Professional Service Industries, Inc.
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October 21, 2021

Ms. Elizabeth Most
Project Manager
Architectural Vision Group, LTD.
23850 Sperry Drive
Westlake, Ohio 44145

Re: Draft Report of Geotechnical Services
Proposed New Elementary School
Washington High School Site
1 Paul E Brown Drive Southeast
Massillon, Stark County, Ohio
PSI Project No.: 0142-2428

Dear Ms. Most:

Per your request, Professional Service Industries, Inc. (PSI) is pleased to submit this Geotechnical Engineering Services Report for the above referenced project. The results of this exploration, together with our recommendations, are to be found in the accompanying report.

After the plans and specifications are complete, PSI should review the final design and specifications in order to verify that the earthwork and recommendations are properly interpreted and implemented. **It is considered imperative that the geotechnical engineer and/or its representative be present during earthwork operations and foundation installations to observe the field conditions with respect to the design assumptions and specifications. PSI will not be held responsible for interpretations and field quality control observations made by others.**

If you have any questions pertaining to this report, please contact our office at (216) 447-1335. PSI would be pleased to continue providing geotechnical services throughout the implementation of the project, and we look forward to working with you and your organization on this and future projects.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Zaineddin Obeid
Project Engineer

A. Veeramani, P.E.
Director/Principal Consultant

Subsurface Exploration Report

For the Proposed

New Elementary School
Washington High School Site
1 Paul E Brown Drive Southeast
Massillon, Stark County, Ohio

Zaineddin Obeid
Project Manager

Prepared for

Architectural Vision Group, LTD.
23850 Sperry Drive
Westlake, Ohio 44145

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PSI Project No. 0142-2428

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1 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

This report presents the results of a geotechnical subsurface exploration and evaluation conducted for Architectural Vision Group, LTD., in connection with the proposed New Elementary School located at 1 Paul E Brown Drive Southeast, in Massillon, Stark County, Ohio. PSI's services for this project were performed in accordance with PSI Proposal No. 0142-354720, dated September 23, 2021. Authorization to perform this exploration and analysis was in the form of a proposal authorization form, signed by Ms. Elizabeth Most, Project Manager, of Architectural Vision Group, LTD., dated September 23, 2021.

1.2 PROJECT DESCRIPTION

Based on the provided information, it is understood that the proposed development will include the construction of a new elementary school building to be located east of the existing Washington High School. The proposed building will be one to two-stories, measuring approximately 60,000 to 80,000 square feet in plan area. Additionally, the project includes the construction of paved parking lots and driveways.

No structural loading information was provided at the time of this report. However, PSI has made the following assumptions, the maximum column, wall, and floor loads for the school building will be 150 kips, 7 kips per linear foot, and 100 pounds per square foot (psf), respectively.

Based on the provided topographic plan, the overall site generally slopes downward from northeast to southwest with an elevation difference about 50 feet (1,090' MSL to 1,040' MSL). No grading plan is available at the time of this report. However, it is assumed that the maximum cut and fill operations of about 10 feet will be required for the proposed building area and some cut/fill as required will be anticipated within the proposed pavement area.

It should be noted that this subsurface exploration has been conducted to provide preliminary geotechnical information relative to the general suitability of the site area for the proposed development. This preliminary exploration is not to be construed as a final definitive study; therefore, a final geotechnical study will be required prior to final design and construction, including additional test borings, laboratory tests, and analysis.

The geotechnical recommendations presented in this report are based on the available project information, the proposed building location and orientation of the building on the site, and the subsurface materials described in this report. If any of the information we have been given or have assumed is incorrect, please contact us so that we may amend the recommendations presented accordingly. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to explore the subsurface conditions at the site and to prepare recommendations for foundations, floor slab construction, site preparation, and other construction considerations. Our scope for this service included a project site reconnaissance, drilling and sampling fifteen (15) test borings, completing a laboratory testing program, and submitting an engineering analysis and evaluation of the subsurface materials.

The scope of services for the geotechnical exploration did not include an environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client. PSI's scope also did not include any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence or the amplification of the same. The Client should be aware that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. The Client should also be aware that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or reoccurrence of mold amplification.

2 SITE AND SUBSURFACE CONDITIONS

2.1 SITE LOCATION AND DESCRIPTION

The site for the proposed New Elementary School project is located at located at 1 Paul E Brown Drive Southeast, in Massillon, Stark County, Ohio. Specifically, the proposed New Elementary School will be located immediately east of the existing Washington High School football stadium and baseball field (Lat: 40.792998° & Long: -81.497825°).

The site is currently predominantly covered with an asphalt paved football practice field and school bus parking facility with associated building structure. The rest of the site area is undeveloped, covered with some light brush and gravel. Based on the provided topographic plan, the overall site generally slopes downward from northeast to southwest with an elevation difference about 50 feet (1,090' MSL to 1,040' MSL). Surface drainage was good to fair at the time of the field drilling operations. PSI recommends that any existing utility lines be checked and marked prior to construction activities.

2.2 SUBSURFACE CONDITIONS

The surface and subsurface conditions at the site were explored with a total of eighteen (18) test borings. The test borings were each drilled to a depth of approximately 10 to 20 feet below the existing surface grades. The approximate boring locations are shown on the Boring Location Plan presented in the *Appendix* of this report. The locations for the test borings were selected by PSI and located in the field relative to existing site features and based on site accessibility and the presence of below ground utilities.

The borings were advanced utilizing 3¼ inch inside diameter, hollow-stem auger drilling methods. Soil samples were routinely obtained during the drilling process. Selected soil samples were later tested in the laboratory to obtain soil material properties for the foundation, floor slabs and pavement recommendations. Drilling, sampling, and laboratory testing were accomplished in general accordance with ASTM procedures.

The types of subsurface materials encountered in the test borings have been visually classified. The results of the visual classifications, Standard Penetration tests, moisture contents and water level observations are presented on the boring logs in the *Appendix* of this report. Representative samples of the soils were placed in sample jars and are now stored in the laboratory for further analysis, if requested. Unless notified to the contrary, all samples will be disposed of after 60 days following the date of this report.

The surface of the site at test boring locations B-01, B-03, B-04, B-07, B-10, B-16 and B-17 was covered with a layer of topsoil measuring approximately 1 to 12 inches in thickness. Boring Locations B-02, B-05, B-08, B-11, B-14 and B-15 were covered with a layer of gravel measuring approximately 1 to 2 inches in thickness. Boring locations B-06 and B-13 were covered with a layer of asphalt measuring approximately 2 to 3 inches in thickness, of which B-6 was underlain with a layer of sand and gravel measuring approximately 21 inches in thickness. Boring location B-18 was covered with a layer of sand and gravel measuring approximately 12 inches in thickness. The thickness and composition of the surface and base materials should be expected to be variable throughout site.

