MINNESOTA DEPARTMENT OF TRANSPORTATION
ANOKA COUNTY

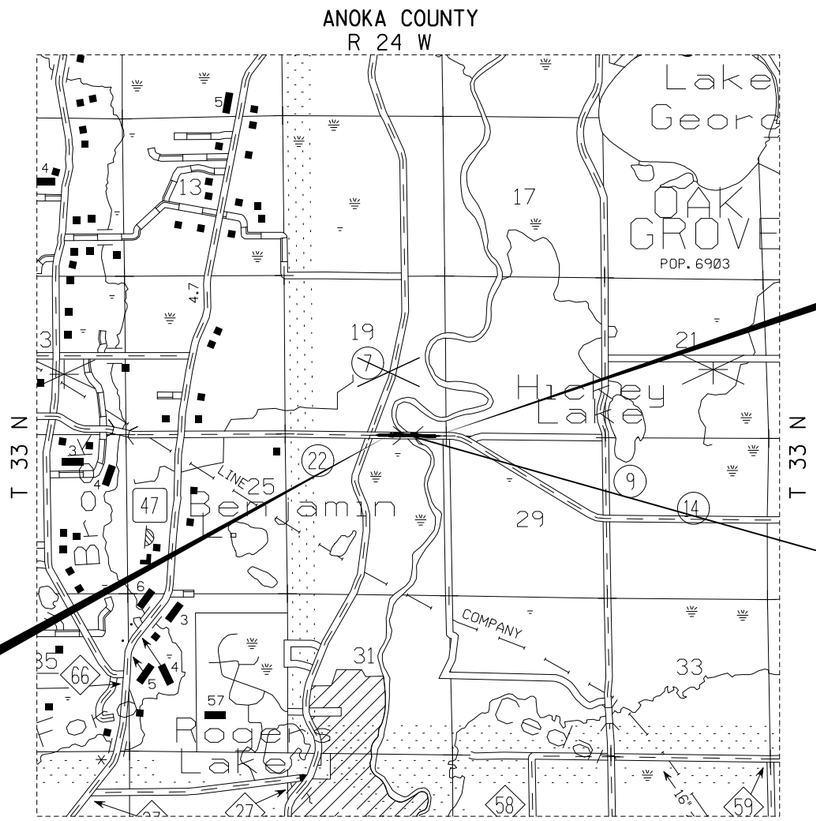
CONSTRUCTION PLAN FOR **GRADING, BITUMINOUS SURFACING, CONCRETE SURFACING, BRIDGE #02595**

LOCATED ON CSAH 22 FROM 630' EAST OF CSAH 7 TO 370' WEST OF BLACKFOOT ST. NW

STATE AID PROJ. NO. 002-622-036

GROSS LENGTH	1514.60	FEET	0.287 MILES
BRIDGES-LENGTH	238.92	FEET	0.045 MILES
EXCEPTIONS-LENGTH	0.00	FEET	0.000 MILES
NET LENGTH	1514.60	FEET	0.287 MILES

PROJECT LOCATION
ANOKA COUNTY
CITY OF OAK GROVE
MNDOT TRANSP. DISTRICT - METRO
SECTION 19,30
TOWNSHIP 33 N
RANGE 24W



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

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

SCALES

PLAN	100'	
PROFILE	100' HORIZ.	10' VERT.
INDEX MAP	1/2 MI	

CSAH 22 DESIGN DESIGNATION

FUNCTIONAL CLASSIFICATION	=	MINOR ARTERIAL	
Design Speed	55 MPH	TON DESIGN	10
Design ESALS	=	NO. OF PARKING LANES	= 0
R-VALUE	=	Based on STOPPING Sight Distance	
NO. OF TRAFFIC LANES	= 2	Height of eye 3.5' Height of object	2.0'
ADT (Current Year) 2019	= 8,914	Design Speed not achieved at:	N/A
ADT (Future Year) 2044	= 10,098	STA. N/A TO STA.	N/A MPH
T (Heavy Commercial)	= %	STA. N/A TO STA.	N/A MPH

TRAIL DESIGN DESIGNATION

Design Speed 20 MPH
Height of eye 4.5'
Height of object 0.0'

PLAN REVISIONS		
DATE	SHEET NO.	APPROVER

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GOVERNING SPECIFICATIONS

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE "SUPPLEMENTAL SPECIFICATIONS" DATED SEPTEMBER 2022 SHALL GOVERN.

INDEX

THIS PLAN CONTAINS 168 SHEETS

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: BRETT A. VOTH LICENSE # 49045

DATE: 8/10/2023 SIGNATURE: Brett Voth

Joseph MacPherson Digitally signed by Joseph MacPherson Date: 2023.08.14 10:01:46 -05'00'
APPROVED 20
ANOKA COUNTY ENGINEER

Charles D. Schwartz, PE 08/11/2023 Digitally signed by Charles D. Schwartz, PE DN: cn=Charles D. Schwartz, PE, o=US, ou=City of Oak Grove, ou=City Engineer, email=cschwartz@msa-pu.com Reason: I have reviewed this document Location: City of Oak Grove Date: 2023.08.11 08:56:11 -05'00'
APPROVED 20
CITY OF OAK GROVE ENGINEER

Lucas Lortie Digitally signed by Lucas Lortie Date: 2023.08.16 08:18:48 -05'00'
REVIEWED FOR COMPLIANCE WITH STATE AID RULES/POLICY 20
For
DISTRICT STATE AID ENGINEER

Lucas Lortie Digitally signed by Lucas Lortie Date: 2023.08.16 08:18:55 -05'00'
APPROVED FOR STATE AID FUNDING 20
For
STATE AID ENGINEER

I HEREBY CERTIFY THAT THE FINAL FIELD REVISIONS, IF ANY, WERE 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: LICENSE #

DATE: SIGNATURE:

PLAN SYMBOLS

COUNTY LINE

SECTION LINE

QUARTER LINE

SIXTEENTH LINE

NEW RIGHT OF WAY LINE

EXISTING RIGHT OF WAY LINE

PROPERTY LINE (EXCEPT LAND LINES)

VACATED PLATTED PROPERTY

CORPORATE OR CITY LIMITS

TRUNK HIGHWAY CENTER LINE

RETAINING WALL

RAILROAD

WATER LINE

MEANDER CORNER

DRAINAGE DITCH

DRAIN TILE

CULVERT

GUARD RAIL

BARBED WIRE FENCE

CHAIN LINK FENCE

XC

STONE WALL OR FENCE

HEDGE

RAILROAD CROSSING SIGN

MARSH

WOODS
ORCHARD
BRUSH
NURSERY

WOODS

CATCH BASIN

FIRE HYDRANT

BUILDING

IRON PIPE OR ROD

MONUMENT (STONE, CONCRETE OR METAL)

SMALL SIGN

UTILITY SYMBOLS

POWER POLE

TELEPHONE POLE

ANCHOR

STEEL TOWER

POWER POLE/LIGHT POLE

TELEPHONE CABINET

T

TELEPHONE PEDESTAL

T

SEWER MANHOLE OR ELECTRIC MANHOLE

M

TELEPHONE MANHOLE

U

WATER MAIN

BURIED TELEPHONE CABLE

T-BUR

OVERHEAD POWER

OHP

BURIED ELECTRIC CABLE

P-BUR

STORM SEWER

OVERHEAD UTILITY

OHU

SANITARY SEWER

GAS MAIN

G

ABANDONED GAS MAIN

G A G

SIGNAL INTERCONNECT

BURIED FIBER IN CONDUIT

F/O

BURIED FIBER OPTIC

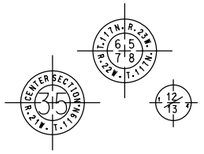
F/O -BUR-

FIBER OPTIC

F/O

COMMUNICATION LINE

SECTION SYMBOLS



NOTE: SECTION NUMBERS
READ FROM THE SOUTH.

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

GENERAL LEGEND

SHEET NO. 2 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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STATEMENT OF ESTIMATED QUANTITIES

TAB	SHEET NO.	ITEM NO.	ITEM DESCRIPTION	NOTE NO.	UNIT	TOTAL ESTIMATED QUANTITY	PARTICIPATING STATE FUNDS	
							SAP 002-622-036	CITY OF OAK GROVE SAP 223-020-006
		2021.501	MOBILIZATION		LUMP SUM	1	0.99	0.01
		2031.502	COMBINATION FIELD LABORATORY-OFFICE		EACH	1	1	
		2051.501	MAINT & RESTORATION OF HAUL ROADS		LUMP SUM	1	1	
A	8	2101.502	CLEARING		EACH	65	65	
A	8	2101.502	GRUBBING		EACH	65	65	
TC	77	2102.503	PAVEMENT MARKING REMOVAL		LIN FT	6060	6060	
H	9	2104.502	REMOVE METAL APRON		EACH	1	1	
H	9	2104.502	REMOVE MANHOLE OR CATCH BASIN		EACH	6	6	
ST	91	2104.502	REMOVE DELINEATOR / MARKER		EACH	8	8	
ST	91	2104.502	REMOVE SIGN		EACH	7	7	
K	8	2104.502	REMOVE ENERGY ABSORBING TERMINAL		EACH	3	3	
E	8	2104.503	SAWING BIT PAVEMENT (FULL DEPTH)	(2)	LIN FT	148	148	
H	9	2104.503	REMOVE SEWER PIPE (STORM)		LIN FT	208	208	
D	8	2104.503	REMOVE BITUMINOUS CURB		LIN FT	2466	2466	
D	8	2104.503	REMOVE CONCRETE RETAINING WALL		LIN FT	21	21	
K	8	2104.503	REMOVE GUARDRAIL-PLATE BEAM		LIN FT	406	406	
D	8	2104.504	REMOVE BITUMINOUS PAVEMENT	(2)	SQ YD	4655	4655	
T	B2	2104.601	REMOVE REGULATED WASTE MATERIAL (BRIDGE)		LUMP SUM	1	1	
B	7	2106.507	EXCAVATION - COMMON		CU YD	6558	6558	
B	7	2106.507	EXCAVATION - CHANNEL AND POND		CU YD	4791	4791	
B,Q	7,61	2106.507	SELECT GRANULAR EMBANKMENT MOD 10% (CV)		CU YD	3120	3120	
B	7	2106.507	COMMON EMBANKMENT (CV)		CU YD	2607	2607	
Q	61	2108.504	GEOTEXTILE FABRIC TYPE 1		SQ YD	260	260	
P	8	2118.507	AGGREGATE SURFACING (CV) CLASS 5 (P)		CU YD	51	51	
F,G,P	8	2211.507	AGGREGATE BASE (CV) CLASS 5		CU YD	1673	1597	76
D	8	2215.504	FULL DEPTH RECLAMATION		SQ YD	1149	1149	
G	8	2301.504	CONCRETE PAVEMENT 8.0"		SQ YD	1865	1865	
F	8	2360.509	TYPE SP 9.5 WEARING COURSE MIX (2,B)	(1)	TON	93		93
F	8	2360.509	TYPE SP 12.5 NON WEAR COURSE MIX (4,B)	(1)	TON	717	717	
F,P	8	2360.509	TYPE SP 12.5 WEARING COURSE MIX (4,F)	(1)	TON	1031	1031	
W,T	61,B2	2401.503	TYPE P-4 (TL-4) BARRIER CONCRETE (3S52) (P)		LIN FT	391	391	
T	B2	2401.503	TYPE S (TL-4) 36" BARRIER CONC (3S52) (P)		LIN FT	350	350	
T	B2	2401.503	TYPE S (TL-4) 54" BARRIER CONC (3S52) (P)		LIN FT	274	274	
T	B2	2401.507	STRUCTURAL CONCRETE (1G52) (P)		CU YD	156	156	
T	B2	2401.507	STRUCTURAL CONCRETE (3B52) (P)		CU YD	600	600	
T	B2	2401.508	REINFORCEMENT BARS (P)		POUND	11790	11790	
T	B2	2401.508	REINFORCEMENT BARS (EPOXY COATED) (P)		POUND	154770	154770	
T	B2	2401.508	REINFORCEMENT BARS (STAINLESS-75KSI) (P)		POUND	910	910	
T	B2	2401.518	BRIDGE SLAB CONCRETE (3YHPC-M) (P)		SQ FT	14406	14406	
T	B2	2401.601	STRUCTURE EXCAVATION		LUMP SUM	1	1	
T	B2	2401.601	FOUNDATION PREP PILE BENT PIERS		LUMP SUM	1	1	
T	B2	2401.618	BRIDGE DECK PLANING (P)		SQ FT	12826	12826	
T	B2	2402.502	BEARING ASSEMBLY		EACH	42	42	
T	B2	2405.503	PRESTRESSED CONCRETE BEAMS 36M (P)		LIN FT	1712	1712	
T	B2	2405.503	DIAPHRAGMS FOR TYPE 36M PREST BEAMS (P)		LIN FT	368	368	
R	8	2406.503	EXPANSION JOINTS, DESIGN E8		LIN FT	112	112	
R	8	2406.504	BRIDGE APPROACH PANELS		SQ YD	677	677	
Q,W	61	2411.507	STRUCTURE EXCAVATION CLASS E		CU YD	1194	1194	
W	61	2411.507	STRUCTURAL CONCRETE (1G52) (P)		CU YD	48	48	
W	61	2411.507	STRUCTURAL CONCRETE (3G52) (P)		CU YD	72	72	
W	61	2411.508	REINFORCEMENT BARS (P)		POUND	3922	3922	
W	61	2411.508	REINFORCEMENT BARS (EPOXY COATED) (P)		POUND	7761	7761	
Q	61	2411.618	PREFABRICATED MODULAR BLOCK WALL		SQ FT	1420	1420	
T	B2	2433.502	ANCH TYPE REINF BARS (STAINLESS TYPE H)		EACH	365	365	
T	B2	2433.502	ANCH TYPE REINF BARS (TYPE L)		EACH	365	365	
T	B2	2442.501	REMOVE EXISTING BRIDGE		LUMP SUM	1	1	
Q	61	2451.507	COARSE FILTER AGGREGATE (CV)		CU YD	77	77	
I	9	2451.507	FINE AGGREGATE BEDDING (CV)		CU YD	161	161	
B,W	7,61	2451.607	STRUCTURAL BACKFILL		CU YD	1806	1806	

NOTES:

(P) = PLAN QUANTITY

(1) BITUMINOUS MATERIAL FOR TACK COAT SHALL BE INCIDENTAL.

(2) SEE TYPICAL SECTIONS FOR APPROXIMATE EXISTING PAVEMENT DEPTHS.

NO	DATE	BY	CKD	APPR	REVISION
1	8/31/2023	JCN	GEB		EXCAVATION - COMMON, SELECT GRANULAR & COMMON EMBANKEMENT QUANTITIES UPDATED.

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ LICENSED PROFESSIONAL ENGINEER 8/10/2023 DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

STATEMENT OF ESTIMATED QUANTITIES

SHEET NO. 3 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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STATEMENT OF ESTIMATED QUANTITIES

TAB	SHEET NO.	ITEM NO.	ITEM DESCRIPTION	NOTE NO.	UNIT	TOTAL ESTIMATED QUANTITY	PARTICIPATING STATE FUNDS	
							SAP 002-622-036	CITY OF OAK GROVE SAP 223-020-006
T	B2	2452.502	C-I-P CONC TEST PILE 75 FT LONG 18"		EACH	2	2	
T	B2	2452.502	STEEL H-TEST PILE 55 FT LONG 10"		EACH	2	2	
T	B2	2452.502	PILE ANALYSIS		EACH	4	4	
T	B2	2452.502	PILE POINTS 18"		EACH	32	32	
T	B2	2452.502	PILE TIP PROTECTION 10"		EACH	51	51	
T	B2	2452.503	C-I-P CONCRETE PILING 18"		LIN FT	1950	1950	
T	B2	2452.503	STEEL H-PILING 10"		LIN FT	2205	2205	
T	B2	2472.502	MECHANICAL SPLICE COUPLERS (REINFORCEMENT BARS) T-6		EACH	48	48	
T	B2	2473.503	EXPANSION JOINT DEVICES TYPE 5		LIN FT	143	143	
W,T	61,B2	2475.503	ORNAMENTAL METAL RAILING DESIGN T-3 (P)		LIN FT	391	391	
I	9	2501.502	15" CAS PIPE APRON		EACH	1	1	
I	9	2501.502	18" RC PIPE APRON		EACH	2	2	
T	B2	2502.501	DRAINAGE SYSTEM TYPE (B910)		LUMP SUM	1	1	
Q,W	61	2502.503	4" PERF TP PIPE DRAIN		LIN FT	251	251	
I	9	2503.503	15" RC PIPE SEWER DES 3006 CL V		LIN FT	123	123	
I	9	2503.503	18" RC PIPE SEWER DES 3006 CL III		LIN FT	643	643	
I	9	2506.502	CASTING ASSEMBLY		EACH	10	10	
I	9	2506.503	CONST DRAINAGE STRUCTURE DESIGN N		LIN FT	3.3	3.3	
I	9	2506.503	CONST DRAINAGE STRUCTURE DES 48-4020		LIN FT	72.8	72.8	
I	9	2511.504	GEOTEXTILE FILTER TYPE 3		SQ YD	55	55	
T	B2	2511.504	GEOTEXTILE FILTER TYPE 7		SQ YD	955	955	
I	9	2511.507	RANDOM RIPRAP CLASS III		CU YD	6	6	
I,T	9,B2	2511.507	RANDOM RIPRAP CLASS IV		CU YD	659	659	
G	8	2521.518	6" CONCRETE WALK		SQ FT	388		388
G	8	2521.602	DRILL & GROUT REINF BAR (EPOXY COATED)		EACH	25	25	
G	8	2531.503	CONCRETE CURB & GUTTER DESIGN B424		LIN FT	2394	1604	790
P	8	2531.504	6" CONCRETE DRIVEWAY PAVEMENT		SQ YD	78	78	
G	8	2531.618	TRUNCATED DOMES		SQ FT	19	19	
TC	77	2533.503	PORTABLE PREC CONC BAR DES 8337-ANCHORED		LIN FT	726	726	
M	8	2540.602	MAIL BOX SUPPORT		EACH	5	5	
K	8	2554.502	END TREATMENT-TANGENT TERMINAL		EACH	4	4	
K	8	2554.503	TRAFFIC BARRIER DESIGN TYPE 31		LIN FT	75	75	
K	8	2554.503	TRAFFIC BARRIER DESIGN TRANS TYPE 31		LIN FT	150	150	
Q	61	2557.503	WIRE FENCE DESIGN 60V-9322		LIN FT	206	206	
TC	77	2563.601	TRAFFIC CONTROL		LUMP SUM	1	0.99	0.01
TC	77	2563.602	RAISED PAVEMENT MARKER TEMPORARY		EACH	798	798	
TC	77	2563.602	PORTABLE BARRIER DELINEATOR		EACH	29	29	
TC	77	2563.610	FLAGGER		HOUR	624	624	
TC	77	2563.615	TEMPORARY IMPACT ATTENUATOR		ASSEMBLY	4	4	
ST	91	2564.602	DELINEATOR / MARKER		EACH	4	4	
ST	91	2564.618	SIGN		SQ FT	56	56	
J	9	2573.502	STORM DRAIN INLET PROTECTION		EACH	12	12	
J	9	2573.502	CULVERT END CONTROLS		EACH	1	1	
J	9	2573.503	SILT FENCE, TYPE MS		LIN FT	1838	1838	
J	9	2573.503	FLOTATION SILT CURTAIN TYPE MOVING WATER		LIN FT	317	317	
N	9	2574.508	FERTILIZER TYPE 3		POUND	220	220	
N	9	2574.508	FERTILIZER TYPE 4		POUND	19	19	
N	9	2575.504	RAPID STABILIZATION METHOD 4		SQ YD	1052	1052	
N	9	2575.504	ROLLED EROSION PREVENTION CATEGORY 15		SQ YD	1556	1556	
N	9	2575.505	SEEDING		ACRE	1	1	
N	9	2575.508	SEED MIXTURE 25-121		POUND	38	38	
N	9	2575.508	SEED MIXTURE 35-221		POUND	6	6	
TC	77	2580.501	INTERIM PAVEMENT MARKING		LUMP SUM	1	1	
TC	77	2581.503	6" REMOVABLE PREFORM PAVEMENT MARKING TAPE WR		LIN FT	19314	19314	
TC	77	2581.603	REMOVABLE PREFORMED PLASTIC MASK (BLACK)		LIN FT	3380	3380	

NOTES:

(P) = PLAN QUANTITY

(1) BITUMINOUS MATERIAL FOR TACK COAT SHALL BE INCIDENTAL.

(2) SEE TYPICAL SECTIONS FOR APPROXIMATE EXISTING PAVEMENT DEPTHS.

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

STATEMENT OF ESTIMATED QUANTITIES

SHEET NO. 4 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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STATEMENT OF ESTIMATED QUANTITIES

TAB	SHEET NO.	ITEM NO.	ITEM DESCRIPTION	NOTE NO.	UNIT	TOTAL ESTIMATED QUANTITY	PARTICIPATING STATE FUNDS	
							SAP 002-622-036	CITY OF OAK GROVE SAP 223-020-006
TC	77	2582.503	6" SOLID LINE PAINT		LIN FT	4867	4867	
TC	77	2582.503	4" DBLE SOLID LINE PAINT		LIN FT	2370	2370	
PM	93	2582.503	4" SOLID LINE MULTI COMP GR IN (WR)		LIN FT	952	952	
PM	93	2582.503	6" SOLID LINE MULTI COMP GR IN (WR)		LIN FT	3210	3210	
PM	93	2582.503	4" BROKEN LINE MULTI COMP GR IN (WR)		LIN FT	190	190	
PM	93	2582.503	4" DBLE SOLID LINE MULTI COMP GR IN (WR)		LIN FT	563	563	

NOTES:

(P) = PLAN QUANTITY

(1) BITUMINOUS MATERIAL FOR TACK COAT SHALL BE INCIDENTAL.

(2) SEE TYPICAL SECTIONS FOR APPROXIMATE EXISTING PAVEMENT DEPTHS.

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

STATEMENT OF ESTIMATED QUANTITIES

SHEET NO. 5 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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11/21/2023 JCN
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THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT	
STANDARD PLATES	
PLATE NO.	DESCRIPTION
3000M	REINFORCED CONCRETE PIPE (6 SHEETS)
3006H	GASKET JOINT FOR R.C. PIPE (2 SHEETS)
3007F	SHEAR REINFORCEMENT FOR PRECAST DRAINAGE STRUCTURES
3100G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE
3133D	RIPRAP AT RCP OUTLETS
3145G	CONCRETE PIPE OR PRECAST BOX CULVERT TIES
4005M	MANHOLE OR CATCH BASIN TYPE A & B CONE SECTIONS PRECAST - DESIGN F
4010I	CONCRETE ADJUSTING RINGS
4011E	PRECAST CONCRETE BASE
4020J	MANHOLE OR CATCH BASIN (FOR USE WITH OR WITHOUT TRAFFIC LOADS) (2 SHEETS)
4026B	CONCRETE ENCASED CONCRETE ADJUSTING RINGS
4101D	RING CASTING FOR MANHOLE OR CATCH BASIN
4108F	ADJUSTING RINGS FOR CATCH BASINS AND MANHOLES
4110F	COVER CASTING FOR MANHOLE (FOR USE IN ALL TRAFFIC AREAS) * CASTING NO. 715 AND 716
4125D	CATCH BASIN FRAME CASTING (FOR SQUARE GRATE) * CASTING NO. 806
4129G	CATCH BASIN FRAME CASTING (FOR SQUARE GRATE) - CASTING NO. 802A
4132G	CATCH BASIN FRAME CASTING (FOR SQUARE GRATE) - CASTING NO. 805
4154B	CATCH BASIN GRATE CASTING - CASTING NO. 816
4160D	CURB BOX CASTING FOR CATCH BASIN - CASTING NO. 823A AND 833A
4180J	MANHOLE OR CATCH BASIN STEP
7100H	CONCRETE CURB AND GUTTER (DESIGN B AND DESIGN V)
7111J	INSTALLATION OF CATCH BASIN CASTINGS (CONCRETE CURB AND GUTTER)
8000K	TEMPORARY CHANNELIZERS (3 SHEETS)
8150C	INSTALLATION OF CULVERT MARKERS
8316C	POST SEAT FOR ANCHORAGE ON FOOTING OR BOX CULVERTS
8318C	GUARDRAIL ANCHORAGE PLATE FOR BRIDGES AND BCT'S
8337D	TEMPORARY PORTABLE PRECAST CONCRETE BARRIER - TYPE F (3 SHEETS)
8338D	W-BEAM GUARDRAIL & END ANCHORAGES (STEEL POSTS) (4 SHEETS)
8350A	THRIE BEAM ANCHORAGE PLATE
8355B	W-BEAM GUARDRAIL (2 SHEETS)
8356A	W-BEAM TO THRIE-BEAM TRANSITION GUARDRAIL
8357A	THRIE-BEAM GUARDRAIL
8360B	GUARDRAIL POST LENGTH MARKING
8361B	GUARDRAIL STEEL POST (3 SHEETS)
8362A	UNIVERSAL BREAKAWAY STEEL POST (UBSP) (2 SHEETS)
8369B	GUARDRAIL BLOCKOUT (2 SHEETS)
9322K	CHAIN LINK FENCE (2 SHEETS)

