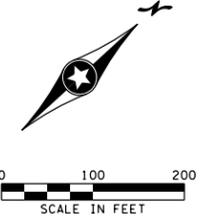


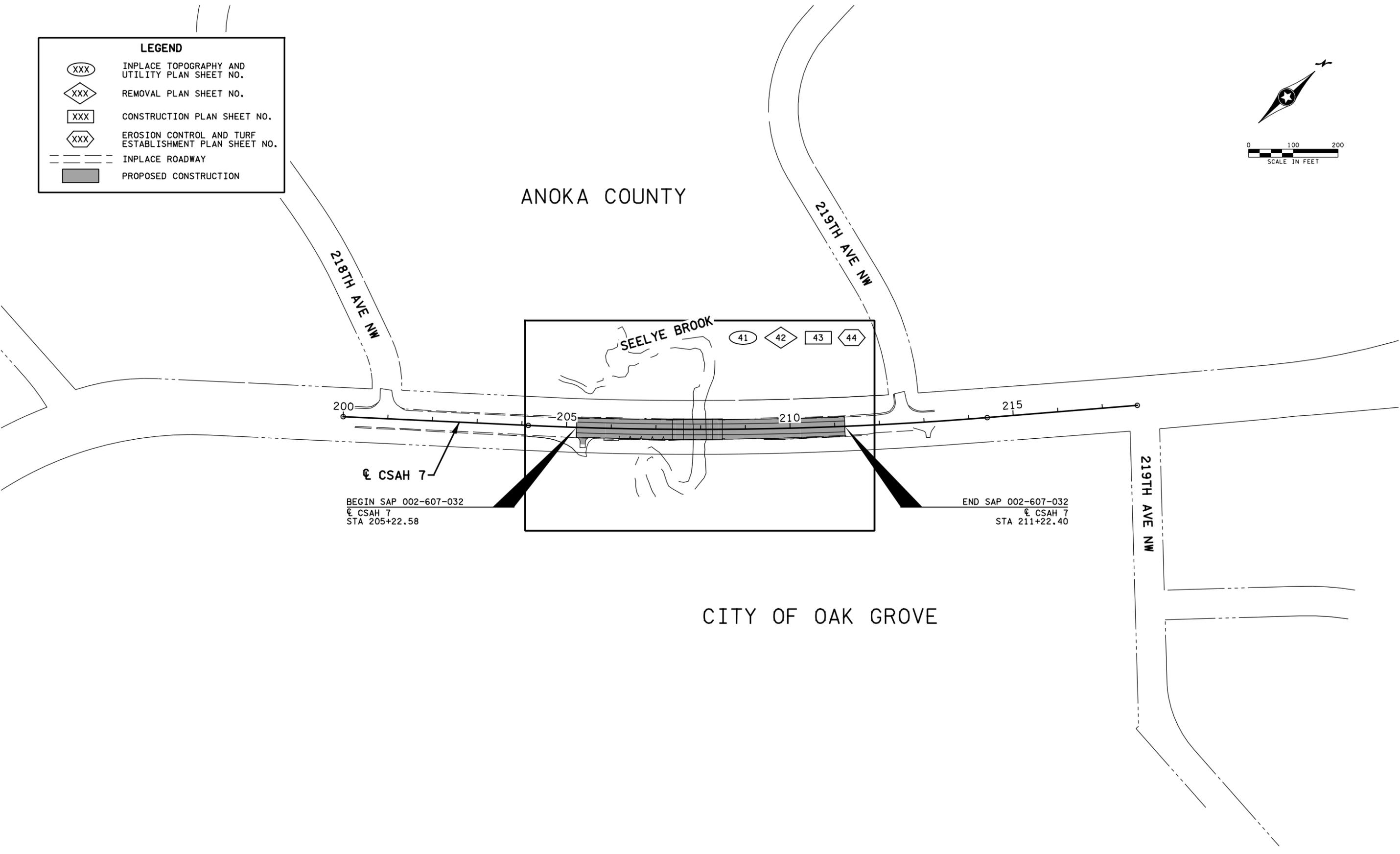


**LEGEND**

(XXX)	INPLACE TOPOGRAPHY AND UTILITY PLAN SHEET NO.
◇(XXX)	REMOVAL PLAN SHEET NO.
□(XXX)	CONSTRUCTION PLAN SHEET NO.
◇(XXX)	EROSION CONTROL AND TURF ESTABLISHMENT PLAN SHEET NO.
- - - - -	INPLACE ROADWAY
■	PROPOSED CONSTRUCTION



ANOKA COUNTY



BEGIN SAP 002-607-032  
 ☉ CSAH 7  
 STA 205+22.58

END SAP 002-607-032  
 ☉ CSAH 7  
 STA 211+22.40

CITY OF OAK GROVE

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NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: KYLE HARRISON

*[Signature]*

Date: 06/17/2025 License # 53658

STATE AID PROJECT NO.  
 SAP 002-607-032

DRAWN BY  
 S. HARGESHEIMER

DESIGNED BY  
 S. HARGESHEIMER

CHECKED BY  
 K. HARRISON

COMM. NO. 2417554



ANOKA COUNTY  
 GENERAL LAYOUT  
 SAP 002-607-032

SHEET  
 2  
 OF  
 54

NOTES	TAB	SHEET NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	PROJECT TOTAL ESTIMATED QUANTITY	SAP 002-607-032			NON-PARTICIPATING QUANTITY
							ROADWAY	RETAINING WALL	BRIDGE	
							QUANTITY	QUANTITY	QUANTITY	
			2021.501	MOBILIZATION	LUMP SUM	1	0.25	0.22	0.53	
	H	6	2101.502	GRUBBING	EACH	20	20			
	K	6	2104.502	REMOVE DELINEATOR / MARKER	EACH	8	8			
	C	5	2104.502	REMOVE ECCENTRIC LOADER BCT	EACH	4	4			
	C	5	2104.503	SAWING BIT PAVEMENT (FULL DEPTH)	LIN FT	88	88			
	C	5	2104.503	REMOVE GUARDRAIL-PLATE BEAM	LIN FT	487.5	487.5			
	C	5	2104.504	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	SQ YD	21	21			
	C	5	2104.504	REMOVE BITUMINOUS PAVEMENT	SQ YD	2862	2862			
	C	5	2104.507	REMOVE RIPRAP	CU YD	21	21			
		B2	2104.507	REMOVE GROUTED RIPRAP	CU YD	208	208			
			2104.601	REMOVE REGULATED WASTE MATERIAL (BRIDGE)	LUMP SUM	1	1			
	A	7	2106.507	EXCAVATION - COMMON (P)	CU YD	628	628			
	A	7	2106.507	EXCAVATION - SUBGRADE	CU YD	512	512			
	A	7	2106.507	SELECT GRANULAR EMBANKMENT (CV)	CU YD	1082	1082			
	A	7	2106.507	COMMON EMBANKMENT (CV) (P)	CU YD	1273	1273			
			2118.507	AGGREGATE SURFACING (CV) CLASS 1	CU YD	42	42			
		B2	2118.609	AGGREGATE SURFACING SPECIAL	TON	26	26			
(2)			2123.610	1.5 CU YD BACKHOE	HOUR	50	50			
	D	5	2211.507	AGGREGATE BASE (CV) CLASS 5	CU YD	440	440			
	D	5	2360.509	TYPE SP 12.5 NON WEAR COURSE MIX (3,C)	TON	450	450			
(3)	D	5	2360.509	TYPE SP 12.5 WEARING COURSE MIX (4,C)	TON	607	607			
		W1 , B2	2401.503	TYPE S (TL-4) 36" BARRIER CONC (3S52) (P)	LIN FT	314		122	192	
		B2	2401.507	STRUCTURAL CONCRETE (1G52)	CU YD	74			74	
		B2	2401.507	STRUCTURAL CONCRETE (3B52) (P)	CU YD	118			118	
		B2	2401.508	REINFORCEMENT BARS	POUND	5500			5500	
		B2	2401.508	REINFORCEMENT BARS (EPOXY COATED) (P)	POUND	32620			32620	
		B2	2401.508	REINFORCEMENT BARS (STAINLESS-75KSI) (P)	POUND	520			520	
		B2	2401.518	BRIDGE SLAB CONCRETE (3YHPC-M)	SQ FT	3052			3052	
		B2	2401.601	STRUCTURE EXCAVATION	LUMP SUM	1			1	
		B2	2401.601	FOUNDATION PREPARATION	LUMP SUM	1			1	
		B2	2401.618	BRIDGE DECK PLANING (P)	SQ FT	4430			4430	
		B2	2402.502	ELASTOMERIC BEARING PAD	EACH	10			10	
		B2	2402.502	BEARING ASSEMBLY	EACH	10			10	
		B2	2405.503	PRESTRESSED CONCRETE BEAMS 22RB	LIN FT	633			633	
	G	6	2406.504	BRIDGE APPROACH PANELS	SQ YD	242	242			
			2406.603	EXPANSION JOINTS, DESIGN E5	LIN FT	93	93			
		W1	2411.507	STRUCTURAL CONCRETE (1G52) (P)	CU YD	74		74		
		W1	2411.507	STRUCTURAL CONCRETE (3G52) (P)	CU YD	53		53		
	A	7	2411.507	STRUCTURE EXCAVATION CLASS U	CU YD	676	676			
		W1	2411.508	REINFORCEMENT BARS (P)	POUND	8777		8777		
		W1	2411.508	REINFORCEMENT BARS (EPOXY COATED) (P)	POUND	5932		5932		
		W1	2411.601	DRAINAGE SYSTEM WALL	LUMP SUM	1		1		
		W1	2411.618	SPECIAL SURFACE FINISH (P)	SQ FT	1316		1316		
		B2	2442.501	REMOVE EXISTING BRIDGE	LUMP SUM	1				1
	A	7	2451.607	STRUCTURAL BACKFILL (P)	CU YD	977	977			
		W1 , B2	2452.502	C-I-P CONC TEST PILE 85 FT LONG 12"	EACH	5		3	2	
		W1 , B2	2452.502	PILE ANALYSIS	EACH	5				5
		W1 , B2	2452.502	PILE POINTS 12"	EACH	54		26	28	
		W1 , B2	2452.503	C-I-P CONCRETE PILING 12"	LIN FT	3675		1725	1950	
		B2	2502.501	DRAINAGE SYSTEM TYPE (B910)	LUMP SUM	1			1	
		B2	2511.507	RANDOM RIPRAP CLASS III	CU YD	335	7		328	
	D	5	2521.518	6" CONCRETE WALK	SQ FT	167	167			
	D	5	2531.503	CONCRETE CURB & GUTTER DESIGN B612	LIN FT	15	15			
	E	5	2554.502	END TREATMENT-TANGENT TERMINAL	EACH	3	3			
	E	5	2554.503	TRAFFIC BARRIER DESIGN TYPE 31	LIN FT	75	75			
	E	5	2554.503	TRAFFIC BARRIER DESIGN TRANS TYPE 31	LIN FT	112.5	112.5			
	E	5	2554.615	IMPACT ATTENUATOR	ASSEMBLY	1	1			
			2563.601	TRAFFIC CONTROL	LUMP SUM	1	0.25	0.22	0.53	
			2563.613	PORTABLE CHANGEABLE MESSAGE SIGN	UNIT DAY	20	20			
	K	6	2564.602	DELINEATOR / MARKER	EACH	8	8			

NOTES

- (1) CLOPYRALID HERBICIDE LABELED FOR RIGHT OF WAY USE AND FORMULATED AT 3 POUNDS ACID EQUIVALENT PER GALLON.
- (2) TO BE USED AS DIRECTED BY THE ENGINEER.
- (3) TO BE USED FOR BITUMINOUS DRIVEWAYS.

(P) PLAN QUANTITY

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NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: KYLE HARRISON

*[Signature]*

Date: 06/26/2025 License # 53658

STATE AID PROJECT NO.  
SAP 002-607-032

DRAWN BY  
S. HARGESHEIMER  
DESIGNED BY  
S. HARGESHEIMER  
CHECKED BY  
K. HARRISON  
COMM. NO. 2417554



**ANOKA COUNTY**  
STATEMENT OF ESTIMATED QUANTITIES  
SAP 002-607-032

**SHEET**  
**3**  
**OF**  
**54**

NOTES	TAB	SHEET NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	PROJECT TOTAL	SAP 002-607-032			NON-PARTICIPATING
						ESTIMATED QUANTITY	ROADWAY	RETAINING WALL	BRIDGE	QUANTITY
							QUANTITY	QUANTITY	QUANTITY	
	F	6	2573.503	SILT FENCE, TYPE SD	LIN FT	450	450			
	F	6	2573.503	SILT FENCE, TYPE MS	LIN FT	920	920			
	F	6	2573.503	FLOTATION SILT CURTAIN TYPE MOVING WATER	LIN FT	200	200			
	F	6	2573.503	SEDIMENT CONTROL LOG TYPE WOOD FIBER	LIN FT	290	290			
	F	6	2574.505	SUBSOILING	ACRE	0.3	0.3			
	F	6	2574.505	SOIL BED PREPARATION	ACRE	0.9	0.9			
	F	6	2574.508	FERTILIZER TYPE 3	POUND	120	120			
	F	6	2575.504	ROLLED EROSION PREVENTION CATEGORY 25	SQ YD	2910	2910			
	F	6	2575.505	SEEDING	ACRE	0.6	0.6			
	F	6	2575.505	WEED SPRAYING	ACRE	0.3	0.3			
(1)	F	6	2575.506	WEED SPRAY MIXTURE	GALLON	0.1	0.1			
	F	6	2575.523	RAPID STABILIZATION METHOD 3	M GALLON	3.6	3.6			
	F	6	2575.608	SEED MESIC INSLOPE	POUND	20	20			
	F	6	2575.608	SEED SOUTHERN TALLGRASS ROADSIDE	POUND	10	10			
	J	6	2582.503	4" SOLID LINE MULTI COMP (WR)	LIN FT	1200	1200			
	J	6	2582.503	4" BROKEN LINE MULTI COMP (WR)	LIN FT	120	120			

NOTES

- (1) CLOPYRALID HERBICIDE LABELED FOR RIGHT OF WAY USE AND FORMULATED AT 3 POUNDS ACID EQUIVALENT PER GALLON.
- (2) TO BE USED AS DIRECTED BY THE ENGINEER.
- (3) TO BE USED FOR BITUMINOUS DRIVEWAYS.

(P) PLAN QUANTITY

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					I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.		STATE AID PROJECT NO. SAP 002-607-032		DRAWN BY S. HARGESHEIMER		ANOKA COUNTY		SHEET 4 OF 54	
					Print Name: KYLE HARRISON				DESIGNED BY S. HARGESHEIMER					
					Date: 06/26/2025 License #: 53658				CHECKED BY K. HARRISON		STATEMENT OF ESTIMATED QUANTITIES SAP 002-607-032			
NO DATE BY CKD APPR REVISION									COMM. NO. 2417554					
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REMOVALS							C
ALIGNMENT	STATION TO STATION	(C-1)					SAWING BITUMINOUS PAVEMENT (FULL DEPTH) LIN FT
		REMOVE ECCENTRIC LOADER BCT	REMOVE GUARDRAIL - PLATE BEAM	REMOVE RIPRAP	REMOVE BITUMINOUS PAVEMENT	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	
		EACH	LIN FT	CU YD	SQ YD	SQ YD	
<b>SAP 002-607-032</b>							
CSAH 7	<b>205+23 - 211+22</b>	<b>4</b>	<b>487.5</b>	<b>21</b>	<b>2862</b>	<b>21</b>	<b>88</b>
<b>TOTALS</b>		<b>4</b>	<b>487.5</b>	<b>21</b>	<b>2862</b>	<b>21</b>	<b>88</b>

NOTES:  
(C-1) REFER TO REMOVAL PLANS FOR EXACT LOCATIONS.

AGGREGATE, BITUMINOUS, WALK, AND CURB							D
ALIGNMENT	STATION TO STATION					(D-1), (D-3)	(D-2), (D-3)
		AGGREGATE BASE (CV) CLASS 5	AGGREGATE SURFACING (CV) CLASS 1	6" CONCRETE WALK	CONCRETE CURB & GUTTER DESIGN B612	TYPE SP 12.5 WEARING COURSE MIX 4,C	TYPE SP 12.5 NON WEAR COURSE MIX (3,C)
		CU YD	CU YD	SQ FT	LIN FT	TON	TON
<b>SAP 002-607-032</b>							
CSAH 7	<b>205+23 - 211+22</b>	<b>440</b>	<b>42</b>	<b>167</b>	<b>15</b>	<b>607</b>	<b>450</b>
<b>TOTALS</b>		<b>440</b>	<b>42</b>	<b>167</b>	<b>15</b>	<b>607</b>	<b>450</b>

NOTES:  
(D-1) MIX TYPE SPWEB440C  
(D-2) MIX TYPE SPNWB330C  
(D-3) ASSUMES 113 LB/SY-IN BITUMINOUS UNIT WEIGHT

TRAFFIC BARRIER					E
ALIGNMENT	STATION TO STATION	TRAFFIC BARRIER DESIGN TYPE 31	TRAFFIC BARRIER DESIGN TRANS TYPE 31	IMPACT ATTENUATOR	END TREATMENT - TANGENT TERMINAL
		LIN FT	LIN FT	EACH	EACH
<b>SAP 002-607-032</b>					
CSAH 7	<b>205+23 - 211+22</b>	<b>75</b>	<b>112.5</b>	<b>1</b>	<b>3</b>
<b>TOTALS</b>		<b>75</b>	<b>112.5</b>	<b>1</b>	<b>3</b>

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NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Print Name: KYLE HARRISON  
*Kyle Harrison*  
Date: 06/17/2025 License # 53658

STATE AID PROJECT NO.  
SAP 002-607-032

DRAWN BY  
S. HARGESHEIMER  
DESIGNED BY  
S. HARGESHEIMER  
CHECKED BY  
K. HARRISON  
COMM. NO. 2417554



ANOKA COUNTY  
TABULATIONS  
SAP 002-607-032

SHEET  
5  
OF  
54

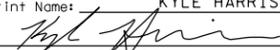


EARTHWORK SUMMARY <span style="float: right;">A</span>						
ALIGNMENT	EXCAVATION TOTALS (EV)			EMBANKMENT TOTALS (CV)		
	COMMON	SUBGRADE	STRUCTURE CLASS U	COMMON	SELECT GRANULAR	STRUCTURAL BACKFILL
	CU YD	CU YD	CU YD	CU YD	CU YD	CU YD
<b>SAP 002-607-032</b>						
CSAH 7 (STA 205+22 TO 207+61)	303	248	658	460	451	200
CSAH 7 (STA 208+26 TO 211+22)	325	264	18	813	631	
BRIDGE 02598 - SOUTH ABUTMENT						606
BRIDGE 02598 - NORTH ABUTMENT						171
<b>SAP 002-607-032 TOTAL</b>	<b>628</b>	<b>512</b>	<b>676</b>	<b>1273</b>	<b>1082</b>	<b>977</b>
<b>PROJECT TOTALS</b>	<b>628</b>	<b>512</b>	<b>676</b>	<b>1273</b>	<b>1082</b>	<b>977</b>

EARTHWORK TABULATION <span style="float: right;">B</span>						
STATION	EXCAVATION TOTALS (EV)			EMBANKMENT TOTALS (CV)		
	COMMON	SUBGRADE	STRUCTURE CLASS U	COMMON	SELECT GRANULAR	STRUCTURAL BACKFILL
	CU YD	CU YD	CU YD	CU YD	CU YD	CU YD
<b>CSAH 7</b>						
205+23.00						
205+37.00	22	24		3	24	
205+50.00	21	23		3	23	
205+75.00	37	45		9	45	
205+86.00	18	21		5	21	
206+00.00	21	29		7	29	
206+18.00	21	32	31	20	35	8
206+50.00	40	42	105	63	62	30
207+00.00	62	30	150	109	99	51
207+39.00	38	2	204	136	76	91
207+50.00	11		87	58	20	20
207+60.00	12		81	47	17	
<b>SUBTOTAL (A)</b>	<b>303</b>	<b>248</b>	<b>658</b>	<b>460</b>	<b>451</b>	<b>200</b>
208+27.00						
208+50.00	18		18	114	46	
209+00.00	60			317	113	
209+34.00	45			128	77	
209+50.00	20	2		39	37	
209+78.00	26	15		65	63	
210+00.00	19	24		41	47	
210+50.00	48	82		64	103	
211+00.00	61	99		37	102	
211+21.00	28	42		8	43	
<b>SUBTOTAL (B)</b>	<b>325</b>	<b>264</b>	<b>18</b>	<b>813</b>	<b>631</b>	
<b>TOTAL</b>	<b>628</b>	<b>512</b>	<b>676</b>	<b>1273</b>	<b>1082</b>	<b>200</b>

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NO	DATE	BY	CKD	APPR	REVISION
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 Print Name: KYLE HARRISON  
  
 Date: 06/17/2025 License # 53658

STATE AID PROJECT NO.  
 SAP 002-607-032

DRAWN BY  
 S. HARGESHEIMER  
 DESIGNED BY  
 S. HARGESHEIMER  
 CHECKED BY  
 K. HARRISON  
 COMM. NO. 2417554



**ANOKA COUNTY**  
 EARTHWORK TABULATIONS AND SUMMARY  
**SAP 002-607-032**

**SHEET**  
**7**  
**OF**  
**54**

**CONSTRUCTION /SOILS NOTES**

**GRADING, BASE AND SURFACE**

1. TOP OF THE GRADING GRADE IS DEFINED AS THE BOTTOM OF THE PROPOSED CLASS 5 AGGREGATE BASE.
2. TEST ROLLING OF THE SUBGRADE WILL BE REQUIRED AS SPECIFIED BY SPEC. 2111.2 (INCIDENTAL).
3. STRIP SOD AND TOPSOIL FROM AREAS TO BE DISTURBED BY CONSTRUCTION AND REUSE TOPSOIL. FOR ESTIMATING PURPOSES, THE DEPTH OF TOPSOIL AVAILABLE IS CONSIDERED TO BE 6.0".
4. ALL EXCAVATION AND EMBANKMENT SHALL BE IN ACCORDANCE WITH MNDOT 2106. FOR ANY AREA DISTURBED BY CONSTRUCTION, PLACE A MINIMUM OF 6" OF SLOPE DRESSING MATERIAL. ANY SLOPE DRESSING NEEDED IN ADDITION TO SALVAGED TOPSOIL SHALL MEET THE REQUIREMENTS OF TOPOSIL MATERIAL (MNDOT SPEC 3877). PAID FOR AS COMMON EMBANKMENT.
5. PRIOR TO CONSTRUCTION OR EXCAVATION, STRIP ALL IN-PLACE TOPSOIL AND SLOPE DRESSING MATERIALS IN AREAS TO BE DISTURBED BY CONSTRUCTION.
6. TOPSOIL EXCAVATION IS INCLUDED IN EXCAVATION-COMMON. EXCAVATED TOPSOIL SHALL BE REUSED AS SLOPE DRESSING AS DIRECTED BY THE ENGINEER. SLOPE DRESSING IS INCLUDED IN COMMON EMBANKMENT (CV).
7. WHERE CONNECTING TO THE INPLACE ROADWAYS AT THEIR TERMINI OF PROPOSED CONSTRUCTION, CUT VERTICALLY TO THE BOTTOM OF THE INPLACE SURFACING OR TO THE BOTTOM OF THE NEW SURFACING, WHICHEVER IS DEEPER, THEN 1V:20H TO THE BOTTOM OF THE RECOMMENDED SUBGRADE EXCAVATION, UNLESS OTHERWISE NOTED.
8. DITCH BOTTOMS, TOE OF FILL, CUT RUNOUTS AND THE TOP EDGE OF THE BACKSLOPES SHALL BE ROUNDED REGARDLESS OF THE SECTION USED ON THE CROSS SECTION SHEETS.
9. ANY DEBRIS WHICH MAY BE ENCOUNTERED DURING GRADING SHALL BE DISPOSED OF BY THE CONTRACTOR OFF THE PROJECT RIGHT OF WAY IN A SUITABLE DISPOSAL AREA AS APPROVED BY THE ENGINEER (INCIDENTAL).
10. NO EXTRA PAYMENT WILL BE MADE FOR MOVING, PLACING, OR TEMPORARY STOCKPILING OF EXCAVATION AND/OR EMBANKMENT MATERIAL.
11. PROVIDE A UNIFORM TACK COAT AS DOCUMENTED IN THE MOST CURRENT SPEC. 2357 - BITUMINOUS TACK COAT REQUIREMENTS
12. VERIFY EXISTING ELEVATIONS ALONG EDGES WHERE NEW PAVEMENT MATCHES EXISTING.
13. OBTAIN COMPACTION ON ALL BITUMINOUS PORTIONS OF CONSTRUCTION IN ACCORDANCE WITH THE "MAXIMUM DENSITY METHOD" REQUIREMENTS.
14. BITUMINOUS MATERIAL MUST BE REMOVED FROM THE PROJECT AND CANNOT BE USED AS EMBANKMENT.

**REMOVALS**

15. THE EXISTING PAVEMENT THICKNESSES ARE ASSUMED TO BE AS FOLLOWS:  
  
*CSAH 7 - 7" BITUMINOUS PAVEMENT*  
  
THE CONTRACTOR SHALL INVESTIGATE AND MAKE THEIR OWN DETERMINATION.  
  
(INFORMATION TAKEN FROM THE PROJECT SOIL BORINGS AND/OR RECORD DRAWINGS).
16. PROVIDE A FULL DEPTH SAWCUT WHERE PLACING NEW PAVEMENT NEXT TO INPLACE PAVEMENT.
17. UNLESS OTHERWISE SPECIFICALLY ALLOWED OR REQUIRED BY THE CONTRACT, BITUMINOUS AND CONCRETE ITEMS DISTURBED BY CONSTRUCTION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND MAY BE RECYCLED OR DISPOSED OF OFF THE RIGHT OF WAY.

THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT.

STANDARD PLATES	
PLATE NO.	DESCRIPTION
8000K	TEMPORARY CHANNELIZERS (3 SHEETS)
8350A	THREE BEAM ANCHORAGE PLATE
8356A	W-BEAM TO THREE-BEAM TRANSITION GUARDRAIL
8361B	GUARDRAIL STEEL POST (3 SHEETS)
8369B	GUARDRAIL BLOCKOUT (2 SHEETS)

**CONSTRUCTION /SOILS NOTES**

**TURF ESTABLISHMENT**

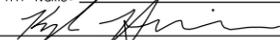
18. TEMPORARY EROSION CONTROL DEVICES AND THEIR SUGGESTED LOCATIONS HAVE BEEN SHOWN IN THE PLANS ALONG WITH PAY ITEMS FOR THEIR USE. THIS DOES NOT HOWEVER RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO CONDUCT CONSTRUCTION IN A MANNER THAT WILL CONTROL EROSION. WILL CONTROL EROSION. RESPONSIBILITY FOR CONTROLLING EROSION AND MAINTENANCE OF EROSION CONTROL AS SET IN MNDOT SPECIFICATIONS 1717 1803, 2101, 2106, 2573, 2575, AND IS AMENDED BY THE SPECIAL PROVISIONS.
19. PLACE A MINIMUM OF 6 INCHES OF TOPSOIL ON ALL AREAS SCHEDULED FOR PERMANENT TURF ESTABLISHMENT.
20. DUE TO THE PROJECT AREA BEING WITHIN A DEFINED WETLAND HOME TO BLANDING'S TURTLE, RECOMMENDATION TO BURY SILT FENCE A MINIMUM OF 10 INCHES TO BE EFFECTIVE AS A TURTLE EXCLUSION BARRIER.
21. FLOTATION SILT CURTAIN SHALL ONLY BE UTILIZED DURING TIME OF ACTUAL IN-WATER WORK AND REMOVED DURING NON-ACTIVE TIMES TO ALLOW FOR SPECIES MOVEMENTS WITHIN BROOK.
22. ALL STOCKPILES MUST HAVE DOWN GRADIENT PERIMETER SEDIMENT CONTROL IMPLEMENTED AND MAINTAINED AT ALL TIMES. STOCKPILES TO RECEIVE TEMPORARY STABILIZATION IF UNWORKED FOR 7 DAYS.
23. STABILIZATION OF DISTURBED AREAS SHALL BE DONE BY PERMANENT TURF ESTABLISHMENT WHENEVER POSSIBLE.
24. ADDITIONAL EROSION AND SEDIMENT CONTROL MAY BE ADDED DURING ANY PHASE OF CONSTRUCTION AS DIRECTED BY THE ENGINEER.
25. SEEDING REQUIREMENTS ON THIS PROJECT ARE AS FOLLOWS:
  - A. ON PERMANENT SLOPES 1:3 OR FLATTER USE SEED MESIC INSLOPE MIX, FERTILIZER TYPE 3 (SLOW RELEASE) @ 200 POUNDS PER ACRE AND ROLLED EROSION PREVENTION CATEGORY 25. SEE EROSION CONTROL AND TURF ESTABLISHMENT PLANS FOR SEED TYPE LOCATIONS.
  - B. ON BACKSLOPES, DRY DITCH BOTTOMS USE SEED SOUTHERN TALLGRASS ROADSIDE MIX, FERTILIZER TYPE 3 (SLOW RELEASE) @ 200 POUNDS PER ACRE AND ROLLED EROSION PREVENTION CATEGORY 25. SEE EROSION CONTROL AND TURF ESTABLISHMENT PLANS FOR SEED TYPE LOCATIONS.
26. PROVIDE TEMPORARY EROSION CONTROL MEASURE DURING AND AFTER BRIDGE CONSTRUCTION TO PREVENT SEDIMENTS AND CONTAMINANTS FROM ENTERING THE BROOK.

**UTILITIES**

27. THIS IS A REMINDER THAT UNDER STATE LAW IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT ALL UTILITIES THAT MAY HAVE FACILITIES IN THE AREA. CONTACT MUST BE MADE THROUGH GOPHER STATE ONE CALL.
28. THE FOLLOWING UTILITY OWNERS HAVE EXISTING FACILITIES IN THE AREA OF CONSTRUCTION AND WILL BE AFFECTED BY WORK UNDER THIS CONTRACT:
  - COMCAST CABLE, LLC
  - CENTERPOINT ENERGY
  - CENTURYLINK
  - CONNEXUS ENERGY
29. ALL UTILITY WORK TO BE DONE BY OTHERS UNLESS OTHERWISE NOTED.

**MISCELLANEOUS**

30. WHERE SEDIMENT DEPOSITS IN WATERS OF THE STATE THE MATERIAL MUST BE REMOVED IN 7 DAYS.
31. THE PROJECT SITE EXISTS WITHIN A DEFINED WETLAND HOME TO THE BLANDING'S TURTLE WHICH IS A PROTECTED SPECIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK FOR TURTLES BEFORE THE USE OF HEAVY EQUIPMENT OR ANY GROUND DISTURBANCE AND TO REPORT BLANDING'S TURTLES SIGHTINGS TO MNDNR.
32. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING THE FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.
33. ALL WORK WITHIN THE CHANNEL AND/OR ADJACENT TO THE CHANNEL AND WATERWAY NEED TO BE COMPLETED BY SEPTEMBER 15, 2025.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: KYLE HARRISON  
  
 Date: 06/17/2025 License # 53658

STATE AID PROJECT NO. SAP 002-607-032

DRAWN BY S. HARGESHEIMER  
 DESIGNED BY S. HARGESHEIMER  
 CHECKED BY K. HARRISON  
 COMM. NO. 2417554



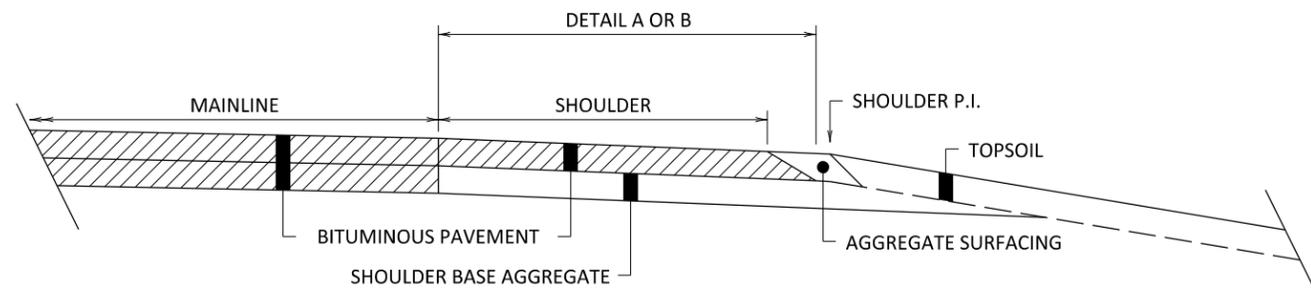
**ANOKA COUNTY**  
 CONSTRUCTION AND SOILS NOTES AND STANDARD PLATES  
 SAP 002-607-032

**SHEET**  
**8**  
**OF**  
**54**

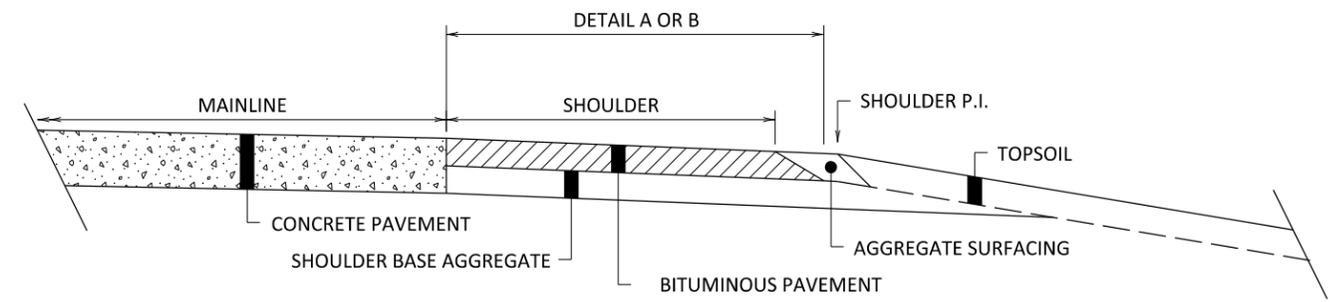
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NO	DATE	BY	CKD	APPR	REVISION

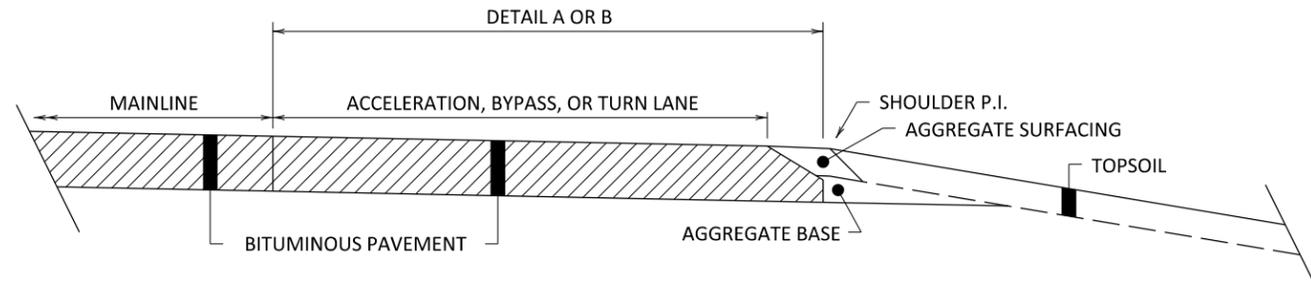




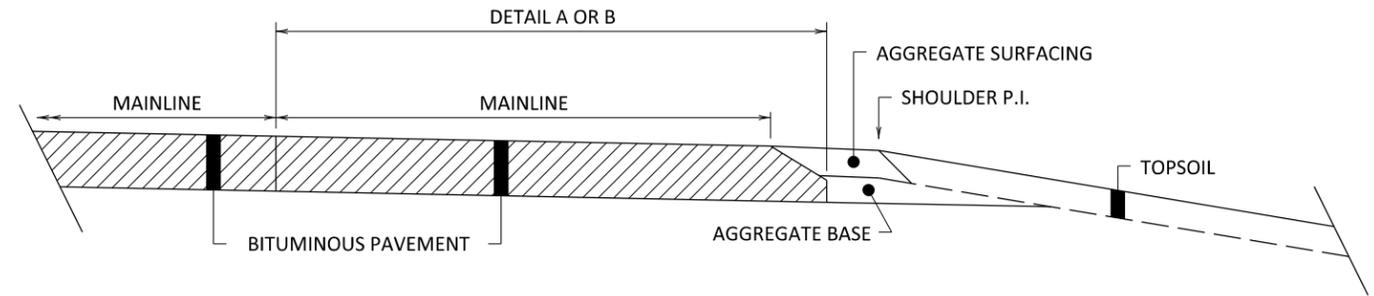
BITUMINOUS PAVEMENT WITH BITUMINOUS SHOULDERS (8' OR LESS)



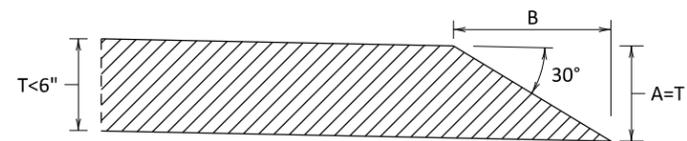
CONCRETE PAVEMENT WITH BITUMINOUS SHOULDERS (8' OR LESS)



BITUMINOUS PAVEMENT WITH ACCELERATION LANES, BYPASS LANES OR TURN LANES

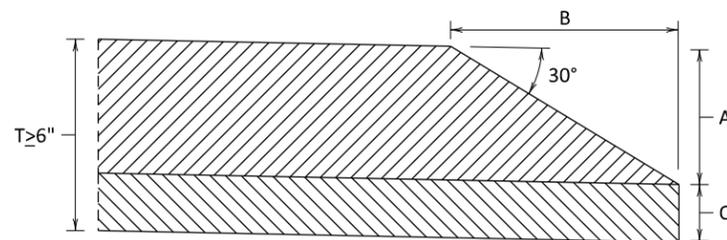


BITUMINOUS PAVEMENT WITH AGGREGATE SHOULDERING



DETAIL A  
PAVEMENT THICKNESS < 6"

FOR BITUMINOUS PAVEMENT THICKNESS < 6"	
PAVEMENT THICKNESS, T	B
2"	3.5"
3"	5.2"
4"	6.9"
5"	8.7"



DETAIL B  
PAVEMENT THICKNESS ≥ 6"

FOR BITUMINOUS PAVEMENT THICKNESS ≥ 6"			
PAVEMENT THICKNESS, T	A	B	C
6"	5"	8.7"	1"
8"	5"	8.7"	3"
10"	5"	8.7"	5"
12"	5"	8.7"	7"

NOTES:

CONSTRUCT THE SAFETY EDGE ALONG ALL BITUMINOUS PAVEMENT EDGES ADJACENT TO AGGREGATE SURFACING. THIS INCLUDES:

- MAINLINE ROADWAYS
- SHOULDERS 8' WIDE OR LESS
- RAMPS AND LOOPS
- ACCELERATION, BYPASS AND TURN TURN LANES

CONSTRUCT THE SAFETY EDGE USING A MANUFACTURED SHOE DEVICE ATTACHED TO THE PAVING MACHINE. A SINGLE-PLATE STRIKE-OFF METHOD IS NOT ALLOWED.

PROVIDE THE SAFETY EDGE ALONG THE ROADWAY THROUGH UNPAVED ENTRANCES SUCH AS FARM ACCESSSES, UNPAVED DRIVEWAYS, AND GRAVEL ROAD ACCESSSES. FOR PAVED PUBLIC ENTRANCES AND PAVED DRIVEWAYS, STOP THE SAFETY EDGE AND MATCH THE PROPOSED CONSTRUCTED PAVEMENT TO THE EXISTING CONDITIONS OR FOLLOW THE DESIGN PLANS. SHORT SECTIONS OF HANDWORK MAY BE NECESSARY FOR TRANSITIONS AND TURNOUTS.

SAFETY EDGE IS OPTIONAL FOR PAVED SHOULDER WIDTHS GREATER THAN 8'.

SEE TYPICAL SECTIONS FOR SAFETY EDGE PLACEMENT LOCATIONS.

THE SAFETY EDGE IS ADDED TO THE OUTSIDE OF THE REQUIRED BITUMINOUS TOP SURFACE WIDTH SHOWN IN THE PLANS.

LEAD EXPERT OFFICE  
CURT TURGEON  
DIRECTOR  
OFFICE OF MATERIALS & ROAD RESEARCH

SAFETY EDGE  
BITUMINOUS PAVEMENT

APPROVED: 02-21-2024  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.220

2 OF 2

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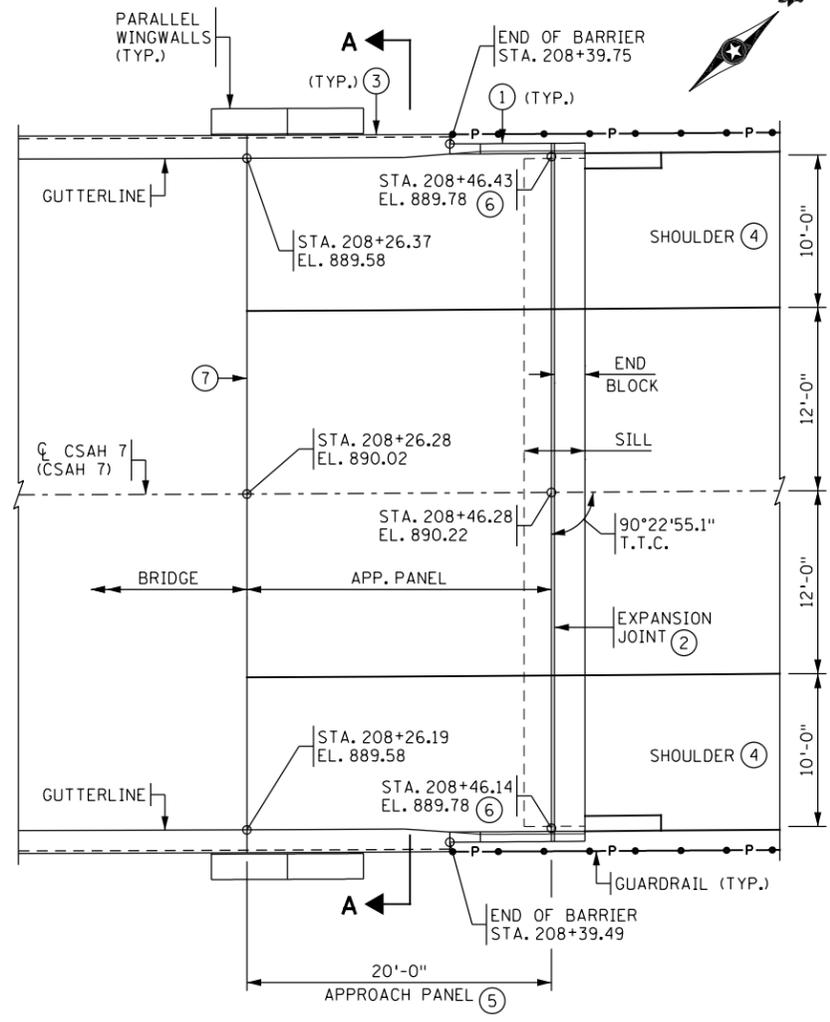
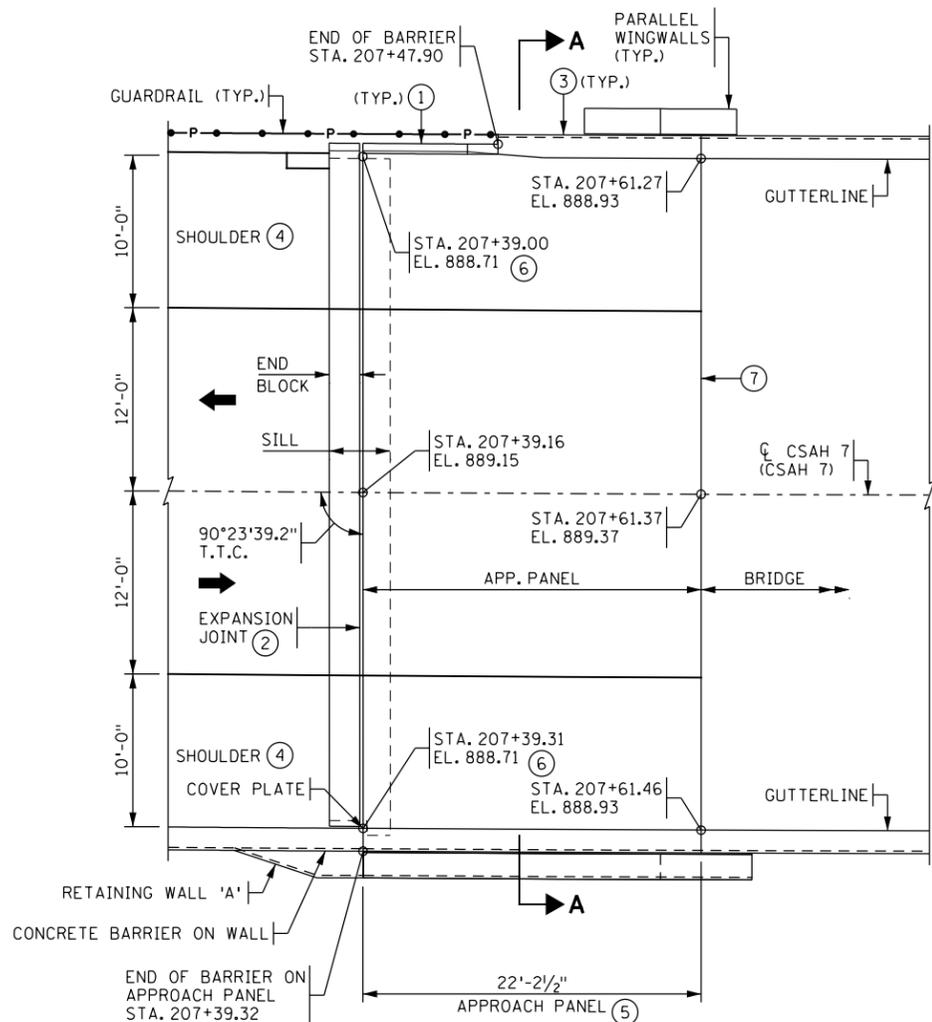


STANDARD PLAN

SAP 002-607-032

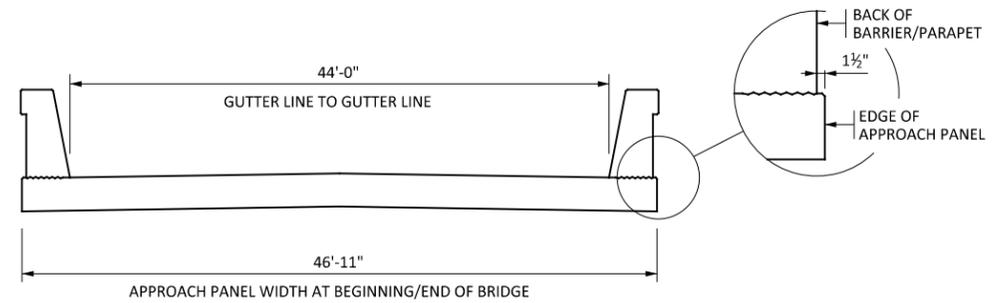
SHEET NO. 10

TOTAL SHEETS 54



**APPROACH PANEL PLAN**

\* MODIFIED PLAN DETAIL



**SECTION A-A**  
(SINGLE SLOPE BARRIER SHOWN, REFER TO BRIDGE PLAN FOR BARRIER/PARAPET TYPE)

EXPANSION JOINT TYPE			
TYPE	WIDTH	SOUTH ABUT.	NORTH ABUT.
E8	4 INCH	<input type="checkbox"/>	<input type="checkbox"/>
E5	2 1/2 INCH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
NONE	Ø INCH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SILL DETAIL		
OPTION	SOUTH ABUT.	NORTH ABUT.
A	<input type="checkbox"/>	<input type="checkbox"/>
B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>	<input type="checkbox"/>
A (MAINLINE)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B (SHOULDER)	<input type="checkbox"/>	<input type="checkbox"/>

ABUTMENT TYPE		
TYPE	SOUTH ABUT.	NORTH ABUT.
INTEGRAL / SEMI-INTEGRAL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PARAPET - DAVIDSON	<input type="checkbox"/>	<input type="checkbox"/>
PARAPET - END BLOCK	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**GENERAL NOTES:**

- REFER TO THE BRIDGE PLANS FOR THE LAYOUT OF THE WINGWALLS.
- IF A CONCRETE SILL IS REQUIRED BENEATH APPROACH PANEL EXPANSION JOINT EXTEND THE EXPANSION JOINT AND THE SILL ALONG THE WIDTH OF THE TRAFFIC LANES AND SHOULDERS AS SHOWN ON STANDARD PLAN 5-297.225. ENSURE THAT SILL DOES NOT INTERFERE WITH GUARDRAIL POST PLACEMENT. CONCRETE SILL AND CURBING, IF REQUIRED, ARE INCLUDED IN THE APPROACH PANEL PAY ITEM.
- GENERAL DRAINAGE DETAILS ARE SHOWN ON STANDARD PLAN 5-297.226 AND 5-297.228. CATCH BASIN DETAILS ARE SHOWN ON CONSTRUCTION PLAN SHEETS.
- REFER TO SPEC. 2406 FOR ADDITIONAL INFORMATION.
- ① REFER TO STANDARD PLAN 5-297.223 (6 OF 6) FOR ADDITIONAL CURB TRANSITION INFORMATION, EXTENDED GUTTER LINE DIMENSIONS, AND ADDITIONAL INFORMATION.
- ② REFER TO TABLE FOR EXPANSION JOINT TYPE. APPROACH PANEL EXPANSION JOINT QUANTITY IS TO BE PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB, BARRIER, OR PARAPET. REFER TO STANDARD PLANS 5-297.226 AND 5-297.227 FOR EXPANSION JOINT DETAILS.
- ③ TO ACCOMMODATE GUARDRAIL CONNECTION AND CRASH TEST REQUIREMENTS THE CONCRETE BARRIER/PARAPET MUST EXTEND 13'-4" MINIMUM ONTO THE APPROACH PANEL. FOR PARALLEL WINGWALLS THE BARRIER MUST ALSO EXTEND TO OR BEYOND THE END OF THE WINGWALL. REFER TO BRIDGE PLAN FOR BARRIER/PARAPET REINFORCEMENT, COVER PLATES, AND PAYMENT.
- ④ REFER TO ROADWAY PLANS FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.
- ⑤ APPROACH PANEL LENGTHS ARE MEASURED ALONG CENTERLINE OF ROADWAY. PANEL SIZE AND JOINT REQUIREMENTS FOR TRANSVERSE AND LONGITUDINAL JOINTS ARE SHOWN ON STANDARD PLANS 5-297.226 AND 5-297.227.
- ⑥ STATION AND ELEVATION AT EXTENDED GUTTER LINE FROM BRIDGE. REFER TO STANDARD PLAN 5-297.223 (6 OF 6).
- ⑦ REFER TO LONGITUDINAL SECTION A-A ON STANDARD PLAN 5-297.224 FOR DELINEATION OF START/END OF BRIDGE AND APPROACH PANEL.

\* INDICATES MODIFICATION FROM STANDARD PLAN

**MODIFIED**

BRIDGE NO. 02598

**LEAD EXPERT OFFICE**  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

CERTIFIED BY: *Kyle Harrison*  
LICENSED PROFESSIONAL ENGINEER  
PRINTED NAME: KYLE HARRISON

06/17/2025  
DATE  
LIC. NO. 53658

**BRIDGE APPROACH PANEL LAYOUT**  
(GREATER THAN 0° UP TO 15° SKEW LEFT)

APPROVED: 04-16-2024  
REVISED:

*Thomas Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.223  
2 OF 6



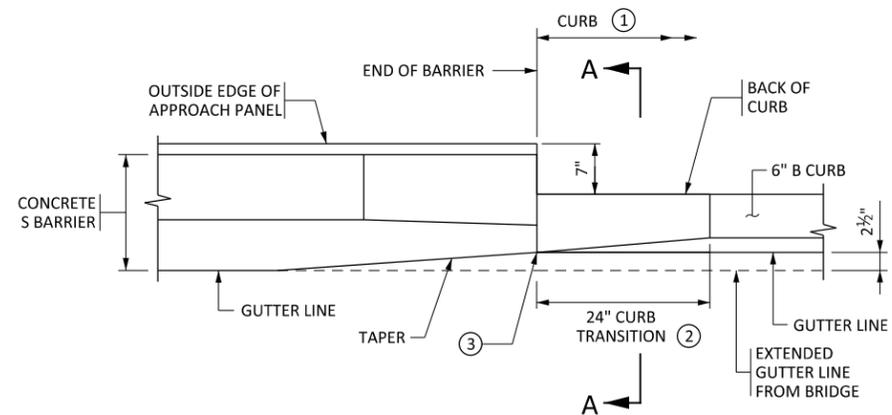
STANDARD PLAN

SAP 002-607-032

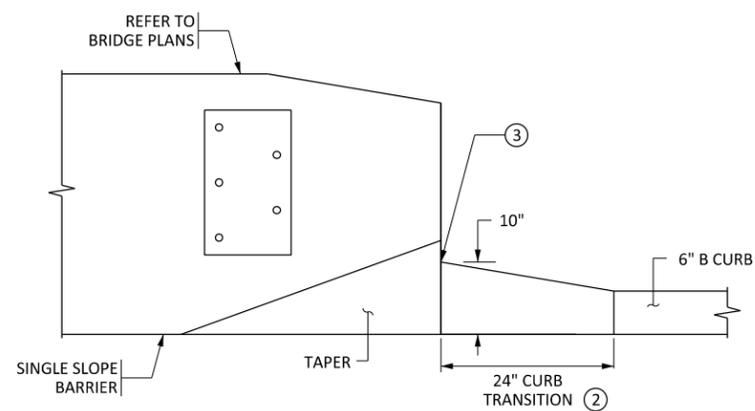
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TOTAL SHEETS 54

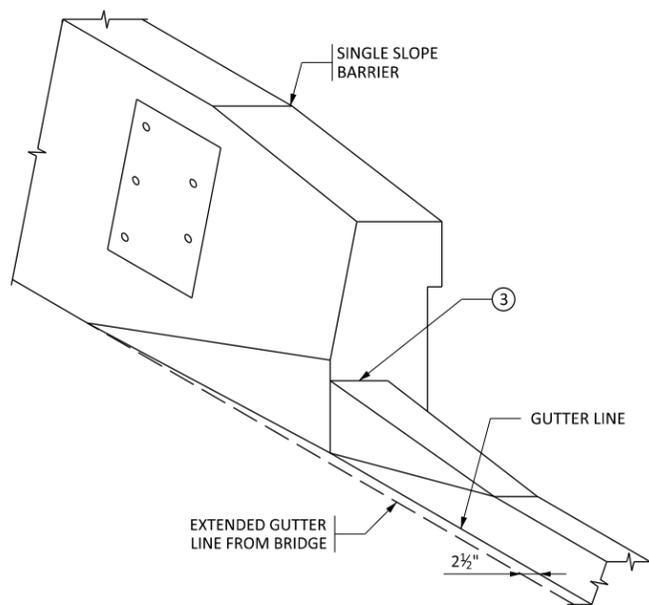
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PLAN VIEW

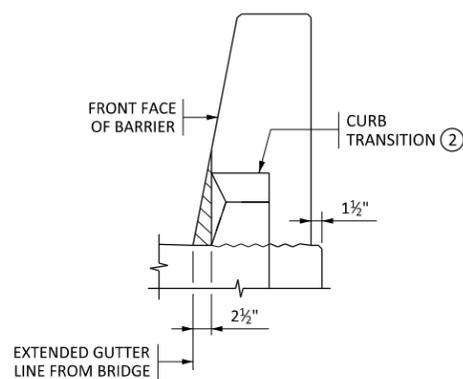


ELEVATION

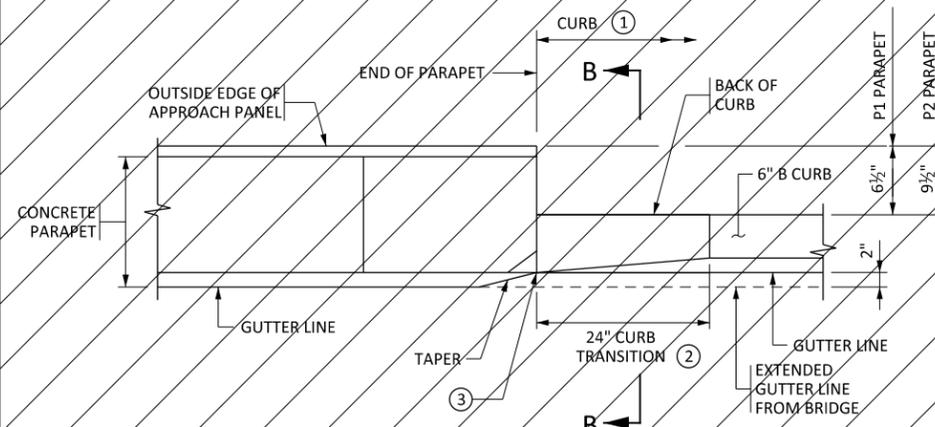


ISOMETRIC VIEW

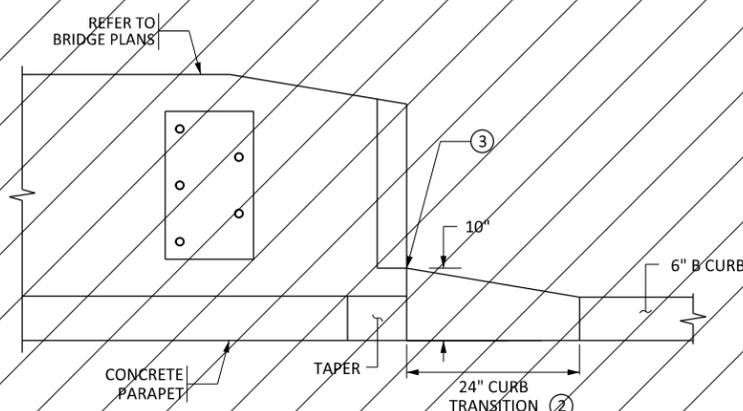
SINGLE SLOPE BARRIER



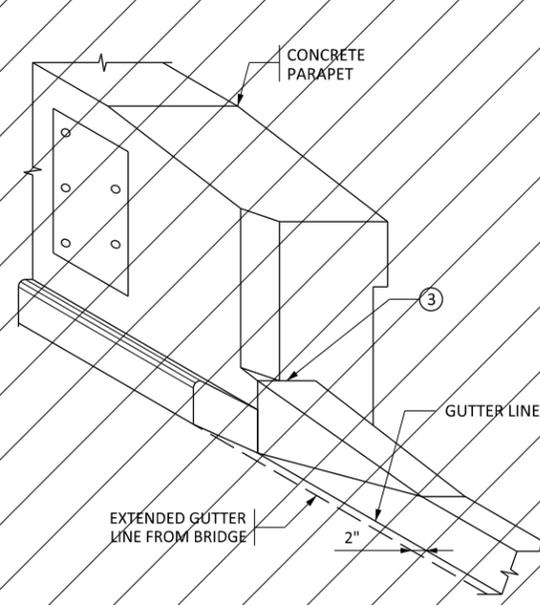
SECTION A-A



PLAN VIEW

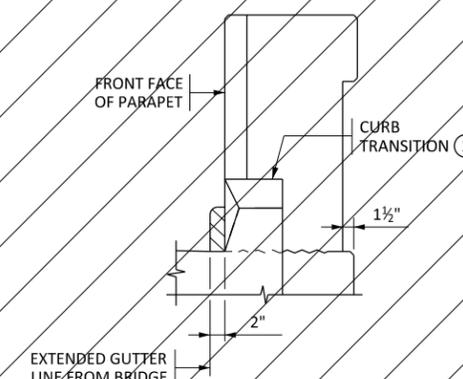


ELEVATION



ISOMETRIC VIEW

VERTICAL PARAPET



SECTION B-B

**NOTES:**

- ① REFER TO STANDARD PLANS 5-297.693 AND 5-297.694 FOR GUARDRAIL POST SPACING AND ADDITIONAL DETAILS. 6\"/>
- ② THE CURB TRANSITIONS FROM A VERTICAL FACE AT END OF BARRIER/PARAPET TO 6\"/>
- ③ AN E5 OR E8 JOINT MAY BE PRESENT AT THIS LOCATION IF THE BARRIER/PARAPET EXTENDS TO THE END OF THE APPROACH PANEL. REFER TO STANDARD PLAN 5-297.226 FOR ADDITIONAL INFORMATION.

LEAD EXPERT OFFICE

EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

BRIDGE APPROACH PANEL  
TRANSITION DETAILS

APPROVED: 04-16-2024  
REVISED:

*Thomas Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.223

6 OF 6

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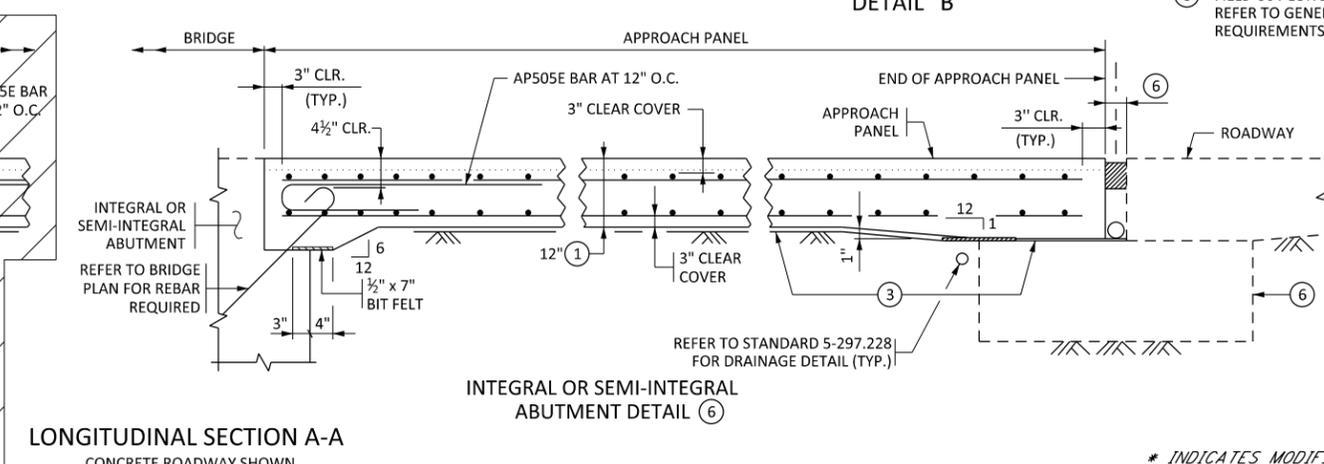
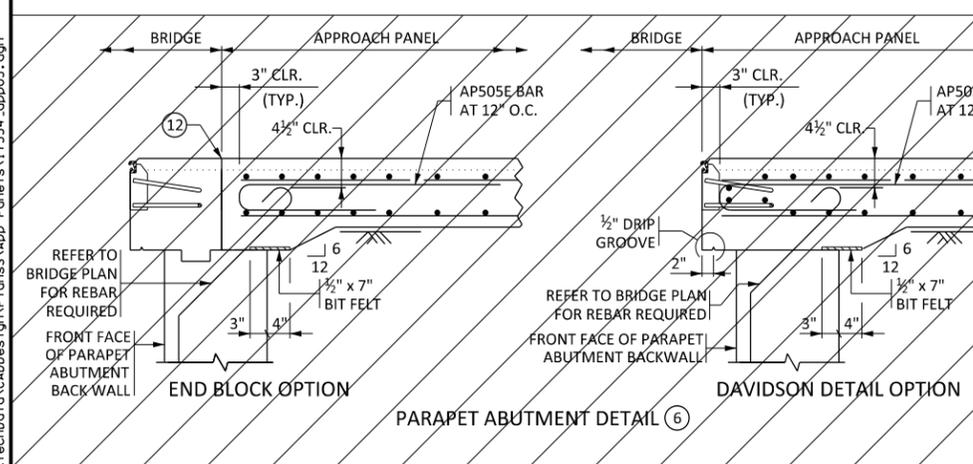
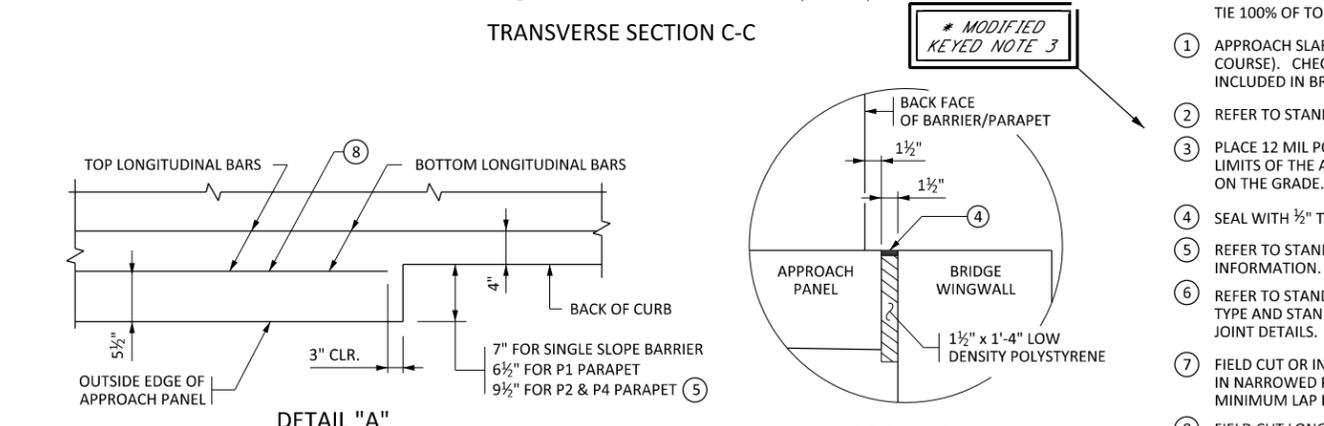
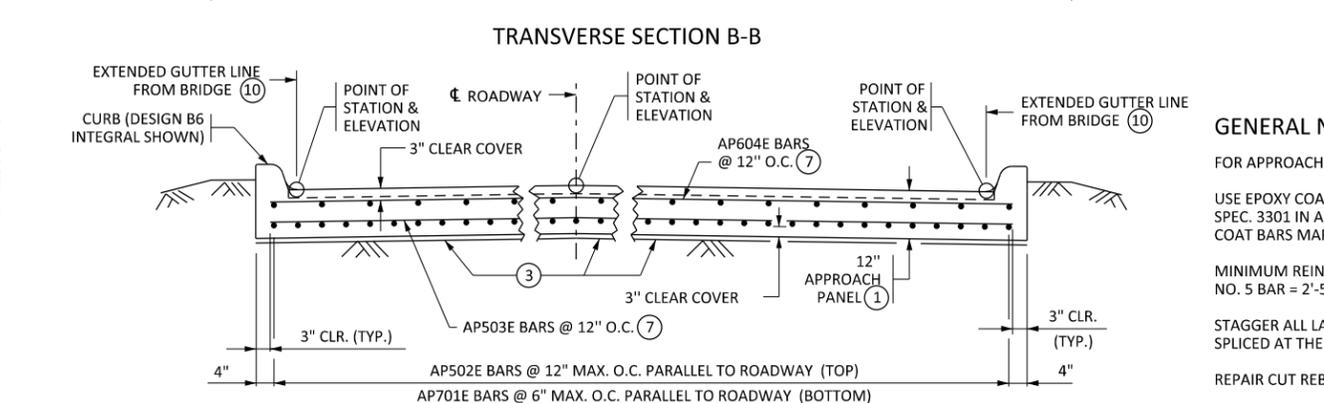
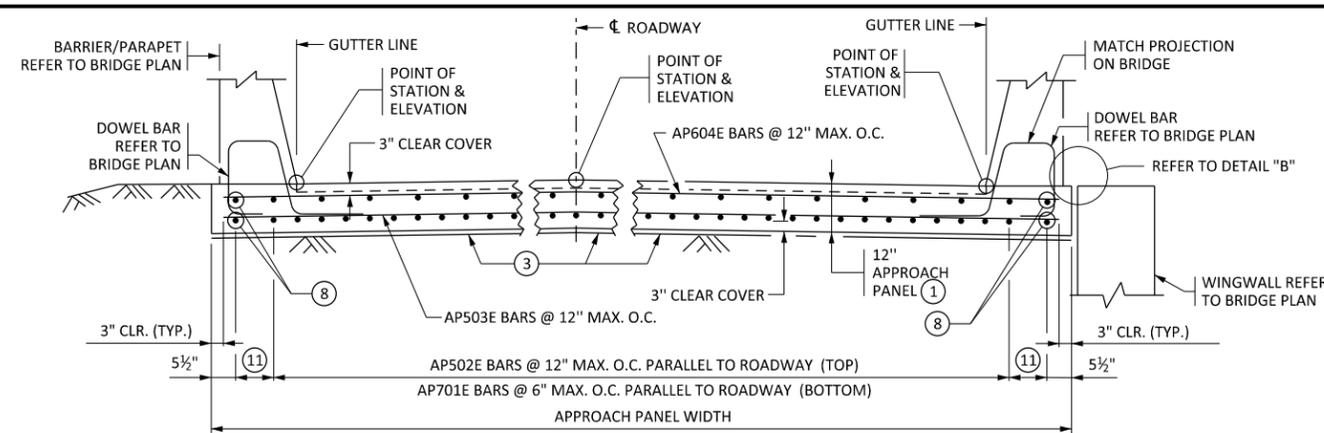
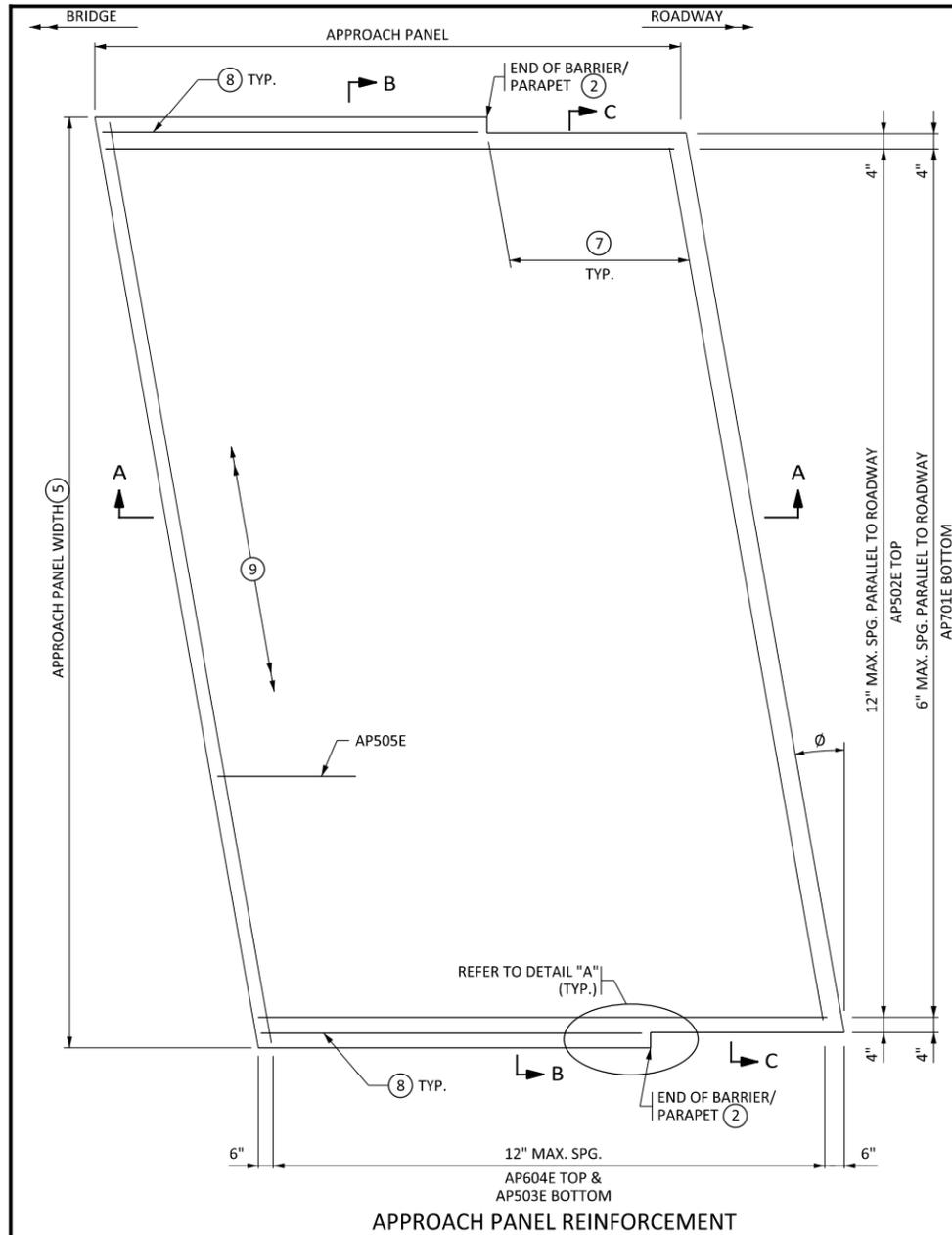


STANDARD PLAN

SAP 002-607-032

SHEET NO. 12

TOTAL SHEETS 54



CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS INCLUDING CURB TRANSITIONS AND ALL DETAILS NECESSARY TO CONSTRUCT THE PANEL. SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.

**SAMPLE BILL OF REINFORCEMENT FOR BRIDGE APPROACH PANELS**

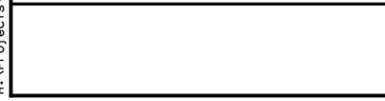
BAR	NO.	LENGTH	SHAPE	LOCATION
AP701E	*	19'-6"	—	BOTTOM LONGITUDINAL
AP502E	**	19'-6"	—	TOP LONGITUDINAL
AP503E	20	***	—	BOTTOM TRANSVERSE
AP604E	20	***	—	TOP TRANSVERSE
AP505E	**	7'-6"	⊔	CONFINEMENT BAR

\* NO. OF BARS = APPROACH PANEL WIDTH (ROUNDED UP TO NEAREST FT.) X 2.  
 \*\* NO. OF BARS = APPROACH PANEL WIDTH (ROUNDED UP TO NEAREST FT.)  
 \*\*\* LENGTH = APPROACH PANEL WIDTH (FT.) X COS θ MINUS 6"  
 θ = SKEW ANGLE

- GENERAL NOTES:**
- FOR APPROACH PANELS WITH RAISED SIDEWALK OR MEDIAN, SEE BRIDGE PLANS.
- USE EPOXY COATED GRADE 60 REINFORCEMENT IN ACCORDANCE WITH SPEC. 3301 IN APPROACH PANEL, CONCRETE SILL, AND CURB TRANSITION. EPOXY COAT BARS MARKED WITH THE SUFFIX "E" IN ACCORDANCE WITH SPEC. 3301.
- MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS: NO. 4 BAR = 1'-11", NO. 5 BAR = 2'-5", NO. 6 BAR = 3'-1", NO. 7 BAR = 3'-7", NO. 8 BAR = 4'-1".
- STAGGER ALL LAP SPLICES SUCH THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.
- REPAIR CUT REBAR ENDS IN ACCORDANCE WITH SPEC. 2472.3C.
- TIE 100% OF TOP MAT REINFORCEMENT BAR INTERSECTIONS.
- APPROACH SLAB THICKNESS IS 12" (12" MONOLITHIC OR 10" SLAB + 2" WEARING COURSE). CHECK BRIDGE PLANS FOR CONCRETE WEARING COURSE, WHICH IS INCLUDED IN BRIDGE PLAN QUANTITIES.
  - REFER TO STANDARD PLAN 5-297.223 FOR END OF BARRIER/PARAPET STATION.
  - PLACE 12 MIL POLYETHYLENE SHEETING (OR 2 LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCLUDED IN THE APPROACH PANEL PAY ITEM.
  - SEAL WITH 1/2" THICKNESS SELF-LEVELING SILICONE IN ACCORDANCE WITH SPEC. 3722.
  - REFER TO STANDARD PLAN 5-297.223 FOR APPROACH PANEL WIDTH AND ADDITIONAL INFORMATION.
  - REFER TO STANDARD PLAN 5-297.223 FOR EXPANSION JOINT TYPE AND ABUTMENT TYPE AND STANDARD PLANS 5-297.225 AND 5-297.226 FOR SILL AND EXPANSION JOINT DETAILS.
  - FIELD CUT OR INCREASE LAP LENGTH ON TRANSVERSE AP503E & AP604E BARS IN NARROWED PORTION OF APPROACH PANEL. REFER TO GENERAL NOTES FOR MINIMUM LAP LENGTHS AND EPOXY REPAIR REQUIREMENTS.
  - FIELD CUT LONGITUDINAL AP502E & AP701E BARS BENEATH BARRIER/PARAPET. REFER TO GENERAL NOTES FOR MINIMUM LAP LENGTHS AND EPOXY REPAIR REQUIREMENTS.
  - AP505E BAR @ 12". REFER TO LONGITUDINAL SECTION A-A.
  - REFER TO STANDARD PLAN 5-297.223 (6 OF 6) FOR EXTENDED GUTTER LINE DETAILS.
  - REFER TO DETAIL "A".
  - CONTRACTION JOINT, REFER TO STANDARD PLAN 5-297.227 FOR ADDITIONAL INFORMATION.

LEAD EXPERT OFFICE

EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE



BRIDGE APPROACH PANEL REINFORCEMENT  
(GREATER THAN 0° UP TO 15° SKEW LEFT)

APPROVED: 04-16-2024  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN

SAP 002-607-032

STANDARD PLAN 5-297.224

2 OF 6

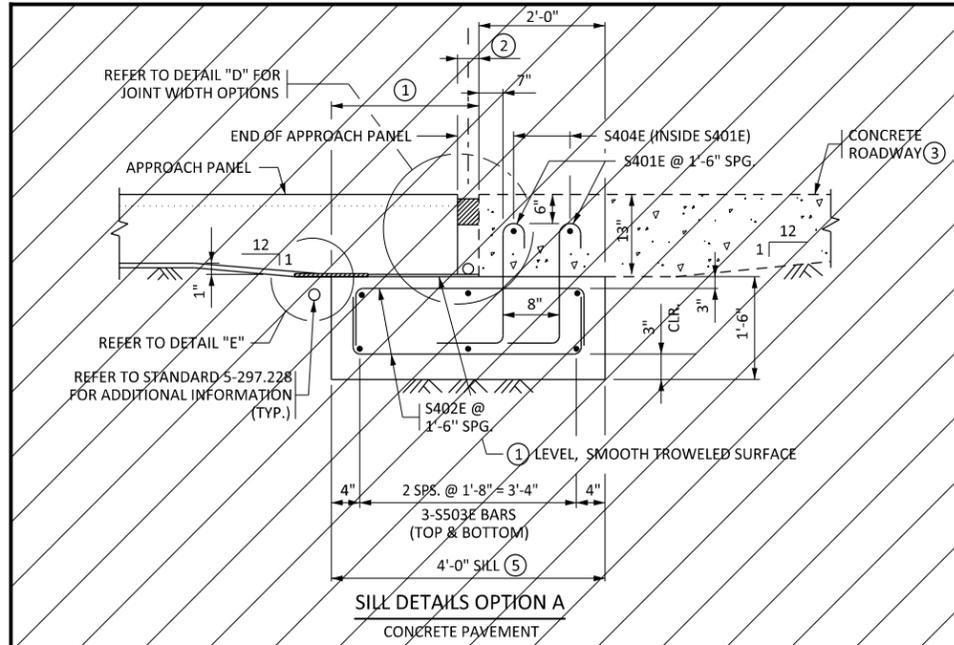
\* INDICATES MODIFICATION FROM STANDARD PLAN

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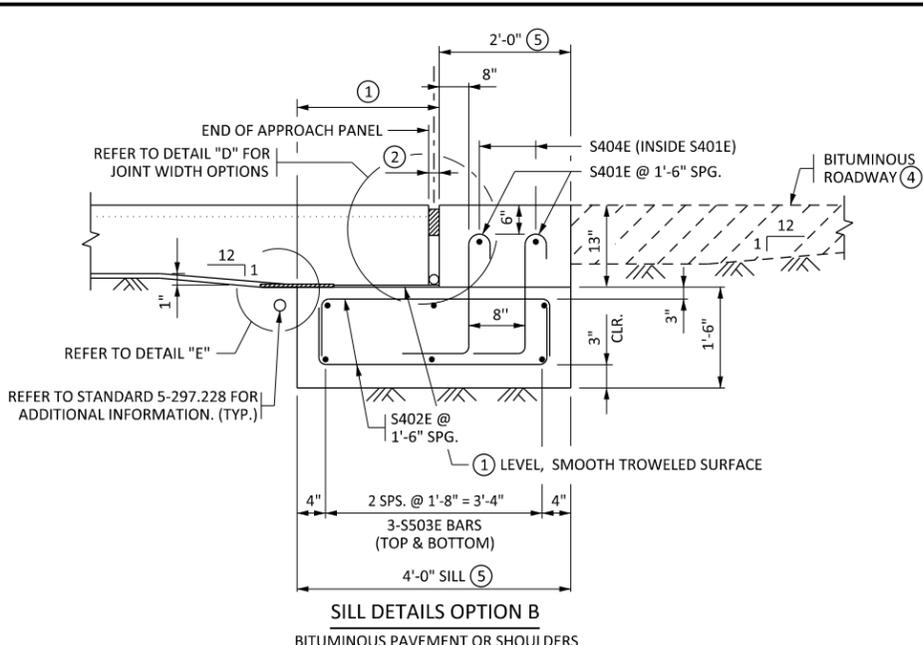
TOTAL SHEETS 54

**MODIFIED**

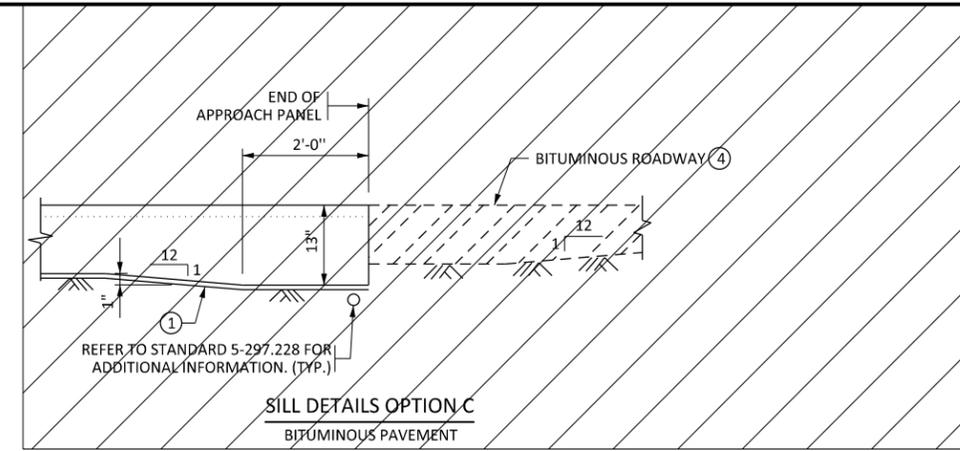
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**SILL DETAILS OPTION A**  
CONCRETE PAVEMENT



**SILL DETAILS OPTION B**  
BITUMINOUS PAVEMENT OR SHOULDERS



**SILL DETAILS OPTION C**  
BITUMINOUS PAVEMENT

CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.

**SAMPLE BILL OF REINFORCEMENT FOR CONCRETE SILL OPTION A**

BAR	NO.	LENGTH	SHAPE	LOCATION
S401E	**	3'-2"	┘	SILL VERTICAL
S402E	**	5'-6"	┘	SILL TIE
* S503E	6	***	—	SILL HORIZONTAL
* S404E	2	***	—	END BLOCK HORIZONTAL

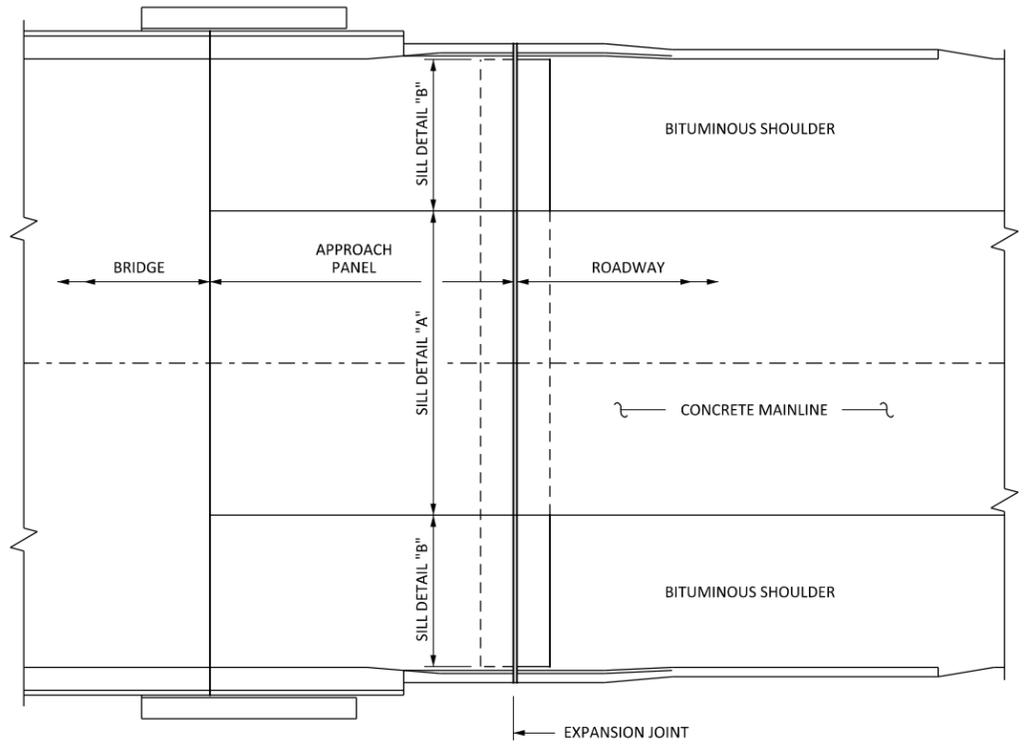
\* MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS:  
 NO. 4 BAR = 1'-11", NO. 5 BAR = 2'-5"  
 \*\* NO. OF BARS =  $2 \times (1 + (\text{APPROACH PANEL WIDTH [FT]} - 2.66')/1.5')$  (ROUNDED UP TO A WHOLE NUMBER)  
 \*\*\* LENGTH =  $(\text{APPROACH PANEL WIDTH [FT]} - 2.5')/\text{COS(SILL SKEW)}$ . ROUND DOWN TO NEAREST INCH.  
 \*\*\*\* LENGTH =  $(\text{APPROACH PANEL WIDTH [FT]} - 0.5')/\text{COS(SILL SKEW)}$ . ROUND DOWN TO NEAREST INCH.

CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.

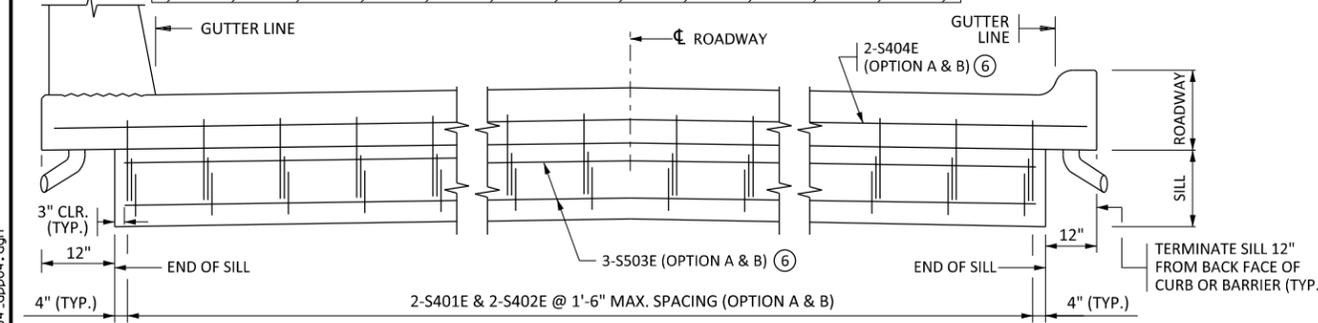
**SAMPLE BILL OF REINFORCEMENT FOR CONCRETE SILL OPTION B**

BAR	NO.	LENGTH	SHAPE	LOCATION
S401E	**	3'-2"	┘	SILL VERTICAL
S402E	**	5'-6"	┘	SILL TIE
* S503E	6	***	—	SILL HORIZONTAL
* S404E	2	***	—	END BLOCK HORIZONTAL

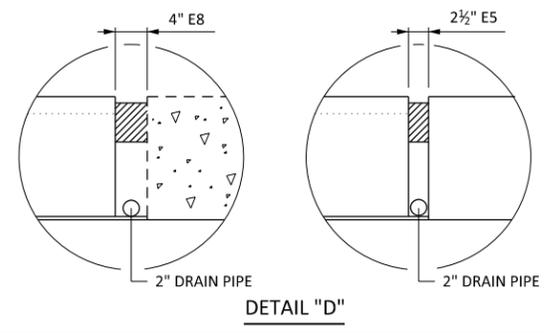
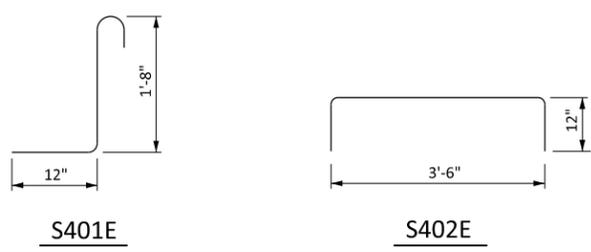
\* MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS:  
 NO. 4 BAR = 1'-11", NO. 5 BAR = 2'-5"  
 \*\* NO. OF BARS =  $2 \times (1 + (\text{APPROACH PANEL WIDTH [FT]} - 2.66')/1.5')$  (ROUNDED UP TO A WHOLE NUMBER)  
 \*\*\* LENGTH =  $(\text{APPROACH PANEL WIDTH [FT]} - 2.5')/\text{COS(SILL SKEW)}$ . ROUND DOWN TO NEAREST INCH.  
 \*\*\*\* LENGTH =  $(\text{APPROACH PANEL WIDTH [FT]} - 0.5')/\text{COS(SILL SKEW)}$ . ROUND DOWN TO NEAREST INCH.



