

5/14/2022

1/13/2022
B:\3186-B-5898-RDY_PSH02B-19.dgn

GUARDRAIL DETAIL

-L ITS-

PROJECT REFERENCE NO. B-3186B-5898	SHEET NO. 2B-19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L ITS-

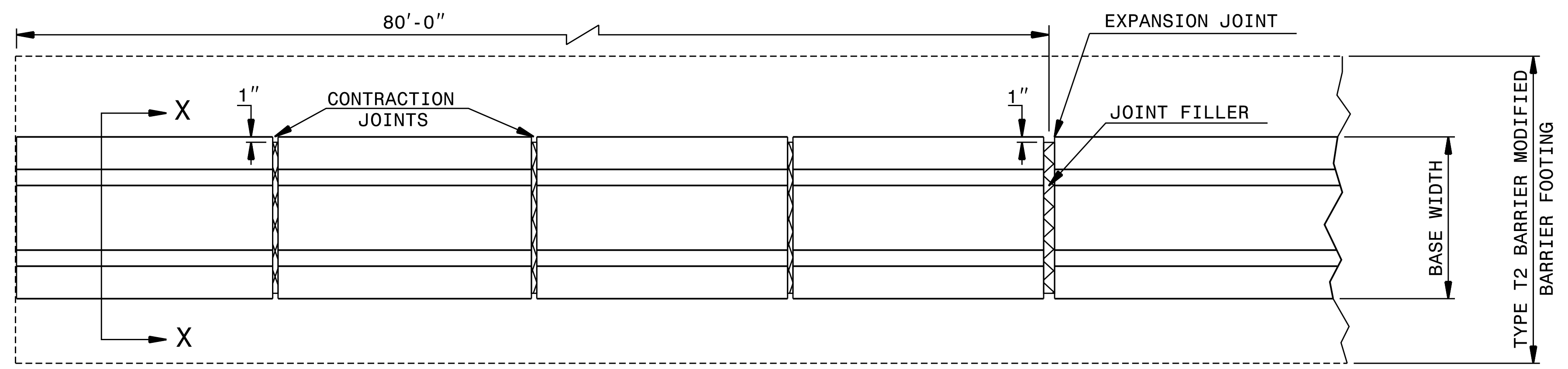
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PROJECT REFERENCE NO. B-3186 / B-5898	SHEET NO. 2B-21
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	STRUCTURES ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
HDR Engineering, Inc. of the Carolinas 555 Fayetteville St. Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116	

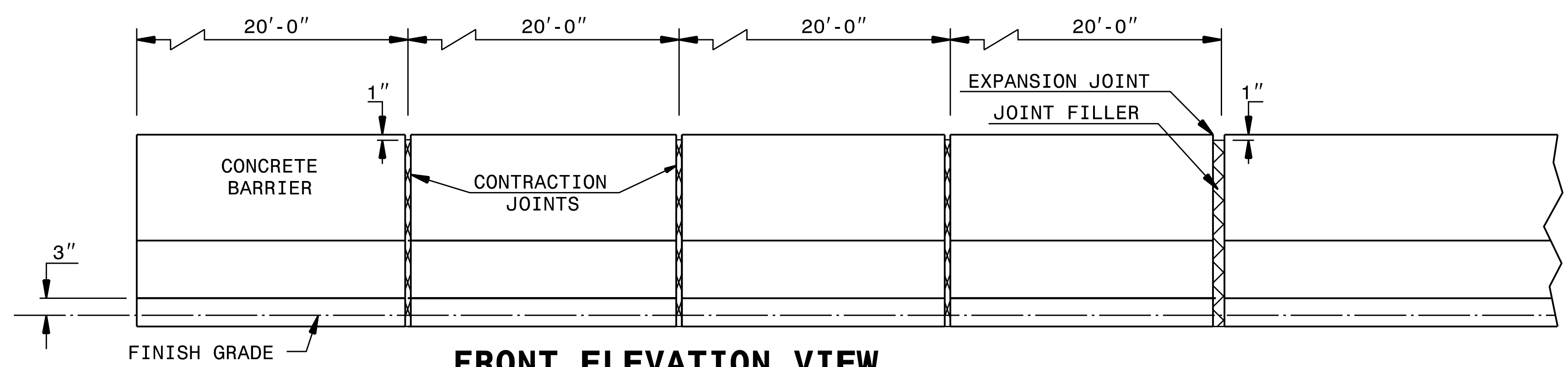
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
DOUBLE FACED CONCRETE BARRIER
TYPE T2 BARRIER MODIFIED

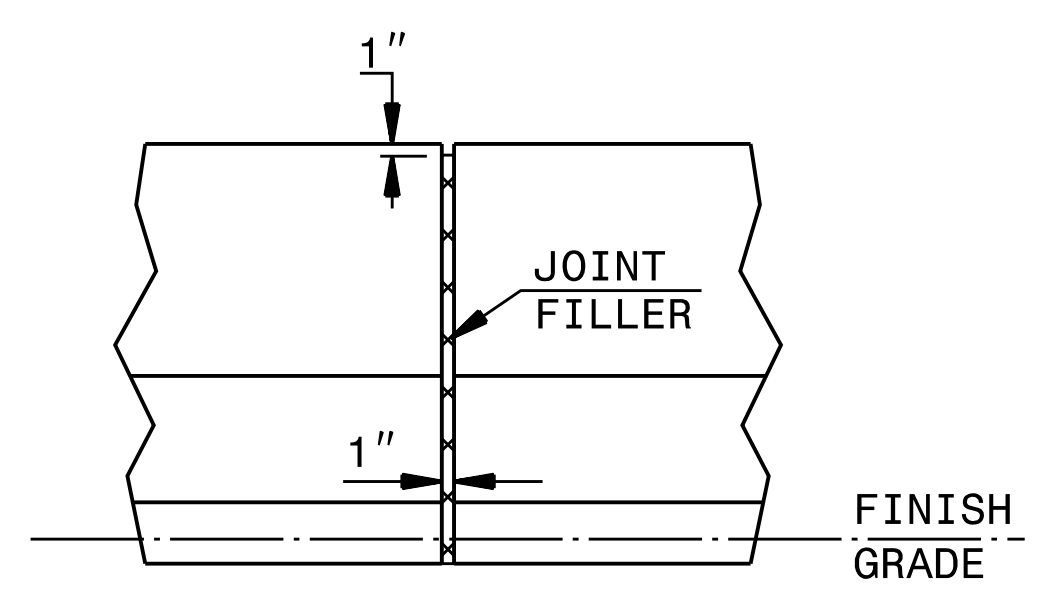
SHEET 2 OF 3
854.02



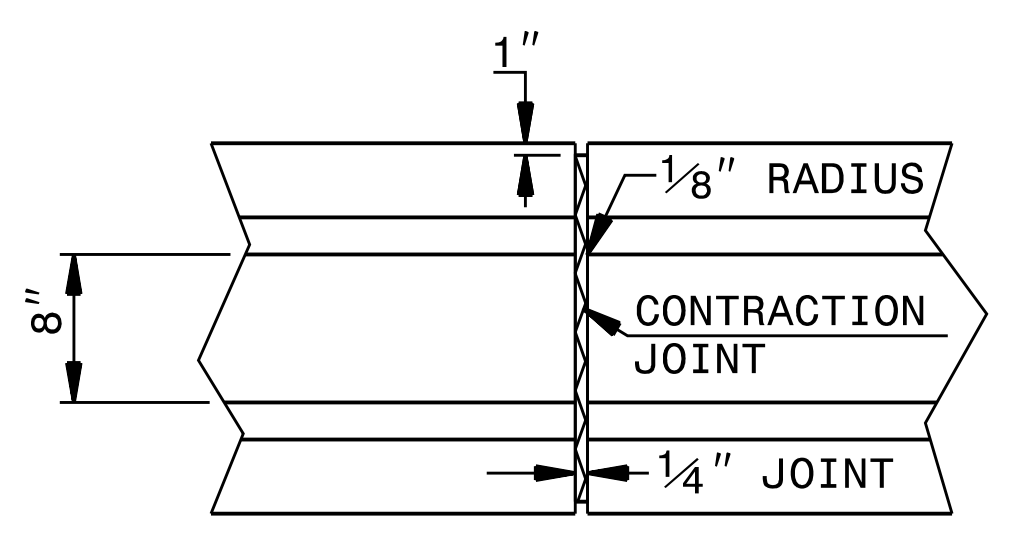
TOP PLAN VIEW



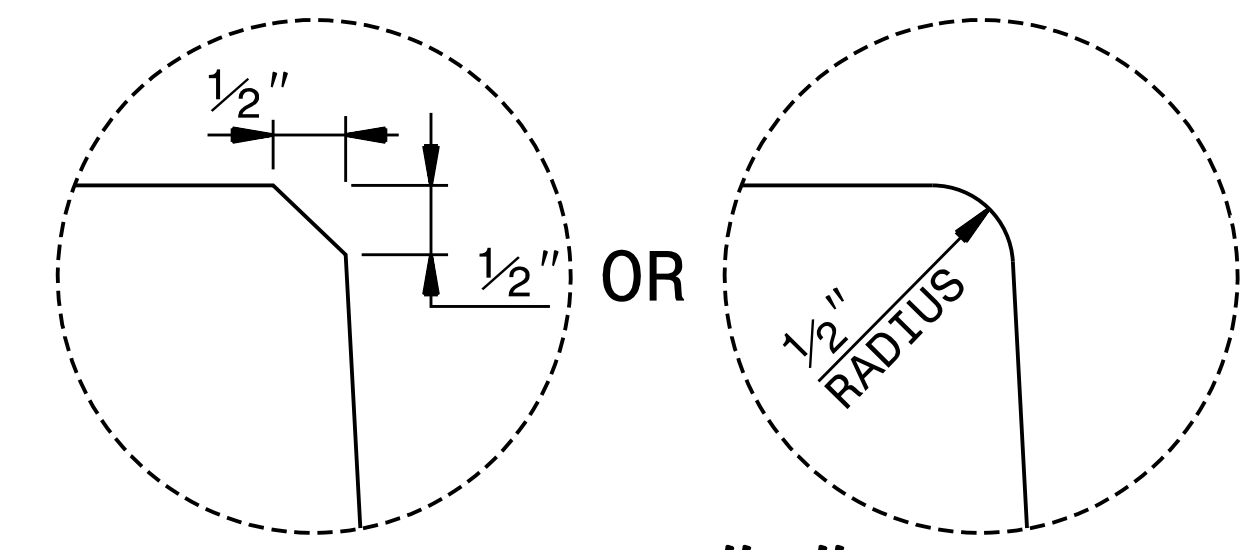
FRONT ELEVATION VIEW



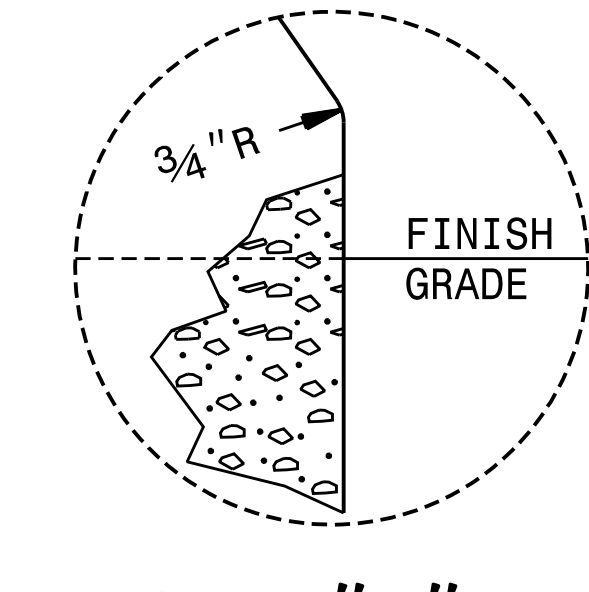
EXPANSION JOINT
PARTIAL ELEVATION VIEW



CONTRACTION JOINT
PARTIAL PLAN VIEW



INSET "A"
SHOWING RADII AND BEVEL



INSET "B"
SHOWING RADII

NOTES:
SEE SHEET 1 FOR GENERAL NOTES.
SEE SHEET 3 FOR STEEL LAYOUT OF BARRIER.

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ROADWAY STANDARD DRAWING FOR
DOUBLE FACED CONCRETE BARRIER
TYPE T2 BARRIER MODIFIED

SHEET 2 OF 3
854.02

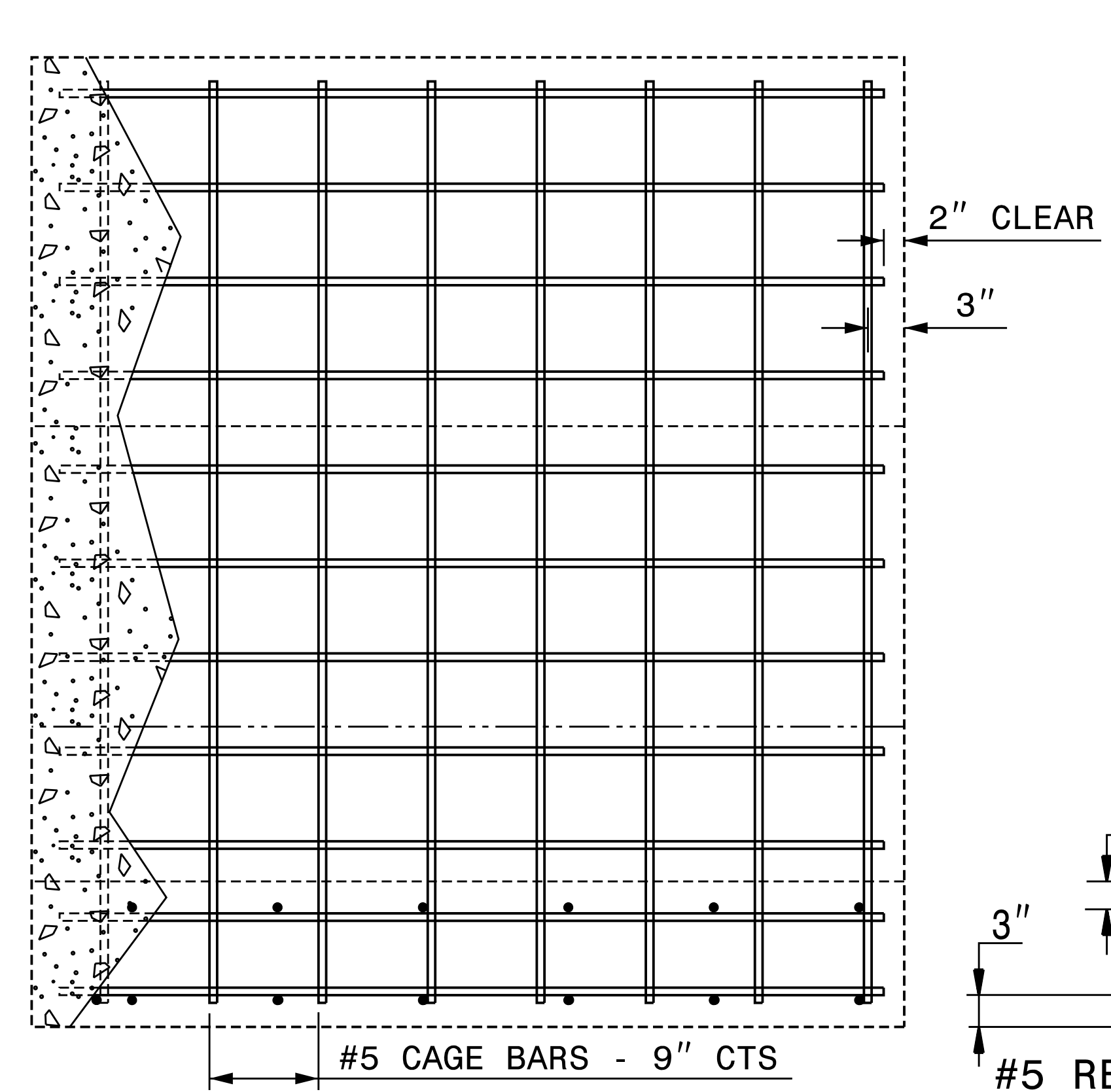
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PROJECT REFERENCE NO. B-3186 / B-5898		SHEET NO. 2B-22
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	STRUCTURES ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
HDR Engineering, Inc. of the Carolinas 555 Fayetteville St. Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116		

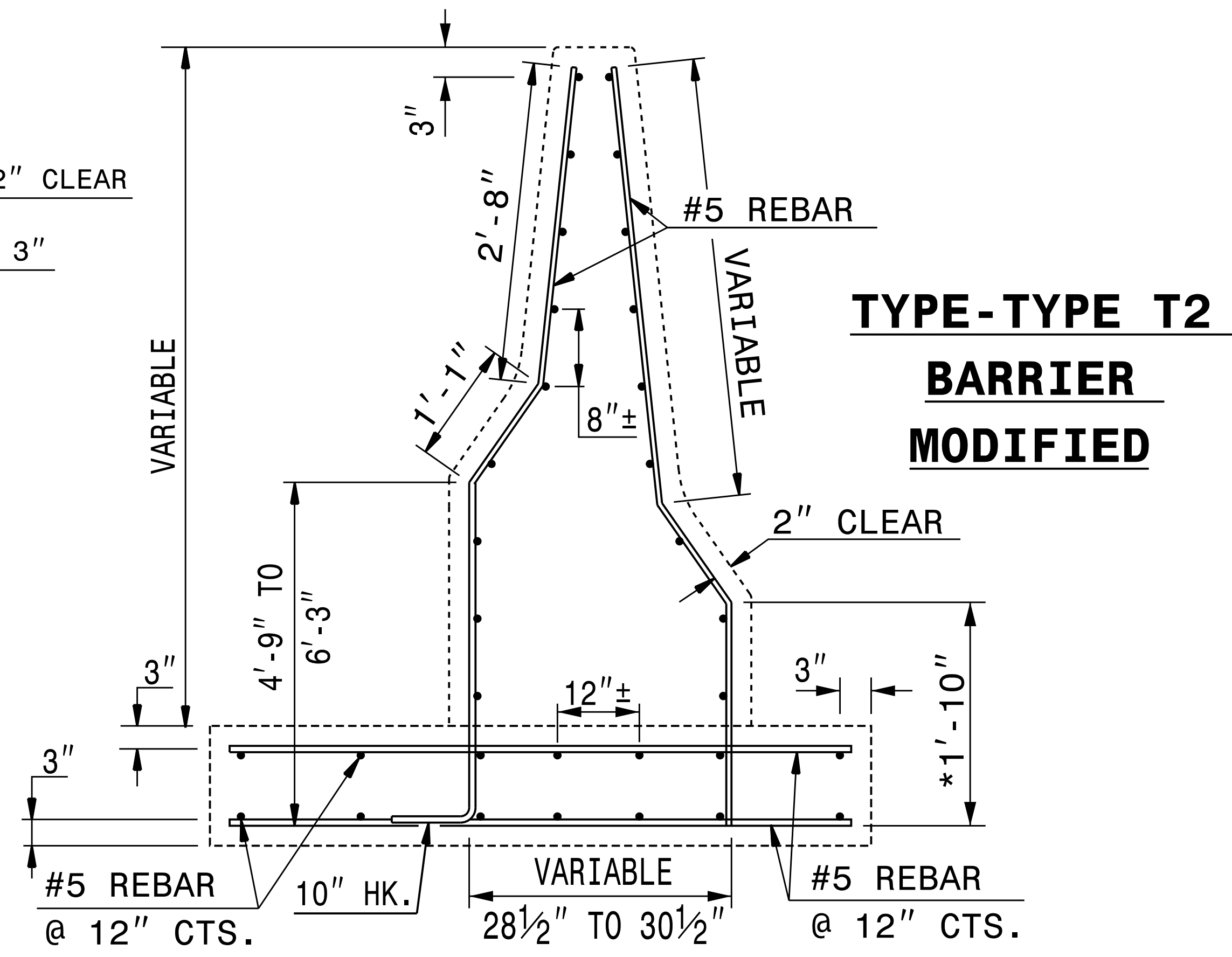
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ROADWAY STANDARD DRAWING FOR
DOUBLE FACED CONCRETE BARRIER
TYPE T2 BARRIER MODIFIED

SHEET 3 OF 3
854.02



ELEVATION VIEW



SECTION VIEW

**TYPE-TYPE T2
BARRIER
MODIFIED**

- NOTES:
1. EVENLY SPACE HORIZONTAL REBAR 8"±1" UNLESS OTHERWISE NOTED.
 2. USE #5 BAR FOR HORIZONTAL STEEL AND #5 BAR FOR THE VERTICAL CAGE.
 3. SUBMIT CHANGES IN STEEL PLACEMENT OR SIZE TO THE ENGINEER.
 4. USE SPLICE LENGTHS EQUAL TO 20 TIMES THE DIAMETER OF THE BAR.
- * REFER TO PLAN TYPICAL SECTIONS AND PAVEMENT SCHEDULE TO DETERMINE KEY-IN DEPTH. DIMENSIONS SHOWN ARE BASED ON A MIN. KEY-IN DEPTH.
- STEEL PLACEMENT FOR CAST-IN-PLACE OR SLIP-FORM CONCRETE BARRIER

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ROADWAY STANDARD DRAWING FOR
DOUBLE FACED CONCRETE BARRIER
TYPE T2 BARRIER MODIFIED

SHEET 3 OF 3
854.02

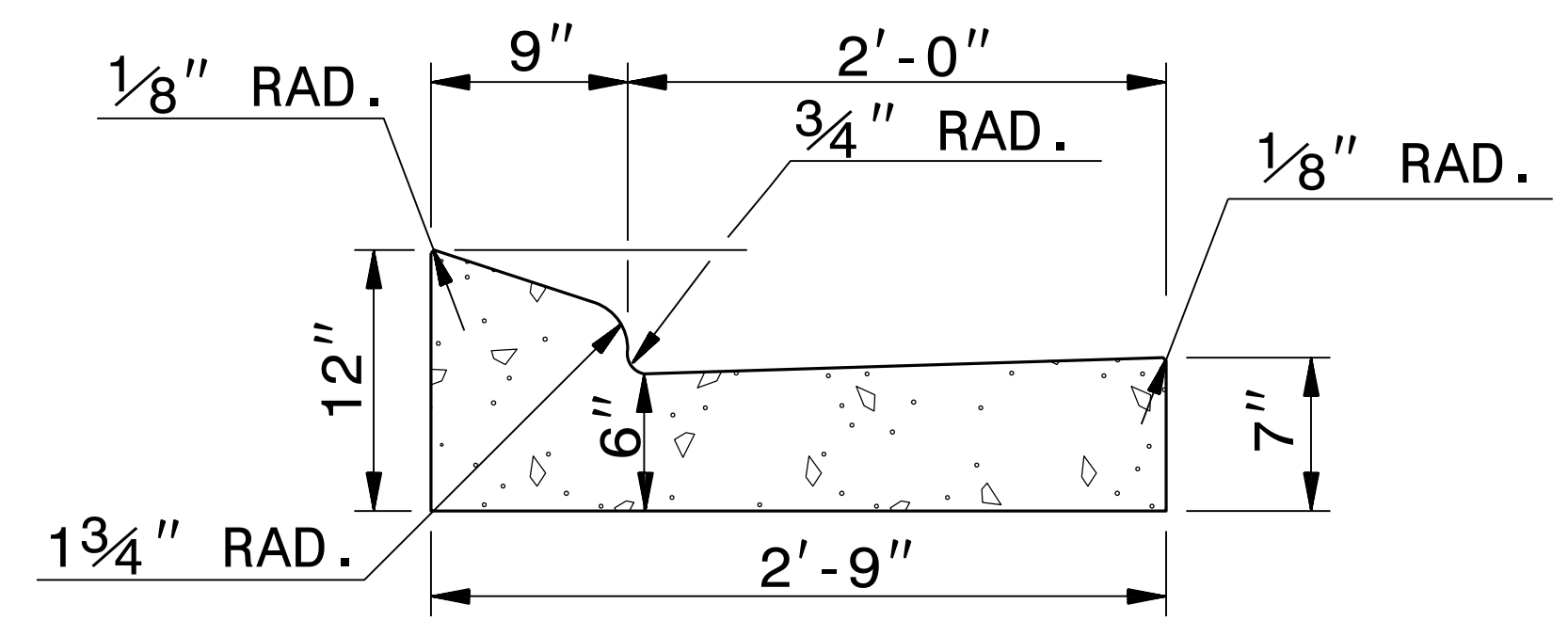
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ENGLISH DETAIL DRAWING FOR
2'-9" CONCRETE CURB & GUTTER

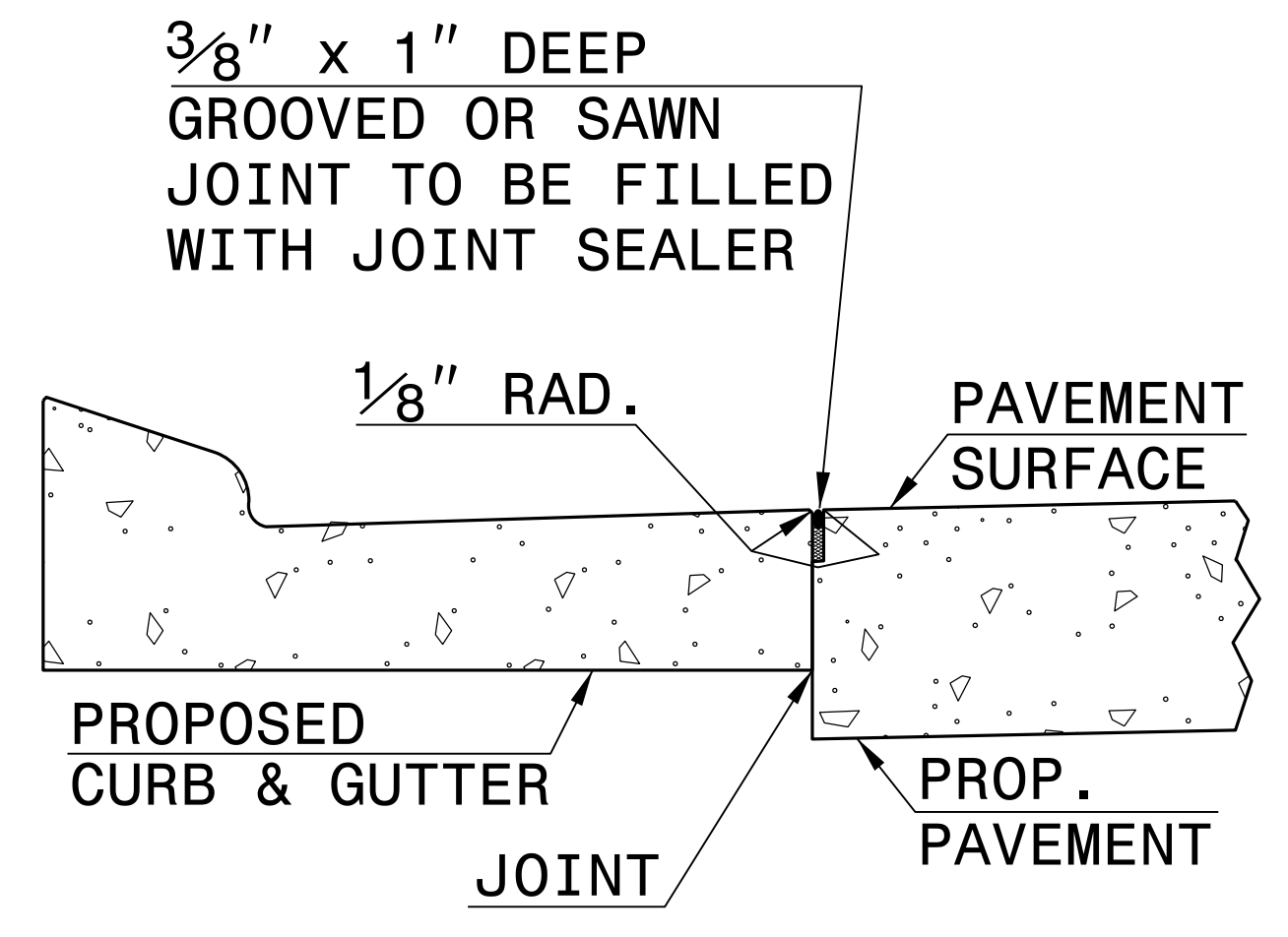
SHEET 1 OF 1
846D01

- GENERAL NOTES:**
- PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
 - JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
 - CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. MAKE NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
 - FILL ALL CONSTRUCTION JOINTS WITH JOINT FILLER AND SEALER.
 - SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.
 - SEE RDWY. STD. DWG. NO. 846.01, SHEET 2 OF 3 FOR PLACEMENT IN SUPERELEVATIONS. (USE 2'-6" CURB AND GUTTER RATES)