Underlying the surface material at test boring locations B-04, B-11, B-15 and B-18, a layer of fill material was encountered, extending to the depths of about 3 to 6 feet below the existing grade. The fill material consisted primarily of sandy silt and lean clay with varying amounts of gravel, cinders, slag, and cobbles. The fill material exhibited moisture contents ranging from 9 to 19 percent. The cohesive fill materials exhibited a soft to stiff consistency, based on the Standard Penetration tests.

The surface and fill materials at all the test boring locations B-01 through B-18 were underlain by natural soils. The natural soils at the test borings location B-16 was extended to the depths about 13.3 feet below the existing surface grades and the natural soils at the test boring locations B-01 through B-15, B-17, and B-18 were encountered to the terminal depth of about 10 to 20 feet below the existing surface grades. The natural soils consisted primarily of lean clay, sandy silt and silty sand with varying amounts of gravel and rock fragments. The natural soils exhibited moisture contents ranging from 5 to 27 percent. The natural cohesive soils exhibited a medium stiff to hard consistency, and the natural granular soils exhibited a loose to medium dense relative density, based on the Standard Penetration tests.

The area's bottommost formation consisted of gray, weathered sandstone bedrock, encountered in test boring B-16.

The subsurface description is of a generalized nature provided to highlight the major strata encountered. The boring logs included in the Appendix should be reviewed for specific information at the individual boring locations. The stratifications shown on the boring logs represent the conditions only at the actual test positions. Variations may occur and should be expected between the boring locations. The stratifications represent the approximate boundary between the subsurface materials, and the transition may be gradual or not clearly defined.

2.3 GROUNDWATER LEVEL MEASUREMENTS

Groundwater was encountered in test boring locations B-16 and B-18 at a depth of 9.5 to 13 feet below existing surface grade during the field drilling operations. Note that groundwater levels fluctuate seasonally as a function of rainfall. During a time of year or weather different from the time of drilling, there may be a considerable change in the water table. Furthermore, the water levels in the boreholes often are not representative of the actual groundwater level, because the boreholes remain open for a relatively short time. Therefore, we recommend that the contractor determine the actual groundwater levels at the time of construction to evaluate groundwater impact on the construction procedures.

3 EVALUATION AND RECOMMENDATIONS

3.1 SITE PREPARATION AND EARTHWORK CONSTRUCTION

Prior to placing concrete floors or engineered fill on this site, general site area clearing should be carried out. All base, topsoil, grass, roots, excessively wet soils, highly organic soils, and soft/loose or obviously compressible materials, should be completely removed from the proposed construction areas. Depending up on the final grades, the unsuitable fill material, as evidenced at all test boring locations B-04, B-11, B-15 and B-18 should be completely removed from below the proposed building foundation footprint, and to a minimum depth of 12 inches below the proposed pavement subgrade elevations and replaced with compacted engineered fill. The precise extent of required cut and fill should be determined in the field by a representative of PSI following observation of the exposed subgrades and proof rolling operations.

Following the site clearing, stripping and undercutting, and prior to placing engineered fill, the exposed subgrades should be critically proof rolled with a loaded 20-ton tandem-axle dump truck until the grade offers a relatively unyielding surface. Areas of excessive yielding, as observed by a geotechnical engineer's representative, should be excavated and backfilled with compacted engineered fill and/or the unstable soils can be stabilized by choking the exposed bearing surface with crushed limestone or similar coarse aggregate. After the existing subgrade materials are excavated to design grade, proper control of subgrade compaction and the placement and compaction of new fill materials should be observed and tested by a representative of PSI.

It is recommended that the site preparation, proof rolling, and earthwork activities should be performed during a period of dry weather, which can significantly reduce the required extent of soil stabilization, drainage and surface repairs.

During site preparation, fill piles, burn pits, trash pits or other isolated disposal areas may be encountered. All too frequently such buried material occurs in isolated areas outside boring locations. Any such material encountered during site work, or foundation, floor slab or pavement construction should be excavated, removed from the site, and backfilled with compacted structural fill.

3.2 ENGINEERED FILL

Materials selected for use as engineered fill should not contain more than 5 percent by weight of organic matter, waste construction debris, or other deleterious materials. Fill materials should have a Standard Proctor maximum dry density (ASTM D-698) greater than 110 pounds per cubic foot (pcf), an Atterberg Liquid Limit of less than 40, a Plasticity Index of less than 15, and a maximum particle size of 3 inches or less. Engineered fill materials should consist of non-expansive materials. Pyritic and/or potentially expansive materials, such as mine tailings, shales and slag should not be used as engineered fill material.

Based on the results of the boring explorations, the on-site soils not suitable for reuse as engineered fill. If the on-site soils are used for fill, close moisture content control will be required to achieve the recommended degree of compaction. PSI anticipates that disking and aerating the soils during a warm, dry period may be necessary to lower the moisture content. If engineered fill placement must proceed during a wet or cool time of the year, it may likely be infeasible to re-use the on-site soils as engineered fill and imported fill materials would be required. If wet or cool season earthwork is necessary, we recommend the use of imported fill materials such as ODOT No. 304 or 411 crushed aggregate.

Representative samples of the proposed fill materials should be collected at least one week prior to the start of the filling operations. The samples should be tested to determine the maximum dry density, optimum moisture content, particle size distribution and plasticity characteristics. These tests are needed to determine if the material is acceptable as structural fill and for quality control during the compaction process.

Engineered fill materials should be placed and compacted in individual lifts of 8 inches or less loose measurement. Within small excavations such as in utility trenches, around manholes, or behind retaining walls, we recommend the use of smaller, hand- or remote-guided equipment. Loose lift thicknesses of 4 inches or less are recommended when using such equipment.

We recommend that structural fill be compacted to a minimum of 98 percent of the maximum dry density and within ±2% of the optimum moisture content, as determined by ASTM D-698. A representative of PSI should observe fill placement operations and perform density tests concurrently to indicate if the specified compaction is being achieved.

3.3 FOUNDATION RECOMMENDATIONS

Based on the test boring results, laboratory test results, and the proposed construction, our analysis indicates that the proposed building structure can be supported on isolated and/or continuous spread-footing foundations, bearing on the existing natural soil or on properly compacted engineered fill, will be suitable to support the proposed building structure. An allowable bearing capacity of 2,500 psf may be utilized for the design of the spread-footing foundations.

All perimeter footings must be placed at a minimum depth of 42 inches below the finished grade in order to protect against frost action. Interior foundations in heated areas may be placed at a depth of at least 18 inches below the floor slab, provided they will be bearing on acceptable natural or compacted engineered fill soils.

Extreme care should be taken to prevent weakening of the foundation bearing materials because of prolonged atmospheric exposure, construction activity disturbance or an increase in moisture content. If an overnight delay in concrete placement is anticipated, the foundation excavations should be cut approximately 6 inches and subsequently excavated to final grade immediately before placement of concrete.

In order to reduce the effects of differential movement that may occur due to variations in the character of the supporting soil and any variations in seasonal moisture contents, it is recommended that all continuous footings be reinforced, as per structural considerations. Foundations supporting individual columns should have a minimum dimension of 24 inches, and continuous wall foundations should have a minimum width of 18 inches.