CONSTRUCTION NOTES

1. TOP OF THE GRADING GRADE IS DEFINED AS THE BOTTOM OF THE CLASS 5 AGGREGATE BASE.
2. COMMON EXCAVATION SHALL CONSIST OF ALL EXCAVATION MATERIALS NOT CLASSIFIED AS EXCAVATION - ROCK AND EXCAVATION - MUCK.
3. SELECTED GRADING MATERIALS SHALL CONSIST OF ALL SOILS ENCOUNTERED EXCLUDING TOPSOIL, ORGANIC MATERIAL, ROCK AND OTHER UNSUITABLE MATERIAL. THESE SELECTED GRADING MATERIALS SHALL BE OBTAINED FROM THE SUBGRADE AND THE COMMON EXCAVATION IN ACCORDANCE WITH MNDOT SPEC. 2106.
4. SELECT GRANULAR BORROW REGARDLESS OF SOURCE SHALL MEET THE REQUIREMENTS OF MNDOT SPEC. 3149.2B2.
5. COMPACTION OF ALL EXCAVATION AND EMBANKMENT CONSTRUCTION, INCLUDING CULVERT BACKFILLS, SHALL BE AS DESCRIBED IN MNDOT 2106. AGGREGATE BASE COURSE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROVISIONS OF MNDOT 2211. COMPACTION OF ALL AGGREGATE BASE, GRANULAR, AND SELECT GRANULAR MATERIAL SHALL BE IN ACCORDANCE WITH MNDOT'S "MODIFIED PENETRATION INDEX" METHOD. COMPACTION OF ALL BITUMINOUS MIXTURES SHALL BE IN ACCORDANCE WITH MNDOT'S "MAXIMUM DENSITY" METHOD.
6. ALL DISTURBED ROADWAY MATERIALS SUCH AS CONCRETE, BITUMINOUS, AND AGGREGATES MAY BE UTILIZED ACCORDING TO MNDOT SPECIFICATIONS. MATERIALS NOT UTILIZED ON THIS PROJECT WILL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF OFF THE RIGHT OF WAY IN ACCORDANCE WITH MNDOT SPECIFICATION 2104 AND AS AGREED UPON BY THE ENGINEER.
7. EXCESS EXCAVATION MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. DISPOSITION OF EXCESS EXCAVATION MATERIAL SHALL BE IN ACCORDANCE WITH SPECIFICATION 2106.3I AND SHALL BE DISPOSED OF OFF THE RIGHT OF WAY, AT NO ADDITIONAL COMPENSATION, AND IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
8. WHERE CHANGING SUBCUT DEPTHS OR WHERE CONNECTING TO THE INPLACE ROADWAYS AT THE PROJECT TERMINI, CUT VERTICALLY TO THE BOTTOM OF INPLACE AGGREGATE BASE OR THE BOTTOM OFPROPOSED AGGREGATE BASE, WHICHEVER IS DEEPER, THEN TAPER AT A 1(V):20(H) RATE TO THE BOTTOM OF THE RECOMMENDED SUBGRADE EXCAVATION.
9. COMMON MATERIAL ASSUMED TO MEET THE REQUIREMENTS OF MNDOT 3149.2B1.
10. NO OVER EXCAVATION WILL BE ALLOWED INSIDE COUNTY RIGHT OF WAY.
11. EXCESS COMMON MATERIAL MUST BE DEEMED EXCESS BY THE ENGINEER PRIOR TO LEAVING PROJECT.
12. THE CONTRACTOR SHALL PROVIDE TACK COAT BETWEEN ALL BITUMINOUS MIXTURES AND PRIOR TO PLACING ANY BITUMINOUS MIXTURES ON EXISTING PAVEMENT IN ACCORDANCE WITH SPECIFICATION 2357. THIS SHALL BE INCIDENTAL.
13. PROVIDE A SAW CUT WHERE PLACING NEW PAVEMENT NEXT TO INPLACE PAVEMENT TO ENSURE A UNIFORM JOINT.
14. STRIP ALL EXISTING TOPSOIL AND SLOPE DRESSING IN AREAS TO BE DISTURBED BY CONSTRUCTION AND REUSE AS SLOPE DRESSING. PAYMENT FOR STRIPPING IS INCLUDED IN EXCAVATION-COMMON AND PAYMENT FOR SLOPE DRESSING IS INCLUDED IN COMMON EMBANKMENT (CV). FOR ESTIMATING PURPOSES, TOPSOIL IS ASSUMED TO BE 4 INCHES.
15. NO EXTRA PAYMENT WILL BE MADE FOR TEMPORARY STOCKPILING OF EXCAVATED OR EMBANKMENT MATERIAL.
16. THE CONTRACTOR IS RESPONSIBLE FOR CONDUCTING CONSTRUCTION IN A MANNER THAT WILL CONTROL EROSION. SEE THE EROSION CONTROL PLANS FOR SUGGESTED LOCATIONS AND DEVICES TO DO SO.
17. UTILITY RELOCATIONS IN THE AREA WILL BE OCCURRING PRIOR TO AND DURING THE PROJECT. THE CONTRACTOR SHALL EXPECT UTILITY CONFLICTS AND ACCOUNT FOR THEM ACCORDINGLY IN THEIR WORK SCHEDULE AND ANTICIPATED PRODUCTION.
18. PRIOR TO PLACING AGGREGATE BASE MATERIAL, TEST ROLL PAVEMENT SUBGRADES TO DETERMINE IF THE SUBGRADE MATERIALS ARE LOOSE, SOFT OR WEAK, AND IN NEED OF FURTHER STABILIZATION, COMPACTION OR SUB-EXCAVATION, AND RECOMPACTION OR REPLACEMENT. A SECOND TEST ROLL SHALL BE PERFORMED AFTER THE AGGREGATE BASE MATERIAL IS IN PLACE, AND PRIOR TO BITUMINOUS PAVEMENT. TEST ROLLING SHALL ONLY BE REQUIRED FOR ROADWAYS. COMPACTION OF ALL AGGREGATE BASE, GRANULAR, AND SELECT GRANULAR MATERIAL SHOULD BE IN ACCORDANCE WITH MNDOT "MODIFIEID PENETRATION INDEX METHOD".
19. CONSTRUCTION SLOPES SHALL BE COVERED WITH 4" OF TOPSOIL MATERIAL. INPLACE TOPSOIL THAT IS REUSED SHALL MEET MNDOT STANDARD SPECIFICATION 3877 OR APPROVED BY THE ENGINEER AND SHALL BE SCREENED PRIOR TO REUSE. PAYMENT FOR TOPSOIL MATERIAL IS PAID FOR AS COMMON EMBANKMENT.
20. ANY TOPSOIL MATERIAL NOT UTILIZED ON THIS PROJECT SHALL BE THE PROPERTY OF THE OWNER UNTIL RELEASED TO THE CONTRACTOR BY THE ENGINEER FOR USE OR DISPOSAL OUTSIDE OF THE RIGHT OF WAY IN ACCORDANCE WITH SPEC 2104.
21. TEMPORARY AND INTERMEDIATE EXCAVATION LIMITS AND SLOPES ARE TO BE DETERMINED BY THE CONTRACTOR DURING CONSTRUCTION. DEPENDING ON SOIL PROPERTIES AND SAFETY FACTORS, ADDITIONAL EXCAVATION AND BACKFILL BEYOND THE LIMITS SHOWN IN THE PLAN SHALL BE CONSIDERED THE CONTRACTOR EXPENSE (2106).
22. WHEN REMOVING PAVEMENTS, FULL-DEPTH SAWCUTS SHOULD BE MADE PERPENDICULAR TO THE ROADWAY CENTERLINE.
23. NON-STRUCTURAL GRADING MATERIAL ARE ALL MINERAL SOILS, EXCESS TOPSOIL, AND ORGANIC SOILS, CAPABLE OF SUPPORTING CONSTRUCTION EQUIPMENT. NON-STRUCTURAL GRADING MATERIAL SHALL ONLY BE PLACED OUTSIDE OF THE ROADWAY CORE AND IN A MANNER IN WHICH THE MATERIAL WILL MAINTAIN LONG TERM STABILITY.
24. EXCEPT FOR SUBGRADE ZONES WHERE SELECT GRANULAR MATERIAL IS SPECIFICALLY REQUIRED, THE SUBGRADE SHALL BE CONSTRUCTED OF SELECT GRADING MATERIAL.
25. STORM SEWERS CONNECTING TO MANHOLES AND CATCH BASINS SHALL BE IN ACCORDANCE WITH MNDOT STANDARD SPECIFICATION 2503. BEDDING AND BACKFILL SHALL CONSIST OF UNIFORM SELECT GRADING MATERIAL MATCHING ADJACENT SOILS UNLESS OTHERWISE DIRECTED BY THE ENGINEEROR AS SHOWN IN THE PLAN.
26. WHERE UNSUITABLE MATERIAL IS ENCOUNTERED DURING COMMON OR SUBGRADE EXCAVATION. THE CONTRACTOR SHALL PROVIDE GRANULAR MATERIAL, FOUND ELSEWHERE ON THE JOB SITE. NO DIRECT COMPENSATION WILL BE MADE THEREAFTER.
27. THE TOP OF BACKSLOPES AND THE TOE OF FILL SLOPES SHALL BE ROUNDED TO NATURALIZE THE CONSTRUCTION EVEN THOUGH THE CROSS SECTIONS DO NOT SHOW ANY SUCH ROUNDING.
28. THE CONSTRUCTION LIMITS AS SHOWN IN THE PLANS REPRESENT THE POINT OF INTERSECTION BETWEEN THE REQUIRED FILL OR CUT SLOPE AND THE EXISTING GROUNDLINE AS DEPICTED ON THE CROSS SECTIONS. THE CONSTRUCTION LIMITS DO NOT INCLUDE AREAS REQUIRED FOR SLOPE ROUNDING.
29. APPROACH EMBANKMENT CONSTRUCTION SHALL BE IN ACCORDANCE WITH MNDOT STANDARD PLAN SHEET 5-297.233 AND MNDOT STANDARDS SPECIFICATION 2106 "EXCAVATION AND EMBANKMENT" (MNDOT 2106).
30. REMOVAL OF PAVEMENTS, EXISTING STRUCTURES, TOPSOIL AND ORGANIC OR LOOSE SOIL FROM BELOW THE PROPOSED EMBANKMENT WIDENING, ABUTMENT WIDENING, AND THEIR OVERSIZE AREAS SHALL BE IN ACCORDANCE WITH MNDOT SPECIFICATION 2106.

30. BASED ON SOIL BORINGS, IT IS ANTICIPATED ON-SITE SOILS IN EXCAVATIONS WILL GENERALLY CONSIST OF GRANULAR FILL OR OUTWASH. OSHA GUIDELINES CONSIDER THESE SOILS AS TYPE C SOIL. OSHA GUIDELINES INDICATE UNSUPPORTED EXCAVATIONS IN TYPE C SOILS SHOULD HAVE A GRADIENT NO STEEPER THAN 1.5H:1V (HORIZONTAL TO VERTICAL). SLOPES CONSTRUCTED IN THIS MANNER MAY STILL EXHIBIT SURFACE SLOUGHING. OSHA REQUIRES AN ENGINEER TO EVALUATE SLOPES OR EXCAVATIONS OVER 20 FEET IN DEPTH. AN OSHA-APPROVED QUALIFIED PERSON SHOULD REVIEW THE SOIL CLASSIFICATION IN THE FIELD. EXCAVATIONS MUST COMPLY WITH REQUIREMENTS OF OSHA 29 CFR, PART 1926, SUBPART O, "EXCAVATION AND TRENCHES". THIS DOCUMENT STATES EXCAVATION SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.

31. FILL SHALL CONSIST OF DEBRIS-FREE, NON-ORGANIC MATERIAL PLACED IN A CONTROLLED MANNER. ABUTMENT EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH MNDOT SPECIFICATION 2451 AND 2106. BASED ON INVESTIGATION, THE MAJORITY OF ONSITE SOILS WOULD CLASSIFY AS MNDOT SPECIFICATION 2106.A.6, SELECT GRADING, FOR USE IN EMBANKMENT. MNDOT SPECIFICATION 3149.2.D.2, STRUCTURAL BACKFILL, SHALL BE USED FOR BACKFILL IN PROXIMITY TO THE ABUTMENTS IN ACCORDANCE WITH STANDARD BRIDGE APPROACH TREATMENTS MNDOT STANDARD PLAN 5-297.233.
32. IN AREAS OF WIDENING, TO THE EXTENT POSSIBLE, THE CONTRACT SHALL MATCH THE EXISTING SOIL IN THE UPPER 5 FEET OF ROADWAY WITH SOILS OF A SIMILAR CLASSIFICATION, MOISTURE CONTENT, AND PERFORMANCE CHARACTERISTICS. DO NOT PLACE NON-GRANULAR BACKFILL ADJACENT TO IN-PLACE GRANULAR SOILS. ENGINEERED FILL SHALL BE SPREAD IN LOOSE LIFTS APPROXIMATELY 12 INCHES THICK. ENGINEERED FILL SHALL BE COMPACTED IN ACCORDANCE WITH THE MNDOT SPECIFICATIONS AS FOLLOWS:

MATERIAL	MATERIAL SPECIFICAITON	COMPACTION SPECIFICATION
PAVEMENT SUBBASE FILL	GRANULAR MATERIAL, MNDOT 3149.2.B	MNDOT 2106.3.G.1
SUBGRADE FILL	SELECT GRADING MATERIAL, MNDOT 2106.2.B.1	MNDOT 2106.3.G.1
STRUCTURE FILL	STRUCTURAL BACKFILL, MNDOT 3149.2.D.2	MNDOT 2106.3.G.1
BELOW LANDSCAPED SURFACES WHERE SUSIDENCE IS NOT A CONCERN	NON-STRUCTURAL EMBANKMENT, MNDOT 2106.2.B.8	MNDOT 2106.3.G.2

33. FROZEN MATERIAL SHALL NOT BE USED AS ENGINEERED FILL. ENGINEERED FILL SHALL NOT BE PLACED ON FROZEN MATERIAL. FROST SHALL NOT PENETRATE UNDER PAVEMENTS DURING CONSTRUCTION. DENSITY TESTS SHALL BE PERFORMED IN ENGINEERED FILL TO MEET PROJECT REQUIREMENTS.
34. IF SOILS BECOME UNSTABLE DURING EXCAVATION FOR RETAINING WALL FOUNDATIONS, THE UPPER 12 INCHES SHALL BE REMOVED AND REPLACED WITH GRANULAR MATERIAL, MNDOT SPECIFICATION 3149.2B, TO PROVIDE A STABLE WORK PLATFORM DURING CONSTRUCITON IN ACCORDANCE WITH MNDOT STANDARD PLAN 5-297.624 (6 OF 6). IF OVER-EXCAVATIONS ARE REQUIRED DURING THE EVALUATION OF THE RETAINING WALL FOOTING SUBGRADE, THE SAME GRANULAR MATERIAL (MNDOT SPECIFICATION 3149.2B, SHALL BE PLACED BELOW THE FOOTING AND OVERSIZE AREA. STRUCTURE EXCAVATIONS AND BACKFILLING SHALL ADHERE TO MNDOT SPECIFICAITON 2451.

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

STANDARD PLATES & CONSTRUCTION NOTES

SHEET NO. 6 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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(B) STATION TO STATION EARTHWORK TABULATION

STATION	EXCAVATION	EMBANKMENT	
	EXCAVATION – COMMON	COMMON EMBANKMENT (CV)	SELECT GRANULAR MOD 10% (CV)
	CU YD	CU YD	CU YD
S.A.P. 002-622-036			
CSAH 22			
100+00.00			
100+50.00	269	19	165
100+73.46	166	6	111
101+00.00	190	5	121
101+10.23	67	4	42
101+50.00	242	19	148
102+00.00	317	21	179
102+50.00	358	14	179
103+00.00	403	15	179
103+50.00	335	21	179
104+00.00	244	25	177
104+45.48	201	20	154
BRIDGE 02595			
107+95.77			
108+50.00	113	217	88
109+00.00	47	414	40
109+25.00	3	239	
109+50.00	2	197	
110+00.00	4	270	
110+50.00	2	198	
111+00.00	2	172	
111+50.00	4	199	
112+00.00	60	176	40
112+50.00	134	75	81
113+00.00	154	10	81
113+50.00	154	9	81
114+00.00	160	11	81
114+50.00	164	12	81
115+00.00	166	14	81
115+14.60	47	3	24
CSAH 22 TOTAL	**4008**	**2385**	**2312**

(B) EARTHWORK SUMMARY

STATION TO STATION	EXCAVATION		EMBANKMENT			REMARKS
	EXCAVATION – COMMON	EXCAVATION – CHANNEL AND POND	COMMON EMBANKMENT (CV)	SELECT GRANULAR MOD 10% (CV)	STRUCTURAL BACKFILL	
	CU YD	CU YD	CU YD	CU YD	CU YD	
S.A.P. 002-622-036						
CSAH 22						
100+00.00 – 115+14.60	4008		2385	2312		(4)
100+01.38 – 101+77.46	435		53	413		STAGE 1 TEMPORARY PAVEMENT (5)
103+51.51 – 105+39.52	772		169			TEMPORARY BENCH (6)
104+06.43 – 104+88.99	672				672	WEST ABUTMENT
104+75.86 – 105+75.06		2473				WEST ABUTMENT (1)
106+69.78 – 107+65.21		2318				EAST ABUTMENT (1)
107+64.05 – 108+45.21	671				671	EAST ABUTMENT
TOTAL	**6558**	**4791**	**2607**	**2725**	**1343**	

(K) BASIS OF QUANTITIES

BITUMINOUS MIXTURES (ROAD AND TRAIL)	115	LB/SY/IN	
SEED MIXTURE 25-121	61	LB/ACRE	
SEED MIXTURE 35-221	36.5	LB/ACRE	
FERTILIZER TYPE 3	350	LB/ACRE	(2)
FERTILIZER TYPE 4	150	LB/ACRE	(3)

SPECIFIC NOTES

(1) EXCAVATION REQUIRED FOR PLACEMENT OF RIPRAP SLOPE UNDER BRIDGE. SEE SHEET B39 FOR RIPRAP PLACEMENT DETAILS.

(2) 22-5-10 ANALYSIS

(3) 17-10-7 ANALYSIS

(4) EXCAVATION – COMMON INCLUDES COINCIDENTAL EXCAVATION FOR STAGE 1 TEMPORARY PAVEMENT CONSTRUCTION.

(5) EXCAVATION AND EMBANKMENT FOR GRADING OF TEMPORARY DITCH AND PLACEMENT OF SELECT GRANULAR EMBANKMENT MOD 10%. SEE CROSS SECTION SHEETS X14 TO X17.

(6) SEE CROSS SECTION SHEETS X11 TO X13.

NO	DATE	BY	CKD	APPR	REVISION
1	8/31/2023	JCN	GEB		EXCAVATION AND EMBANKMENT QUANTITIES ADDED FOR TEMPORARY CONDITIONS.

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

TABULATED QUANTITIES

SHEET NO. 7 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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(A) CLEARING AND GRUBBING

STATION TO STATION	LOCATION	CLEARING EACH	GRUBBING EACH
S.A.P. 002-622-036			
CSAH 22			
101+13.35	39' LT	1	1
101+38.83	30' LT	1	1
101+51.77	32' LT	1	1
101+70.78	33' LT	1	1
101+74.07	36' LT	1	1
101+88.61	37' LT	1	1
101+97.77	34' LT	1	1
102+00.65	33' LT	1	1
102+10.61	39' LT	1	1
102+15.56	38' LT	1	1
102+27.55	44' LT	1	1
102+29.13	37' LT	1	1
102+28.61	39' LT	1	1
101+64.47	33' LT	1	1
101+86.62	30' LT	1	1
101+94.00	29' LT	1	1
102+24.80	36' LT	1	1
102+32.17	33' LT	1	1
102+43.29	40' LT	1	1
102+46.17	37' LT	1	1
102+52.55	36' LT	1	1
102+55.14	36' LT	1	1
102+69.11	44' LT	1	1
102+75.16	59' LT	1	1
102+81.29	54' LT	1	1
102+86.26	57' LT	1	1
102+90.74	53' LT	1	1
103+70.54	46' LT	1	1
102+64.41	36' LT	1	1
102+76.71	46' LT	1	1
102+80.05	47' LT	1	1
102+81.89	33' LT	1	1
102+96.91	31' LT	1	1
103+79.92	57' LT	1	1
104+02.71	58' LT	1	1
104+12.05	55' LT	1	1
104+16.97	57' LT	1	1
104+36.03	43' LT	1	1
104+44.14	48' LT	1	1
104+47.47	53' LT	1	1
104+50.13	50' LT	1	1
103+57.50	41' LT	1	1
103+36.38	43' LT	1	1
103+29.86	42' LT	1	1
104+03.17	44' LT	1	1
103+99.26	42' LT	1	1
103+91.89	45' LT	1	1
104+49.51	44' LT	1	1
104+49.79	44' LT	1	1
104+72.67	42' LT	1	1
104+65.52	52' LT	1	1
104+69.43	54' LT	1	1
104+76.39	57' LT	1	1
104+92.80	54' LT	1	1
104+99.62	50' LT	1	1
105+07.80	55' LT	1	1
105+25.03	41' LT	1	1
106+72.62	56' LT	1	1
106+73.07	54' LT	1	1
107+25.12	43' LT	1	1
110+58.31	55' LT	1	1
110+59.72	56' LT	1	1
111+39.70	53' LT	1	1
111+44.52	56' LT	1	1
111+82.11	58' LT	1	1
TOTAL		**65**	**65**

(D) REMOVALS

STATION TO STATION	LOCATION	REMOVE: BITUMINOUS CURB	REMOVE: CONCRETE RETAINING WALL	REMOVE: BITUMINOUS PAVEMENT	FULL DEPTH RECLAMATION
		LIN FT	LIN FT	SQ YD	SQ YD
S.A.P. 002-622-036					
CSAH 22					
100+00.00 - 105+23.79	LT/RT	947		2401	
107+39.43 - 115+14.60	LT/RT	1519	21	2254	1149
TOTAL		2466	21	4655	1149

(M) MAIL BOXES

STATION	LOCATION	NOTES	MAIL BOX SUPPORT
			EACH
S.A.P. 002-622-036			
CSAH 22			
100+58.22	LT		1
101+38.48	RT		1
101+44.99	RT		1
109+47.48	LT		1
109+53.47	LT		1
TOTAL			5

(E) SAWING

STATION TO STATION	OFFSET	NOTES	BITUMINOUS PAVEMENT (FULL DEPTH)
			LIN FT
S.A.P. 002-622-036			
CSAH 22			
100+00.00 - 100+91.50	LT/RT		90
109+17.28 - 115+14.60	LT/RT		58
TOTAL			148

(P) DRIVEWAYS

STATION	LT/RT	NOTES	AGGREGATE SURFACING (CV) CLASS 5	TYPE SP 12.5 WEARING COURSE MIX (4,F) (SPWEB440F)	6" CONCRETE DRIVEWAY PAVEMENT	AGGREGATE BASE (CV) CLASS 5
			CU YD	TON	SQ YD	CU YD
S.A.P. 002-622-036						
CSAH 22						
100+73.46	LT			8	26	3
101+10.23	RT			7	6	1
109+21.45	RT			12	7	1
109+28.74	LT		51		39	4
TOTAL			51	27	78	9

(G) CONCRETE PAVEMENT AND CURB & GUTTER AND WALK

STATION TO STATION	LT/RT	NOTES	CONCRETE PAVEMENT 8.0"	TRUNCATED DOMES	DRILL & GROUT REINF. BAR (EPOXY COATED)	AGGREGATE BASE (CV) CLASS 5	CONCRETE: WALK 6"	CONCRETE: C&G DESIGN B424
			SQ YD	SQ FT	EACH	CU YD	SQ FT	LIN FT
S.A.P. 002-622-036								
CSAH 22								
100+00.00 - 105+19.45	LT/RT		1865			414		956
107+12.91 - 112+17.34	LT/RT			19	25	5	388	1438
TOTAL			1865	19	25	419	388	2394

(F) AGGREGATE AND BITUMINOUS PAVEMENT

ROADWAY	STATION TO STATION	LOCATION	NOTE	AGGREGATE BASE (CV) CLASS 5	TYPE SP 9.5 WEARING COURSE MIX (2,B) (SPWEA230B)	TYPE SP 12.5 WEARING COURSE MIX (4,F) (SPWEB440F)	TYPE SP 12.5 NON WEARING COURSE MIX (4,B) (SPNWB430B)
				CU YD	TON	TON	TON
S.A.P. 002-622-036							
CSAH 22	100+00.00 - 104+45.49	LT/RT		130	69	49	
CSAH 22	107+34.43 - 115+14.60	LT/RT		760	24	661	496
CSAH 22 TEMPORARY	100+00.00 - 104+45.49	LT		253		209	157
CSAH 22 TEMPORARY	107+95.77 - 110+36.46	LT		102		85	64
TOTAL				1245	93	1004	717

(R) APPROACH PANELS

STATION TO STATION	LT/RT	NOTES	EXPANSION JOINTS, DESIGN E8	BRIDGE APPROACH PANELS
			LIN FT	SQ YD
S.A.P. 002-622-036				
CSAH 22				
100+00.00 - 105+19.45	LT/RT		56	338
107+12.91 - 112+17.34	LT/RT		56	339
TOTAL			112	677

(K) TRAFFIC BARRIER

STATION TO STATION	LOCATION	REMOVE GUARDRAIL - PLATE BEAM	REMOVE ENERGY ABSORBING TERMINAL	END TREATMENT - TANGENT TERMINAL	TRAFFIC BARRIER DESIGN TYPE 31	TRAFFIC BARRIER DESIGN TRANS TYPE 31	REMARKS
	LT/RT	LIN FT	EACH	EACH	LIN FT	LIN FT	
S.A.P. 002-622-036							
CSAH 22							
103+83.14 - 104+45.49	LT			1	25	37.5	STATIONING DOES NOT INCLUDE END TREATMENT
103+95.44 - 104+45.49	RT			1	12.5	37.5	STATIONING DOES NOT INCLUDE END TREATMENT
103+94.75 - 105+02.94	LT	109	1				LENGTH INCLUDES END TREATMENT
104+17.06 - 105+26.45	RT	110	1				LENGTH INCLUDES END TREATMENT
107+43.97 - 109+06.21	LT	65					LENGTH INCLUDES END TREATMENT
107+59.94 - 108+81.82	RT	122	1				LENGTH INCLUDES END TREATMENT
107+95.26 - 108+45.36	RT			1	12.5	37.5	STATIONING DOES NOT INCLUDE END TREATMENT
107+95.26 - 108+57.65	LT			1	25	37.5	STATIONING DOES NOT INCLUDE END TREATMENT
TOTAL		**406**	**3**	**4**	**75**	**150**	

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023
LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN
DESIGNED BY: JCN
CHECKED BY: GEB

HDR

ANOKA COUNTY

TABULATED QUANTITIES

SHEET NO. 8 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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(H) INPLACE DRAINAGE

STATION TO STATION				DRAINAGE STRUCTURE	REMOVE SEWER PIPE (STORM)	REMOVE MANHOLE OR CATCH BASIN	REMOVE METAL APRON	REMARKS
STATION	OFFSET	TO STATION	OFFSET		LIN FT	EACH	EACH	
S.A.P. 002-622-036								
CSAH 22								
106+81.99	42 LT			CM APRON			1	
106+81.99	42 LT	- 107+15.25	52 LT	15" CMP	8			
107+44.27	12 LT			CB		1		
107+44.27	12 LT	- 107+69.07	23 RT	12" CMP	42			
107+69.07	23 RT			CB		1		
107+69.07	23 RT	- 107+78.95	61 RT	18" CMP	39			
109+04.33	26 RT			CB		1		
109+04.33	26 RT	- 109+00.17	42 RT	15" CMP	16			
109+06.23	18 RT			MH		1		
109+06.23	18 RT	- 109+04.33	26 RT	15" CMP	8			
109+95.20	17 RT			CB		1		
109+95.20	17 RT	- 109+06.23	18 RT	15" CMP	89			
109+96.38	22 RT			CB		1		
109+96.38	22 RT	- 109+95.20	17 RT	15" CMP	6			
TOTAL					208	6	1	

(J) TEMPORARY EROSION CONTROL

STATION TO STATION			OFFSET	SILT FENCE, TYPE MS	FLOTATION SILT CURTAIN TYPE MOVING WATER	CULVERT END CONTROLS	STORM DRAIN INLET PROTECTION	NOTES
			LT/RT	LIN FT	LIN FT	EACH	EACH	
S.A.P. 002-622-036								
CSAH 22								
100+00.00	-	105+66.51	LT/RT	279	110		4	
106+68.52	-	115+14.60	LT/RT	1559	207	1	8	
TOTAL				1838	317	1	12	

GENERAL NOTES - DRAINAGE TABULATION

- STATION, OFFSET, COORDINATES AND TOP OF CASTING ELEVATION ARE GIVEN AT CENTER OF GRATE OR COVER CASTING.
- STATION, OFFSET, AND COORDINATES ARE GIVEN AT END OF APRON FOR APRON STRUCTURES.
- INVERT ELEVATIONS ARE GIVEN AT CENTER OF STRUCTURE AND END OF APRON.
- STRUCTURES WITH PAY HEIGHT DEPTHS GREATER THAN 4.0' SHALL INCLUDE MANHOLE STEPS 16" ON CENTER. SEE MNDOT STANDARD PLATE 4180.
- ALL PIPE JOINTS SHALL BE TIED FROM APRON TO THE FIRST STRUCTURE. PIPE TIES SHALL BE INCIDENTAL.
- ALL CONCRETE PIPE SEWER IS DESIGN 3006 GASKET JOINT PIPE.
- ALL DRAINAGE STRUCTURES SHALL BE PRECAST UNLESS OTHERWISE APPROVED BY THE PROJECT ENGINEER.

(I) DRAINAGE

STRUCTURE NO.		STRUCTURE LOCATION		DRAINAGE STRUCTURE				TOP OF CASTING ELEV.	OUTLET ELEV.	INLET ELEV.	SUMP INVERT	RC PIPE SEWER DES 3006		RC PIPE APRON	CAS PIPE APRON	FINE AGGREGATE BEDDING (CV)	GEOTEXTILE FILTER TYPE 3	RANDOM RIPRAP CLASS III	RANDOM RIPRAP CLASS IV	REMARKS
FLOWS FROM	FLOWS TO	STATION	OFFSET	TYPE	PAY HEIGHT N	PAY HEIGHT 48-4020	CASTING ASSEMBLY					15"	18"	18"	15"					
					LIN FT	LIN FT						LIN FT	LIN FT	EACH	EACH	CU YD	SQ YD	CU YD	CU YD	
S.A.P. 002-622-036																				
CSAH 22																				
5000	5001	100+06.00	21 LT	CB		9.7	B-13	897.01	887.25	882.31			299							
5001	5004	103+05.00	21 LT	CB		5.2	B-13	886.02	880.73	879.40			133							
5002	5012	104+37.98	28 RT	MH		8.3	A-4D	883.75	878.85	877.12	875.85		86							SUMP 3' IN DEPTH
5003		105+57.87	39 RT						866.95					1						
5004	5005	104+37.96	19 LT	CB		3.6	B-13	883.11	879.40	879.09			39							
5005	5002	104+37.98	19 RT	CB		3.9	B-13	883.11	879.09	878.97			9							
5006		107+79.05	70 RT						868.57					1						
5007	5008	108+00.02	19 LT	CB		7.4	B-13	880.62	876.09	875.90	873.09	38								SUMP 3' IN DEPTH
5008	5006	108+00.04	19 RT	CB		13.8	B-13	880.62	869.67	868.57	866.67		49			107	26	6		SUMP 3' IN DEPTH
5009	5008	108+84.91	19 RT	CB		6.3	B-13	880.27	876.82	875.90	873.82	85								SUMP 3' IN DEPTH
5010	5007	108+84.91	19 LT	CB	3.3		B-13	880.27	876.82	876.39										
5011		106+89.64	45 LT												1					
5012	5003	105+24.10	36 RT	MH		14.6	A-4D	879.83	868.56	866.95	865.56		28			54	29		9	SUMP 3' IN DEPTH
TOTAL					3.3	72.8	10					123	643	2	1	161	55	6	9	

(L) CASTING ASSEMBLY KEY AND SUMMARY

ASS' Y.	ASS'Y REQ'D	CASTING NUMBER	STANDARD PLATE
A-4D	1	RING CASTING NO. 700-4 COVER CASTING 715	4101 4110
B-13	9	FRAME CASTING NO. 806 GRATE CASTING NO. 816	4132 4154

(N) TURF ESTABLISHMENT

STATION TO STATION	OFFSET	SEEDING	SEED MIX. 25-121	SEED MIX. 35-221	RAPID STABILIZATION METHOD 4	FERTILIZER TYPE 3	FERTILIZER TYPE 4	ROLLED EROSION PREVENTION CATEGORY 15	NOTES
	LT / RT	ACRE	POUND	POUND	SQ YD	POUND	POUND	SQ YD	
S.A.P. 002-622-036									
CSAH 22									
100+00.00 - 105+61.38	LT/RT	0.4	7	6	532	42	19	390	
106+71.03 - 115+14.60	LT/RT	0.6	31		520	178		1166	
TOTAL		1.0	38	6	1052	220	19	1556	

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.

NAME: GINA E. BEERS LIC. NO. 56150

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

TABULATED QUANTITIES

SHEET NO. 9 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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UTILITIES

THE FOLLOWING LIST SHOWS THE UTILITY COMPANIES INVOLVED IN THIS PROJECT.

-CENTURYLINK

-COMCAST

-CONNEXUS ENERGY

-CENTERPOINT ENERGY

-ZAYO

OWNERSHIP	
CENTURYLINK	CENTURYLINK
COMCAST	COMCAST
CONNEXUS	CONNEXUS ENERGY
CENTERPOINT	CENTERPOINT ENERGY
ZAYO	ZAYO

GENERAL NOTES

1. UTILITY WORK WILL BE PERFORMED BY OTHERS UNLESS NOTED OTHERWISE.
2. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILTY TO UTILIZE THE GOPHER STATE ONE CALL EXCAVATION NOTICE SYSTEM REQUIRED BY MINNESOTA STATUTE, CHAPTER 216D FOR ALL UNDERGROUND UTILITY LOCATIONS.
4. ALL RELOCATES AND ADJUSTMENTS SUBJECT TO ANOKA COUNTY RIGHT OF WAY.
5. ALL POWERLINES ARE DISTRIBUTION UNLESS NOTED OTHERWISE.