**SILL DETAIL - OPTION A FOR CONCRETE MAINLINE, OPTION B FOR BITUMINOUS SHOULDERS**



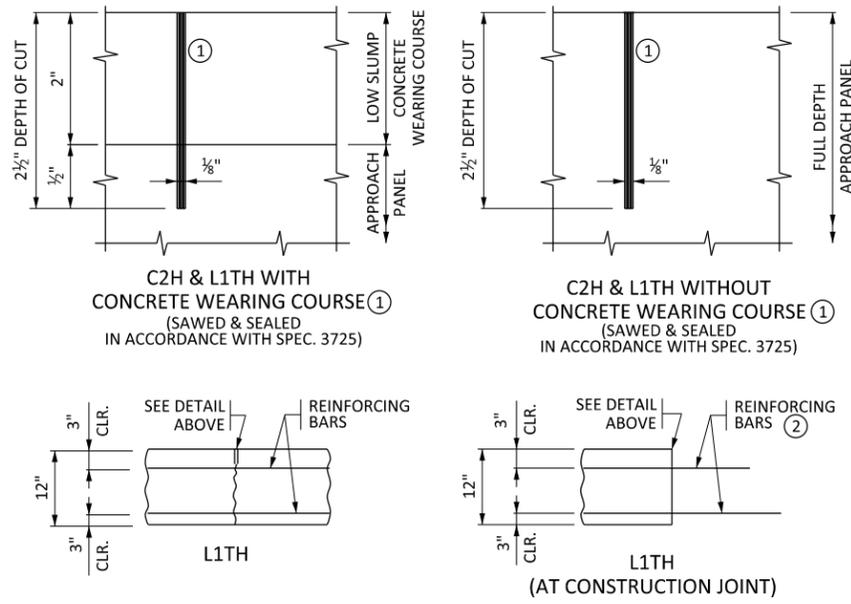
**SILL ELEVATION**  
(REINFORCEMENT IN PAVEMENT NOT SHOWN)



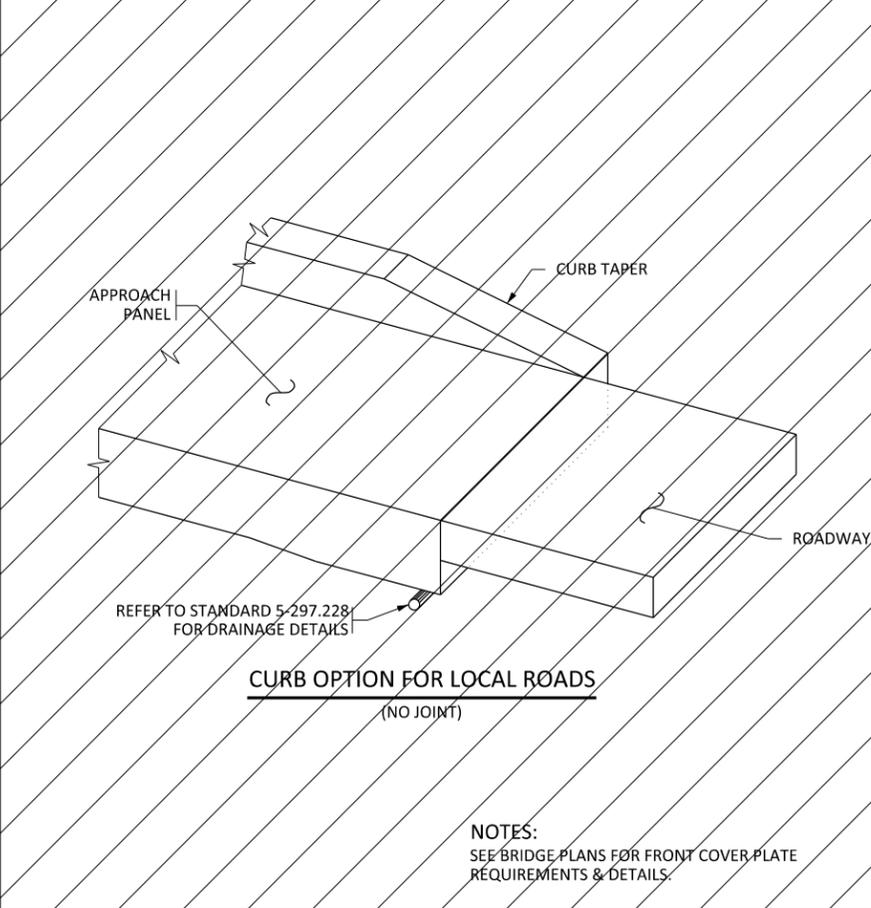
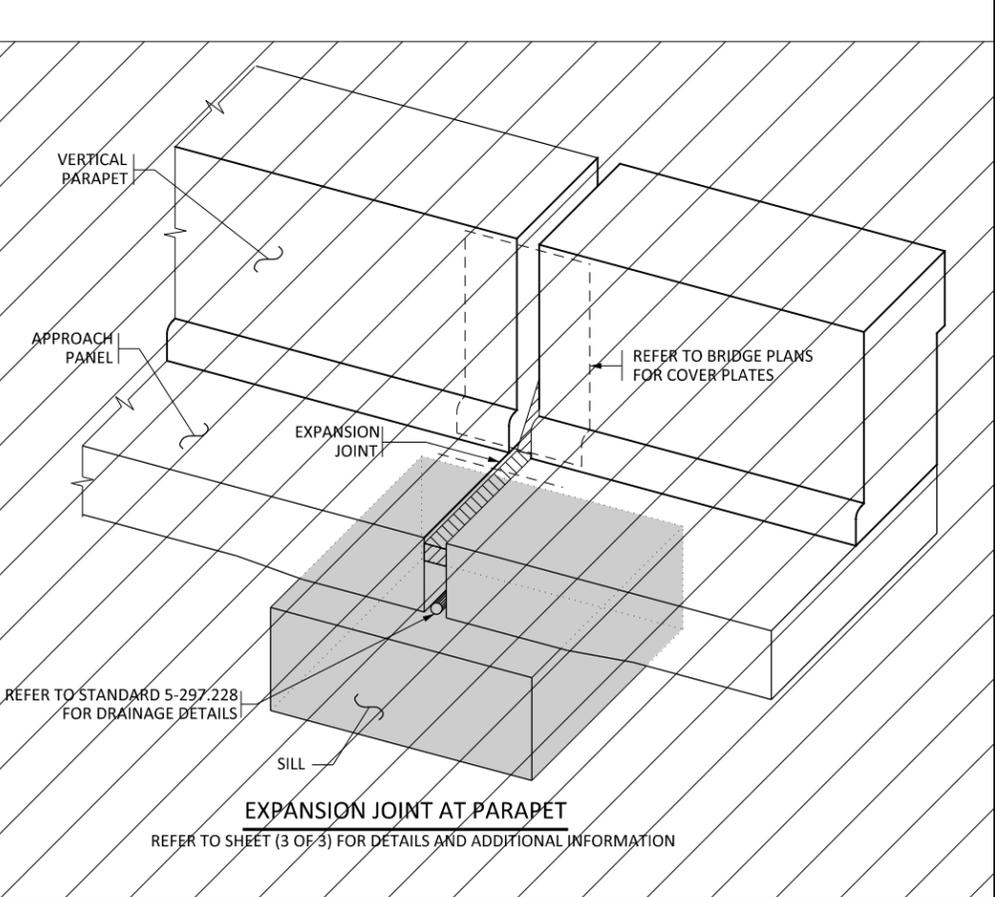
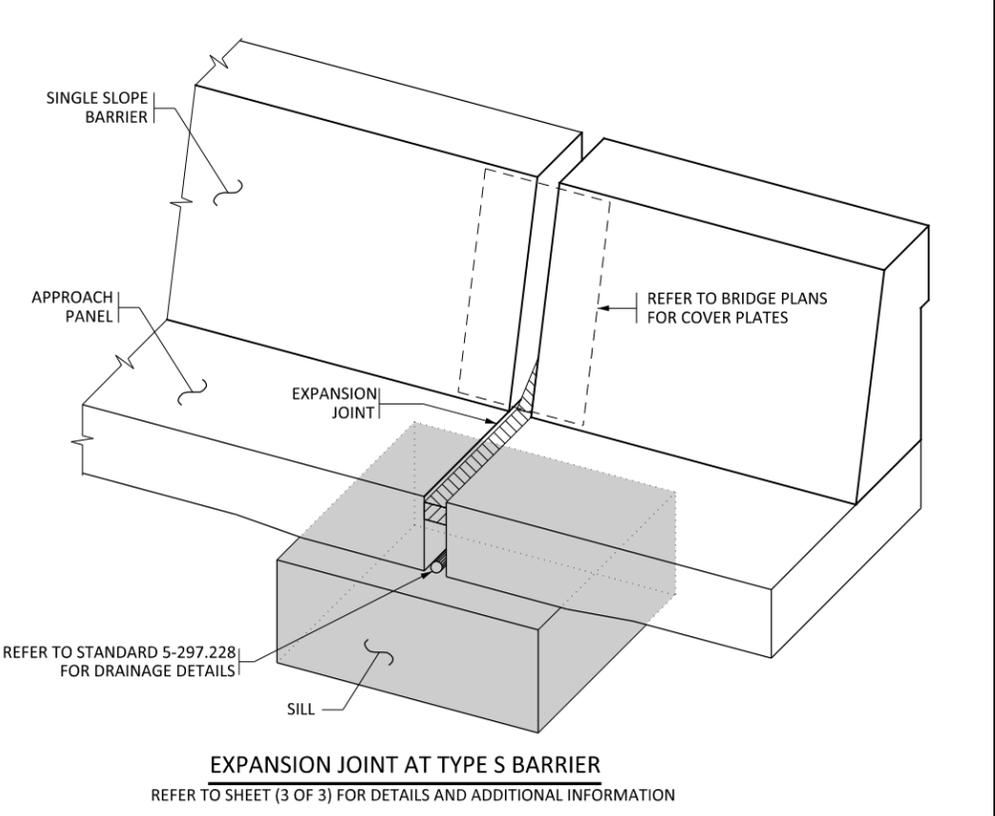
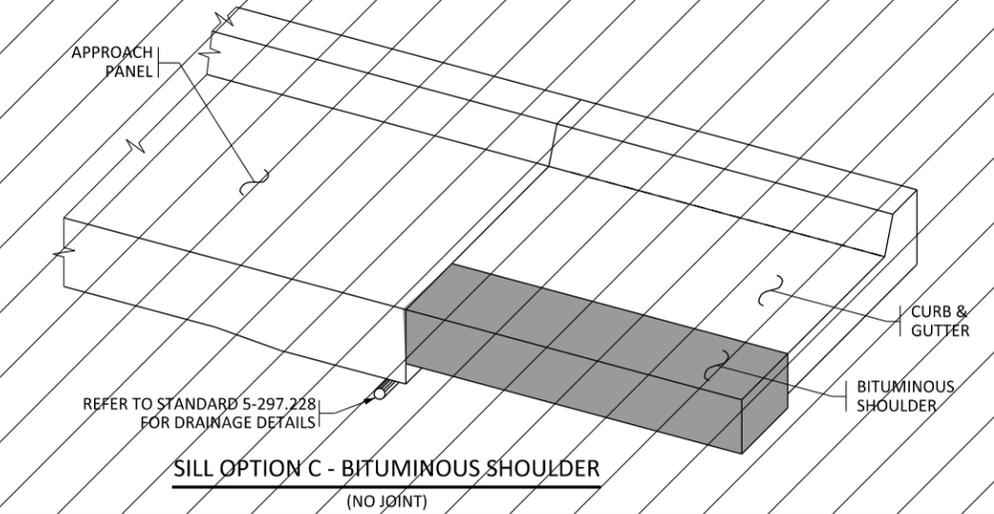
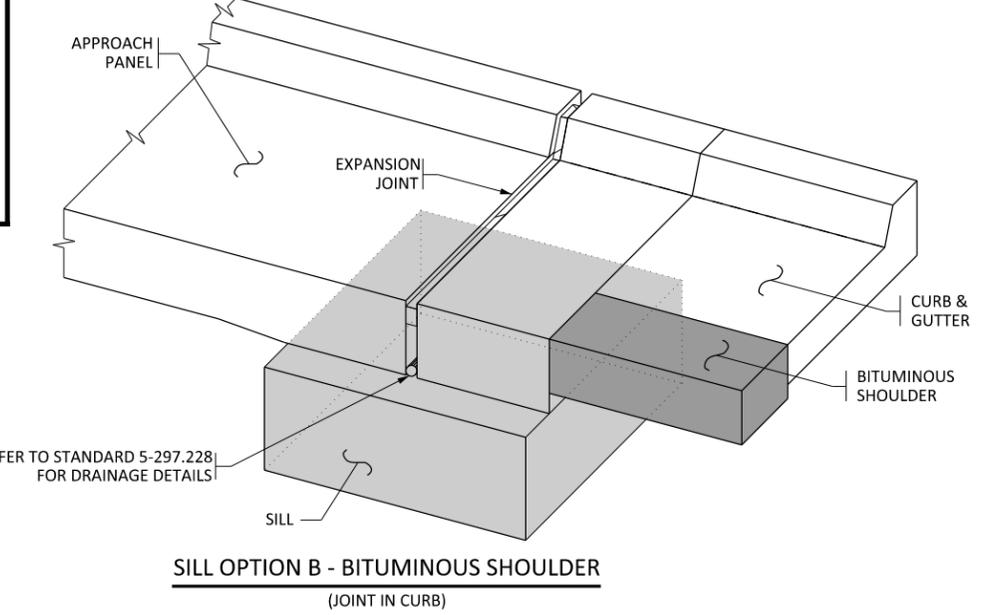
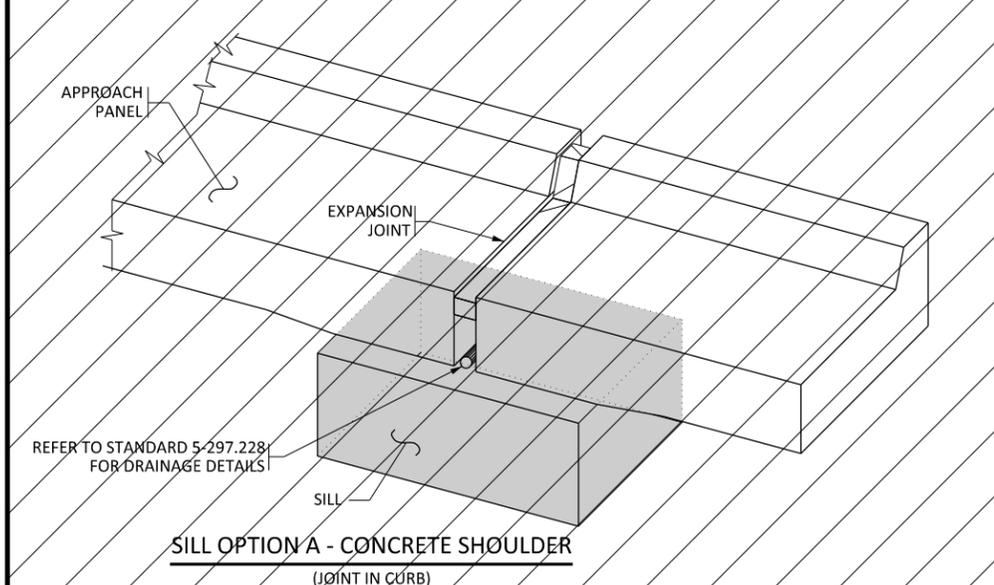
- NOTES:**
- USE EPOXY COATED GRADE 60 REINFORCEMENT IN ACCORDANCE WITH SPEC 3301.
  - USE CONCRETE MIX 3S52.
  - REFER TO TABLE ON STANDARD PLAN 5-297.223 FOR SILL OPTION TYPE.
  - REPAIR CUT REBAR ENDS IN ACCORDANCE WITH SPEC. 2472.3C.
  - STAGGER ALL LAP SPLICES SUCH THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.
  - 1 EXTEND 8 MIL. POLYETHYLENE SHEETING (OR 2 LAYERS OF 4 MIL.) FROM UNDERSIDE OF APPROACH PANEL ONTO THE TOP OF THE SILL, IF PRESENT. COVER AREA SHOWN IN DETAIL. (SHEETING IS INCLUDED IN THE APPROACH PANEL PAY ITEM).
  - 2 REFER TO TABLE ON STANDARD PLAN 5-297.223 FOR EXPANSION JOINT TYPE AND STANDARD PLAN 5-297.226 (3 OF 3) FOR EXPANSION JOINT DETAILS.
  - 3 REFER TO PAVING PLANS AND STANDARD PLAN 5-297.235 FOR LUGS IN CONCRETE PAVEMENT.
  - 4 REFER TO PAVING PLANS FOR BITUMINOUS HEADER DETAIL.
  - 5 INCLUDED IN PAYMENT FOR APPROACH PANEL.
  - 6 FIELD CUT OR INCREASE LAP LENGTH ON TRANSVERSE S503E AND S404E BARS IN NARROWED PORTION OF APPROACH PANEL. REFER TO GENERAL NOTES FOR MINIMUM LAP LENGTHS AND EPOXY REPAIR REQUIREMENTS.

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# JOINT DETAILS



- ① CLEAN AND DRY FULLY CURED JOINT FACES BY SANDBLASTING PRIOR TO SEALING THE JOINT.
- ② WHEN CONSTRUCTING A L1TH JOINT UNDER STAGED CONSTRUCTION, EXTEND NO. 4 BARS 1'-8" AND NO. 5 BARS 2'-1" PAST THE EDGE OF THE FIRST CONCRETE POUR. CONSTRUCT L1TH JOINT ACCORDING TO DETAIL SHOWN AFTER ADJACENT POUR IS COMPLETE.



NOTES:  
SEE BRIDGE PLANS FOR FRONT COVER PLATE REQUIREMENTS & DETAILS.

LEAD EXPERT OFFICE  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

BRIDGE APPROACH PANEL JOINT DETAILS

APPROVED: 04-16-2024  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.226

1 OF 3

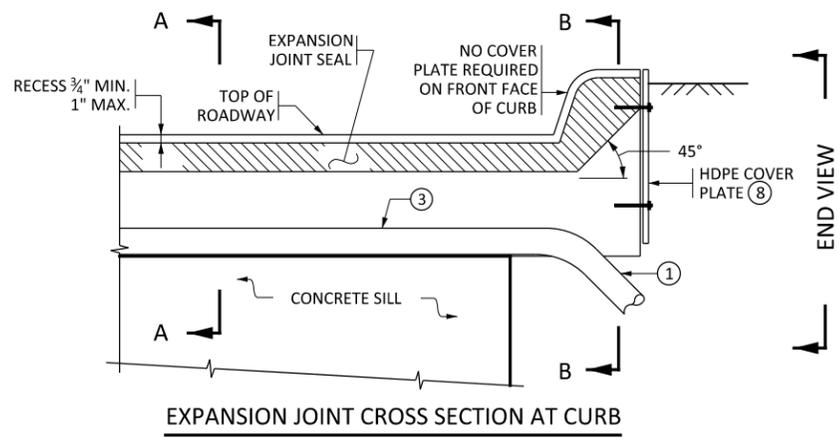
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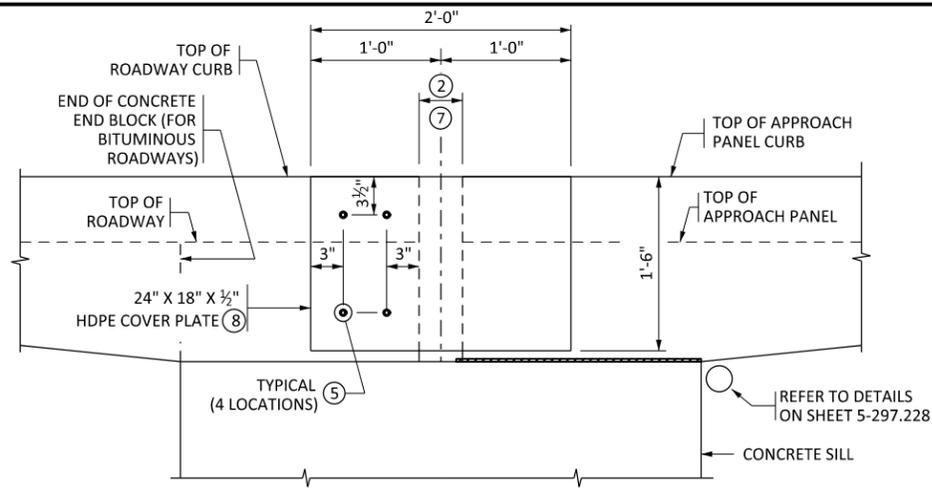
STANDARD PLAN

SAP 002-607-032

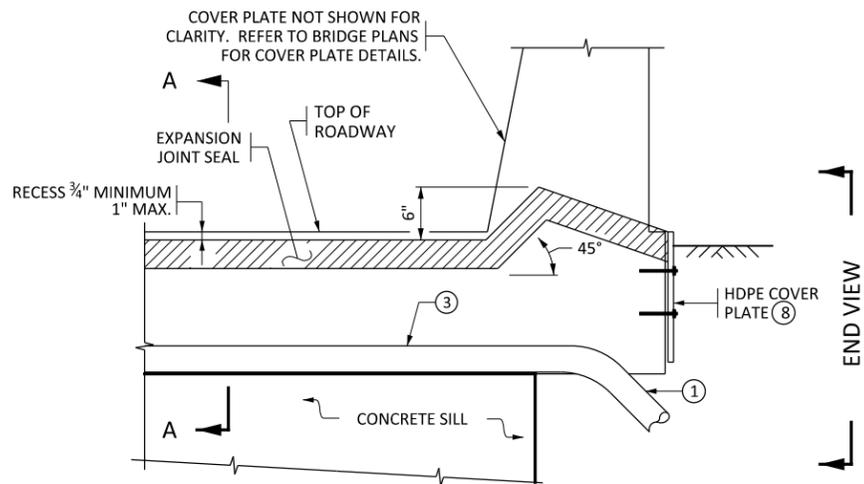
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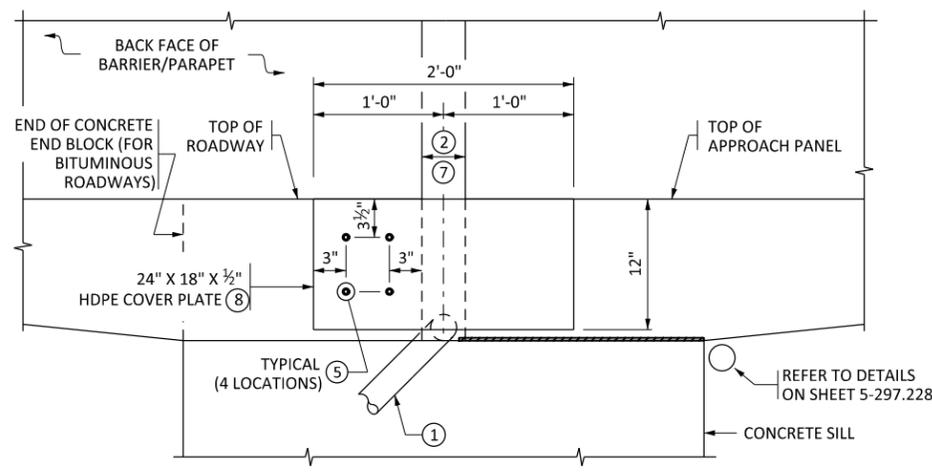
EXPANSION JOINT CROSS SECTION AT CURB



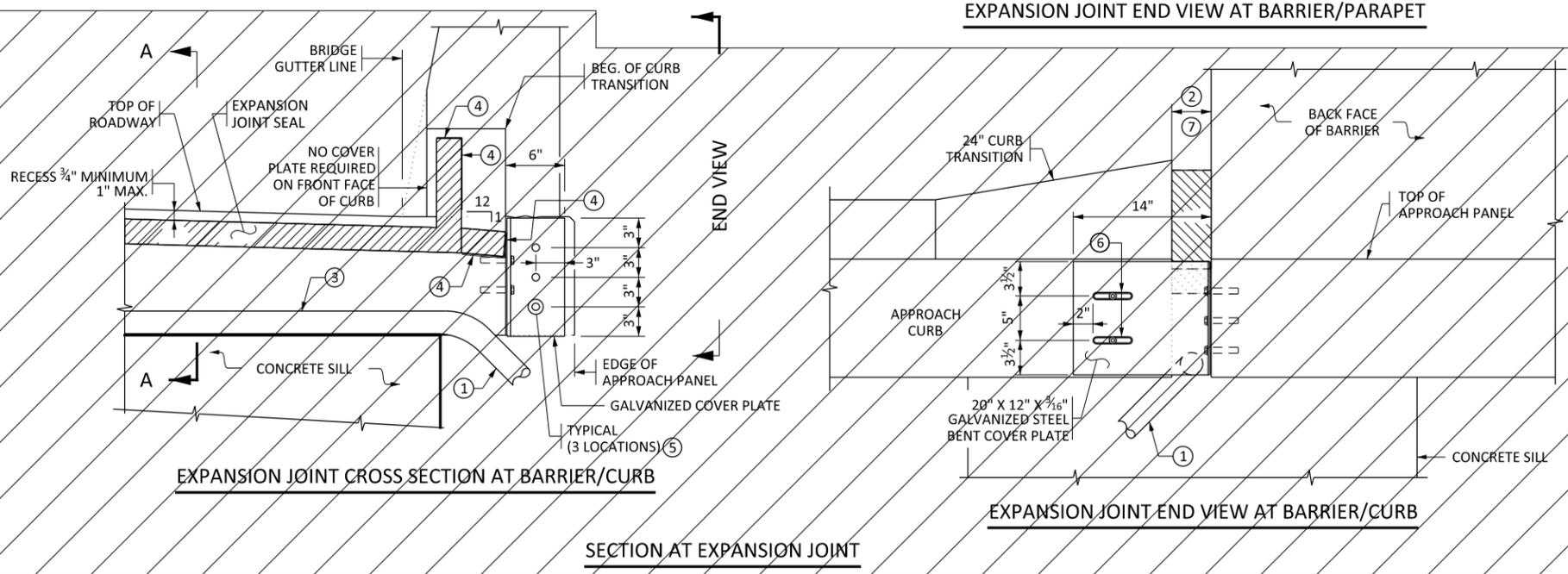
EXPANSION JOINT END VIEW AT CURB



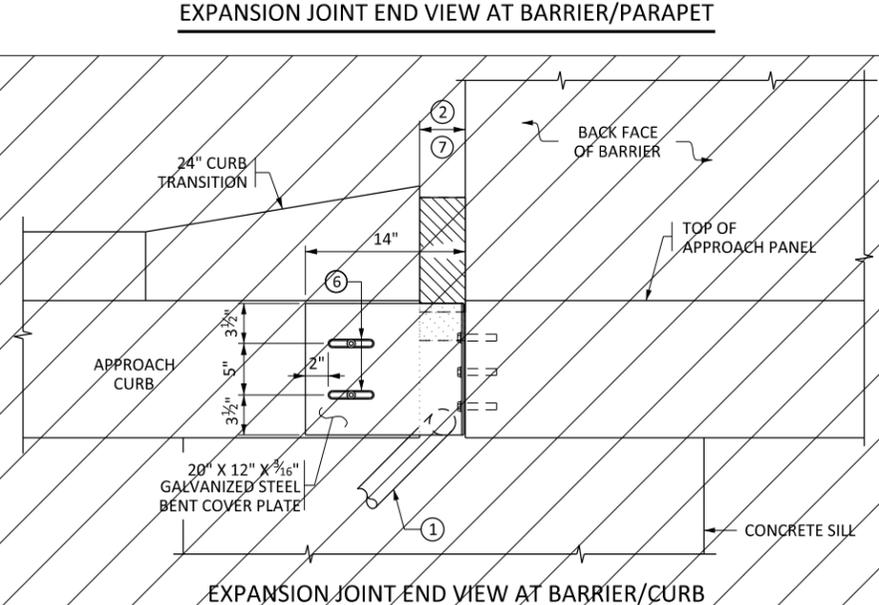
EXPANSION JOINT CROSS SECTION AT BARRIER/PARAPET  
(TYPE S BARRIER SHOWN, OTHER BARRIERS SIMILAR)



EXPANSION JOINT END VIEW AT BARRIER/PARAPET



EXPANSION JOINT CROSS SECTION AT BARRIER/CURB



EXPANSION JOINT END VIEW AT BARRIER/CURB

**EXPANSION JOINT SEAL INSTALLATION INSTRUCTIONS**

ALL CONCRETE SURFACES THAT ARE IN CONTACT WITH THE SEAL ADHESIVE MUST BE AT LEAST 28 CALENDAR DAYS OLD PRIOR TO INSTALLATION OF THE APPROACH PANEL EXPANSION JOINT SEAL.

REFER TO SPEC. 2406, "BRIDGE APPROACH PANELS," THE SPECIAL PROVISIONS, AND THE MNDOT APL "APPROACH PANEL EXPANSION JOINT SEAL."

VERIFY THE JOINT OPENING IS UNIFORM AND PER PLAN DIMENSIONS, AND THAT THE CONCRETE SURFACE IS APPROPRIATELY PREPARED PER PRODUCT MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUPPLY A JOINT MATERIAL THAT IS DESIGNED BY THE MANUFACTURER TO FIT THE FIELD MEASURED JOINT OPENING.

PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS TO THE ENGINEER A MINIMUM OF THREE CALENDAR DAYS PRIOR TO THE INSTALLATION. CAREFULLY READ, UNDERSTAND AND INSTALL THE SEAL PER THE MANUFACTURER'S INSTALLATION PROCEDURE EXCEPT AS DETAILED.

PLACE APPROACH PANEL EXPANSION JOINT SEAL POSITIONING IT TO WITHIN 3/4" MINIMUM, 1" MAX. RECESSED FROM THE TRAFFIC SURFACE PER THE DETAIL.

1 PLACE THE 2" PERFORATED PIPE, AS DETAILED IN NOTE 3, ON TOP OF THE CONCRETE SILL AS SHOWN. CONNECT 1 1/2" PIPE BEYOND SILL INTO EXISTING 4" DRAIN SYSTEM IF AVAILABLE. IF NOT AVAILABLE THEN DAYLIGHT USING A PRECAST CONCRETE HEADWALL IN ACCORDANCE WITH STANDARD PLATE 3131 OR DRAIN INTO CATCH BASIN. EITHER OPTION IS INCLUDED IN THE APPROACH PANEL PAY ITEM. REFER TO STANDARD 5-297.228 FOR ADDITIONAL DRAINAGE DETAILS. LOCATE GUARDRAIL POSTS PRIOR TO INSTALLING PIPE AND ROUTE PIPE TO PROVIDE 12" MINIMUM BETWEEN C PIPE AND EDGE OF GUARDRAIL POST. REFER TO STANDARD PLAN 5-297.693 AND 5-297.694 FOR GUARDRAIL POST LOCATIONS.

2 REFER TO STANDARD PLAN 5-297.223 FOR EXPANSION JOINT TYPE AND STANDARD PLAN 5-297.225 FOR SILL AND EXPANSION JOINT DETAILS.

NOTES:  
FURNISHING AND INSTALLING COVER PLATES AND CONCRETE ANCHORS IS INCLUDED IN THE APPROACH PANEL PAY ITEM.

3 2" NOMINAL DIA. PERFORATED PIPE IN ACCORDANCE WITH SPEC. 3278.2.B. SLEEVE WITH GEOTEXTILE IN ACCORDANCE WITH SPEC. 3733 TYPE 1.

4 SEAL UNCOATED EXPOSED SURFACE WITH MANUFACTURER'S APPROVED SEALANT.

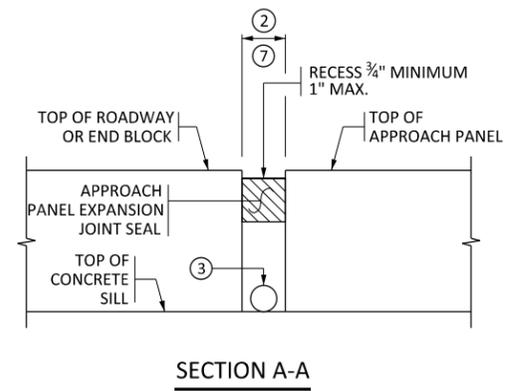
5 3/4" DIA. HOLE. 1/2" X 3" GALVANIZED STEEL CONCRETE ANCHORS WITH WASHERS IN ACCORDANCE WITH SPEC. 3392.

6 3/4" X 4" SLOTTED HOLE. PLACE 1/2" X 3" GALVANIZED STEEL CONCRETE ANCHOR WITH WASHER IN CENTER OF SLOT, SNUG TIGHT, ALLOWING PLATE TO SLIDE.

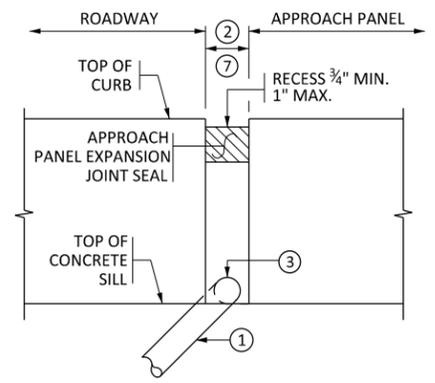
7 IF APPROACH PANEL IS TIED TO A JOINTLESS BRIDGE, REMOVE THE FORM THAT MAINTAINS THE WIDTH OF THE APPROACH PANEL JOINT OPENING AS SOON AS THE CONCRETE SETS ON BOTH SIDES OF THE OPENING.

8 PLACE A BLACK HDPE COVER PLATE IN ACCORDANCE WITH ASTM D4976 GROUP 2, CLASS 3, GRADE 5.

▨ DENOTES EXPANSION JOINT SEAL MATERIAL



SECTION A-A



SECTION B-B

LEAD EXPERT OFFICE  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

BRIDGE APPROACH PANEL  
JOINT DETAILS

APPROVED: 04-16-2024  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.226

3 OF 3

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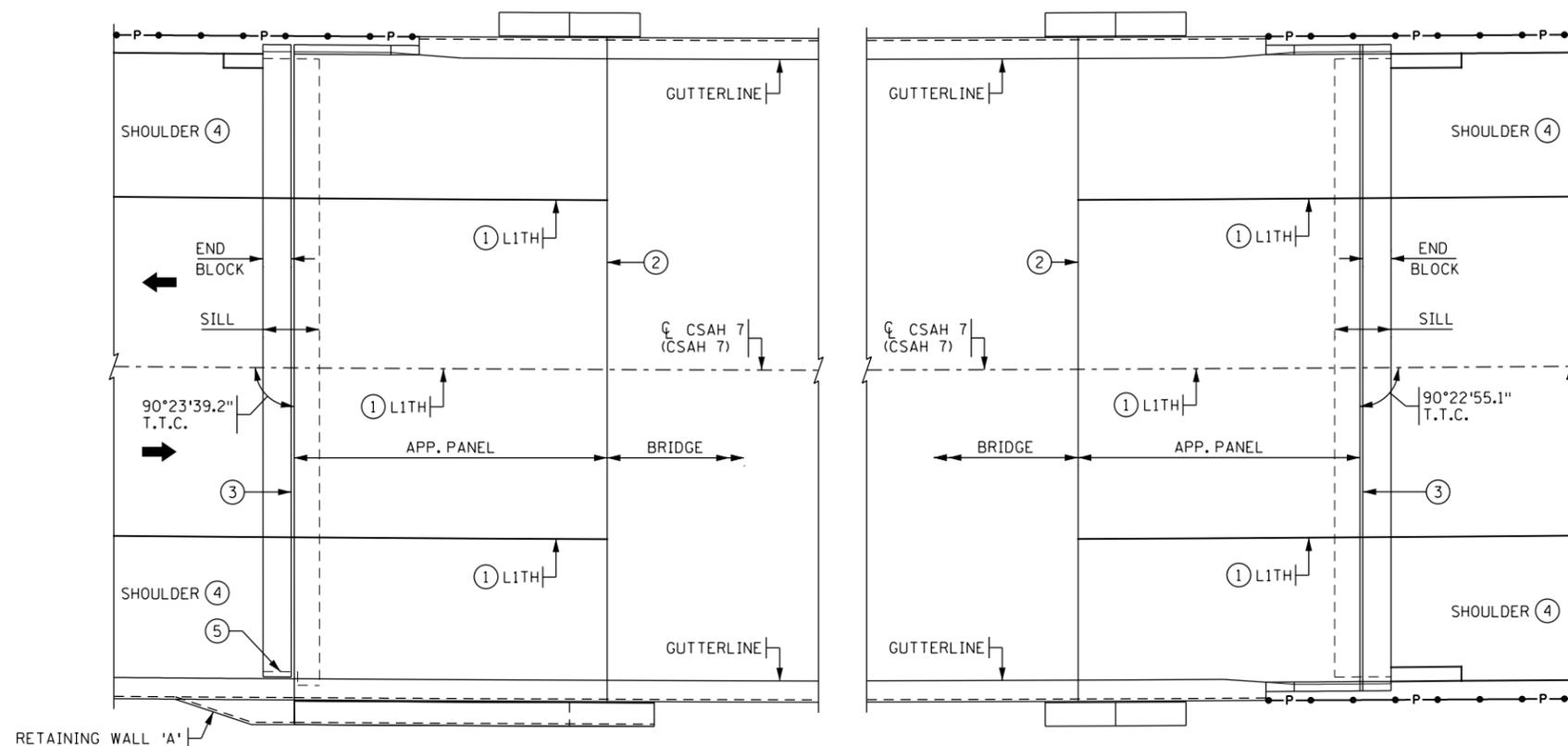


STANDARD PLAN

SAP 002-607-032

SHEET NO. 16

TOTAL SHEETS 54



**APPROACH PANELS - 0° TO 15° SKEW**

\* MODIFIED  
PLAN DETAIL

**APPROACH PANEL JOINT LAYOUT NOTES:**

REFER TO STANDARD PLAN SHEET 5-297.226 FOR ADDITIONAL INFORMATION AND DETAILS FOR THE VARIOUS JOINT TYPES.

SAWCUT ALL JOINTS. SAWCUTS SHALL BE MADE WHILE THE CONCRETE IS STILL GREEN. WHEN A CONCRETE WEARING COURSE IS SPECIFIED, SAWCUT THROUGH BOTH THE WEARING COURSE AND THE UNDERLYING APPROACH SLAB IN A SINGLE OPERATION.

- ① L1TH LONGITUDINAL JOINT. SEE STANDARD PLAN 5-297.226 FOR REINFORCEMENT LAP LENGTH REQUIREMENTS FOR STAGED CONSTRUCTION.
- ② C2H CONTRACTION JOINT ON INTEGRAL ABUTMENT, SEMI-INTEGRAL ABUTMENT, AND PARAPET ABUTMENT BRIDGES WITH AN END BLOCK. WATERPROOF EXPANSION DEVICE ON PARAPET ABUTMENT BRIDGES WITH DAVIDSON DETAIL (REFER TO BRIDGE PLANS).
- ③ REFER TO STANDARD PLAN 5-297.223 FOR EXPANSION JOINT TYPE. EXPANSION JOINT IS PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB OR BARRIER/PARAPET TO BACK OF CURB OR BARRIER/PARAPET.
- ④ REFER TO ROADWAY PLAN FOR PAVEMENT, LANE AND SHOULDER WIDTHS AND CONFIGURATION.
- ⑤ SILL BLOCKOUT FOR RETAINING WALL REQUIRED. SEE APPROACH PANEL TO RETAINING WALL DETAIL ON STANDARD PLAN 5-297.228.

\* ADDED  
KEYED NOTE 5

\* INDICATES MODIFICATION FROM STANDARD PLAN

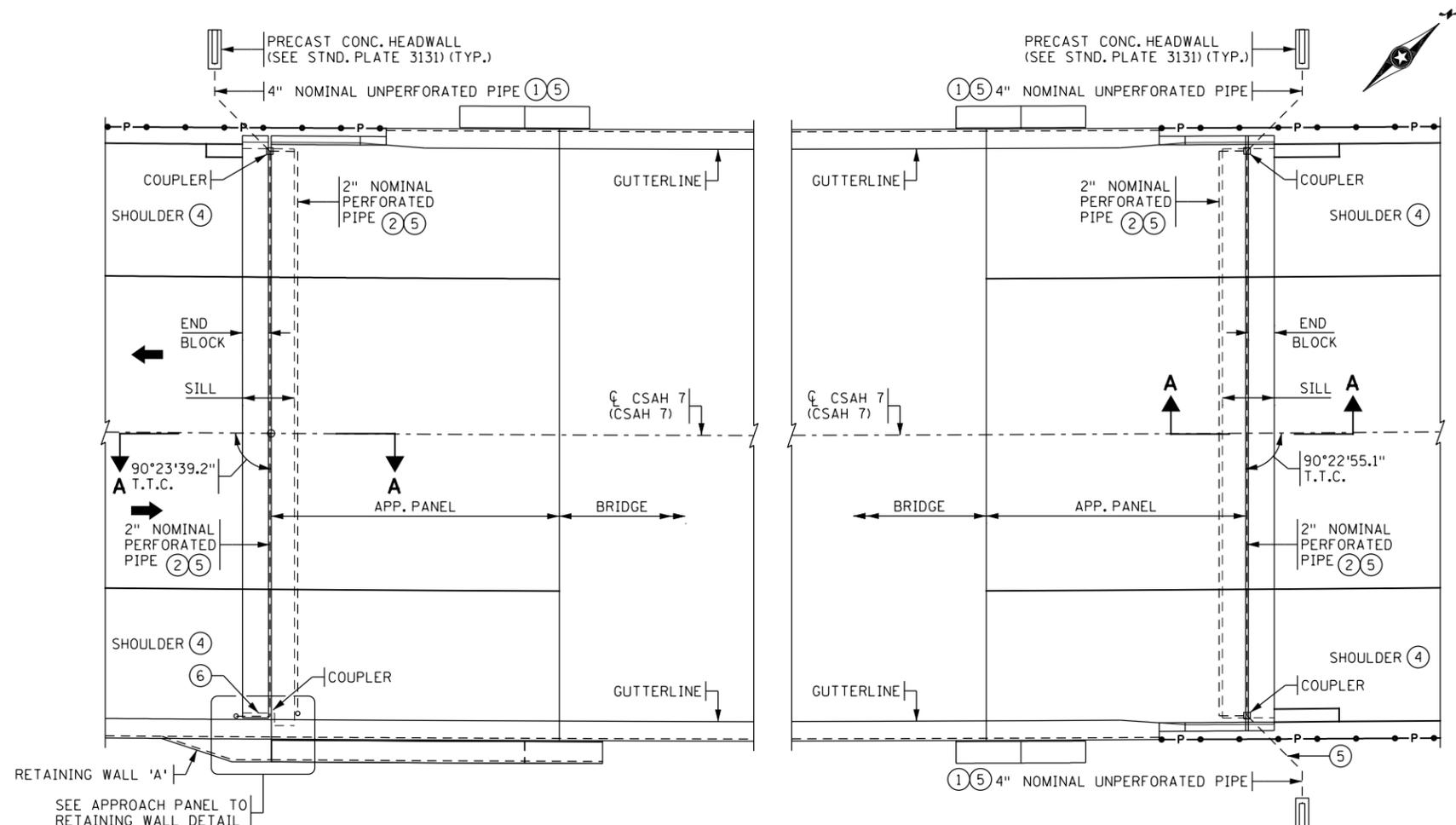
**MODIFIED**

LEAD EXPERT OFFICE	EDWARD LUTGEN OFFICE DIRECTOR BRIDGE OFFICE	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. CERTIFIED BY: <i>Kyle Harrison</i> LICENSED PROFESSIONAL ENGINEER DATE: 06/17/2025 PRINTED NAME: KYLE HARRISON LIC. NO. 53658	BRIDGE APPROACH PANEL JOINT LAYOUT (0° UP TO 15° SKEWS)	APPROVED: 04-16-2024	THOMAS STYRBICKI STATE DESIGN ENGINEER	STANDARD PLAN 5-297.227	1 OF 2
				REVISED:			



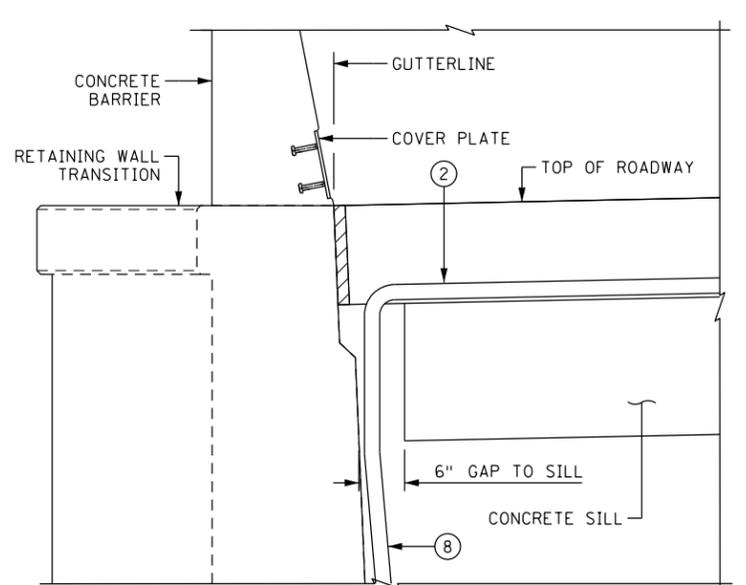
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**APPROACH PANEL PLAN**

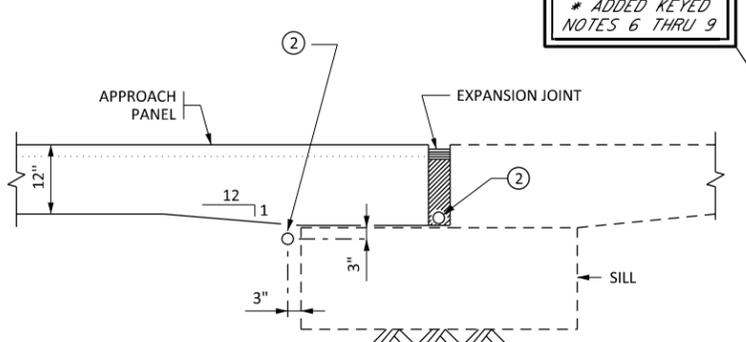
\* MODIFIED PLAN DETAIL



**SECTION B-B**

DRAINAGE AT EXPANSION JOINT DETAIL AT END OF RETAINING WALL

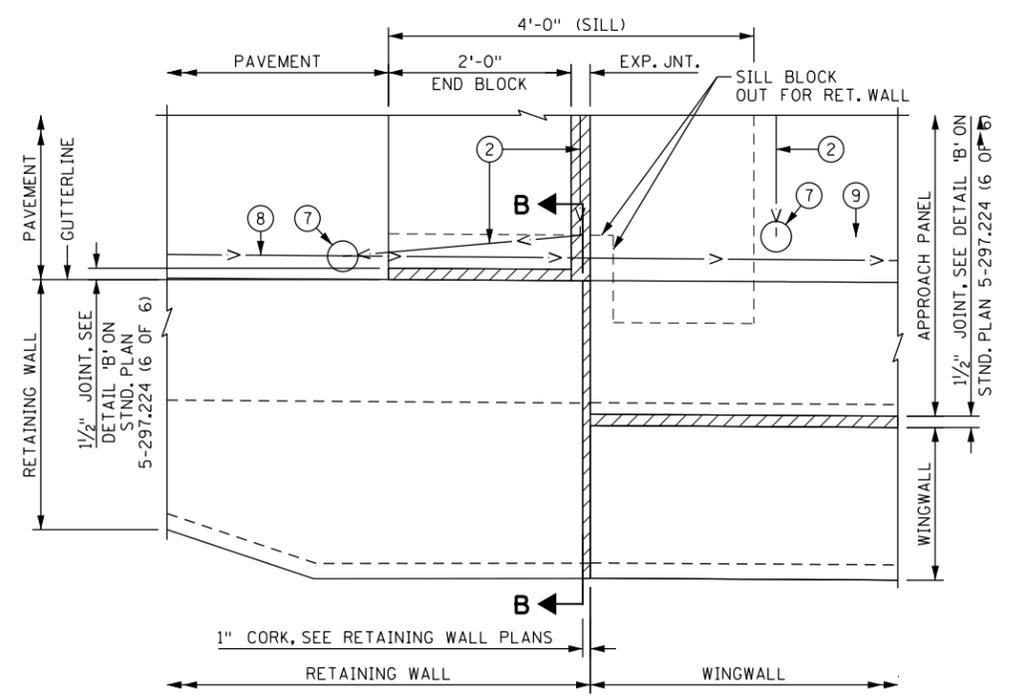
\* ADDED SECTION B-B



**SECTION A-A**

DRAINAGE AT EXPANSION JOINT DETAIL REFER TO STANDARD PLAN 5-297.225 FOR ADDITIONAL SILL OPTIONS AND DETAILS

\* ADDED KEYED NOTES 6 THRU 9



**APPROACH PANEL TO RETAINING WALL DETAIL**

\* ADDED DETAIL

**NOTES:**

- ① UNPERFORATED PIPE IN ACCORDANCE WITH SPEC 3245.2(5). 1/8 INCH PER 12 INCH MINIMUM SLOPE. FURNISHING AND INSTALLING THE DRAIN SYSTEM IS INCLUDED IN THE APPROACH PANEL PAY ITEM.
- ② 2" NOMINAL PERFORATED PIPE IN ACCORDANCE WITH SPEC 3278. SLEEVE WITH GEOTEXTILE IN ACCORDANCE WITH SPEC. 3733 TYPE 1. 1/8 INCH PER 12 INCH MINIMUM SLOPE. FURNISHING AND INSTALLING DRAIN SYSTEM IS INCLUDED IN THE APPROACH PANEL PAY ITEM. REFER TO STANDARD PLAN 5-297.226 FOR ADDITIONAL INFORMATION AND DETAILS.
- ③ REFER TO CONSTRUCTION PLANS TO DETERMINE WHETHER A FLUME OR CATCH BASIN IS REQUIRED AND FOR ADDITIONAL DRAINAGE DETAILS.
- ④ SEE CONSTRUCTION PLANS FOR PAVEMENT, LANE AND SHOULDER WIDTHS AND CONFIGURATION.
- ⑤ CONNECT 2" PIPE BEYOND SILL INTO 4" DRAIN SYSTEM IF AVAILABLE. IF NOT AVAILABLE THEN DAYLIGHT USING A PRECAST CONCRETE HEADWALL IN ACCORDANCE WITH STANDARD PLATE 3131 OR DRAIN INTO CATCH BASIN. EITHER OPTION IS INCLUDED IN THE APPROACH PANEL PAY ITEM. REFER TO STANDARD PLAN 5-297.226 (3 OF 3) FOR PIPE DETAILS AT END OF SILL AND FOR ADDITIONAL DRAINAGE DETAILS. LOCATE GUARDRAIL POSTS PRIOR TO INSTALLING PIPE AND ROUTE PIPE TO PROVIDE 12" MINIMUM BETWEEN C PIPE AND EDGE OF GUARDRAIL POST. REFER TO STANDARD PLAN 5-297.693 AND 5-297.694 FOR GUARDRAIL POST LOCATIONS.
- ⑥ SILL BLOCKOUT FOR RETAINING WALL REQUIRED. SEE APPROACH PANEL TO RETAINING WALL DETAIL.
- ⑦ CONNECT TO DRAINAGE SYSTEM BELOW WITH COUPLER & VERTICAL UNPERFORATED PIPE. SEE RETAINING WALL PLANS FOR ADDITIONAL INFORMATION.
- ⑧ DRAINAGE SYSTEM WALL AT TOP OF RETAINING WALL FOOTING. SEE RETAINING WALL PLANS.
- ⑨ DRAINAGE SYSTEM B910 AT TOP OF WINGWALL FOOTING. SEE BRIDGE DETAILS IN BRIDGE NO. 02598 PLANS.

\* INDICATES MODIFICATION FROM STANDARD PLAN

**MODIFIED**

**LEAD EXPERT OFFICE**  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

CERTIFIED BY: *Kyle Harrison*  
LICENSED PROFESSIONAL ENGINEER  
PRINTED NAME: KYLE HARRISON

06/17/2025  
DATE  
LIC. NO. 53658

**BRIDGE APPROACH PANEL DRAINAGE LAYOUT**

APPROVED: 04-16-2024  
REVISED:

*Thomas Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

**STANDARD PLAN 5-297.228**

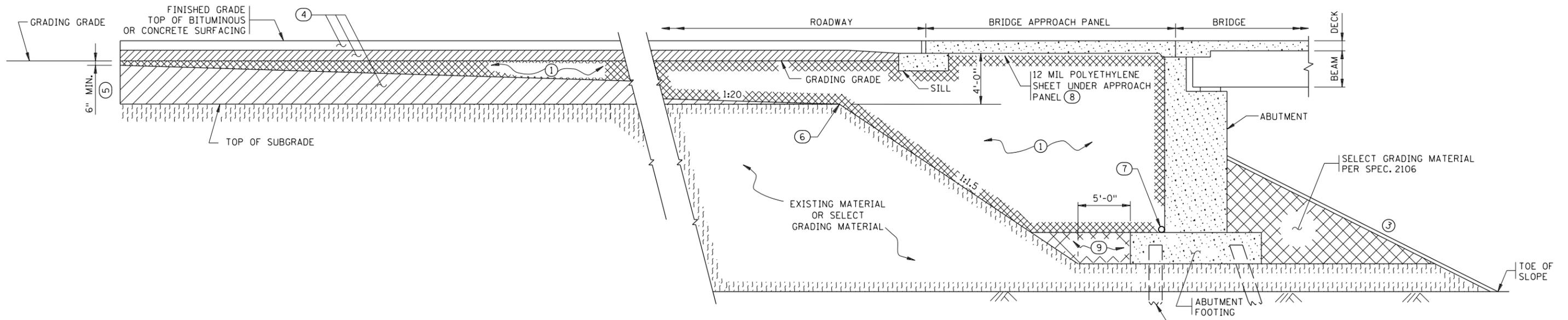
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STANDARD PLAN

SAP 002-607-032

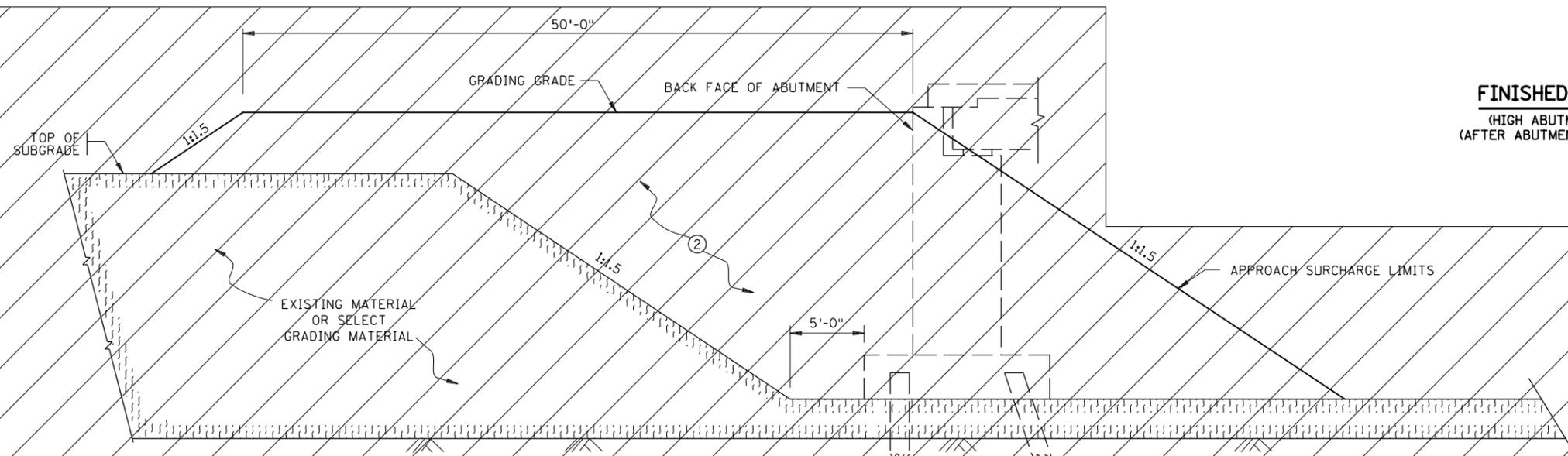
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ELEVATION

**FINISHED GRADING SECTION**  
 (HIGH ABUTMENT ON PILING SHOWN)  
 (AFTER ABUTMENT HAS BEEN CONSTRUCTED)



ELEVATION

**ROUGH GRADING SECTION**  
 (PRIOR TO ABUTMENT CONSTRUCTION)

**NOTES:**

- ① QUANTITY OF STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) IS BASED ON DIMENSIONS SHOWN, AND PAYMENT IS BASED ON THIS QUANTITY. SEE PLAN FOR QUANTITY. IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS, ANY QUANTITY INCREASES ARE CONSIDERED INCIDENTAL.
- ② PLACE ABUTMENT APPROACH SURCHARGE MATERIAL PRIOR TO ABUTMENT CONSTRUCTION. AFTER COMPLETION OF SURCHARGE WAITING PERIOD, REMOVE SURCHARGE AND EXISTING MATERIAL OR SELECT GRADING MATERIAL TO THE LIMITS SHOWN IN "ROUGH GRADING SECTION" ABOVE, PRIOR TO ABUTMENT CONSTRUCTION. SEE BRIDGE PLANS AND SPECIAL PROVISIONS FOR ABUTMENT APPROACH SURCHARGE REQUIREMENT AND PAYMENTS.
- ③ SEE BRIDGE PLAN FOR SLOPE AND SLOPE PROTECTION.
- ④ SEE PLAN FOR TYPE OF MATERIAL.
- ⑤ GRADING TO BE SQUARED OFF ON SKEWED BRIDGES.
- ⑥ TOP OF 1:1.5 SLOPE (FORMS A LINE PARALLEL TO END OF BRIDGE).
- ⑦ SUBSURFACE PIPE DRAIN. FURNISH AND INSTALL AT TOP OF BRIDGE FOOTING IF BRIDGE DETAIL B910 IS INCLUDED ON BRIDGE PLAN.
- ⑧ IF THE APPROACH PANEL IS TIED TO THE ABUTMENT WITH REINFORCEMENT BARS, PLACE 12 MIL POLYETHYLENE SHEETING (OR TWO LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCIDENTAL.
- ⑨ SELECT GRADING MATERIAL (SPEC. 2106) SHALL BE COMPACTED AND MEET THE MOISTURE REQUIREMENTS OF 2106. STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) MAY BE USED IN LIEU OF SELECT GRADING MATERIAL PER SPEC. 2106.
- ⑩ FOR BRIDGES WITHOUT PILING, REFER TO BRIDGE PLANS FOR MATERIAL REQUIREMENTS BELOW ABUTMENT FOOTING.

LEAD EXPERT OFFICE  
 GLENN ENGSTROM  
 DIRECTOR  
 OFFICE OF MATERIALS & ROAD RESEARCH

BRIDGE ABUTMENT APPROACH TREATMENT FOR  
 PARAPET OR SEMI-INTEGRAL ABUTMENT ON FOOTING

APPROVED: 08-22-2019  
 REVISED:

*Peter A. Harff*  
 PETER A. HARFF  
 STATE DESIGN ENGINEER

STANDARD PLAN  
 5-297.233

1 OF 2

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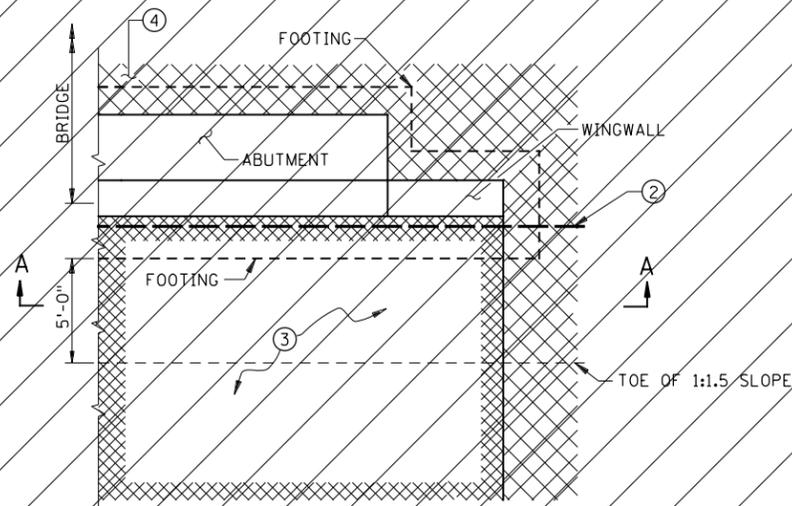


STANDARD PLAN

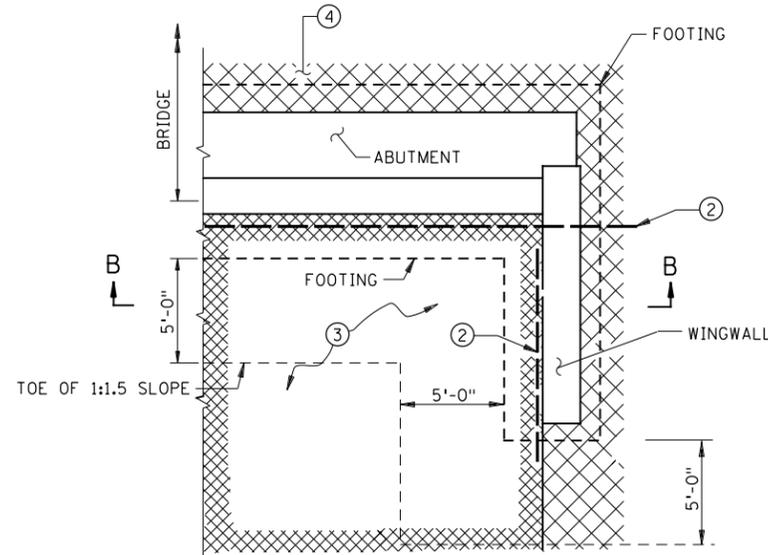
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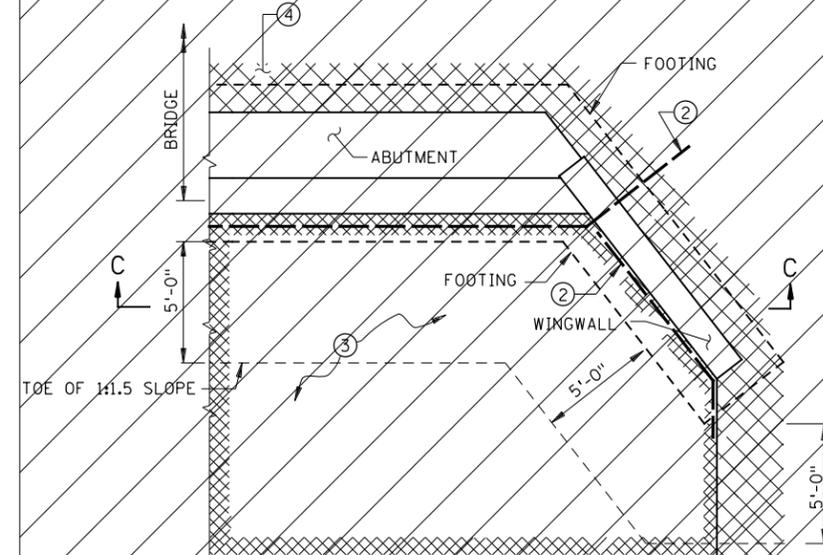
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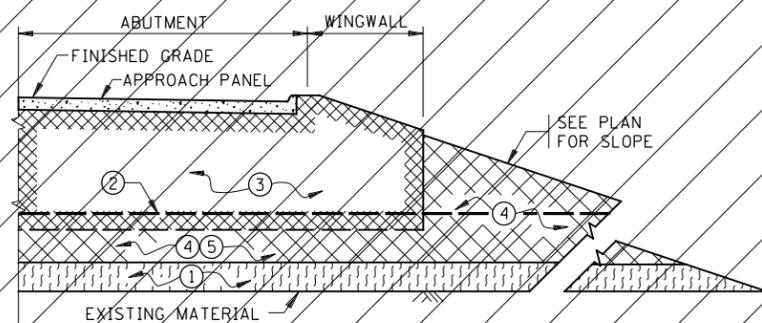
**PARTIAL PLAN VIEW AT ABUTMENT**  
(WINGWALL AT 180°) (FINISHED GRADING)



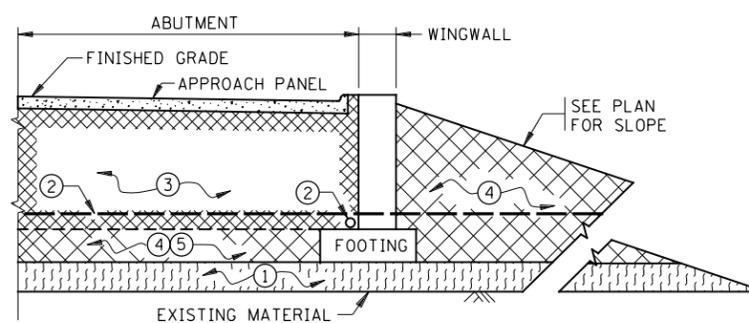
**PARTIAL PLAN VIEW AT ABUTMENT**  
(WINGWALL AT 90°) (FINISHED GRADING)



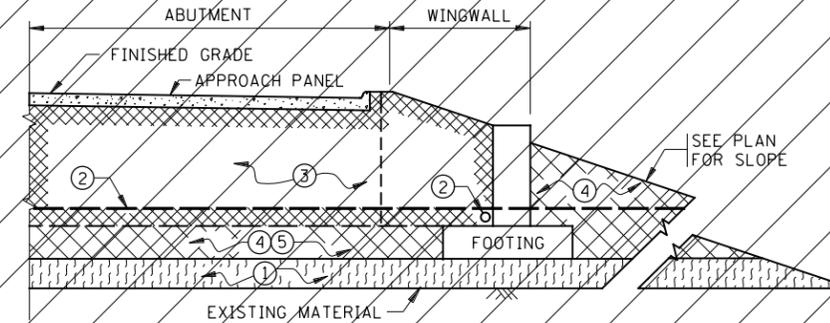
**PARTIAL PLAN VIEW AT ABUTMENT**  
(WINGWALL AT ANY OTHER ANGLE) (FINISHED GRADING)



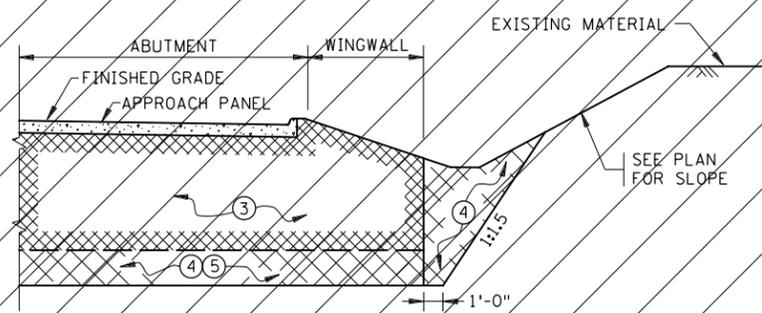
**FINISHED GRADING SECTION A-A**  
(FILL SECTION)



**FINISHED GRADING SECTION B-B**  
(FILL SECTION)



**FINISHED GRADING SECTION C-C**  
(FILL SECTION)



**FINISHED GRADING SECTION A-A**  
(CUT SECTION)  
(BRIDGE DETAIL B910 DRAIN NOT SHOWN)

**NOTES:**

- ① EXISTING MATERIAL OR SELECT GRADING MATERIAL (SPEC. 2106).
- ② SUBSURFACE PIPE DRAIN, FURNISH AND INSTALL AT TOP OF BRIDGE FOOTING IF BRIDGE DETAIL B910 IS INCLUDED ON BRIDGE PLAN.
- ③ QUANTITY OF STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) IS BASED ON DIMENSIONS SHOWN, AND PAYMENT IS BASED ON THIS QUANTITY. SEE PLAN FOR QUANTITY. IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS, ANY QUANTITY INCREASES ARE CONSIDERED INCIDENTAL.
- ④ SELECT GRADING MATERIAL (SPEC. 2106).
- ⑤ MATERIAL SHALL MEET THE COMPACTION AND MOISTURE CONTENT REQUIREMENTS OF SPEC. 2106. STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) MAY BE USED IN LIEU OF SELECT GRADING MATERIAL (SPEC. 2106).

LEAD EXPERT OFFICE  
GLENN ENGSTROM  
DIRECTOR  
OFFICE OF MATERIALS & ROAD RESEARCH

BRIDGE ABUTMENT APPROACH TREATMENT FOR  
PARAPET OR SEMI-INTEGRAL ABUTMENT ON FOOTING

APPROVED: 08-22-2019  
REVISED:

*Peter A. Harff*  
PETER A. HARFF  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.233

2 OF 2

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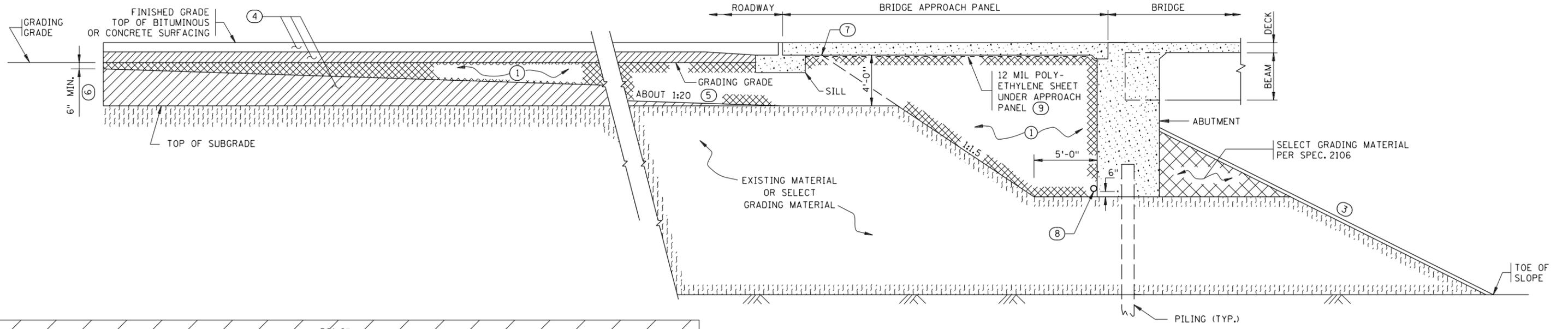


STANDARD PLAN

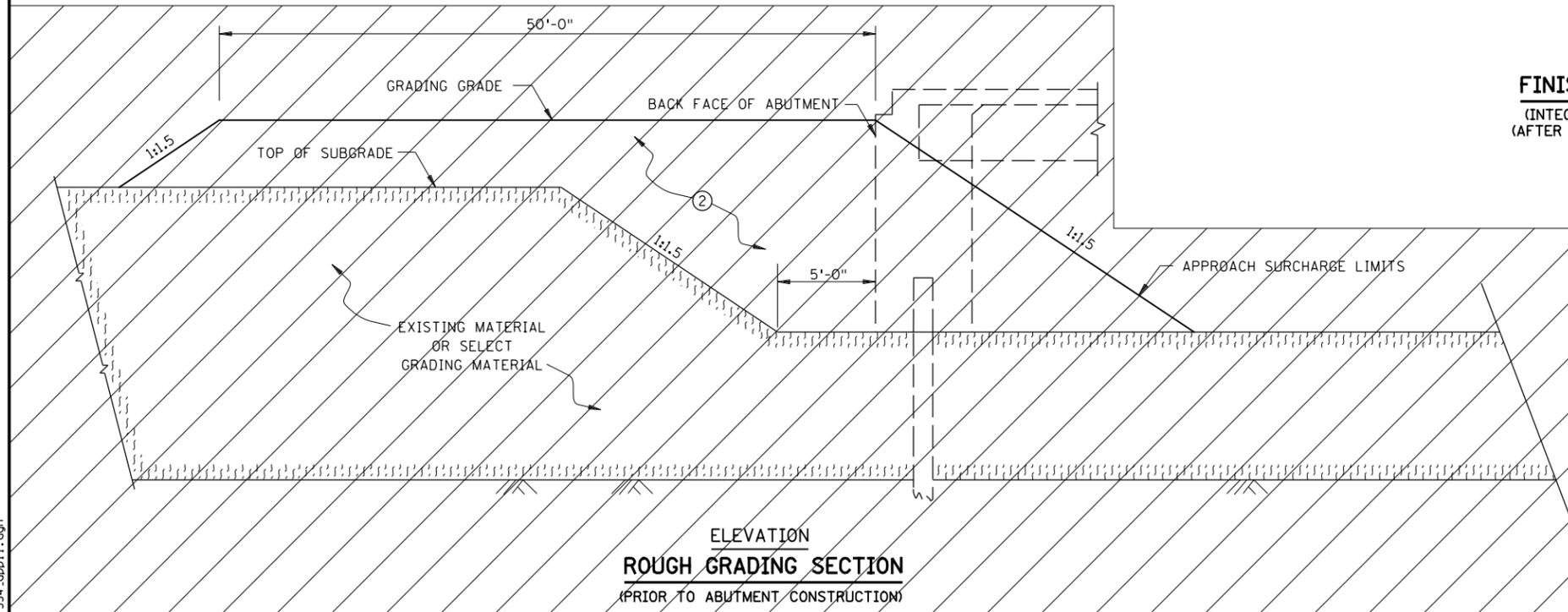
SAP 002-607-032

SHEET NO. 20

TOTAL SHEETS 54



**ELEVATION  
FINISHED GRADING SECTION**  
(INTEGRAL ABUTMENT ON PILING SHOWN)  
(AFTER ABUTMENT HAS BEEN CONSTRUCTED)



**ELEVATION  
ROUGH GRADING SECTION**  
(PRIOR TO ABUTMENT CONSTRUCTION)

**NOTES:**

- ① QUANTITY OF STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) IS BASED ON DIMENSIONS SHOWN, AND PAYMENT IS BASED ON THIS QUANTITY. SEE PLAN FOR QUANTITY. IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS, ANY QUANTITY INCREASES ARE CONSIDERED INCIDENTAL.
- ② PLACE ABUTMENT APPROACH SURCHARGE MATERIAL PRIOR TO ABUTMENT CONSTRUCTION. AFTER COMPLETION OF SURCHARGE WAITING PERIOD, REMOVE SURCHARGE AND EXISTING MATERIAL OR SELECT GRADING MATERIAL TO THE LIMITS SHOWN IN "ROUGH GRADING SECTION" ABOVE, PRIOR TO ABUTMENT CONSTRUCTION. SEE BRIDGE PLANS AND SPECIAL PROVISIONS FOR ABUTMENT APPROACH SURCHARGE REQUIREMENT AND PAYMENTS.
- ③ SEE BRIDGE PLAN FOR SLOPE AND SLOPE PROTECTION.
- ④ SEE PLAN FOR TYPE OF MATERIAL.
- ⑤ START 1:20 TAPER AT END OF APPROACH PANEL. 1:20 VARIES WHEN APPROACH PANEL IS SKEWED.
- ⑥ GRADING TO BE SQUARED OFF ON SKEWED BRIDGES.
- ⑦ TOP OF 1:1.5 SLOPE (FORMS A LINE PARALLEL TO END OF BRIDGE).
- ⑧ SUBSURFACE PIPE DRAIN. SEE BRIDGE PLAN FOR STANDARD DETAIL B910 FOR DETAILS.
- ⑨ PLACE 12 MIL POLYETHYLENE SHEETING (OR TWO LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCIDENTAL.

**LEAD EXPERT OFFICE**  
GLENN ENGSTROM  
DIRECTOR  
OFFICE OF MATERIALS & ROAD RESEARCH

**BRIDGE ABUTMENT APPROACH TREATMENT FOR INTEGRAL ABUTMENTS**

APPROVED: 08-22-2019  
REVISED:

*Peter A Harff*  
PETER A. HARFF  
STATE DESIGN ENGINEER

**STANDARD PLAN 5-297.234**

1 OF 2

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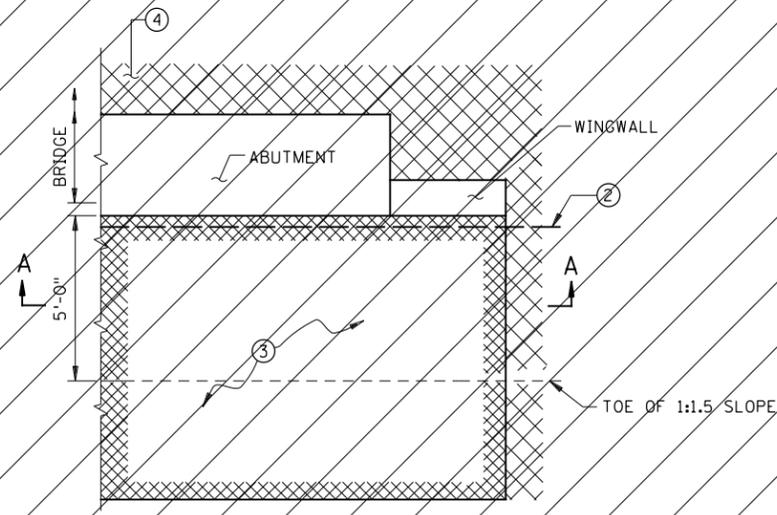


STANDARD PLAN

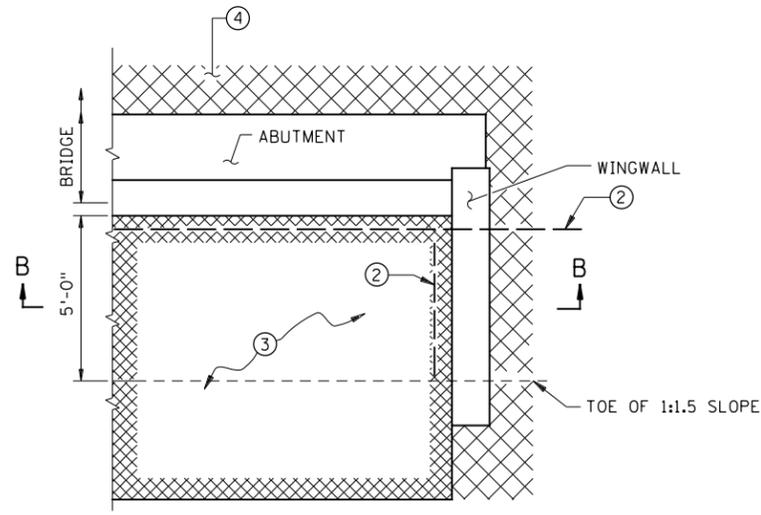
SAP 002-607-032

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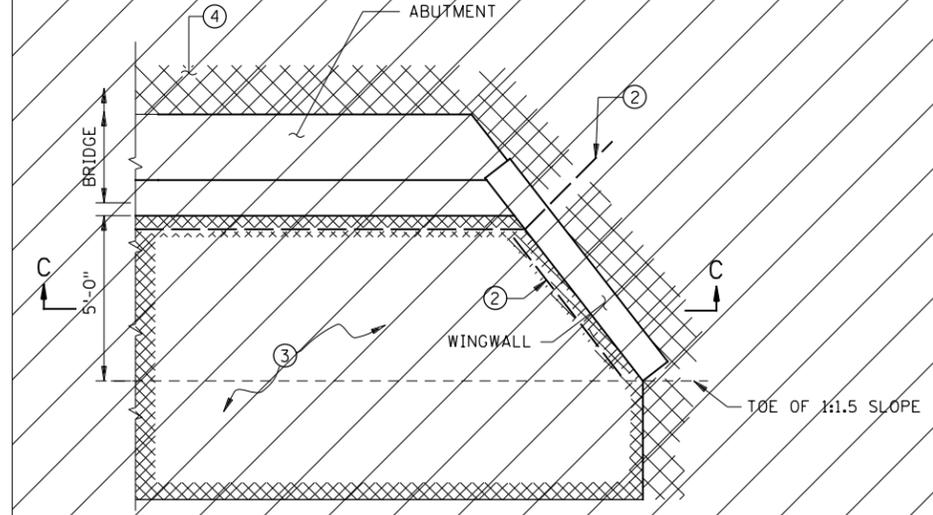
TOTAL SHEETS 54



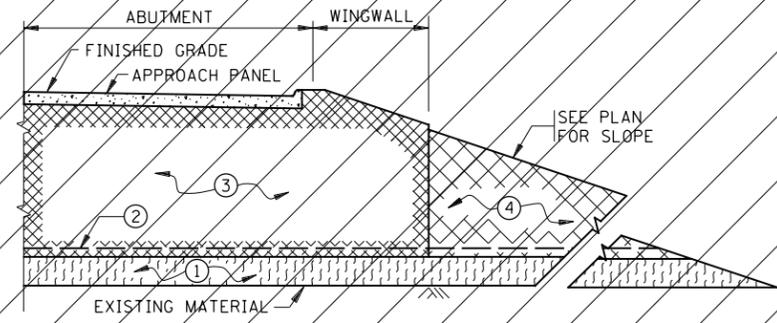
**PARTIAL PLAN VIEW AT ABUTMENT**  
(WINGWALL AT 180°) (FINISHED GRADING)



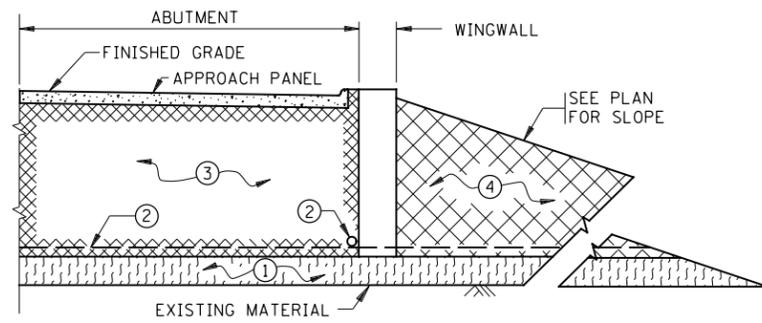
**PARTIAL PLAN VIEW AT ABUTMENT**  
(WINGWALL AT 90°) (FINISHED GRADING)



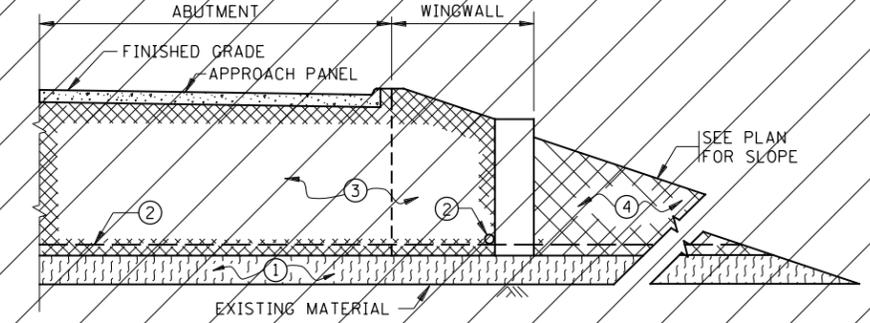
**PARTIAL PLAN VIEW AT ABUTMENT**  
(WINGWALL AT ANY OTHER ANGLE) (FINISHED GRADING)



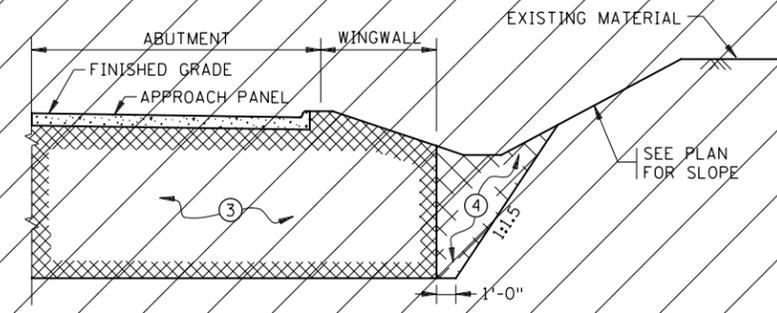
**FINISHED GRADING SECTION A-A**  
(FILL SECTION)



**FINISHED GRADING SECTION B-B**  
(FILL SECTION)



**FINISHED GRADING SECTION C-C**  
(FILL SECTION)



**FINISHED GRADING SECTION A-A**  
(CUT SECTION)  
(BRIDGE DETAIL B910 DRAIN NOT SHOWN)

**NOTES:**

- ① EXISTING MATERIAL OR SELECT GRADING MATERIAL (SPEC. 2106).
- ② SUBSURFACE PIPE DRAIN. SEE BRIDGE PLAN FOR STANDARD DETAIL B910 FOR DETAILS.
- ③ QUANTITY OF STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) IS BASED ON DIMENSIONS SHOWN, AND PAYMENT IS BASED ON THIS QUANTITY. SEE PLAN FOR QUANTITY. IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS, ANY QUANTITY INCREASES ARE CONSIDERED INCIDENTAL.
- ④ SELECT GRADING MATERIAL (SPEC. 2106).

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**LEAD EXPERT OFFICE**  
GLENN ENGSTROM  
DIRECTOR  
OFFICE OF MATERIALS & ROAD RESEARCH



**BRIDGE ABUTMENT APPROACH TREATMENT FOR INTEGRAL ABUTMENTS**

APPROVED: 08-22-2019  
REVISED:

*Peter A. Harff*  
PETER A. HARFF  
STATE DESIGN ENGINEER

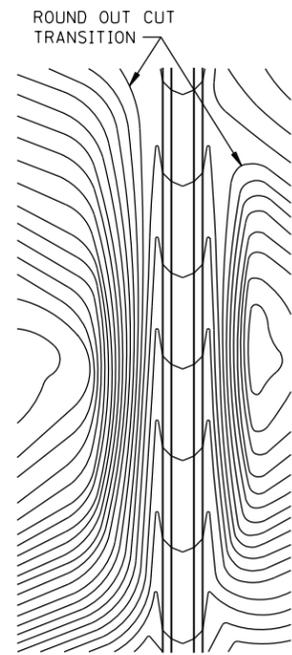
**STANDARD PLAN 5-297.234**

**2 OF 2**

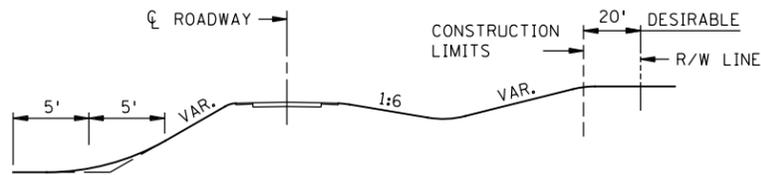
**STANDARD PLAN**

SAP 002-607-032

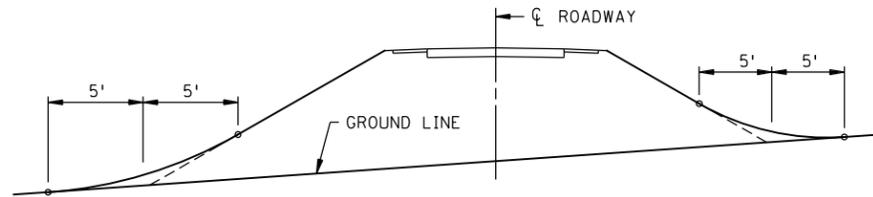
SHEET NO. 22  
TOTAL SHEETS 54



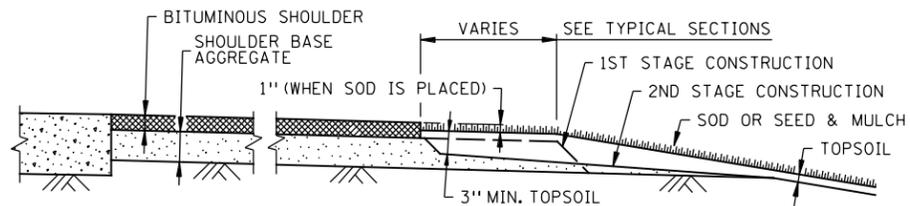
CONTOURING ROAD CUTS



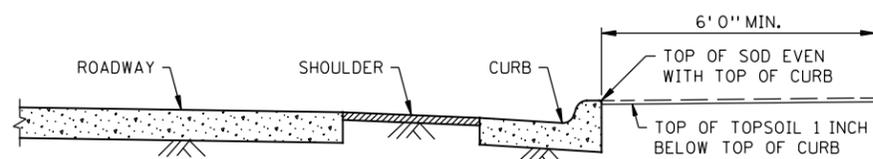
ROUNDING SHOULDERS AND BACKSLOPES



SHAPING FOR DRAINAGE ALONG THE TOE OF FILL SLOPES

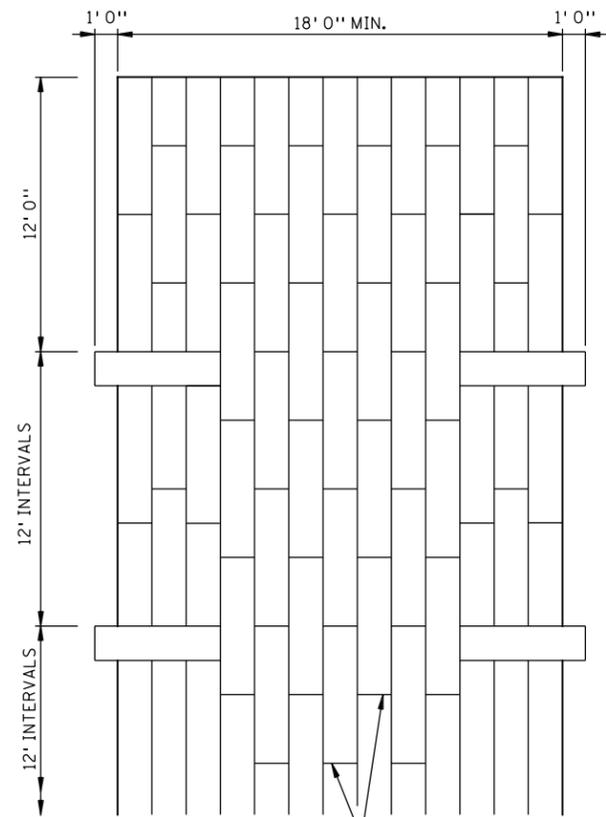


SHAPING AND TOPSOILING INSLOPES

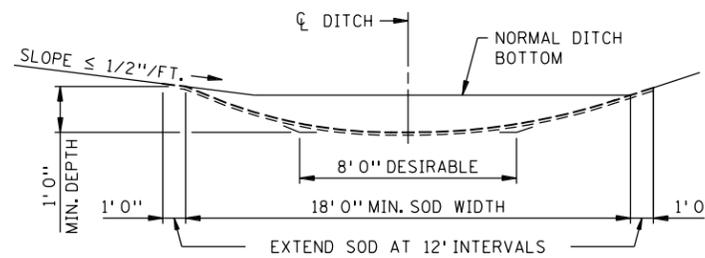


SHAPING ADJACENT TO CURBS WHEN SOD IS PLACED

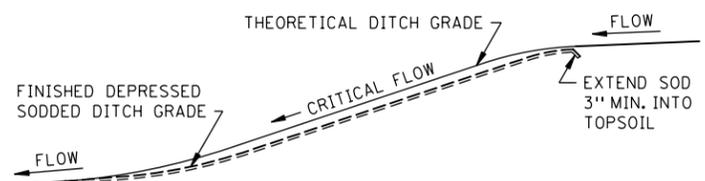
**NOTES:**  
 SEE SPEC. 2575.3 FOR ADDITIONAL INFORMATION.  
 ① CONSTRUCT TAPER AS DIRECTED BY THE ENGINEER.



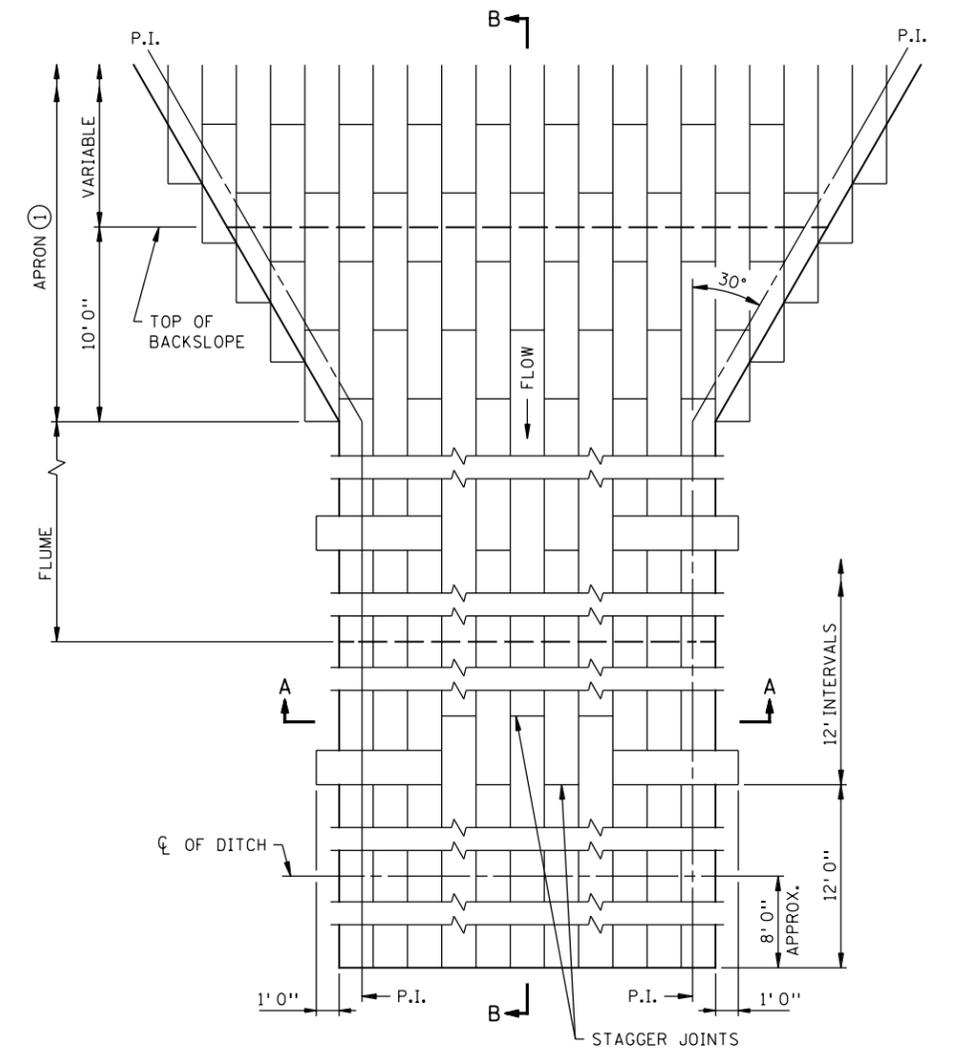
PLAN VIEW



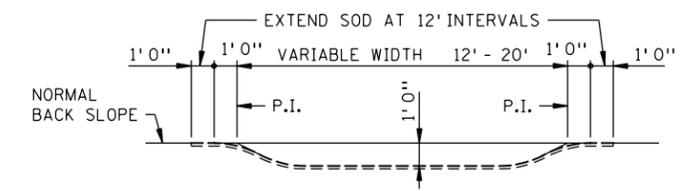
SODDED DITCH CROSS SECTION  
 WHERE FRONT OR BACK SLOPE IS FLAT (LESS THAN 1/2"/FT.),  
 FIRST NOTCH DITCH AND THEN PROVIDE ROUNDING.



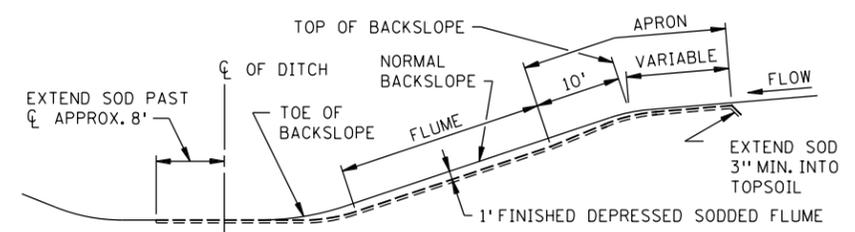
DITCH PROFILE  
 SODDED DITCH DETAILS



PLAN VIEW



SECTION A-A



SECTION B-B

SODDED FLUME DETAILS

LEAD EXPERT OFFICE  
 LYNN CLARKOWSKI  
 CHIEF ENVIRONMENTAL OFFICER  
 OFFICE OF ENVIRONMENTAL STEWARDSHIP

PERMANENT EROSION CONTROL  
 ALONG ROADWAYS, DITCHES AND FLUMES

APPROVED: 02-28-2017  
 REVISED:

THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

STANDARD PLAN  
 5-297.404

1 OF 3

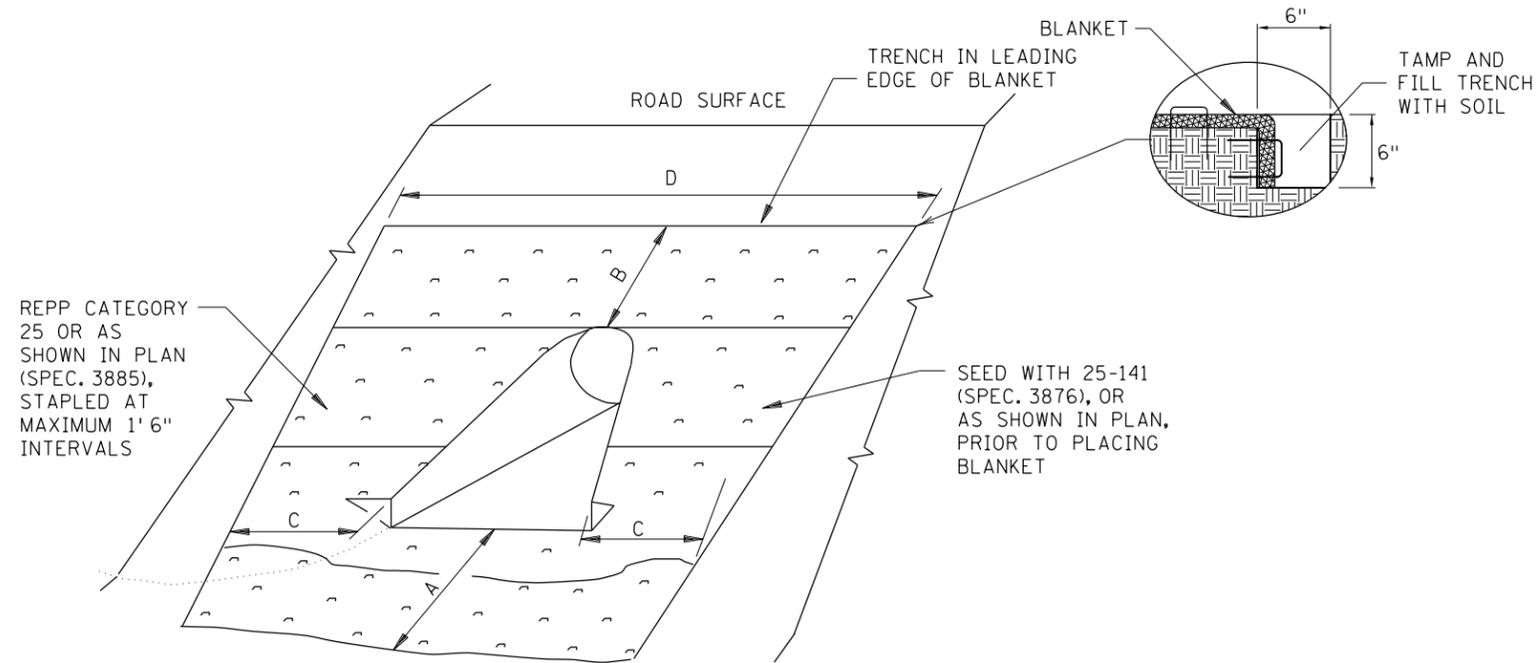
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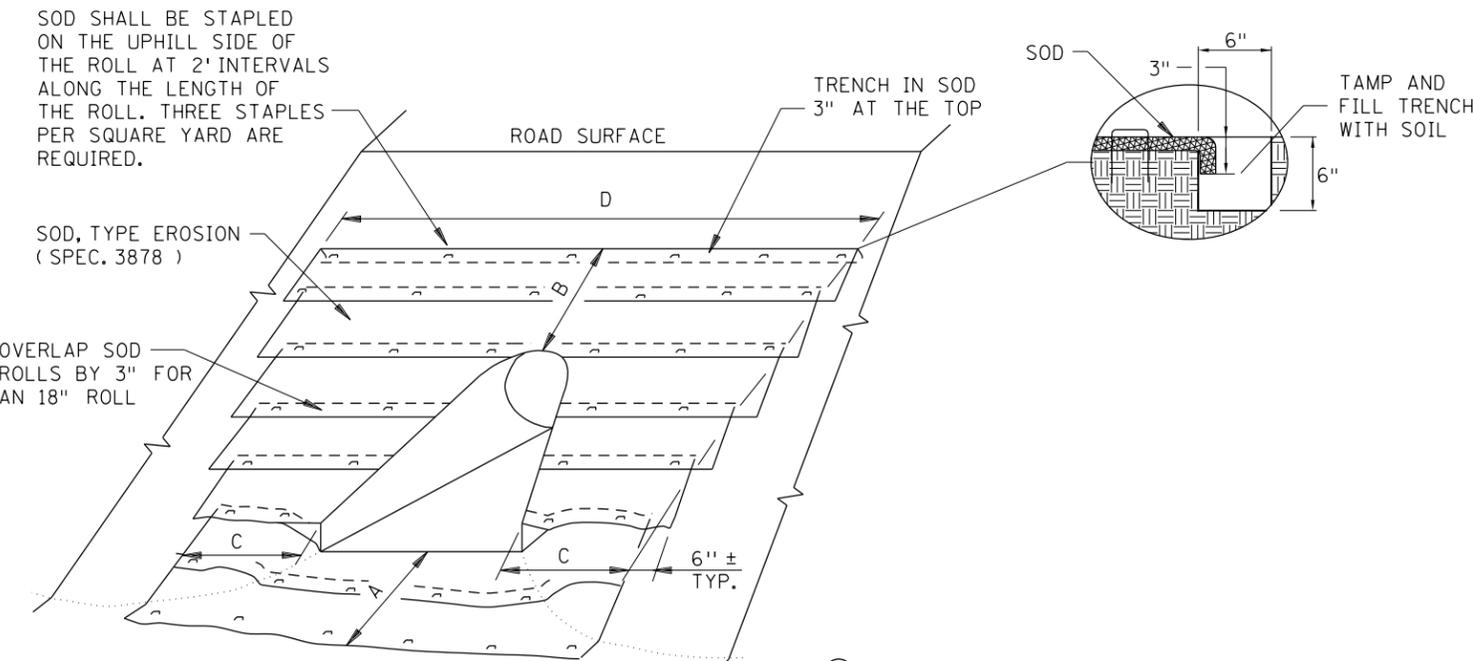
STANDARD PLAN

SAP 002-607-032

SHEET NO. 23  
 TOTAL SHEETS 54



ROLLED EROSION PREVENTION PRODUCT (BLANKET) & SEED DETAIL



SODDING DETAIL

- ① ADDITIONAL QUANTITIES MAY BE SHOWN IN THE PLAN OR REQUIRED BY THE ENGINEER.
- ② FOR ARCH PIPE USE CLOSEST CIRCULAR PIPE DIAMETER AND APRON SLOPE. DIAMETERS LARGER THAN 72" REQUIRE SPECIAL DESIGNS.

CULVERT DIAMETER ②	CULVERT INLET APRON ①						"A"	"B"	"C"	"D"
	SOD OR REPP (SQ. YDS.)									
	CIRCULAR AND ARCH PIPE METAL APRON (PLATE 3123, PLATE 3122)	CIRCULAR AND ARCH PIPE CONCRETE APRON (PLATE 3100, PLATE 3110)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:4 SLOPE (PLATE 3148)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:6 SLOPE (PLATE 3148)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:6 SLOPE (PLATE 3128)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:4 SLOPE (PLATE 3128)				
15"	9	9	8	8	N/A	N/A	3'	1.5'	3'	13'
18"	13	12	12	14	16	N/A	3'	3'	3'	16'
21"	14	14	14	16	18	14	3'	3'	3'	17'
24"	16	15	16	19	21	17	3'	3'	3'	18'
27"	N/A	20	N/A	N/A	N/A	N/A	3'	4.5'	3'	20'
30"	23	22	25	30	32	N/A	3'	4.5'	3'	22'
36"	34	34	39	48	51	37	4.5'	4.5'	4.5'	27'
42"	43	40	51	64	N/A	N/A	4.5'	6'	4.5'	30'
48"	54	50	66	82	N/A	N/A	4.5'	7.5'	4.5'	34'
54"	65	58	81	102	N/A	N/A	4.5'	9'	4.5'	37'
60"	69	59	91	115	N/A	N/A	4.5'	9'	4.5'	39'
66"	69	63	N/A	N/A	N/A	N/A	4.5'	9'	4.5'	39'
72"	78	72	99	122	N/A	N/A	4.5'	10.5'	4.5'	41'

CULVERT DIAMETER ②	CULVERT OUTLET APRON ①						"A"	"B"	"C"	"D"
	SOD OR REPP (SQ. YDS.)									
	CIRCULAR AND ARCH PIPE METAL APRON (PLATE 3123, PLATE 3122)	CIRCULAR AND ARCH PIPE CONCRETE APRON (PLATE 3100, PLATE 3110)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:4 SLOPE (PLATE 3148)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:6 SLOPE (PLATE 3148)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:6 SLOPE (PLATE 3128)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:4 SLOPE (PLATE 3128)				
15"	10	10	9	10	N/A	N/A	4.5'	1.5'	3'	13'
18"	13	13	12	14	15	N/A	6'	1.5'	3'	14'
21"	16	14	16	18	19	15	6'	1.5'	3'	15'
24"	18	18	18	21	22	18	7.5'	1.5'	3'	16'
27"	N/A	19	N/A	N/A	N/A	N/A	7.5'	1.5'	3'	17'
30"	23	23	24	28	29	N/A	9'	1.5'	3'	18'
36"	36	35	38	47	48	37	10.5'	1.5'	4.5'	23'
42"	43	40	47	58	N/A	N/A	12'	1.5'	4.5'	25'
48"	50	46	57	70	N/A	N/A	13.5'	1.5'	4.5'	27'
54"	57	50	67	84	N/A	N/A	15'	1.5'	4.5'	29'
60"	74	63	90	113	N/A	N/A	16.5'	1.5'	6'	33'
66"	75	67	N/A	N/A	N/A	N/A	16.5'	1.5'	6'	33'
72"	77	70	92	114	N/A	N/A	16.5'	1.5'	6'	34'

NOTES:

REPP = ROLLED EROSION PREVENTION PRODUCT.

