

DESIGN NOTES

1. Design is based on the assumption that backfill within the reinforced soil mass, methods of construction and quality of materials conform to the requirements of Hilfiker Retaining Walls.
2. Assumed Soil Characteristics:

Wall Backfill :

Unit Weight: 135 pcf

Internal Friction Angle: 38°

Cohesion = 0 psf

Retained Backfill:

Unit Weight: 135 pcf

Internal Friction Angle: 38°

Cohesion = 0 psf

Foundation Soils:

Unit Weight: 70 pcf

Friction Angle for Sliding: 36°

Cohesion = 0 psf

Worst Case Applied Factored Bearing Pressure by MSE Wall - @ 34.5' Height - 9355 psf.

- If actual characteristics, grades or dimensions of soil materials differ from those listed above or shown on the plans, Hilfiker Retaining walls shall be notified to evaluate the need to redesign.
3. If during construction, the wall location, structure location or loads are different than that proposed in this plan set and calculation package, HRW shall be notified to evaluate the need for a redesign.
4. The design requires a non-saturated backfill. Surface and sub-surface drainage control may be required to prevent saturation of the backfill or relieve hydrostatic pressures.

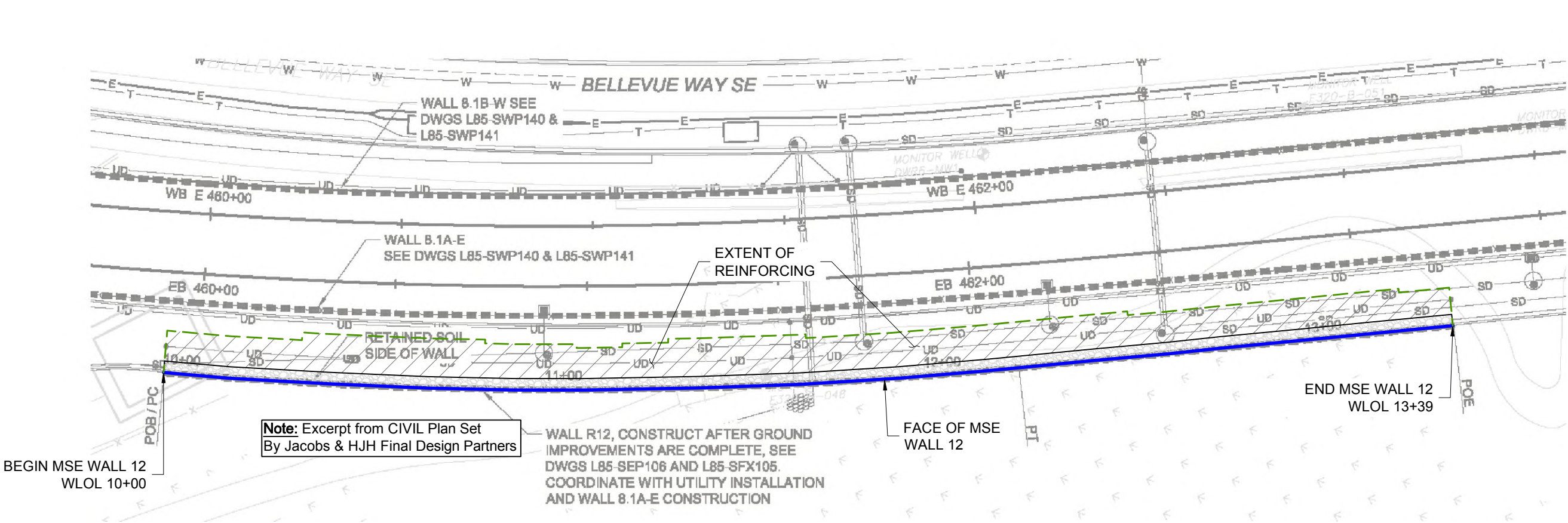
Drainage control shall be as specified in the project plans and specifications or as directed by the engineer.
5. Design Procedure:

Mechanically Stabilized Earth walls and Reinforced Soil Slopes, AASHTO LRFD Bridge Design Specifications and FHWA report No. FHWA-NHI-10-024 Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Slopes - Vol. 1.

6. All information hereon is derived from the reference drawings, and is subject to geometric and geotechnical confirmation. Field verification of existing ground elevations and bottom of wall elevations should be completed prior to preparation. The applicable Hilfiker construction guide and specifications are an integral part of this submittal.
7. Hilfiker Retaining Walls and CES shall be responsible only for the internal stability of the retaining walls.

SUPPLIED QUANTITIES:

WALL 12	
FACE AREA	3429 FT <sup>2</sup>
12'x3'x3' GABION:	87
6'x3'x1.5' GABION:	30
3'x3'x3' GABION:	3
WALL 14	
FACE AREA	5103 FT <sup>2</sup>
12'x3'x3' GABION:	134
6'x3'x3' GABION:	2
6'x3'x1.5' GABION:	25
3'x3'x3' GABION:	2
WALL 15	
FACE AREA	7551 FT <sup>2</sup>
12'x3'x3' GABION:	199
6'x3'x3' GABION:	3
6'x3'x1.5' GABION:	37



WALL 12 - PLAN VIEW

SCALE: 1" = 30'

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**HILFIKER RETAINING WALLS**



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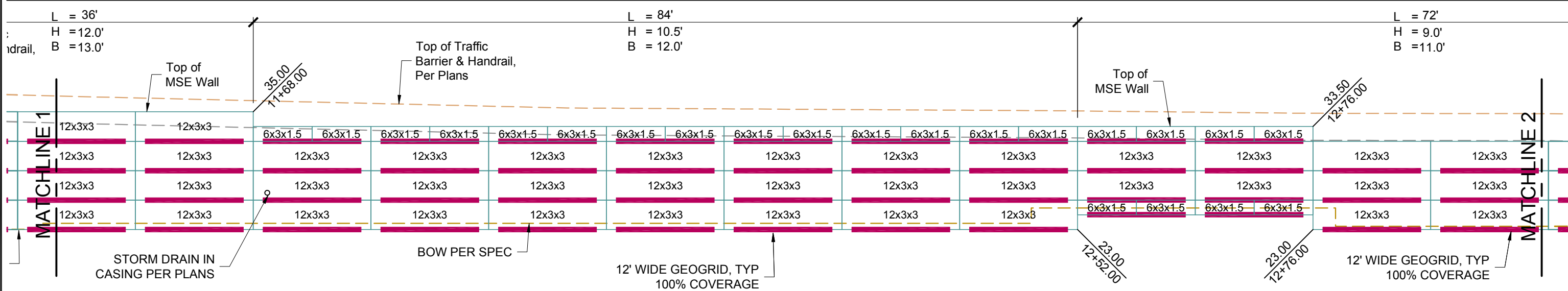
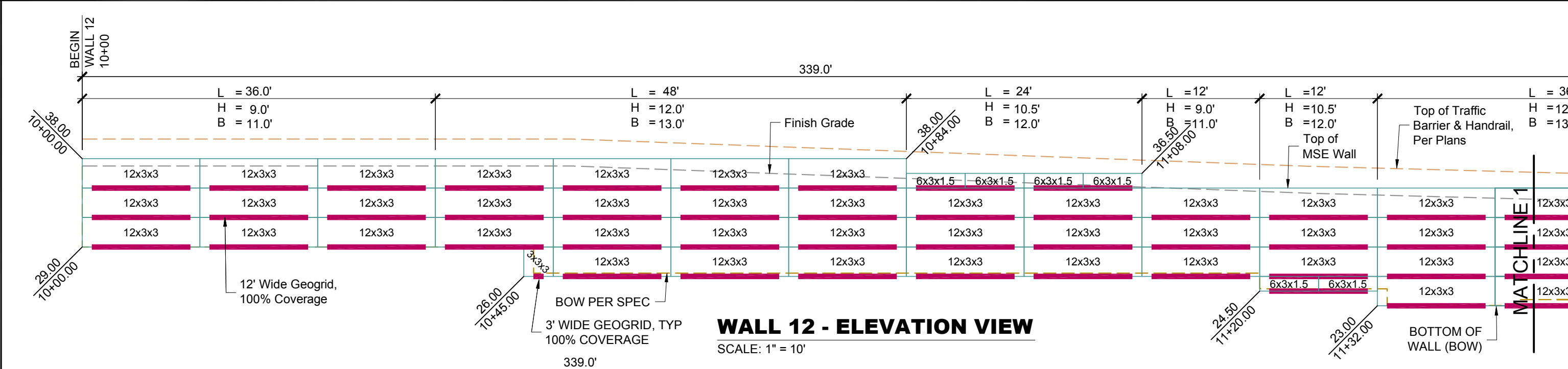
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SoundTransit East Link Extension Contract E320  
S. Bellevue  
MSE WALL 12 PLAN VIEW &  
GENERAL NOTES

