

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 (Compliant to the Special Provisions Requirement 0A596.11):

Unit Weight: 136 pcf

Internal Friction Angle: 35°

Cohesion = 0 psf

Retained Backfill:

Unit Weight: 136 pcf

Internal Friction Angle: 35°

Cohesion = 0 psf

Foundation Soils:

Unit Weight: 136 pcf

Friction Angle for Sliding: 35°

Cohesion = 0 psf

Assumes a worst case Building Surcharge Dead Load of 2000 psf.
Worst Case Factored Bearing Pressure by MSE Wall- @ 18' Height - 6750 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.

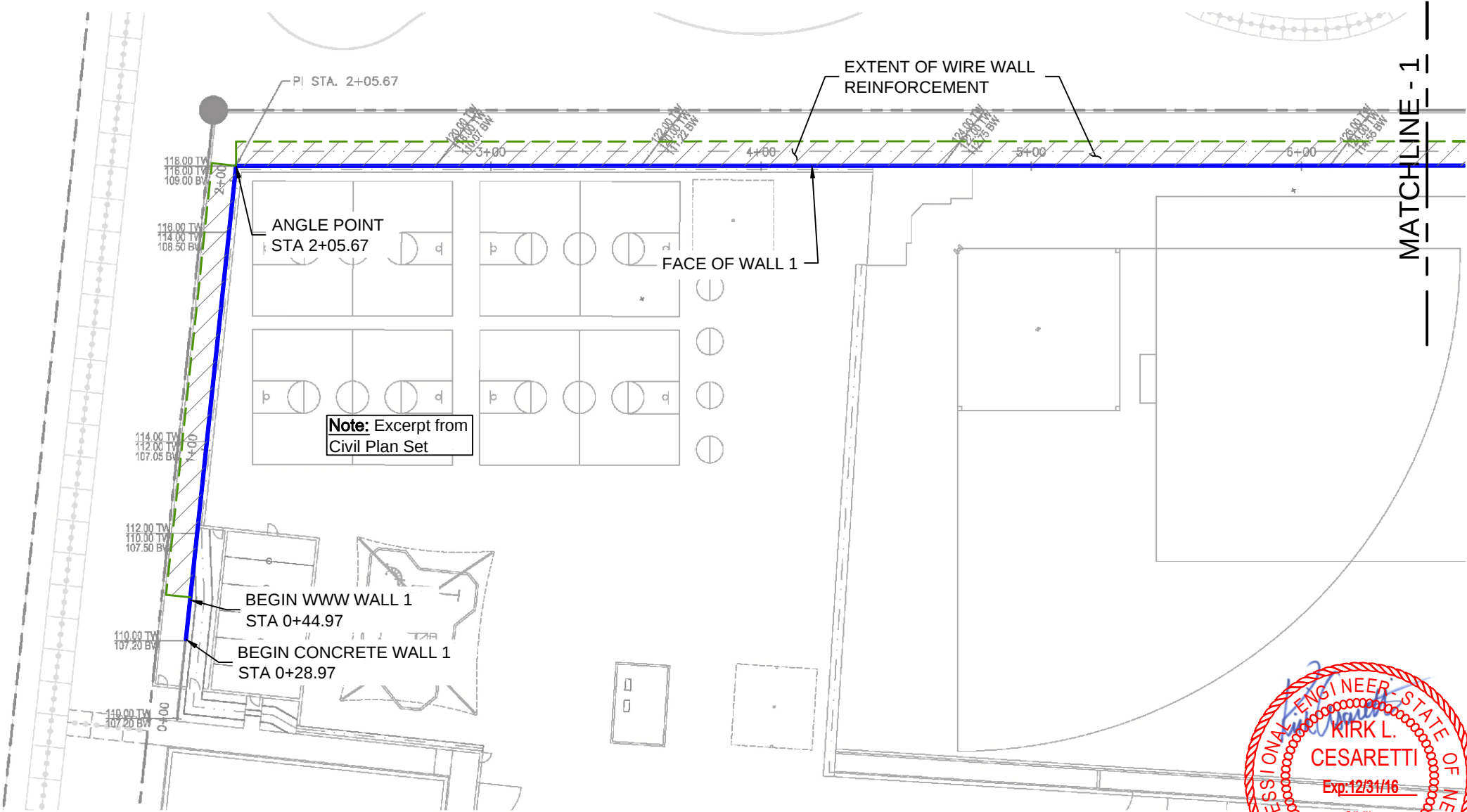
3. If during construction, the wall location, structure location or loads are different than that proposed in this plan set and calculation package, HRW shall be notified to evaluate the need for a redesign.
4. The design requires a non-saturated backfill. Surface and sub-surface drainage control may 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, FHWA report No. FHWA-NHI-00-043.
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 construction of the walls. The applicable Hilfiker construction guide and specifications are an integral part of this submittal.
7. Hilfiker Retaining Walls shall be responsible only for the internal stability of the retaining wall.
8. These plans are not intended to replace the Architectural Plans or Civil Plans for this project. If there are discrepancies the Project Plans take precedent as the information on these plans is derived from those.

WELDED WIRE WALL FACE AREAS

Wall	Quantity	Sheet
WALL 1	8,912 ft²	1-4
WALL 2	656 ft²	5
WALL STAIR 3R	128 ft²	5
WALL 3	320 ft²	6
WALL 4	2,864 ft²	7
WALL STAIR 4 P3	480 ft²	8
WALL STAIR 4 P4	128 ft²	8
WALL 5	2,080 ft²	9
WALL 6	1,760 ft²	10-11
WALL 7	2,832 ft²	12
WALL 8	1,856 ft²	13
WALL 9	2,224 ft²	14
WALL 11	288 ft²	15
WALL 12	288 ft²	15
WALL 13	1,088 ft²	16-17
WALL 14	672 ft²	18
Total	26,576 ft²	



PLAN VIEW - WALL 1
SCALE: 1" = 50'

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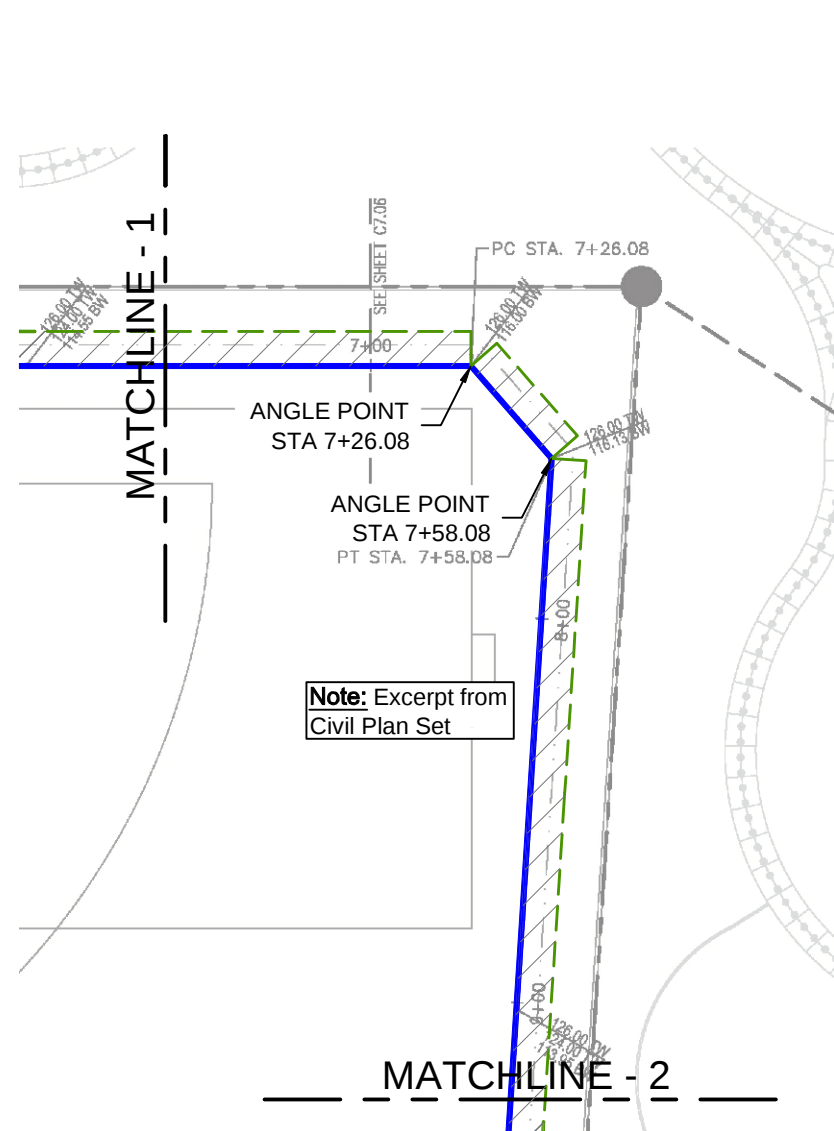
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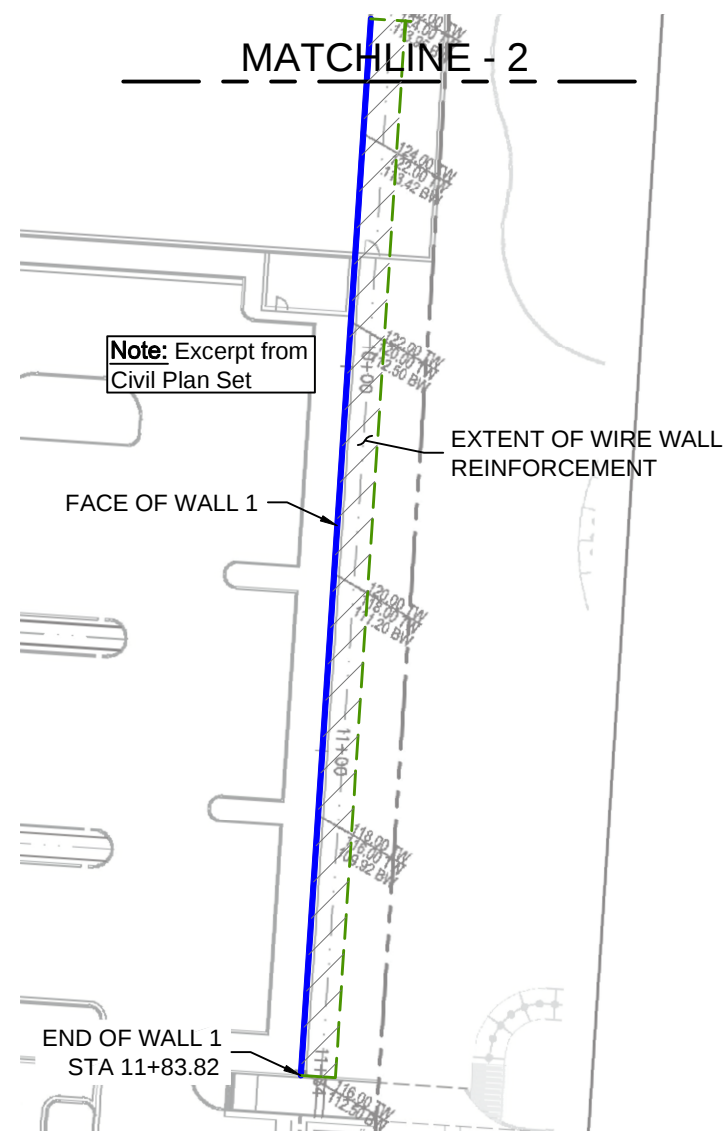
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PLAN VIEW - WALL 1 & GENERAL
NOTES

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SHT	1 OF 21



PLAN VIEW - WALL 1 (CONT'D)

SCALE: 1" = 50'



PLAN VIEW - WALL 1 (CONT'D)

SCALE: 1" = 50'

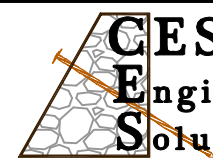
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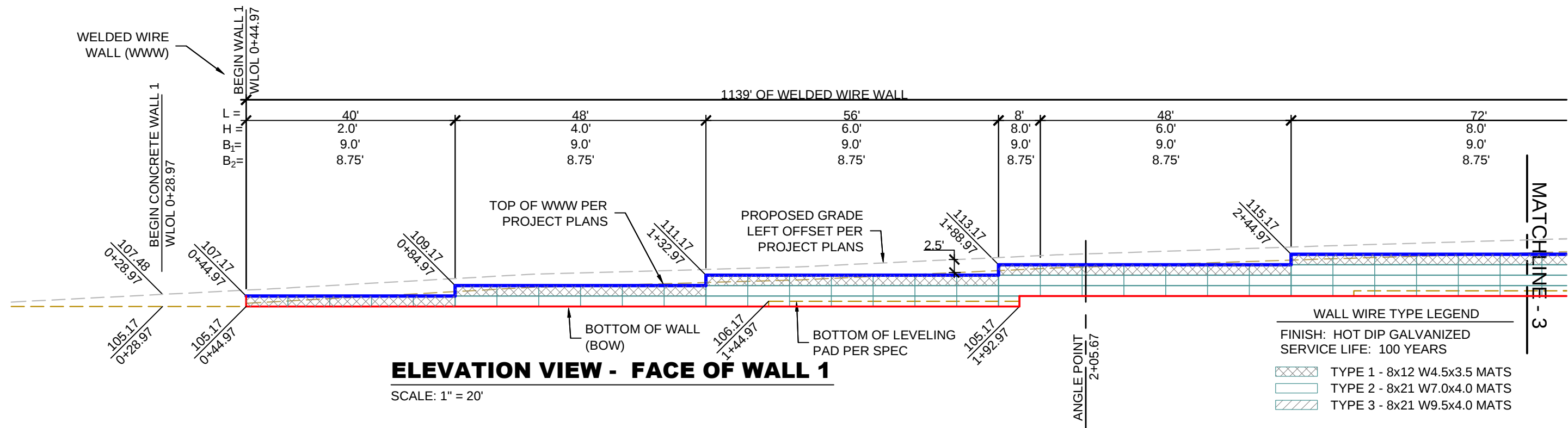
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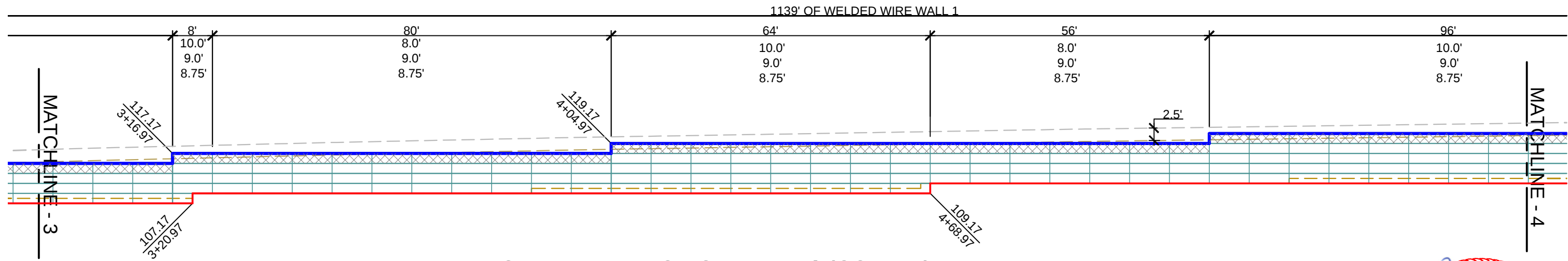
PLAN VIEW - WALL 1 (CONT'D)

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SHT 2 OF 21



ELEVATION VIEW - FACE OF WALL 1
SCALE: 1" = 20'



