BECKER MORGAN GROUP

ARCHITECTURE
ENGINEERING

April 11, 2014

Re: **DELAWARE STATE POLICE – TROOP 3 – BID PAC II**
Kent County, Delaware
2011116.00

ADDENDUM ONE

The addendum forms a part of the contract documents and modifies the original bidding documents dated April 7, 2014 as noted below.

PRE-BID MEETING MINUTES

1) Pre-Bid meeting minutes are included with this addendum

GENERAL

1) Project is required to follow Delaware Department of Labor, Certified Prevailing Wage Rate requirements.
2) Bidding Schedule

   a. **Pre-Bid Meeting** – Wednesday April 9 at 2:00 pm EST

   b. **Last Day for Bidder Questions** – Friday April 18. Questions shall be received by 5:00 pm EST

   c. **Last Addendum Issued** – Tuesday April 22.

   d. **Bids Due / Bid Opening** – Friday April, 25 at 2:00 pm EST

3) List of Contractor/Subcontractor Prequalification Registry attached for information.

PROJECT MANUAL VOLUMES 1, 2 AND 3

1) SECTION 003132 – GEOTECHNICAL DATA
   a. ADD - Specification Section
   b. ADD - GEOTECHNICAL REPORT BY JOHN D. HYNES & ASSOCIATES, INC. (July 10, 2013)

2) SECTION 004100 – BID FORM
   a. REVISE Subcontractor List – Revised Bid Form Attached

Attachments:

PRE-BID MEETING MINUTES
List of Contractors / Subcontractors Prequalification Registry
SECTION 003131 – GEOTECHNICAL DATA [Geotechnical Report by John D. Hynes & Associates, Inc.]
SECTION 004100 – BID FORM

END OF ADDENDUM ONE

201208000_addendum1.doc

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ARCHITECTURE ENGINEERING

Pre-Bid Meeting Minutes for

Delaware State Police – Troop 3 – Bid Pack II

2011116.00

Project Number:	2011116.00	**Next Date:**	
Meeting Date / No.:	04/9/2014	**Next Time:**	
Distribution Date:	04/11/2014	**Next Location:**	
Location:	DFM, Thomas Collins Building, Dover	**Minutes Prepared By:**	BDF

Attended By:

	Organization	Phone Number	E-Mail
Brenden Frederick	Becker Morgan Group, Inc.	410.546.9100	bfrederick@beckermorgan.com
Sarah Rigot	Becker Morgan Group, Inc.	410.546.9100	srigot@beckermorgan.com
Alisha McCullough	DE Dept. Facilities Management	302.739.5644	Alisha.mccullough@state.de.us
Terri McCall	DE Dept. Facilities Management	302.739.5644	Terri.mccall@state.de.us
Bill Braswell	Delaware State Police	302.739.5852	William.braswell@state.de.us
Mike Barrett	Simplex Grinnell	302.740.6253	mbarrett@simplexgrinnell.com
Jason Garland	Sherwin-Williams	302.233.0952	Swrep5507@sherwin.com
Ken Quillen	Richard Y. Johnson	302.422.3732	dzook@ryjson.com
Rob Rettig	Merit Mechanical	302.366.8673	brettig@meritmech.com
Ivan Wilkins	Modern Controls	302.325.6800	ivanwe@moderncontrols.com
Leonard Donovan	Quality Exteriors	302.398.9283	leonard@qexteriorsinc.com
Josh George	Whiting-Turner	302.292.0676	Joshua.george@whiting-turner.com
Matthew Tetrick	Farrell Roofing	302.378.7663	mrtetrick@farrellroofinginc.com
John Gavin	Battaglia Mechanical	302.218.2219	jgavin@battag.com
Jerome Robinson	Bristol Industrial Corporation	302.322.1100	acristol@aol.com
Ron Dawson	Envirotrols	302.846.9105	ron@telcoenvirotrols.com
Victor Rolli	Mid-Atlantic Electrical Serv.	302.934.7171	vrolli@maes1.com
Kim Coury	State of DE – Correctional Industries	302.857.5424	Kim.coury@state.de.us
Craig DeVries	State of DE – Correctional Industries	302.857.5424	Craig.devries@state.de.us
Ted Laws	DiSabatino Construction	302.652.3838 x 120	tlaws@disabatino.com
Michael McDaniel	C+D Contractors	302.764.8013	Kvandegrift.cd@verizon.net
James Vandersliez	Nickle Electrical	302.856.1006	jvandersliez@nickleelectrical.com
Richard Aultman	Nowland Associates	302.731.1333	Richard@nowlandassociates.com
Dan Edelen	RcFabricators	302.573.8989	dedelen@rcfabricators.com
Ron Sanna	Tri-State Roofers	302.995.7027	Rsanna01@comcast.net
Fred Viehman	I.D. Griffith Inc.	302.656.8253	f.viehman@idgriffith.com
C.G. Ware	Kent Construction Co.	302.653.6469	rose@kentconstructionco.com
Brian Moriarty	Building Concepts	302.292.0200	bmoriary@buildingconceptsofamerica.com
Chris Honeycutt	Assurance Media	302.363.1500	choneycutt@assurancemedia.net
Laura Schaefer	Nason Construction	443.669.3570	lschaefer@nasonconstruciton.com
Candace Williams	Bancroft Construction	302.353.8218	cwilliams@bancroft.usa.com
Darren Phillips	Diversified Storage Solutions, Inc.	215.264.0058	Darren.phillips@thestorageteam.com
Jeff Nowland	Nowland Associates	302.731.1333	jeff@nowlandassociates.com
Lee Thompson	Advantech Inc.	302.674.8405	leet@advantechsecurity.net
Richard W. Arndt	H&A Electric Co.	302.678.8252	Joew.hana@comcast.net
Dave Walker	J.W. Walker & Sons	302.378.3500	dave@jwwalker.biz
Bill Booth	Commonwealth Construction Co.	302.654.6611	bbooth@itscommonwealth.com

Distribution List:

Name	Organization	Role/Title
Standard distribution / all attendees		

Meeting Purpose:

Pre-Bid meeting for Delaware State Police – Troop 3 – Bid Pack II

I. Discussion Topics:

BECKER MORGAN GROUP

ARCHITECTURE ENGINEERING

Pre-Bid Meeting Minutes for

Delaware State Police – Troop 3 – Bid Pack II

2011116.00

Agenda Item #	Description
1	Mandatory pre-bid meeting opening, contract name and number description and completion of the sign in sheet.
2.a	BMG introduces the project team. Becker Morgan Group, Inc. is the Architect and Civil Engineer for the project. Overall project manager for Becker Morgan Group is Brenden Frederick, AIA. LEED AP BD+C. Principal in charge of the project is Greg Moore, P.E. MEP Engineer is Delaware Engineering Design Co (DEDC). Structural Engineer is Backer Ingram Associates.
2.b.	Owner's team is comprised of the Delaware State Police and the Division of Facilities Management. With us today we have Mr. Rich Glazeski, Alisha McCullough, and Terri McCall.
3.	Point of contact for this project will be Brenden Frederick, AIA, LEED AP. of Becker Morgan. Please forward all communication in writing via e-mail to bfrederick@beckermorgan.com or fax (410.546.5824). Addenda will be issued electronically to those in attendance today.
4.a.	The overall Troop 3 project is split into two separate bid packages. Bid Pack 1 was awarded to A-Del construction and is underway. The bi-weekly project meetings will be held on Thursday's at 1pm.
4.b.	Project Overview: This overall project includes approximately 32,000 sq ft Troop and 8,000 sq ft Maintenance and associated site work on a 20 site. The site work was awarded under Bid Pack I to A-Del construction. This Bid Packs (Bid Pack II) work includes the remainder of the project scope, including construction of the 32,000 Troop Building, 8,000 Maintenance Building, and miscellaneous site work.
4.b.	Offsite water main material shall be provided by Owner. Installer shall be an Artesian approved water main contractor. Chesapeake Gas will install gas service up to and including gas meters. Six existing power poles shall be relocated during the contract. Owner is coordinating with Delmarva Power to affect this relocation. Contractor shall install conduits for Delmarva Power electric service.
4.b.	The date of substation completion shall be July 13, 2015, based upon a P.O. being received by the successful contractor by June 2, 2014. Upon notice of award, meeting will be held with both Bid Pack I&II contractors, DFM, and BMG to confirm final project schedule identifying milestone dates and to finalize date of substantial completion in order to finalize contracts.
5.a.	Bid opening Friday April 25, 2014 at 2:00 p.m. Completed bid submissions shall be received at Division of Facilities Management by 2:00 p.m. on April 25, 2014. Mailing address: Delaware Office of Management and Budget Division of Facilities Management 540 South DuPont Highway, Suite 1, 3rd Floor Dover, DE 19901

Pre-Bid Meeting Minutes for
Delaware State Police – Troop 3 – Bid Pack II
2011116.00

5.b.	Identified subcontractors are to include: Concrete Masonry Electrical Mechanical Plumbing Roofing Steel Erection Painting Drywall Resinous Floor Systems Resilient Floor Systems Carpet Floor Systems Ceilings Millwork / Casework Storefront / Curtainwall Pre-Engineered Metal Building Fire Alarm Fire Sprinkler Ballistic Materials Insulating Air Barrier
6.	Questions: • Can the bid date be extended? – Owner's team will review and provide direction via addendum. • Is this project pursuing LEED Certification? – No, the project is not pursuing LEED Certification • Has the owner contracted with a commission agent? – Yes, the owner has hired a third party commissioning agent. • Is there a requirement for pre-approved detention equipment installer / supplier? No • Has the project received permits? – The Bid Pack I site work permits have either been received or are in process and are the responsibility of the Bid Pack I contractor. The Bid Pack II permits have not been initiated and are the responsible of the Bid Pack II contractor.
7.	Construction documents were signed and paid for, distributed on an individual compact disc for $100 check.

Meeting Adjourned.
END OF MEETING

enc:

201111600_BidPackII_Prebid-Minutes.doc

DOCUMENT 003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. A geotechnical investigation report for Project, prepared by John D. Hynes & Associates, Inc., dated July 10, 2013, is available for viewing as appended to this Document.

C. Related Requirements:

1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF DOCUMENT 003132

JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

July 10, 2013

State of Delaware Division of Facilities Management
c/o Brenden D. Frederick, AIA
Becker Morgan Group
Port Exchange
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Re: Report of Subsurface Exploration and Geotechnical Engineering Recommendations
Delaware State Police Troop 3
Dover, Delaware
Project No.: JDH-10/13/263

Dear Mr. Frederick:

John D. Hynes & Associates, Inc. has completed the authorized subsurface exploration and geotechnical engineering evaluations for the Delaware State Police Troop 3 project located in Dover, Delaware. Our services were conducted, generally, in accordance with our proposal dated April 8, 2013 and subsequent communications between our offices and the offices of Becker Morgan Group.

This report describes the exploration methods employed, exhibits the data obtained, and presents our evaluations and recommendations. In summary, we recommend that the buildings' structural elements be supported by spread footing foundations bearing on firm, natural soils or controlled, structural fill. If the recommendations of this report regarding subgrade preparation and construction are followed, then 1,500 psf bearing should be used to proportion the spread footings for the wall and column elements of the proposed new buildings.

We appreciate the opportunity to be of service to you. If you have any questions regarding the contents of this report or if we may be of further assistance, please contact our office.

Respectfully,

JOHN D. HYNES & ASSOCIATES, INC.

Justin J. Redding
Staff Engineer

John D. Hynes, P.E.
President

JOHN D. HYNES REGISTERED No. 7501 DELAWARE PROFESSIONAL ENGINEER

JJR: JDH/jsl

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HYNES

REPORT OF
SUBSURFACE EXPLORATION
AND
GEOTECHNICAL ENGINEERING RECOMMENDATIONS

DELAWARE STATE POLICE TROOP 3
DOVER, DELAWARE

PREPARED FOR
STATE OF DELAWARE DIVISION OF FACILITIES MANAGEMENT

JULY 10, 2013
PROJECT NO.: JDH-10/13/263

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HYNES

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PURPOSE AND SCOPE

The subsurface exploration study was performed to evaluate the subsurface conditions with respect to the following:

1. General site and subgrade preparation;
2. Fill and backfill construction;
3. Foundation recommendations, including allowable bearing capacity and estimated embedment depths of spread footings;
4. Foundation construction and inspection procedures;
5. Floor slab support and modulus of subgrade reaction;
6. Earth pressure requirements for below grade walls;
7. Pavement subgrade preparation and design;
8. Stormwater management facilities;
9. Infiltration testing;
10. Location of groundwater and applicable construction dewatering control procedures;
11. Seismic site characterization; and
12. Other aspects of the design and construction for the proposed structures indicated by the exploration.

An evaluation of the site, with respect to potential construction problems and recommendations dealing with earthwork and inspection during construction, is included. The inspection is considered necessary both to confirm the subsurface conditions and to verify that the soils related construction phases are performed properly.

EXISTING SITE CONDITIONS

As shown on the Project Location Map (Drawing JDH-10/13/263-A) in the Appendix, the project site is located on South State Street between Locust Grove Road and Golden Oak Drive in Dover, Delaware. Topographically, the site slopes downward to the southeast with a surface of predominantly organic bearing soil. The area is currently being used as farmland for vegetable cultivation.

Site elevations vary between El. 27 and approximately El. 14 except at swales and drainage areas. Grades are as shallow as El. 11 at the east drainage area and as shallow as El. 8 in the "wetlands" area at the southeast corner of the site. Grades at the main administration building area range from El. 25 at the west building line to El. 21 at the east building line. Elevations range between El. 20.5 at the southwest maintenance/storage building corner to El. 17.5 at the northeast building corner. Elevation information was estimated from "Soil Borings" plan provided by Becker Morgan Group.

FIELD EXPLORATION AND STUDY

In order to determine the nature of the subsurface conditions at the site, 22 borings were drilled at the site. Ten building borings were drilled, designated B-1 to B-10, to depths of 20.5 to 50.5 feet, on June 8 through the 13, 2013, at locations shown on our Boring Location Plan (Drawing JDH-10/13/263-B) in the Appendix. A Mobile B-47 trailer-mounted drill rig was used to drill the building borings. Also, 5 pavement borings, designated P-1 to P-5, were hand augered to depths of 6 feet. Two borings, designated as G-1 and G-2, were hand augered at utility areas for above ground storage tanks. Five stormwater borings were hand augered to depths of 6 feet.

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Constant head, single ring, field infiltration tests were performed in companion test pit excavations adjacent to borings SWM-1 to SWM-5. The infiltration tests were performed in accordance with DNREC requirements for infiltration testing. The test procedures are included in the Appendix as "Single Ring Infiltration – Constant Head Test Procedures".

Soil sampling and testing were carried out in accordance with ASTM Specification D-1586. A brief description of our field procedures is included in the Appendix. The results of all boring and sampling operations are shown on the boring logs.

Samples of the subsurface soils were examined by our engineering staff and were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM Specification D-2488. The estimated USCS symbols appear on the boring logs and keys to the systems' nomenclature are provided in the Appendix of this report. The stormwater pond borings were, also, classified in accordance with the USDA soil classification system. Also included are reference sheets which define the terms and symbols used on the boring logs and explain the Standard Penetration Test procedures.

We note that the test boring records represent our interpretation of the field data based on visual examination and selected soil classification tests. Indicated interfaces between materials may be gradual.

The field exploration data was supplemented with laboratory testing data. The laboratory at John D. Hynes & Associates, Inc. performed 6 Atterberg Limits tests, and 6 natural moisture content tests. The test results are noted on the boring logs in the Appendix. Also, 5 samples were taken from the pavement areas for California Bearing Ratio (CBR) testing. Two samples were selected for CBR testing. The CBR test and Proctor test results are included in graphical format in the Appendix.

SUBSURFACE CONDITIONS

At the time of our field exploration, approximately 12 to 18 inches of organic bearing soil were encountered at the boring locations. Other surficial materials in varying thicknesses may be encountered at other locations on site.