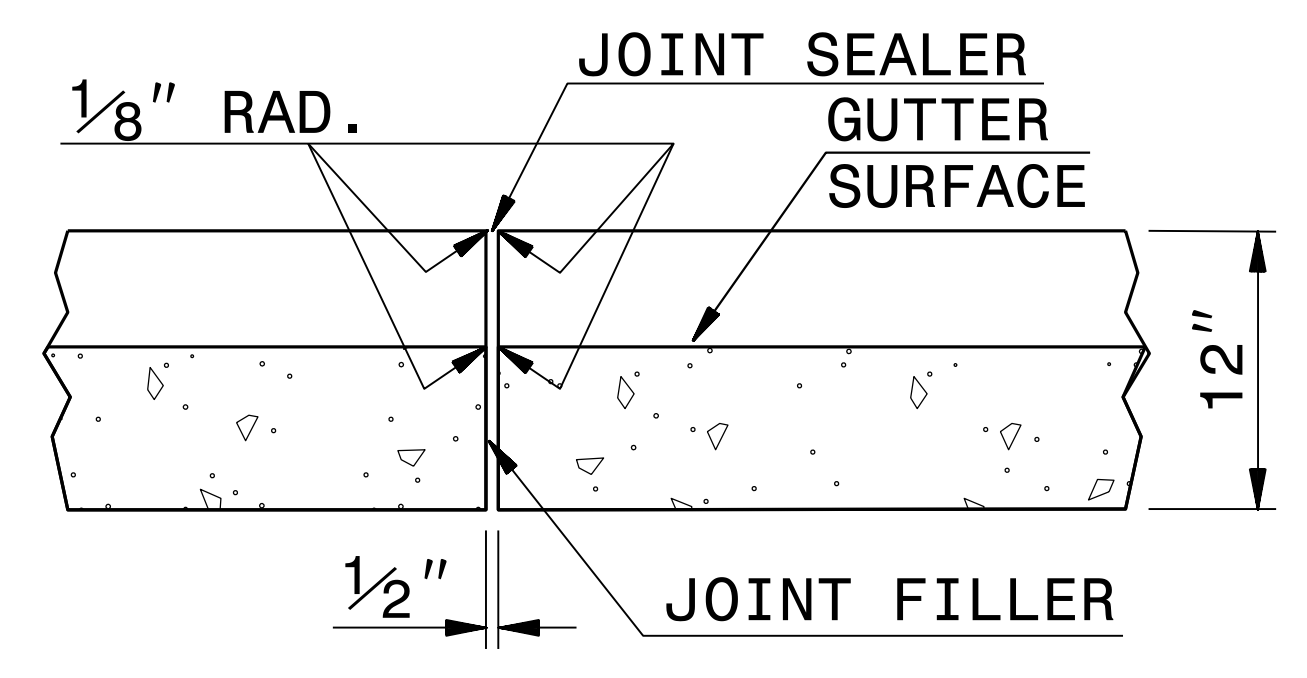


2'-9" CURB AND GUTTER

SECTION VIEW OF CURB AND GUTTER



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT IN CURB AND GUTTER

SECTION VIEW OF JOINTS

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ENGLISH DETAIL DRAWING FOR
2'-9" CONCRETE CURB & GUTTER

SHEET 1 OF 1
846D01

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3/18/2022

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CONTRACT STANDARDS AND DEVELOPMENT UNIT
 Office 919-707-6950 FAX 919-250-4119
SEE PLATE FOR TITLE
 ORIGINAL BY: STD. 846.01 DATE: _____
 MODIFIED BY: E.E. WARD DATE: 8-15-00
 CHECKED BY: _____ DATE: _____
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DIVISION OF HIGHWAYS
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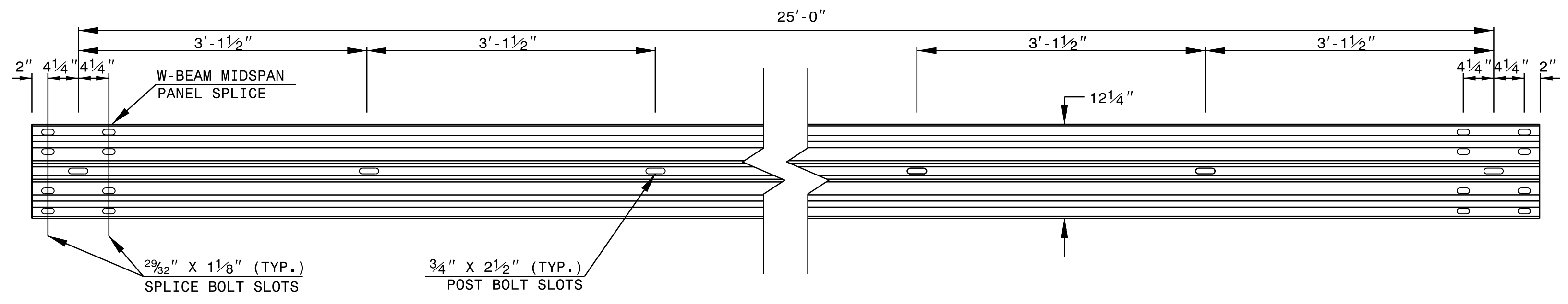
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

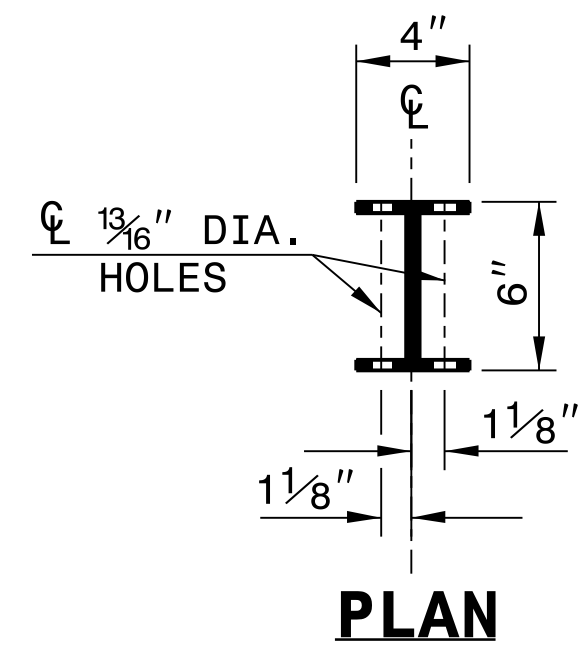
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

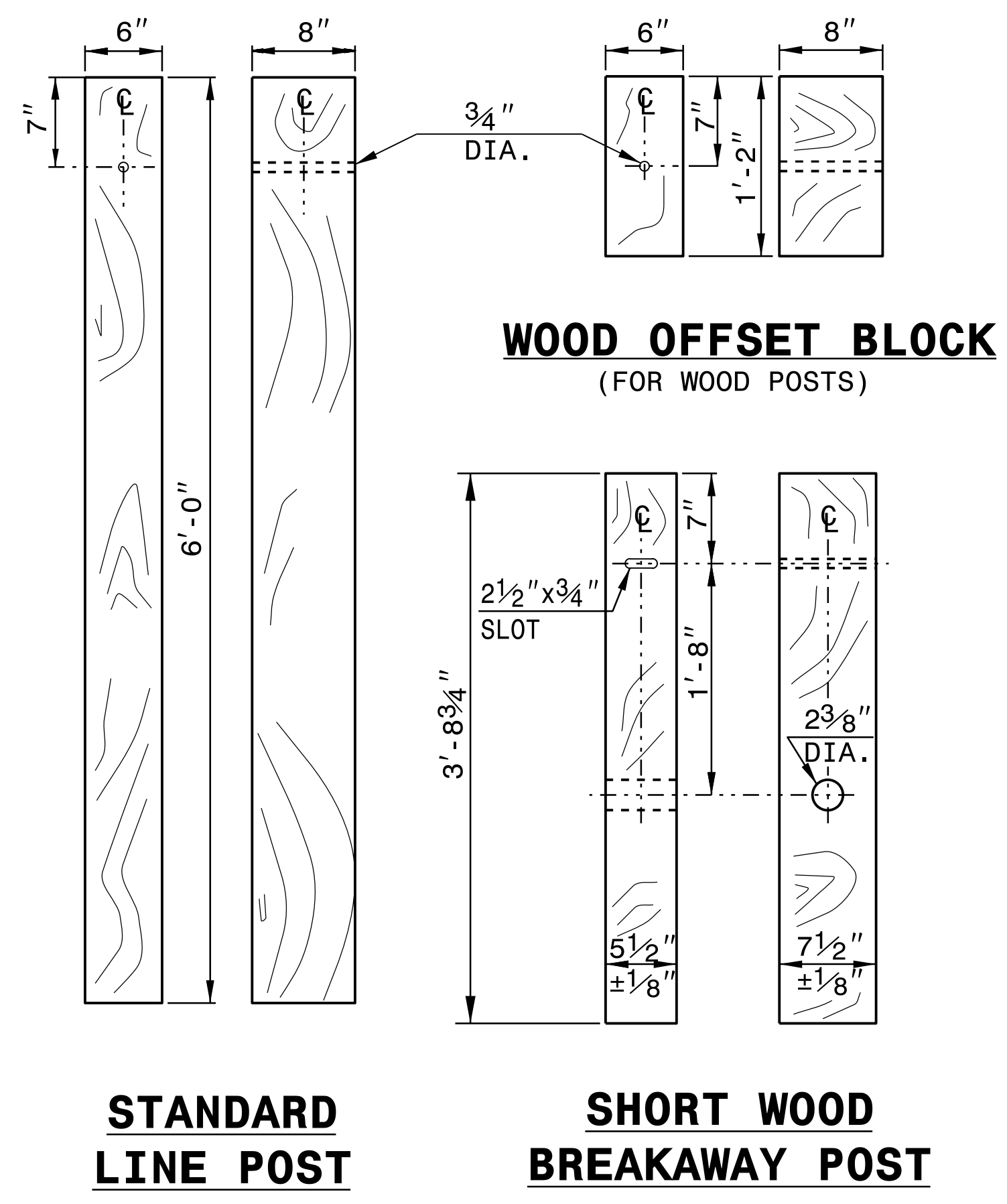
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL

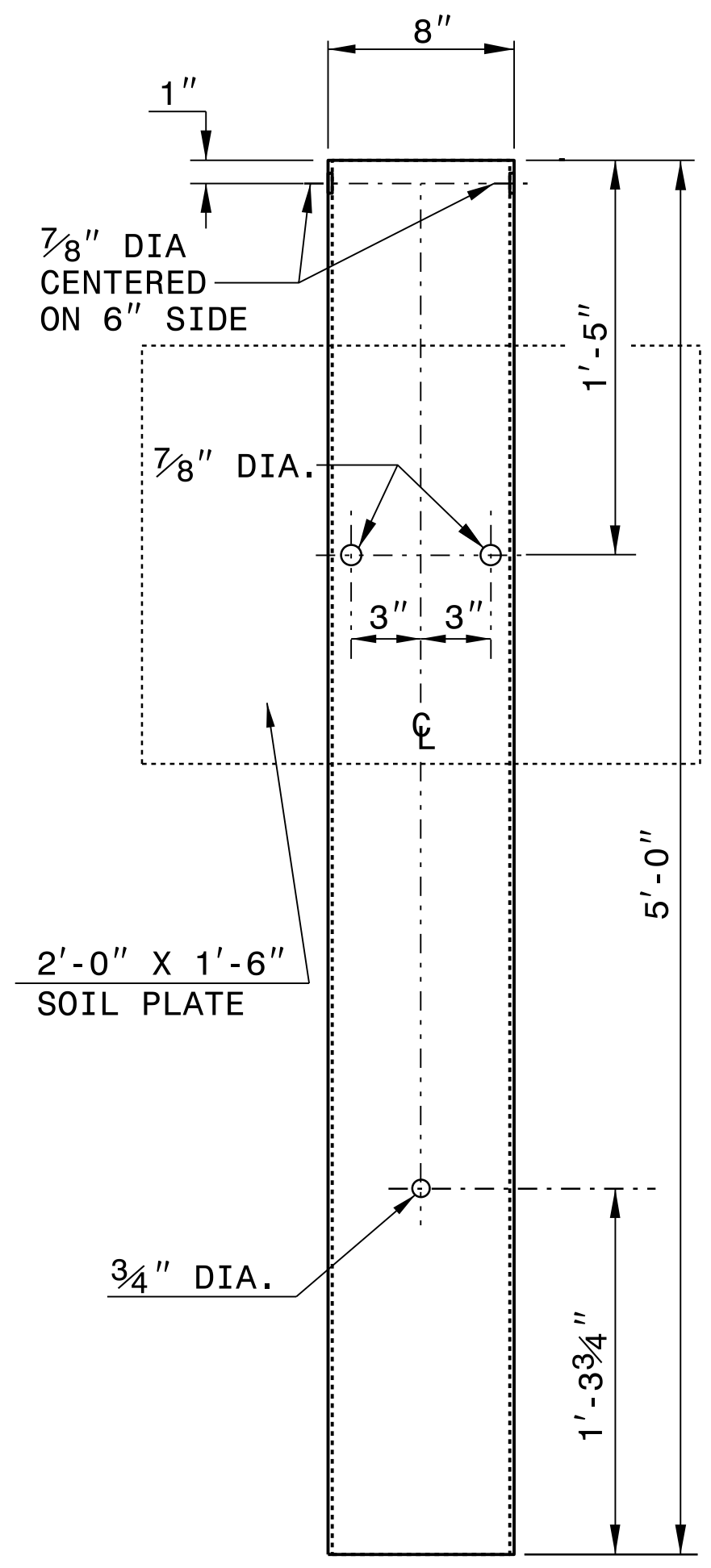


PLAN

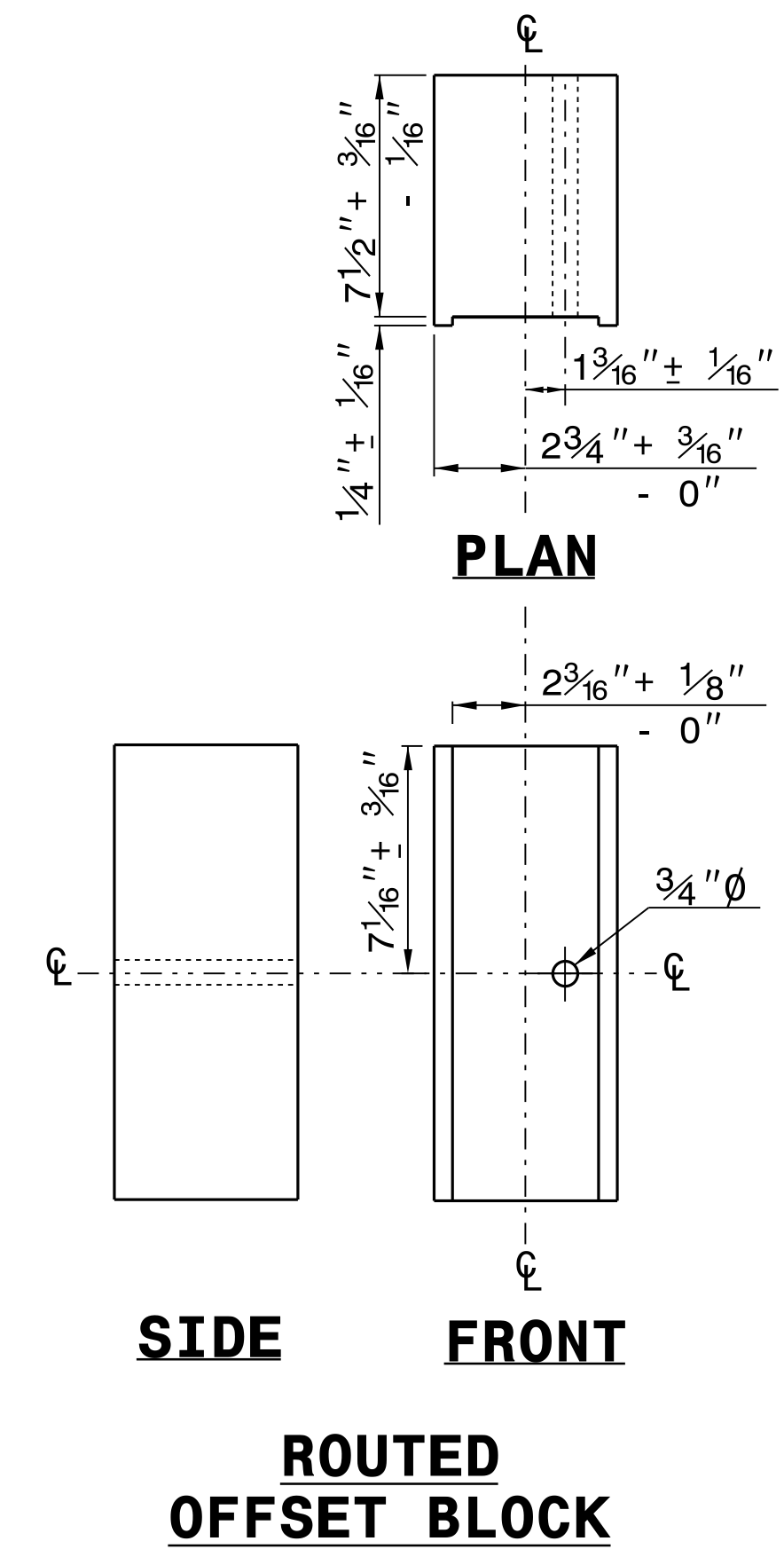


STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



STEEL TUBE
TS 6"x8"x0.1875"

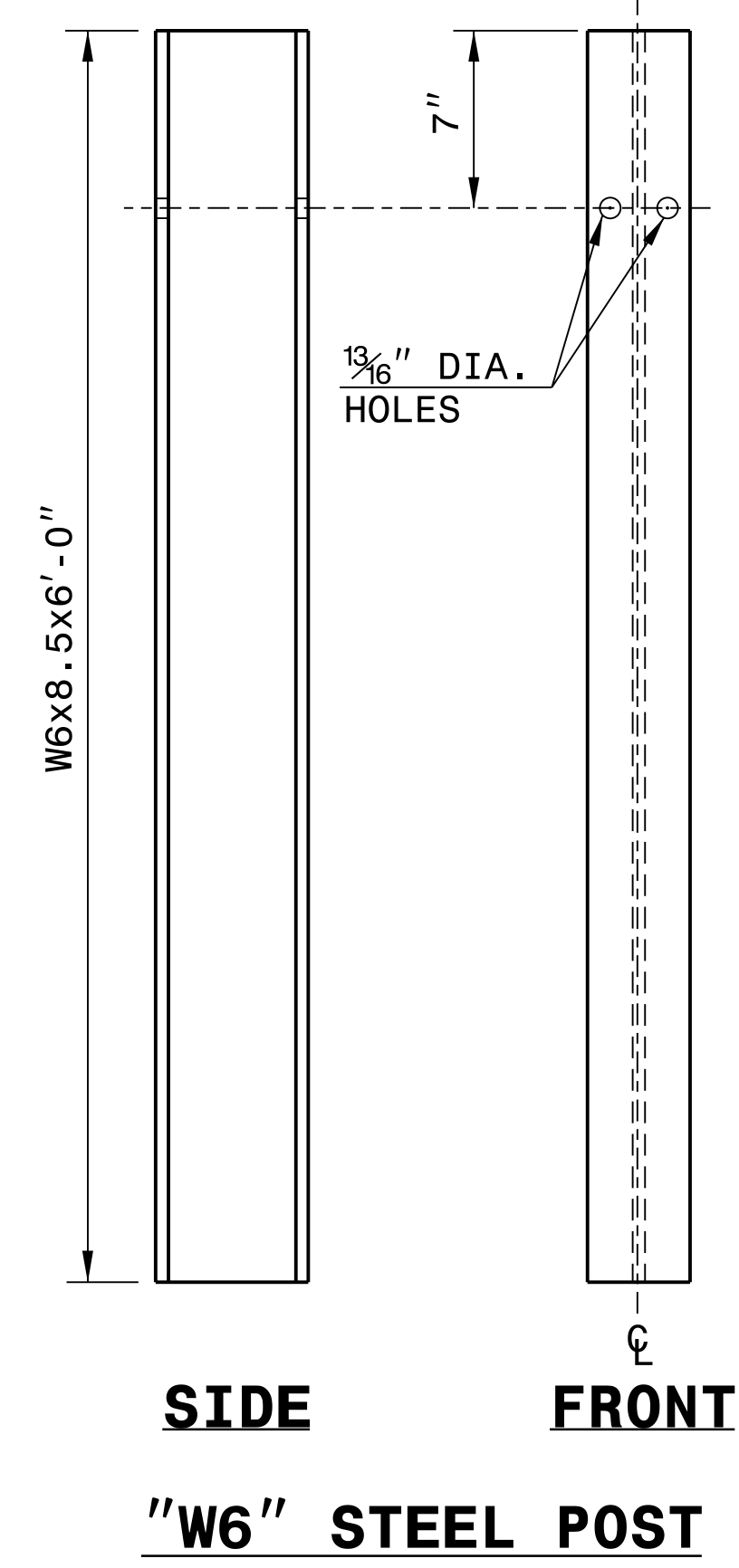


PLAN

SIDE

FRONT

ROUTED OFFSET BLOCK



SIDE

FRONT

"W6" STEEL POST

SYSTEM PARTS



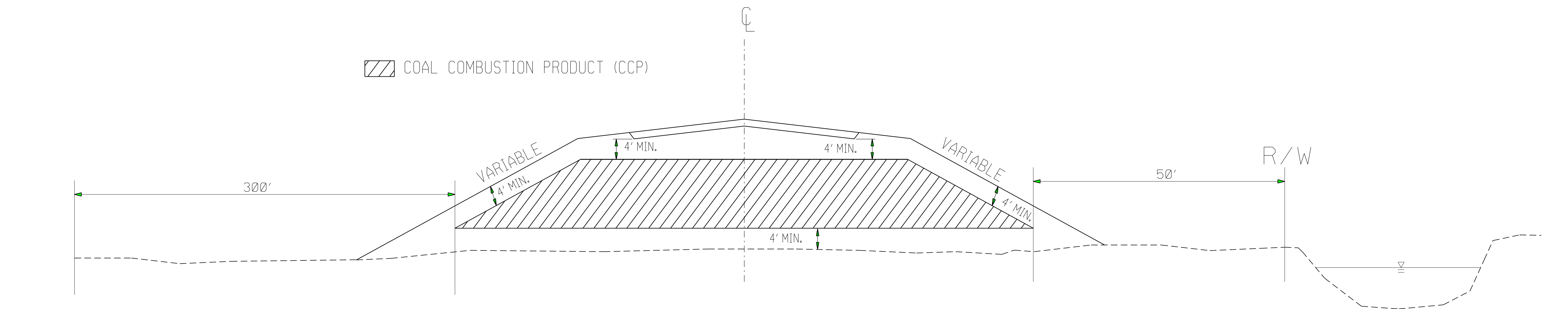
3/18/2022

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: J. HOWERTON	DATE: 3-7-2018
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.:	

COAL COMBUSTION PRODUCT PLACEMENT



PRIVATE DWELLING
OR WELL

PERENNIAL STREAM, OTHER SURFACE
WATER BODY OR *WETLAND

*(OBTAIN PERMISSION FROM ARMY
CORPS OF ENGINEERS)

PLACE CCP IN HATCHED AREA IN ACCORDANCE
WITH THE PROJECT SPECIAL PROVISIONS

PLACE CCP A MINIMUM OF 5' ABOVE
SEASONAL HIGH GROUND WATER

PLACE AT LOCATIONS AS APPROVED BY THE ENGINEER

PLACE SOIL BORROW MATERIAL ON THE OUTSIDE
OF CCP AS EACH LIFT OF CCP IS PLACED

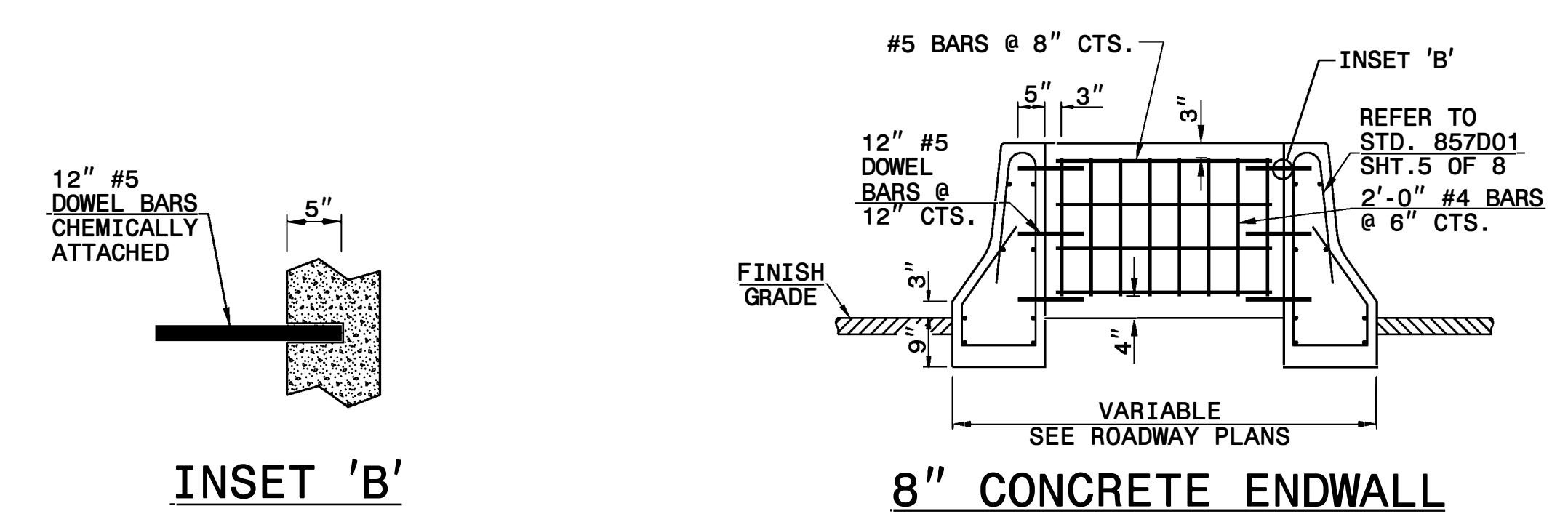
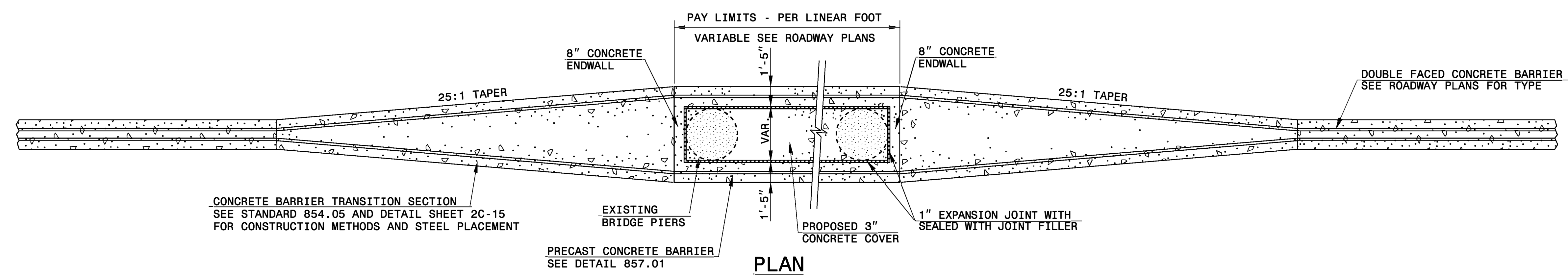
DOCUMENT NOT CONSIDERED FINAL
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3/18/2022

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Office 919-707-6950 FAX 919-250-4119	
COAL COMBUSTION PRODUCT PLACEMENT DETAIL	
ORIGINAL BY: J.S.H.	DATE: 3/16/15
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.: joel/coal combustion material detail.dgn	

07-SEP-2017 08:21 S:\Contracts\Special Details\Jhoverton\Coal Combustion Product Detail.dgn Jhoverton AT USD-232595



GENERAL NOTES:

CONSTRUCT CONCRETE BARRIER WITH CLASS 'AA' CONCRETE. (SEE SPECIFICATIONS SECTION 854).