AREA SHOWN IN SQUARE YARDS IS FOR ONE CULVERT END.

QUANTITIES ARE CALCULATED TO INCLUDE SOD REQUIRED TO PROVIDE A 3" OVERLAP ON ALL 18" WIDE ROLLS. THIS ALLOWS FOR SHRINKAGE OF THE SOD.

FOR PIPE ARCHES USE EQUIVALENT PIPE DIAMETER TO APPROXIMATE AREA.

FOR CORRUGATED POLYETHYLENE PIPE METAL APRON (PLATE 3129), USE THE METAL APRON COLUMN (PLATE 3123).

AREAS AND DIMENSIONS ARE APPROXIMATE AND ARE BASED ON APRON SIDE SLOPES OF NO STEEPER THAN 1:2, UNLESS INDICATED AS FOR SAFETY APRONS.

CARE SHOULD BE TAKEN IN SELECTING SOD TO STABILIZE THE APRON. RIP-RAP SHOULD BE USED FOR FLOW VELOCITIES GREATER THAN 6 FPS.

LEAD EXPERT OFFICE  
MARNI KARNOWSKI  
CHIEF ENVIRONMENTAL OFFICER  
OFFICE OF ENVIRONMENTAL STEWARDSHIP

PERMANENT EROSION CONTROL  
TURF ESTABLISHMENT DETAIL AT CULVERT ENDS

APPROVED: 01-08-2020  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.404

2 OF 3

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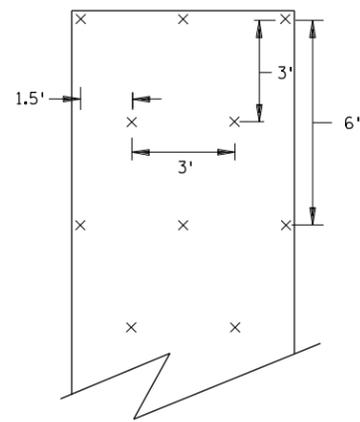


STANDARD PLAN

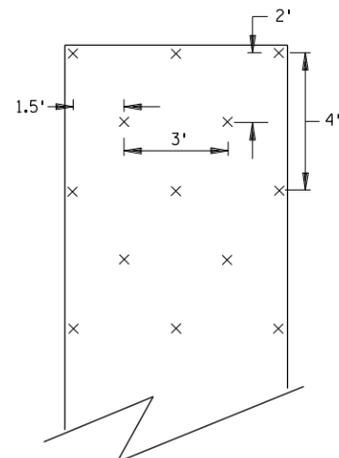
SAP 002-607-032

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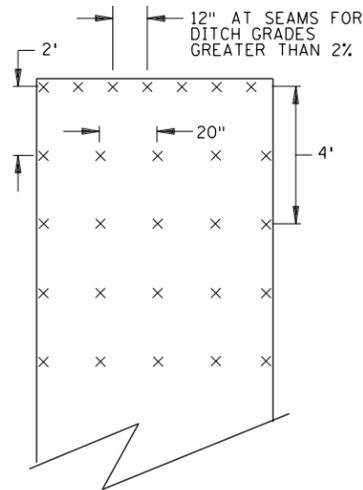
TOTAL SHEETS 54



SLOPES FLATTER THAN 1:2  
120 STAPLES PER 100 SQ YD

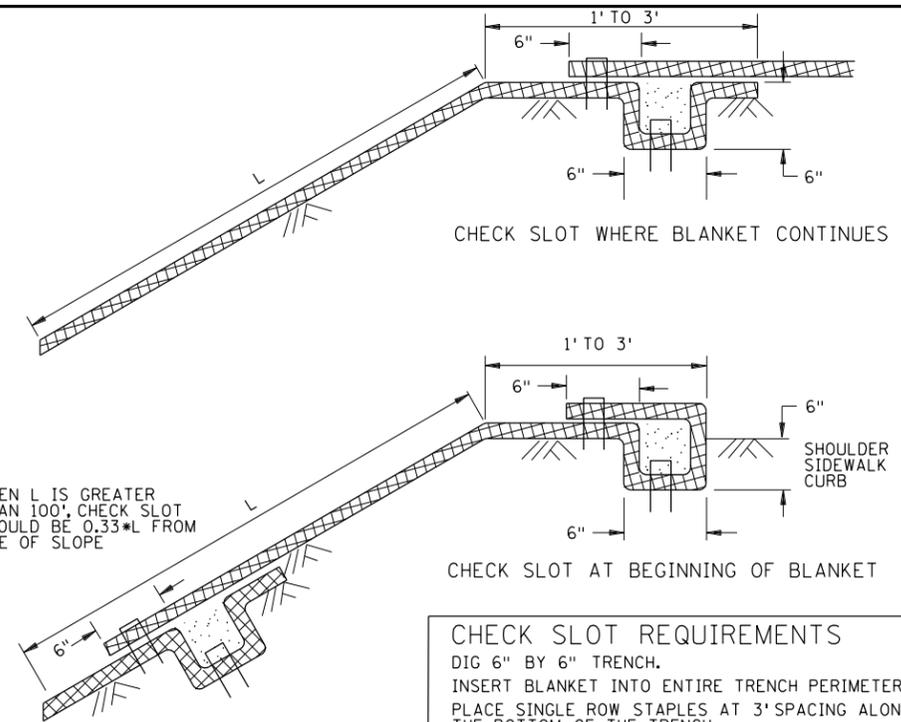


SLOPES 1:2 TO 1:1  
170 STAPLES PER 100 SQ YD



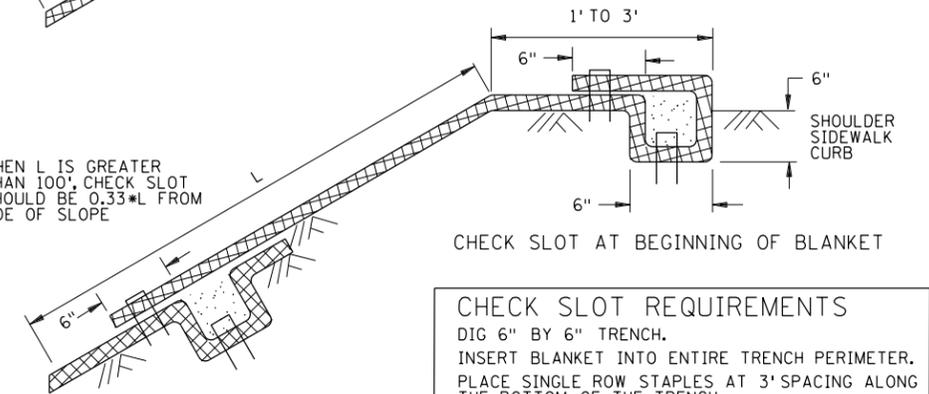
CHANNEL AND DITCH APPLICATIONS  
350 STAPLES PER 100 SQ YD

BLANKET STAPLE PATTERN



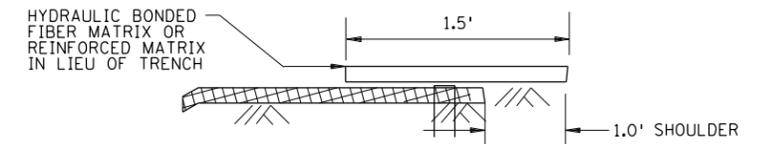
CHECK SLOT WHERE BLANKET CONTINUES

WHEN L IS GREATER THAN 100', CHECK SLOT SHOULD BE 0.33\*L FROM TOE OF SLOPE

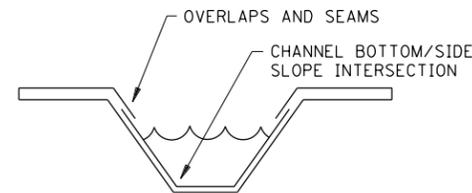


CHECK SLOT AT BEGINNING OF BLANKET

**CHECK SLOT REQUIREMENTS**  
DIG 6" BY 6" TRENCH.  
INSERT BLANKET INTO ENTIRE TRENCH PERIMETER.  
PLACE SINGLE ROW STAPLES AT 3' SPACING ALONG THE BOTTOM OF THE TRENCH.  
BACKFILL TRENCH WITH SOIL AND TAMP.  
PLACE SINGLE ROW STAPLES AT 3' SPACING ON OVERLAP.



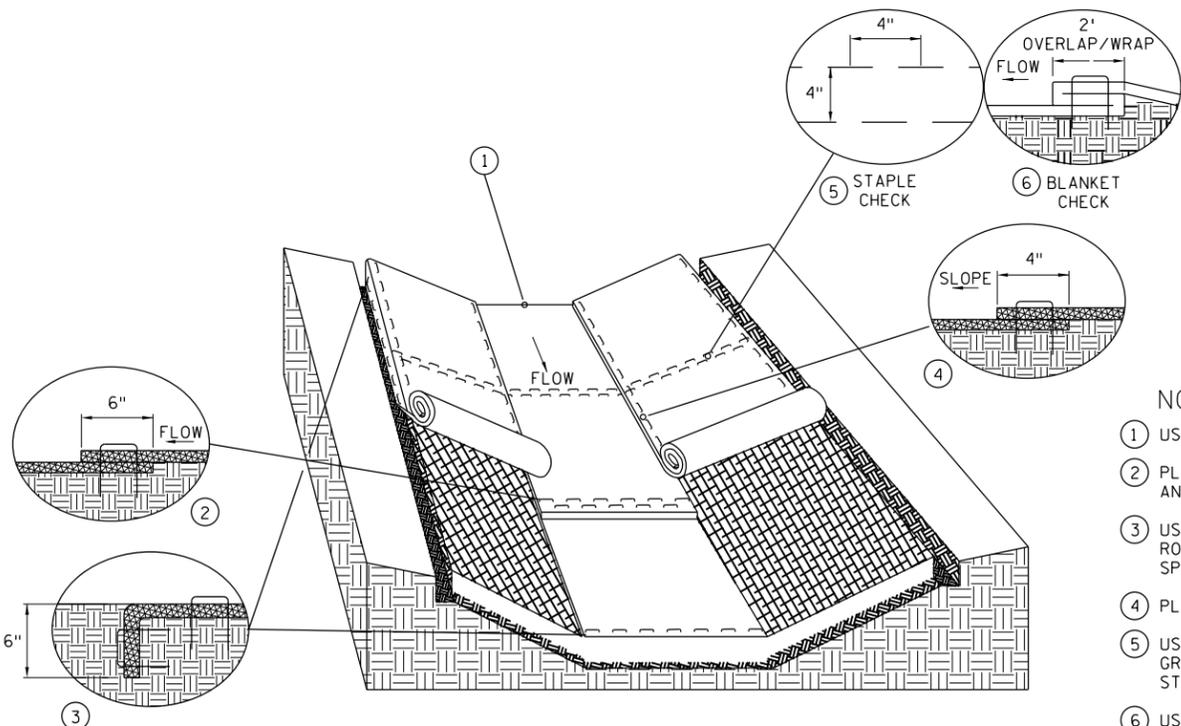
CHECK SLOT ALTERNATIVE  
PLACE SINGLE ROW STAPLES AT 12" SPACING  
CHECK SLOT DETAILS



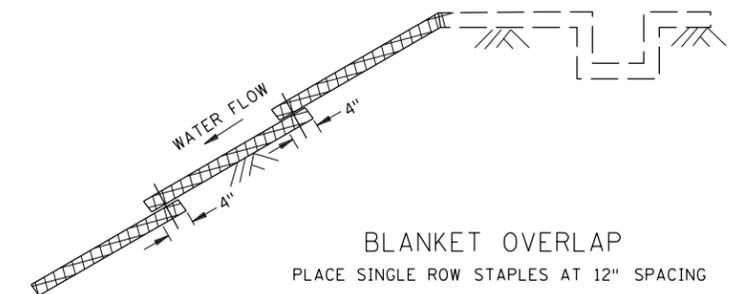
DITCH BLANKET CRITICAL POINTS 7

NOTES:

- 1 USE CHECK SLOT DETAIL (NO ALTERNATES).
- 2 PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER.
- 3 USE 6" X 6" TRENCH TO PLACE BLANKET. PLACE SINGLE ROW OF STAPLES ON TOP AND TRENCH SIDES AT 12" SPACING. BACKFILL TRENCH WITH SOIL AND TAMP.
- 4 PLACE SINGLE ROW OF STAPLES AT 12" SPACING.
- 5 USE STAPLE CHECK FOR CHANNEL SLOPES LESS THAN 2.5%. GRADE AT 100' INTERVALS. PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND AT 4" SPACING.
- 6 USE BLANKET CHECKS FOR THE FOLLOWING SLOPES:  
2.5%-3% 100' INTERVALS  
3%-5% 50' INTERVALS  
5%-7% 25' INTERVALS
- 7 CRITICAL POINTS SHALL BE SECURED WITH PROPER STAPLE PATTERNS.



DITCH BLANKET STAPLE DETAIL



BLANKET OVERLAP  
PLACE SINGLE ROW STAPLES AT 12" SPACING

**GENERAL BLANKET INSTALLATION REQUIREMENTS**  
REPP = ROLLED EROSION PREVENTION PRODUCT.  
PREPARE SOIL AS PER SPECIFICATION 2574.  
LAY PARALLEL OR PERPENDICULAR TO THE DIRECTION OF WATER FLOW.  
OVERLAP ADJACENT STRIP EDGES A MINIMUM OF 4".  
OVERLAP BLANKET 6" (MINIMUM) AT EACH END. OVERLAP BOTTOM END OF UPPER BLANKET OVER TOP END OF LOWER BLANKET. STAPLE ALONG OVERLAP EVERY 1.5'.  
THE UPPERMOST BLANKET OF ALL SLOPE APPLICATIONS MUST START IN A CHECK SLOT. IF SLOPE LENGTH (L) IS 100' OR GREATER, INSERT BLANKET INTO A CHECK SLOT 1/3 FROM THE BOTTOM OF THE SLOPE.

LEAD EXPERT OFFICE  
MARNI KARNOWSKI  
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OFFICE OF ENVIRONMENTAL STEWARDSHIP

PERMANENT EROSION CONTROL  
REPP (BLANKET) STAPLE PATTERN FOR SLOPES

APPROVED: 01-08-2020  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.404

3 OF 3

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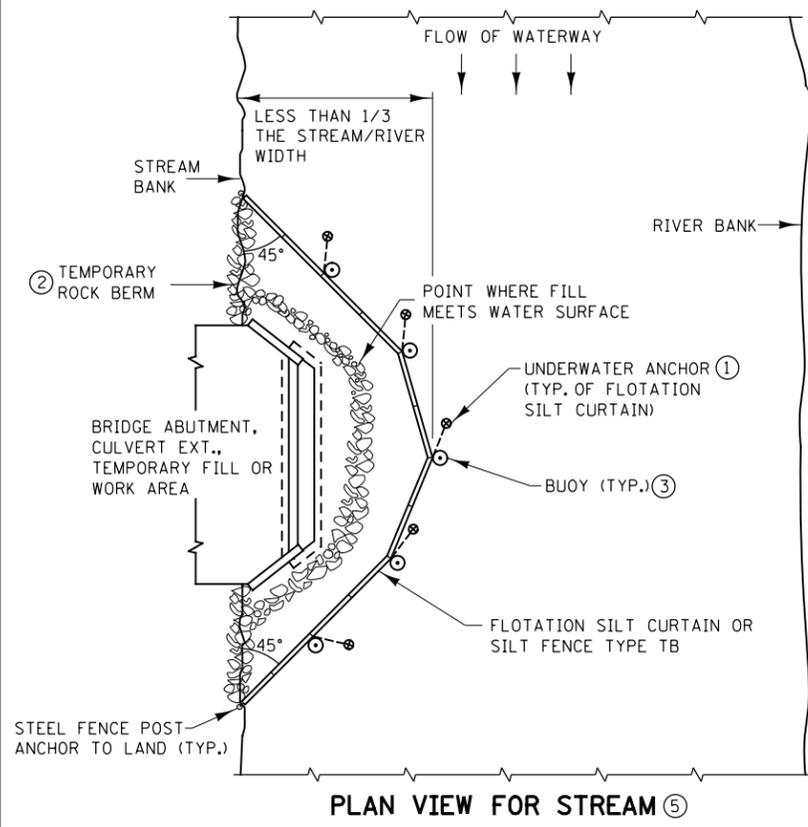


STANDARD PLAN

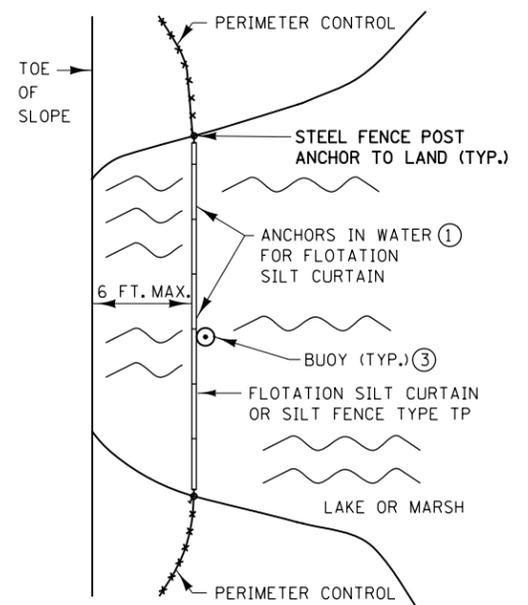
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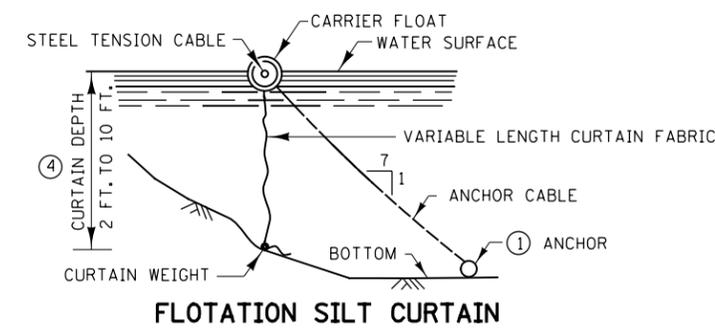
TOTAL SHEETS 54



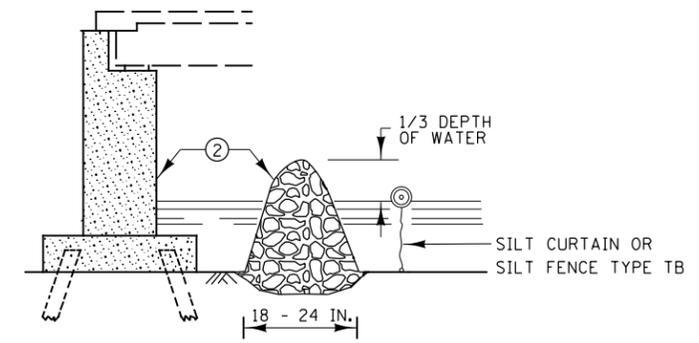
PLAN VIEW FOR STREAM ⑤



PLAN VIEW FOR LAKE OR MARSH ⑤



FLOTATION SILT CURTAIN

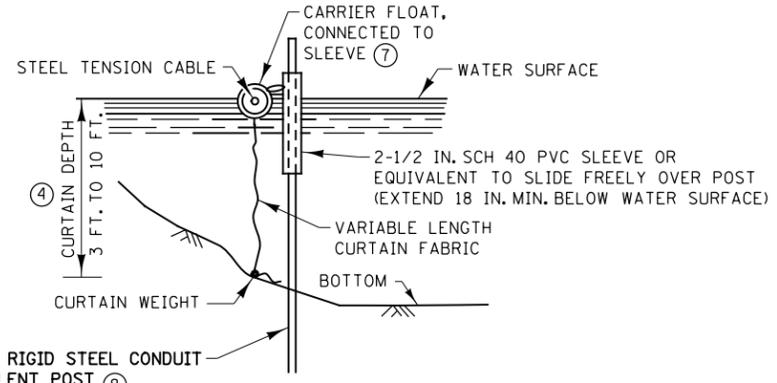


TEMPORARY ROCK BERM FOR SEDIMENT CONTROL

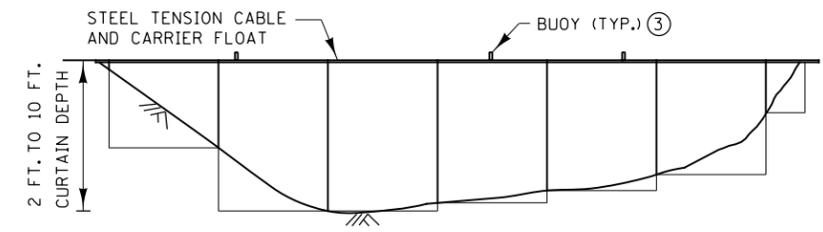
**INSTALLATION GUIDELINES SILT FENCE TYPE TB**  
 MINIMUM WATER DEPTH: 1 FT.  
 MAXIMUM WATER DEPTH: 3 FT.  
 MAXIMUM WATER VELOCITY: 5 FT./SEC.

**INSTALLATION GUIDELINES FLOTATION SILT CURTAIN TYPE: STILL WATER**  
 MINIMUM WATER DEPTH: 3 FT.  
 MAXIMUM WATER DEPTH: 10 FT.  
 MAXIMUM WATER VELOCITY: 2 FT./SEC.  
 MAXIMUM WAVE HEIGHT: 1 FT

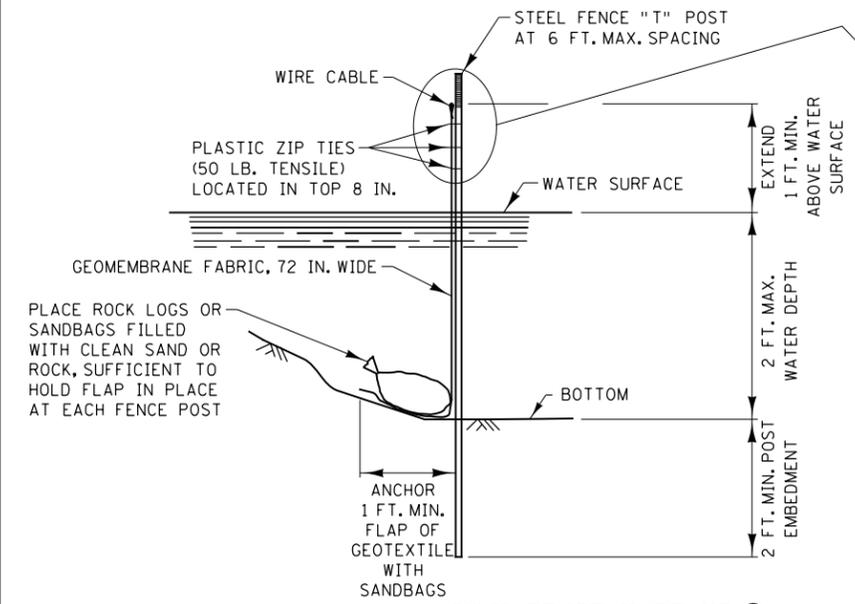
**INSTALLATION GUIDELINES FLOTATION SILT CURTAIN TYPE: MOVING WATER**  
 MINIMUM WATER DEPTH: 3 FT.  
 MAXIMUM WATER DEPTH: 10 FT.  
 MAXIMUM WATER VELOCITY: 5 FT./SEC.  
 MAXIMUM WAVE HEIGHT: 2 FT.



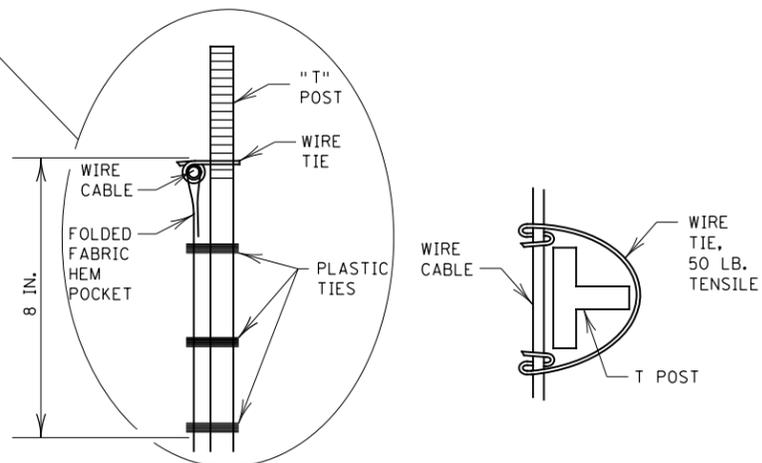
ALTERNATE FLOTATION SILT CURTAIN



FRONT VIEW FOR FLOTATION SILT CURTAIN



SILT FENCE TYPE TB ⑥



FABRIC/CABLE/POST CONNECTION

**NOTES:**

- SEE SPECS. 2573, 3886, 3887 & 3893.
- ① FOR ANCHOR SPACING AND WEIGHT REQUIREMENTS, SEE SPEC. 2573.
- ② IN AREAS WHERE THE PLAN CALLS FOR RIPRAP AT A BRIDGE, CULVERT, OR SLOPE, A TEMPORARY ROCK BERM CONSTRUCTED FROM THE RIPRAP CAN BE USED TO PROVIDE ADDITIONAL PROTECTION. WHEN THE WORK IS COMPLETE THE RIPRAP CAN THEN BE MOVED TO THE PERMANENT LOCATION INDICATED IN THE PLANS. THE TEMPORARY ROCK BERM IS INCIDENTAL.
- ③ ON U.S. COAST GUARD OR OTHER MOTORIZED WATERWAYS, BUOYS ARE REQUIRED TO MARK THE ENDS AND SPECIAL AREAS FOR VISIBILITY. PLACE BUOYS AS REQUIRED FOR NAVIGATIONAL PURPOSES.
- ④ MINIMUM WATER DEPTH APPLIES TO THE DEEPEST POINT ALONG THE FLOTATION SILT CURTAIN OR SILT FENCE TYPE TB FOR DETERMINING APPLICABILITY OF FLOTATION SILT CURTAIN OR SILT FENCE TYPE TB.
- ⑤ SILT CURTAIN SHOULD BE REMOVED WHEN THE AREA CONTRIBUTING DIRECT RUNOFF HAS BEEN TEMPORARILY OR PERMANENTLY STABILIZED. SILT CURTAIN SHOULD ALSO BE REMOVED BEFORE WINTER IF ICE UP OR ICE FLOW IS ANTICIPATED.
- ⑥ EMBED POST INTO BOTTOM A MINIMUM OF 40% OF THE WATER DEPTH (INCLUDING WAVE HEIGHT), BUT IN NO CASE SHALL EMBEDMENT BE LESS THAN 2 FEET.
- ⑦ ANCHOR FLOAT MUST BE CONNECTED SECURELY TO SLEEVE WITH A MINIMUM TENSILE STRENGTH OF 100 LBS. CONNECTION METHOD MUST ALLOW FOR SLEEVE TO MOVE FREELY ON POST.
- ⑧ PROVIDE SUFFICIENT NUMBER OF POST ANCHORS TO MAINTAIN SILT CURTAIN POSITION.

**LEAD EXPERT OFFICE**  
 LYNN CLARKOWSKI  
 CHIEF ENVIRONMENTAL OFFICER  
 OFFICE OF ENVIRONMENTAL STEWARDSHIP

**TEMPORARY SEDIMENT CONTROL**  
 SILT CURTAIN OR SILT FENCE TYPE TB

APPROVED: 02-28-2017  
 REVISED:

*Thomas Styrbicki*  
 THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

**STANDARD PLAN**  
 5-297.405

1 OF 8

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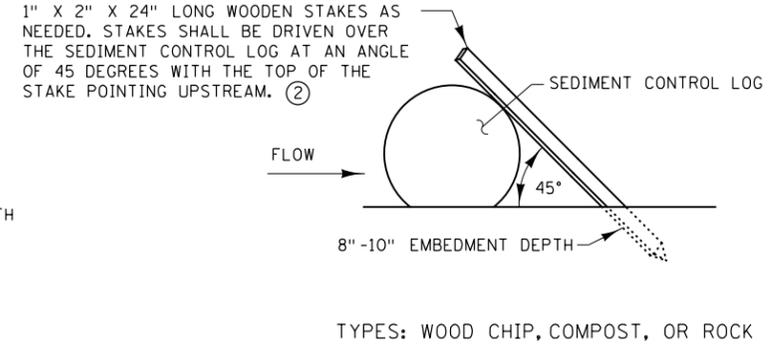
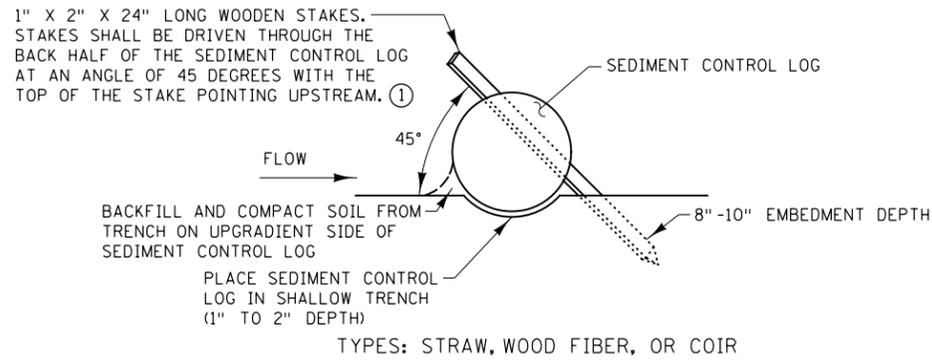


STANDARD PLAN

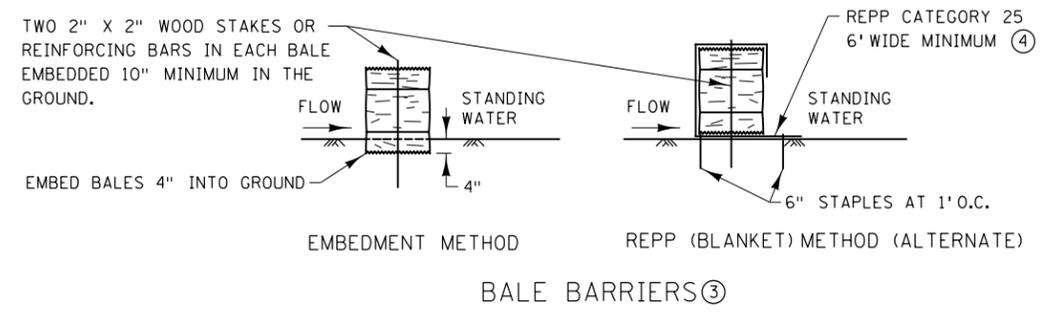
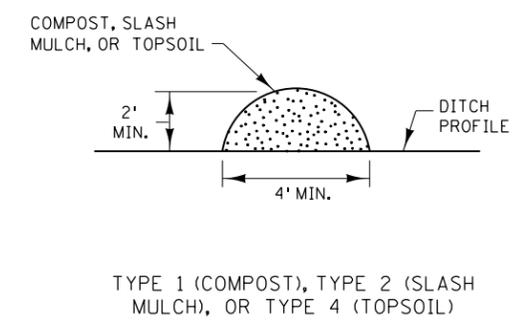
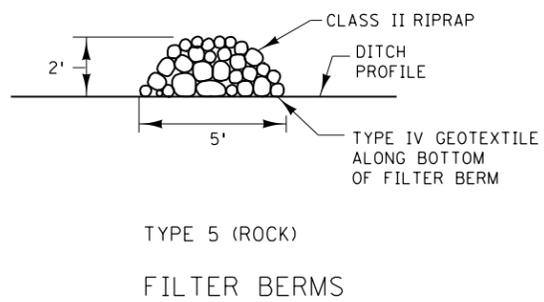
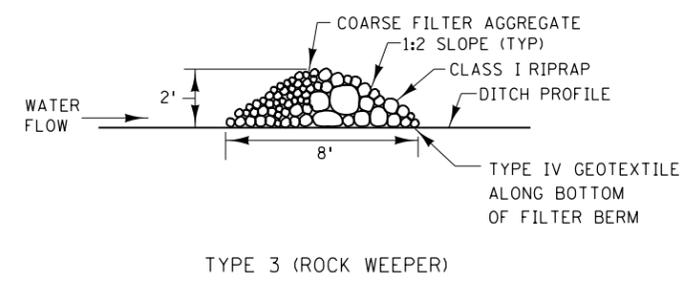
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TOTAL SHEETS 54



SEDIMENT CONTROL LOGS

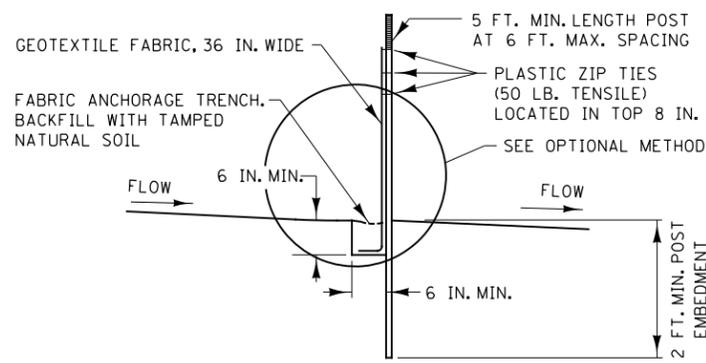


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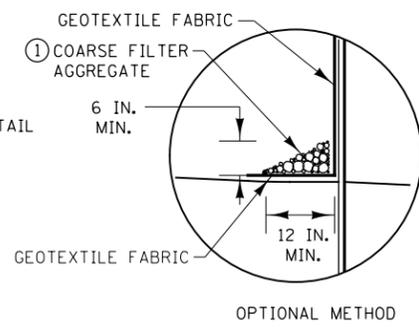
- REPP = ROLLED EROSION PREVENTION PRODUCT.
- SEE SPECS. 2573, 3149, 3874, 3882, 3885, 3886, AND 3897.
- ① SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1' FOR DITCH CHECKS OR 2' FOR OTHER APPLICATIONS.
- ② PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.
- ③ TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS WHERE STANDING WATER OCCURS (6" MAXIMUM DEPTH). BALES SHALL CONSIST OF TYPE 1 MULCH OF APPROXIMATELY 14" X 18" X 36" LONG. BALES SHALL BE PLACED ON EDGE AND BUTTED TIGHT TO ADJACENT BALES.
- ④ INSTEAD OF TRENCHING, PLACE BALE ON THE REPP (BLANKET) AND WRAP BLANKET AROUND THE BALE. PLACE STAKE THROUGH BALE AND BLANKET.

LEAD EXPERT OFFICE MARNI KARNOWSKI CHIEF ENVIRONMENTAL OFFICER OFFICE OF ENVIRONMENTAL STEWARDSHIP		TEMPORARY SEDIMENT CONTROL FILTER BERMS, SEDIMENT CONTROL LOGS, AND BALE BARRIERS		APPROVED: 01-08-2020 REVISED:	 THOMAS STYRBICKI STATE DESIGN ENGINEER	STANDARD PLAN 5-297.405	2 OF 8
		STANDARD PLAN		SAP 002-607-032	SHEET NO. 27 TOTAL SHEETS 54		

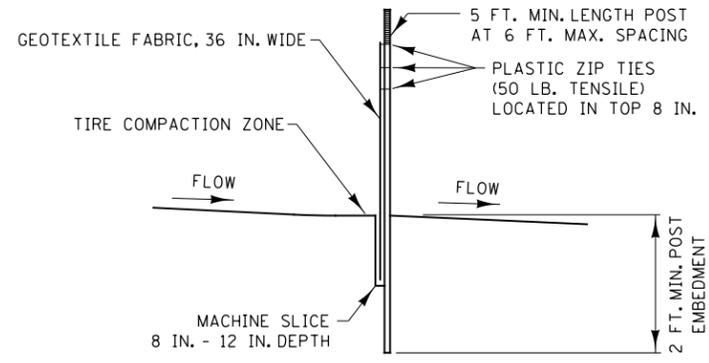
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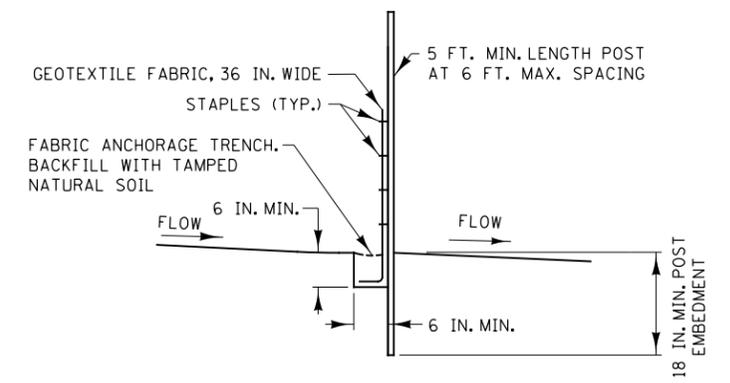
**SILTS FENCE TYPE HI ②  
(HAND INSTALLED)**



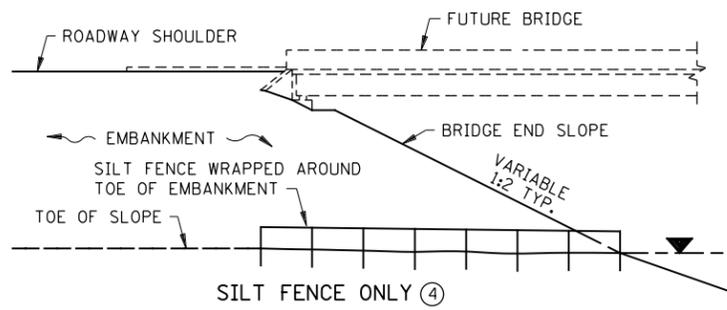
OPTIONAL METHOD



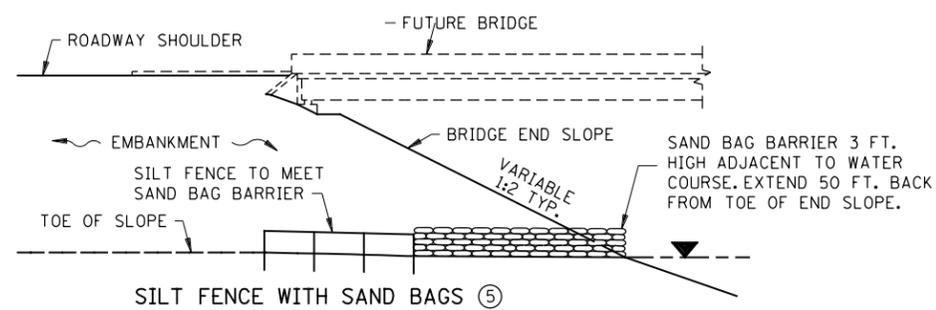
**SILTS FENCE TYPE MS ②  
(MACHINE SLICED)**



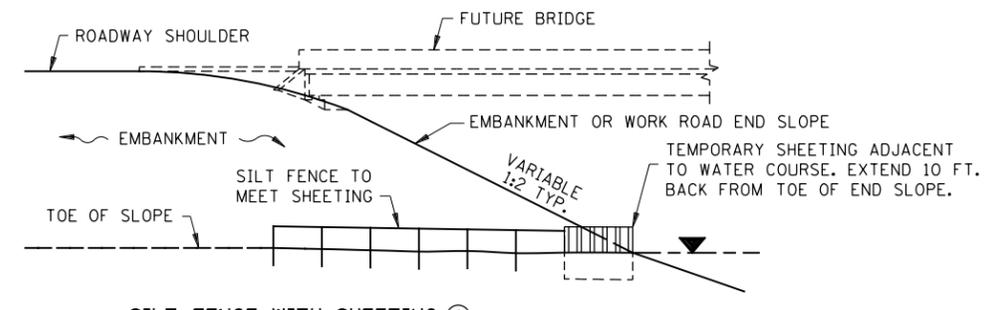
**SILTS FENCE TYPE PA ③  
(PREASSEMBLED)**



SILTS FENCE ONLY ④

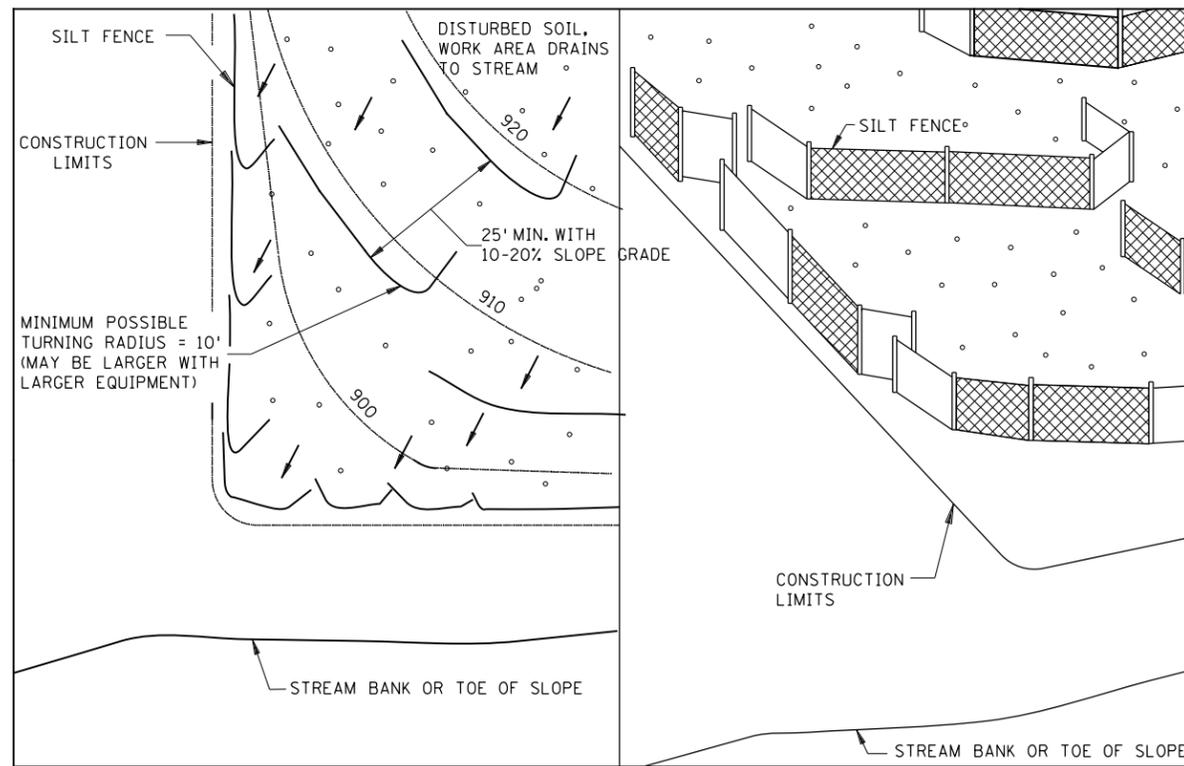


SILTS FENCE WITH SAND BAGS ⑤



SILTS FENCE WITH SHEETING ⑥

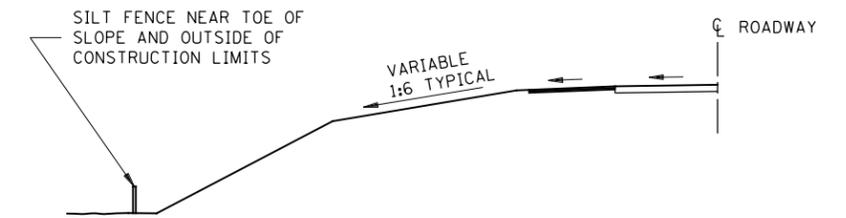
**INSTALLATION AT BRIDGE EMBANKMENT ADJACENT TO WATER**



PLAN VIEW

**J-HOOK INSTALLATION**

PERSPECTIVE VIEW



**LOCATION AT TOE OF ROADWAY EMBANKMENT**

**NOTES:**

- SEE SPECS. 2573, 3149 & 3886.
- ① COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.
- ② TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 1 ACRE.
- ③ TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 0.25 ACRE.
- ④ WATER COURSE FLOW VELOCITY: STANDING. CONTRIBUTING SLOPE AREA: 1/2 ACRE.
- ⑤ WATER COURSE FLOW VELOCITY: 1 TO 7 FT./SEC. CONTRIBUTING SLOPE AREA: 1 ACRE.
- ⑥ WATER COURSE FLOW VELOCITY: 8 TO 15 FT./SEC. CONTRIBUTING SLOPE AREA: 3 ACRES.

**LEAD EXPERT OFFICE**  
LYNN CLARKOWSKI  
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OFFICE OF ENVIRONMENTAL STEWARDSHIP

**TEMPORARY SEDIMENT CONTROL**  
SILTS FENCE

APPROVED: 02-28-2017  
REVISED:

*Thomas Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

**STANDARD PLAN**  
5-297.405

6 OF 8

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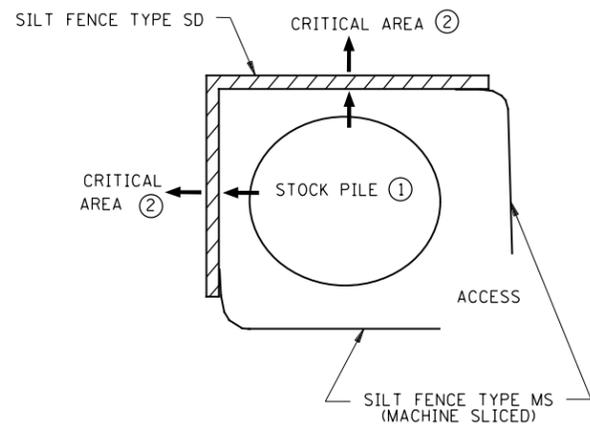


STANDARD PLAN

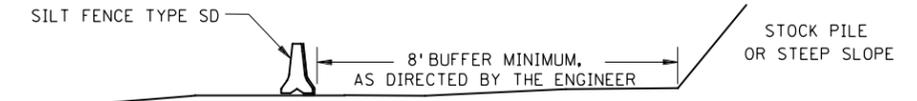
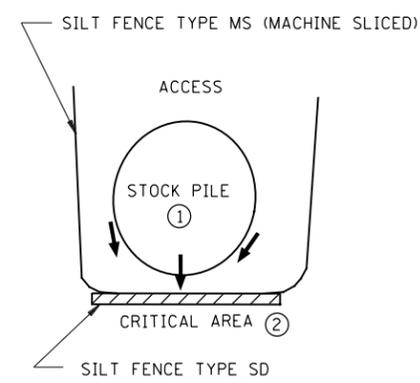
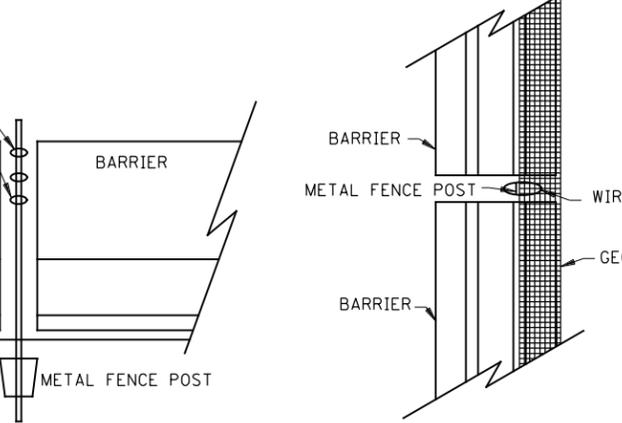
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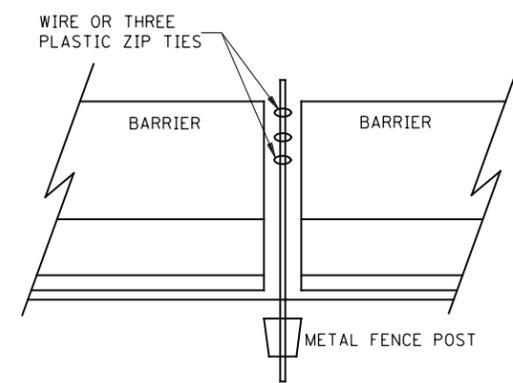
TOTAL SHEETS 54



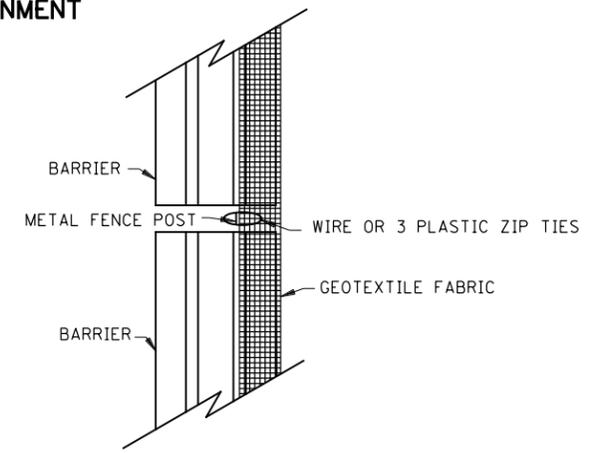
**STOCK PILE CONTAINMENT**



**STOCKPILE SEDIMENT CONTROL**

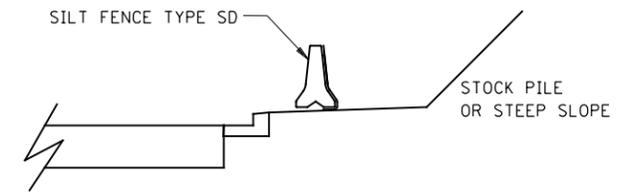


**PROFILE VIEW**

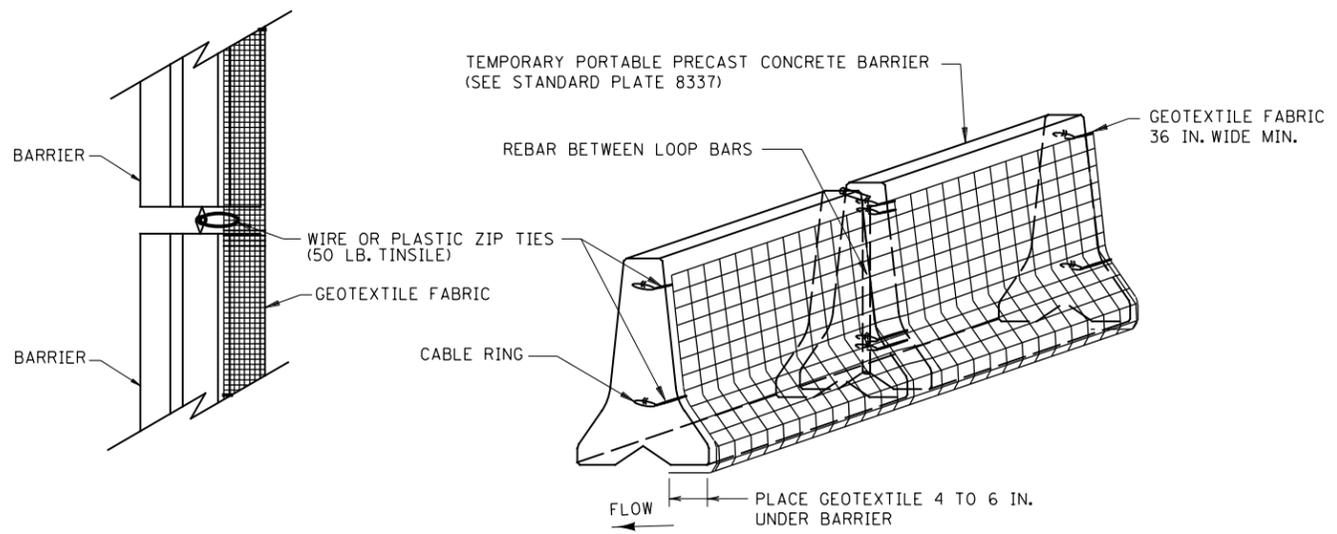


**TOP VIEW**

**SILT FENCE TYPE SD (SUPER DUTY) BARRIER WITHOUT LOOP BARS**



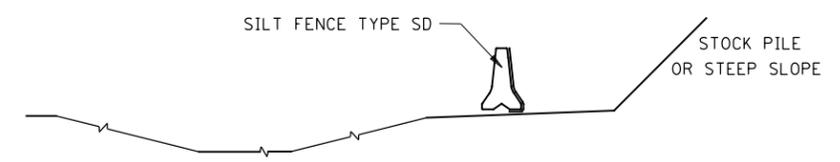
**CURB AND GUTTER PROTECTION SYSTEM**



**TOP VIEW**

**PERSPECTIVE VIEW**

**SILT FENCE TYPE SD (SUPER DUTY) BARRIER WITH LOOP BARS**



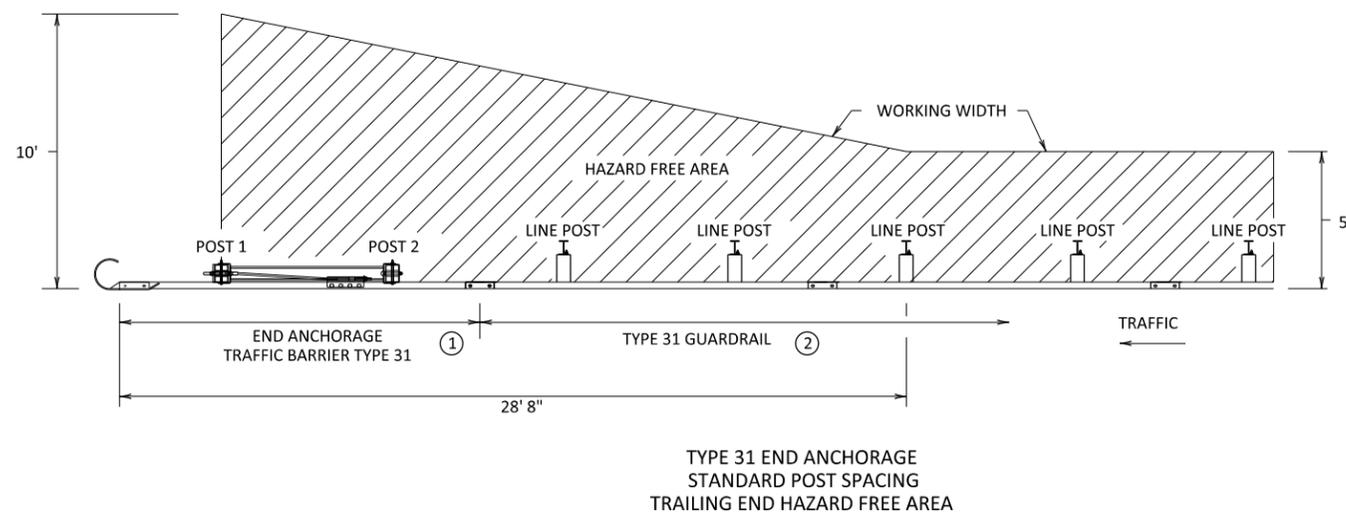
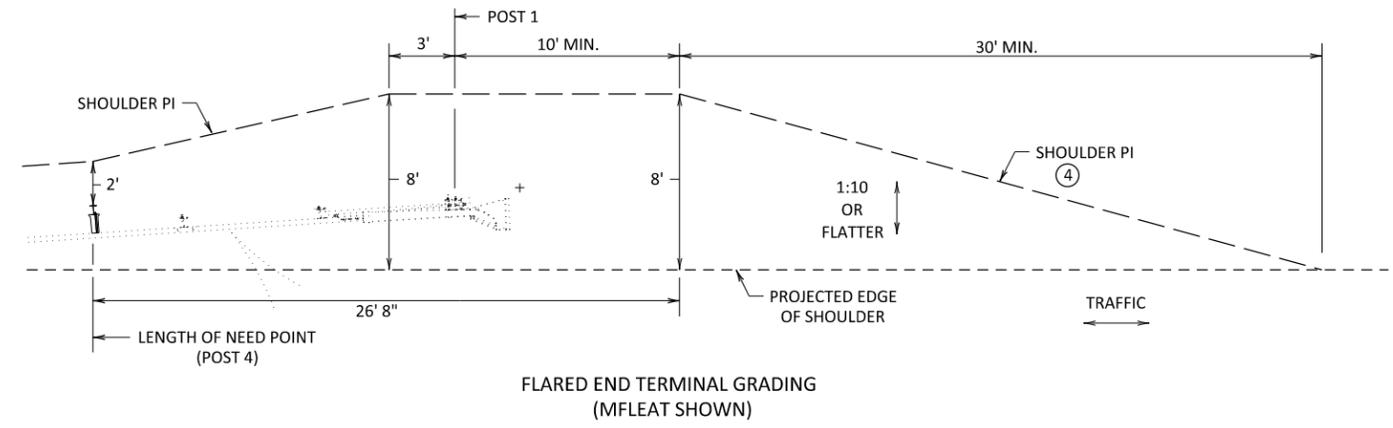
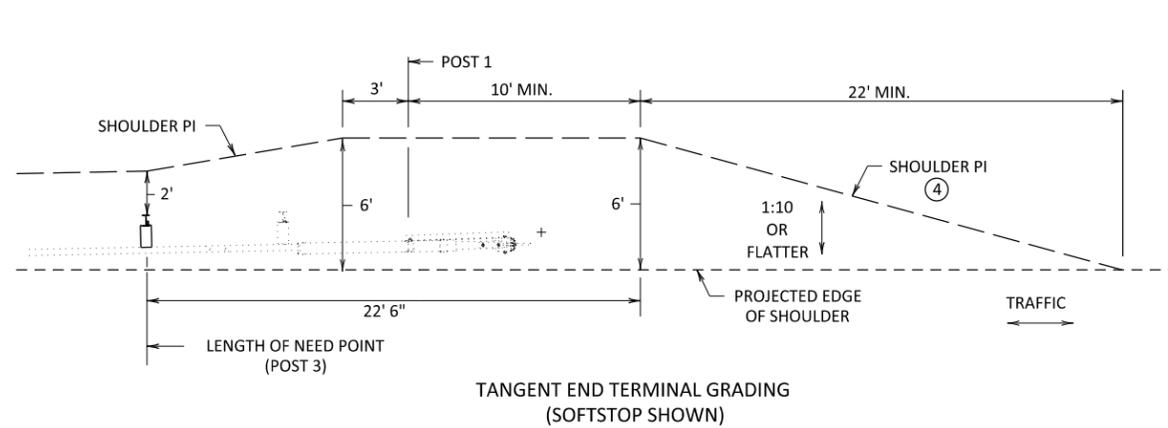
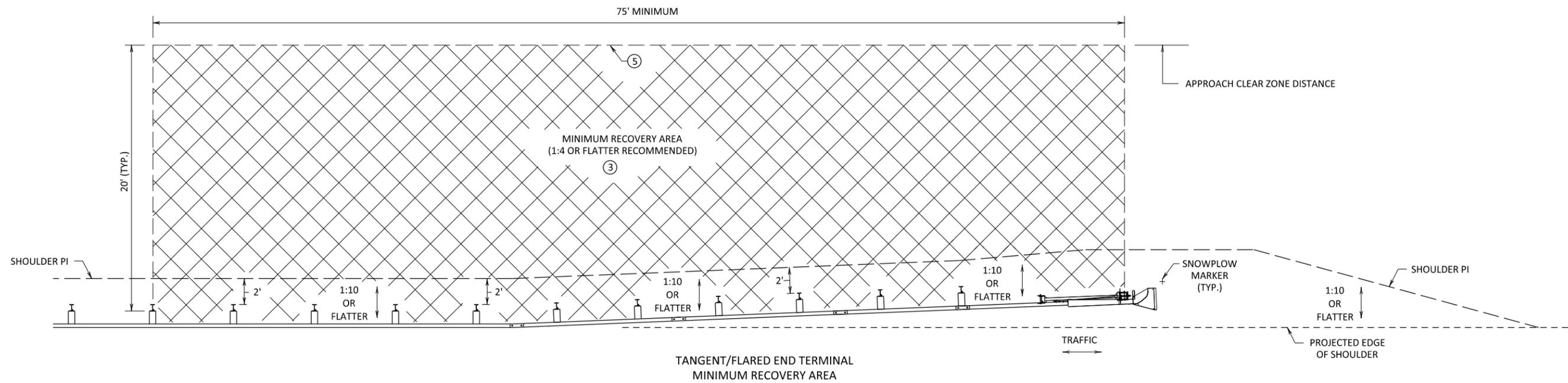
**DITCH PROTECTION SYSTEM**

**NOTES:**

- SEE SPECS. 2533, 2573 & 3886.
- SILT FENCE TYPE SD USED TO PROTECT CRITICAL AREAS FROM SHEET FLOW, AND AREAS WHERE OTHER SILT FENCES CANNOT BE PLACED. MAXIMUM CONTRIBUTING AREA: 1 ACRE.
- PLACE SILT FENCE TYPE SD ALONG A CONSTANT ELEVATION.
- SILT FENCE TYPE SD CAN UTILIZE EITHER A CONCRETE, OR WATER FILLED, TEMPORARY MEDIAN BARRIER.
- ① PLACING STOCK PILES NEXT TO AN ENVIRONMENTALLY SENSITIVE AREA IS NOT RECOMMENDED. WHEN THERE ARE NO FEASIBLE ALTERNATIVES, PLACE SILT FENCE SD AS SHOWN OR AS DIRECTED BY THE ENGINEER.
- ② CRITICAL AREAS INCLUDE WETLANDS, JUDICIAL DITCHES, STREAMS, WATER BODIES, AND OTHER AREAS REQUIRING PROTECTION.

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<b>LEAD EXPERT OFFICE</b> LYNN CLARKOWSKI CHIEF ENVIRONMENTAL OFFICER OFFICE OF ENVIRONMENTAL STEWARDSHIP		<b>TEMPORARY SEDIMENT CONTROL</b> SUPER DUTY SILT FENCE		APPROVED: 02-28-2017 REVISED:	 THOMAS STYRBICKI STATE DESIGN ENGINEER	<b>STANDARD PLAN</b> 5-297.405	7 OF 8
		<b>STANDARD PLAN</b>		SAP 002-607-032 TRUNK HWY. # (TH XXX)#		SHEET NO. 29 TOTAL SHEETS 54	



NOTES:

- ① SEE STANDARD PLAN 5-297.692.
- ② SEE STANDARD PLAN 5-297.690.
- ③ THIS AREA FREE OF FIXED OBJECTS. SLOPES BETWEEN 1:3 AND 1:4 PERMITTED WHEN 1:4 OR FLATTER IS NOT POSSIBLE. FOR SLOPES STEEPER THAN 1:3, THIS AREA SHOULD BE SIMILAR IN CROSS SECTION TO THE UNSHIELDED ROADSIDE AREA UPSTREAM OF THE END TERMINAL.
- ④ SMOOTHLY TRANSITION THE GRADING PLATFORM TO EXISTING SIDE SLOPE SO THE ENTIRE ROADSIDE APPROACH TO THE BARRIER REMAINS TRAVERSABLE.
- ⑤ GRADUALLY BLEND SLOPE FROM TRAVERSABLE AREA TO STEEP EXISTING SLOPE (WHEN SLOPE IS STEEPER THAN 1:6).

LEAD EXPERT OFFICE  
 NANCY YOO  
 DESIGN SUPPORT DIRECTOR  
 OFFICE OF PROJECT MANAGEMENT  
 & TECHNICAL SUPPORT

GUARDRAIL / END TREATMENTS  
 MISCELLANEOUS DETAILS

APPROVED: 05-14-2021  
 REVISED:

THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

STANDARD PLAN  
 5-297.601

1 OF 4

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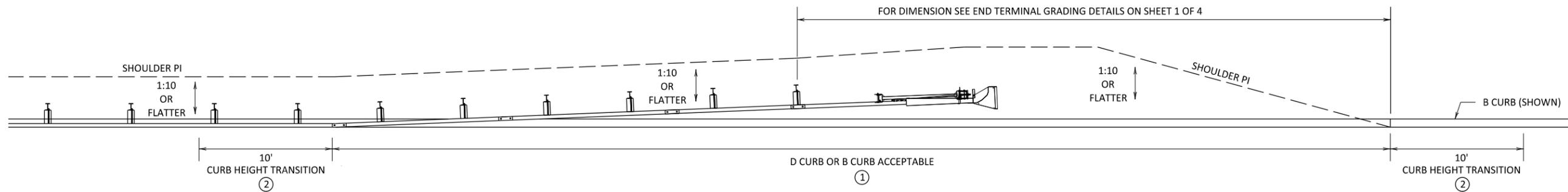


STANDARD PLAN

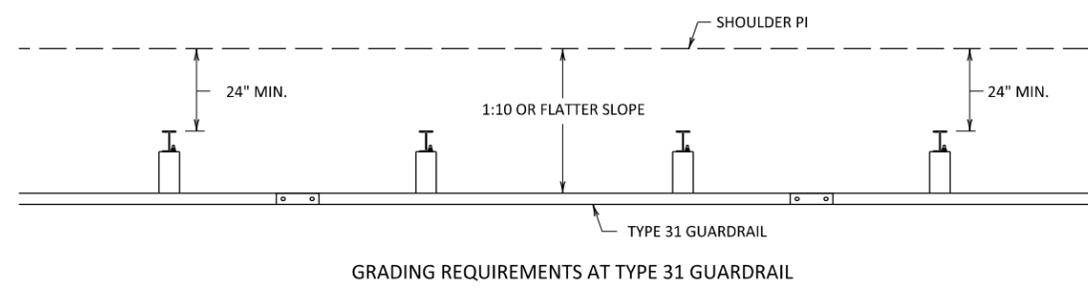
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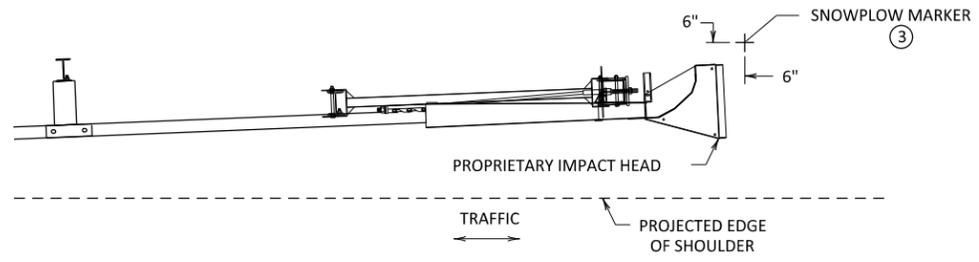
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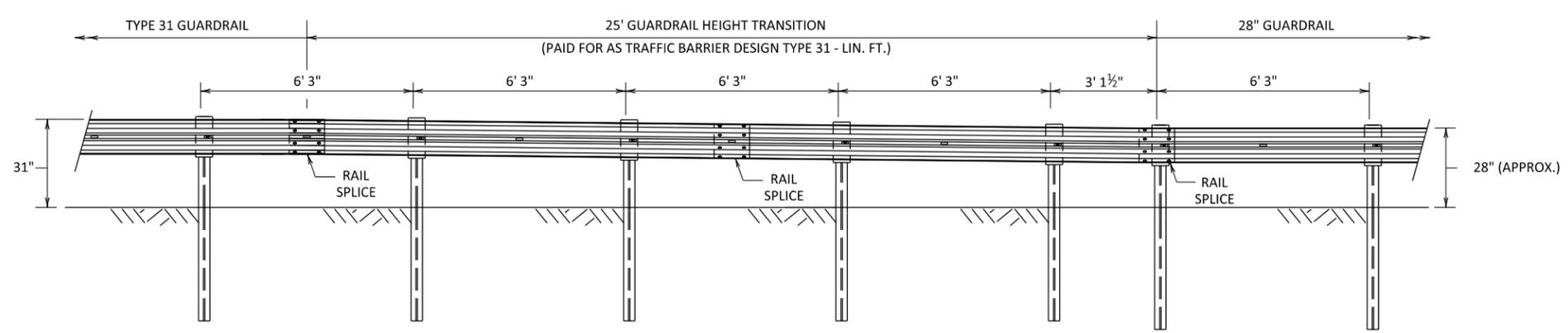
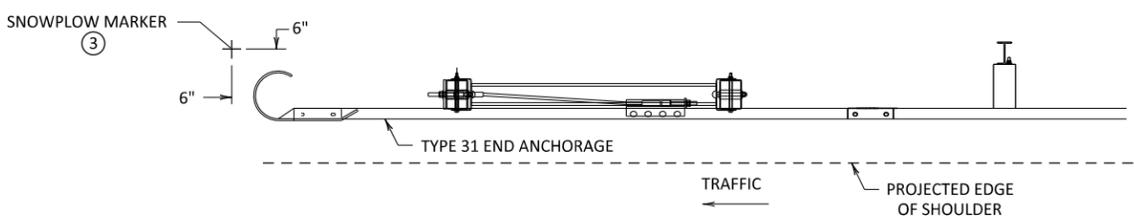
TRAFFIC  
 INPLACE CURB AT END TERMINAL



GRADING REQUIREMENTS AT TYPE 31 GUARDRAIL



SNOWPLOW MARKER LOCATION AT END TERMINAL/END ANCHORAGE



TYPE 31 W-BEAM GUARDRAIL HEIGHT TRANSITION TO 28" ④

- NOTES:
- ① IF INPLACE CURB IS OVER 4" HEIGHT, MILL TO 3" HEIGHT.
  - ② CONTINUE MILLING FROM 3" MILLED HEIGHT TO MATCH INPLACE CURB HEIGHT.
  - ③ SNOWPLOW MARKER (X3-5) WITH A SQUARE-TUBE THREE-WALL SIGN BASE PER STANDARD PLAN 5-297.721. TOP OF POST SHALL BE 3' ABOVE THE HEIGHT OF THE END TERMINAL/END ANCHORAGE. PLACE MARKER AT BOTH ENDS OF GUARDRAIL RUN.
  - ④ USE ONLY WHEN CONNECTING TO GUARDRAIL TYPES 8338 AND 8307.

LEAD EXPERT OFFICE  
 NANCY YOO  
 DESIGN SUPPORT DIRECTOR  
 OFFICE OF PROJECT MANAGEMENT & TECHNICAL SUPPORT

GUARDRAIL / END TREATMENTS  
 MISCELLANEOUS DETAILS

APPROVED: 05-14-2021  
 REVISED:

THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

STANDARD PLAN  
 5-297.601

2 OF 4

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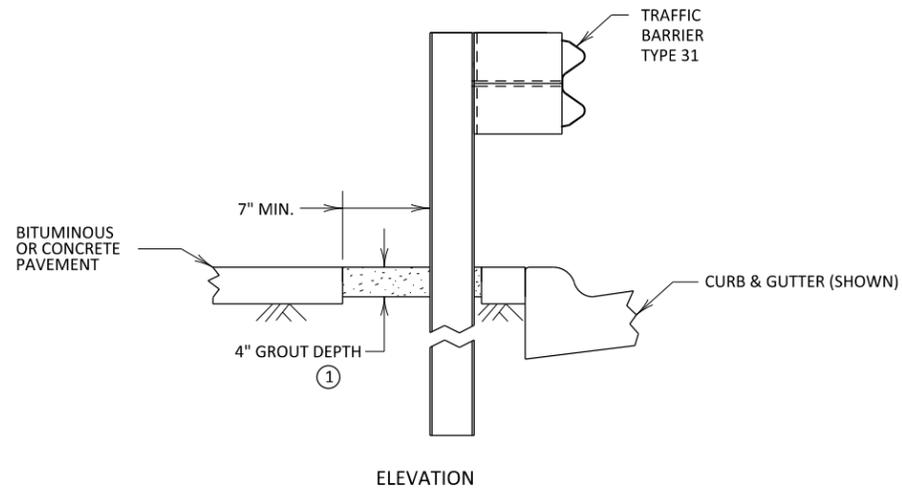
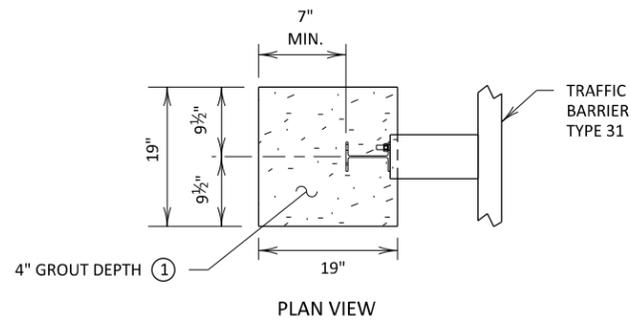


STANDARD PLAN

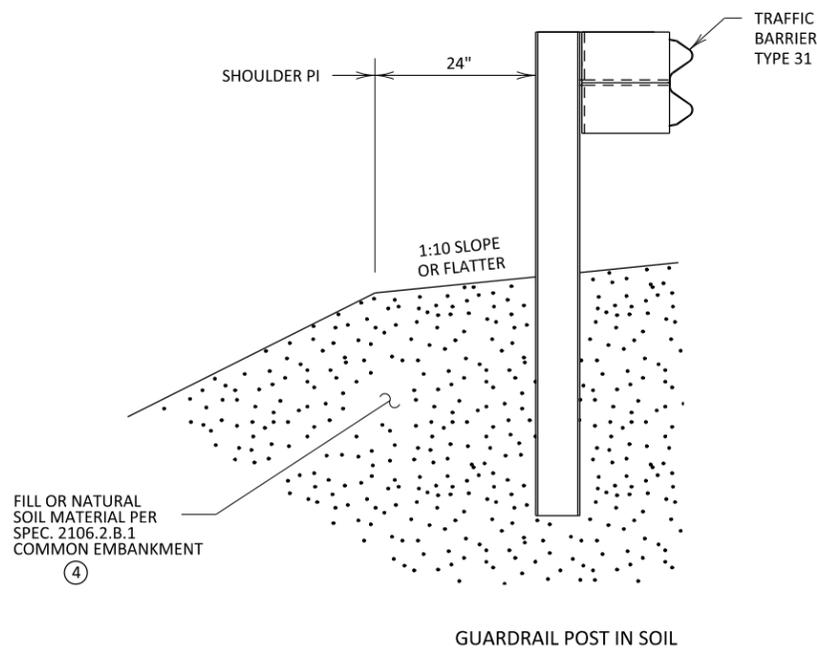
SAP 002-607-032

SHEET NO. 31

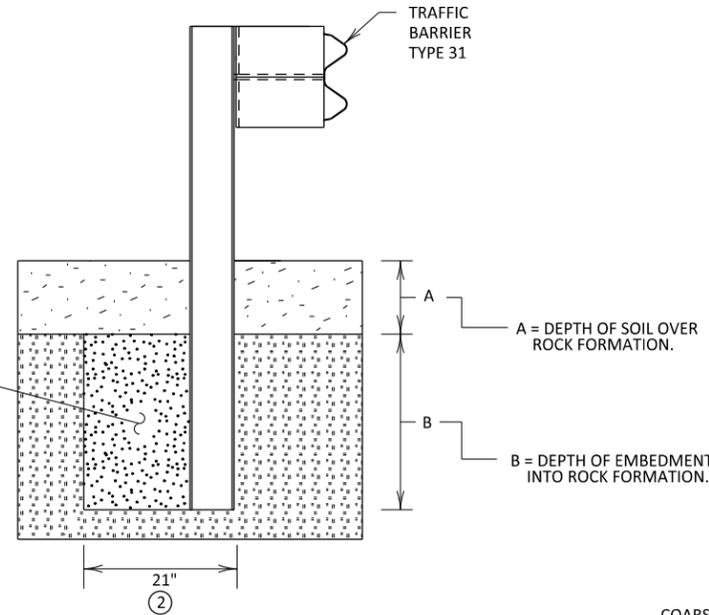
TOTAL SHEETS 54



POST LEAVE-OUT FOR TRAFFIC BARRIER TYPE 31



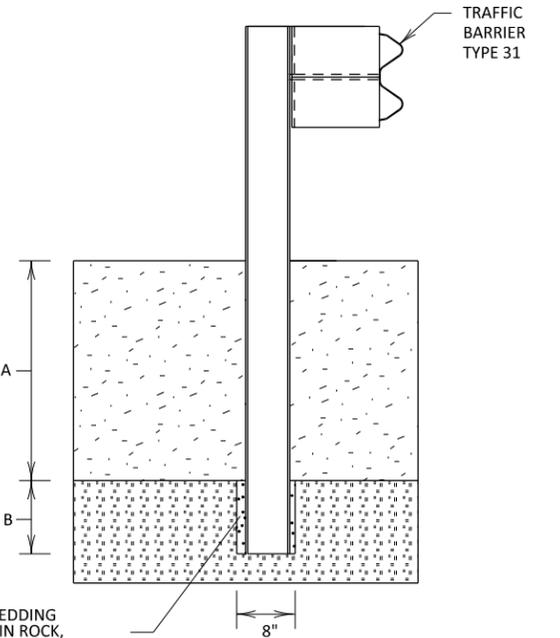
COARSE AGGREGATE BEDDING TYPE 3149. BACKFILL IN ROCK, LAYERED AND COMPACTED.



- FOR OVERLYING SOIL DEPTHS (A) RANGING FROM 0" TO 18", THE DEPTH INTO ROCK (B) IS 24".

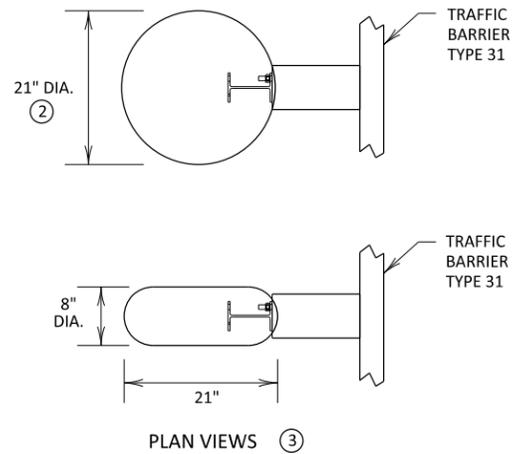
ELEVATION

COARSE AGGREGATE BEDDING TYPE 3149. BACKFILL IN ROCK, LAYERED AND COMPACTED.

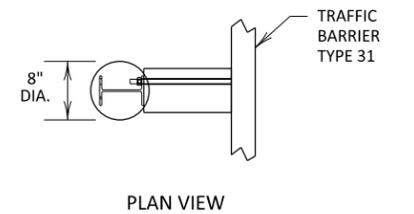


- FOR OVERLYING SOIL DEPTHS (A) RANGING FROM 18" TO FULL POST EMBEDMENT DEPTH. THE REQUIRED DEPTH INTO ROCK (B) IS EQUAL TO FULL POST EMBEDMENT DEPTH MINUS (A). FULL POST EMBEDMENT DEPTH FOR BLOCKED OUT W-BEAM IS APPROXIMATELY 42".

ELEVATION



GUARDRAIL POST IN ROCK 0" TO 18" OVERLYING SOIL DEPTH (POST HOLE IN ROCK SPECIAL)



GUARDRAIL POST IN ROCK 18" OR GREATER OVERLYING SOIL DEPTH (POST HOLE IN ROCK)

NOTES:

- ① GROUT IS ONE PART TYPE 1A CEMENT, 14 PARTS SAND, AND 5 PARTS WATER, BY VOLUME.
- ② 24" DIAMETER ACCEPTABLE.
- ③ EITHER HOLE CONFIGURATION (CIRCULAR OR ELONGATED) ACCEPTABLE.
- ④ MATERIAL SHALL NOT CONTAIN GEOFOAM, TIRE SHREDS, OR OTHER LIGHTWEIGHT FILL MATERIALS. POST SHALL NOT BE DRIVEN THROUGH PAVEMENT OR GEOCELL SLOPE REINFORCEMENT.

LEAD EXPERT OFFICE  
NANCY YOO  
DESIGN SUPPORT DIRECTOR  
OFFICE OF PROJECT MANAGEMENT & TECHNICAL SUPPORT

GUARDRAIL / END TREATMENTS  
MISCELLANEOUS DETAILS

APPROVED: 05-14-2021  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.601

4 OF 4

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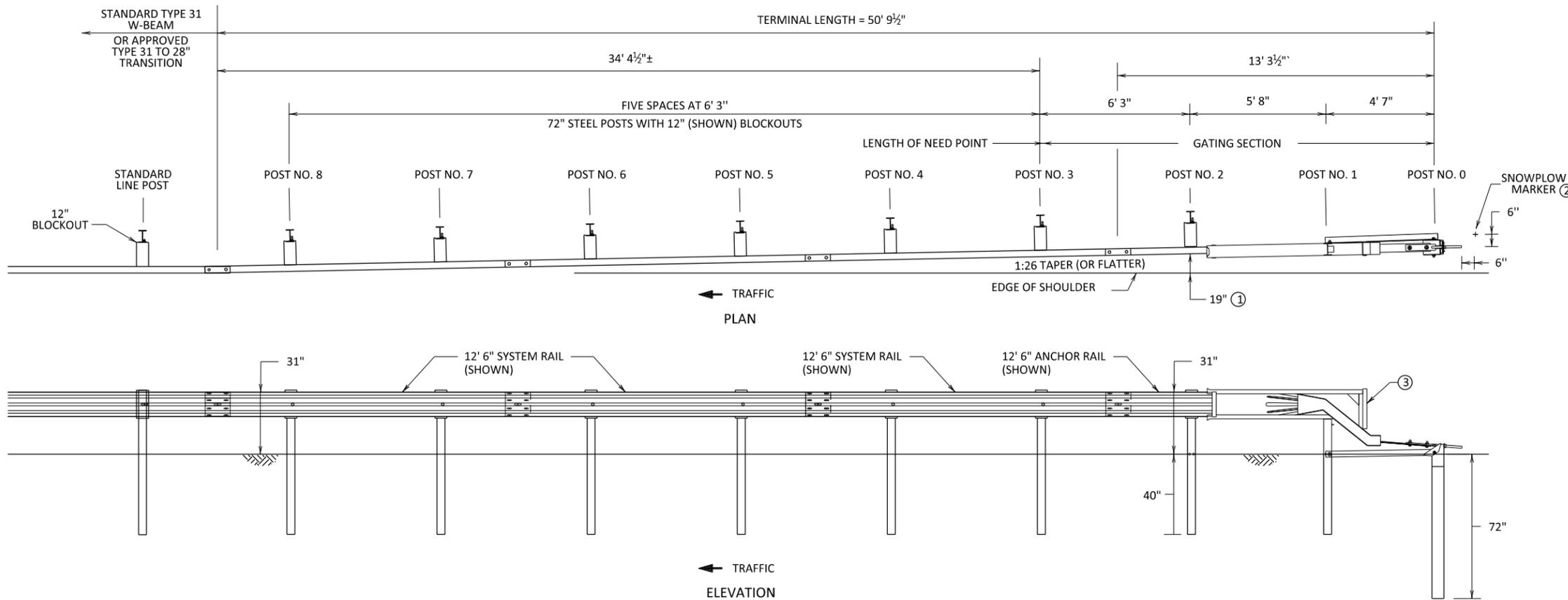


STANDARD PLAN

SAP 002-607-032

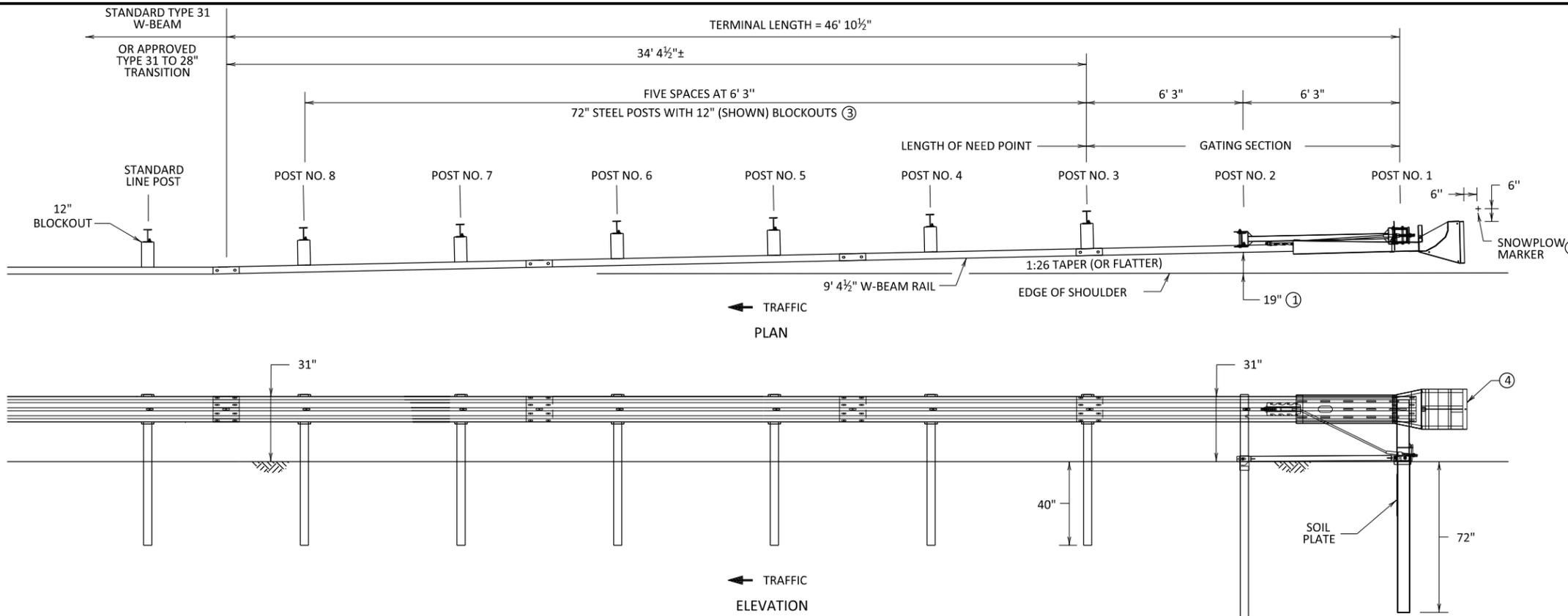
SHEET NO. 32

TOTAL SHEETS 54



**SOFTSTOP  
(TRINITY HIGHWAY PRODUCTS)**

- NOTES:**  
THIS IS A PROPRIETARY ITEM AS PER SPEC. 1703.
- THESE DETAILS ARE FOR DESIGN GUIDANCE INFORMATION ONLY. CHECK WITH MANUFACTURER FOR CURRENT DETAILS AND INSTALLATION INSTRUCTIONS.
- ALL TERMINAL RAIL MUST BE STRAIGHT. CURVED TERMINAL RAIL IS NOT ALLOWED.
- ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS, AND BEARING PLATES SHALL BE GALVANIZED PER MNDOT SPEC. 3392.
- POSTS 1 AND 2 ARE PROPRIETARY STEEL YIELDING TERMINAL POSTS.
- POST 0 IS A PROPRIETARY ANCHOR POST.
- POSTS 2 - 8, 8" BLOCKOUTS ACCEPTABLE.
- OPTIONAL 25' ANCHOR RAIL AND 25' SYSTEM RAIL ACCEPTABLE.
- END TERMINAL TO FOLLOW A STRAIGHT TAPER.
- PLACE STEEL I-BEAM POST DELINEATORS PER THE APPROVED PRODUCTS LIST ON THE TOP OF THE FIRST FIVE I-BEAM POSTS OF UPSTREAM TERMINAL AND THE LAST FIVE I-BEAM POSTS OF DOWNSTREAM TERMINAL. ATTACH USING ADHESIVE (PER MANUFACTURER RECOMMENDATION). THE RETROREFLECTIVE SHEETING SHALL FACE TRAFFIC AND MATCH THE COLOR OF THE ADJACENT EDGE LINE.
- ① LESSER OFFSET ALLOWED WITH APPROVAL OF THE ENGINEER.  
② SEE STANDARD PLAN 5-297.601.  
③ 6" X 18" OBJECT MARKER (OM3-R OR OM3-L) PER MNDOT STANDARD SIGNS AND MARKINGS MANUAL. ALTERNATING STRIPES SHALL BE SLOPED DOWN TOWARD THE SIDE ON WHICH TRAFFIC IS TO PASS THE OBSTRUCTION.



**MSKT  
(ROAD SYSTEMS INC.)**

- NOTES:**  
THIS IS A PROPRIETARY ITEM AS PER SPEC. 1703.
- THESE DETAILS ARE FOR DESIGN GUIDANCE INFORMATION ONLY. CHECK WITH MANUFACTURER FOR CURRENT DETAILS AND INSTALLATION INSTRUCTIONS.
- ALL TERMINAL RAIL MUST BE STRAIGHT. CURVED TERMINAL RAIL IS NOT ALLOWED.
- ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS, AND BEARING PLATES SHALL BE GALVANIZED PER MNDOT SPEC. 3392.
- POSTS 1 AND 2 ARE PROPRIETARY HINGED POSTS.
- THE RAIL IS DESIGNED TO EXIT THE IMPACT HEAD ON THE BACK SIDE OF THE TERMINAL.
- END TERMINAL TO FOLLOW A STRAIGHT TAPER.
- PLACE STEEL I-BEAM POST DELINEATORS PER THE APPROVED PRODUCTS LIST ON THE TOP OF THE FIRST FIVE I-BEAM POSTS OF UPSTREAM TERMINAL AND THE LAST FIVE I-BEAM POSTS OF DOWNSTREAM TERMINAL. ATTACH USING ADHESIVE (PER MANUFACTURER RECOMMENDATION). THE RETROREFLECTIVE SHEETING SHALL FACE TRAFFIC AND MATCH THE COLOR OF THE ADJACENT EDGE LINE.
- ① LESSER OFFSET ALLOWED WITH APPROVAL OF THE ENGINEER.  
② SEE STANDARD PLAN 5-297.601.  
③ 8" BLOCKOUTS ARE ACCEPTABLE.  
④ 18" X 18" OBJECT MARKER (OM3-R OR OM3-L) PER MNDOT STANDARD SIGNS AND MARKINGS MANUAL. ALTERNATING STRIPES SHALL BE SLOPED DOWN TOWARD THE SIDE ON WHICH TRAFFIC IS TO PASS THE OBSTRUCTION.

**LEAD EXPERT OFFICE**  
NANCY YOO  
DESIGN SUPPORT DIRECTOR  
OFFICE OF PROJECT MANAGEMENT & TECHNICAL SUPPORT

**PROPRIETARY END TERMINAL - TANGENT  
FOR TYPE 31 GUARDRAIL**

APPROVED: 05-14-2021  
REVISED:

*Thomas Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

**STANDARD PLAN  
5-297.612**

1 OF 1

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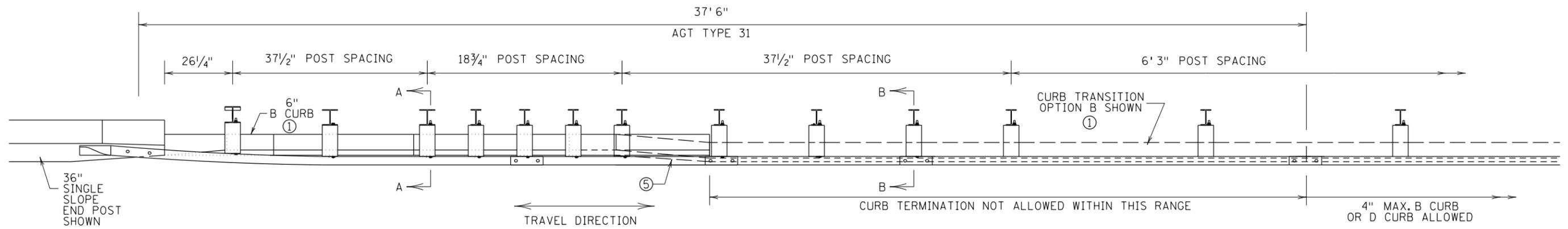


STANDARD PLAN

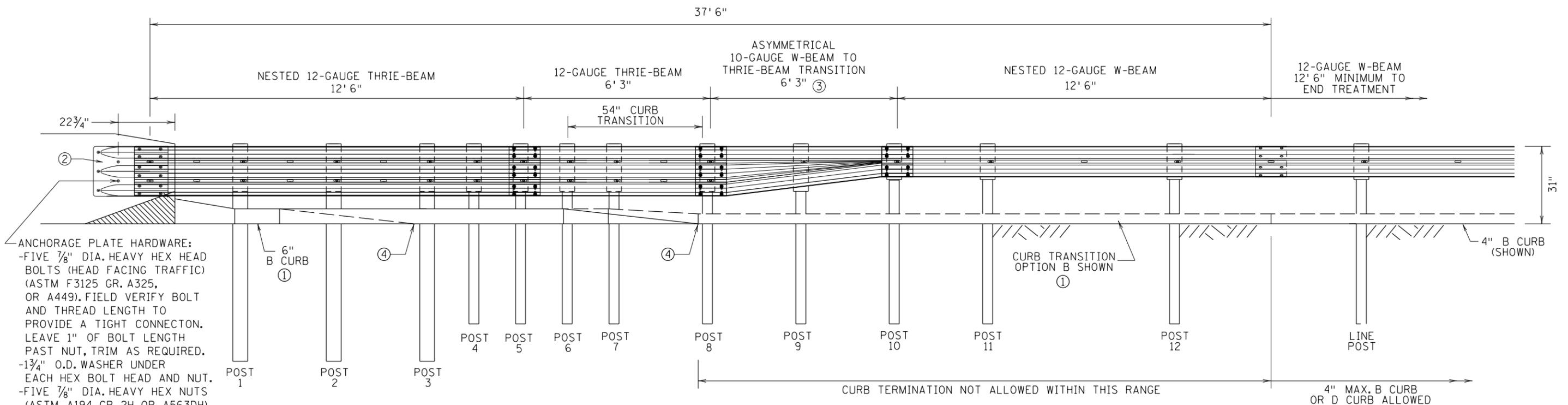
SAP 002-607-032

SHEET NO. 33

TOTAL SHEETS 54

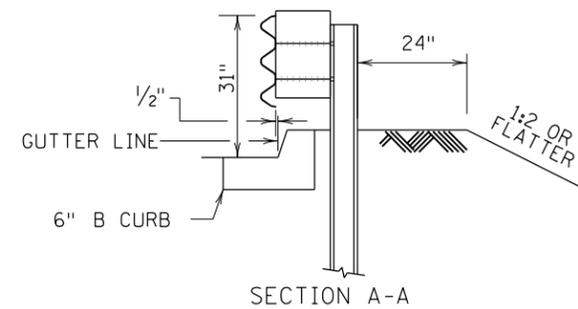


PLAN VIEW

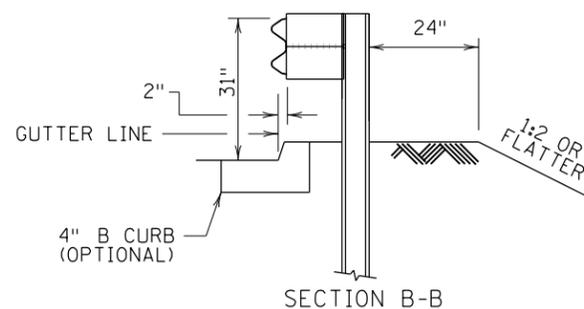


FRONT VIEW

ANCHORAGE PLATE HARDWARE:  
 -FIVE 7/8" DIA. HEAVY HEX HEAD BOLTS (HEAD FACING TRAFFIC) (ASTM F3125 GR. A325, OR A449). FIELD VERIFY BOLT AND THREAD LENGTH TO PROVIDE A TIGHT CONNECTION. LEAVE 1" OF BOLT LENGTH PAST NUT, TRIM AS REQUIRED.  
 -1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.  
 -FIVE 7/8" DIA. HEAVY HEX NUTS (ASTM A194 GR. 2H OR A563DH).  
 -ALL HARDWARE GALVANIZED PER ASTM A153 AND A780.



SECTION A-A



SECTION B-B

TRANSITION POST AND BLOCKOUT SIZING		
POST #	STEEL POST SIZE	BLOCKOUT SIZE
1-3	84" - W6 x 15	6 x 12 x 19"
4-9	72" - W6 x 9	6 x 12 x 19"
10-12	72" - W6 x 9	6 x 12 x 14 1/4"

NOTES:

- APPROACH GUARDRAIL TRANSITION SHALL BE USED ON THE APPROACH SIDE, AND SHALL BE USED ON THE DEPARTING/TRAILING END IF GUARDRAIL IS NEEDED. GUARDRAIL BEAM AND HARDWARE IN ACCORDANCE WITH AASHTO SPEC. M 180. REFER TO APPROACH PANEL PLANS FOR LOCATION OF E8 JOINT.
- ① SEE CURB DETAILS ON SHEET 2 OF 3.
- ② THRIE-BEAM ANCHORAGE PLATE (STANDARD PLATE 8350) IS INCIDENTAL.
- ③ SEE STANDARD PLATE 8356.
- ④ CURB MAY BE TERMINATED AT THIS LOCATION, SEE CONSTRUCTION PLAN SHEETS FOR LOCATION. SEE CURB DETAILS ON SHEET 2 OF 3.
- ⑤ GUTTER LINE TAPERS 2 1/2" TO MATCH EXTENDED GUTTER LINE FROM BRIDGE.

