



September 10, 2020

John Sather
Yardscapes, Inc.
8609 Harriet Ave. S.
Bloomington, MN 55420

RE: Boulder Retaining Wall Typical Section
Project Location: 4604 Browndale Avenue, Edina, MN
Project No. 20-4834

Dear Mr. Sather:

This letter includes important details regarding the attached design for the typical engineered section of the boulder retaining walls at the above location. This design is based on wall layout plan prepared by Yardscapes, Inc. dated April 16, 2020.

The attached typical section(s) should be referenced for construction details. Special note should be made of the wall embedment depth and the geosynthetic fabric (geogrid) length as measured from the front face of the wall if applicable.

Refer to industry standard practice references for installation information, specifications, and details.

- Boulders shall be placed to avoid continuous joint planes in vertical directions.
- Each stone shall bear on two or more rocks below it with good flat-to-flat contact.
- Compact any structural fill place behind the drainage zone to 95% standard proctor.
- Install woven landscape fabric behind the stone to limit soil migration through the wall face.
- Drainage stone shall consist of clean 3/4" to 1.5" crushed stone

The design of the wall system is specific to the following parameters:

- Location: Partial replacement of existing timber walls along creek. New boulder walls to be built in front of existing timber walls. Remove top 1 to 2 feet of existing timber walls.
- Maximum exposed height: Two-tiered wall system 7-feet total, maximum exposed height
- Minimum embedment depth = 6", or as noted
- Soil conditions: Sand, friction angle = 30.0 degrees, unit weight of 120.0 lb/ft³
- Required soil bearing capacity = 1500 psf
- Surcharge load behind the wall: None
- 10:1 slope at top of wall; 3:1 maximum slope at bottom of wall
- Boulder sizes: see cross section drawing
- Geosynthetic Reinforcement Fabric Type: Not required
- Drainage pipe: Required

This wall system has not been designed for ground water surcharge loads. Direct all surface drainage away from the wall. Methods to do so include but are not limited to the following: drainage swale, site grading, retention ponds, etc. Details of water control are left to the wall contractor. Additional information requested by Criterium-Schimnowski Engineers but not available includes: geotechnical site survey and soil data. Please contact Criterium-Schimnowski to provide additional site assessment services if desired.

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The wall design was performed using the design guidelines presented in the third edition of the "Design Manual for Segmental Retaining Walls" (DMSRW) published by NCMA in 2009. If soil conditions, proposed wall layouts, or any other design parameters vary from those stated above, contact me for a revised design. Please call me if you have any questions or need more information. Thank you.

Please call with any additional questions you may have. Thank you for the opportunity to be of assistance to you.

Sincerely,



Paul Schimnowski, P.E.
MN #40126

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



Paul Schimnowski, P.E.
Date: September 10, 2020 License #: 40126 (MN)

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DESIGN PARAMETERS AND PROVISIONS

DESIGN PROVISIONS:

1. REFER TO BOULDER RETAINING WALL INDUSTRY STANDARD SPECIFICATIONS AS THEY ARE INTEGRAL TO THIS PLAN
2. THE DESIGN OF THIS RETAINING WALL SYSTEM WAS BASED UPON THE EFFECTIVE STRENGTH PARAMETERS SHOWN ON THE "SOIL VALUES" TABLE. UNLESS OTHERWISE NOTED, NO FORMAL SOIL INFORMATION WAS PROVIDED BY THE OWNER OR OWNER'S REPRESENTATIVE. IF SOIL CONDITIONS VARY AT TIME OF CONSTRUCTION, WALL ENGINEER MUST BE CONTACTED TO DETERMINE IF A REVISED DESIGN IS NEEDED.
3. THE WALL DESIGN WAS BASED ON THE INFORMATION NOTED IN THE LETTER ABOVE.
4. REFER TO WALL CALCULATIONS FOR BEARING CAPACITY REQUIREMENTS.
5. NO PRODUCT/MATERIAL SUBSTITUTIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN PERMISSION OF CRITERIUM-SCHIMNOWSKI ENGINEERS.
6. FINAL SITE GRADES AND ROOF DRAINS SHALL DIRECT RUNOFF AWAY FROM ANY RETAINING WALL(S). UNLESS OTHERWISE NOTED, THE WALL(S) HAS NOT BEEN DESIGNED FOR HYDROSTATIC SURCHARGE LOADING.
7. THE WALL DESIGN WAS PERFORMED USING DESIGN GUIDELINES PRESENTED IN THE THIRD EDITION OF THE "DESIGN MANUAL FOR SEGMENTAL RETAINING WALLS" PUBLISHED BY NCMA.

