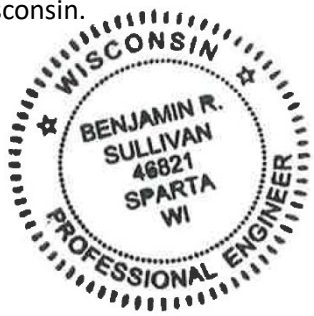
Geotechnical Evaluation Report

Proposed 5th Ward Residential Development
1325 Saint Andrew Street
La Crosse, Wisconsin

Prepared for

5th Ward Residence, LLC

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Wisconsin.



Benjamin R. Sullivan, PE
Project Engineer
License Number: 46821
August 25, 2021

BRAUN INTERTEC
The Science You Build On.

Project B2106376

Braun Intertec Corporation

BRAUN INTERTEC
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August 25, 2021 Project B2106376

Mr. Paul Borsheim
5th Ward Residence, LLC
2 Copeland Avenue, Suite 201
La Crosse, WI 54601

Re: Geotechnical Evaluation
Proposed 5th Ward Residential Development
1325 Saint Andrew Street
La Crosse, Wisconsin

Dear Mr. Borsheim:

We are pleased to present this Geotechnical Evaluation Report for the proposed 5th Ward Residential Development to be located at 1319 and 1325 Saint Andrew Street in La Crosse, Wisconsin.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Ben Sullivan or Brandon Wright at 608.781.7277 or by email at bsullivan@braunintertec.com or bwright@braunintertec.com.

Sincerely,

BRAUN INTERTEC CORPORATION

Benjamin R. Sullivan, PE
Project Engineer

Brandon K. Wright, PE
Senior Engineer

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A. Introduction

A.1. Project Description

This Geotechnical Evaluation Report addresses the proposed design and construction of the 5th Ward Residential Development to be located at 1325 Saint Andrew Street in La Crosse, Wisconsin. The project will include design and construction of five new buildings including two five-story 72-unit apartment complexes with above grade parking under them, two two-story 7-unit townhomes with garage stalls and one single-story activity center. The project will also include associated site improvements including concrete and bituminous pavements, sidewalks, utilities, storm water drainage systems, and outdoor activity space. Table 1 provides the project details.

Table 1. Project Description

Aspect	Description
Proposed Apartment Complex Buildings	▪ Five-story, slab-on-grade, wood-framed and precast concrete structures. Each structure will have 72 units with 42 above grade parking stalls on the ground level of the structures. ▪ Approximately 84,325 square feet each. ▪ Based on our conversations with I & S Group, Inc., we have assumed that column loads will be 350 kips or less, wall loads will be 10,000 pounds per lineal foot (plf) or less, and interior floor slabs will support 250 pounds per square foot (psf) or less. ▪ According to preliminary grading plans provided by I & S Group, Inc., the proposed finished floor elevations of the apartment buildings are 648 feet. ▪ Based on the preliminary site grading plans fills of 2 feet or less from existing grades will be required to achieve finished floor elevation.
Proposed Townhome Buildings	▪ Two-story, slab-on-grade, wood-framed structures. Each structure will have 7 units with 8 garage stalls. ▪ Approximately 7,675 square feet each. ▪ Based on our conversations with I & S Group, Inc., we have assumed that column loads will be 100 kips or less, wall loads will be 5,000 plf or less, and interior floor slabs will support 100 psf or less. ▪ According to preliminary grading plans provided by I & S Group, Inc., the proposed finished floor elevations of the townhomes are 648.3 feet. ▪ Based on the preliminary site grading plans fills of 2 feet or less from existing grades will be required to achieve finished floor elevation.

Aspect	Description
Proposed Activity Center Building	▪ Single-story, slab-on-grade, wood-framed structure. ▪ Approximately 4,785 square feet. ▪ Based on our conversations with I & S Group, Inc., we have assumed that column loads will be 100 kips or less, wall loads will be 5,000 plf or less, and interior floor slabs will support 100 psf or less. ▪ According to preliminary grading plans provided by I & S Group, Inc., the proposed finished floor elevation of the activity center is 648 feet. ▪ Based on the preliminary site grading plans fills of 2 feet or less from existing grades will be required to achieve finished floor elevation.
Pavement and Assumed Traffic Loads	▪ Flexible bituminous pavements for existing pavement patching ▪ Rigid concrete pavements for the extension of Hagar Street and the parking lots and drive lanes throughout the development. ▪ Light-duty pavements: 50,000 ESALs* ▪ Medium-duty pavements: 150,000 ESALs* ▪ Cuts and fills of 2 feet or less from existing grades paved on preliminary site grading plans.

*Equivalent 18,000-lb single axle loads based on 20-year design for bituminous and 35-year design for concrete pavements.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

The figure below shows an illustration of the proposed site layout.

Figure 1. Preliminary Site Layout

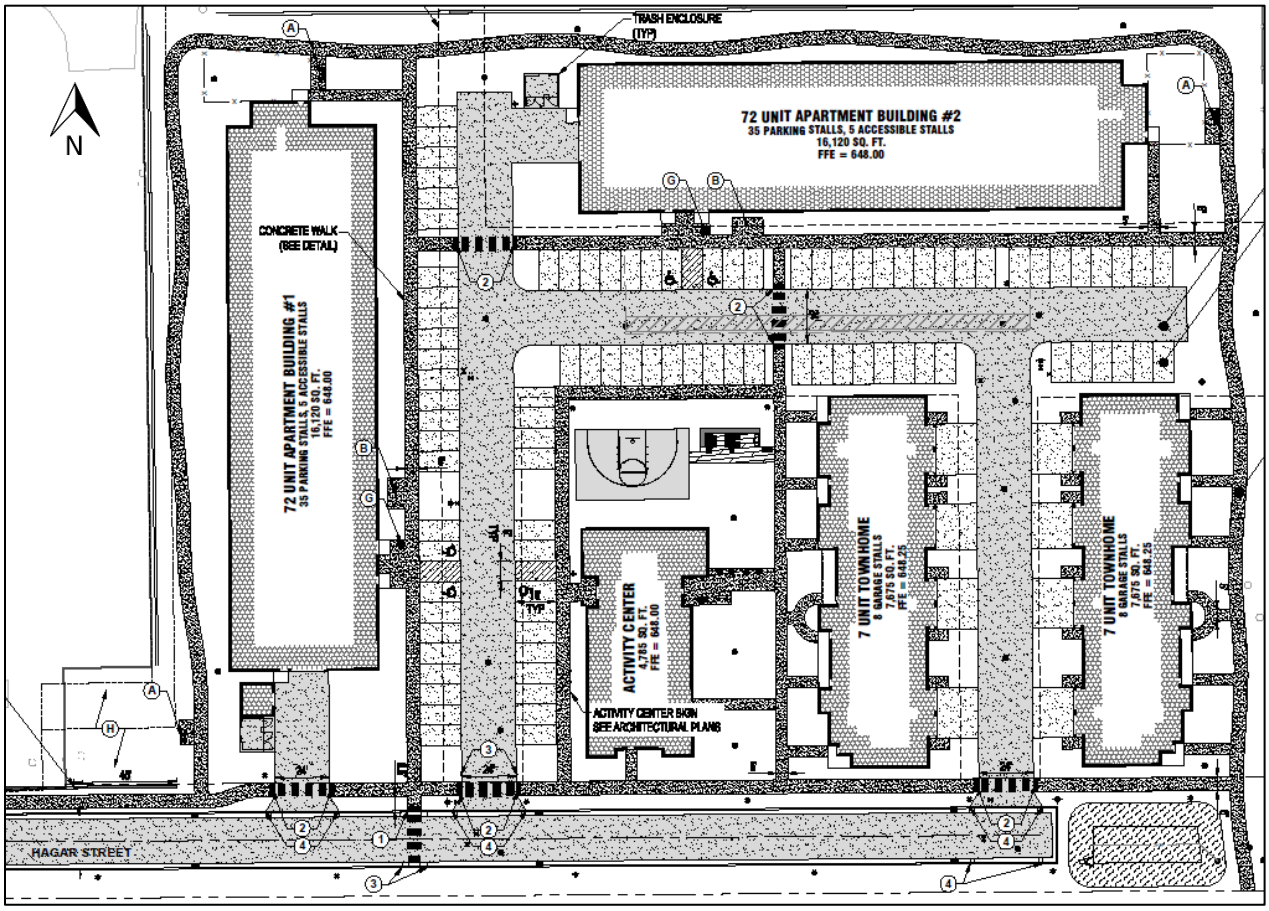


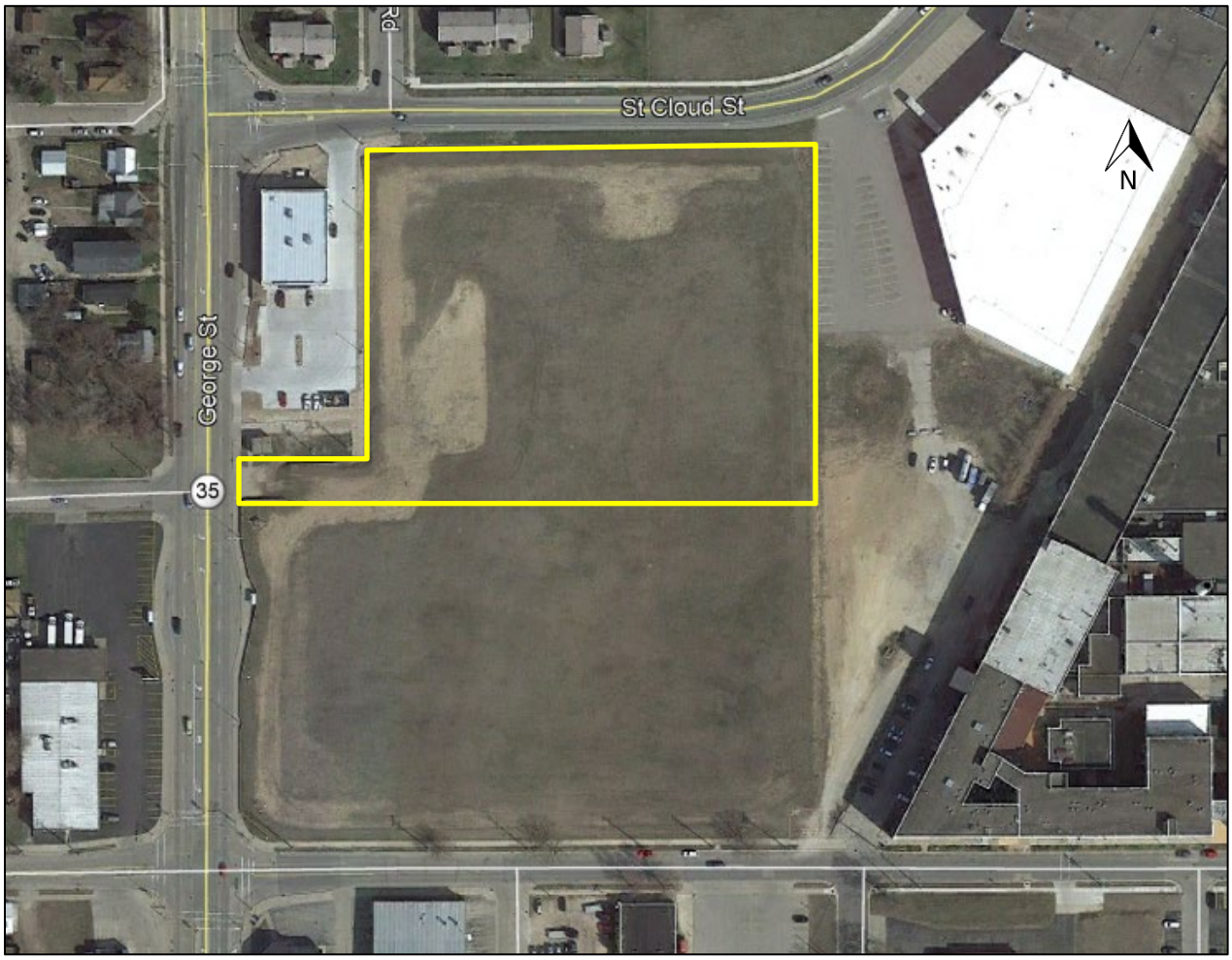
Figure provided by I & S Group, Inc., dated April 2, 2021.

A.2. Site Conditions and History

Based on our referenced documents and knowledge of the site, we understand the site was previously developed. The previous structure was demolished and backfilled. To our knowledge, earthwork associated with the backfill, including proper lift thickness, compaction effort, testing records, and documentation of the backfill was not conducted during the demolition process. In 2015, the site was elevated above the flood plain by importing approximately 60,000 cubic yards of soil, bringing the site to the approximate elevation of 647 ½ feet, leaving the underlying fill in place. The additional fill brought to the site was tested for in-place density and level of compaction.

The site currently exists as a vacant lot with surficial vegetation. Based on elevations at the boring locations, the site is relatively flat and has less than 1-foot of grade relief. The photograph below provides an aerial image of the site.

Photograph 1. Aerial Photograph of the Site



Photograph provided by Google Earth, dated April 2, 2021.

A.3. Purpose

The purpose of our geotechnical evaluation was to characterize subsurface geologic conditions at selected exploration locations, evaluate their impact on the project, and provide geotechnical recommendations for the design and construction of the proposed building foundations and floor slabs, pavements, underground utilities, and storm water drainage systems.