LEAD EXPERT OFFICE  
 NANCY YOO  
 DESIGN SUPPORT DIRECTOR  
 OFFICE OF PROJECT MANAGEMENT & TECHNICAL SUPPORT

APPROACH GUARDRAIL TRANSITION (AGT) TYPE 31  
 AT SINGLE SLOPE END POST  
 ASSEMBLY DETAILS

APPROVED: 07-05-2022  
 REVISED:

THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

STANDARD PLAN  
 5-297.694

1 OF 3

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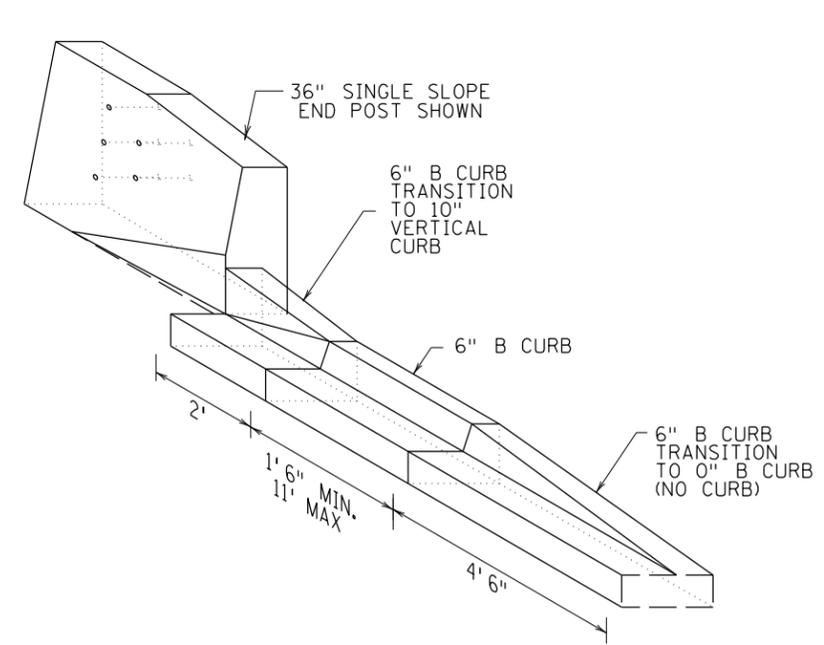
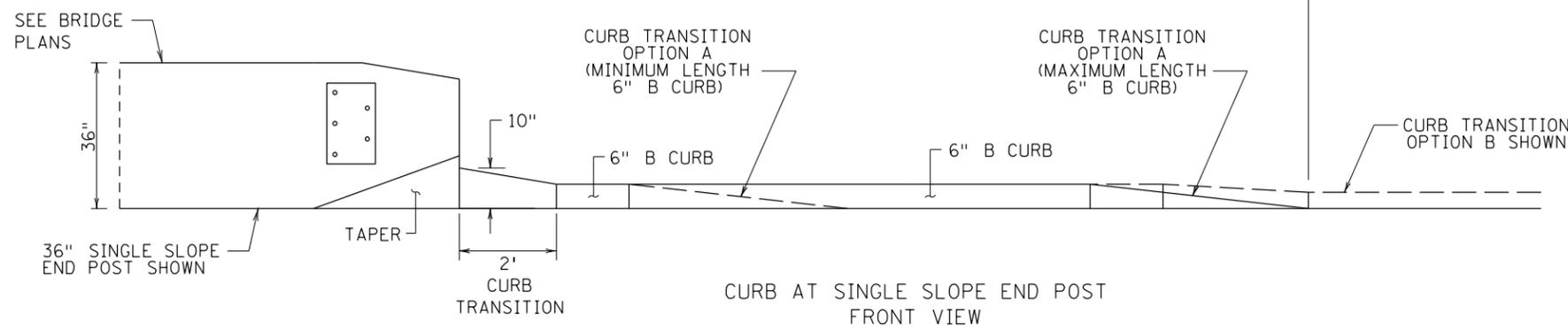
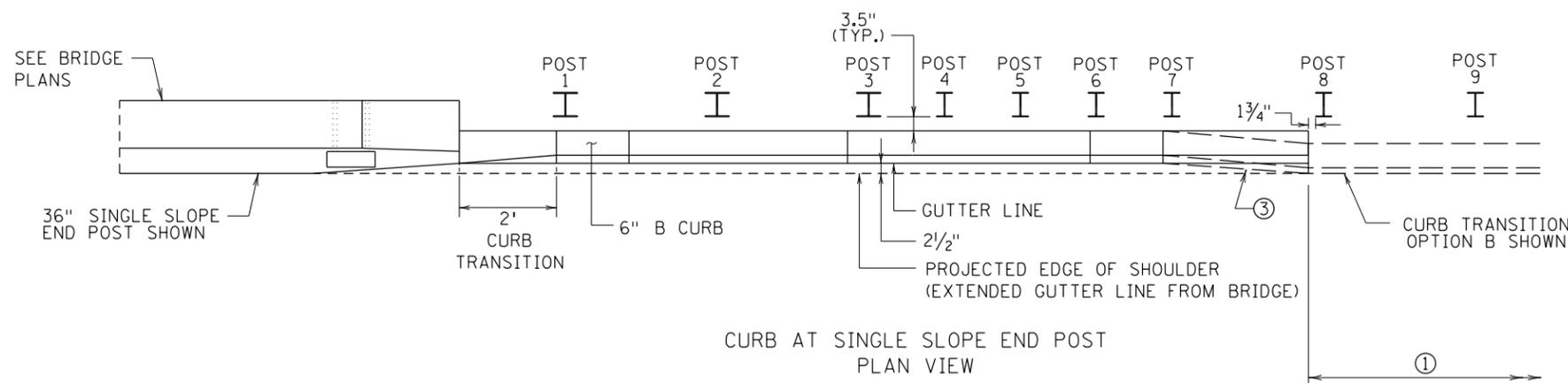


STANDARD PLAN

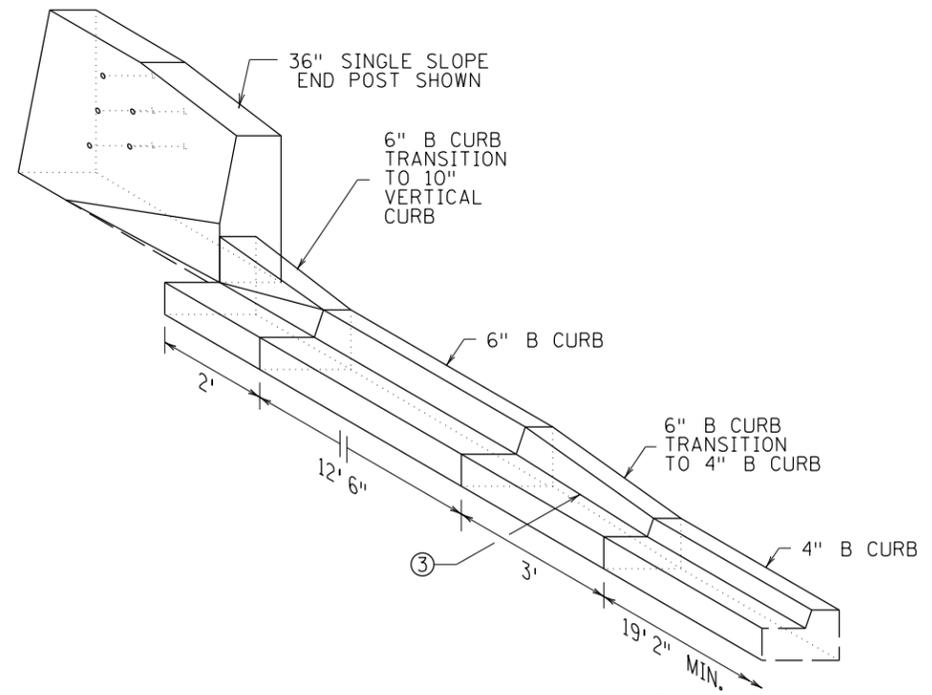
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SHEET NO. 34

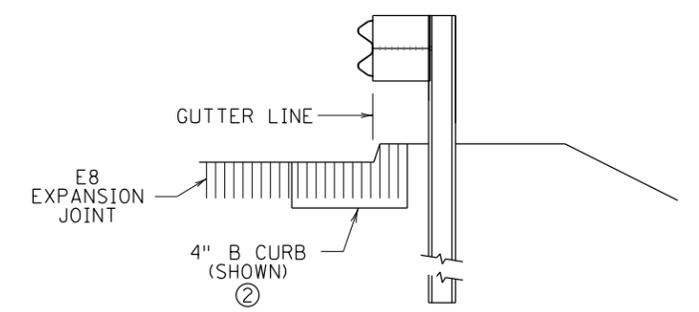
TOTAL SHEETS 54



CURB TRANSITION - OPTION A  
6" B CURB ONLY



CURB TRANSITION - OPTION B ①  
6" WITH 4" B CURB



EXPANSION JOINT AT CURB

- NOTES:
- DESIGN B CURB REQUIRED WITH THIS SYSTEM.
  - DESIGN D CURB ALLOWED BEYOND THE 37' 6" DISTANCE FROM THE RAIL CONNECTION AT THE THRIE-BEAM ANCHORAGE PLATE.
  - REFER TO APPROACH PANEL PLANS FOR LOCATION OF E8 JOINT.
  - ① CURB TERMINATION NOT ALLOWED BETWEEN POST 8 AND THE 37' 6" DISTANCE FROM THE RAIL CONNECTION AT THE THRIE-BEAM ANCHORAGE PLATE. SEE SHEET 1 OF 3.
  - ② AT CURB CONTAINING E8 EXPANSION JOINT, PLACE BACK FACE OF GUARDRAIL AT THE GUTTER LINE.
  - ③ GUTTER LINE TAPERS 2 1/2" TO MATCH EXTENDED GUTTER LINE FROM BRIDGE.

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**LEAD EXPERT OFFICE**  
NANCY YOO  
DESIGN SUPPORT DIRECTOR  
OFFICE OF PROJECT MANAGEMENT & TECHNICAL SUPPORT

**APPROACH GUARDRAIL TRANSITION (AGT) TYPE 31 AT SINGLE SLOPE END POST CURB DETAILS**

APPROVED: 07-05-2022  
REVISED:

*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

**STANDARD PLAN 5-297.694**

2 OF 3

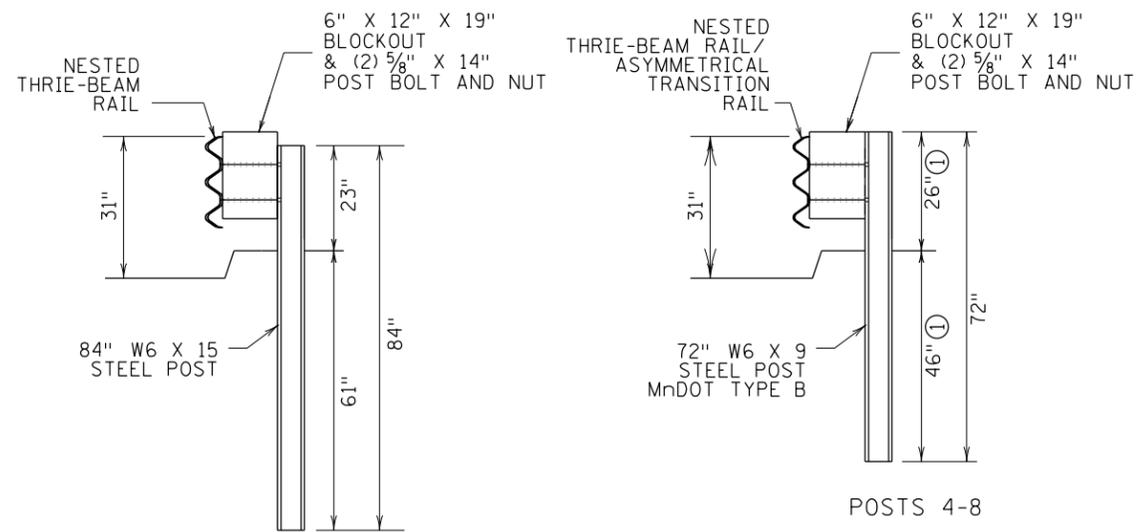


STANDARD PLAN

SAP 002-607-032

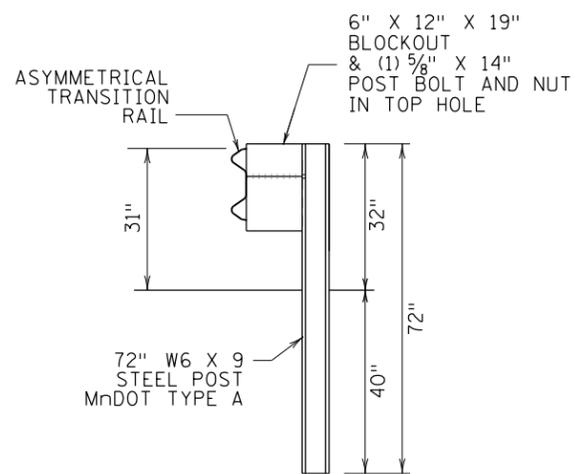
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TOTAL SHEETS 54

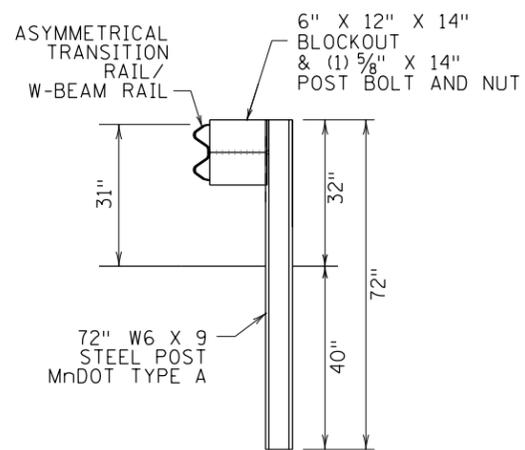


POSTS 1-3

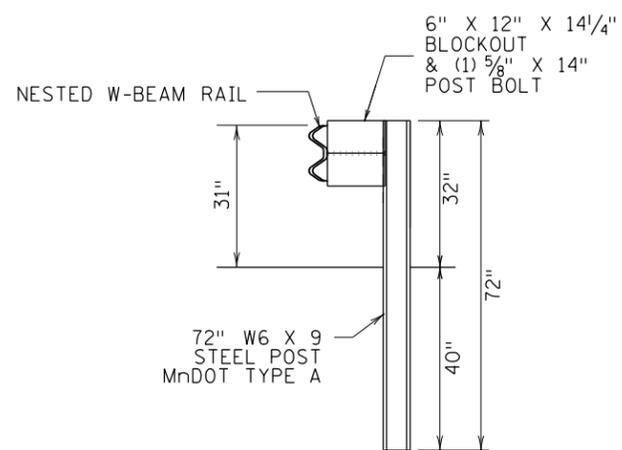
POSTS 4-8



POST 9

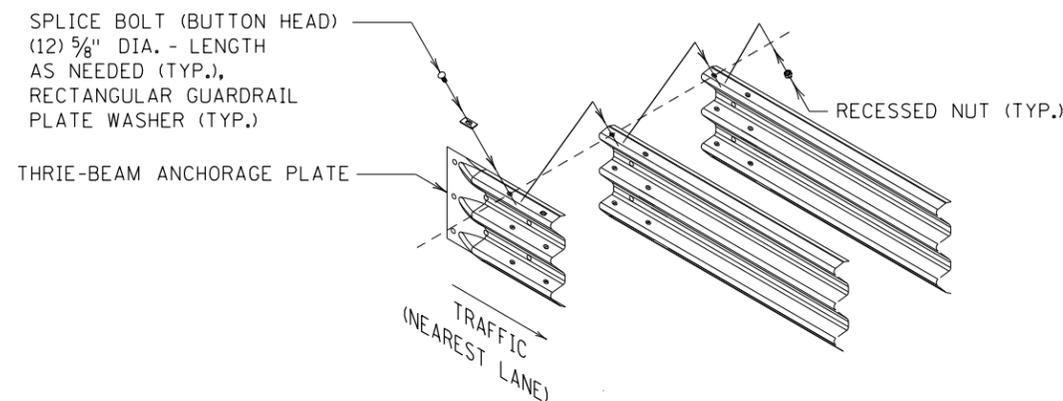
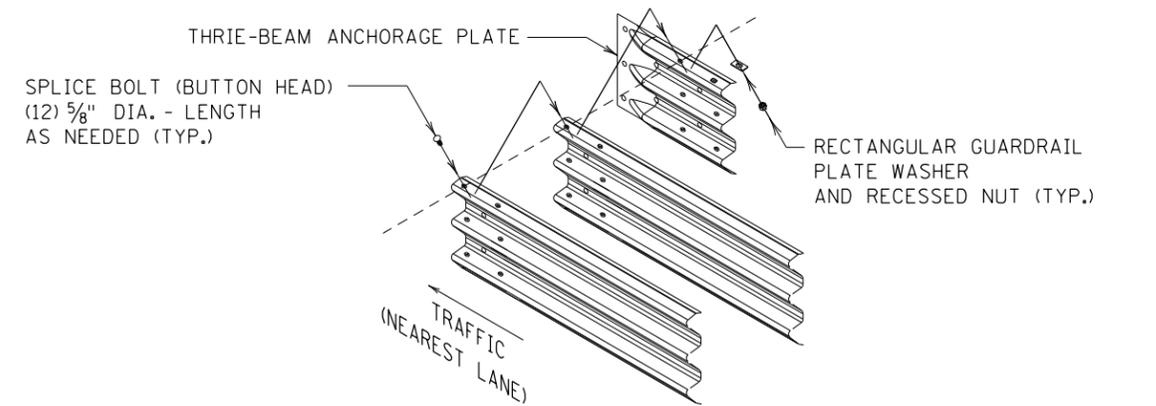


POST 10

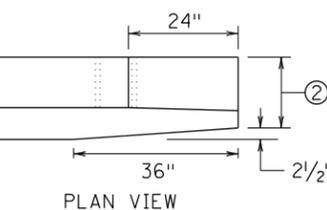
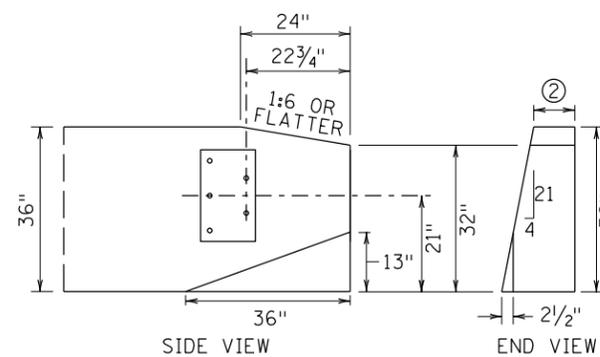


POSTS 11-12

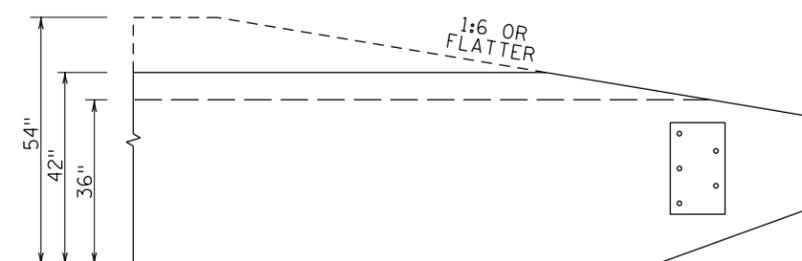
AGT POST COMPONENTS



THRIE BEAM RAIL/ANCHORAGE PLATE SPLICE CONNECTION DETAIL ④



SINGLE SLOPE BARRIER ③  
(36" HEIGHT SHOWN)



SINGLE SLOPE BARRIER HEIGHT OPTIONS

- NOTES:
- FOR GUARDRAIL STEEL POSTS, SEE STANDARD PLATE 8361.
  - FOR GUARDRAIL BLOCKOUTS, SEE STANDARD PLATE 8369.
  - GUARDRAIL BEAM AND HARDWARE IN ACCORDANCE WITH AASHTO SPEC. M 180.
  - ① DIMENSIONS APPLICABLE FOR POSTS 4-5. DIMENSIONS VARY AT POSTS 4-6 WHERE CURB HEIGHT TRANSITIONS TO NO HEIGHT.
  - ② SEE BRIDGE PLAN.
  - ③ 36" HEIGHT SHOWN.
  - ④ DRILL THRIE-BEAM ANCHORAGE PLATE AS NEEDED FOR FIT, REPAIR GALVANIZED COATINGS IN ACCORDANCE WITH ASTM SPEC. A780.

LEAD EXPERT OFFICE  
NANCY YOO  
DESIGN SUPPORT DIRECTOR  
OFFICE OF PROJECT MANAGEMENT  
& TECHNICAL SUPPORT

APPROACH GUARDRAIL TRANSITION (AGT) TYPE 31  
AT SINGLE SLOPE END POST  
MISCELLANEOUS AND COMPONENT DETAILS

APPROVED: 07-05-2022  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.694

3 OF 3

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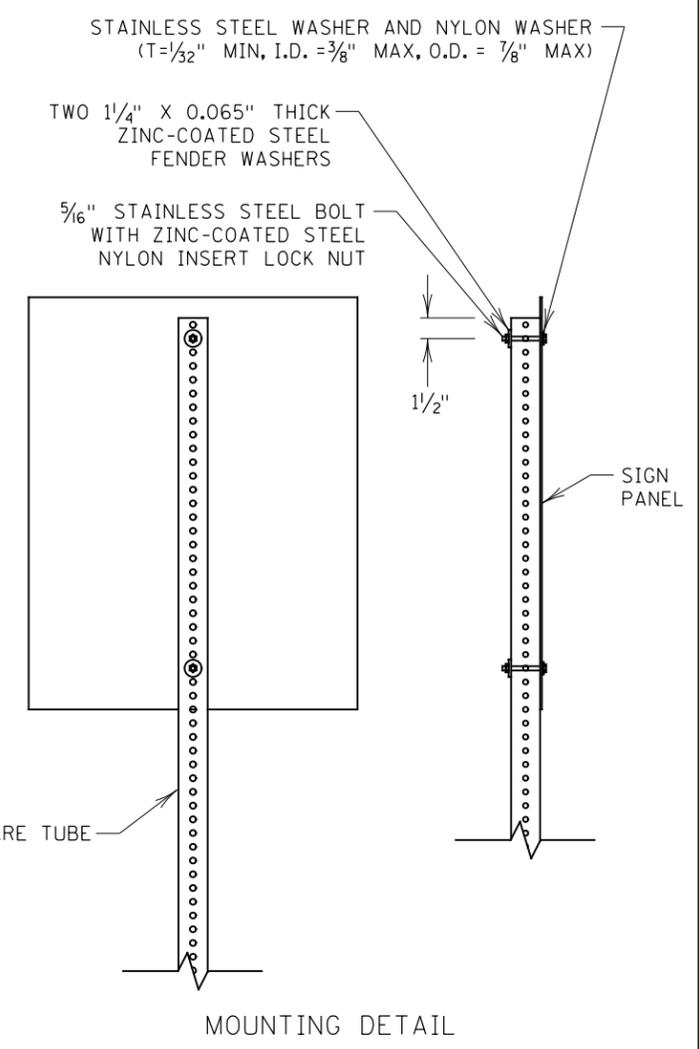
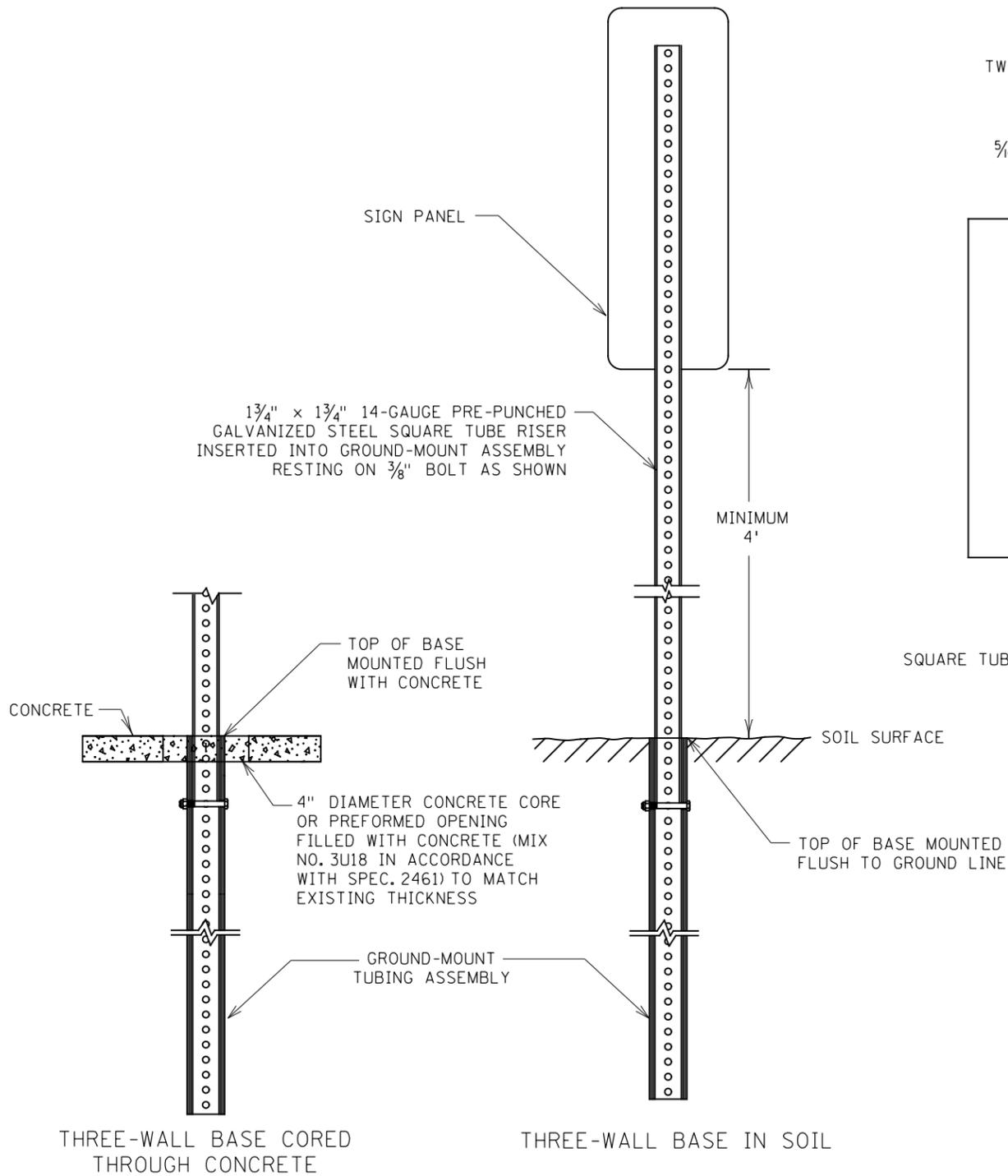
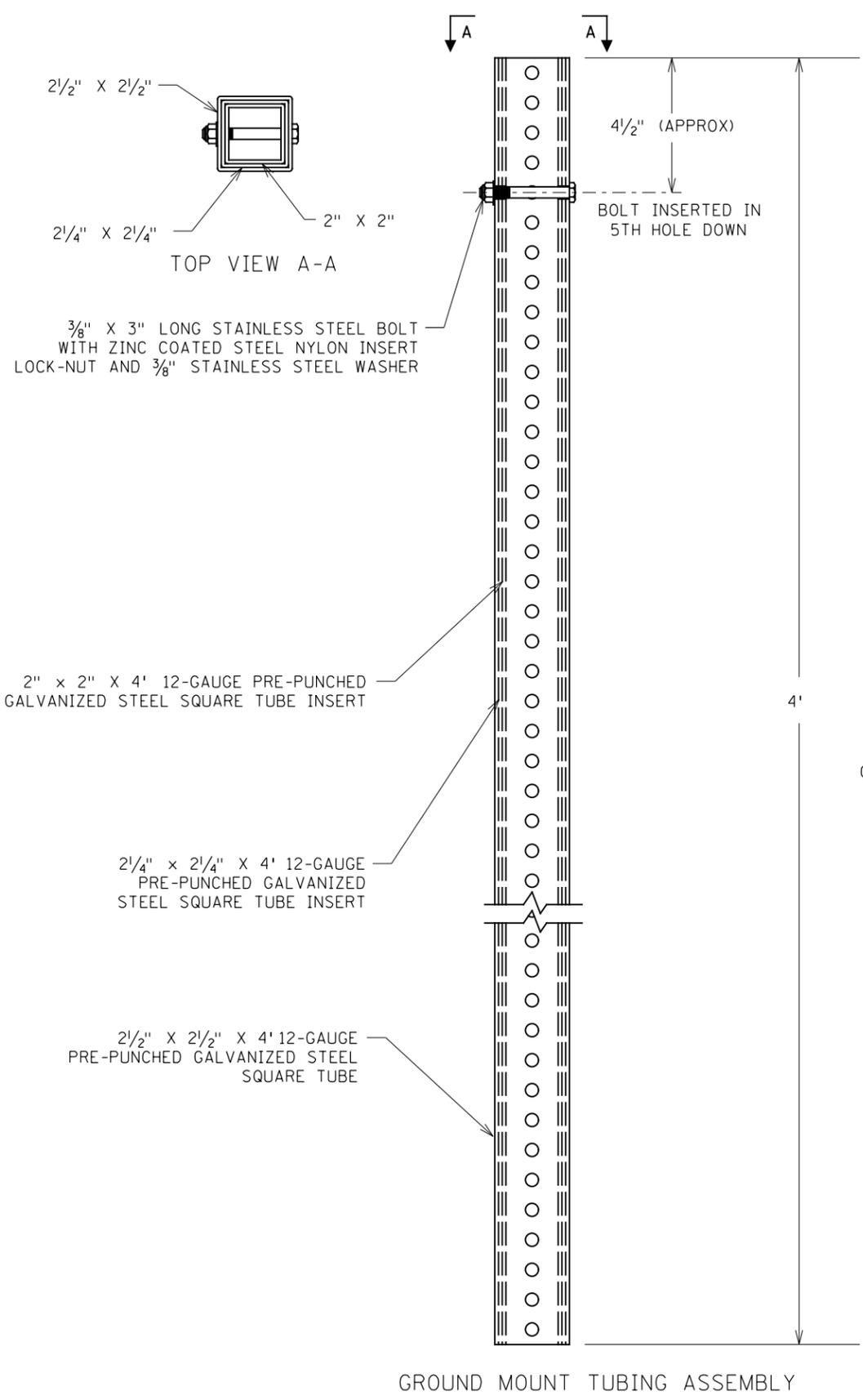


STANDARD PLAN

SAP 002-607-032

SHEET NO. 36

TOTAL SHEETS 54



NOTES:

THE CRASH RESPONSE FOR THIS STRUCTURE IS BENDABLE.

TO MEET CRASHWORTHY REQUIREMENTS THE DISTANCE BETWEEN THE BOTTOM OF THE SIGN PANEL AND THE GROUND SURFACE BELOW ANY PORTION OF THE SIGN PANEL SHALL BE A MINIMUM OF 4'. SEE TABULATIONS FOR MOUNTING HEIGHT.

SQUARE TUBE SIGN POSTS PER MnDOT SPEC. 3402.

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<b>LEAD EXPERT OFFICE</b> BRIAN SORENSON STATE TRAFFIC ENGINEER OFFICE OF TRAFFIC ENGINEERING		<b>THREE-WALL BASE</b> FOR 1 3/4" SQUARE-TUBE RISER POST		APPROVED: 11-29-2022 REVISED:	 THOMAS STYRBICKI STATE DESIGN ENGINEER	<b>STANDARD PLAN</b> 5-297.721	1 OF 1
		<b>STANDARD PLAN</b>		SAP 002-607-032 TRUNK HWY. # (TH XXX)#	SHEET NO. 37 TOTAL SHEETS 54		

**NOTES:**

EXISTING ACCESS TO RESIDENCES SHALL BE MAINTAINED THROUGHOUT PROJECT DURATION.

ALL COSTS INCURRED FOR MATERIALS, INSTALLATION, MAINTENANCE, AND REMOVAL OF TRAFFIC CONTROL DEVICES AS SHOWN ON THIS SHEET AND RELATED WORK DURING CONSTRUCTION SHALL BE INCLUDED IN PRICE BID FOR ITEM "TRAFFIC CONTROL".

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING THE LATEST FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.

BARRICADE PLACEMENT TO BE DETERMINED IN THE FIELD SO AS NOT TO OBSTRUCT VISION TO OR FROM ROADWAY ENTRANCES.

EXACT LOCATION OF TRAFFIC CONTROL DEVICES TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

THE CONTRACTOR SHALL REMOVE, SALVAGE OR COVER & RESTORE AS APPROPRIATE, ALL EXISTING SIGNING THAT CONFLICTS WITH THIS TRAFFIC CONTROL PLAN TO THE SATISFACTION OF THE ENGINEER.

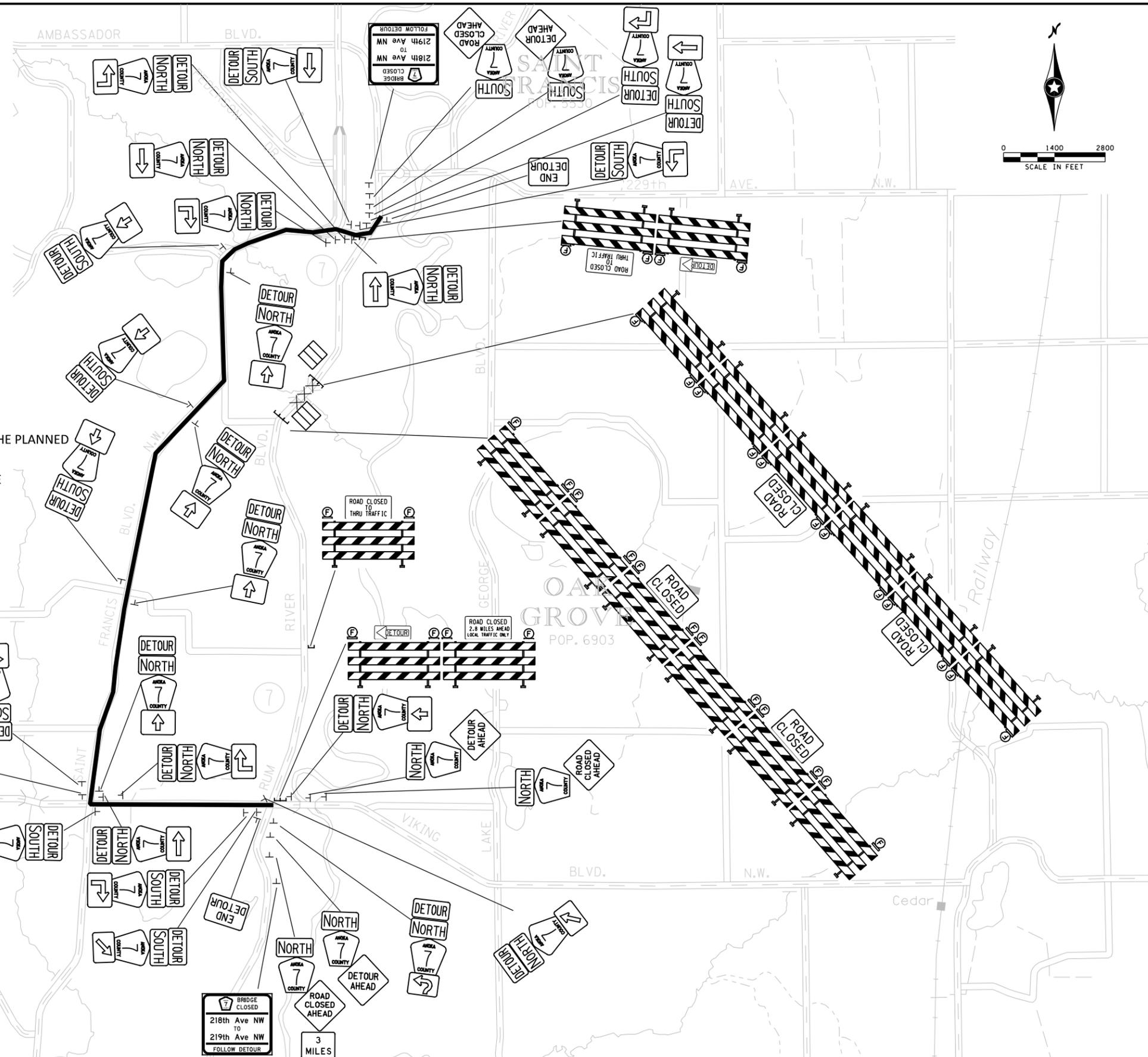
ALL INSTALLATIONS REQUIRING POSTS SHALL BE A "U" CHANNEL TYPE. MINIMUM WEIGHT PER FOOT - 3.00 LBS.

ALL TRAFFIC CONTROL DEVICES SHALL HAVE RETROREFLECTIVE SHEETING.

THE USE OF TEMPORARY ORANGE CONSTRUCTION FENCING MAY BE REQUIRED BY THE ENGINEER TO COMPLETELY CLOSE OFF ANY SPECIFIC WORK AREA.

PLACE THE PORTABLE CHANGEABLE MESSAGE BOARDS FOR ADVANCE NOTICE 10 DAYS PRIOR TO THE PLANNED CLOSURE DATE. COORDINATE MESSAGE WITH THE COUNTY OR FIELD ENGINEER.

IF CONSTRUCTION INFORMATION SIGNING IS NO LONGER VISIBLE TO THE MOTORING PUBLIC ONCE WORK BEGINS, MOVE SAID SIGNING TO A SITE IN ADVANCE OF THE WORK ZONE OR CLOSURE AS SHOWN IN THE PLAN OR APPROVED BY THE ENGINEER.



**LEGEND:**

- ROAD CLOSED TO TRAFFIC
- STANDARD SIGN (POST OR STAND MOUNTED)
- TYPE III BARRICADE
- TYPE A FLASHING WARNING LIGHT
- DETOUR ROUTE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: CLAYTON BAYER  
*Clayton Bayer*  
 Date: 06/17/2025 License # 57865

STATE AID PROJECT NO. SAP 002-607-032  
 DRAWN BY R.MAKSYMCHUK  
 DESIGNED BY R.MAKSYMCHUK  
 CHECKED BY C.BAYER  
 COMM. NO. 2417554



**ANOKA COUNTY**  
 DETOUR PLANS  
 SAP 002-607-032

**SHEET**  
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 OF  
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NO	DATE	BY	CKD	APPR	REVISION

"M" SERIES						
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.)	ASSEMBLY (WxH)	NUMBER OF POST	POST SPACING
	M4 - 8	BLACK ON ORANGE	24" X 12"	24" X 63"	1	
	M3 - 1 M3 - 3	BLACK ON WHITE	24" X 12"			
	M1 - 6M	WHITE AND YELLOW ON BLUE	24" X 24"			
	M5 - 1L M5 - 1R M5 - 3	BLACK ON WHITE	21" X 15"			
	M6 - 3	BLACK ON WHITE	21" X 15"			
	M6 - 1L M6 - 1R M6 - 2R	BLACK ON WHITE	21" X 15"			
	M4 - 8a	BLACK ON ORANGE	24" X 18"		1	

"W" SERIES						
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)	ASSEMBLY (IN. X IN.) (WxH)	NUMBER OF POST	POST SPACING INCHES
	W20 - 2	BLACK ON ORANGE	36" X 36"		1	
	W20 - 3 ROAD	BLACK ON ORANGE	36" X 36"	36" X 60"	1	
	W16 - 3P	BLACK ON ORANGE	30" X 24"			

BARRICADE MOUNTED SIGNS			
SIGN	SIGN NO.	COLOR	SIZE (W x H) INCHES
	M4 - 10R	BLACK ON ORANGE	48" X 18"
	R11 - 3a	BLACK ON WHITE	60" X 30"
	R11 - 4	BLACK ON WHITE	60" X 30"
	R11 - 2M ROAD	BLACK ON WHITE	48" X 30"

"G" SERIES						
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)	ASSEMBLY (IN. X IN.) (WxH)	NUMBER OF POST	POST SPACING INCHES
	G20 - X2 DESIGN	BLACK ON ORANGE	96" X 84"		2	54

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NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: CLAYTON BAYER

*Clayton Bayer*

Date: 06/17/2025 License # 57865

STATE AID PROJECT NO. SAP 002-607-032

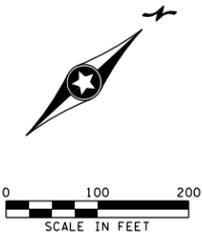
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DESIGNED BY R.MAKSYMCHUK  
CHECKED BY C.BAYER  
COMM. NO. 2417554



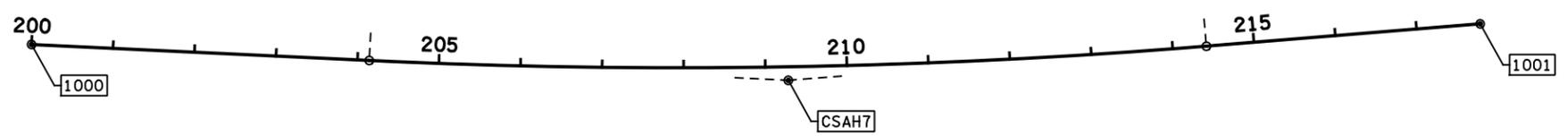
ANKA COUNTY  
DETOUR PLANS  
SAP 002-607-032  
TEMPORARY TRAFFIC CONTROL SIGN TABULATION

SHEET 39 OF 54

ALIGNMENT TABULATION											
POINT NUMBER	POINT	STATION	CIRCULAR CURVE DATA					COORDINATES		AZIMUTH	
			DELTA	DEGREE	RADIUS	TANGENT	LENGTH	X	Y		
			SPIRAL CURVE DATA								
ANGLE ( $\theta_s$ )	DEGREE	ST	LT	LS							
<b>CSAH 7 &lt;CSAH7&gt;</b>											
1000	POT	CSAH 7	200+00.000						472,213.6160	220,191.1468	
	PC		204+14.472						472,507.4432	220,483.4701	45° 08' 49.23"
CSAH7	PI		209+28.704	7° 21' 20.55" LT	0° 42' 58.31"	8,000.000'	514.232'	1,027.051'	472,871.9917	220,846.1527	PI
	CC								466,865.1218	226,154.8199	
	PT		214+41.523						473,187.1063	221,252.5233	37° 47' 28.68"
1001	POT		217+78.234						473,393.4384	221,518.6085	



NOTES:  
 <XXXX> INDICATES GEOPAK ALIGNMENT NAME.

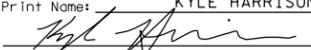


HORIZONTAL DATUM  
 HORIZONTAL CONTROL FOR THIS PLAN IS  
 ANOKA COUNTY COORDINATE SYSTEM  
 NAD 83 (2011 ADJUSTMENT)

VERTICAL DATUM  
 VERTICAL CONTROL FOR THIS PLAN IS  
 BASED ON NGVD 88 DATUM

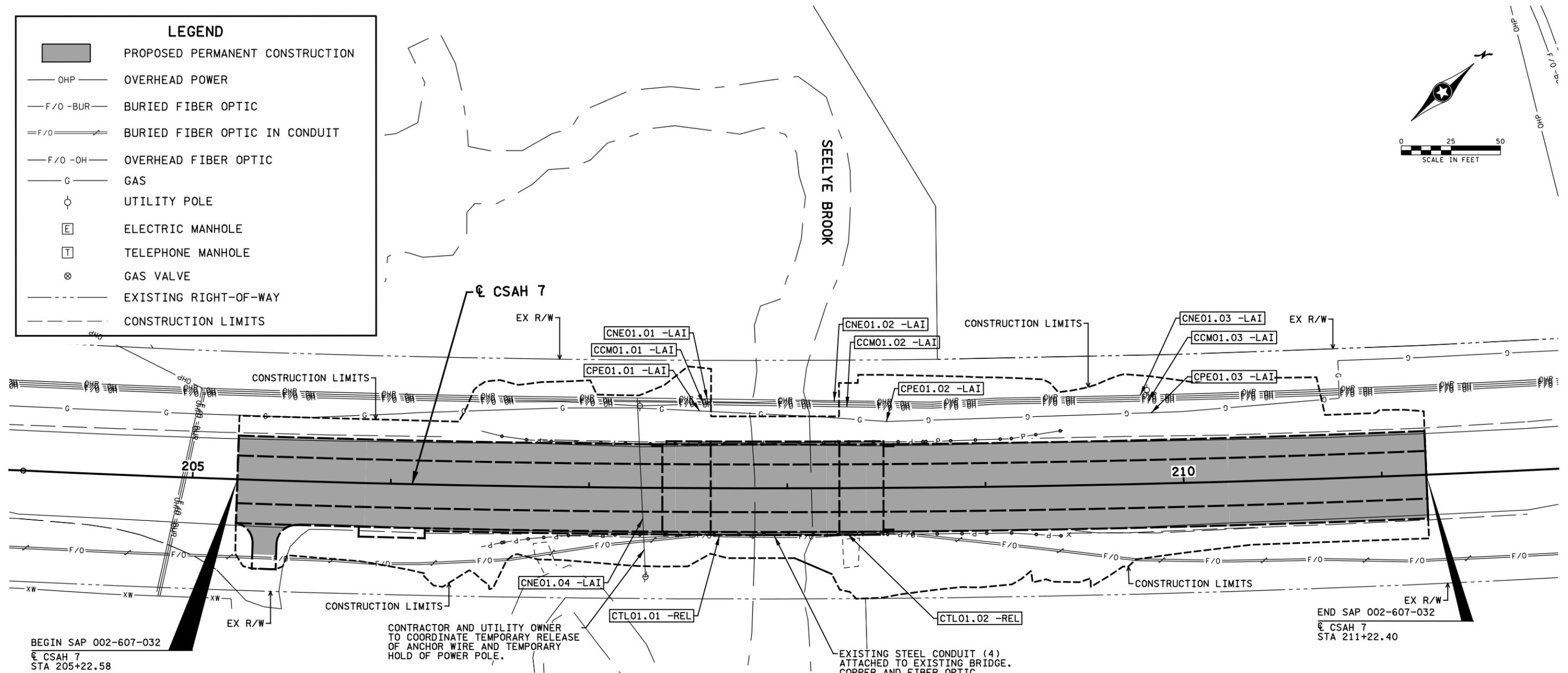
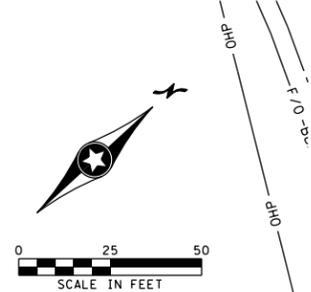
LEGEND  
 [1000] ALIGNMENT POINT NUMBER

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					I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Print Name: <u>KYLE HARRISON</u>  Date: <u>06/17/2025</u> License # <u>53658</u>	STATE AID PROJECT NO. SAP 002-607-032	DRAWN BY S. HARGESHEIMER DESIGNED BY S. HARGESHEIMER CHECKED BY K. HARRISON COMM. NO. 2417554		<b>ANOKA COUNTY</b> ALIGNMENT PLANS AND TABULATION SAP 002-607-032	<b>SHEET</b> <b>40</b> <b>OF</b> <b>54</b>
NO	DATE	BY	CKD	APPR	REVISION					

### LEGEND

- PROPOSED PERMANENT CONSTRUCTION
- OVERHEAD POWER
- BURIED FIBER OPTIC
- BURIED FIBER OPTIC IN CONDUIT
- OVERHEAD FIBER OPTIC
- GAS
- UTILITY POLE
- ELECTRIC MANHOLE
- TELEPHONE MANHOLE
- GAS VALVE
- EXISTING RIGHT-OF-WAY
- CONSTRUCTION LIMITS



### UTILITY LEGEND

OWN\*.##-ACT

OWNERS	OWN*.##-ACT
CCM	COMCAST CABLE, LLC.
CPE	CENTERPOINT ENERGY
CTL	CENTURYLINK
CNE	CONNEXUS ENERGY

\* = UTILITY PLAN SHEET NUMBER  
\* = CONFLICT NUMBER ON SHEET \*

ACTION	ACT
LAI	LEAVE AS IS
REL	RELOCATE

### UTILITY SUMMARY

CENTURYLINK	
CTLO1.01-REL	RELOCATE BURIED FIBER IN CONDUIT
CTLO1.02-REL	RELOCATE BURIED FIBER IN CONDUIT

GENERAL NOTES:

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED, "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

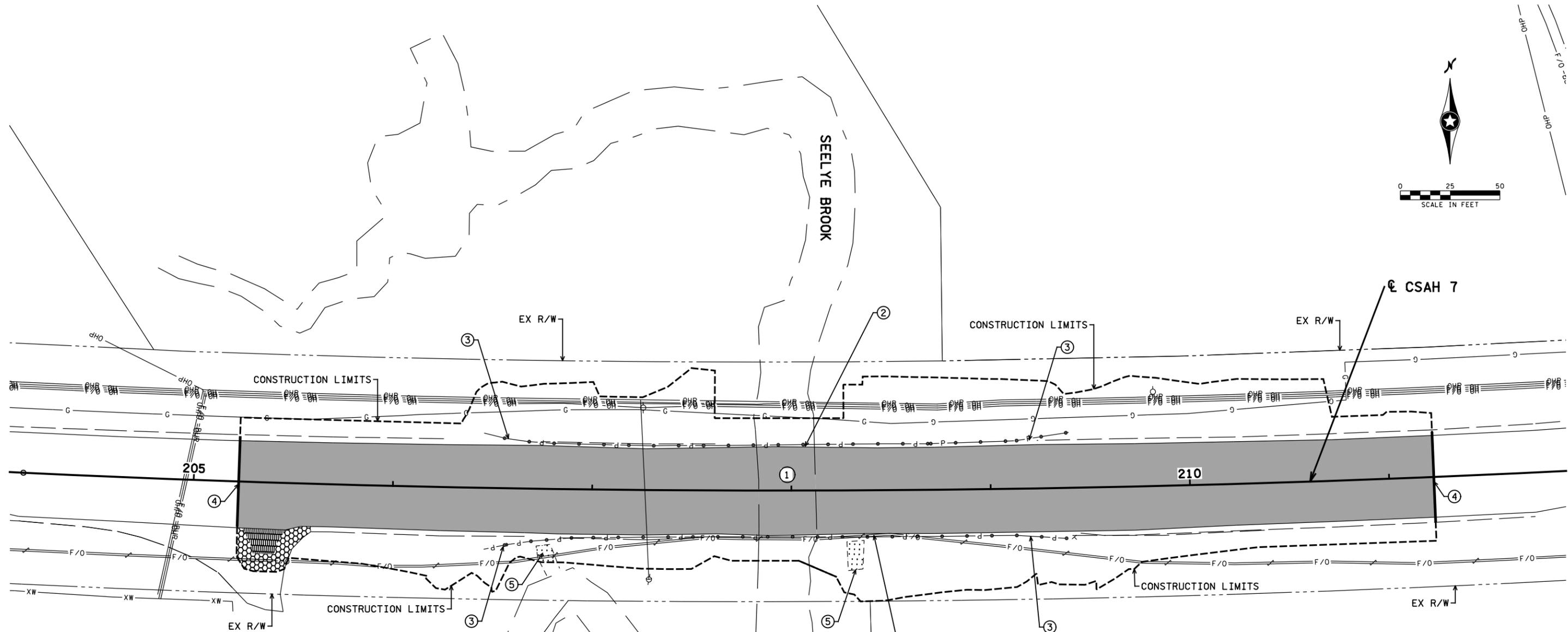
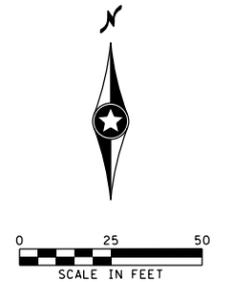
SOME UTILITIES MAY BE RELOCATED PRIOR TO CONSTRUCTION.

ALL POWER LINES ARE DISTRIBUTION UNLESS NOTED OTHERWISE.

THE RIGHT-OF-WAY SHOWN IN THIS PLAN GIVES A GRAPHICAL LOCATION WITH RESPECT TO THE GEOMETRIC DESIGN AND MAP DATA. THE EXACT RIGHT OF WAY AND BOUNDARY CORNERS ARE LOCATED BY REFERENCE TO THE RIGHT OF WAY PLATS AND ARE IDENTIFIED ON THE RIGHT OF WAY MAP.

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Print Name: <u>KYLE HARRISON</u>  Date: <u>06/17/2025</u> License # <u>53658</u>					STATE AID PROJECT NO. SAP 002-607-032	DRAWN BY S. HARGESHEIMER DESIGNED BY S. HARGESHEIMER CHECKED BY K. HARRISON COMM. NO. 2417554		<b>ANOKA COUNTY</b> INPLACE TOPOGRAPHY AND UTILITY PLANS <b>SAP 002-607-032</b>	<b>SHEET</b> <b>41</b> <b>OF</b> <b>54</b>	
NO	DATE	BY	CKD	APPR	REVISION					
						17554_top01.dgn				



**GENERAL NOTES:**

EXISTING PAVEMENT THICKNESS VARIES AND IS COMPRISED OF BITUMINOUS, CONCRETE, AGGREGATE OR A COMBINATION OF ANY OR ALL OF THESE COMPONENTS. SEE THE SOIL BORINGS IN THE SPECIAL PROVISIONS FOR APPROXIMATE DEPTHS. REMOVAL OF PAVEMENT SHALL CONSIST OF REMOVING ALL LAYERS OF PAVEMENT BASED ON THE AREA OF THE TOP SURFACE, REGARDLESS OF MATERIAL TYPE, THICKNESS, REINFORCING OR REMOVAL METHOD.

PROTECT ALL TREES THAT ARE NOT MARKED FOR REMOVAL (INCIDENTAL).  
 SEE TOPOGRAPHY AND UTILITY PLANS FOR PRIVATE UTILITY ITEMS.  
 SEE SIGNING REMOVAL PLANS AND TABS FOR SIGN REMOVALS.

LEGEND	
	REMOVE BITUMINOUS PAVEMENT
	REMOVE BITUMINOUS DRIVEWAY PAVEMENT
	REMOVE AGGREGATE DRIVEWAY (PAID FOR AS EXCAVATION - COMMON)
	CONSTRUCTION LIMITS
	EXISTING RIGHT-OF-WAY

**NOTES:**

- ① REMOVE BITUMINOUS SURFACING ON EXISTING BRIDGE (PAID FOR AS REMOVE BITUMINOUS PAVEMENT)
- ② REMOVE GUARDRAIL - PLATE BEAM
- ③ REMOVE ECCENTRIC LOADER BCT
- ④ SAWING BIT PAVEMENT (FULL DEPTH)
- ⑤ REMOVE RIPRAP

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NO	DATE	BY	CKD	APPR	REVISION

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: KYLE HARRISON

*Kyle Harrison*

Date: 06/11/2025 License # 53658

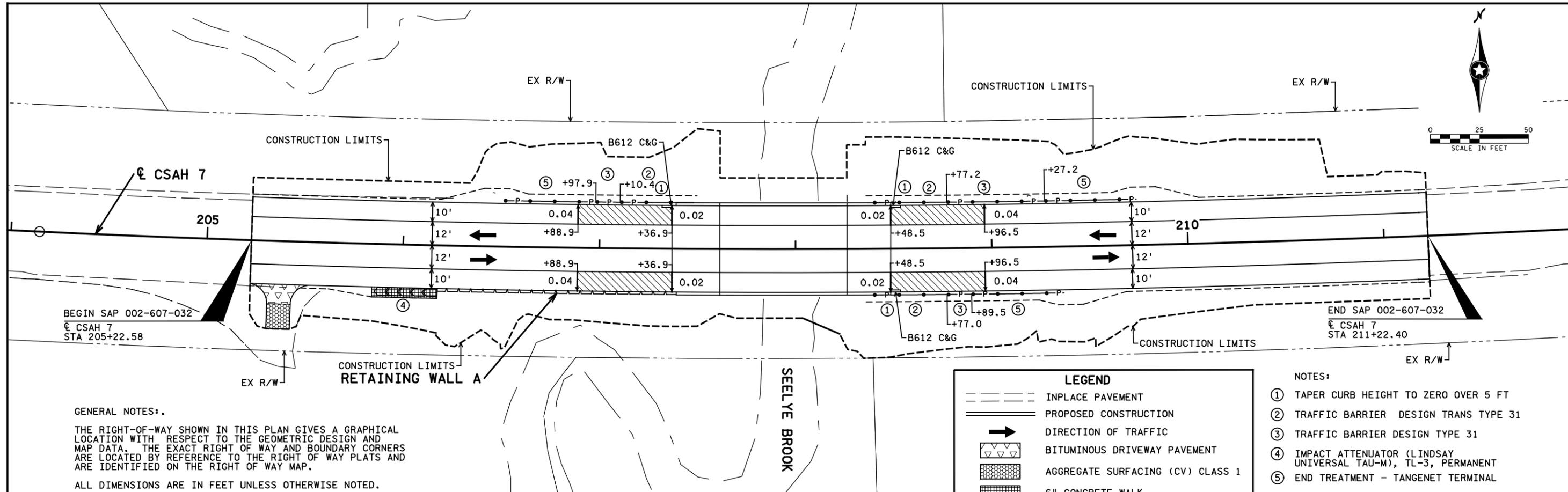
STATE AID PROJECT NO. SAP 002-607-032

DRAWN BY S. HARGESHEIMER  
 DESIGNED BY S. HARGESHEIMER  
 CHECKED BY K. HARRISON  
 COMM. NO. 2417554



**ANOKA COUNTY**  
 REMOVAL PLAN  
 SAP 002-607-032

**SHEET**  
 42  
 OF  
 54



**GENERAL NOTES:**

THE RIGHT-OF-WAY SHOWN IN THIS PLAN GIVES A GRAPHICAL LOCATION WITH RESPECT TO THE GEOMETRIC DESIGN AND MAP DATA. THE EXACT RIGHT OF WAY AND BOUNDARY CORNERS ARE LOCATED BY REFERENCE TO THE RIGHT OF WAY PLATS AND ARE IDENTIFIED ON THE RIGHT OF WAY MAP.

ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

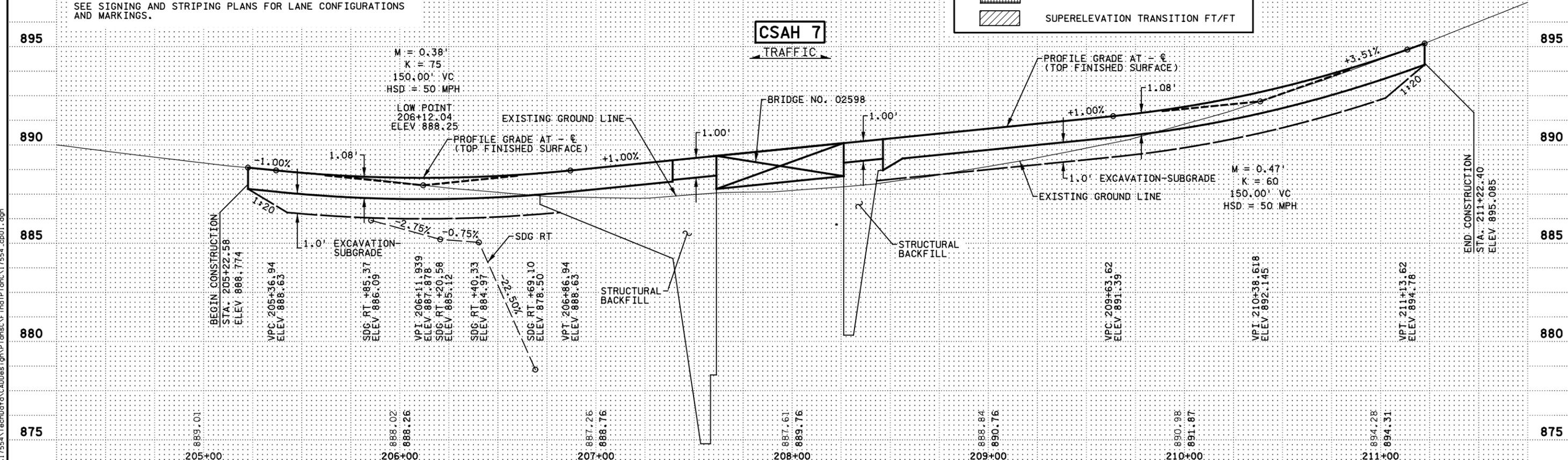
SEE SIGNING AND STRIPING PLANS FOR LANE CONFIGURATIONS AND MARKINGS.

**LEGEND**

- INPLACE PAVEMENT
- PROPOSED CONSTRUCTION
- DIRECTION OF TRAFFIC
- BITUMINOUS DRIVEWAY PAVEMENT
- AGGREGATE SURFACING (CV) CLASS 1
- 6" CONCRETE WALK
- SUPERELEVATION TRANSITION FT/FT

**NOTES:**

- ① TAPER CURB HEIGHT TO ZERO OVER 5 FT
- ② TRAFFIC BARRIER DESIGN TRANS TYPE 31
- ③ TRAFFIC BARRIER DESIGN TYPE 31
- ④ IMPACT ATTENUATOR (LINDSAY UNIVERSAL TAU-M), TL-3, PERMANENT
- ⑤ END TREATMENT - TANGENT TERMINAL



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Print Name: **KYLE HARRISON**

Date: **06/17/2025** License #: **53658**

STATE AID PROJECT NO. SAP 002-607-032

DRAWN BY S. HARGESHEIMER  
DESIGNED BY S. HARGESHEIMER  
CHECKED BY K. HARRISON  
COMM. NO. 2417554

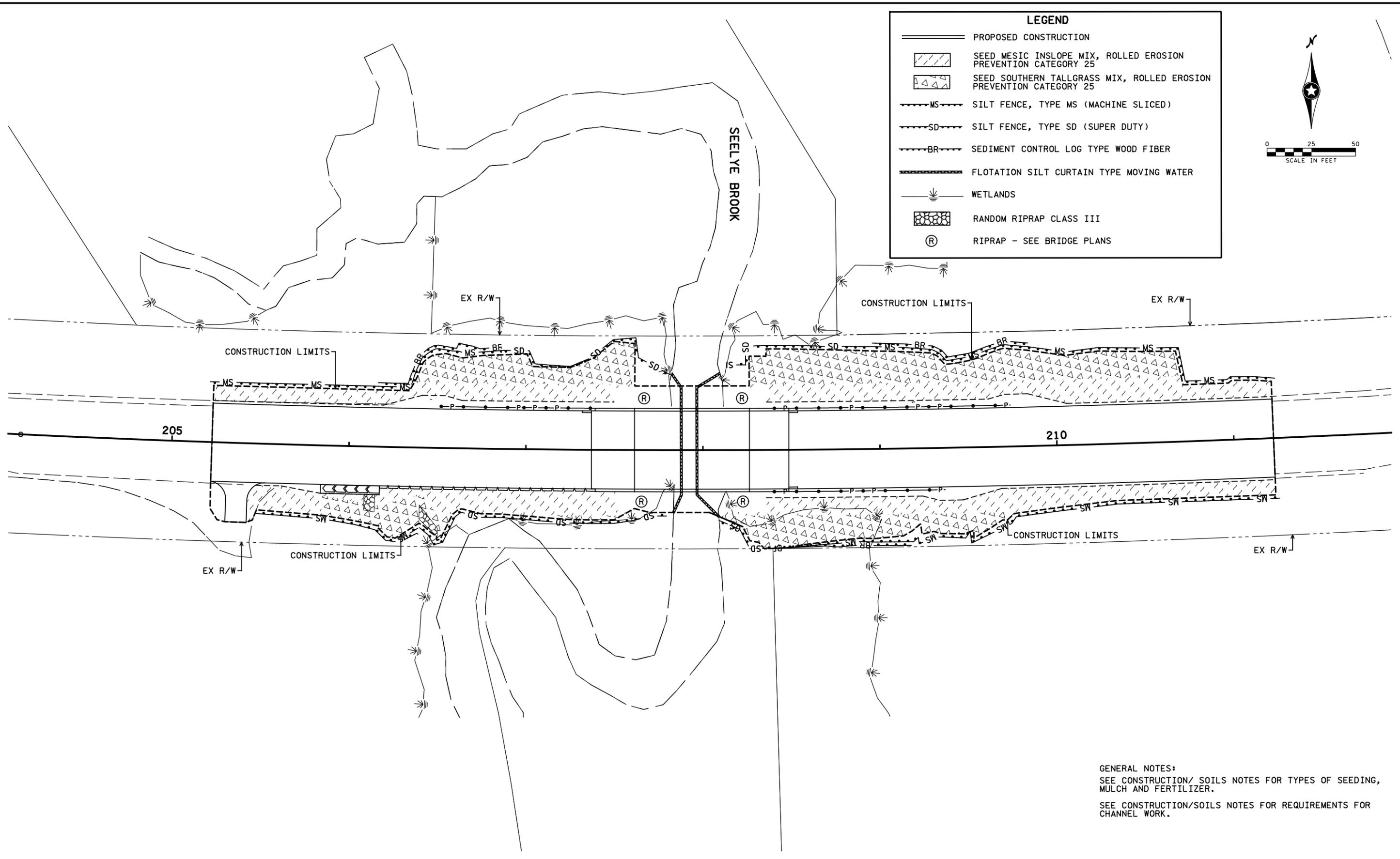
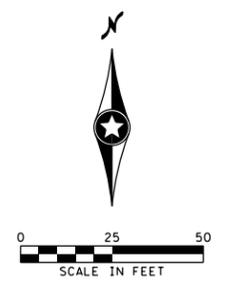


**ANOKA COUNTY**  
CONSTRUCTION PLAN  
SAP 002-607-032

**SHEET**  
43  
OF  
54

**LEGEND**

- PROPOSED CONSTRUCTION
-  SEED MESIC INSLOPE MIX, ROLLED EROSION PREVENTION CATEGORY 25
-  SEED SOUTHERN TALLGRASS MIX, ROLLED EROSION PREVENTION CATEGORY 25
- MS----- SILT FENCE, TYPE MS (MACHINE SLICED)
- SD----- SILT FENCE, TYPE SD (SUPER DUTY)
- BR----- SEDIMENT CONTROL LOG TYPE WOOD FIBER
- ===== FLOTATION SILT CURTAIN TYPE MOVING WATER
-  WETLANDS
-  RANDOM RIPRAP CLASS III
- Ⓡ RIPRAP - SEE BRIDGE PLANS



GENERAL NOTES:  
 SEE CONSTRUCTION/ SOILS NOTES FOR TYPES OF SEEDING, MULCH AND FERTILIZER.  
 SEE CONSTRUCTION/SOILS NOTES FOR REQUIREMENTS FOR CHANNEL WORK.

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NO	DATE	BY	CKD	APPR	REVISION

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Print Name: KYLE HARRISON

*Kyle Harrison*

Date: 06/17/2025 License # 53658

STATE AID PROJECT NO.  
 SAP 002-607-032

DRAWN BY  
 S. HARGESHEIMER

DESIGNED BY  
 S. HARGESHEIMER

CHECKED BY  
 K. HARRISON

COMM. NO. 2417554

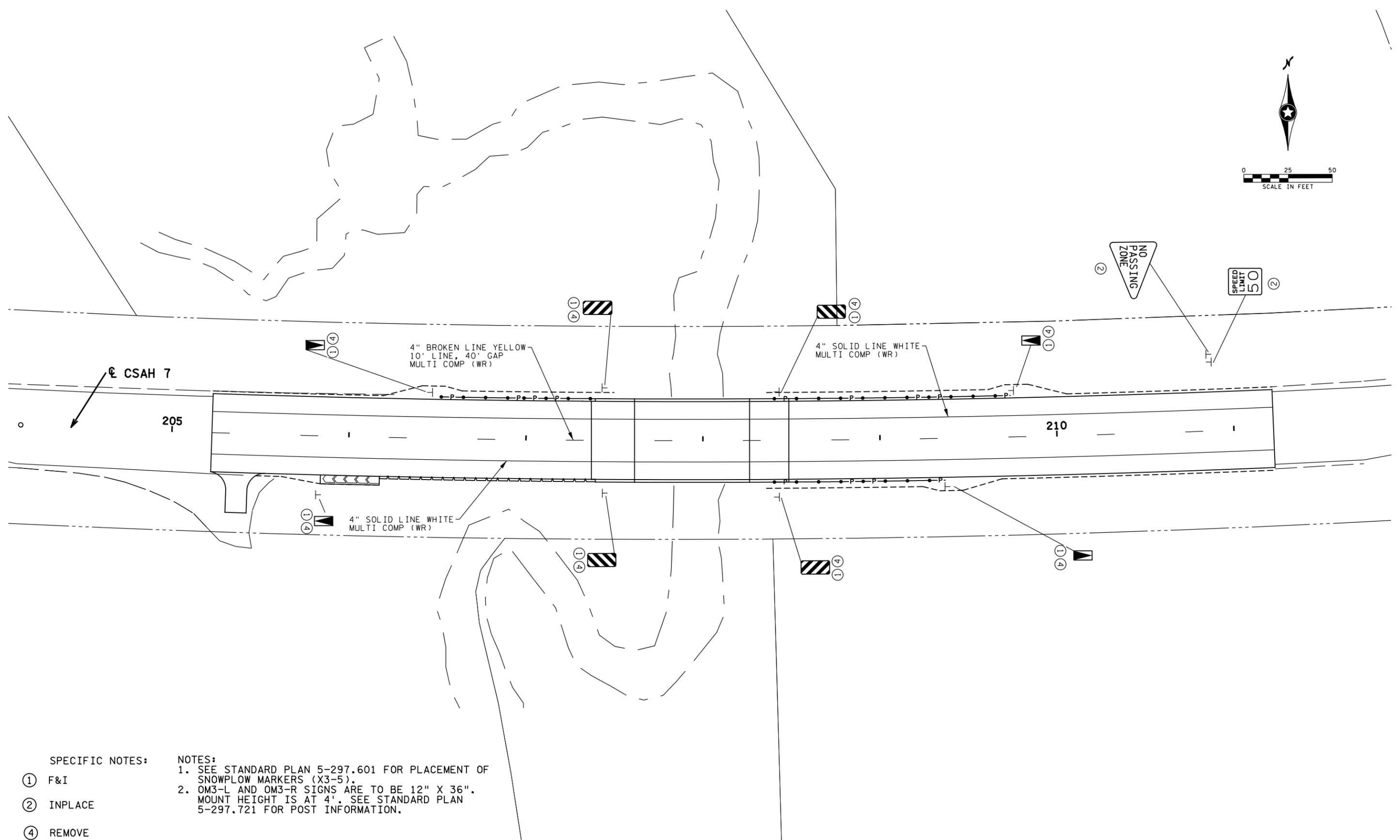
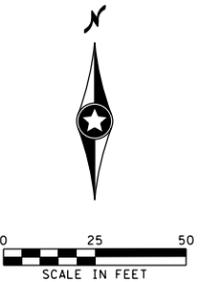


**ANOKA COUNTY**

EROSION CONTROL AND TURF ESTABLISHMENT PLAN

**SAP 002-607-032**

**SHEET**  
**44**  
**OF**  
**54**



CSAH 7

205

210

4" BROKEN LINE YELLOW  
10' LINE, 40' GAP  
MULTI COMP (WR)

4" SOLID LINE WHITE  
MULTI COMP (WR)

4" SOLID LINE WHITE  
MULTI COMP (WR)

- SPECIFIC NOTES:
- ① F&I
  - ② INPLACE
  - ④ REMOVE

- NOTES:
1. SEE STANDARD PLAN 5-297.601 FOR PLACEMENT OF SNOWPLOW MARKERS (X3-5).
  2. OM3-L AND OM3-R SIGNS ARE TO BE 12" X 36". MOUNT HEIGHT IS AT 4'. SEE STANDARD PLAN 5-297.721 FOR POST INFORMATION.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: CLAYTON BAYER

*Clayton Bayer*

Date: 06/17/2025 License # 57865

STATE AID PROJECT NO.  
SAP 002-607-032

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DESIGNED BY  
R.MAKSYMCHUK  
CHECKED BY  
C.BAYER  
COMM. NO. 2417554

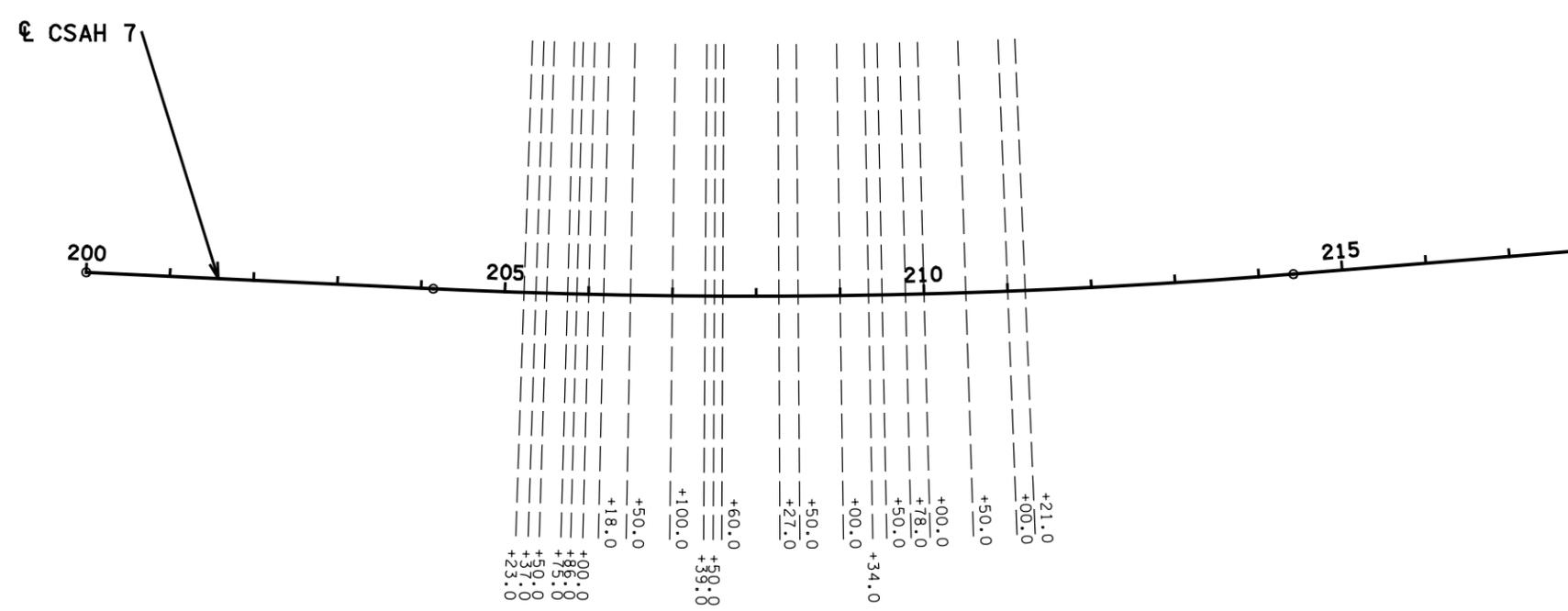
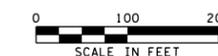


ANOKA COUNTY  
SIGNING AND STRIPING PLAN  
SAP 002-607-032

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CSAH 7

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NO	DATE	BY	CKD	APPR	REVISION

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Print Name: KYLE HARRISON

*Kyle Harrison*

Date: 06/17/2025 License # 53658

STATE AID PROJECT NO.  
SAP 002-607-032

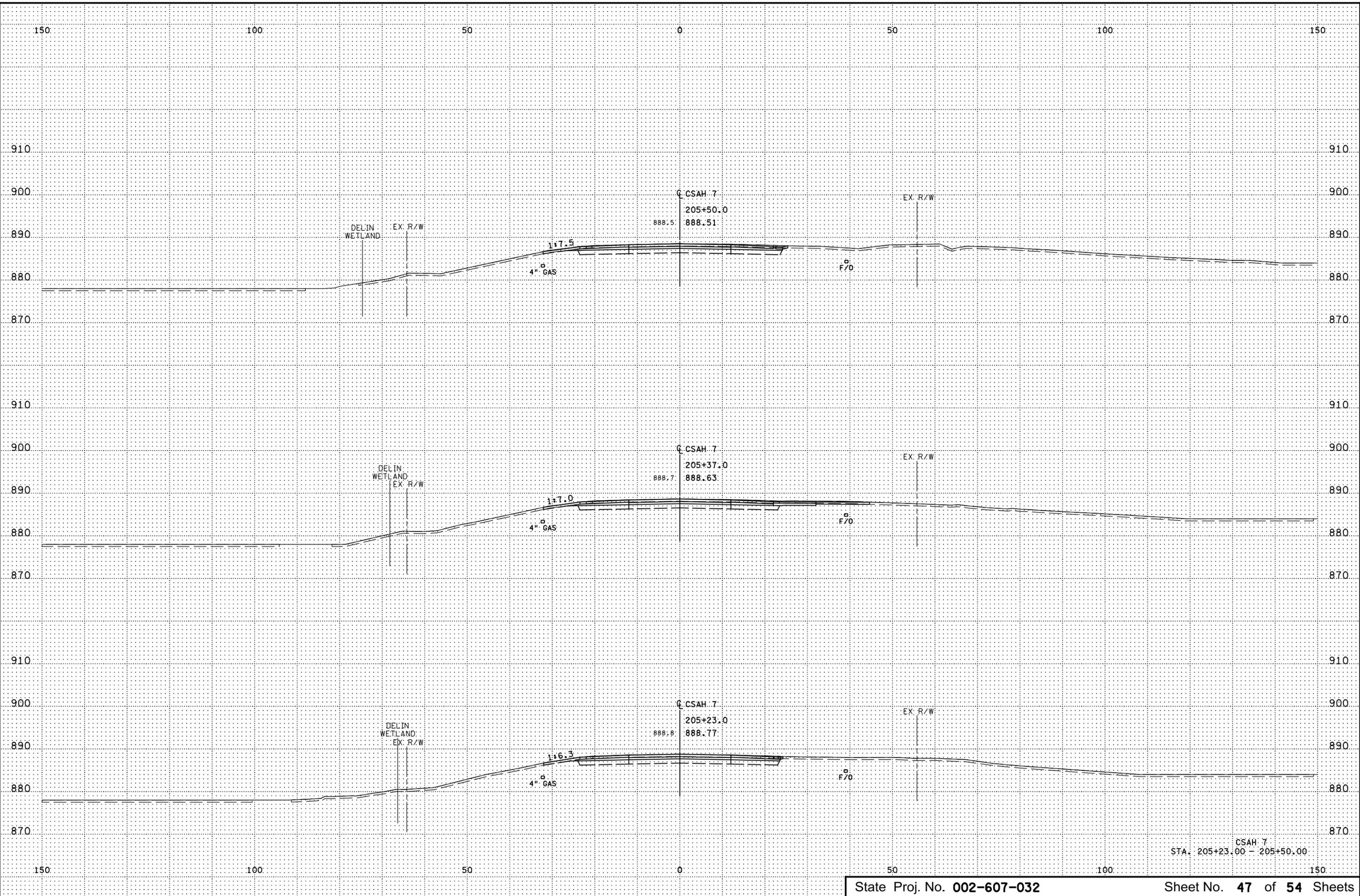
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DESIGNED BY  
S. HARGESHEIMER  
CHECKED BY  
K. HARRISON  
COMM. NO. 2417554



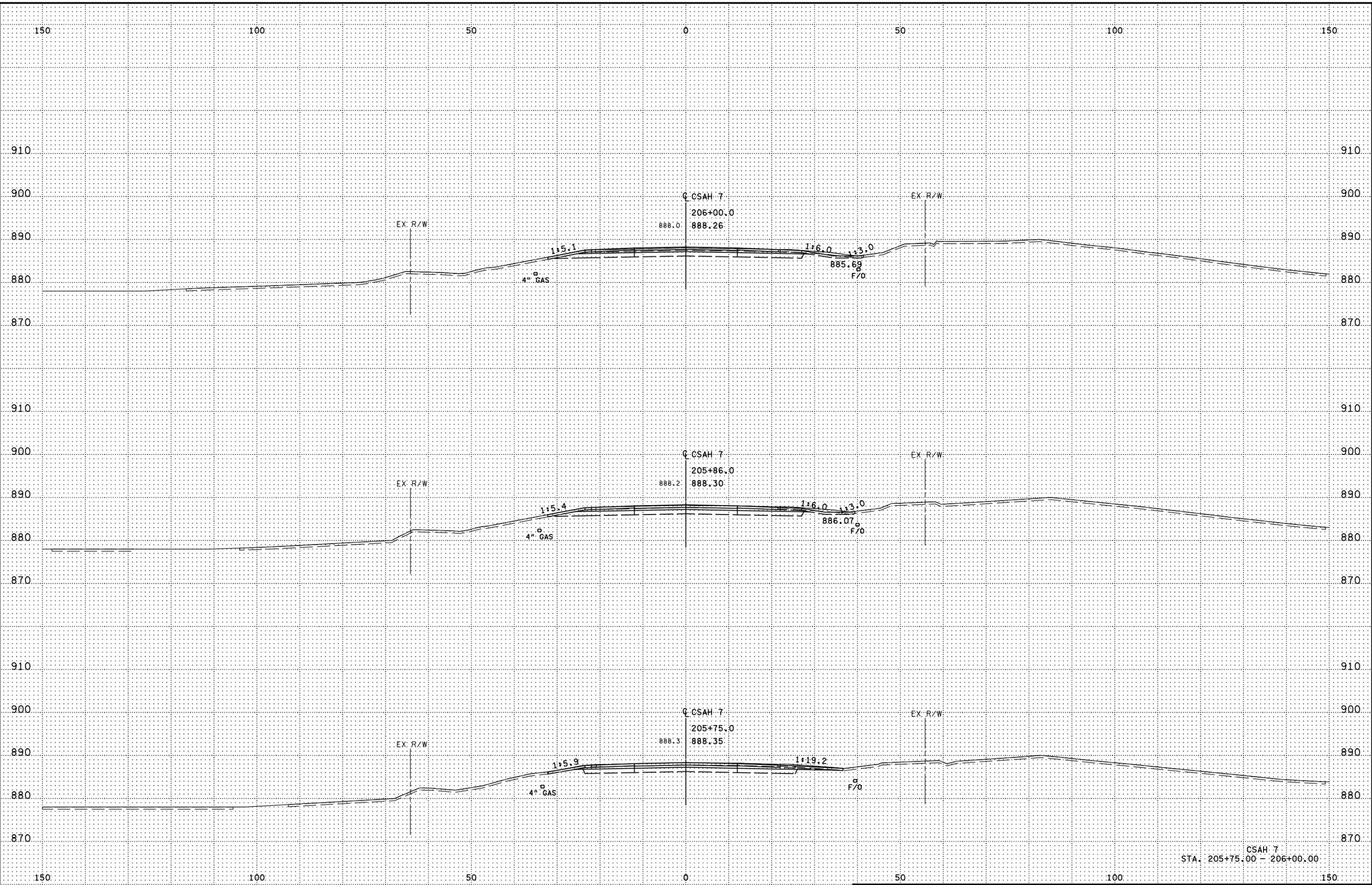
**ANOKA COUNTY**  
CROSS SECTION LAYOUT PLANS  
SAP 002-607-032

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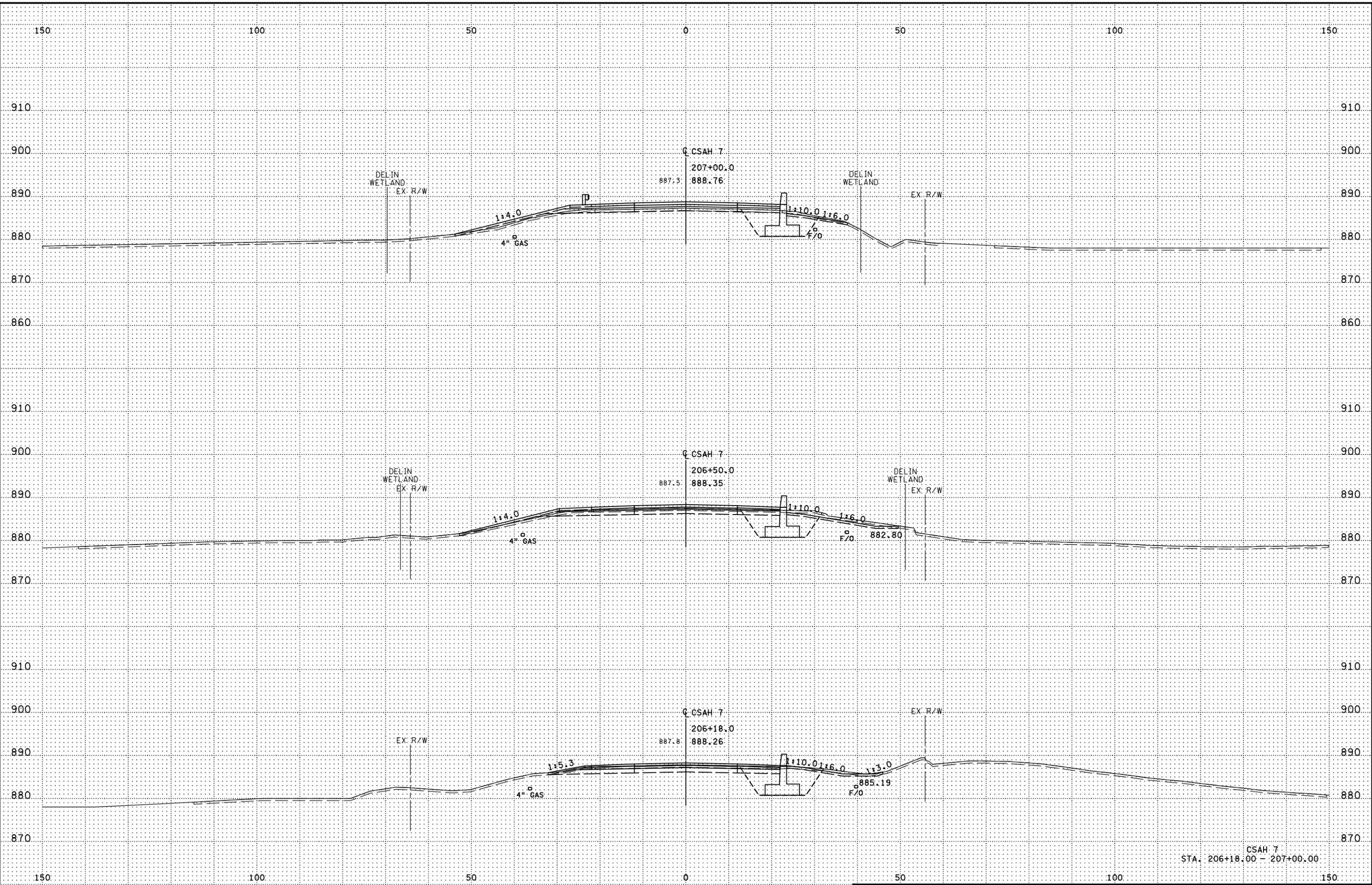


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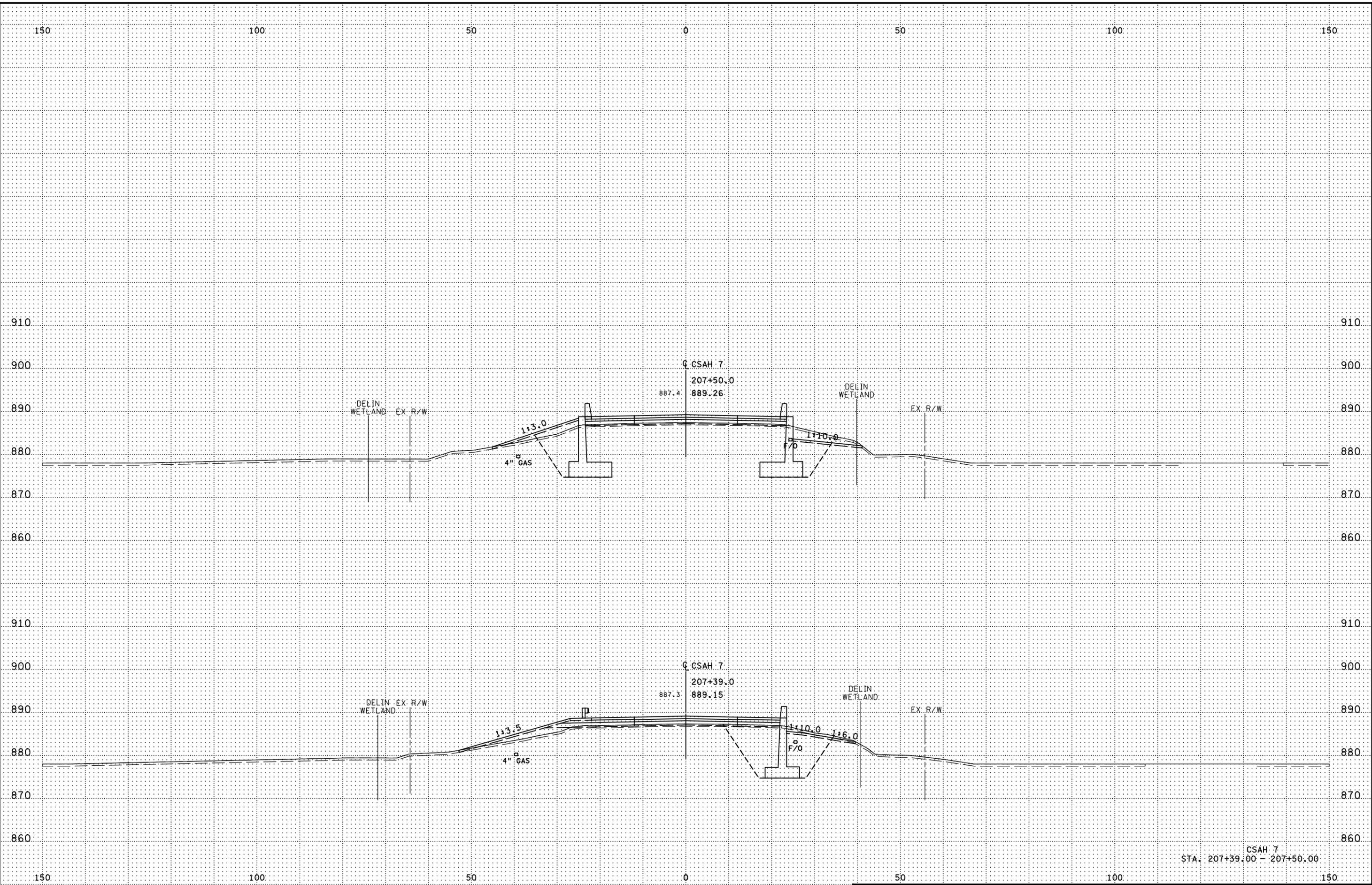
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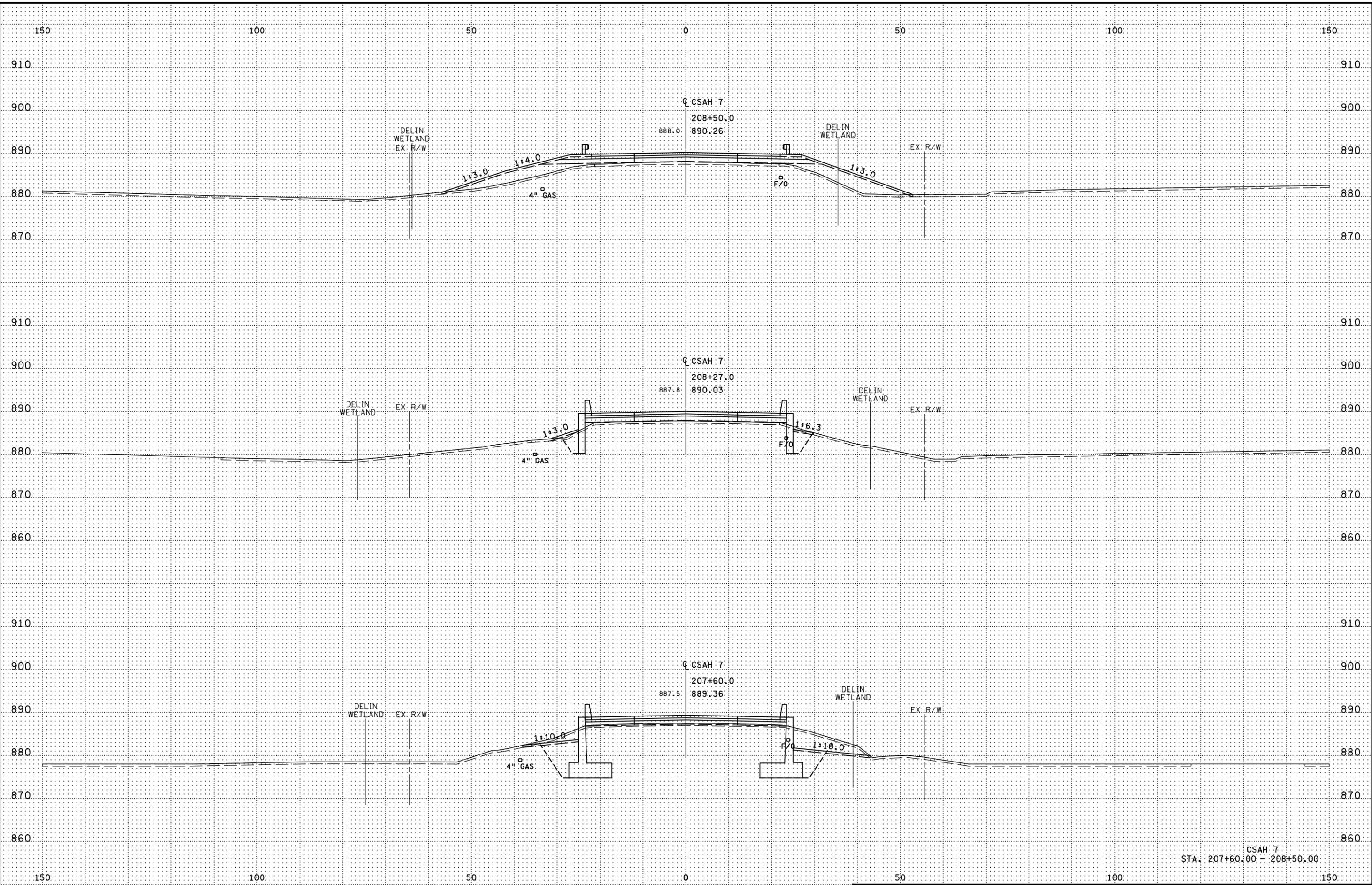
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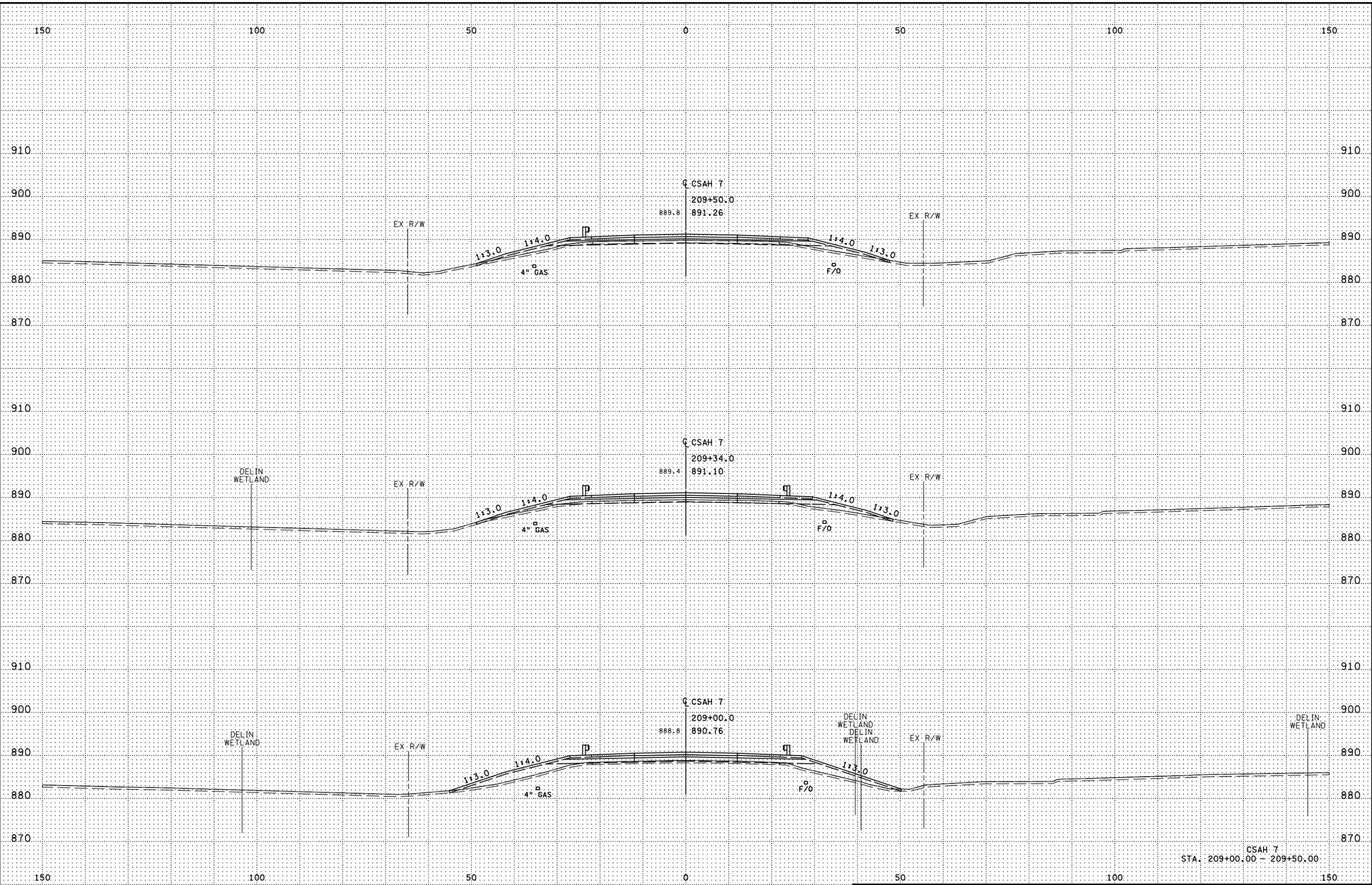


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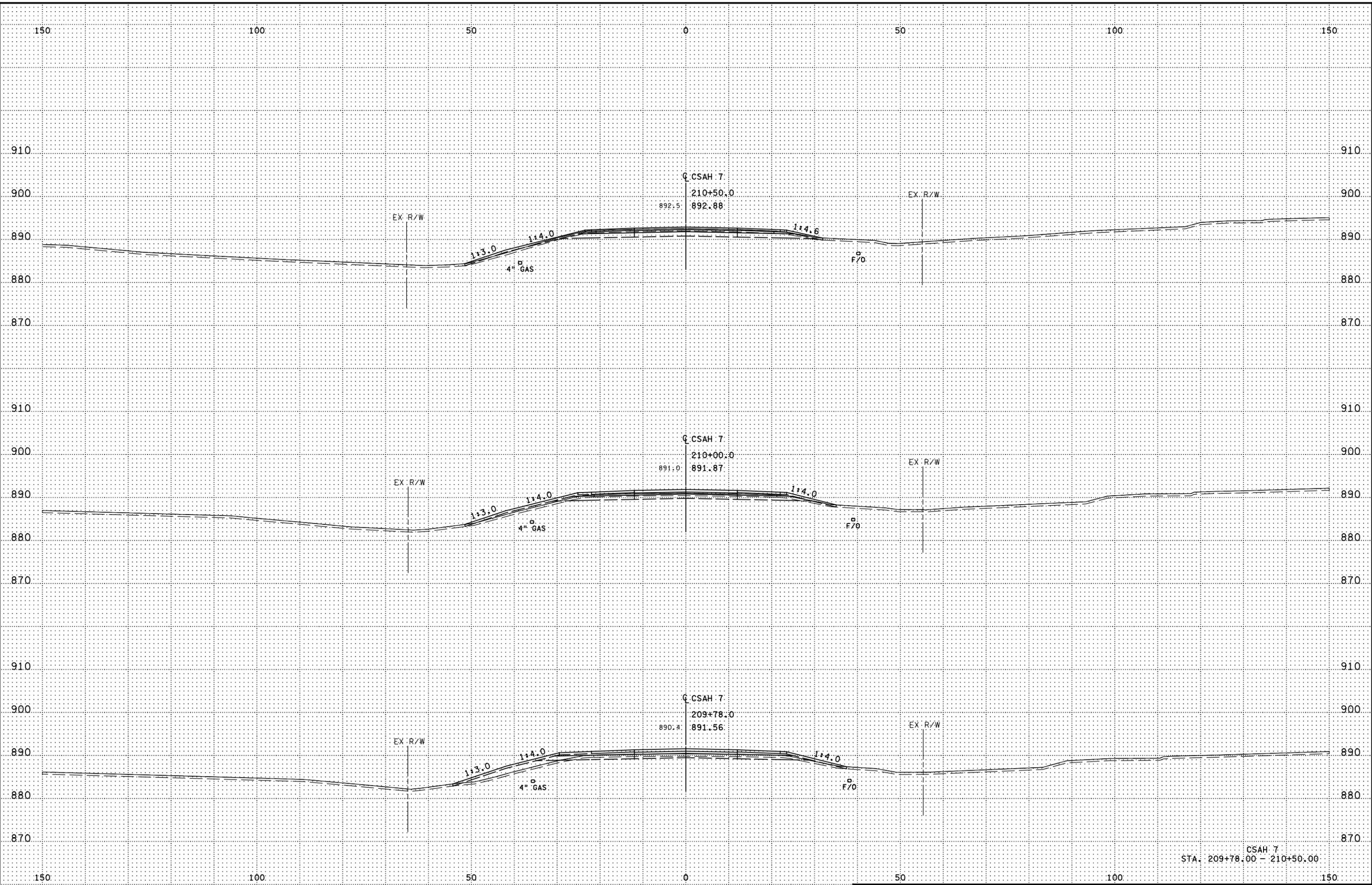
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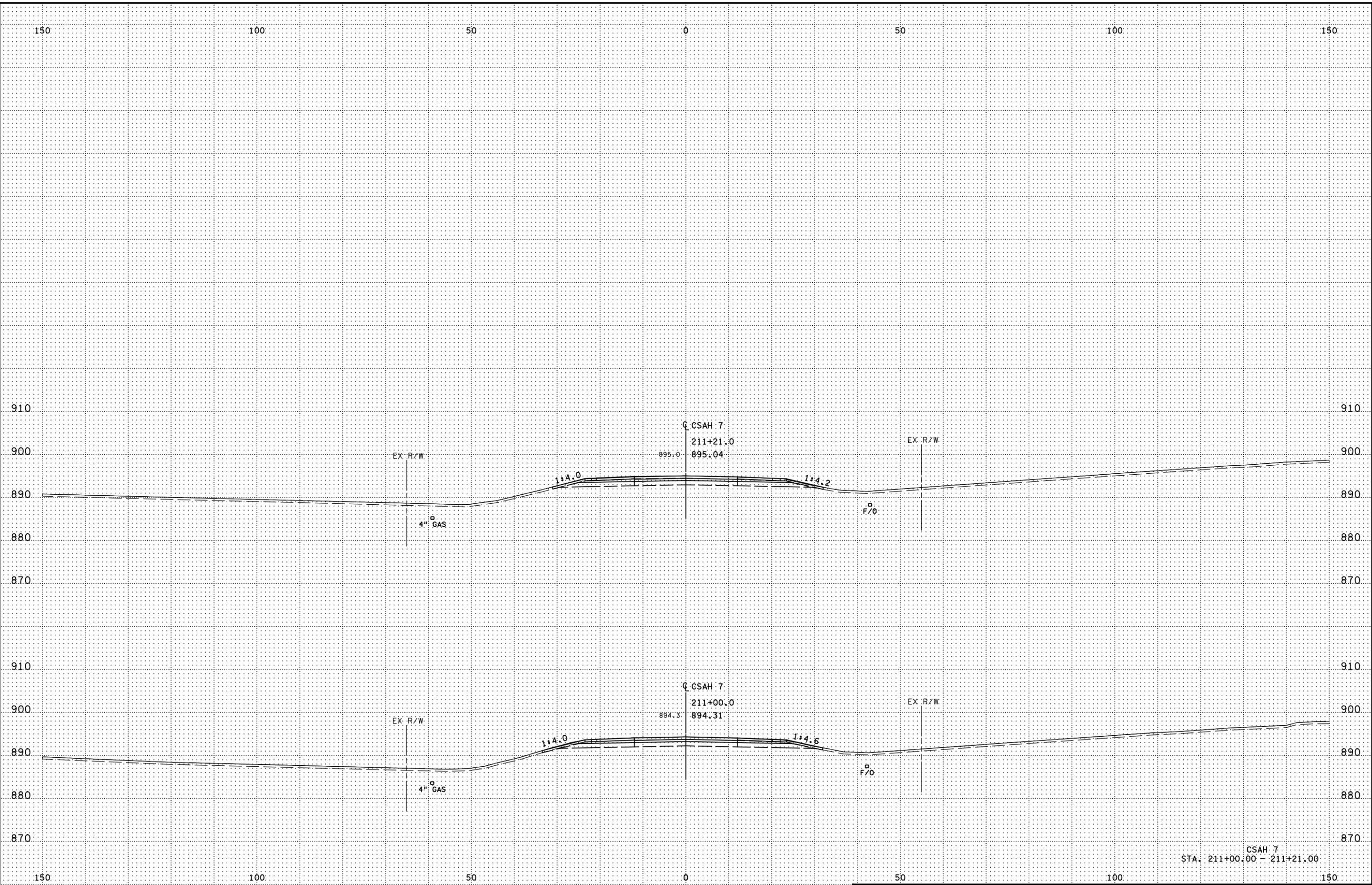
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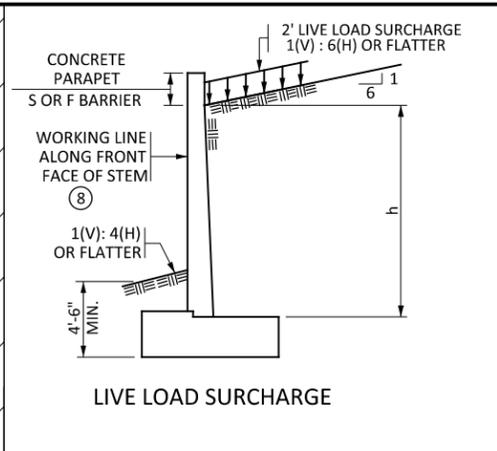
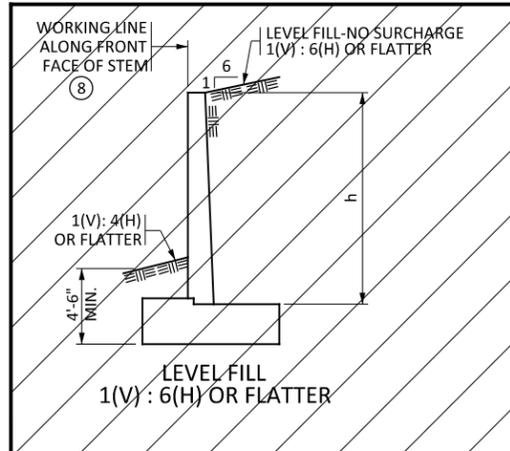


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**DESIGN CRITERIA**

THESE LRFD CIP RETAINING WALL STANDARDS HAVE BEEN DEVELOPED BASED ON THE FIFTH EDITION WITH 2010 INTERIMS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND MnDOT DESIGN POLICIES AS STATED IN THE MnDOT LRFD BRIDGE DESIGN MANUAL.

