



November 25, 2022

Town of Weymouth Conservation Commission
Attn: Mary Ellen Schloss, Conservation Administrator
75 Middle Street
Weymouth, MA 02189
Phone (781) 340-5007

**RE: HANOVER, WEYMOUTH PROJECT – RETAINING WALL CONSTRUCTION
1325 Washington Street
MassDEP File # 81-1271**

Dear Ms. Schloss and Members of the Commission;

Crocker Design Group, LLC (CDG), on behalf of the Applicant, Hanover R.S. Limited Partnership (Hanover), as required by Condition 31 of the Order of Conditions, MA DEP File #81-1271, has prepared this letter to summarize and request permission to implement the proposed design changes at the retaining wall northeast of front building, adjacent to Wetland series F, which is within the jurisdiction of the Weymouth Conservation Commission.

Included with this submission are the following documents:

- Enclosure 1: Proposed Retaining Wall #5A Exhibit, WX-1, dated 11/18/22
- Enclosure 2: Proposed Buffer Zone Restoration Landscaping Plan
- Enclosure 3: Retaining Wall Design Sheets 1 &2, dated 11/4/22
- Enclosure 4: Lock & Load Product Information

The permitted retaining wall to the east of Building 1, adjacent to the outdoor amenity and pool area, requires a “cut” into the existing grade with the height of the wall varying from 2 feet to approximately 22.5 feet tall in this location. The permitted plans included the retaining wall, however at the time of permitting, the need for the geogrid reinforcement behind the wall had not been analyzed or designed. Therefore, the anticipated limit of work/erosion control line was shown close to the rear of the wall on the permitted plans.

Hanover has now contracted with Pompeo as their site contractor and Pompeo has performed additional site geotechnical investigation along the proposed wall location and has coordinated with the various retaining wall block designers and has recommended the use of the “Lock and Load” wall system as manufactured by Versa-Lok and has completed the structural design of the wall through Souhegan Valley Engineering, LLC (SVE). Refer to Enclosure 3 for SVE’s retaining wall design and Enclosure 4 for the product brochure for the Lock and Load wall system. SVE’s wall design requires geogrid/tie backs behind the wall. Please Enclosure 1, which provides the



layout of the wall, and the top and bottom of wall elevations at each proposed change in height. This exhibit also shows the required depth of the geogrid along the wall, and the required space needed for the installation of the geogrid and wall, the limits of which have been field coordinated with Pompeo. To accomplish the wall and geogrid installation, Pompeo requires access to 4,260 +/- of area within the buffer zone. Refer to Enclosure 1 – Retaining Wall #5A Exhibit Sheet WX-1 prepared by CDG which shows the wall, the geogrid reinforcement and the proposed work area required by Pompeo to complete the wall installation.

To minimize encroachment into the buffer zone, and maintain no disturbance within the 25ft buffer zone, the wall was pulled in at the area to the north of the pool where in the permitted plans the wall was almost directly at the 25ft buffer line. Hanover proposes to restore the buffer zone from the proposed back of wall to the new proposed limit of work line. Please refer to Enclosure 2 for the Proposed Buffer Zone Restoration Landscaping plan which proposed replacement buffer plantings in order to restore the work area behind the wall once the wall installation is complete.

Based on the above, Hanover respectfully requests permission to implement the wall design, using SVE's Lock and Load with geogrid reinforcement design as proposed herein.

Should you have any questions or require any further information, please do not hesitate to contact Gabe Crocker, P.E. at gabecrocker@crockerdesigngroup.com or 781-919-0808.

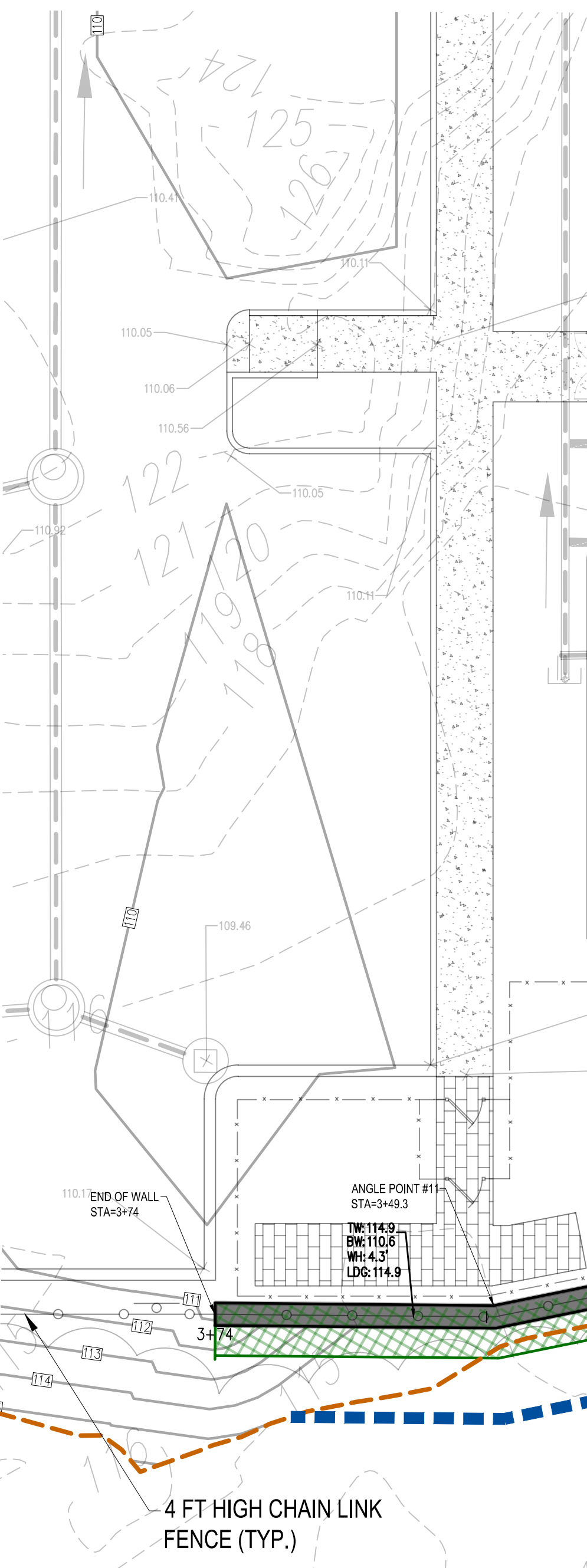
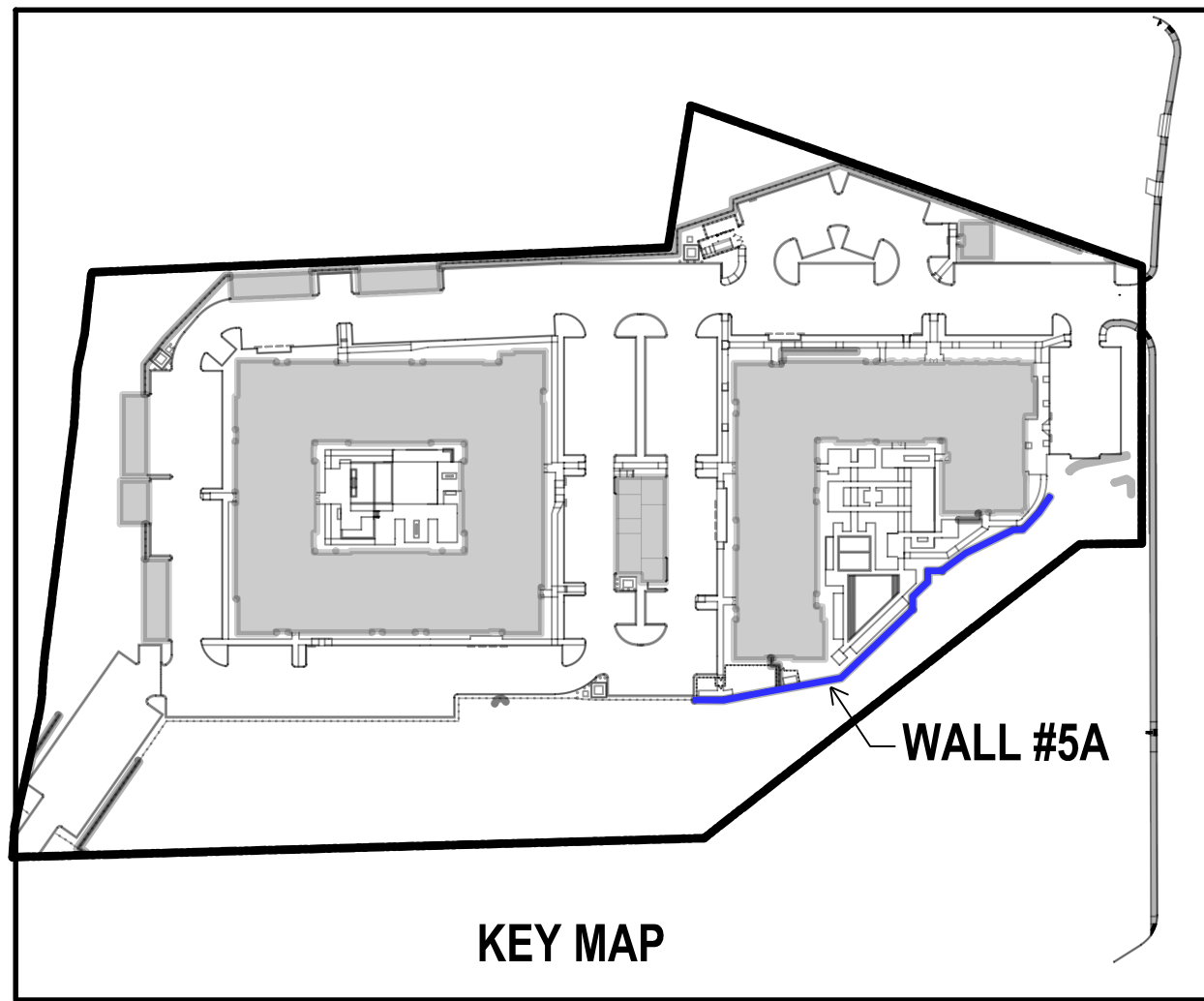
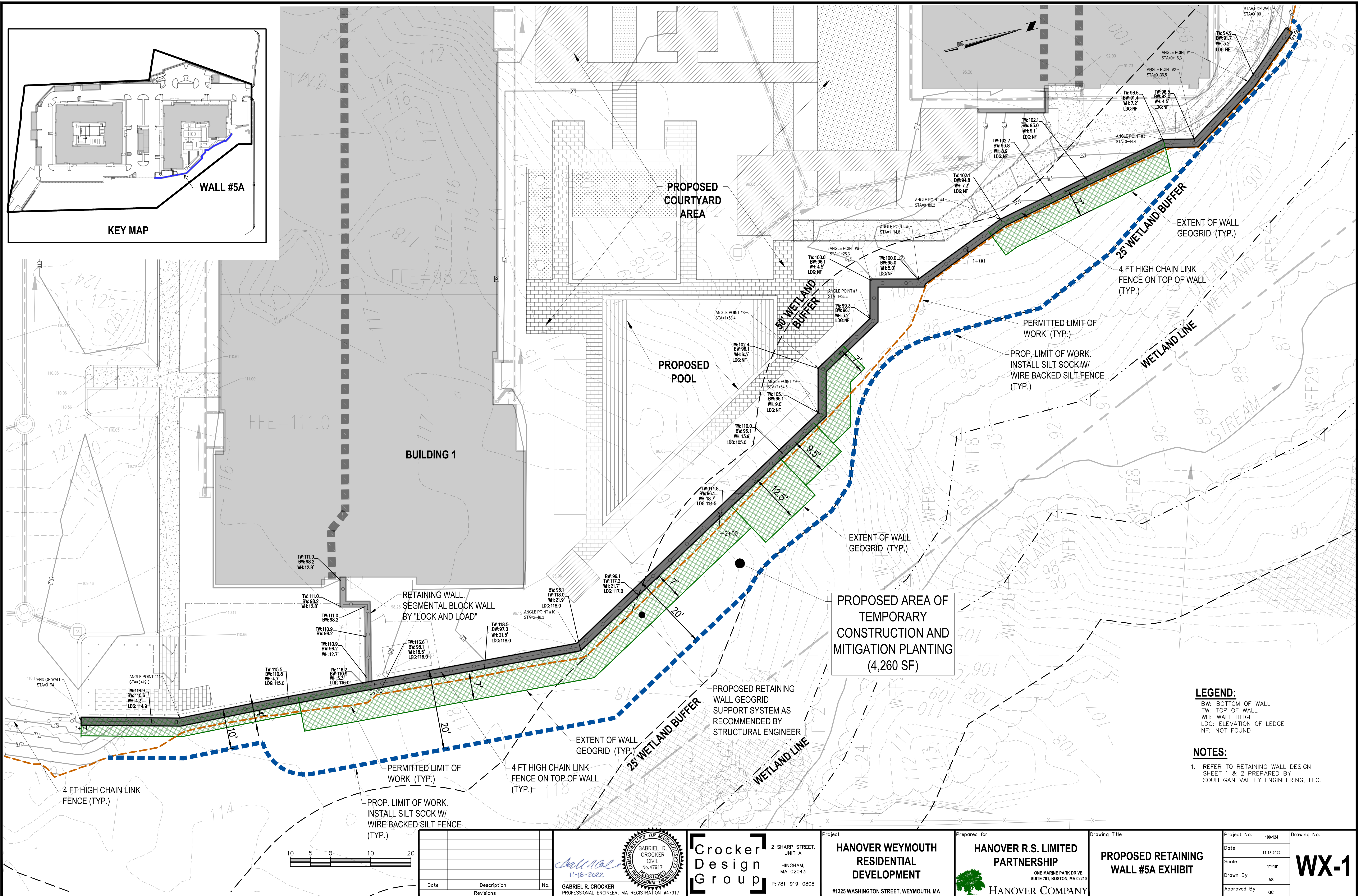
Sincerely,
Crocker Design Group LLC