SPECIFIC NOTES

(1) CONNEXUS TO DROP OVERHEAD POWER LINE AND REMOVE POWER POLES PRIOR TO CONSTRUCTION. CONNEXUS WILL SERVICE PROPERTIES FROM THE EAST AND WEST DURING CONSTRUCTION AND INSTALL NEW FACILITIES AFTER THE PROJECT.

UTILITY

ANC = ANC	SFM = SAN FORCE MAIN
CHH = COM HH	SLIN = SAN
CPED = COM PED	SMH = SAN MH
CVLT = COM VAULT	TCON = T-BUR IN COND
EHH = P HH	TMH = TEL MH
ELIN = P-BUR	T-BUR = TELE BURIED
EMTR = P METER	TOH = OVERHEAD TEL LINE
OHU = OVERHEAD ELECT LINE	TPED = TEL PED
EP = P POLE	THH = TEL HH
EPED = P PED	TP = TEL POLE
ETOW = P TOWER	TPMH = TEL MH
EVLT = P VAULT	TV-BUR = TV BURIED
F/O-BUR = FIBER OPTIC BURIED	TVOH = OVERHEAD TV CABLE
FOCD = FIBER OPTIC IN CONDUIT	TVP = TV POLE
FOOH = FIBER OPTIC OVERHEAD	TGRP = TELEGRAPH POLE
GLIN = GAS	USI = SIG-INT
GMTR = GAS METER	USL = U ST LIGHT
GVLV = GAS VALVE	UTSW = SIG WIRE
HYD = FIRE HYD	WLIN = WATER
LP = L POLE	WMH = WATER MH
PTNK = PETRO TANK	W/S = WATER/STREAM
PWEL = PIEZOMETER WELL	WVLV = WATER VLV

(C) UTILITY TABULATION

STATION TO STATION	ROADWAY	ALIGNMENT	OFFSET TO OFFSET (FT)	ITEM INPLACE	OWNER	REMARKS: LEAVE AS IS	REMOVE	ADJUST	RELOCATE	NOTES
COMMUNICATION - S.A.P. 002-622-036										
COMCAST										
100+00.00 - 101+38.78	CSAH 22	P_CSAH22	30.98 LT - 20.3 LT	BURIED COAX	COMCAST	X				
100+00.00 - 101+39.05	CSAH 22	P_CSAH22	40.07 RT - 36.69 RT	BURIED COAX	COMCAST	X				
100+88.09 - 100+92.15	CSAH 22	P_CSAH22	317 RT - 43.75 RT	BURIED COAX	COMCAST	X				
100+92.15 - 101+38.78	CSAH 22	P_CSAH22	43.75 RT - 20.3 LT	BURIED COAX	COMCAST	X				CROSSING
100+92.15 - 101+39.05	CSAH 22	P_CSAH22	43.75 RT - 36.69 RT	BURIED COAX	COMCAST	X				
101+38.78	CSAH 22	P_CSAH22	20.3 LT	PEDESTAL	COMCAST				X	
101+38.78 - 102+10.05	CSAH 22	P_CSAH22	20.3 LT - 16.95 LT	BURIED COAX	COMCAST				X	
101+39.05	CSAH 22	P_CSAH22	36.69 RT	PEDESTAL	COMCAST		X			
101+39.05 - 104+68.82	CSAH 22	P_CSAH22	36.69 RT - 38.92 RT	BURIED COAX	COMCAST		X			
102+10.05 - 107+36.00	CSAH 22	P_CSAH22	16.95 LT - 14.87 LT	OVERHEAD COAX	COMCAST				X	
104+60.85 - 104+68.82	CSAH 22	P_CSAH22	13.12 LT - 38.92 RT	BURIED COAX	COMCAST		X			
107+36.00 - 115+14.60	CSAH 22	P_CSAH22	11.29 LT - 25.41 LT	OVERHEAD COAX	COMCAST				X	
107+36.00	CSAH 22	P_CSAH22	14.87 LT	VAULT	COMCAST				X	
107+82.18 - 108+27.52	CSAH 22	P_CSAH22	13.32 LT - 44.14 RT	BURIED COAX	COMCAST				X	CROSSING
108+27.52 - 115+14.60	CSAH 22	P_CSAH22	44.14 RT - 31.8 RT	BURIED COAX	COMCAST		X			
109+69.29	CSAH 22	P_CSAH22	41.35 RT	PEDESTAL	COMCAST				X	
ZAYO										
100+00.00 - 101+41.08	CSAH 22	P_CSAH22	24.19 LT - 28.42 LT	BURIED FIBER OPTIC	ZAYO			X		
101+41.08	CSAH 22	P_CSAH22	28.42 LT	PEDESTAL	ZAYO				X	
101+41.08 - 107+48.29	CSAH 22	P_CSAH22	28.42 LT - 16.88 LT	BURIED FIBER OPTIC	ZAYO			X		
107+48.29	CSAH 22	P_CSAH22	16.88 LT	PEDESTAL	ZAYO				X	
107+48.29 - 109+83.87	CSAH 22	P_CSAH22	16.88 LT - 35.74 LT	BURIED FIBER OPTIC	ZAYO			X		
109+83.87	CSAH 22	P_CSAH22	35.74 LT	HANDHOLE	ZAYO				X	
109+83.87 - 115+14.60	CSAH 22	P_CSAH22	35.74 LT - 45 LT	BURIED FIBER OPTIC	ZAYO			X		
CENTURYLINK										
100+00.00 - 101+41.00	CSAH 22	P_CSAH22	34.87 RT - 35.52 RT	BURIED COPPER & F/O	CENTURYLINK	X				
100+17.29 - 100+18.54	CSAH 22	P_CSAH22	139 RT - 35.04 RT	BURIED FIBER OPTIC	CENTURYLINK	X				
101+41.00	CSAH 22	P_CSAH22	35.52 RT	PEDESTAL	CENTURYLINK	X				
101+41.00 - 109+66.34	CSAH 22	P_CSAH22	35.52 RT - 34.82 RT	BURIED COPPER & F/O	CENTURYLINK				X	
100+91.90	CSAH 22	P_CSAH22	65.17 RT	PEDESTAL	CENTURYLINK	X				
102+30.63 - 102+30.67	CSAH 22	P_CSAH22	27.69 LT - 36.38 RT	BURIED COPPER	CENTURYLINK	X				CROSSING
108+46.10 - 108+47.44	CSAH 22	P_CSAH22	33.38 RT - 44.4 LT	BURIED COPPER	CENTURYLINK			X		
108+47.44	CSAH 22	P_CSAH22	44.4 LT	PEDESTAL	CENTURYLINK			X		
109+66.34	CSAH 22	P_CSAH22	34.82 RT	PEDESTAL	CENTURYLINK			X		
109+66.34 - 115+14.60	CSAH 22	P_CSAH22	34.82 RT - 27.72 RT	BURIED COPPER & F/O	CENTURYLINK	X				
POWER/ELECTRIC - S.A.P. 002-622-036										
100+00.00 - 102+10.47	CSAH 22	P_CSAH22	24.17 RT - 15.94 LT	OVERHEAD	CONNEXUS		X			(1) CROSSING
100+93.63 - 101+25.39	CSAH 22	P_CSAH22	86.53 RT - 73.27 RT	BURIED POWER	CONNEXUS	X				
101+25.39	CSAH 22	P_CSAH22	73.27 RT	POWER POLE	CONNEXUS	X				
101+25.39 - 102+10.47	CSAH 22	P_CSAH22	73.27 RT - 15.94 LT	OVERHEAD	CONNEXUS		X			(1) CROSSING
102+52.93 - 102+10.47	CSAH 22	P_CSAH22	77.13 RT - 15.94 LT	OVERHEAD	CONNEXUS		X			(1) CROSSING
102+10.47 - 107+41.81	CSAH 22	P_CSAH22	15.94 LT - 13.55 LT	OVERHEAD	CONNEXUS		X			(1)
102+10.47	CSAH 22	P_CSAH22	15.94 LT	POWER POLE	CONNEXUS		X			(1)
104+60.85	CSAH 22	P_CSAH22	13.12 LT	POWER POLE	CONNEXUS		X			(1)
107+41.81 - 115+14.60	CSAH 22	P_CSAH22	13.55 LT - 24.4 LT	OVERHEAD	CONNEXUS		X			(1)
107+41.81	CSAH 22	P_CSAH22	13.55 LT	POWER POLE	CONNEXUS		X			(1)
110+17.08	CSAH 22	P_CSAH22	16.78 LT	POWER POLE	CONNEXUS		X			(1)
112+91.65	CSAH 22	P_CSAH22	23.43 LT	POWER POLE	CONNEXUS		X			(1)
GAS - S.A.P. 002-622-036										
100+00.00 - 101+24.41	CSAH 22	P_CSAH22	32 LT - 23.48 LT	2" PLASTIC	CENTERPOINT	X				
100+41.33 - 100+43.00	CSAH 22	P_CSAH22	106 RT - 30 LT	2" PLASTIC	CENTERPOINT	X				CROSSING - VERIFY DEPTH
100+94.61 - 101+01.16	CSAH 22	P_CSAH22	28 LT - 48 LT	2" PLASTIC	CENTERPOINT	X				
101+24.41 - 101+23.26	CSAH 22	P_CSAH22	23.48 LT - 108.21 RT	2" PLASTIC	CENTERPOINT			X		CROSSING
107+66.57 - 107+67.24	CSAH 22	P_CSAH22	155.05 LT - 84.32 LT	2" PLASTIC	CENTERPOINT	X				
107+67.24 - 108+14.72	CSAH 22	P_CSAH22	84.32 LT - 75.55 LT	2" PLASTIC	CENTERPOINT	X				
108+14.72 - 108+27.19	CSAH 22	P_CSAH22	75.55 LT - 29.01 LT	2" PLASTIC	CENTERPOINT			X		VERIFY DEPTH
108+27.19 - 115+14.60	CSAH 22	P_CSAH22	29.01 LT - 32.93 LT	2" PLASTIC	CENTERPOINT			X		VERIFY DEPTH

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

INPLACE UTILITY TABULATIONS

SHEET NO. 10 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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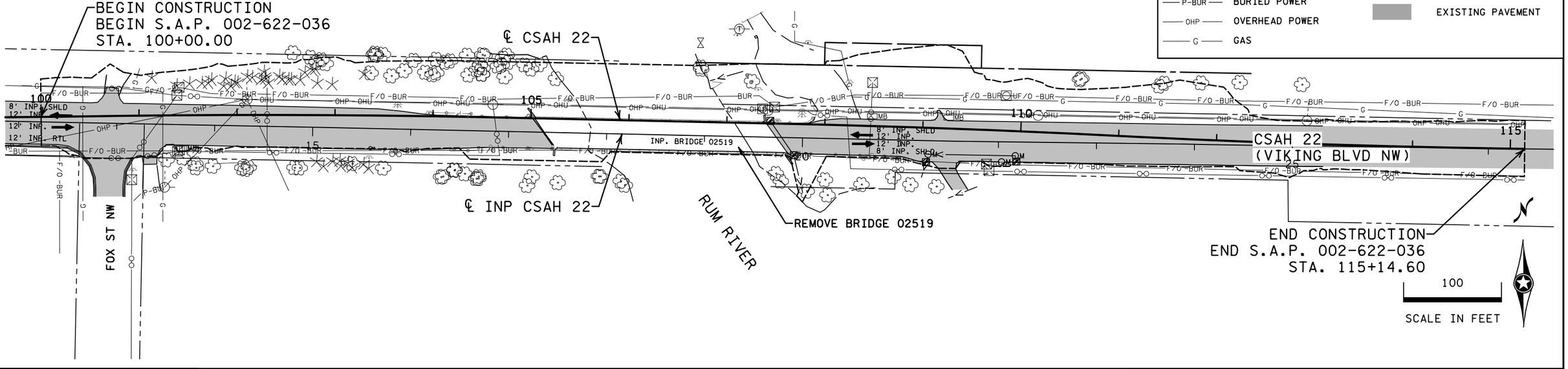
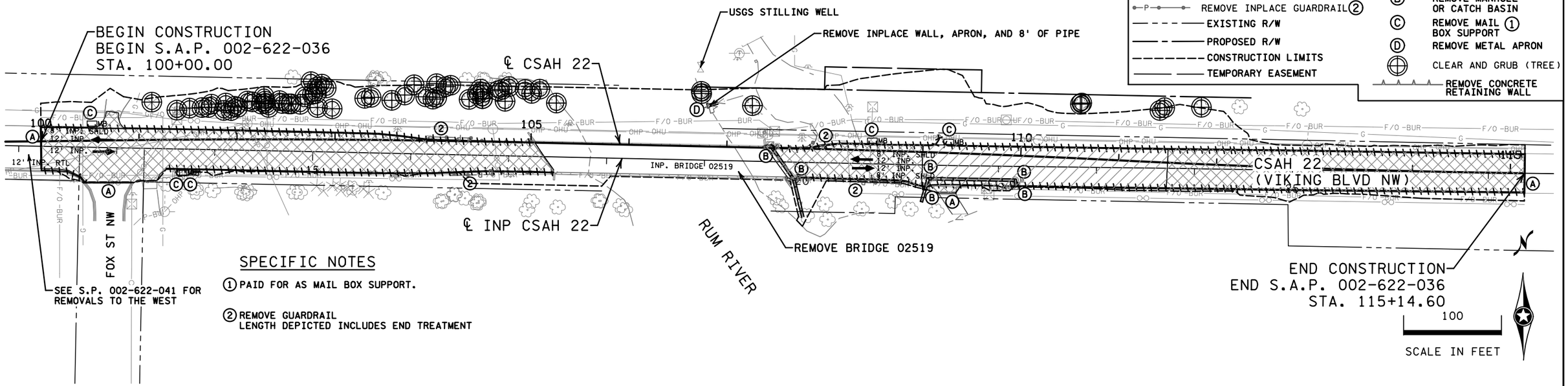
INPLACE TOPOGRAPHY & UTILITY PLAN



LEGEND

- EXISTING R/W
- PROPOSED R/W
- CONSTRUCTION LIMITS
- TEMPORARY EASEMENT
- P-BUR — BURIED POWER
- OHP — OVERHEAD POWER
- G — GAS
- OHU — OVERHEAD UTILITY
- F/O -BUR — BURIED FIBER OPTIC
- COMMUNICATION
- STORM SEWER
- EXISTING PAVEMENT

REMOVAL PLAN



LEGEND

- REMOVE BITUMINOUS PAVEMENT
- REMOVE SEWER PIPE (STORM)
- REMOVE BITUMINOUS CURB
- REMOVE INPLACE GUARDRAIL (2)
- EXISTING R/W
- PROPOSED R/W
- CONSTRUCTION LIMITS
- TEMPORARY EASEMENT
- FULL DEPTH RECLAMATION
- (A) SAWCUT BIT PAVEMENT
- (B) REMOVE MANHOLE OR CATCH BASIN
- (C) REMOVE MAIL (1) BOX SUPPORT
- (D) REMOVE METAL APRON
- CLEAR AND GRUB (TREE)
- REMOVE CONCRETE RETAINING WALL

SPECIFIC NOTES

(1) PAID FOR AS MAIL BOX SUPPORT.

(2) REMOVE GUARDRAIL
LENGTH DEPICTED INCLUDES END TREATMENT

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

INPLACE TOPOGRAPHY, UTILITY & REMOVAL PLAN

SHEET NO. 11 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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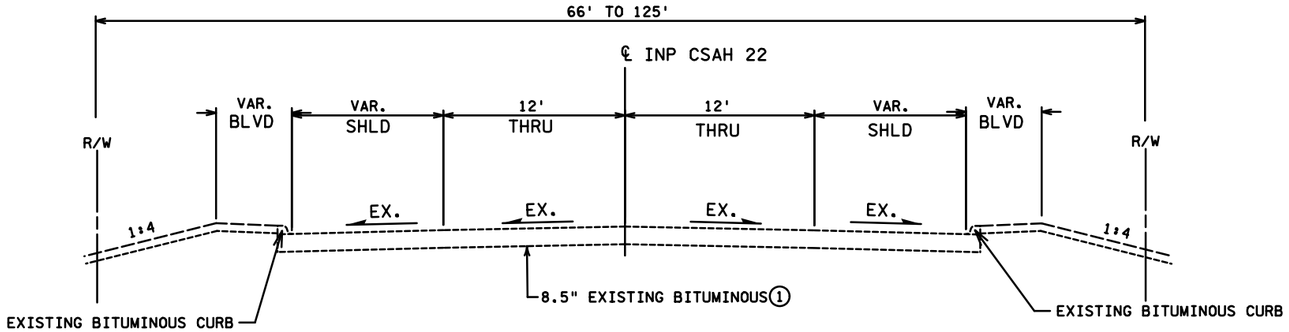
EXISTING CSAH 22 (VIKING BLVD NW)

INP CSAH 22 STA. 12+22.78 TO 17+36.22
INP CSAH 22 STA. 19+72.94 TO 27+37.02 (2)



GENERAL NOTES

ALL CROSS SLOPES ARE IN FT. PER FT.

SPECIFIC NOTES

(1) DEPTHS ARE AVERAGES.

(2) EXISTING BRIDGE 02519 IS FROM INP CSAH 22 STA. 17+36.22 TO 19+72.94

EXISTING CSAH 22

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: _____ 8/10/2023
LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN
DESIGNED BY: JCN
CHECKED BY: GEB

HDR

ANOKA COUNTY

TYPICAL SECTIONS

SHEET NO. 12 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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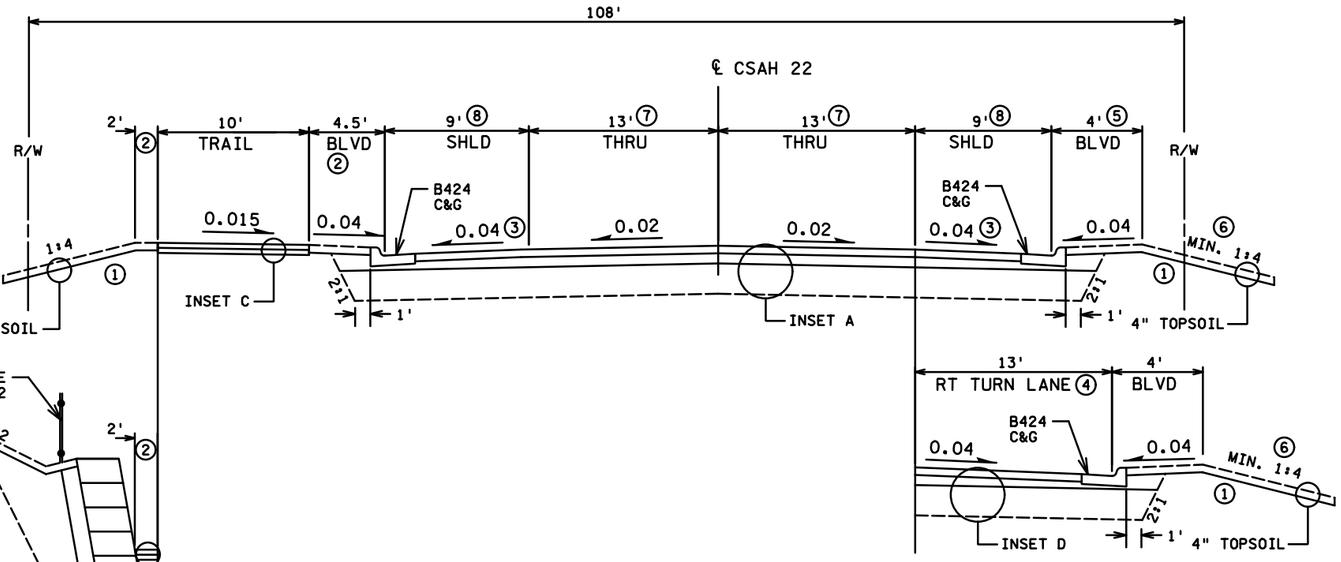
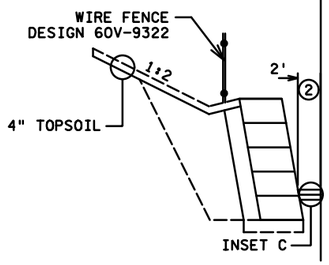
CSAH 22 (VIKING BLVD NW)

CSAH 22 STA. 100+00.00 TO 104+45.48 (9)

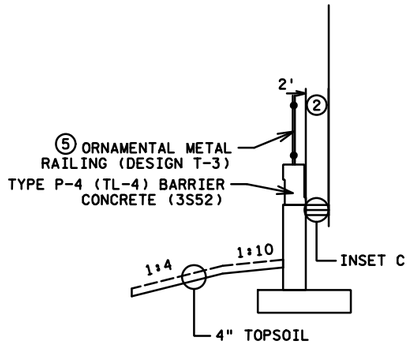


CSAH 22 STA. 101+88.20 to 103+39.15



CSAH 22 STA. 100+00.00 to 102+28.04

CSAH 22 STA. 103+45.93 TO 104+45.48



SPECIFIC NOTES

(1) BACKFILL WITH SUITABLE GRADING MATERIAL.

(2) 2' SHLD/CLEAR ZONE OFFSET FROM TRAIL.

(3) TRANSITION FROM 4% TO 2% FROM STA. 103+90.48 TO 104+45.48

(4) INCLUDES FOX STREET ENTRANCE.
SEE INTERSECTION & DRIVEWAY DETAILS SHEET FOR MORE INFORMATION.

(5) SEE SHEET B30 FOR DETAILS.

(6) SEE CROSS SECTIONS.

(7) TRANSITION FROM 13' TO 12' FROM STA. 103+90.48 TO 104+45.48

(8) TRANSITION FROM 9' TO 8' FROM STA. 103+90.48 TO 104+45.48

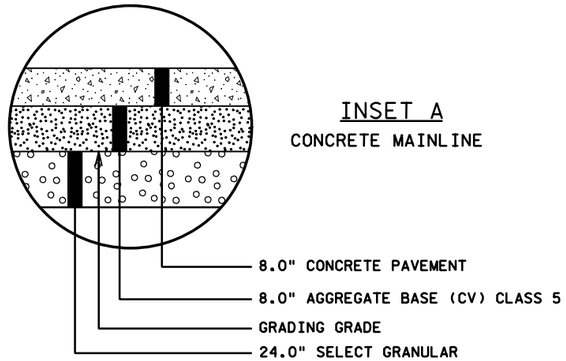
(9) BRIDGE APPROACH PANEL FROM CSAH 22 STA. 104+45.48 TO 103+03.25
SEE STANDARD PLAN 5-297.224 ON SHEET 17 FOR DETAILS.

GENERAL NOTES

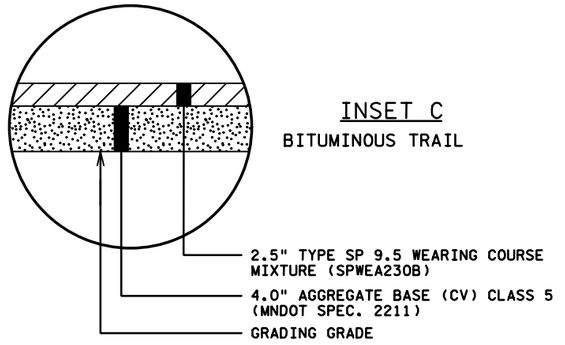
ALL CROSS SLOPES ARE IN FT. PER FT.

UNLESS OTHERWISE SPECIFIED, GRADING GRADE SLOPES WILL BE THE SAME AS THE PROPOSED DRIVING SURFACE.

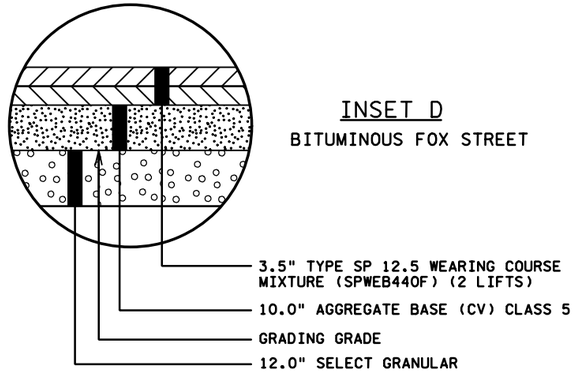
SEE CONSTRUCTION PLAN SHEETS FOR BITUMINOUS TRAIL LOCATIONS. AGGREGATE BASE CLASS 5 SHALL BE EXTENDED 6" ON EACH EDGE OF TRAIL WIDTH.



INSET A
CONCRETE MAINLINE



INSET C
BITUMINOUS TRAIL



INSET D
BITUMINOUS FOX STREET

PROPOSED CSAH 22

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023
LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN
DESIGNED BY: JCN
CHECKED BY: GEB

HDR

ANOKA COUNTY

TYPICAL SECTIONS

SHEET NO. 13 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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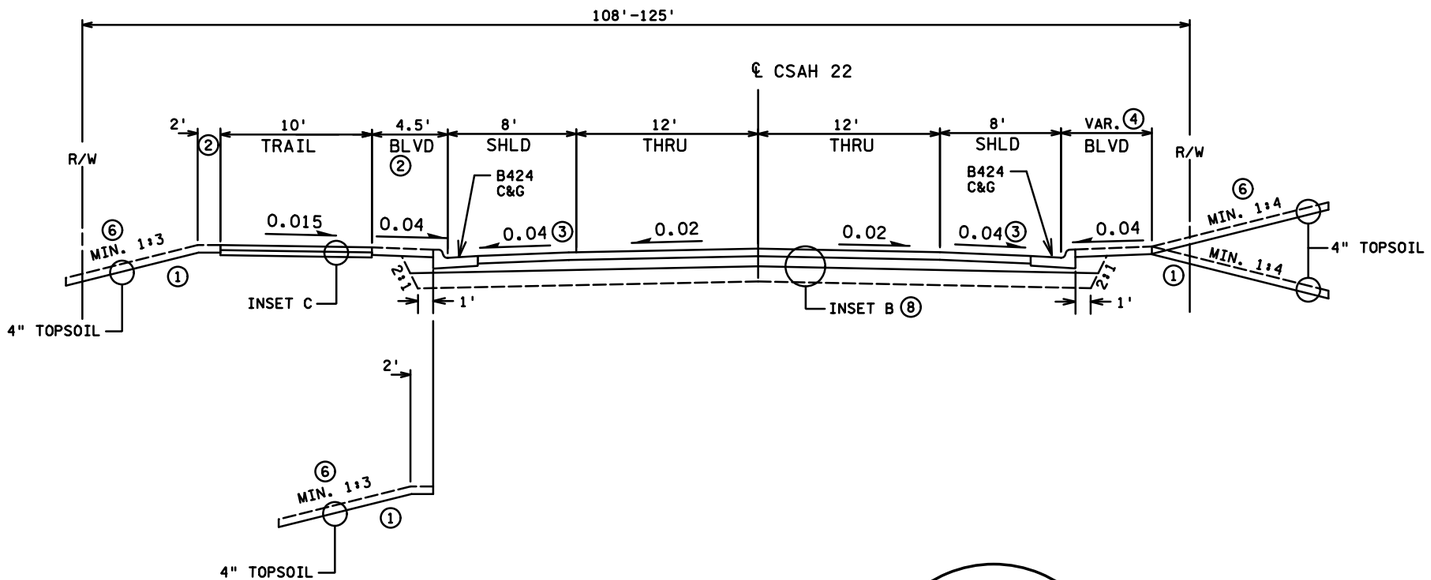
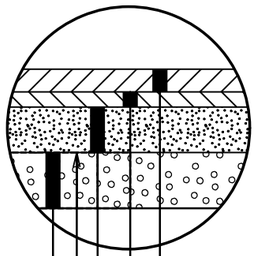
CSAH 22 (VIKING BLVD NW)

CSAH 22 STA. 107+95.77 TO 115+14.60 (7)

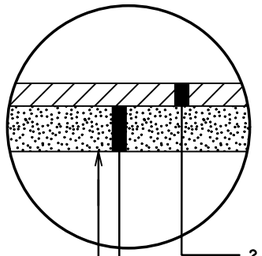


CSAH 22 STA. 110+40.76 TO 115+14.60



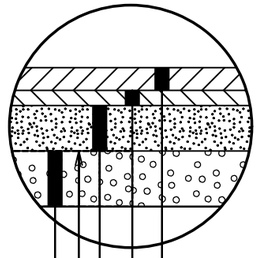
INSET B
BITUMINOUS MAINLINE

- 4.0" TYPE SP 12.5 WEARING COURSE MIXTURE (SPWEB440F)
- 3.0" TYPE SP 12.5 NON WEARING COURSE MIXTURE (SPNWB430B)
- 10.0" AGGREGATE BASE (CV) CLASS 5
- GRADING GRADE
- 12.0" SELECT GRANULAR



INSET C
BITUMINOUS TRAIL

- 2.5" TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA230B)
- 4.0" AGGREGATE BASE (CV) CLASS 5 (MNDOT SPEC. 2211)
- GRADING GRADE



INSET E (8)
BITUMINOUS MAINLINE
STATION 109+00 TO 111+50

- 4.0" TYPE SP 12.5 WEARING COURSE MIXTURE (SPWEB440F)
- 3.0" TYPE SP 12.5 NON WEARING COURSE MIXTURE (SPNWB430B)
- 8.0" AGGREGATE BASE (CV) CLASS 5
- GRADING GRADE
- VARIABLE DEPTH BITUMINOUS RECLAMATION

SPECIFIC NOTES

(1) BACKFILL WITH SUITABLE GRADING MATERIAL.

(2) 2' SHLD/CLEAR ZONE OFFSET FROM TRAIL.

(3) TRANSITION FROM 2% TO 4% FROM STA. 107+95.77 TO 108+91.77

(4) BLVD WIDTH VARIES TO MATCH EXISTING. MINIMUM WIDTH 1.5'. SEE CROSS SECTIONS.

(5) NOT USED.

(6) SEE CROSS SECTIONS.

(7) BRIDGE APPROACH PANEL FROM CSAH 22 STA. 107+49.50 TO 107+95.77 SEE STANDARD PLAN 5-297.224 ON SHEET 17 FOR DETAILS.