CONSTRUCT EXPANSION AND CONTRACTION JOINTS AS SHOWN IN STANDARD DRAWING 854.01.

SEAL EXPANSION JOINTS WITH JOINT FILLER. (SEE SECTION 1028 OF THE SPECIFICATIONS).

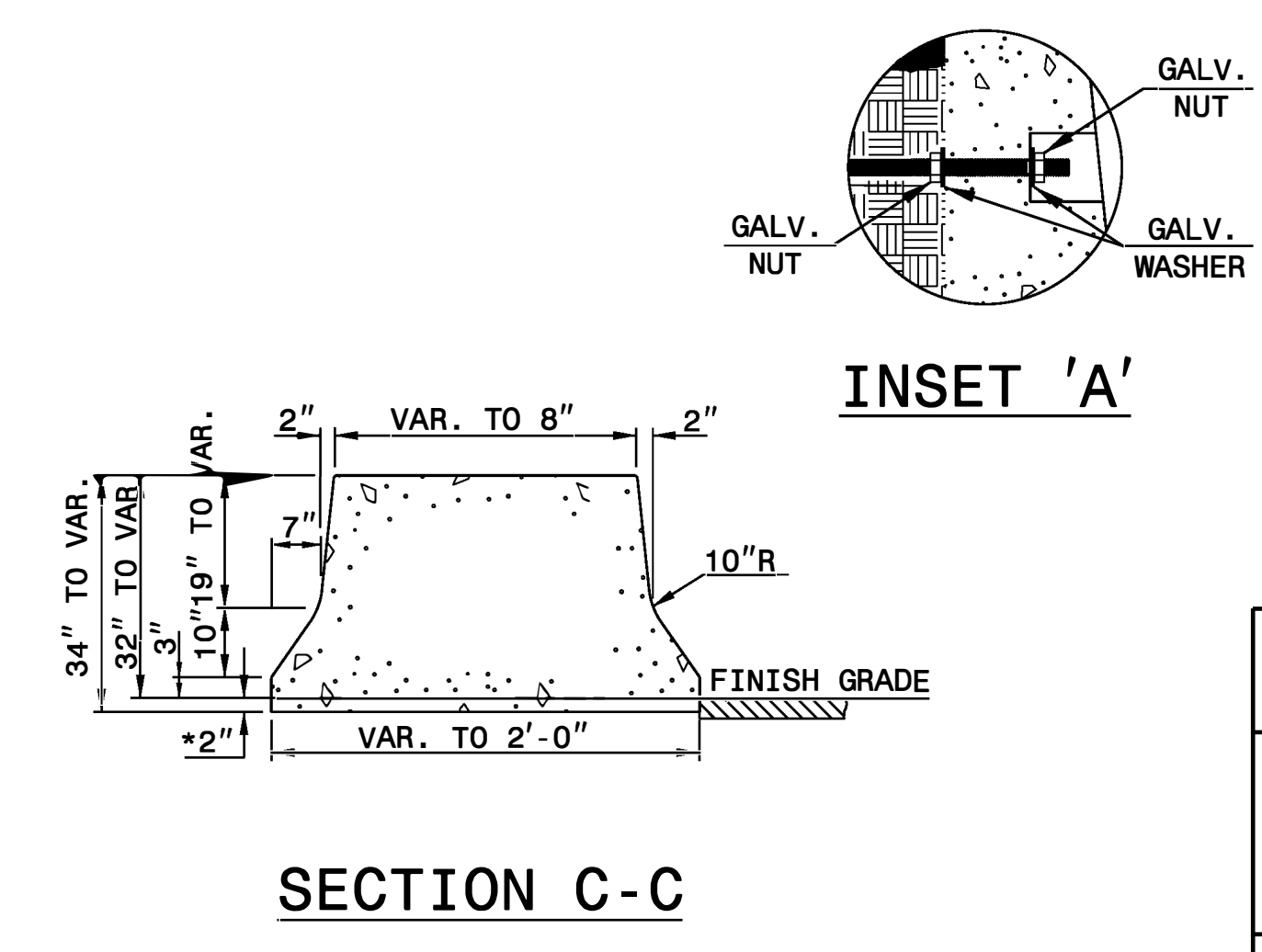
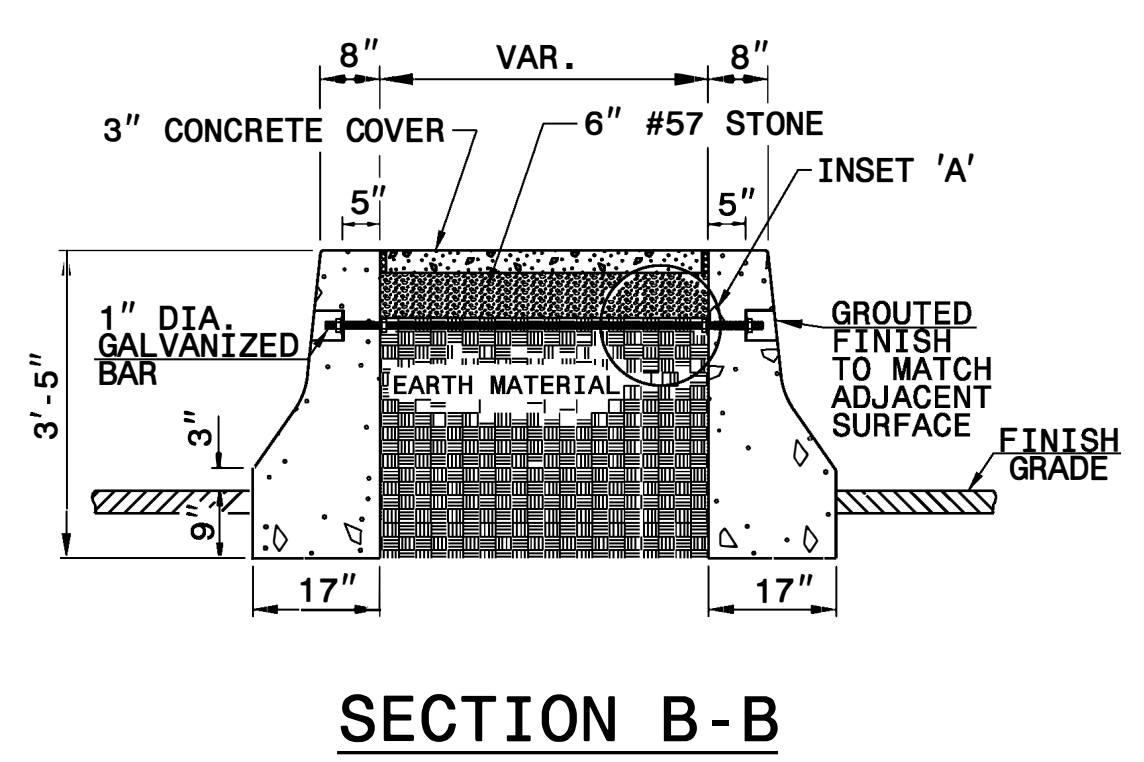
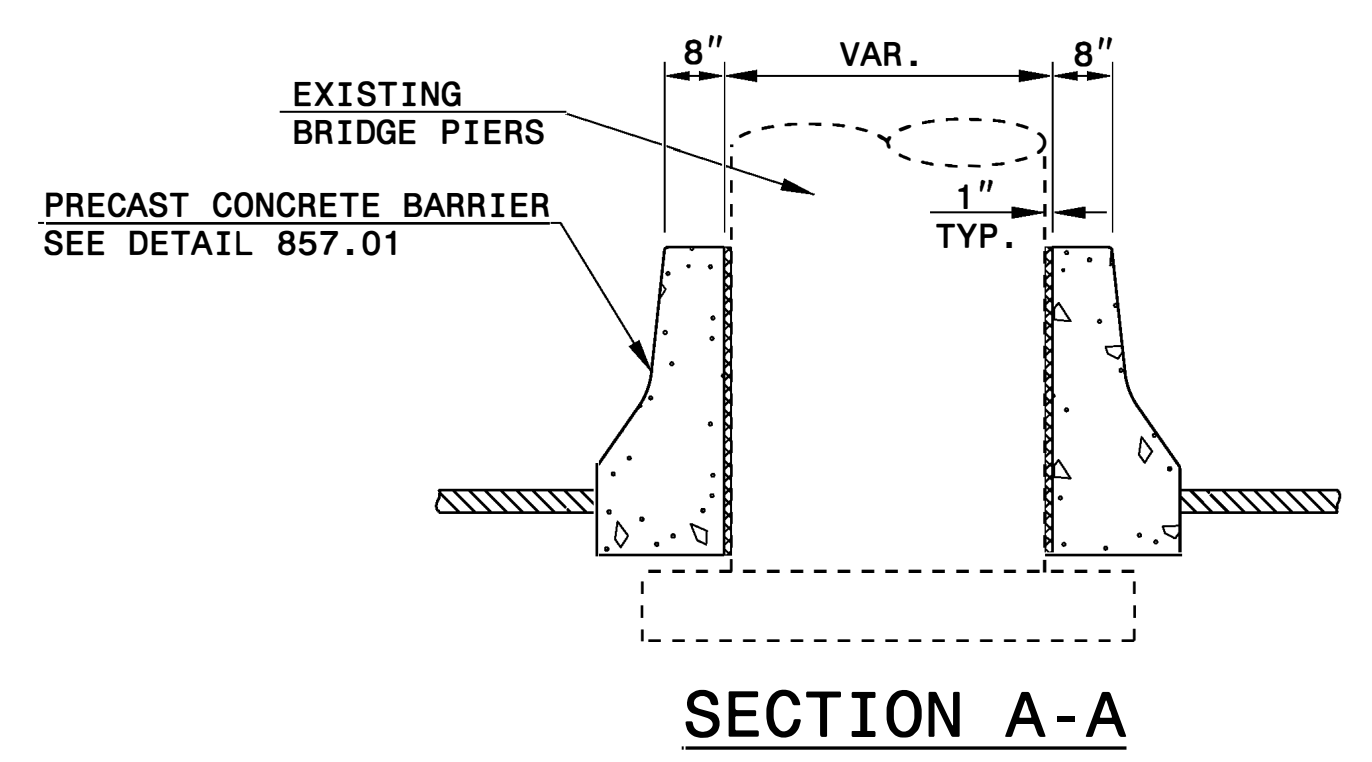
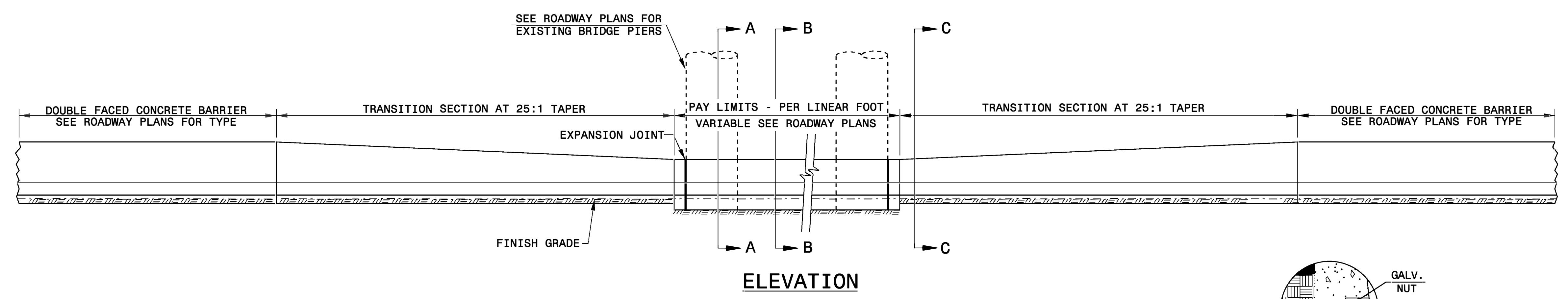
SUBMIT ALTERNATIVE METHODS FOR STEEL FABRICATION PLACEMENT FOR REVIEW AND APPROVAL.

SEE STANDARD DRAWING 854.05 FOR STEEL LAYOUT OF TRANSITION BARRIER.

*THE 2" DIMENSION FROM FINISH GRADE TO THE BASE IS A MINIMUM DIMENSION.

INSET FIRST 1" DIA. GALVANIZED BAR 12'-6" AND SPACE THE REMAINING 1' BARS AT 25'-0".

USE AN APPROVED BONDING SYSTEM IN ACCORDANCE WITH SECTION 1081 OF THE STANDARD SPECIFICATIONS.



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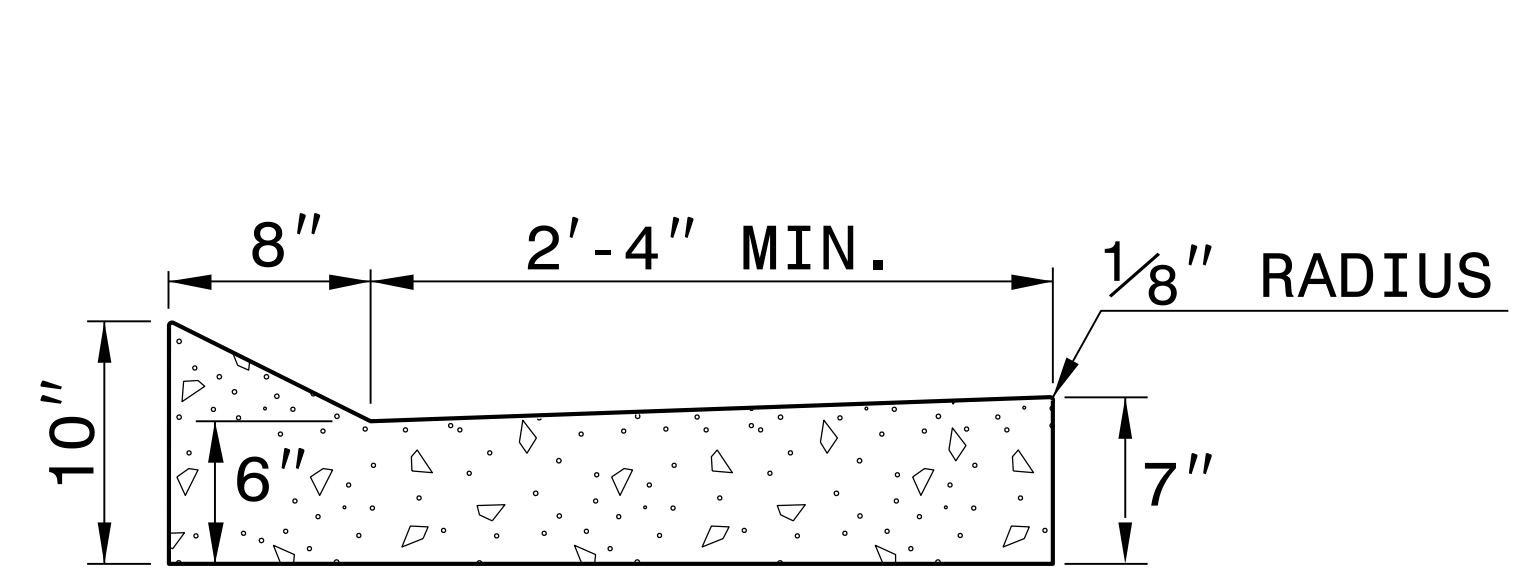


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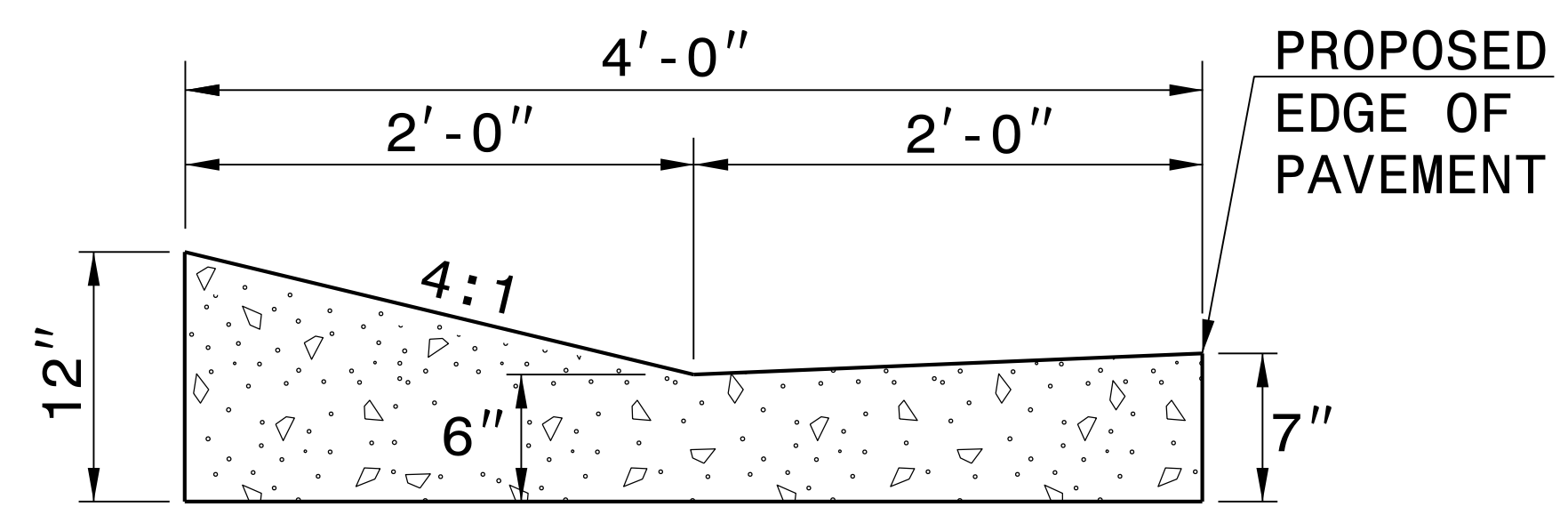
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**MEDIAN HAZARD
PIER PROTECTION**

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 MODIFIED BY: E.E. WARD DATE: 8-26-04
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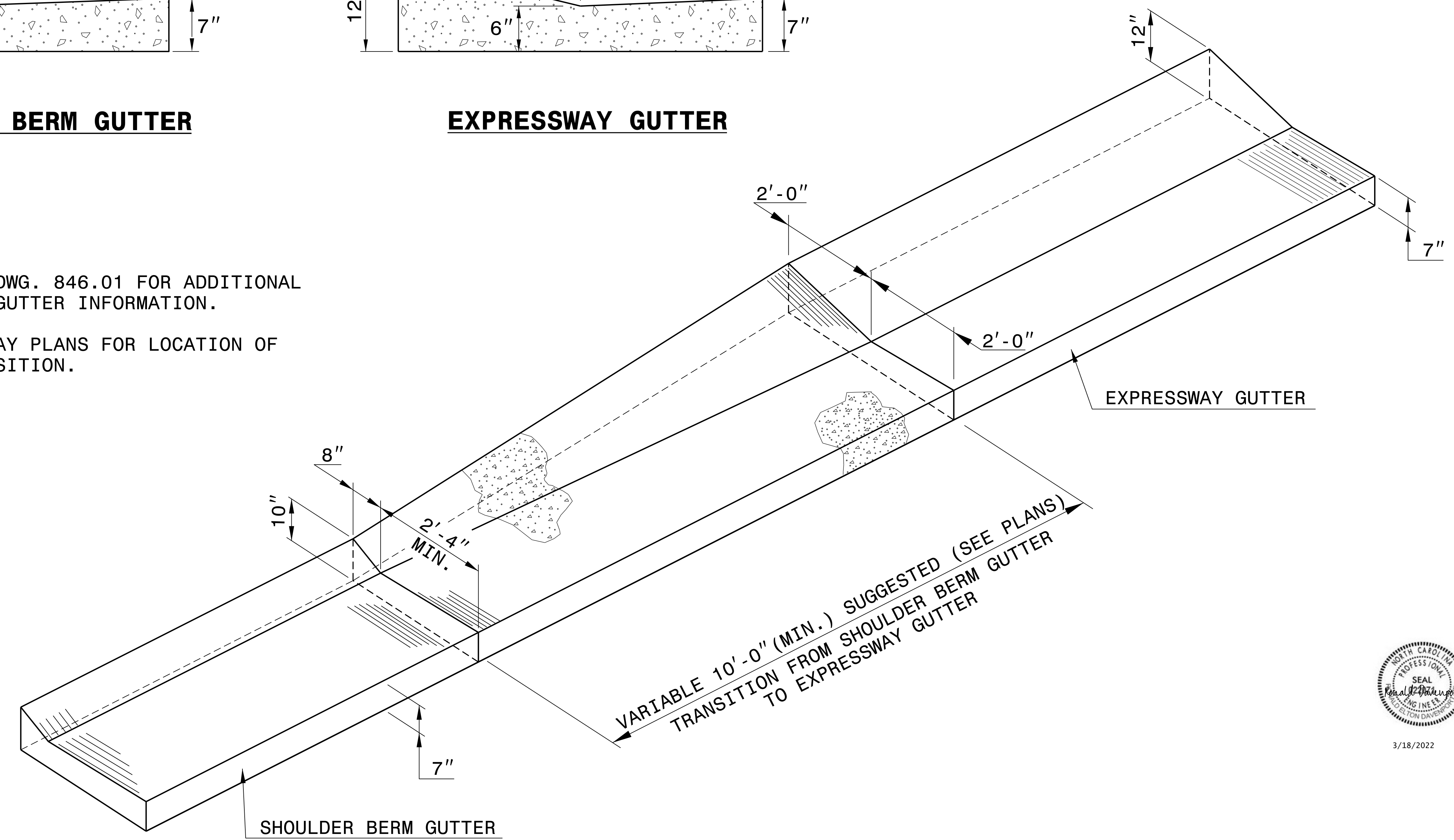
SHOULDER BERM GUTTER



EXPRESSWAY GUTTER

NOTE: SEE STD. DWG. 846.01 FOR ADDITIONAL CURB AND GUTTER INFORMATION.

SEE ROADWAY PLANS FOR LOCATION OF CURB TRANSITION.