HW 170210AT

PROJECT	17-059
DATE	8- 7-17
DESIGN	KLC
DRAWN	KLC

SHT 1 of 12



**REINFORCING TYPE LEGEND**

- TYPE 1 - MIRAGRID 10XT MATS
- TYPE 2 - MIRAGRID 20XT MATS
- TYPE 3 - MIRAGRID 22XT MATS

**GEOGRID BASE LENGTH TO WALL HEIGHT**

Height of Wall (H) ft	Length of Geogrids (B) ft
≤7.5'	10'
9.0'	11'
10.5'	12'
12.0'	13'

**NOTE:** GEOGRID Reinforcing mats are Miragrid 10XT, MD - Tencate. These mats come in 12' wide x 200' L rolls.

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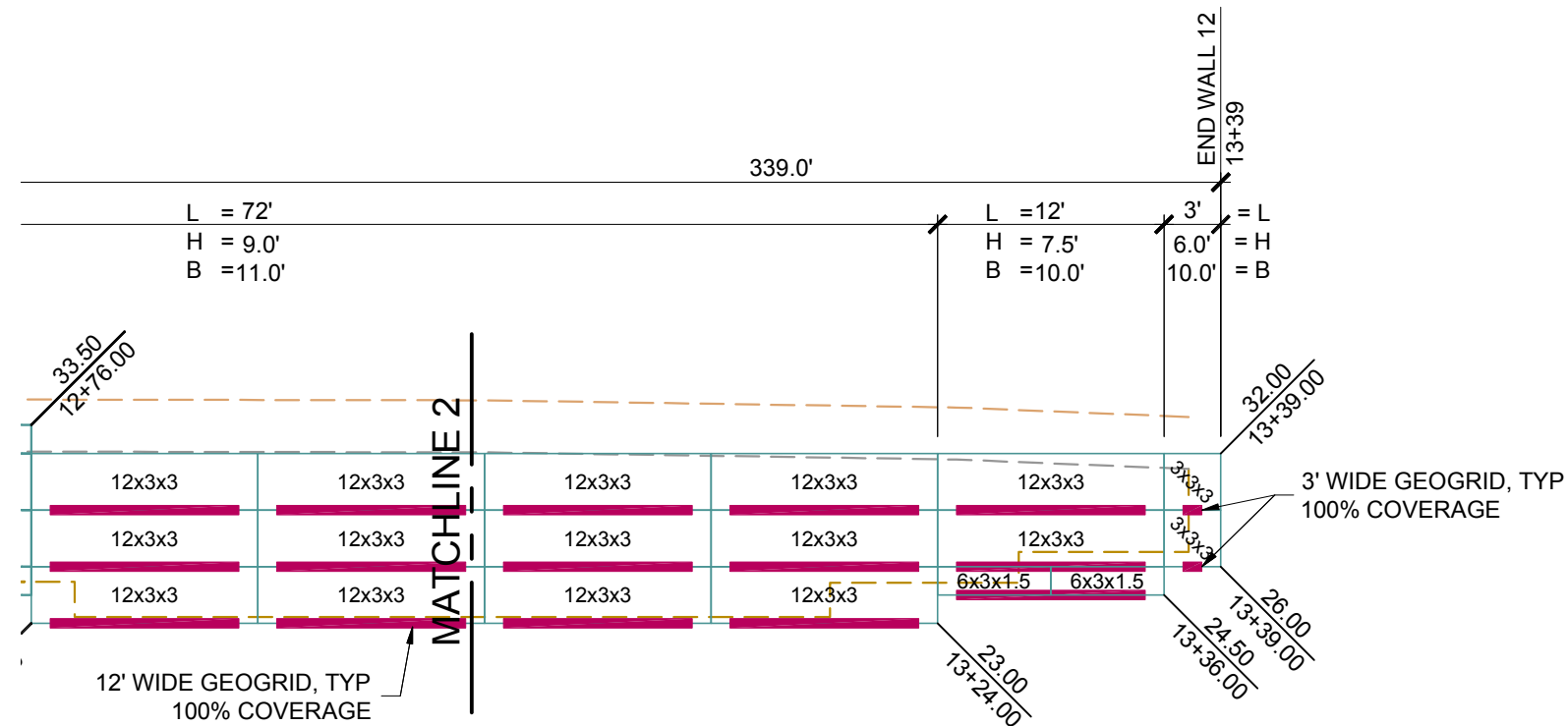
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**MSE WALL 12 ELEVATION VIEW**

PROJECT 17-059  
DATE 8- 7-17  
DESIGN KLC  
DRAWN KLC

SHT **2** OF 12



## WALL 12 - ELEVATION VIEW (CONT'D)

SCALE: 1" = 10'