(8) INSET E SHALL BE USED FROM APPROXIMATE CSAH 22 STA. 109+00 TO 111+50 TO CONSTRUCT THE CSAH 22 PROFILE GRADE RAISE. EXISTING BITUMINOUS PAVEMENT SHALL BE RECLAIMED AND USED AS AGGREGATE BASE (CV) CLASS 6 FOR PROFILE GRADING.

GENERAL NOTES

ALL CROSS SLOPES ARE IN FT. PER FT.

UNLESS OTHERWISE SPECIFIED, GRADING GRADE SLOPES WILL BE THE SAME AS THE PROPOSED DRIVING SURFACE.

SEE CONSTRUCTION PLAN SHEETS FOR BITUMINOUS TRAIL LOCATIONS. AGGREGATE BASE CLASS 5 SHALL BE EXTENDED 6" ON EACH EDGE OF TRAIL WIDTH.

PROPOSED CSAH 22

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

TYPICAL SECTIONS

SHEET NO. 14 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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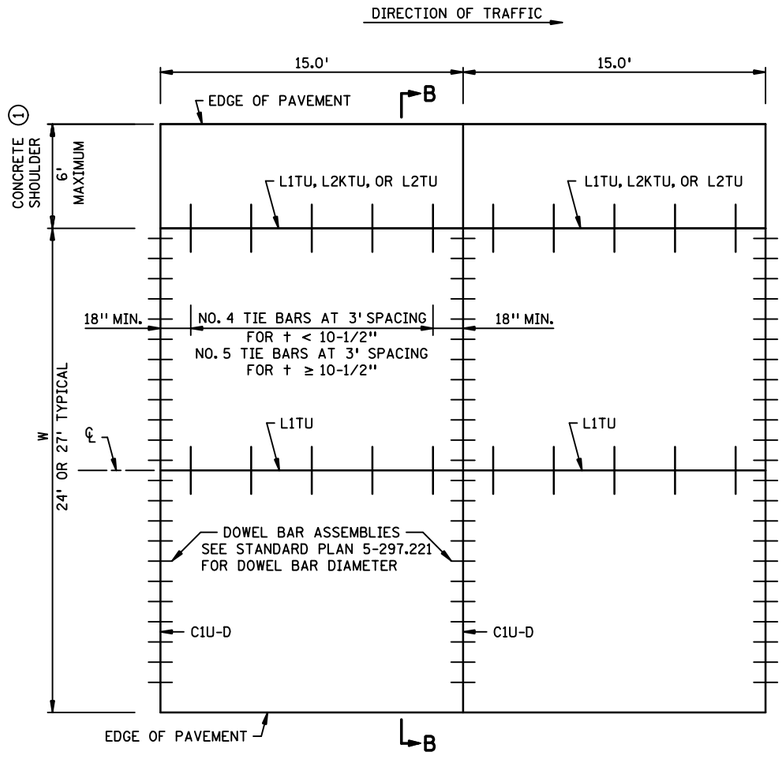
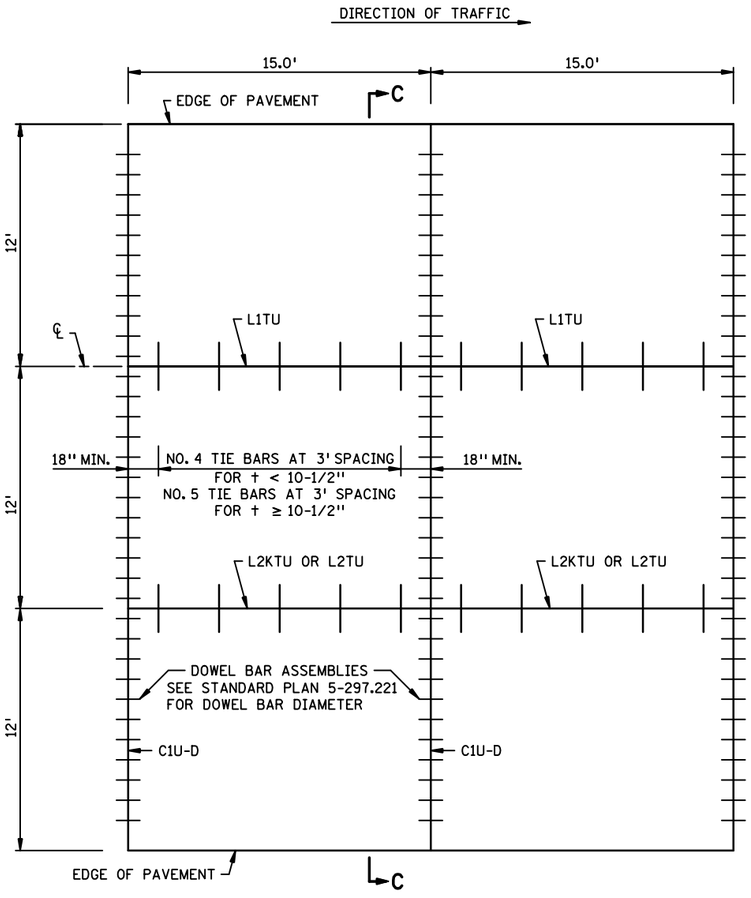


MAINLINE PAVEMENT WITH INSIDE CONCRETE SHOULDER

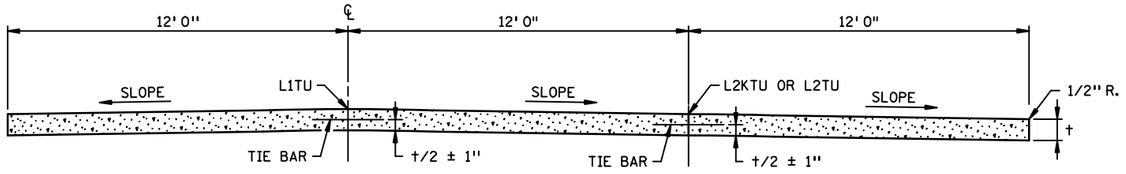
DOWELED

SECTION B-B



MAINLINE PAVEMENT URBAN

DOWELED



SECTION C-C

GENERAL NOTES:

SEE TYPICAL SECTIONS AND PLAN SHEETS FOR CROSS SLOPES AND PAVEMENT THICKNESS, t.

DOWEL BAR ASSEMBLIES, WHEN REQUIRED, SHALL BE SIMILAR TO THOSE SHOWN ON STANDARD PLATE 1103.

ALL REINFORCING BARS SHALL BE EPOXY COATED AND COMPLY WITH SPEC. 3301.

FOR SUPPLEMENTAL PAVEMENT REINFORCEMENT, SEE STANDARD PLATE 1070.

① CONTACT THE CONCRETE ENGINEER TO DISCUSS WHETHER TIE BARS AND SAWED JOINTS ARE NEEDED BASED ON CONCRETE SHOULDER WIDTH AND DEPTH.

REVISION:

APPROVED: FEBRUARY 16, 2016

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

STANDARD PLAN 5-297.217 | 2 OF 2

APPROVED: 2-16-2016

REVISED:

CONCRETE MAINLINE PAVEMENT

15.0 FT. PANEL LENGTH

URBAN OR CONCRETE SHOULDERS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 15 OF 97 SHEETS

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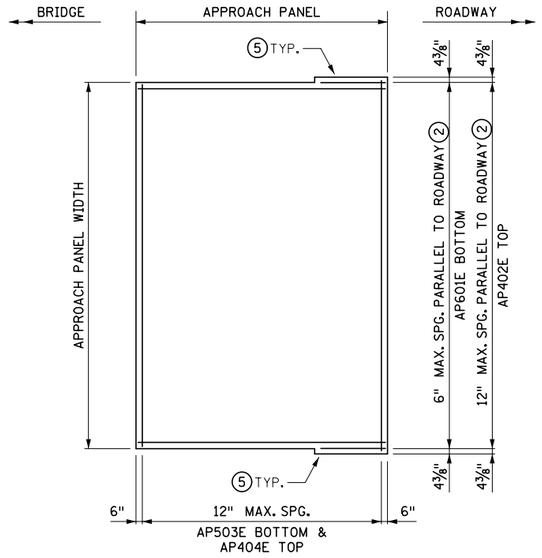
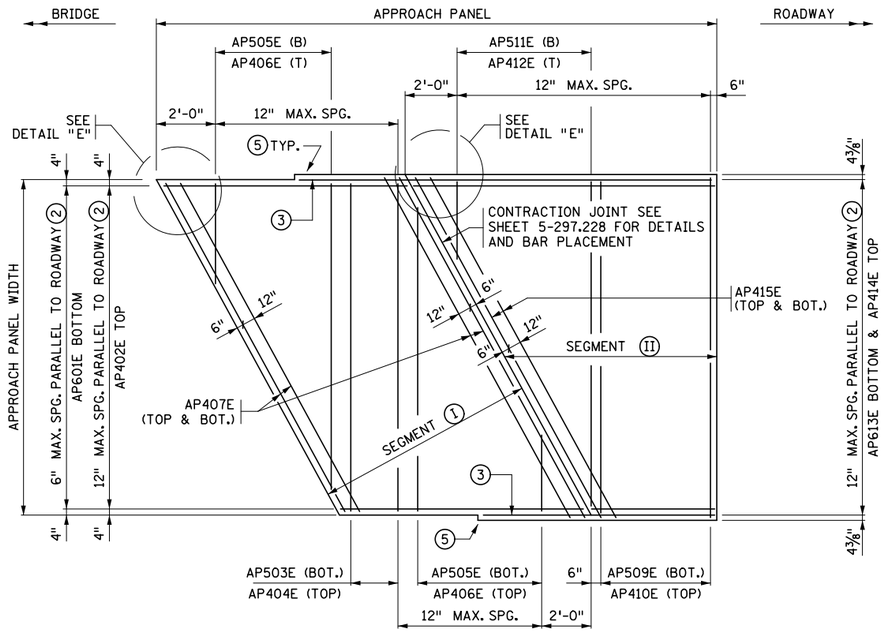


APPROACH PANEL REINFORCEMENT

SQUARE TO 10° SKEWS



APPROACH PANEL REINFORCEMENT

OVER 10° SKEWS

ESTIMATED REINFORCEMENT QUANTITY FOR BRIDGE APPROACH PANELS

TYPE	LOCATION	ESTIMATIED WEIGHT
PANEL (SQ. TO 10°)	BRIDGE TO END OF APPROACH PANEL	48.5 LB./SQ. YD.
PANEL SEGMENT (I) (OVER 10°)	BRIDGE TO CONTRACTION JOINT	48.5 LB./SQ. YD.
PANEL SEGMENT (II) (OVER 10°)	CONTRACTION JOINT TO END OF APPROACH PANEL	35.0 LB./SQ. YD.
SILL	SILL (IF REQUIRED)	14.0 LB./LIN FT.

NOTES:

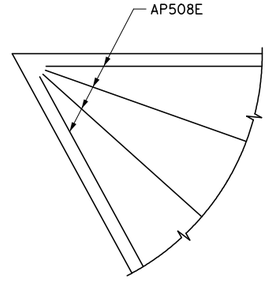
TRANSVERSE BARS IN BOTH PANEL SEGMENTS ARE PERPENDICULAR TO ROADWAY CENTERLINE EXCEPT AP407E ARE PARALLEL TO SKEW IN SEGMENT (I) AND AP415E ARE PARALLEL TO SKEW IN SEGMENT (II).

LONGITUDINAL BARS IN BOTH PANEL SEGMENTS ARE PARALLEL TO ROADWAY CENTERLINE.

BILL OF REINFORCEMENT FOR BRIDGE APPROACH PANELS

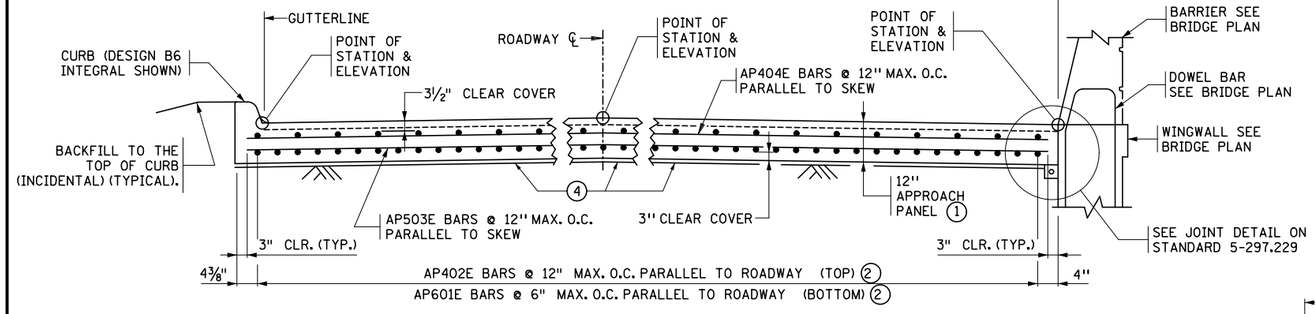
CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS INCLUDING CURB TRANSITIONS AND ALL DETAILS NECESSARY TO CONSTRUCT THE PANEL. SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.

BAR	NO.	LENGTH	SHAPE	LOCATION
AP601E		'-	———	BOTTOM LONGITUDINAL
AP402E		'-	———	TOP LONGITUDINAL
AP503E		'-	———	BOTTOM TRANSVERSE
AP404E		'-	———	TOP TRANSVERSE
AP505E	SER. OF	'- TO '-	———	BOTTOM TRANSVERSE
AP406E	SER. OF	'- TO '-	———	TOP TRANSVERSE
AP407E		'-	———	TOP & BOTTOM EDGE
AP508E		8'-0	———	TOP CORNER - FAN
AP509E		'-	———	BOTTOM TRANSVERSE
AP410E		'-	———	TOP TRANSVERSE
AP511E	SER. OF	'- TO '-	———	BOTTOM TRANSVERSE
AP412E	SER. OF	'- TO '-	———	TOP TRANSVERSE
AP613E	SER. OF	'- TO '-	———	BOTTOM LONGITUDINAL
AP414E	SER. OF	'- TO '-	———	TOP LONGITUDINAL
AP415E		'-	———	TOP & BOTTOM EDGE
AP616E		5'-0	———	C2H-D JOINT



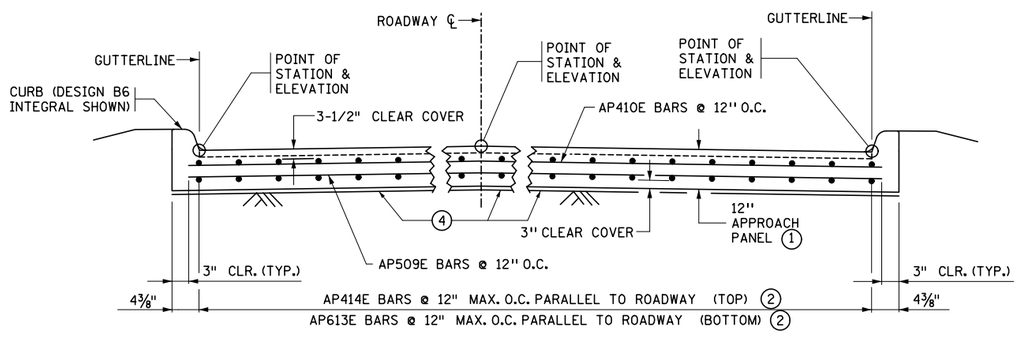
DETAIL "E"

FAN 4-AP508E BARS AS SHOWN
IN ACUTE CORNERS FOR SKEWS OVER 30°.



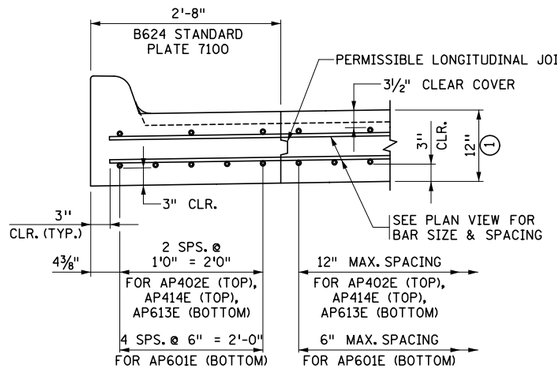
TRANSVERSE SECTION B-B

FROM STANDARD PLAN 5-297.222



TRANSVERSE SECTION C-C

FROM STANDARD PLAN 5-297.222



CURB DETAIL

(B624 CURB AND GUTTER SHOWN)

GENERAL NOTES:

USE EPOXY COATED GRADE 60 REINFORCEMENT PER SPEC. 3301 IN APPROACH PANEL, CONCRETE SILL, AND CURB TRANSITION. EPOXY COAT BARS MARKED WITH THE SUFFIX "E" IN ACCORDANCE WITH SPEC. 3301.

FOR VARIABLE ROADWAY WIDTHS, VARY THE LAP LENGTH OF THE REINFORCEMENT.

MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS: NO. 4 BAR = 1'-11", NO. 5 BAR = 2'-5", NO. 6 BAR = 2'-10".

ALL LAP SPLICES SHALL BE STAGGERED SUCH THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.

(1) 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.

(2) SPACING ONLY FOR B6 INTEGRANT CURB. SEE CURB DETAIL FOR SPACING FOR USING B624 CURB AND GUTTER.

(3) EXTEND AND/OR CUT REINFORCING AS NECESSARY TO ACCOMMODATE CURB TRANSITION IF PRESENT. REINFORCEMENT MUST EXTEND INTO CURB AS SHOWN IN TRANSVERSE SECTIONS B-B AND C-C.

(4) IF THE APPROACH PANEL IS TIED TO THE BRIDGE ABUTMENT WITH REINFORCEMENT BARS, 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.

(5) SEE STANDARD PLAN 5-297.222 FOR CURB TRANSITION LOCATION.

STANDARD PLAN SHEET NO.	TITLE:
5-297.223 (2 OF 2)	BRIDGE APPROACH PANEL REINFORCEMENT DETAILS (TYPE S CONCRETE BARRIER ON WINGWALL)
STANDARD APPROVED: AUGUST 22, 2016	

SAP 002-622-036, SAP 223-020-006 SHEET NO. 16 OF 97 SHEETS

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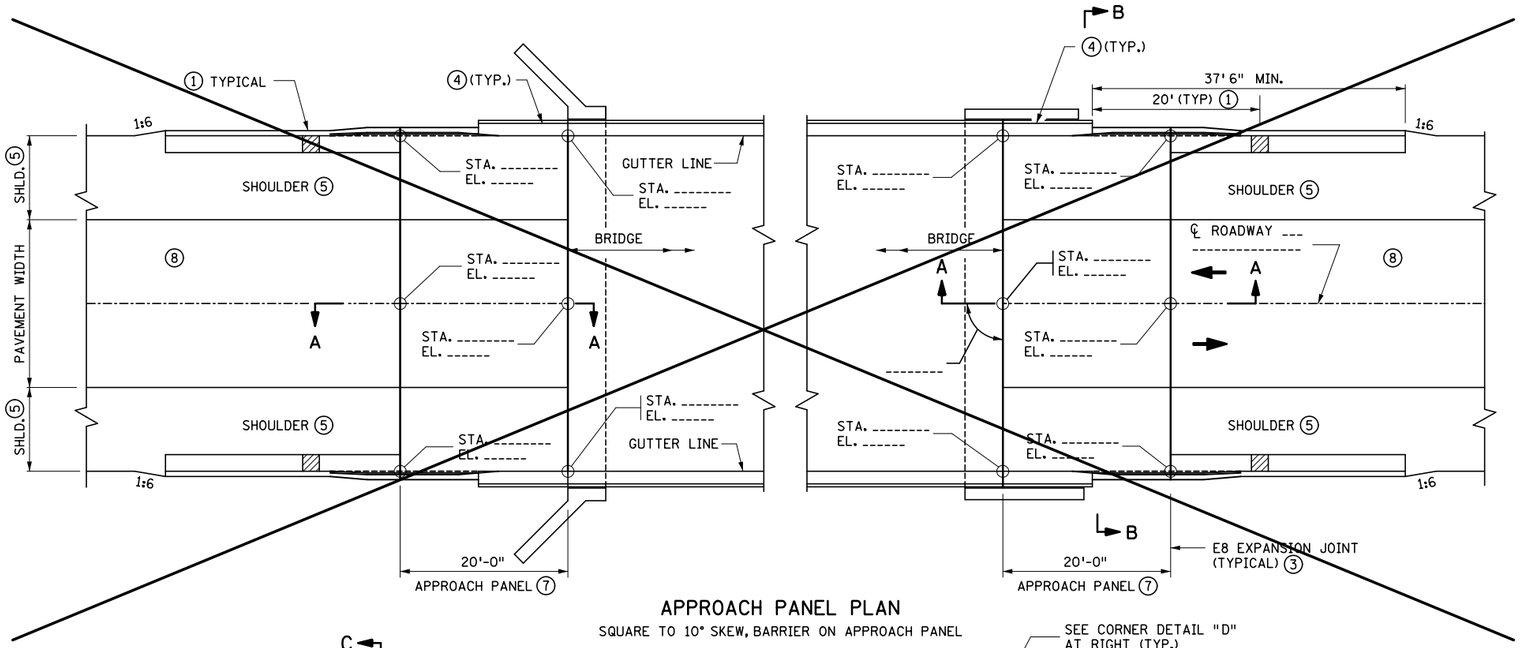
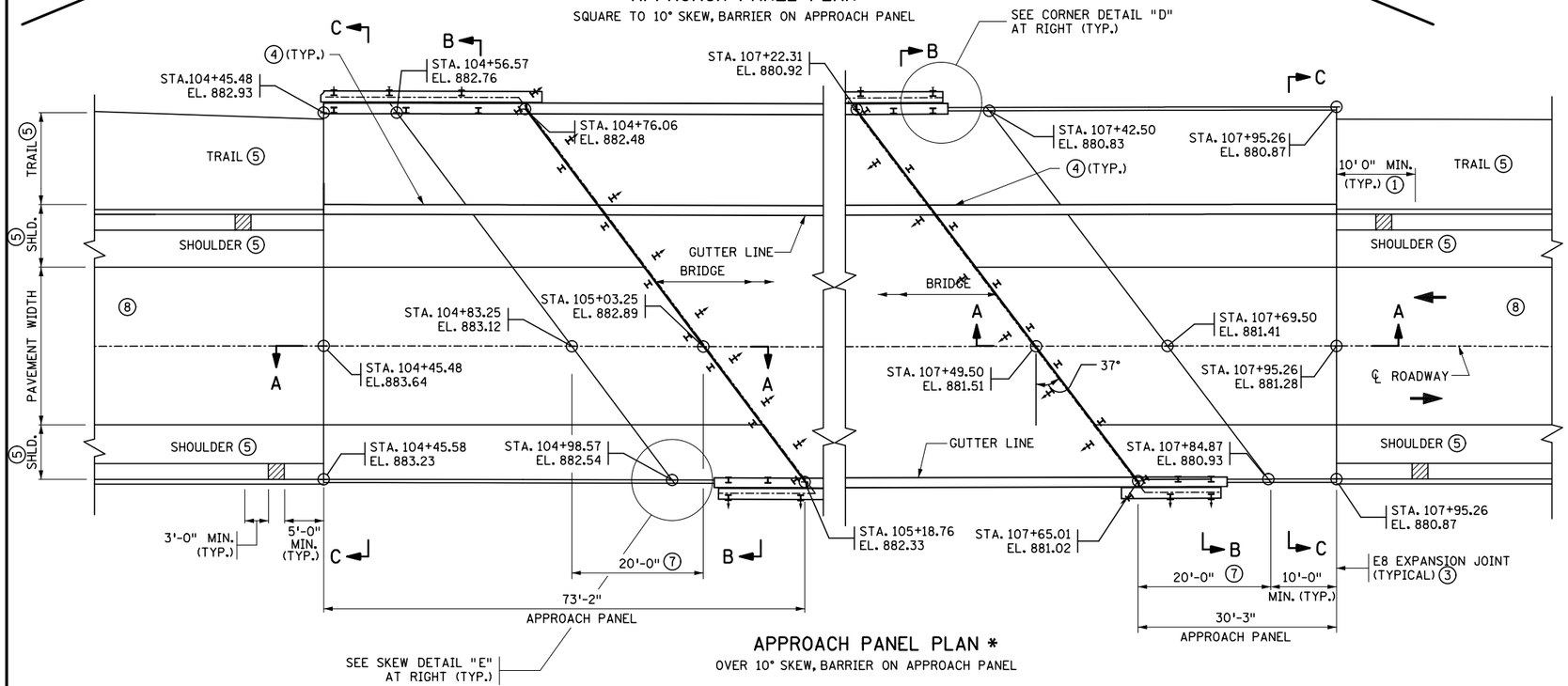


APPROACH PANEL PLAN

SQUARE TO 10° SKEW, BARRIER ON APPROACH PANEL



APPROACH PANEL PLAN *

OVER 10° SKEW, BARRIER ON APPROACH PANEL

NOTES:

1. SEE STANDARD PLAN 5-297.231 FOR DRAINAGE DETAILS AND ADDITIONAL REQUIREMENTS.
2. B6 CURB DESIGN SHOWN. SEE STANDARD PLATES FOR CURB DETAILS.
3. E8 QUANTITY SHALL BE PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB TO BACK OF CURB.
4. TO ACCOMMODATE GUARDRAIL CONNECTION AND CRASH TEST REQUIREMENTS THE CONCRETE BARRIER MUST EXTEND 10'-8" MINIMUM ONTO THE APPROACH PANEL. FOR PARALLEL WINGWALLS THE BARRIER MUST EXTEND 10'-8" MINIMUM ON TO THE APPROACH PANEL OR TO THE END OF THE WINGWALL, WHICH EVER IS LONGER. REFER TO BRIDGE PLAN FOR BARRIER REINFORCEMENT AND PAYMENT.
5. SEE GRADING PLANS FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.
6. WHEN SKEW IS OVER 45°, THE JOINT SHALL BE PERPENDICULAR TO GUTTER FOR 1' (TYP.).
7. APPROACH PANEL LENGTHS ARE MEASURED ALONG CENTERLINE. PANEL SIZE AND REQUIREMENTS FOR TRANSVERSE AND LONGITUDINAL JOINTS ARE SHOWN ON STANDARD PLANS 5-297.228 AND 5-297.229. MAXIMUM PANEL LENGTH OF 20'-0" FOR UP TO 40°SKEWS, 15'-0" FOR SKEWS OVER 40°
8. FOR CONCRETE PAVEMENT, SEE STANDARD PLAN 5-297.227 FOR LUG REQUIREMENTS.

GENERAL NOTES:

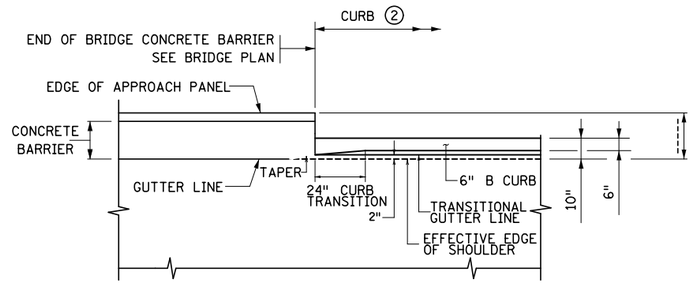
SECTION A-A IS SHOWN ON STANDARD PLAN 5-297.227.
SECTIONS B-B AND C-C ARE SHOWN ON STANDARD PLAN 5-297.225 AND SHOW THE STATION AND ELEVATION AT END LOCATIONS ON THE APPROACH PANEL.

A CONCRETE SILL IS REQUIRED BENEATH EXPANSION JOINT TYPE E8. EXTEND THE EXPANSION JOINT AND THE SILL ALONG THE FULL WIDTH OF THE TRAFFIC LANES, SHOULDERS AND CURB. ENSURE THAT SILL DOES NOT INTERFERE WITH GUARDRAIL POST PLACEMENT. CONCRETE SILL AND CURBING, IF REQUIRED, ARE INCLUDED IN THE APPROACH PANEL PAY ITEM.

REFER TO STANDARD PLAN 5-297.694 (1 OF 5) AND (4 OF 5) FOR ADDITIONAL CURB TRANSITION INFORMATION.

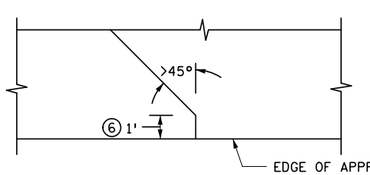
GENERAL DRAINAGE DETAILS ARE SHOWN ON BRIDGE APPROACH PANEL DRAINAGE DETAILS, STANDARD PLAN 5-297.231. ADDITIONAL CATCH BASIN DETAILS ARE SHOWN ON DRAINAGE PLAN SHEETS.

REFER TO SPEC. 2406 FOR ADDITIONAL INFORMATION.