ISOMETRIC VIEW OF TRANSITION



3/18/2022

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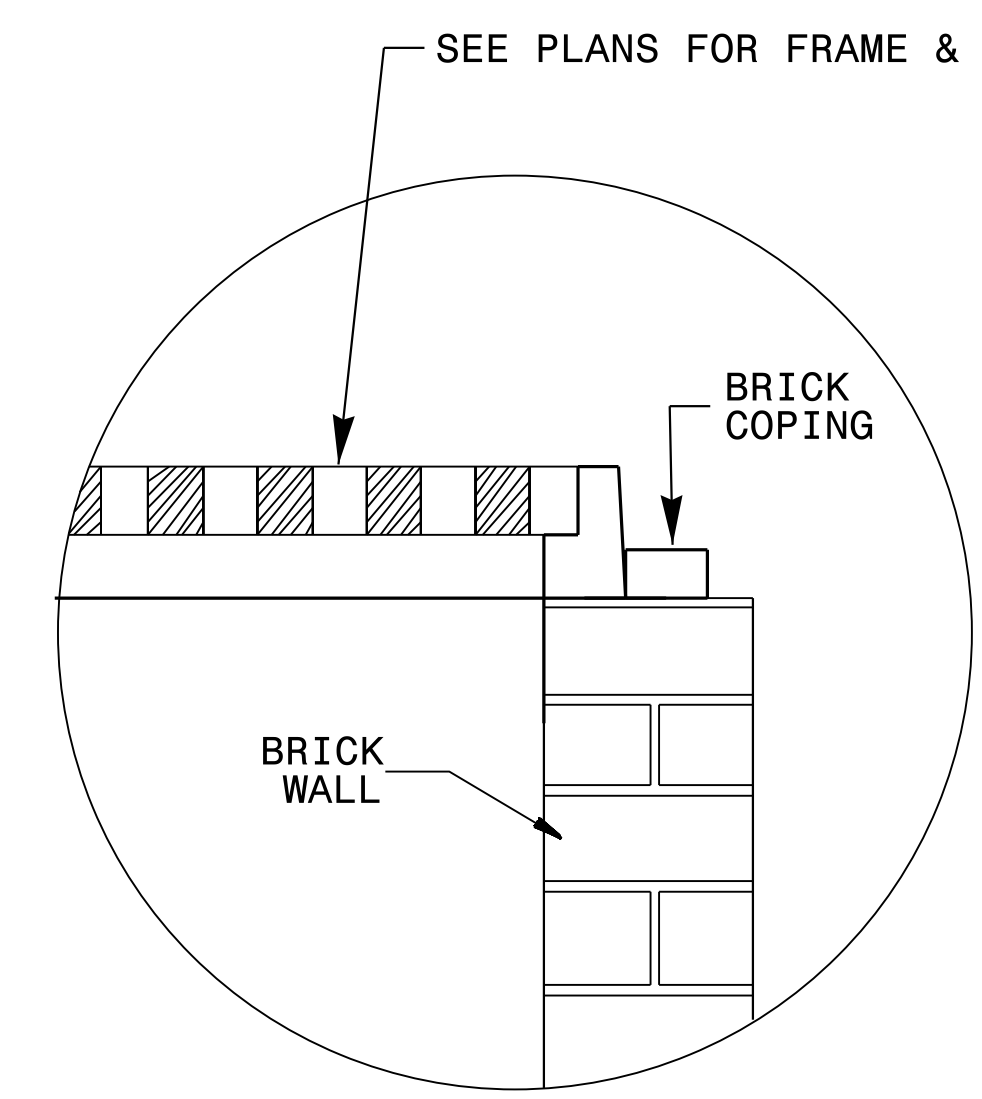
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DETAIL OF SHOULDER BERM GUTTER TO EXPRESSWAY GUTTER TRANSITION SECTION

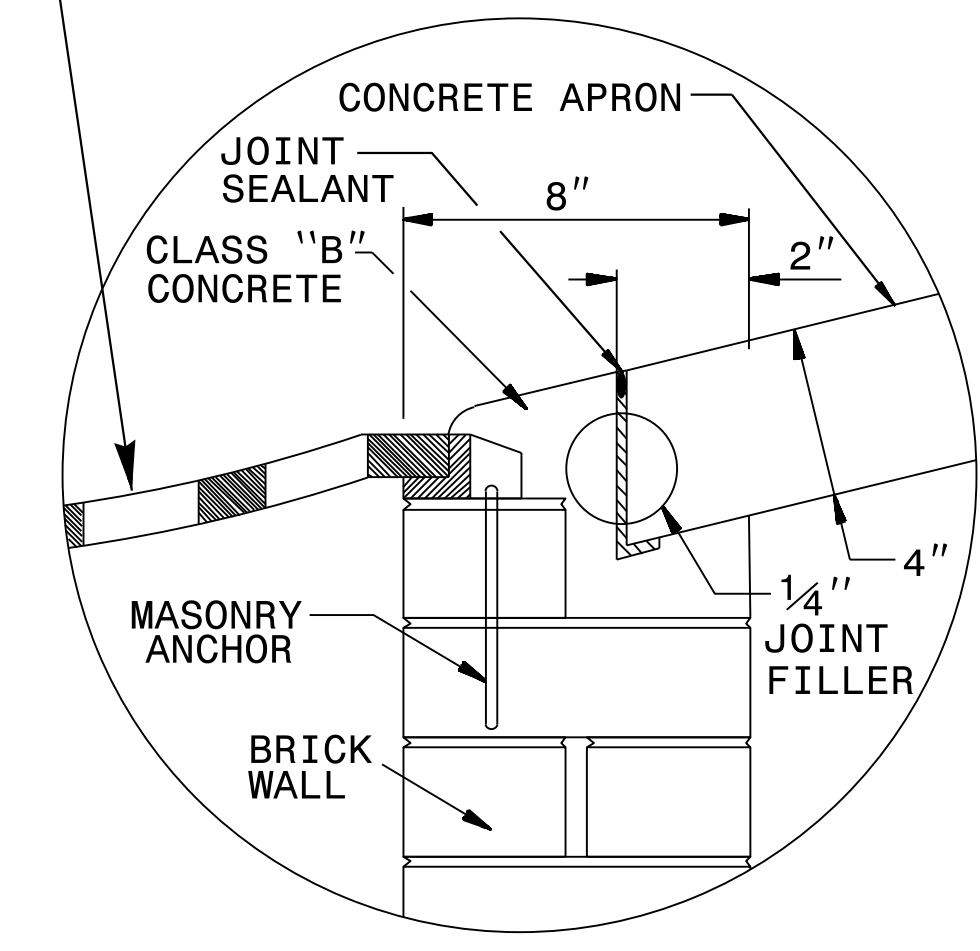
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5/14/99



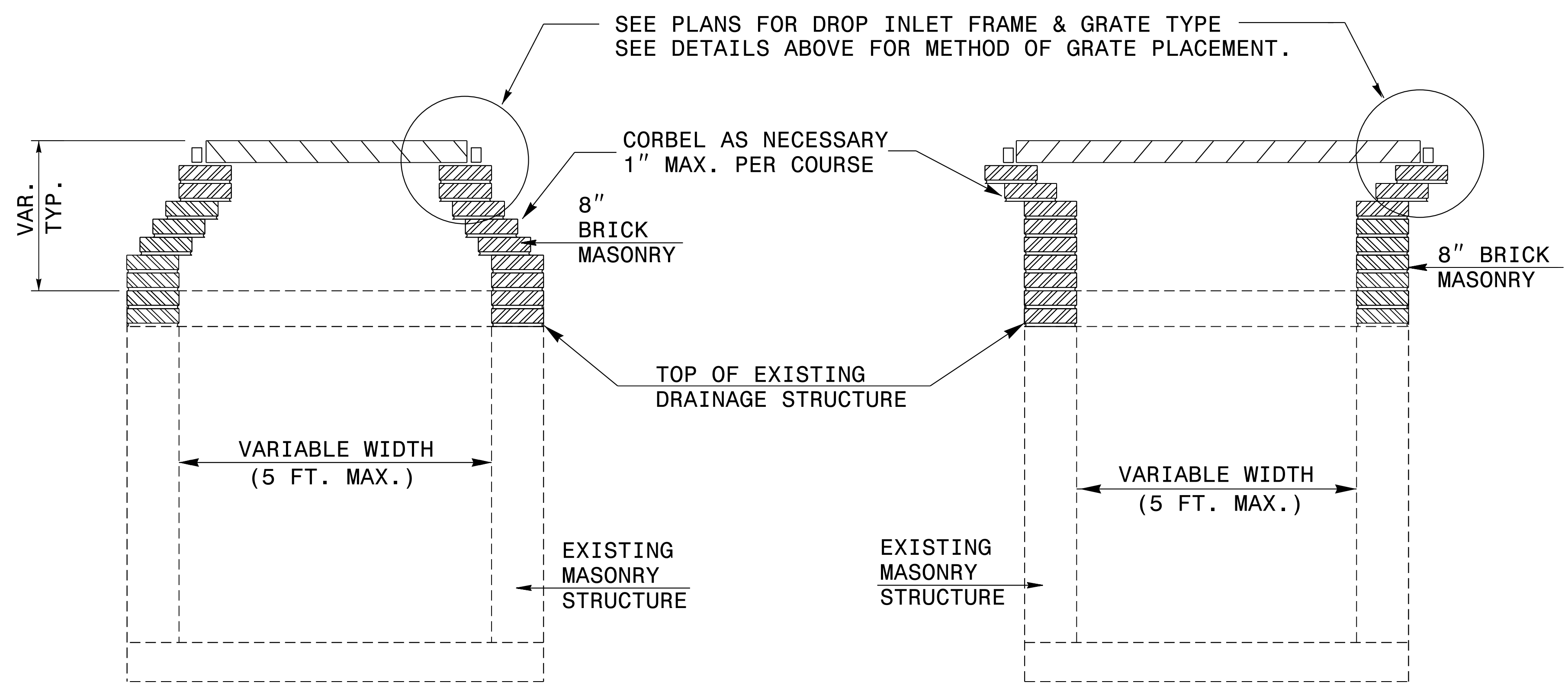
GRATE PLACEMENT DETAIL
FOR DROP INLETS



GRATE PLACEMENT DETAIL
FOR GRATED DROP INLETS

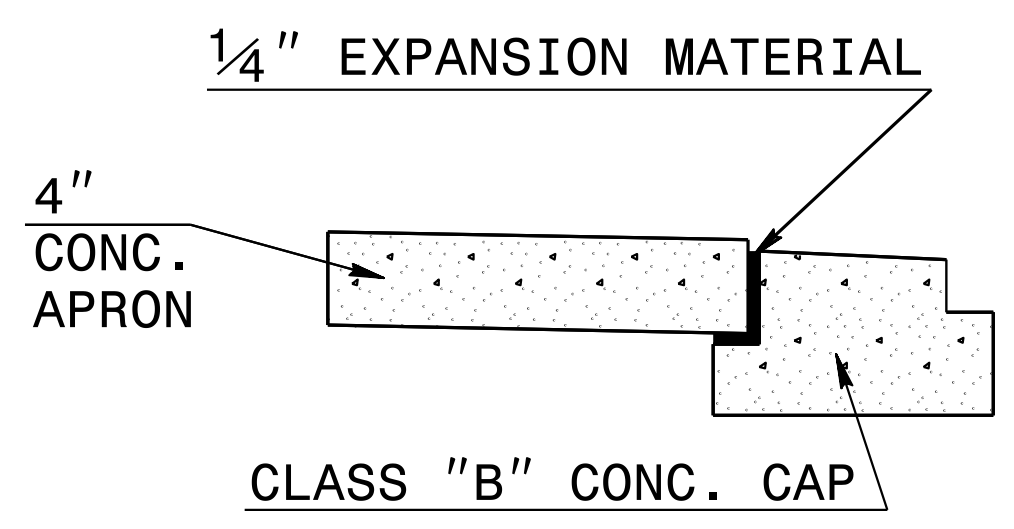
GENERAL NOTES:

- CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.
- USE CLASS B CONCRETE.
- THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.
- JUMBO CONCRETE BRICK WILL BE PERMITTED. 4" CONCRETE BRICK OR 8" SOLID CONCRETE BLOCK ARE REQUIRED FOR DRAINAGE STRUCTURE.
- INCLUDE 18" CONCRETE APRON IN UNIT PRICE BID PER EACH, CONVERT EXISTING CATCH BASIN TO DROP INLET.
- SPECIAL DESIGN IS REQUIRED FOR USE UNDER PAVEMENT.
- CONFIRM DIMENSIONS ON EACH INDIVIDUAL FRAME & GRATE PROPOSAL.
- SEE STD. DRAWING 840.25 FOR MASONRY ANCHORAGE.



TYPICAL SECTION

TYPICAL SECTION



EXPANSION JOINT DETAIL



3/18/2022

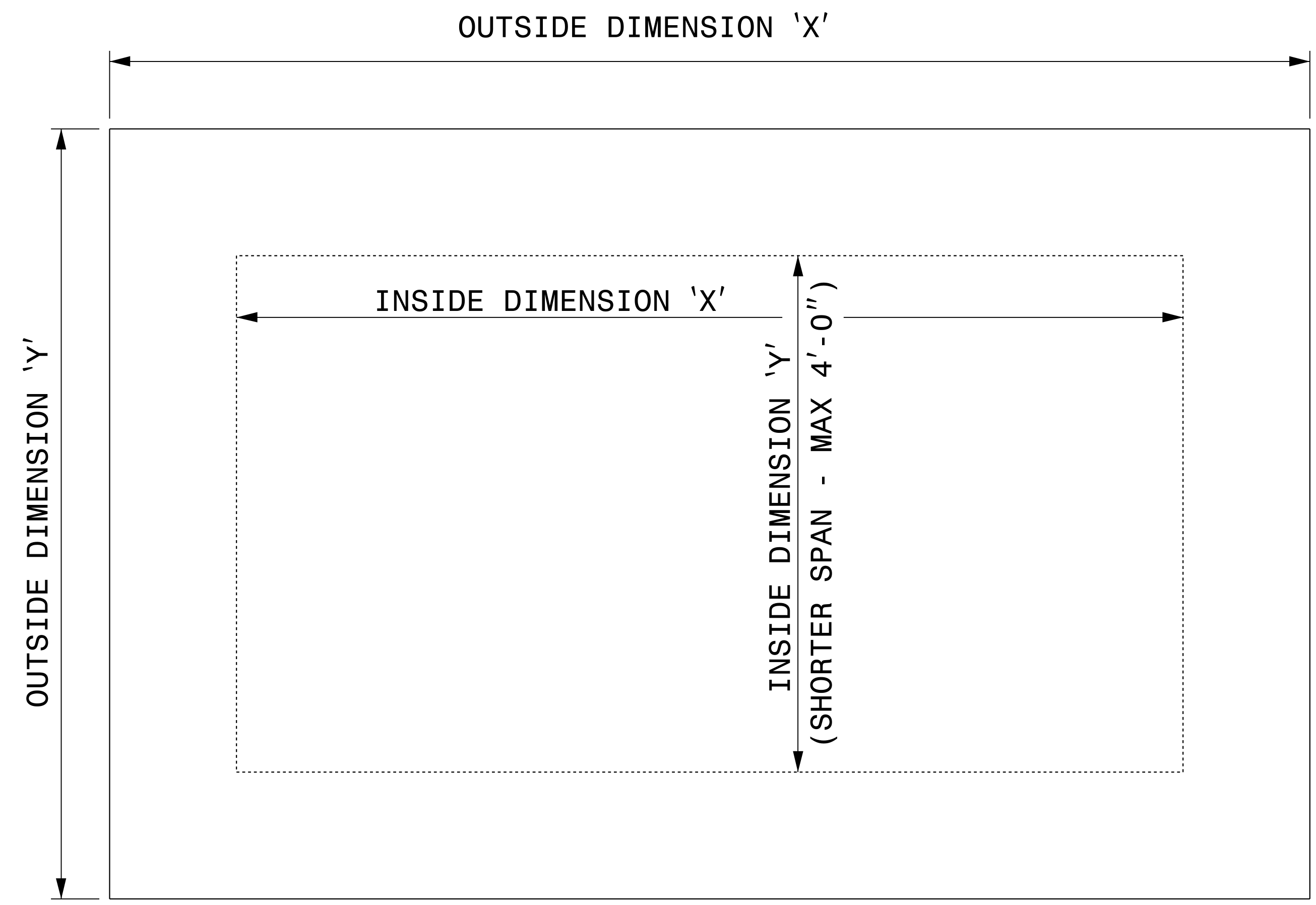
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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DETAIL TO CONVERT EXISTING CATCH BASIN OR JUNCTION BOX TO DI OR 2-GI

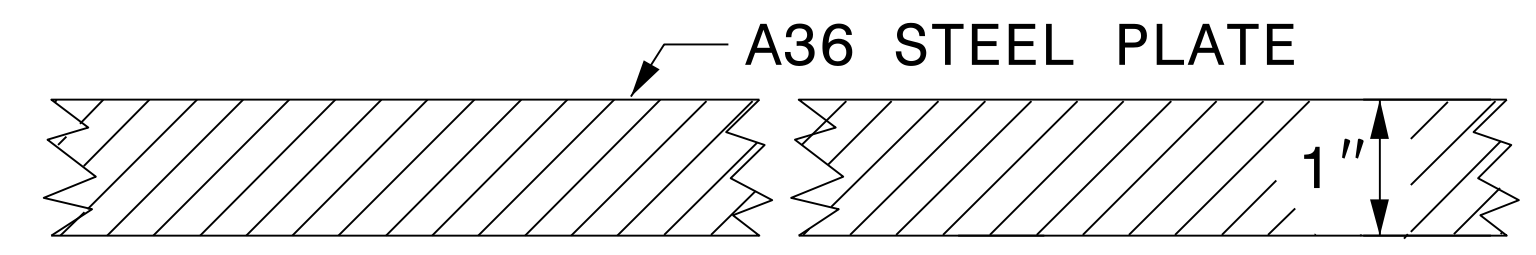
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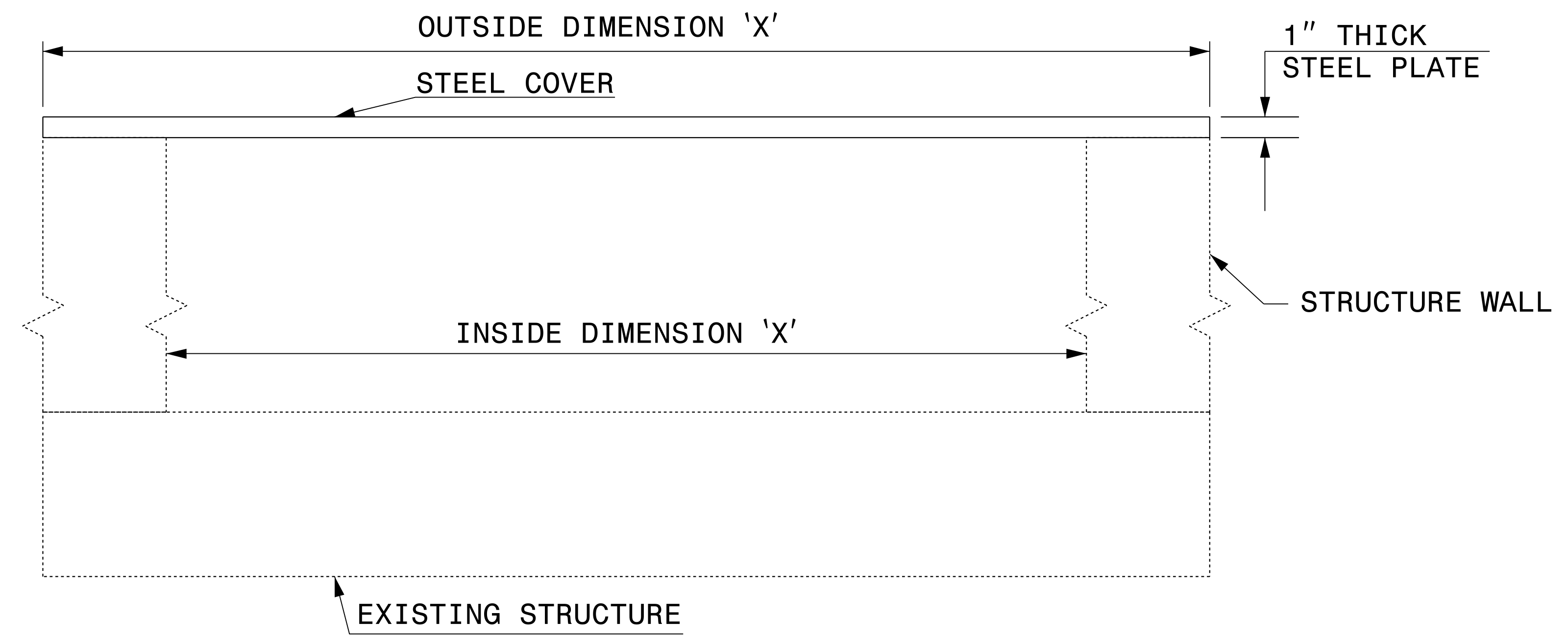
GENERAL NOTES:

- USE GRADE A36 STEEL
- STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
- FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
- SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
- QUANTITIES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.



SECTION VIEW OF STEEL TOP PLATE

PLAN VIEWS



ELEVATION VIEWS



3/18/2022

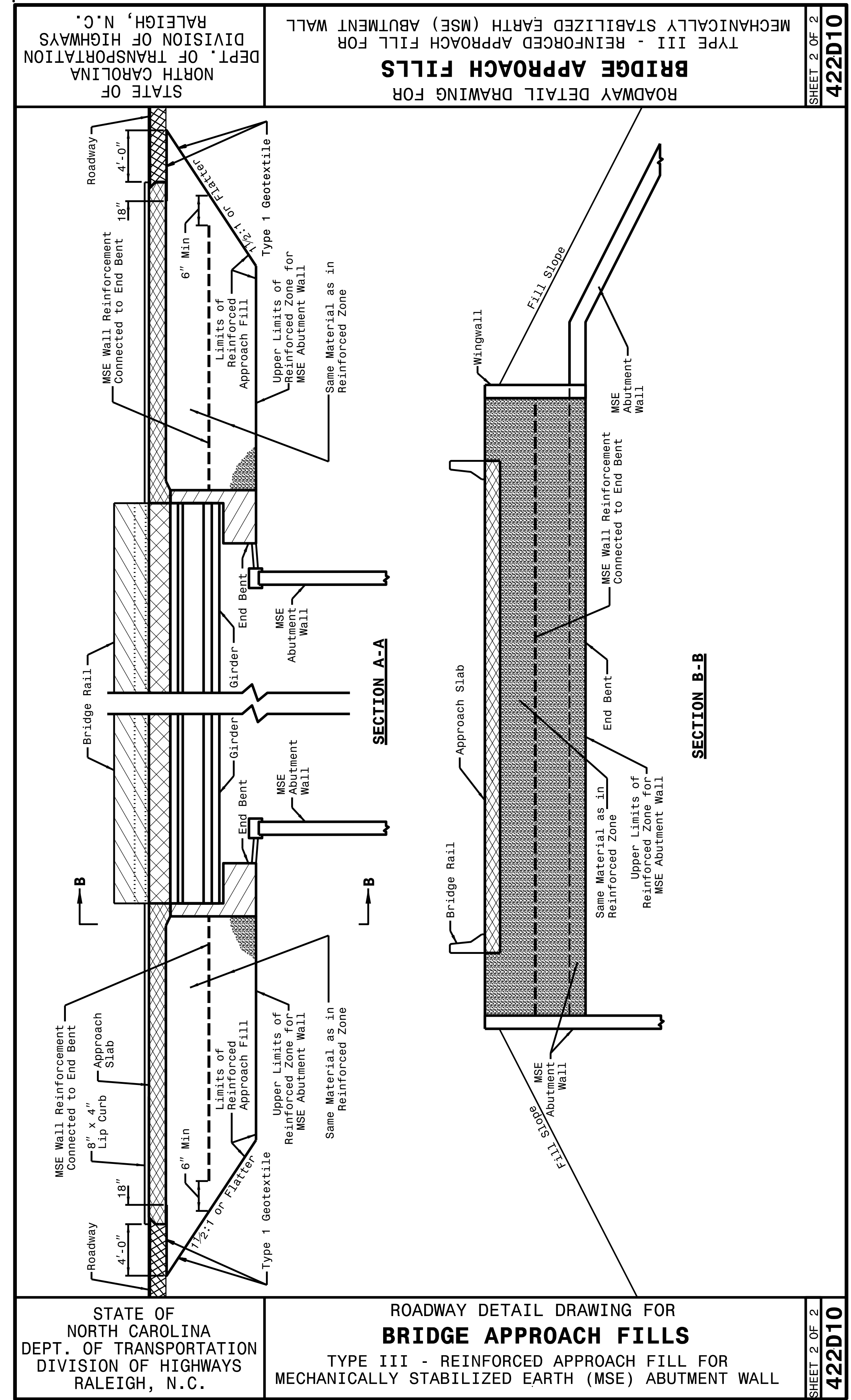
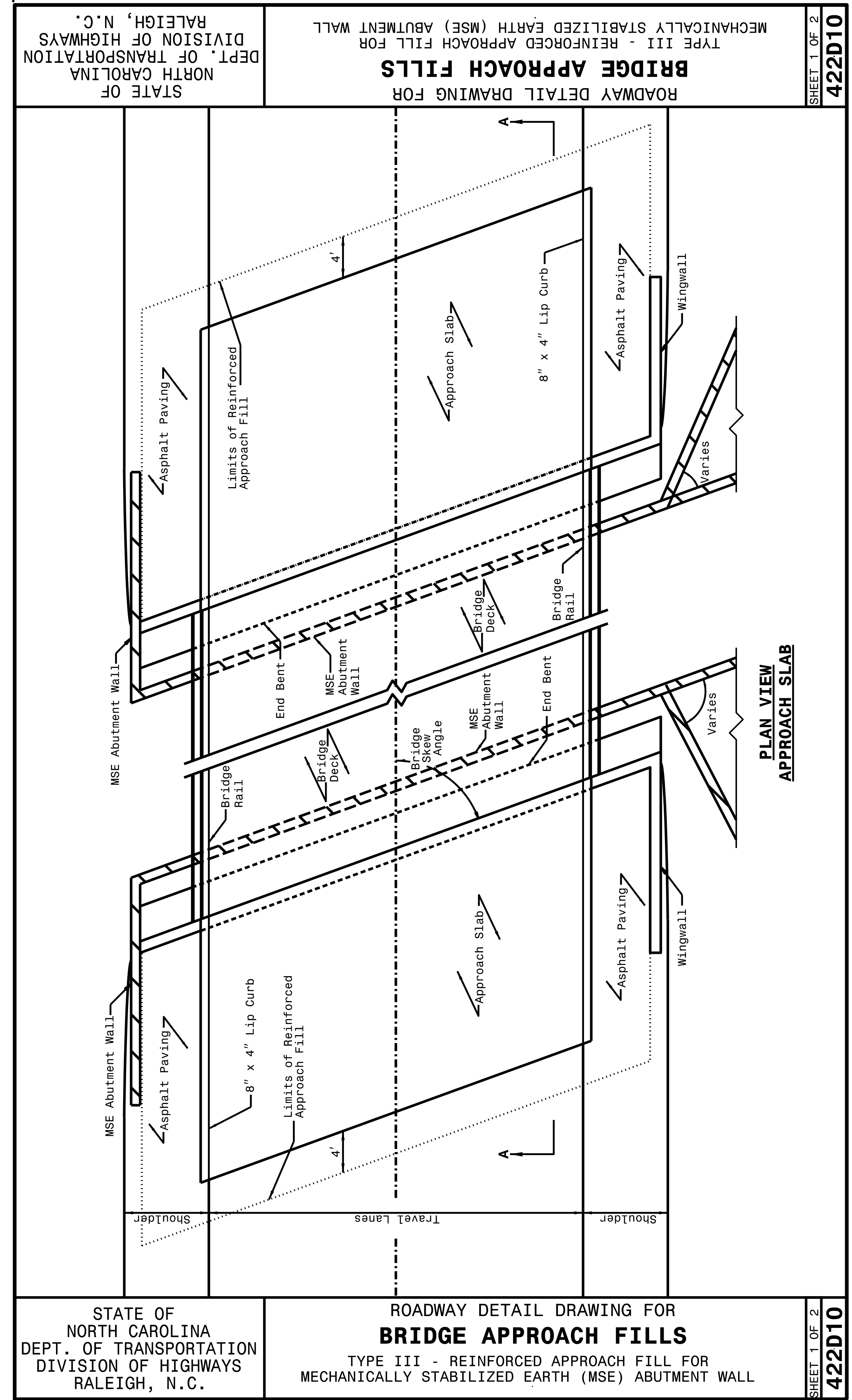
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**DETAIL OF TEMPORARY
1" STEEL COVER**

ORIGINAL BY: E.E. WARD DATE: 2-2-98
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: eric:/usr/details/metric/stand/stlcvr2.dgn

07-DEC-2018 09:57
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Jhoverton AT USD-292595