Subsurface soils, visually classified in accordance with the USCS, consisted entirely of Silty SANDs (SM), Clayey SANDs (SC), SANDs (SP), Clayey SILTs (ML and MH), and Silty CLAY (CL and CH) to boring termination depths. In the borings, the sandy soils were characterized by Standard Penetration Test (SPT) values (N-values) of 4 to 76 blows per foot. This range of penetration resistance indicates in-place relative densities of very loose to very dense. The cohesive soils were characterized by N-values of 4 to 40, indicating consistencies of soft to hard.

Groundwater was encountered in the test borings at depths of 7.5 to 19 feet below grade. The test borings were drilled during a prolonged wet period. Groundwater elevations may vary at other times during the year depending upon the amount of precipitation, and the extent of local surface development.

The stormwater management borings were, also, visually classified according to the USDA soil classification system. Referring to the stormwater borings (SWM-1 to SWM-5), we encountered Sandy Loam and Loamy Sand (SM), Sandy Clay Loam (SC), and Silty Clay Loam (CL) in the stormwater borings.

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PROJECT CHARACTERISTICS

Proposed for development are two buildings in the west-central area of the site. The southern building is the main police troop facility. The building to the north will be a remote evidence storage and maintenance building. The main facility is approximately 39,000 square feet and will utilize a concrete slab on-grade floor with structural steel framing. The roofing system will include steel joists and trusses. The maintenance facility is an 8,000 square foot, pre-engineered metal building. Both buildings are a single story and do not have basements.

According to the Structural Engineer, Baker Ingram & Associates, the new Troop 3 Facility will have two separate single-story buildings on the site. There will be a 39,000 square foot conventionally framed Administrative Building generally containing: offices, training rooms, locker/shower facilities, evidence rooms, a sally port and two vehicular processing bays. The second building is for remote evidence storage and will be a pre-engineered metal building.

Footing foundations are proposed. The ground supported slabs will consist of 4,000 psi concrete reinforced with welded wire fabric. The majority of the slabs will be 4 inch thick except for the vehicular bays, the evidence storage rooms, and the pre-engineered building where a 6 inch slab will be utilized. All slabs will be cast on a vapor barrier and crushed stone.

The administration building will consist of a structural steel frame with open web steel bar joists at the low slope roofs and cold-formed steel trusses at the gable roofs. Both roof types will have a 1-½ inch galvanized metal roof deck. Maximum loads for the administration building are expected to be 80 kips for columns and 3 klf for walls.

The metal building structural framing will be designed by the manufacturer but is anticipated to consist of rigid built-up steel frames with cold-formed purlins and girts.

The campus will have an eastern entrance/exit way from northbound South State Street. Two parking lots will be built on the site: one is south of the main facility and the larger lot is to the north of the main building, between the two proposed buildings. There will be access roads along both sides of the main facility, and both will collect to the southern entrance/exit way.

A stormwater management area is proposed at the southern corner of the site, approximately 75 feet east of South State Street. The site will, also, drain to the "existing wetlands" area to the south and to a wide, shallow drainage area to the east.

RECOMMENDATIONS

The following recommendations and considerations are based on our understanding of the proposed construction, the data obtained from the exploration, and our previous experience with similar subsurface conditions and projects. If there are any significant changes to the project characteristics, such as revised structural loadings differing significantly from those noted above, building geometry, building location, elevations, etc., we request that this office be advised so the recommendations of this report can be re-evaluated.

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A. Site Preparation

Prior to the construction of foundations, ground slabs or pavements, or the placement of fill in any structural areas, all existing organic materials, frozen or wet, excessively soft or loose soils, and other deleterious materials should be removed and wasted. The existing organic bearing soil should be stripped and can be stockpiled for reuse in landscape areas.

After the stripping operations have been completed, the exposed subgrade soils should be inspected by the Geotechnical Engineer or his approved representative. The inspector should verify that organic matter, root mat, and tree stumps have been removed from structural subgrade areas. The inspector should require the exposed subgrade materials be proofrolled utilizing a heavily-loaded dump truck or other pneumatic tired vehicle of similar size and weight. The purpose of proofrolling would be to provide surficial densification and to locate any isolated areas of soft or loose soils requiring undercutting. Proofrolling is not advised in wet areas which may deteriorate under repeated vehicular loading. Wet areas should be drained and allowed to dry prior to proofrolling. Precipitation may result in standing water (perched water) at low areas. If the water is allowed to pond, the natural soils may deteriorate and overexcavation or subgrade improvement may be necessary at those areas. The Geotechnical Engineer should be consulted to evaluate poor subgrade conditions during construction.

Care should be exercised during the grading operations at the site. Shallow SM materials were identified at the boring locations. These materials are moderately sensitive to changes in moisture conditions and should therefore be protected. If earthwork is conducted in the presence of moisture, the traffic of heavy equipment, including heavy compaction equipment, may create pumping and a general deterioration of the subgrade soils. Construction traffic should be minimized at structural subgrade areas. If subgrade problems arise, the Geotechnical Engineer should be consulted for an evaluation of the conditions. Overexcavated areas resulting from the removal of organic matter, or otherwise unsuitable materials should be backfilled with properly compacted materials in accordance with the procedures discussed in the following section.

B. Fill Selection, Placement and Compaction

It is recommended that all materials to be used as structural fill be inspected, tested and approved by the Geotechnical Engineer prior to use. The existing SM and SP soils that do not contain organics may be re-used for structural fill. Acceptable borrow material should include GW, GP, GM, SM, SW and SP classified in accordance with the USCS. Furthermore, the material to be utilized as structural fill should have a Plasticity Index (PI) less than 20. The native Clayey SANDs (SC), Silty CLAYs (CL and CH), and Clayey SILTs (ML and MH) should not be re-used as structural fill.

Depending upon the thickness of the removed organic bearing soils, approximately 3 feet of fill will be needed at the east end of the Troop 3 administration building. The site will be a "cut" at the west side of the building. Approximately 2 to 6 feet of fill will be needed at the storage/maintenance building.

The importation of high quality, granular material should be allowed, and acceptable unit rates for importation and placement should be established. Sand, gravel or sand/gravel mixtures would be appropriate for wet weather placement. Otherwise, the materials noted above will be acceptable for use as structural fill. Native or imported SM soils will be sensitive to alteration in moisture content and will become unworkable during and following periods of precipitation. For this reason, if earthwork is attempted in late autumn,

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winter or early spring, the above mentioned high quality imported granular material should be limited to those soils better than SM. SM materials become unworkable at moisture contents greater than 3 percentage points above optimum. The contractor would have to dry these SM materials or set them aside for use in landscaping areas.

Structural fill should be placed in lifts which are eight inches or less in loose thickness and should be compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557). Adjustments to the natural moisture content of the soils may be required in order to obtain specified compaction levels. Should utility construction be performed after earthwork, the Contractor should be responsible for achieving 95 percent compaction in all trench backfill. These guidelines should be set for all structural fill at the site including, but not limited to building, ground slab and pavement fills.

For the proofrolling and fill compaction operations, fill limits should be extended at least 8 feet beyond the building additions' exterior walls, exterior columns, and pavement boundaries. A sufficient number of in-place density tests should be performed by an engineering technician to verify that the proper degree of compaction is being obtained in all fill soils.

C. Structure Foundations

Considering current and proposed grade levels, the in-situ soil conditions and the proposed structural loadings, we recommend that the new buildings structural elements be supported on spread footing foundations bearing on firm, natural soils or controlled, structural fill. Footings supporting building elements fo the administration building may be proportioned based upon a maximum allowable soil pressure not in excess of 1,500 psf. When excavating for the construction of the building foundations, some locations may be encountered where less than the required bearing is available. At those locations, compaction in the foundation excavations may be necessary or minor overexcavation may yield greater soil support. The low allowable soil bearing pressure is due to the soft silts and clays in some of the borings.

Our preliminary recommendation is to use 1,500 psf bearing for the allowable bearing pressure for the pre-engineered metal building. We should review the allowable bearing pressure for the metal building when the building loads are available.

Minimum dimensions of 24 inches for square footings and 18 inches for continuous or rectangular footings should be used in foundation design to minimize the possibility of a local shear failure. All foundation excavations should be inspected by the Geotechnical Engineer or his approved representative prior to the placement of concrete. The purpose of the inspection would be to verify that the exposed bearing materials are suitable for the design soil bearing pressure and that loose, wet, frozen or compressible soils are not present.

Where continuous wall footings may need to be raised in elevation in a direction away from and perpendicular to other footings, footings may be gradually raised or lowered to the desired elevation using step construction procedures with a 2H:1V, or more gentle, slope. In addition, discrete column, pier or wall footings bearing at a higher elevation than lower footings should be located at a distance apart which is equal to or greater than the difference in the elevations of the footings.

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Generally, exterior footings and footings in unheated areas should be located at a depth of at least 2 feet to bottom of footing below the outside final grade to provide adequate frost cover protection. If the building is to be constructed during the winter months or if the building will be subjected to freezing temperatures after footing construction, then all footings should be adequately protected during freezing periods.

Soils exposed at the bases of all satisfactory foundation excavations should be protected against any detrimental change in condition, such as disturbance from rain or frost. Surface runoff should be drained away from the excavations and not be allowed to pond.

If our recommendations are followed, we estimate total settlements of 1 inch or less. Differential settlements of ½ inch or less can be expected.

D. Floor Slab Support

Ground supported slabs may be supported on firm, natural soils or on a layer of controlled, structural fill. The subgrade should be prepared in accordance with the procedures described in Sections A and B of this report. It is also recommended that a 4 to 6 inch clean, granular, leveling and load-distributing material such as washed gravel, or screened crushed stone, be used beneath the floor slabs. This material will require acquisition from off-site sources. Prior to placing the leveling and load distributing material, the slab subgrade should be free of standing water or mud. A suitable moisture barrier should also be provided for the building slab. These procedures will help to prevent capillary rise and damp floor slab conditions. For native soil or fill material placed and compacted according to the procedures outlined in this report, we recommend using a value of modulus of subgrade reaction of 150 pounds per cubic inch.

E. Below Grade Walls and Lateral Soil Pressures

Below grade structure walls (retaining walls and swimming pool walls), designed with either unrestricted or restricted rotation at the top of the wall (i.e., cantilevered or with a single lateral support) subject to lateral earth pressure should be designed to resist an equivalent fluid weight of 65 pcf provided that the backfill meets the requirements specified in this report.

The lateral earth pressure intensity is based on long term soil loading conditions using an at rest soil coefficient of 0.5. On site soils are not acceptable for backfill behind permanent retaining walls. Specified backfill materials compacted in place, applicable engineering characteristics suitable for design are as follows:

Cohesion	0
Angle of Internal Friction, Ø	30
Maximum moist density, compacted backfill	130 pcf
Coefficient of sliding friction between cast in place footing and soil	0.40

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In design of walls to resist lateral loading, where hydrostatic loading is applied, the equivalent fluid weight of soil may be reduced to 32 pcf within the height of the hydrostatic load distribution. A lateral surcharge loading should, also, be applied in wall designs to account for all construction and future traffic loading to be applied adjacent to the wall. Please see sketch (Drawing No. JDH-10/13/263-C) in the Appendix for loading parameters for the undrained condition.

Where drainage is provided, the drainage system components should be at least 4 inch diameter perforated PVC underdrain installed in 12 inches of clean stone, wrapped in a filter fabric material. This system, commonly termed "drainage tile", should be installed to industry standards. Water collected by this system can be discharged through the use of a sump pump system or by gravity means. Refer to Drawing No. JDH-10/13/263-D for the drained condition.

Backfill immediately behind walls should be relatively clean, imported granular material containing less than 10 percent passing the No. 200 sieve (0.074 mm). In addition, the compaction behind these walls should be 92 to 95 percent of the Modified Proctor maximum dry density in accordance with ASTM D-1557. Since excessive compaction may cause yielding or damage to foundation and retaining walls, hand operated equipment should be used near the walls.

For excavation support systems, walls and bracing elements may be designed for the active soil loading condition. For recommended loading values, please see Note 7 Drawing No.: JDH-10/13/263-C or Note 8 Drawing No.: JDH-10/13/263-D in the Appendix for retaining systems designated using the active condition.

F. Pavement Subgrade Preparation and Design

As indicated under "Field Exploration and Study" above, 5 pavement area borings, designated P-1 to P-5, were drilled to depths of 6 feet in the proposed pavement areas. Samples of the subsurface soils were examined by our engineering staff and visually classified in accordance with USCS requirements. The shallow, pavement subgrade soils are all Silty SANDs with trace clay (SM).

After visually classifying the CBR samples, two samples were selected for CBR testing from boring locations P-2 and P-4. The CBR test results were 2.8 and 2.1, for P-2 and P-4, respectively. The CBR and Proctor test results are included in graphic format in the Appendix.

The following recommendations are provided for new pavements assuming a uniformly firm subgrade with the subgrade soils and fill compacted to 95 percent of ASTM D-1557, and that organic soils have been removed from pavement subgrade areas (see Section A) and approved subgrade soil types:

PASSENGER CAR PAVEMENT (RESTRICTED):

*Hot Mix Asphalt Surface Course Type C (Superpave 9.5 mm, PG 64-22)	1.5 inches
*Hot Mix Asphalt Base Course Type B (Superpave 19 mm, PG 64-22)	2.5 inches
Graded Aggregate Base (CR-6 or GA Subbase)	6 inches

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PAVEMENT AREAS WITH UP TO 10 HEAVY TRUCKS PER DAY:

*Hot Mix Asphalt Surface Course Type C (Superpave 9.5 mm, PG 64-22)	1.5 inches
*Hot Mix Asphalt Base Course Type B (Superpave 19 mm, PG 64-22)	3.5 inches
Graded Aggregate Base (CR-6 or GA Subbase)	8 inches

The pavement materials and construction should be in general accordance with the DELDOT Road Design Manual latest edition, and this report.

All pavement subgrade areas should be inspected and proofrolled in accordance with Section A and B of this report. As noted, the pavement subgrade soils will consist of materials having the classifications of SM in accordance with the USCS. The top 12 inches of the natural subgrades at pavement areas should be compacted to 95 percent of the Modified Proctor maximum dry density (ASTM D-1557) prior to fill or stone placement.

The pavement subgrade and pavement layers should be graded such that surface water is carried off the pavement areas and away from building areas. The surface water should not be allowed to pond. Runoff onto adjacent properties should be controlled property.

Hynes & Associates recommends that rigid pavement be designed and installed for use at trash container storage and pick-up locations. These "dumpster pad" locations receive extreme wheel loads during emptying and placement. Also, hydraulic oils usually accumulate at these areas causing a breakdown in asphalt pavement mixtures.

G. Stormwater Management Areas

The borings SWM-1 to SWM-5 were advanced for stormwater management use on the north and south sides of the property. Borings were drilled to depths of 6 feet. The locations are indicated on our Boring Location Plan (JDH-10/13/263-B) in the Appendix.

Borings indicated Sandy Loam and Loamy Sand (SM), Sandy Clay Loam (SC), and Silty Clay Loam (CL). Sandy Loam and Loamy Sand (SM) will be acceptable for use as structural fill.

Infiltration testing was performed by Hynes & Associates at the five SWM boring locations at depths of 4 to 5 feet as directed by Becker Morgan Group. Measures should be implemented to minimize the accumulation of sediments in stormwater management structures. This would include natural filters such as grass plantings or other buffers. Despite measures to mitigate sedimentation, requirements for continuous maintenance should be stressed by the designers. Finally, because of the probability of some sedimentation and realignment of soil grains as the swales fill, design rates of infiltration should be assumed as being somewhat slower than actual test infiltration rates.