DESIGN LIMITATIONS:

1. THE INFORMATION PROVIDED WITHIN THESE DOCUMENTS IS FOR THE STRUCTURAL DESIGN OF THE PROPOSED RETAINING WALL(S) ONLY. THE REQUIREMENTS FOR AND/OR WORK RELATED TO HANDRAILS, GUARDRAILS, OR OTHER LIFE/SAFETY ISSUES ARE EXCLUDED FROM THESE DOCUMENTS AND ARE TO BE PROVIDED BY OTHERS.
2. SITE LAYOUT AND GRADING DESIGN ARE NOT INCLUDED IN WALL DESIGN SERVICES. THOSE SERVICE ARE THE RESPONSIBILITY OF THE SITE CIVIL ENGINEER.
3. INTERNAL COMPOUND STABILITY (ICS) HAS BEEN CALCULATED FOR THIS PROJECT BY CRITERIUM. HOWEVER, ICS IS NOT A SUBSTITUTE FOR A GLOBAL STABILITY ANALYSIS WHICH SHOULD BE PERFORMED BY A QUALIFIED GEOTECHNICAL ENGINEER. ADDITIONAL SUBSURFACE EXPLORATION MAY BE REQUIRED.

SUGGESTED QUALITY ASSURANCE REQUIREMENTS:

1. A QUALIFIED ENGINEER OR TECHNICIAN SHALL SUPERVISE THE WALL CONSTRUCTION TO VERIFY SITE SOIL CONDITIONS. IF THE PROJECT GEOTECHNICAL ENGINEER DOES NOT PERFORM THIS WORK, A QUALIFIED GEOTECHNICAL ENGINEER/TECHNICIAN SHALL BE HIRED TO ASSURE THE RETAINING WALL IS CONSTRUCTED WITH PROPER SOIL PARAMETERS.
2. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE CONSULTED TO VERIFY THE SUITABILITY OF DESIGN ASSUMPTIONS MADE BY CRITERIUM.
3. WALL EXCAVATION AND SOILS SHALL BE INSPECTED FOR GROUNDWATER CONDITIONS. THE GEOTECHNICAL ENGINEER SHALL DETERMINE ADDITIONAL DRAINAGE PROVISIONS TO BE INCORORATED INTO THE WALL DESIGN.
4. THE WALL DESIGN ENGINEER SHALL BE HIRED TO PERFORM A PRE-CONSTRUCTION SITE VISIT.
5. THE WALL DESIGN ENGINEER CAN BE HIRED FOR CONSTRUCTION OBSERVATION SERVICES.
6. THE WALL CONTRACTOR IS RESPONSIBLE FOR MAINTAINING QUALITY CONTROL FOR THE CONSTRUCTION OF THE WALL IN ACCORDANCE WITH CONTRACT REQUIREMENTS.
7. SEE PROJECT CONTRACT DOCUMENTS FOR SPECIFIC DETAILS ON THE SCOPE OF WORK THAT WILL BE PROVIDED BY ALL PARTIES.

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TERMS AND CONDITIONS

This design is expressly made subject to the following terms and conditions to which all persons that receive and rely thereon agree:

