

# EAST TOWN CROSSING PIONEER IMPROVEMENTS

## PUYALLUP, WA

### GENERAL NOTES:

#### DESIGN PROVISIONS:

1. THE FOLLOWING EFFECTIVE STRENGTH PARAMETERS WERE ASSUMED IN THE PREPARATION OF THE STRUCTURAL CALCULATIONS FOR THE RETAINING WALL SYSTEM:

SOIL PROPERTIERS				
ZONE	$\phi^\circ$	COH (PSF)	$\gamma$ (PCF)	DESCRIPTION
REINFORCED FILL	32	0	120	SILTY SAND
RETAINED FILL	32	0	120	SILTY SAND
FOUNDATION	32	50	120	SILTY SAND

SOIL TYPES AND DESIGN PROPERTIES SHALL BE CONFIRMED BY THE SITE GEOTECHNICAL ENGINEER PRIOR TO WALL CONSTRUCTION OR THESE PLANS SHALL BE VOIDED.

2. THE WALL(S) ARE DESIGNED TO SUPPORT THE FOLLOWING MAXIMUM SURCHARGE LOADINGS:

LIVE LOAD: NONE  
DEAD LOAD: NONE  
BACK SLOPE: NONE  
SEISMIC: 0.474g (PGA=0.393, Fpga=1.207)  
HYDROSTATIC: NOT APPLICABLE

Revise to reflect design calculations.  
[Plans: Sht T-1]

3. THE FOUNDATION SOILS AT WALL LOCATIONS SHALL BE CAPABLE OF SAFELY SUPPORTING THE MAXIMUM APPLIED BEARING PRESSURE, AS SHOWN ON THE WALL PROFILES, WITHOUT FAILURE OR EXCESSIVE SETTLEMENT. LOCAL BEARING CAPACITY SHALL BE CONFIRMED BY THE SITE GEOTECHNICAL ENGINEER AFTER FOUNDATION EXCAVATION AND PRIOR TO WALL CONSTRUCTION.

#### 4. REFERENCES:

- 4.1. GEOTECHNICAL REPORT  
4.1.1. FIELD VERIFY

### GeoWall Plus Retaining Wall

SHEET INDEX	
SHEET	DESCRIPTION
T-1	TITLE PAGE
S-1	SPECIFICATIONS
P-1	PLAN VIEW
1-1	WALLS 1-2
2-1	WALLS 3-5
3-1	WALL 6
D-1	GEOWALL PLUS DETAILS

Please include sheet D-2 to the Sheet Index. [Reference the marked-up drawing STRUCTURAL PLANS, sheet T-1]

### GENERAL NOTES:

#### SUGGESTED QUALITY ASSURANCE PROVISIONS:

- WALL CONSTRUCTION SHALL BE SUPERVISED BY A QUALIFIED ENGINEER OR TECHNICIAN TO VERIFY FIELD AND SITE SOIL CONDITIONS. IF THIS WORK IS NOT PERFORMED BY THE SITE GEOTECHNICAL ENGINEER, A QUALIFIED GEOTECHNICAL ENGINEER/TECHNICIAN SHALL BE CONSULTED IN THOSE MATTERS PERTAINING TO THE SOIL CONDITIONS AND WALL PERFORMANCE.
- THE FOUNDATION SOILS AT THE BASE OF THE WALL(S) SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER. ANY UNSUITABLE SOILS OR IMPROPERLY COMPACTED EMBANKMENT MATERIAL SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER PRIOR TO WALL CONSTRUCTION TO PROVIDE ADEQUATE BEARING CAPACITY AND MINIMIZE SETTLEMENT.
- ALL WALL EXCAVATION AND RETAINED SOILS SHALL BE INSPECTED FOR GROUNDWATER CONDITIONS. ANY ADDITIONAL DRAINAGE PROVISIONS REQUIRED IN THE FIELD SHALL BE INCORPORATED INTO THE WALL CONSTRUCTION AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- WALL BACKFILL MATERIAL SHALL BE TESTED AND APPROVED BY THE ENGINEER, MEETING THE MINIMUM REQUIREMENTS OF THE APPROVED DESIGN PLANS OR SPECIFICATIONS.
- ALL SOIL BACKFILL SHALL BE TESTED BY THE GEOTECHNICAL ENGINEER FOR MOISTURE, DENSITY, AND COMPACTION PERIODICALLY (EVERY 2' VERTICALLY, 100'-200' C/C) MEETING THE MINIMUM REQUIREMENTS OF THE APPROVED DESIGN PLANS OR SPECIFICATIONS.
- THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN QUALITY CONTROL FOR THE CONSTRUCTION OF THE WALL TO ASSURE COMPLIANCE WITH CONTRACT REQUIREMENTS AND MAINTAIN RECORDS OF ITS QUALITY CONTROL.
- ALL WALL ELEVATIONS, GRADES, AND BACK SLOPE CONDITIONS SHALL BE VERIFIED BY THE ENGINEER IN THE FIELD FOR CONFORMANCE WITH APPROVED DESIGN PLANS. ANY REVISIONS TO THE STRUCTURE GEOMETRY OR DESIGN CRITERIA SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.
- SURFACE WATER SHALL BE DIVERTED AWAY FROM THE RETAINING WALL. WHERE WATER CANNOT BE DIVERTED, NOTIFY THE ENGINEER FOR DESIGN OF A SWALE TO DIVERT THE FLOW OR A DROP BOX TO DRAIN THE WATER THROUGH THE WALL.

Project Name and Address

PRRWF20250442

EAST TOWN CROSSING  
PUYALLUP, WA

Firm Name and Address

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RESPONSIBILITY OF THE OWNER AND OWNER'S  
ENGINEER.

### Grade Solutions, Inc.

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General Notes

1	ADDED WALL 7, ENTRY WALL PIONEER WAY E.	4/2/25
No.	Revision/Issue	Date

PROFESSIONAL SIGNATURE



SHEET TITLE

TITLE PAGE

Project 25-006-01	Sheet  <b>T-1</b>
Date 3-26-2025	
Scale	



SPECIFICATION:

Part 1:GENERAL

- 1.1Description

AThe work to be performed includes sourcing, providing, and installing concrete retaining wall blocks to the lines and grades as specified on the project construction drawings and as may be further specified herein.

BWork includes preparing foundation soil, furnishing, and installing leveling pad, unit fill and backfill to the lines and grades shown on the construction drawings.

CWork includes furnishing and installing all related materials required for construction of the retaining wall as shown on the construction shop drawings.
- 1.2Referenced Standards

AEngineering Design

1NCMA Design Manual for Segmental Retaining Walls 3<sup>rd</sup> Edition

2ASTM D 6638 - Standard Test Method for Determining the Connection Strength Between Geosynthetics Reinforcement and Segmental Concrete Units

3ASTM D 6916 - Standard Test Method for Determining the Shear Strength Between Segmental Concrete Units

BSegmental Retaining Wall Units

1ASTM C 140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

2ASTM C 1262 - Standard Test Method for Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units

3ASTM C 1372 - Standard Specification for Dry-Cast Segmental Retaining Wall Units

CGeosynthetic Reinforcement

1ASTM D 4595 - Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

2ASTM D 5262 - Standard Test Methods for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

3ASTM D 5321 - Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method

4ASTM D 5818 - Standard Practice for Exposure and Retrieval of Samples to Evaluate Installation Damage of Geosynthetics

5ASTM D 6637 - Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

6ASTM D 6706 - Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil

7ASTM D 6992 - Standard Test Method for Accelerated Tensile Creep and Creep-Rupture of Geosynthetic Materials Based on Time-Temperature Superposition Using Stepped Isothermal Method

DSoils

1ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils

2ASTM D 698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))

3ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

4ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))

5ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) [Ref. 89]

6ASTM D 6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

7ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

8ASTM D 6913 - Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

9ASTM G 51 - Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing

EDrainage Pipe

1ASTM F 405 - Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings.

2ASTM F 758 - Standard Specification for Smooth-Wall Poly(Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage

FWhere specifications and reference documents conflict, the Owner's Engineer shall make the final determination of applicable document.

1.3Quality Assurance

AOwner shall be responsible for soil testing and inspection quality control during earthwork operations.

Part 2:MATERIALS

2.1Definitions

ARetaining Wall Unit - A segmental concrete facing block that is able to be arranged, stacked, placed, combined, or interchanged easily into an assembled wall system.

BLeveling Pad - A compacted crushed stone pad which serves as a flat surface for placing the initial course of precast units.

CGranular Aggregate - Clean 1" minus crushed angular rock located within and immediately behind the retaining wall units to facilitate drainage and avoid compaction in close proximity to the retaining wall units.