Based on the assumed structural loads, it is anticipated that total and differential foundation settlements will be less than 1.0-inch and 0.50-inch, respectively. However, actual settlements will be dependent upon the depth of the foundations, column spacing, structural loads and other related factors. The structural and architectural design should include provisions for liberally spaced, vertical control joints to minimize the effects of potential settlement.

Control points should be established within the anticipated fill areas (more than 4 feet) to monitor, during and subsequent to the completion of the fill operations, any and all settlements of the final grade resulting from

consolidation of the area's subsurface materials under the weight of the engineered fill, and from the engineered fill under their own weight. Settlement-time data, thus developed, should be employed to establish the time of placement of the building structure and pavement areas.

PSI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork and related activities of this project. PSI cannot accept responsibility for conditions that deviate from those described in this report, nor for the performance and testing for this project.

Based on table 1615.1.1 of the OBC Building Code, the test boring results, and review of the geology in vicinity to the project area, a **Site Classification of 'C'** can be utilized for the seismic design.

3.4 FLOOR SLAB DESIGN AND CONSTRUCTION

Preparation of floor slab subgrades should be in accordance with the recommendations outlined in the *Site Preparation* and *Engineered Fill* sections of the report. If subsurface materials at the finished subgrade elevations exhibit excessive moisture contents and unstable subgrade conditions, then undercutting and replacement of the objectionable soils should be performed to achieve firm subgrade support. Alternatively, the unstable soils can be stabilized by choking the exposed bearing surface with crushed limestone or similar coarse aggregate.

After the soils in the building area have been prepared as discussed, it is recommended that the subgrade surface be subjected to surface compaction to the extent that a minimum of 24 inches of materials underlying the slab subgrade elevation achieve a minimum in-place density of 98 percent of the maximum laboratory dry density and should be within $\pm$ 2 % of the optimum moisture content, as determined in general accordance with ASTM D-698.

A capillary gravel layer (such as AASHTO #57 or ODOT #304) should be provided between the floor slab and the approved subgrade materials. The gravel layer should have a minimum thickness of 6 inches and should be properly compacted. Also, a vapor barrier is recommended below the floor slab as per ACI specifications. We recommend that a subgrade modulus (k) of 80 pci be used in floor slab design calculations.

Careful field control is to be exercised in finish grading operations in order to assure that subgrade tolerances are maintained. It is particularly important that no low sectors or depressions be allowed to exist within these areas, water may accumulate and lead to serious loss of supporting capacity.

The floor slab should be suitably reinforced, as per structural considerations, to make it as rigid as practical. Proper joints should be provided at the junctions of the slab and foundation system so that a small amount of independent movement can occur without causing damage. Large floor areas should be provided with joints at frequent intervals to compensate for concrete volume changes during curing and temperature changes.

3.5 PAVEMENT RECOMMENDATIONS

Pavement design will include proper preparation of subgrade sectors, careful design of the pavement area drainage systems and utilization of an aggregate base course with asphalt concrete or concrete surface course. Preparation of pavement subgrades should be in accordance with the recommendations outlined in the *Site Preparation* and *Engineered Fill* sections of the report. Careful attention will be required in fine grading the subgrade surfaces in order to eliminate undulations and depressions that would tend to collect water.

We recommend that the exposed surface be proof rolled, and any soft areas removed. Compaction of fill soil intended to support pavement should meet or exceed 98% of the maximum dry density as determined by ASTM D698 (Standard Proctor). The moisture content at the time of compaction should be within 2% of the optimum value. Any removed soil should be replaced by compacted structural fill to arrive at the desired grade.

The proposed pavement construction will be primarily for car and bus traffic. No traffic loading information was provided at the time of this report. However, PSI has assumed average daily traffic (ADT) of about 150 cars, 30 buses, and 2 semi-trucks. Based on the anticipated pavement design information, the following pavement design parameters may be utilized for new pavement design:

Design Parameters		
	Flexible Pavement	**Rigid Pavement**
Light Duty design 18-kip ESAL's	50,000	50,000
Heavy Duty design 18-kip ESAL's	200,000	200,000
Reliability:	80%	80%
Overall Deviation:	0.49	0.39
Design Life (Years):	20	20
Initial Serviceability:	4.5	4.2
Terminal Serviceability:	2.5	2.5
Design CBR	4	--
Subgrade Modulus (k, pci)	--	80

Flexible Pavement

The recommended pavement thickness values are shown in Tables 1 and 2. These design thicknesses assume that a properly prepared subgrade has been achieved.

Table 1: Flexible Pavement Sections (20-Year Design Life)

	Light-Duty*	**Heavy Duty**
Surface Course (ODOT #448 Type 1)	1.5 inches	1.5 inches
Intermediate Course (ODOT #448 Type 2)	2.0 inches	3.0 inches
Aggregate Base Course (ODOT #304)	6.0 inches	8.0 inches

**Parking spaces only*

For parking stalls that allow free movement through them (i.e., no parking block or curbs), we recommend installing the heavy-duty asphalt section. Allowances for proper drainage and proper material selection of base materials are most important for performance of asphaltic pavements. Ruts and birdbaths in asphalt pavement allow for quick deterioration of the pavement primarily due to saturation of the underlying base and subgrade.

Rigid Pavement

The use of concrete for paving has become more prevalent in recent years due to the long-term maintenance cost benefits of concrete compared to asphaltic pavements. Should concrete pavement be utilized, the concrete should be properly reinforced and jointed, and should have a 28-day flexural strength of no less than 650 psi and should be air entrained. Expansion joints should be sealed with a polyurethane sealant so that moisture infiltration into the subgrade soils and resultant concrete deterioration at the joints is reduced.

Table 2: Rigid Pavement Sections

	Light-Duty*	Heavy Duty
Reinforced Concrete	5.0 inches	7.0 inches
Aggregate Base Course (ODOT #304)	6.0 inches	6.0 inches

**Parking spaces only*

The portions of the site where rigid (concrete) pavements are recommended include the entrance/exit driveway aprons and the dumpster pad enclosure area. A heavy-duty pavement section is recommended for lanes designated for delivery trucks. Crushed aggregate base materials should be compacted to at least 98% of the standard Proctor (ASTM D 698) maximum dry density near optimum moisture content. The use of Portland cement concrete (PCC) for paving has become more prevalent in recent years based on material costs for concrete vs. bituminous and the long-term maintenance cost benefits of concrete compared to bituminous pavements. If PCC pavement is utilized, the concrete should be properly jointed, have proper load-transfer mechanisms installed, and should have a minimum 28-day compressive strength of 4,000 psi. Expansion and construction joints should be sealed with a polyurethane sealant so that moisture infiltration into the subgrade soils and resultant concrete deterioration at the joints is minimized. Concrete pavement at least 8 inches thick is recommended for the trash dumpster pad and entrance/exit aprons due to the high wheel and impact loads that these areas experience.