### REINFORCING TYPE LEGEND

- TYPE 1 - MIRAGRID 10XT MATS
- TYPE 2 - MIRAGRID 20XT MATS
- TYPE 3 - MIRAGRID 22XT MATS

GEOGRID BASE LENGTH TO WALL HEIGHT	
Height of Wall (H) ft	Length of Geogrids (B) ft
≤7.5'	10'
9.0'	11'
10.5'	12'
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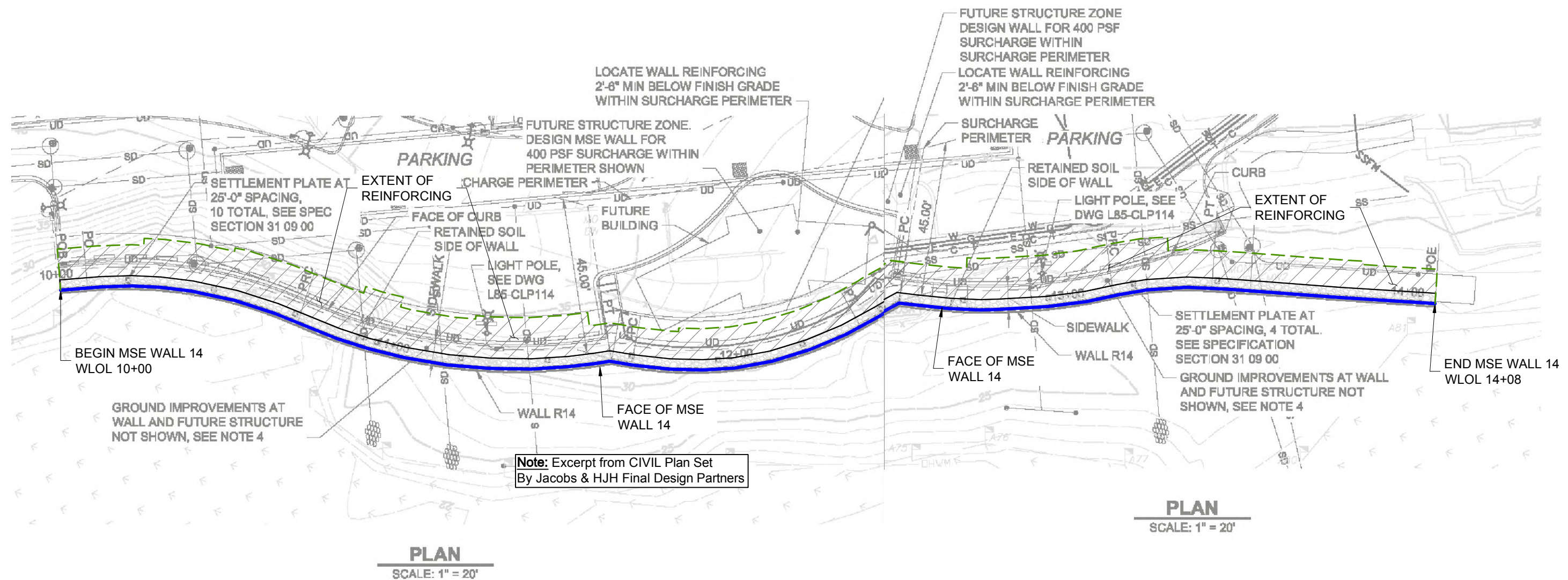
MSE WALL 12 ELEVATION VIEW  
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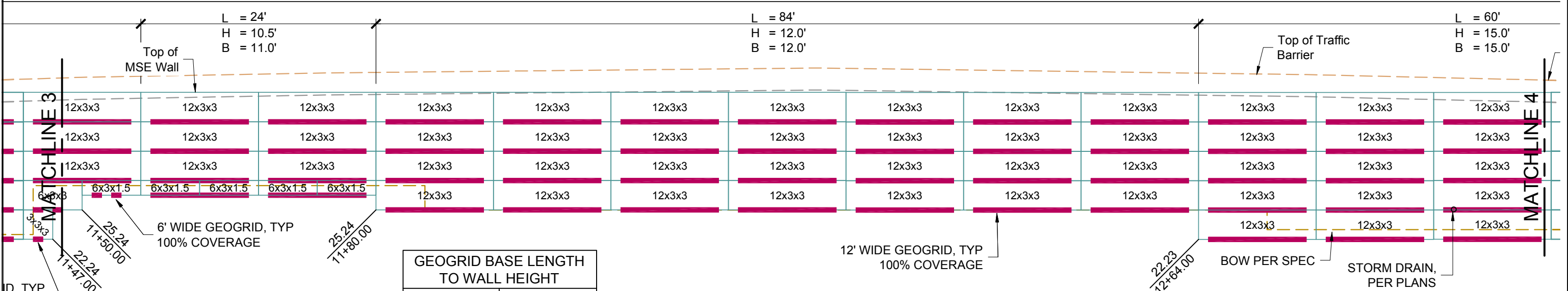
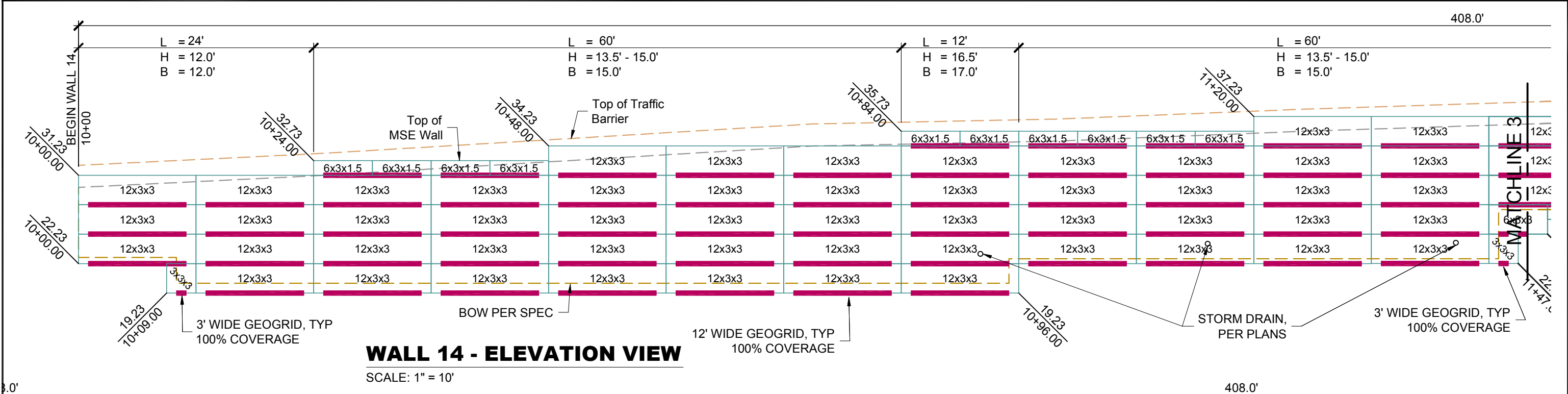
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MSE WALL 14 PLAN VIEW

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PROJECT 17-059  
DATE 8-7-17  
DESIGN KLC  
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SHT 4 OF 12



GEOGRID BASE LENGTH TO WALL HEIGHT	
Height of Wall (H) ft	Length of Geogrids (B) ft
9.0'	10.0'
10.5'	11.0'
12.0'	12.0'
13.5' - 15.0'	15.0'
16.5'	17.0'

**NOTE:**  
GEOGRID Reinforcing mats are Miragrid 10XT, MD - Tencate. These mats come in 12' wide x 200' L rolls.

- REINFORCING TYPE LEGEND**
- TYPE 1 - MIRAGRID 10XT MATS
  - TYPE 2 - MIRAGRID 20XT MATS
  - TYPE 3 - MIRAGRID 22XT MATS

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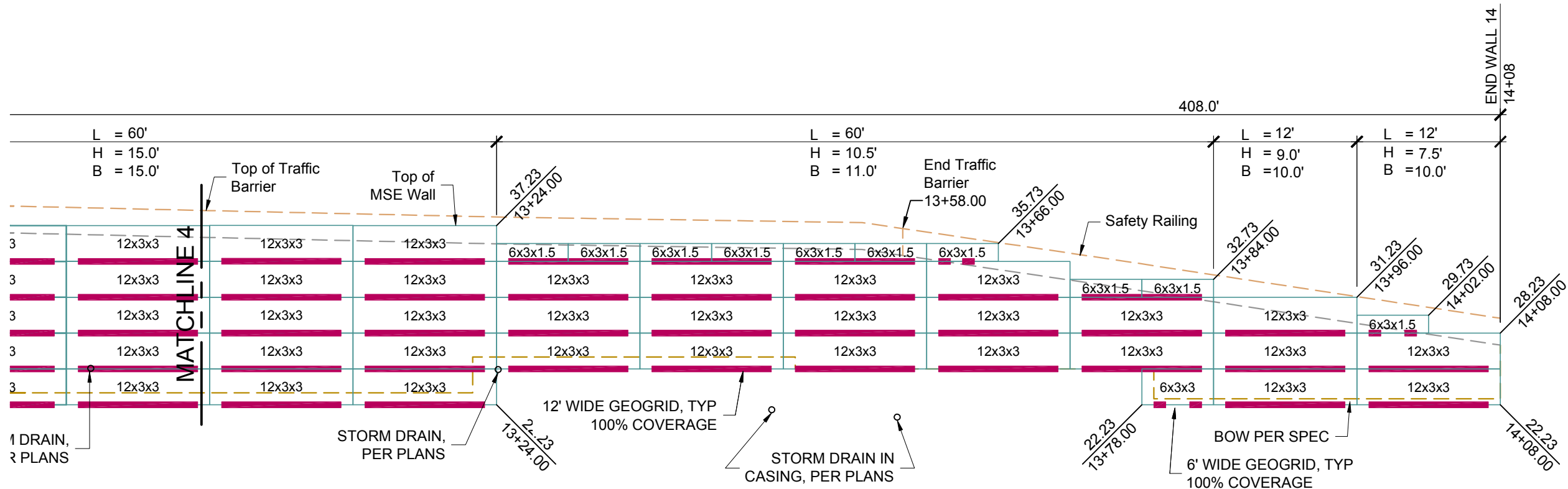
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MSE WALL 14 ELEVATION VIEW