A.4. Background Information and Reference Documents

We reviewed the following information:

- Historical aerial photographs and topographic maps of the site.
- Geologic maps of La Crosse County, Wisconsin.
- Preliminary site layout plan prepared by I & S Group, Inc., dated April 2, 2021.
- Preliminary apartment complex building elevation, floor layout, and structural plans prepared by I &S Group, Inc., dated July 30, 2021.
- Preliminary townhome building elevation, floor layout, and foundation plans prepared by Master Craft Homes, dated March 1, 2021.
- Preliminary activity center building elevation and floor layout plans prepared by I & S Group, Inc., dated March 19, 2021.
- Final site grading plan prepared by Cedar Corporation, dated September 2015.
- Previous Geotechnical Evaluation Report prepared by Braun Intertec, project number B1407491, dated December 17, 2014.
- Previous Geotechnical Evaluation Report prepared by Braun Intertec, project number B1907847, dated August 15, 2019.
- Addendum to Final Case Closure with Continuing Obligations Letter Dated January 30, 2014; Former Trane Company Plant #6 Located at 606 George Street/1319 St. Andrew Street (f/k/a 1305 St. Andrew Street) La Crosse, Wisconsin WDNR BRRT Activity # 02-32-000195 & # 07-32-547753, dated April 30, 2015.
- Communications with the project team including 5th Ward Residence, LLC and I & S Group, Inc. regarding project details.

Our referenced documents and past project experience in the general area indicate that the site is underlain with engineered fill over uncontrolled fill and undocumented fill over buried topsoil and alluvial sand soils at depth.

A.5. Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB137044 to Mr. Paul Borsheim of 5th Ward Residence, LLC, dated April 13, 2021, and authorized on July 9, 2021. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and clearing the exploration location of underground utilities. We selected and we staked the boring exploration locations. We acquired the surface elevations and locations with GPS technology. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.
- Performing 18 standard penetration test (SPT) borings, denoted as ST-1 to ST-18, to nominal depths of 20 to 31 feet below grade across the site.
- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.
- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for structure and pavement subgrade preparation and the design of foundations, floor slabs, exterior slabs, pavements, underground utilities, stormwater improvements.

Our scope of services did not include environmental services or testing, and we did not train the personnel performing this evaluation to provide environmental services or testing. We can provide these services or testing at your request.

B. Results

B.1. Geologic Overview

We based the geologic origins used in this report on the soil types, laboratory testing, and available interpreted knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Previous Geotechnical Information

We performed six soil borings at this site in October of 2014 and completed a Geotechnical Evaluation Report for a proposed site redevelopment. The previous evaluation was completed prior to the additional fill brought to the site to raise site grades above the flood plain to an approximate elevation of 647 ½ feet. Those borings encountered approximately 4 to 9 feet of uncontrolled and undocumented fill that contained pockets of debris including concrete, glass, bricks, and large voids over buried topsoil. Below the fill and buried topsoil, the borings encountered alluvial sand soils.

In July of 2019, we performed six additional soil borings on the south side of this parcel and completed a Geotechnical Evaluation Report for a proposed site development. This evaluation was completed after the additional fill was brought to the site to raise site grades above the flood plain to an approximate elevation of 647 ½ feet. Those borings encountered approximately 4 to 5 feet of engineered fill over uncontrolled and undocumented fill that extended to depths of approximately 8 to 17 feet below existing grades. Buried topsoil was not encountered but was likely present based on the previous site evaluation. Below the fill, the borings encountered alluvial sand soils.

B.3. Boring Results

Table 2 provides a summary of the soil boring results; in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details. The Descriptive Terminology sheets in the Appendix include definitions of abbreviations used in Table 2.

Table 2. Subsurface Profile Summary*

Strata	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Topsoil Fill	SP, SP-SM, SM	---	▪ Topsoil fill was encountered at the ground surface in all borings except ST-9, ST-11, and ST-15. ▪ The topsoil fill consisted of poorly graded sand (SP), poorly graded sand with silt (SP-SM), and silty sand (SM) with roots and various amounts of gravel that was dark brown in color and was dry to moist. ▪ Thicknesses at the boring locations varied from less than ½-foot to about 1-foot.
Engineered Fill	SP, SP-SM, SM	5 to 55 BPF	▪ Engineered fill was encountered below the topsoil fill and at the surface in all borings and extended to depths of about 4 to 5 feet. ▪ This fill was placed in 2015 to elevate the site above the flood plain and was tested for in-place density and level of compaction during placement. ▪ The fill consisted of fine- to medium-grained poorly graded sand (SP), poorly graded sand with silt (SP-SM), and silty sand (SM) that contained various amounts of gravel and was brown, tan, and yellow in color and was moist.
Undocumented Fill	SP, SP-SM, SM, CL, OL	3 to 45 BPF	▪ Undocumented fill was encountered in all borings below the engineered fill and extended to depths of approximately 8 to 15 feet. ▪ General penetration resistance suggests the fill received variable compaction. ▪ The fill consisted of fine- to medium-grained poorly graded sand (SP), poorly graded sand with silt (SP-SM), silty sand (SM), sandy lean clay (CL), and organic clay (OL) that was light brown, brown, dark brown, tan, black, and yellowish brown in color and was moist to wet. ▪ The fill contained various amounts of gravel, intermixed clay, silt, and gravel seams. ▪ Contained trace amounts of debris including concrete and brick as well as organic matter.
Buried Topsoil	SM, SC, OL	2 to 25 BPF	▪ Buried topsoil was encountered in Borings below the undocumented fill and extended to depths of approximately 11 ½ to 17 feet. ▪ Thicknesses at boring locations varied from about 2 feet to 5 feet. ▪ The buried topsoil consisted of fine-grained silty sand (SM), clayey sand (SC), and organic clay (OL) that slightly organic to organic and was dark brown and black in color and was moist to wet.

Strata	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Alluvium	SP, SP-SM	4 to 28 BPF	▪ Alluvial soils were encountered in all borings below the topsoil fill, fill, and buried topsoil and extended to the termination depths of our borings. ▪ Consisted of fine- to coarse-grained poorly graded sand (SP) and poorly graded sand with silt (SP-SM) that contained with traces of gravel that was brown and gray in color and wet. ▪ Penetration resistance testing in the sandy alluvial soils indicates they are very loose to medium dense in relative density.

*Abbreviations defined in the attached Descriptive Terminology sheets.

B.4. Groundwater

Table 3 summarizes the depths where we observed groundwater; the attached Log of Boring sheets in the Appendix also include this information and additional details. Corresponding groundwater elevations were determined from comparisons of the measured and estimated depths to groundwater and surface elevations and were rounded to the nearest ½-foot.

Table 3. Groundwater Summary

Boring Location	Surface Elevation (feet)	Measured or Estimated Depth to Groundwater (feet)	Corresponding Groundwater Elevation (feet)
ST-1	647.1	12 ½	634 ½
ST-2	646.9	12 ½	634 ½
ST-3	647.2	14	633 ½
ST-4	647.1	12 ½	634 ½
ST-5	647.5	12 ½	635
ST-6	647.1	12 ½	634 ½
ST-7	647.4	14	633 ½
ST-8	647.1	12 ½	634 ½
ST-9	647.5	15	632 ½
ST-10	647.5	14	633 ½
ST-11	647.6	12 ½	635
ST-12	647.5	12 ½	635

Boring Location	Surface Elevation (feet)	Measured or Estimated Depth to Groundwater (feet)	Corresponding Groundwater Elevation (feet)
ST-13	647.5	15	632 ½
ST-14	647.3	12 ½	635
ST-15	647.5	12 ½	635
ST-16	647.4	12 ½	635
ST-17	647.4	12	635 ½
ST-18	647.4	14	633 ½

At the time of our observation, we observed groundwater at depths of 12 to 15 feet as our borings were advanced. These depths correspond to elevation 632 ½ to 635 ½ feet. Seasonal and annual fluctuations of groundwater should also be anticipated.

B.5. Environmental Discussion

We understand contaminated soil, slag, and rubble were identified in Wisconsin Department of Natural Resources (WDNR) approved NR700 Remedial Action Plan. The cleanup site is register as WDNR BRRTS #02-32-000195 and #07-32-547753. Continuing obligations remain associated with the site. It is imperative that a soil management plan be developed and implemented prior to any earthwork taking placed in the impacted areas. The soil management plan will provide direction to properly handle all impacted soils properly during all aspects of the new construction. The client has indicated they have retained Bay West, LLC, an environmental consultant to provide environmental management of the project.

B.6. Laboratory Test Results

The following sections summarize our laboratory testing results. Laboratory testing was completed in general accordance with ASTM standards.

B.6.a. Mechanical Sieve Analysis Tests

We performed mechanical sieve analyses (ASTM C136) on a selected sample to assist in soil classification and particle size analysis. The test indicated the sample tested classified as poorly graded sand (SP) and poorly graded sand with silt (SP-SM). The Log of Boring sheets present the moisture content and percent passing a #200 sieve results and the Appendix includes a graph showing the results of the mechanical sieve analysis.

B.6.b. Moisture Content, Particles Passing a #200 Sieve, and Organic Content Tests

Results of our laboratory tests for soil classification, moisture content, particles passing a #200 sieve, and organic content are presented below in Table 4.

Table 4. Laboratory Classification Test Results

Boring Location	Sample Depth (feet)	USCS Soil Classification	Moisture Content (w, %)	Percent Passing a #200 Sieve	Organic Content (%)
ST-1	2 ½	FILL: SM	8	36	---
ST-1	10	SM	20	---	3
ST-1	15	SP	22	2	---
ST-2	10	SM	11	---	3
ST-3	2 ½	FILL: SM	7	18	---
ST-3	10	FILL: SM	13	17	---
ST-4	7 ½	FILL: SP-SM	7	6	---
ST-5	7 ½	FILL: SP-SM	8	9	---
ST-5	10	FILL: SP-SM	11	---	3
ST-6	7 ½	FILL: SM	15	---	5
ST-6	10	FILL: SM	19	---	---
ST-7	5	FILL: SP	8	5	---
ST-7	7 ½	FILL: OL	26	---	7
ST-7	12 ½	SC	23	---	4
ST-7	15	SC	35	---	---
ST-8	7 ½	FILL: SP	16	5	---
ST-8	12 ½	FILL: SM	28	---	---
ST-8	15	OL	51	---	6
ST-8	17 ½	SP	21	2	---
ST-9	15	SP	17	3	---
ST-10	2 ½	FILL: SP	7	3	---
ST-10	15	SP	20	---	---
ST-11	7 ½	FILL: SM	10	13	---
ST-11	15	SP	18	---	---
ST-11	17 ½	SP	21	4	---
ST-12	7 ½	FILL: SP-SM	9	10	---
ST-13	5	FILL: CL	22	67	---

Boring Location	Sample Depth (feet)	USCS Soil Classification	Moisture Content (w, %)	Percent Passing a #200 Sieve	Organic Content (%)
ST-14	12 ½	FILL: SP	19	5	---
ST-14	15	SC	36	---	4
ST-15	5	FILL: SP-SM	11	12	---
ST-16	10	FILL: SP-SM	13	7	---
ST-17	2	FILL: SM	9	26	---
ST-17	8	FILL: SP-SM	15	11	---
ST-17	12	SC	21	---	3
ST-18	4	FILL: SM	11	27	---
ST-18	8	FILL: SM	15	---	---
ST-18	12	OL	19	---	5
ST-18	16	SP-SM	20	11	---

C. Basis for Recommendations

C.1. Design Discussion

C.1.a. Introduction

The site contains unsuitable materials including undocumented fill and buried topsoil that extends to depths of approximately 11 ½ to 17 feet across the site, corresponding to elevation 630 to 636 feet. The fill was noted to have variable compaction and consistency and contained trace amounts of debris and organics, and the buried topsoil could be compressible. These findings are consistent with previous subsurface explorations at the site. These materials are not suitable for support of the proposed buildings. To limit post-construction settlement, the buildings should be supported on improved subgrades or intermediate foundation systems. After discussing this with the project team including 5th Ward Residences, LLC and I & S Group, Inc., we developed our recommendations for improving subgrades by installation of rammed aggregate piers.

C.1.b. Building Foundation and Slab Support

As mentioned above, to reduce the risk of future excessive building and site settlements, it is our opinion the proposed buildings will need to be supported on intermediate foundations. The proposed building foundations and interior floor slabs should be supported on rammed aggregate piers.

Alternatively, if the owner is willing to accept the risk of some settlement, then the fill below the interior floor slabs could be surface-compacted and left in place under the activity center building and townhome buildings provided the building foundations are supported on rammed aggregate piers. The amount of settlement associated with this approach is dependent on the amount of compacted soil below the interior floor slabs and the composition of the existing fill left in place but is expected to be less than 1-inch under the assumed loads. There is some risk associated with this alternate approach. The recommendations and parameters discussed below are based on the conditions encountered in our borings and our experiences on similar sites. Please note that actual settlements will vary and could be much higher if voids or compressible materials are concealed by the fill. The owner needs to accept the additional risk of differential settlement by leaving the fill in place, in return for the cost savings. These risks can be reduced through additional testing and observations but cannot be eliminated unless the fill is removed in its entirety, or an intermediate foundation system is used to support all components of the proposed buildings.

C.1.c. Pavements

Areas receiving new pavements should be prepared by removing the topsoil fill and surficial vegetation from below the proposed pavement subgrade elevations and be replaced with compacted granular fill. These materials are anticipated to be about 1-foot thick or less. Prior to elevating or placing additional fill required, the exposed subgrade soils should be surface compacted to densify and enhance uniformity of the exposed soils. The fill present below these materials appeared to be free of debris and can be left in place provided it is evaluated for suitability at the time of construction. If the fill is considered suitable, it should be surface-compacted. If the fill is unsuitable, additional sub-cuts and subgrade improvements may be required. A proofroll should also be performed after the aggregate base material is in place, and prior to placing bituminous or concrete pavement.