DJoint Geotextile - A filter fabric installed to prevent infill and/or backfill material from migrating through the joints.

EFoundation Soil - Soil zone immediately beneath the retaining wall facing units, the wall leveling pad and the reinforced soil zone.

FReinforced Backfill - Soil immediately behind the retaining wall facing drainage aggregate for reinforced walls.

GRetained Soil - Soil immediately behind the retaining wall facing drainage aggregate or reinforced backfill if present.

HSubsurface Drainage System - A system for removing water from behind the wall and channeling it to a point of positive drainage.

2.2GeoWall Pro

AGeoWall Pro wall units shall have a minimum 28-day compressive strength of 3,000 psi.

BTexture on the face of the block shall be specified. Other surfaces to be smooth form type.

CBase Leveling Pad Material

DMaterial shall consist of compacted crushed stone as shown on the construction drawing.

2.3Gravel Layer

AGravel layer shall consist of clean 1" minus crushed stone or crushed gravel meeting the following gradation:

Sieve Size	% Passing
1"	100
3/4"	100-75
No. 4	0-10
No. 50	0-5

2.4Reinforced Backfill

1For walls over 15 ft in total height:

(a)The reinforced backfill shall be free of debris and consist of one of the following inorganic USCS soil types: GP, GW, SW, SP, SM, meeting the following gradation as determined in accordance with ASTM D 422.

Sieve Size	Percent Passing
1 in.	100
No. 4	100 - 20
No. 40	0 - 60
No. 200	0 - 15

(a)The maximum size should be limited to 1.0 in. for geosynthetic reinforced soil SRWs unless tests have been performed to evaluate potential strength reduction in the geosynthetic due to installation damage.

(b)The plasticity of the fine fraction of the reinforced soil shall be less than 20.

2For walls less than 15 ft in total height:

(a)The reinforced backfill shall be free of debris and consist of one of the following inorganic USCS soil types: GP, GW, SW, SP, SM, meeting the following gradation as determined in accordance with ASTM D 422.

Sieve Size	Percent Passing
1 in.	100
No. 4	100 - 20
No. 40	0 - 60
No. 200	0 - 35

(b)The maximum size should be limited to 1.0 in. for geosynthetic reinforced soil SRWs unless tests have been performed to evaluate potential strength reduction in the geosynthetic due to installation damage.

(c)Plasticity Index (PI)<20 and Liquid Limit (LL)<40.

(d)The pH of the backfill material shall be between 3 and 9 when tested in accordance with ASTM G 51.

2.5Retained Backfill

ABackfill shall be free of debris or organic material.

BPlasticity Index (PI)<20 and Liquid Limits (LL)<40

CMaterial can be site excavated material when the above requirements are met. Unsuitable soils for backfill (high plastic clays or organic materials) shall not be used in the retained soil mass.

Part 3:EXECUTION

3.1Excavation

AContractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall be careful not to disturb embankment and foundation materials beyond lines shown.

3.2Foundation Soil Preparation

AFoundation soil shall be excavated as required for leveling pad dimensions shown on the construction drawings, or as directed by the Geotechnical Engineer.

BUnsuitable soils shall be removed and replaced with acceptable material.

COver-excavated areas shall be backfilled with approved compacted backfill material.

3.3Base Leveling Pad

ALeveling pad materials shall be placed upon approved foundation as shown on the construction drawings to a minimum thickness of 6".

BAggregate material shall be compacted to provide a dense, level surface on which to place the first course of modular units. Compaction shall be to 95% of Standard Proctor Density as determined in accordance with ASTM D698. For crushed rock, material shall be densely compacted as determined by visual observation.

3.4Unit Installation

AThe first course of concrete modular wall units shall be carefully placed on the base leveling pad. Each unit shall be checked for level and alignment.

BUnits are placed side by side for full length of wall alignment. Alignment may be done by means of a string line or offset from a base line.

C Sweep excess material from top of units and install next course. Ensure that each course is completely unit filled between and 12" behind block. Backfill and compact prior to proceeding to next course.

3.5Fill Placement

3.6Fill Placement

ABackfill material shall be placed with a maximum of 8" lifts and compacted to 95% of Standard Proctor Density. As determined in accordance with ASTM D698. The in-place moisture content shall not exceed the optimum moisture content as determined in accordance with ASTM D698 and be no lower than 2% below optimum moisture content.

BOnly hand-operated compaction equipment shall be allowed within 3' of the back surfaces of the concrete units.

Each sheet completed by or directly supervised by the engineer of record needs to be signed by the engineer of record per the RCW 18.43 and WAC 196-23-070. [Reference the marked-up drawing STRUCTURAL PLANS, sheet S-1]

Project Name and Address

PRRWF20250442EAST TOWN CROSSINGPUYALLUP, WA

Firm Name and Address

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General Notes

1	ADDED WALL 7, ENTRY WALL PIONEER WAY E.	4/2/25
No.	Revision/Issue	Date

PROFESSIONAL SIGNATURE

ROBERT J. RACE

STATE OF WASHINGTON

26697

REGISTERED PROFESSIONAL ENGINEER

SHEET TITLE

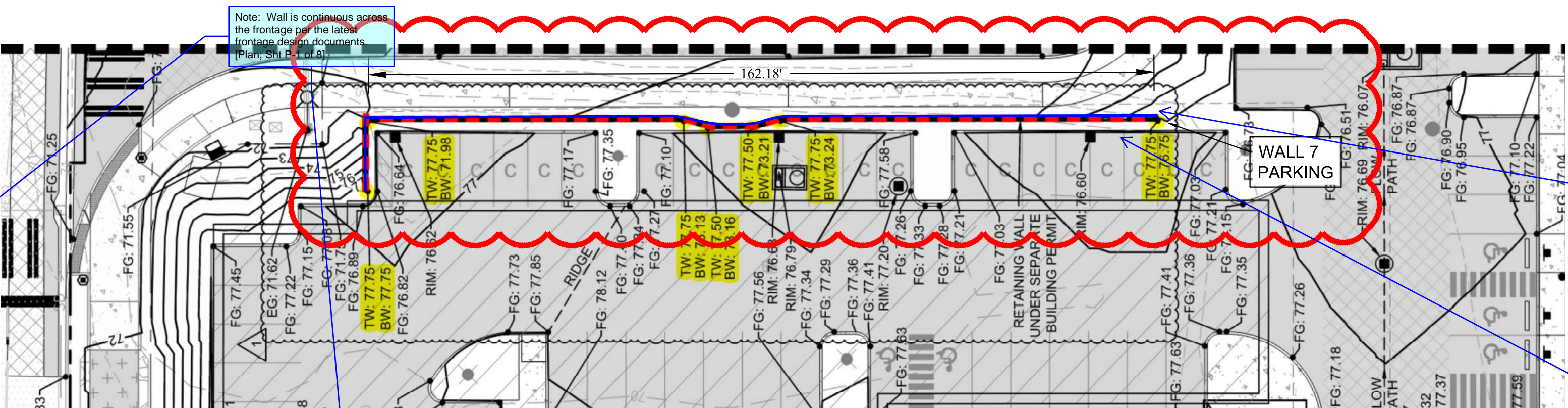
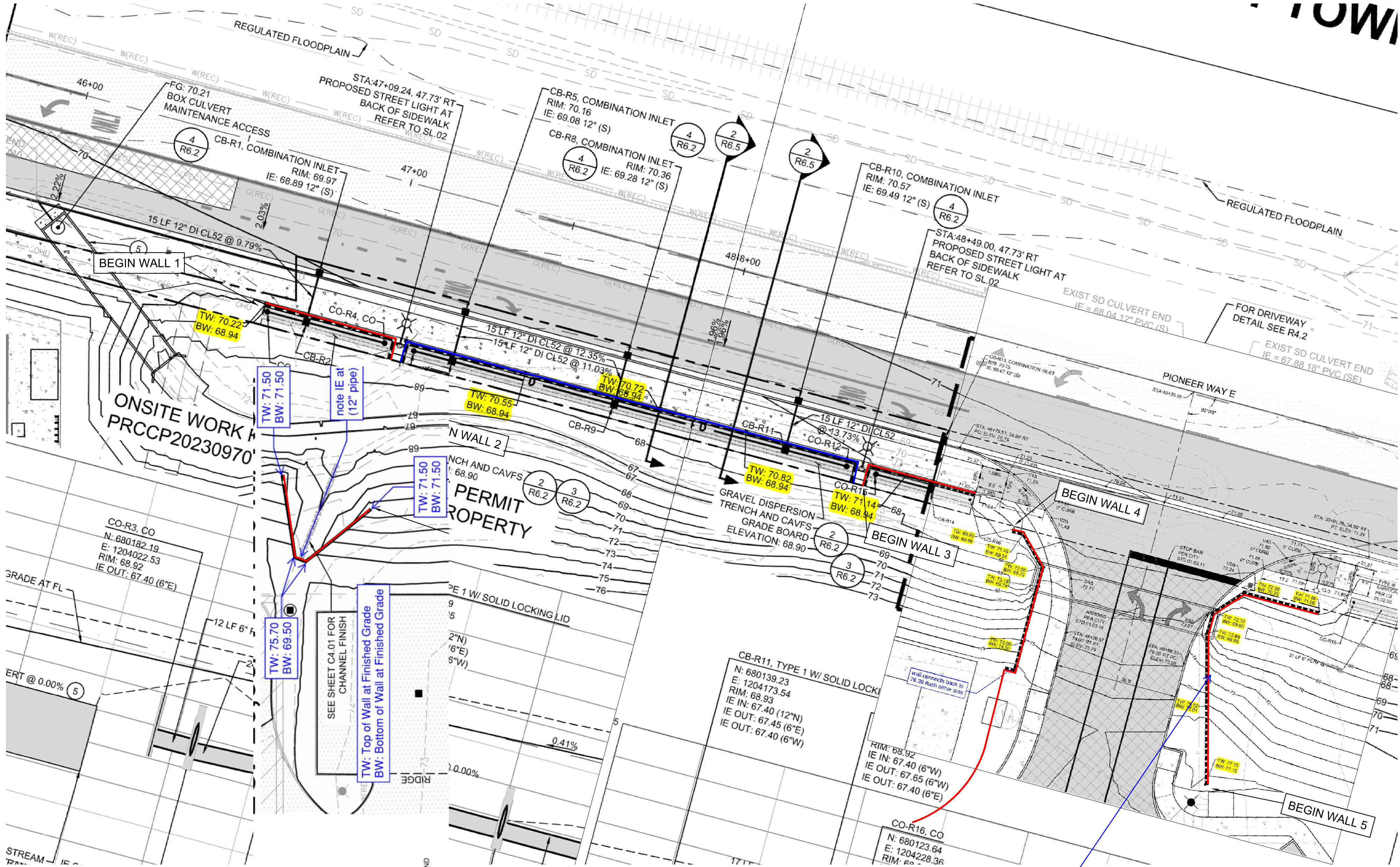
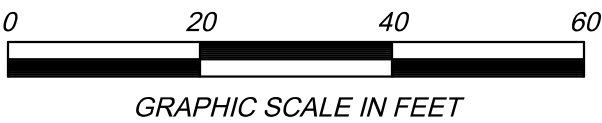
SPECIFICATION