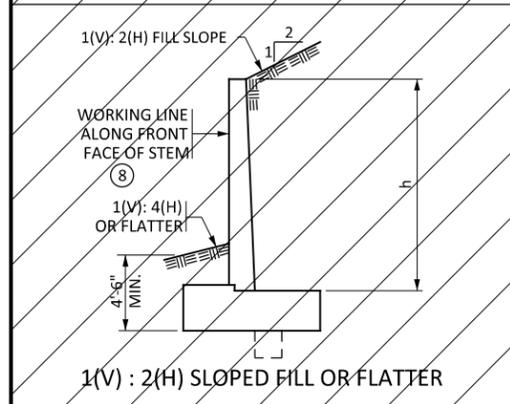
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 $f_y = 60 \text{ ksi}$   
 $n = 8$

REFER TO STANDARD FIGURE 5-297.639 FOR ADDITIONAL DESIGN CRITERIA.

**\* SCHEDULE OF QUANTITIES FOR RETAINING WALL 'A'**

ITEM NO.	ITEM	UNIT	PANEL 1 QUANTITY	PANEL 2 QUANTITY	PANEL 3 QUANTITY	PANEL 4 QUANTITY	TOTAL QUANTITY
2401.503	TYPE S (TL-4) 36" BARRIER CONC (3S52)	LIN FT	30.5	30.5	30.5	30.5	122 (P)
2411.507	STRUCTURAL CONCRETE (1G52)	CU YD	18.5	18.5	18.5	18.5	74 (P)
2411.507	STRUCTURAL CONCRETE (3G52)	CU YD	9.0	11.0	11.0	21.4	53 (P)
2411.508	REINFORCEMENT BARS	POUND	1949.0	1949.0	1949.0	2930.0	8777 (P)
2411.508	REINFORCEMENT BARS (EPOXY COATED)	POUND	1201.0	1310.0	1310.0	2111.0	5932 (P)
2411.601	DRAINAGE SYSTEM WALL	LUMP SUM	0.2	0.2	0.3	0.3	1
2411.618	SPECIAL SURFACE FINISH	SQ FT	295.0	321.0	339.1	360.6	1316 (P)
2452.502	C-I-P CONC TEST PILE 85 FT LONG 12"	EACH	1	1	0	1	3
2452.502	PILE ANALYSIS	EACH	1	1	0	1	3
2452.502	PILE POINTS 12"	EACH	6	6	6	8	26
2452.503	C-I-P CONCRETE PILING 12"	LIN FT	375	375	450	525	1725

SEE SPECIAL PROVISIONS DIVISION SB FOR ALL XXXX.6XX SERIES PAY ITEMS FOR ADDITIONAL REQUIREMENTS, UNLESS NOTED OTHERWISE.



$h = \text{STEM HEIGHT. DEFINED AS DISTANCE BETWEEN TOP OF FOOTING TO TOP OF WALL, NOT INCLUDING PARAPET OR BARRIER.}$

**BAR LAP**

BAR SIZE	PLAIN	EPOXY
5	2'-5"	2'-1"
6	2'-11"	3'-1"
7	3'-7"	3'-10"
8	4'-9"	5'-1"
9	6'-0"	6'-5"
10	7'-7"	8'-2"
11	9'-4"	10'-0"

**LOAD CASES**

**GENERAL NOTES:**

**UTILITIES:**  
 EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. PRIOR TO EXCAVATION VERIFY THE LOCATION OF EXISTING FACILITIES AND EXERCISE CARE IN ADJACENT CONSTRUCTION.

**EXCAVATION AND EARTHWORK:**  
 ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO SPEC. 2451.

**CONCRETE:**  
 ALL CONCRETE SHALL CONFORM TO SPEC. 2461.

TRANSVERSE CONSTRUCTION JOINTS IN FOOTING ARE PERMISSIBLE. KEYWAYS AND CONTINUOUS REINFORCEMENT ARE REQUIRED THROUGH THESE JOINTS.

THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF PATTERN. THE STRUCTURAL CONCRETE QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. CONCRETE NEEDED FOR THE TEXTURING IS INCIDENTAL.

**POURING SEQUENCE:**  
 THE POURING SEQUENCE SHALL BE AT THE CONTRACTOR'S OPTION. SUBMIT SEQUENCE (WITHIN 7 CALENDAR DAYS) TO THE ENGINEER FOR APPROVAL PRIOR TO BEGINNING THE FIRST POUR.

**CONSTRUCTION:**  
 CONSTRUCT IN ACCORDANCE WITH SPEC. 2411, EXCEPT AS NOTED. REFER TO STANDARD PLAN 5-297.624 (2 OF 6) FOR WALL CORNER DETAILS AND STEPPED FOOTING DETAILS.

REFER TO STANDARD PLAN 5-297.625 FOR WALL SHEAR LUG DETAILS. APPLY MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481 TO BACK SIDE OF WALL TO COVER ALL THRU-BOLT FORM HOLES.

FOR WALLS WITH CONDUIT INSIDE THE STEM, PLACE CONDUIT EXPANSION FITTINGS AT 200' MAX. SPACING, AT CORK AND DOWEL JOINT LOCATION.

**REINFORCING STEEL:**  
 USE REINFORCEMENT BARS CONFORMING TO SPEC. 3301, GRADE 60. BARS MARKED WITH THE SUFFIX "E" TO BE EPOXY COATED. ALL BARS WHICH EXTEND OUT OF THE FOOTING AND ALL BARS WHICH ARE ABOVE THE FOOTING TO BE EPOXY COATED.

ALL BENT BAR DIMENSIONS ARE GIVEN OUT-TO-OUT.

MAINTAIN CLEAR DISTANCE BETWEEN REINFORCEMENT BARS AND FACE OF CONCRETE OF 3 INCHES IN FOOTINGS, 5 INCHES IN BOTTOM OF SPREAD FOOTINGS, AND 2 INCHES ELSEWHERE UNLESS OTHERWISE NOTED. REFER TO STANDARD PLAN 5-297.624 (1 OF 6) DETAIL "C" FOR COVER REQUIREMENTS ON WALLS WITH ARCHITECTURAL CONCRETE TEXTURE OR RUSTICATION.

THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING 60'-0" LONG BARS FOR THE LONGITUDINAL FOOTING STEEL SHOWN. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT WILL BE BASED ON QUANTITIES SHOWN.

THE CONSTRUCTION JOINT FOR CONCRETE PARAPET OR BARRIER MAY BE LOCATED AT TOP OR BOTTOM OF COPING, AT THE CONTRACTOR'S OPTION. PAYMENT WILL BE BASED ON QUANTITIES SHOWN, WHICH IS BASED ON CONSTRUCTION JOINT ABOVE COPING.

FOR VARIABLE STEM HEIGHTS, VARY THE LAP LENGTH OF THE VERTICAL REINFORCEMENT. MINIMUM LAP LENGTHS ARE GIVEN IN THE TABLE ON THIS SHEET. SMALLER BAR GOVERNS LAP LENGTH.

**DOWEL BAR ASSEMBLIES:**  
 DOWELED JOINTS/CONSTRUCTION JOINTS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6). THESE JOINTS ARE INCIDENTAL.

AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 9'-6". PLACE A CORK AND DOWEL JOINT AT ALL VERTICAL FOOTING STEPS.

**GEOMETRICS AND GRADES:**  
 DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL.

ON UP TO 10% SLOPES, THE CONTRACTOR HAS THE OPTION OF POURING FOOTINGS SLOPED OR STEPPED. ADDITIONAL CONCRETE VOLUMES AND CHANGES TO THE BILL OF REINFORCEMENT WHICH MAY RESULT FROM CONTRACTOR REQUESTED OPTIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE.

QUANTITIES ARE BASED ON ASSUMED TOP OF ROCK ELEVATION. ACTUAL TOP OF ROCK TO BE DETERMINED BY ENGINEER. SEE SHEET 5-297.624 (4 OF 6) FOR PAY LIMITS.

**PILE LOADS:**  
 THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCES ( $R_n$ ) WERE COMPUTED USING LRFD METHODOLOGY.

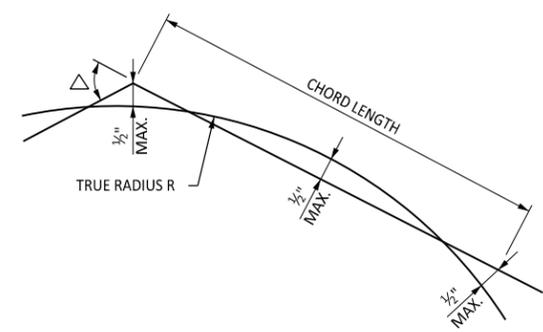
- NOTES:**
- \* SEE EARTHWORK IN GRADING PLANS FOR EXCAVATION AND STRUCTURAL BACKFILL QUANTITIES.
  - \* ~~① STRUCTURAL BACKFILL SPEC. 3149.2.D.2.~~
  - \* ~~② COMPACT TO 100% DENSITY IN ACCORDANCE WITH SPEC. 2105.3.F.1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.~~
  - ③ LIMITING CRITERIA.
  - ④ CURVED FORMS MAY BE USED FOR ANY WALL WITH A RADIUS, BUT MUST BE USED ON WALLS WITH RADIUS LESS THAN 23 FEET.
  - ⑤ DOES NOT INCLUDE DOWELED JOINT/CONSTRUCTION JOINT QUANTITIES, WHICH ARE INCIDENTAL. DOWELED JOINT/CONSTRUCTION JOINT DETAILS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6).
  - \* ~~⑥ QUANTITIES FOR THE FOUNDATION WITH AGGREGATE BACKFILL OPTION ONLY.~~
  - ⑦ DOES NOT INCLUDE ADDITIONAL REINFORCING BARS AND STRUCTURAL CONCRETE (1G52) REQUIRED FOR STEPPED FOOTINGS, WHICH IS INCIDENTAL.
  - ⑧ FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.
  - \* ⑨ INCLUDES SPECIAL SURFACE FINISH ON RETAINING WALL FRONT FACE, COPING AND VISIBLE FACES OF BARRIER.
  - \* ⑩ DOES NOT INCLUDE ADDITIONAL REINFORCING BARS (EPOXY COATED) AND STRUCTURAL CONCRETE (1G52) REQUIRED FOR PANEL 4 TRANSITION TO BRIDGE WINGWALL, WHICH IS INCIDENTAL.

**LIST OF SHEETS**

W1	GENERAL NOTES & QUANTITIES
W2 - W3	WALL REINFORCEMENT DETAILS
W4 - W8	WALL MISCELLANEOUS DETAILS
W9	WALL PANEL TABULATIONS
W10	PILE FOUNDATION DETAILS
W11	CONCRETE BARRIER DETAILS
W12 - W13	MISCELLANEOUS BARRIER DETAILS
W14	WALL 'A' GEOMETRY
W15	WALL 'A' FOOTING PLAN
W16	WALL 'A' TRANSITION DETAILS
W17	WALL 'A' PLAN & PROFILE

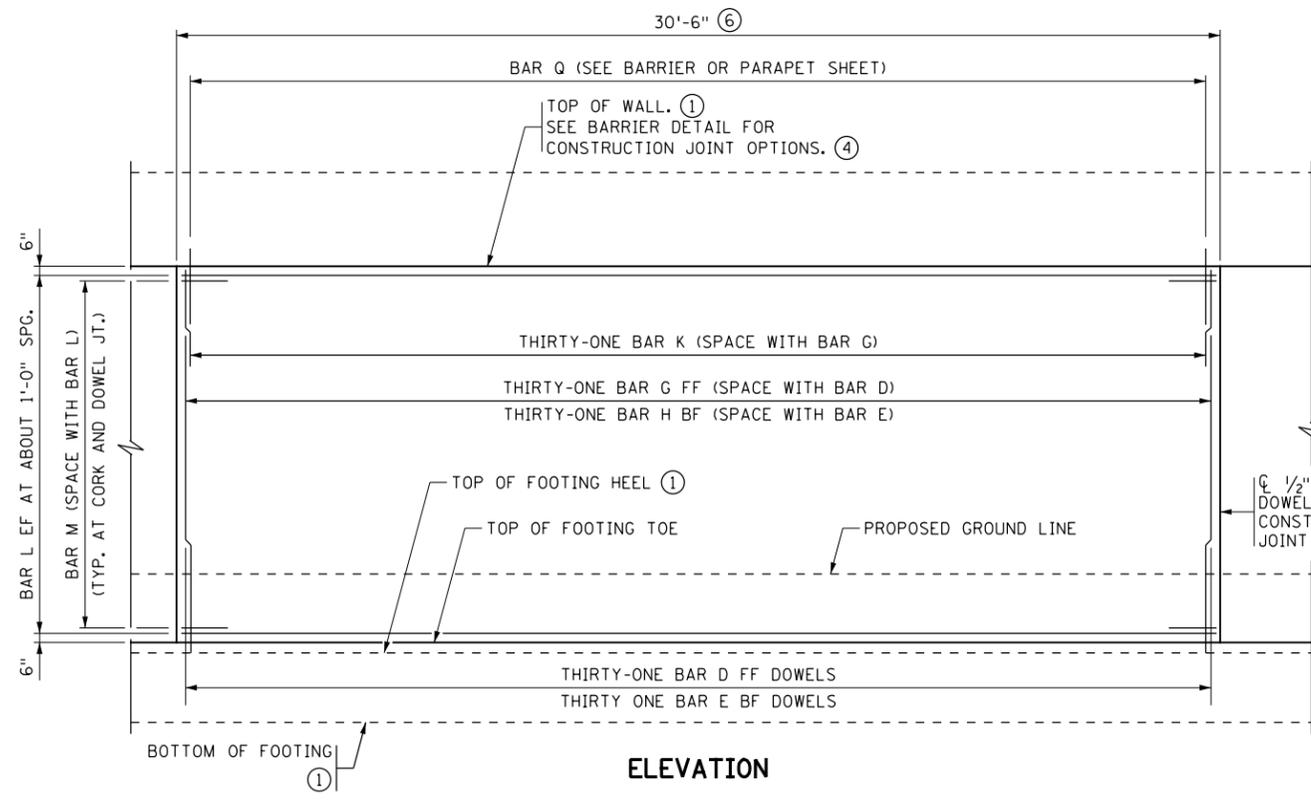
**CURVED RETAINING WALLS ALLOWABLE CHORD LENGTH**

MAXIMUM DEGREE OF CURVE	RADIUS	ALLOWABLE CHORD LENGTH	DEVIATION FROM TRUE RADIUS	MAXIMUM DEFLECTION ANGLE $\Delta$
4°-00'	1432'	30'-6"	$\pm \frac{1}{2}$ " (3)	1°-15'
8°-00'	716'	21'-10"	$\pm \frac{1}{2}$ " (3)	1°-45'
16°-30'	347'	15'-3"	$\pm \frac{1}{2}$ " (3)	2°-30'
23°-00'	249'	12'-11"	$\pm \frac{1}{2}$ " (3)	2°-57'
65°-30'	87'	7'-7 $\frac{1}{2}$ "	$\pm \frac{1}{2}$ "	5°-00' (3)
114°-30'	50'	4'-4 $\frac{1}{16}$ "	$\pm \frac{1}{4}$ "	5°-00' (3)
250°-00'	23'	2'-0"	$\pm \frac{1}{8}$ "	5°-00' (3)

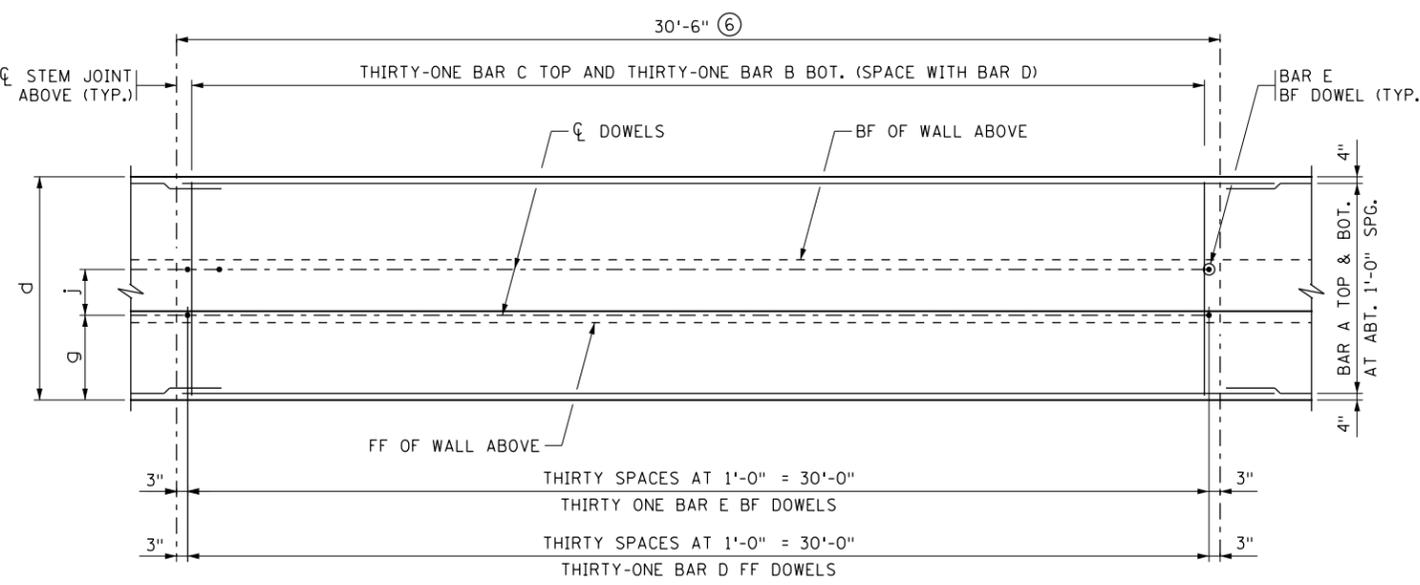


<b>LEAD EXPERT OFFICE</b> NANCY DAUBENBERGER STATE BRIDGE ENGINEER	<b>RETAINING WALL GENERAL NOTES AND SUMMARY OF QUANTITIES</b>		APPROVED: 08-27-2014 REVISED: 09-01-2016	STANDARD PLAN 5-297.620	1 OF 1
	MODIFIED		DES: C. BLACK CHK: R. DURHAM	DR: C. BLACK CHK: R. DURHAM	<b>SHEET NO. W1 OF W17 SHEETS</b>
NO. DATE BY CKD REVISION		I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. <i>Rachael Durham</i> 6-17-2025 RACHAEL DURHAM License # 55461	STATE AID PROJECT NO. 002-607-032	TITLE: RETAINING WALL PLANS 002-607-032 GENERAL NOTES & QUANTITIES	17554_rw620_1.dgn

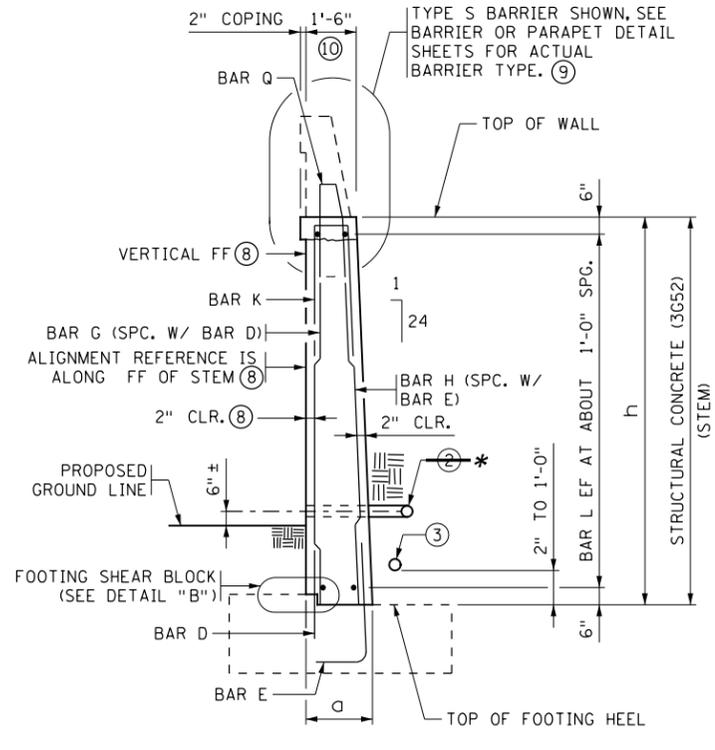
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ELEVATION

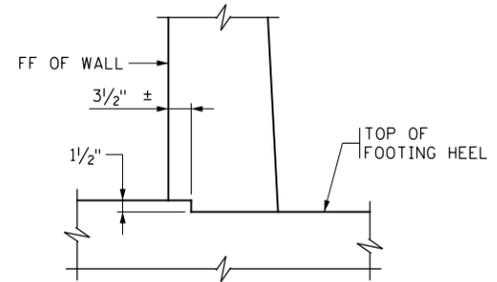


FOOTING PLAN ~ REINFORCEMENT

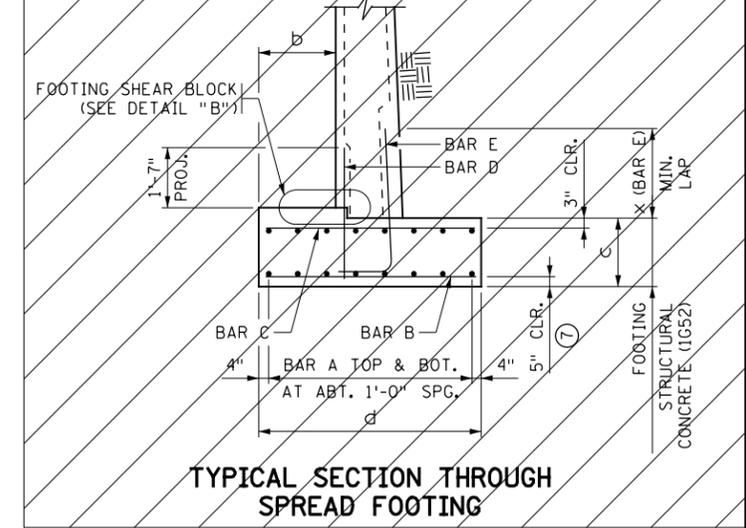


WALL SECTION

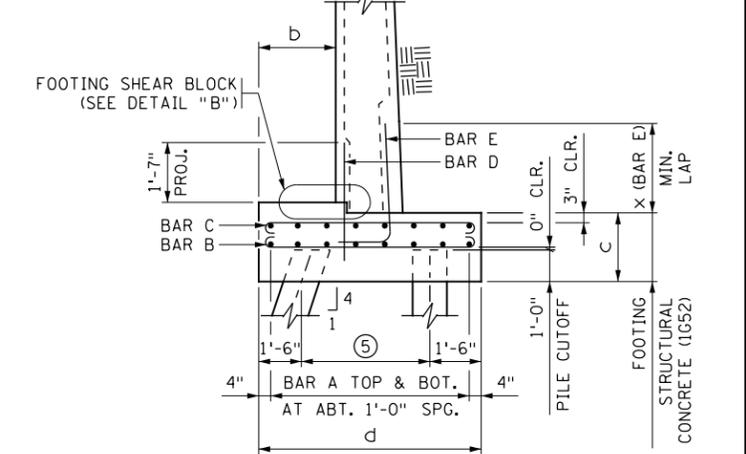
(F BARRIER AND 2" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
- STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
- FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE.
- FF DENOTES FRONT FACE.
- EF DENOTES EACH FACE.
- ① STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER OR PARAPET IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
- \* ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- \* ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.

\* DENOTES MODIFICATION FROM STANDARD PLAN

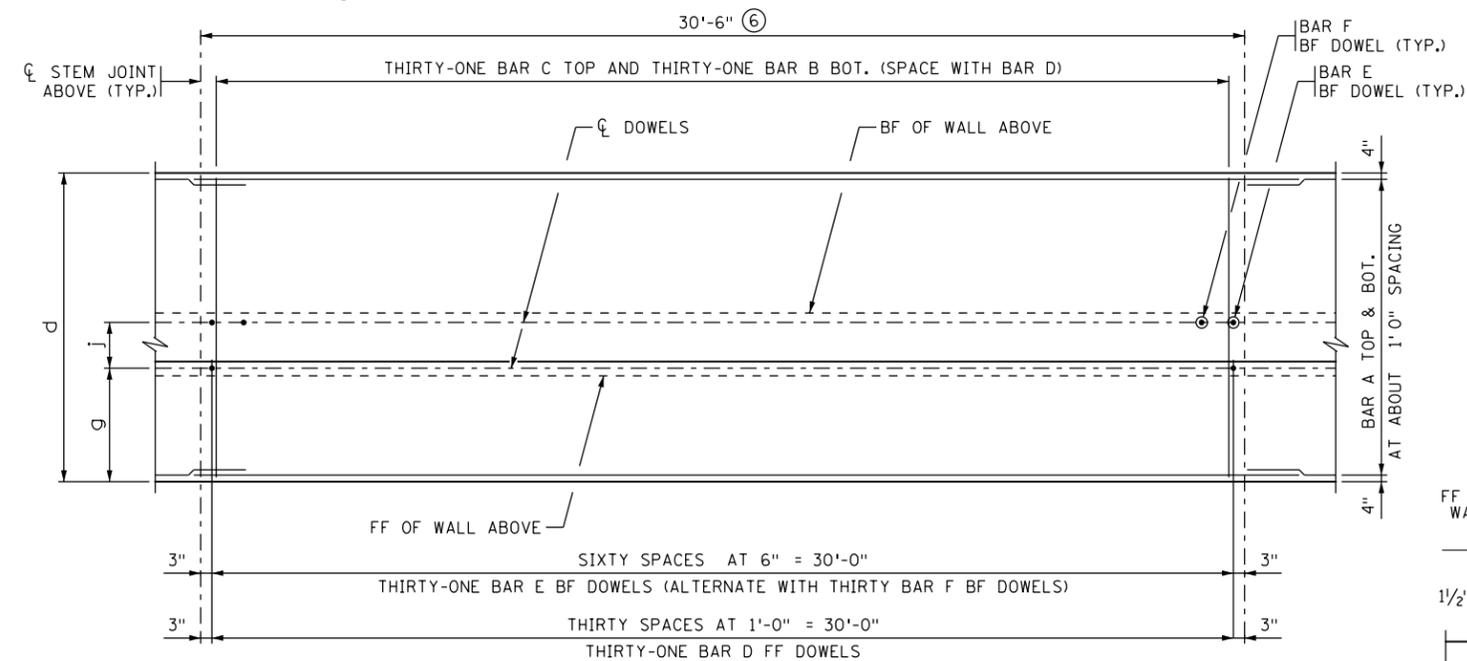
LEAD EXPERT OFFICE NANCY DAUBENBERGER STATE BRIDGE ENGINEER	RETAINING WALL REINFORCEMENT DETAILS (SHORT WALLS)		APPROVED: 08-27-2014 REVISED: 09-01-2016	STANDARD PLAN 5-297.621	1 OF 1
	MODIFIED		DES: C. BLACK CHK: R. DURHAM	DR: C. BLACK CHK: R. DURHAM	SHEET NO. W2 OF W17 SHEETS
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.		RACHAEL DURHAM License # 55461	STATE AID PROJECT NO. 002-607-032	TITLE: RETAINING WALL PLANS 002-607-032 WALL REINFORCEMENT DETAILS	DATE: 6-17-2025



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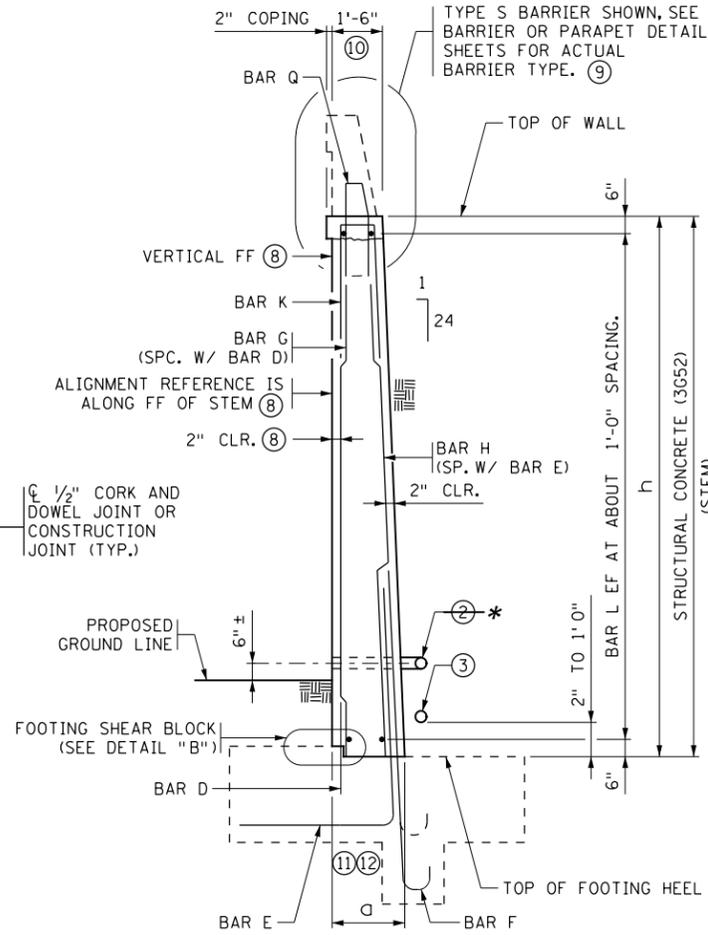


**ELEVATION**



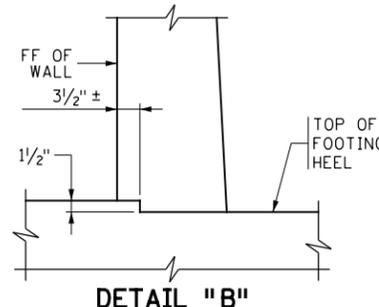
**FOOTING PLAN ~ REINFORCEMENT**

\* DENOTES MODIFICATION FROM STANDARD PLAN

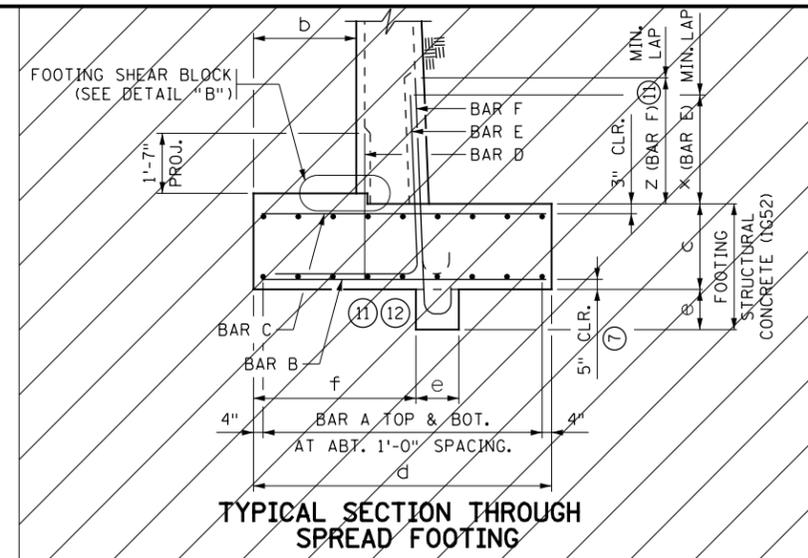


**WALL SECTION**

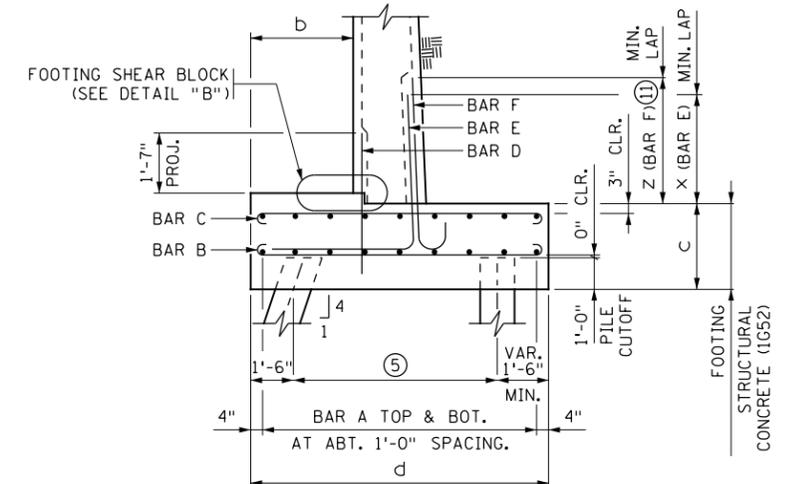
(F BARRIER AND 2" COPING OPTION SHOWN)



**DETAIL "B"**



**TYPICAL SECTION THROUGH SPREAD FOOTING**



**TYPICAL SECTION THROUGH PILE FOOTING**

**NOTES:**

- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x". STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS. FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE. FF DENOTES FRONT FACE. EF DENOTES EACH FACE.
- ① STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER OR PARAPET IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
- \* ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- \* ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.
- ⑪ THIS FEATURE MAY NOT BE PRESENT ON ALL MEDIUM HEIGHT WALLS.
- ⑫ CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.

LEAD EXPERT OFFICE  
NANCY DAUBENBERGER  
STATE BRIDGE ENGINEER

RETAINING WALL REINFORCEMENT DETAILS  
(MEDIUM WALLS)

APPROVED: 08-27-2014  
REVISED: 09-01-2016

CHRISTOPHER ROY  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.622

1 OF 1

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NO	DATE	BY	CKD	REVISION



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

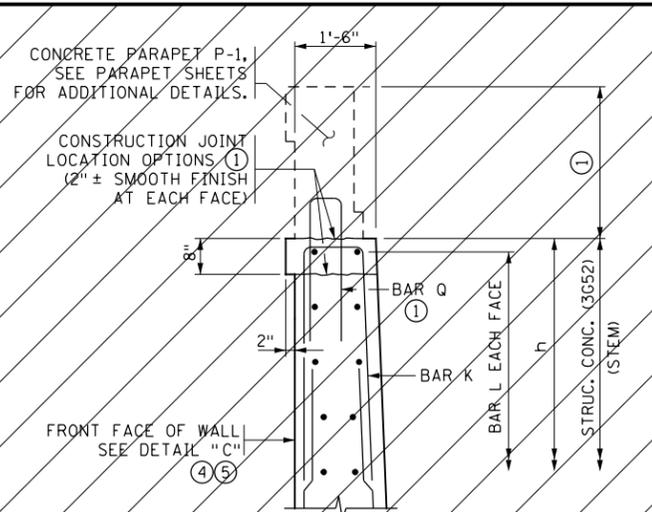
*Rachael Durham*  
RACHAEL DURHAM License # 55461  
6-17-2025 DATE

STATE AID PROJECT NO.  
002-607-032

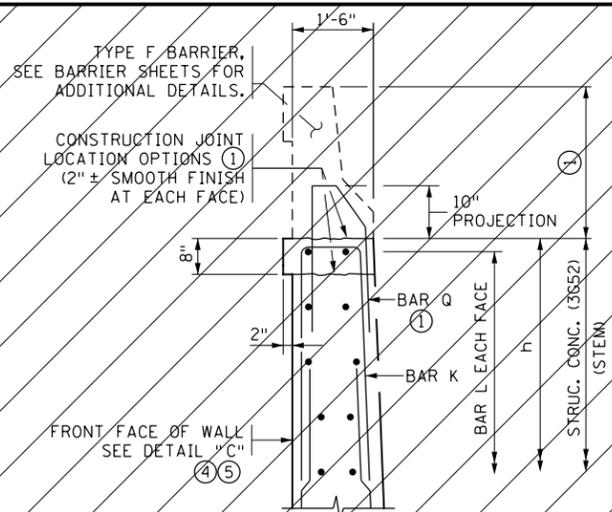
TITLE: RETAINING WALL PLANS  
002-607-032  
WALL REINFORCEMENT DETAILS

DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM

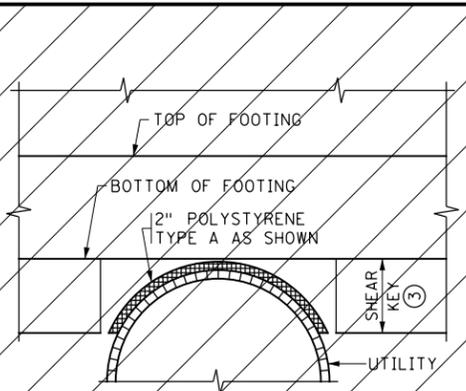
SHEET NO. W3 OF W17 SHEETS



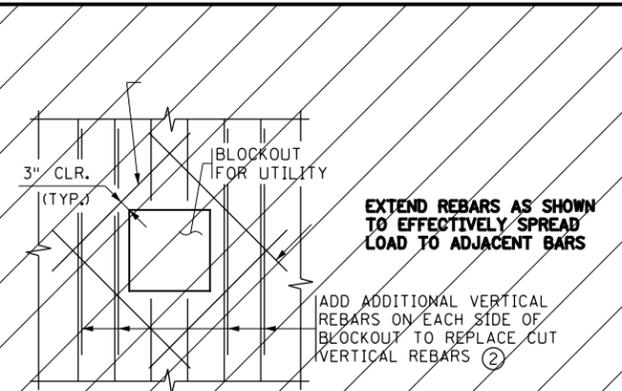
**CONCRETE PARAPET P-1 DETAIL**  
2" COPING OPTION SHOWN



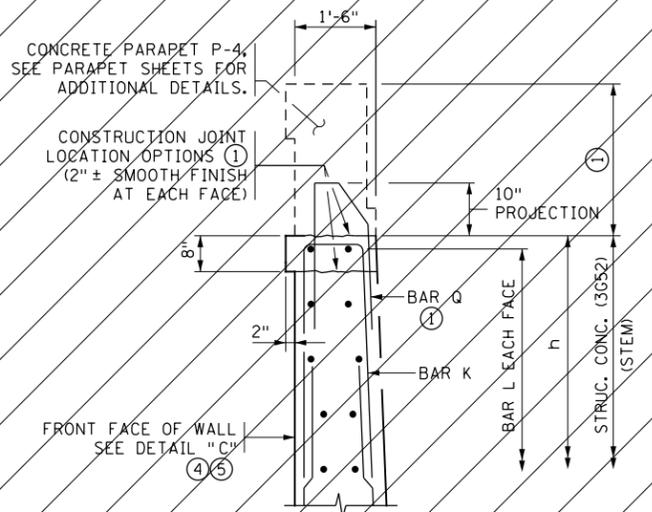
**TYPE F BARRIER DETAIL**  
2" COPING OPTION SHOWN



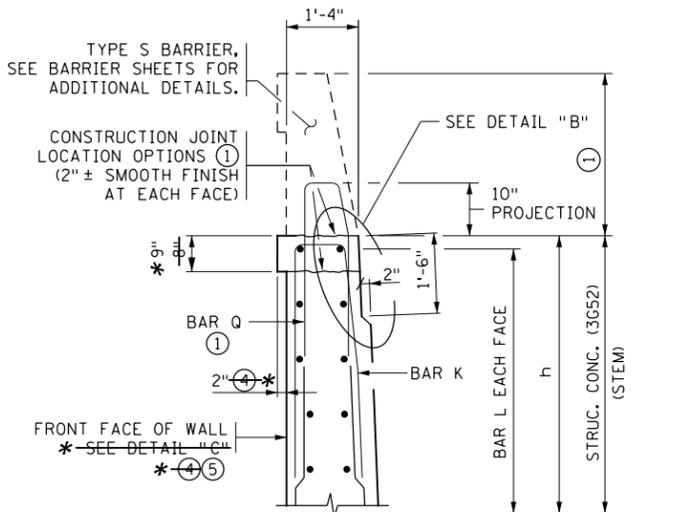
**PIPE UNDER SPREAD FOOTING (THROUGH SHEAR KEY)**



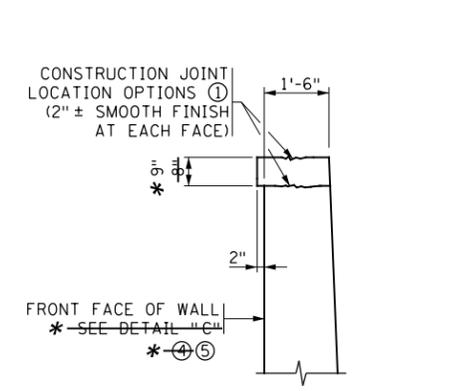
**UTILITY BLOCKOUT DETAIL**



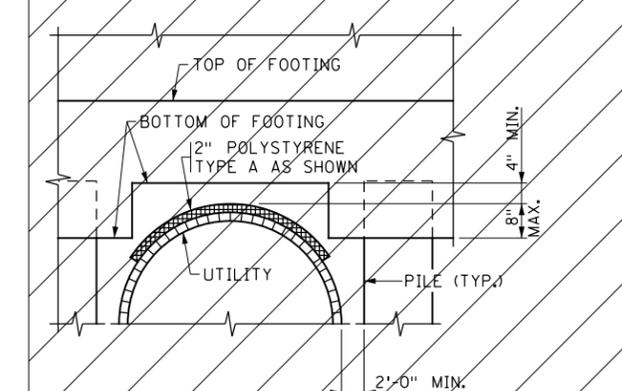
**CONCRETE PARAPET P-4 DETAIL**  
2" COPING OPTION SHOWN



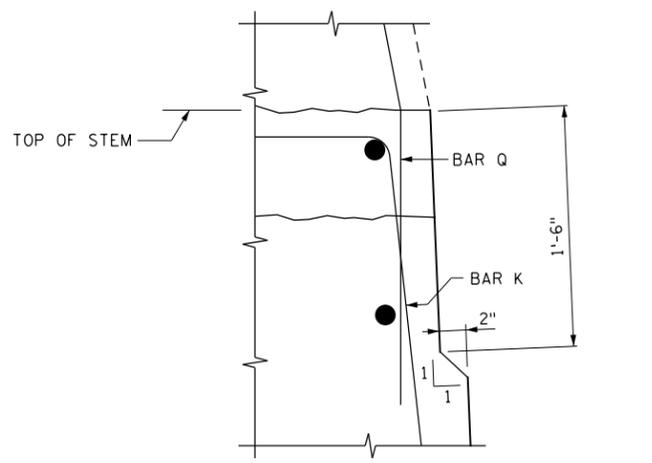
**TYPE S BARRIER DETAIL**  
2" COPING OPTION SHOWN



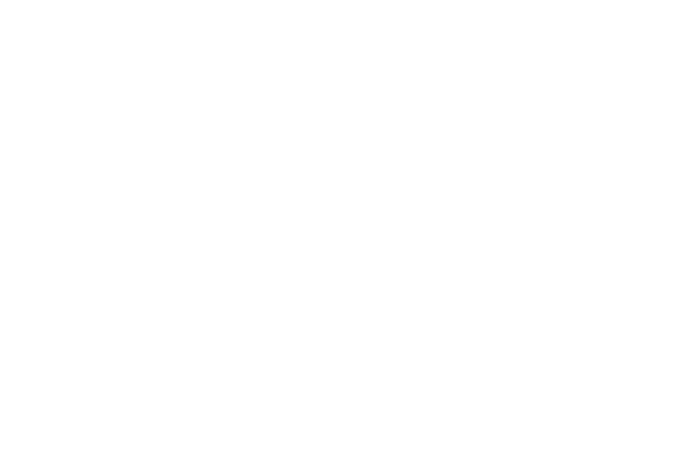
**COPING DETAIL**



**PIPE THROUGH PILE FOOTING**



**DETAIL "B"**



**DETAIL "C"**

\* DENOTES MODIFICATION FROM STANDARD PLAN

**NOTES:**

- ARCHITECTURAL TREATMENT OPTION ON FRONT FACE OF RETAINING WALL, INCLUDING COPING OR HORIZONTAL REVEL OPTION TO BE DETERMINED BY MNDOT.
- ① REFER TO PARAPET OR BARRIER SHEETS FOR ADDITIONAL INFORMATION INCLUDING Q BAR PLACEMENT DETAILS, AND PAYMENT.
- ② FIELD CUT/ADJUST VERTICAL AND HORIZONTAL REINFORCEMENT AS NECESSARY TO CLEAR BLOCKOUT. PLACE REINFORCEMENT AS SHOWN.
- ③ MODIFY AS NEEDED FOR INTERRUPTION.
- ④ THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF. THE STRUCTURAL CONCRETE QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. MATERIAL NEEDED FOR THE TEXTURING SHALL BE INCIDENTAL. SEE SPECIAL PROVISIONS 2411. TEXTURE RELIEF TO ADHERE TO NCHRP REPORT 554 CRASH BARRIER GUIDANCE WHENEVER THE WALL FACE IS INSIDE OR NEAR THE CLEAR ZONE.
- ⑤ FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.
- ⑥ DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL.

LEAD EXPERT OFFICE  
KEVIN WESTERN  
STATE BRIDGE ENGINEER

RETAINING WALL MISCELLANEOUS DETAILS  
MODIFIED

APPROVED: 02-16-2016  
REVISED: 09-01-2016

STANDARD PLAN  
5-297.624  
1 OF 6



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
*Rachael Durham*  
RACHAEL DURHAM License # 55461  
6-17-2025  
DATE

STATE AID PROJECT NO.  
002-607-032

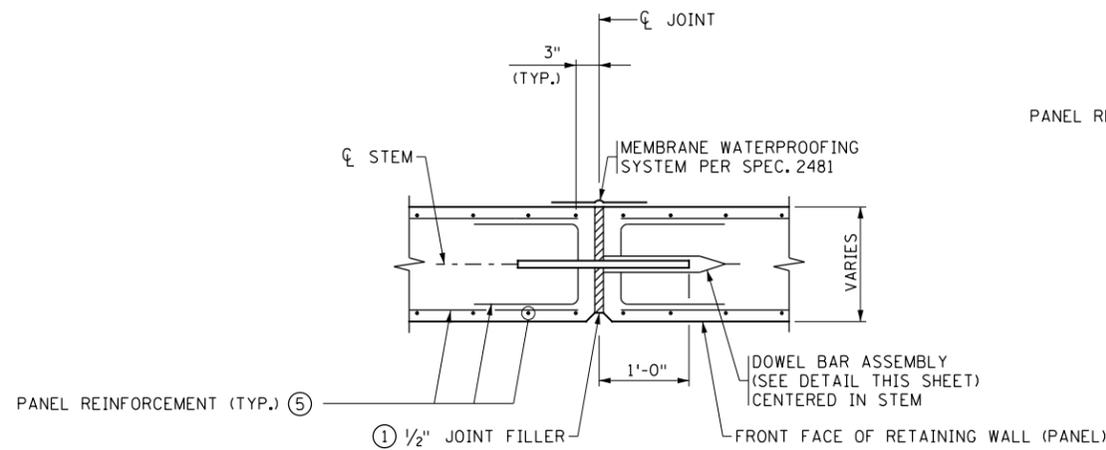
TITLE: RETAINING WALL PLANS  
002-607-032  
WALL MISCELLANEOUS DETAILS

DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM  
SHEET NO. W4 OF W17 SHEETS

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NO	DATE	BY	CKD	REVISION

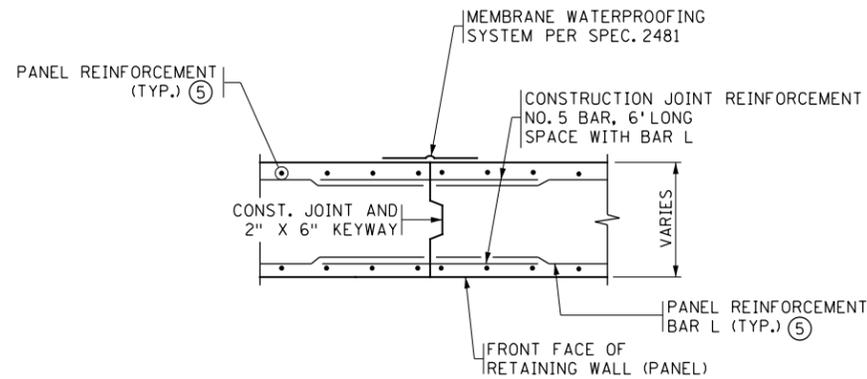




**CORK AND DOWELED JOINT DETAIL**

(TYPICAL SECTION THROUGH JOINT)

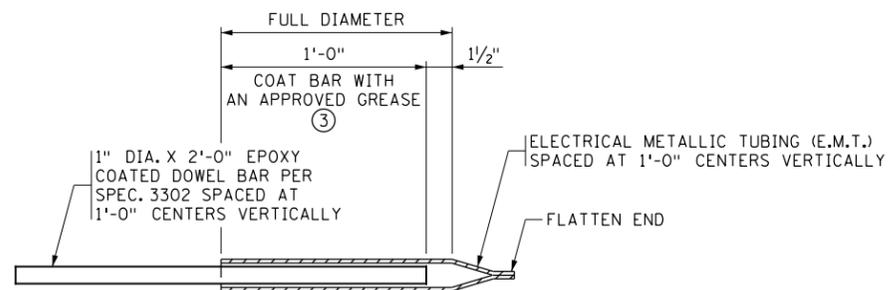
② ④



**CONSTRUCTION JOINT DETAIL**

(TYPICAL SECTION THROUGH JOINT)

② ④



**DOWEL BAR ASSEMBLY**

**NOTES:**

THE MATERIALS AND PLACEMENT OF THE CORK AND DOWEL JOINT/ CONSTRUCTION JOINT (DOWEL BAR ASSEMBLIES, NO. 5 REINFORCING BARS, JOINT FILLER, AND JOINT WATERPROOFING) ARE INCIDENTAL.

THE CONTRACTOR SHALL ASSIGN TO THE REINFORCING BAR SUPPLIER THE RESPONSIBILITY OF SUPPLYING THE NECESSARY MATERIALS ASSOCIATED WITH THE DETAILS SHOWN ON THIS SHEET.

- ① JOINT FILLER SHALL BE CORK SPEC. 2401.3.E.3.
- ② AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 9'-6". A CORK AND DOWEL JOINT IS REQUIRED AT ALL VERTICAL FOOTING STEPS.
- ③ GREASE SHALL BE AN APPROVED HIGH PRESSURE TYPE THAT IS EFFECTIVE OVER THE FULL RANGE OF EXPECTED TEMPERATURES AND RESISTANT TO CHEMICAL ACTION.
- ④ DOWEL BAR ASSEMBLY MUST BE PLACED PERPENDICULAR TO JOINT AND PARALLEL TO THE WALL FACE, AND TO EACH OTHER.
- ⑤ SEE PANEL SHEETS FOR REINFORCING DETAILS.

LEAD EXPERT OFFICE  
NANCY DAUBENBERGER  
STATE BRIDGE ENGINEER

RETAINING WALL MISCELLANEOUS DETAILS

APPROVED: 08-27-2014  
REVISED: 09-01-2016

STANDARD PLAN  
5-297.624

3 OF 6

NO	DATE	BY	CKD	REVISION



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

*Rachael Durham*  
RACHAEL DURHAM License # 55461  
DATE 6-17-2025

STATE AID PROJECT NO.  
002-607-032

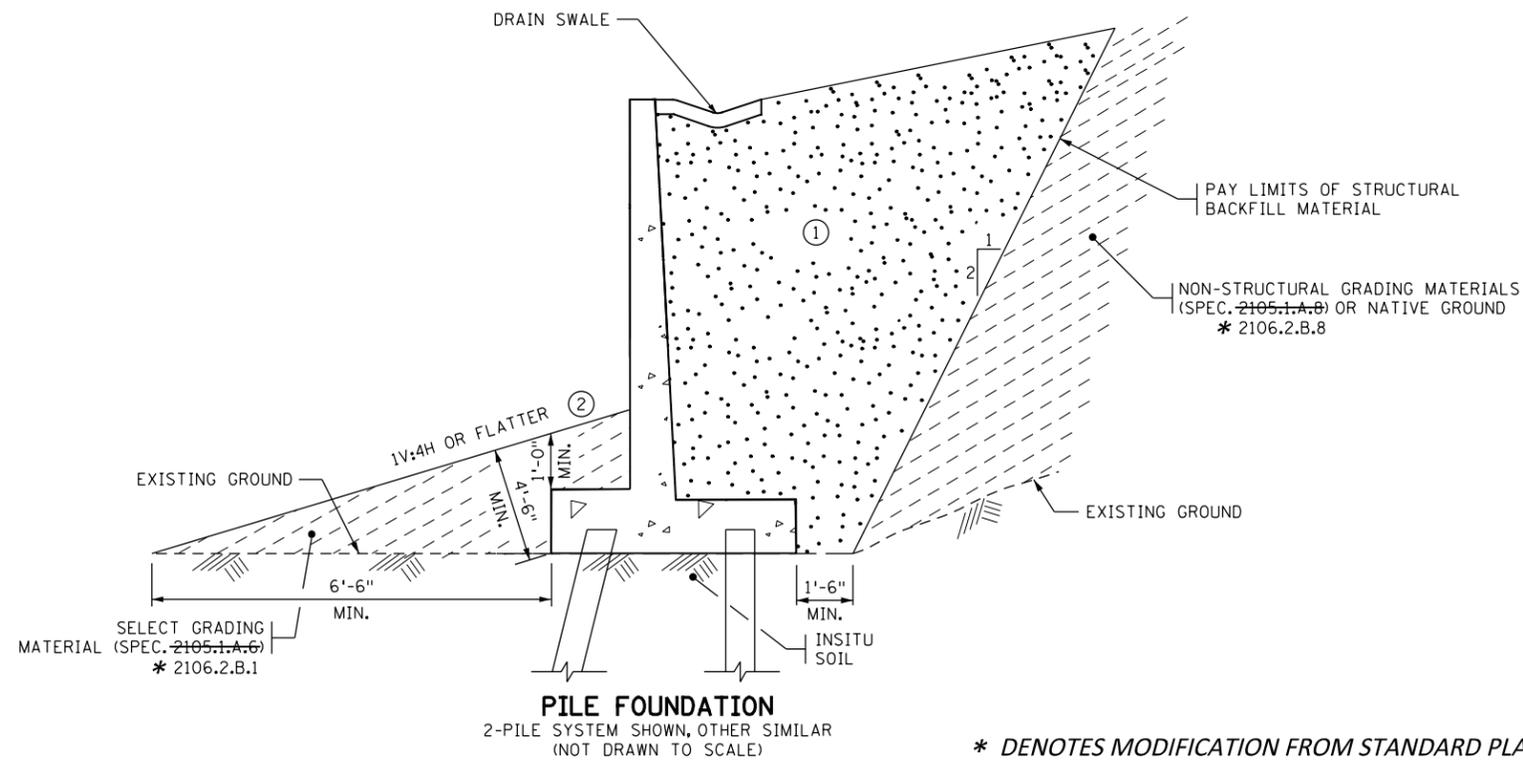
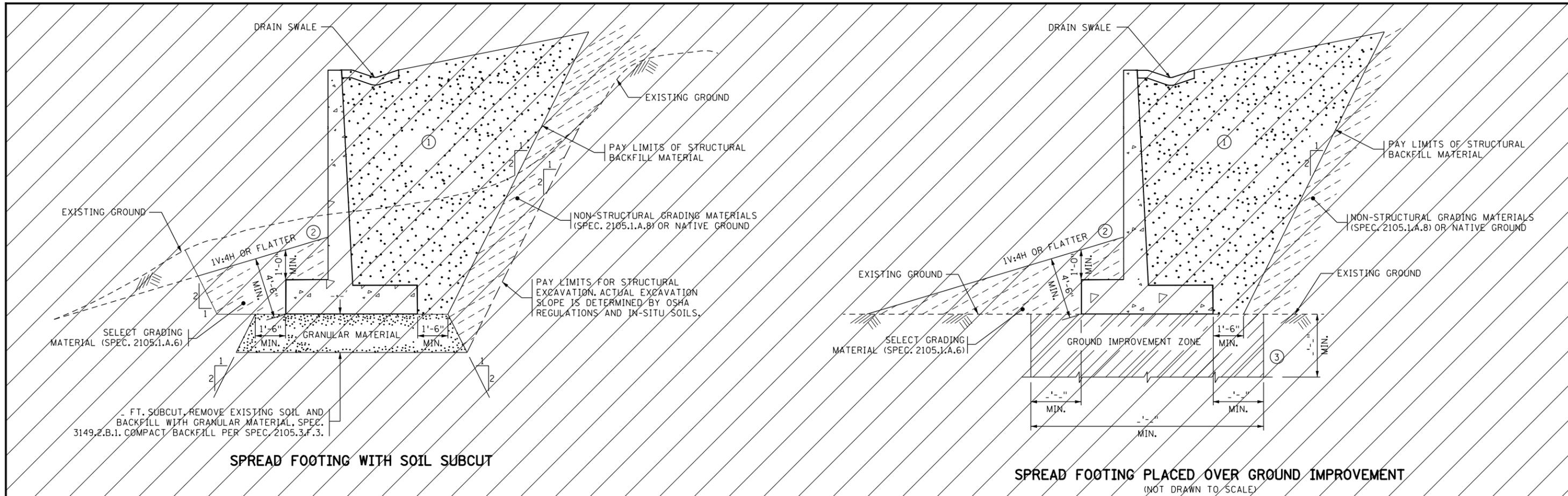
TITLE: RETAINING WALL PLANS  
002-607-032  
WALL MISCELLANEOUS DETAILS

DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM

SHEET NO. W6 OF W17 SHEETS

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- ① BACKFILL WITH STRUCTURAL BACKFILL SPEC. 3149.2.D.2 COMPACT BACKFILL PER SPEC. 2105.3.F.3, 2106.3.G.3 \*
- ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- ③ PROVIDE SUFFICIENT COVERAGE AREA AND TREATMENT VOLUME TO GIVE GENERALLY UNIFORM SUPPORT TO THE FOUNDATION. IMPROVED GROUND OR SURFACE PREPARATIONS PLACED TO IMPROVE GROUND SUPPORT ARE TO BE IN IMMEDIATE CONTACT WITH THE FOOTING AND FOUNDATION MATERIAL.

\* DENOTES MODIFICATION FROM STANDARD PLAN

LEAD EXPERT OFFICE	NANCY DAUBENBERGER STATE BRIDGE ENGINEER	RETAINING WALL MISCELLANEOUS DETAILS (GEOTECHNICAL DETAILS)	MODIFIED	APPROVED: 08-27-2014 REVISED: 09-01-2016	STANDARD PLAN 5-297.624	6 OF 6											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO</th> <th>DATE</th> <th>BY</th> <th>CKD</th> <th>REVISION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO	DATE	BY	CKD	REVISION							I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. <i>Rachael Durham</i> 6-17-2025 RACHAEL DURHAM License # 55461		STATE AID PROJECT NO. <b>002-607-032</b>	TITLE: RETAINING WALL PLANS <b>002-607-032</b> WALL MISCELLANEOUS DETAILS	DES: C. BLACK DR: C. BLACK CHK: R. DURHAM CHK: R. DURHAM <b>SHEET NO. W8 OF W17 SHEETS</b>
NO	DATE	BY	CKD	REVISION													

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 6/17/2025  
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BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES			
h = 5' PANELS: 1 PANEL LENGTH = 30'-6"										
SPREAD FOOTING REINFORCEMENT						DIMENSIONS				
A	F501	18	32'-11"	STR.	LONG T & B	618	SPREAD FOOTING			
B	F502	31	8'-0"	STR.	TRANS BOT	259	b	2'-7"	e	----
C	F503	31	8'-0"	STR.	TRANS TOP	259	c	1'-5"	f	----
							d	8'-6"	g	2'-9 1/4"
PILE FOUNDATION REINFORCEMENT						PILE FOUNDATION				
A	F701	18	34'-2"	STR.	LONG T & B	1257	b	2'-9"	d	8'-0"
B	F602	31	8'-10"	7'-6"	TRANS BOT	411	c	2'-0"	g	2'-11 1/4"
C	F503	31	8'-8"	7'-6"	TRANS TOP	280				
							STEM			
							a	1'-8 1/2"	x	2'-1"
							j	1'-3 3/8"	z	----
FOOTING DOWELS & STEM REINFORCEMENT						QUANTITIES				
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)			
E	F505E	31	4'-4"	10"	DOWEL BF	140	(FOOTING)			
F	F506E	----	----	----	DOWEL BF	----	SPREAD	14.0	CU YD	----
G	S401E	31	3'-11"	STR.	VERT FF	81	PILE	18.5	CU YD	----
H	S502E	31	3'-11"	STR.	VERT BF	127	STRUCTURAL CONCRETE (3G52)			
J	S503E	----	----	STR.	VERT BF	----	(STEM)			
K	S504E	31	7'-2"	3'-0"	TIE	232	9.0 CU YD			
L	S405E	10	30'-0"	STR.	HORIZ EF	200	REINFORCEMENT (PLAIN)			
M	S506E	10	7'-4"	1'-4"	EXP JT TIE	76	SPREAD	1135	LB	----
N	S507E	----	7'-9"	1'-9"	EXP JT TIE	----	PILE	1949	LB	----
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	REINFORCEMENT (EPOXY)			
Q	S509E	34	6'-11"	3'-1"	PARAPET DWL	245	-953 1201 * LB			
Q	S509E	34	6'-11"	3'-1"	F/P4 BAR, DWL	245				
Q	S509E	34	7'-0"	3'-1"	S BAR, DWL	248				

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES			
h = 6' PANELS: 2-3 PANEL LENGTH = 30'-6"										
SPREAD FOOTING REINFORCEMENT						DIMENSIONS				
A	F501	18	32'-11"	STR.	LONG T & B	618	SPREAD FOOTING			
B	F502	31	8'-0"	STR.	TRANS BOT	259	b	2'-7"	e	----
C	F503	31	8'-0"	STR.	TRANS TOP	259	c	1'-5"	f	----
							d	8'-6"	g	2'-9 1/4"
PILE FOUNDATION REINFORCEMENT						PILE FOUNDATION				
A	F701	18	34'-2"	STR.	LONG T & B	1257	b	2'-9"	d	8'-0"
B	F602	31	8'-10"	7'-6"	TRANS BOT	411	c	2'-0"	g	2'-11 1/4"
C	F503	31	8'-8"	7'-6"	TRANS TOP	280				
							STEM			
							a	1'-9"	x	2'-1"
							j	1'-4 3/8"	z	----
FOOTING DOWELS & STEM REINFORCEMENT						QUANTITIES				
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)			
E	F505E	31	4'-4"	10"	DOWEL BF	140	(FOOTING)			
F	F506E	----	----	----	DOWEL BF	----	SPREAD	14.0	CU YD	----
G	S401E	31	4'-11"	STR.	VERT FF	102	PILE	18.5	CU YD	----
H	S502E	31	4'-11"	STR.	VERT BF	159	STRUCTURAL CONCRETE (3G52)			
J	S503E	----	----	STR.	VERT BF	----	(STEM)			
K	S504E	31	7'-2"	3'-0"	TIE	232	11.0 CU YD			
L	S405E	12	30'-0"	STR.	HORIZ EF	240	REINFORCEMENT (PLAIN)			
M	S506E	12	7'-4"	1'-4"	EXP JT TIE	92	SPREAD	1135	LB	----
N	S507E	----	7'-9"	1'-9"	EXP JT TIE	----	PILE	1949	LB	----
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	REINFORCEMENT (EPOXY)			
Q	S509E	34	6'-11"	3'-1"	PARAPET DWL	245	-1062 1310 * LB			
Q	S509E	34	6'-11"	3'-1"	F/P4 BAR, DWL	245				
Q	S509E	34	7'-0"	3'-1"	S BAR, DWL	248				

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES			
h = 7' PANELS: PANEL LENGTH = 30'-6"										
SPREAD FOOTING REINFORCEMENT						DIMENSIONS				
A	F501	18	32'-11"	STR.	LONG T & B	618	SPREAD FOOTING			
B	F502	31	8'-0"	STR.	TRANS BOT	259	b	2'-7"	e	----
C	F503	31	8'-0"	STR.	TRANS TOP	259	c	1'-5"	f	----
							d	8'-6"	g	2'-9 1/4"
PILE FOUNDATION REINFORCEMENT						PILE FOUNDATION				
A	F801	18	35'-4"	STR.	LONG T & B	1698	b	2'-9"	d	8'-0"
B	F602	31	8'-10"	7'-6"	TRANS BOT	411	c	2'-0"	g	2'-11 1/4"
C	F503	31	8'-8"	7'-6"	TRANS TOP	280				
							STEM			
							a	1'-9 1/2"	x	2'-1"
							j	1'-4 3/8"	z	----
FOOTING DOWELS & STEM REINFORCEMENT						QUANTITIES				
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)			
E	F505E	31	4'-4"	10"	DOWEL BF	140	(FOOTING)			
F	F506E	----	----	----	DOWEL BF	----	SPREAD	14.0	CU YD	----
G	S401E	31	4'-2"	STR.	VERT FF	86	PILE	18.5	CU YD	----
H	S502E	31	4'-2"	STR.	VERT BF	135	STRUCTURAL CONCRETE (3G52)			
J	S503E	----	----	STR.	VERT BF	----	(STEM)			
K	S504E	31	10'-8"	4'-9"	F/P1/P4 BAR, TIE	345	13.0 CU YD			
L	S504E	31	10'-5"	4'-9"	S BARRIER TIE	337	REINFORCEMENT (PLAIN)			
K	S504E	14	30'-0"	STR.	HORIZ EF	281	SPREAD	1135	LB	----
M	S506E	14	7'-4"	1'-4"	EXP JT TIE	107	PILE	2390	LB	----
N	S507E	----	7'-9"	1'-9"	EXP JT TIE	----	REINFORCEMENT (EPOXY)			
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	1191 LB			
Q	S509E	34	6'-11"	3'-1"	PARAPET DWL	245				
Q	S509E	34	6'-11"	3'-1"	F/P4 BAR, DWL	245				
Q	S509E	34	7'-0"	3'-1"	S BARRIER DWL	248				

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES			
h = 8' PANELS: PANEL LENGTH = 30'-6"										
SPREAD FOOTING REINFORCEMENT						DIMENSIONS				
A	F501	18	32'-11"	STR.	LONG T & B	618	SPREAD FOOTING			
B	F502	31	8'-0"	STR.	TRANS BOT	259	b	2'-7"	e	----
C	F503	31	8'-0"	STR.	TRANS TOP	259	c	1'-5"	f	----
							d	8'-6"	g	2'-9 1/4"
PILE FOUNDATION REINFORCEMENT						PILE FOUNDATION				
A	F801	18	35'-4"	STR.	LONG T & B	1698	b	2'-9"	d	8'-0"
B	F602	31	8'-10"	7'-6"	TRANS BOT	411	c	2'-0"	g	2'-11 1/4"
C	F503	31	8'-8"	7'-6"	TRANS TOP	280				
							STEM			
							a	1'-10"	x	2'-1"
							j	1'-5 3/8"	z	----
FOOTING DOWELS & STEM REINFORCEMENT						QUANTITIES				
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)			
E	F505E	31	4'-4"	10"	DOWEL BF	140	(FOOTING)			
F	F506E	----	----	----	DOWEL BF	----	SPREAD	14.0	CU YD	----
G	S401E	31	5'-2"	STR.	VERT FF	107	PILE	18.5	CU YD	----
H	S502E	31	5'-2"	STR.	VERT BF	167	STRUCTURAL CONCRETE (3G52)			
J	S503E	----	----	STR.	VERT BF	----	(STEM)			
K	S504E	31	10'-8"	4'-9"	F/P1/P4 BAR, TIE	345	15.0 CU YD			
K	S504E	31	10'-5"	4'-9"	S BARRIER TIE	337	REINFORCEMENT (PLAIN)			
L	S405E	16	30'-0"	STR.	HORIZ EF	321	SPREAD	1135	LB	----
M	S506E	16	7'-4"	1'-4"	EXP JT TIE	122	PILE	2390	LB	----
N	S507E	----	7'-9"	1'-9"	EXP JT TIE	----	REINFORCEMENT (EPOXY)			
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	1299 LB			
Q	S509E	34	6'-11"	3'-1"	PARAPET DWL	245				
Q	S509E	34	6'-11"	3'-1"	F/P4 BAR, DWL	245				
Q	S509E	34	7'-0"	3'-1"	S BARRIER DWL	248				

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES			
h = 9' PANELS: PANEL LENGTH = 30'-6"										
SPREAD FOOTING REINFORCEMENT						DIMENSIONS				
A	F501	18	32'-11"	STR.	LONG T & B	618	SPREAD FOOTING			
B	F502	31	8'-0"	STR.	TRANS BOT	259	b	2'-7"	e	----
C	F503	31	8'-0"	STR.	TRANS TOP	259	c	1'-5"	f	----
							d	8'-6"	g	2'-9 1/4"
PILE FOUNDATION REINFORCEMENT						PILE FOUNDATION				
A	F801	18	35'-4"	STR.	LONG T & B	1698	b	2'-9"	d	8'-0"
B	F602	31	8'-10"	7'-6"	TRANS BOT	411	c	2'-0"	g	2'-11 1/4"
C	F503	31	8'-8"	7'-6"	TRANS TOP	280				
							STEM			
							a	1'-10 1/2"	x	2'-1"
							j	1'-5 3/8"	z	----
FOOTING DOWELS & STEM REINFORCEMENT						QUANTITIES				
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)			
E	F505E	31	7'-9"	4'-0"	DOWEL BF	251	(FOOTING)			
F	F506E	----	----	----	DOWEL BF	----	SPREAD	14.0	CU YD	----
G	S401E	31	6'-2"	STR.	VERT FF	128	PILE	18.5	CU YD	----
H	S502E	31	6'-2"	STR.	VERT BF	199	STRUCTURAL CONCRETE (3G52)			
J	S503E	----	----	STR.	VERT BF	----	(STEM)			
K	S504E	31	10'-8"	4'-9"	F/P1/P4 BAR, TIE	345	17.1 CU YD			
K	S504E	31	10'-5"	4'-9"	S BARRIER TIE	337	REINFORCEMENT (PLAIN)			
L	S405E	18	30'-0"	STR.	HORIZ EF	361	SPREAD	1135	LB	----
M	S506E	18	7'-4"	1'-4"	EXP JT TIE	138	PILE	2390	LB	----
N	S507E	----	7'-9"	1'-9"	EXP JT TIE	----	REINFORCEMENT (EPOXY)			
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	1518 LB			
Q	S509E	34	6'-11"	3'-1"	PARAPET DWL	245				
Q	S509E	34	6'-11"	3'-1"	F/P4 BAR, DWL	245				
Q	S509E	34	7'-0"	3'-1"	S BARRIER DWL	248				

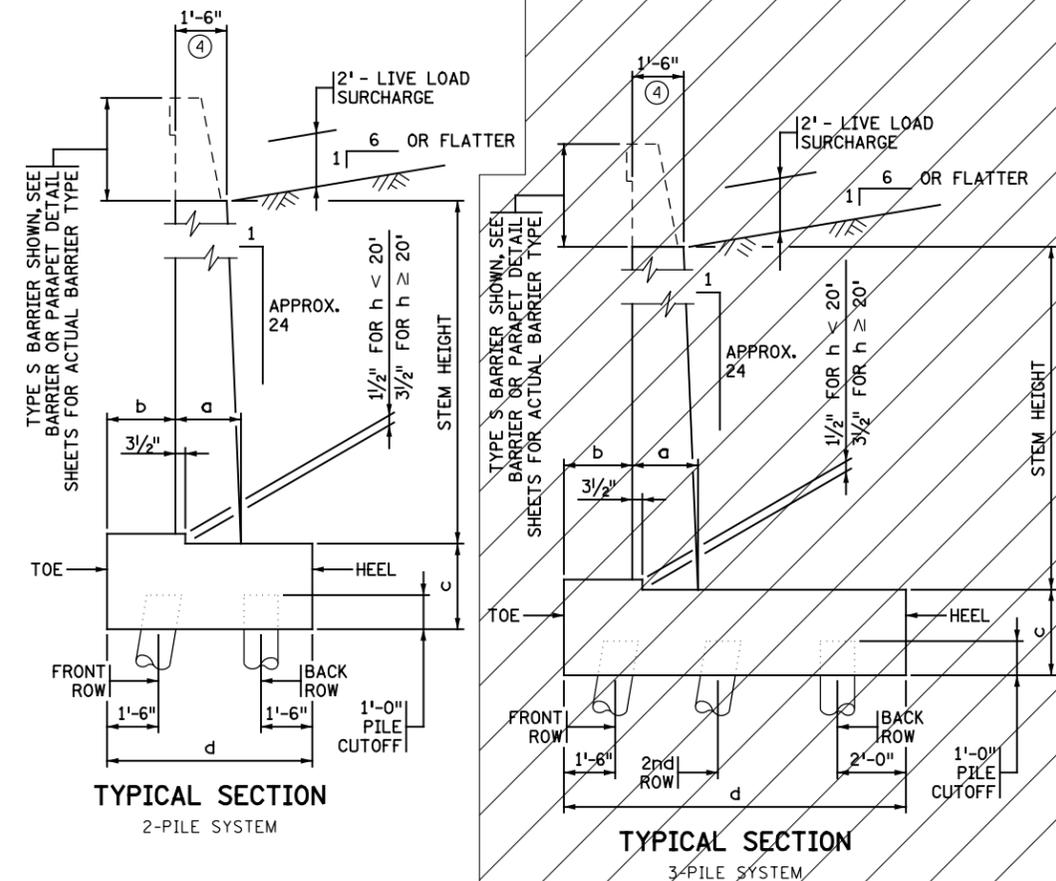
BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES			
h = 10' PANELS: PANEL LENGTH = 30'-6"										
SPREAD FOOTING REINFORCEMENT						DIMENSIONS				
A	F501	18	32'-11"	STR.	LONG T & B	618	SPREAD FOOTING			
B	F502	31	8'-0"	STR.	TRANS BOT	259	b	2'-7"	e	----
C	F503	31	8'-0"	STR.	TRANS TOP	259	c	1'-5"	f	----
							d	8'-6"	g	2'-9 1/4"
PILE FOUNDATION REINFORCEMENT						PILE FOUNDATION				
A	F901	18	36'-7"	STR.	LONG T & B	2239	b	2'-9"	d	8'-0"
B	F602	31	8'-10"	7'-6"	TRANS BOT	411	c	2'-0"	g	2'-11 1/4"
C	F503	31	8'-8"	7'-6"	TRANS TOP	280				
							STEM			
							a	1'-11"	x	2'-1"
							j	1'-6 3/8"	z	2'-1"
FOOTING DOWELS & STEM REINFORCEMENT						QUANTITIES				
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)			
E	F505E	31	7'-9"	4'-1"	DOWEL BF	251	(FOOTING)			
F	F506E	30	4'-1"	3'-0"	DOWEL BF	128	SPREAD	14.0	CU YD	----
G	S401E	31	7'-2"	STR.	VERT FF	148	PILE	18.5	CU YD	----
H	S502E	31	7'-2"	STR.	VERT BF					

**PILE FOOTING DIMENSIONS AND PILE SPACING - 100 TON FACTORED RESISTANCE PILE  
LIVE LOAD SURCHARGE**

SHORT WALL (5'-9")  
MEDIUM WALL (10'-16")  
TALL WALL (17'-27")

STEM HEIGHT	FOOTING GEOMETRY				PILE SPACING									QUANTITIES			WALL DETAILING SCHEME
	DIM. a	DIM. b	DIM. c	DIM. d	TRANSVERSE				LONGITUDINAL ③					PER FOOT			
					FRONT ROW TO BACK ROW	FRONT ROW TO 2ND ROW	2ND ROW TO 3RD ROW	3RD ROW TO BACK ROW	BACK ROW TO HEEL	FRONT ROW	2ND ROW	3RD ROW	BACK ROW	STEEL PLAIN (POUND)	CONCRETE 1G52 CU. YD.	NO. OF PILES	
5	1'-8 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	63.87	0.61	0.167	SHORT
6	1'-9"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	63.87	0.61	0.167	SHORT
7	1'-9 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	78.33	0.61	0.167	SHORT
8	1'-10"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	78.33	0.61	0.167	SHORT
9	1'-10 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	78.33	0.61	0.167	SHORT
10	1'-11"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	96.07	0.61	0.167	MEDIUM
11	1'-11 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	96.07	0.61	0.167	MEDIUM
12	2'-0"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
13	2'-0 1/2"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
14	2'-1"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
15	2'-1 1/2"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-8"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
16	2'-2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	8'-0"	8'-0"	77.74	0.99	0.375	MEDIUM
17	2'-2 1/2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	8'-0"	8'-0"	77.74	0.99	0.375	TALL
18	2'-3"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	8'-0"	8'-0"	77.74	0.99	0.375	TALL
19	2'-3 1/2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	8'-0"	8'-0"	77.74	0.99	0.375	TALL
20	2'-4"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	8'-0"	8'-0"	77.74	1.02	0.375	TALL
21	2'-4 1/2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	8'-0"	8'-0"	77.74	1.02	0.375	TALL
22	2'-5"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
23	2'-5 1/2"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
24	2'-6"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
25	2'-6 1/2"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
26	2'-7"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	125.34	1.44	0.615	TALL
27	2'-7 1/2"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	138.66	1.44	0.615	TALL

N.A. = NOT APPLICABLE



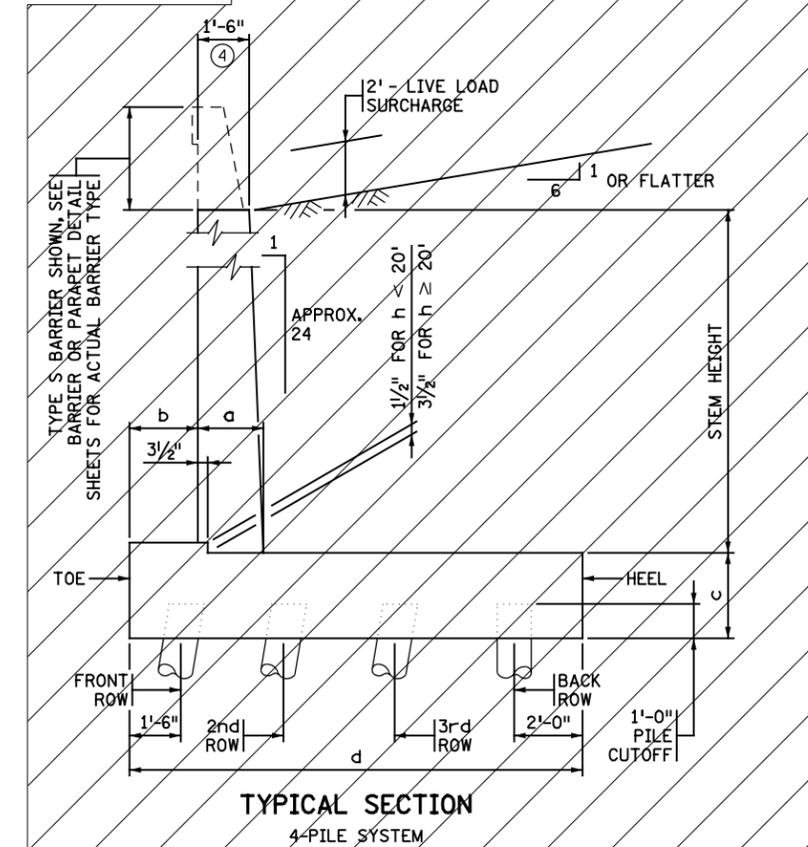
STEM HEIGHT	REINFORCEMENT - PILE FOUNDATION			
	STEM	FOOTING		
		DOVEL SIZE AND SPACING	TOE (BOTTOM TRANSVERSE) BAR SIZE & SPA.	HEEL (TOP TRANSVERSE) BAR SIZE & SPA.
5	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
6	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
7	5 @ 12"	6 @ 12"	5 @ 12"	8 @ 12"
8	5 @ 12"	6 @ 12"	5 @ 12"	8 @ 12"
9	5 @ 12"	6 @ 12"	5 @ 12"	8 @ 12"
10	5 @ 12"	6 @ 12"	5 @ 12"	9 @ 12"
11	5 @ 12"	6 @ 12"	5 @ 12"	9 @ 12"
12	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
13	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
14	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
15	6 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
16	6 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
17	6 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
18	6 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
19	7 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
20	7 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
21	8 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
22	8 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
23	9 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
24	9 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
25	9 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
26	10 @ 12"	8 @ 12"	9 @ 12"	5 @ 12"
27	10 @ 12"	9 @ 12"	9 @ 12"	5 @ 12"

REQUIRED NOMINAL PILE BEARING RESISTANCE R <sub>n</sub> - TONS/PILE				
FIELD CONTROL METHOD	CIP PILES		H PILES	
	φ <sub>dyn</sub>	* R <sub>n</sub>	φ <sub>dyn</sub>	* R <sub>n</sub>
MnDOT PILE FORMULA 2012 (MPF12)	0.50	200	0.60	167
$R_n = 20 \sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{S}\right)$				
PDA	0.65	154	0.65	154

\* R<sub>n</sub> = (FACTORED DESIGN LOAD) / φ<sub>dyn</sub>

**NOTES**

- ALL PILES TO BE BATTERED 4(V):1(H) EXCEPT BACK ROW WHICH IS TO BE DRIVEN VERTICAL
  - ① FOOTING CONCRETE. FOR STEM CONCRETE (3G52) SEE APPROPRIATE WALLPANEL TABULATION.
  - ② SEE STANDARD PLANS 5-297.621 TO .623 FOR REINFORCING DETAILS.
  - ③ THIS IS THE MAXIMUM PERMITTED LONGITUDINAL PILE SPACING; REFER TO THE PILE LAYOUT SHEETS FOR THE FINAL PILE SPACING.
  - ④ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.
- FOOTING BAR SIZE: NO. 5 BAR MINIMUM FOR TRANSVERSE REINFORCEMENT.  
NO. 6 BAR MINIMUM FOR LONGITUDINAL REINFORCEMENT.



LEAD EXPERT OFFICE  
NANCY DAUBENBERGER  
STATE BRIDGE ENGINEER

RETAINING WALL (LIVE LOAD SURCHARGE)  
PILE FOUNDATION GEOMETRY AND DATA

APPROVED: 08-27-2014  
REVISED: 09-01-2016

CHRISTOPHER ROY  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.632

2 OF 2

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Rachael Durham  
6-17-2025  
DATE  
RACHAEL DURHAM License # 55461

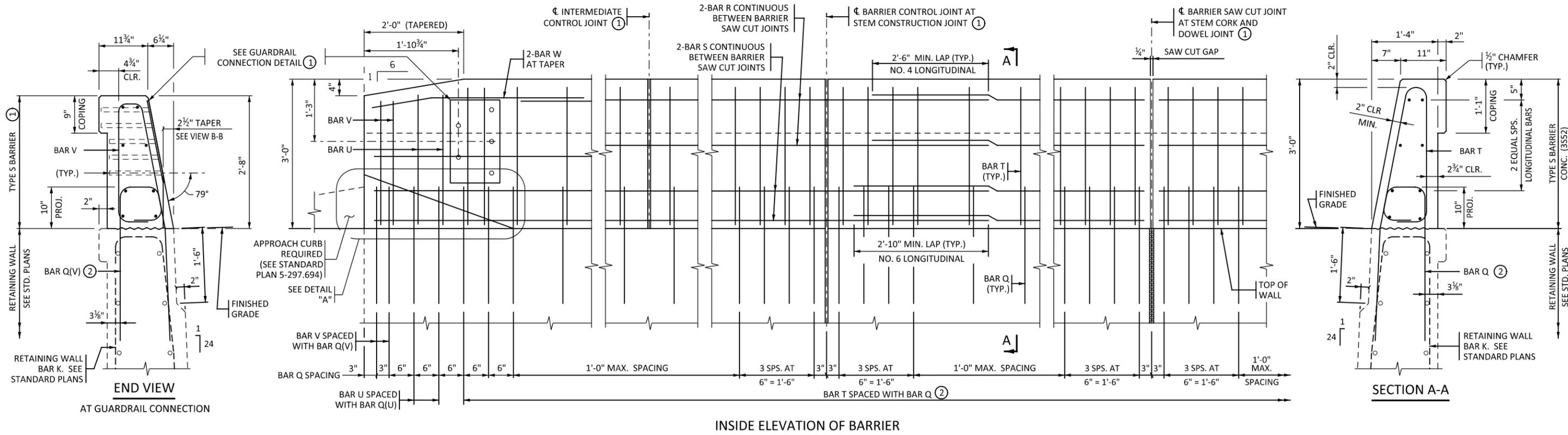
STATE AID PROJECT NO.  
002-607-032

TITLE: RETAINING WALL PLANS  
002-607-032  
PILE FOUNDATION DETAILS

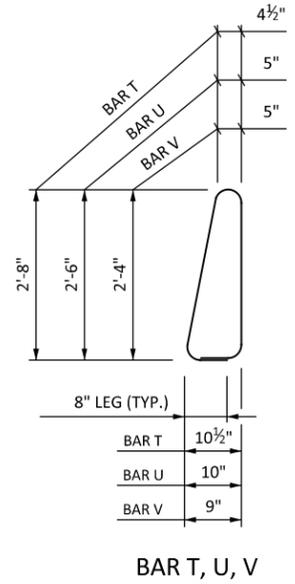
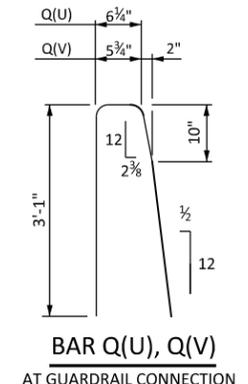
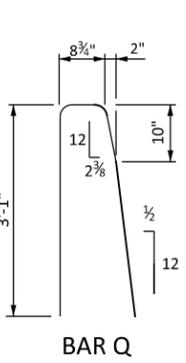
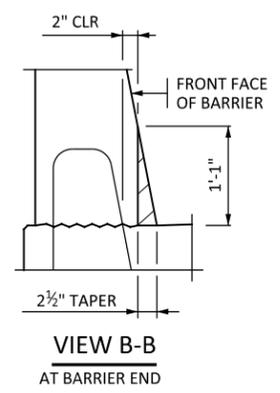
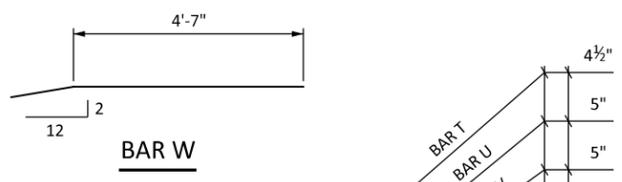
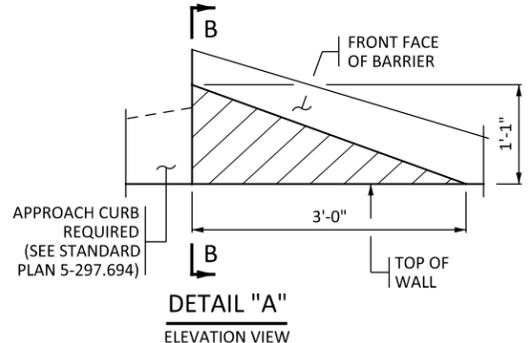
DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM

SHEET NO. W10 OF W17 SHEETS

NO	DATE	BY	CKD	REVISION



**BARRIER MEETS MASH TL-4 REQUIREMENTS**



- NOTES:**
- MATCH BARRIER SAW CUT JOINTS WITH RETAINING WALL STEM CORK AND DOWEL JOINTS.
  - MATCH BARRIER CONTROL JOINTS WITH RETAINING WALL STEM CONSTRUCTION JOINTS. PLACE INTERMEDIATE BARRIER CONTROL JOINTS AT 10'-0" MAXIMUM SPACING.
  - FOR BARRIERS OR PARAPETS WITH CONDUIT, PLACE CONDUIT EXPANSION FITTINGS AT 200' MAX. SPACING, AT SAW CUT JOINT LOCATION.
  - EPOXY COAT BARS MARKED WITH THE SUFFIX "E" IN ACCORDANCE WITH SPEC. 3301.
  - FOR SLIPFORM CONSTRUCTION, TIE 100% OF THE REINFORCEMENT BAR INTERSECTIONS IN THE BARRIER.
  - FOR TYPICAL RETAINING WALL REINFORCEMENT AND DETAILS, SEE STANDARD RETAINING WALL PLANS.
  - PAY FOR CONCRETE BARRIER (TYPE S) ON A LINEAR FOOT BASIS.
  - IF RETAINING WALL TIES TO BRIDGE WINGWALL, COORDINATE X,Y AND ELEVATION AT TIE IN POINT WITH BRIDGE DESIGNER.
- ① REFER TO STANDARD PLAN 5-297.637 FOR DETAILS.
- ② BAR Q SPACING AND CLEARANCES ARE SHOWN ON THIS SHEET. BAR Q QUANTITIES ARE INCLUDED IN THE WALL PANEL TABULATIONS, EXCEPT FOR TWO Q(U) AND TWO Q(V) BARS INCLUDED AS ADDITIONAL REINFORCING AT THE GUARDRAIL CONNECTION SHOWN ON STANDARD PLAN 5-297.637.