C.2. Construction Considerations

From a construction perspective, the project team should also be aware that:

- Excavations will penetrate the groundwater surface at a depth of approximately 12 to 15 feet. Dewatering will be required for excavations (particularly for installation of underground utilities with deep invert elevations) that extent below elevation 636 feet to facilitate an evaluation of the geologic materials exposed in the excavation sides and bottoms, and the placement and compaction of backfill.

- The on-site existing fill can be considered for re-use as backfill and additional required fill provided debris and organic soils are first removed. The alluvial soils can also be considered for reuse as backfill and additional required fill.

- Imported material needed to replace excavation spoils or balance cut and fill quantities, should consist of sandy soils having less than 20 percent of the particles by weight passing a #200 sieve. Soil needed to facilitate drainage should consist of sand and gravel soils with less than 5 percent passing a #200 sieve.

D. Recommendations

D.1. Earthwork

D.1.a. Building Subgrade Preparation

We recommend removing the topsoil fill and surficial vegetation from below the proposed building footprints and their oversize areas. To provide support for construction equipment for installation of the rammed aggregate piers, we recommend the building pad be filled to subgrade elevation with granular soils having less than 20 percent passing a #200 sieve followed by a minimum of 6 inches of crushed aggregate base material.

A geotechnical representative should observe the excavations to make the necessary field judgments regarding the suitability of the exposed soils.

D.1.b. Excavated Slopes

Based on the borings, we anticipate on-site soils in excavations will consist of sandy fill and alluvial sand soils. These soils are considered Type C Soil under OSHA (Occupational Safety and Health Administration) guidelines. OSHA guidelines indicate unsupported excavations in Type C soils should have a gradient no steeper than 1 ½H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches.” This document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

D.1.c. Excavation Dewatering

We do not anticipate dewatering will be required for this project but could be necessary during the installation of underground utilities depending on the final design invert elevations. We recommend removing groundwater from the excavations. Project planning should include temporary sumps and pumps for excavations where groundwater is encountered. Dewatering of high-permeability soils (e.g., sands) from within the excavation with conventional pumps has the potential to loosen the soils, due to upward flow. If excavations will be opened for an extended period, then a dewatering contractor should develop a dewatering plan; the design team should review this plan.

D.1.d. Surface Compaction

We recommend that exposed soils be surface compacted prior to placing additional required fill, footings, and floor slabs for the proposed buildings and pavement areas. This will densify and enhance uniformity of the exposed soils. We recommend surface compacting the exposed soils with a minimum of five passes by a large (minimum diameter of 3 ½ feet), smooth-drum compactor. Areas that yield or pump during surface compaction may require additional sub-cutting.

D.1.e. Engineered Fill Materials and Compaction

We recommend spreading fill in loose lifts of approximately 12 inches thick. Table 5 below contains our recommendations for fill materials, gradation, and minimum compaction level for compacted fills.

Table 5. Soil for Fill Description*

Fill Classification	Locations to Be Used	Fill Source and Soil Descriptions	Gradation	Relative Compaction, percent (ASTM D1557 – Modified Proctor)
Structural Fill	▪ General site grading ▪ Elevating the building pad to finished floor elevation ▪ Interior and exterior foundation wall backfill ▪ Below interior floor slabs and exterior slabs	On-site fill free of debris and organics or imported sand and gravel consisting of GP, GW, SW, SP, SP-SM, SP-SC, SM, SC	100% passing 2-inch sieve <20% passing #200 sieve < 2% Organic Content (OC)	95
Trench Backfill	Utility trench backfill	On-site soils free of debris and organics or imported sand and gravel consisting of GP, GW, SW, SP, SP-SM, SP-SC, SM, SC	100% passing 2-inch sieve <20% passing #200 sieve < 2% OC	95

Fill Classification	Locations to Be Used	Fill Source and Soil Descriptions	Gradation	Relative Compaction, percent (ASTM D1557 – Modified Proctor)
Non-Frost-Susceptible Fill	Non-frost-susceptible below building entry slabs	Imported sand or gravel: GP, GW, SP, SW	100% passing 1-inch sieve < 50% passing #40 sieve < 5% passing #200 sieve < 2% OC	95
Non-Structural Fill	Below landscaped surfaces, where subsidence is not a concern	On-site soils and imported soils	100% passing 6-inch sieve < 10% OC	90

* More select soils comprised of coarse sands with < 5% passing #200 sieve may be needed to accommodate work occurring in periods of wet or freezing weather.

Sandy soil with less than 12 percent particles by weight passing a number 200 sieve may be compacted without moisture conditioning, although, some water may be needed to achieve compaction. Silty sand, soils used as backfill should be moisture conditioned to between 1 percent below to 3 percent above their optimum moisture content.

The project documents should not allow the contractor to use frozen material as fill or to place fill on frozen material. Frost should not penetrate under foundations or slabs during construction.

We recommend performing density tests in fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

D.2. Foundation Support on Rammed Aggregate Piers

D.2.a. Rammed Aggregate Piers

Based on the anticipated depth of excavations needed to remove the existing fill from the proposed building footprints and their oversize areas, it appears that conventional soil corrections would add a significant cost to the project. Thus, based on discussions with the project team, we recommend installing rammed aggregate piers.

A subgrade improved with rammed aggregate piers will reduce the potential for detrimental settlement associated with the existing fill to occur, provide adequate bearing capacity, eliminate the need for deep excavations, reduce the need to dewatering excavations, reduce the need to handle contaminated soils (if encountered), reduce impacts to adjacent site features, and reduce the volume of subgrade soils disturbed at this site.

Different contractors use varying techniques to construct rammed aggregate piers, but generally consist of excavating soil from a hole with an auger or vibrating a probe into the ground, and then building a column of clean, open-graded aggregate. The contractor constructs the pier by placing the aggregate in lifts from the bottom of the pier and compacting each lift before placing aggregate for the subsequent lift. The vibratory energy, and sometimes ramming action, causes the aggregate to interlock, forming a stiff pier that provides soil reinforcement and increases shear resistance. Due to the many variations in techniques, we recommend using performance-based specifications with design-build contracting. We recommend requiring the contractor to have at least five years of experience in performing this work, and to demonstrate performing the proposed protection system(s) on at least three previous projects of similar size and scope. The specifications should require the design engineer be licensed in the project state. We can assist you with developing a list of pre-qualified contractors prior to bidding or with reviewing contractor experience as part of the bidding process.

Rammed aggregate piers are a Special Inspection item in accordance with Chapter 17 of the IBC. The observations should include installed length, consistency of soil profile with the geotechnical evaluation confirmation of the materials, and confirmation of installation techniques.

We recommend installing rammed aggregate piers under foundations for all the proposed buildings. The rammed aggregate piers should extend through the existing fill to bear within the alluvial sand soils at depth.

Note, this approach may encounter installation difficulties in the engineered fill near the surface and if large objects or debris cannot be penetrated in the undocumented fill with installation equipment. The pier installation contractor may find it necessary to pre-drill locations where installation difficulties are encountered. For this reason, the project team should also consider exploratory test pits throughout the proposed building locations which may provide more details and information to aid in preconstruction planning.

D.2.b. Spread Footing Design Parameters

Table 6 below contains our design parameters for foundations supported on rammed aggregate piers.

Table 6. Recommended Spread Footing Design Parameters on Rammed Aggregate Piers

Item	Description
Bearing Soils	Footings shall be supported on improved subgrades by means of rammed aggregate piers in accordance with Section D.2.
Maximum net allowable bearing pressure (psf) Interior column pad footings Perimeter strip footings	Determined by aggregate pier designer.
Minimum embedment below final exterior grade for heated structures (inches)	48
Minimum embedment below final exterior grade for unheated structures or for footings not protected from freezing temperatures during construction (inches)	60
Total and Differential settlement	Typically, less than 1-inch and ½-inch, respectively. *

* Actual settlement amounts will depend on final loads, foundation layout, and design criteria from aggregate pier designer.

D.3. Interior Floor Slabs

D.3.a. Subgrade Modulus

We recommend the interior floor slabs be supported on rammed aggregate piers that extend through the existing fill to bear on the alluvial sand soils at depth for all the proposed buildings. The aggregate pier designer will provide a modulus of subgrade reaction for slab design based on the pier layout and load transfer platform design.

Alternatively, if the owner is willing to accept the risk of some settlement, then the interior floor slabs for the activity center building and townhome buildings could be supported on the existing fill provided it is surface compacted prior to place additional fill required or concrete. We recommend the interior floor slabs for the apartment complex buildings remain supported on rammed aggregate piers based on the anticipated floor loads. Interior floor slabs supported on surface compacted engineered fill may be designed using a modulus of subgrade reaction, k, of 200 pounds per square inch per inch of deflection (pci). If the slab design requires placing 6 inches of compacted crushed aggregate base immediately below the slab, the slab design may increase the k-value by 50 pci. We recommend that the aggregate base materials be free of bituminous. In addition to improving the modulus of subgrade reaction, an aggregate base facilitates construction activities and is less weather sensitive.

There is an elevated risk of settlement with this alternate approach based on the nature of the fill and that the fill could contain voids or compressible materials. The owner needs to accept the additional risk of differential settlement by leaving a portion of the fill in place, in return for the cost savings. These risks can be reduced through additional testing and observations but cannot be eliminated unless all the interior slabs are supported on rammed aggregate piers.

D.3.b. Moisture Vapor Protection

Excess transmission of water vapor could cause floor dampness, certain types of floor bonding agents to separate, or mold to form under floor coverings. If project planning includes using floor coverings or coatings, we recommend placing a vapor retarder or vapor barrier immediately beneath the slab. We also recommend consulting with floor covering manufacturers regarding the appropriate type, use and installation of the vapor retarder or barrier to preserve warranty assurances.

D.4. Frost Protection

We consider the sandy fill to be non- to slightly-frost susceptible. Unfavorable amounts of heaving could occur if these soils become saturated and freeze. Soils with silt and clay content over 7 percent will have an elevated potential to heave when frozen and reduced strength during spring thaw. Site grades should be graded to promote drainage of the pavement areas and help limit the potential for saturation and subsequent heaving to occur. Over the life of the pavement or slab, cracks may develop, and joints may open, which will expose the subgrade and allow water to enter the subgrade. This water entering the subgrade increases the likelihood of heave. It will be critical that the owner develop a detailed maintenance program to repair any cracks and joints that may develop during the useful life of the various surface features.

The maintenance program should pay special attention to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.

D.5. Pavements and Exterior Slabs

D.5.a. Pavement Subgrade Preparation

We recommend areas receiving new pavement be prepared by removing the topsoil fill and surficial vegetation from below the proposed pavement subgrade elevations and be replaced with compacted granular fill. These materials are anticipated to be about 1-foot thick or less. Prior to placing additional fill required, we recommend surface compacting the exposed subgrade soils to densify and enhance uniformity of the exposed soils. The fill present below these materials appeared to be free of debris and could be left in place provided it is evaluated for suitability at the time of construction. If the fill is considered suitable, it should be surface compacted. If the fill is considered to be unsuitable, additional sub-cuts and subgrade improvements may be required.

D.5.b. Proofroll

We recommend performing a proofroll with a fully loaded tandem-axle truck after the aggregate base material is in place, and prior to placing bituminous or concrete pavement to located loose, soft, and weak subgrade materials. The contractor should correct areas that display excessive yielding or rutting (1-inch or more) during the proofroll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and re-compaction or sub-cutting and replacement with soil or crushed aggregate.

D.5.c. Pavement Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine a California Bearing Ratio (CBR) value for pavement design. Based on our experience with similar sand soils anticipated at the pavement subgrade elevation, we recommend pavement design assume a CBR-value of 15. Note the contractor may need to perform limited removal of unsuitable or less suitable soils and surface compact subgrade soils to achieve this value. Table 7 provides recommended light- and medium-duty bituminous pavement sections, based on the soils estimated support and assumed traffic loads provided in Table 1 in Section A.1 above.

Table 7. Recommended Bituminous Pavement Sections

Pavement Material	Light-Duty Pavements Thickness/Preparations	Medium-Duty Pavements Thickness/Preparations
Minimum Bituminous Thickness (in.)	3 ½	4 ½
Minimum Aggregate Base Thickness (in.)	8	10
Subgrade Preparation	Surface compact, then proofroll after placement of aggregate base to locate loose or weak subgrade materials prior to placement of pavement materials.	

For concrete pavements based upon the assumed traffic loads, and an estimated modulus of subgrade reaction (k) of 200 pci, we recommend light- and medium-duty concrete pavement sections as shown in Table 8 below.

Table 8. Recommended Concrete Pavement Sections

Pavement Material	Light-Duty Pavements Thickness/Preparations	Medium-Duty Pavements Thickness/Preparations
Minimum Concrete Thickness (in.)	5	6
Minimum Aggregate Base Thickness (in.)	4	6
Subgrade Preparation	Surface compact, then proofroll after placement of aggregate base to locate loose or weak subgrade materials prior to placement of pavement materials.	

D.5.d. Concrete Pavements

We recommend specifying concrete for pavements that has a minimum 28-day compressive strength of 4,500 psi, and a modulus of rupture (Mr) of at least 650 psi. We also recommend Type I or Type II cement meeting the requirements of ASTM International C 150. We recommend specifying 4.5 to 7.5 percent entrained air for exposed concrete to provide resistance to freeze-thaw deterioration. We also recommend using a water/cement ratio of 0.42 or less for concrete exposed to deicers.