A handwritten signature in blue ink, appearing to read "Gabe Crocker".

Gabe Crocker P.E.
President/Agent



**Enclosure 1:
Proposed Retaining Wall #5A Exhibit, WX-1, dated 11/18/22**



- LEGEND:**
 BW: BOTTOM OF WALL
 TW: TOP OF WALL
 WH: WALL HEIGHT
 LDG: ELEVATION OF LEDGE
 NF: NOT FOUND
- NOTES:**
 1. REFER TO RETAINING WALL DESIGN SHEET 1 & 2 PREPARED BY SOUHEGAN VALLEY ENGINEERING, LLC.



Date	Description	No.

GABRIEL R. CROCKER
 PROFESSIONAL ENGINEER, MA REGISTRATION #47917

Crocker Design Group
 2 SHARP STREET, UNIT A
 HINGHAM, MA 02043
 P: 781-919-0808

HANOVER WEYMOUTH RESIDENTIAL DEVELOPMENT
 #1325 WASHINGTON STREET, WEYMOUTH, MA

Prepared for
HANOVER R.S. LIMITED PARTNERSHIP
 ONE MARINE PARK DRIVE, SUITE 701, BOSTON, MA 02210
HANOVER COMPANY

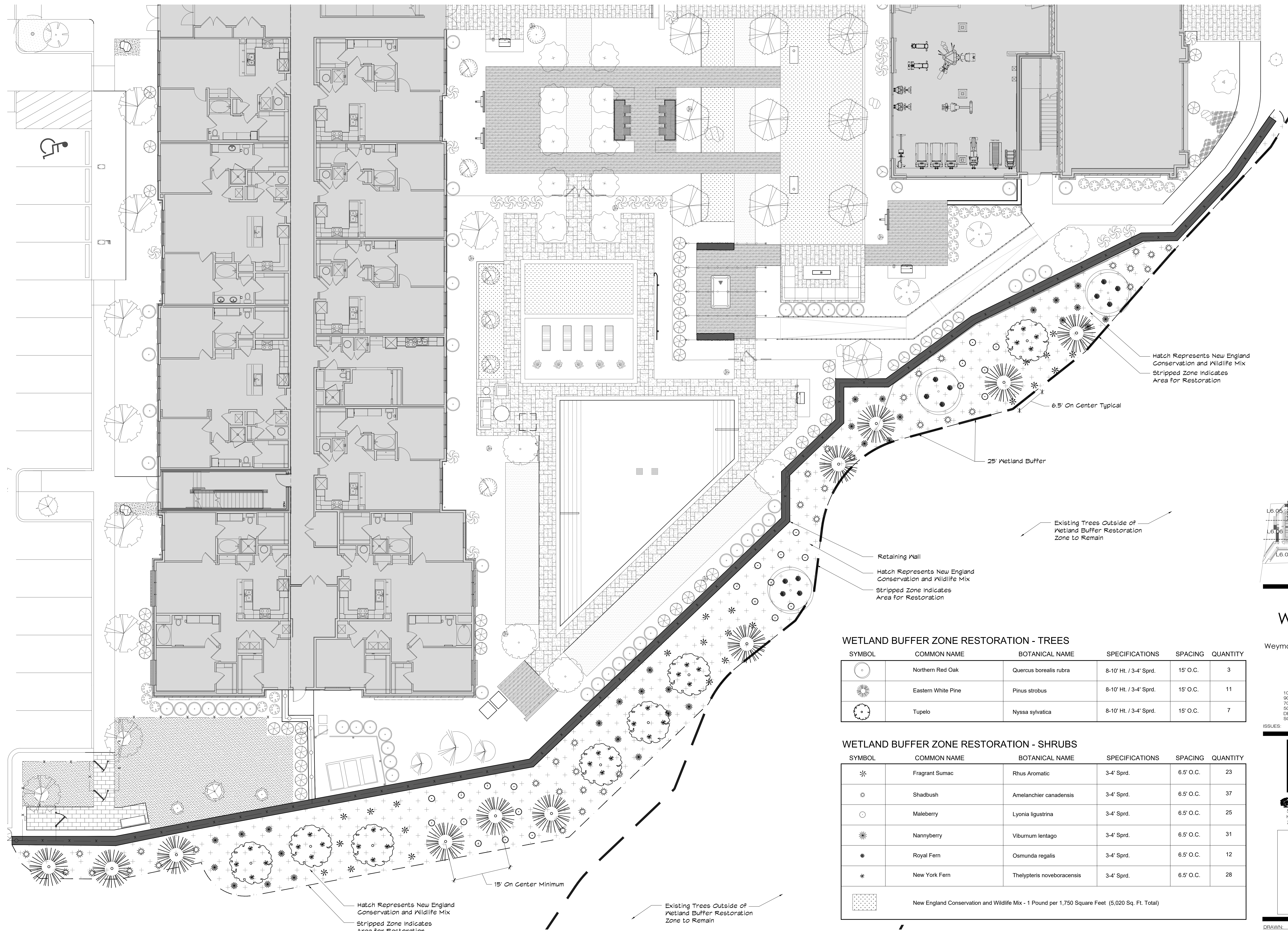
PROPOSED RETAINING WALL #5A EXHIBIT

Project No.	100-124	Drawing No.	WX-1
Date	11.18.2022		
Scale	1"=10'		
Drawn By	AS		
Approved By	GC		



**Enclosure 2:
Proposed Buffer Zone Restoration Landscaping Plan**

PLANTING



Hatch Represents New England Conservation and Wildlife Mix
Stripped Zone Indicates Area for Restoration

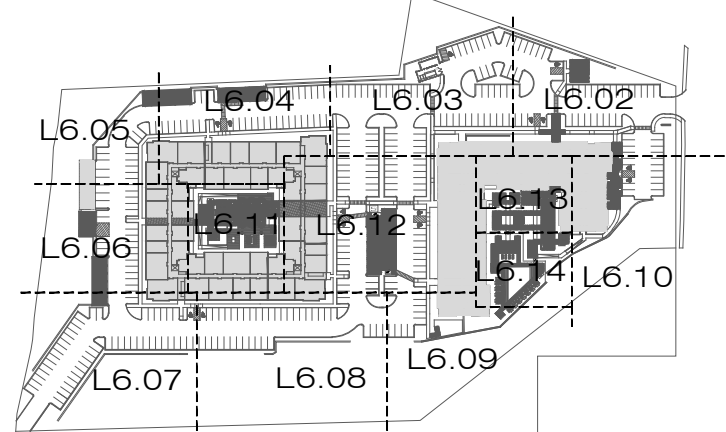
6.5' On Center Typical

25' Wetland Buffer

Existing Trees Outside of Wetland Buffer Restoration Zone to Remain

Retaining Wall

Hatch Represents New England Conservation and Wildlife Mix
Stripped Zone Indicates Area for Restoration



WETLAND BUFFER ZONE RESTORATION - TREES

SYMBOL	COMMON NAME	BOTANICAL NAME	SPECIFICATIONS	SPACING	QUANTITY
	Northern Red Oak	<i>Quercus borealis rubra</i>	8-10' Ht. / 3-4' Sprd.	15' O.C.	3
	Eastern White Pine	<i>Pinus strobus</i>	8-10' Ht. / 3-4' Sprd.	15' O.C.	11
	Tupelo	<i>Nyssa sylvatica</i>	8-10' Ht. / 3-4' Sprd.	15' O.C.	7

WETLAND BUFFER ZONE RESTORATION - SHRUBS

SYMBOL	COMMON NAME	BOTANICAL NAME	SPECIFICATIONS	SPACING	QUANTITY
	Fragrant Sumac	<i>Rhus Aromatic</i>	3-4' Sprd.	6.5' O.C.	23
	Shadbush	<i>Amelanchier canadensis</i>	3-4' Sprd.	6.5' O.C.	37
	Maleberry	<i>Lyonia ligustrina</i>	3-4' Sprd.	6.5' O.C.	25
	Nannyberry	<i>Viburnum lentago</i>	3-4' Sprd.	6.5' O.C.	31
	Royal Fern	<i>Osmunda regalis</i>	3-4' Sprd.	6.5' O.C.	12
	New York Fern	<i>Thelypteris noveboracensis</i>	3-4' Sprd.	6.5' O.C.	28
	New England Conservation and Wildlife Mix - 1 Pound per 1,750 Square Feet (5,020 Sq. Ft. Total)				

Hatch Represents New England Conservation and Wildlife Mix
Stripped Zone Indicates Area for Restoration