Project25-006-01	Sheet
Date3-26-2025	S-1
Scale	



GENERAL DESIGN NOTES:

THE SITE PLAN IS FOR ILLUSTRATION ONLY. IT WAS REPRODUCED FROM: PIONEER WAY E IMPROVEMENTS STA. 43+50-48+00, EAST TOWN CROSSING FRONTAGE IMPROVEMENTS; AHB/L, PROJECT NO. 2230752, PERMIT SUBMITTAL, SHEETS R4.0, R4.1, 2/24/2025.



Wall 5 design must include the adjacent stormwater drainage design and crossing depicted in PRCCP20230970. Update screenshot accordingly. [STRUCTURAL PLANS, sheet P-1]

Depict and label how and where the Wall 7 footing drains will connect to the onsite stormwater system. [STRUCTURAL PLANS, sheet P-1]

Wall 7 design must include the adjacent stormwater drainage design and crossing depicted in PRCCP20230970, PCR 001. Update screenshot accordingly. [STRUCTURAL PLANS, sheet P-1]

The Engineer of Record must provide a signed statement indicating that the placement and imposed load of Retaining Wall 7 will not impact or damage the sanitary sewer main crossing and running underneath the new wall. [STRUCTURAL PLANS, sheet P-1]

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SHEET TITLE

PLAN VIEW

Project  
25-006-01

Date  
3-26-2025

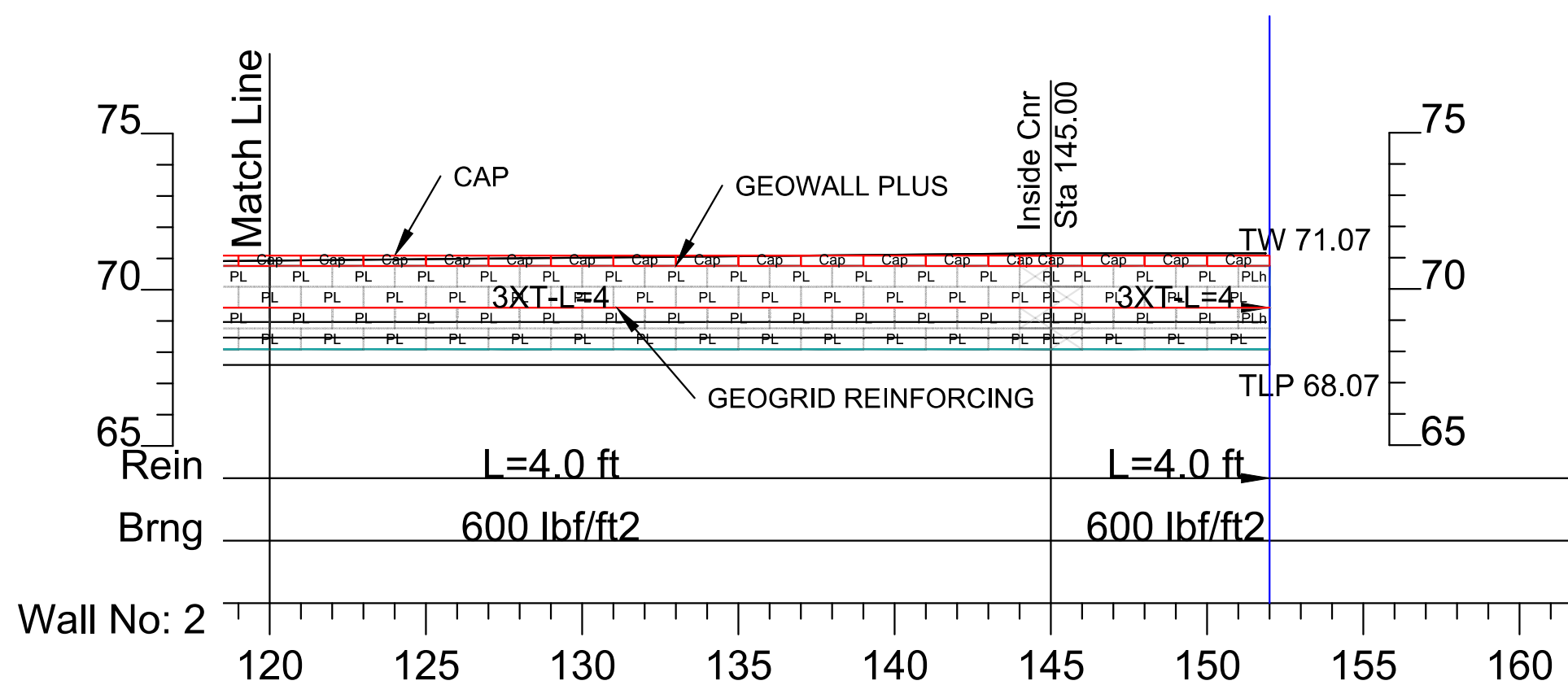
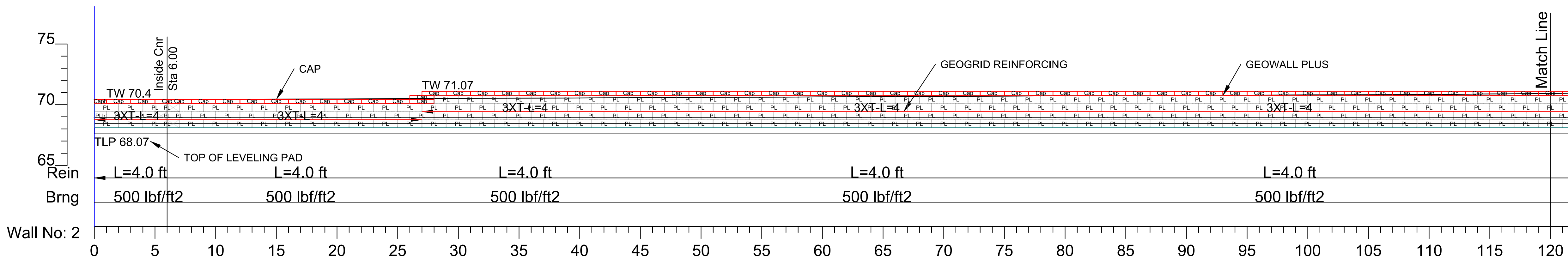
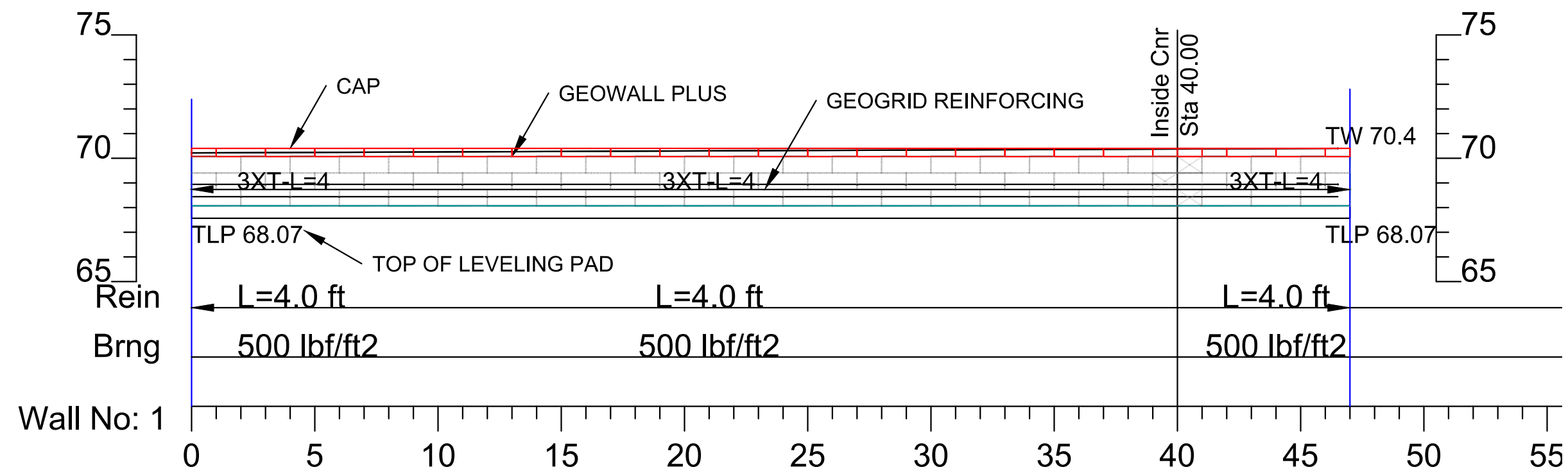
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Sheet