H. Infiltration Testing

On June 10 to 18, 2013, five infiltration tests were conducted. The tests were completed in test pit excavations adjacent to borings SWM-1 to SWM-5. The testing was completed in general accordance with guidelines in the Delaware Department of Natural Resources and Environmental Controls (DNREC). We

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performed 12 inch diameter, single ring, constant head field infiltration tests. The test locations, depths, average measured infiltration rates and lowest measured infiltration rates are summarized in the table below:

Boring	Depth to Groundwater (ft.)	Depth of Test Below Ground Surface (ft.)	Average Infiltration Rate in./hr.	Lowest Measured Infiltration Rate in/hr	Seasonal High Water Table (ft.)
SWM-1	7.5	5.0	71.14	41.61	7
SWM-2	7.5	4.0	15.29	11.10	7
SWM-3	10	4.0	1.68	1.06	9
SWM-4	10	4.0	1.23	0.37	9
SWM-5	10	4.0	1.88	1.18	9

The measured rates for test location SWM-1 and SWM-2 were significantly higher than those on the north side of the site. The test at SWM-1 was attempted at 4 feet below grade. The infiltration rate was so fast, we could not supply water fast enough to keep a constant head in the test cylinder. We lowered the test depth to 5 feet and re-ran the test. Refer to the "Infiltration Data Table" and "Single Ring Infiltration" test procedures in the Appendix for additional infiltration regarding the infiltration testing.

I. Groundwater and Drainage

Groundwater was encountered during drilling operations at depths of 7.5 to 19 feet. The boring excavations caved in at depths of 8 to 18 feet below grade. Considering the proposed construction, the Contractor should not experience foundation construction problems relating to the groundwater. However, the Contractor should be prepared to dewater the lowest excavations in the event of the infiltration of precipitation. If required, suitable measures for dewatering should be implemented. These methods may include sumping and pumping, etc. Efforts should be made to keep exposed subgrade areas dry during construction, primarily, because the soils will be susceptible to deterioration and loss of strength in the presence of moisture. Adequate drainage should be provided at the site to minimize any increase in moisture content of the foundation and pavement subgrade soils. All pavements should be sloped away from the building to prevent ponding of water around it. The final site drainage should also be designed such that run-off onto adjacent properties is controlled properly.

J. Seismic Site Characterization

Geologically, the Dover area lies within the Atlantic Coastal Plain physiographic region. Parent soils of the area consisted primarily of excessively to moderately well drained, brown sandy loams and loamy sands. Generally, there is a substratum of finer textured, moisture retaining soil. As stated above, subgrade soils at the Delaware State Police Troop facility site consist predominately of interbedded relatively dense to stiff sands, silts and clays.

Hynes & Associates is providing below, the Seismic Site Class in accordance with the International Building Code (IBC). Accordingly, we drilled Boring B-7 to a depth of 50.5 feet. Based on the boring data and our knowledge of the local subsurface conditions between 50 and 100 feet below grade, we find that the

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properties of the soils in the upper 100 feet of the local subsurface stratigraphy meet Site Class "D" criteria according to the IBC-2006, Section 1613.5.2.

ADDITIONAL SERVICES RECOMMENDED

Additional engineering, testing and consulting services recommended for this project are summarized below.

A. Site Preparation and Proofrolling Monitoring

The Geotechnical Engineer or experienced soils inspector should inspect the site after it has been stripped and excavated. The inspector should determine if any undercutting or in-place densification is necessary to prepare a subgrade for fill placement, or slab and pavement support. The inspector should verify that organic soils, and organic matter have been removed from all structural subgrade areas prior to filling operations.

B. Fill Placement and Compaction Monitoring

The Geotechnical Engineer or experienced soils inspector should witness all fill operations and take sufficient in-place density tests to verify that the specified degree of fill compaction is achieved. The inspector should observe and approve borrow materials used and should determine if their existing moisture contents are acceptable.

C. Footing Excavation Inspections

The Geotechnical Engineer should inspect all foundation excavations for the structures. He should verify that the design bearing pressures are available and that no loose or soft areas exist beneath the bearing surfaces of the foundation excavations.

D. Pavement System Inspection

All pavement subgrade soils should be inspected and compacted, in accordance with Section A and B of this report, prior to the placement of pavement materials to verify that proper compaction has been achieved and that project specifications are being followed. The subbase stone layer should be testing for compaction to verify that the project requirements are met.

REMARKS

This report has been prepared solely and exclusively for the State of Delaware Division of Facilities Management to provide guidance to design professionals in developing facilities plans for the Delaware State Police Troop 3 project located in Dover, Delaware. It has not been developed to meet the needs of others, and application of this report for other than its intended purpose could result in substantial difficulties. The Consulting Engineer cannot be held accountable for any problems which occur due to the application of this report to other than its intended purpose. This report in its entirety should be attached to the project specifications.

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These analyses and recommendations are, of necessity, based on the concepts made available to us at the time of the writing of this report, and on-site conditions, surface and subsurface that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the areal extent of the site and to depth, are representative of conditions across the site. It is also recommended that we be given the opportunity to review all plans for the project in order to comment on the interaction of soil conditions as described herein and the design requirements.

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices.

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APPENDIX

1. Investigative Procedures
2. Project Location Map
3. Boring Location Plans
4. Boring Logs
5. Earth Pressure Requirements for Below Grade Walls (Undrained)
6. Earth Pressure Requirements for Below Grade Walls (Drained)
7. CBR and Modified Proctor Test Results
8. Infiltration Data Tables
9. Single Ring Infiltration- Falling Head Test Procedure
10. Unified Classification Sheet
11. USDA Classification Sheet
12. Field Classification Sheet
13. Important Information Sheet

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INVESTIGATIVE PROCEDURES

SOIL TEST BORINGS

Soil drilling and sampling operations for borings B-1 and B-2 were conducted in accordance with ASTM Specification D-1586. The borings were advanced by mechanically turning continuous hollow stem auger flights into the ground. At regular intervals, samples were obtained with a standard 1.4 inch I.D., 2.0 inch O.D. splitspoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the "Standard Penetration Resistance". The penetration resistance, when properly evaluated, is an index to the soil's strength, density and behavior under applied loads. The soil descriptions and penetration resistances for each boring are presented on the Test Boring Records in the Appendix.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigation, jar samples obtained during drilling operations are examined in our laboratory and visually classified by the geotechnical engineer in accordance with ASTM Specification D-2488. The soils are classified according to the AASHTO or Unified Classification System (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior.

ATTERBERG LIMITS TEST

Portions from representative soil samples obtained during drilling operations were selected for Atterberg Limits tests. The Atterberg Limits are indicative of the soil's plasticity characteristics. The liquid limit is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in accordance with ASTM Specification D-4318. The plastic limit is the moisture content at which the soil begins to lose its plasticity and is determined in accordance with ASTM Specification D-4318.

NATURAL MOISTURE

Portions from representative soil samples obtained during drilling operations were selected for Natural Moisture Content tests. The Natural Moisture Content Test determines the water content of soils by drying into an oven with a standard drying temperature of 110 °C. The lost of mass drying the sample, determines the water content into the soil. The water content of the sample is calculated in percentage. The water content of soils (natural moisture) is determined in accordance with ASTM Specification D-2216.

MODIFIED PROCTOR TEST

Bulk samples were obtained from the pavement area test borings. A Modified Proctor compaction test (ASTM D 1557) was performed on this soil to determine its compaction characteristics, including its maximum dry density and optimum moisture content.

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INVESTIGATIVE PROCEDURES (CONTINUED)

CALIFORNIA BEARING RATIO TEST

The results of the compaction testing described above were utilized in compacting samples for the laboratory California Bearing Ratio tests. The California Bearing Ratio, abbreviated as CBR, is a punching shear test. It provides data that are a semi-empirical index of the strength and deflection characteristics of a soil that has been correlated with pavement performance. This correlation has resulted in the establishment of design curves for pavement thickness.

The test is performed on a 6-inch diameter, 5-inch thick, disc of compacted soil which is confined in a steel cylinder. The specimens are first tested immediately after compaction and then soaked for four (4) days to simulate a saturated pavement subgrade.

A 1.95-inch diameter piston is forced into the soil at a standard rate and the resistance of the piston penetration is measured. The CBR is the ratio expressed as a percentage of the load at 1.0-inch piston penetration compared to the load required to produce the same penetration in a standard crushed stone.

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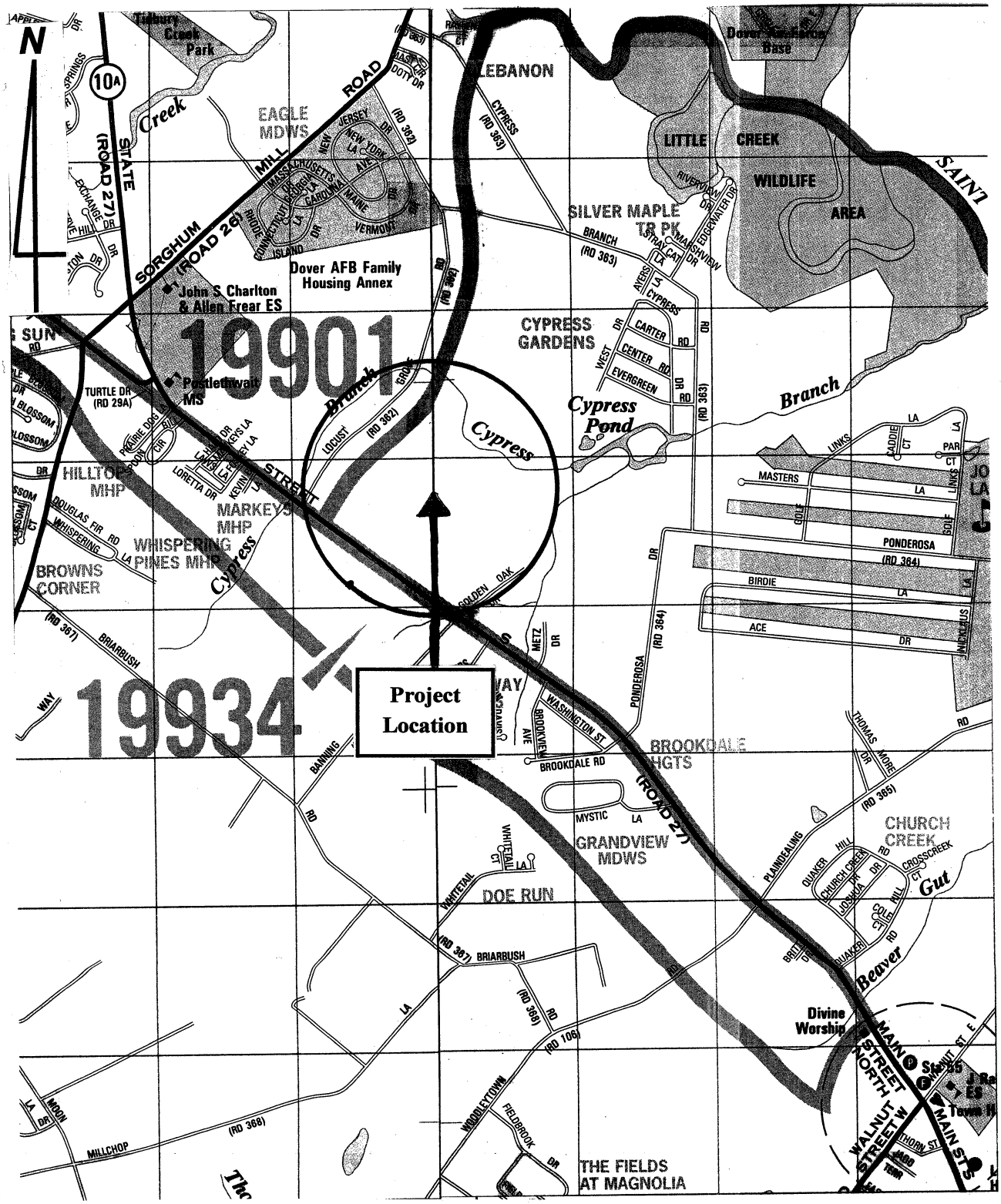

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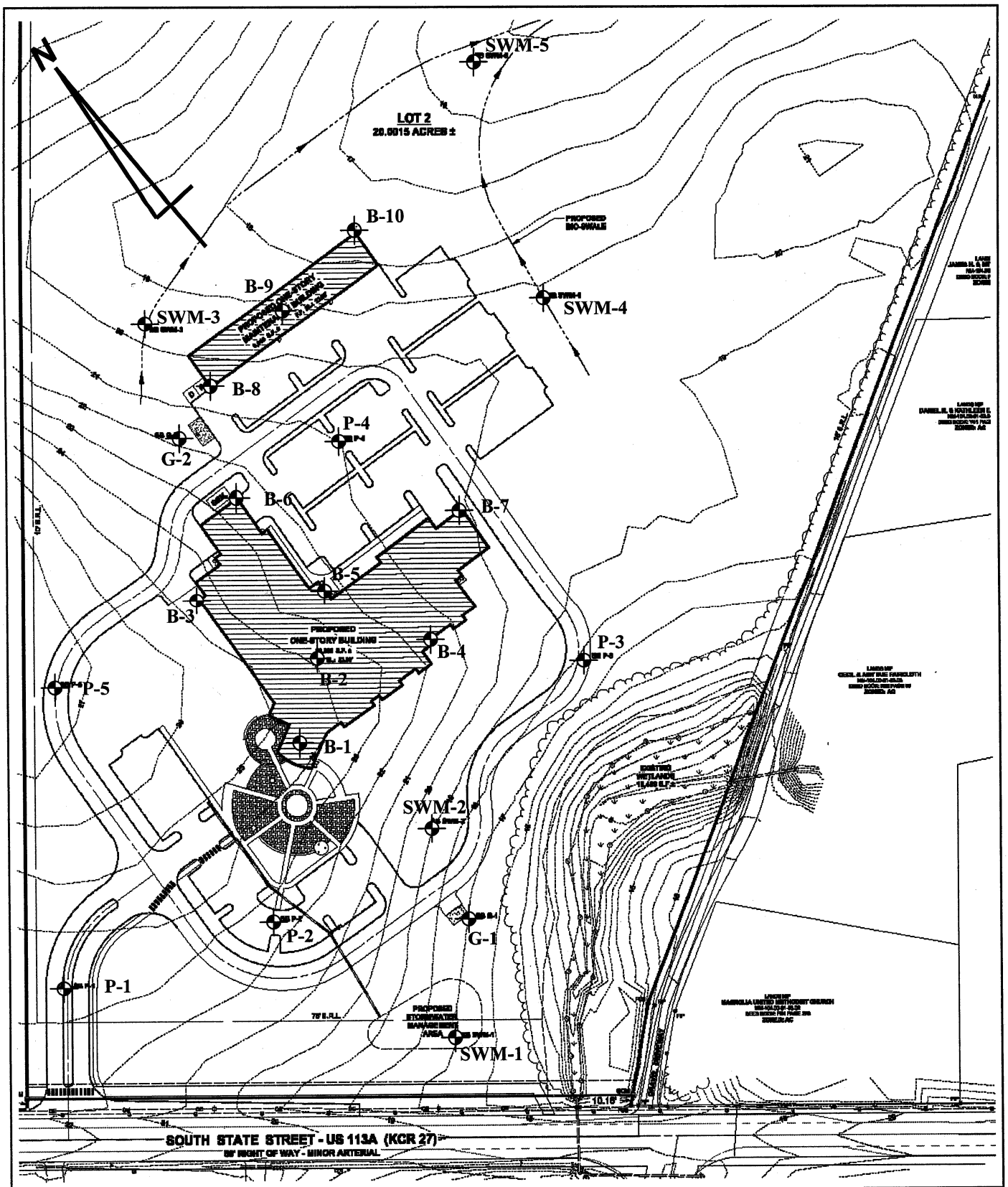
	Date: June 24, 2013
	Scale: 1"= 2000'
	Drawn: ADC Map
Project Location Map Delaware State Police Troop 3 Dover, Delaware	**DWG. No.** **JDH-10/13/263-A**



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	Date: June 24, 2013
	Scale: 1" = 137'
	Drawn:BeckerMorgan
Boring Location Plan Delaware State Police Troop 3 Dover, Delaware	**DWG. No.** **JDH-10/13/263-B**

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LOG OF BORING B-1

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 10, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 25.5 feet