CORNER DETAIL "D"

(PLAN VIEW)



(PLAN VIEW)

SKEW DETAIL "E"

**DENOTES MODIFICATION FROM STANDARD PLAN*

MODIFIED

BRIDGE NO. 02595

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

STANDARD PLAN SHEET NO: ~~5-297.224 (2 OF 2)~~

STANDARD APPROVED: ~~AUGUST 22, 2016~~

TITLE: **BRIDGE APPROACH PANEL LAYOUT (TYPE S CONCRETE BARRIER ON APPROACH PANEL)**

SAP 002-622-036, SAP 223-020-006

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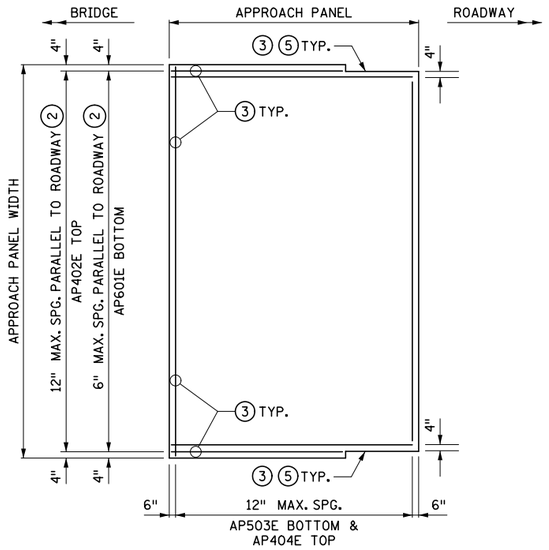
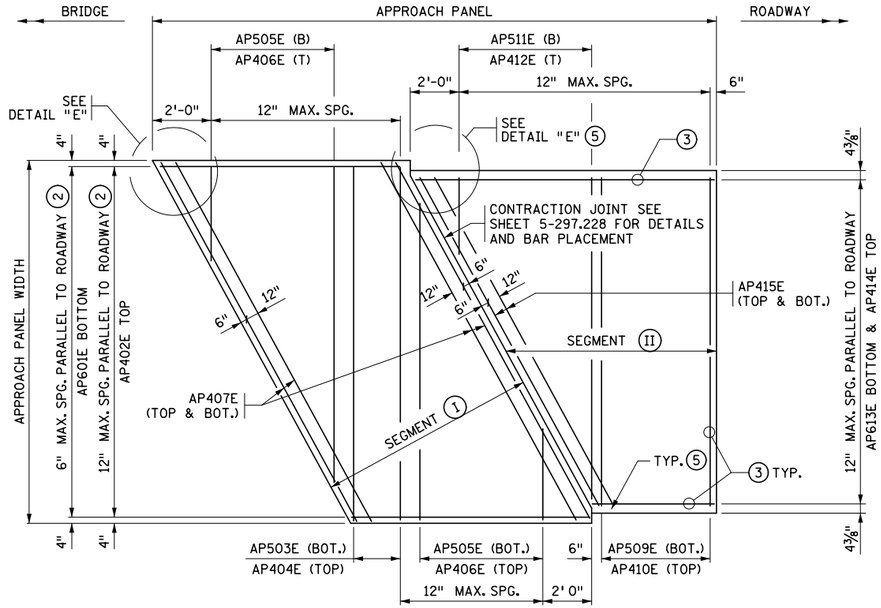
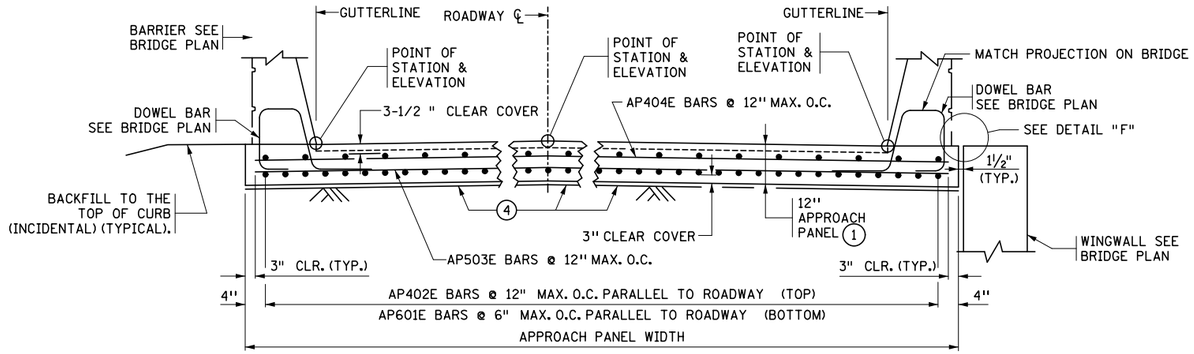


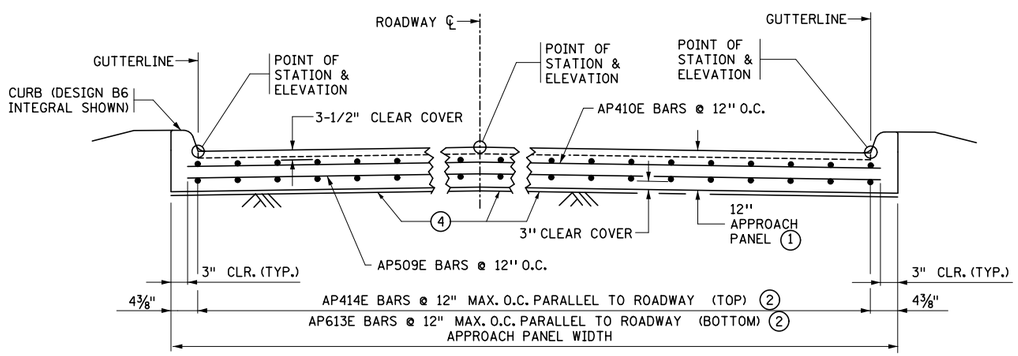
APPROACH PANEL REINFORCEMENT
SQUARE TO 10° SKEWS



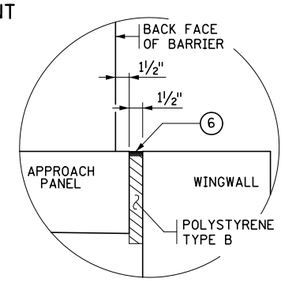
APPROACH PANEL REINFORCEMENT
OVER 10° SKEWS



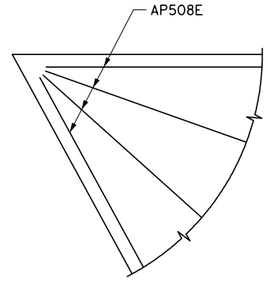
TRANSVERSE SECTION B-B
FROM STANDARD PLAN 5-297.224
CONCRETE BARRIERS ARE SHOWN, BUT MAY NOT BE PRESENT.
REFER TO BRIDGE PLANS FOR END OF BARRIER LOCATIONS.



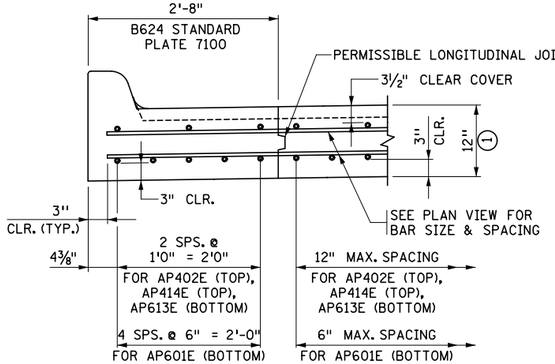
TRANSVERSE SECTION C-C
FROM STANDARD PLAN 5-297.224



DETAIL "F"



DETAIL "E"
FAN 4-AP508E BARS AS SHOWN
IN ACUTE CORNERS FOR SKEWS OVER 30°.



CURB DETAIL
(B624 CURB AND GUTTER SHOWN)

ESTIMATED REINFORCEMENT QUANTITY FOR BRIDGE APPROACH PANELS

TYPE	LOCATION	ESTIMATED WEIGHT
PANEL (SQ. TO 10°)	BRIDGE TO END OF APPROACH PANEL	48.5 LB./SQ. YD.
PANEL SEGMENT ① (OVER 10°)	BRIDGE TO CONTRACTION JOINT	48.5 LB./SQ. YD.
PANEL SEGMENT ⑪ (OVER 10°)	CONTRACTION JOINT TO END OF APPROACH PANEL	35.0 LB./SQ. YD
SILL	SILL (IF REQUIRED)	14.0 LB./LIN FT.

NOTES:

TRANSVERSE BARS IN BOTH PANEL SEGMENTS ARE PERPENDICULAR TO ROADWAY CENTERLINE EXCEPT AP407E ARE PARALLEL TO SKEW IN SEGMENT ① AND AP415E ARE PARALLEL TO SKEW IN SEGMENT ⑪.

LONGITUDINAL BARS IN BOTH PANEL SEGMENTS ARE PARALLEL TO ROADWAY CENTERLINE.

BILL OF REINFORCEMENT FOR BRIDGE APPROACH PANELS

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.

BAR	NO.	LENGTH	SHAPE	LOCATION
AP601E		'-	———	BOTTOM LONGITUDINAL
AP402E		'-	———	TOP LONGITUDINAL
AP503E		'-	———	BOTTOM TRANSVERSE
AP404E		'-	———	TOP TRANSVERSE
AP505E	SER. OF	'- TO '-	———	BOTTOM TRANSVERSE
AP406E	SER. OF	'- TO '-	———	TOP TRANSVERSE
AP407E		'-	———	TOP & BOTTOM EDGE
AP508E		8'-0	———	TOP CORNER - FAN
AP509E		'-	———	BOTTOM TRANSVERSE
AP410E		'-	———	TOP TRANSVERSE
AP511E	SER. OF	'- TO '-	———	BOTTOM TRANSVERSE
AP412E	SER. OF	'- TO '-	———	TOP TRANSVERSE
AP613E	SER. OF	'- TO '-	———	BOTTOM LONGITUDINAL
AP414E	SER. OF	'- TO '-	———	TOP LONGITUDINAL
AP415E		'-	———	TOP & BOTTOM EDGE
AP616E		5'-0	———	C2H-D JOINT

GENERAL NOTES:

USE EPOXY COATED GRADE 60 REINFORCEMENT PER SPEC. 3301 IN APPROACH PANEL, CONCRETE SILL, AND CURB TRANSITION. EPOXY COAT BARS MARKED WITH THE SUFFIX "E" IN ACCORDANCE WITH SPEC. 3301.

FOR VARIABLE ROADWAY WIDTHS, VARY THE LAP LENGTH OF THE REINFORCEMENT.

MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS: NO. 4 BAR = 1'-11", NO. 5 BAR = 2'-5", NO. 6 BAR = 2'-10".

ALL LAP SPLICES SHALL BE STAGGERED SUCH THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.

① 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.

② SPACING ONLY FOR B6 INTEGRANT CURB. SEE CURB DETAIL FOR SPACING FOR USING B624 CURB AND GUTTER.

③ EXTEND AND/OR CUT REINFORCING AS NECESSARY TO ACCOMMODATE CURB TRANSITION IF PRESENT. REINFORCEMENT MUST EXTEND INTO CURB AS SHOWN IN TRANSVERSE SECTIONS B-B AND C-C.

④ IF THE APPROACH PANEL IS TIED TO THE BRIDGE ABUTMENT WITH REINFORCEMENT BARS, 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.

⑤ SEE STANDARD PLAN 5-297.224 FOR CURB TRANSITION LOCATION.

⑥ SEAL WITH SELF-LEVELING SILICONE PER SPEC. 3722.

STANDARD PLAN SHEET NO.	TITLE:
5-297.225 (2 OF 2)	**BRIDGE APPROACH PANEL**
STANDARD APPROVED: AUGUST 22, 2016	**REINFORCEMENT DETAILS** (TYPE S CONCRETE BARRIER ON APPROACH PANEL)

SAP 002-622-036, SAP 223-020-006 SHEET NO. 18 OF 97 SHEETS

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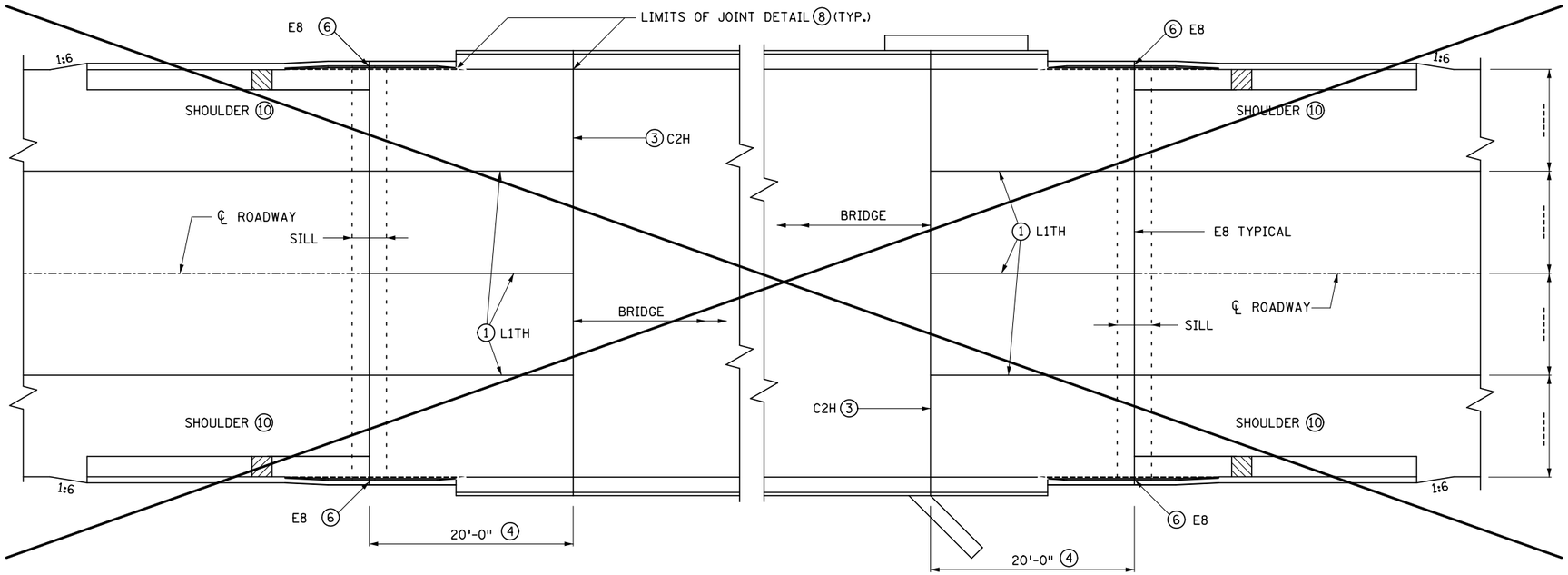
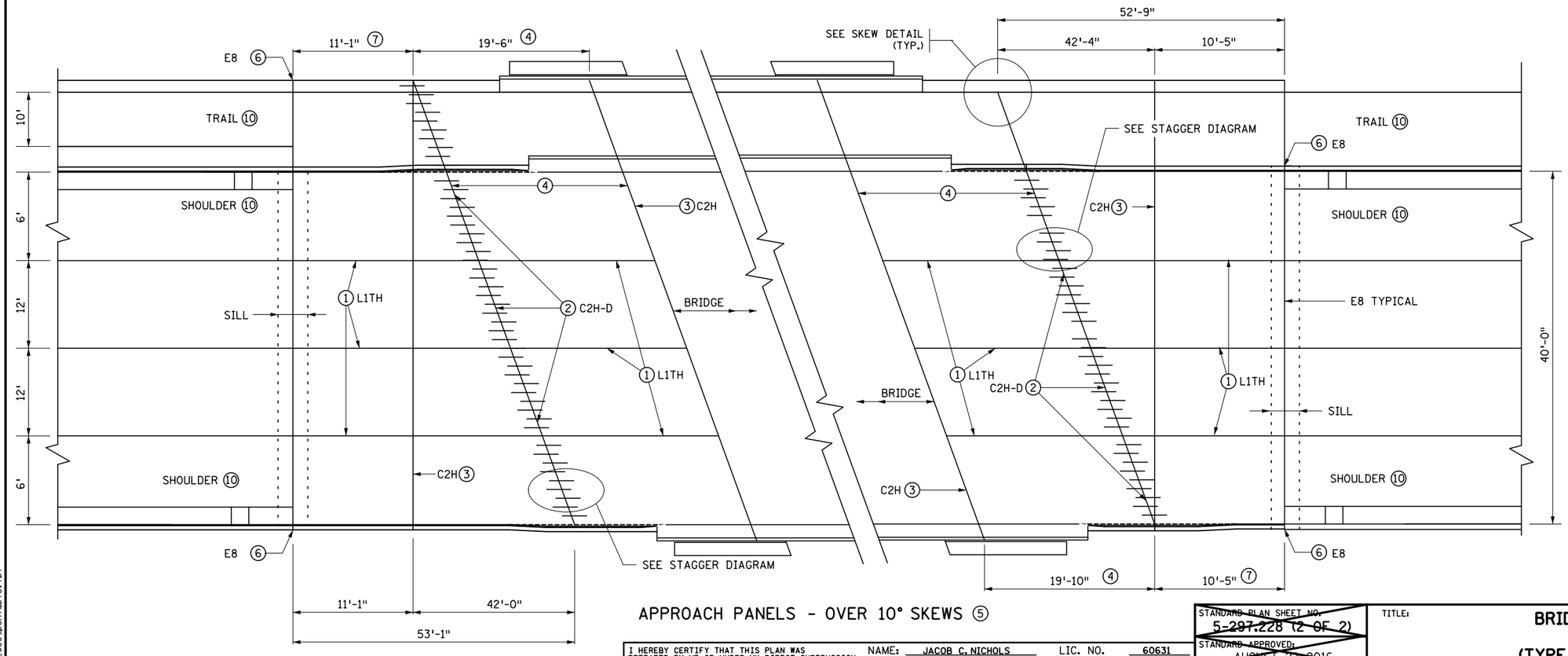
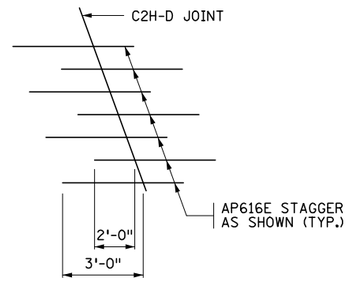


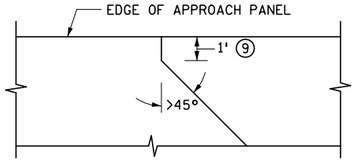
APPROACH PANELS - SQUARE TO 10° SKEWS (5)



APPROACH PANELS - OVER 10° SKEWS (5)



STAGGER DIAGRAM



SKEW DETAIL
(PLAN VIEW)

APPROACH PANEL JOINT LAYOUT NOTES:

(1) L1TH LONGITUDINAL JOINT. SEE STANDARD PLAN 5-297.229 FOR REINFORCEMENT LAP LENGTH REQUIREMENTS FOR STAGED CONSTRUCTION.

(2) PERMISSIBLE CONSTRUCTION JOINT. USE JOINT TYPE C2H-D WITH AP616E BARS AT 12-INCH SPACING AT MID DEPTH OF THE SLAB, PARALLEL TO THE CENTERLINE OF THE ROADWAY. AP616E BARS ARE 5'-0" LONG. PLACE THE BAR WITH 2'-0" ON ONE SIDE OF THE JOINT AND 3'-0" ON THE OPPOSITE SIDE OF THE JOINT. ALTERNATE THE 2'-0" AND 3'-0" DIMENSIONS AS SHOWN ON THE PLAN. THE C2H-D JOINT AND AP616E BARS ARE REQUIRED ON ALL PANELS WITH A SKEW OVER 10 DEGREES.

(3) C2H CONTRACTION JOINT.

(4) MAXIMUM PANEL LENGTH MEASURED ALONG CENTERLINE OF 20'-0" FOR UP TO 40° SKEWS, 15'-0" FOR SKEWS OVER 40°.

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

(6) E8 JOINT REQUIRED IN CURB ADJACENT TO E8 JOINT. E8 QUANTITY SHALL BE PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB TO BACK OF CURB.

(7) 10'-0" MINIMUM.

(8) SEE STANDARD PLANS 5-297.229 OR 5-297.231 FOR JOINT DETAIL FOR CONCRETE BARRIER ON WINGWALL.

(9) WHEN SKEW IS OVER 45°, THE JOINT SHALL BE PERPENDICULAR TO GUTTER FOR 1' (TYP).

(10) SEE GRADING PLAN FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.

DENOTES MODIFICATION FROM STANDARD PLAN

BRIDGE NO. 02595

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023
LICENSED PROFESSIONAL ENGINEER DATE

STANDARD PLAN SHEET NO: ~~5-297.228 (2 OF 2)~~
STANDARD APPROVED: AUGUST 22, 2016

TITLE: **BRIDGE APPROACH PANEL JOINT LAYOUT (TYPE S CONCRETE BARRIER)**

SAP 002-622-036, SAP 223-020-006

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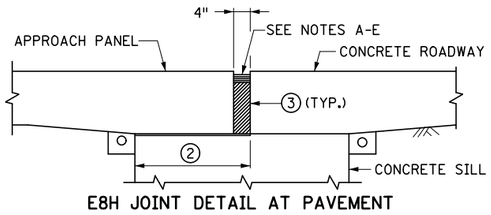
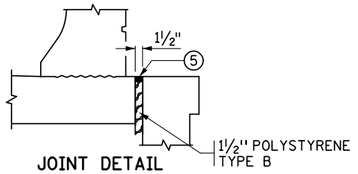
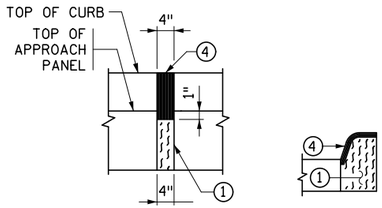
EXPANSION JOINTS



E8H JOINT DETAIL AT PAVEMENT

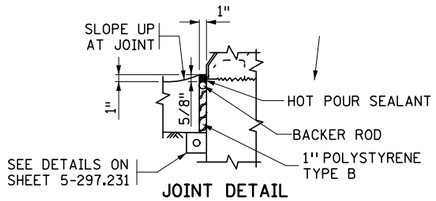


JOINT DETAIL
(CONCRETE BARRIER ON APPROACH PANEL)



SECTION THRU CURB

E8H JOINT AT CURB



JOINT DETAIL
(CONCRETE BARRIER ON WINGWALL)

EXPANSION JOINT NOTES:

1. PREFORMED JOINT FILLER MATERIAL, SPEC. 3702.
2. PLACE PLASTIC SHEETING SPEC. 3756 AS APPROVED BY THE ENGINEER TO BREAK BOND. COVER AREA SHOWN IN DETAIL. SEE SILL DETAILS ON STANDARD PLAN 5-297.227.
3. THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING PRIOR TO SEALING THE JOINT.
4. HOT POUR JOINT SEALER SPEC. 3725. TOP OF SEALER FLUSH TO 1/8 INCH BELOW TOP OF PAVEMENT SURFACE. MAKE TOP OF SEALER FOR CURB SECTION E8H JOINTS FLUSH WITH SURFACE (+ 1/8 INCH OR - 1/8 INCH).
5. SEAL WITH SELF-LEVELING SILICONE PER MNDOT 3722.

E8H PRESSURE RELIEF JOINT MATERIAL INSTALLATION INSTRUCTIONS:

SEE MNDOT APPROVED/QUALIFIED PRODUCTS LIST.

FURNISH AND INSTALL JOINT MATERIAL IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE FOLLOWING:

(A) EXPANSION JOINT FILLER MATERIALS USED FOR A 4 INCH PRESSURE RELIEF JOINT CONSISTS OF A PREFORMED FOAM PRODUCT HAVING MINIMUM DIMENSIONS OF 4.5 INCHES IN WIDTH (MAY BE LAMINATED) AND 8 INCHES IN DEPTH, AND A MINIMUM LENGTH OF 10 FEET. WHEN THE CONCRETE DEPTH IS GREATER THAN THE DEPTH OF THE PRESSURE RELIEF MATERIAL, FILL THE VOID BELOW THE MATERIAL WITH POLYSTYRENE. FURNISH AND INSTALL THE JOINT MATERIAL UNDER COMPRESSION WITH A LUBRICANT ADHESIVE APPLIED TO THE CONCRETE CONTACT SURFACES.

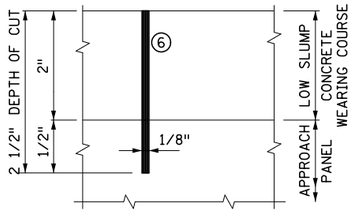
(B) SAW OR FORM THE JOINTS 4 INCHES WIDE BY THE FULL-DEPTH OF THE PANEL. INSPECT TO ASSURE THAT THE INSIDE WALLS OF THE JOINT HAVE BEEN SANDBLASTED, ARE DRY, SMOOTH AND FREE OF DEBRIS AND LOOSE PARTICLES. APPLY TAPE TO THE TOP 1 INCH OF THE INSIDE WALLS TO PREVENT THE LUBRICANT ADHESIVE FROM CONTAMINATING THE CONCRETE BONDING SURFACES OF THE SUBSEQUENTLY PLACED HOT POUR JOINT SEALER.

(C) PAINT THE INSIDE WALLS OF THE JOINT WITH LUBRICANT ADHESIVE AT THE RATE OF 1 GALLON PER 50 LINEAL FEET OF JOINT.

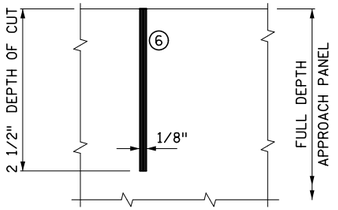
(D) PINCH THE BOTTOM OF THE MATERIAL TOGETHER AND PUSH IT DOWN INTO THE JOINT. WALK THE MATERIAL DOWN INTO THE JOINT; USE A SLEDGEHAMMER AND A 2 X 4 IF NECESSARY. APPLY LUBRICANT ADHESIVE TO THE ENDS OF THE PREFORMED FOAM MATERIAL WHEN BUTTING TWO PIECES TOGETHER.

(E) FURNISH AND INSTALL THE FOAM RELIEF JOINT MATERIAL TO A DEPTH OF APPROXIMATELY 7/8 INCH BELOW THE FINISHED CONCRETE SURFACE. AFTER INSTALLATION, REMOVE THE TAPE AND FILL THE VOID ON TOP OF THE FOAM MATERIAL WITH APPROXIMATELY 1/2 INCH OF HOT POUR JOINT SEALER (MNDOT 3723 OR 3725) TO A LEVEL OF 3/8 INCH +/- 1/4 INCH BELOW THE FINISHED CONCRETE SURFACE. THE HOT POUR JOINT SEALER SHOULD ONLY SLIGHTLY MELT INTO THE FOAM JOINT MATERIAL (TO PREVENT EXCESSIVE MELTING OF THE JOINT MATERIAL, PLACE THE HOT POUR SEALER AT THE LOWER END OF THE TEMPERATURE SPECIFICATION). CHECK FOR CORRECT TEMPERATURE BY PLACING HOT POUR SEALER ON A SAMPLE OF WASTE FOAM MATERIAL.

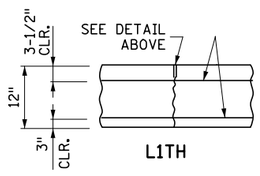
JOINT DETAILS



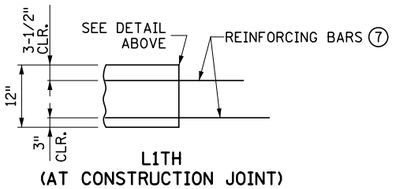
C2H & L1TH WITH CONCRETE WEARING COURSE (6)
(SAWED & SEALED PER SPEC. 3725)



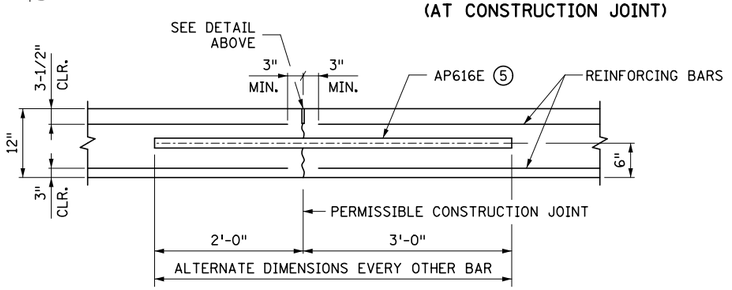
C2H & L1TH WITHOUT CONCRETE WEARING COURSE (6)
(SAWED & SEALED PER SPEC. 3725)



L1TH



L1TH
(AT CONSTRUCTION JOINT)



SECTION AT C2H-D JOINT (5)

JOINT NOTES:

5. PERMISSIBLE CONSTRUCTION JOINT. AP616E BARS AT 12-INCH SPACING AT MID DEPTH OF SLAB, PARALLEL TO THE CENTERLINE OF THE ROADWAY. AP616E BARS ARE 5'-0" LONG. PLACE THE BAR WITH 2'-0" ON ONE SIDE OF THE JOINT AND 3'-0" ON THE OPPOSITE SIDE OF THE JOINT. ALTERNATE THE 2'-0" AND 3'-0" DIMENSION AS SHOWN ON THE PLAN.
6. CLEAN AND DRY FULLY CURED JOINT FACES BY SANDBLASTING PRIOR TO SEALING THE JOINT.
7. 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.

SIDEWALK COVER PLATE

GENERAL NOTES:

GALVANIZE STRUCTURAL STEEL AFTER FABRICATION PER Mn/DOT SPEC. 3394
GALVANIZE FASTENERS PER Mn/DOT SPEC.3392.

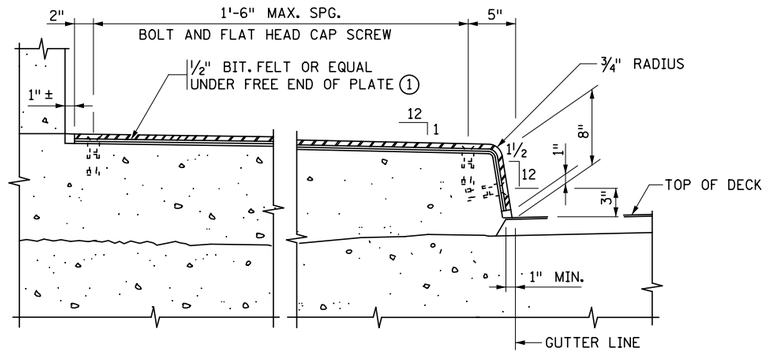
STRUCTURAL STEEL SHALL COMPLY WITH Mn/DOT SPEC. 3306 OR Mn/DOT SPEC. 3309.

SHOP DRAWING SUBMITTALS REQUIRED PER Mn/DOT SPEC. 2471.