**LEAD EXPERT OFFICE**  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

RETAINING WALL CONCRETE BARRIER (TYPE S, TL-4)

APPROVED:  
07-15-2024

*Thomas Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.636

1 OF 1



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

*Rachael Durham*  
RACHAEL DURHAM  
6-17-2025  
DATE  
License # 55461

STATE AID PROJECT NO.  
002-607-032

TITLE: RETAINING WALL PLANS  
002-607-032  
CONCRETE BARRIER DETAILS

DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM

SHEET NO. W11 OF W17 SHEETS

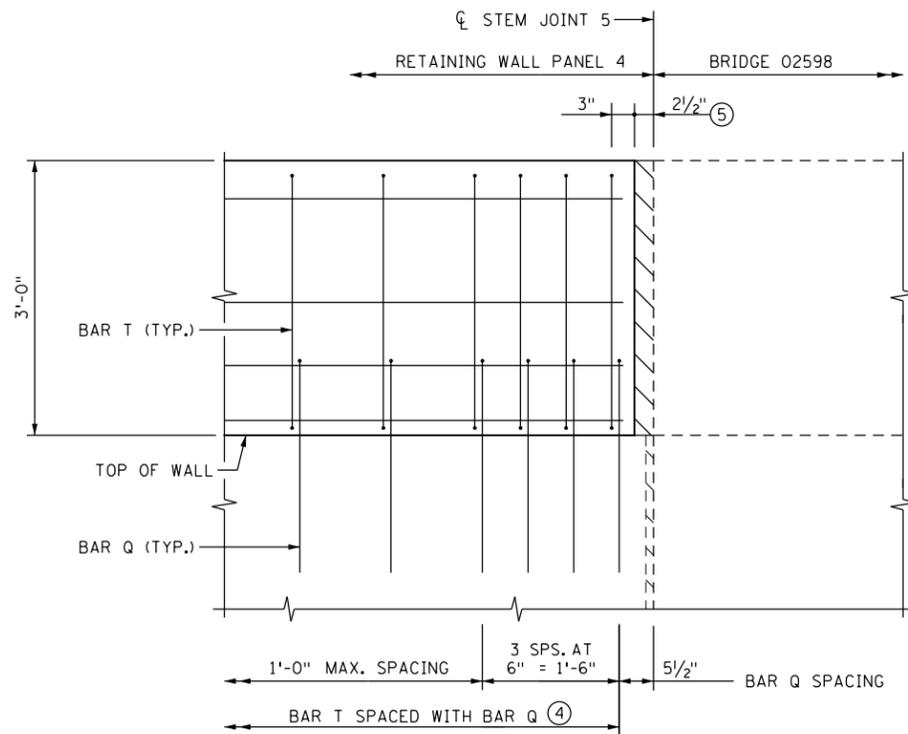
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NO	DATE	BY	CKD	REVISION

BILL OF REINFORCEMENT - TYPE P1					
TYPICAL PARAPET ON RETAINING WALL 30'-6" PANEL LENGTH, PANELS:					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E	4	30'-2"	—	PARAPET - HORIZONTAL
S	R602E	4	30'-2"	—	PARAPET - HORIZONTAL
T	R503E	34	7'-0"	□	PARAPET - VERTICAL
PARAPET CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
3.6 CU YD (1)			510 POUND (1)		
30'-6" PANEL LENGTH WITH GUARDRAIL CONNECTION					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
Q	S509E	2	6'-11"	□	PARAPET - VERTICAL
R	R401E	4	30'-2"	—	PARAPET - HORIZONTAL
S	R602E	4	30'-2"	—	PARAPET - HORIZONTAL
T	R503E	35	7'-0"	□	PARAPET - VERTICAL
U	R504E	1	6'-10"	□	PARAPET - VERTICAL
PARAPET CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
3.6 CU YD (1)			575 POUND (1)		
TYPICAL PARAPET ON RETAINING WALL PANEL LENGTH, PANEL:					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E			—	PARAPET - HORIZONTAL
S	R602E			—	PARAPET - HORIZONTAL
T	R503E			□	PARAPET - VERTICAL
PARAPET CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
CU YD (1)			POUND (2)		

BILL OF REINFORCEMENT - TYPE P-4					
TYPICAL PARAPET ON RETAINING WALL 30'-6" PANEL LENGTH, PANELS:					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E	4	30'-2"	—	PARAPET - HORIZONTAL
S	R602E	4	30'-2"	—	PARAPET - HORIZONTAL
T	R502E	34	8'-1"	□	PARAPET - VERTICAL
PARAPET CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
4.8 CU YD (1)			549 POUND (1)		
30'-6" PANEL LENGTH WITH GUARDRAIL CONNECTION					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
Q	S509E	2	6'-11"	□	PARAPET - VERTICAL
R	R401E	4	30'-2"	—	PARAPET - HORIZONTAL
S	R602E	4	30'-2"	—	PARAPET - HORIZONTAL
T	R503E	32	8'-1"	□	PARAPET - VERTICAL
U	R504E	SER. OF 3	7'-7" TO 7'-11"	□	PARAPET - VERTICAL
V	R505E	1	7'-3"	□	PARAPET - VERTICAL
W	R406E	2	6'-0"	—	PARAPET END
PARAPET CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
4.8 CU YD (1)			586 POUND (1)		
TYPICAL PARAPET ON RETAINING WALL PANEL LENGTH, PANEL:					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E			—	PARAPET - HORIZONTAL
S	R602E			—	PARAPET - HORIZONTAL
T	R503E			□	PARAPET - VERTICAL
PARAPET CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
CU YD (1)			POUND (1)		

BILL OF REINFORCEMENT - TYPE S, TL-4					
TYPICAL BARRIER ON RETAINING WALL 30'-6" PANEL LENGTH, PANELS: 2, 3 & 4					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R404E	4	30'-2"	—	BARRIER - HORIZONTAL
S	R602E	4	30'-2"	—	BARRIER - HORIZONTAL
T	R503E	34	7'-1"	□	BARRIER - VERTICAL
TYPE S BARRIER CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
3.8 CU YD (2)			513 POUND (2)		
30'-6" PANEL LENGTH WITH GUARDRAIL CONNECTION, PANELS: 1					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
Q(U)	S509E	2	7'-0"	□	BARRIER DOWEL
Q(V)	S510E	2	6'-11"	□	BARRIER DOWEL
R	R401E	4	30'-2"	—	BARRIER - HORIZONTAL
S	R602E	4	30'-2"	—	BARRIER - HORIZONTAL
T	R503E	30	7'-1"	□	BARRIER - VERTICAL
U	R504E	2	6'-9"	□	BARRIER - VERTICAL
V	R505E	2	6'-5"	□	BARRIER - VERTICAL
W	R406E	2	6'-0"	—	BARRIER - HORIZONTAL
TYPE S BARRIER CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
3.8 CU YD (2)			570 POUND (2)		
TYPICAL BARRIER ON RETAINING WALL PANEL LENGTH, PANELS:					
BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E			—	BARRIER - HORIZONTAL
S	R602E			—	BARRIER - HORIZONTAL
T	R503E			□	BARRIER - VERTICAL
TYPE S BARRIER CONC. (3552)			REINFORCEMENT BARS (EPOXY)		
CU YD (2)			POUND (2)		



\* BRIDGE TO RETAINING WALL INTERFACE ELEVATION

\* DENOTES MODIFICATION FROM STANDARD PLAN

NOTES:

REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A SAW CUT JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE.

- ① REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FOOT FOR THE PARAPET.
- ② REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FOOT FOR THE BARRIER.
- ③ BAR Q SPACING AND CLEARANCES ARE SHOWN ON THE PARAPET PLAN. BAR Q QUANTITIES ARE INCLUDED IN THE WALL PANEL TABULATIONS, EXCEPT FOR TWO ADDITIONAL Q BARS ADDED AT THE GUARDRAIL CONNECTION.
- ④ BAR Q SPACING AND CLEARANCES ARE SHOWN ON THE BARRIER PLAN. BAR Q QUANTITIES ARE INCLUDED IN THE WALL PANEL TABULATIONS, EXCEPT FOR TWO Q(U) AND TWO Q(V) BARS INCLUDED AS ADDITIONAL REINFORCEMENT AT THE GUARDRAIL CONNECTION.
- ⑤ 2 1/2" JOINT OPENING BETWEEN BARRIERS. SEE BRIDGE PLANS FOR COVER PLATE DETAILS

LEAD EXPERT OFFICE  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
CERTIFIED BY: \_\_\_\_\_ DATE \_\_\_\_\_  
LICENSED PROFESSIONAL ENGINEER  
PRINTED NAME: \_\_\_\_\_ LIC. NO. \_\_\_\_\_

MISCELLANEOUS CONCRETE BARRIER AND PARAPET DETAILS  
MODIFIED

APPROVED:  
07-15-2024

THOMAS STYRICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.637

1 OF 2



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Rachael Durham 6-17-2025  
DATE  
RACHAEL DURHAM License # 55461

STATE AID PROJECT NO.  
002-607-032

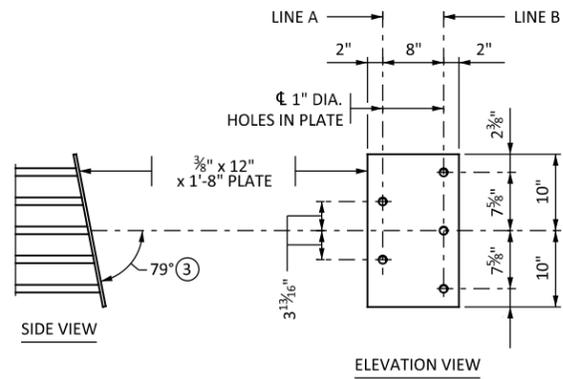
TITLE: RETAINING WALL PLANS  
002-607-032  
MISCELLANEOUS BARRIER DETAILS

DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM

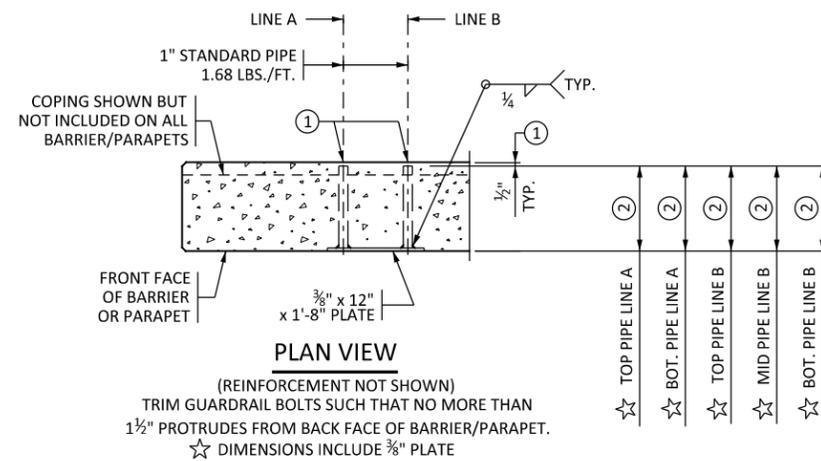
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**GUARDRAIL CONNECTION**



**GUARDRAIL CONNECTION DETAIL**



(REINFORCEMENT NOT SHOWN)  
TRIM GUARDRAIL BOLTS SUCH THAT NO MORE THAN 1/2" PROTRUDES FROM BACK FACE OF BARRIER/PARAPET.  
☆ DIMENSIONS INCLUDE 3/8" PLATE

BARRIER/PARAPET TYPE	PIPE LENGTH					WEIGHT
	TOP PIPE LINE A	BOT. PIPE LINE A	TOP PIPE LINE B	MID. PIPE LINE B	BOT. PIPE LINE B	
36" SINGLE SLOPE	1'-0 3/4"	1'-0 3/4"	1'-0"	11 1/2"	1'-1"	34 LBS.
TYPE P-1 PARAPET	1'-2 1/2"	1'-0 1/2"	1'-2 1/2"	1'-2 1/2"	1'-0 1/2"	34 LBS.
TYPE P-4 PARAPET	1'-5 1/2"	1'-3 1/2"	1'-5 1/2"	1'-3 1/2"	1'-3 1/2"	37 LBS.

**NOTES:**

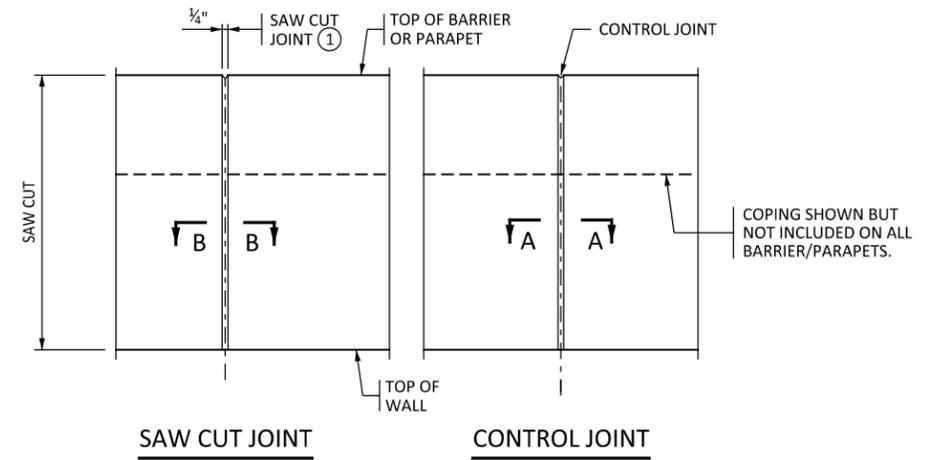
GUARDRAIL CONNECTION TO BE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306.

GALVANIZE PLATE AND PIPES AFTER FABRICATION IN ACCORDANCE WITH SPEC. 3394

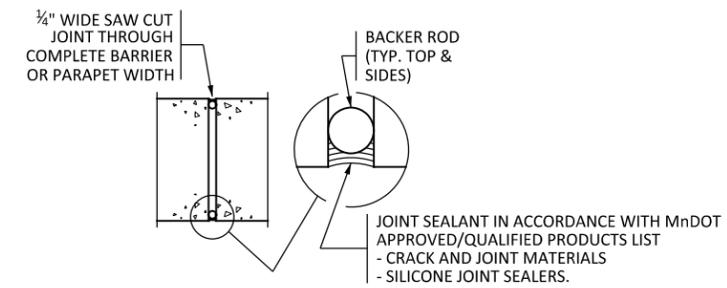
GUARDRAIL CONNECTION IS INCIDENTAL.

- ① REMOVE CONCRETE FROM PIPE ENDS AFTER SLIPFORMING OR FORM REMOVAL.
- ② SEE PIPE LENGTH TABLE.
- ③ 90° FOR VERTICAL PARAPETS.

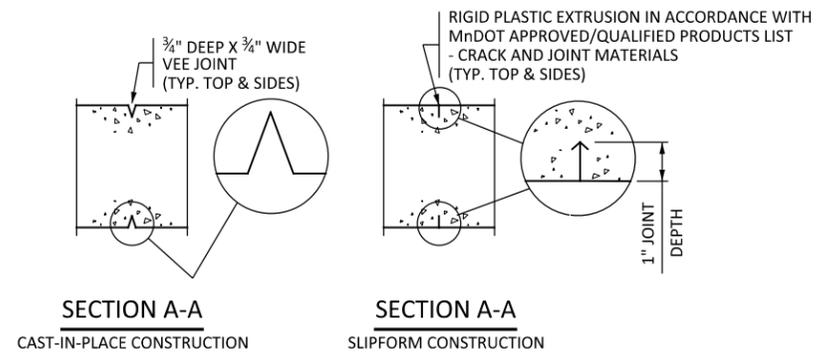
**BARRIER JOINT DETAILS**



**INSIDE ELEVATION OF CONCRETE BARRIER OR PARAPET**



**SECTION B-B**



**CONTROL JOINT DETAILS**

FOR SLIPFORM CONSTRUCTION: IMMEDIATELY AFTER CONCRETE IS PLACED AND WHILE IT IS STILL WET, CREATE A ONE INCH STRAIGHT GROOVE USING A TROWEL. INSERT RIGID PLASTIC EXTRUSION INTO GROOVE TO A DEPTH 1/4" BELOW THE SURFACE; FINISH OVER GROOVE COMPLETELY HIDING THE EXTRUSION.

**NOTES:**

- ① SAWCUT WITHIN 18 HOURS OF PLACEMENT.

LEAD EXPERT OFFICE  
EDWARD LUTGEN  
OFFICE DIRECTOR  
BRIDGE OFFICE

MISCELLANEOUS CONCRETE BARRIER AND PARAPET DETAILS

APPROVED:  
07-15-2024

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

STANDARD PLAN  
5-297.637

2 OF 2

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NO	DATE	BY	CKD	REVISION



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*Rachael Durham*  
RACHAEL DURHAM License # 55461  
DATE 6-17-2025

STATE AID PROJECT NO.  
002-607-032

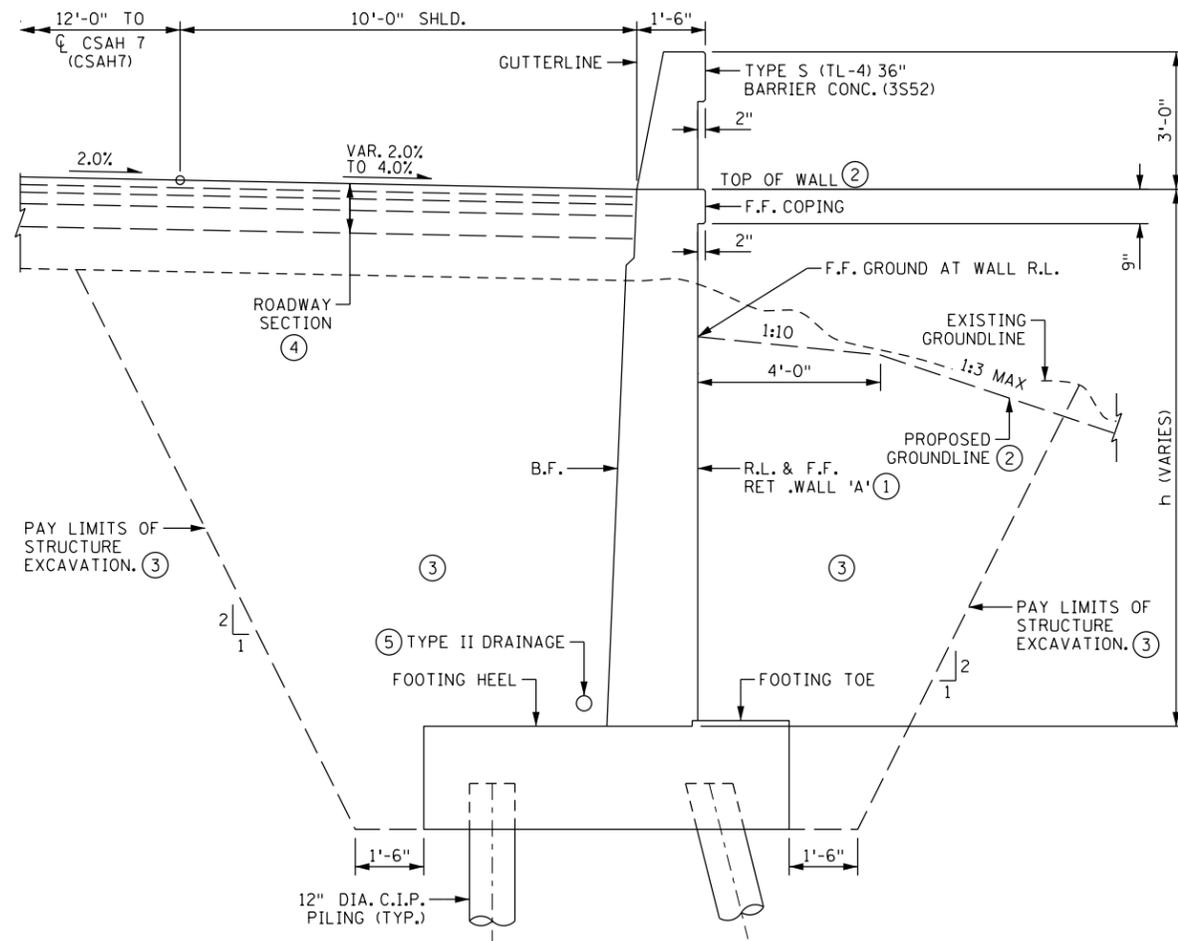
TITLE: RETAINING WALL PLANS  
002-607-032  
MISCELLANEOUS BARRIER DETAILS

DES: C. BLACK DR: C. BLACK  
CHK: R. DURHAM CHK: R. DURHAM

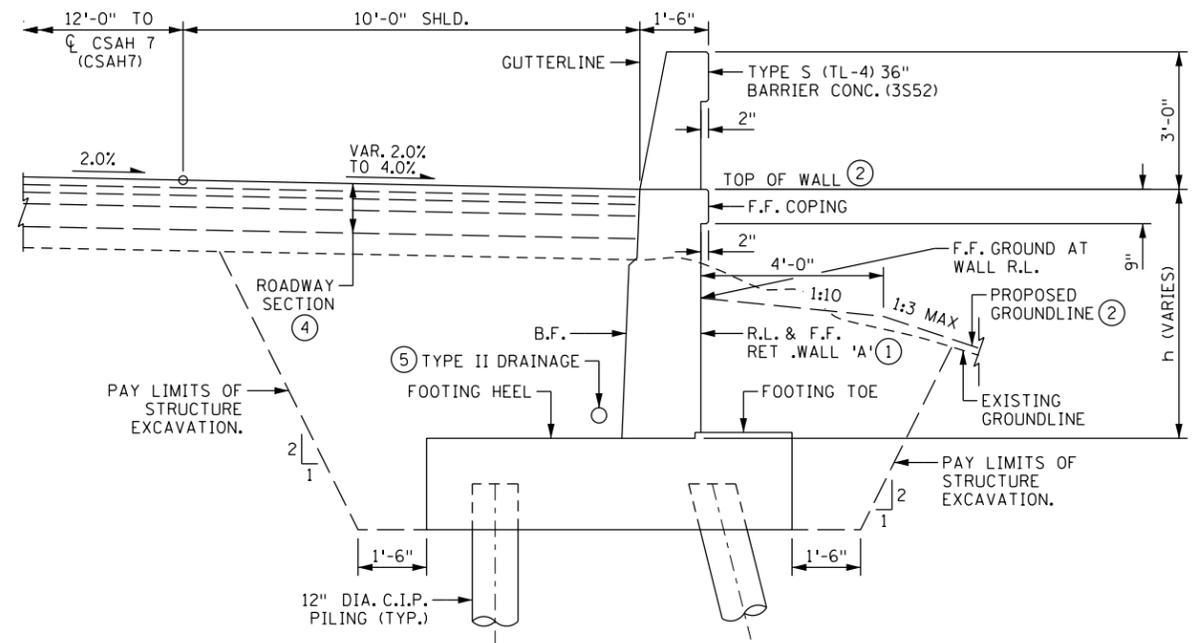
SHEET NO. W13 OF W17 SHEETS

GEOMETRICS FOR RETAINING WALL A

JOINT NUMBER	WALL STATION	COORDINATES		FRONT FACE ELEVATION	TOP OF WALL ELEVATION	BOTTOM OF FOOTING ELEVATION DOWNSTATION	BOTTOM OF FOOTING ELEVATION UPSTATION	TOP OF FOOTING HEEL ELEVATION DOWNSTATION	TOP OF FOOTING HEEL ELEVATION UPSTATION	STEM HEIGHT (h)	PANEL LENGTH	PANEL NUMBER	REMARKS
		X	Y										
1	20+58.36	472666.531	220612.480	887.62	887.62	-	880.73	-	882.73	4.97	30.50	1	PILE FOOTING
2	20+88.86	472687.557	220634.573	886.52	887.70	880.73	880.73	882.73	882.73	5.18	30.50	2	PILE FOOTING
3	21+19.36	472708.500	220656.747	886.21	887.91	880.73	880.73	882.73	882.73	5.55	30.50	3	PILE FOOTING
4	21+49.86	472729.358	220678.999	885.91	888.28	880.73	875.83	882.73	877.83	10.88	30.50	4	PILE FOOTING
5	21+80.36	472750.132	220701.331	885.60	888.71	875.83	-	877.83	-				



TYPICAL SECTION  
(PANEL 4)



TYPICAL SECTION  
(PANELS 1-3)

NOTES:

- F.F. DENOTES FRONT FACE
- B.F. DENOTES BACK FACE
- R.L. DENOTES REFERENCE LINE
- ① FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WINGWALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.
- ② SEE PLAN AND PROFILE SHEETS FOR RETAINING WALL ELEVATIONS AT TOP OF WALL AND PROPOSED FRONT FACE GROUNDLINE.
- ③ SEE MISCELLANEOUS DETAILS FOR FINISHED GRADE AND BACKFILL MATERIAL INFORMATION.
- ④ SEE TYPICAL SECTIONS IN ROADWAY PLANS.
- ⑤ SEE MISCELLANEOUS DETAILS FOR DRAINAGE INFORMATION.

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NO	DATE	BY	CKD	REVISION



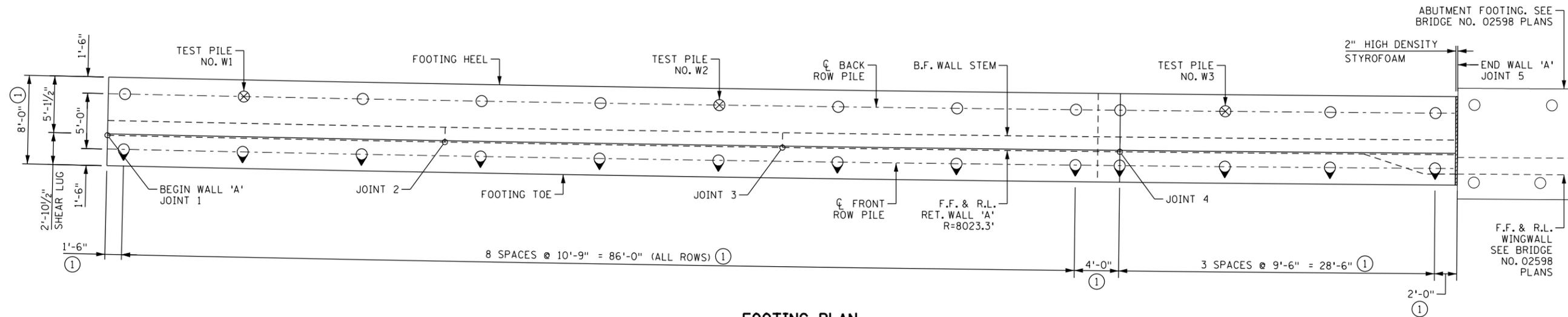
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

*Rachael Durham* 6-17-2025  
RACHAEL DURHAM License # 55461

STATE AID PROJECT NO.  
002-607-032

TITLE: RETAINING WALL PLANS  
002-607-032  
WALL 'A' GEOMETRY

DES: C. BLACK	DR: C. BLACK
CHK: R. DURHAM	CHK: R. DURHAM
SHEET NO. W14 OF W17 SHEETS	



**FOOTING PLAN**

**NOTES:**

F.F. DENOTES FRONT FACE  
 B.F. DENOTES BACK FACE  
 R.L. DENOTES REFERENCE LINE

SEE TABLE ON STANDARD PLAN 5-297.632 FOR REQUIRED NOMINAL PILE BEARING RESISTANCE REQUIREMENTS FOR PILE INSTALLATION.

① FOOTING MEASUREMENTS AND PILE SPACING ARE MEASURED ALONG THE RETAINING WALL REFERENCE LINE.

**PILE NOTES:**

3 - 12" C-I-P TEST PILES, 85 FEET LONG  
 23 - 12" C-I-P PILES, ESTIMATED LENGTH 75 FEET LONG  
 26 - 12" C-I-P PILES REQUIRED FOR RETAINING WALL A.  
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.  
 PILES MARKED THUS SHALL BE BATTERED AS CALLED FOR ON STANDARD SHEET 5-297.632.  
 PILES SHALL HAVE A NOMINAL DIAMETER OF 12" AND A MINIMUM WALL THICKNESS OF 1/4"  
 FOR PILE SPLICE INFORMATION, SEE DETAIL B201 IN BRIDGE NO. 02598 PLANS.

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*Rachael Durham* 6-17-2025  
 RACHAEL DURHAM License # 55461

STATE AID PROJECT NO. 002-607-032

TITLE: RETAINING WALL PLANS  
 002-607-032  
 WALL 'A' FOOTING PLAN

DES: C. BLACK	DR: C. BLACK
CHK: R. DURHAM	CHK: R. DURHAM
<b>SHEET NO. W15 OF W17 SHEETS</b>	

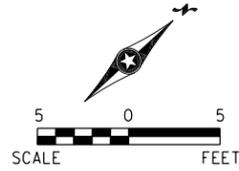


**NOTES:**

F.F. DENOTES FRONT FACE  
 R.L. DENOTES REFERENCE LINE  
 C.J. DENOTES CORK JOINT  
 O.J. DENOTES OPEN JOINT  
 C.D.J. DENOTES CORK AND DOWEL JOINT  
 DENOTES PANEL NUMBER

APPLY SPECIAL SURFACE FINISH TO A MINIMUM  
 OF 2-FEET BELOW THE PROPOSED GROUNDLINE.  
 SEE SHEET W15 FOR WALL FOOTING PLAN.

① 4" DIA. NON-PERFORATED PIPE TO EXTEND VERTICALLY  
 TO BOTTOM OF APPROACH PANEL SILL. CONNECT  
 APPROACH PANEL DRAINAGE INTO WALL DRAINAGE  
 SYSTEM (INCIDENTAL). SEE APPROACH PANEL DETAILS  
 IN STANDARD PLANS.



CSAH 7 (CSAH7)

CONTRACTOR AND UTILITY OWNER TO  
 COORDINATE TEMPORARY RELEASE OF  
 ANCHOR WIRE AND TEMPORARY HOLD  
 OF POWER POLE.

APPROACH PANEL DRAINAGE, SEE  
 DETAILS IN STANDARD PLANS

TYPE II DRAINAGE, OUTLET WALL  
 DRAINAGE BY CONNECTING TO  
 BRIDGE ABUTMENT DRAINAGE

DRAINAGE SYSTEM B910  
 (SEE BR 02598 PLANS)

BEGIN WALL 'A'  
 STA. 20+58.36=  
 C CSAH 7  
 STA. 206+17.67  
 23.33' RT  
 X=472666.531  
 Y=220612.480

FOOTING HEEL

TYPE II DRAINAGE

END CAP

TYPE II DRAINAGE, OUTLET WALL  
 DRAINAGE BY CONNECTING TO  
 BRIDGE ABUTMENT DRAINAGE

DRAINAGE SYSTEM B910  
 (SEE BR 02598 PLANS)

CRASH CUSHION. SEE  
 ROADWAY PLANS

FOOTING TOE

WALL 'A' F.F. AND R.L.

FIBER LINE (TO  
 BE RELOCATED)

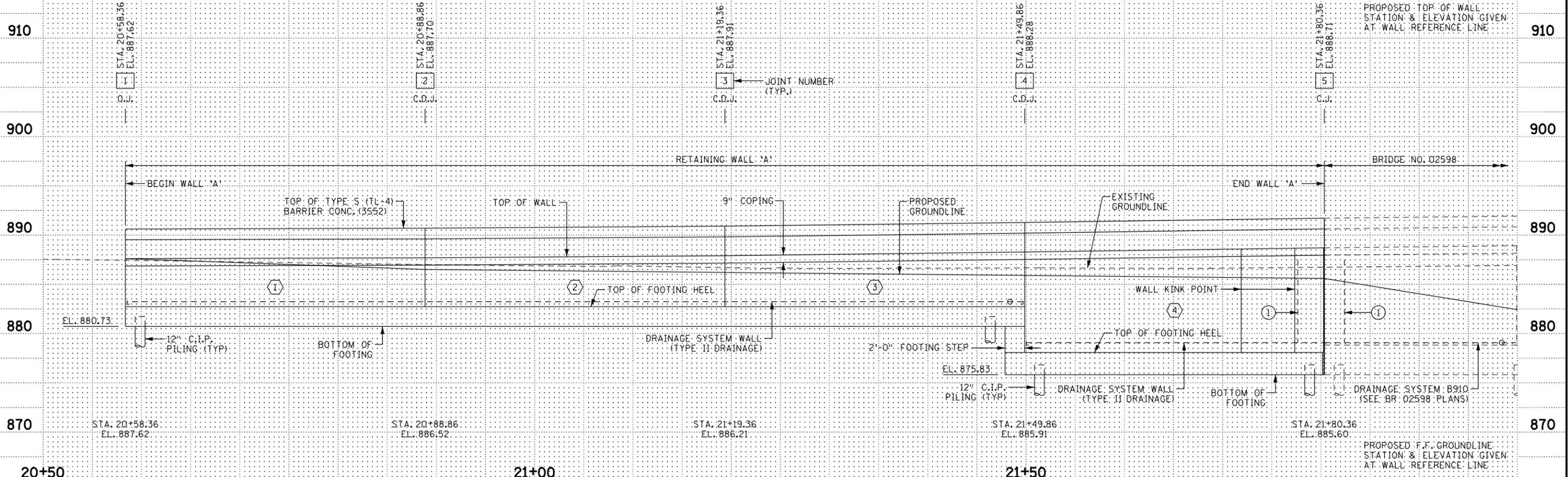
TYPE II DRAINAGE OUTLET  
 TO PRECAST CONCRETE  
 HEADWALL WITH RODENT  
 SCREEN. INCIDENTAL

RET WALL 'A' KINK POINT  
 STA. 21+71.92=  
 C CSAH 7  
 STA. 207+30.90  
 23.33' RT  
 X=472744.393  
 Y=220695.146

RET WALL 'A' KINK POINT  
 STA. 21+77.37  
 1.77' RT=  
 C CSAH 7  
 STA. 207+36.34  
 25.10' RT  
 X=472749.399  
 Y=220697.936

END WALL 'A'  
 STA. 21+80.36=  
 C CSAH 7  
 STA. 207+39.32  
 23.33' RT  
 X=475750.132  
 Y=220701.331

BRIDGE 02598  
 FOOTING



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NO	DATE	BY	CKD	REVISION



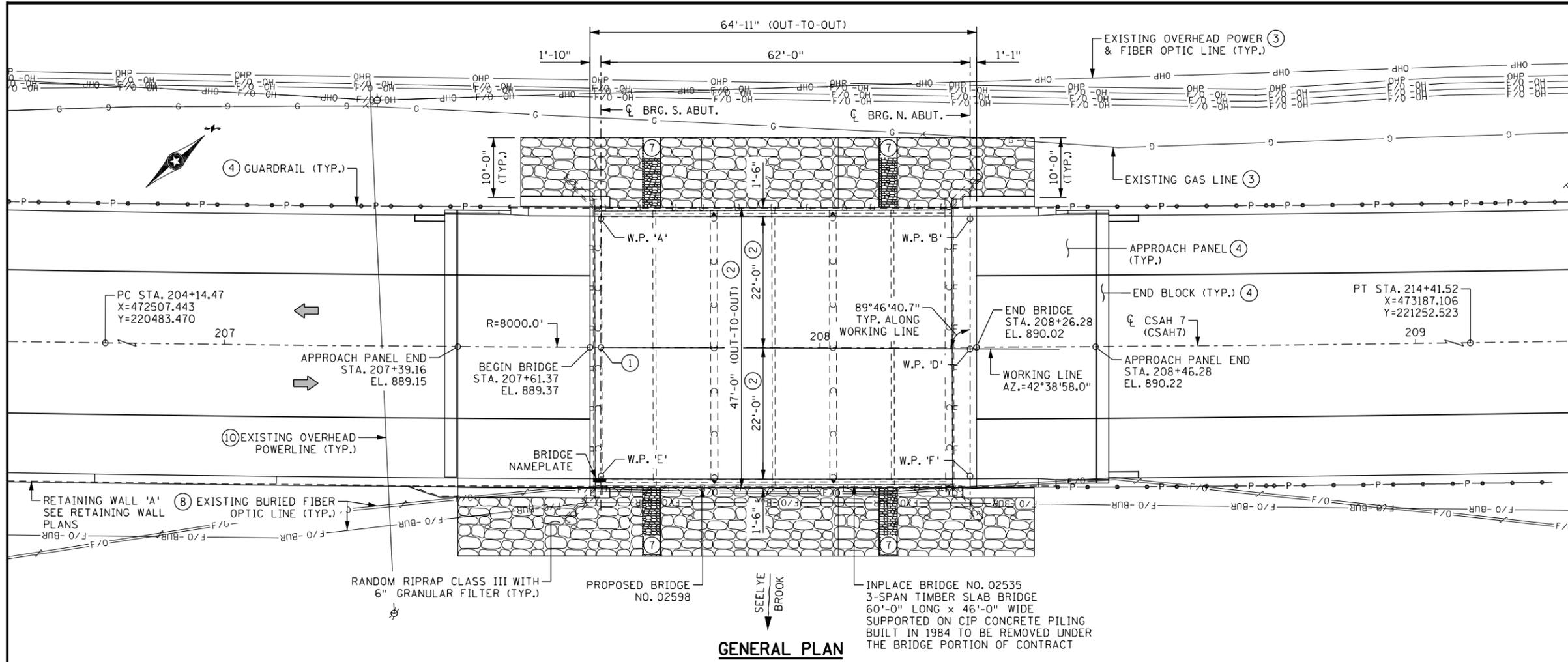
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

*Rachael Durham*  
 RACHAEL DURHAM License # 55461  
 DATE 6-17-2025

STATE AID PROJECT NO.  
 002-607-032

TITLE: RETAINING WALL PLANS  
 002-607-032  
 WALL 'A' PLAN & PROFILE

DES: C. BLACK DR: C. BLACK  
 CHK: R. DURHAM CHK: R. DURHAM  
 SHEET NO. W17 OF W17 SHEETS



### DESIGN DATA

DESIGNED IN ACCORDANCE WITH 2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

HL-93 LIVE LOAD

DEAD LOAD INCLUDES 20 POUNDS PER SQUARE FOOT ALLOWANCE FOR FUTURE WEARING COURSE MODIFICATIONS

MATERIAL DESIGN PROPERTIES:

REINFORCED CONCRETE:  
 $f'_c = 4$  KSI CONCRETE  
 $f_y = 60$  KSI PLAIN AND EPOXY COATED BARS  
 $f_y = 75$  KSI STAINLESS STEEL BARS  
 $n = 7.3$  FOR REINFORCEMENT

PRESTRESSED CONCRETE:  
 $f'_c = 9.3$  KSI CONCRETE (MAX.)  
 $f_{pu} = 300$  KSI LOW RELAXATION STRANDS  
 $n = 1$  FOR PRETENSIONING STRANDS  
 $0.72 f_{pu}$  FOR INITIAL PRESTRESS

DESIGN SPEED:  
 OVER = 50 MPH  
 UNDER = N/A

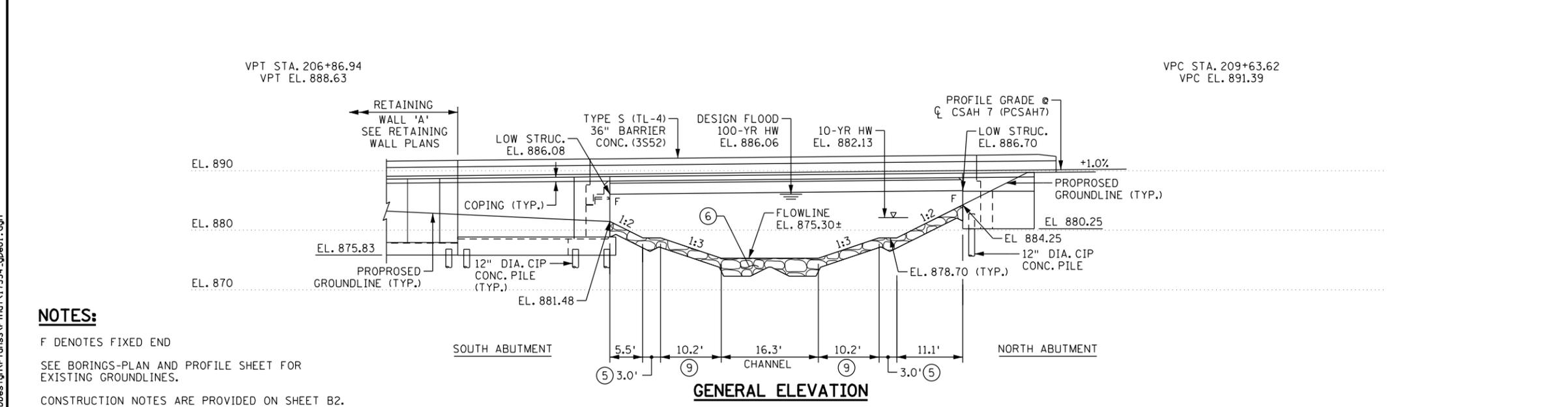
APPROXIMATE DECK AREA = 3052 SQUARE FEET

ROADWAY TRAFFIC VOLUMES:  
 2025 (CURRENT) 2045 (PROJECTED)  
 5750 AADT 8150  
 575 DHV 815  
 175 HCAADT 245

HL-93 LRFR  
 BRIDGE OPERATING RATING FACTOR RF = 1.34

### LIST OF SHEETS

B1	GENERAL PLAN & ELEVATION
B2	TRANSVERSE SECTION & QUANTITIES
B3	BRIDGE LAYOUT
B4 - B7	SOUTH ABUTMENT DETAILS
B8 - B11	SOUTH ABUTMENT REINF. DETAILS
B12 - B13	NORTH ABUTMENT DETAILS
B14 - B16	NORTH ABUTMENT REINF. DETAILS
B17	FRAMING PLAN
B18 - B19	RECTANGULAR PRESTRESSED CONCRETE BEAM DETAILS
B20 - B22	SUPERSTRUCTURE DETAILS
B23 - B24	CONCRETE END DIAPHRAGM DETAILS
B25 - B26	CONCRETE BARRIER DETAILS
B27	RIPRAP SLOPE DETAILS
B28	COVER PLATE DETAILS
B29 - B33	BRIDGE DETAILS
B34	AS-BUILT BRIDGE DATA
B35	BRIDGE SURVEY
B36	BORINGS - PLAN & PROFILE
B37	BORINGS



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Print Name: RACHAEL DURHAM

Signature: *Rachael Durham*

SRF Date 6-13-2025 License # 55461

ANOKA COUNTY

**BRIDGE NO. 02598**

CSAH 7 OVER SEELYE BROOK  
 1.2 MILES SOUTH OF JCT. CSAH 24

62'-0" PRESTRESSED CONC. BEAM SPAN,  
 44'-0" ROADWAY, .00°13'19.3" SKEW,  
 TWO TYPE S, TL-4 CONC. BARRIERS,

BRIDGE I.D. NO. 501

**GENERAL PLAN & ELEVATION**

SEC. 7 T 33 N R 24 W  
 CITY OF OAK GROVE ANOKA COUNTY

Joe MacPherson  
 Date: 2025.06.16 09:22:34 -0500  
 06/16/2025

APPROVED: ANOKA COUNTY ENGINEER DATE  
*Edward A. Lutgen*  
 State Bridge Engineer Digitally signed by Edward Lutgen  
 Date: 2025.06.20 10:06:56 -0500 DATE

- ### NOTES:
- F DENOTES FIXED END
- SEE BORINGS-PLAN AND PROFILE SHEET FOR EXISTING GROUNDLINES.
- CONSTRUCTION NOTES ARE PROVIDED ON SHEET B2.
- CONTROL POINT & W.P. 'C':  
 C. CSAH 7 (CSAH7)  
 STA. 207+63.20  
 C. BRG. S. ABUT.  
 X=472749.223  
 Y=220734.732  
 EL. 889.39
  - MEASURED PERPENDICULAR TO ROADWAY CENTERLINE.
  - TO REMAIN. SEE UTILITY PLANS.
  - SEE GRADING PLANS FOR INFORMATION.
  - PASSAGE BENCH (LEVEL) WITH AGGREGATE SURFACING SPECIAL. SEE RIPRAP DETAILS SHEET.
  - RANDOM RIPRAP CLASS III WITH 6" GRANULAR FILTER (TYP.)
  - TRANSITION PASSAGE BENCH INTO EXISTING GRADE AWAY FROM THE BRIDGE AND WITHIN THE RIGHT-OF-WAY AS INSTRUCTED BY THE CONSTRUCTION ENGINEER.
  - TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION. SEE UTILITY PLANS.
  - FILL VOIDS IN RIPRAP WITH AGGREGATE SURFACING SPECIAL TO PROVIDE FOR ADDITIONAL WILDLIFE PASSAGE.
  - CONTRACTOR AND UTILITY OWNER TO COORDINATE TEMPORARY RELEASE OF ANCHOR WIRE AND TEMPORARY HOLD OF POWER POLE.

**B.M. ELEVATION 911.412 (NAVD88)**

BENCH MARK 1 ELEVATION: 911.412 (NAVD88) (ADJUST 2016)  
 1.8 MI SW OF ST. FRANCIS, 0.8 MI S OF THE JCT OF CR 24 (NORRIS LAKE RD NW) AND TH 47 (SAINT FRANCIS BLVD NW) IN OAK GROVE, AT TH 47 MILEPOINT 32.8, 39.0 FT SE OF TH 47, 18.0 FT E OF THE SE LEG OF A STREET SIGN, 6.0 FT E OF A POWER POLE WITH 2 GUY WIRES, 0.5 FT W OF A WITNESS POST.

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**CONSTRUCTION NOTES**

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

SEE SPECIAL PROVISIONS FOR ALL XXXX.6XX SERIES PAY ITEMS FOR ADDITIONAL REQUIREMENTS.

BAR SIZES SHOWN IN THIS PLAN ARE IN US CUSTOMARY DESIGNATIONS.

PROVIDE EPOXY COATED BARS MARKED WITH THE SUFFIX "E" IN ACCORDANCE WITH SPEC. 3301.

PROVIDE STAINLESS STEEL BARS MARKED WITH THE SUFFIX "S" IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

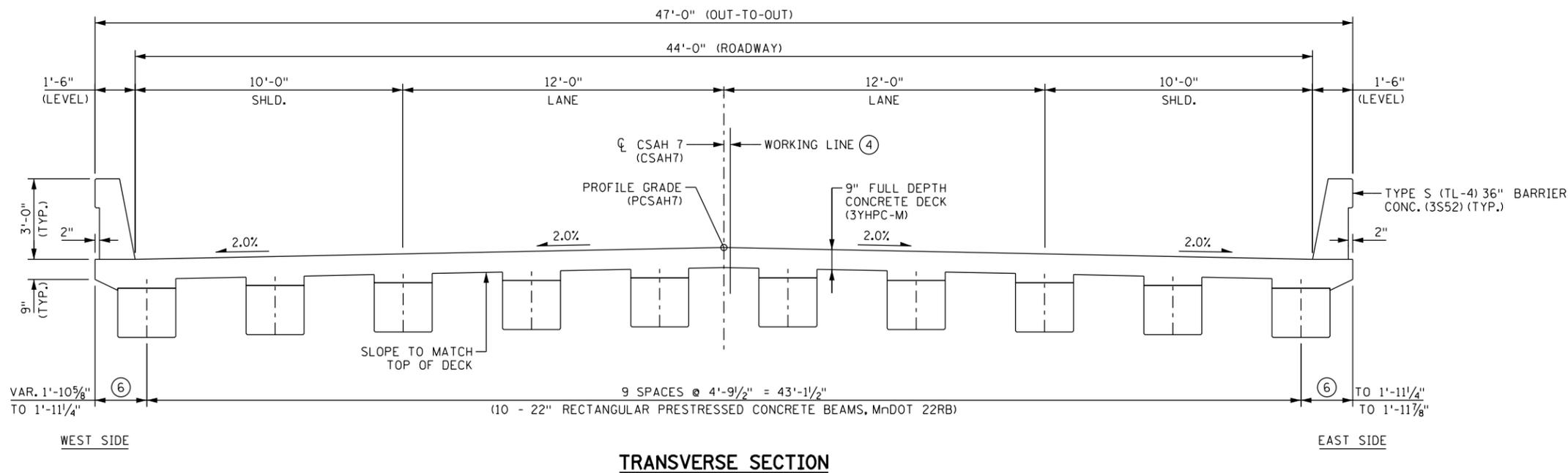
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

THE GIRDERS HAVE BEEN DESIGNED AND DETAILED WITHOUT DIAPHRAGMS. CONTRACTOR'S ENGINEER TO DESIGN, AND CONTRACTOR TO CONSTRUCT A TEMPORARY BRACING SYSTEM AND/OR A DECK FALSEWORK/FORMWORK SYSTEM. PROVIDE A SYSTEM WITH LATERAL AND ROTATIONAL STABILITY OF THE GIRDERS TO RESIST UNSYMMETRICAL CONCRETE AND CONSTRUCTION LOADS UNTIL THE DECK CONCRETE HAS ATTAINED A MINIMUM STRENGTH OF 2800 PSI.

**SCHEDULE OF QUANTITIES FOR ENTIRE BRIDGE NO. 02598**

ITEM NO.	ITEM	UNIT	QUANTITY
2104.507	REMOVE GROUTED RIPRAP	CU YD	208
2104.601	REMOVE REGULATED WASTE MATERIAL (BRIDGE)	LUMP SUM	1
2118.609	AGGREGATE SURFACING SPECIAL	TON	26
2401.503	TYPE S (TL-4) 36" BARRIER CONC (3S52)	LIN FT	192 (P)
2401.507	STRUCTURAL CONCRETE (1G52)	CU YD	74 (P)
2401.507	STRUCTURAL CONCRETE (3B52)	CU YD	118 (P)
2401.508	REINFORCEMENT BARS	POUND	5500 (P)
2401.508	REINFORCEMENT BARS (EPOXY COATED)	POUND	32620 (P)
2401.508	REINFORCEMENT BARS (STAINLESS-75KSI)	POUND	520 (P)
2401.518	BRIDGE SLAB CONCRETE (3YHPC-M)	SQ FT	3052 (P)
⑦	2401.601 STRUCTURE EXCAVATION	LUMP SUM	1
	2401.601 FOUNDATION PREPARATION	LUMP SUM	1
②	2401.618 BRIDGE DECK PLANING	SQ FT	4430 (P)
	2402.502 ELASTOMERIC BEARING PAD	EACH	10
	2402.502 BEARING ASSEMBLY	EACH	10
	2405.503 PRESTRESSED CONCRETE BEAMS 22RB	LIN FT	633 (P)
① ⑤	2442.501 REMOVE EXISTING BRIDGE	LUMP SUM	1
	2452.502 C-I-P CONC TEST PILE 85 FT LONG 12"	EACH	2
⑤	2452.502 PILE ANALYSIS	EACH	2
	2452.502 PILE POINTS 12"	EACH	28
	2452.503 C-I-P CONCRETE PILING 12"	LIN FT	1950
	2502.501 DRAINAGE SYSTEM TYPE (B910)	LUMP SUM	1
③	2511.507 RANDOM RIPRAP CLASS III	CU YD	328

SEE SPECIAL PROVISIONS DIVISION SB FOR ALL XXXX.6XX SERIES PAY ITEMS FOR ADDITIONAL REQUIREMENTS, UNLESS NOTED OTHERWISE.



**NOTES:**

- ① REMOVE EXISTING PILE AT ABUTMENTS AND PIERS TO AT LEAST 1-FOOT BELOW THE EXISTING OR PROPOSED FOOTING OR 3-FEET BELOW PROPOSED FINISHED GRADE, WHICHEVER IS LOWER.
- ② QUANTITY INCLUDES APPLICATION TO BRIDGE DECK AND APPROACH PANELS.
- ③ ITEM INCLUDES GRANULAR FILTER BELOW RIPRAP.
- ④ VARIES 0'-0" AT SOUTH ABUTMENT BEARING LINE. TO 0'-2 7/8" AT NORTH ABUTMENT BEARING LINE.
- ⑤ ITEM IS NON-PARTICIPATING FOR BRIDGE BOND FUNDS.
- ⑥ DIMENSIONS ARE SHOWN MEASURED ALONG THE CENTERLINE OF BEARING AT ABUTMENTS.
- ⑦ SEE SPECIAL PROVISIONS FOR PAYMENT FOR MEASURES TO CONTROL GROUNDWATER.

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NO	DATE	BY	CKD	APPR	REVISION

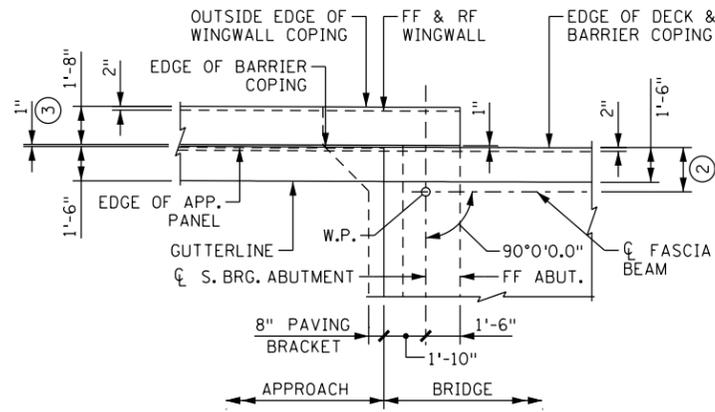
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-18-2025 License # 55461

STATE AID PROJECT NO. 002-607-032  
 BRIDGE NO. **02598**  
 DRAWN BY J. HOFFMAN  
 DESIGNED BY R. DURHAM  
 CHECKED BY C. BLACK  
 COMM. NO. 17554

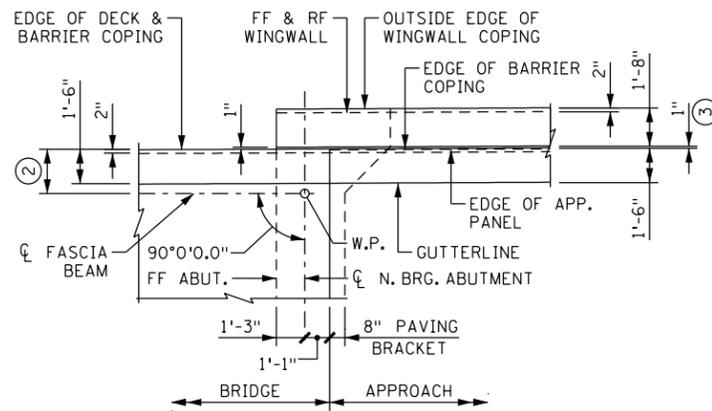


**ANOKA COUNTY**  
 TRANSVERSE SECTION & QUANTITIES  
 CSAH 7 OVER SEELYE BROOK

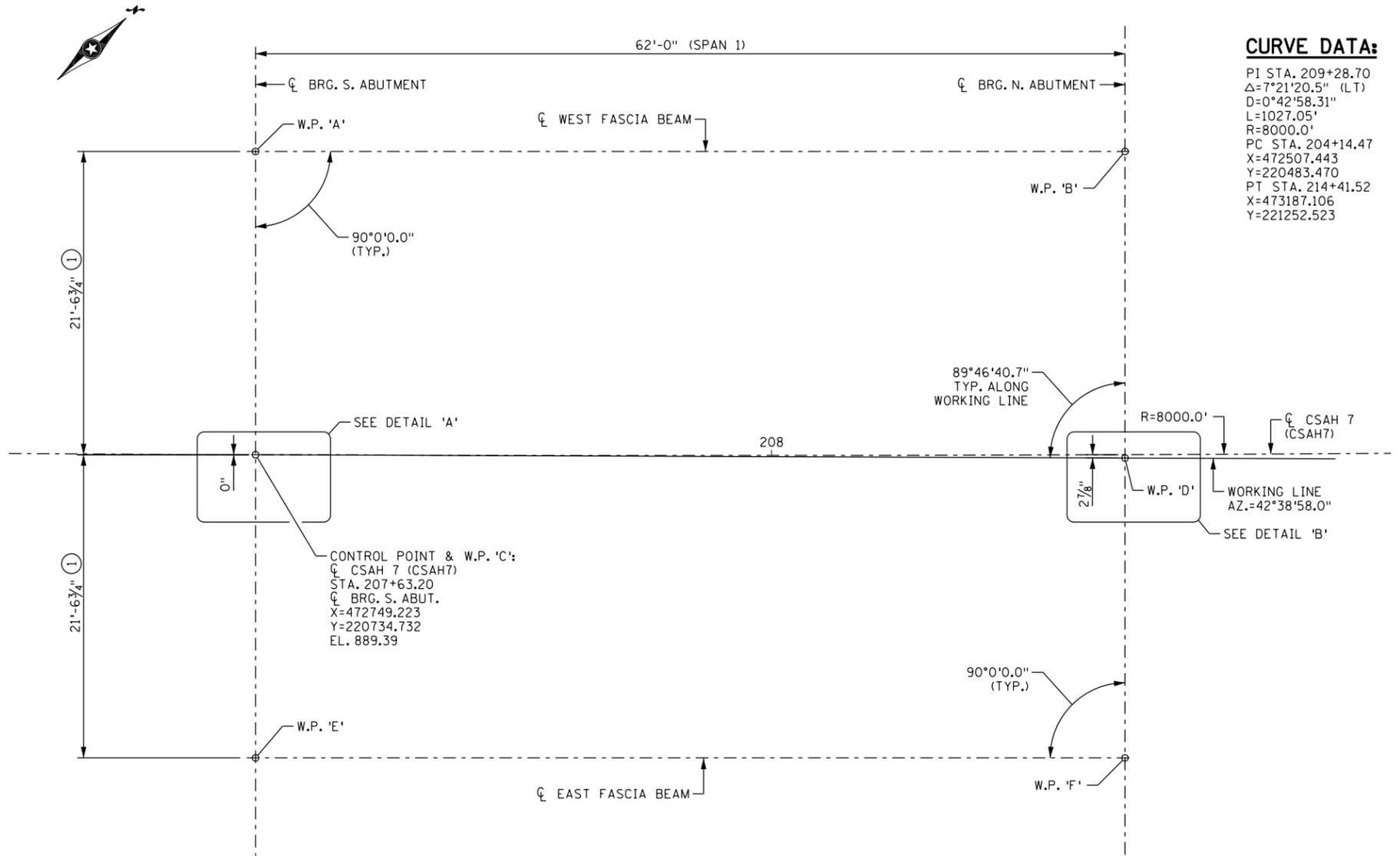
**SHEET B2 OF B37**



**SW CORNER DETAIL**  
(SE CORNER SIMILAR)



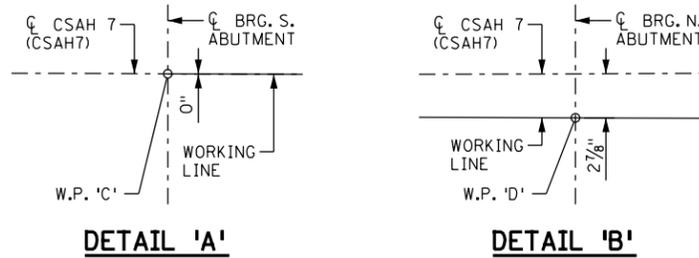
**NW CORNER DETAIL**  
(NE CORNER SIMILAR)



**CURVE DATA:**

PI STA. 209+28.70  
 $\Delta=7^{\circ}21'20.5''$  (LT)  
 $D=0^{\circ}42'58.31''$   
 $L=1027.05'$   
 $R=8000.0'$   
 PC STA. 204+14.47  
 $X=472507.443$   
 $Y=220483.470$   
 PT STA. 214+41.52  
 $X=473187.106$   
 $Y=221252.523$

**WORKING POINT LAYOUT**



TOP OF ROADWAY TO BRIDGE SEAT						
	SLAB THICKNESS	STOOL HEIGHT	BEAM HEIGHT	BEARING HEIGHT	TOTAL	
					INCHES	FEET
SOUTH ABUTMENT	9"	3 1/2"	22"	3 1/4"	37 3/4"	3.15'
NORTH ABUTMENT	9"	3 1/2"	22"	1/2"	35"	2.92'

DIMENSIONS BETWEEN WORKING POINTS										ELEVATION			
POINT	STATION	X-COORDINATE	Y-COORDINATE	A	B	C	D	E	F	TOP OF FIN. DECK	FIN. DECK TO BR. SEAT	BRIDGE SEAT	POINT
A	207+63.11	472733.307	220749.280		62.00		65.72	43.13		888.96	3.15	885.81	A
B	208+25.28	472775.136	220795.044			65.64	21.80	75.52	43.13	889.58	2.92	886.66	B
C	207+63.20	472749.223	220734.732						65.64	889.39	-	-	C
D	208+25.20	472791.229	220780.335					65.56	21.32	890.01	-	-	D
E	207+63.28	472765.139	220720.185						62.00	888.96	3.15	885.81	E
F	208+25.12	472806.968	220765.949							889.58	2.92	886.66	F

**NOTES:**

- FF DENOTES FRONT FACE  
RF DENOTES REFERENCE LINE
- ① MEASURED ALONG CENTERLINE OF BEARING TO CENTERLINE OF ROADWAY AT SOUTH AND NORTH ABUTMENTS.
- ② 1'-11 1/4" MEASURED AT CENTERLINE OF BEARING.
- ③ DIMENSION SHOWN IS FROM EDGE OF PARAPET COPING TO BACK FACE OF WINGWALL. DIMENSION IS 1/2" FROM EDGE OF APPROACH PANEL TO BACK FACE OF WINGWALL. SEE FIG. 5-297.223 IN THE APPROACH PANEL DETAILS.

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NO	DATE	BY	CKD	APPR	REVISION

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 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
002-607-032  
 BRIDGE NO.  
**02598**  
 COMM. NO. 17554



**ANOKA COUNTY**  
 BRIDGE LAYOUT  
**CSAH 7 OVER SEELYE BROOK**

**SHEET B3 OF B37**

**SUMMARY OF QUANTITIES: SOUTH ABUTMENT**

ITEM	UNIT	QUANTITY
REMOVE GROUDED RIPRAP	CU YD	104
AGGREGATE SURFACING SPECIAL	TON	13
STRUCTURAL CONCRETE (1G52)	CU YD	74
STRUCTURAL CONCRETE (3B52)	CU YD	69
REINFORCEMENT BARS	POUND	5500
REINFORCEMENT BARS (EPOXY COATED)	POUND	8480
C-I-P CONC TEST PILE 85 FT LONG 12"	EACH	1
PILE ANALYSIS	EACH	1
PILE POINTS 12"	EACH	21
C-I-P CONCRETE PILING 12"	LIN FT	1500
RANDOM RIPRAP CLASS III	CU YD	164

**SOUTH ABUTMENT  
REQUIRED NOMINAL PILE BEARING  
RESISTANCE FOR CIP PILES  
R<sub>n</sub> - TONS/PILE**

FIELD CONTROL METHOD	Φ <sub>dyn</sub>	** R <sub>n</sub>
MnDOT PILE FORMULA 2012 (MPF12) $R_n = 20 \sqrt{\frac{W \times H}{1000}} \times \text{LOG}(\frac{10}{S})$	0.50	197.0
PDA	0.65	151.5

\*\* R<sub>n</sub> = (FACTORED DESIGN LOAD) / Φ<sub>dyn</sub>

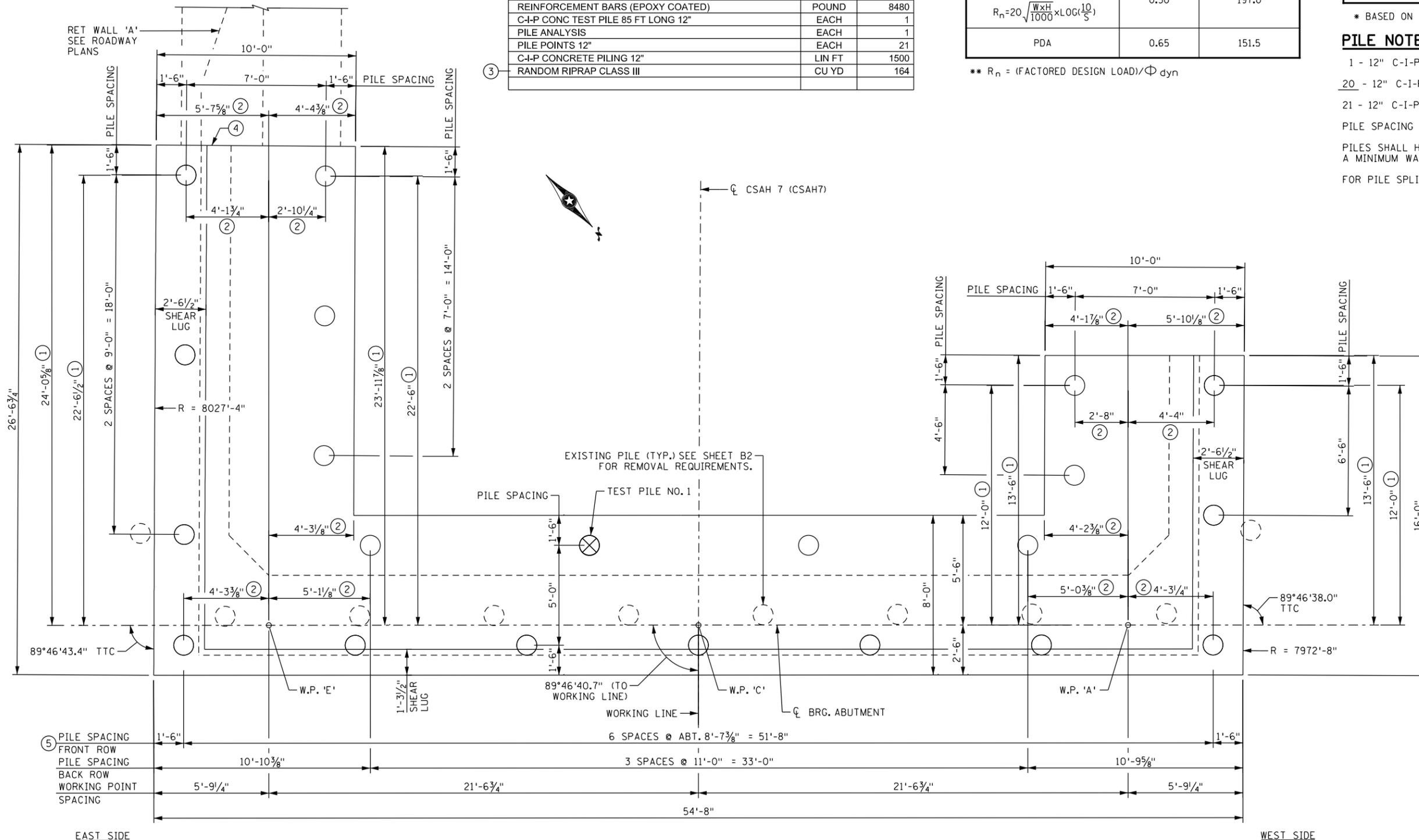
**SOUTH ABUTMENT  
COMPUTED PILE LOAD - TONS/PILE**

FACTORED DEAD LOAD + EARTH PRESSURE	76.2
FACTORED LIVE LOAD	22.3
* FACTORED DESIGN LOAD	98.5

\* BASED ON STRENGTH I LOAD COMBINATION

**PILE NOTES:**

- 1 - 12" C-I-P TEST PILES 85 FEET LONG.
- 20 - 12" C-I-P PILES ESTIMATED LENGTH 75 FEET.
- 21 - 12" C-I-P PILES REQUIRED FOR SOUTH ABUTMENT.
- PILE SPACING SHOWN IS AT BOTTOM OF ABUTMENT.
- PILES SHALL HAVE A NOMINAL DIAMETER OF 12", AND A MINIMUM WALL THICKNESS OF 1/4".
- FOR PILE SPLICE DETAILS SEE DETAIL B201.



**SOUTH ABUTMENT FOOTING PLAN**

**NOTES:**

- FF DENOTES FRONT FACE
- TTC DENOTES TANGENT TO CURVE
- ALL DIMENSIONS MEASURED ALONG EDGE OF FOOTING UNLESS NOTED OTHERWISE.
- ① MEASURED PERPENDICULAR TO CL BEARING SOUTH ABUTMENT.
- ② MEASURED PARALLEL TO CL BEARING SOUTH ABUTMENT.
- ③ ITEM INCLUDES GRANULAR FILTER BELOW RIPRAP.
- ④ SEE WALL 'A' TRANSITION DETAILS IN ROADWAY PLANS FOR JOINT DETAILS.
- ⑤ EXISTING PILE LOCATIONS ARE APPROXIMATE. PER SPEC. 2452.3D.4, THE CONTRACTOR MAY ADJUST PILE LOCATIONS BY UP TO 6" TO AVOID PILE CONFLICTS. SHIFTS GREATER THAN 6" MAY BE ALLOWED IN A DIRECTION PARALLEL TO THE CENTERLINE OF BEARING TO AVOID EXISTING PILE WITH THE APPROVAL OF THE ENGINEER. FOR SHIFTS GREATER THAN 6", THE CONTRACTOR SHALL PROVIDE THE LOCATION OF THE EXISTING PILE IN CONFLICT AND THE PROPOSED PILE ADJUSTMENT TO THE ENGINEER. ADJUSTMENTS THAT LIMIT SPACING BETWEEN PROPOSED ADJACENT FRONT ROW PILES TO A MAXIMUM OF 11'-0" MAY BE CONSIDERED.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-18-2025 License #: 55461

STATE AID PROJECT NO. 002-607-032  
 BRIDGE NO. 02598  
 DRAWN BY E. JOHNSON  
 DESIGNED BY D. PETERSON  
 CHECKED BY R. DURHAM  
 COMM. NO. 17554



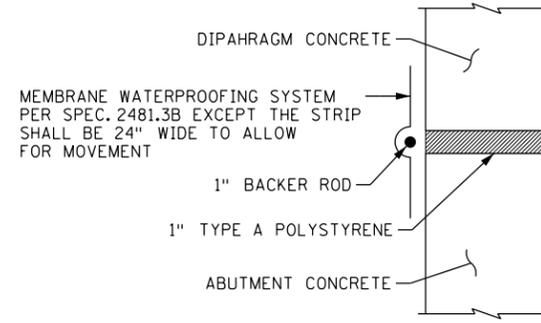
**ANOKA COUNTY**  
 SOUTH ABUTMENT DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 (SHEET 1 OF 4)

**SHEET B4 OF B37**

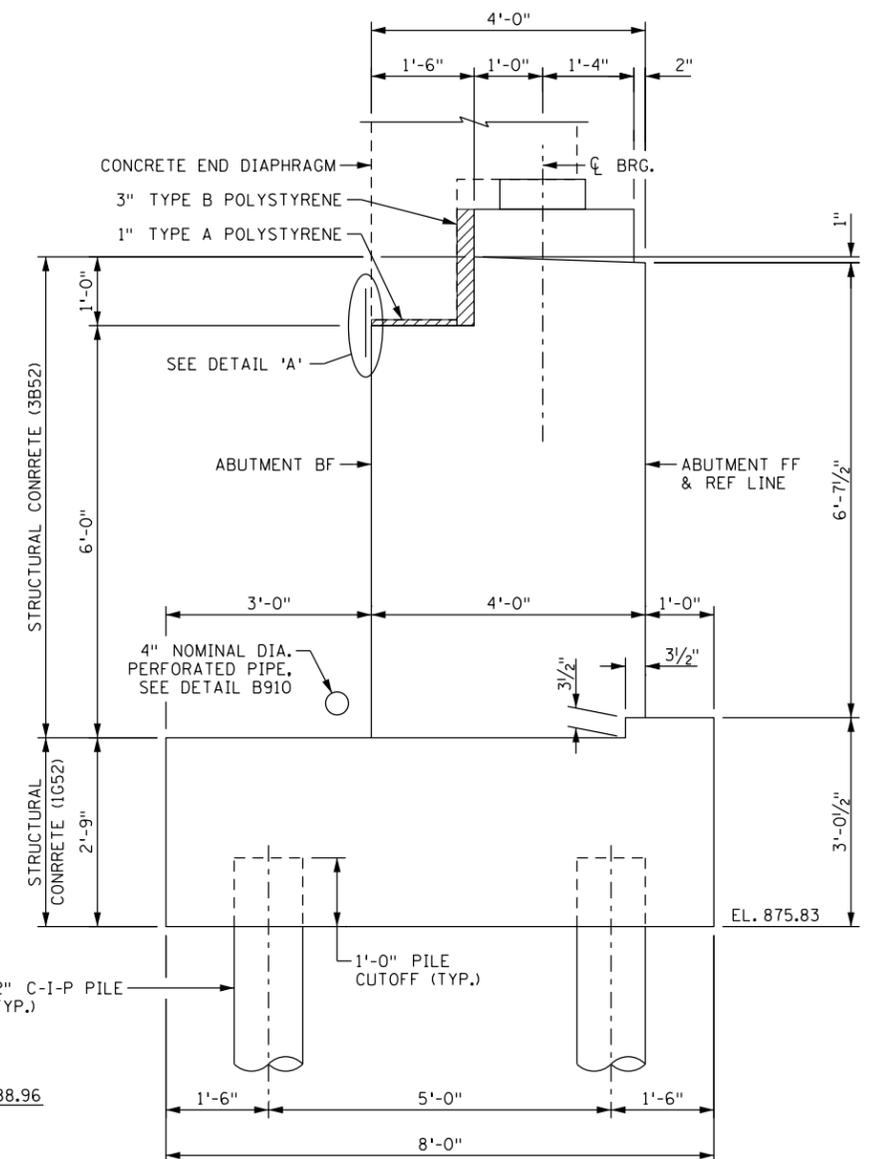
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NO	DATE	BY	CKD	APPR	REVISION

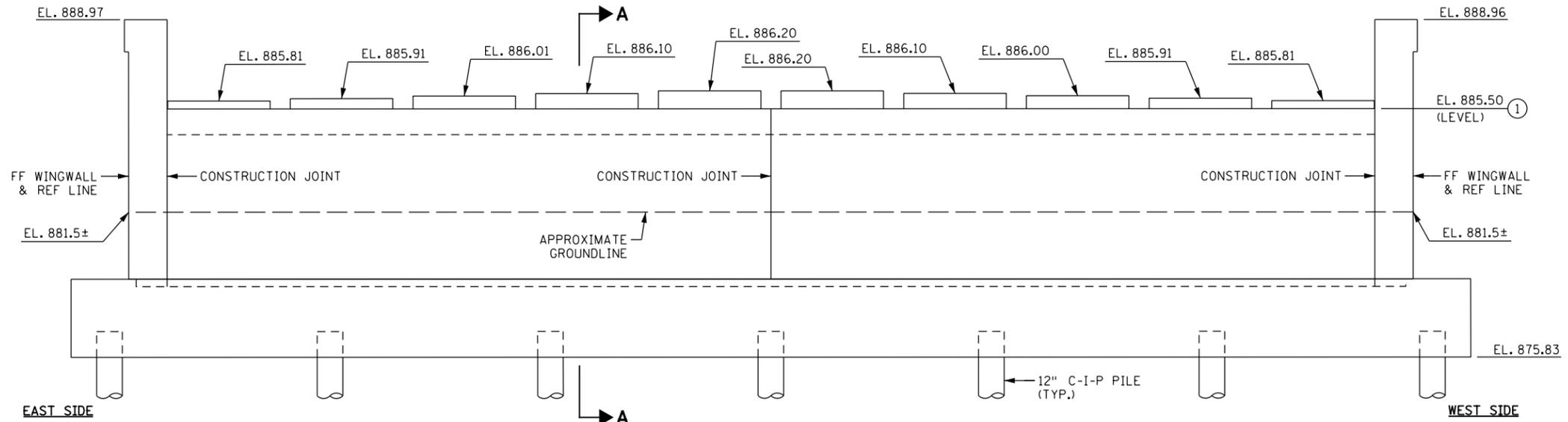




**DETAIL 'A'**



**SECTION A-A**



**SOUTH ABUTMENT ELEVATION**

**NOTES:**  
 FF DENOTES FRONT FACE  
 BF DENOTES BACK FACE  
 REF DENOTES REFERENCE  
 ① ELEVATION AT FRONT FACE OF ABUTMENT.

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NO	DATE	BY	CKD	APPR	REVISION

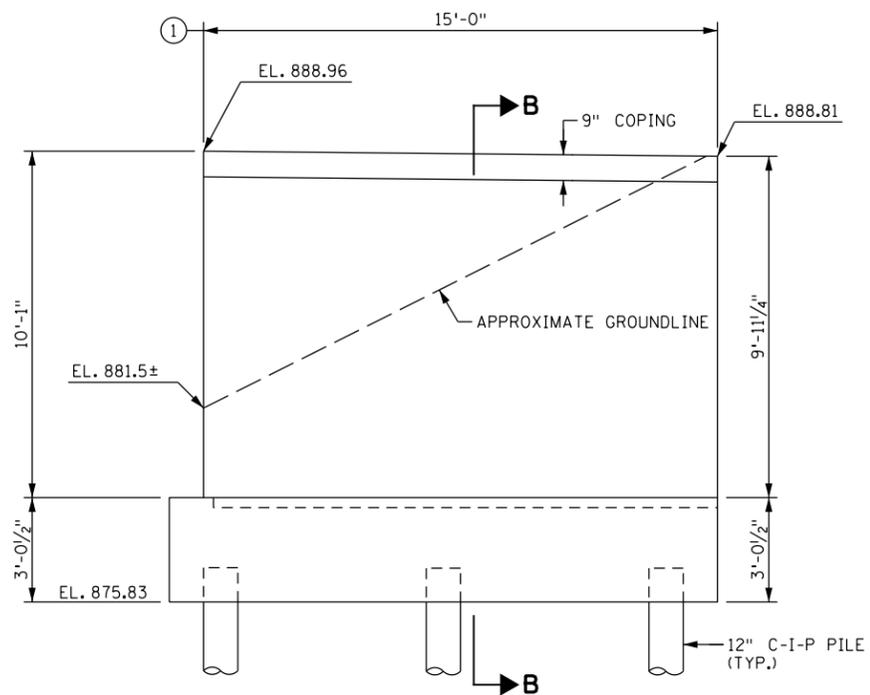
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*Rachael Durham*  
 Date: 6-13-2025 License # 55461

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D. PETERSON  
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R. DURHAM  
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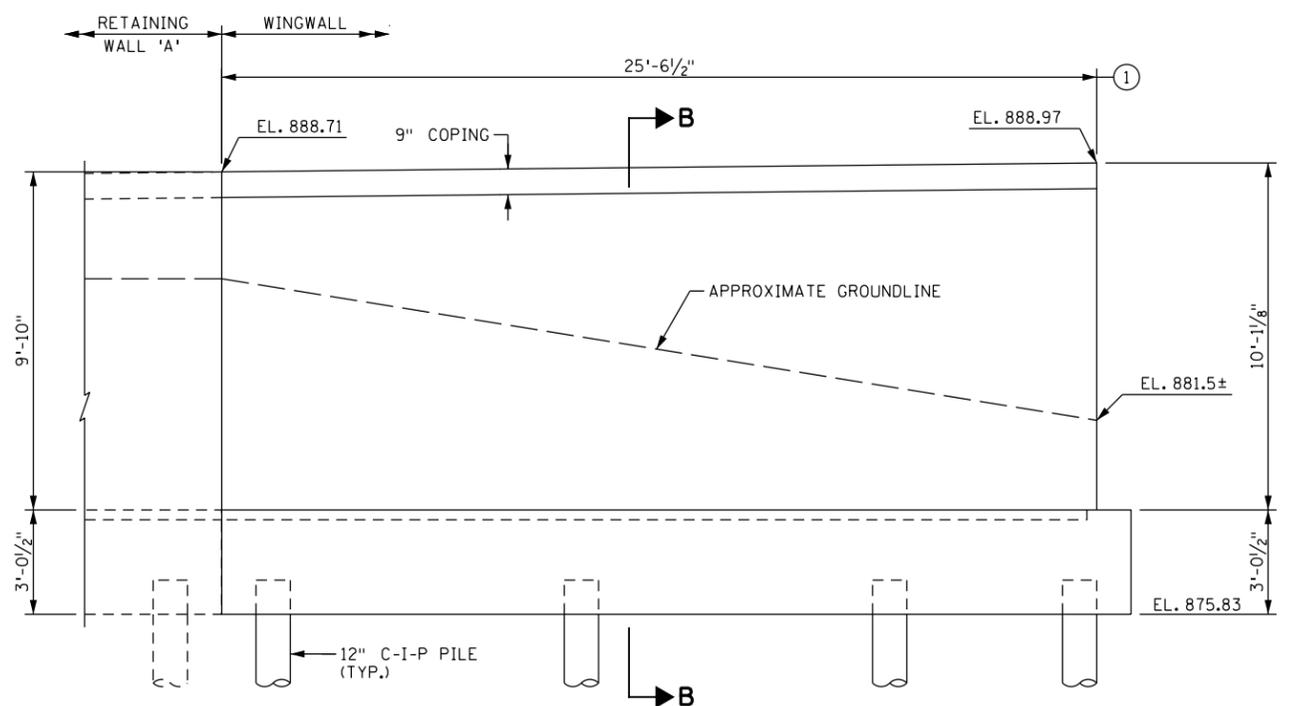


**ANOKA COUNTY**  
 SOUTH ABUTMENT DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 (SHEET 3 OF 4)

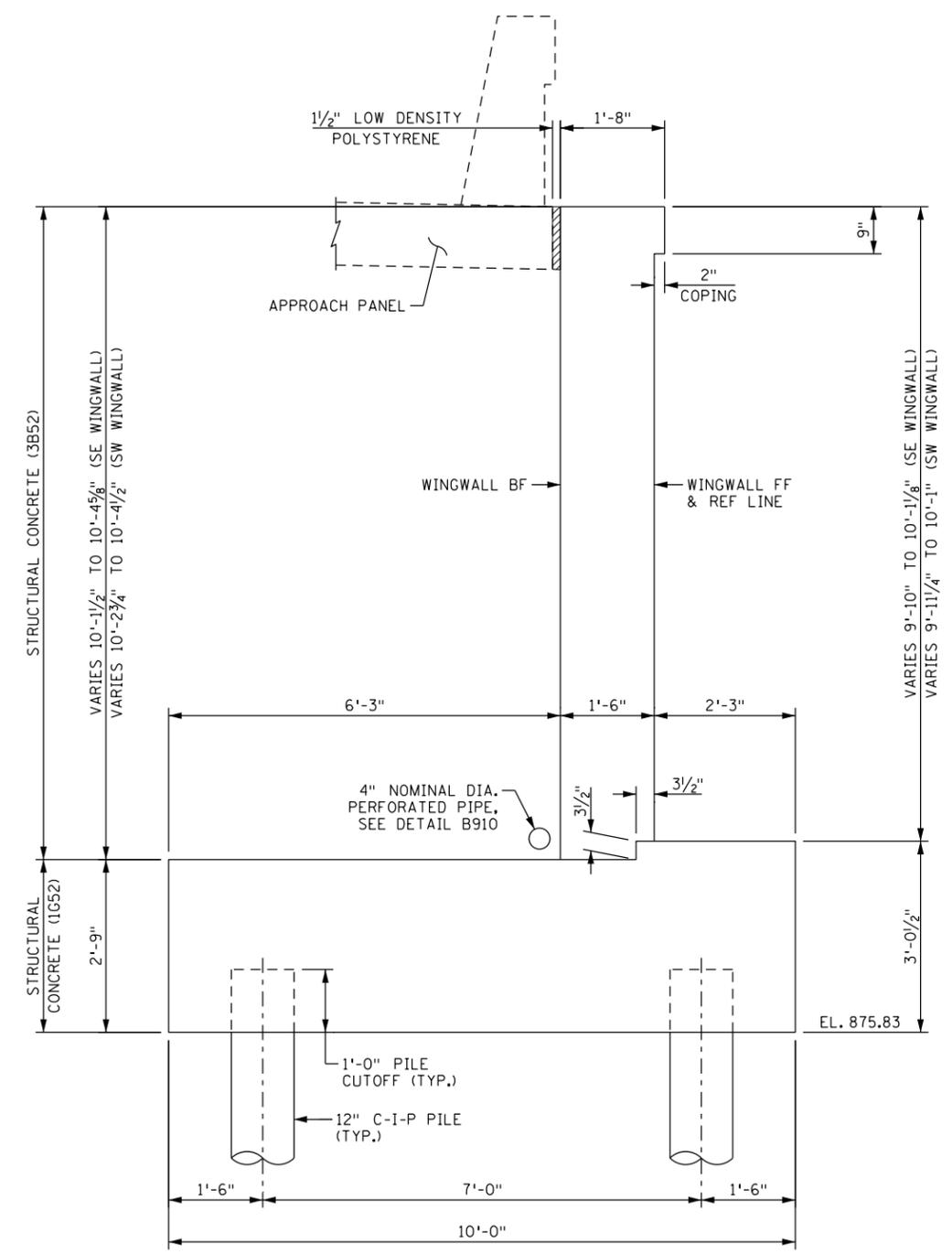
**SHEET**  
**B6**  
**OF**  
**B37**



**SOUTHWEST WINGWALL ELEVATION**



**SOUTHEAST WINGWALL ELEVATION**



**SECTION B-B**

**NOTES:**  
 FF DENOTES FRONT FACE  
 BF DENOTES BACK FACE  
 REF DENOTES REFERENCE  
 ① MEASURED ALONG WINGWALL REFERENCE LINE.

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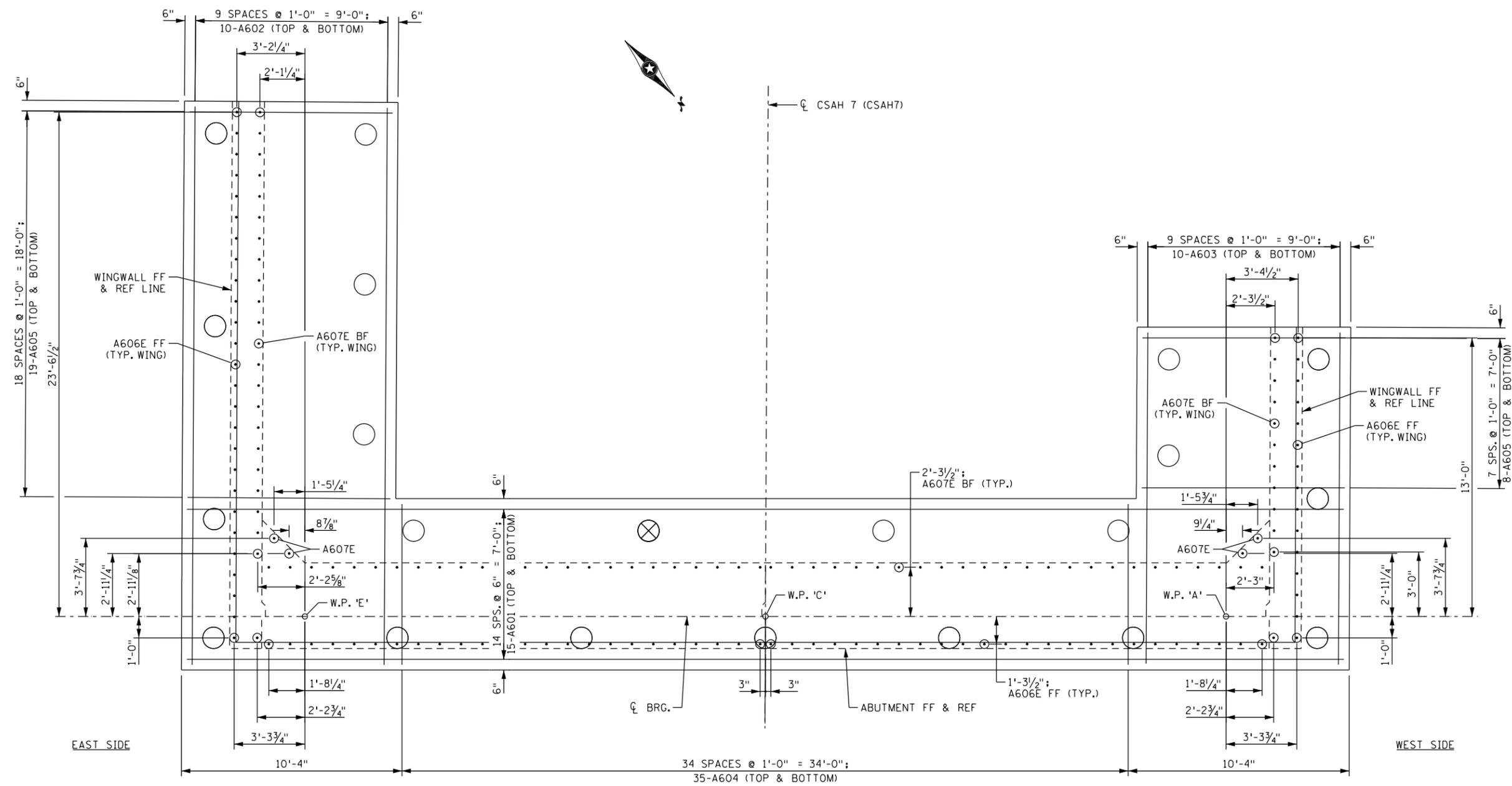
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*Rachael Durham*  
 Date: **6-13-2025** License #: **55461**

STATE AID PROJECT NO.  
**002-607-032**  
 BRIDGE NO.  
**02598**  
 DRAWN BY  
 E. JOHNSON  
 DESIGNED BY  
 D. PETERSON  
 CHECKED BY  
 R. DURHAM  
 COMM. NO. 17554



**ANOKA COUNTY**  
 SOUTH ABUTMENT DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 (SHEET 4 OF 4)

**SHEET B7 OF B37**



**SOUTH ABUTMENT FOOTING REINFORCEMENT PLAN**

**NOTES:**  
 FF DENOTES FRONT FACE  
 BF DENOTES BACK FACE  
 REF DENOTES REFERENCE

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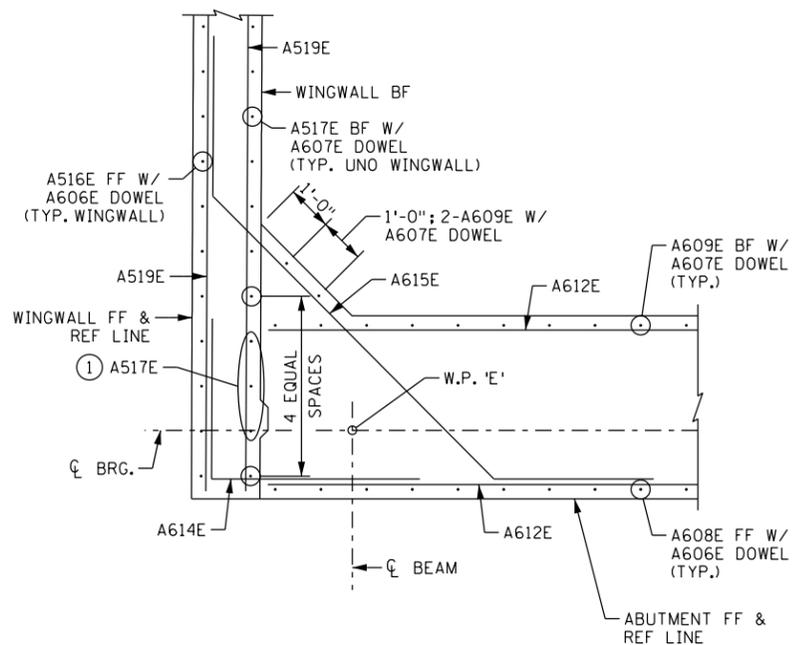
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*Rachael Durham*  
 Date: 6-13-2025 License # 55461

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 002-607-032  
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**02598**  
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 COMM. NO. 17554

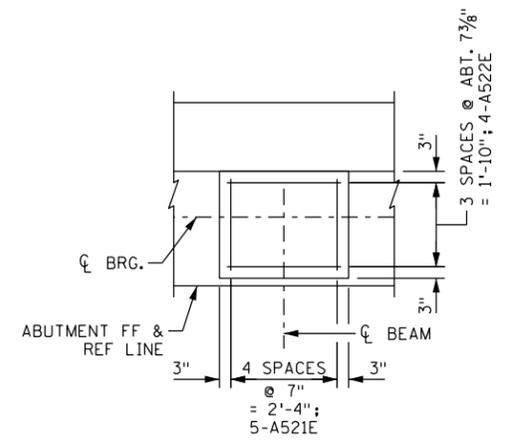


**ANOKA COUNTY**  
 SOUTH ABUTMENT REINFORCEMENT DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 (SHEET 1 OF 4)

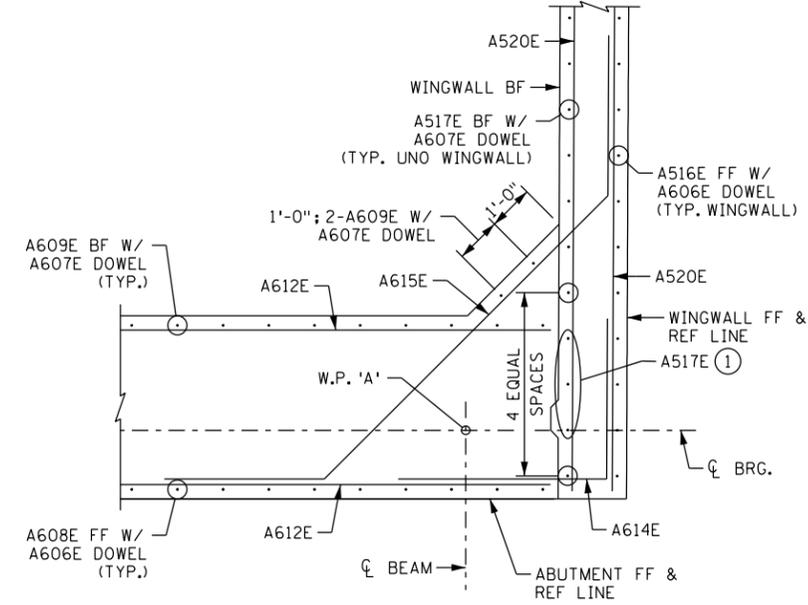
**SHEET**  
**B8**  
**OF**  
**B37**



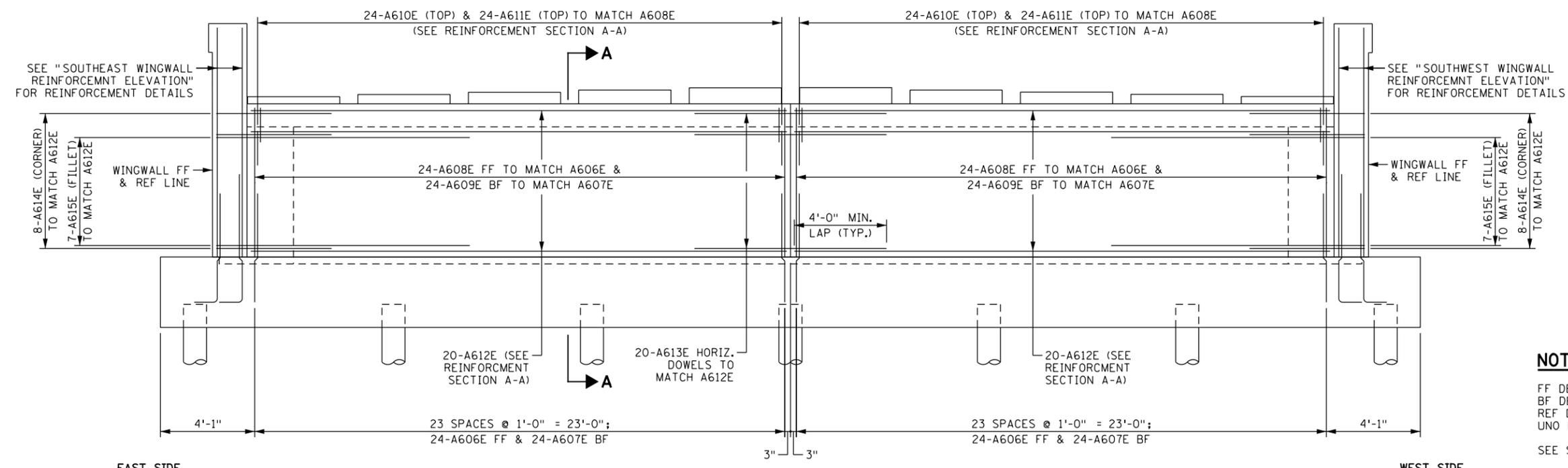
**SOUTHEAST CORNER REINFORCEMENT DETAIL**



**BRIDGE SEAT TYPE 1 REINFORCEMENT DETAIL**



**SOUTHWEST CORNER REINFORCEMENT DETAIL**



**SOUTH ABUTMENT REINFORCEMENT ELEVATION**

**NOTES:**  
 FF DENOTES FRONT FACE  
 BF DENOTES BACK FACE  
 REF DENOTES REFERENCE  
 UNO DENOTES UNLESS NOTED OTHERWISE  
 SEE SHEET B11 FOR SECTION A-A.  
 SEE SHEET B10 FOR SOUTHEAST AND SOUTHWEST WINGWALL REINFORCEMENT ELEVATION.  
 ① SET A517E ON TOP OF FOOTING.

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NO	DATE	BY	CKD	APPR	REVISION

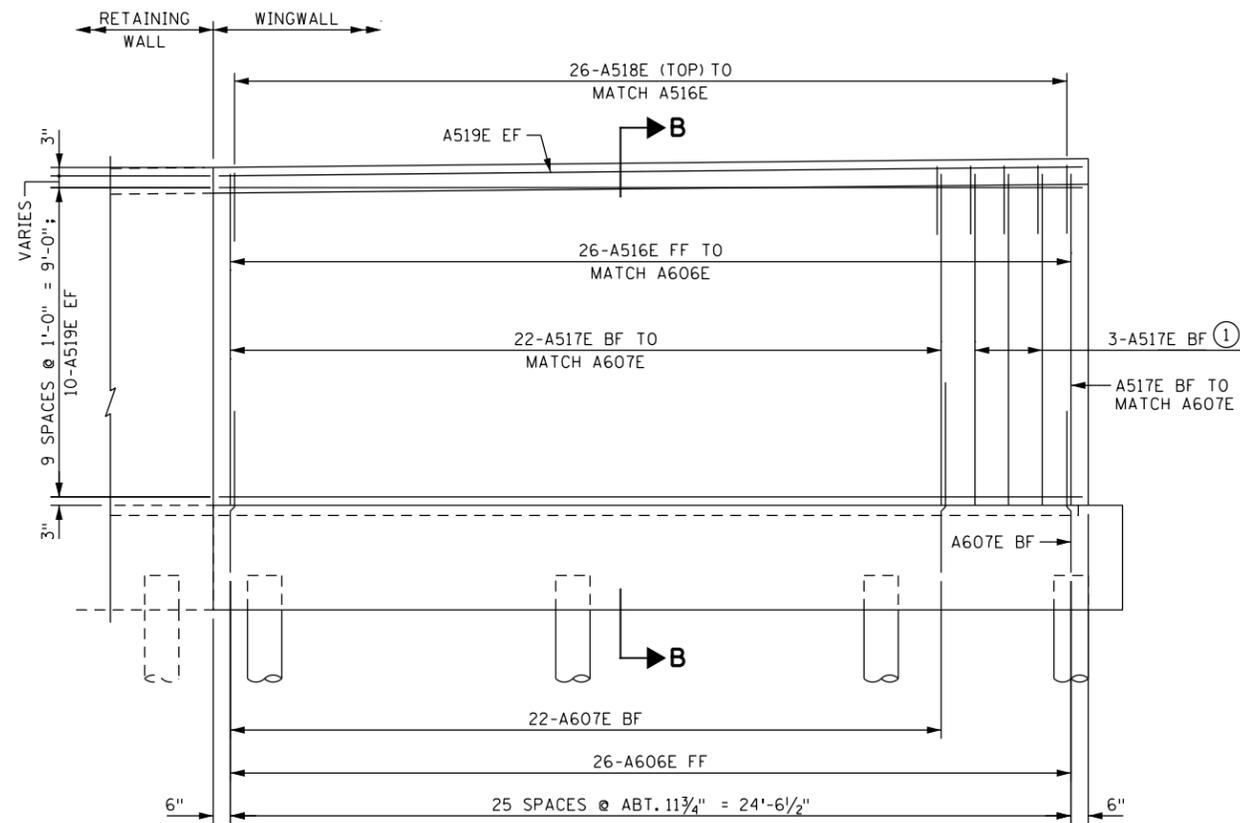
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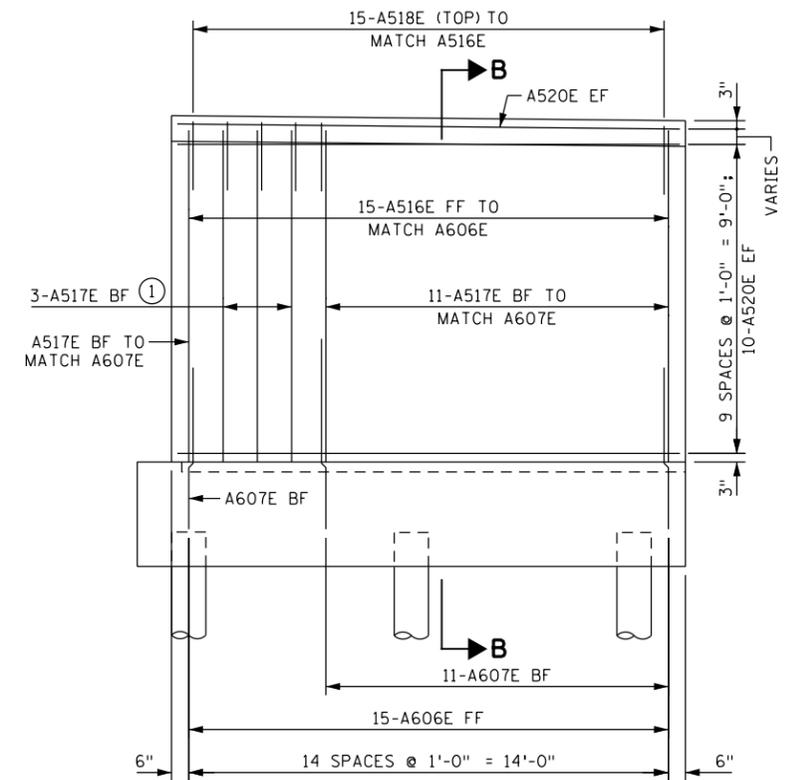


**ANOKA COUNTY**  
 SOUTH ABUTMENT REINFORCEMENT DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 (SHEET 2 OF 4)

**SHEET  
 B9  
 OF  
 B37**



**SOUTHEAST WINGWALL REINFORCEMENT ELEVATION**



**SOUTHWEST WINGWALL REINFORCEMENT ELEVATION**

**NOTES:**

FF DENOTES FRONT FACE  
BF DENOTES BACK FACE

SEE SHEET B11 FOR SECTION B-B.