ELEVATION VIEW - FACE OF WALL 1 (CONT'D)
SCALE: 1" = 20'

WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
≤10'	9.0'	8.75'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2)) Finish: Hot Dip Galvanized - 100 Year Service Life		



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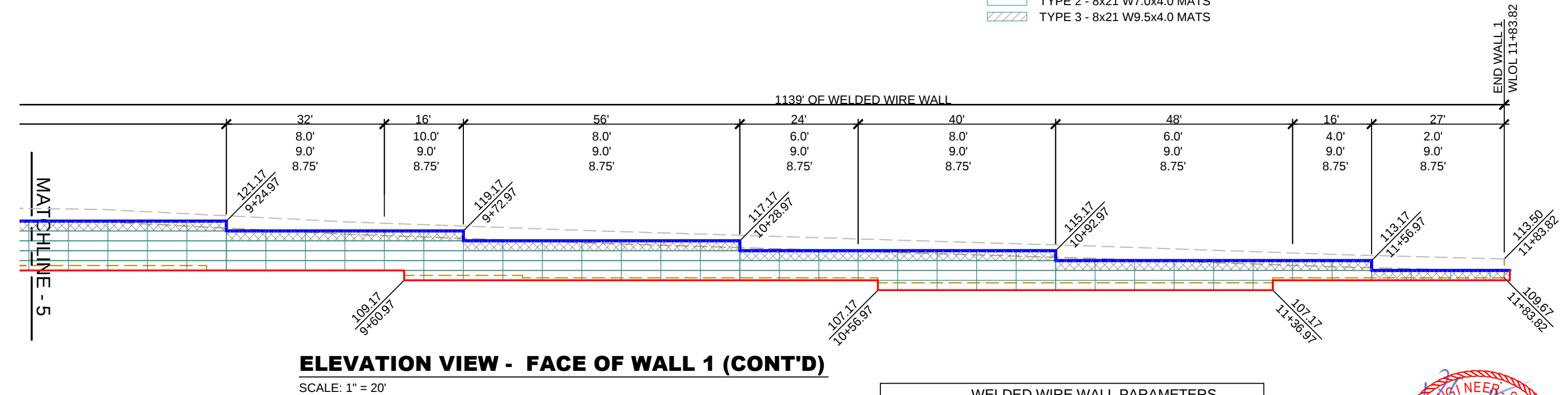
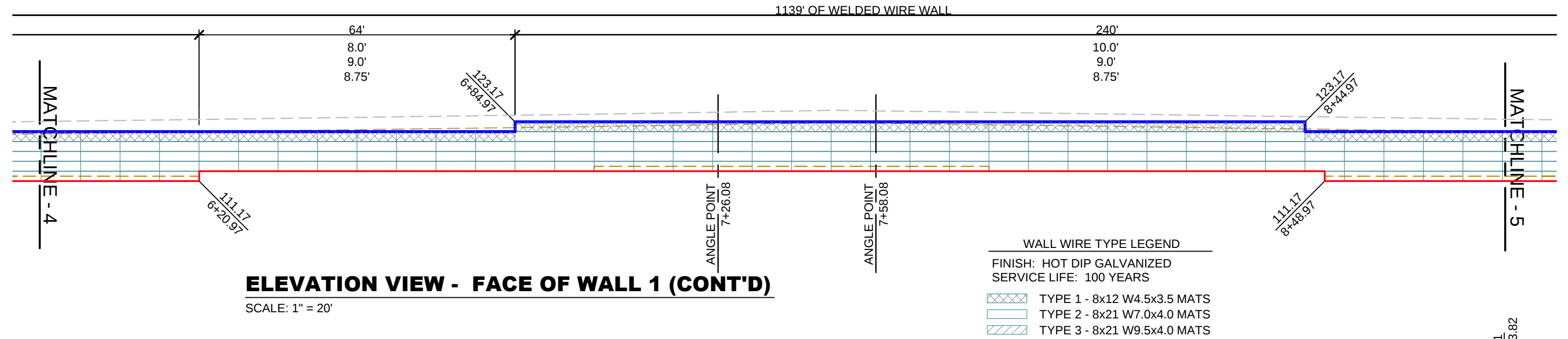
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ELEVATION VIEW - WALL 1

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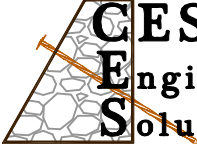
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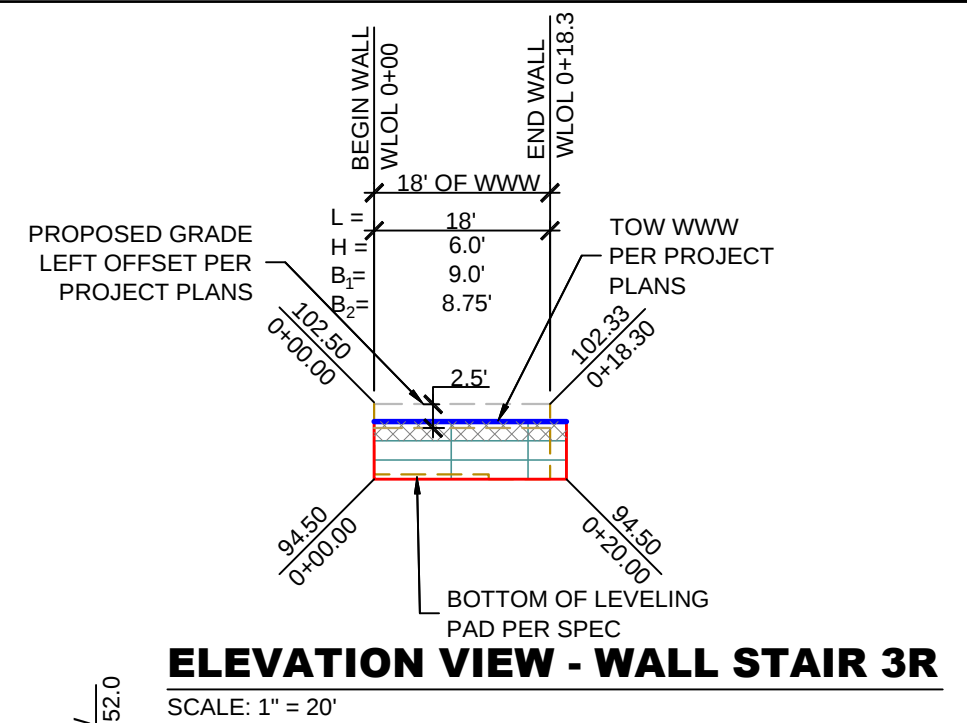
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ELEVATION VIEW - WALL 1 (CONT'D)

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WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
<u>≤</u> 10'	9.0'	8.75'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2)) Finish: Hot Dip Galvanized - 100 Year Service Life		

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PLAN VIEW WALLS 2 & 3
& ELEVATION VIEW - WALL 2

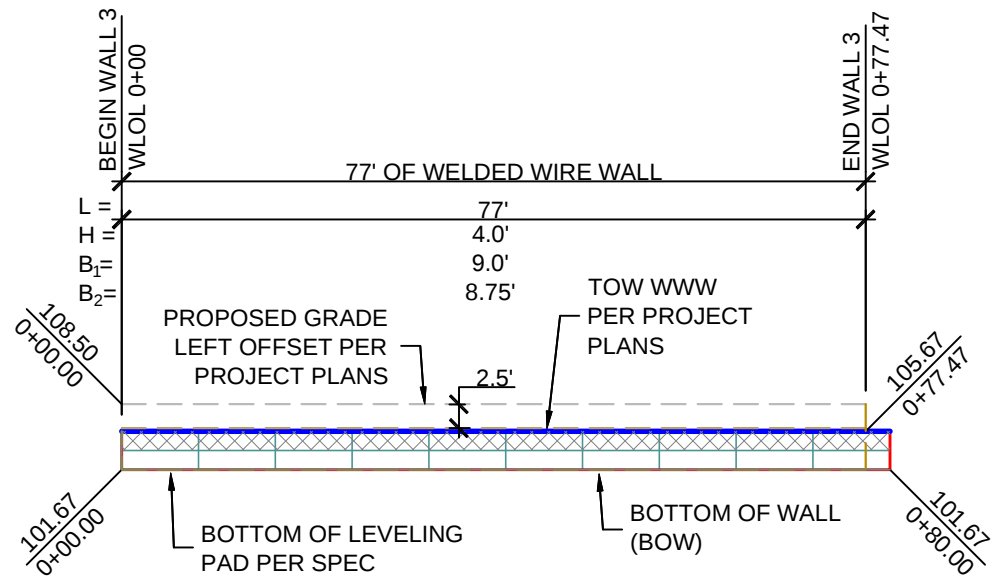
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WALL WIRE TYPE LEGEND

FINISH: HOT DIP GALVANIZED
SERVICE LIFE: 100 YEARS

TYPE 1 - 8x12 W4.5x3.5 MATS

TYPE 2 - 8x21 W7.0x4.0 MATS

WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
4'	9.0'	8.75'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2)) Finish: Hot Dip Galvanized - 100 Year Service Life		

ELEVATION VIEW - WALL 3

SCALE: 1" = 20'

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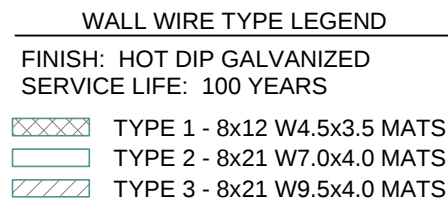
ELEVATION VIEW - WALL 3

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SCALE: 1" = 40'

282' OF WELDED WIRE WALL



SCALE: 1" = 20'

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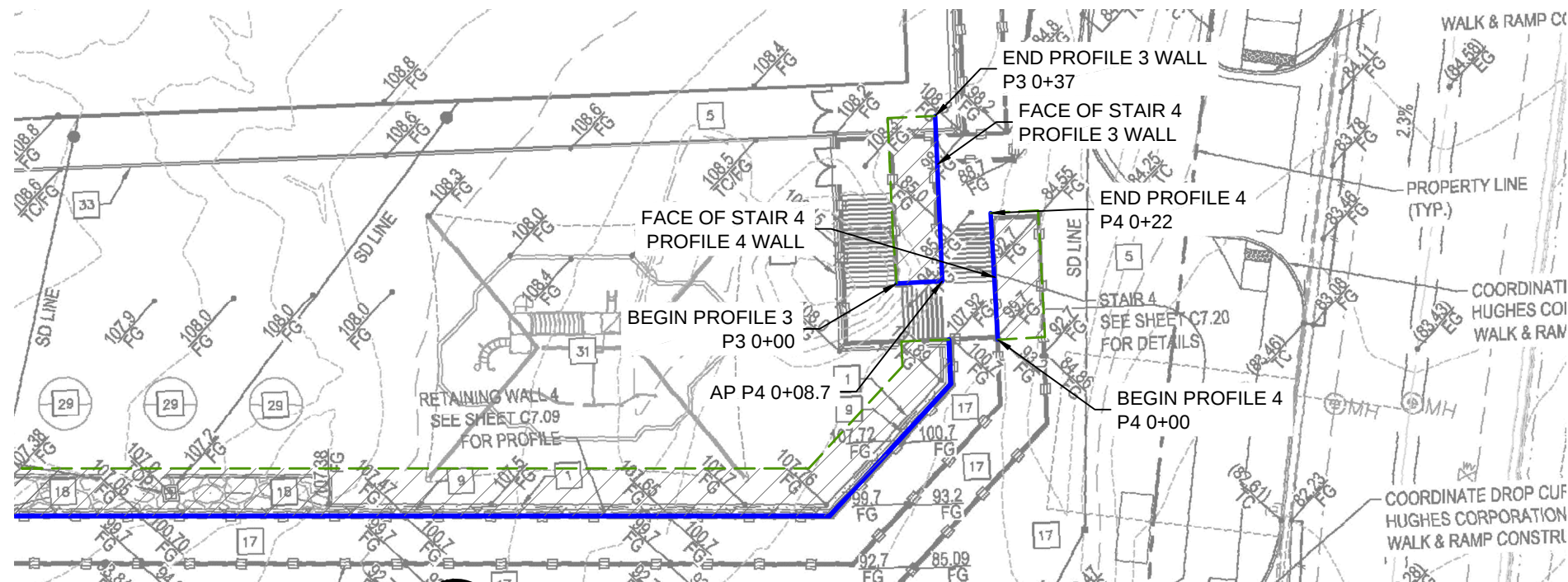
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PLAN VIEW
& ELEVATION VIEW - WALL 4

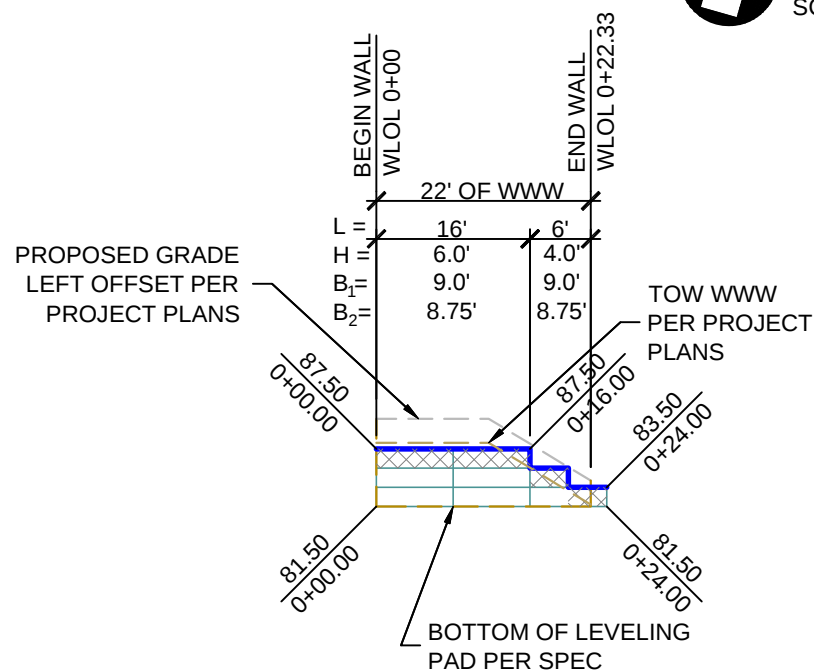
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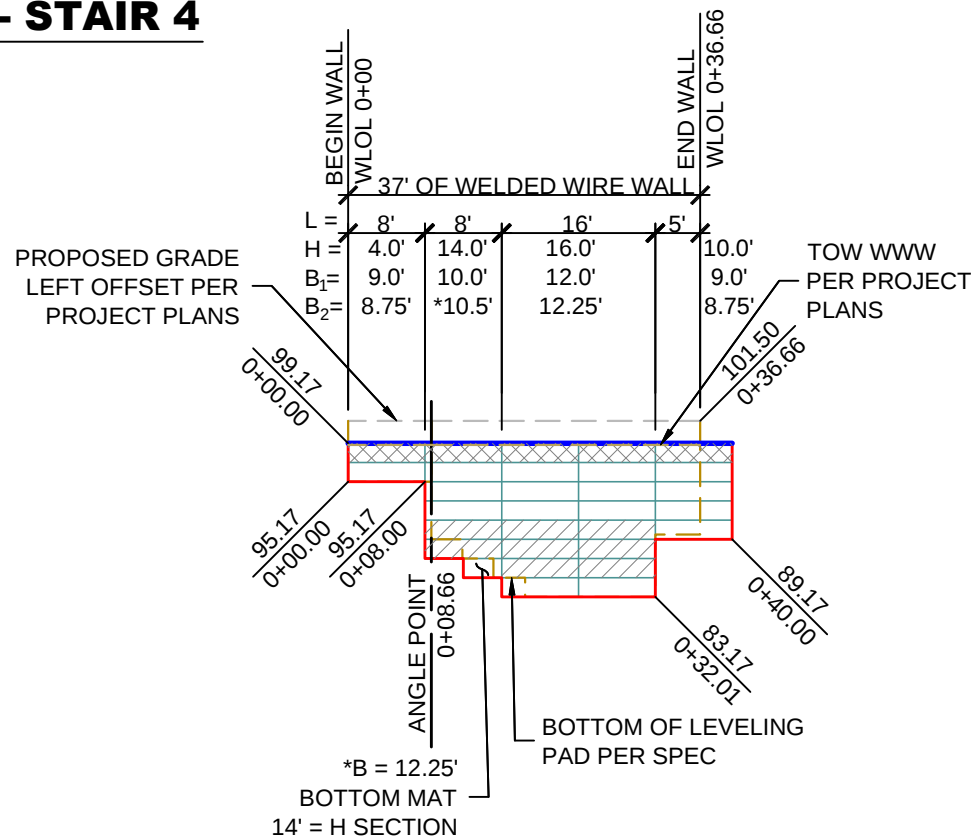
PLAN VIEW - STAIR 4