P-1

Wall 7, SHEET 3.02  
ENTRY WALL, PIONEER WAY E.





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SHEET TITLE

WALLS 1-2

Project  
25-006-01

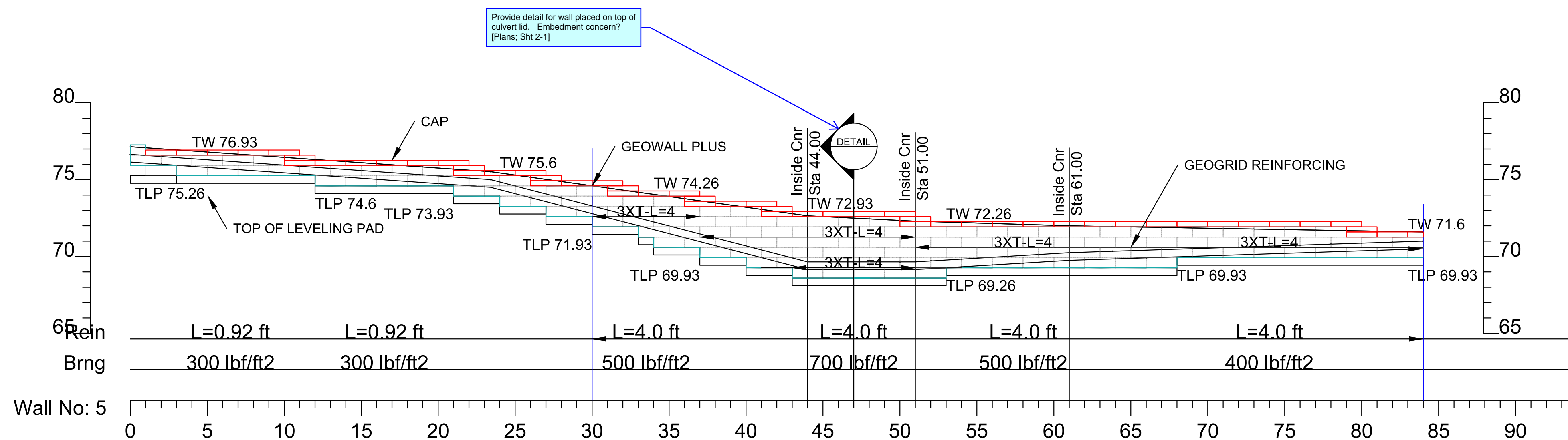
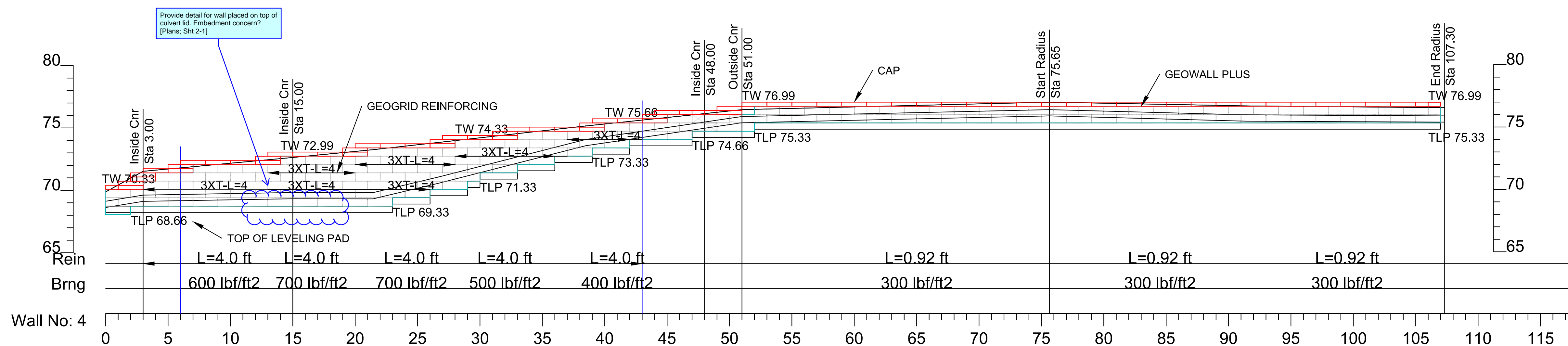
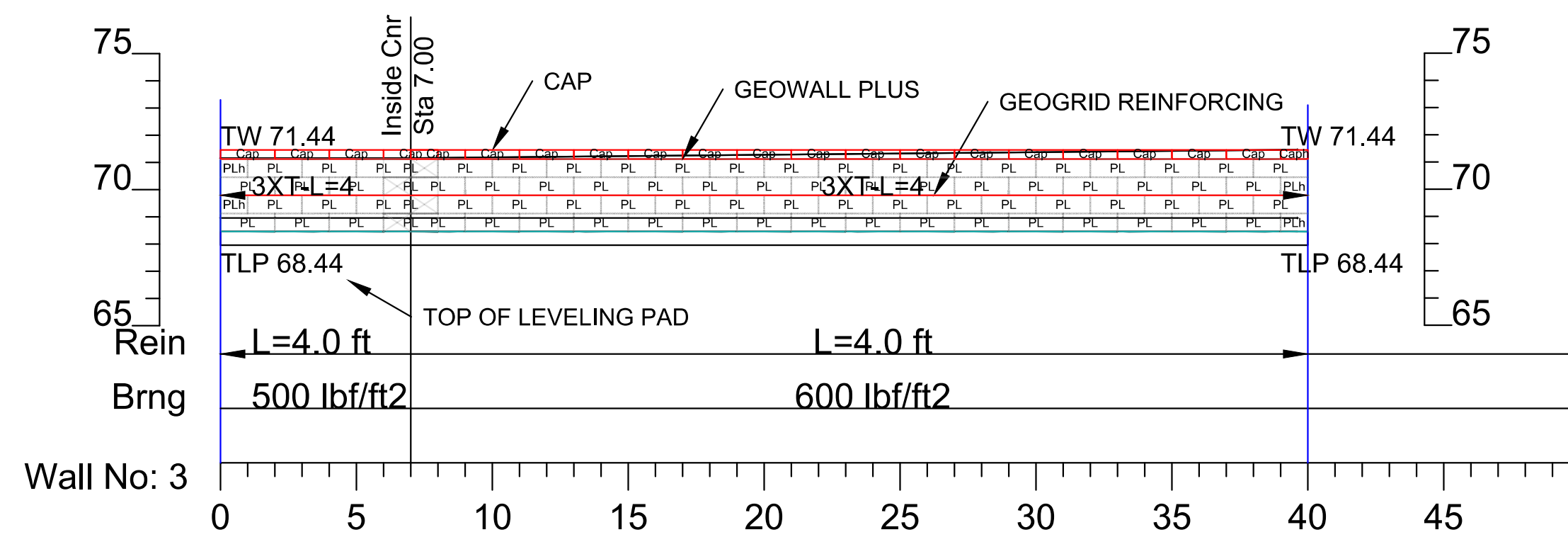
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Sheet