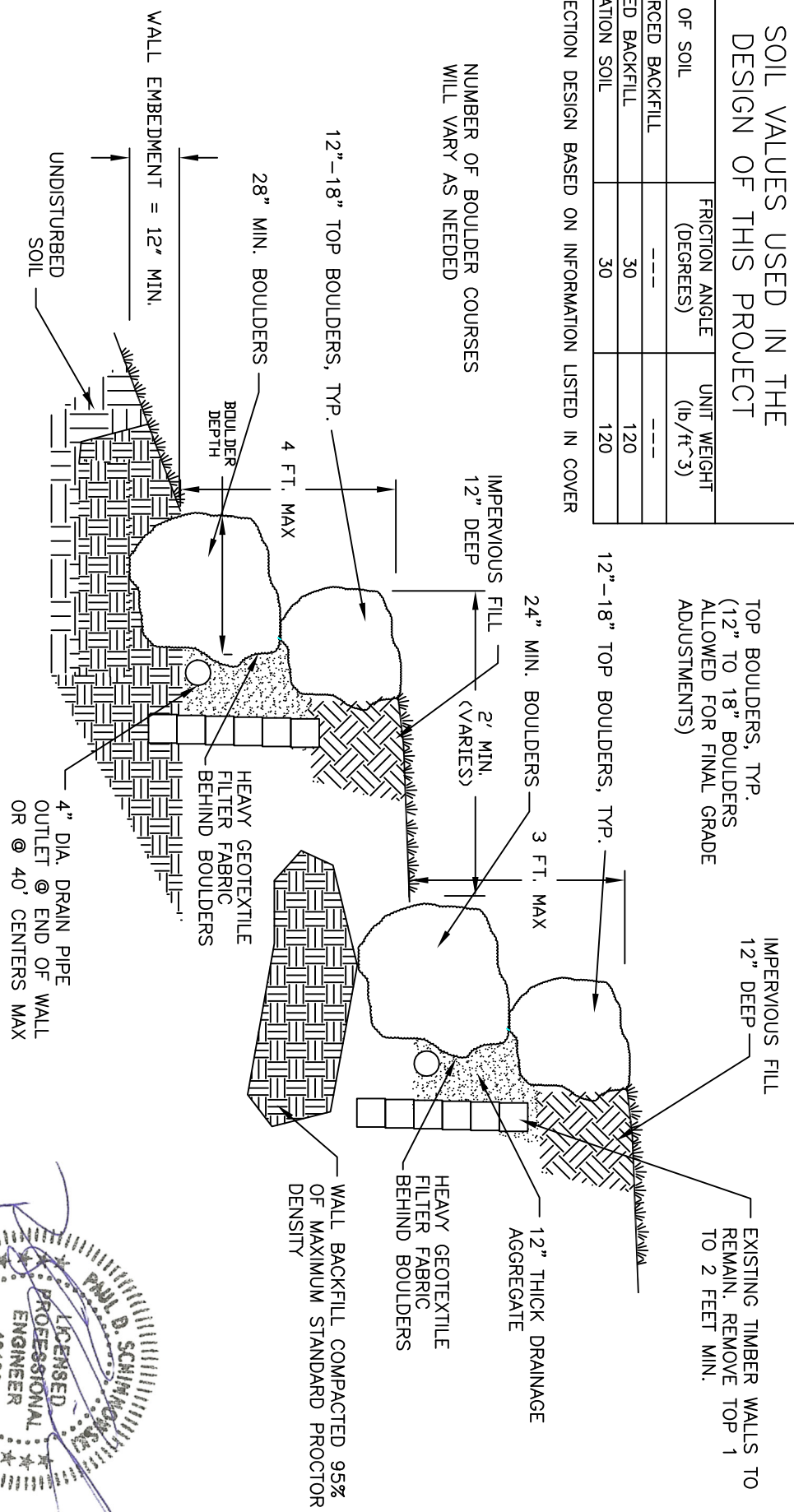
1. **STANDARD OF SERVICE:** Services performed by ENGINEER under this agreement shall be performed in a manner consistent with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the time and in the locality the services are performed.
 - Client recognizes that interpretations and recommendations of ENGINEER are based solely on the information available to the company.
 - ENGINEER will be responsible for those interpretations and recommendations, but shall not be responsible for the interpretation by others of the information developed.
 - Services provided reflect the professional judgment of ENGINEER, to the best of ENGINEER's knowledge, information, and belief as of the date hereof.
 - No other warranty or guarantee, express or implied, is made.
2. **SCOPE OF SERVICE:** Services performed by ENGINEER are expressly limited by the scope of services ENGINEER has been employed by Client to perform.
3. **TERMS OF PAYMENT:** ENGINEER may require a retainer fee to be paid before commencing any project. Extended engagements may require interim invoicing on a weekly, monthly, or other basis. At the completion of the project, we will issue a final invoice. Payment of each invoice is due upon presentation. Failure to pay invoices within the allotted time period will constitute a breach of contract and may result in suspension of work until such time as all overdue payments are made in full. Should any suspension occur because of overdue payments, the time for contract completion, if any is stated, shall be extended by the period of the suspension. Invoiced balances remaining unpaid for thirty (30) days after the date of invoice may be charged a finance charge in the amount of ½ percent per month from the date of invoice. If an invoice remains unpaid and it becomes necessary, in the ENGINEERS' opinion to initiate collection procedures, the client hereby agrees to pay all collection costs including, but not limited to, reasonable fees for attorneys retained by ENGINEER and court costs at our standard billing rate for time necessitated in court appearances or presentation of claim to the appropriate court jurisdiction. Exceptions to payment terms must be specified in writing.
4. **OWNERSHIP OF DOCUMENTS:** All reports, field data, field notes, calculations, estimates and other documents ('reports') prepared by Engineer, as instruments of service, shall remain the property of Engineer. Client agrees that all reports furnished to Client or his agents, which are not paid for, will be returned upon demand and will not be used by Client for any purpose whatever. ENGINEER will retain all pertinent records relating to the services performed for a period of five years following submission of the report, during which period the records will be made available to Client at all reasonable times.
5. **COPIES OF DOCUMENTS:** ENGINEER agrees to furnish client with an electronic copy of our report, drawings, or documents relating to the services performed. Hard copies, bound or unbound, may be provided upon request at charge of cost plus 10 percent, at ENGINEERS's sole discretion. ENGINEER shall retain an electronic copy of the final documents in its files for a period of five years.
6. **INSURANCE:** ENGINEER represents and warrants that it is protected by Workers Compensation insurance and has such coverage under Public Liability and Property Damage insurance policies which ENGINEER deems adequate. Certificate for all such policies of insurance shall be provided to the Client upon request in writing. ENGINEER shall not be responsible for any loss, damage or liability arising from any acts by Client, its agents, staff and other consultants employed by it.
7. **TERMINATION:** This agreement may be terminated by either party by written notice. In the event of termination, ENGINEER shall be paid for services performed and expenses incurred up to the termination notice date. Neither Client nor ENGINEER may delegate, assign, sublet or transfer his/her duties or interest in this Agreement without the written consent of the other party.
8. **LIMITATION OF LIABILITY:** To the fullest extent permitted by law, Client and ENGINEER
 - (a) waive against each other, and the other's employees, officers, directors, agents, insurers, partners, and consultants, any and all claims for or entitlement to special, incidental, indirect, or consequential damages arising out of, resulting from, or in any way related to this report,
 - (b) agree that ENGINEER's total liability to Client shall be limited to the total amount of compensation received by ENGINEER, and
 - (c) if an action is brought against the ENGINEER and the ENGINEER prevails, ENGINEER shall be entitled to recover costs and expenses, including reasonable attorneys' fees and costs.