We assumed the concrete pavement sections in Table 8 will have edge support. We recommend placing an aggregate base below the pavement to provide a suitable subgrade for concrete placement, reduce faulting, and help dissipate loads. Appropriate mix designs, panel sizing, jointing, doweling, and edge reinforcement are critical to performance of rigid pavements. We recommend you contact your civil engineer for the final design.

D.5.e. Bituminous Pavement Materials

Appropriate mix designs are critical to the performance of flexible pavements. We recommend utilizing hot mix asphalt meeting the specifications of Wisconsin Department of Transportation (WisDOT) Section 460. We recommend utilizing a nominal 12.5 mm gradation for the base course and a nominal 9.5 mm gradation for the surface course as defined in Table 460-1 in Section 460.2.2.3. We recommend the Performance Graded Asphalt cement be a PG 58-28.

D.5.f. Pavement Materials and Compaction

Table 9 below contains our recommendations for fill materials, minimum compaction level, and moisture content for compacted fills.

Table 9. Recommended Pavement Materials and Compaction

Locations To Be Used	Fill Source and Soil Descriptions	Gradation	Relative Compaction, percent (ASTM D1557 – Modified Proctor)	Moisture Content Variance from Optimum, percentage points
Dense Graded Base	Imported aggregate	WisDOT Standard Spec 305 Dense Graded Base	95	-3 to +3 for aggregate base
Granular Subbase	Imported sand and gravel	WisDOT Standard Spec 209 Grade 1 or Grade 2	95	-6 to +3 for granular subbase
Pavement subgrades and grading	On-site soils free of debris and organics	100% passing 3-inch sieve < 2% OC	95	-6 to +3 for pavement subgrade

D.5.g. Performance and Maintenance

We based the above pavement designs on a 20-year performance life for bituminous pavements and a 35-year life for concrete pavements. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

It is common to place the binder (base) course of bituminous and then delay placement of wear course. For this situation, we recommend evaluating if the reduced pavement section will have sufficient structure to support construction traffic.

Many conditions affect the overall performance of the exterior slabs and pavements. Some of these conditions include the environment, loading conditions and the level of ongoing maintenance. Regarding bituminous pavements, it is common to have thermal cracking develop within the first few years of placement and continue throughout the life of the pavement. We recommend developing a regular maintenance plan for filling cracks in exterior slabs and pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade.

Note if debris laden fill is left in place, more than normal maintenance should be anticipated.

D.6. Underground Utilities

D.6.a. Subgrade Stabilization

Earthwork activities associated with utility installations located inside the building area should adhere to the recommendations in Section D.1.

For exterior utilities, we anticipate the soils at typical invert elevations will be suitable for utility support. However, if construction encounters unfavorable conditions such as soft clay, organic soils or perched water at invert grades, the unsuitable soils may require some additional subcutting and replacement with sand or crushed rock to prepare a proper subgrade for pipe support. Project design and construction should not place utilities within the 1H:1V oversizing of foundations.

D.6.b. Corrosion Potential

A majority of the soil borings indicated the site predominantly consists of sandy soils. We consider these soils non- to slightly-corrosive to metallic conduits. If utilities extend through clay soils, we recommend bedding the utilities in sandy soil free of any clay lumps or constructing the utilities with non-corrosive materials.

D.6.c. Backfill

Utility trench backfill should adhere to the recommendations in Section D.1.e above.

D.7. Stormwater

Borings ST-17 and ST-18 were drilled and sampled continuously to depths of approximately 20 feet for the proposed storm water drainage system locations. The borings encountered fill, buried topsoil, and alluvial soils consisting of fine- to medium-grained loamy sand, sandy loam, clayey sand, and sand. Groundwater was encountered at depths of 12 to 15 feet as our borings were advanced. These depths correspond to an elevation of 632 ½ to 635 ½ feet and are the elevations of the limiting factor per the Wisconsin DNR. Seasonal and annual fluctuations of groundwater should also be anticipated.

Infiltration rates associated with the soils present at this location are included on the Soil Evaluation – Storm form included in the Appendix of this report. The reported infiltration rates were determined by referencing Table 2 in the Wisconsin DNR Storm Water Infiltration Technical Standard 1002, dated September 2017.

Fine-grained soils (silts and clays), topsoil or organic matter that mixes into or washes onto the soil will lower the permeability. The contractor should maintain and protect infiltration areas during construction. Furthermore, organic matter and silt washed into the system after construction can fill the soil pores and reduce permeability over time. Proper maintenance is important for long-term performance of infiltration systems.

This geotechnical evaluation does not constitute a review of site suitability for storm water infiltration or evaluate the potential impacts, if any, from infiltration of large amounts of storm water.

D.8. Equipment Support

The recommendations included in the report may not be applicable to equipment used for the construction and maintenance of this project. We recommend evaluating subgrade conditions in areas of shoring, scaffolding, cranes, pumps, lifts and other construction equipment prior to mobilization to determine if the exposed materials are suitable for equipment support, or require some form of subgrade improvement. We also recommend project planning consider the effect that loads applied by such equipment may have on structures they bear on or surcharge – including pavements, buried utilities, below-grade walls, etc. We can assist you in this evaluation.

E. Procedures

E.1. Penetration Test Borings

We drilled the penetration test borings with a floatation tire-mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 ½- or 5-foot intervals in general accordance with ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

We sealed penetration test boreholes meeting the Wisconsin Administrative Code NR 141.25 criteria using 3/8-inch bentonite chips and auger cuttings. A copy of the sealing record can be obtained upon request.

E.2. Exploration Logs

E.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples and groundwater measurements. The Appendix also includes a Fence Diagram intended to provide a summarized cross-sectional view of the soil profile across the site.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

E.2.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance testing performed for the project, (4) laboratory test results, and (5) available interpreted knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

E.3. Material Classification and Testing

E.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

E.3.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM procedures.

E.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes as noted on the boring logs.

F. Qualifications

F.1. Variations in Subsurface Conditions

F.1.a. Material Strata

We developed our evaluation, analyses, and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation, and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

F.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

F.2. Continuity of Professional Responsibility

F.2.a. Plan Review

We based this report on a limited amount of information, and we made several assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

F.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

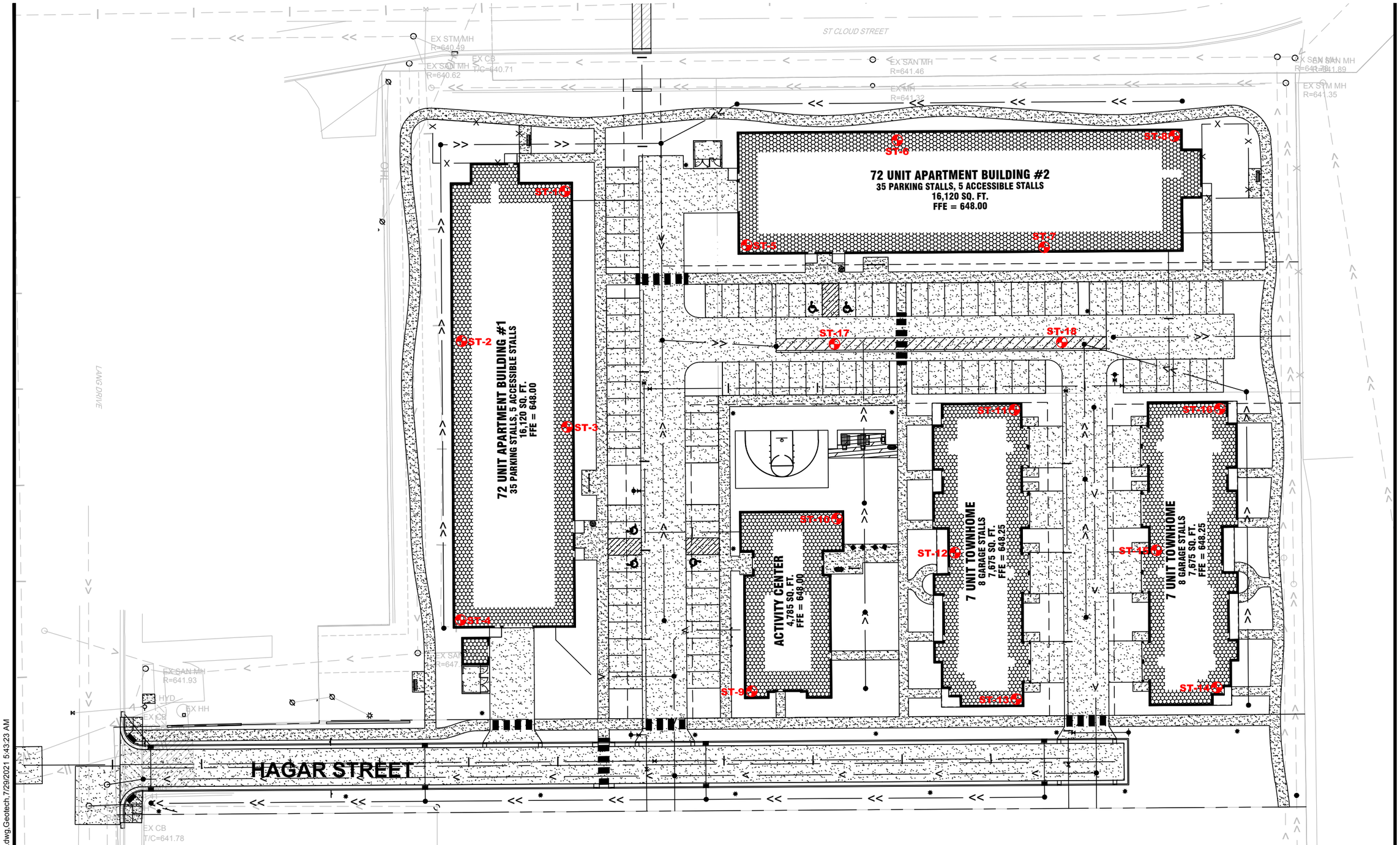
F.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

F.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix



DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

25' 0 50'

SCALE: 1"= 50'

F:\2021\B2106376\CAD\B2106376.dwg,Geotech,7/29/2021 5:43:23 AM

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Drawing Information

Project No:	B2106376
Drawing No:	B2106376
Drawn By:	JAG
Date Drawn:	7/14/21
Checked By:	BRS
Last Modified:	7/29/21

Project Information

Proposed 5th Ward Residence Development

1325 St. Andrew Street

La Crosse, Wisconsin

Soil Boring Location Sketch

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-01**
LOCATION: See attached location sketch
NORTHING: 140164 EASTING: 448627
DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/26/21 END DATE: 07/26/21
SURFACE ELEVATION: 647.1 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
646.4		SILTY SAND with GRAVEL (SM), fine-grained, brown, dry (TOPSOIL FILL)					
0.7		FILL: SILTY SAND with GRAVEL (SM), fine to medium-grained, brown and tan, moist		7-7-10 (17) 14"		8	P200=36%
			5	6-6-6 (12) 3"			
640.6							
6.5		FILL: POORLY GRADED SAND (SP), fine-grained, yellow, moist		5-5-8 (13) 12"			
639.1							
8.0		SILTY SAND (SM), fine-grained, slightly organic, trace Gravel, black, moist (BURIED TOPSOIL)	10	7-11-7 (18) 14"		20	OC=3%
635.6							
11.5	▽	POORLY GRADED SAND (SP), fine to medium-grained, brown, moist to wet, medium dense to loose (ALLUVIUM)		3-5-7 (12) 18"			
			15	3-4-3 (7) 14"		22	P200=2%
630.6	▼						
16.5		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose (ALLUVIUM)		3-3-3 (6) 18"			
			20	3-3-4 (7) 18"			
			25	2-3-5 (8) 18"			Boring elevations and surface elevations were measured by Braun Intertec using GPS technology
			30	6-6-3 (9) 18"			
616.1							
31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 12.5 feet while drilling. Water observed at 16.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-02**

LOCATION: See attached location sketch

NORTHING: 140083 EASTING: 448572

DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/26/21 END DATE: 07/26/21

SURFACE ELEVATION: 646.9 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
646.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, dry (TOPSOIL FILL)					
0.9		FILL: SILTY SAND with GRAVEL (SM), fine to medium-grained, brown and tan, moist		12-15-11 (26) 15"			
		Possible cobbles from 5 to 10 feet	5	14-10-35 (45) 16"			
638.9				7-12-20 (32) 14"			
8.0		SILTY SAND (SM), fine-grained, slightly organic, black, moist to wet (BURIED TOPSOIL)	10	12-9-16 (25) 16"		11	OC=3%
633.9	▽			2-3-5 (8) 13"			
13.0	▼	POORLY GRADED SAND (SP), fine-grained, brown, wet, loose (ALLUVIUM)	15	1-2-4 (6) 14"			
628.9				2-4-3 (7) 0"			
18.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose to medium dense (ALLUVIUM)	20	2-2-3 (5) 18"			
			25	7-4-6 (10) 18"			
			30	9-6-7 (13) 18"			
615.9							
31.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 15.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-03**