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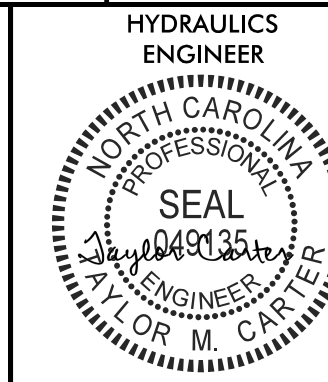
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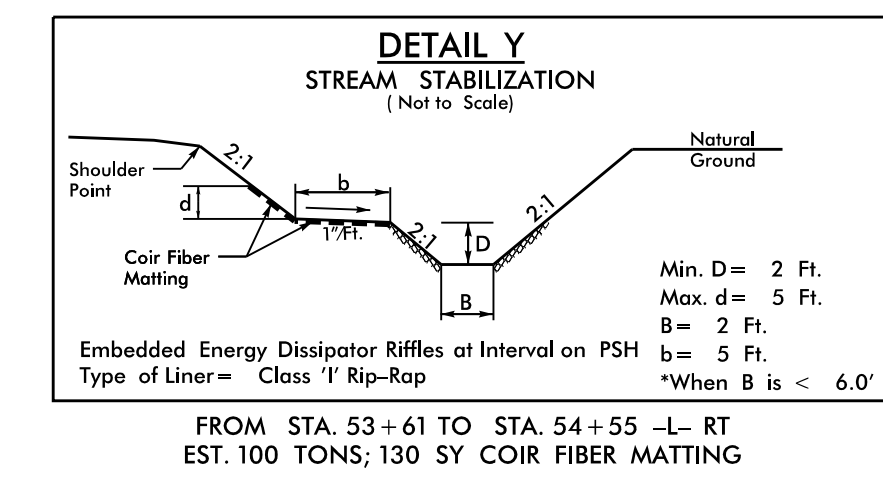
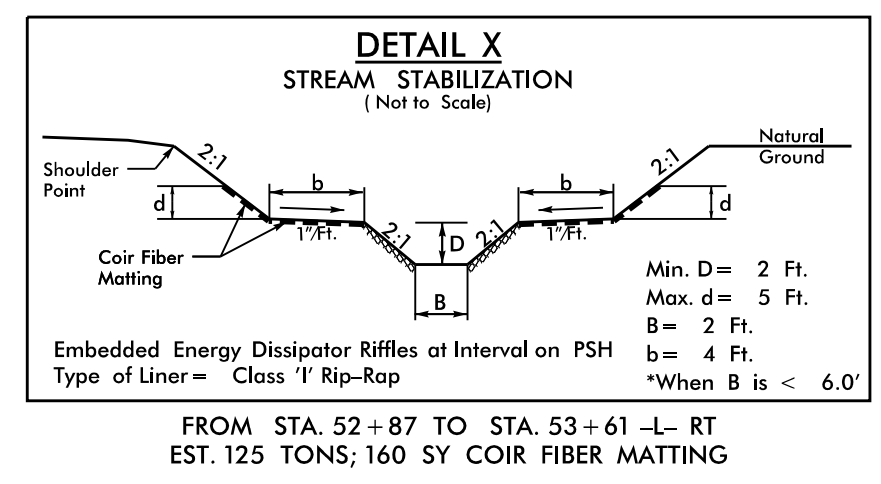
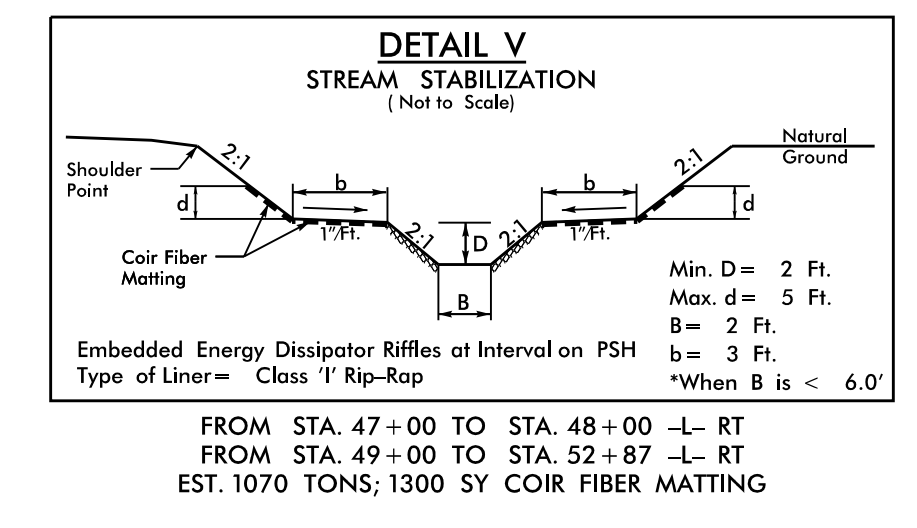
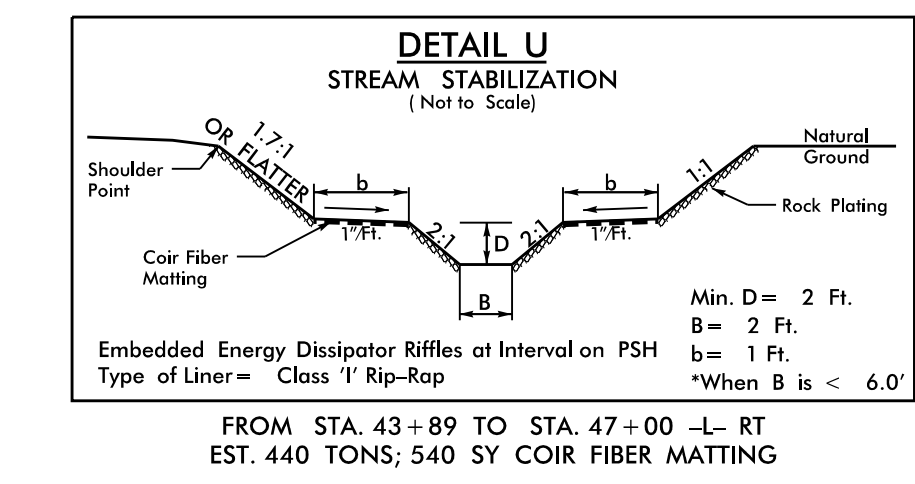
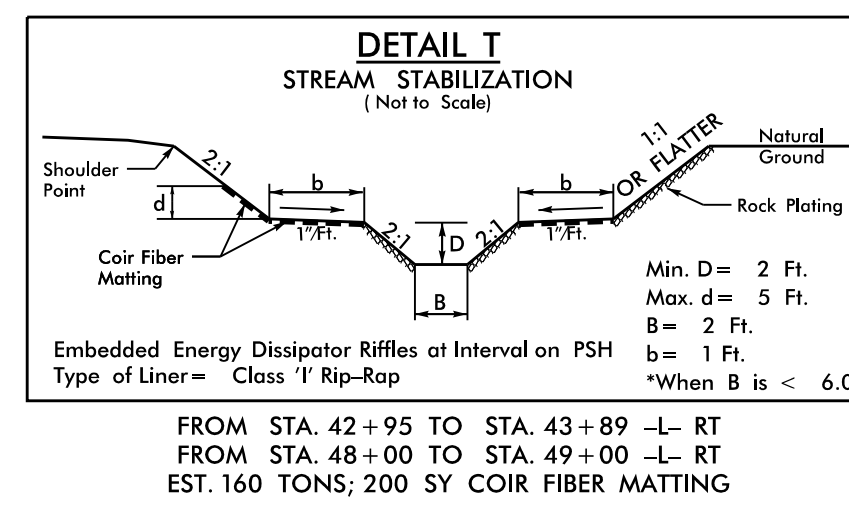
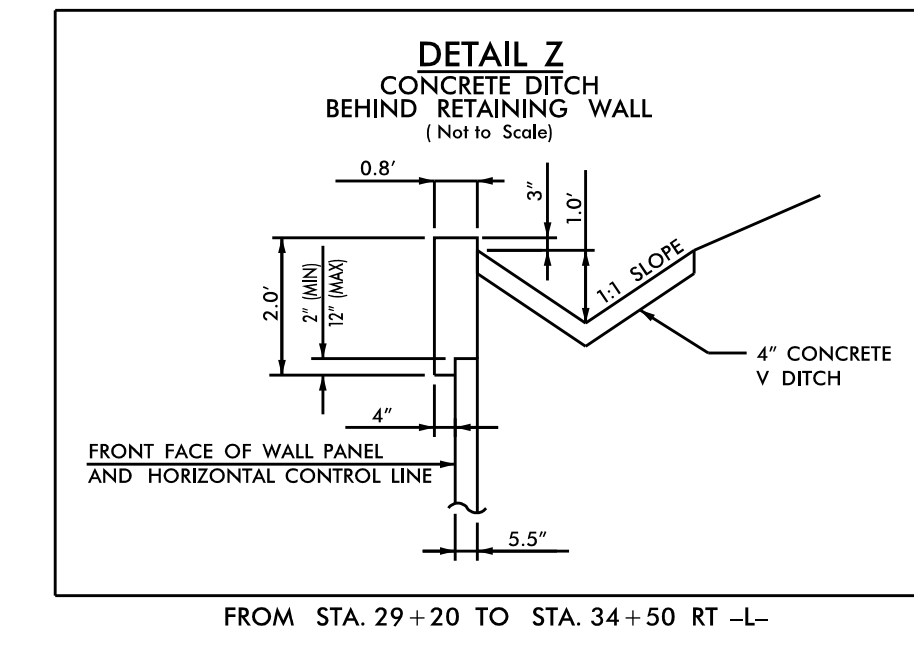
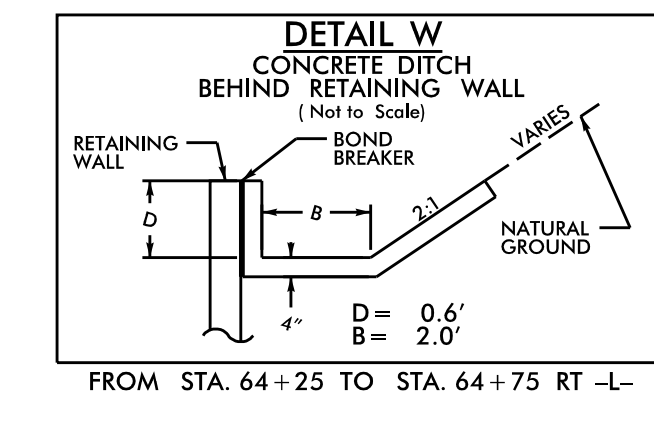
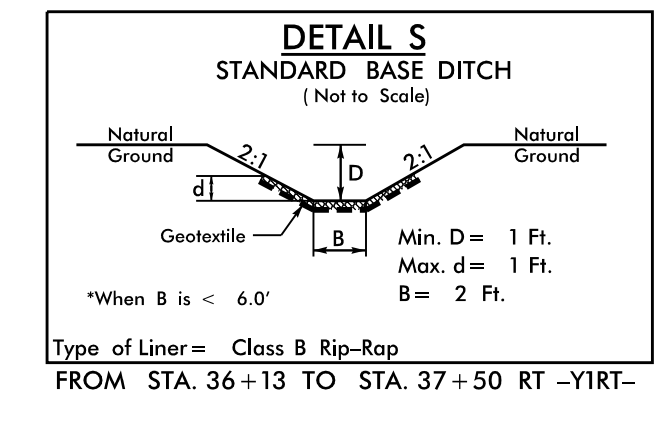
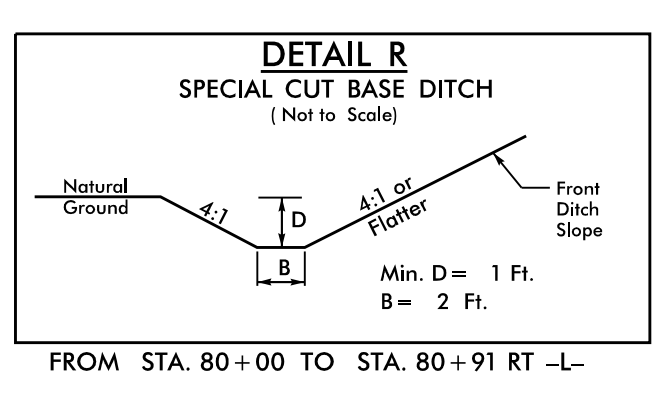
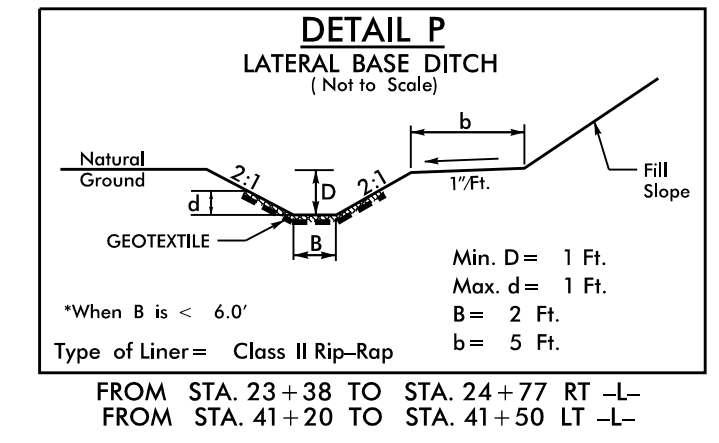
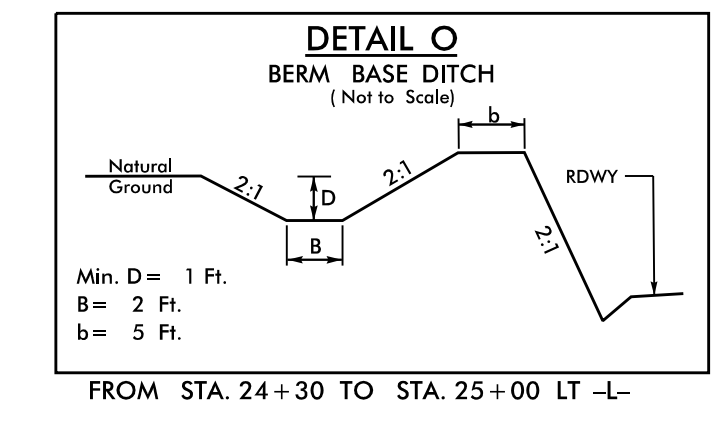
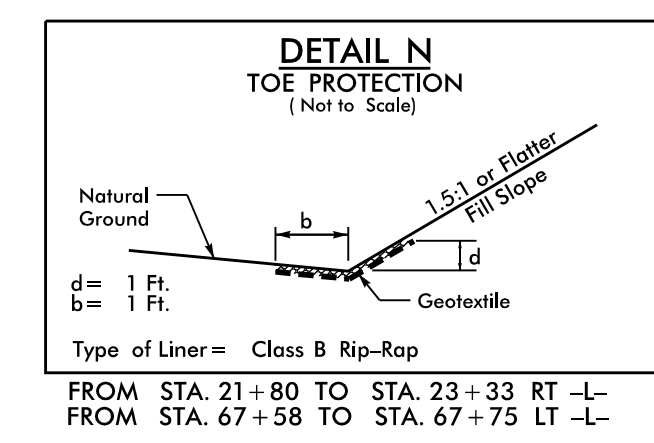
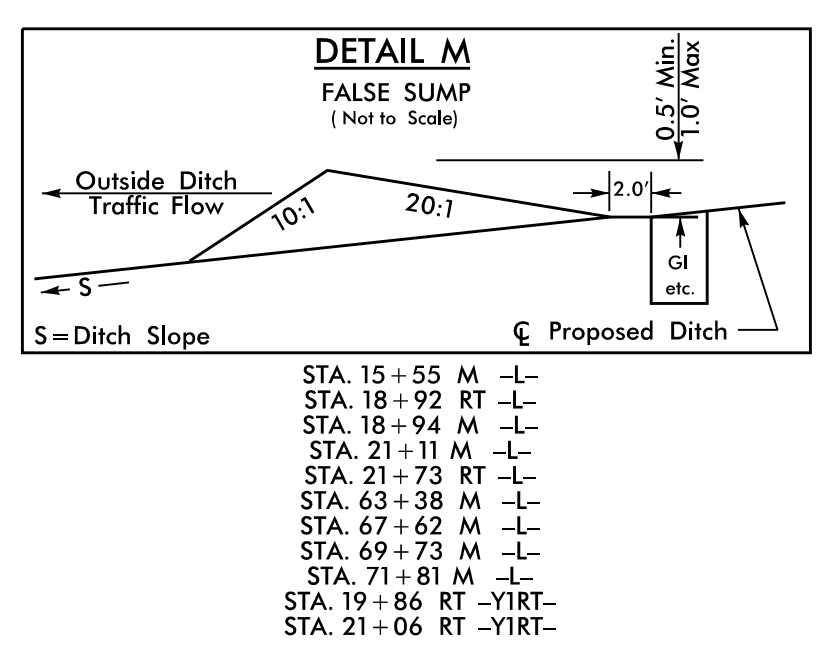
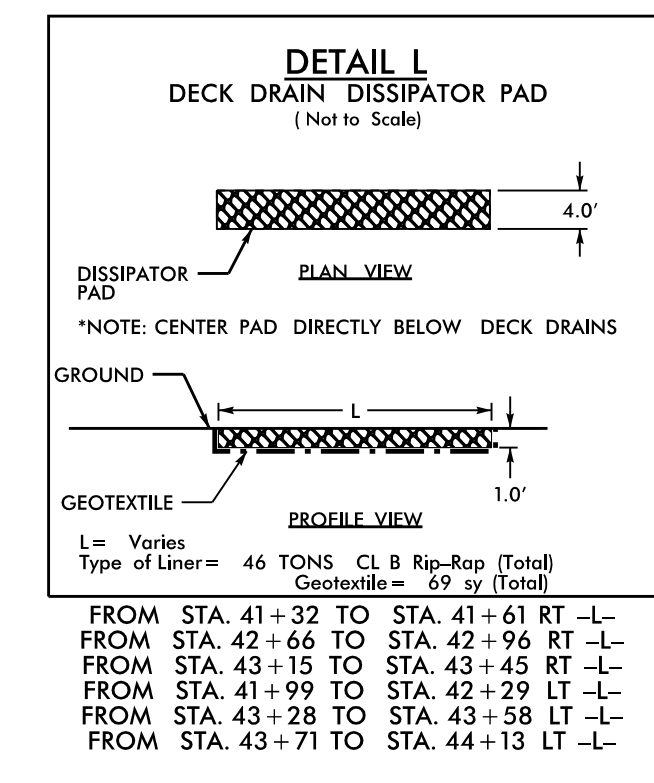
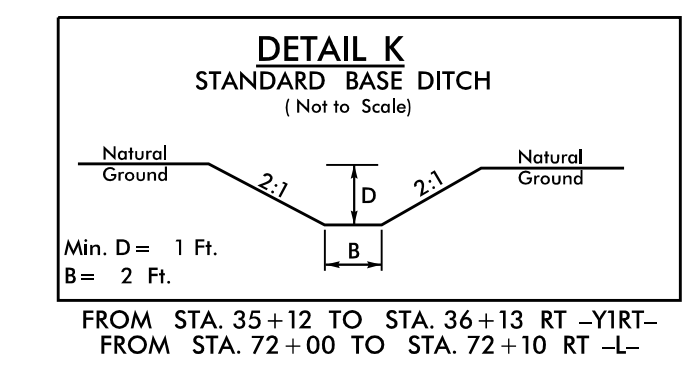
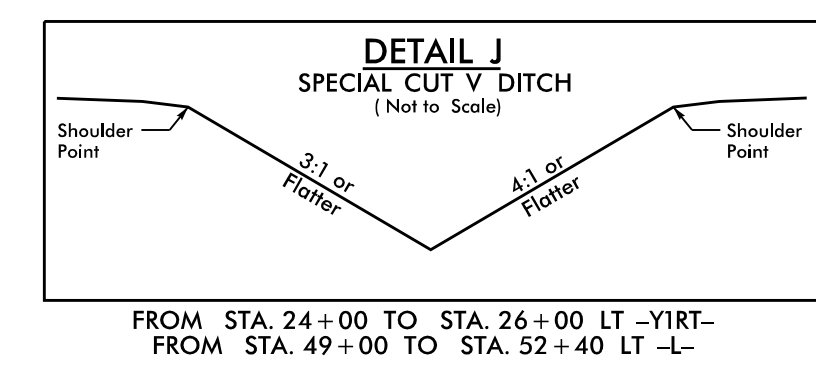
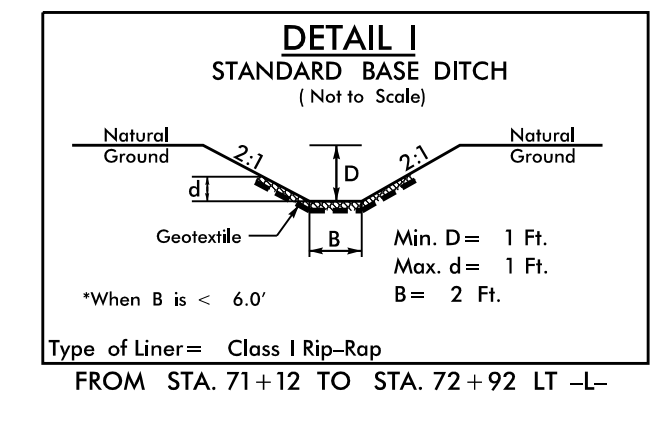
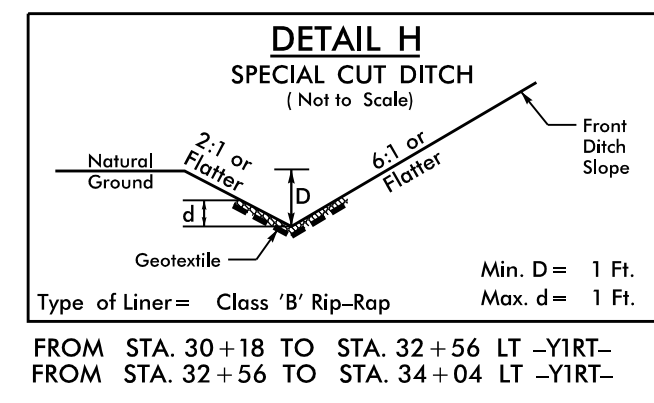
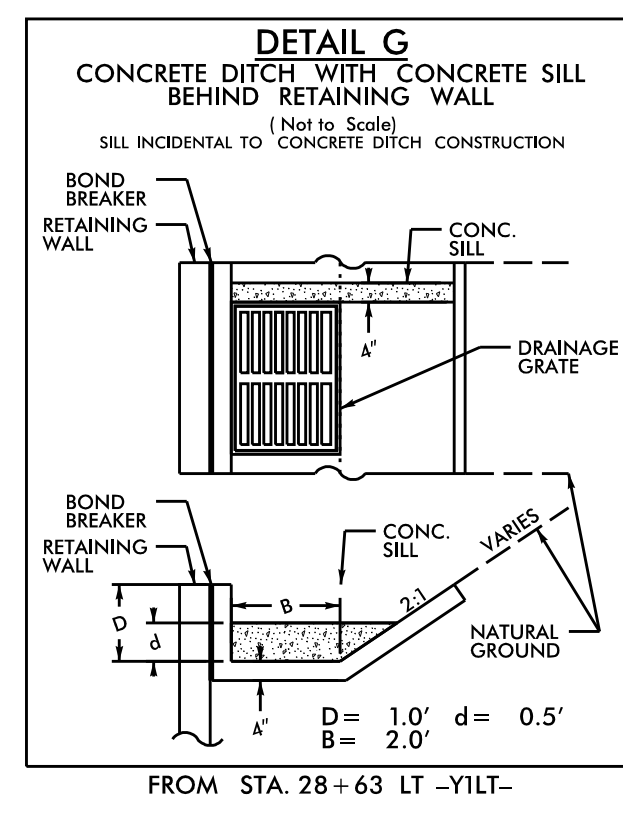
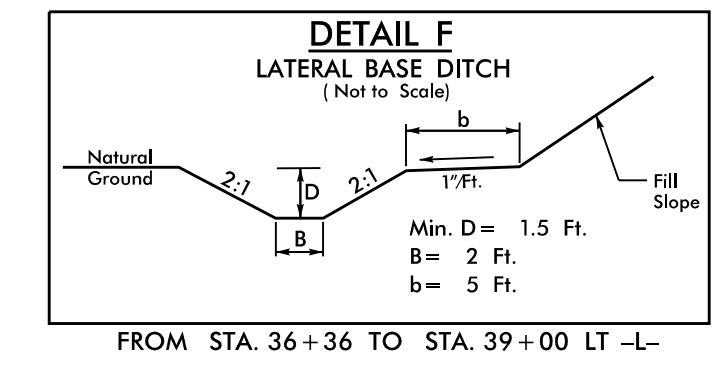
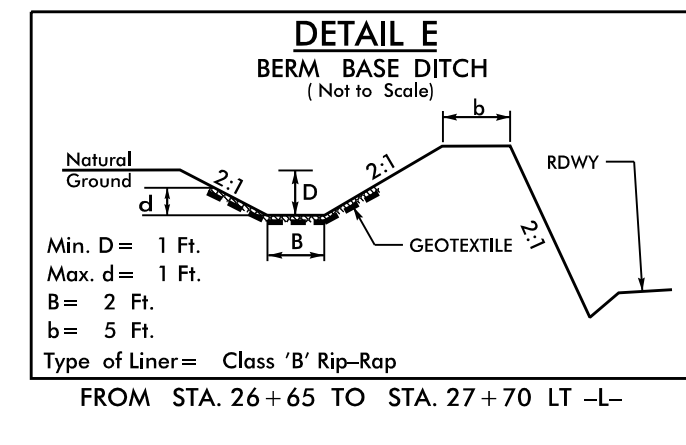
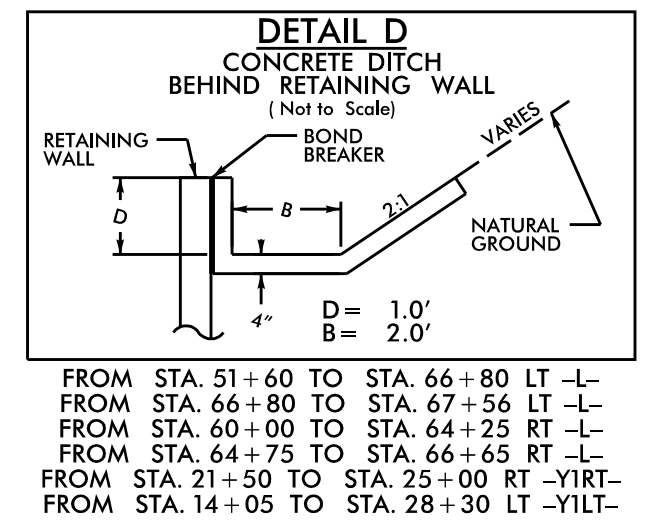
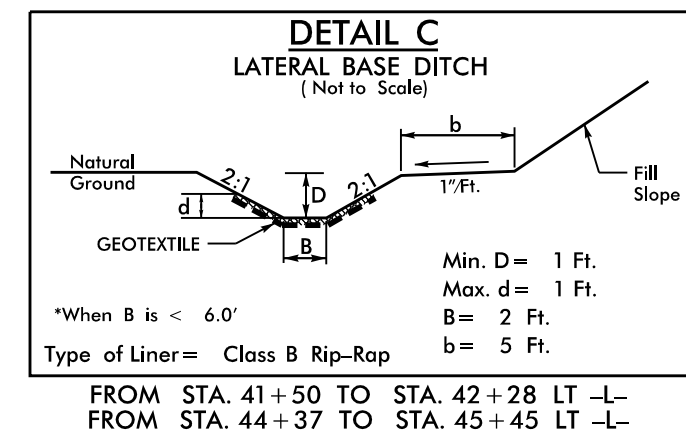
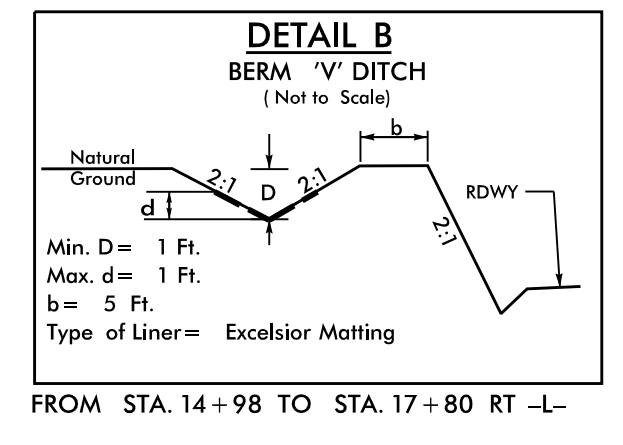
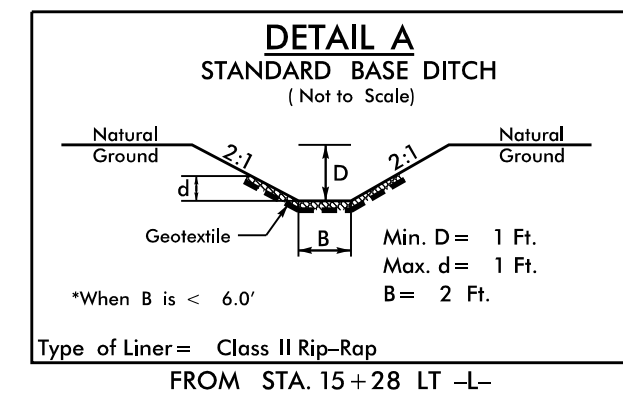
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 MODIFIED BY: DATE: _____
 CHECKED BY: DATE: _____
 FILE SPEC.: 2018 standard drawings\division 422d10.dgn