1-1





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SHEET TITLE

WALLS 3-5

Project  
25-006-01

Date  
3-26-2025

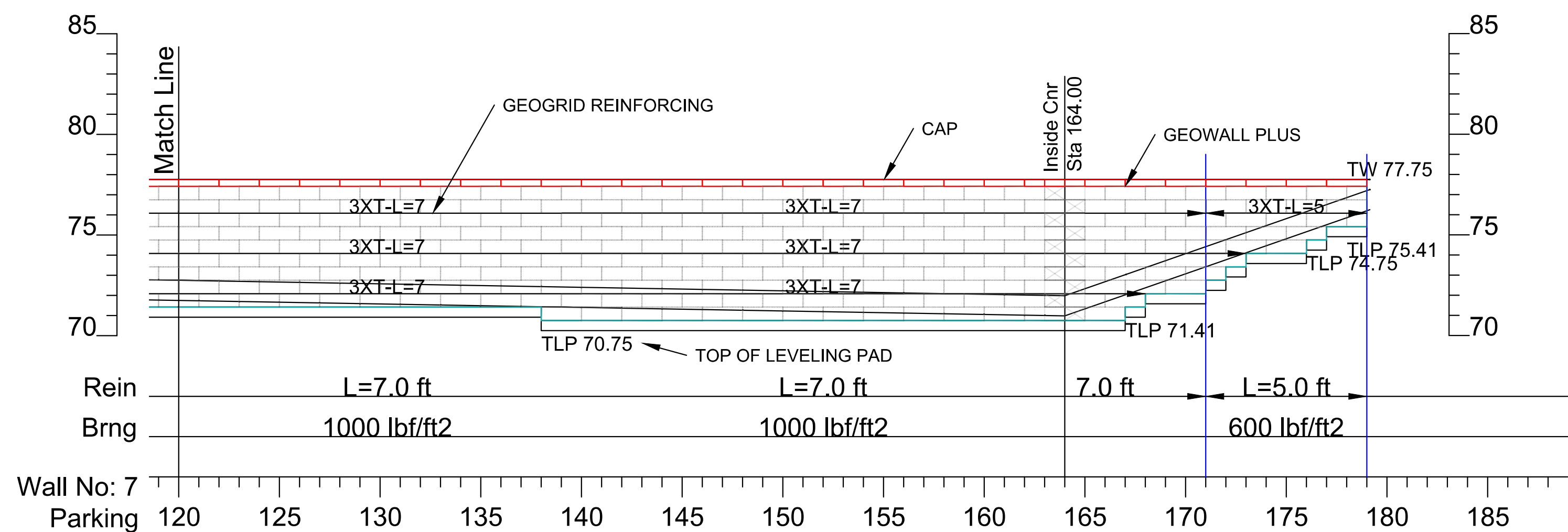
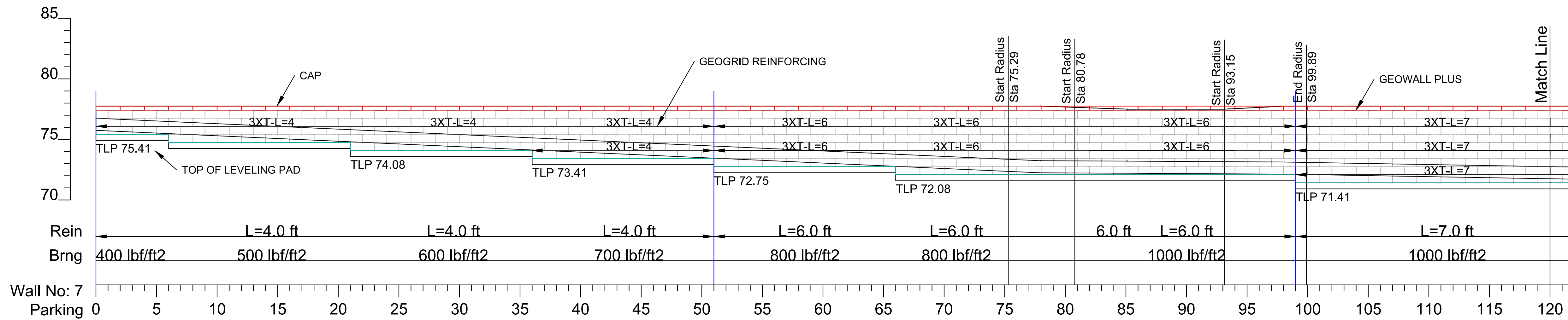
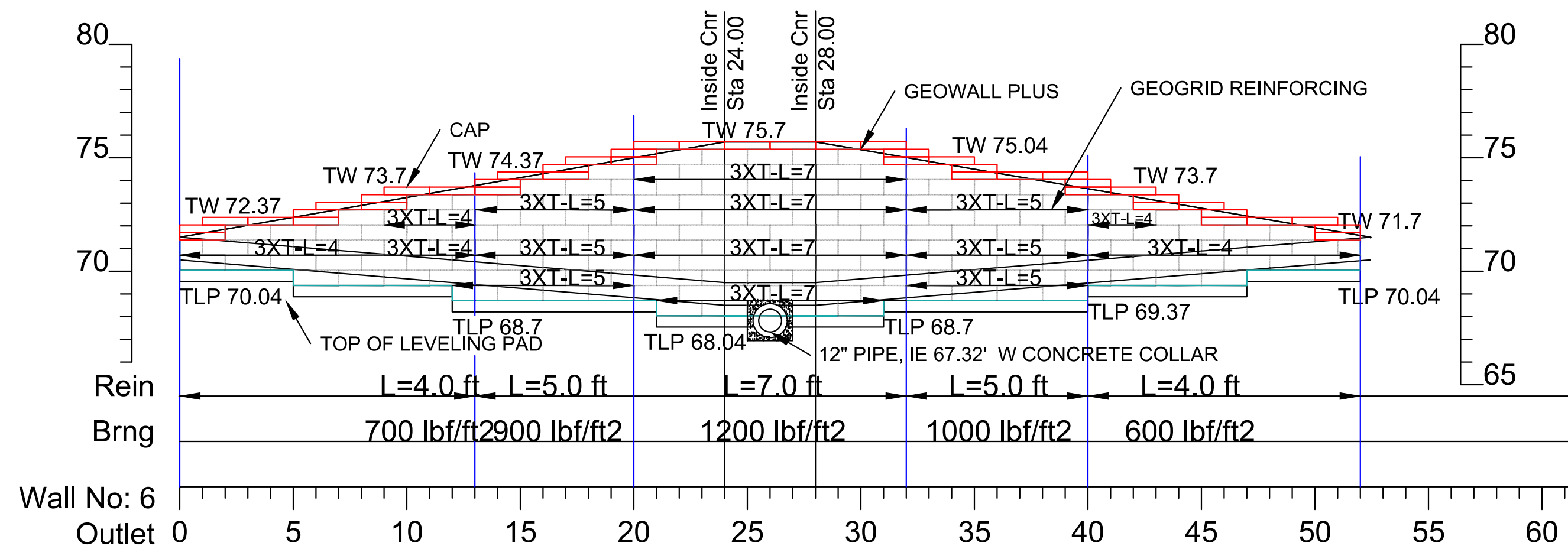
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Sheet

2-1

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drawing STRUCTURAL PLANS, sheet 2-1]