Existing Trees Outside of Wetland Buffer Restoration Zone to Remain

15' On Center Minimum

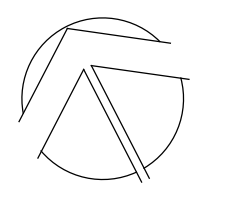
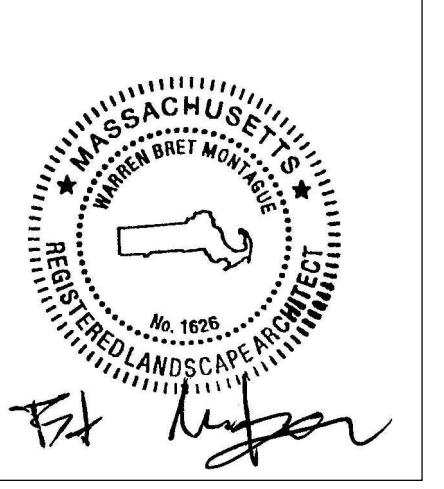
Hanover WEYMOUTH
1325 Washington St.
Weymouth, Massachusetts 02189

100% CONSTRUCTION DOCS 10/14/2022
90% CONSTRUCTION DOCS 07/28/2022
70% CDs for Permit 06/03/2022
50% CONSTRUCTION DOCS 04/22/2022
DESIGN DEVELOPMENT 03/04/2022
SCHEMATIC DESIGN xx/xx/xxxx

ISSUES:



an affiliate of
THE HANOVER COMPANY
5847 SAN FELICE SUITE 3600
HOUSTON TEXAS 77057
713.267.2100 FAX 713.267.2145



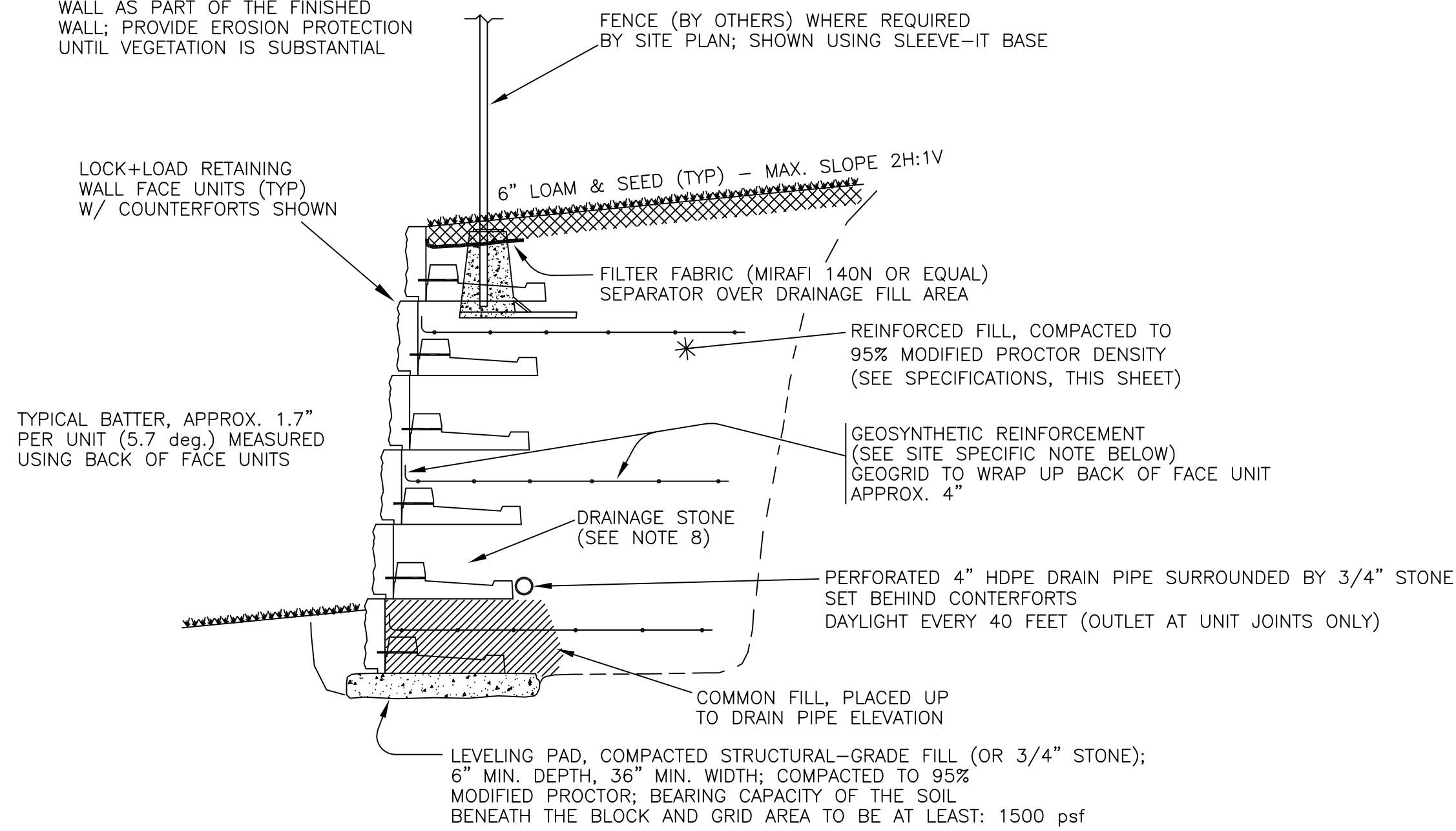
PLAN SCALE:

SITE PLAN 1/8" = 1'-0"



**Enclosure 3:
Retaining Wall Design Sheets 1 &2, dated 11/4/22**

DO NOT INSTALL SWALE BEHIND WALL AS PART OF THE FINISHED WALL; PROVIDE EROSION PROTECTION UNTIL VEGETATION IS SUBSTANTIAL



**WALL PARTS DETAIL - LOCK+LOAD WALL - REINFORCED
(WALL PARTS DETAIL ONLY - SEE WALL FACE DRAWING
FOR SPECIFIC BLOCK & GEOGRID CONFIGURATIONS)**

LOCK + LOAD SEGMENTAL RETAINING WALL
(NOT TO SCALE)

REINFORCED BACKFILL GENERAL REQUIREMENTS	
SIEVE SIZE	% PASSING
3"	100%
1 1/2"	50-85%
#4	40-75%
#50	8-28%
#200	0-10%

NOTE: THE DESIGN ENGINEER MUST BE MADE AWARE WHENEVER THE PERCENT PASSING THE #200 SIEVE EXCEEDS 10%. GROUNDWATER CONTROL METHODS MAY BE REQUIRED.

SITE SPECIFIC NOTE: THE WALL HEIGHTS AT THIS SITE VARY AND ARE SHOWN ON THE WALL FACE DRAWING ON SHEET 2 OF 2. THE GEOGRID SHALL BE STRATAGRID PRODUCTS AS DETAILED ON THE WALL FACE DRAWING. THE CUT LENGTHS OF THE GEOGRID LAYERS, AND THE PLACEMENT ELEVATIONS OF THE GEOGRID LAYERS ARE SHOWN ON THE WALL FACE DRAWING. THE GEOGRID SHALL PROVIDE 100% COVERAGE.

THE CONTRACTOR SHOULD CONTACT THE DESIGN ENGINEER WITH ANY QUESTIONS.

DESIGN ASSUMPTIONS		
SOIL	SOIL UNIT WEIGHT	φ
REINFORCED SELECT FILL	130	34
RETAINED EARTH	130	34
FOUNDATION SOIL	130	34

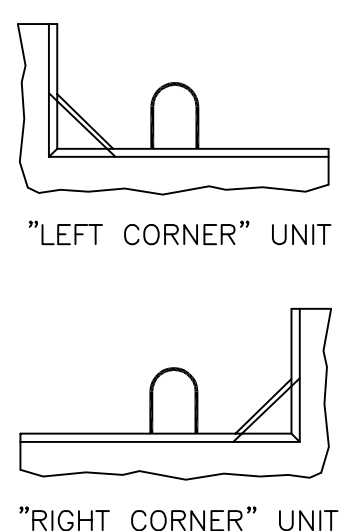
APPLIED SURCHARGE LOADINGS:
250 psf = ROADWAY/DRIVEWAY LOADS
100 psf = PARKING/YARD LOADS
SLOPE LOADS, PER SITE GRADING

SEISMIC ACCELERATION = 0.16

MINIMUM FACTORS OF SAFETY	
OVERTURNING	2.0
SLIDING	1.5
BEARING CAPACITY	2.0
GEOGRID PULLOUT	1.5

IF CONDITIONS ARE DIFFERENT THAN THOSE STATED IN THESE DRAWINGS AND SPECIFICATIONS, THE CONTRACTOR MUST CONTACT THE DESIGN ENGINEER PRIOR TO PROCEEDING WITH THE CONSTRUCTION OF THE WALL.

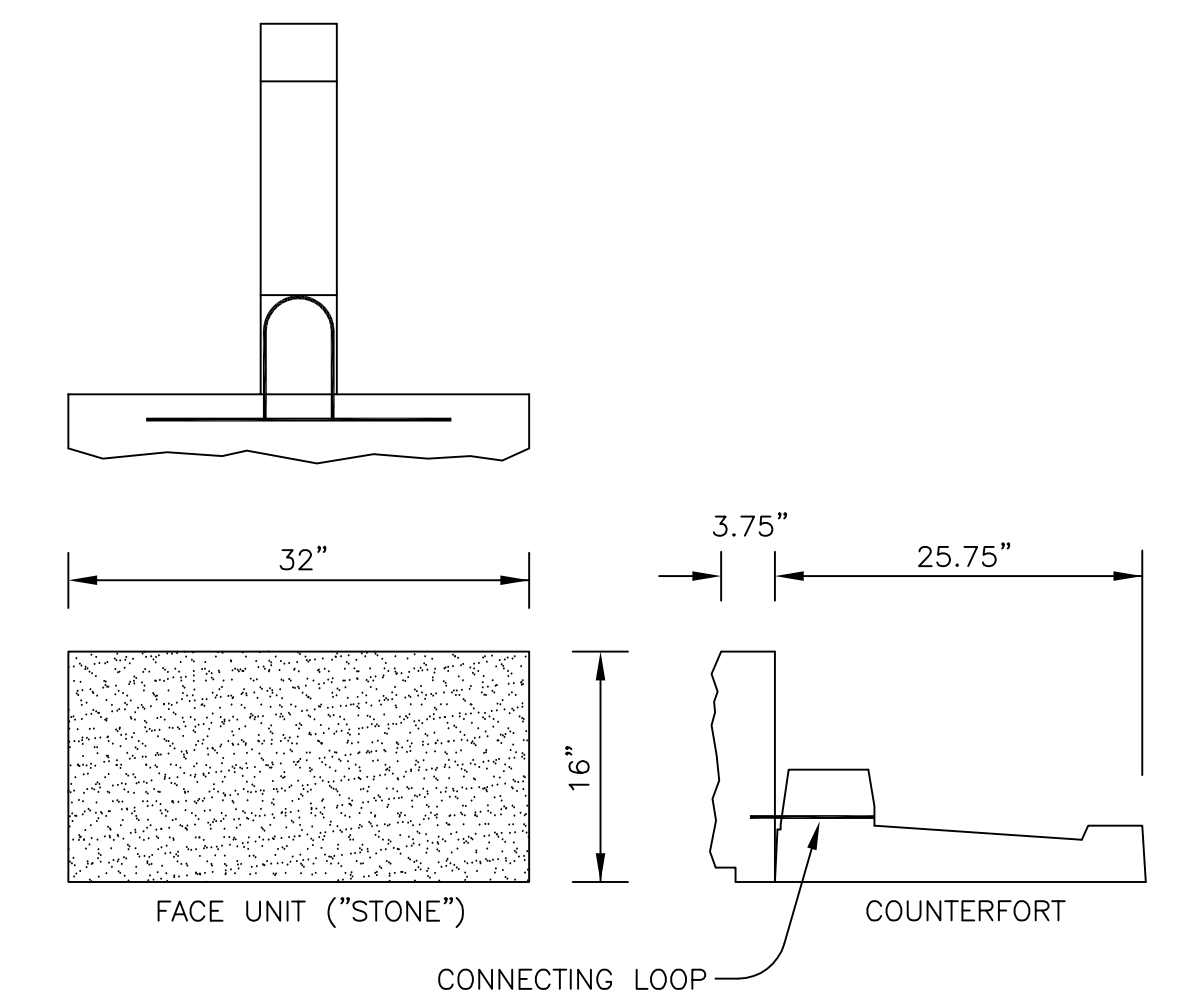
COMPACTION NOTE: WHERE THE RETAINING WALL PASSES OVER ANY UTILITY LINES, COMPACTION OF THE SOIL WITHIN THE UTILITY TRENCH IS CRITICAL IN ORDER TO PREVENT SETTLEMENT OF THE WALL. COMPACTION OF ALL FILL MATERIAL IN UTILITY TRENCHES WHICH PASS UNDER THIS RETAINING WALL MUST BE AT LEAST 95% OF THE MAXIMUM DENSITY OF THE FILL MATERIAL.