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# WALL 14 - ELEVATION VIEW (CONT'D)

SCALE: 1" = 10'

## REINFORCING TYPE LEGEND

- TYPE 1 - MIRAGRID 10XT MATS
- TYPE 2 - MIRAGRID 20XT MATS
- TYPE 3 - MIRAGRID 22XT MATS

GEOGRID BASE LENGTH TO WALL HEIGHT	
Height of Wall (H) ft	Length of Geogrids (B) ft
9.0'	10.0'
10.5'	11.0'
12.0'	12.0'
13.5' - 15.0'	15.0'
16.5'	17.0'

**NOTE:**  
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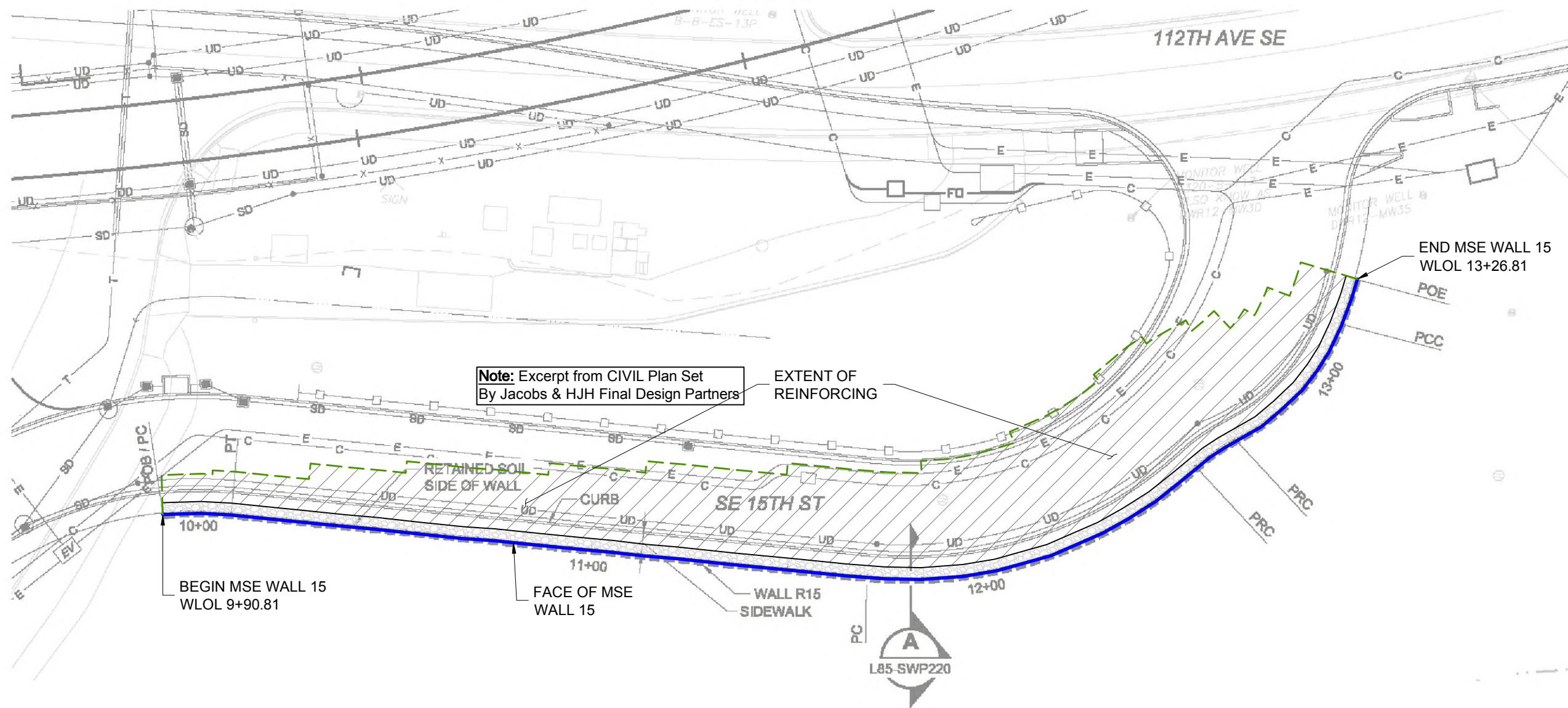
MSE WALL 14 ELEVATION VIEW  
(CONT'D)

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**WALL 15 - PLAN VIEW**  
SCALE: 1" = 30'

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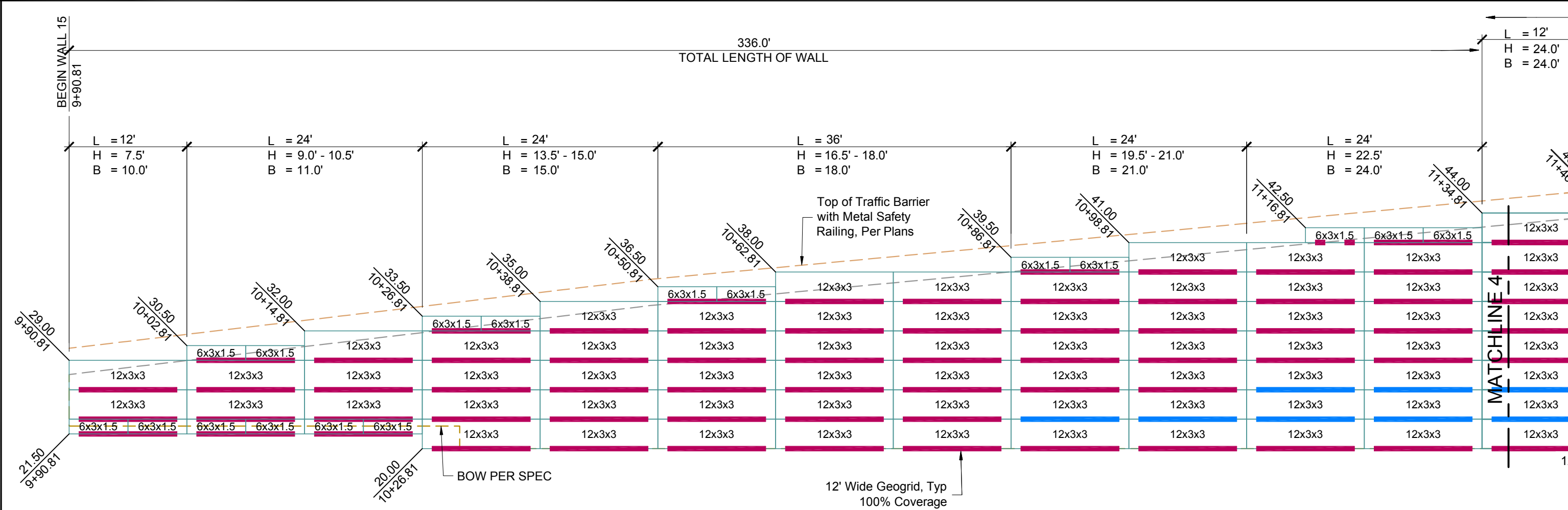
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**MSE WALL 15 PLAN VIEW**

