REBID – UNIVERSITY OF IDAHO MENARD LAW BUILDING, REPAIR & RENOVATION OF EAST ENTRY STEPS & PLANTERS

711 Rayburn Street
Moscow, ID 83844

DPW PROJECT NO. 19255

This addendum is part of the Contract Documents and is used to modify or interpret previously issued Bid Documents dated March 8, 2019. Acknowledge receipt of the Addendum in the space provided on the Bid Proposal. Failure to do so may subject Bidder to disqualification.

This Addendum consists of 38 pages, including attached documents identified with the Addendum number and date. Replace previously issued documents of the like number with those revised and reissued by this Addendum. Insert added documents and remove deleted documents as applicable.

ADDENDUM NO. 1
February 21, 2020

GENERAL INFORMATION

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<tr>
<td>1</td>
<td>Pre-Bid Meeting Minutes and attendance roster</td>
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<td>2</td>
<td>Clarification: The project includes four (4) Add Alternates associated with the REBID Construction Documents. Refer to the Alternate descriptions on the Cover Sheet, notes on Sheet L-100 Site Plan, and Specification Section 01 2300.</td>
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<td>See attached geotechnical report</td>
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<td>Brent Beaudoin, the local architect, offered to walk the site with any contractors unable to attend the Pre-Bid conference. Coordinate a meeting time by calling Brent at: 208-746-0183.</td>
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<td>DPW will pay for the first special inspection (ie; concrete). But if the inspection fails, the contractor will be responsible for subsequent testing.</td>
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<td>Contractors shall complete the Plumbing and Electrical portions of the Bid Proposal form. Contractors may name themselves if they hold plumbing and electrical licenses.</td>
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IN THE PROJECT MANUAL

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<td>CHANGE: There shall be no noise July 6 through 10, and no construction activities occurring July 28 through 29, 2020.</td>
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## IN THE DRAWINGS

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<td>LA-01 Adjust plant quantities.</td>
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END OF ADDENDUM NO. 1
REBID | Meeting Minutes to Pre-Bid Conference held – February 20, 2020

Project: DPW Project No. 19255
University of Idaho Menard Law Building,
Repair & Renovation of East Entry Steps & Planters

For the STATE OF DIVISION OF PUBLIC WORKS at the University of Idaho
Moscow, Idaho

Attendance:
• Sign in sheet

Project Team Introductions:
Design Professionals:

Anne M. Hanenburg, Principal in-charge
SPVV Landscape Architects
509-325-0511
anne@spvv.com

Ryan Berg, Senior Project Manager
DCI Engineers
509-227-6914
rberg@dci-engineers.com

Brent Beaudoin, Architect – Construction Administration
Castellaw Kom Architects
208-746-0183
bbeaudoin@ckarchitects.com

University of Idaho Project Manager:
Stephanie Clarkson, Project Architect
University of Idaho, Architectural and Engineering Services
O: 208-885-6246
sclarkson@uidaho.edu

University of Idaho Construction Inspector
Matthew Proctor, Construction Inspector
University of Idaho, Architectural and Engineering Services
O: 208-885-1057
C: 208-596—3035
mrproctor@uidaho.edu

University of Idaho Menard Law Building
Repair & Renovation of East Entry Steps & Planters
University of Idaho, Moscow
Description of the Project: Specification Section 01 100 Summary of Work
Work includes: Removal of existing concrete stairs, landing, and portion of planters on the east side of the Menard Law Building. New work includes installation of a new concrete plaza, walkway, concrete stairs, handrails, guardrail, planters and pilasters with masonry veneer/accent and pre-cast caps. The work includes repointing deteriorated mortar joints, replacing deteriorated and missing mortar, repair and replacement of existing masonry. The work includes new landscaping, irrigation, and replacement of two pedestrian light poles. Base Bid hardscape surfaces total approximately 3,800 sf. Landscape areas, including lawn repair total approximately 7,200 sf.

Bid Opening | Bid Proposal
Bid Opening is Thursday, March 5, 2020 at 2:00PM local time, at State of Idaho DPW Field Office, 875 Perimeter Drive, MS-2281, Moscow, Idaho 83844. Bring bids to the DPW Field Office prior to 2:00PM where they will be time stamped by the attendant. DO NOT TURN BIDS IN AT THE UI AES FRONT DESK.

This project requires a State of Idaho Public Works contractor’s license prior to submitting the bid. A 5% Bid Bond is required to be submitted with each Bid (Bid Bond of 5% to include base bid and alternates).

Bidders shall take care to fill out the Bid Proposal correctly using verified business names and license numbers. Complete ALL items on the Bid Proposal (do NOT leave any spaces blank or bids will be deemed ‘non-responsive’).

Make sure to list all Alternates and acknowledge the number of Addenda received. Do not use whiteout to modify the bid form. Any changes to the bid form must be crossed out and initialed.

Make sure to include all required paperwork with the bid:
- Bid Proposal Form and Seal (page 3 of Bid Proposal form)
- Contractor’s Affidavit Concerning Alcohol and Drug-Free Workplace
- Bidders Acknowledgement Statement
- Bid Bond

Each Bid submitted must be good for 45 calendar days after the Bid Opening.

100% Performance and Labor and Materials Payment Bonds are required for this project.

There is no federal funding on this project and there are no prevailing wage requirements.

Construction Contract / Duration:
The Construction Contract time period will be 120 calendar days from issuance of the Notice To Proceed, with substantial completion of all concrete work, handrails/guardrails, lighting, masonry repair, and landscaping.
If bids are favorable, the Owner intends to issue the N.T.P sometime around May 15, 2020.

Contract to be standard DPW contracts with DPW standard modifications as outlined in the Specifications.

Liquidated Damages will be assessed at $\_500.00\_\_ per day for not completing work within the 120-day contract period as outlined in the Bidding and Contract Requirements.

The estimated construction cost is $430,000.00 as published in the Advertisement for Bid.

**Bid Addenda:**
Addendum No. 1 will be issued Friday, February 21, 2020 and will include the meeting minutes and attendance sheet from the Pre-Bid Conference.

**Permits and Inspections:**
The Contractor is responsible for and shall secure and pay for all permits required by the State of Idaho Division of Building Safety (DBS), including plumbing and electrical as required. The Owner has paid for associated plan review fees for this project.

The Owner will hire a qualified special testing agency for all required construction testing on the project (Soils, concrete, etc.)

**Base Bid & Alternates:**
Base Bid includes: Removal of existing concrete stairs, landing, and portion of planters on the east side of the Menard Law Building. New work includes installation of a new concrete plaza, walkway, concrete stairs, handrails, guardrail, planters and pilasters with masonry veneer/accent and pre-cast caps. The work includes repointing deteriorated mortar joints, replacing deteriorated and missing mortar, repair and replacement of existing masonry. The work includes new landscaping, irrigation, and replacement of two pedestrian light poles. Base Bid hardscape surfaces total approximately 3,800 sf. Landscape areas, including lawn repair total approximately 7,200 sf.