LOCATION: See attached location sketch

NORTHING: 140037 EASTING: 448629

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/28/21 | END DATE: 07/28/21

SURFACE ELEVATION: 647.2 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Rain/Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~646.9~~ 0.3		POORLY GRADED SAND (SP), fine-grained, trace Gravel, brown and tan, moist (TOPSOIL FILL)					
643.2		FILL: SILTY SAND (SM), fine-grained, with Sandstone, brown, moist		6-12-17 (29) 14"		7	P200=18%
4.0		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist	5	6-12-14 (26) 16"			
638.2				6-9-11 (20) 16"			
9.0		FILL: SILTY SAND (SM), fine-grained, brown, moist	10	7-8-14 (22) 18"		13	P200=17%
635.7							
11.5		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist to wet		6-8-9 (17) 16"			
633.2	▽						
14.0		POORLY GRADED SAND (SP), fine-grained, trace Gravel, brown, wet, loose (ALLUVIUM)	15	3-3-3 (6) 9"			
630.7	▼						
16.5		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose (ALLUVIUM)		4-3-4 (7) 18"			
			20	3-3-3 (6) 20"			
			25	2-3-4 (7) 18"			
			30	0"			
616.2							
31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 14.0 feet while drilling. Water observed at 16.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-04**

LOCATION: See attached location sketch

NORTHING: 139933 EASTING: 448571

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/26/21 | END DATE: 07/26/21

SURFACE ELEVATION: 647.1 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~646.7~~ 0.4		POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, dry (TOPSOIL FILL)					
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown		4-12-12 (24) 16"			
		Trace Gravel at 5 feet	5	4-4-3 (7) 14"			
				4-6-9 (15) 18"		7	P200=6%
		Trace brick at 10 feet	10	4-4-2 (6) 12"			
635.6 11.5	▽	POORLY GRADED SAND (SP), fine-grained, brown, moist to wet, loose (ALLUVIUM)		4-5-4 (9) 16"			
	▼		15	1-2-4 (6) 14"			
629.1 18.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, very loose to medium dense (ALLUVIUM)		4-2-4 (6) 18"			
			20	5-2-3 (5) 16"			
			25	1-2-2 (4) 18"			
			30	2-5-7 (12) 18"			
616.1 31.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 15.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-05**
LOCATION: See attached location sketch
NORTHING: 140135 EASTING: 448725
DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/26/21 END DATE: 07/26/21
SURFACE ELEVATION: 647.5 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
647.0		SILTY SAND (SM), fine-grained, brown, dry (TOPSOIL FILL)					
0.5		FILL: POORLY GRADED SAND with SILT and GRAVEL (SP-SM), fine to medium-grained, brown and tan, moist		5-8-7 (15) 16"			
			5	7-9-9 (18) 14"			
641.0							
6.5		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace brick fragments, and glass, with roots, slightly organic, trace Gravel, dark brown and black, moist		5-5-8 (13) 14"		8	P200=9%
			10	6-7-8 (15) 16"		11	OC=3%
636.0							
11.5	▽	POORLY GRADED SAND (SP), fine-grained, brown and gray, moist to wet, loose (ALLUVIUM)		2-3-3 (6) 14"			
			15	2-3-2 (5) 14"			
631.0							
16.5	▼	POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, light brown, wet, loose (ALLUVIUM)		2-3-3 (6) 16"			
			20	3-3-3 (6) 20"			
			25	6-2-4 (6) 18"			
			30	2-2-5 (7) 16"			
616.5							
31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 12.5 feet while drilling. Water observed at 17.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-06**

LOCATION: See attached location sketch

NORTHING: 140192 EASTING: 448807

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/26/21 | END DATE: 07/26/21

SURFACE ELEVATION: 647.1 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
645.9		POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, dry (TOPSOIL FILL)					
1.2		FILL: SILTY SAND with GRAVEL (SM), fine to medium-grained, brown and tan, moist		8-8-10 (18) 16"			
643.1							
4.0		FILL: POORLY GRADED SAND (SP), fine-grained, tan and yellow, moist	5	2-5-7 (12) 14"			
640.6							
6.5		FILL: SILTY SAND (SM), fine-grained, with concrete fragments, and roots, with organics, dark brown and black, moist		3-4-7 (11) 10"		15	OC=5%
		Brick at 10 feet	10	6-9-8 (17) 16"		19	
635.6							
11.5	▽	POORLY GRADED SAND (SP), fine-grained, brown, moist to wet, loose (ALLUVIUM)		5-5-5 (10) 18"			
			15	2-5-4 (9) 16"			
630.6	▼						
16.5		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose to medium dense (ALLUVIUM)		2-4-3 (7) 20"			
			20	2-3-3 (6) 18"			
			25	2-3-4 (7) 18"			
			30	12-8-6 (14) 18"			
616.1							
31.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 16.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-07**

LOCATION: See attached location sketch

NORTHING: 140134 EASTING: 448886

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/27/21 | END DATE: 07/27/21

SURFACE ELEVATION: 647.4 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Sunny/Cloudy

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
647.1							
0.3		SILTY SAND (SM), fine-grained, with roots, dark brown, moist (TOPSOIL FILL)					
		FILL: SILTY SAND with GRAVEL (SM), fine to medium-grained, brown and tan, moist		20-30-25 (55) 4"			
643.4							
4.0		FILL: POORLY GRADED SAND (SP), fine-grained, with Sandstone, tan and brown, moist	5	8-8-12 (20) 18"		8	P200=5%
640.9							
6.5		FILL: ORGANIC CLAY (OL), with Clay seams, black, moist		3-4-3 (7) 14"		26	OC=7%
			10	0"			
635.9							
11.5		CLAYEY SAND (SC), trace Gravel, slightly organic, black, moist to wet, medium to stiff (BURIED TOPSOIL)		4-7-3 (10) 16"		23	OC=4%
	▽		15	1-2-3 (5) 3"		35	
630.9							
16.5		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, wet, loose (ALLUVIUM)		4-5-4 (9) 14"			
627.4			20	2-3-3 (6) 18"			
20.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose (ALLUVIUM)					
			25	3-3-3 (6) 20"			
			30	4-5-4 (9) 20"			
616.4							
31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 14.0 feet while drilling. Water observed at 15.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-08**
LOCATION: See attached location sketch
NORTHING: 140194 EASTING: 448956
DRILLER: E. Rislov LOGGED BY: B. Sullivan
START DATE: 07/27/21 END DATE: 07/27/21
SURFACE ELEVATION: 647.1 ft RIG: 75010 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Sunny/Cloudy

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
646.1		POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, moist (TOPSOIL FILL)					
1.0		FILL: SILTY SAND (SM), fine-grained, with Sandstone, brown and tan, moist		5-8-8 (16) 18"			
			5	5-5-4 (9) 14"			
640.6							
6.5		FILL: POORLY GRADED SAND (SP), fine-grained, trace Gravel, dark brown, moist		5-6-6 (12) 14"		16	P200=5%
			10	6-6-8 (14) 14"			
635.6							
11.5	▽	FILL: SILTY SAND (SM), fine-grained, trace Gravel, slightly organic, black, moist to wet		2-2-1 (3) 16"		28	
633.1							
14.0	▼	ORGANIC CLAY with SAND (OL), black, wet (BURIED TOPSOIL)	15	1-2-4 (6) 16"		51	OC=6%
630.6							
16.5		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, wet, loose (ALLUVIUM)		2-3-5 (8) 18"		21	P200=2%
627.1			20	5-4-5 (9) 18"			
20.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, wet, loose (ALLUVIUM)					
624.1							
23.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, wet, loose (ALLUVIUM)	25	2-3-4 (7) 20"			
			30	3-3-3 (6) 20"			
616.1							
31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 12.5 feet while drilling. Water observed at 15.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-09**

LOCATION: See attached location sketch

NORTHING: 139895 EASTING: 448728

DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/28/21 END DATE: 07/28/21

SURFACE ELEVATION: 647.5 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Rain/Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
643.5		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist		3-6-9 (15) 14"			
4.0 641.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, trace concrete, brown, moist	5	6-6-10 (16) 12"			
6.5 633.5		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist		4-4-6 (10) 16"			
			10	5-5-5 (10) 16"			
				6-7-11 (18) 14"			
14.0	▽	POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, wet, loose to medium dense (ALLUVIUM)	15	3-5-7 (12) 15"		17	P200=3%
				3-4-3 (7) 16"			
			20	1-2-4 (6) 18"			
			25	5-6-7 (13) 20"			
616.5			30	6-5-6 (11) 16"			
31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 15.0 feet while drilling. Water observed at 16.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-10**
LOCATION: See attached location sketch
NORTHING: 139988 EASTING: 448774
DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/28/21 END DATE: 07/28/21
SURFACE ELEVATION: 647.5 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Rain/Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~647.1~~ 0.4		POORLY GRADED SAND with SILT (SP-SM), fine-grained, with roots, dark brown, moist (TOPSOIL FILL)					
		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist		2-3-4 (7) 14"		7	P200=3%
			5	10-14-8 (22) 15"			
				6-8-11 (19) 16"			
			10	4-6-10 (16) 14"			
				7-9-12 (21) 16"			
633.5 14.0	▽	POORLY GRADED SAND (SP), fine to medium-grained, brown and gray, wet, medium dense (ALLUVIUM)	15	7-7-8 (15) 16"		20	
	▼			7-7-7 (14) 18"			
628.5 19.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose (ALLUVIUM)	20	1-3-4 (7) 18"			
			25	3-3-4 (7) 18"			
			30	6-3-4 (7) 20"			
616.5 31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 14.0 feet while drilling. Water observed at 16.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-11**

LOCATION: See attached location sketch

NORTHING: 140046 EASTING: 448870

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/29/21 | END DATE: 07/29/21

SURFACE ELEVATION: 647.6 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
643.6		FILL: POORLY GRADED SAND with SILT and GRAVEL (SP-SM), fine-grained, brown and tan, moist		5-5-5 (10) 20"			
4.0		FILL: SILTY SAND (SM), fine-grained, brown, moist to wet	5	13-15-15 (30) 14"			
				8-8-10 (18) 14"		10	P200=13%
		Trace Clay at 10 feet	10	7-7-7 (14) 14"			
	▽			5-5-6 (11) 16"			
633.6							
14.0		POORLY GRADED SAND (SP), fine to medium-grained, brown and gray, wet, medium dense (ALLUVIUM)	15	5-6-8 (14) 16"		18	
	▼			2-3-8 (11) 18"		21	P200=4%
628.6							
19.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, loose (ALLUVIUM)	20	3-4-5 (9) 18"			
			25	2-3-2 (5) 18"			
			30	2-3-3 (6) 18"			
616.6							
31.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 18.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-12**

LOCATION: See attached location sketch

NORTHING:	139969	EASTING:	448838
DRILLER:	E. Rislov	LOGGED BY:	B. Sullivan
START DATE:	07/28/21	END DATE:	07/28/21
SURFACE ELEVATION:	647.5 ft	RIG:	75010
METHOD:	3 1/4" HSA	SURFACING:	Grass
WEATHER:	Rain/Sunny		

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
647.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, with roots, dark brown, moist (TOPSOIL FILL)					
0.5		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, moist		3-3-2 (5) 14"			
			5	5-9-7 (16) 16"			
				4-8-9 (17) 12"		9	P200=10%
			10	4-7-9 (16) 16"			
	▽	*Wet at 12 1/2 feet*		5-6-6 (12) 14"			
633.5							
14.0	▼	POORLY GRADED SAND (SP), fine to medium-grained, brown, wet, medium dense (ALLUVIUM)	15	5-9-7 (16) 18"			
				5-12-12 (24) 20"			
628.5							
19.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, wet, medium dense (ALLUVIUM)	20	4-6-7 (13) 20"			
			25	4-5-7 (12) 18"			
			30	3-7-5 (12) 0"			
616.5							
31.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 15.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-13**

LOCATION: See attached location sketch

NORTHING: 139890 EASTING: 448871

DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/28/21 END DATE: 07/28/21

SURFACE ELEVATION: 647.5 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Rain/Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~647.2~~ 0.3		SILTY SAND (SM), fine-grained, with roots, dark brown, moist (TOPSOIL FILL)					
		FILL: POORLY GRADED SAND with SILT (SP-SM), trace Gravel, brown and tan, moist		2-5-10 (15) 16"			
643.5 4.0		FILL: LEAN CLAY with SAND (CL), brown, moist	5	5-9-10 (19) 18"		22	P200=67%
641.0 6.5		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist		5-8-11 (19) 16"			
			10	5-6-11 (17) 14"			
633.5 14.0	▽	POORLY GRADED SAND (SP), fine to medium-grained, brown, wet, loose (ALLUVIUM)	15	8-11-9 (20) 16"			
	▼	*Trace Gravel at 17 1/2 feet*		2-5-4 (9) 15"			
			20	3-4-6 (10) 20"			
				2-3-4 (7) 18"			
			25	3-3-3 (6) 16"			
			30	4-3-4 (7) 20"			
616.5 31.0		*Trace Gravel at 30 feet*					
		END OF BORING					Water observed at 15.0 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 18.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-14**
LOCATION: See attached location sketch
NORTHING: 139897 EASTING: 448979
DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/27/21 END DATE: 07/27/21
SURFACE ELEVATION: 647.3 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny/Cloudy

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
646.3		POORLY GRADED SAND with SILT (SP-SM), fine-grained, dark brown to brown, moist (TOPSOIL FILL)					
1.0		FILL: POORLY GRADED SAND (SP), fine-grained, brown, moist		4-5-6 (11) 15"			
		Little Clay at 5 feet	5	4-6-8 (14) 16"			
				4-5-9 (14) 18"			
		Clay seams at 10 feet	10	6-9-12 (21) 14"			
635.8							
11.5	▽	FILL: POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist to wet		6-6-10 (16) 12"		19	P200=5%
632.3			15	2-2-2 (4) 15"		36	OC=4%
15.0		CLAYEY SAND (SC), trace Gravel, slightly organic, black, wet (BURIED TOPSOIL)					Petroleum like odor at 15 feet
630.3							
17.0	▼	POORLY GRADED SAND (SP), fine to medium-grained, brown, wet, loose (ALLUVIUM)		2-3-3 (6) 20"			
			20	3-3-4 (7) 20"			
			25	2-3-3 (6) 20"			
		Trace Gravel at 30 feet	30	3-4-3 (7) 20"			
616.3							
31.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 19.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-15**

LOCATION: See attached location sketch

NORTHING: 139971 EASTING: 448946

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/27/21 | END DATE: 07/27/21

SURFACE ELEVATION: 647.5 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Sunny/Cloudy

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, moist		2-3-7 (10) 14"			
			5	6-9-14 (23) 16"		11	P200=12%
		Clay seams at 7 feet		7-9-11 (20) 18"			
			10	4-6-7 (13) 14"			
	⊠	*Wet at 12 1/2 feet*		3-7-11 (18) 14"			
633.5 14.0		POORLY GRADED SAND (SP), fine to medium-grained, brown, wet, loose to medium dense (ALLUVIUM)	15	2-4-4 (8) 16"			
	▼			6-6-6 (12) 18"			
			20	2-3-5 (8) 18"			
			25	3-3-5 (8) 20"			
			30	3-4-3 (7) 18"			
616.5 31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 12.5 feet while drilling. Water observed at 18.0 feet at end of drilling.