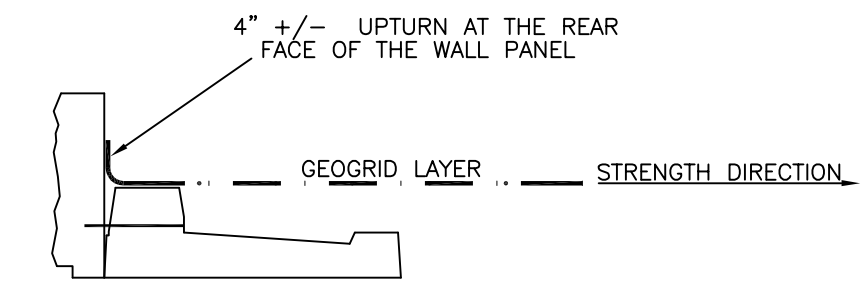
TYPICAL CORNER UNITS
(NOT TO SCALE)
OPTIONAL FOR USE AT TOP STEPS

GENERAL NOTES:

1. STRIP ALL VEGETATION, ORGANIC SOILS AND UNSUITABLE FILL SOILS FROM THE WALL ALIGNMENT AREA.
2. BENCH CUT ALL EXCAVATED SLOPES.
3. DO NOT OVER EXCAVATE UNLESS DIRECTED TO DO SO BY THE OWNER'S SITE REPRESENTATIVE IN ORDER TO REMOVE UNSUITABLE SOIL.
4. THE OWNER'S SITE REPRESENTATIVE SHALL VERIFY FOUNDATION SOILS AS BEING COMPETENT PER THE DESIGN STANDARDS AND PARAMETERS.
5. LEVELING PAD SHALL CONSIST OF COMPACTED, STRUCTURAL-GRADE SAND & GRAVEL, 6" THICK AND EXTENDING AT LEAST 6" TO EITHER SIDE OF THE FACING PANEL AND COUNTERFORT.
6. MINIMUM EMBEDMENT OF WALL BELOW FINISH GRADE SHALL BE AS INDICATED ON THE WALL FACE DRAWING.
7. FOLLOW APPLICABLE PROVISIONS OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WRITTEN SPECIFICATIONS, ESPECIALLY WITH REGARDS TO LEVELING OF PANELS AND BASE.
9. WHERE PERFORATED HDPE DRAINS ARE USED, PROVIDE OUTLETS AT THE ENDS OF THE WALL OR AT A LOW COLLECTION POINT ALONG THE WALL. (ALTERNATE OUTLET METHODS MAY BE APPROVED BY THE DESIGN ENGINEER.)
10. BACKFILL AND COMPACT THE FILL MATERIAL BEHIND THE WALL AS THE WALL IS INSTALLED.
11. COMPACTION TESTS SHALL BE TAKEN AS THE WALL IS INSTALLED. THE MINIMUM NUMBER OF TESTS SHALL BE DETERMINED BY THE OWNER'S SITE REPRESENTATIVE.
12. PLACE A FILTER FABRIC (MIRAFI 140N, OR EQUAL) OVER THE DRAINAGE MATERIAL TO MINIMIZE SOIL MIGRATION FROM THE SURFACE MATERIAL INTO THE DRAINAGE MATERIAL.
13. COMPACTION SHALL BE TO 95% MODIFIED PROCTOR.
14. PROVIDE LATERAL DRAINAGE SWALES TO DIRECT FLOWS AROUND THE ENDS OF THE WALL AND AWAY FROM THE WALL DURING CONSTRUCTION. DO NOT CONSTRUCT A SWALE BEHIND THE WALL AS PART OF THE FINISHED WALL. GRADE ABOVE THE WALL SO THAT WATER FLOWS OVER THE WALL FACE OR TO A POINT AT LEAST AS FAR BEHIND THE WALL AS THE WALL HEIGHT.
15. TURF, OR SOME ACCEPTABLE FORM OF SOIL EROSION PROTECTION, SHOULD BE ESTABLISHED AT THE TOP OF THE WALL (WHERE REQUIRED) BY THE LANDSCAPE CONTRACTOR AS SOON AS THE WALL IS COMPLETED.
16. FINAL WALL ALIGNMENT SHALL BE LOCATED IN THE FIELD.
17. RECOMMENDED COMPACTION EQUIPMENT WITHIN 15 FEET OF THE BACK OF THE WALL IS AS FOLLOWS:
0 - 4 FEET HAND TAMP OR VIBRATORY PLATE COMPACTOR
4 - 15 FEET NOTHING LARGER THAN TWO-DRUM, WALK-BEHIND VIBRATORY ROLLER (LARGER ROLLERS CAN BE USED STATICALLY, PROVIDED LIFT SIZE DOES NOT COMPROMISE ACHIEVEMENT OF NECESSARY COMPACTION RATES.)
18. THESE WALLS HAVE BEEN DESIGNED WITH CONSIDERATION OF SEISMIC LOADINGS.

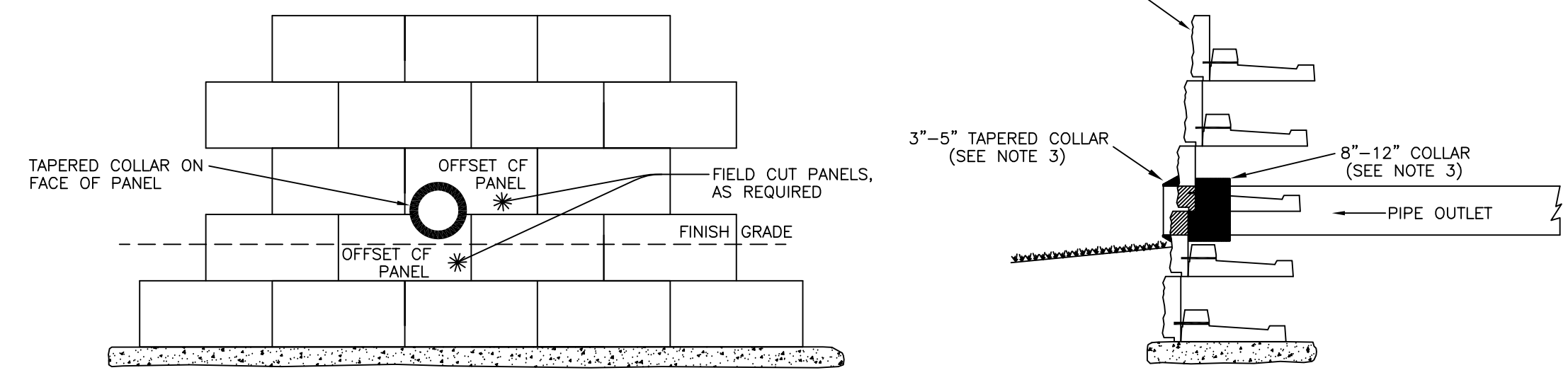


TYPICAL UNIT CONFIGURATION
UNIT DIMENSIONS
(NOT TO SCALE)



1. PLACE GEOGRID AT MID-POINT OF THE WALL PANEL.
2. SECURE WITH PLACEMENT OF DRAINAGE FILL.
3. APPLY TENSION AND MAINTAIN UNTIL 6" OF SOIL IS PLACED OVER GEOGRID LAYER.
4. GEOGRID LENGTHS ARE MEASURED FROM THE REAR FACE OF THE WALL PANEL.

GEOGRID PLACEMENT DETAIL
(NOT TO SCALE)