(1) SET A517E ON TOP OF FOOTING. SEE CORNER REINFORCEMENT DETAILS ON SHEET B9 FOR SPACING.

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 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-13-2025 License # 55461

STATE AID PROJECT NO.  
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**02598**

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 DESIGNED BY  
D. PETERSON  
 CHECKED BY  
R. DURHAM  
 COMM. NO. 17554



**ANOKA COUNTY**  
 SOUTH ABUTMENT REINFORCEMENT DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 (SHEET 3 OF 4)

**SHEET  
B10  
OF  
B37**

**BILL OF REINFORCEMENT: SOUTH ABUTMENT**

MARK	NO	LENGTH [FT-IN]	SHAPE	LOCATION
A601	30	54 - 2		FOOTING LONG
A602	20	25 - 11		FOOTING LONG
A603	20	15 - 6		FOOTING LONG
A604	70	8 - 10		FOOTING TRANS
A605	54	10 - 10		FOOTING TRANS
A606E	89	5 - 9	U	FF DOWEL
A607E	87	6 - 5	U	BF DOWEL
A608E	48	6 - 4		STEM FF VERT
A609E	52	5 - 10		STEM BF VERT
A610E	48	7 - 8	U	STEM TOP
A611E	48	6 - 2	U	STEM TOP
A612E	40	23 - 3		STEM HORIZ
A613E	20	8 - 6		STEM HORIZ DOWEL
A614E	16	9 - 5	U	CORNER
A615E	14	17 - 3	U	FILLET
A516E	41	9 - 8		WW FF VERT
A517E	41	9 - 11		WW BF VERT
A518E	41	6 - 8	U	WW TOP
A519E	22	25 - 2		SE WW HORIZ
A520E	22	14 - 8		SW WW HORIZ
A521E	50	7 - 0	U	BRIDGE SEAT
A522E	40	7 - 6	U	BRIDGE SEAT

**NOTES:**

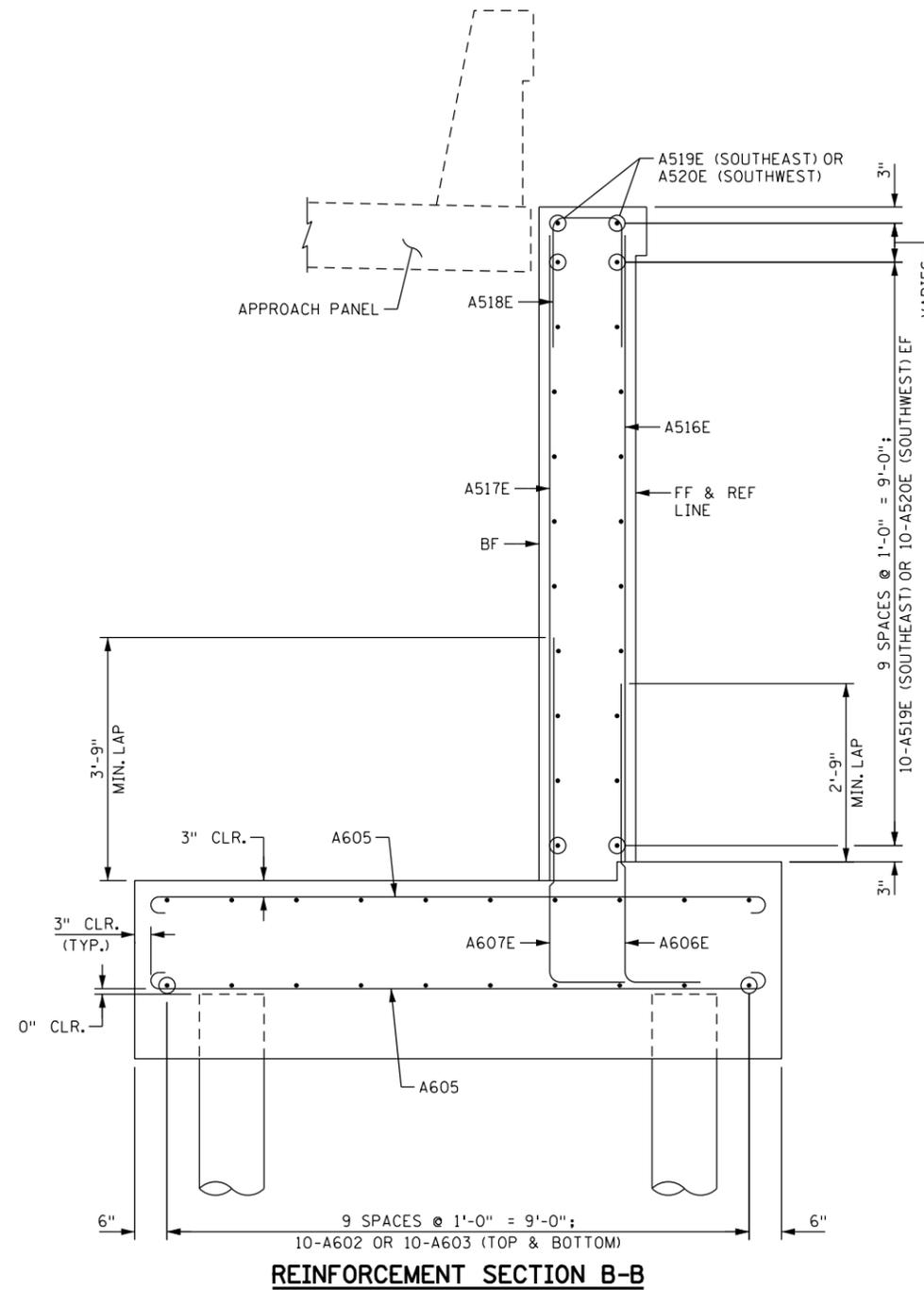
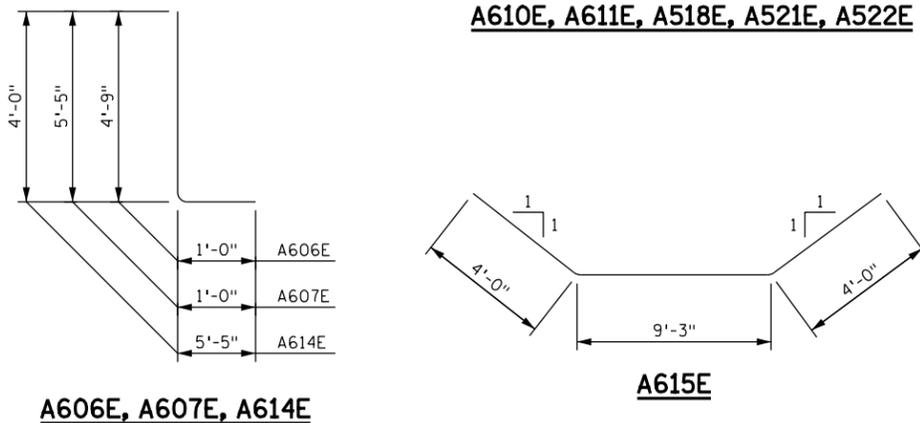
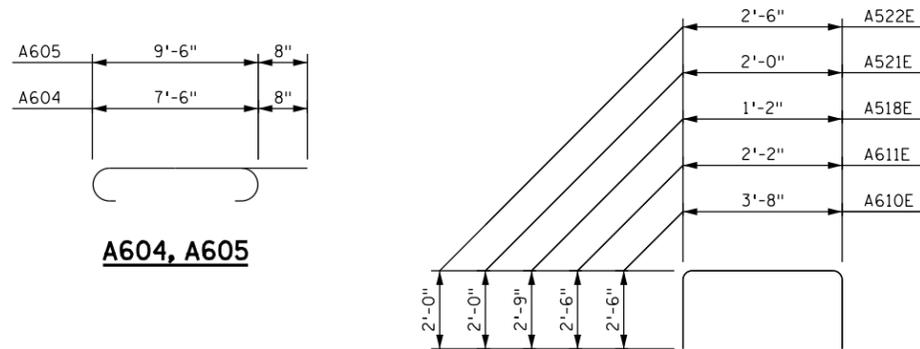
FF DENOTES FRONT FACE  
 BF DENOTES BACK FACE  
 EF DENOTES EACH FACE  
 REF DENOTES REFERENCE

SEE SHEET B9 FOR SECTION A-A CALLOUT AND SHEET B10 FOR SECTION B-B CALLOUT.

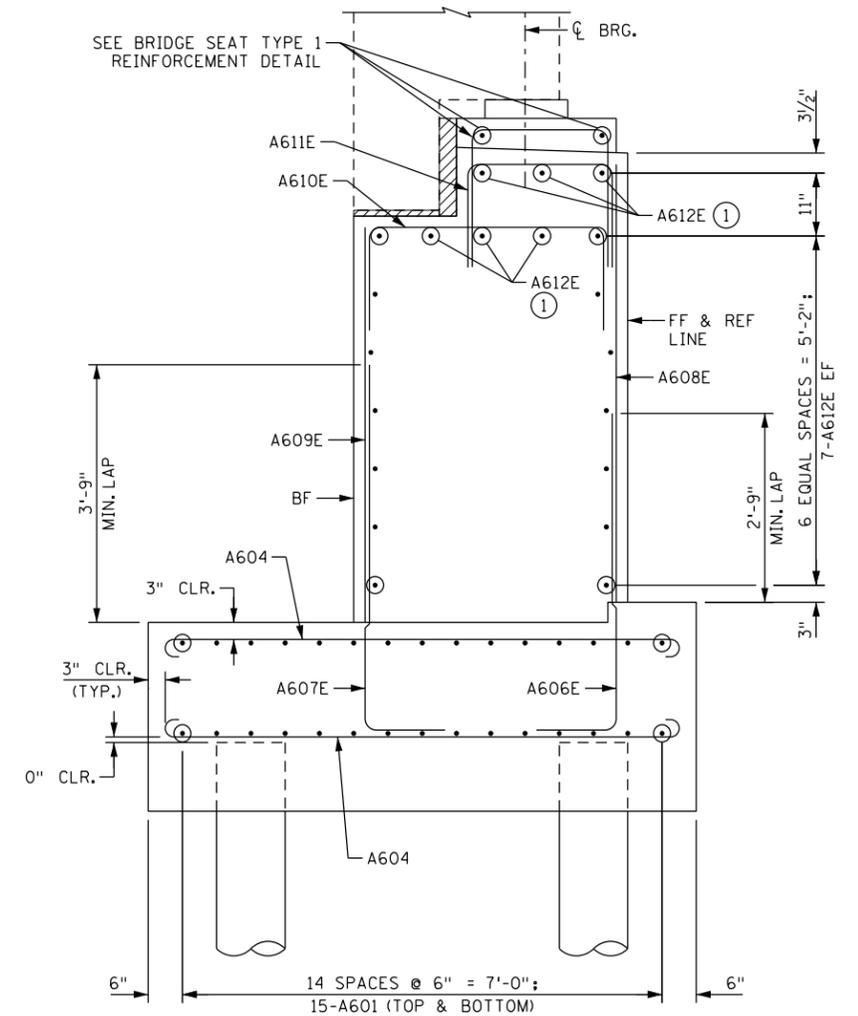
SEE SHEET B9 FOR BRIDGE SEAT TYPE 1 REINFORCEMENT DETAIL.

① SPACE AT 1'-0" MAX.

**BAR SHAPES:**



**REINFORCEMENT SECTION B-B**



**REINFORCEMENT SECTION A-A**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-13-2025 License # 55461

STATE AID PROJECT NO.  
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 E. JOHNSON  
 DESIGNED BY  
 D. PETERSON  
 CHECKED BY  
 R. DURHAM  
 COMM. NO. 17554

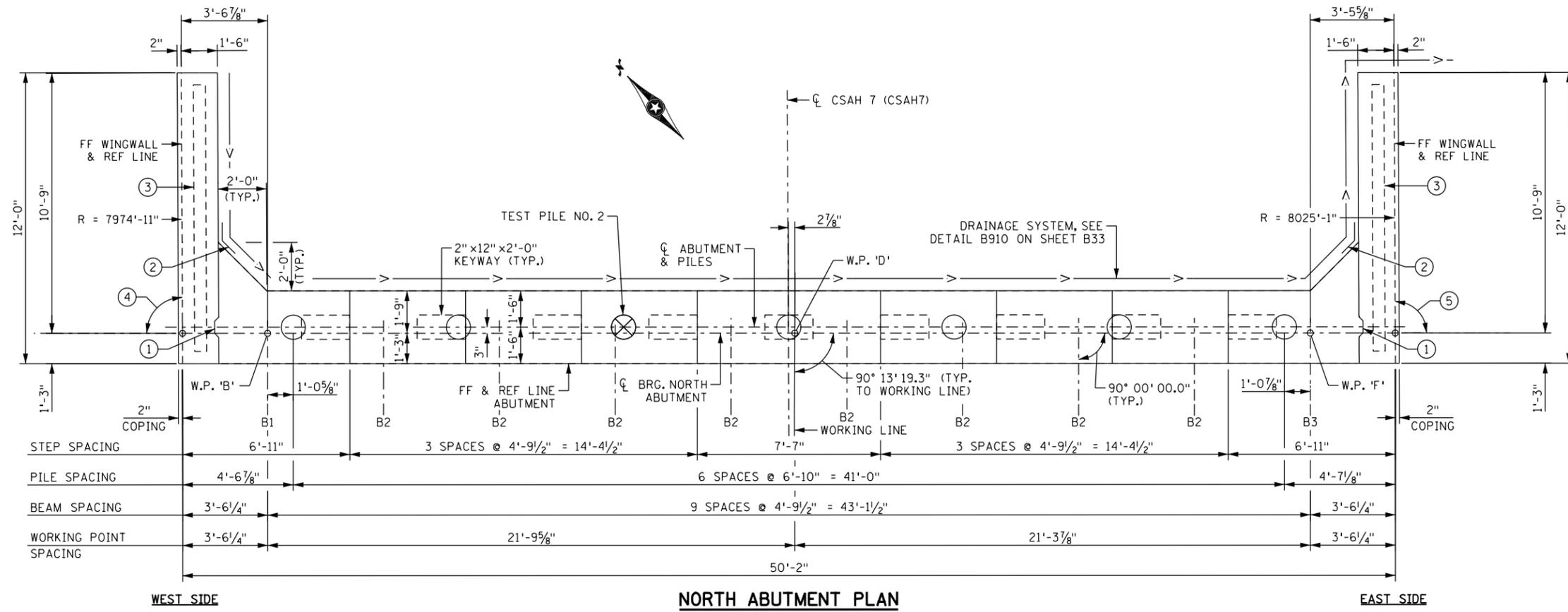


**ANOKA COUNTY**  
 SOUTH ABUTMENT REINFORCEMENT DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 (SHEET 4 OF 4)

**SHEET B11 OF B37**

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NO	DATE	BY	CKD	APPR	REVISION



NORTH ABUTMENT COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD + EARTH PRESSURE	67.5
FACTORED LIVE LOAD	27.9
* FACTORED DESIGN LOAD	95.4

NORTH ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R <sub>n</sub> - TONS/PILE		
FIELD CONTROL METHOD	Φ <sub>dyn</sub>	** R <sub>n</sub>
MnDOT PILE FORMULA 2012 (MPF12) R <sub>n</sub> = 20 √(W <sub>x</sub> H/1000) x LOG(10/S)	0.50	190.7
PDA	0.65	146.7

\*\* R<sub>n</sub> = (FACTORED DESIGN LOAD)/Φ<sub>dyn</sub>

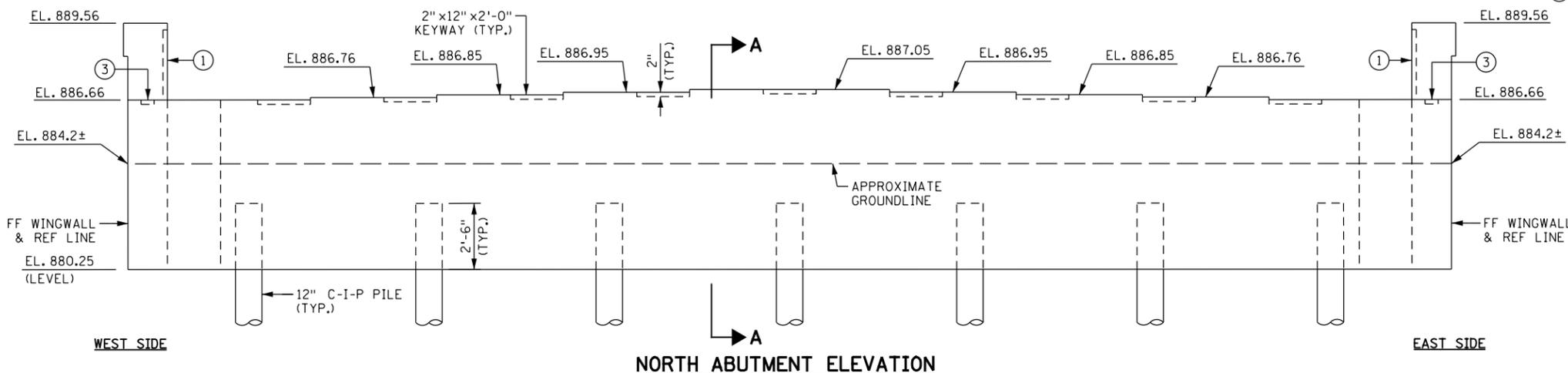
**PILE NOTES:**

- 1 - 12" C-I-P TEST PILES 85 FEET LONG.
- 6 - 12" C-I-P PILES ESTIMATED LENGTH 75 FEET.
- 7 - 12" C-I-P PILES REQUIRED FOR NORTH ABUTMENT.
- PILE SPACING SHOWN IS AT BOTTOM OF ABUTMENT.
- PILES SHALL HAVE A NOMINAL DIAMETER OF 12", AND A MINIMUM WALL THICKNESS OF 1/4".
- FOR PILE SPLICE DETAILS SEE DETAIL B201.

**NOTES:**

- FF DENOTES FRONT FACE. REF DENOTES REFERENCE. TTC DENOTES TANGENT TO CURVE.
- FOR CUT SECTION A-A SEE SHEET B13.
- 1 PERMISSIBLE CONSTRUCTION JOINT W/ 2" x 6" KEYWAY IF UPPER PORTION OF WINGWALL IS PLACED WITH ABUTMENT. A 72 HOUR DELAY IS REQUIRED BETWEEN ADJACENT POURS.
- 2 MEMBRANE WATERPROOFING SYSTEM PER MNDOT 2481.3B IF CONSTRUCTION JOINT IS USED. PAYMENT FOR MEMBRANE SHALL BE INCIDENTAL TO "STRUCTURAL CONCRETE (3B52)".
- 3 PERMISSIBLE CONSTRUCTION JOINT W/ 2" x 6" KEYWAY. A 72 HOUR DELAY IS REQUIRED BETWEEN ADJACENT POURS.
- 4 89° 46' 38.2" TTC.
- 5 90° 13' 16.8" TTC.
- 6 ITEM INCLUDES GRANULAR FILTER BELOW RIPRAP.

SUMMARY OF QUANTITIES: NORTH ABUTMENT		
ITEM	UNIT	QUANTITY
REMOVE GROUTED RIPRAP	CU YD	104
AGGREGATE SURFACING SPECIAL	TON	13
STRUCTURAL CONCRETE (3B52)	CU YD	49
REINFORCEMENT BARS (EPOXY COATED)	POUND	6500
C-I-P CONC TEST PILE 85 FT LONG 12"	EACH	1
PILE ANALYSIS	EACH	1
PILE POINTS 12"	EACH	7
C-I-P CONCRETE PILING 12"	LIN FT	450
RANDOM RIPRAP CLASS III	CU YD	164



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NO	DATE	BY	CKD	APPR	REVISION

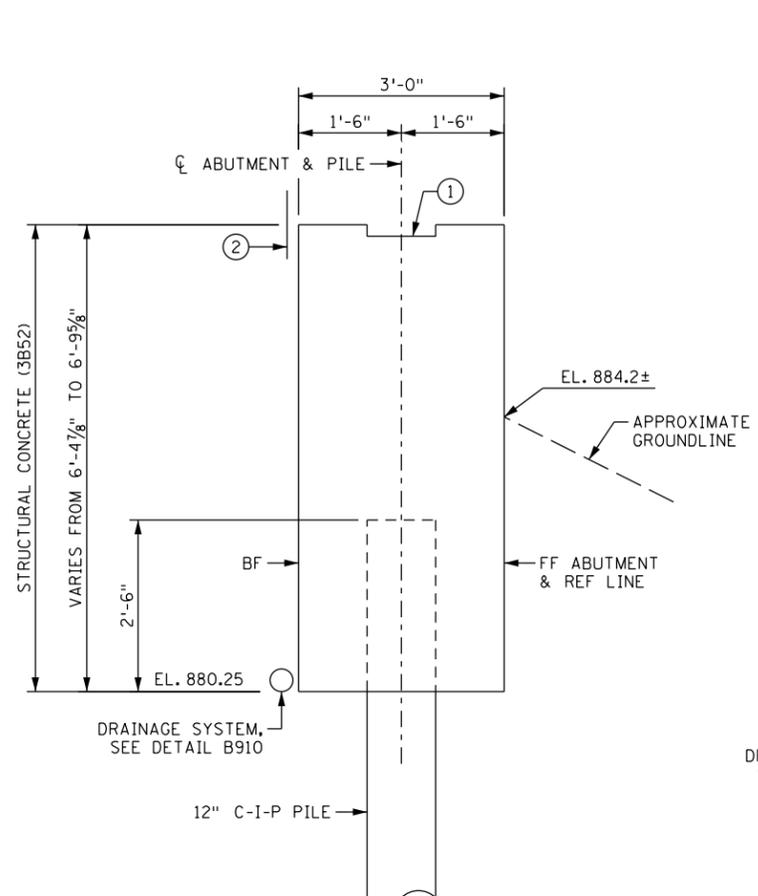
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 Date: 6-16-2025 License #: 55461

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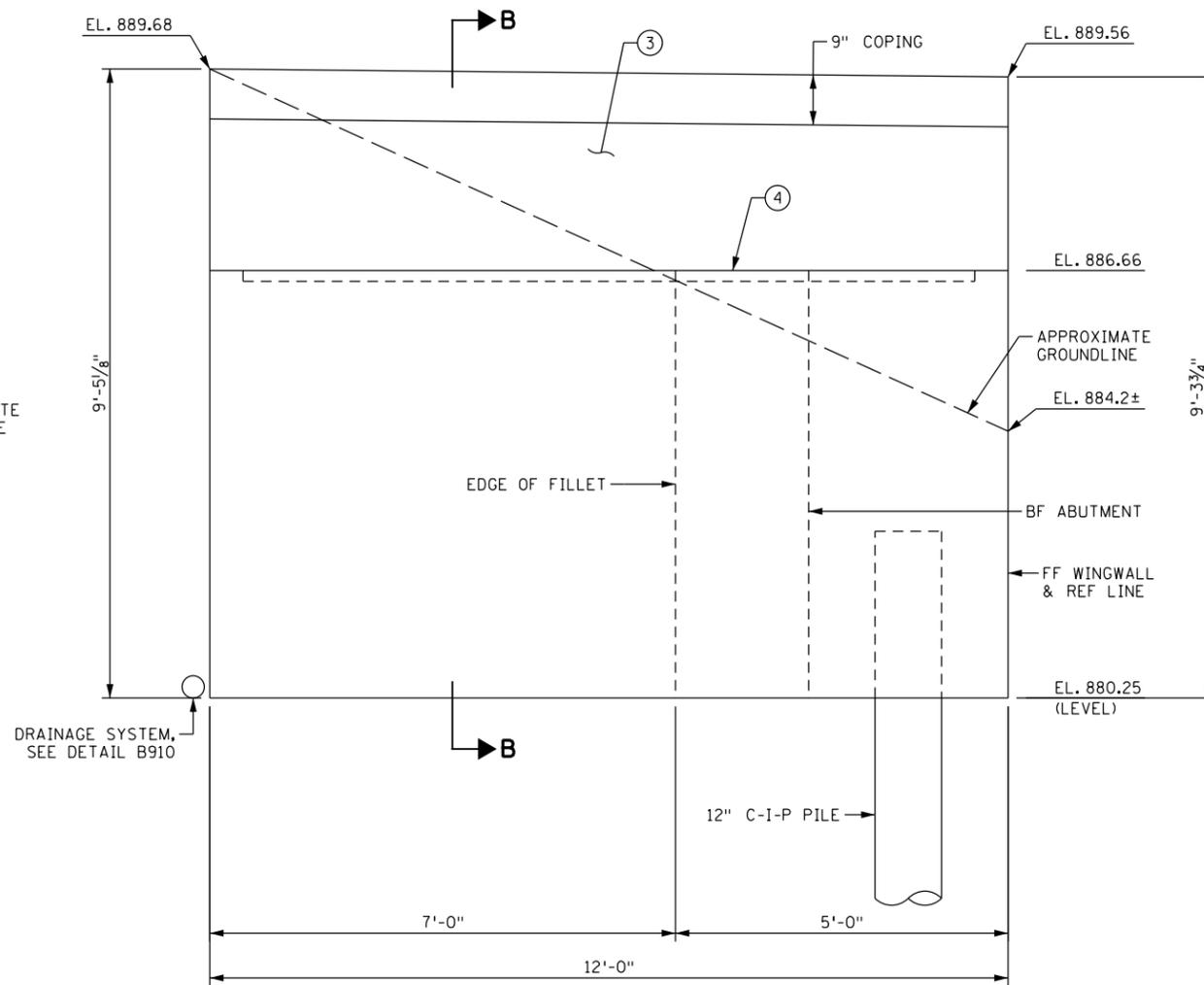


ANOKA COUNTY  
 NORTH ABUTMENT DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 (SHEET 1 OF 2)

SHEET  
B12  
OF  
B37

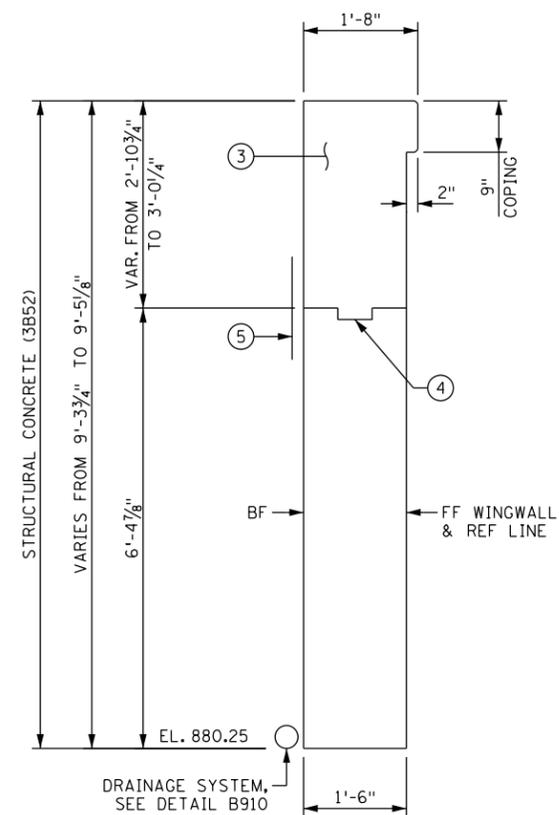


**SECTION A-A**



**NORTHWEST WINGWALL ELEVATION**

(NORTHEAST SIMILAR)



**SECTION B-B**

**NOTES:**

FF DENOTES FRONT FACE.  
BF DENOTES BACK FACE.  
REF DENOTES REFERENCE

- ① CONSTRUCTION JOINT W/ 2" x 12" KEYWAY BETWEEN BEAMS. (A 72 HOUR DELAY IS REQUIRED BETWEEN ADJACENT POURS)
- ② MEMBRANE WATERPROOFING SYSTEM PER MNDOT 2481.3B. PAYMENT FOR MEMBRANE SHALL BE INCIDENTAL TO "STRUCTURAL CONCRETE (3B52)"
- ③ UPPER PORTION OF WINGWALL MAY BE CONCRETE MIX 3B52 OR SAME AS DECK CONCRETE, BUT WILL BE PAID FOR AS 3B52 CONCRETE.
- ④ PERMISSIBLE CONSTRUCTION JOINT W/ 2" x 6" KEYWAY. A 72 HOUR DELAY IS REQUIRED BETWEEN ADJACENT POURS.
- ⑤ MEMBRANE WATERPROOFING SYSTEM PER MNDOT 2481.3B IF CONSTRUCTION JOINT IS USED. PAYMENT FOR MEMBRANE SHALL BE INCIDENTAL TO "STRUCTURAL CONCRETE (3B52)"

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NO	DATE	BY	CKD	APPR	REVISION

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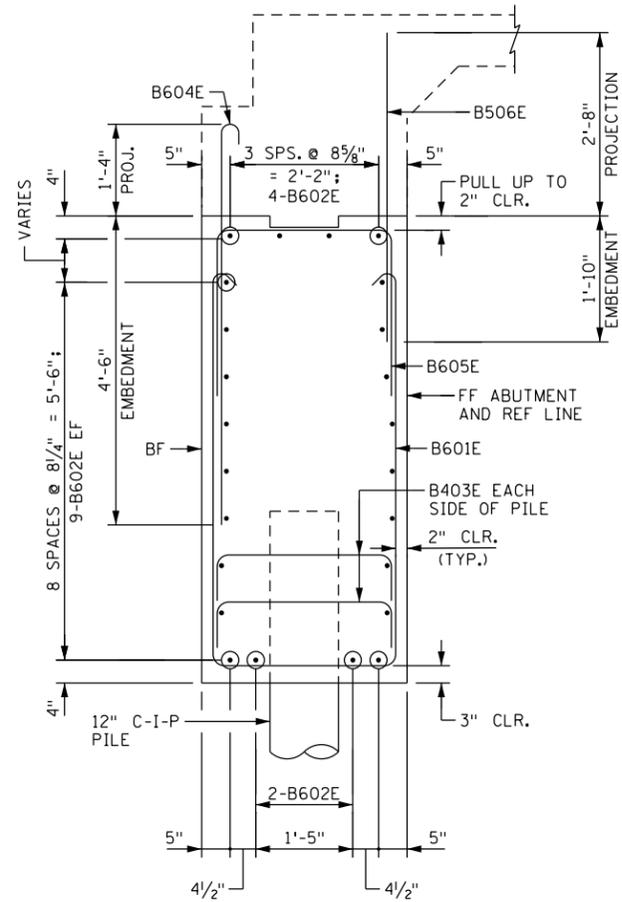
STATE AID PROJECT NO.  
002-607-032  
BRIDGE NO.  
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D. PETERSON  
CHECKED BY  
R. DURHAM  
COMM. NO. 17554



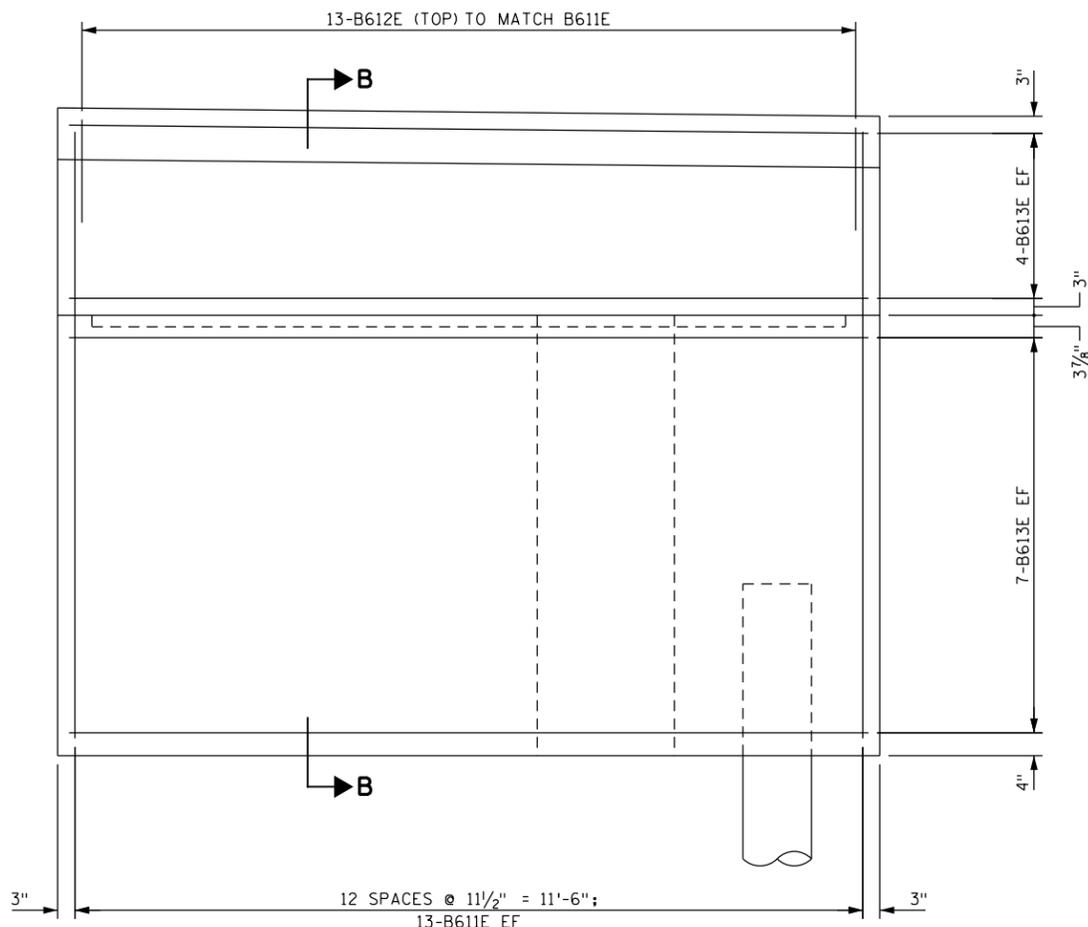
**ANOKA COUNTY**  
NORTH ABUTMENT DETAILS  
CSAH 7 OVER SEELYE BROOK  
(SHEET 2 OF 2)

**SHEET  
B13  
OF  
B37**



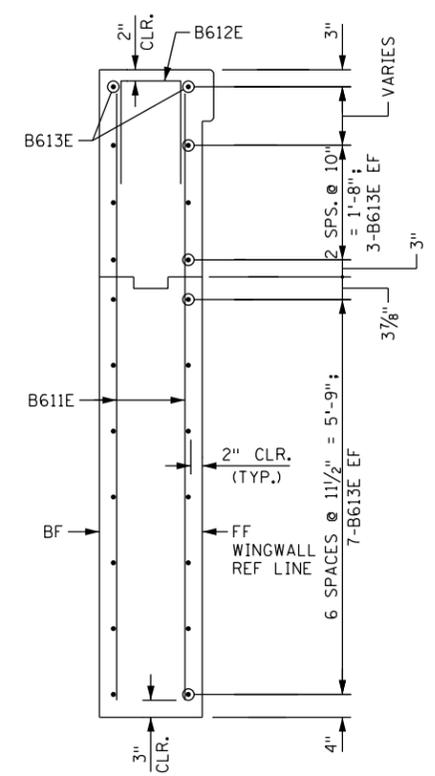


**REINFORCEMENT SECTION A-A**

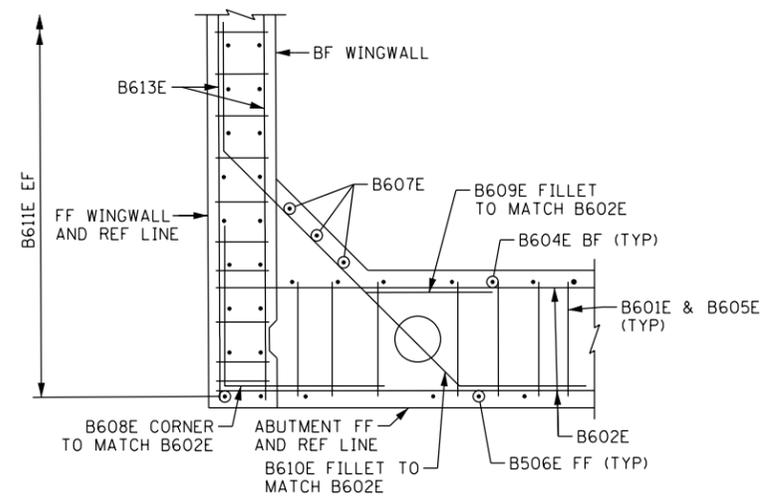


**NORTHWEST WINGWALL REINFORCEMENT ELEVATION**

(NORTHEAST SIMILAR)



**REINFORCEMENT SECTION B-B**



**NORTHWEST CORNER REINFORCEMENT DETAIL**

(NORTHEAST CORNER SIMILAR)

**NOTES:**

- FF DENOTES FRONT FACE
- BF DENOTES BACK FACE
- EF DENOTES EACH FACE
- REF DENOTES REFERENCE

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NO	DATE	BY	CKD	APPR	REVISION

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*Rachael Durham*

Date: 6-13-2025 License # 55461

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DESIGNED BY  
D. PETERSON

CHECKED BY  
R. DURHAM

COMM. NO. 17554



**ANOKA COUNTY**

NORTH ABUTMENT REINFORCEMENT DETAILS

**CSAH 7 OVER SEELYE BROOK**

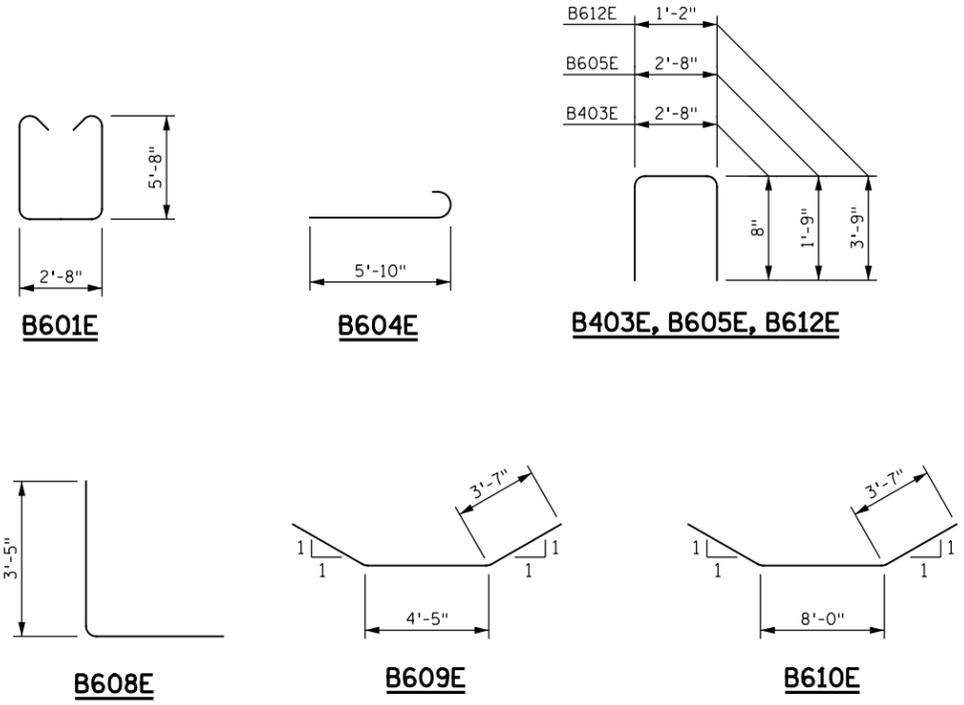
(SHEET 2 OF 3)

**SHEET B15 OF B37**

**BILL OF REINFORCEMENT: NORTH ABUTMENT**

MARK	NO	LENGTH [FT-IN]	SHAPE	LOCATION
B601E	48	15 - 4		STEM STIRRUP
B602E	24	49 - 10		STEM HORIZ
B403E	28	4 - 0		PILE TILE
B604E	48	6 - 6		STEM BF VERT
B605E	48	6 - 2		STEM SEAT TIE
B506E	29	4 - 6		STEM FF VERT
B607E	6	6 - 0		FILLET VERT
B608E	20	6 - 10		CORNER
B609E	8	11 - 7		CORNER FILLET
B610E	12	15 - 2		CORNER FILLET
B611E	52	8 - 10		WW VERT
B612E	26	8 - 8		WW TOP
B613E	44	11 - 8		WW HORIZ

**BAR SHAPES:**



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NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: RACHAEL DURHAM

*Rachael Durham*

Date: 6-13-2025 License # 55461

STATE AID PROJECT NO.  
002-607-032

BRIDGE NO.  
**02598**

DRAWN BY  
E. JOHNSON

DESIGNED BY  
D. PETERSON

CHECKED BY  
R. DURHAM

COMM. NO. 17554



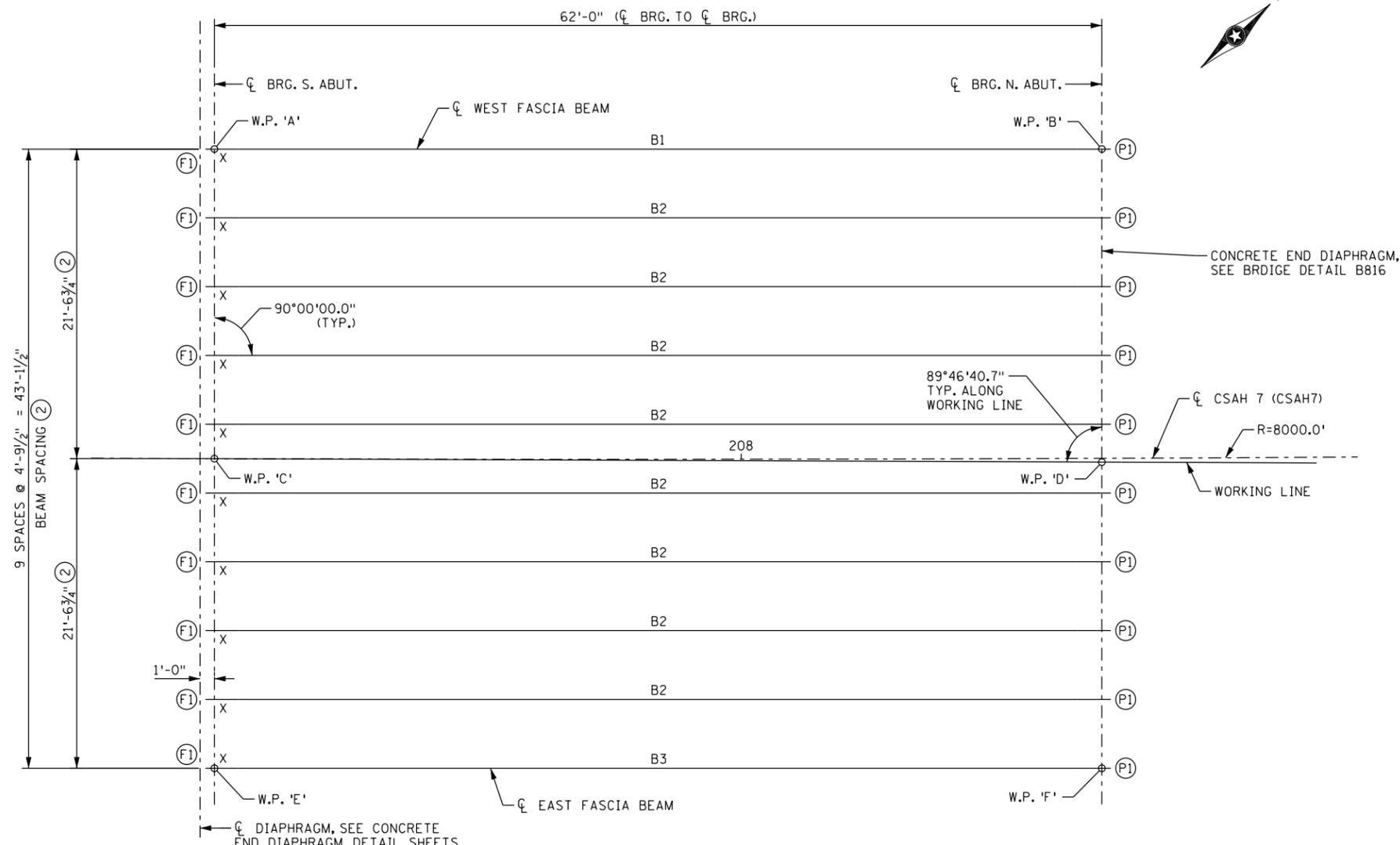
**ANOKA COUNTY**

NORTH ABUTMENT REINFORCEMENT DETAILS

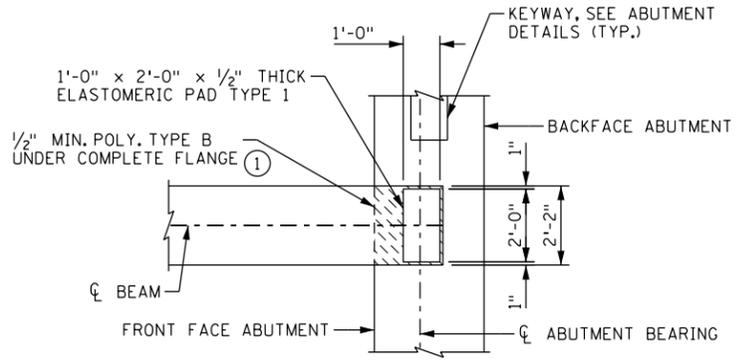
**CSAH 7 OVER SEELYE BROOK**

(SHEET 3 OF 3)

**SHEET  
B16  
OF  
B37**



**FRAMING PLAN**



**ELASTOMERIC BEARING PAD DETAIL**  
(NORTH ABUTMENT)

**LEGEND:**

- (F1) FIXED CURVED PLATE BEARING ASSEMBLY TYPE F1, SEE BRIDGE DETAIL B310.
- (P1) ELASTOMERIC BEARING PAD TYPE P1, SEE BRIDGE DETAIL B305.

**NOTES:**

- X DENOTES WHICH END OF THE BEAM TO BE MARKED WITH AN "X".
- (1) POLYSTYRENE PER SPEC. 3760 AND SHALL BE INCIDENTAL TO OTHER ITEMS.
- (2) DIMENSIONS ARE PERPENDICULAR TO CL BEAMS.

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*Rachael Durham*

Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
002-607-032

BRIDGE NO.  
**02598**

DRAWN BY  
J. HOFFMAN

DESIGNED BY  
R. DURHAM

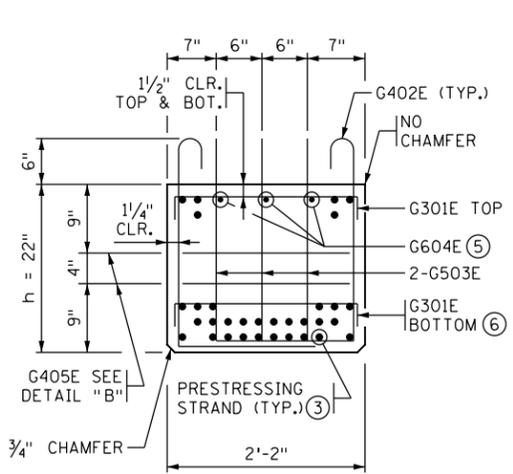
CHECKED BY  
C. BLACK

COMM. NO. 17554



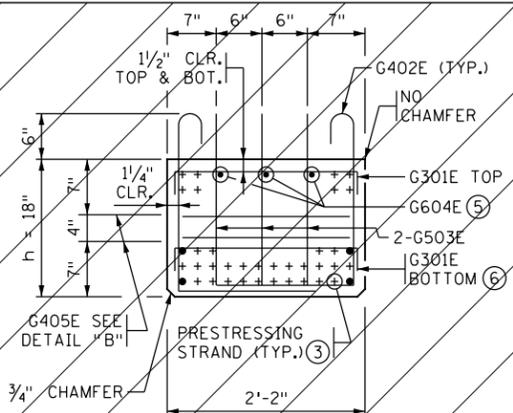
**ANOKA COUNTY**  
FRAMING PLAN  
**CSAH 7 OVER SEELYE BROOK**

**SHEET**  
**B17**  
**OF**  
**B37**



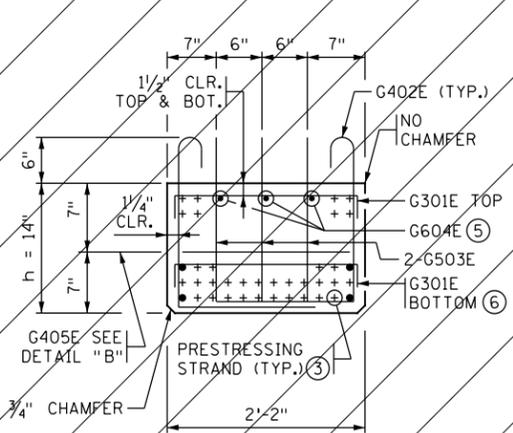
**END VIEW - 22" RB**

CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH ONE COMPONENT POLYURETHANE SEALANT PER APPROVED PRODUCT LIST.



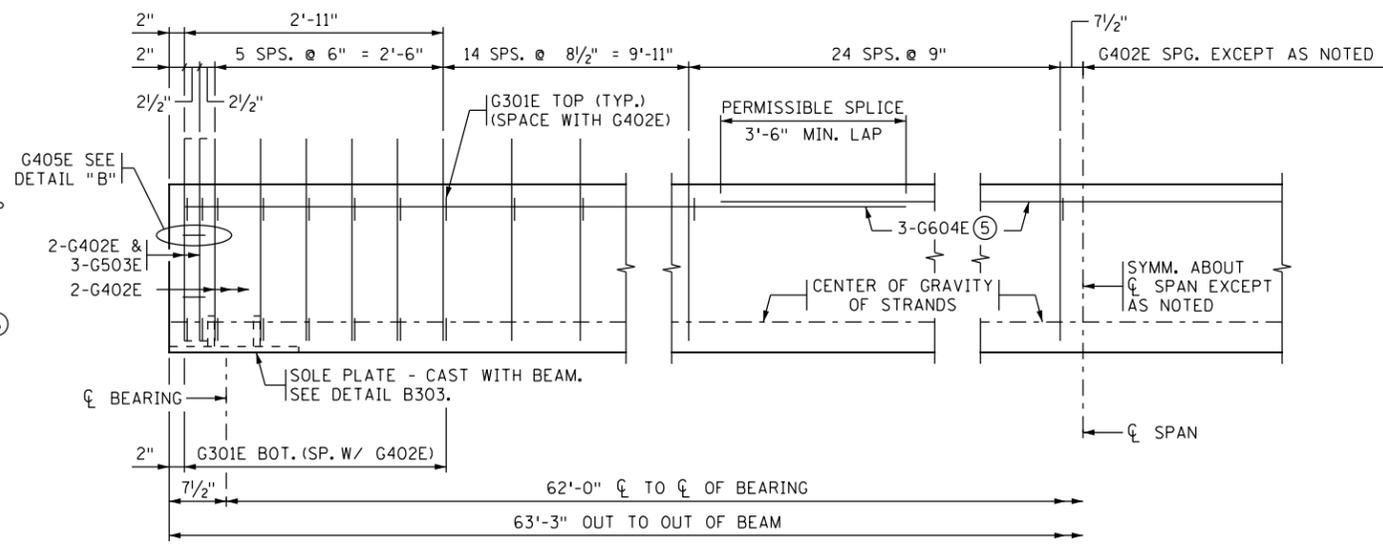
**END VIEW - 18" RB**

CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH ONE COMPONENT POLYURETHANE SEALANT PER APPROVED PRODUCT LIST.

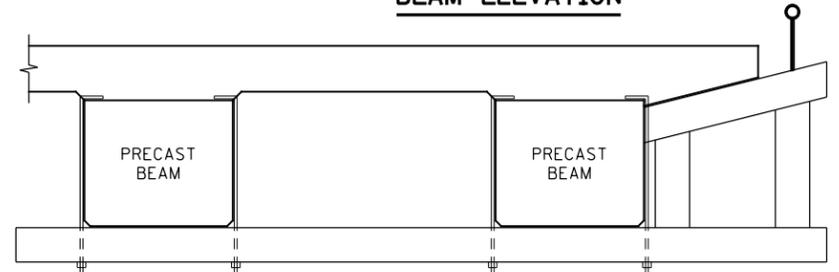


**END VIEW - 14" RB**

CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH ONE COMPONENT POLYURETHANE SEALANT PER APPROVED PRODUCT LIST.

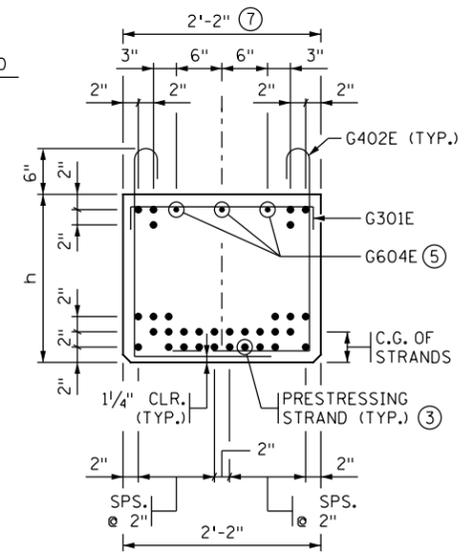


**BEAM ELEVATION**



**OVERHANG SUPPORT CONCEPT SKETCH**

SEE THE "CONSTRUCTION NOTES" ON FRONT PORTION OF THE BRIDGE PLANS. THIS CONCEPT HAS BEEN USED SUCCESSFULLY ON PREVIOUS PROJECTS. CONTRACTORS MAY CONSIDER THIS OR ANOTHER SYSTEM AT THEIR DISCRETION.



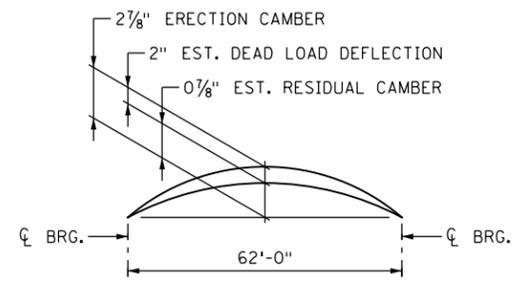
**SECTION AT CL SPAN**

STRAND ARRANGEMENT	
LOCATION	NO. OF STRANDS
TOP ROW	4
2ND ROW FROM TOP	2
3RD ROW FROM BOTTOM	6
2ND ROW FROM BOTTOM	10
BOTTOM ROW	10
<b>TOTAL</b>	<b>32</b>

C.G. OF STRANDS = 6.63 INCHES

C.G. = DISTANCE TO CENTER OF GRAVITY OF ALL STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.

ALL STRAIGHT STRAND.

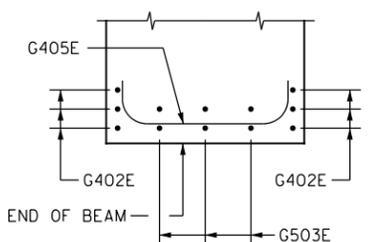


**CAMBER DIAGRAM**

DEAD LOAD DEFLECTION SHOWN IS FOR WEIGHT OF SLAB, WEARING COURSE, BARRIER, SIDEWALK AND MEDIAN WHERE APPLICABLE.

CONTRACTOR WILL TAKE ELEVATIONS AT TOP OF BEAMS AFTER ERECTION AND WILL ALLOW FOR DEFLECTION SHOWN TO ENABLE BUILDING FORMS TO CORRECT GRADE AND SPECIFIED SLAB THICKNESS. PROVIDE COPY OF ELEVATIONS TO THE ENGINEER.

**CONTRACTOR SHALL VERIFY STABILITY OF FASCIA BEAMS FROM OVERTURNING (NO PERMANENT BEAM DIAPHRAGMS ARE PRESENT). CONTRACTOR SHALL PROVIDE TEMPORARY BRACING.**



**DETAIL "B"**

PLAN VIEW SHOWING PLACEMENT OF G405E BAR

SECTION HEIGHT "h"		
14" <input type="checkbox"/>	18" <input type="checkbox"/>	22" <input checked="" type="checkbox"/>

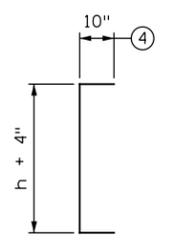
AN "X" IN THE BOX INDICATES THE SECTION HEIGHT.

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	17.73 KSI
LONG TERM LOSSES	23.00 KSI
<b>TOTAL LOSSES</b>	<b>40.73 KSI</b>

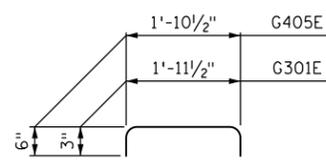
MINIMUM CONCRETE STRENGTH - KSI	
① f'ci	② f'c
8.0 KSI	9.3 KSI

PRESTRESSING STRAND DIAMETER	
③ 1/2" <input type="checkbox"/>	③ 0.60" <input checked="" type="checkbox"/>

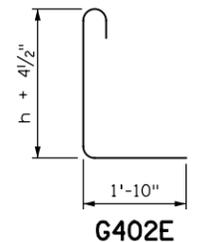
INITIAL PRESTRESS 1,499,904 LB.
<input checked="" type="checkbox"/> 0.72 f <sub>pu</sub>
<input type="checkbox"/> 0.75 f <sub>pu</sub>



**G503E**



**G301E, G405E**



**G402E**

**GENERAL NOTES**

- PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.
- MARK EACH BEAM SHOWING BRIDGE NUMBER, CASTING DATE, AND INDIVIDUAL IDENTIFICATION LETTERS AND NUMBERS ON THE FACE OF THE BEAM, NEAR THE END, SO LOCATED THAT THEY WILL BE EXPOSED AFTER THE END DIAPHRAGMS HAVE BEEN CAST. MARK FASCIA BEAMS ON THE INSIDE FACE. ENSURE ALL MARKINGS ARE STENCILLED AND CLEARLY LEGIBLE. FOR LOCATION OF BEAMS, SEE FRAMING PLAN.
- ALL MATERIAL AND WORK SHOWN OR NOTED ON THIS SHEET IS INCLUDED IN UNIT PRICE BID FOR PRESTRESSED CONCRETE BEAMS. SEE SPEC. 2405.
- SEE FRAMING PLAN FOR BEAM END MARKED "X".
- REFER TO "PRESTRESSED CONCRETE BEAM DIAPHRAGM CONNECTION DETAILS" SHEET INCLUDED IN THIS PLAN SET FOR CONCRETE END DIAPHRAGM DETAILS.
- ① MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- ② MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.
- ③ USE MNDOT GRADE 300, 7-WIRE LOW RELAXATION PRESTRESSING STRAND, IN ACCORDANCE WITH ASTM A416 AS MODIFIED IN THE SPECIAL PROVISIONS.
- ④ MAY STAGGER BARS TO AVOID INTERFERENCE.
- ⑤ PROVIDE 2" CLEARANCE AT ENDS OF BEAM.
- ⑥ PLACE G301E BAR ON TOP OF THE TOP ROW OF PRESTRESSING STRANDS IN THE BOTTOM OF THE BEAM.
- ⑦ ROUGH FLOAT AND BROOM TRANSVERSELY FOR BOND IN ACCORDANCE WITH SPEC. 2405.3D.

REVISED: DECEMBER 21, 2022  
APPROVED: JANUARY 13, 2015  
*Nancy Dubenberger*  
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY *Rachael Durham* 6-13-2025  
LICENSED PROFESSIONAL ENGINEER  
NAME: RACHAEL DURHAM LIC. NO. 55461

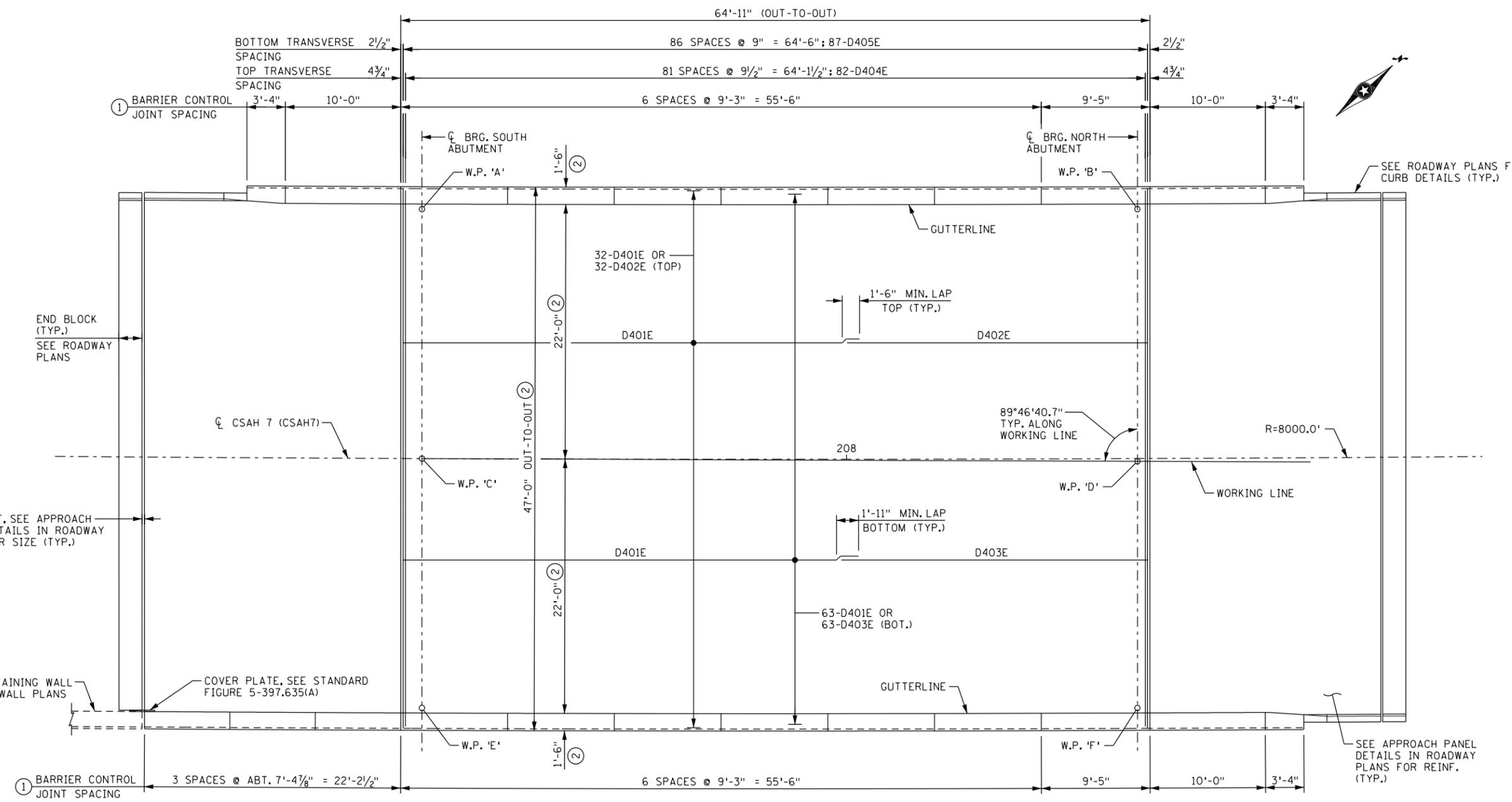
TITLE: **14", 18" & 22" RECTANGULAR PRESTRESSED CONCRETE BEAM (PRETENSIONED) RB-64**

DES: DPP	DR: JEH	APPROVED:	BRIDGE NO. 02598
CHK: RAD	CHK: RAD	SHEET NO. B18 OF B37 SHEETS	

BEAMS B1-B3 FIG. 5-397.550

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**BRIDGE DECK LAYOUT**



- NOTES:**
- ADJACENT LONGITUDINAL BARS SHALL BE TURNED END FOR END SO THAT THE LAP SPLICE LOCATIONS ARE STAGGERED.
  - ① MEASURED ALONG EDGE OF DECK.
  - ② DIMENSION IS PERPENDICULAR TO ROADWAY CENTERLINE.

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NO	DATE	BY	CKD	APPR	REVISION

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Print Name: RACHAEL DURHAM

*Rachael Durham*

Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
002-607-032

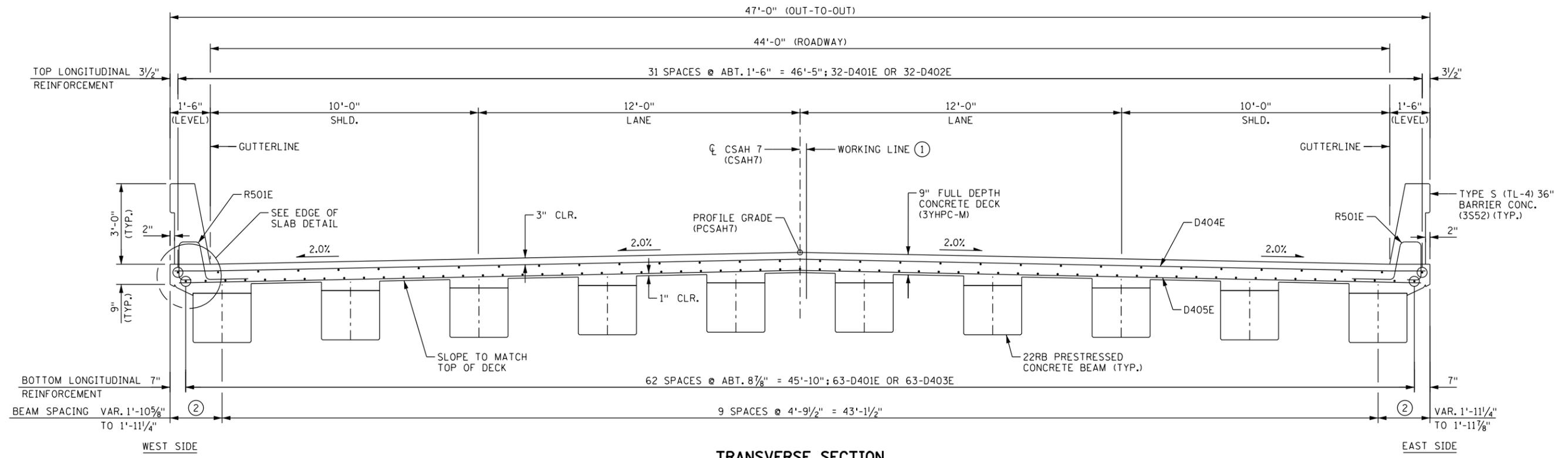
BRIDGE NO.  
**02598**

COMM. NO. 17554

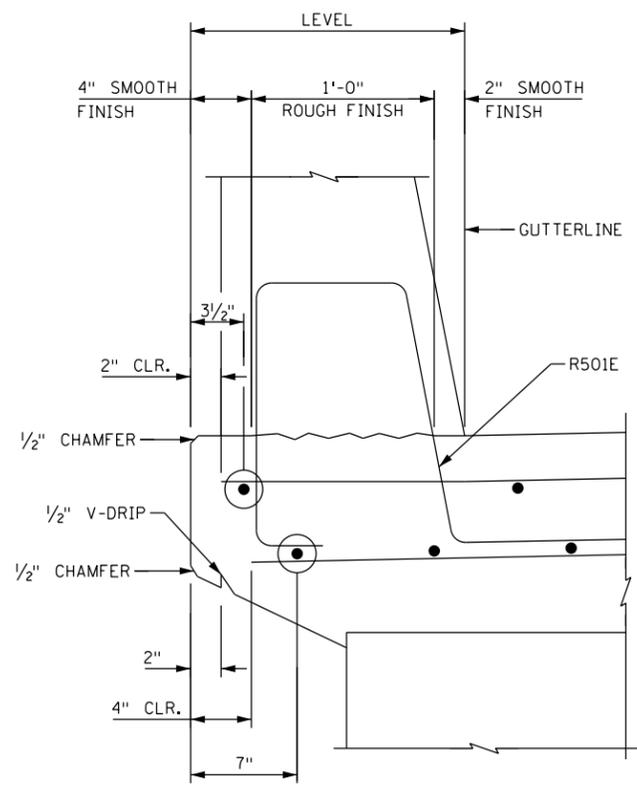


**ANOKA COUNTY**  
SUPERSTRUCTURE DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
(SHEET 1 OF 3)

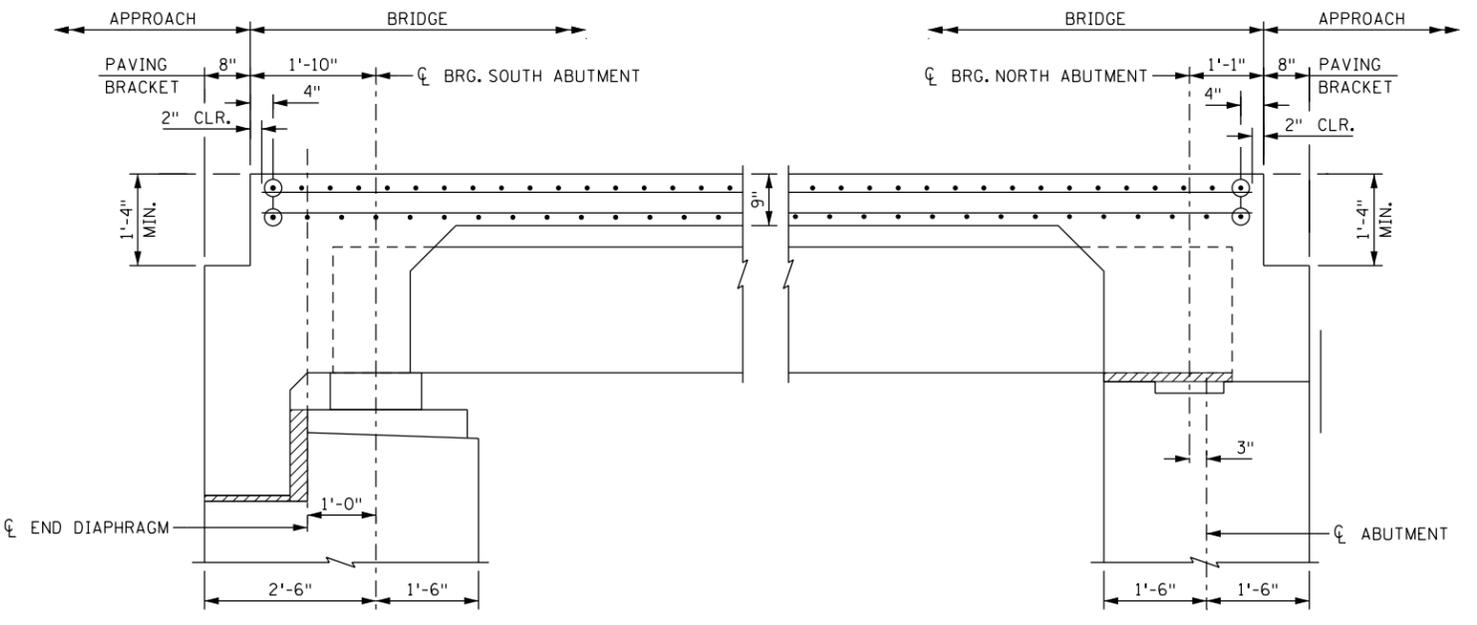
**SHEET B20 OF B37**



**TRANSVERSE SECTION**



**EDGE OF SLAB DETAIL**



**LONGITUDINAL SECTION**

- NOTES:**
- ① VARIES 0'-0" AT SOUTH ABUTMENT BEARING LINE TO 0'-2 7/8" AT NORTH ABUTMENT BEARING LINE.
  - ② DIMENSIONS ARE SHOWN MEASURED ALONG THE CENTERLINE OF BEARING AT ABUTMENTS.

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Print Name: **RACHAEL DURHAM**

*Rachael Durham*

Date: **6-13-2025** License #: **55461**

STATE AID PROJECT NO.  
002-607-032

BRIDGE NO.  
**02598**

DRAWN BY  
J. HOFFMAN

DESIGNED BY  
R. DURHAM

CHECKED BY  
C. BLACK

COMM. NO. 17554



**ANOKA COUNTY**

SUPERSTRUCTURE DETAILS

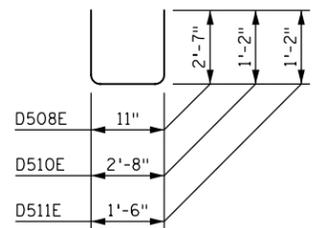
**CSAH 7 OVER SEELYE BROOK**

(SHEET 2 OF 3)

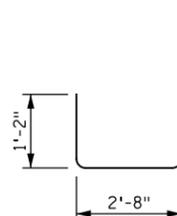
**SHEET**  
**B21**  
**OF**  
**B37**

BILL OF REINFORCEMENT: DECK				
MARK	NO	LENGTH [FT - IN]	SHAPE	LOCATION
D401E	95	40 - 0	=====	LONGITUDINAL
D402E	32	26 - 3	=====	TOP LONGITUDINAL
D403E	63	26 - 6	=====	BOTTOM LONGITUDINAL
D404E	82	46 - 8	=====	TOP TRANSVERSE
D405E	87	46 - 4	=====	BOTTOM TRANSVERSE
D606E	11	46 - 8	=====	DIAPHRAGM LONGITUDINAL
D607E	27	2 - 3	=====	DIAPHRAGM HORIZONTAL
D508E	59	6 - 1	U	DIAPHRAGM LUG STIRRUP
D509E	29	6 - 3	U	DIAPHRAGM STIRRUP
D510E	29	5 - 0	U	DIAPHRAGM TIE
D511E	60	3 - 10	U	DIAPHRAGM STIRRUP
D612E	59	5 - 6	U	DIAPHRAGM DECK TIE
D613E	27	4 - 10	U	DIAPHRAGM DECK TIE
D614S	59	3 - 7	U	DIAPHRAGM APPROACH TIE
D415E	1	44 - 11	=====	DIAPHRAGM FILLET LONG.
		-		

**BAR SHAPES:**



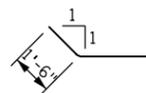
**D508E, D510E, D511E**



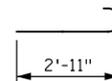
**D509E**



**D612E**



**D613E**



**D614S**

SUMMARY OF QUANTITIES: SUPERSTRUCTURE		
ITEM	UNIT	QUANTITY
TYPE S (TL-4) 36" BARRIER CONC (3S52)	LIN FT	192
REINFORCEMENT BARS (EPOXY COATED)	POUND	17640
REINFORCEMENT BARS (STAINLESS-75KSI)	POUND	520
BRIDGE SLAB CONCRETE (3YHPC-M)	SQ FT	3052
BRIDGE DECK PLANING	SQ FT	4430
ELASTOMERIC BEARING PAD	EACH	10
BEARING ASSEMBLY	EACH	10
PRESTRESSED CONCRETE BEAMS 22RB	LIN FT	633

①

**NOTES:**

① QUANTITY INCLUDES BRIDGE DECK AND APPROACH PANELS.

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*Rachael Durham*  
 Date: 6-13-2025 License # 55461

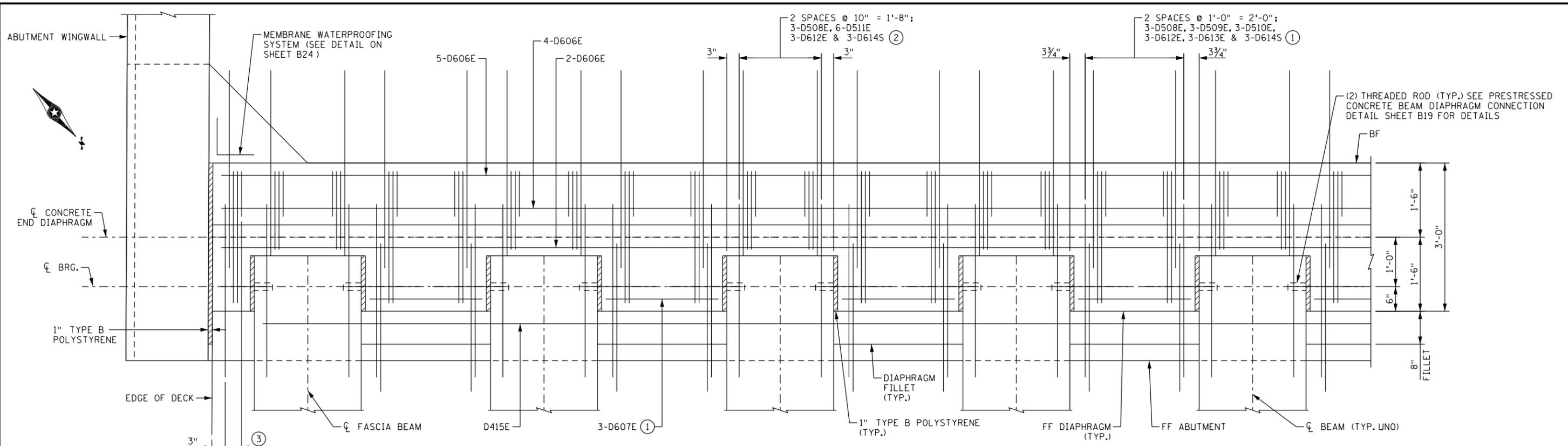
STATE AID PROJECT NO.  
002-607-032  
  
 BRIDGE NO.  
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DRAWN BY  
J. HOFFMAN  
 DESIGNED BY  
R. DURHAM  
 CHECKED BY  
C. BLACK  
 COMM. NO. 17554



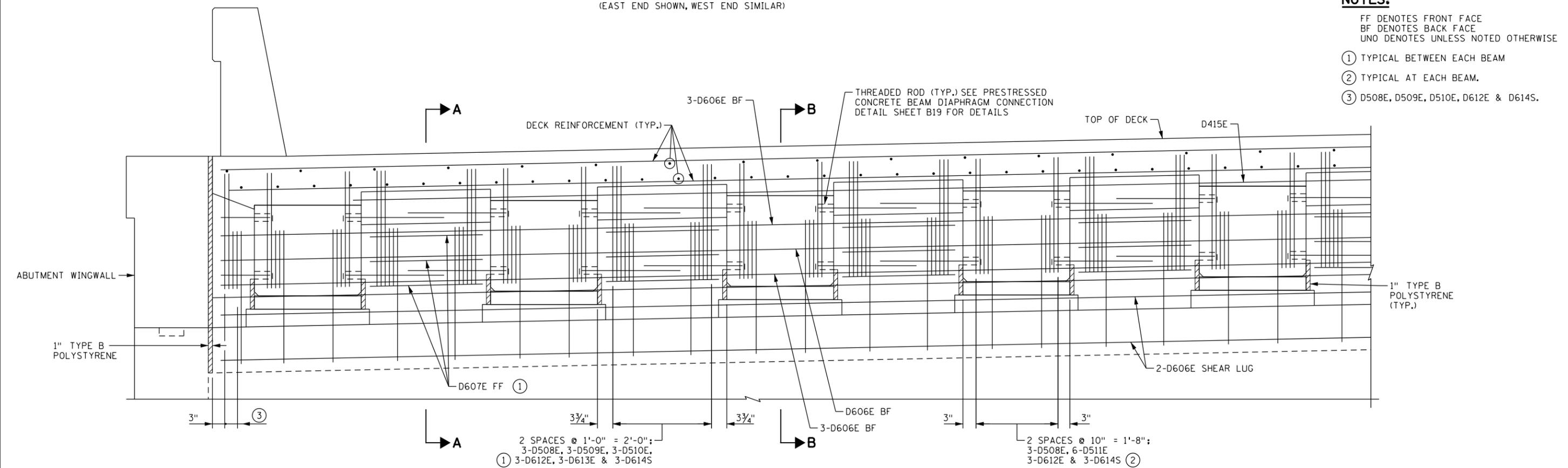
**ANOKA COUNTY**  
 SUPERSTRUCTURE DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 (SHEET 3 OF 3)

**SHEET  
B22  
OF  
B37**



**PARTIAL END DIAPHRAGM PLAN - SOUTH ABUTMENT**  
(EAST END SHOWN, WEST END SIMILAR)

- NOTES:**
- FF DENOTES FRONT FACE
  - BF DENOTES BACK FACE
  - UNO DENOTES UNLESS NOTED OTHERWISE
  - ① TYPICAL BETWEEN EACH BEAM
  - ② TYPICAL AT EACH BEAM.
  - ③ D508E, D509E, D510E, D612E & D614S.



**PARTIAL END DIAPHRAGM ELEVATION - SOUTH ABUTMENT**  
(EAST END SHOWN, WEST END SIMILAR)

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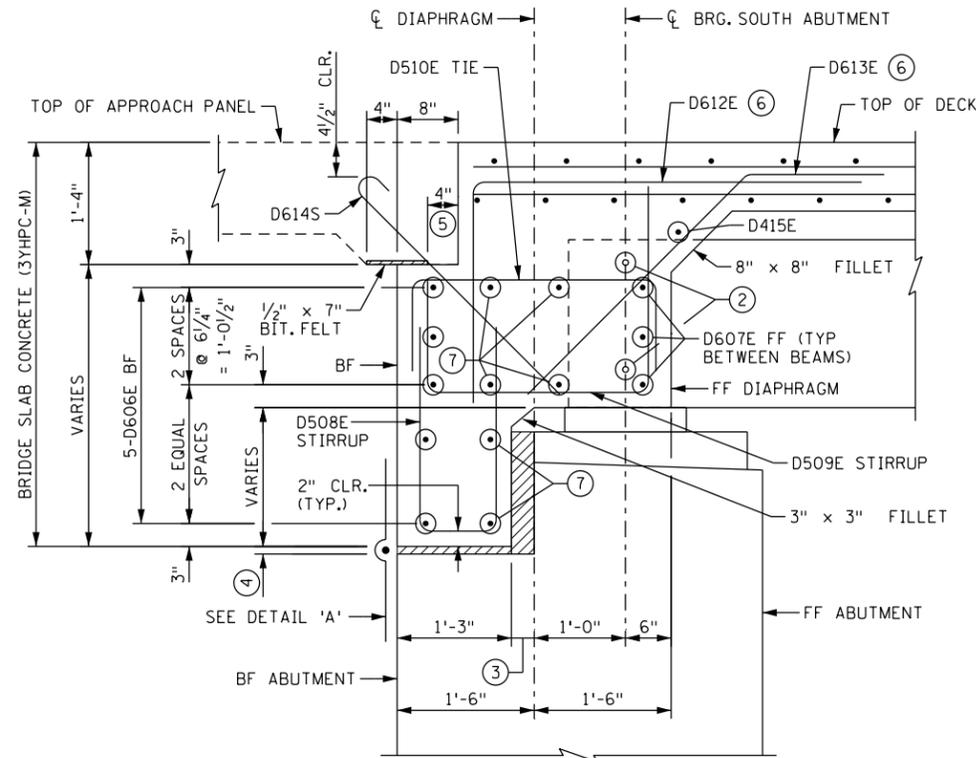
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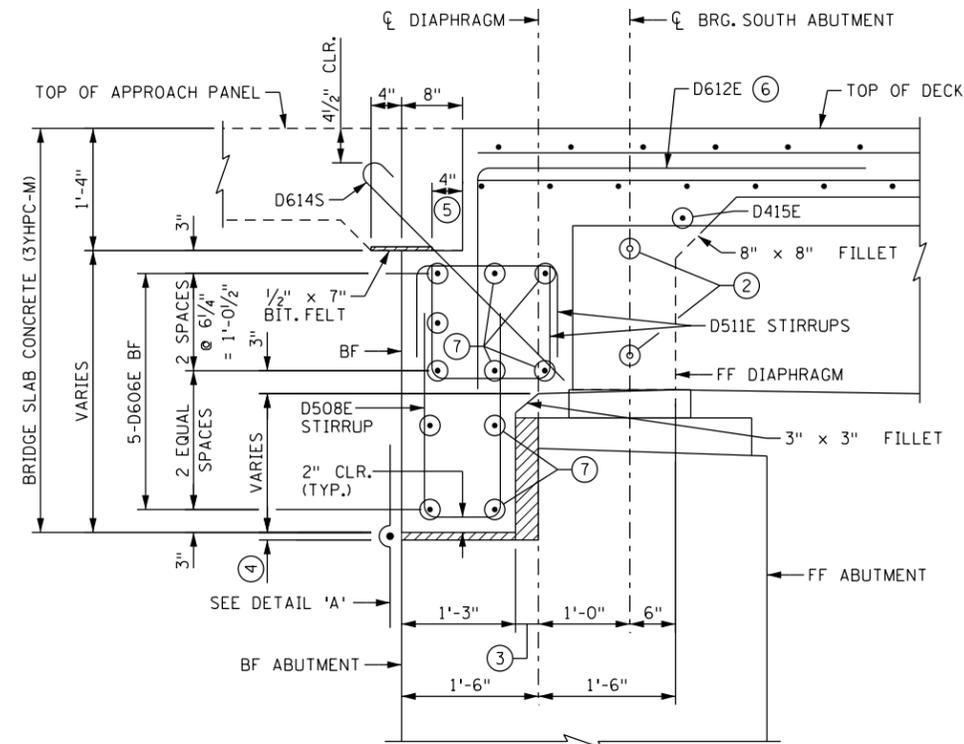
**ANOKA COUNTY**

CONCRETE END DIAPHRAGM DETAILS  
CSAH 7 OVER SEELYE BROOK  
(SHEET 1 OF 2)

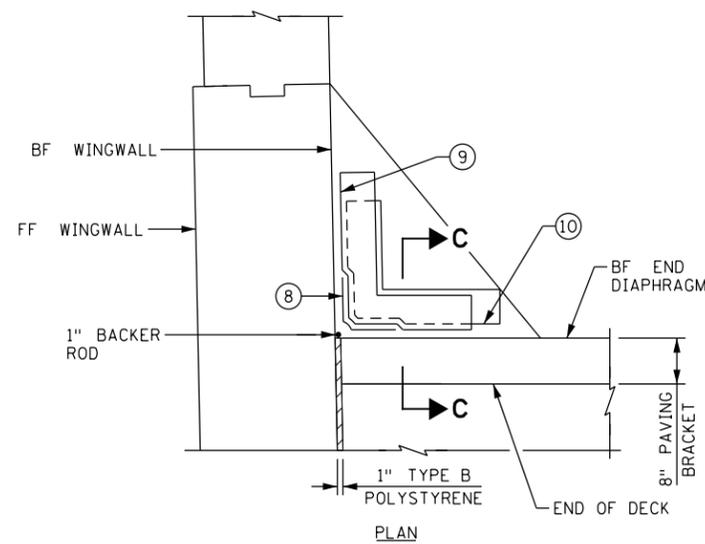
**SHEET B23 OF B37**



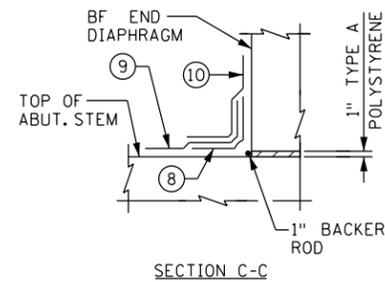
**SECTION A-A**  
(BETWEEN BEAM)



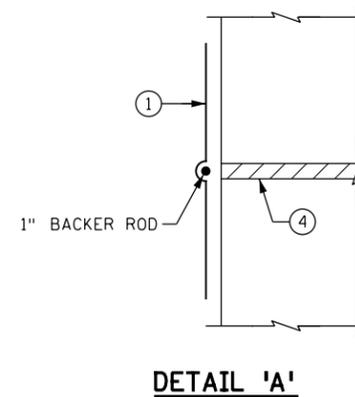
**SECTION B-B**  
(AT BEAM)



**MEMBRANE WATERPROOFING AT END DIAPHRAGM DETAIL (11)**  
(SOUTHEAST CORNER SHOWN, OTHERS SIMILAR)



**SECTION C-C**



**DETAIL 'A'**

**NOTES:**

- FF DENOTES FRONT FACE  
BF DENOTES BACK FACE
- (1) MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B EXCEPT THE STRIP SHALL BE 24" WIDE TO ALLOW MOVEMENT. WATERPROOFING IS INCIDENTAL TO "BRIDGE SLAB CONCRETE (3YHPC-M)".
- (2) (2) THREADED ROD (TYP.) SEE PRESTRESSED CONCRETE BEAM DIAPHRAGM CONNECTION DETAIL SHEET B19 FOR DETAILS
- (3) 3" TYPE B POLYSTYRENE.
- (4) 1" TYPE A POLYSTYRENE.
- (5) DISTANCE TO APPROACH PANEL DOWEL BAR.
- (6) TIE BAR TO TOP MAT DECK REINFORCEMENT.
- (7) D606E
- (8) MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B.
- (9) GEOTEXTILE FILTER TYPE II ATTACHED TO WINGWALL. DO NOT ATTACH TO DIAPHRAGM OR OTHER LAYER. LAP 2'-0" MIN.
- (10) GEOTEXTILE FILTER TYPE II ATTACHED TO DIAPHRAGM. DO NOT ATTACH TO WINGWALL OR OTHER LAYER TO ALLOW MOVEMENT BETWEEN DIAPHRAGM & WINGWALL.
- (11) MEMBRANE WATERPROOFING SYSTEM AND GEOTEXTILE FILTER ARE INCIDENTAL TO "BRIDGE SLAB CONCRETE (3YHPC-M)".

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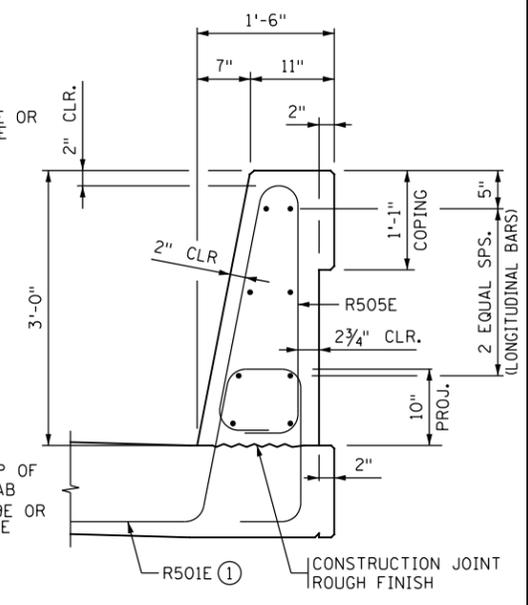
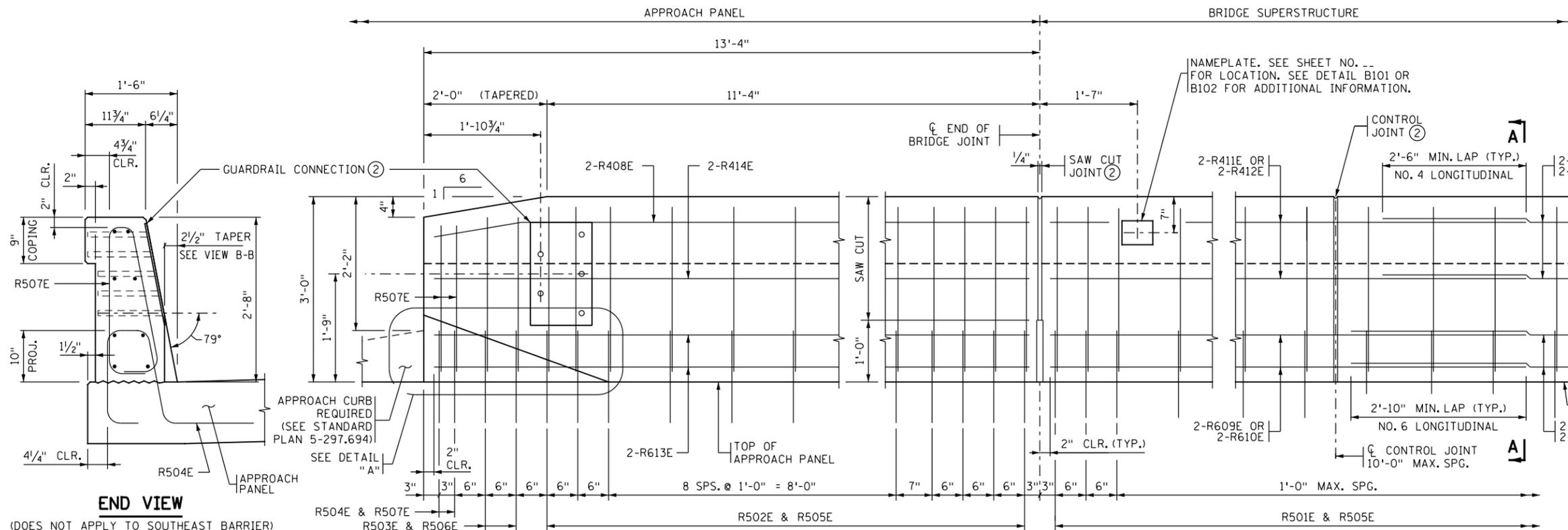
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*Rachael Durham*  
 Date: 6-13-2025 License # 55461

STATE AID PROJECT NO.  
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 BRIDGE NO.  
**02598**  
 DRAWN BY  
J. HOFFMAN  
 DESIGNED BY  
R. DURHAM  
 CHECKED BY  
C. BLACK  
 COMM. NO. 17554



**ANOKA COUNTY**  
 CONCRETE END DIAPHRAGM DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 (SHEET 2 OF 2)

**SHEET**  
**B24**  
**OF**  
**B37**



**END VIEW**  
(DOES NOT APPLY TO SOUTHEAST BARRIER)

**SECTION A-A**

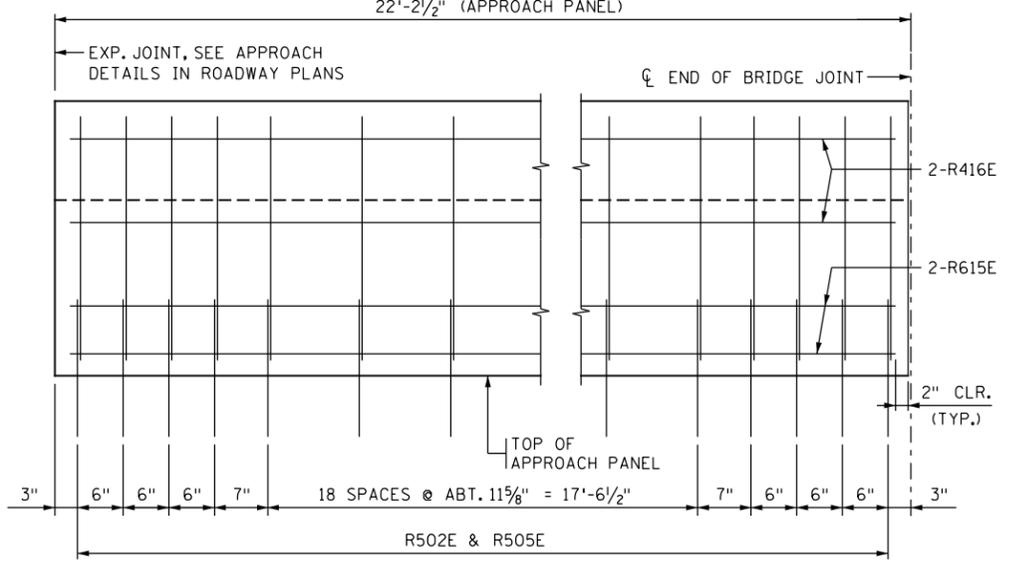
**JOINT AT ABUTMENT ②**  
(INTEGRAL OR SEMI-INTEGRAL ABUTMENT)

**CONTROL JOINT ②**

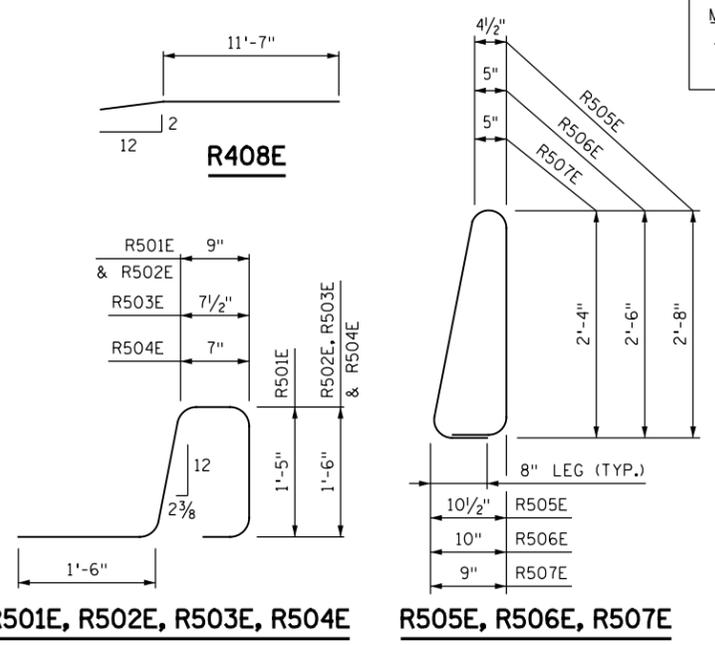
**INSIDE ELEVATION OF BARRIER**

**BARRIER MEETS MASH TL-4 REQUIREMENTS ON BRIDGE DECK AND TL-3 ON APPROACH PANEL.**

BILL OF REINFORCEMENT FOR BARRIER				
BAR	NO.	LENGTH	SHAPE	LOCATION
R501E	136	5'-7"		BARRIER DOWEL
R502E	72	5'-9"		BARRIER DOWEL
R503E	6	5'-8"		BARRIER DOWEL
R504E	6	5'-7"		BARRIER DOWEL
R505E	208	7'-1"		BARRIER VERTICAL
R506E	6	6'-9"		BARRIER VERTICAL
R507E	6	6'-5"		BARRIER VERTICAL
R408E	6	13'-0"		BARRIER LONGIT.
R609E	8	40'-0"		BARRIER LONGIT.
R610E	8	28'-0"		BARRIER LONGIT.
R411E	8	40'-0"		BARRIER LONGIT.
R412E	8	27'-8"		BARRIER LONGIT.
R613E	12	13'-0"		BARRIER LONGIT.
R414E	6	13'-0"		BARRIER LONGIT.
R615E	4	21'-10"		BARRIER LONGIT.
R416E	4	21'-10"		BARRIER LONGIT.