SCALE: 1" = 30'



ELEVATION VIEW - STAIR 4 PROFILE 4 WALL (REAR VIEW)

SCALE: 1" = 20'



ELEVATION VIEW - STAIR 4 PROFILE 3 WALL (FRONT VIEW)

SCALE: 1" = 20'

WALL WIRE TYPE LEGEND

FINISH: HOT DIP GALVANIZED
SERVICE LIFE: 100 YEARS

- TYPE 1 - 8x12 W4.5x3.5 MATS
- TYPE 2 - 8x21 W7.0x4.0 MATS
- TYPE 3 - 8x21 W9.5x4.0 MATS

WELDED WIRE WALL PARAMETERS

Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
<10'	9.0'	8.75'
12'	9.0'	10.5'
14'	10.0'	10.5'
16'	12.0'	12.25'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2) 8x21 W9.5x4.0 WWR (Type 3 = B2) Finish: Hot Dip Galvanized - 100 Year Service Life		



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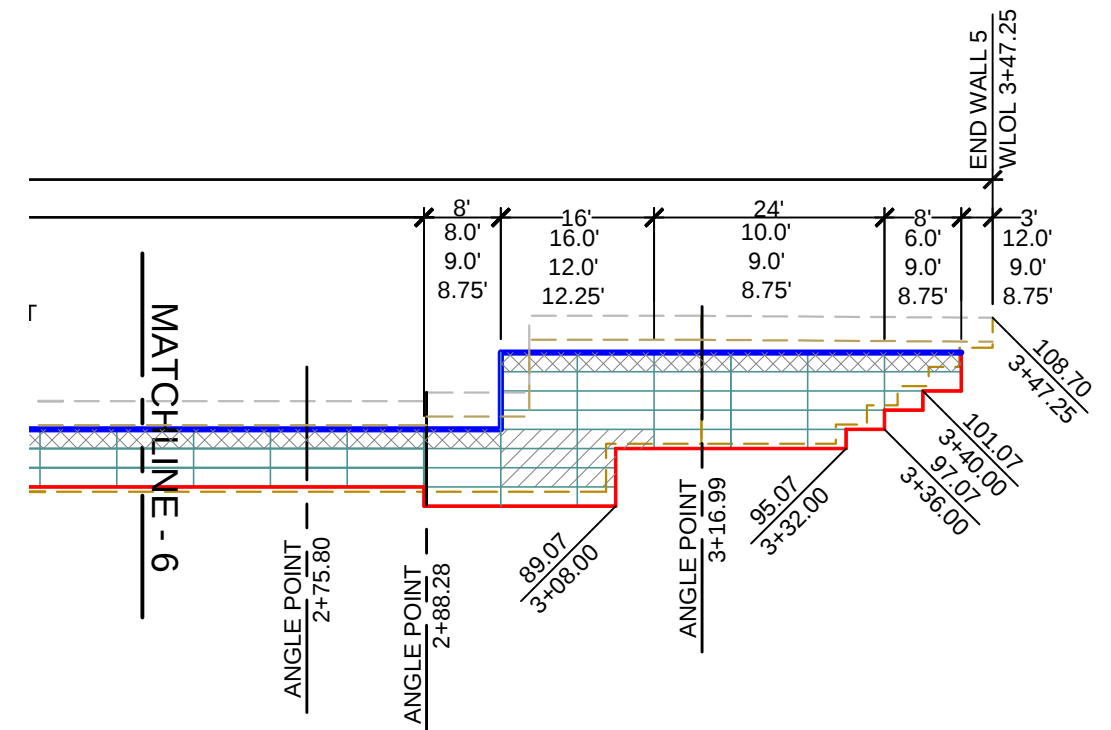
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PLAN VIEW
& ELEVATION VIEW - STAIR 4 WALLS

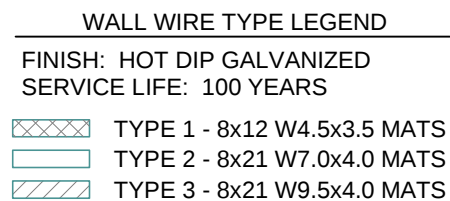
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SCALE: 1" = 20'



SCALE: 1" = 20'

WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
≤10'	9.0'	8.75'
12'	9.0'	10.5'
14'	10.0'	10.5'
16'	12.0'	12.25'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2) 8x21 W9.5x4.0 WWR (Type 3 = B2) Finish: Hot Dip Galvanized - 100 Year Service Life		



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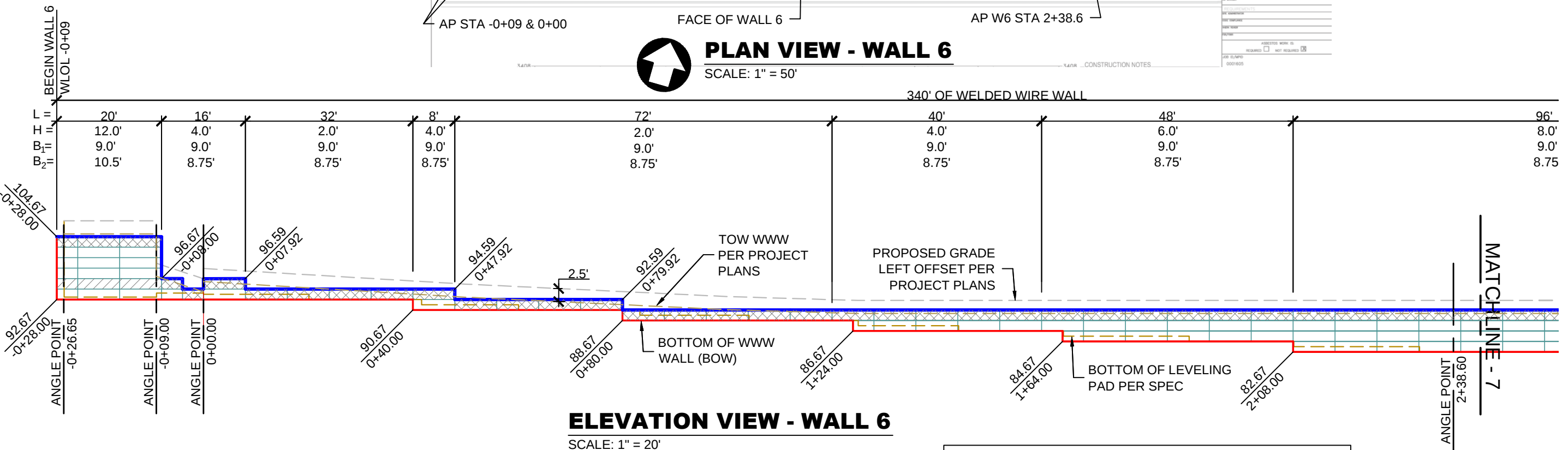


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PLAN & ELEVATION VIEW - WALL 5

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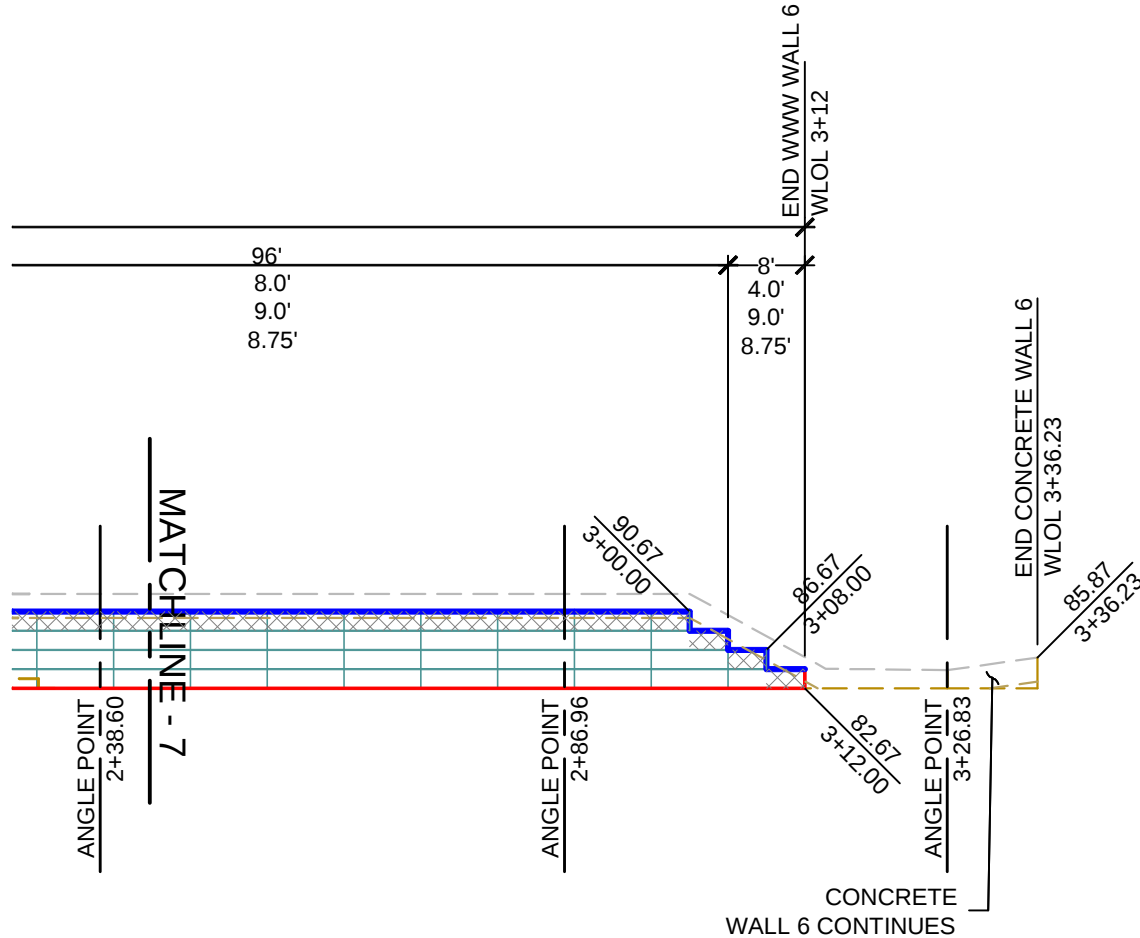
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PLAN & ELEVATION VIEW - WALL 6

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WALL WIRE TYPE LEGEND	
FINISH: HOT DIP GALVANIZED SERVICE LIFE: 100 YEARS	
	TYPE 1 - 8x12 W4.5x3.5 MATS
	TYPE 2 - 8x21 W7.0x4.0 MATS
	TYPE 3 - 8x21 W9.5x4.0 MATS



WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
≤10'	9.0'	8.75'
12'	9.0'	10.5'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2) 8x21 W9.5x4.0 WWR (Type 3 = B2) Finish: Hot Dip Galvanized - 100 Year Service Life		

ELEVATION VIEW (CONT'D) - WALL 6

SCALE: 1" = 20'

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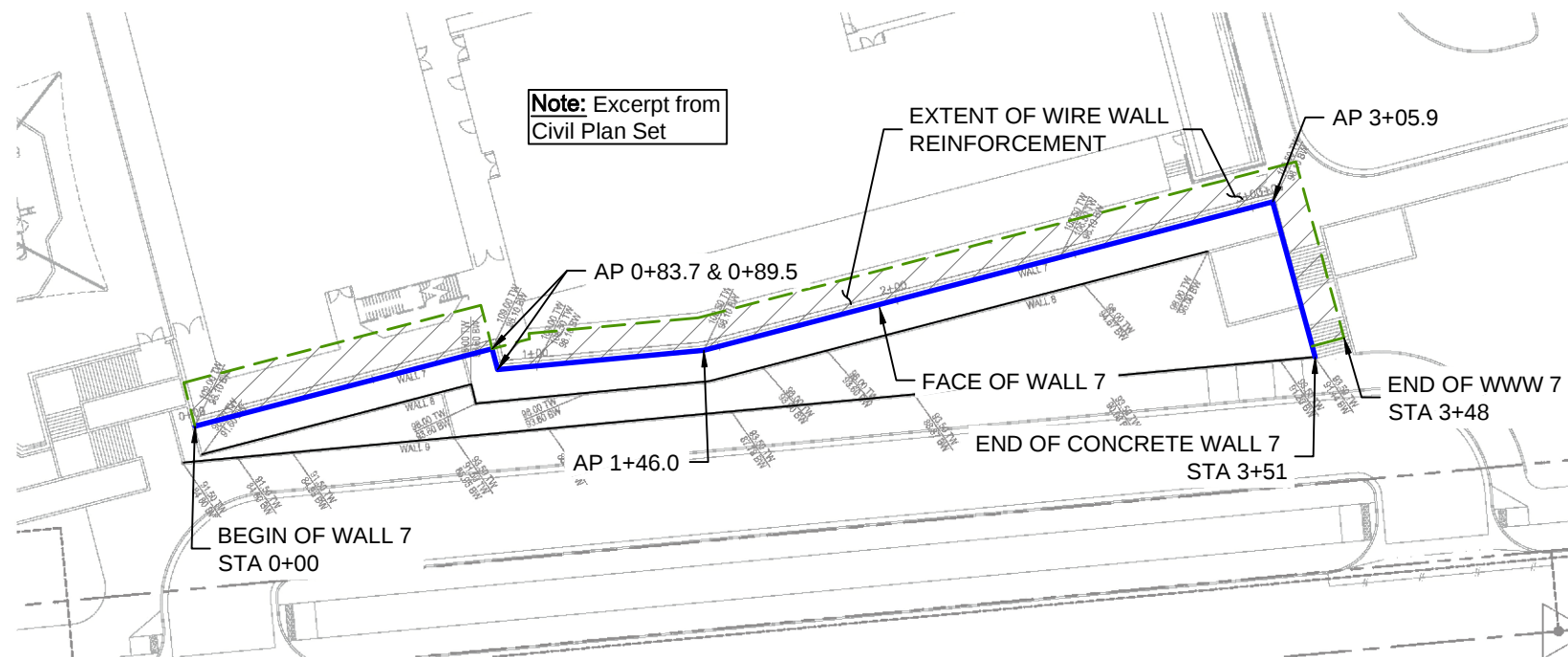
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ELEVATION VIEW (CONT'D) - WALL 6