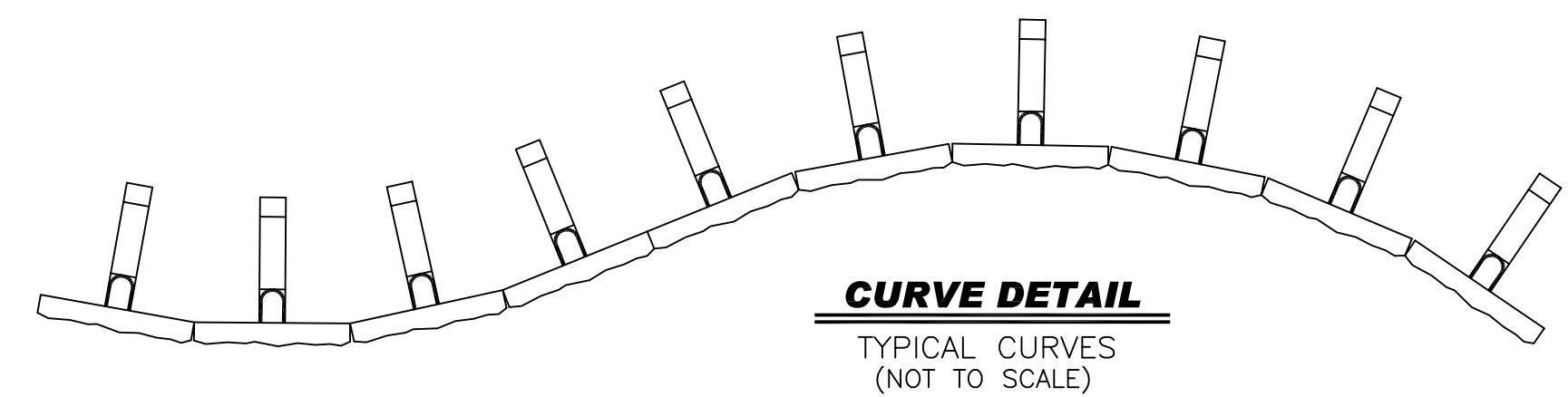


TYPICAL DETAIL - PIPE OUTLET THROUGH FACE PANELS

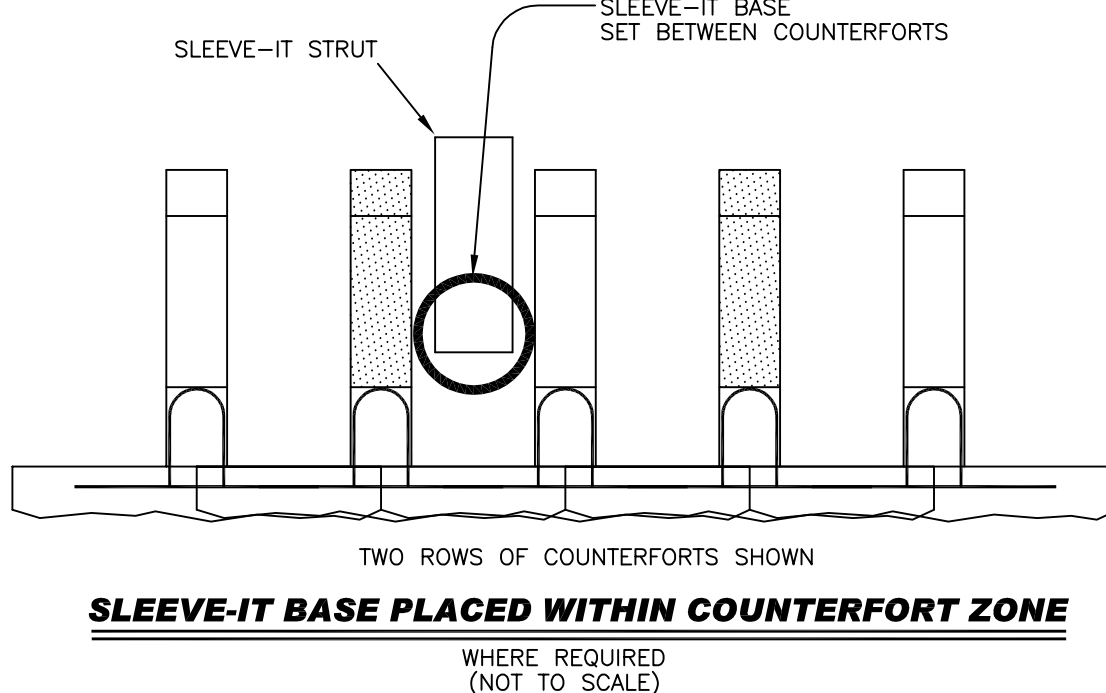
LOCK+LOAD SEGMENTAL RETAINING WALL
(NOT TO SCALE)

1. THE INTENT OF THIS DETAIL IS TO PROVIDE GENERAL GUIDANCE FOR INSTALLING AN OUTLET PIPE THROUGH THE WALL FACE PANELS.
2. PANELS CAN BE FIELD-CUT TO SIZE TO ALLOW THE PIPE THROUGH THE FACE. USE OFFSET COUNTERFORT PANELS ON EITHER SIDE OF THE PIPE, AS MAY BE REQUIRED, TO ALLOW CUTTING OF THE PANEL FACE.
3. INSTALL GROUT COLLARS AROUND THE PIPE ON BOTH SIDES OF THE FACE PANEL. USE A LONGER COLLAR ON THE INSIDE OF THE PANEL, AND A SHORTER, TAPERED COLLAR ON THE FACE OF THE PANEL. USE A QUICK-SET GROUT MIX (RAPID SET CEMENTALL, OR SIMILAR).

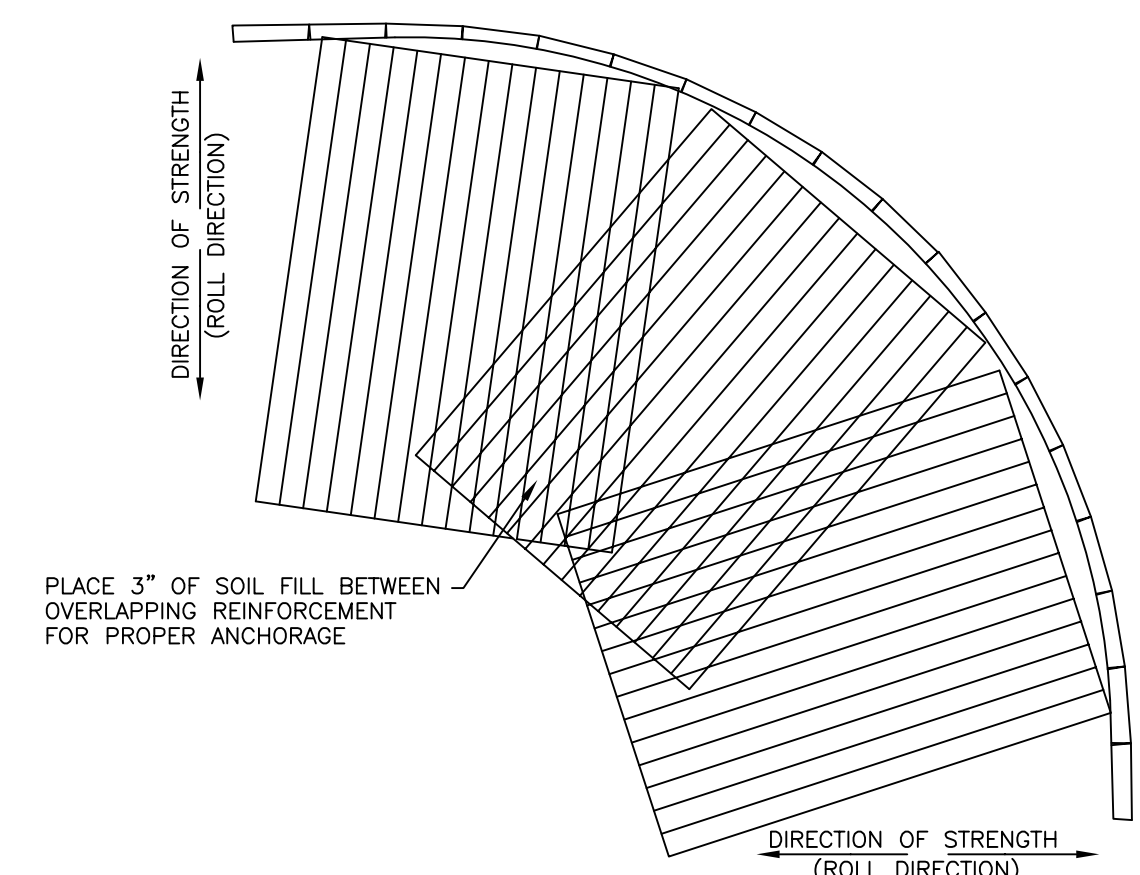
**REFER TO NOTES AND DETAILS
ON ALL SHEETS OF THIS SET**



CURVE DETAIL
TYPICAL CURVES
(NOT TO SCALE)



SLEEVE-IT BASE PLACED WITHIN COUNTERFORT ZONE
WHERE REQUIRED
(NOT TO SCALE)



GEOSYNTHETIC PLACEMENT - CONVEX CURVE
SCALE: NONE



**LOCK + LOAD
RETAINING WALLS**

NOTE: THIS DRAWING WAS PREPARED FOR USE WITH LOCK + LOAD RETAINING WALL SYSTEMS.

SOUHEGAN VALLEY ENGINEERING, LLC
CIVIL ENGINEERING CONSULTANTS SITE DESIGN SPECIALISTS
2 DARTMOUTH STREET CLAREMONT, NEW HAMPSHIRE 03743
Est. 1990 Available On The Web At www.SVEngineering.com

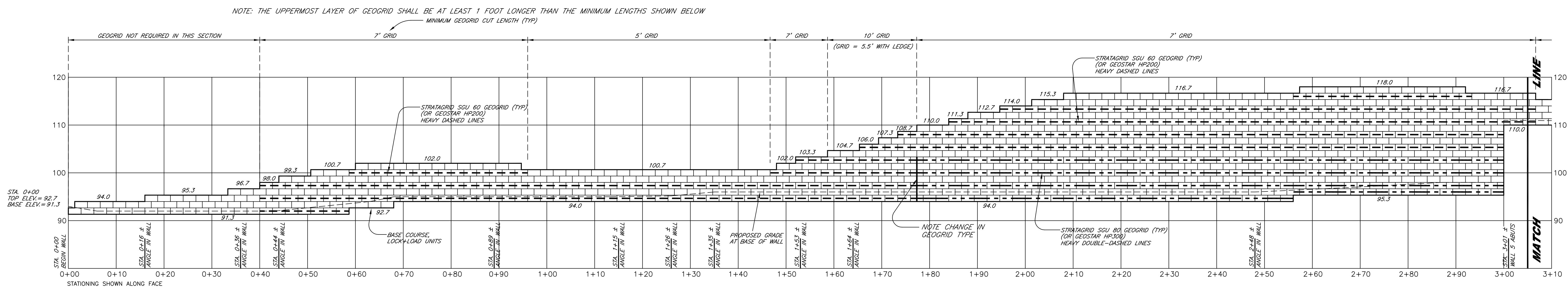
CLIENT: **VERSA-LOK OF NEW ENGLAND**
5 NORTHERN BOULEVARD, UNIT 15, AMHERST, NH 03301

PROJECT: **HANOVER WEYMOUTH RESIDENCES - WALL 5A**
1325 WASHINGTON STREET, WEYMOUTH, NH

SHEET TITLE: **RETAINING WALL DESIGN SHEET 1**

DATE: **NOVEMBER 4, 2022** SCALE: **AS SHOWN** PROJECT No.: **22-183A**

REVISION SET NUMBER	2
---------------------	---



WALL FACE DRAWING WALL #5A

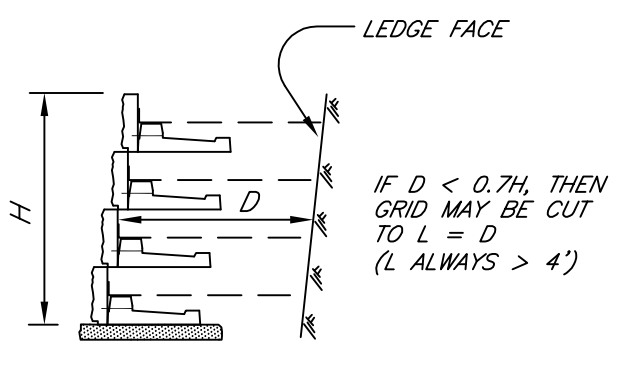
SCALE: 1" = 10'