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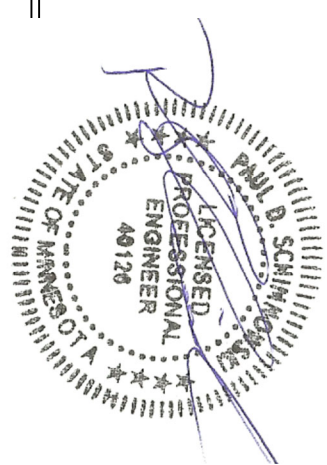
SOIL VALUES USED IN THE DESIGN OF THIS PROJECT		
TYPE OF SOIL	FRICTION ANGLE (DEGREES)	UNIT WEIGHT (lb/ft ³)
REINFORCED BACKFILL	---	---
RETAINED BACKFILL	30	120
FOUNDATION SOIL	30	120

CROSS SECTION DESIGN BASED ON INFORMATION LISTED IN COVER LETTER.



TYPICAL SECTION - TIERED BOULDER RETAINING WALL

SCALE: NONE



Designed By: PDS	PROJECT NAME/ LOCATION:	4604 BRDWNDALE AVENUE / EDINA, MN	Date:	9/10/2020
Checked By:	CRITERIUM-SCHIMMOWSKI ENGINEERS	CLIENT: YARDSCAPES, INC.	Project No:	20-4834
PDS	161 DUNBAR WAY MAHTOMEDI, MN 55115	8609 HARRIET AVENUE SOUTH BLOOMINGTON, MN 55420	Drawing Name:	TIERED BOULDER WALL
Scale:	AS NOTED	PHONE: 651.779.7700 FAX: 651.779.7114 pschimmo@criterium-schimowski.com		