There are (4) Add Alternate for this project (make sure to fill out Alternate on the bid proposal):
- Alternate No. 1 Includes: Concrete ADA ramp and Raised Planter. Work includes: Demolition of existing shrubs and landscape in location of proposed ADA ramp (take care to protect and preserve existing oak tree). Install concrete ADA ramp, guardrail, handrails, raised planter and concrete cap, foundation drainage, sewer cleanout, topsoil, plantings, mulch, and irrigation.
- Alternate No. 2 Includes: 6’W x 50’L concrete sidewalk. Work includes: Demolition of existing lawn in location of proposed sidewalk. Install concrete sidewalk per plans, details, and specifications.
- Alternate No. 3 Includes: Concrete Paver Accent in Plaza Hardscape. Work includes installation of concrete paver accent band per plans and details.
- Alternate No. 4 Includes: (4) four Benches supplied and installed. Work includes procurement and installation of (4) four surface mount benches in new plaza per the plans and specifications.

**Project Schedule:**
- The project will Bid on March 5, 2020
- Contractor can anticipate a Notice of Intent to Award within 1-2 weeks of bids.
- Owner / Contractor Agreements are typically finalized in about 3-4 weeks.
- A Notice to Proceed will be issued once Owner / Contractor Agreements are finalized which will indicate the actual NTP start date. The project construction period is 120 consecutive calendar days from the NTP start date.
- Contracts should be signed and sent back to DPW as quickly as possible.
- Submittals and shop drawing review and approval process to commence as soon as possible, being no later than the issuance of the NTP to the contractor in order to begin procuring long lead items.
- Work hours are from 7AM to 5PM, Monday through Friday, unless coordinated otherwise with the Agency (UI).
- Summer exams are July 6-10 (no noise)
- **NO onsite construction activities shall occur July 28 through July 29, 2020 during the Bar Exam**
- Faculty / staff return August 14, 2020.
- Fall Classes begin Monday, August 24, 2020.

**Construction Laydown and Staging Area:**
The construction site and the adjacent staging/storage area must be enclosed by a chain link fence.

Additional Contractor Requirements:
- **Occupied Building:**
  - Building will remain occupied during construction.
  - Coordinate alternate pedestrian routes on building exterior and interior with Owner (UI) – UI will provide the signage.
    - Notify Owner not less than 72 hours in advance of activities that will affect Owner’s operations.
  - Use of Owner’s web-based construction management software:
    - DPW has their own web-based construction management software “Projectmates”.
    - Contractor will be required to use software for management of items including, but not limited to, pay applications, RFI’s, submittals, etc.
    - Brent Beaudoin, CKA will assist the contractor with Projectmates if needed.

**Parking:**
Parking availability is at a premium, and parking enforcement is a critical issue on campus. Violators, including contractors, will be ticketed. Unpaid tickets will be charged to the Contractor.

UI AES (Matt Proctor) will assist the contractor in obtaining a parking permit.

**Questions and/or Discussion:**
- Preservation of existing Oak tree is critical. Coordinate with David Rauk, UI Horticulturalist prior to construction activities commencing. And again, prior to excavation of nearby footings and concrete edging installation. Contractor should reference Specification 01 5639 Temporary Tree Protection.

- Contractor shall conduct an onsite pre-installation conference with UI LES staff two weeks prior to the start of construction. Contractor shall coordinate marking/locating all existing irrigation lines, valve boxes, heads, etc. with UI Landscape Exterior Services (LES) staff prior to start of construction.

- Read plans carefully for demolition of existing items. Coordinate with all drawings for demolition work required, taking careful measures during demolition to salvage existing masonry for reuse on pilasters and east planter.

The contractor's use of the site shall be coordinated with the Agency (UI) / Architect during the course of the project.
- Any shut downs will need to be carefully coordinated with the contractor and Agency (UI) with a minimum 2 weeks’ notice.
- The importance of maintaining a safe, secure and clean work area is emphasized. Clean up and securing of the site is to be maintained and is the contractor’s responsibility on a daily basis. Careful communication and coordination with the Agency (UI) will be required.
Contractor shall coordinate access to the site and staging areas with the Agency representative(s) and Architect at the time of the pre-construction conference. There is a possibility of using on-street parking adjacent to the site – coordinate with UI.

- Site access will be restricted to areas indicated by the Agency (UI) and Architect.
- Contractor will be responsible for keeping work area secure at all times (chain-link fence and/or locked storage container).

The General Contractor is to provide a superintendent who remain on site at all times when work is occurring. The intended superintendent representing the G.C. for the project is required to be at the pre-construction conference.

PLEASE NOTE: Full size drawings are 30"x42" architectural sheets.

Post Meeting Site Walk-through: UI Menard Law Building, 711 Rayburn Street, Moscow, Idaho.
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<tr>
<th>Name</th>
<th>Company</th>
<th>E-Mail Address</th>
<th>Telephone Number</th>
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<tr>
<td>Anne Haenel&lt;br&gt;SPV Landscape&lt;br&gt;312-325-0511</td>
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<td>Mark Schillker&lt;br&gt;Niks&lt;br&gt;208-685-1231</td>
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<td>Chris Whitney&lt;br&gt;Curriculum Summit Group&lt;br&gt;206-685-3893</td>
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NOTES:

1. REFER TO SHEET L-130 FOR PLANT SCHEDULE AND NOTES.
2. ADJUST PLANT QUANTITIES AS INDICATED ON PLAN.
January 18, 2019
File: MO18196

Ms. Elaine M. Hill, Architect
Project Manager
Division of Public Works
502 N. 4th Street
PO Box 83720
Boise, Idaho 83720

RE: Geotechnical Engineering Evaluation
Menard Law Repair/Renovate – 18-256
University of Idaho
711 Rayburn Street
Moscow, Idaho

Greetings, Elaine.

GeoProfessional Innovation Corporation (GPI) has performed the authorized geotechnical engineering evaluation for the proposed improvements to the Menard Law Building on the University of Idaho (UI) campus in Moscow, Idaho. Our evaluation’s purpose was to explore the subsurface conditions within the proposed project area and provide geotechnical engineering recommendations to assist planning, design, and construction. The attached report summarizes our field and laboratory test results, engineering analyses, and presents our geotechnical opinions and recommendations. It is important to read and implement the report in its entirety. Report portions or attachments cannot be relied upon outside the context of the entire document.

GPI is retained to provide geotechnical continuity and material testing services for Idaho Division of Public Works (DPW) throughout construction for this project. Our opinion is project success will depend in part, on incorporating the recommendations in this report into construction.

We appreciate the opportunity to continue our professional relationship with the Idaho Division of Public Works on this University of Idaho project. Please contact us if you have any questions or comments.