- NOTES:**
- CARE SHOULD BE TAKEN TO REMOVE ALL ORGANIC MATERIAL FROM THE BASE EXCAVATION FOR THE RETAINING WALL.
 - GEOGRID LENGTHS ARE MEASURED FROM THE WALL FACE, I.E. THE GEOGRID ROLL IS SET AT THE BACK OF THE BLOCK, ROLLED OUT PERPENDICULAR TO THE BLOCK, AND CUT TO LENGTH. (ADD 4" PER INSTALLATION GUIDELINES)
 - ENDS OF THE RETAINING WALLS SHALL BE BLENDED INTO THE PROPOSED/EXISTING GRADE IN A MANNER SATISFACTORY TO THE OWNER'S SITE REPRESENTATIVE. AT THE ENDS OF A WALL WHERE BLENDING TAKES PLACE, THE ISSUE IS NOT A STRUCTURAL FACTOR BUT AN AESTHETIC FACTOR AND THE OWNER'S SITE REPRESENTATIVE IS QUALIFIED TO MAKE THIS JUDGEMENT.
 - END UNITS, PLACED WHERE THE GRADE BEHIND THE WALL IS DROPPING ALONG THE WALL LENGTH, MAY BE FIELD CUT SUCH THAT THE TOP OF THE BLOCK IS ANGLED TO FOLLOW THE GRADE BEHIND THE WALL. THIS IS AESTHETIC ONLY AND HAS NO IMPACT ON THE WALL SYSTEM'S STABILITY.
 - THE PREFERRED METHOD FOR PEDESTRIAN FENCES/RAILS IS TO INSTALL SLEEVES FOR THE POSTS DURING THE WALL INSTALLATION SO THAT POSTS CAN BE PLACED LATER WITHOUT IMPACTING THE WALL'S FACIAL STABILITY.
 - THE USE OF SLEEVE-IT POST BASES IS THE RECOMMENDED METHOD FOR PEDESTRIAN FENCE/RAIL POSTS.
 - ANY PLANTINGS SET BEHIND THE WALLS SHALL BE PLACED WITHOUT IMPACT TO ANY COUNTERFORTS OR GEOGRID PLACED AS PART OF THE WALL SYSTEM.
 - WHERE ANGLES IN THE RETAINING WALL ARE SHOWN, THE CONTRACTOR MAY CHOOSE TO CONSTRUCT THE WALL USING A CURVED FACE (AS DETAILED ON SHEET 1) AS OPPOSED TO THE SHARP ANGLE DEPICTED IN THE PLAN VIEW DRAWING.
 - USE OF CURVES IN PLACE OF SHARP ANGLES MUST BE APPROVED BY THE OWNER'S SITE REPRESENTATIVE.
 - FOR PIPES (>8" DIA.) WHICH OUTLET THROUGH THE RETAINING WALL, THE SPACE NEEDED TO SQUARE OFF THE PIPE TO THE WALL MAY BE FILLED WITH NON-SHRINK MORTAR, BLOCKS CUT TO SIZE OR OTHER APPROVED SEALANT METHOD TO PREVENT MIGRATION OF FINES THROUGH GAPS AROUND THE PIPE. FILTER FABRIC SHALL BE PLACED AROUND THE PIPE AS A SECONDARY MEASURE TO PREVENT MIGRATION.
 - ANY UTILITY LINE HAVING A DIAMETER GREATER THAN 4" AND PASSING UNDER A RETAINING WALL MUST HAVE A MINIMUM CLEARANCE OF 24" BETWEEN THE WALL BASE COURSE AND THE CROWN OF THE UTILITY LINE. WHERE THIS MINIMUM CLEARANCE CANNOT BE ACHIEVED, A GRANITE OR CONCRETE HEADER SHALL BE INSTALLED OVER THE PIPE. THIS HEADER SHALL EXTEND AT LEAST 24" BEYOND BOTH SIDES OF THE PIPE, RUNNING ALONG THE WALL BASE. THE HEADER SHALL BE AT LEAST 12" DEEP AND BE CENTERED BENEATH THE WALL BASE.
 - THE LOCATIONS, SIZES AND HEADWALL CONFIGURATIONS OF ANY PIPE/CULVERT SHOWN ON THESE DRAWINGS WERE TAKEN FROM INFORMATION SUPPLIED BY OTHERS. THE CONTRACTOR SHALL REFER TO DRAWINGS PREPARED BY THE SITE DESIGN ENGINEER FOR SPECIFIC SIZE, LOCATION AND CONFIGURATION INFORMATION OF ALL SITE UTILITIES.

LEDGE NOTES

1. WHERE THE LOCK+LOAD WALL COMES IN CLOSE PROXIMITY TO AN EXISTING OR CREATED LEDGE FACE, THE NEED FOR PARTICULAR LENGTHS OF GEOGRID MAY BE REDUCED. THEREFORE, THE FOLLOWING RULE SHALL APPLY TO THIS PROJECT:

WHERE THE FACE OF THE PROPOSED LOCK+LOAD WALL IS A DISTANCE FROM THE LEDGE FACE WHICH IS LESS THAN 0.7 * FULL HEIGHT OF LOCK+LOAD WALL, THE GRID LENGTHS IN THE LOCK+LOAD WALL MAY BE REDUCED TO A LENGTH WHICH, WHEN SPREAD FLAT, FILLS THE DISTANCE BETWEEN THE LOCK+LOAD WALL AND THE LEDGE FACE. HOWEVER, THE GRID LENGTH SHALL NEVER BE LESS THAN 4 FEET OR 0.3H, WHICHEVER IS GREATER. THEREFORE, THE MINIMUM EXCAVATION TO THE FACE OF LEDGE SHALL BE AS REQUIRED TO PROVIDE THE NECESSARY GRID LENGTHS AS NOTED HERE.



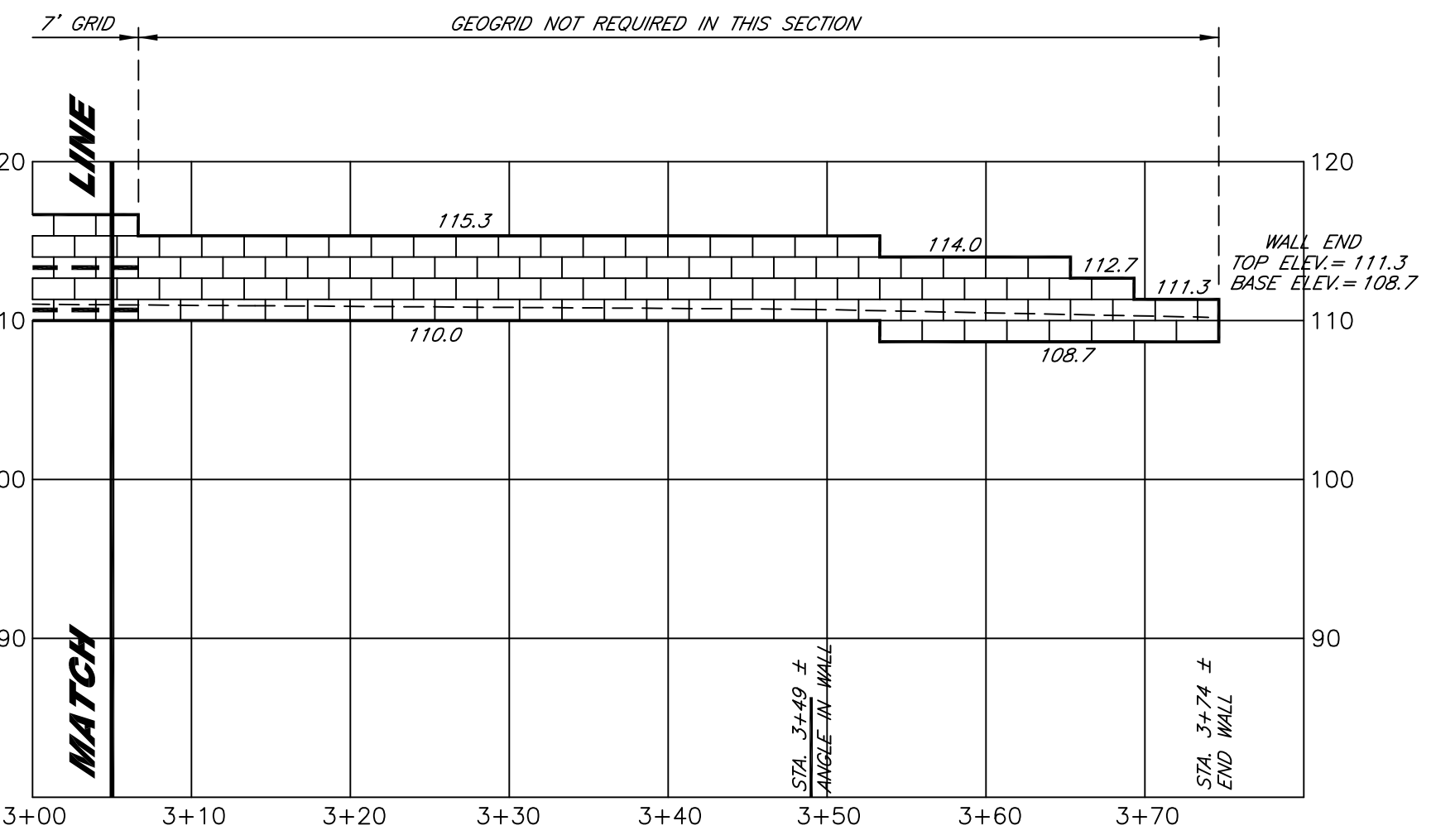
NOTE THAT THE ELEVATIONS OF THE GRID LAYERS SHALL NOT CHANGE FROM THOSE INDICATED ON THE WALL FACE DRAWINGS.

IN AREAS WHERE THE ABOVE REDUCED GRID LENGTHS ARE UTILIZED, THE SOIL THAT IS PLACED AND COMPACTED IN THE REINFORCED ZONE SHALL BE A CLEAN (LESS THAN 7% FINES) SAND AND GRAVEL MIX TO ALLOW FOR POSSIBLE WATER FLOW FROM THE LEDGE FACE. AN ALTERNATIVE WOULD BE THE PLACEMENT OF A COMPOSITE DRAINAGE MATERIAL OVER THE LEDGE FACE PRIOR TO THE PLACEMENT OF A SITE STANDARD REINFORCED FILL MATERIAL. THIS PLACEMENT OF COMPOSITE MATERIAL WILL WRAP AROUND A PERFORATED BASE DRAIN PIPE, WHICH WILL THEN BE OUTLETED THROUGH THE WALL FACE WITH SOLID PVC PIPES.

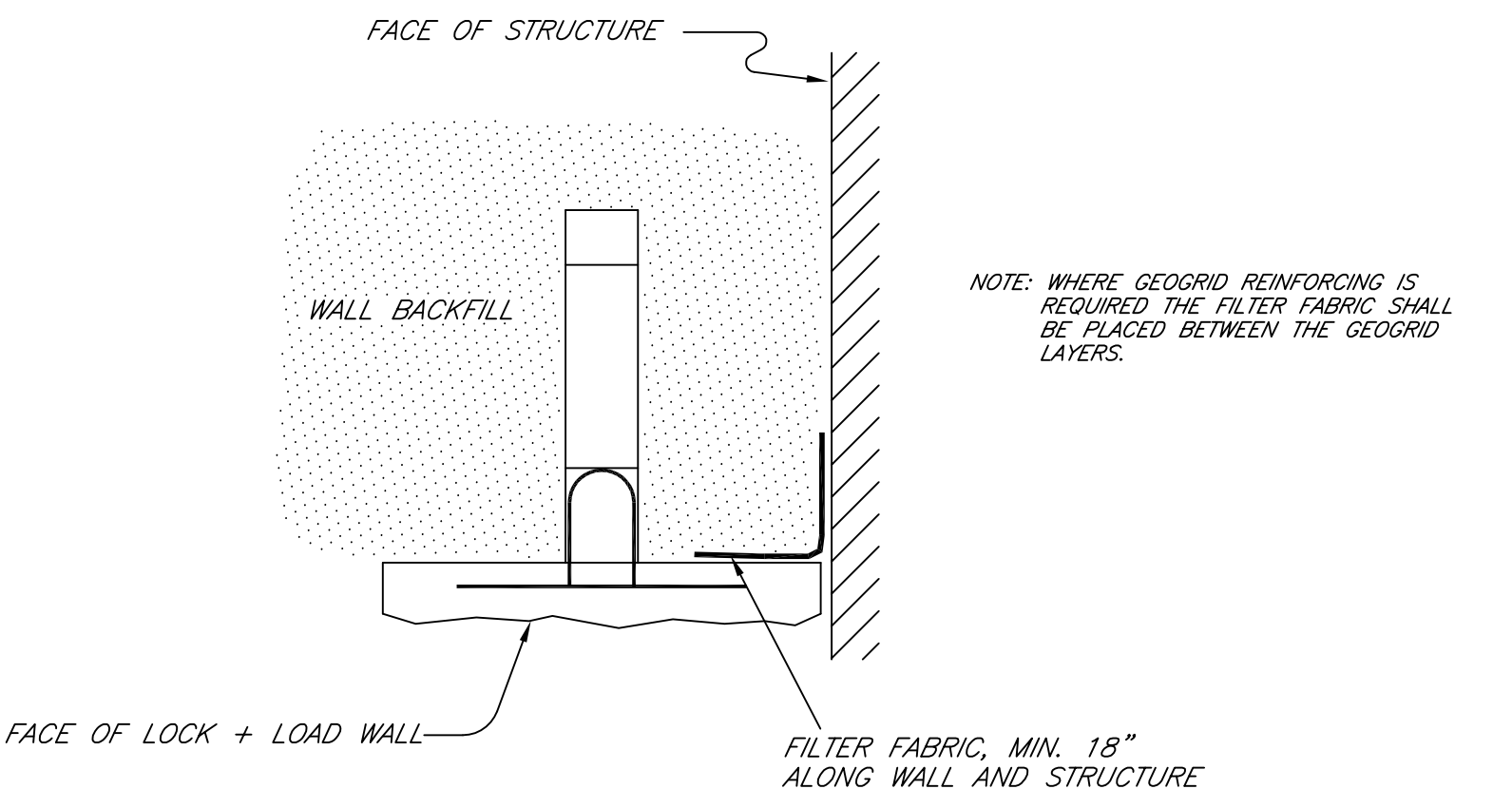
2. AS THE ELEVATION OF THE WALL FACE RISES ABOVE THE LEDGE ELEVATION, THE GEOGRID LENGTHS SHALL BE INCREASED TO THE LENGTHS INDICATED FOR THAT WALL SECTION SHOWN ON THE WALL FACE DRAWINGS IN THESE PLANS.