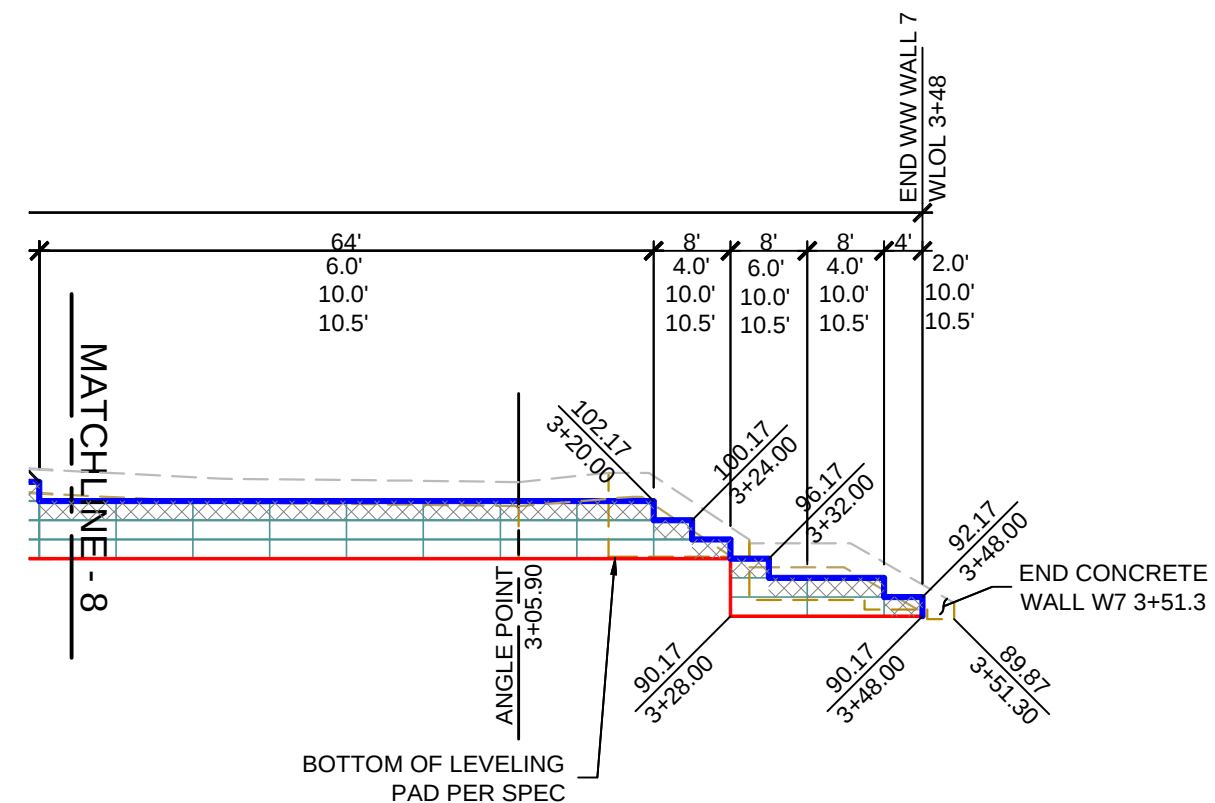
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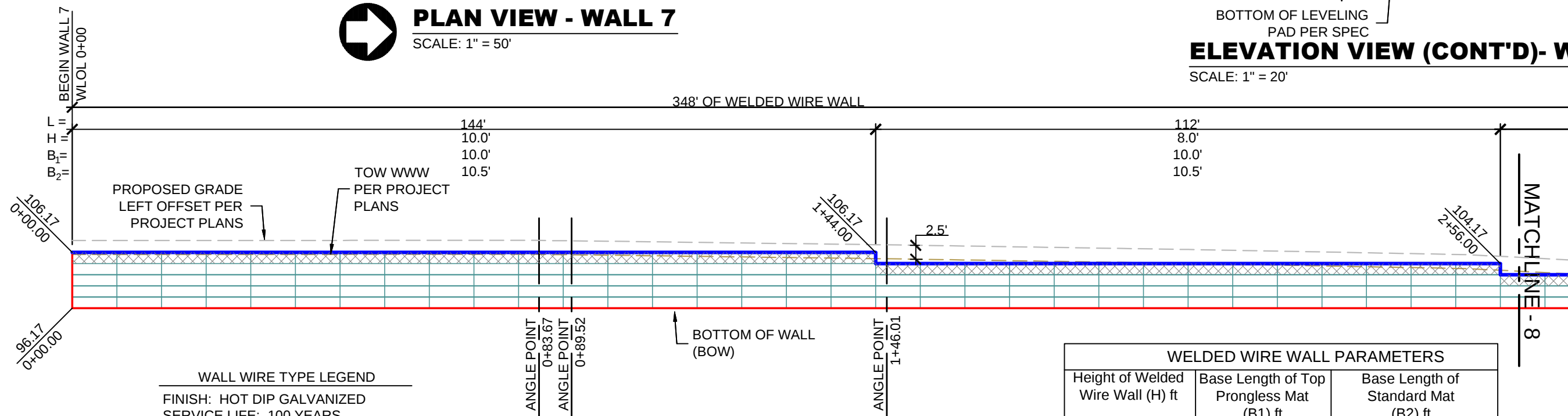
PLAN VIEW - WALL 7

SCALE: 1" = 50'



ELEVATION VIEW (CONT'D)- WALL 7

SCALE: 1" = 20'



WALL WIRE TYPE LEGEND

FINISH: HOT DIP GALVANIZED
SERVICE LIFE: 100 YEARS

- TYPE 1 - 8x12 W4.5x3.5 MATS
- TYPE 2 - 8x21 W7.0x4.0 MATS
- TYPE 3 - 8x21 W9.5x4.0 MATS

ELEVATION VIEW - WALL 7

SCALE: 1" = 20'

WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
≤10'	10.0'	10.5'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2) 8x21 W9.5x4.0 WWR (Type 3 = B2) Finish: Hot Dip Galvanized - 100 Year Service Life		



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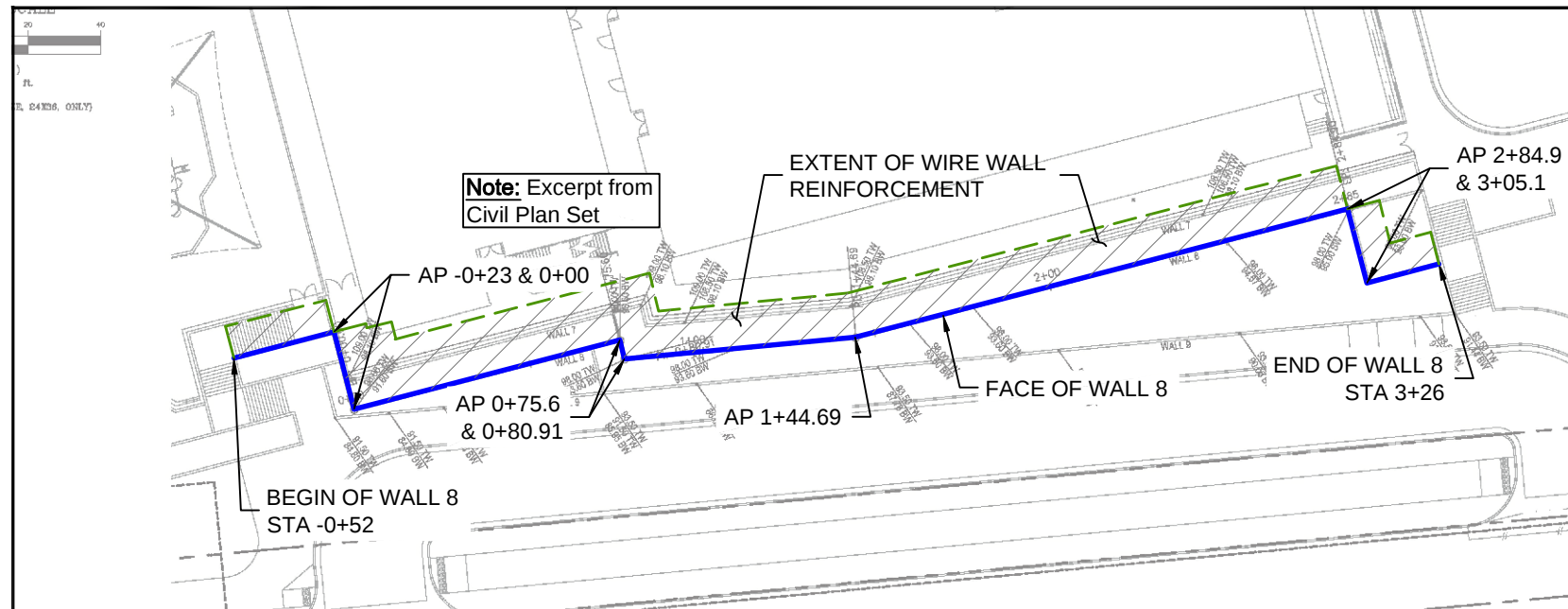
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PLAN & ELEVATION VIEW - WALL 7

HW 160427BW

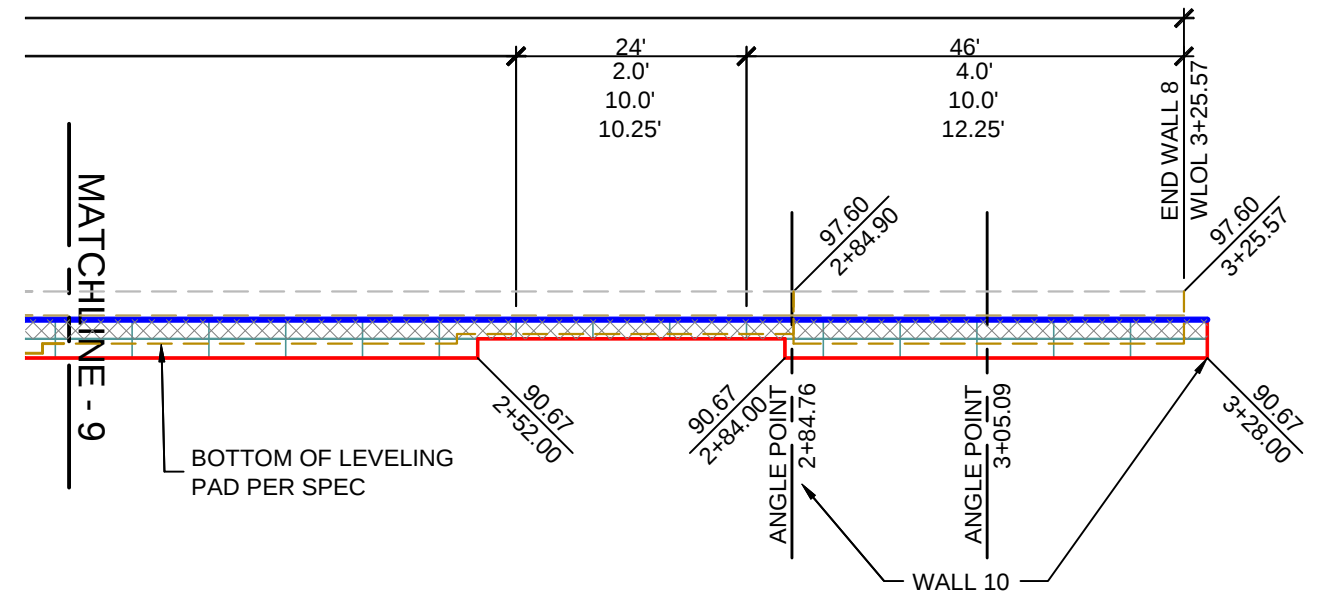
PROJECT	16-046
DATE	7-29-16
DESIGN	KLC
DRAWN	KLC

SHT 12 OF 21



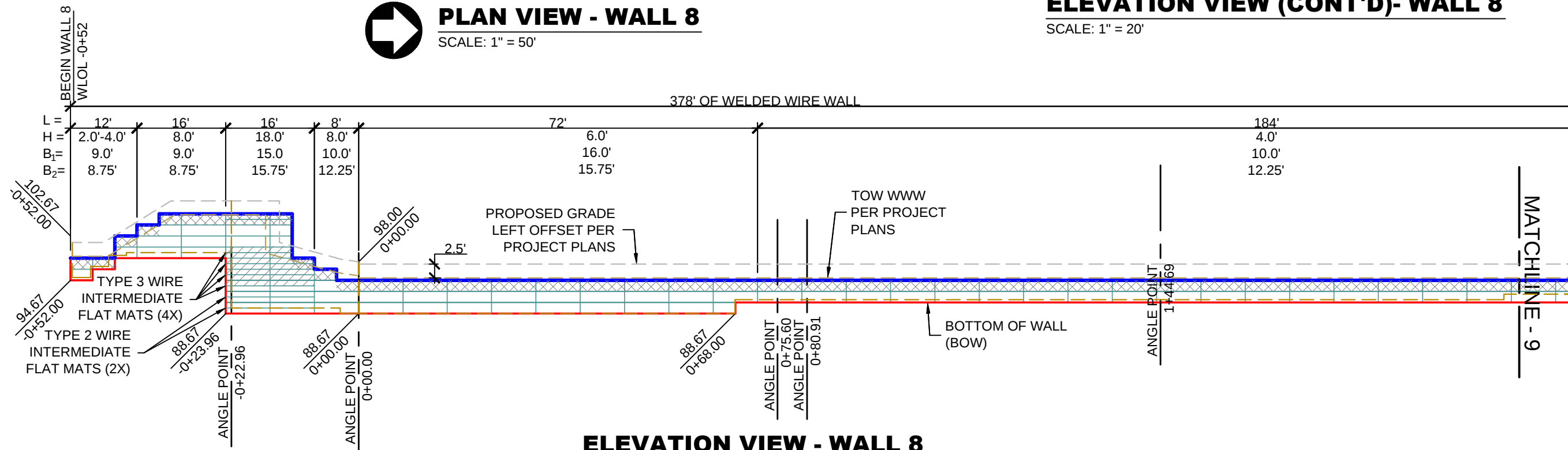
PLAN VIEW - WALL 8

SCALE: 1" = 50'



ELEVATION VIEW (CONT'D)- WALL 8

SCALE: 1" = 20'



ELEVATION VIEW - WALL 8

SCALE: 1" = 20'

WALL WIRE TYPE LEGEND

FINISH: HOT DIP GALVANIZED
SERVICE LIFE: 100 YEARS

- TYPE 1 - 8x12 W4.5x3.5 MATS
- TYPE 2 - 8x21 W7.0x4.0 MATS
- TYPE 3 - 8x21 W9.5x4.0 MATS

Note: Due to varying load conditions on this wall the Wire Parameter Table is not used. The Base lengths and wire type are clearly delineated in the Wire Type Legend and the Elevation View.