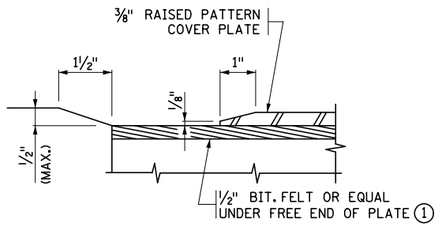
CAP SCREWS SHALL BE COUNTERSUNK 1/16" BELOW TOP OF PLATE.

FURNISHING AND INSTALLING SIDEWALK COVER PLATE IS INCIDENTAL.

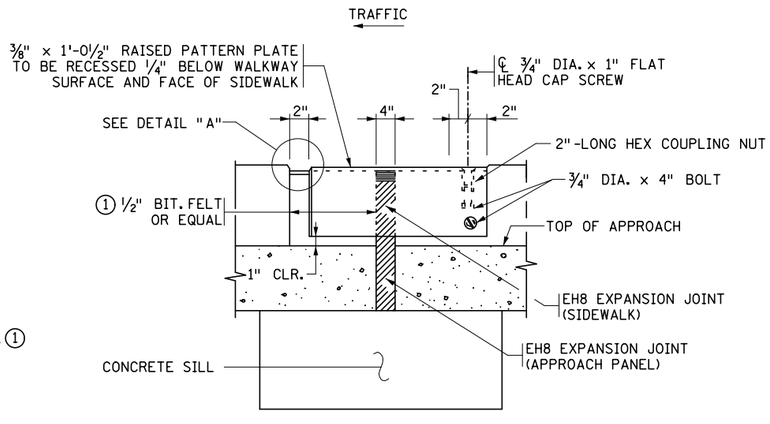
(1) USE LARGEST SINGLE PIECE POSSIBLE. USE OF SMALL PIECES OR SCRAPS SECURED TOGETHER IS PROHIBITED.



SECTION THROUGH SIDEWALK



DETAIL "A"



SIDEWALK ELEVATION

STANDARD PLAN SHEET NO. 5-297.229	TITLE: BRIDGE APPROACH PANEL JOINT DETAILS
STANDARD APPROVED: DECEMBER 20, 2011	
REVISION DATE 3-22-2013	SAP 002-622-036, SAP 223-020-006 SHEET NO. 20 OF 97 SHEETS

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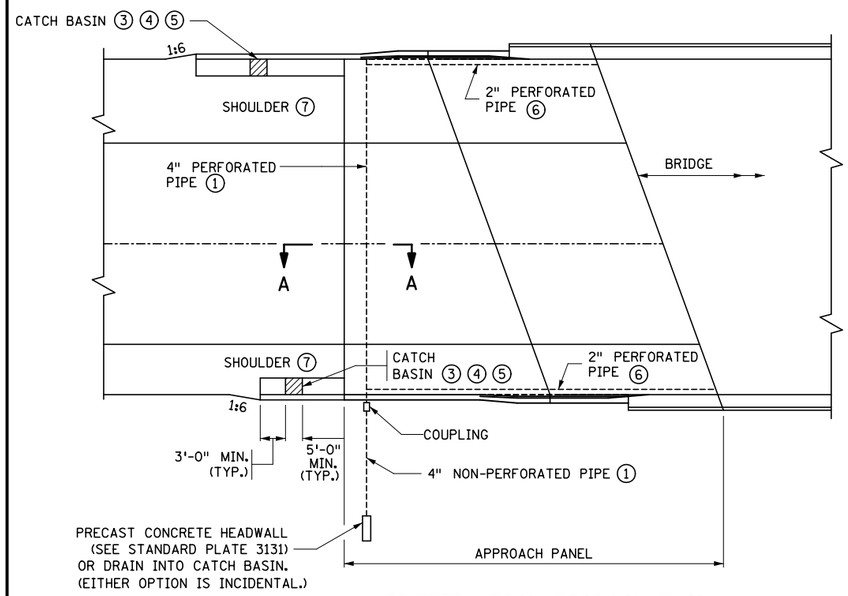
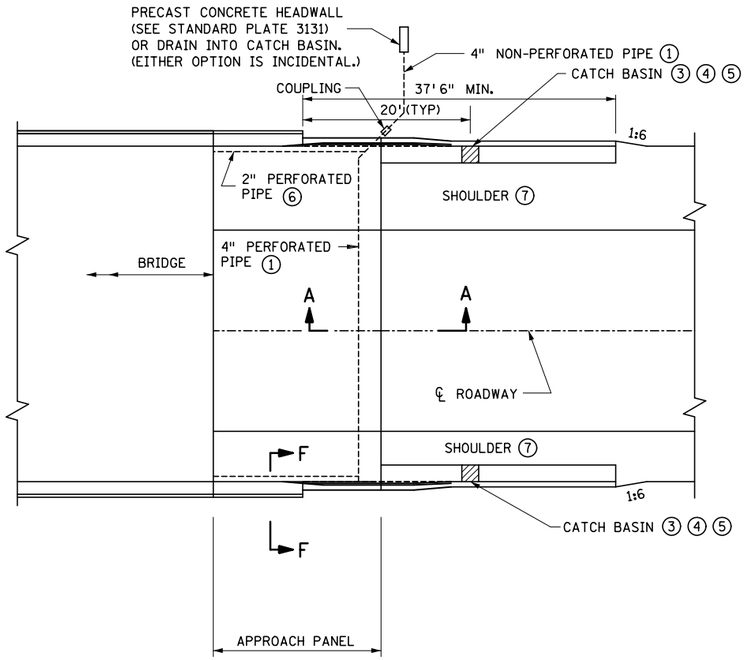
NOTES:

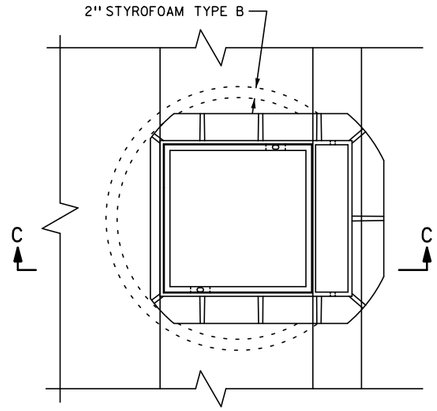
1. 4-INCH NOMINAL DIAMETER THERMOPLASTIC PIPE, AS PER ASTM D1785M, SCHEDULE 40. SLOPE PIPE TO DITCH. WRAP PERFORATED PIPE WITH GEOTEXTILE AS PER SPEC. 3733. 1/8 INCH PER 12 INCH MINIMUM SLOPE. FURNISHING AND INSTALLING THE DRAIN SYSTEM IS INCIDENTAL.
2. BACKFILL WITH FINE AGGREGATE (MNDOT 3149) MODIFIED TO 0-3% PASSING A NO. 200 SIEVE (INCIDENTAL).
3. SEE ROADWAY PLAN FOR ADDITIONAL CATCH BASIN DETAILS.
4. LOCATE BETWEEN GUARDRAIL POST OR AS DETERMINED BY THE DESIGNER.
5. REFER TO THE DRAINAGE PLAN TO DETERMINE WHETHER A FLUME OR A CATCH BASIN REQUIRED.
6. 2-INCH NOMINAL DIAMETER THERMOPLASTIC PIPE, AS PER ASTM D1785M, SCHEDULE 40. SLOPE PIPE TO DITCH. WRAP PERFORATED PIPE WITH GEOTEXTILE AS PER SPEC. 3733. 1/8 INCH PER 12 INCH MINIMUM SLOPE. FURNISHING AND INSTALLING THE DRAIN SYSTEM IS INCIDENTAL.
7. SEE GRADING PLANS FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.



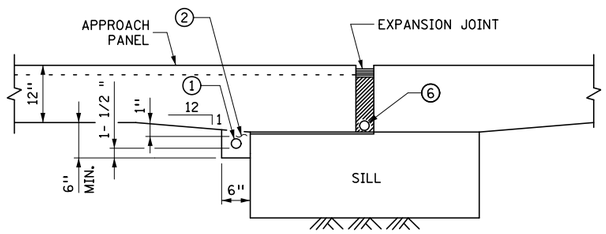
DIVIDED-URBAN ROADWAY PLAN
OVER 10° - SKEWS



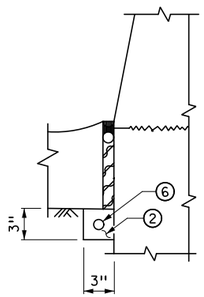
DIVIDED-URBAN ROADWAY PLAN
SQUARE TO 10° SKEWS



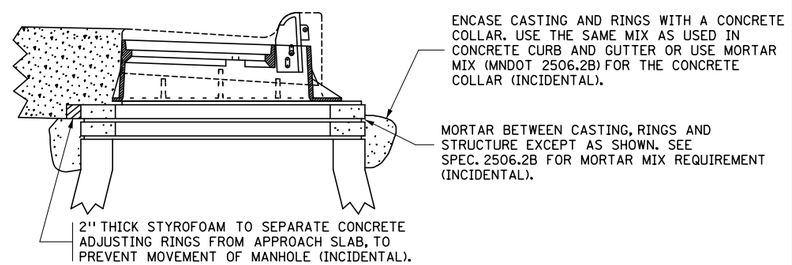
PLAN VIEW OF C.B. CASTING
(GRATE NOT SHOWN)



SECTION A-A
DRAINAGE AT EXPANSION JOINT DETAIL



SECTION F-F
DRAINAGE AT PANEL EDGE OF JOINT
(THIS DETAIL IS USED IF THE CONCRETE BARRIER IS MOUNTED ON THE WINGWALL. DO NOT USE THIS DETAIL IF THE BARRIER IS MOUNTED ON THE APPROACH PANEL).



SECTION C-C

STANDARD PLAN SHEET NO. 5-297.231 (2 OF 2)	TITLE: BRIDGE APPROACH PANEL DRAINAGE DETAILS (TYPE S CONCRETE BARRIER)
STANDARD APPROVED: AUGUST 22, 2016	
SAP 002-622-036, SAP 223-020-006	SHEET NO. 21 OF 97 SHEETS

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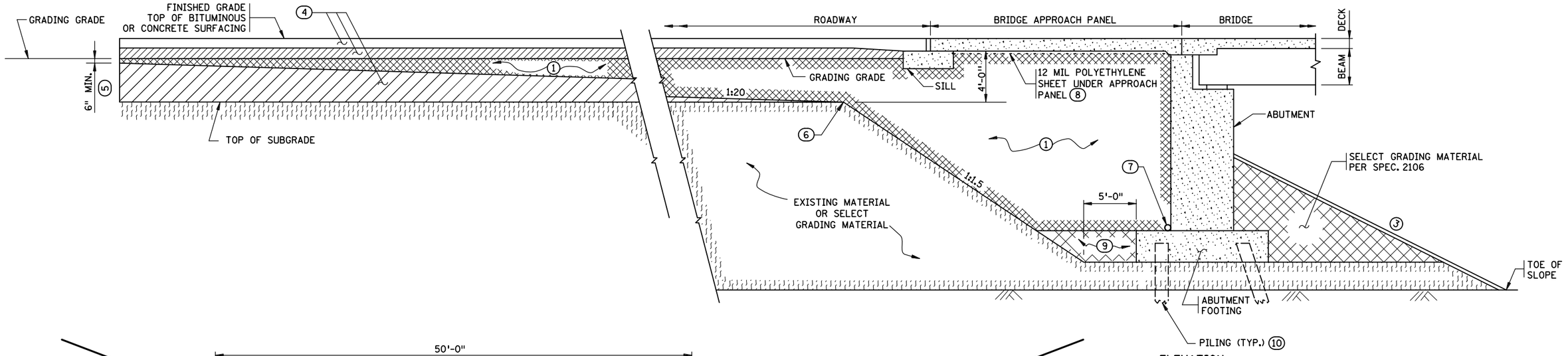
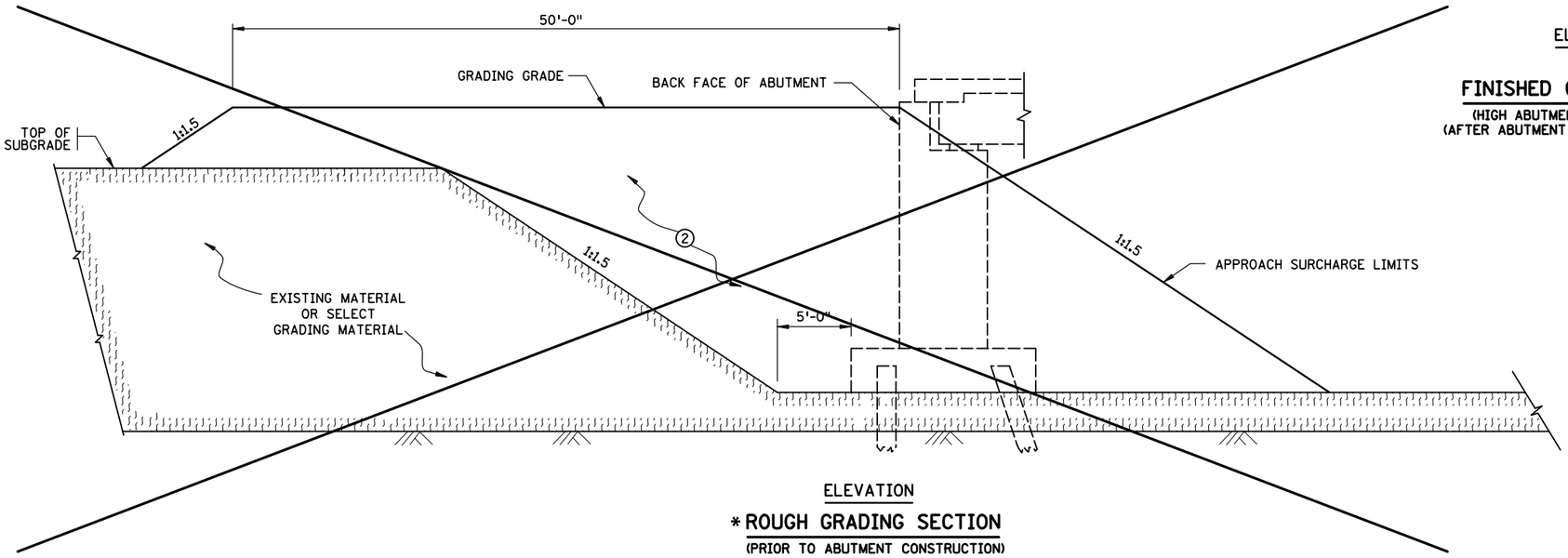


ELEVATION

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.

REVISION:

APPROVED: AUGUST 22, 2019

GLENN ENGSTROM
DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

*DENOTES MODIFICATION FROM STANDARD PLAN

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023
LICENSED PROFESSIONAL ENGINEER DATE

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.233 | 1 OF 2

APPROVED: 08-22-2019
REVISED:

STATE DESIGN ENGINEER

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

SAP 002-622-036, SAP 223-020-006 SHEET NO. 22 OF 97 SHEETS

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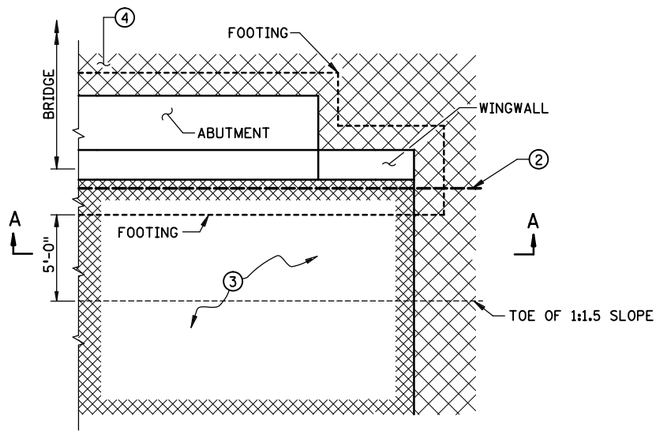
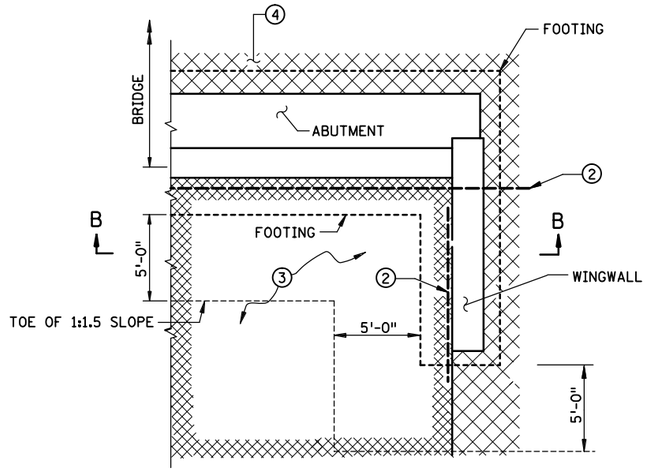


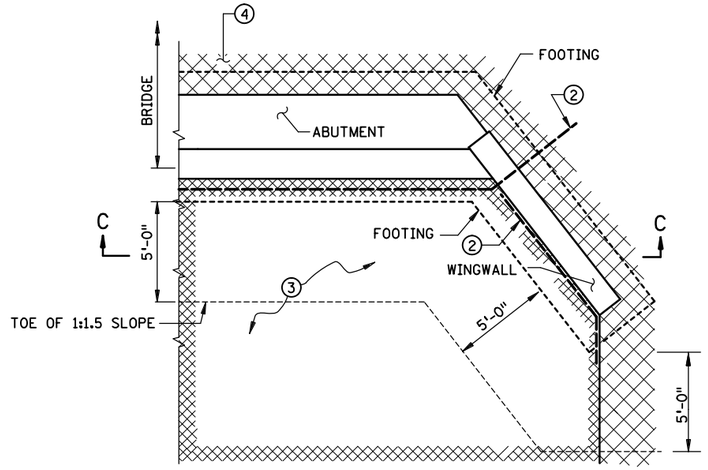
PARTIAL PLAN VIEW AT ABUTMENT

(WINGWALL AT 180°) (FINISHED GRADING)



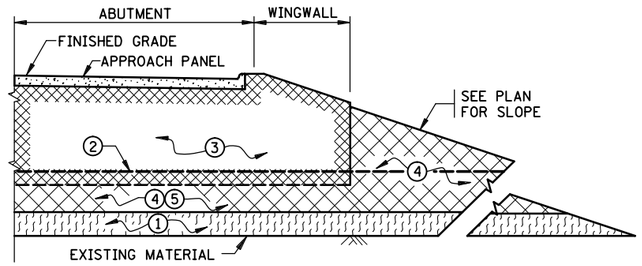
PARTIAL PLAN VIEW AT ABUTMENT

(WINGWALL AT 90°) (FINISHED GRADING)



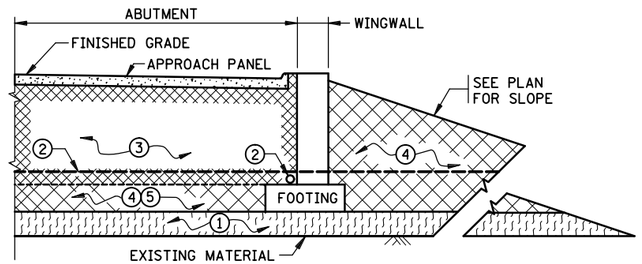
PARTIAL PLAN VIEW AT ABUTMENT

(WINGWALL AT ANY OTHER ANGLE) (FINISHED GRADING)



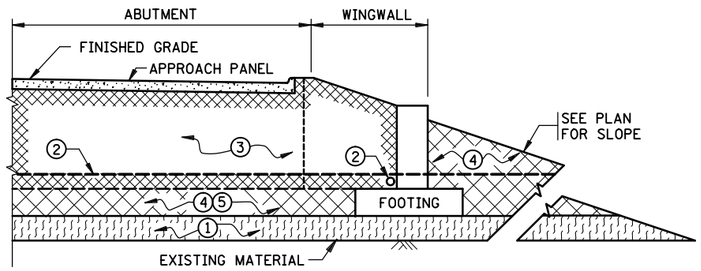
FINISHED GRADING SECTION A-A

(FILL SECTION)



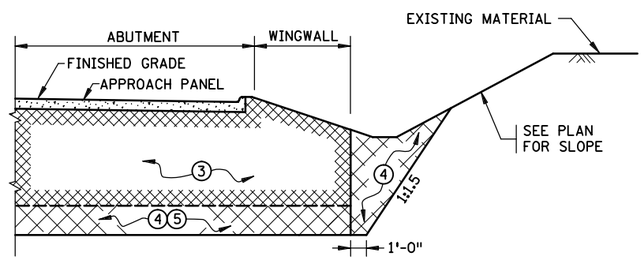
FINISHED GRADING SECTION B-B

(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 REQUIRMENTS OF SPEC. 2106. STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) MAY BE USED IN LIEU OF SELECT GRADING MATERIAL (SPEC. 2106).

REVISION:

APPROVED: AUGUST 22, 2019

GLENN ENGSTROM
DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.233 | 2 OF 2

Peter A Harff
STATE DESIGN ENGINEER

APPROVED: 08-22-2019
REVISED:

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

SAP 002-622-036, SAP 223-020-006 SHEET NO. 23 OF 97 SHEETS

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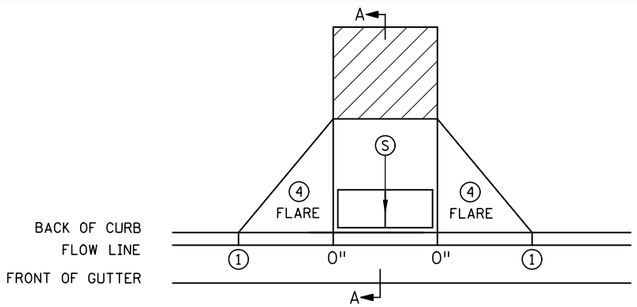

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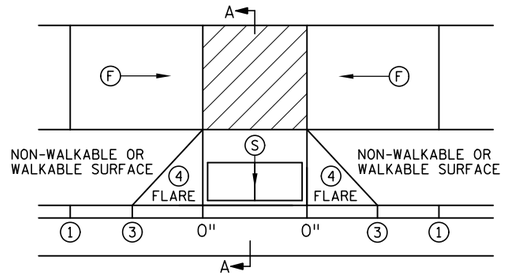
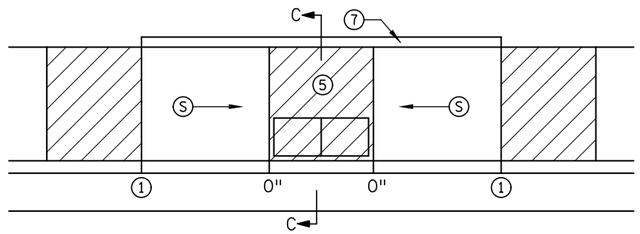
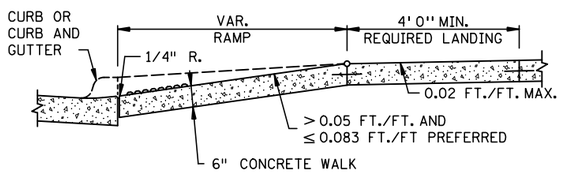


TIERED PERPENDICULAR

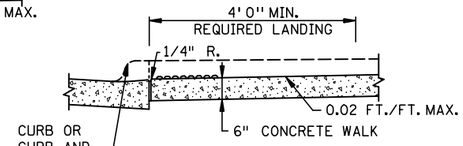


PARALLEL



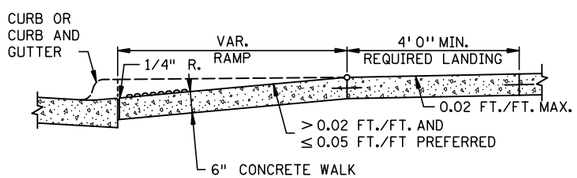
SECTION A-A

PERPENDICULAR/TIERED/DIAGONAL



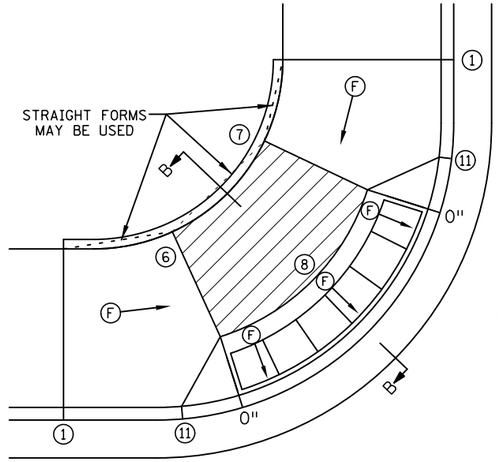
SECTION C-C

PARALLEL/DEPRESSED CORNER

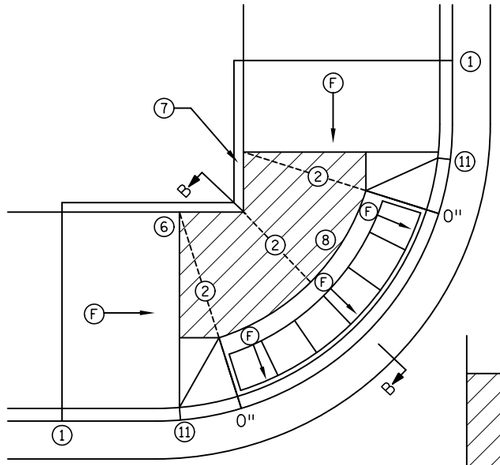


SECTION B-B

FAN

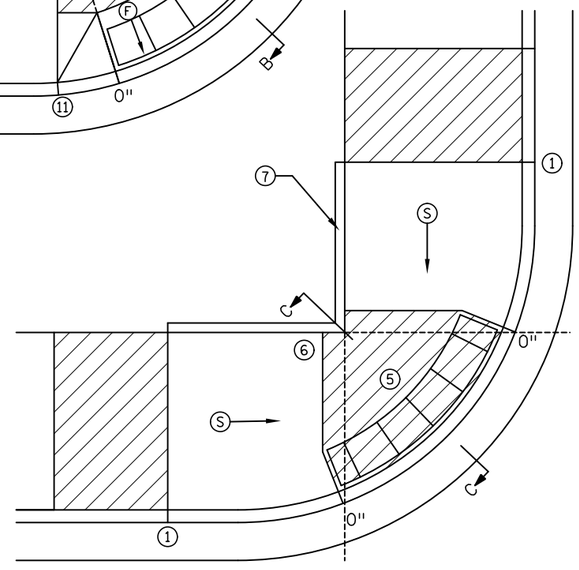


FAN (10)

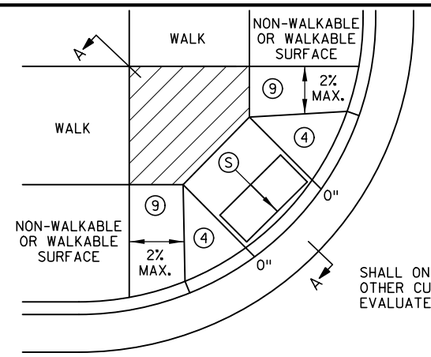


MODIFIED FAN (10)

USED WHEN RIGHT-OF-WAY IS CONSTRAINED



DEPRESSED CORNER



DIAGONAL

SHALL ONLY BE USED AFTER ALL OTHER CURB RAMP TYPES HAVE BEEN EVALUATED AND DEEMED IMPRACTICAL

NOTES:

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE GREATER THAN 2%.

INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB, WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE, ONLY APPLICABLE WHEN THE INITIAL RAMP RUNNING SLOPE IS OVER 5.0%.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL RUNNING SLOPE IS GREATER THAN 5.0%.

CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PAR. 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOPS OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.

ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL, THUS BOTH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH. (EXCEPT AS STATED IN (6) BELOW.

TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, ALL INITIAL LANDINGS AT A TOP OF A RAMPED SURFACE (RUNNING SLOPE GREATER THAN 2%) SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 6 OF 6 FOR ALL SEPARATELY POURED INITIAL LANDINGS.

WHEN SIDEWALK IS AT BACK OF CURB, TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

MAINTAIN POSITIVE BOULEVARD DRAINAGE TO TOP OF CURB.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL. DETECTABLE WARNING TO COVER THE ENTIRE PAR WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK WITH THE EXCEPTION OF 3" MAXIMUM ON EACH OUTSIDE EDGE WHICH ENSURES THE DETECTABLE WARNINGS ARE ENCASED IN CONCRETE WHEN ADJACENT TO TURF. WHEN ADJACENT TO CONCRETE FLARES 0" - 3" OFFSET IS ALLOWED.

WHEN DESIGNING OR ORDERING RECTANGULAR DETECTABLE WARNING SURFACES SHOULD BE 6" LESS THAN THE INCOMING PAR. ARC LENGTH OF THE RADIAL DETECTABLE WARNINGS SHOULD NOT BE GREATER THAN 20 FEET.

RECTANGULAR DETECTABLE WARNINGS SHALL BE SETBACK 3" FROM THE BACK OF CURB. RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB.

(1) MATCH FULL HEIGHT CURB.

(2) 4' MINIMUM DEPTH LANDING REQUIRED ACROSS TOP OF RAMP.

(3) 3" HIGH CURB WHEN USING A 3' LONG RAMP, 4" HIGH CURB WHEN USING A 4' LONG RAMP.

(4) SEE SHEET 4 OF 6, TYPICAL SIDE TREATMENT OPTIONS, FOR DETAILS ON FLARES AND RETURNED CURBS.

(5) DETECTABLE WARNINGS MAY BE PART OF THE 4' X 4' MIN. LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.

(6) THE GRADE BREAK SHALL BE PERPENDICULAR TO THE BACK OF WALK. THIS WILL ENSURE THAT THE GRADE BREAK IS PERPENDICULAR TO THE DIRECTION OF TRAVEL. (TYPICAL FOR ALL)

(7) WHEN ADJACENT TO GRASS, GRADING SHALL ALWAYS BE USED WHEN FEASIBLE. V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. WHEN ADJACENT TO PARKING LOTS, CONCRETE OR BITUMINOUS TAPERS LESS THAN 5% RUNNING SLOPE SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.