Design for drainage is of the utmost importance to minimize detrimental effects that may shorten the service life of the pavements. The pavement should be crowned or sloped in order to promote effective surface drainage and reduce the risk of water ponding. We recommend a minimum slope of 1.5 percent. In addition, the subgrade should be similarly sloped to promote effective subgrade drainage. We recommend “stub” or “finger” drains be provided around catch-basins and in other low areas of the proposed pavements to limit the accumulation of water on the frost susceptible subgrade soils. Subsurface edge drains should be provided at curbs. Where no curbs are proposed, ditches should be provided, and the pavement base course should be daylighted through the ditch side slope to facilitate drainage of the base course.

If fill material is needed to establish the required pavement grade, fill placement and compaction must be performed in accordance with the procedures outlined in the *Site Preparation* section of this report. The edges of compacted fill should extend a minimum 2 feet beyond the edges of the pavement, or a distance equal to the depth of fill beneath the pavement, whichever is greater.

All materials to be employed and field operations required in connection with the contemplated pavement structures should follow recommendations and procedural details as per the Ohio Department of Transportation, Asphalt Institute, and/or American Concrete Institute.

4 CONSTRUCTION CONSIDERATIONS

4.1 GROUNDWATER CONTROL AND DRAINAGE

Free groundwater was encountered in test boring locations B-16 and B-18 at a depth of 9.5 to 13 feet below existing surface grade during the field drilling operations. However, groundwater and/or seepage could be encountered during foundation excavation and construction. Accordingly, a gravity drainage system, sump pump or other conventional dewatering procedure, as deemed necessary by the field conditions, should be implemented throughout construction such that the groundwater is always controlled and maintained at an elevation of at least 2 feet below the excavation bottom. Every effort should be made to keep the excavations dry if water is encountered.

Water should not be allowed to collect near the foundation or floor slab areas of the building either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slab. Overall site area drainage is to be arranged in a manner such that the possibility of water impounding below slab-on-grade areas and over the structural fill is prevented.

4.2 EXCAVATIONS

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P." This document was issued to better ensure the safety of workers entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations or foundation excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced. If they are not followed closely, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person" as defined in "CFR Part 1926," should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred. If the excavations are left open and exposed to the elements for a significant length of time, desiccation of the clays may create minute shrinkage cracks which could allow large pieces of clay to collapse or slide into the excavation.

Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a collapse of the embankment.

4.3 WEATHER CONSIDERATIONS

The soils encountered at this site are known to be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Care should be exercised during the grading operations at the site. Due to the fine-grained nature of the surficial soils, the traffic of heavy equipment, including heavy compaction equipment, may very well create pumping and a general deterioration of those soils in the presence of water. Therefore, the grading should, if possible, be performed during a dry season. A layer of crushed stone may be required to allow the movement of construction traffic over the site during the rainy season. The contractor should maintain positive site drainage and if wet/pumping conditions occur, the contractor will be responsible to over excavate the wet soils and replace them with a properly compacted engineered fill. During wet seasons, limestone stabilization may be required to place engineered fill.

5 GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. Site exploration identifies actual subsurface conditions only at those points where samples are taken. A geotechnical report is based on conditions that existed at the time of the subsurface exploration. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitute PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

6 REPORT LIMITATIONS

The recommendations submitted in this report are based on the available subsurface information obtained by PSI and design details furnished by Architectural Vision Group, LTD. If there are any revisions to the plans for the proposed structures, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be retained to determine if changes in the recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are complete, it is recommended that PSI be provided the opportunity to review the final design and specifications, in order to verify that the earthwork and recommendations are properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Architectural Vision Group, LTD., for the specific application to the proposed New Elementary School located at 1 Paul E Brown Drive Southeast, in Massillon, Stark County, Ohio.