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DATE 8- 7-17  
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**WALL 15 - ELEVATION VIEW**

SCALE: 1" = 10'

**REINFORCING TYPE LEGEND**

- TYPE 1 - MIRAGRID 10XT MATS
- TYPE 2 - MIRAGRID 20XT MATS
- TYPE 3 - MIRAGRID 22XT MATS

GEOGRID BASE LENGTH TO WALL HEIGHT		GEOGRID BASE LENGTH TO WALL HEIGHT	
Height of Wall (H) ft	Length of Geogrids (B) ft	Height of Wall (H) ft	Length of Geogrids (B) ft
7.5'	10'	22.5'-24'	24'
9'-10.5'	11'	25.5'-27'	27'
13.5'-15'	15'	28.5'-30'	30'
16.5'-18'	18'	31.5'-33'	33'
19.5'-21'	21'	34'	34'

**NOTE:**  
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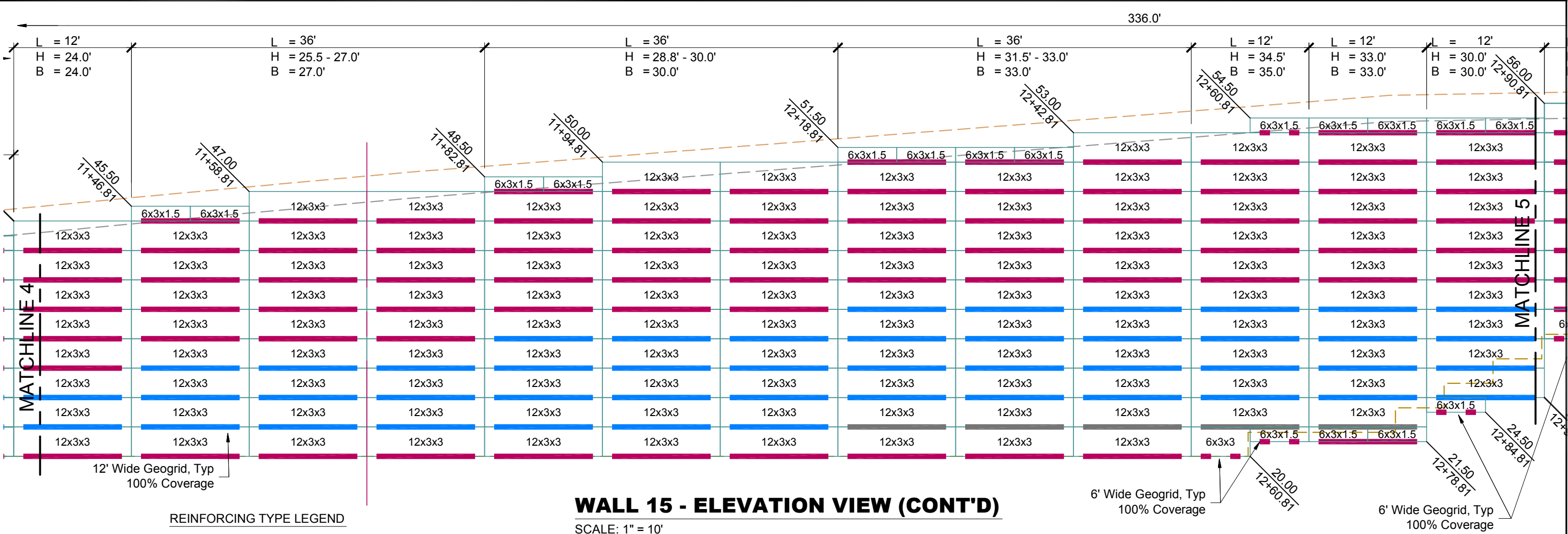
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MSE WALL 15 ELEVATION VIEW

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**WALL 15 - ELEVATION VIEW (CONT'D)**

SCALE: 1" = 10'

**REINFORCING TYPE LEGEND**

- TYPE 1 - MIRAGRID 10XT MATS
- TYPE 2 - MIRAGRID 20XT MATS
- TYPE 3 - MIRAGRID 22XT MATS

GEOGRID BASE LENGTH TO WALL HEIGHT		GEOGRID BASE LENGTH TO WALL HEIGHT	
Height of Wall (H) ft	Length of Geogrids (B) ft	Height of Wall (H) ft	Length of Geogrids (B) ft
7.5'	10'	22.5'-24'	24'
9'-10.5'	11'	25.5'-27'	27'
13.5'-15'	15'	28.5'-30'	30'
16.5'-18'	18'	31.5'-33'	33'
19.5'-21'	21'	34'	34'

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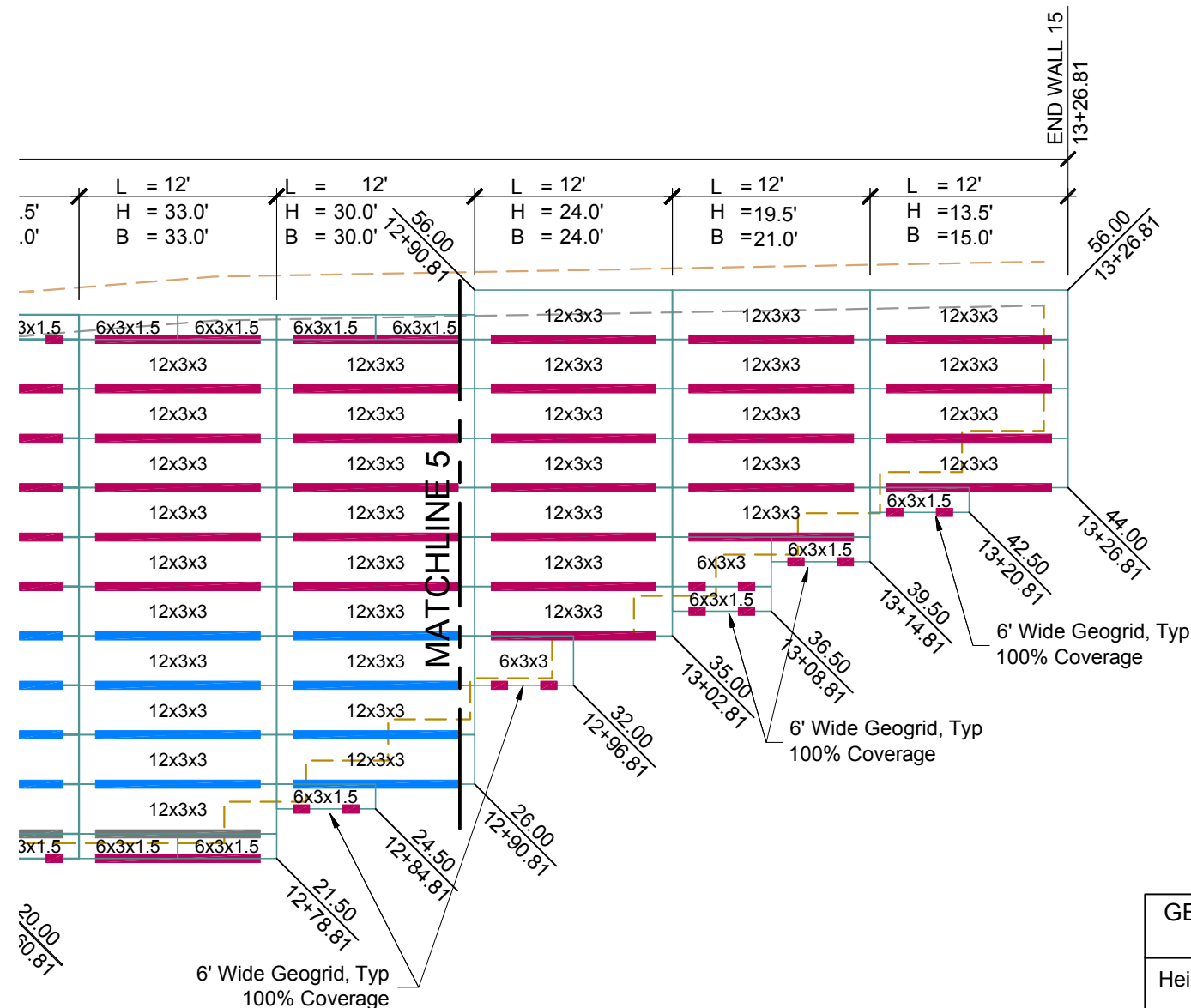
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- REINFORCING TYPE LEGEND
- TYPE 1 - MIRAGRID 10XT MATS
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  - TYPE 3 - MIRAGRID 22XT MATS