B-17/99

PROJECT REFERENCE NO. B-3186 / B-5898	SHEET NO. 2D-1
HYDRAULICS ENGINEER	
	
3/17/2022	

HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

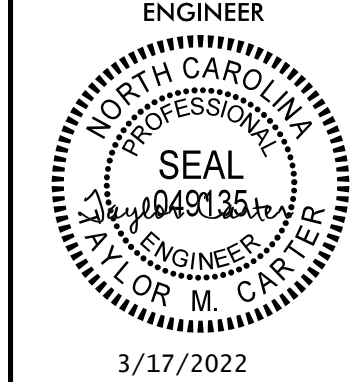



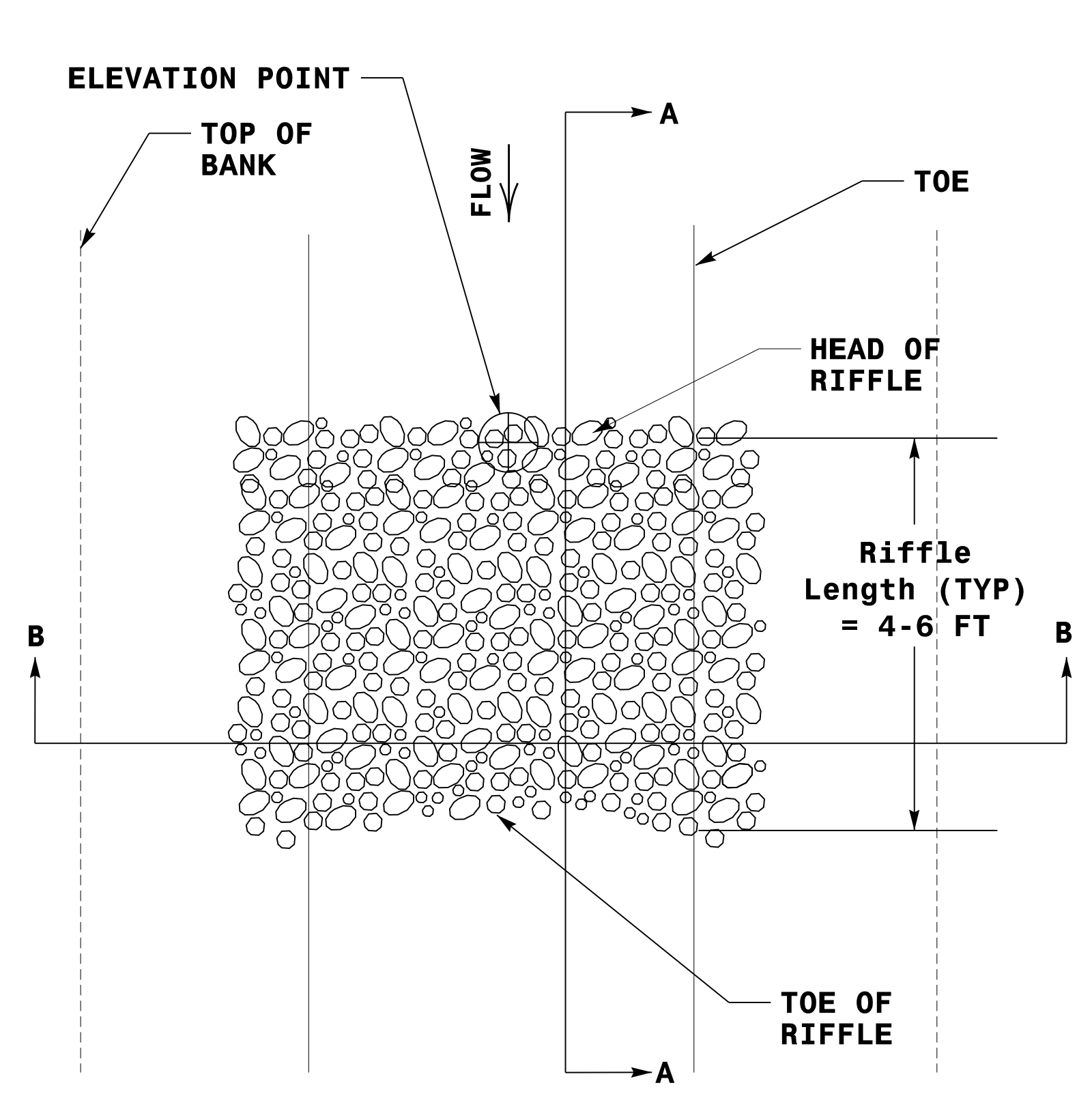
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REVISIONS

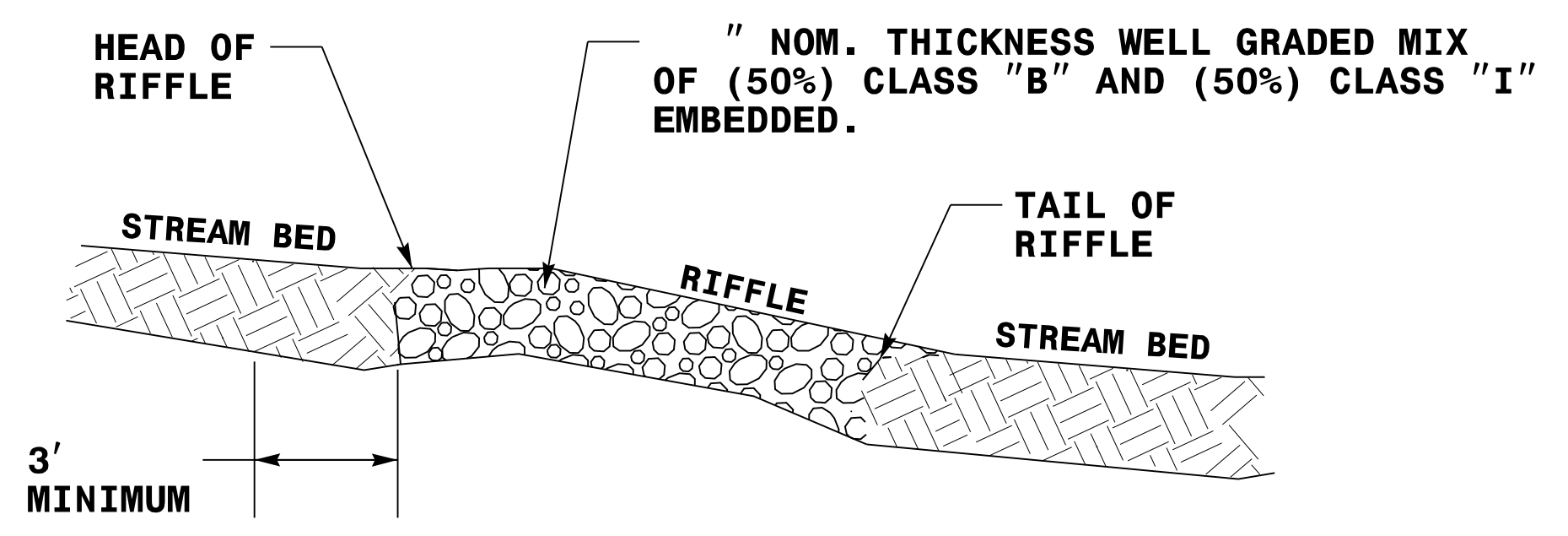
8/17/99

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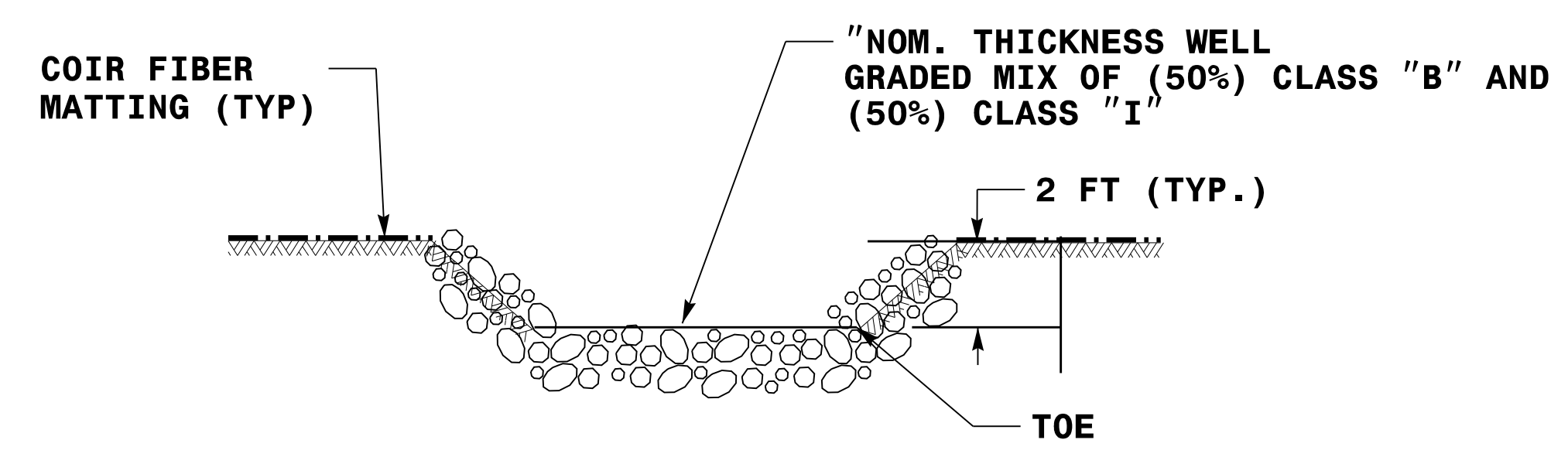
PROJECT REFERENCE NO. B-3186 / B-5898	SHEET NO. 2D-2
HYDRAULICS ENGINEER  3/17/2022	
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PLAN VIEW



SECTION A-A



SECTION B-B

STATION	ELEVATION
43+32 RT -L-	2566.3 FT
44+12 RT -L-	2567.8 FT
44+45 RT -L-	2568.0 FT
44+95 RT -L-	2568.5 FT
45+45 RT -L-	2569.3 FT
46+45 RT -L-	2570.6 FT
47+45 RT -L-	2571.8 FT
48+45 RT -L-	2572.8 FT
49+45 RT -L-	2573.9 FT
50+43 RT -L-	2574.3 FT
50+95 RT -L-	2575.3 FT
51+45 RT -L-	2576.6 FT
51+95 RT -L-	2578.0 FT
52+45 RT -L-	2579.5 FT
52+45 RT -L-	2580.9 FT
53+90 RT -L-	2584.6 FT
54+11 RT -L-	2585.6 FT
54+34 RT -L-	2586.9 FT

QUANTITY ESTIMATE PER E.R.R.
 EST. 5 TONS CLASS B RIP RAP
 EST. 5 TONS CLASS I RIP RAP

NOTE
 SEE TABLE FOR ELEVATION POINT DATA
 PER STRUCTURE ON PLANS
 EACH STRUCTURE EMBEDDED IN ORDER TO NOT
 IMPEDE AQUATIC ORGANISM PASSAGE
 OPTION FOR INCLUDING LIVE STAKES ON FLOODPLAIN
 BENCHES. SEE STREAMBANK REFORESTATION DETAIL.
 NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE
 ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3186 / B-5898	2G-2

GEOTECHNICAL ENGINEER

Kenneth R. Bussey, Jr.
SIGNATURE

3/17/2022
DATE

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N.C.B.E.L.S. License Number: F-0116

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	900	500	1200	900	1800	1200
1.5:1 TO 1.75:1 (H:V) RSS	500	500	900	500	1400	1000
> 1.75:1 TO < 2:1 (H:V) RSS	500	500	600	500	1000	800

**MINIMUM REQUIRED PRIMARY GEOGRID
LONG-TERM DESIGN STRENGTH (LTDS, LB/FT) IN MACHINE DIRECTION (MD)**
(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID.
SEE NOTE 8 FOR LESS THAN 100% COVERAGE.)

NOTES:

- SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.
- FOR STANDARD REINFORCED SOIL SLOPES, SEE REINFORCED SOIL SLOPES PROVISION FOR STEEL BEAM GUARDRAIL, SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.
- FOR SHOULDER AND SLOPE BORROW, SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR GEOCELLS, SEE CELLULAR CONFINEMENT SYSTEMS PROVISION. FOR COIR FIBER MAT, MATTING FOR EROSION CONTROL AND COMPOST BLANKET, SEE EROSION CONTROL PROVISIONS, SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO. 1631.01.
- STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD RSS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER OR FLOOD ELEVATION IS ABOVE TOE OF RSS.
- DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.
- PRIMARY GEOGRIDS ARE APPROVED FOR LTDS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Products.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SELECT MATERIAL AS FOLLOWS:

MATERIAL TYPE	SELECT MATERIAL
BORROW	CLASS I SELECT MATERIAL
FINE AGGREGATE	CLASS II OR III SELECT MATERIAL

- FOR PRIMARY GEOGRIDS WITH 100% COVERAGE, PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,
 $MINIMUM\ REQUIRED\ PRIMARY\ GEOGRID\ LTDS = LTDS\ BASED\ ON\ 100\% \ COVERAGE \times (W + S) / W$
SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE, STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.
- DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.
- FOR SLOPE EROSION CONTROL, USE GEOCELLS OR MATTING ON SLOPE FACES OF RSS AS FOLLOWS:

RSS ANGLE	SLOPE EROSION CONTROL
1:1 TO < 1.5:1 (H:V)	GEOCELLS WITH COMPOST BLANKET
1.5:1 TO < 2:1 (H:V)	GEOCELLS WITH COMPOST BLANKET OR COIR FIBER MAT WITH SHOULDER AND SLOPE BORROW*
2:1 (H:V) OR FLATTER	MATTING FOR EROSION CONTROL WITH SHOULDER AND SLOPE BORROW

*SEE REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL SUMMARY TABLE IN THE ROADWAY SUMMARY SHEETS FOR SLOPE EROSION CONTROL ON SLOPE FACES OF RSS 1.5:1 (H:V) TO STEEPER THAN 2:1.

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	1.25	1.20	1.15	1.10	1.10	1.00
1.5:1 TO 1.75:1 (H:V) RSS	1.10	1.00	0.95	0.90	0.90	0.85
> 1.75:1 TO < 2:1 (H:V) RSS	1.00	0.85	0.80	0.75	0.75	0.70

PRIMARY GEOGRID LENGTH / RSS HEIGHT (L / H) RATIO (L > 6' MIN)
(IF L ≤ 6', USE SECONDARY GEOGRID INSTEAD OF PRIMARY GEOGRID.)

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 USER: HBARE
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 PENTABLE: NCDOT_pshp.plt.tdi
 TIME: 9:20:00 AM
 DATE: 2/9/2022

REVISIONS

GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT						SURCHARGE CASE WITH TRAFFIC IMPACT					
		SHEET PILES		H-PILES WITH TIMBER LAGGING				SHEET PILES		H-PILES WITH TIMBER LAGGING			
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN ³ /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN ³ /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)				
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73		
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0		
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5		
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5		
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0		
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5		
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0		
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5		
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5		
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5		
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5		
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5		
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5		
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5		
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5		

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "---".**

NOTES:

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
- SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.

PROJECT REFERENCE NO. SHEET NO.
B-3186 / B-5898 2G-3

GEOTECHNICAL ENGINEER

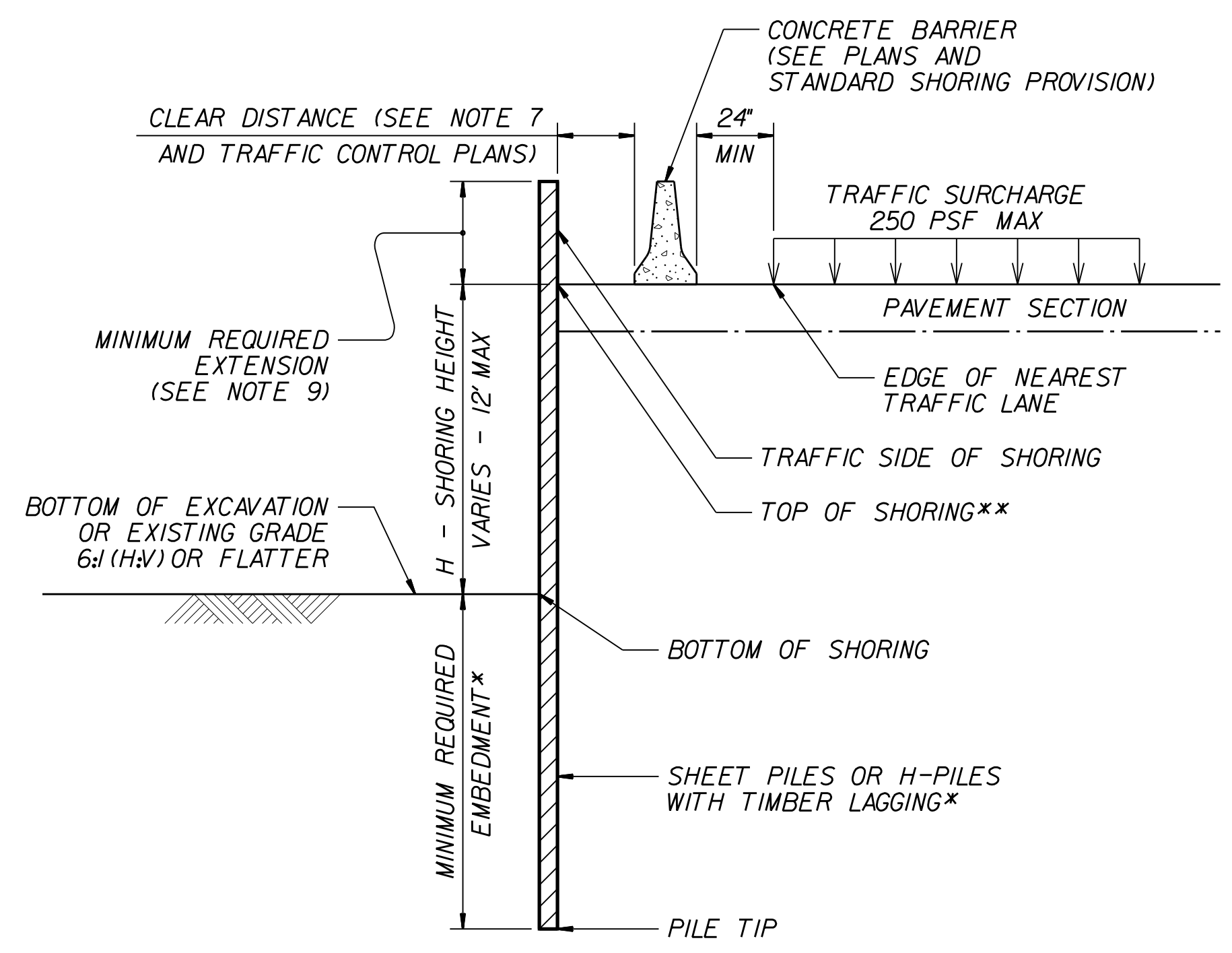
SEAL 038206

KENNETH R. BUSSEY JR.
ENGINEER

Signature: Kenneth R. Bussey, Jr. DATE: 3/31/2022

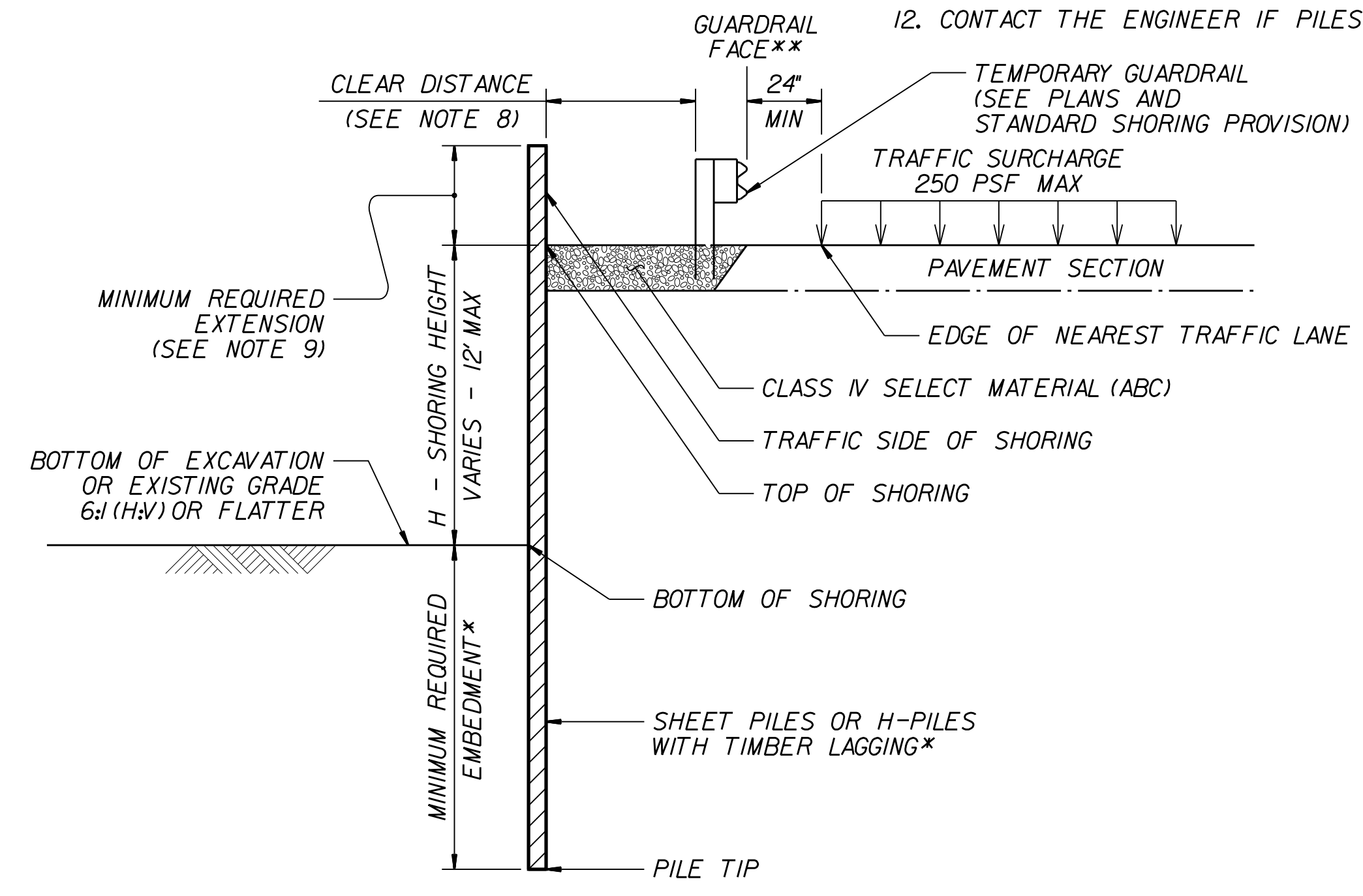
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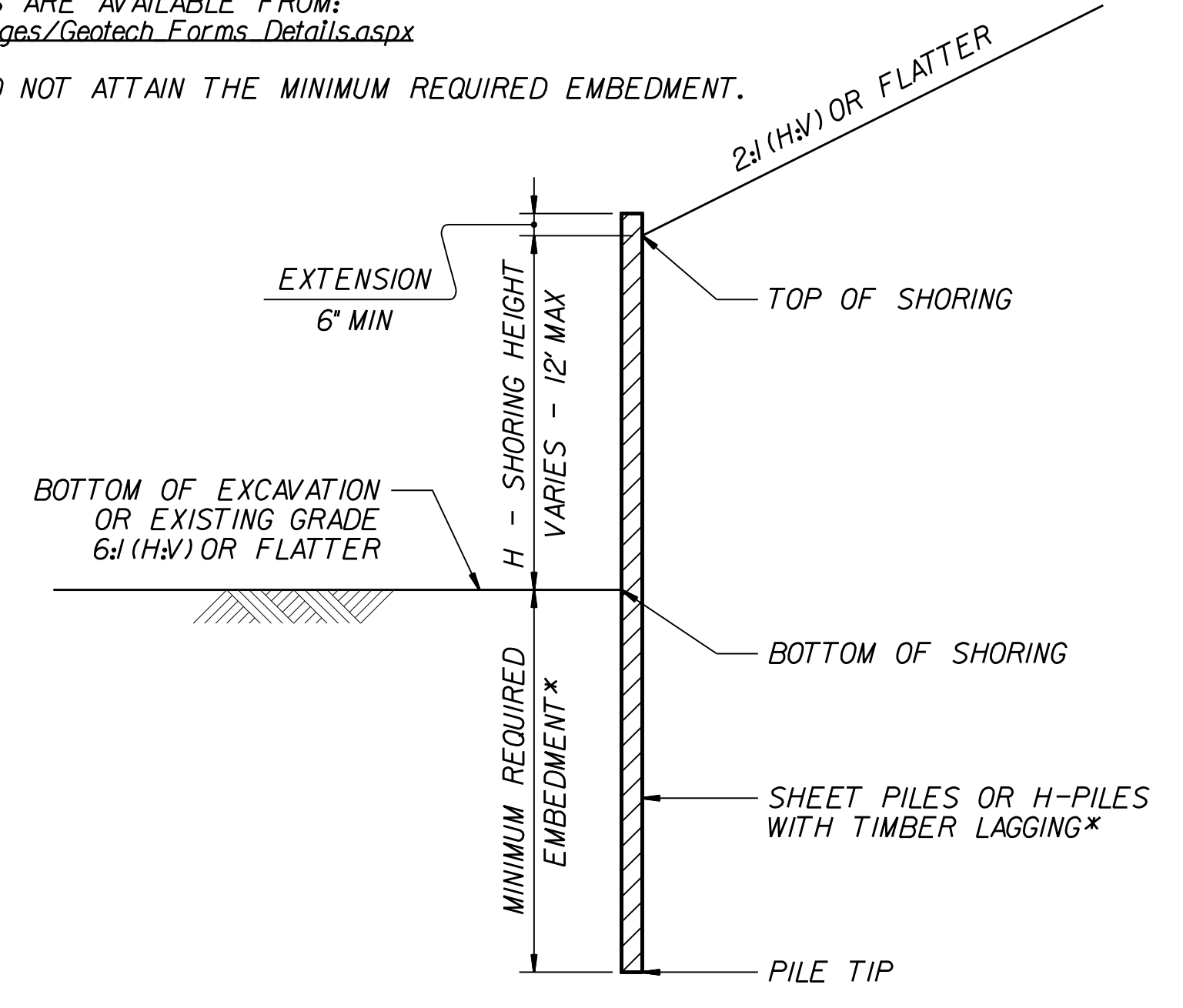


CONCRETE BARRIER
**TOP OF SHORING = EDGE OF PAVEMENT

STANDARD TEMPORARY SHORING (SURCHARGE CASE)
*SEE TABLE ABOVE.