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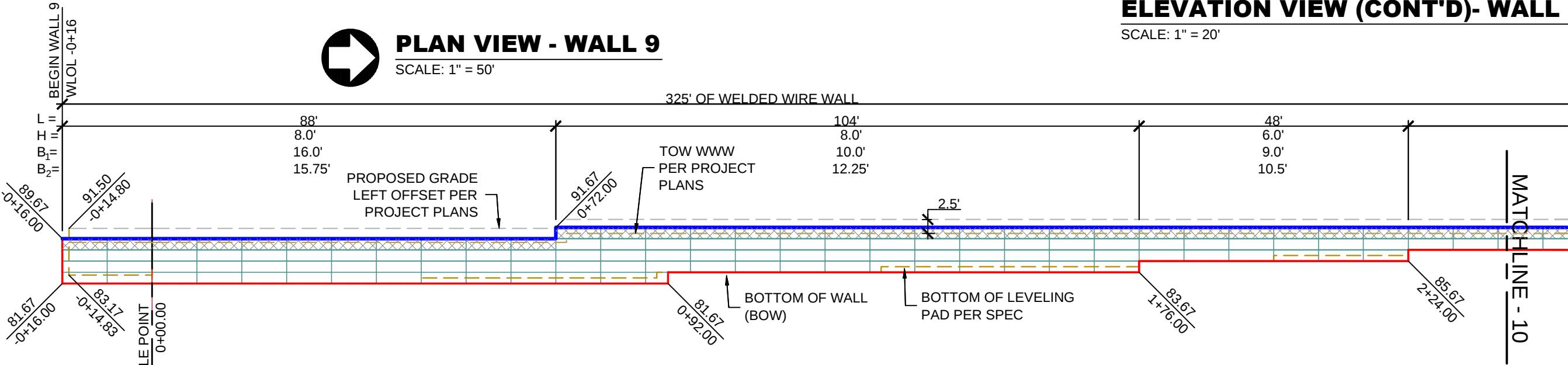
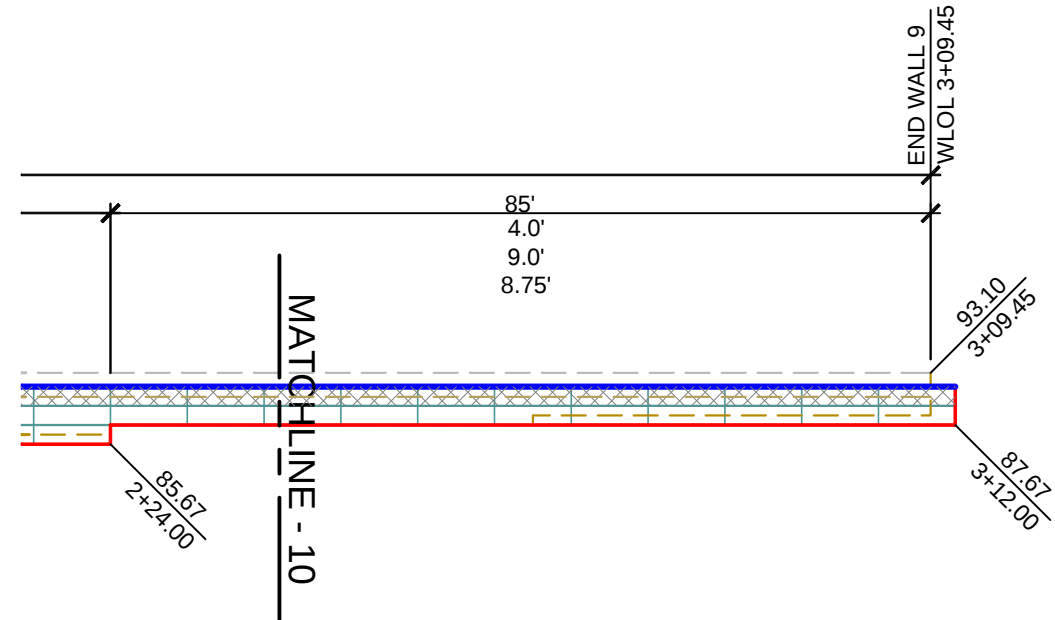
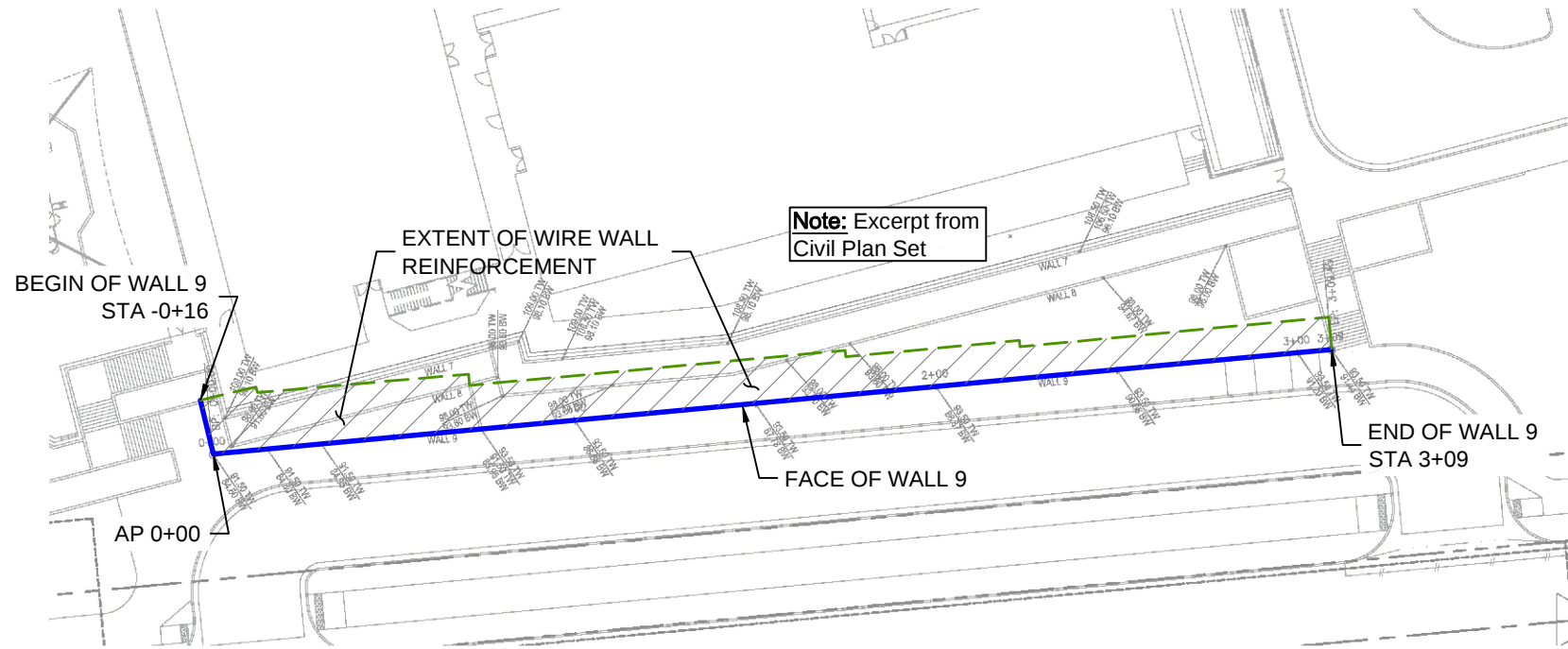
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PLAN & ELEVATION VIEW - WALL 8

PROJECT	16-046
DATE	7-29-16
DESIGN	KLC
DRAWN	KLC

SHT 13 OF 21



WALL WIRE TYPE LEGEND

FINISH: HOT DIP GALVANIZED
SERVICE LIFE: 100 YEARS

	TYPE 1 - 8x12 W4.5x3.5 MATS
	TYPE 2 - 8x21 W7.0x4.0 MATS
	TYPE 3 - 8x21 W9.5x4.0 MATS

Note: Due to varying load conditions on this wall the Wire Parameter Table is not used. The Base lengths and wire type are clearly delineated in the Wire Type Legend and the Elevation View.



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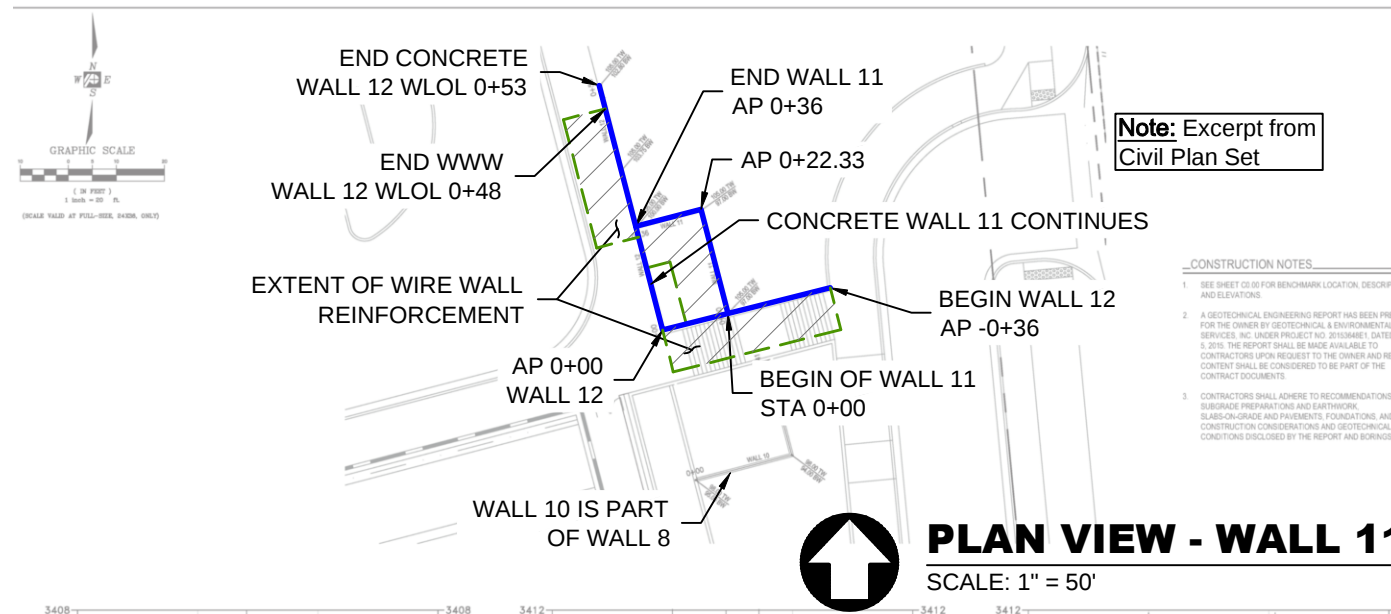
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PLAN & ELEVATION VIEW - WALL 9

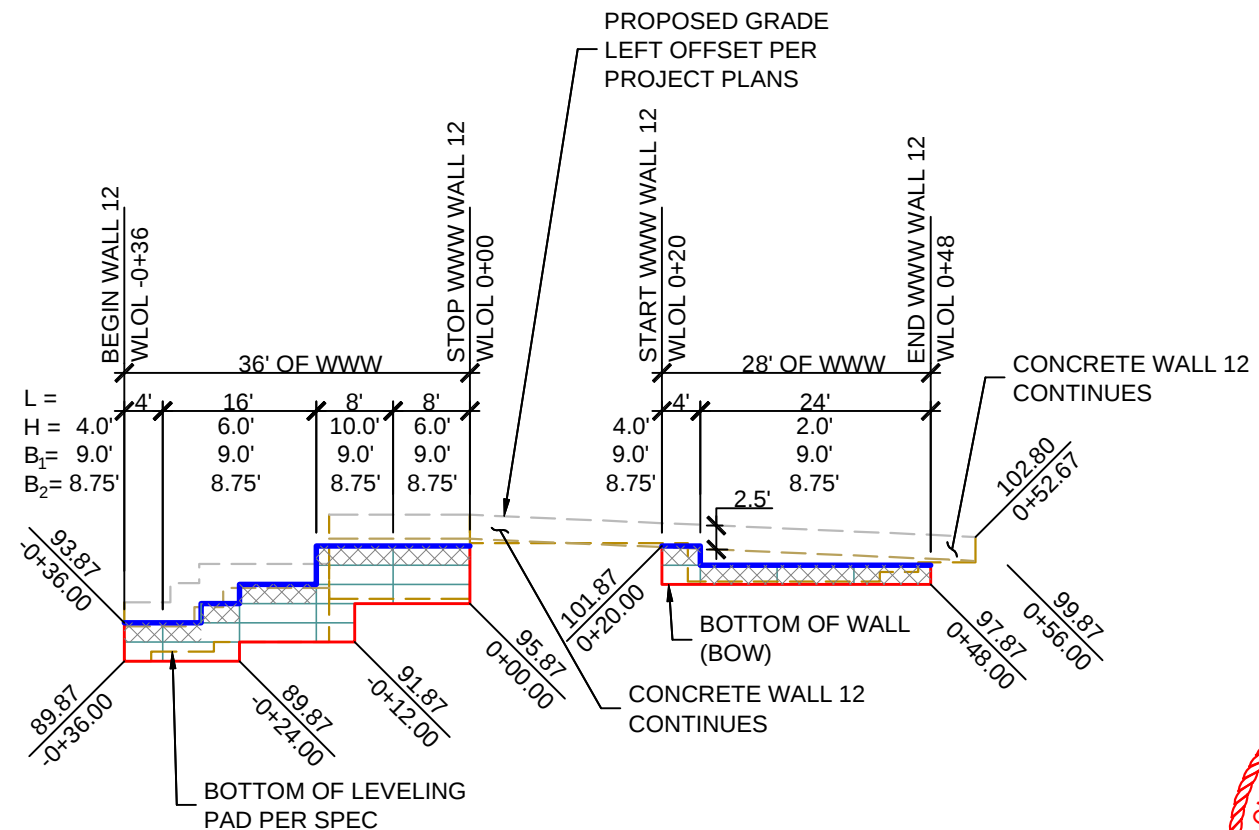
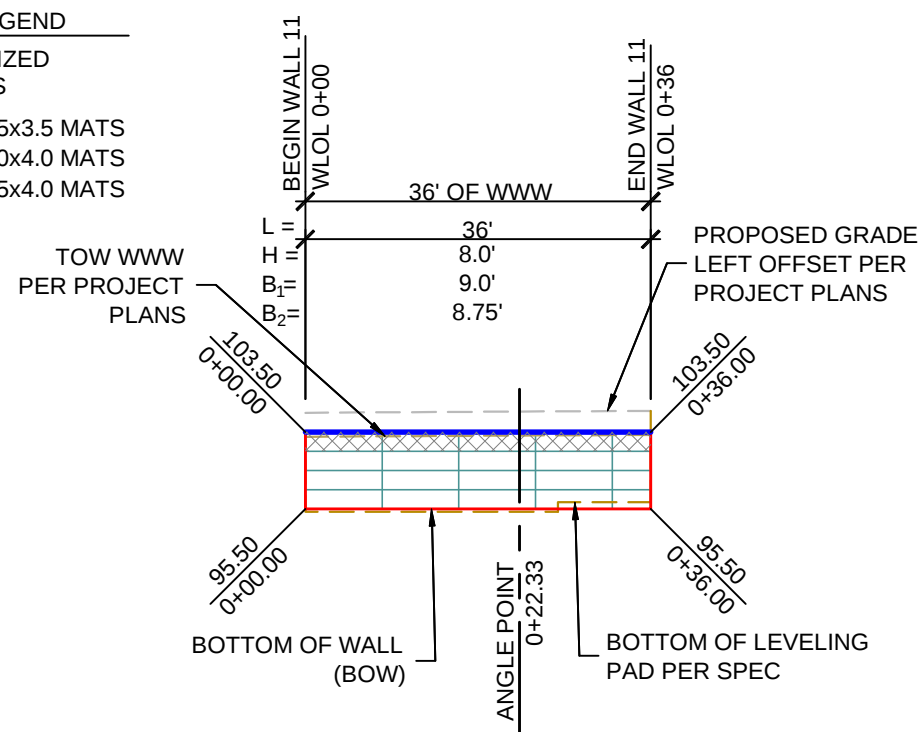
HW 160427BW