### WALL 15 - ELEVATION VIEW (CONT'D)

SCALE: 1" = 10'

GEOGRID BASE LENGTH TO WALL HEIGHT		GEOGRID BASE LENGTH TO WALL HEIGHT	
Height of Wall (H) ft	Length of Geogrids (B) ft	Height of Wall (H) ft	Length of Geogrids (B) ft
7.5'	10'	22.5'-24'	24'
9'-10.5'	11'	25.5'-27'	27'
13.5'-15'	15'	28.5'-30'	30'
16.5'-18'	18'	31.5'-33'	33'
19.5'-21'	21'	34'	34'

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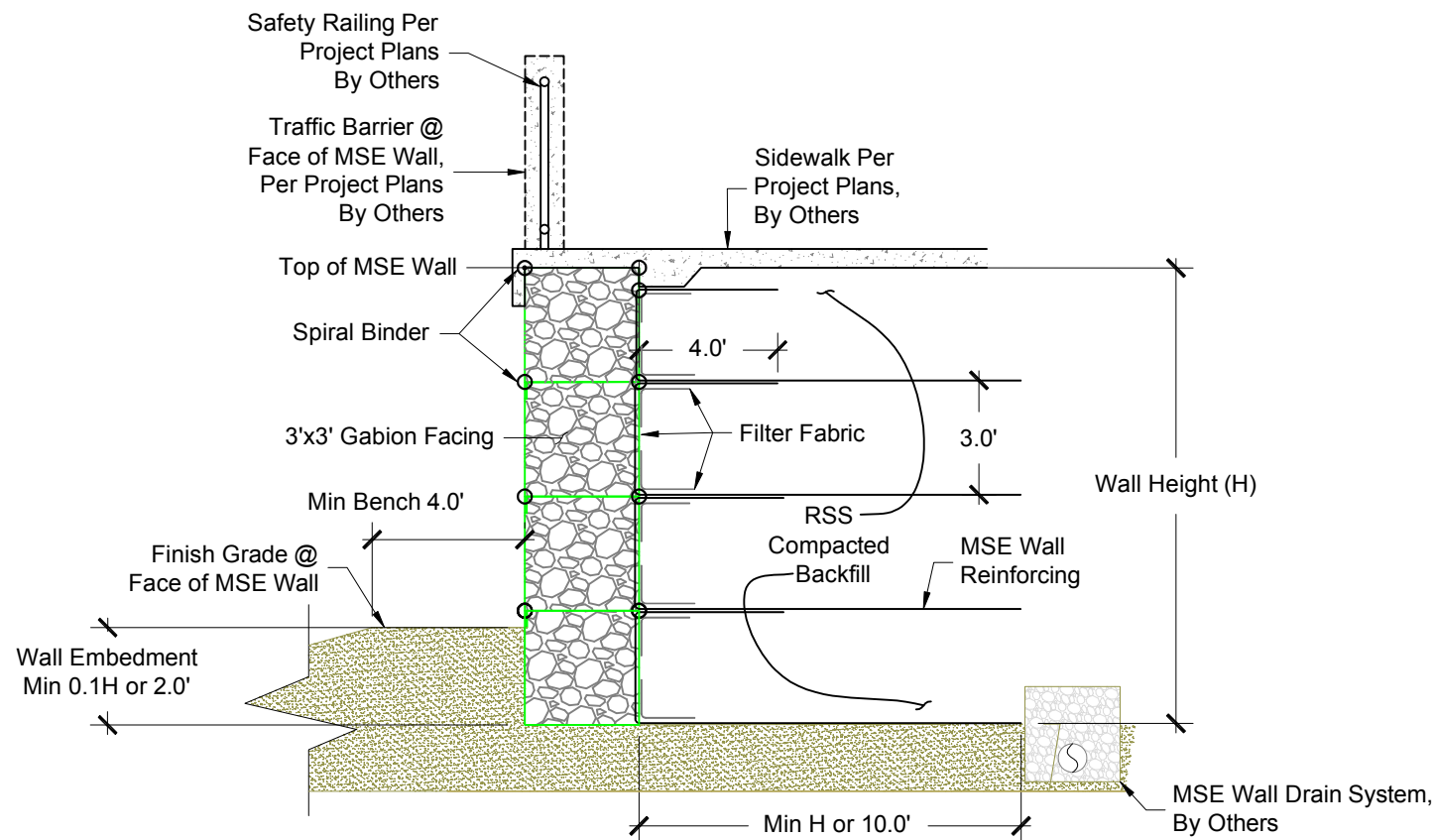
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MSE WALL 15 ELEVATION VIEW  
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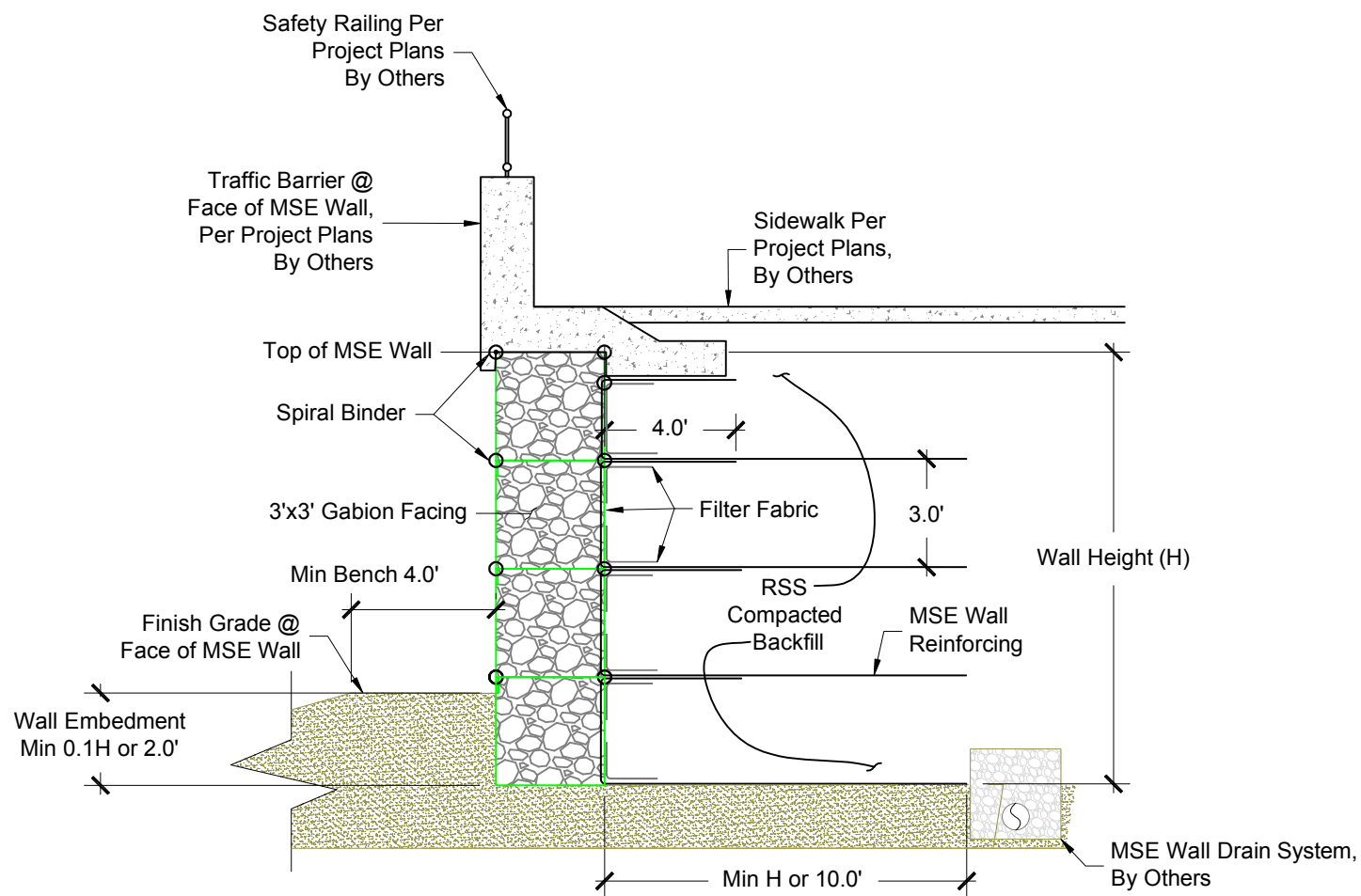
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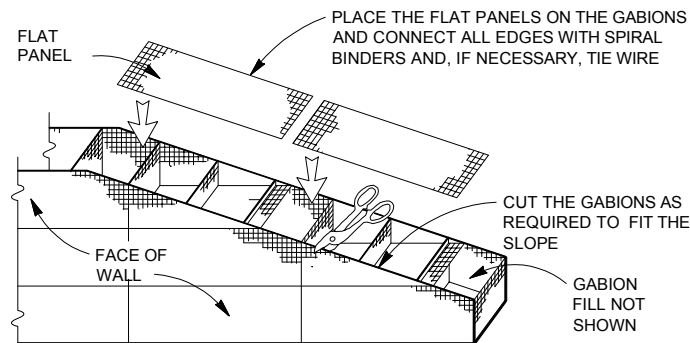
**TYPICAL MSE WALL WITH TRAFFIC BARRIER OR SIDEWALK**

