**Soils &
Engineering
Services, Inc.**

June 23, 2026

Project 13698
Report 26.001

Ms. Jan Cowan
4503 Cowan Lane
Black Earth, Wisconsin 53515

Subject: Geotechnical Exploration and Analyses Report
Proposed Lot 3 Development
County Road JJ
Town of Vermont
Dane County, Wisconsin

Dear Ms. Cowan:

We have completed the requested exploration consisting of the performance of three borings and associated laboratory testing and geotechnical engineering analyses. The purpose of the borings was to obtain information about the subsurface material types and stratification and short-term subsurface water levels at the boring locations. We present our findings and our comments and recommendations in the enclosed *Geotechnical Exploration and Analyses Report* for the subject project.

Respectfully submitted,

SOILS & ENGINEERING SERVICES, INC.

Craig M. Bower

Craig M. Bower, P.E.

CMB:DER:cmb

Enclosure

Delivered by email: Ms. Steph Belmas (via email: [redacted]

xc: Mr. Chris Belmas [redacted]
Mr. Ryan Cowan
Ms. Heidi Kopras

1102 Stewart Street
Madison, WI 53713-4648
Phone: 608-274-7600
soils@soils.ws
Fax: 608-274-7511
www.soils.ws
Geotechnical Engineers since 1966

GEOTECHNICAL EXPLORATION AND ANALYSES REPORT

PROPOSED LOT 3 DEVELOPMENT
COUNTY ROAD JJ
TOWN OF VERMONT
DANE COUNTY, WISCONSIN

SES Project Number 13698
SES Report Number 26.001

Prepared By

Soils & Engineering Services, Inc.
1102 Stewart Street
Madison, Wisconsin 53713-4648
phone: (608) 274-7600
e-mail: soils@soils.ws

Craig M. Bower, P.E.

Craig M. Bower

CRAIG M.
BOWER
E-26676
COTTAGE GROVE
WIS.
6/23/26

Submitted To

Ms. Jan Cowan
4503 Cowan Lane
Black Earth, Wisconsin 53515

June 23, 2026

Geotechnical Engineers since 1966

TABLE OF CONTENTS

LIST OF REPORT SECTIONS

TABLE OF CONTENTS

LIST OF APPENDICES

DEFINITIONS OF ACRONYMS

AASHTO = American Association of State Highway and Transportation Officials

ANSI = American National Standards Institute

ASTM = American Society of Testing and Materials

AWWA = American Water Works Association

CIP = cast-in-place

DFD = Division of Facilities Development

DI = ductile-iron

DMA = Department of Military Affairs

EBS = excavation below subgrade

EPS = expanded polystyrene

FDM = *Facilities Design Manual*

FPFS = Frost-Protected Shallow Foundation

GPS = global positioning system

HMA = hot-mix asphalt

HSA = hollow-stem augers

LF = lineal feet

LRFD = load and resistance factor design

OSHA = Occupational Safety and Health Administration

PCC = Portland cement concrete

pcf = pounds per cubic foot

PID = photoionization detector

plf = pounds per lineal foot

psf = pounds per square foot

$^{\text{psi}}/_{\text{in}}$ = pounds per square inch per inch

PVC = polyvinyl chloride

RCP = reinforced-concrete-pipe

SES = Soils & Engineering Services, Inc.

SPT = standard penetration test

SSA = solid-stem augers

SSHSC = *Standard Specifications for Highway and Structure Construction*

USCS = Unified Soil Classification System

VOC = volatile organic compounds

WBM = WisDOT Bridge Manual

WDNR = Wisconsin Department of Natural Resources

WDOA = Wisconsin Department of Administration

WDSPS = Wisconsin Department of Safety and Professional Services

WGNHS = Wisconsin Geological and Natural History Survey

WisDOT = Wisconsin Department of Transportation

XPS = extruded polystyrene

I. INTRODUCTION

This *Geotechnical Exploration and Analyses Report* summarizes the findings of the geotechnical exploration and geotechnical engineering analyses performed for the development of a residence on Lot 3 located on County Road JJ in the Town of Vermont in Dane County, Wisconsin. We completed this work under the general direction of Ms. Steph Belmas who established the general scope of the work.

The intent of this report is to: (1) convey the geotechnical information obtained from three borings; (2) present the results of the field tests; (3) provide the results of our geotechnical engineering analyses; and (4) present our comments and recommendations for the design and construction of the proposed improvements. We recommend Soils & Engineering Services, Inc. be employed to make observations and perform tests at the time of excavation and construction of any proposed improvements on the subject property in order to verify the subsurface conditions encountered by the exploration performed and to validate our comments, analyses, and recommendations presented in this report for those improvements.

II. PROJECT DESCRIPTION

The project consists of the development of a residence on Lot 3. The project site is located approximately 1,100 feet west of the intersection of CTH JJ and STH 78. The site is currently an agricultural field. Please refer to the Project Site Location Sketch, Drawing 26.001-A, enclosed in Appendix A which shows the general location of this project.

We understand the area that can be developed on this property is limited by wetland, flood plain, and county highway setback designated limits. The majority of the subject property is located within the designated wetland area.

We understand the intent of this exploration is to determine whether the area that can be developed is suitable for residential construction and to provide a recommended lowest liveable level elevation for this construction.

III. GEOTECHNICAL EXPLORATION

The geotechnical field exploration consisted of the performance of three borings (designated Borings 1, 2, and 2A). We present the results of this geotechnical field exploration on the Boring Log Records, Laboratory Test Result Records, and Boring Fence Record enclosed in Appendix A. The Boring Log Records present the subsurface stratigraphy and related information obtained by the borings. We provide information pertinent to the Boring Log Records on the Notes and Legend Records enclosed in Appendix A. The Laboratory Test Result Records present the results of the laboratory tests performed on selected samples recovered by the borings. The Boring Fence Record presents the subsurface stratigraphy of the borings along a designated cross-section (fence) line as described in Section III.E on page 4 of this report.

A. Boring Locations

We located Borings 1, 2, and 2A in the vicinity of the southwest and northeast staked corners of the buildable area. We show the locations of these borings on the Boring Location Overview Sketch and Boring Location Sketch, Drawing 25.001-B, enclosed in Appendix A.

Our drilling crew used a GPS application on a "smart" cell phone to obtain the approximate latitude and longitude coordinates for Boring 2 at the time of the field work. The accuracy of the GPS application is unknown. We obtained approximate latitude and longitude coordinates for Borings 1 and 2A using the Google Earth computer application.[1] We include the approximate GPS coordinates for each boring on the Boring Log Records and WDNR Well/Drillhole/Borehole Abandonment Forms enclosed in Appendix A.

B. Boring Elevations

We estimated the USGS ground surface elevation at the locations of the borings based on the topographic contours obtained from the Dane County Land Information Office (LIO) DciMap website on June 18, 2026.

Using a surveying level and a leveling rod, SES personnel obtained the elevation difference between the ground surface elevation at the locations of the borings and the invert of a nearby culvert and the roadway centerline of County Road JJ (aka, CTH JJ) inline with the culvert.

We include the estimated ground surface elevation for each boring on the Boring Log Records enclosed in Appendix A. We plotted the Boring Log Records with depth and elevation scales for reference.

C. Drilling and Sampling Procedures

We drilled and sampled Borings 1, 2, and 2A to the following depths below ground surface and corresponding elevations:

Boring	**Ground Surface Elevation (feet)**	**Bottom of Boring**	
		Depth (feet-inch)	**Elevation (feet)**
1	835.0	25'-0"	810.0
2	835.0	35'-0"	800.0
2A	835.0	7'-0"	828.0

---

[1] "Google Earth Pro." 7.3.6.10441, Google, 2025.

We used a Geoprobe 7822DT drill rig mounted on an all-terrain, rubber-tracked carrier to complete the borings. We used 2¼-inch-inside-diameter HSA to maintain an open borehole as we advanced the borehole of each boring to the termination depth. At each of Borings 1 and 2, we obtained soil samples at 2- to 3-foot intervals starting at the ground surface and continued to a depth of 10 feet. We performed this sampling using a 2-inch-outside-diameter split-barrel sampler according to ASTM Designation D1586.[2] At Boring 2A, we advanced the borehole to a sample depth of 5 feet and collected a relatively undisturbed cohesive soil sample by pushing a 2-inch-outside-diameter, thin-wall steel tube (Shelby tube) sampler according to ASTM Designation D1587.[3]

We visually identified the recovered soils in general compliance with the USCS identification procedures as defined in ASTM Designation D2488.[4]

Please refer to the Boring Log Records enclosed in Appendix A for additional information regarding the drilling and sampling of Borings 1, 2, and 2A.

D. Borehole Abandonments

We abandoned the boreholes in compliance with the State of Wisconsin Administrative Code Chapters NR141 and NR812 following the removal of the drilling tools and HSA. Please refer to the WDNR Well/Drillhole/Borehole Abandonment Form 3300-005 enclosed in Appendix A for specifics regarding the abandonment of the three borings.

E. Subsurface Stratigraphy

The soil stratigraphy encountered at Borings 1, 2, and 2A consisted of topsoil overlying native soil strata. The soil stratigraphy at Boring 2A was the same as at Boring 2 to the depth drilled and sampled. Boring 2 encountered bedrock below the native soil within the depth drilled.

The topsoil strata encountered by the borings consisted of 7 to 7½ inches of brown LEAN CLAY (CL) TOPSOIL with trace organics.

Below the topsoil stratification, Borings 1 and 2 encountered a native soil strata that was variable. We describe the native soil strata encountered at these borings as follows:

---

[2] ASTM Designation D1586 is the Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. See Section III.G.2 below for more information regarding the field test associated with this sampling methodology.

[3] ASTM Designation D1587 is the *Standard Method of Test for Thin-Walled Sampling of Soils for Geotechnical Purposes*.

[4] ASTM Designation D2488 is the *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*.

- Boring 1 encountered brown grading to grayish-brown mottled with yellowish-brown and dark brown grading to gray with brown mottling grading to brown grading to gray LEAN CLAY (CL) over gray SANDY SILT (ML/SM) over gray LEAN CLAY (CL) stratified with SILT (ML) partings and lenses.

- Boring 2 encountered brown mottled grading to grayish-brown mottled with yellowish-brown and dark brown grading to gray with brown mottling LEAN CLAY (CL) over yellowish-brown fine POORLY-GRADED SAND (SP) with trace fines over gray SILT (ML) over gray LEAN CLAY (CL) stratified with SILT (ML) partings and lenses.

Below the native soil strata, Boring 2 encountered dark yellowish-orange moderately- to slightly-weathered SANDSTONE bedrock.

Please refer to the Boring Log Records enclosed in Appendix A for a further description of the native soil and bedrock strata encountered at the locations of Borings 1, 2, and 2A.

We prepared a fence diagram (see the Boring Fence Record, Figure A, enclosed in Appendix A) showing the subsurface stratigraphy encountered at each of the borings located along a line connecting the two borings. We plotted the Boring Fence Record with an elevation scale and a horizontal distance scale. A depth scale is also provided along the left side of the stratification graphic for each boring depicted on the Boring Fence Record. We include on the Boring Fence Record lines showing the estimated CTH JJ centerline elevation, the estimated CTH JJ culvert invert elevation, and the recommended minimum basement elevation.

F. Subsurface Water/Caved Levels

Our drilling crew estimated the water level depth inside the HSA where water was first noted on the drilling rods during the drilling and sampling at each of Borings 1 and 2.

After completion of the drilling and sampling of each of the borings, our drilling crew found the boreholes of Borings 1 and 2 had a water level and were caved.[5] Our drilling crew left the Boring 2 borehole open overnight and obtained another water and caved level measurement prior to abandoning this boring.

We summarize the recorded water and caved level depths and respective elevations at completion for each boring as follows:

---

[5] We define "completion of the drilling and sampling" for a boring as the time when our drilling crew has completed the removal of all drilling tools, HSA, and/or casing from the borehole.

Boring	Ground Surface Elevation (feet)	Subsurface Water			Caved Level		
		Depth (feet-inch)	Elevation (feet)	Comments	Depth (feet-inch)	Elevation (feet)	Comments
1	835.0	15'-9.6"	819.2	through HSA after 18'-6" sample	—	—	—
		6'-8"	828.3	At completion	17'-0"	818.0	At completion
2	835.0	12'-2"	822.8	through HSA after 13'-6" sample	—	—	—
		9'-8"	825.3	At completion	16'-4"	818.7	At completion
		4'-8"	830.3	At 23½ hours after completion	6'-0"	829.0	At 23½ hours after completion
2A	835.0	—	—	—	4'-0"	831.0	At completion

We include the information regarding the subsurface water and caved soil level of each borehole at completion of the drilling and sampling for the borings on the Boring Log Records enclosed in Appendix A.

We expect the subsurface (groundwater) levels to fluctuate as influenced by precipitation, snowmelt, surface water runoff, the stage of Vermont Creek and other nearby water features, and other hydrological and hydrogeological factors. The groundwater levels at the time of construction of the subject project may be higher or lower than the groundwater levels encountered on the days that we performed the borings.

G. Laboratory and Field Tests

1. Laboratory Tests

We performed laboratory tests on selected split-barrel soil samples to determine the physical properties of the native soil strata encountered at the borings. The laboratory tests that we performed on the selected material consisted of determining the moisture content (MC), Atterberg limits (liquid limit [LL] and plastic limit [PL]), wet and dry densities (γ_w and γ_d), and unconfined compressive strength (q_u). In addition to the above tests, we tested some of the cohesive soils for approximate unconfined compressive strength (q_p) using a spring penetrometer and for approximate undrained shear strength (V_s) using a spring torsional vane shear tester.

We include the laboratory test results of the selected soil samples obtained for this report on the Boring Log Records and Laboratory Test Result Records enclosed in Appendix A. We used the results from the Atterberg limits and q_u tests to confirm or modify the USCS soil identifications in general compliance with USCS classification procedures as defined in ASTM Designation D2487.[6]

2. Field Tests

The field test consisted of the performance of the standard penetration test (SPT).

We performed the SPT during the sampling procedure at each boring. It consists of driving the split-barrel sampler up to 18 inches with a 140-pound hammer weight falling 30 inches. From the SPT, we record the number of blows required to drive the split-barrel sampler every 6 inches as noted in the Field Blow Counts column on the Boring Log Records. If the sampler is driven more or less than the 6 inches, then that distance is also noted in this column. From the Field Blow Counts we obtain the N-value which is the sum of the number of blows required to drive the split-barrel sampler the last 12 inches as noted on the Boring Log Records. If the sampler is not driven the total 18 inches, then there is no reportable N-value for that sample interval. We correct the N-value for hammer efficiency {N_{60}-value}.[7]

We include the N-value and N_{60}-value field test results obtained for this report on the Boring Log Records enclosed in Appendix A.

H. Exploration Results Discussion

The exploration results indicated the following:

- The soil strata encountered at Boring 1 extending from the ground surface to the boring extents are of a predominantly soft to medium consistency or in a medium dense state of relative density. We consider these soil strata to be of low strength for the proposed improvements due to the potential for excessive settlement under the proposed design loading.

- The soil strata encountered at Boring 2 extending from the ground surface to the approximately elevation 806 feet are of predominantly very soft to medium consistency. There is a dense state of relative density layer of POORLY-GRADED SAND (SP) between approximate elevations 821 and 816 feet at Boring 2. However, it is underlain by a layer of very loose state of relative density SILT (ML) and a layer of soft to very soft consistency LEAN CLAY (CL) stratified with SILT (ML) partings and lenses which negates any benefit to the presence of this higher strength granular soil stratum. Thus, we consider the soil strata encountered at

---

[6] ASTM Designation D2487 is the *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*.

[7] The drill rigs we employ are equipped with automatic hammers with an 80- to 91-percent efficiency. The SPT was developed using cathead and rope (donut) hammers with a 60-percent efficiency. Therefore, a correction is applied to the recorded N-value to obtain the N_{60}-value for use in geotechnical engineering equations.

Boring 2 to be of low strength for the proposed improvements due to the potential for excessive settlement under the proposed design loading.

- SANDSTONE bedrock was encountered by Boring 2 starting at approximately elevation 806 feet. This bedrock is considered to be of a moderately- to slightly-weathered condition and is in a dense to very dense state of relative density. We consider this bedrock to be of high strength and acceptable for providing support for the proposed improvements through the use of a deep foundation system.

We utilized the field test results in our evaluation of the soils for the determination of design parameters, and to provide comments and recommendations for the design and construction of the proposed improvements.

IV. CONCLUSIONS

Due to the low strength of the soil strata encountered by Borings 1 and 2, we do <u>not</u> recommend that any structure constructed on the subject property be supported on a shallow foundation system consisting of spread footings. The soil strata present will be subject to settlement under additional loading from raising the grade and from any structure located on it that is supported on a shallow foundation system. We estimate that this settlement could be in excess of 2 inches. Therefore, we recommend helical screw piles (HSPs) be used to provide support for the proposed improvements on the subject property. HSPs are a type of deep foundation system that would transfer the structure loads to the deeper higher strength bedrock. Driven H-piles or pipe piles, drilled shafts, or compacted aggregate piers could be used to support this structure, however we judge that the cost of these deep foundation members would be greater than the cost of installing HSPs. If you desire to pursue a system consisting of driven piles, drilled shafts, or compacted aggregate piers, please contact us for our comments and recommendations regarding such a system.