Sincerely,
GPI

[Signature]
Andrew J. Abrams, P.E.
Senior Engineer

[Signature]
Travis J. Wambute, P.E.
Principal

TJW/ac
Geotechnical Engineering Evaluation
Menard Law Repair/Renovate – 18-256
University of Idaho
711 Rayburn Street
Moscow, Idaho

PREPARED FOR:
Ms. Elaine M. Hill, Architect
Project Manager
Division of Public Works
502 N. 4th Street
PO Box 83720
Boise, Idaho 83720

PREPARED BY:
GPI
A Professional Services Corporation
6 O’Donnell Rd
Pullman, Washington 99163
Telephone 509.339.2000
Facsimile 509.339.2001

January 18, 2019
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INTRODUCTION

The Idaho Division of Public Works (DPW) plans to renovate and repair the entryway to the existing Menard Law building located at 711 Rayburn Street on the University of Idaho (UI) Campus in Moscow, Idaho. Our purpose was to explore and evaluate subsurface conditions at the project site and develop geotechnical engineering opinions and recommendations to assist in project planning, design, and construction consideration. GPI performed the scope of services presented in our October 30, 2018. Below, we outline the services accomplished in providing our geotechnical engineering evaluation:

1. Coordinated exploration with the Idaho Dig Line and UI to help reduce the potential for damage to existing utilities.
2. Performed 3 Dynamic Cone Penetrometer (DCP) soundings in the approximate locations shown on Plate 1, Exploration Map.
3. Accomplished laboratory tests on select soil samples obtained from the site during our exploration, referencing ASTM International (ASTM) procedures.
4. Performed engineering analyses to provide geotechnical design and earthwork recommendations to aid project planning, design, and construction.
5. Prepared and provided this electronic report including our exploration results, geotechnical recommendations and associated schematics illustrating our recommendations.

PROJECT UNDERSTANDING

Existing Site Conditions

The existing entrance to the Menard Law building on UI campus comprises a concrete walkway, stairs, and concrete retaining walls with brick facing to support grade change and various landscape improvements. Existing site surfaces are relatively flat outside of existing retaining wall alignments. The existing entryway and the walls associated with it currently create about 12 feet of vertical grade change between the south (high side) and north (low side) of the entryway. The site is illustrated in Photograph 1.
Proposed Construction

Our project understanding is based on discussions with Ms. Anne Hanenburg with SPVV Landscape Architects (SPVV), and Ryan Berg P.E. with DCI Engineers, Inc. (DCI); as well as reviewing preliminary design plans provided by DCI dated December 14, 2018. We understand the proposed improvements will include demolishing the existing Menard law building entrance and replacing it with a new entryway comprising multiple new stairways, sidewalks, hardscapes, and exterior seating. Specifically, the project will require constructing 3 new retaining walls to facilitate site grades throughout the project area. Retaining walls will be cast-in-place (CIP) concrete, with brick veneer; designed by DCI. Wall design is not yet complete. From our interactions with SPVV and DCI, we expect new walls ranging from about 3 to 8 feet in exposed height, and between 30 to 50-feet-long. Loads on retaining wall footings will be less than 1.5 kips per linear foot (klf). Wall back slopes will be flat to facilitate landscaping and pedestrian access. New walls and hardscapes will be constructed to approximately match existing grades. Therefore, substantial new fill embankments are not anticipated. Rather, wall backfill will be constructed to replace what was removed during demolition and backfill new walls referencing the recommendations in this report.

Existing surface drainage patterns will essentially be maintained. Site drainage will be directed to the existing City of Moscow stormwater management facilities in Rayburn Street. Pedestrian hardscapes and associated aggregate support sections will be constructed referencing typical DPW and UI requirements. Therefore, design recommendations for hardscape section thickness are not included in GPI’s services.

SITE SUBSURFACE EVALUATION

Subsurface Exploration

GPI performed exploration via 3 hand-augered holes surrounding the existing Menard law building entryway, in the approximate locations shown on Plate 1. Select soil samples were retained from explorations and transported to our laboratory for further testing. Soil conditions in each hole comprised 0.7 to 1.0 feet of
topsoil, overlying previously placed silt and clay fill extending 2 to 2.5 feet below the ground surface. Beneath fill, we encountered native clay loess to the termination depth of each exploration.

**Laboratory Testing**

We performed laboratory testing on select soil samples obtained during our subsurface exploration to assess various engineering characteristics. Tests were performed in reference to ASTM testing procedures and are presented in Appendix B, *Laboratory Test Results*, and on the exploration logs. Laboratory testing included:

- Natural moisture content
- Atterberg limits
- Maximum dry density
- Optimum moisture content
- In-place density

**DISCUSSION**

Our opinion is the primary geotechnical concern for this project is undocumented fill placed for construction of the existing entryway. Our explorations encountered fill overlying native soil extending 2 to 2.5 feet deep. Based on visual observation and reviewing a grading plan drawing for the original Menard law building construction provided by the UI dated February 1, 1971, we expect fill soil may extend up to 8 feet above native soil in some locations. Specifically, we expect this deeper fill behind the retaining wall which comprises the north side of the existing entryway.

We consider this existing fill to be “undocumented”, as no documentation exists regarding its composition, placement, and compaction. Without documentation, and without demolishing the existing hardscapes to perform a detailed evaluation of the fill conditions, we cannot guarantee its condition is consistent with typical structural fill requirements. Neither can we accurately predict its performance under changing load and moisture conditions associated with the planned improvements. Variation in fill composition, compaction, or other conditions can result in differential performance for improvements planned over it.

No deleterious debris or other unsuitable material was observed in the fill during our exploration. Further, we understand no major settlement-related performance issues have been observed at the existing entry way in the 40+ years it has been in service. Therefore, our opinion is the risks of substantial deleterious debris or conditions within the fill that are detrimental to the planned improvements are relatively low.

After discussing these risks with DPW and SPVV, we understand DPW has elected to leave this existing fill in place to reduce project cost. During our discussions, DPW confirmed variable fill performance does not present life-safety risks for the project, as these walls are solely for exterior hardscape improvements. In this report, we provide recommendations to help reduce, but not eliminate differential fill performance risks.

**GEOTECHNICAL OPINIONS AND RECOMMENDATIONS**

The following report sections summarize our geotechnical opinions and recommendations for the proposed entryway improvements at the Menard law building on UI campus. Our geotechnical recommendations are based on our current project understanding, subsurface exploration, laboratory test results, discussions with DPW, and SPVV, our experience with similar soil and geologic conditions. If improvement plans change, we should be notified so we can make modifications to our recommendations with respect to the revised construction plan.
Earthwork

Site Stripping

We encountered soil containing vegetation and organics (topsoil) extending approximately 0.7 to 1.0 foot below the existing ground surface in the locations explored. However, isolated thicker areas of topsoil could be encountered, especially around trees and shrubs. We recommend a 1-foot-thick topsoil stripping depth be used for estimating purposes in vegetated areas. Extend site stripping extend at least 5 feet (horizontally) outside the planned improvement areas. The contractor should be prepared to remove any soil containing vegetation and organics below planned improvements or structures and stockpile for use as landscaping on the site as designated by SPVV’s design. We encourage DPW and UI to turn off the irrigation system within the planned construction area 1 month prior to construction initiation and not turn it back on until construction is complete.