SCALE: 1" = 5'



**TYPICAL MSE WALL WITH TRAFFIC BARRIER**

SCALE: 1" = 5'



**PICTORIAL ELEVATION**

**SLOPED GABION DETAIL**  
NOT TO SCALE

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MSE WALLS CROSS SECTIONS &  
SLOPE CAP DETAIL

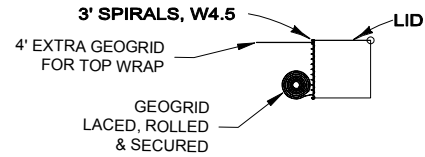
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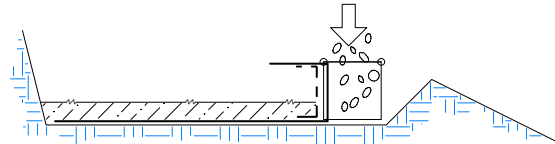
SHT 11 OF 12



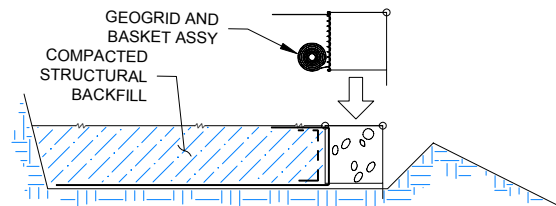
- STEP 1**
1. PREPARE FACING BASKET AND GEOGRID ASSEMBLY. LACE SOIL REINFORCEMENT GRID UP THRU THE BOTTOM OF THE BASKET AND OVER THE TOP. PULL 4' OF EXTRA GEOGRID FOR TOP WRAP. TOTAL LENGTH OF GEOGRID S/B B+4 OR B1+4. SPIRAL BIND THE GEOGRID TO THE BASKET USING THE 5 VERTICAL SPIRAL BINDERS OF THE INNER DIAPHRAGMS.
  2. ATTACH THE LID IN PLACE USING SPIRAL BINDERS.
  3. THE BASKET AND GEOGRID ASSEMBLY IS NOW READY TO BE PLACED AT THE SITE.



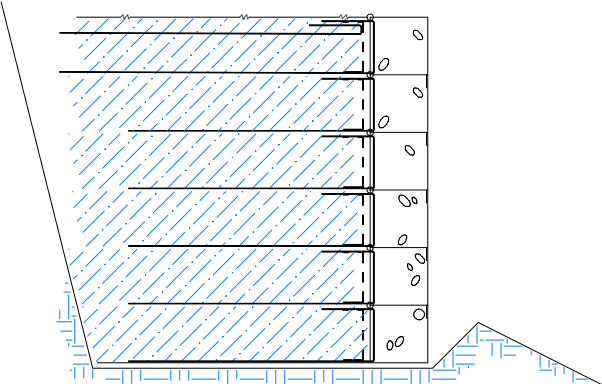
- STEP 2**
1. PLACE ASSEMBLED SOIL REINFORCEMENT GRIDS AND BASKET ON PREPARED FOUNDATION.
  2. FILL THE GABION BASKET WITH ROCK THRU THE CLOSED LID, LEAVE SOME VOID AT THE TOP. DO NOT OVER FILL.
  3. ROLL OUT GEOGRID AND TENSION THE MATERIAL LYING FLAT, FREE OF WRINKLES. SEE TENCATE INSTALLATION GUIDELINES FOR COMPLIANCE TO TENCATE SPECIFICATIONS.
  4. INSTALL FILTER FABRIC. HOG RING FABRIC TO THE BACK OF THE BASKET.
  5. PLACE AND COMPACT THE FIRST COURSE OF BACKFILL ON THE SOIL REINFORCEMENT GRIDS. BACKFILL TO BE OF SUFFICIENT DEPTH TO PROTECT SOIL REINFORCEMENT MATS FROM DAMAGE OR MOVEMENT BY EQUIPMENT DURING DELIVERY OF ROCK TO THE GABIONS. AGAIN, NOTE THE TENCATE INSTALLATION GUIDELINES FOR SPECIFIC BACKFILL DIRECTIONS.



- STEP 3**
1. PLACE THE SECOND LIFT OF THE GABION BASKET GEOGRID ASSEMBLY OVER THE FIRST LIFT, USING THE PRONGED BOTTOM FRONT TO INTERCONNECT THE GABIONS. PLACE PRONGS INSIDE NEIGHBORING BOTTOM BASKET.
  2. REPEAT ABOVE STEPS 2-5.



- STEP 4**
1. REPEAT STEP 3 TO THE TOP LIFT OF GABIONS.
  2. PLACE 2' OF BACKFILL ON THE FINAL LIFT AND ADD THE TOP FINAL REINFORCING LIFT 1.0' FROM THE TOP OF TOP BASKET. FINAL REINFORCING NOT THREADED THRU THE BASKET.
  3. PLACE THE FINAL 1.0' OF BACKFILL PER PROJECT PLANS.