PROJECT	16-046
DATE	7-29-16
DESIGN	KLC
DRAWN	KLC
SHT	14 OF 21



WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
≤10'	9.0'	8.75'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2)) Finish: Hot Dip Galvanized - 100 Year Service Life		

WALL WIRE TYPE LEGEND	
FINISH: HOT DIP GALVANIZED SERVICE LIFE: 100 YEARS	
	TYPE 1 - 8x12 W4.5x3.5 MATS
	TYPE 2 - 8x21 W7.0x4.0 MATS
	TYPE 3 - 8x21 W9.5x4.0 MATS



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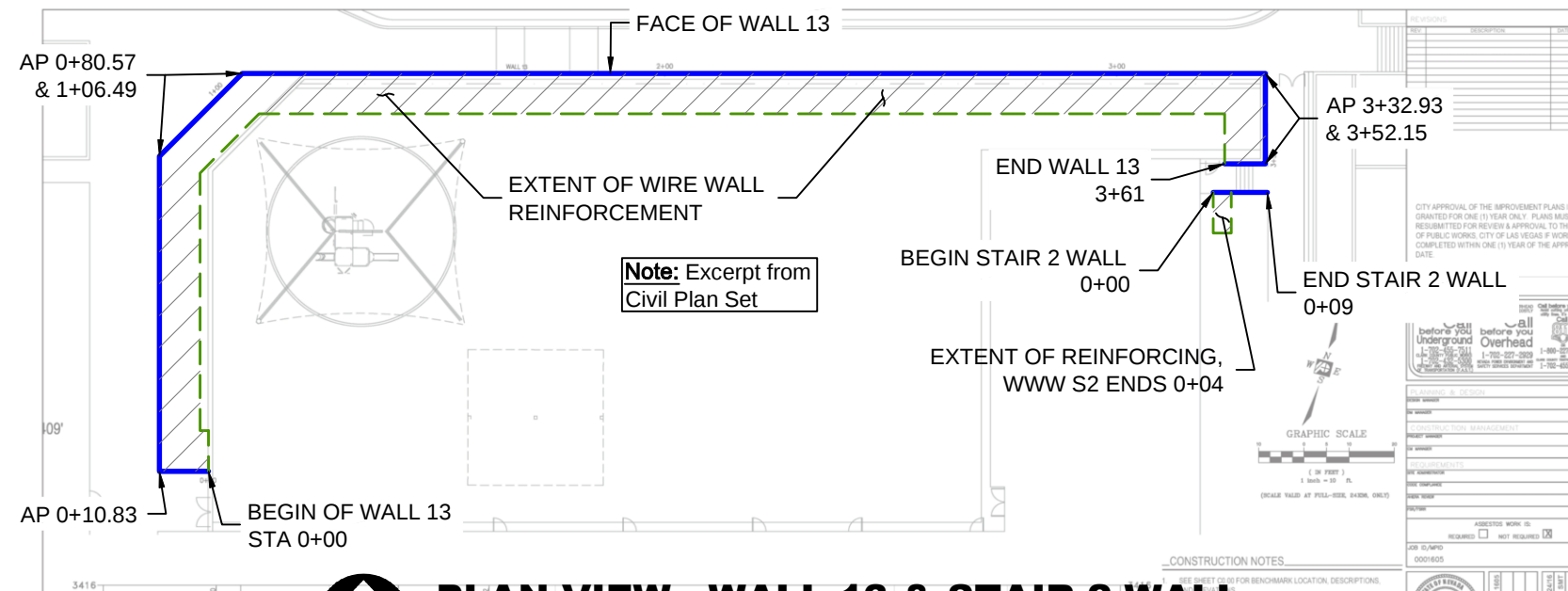
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PLAN & ELEVATION VIEW -
WALLS 11 & 12

HW 160427BW

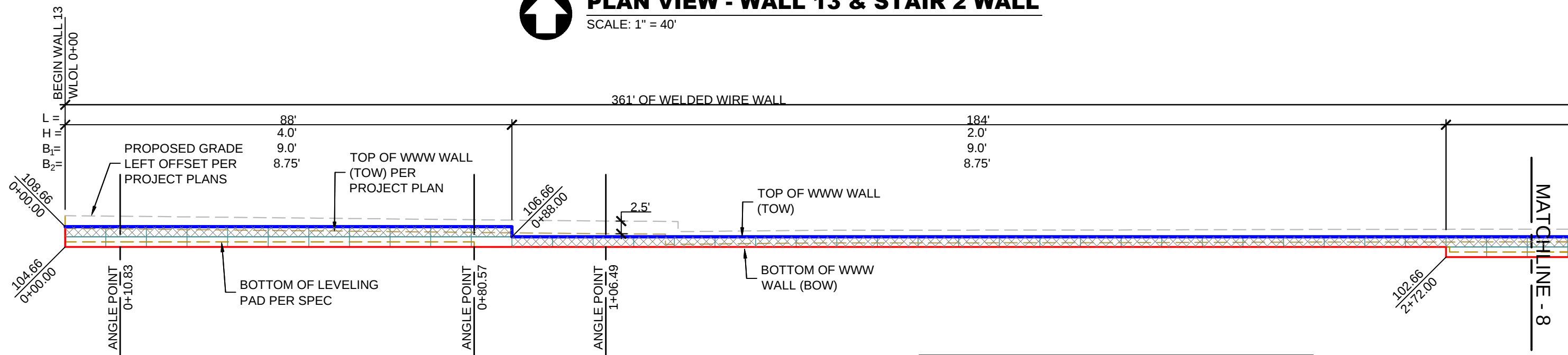
PROJECT	16-046
DATE	7-29-16
DESIGN	KLC
DRAWN	KLC

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PLAN VIEW - WALL 13 & STAIR 2 WALL

SCALE: 1" = 40'



ELEVATION VIEW - WALL 13

SCALE: 1" = 20'

WALL WIRE TYPE LEGEND

FINISH: HOT DIP GALVANIZED
SERVICE LIFE: 100 YEARS

-  TYPE 1 - 8x12 W4.5x3.5 MATS
-  TYPE 2 - 8x21 W7.0x4.0 MATS
-  TYPE 3 - 8x21 W9.5x4.0 MATS

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WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
4'	9.0'	8.75'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2) Finish: Hot Dip Galvanized - 100 Year Service Life		



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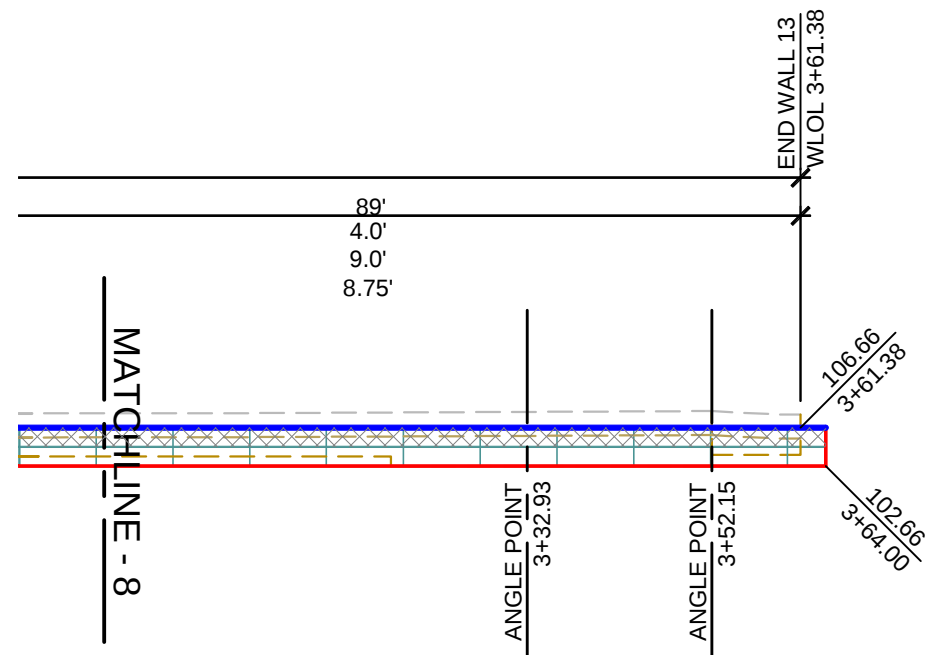
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PLAN & ELEVATION VIEW -
WALL 13 & STAIR 2 WALL

HW 160427BW

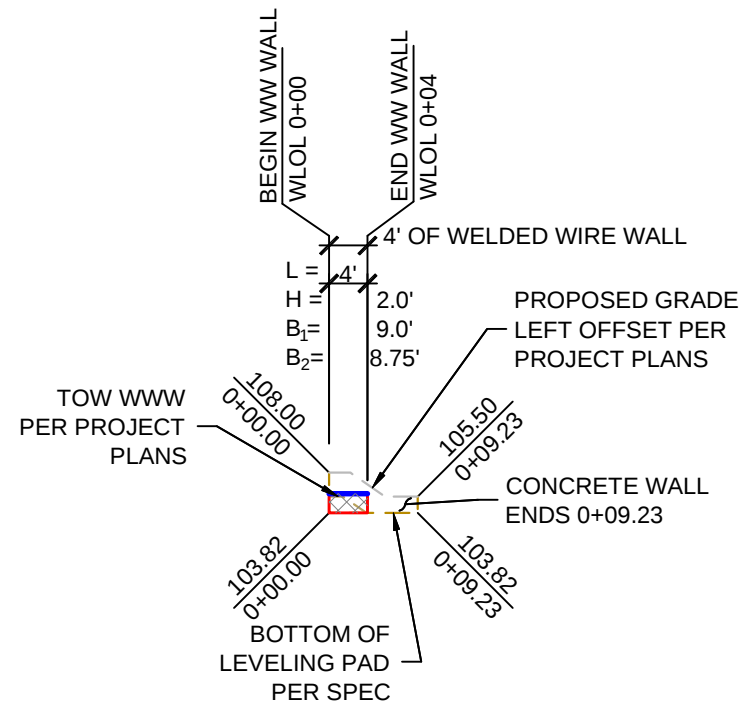
PROJECT 16-046
DATE 7-29-16
DESIGN KLC
DRAWN KLC

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ELEVATION VIEW (CONT'D)- WALL 13
SCALE: 1" = 20'

WALL WIRE TYPE LEGEND	
FINISH: HOT DIP GALVANIZED SERVICE LIFE: 100 YEARS	
	TYPE 1 - 8x12 W4.5x3.5 MATS
	TYPE 2 - 8x21 W7.0x4.0 MATS
	TYPE 3 - 8x21 W9.5x4.0 MATS



ELEVATION VIEW - STAIR 2 WALL
SCALE: 1" = 20'

WELDED WIRE WALL PARAMETERS		
Height of Welded Wire Wall (H) ft	Base Length of Top Prongless Mat (B1) ft	Base Length of Standard Mat (B2) ft
4'	9.0'	8.75'
Top Prongless Mats is: 8x12 W4.5x3.5 WWR (Type 1 = B1) & Standard Mats are: 8x21 W7.0x4.0 WWR (Type 2 = B2)) Finish: Hot Dip Galvanized - 100 Year Service Life		



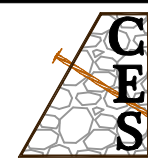
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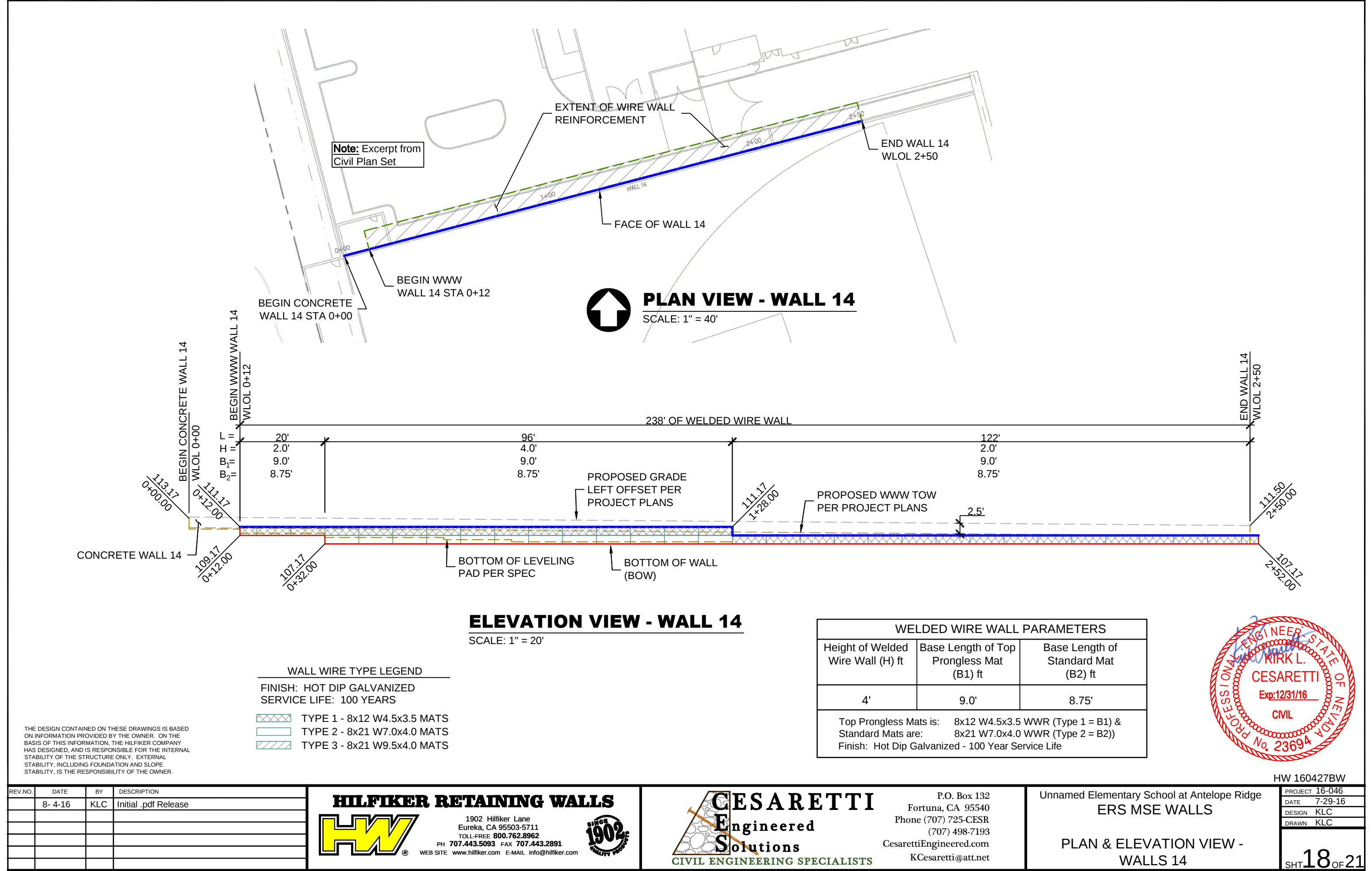
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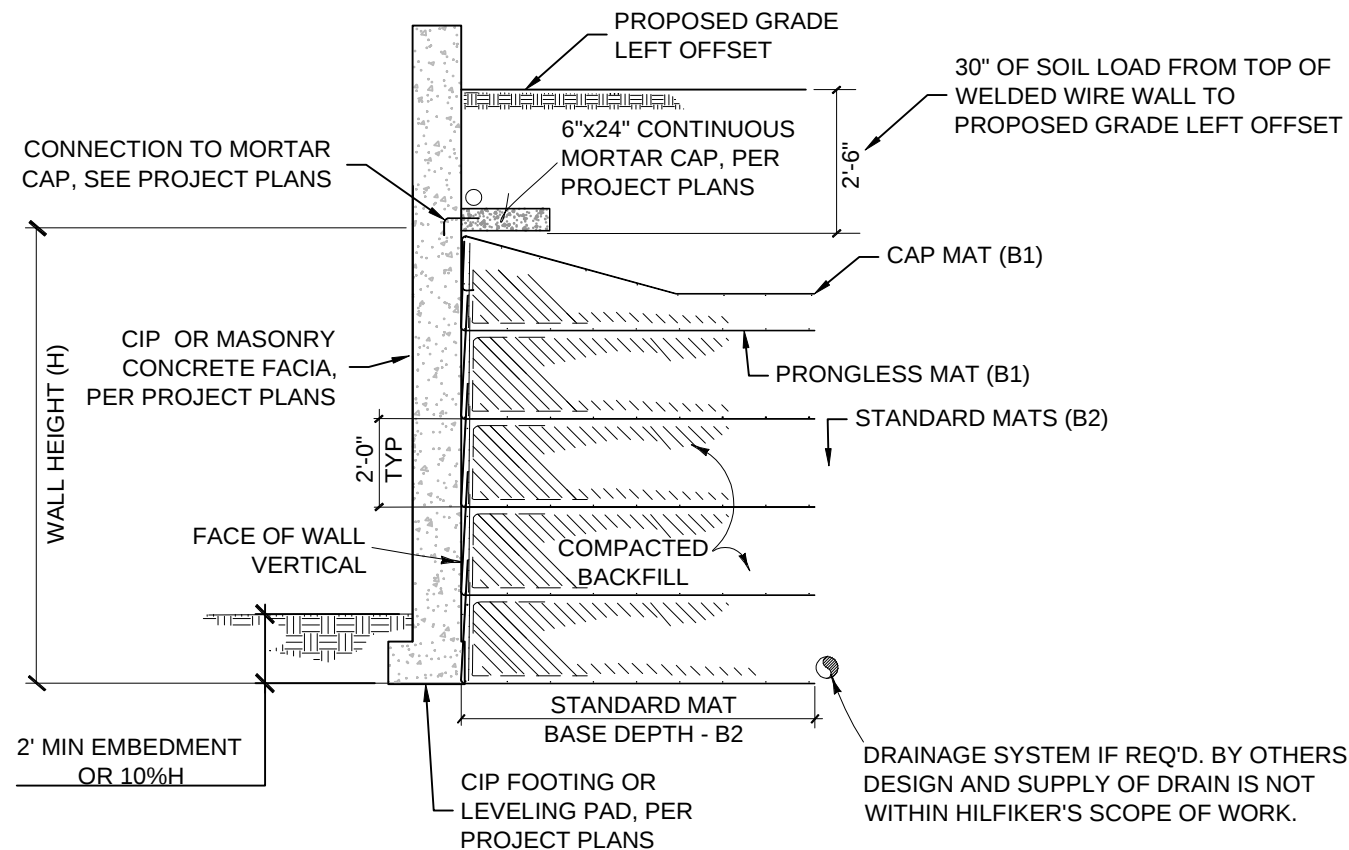
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ELEVATION VIEW -
WALLS 13 & STAIR 2 WALL