(8) A 7' MIN TOP RADIUS GRADE BREAK IS REQUIRED TO BE CONSTRUCTIBLE.

(9) PAVE FULL WALK WIDTH.

(10) "S" SLOPES ON FANS SHALL ONLY BE USED WHEN ALL OTHER FEASIBLE OPTIONS HAVE BEEN EVALUATED AND DEEMED IMPRACTICAL.

(11) INTERMEDIATE CURB HEIGHTS TAPER SHALL RISE AT 8-10% TO A MINIMUM 3" CURB HEIGHT. REDUCE INTERMEDIATE CURB HEIGHT TO 2+ INCHES IF NECESSARY TO MATCH ADJACENT BOULEVARD OR SIDEWALK GRADES.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.

(S) INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%.

(F) INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

REVISION:

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.250 | 1 OF 6

APPROVED: 11-04-2021
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 24 OF 97 SHEETS

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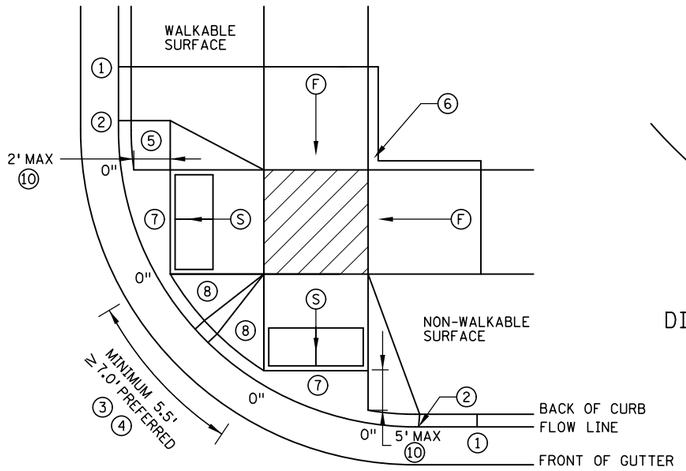
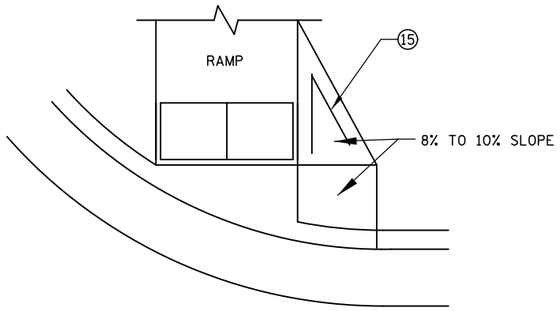
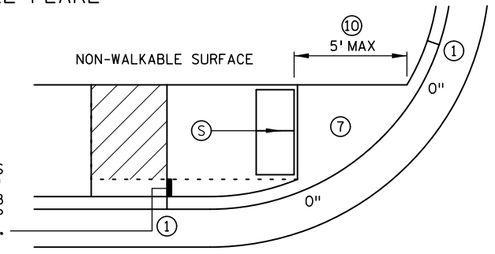


COMBINED DIRECTIONAL

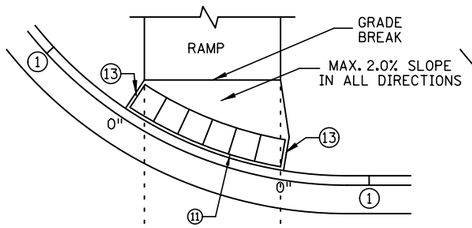


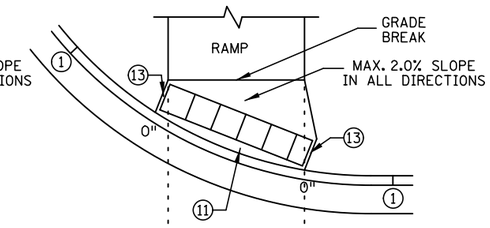
DIRECTIONAL RAMP WALKABLE FLARE

IF NON-CONCRETE BLVD. IS CONSTRUCTED AND IS LESS THAN 2' IN WIDTH AT TOP OF CURB TRANSITION, PAVE CONCRETE RAMP WIDTH TO ADJACENT BACK OF CURB.



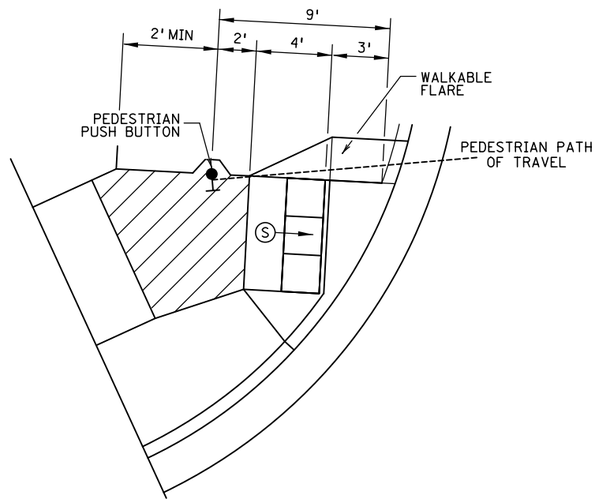
STANDARD ONE-WAY DIRECTIONAL ⑨





DETECTABLE WARNING PLACEMENT WHEN SETBACK CRITERIA IS EXCEEDED ⑫

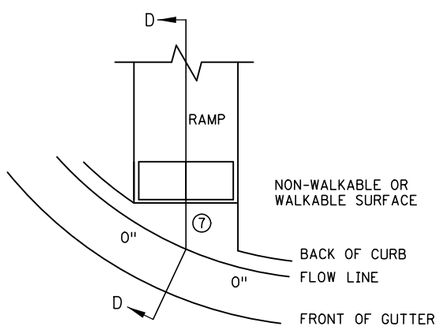
ONE-WAY DIRECTIONAL WITH DETECTABLE WARNING AT BACK OF CURB

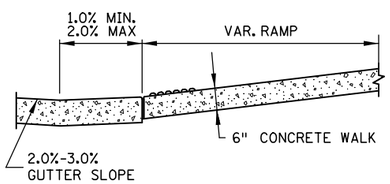


SEMI-DIRECTIONAL RAMP ③④⑨

3' DOME SETBACK, 4' LONG RAMP AND PUSH BUTTON 9' FROM THE BACK OF CURB

PRIMARILY USED FOR APS APPLICATIONS WHERE THE PAR DOES NOT CONTINUE PAST THE PUSH BUTTON (DEAD-END SIDEWALK)





SECTION D-D

CURB FOR DIRECTIONAL RAMPS ⑭

NOTES:

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE.

INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB, WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE, ONLY APPLICABLE WHEN THE INITIAL RAMP RUNNING SLOPE IS OVER 5.0%.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS GREATER THAN 5.0%.

CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PAR. 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOP GRADE BREAK OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.

ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL. THUS BOTH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH.

TO ENSURE INITIAL RAMPS AND INITIAL LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS SHALL BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 6 AND THE ADA SPECIAL PROVISION (PROSECUTION OF WORK).

TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

WHEN THE BOULEVARD IS 4' WIDE OR LESS, THE TOP OF CURB TAPER SHALL MATCH THE RAMP SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL. DETECTABLE WARNING TO COVER THE ENTIRE PAR WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK WITH THE EXCEPTION OF 3" MAXIMUM ON EACH OUTSIDE EDGE WHICH ENSURES THE DETECTABLE WARNINGS ARE ENCASED IN CONCRETE WHEN ADJACENT TO TURF. WHEN ADJACENT TO CONCRETE FLARES 0" - 3" OFFSET IS ALLOWED.

WHEN DESIGNING OR ORDERING RECTANGULAR DETECTABLE WARNING SURFACES SHOULD BE 6" LESS THAN THE INCOMING PAR. ARC LENGTH OF THE RADIAL DETECTABLE WARNINGS SHOULD NOT BE GREATER THAN 20 FEET.

RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB. SEE NOTES ⑩ & ⑪ FOR INFORMATION REGARDING RECTANGULAR DETECTABLE WARNING PLACEMENT.

① MATCH FULL CURB HEIGHT.

② 3" HIGH CURB WHEN USING A 3' LONG RAMP
4" HIGH CURB WHEN USING A 4' LONG RAMP.

③ 3" MINIMUM CURB HEIGHT (5.5' MIN. DISTANCE REQUIRED BETWEEN DOMES)
4" PREFERRED (7' MIN. DISTANCE REQUIRED BETWEEN DOMES).

④ THE "BUMP" IN BETWEEN THE RAMPS SHOULD NOT BE IN THE PATH OF TRAVEL FOR COMBINED DIRECTIONAL RAMPS. IF THIS OCCURS MODIFY THE RAMP LOCATION OR SWITCH RAMP TO A FAN/DEPRESSED CORNER.

⑤ WHEN USING CONCRETE PAVED FLARES ON THE OUTSIDE OF DIRECTIONAL RAMPS, AND ADJACENT TO A WALKABLE SURFACE, DIRECTIONAL RAMP FLARES SHALL BE USED. SEE THE DETAIL ON THIS SHEET.

⑥ GRADING SHALL ALWAYS BE USED WHEN FEASIBLE. V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. WHEN ADJACENT TO PARKING LOTS, CONCRETE OR BITUMINOUS TAPERS SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.

⑦ MAX. 2.0% SLOPE IN ALL DIRECTIONS IN FRONT OF GRADE BREAK AND DRAIN TO FLOW LINE. SHALL BE CONSTRUCTED INTEGRAL WITH CURB AND GUTTER.

⑧ 8% TO 10% WALKABLE FLARE.

⑨ PLACE DOMES AT THE BACK OF CURB WHEN ALLOWABLE SETBACK CRITERIA IS EXCEEDED.

⑩ FRONT EDGE OF DETECTABLE WARNING SHALL BE SET BACK 2' MAXIMUM WHEN ADJACENT TO WALKABLE SURFACE, AND 5' MAXIMUM WHEN ADJACENT TO NON-WALKABLE SURFACE WITH ONE CORNER SET 3" FROM BACK OF CURB. A WALKABLE SURFACE IS DEFINED AS A PAVED SURFACE ADJACENT TO A CURB RAMP WITHOUT RAISED OBSTACLES THAT COULD MISTAKENLY BE TRAVERSED BY A USER WHO IS VISUALLY IMPAIRED.

⑪ RECTANGULAR DETECTABLE WARNINGS MAY BE SETBACK UP TO 9" FROM THE BACK OF CURB WITH CORNERS SET 3" FROM BACK OF CURB. IF 9" SETBACK IS EXCEEDED USE RADIAL DETECTABLE WARNINGS.

⑫ FOR DIRECTIONAL RAMPS WITH THE DETECTABLE WARNINGS PLACED AT THE BACK OF CURB, THE DETECTABLE WARNINGS SHALL COVER THE ENTIRE WIDTH OF THE WALK/PATH. THIS ENSURES A DETECTABLE EDGE AND HELPS ELIMINATE THE CURB TAPER OBSTRUCTING THE PATH OF PEDESTRIAN TRAVEL.

⑬ THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE BACK OF CURB. MAINTAIN 3" BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.

⑭ TO BE USED FOR ALL DIRECTIONAL RAMPS, EXCEPT WHERE DOMES ARE PLACED ALONG THE BACK OF CURB.

⑮ PLACE 2 NO. 4 BARS 4 INCHES FROM SIDE OF FORMS WITH A MINIMUM 2 INCHES OF CONCRETE COVER ALONG EACH SIDE OF FLARE (INCIDENTAL).

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.

(S) INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%.

(F) INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

REVISION:

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.250 | 2 OF 6

APPROVED: 11-04-2021
REVISED:

PEDESTRIAN CURB RAMP DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 25 OF 97 SHEETS

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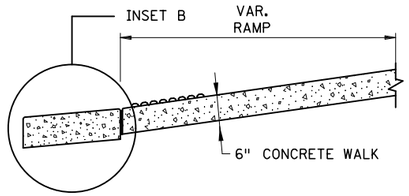
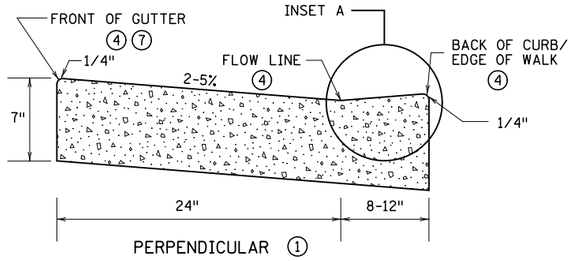
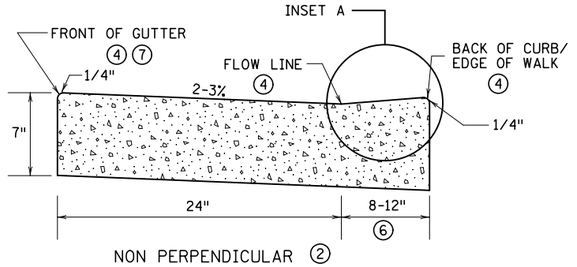
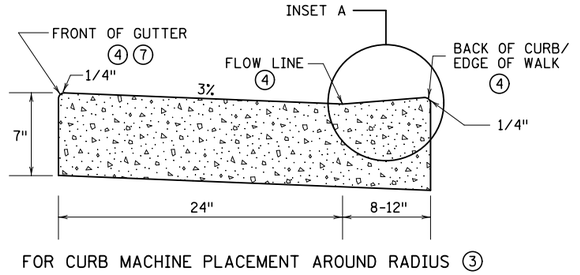




PERPENDICULAR ①

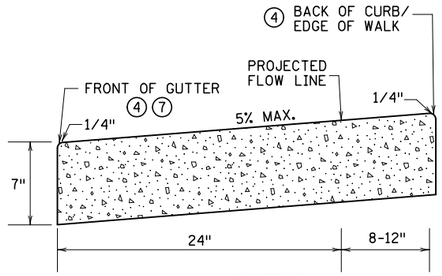


NON PERPENDICULAR ②

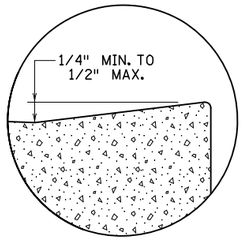


FOR CURB MACHINE PLACEMENT AROUND RADIUS ③
(REGARDLESS OF RAMP TYPE)

PEDESTRIAN ACCESS ROUTE CURB & GUTTER DETAIL



INSET B
OUTFLOW GUTTER ⑧



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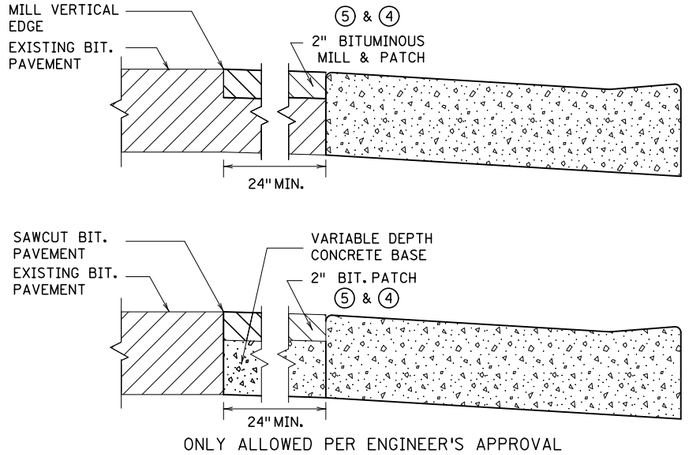
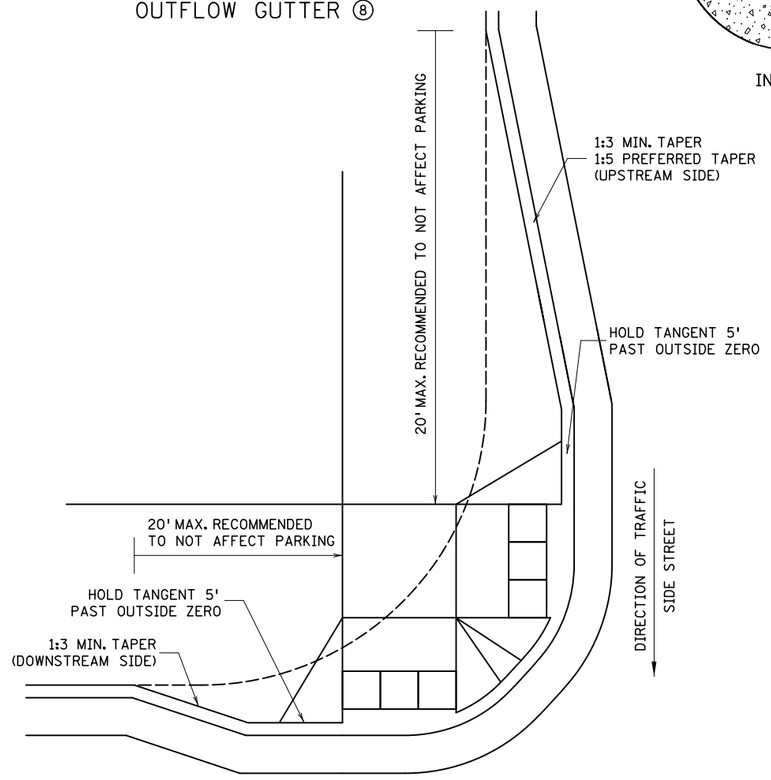


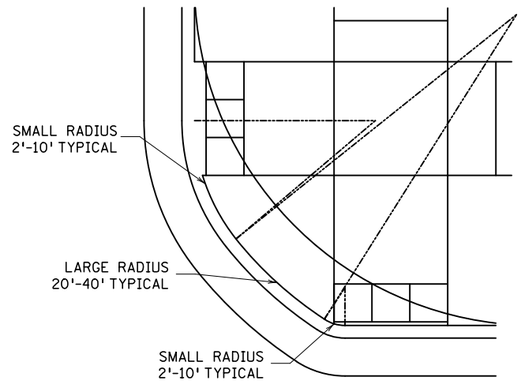
ONLY ALLOWED PER ENGINEER'S APPROVAL

PAVEMENT TREATMENT OPTIONS IN FRONT OF CURB & GUTTER

FOR USE ON CURB RAMP RETROFITS



ADA CURB EXTENSION WITH COMPOUND RADIUS (BUMP OUT) ⑪



COMBINED DIRECTIONAL ⑩
(COMPOUND RADIUS)

NOTES:

POSITIVE FLOW LINE DRAINAGE SHALL BE MAINTAINED THROUGH THE PEDESTRIAN ACCESS ROUTE (PAR) AT A 2% MAXIMUM.

NO PONDING SHALL BE PRESENT IN THE PAR.

ANY VERTICAL LIP THAT OCCURS AT THE FLOW LINE SHALL NOT BE GREATER THAN 1/4 INCH.

① FOR USE AT CURB CUTS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: PERPENDICULAR, TIERED PERPENDICULAR, PARALLEL, AND DIAGONAL RAMPS.

② FOR USE AT CURB RAMPS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED NON PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: FANS & DEPRESSED CORNERS.

③ BEGIN GUTTER SLOPE TRANSITION 10' OUTSIDE OF ALL CURB RAMPS.

④ THERE SHALL BE NO VERTICAL DISCONTINUITIES GREATER THAN 1/4".

⑤ ELEVATION CHANGE TAKES PLACE FROM THE EXISTING TO NEW FRONT OF GUTTER. PATCH IS USED TO MATCH THE NEW GUTTER FACE INTO THE EXISTING ROADWAY.

⑥ VARIABLE WIDTH FOR DIRECTIONAL CURB APPLICATIONS. SEE SHEET 2 FOR DIRECTIONAL CURB SLOPE REQUIREMENTS.

⑦ TOP FRONT OF GUTTER SHALL BE CONSTRUCTED FLUSH WITH PROPOSED ADJACENT PAVEMENT ELEVATION. TOP 1.5" OF THE GUTTER FACE MUST BE A FORMED EDGE. PAR GUTTER SHALL NOT BE OVERLAID.

⑧ SHOULD BE USED AT VERTICALLY CONSTRAINED AREAS WHEN AT A DRAINAGE HIGH POINT OR SUPER ELEVATED ROADWAY SEGMENTS.

⑨ DRILL AND GROUT NO. 4 EPOXY-COATED 18" LONG TIE BARS AT 30" CENTER TO CENTER INTO EXISTING CONCRETE PAVEMENT 1' MINIMUM FROM ALL JOINTS.

⑩ HELPS PROVIDE TWO SEPARATE RAMPS, REDUCES THE DOME SETBACK LENGTH AND MINIMIZES DIRECTIONAL CURB. THIS RADIUS DESIGN CLOSELY FOLLOWS THE TURNING VEHICLE PATH WHILE OPTIMIZING CURB RAMP LENGTH.

⑪ CURB EXTENSIONS SHOULD BE USED IN VERTICALLY CONSTRAINED AREAS, USUALLY IN DOWNTOWN ROADWAY SEGMENTS WHERE ON-STREET PARKING IS AVAILABLE. CURB EXTENSIONS SHOULD BE CONSIDERED FOR APS INTERSECTIONS WHERE SPACE IS LIMITED.
PUSH BUTTONS MUST MEET APS CRITERIA AS DESCRIBED IN THE PUSH BUTTON LOCATION DETAIL SHEET.

REVISION:

APPROVED: 11-04-2021
JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA
DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.250 | 3 OF 6

APPROVED: 11-04-2021
REVISED:
THOMAS STYRBICKI
STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 26 OF 97 SHEETS

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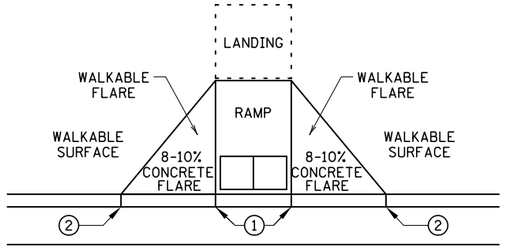
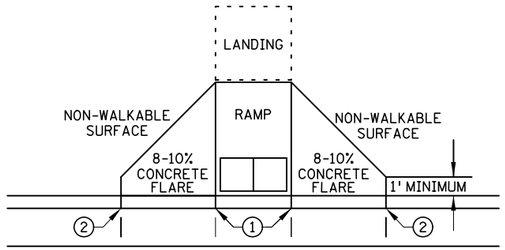
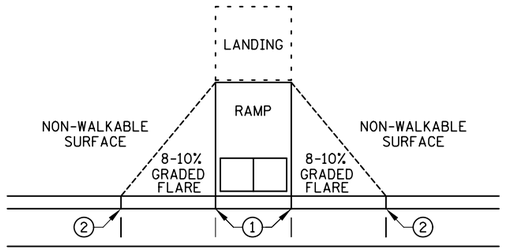


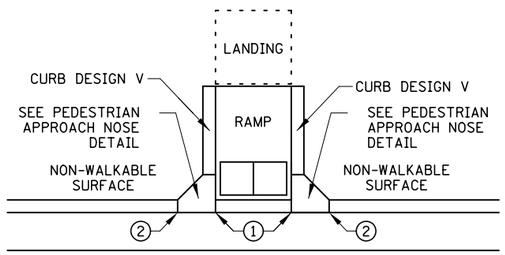
PAVED FLARES
ADJACENT TO WALKABLE SURFACE



PAVED FLARES
ADJACENT TO NON-WALKABLE SURFACE

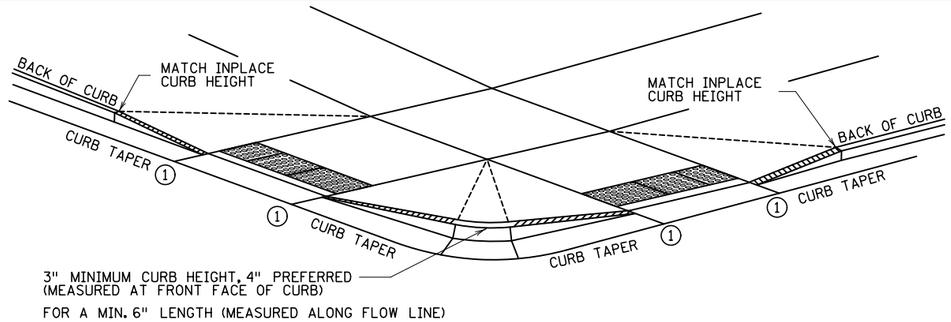


GRADED FLARES

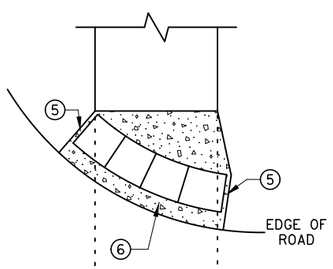


RETURNED CURB ④

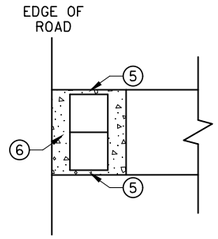
TYPICAL SIDE TREATMENT OPTIONS ③ ⑩



DETECTABLE EDGE WITH ⑦
CURB AND GUTTER

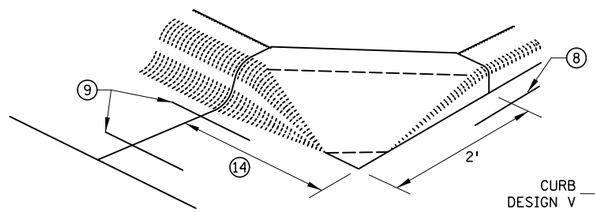


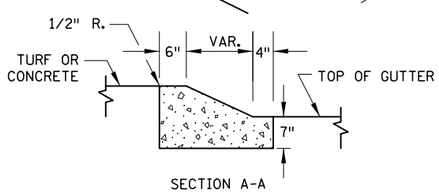
RADIAL DETECTABLE WARNING



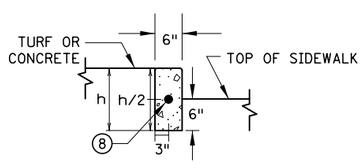
RECTANGULAR DETECTABLE WARNING

DETECTABLE EDGE WITHOUT CURB AND GUTTER

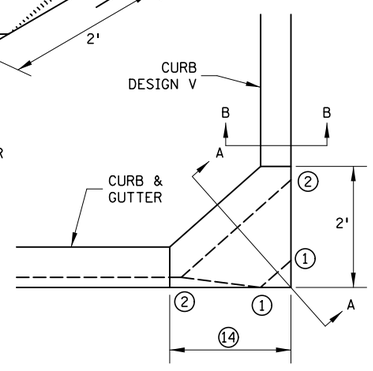




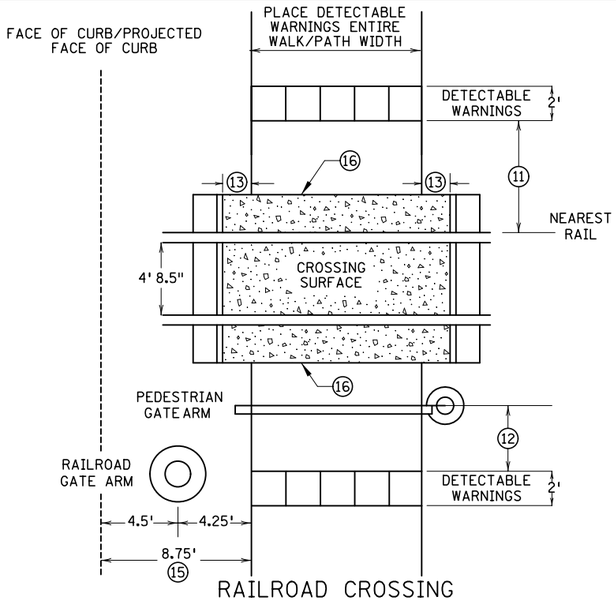
SECTION A-A



SECTION B-B



PEDESTRIAN APPROACH
NOSE DETAIL
(FOR RETURNED CURB
SIDE TREATMENT)



RAILROAD CROSSING
PLAN VIEW

NOTES:

INTERMEDIATE CURB HEIGHTS TAPER SHALL RISE AT 8-10% TO A MINIMUM 3 INCH CURB HEIGHT. INCREASE CURB TAPER LENGTH AT LESS THAN 8% OR REDUCE INTERMEDIATE CURB HEIGHT TO 2+ INCHES IF NECESSARY TO MATCH ADJACENT BOULEVARD OR SIDEWALK GRADES.

SEE STANDARD PLATE 7038 AND THIS SHEET FOR ADDITIONAL DETAILS ON DETECTABLE WARNING.

A WALKABLE SURFACE IS DEFINED AS A PAVED SURFACE ADJACENT TO A CURB RAMP WITHOUT RAISED OBSTACLES THAT COULD MISTAKENLY BE TRAVERSED BY A USER WHO IS VISUALLY IMPAIRED.

CONCRETE FLARE LENGTHS ADJACENT TO NON-WALKABLE SURFACES SHOULD BE LESS THAN 8' LONG MEASURED ALONG THE RAMPS FROM THE BACK OF CURB.

① 0" CURB HEIGHT. SEE INSET A ON SHEET 3 OF 6.

② FULL CURB HEIGHT.

③ SIDE TREATMENTS ARE APPLICABLE TO ALL RAMP TYPES AND SHOULD BE IMPLEMENTED AS NEEDED AS FIELD CONDITIONS DICTATE. THE ENGINEER SHALL DETERMINE THE RAMP SIDE TREATMENTS BASED ON MAINTENANCE OF BOTH ROADWAY AND SIDEWALK, ADJACENT PROPERTY CONSIDERATIONS, AND MITIGATING CONSTRUCTION IMPACTS.

④ TYPICALLY USED FOR MEDIANS AND ISLANDS.

⑤ WHEN NO CONCRETE FLARES ARE PROPOSED, THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE EDGE OF ROADWAY. MAINTAIN 3" MAX. BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.