APPENDIX

SOIL BORING LOCATION PLAN

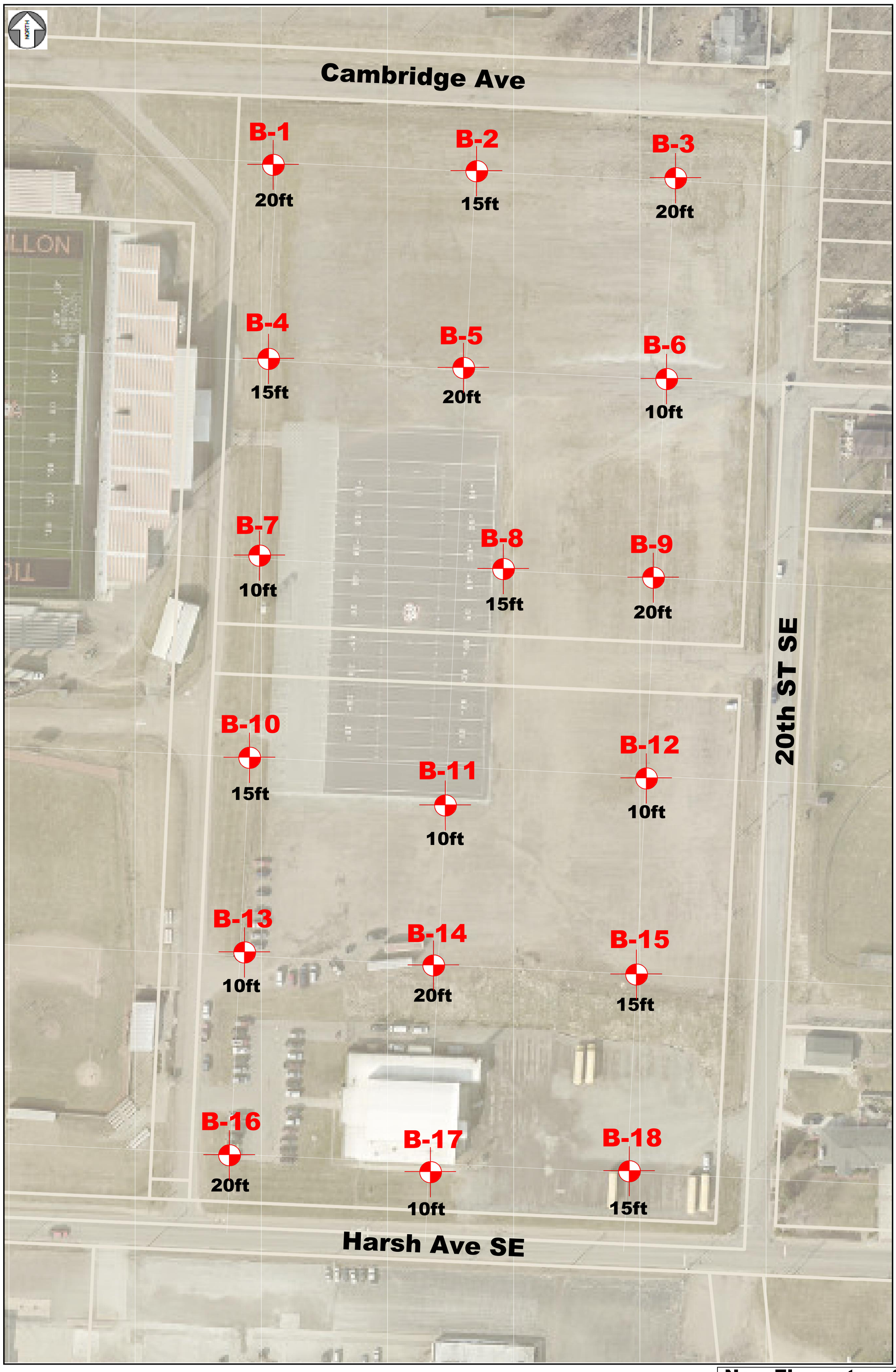
FENCE DIAGRAM

BORING LOGS

GRAIN SIZE GRAPH

GENERAL NOTES & USCS SOIL CLASSIFICATION CHART

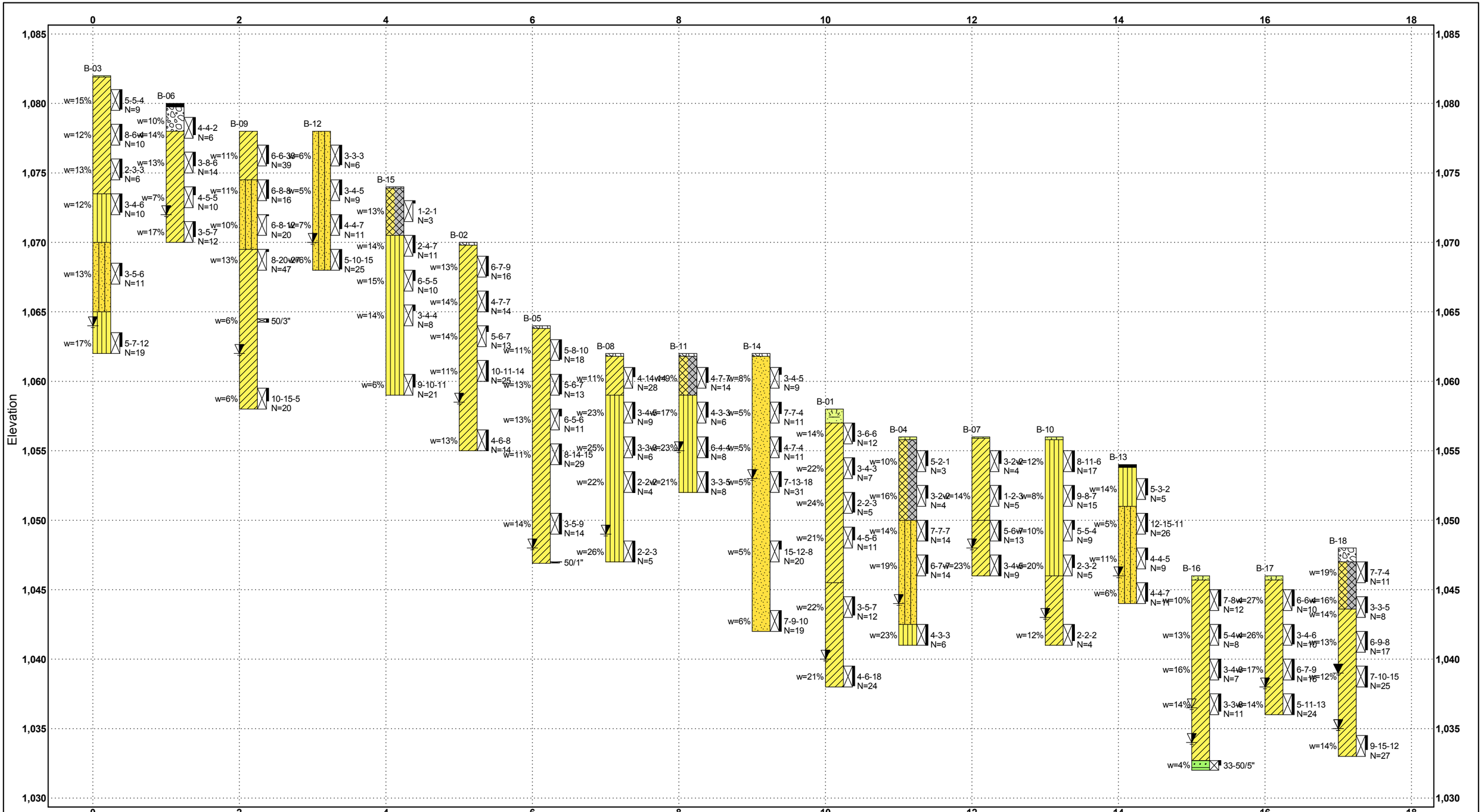
Boring Location Plan



New Elementary School

Washington High School Site
1 Paul E Brown Drive Southeast
Massillon, Stark County, Ohio

PSI Project No:. 0142-2428



intertek psi

Professional Service Industries, Inc.
5555 Canal Road
Cleveland, OH 44125

Profile

Proposed Elem School - Washington
PSI Project Number: 0142-2428

1 Paul E Brown Drive, Southeast
Massillon, Stark County, Ohio

BORING B-01

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1058 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	18 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**12" Topsoil**	Topsoil				
				1	16	Stiff to Medium Stiff to Stiff, Moist, Gray **Lean CLAY** with Silt, Trace to Little Gravel, Trace Organics		3-6-6 N=12	14		
1055											
				2	15			3-4-3 N=7	22		
	5										
				3	17		CL	2-2-3 N=5	24		
1050											
				4	11			4-5-6 N=11	21		
	10										
						Stiff to Very Stiff, Moist, Brown **Lean CLAY**, Trace Gravel					
1045											
				5	16			3-5-7 N=12	22		
	15						CL				
1040											
				6	17			4-6-18 N=24	21		
	20										

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Professional Service Industries, Inc.
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PROJECT NO.: 0142-2428
PROJECT: Proposed Elem School - Washington
LOCATION: 1 Paul E Brown Drive, Southeast
Massillon, Stark County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-02

DATE STARTED:	10/1/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/1/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1070 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