Demolition & Recycling Considerations

The existing entryway will be demolished prior to initiating construction for the new entryway. Demolition activities shall remove existing concrete, foundations, utilities, or any other existing site features not included in the new improvements plan. Demolition must remove these features to the subgrade elevations and expose underlying soil prior to placing fill or concrete. Demolishing existing structures such as sidewalks, thrust blocks, foundations, or utilities may require equipment with “breakers”, “rippers”, or pneumatic hammers. Remediate depressions caused by removing demolished site features by preparing the according to the Establishing Subgrades and Structural Fill requirements herein over a compacted subgrade.

Various demolished materials excavated from the site can be reused or recycled. We recommend project specifications consider outlining recycling requirements for the existing aggregate, concrete, brick, metal or other material encountered at the project site during demolition. Crushed concrete or demolished brick debris generated during demolition may be used as backfill provided it is approved by DPW and UI and processed to meet the Structural Fill requirements in this report. In the interest of project economy, we recommend the selected contractor be required to submit a recycling plan that incorporates the above considerations into the proposed construction.

Undocumented Fill

With GPI’s consultation, UI and SPVV have elected to leave undocumented fill in place beneath the planned improvements. Near-surface fill will be improved via subgrade compaction and shallow over-excavation where necessary to remove unstable conditions, as recommended in subsequent report sections. These improvements will reduce, but not eliminate, differential performance risks to the planned walls (such as differential settlement and potential cracking that would diminish wall aesthetics). DPW reports variable fill performance risks are not a significant concern for this project, as the walls will support only exterior hardscape improvements, with no impact to public safety. Further, our opinion is these risks are relatively low given the existing entryway’s reported acceptable performance to date.

Soil Excavation Characteristics

Based on our exploration results, it appears the site soil surrounding the planned improvement area can be excavated with conventional equipment. Excavations can cave and slough and must be sloped back in accordance with Occupational Safety and Health Administration (OSHA) guidelines. Site soil encountered within our explorations is classified as Type C when it remains dry, requiring temporary slopes be laid back at 1.5H:1V (horizontal to vertical). The contractor should evaluate the soil conditions at the time of construction and select appropriate excavation and ground support techniques. The contractor will be responsible for ensuring all excavations are properly constructed for worker safety and protecting existing site features. Heavy
construction equipment, stockpiled materials, excavated soil, and vehicular traffic should not be allowed within $\frac{1}{2}$ of the slope height, laterally away from the top of the excavation.

Even OSHA compliant excavations can slough due to groundwater and especially vibrations caused by construction and adjacent non-construction traffic, such as from vehicles. Surcharges from equipment, stockpiles, or material storage should not be placed adjacent to excavations within one-half the height of any given excavation. Care must be taken when excavating next to structures, including the existing building, utilities, or other permanent improvements to avoid undermining or damaging existing site features.

**Groundwater Considerations**

We did not encounter groundwater in our explorations. However, in our experience, groundwater levels can vary with seasonal fluctuations in precipitation, irrigation, and infiltration. Specifically, we expect high soil moisture contents will be encountered if construction is undertaken during wet months (November through May) or at any time if the site is irrigated until immediately prior to construction.

Groundwater seepage can occur as minor or significant seeps or springs in excavation sidewalls at any elevation as water infiltrates the soil profile and migrates along discontinuities in the soil structure or along boundaries between different soil types. Seeps and springs also commonly occur along the interface between fill and native soil. Groundwater and soil seeps may be encountered at any time of the year and contractors must have contingencies to rapidly remove water from all excavations with appropriately sized and maintained sumps or pumps. Recommendations for wall foundation drains and other measures to reduce groundwater infiltration are included in the subsequent report text.

**Establishing Subgrades**

Following site stripping, demolition, and excavation to achieve planned site grades, prepare subgrades according to one of the following conditions prior to placing concrete, structural fill, foundations, or prior to constructing structural fill over the subgrade surface:

- Stiff undisturbed native soil that has been cut with a smooth blade, and maintains a pocket penetrometer resistance exceeding 2.0 tons per square foot (tsf).
- Existing fill soil that has been scarified, moisture-conditioned and recompacted to *Structural Fill* requirements, at least 8 inches below the subgrade surface. Compacting undocumented fill subgrades will improve their performance, but will not completely remove differential fill performance risks.
- All prepared subgrades must be free of loose soil, debris, standing water, ice and other deleterious material.

Our opinion is that careful construction and earthwork procedures are critical to achieving adequate subgrade preparation and reducing over-excavation. Specifically, these procedures could include, but are not limited to, carefully staging equipment and/or stockpiles, routing construction equipment away from subgrades, and implementing aggressive site drainage procedures to help reduce the potential for saturating subgrades during wet weather conditions. It is the contractor’s responsibility to protect subgrades throughout construction. Subgrade disturbance that occurs due to the contractor’s means and methods must be repaired at no cost to DPW or UI. GPI will remain available to consult with DPW and the selected contractor as the project moves forward regarding subgrade preparation procedures and risks.

**Structural Fill**

Place all fill for this project as structural fill. Our opinion is site soil may be re-used for site grading outside the entryway footprint as landscape fill or general structural fill, provided it is processed to meet the requirements...
in this report. As stated previously, some demolition debris, such as crushed concrete and bricks may be viable for re-use as structural fill. However, this requires DPW and UI approval. Further, demolition debris will require substantial processing to meet the requirements in Table 1 below. Soil and demolition debris not reused becomes the contractor’s property to be properly disposed. Descriptions of acceptable fill materials referencing the latest Idaho Standards for Public Works Construction (ISPWC) are presented in Table 1.

**Table 1: Structural Fill Specifications and Allowable Use**

<table>
<thead>
<tr>
<th>Structural Fill Product</th>
<th>Allowable Use</th>
<th>Material Specifications</th>
</tr>
</thead>
</table>
| General Structural Fill | Site grading and fill placement outside retaining wall drain zone. | • Soil classified as GP, GM, GW, SP, SM, SW, CL or ML according to the USCS  
• Soil may not contain particles larger than 8 inches in median diameter  
• Soil consisting of inert earth materials with less than 3% organics or other deleterious substances (wood, metal, plastic, waste, etc.). |
| Granular Structural Fill | Retaining wall backfill, General Structural Fill applications. | • Soil meeting requirements stated in Section 801 – Uncrushed Aggregates in the latest ISPWC Specifications. |
| Drain Rock               | Wall drain zone. | • Aggregate meeting requirements stated in Section 801 – Uncrushed Aggregates – Section 2.2, Table 1 - Drain Rock in the latest ISPWC Specifications |
| Crushed Aggregate       | Wall foundation levelling course, hardscape support aggregate. | • Aggregate meeting requirements stated in Section 802 – Crushed Aggregates in the latest ISPWC Specifications. |
| Unsatisfactory Soil      | NONE           | • Soil classified as MH, OH, CH, OL, or PT may not be used at the project site.  
• Over-optimum moisture conditions does not render a soil unsuitable. |