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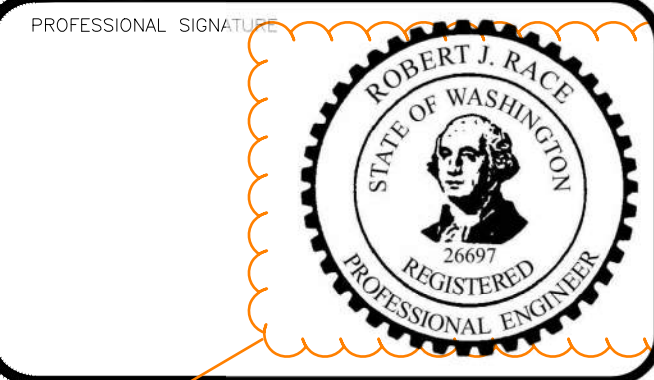
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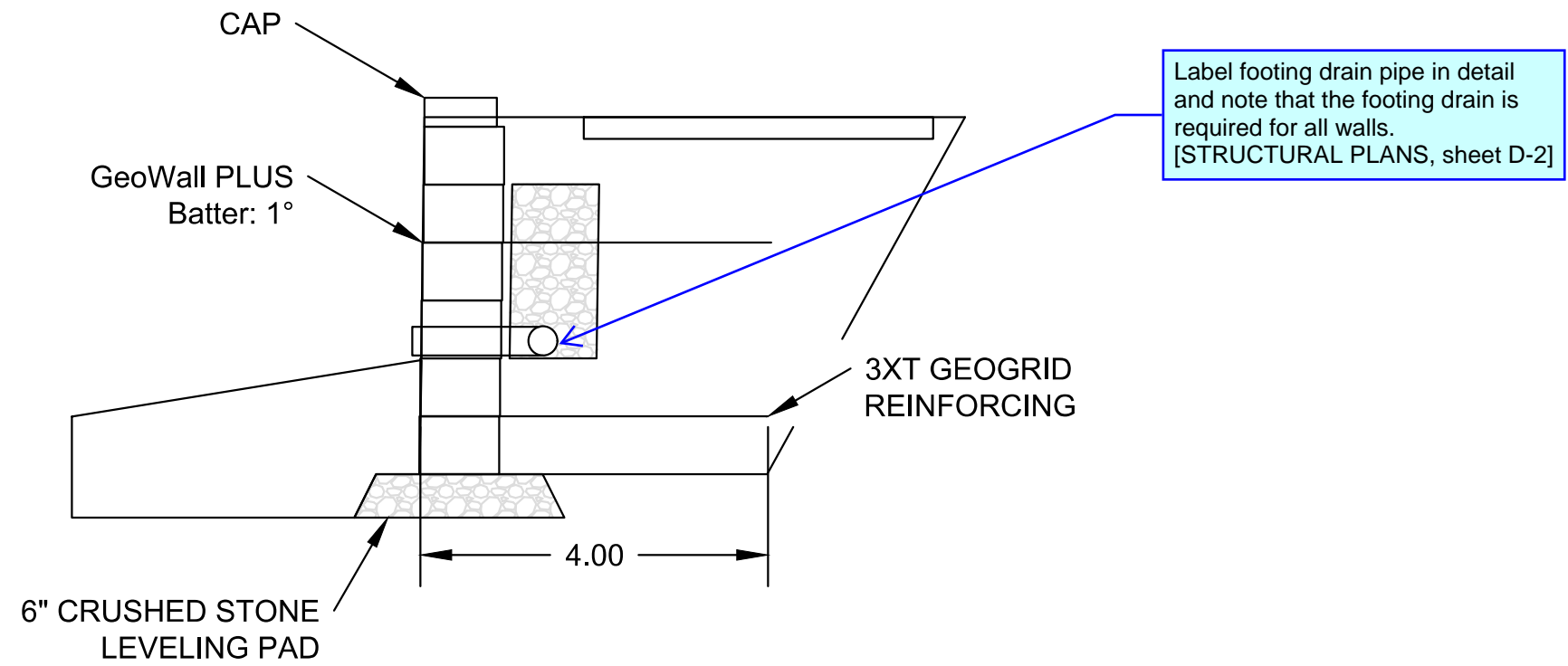
General Notes		
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SHEET TITLE  
WALLS 6-7

Project 25-006-01	Sheet
Date 3-26-2025	3-1
Scale	





1. THE SECTION SHOWN IS A REPRESENTATIVE WALL SECTION. THE WALL HEIGHTS, ELEVATIONS, TOE SLOPES, AND BACK SLOPES VARY ACCORDING TO THE ELEVATION PLAN AND SITE PLAN RESPECTIVELY.
2. UPON EXCAVATION, WHERE UNSUITABLE SOILS ARE FOUND, SUBCUT TO DEPTH "D" AS REQUIRED BY THE ONSITE GEOTECHNICAL ENGINEER AND REPLACE WITH SUITABLE COMPACTED STRUCTURAL FILL TO ACHIEVE THE REQUIRED BEARING CAPACITY. THE STRUCTURAL FILL SHALL BE COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY.
3. APPROXIMATE LIMITS OF EXCAVATION VARIES. ACTUAL LIMITS AND SIDE SLOPES TO BE DETERMINED BY CONTRACTOR, FIELD CONDITIONS AND OSHA REGULATIONS.
4. THE WALLS SHALL BE CONSTRUCTED WITH GEOWALL PLUS UNITS USING THE 1° SETBACK.
5. THE DESIGN REQUIRES MIRAFI SOIL REINFORCEMENT AT THE ELEVATIONS SHOWN.
6. DO NOT BRING HEAVY COMPACTION OR PAVING EQUIPMENT WITHIN 3' OF THE BACK OF THE RETAINING WALL.
7. SEE MANUFACTURER INFORMATION FOR ADDITIONAL DETAILS ON THE GEOWALL PLUS RETAINING WALL SYSTEM.

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DETAILS

Project 25-006-01	Sheet <b>D-1</b>
Date 3-26-2025	
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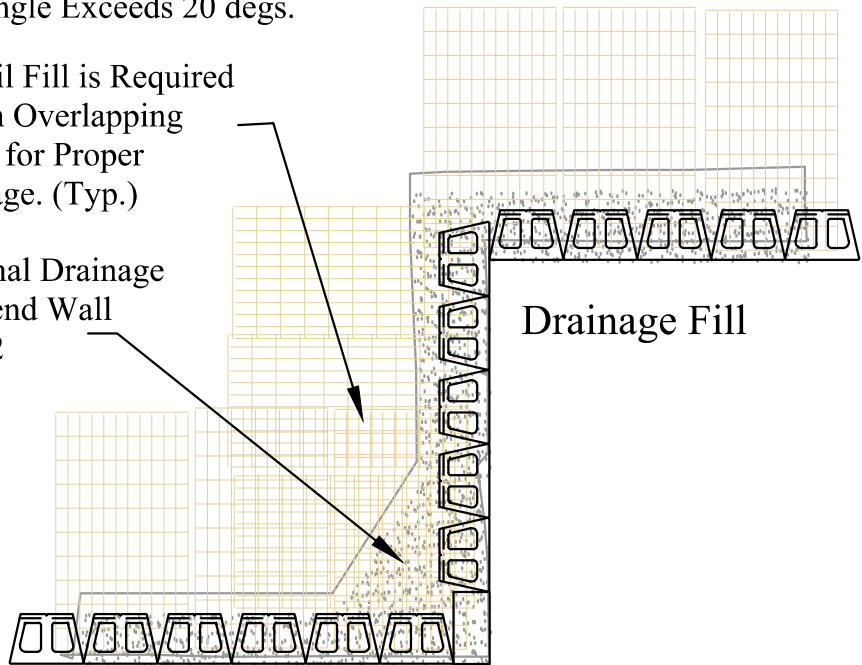
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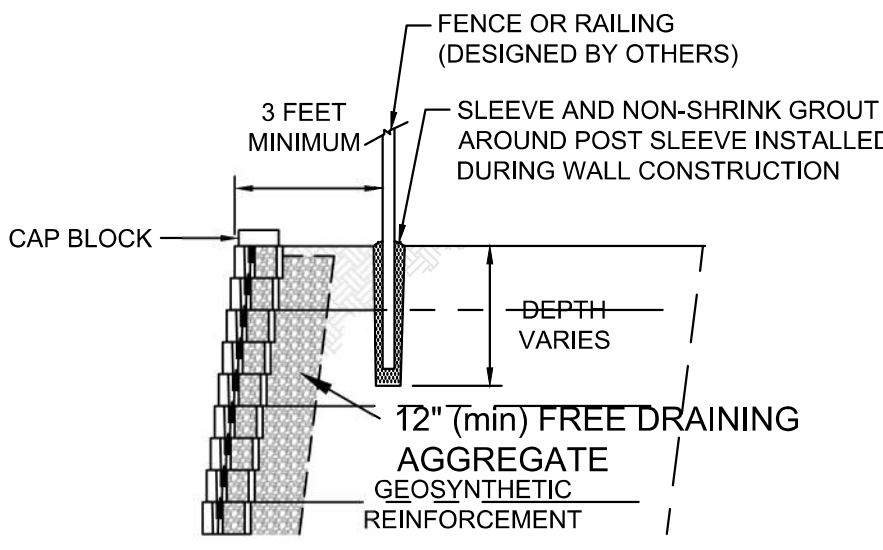
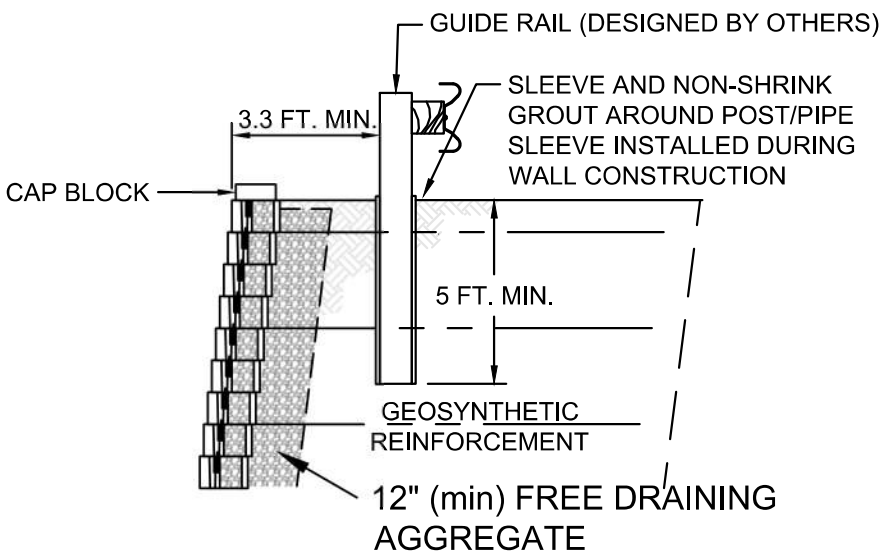
Place Additional Pieces of Geogrid When Angle Exceeds 20 degs.