TEMPORARY GUARDRAIL
**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING (SLOPE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

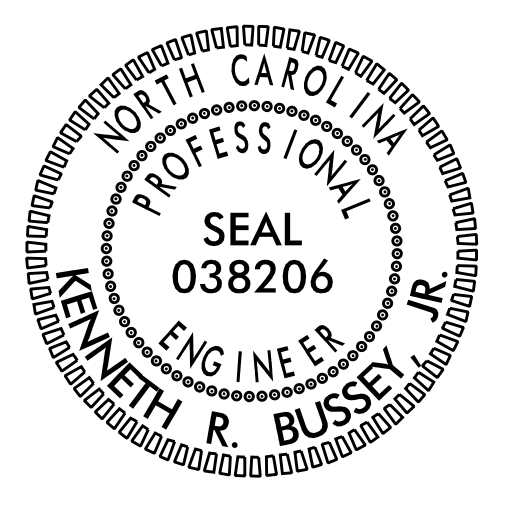
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DATE: 3/31/2022

REVISIONS


GEO TECHNICAL ENGINEER

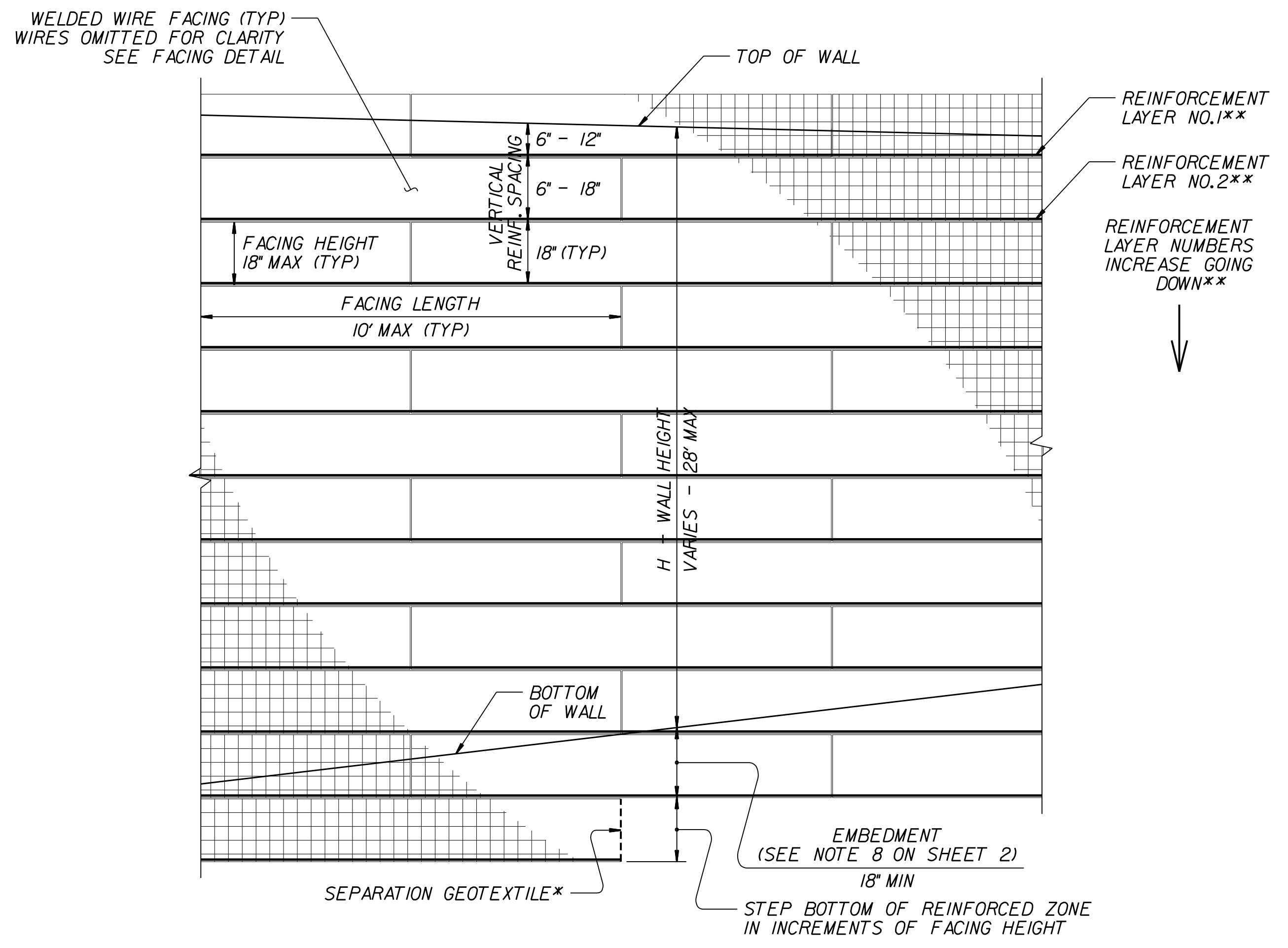
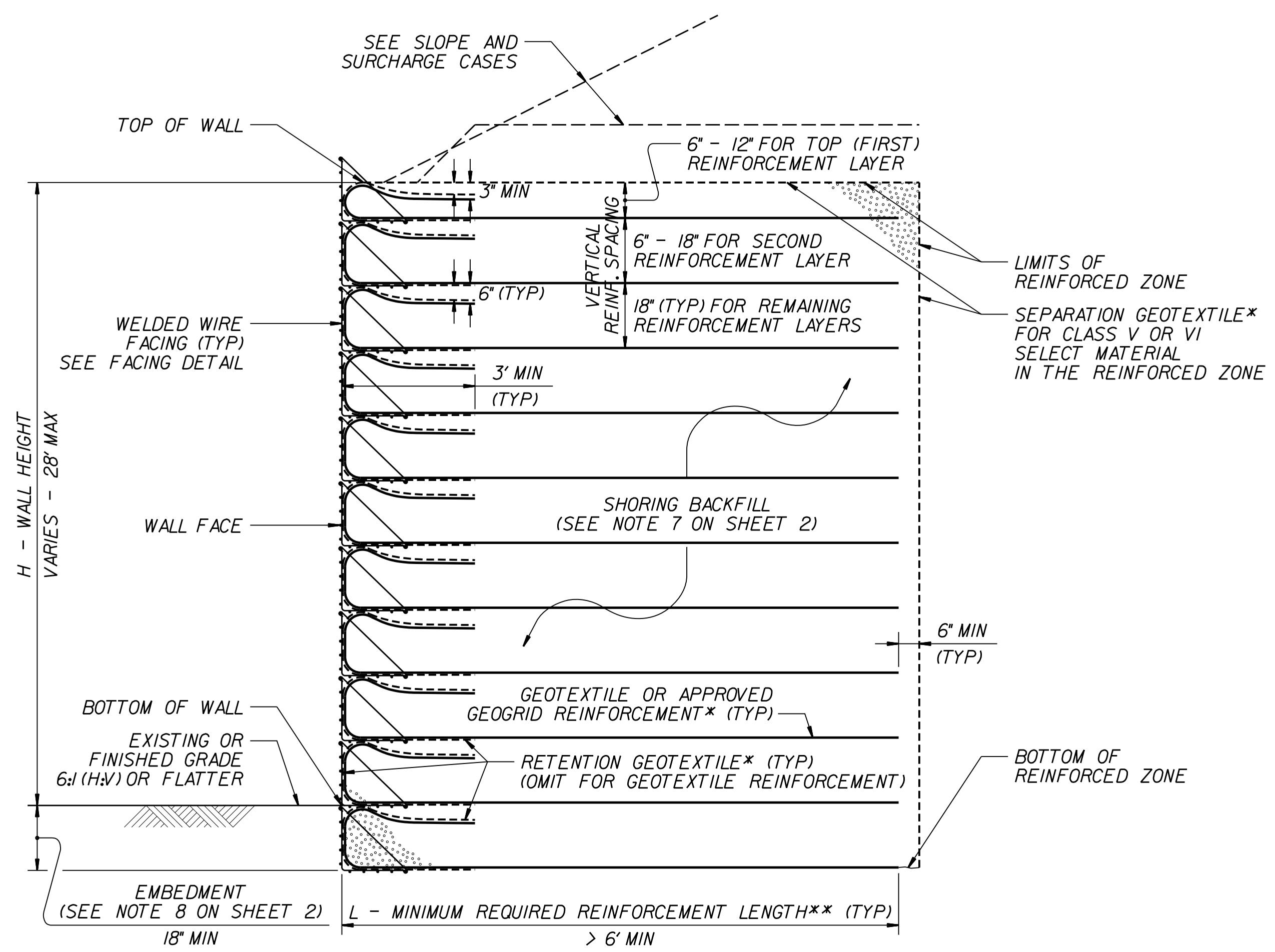
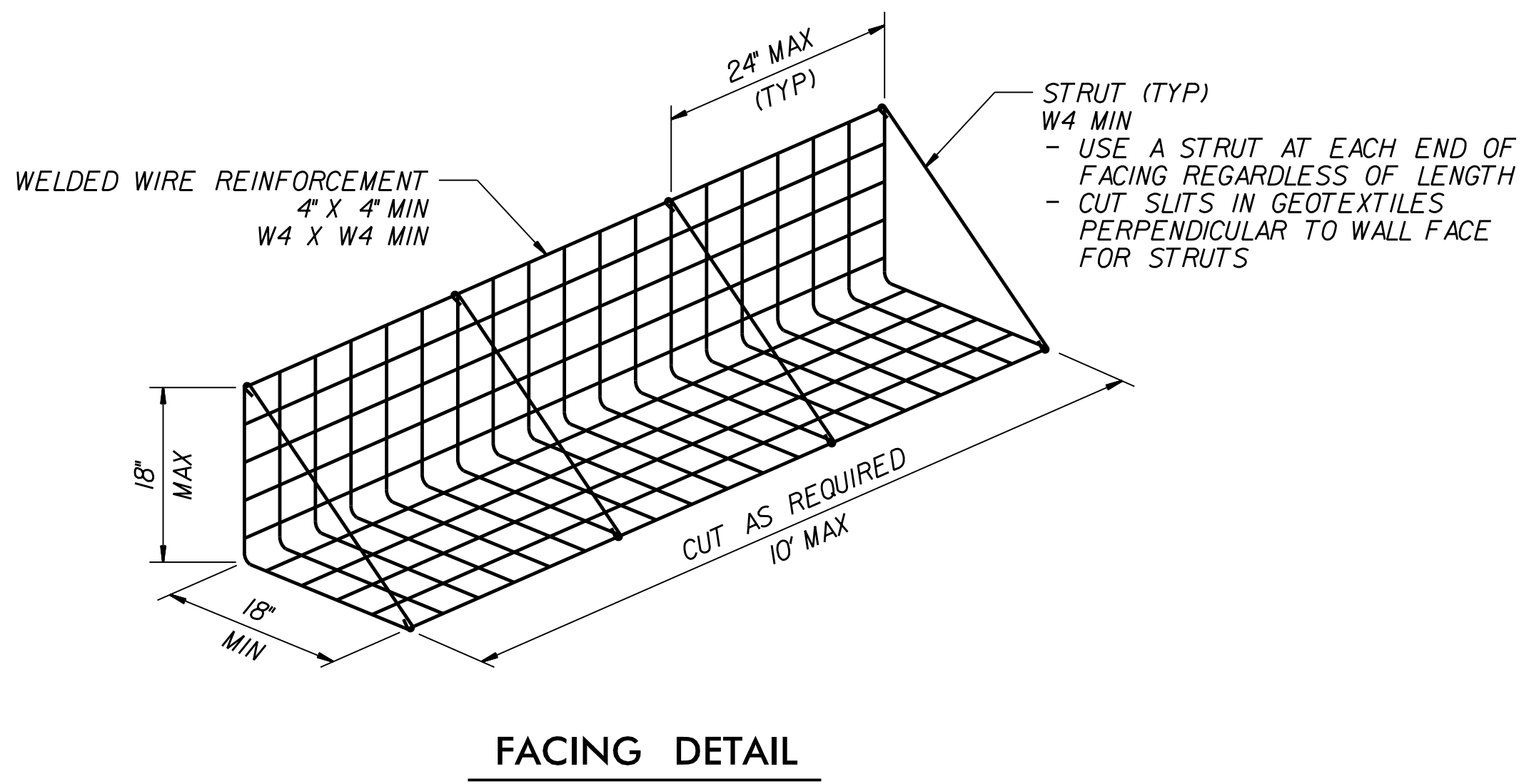
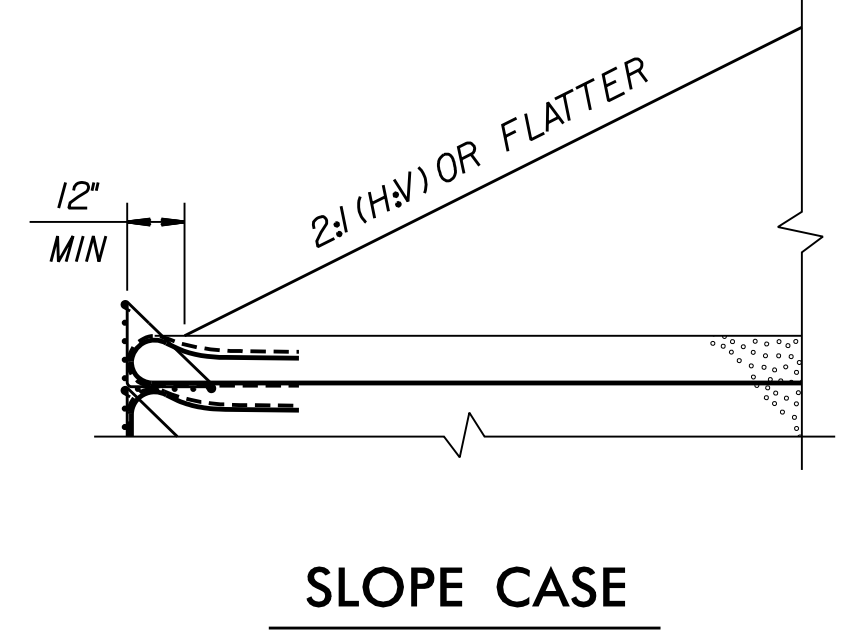
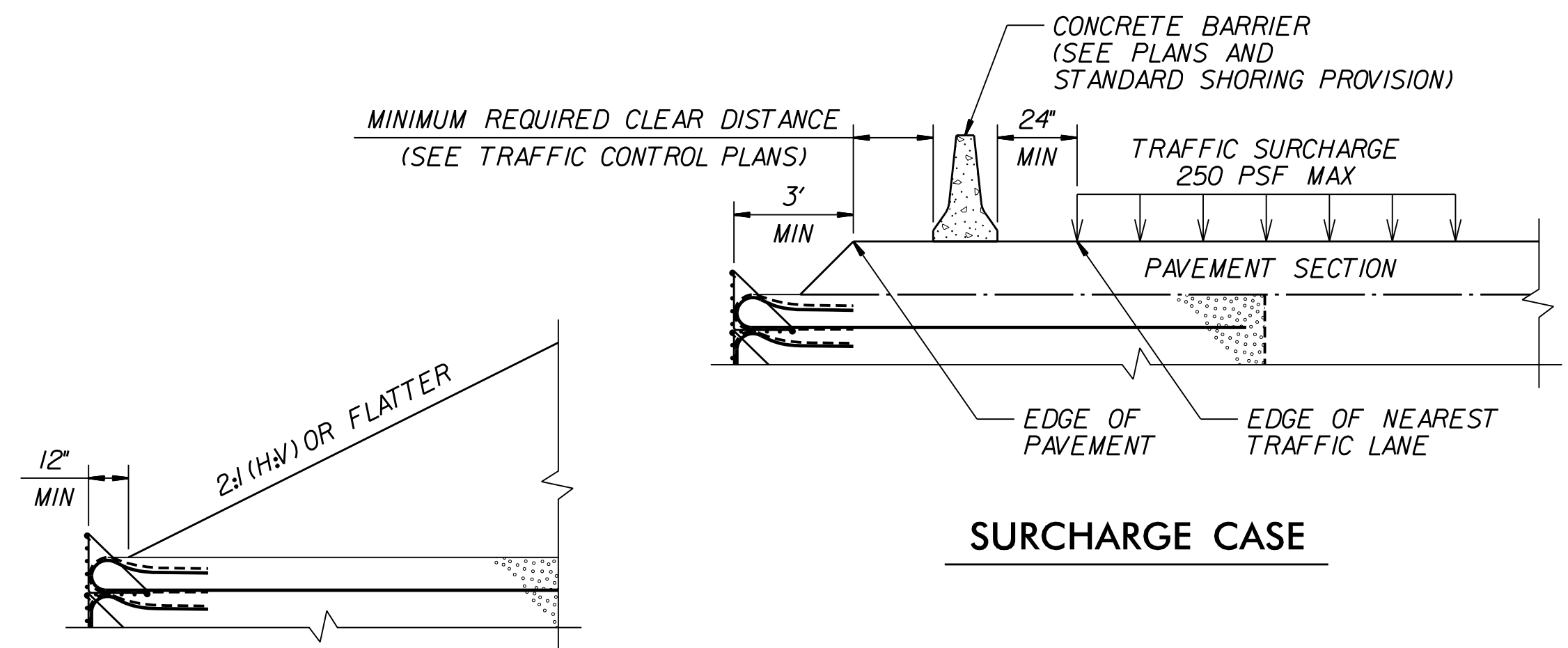


SEAL 038206
ENGINEER
KENNETH R. BUSSEY, JR.

Kenneth R. Bussey, Jr. 3/31/2022
SIGNATURE DATE

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N.C.B.E.L.S. License Number: F-0116

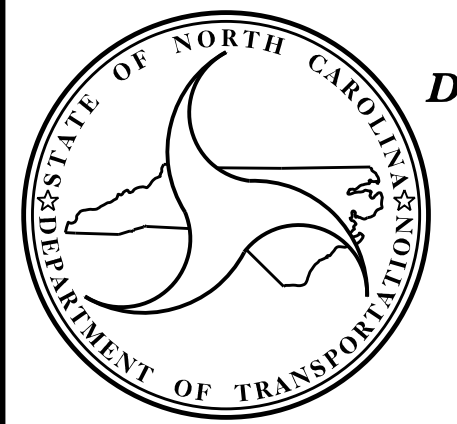


STANDARD TEMPORARY WALL
(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

STANDARD TEMPORARY WALL - PARTIAL ELEVATION
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

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 USER: ASNIDER
 FILE: \

REVISIONS



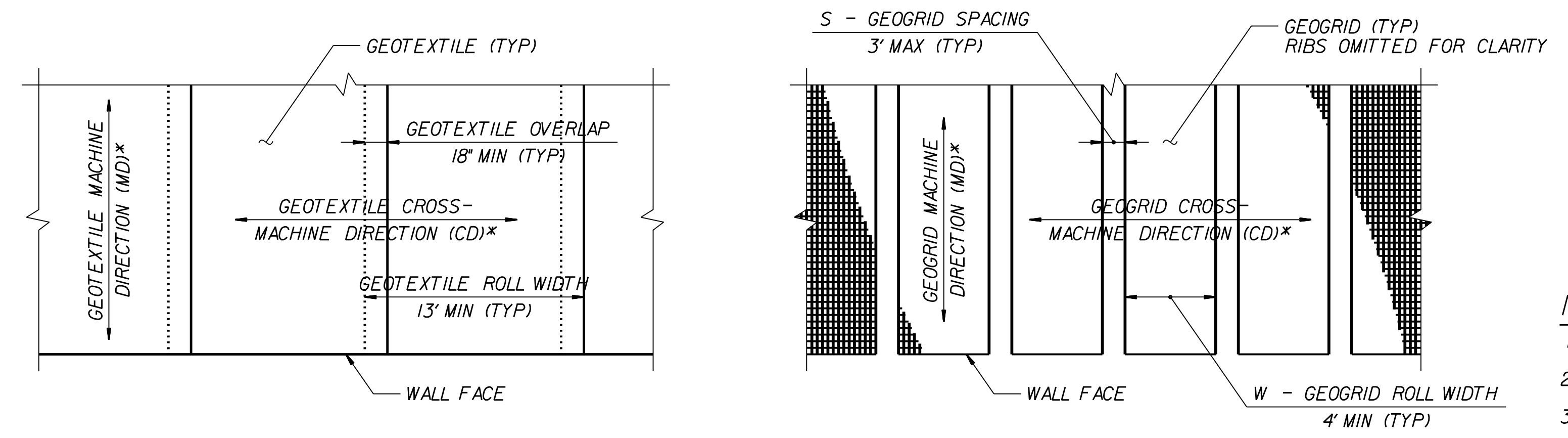
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEO TECHNICAL ENGINEERING UNIT

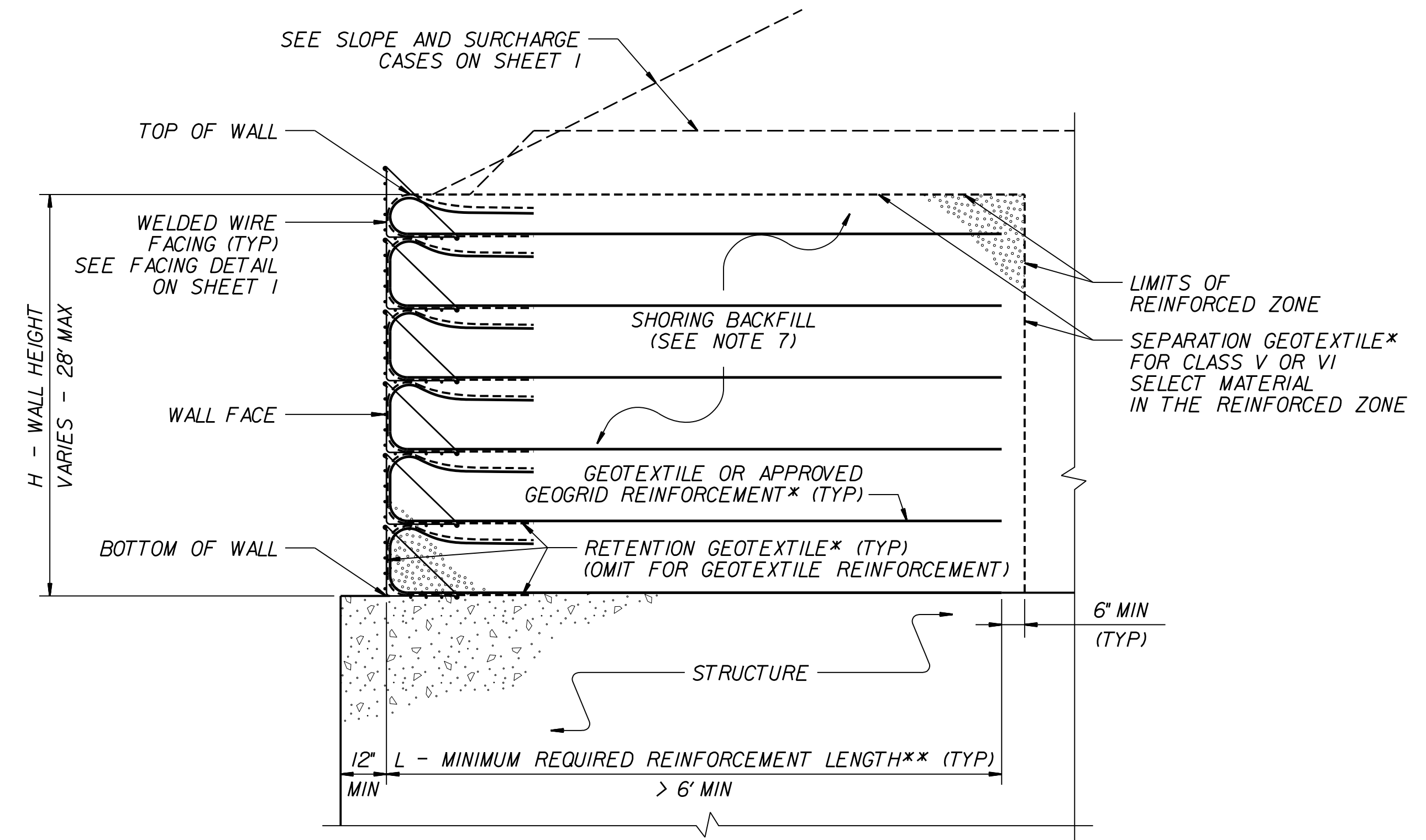
STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL
SHEET 1 OF 3

DATE: 11-19-13



GEOSYNTHETIC PLACEMENT DETAILS
 (PLAN VIEW)
 *SEE NOTE 12.



NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 UNIT WEIGHT, $\gamma = 120$ PCF
 FRICTION ANGLE, $\phi = 30$ DEGREES
 COHESION, $c = 0$ PSF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Manual.aspx
 DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
 12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
 - W (REINFORCEMENT ROLL WIDTH) \geq (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
 - REINFORCEMENT STRENGTH IN CD \geq MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
 13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
 14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
 15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
 16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
 17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
 18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
 19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

GEOTECHNICAL ENGINEER

Kenneth R. Bussey, Jr.
 SIGNATURE DATE 3/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL
 SHEET 2 OF 3

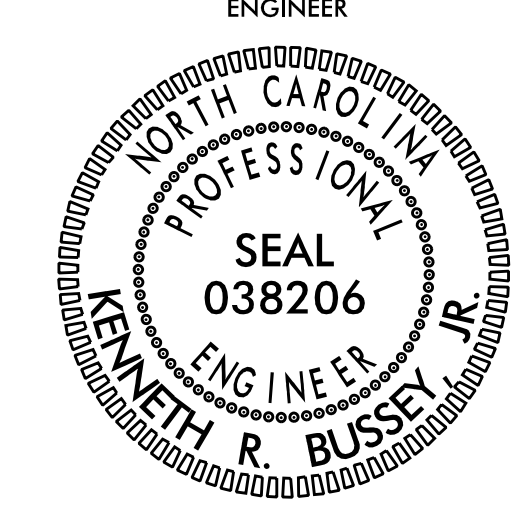
DATE: 11-19-13

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 USER: ASNIDER
 FILE: \

PENTABLE: B-3186 B-5898 NCDOT_pshpfl.tbl
 TIME: 2:43:05 PM
 DATE: 3/31/2022

REVISIONS

GEOTECHNICAL ENGINEER



Kenneth R. Bussey, Jr.
SIGNATURE DATE 3/31/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900, Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
		A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)
(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

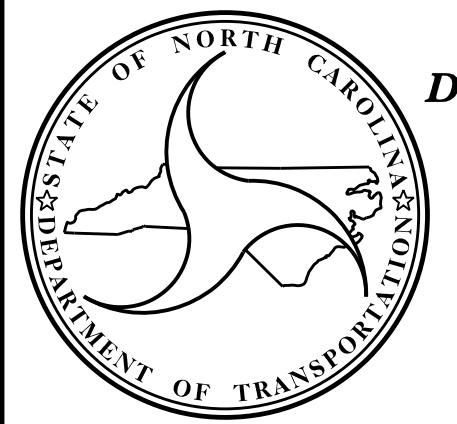
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT-TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
 USER: ASNIDER
 FILE: \

REVISIONS

PENTABLE: B-3186 B-5898 NCDOT_pshpfi.tbl
 TIME: 2:43:05 PM

DATE: 3/31/2022

COMPUTED BY: ADS DATE: 1/24/2022

PROJECT NUMBER

B-5898

SHEET NUMBER

3B-2

RD.