ANY QUESTIONS REGARDING THIS DETAIL OR ITS USE SHALL BE DIRECTED TO THE DESIGN ENGINEER.

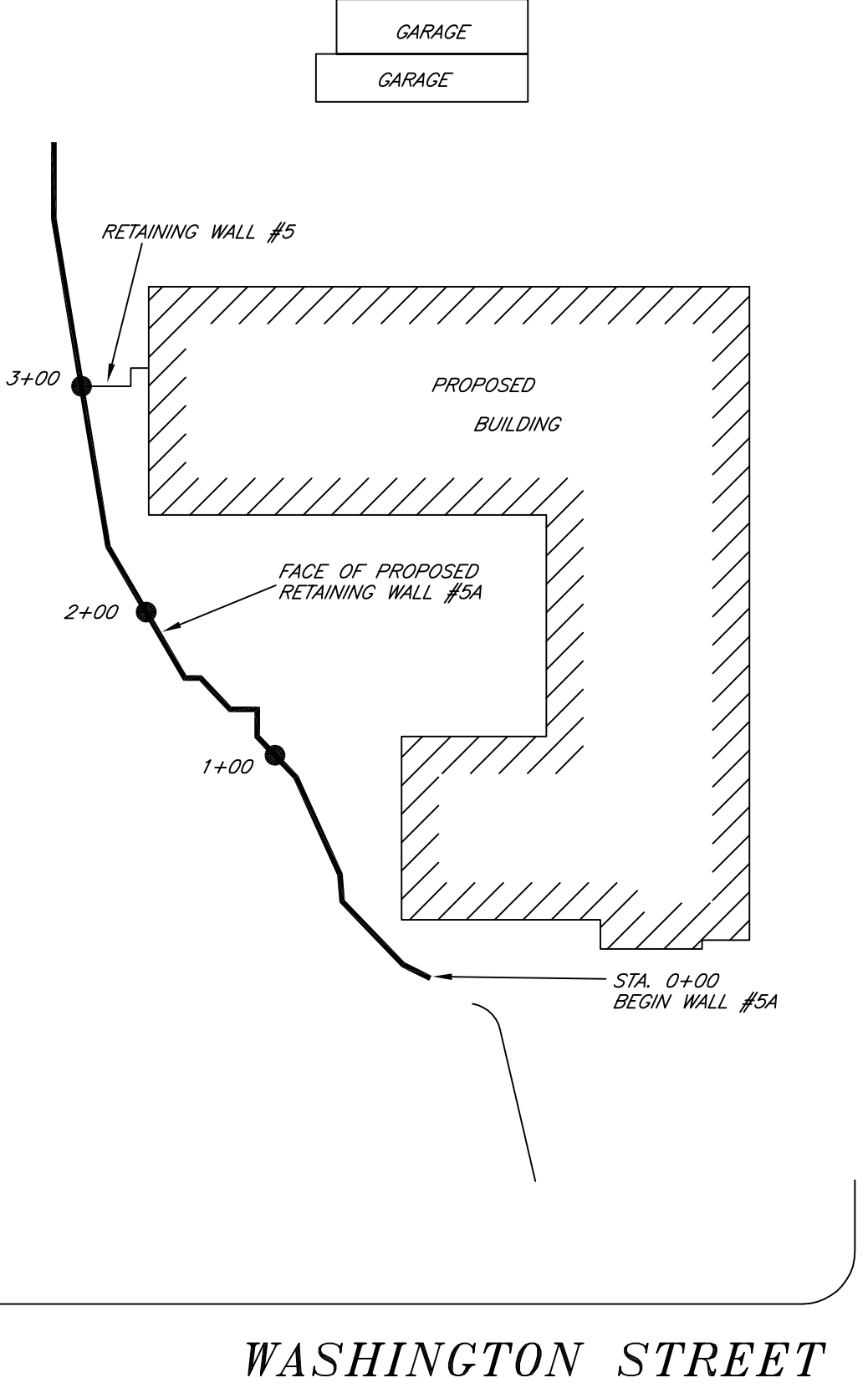
THE DESIGN OF THIS DETAIL WAS BASED ON INFORMATION OBTAINED FROM THE SITE CONTRACTOR THAT LEDGE IN THE AREA OF THE WALLS IS SOUND AND OF GOOD QUALITY, I.E. NOT FRACTURED.



WHERE THE WALL ABUTS A STRUCTURE, A FILTER FABRIC (MIRAFI 140N, OR EQUAL) SHALL BE PLACED VERTICALLY ALONG THE SEAM TO PREVENT MIGRATION OF SOILS BETWEEN THE WALL BLOCK AND THE STRUCTURE. THE FABRIC SHOULD EXTEND AT LEAST 18" ALONG THE STRUCTURE AND 18" ALONG THE REAR OF THE WALL UNIT.



DETAIL WALL ABUTTING STRUCTURE
(NOT TO SCALE)



WASHINGTON STREET
VICINITY SKETCH
(NOT TO SCALE)
REFER TO CONSTRUCTION DRAWINGS BY OTHERS

NOTE: IF THE FIELD CONDITIONS INDICATE THE GRADE AT THE BASE AND/OR TOP OF THE WALL TO BE DIFFERENT FROM THAT SHOWN ON THESE PLANS, THE DESIGN ENGINEER SHALL BE CONTACTED TO VERIFY CHANGES TO THE WALL BASE COURSE AND/OR TOP OF WALL ELEVATION. THE ELEVATIONS USED FOR THE WALLS AT THIS SITE WERE INTERPOLATED FROM THE GRADING PLAN PREPARED BY CROCKER DESIGN GROUP, DRAWING No. C-2.1, DATED 4/8/21, REVISED TO 10/14/22, PROJECT No. 100-124. UPDATED (REV. SET #2) WALL ALIGNMENT AND GRADING INFORMATION WAS INTERPOLATED FROM THE PROPOSED RETAINING WALL #5A EXHIBIT, PREPARED BY CROCKER DESIGN GROUP, DRAWING No. WX-1, DATED 11/18/22, PROJECT No. 100-124.

REFER TO NOTES AND DETAILS ON ALL SHEETS OF THIS SET

New England's
SVE
Retaining Wall Designers

COMMONWEALTH OF MASSACHUSETTS
REGISTERED PROFESSIONAL ENGINEER
RANDALL H. BRAGDON
CIVIL
No. 35217

LOCK + LOAD
RETAINING WALLS

NOTE: THIS DRAWING WAS PREPARED FOR USE WITH LOCK + LOAD RETAINING WALL SYSTEMS.

SOUHEGAN VALLEY ENGINEERING, LLC
CIVIL ENGINEERING CONSULTANTS SITE DESIGN SPECIALISTS
2 DARTMOUTH STREET CLAREMONT, NEW HAMPSHIRE 03743
Est. 1990 Available On The Web At www.SVEngineering.com

CLIENT: **VERSA-LOK OF NEW ENGLAND**
5 NORTHERN BOULEVARD, UNIT 15, AMHERST, NH 03301

PROJECT: **HANOVER WEYMOUTH RESIDENCES - WALL 5A**
1325 WASHINGTON STREET, WEYMOUTH, NH

SHEET TITLE: **RETAINING WALL DESIGN SHEET 2**

DATE: **NOVEMBER 4, 2022** SCALE: **AS SHOWN** PROJECT No.: **22-183A**

REVISION #	DATE	DESCRIPTION	BY	REVISION SET NUMBER
REVISION #2	11/23/22	MODIFY WALL ALIGNMENT/GRADES PER SITE LAYOUT/GRADING CHANGES	RHB	2
REVISION #1	11/14/22	MODIFY GRID LENGTHS PER LEDGE PROBES INFO	RHB	

SHEET 2 OF 2



**Enclosure 4:
Lock & Load Product Information**



INSTALLATION GUIDE

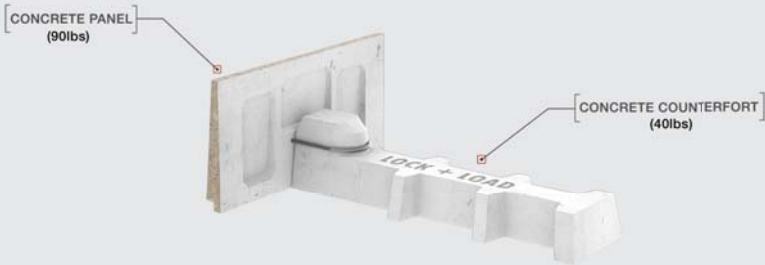


CONTENTS

Introduction	3
Foundation	4
Drainage and Backfill	6
Compaction	7
Subsequent Rows	8
Special Considerations	10
Tool Lists	12



CANTILEVER UNIT



This manual presents the steps necessary in the construction of LOCK+LOAD retaining walls.

“Modular Cantilevered Walls”

Each LOCK+LOAD Cantilever Unit is comprised of a panel and a counterfort. Shipped as units, they are easily assembled at the construction site as shown in the picture above.

LOCK+LOAD has several unique aspects that require procedures different and at times in direct contravention of procedures commonly used in the building of other “Hand Placed” retaining walls.

First and most importantly, LOCK+LOAD is designed specifically for the large forces needed to achieve specified compaction throughout the backfill.

Second, each Cantilever Unit is independently stable within the soil. LOCK+LOAD concrete parts do not stack on one another, as they are supported by the surrounding soil. This flexibility allows any inclination, any configuration or any alignment desired.

Utilizing LOCK+LOAD to achieve consistent specified compaction, results in a stable monolithic mass of reinforced soil protected by an attractive, independent, 5500psi (42 Mpa), cast, reinforced, concrete armor plating. A LOCK+LOAD Retaining Wall.

Third, LOCK+LOAD allows placement of the soil reinforcement (geo-grid) at the half height of the Cantilever Unit. This ensures the geo-grid’s connection with LOCK+LOAD is identical to the geo-grid reinforcement connection throughout the wall.

INTRODUCTION



FOUNDATION

Consult Engineer: Locate survey control points and confirm with the engineer that foundation soils have adequate bearing capacity for the wall height. Once foundation condition and materials are approved, wall construction can begin.