3" of Soil Fill is Required Between Overlapping Geogrid for Proper Anchorage. (Typ.)

Additional Drainage Fill Extend Wall Height/2

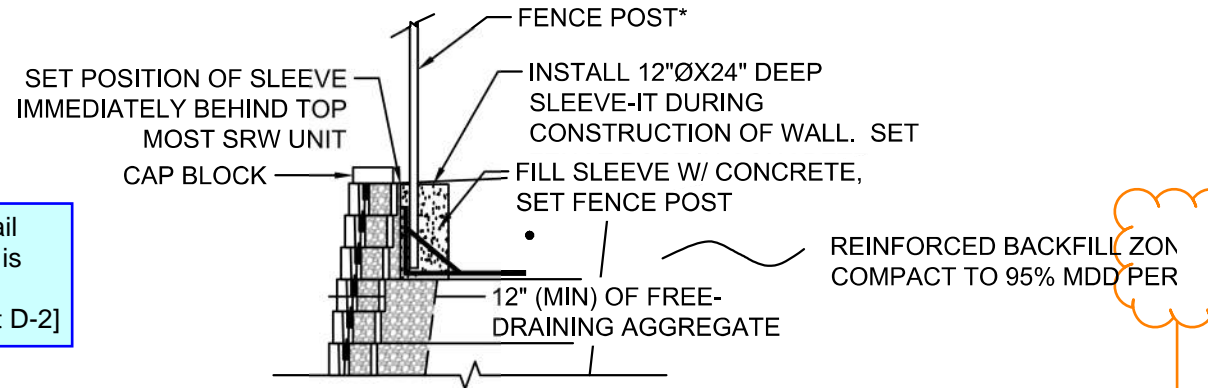


Geogrid Installation at Corners



FOR MORE INFORMATION CONTACT:  
STRATA GLOBAL SOLUTIONS  
1-800-680-7750

- \*FENCING SYSTEMS APPROVED FOR USE WITH SLEEVE-IT ARE LIMITED TO THE FOLLOWING HEIGHTS:
- A. CHAIN LINK UP TO 8 FEET ABOVE FINISHED GRADE WITH POST SPACING OF 8 FEET (MIN)
  - B. ORNAMENTAL (STEEL, ALUMINUM, WROUGHT IRON) POST UP TO 6 FEET ABOVE GRADE WITH POST SPACING OF 10 FEET (MIN)
  - C. OPEN BOARD / GAP BOARD (70% OPEN) POST UP TO 6 FEET ABOVE FINISHED GRADE WITH POST SPACING OF 6 FEET (MIN)



Label footing drain pipe in detail and note that the footing drain is required for all walls. [STRUCTURAL PLANS, sheet D-2]

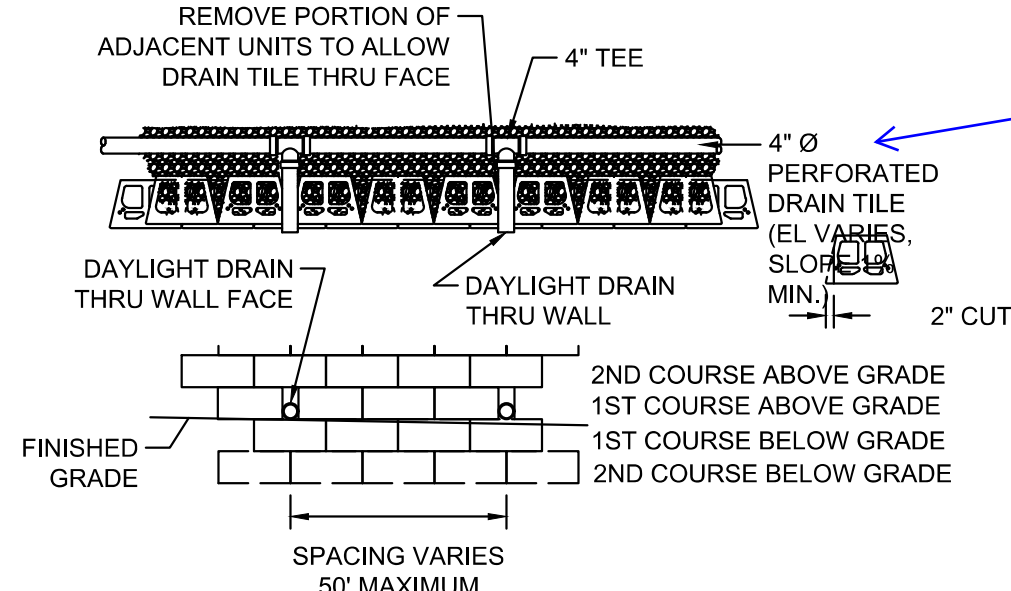
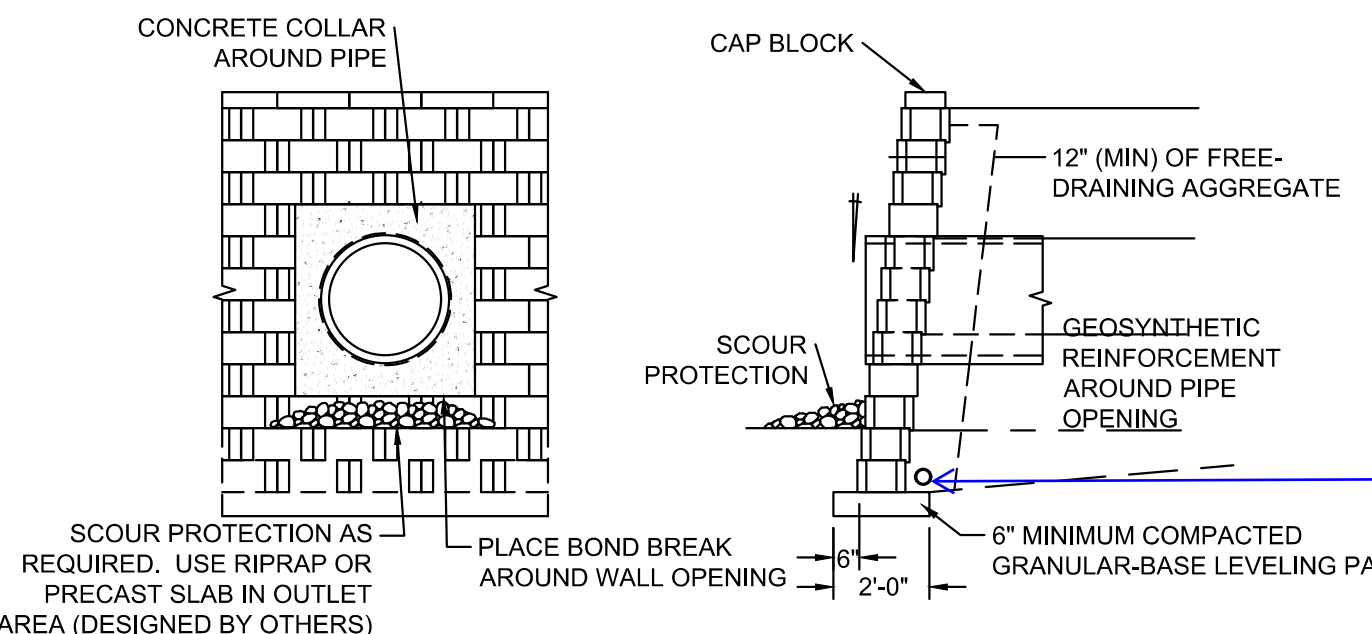
It appears this note has been cut-off. [Reference the marked-up drawing STRUCTURAL PLANS, sheet D-2]