Note: Detour cross sections were run on original ground. L Line cross sections were re-cut with the detours in place.

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

CHAIN	BEGINNING STATION	ENDING STATION	UNCL. EXCA. C.Y.	UNDERCUT C.Y.	EMBANK. +% C.Y.	BORROW C.Y.	WASTE C.Y.
SUMMARY 1							
-L (DET01_PH1_RUN)-	46+00.00	56+50.00	348		7,890	7,542	
SUBTOTAL			348		7,890	7,542	
SUMMARY 2							
-L (DET01_EB)-	46+11.55	56+23.28	465		57,997	57,532	
-L (DET01_EB-Y1RT)-	56+23.28	66+69.92	395		15,485	15,090	
-L (DET01_WB)-	46+11.55	61+48.17	3,019		1,766		1,253
-L (DET01_Y1RT)-	49+41.83	55+54.86	1,507		5		1,502
-L (L_RT)-	61+48.14	67+71.14	797		649		148
-L (DET01_EB_EXT)-	66+69.92	67+42.04	43		251	208	
SUBTOTAL			6,226		76,152	72,829	2,903
SUMMARY 3							
-L (DET01_EB)-	69+45.10	76+69.75	816		5		811
-L (DET01_WB)-	71+28.99	76+69.75	537		39		498
SUBTOTAL			1,353		44		1,309
SUMMARY 4							
-L (Y1LTXRP)-	63+01.54	67+49.55	292		5		287
SUBTOTAL			292		5		287
SUMMARY 5							
-L (L_LT)-	46+11.55	67+93.53	28,597		4,787		23,810
-L (L_LT-Y1LT)-	49+00.00	52+65.26	6,086		219		5,868
SUBTOTAL			34,683		5,006		29,677
SUMMARY 6							
-L (L_LT)-	69+52.65	80+69.89	3,073		1,442		1,631
SUBTOTAL			3,073		1,442		1,631
SUMMARY 7							
-Y1RT-	13+20.00	17+00.00	362		21		341
-Y1RT (Y1LT)-	13+19.56	17+00.00	632		25		607
SUBTOTAL			994		46		948
SUMMARY 8							
-Y1RT-	17+00.00	26+00.46	104		38,057	37,953	
-Y1RT (Y1LT)-	17+00.00	26+00.46	995		9,216	8,221	
SUBTOTAL			1,099		47,273	46,174	
SUMMARY 9							
-L (L_RT-Y1RT)-	52+43.00	56+23.28	8,866		2,108		6,758
-L (L_RT-Y1RT)-	56+23.28	61+13.87	913		48		865
SUBTOTAL			9,779		2,156		7,623
SUMMARY 10							
-L (Y1RTXRP)-	55+22.36	62+05.36	91		1,563	1,472	
-L (Y1RTXRP-L LT)-	62+05.36	67+75.97	83		383	300	
SUBTOTAL			174		1,946	1,772	
SUMMARY 11							
-L (L_RT)-	46+11.55	61+48.14	36,113		12,128		23,985
-L (L_RT)-	61+48.14	67+83.05	344				344
SUBTOTAL			36,457		12,128		24,329

CHAIN	BEGINNING STATION	ENDING STATION	UNCL. EXCA. C.Y.	UNDERCUT C.Y.	EMBANK. +% C.Y.	BORROW C.Y.	WASTE C.Y.
SUMMARY 12							
-L (DET02_WB_X2)-	72+04.86	80+56.61	726		170		556
-L (L_RT)-	69+57.30	81+35.95	2,074		206		1,868
SUBTOTAL			2,800		376		2,424
SHEET TOTALS			97,278		154,463	128,317	71,132
LOSS DUE TO CLEARING AND GRUBBING			-5,100			5,100	
MATERIAL FOR SHOULDER CONSTRUCTION					3,007	3,007	
UNSUITABLE WASTE (PER GEOTECH)					575	575	500
EARTH WASTE IN LIEU OF BORROW						-59,330	-59,330
PROJECT TOTAL			92,178		158,046	77,670	12,302
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT						3,883	
GRAND TOTAL			92,178			81,553	
SAY			92,200			81,600	
DRAINAGE DITCH EXCAVATION			1,700	CY			
SHALLOW UNDERCUT CONTINGENCY			10,233	CY			
GEOTEXTILE FOR SOIL STABILIZATION (RDY)			61,100	SY			
GEOTEXTILE FOR SOIL STABILIZATION (EC)			100	SY			
CLASS IV SUBGRADE STABILIZATION			43,163	TONS			

**STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS**

**B-3186
 PAVEMENT REMOVAL SUMMARY
 IN SQUARE YARDS**

LINE	Station	Station	Location LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP
-LRT-	33+50	34+50	RT	481.56	
-LRT-	34+50	41+75	RT		2782.78
-LLT-	33+80	35+00	LT	476.56	
-LLT-	34+50	41+80	LT		2801.89
-LRT-	43+75	46+28	RT		964.44
-LLT-	43+75	45+20	LT		479.44
-LLT-	45+20	46+02	LT	340.56	
-DET01EB-	34+58	35+00	RT		111.11
-DET01EB-	35+00	41+03	RT	2923.44	
-DET01EB-	44+04	46+60	RT	1272	
TOTAL				5494.11	7139.67
SAY				5500	7140

**B-5898
 PAVEMENT REMOVAL SUMMARY
 IN SQUARE YARDS**

LINE	Station	Station	Location LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP
-LLT-	46+02	48+77	LT	985.22	
-LRT-	46+28	57+25	RT		4603.11
-LLT-	50+75	58+50	LT	3339.56	
-LRT-	57+25	60+25	RT	792.44	
-Y1RT-	17+00	18+00	RT	275.78	
-Y1LT-	17+00	18+00	LT	272.33	
-Y1RT-	18+00	26+90	RT		2052.44
-Y1LT-	18+00	24+00	LT		1552.00
-Y1LT-	24+00	29+47	LT/RT	1355.22	
-Y1RT-	26+90	31+00	LT	931.22	
DETOUR REMOVAL					
-LRT-	72+55	77+80	RT	918.11	
-L-	72+05	80+55	LT/RT	1785.56	
-L-	72+50	75+35	RT	314.67	
-L-	46+12	56+23	RT	4570.33	
-Y1RT-	33+75	38+71	LT	408.11	
-L-	55+60	67+75	RT	2031.78	
TOTAL				17980.33	8207.56
SAY				18000	8210.00

**B-3186
 SUMMARY OF CONCRETE BARRIER**

LINE	BEGIN STATION	END STATION	LOCATION	LENGTH IN FEET					SINGLE FACED BARRIER W/ MOMENT SLAB
				SINGLE FACED BARRIER	DOUBLE FACED TYPE T	DOUBLE FACED TYPE T1	DOUBLE FACED TYPE T2	VARIABLE HEIGHT DOUBLE FACED BARRIER	
-L-	24+00	25+50	MED		150				
-L-	25+50	26+50	MED			100			
-L-	26+50	28+50	MED				200		
-L-	28+50	35+50	MED					700	
-L-	29+24.1	34+63.5	RT	539					
-L-	35+50	38+00	MED				250		
-L-	38+00	40+50	MED			250			
-L-	40+50	45+50	MED		500				
-L-	45+50	46+11.55	MED			62			
TOTAL				539	650	412	450	700	
SAY				540	650	420	450	700	

**B-5898
 SUMMARY OF CONCRETE BARRIER**

LINE	BEGIN STATION	END STATION	LOCATION	LENGTH IN FEET					SINGLE FACED BARRIER W/ MOMENT SLAB
				SINGLE FACED BARRIER	DOUBLE FACED TYPE T	DOUBLE FACED TYPE T1	DOUBLE FACED TYPE T2	VARIABLE HEIGHT DOUBLE FACED BARRIER	
-L-	46+11.55	47+50	MED			138			
-L-	47+50	49+25	MED				175		
-LLT-	48+54	49+57	LT	103					
-L-	49+25	55+10	MED					585	
-LRT-	51+17	53+56	RT	239					
-L-	55+10	57+00	MED				190		
-LLT-	56+12	68+45	LT	1233					
-L-	57+00	58+00	MED			100			
-L-	58+00	60+00	MED		200				
-LRT-	66+70.6	67+14.31	RT						44
-LRT-	66+75	67+30	RT	55					
-LLT-	67+53.44	68+26.54	LT						73
-LLT-	70+04	77+36	LT	732					
-L-	76+52.70	77+39.30	LT				87		
-Y1LT-	14+10	33+17	RT	1907					
-Y1RT-	16+50	25+80	LT	937					
-Y1RT-	29+51	44+32	RT	1481					
-Y1RT-	30+25	3145	LT						120
-Y1RT-	40+54	40+80	RT			26			
-Y1RT-	40+90	43+60	RT				280		
-Y1RT-	43+60	44+26.40	RT			66			
TOTAL				6680	200	330	732	585	237
SAY				6680	200	340	740	590	240

RA15-SCD09R6L6E

COMPUTED BY: TMC/CGM DATE: 01/11/2022
CHECKED BY: TMC/CGM DATE: 01/11/2022

PROJECT NO. SHEET NO.
B-5898 DETOUR 3D-10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Table with columns for Line & Station, Offset, Structure Number, Invert Elevation, Minimum Required Slope, Pipe Size, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Remarks. Includes a SHEET TOTALS row at the bottom.

ABBREVIATIONS table listing codes like C.A.A., C.B., C.S., D.I., G.D.I., H.D.P.E., J.B., M.H., N.S., P.V.C., R.C., T.B.D.I., T.B.J.B., W.S. and their corresponding descriptions.

REMARKS

COMPUTED BY: KRB DATE: 01/11/2022
 CHECKED BY: _____ DATE: _____

(12-17-19)

PROJECT NO.	SHEET NO.
B-3186	3G-1

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	1000
				TOTAL LF:	1000

*UD = Underdrain
 *BD = Blind Drain
 *SD = Subsurface Drain

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

LINE	Station	Station	Geotextile for Pavement Stabilization SY	Class IV Subgrade Stabilization TONS
CONTINGENCY			12006	23262
TOTAL SY/TONS:			12006	23262*

*Total tons of "Class IV Subgrade Stabilization" is only the estimated quantity for pavement stabilization and may only represent a portion of the subgrade stabilization quantity shown in the Item Sheets of the Proposal.

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU(1)		3967			163	
CONTINGENCY			ASU(1)		2000	2975	4000		
TOTAL CY/TONS/SY:					5967	2975**	4000**	163	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
 *AST = Aggregate Stabilization
 **Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
L	1.5:1	15+00	2:1	18+25	LT	3		1325
L	1:1	43+62.5	2:1	46+11.55	RT	3		485
TOTAL SY:								1810

*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
L	2:1	22+19	1.5:1	29+00	RT	8250	8250		
L	2:1	40+35	1.5:1	40+61	RT	200	200		
L	2:1	41+55	1.75:1	41+81.48	LT	175	175		
L	1.5:1	43+62.5	2:1	46+00	RT	1405	1405		
L	1:1	43+62.5	2:1	46+11.55	RT	485	485		
L	1.5:1	44+38.42	2:1	44+65	LT	105	105		
TOTAL SY:						10620	10620	0*	0**

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.
 **Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

COMPUTED BY: KRB DATE: 01/11/2022
 CHECKED BY: _____ DATE: _____

(12-17-19)

PROJECT NO.	SHEET NO.
B-5898	3G-2

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	1000
TOTAL LF:					1000

*UD = Underdrain
 *BD = Blind Drain
 *SD = Subsurface Drain

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

LINE	Station	Station	Geotextile for Pavement Stabilization SY	Class IV Subgrade Stabilization TONS
CONTINGENCY			1284	2488
TOTAL SY/TONS:			1284	2488*

*Total tons of "Class IV Subgrade Stabilization" is only the estimated quantity for pavement stabilization and may only represent a portion of the subgrade stabilization quantity shown in the Item Sheets of the Proposal.

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU(1)		8233			337	
CONTINGENCY			ASU(1)		2000	2975	4000		
TOTAL CY/TONS/SY:					10233	2975**	4000**	337	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
 *AST = Aggregate Stabilization
 **Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
L	1.1:1	46+11.55	2:1	46+50	RT	3		200
L	2:1	70+50	1.5:1	72+10	RT	3		310
L	2:1	73+50	1.3:1	75+00	RT	3		500
TOTAL SY:								1010

*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
TOTAL SY:						0	0	0*	0**

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.
 **Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS
Bridge on -Y1RT- (US 19) over -L-, -L_ LT-, and -L_ RTp (US 74/US 23)	1	2
Bridge on -Y1RT- (US 19) over -L-, -L_ LT-, and -L_ RTp (US 74/US 23)	2	2

-L-LT-

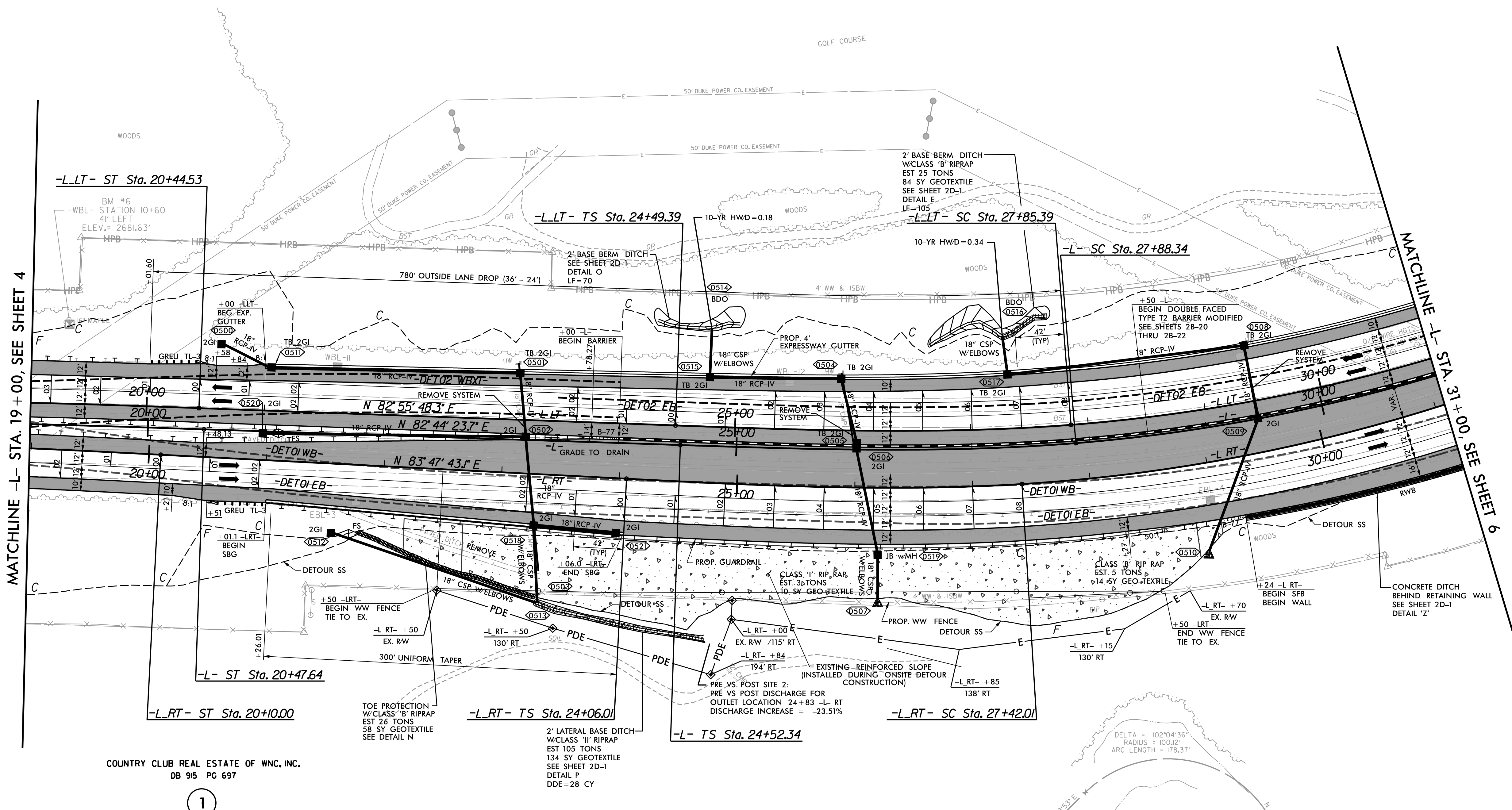
Pls Sta 19+04.53	Pls Sta 26+73.54	Pl Sta 32+18.70
$\Theta_s = 1' 41'' 40.8''$	$\Theta_s = 6' 30'' 13.8''$	$\Delta = 32' 38'' 17.0'' (LT)$
$L_s = 210.00'$	$L_s = 336.00'$	$D = 3' 52'' 16.8''$
$LT = 140.01'$	$LT = 224.15'$	$L = 843.07'$
$ST = 70.01'$	$ST = 112.14'$	$T = 433.32'$
		$R = 1,480.00'$

PROJECT REFERENCE NO. B-3186 / B-5898	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LAKE JUNALUSKA
ASSEMBLY, INC
DB 34 PG 476

NAD 83/2011



MATCHLINE -L- STA. 19+00, SEE SHEET 4

MATCHLINE -L- STA. 31+00, SEE SHEET 6

COUNTRY CLUB REAL ESTATE OF WNC, INC.
DB 915 PG 697

-L-RT-

Pls Sta 18+70.00	Pls Sta 26+30.16	Pl Sta 31+87.49
$\Theta_s = 1' 31'' 16.1''$	$\Theta_s = 6' 30'' 13.8''$	$\Delta = 33' 30'' 11.9'' (LT)$
$L_s = 210.00'$	$L_s = 336.00'$	$D = 3' 52'' 16.8''$
$LT = 140.01'$	$LT = 224.15'$	$L = 865.42'$
$ST = 70.00'$	$ST = 112.14'$	$T = 445.48'$
		$R = 1,480.00'$

-L-

Pls Sta 18+47.65	Pls Sta 26+76.49	Pl Sta 32+18.99
$\Theta_s = 2' 12'' 13.3''$	$\Theta_s = 6' 30'' 13.8''$	$\Delta = 32' 26'' 52.5'' (LT)$
$L_s = 300.00'$	$L_s = 336.00'$	$D = 3' 52'' 16.8''$
$LT = 200.02'$	$LT = 224.15'$	$L = 838.16'$
$ST = 100.01'$	$ST = 112.14'$	$T = 430.65'$
		$R = 1,480.00'$
		$SE = 0.08$
		$DS = 65mph$

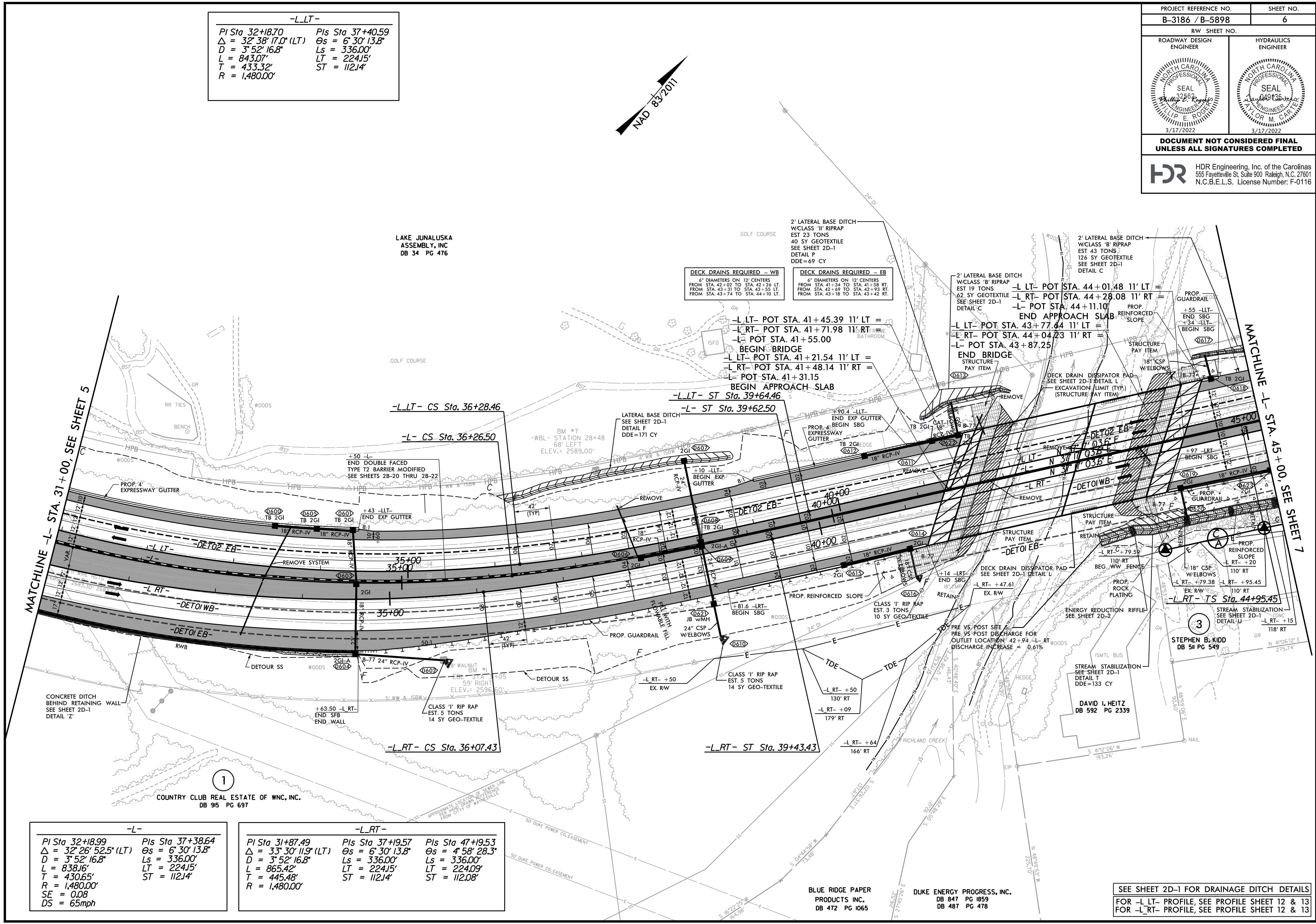
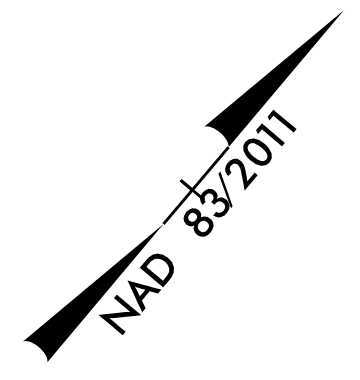
SEE SHEET 2D-1 FOR DRAINAGE DITCH DETAILS
FOR -L-LT- PROFILE, SEE PROFILE SHEET 12
FOR -L-RT- PROFILE, SEE PROFILE SHEET 11 & 12

PLOT DRIVER: NCDOT_color_eng_50.plt
 USER: HBARE
 FILE: NCDOT\NCDOT-B3186_T02.c. \6.0.CAD.BTM.6.2_Work_In_Progress\B-3186-B-5898\Roadway\Pro\B3186-B5898_RDY_PSH05.dgn
 PENTABLE: NCDOT_pshp.plt
 TIME: 1:47:33 PM
 DATE: 3/16/2022

PROJECT REFERENCE NO.		SHEET NO.	
B-3186 / B-5898		6	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
HDR Engineering, Inc. of the Carolinas 555 Fayetteville St. Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116			

-L-LT-

PI Sta 32+18.70	PIs Sta 37+40.59
$\Delta = 32^{\circ} 38' 17.0"$ (LT)	$\Theta s = 6^{\circ} 30' 13.8"$
D = 3' 52' 16.8"	Ls = 336.00'
L = 843.07'	LT = 224.15'
T = 433.32'	ST = 112.14'
R = 1,480.00'	



LAKE JUNALUSKA ASSEMBLY, INC
DB 34 PG 476

DECK DRAINS REQUIRED - WB
6" DIAMETERS ON 12' CENTERS
FROM STA. 42+02 TO STA. 42+26 LT.
FROM STA. 43+31 TO STA. 43+55 LT.
FROM STA. 43+74 TO STA. 44+10 LT.

DECK DRAINS REQUIRED - EB
6" DIAMETERS ON 12' CENTERS
FROM STA. 41+34 TO STA. 41+38 RT.
FROM STA. 42+69 TO STA. 42+93 RT.
FROM STA. 43+18 TO STA. 43+42 RT.

2' LATERAL BASE DITCH
W/CLASS 'B' RIPRAP
EST 19 TONS
62 SY GEOTEXTILE
SEE SHEET 2D-1
DETAIL C

2' LATERAL BASE DITCH
W/CLASS 'B' RIPRAP
EST 43 TONS
126 SY GEOTEXTILE
SEE SHEET 2D-1
DETAIL C

-L-LT- POT STA. 41+45.39 11' LT =
-L-RT- POT STA. 41+71.98 11' RT =
-L- POT STA. 41+55.00
BEGIN BRIDGE
-L-LT- POT STA. 41+21.54 11' LT =
-L-RT- POT STA. 41+48.14 11' RT =
-L- POT STA. 41+31.15
BEGIN APPROACH SLAB

-L-LT- POT STA. 44+01.48 11' LT =
-L-RT- POT STA. 44+28.08 11' RT =
-L- POT STA. 44+11.10
END APPROACH SLAB

END BRIDGE
STRUCTURE PAY ITEM

-L-LT- CS Sta. 36+28.46

-L- CS Sta. 36+26.50

-L-LT- ST Sta. 39+64.46

-L- ST Sta. 39+62.50

-L-RT- TS Sta. 44+95.45

-L-RT- CS Sta. 36+07.43

-L-RT- ST Sta. 39+43.43

-L-

PI Sta 32+18.99	PIs Sta 37+38.64
$\Delta = 32^{\circ} 26' 52.5"$ (LT)	$\Theta s = 6^{\circ} 30' 13.8"$
D = 3' 52' 16.8"	Ls = 336.00'
L = 838.16'	LT = 224.15'
T = 430.65'	ST = 112.14'
R = 1,480.00'	
SE = 0.08	
DS = 65mph	

-L-RT-

PI Sta 31+87.49	PIs Sta 37+19.57	PIs Sta 47+19.53
$\Delta = 33^{\circ} 30' 11.9"$ (LT)	$\Theta s = 6^{\circ} 30' 13.8"$	$\Theta s = 4^{\circ} 58' 28.3"$
D = 3' 52' 16.8"	Ls = 336.00'	Ls = 336.00'
L = 865.42'	LT = 224.15'	LT = 224.09'
T = 445.48'	ST = 112.14'	ST = 112.08'
R = 1,480.00'		

SEE SHEET 2D-1 FOR DRAINAGE DITCH DETAILS
FOR -L-LT- PROFILE, SEE PROFILE SHEET 12 & 13
FOR -L-RT- PROFILE, SEE PROFILE SHEET 12 & 13

PLOT DRIVER: NCDOT_color_eng_50.plt
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COUNTRY CLUB REAL ESTATE OF WNC, INC.
DB 95 PG 697

BLUE RIDGE PAPER PRODUCTS INC.
DB 472 PG 1065

DUKE ENERGY PROGRESS, INC.
DB 847 PG 1859
DB 487 PG 478