Excavate for the foundation pad: Excavate a 3-foot (1 M) wide foundation allowing for 6" (15cm) min depth of footing gravel. Remove surface vegetation and organic soils as required. If there are elevation steps in the foundation cut each step 16" (4cm) higher than the next lower level.

The foundation width must accommodate the LOCK+LOAD cantilevers and any drainage requirements. Drain system design, is site and soil specific and must be constructed in accordance with the plan.

Compact foundation pad: Place $\frac{3}{4}$ " (20mm) Minus stone required for grade to a min. 6" (15cm) deep and compact to 95% Modified Proctor (a typical - minimum of 4 passes with a 750lb or larger plate compactor). When the base pad is complete, layout and assemble LOCK+LOAD.

Except for special circumstances always begin the building of the wall from the lowest break point of the alignment. Ensuring work is always drained.

The Cantilever Units have a unique installation technique. However, as with any modular construction, becomes a natural and efficient operation. Like "Bricks and Mortar" the Cantilever Units are positioned and held in the wall by the backfill.



Place Cantilever Units. Setout pallets and place the panels face down side-by-side along the wall edge. With the counterforts, assemble the cantilever unit and position along the wall edge. Tilt outwards by placing wedge under Cantilever Units base. The Unit is now placed.

After the LOCK+LOAD Cantilever Units have been assembled and placed, establish a string line for the alignment of the top inside edge of the panel. Set one Cantilever Unit at each end of the section to be constructed as described below. At these locations secure a string line for alignment of the top inside edge of the Cantilever Unit. Several stakes may be added to eliminate sag and double check alignment.

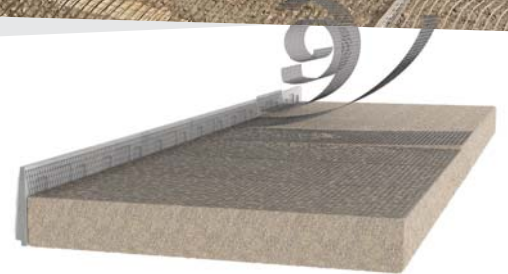
Placing LOCK+LOAD on a grade or a curve are accomplished with appropriate alignment verifications.

Setting LOCK+LOAD: Taking a few minutes to be accurate with alignment will ensure the quality of the installation.

- 1) LOCK the parts together. Using a wedge or similar create a rigid single Cantilever Unit.
- 2) Plumb the back of the LOCK+LOAD by adjusting the grade under the base.
- 3) Then level and align the Cantilever Unit with similar grading methods and minor elevation adjustments by sledge blows to wood blocking on the top.

Low Cantilever Units can be raised by tipping them forward and adding gravel under the panel and counterfort to raise the Cantilever Unit elevation.

After some practice this process becomes quick and efficient, a sign of quality work. Accurate alignment and proper compaction result in excellent wall installations something to be proud of for a long time.



DRAINAGE & BACKFILL

Drainage is always site specific. On shorter walls with LOCK+LOAD only, the drain pipe will be located at the rear of the Cantilever Unit, at foundation pad elevation. On taller walls the drain goes at the back of the soil reinforcement if possible. Check the plans!

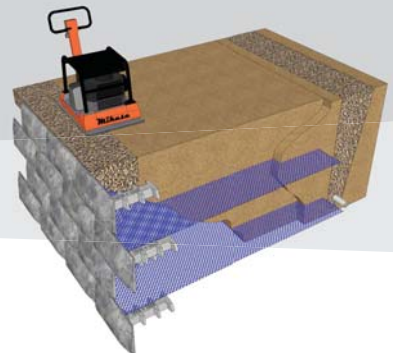
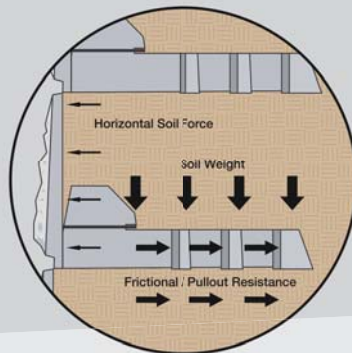
Facing Gravel is required at the LOCK+LOAD panel to ensure consistent vertical support maintaining wall alignment and appearance.

Select 3/4" (20mm) clear crushed rock material, a minimum of 6" (15cm) wide at the top of the Cantilever Unit, spilling on an angle down over the base. This is required on each row. Other non-plastic soils such as coarse sand etc. are feasible facing soils.

Backfill thickness at wall face, is 12" (30cm) tapering down to 8" (20cm) for rest of the fill. This allows adequate compaction of the backfill near the face. Soil compacts to near mid panel height without disturbing the Cantilever Units.

As designed, soil reinforcement is placed, at the mid height, to the back of the panel section and up 3" (75mm), ensuring 100% lap connection. Next lift of backfill should be almost 2" (5cm) above the top and then compacted flush with the top edge of the panel. Ready for the next row.

Leveling: Using a flat nose shovel grade the first 5" (15cm) of backfill level with the top of previous Cantilever in preparation for the subsequent row.



COMPACTION

Compaction operations and soil density tests are completed in the backfilled reinforced soil zone. This is to confirm that what was designed was built.

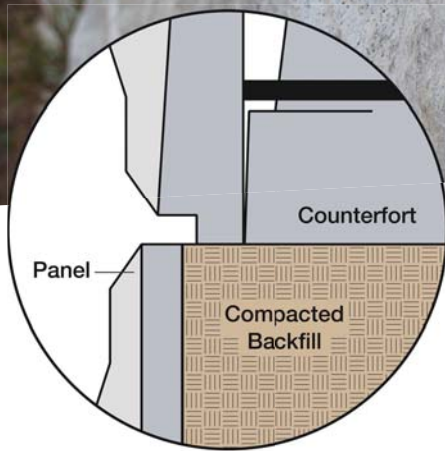
A performance specification for compaction in LOCK+LOAD area would be: Backfill as specified and compact with a minimum of four passes, over 100% of the backfill in the zone, with a compactor of a minimum of 800lbs. Two complete compaction operations are required per row of LOCK+LOAD. Compaction to 95% Modified Proctor is typically required and should be checked and verified.

All compaction activity, **always** begins over the back of the Cantilever Unit first – “LOCKING IT” with gravel prior to moving towards the wall face.

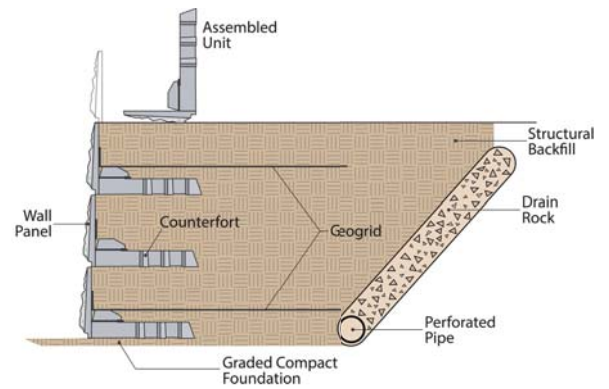
Compact along the horizontal distance of the wall. Using a large plate compactor at the face and larger roller compactors in the reinforced soil zone

LOCK+LOAD’s Cantilever Units have solved the compaction problems that most “Hand Placed” retaining walls had in the past.

Consistent compaction throughout the reinforced soil zone, specifically in the face area, to a uniform specified amount is a requirement for optimal Reinforced Soil Wall behavior.



Assembly detail



SUBSEQUENT ROWS

Note: THE CONCRETE PARTS DO NOT STACK!!! EACH CANTILEVER UNIT IS COMPLETELY INDEPENDENT.

Repeat the procedures for placing and setting Cantilever Units on page 5 for constructing the next rows. Location, alignment and elevation need to be checked.

Soil reinforcement, where required, is commonly installed near the mid height of the panel as the first lift of backfill is finished. The specified reinforcement can be rolled up and have an end trapped at the wall face with facing gravel. Then, as required unroll the reinforcement and cover with backfill. Grading and compacting the backfill in preparation for the placement of the next row of LOCK+LOAD.

Check the plans to confirm the grade, as well as the elevation and length of soil reinforcement, matches the original specifications. The LOCK+LOAD Cantilever Units are capable of creating walls up to four units high by themselves, with the inclusion of other soil reinforcement LOCK+LOAD becomes a part of a larger structure for walls over 60 feet high.

When the backfill is completed the compaction should be checked and approved before construction proceeds. Once approved, this construction sequence repeats for the next and subsequent rows until the wall is completed.



It should be noted that like all reinforced soil structures, LOCK+LOAD will consolidate at the same rate as the backfill soils maintaining a stress-free wall. Soil below the structure can also consolidate without adding wall stress. Overall compacted backfill soil will compress about 0.8% under its own weight, though minor these compressions should be considered in establishing foundation elevation. The individual stability of each LOCK+LOAD Cantilever Unit makes almost any configuration option a possibility. LOCK+LOAD can be installed vertically or near vertical.



SPECIAL CONSIDERATIONS

Curved: Alignments can be accomplished in several ways depending on the requirements. Set the first Cantilever Unit and then skip a couple. Then set another LOCK+LOAD, checking offset and elevation. Returning to set other Cantilever Units afterwards to suit. For tight curves use half wide Units and construct in the same manner.

Corners: Corners should be wired to adjacent Cantilever Units for support during the compaction process.

Trimming: LOCK+LOAD does not need to be built "on bond" but if it is required, for aesthetic reasons, the Cantilever Units can be trimmed for inside corners and maintaining bond on outside corners or abutting structures.

Trimming LOCK+LOAD using a diamond blade on a powered cut off saw with a water attachment is ideal. Aesthetically it is better to spread trimming to several Cantilever Units rather than making a large adjustment to just one.

Cuts can be made to maintain bond, smooth height transition, change grade of installation, abutting an existing structure, accommodate installation around a culvert etc.





TOOL LISTS

Required Tools

1. String Line
2. Flat pry bar, (12" wonder nail pulling bar)
3. 36" round steel concrete stakes
4. Flat point shovel
5. 4-16 Lb. Hammer
6. 2 ft. Builders Level
7. String line level (minimum), Rotating Laser level and string line preferred.
8. Plate Compactor; with 16 in. backfill lift capability (minimum). For example: Wacker BPU 2440 or Equivalent 24 Kn or 5400 lb, centrifugal force or larger, the best results with fewer passes. Note: a smaller compactor is only acceptable on walls 4 ft or less where access for a larger compactor may be difficult and Lifts must be reduced to 8 in maximum with multiple passes.
9. Scrap lumber, (2 x 4's).
10. Always work safely, Safety Glasses, Ear Protection, Hard Hat, Leather Gloves, Leather Work Boots.

Recommended Tools

1. *Material Handling Equipment:* Front End Loader (skid steer, wheel loader, backhoe) and or Excavator with grading bucket, Dozer etc. for excavation, placement and leveling of backfill.
2. *Ride on Vibratory Roller:* Pad-foot recommended for clay and cohesive soils. Smooth drum for granular material. Geo-tech can aid in your selection for soil type and geographic location.
3. *Laser Level:* Speeds up leveling process and insures accuracy.
4. *Utility Knife:* Used to cut geo-grid in taller wall designs.
5. 12" or 14" Diamond concrete blade on a *Cut Off Saw* with water.



For more information please contact:

LOCK+LOAD
Suite #400, 1681 Chestnut Street
Vancouver, British Columbia V6J 4M6
Canada

Tel: 604.732.9990
Fax: 604.676.2705
Email: info@Lock-Load.com

www.Lock-Load.com