ONAL DRAINAGE FILL END WALL HEIGHT/2

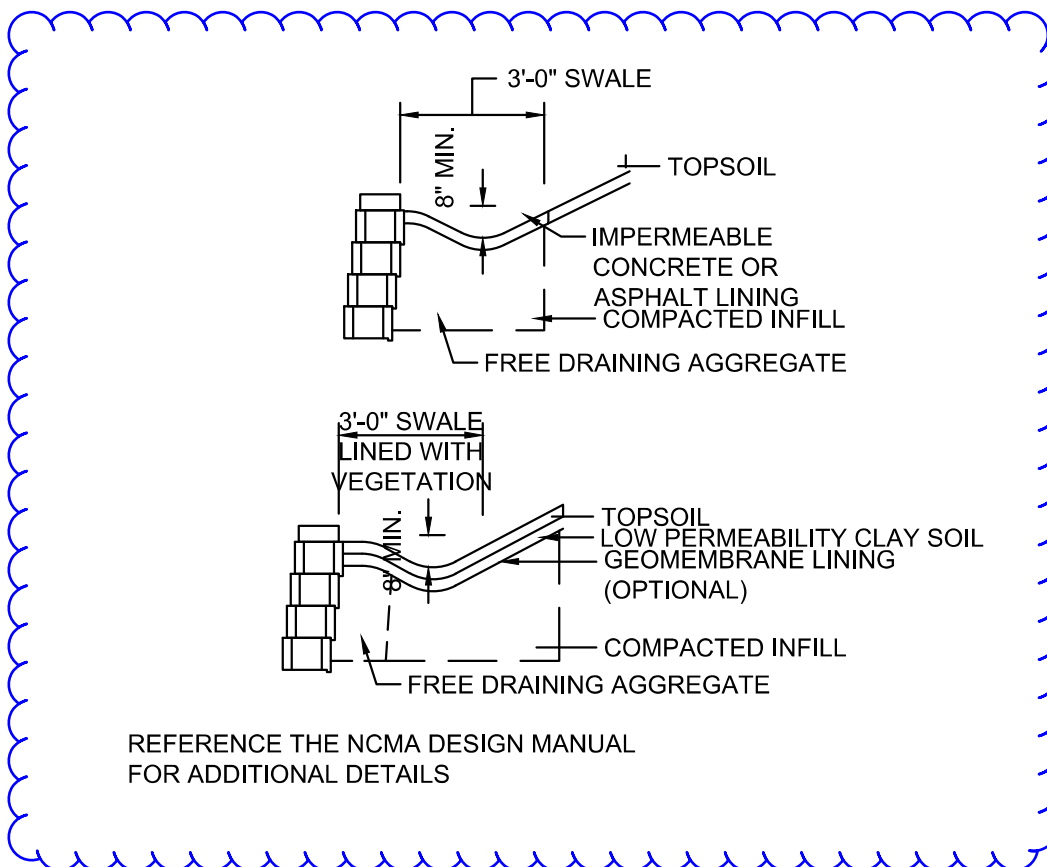
3" OF SOIL IS REQUIRED BETWEEN OVERLAPPING GEOGRID FOR PROPER ANCHORAGE (TYP) DRAINAGE FILL

Note: Check with manufacturer's specifications on geogrid orientation.

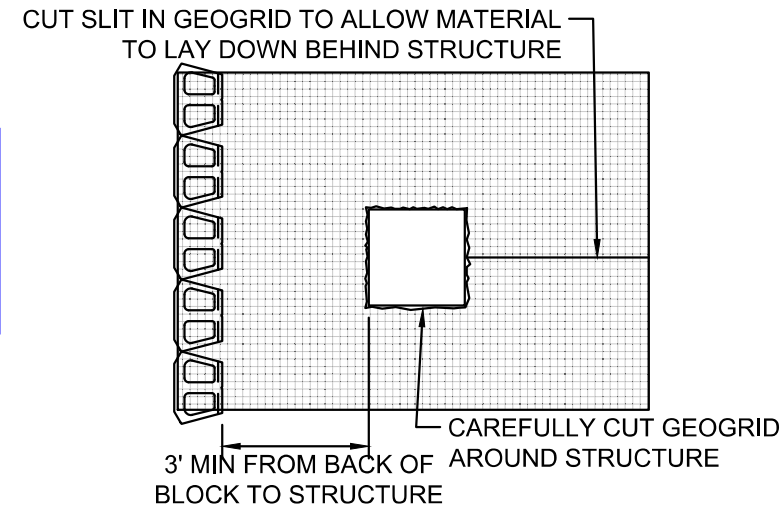
Geogrid Installation on Curves



Footing drains are required behind all walls. For those drains that daylight into the stream corridor, this particular detail is acceptable. Indicate which walls will use this particular detail or reference this detail for the walls on sheet P-1. For the footing drains that do not daylight on the stream, provide a separate detail depicting how the footing drains will connect to the approved onsite storm system. [STRUCTURAL PLANS, sheet D-2]



Indicate which walls will use this particular detail. Demonstrate that the proposed swale will not overwhelm any footing drains that do not daylight onto the stream corridor. [STRUCTURAL PLANS, sheet D-2]



Each sheet completed by or directly supervised by the engineer of record needs to be signed by the engineer of record per the RCW 18.43 and WAC 196-23-070. [Reference the marked-up drawing STRUCTURAL PLANS, sheet D-2]

Project Name and Address

PRRWF20250442  
EAST TOWN CROSSING  
PUYALLUP, WA

Firm Name and Address

RACE ENGINEERING ASSOC.  
4851 Four Seasons Ct  
Eagan, MN 55122  
e: rrace@rea-llc.com  
t: 612-670-7009

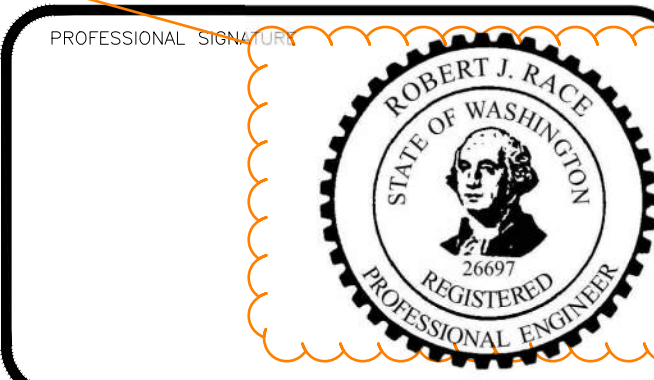
DESIGN INFORMATION PROVIDED FOR INTERNAL STABILITY ONLY. EXTERNAL STABILITY, INCLUDING BUT NOT LIMITED TO FOUNDATION SETTLEMENT, GLOBAL STABILITY AND SLOPE STABILITY ARE THE RESPONSIBILITY OF THE OWNER AND OWNER'S ENGINEER.

Grade Solutions, Inc.

P.O. Box 65449  
Tacoma, WA 98464  
T: 944.213.2480

General Notes

1	ADDED WALL 7, ENTRY WALL PIONEER WAY E.	4/2/25
No.	Revision/Issue	Date



SHEET TITLE  
**DETAILS**

Project 25-006-01	Sheet
Date 3-26-2025	<b>D-2</b>
Scale	