Depth in Feet	Surf. Elev. 24.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	24.5	Brown, wet, loose, fine to medium SAND, with some silt, little clay		SM	1	2-2-4-4	Scale 1" ~ 7.75 feet
2	22.5						Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	20.5	Brown, wet, loose, fine to medium SAND, with little silt, little clay		SM/SC	2	2-4-6	
6	18.5	Orange-brown, wet, very loose to loose, fine to coarse SAND, with little silt, trace fine gravel		SM	3	2-3-2	Groundwater was encountered at 14 during drilling operations.
8	16.5						
10	14.5				4	2-4-5	Boring caved in at 13.6 feet.
12	12.5						
14	10.5	Orange-brown, saturated, loose, fine to coarse SAND, with some silt		SM	5	4-3-4	
16	8.5	Orange-brown, wet to saturated, medium stiff, silty CLAY, with trace fine sand		CL			
18	6.5	Light brown to orange-brown, saturated, loose to medium dense, fine to coarse SAND, with some silt, trace clay		SM	6	4-5-8	
20	4.5						
22	2.5						
24	.5	Orange-brown, saturated, medium dense, fine SAND, with some silt, trace fine gravel		SM	7	4-6-7	
26	-1.5	Boring terminated at 25.5 feet.					
28	-3.5						
30	-5.5						
32	-7.5						
34	-9.5						
36	-11.5						
38	-13.5						
40	-15.5						
42	-17.5						
44	-19.5						
46	-21.5						
48	-23.5						
50	-25.5						
52							

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LOG OF BORING B-2

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 10, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 20.5 feet

Depth in Feet	Surf. Elev. 23.75	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	23.75	Brown, wet, loose, silty, fine to medium SAND, with trace clay		SM	1	2-2-3-4	Scale 1" ~ 7.75 feet
2	21.75	Orange-brown, wet, medium dense, fine to coarse SAND, with some silt, trace fine gravel		SM	2	3-5-6	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	19.75	Brown, wet, loose, fine to medium SAND, with some silt		SM	3	3-3-5	Groundwater was encountered at 14 during drilling operations.
6	17.75						
8	15.75	Brown to orange-brown, loose, fine to coarse SAND, with some silt, trace clay		SM	4	3-4-6	Boring caved in at 13 feet.
10	13.75						
12	11.75	Light brown, wet to saturated, medium dense, fine to medium SAND, with trace silt		SP	5	4-7-7	
14	9.75						
16	7.75						
18	5.75	Orange-brown, saturated, medium dense, fine to coarse SAND, with some silt, trace clay		SM	6	4-6-8	
20	3.75	Brown, saturated, medium dense, fine to medium SAND, with trace silt		SP			
22	1.75	Boring terminated at 20.5 feet.					
24	-.25						
26	-2.25						
28	-4.25						
30	-6.25						
32	-8.25						
34	-10.25						
36	-12.25						
38	-14.25						
40	-16.25						
42	-18.25						
44	-20.25						
46	-22.25						
48	-24.25						
50	-26.25						
52							

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LOG OF BORING B-3

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 8, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 20.5 feet

Depth in Feet	Surf. Elev. 24.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	24.5	Brown, wet, very loose, fine to medium SAND, with some silt, trace clay		SM	1	2-2-1-3	Scale 1" ~ 7.75 feet
2	22.5	Brown, wet, medium dense, fine to medium SAND, with little silt, trace fine gravel		SP/SM	2	4-7-5	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	20.5						
6	18.5	Orange-brown, wet, medium dense, fine to medium SAND, with little silt, trace clay		SM	3	5-6-7	Groundwater was encountered at 19 during drilling operations.
8	16.5						
10	14.5				4	5-8-9	Boring caved in at 18 feet.
12	12.5	Brown-gray, wet, very stiff, clayey SILT		MH			
14	10.5	Orange-brown, moist, very dense, fine to medium SAND, with little silt		SM	5	21-33-43	
16	8.5						
18	6.5	Light gray and orange-brown, medium dense, fine to medium SAND, with little silt, little clay (mottled)		SM			
20	4.5				6	10-20-30	
22	2.5	Boring terminated at 20.5 feet.					
24	.5						
26	-1.5						
28	-3.5						
30	-5.5						
32	-7.5						
34	-9.5						
36	-11.5						
38	-13.5						
40	-15.5						
42	-17.5						
44	-19.5						
46	-21.5						
48	-23.5						
50	-25.5						
52							

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LOG OF BORING B-4

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 13, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 20.5 feet

Depth in Feet	Surf. Elev. 21.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	21.5	Brown, wet, loose, fine to medium SAND, with some silt, trace clay		SM	1	4-3-4-4	Scale 1" ~ 7.75 feet
2	19.5						Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	17.5	Brown, wet, medium dense, fine to coarse SAND, with some silt		SM	2	6-5-6	
6	15.5				3	3-9-5	Groundwater was encountered at 13 during drilling operations.
8	13.5	Orange-brown, wet, medium dense, fine to medium SAND, with some silt		SM			
10	11.5	Light brown, wet, medium stiff, silty CLAY, with trace fine sand		CH	4	2-3-5	Boring caved in at 10 feet.
12	9.5						Laboratory Test Results
14	7.5				5	2-10-9	Sample No. 4 From 9 to 10.5 feet
16	5.5	Orange-brown, saturated, medium dense, fine to medium SAND, with some silt		SM			Atterberg Limits
18	3.5	Gray and orange-brown, saturated, medium dense, fine to medium SAND, wtih some clay, trace silt		SC			Liquid Limit = 84 Plasticity Index = 50 Natural Moisture = 30.0%
20	1.5				6	3-5-13	
22	-.5	Boring terminated at 20.5 feet.					
24	-2.5						
26	-4.5						
28	-6.5						
30	-8.5						
32	-10.5						
34	-12.5						
36	-14.5						
38	-16.5						
40	-18.5						
42	-20.5						
44	-22.5						
46	-24.5						
48	-26.5						
50	-28.5						
52							

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HYNES & ASSOCIATES

LOG OF BORING B-5

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 8, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 20.5 feet

Depth in Feet	Surf. Elev. 22.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Recovery (inches)	Remarks
0	22.5	Brown, wet, loose, fine to medium SAND, with some silt, trace clay, trace fine gravel		SM	1	2-5-4-3	19	Scale 1" ~ 7.75 feet
2	20.5							
4	18.5	Brown, wet, loose, fine to coarse SAND, with some silt, trace fine gravel		SM	2	2-3-6	16	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
6	16.5	Orange-brown, wet, medium dense, fine to coarse SAND, with some silt		SM	3	7-7-8	18	Groundwater was encountered at 14 during drilling operations.
8	14.5							
10	12.5				4	9-11-18	15	Boring caved in at 13.5 feet.
12	10.5	Gray-brown, saturated, medium dense, fine to coarse SAND, with some silt, little fine to coarse gravel (decomposing rock)		SM				
14	8.5	Orange-brown, saturated, dense, fine to coarse SAND, with little silt		SM	5	11-16-23	18	
16	6.5							
18	4.5	Brown-white, saturated, very dense, fine to medium SAND, with trace silt		SP	6	15-31-45	18	
20	2.5							
22	.5	Boring terminated at 20.5 feet.						
24	-1.5							
26	-3.5							
28	-5.5							
30	-7.5							
32	-9.5							
34	-11.5							
36	-13.5							
38	-15.5							
40	-17.5							
42	-19.5							
44	-21.5							
46	-23.5							
48	-25.5							
50	-27.5							
52								

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HYNES & ASSOCIATES

LOG OF BORING B-6

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 8, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 25.5 feet

Depth in Feet	Surf. Elev. 22.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	22.5	Brown, wet, very loose, fine to coarse SAND, with some silt		SM	1	3-2-2-3	Scale 1" ~ 7.75 feet
2	20.5						Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	18.5	Brown, wet, medium dense, fine to coarse SAND, with some silt, trace fine gravel		SM	2	3-6-6	
6	16.5				3	6-8-9	Groundwater was encountered at 15 during drilling operations.
8	14.5						
10	12.5				4	10-14-12	At compeltion water was at 14.5 feet; boring caved in at 16.5 feet.
12	10.5	Gray, wet to saturated, very stiff, silty CLAY, with some fine to medium sand (mottled)		CH			
14	8.5				5	7-26-33	
16	6.5	Orange-brown, saturated, very dense, fine to medium SAND, with some silt		SM			
18	4.5						
20	2.5				6	26-30-40	
22	.5						
24	-1.5				7	21-29-37	
26	-3.5	Boring terminated at 25.5 feet.					
28	-5.5						
30	-7.5						
32	-9.5						
34	-11.5						
36	-13.5						
38	-15.5						
40	-17.5						
42	-19.5						
44	-21.5						
46	-23.5						
48	-25.5						
50	-27.5						
52							

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HYNES & ASSOCIATES

LOG OF BORING B-7

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 8, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 50.5 feet

Depth in Feet	Surf. Elev. 20.25	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	20.25	Brown, wet, loose, fine to medium SAND, with little to some silt, trace clay		SM	1	4-4-3-3	Scale 1" ~ 7.75 feet
2	18.25				2	6-4-4-4	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	16.25						
6	14.25	Brown and gray, wet, very stiff, silty CLAY, with some fine to medium sand (mottled)		CH	3	5-7-14	Groundwater was encountered at 15 during drilling operations.
8	12.25						
10	10.25				4	16-16-15	At compeltion water was at 9 feet; boring caved in at 13 feet.
		Brown, wet, dense, fine to coarse SAND, with some silt, litle fine to medium gravel, trace clay		SM			
12	8.25						Laboratory Test Results
14	6.25	Orange-brown, wet to saturated, very stiff to stiff, silty CLAY, with trace fine sand		CH	5	6-4-7	Sample No. 3 From 6 to 7.5 feet
16	4.25						Atterberg Limits
18	2.25	Orange-brown, saturated, dense to very dense, fine to medium SAND, with trace silt			6	9-16-18	Liquid Limit = 60 Plasticity Index = 36 Natural Moisture = 20.0%
20	.25						
22	-1.75			SP			
24	-3.75				7	19-27-37	
26	-5.75						
28	-7.75	Orange-brown, saturated, dense, fine to coarse SAND, with trace silt, trace fine gravel		SP	8	10-20-30	
30	-9.75						
32	-11.75						
34	-13.75	Orange-brown, saturated, very dense, fine to medium SAND, with trace silt		SP	9	25-28-36	
36	-15.75						
38	-17.75	Orange-brown, saturated, very dense, fine to coarse SAND, with little silt, trace fine gravel		SP/SM	10	16-21-28	
40	-19.75						
42	-21.75						
44	-23.75	Brown, saturated, very dense, fine to coarse SAND, with trace silt		SP	11	18-23-32	
46	-25.75						
48	-27.75	Orange-brown, saturated, dense, fine to coarse SAND, with some silt		SM	12	19-24-30	
50	-29.75						
52		Boring terminated at 50.5 feet.					

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HYNES & ASSOCIATES

LOG OF BORING B-8

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 13, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 25.5 feet

Depth in Feet	Surf. Elev. 20.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	20.5	Dark brown to brown, saturated, very soft, silty CLAY, with some fine to medium sand		CL-ML	1	2-2-2-2	Scale 1" ~ 7.75 feet
2	18.5	Orange-brown, wet, soft, silty CLAY, with little fine sand		CH	2	2-2-3	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	16.5	Orange-brown, wet, soft, silty CLAY, with some fine to medium sand		CH	3	2-3-2	Groundwater was encountered at 14 during drilling operations.
6	14.5						
8	12.5	Light gray, wet to saturated, medium stiff, clayey SILT, with some fine sand			4	2-3-4	Boring caved in at 8 feet.
10	10.5						Laboratory Test Results
12	8.5						Sample No. 2 From 3 to 4.5 feet
14	6.5			MH	5	2-4-4	Atterberg Limits
16	4.5						Liquid Limit = 73 Plasticity Index = 46 Natural Moisture = 24.0%
18	2.5						
20	.5				6	10-19-21	
22	-1.5	Orange-brown, saturated, dense, fine to medium SAND, with some silt, trace clay		SM			
24	-3.5				7	7-21-18	
26	-5.5	Boring terminated at 25.5 feet.					
28	-7.5						
30	-9.5						
32	-11.5						
34	-13.5						
36	-15.5						
38	-17.5						
40	-19.5						
42	-21.5						
44	-23.5						
46	-25.5						
48	-27.5						
50	-29.5						
52							

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HYNES & ASSOCIATES

LOG OF BORING B-9

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 13, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 20.5 feet

Depth in Feet	Surf. Elev. 19.25	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	19.25	Brown, wet, very loose, clayey, fine to medium SAND, with trace silt		SC	1	2-2-2-3	Scale 1" ~ 7.75 feet
2	17.25				2	3-4-5	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	15.25						
6	13.25	Orange-brown, wet, medium dense, fine to medium SAND, with some silt, trace fine gravel		SM	3	5-6-6	Groundwater was encountered at 15 during drilling operations.
8	11.25						
10	9.25	Orange-brown, saturated, medium dense, fine to medium SAND, with some silt		SM	4	12-12-7	At completion water was at 10 feet; boring caved in at 13 feet.
12	7.25						
14	5.25	Light gray, saturated, medium stiff, clayey SILT, with trace fine to medium sand (mottled)		MH	5	3-3-4	
16	3.25						
18	1.25	Light brown, saturated, dense, fine SAND, with some silt, trace clay		SM	6	7-21-19	
20	-.75	Boring terminated at 20.5 feet.					
22	-2.75						
24	-4.75						
26	-6.75						
28	-8.75						
30	-10.75						
32	-12.75						
34	-14.75						
36	-16.75						
38	-18.75						
40	-20.75						
42	-22.75						
44	-24.75						
46	-26.75						
48	-28.75						
50	-30.75						
52							

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LOG OF BORING B-10

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 13, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 25.5 feet

Depth in Feet	Surf. Elev. 17.75	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	17.75	Dark brown to brown, wet, loose, SILT, with some fine to medium sand		ML	1	3-3-4-4	Scale 1" ~ 7.75 feet
2	15.75	Orange-brown, wet, loose, fine to medium SAND, with some clay, trace silt		SC	2	2-4-3	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	13.75						
6	11.75	Gray, wet, soft, clayey SILT, with trace fine to medium SAND (mottled)		MH	3	2-2-3	Groundwater was encountered at 10 during drilling operations.
8	9.75						
10	7.75	Orange-brown, wet to saturated, medium stiff, clayey SILT, with some fine to medium sand		MH	4	3-3-3	At completion water was at 10 feet; boring caved in at 13 feet.
12	5.75						Laboratory Test Results
14	3.75	Light brown, wet, medium stiff, clayey SILT, with trace to litle fine to medium sand		MH	5	3-3-3	Sample No. 3 From 6 to 7.5 feet
16	1.75						Atterberg Limits
18	-.25						Liquid Limit = 75 Plasticity Index = 32 Natural Moisture = 46.2%
20	-2.25				6	6-4-9	
22	-4.25	Orange-brown, saturated, medium dense, fine to medium SAND, with some silt		SM			Sample No. 4 From 9 to 10.5 feet
24	-6.25	Orange-brown, saturated, medium dense, fine to medium SAND, with little silt		SM	7	6-5-9	Atterberg Limits
26	-8.25	Boring terminated at 25.5 feet.					Liquid Limit = 68 Plasticity Index = 35 Natural Moisture = 33.1%
28	-10.25						
30	-12.25						
32	-14.25						
34	-16.25						
36	-18.25						
38	-20.25						
40	-22.25						
42	-24.25						
44	-26.25						
46	-28.25						
48	-30.25						
50	-32.25						
52							

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LOG OF BORING G-1

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 8, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger and HSA (Mobile B-47 HD)
Total Depth: : 12 feet