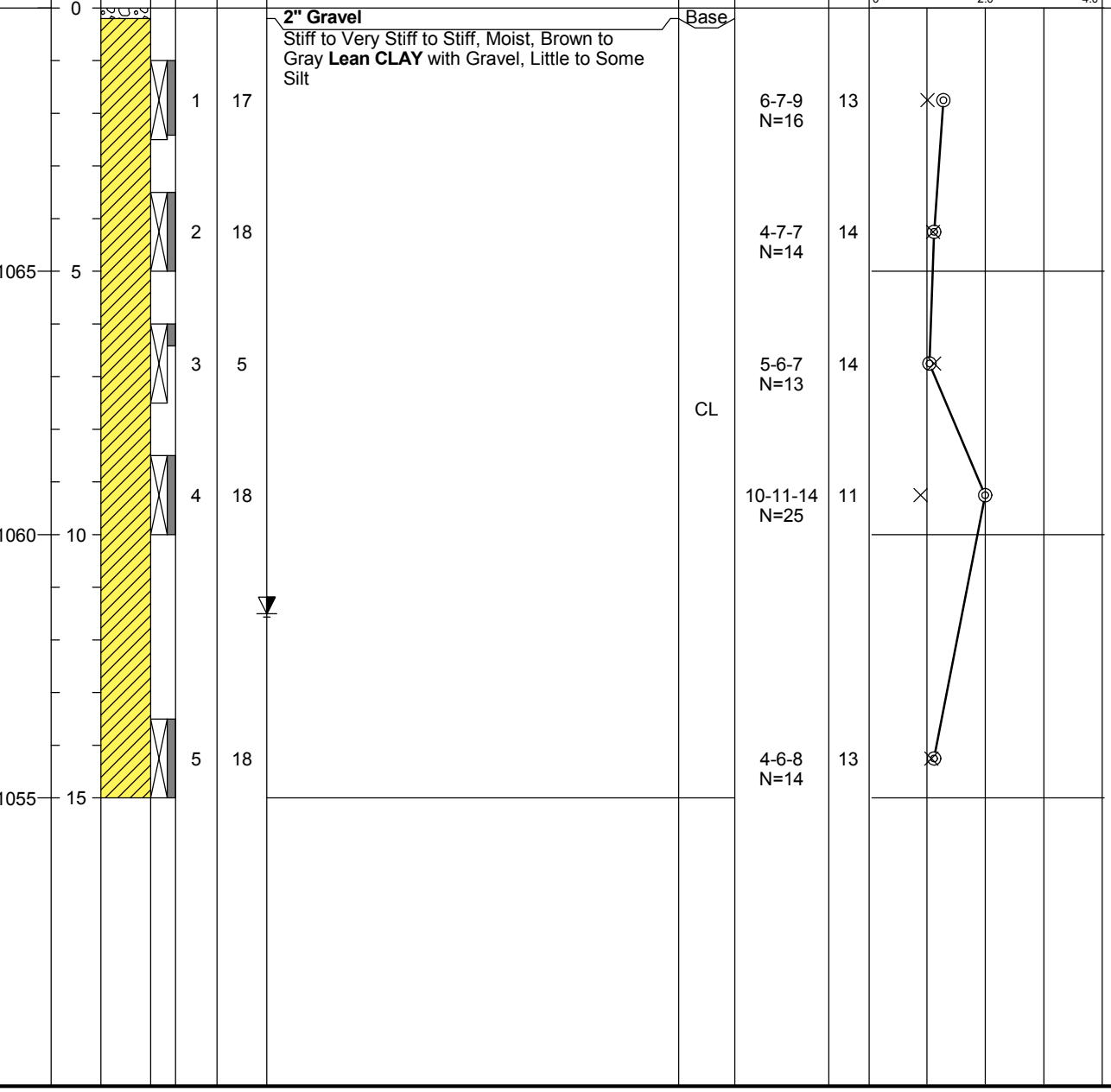
While Drilling	N/A
Upon Completion	N/A
Caved Depth	11.5 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0			**2" Gravel**	Base		
		1	17	Stiff to Very Stiff to Stiff, Moist, Brown to Gray **Lean CLAY** with Gravel, Little to Some Silt		6-7-9 N=16	13
		2	18			4-7-7 N=14	14
1065	5	3	5		CL	5-6-7 N=13	14
		4	18			10-11-14 N=25	11
1060	10						
		5	18			4-6-8 N=14	13
1055	15						

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture ✕ PL ◪ LL ✚
0 25 50
STRENGTH, tsf
Qu ▲ Qp ✳
0 2.0 4.0

Additional Remarks



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BORING B-03

DATE STARTED:	9/30/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	9/30/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1082 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	18 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
1080	0	1	17	**1" Topsoil** Stiff to Medium Stiff, Moist, Brown **Lean CLAY** with Sand and Gravel	Topsoil CL	5-5-4 N=9	15
	5	2	14			8-6-4 N=10	12
1075		3	16			2-3-3 N=6	13
	10	4	16	Stiff, Moist, Brown **Sandy SILT**, Trace Gravel, Some Clay	ML	3-4-6 N=10	12
1070				Medium Dense, Moist, Brown **Silty SAND** with Gravel, Trace Clay			
	15	5	11		SM	3-5-6 N=11	13
1065				Very Stiff, Moist, Brown **Sandy SILT**, Trace Gravel	ML		
	20	6	12			5-7-12 N=19	17

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture × PL ◪ LL ✚
0 — 25 — 50
STRENGTH, tsf
Qu ▲ Qp ✳
0 — 2.0 — 4.0

Additional Remarks

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BORING B-04

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1056 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	12 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
1055	0			**2" Topsoil**	Topsoil		
		1	13	Soft, Moist, Black/Brown **Sandy SILT** with Gravel, Some Slag, Little Cinders	Fill	5-2-1 N=3	10
	5	2	11			3-2-2 N=4	16
1050		3	18	Medium Dense, Moist, Brown **Silty SAND** with Little Clay	SM	7-7-7 N=14	14
		4	16			6-7-7 N=14	19
1045	10						
		5	18	Medium Stiff, Moist, Brown **Sandy SILT**	ML	4-3-3 N=6	23
	15						

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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BORING B-05

DATE STARTED:	10/1/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/1/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	17.1 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1064 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	16 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
1064	0			**2" Gravel**	Base			
		1	17	Very Stiff to Stiff to Hard, Moist, Brown **Lean CLAY** with Sand, Trace to Some Gravel		5-8-10 N=18	11	
1060		2	17			5-6-7 N=13	13	
	5	3	6		CL	6-5-6 N=11	13	LL = 22 PL = 15 Fines=50.5%
1055		4	18			8-14-15 N=29	11	
	10							
1050		5	18			3-5-9 N=14	14	
	15							
		6	0	@ 17 feet; Auger Refusal		50/1"		>>

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
Moisture × PL ◪ LL ✚
0 25 50
STRENGTH, tsf
Qu ▲ Qp ✳
0 2.0 4.0

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BORING B-06

DATE STARTED:	9/30/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	9/30/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1080 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	8 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**3" Asphalt over 21" Black Sand and Gravel Base**	Asphalt				
							Base		10	×	
				1	15			4-4-2 N=6	14	×	
						Medium Stiff to Stiff, Moist, Brown **Lean CLAY** with Sand and Gravel					
				2	12			3-8-6 N=14	13	◎	
1075	5						CL				
				3	7			4-5-5 N=10	7	× ◎	
				4	13			3-5-7 N=12	17	◎ ×	
1070	10										

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BORING B-07

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1056 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	8 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**1" Topsoil**	Topsoil				
1055				1	11	Medium Stiff, Moist, Brown **Lean CLAY** with Gravel and Rock Fragments (Clean Fill)	CL	3-2-2 N=4			
				2	12			1-2-3 N=5	14		
	5										
1050				3	18	Stiff, Moist, Brown **Lean CLAY** with Gravel and Rock Fragments	CL	5-6-7 N=13			
				4	18			3-4-5 N=9	23		
	10										