PROJECT	16-046
DATE	7-29-16
DESIGN	KLC
DRAWN	KLC
SHT	17 OF 21

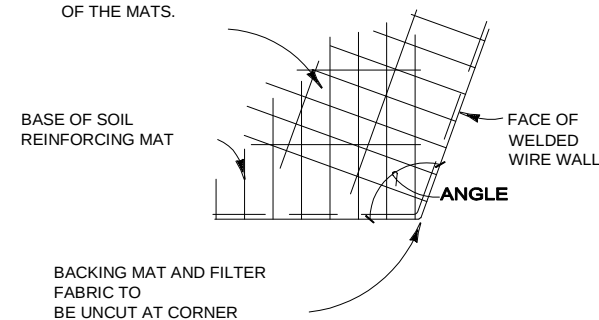




CROSS SECTION (TYP)

SCALE: 1" = 20'

CUT THE TRANSVERSE WIRES ON THE BASE OF THE MATS AND BEND THE FACE OF THE MATS TO THE REQUIRED ANGLE. OVERLAP THE BASE OF THE MATS.

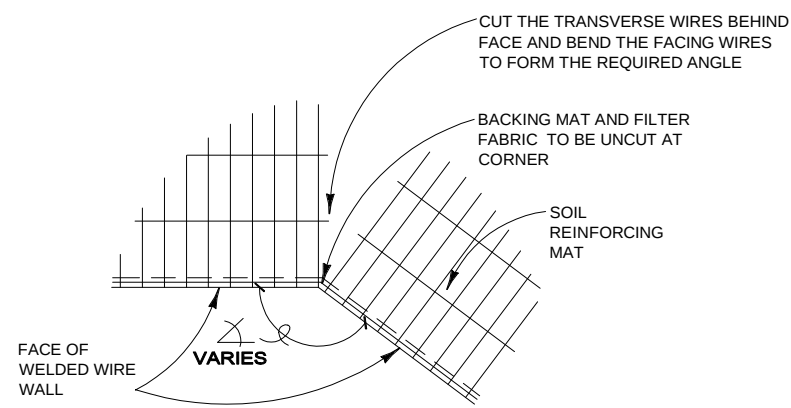


PLAN VIEW

OBTUSE CONVEX ANGLE

NOT TO SCALE

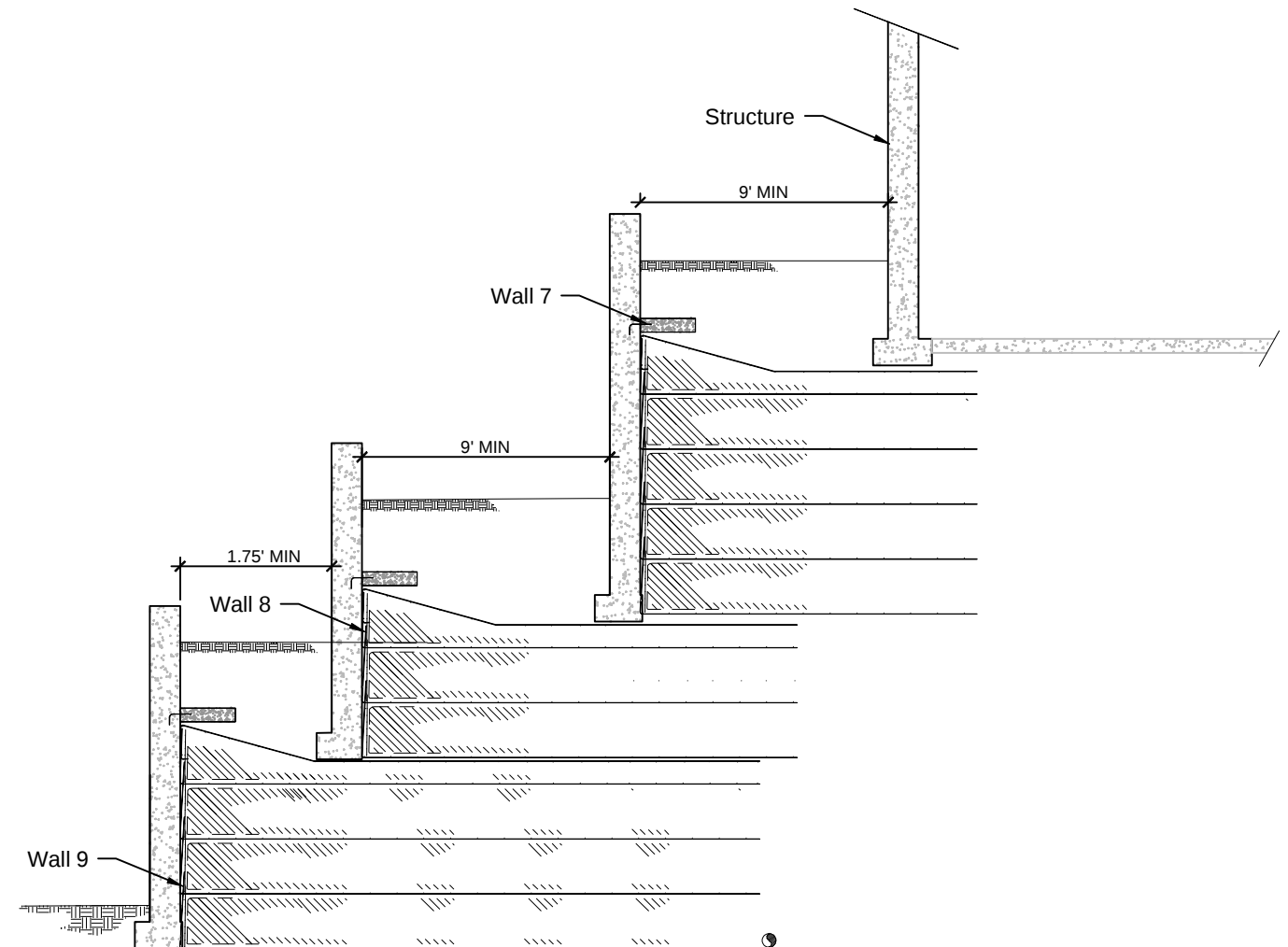
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PLAN VIEW

CONCAVE ANGLE DETAIL

NOT TO SCALE



CROSS SECTION - WALLS 7, 8 & 9

SCALE: 1" = 20'



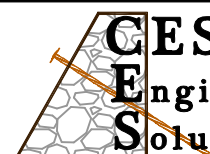
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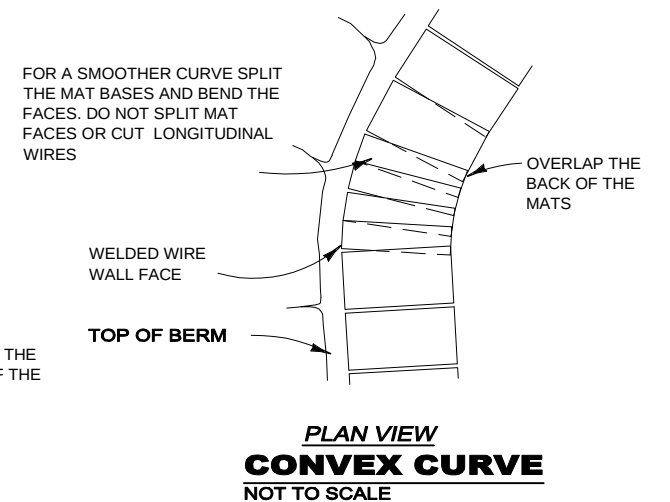
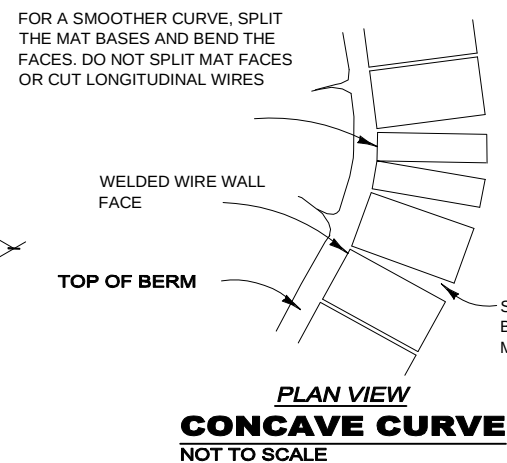
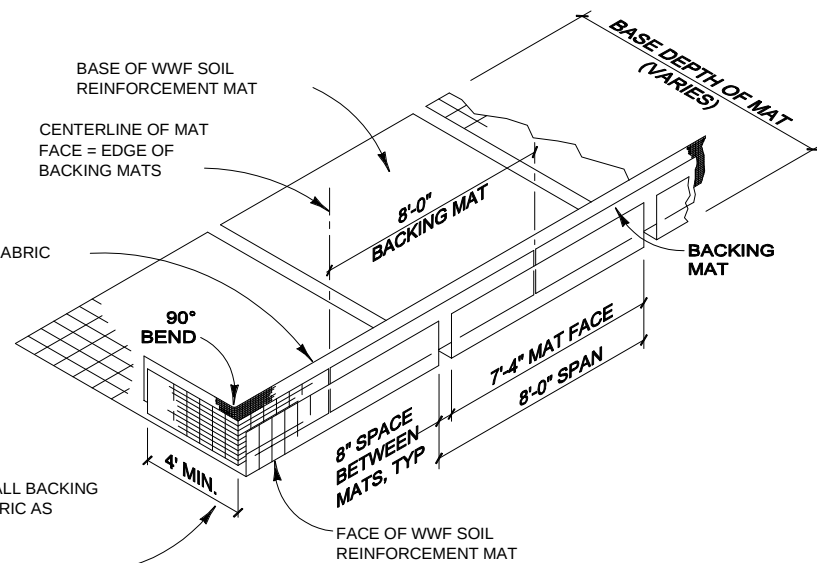
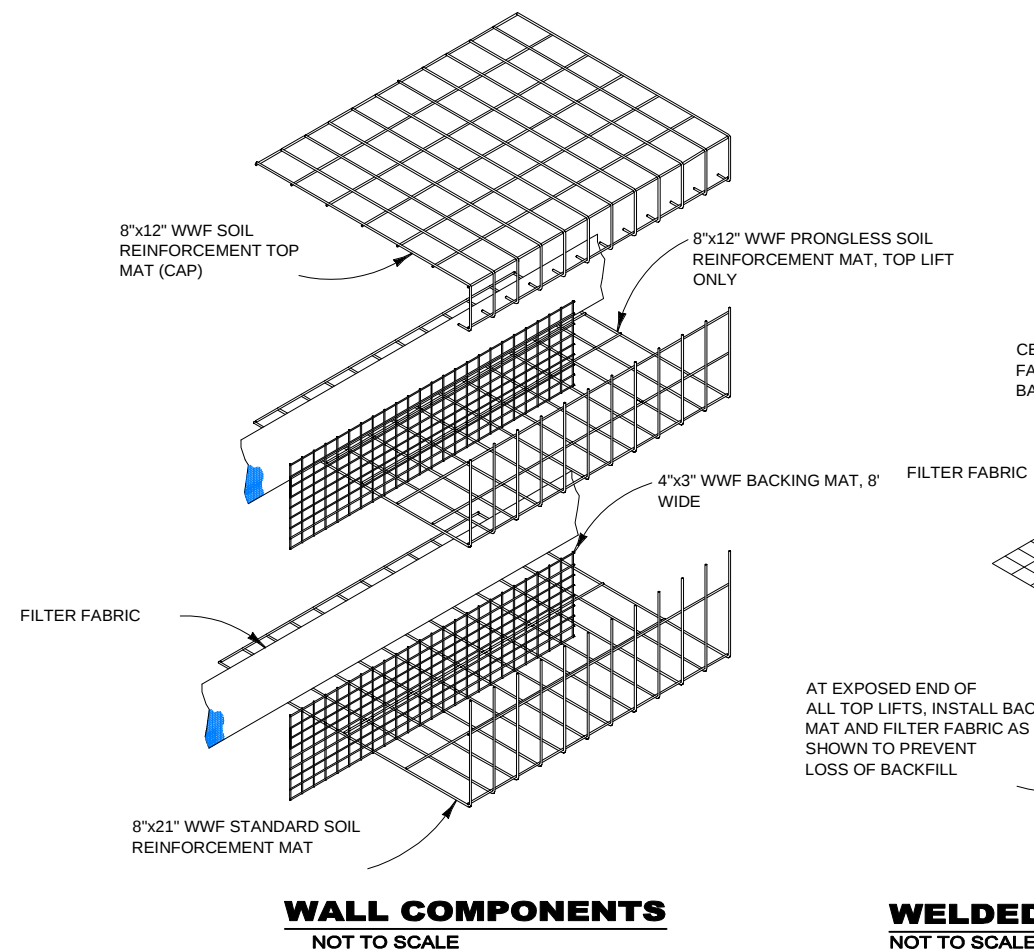
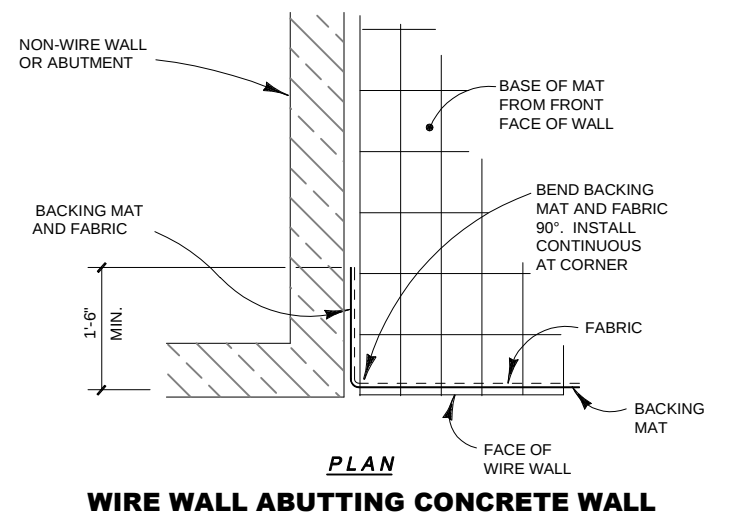
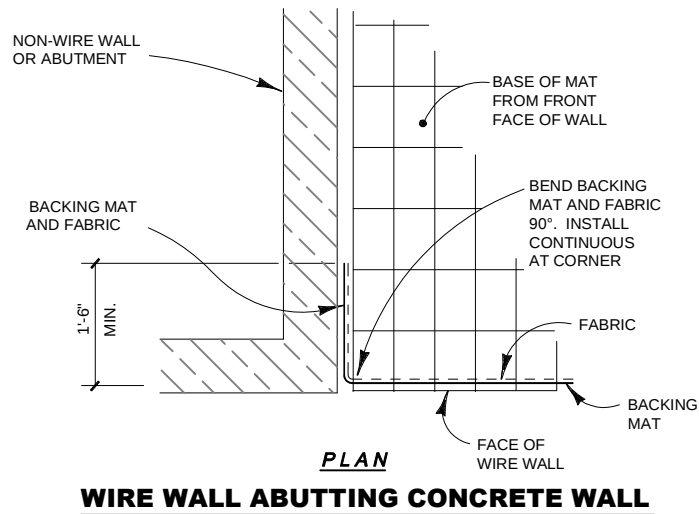
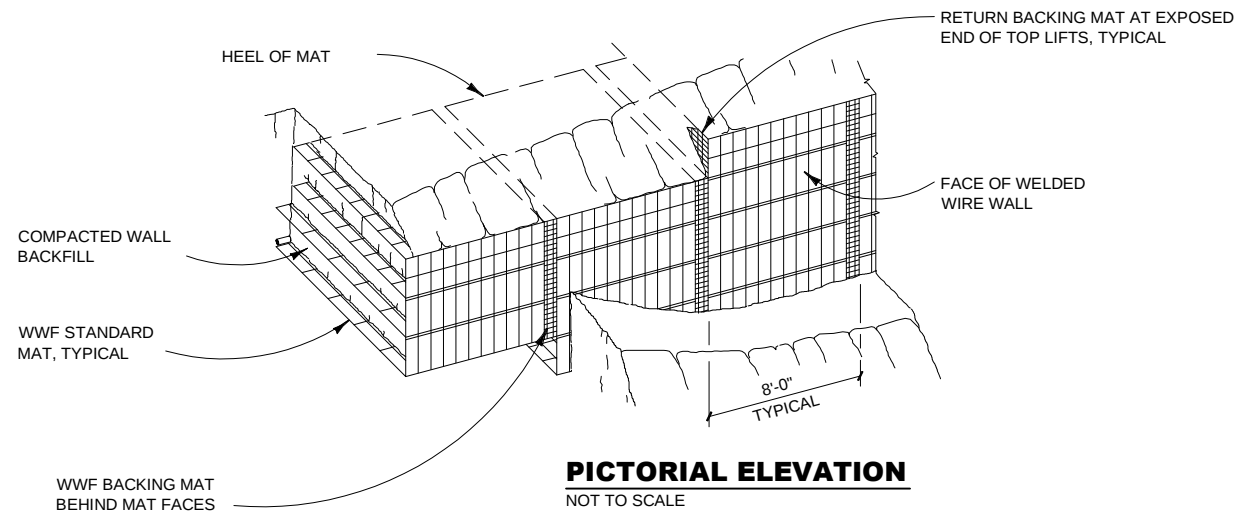
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CROSS SECTIONS