For a deep foundation system consisting of HSPs, the HSPs should be terminated in structurally-reinforced concrete grade beams or pile caps resting at frost depth and the helical screw piles should be terminated with the top of the helixes located in the dense to very dense SANDSTONE bedrock strata below approximate elevation 806 feet. We recommend the lowest floor of the proposed structure consist of structurally-reinforced concrete slabs that are supported on the grade beams or pile caps.

V. COMMENTS AND RECOMMENDATIONS

Based on the geotechnical exploration results of the laboratory and field tests performed, we offer the following comments and recommendations regarding constructing a residence on Lot 3 located on County Road JJ in the Town of Vermont in Dane County, Wisconsin.

A. Lowest Floor Elevation

We recommend the lowest floor elevation be at least 3 feet above the highest anticipated groundwater elevation for the area. Due to the proximity of the proposed improvement to the wetland designated area adjacent to Vermont Creek, the groundwater level will be related and controlled by the level of these water-related features. Based on the limited short-term water level measurements obtained from the borings completed, we recommend a lowest floor elevation of 834 feet. Installation of a monitoring well to obtain additional long-term water level measurements could possibly indicate that the groundwater elevation for the proposed improvement is higher or lower than what was measured at the time of the borings.

It is unknown to us how the site will be graded to handle the surface water flowage from the nearby culvert under CTH JJ. If surface water flowage from this culvert is not properly handled through site grading to direct surface water away from structure(s), it could negatively impact the lowest level of the structure(s). Therefore, we recommend the lowest floor elevation be adjusted to provide protection from surface water flowage from the nearby culvert under CTH JJ if needed based on how the site is graded.

Moisture buildup within a basement or crawl space could occur due to the proximity to the groundwater table, even with the recommended vertical distance above the groundwater. If moisture buildup does occur, mold and unsuitable odors could be produced as well as possible rotting of wooden floor supports supporting the first floor of the residence. We suggest consideration be given to design the lowest level with an active ventilation system to keep the humidity levels within the space at acceptable levels necessary to prevent the formation of mold, production of unsuitable odors, or rotting of wooden first floor supports.

B. Topsoil Removal and Grubbing

Topsoil removal and grubbing below the defined horizontal limits of the proposed buildings, driveways, and any other structural improvement should include the removal of the existing surficial topsoil and vegetation(including trees and tree roots). We recommend that these initial site preparations include removal of tree roots which are 1-inch or larger in diameter within the horizontal limits defined above. The borings found the thickness of the existing topsoil to range between 7 and 7½ inches. The thickness of the topsoil could be greater than or less than the thickness encountered at the boring locations. Any topsoil removed could be stockpiled for reuse in landscaped areas.

We recommend the horizontal limits of the topsoil removal and grubbing be based on a 1:1 line extending down and away from the exterior limits of the proposed improvements. For hardscape elements, the 1:1 line should extend from the lower outer edge of the design base course thickness for each element.[8] The horizontal limits of the topsoil removal and grubbing should also take into account the recommended horizontal increase in the excavation planned dimensions as specified in Section ?.

We anticipate that the soil exposed by the topsoil removal and grubbing excavation to accommodate the proposed development will predominantly consist of LEAN CLAY (CL) soils based on the borings.

C. Site Preparation

In areas that are high in elevation following completion of the topsoil removal and grubbing, we recommend the soils be excavated to the proposed design subgrade elevation. We anticipate that cohesive soils will be exposed following these excavations. After reaching the proposed design subgrade elevation, we recommend the exposed cohesive soil be proof-rolled and tested as specified below.

In areas that are low in elevation following completion of the initial site preparations, we recommend the exposed cohesive soil be tested as specified below prior to placing any fill material.

Proof-rolling of cohesive excavation surfaces should be performed using a heavily-loaded, triaxle dump truck or similar heavy rubber-tire equipment. The equipment used should traverse the exposed cohesive soil twice each in two directions that are perpendicular to each other. SES personnel should observe the proof-rolling procedure. If the excavation surface soil exhibits rutting, pumping, or yielding during the initial proof-rolling, the proof-rolling should be stopped and the need for excavation surface stabilization should be considered. Excavation surface stabilization may consist of excavation of poor-quality soil, placement of a separation-type geotextile and coarse crushed stone, or other possible methods. Dependant upon the proof-rolling results, SES personnel may need to test the entire cohesive soil thickness or to a depth of 4 feet, whichever is less, for strength.

Following acceptance of the proof-rolling of cohesive soils in low areas, we recommend the placement of landscape fill material, general fill material, or structural fill material as specified below in Section V.E of this Report.

---

[8] Hardscape elements are defined as any roadway, parking lot, driveway, sidewalk, paving blocks, or any other exterior improvement that has a hardened surface covering.

Interior concrete slab-on-grade floors are not considered a hardscape element. Interior concrete slab-on-grade floors are considered a structural improvement element.

D. Excavation Sidewall Stability

We recommend the sidewalls of any excavations performed for the proposed improvements be adequately sloped or properly shored in accordance with the OSHA and WDSPS regulations regarding construction excavations.

Due to the type of soil strata encountered by the borings, the sidewalls of the excavations may experience instability if they are not "laid back" to a stable slope or supported by an earth retention system. We recommend the existing soil strata encountered by the borings be designated as "Type C" soil in accordance with the OSHA regulations. The OSHA regulations indicate that Type C soils should be excavated at a slope not steeper than 1½H:1V. In areas affected by nearby facilities, such as the existing utility lines, flatter slopes may be necessary to maintain the stability of the sidewalls of excavations.

Depending on the depth of the excavations accomplished to accommodate the proposed improvements, a means of providing lateral and vertical support to existing structures or improvements including underground utility lines may be necessary. Lateral and vertical support may consist of, but not limited to, underpinning or installation of a temporary earth retention system.

Saturated, or wet, fill and/or native soil strata can be unstable or may become unstable over time after exposure by excavation. Effective and efficient dewatering will be important to aid in maintaining sidewall stability.

As included in the OSHA regulations, the selected earthwork contractor should have a designated competent person on site to confirm that the soils exposed by the excavations meet the recommended Type C designation.

E. Site Filling

Following acceptance of an excavation bottom that is low in elevation, we recommend the placement of landscape fill material, general fill material, or structural fill material, as appropriate for the area being filled, be properly placed and compacted to minimize the formation of low areas in the future due to settlement of poorly-compacted materials. We recommend the following based on the intended usage of the area:

- Below proposed landscaped areas, we recommend the use of either landscape fill material or general fill material which should consist of the material types, and be placed and compacted, as specified in Sections C1 and C2 of Appendix C of this Report.
- Below proposed hardscape areas and underground utilities, we recommend the use of either general fill material or structural fill material which should consist of the material types, and be placed and compacted, as specified in Sections C2 and C3 of Appendix C of this Report.

- Below the proposed structure(s), we recommend the use of structural fill material which should consist of the material types, and be placed and compacted, as specified in Section C3 of Appendix C of this Report.

If low areas within the project site limits are not properly backfilled as recommended herein, then settlement of the ground surface could, in most probability, occur slowly over time. Proper backfilling includes not only the usage of the appropriate material for the area being backfilled, but also the placement of the material in controlled thin layers followed by compaction of each layer to specified densities.

F. Helical Screw Piles

A deep foundation system consisting of HSPs could be used to support a proposed structure. HSPs can provide soil bearing, uplift, and lateral resistance. HSPs consist of one to several helical flights welded to a hollow steel pipe shaft. They are installed by turning the pile into the ground similar to a screw being turned into a piece of wood. The top of the piles normally are terminated in pile caps or grade beams which are used to transfer the structural loads to the piles.

The ultimate compression and tension capacity of a helical screw pile is dependant upon the shaft diameter, the distance between adjacent HSPs, the diameter of the flights of the HSPs, the elevation of the helical screw pile tip, and the strength of the soil strata. If lateral resistance is required, the HSPs can be installed at an angle. The final design of HSPs is proprietary and is completed by a professional engineer using the design equations and procedures specified by the manufacturer of the HSPs selected for use on a project.

We offer the following recommendations regarding the design and installation of the HSPs based on the results of the borings performed:

- We recommend exterior grade beams or pile caps rest a minimum of 5.0 feet below the lowest proposed exterior finished grade elevation adjacent to a foundation to provide frost protection. We recommend interior grade beams or pile caps located below heated areas of a structure rest a minimum of 1.5 feet below the finished floor elevation. We recommend interior grade beams or pile caps located below unheated areas of a structure rest a minimum of 5.0 feet below the finished floor elevation.

- We recommend the grade beams or pile caps be designed to transfer the structure and monolithic-reinforced-concrete floor slab loads of a structure to the HSPs.

- We recommend a design groundwater elevation of 830 feet based on the borings performed.

- We recommend the horizontal spacing between two HSPs be equal to a nominal three diameters of the largest helix of the two HSPs.

- We recommend each HSP consist of a minimum of two helical flights that are located in the SANDSTONE bedrock below approximate elevation 806 feet. We recommend that the HSPs not be terminated in the dense POORLY-GRADED SAND (SP) stratum (approximate elevation 803 to 816 feet) that was encountered at Boring 2 due to the potential for excessive settlement from these low strength soils under the new loads from the structure. We anticipate that the HSPs will encounter refusal in the SANDSTONE.

- We recommend that downdrag load be included in the HSP capacity design. Downdrag load is caused by negative skin friction due to the consolidation of the very soft to soft cohesive soils encountered by Borings 1 and 2 between the ground surface and the SANDSTONE bedrock. Consolidation of these soils will occur due to any site grading changes that are implemented below a structure. The amount of downdrag could be considerable depending upon the depth of the new fills that are placed to raise the grade below a structure.

- We recommend the ultimate capacity of a helical screw pile be determined using friction and end bearing.

- We recommend a factor of safety of 2.0 be used to determine the allowable capacity of a helical screw pile. If a load test is performed, then a factor of safety of 1.5 could be used to determine the allowable helical screw pile capacity. Based on the size of the project, it is our opinion that the cost savings for each individual helical screw pile would not offset the pile load test cost.

- The installation of the HSPs should be performed by applying sufficient downward pressure such that for every revolution, the screw pile travels downward one pitch distance. Spinning of a helical screw pile without downward movement damages the soil matrix load-carrying capacity and should not be allowed to occur.

- The amount of torque needed to turn the HSPs should be monitored and recorded continuously during installation. The amount of torque used to install the HSPs is a function of the capacity of the HSPs.

- We recommend the shaft and helixes of the HSPs be galvanized for corrosion protection.

- We recommend a professional engineer licensed in the State of Wisconsin use the design procedures specified by the selected helical screw pile manufacturer/ contractor for this project to design the HSPs and grade beams/pile caps to use to support the proposed residence.

- Total settlement for a helical screw pile foundation will be dependant, at a minimum, upon the service load, the total depth of the HSPs, the spacing between the HSPs, and the type of soils/bedrock present below the helical screw pile. Preliminarily, we estimate that total settlement to be less than 1-inch. We recommend that after the helical screw pile foundations are designed that total and differential settlement computations be performed based on the design install depths and spacings of the HSPs.

- We recommend full-time observation of the HSPs by SES personnel to document their installation.

- We recommend the soil parameters presented in Table B-1 enclosed in Appendix B be used to design the HSPs. Using these soil parameters, we offer the following preliminary capacities for two different helical screw pile configurations installed in the vicinity of Boring 2:

Shaft Diameter (inches)	Helix Diameter(s) (inches)	Approximate Helix Elevation		Compression Load	
		Top (feet)	Bottom (feet)	Ultimate (kips)	Allowable (kips)
3½	8 and 6	806	804.5	69.0	34.5
3½	10 and 8	806	804	130.0	65.0

G. Foundation Backfill

We recommend the exterior and interior of the foundations for the proposed improvement be backfilled using structural fill material. The structural fill material should consist of a granular soil type and it should be placed and compacted as specified in Section C3 of Appendix C.

H. Lateral and Vertical Support of Existing Improvements

To maintain the stability of existing improvements (e.g. structures, pavement, sidewalks, utilities, etc.), the soil supporting these existing improvements should be properly retained at all times. If any excavation accomplished for the proposed improvements will intersect a 1½H:1V line extending down and away from the exterior limits of the existing improvements (such as building foundations or paved areas), then a suitable earth retaining method should be implemented to support the existing improvements.

I. Suitability of On-Site Soils

We provide the following recommendations regarding the suitability of the on-site soils for reuse on the project as fill materials.

- Excavated Topsoil:
  - LEAN CLAY (CL) TOPSOIL was encountered by the borings.
  - Could be stockpiled for use in landscaped areas only.
  - Is <u>not</u> suitable to use as fill material:
    - to raise the grade beneath any structural improvement.

- to raise the grade beneath any hardscape improvement.
- to be placed to backfill the interior or exterior of below-grade sections of any foundation element.

- Excavated Cohesive and Cohesive/Granular Soils:
  - Cohesive soil types encountered by the borings that may be excavated consisted of LEAN CLAY (CL).
  - Could be stockpiled for use as landscape fill material or general fill material as specified in Sections C1 and C2 in Appendix C.
  - Are <u>not</u> suitable to use as fill material:
    - to raise the grade beneath any structure.
    - to be placed to backfill the interior of below-grade sections of any foundation element.
    - to be placed to backfill the exterior of below-grade sections of any foundation element where a structural improvement will be located.
  - Are suitable to use as fill material:
    - to raise the grade beneath proposed hardscape improvements.
    - to raise the grade beneath proposed landscaped areas.
  - Wetting and/or drying of this soil type, as well as the use of thinner loose lifts, may be necessary to be able to achieve specified compaction levels.

- Excavated Granular Soils
  - The granular soil types encountered by Boring 2 are below the depth of anticipated excavation.
  - If granular soil is encountered during site excavation activities, then it:
    - Could be stockpiled for use as landscape fill material, general fill material, or structural fill material as specified in Sections C1, C2, and C3 of Appendix C.
    - Is suitable to use as fill material:
      - to raise the grade beneath any structure.
      - to raise the grade beneath any hardscape improvement.
      - to raise the grade beneath proposed landscaped areas.
      - to be placed to backfill the interior or exterior of below-grade sections of any foundation element.

J. Site Grading Recommendations

As subsurface water (groundwater) can cause problems with construction, so can surface water from precipitation runoff if allowed to accumulate within the construction area. The contractor should grade the site to drain surface water away from the construction areas. Water accumulations in the construction area should be promptly removed. Any soil softened, loosened or disturbed by water should be excavated, removed and replaced with properly compacted structural fill material or coarse crushed stone. Temporary surface water diversion structures, such as ditches and berms, could be constructed in areas where surface water drainage into the work area is encountered.

K. Seismic Site Classification

The Wisconsin Commercial Building Code incorporates the 2021 International Building Code which specifies the Seismic Site Class for a building site be determined using the procedures defined in Chapter 20 of ASCE Standard 7-16. In ASCE 7-16 Chapter 20, the upper 100 feet of subsurface profile is used to determine the Seismic Site Class. Where site-specific subsurface profile data are not available to a depth of 100 feet, appropriate soil properties are permitted to be estimated by the registered design professional preparing the geotechnical exploration report based on known geologic conditions. Per WDSPS Division of Industry Services personnel, the site profile starts at the existing or proposed ground surface for the proposed structure. Additionally, the use of soil improvements below a structure does not necessarily increase the seismic site class for the site since the soils surrounding the site have not been improved.

As defined in ASCE 7-16 Chapter 20, the seismic site class is computed using either the measured shear wave velocity determined using a geophysical field testing method or computing an estimated seismic site class using Methods 2 and 3 as defined in this code chapter.[9] Method 2 determines the estimated weighted-average of the field SPT values for all soil/bedrock encountered by a boring to a depth of 100 feet. Method 3 determines the estimated weighted-average of the field SPT values for granular soil/bedrock and the estimated weighted-average of the undrained shear strength for cohesive soil/bedrock encountered by a boring to a depth of 100 feet. Our scope of services does not include the performance of geophysical field testing. Therefore, we performed the Methods 2 and 3 weighted-average computations for the soil/bedrock subsurface profile using the equations provided in ASCE 7-16. The lowest seismic site class from the Methods 2/3 computations controls the seismic site class assigned to a boring. If more than one boring is completed in the vicinity of a building site, then the seismic site class for the building site is the lowest seismic site class assigned to a boring within the group of borings completed for the building site.

For this building site, we completed Borings 1 and 2 to a depth of 25 and 35.0 feet, respectively, and they encountered a subsurface profile containing predominantly low strength soils over high strength bedrock. Since the borings did not extend to a depth of 100 feet, we estimated the subsurface profile below the boring extents based on our knowledge of the project area and available WGNHS soil/bedrock geology maps. Using the ASCE 7-16 Chapter 20 procedures, we computed the seismic site class for the subsurface profile at each of the borings. Our computations found that the seismic site class for the subsurface profile encountered at each of the boring locations is Site Class E.

Based on our seismic site class computations for Borings 1 and 2 based on ASCE 7-16 Chapter 20 procedures and WDSPS guidance, we recommend the subsurface profile

---

[9] "Chapter 20: Site Classification Procedure for Seismic Design." *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*: ASCE/SEI 7-16, American Society of Civil Engineers, 2017, pp. 203–205.

beneath the proposed building site be assigned Site Class E, "very loose sand or soft clay." Higher site classifications may be possible, but would require the performance of shear wave analyses, which is outside the scope of our services. We include our seismic site class calculation results obtained for each of the borings and the recommended seismic site class for the building site on the Seismic Site Class Record enclosed in Appendix D.

Assuming the proposed structural improvements meet the definition for seismic Risk Category II, we provide additional site-specific seismic parameters in the "ASCE 7 Hazards Report" enclosed in Appendix D for the assigned Site Class E.[10]

L. Cold Weather Construction

Construction during cold weather (late fall, winter and early spring) requires special considerations. The soil which will be supporting foundation elements should not be frozen at the time of construction. We recommend that a means of preventing the soil from freezing be implemented at the time of excavation, during backfilling operations, or after fill material is placed to the design elevation. To prevent the soil from freezing, various materials are available, such as a thick layer of straw or insulation blankets which should be placed on the soil after excavation to the design grade and prior to the placement of concrete for foundation elements. An alternative method is to provide a heated enclosure for the area under construction.

We recommend that concrete for foundation elements not be placed on frozen soil. If the soil becomes frozen prior to the placement of concrete, either the frozen soil should be excavated and replaced with compacted granular fill material or crushed stone, or a means of thawing the frozen soil should be implemented followed by re-compaction of the bearing soil. The bearing soils should then be observed and tested by SES to verify the suitability of the soil for support of the concrete. Any forms or reinforcing steel should be warmed prior to the placement of the concrete.

At the time of placement of fresh concrete for foundation elements, the concrete should be protected against freezing for a minimum of 7 days, and possibly longer depending on the design strength of the concrete. Insulation blankets or heated enclosures should be used to protect the fresh concrete against freezing. The use of concrete forms as the method of protecting fresh concrete is not acceptable. We recommend the procedures presented in American Concrete Institute's (ACI) document titled "Recommended Practices for Cold Weather Concreting" (ACI 306) be used for placing and protecting concrete during the cold weather.

---

[10] *ASCE 7 Hazard Tool*, ASCE, 19 June 2026, https://asce7hazardtool.online/.

M. Project Safety

Safety precautions, such as those required by OSHA and WDSPS, should be followed throughout the entire construction of the proposed project. They include, but are not limited to, the proper sloping and/or support of excavation sidewalls and adjacent embankments, roadways, access ramps, sidewalks, utility lines, towers, and/or buildings.

VI. CLOSING COMMENTS

Soils & Engineering Services, Inc. prepared this report for the exclusive use of Ms. Jan Cowan to aid in the development of a residence on Lot 3 on County Road JJ in the Town of Vermont in Dane County, Wisconsin. The recommendations in this report are based on the project information provided to our office. Soils & Engineering Services, Inc. should review any changes in the nature, design, or location of the proposed improvements after submittal of this *Geotechnical Exploration and Analyses Report* to revise the recommendations in the report, if necessary. The nature and extent of soil, bedrock, or groundwater variations at this project site may not become evident until the time of excavation or construction of the subject project. If soil, bedrock, or groundwater variations are evident at the time of excavation or construction, it will be necessary for Soils & Engineering Services, Inc. to re-evaluate the soil, bedrock, and groundwater, and other site conditions, which may result in revision of our recommendations in this report.

Please read the *Important Information about This Geotechnical-Engineering Report* advisory sheet enclosed in Appendix E which provides comments about how to interpret and use this *Geotechnical Exploration and Analyses Report* for the Proposed Lot 3 Development project.

Soils & Engineering Services, Inc. should review the final design and specification documents for this project to verify that our recommendations regarding the proposed improvements are interpreted correctly and implemented in the design of the subject project as they are intended. We recommend that Soils & Engineering Services, Inc. be present at the time of construction to observe compliance with the design concept and specifications, and to provide recommendations to modify the design if subsurface conditions differ from those anticipated prior to construction. It is important that the exposed soil strength, degree of compaction, and other soil properties required be confirmed and/or determined at the time of excavation and construction activities for the subject project.

The recommendations provided in this report are based on our identification/classification and interpretation of the soils, bedrock, and other information given on the Boring Log Records, and may not be based solely on the contents of the driller's field logs.

Soils & Engineering Services, Inc. prepared this report for the subject project in accordance with generally accepted geotechnical engineering practices at this time. Soils & Engineering Services, Inc. offers no other expressed or implied warranty.

Soils & Engineering Services, Inc. will store the soil/bedrock samples obtained from the borings performed for this project for a period of 60 calendar days after the date of this report. Please advise us if we should extend this period.

We recommend that this *Geotechnical Exploration and Analyses Report*, in its entirety, be made available to bidding contractors or subcontractors for information purposes. The Appendices, Boring Log Records, and/or other attachments referenced in this report should not be separated from the text of this report. This report should be considered invalid if used for purposes other than those described herein.

Soils & Engineering Services, Inc. respectfully submits this *Geotechnical Exploration and Analyses Report*, dated June 23, 2026, to **Ms. Jan Cowan**.

APPENDIX A

Appendix A Contents

- Project Site Location Sketch
- Boring Location Overview Sketch
- Boring Location Sketch
- Notes and Legend Records
- Boring Log Records
- WDNR Well/Drillhole/Borehole Abandonment Forms
- Laboratory Test Result Records
- Boring Fence Record

GENERAL NOTES

G1. The latitude and longitude coordinates provided on each Boring Log Record were obtained using a "smart" cell phone GPS application or an online map viewer and are considered approximate.

G2. The Notes and Legend Records and the Boring Log Record(s) are part of the *Geotechnical Exploration and Analyses Report* for the subject project. The *Geotechnical Exploration and Analyses Report* should be included in the bid or reference documents.

BORING NOTES

B1. The boundary lines between different subsurface strata shown on each Boring Log Record are approximate and may be gradual.

B2. Each boring field log contains the visual/manual identification of soil/bedrock samples obtained and a description of the subsurface conditions between samples based on the equipment performance and the cuttings returned to the ground surface. Each Boring Log Record contains a description of the subsurface conditions as interpreted by a geotechnical engineer and/or a geologist after a review of the boring field logs, and subsurface samples and/or laboratory test results.

B3. We perform the split-barrel sampling according to the indicated Sampling Method (ASTM D1586/AASHTO T 206) on the Boring Log Record(s). Per applicable sections of the indicated Sampling Method,

(a) We count and record the number of blows for each of three 6-inch increments while driving the split-barrel sampler until one of the following occurs:

- (i) A total of 50 blows during any one of the three 6-inch increments.
- (ii) A total of 100 blows have been applied.
- (iii) There is no observed advance (less than 0.1-inch per blow) of the sampler during the application of 10 successive blows of the hammer.
- (iv) The sampler is advanced the entire 18-inches of penetration without the limiting blow counts occurring as described in Items B3(a)(i) through B3(a)(iii) above.

(b) For partial increments, we record the depth of penetration to the nearest 1-inch with the number of blows for the partial increment (e.g., 25/3")

B4. We perform the thin-wall steel tube (Shelby tube) sampling according to the indicated Sampling Method (ASTM D1587/AASHTO T 207) on the Boring Log Record(s). Per applicable sections of the indicated Sampling Method, at selected depths, we slowly push a thin-wall steel tube under constant pressure a selected distance to obtain a relatively undisturbed sample of cohesive soils.

B5. We define "at completion" for a boring as the time when our drilling crew has completed the removal of all drilling tools from the borehole.

B6. We define "Caved Level" for a boring as the depth below the existing ground surface where material has collapsed into the borehole following the removal of all drilling tools from the borehole at the time indicated on each Boring Log Record.

B7. We define "Water Level" for a boring as the depth below the existing ground surface at a boring location to the level of water in the open borehole, unless otherwise defined, at the time indicated on each Boring Log Record.

SAMPLER TYPES LEGEND

▥ Grab sample

◀ 2-inch-outside-diameter, thin-wall (Shelby) sampler

⧄ 2-inch-outside-diameter, split-barrel sampler

This Notes and Legend Record is considered a part of each Boring Log Record for the subject project.

NOTES AND LEGEND RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

SOIL IDENTIFICATION/CLASSIFICATION NOTES

1. We use the Unified Soil Classification System (USCS) to identify/classify the soils encountered.
2. *Soil identification is specified in ASTM D2488,* Standard Practice for Description and Identification of Soils *(Visual-Manual Procedure)*. Soil Identification is based on estimating the particle size gradation of the soil and estimating the plasticity of the fine-grained portion of the soil using visual observations and manual testing to identify (estimate) the USCS soil group name.
3. *Soil classification is specified in ASTM D2487,* Standard Practice for Classification of Soils for Engineering *Purposes (Unified Soil Classification System)*. Soil Classification uses the results of particle size distribution analysis (gradation), Atterberg limits, and oven-dried liquid limit laboratory tests to classify the USCS soil group name.
4. Coarse-grained soils are defined in the USCS to have more than 50-percent of the soil particles retained on the No. 200-mesh sieve. They are principally called gravel or sand. The primary (predominant) particle size content of the retained soil determines whether the soil's group name is a GRAVEL or a SAND. The grading of the GRAVEL/SAND is added to the front of the group name, e.g., POORLY-GRADED SAND. Secondary and tertiary particle size contents determine the types of modifiers to be added to the front or behind the group name, e.g., SILTY SAND or POORLY-GRADED GRAVEL WITH SILT.
5. Fine-grained soils are defined in the USCS to have less than or equal to 50-percent of the soil particles retained on the No. 200-mesh sieve. The fine-grained portion of a coarse-grained soil is that portion of the soil particles that pass the No. 200-mesh sieve. They are principally called LEAN CLAY or FAT CLAY (if they are plastic or highly plastic) or SILT or ELASTIC SILT (if they are non-plastic or slightly plastic). Secondary and tertiary particle size contents determine the types of modifiers to be added to the front or behind the group name, e.g., SANDY LEAN CLAY or ELASTIC SILT WITH GRAVEL.

BEDROCK IDENTIFICATION NOTE

We use the US Department of the Interior Bureau of Reclamation (USBR) Engineering Geology Manual and available University Of Wisconsin-Extension Geological And Natural History Survey (WGNHS) literature to identify the bedrock encountered.

TEST RESULTS/REMARKS LEGEND

q_p = Penetrometer reading, $^{ton}/_{ft^2}$

V_s = Vane Shear reading, $^{ton}/_{ft^2}$

MC = Moisture Content, % moisture by weight

LL = Liquid Limit, % moisture by weight

PL = Plastic Limit, % moisture by weight

PI = Plasticity Index, % moisture by weight

q_u = Unconfined Compressive Strength, $^{ton}/_{ft^2}$

WH = Weight of hammer and sampling rods.

DRILLING METHODS LEGEND

HSA = Continuous flight hollow-stem augers

This Notes and Legend Record is considered a part of each Boring Log Record for the subject project.

Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

NOTES AND LEGEND RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	Field Approximation Criteria
Very Soft	0 to 0.25	Easily penetrated several inches by fist. Extrudes between fingers when squeezed.
Soft	0.26 to 0.50	Easily penetrated several inches by thumb. Molded by light to moderate finger pressure.
Medium	0.51 to 1.00	Can be penetrated several inches by thumb with moderate effort. Molded by moderate to firm finger pressure.
Stiff	1.01 to 2.00	Readily indented by thumb but penetrated only with great effort.
Very Stiff	2.01 to 4.00	Readily indented by thumbnail.
Hard	4.01 or more	Indented by thumbnail with difficulty.

PLASTICITY OF FINE-GRAINED SOILS (SILTS & CLAYS)

Descriptor	Field Approximation Criteria
Non-plastic	An $^{1}/_{8}$-inch thread cannot be rolled at any water content.
Low	An $^{1}/_{8}$-inch thread can barely be rolled. A lump of soil cannot be formed when drier than the plastic limit.
Medium	An $^{1}/_{8}$-inch thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. A lump of soil crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. An $^{1}/_{8}$-inch thread can be rerolled several times after reaching the plastic limit. A lump of soil can be formed without crumbling when drier than the plastic limit.

RELATIVE MOISTURE TERMS

Descriptor	Abbreviation	Criteria
Frozen	F	Frozen material.
Dry	—	Dusty, dry to touch, absence of moisture.
Moist	M	Damp to touch, no visible water.
Wet	W	Visible free water.

LAYERING STRUCTURE TERMS

Descriptor	Description
Varved	Sedimentary soil with alternating layers of clay, silt, and/or fine sand.
Stratified	Alternating ≥¼-inch-thick layers of varying material or color.
Laminated	Alternating <¼-inch-thick layers of varying material or color.

RELATIVE PERCENTAGE TERMS

Descriptor	Criteria
No	0%
Occasional	<1%
Trace	<5%
Few	5 to <10%
Little	10 to <30%
Some	30 to <50%

RELATIVE DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N_{60}-Value (blows/foot)
Very Loose	0 to 4
Loose	5 to 9
Medium Dense	10 to 29
Dense	30 to 49
Very Dense	50 or more

SOIL PARTICLE SIZES

Particle Name	Diameter (mm)	ASTM Sieve Size
Boulder	>305	>12"
Cobble	305 to 75	12" to 3"
Gravel Coarse Grains Fine Grains	75 to 4.75 75 to 19.0 19.0 to 4.75	3" to No. 4 3" to ¾" ¾" to No. 4
Sand Coarse Grains Medium Grains Fine Grains	4.75 to 0.075 4.75 to 2.00 2.00 to 0.425 0.425 to 0.075	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No.200
Fines	< 0.075	< No. 200

LAYERING THICKNESS TERMS

Descriptor	Criteria
Partings	< $^{1}/_{8}$-inch
Lenses	$^{1}/_{8}$-inch to 1-inch
Seams	1-inch to 6 inches
Layers	>6 inches

This Notes and Legend Record is considered a part of each Boring Log Record for the subject project.

Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

NOTES AND LEGEND RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

Unified Soil Classification System (USCS)
(ASTM D2487)

CRITERIA FOR ASSIGNING GROUP NAMES AND SYMBOLS USING LABORATORY TESTS FOR COARSE-GRAINED SOILS[A]

Soil Type	P_4 Content[B]	P_{200} Content[C]	Grading Classifies As[D]	Fines Classify As[E]	USCS Soil Classification Group Name (Symbol) §
Gravels[F]	$P_4 < 50\%$	$P_{200} < 5\%$	$C_u \geq 4$ and $1 \leq C_c \leq 3$	n/a	WELL-GRADED GRAVEL (GW)
			$C_u < 4$ and/or $1 > C_c > 3$	n/a	POORLY-GRADED GRAVEL (GP)
		$5\% \leq P_{200} \leq 12\%$	$C_u \geq 4$ and $1 \leq C_c \leq 3$	ML or MH	WELL-GRADED GRAVEL WITH SILT (GW-GM)
				CL, CL-ML, or CH	WELL-GRADED GRAVEL WITH CLAY (GW-GC)
			$C_u < 4$ and/or $1 > C_c > 3$	ML or MH	POORLY-GRADED GRAVEL WITH SILT (GP-GM)
				CL, CL-ML, or CH	POORLY-GRADED GRAVEL WITH CLAY (GP-GC)
		$P_{200} > 12\%$	n/a	ML or MH	SILTY GRAVEL (GM)
				CL-ML	SILTY CLAYEY GRAVEL (GC-GM)
				CL or CH	CLAYEY GRAVEL (GC)
Sands[G]	$P_4 \geq 50\%$	$P_{200} < 5\%$	$C_u \geq 6$ and $1 \leq C_c \leq 3$	n/a	WELL-GRADED SAND (SW)
			$C_u < 6$ and/or $1 > C_c > 3$	n/a	POORLY-GRADED SAND (SP)
		$5\% \leq P_{200} \leq 12\%$	$C_u \geq 6$ and $1 \leq C_c \leq 3$	ML or MH	WELL-GRADED SAND WITH SILT (SW-SM)
				CL, CL-ML, or CH	WELL-GRADED SAND WITH CLAY (SW-SC)
			$C_u < 6$ and/or $1 > C_c > 3$	ML or MH	POORLY-GRADED SAND WITH SILT (SP-SM)
				CL, CL-ML, or CH	POORLY-GRADED SAND WITH CLAY (SP-SC)
		$P_{200} > 12\%$	n/a	ML or MH	SILTY SAND (SM)
				CL-ML	SILTY CLAYEY SAND (SC-SM)
				CL or CH	CLAYEY SAND (SC)

Coarse-Grained Soils Footnotes

[A] Based on the material passing the 3-inch-mesh (75-mm) sieve and more than 50% of this material is retained on No. 200-mesh sieve.

[B] P_4 Content is the percentage of the material passing the No. 4-mesh (4.75-mm) sieve.

[C] P_{200} Content is the percentage of the material passing the No. 200-mesh (0.075-mm) sieve.

[D] $C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[E] Atterberg limits test results for the Fine-Grained portion of the soil are plotted in the chart shown below to classify the Fines.

[F] If soil contains ≥15% sand, add "WITH SAND" to group name.

[G] If soil contains ≥15% gravel, add "WITH GRAVEL" to group name.

CRITERIA FOR ASSIGNING GROUP NAMES AND SYMBOLS USING LABORATORY TESTS FOR FINE-GRAINED SOILS OR THE FINE-GRAINED FRACTION OF COARSE-GRAINED SOILS[I]

	Organic/Inorganic	Liquid Limit (LL)	Plasticity Index (PI)	USCS Soil Classification Group Name (Symbol) §
Silts and Clays[I, J, K, L]	Inorganic[M]	$LL < 50$	$PI > 7$ and plots on or above "A" line	LEAN CLAY (CL)
			Plot in hatched area	SILTY CLAY (CL-ML)
			$PI < 4$ or plots below "A" line	SILT (ML)
		$LL \geq 50$	PI plots on or above "A" line	FAT CLAY (CH)
			PI plots below "A" line	ELASTIC SILT (MH)
	Organic[N]	$LL < 50$	$PI \geq 4$ and plots on or above "A" line	ORGANIC CLAY (OL)
			$PI < 4$ or plots below "A" line	ORGANIC SILT (OL)
		$LL \geq 50$	PI plots on or above "A" line	ORGANIC CLAY (OH)
			PI plots below "A" line	ORGANIC SILT (OH)

Fine-Grained Soils Footnotes

[H] Based on the material passing the 3-inch-mesh (75-mm) sieve and 50% or more of this material is passing the No. 200-mesh sieve.

[I] If soil contains 15 to 29% plus No. 200-mesh sieve material and the %sand≥ %gravel, add "WITH SAND" to group name.

[J] If soil contains 15 to 29% plus No. 200-mesh sieve material and the %sand< %gravel, add "WITH GRAVEL" to group name.

[K] If soil contains ≥30% plus No. 200-mesh sieve material and %sand≥%gravel, add "SANDY" to group name.

[L] If soil contains ≥30% plus No. 200-mesh sieve material and %sand<%gravel, add "GRAVELLY" to group name.

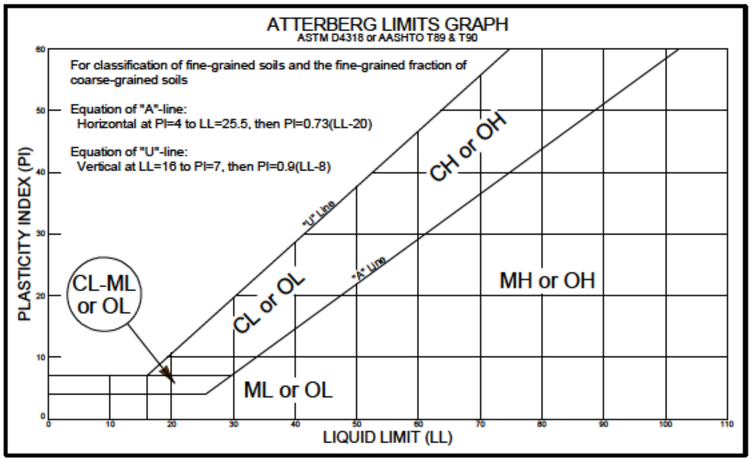
[M] If the $\frac{\text{Liquid Limit}_{\text{oven-dried}}}{\text{Liquid Limit}}$ is ≥75% for a soil, then the soil is inorganic.

[N] If the $\frac{\text{Liquid Limit}_{\text{oven-dried}}}{\text{Liquid Limit}}$ is <75% for a soil, then the soil is organic.

Coarse- or Fine-Grained Soils Footnote

§ If the field sample contained cobbles, boulders, or cobbles and boulders, add "WITH COBBLES", "WITH BOULDERS", or "WITH COBBLES AND BOULDERS" to group name.

ATTERBERG LIMITS GRAPH
ASTM D4318 or AASHTO T89 & T90



This Notes and Legend Record is considered a part of each Boring Log Record for the subject project.

Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600
CONSULTING CIVIL ENGINEERS SINCE 1966

NOTES AND LEGEND RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698

U.S. Department. of the Interior, Bureau of Reclamation (USBR)
Engineering Geology Field Manual Cored Rock Identification/Classification Parameters

USBR BEDROCK WEATHERING LIST DESCRIPTIONS AND CRITERIA ¥

Descriptor	Chemical-Weathering-Discoloration and/or Oxidation		Mechanical-weathering†	Texture and Leaching		General Characteristics (strength, excavation, etc.) §
	Body of Rock	Fracture surfaces ‡		Texture	Leaching	
unweathered	No discoloration, not oxidized.	No discoloration or oxidation.	No separation, intact (tight).	No change	No leaching	Hammer rings when crystalline rocks are struck.
slightly-weathered to unweathered*						
slightly-weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull.	Minor to complete discoloration or oxidation of most surfaces.	No visible separation, intact (tight).	Preserved	Minor leaching of some soluble minerals	Hammer rings when crystalline rocks are stuck. Body of rock not weakened.
moderately- to slightly-weathered*						
moderately-weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty," feldspar crystals are "cloudy."	All fracture surfaces are discolored or oxidized.	Partial separation of boundaries visible.	Generally preserved	Soluble minerals may be mostly leached.	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
highly- to moderately-weathered*						
highly-weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation, see grain boundary conditions.	All fracture surfaces are discolored or oxidized, surfaces friable.	Partial separation, rock is friable; in semiarid conditions granitics are disaggregated.	Texture altered by chemical disintegration (hydration, argillation).	Leaching of soluble minerals may be complete.	Dull sound when struck with hammer, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures, or veinlets. Rock is significantly weakened.
completely- to highly-weathered*						
completely-weathered	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay.		Complete separation of grain boundaries (disaggregated)	Resembles a soil, partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete.		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes."

USBR FRACTURE DENSITY DESCRIPTORS AND CRITERIA

Descriptor	Criteria
unfractured	No observed fractures.
very-slightly-fractured to unfractured*	
very-slightly-fractured	Mostly fractured lengths greater than 36 inches (3 feet).
slightly- to very-slightly-fractured*	
slightly-fractured	Mostly fractured lengths from 12 to 36 inches (1 to 3 feet) with few scattered lengths less than 12 inches or greater than 36 inches.
moderately- to slightly-fractured*	
moderately-fractured	Mostly fractured lengths from 4 to 12 inches (0.33 to 1-foot) with most lengths about 8 inches (0.67 feet).
intensely- to moderately-fractured*	
intensely-fractured	Average fractured lengths from 1¼ to 4 inches (0.1 to 0.33 feet) with fragmented intervals. Mostly fractured lengths less than 4 inches (0.33 feet).
very-intensely- to intensely-fractured*	
very-intensely	Mostly as chips and fractured fragments with a few scattered short core lengths. (Rubblized)

USBR ROCK HARDNESS/STRENGTH DESCRIPTORS AND CRITERIA

Descriptor	Criteria
extremely-hard	Cannot be scratched with a pocketknife or sharp pick. Can only be chipped with repeated heavy hammer blows.
very-hard to extremely-hard*	
very-hard	Cannot be scratched with a pocketknife or sharp pick. Breaks with repeated heavy hammer blows.
hard to very-hard*	
hard	Can be scratched with a pocketknife or sharp pick with difficulty (heavy pressure). Breaks with heavy hammer blows.
moderately-hard to hard*	
moderately-hard	Can be scratched with a pocketknife or sharp pick with light or moderate pressure. Breaks with moderate hammer blows.
moderately-soft to moderately-hard*	
moderately-soft	Can be grooved 1/16 in deep with a pocketknife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
soft to moderately-soft*	
soft	Can be grooved or gouged easily with a pocketknife or sharp pick with light pressure, can be scratched with a fingernail. Breaks with light to moderate manual pressure.

¥ The weathering chart and its horizontal categories are more readily applied to rocks with feldspars and mafic minerals. Weathering in various sedimentary rocks, particularly limestones and poorly indurated sediments, will not always fit the categories established. This chart and weathering categories may have to be modified for particular site conditions or alteration such as hydrothermal effects; however, the basic framework and similar descriptors are to be used.

‡ Does not include directional weathering along shears or faults and their associated features. For example, a shear zone that carried weathering to great depths into a fresh rock mass would not require the rock mass to be classified as weathered.

† Grain boundary conditions (disaggregation) primarily for granitics and some coarse-grained sediments

§ These are generalizations and should not be used as diagnostic features for weathering or excavation classification. These characteristics vary to a large extent based on naturally weak materials or cementation and type of excavation.

* Combination weathering, fracture density, or hardness descriptors are permissible where equal distribution of adjacent-descriptor characteristics are present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, dual descriptors should not be used where significant, identifiable zones can be delineated. When given as a range, only two adjacent terms may be combined (e.g., 'slightly- to completely-weathered', 'very-intensely- to slightly-fractured','hard to soft', etc. are not acceptable).

USBR VOID/HOLE TERMINOLOGY DESCRIPTORS AND CRITERIA

Descriptor	Criteria
Pit (pitted)	Pinhole to $^{3}/_{8}$-inch openings.
Vug (vuggy)	$^{3}/_{8}$- to 4-inch openings. (usually lined with crystals)
Honeycombed	Individual pits or vugs are so numerous that they are separated only by thin walls; this term is used to describe a cell-like form.

RELATIVE PERCENTAGE TERMS

Descriptor	Criteria
No	0%
Occasional	<1%
Trace	<5%
Few	5 to <10%
Little	10 to <30%
Some	30 to <50%

LAYERING THICKNESS TERMS

Descriptor	Criteria
Partings	< $^{1}/_{8}$-inch
Lenses	$^{1}/_{8}$-inch to <1-inch
Seams	1-inch to <6 inches
Layers	≥6 inches

This Notes and Legend Record is considered a part of each Boring Log Record for the subject project.

Soils & Engineering Services, Inc.

1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

NOTES AND LEGEND RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698

Printed on 6/19/2026

GENERAL LOCATION:

Boring 1

LATITUDE: N43° 6' 36.9"	LONGITUDE: W89° 45' 32.9"	COUNTY: Dane	¼ ¼: NW	DRILL CO.: SES	CREW CHIEF: MAG	PAGE: 1 of 2
NORTHING: —	EASTING: —	TOWNSHIP: (Vermont) 7 N	¼: SW	DRILL RIG: Geoprobe 7822DT	CREW: CPV	TOTAL DEPTH: 25'-0"
STATION: —	OFFSET: —	RANGE: 6 E	SECTION: 2	HAMMER TYPE (EFFICIENCY): Automatic (80%)	LOG REVIEW: CMB LOG QC: CMB	DATE STARTED: 06/03/2026
						DATE COMPLETED: 06/03/2026

Elevation (feet)	Material Description	Field Blow Counts	N-Value $<N_{60}>$-Value	Test Results/Remarks	Depth (feet)
835.0	***LEAN CLAY (CL)** — medium plasticity; brown; dry to moist; **TOPSOIL**; trace organics*-[7" thick]			Dry	0
834	***LEAN CLAY (CL)** — medium plasticity; brown; moist; very stiff to stiff consistency*	1 1 1 1	2 <2>	M; q_p=3.40, 4.00 M; q_p=1.70, 1.00; MC=24.2	
	***LEAN CLAY (CL)** — medium plasticity; grayish-brown mottled with yellowish-brown and dark brown; moist; stiff to soft consistency*				3
831		WH/12" 2	—	M; q_p=1.80, 1.60 M; q_p=1.00, 1.25, 1.30; MC=32.7	
	▽	WH/6" 1 1	2 <2>	M; q_p=0.60, 0.70 M; q_p=0.40, 0.80; MC=29.7; LL=32 PL=23; PI=9	6
828	***LEAN CLAY (CL)** — medium plasticity; gray with brown mottling; moist; stiff to medium consistency*				
825		WH/12" 2	—	M; q_p=0.60, 0.90 M; q_p=1.25, 0.70, 1.70; MC=25.0	9
822	***LEAN CLAY (CL)** — medium plasticity; brown; moist; very soft consistency*	1		M; q_p=0.10, <0.10	12
	***LEAN CLAY (CL)** — medium plasticity; gray; moist; soft to medium consistency*	2 3	5 <7>	M; MC=25.9; LL=31; PL=22; PI=9	15
819	▼ ⊠				18

Boring 1 Continued On Page 2/2

WATER LEVEL LEGEND	OTHER LEVEL LEGEND
▽ 6'-8" at completion ▼ 15'-9$^5/_8$" through HSA after 18'-6" sample (estimated)	⊠ 17'-0" Caved at completion

DRILL METHOD	TOOL SIZE	CASING SIZE ID	DRILL FLUID	DEPTH FROM	DEPTH TO	HOLE DIA
HSA	2 $^1/_4$"	—	None	0'-0"	25'-0"	6.3"

SAMPLING METHOD(S): ASTM D1586

SURFACE PATCH: —

BACKFILL: Auger Cuttings, Bentonite Chips, Caved Soil

The Notes and Legend Records are considered a part of this Boring Log Record.

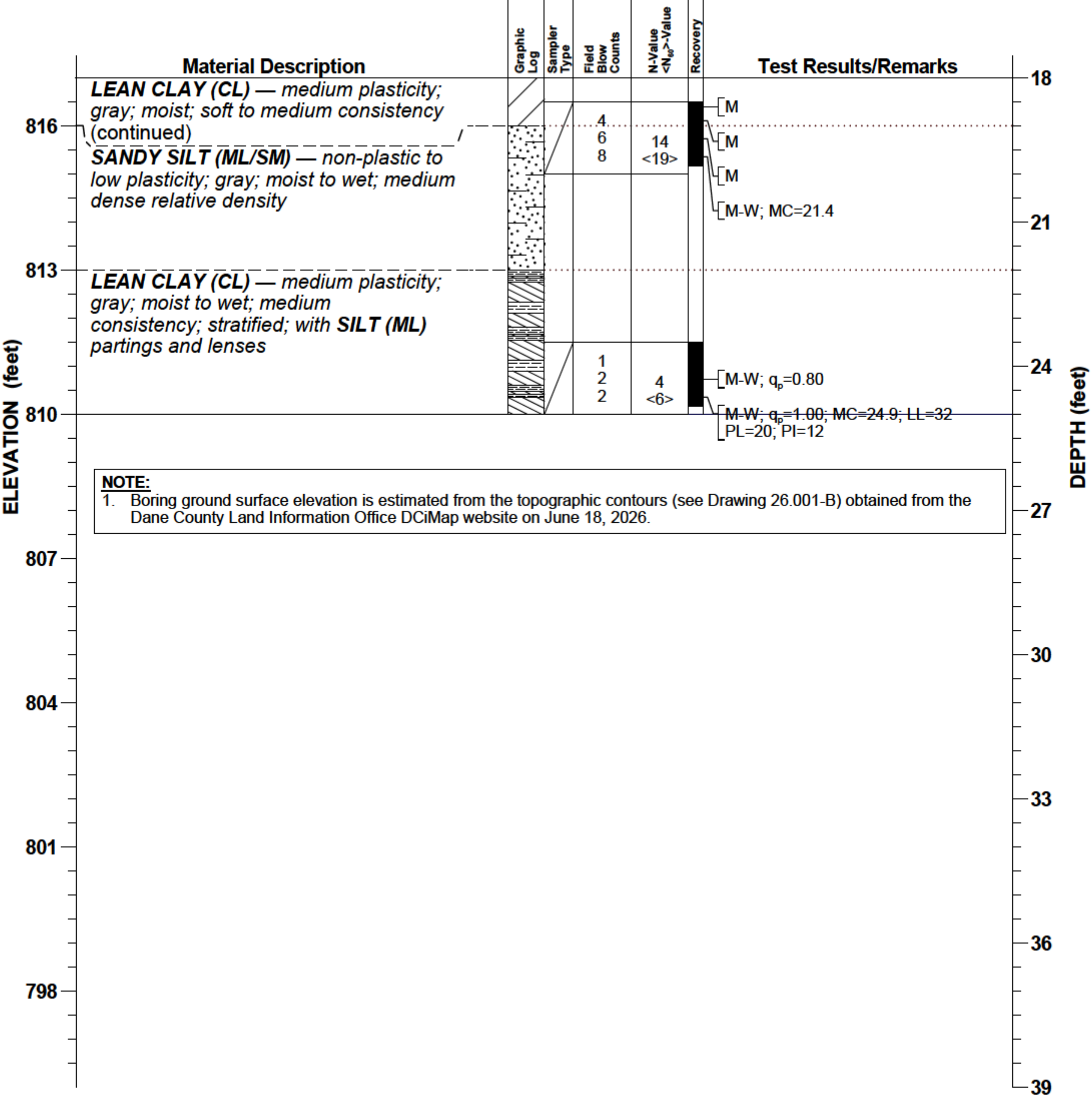
Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600
CONSULTING CIVIL ENGINEERS SINCE 1966

BORING LOG RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698

Boring 1

PAGE: 2 of 2



***LEAN CLAY (CL)** — medium plasticity; gray; moist; soft to medium consistency* (continued)

***SANDY SILT (ML/SM)** — non-plastic to low plasticity; gray; moist to wet; medium dense relative density*

***LEAN CLAY (CL)** — medium plasticity; gray; moist to wet; medium consistency; stratified; with **SILT (ML)** partings and lenses*

NOTE:

1. Boring ground surface elevation is estimated from the topographic contours (see Drawing 26.001-B) obtained from the Dane County Land Information Office DCiMap website on June 18, 2026.

The Notes and Legend Records are considered a part of this Boring Log Record.

Soils & Engineering Services, Inc.

1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

BORING LOG RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

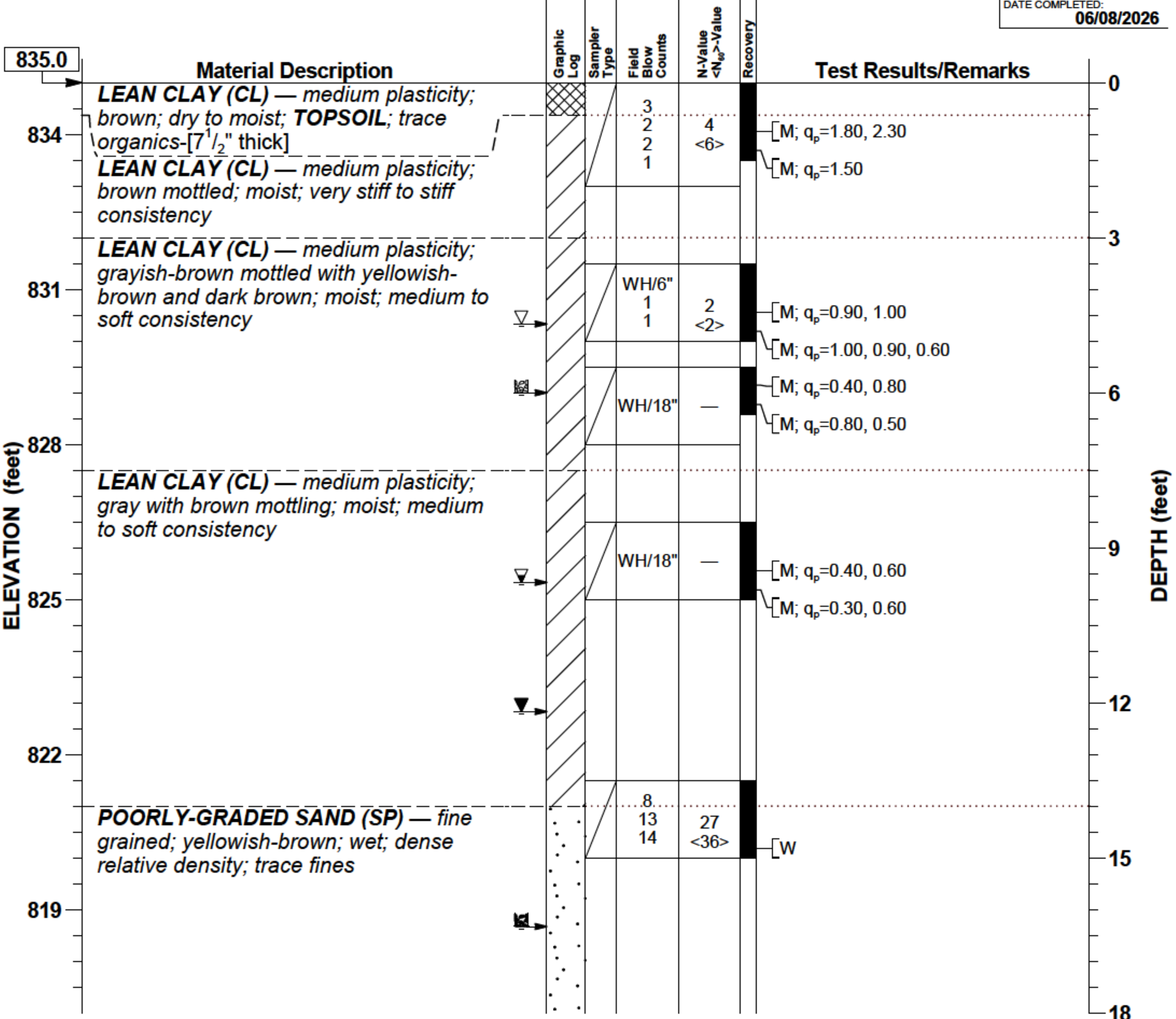
13698

Printed on 06/19/2026

GENERAL LOCATION:

Boring 2

LATITUDE: N43° 6' 35.9"	LONGITUDE: W89° 45' 32.9"	COUNTY: Dane	¼ ¼: NW	DRILL CO.: SES	CREW CHIEF: SWK		PAGE: 1 of 2
NORTHING: —	EASTING: —	TOWNSHIP: (Vermont) 7 N	¼: SW	DRILL RIG: Geoprobe 7822DT	CREW: JMC		TOTAL DEPTH: 35'-0"
STATION: —	OFFSET: —	RANGE: 6 E	SECTION: 2	HAMMER TYPE (EFFICIENCY): Automatic (80%)	LOG REVIEW: CMB	LOG QC: CMB	DATE STARTED: 06/08/2026
							DATE COMPLETED: 06/08/2026



Material Description

LEAN CLAY (CL) *— medium plasticity; brown; dry to moist;* ***TOPSOIL****; trace organics-[7$^1/_2$" thick]*

LEAN CLAY (CL) *— medium plasticity; brown mottled; moist; very stiff to stiff consistency*

LEAN CLAY (CL) *— medium plasticity; grayish-brown mottled with yellowish-brown and dark brown; moist; medium to soft consistency*

LEAN CLAY (CL) *— medium plasticity; gray with brown mottling; moist; medium to soft consistency*

POORLY-GRADED SAND (SP) *— fine grained; yellowish-brown; wet; dense relative density; trace fines*

Field Blow Counts	N-Value <N_{60}>-Value	Test Results/Remarks
3 2 2 1	4 <6>	M; q_p=1.80, 2.30 M; q_p=1.50
WH/6" 1 1	2 <2>	M; q_p=0.90, 1.00 M; q_p=1.00, 0.90, 0.60
WH/18"	—	M; q_p=0.40, 0.80 M; q_p=0.80, 0.50
WH/18"	—	M; q_p=0.40, 0.60 M; q_p=0.30, 0.60
8 13 14	27 <36>	W

Boring 2 Continued On Page 2/2

WATER LEVEL LEGEND

▽ 4'-8" at 23$^1/_2$ hours after completion

▽ 9'-8" at completion

▼ 12'-2" through HSA after 13'-6" sample (estimated)

OTHER LEVEL LEGEND

6'-0" Caved at 23$^1/_2$ hours after completion

16'-4" Caved at completion

DRILL METHOD	TOOL SIZE	CASING SIZE ID	DRILL FLUID	DEPTH FROM	DEPTH TO	HOLE DIA
HSA	2 $^1/_4$"	—	None	0'-0"	35'-0"	6.3"

SAMPLING METHOD(S): ASTM D1586

SURFACE PATCH: —

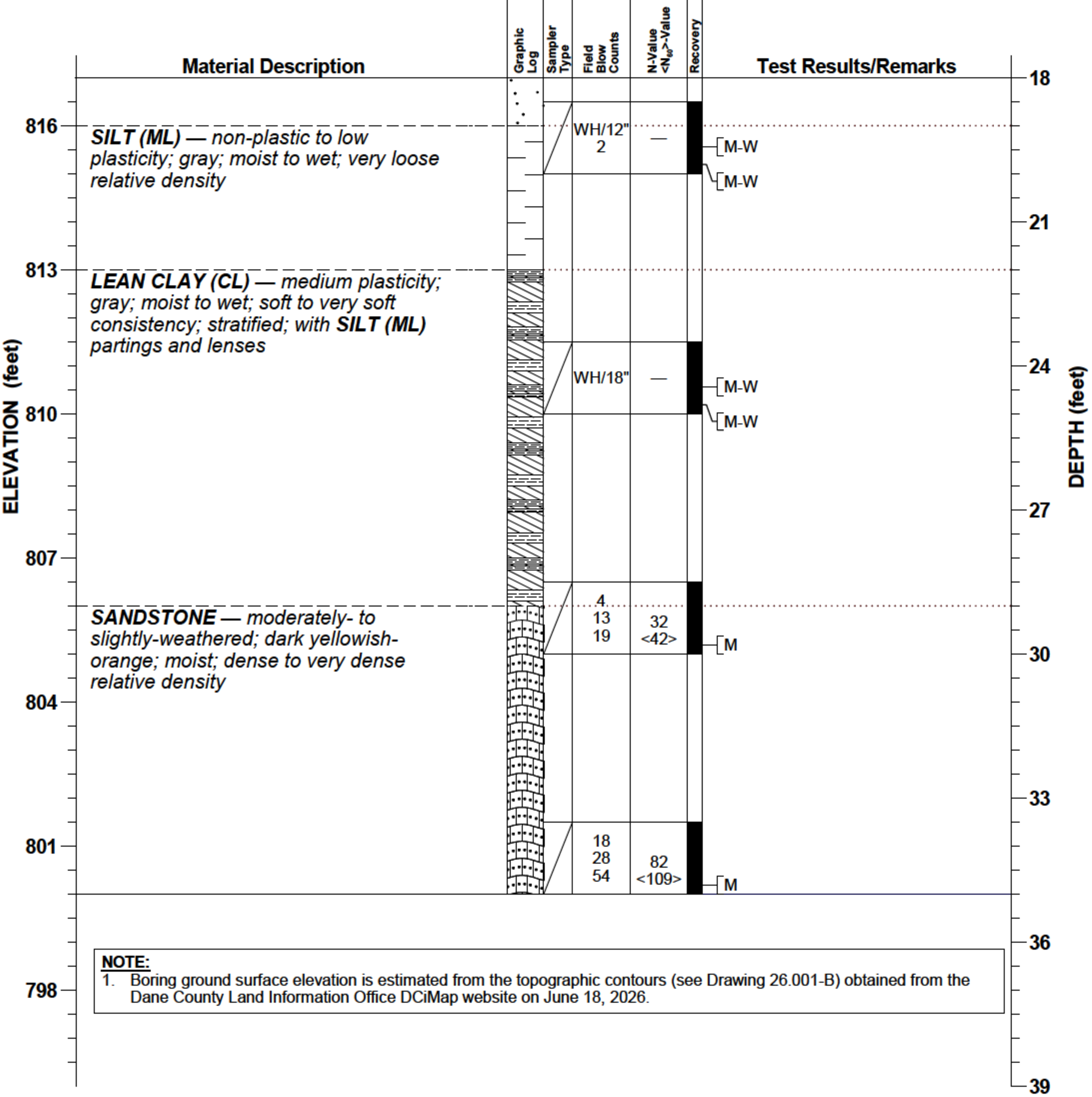
BACKFILL: Auger Cuttings, Bentonite Chips, Caved Soil

The Notes and Legend Records are considered a part of this Boring Log Record.

Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600
CONSULTING CIVIL ENGINEERS SINCE 1966

BORING LOG RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698



SILT (ML) *— non-plastic to low plasticity; gray; moist to wet; very loose relative density*

LEAN CLAY (CL) *— medium plasticity; gray; moist to wet; soft to very soft consistency; stratified; with* ***SILT (ML)*** *partings and lenses*

SANDSTONE *— moderately- to slightly-weathered; dark yellowish-orange; moist; dense to very dense relative density*

NOTE:

1. Boring ground surface elevation is estimated from the topographic contours (see Drawing 26.001-B) obtained from the Dane County Land Information Office DCiMap website on June 18, 2026.

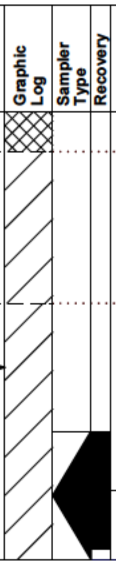
The Notes and Legend Records are considered a part of this Boring Log Record.

Boring 2A

GENERAL LOCATION:

LATITUDE: N43° 6' 35.9"	LONGITUDE: W89° 45' 32.9"	COUNTY: Dane	¼ ¼: NW	DRILL CO.: SES	CREW CHIEF: SWK		PAGE: 1 of 1
NORTHING: —	EASTING: —	TOWNSHIP: (Vermont) 7 N	¼: SW	DRILL RIG: Geoprobe 7822DT	CREW: JMC		TOTAL DEPTH: 7'-0"
STATION: —	OFFSET: —	RANGE: 6 E	SECTION: 2	HAMMER TYPE (EFFICIENCY): Automatic (80%)	LOG REVIEW: CMB	LOG QC: CMB	DATE STARTED: 06/08/2026
							DATE COMPLETED: 06/08/2026

ELEVATION (feet)	Material Description	Test Results/Remarks	DEPTH (feet)
835.0	***LEAN CLAY (CL)** — medium plasticity; brown; dry to moist; **TOPSOIL**; trace organics-[7 1/2" thick]*		0
834	***LEAN CLAY (CL)** — medium plasticity; brown; moist; very stiff to stiff consistency*		
	***LEAN CLAY (CL)** — medium plasticity; grayish-brown mottled with yellowish-brown and dark brown; moist; medium to soft consistency*		3
831			
		M; q_p=0.60; V_s=0.23; MC=30.6; LL=36; PL=19; PI=17 q_u=0.64; γ_m=121.2; γ_d=92.8	6
828			
			9
825			
			12
822			
			15
819			
			18



NOTE:
1. Boring ground surface elevation is estimated from the topographic contours (see Drawing 26.001-B) obtained from the Dane County Land Information Office DCiMap website on June 18, 2026.

WATER LEVEL LEGEND	OTHER LEVEL LEGEND
D 4'-0" Dry at completion	4'-0" Caved at completion

DRILL METHOD	TOOL SIZE	CASING SIZE ID	DRILL FLUID	DEPTH FROM	DEPTH TO	HOLE DIA
HSA	2 1/4"	—	None	0'-0"	7'-0"	6.3"

SAMPLING METHOD(S): ASTM D1587

SURFACE PATCH: —

BACKFILL: Auger Cuttings, Caved Soil

The Notes and Legend Records are considered a part of this Boring Log Record.

Soils & Engineering Services, Inc.

1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

BORING LOG RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698

State of Wis., Dept. of Natural Resources
dnr.wi.govb

Well / Drillhole / Borehole Abandonment

Form 3300-005 (R 4/2015) Page 1 of 2

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141 and 812, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

☐ **Verification Only of Fill and Seal**

SES Project Number 13698

Route to:
☐ Drinking Water ☐ Watershed/Wastewater ☐ Remediation/Redevelopment
☐ Waste Management ☐ Other:

1. ~~Well Location Information~~ Boring Location Information

County: **Dane**
Boring Number: **1**

Latitude / Longitude (Degrees and Minutes): **43° 6' 36.9"** N / **89° 45' 32.9"** W
Format Code: ☐ DD ☒ DDM
Method Code: ☐ GPS008 ☒ SCR002 ☐ OTH001

¼ / ¼: **NW** ¼: **SW** or Gov't Lot #
Section: **2**
Township: **7** N
Range: **6** ☒ E ☐ W

~~Well~~ Boring Street Address: **County Road JJ**
~~Well~~ Boring City, Village or Town: **Civil Township of Vermont**
~~Well~~ Boring ZIP Code:
Subdivision Name:
Lot #:

Reason For Removal ~~From Service~~: **Boring for GEOTECHNICAL sampling.**
WI Unique Well # of Replacement Well: **NA**

2. Facility / Owner Information

Facility Name: **Proposed Lot 3 Development**
Facility ID (FID or PWS): **NA**
License/Permit/Monitoring No: **NA**
Original Well Owner: **NA**
~~Present Well Owner~~ **Present Property Owner**: **Unknown**
Mailing Address of Present Owner:
City of Present Owner: State: Zip Code:

3. Well / Drillhole / Borehole Information

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

~~Original Construction~~ Boring Completion Date (mm/dd/yyyy): **06/03/2026**
If a Well Construction Report is available, please attach. **NA**

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (specify):

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total ~~Well~~ Boring Depth From Ground Surface (ft.): **25.0**
Casing Diameter (in.): **NA**
~~Lower~~ Drillhole Diameter (in.): **6.3**
Casing Depth (ft.): **NA**

Was well annular space grouted? **NA** ☐ Yes ☐ No ☐ Unknown
If yes, to what depth (feet)?
Depth to Water (Feet): **6.67**

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes	☐ No	☒ N/A
Liner(s) removed?	☐ Yes	☐ No	☒ N/A
Screen removed?	☐ Yes	☐ No	☒ N/A
Casing left in place?	☐ Yes	☐ No	☒ N/A
Was casing cut off below surface?	☐ Yes	☐ No	☒ N/A
Did sealing material rise to surface?	☒ Yes	☐ No	☐ N/A
Did material settle after 24 hours?	☐ Yes	☒ No	☐ N/A
If yes, was hole retopped?	☐ Yes	☐ No	☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☐ Yes	☒ No	☐ N/A

Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips) ☐ Other (Explain):

Sealings Materials
☐ Neat Cement Grout ☐ Concrete
☐ Sand-Cement (Concrete) Grout ☒ Bentonite Chips

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

5. Material Used To Fill Well / Drillhole

5. Material Used To Fill Well / Drillhole	From (Ft.)	To (Ft.)	No. Yards, [✓ Sacks Sealant] or [✓ Volume] (circle one)	Mix Ratio or Mud Weight
Auger Cuttings	**Surface**	**1.00**	**0.21 ft^3**	
Bentonite Chips	**1.00**	**17.00**	**3 - 50 lb Bags**	
Caved Soil	**17.00**	**25.00**	**1.7 ft^3**	

6. Comments

NA = Not applicable to soil borings.

7. Supervision of Work

Name of Person or Firm Doing Filling & Sealing: **SOILS & ENGINEERING SERVICES, INC.**
License #:
Date of Filling & Sealing (mm/dd/yyyy): **06/03/2026**
Street or Route: **1102 Stewart Street**
Telephone Number: **(608) 274-7600**
City: **Madison**
State: **WI**
ZIP Code: **53713**
Signature of Person Doing Work: Craig M. Bower
Date Signed: **06/06/2026**

DNR Use Only
Date Received:
Noted By:
Comments:

State of Wis., Dept. of Natural Resources
dnr.wi.govb

Well / Drillhole / Borehole Abandonment

Form 3300-005 (R 4/2015) Page 1 of 2

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141 and 812, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

☐ **Verification Only of Fill and Seal**

SES Project Number 13698

Route to:
☐ Drinking Water ☐ Watershed/Wastewater ☐ Remediation/Redevelopment
☐ Waste Management ☐ Other:

1. ~~Well Location Information~~ Boring Location Information

County: **Dane**
Boring Number: **2**
Latitude / Longitude (Degrees and Minutes): **43° 6' 35.9"** N; **89° 45' 32.9"** W
Format Code: ☐ DD ☒ DDM
Method Code: ☐ GPS008 ☐ SCR002 ☒ OTH001
¼ / ¼ **NW** ¼ **SW** or Gov't Lot #
Section: **2**
Township: **7** N
Range: **6** ☒ E ☐ W
~~Well~~ Boring Street Address: **County Road JJ**
~~Well~~ Boring City, Village or Town: **Civil Township of Vermont**
~~Well~~ Boring ZIP Code:
Subdivision Name:
Lot #:
Reason For Removal ~~From Service~~: **Boring for GEOTECHNICAL sampling.**
WI Unique Well # of Replacement Well: **NA**

2. Facility / Owner Information

Facility Name: **Proposed Lot 3 Development**
Facility ID (FID or PWS): **NA**
License/Permit/Monitoring No: **NA**
Original Well Owner: **NA**
~~Present Well Owner~~ **Present Property Owner**: **Unknown**
Mailing Address of Present Owner:
City of Present Owner:
State:
Zip Code:

3. Well / Drillhole / Borehole Information

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

~~Original Construction~~ Boring Completion Date (mm/dd/yyyy): **06/08/2026**
If a Well Construction Report is available, please attach. **NA**

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (specify):

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total ~~Well~~ Boring Depth From Ground Surface (ft.): **35.0**
Casing Diameter (in.): **NA**
~~Lower~~ Drillhole Diameter (in.): **6.3**
Casing Depth (ft.): **NA**
Was well annular space grouted? **NA** ☐ Yes ☐ No ☐ Unknown
If yes, to what depth (feet)?
Depth to Water (Feet): **4.67**

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes	☐ No	☒ N/A
Liner(s) removed?	☐ Yes	☐ No	☒ N/A
Screen removed?	☐ Yes	☐ No	☒ N/A
Casing left in place?	☐ Yes	☐ No	☒ N/A
Was casing cut off below surface?	☐ Yes	☐ No	☒ N/A
Did sealing material rise to surface?	☒ Yes	☐ No	☐ N/A
Did material settle after 24 hours?	☐ Yes	☒ No	☐ N/A
If yes, was hole retopped?	☐ Yes	☐ No	☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☐ Yes	☒ No	☐ N/A

Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips) ☐ Other (Explain):

Sealings Materials
☐ Neat Cement Grout ☐ Concrete
☐ Sand-Cement (Concrete) Grout ☒ Bentonite Chips

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

5. Material Used To Fill Well / Drillhole

5. Material Used To Fill Well / Drillhole	From (Ft.)	To (Ft.)	No. Yards, [✓ Sacks Sealant] [✓ or Volume] (circle one)	Mix Ratio or Mud Weight
Auger Cuttings	**Surface**	**1.00**	**0.21 ft^3**	
Bentonite Chips	**1.00**	**6.00**	**3 - 50 lb Bags**	
Caved Soil	**6.00**	**35.00**	**6.2 ft^3**	

6. Comments

NA = Not applicable to soil borings.

7. Supervision of Work

Name of Person or Firm Doing Filling & Sealing: **SOILS & ENGINEERING SERVICES, INC.**
License #:
Date of Filling & Sealing (mm/dd/yyyy): **06/09/2026**
Street or Route: **1102 Stewart Street**
Telephone Number: **(608) 274-7600**
City: **Madison**
State: **WI**
ZIP Code: **53713**
Signature of Person Doing Work: Craig M. Bower
Date Signed: **06/12/2026**

DNR Use Only
Date Received:
Noted By:
Comments:

State of Wis., Dept. of Natural Resources
dnr.wi.govb

Well / Drillhole / Borehole Abandonment

Form 3300-005 (R 4/2015) Page 1 of 2

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141 and 812, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

☐ **Verification Only of Fill and Seal**

Route to:
☐ Drinking Water ☐ Watershed/Wastewater ☐ Remediation/Redevelopment
☐ Waste Management ☐ Other:

SES Project Number 13698

1. ~~Well Location Information~~ Boring Location Information

County: **Dane**
Boring Number: **2A**
Latitude / Longitude (Degrees and Minutes): **43° 6' 35.9"** N; **89° 45' 32.9"** W
Format Code: ☐ DD ☒ DDM
Method Code: ☐ GPS008 ☒ SCR002 ☐ OTH001
¼ / ¼ **NW** ¼ **SW** or Gov't Lot #
Section **2** Township **7** N Range **6** ☒ E ☐ W
~~Well~~ Boring Street Address: **County Road JJ**
~~Well~~ Boring City, Village or Town: **Civil Township of Vermont**
~~Well~~ Boring ZIP Code:
Subdivision Name:
Lot #:
Reason For Removal ~~From Service~~: **Boring for GEOTECHNICAL sampling.**
WI Unique Well # of Replacement Well: **NA**

2. Facility / Owner Information

Facility Name: **Proposed Lot 3 Development**
Facility ID (FID or PWS): **NA**
License/Permit/Monitoring No: **NA**
Original Well Owner: **NA**
~~Present Well Owner~~ **Present Property Owner**: **Unknown**
Mailing Address of Present Owner:
City of Present Owner: State: Zip Code:

3. Well / Drillhole / Borehole Information

☐ Monitoring Well
☐ Water Well
☒ Drillhole / Borehole

~~Original Construction~~ Boring Completion Date (mm/dd/yyyy): **06/08/2026**
If a Well Construction Report is available, please attach. **NA**

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (specify):

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total ~~Well~~ Boring Depth From Ground Surface (ft.): **7.0**
Casing Diameter (in.): **NA**
~~Lower~~ Drillhole Diameter (in.): **6.3**
Casing Depth (ft.): **NA**
Was well annular space grouted? **NA** ☐ Yes ☐ No ☐ Unknown
If yes, to what depth (feet)?
Depth to Water (Feet): **Dry**

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes	☐ No	☒ N/A
Liner(s) removed?	☐ Yes	☐ No	☒ N/A
Screen removed?	☐ Yes	☐ No	☒ N/A
Casing left in place?	☐ Yes	☐ No	☒ N/A
Was casing cut off below surface?	☐ Yes	☐ No	☒ N/A
Did sealing material rise to surface?	☒ Yes	☐ No	☐ N/A
Did material settle after 24 hours?	☐ Yes	☒ No	☐ N/A
If yes, was hole retopped?	☐ Yes	☐ No	☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☐ Yes	☒ No	☐ N/A

Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips) ☐ Other (Explain):

Sealings Materials
☐ Neat Cement Grout ☐ Concrete
☐ Sand-Cement (Concrete) Grout ☒ Bentonite Chips

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

5. Material Used To Fill Well / Drillhole

5. Material Used To Fill Well / Drillhole	From (Ft.)	To (Ft.)	No. Yards, Sacks Sealant [✓ or Volume] (circle one)	Mix Ratio or Mud Weight
Auger Cuttings	Surface	4.00	0.85 ft^3	
Caved Soil	4.00	7.00	0.64 ft^3	

6. Comments

NA = Not applicable to soil borings.

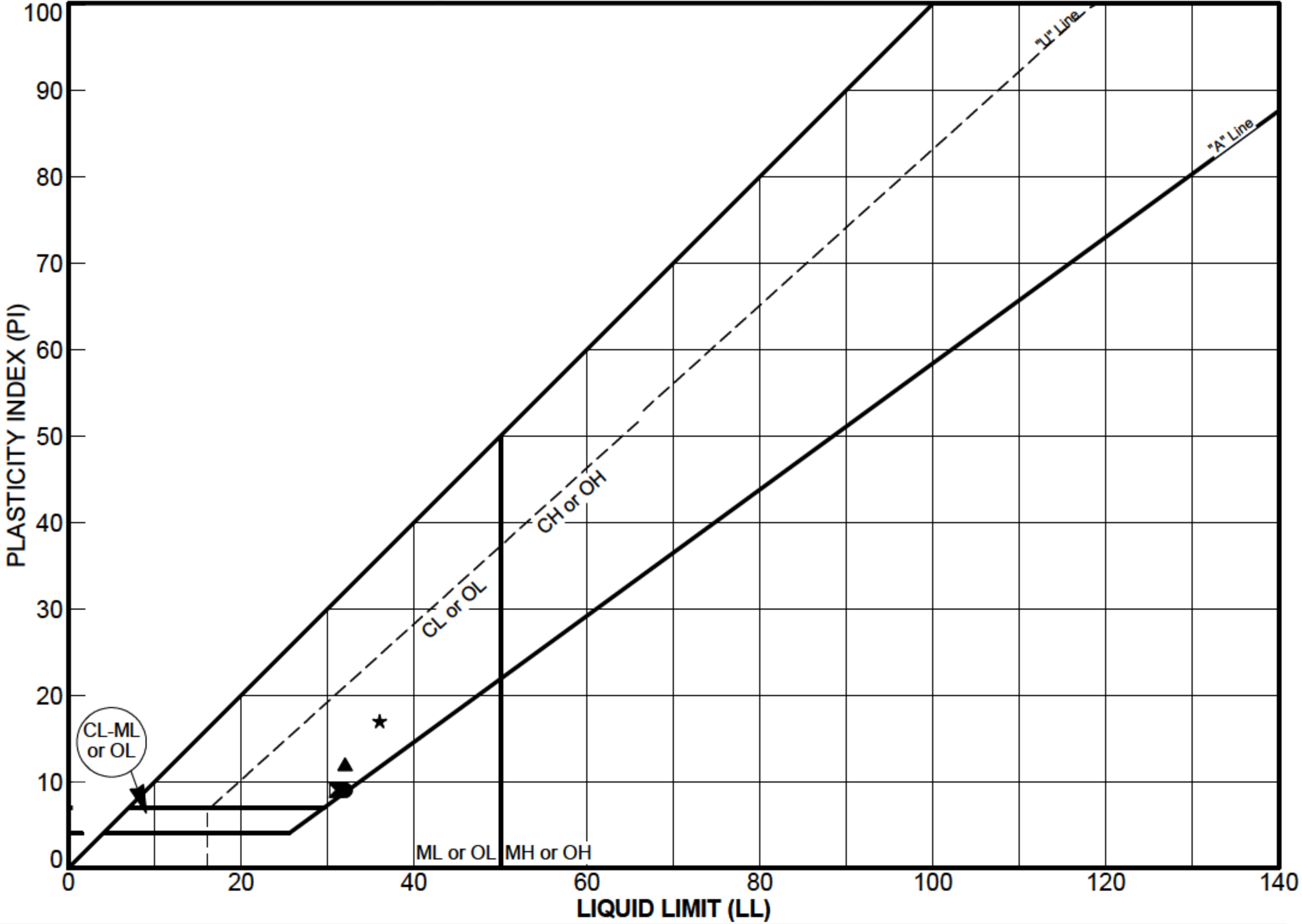
7. Supervision of Work

Name of Person or Firm Doing Filling & Sealing: **SOILS & ENGINEERING SERVICES, INC.**
License #:
Date of Filling & Sealing (mm/dd/yyyy): **06/08/2026**
Street or Route: **1102 Stewart Street**
Telephone Number: **(608) 274-7600**
City: **Madison** State: **WI** ZIP Code: **53713**
Signature of Person Doing Work: Craig M. Bower
Date Signed: **06/11/2026**

DNR Use Only
Date Received:
Noted By:
Comments:

ATTERBERG LIMITS TEST REPORT

ASTM Test Designation D4318/AASHTO Test Designations T89 & T90



	Specimen Identification	LL	PL	PI	Sample Classification
●	**Boring 1, 6'-7$^{3}/_{4}$" Depth**	**32**	**23**	**9**	***LEAN CLAY (CL)*** — *medium plasticity; brown; moist; soft to medium consistency*
⧗	**Boring 1, 14'-9$^{3}/_{4}$" Depth**	**31**	**22**	**9**	***LEAN CLAY (CL)*** — *medium plasticity; dark gray; moist; soft to medium consistency*
▲	**Boring 1, 24'-7$^{3}/_{4}$" Depth**	**32**	**20**	**12**	***LEAN CLAY (CL)*** — *medium plasticity; dark grayish-brown; moist to wet; medium consistency*
★	**Boring 2A, 5'-11" Depth**	**36**	**19**	**17**	***LEAN CLAY (CL)*** — *medium plasticity; grayish-brown mottled with yellowish-brown and dark brown; moist; medium consistency*

Soils & Engineering Services, Inc.

1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

LABORATORY TEST RESULT RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

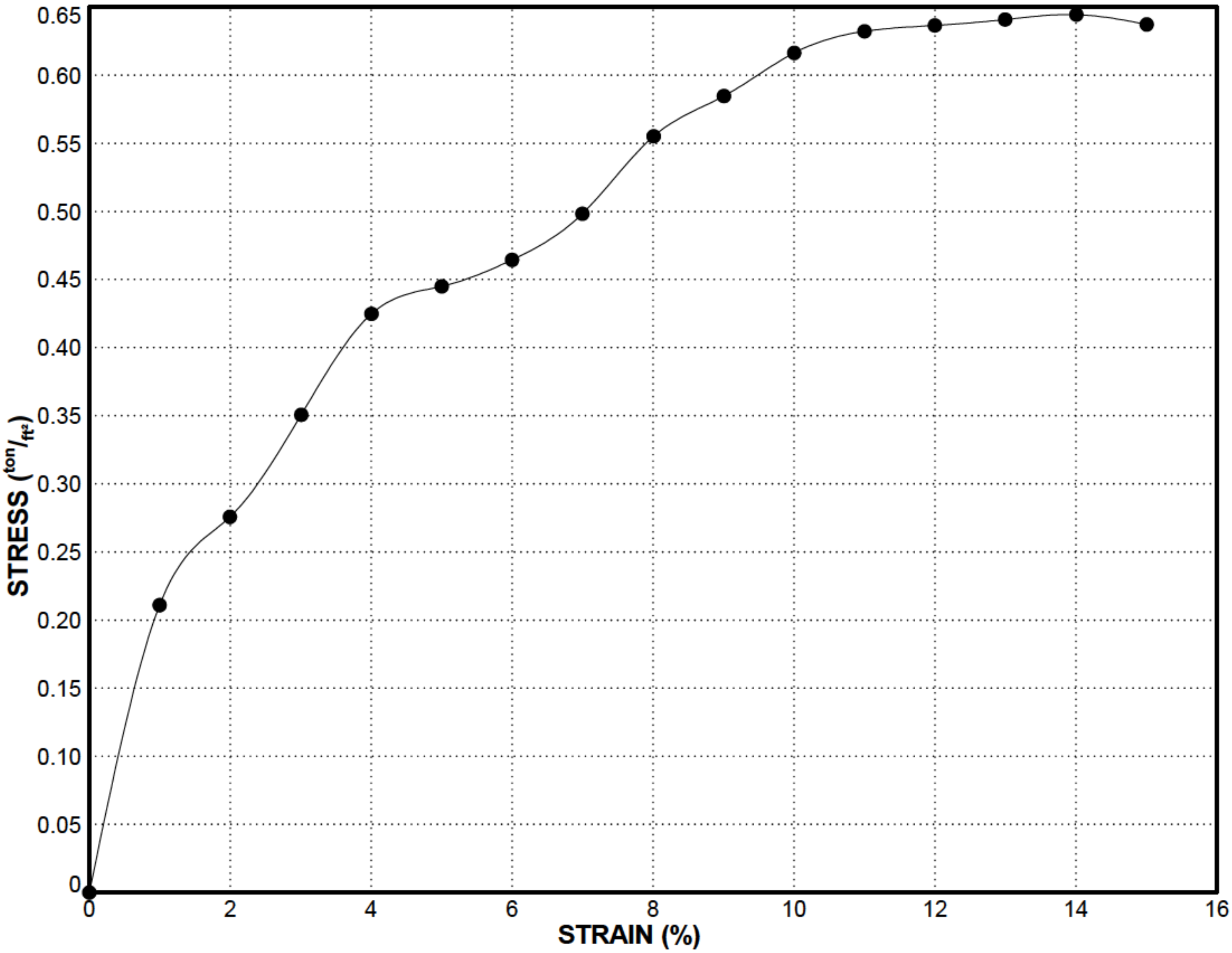
13698

FIGURE 1

Printed on 06/19/2026

UNCONFINED COMPRESSION TEST REPORT

ASTM Test Designation D2166



Sample Designation	Sample Type
Boring 2A, 5'-11" Depth	**Shelby tube**
Soil Identification/Classification	
LEAN CLAY (CL) *— medium plasticity (LL=36; PL=19); grayish-brown mottled with yellowish-brown and dark brown; moist; medium consistency*	
 	

Sample Test Data		
Initial	Height (inches)	**3.559**
	Diameter (inches)	**1.877**
	Height:Diameter Ratio	**1.896**
	Wet Density ($^{lb}/_{ft^3}$)	**121.2**
	Dry Density ($^{lb}/_{ft^3}$)	**92.8**
	Moisture Content (%)	**30.6**
	Assumed Specific Gravity	**2.65**
	Estimated Saturation (%)	**100**
	Failure Strain (%)	**14.0**
	Unconfined Compressive Strength ($^{ton}/_{ft^2}$)	**0.64**
	Undrained Shear Strength ($^{ton}/_{ft^2}$)	**0.32**
	Average Strain Rate (%/min)	**1**

Soils & Engineering Services, Inc.

1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

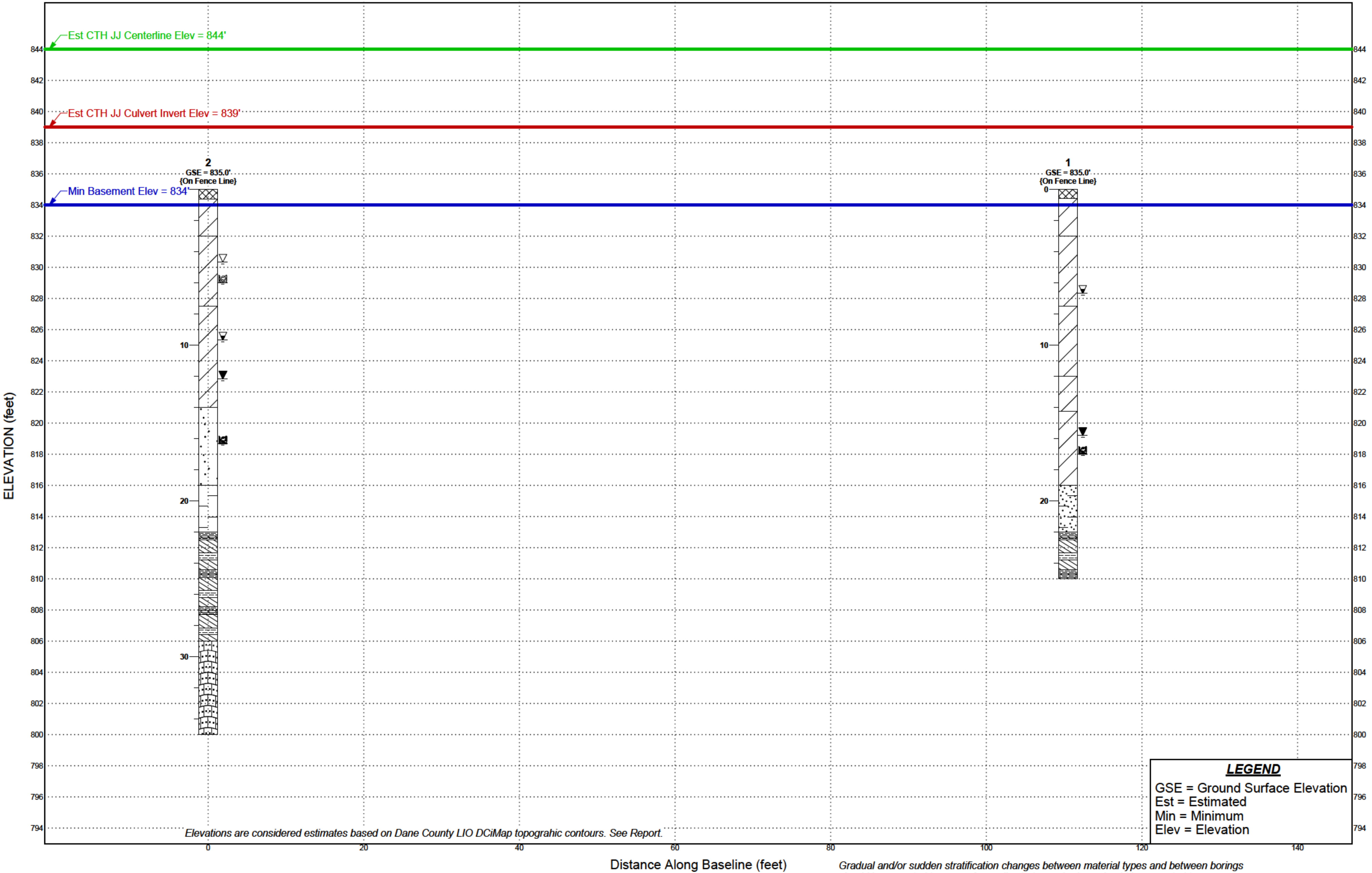
CONSULTING CIVIL ENGINEERS SINCE 1966

LABORATORY TEST RESULT RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

13698

FIGURE 2

Printed on 06/19/2026



Elevations are considered estimates based on Dane County LIO DCiMap topograhic contours. See Report.

LEGEND

GSE = Ground Surface Elevation
Est = Estimated
Min = Minimum
Elev = Elevation

Gradual and/or sudden stratification changes between material types and between borings should be expected to occur. Anomalies between borings should be expected to occur.

Please refer to the Boring Log Records for soil/rock stratification and sample specifics at each boring location presented on this cross-section.

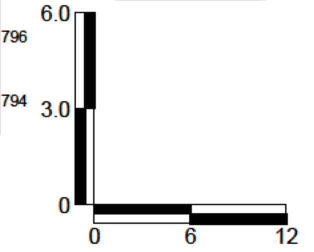


FIGURE A

13698

BORING FENCE RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600

CONSULTING CIVIL ENGINEERS SINCE 1966

Printed on 06/19/2026

APPENDIX B

Appendix B Contents

- Recommended Soil Design Parameters, Table B-1

Table B-1: RECOMMENDED SOIL/BEDROCK DESIGN PARAMETERS
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

		Estimated Soil/Bedrock Parameters‡			
Elevation (feet)	**Material Type**	**Moist Density (pcf)**	**Bouyant Density (pcf)**	**Angle of Internal Friction (degrees)**	**Cohesion (psf)**
	---------- Boring 1 ----------				
	---------- Boring Ground Surface Elevation = 835.0' ----------				
835.0 to 834.4	*__LEAN CLAY (CL)__ — medium plasticity; brown; dry to moist; __TOPSOIL__; trace organics*	120	65	0	100
834.4 to 832.0	*__LEAN CLAY (CL)__ — medium plasticity; brown; moist; very stiff to stiff consistency*	125	70	0	900
832.0 to 827.5	*__LEAN CLAY (CL)__ — medium plasticity; grayish-brown mottled with yellowish-brown and dark brown; moist; stiff to soft consistency*	125	70	0	900
827.5 to 823.0	*__LEAN CLAY (CL)__ — medium plasticity; gray with brown mottling; moist; stiff to medium consistency*	125	70	0	900
823.0 to 820.8	*__LEAN CLAY (CL)__ — medium plasticity; brown; moist; very soft consistency*	125	70	0	100
820.8 to 816.0	*__LEAN CLAY (CL)__ — medium plasticity; gray; moist; soft to medium consistency*	125	70	0	250
816.0 to 813.0	*__SANDY SILT (ML/SM)__ — non-plastic to low plasticity; gray; moist to wet; medium dense relative density*	125	70	25	0
813.0 to 810.0	*__LEAN CLAY (CL)__ — medium plasticity; gray; moist to wet; medium consistency; stratified; with __SILT (ML)__ partings and lenses*	125	70	0	900

Table Notes

‡ The Moist Density, Bouyant Density, Angle of Internal Friction, and Cohesion values presented above are estimated averages for each of the soil/bedrock strata encountered at the indicated boring. See report text for further information.

Table Abbreviations and Symbols

pcf = pounds per cubic foot.

psf = pounds per square foot.

Printed on 6/22/2026

Table B-1: RECOMMENDED SOIL/BEDROCK DESIGN PARAMETERS
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

		Estimated Soil/Bedrock Parameters‡			
Elevation (feet)	**Material Type**	**Moist Density (pcf)**	**Bouyant Density (pcf)**	**Angle of Internal Friction (degrees)**	**Cohesion (psf)**
	---------- Boring 2 ----------				
	---------- Boring Ground Surface Elevation = 835.0' ----------				
835.0 to 834.4	***LEAN CLAY (CL)*** *— medium plasticity; brown; dry to moist;* ***TOPSOIL****; trace organics*	120	65	0	100
834.4 to 832.0	***LEAN CLAY (CL)*** *— medium plasticity; brown mottled; moist; very stiff to stiff consistency*	125	70	0	900
832.0 to 827.5	***LEAN CLAY (CL)*** *— medium plasticity; grayish-brown mottled with yellowish-brown and dark brown; moist; medium to soft consistency*	125	70	0	900
827.5 to 821.0	***LEAN CLAY (CL)*** *— medium plasticity; gray with brown mottling; moist; medium to soft consistency*	125	70	0	900
821.0 to 816.0	***POORLY-GRADED SAND (SP)*** *— fine grained; yellowish-brown; wet; dense relative density; trace fines*	125	70	30	0
816.0 to 813.0	***SILT (ML)*** *— non-plastic to low plasticity; gray; moist to wet; very loose relative density*	125	70	25	0
813.0 to 806.0	***LEAN CLAY (CL)*** *— medium plasticity; gray; moist to wet; soft to very soft consistency; stratified; with* ***SILT (ML)*** *partings and lenses*	125	70	0	250
806.0 to 800.0	***SANDSTONE*** *— moderately- to slightly-weathered; dark yellowish-orange; moist; dense to very dense relative density*	140	86	45	0

Table Notes

‡ The Moist Density, Bouyant Density, Angle of Internal Friction, and Cohesion values presented above are estimated averages for each of the soil/bedrock strata encountered at the indicated boring. See report text for further information.

Table Abbreviations and Symbols

pcf = pounds per cubic foot.

psf = pounds per square foot.

APPENDIX C

Appendix C Contents

- Fill Material Recommendations

We provide the following recommendations regarding fill material used to raise the grade below proposed improvements and used to backfill below-grade foundation elements and structures.

All materials and the placement of those materials are to conform to applicable sections of the project specifications and drawings or the recommendations presented below. If there is a conflict between the project specifications/drawings and the recommendations presented below, we recommend the more stringent requirements for the intended use be followed. The Project Civil/Structural Engineer should be consulted for any clarification of the recommendations provided herein and in the project specifications/drawings.

C1. Landscape Fill Material

We recommend landscape fill material be used to raise the grade below areas that will not have any type of improvement constructed on top of it. It may consist of either cohesive, granular, or a mixture of cohesive and granular soils with a maximum aggregate size of 3 inches in the greatest dimension. It shall be free of construction debris and free from sod, stumps, logs, and other perishable and deleterious matter.

We recommend the landscape fill material be placed in maximum 1-foot-thick loose layers and compacted to at least 88 percent of the maximum dry density determined for the material according to ASTM Designation D1557. Cohesive or cohesive/granular material should be placed at a moisture content within 3 percent above or below the optimum moisture content for the material as determined by ASTM Designation D1557. Improper or poor densification of the landscape fill material could result in settlement of the soils and subsequent depressions in the landscaped area surface.

We recommend the placement and compaction of the landscape fill material be monitored and/or tested as specified in Section C10 of this appendix.

C2. General Fill Material

We recommend the general fill material used to raise the grade below roadways or similar hardscaped surface areas. It may consist of cohesive or a mixture of cohesive and granular soils with a maximum aggregate size of 3 inches in the greatest dimension. It shall be free of construction debris and free from sod, stumps, logs, and other perishable and deleterious matter.

Be advised that this type of fill material will typically retain more moisture than and will have a lower permeability rate than structural fill material. Thus, the potential for frost heave to occur will be greater. Therefore, providing a positive slope to the subgrade surface to drain moisture away from any structural improvement should be included in the project design.

We recommend the general fill material be placed at a moisture content at the optimum moisture to approximately 2 percent above the optimum moisture of the material in maximum 6- to 12-inch-thick loose lifts depending upon the composition of the material. The allowable loose lift thickness of the material will be dependant upon the composition of the material, the optimum moisture content of the material, and the size of the compactor to be used to compact the material.

We recommend each lift of the general fill material be compacted using segmented-pad compactors. This type of compactor will help to kneed the placed material into a well-knit soil mass. The size of the compactor used to compact the cohesive or cohesive/granular mixed fill material is anticipated to be larger than what would be needed to compact structural fill material. We recommend smooth drum or flat plate vibratory compactors not be used to compact general fill material. We recommend each lift of general fill material be compacted to at least 90 or 95 percent of the maximum dry density determined for the material according to ASTM Designation D 1557 as follows:

- Inside a 1:1 line from the lower exterior limits of a roadway or hardscape surface improvement, compact the material placed 3 feet or more below the design finished subgrade to at least 90 percent of the maximum dry density and the material placed within 3 feet of the design finished subgrade to at least 95 percent of the maximum dry density.
- Outside a 1:1 line from the lower exterior limits of a roadway or hardscape surface improvement, each lift should be thoroughly compacted to at least 90 percent of the maximum dry density.
- In addition, where the general fill material consists of predominantly cohesive material (soils identified/classified with USCS symbols of CL, CL-ML, CH, or MH), the compacted material shall be well-knit together to eliminate voids within the soil mass and have a minimum unconfined compressive strength of 1.5 tons per square foot as measured with a spring penetrometer.

We recommend the placement and compaction of the general fill material be monitored and/or tested as specified in Section C10 of this appendix.

C3. Structural Fill Material

We recommend the structural fill material be used to backfill any below-grade section of a foundation element that is adjacent to or below an area that will have a structural improvement constructed on it. We recommend the structural fill material be used to backfill any below-grade section of a foundation element that is adjacent to or below an area that will have a structural improvement constructed on it. We recommend the structural fill material consist of a granular soil meeting the following specifications.

Sieve Size	Percent Passing by Weight
2½-inch	100
¾-inch	70 to 100
No. 200	0.0 to 25.0

Granular soils that meet the above specifications will be identified/classified with one of the following USCS symbols — SC, SM, SP-SC, SP-SM, SP, GC, GM, GP-GC, GP-GM, or GP.

We recommend the structural fill material be placed in 8- to 12-inch-thick loose lifts. Depending upon the selected granular soil's particle-size composition, thinner loose lift thicknesses, drying out of the material, and/or the addition of water to the material may be necessary to achieve the recommended percent compaction. We recommend each loose lift of material be compacted to at least 90 or 95 percent of the maximum dry density determined for the material according to ASTM Designation D 1557 as follows:

Below Structures and Foundation Backfill
We recommend each lift be compacted to at least 95 percent of the maximum dry density.

Below Hardscape Surfaces[11]
We recommend each lift be compacted to at least 95 percent of the maximum dry density for material placed within 3 feet of the design hardscape surface subgrade elevation and to at least 90 percent of the maximum dry density for material placed below a depth of 3 feet from the design hardscape surface subgrade elevation.

We recommend the placement and compaction of the structural fill material be monitored and/or tested as specified in Section C10 of this appendix.

C4. Free-Draining Fill Material

We recommend the free-draining fill material consist of a granular soil meeting the following specifications.

Sieve Size	Percent Passing by Weight
1½-inch	100
1-inch	65 to 100
No. 200	0.0 to 8.0

---

[11] Hardscape surfaces, at a minimum, consist of the pavement for roadways, parking lots, driveways, etc.; sidewalks, and landscaping pavers.

Granular soils that meet the above specifications will be identified/classified with one of the following USCS symbols — SP-SC, SP-SM, SP, GP-GC, GP-GM, or GP.

The free-draining fill material should be placed and compacted as described for structural fill material in Section C3 of this appendix. Depending upon the type of soils the free-draining fill material is resting on, placement of a non-woven geotextile (See Section C6 of this appendix.) may be needed to minimize the intrusion of fine particles into the free-draining fill material or the placement of a woven geotextile (See Section C5 of this appendix.) may be needed to provide strength to and to minimize the intrusion of fine particles into the free-draining fill material. Intrusion of fine particles would reduce the capability of the free-draining fill material to perform as intended.

We recommend the placement and compaction of the free-draining fill material be monitored and/or tested as specified in Section C10 of this appendix.

We recommend free-draining fill material be placed below the slab-on-grade floor for a structure to aid in providing a moisture break between the underlying material and the slab-on-grade floor. It is also used in situations where frost protection of a foundation element terminating above the recommended frost depth is needed. In frost protection situations, the bottom of the free-draining fill material is placed at or below the recommended frost depth.

C5. Woven Geotextile

Depending upon the soil and groundwater conditions exposed in the excavations to accommodate the proposed improvements, it may be necessary to install a woven geotextile on the excavation surface and possibly extending up the sidewalls of the excavation and/or to cover the top of a layer of coarse granular soil (e.g., coarse crushed stone or breaker run). We recommend the geotextile consist of Mirafi 600X, Contech C300, or equivalent. The geotextile should be pulled taut to remove wrinkles and slack prior to placement of any fill material on it. The use of a woven geotextile should be limited to those situations where added strength to and prevention of the infiltration of fines into the coarse granular soil is required. Where prevention of the infiltration of fines is the purpose of the geotextile then a non-woven geotextile as specified in Section C6 of this appendix should be used.

The geotextile is intended to aid in forming a working mat upon which placement of coarse crushed stone or breaker run can take place without disturbing or loosening the soil at the bottom of the excavations.

C6. Non-Woven Geotextile

Depending upon the soil and groundwater conditions exposed in the excavations to accommodate the proposed improvements, it may be necessary to install a non-woven geotextile on the excavation surface and possibly extending up the sidewalls of the excavation and/or to cover the top of a layer of coarse granular soil (e.g., coarse crushed stone or breaker run). We recommend the geotextile consist of Mirafi 140N, Contech C-45NW, or equivalent. The geotextile should be pulled taut to remove wrinkles and slack prior to placement of any fill material on it. The use of a non-woven geotextile should be limited to those situations where prevention of the infiltration of fines into the coarse granular soil is the primary purpose of the geotextile. Where strength as well as fines infiltration prevention is the purpose of the geotextile then a woven geotextile as specified in Section C5 of this appendix should be used.

The geotextile is intended to aid in forming a working mat upon which placement of coarse crushed stone or breaker run can take place without disturbing or loosening the soil at the bottom of the excavations.

C7. Coarse Crushed Stone

Depending upon the soil and groundwater conditions exposed in the excavations to accommodate the proposed improvements, it may be necessary to install coarse crushed stone mat over exposed soil in an excavation. We recommend coarse crushed stone consist of Number 2 stone as defined in ASTM Designation C33. Number 2 stone consists of particles primarily in the 1½- to 2½-inch range without fines as follows:

Sieve Size	Percent Passing by Weight
3-inch	100
2½-inch	90 to 100
2-inch	35 to 70
1½-inch	0 to 15
¾-inch	0 to 5

The coarse crushed stone should be placed in maximum 1-foot-thick loose layers. Each layer of coarse crushed stone should be thoroughly-compacted with a large, vibratory smooth-drum compactor, or a backhoe-mounted plate compactor, to densify the placed stone until no further consolidation is evident.

Coarse crushed stone is normally intended to form a working mat upon which placement of other fill material, or construction of proposed improvements or spread footings, can take place without disturbing or loosening the soil at the bottom of the excavations.

Depending upon the soil and groundwater conditions, the coarse crushed stone may need to be underlain by or even wrapped by a woven geotextile as specified in Section C5 of this appendix.

We recommend the placement and compaction of the coarse crushed stone be monitored and/or tested as specified in Section C10 of this appendix.

C8. Breaker Run Material

Depending upon the soil and groundwater conditions exposed in the excavations to accommodate the proposed improvements, it may be necessary to place breaker run on the excavation surface. If needed, a woven geotextile may also be needed as specified in Section C5 of this appendix. If breaker run is needed, the thickness of the breaker run can be considered to replace an equal thickness of structural fill material (i.e., 1-foot of breaker run equals 1-foot of structural fill material).

We recommend the breaker run material consist of crushed stone meeting the requirements for Section 312, Select Crushed Material, of the WisDOT *Standard Specifications for Highway and Structure Construction* specifications. Select Crushed Material consists of particles primarily in the 1½- to 5-inch range without fines as follows:

Sieve Size	Percent Passing by Weight
5-inch	100
1½-inch	20 to 50
No. 10	0 to 10

We recommend the breaker run be placed in maximum 1-foot-thick loose layers. Each layer of breaker run should be thoroughly-compacted with a large, vibratory smooth-drum compactor, or a backhoe-mounted plate compactor, to densify the placed breaker run until no further consolidation is evident.

The breaker run is intended to aid in forming a working mat upon which placement of other fill material, or construction of proposed improvements or spread footings, can take place without disturbing or loosening the soil at the bottom of the excavations.

Depending upon the soil and groundwater conditions, the breaker run may need to be underlain by or even wrapped by a woven geotextile as specified in Section C5 of this appendix.

We recommend the placement and compaction of the breaker run be monitored and/or tested as specified in Section C10 of this appendix.

C9. Aggregate Base Course

We recommend the aggregate base course which is placed below vehicular or hardscaped improvements consist of material meeting the requirements for 1¼-inch Dense Graded Base per Section 305 of the WisDOT *Standard Specifications for Highway and Structure Construction*. If desired, the top 6 inches of aggregate base course could consist of ¾-inch Dense Graded Base.

We recommend the aggregate base course material be placed on top of the approved subgrade surface following completion of the site excavation, thorough compaction/proof-rolling, and site filling as recommended in the appropriate sections of this report. We recommend the aggregate base course material be placed and compacted in two or more lifts with a maximum loose lift thickness of 6-inches and with each lift being compacted to a density of at least 95 percent of the maximum dry density determined for the material in accordance with ASTM Designation D1557.

We recommend the placement and compaction of the aggregate base course material be monitored and/or tested as specified in Section C10 of this appendix.

C10. Fill Material Monitoring

We recommend the compactive effort of the Landscaped Fill Material, Structural Fill Material, Free-Draining Fill Material, Coarse Crushed Stone, Breaker Run Material, and/or Aggregate Base Course be monitored during construction by SES personnel at regular depths and intervals to verify that the minimum density has been achieved, especially during initial placement of the fill material. Any compacted lift that does not meet the specified density should receive additional compactive effort and then be retested until the required density has been achieved. Subsequent lifts should not be placed until the specified minimum density has been achieved on the preceding lift.

C11. Cold Weather Fill Material Placement

During cold weather conditions, Landscaped Fill Material, Structural Fill Material, Free-Draining Fill Material, Coarse Crushed Stone, Breaker Run Material, and/or Aggregate Base Course used to backfill any excavation or to raise the grade should <u>not</u> be deposited over frozen soil, either frozen native soil or frozen fill material. Also, any of the fill materials to be placed and compacted should <u>not</u> be frozen or contain snow or ice.

APPENDIX D

Appendix D Contents
- Seismic Site Class Record
- "ASCE 7 Hazards Report" printout

Boring	Method 2		Method 3				Site Class For Boring
	All Soils		Granular Soils		Cohesive Soils		
	Avg N-value	Site Class	Avg N-value	Site Class	Avg s_u (tsf)	Site Class	
1	7	E	42	D	0.2	E	E
2	5	E	13	E	0.4	E	E

Recommend Site Class E (soft clay soil) for proposed improvement(s) in the vicinity of Borings 1 and 2.

ASCE Standard 7-16 Site Class Definitions		
Site Class	**Method 2 All Soil Criteria Method 3 Granular Soil Criteria**	**Method 3 Cohesive Soil Criteria**
A: Hard Rock	Shear Wave Analyses Required	Shear Wave Analyses Required
B: Rock	Shear Wave Analyses Required	Shear Wave Analyses Required
C: very dense soil and soft rock	Avg N-Value > 50	Avg s_u > 1.0 tsf
D: stiff soil	15 ≤ Avg N-Value ≤ 50	0.5 tsf ≤ Avg s_u ≤ 1.0 tsf
E: soft clay soil	Avg N-Value < 15	Avg s_u < 0.5 tsf
F: Soils vulnerable to potential failure or collapse under seismic loading, such as liquefiable soils, quick and highly sensitive clays, collapsible weakly-cemented soils, peats, and organic soils. See ASCE 7-16 Chapter 20 Section 20.3.1 for explanations of the required site response analysis, additional criteria, and exceptions for Site Class F.		

Table Notes

1. We use the Field N-value for granular soils/bedrock and the Field N-value Undrained Shear Strength (s_u) for cohesive soils/bedrock obtained by each boring performed for this project to compute the Avg N-value and Avg s_u using the equations presented Sections 20.4.2 and 20.4.3 of ASCE 7-16 Chapter 20. Please note that the averages computed are weighted averages using the thickness of each designated sub-stratum and stratum of material to a depth of 100 feet.

2. For borings that do not extend to a depth of 100 feet, we estimate the Field N-value or s_u based on extrapolation of the boring results and on published geological publications.

3. Per ASCE 7-16 Chapter 20, the lowest seismic site class from Methods 2 and 3 is applied to a boring subsurface profile. Additionally, the lowest seismic site class from an individual boring within a group of borings for a specific improvement is used for that improvement.

Soils & Engineering Services, Inc.
1102 STEWART STREET
MADISON, WISCONSIN 53713-4648
Phone: (608) 274-7600
CONSULTING CIVIL ENGINEERS SINCE 1966

SEISMIC SITE CLASS RECORD
Proposed Lot 3 Development
County Road JJ
Town of Vermont, Dane County, Wisconsin

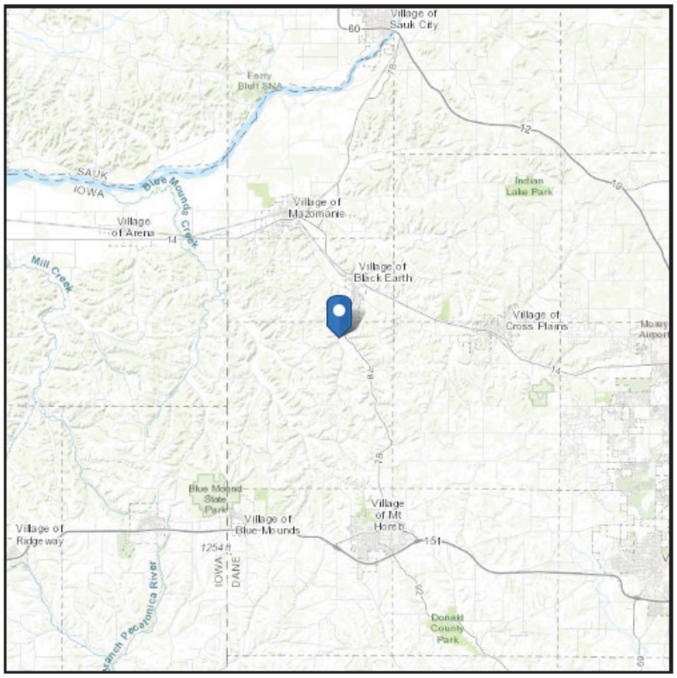
13698

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: E - Soft Clay Soil

Latitude: 43.109996
Longitude: -89.759027
Elevation: 834.4773186619348 ft (NAVD 88)



Seismic

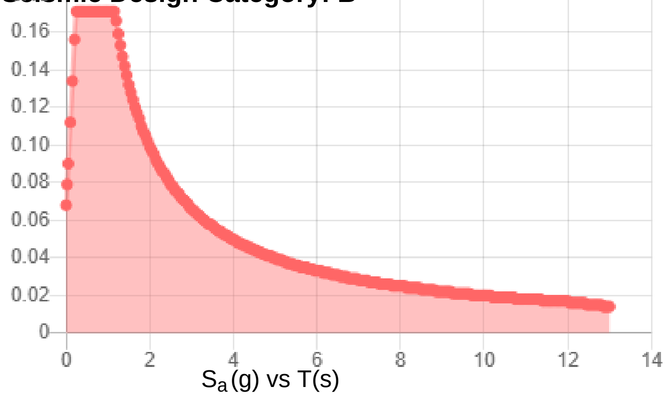
Site Soil Class: E - Soft Clay Soil

Results:

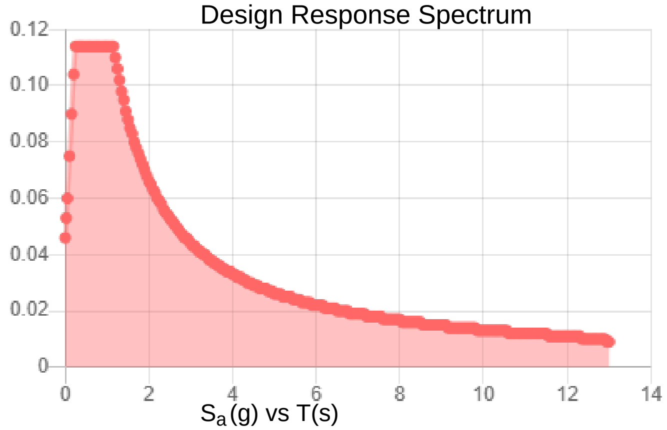
S_S :	0.071	S_{D1} :	0.132
S_1 :	0.047	T_L :	12
F_a :	2.4	PGA :	0.034
F_v :	4.2	PGA $_M$:	0.083
S_{MS} :	0.171	F_{PGA} :	2.4
S_{M1} :	0.199	I_e :	1
S_{DS} :	0.114	C_v :	0.7

Seismic Design Category: B

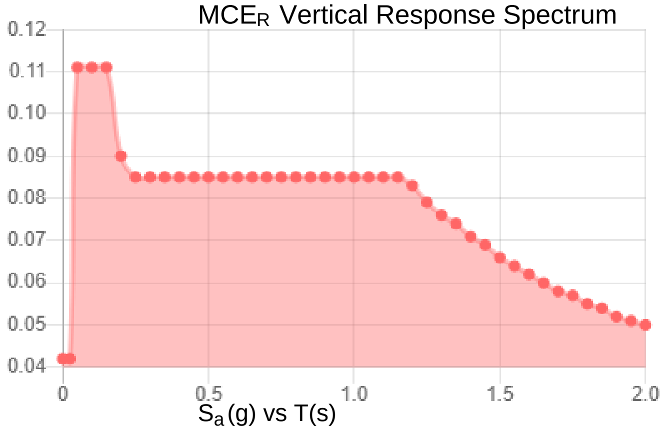
MCE$_R$ Response Spectrum



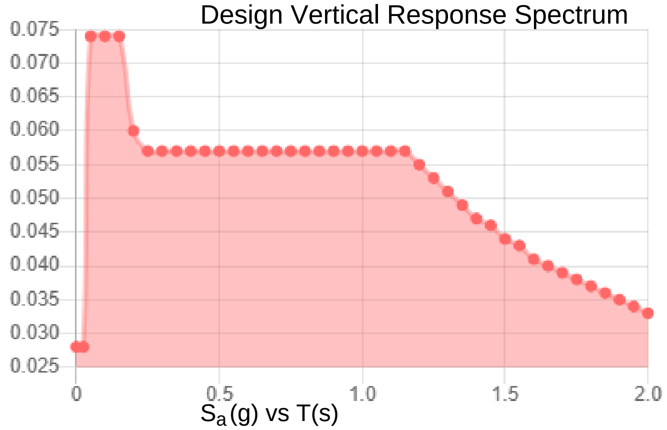
Design Response Spectrum



MCE$_R$ Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: **Fri Jun 19 2026**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.

APPENDIX E

Appendix E Contents

- *Important Information about This Geotechnical-Engineering Report* advisory

Important Information about This
Geotechnical-Engineering Report

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

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL
BUSINESS
ASSOCIATION

Telephone: 301/565-2733
e-mail: [redacted] www.geoprofessional.org