Depth in Feet	Surf. Elev. 17.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	17	Dark brown, wet, fine to coarse SAND, with little silt, trace clay		SM	1	---	Scale 1" ~ 7.75 feet
2	15	Brown, wet, fine to coarse SAND, with some silt, little fine gravel, trace clay		SM	2	---	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	13	Brown, wet, fine to coarse SAND, with little silt, trace clay, trace fine gravel		SM	3	---	
6	11	Brown, wet to saturated, fine to coarse SAND, with trace silt		SP	4	---	Groundwater was encountered at 7.5 during drilling operations.
8	9	White-brown, saturated, dense, fine to coarse SAND, with some silt, little fine to medium gravel		SM	5	---	
10	7	Brown, saturated, very dense, fine to medium SAND, with little silt		SM	6	12-20-23-27	Laboratory Test Results
12	5	Boring terminated at 12 feet.		SM	7	11-18-24-30	Sample No. 5 From 6.5 to 8 feet
14	3						Natural Moisture = 21.0%
16	1						
18	-1						
20	-3						
22	-5						
24	-7						
26	-9						
28	-11						
30	-13						
32	-15						
34	-17						
36	-19						
38	-21						
40	-23						
42	-25						
44	-27						
46	-29						
48	-31						
50	-33						
52							

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LOG OF BORING G-2

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4 feet

Depth in Feet	Surf. Elev. 21.75	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	21.75	Brown, wet, silty, fine to coarse SAND		SM	1	Scale 1" ~ 7.75 feet
2	19.75	Orange-brown, wet, fine to medium SAND, with some silt, trace clay, trace fine gravel		SM	2	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	17.75	Orange-brown, wet, fine SAND, with some silt		SM	3	Groundwater was not encountered during augering operations.
6	15.75	Boring terminated at 4 feet.				
8	13.75					
10	11.75					
12	9.75					
14	7.75					
16	5.75					
18	3.75					
20	1.75					
22	-.25					
24	-2.25					
26	-4.25					
28	-6.25					
30	-8.25					
32	-10.25					
34	-12.25					
36	-14.25					
38	-16.25					
40	-18.25					
42	-20.25					
44	-22.25					
46	-24.25					
48	-26.25					
50	-28.25					
52						

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HYNES & ASSOCIATES

LOG OF BORING P-1

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 23.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	23.5	Dark brown, wet, fine to medium SAND, with some silt		SM	1	Scale 1" ~ 7.75 feet
2	21.5	Orange-brown, wet, fine to medium SAND, with little to some silt		SM	2	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	19.5	Orange-brown, wet, fine to coarse SAND, with some silt, trace fine gravel		SM	3	
6	17.5	Brown, wet, fine to coarse SAND, with some silt, little fine to medium gravel		SM	4	Groundwater was not encountered during augering operations.
8	15.5	Boring terminated at 6 feet.				Laboratory Test Results
10	13.5					Sample No. 3 From 4 to 5.5 feet
12	11.5					Natural Moisture = 5.0%
14	9.5					
16	7.5					
18	5.5					
20	3.5					
22	1.5					
24	-.5					
26	-2.5					
28	-4.5					
30	-6.5					
32	-8.5					
34	-10.5					
36	-12.5					
38	-14.5					
40	-16.5					
42	-18.5					
44	-20.5					
46	-22.5					
48	-24.5					
50	-26.5					
52						

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LOG OF BORING P-2

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 22.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	22.5	Dark brown, wet, silty, fine to medium SAND		SM	1	Scale 1" ~ 7.75 feet
2	20.5	Orange-brown, wet, fine to coarse SAND, with some silt, trace to little fine gravel		SM	2	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	18.5				3	
6	16.5	Orange-brown, wet, fine to coarse SAND, with some to little silt		SM	4	Groundwater was not encountered during augering operations.
8	14.5	Boring terminated at 6 feet.				
10	12.5					
12	10.5					
14	8.5					
16	6.5					
18	4.5					
20	2.5					
22	.5					
24	-1.5					
26	-3.5					
28	-5.5					
30	-7.5					
32	-9.5					
34	-11.5					
36	-13.5					
38	-15.5					
40	-17.5					
42	-19.5					
44	-21.5					
46	-23.5					
48	-25.5					
50	-27.5					
52						

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HYNES & ASSOCIATES

LOG OF BORING P-3

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 17.75	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	17.75	Dark brown, wet, silty, fine SAND		SM	1	Scale 1" ~ 7.75 feet
2	15.75	Orange-brown, wet, fine SAND, with some silt, trace clay		SM	2	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	13.75	Light brown, wet, fine to coarse SAND, with trace to little silt, little fine gravel		SP/SM	3	
6	11.75	Boring terminated at 6 feet.			4	Groundwater was not encountered during augering operations.
8	9.75					
10	7.75					
12	5.75					
14	3.75					
16	1.75					
18	-.25					
20	-2.25					
22	-4.25					
24	-6.25					
26	-8.25					
28	-10.25					
30	-12.25					
32	-14.25					
34	-16.25					
36	-18.25					
38	-20.25					
40	-22.25					
42	-24.25					
44	-26.25					
46	-28.25					
48	-30.25					
50	-32.25					
52						

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HYNES & ASSOCIATES

LOG OF BORING P-4

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 21.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	21	Dark brown, wet, silty, fine to medium SAND		SM	1	Scale 1" ~ 7.75 feet
2	19	Orange-brown, wet, fine to medium SAND, with some silt		SM	2	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	17	Orange-brown, wet, fine to medium SAND, with some silt, trace fine gravel		SM	3	Groundwater was not encountered during augering operations.
6	15	Orange-brown, wet, fine to coarse SAND, with some silt, trace fine gravel, trace clay (mottled)		SM	4	Laboratory Test Results
8	13	Boring terminated at 6 feet.				Sample No. 2 From 1.5 to 3.5 feet
10	11					Natural Moisture = 9.8%
12	9					
14	7					
16	5					
18	3					
20	1					
22	-1					
24	-3					
26	-5					
28	-7					
30	-9					
32	-11					
34	-13					
36	-15					
38	-17					
40	-19					
42	-21					
44	-23					
46	-25					
48	-27					
50	-29					
52						

HYNES & ASSOCIATES

LOG OF BORING P-5

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 27.25	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	27.25	Dark brown, wet, fine to medium SAND, with some silt		SM	1	Scale 1" ~ 7.75 feet
2	25.25	Orange-brown, wet to saturated, fine to coarse SAND, with some silt, trace fine gravel		SM	2	Approximately 15 inches of organic bearing soil was encountered at the ground surface.
4	23.25				3	
6	21.25	Boring terminated at 6 feet.			4	Groundwater was not encountered during augering operations.
8	19.25					Laboratory Test Results
10	17.25					Sample No. 4 From 5.5 to 6 feet
12	15.25					Natural Moisture = 8.3%
14	13.25					
16	11.25					
18	9.25					
20	7.25					
22	5.25					
24	3.25					
26	1.25					
28	-.75					
30	-2.75					
32	-4.75					
34	-6.75					
36	-8.75					
38	-10.75					
40	-12.75					
42	-14.75					
44	-16.75					
46	-18.75					
48	-20.75					
50	-22.75					
52						

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HYNES & ASSOCIATES

LOG OF BORING SWM-1

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 10, 2013
Logged By: : J. Redding
Drilled By: : J. Briddell
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 17.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	17	7.5 YR 4/4 Dark brown, wet, fine to medium SAND, with some silt, trace clay (Sandy loam)		SM	1	Scale 1" ~ 7.75 feet
2	15	7.5 YR 4/6 Strong brown, wet, fine to coase SAND, with little silt, trace clay (Loamy sand)		SM	2	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	13	7.5 YR 5/8 Strong brown, wet, fine to coarse SAND, with little silt (Loamy sand)		SM-SP	3	
6	11	7.5 YR 5/8 Strong brown, wet, medium to coarse SAND, with little silt, trace gravel (Loamy sand)		SM-SP	4	Groundwater was not encountered during augering operations.
8	9	Boring terminated at 6 feet.				
10	7					
12	5					
14	3					
16	1					
18	-1					
20	-3					
22	-5					
24	-7					
26	-9					
28	-11					
30	-13					
32	-15					
34	-17					
36	-19					
38	-21					
40	-23					
42	-25					
44	-27					
46	-29					
48	-31					
50	-33					
52						

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HYNES & ASSOCIATES

LOG OF BORING SWM-2

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 10, 2013
Logged By: : J. Redding
Drilled By: : J. Briddell
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 19.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	19	10 YR 4/3 Dark brown, wet, fine to medium SAND, with some silt, trace clay, trace fine gravel (Loamy sand)		SM	1	Scale 1" ~ 7.75 feet
2	17			SM	2	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	15	7.5 YR 5/8 Strong brown, wet, fine to medium SAND, with some silt, trace fine gravel (Loamy sand)		SM	3	
6	13	7.5 YR 5/8 Strong brown, wet, fine to coarse SAND, with some silt, trace fine gravel (Loamy sand)		SM	4	Groundwater was not encountered during augering operations.
8	11	7.5 YR 4/6 Strong brown, wet, fine to coarse SAND, with some silt, trace fine gravel (Loamy sand)				
10	9	Boring terminated at 6 feet.				
12	7					
14	5					
16	3					
18	1					
20	-1					
22	-3					
24	-5					
26	-7					
28	-9					
30	-11					
32	-13					
34	-15					
36	-17					
38	-19					
40	-21					
42	-23					
44	-25					
46	-27					
48	-29					
50	-31					
52						

07-10-2013 J:\Mtech 2010\Delaware State Police Troop 3-13263\SWM-2.bor

HYNES & ASSOCIATES

LOG OF BORING SWM-3

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 11, 2013
Logged By: : J. Redding
Drilled By: : D. Hynes
Drilling Method: : Hand Auger
Total Depth: : 9.5 feet

Depth in Feet	Surf. Elev. 20.75	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	20.75	10 YR 3/3 Dark brown, wet, silty fine to medium SAND (Sandy loam)		SM	1	Scale 1" ~ 7.75 feet
2	18.75	7.5 YR 3/4 Brown, wet, fine to medium SAND, with some silt, trace clay (Loamy sand)		SM	2	Approximately 18 inches of organic bearing soil was encountered at the ground surface.
4	16.75	7.5 YR 5/8 Strong brown, wet, fine to coarse SAND, with some silt (Loamy sand)		SM	3	
6	14.75	7.5 YR 4/6 Strong brown, wet, fine to coarse SAND, with some silt, little fine to medium gravel, trace clay (Loamy sand)		SM	4	Groundwater was not encountered during augering operations.
8	12.75			SM	5	
10	10.75	7.5 YR 5/8 Strong brown, wet, fine SAND, with some silt (Loamy sand)		SM	6	
12	8.75			SM	7	
14	6.75	7.5 YR 4/6 Strong brown, wet, fine to medium SAND, with some silt, little fine to coarse gravel (Loamy sand)				
16	4.75	Boring terminated at 9.5 feet.				
18	2.75					
20	.75					
22	-1.25					
24	-3.25					
26	-5.25					
28	-7.25					
30	-9.25					
32	-11.25					
34	-13.25					
36	-15.25					
38	-17.25					
40	-19.25					
42	-21.25					
44	-23.25					
46	-25.25					
48	-27.25					
50	-29.25					
52						

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HYNES & ASSOCIATES

LOG OF BORING SWM-4

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 10, 2013
Logged By: : J. Redding
Drilled By: : J. Briddell
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 19.25	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	19.25	10 YR 4/3 Dark brown, wet, silty fine to medium SAND, trace fine gravel (Loamy sand)		SM	1	Scale 1" ~ 7.75 feet
2	17.25	7.5 YR 4/6 Strong brown, wet, fine to coarse SAND, with little clay, little silt (Sandy clay loam)		SC	2	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	15.25	7.5 YR 5/8 Strong brown, wet, silty CLAY, with trace fine sand (Silty clay loam)		CH	3	Groundwater was not encountered during augering operations.
6	13.25	7.5 YR 6/2 Pinkish gray, wet, silty CLAY (Silty clay loam) (mottled)		CH	4	Laboratory Test Results
8	11.25	Boring terminated at 6 feet.				Sample No. 4 From 4.5 to 6 feet
10	9.25					Atterberg Limits
12	7.25					Liquid Limit = 73 Plasticity Index = 41 Natural Moisture = 30.5%
14	5.25					
16	3.25					
18	1.25					
20	-.75					
22	-2.75					
24	-4.75					
26	-6.75					
28	-8.75					
30	-10.75					
32	-12.75					
34	-14.75					
36	-16.75					
38	-18.75					
40	-20.75					
42	-22.75					
44	-24.75					
46	-26.75					
48	-28.75					
50	-30.75					
52						

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HYNES & ASSOCIATES

LOG OF BORING SWM-5

State of DE Division of Facilities Management
312 West Main Street, Suite 300
Salisbury, Maryland 21801

Delaware State Police Troop 3

Project No.: JDH-10/13/263

Date Completed: : June 10, 2013
Logged By: : J. Redding
Drilled By: : J. Briddell
Drilling Method: : Hand Auger
Total Depth: : 6 feet

Depth in Feet	Surf. Elev. 15.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	15.5	10 YR 3/3 Dark brown, wet, fine to coarse SAND, with some silt, trace clay (Sandy loam)		SM	1	Scale 1" ~ 7.75 feet
2	13.5	7.5 YR 4/6 Strong brown, wet, fine SAND, with some clay, trace silt (Sandy clay loam)		SC	2	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4	11.5	10 YR 6/6 Brownish yellow, wet, fine to medium SAND, with some silt, trace clay (Sandy loam)		SM	4	Groundwater was not encountered during augering operations.
6	9.5	10 YR 6/4 Light yellowish brown, wet, fine to medium SAND, with some silt (Loamy sand)		SM	5	
8	7.5	Boring terminated at 6 feet.				
10	5.5					
12	3.5					
14	1.5					
16	-.5					
18	-2.5					
20	-4.5					
22	-6.5					
24	-8.5					
26	-10.5					
28	-12.5					
30	-14.5					
32	-16.5					
34	-18.5					
36	-20.5					
38	-22.5					
40	-24.5					
42	-26.5					
44	-28.5					
46	-30.5					
48	-32.5					
50	-34.5					
52						

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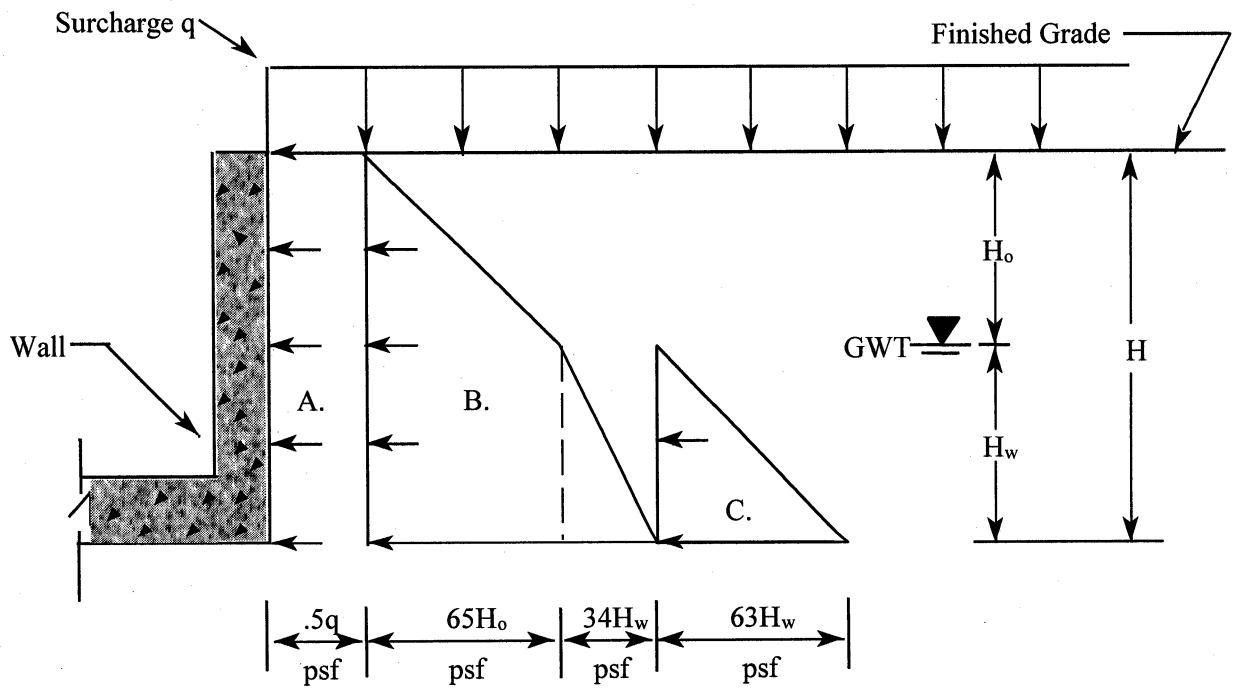
EARTH PRESSURE REQUIREMENTS
FOR
BELOW GRADE WALLS (UNDRAINED)



A. Lateral Surcharge
B. Lateral Soil Pressure
C. Hydrostatic Pressure

1. Pressure diagram assumes undrained soil conditions.
2. Pressure diagram assumes at rest soil pressures on cantilevered walls or walls with one support level.
3. For backfill, use non-plastic SP or better quality material (ASTM D-2487).
4. Compact backfill in maximum 8-inch loose lifts to 92 to 95 percent maximum dry density (ASTM D-1557).
5. Use only light-duty hand operated compaction equipment within 10 feet of walls.
6. For surcharge q, consider the greater of the maximum expected construction equipment live loads or permanent structure dead and live loads.
7. For temporary retaining walls used for excavation support, use 2/3 of the above values for lateral surcharge and soil pressures. This reflects the active soil pressure condition.