BRAUN INTERTEC
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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-16**

LOCATION: See attached location sketch

NORTHING: 140047 EASTING: 448980

DRILLER: E. Rislov | LOGGED BY: B. Sullivan | START DATE: 07/27/21 | END DATE: 07/27/21

SURFACE ELEVATION: 647.4 ft | RIG: 75010 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Sunny/Cloudy

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
647.2 0.2		POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace roots, brown, moist (TOPSOIL FILL)					
		FILL: SILTY SAND (SM), fine-grained, with Sandstone, brown and yellow, moist		3-13-16 (29) 12"			
643.4 4.0		FILL: POORLY GRADED SAND (SP), fine-grained, trace Gravel, brown, moist	5	3-4-12 (16) 18"			
				6-8-10 (18) 16"			
638.4 9.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, moist	10	6-6-8 (14) 16"		13	P200=7%
635.9 11.5	▽	POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist to wet, medium dense to loose (ALLUVIUM)		4-7-10 (17) 14"			
	▼		15	2-5-5 (10) 18"			
				6-5-8 (13) 20"			
			20	2-5-6 (11) 18"			
			25	4-4-3 (7) 18"			
			30	4-3-6 (9) 20"			
616.4 31.0		END OF BORING Boring then backfilled with bentonite chips					Water observed at 12.5 feet while drilling. Water observed at 16.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-17**
LOCATION: See attached location sketch
NORTHING: 140082 EASTING: 448773
DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/29/21 END DATE: 07/29/21
SURFACE ELEVATION: 647.4 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
647.0							
0.4		SILTY SAND (SM), fine-grained, with roots, dark brown, moist (TOPSOIL FILL)		3-5-10-20 (15) 18"			
		FILL: SILTY SAND with GRAVEL (SM), fine-grained, and Sandstone, brown and tan, moist		10-12-19-14 (31) 20"		9	P200=26%
				6-6-10-8 (16) 15"			
			5				
640.9				12-12-15-16 (27) 18"			
6.5		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, dark brown, moist		4-4-5-5 (9) 16"		15	P200=11%
		Gravel at 10 to 12 feet	10	3-4-5-5 (9) 0"			
635.4	▽						
12.0		CLAYEY SAND (SC), trace Gravel, slightly organic, black to gray, wet (BURIED TOPSOIL)		2-2-2-4 (4) 12"		21	OC=3%
633.4							
14.0		POORLY GRADED SAND (SP), fine to medium-grained, brown, wet, very loose to medium dense (ALLUVIUM)		3-5-7-8 (12) 18"			
			15	1-2-2-2 (4) 16"			
	▼			3-3-3-9 (6) 20"			
627.4			20				
20.0		END OF BORING					Water observed at 12.0 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 18.0 feet at end of drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2106376
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

BORING: **ST-18**

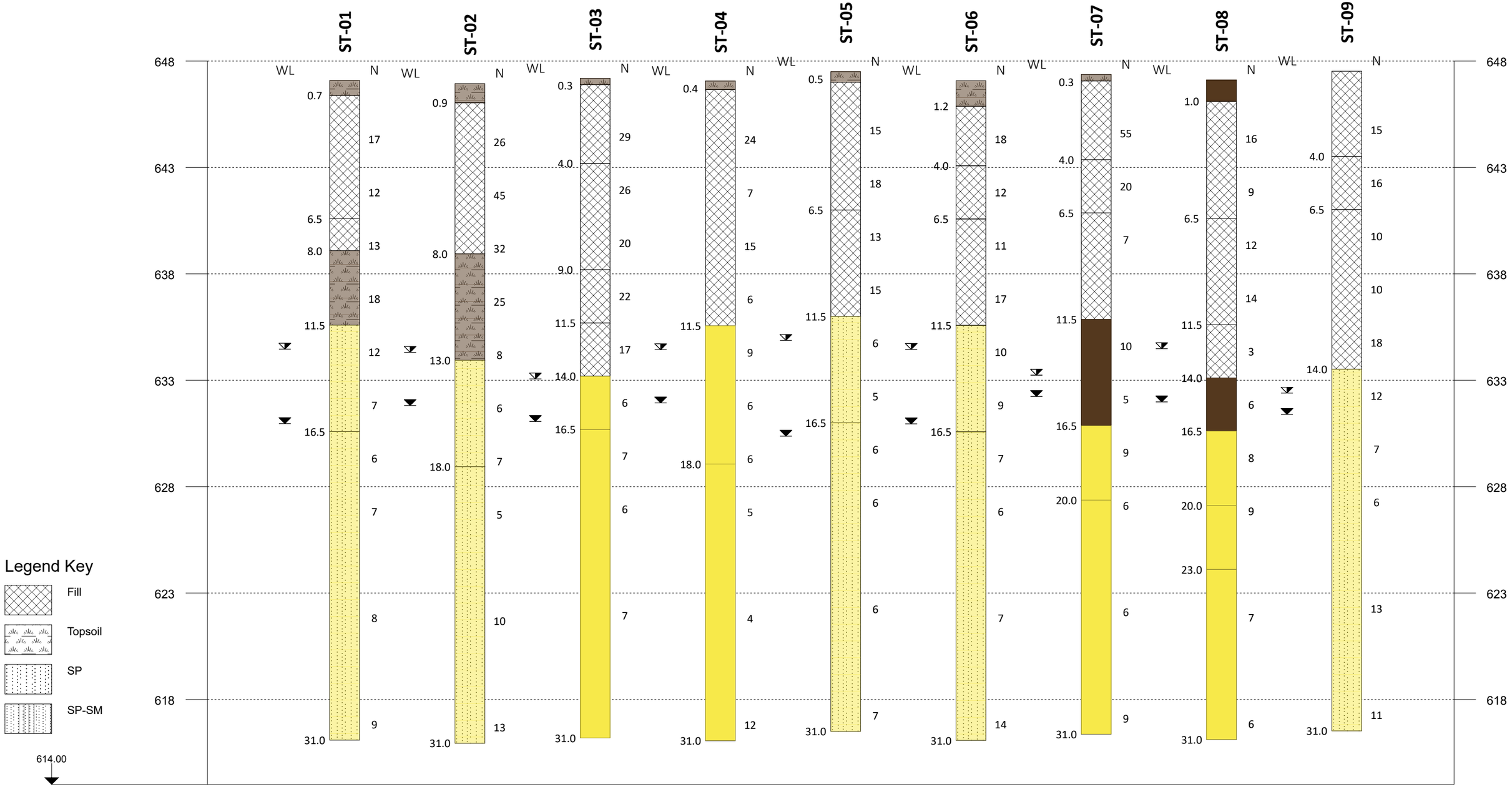
LOCATION: See attached location sketch

NORTHING: 140083 EASTING: 448895

DRILLER: E. Rislov LOGGED BY: B. Sullivan START DATE: 07/29/21 END DATE: 07/29/21

SURFACE ELEVATION: 647.4 ft RIG: 75010 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
647.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown, moist (TOPSOIL FILL)		3-7-30-15 (37) 15"			
0.4		FILL: SILTY SAND with GRAVEL (SM), fine-grained, and Sandstone, brown and tan, moist		8-15-13-10 (28) 14"			
				6-6-7-8 (13) 14"		11	P200=27%
641.4			5				
6.0		FILL: SILTY SAND (SM), fine-grained, black, moist		15-9-9-12 (18) 20"			
640.4							
7.0		FILL: POORLY GRADED SAND (SP), fine-grained, with Sandstone, reddish brown, moist					
639.4				4-5-5-4 (10) 6"		15	
8.0		SILTY SAND (SM), fine-grained, trace Gravel, black, moist					
637.4			10				
10.0		FILL: SILTY SAND with GRAVEL (SM), fine-grained, black and brown, moist		3-5-6-6 (11) 4"			
635.4							
12.0		ORGANIC CLAY (OL), with wood fragments, and Sand, black, wet (BURIED TOPSOIL)		1-1-1-1 (2) 5"		19	OC=5%
633.4							
14.0	▽	POORLY GRADED SAND with SILT (SP-SM), fine-grained, brown and gray, wet, loose to medium dense (ALLUVIUM)		1-3-4-4 (7) 12"			
			15				
		With Clay seams from 16 to 20 feet		5-7-8-8 (15) 16"		20	P200=11%
	▼						
				8-14-14-14 (28) 20"			
627.4			20				
20.0		END OF BORING					Water observed at 14.0 feet while drilling.
		Boring then backfilled with bentonite chips					Water observed at 17.0 feet at end of drilling.



SECTION LINE 1

Fence Diagram
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

Project ID:	B2106376
Vert. Scale:	1"= xxx'
Hor. Scale:	NTS
Date:	08/23/2021

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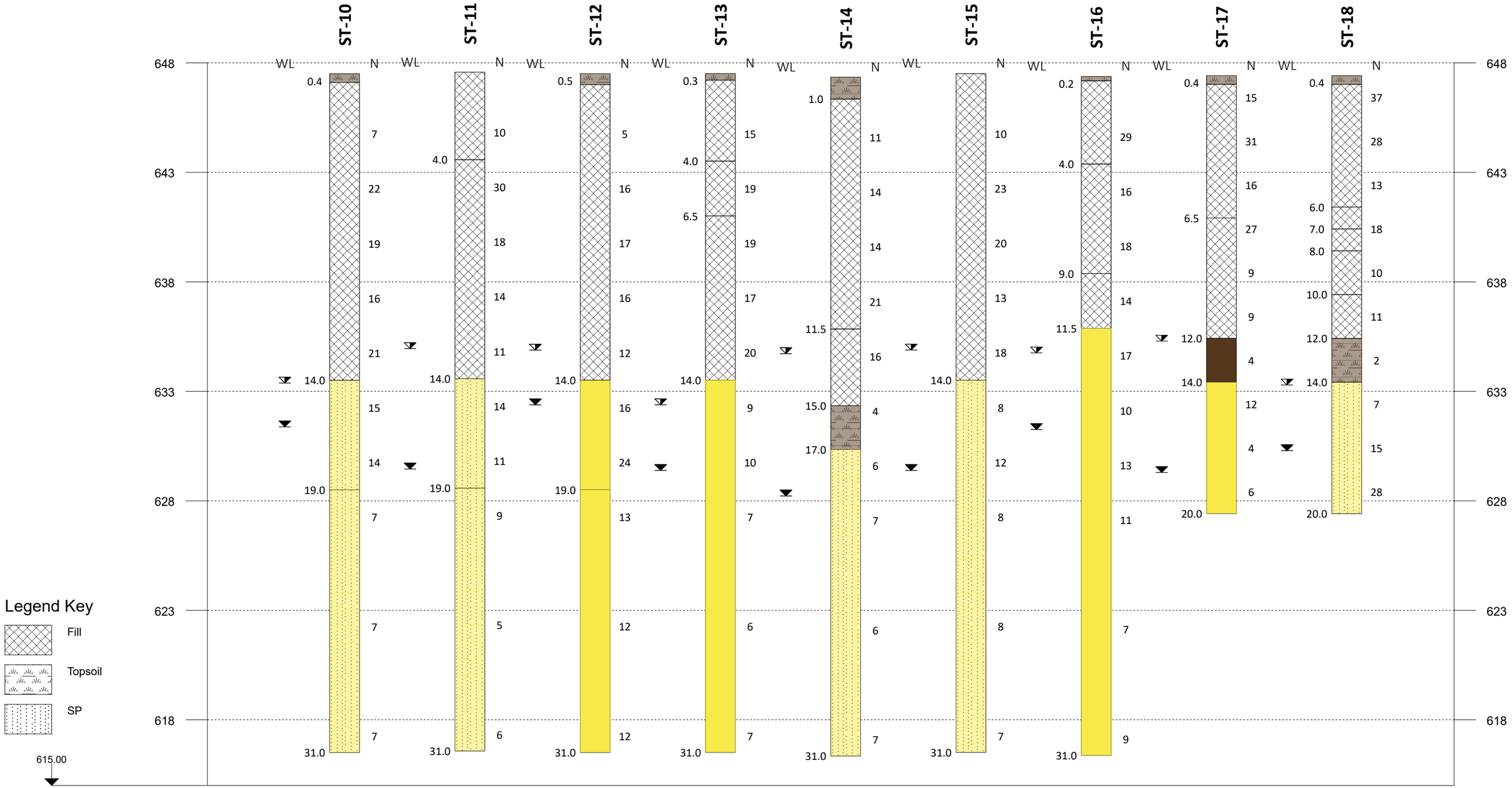