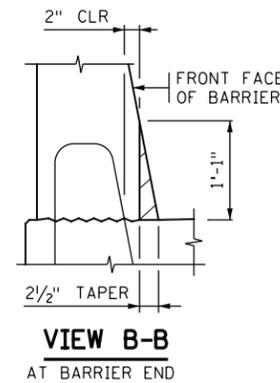
**INSIDE ELEVATION OF SOUTHEAST BARRIER**



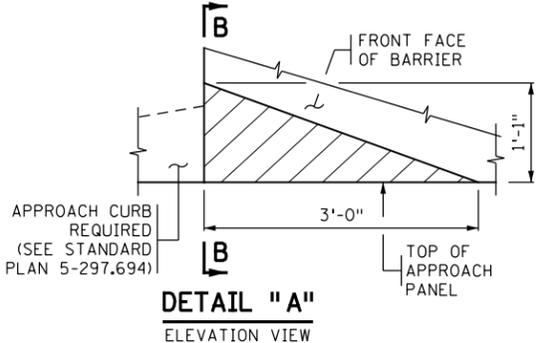
**MODIFICATIONS:**  
- ADDED INSIDE ELEVATION OF SOUTHEAST BARRIER

**GENERAL NOTES**

- FOR SLIPFORM CONSTRUCTION, TIE 100% OF THE REINFORCEMENT BAR INTERSECTIONS IN THE BARRIER.
- CONCRETE BARRIER = 496 LBS./FT. (0.123 CU. YDS./FT.)
- FINISH ALL EDGES OF BARRIER WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.
- SPACE CONTROL JOINTS AT 10 FT. MAXIMUM. REFER TO SUPERSTRUCTURE SHEET FOR SPECIFIC SPACING INFORMATION.
- NAMEPLATE IS INCIDENTAL.
- BARRIER QUANTITIES ARE LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.
- ① PLACE BAR ON TOP OF BOTTOM REINFORCEMENT MAT IN DECK.
- ② REFER TO "MISCELLANEOUS CONCRETE BARRIER AND PARAPET DETAILS" SHEET INCLUDED IN THIS PLAN SET FOR GUARDRAIL CONNECTION DETAILS AND CONTROL JOINT AND ABUTMENT JOINT DETAILS.



**VIEW B-B**  
AT BARRIER END



**DETAIL "A"**  
ELEVATION VIEW

REVISION: DECEMBER 21, 2022

APPROVED: AUGUST 24, 2016  
*Kevin Weston*  
STATE BRIDGE ENGINEER

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY *Rachael Durham* 6-13-2025  
LICENSED PROFESSIONAL ENGINEER  
NAME: RACHAEL DURHAM LIC. NO. 55461

TITLE: **CONCRETE BARRIER 36" (TYPE S, TL-4)**  
INTEGRAL OR SEMI-INTEGRAL ABUTMENT WITH GUARDRAIL CONNECTION (WITHOUT CONCRETE WEARING COURSE)

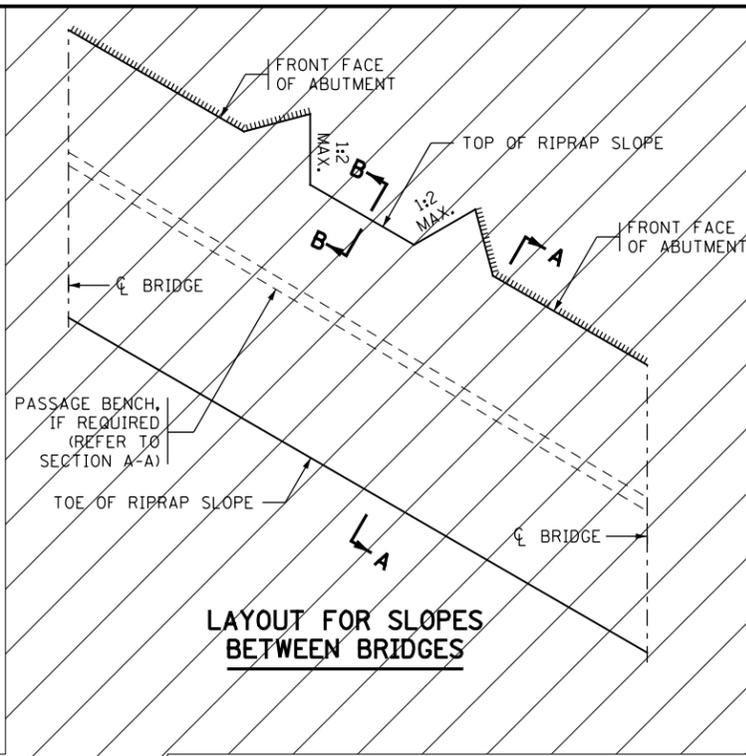
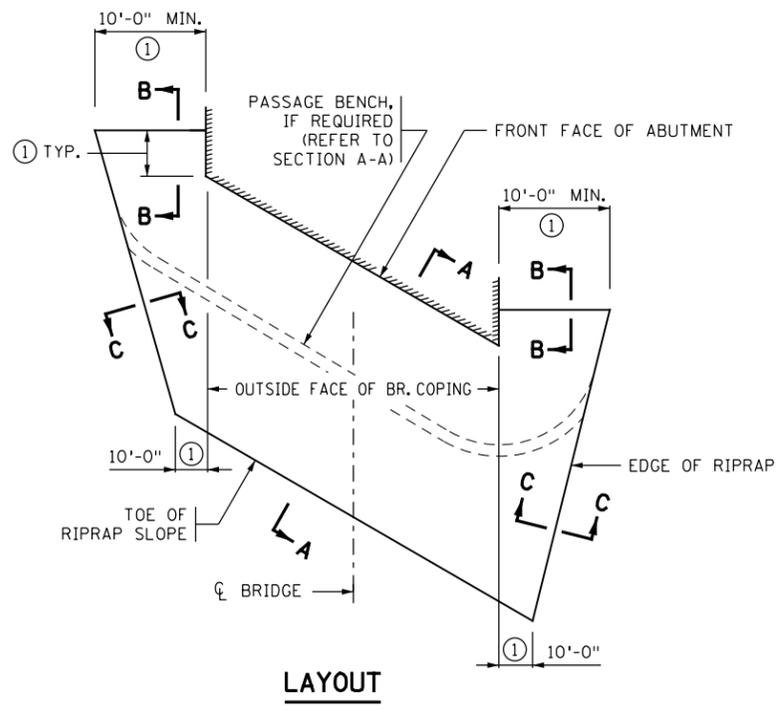
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CHK: RAD	CHK: RAD	SHEET NO. B25 OF B37 SHEETS	

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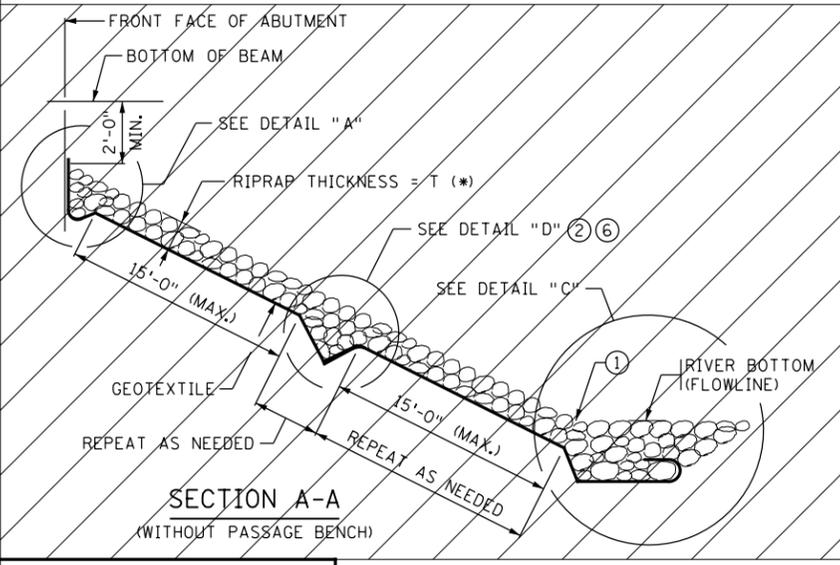
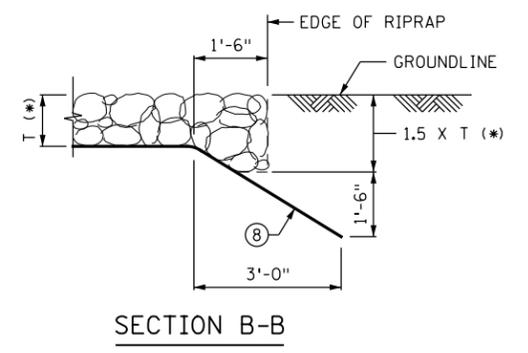
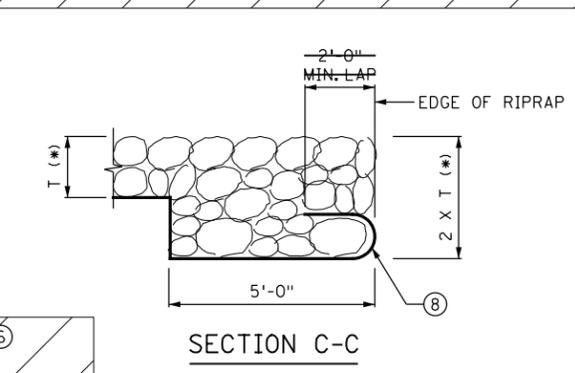
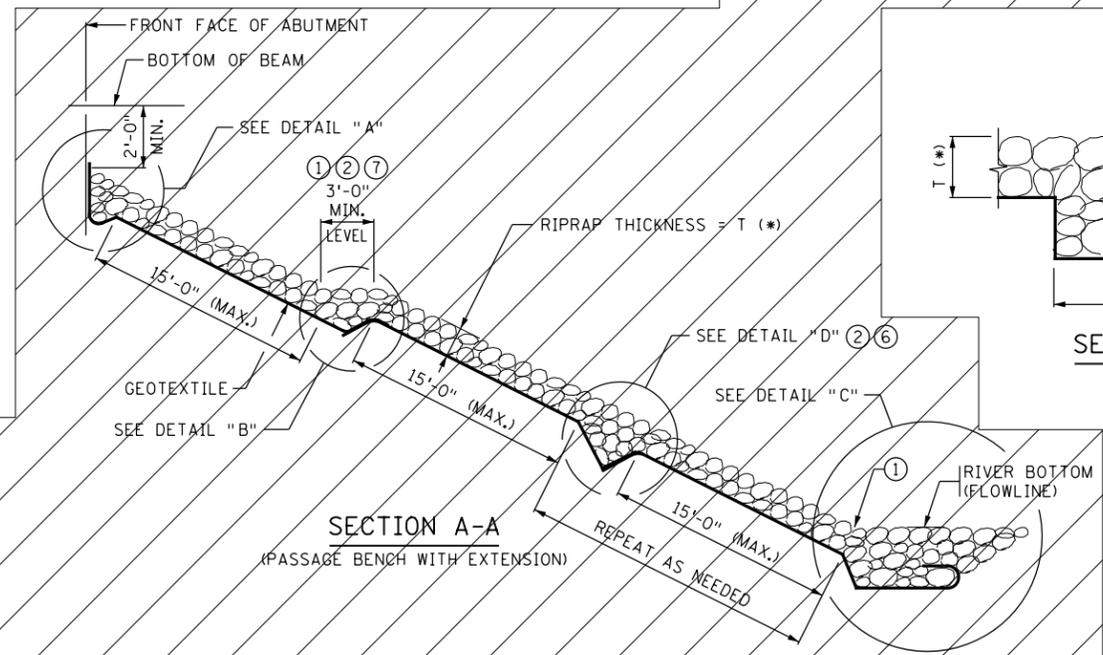
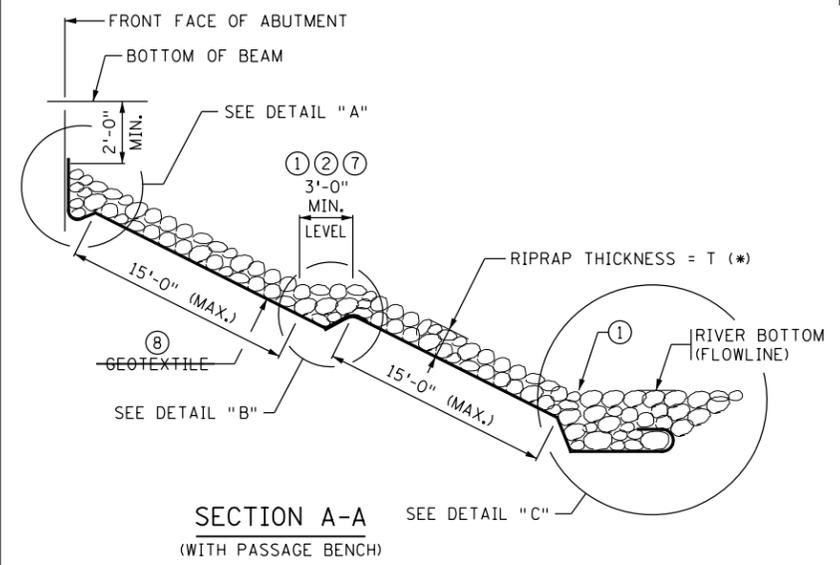
**MODIFICATIONS:**

- REPLACED GEOTEXTILE WITH 6" GRANULAR FILTER.
- REPLACED COARSE FILTER AGGREGATE AT BENCHES WITH AGGREGATE SURFACING SPECIAL.



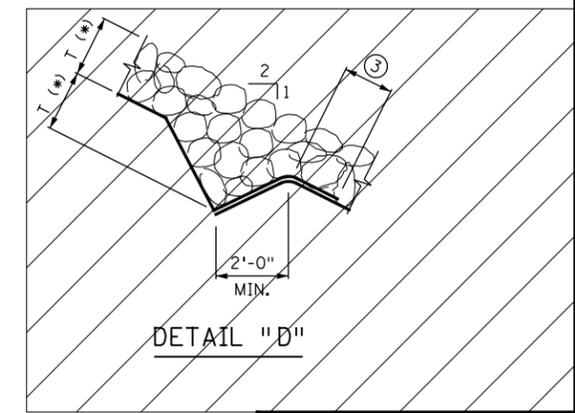
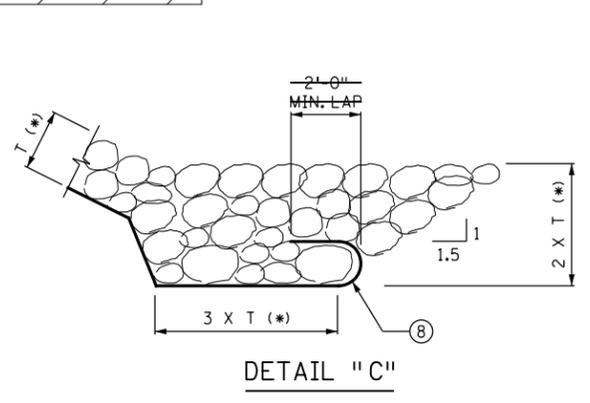
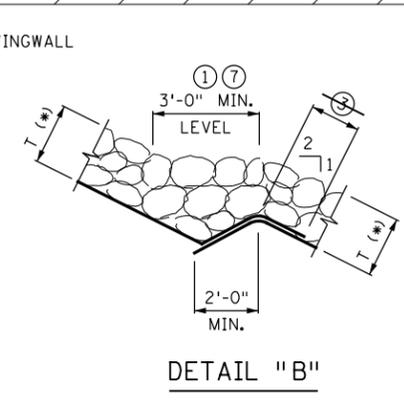
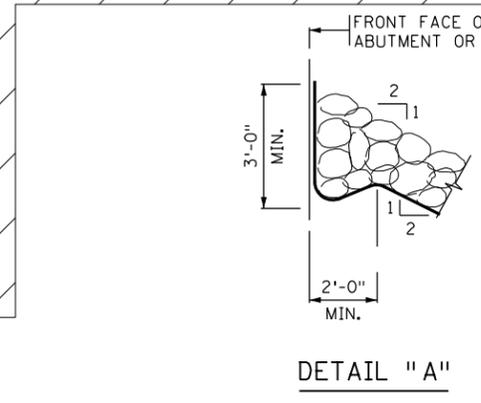
**GENERAL NOTES**

- ~~GEOTEXTILE TYPE 7 IN ACCORDANCE WITH SPEC. 3733, BY THE SQ. YD.~~
- RIPRAP IN ACCORDANCE WITH SPEC. 2511, RANDOM RIPRAP CLASS III BY THE CU. YD.
- SLOPES ARE EXPRESSED AS A RATIO OF VERTICAL DISTANCE : HORIZONTAL DISTANCE.
- SLOPE BOTTOM OF TRENCHES 1:20 PARALLEL TO ABUTMENT FACE TO PROVIDE POSITIVE DRAINAGE.
- SEE PLAN SHEET NO. B1 FOR DIMENSIONS, AND FOR ELEVATIONS OF RIPRAP TOE AND PASSAGE BENCHES.
- PLACE RIPRAP STARTING FROM THE BOTTOM OF THE SLOPE. DO NOT PLACE RIPRAP IN TRENCH UNTIL RIPRAP HAS BEEN PLACED ON ENTIRE SLOPE BENEATH THE TRENCH.
- OVERLAP GEOTEXTILE 2'-0" MINIMUM.
- WRAP GEOTEXTILE AROUND TOE, OVERHANG BETWEEN 1ST AND 2ND LAYER OF RIPRAP. USE HAND PLACEMENT OR SIMILAR METHODS TO ESTABLISH PROFILE AND PLACE FABRIC IF UNDER WATER.
- BURY EDGES OF GEOTEXTILE TO DIRECT WATER FLOW OVER THE FABRIC WITHOUT UNDERMINING.
- OMIT THE TRENCH SHOWN IN DETAIL "D" AND THE 15'-0" MAXIMUM SPACING BETWEEN TRENCHES FOR SLOPES 1:3 OR FLATTER.
- SURFACE BENCHES WITH AGGREGATE SURFACING SPECIAL (INCLUDED IN PRICE BID FOR RANDOM RIPRAP). SEE SPECIAL PROVISIONS FOR MATERIAL REQUIREMENTS. TIE BENCHES TO NATURAL GROUND LINES OUTSIDE OF BRIDGE.
- IN PLACE OF GEOTEXTILE, INSTALL RIPRAP ON 6" GRANULAR FILTER.



**\* DIMENSION T**

CLASS III	= 1'-6"
CLASS IV	= 2'-0"
CLASS V	= 2'-6"



REVISED: DECEMBER 21, 2022

APPROVED: MAY 24, 2011

*Nancy Sibenberger*  
STATE BRIDGE ENGINEER

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY *Rachael Durham* 6-13-2025  
LICENSED PROFESSIONAL ENGINEER DATE  
NAME: RACHAEL DURHAM LIC. NO. 55461

TITLE: **RIPRAP SLOPE WITH GEOTEXTILE (SLOPES 1:2 AND FLATTER)**

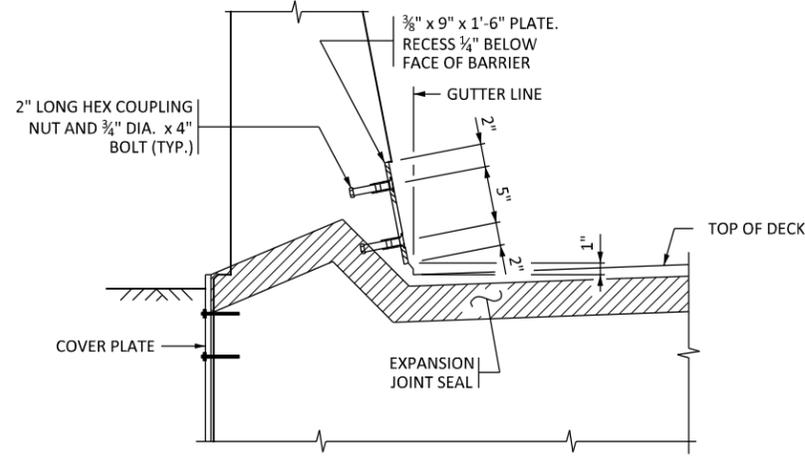
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CHK: RAD CHK: RAD  
APPROVED: SHEET NO. B27 OF B37 SHEETS

FIG. 5-397.309

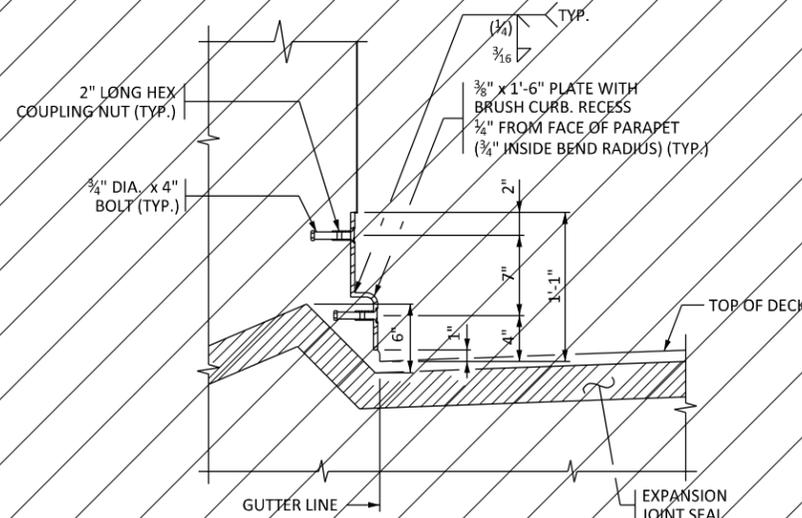
BRIDGE NO. 02598

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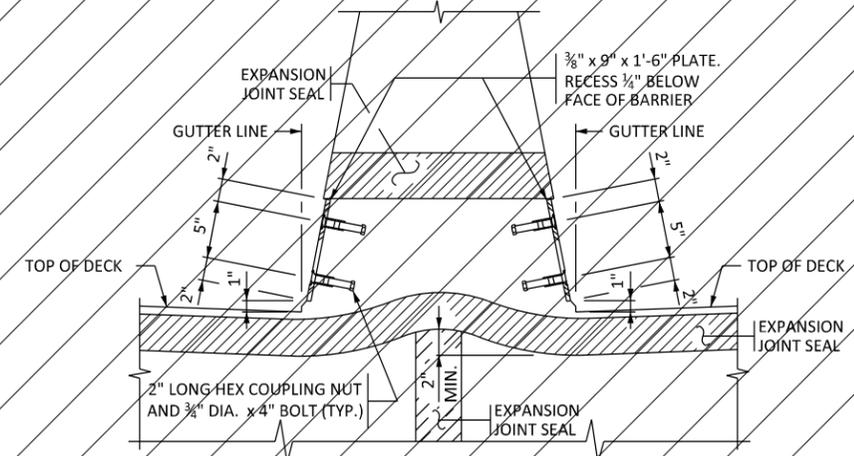
REV. NO.	DATE	REVISION DESCRIPTION	BY



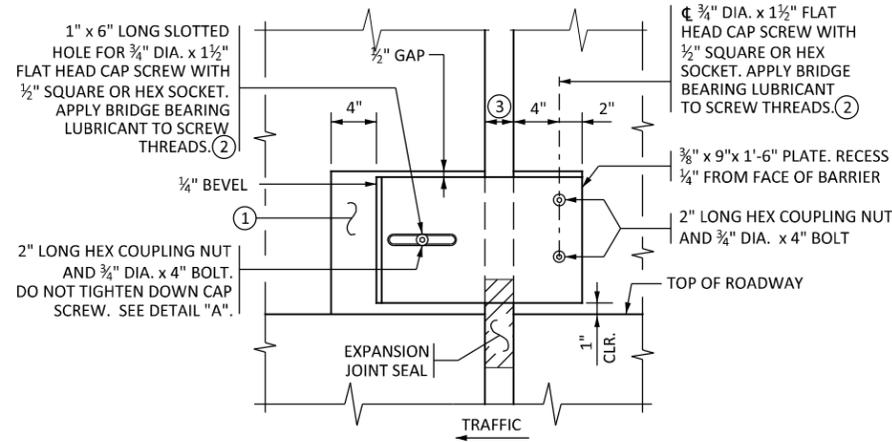
SECTION THROUGH BARRIER  
TYPE S BARRIER



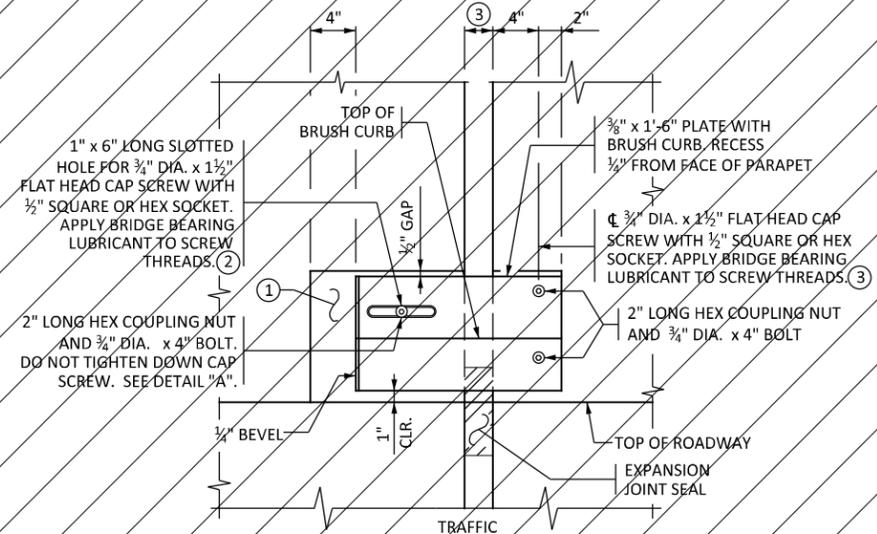
SECTION THROUGH PARAPET



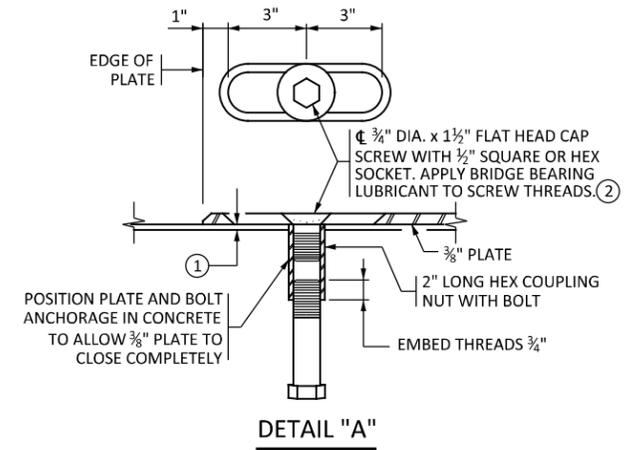
SECTION THROUGH SOLID MEDIAN BARRIER



BARRIER ELEVATION



PARAPET ELEVATION



DETAIL "A"

**GENERAL NOTES:**

- PROVIDE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306 OR 3310.
- GALVANIZE STRUCTURAL STEEL AFTER FABRICATION IN ACCORDANCE WITH SPEC. 3394. GALVANIZE FASTENERS IN ACCORDANCE WITH SPEC. 3392.
- SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SPEC. 2471.
- COUNTERSINK CAP SCREWS 1/16" BELOW TOP OF PLATE.
- FURNISHING AND INSTALLING COVER PLATES IS INCIDENTAL.

- ① PROVIDE SMOOTH CONCRETE FINISH BENEATH PLATE WITH 0" MIN. TO 1/8" MAX. GAP BETWEEN CONCRETE AND UNDERSIDE OF PLATE. PROVIDE BOND BREAKER (DUCT TAPE, ETC.) TO UNDERSIDE OF COVER PLATE.
- ② PROVIDE LUBRICANT IN ACCORDANCE WITH MnDOT APPROVED/QUALIFIED PRODUCTS LIST: BRIDGE GREASE.
- ③ REFER TO STANDARD PLAN 5-297.223 FOR EXPANSION JOINT TYPE AND STANDARD PLANS 5-297.225 AND 5-297.226 FOR SILL AND EXPANSION JOINT DETAILS.

REVISION:  
APPROVED: MAY 21, 2025  
*Edward A. Sutzger*  
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY *Rachael Durham* 6-13-2025  
LICENSED PROFESSIONAL ENGINEER DATE  
NAME: RACHAEL DURHAM LIC. NO. 55461

TITLE: **BRIDGE APPROACH PANEL BARRIER/PARAPET COVER PLATE DETAILS**

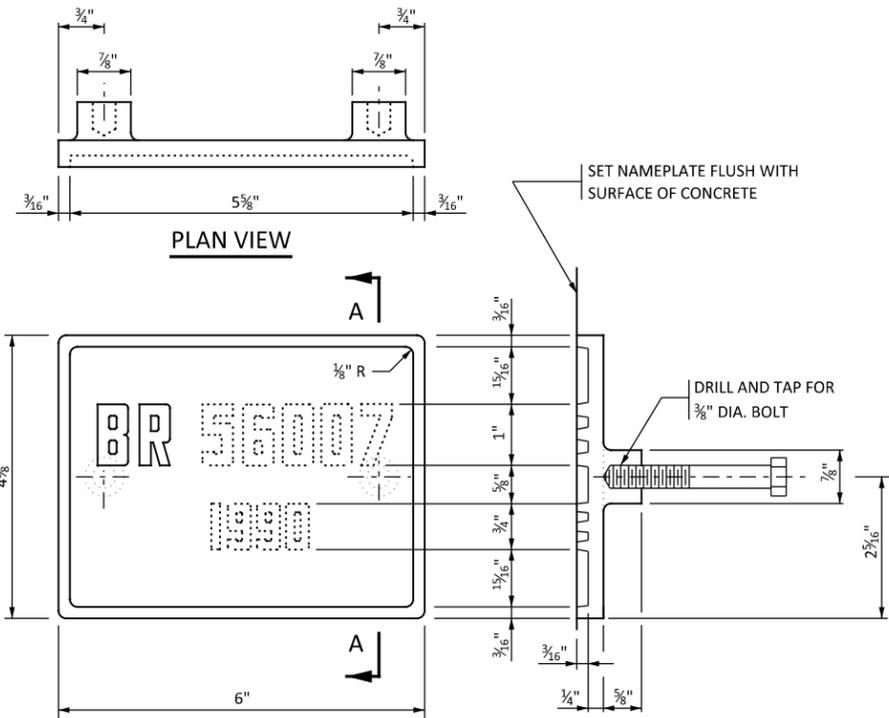
DES: CEB	DR: CEB	APPROVED:
CHK: RAD	CHK: RAD	

SHEET NO. B28 OF B37 SHEETS

FIG. 5-397.635(A)

BRIDGE NO. 02598

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THE DASHED NUMBERS SHOWN ABOVE ARE FOR ILLUSTRATION. SHOW THE FOLLOWING DATA ON THE NAMEPLATE:

BRIDGE 02598  
 YEAR 2025 ①

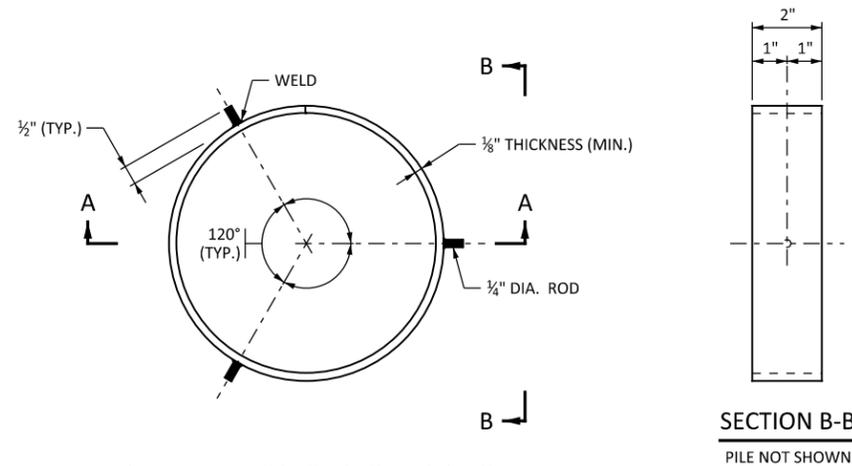


NUMBERS FOR NAMEPLATE

**NOTES:**

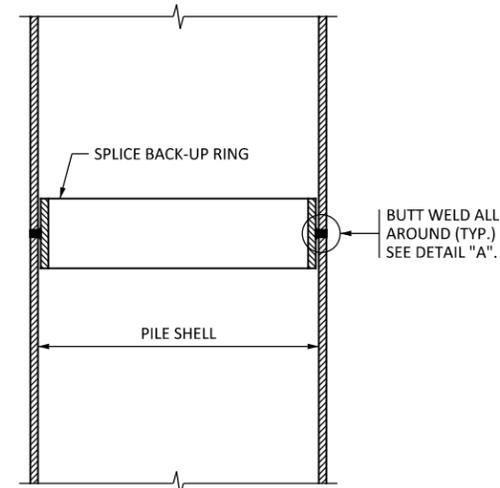
- PROVIDE MATERIAL IN ACCORDANCE WITH SPEC. 3327.
- CONFORM LETTERS AND NUMBERS TO THOSE SHOWN.
- PROVIDE DRAFT ON LETTERS AND NUMBERS OF NOT MORE THAN 3" IN 12".
- PRODUCE A BALANCED LAYOUT OF LETTERS AND NUMBERS WITH HORIZONTAL SPACING IN PROPORTION TO THAT SHOWN.
- BURNISH THE TOP SURFACE OF LETTERS, NUMBERS AND THE FRAME.
- FURNISH 2 STEEL, (260) BRASS, OR (360) BRASS HEX BOLTS 3/8" DIA. x 3" LONG WITH EACH PLATE. GALVANIZE STEEL BOLTS IN ACCORDANCE WITH SPEC. 3392.
- DIMENSIONS 3/4" TALL LETTERS AND NUMBERS IN DIRECT PROPORTION TO THOSE SHOWN FOR 1" TALL LETTERS AND NUMBERS.

① YEAR OF CONSTRUCTION

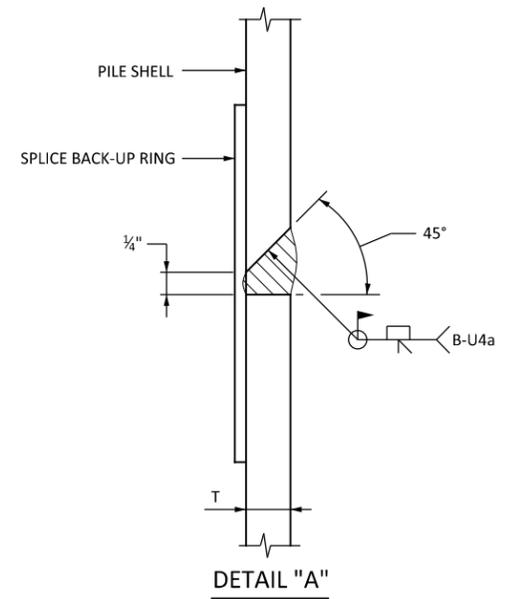


PLAN VIEW - SPLICE BACK-UP RING  
 PILE NOT SHOWN

SECTION B-B  
 PILE NOT SHOWN



SECTION A-A



DETAIL "A"

**NOTES:**

- APPROVED COMMERCIAL PILE SPLICE BACK-UP RING MAY BE USED IN LIEU OF THE TYPE DETAILED, PROVIDED THAT 1/4" ROOT IS MAINTAINED. PROVIDE BACK-UP RING WITH A TIGHT FIT.
- USE CELLULOSIC TYPE WELDING ELECTRODES E-6010 OR E-6011.
- DO NOT USE ELECTRODES THAT HAVE BECOME WET, SOILED OR DAMAGED.
- DO NOT WELD WHEN THE AMBIENT TEMPERATURE IS LOWER THAN 0° F. OR WHEN THE PILE IS WET OR EXPOSED TO FALLING RAIN OR SNOW. WHEN THE PILE METAL TEMPERATURE IS BELOW 32° F., HEAT THE PILE METAL IN THE AREA OF THE WELD TO A MINIMUM TEMPERATURE OF 70° F. AND MAINTAIN THIS TEMPERATURE DURING WELDING.

APPROVED: DECEMBER 17, 2024  
 Edward A. Rutgen  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 BRIDGE NAMEPLATE  
 (FOR NEW BRIDGES)

REVISION  
 DETAIL NO.  
 B101

APPROVED: DECEMBER 17, 2024  
 Edward A. Rutgen  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 PILE SPLICE  
 (CAST-IN-PLACE CONCRETE PILES)

REVISION  
 DETAIL NO.  
 B201

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
 Rachael Durham  
 Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
 002-607-032  
 BRIDGE NO.  
 02598

DRAWN BY  
 J. HOFFMAN  
 DESIGNED BY  
 R. DURHAM  
 CHECKED BY  
 C. BLACK  
 COMM. NO. 17554

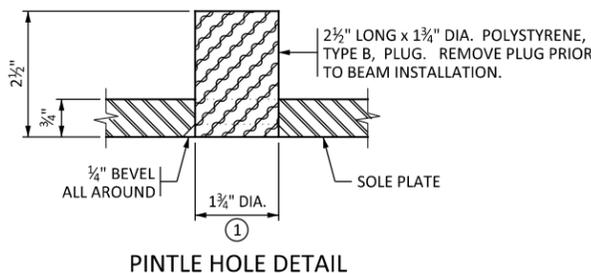
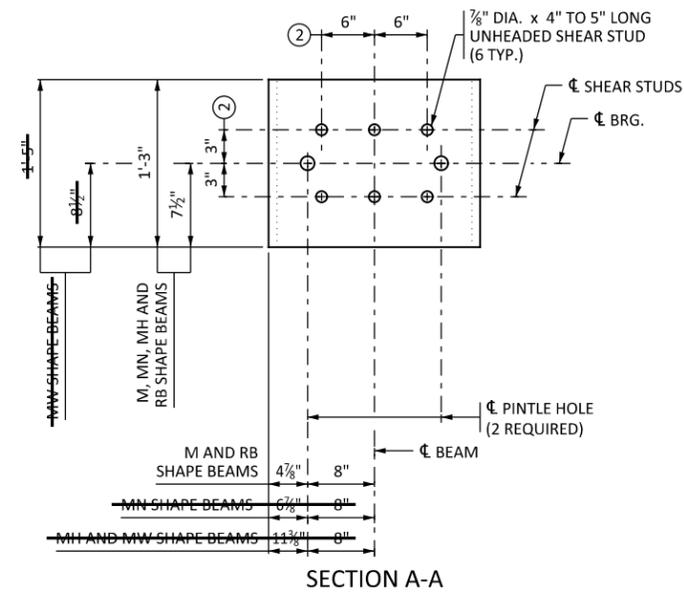
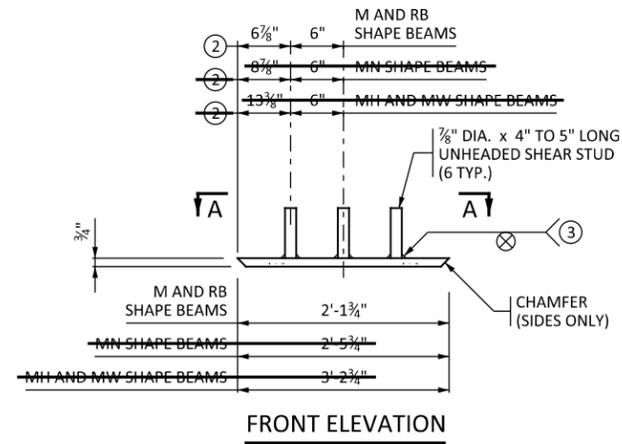


ANOKA COUNTY  
 BRIDGE DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 SHEET 1 OF 5

SHEET  
 B29  
 OF  
 B37

NO	DATE	BY	CKD	APPR	REVISION

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- NOTES:**
- PROVIDE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306.
  - PROVIDE WELDED STUDS OF WELDABLE CARBON STEEL IN ACCORDANCE WITH SPEC. 3391.2D.
  - GALVANIZE SOLE PLATE FOR BEARING ASSEMBLY IN ACCORDANCE WITH SPEC. 3394 AFTER FABRICATION.
  - ENSURE PINTLE HOLES ARE FREE OF ZINC BUILD UP FROM GALVANIZING.
  - SOLE PLATES ARE INCLUDED IN THE COST OF PRESTRESSED CONCRETE BEAMS.
  - ① FOR 1 1/2" DIA. PINTLES.
  - ② THESE DIMENSIONS MAY BE MODIFIED TO CLEAR PRESTRESSED STRANDS. HOWEVER, CHANGES MUST BE APPROVED BY THE ENGINEER.
  - ③ STUD WELDING PER AWS D1.1.

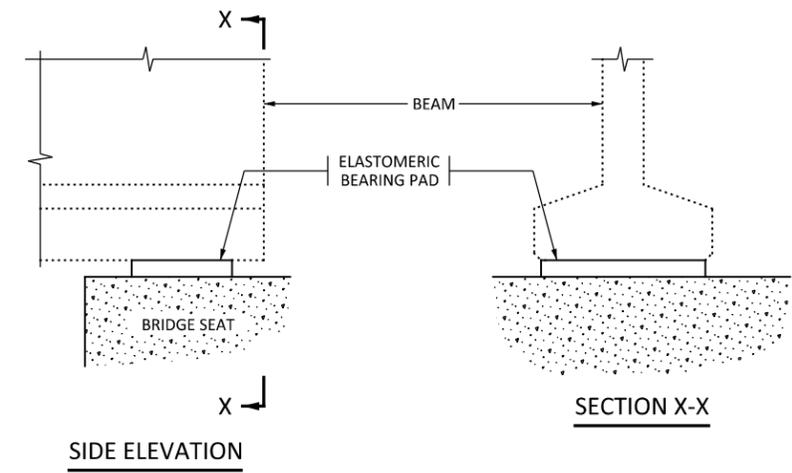
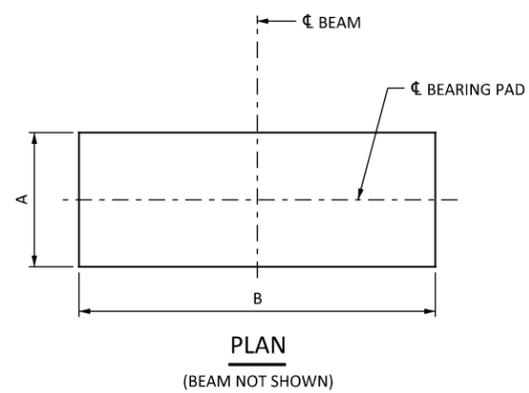


TABLE						
PAD TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR
			A	B	D ①	
P1	N. ABUT.	22RB, <del>M, MN</del>	12	24	1/2	8.0
		<del>MH</del>	<del>12</del>	<del>30</del>	<del>1/2</del>	<del>8.6</del>

- NOTES:**
- USE NEOPRENE OR NATURAL RUBBER AND FABRICATE PAD IN ACCORDANCE WITH SPEC. 3741.
  - PAYMENT FOR ELASTOMERIC BEARING PAD INCLUDED IN ITEM "ELASTOMERIC BEARING PAD" PER EACH.
  - ① "D" INDICATES THE THICKNESS OF THE BEARING PAD.

APPROVED: DECEMBER 17, 2024  
*Edward A. Sutzger*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 SOLE PLATE  
 (PRESTRESSED CONCRETE BEAMS)

REVISION  
 DETAIL NO.  
 B303

APPROVED: OCTOBER 22, 2019  
*Kevin Westrom*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 ELASTOMERIC BEARING PAD  
 (PRESTRESSED CONCRETE BEAMS)

REVISION  
 DETAIL NO.  
 B305

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
 002-607-032  
 BRIDGE NO.  
 02598

DRAWN BY  
 J. HOFFMAN  
 DESIGNED BY  
 R. DURHAM  
 CHECKED BY  
 C. BLACK  
 COMM. NO. 17554

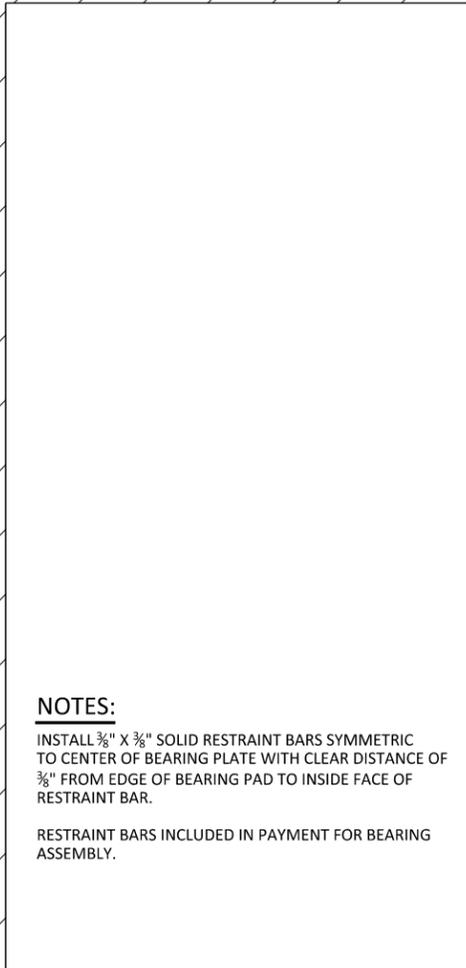
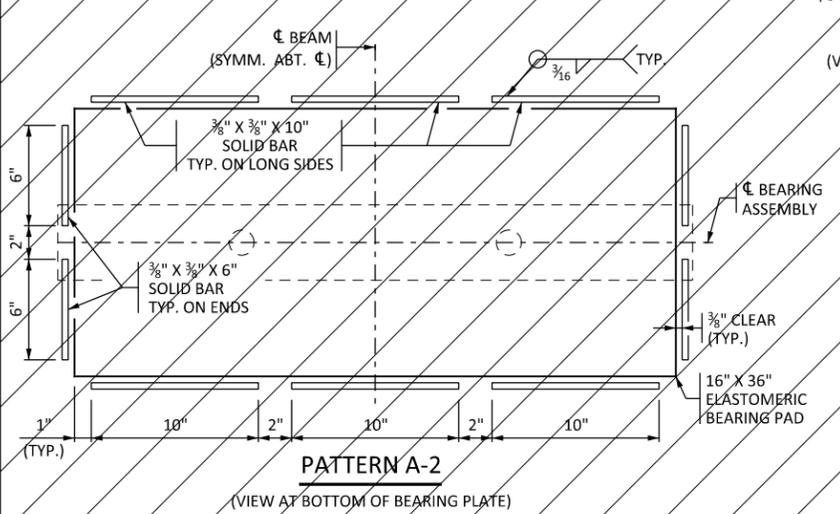
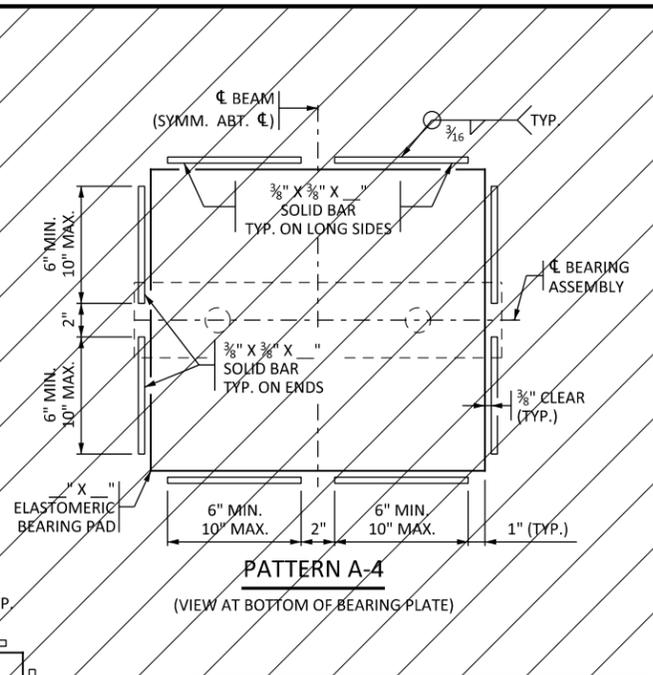
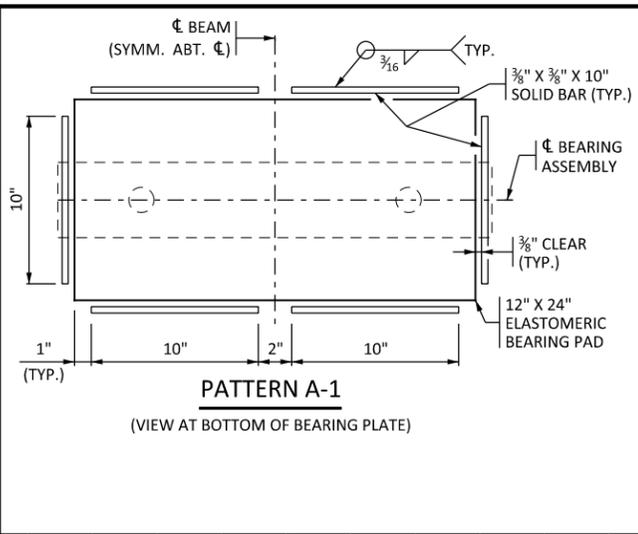


ANOKA COUNTY  
 BRIDGE DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 SHEET 2 OF 5

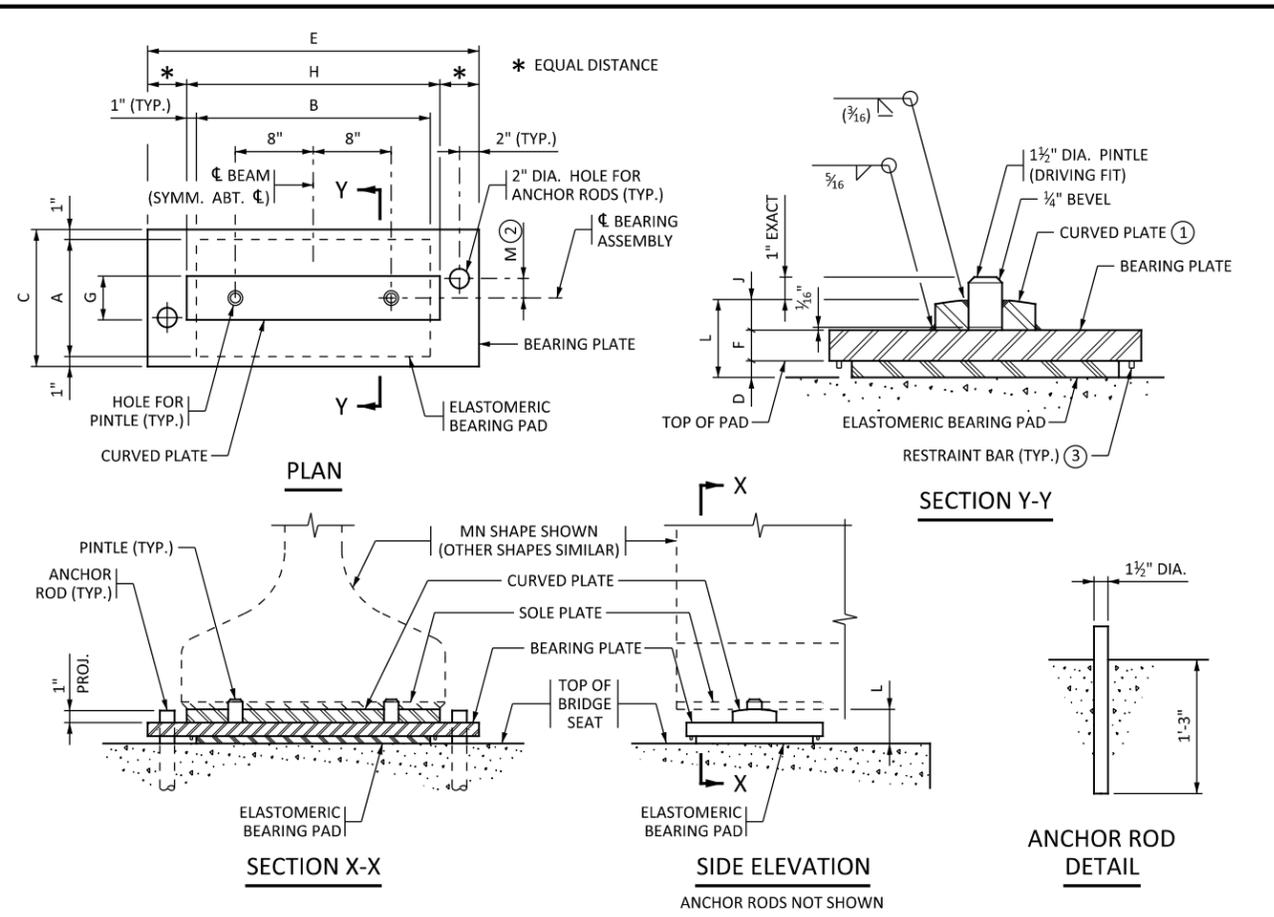
SHEET  
 B30  
 OF  
 B37

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NO	DATE	BY	CKD	APPR	REVISION



**NOTES:**  
 INSTALL 3/8\"/>



ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE				ANCHOR ROD OFFSET		ASSY. HEIGHT	RESTRAINT PATTERN
			A	B	D		C	E	F	G	H	J	R (1)	+/- (2)	M		
F1	S. ABUT.	22RB, <del>M, MN</del>	12"	24"	1/2"	8.0	14"	34"	1 1/2"	4 1/2"	26"	1 1/4"	16"	+	0"	3 1/4"	A-1
		<del>MW</del>		36"	1/2"			47"		38"	1 1/4"					3 1/4"	A-2
		<del>MH</del>		36"	1/2"			47"	1 1/2"	32"	1 1/4"					3 1/4"	A-3

**NOTES:**  
 PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION IN ACCORDANCE WITH SPEC. 3741.  
 PROVIDE STEEL PLATES IN ACCORDANCE WITH SPEC. 3306.  
 PROVIDE ROUND BARS IN ACCORDANCE WITH SPEC. 3306 FOR USE AS ANCHOR RODS. GALVANIZE IN ACCORDANCE WITH SPEC. 3394.  
 PROVIDE PINTLES IN ACCORDANCE WITH SPEC. 3309.  
 GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION IN ACCORDANCE WITH SPEC. 3394, EXCEPT AS NOTED.  
 PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

(1) THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.  
 (2) "+" DENOTES OFFSET AS SHOWN. "-" DENOTES OFFSET OPPOSITE OF SHOWN.  
 (3) REFER TO BEARING PAD RESTRAINT B-DETAIL FOR ADDITIONAL INFORMATION AND DETAILS.

APPROVED: NOVEMBER 02, 2017  
*Kevin Weston*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 BEARING PAD RESTRAINT

REVISION  
 11-08-2018  
 12-20-2018  
 12-17-2024  
 DETAIL NO.  
 B307

APPROVED: DECEMBER 17, 2024  
*Edward A. Rutgen*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 CURVED PLATE BEARING ASSEMBLY  
 (PRESTRESSED CONCRETE BEAMS)  
 (FIXED)

REVISION  
 DETAIL NO.  
 B310

NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
 002-607-032  
 BRIDGE NO.  
 02598

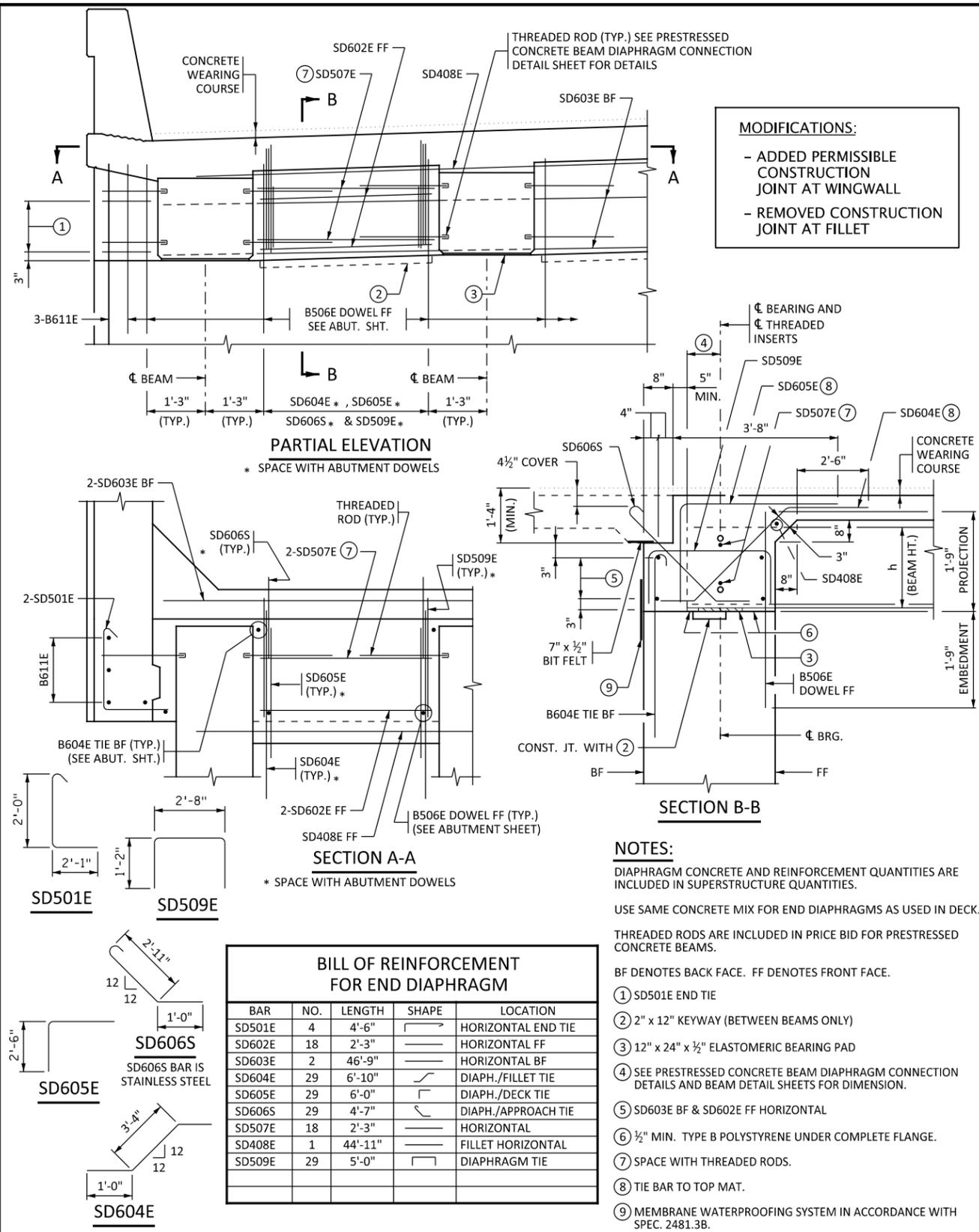
DRAWN BY  
 J. HOFFMAN  
 DESIGNED BY  
 R. DURHAM  
 CHECKED BY  
 C. BLACK  
 COMM. NO. 17554



ANOKA COUNTY  
 BRIDGE DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 SHEET 3 OF 5

SHEET  
 B31  
 OF  
 B37

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**MODIFICATIONS:**

- ADDED PERMISSIBLE CONSTRUCTION JOINT AT WINGWALL
- REMOVED CONSTRUCTION JOINT AT FILLET

**NOTES:**

DIAPHRAGM CONCRETE AND REINFORCEMENT QUANTITIES ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

USE SAME CONCRETE MIX FOR END DIAPHRAGMS AS USED IN DECK.

THREADED RODS ARE INCLUDED IN PRICE BID FOR PRESTRESSED CONCRETE BEAMS.

BF DENOTES BACK FACE. FF DENOTES FRONT FACE.

① SD501E END TIE

② 2" x 12" KEYWAY (BETWEEN BEAMS ONLY)

③ 12" x 24" x 1/2" ELASTOMERIC BEARING PAD

④ SEE PRESTRESSED CONCRETE BEAM DIAPHRAGM CONNECTION DETAILS AND BEAM DETAIL SHEETS FOR DIMENSION.

⑤ SD603E BF & SD602E FF HORIZONTAL

⑥ 1/2" MIN. TYPE B POLYSTYRENE UNDER COMPLETE FLANGE.

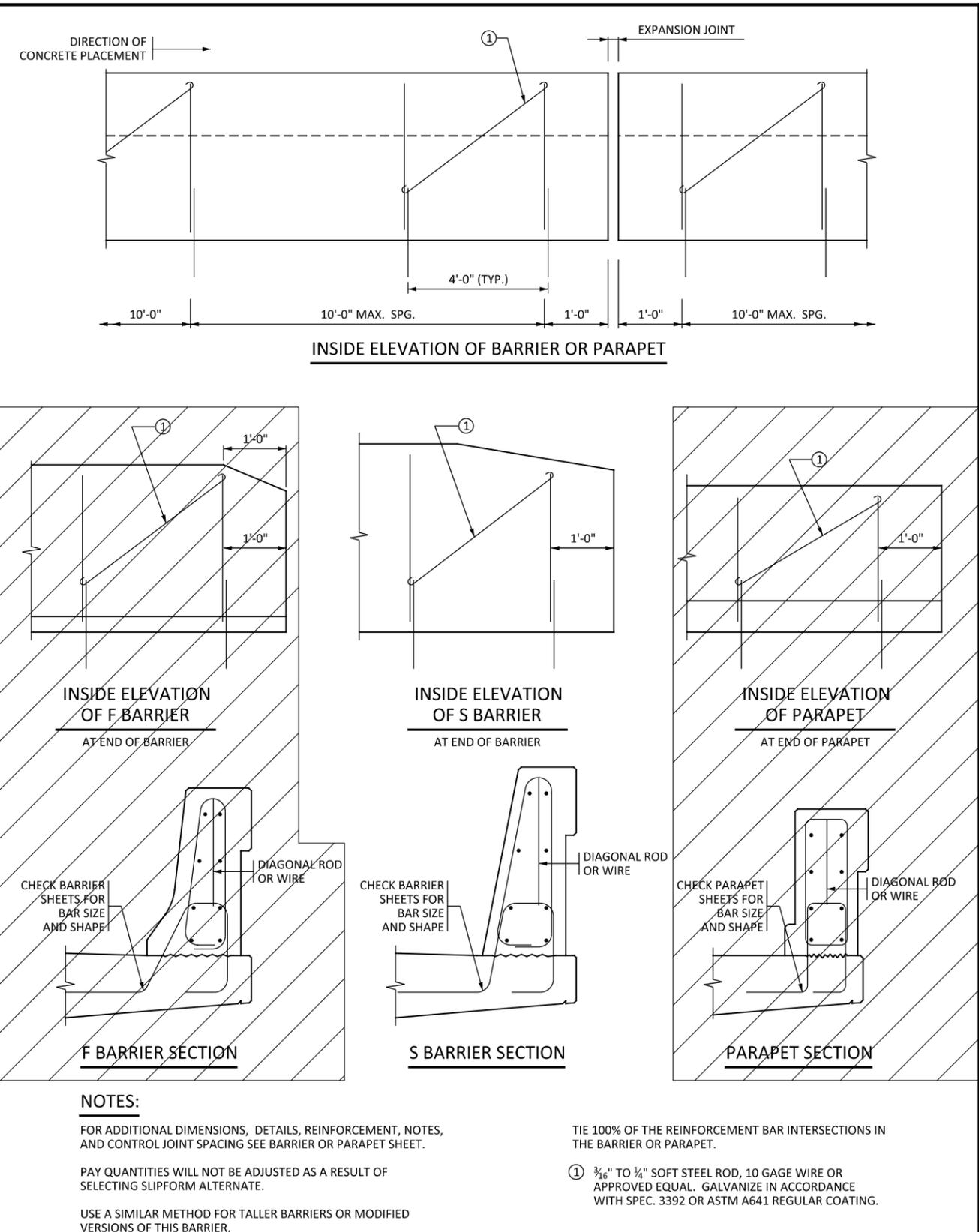
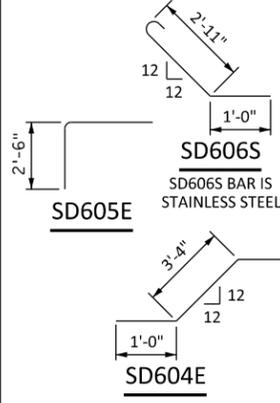
⑦ SPACE WITH THREADED RODS.

⑧ TIE BAR TO TOP MAT.

⑨ MEMBRANE WATERPROOFING SYSTEM IN ACCORDANCE WITH SPEC. 2481.3B.

**BILL OF REINFORCEMENT FOR END DIAPHRAGM**

BAR	NO.	LENGTH	SHAPE	LOCATION
SD501E	4	4'-6"	—	HORIZONTAL END TIE
SD602E	18	2'-3"	—	HORIZONTAL FF
SD603E	2	46'-9"	—	HORIZONTAL BF
SD604E	29	6'-10"	—	DIAPH./FILLET TIE
SD605E	29	6'-0"	—	DIAPH./DECK TIE
SD606S	29	4'-7"	—	DIAPH./APPROACH TIE
SD507E	18	2'-3"	—	HORIZONTAL
SD408E	1	44'-11"	—	FILLET HORIZONTAL
SD509E	29	5'-0"	—	DIAPHRAGM TIE



**NOTES:**

FOR ADDITIONAL DIMENSIONS, DETAILS, REINFORCEMENT, NOTES, AND CONTROL JOINT SPACING SEE BARRIER OR PARAPET SHEET.

PAY QUANTITIES WILL NOT BE ADJUSTED AS A RESULT OF SELECTING SLIPFORM ALTERNATE.

USE A SIMILAR METHOD FOR TALLER BARRIERS OR MODIFIED VERSIONS OF THIS BARRIER.

TIE 100% OF THE REINFORCEMENT BAR INTERSECTIONS IN THE BARRIER OR PARAPET.

① 3/16" TO 1/4" SOFT STEEL ROD, 10 GAGE WIRE OR APPROVED EQUAL. GALVANIZE IN ACCORDANCE WITH SPEC. 3392 OR ASTM A641 REGULAR COATING.

APPROVED: DECEMBER 17, 2024  
*Edward A. Dutgen*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION

**CONCRETE END DIAPHRAGM**  
 (14", 18" AND 22" RECTANGULAR PRESTRESSED CONCRETE BEAMS)  
 (INTEGRAL ABUTMENT)

REVISION

DETAIL NO. **B816 MOD**

APPROVED: AUGUST 24, 2016  
*Kevin Weston*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER OR PARAPET**  
 (SLIPFORM ALTERNATE)

REVISION

DETAIL NO. **B830**

NO	DATE	BY	CKD	APPR	REVISION

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: **RACHAEL DURHAM**

*Rachael Durham*

Date: **6-13-2025** License #: **55461**

STATE AID PROJECT NO. 002-607-032

BRIDGE NO. **02598**

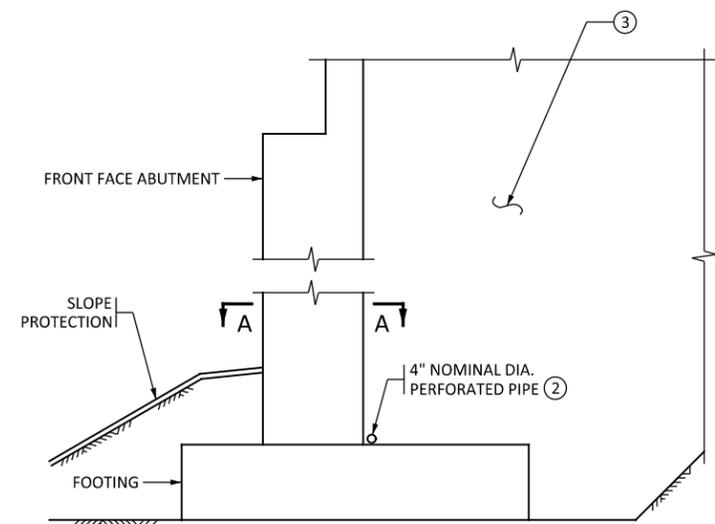
DRAWN BY J. HOFFMAN  
 DESIGNED BY R. DURHAM  
 CHECKED BY C. BLACK  
 COMM. NO. 17554

**ANOKA COUNTY**

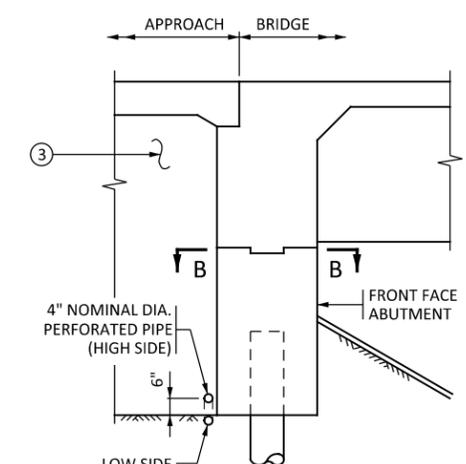
BRIDGE DETAILS  
**CSAH 7 OVER SEELYE BROOK**  
 SHEET 4 OF 5

**SHEET B32 OF B37**

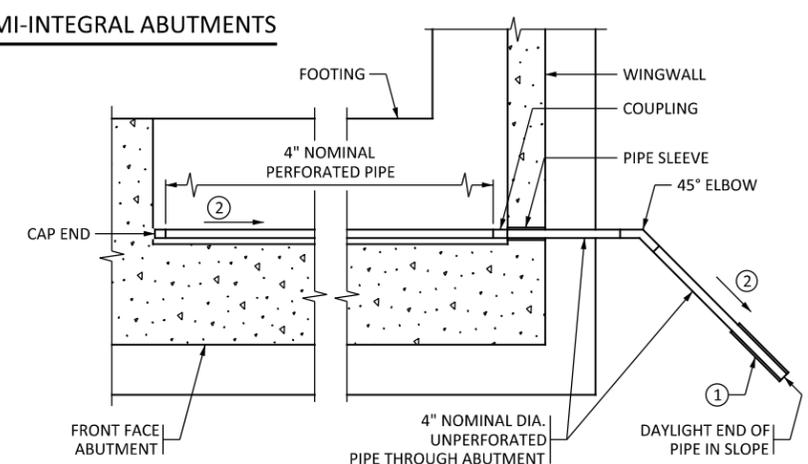
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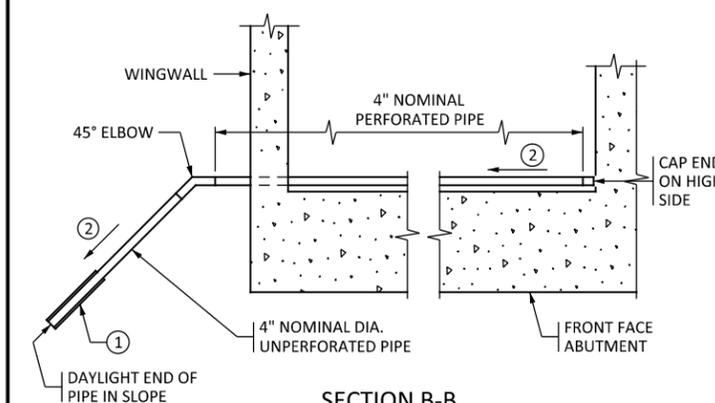
SECTION THROUGH PARAPET AND SEMI-INTEGRAL ABUTMENTS



SECTION THROUGH INTEGRAL ABUTMENT



SECTION A-A



SECTION B-B

**NOTES:**

PAYMENT WILL BE INCLUDED IN THE SINGLE LUMP SUM PRICE FOR "DRAINAGE SYSTEM TYPE (B910)", INCLUDES BUT IS NOT LIMITED TO 4" DIAMETER PERFORATED AND UNPERFORATED PIPE, ELBOWS, END CAPS, COUPLINGS, SLEEVES AND PRECAST CONCRETE HEADWALLS.

ALL PIPE TO COMPLY WITH SPEC. 3245.2(5).

SLEEVE PERFORATED PIPE WITH GEOTEXTILE KNIT SOCK IN ACCORDANCE WITH SPEC. 3733, TYPE 1. ATTACH TO PIPE IN ACCORDANCE WITH SPEC. 2502.3B.

- ① USE PRECAST CONCRETE HEADWALL WITH RODENT SCREEN. SEE STANDARD PLATE 3131 FOR DETAILS. AT CONTRACTOR'S OPTION, TIE APPROACH PANEL DRAINAGE SYSTEM AND ABUTMENT DRAINAGE SYSTEM INTO A SINGLE PRECAST CONCRETE HEADWALL OR INTO A CATCH BASIN AS LONG AS A MINIMUM OF 2% POSITIVE SLOPE CAN BE MAINTAINED.
- ② 1/8" PER FT. MINIMUM SLOPE.
- ③ REFER TO GRADING PLANS FOR ABUTMENT BACKFILL REQUIREMENTS.

APPROVED: JANUARY 13, 2015  
*Nancy Durbenberger*  
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 DRAINAGE SYSTEM

REVISION  
 12-02-2015  
 02-22-2018  
 11-08-2018  
 12-21-2022  
 12-17-2024

DETAIL NO.  
 B910

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: RACHAEL DURHAM  
*Rachael Durham*  
 Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
 002-607-032  
 BRIDGE NO.  
 02598

DRAWN BY  
 J. HOFFMAN  
 DESIGNED BY  
 R. DURHAM  
 CHECKED BY  
 C. BLACK  
 COMM. NO. 17554



ANOKA COUNTY  
 BRIDGE DETAILS  
 CSAH 7 OVER SEELYE BROOK  
 SHEET 5 OF 5

SHEET  
 B33  
 OF  
 B37

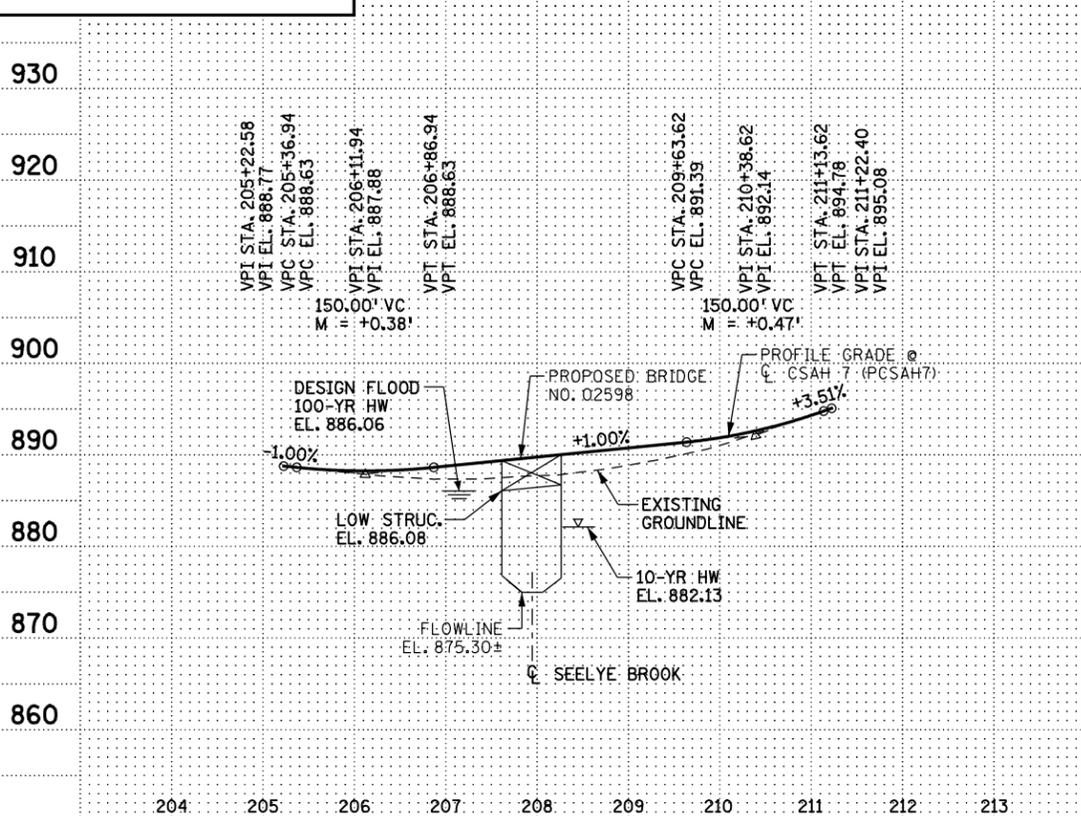
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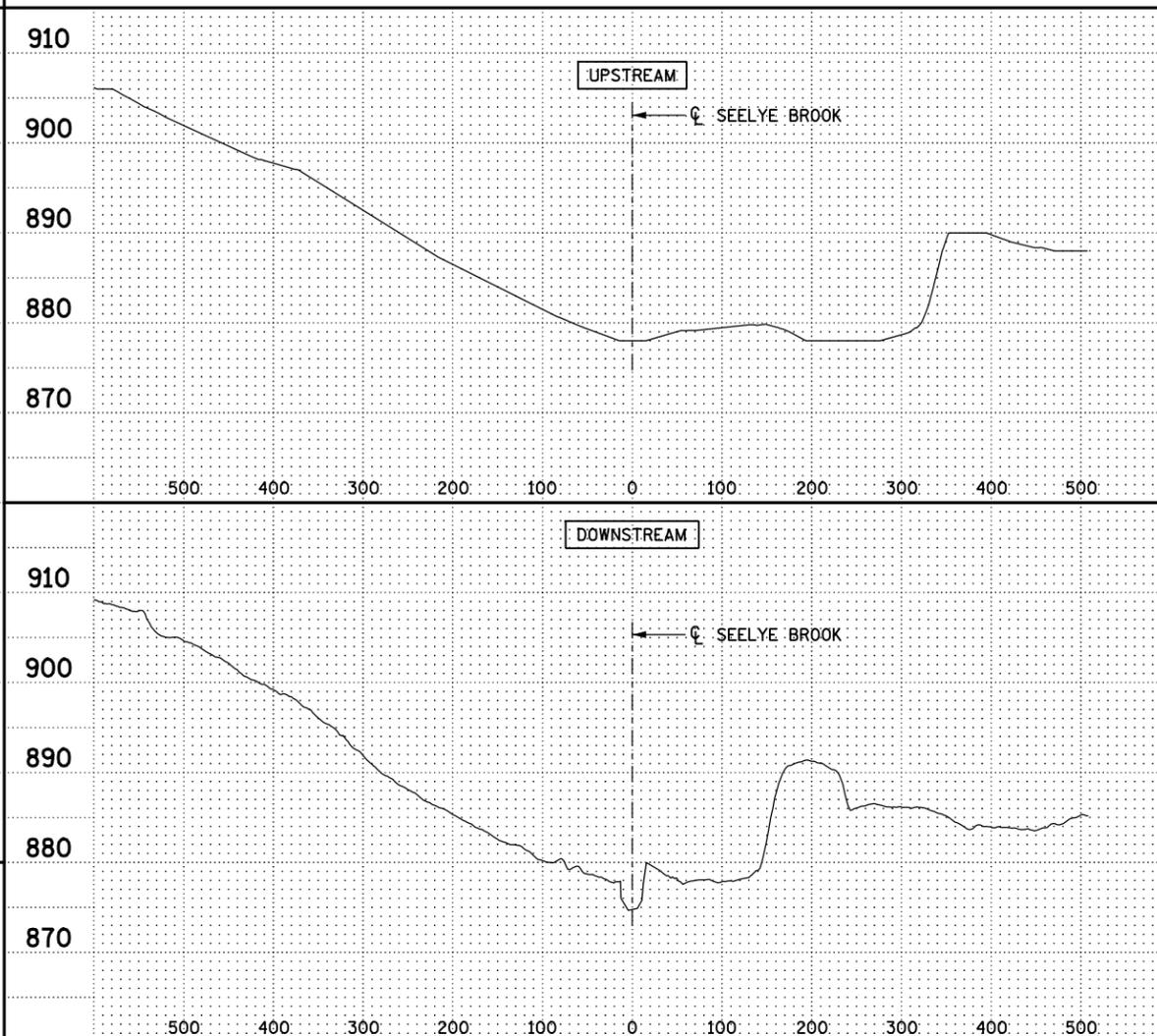
**CONTRACTED PROFILE**

SCALE:  $\frac{1}{480}$  HORIZONTAL  $\frac{1}{96}$  VERTICAL



**CSAH 7 (PCSAH7)**

**X-SECTION ALONG SEELYE BROOK**



**LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE**

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS, SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARLY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY): GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

**HYDRAULIC ENGINEERS RECOMMENDATION**  
DATE: JUNE 5, 2025

WATERWAY DESIGNATION: SEELYE BROOK  
DRAINAGE AREA: 40.0 SQ. MI.  
MAX. FLOOD ON RECORD: N/A C.F.S.  
MAX. OBSERVED HIGHWATER ELEVATION: N/A FT.  
DESIGN FLOOD (100-YR. FREQ.): 1770 C.F.S.

HEADWATER ELEVATION: 886.06 FT.  
DESIGN MEAN VELOCITY THROUGH STRUCTURE: 4.0 F.P.S.  
TOTAL STAGE INCREASE: -0.02 FT.  
LOW MEMBER AT OR ABOVE ELEVATION: 886.08 FT.

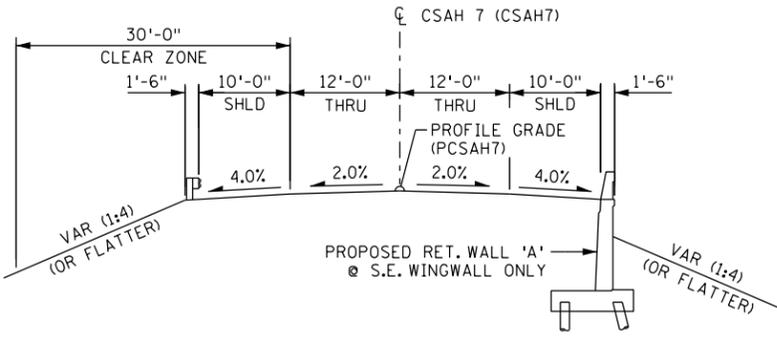
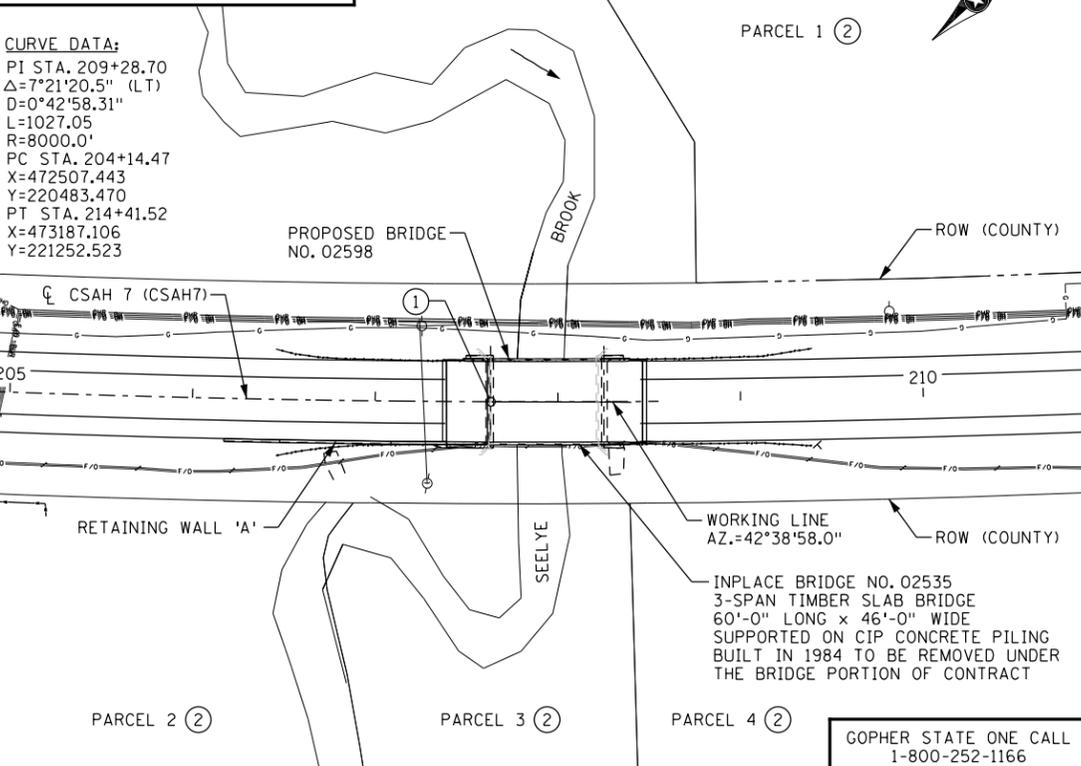
WATERWAY AREA REQUIRED BELOW ELEV. 886.06 FT. = 447 SQ. FT. AT RIGHT ANGLES TO CHANNEL  
BASIC FLOOD (100-YR. FREQ.): 1770 C.F.S.  
HEADWATER ELEVATION: 886.06 FT.  
MEAN VELOCITY THROUGH STRUCTURE: 4.0 F.P.S.  
TOTAL STAGE INCREASE: -0.02 FT.

FLOWLINE ELEVATION: 875.3 FT. SKEW ANGLE: 0.0 DEG.  
TOTAL SCOUR AT PIER EL. (500-YR.): N/A FT. (N/A FT. ESTIMATED DEPTH)  
SCOUR CODE: N

BENCH MARK 1 ELEVATION: 911.412 (NAVD88) (ADJUST 2016)  
LOCATION: 1.8 MI SW OF ST. FRANCIS, 0.8 MI S OF THE JCT OF CR 24 (NORRIS LAKE RD NW) AND TH 47 (SAINT FRANCIS BLVD NW) IN OAK GROVE, AT TH 47 MILEPOINT 32.8, 39.0 FT. SE OF TH 47, 18.0 FT. E. OF THE SE LEG OF A STREET SIGN, 6.0 FT. E. OF A POWER POLE WITH 2 GUY WIRES, 0.5 FT. W. OF A WITNESS POST.

BENCH MARK 2 ELEVATION: N/A  
LOCATION: N/A

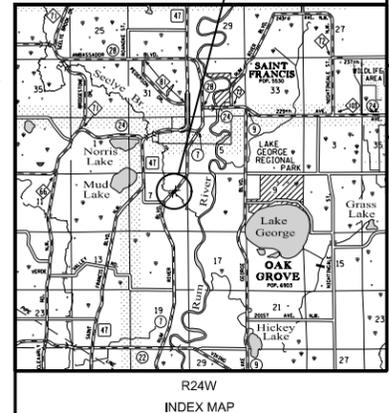
**PLAT**



**TYPICAL APPROACH SECTION (EXISTING & PROPOSED)**

**NOTES:**

- CONTROL POINT & W.P. 'C':  
CSAH 7 (CSAH7)  
STA. 207+63.20  
BRG. S. ABUT.  
X=472749.223  
Y=220734.732  
EL. 889.39
- SEE EXISTING TOPOGRAPHY PLANS IN GRADING PLANS FOR RIGHT-OF-WAY INFORMATION.



SURVEY SHEETS MADE FROM:  
SRF CONSULTING GROUP, INC. IN SRPING 2023

**ANOKA COUNTY**  
**BRIDGE SURVEY**  
AT MILE POINT ..... ON .....  
(T.H., C.S.A.H., C.R., etc.)  
PROPOSED BRIDGE LOCATED 1.2 MILES SOUTH OF  
JCT. CSAH 24 & CSAH 7  
IN THE CITY OF OAK GROVE

SEC 07 TWP 33N R 24W  
CITY OAK GROVE COUNTY ANOKA

**ANOKA COUNTY**  
**BRIDGE SURVEY**  
**CSAH 7 OVER SEELYE BROOK**

NO	DATE	BY	CKD	APPR	REVISION

17554\_sur01.dgn

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: RACHAEL DURHAM  
*Rachael Durham*  
Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
002-607-032

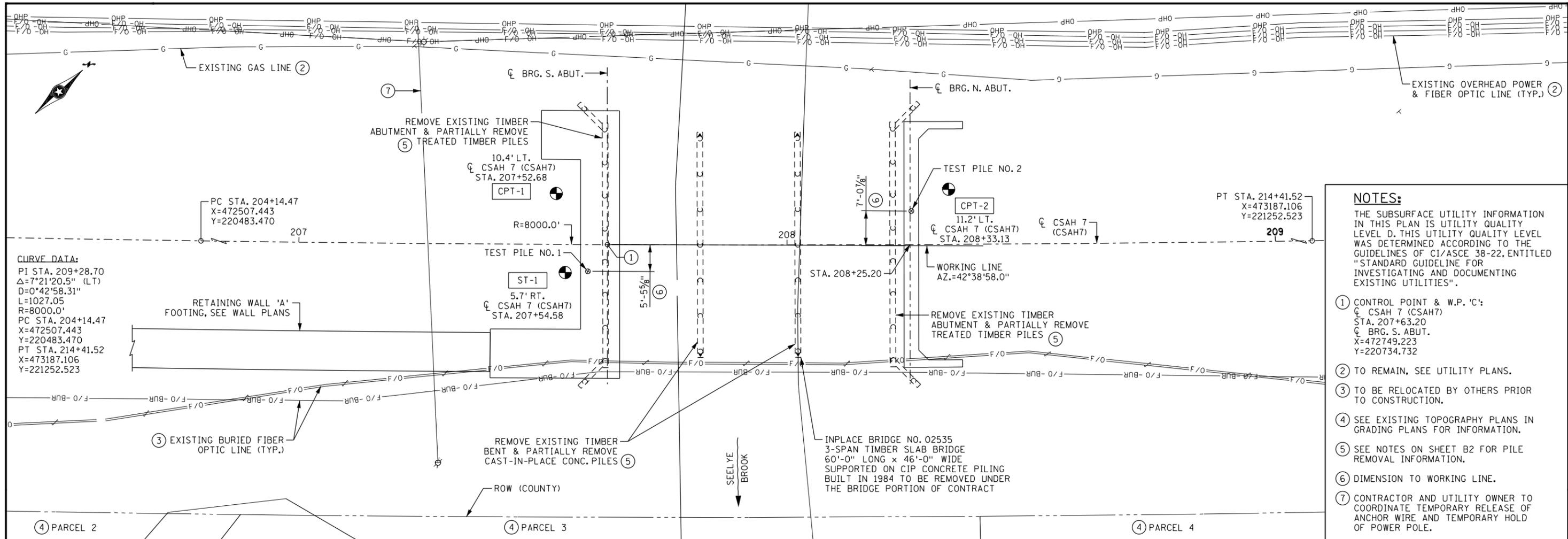
BRIDGE NO.  
**02598**

DRAWN BY  
J. HOFFMAN  
DESIGNED BY  
R. DURHAM  
CHECKED BY  
C. BLACK  
COMM. NO. 17554

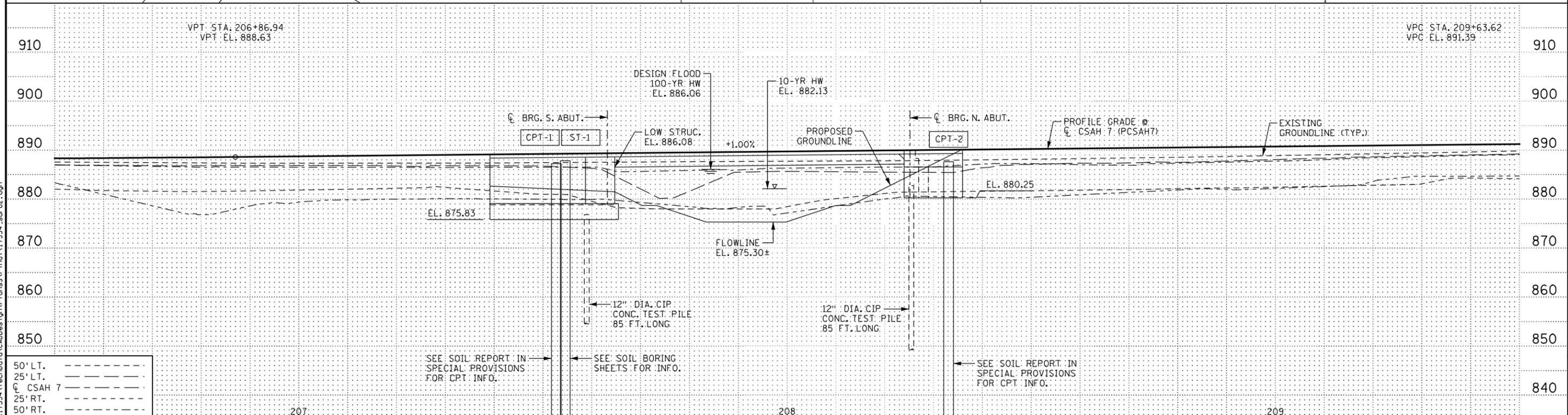


**SHEET**  
**B35**  
**OF**  
**B37**

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- NOTES:**
- THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-22, ENTITLED "STANDARD GUIDELINE FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES".
- CONTROL POINT & W.P. 'C':  
 C CSAH 7 (CSAH7)  
 STA. 207+63.20  
 C BRG. S. ABUT.  
 X=472749.223  
 Y=220734.732
  - TO REMAIN, SEE UTILITY PLANS.
  - TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION.
  - SEE EXISTING TOPOGRAPHY PLANS IN GRADING PLANS FOR INFORMATION.
  - SEE NOTES ON SHEET B2 FOR PILE REMOVAL INFORMATION.
  - DIMENSION TO WORKING LINE.
  - CONTRACTOR AND UTILITY OWNER TO COORDINATE TEMPORARY RELEASE OF ANCHOR WIRE AND TEMPORARY HOLD OF POWER POLE.



50' LT.	---
25' LT.	----
C CSAH 7	-----
25' RT.	-----
50' RT.	-----

NO	DATE	BY	CKD	APPR	REVISION

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Print Name: RACHAEL DURHAM

*Rachael Durham*

Date: 6-18-2025 License #: 55461

STATE AID PROJECT NO. 002-607-032

BRIDGE NO. 02598

DRAWN BY J. HOFFMAN

DESIGNED BY R. DURHAM

CHECKED BY C. BLACK

COMM. NO. 17554

**ANOKA COUNTY**

BORINGS - PLAN AND PROFILE

CSAH 7 OVER SEELYE BROOK

**SHEET B36 OF B37**

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**BORING LOG TERMINOLOGY**

C ... Clay  
L ... Loam  
S ... Sand  
SI ... Silt  
T ... Glacial Till  
G ... Gravel (No. 10 Sieve to 3 in.)

lmst ... Limestone  
Sst ... Sandstone  
Dolo ... Dolostone  
wk ... weathered  
Bldr ... Boulder (1+3 in.)

The above soil terms are from the MNDOT Triangular Textural Classification System as shown below.

blk ... Black  
brn ... Brown  
org ... Orange  
grn ... Green  
IOS ... Iron Oxide Stains

wht ... White  
yel ... Yellow  
lt ... Light  
dk ... dark  
gr ... Grey

VF ... Very Fine  
F ... Fine  
Cr ... Coarse

pl ... Plastic  
slpl ... Slightly Plastic

SPT No. MNDOT Modified Standard Penetration Test Blows per ft. with 140 lb. hammer and a standard energy of 210 ft-lbs. This energy represents 60% of the potential energy of the system and is the average energy provided by a Rope & Cathead system.

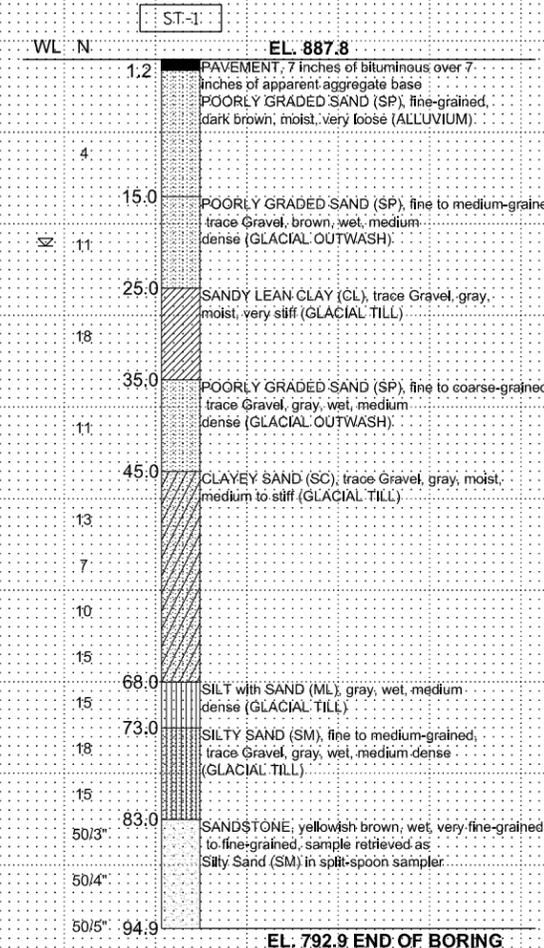
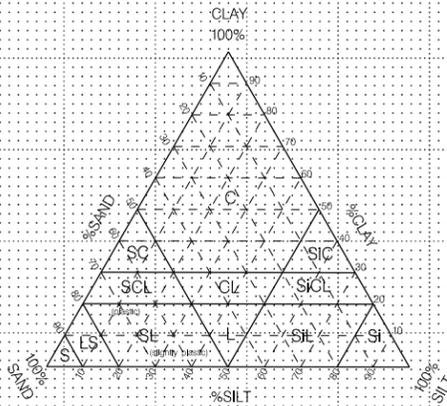
WR ... Weight of Rods  
WH ... Weight of Hammer

COH ... Cohesion (Undrained Shear Strength)  
REC ... Percent Core Recovered  
RQD ... Rock Quality Description  
(Percent of total core interval consisting of unbroken pieces 4 in. or longer)

ACL ... Average Core Length  
(Average length of core that is greater than 4 in. long)  
Core Breaks ... Number of natural core breaks per 2 ft.

▼ Measured or assumed ground water level

MNDOT Triangular Textural Classification System



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NO	DATE	BY	CKD	APPR	REVISION

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*Rachael Durham*

Date: 6-13-2025 License #: 55461

STATE AID PROJECT NO.  
002-607-032

BRIDGE NO.  
**02598**

DRAWN BY  
J. HOFFMAN

DESIGNED BY  
R. DURHAM

CHECKED BY  
C. BLACK

COMM. NO. 17554



**ANOKA COUNTY**  
BORINGS  
CSAH 7 OVER SEELYE BROOK

**SHEET B37 OF B37**