**CONSTRUCTION SEQUENCE**  
NOT TO SCALE

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE HILFIKER COMPANY HAS DESIGNED, AND IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	8- 7-17	KLC	Initial .pdf Release

**HILFIKER RETAINING WALLS**



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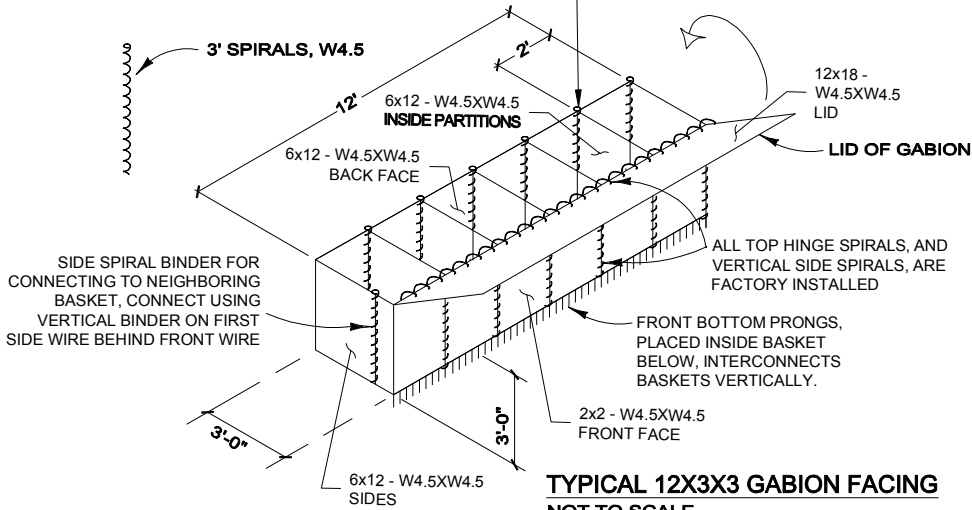
SoundTransit East Link Extension Contract E320  
S. Bellevue  
MSE WALLS CONSTRUCTION  
SEQUENCE AND DETAILS

HW 170210AT

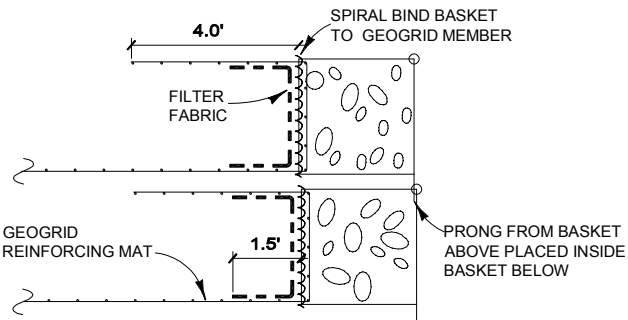
PROJECT 17-059  
DATE 8- 7-17  
DESIGN KLC  
DRAWN KLC

SHT 12 of 12

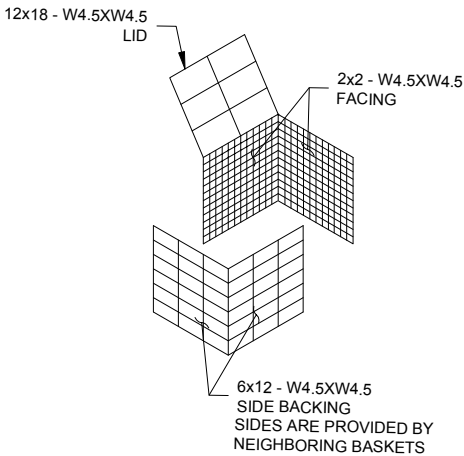
ASSEMBLE THE INNER DIAPHRAGMS WITH SPIRAL (5X) BINDERS AFTER PLACING THE CORRECT LENGTH OF GEOGRID THRU THE BOTTOM AND TOP OF THE BASKET. SECURE LID POST GEOGRID PLACEMENT. BASKET ROCK FILL TO BE LOADED THRU THE CLOSED TOP LID.



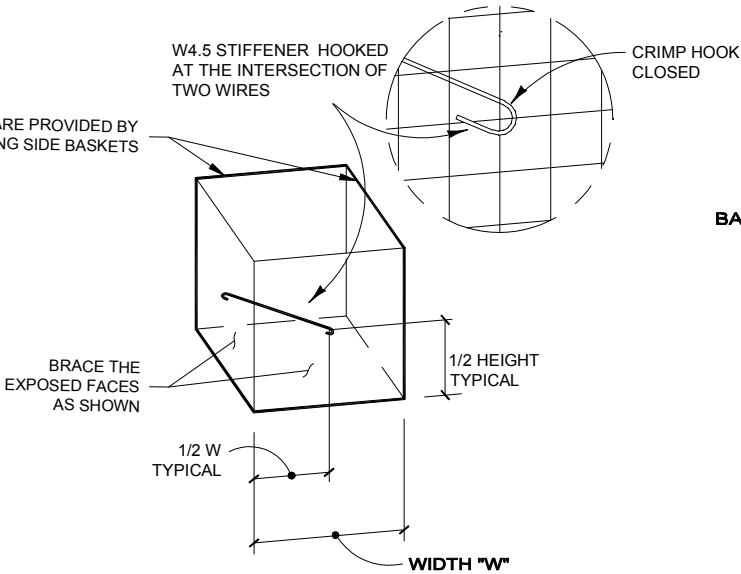
**TYPICAL 12X3X3 GABION FACING**  
NOT TO SCALE



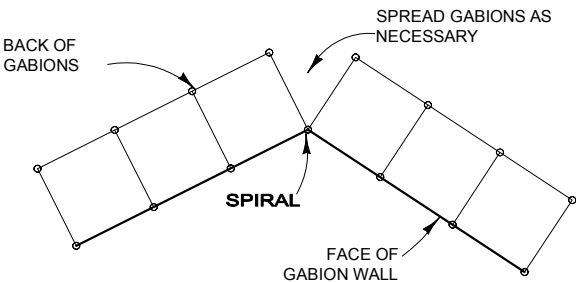
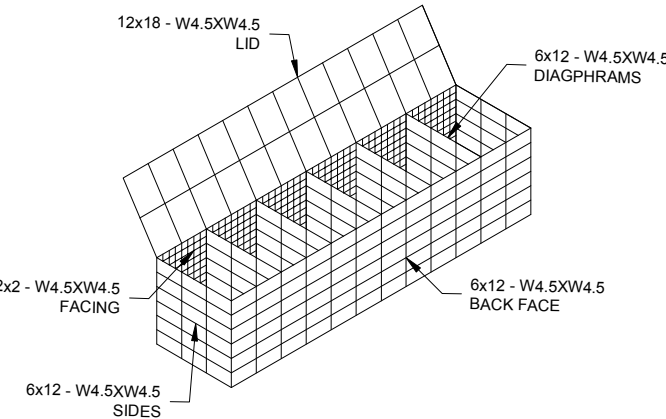
**CONNECTION DETAIL**  
NOT TO SCALE



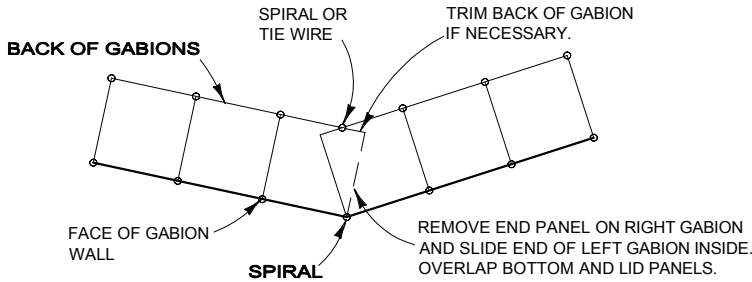
ENCLOSING SIDES ARE PROVIDED BY THE NEIGHBORING SIDE BASKETS



**CORNER (ANGLE POINT) BASKET DETAILS**  
NOT TO SCALE



**PLAN VIEW**  
**CONVEX ANGLE**



**PLAN VIEW**  
**CONCAVE ANGLE**