**Required Compaction**

Fill placed to support any structure or improvement must be compacted to structural fill requirements presented above. Fill placed outside any wall or structural envelope can be placed as non-structural fill (i.e., landscape fill) providing there are no structures (sidewalk, curbs, signs, etc.) planned directly above the landscape fill. Table 2 below summarizes fill compaction requirements.
Table 2: Required Structural Fill Products for Designated Project Areas

<table>
<thead>
<tr>
<th>Project Area</th>
<th>Required Structural Fill Product</th>
<th>Compaction Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscaping fill subgrades</td>
<td>Existing Site Soil</td>
<td>N/A²</td>
</tr>
<tr>
<td>Wall foundation subgrades</td>
<td>Recompacted Site Soil</td>
<td>92%³</td>
</tr>
<tr>
<td>Wall foundation levelling course</td>
<td>Crushed Aggregate</td>
<td>95%</td>
</tr>
<tr>
<td>Wall backfill (within 10 feet of walls)</td>
<td>General or Granular Structural Fill</td>
<td>95%</td>
</tr>
<tr>
<td>Wall drain zone (within 1 foot of walls)</td>
<td>Drain Rock</td>
<td>N/A⁴</td>
</tr>
</tbody>
</table>

1. Referencing ASTM D1557, Modified Proctor.
2. Subgrades beneath landscaping fill placements need not be recompacted. Cut landscaping subgrades with smooth blade equipment to create an undisturbed surface free of loose soil, debris and standing water.
3. Subgrades beneath wall foundations must be prepared according to the Establishing Subgrades report section.
4. Drain rock is typically too coarse for compaction testing per ASTM D 1557. Therefore, consolidate drain rock using vibratory equipment to create a dense, interlocking condition, without damaging drainage system features or causing wall movement.

Place structural fill only over approved subgrades. Never place structural fill over frozen, saturated or, soft subgrades. Structural fill products must be moisture conditioned to near optimum moisture content and placed in maximum 1 foot thick, loose lifts, providing compaction equipment weighs at least 5 tons. If smaller or lighter compaction equipment is provided, reduce the lift thickness to meet the compaction requirements presented herein. GPI recommends only small, hand-operated compaction equipment should be utilized within 3-feet behind walls to avoid damaging or displacing walls. The contractor must select compaction equipment appropriately to protect new and existing site features.

The site soil is expected to be suitable for reuse as General Structural Fill outside building or structural areas, providing it can meet the criteria presented in Tables 1 and 2 in this report. The contractor is responsible for selecting compaction equipment suitable for achieving compaction.

Coarse Fill

Coarse granular fill (locally known as “shotrock”) or any material with greater than 30 percent retained above the ¾-inch sieve is too coarse for Proctor density testing, and therefore, must be compacted using a “method specification” developed during construction, based on the material characteristics and the contractor’s means and methods for compaction. ISPWC Section 202-3.8 outlines general coarse fill construction requirements. At a minimum, GPI recommends coarse fill be placed in maximum 1.5-foot-thick lifts and compacted to a dense, interlocking and unyielding surface through at least 3 passes of large compaction equipment (vibratory roller with minimum 30,000 pounds per impact and at least 1,000 vibrations per minute) per each 0.5-feet of lift thickness. Smaller equipment requires thinner lift thickness to achieve adequate compaction. GPI will remain available to consult with DPW and the selected contractor regarding equipment applicable for compacting coarse fill.

Wet Weather/Soil Construction

We strongly recommend earthwork construction take place during dry weather conditions. The fine-grained site soil will be susceptible to pumping or rutting from heavy loads such as rubber-tired equipment or vehicles any time of the year. Recompacting site soil to structural fill conditions requires moisture conditioning and soil processing. Subgrade preparations often can help identify areas susceptible to subgrade pumping and rutting. After attempting moisture conditioning, remove pumping or rutting subgrade areas to depths between 1 and
1.5-feet at DPW’s direction. Replace these over-excavations with granular structural fill or crushed aggregate per Table 1 in this report.

Earthwork should not be performed immediately after rainfall or until soil can dry sufficiently to allow construction traffic without disturbing the subgrade. Earthwork must be completed by track-mounted equipment that reduces vehicular pressure applied to the soil if construction commences in wet areas before soil can dry.

We expect soil excavated from the site will be over optimum moisture content. The contractor should expect these conditions and be prepared to install surface water management facilities and to replace wet or disturbed soil with granular structural fill. Over-excavation and replacement in wet areas should only be allowed after moisture conditioning and recompaction has been attempted. Drying can be accomplished by ripping and aerating the wet soil during dry weather conditions. If construction takes place during wet weather conditions (not recommended), or the soil cannot achieve the required compaction, over-excavate to undisturbed, firm soil following adequate efforts to moisture condition the soil. Complete over-excavations with smooth-blade equipment prior to replacing excavation with geotextile fabric and granular structural fill or crushed surfacing. We recommend over-excavation criteria be determined during construction by GPI, but it is anticipated to extend at least 1 foot below the subgrade.

Geotextiles

Geotextile fabric is necessary when constructing drains and foundation levelling course for retaining walls. Geogrid is not specifically required, but may be used where persistent soft soil conditions are encountered. Geotextiles shall meet the minimum requirements in the latest ISPWC Section 2050 – Construction Geotextiles – 2.3 Subgrade Separation Geotextiles. Geogrid reinforcement shall meet the requirements in Table 3 below.

Table 3: Geosynthetic Requirements

<table>
<thead>
<tr>
<th>Geosynthetic Type</th>
<th>Use</th>
<th>Minimum Material Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-woven Geotextile Fabric</td>
<td>• Wall drain construction</td>
<td>• Grab tensile strength: 270 pounds (ASTM D4632)</td>
</tr>
<tr>
<td></td>
<td>• Wall foundation levelling course</td>
<td>• Puncture strength: 100 pounds (ASTM D4833)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Apparent opening size: US Sieve #30 (ASTM D4751)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permittivity: 0.02 seconds(^{-1}) (ASTM D4491)</td>
</tr>
<tr>
<td>Geogrid Reinforcement (Triaxial</td>
<td>• Persistent soft soil conditions</td>
<td>• Extruded polypropylene products only</td>
</tr>
<tr>
<td>or Biaxial geogrids)</td>
<td></td>
<td>• 93 percent junction efficiency (GRI-GG2-05)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3.0 kg-cm/degree Aperture Stability (U.S. Army Corp of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineers Ref. 3.3.1.2000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimum Tensile Strength of 700 lb/ft at 5.0% Strain (ASTM D6637)</td>
</tr>
</tbody>
</table>

GPI must be consulted to review geotextile applications. Where required, apply geotextile directly on approved subgrades taut and free of wrinkles and overlapped at least 1-foot at each seam.