Legend Key

- Fill
- Topsoil
- SP

Project ID:	B2106376
Vert. Scale:	1"=
Hor. Scale:	NTS
Date:	08/23/2021

Fence Diagram
Geotechnical Evaluation
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, Wisconsin

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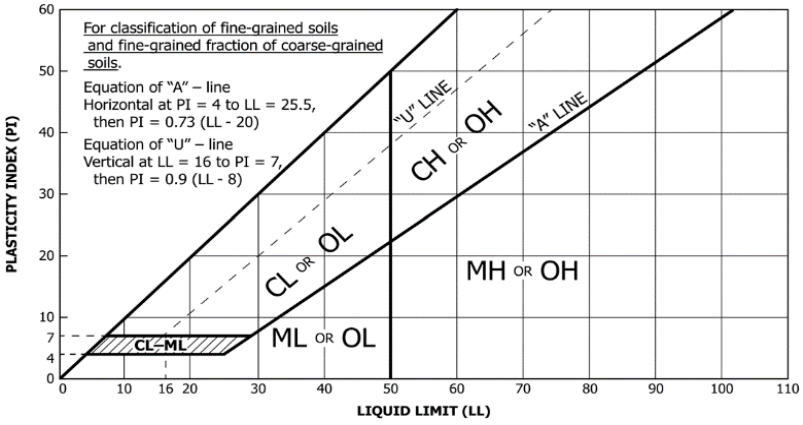
Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3$[D]	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3$[D]	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[I]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K L M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OL	Organic clay[K L M N] / Organic silt[K L M O]
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K L M]
			PI plots below "A" line	MH	Elastic silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OH	Organic clay[K L M P] / Organic silt[K L M Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	**q_p**	Pocket penetrometer strength, tsf
WD	Wet density, pcf	**q_U**	Unconfined compression test, tsf
P200	% Passing #200 sieve	**LL**	Liquid limit
MC	Moisture content, %	**PL**	Plastic limit
OC	Organic content, %	**PI**	Plasticity index

Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L, M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

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.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

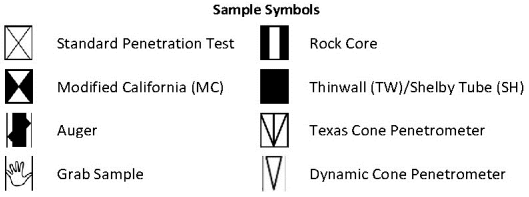
Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▼).

Sample Symbols



5/2021

BRAUN INTERTEC
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Sieve Analysis Of Aggregate

ASTM C136

08/02/2021

2309 Palace Street
La Crosse, WI 54603
Phone: 608-781-7277

Client:

5th Ward Residences, LLC
2 Copeland Avenue, Ste 201
La Crosse, WI 54601

Project:

B2106376
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, WI 54603

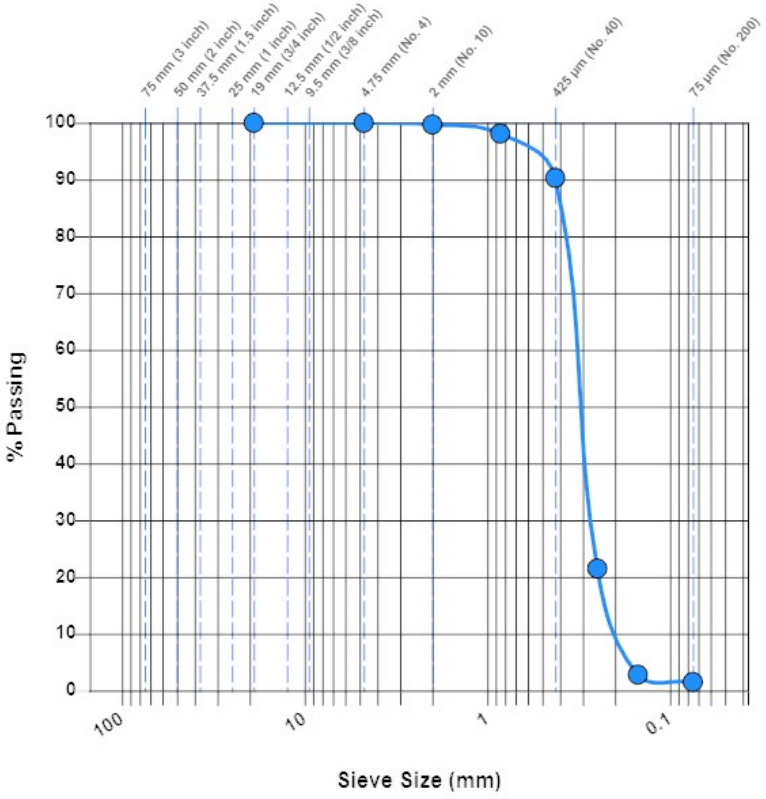
Sample Information

Sample Number: 393142
Sampled By: Drill Crew
Sampling Method:
Sample From: Splitspoon
Location: In-place
Location Details: Boring ST-1 at 15 feet
Sample Date: 07/26/2021
Received Date: 07/26/2021
Lab: 2309 Palace Street, La Crosse, WI
Tested Date: 07/27/2021
Tested By: Tos, Yot

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100	
4.75 mm (No. 4)	100	
2 mm (No. 10)	100	
850 µm (No. 20)	98	
425 µm (No. 40)	90	
250 µm (No. 60)	22	
150 µm (No. 100)	3	
75 µm (No. 200)	1.5	

#200 Wash Loss ASTM C117 (%) 2.1



Gravel (%): 0.0 **Sand (%):** 98.5 **Silt & Clay (%):** 1.5

D_{60} (mm): 0.35 **D_{30} (mm):** 0.27 **D_{10} (mm):** 0.19 **C_U:** 1.84 **C_C:** 1.10

General

Results: The test is for informational purposes.

Remarks: Moisture Content (ASTM D2216) = 22%

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Sieve Analysis Of Aggregate

ASTM C136

08/02/2021

2309 Palace Street
La Crosse, WI 54603
Phone: 608-781-7277

Client:

5th Ward Residences, LLC
2 Copeland Avenue, Ste 201
La Crosse, WI 54601

Project:

B2106376
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, WI 54603

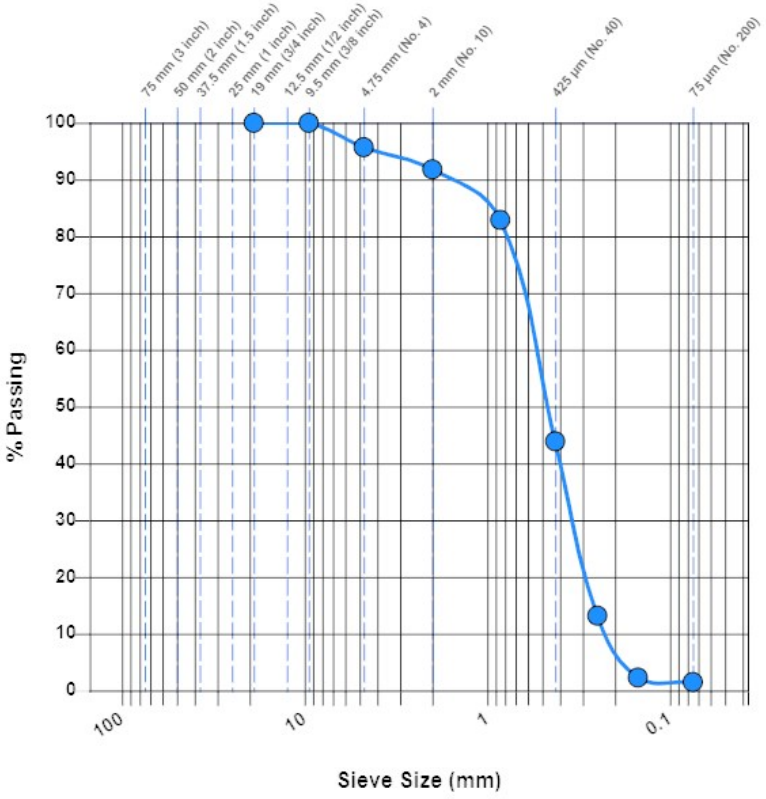
Sample Information

Sample Number: 393145
Sampled By: Drill Crew
Sampling Method:
Sample From: Splitspoon
Location: In-place
Location Details: Boring ST-8 at 17 1/2 feet
Sample Date: 07/27/2021
Received Date: 07/27/2021
Lab: 2309 Palace Street, La Crosse, WI
Tested Date: 07/28/2021
Tested By: Tos, Yot

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100	
9.5 mm (3/8 inch)	100	
4.75 mm (No. 4)	96	
2 mm (No. 10)	92	
850 µm (No. 20)	83	
425 µm (No. 40)	44	
250 µm (No. 60)	13	
150 µm (No. 100)	2	
75 µm (No. 200)	1.5	

#200 Wash Loss ASTM C117 (%) 1.4



Gravel (%): 4.3 **Sand (%):** 94.2 **Silt & Clay (%):** 1.5

D_{60} (mm): 0.60 **D_{30} (mm):** 0.35 **D_{10} (mm):** 0.22 **C_U:** 2.73 **C_C:** 0.93

General

Results: The test is for informational purposes.

Remarks: Moisture Content (ASTM D2216) = 21%

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Sieve Analysis Of Aggregate

ASTM C136

08/02/2021

2309 Palace Street
La Crosse, WI 54603
Phone: 608-781-7277

Client:

5th Ward Residences, LLC
2 Copeland Avenue, Ste 201
La Crosse, WI 54601

Project:

B2106376
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, WI 54603

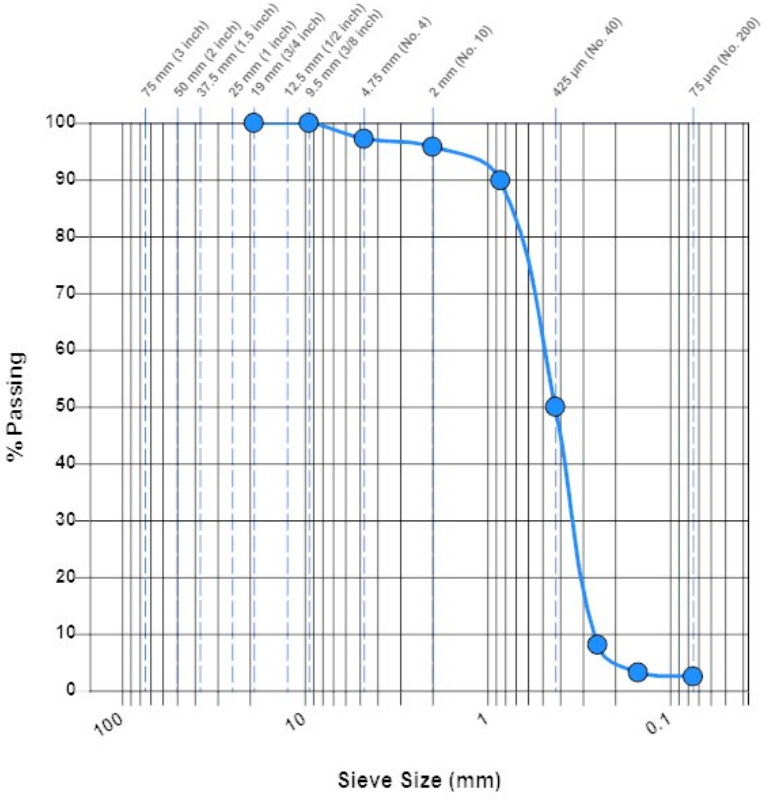
Sample Information

Sample Number: 393148
Sampled By: Drill Crew
Sampling Method:
Sample From: Splitspoon
Location: In-place
Location Details: Boring ST-9 at 15 feet
Sample Date: 07/28/2021
Received Date: 07/28/2021
Lab: 2309 Palace Street, La Crosse, WI
Tested Date: 07/29/2021
Tested By: Tos, Yot

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100	
9.5 mm (3/8 inch)	100	
4.75 mm (No. 4)	97	
2 mm (No. 10)	96	
850 µm (No. 20)	90	
425 µm (No. 40)	50	
250 µm (No. 60)	8	
150 µm (No. 100)	3	
75 µm (No. 200)	2.5	

#200 Wash Loss ASTM C117 (%) 2.1



Gravel (%): 2.8 **Sand (%):** 94.7 **Silt & Clay (%):** 2.5

D_{60} (mm): 0.53 **D_{30} (mm):** 0.34 **D_{10} (mm):** 0.26 **C_U:** 2.04 **C_C:** 0.84

General

Results: The test is for informational purposes.