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CONSTRUCTION SEQUENCE

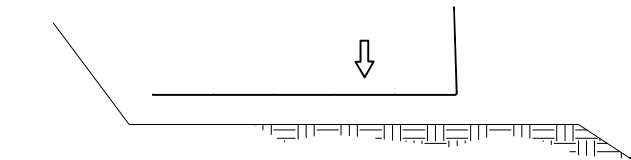
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DRAWN	KLC

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HW 160427BW

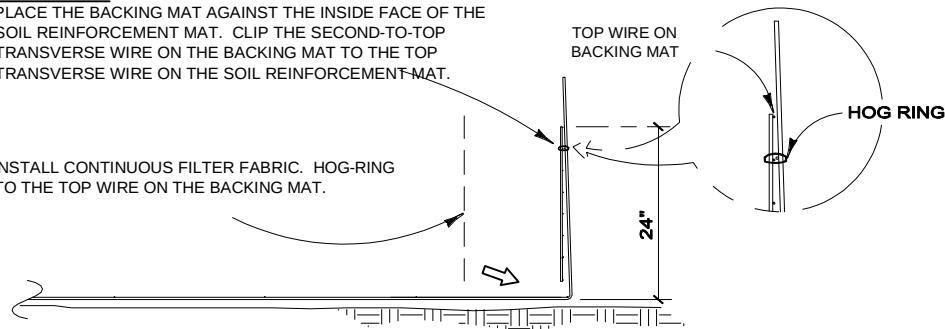
STEP 1

PLACE THE FIRST COURSE OF SOIL REINFORCEMENT MATS ON PREPARED FOUNDATION



STEP 2

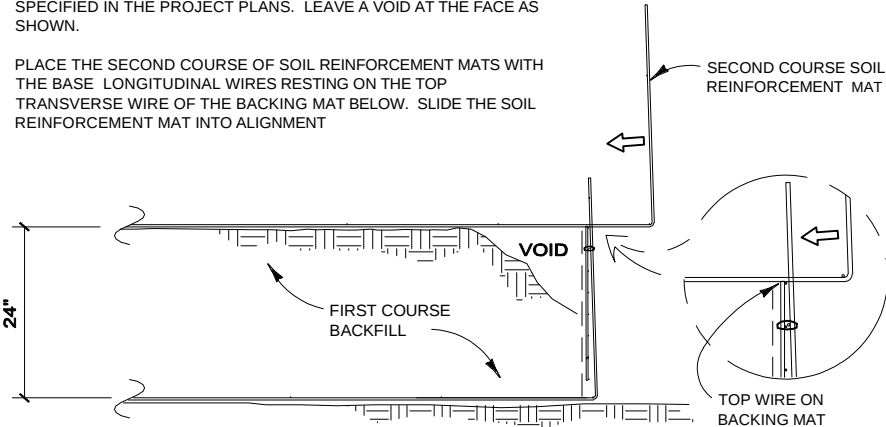
PLACE THE BACKING MAT AGAINST THE INSIDE FACE OF THE SOIL REINFORCEMENT MAT. CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP TRANSVERSE WIRE ON THE SOIL REINFORCEMENT-MAT.



STEP 3

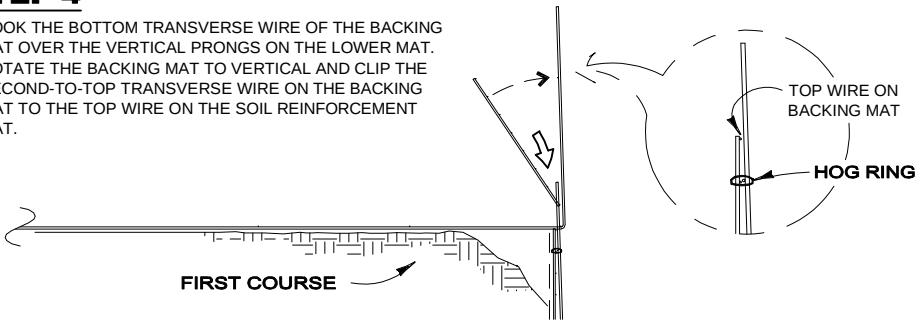
PLACE AND COMPACT THE BACKFILL IN LAYERS AND DENSITIES AS SPECIFIED IN THE PROJECT PLANS. LEAVE A VOID AT THE FACE AS SHOWN.

PLACE THE SECOND COURSE OF SOIL REINFORCEMENT MATS WITH THE BASE LONGITUDINAL WIRES RESTING ON THE TOP TRANSVERSE WIRE OF THE BACKING MAT BELOW. SLIDE THE SOIL REINFORCEMENT MAT INTO ALIGNMENT



STEP 4

HOOK THE BOTTOM TRANSVERSE WIRE OF THE BACKING MAT OVER THE VERTICAL PRONGS ON THE LOWER MAT. ROTATE THE BACKING MAT TO VERTICAL AND CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP WIRE ON THE SOIL REINFORCEMENT MAT.

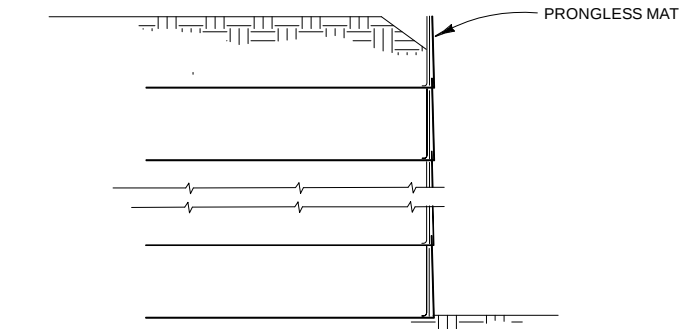
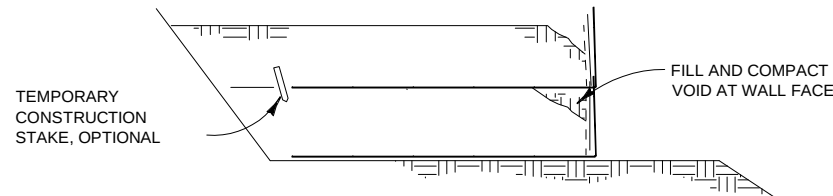


STEP 5

INSTALL FILTER FABRIC BEHIND THE BACKING MATS.

PLACE AND COMPACT THE BACKFILL TO THE BASE ELEVATION OF THE NEXT MAT.

REPEAT STEPS 3 THRU 5 TO THE TOP LIFT.

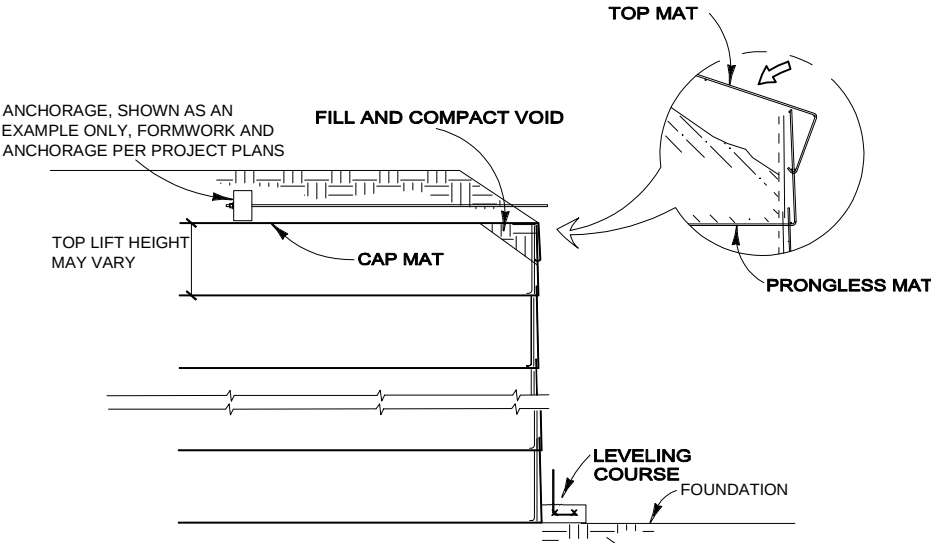


STEP 6

PLACE THE TOP LIFT PRONGLESS MAT, BACKING MAT AND FILTER FABRIC.

CUT OFF HEIGHT OF PRONGLESS MAT FACE AND FILTER FABRIC, IF REQUIRED, TO PARALLEL FINISHED GRADE.

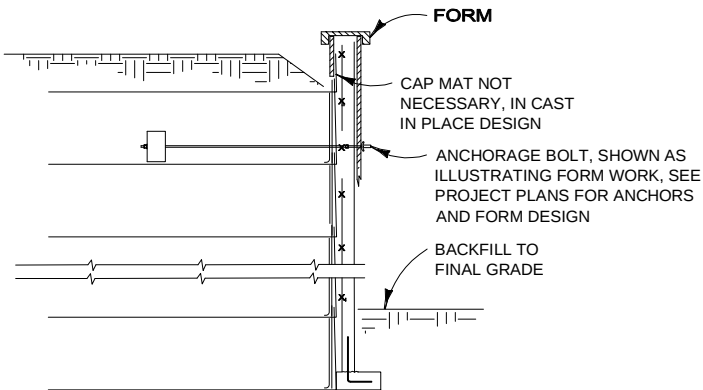
PLACE AND COMPACT THE BACKFILL IN THE PRONGLESS MAT LIFT.



STEP 7

INSTALL THE CAP MAT OVER THE COMPACTED BACKFILL. INSTALL THE PANEL ANCHORAGES PER PROJECT PLANS. BACKFILL TO 2'-6" COVER OVER THE TOP MAT, PER PROJECT PLANS.

FORM THE LEVELING COURSE AS SHOWN IN THE PROJECT PLANS.



STEP 8 CASTING THE FACE

1. ATTACH THE FORMS TO THE FACE ANCHOR BOLTS PER PROJECT PLANS.
2. CAST CONCRETE AS SHOWN IN PROJECT PLANS.
3. STRIP FORMS AND BACKFILL AT TOE TO FINAL GRADE.
4. FINISH TOP OF WALL PER PROJECT PLANS.

STEP 8

FINISH THE TOP OF THE WALL PER PROJECT PLANS.

ERS RETAINING WALL CONSTRUCTION SEQUENCE
NOT TO SCALE

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Unnamed Elementary School at Antelope Ridge
ERS MSE WALLS

CONSTRUCTION SEQUENCE

HW 160427BW

PROJECT	16-046
DATE	7-29-16
DESIGN	KLC
DRAWN	KLC

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