Compaction Documentation

Successful earthwork and construction activities are important to the project’s long-term performance. Retaining experienced contractors is the first step in having confidence that construction will be performed in reference to this report’s requirements. Providing the necessary testing and engineering verification of construction activities is the second step. GPI is retained to provide testing and observation services during
construction. The criteria below outlines the minimum testing and observation frequencies to GPI plans to implement during earthwork and wall construction.

1. Wall Foundation Bearing Surfaces – Bearing surface conditions verified by an experienced engineer to confirm conditions as required by design. Additionally, and as applicable pending materials encountered, 1 compaction test every 100 linear feet (lf) along wall foundations and 1,000 sf for slab areas, or a minimum of 3 tests per alignment/area.

2. Wall Construction – One set of field tests on fluid concrete (slump, air content, temperature) and a set of 4 compressive strength test cylinders per each day’s concrete placement. Cylinders will be retrieved and cured in our facility, and tested at 7- and 28-day increments for to document compressive strength. Document reinforcing steel placement for wall construction meets design requirements prior to concrete placement.

3. Wall Backfill – One compaction test every 100 lf of wall or minimum 2 tests per wall line (interior and exterior), whichever results in the greater number of tests, per fill lift.

Retaining Wall Design and Construction Recommendations

Wall Stability

Walls which alter site geometry must be evaluated for both internal stability and global stability. Internal wall failure mechanisms include sliding, overturning and bearing capacity failures, or a combination thereof. Global stability failures refer to potential failure paths and slip planes that pass outside the wall’s “active” zone. Internal wall stability must be evaluated by SPVV and DCI as the wall designers, based on their design configuration and professional judgment. GPI’s scope includes evaluating global stability, based on our geotechnical site information, as well as the planned wall configurations and site grading illustrated in the preliminary drawings provided by DCI dated December 14, 2018. The following text describes our global wall stability analysis and results.

We used the computer software SLOPE/W, developed by GEO-SLOPE International, Ltd., to evaluate slope stability. SLOPE/W searches for the potential failure surface with the lowest factor of safety (FOS) by calculating FOS values on many different potential failure surfaces using various slope stability analysis methods. Our analyses evaluated potential failure surfaces that we consider critical along planned wall alignments. We selected the critical wall and slope configuration used in our analysis based on the anticipated tallest wall sections reported by DCI. We also incorporated our exploration and laboratory test results, to represent critical combinations of slope height and subsurface conditions, with respect to global slope stability risks. The approximate section alignment used in our analysis is labeled A-A’, shown on Plate 1. The cross-sectional site subsurface geometry used in our analysis is illustrated on Figure C.1 in Appendix C.

Our analyses provides estimated FOS values against potential global wall instability. Our stability analysis results are summarized in Table 4 below, and are illustrated on Figure C.2 in Appendix C.

Table 4: Stability Analysis Results: Deep-seated Failures

<table>
<thead>
<tr>
<th>Critical Section</th>
<th>Exposed Wall Height</th>
<th>Backslope Inclination</th>
<th>Surcharge</th>
<th>Surface Moisture Conditions</th>
<th>Factor of Safety</th>
<th>Appendix C Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-A’</td>
<td>8.0</td>
<td>Flat</td>
<td>250 psf(^1)</td>
<td>Dry(^2)</td>
<td>1.60</td>
<td>C.2</td>
</tr>
</tbody>
</table>

1. Estimated surface surcharge
The geotechnical standard of practice for constructed slopes and walls within public areas requires minimum computed FOS values above 1.5 for global stability\(^1\). As summarized in Table 4, our analyses suggest walls constructed as described herein will have computed FOS values above 1.5 with respect to deep-seated circular failures passing outside the wall's active zone.

Wall stability will be enhanced by the wall backfill remaining in a relatively dry condition, not subject to changing moisture content. If the embankment soil or wall backfill becomes saturated, the risks of deep-seated global instability will increase significantly. Such failures can impact structures, utilities, and other improvements above retaining walls and encroach on property lines above or below walls.

**Wall Foundation Design**

Retaining walls will be supported on typical shallow spread footings. To help reduce differential performance risks due to undocumented fill left in place beneath the walls, and to aid wall drainage, we recommend wall foundations bear on a granular levelling course, constructed as described below. GPI is retained to review final foundation designs and configurations established by SPVV and DCI beneath each wall, for conformance with the recommendations herein. A schematic illustrating granular levelling course construction is provided in Plate 2, *Wall Construction Schematic*.

Wall foundations bearing over granular levelling course constructed as outlined above, may be designed according to the current IBC edition and the following criteria:

1. Frost protection embedment depth  
   a. 30 inches below finished exterior surface

2. Allowable foundation bearing pressure: 3,000 psf  
   a. This allowable bearing pressure requires aggressive drainage at the subgrade elevation, via a perforated drain pipe as shown on Plate 2.  
   b. The allowable bearing pressure can be increased 33 percent to account for transitory live loads such as wind or seismic accelerations.

3. Lateral load resistance  
   a. Foundation base friction coefficient:  
      i. 0.50 for foundations cast on granular structural fill  
      ii. Reduce friction coefficient by 1/3 for precast concrete  
   b. Lateral passive resistance is available on foundation sides as outlined in Table 5 and Figure 1 above, depending on backfill used and where ¾ inches of lateral movement can be tolerated.

4. Estimated vertical foundation settlement  
   a. Total settlement: 1 inch  
   b. Differential settlement: 0.7 inches in 30-foot, horizontal span

**Wall Backfill Construction**

Wall backfill must be constructed per this report’s *Structural Fill* requirements. This requires all wall backfill be keyed into existing site soil surfaces steeper than 5H:1V. Subgrade keying is illustrated in Plate 2. If adequate keying into existing surfaces, subgrade preparations, structural fill placement, and drainage are not accomplished as recommended in this report, differential performance of walls and overlying hardscaped can be expected.

Settlement beneath the planned wall backfill is not expected to be substantial, as new walls will essentially

---
replace existing walls. Therefore, the existing subgrades beneath newly constructed walls will not experience significant "new" loading. However, we do expect site soil will equilibrate to new backfill and wall construction over time, and settlement less than 1 inch may occur after construction.

**Lateral Earth Pressures**

Design retaining walls to resist lateral pressures imparted by the retained soil and any surcharges impacting the wall. We recommend static lateral earth pressures for retaining walls be estimated using the following equivalent fluid weights (EFWs) from Table 5. Figure 1 below illustrates the static EFW distributions.