Remarks: Moisture Content (ASTM D2216) = 17%

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Sieve Analysis Of Aggregate

ASTM C136

08/03/2021

2309 Palace Street
La Crosse, WI 54603
Phone: 608-781-7277

Client:

5th Ward Residences, LLC
2 Copeland Avenue, Ste 201
La Crosse, WI 54601

Project:

B2106376
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, WI 54603

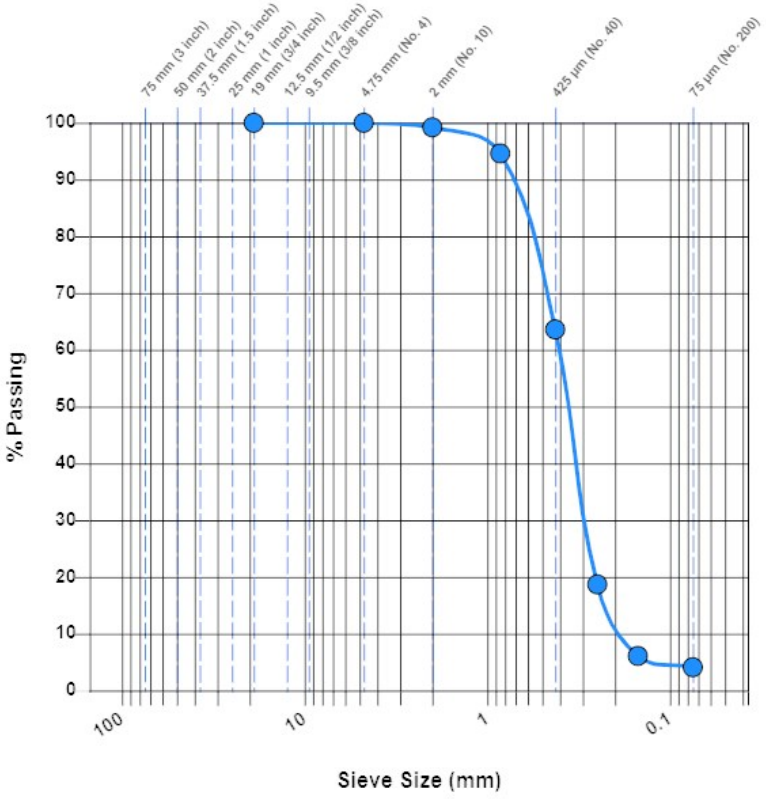
Sample Information

Sample Number: 393220
Sampled By: Drill Crew
Sampling Method:
Sample From: Splitspoon
Location: Native Soil
Location Details: Boring ST-11 at 17 1/2 feet
Sample Date: 07/29/2021
Received Date: 07/29/2021
Lab: 2309 Palace Street, La Crosse, WI
Tested Date: 08/02/2021
Tested By: Tos, Yot

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100	
4.75 mm (No. 4)	100	
2 mm (No. 10)	99	
850 µm (No. 20)	95	
425 µm (No. 40)	64	
250 µm (No. 60)	19	
150 µm (No. 100)	6	
75 µm (No. 200)	4.1	

#200 Wash Loss ASTM C117 (%) 3.3



Gravel (%): 0.0 **Sand (%):** 95.9 **Silt & Clay (%):** 4.1

D_{60} (mm): 0.41 **D_{30} (mm):** 0.29 **D_{10} (mm):** 0.18 **C_U:** 2.28 **C_C:** 1.14

General

Results: The test is for informational purposes.
Remarks: Moisture Content (ASTM D2216) = 21%

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Sieve Analysis Of Aggregate

ASTM C136

08/02/2021

2309 Palace Street
La Crosse, WI 54603
Phone: 608-781-7277

Client:

5th Ward Residences, LLC
2 Copeland Avenue, Ste 201
La Crosse, WI 54601

Project:

B2106376
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, WI 54603

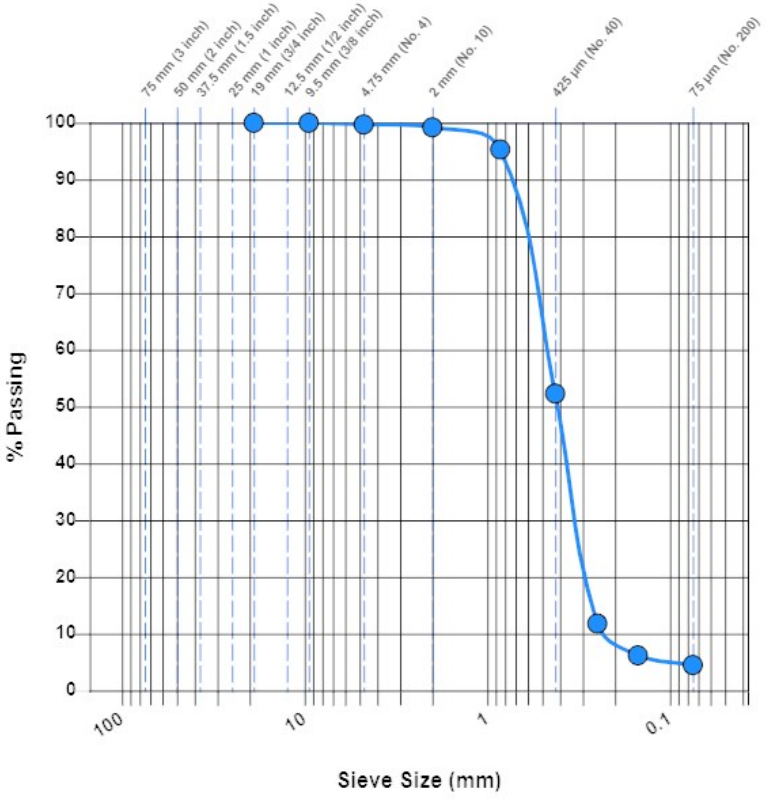
Sample Information

Sample Number: 393146
Sampled By: Drill Crew
Sampling Method:
Sample From: Splitspoon
Location: In-place
Location Details: Boring ST-14 at 12 1/2 feet
Sample Date: 07/28/2021
Received Date: 07/28/2021
Lab: 2309 Palace Street, La Crosse, WI
Tested Date: 07/29/2021
Tested By: Tos, Yot

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100	
9.5 mm (3/8 inch)	100	
4.75 mm (No. 4)	100	
2 mm (No. 10)	99	
850 µm (No. 20)	95	
425 µm (No. 40)	52	
250 µm (No. 60)	12	
150 µm (No. 100)	6	
75 µm (No. 200)	4.5	

#200 Wash Loss ASTM C117 (%) 4.3



Gravel (%): 0.3 **Sand (%):** 95.2 **Silt & Clay (%):** 4.5

D_{60} (mm): 0.50 **D_{30} (mm):** 0.33 **D_{10} (mm):** 0.22 **C_U:** 2.27 **C_C:** 0.99

General

Results: The test is for informational purposes.

Remarks: Moisture Content (ASTM D2216) = 19%

BRAUN INTERTEC
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Sieve Analysis Of Aggregate

ASTM C136

08/03/2021

2309 Palace Street
La Crosse, WI 54603
Phone: 608-781-7277

Client:

5th Ward Residences, LLC
2 Copeland Avenue, Ste 201
La Crosse, WI 54601

Project:

B2106376
Proposed 5th Ward Residence Development
1325 Saint Andrew Street
La Crosse, WI 54603

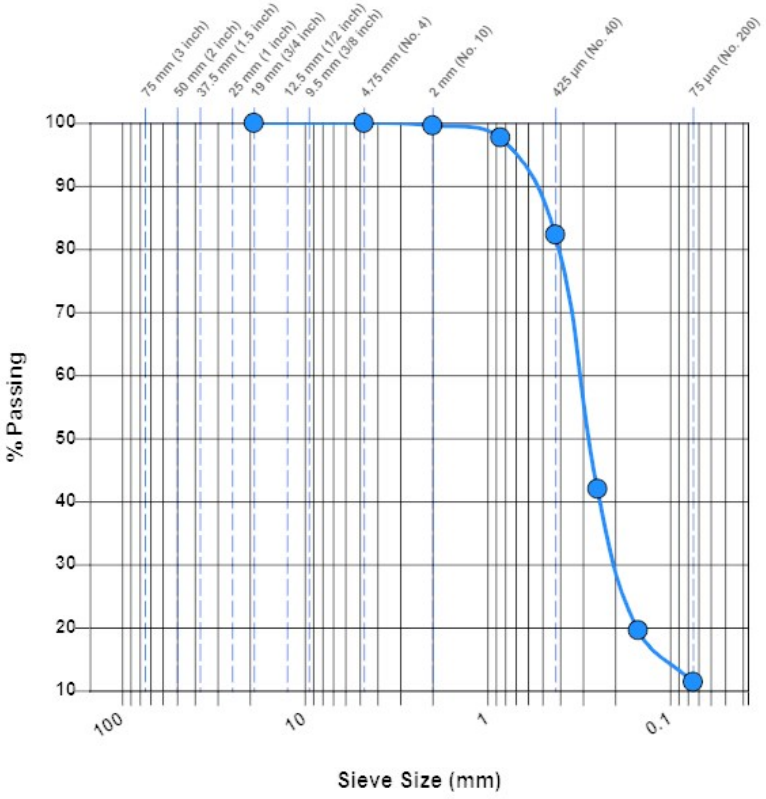
Sample Information

Sample Number: 393219
Sampled By: Drill Crew
Sampling Method:
Sample From: Splitspoon
Location: Native Soil
Location Details: Boring ST-18 at 17 feet
Sample Date: 07/29/2021
Received Date: 07/29/2021
Lab: 2309 Palace Street, La Crosse, WI
Tested Date: 08/02/2021
Tested By: Tos, Yot

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100	
4.75 mm (No. 4)	100	
2 mm (No. 10)	100	
850 µm (No. 20)	98	
425 µm (No. 40)	82	
250 µm (No. 60)	42	
150 µm (No. 100)	20	
75 µm (No. 200)	11.4	

#200 Wash Loss ASTM C117 (%) 10.1



Gravel (%): 0.0 **Sand (%):** 88.6 **Silt & Clay (%):** 11.4

D_{60} (mm): 0.33 **D_{30} (mm):** 0.20

General

Results: The test is for informational purposes.

Remarks: Moisture Content (ASTM D2216) = 20%

1002-CPS-23
Division of Industry Services
PO Box 2658
Madison, Wisconsin

Attachment 2:

SOIL AND SITE EVALUATION - STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach a complete site plan on paper not less than 8 ½ x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent of slope, scale or dimensions, north arrow, and BM reference to nearest road. ***Please print all information*** Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1)(m)]	County La Crosse Parcel I.D. 17-10289-40 Reviewed by: Date:

Property Owner: Stizo Development, LLC	Property Location Govt. Lot SW¼ NE¼ S29 T07 R16 W		
Property Owner's Mailing Address: PO Box 609	Lot	Block #	Subd. Name or CSM #
City, State Zip Phone Number La Crosse, WI 54602	☒ City ☐ Village ☐ Town La Crosse		Nearest Road Saint Andrew Street
Drainage Area _____ ☐ sq. ft. ☐ acres Test site suitable for (check all that apply): ☐ Bio-retention; ☐ Subsurface Dispersal System; ☐ Reuse; ☐ Irrigation ☐ Other	Hydraulic Application Test Method ☒ Morphological Evaluation ☐ Double Ring Infiltrometer Other: (specify)		Soil Moisture Date of soil Borings: July 29, 2021 USDA-NRCS WETS Value: ☐ Dry = 1; ☒ Normal = 2; ☒ Wet = 3.

ST-17 #OBS ☐ Pit ☒ Boring Ground surface Elevation 647.4 ft. Elevation of limiting factor 12 ft.

Horizon	Depth In.	Dominate Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr.
FILL	0 - 5	10YR 3/2	---	f.sl	0.f.sg	mvfr	c	0	< 20	0.50
FILL	5 - 78	10YR 5/4	---	f.sl	0.f.sg	ml	c	30	26	0.50
FILL	78 - 144	10YR 3/1	---	f.ls	0.f.sg	mvfr	c	20	11	0.50
E	144 - 168	10YR 2.5/1	---	sc	0.f.gr	mfr	c	10	< 50	0.04
C	168 - 240	10YR 5/2	---	f/m.s	0.f/m.sg	ml	g	0	<5	1.63

Comments: Gravel layer from 10 to 12 feet. Groundwater was encountered at 12 feet while drilling and is a limiting layer. Seasonal and annual fluctuations of groundwater should also be anticipated.

ST-18 #OBS ☐ Pit ☒ Boring Ground surface Elevation 647.4 ft. Elevation of limiting factor 14 ft.

Horizon	Depth In.	Dominate Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr.
FILL	0 - 5	10YR 5/4	---	f.ls	0.f.sg	mvfr	c	0	< 15	0.50
FILL	5 - 72	10YR 5/3	---	f.sl	0.f.sg	ml	g	30	27	0.50
FILL	72 - 84	10YR 3/1	---	f.sl	0.f.sg	mvfr	c	0	< 30	0.50
FILL	84 - 96	10YR 4/4	---	f.s	0.f.sg	ml	c	10	< 5	0.50
FILL	96 - 120	10YR 3/1	---	f.sl	0.f.sg	mvfr	c	10	< 30	0.50
FILL	120 - 144	10YR 4/2	---	f.sl	0.f.sg	mvfr	g	20	< 30	0.50
E	144 - 168	10YR 2.5/1	---	sc	0.f.gr	mfr	c	0	< 75	0.04
C	168 - 240	10YR 5/2	---	f/m.ls	0.f/m.sg	ml	c	0	11	1.63

Comments: Groundwater was encountered at 14 feet while drilling and is a limiting layer. Seasonal and annual fluctuations of groundwater should also be anticipated.

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Overall Site Comments: The site contains deep fills that generally consist of sandy soils with trace amounts of debris and organics. Buried topsoil was also encountered below the fill with alluvial sand soils at depth. Groundwater was encountered at depths of 12 to 15 feet across the site corresponding to an elevation of 632 ½ to 635 ½ feet. Seasonal and annual fluctuations of groundwater should be anticipated.