HYNES

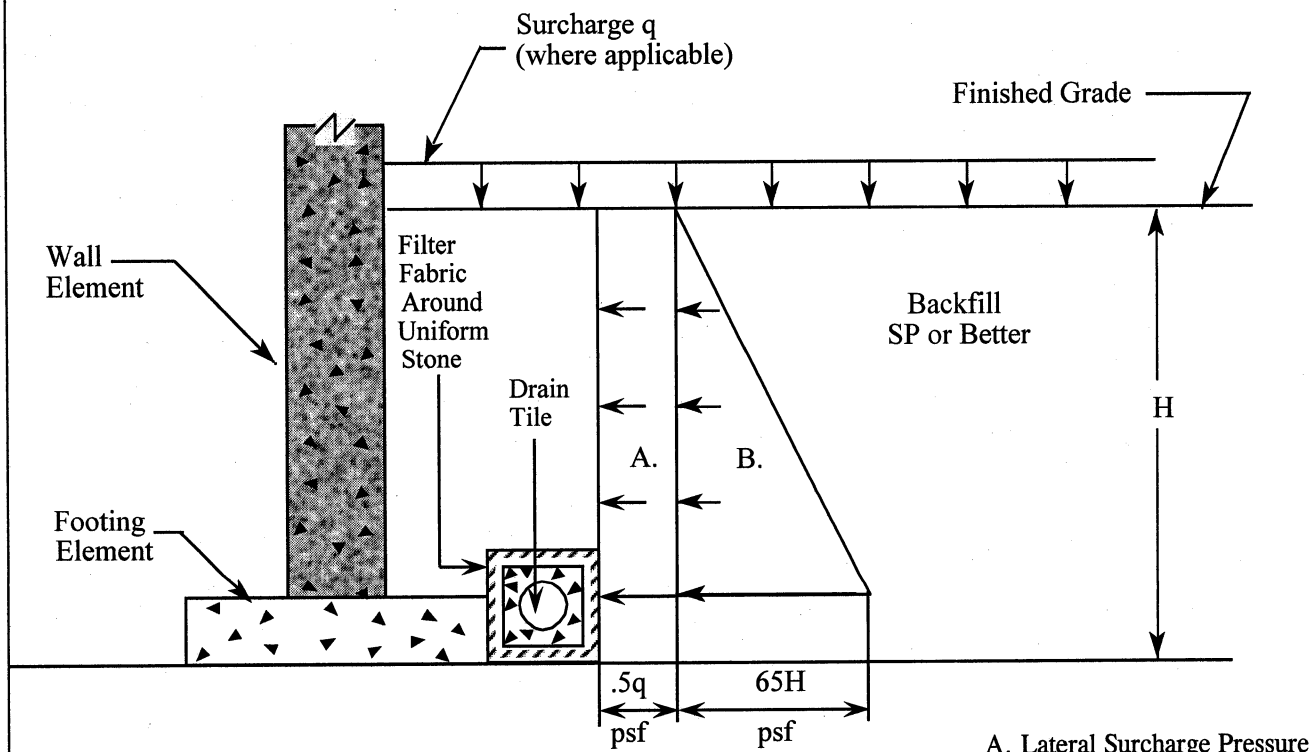
JOHN D. HYNES & ASSOCIATES, INC.
32185 Beaver Run Drive • Salisbury, Maryland 21804
410-546-6462 / Fax: 410-548-5346

Date: July 10, 2013
Scale: Not to Scale
DRAWN: JDH

Earth Pressure Requirements for Below Grade Walls (Undrained)
Delaware State Police Troop 3
Dover, Delaware

DWG. No.
JDH-10/13/263-C

EARTH PRESSURE REQUIREMENTS
FOR
BELOW GRADE WALLS (DRAINED)



A. Lateral Surcharge Pressure
B. Lateral Soil Pressure

1. Pressure diagram assumes at rest soil pressures on cantilevered walls or walls with one support level.
2. Pressure diagram includes only loads resulting from backfill and surcharges.
3. This distribution assumes perimeter sub-drainage will be provided; therefore, hydrostatic pressure is not included.
4. For backfill, use SP or better quality material (ASTM D-2487).
5. Compact backfill in maximum 8-inch loose lifts to 92 to 95 percent maximum dry density (ASTM D-1557).
6. Use only light-duty hand operated compaction equipment within 10 feet of walls.
7. For surcharge q, consider the greater of the maximum expected construction equipment live loads or permanent structure dead and live loads.
8. For temporary retaining walls used for excavation support, use 2/3 of the above values for lateral surcharge and soil pressures. This reflects the active soil pressure condition.

HYNES

JOHN D. HYNES & ASSOCIATES, INC.

32185 Beaver Run Drive • Salisbury, Maryland 21804
410-546-6462 / Fax: 410-548-5346

Date: July 10, 2013
Scale: Not to Scale
DRAWN: JDH

Earth Pressure Requirements for Below Grade Walls (Drained)
Delaware State Police Troop 3
Dover, Delaware

DWG. No.
JDH-10/13/263-D

JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

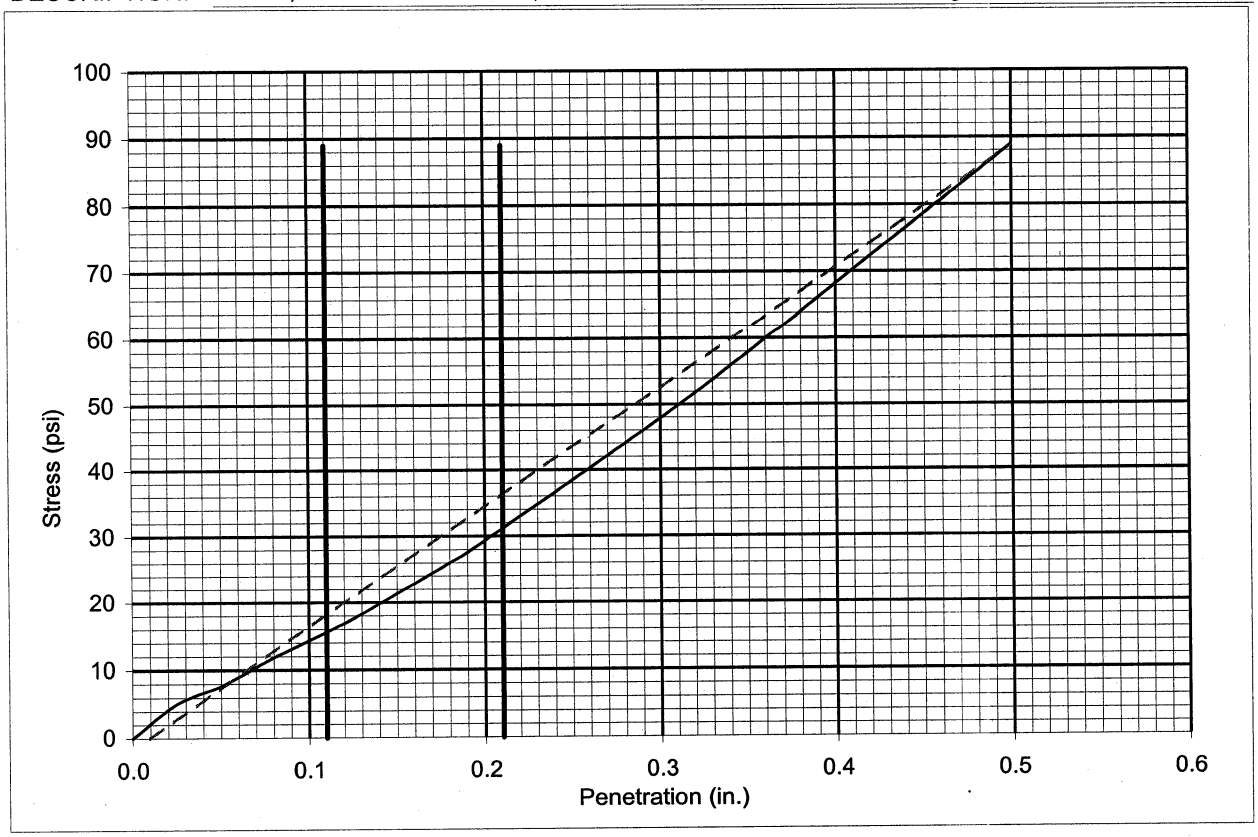
RECORD No: JDH-10/13/263 TEST TYPE: California Bearing Ratio (CBR) Test

MADE FOR: Becker Morgan Group TEST DATE: June 21, 2013

PROJECT: DE State Police Troop 3

LOCATION: P-2 (10379) TEST METHOD: ASTM D-1883

DESCRIPTION: Brown, fine to coarse SAND, with some silt, trace fine to medium gravel



Sample Condition:	Soaked		
Zero correction:	0.010	inches	
Piston Penetration (inches):	0.1	0.2	Design
CBR Value:	1.6	2.1	2.1

Maximum Dry Density:	130.0 pcf
Optimum Moisture Content:	9.6 %
Dry Density of CBR Sample:	271.4 pcf
Moisture Content Before Soak:	12.8 %
Moisture Content After Soak:	10.9 %
Top 1-in Layer After Soak:	11.8 %
Average Moisture Content After Soak:	11.4 %

JOHN D. HYNES & ASSOCIATES, INC.

By: _____

32185 Beaver Run Drive, Salisbury, Maryland 21804
302-678-9718 • Fax 302-678-9733

JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

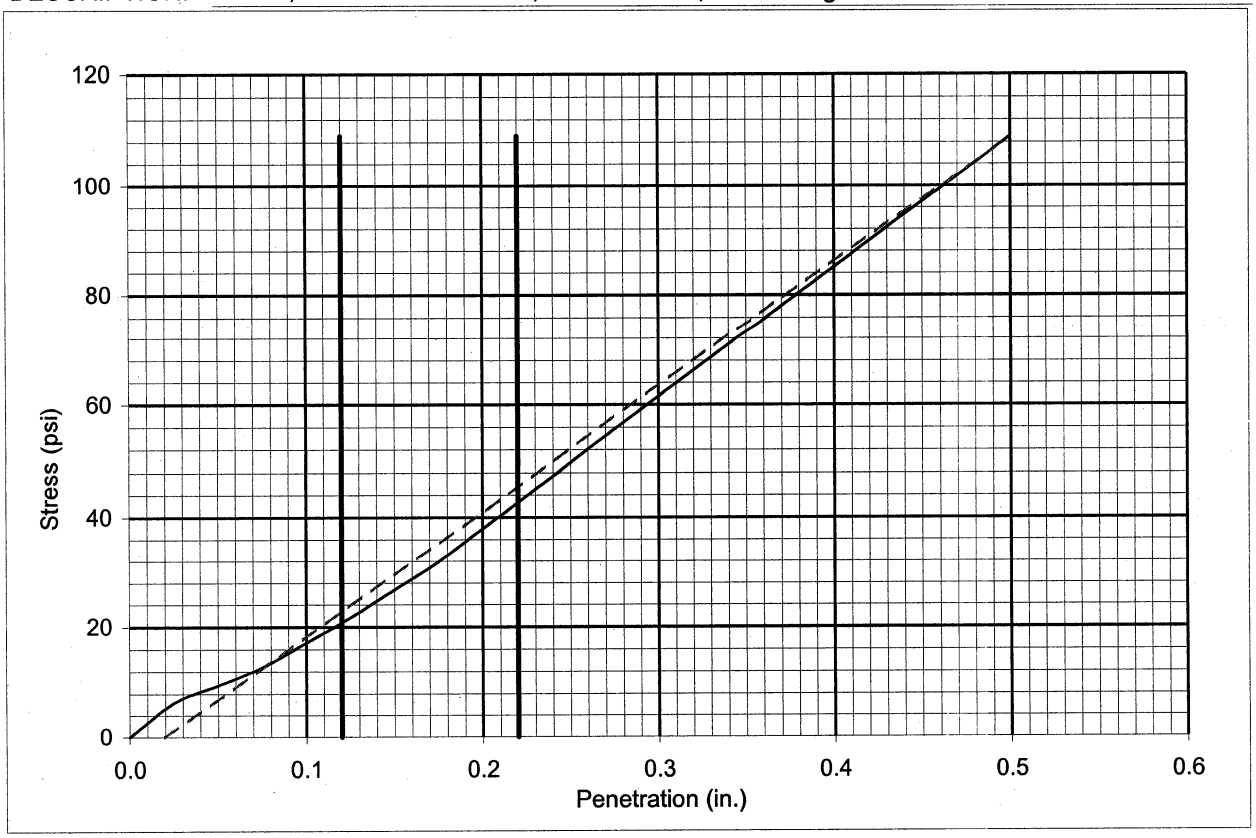
RECORD No: JDH-10/13/263 TEST TYPE: California Bearing Ratio (CBR) Test

MADE FOR: Becker Morgan Group TEST DATE: June 21, 2013

PROJECT: Delaware State Police Troop 3

LOCATION: P-4 (10381) TEST METHOD: ASTM D-1883

DESCRIPTION: Brown, fine to coarse SAND, with some silt, trace fine gravel



Sample Condition:	Soaked		
Zero correction:	0.020	inches	
Piston Penetration (inches):	0.1	0.2	Design
CBR Value:	2.1	2.8	2.8

Maximum Dry Density:	126.7 pcf
Optimum Moisture Content:	9.9 %
Dry Density of CBR Sample:	260.3 pcf
Moisture Content Before Soak:	14.2 %
Moisture Content After Soak:	13.9 %
Top 1-in Layer After Soak:	14.9 %
Average Moisture Content After Soak:	14.4 %

JOHN D. HYNES & ASSOCIATES, INC.

By: _____

32185 Beaver Run Drive, Salisbury, Maryland 21804
302-678-9718 • Fax 302-678-9733

DELAWARE INFILTRATION TESTING

JOB NAME: Delaware State Police Troop 3

PROJECT NUMBER: JDH-10/13/263

TEST DATE: June 13, 2013

TEST LOCATION: SWM-1

TEST DEPTH: 5.0 ft

HYNES

A	B	C	D	E = D/B	F = E/2.75 x 30.48 x H_c	G = F x 1417.3	
TIME	**Δ TIME (seconds)**	**VOLUME (mL)**	**Δ VOLUME (mL)**	**FLOW - q (cm^3/sec)**	**PERMEABILITY K_m (cm/sec)**	**PERMEABILITY K_m (in./hr)**	**COMMENTS**
13:55	0	0	0	0	0	0	
13:59	240	9,000	9,000	37.50	2.94E-02	41.61	Refilled to Zero
14:03	240	9,000	9,000	37.50	2.94E-02	41.61	Refilled to Zero
14:07	240	12,000	12,000	50.00	3.91E-02	55.48	Refilled to Zero
14:11	240	12,000	12,000	50.00	3.91E-02	55.48	Refilled to Zero
14:15	240	12,000	12,000	50.00	3.91E-02	55.48	Refilled to Zero
14:19	240	19,000	19,000	79.17	6.20E-02	87.84	Refilled to Zero
14:23	240	16,000	16,000	66.67	5.22E-02	73.97	Refilled to Zero
14:27	240	16,000	16,000	66.67	5.22E-02	73.97	Refilled to Zero
14:31	240	18,000	18,000	75.00	5.87E-02	83.21	Refilled to Zero
14:35	240	17,500	17,500	72.92	5.71E-02	80.90	Refilled to Zero
14:39	240	10,000	10,000	41.67	3.26E-02	46.23	Refilled to Zero
14:43	240	17,500	17,500	72.92	5.71E-02	80.90	Refilled to Zero
14:47	240	12,500	12,500	52.08	4.08E-02	57.79	Refilled to Zero
					Time Weighted Average =	71.14	
					Last Test Hour =	NA	

	D = 30.48 cm (12 in. Θ RING)	HEAD (Hc) =15.24 cm HEAD (H_c) = 6.00 in. CONVERT TO cm TO OBTAIN H_c (1" = 2.54cm)	CONVERT K_m FROM cm/sec TO in/hr BY MULTIPLYING (rate x 1417.3)	$K_m = \frac{q}{30.48 \times 2.75 \times H_c}$

DELAWARE INFILTRATION TESTING

JOB NAME: Delaware State Police Troop 3

PROJECT NUMBER: JDH-10/13/263

TEST DATE: June 13, 2013

TEST LOCATION: SWM-2

TEST DEPTH: 4.0 ft

HYNES

A	B	C	D	E = D/B	F = E/2.75 x 30.48 x H_c	G = F x 1417.3	
TIME	Δ TIME (seconds)	VOLUME (mL)	Δ VOLUME (mL)	FLOW - q (cm^3/sec)	PERMEABILITY K_m (cm/sec)	PERMEABILITY K_m (in./hr)	COMMENTS
13:00	0	0	0	0	0	0	
13:15	900	19,000	19,000	21.11	1.65E-02	23.42	Refilled to Zero
13:30	900	19,000	19,000	21.11	1.65E-02	23.42	Refilled to Zero
13:45	900	18,400	18,400	20.44	1.60E-02	22.68	Refilled to Zero
14:00	900	18,000	18,000	20.00	1.57E-02	22.19	Refilled to Zero
14:15	900	18,000	18,000	20.00	1.57E-02	22.19	Refilled to Zero
14:30	900	14,600	14,600	16.22	1.27E-02	18.00	Refilled to Zero
14:45	900	14,000	14,000	15.56	1.22E-02	17.26	Refilled to Zero
15:00	900	11,300	11,300	12.56	9.83E-03	13.93	Refilled to Zero
15:15	900	13,900	13,900	15.44	1.21E-02	17.14	Refilled to Zero
15:30	900	14,500	14,500	16.11	1.26E-02	17.88	Refilled to Zero
15:45	900	12,500	12,500	13.89	1.09E-02	15.41	Refilled to Zero
16:00	900	13,300	13,300	14.78	1.16E-02	16.40	Refilled to Zero
16:15	900	14,500	14,500	16.11	1.26E-02	17.88	Refilled to Zero
16:30	900	11,000	11,000	12.22	9.57E-03	13.56	Refilled to Zero
16:45	900	11,000	11,000	12.22	9.57E-03	13.56	Refilled to Zero
17:00	900	11,000	11,000	12.22	9.57E-03	13.56	Refilled to Zero
17:15	900	10,500	10,500	11.67	9.13E-03	12.94	Refilled to Zero
17:30	900	10,300	10,300	11.44	8.96E-03	12.70	Refilled to Zero
17:45	900	9,000	9,000	10.00	7.83E-03	11.10	Refilled to Zero
18:00	900	9,000	9,000	10.00	7.83E-03	11.10	Refilled to Zero
					Time Weighted Average =	15.29	
					Last Test Hour =	11.96	

	D = 30.48 cm (12 in. Θ RING)	HEAD (Hc) =15.24 cm HEAD (H_c) = 6.00 in. CONVERT TO cm TO OBTAIN H_c (1" = 2.54cm)	CONVERT K_m FROM cm/sec TO in/hr BY MULTIPLYING (rate x 1417.3)	$K_m = \frac{q}{30.48 \times 2.75 \times H_c}$

DELAWARE INFILTRATION TESTING

JOB NAME: Delaware State Police Troop 3

PROJECT NUMBER: JDH-10/13/263

TEST DATE: June 18, 2013

TEST LOCATION: SWM-3

TEST DEPTH: 4.0 ft

HYNES

A	B	C	D	E = D/B	F = E/2.75 x 30.48 x H_c	G = F x 1417.3	
TIME	Δ TIME (seconds)	VOLUME (mL)	Δ VOLUME (mL)	FLOW - q (cm^3/sec)	PERMEABILITY K_m (cm/sec)	PERMEABILITY K_m (in./hr)	COMMENTS
8:07	0	0	0	0	0	0	
8:22	900	12,000	12,000	13.33	8.95E-03	12.68	Refilled to Zero
8:37	900	2,000	2,000	2.22	1.49E-03	2.11	
8:52	900	3,500	1,500	1.67	1.12E-03	1.59	
9:07	900	5,200	1,700	1.89	1.27E-03	1.80	
9:22	900	7,000	1,800	2.00	1.34E-03	1.90	
9:37	900	8,400	1,400	1.56	1.04E-03	1.48	
9:52	900	10,000	1,600	1.78	1.19E-03	1.69	
10:07	900	11,800	1,800	2.00	1.34E-03	1.90	
10:22	900	13,500	1,700	1.89	1.27E-03	1.80	
10:37	900	15,800	2,300	2.56	1.71E-03	2.43	
10:52	900	17,500	1,700	1.89	1.27E-03	1.80	Refilled to Zero
11:07	900	2,000	2,000	2.22	1.49E-03	2.11	
11:22	900	3,300	1,300	1.44	9.69E-04	1.37	
11:37	900	4,500	1,200	1.33	8.95E-04	1.27	
11:52	900	5,500	1,000	1.11	7.46E-04	1.06	
12:07	900	6,800	1,300	1.44	9.69E-04	1.37	
12:22	900	8,000	1,200	1.33	8.95E-04	1.27	
12:37	900	9,500	1,500	1.67	1.12E-03	1.59	
12:52	900	11,200	1,700	1.89	1.27E-03	1.80	
13:07	900	12,500	1,300	1.44	9.69E-04	1.37	
					Time Weighted Average =	1.64	
					Last Test Hour =	1.51	

	D = 30.48 cm (12 in. Θ RING)	HEAD (Hc) =17.78 cm HEAD (H_c) = 7.00 in. CONVERT TO cm TO OBTAIN H_c (1" = 2.54cm)	CONVERT K_m FROM cm/sec TO in/hr BY MULTIPLYING (rate x 1417.3)	$K_m = \frac{q}{30.48 \times 2.75 \times H_c}$

DELAWARE INFILTRATION TESTING

JOB NAME: Delaware State Police Troop 3

PROJECT NUMBER: JDH-10/13/263

TEST DATE: June 10, 2013

TEST LOCATION: SWM-4

TEST DEPTH: 4.0 ft

HYNES

A	B	C	D	E = D/B	F = E/2.75 x 30.48 x H_c	G = F x 1417.3	
TIME	Δ TIME (seconds)	VOLUME (mL)	Δ VOLUME (mL)	FLOW - q (cm^3/sec)	PERMEABILITY K_m (cm/sec)	PERMEABILITY K_m (in./hr)	COMMENTS
0:55	0	0	0	0	0	0	
1:10	900	0	0	0.00	0.00E+00	0.00	
1:25	900	1,000	1,000	1.11	8.70E-04	1.23	
1:40	900	2,000	1,000	1.11	8.70E-04	1.23	
1:55	900	3,000	1,000	1.11	8.70E-04	1.23	
2:10	900	4,000	1,000	1.11	8.70E-04	1.23	
2:25	900	5,000	1,000	1.11	8.70E-04	1.23	
2:40	900	6,000	1,000	1.11	8.70E-04	1.23	
2:55	900	7,000	1,000	1.11	8.70E-04	1.23	
3:10	900	8,300	1,300	1.44	1.13E-03	1.60	
3:25	900	9,300	1,000	1.11	8.70E-04	1.23	
3:40	900	10,300	1,000	1.11	8.70E-04	1.23	
3:55	900	11,300	1,000	1.11	8.70E-04	1.23	
4:10	900	12,300	1,000	1.11	8.70E-04	1.23	
4:25	900	13,700	1,400	1.56	1.22E-03	1.73	
4:40	900	15,100	1,400	1.56	1.22E-03	1.73	
4:55	900	15,400	300	0.33	2.61E-04	0.37	
5:10	900	700	700	0.78	6.09E-04	0.86	Refilled to Zero
5:25	900	1,600	900	1.00	7.83E-04	1.11	
5:40	900	2,400	800	0.89	6.96E-04	0.99	
5:55	900	3,500	1,100	1.22	9.57E-04	1.36	
					Time Weighted Average =	1.23	
					Last Test Hour =	1.08	

	D = 30.48 cm (12 in. Θ RING)	HEAD (Hc) =15.24 cm HEAD (H_c) = 6.00 in. CONVERT TO cm TO OBTAIN H_c (1" = 2.54cm)	CONVERT K_m FROM cm/sec TO in/hr BY MULTIPLYING (rate x 1417.3)	$K_m = \frac{q}{30.48 \times 2.75 \times H_c}$

DELAWARE INFILTRATION TESTING

JOB NAME: Delaware State Police Troop 3

PROJECT NUMBER: JDH-10/13/263

TEST DATE: June 10, 2013

TEST LOCATION: SWM-5

TEST DEPTH: 4.0 ft

HYNES

A	B	C	D	E = D/B	F = E/2.75 x 30.48 x H_c	G = F x 1417.3	
TIME	**Δ TIME (seconds)**	**VOLUME (mL)**	**Δ VOLUME (mL)**	**FLOW - q (cm^3/sec)**	**PERMEABILITY K_m (cm/sec)**	**PERMEABILITY K_m (in./hr)**	**COMMENTS**
0:20	0	0	0	0	0	0	
0:35	900	3,400	3,400	3.78	2.84E-03	4.02	
0:50	900	7,400	4,000	4.44	3.34E-03	4.73	
1:05	900	10,500	3,100	3.44	2.59E-03	3.67	
1:20	900	13,000	2,500	2.78	2.09E-03	2.96	
1:35	900	14,500	1,500	1.67	1.25E-03	1.78	
1:50	900	17,000	2,500	2.78	2.09E-03	2.96	
2:05	900	1,500	1,500	1.67	1.25E-03	1.78	
2:20	900	4,000	2,500	2.78	2.09E-03	2.96	
2:35	900	5,500	1,500	1.67	1.25E-03	1.78	
2:50	900	7,000	1,500	1.67	1.25E-03	1.78	
3:05	900	9,300	2,300	2.56	1.92E-03	2.72	
3:20	900	10,700	1,400	1.56	1.17E-03	1.66	
3:35	900	12,100	1,400	1.56	1.17E-03	1.66	
3:50	900	13,100	1,000	1.11	8.35E-04	1.18	
4:05	900	14,100	1,000	1.11	8.35E-04	1.18	
4:20	900	17,000	2,900	3.22	2.42E-03	3.43	
4:35	900	18,300	1,300	1.44	1.09E-03	1.54	
4:50	900	1,000	1,000	1.11	8.35E-04	1.18	
5:05	900	2,100	1,100	1.22	9.19E-04	1.30	
5:20	900	3,100	1,000	1.11	8.35E-04	1.18	
					Time Weighted Average =	1.88	
					Last Test Hour =	1.30	

	D = 30.48 cm (12 in. Θ RING)	HEAD (Hc) =15.875 cm HEAD (H_c) = 6.25 in. CONVERT TO cm TO OBTAIN H_c (1" = 2.54cm)	CONVERT K_m FROM cm/sec TO in/hr BY MULTIPLYING (rate x 1417.3)	$K_m = \frac{q}{30.48 \times 2.75 \times H_c}$

Constant Head
Single Ring Infiltration Test

Tools and Supplies:

- ☐ 50 gallons of clean water per test
- ☐ One infiltrometer per test
- ☐ One 12" ring per test
- ☐ Splash guard
- ☐ Shovels Flat/Round
- ☐ Hand Rake
- ☐ Sledge Hammer
- ☐ Driving Block and Cap
- ☐ Purge Pump and tubing
- ☐ Battery
- ☐ Backhoe (for tests greater than 2 feet)
- ☐ Gator/ATV (as necessary
- ☐ Hand Auger (with extensions)
- ☐ Supply bucket (1/2 inch PVC, tubing, funnel extra valves…..)

Procedure:

A. Advance one soil boring at each test location. The boring should extend to groundwater. Accurately measure depth to groundwater and depth of each soil change. Pay close attention to soils for mottling. Contact office to determine test depth.

B. Excavate test pit to specified test depth. Test pit should be sloped or benched in accordance with OSHA standards. (For safety two people will be onsite for tests deeper than 4 feet).

C. Use Flat point shovel to grade bottom of test pit. Bottom of excavation should be flat but not compacted. **Check boring log to ensure that soil at bottom of excavation is soil type to be tested.**

D. Set up infiltrometer:

1. Set ring at bottom of excavation.
2. Using driving block drive (ring) 2 to 4 inches into the ground.
3. Lightly tamp disturbed soil along inside and outside edges of ring. **Do not compact soil at the bottom of the hole.**
4. Use hand rake to scarify soils within test ring.
5. Install drop tube on infiltrometer.
6. Set stand and infiltrometer on ring.
    a. Make sure infiltrometer is oriented so that bottom valve is easy to reach.
    b. Measure distance from bottom of drop tube to soil. Should be 5 to 6 inches. Record as Hc on attached form.

E. Fill infiltrometer and ring.

1. Use pump and battery to transfer water to test set up as necessary.
2. Be sure bottom valve is closed and both top valves are open.
3. Fill infiltrometer through top valve to 0 L mark.
4. Place splash guard within test ring to prevent scouring.
5. Fill ring until water reaches the bottom of the drop tube.
6. Remove splash guard.

Constant Head
Single Ring Infiltration Test

F. Start Test

1. Close both upper valves.
2. Open bottom valve.
3. Record water level (in milliliters) in sight window on attached form. Observe water from vantage point that is approximately level with the water in the site glass. Please note that markings on PVC casing are for reference only. Do not use these marks when observing water level.
4. Record time on attached form.

G. Monitor Test

1. Record water level in sight window and time on attached form.
2. Readings should be no greater than 30 minutes apart.
3. Do not allow water to drop below sight window at any time during testing.
4. Test duration is a minimum of 5 hours.
5. **Refill test set up as necessary (When the water level reaches a point which will not allow another reading without running out.)**
    a. Close bottom valve.
    b. Open top two valves.
    c. Fill infiltrometer through top valve to 0 L mark.
    d. Record time and water level before and after filling.
    e. Close top two valves.
    f. Open bottom valve.
6. Test can be terminated when two successive permeability rates do not vary by more than 10%.

H. Calculations (To be made after each hour of testing)

$$Km = \frac{q}{2.75 * D * Hc}$$

Km = coefficient of permeability (cm/sec)
q = flow of water cm^3/sec
D= diameter of ring in centimeters
Hc= constant head (cm)

Note that all times used for calculations are in seconds (multiply minutes by 60 and hours by 360).All dimensions are in centimeters (multiply inches by 2.54).

To calculate q: Change in volume in milliliters divided by change in time in seconds.