**Table 5: Static Equivalent Fluid Weights**

<table>
<thead>
<tr>
<th>Rankine Lateral Earth Pressure Case</th>
<th>Equivalent Fluid Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>At-rest case (no wall movement)</td>
<td>65 pcf</td>
</tr>
<tr>
<td>Active case (wall movement away from soil mass)</td>
<td>45 pcf</td>
</tr>
<tr>
<td>Passive case (wall movement toward soil mass)</td>
<td>1 f¹</td>
</tr>
</tbody>
</table>

1. Assumes ⅜ inch lateral movement to fully mobilize passive resistance

**Figure 1: Static Lateral Earth Pressures**

These equivalent fluid weights assume drained conditions and no hydrostatic forces acting on the wall. Drained conditions must be achieved by implementing foundation drains and other drainage measures outlined in the Site Drainage report section. For retaining walls that tolerate some lateral movement (i.e., 1 to 2 percent of the wall height), we recommend they be designed utilizing active EFWs. The above recommended EFW’s also assume the top surface of backfill adjacent to walls is relatively flat, and slopes down and away from the wall at least 5 percent for drainage.

Additional lateral pressures will be applied to walls due to equipment, slopes, storage loads, etc., have not been included in the above lateral earth pressure recommendations. A lateral earth pressure coefficient of 0.5, acting over the entire below-grade wall height, should be used to estimate the lateral surcharge loads from equipment, stockpiled soil and other surcharge loads behind and above walls.

**Soil Corrosivity and Reactivity Potential**

Corrosion of buried structures is an electrochemical process and is dependent on many factors, including type of metal or alloy, galvanic effects, and soil properties such as resistivity, pH, and oxygen content. Generally, soil that has low resistivity and low pH is more corrosive than soil with high resistivity and high or neutral pH.
From our experience on the UI campus, we expect the site soil will exhibit a relatively neutral pH and a mild to moderate resistivity. This results in a mild corrosive potential. Therefore, mild steel loss due to corrosion should be considered with respect to selecting pipes and other buried or underground structures. Maintaining appropriate cover and protection for reinforcing steel will be critical to long term wall performance.

**Seismic Site Class**

We expect the 2015 *International Building Code* (IBC) *Section 1613* will be utilized for project structural design. GPI utilized site soil and geologic data and the project location to establish site class referencing the IBC. Based on the site soil conditions encountered during exploration, we recommend a site class D be utilized for wall structural design. A site-specific study seismic response was not performed.

**Site Drainage**

**Surface Drainage**

Runoff from precipitation, snowmelt, seeps or springs must not be allowed to pond atop walls, or at the wall foundation subgrade. Runoff or water migrating along the ground surface must be conveyed away from walls by a series of surface water collection and disposal facilities design by DCI.

We recommend the ground surface outside structures be sloped to meet *Americans with Disabilities Act* (ADA) requirements at entrances and at least 5 percent away for a minimum of 10 feet in other areas to rapidly convey surface water or roof runoff away from foundations. Remaining landscapes should slope at least 2 percent away from structures. However, ADA requirements supersede surface water conveyance requirements. During and post-construction, route stormwater away from the site and dispose it in a suitable location as determined by the contractor and UI. At this time, we anticipate site stormwater will be directed to existing site stormwater management facilities located along Rayburn Street.

**Wall Foundation Drainage**

Retaining walls must be constructed with aggressive drainage systems to reduce the potential for water ponding behind the wall or at the wall foundation subgrade. Our recommended methods for wall drainage are illustrated on Plate 2. Install foundation drains with a minimum 0.5 percent slope and dispose of collected water in suitable locations at least 30 feet from walls existing buildings. Foundation drains must not be connected to the existing drainage systems for adjacent structures, roof drains, or other nearby facilities, and must maintain positive gravity drainage away from the wall. Foundation drains must daylight to an appropriate discharge or collection area. Apply additional wall and site drainage per architectural, civil, and structural specifications.

**ADDITIONAL RECOMMENDED SERVICES**

**Geotechnical Design Continuity**

Our experience with previous DPW and UI projects suggests providing geotechnical continuity throughout design and construction is critical to project success. GPI is currently retained to provide geotechnical continuity and construction testing services to document our recommendations are incorporated into construction.

**EVALUATION LIMITATIONS**

**General**

This report is prepared to assist the planning, design and construction for the proposed Menard law building located on the University of Idaho campus in Moscow, Idaho. Our authorized scope does not include site civil
design, structural design, retaining wall internal stability evaluation, site drainage design, stormwater management, erosion control design, shoring or dewatering system design. Our services comprise professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices, as they exist at the time and in the area of this report.

We base this report’s information and recommendations on assumed static loading conditions, contemplated site configurations, and preliminary site development concepts provided by SPVV and DCI. The final wall footing configurations, loading conditions, site grading plan and site geometry may alter our opinions and design recommendations. Therefore, it is critical that GPI provide geotechnical continuity for final planning and design for the planned construction as individual aspects become available during design development phases. This acknowledgement is in lieu of all express or implied warranties.

**Geoenvironmental Concerns—Not Included**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, geotechnical engineering documents do not relate geoenvironmental findings, opinions or recommendations (e.g., the likelihood of encountering underground storage tanks or regulated contaminants). Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask GPI for risk management guidance.

The following plates accompany this report:

- **Plate 1:** Exploration Map
- **Plate 2:** Wall Foundation Construction Schematic
- **Appendix A:** Unified Soil Classification System (USCS) and Exploration Logs
- **Appendix B:** Laboratory Test Results
- **Appendix C:** Stability Analysis Results
Reference: Base drawing from Sheet C-120 by DCI Engineers, Inc. dated December 14, 2018. No Scale Intended

Approximate hand auger exploration location observed on November 30, 2018
Uncontrolled fill depth encountered during exploration (feet)

Slope stability analysis section. See Appendix C.
Granular Leveling Course Construction

Construct granular leveling course beneath wall footings according to the following steps.

A. Over-excavate the subgrade beneath the planned foundation bearing elevation to expose stiff fine-grained soil. Over-excavation depth must be a minimum of 12 inches. See Geotechnical Report recommendations.

B. Prepare the exposed subgrade referencing the Earthwork report requirements. Geotechnical engineer to verify subgrades.

C. Place non-woven geotextile fabric over the subgrade and extend it up the sidewalls to the bearing elevation. Geotextile fabric must meet the report requirements.

D. Place 4-inch diameter, perforated pipe at lowest possible elevation, sloped at least 0.5% towards daylight or approved discharge facility.

E. Backfill over-excavations with crushed aggregate in backfill side of wall, placed and compacted referencing the Structural Fill report section.

This drawing is intended for retaining wall foundations. Wall height will vary. This is not a structural detail.
APPENDIX A

Unified Soil Classification System (USCS)
Exploration Logs
WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES.
POORLY-GRADED GRAVEL, GRAVEL-SAND MIXTURES.
CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURES.
WELL-GRADED SAND, GRAVELLY SAND.
POORLY-GRADED SAND, GRAVELLY SAND.
SILTY SAND, SAND-SILT MIXTURES.
CLAYEY SAND, SAND-CLAY MIXTURES.
INORGANIC SILT, SANDY OR CLAYEY SILT.
INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY, SANDY OR SILTY CLAY.
INORGANIC MIXED CLAY AND SILT.
ORGANIC SILT AND CLAY OF LOW PLASTICITY.
INORGANIC SILT, MICA-CEOS SILT, PLASTIC SILT.
INORGANIC CLAY OF HIGH PLASTICITY, FAT CLAY.
ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY.
PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS.