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BORING B-08

DATE STARTED:	10/1/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/1/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1062 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	13 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**2" Gravel**	Base				
1060				1	8	Very Stiff, Moist, Brown **Lean CLAY** with Sand and Gravel	CL	4-14-14 N=28	11		
				2	14	Stiff to Medium Stiff, Moist, Brown/Gray **Sandy SILT**, Trace to Little Gravel		3-4-5 N=9	23		
	5										
1055				3	16			3-3-3 N=6	25		
				4	18		ML	2-2-2 N=4	22		
	10										
1050											
				5	18			2-2-3 N=5	26		
	15										

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BORING B-09

DATE STARTED:	9/30/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	9/30/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1078 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	16 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ / STRENGTH, tsf	Additional Remarks
	0									Moisture × PL ◪ LL ✚ (0, 25, 50); Qu ▲ Qp ✳ (0, 2.0, 4.0)	
				1	16	Hard, Moist, Brown/Gray **Lean CLAY** with Sand and Gravel, Some Cobbles	CL	6-6-33 N=39	11		
1075											
				2	16	Medium Dense, Moist, Brown **Silty SAND** with Gravel and Cobbles		6-8-8 N=16	11		LL = 23 PL = 16 Fines=47.0%
	5										
				3	1	@ 6 feet; Pushed Boulder	SM	6-8-12 N=20	10		
1070											
				4	2	Hard to Very Stiff, Moist, Brown/Gray **Lean CLAY** with Sand and Gravel, Some Cobbles @ 8.5 feet; Pushed Boulder		8-20-27 N=47	13		
	10										
1065											
				5	3	@ 13.5 feet; Pushed Boulder	CL	50/3"	6	>>	
	15										
1060											
				6	11			10-15-5 N=20	6		
	20										

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BORING B-10

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1056 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	13 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
1055	0			**2" Topsoil**	Topsoil		
		1	18	Very Stiff to Stiff, Moist, Brown **Sandy SILT** with Gravel and Rock Fragments		8-11-6 N=17	12
		2	12			9-8-7 N=15	8
	5				ML		
1050		3	8			5-5-4 N=9	10
		4	11			2-3-2 N=5	20
	10			Medium Stiff, Moist, Brown **Lean CLAY** with Gravel and Shale Fragments			
1045					CL		
		5	14			2-2-2 N=4	12
	15						

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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BORING B-11

DATE STARTED:	10/1/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/1/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1062 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	7 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0					**2" Gravel**	Base		
1060				1	13	Stiff, Moist, Brown/Black **Lean CLAY** with Silt, Gravel and Cobbles, Trace Slag	Fill	4-7-7 N=14	9
				2	13	Medium Stiff to Stiff, Moist, Brown **Sandy SILT**, Trace Gravel, Trace Clay		4-3-3 N=6	17
	5								
1055				3	18		ML	6-4-4 N=8	23
				4	18			3-3-5 N=8	21
	10								

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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BORING B-12

DATE STARTED:	9/30/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	9/30/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1078 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	8 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Loose to Medium Dense, Moist, Brown **Silty SAND** with Gravel					
1075				1	17			3-3-3 N=6	6		
				2	13		SM	3-4-5 N=9	5		
	5										
				3	12			4-4-7 N=11	7		
1070											
				4	17			5-10-15 N=25	6		
	10										

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BORING B-13

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Truck D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1054 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	94%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	8 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ Moisture × PL ◪ LL ✚ (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**2" Asphalt**	Asphalt				
				1	14	Medium Stiff, Moist, Brown **Sandy SILT** with Gravel	ML	5-3-2 N=5	14		
1050				2	16	Medium Dense to Loose to Medium Dense, Moist, Brown **Silty SAND** with Gravel		12-15-11 N=26	5		
	5			3	10		SM	4-4-5 N=9	11		
1045				4	16			4-4-7 N=11	6		
	10										

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Professional Service Industries, Inc.
5555 Canal Road
Cleveland, OH 44125
Telephone: (216) 447-1335

PROJECT NO.: 0142-2428
PROJECT: Proposed Elem School - Washington
LOCATION: 1 Paul E Brown Drive, Southeast
Massillon, Stark County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-14

DATE STARTED:	10/1/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/1/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1062 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	9 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**2" Gravel**	Base				
1060				1	6	Loose to Medium Dense, Moist, Brown **Poorly Graded SAND** with Gravel and Cobbles		3-4-5 N=9	8		
				2	10			7-7-4 N=11	5		
	5										
1055				3	13			4-7-4 N=11	5		
				4	13			7-13-18 N=31	5		
	10						SP				
1050											
				5	7			15-12-8 N=20	5		
	15										
1045											
				6	18			7-9-10 N=19	6		
	20										

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BORING B-15

DATE STARTED:	10/1/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/1/21	**DRILLER:** TS	**LOGGED BY:** ZO
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	ATV CME-55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1074 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	93%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	N/A
Upon Completion	N/A
Caved Depth	N/A

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0					**1" Gravel** Base			
				1	2	Soft, Moist, Brown/Black **Lean CLAY** with Silt, Gravel and Cobbles, Trace Organics	Fill	1-2-1 N=3	13
1070				2	15	Soft to Very Stiff, Moist, Brown **Sandy SILT** with Gravel, Trace Clay		2-4-7 N=11	14
	5			3	9			6-5-5 N=10	15
1065				4	5		ML	3-4-4 N=8	14
	10								
1060				5	11			9-10-11 N=21	6
	15								

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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Massillon, Stark County, Ohio

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BORING B-16

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	14.0 ft	**DRILL RIG:**	Truck D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1046 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	94%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water		
While Drilling	9.5	feet
Upon Completion	N/A	
Caved Depth	12	feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					**3" Topsoil**	Topsoil				
1045						Stiff to Medium Stiff, Moist, Brown **Lean CLAY** with Sand and Gravel					
				1	14			7-8-4 N=12	10		
				2	12			5-4-4 N=8	13		
	5										
1040				3	16		CL	3-4-3 N=7	16		
				4	15			3-3-8 N=11	14		
	10										
1035											
				5	4	Weak, Brown **Weathered SANDSTONE**	Rock	33-50/5"	4	>>◎	
						@ 14 feet; Auger Refusal					

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Massillon, Stark County, Ohio

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BORING B-17

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Truck D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1046 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	94%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV

REMARKS:

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Caved Depth	8 feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎	Additional Remarks
	0					**3" Topsoil**	Topsoil				
1045				1	14	Stiff to Very Stiff, Moist, Brown/Gray **Lean CLAY** with Sand and Gravel		6-6-4 N=10	27		
				2	17			3-4-6 N=10	26		
	5						CL				
1040				3	18			6-7-9 N=16	17		
				4	18			5-11-13 N=24	14		
	10										

Moisture × PL ◪ LL ✚ (0, 25, 50)

STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)

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PROJECT: Proposed Elem School - Washington
LOCATION: 1 Paul E Brown Drive, Southeast
Massillon, Stark County, Ohio