To convert cm/sec to inches per hour, multiply by 1417.3

Constant Head
Single Ring Infiltration Test

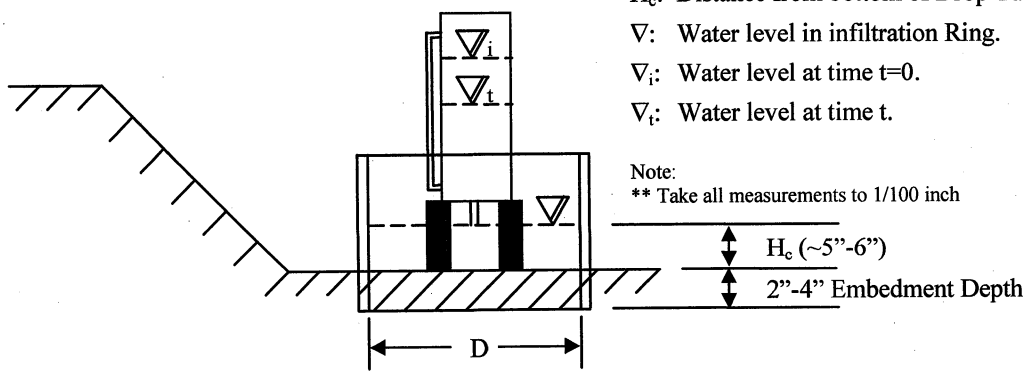
D: Diameter of Ring.

H_c: Distance from bottom of Drop Tube to Soil.

∇: Water level in infiltration Ring.

∇_i: Water level at time t=0.

∇_t: Water level at time t.



Note:
** Take all measurements to 1/100 inch

SINGLE RING CONSTANT HEAD INFILTRATION TESTING

JOB NAME:

PROJECT NUMBER:

DATE:

TEST LOCATION:

TEST DEPTH:

A	B	C	D	E = D/B	F = E/2.75 x 30.48 x H_c	G = F x 1417.3	
TIME	**Δ TIME (seconds)**	**VOLUME (mL)**	**Δ VOLUME (mL)**	**FLOW - q (cm^3/sec)**	**PERMEABILITY K_m (cm/sec)**	**PERMEABILITY K_m (in./hr)**	**COMMENTS**

HEAD (H_c) = in.

= cm

$$K_m \text{ (cm/sec.)} = \frac{q\ (cm^3/sec.)}{2.75 \times D(cm) \times H_c(cm)}$$

CONVERT Km FROM cm/sec TO in/hr BY MULTIPLYING (rate x 1417.3)

CONVERT TO cm TO OBTAIN Hc (1" = 2.54cm)

JOHN D. HYNES & ASSOCIATES, INC.

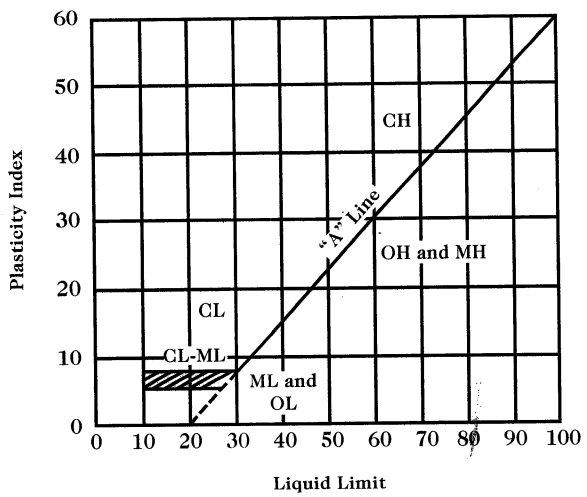
Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			*Group Symbols*	*Typical Names*	*Laboratory Classification Criteria*	
Coarse-grained soils (More than half of material is larger than No 200 sieve size)	Gravels (More than half of coarse fraction is larger than No 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u=\frac{D_{60}}{D_{10}}$ greater than 4; $C_c=\frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravels, gravel sand mixtures, little or no fines	Not meeting all graduation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a] d u	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	
	Sands (More than half of coarse fraction is smaller than No 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands,	$C_u=\frac{D_{60}}{D_{10}}$ greater than 6; $C_c=\frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all graduation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a] d u	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols.
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			OL	Organic silts and organic silty clays of low plasticity		
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			CH	Inorganic clays of high plasticity, fat clays		
			OH	Organic clays of medium to high plasticity, organic silts		
	Highly organic soils		Pt	Peat and other highly organic soils		

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No 200 sieve size), coarse grained soils are classified as follows:
Less than 5 percent — GW, GP, SW, SP
More than 12 percent — GM, GC, SM, SC
5 to 12 percent — *Borderline cases requiring dual symbols*[f]

Plasticity Chart

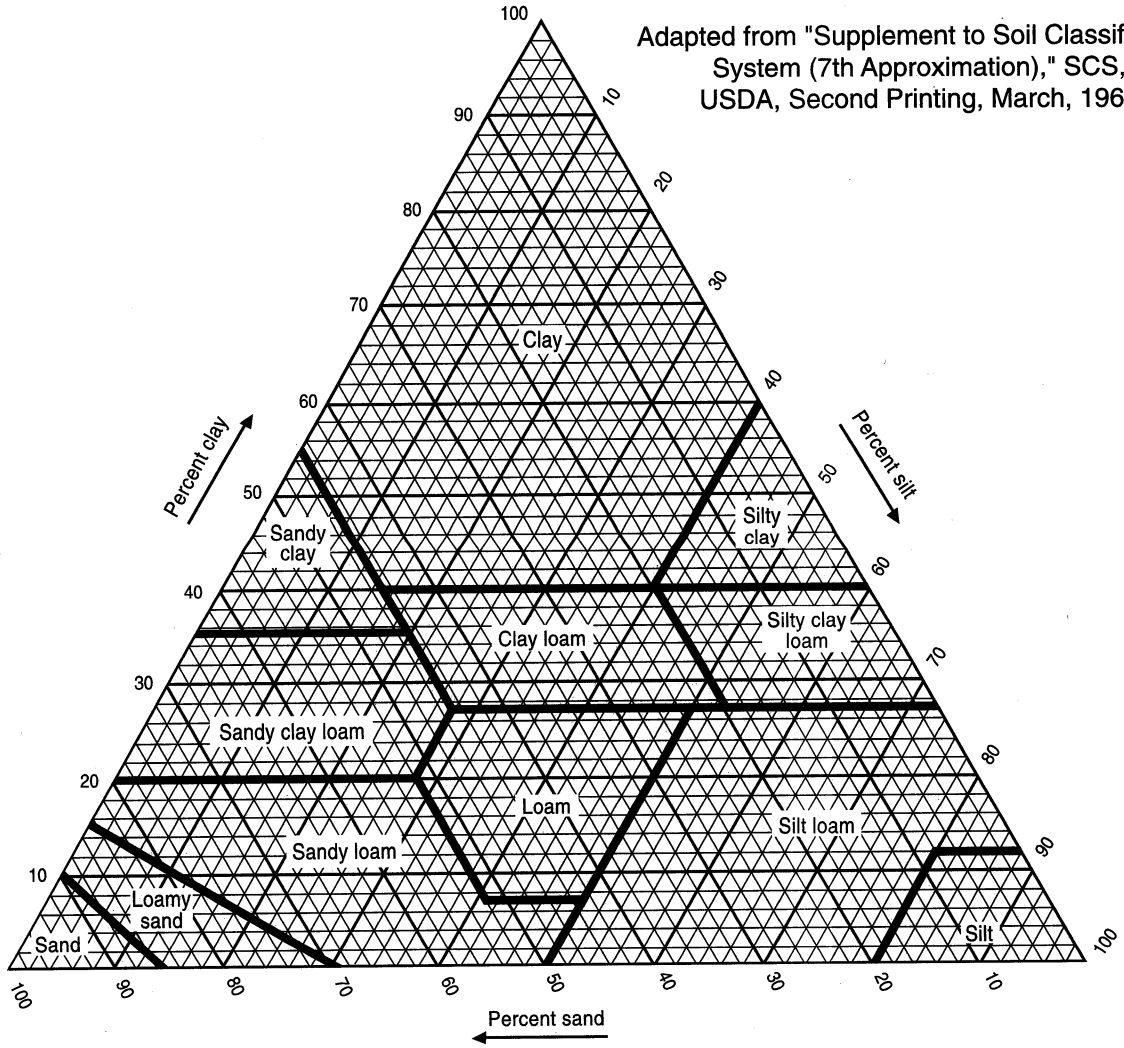


☐ ***Main Office*** - 32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
☐ ***Dover Office*** - 1039 Fowler Court • Dover, Delaware 19901 • 302-678-9718 • Fax 302-678-9733
E-mail - Salisbury jdhynes@aol.com

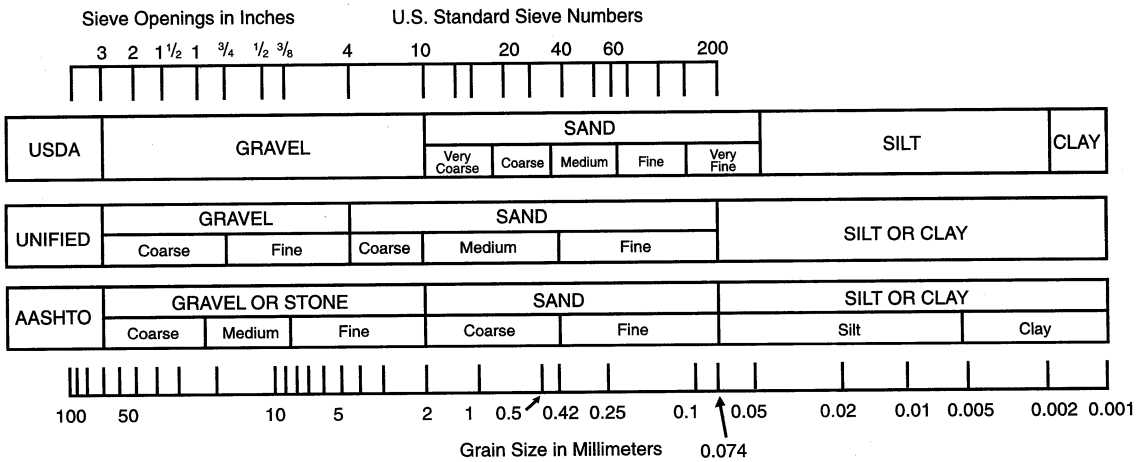
HYNES

USDA SOIL CLASSIFICATION SYSTEM

Adapted from "Supplement to Soil Classification System (7th Approximation)," SCS, USDA, Second Printing, March, 1967



COMPARISON OF PARTICLE - SIZE SCALES



Soil triangle of the basic soil textural classes. (U.S. Soil Conservation Service.) 288-D-2782.

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HYNES

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

NON-COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

DENSITY

Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

RELATIVE PROPORTIONS

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

PARTICLE SIZE IDENTIFICATION

Boulders	- 8 inch diameter or more
Cobbles	- 3 to 8 inch diameter
Gravel	- Coarse - 1 to 3 inch
	- Medium - 1/2 to 1 inch
	- Fine - 4.75 mm to 1/2 inch
Sand	- Coarse - 2.0 mm to 4.75 mm
	- Medium - 0.425 mm to 2.0 mm
	- Fine - 0.075 mm to 0.425 mm
Silt	- 0.075 mm to 0.002 mm

COHESIVE SOILS
(Clay, Silt and Combinations)

CONSISTENCY

Very Soft	- 3 blows/ft. or less
Soft	- 4 to 5 blows/ft.
Medium Stiff	- 6 to 10 blows/ft.
Stiff	- 11 to 15 blows/ft.
Very Stiff	- 16 to 30 blows/ft.
Hard	- 31 blows/ft. or more

PLASTICITY

Degree of Plasticity	Plasticity Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	over 22

Classification on logs are made by visual inspection of samples unless a sample has been subjected to laboratory classification testing.

Standard Penetration Test - Driving a 2.0" O.D., 1-3/8" I.D., splitspoon sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the test are recorded for each 6 inches of penetration on the drill log (Example - 6/8/9). The standard penetration test value (N - value) can be obtained by adding the last two figures (i.e. 8 + 9 = 17 blows/ft.). (ASTM D-1586)

Strata Changes - In the column "Soil Descriptions," on the drill log, the horizontal lines represent strata changes. A solid line (—) represents an actually observed change, a dashed line (----) represents an estimated change.

Groundwater - Observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc. may cause changes in the water levels indicated on the logs.

32185 Beaver Run Drive • Salisbury, Maryland 21804
410-546-6462 • Fax 410-548-5346

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one—not even you*—should apply the report for any purpose or project except the one originally contemplated.

Read the full report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject To Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations", many of these provisions indicate where geotechnical engineers responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE

8811 Colesville Road Suite G106 Silver Spring, MD 20910
Telephone: 301-565-2733 Facsimile: 301-589-2017
email: info@asfe.org www.asfe.org

UGER1000.10M

DELAWARE STATE POLICE NEW TROOP 3 – BID PACK II - BUILDINGS
KENT COUNTY, DELAWARE
CONTRACT # MJ4506000001

BID FORM

For Bids Due: Until 2:00 pm (Local Time)
April 25, 2014

To: State of Delaware, Office of Management and Budget
Division of Facilities Management
540 S. DuPont Highway, Suite 1
Dover, Delaware 19901
Attn: Rich Glazeski

Name of Bidder: _____

Delaware Business License No.: _____ **Taxpayer ID No.:** _____

(Other License Nos.): _____

Phone No.: ( ) _____ - _____ **Fax No.: ( ) _____ - _____**

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____
($)

ALTERNATES

Alternate prices conform to applicable project specification section. Refer to specifications for a complete description of the following Alternates. An "ADD" or "DEDUCT" amount is indicated by the crossed out part that does not apply.

ALTERNATE No. 1: Construction of Maintenance Building and associated construction. Refer to drawings and specifications for scope.

Add/Deduct: _____
($)

ALTERNATE No. 2: Provide Asphalt Shingle Roof and Modified Bitumen Roofing in Lieu of Standing Seam Metal Roofing. Refer to drawings and specifications for scope.

Add/Deduct: _____
($)

ALTERNATE No. 3: Provide Rubber Base and VCT Flooring in Lieu of Wood Base and Resinous Flooring at Corridors. Refer to drawings and specifications for scope.

Add/Deduct: _____

($)

ALTERNATE No. 4: Provide insulated metal panel in lieu of standard metal panel at Maintenance Building. Refer to drawings and specifications for scope.

Add/Deduct: _____

($)

ALTERNATE No. 5: Provide Alternate Bricks in Lieu of Base Bid Bricks. Refer to drawings and specifications for scope.

Add/Deduct: _____

($)

DELAWARE STATE POLICE NEW TROOP 3
KENT COUNTY, DELAWARE
CONTRACT # MJ4506000001

BID FORM

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

		ADD	DEDUCT
UNIT PRICE No. 1:	(BRIEF DESCRIPTION)	$	$

DELAWARE STATE POLICE NEW TROOP 3
KENT COUNTY, DELAWARE
CONTRACT # MJ4506000001

BID FORM

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for sixty (60) days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid.

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within _____ calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ **By:** _____
(Authorized Signature)

(SEAL)

_____
(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Bid Security
(Others as Required by Project Manuals)

DELAWARE STATE POLICE NEW TROOP 3
KENT COUNTY, DELAWARE
CONTRACT # MJ4506000001

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

	Subcontractor Category	Subcontractor	Address (City & State)	Subcontractors tax payer ID # or Delaware Business license #
1.	**Concrete**			
2.	**Masonry**			
3.	**Electrical**			
4.	**Mechanical**			
5.	**Plumbing**			
6.	**Roofing**			
7.	**Steel Erection**			
8.	**Painting**			

9.	**Drywall**			
10.	**Resinous Floor Systems**			
11.	**Resilient Floor Systems**			
12.	**Carpet Floor Systems**			
13.	**Ceilings**			
14.	**Millwork / Casework**			
15.	**Storefront / Curtainwall**			
16.	**Pre-Eng. Metal Building**			
17.	**Fire Alarm**			
18.	**Fire Sprinkler**			
19.	**Ballistic Materials**			
20.	**Insulating Air Barrier**			

DELAWARE STATE POLICE NEW TROOP 3
KENT COUNTY, DELAWARE
CONTRACT # MJ4506000001

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date *(to the Office of Management and Budget, Division of Facilities Management)*.

All the terms and conditions of *(Project or Contract Number)* have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

E-MAIL: _____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.