GROUND WATER AFTER 24 HOURS
GROUND WATER AT TIME OF DRILLING
GROUND WATER AT THE END OF DRILLING

SHELBY TUBE 3 INCH OD UNDISTURBED SAMPLE
ROCK CORE
CALIFORNIA MODIFIED 3 INCH OD SPLIT SPOON SAMPLE
STANDARD 2 INCH OD SPLIT SPOON SAMPLE
GRAB BAG SAMPLE
BULK SAMPLE
RING SAMPLE

UNIFIED SOIL CLASSIFICATION SYSTEM
### USCS Description

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>U.S.C.S. Class</th>
<th>Symbol</th>
<th>Sample Type</th>
<th>% Passing No. 200 Mesh</th>
<th>Dry Density (pcf)</th>
<th>Moisture Content (%)</th>
<th>Pore Pen. (ft)</th>
<th>Atterberg Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CL-ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CL</td>
<td>BG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**TOPSOIL - SILT, (ML) dark brown to black, soft, wet**

**FILL - MIXED SILT AND CLAY WITH SAND AND TRACE GRAVEL, (CL-ML) light brown with dark brown mottling, soft to stiff, moist**

**LOESS - CLAY, (CL) reddish brown, firm to stiff, moist**

**Remarks**

- Dynamic Cone Penetrometer (DCP) Reading at 2 feet BGS: 9 blows per 1.75"  
- Dynamic Cone Penetrometer (DCP) Reading at 3 feet BGS: 16 blows per 1.75"

**Exploration Terminated at 3.0 Feet.**  
**Loosely backfilled upon completion.**

---

**Client:** Division of Public Works  
**Boring Number:** HA-1  
**Project:** MO18196A  
**Date Drilled:** 11-30-2018  
**Equipment:** Hand auger  
**Diameter:** 4"  
**Depth to Groundwater:** N.E.  
**Logged By:** AJA
**USCS Description**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>USCS Class</th>
<th>Symbol</th>
<th>Sample Type</th>
<th>% Passing No. 200</th>
<th>Dry Density (pcf)</th>
<th>Moisture Content (%)</th>
<th>Pocket Pen. (ft)</th>
<th>Atterberg Limits</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ML</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CL-ML</td>
<td>BK/RG</td>
<td></td>
<td>99.8</td>
<td>22.4</td>
<td></td>
<td>30</td>
<td>8</td>
<td>ASTM D 1557: Max. DD: 113.5 pcf Opt. MC: 14.5 %</td>
</tr>
<tr>
<td>2</td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dynamic Cone Penetrometer (DCP) Reading at 2 feet BGS: 15 blows per 1.75&quot;</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dynamic Cone Penetrometer (DCP) Reading at 3 feet BGS: 19 blows per 1.75&quot;</td>
</tr>
</tbody>
</table>

**Remarks**

Note: BGS = Below Ground Surface

Exploration Terminated at 3.0 Feet.

Loosely backfilled upon completion.

---

**Client:** Division of Public Works  
**Boring Number:** HA-2  
**Project:** MO18196A  
**Date Drilled:** 11-30-2018  
**Equipment:** Hand Auger  
**Depth to Groundwater:** N.E.  
**Logged By:** AJA
<table>
<thead>
<tr>
<th>USCS Description</th>
<th>Depth (ft)</th>
<th>U.S.C.S. Class</th>
<th>Symbol</th>
<th>Sample Type</th>
<th>% Passing No. 200</th>
<th>Dry Density (pcf)</th>
<th>Moisture Content (%)</th>
<th>Pocklet Pen. (ted)</th>
<th>Atterburg Limits</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOPSOIL - SILT, (ML) dark brown to black, soft, wet</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Note: BGS = Below Ground Surface</td>
</tr>
<tr>
<td>(FILL) - MIXED SILT AND CLAY WITH SAND AND TRACE GRAVEL, (CL-ML) light brown with dark brown mottling, soft to stiff, moist</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dynamic Cone Penetrometer (DCP) Reading at 2 feet BGS: 15 blows per 1.75&quot;</td>
</tr>
<tr>
<td>LOESS - CLAY, (CL) reddish brown, firm to stiff, moist</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dynamic Cone Penetrometer (DCP) Reading at 3 feet BGS: 27 blows per 1.75&quot;</td>
</tr>
</tbody>
</table>

Exploration Terminated at 3.0 Feet. Loosely backfilled upon completion.

Client: Division of Public Works
Boring Number: HA-3
Project: MO18196A
Date Drilled: 11-30-2018
Equipment: Hand Auger
Depth to Groundwater: N.E.
Logged By: AJA

GeoProfessional Innovation
EXPLORATORY HAND AUGER
Sheet 1 Of 1
APPENDIX B
Laboratory Test Results
<table>
<thead>
<tr>
<th>Exploration Location</th>
<th>Depth (feet)</th>
<th>Lab Number</th>
<th>Description (U.S.C.S. Classification)</th>
<th>In situ Moisture, %</th>
<th>In situ Density, pcf</th>
<th>Max Dry Density, pcf</th>
<th>Optimum Moisture, %</th>
<th>Atterberg Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA-1</td>
<td>2.5-3.0</td>
<td>PUL18-0253B</td>
<td>Lean Clay (CL)</td>
<td>25.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HA-2</td>
<td>1.0-2.0</td>
<td>PUL18-0253A</td>
<td>Mixed Silt and Clay (CL/ML)</td>
<td>22.4</td>
<td>99.8</td>
<td>113.5</td>
<td>14.5</td>
<td>LL=30/PI=8</td>
</tr>
</tbody>
</table>

Reviewed by: ________________________________
Project: Menard Law Building - Entryway Improvements
Client: Idaho Division of Public Works
Project Number: MO18196A
Lab Number: PUL18-0253A
Sample Location: HA-2 @ 1 - 2 feet BGS
Sample Classification: Lean Clay (CL)
Date Tested: 12/5/18  By: AJA
Rammer Type: Manual

Maximum Dry Density, pcf: 113.5
Optimum Moisture Content, %: 14.5
Notes:
1. Soil conditions extrapolated from nearby explorations and may vary from that shown.
2. Retaining wall construction must follow design plans by SPVV and DCI. This is not a structural detail.
3. Surface geometry based on site drawings provided by DCI.
4. Soil strength parameters correlated from field and laboratory test data.
SECTION A-A’

8- Foot Exposed Height – Concrete Retaining Wall

Static Conditions - Global Stability Analysis Results

Morgenstern-Price Method of Slices

Notes:
1. Underlined number and bold red point indicate minimum safety factor and center location of circular failure shown in green.
2. Temporary groundwater near surface behind wall is based on anticipated seasonal irrigation and soil moisture variations.