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BORING B-18

DATE STARTED:	10/4/21	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	10/4/21	**DRILLER:** JJ	**LOGGED BY:** ZO
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	Truck D-50
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	1048 ft	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	94%
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AV
REMARKS:			

Water

While Drilling	13	feet
Upon Completion	9	feet
Caved Depth	13	feet

BORING LOCATION:

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %
	0			**12" Sand and Gravel**	Base		
		1	17	Stiff, Moist, Black/Gray **Sandy SILT** with Gravel, Trace Organics	Fill	7-7-4 N=11	19
1045		2	14			3-3-5 N=8	16 14
	5			Stiff to Very Stiff, Moist, Brown/Gray **Lean CLAY** with Sand, Trace to Some Gravel			
		3	16			6-9-8 N=17	13
1040		4	18		CL	7-10-15 N=25	12
	10			@ 11 feet; Large Cobbles			
1035		5	12			9-15-12 N=27	14
	15						

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

Additional Remarks

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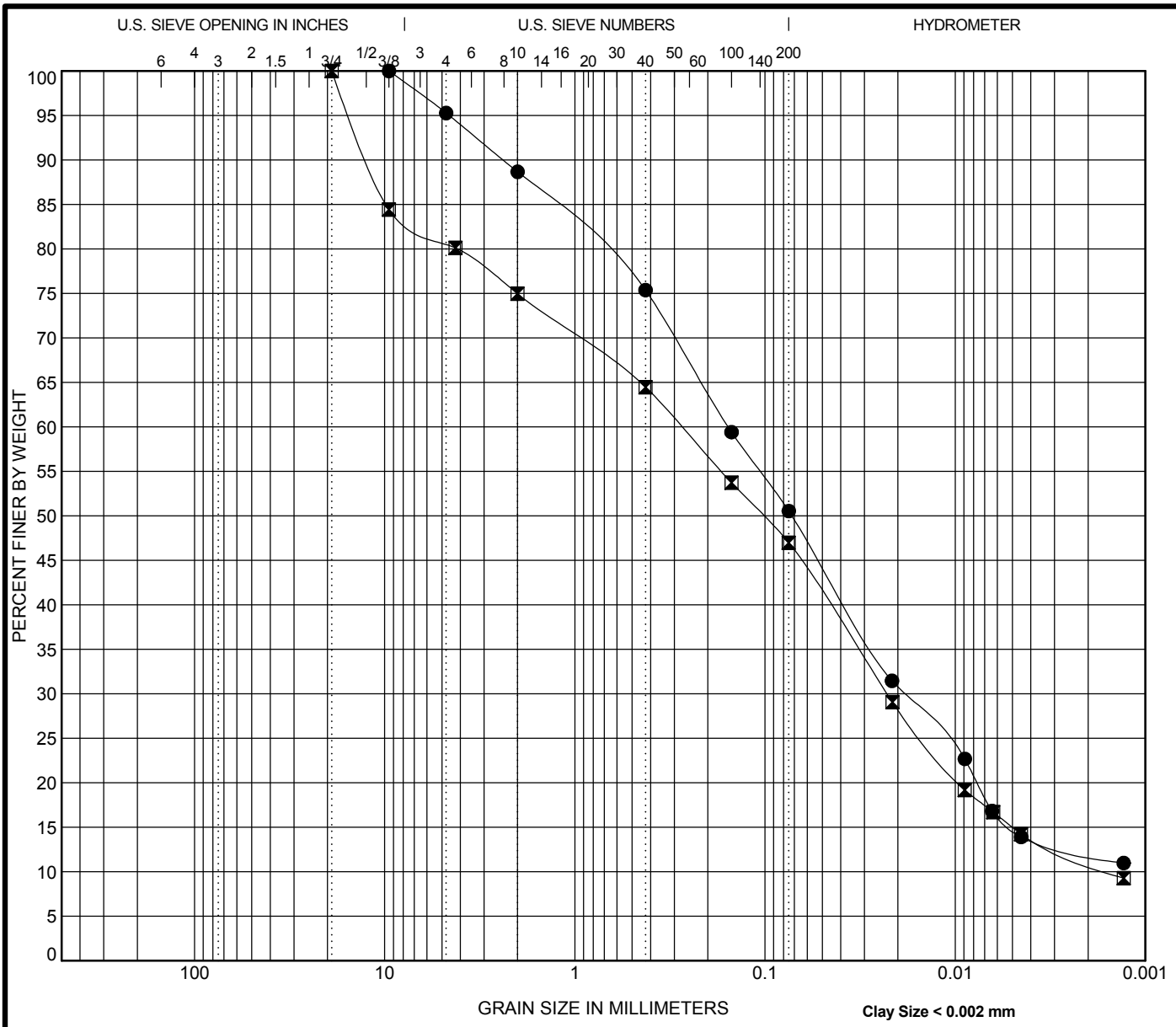
PROJECT NO.: 0142-2428
PROJECT: Proposed Elem School - Washington
LOCATION: 1 Paul E Brown Drive, Southeast
Massillon, Stark County, Ohio

The stratification lines represent approximate boundaries. The transition may be gradual.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● **B-5**	**6.8**	Lean CLAY (CL)	**22**	**15**	**7**		
⊠ **B-9**	**4.3**	Silty SAND (SM)	**23**	**16**	**7**	**1.21**	**176.84**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **B-5**	**6.8**	**9.5**	**0.156**	**0.019**		**4.7**	**44.7**	**38.6**	**12.0**
⊠ **B-9**	**4.3**	**19**	**0.276**	**0.023**	**0.002**	**19.3**	**33.7**	**36.0**	**11.0**

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GRAIN SIZE DISTRIBUTION

Project: Washington High School
PSI Job No.: 0142-2428
Location: 1 Paul E Brown Drive, Southeast
Massillon, Stark County, Ohio

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.002 mm to 0.075 mm
Clay:	<0.002mm to <0.005 mm depending on agency

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

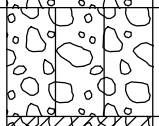
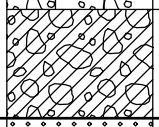
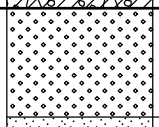
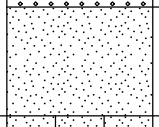
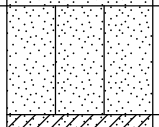
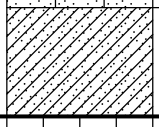
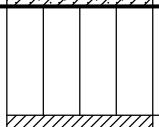
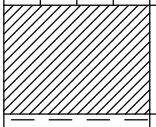
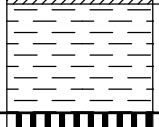
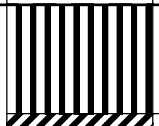
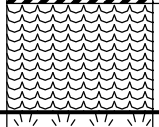
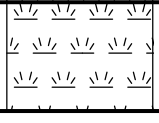
Slightly Weathered: Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.

Weathered: Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.

Highly Weathered: Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	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
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS