' DEPT. OF
S, HIGHWAY &
TION

1919 Alliant Energy Center Way
Madison, Wisconsin 53713
Office: 608/266-4018 ◊ Fax: 608/267-1533
Public Works Engineering Division
Public Works Solid Waste Division

ADDENDUM

January 6, 2017

ATTENTION ALL REQUEST FOR BID (RFB) HOLDERS

RFB NO. 316048 - ADDENDUM NO. 6

NEW RESTROOM FACILITY

HENRY VILAS ZOO

BIDS DUE: TUESDAY, JANUARY 10, 2017, 2:00 PM. DUE DATE AND TIME **ARE NOT** CHANGED BY THIS ADDENDUM.

This Addendum is issued to modify, explain or clarify the original Request for Bid (RFB) and is hereby made a part of the RFB. Please attach this Addendum to the RFB.

PLEASE MAKE THE FOLLOWING CHANGES:

1. **Bid Form**
   Please delete the current Bid Form and replace with new Bid Form issued with this Addendum.

2. **Geotechnical Report**
   Following the Instructions To Bidders documents, please insert the Geotechnical Report issued with this Addendum.

If any additional information about this Addendum is needed, please call Eric Urtes at 608/266-4798, urtes.eric@countyofdane.com .

Sincerely,
Eric Urtes, AIA
Project Manager

Enclosures:
Geotechnical Report
Bid Form

H:\Shared\ENGINEERING DIVISION\Eric Urtes\316048 - HVZ New Restroom Facility (Construction)\03 - Addendum\Addm 6\0 - 316048 - Addendum 6.docx

Name of Bidding Firm: _____

BID FORM

BID NO. 316048
PROJECT: NEW RESTROOM FACILITY
HENRY VILAS ZOO

TO: DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION PROJECT MANAGER
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

NOTE: WISCONSIN STATUTE 77.54 (9M) ALLOWS FOR NO SALES & USE TAX ON THE PURCHASE OF MATERIALS FOR COUNTY PUBLIC WORKS PROJECTS.

BASE BID - LUMP SUM:
Dane County is inviting Bids for demolition of the existing restroom building and construction of a new restroom facility for the Henry Vilas Zoo on the same foundation. Only firms with capabilities, experience & expertise with similar projects should obtain this Request for Bids document & submit Bids. The undersigned, having examined the site where the Work is to be executed and having become familiar with local conditions affecting the cost of the Work and having carefully examined the Drawings and Specifications, all other Construction Documents and Addenda thereto prepared by Dane County Department of Public Works, Highway & Transportation hereby agrees to provide all labor, materials, equipment and services necessary for the complete and satisfactory execution of the entire Work, as specified in the Construction Documents, for the Base Bid stipulated sum of:

_____ and _____ /100 Dollars
Written Price

$ _____
Numeric Price

LUMP SUM ALLOWANCE
Provide a lump sum allowance to be included in the Base Bid of twenty thousand dollars ($20,000.00). This allowance will be used for plantings including installation, maintenance and design in coordination with the Owner, design team and City of Madison staff. Owner will provide the awarded general contractor with landscape contractor qualification requirements and project requirements.

Twenty Thousand - and 00 /100 Dollars
Written Price

$20,000.00
Numeric Price

ALTERNATE BID 1 - LUMP SUM:
Add price for providing AC split system. Provide all equipment, piping, and installation associated with ductless split heat pump system. Refer to specifications and drawings.

_____ and _____ /100 Dollars
Written Price

$_____
Numeric Price (circle: Add or Deduct)

UNIT PRICING: REMOVAL OF SOIL -
Add pricing for the removal of unsuitable soil and engineered fill material where soil testing agency has determined existing conditions are insufficient for the purposes of the project.

Unsuitable Soil Removal & Replacement with Engineered Fill: @$_____/cubic yard

UNIT PRICING: PROVIDE GEOTEXTILE MAT
Add pricing for providing non-woven geotextile material as specified by soil testing agency in the attached Geotechnical Report.

Geotextile Mat for Subgrade Stabilization: @$_____/square yard

The undersigned agrees to add the alternate(s) portion of the Work as described, for the following addition(s) to or subtraction(s) from the Base Bid, as stipulated below.

Receipt of the following addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No(s). _____ through _____

Dated _____

Dane County Henry Vilas Zoo must have this project completed by May 15, 2017. Assuming this Work can be started by January 24, 2017, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(final, not substantial)

I hereby certify that all statements herein are made on behalf of:

_____
(Name of Corporation, Partnership or Person submitting Bid)

Select one of the following:
1. A corporation organized and existing under the laws of the State of _____, or

2. A partnership consisting of _____, or

3. A person conducting business as _____;

Of the City, Village, or Town of _____ of the State of _____.

I have examined and carefully prepared this Bid from the associated Construction Documents and have checked the same in detail before submitting this Bid; that I have full authority to make such statements and submit this Bid in (its) (their) (my) behalf; and that the said statements are true and correct. In signing this Bid, we also certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a Bid; that this Bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; that this Bid has not been knowingly disclosed prior to the Bids Due Date to another bidder or competitor; that the above statement is accurate under penalty of perjury.

The undersigned further agrees to honor the Base Bid and the Alternate Bid(s) for sixty (60) calendar days from date of Award of Contract.

SIGNATURE: _____
(Bid is invalid without signature)

Print Name: _____ Date: _____

Title: _____

Address: _____

Telephone No.: _____ Fax No.: _____

Email Address: _____

Contact Person: _____

THIS PAGE IS FOR BIDDERS' REFERENCE AND NEED NOT BE SUBMITTED WITH BID FORM.

BID CHECK LIST:
These items **must** be included with Bid:
☐ Bid Form ☐ Bid Bond ☐ Fair Labor Practices Certification
☐ Project Experience / Reference Summary

BIDDERS SHOULD BE AWARE OF THE FOLLOWING:

DANE COUNTY VENDOR REGISTRATION PROGRAM

Any person bidding on any County contract must be registered with the Dane County Purchasing Division & pay an annual registration fee. A contract will not be awarded to an unregistered vendor. Obtain a *Vendor Registration Form* by calling 608/266-4131 or complete a new form or renewal online at:
www.danepurchasing.com/registration

DANE COUNTY BEST VALUE CONTRACTING PRE-QUALIFICATION

Contractors must be pre-qualified as a Best Value Contractor with the Dane County Public Works Engineering Division before the award of contract. Obtain a *Best Value Contracting Application* by calling 608/266-4018 or complete one online at:
www.countyofdane.com/pwht/BVC_Application.aspx

EQUAL BENEFITS REQUIREMENT

By submitting a Bid, the contractor acknowledges that a condition of this contract is to provide equal benefits as required by Dane County Code of Ordinances Chapter 25.016. Contractor shall provide equal benefits as required by that Ordinance to all required employees during the term of the contract. Equal Benefits Compliance Payment Certification shall be submitted with final pay request. For more information:
www.danepurchasing.com/partner_benefit.aspx

CGC, Inc.

Construction • Geotechnical
Consulting Engineering/Testing

January 4, 2017
C16588

Mr. Eric Urtes
Dane County Public Works
1919 Alliant Energy Center Way
Madison, WI 53713

Re: Geotechnical Exploration Report
Proposed Restroom Building Reconstruction
Henry Vilas Zoo
City of Madison, Dane County, Wisconsin

Dear Mr. Urtes:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the geotechnical exploration program for the proposed restroom building reconstruction at Henry Vilas Zoo. The purpose of this exploration program was to evaluate the subsurface conditions within the proposed building area and to provide geotechnical recommendations regarding foundation and floor slab design/construction. We are sending you an electronic paper copy of this report and can provide a paper copy upon request.

PROJECT & SITE DESCRIPTION

We understand the existing restroom building at Henry Vilas Zoo will be partially demolished (excluding foundations), and some new foundations and superstructure will be constructed. Currently there are two buildings, with a 20-ft wide open-air section connected at the roof level. New strip footings will be poured to connect the two buildings, with five new interior column pads, as well as some perimeter footings planned. The building will primarily be a masonry and steel structure. Based on provided project plans, finish floor elevation will be established at EL 853.35 ft, and bottom of footing grade is expected to be about 1.5 to 5 ft below slab grade. Although not provided, foundation and slab grades are expected to be fairly light. Based on the provided drawings, the existing foundations were proportioned using an allowable bearing pressure of 2,500 psf, with the allowable bearing pressure contingent upon the removal of unsuitable soft and organic soils below the foundations, as well as below floor slab.

SITE CONDITIONS

The existing building is located in the south-central part of Henry Vilas Zoo. Lightly-wooded land and asphalt paved area generally exists south of the building, with asphalt pavement on the other sides. A small pond (connected to Lake Wingra) exists south and west of the building. Site grades generally slope down gently from the northeast to the southwest.

2921 Perry Street, Madison WI 53713
Telephone: 608/288-4100
FAX: 608/288-7887

SUBSURFACE CONDITIONS

Subsurface conditions on site were explored by drilling a total of two Standard Penetration Test (SPT) soil borings to planned depths of 20 ft below existing site grades. The borings were located in the field by CGC after a site meeting with Dane County. The borings were drilled on December 29, 2016 by Soil Essentials (under subcontract to CGC) using an ATV-mounted drill rig equipped with hollow-stem augers and an automatic SPT hammer. Specific details on the drilling and sampling procedures are included in Appendix A. The boring locations are shown in plan on the Soil Boring Location Exhibit attached in Appendix B. The ground surface elevations at the boring locations were estimated by CGC using a provided topographic map, and the elevations should therefore be considered approximate (+/- 1 ft).

The subsurface profile at the boring locations varied to some degree, but a generalized profile includes the following strata, in descending order:

- 4.75 to 5.5 in. of ***asphalt pavement*** over 8.5 to 9 in. of ***base course***, over
- About 1.5 ft of ***fill*** in Boring 1 consisting of medium dense silty sand, followed by
- About 1.5 to 3 ft of very soft ***organic clayey silty*** (marl), underlain by
- 0.5 to 1 ft of very loose ***sedimentary peat***, followed by
- Medium dense to dense ***sand*** with significant silt content, minor gravel content, as well as occasional silt seams to the maximum depth explored.

The soil conditions in two previous borings drilled in the north and south portions of the existing building were fairly similar to the recently-drilled borings, and the soil profiles generally consisted of lower quality fill and organic silt to about 6 ft below grade over loose to dense sand with scattered silt seams, with weathered sandstone bedrock encountered in the southern boring (B-1).

Moisture contents were measured on four samples of the shallow organic soils, and the moisture contents ranged from 78.3 to 174.1%. The organic content (as measured by loss-on-ignition) was also measured to be 6.0% and 33.5%, respectively, where soils with organic contents of more than 4% are considered to be organic, and soils with organic contents of more than 12% are considered to be sedimentary peat.

Groundwater was encountered in the borings at 2.9 to 6.2 ft below existing grade during or shortly after drilling. Groundwater was encountered in the previous borings about 6 ft below existing grade. Groundwater levels can be expected to fluctuate with seasonal variations in precipitation, infiltration, evapotranspiration, the level of nearby Lake Wingra and other factors. A more detailed description of the site soil and groundwater conditions is presented on the Soil Boring Logs attached in Appendix B.

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations discussed below and based on the subsurface exploration, it is our opinion that the site is generally suitable for the proposed construction and conventional spread footing foundations can be used to supplement the existing foundations, where required, for the new restroom building. *However, undercutting of unsuitable soils (fill, organic silty clay and peat) below footings and floor slab will likely be required.* Our recommendations for foundation and floor slab design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

1. Foundation Design

In our opinion, new foundations for the proposed building can consist of conventional spread footings bearing on suitable natural soils or engineered granular backfill where undercutting of unsuitable soil is required. Around the perimeter of the building, undercutting of unsuitable soil is expected to extend about 4 to 6 ft below existing grade. If undercutting of unsuitable soils occurred within the entire building footprint during initial construction, undercutting may not be required, but supplemental hand auger borings or test holes should be excavated below footing grade to check for the presence of unsuitable soil. Existing abandoned utilities or obsolete structure elements should also be undercut below new foundations in order to create a fairly uniform bearing surface. Assuming that footings will bear on suitable natural soils or engineered granular backfill where undercutting of unsuitable soil occurs, the following parameters should be used for foundation design:

- Maximum net allowable bearing pressure: 2,500 psf
- Minimum foundation widths:
  - -- Continuous wall footings: 18 in.
  - -- Column pad footings: 30 in.
- Minimum footing depths:
  - -- Exterior/perimeter footings: 4 ft
  - -- Interior footings: no minimum requirement

The subgrade soils should be carefully checked for footing support suitability during footing excavation. Undercutting below footing grade will be required where unsuitable existing fill or organic soils soils, loose natural sands or native clays with pocket penetrometer readings (an estimate of the unconfined compressive strength of cohesive soils) of less than 1.25 tsf are encountered at or slightly below footing grade. Where undercutting is required, the base of the undercut excavation should be widened beyond the footing edges at least 0.5 ft in each direction for each foot of undercut depth for stress distribution purposes. Since the bottom of the undercut will likely extend near or slightly below the water table, a minimum 6-in. thick layer of clear stone should be placed and compacted at the bottom of the excavation

to stabilize the soils. If the the clear stone layer exceeds 12 in., the stone should be enveloped in non-woven geotextile fabric (e.g., Mirafi 160N or equivalent). If the bottom of the excavation is dry or above the 6-in. clear stone layer (if dry), granular backfill compacted to at least 95% compaction (ASTM D1557) or well-compacted 3-in. dense graded base can be used to re-establish footing grade.

If footing or undercut excavations will extend below the groundwater table, measures should be taken to control and lower the groundwater at least 2 ft below the bottom of footing or undercut excavation grade in advance of final excavation to reduce the risk of subgrade disturbance. For groundwater draw downs of less than about 1 to 2 ft, groundwater can likely be controlled using submersible pumps in filtered sump pits outside the footing line. If groundwater draw downs exceed about 1 to 2 ft, wells points or deep wells are typically required to control groundwater. Dewatering means and methods are the responsibility of the contractor.

CGC should be present during footing excavations to check whether the subgrades are satisfactory for the design bearing pressure and to advise on corrective measures, where necessary. We recommend using a smooth-edged backhoe bucket for footing excavations. Additionally, granular soils exposed at footing grade (well above groundwater) should be thoroughly recompacted with a large vibratory plate compactor prior to formwork/concrete placement to densify soils loosened during the excavation process. Soils potentially susceptible to disturbance from compaction (e.g., silty or clayey soils or soils with elevated water content) should be hand trimmed, and soils at or below the water table should be stabilized with compacted clear stone, as discussed above. Provided the foundation design/construction recommendations discussed above are followed, we estimate that total and differential settlements should be on the order of 1.0 and 0.5 in., respectively.

2. Floor Slab

To reduce the risk of floor slab settlement and cracking, we recommend that the existing fill and organic soils (organic clayey silt and peat) be undercut below new slabs (including new stoops). Note that much of the unsuitable existing soil will be removed when undercutting below new footings, and undercut depths are similarly expected to be on the order of 4 to 6 ft below existing grade. As discussed in the Foundation Design Section of this report, appropriate dewatering and subgrade stabilization techniques should be used to reduce the potential for subgrade disturbance. Fill/backfill below floor slab areas should be compacted to at least 95% compaction based on modified Proctor methods (ASTM D 1557).

Assuming the existing fill and organic soils are undercut below new slab areas, we anticipate that the floor slab subgrade outside the existing building will consist of newly-placed engineered granular fill. Assuming that the unsuitable soils were undercut/removed during original construction, compacted granular fill will also likely be present within the existing building footprint, but this assumption should be checked in the field. We recommend that a couple shallow hand auger borings, test pits or observation of new footings inside the existing building be completed to check for the presence of unsuitable soils that would require undercutting/replacement below slabs.

Prior to slab construction, the subgrades should be thoroughly proof-rolled/recompacted to densify soils that may become disturbed or loosened during construction activities. Areas that remain loose after recompaction should be undercut and replaced with compacted 3-in. dense graded base or granular fill.

The design subgrade modulus is based on a recompacted subgrade such that non-yielding conditions are developed. The final 4 to 6 in. of soil placed below the slab should consist of well-graded sand/gravel with no more than 5 percent by weight passing a No. 200 U.S. standard sieve to act as a capillary break. (Note that some structural engineers require a 4 to 6 in. layer of ¾ in. or 1-¼ in. dense graded base below the slab to increase the subgrade modulus immediately below the slab.) Fill and base layer material below the floor slab should be placed and compacted to 95% compaction based on modified Proctor methods (ASTM D 1557). A subgrade modulus of 100 pci may be used for slab design if the slab is supported on well-graded sand/gravel over a firm subgrade. If 6 in. of dense graded base is included below the slab, the subgrade modulus can be increased to 150 pci. To further minimize the potential for moisture migration, a plastic vapor barrier can also be utilized below the slab. The slab should be structurally separate from the foundations and have construction joints and reinforcement for crack control.

3. Seismic Design Category

In our opinion, the average soil/rock properties in the upper 100 ft of the site (based on SPT blow counts (N-values) of more than 15 blows/ft, on average, in the granular soils underlying the site) may be characterized as a stiff soil profile. This characterization would place the site in Site Class D for seismic design according to the International Building Code (see Table 1613.5.2).

CONSTRUCTION CONSIDERATIONS

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil related difficulties that could be encountered on the site are discussed below:

- Due to the potentially sensitive nature of the on-site soils, we recommend that final site grading activities be completed during dry weather, if possible. Construction traffic should be avoided on prepared subgrades to minimize potential disturbance.

- Earthwork construction during the early spring or late fall could be complicated as a result of wet weather and freezing temperatures. During cold weather, exposed subgrades should be protected from freezing before and after footing construction. Fill should never be placed while frozen or on frozen ground.

- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards.

- When excavating next to existing footings caution should be exercised to prevent undermining of the existing foundations. If footings will be undermined, underpinning or other methods of support should be provided to properly support the footing to reduce the risk of unacceptable settlement.

- Based on observations made during the field exploration, groundwater may be encountered in building excavations at this site, and dewatering was previously discussed. Additional water accumulating at the base of excavations as a result of precipitation or seepage should be controlled and quickly removed using pumps operating from filtered sump pits.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the foundation and floor slab subgrades will be largely determined by the level of care exercised during site development. To check that earthwork and foundation construction proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

- Foundation excavation/subgrade preparation;
- Fill/backfill placement and compaction; and
- Concrete placement.

* * * * *

CGC, Inc.

It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,

CGC, Inc.

David A. Staab, P.E., LEED AP
Consulting Professional

Michael N. Schultz, P.E.
Principal/Consulting Professional

Encl: Appendix A - Field Exploration
Appendix B - Soil Boring Location Exhibit
Logs of Test Borings (2)
Log of Test Boring-General Notes
Unified Soil Classification System
Appendix C - Document Qualifications
Appendix D - Recommended Compacted Fill Specifications

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

A total of two Standard Penetration Test (SPT) soil borings were drilled to planned depths of 20 ft below existing site grades. The borings were located in the field by CGC after a site meeting with Dane County. The borings were drilled on December 29, 2016 by Soil Essentials (under subcontract to CGC) using an ATV-mounted drill rig equipped with hollow-stem augers and an automatic SPT hammer. The boring locations are shown in plan on the Soil Boring Location Exhibit attached in Appendix B. The ground surface elevations at the boring locations were estimated by CGC using a provided topographic map, and the elevations should therefore be considered approximate (+/- 1 ft).

In each boring, soil samples were obtained at 2.5 foot intervals to a depth of 10 ft and at 5 ft intervals thereafter. The soil samples were obtained in general accordance with specifications for standard penetration testing, ASTM D 1586. The specific procedures used for drilling and sampling are described below.

1. Boring Procedures between Samples

   The boring is extended downward, between samples, by a hollow-stem auger.

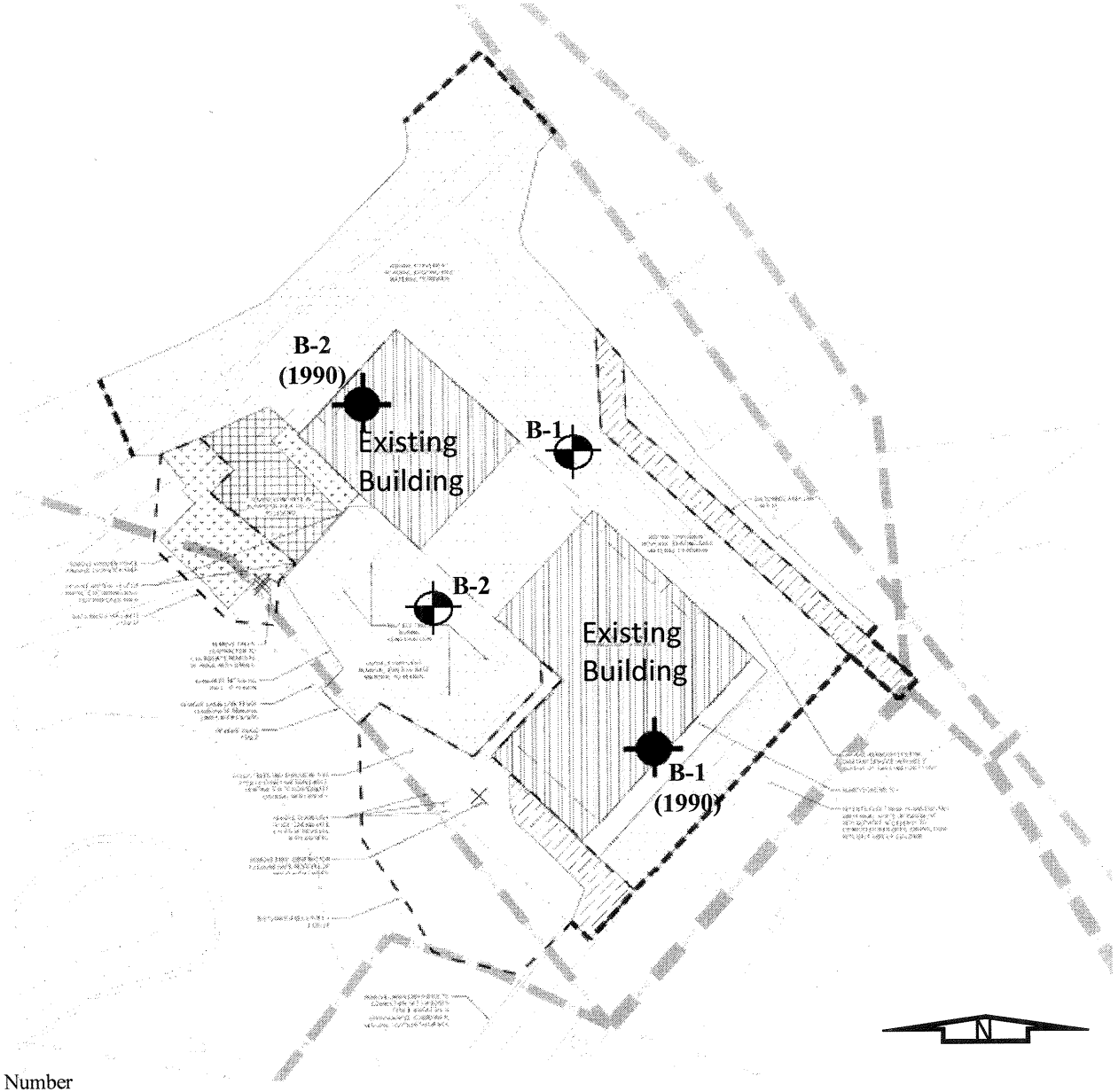
2. Standard Penetration Test and Split-Barrel Sampling of Soils
   (ASTM Designation: D 1586)

   This method consists of driving a 2-inch outside diameter split-barrel sampler using a 140-pound weight falling freely through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven 12 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the log of borings and is known as the Standard Penetration Resistance.

During the field exploration, the driller visually classified the soil and prepared a field log. *Field screening of the soil samples for possible environmental contaminants was not conducted by the drillers as environmental site assessment activities were not part of CGC's work scope.* Water level observations were made in each boring during and after drilling and are shown at the bottom of each boring log. Upon completion of drilling, the borings were backfilled with bentonite (where required) to satisfy WDNR regulations and the soil samples were delivered to our laboratory for visual classification and laboratory testing. The soil samples were visually classified by a geotechnical engineer using the Unified Soil Classification System. The final logs prepared by the engineer and a description of the Unified Soil Classification System are presented in Appendix B.

APPENDIX B

SOIL BORING LOCATION EXHIBIT
LOGS OF TEST BORINGS (2)
LOG OF TEST BORING – GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM



Scale: Reduced

Legend

Denotes Recent Boring Location and Number

Denotes Previous Boring Location and Number

Notes

1. Borings drilled by Soil Essentials on December 29, 2016.
2. Base map provided by Dane County.
3. Boring locations are approximate.

Job No. C16588	CGC, Inc.	**SOIL BORING LOCATION EXHIBIT** **Proposed Restroom Reconstruction** **Henry Vilas Zoo** **Madison, WI**
Date: 01/2017		

LOG OF TEST BORING

CGC Inc.

Project: Henry Vilas Zoo
Restroom Building Reconstruction
Location: Madison, WI

Boring No. B1
Surface Elevation (ft) 852±
Job No. C16588
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						5.5 in. Asphalt/9 in. Base Course					
1		18	M	12		FILL: Medium Dense, Dark Brown Silty Sand, Little Clay and Gravel					
						Very Soft, Gray Organic Clayey SILT, Little Sand, with Shells (OL-Marl)		78.7			7.4
2		5	M	2/18"		Very Loose, Dark Brown Sedimentary PEAT (PT)	(0.25)	174.1			33.5
					5	Medium Dense to Dense, Brown to Tan Fine to Medium SAND, Some Silt, Trace Gravel, with Occasional Silt Seams (SM)					
3		16	W	14							
4		14	W	27							
					10						
5		16	W	34							
					15						
6		18	W	36							
					20	End of Boring at 20 ft Borehole backfilled with bentonite chips Note: Frost to 1.5 ft					
					25						

WATER LEVEL OBSERVATIONS

While Drilling ▽ 6.0'
Upon Completion of Drilling
Time After Drilling 15 min.
Depth to Water 6.2 ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 12/29/16 End 12/29/16
Driller SE Chief DAP Rig Geoprobe 7822DT
Logger DAP Editor AJB
Drill Method 2.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project: Henry Vilas Zoo
Restroom Building Reconstruction
Location: Madison, WI

Boring No. B2
Surface Elevation (ft) 851.5±
Job No. C16588
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						4.75 in. Asphalt/8.5" Base Course					
1		18	M	1/12"		Very Soft, Gray Organic Clayey SILT, Little Sand, with Shells (OL-Marl)		78.3			6
2		12	M	16		Very Loose, Dark Brown to Black Sedimentary PEAT (PT)		155.6			26.2
					5						
3		10	W	14		Medium Dense to Dense, Brown to Tan Fine to Medium SAND, Some Silt, Trace Gravel, with Occasional Silt Seams (SM)					
4		17	W	26							
					10						
5		18	W	30							
					15						
6		18	W	34							
					20	End of Boring at 20 ft Borehole backfilled with bentonite chips Note: Frost to 1.5 ft					
					25						

WATER LEVEL OBSERVATIONS

While Drilling ▽ 6.0'
Upon Completion of Drilling
Time After Drilling 15 min.
Depth to Water 2.9 ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 12/29/16 End 12/29/16
Driller SE Chief DAP Rig Geoprobe 7822DT
Logger DAP Editor AJB
Drill Method 2.25" HSA; Autohammer

CGC, Inc.

LOG OF TEST BORING

General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	¾" to 3"	¾" to 3"
Fine	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 to mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term	"N" Value
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

Consistency

Term	q_u-tons/sq. ft
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4 – 12%
Sedimentary Peat	12% - 50%
Fibrous and Woody Peat	More than 50%

Plasticity

Term	Plastic Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

CS – Continuous Sampling
RC – Rock Coring: Size AW, BW, NW, 2"W
RQD – Rock Quality Designation
RB – Rock Bit/Roller Bit
FT – Fish Tail
DC – Drove Casing
C – Casing: Size 2 ½", NW, 4", HW
CW – Clear Water
DM – Drilling Mud
HSA – Hollow Stem Auger
FA – Flight Auger
HA – Hand Auger
COA – Clean-Out Auger
SS - 2" Dia. Split-Barrel Sample
2ST – 2" Dia. Thin-Walled Tube Sample
3ST – 3" Dia. Thin-Walled Tube Sample
PT – 3" Dia. Piston Tube Sample
AS – Auger Sample
WS – Wash Sample
PTS – Peat Sample
PS – Pitcher Sample
NR – No Recovery
S – Sounding
PMT – Borehole Pressuremeter Test
VS – Vane Shear Test
WPT – Water Pressure Test

Laboratory Tests

q_a – Penetrometer Reading, tons/sq ft
q_a – Unconfined Strength, tons/sq ft
W – Moisture Content, %
LL – Liquid Limit, %
PL – Plastic Limit, %
SL – Shrinkage Limit, %
LI – Loss on Ignition
D – Dry Unit Weight, lbs/cu ft
pH – Measure of Soil Alkalinity or Acidity
FS – Free Swell, %

Water Level Measurement

▽ - Water Level at Time Shown
NW – No Water Encountered
WD – While Drilling
BCR – Before Casing Removal
ACR – After Casing Removal
CW – Cave and Wet
CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

Unified Soil Classification System

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

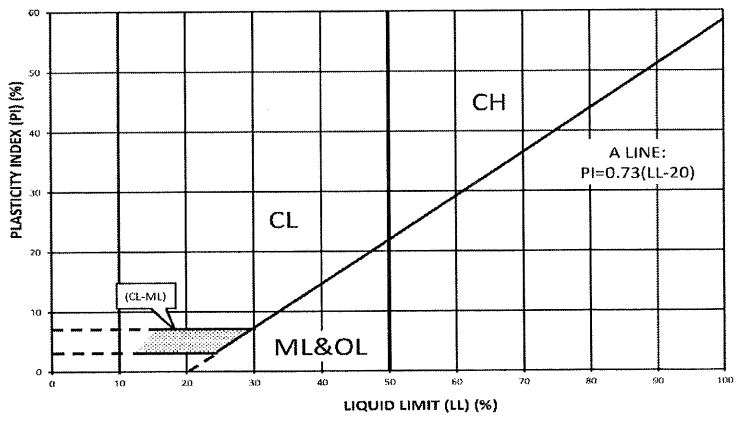
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limts below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limts above "A" line or P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



APPENDIX C

DOCUMENT QUALIFICATIONS

APPENDIX C
DOCUMENT QUALIFICATIONS

I. GENERAL RECOMMENDATIONS/LIMITATIONS

CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

II. IMPORTANT INFORMATION ABOUT YOUR 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.

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

READ THE FULL REPORT

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

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

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

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

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

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

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

SUBSURFACE CONDITIONS CAN CHANGE

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

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINION

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

effective method of managing the risks associated with unanticipated conditions.

A REPORT'S RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the confirmation-dependent recommendations included in your report. *Those confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's confirmation-dependent recommendations if we do not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

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

DO NOT REDRAW THE ENGINEER'S LOGS

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

GIVE CONSTRUCTORS A COMPLETE REPORT AND GUIDANCE

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

READ RESPONSIBILITY PROVISIONS CLOSELY

Some clients, design professionals, and constructors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's 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.

ENVIRONMENTAL CONCERNS ARE NOT COVERED

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

OBTAIN PROFESSIONAL ASSISTANCE TO DEAL WITH MOLD

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Membership in the Geotechnical Business Council (GBC) of Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of GBC, for more information.

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Geotechnical Business Council
of the Geoprofessional Business Association
8811 Colesville Road, Suite G 106
Silver Spring, MD 20910

APPENDIX D

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX D

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

Table 1
Gradation of Special Fill Materials

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55			
No. 40			5-20	8-28	10-35	75 (2)		
No. 100						15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:

1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction.*
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

Table 2
Compaction Guidelines

Area	Percent Compaction (1)	
	Clay/Silt	Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

Notes:

1. Based on Modified Proctor Dry Density (ASTM D 1557)