⑥ IF NO CURB AND GUTTER IS PLACED IN RURAL SECTIONS, DETECTABLE WARNINGS SHALL BE PLACED 1' FROM THE EDGE OF BITUMINOUS ROADWAY AND/OR BITUMINOUS SHARED-USE PATH TO PROVIDE VISUAL CONTRAST.

⑦ ALL CONSTRUCTED CURBS MUST HAVE A CONTINUOUS DETECTABLE EDGE FOR THE VISUALLY IMPAIRED. THIS DETECTABLE EDGE REQUIRES DETECTABLE WARNINGS WHEREVER THERE IS ZERO-INCH HIGH CURB. CURB TAPERS ARE CONSIDERED A DETECTABLE EDGE WHEN THE TAPER STARTS WITHIN 3" OF THE EDGE OF THE DETECTABLE WARNINGS. AND UNIFORMLY RISES TO A 3-INCH MINIMUM CURB HEIGHT. ANY CURB NOT PART OF A CURB TAPER AND LESS THAN 3 INCHES IN HEIGHT IS NOT CONSIDERED A DETECTABLE EDGE AND THEREFORE IS NOT COMPLIANT WITH ACCESSIBILITY STANDARDS.

⑧ DRILL AND GROUT 1 - NO. 4 12" LONG REINFORCEMENT BAR (EPOXY COATED) WITH 3" MIN. COVER. REINFORCEMENT BARS ARE NOT NEEDED IF THE APPROACH NOSE IS POURED INTEGRAL WITH THE V CURB.

⑨ DRILL AND GROUT 2 - NO. 4 12" LONG REINFORCEMENT BARS (EPOXY COATED) WITH 3" MIN. COVER. REINFORCEMENT BARS ARE NOT NEEDED IF THE APPROACH NOSE IS POURED INTEGRAL WITH THE CURB AND GUTTER.

⑩ SIDE TREATMENT EXAMPLES SHOWN ARE WHEN THE INITIAL LANDING IS APPROXIMATELY LEVEL WITH THE FULL HEIGHT CURB (I.E. 6' LONG RAMP FOR 6" HIGH CURB). WHEN THE INITIAL LANDING IS MORE THAN 1" BELOW FULL HEIGHT CURB REFER TO SHEETS 1 & 2 TO MODIFY THE CURB HEIGHT TAPERS AND MAINTAIN POSITIVE BOULEVARD DRAINAGE. CONSTRUCT THESE TAPERS AT 0"-3" AT 8-10%, THEN LESS THAN 5% FROM 3" CURB TO FULL CURB HEIGHT.

⑪ NEAREST EDGE OF DETECTABLE WARNING SURFACES SHALL BE PLACED 12' MINIMUM TO 15' MAXIMUM FROM THE NEAREST RAIL. FOR SKEWED RAILWAYS IN NO INSTANCE SHALL THE DETECTABLE WARNING BE CLOSER THAN 12' MEASURED PERPENDICULAR TO THE NEAREST RAIL.

⑫ WHEN PEDESTRIAN GATES ARE PROVIDED, DETECTABLE WARNING SURFACES SHALL BE PLACED ON THE SIDE OF THE GATES OPPOSITE THE RAIL, 2' FROM THE APPROACHING SIDE OF THE GATE ARM. THIS CRITERIA GOVERNS OVER NOTE ⑪.

⑬ CROSSING SURFACE SHALL EXTEND 2' MINIMUM PAST THE OUTSIDE EDGE OF WALK OR SHARED-USE PATH.

⑭ 3' FOR MEDIANS AND SPLITTER ISLANDS. NOSE CAN BE REDUCED TO 2' ON FREE RIGHT ISLANDS.

⑮ SIDEWALK TO BE PLACED 8.75' MIN. FROM THE FACE OF CURB/PROJECTED FACE OF CURB. THIS ENSURES MIN. CLEARANCE BETWEEN THE SIDEWALK AND GATE ARM COUNTERWEIGHT SUPPORTS.

⑯ CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE.

REVISION:

APPROVED: 11-04-2021
JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.250 | 4 OF 6

APPROVED: 11-04-2021
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 27 OF 97 SHEETS

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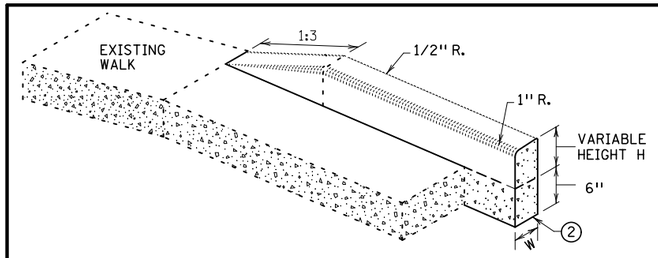
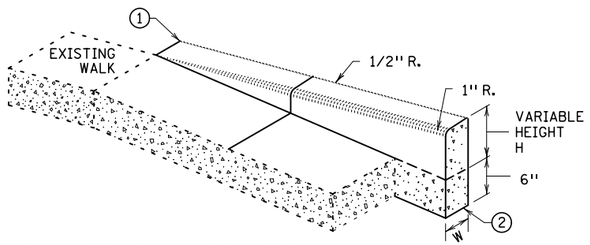


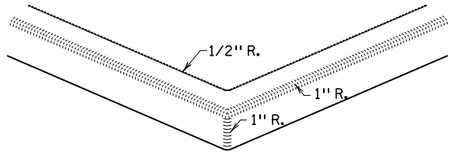
V CURB ADJACENT TO LANDSCAPE

CURB WITHIN SIDEWALK LIMITS



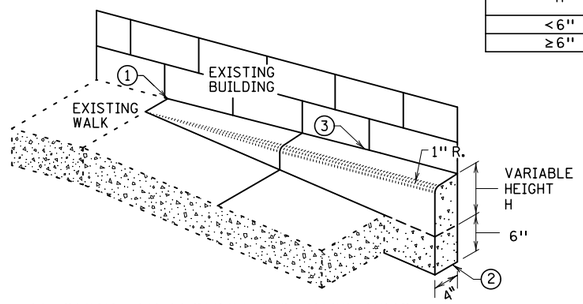
V CURB ADJACENT TO LANDSCAPE

CURB OUTSIDE SIDEWALK LIMITS

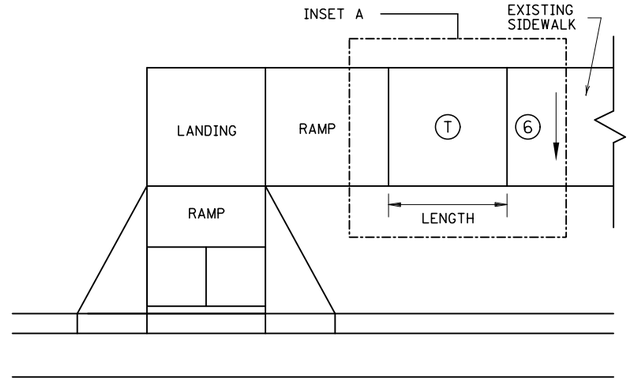


V CURB INTERSECTION

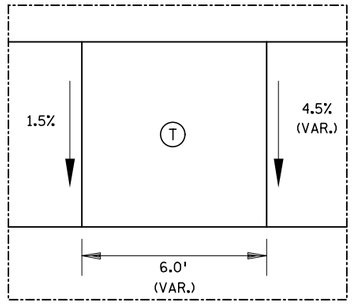
CONCRETE CURB DESIGN V	
CURB HEIGHT H	CURB WIDTH W
< 6"	4"
≥ 6"	6"



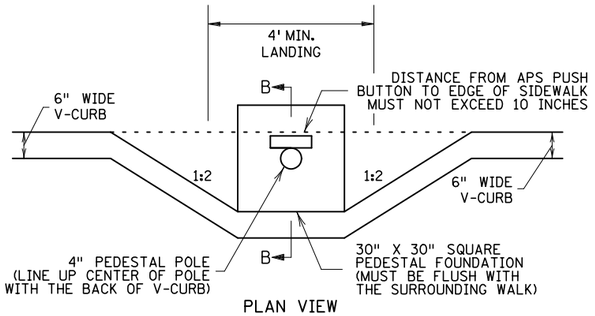
V CURB ADJACENT TO BUILDING OR BARRIER



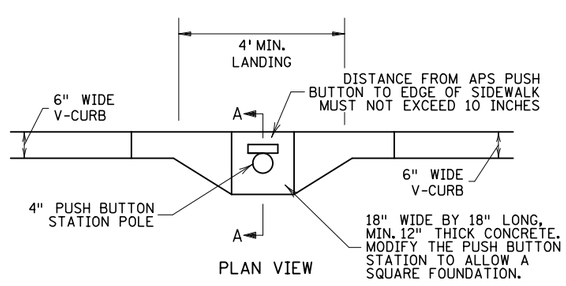
TRANSITION PANEL ④⑤



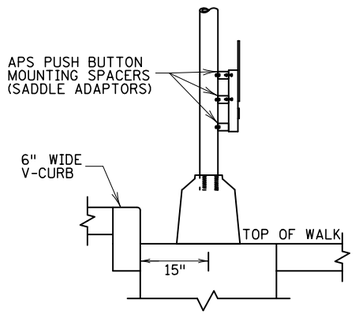
INSET A



PLAN VIEW

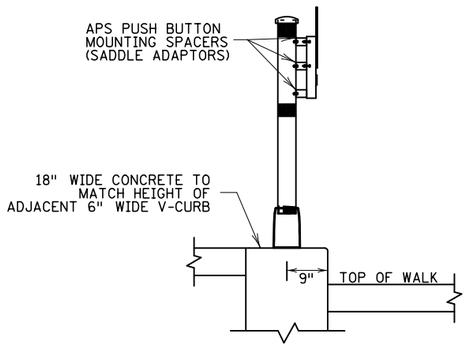


PLAN VIEW



SECTION B-B

SIGNAL PEDESTAL & PUSH BUTTON (V-CURB)



SECTION A-A

PUSH BUTTON STATION (V-CURB)

NOTES:

A WALKABLE FLARE IS AN 8-10% CONCRETE FLARE THAT IS REQUIRED WHEN THE FLARE IS ADJACENT TO A WALKABLE SURFACE, OR WHEN THE PEDESTRIAN PATH OF TRAVEL OF A PUSH BUTTON TRAVERSES THE FLARE.

ALL V CURB CONTRACTION JOINTS SHALL MATCH CONCRETE WALK JOINTS.

WHERE RIGHT-OF-WAY ALLOWS, USE OF V CURB SHOULD BE MINIMIZED. GRADING ADJACENT TURF OR SLOPING ADJACENT PAVEMENT IS PREFERRED.

V CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.

V CURB NEXT TO BUILDING SHALL BE A 4" WIDTH AND SHALL MATCH PREVIOUS TOP OF SIDEWALK ELEVATIONS.

① END TAPERS AT TRANSITION SECTION SHALL MATCH INPLACE SIDEWALK GRADES.

② ALL V CURB SHALL MATCH BOTTOM OF ADJACENT WALK.

③ CONSTRUCT USING APPROVED EXPANSION MATERIAL PER MNDOT TYPE A-E EXPANSION. LEAVE A MINIMUM ½" TOP GAP AND SEAL WITH MNDOT APPROVED SILICONE PER MNDOT SPEC 3722.

④ THE MAX. RATE OF CROSS SLOPE TRANSITIONING IS 1' LINEAR FOOT OF SIDEWALK PER HALF PERCENT CROSS SLOPE. WHEN PAR WIDTH IS GREATER THAN 6' OR THE RUNNING SLOPE IS GREATER THAN 5%, DOUBLE THE CALCULATED TRANSITION LENGTH.

⑤ TRANSITION PANELS ARE TO ONLY BE USED AFTER THE RAMP, OR IF NEEDED, LANDING ARE AT THE FULL CURB HEIGHT (TYPICAL SECTION).

⑥ EXISTING CROSS SLOPE GREATER THAN 2.0%.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.

Ⓢ INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%.

LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

Ⓣ TRANSITION PANEL(S) - TO BE USED FOR TRANSITIONING THE CROSS-SLOPE OF A RAMP TO THE EXISTING WALK CROSS-SLOPE. RATE OF TRANSITION SHOULD BE 0.5% PER 1 LINEAR FOOT OF WALK. SEE THIS SHEET FOR ADDITIONAL INFORMATION.

REVISION:

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.250 | 5 OF 6

APPROVED: 11-04-2021
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 28 OF 97 SHEETS

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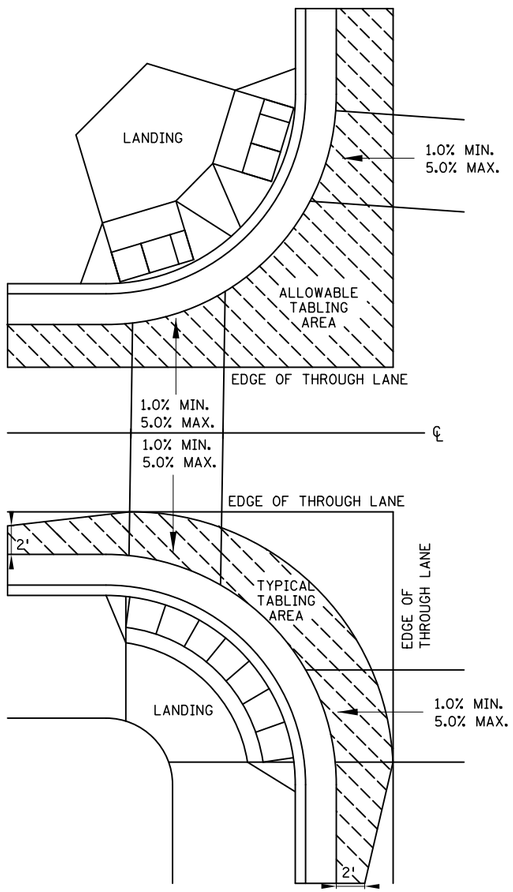
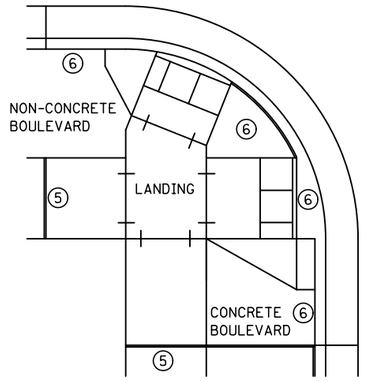
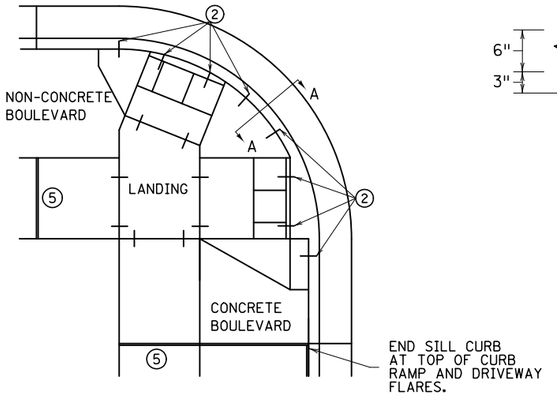


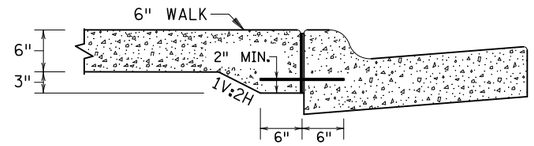
CURB LINE AND ROAD CROSSING ADJUSTMENTS



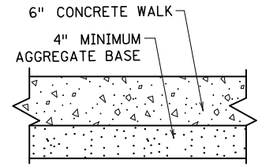
EXPANSION MATERIAL PLACEMENT
FOR CONCRETE ROADWAYS



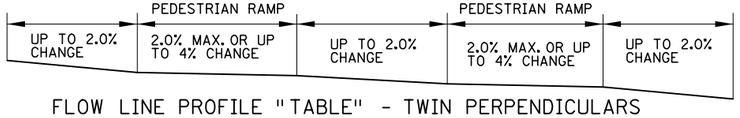
CURB LINE REINFORCEMENT ④
PLACEMENT ON BITUMINOUS ROADWAYS



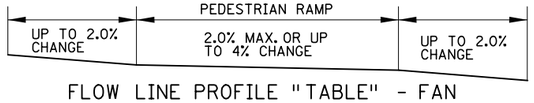
SECTION VIEW A-A
THICKENED SECTION
THROUGH CURB RAMP FLARES



TYPICAL SIDEWALK SECTION
WITHIN INTERSECTION CORNER



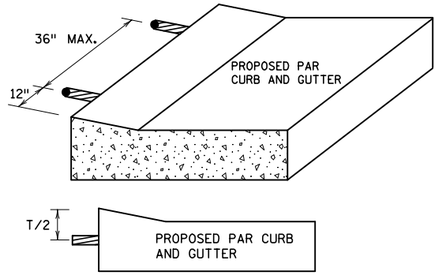
FLOW LINE PROFILE "TABLE" - TWIN PERPENDICULARS



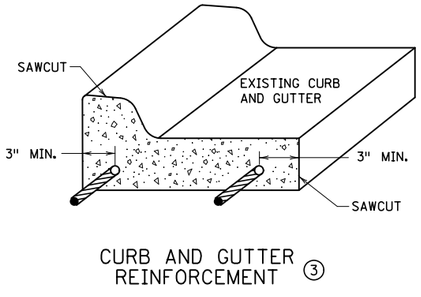
FLOW LINE PROFILE "TABLE" - FAN

FLOW LINE PROFILE RAISE - TWIN PERPENDICULARS

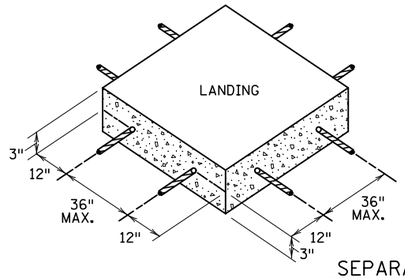
FLOW LINE PROFILE RAISE - FAN

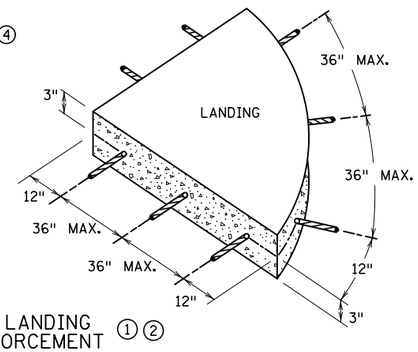


CURB RAMP REINFORCEMENT DETAILS ②④



CURB AND GUTTER
REINFORCEMENT ③





SEPARATE LANDING
POUR REINFORCEMENT ①②

GENERAL NOTES:

"TABLING" OF CROSSWALKS MEANS MAINTAINING LESS THAN 2% CROSS SLOPE WITHIN A CROSSWALK, IS REQUIRED WHEN A ROADWAY IS IN A STOP OR YIELD CONDITION AND THE PROJECT SCOPE ALLOWS.

RECONSTRUCTION PROJECTS: ON FULL PAVEMENT REPLACEMENT PROJECTS "TABLING" OF ENTIRE CROSSWALK SHALL OCCUR WHEN FEASIBLE.

MILL & OVERLAY PROJECTS: "TABLING" OF FLOW LINES, IN FRONT OF THE PEDESTRIAN RAMP, IS REQUIRED WHEN THE EXISTING FLOW LINE IS GREATER THAN 2%. WARPING OF THE BITUMINOUS PAVEMENT CAN NOT EXTEND INTO THE THROUGH LANE. TABLE THE FLOW LINE TO 2% OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA;

1) 1.0% MIN. CROSS-SLOPE OF THE ROAD
2) 5.0% MAX. CROSS-SLOPE OF THE ROAD
3) "TABLE" FLOW LINE UP TO 4% CHANGE FROM EXISTING SLOPE IN FRONT OF PEDESTRIAN RAMP
4) UP TO 2% CHANGE IN FLOW LINE FROM EXISTING SLOPE BEYOND THE PEDESTRIAN CURB RAMP

STAND-ALONE ADA RETROFITS: FOLLOW MILL & OVERLAY CRITERIA ABOVE HOWEVER ALL PAVEMENT WARPING IS DONE WITH BITUMINOUS PATCHING ON BITUMINOUS ROADWAYS AND FULL-DEPTH APRON REPLACEMENT ON CONCRETE ROADWAYS.

RAISING OF CURB LINES SHOULD OCCUR IN VERTICALLY CONSTRAINED AREAS. RAISE THE CURB LINES ENOUGH TO ALLOW COMPLIANT RAMPS OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA;

1) 1.0% MIN. AND 5.0% MAXIMUM CROSS-SLOPE OF THE ROAD
2) 1.0% MIN. FLOW LINE (ON EITHER SIDE OF PEDESTRIAN RAMP) TO MAINTAIN POSITIVE DRAINAGE
3) 5.0% RECOMMENDED MAX. FLOW LINE
4) LONGITUDINAL THROUGH LANE ROADWAY TAPERS SHOULD BE 1" VERTICAL PER 15' HORIZONTAL

NOTES:

① TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, ALL INITIAL LANDINGS AT A TOP OF A RAMPED SURFACE (RUNNING SLOPE GREATER THAN 2%) SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON THIS SHEET FOR ALL SEPARATELY POURED INITIAL LANDINGS.

② DRILL AND GROUT NO. 4 12" LONG REINFORCEMENT BARS (EPOXY COATED) AT 36" MAXIMUM CENTER TO CENTER MINIMUM 12" SPACING FROM CONSTRUCTION JOINTS. BARS TO BE ADJUSTED TO MATCH RAMP GRADE. BARS TO BE PAID BY EACH.

③ DRILL AND GROUT 2 - NO. 4 X 12'' LONG (6" EMBEDDED) REINFORCEMENT BARS (EPOXY COATED). REINFORCEMENT REQUIRED FOR ALL CONSTRUCTION JOINTS. BARS TO BE PAID BY EACH.

④ THIS CURB LINE REINFORCEMENT DETAIL SHALL BE USED ON BITUMINOUS ROADWAYS. FOR CONCRETE ROADWAYS, SEE NOTE 6.

⑤ CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE.

⑥ USE AN APPROVED TYPE F (1/4 INCH THICK) SEPARATION MATERIAL. SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.

REVISION:

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA
DEPARTMENT OF TRANSPORTATION

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STATE DESIGN ENGINEER

STANDARD PLAN 5-297.250 | 6 OF 6

APPROVED: 11-04-2021
REVISED:

PEDESTRIAN CURB RAMP DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 29 OF 97 SHEETS

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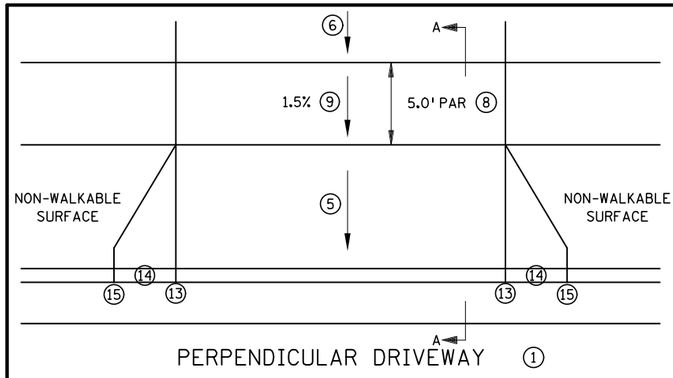
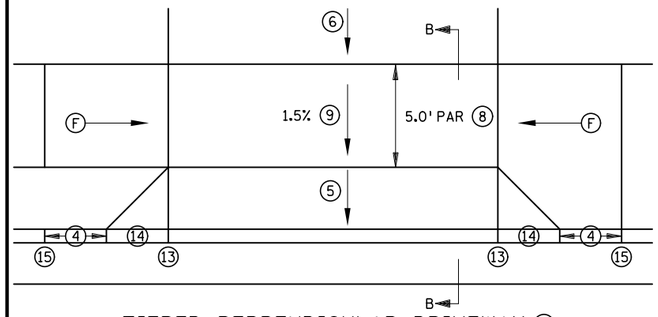
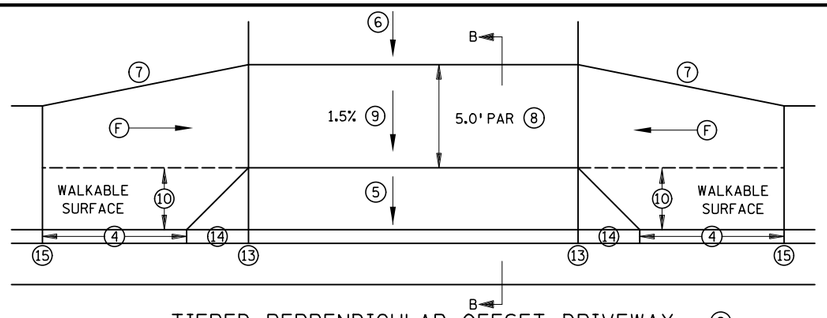


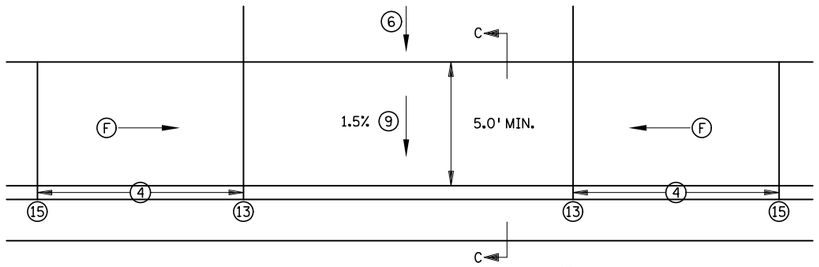
PERPENDICULAR DRIVEWAY ①



TIERED PERPENDICULAR DRIVEWAY ②



TIERED PERPENDICULAR OFFSET DRIVEWAY ②



PARALLEL DRIVEWAY ③

LEGEND

(F) ↓	INDICATES DRIVEWAY RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

NOTES:

ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURE FROM BACK OF CURB.

IN URBAN ROADWAY SECTIONS, 6" CURB HEIGHT SHOULD BE USED WHEN 6' OR GREATER BOULEVARD WIDTH IS PROPOSED. WHEN BOULEVARD IS LESS THAN 6' WIDE, 4" CURB HEIGHT SHOULD BE USED.

MAINTAIN EXISTING DRAINAGE PATTERNS FLOWING TO PUBLIC RIGHT OF WAY.

ACQUIRE ADEQUATE L3 TO ALLOW FOR A CONTINUOUS PAR PROFILE (UNIFORM TYPICAL SIDEWALK SECTION) THROUGH THE DRIVEWAY APRON.

IN NO CASE SHALL SIDEWALK PROFILES EXCEED 5.0%, EXCEPT SIDEWALK PROFILES CAN MATCH ROADWAY GRADE IF ROADWAY GRADE IS GREATER THAN 5.0%. RAMPS FOR DRIVEWAYS ARE REQUIRED TO FOLLOW THE ABOVE SIDEWALK CRITERIA.

CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PEDESTRIAN ACCESS ROUTE (PAR). 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOPS OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.

DRIVEWAY TYPES FROM MOST PREFERRED TO LEAST PREFERRED ARE AS FOLLOWS: PERPENDICULAR, TIERED PERPENDICULAR, TIERED PERPENDICULAR OFFSET & PARALLEL.

① PERPENDICULAR DRIVEWAYS ARE THE STANDARD AND STARTING POINT FOR ALL DRIVEWAY DESIGN AND CONSTRUCTION. SHOULD BE USED TO ACHIEVE CONTINUOUS PAR PROFILE THROUGH THE DRIVEWAY. OBTAINING A PERPENDICULAR DRIVEWAY DESIGN BECOMES MORE CRITICAL WITH STEEP ROADWAY PROFILES.

② TO BE USED WHEN PERPENDICULAR DRIVEWAY DESIGN CANNOT BE ACHIEVED, THE DRIVEWAY PAR IS BELOW ROADWAY CURB HEIGHT. THIS DRIVEWAY TYPE CAN BE USED FOR BOTH PAVED (AS SHOWN) AND GRASS BOULEVARDS.

③ TO BE USED WHEN PERPENDICULAR AND TIERED PERPENDICULAR DRIVEWAY DESIGN CANNOT BE ACHIEVED. CAN BE USED FOR STEEP NEGATIVE SLOPED DRIVEWAYS. DW CURB TYPE 2 SHOULD BE USED TO RAISE PAR ABOVE GUTTER AND REDUCE "ROLLER COASTER" EFFECT. 4" HIGH ROADWAY CURB SHOULD BE USED TO REDUCE "ROLLER COASTER" EFFECT ESPECIALLY WHEN MULTIPLE DRIVEWAYS ARE PRESENT.

④ TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

⑤ 8% STANDARD, 10% MAX. FOR COMMERCIAL AND 12% MAX. FOR RESIDENTIAL. SEE GENERAL NOTES ON SHEET 2 FOR MORE INFORMATION.

⑥ S3 8% MAXIMUM, IF THE SLOPE IS EXCEEDED OR CONTINUED FOR MORE THAN 5', ANALYZE VEHICLE TEMPLATES FOR VERTICAL CLEARANCE. IF EXISTING DRIVEWAY IS NEGATIVELY DRAINING, S3 CAN BECOME SLIGHTLY MORE NEGATIVE TO ACHIEVE PERPENDICULAR DRIVEWAY DESIGN IF THE VERTICAL CLEARANCE IS ACHIEVED IN VEHICLE TEMPLATES.

⑦ 1:3 MIN. 1:5 PREFERRED FOR DRIVEWAY RETROFIT PROJECTS. 1:10 PREFERRED FOR SIDEWALK REPLACEMENT PROJECTS.

⑧ 5.0' MIN. PAR WIDTH IS THE STANDARD THROUGH DRIVEWAYS. IF FEASIBLE WIDEN DRIVEWAY PAR WIDTH TO MATCH APPROACHING SIDEWALK PAR WIDTHS. IN VERTICALLY CONSTRAINED AREAS PAR WIDTHS CAN INCREMENTALLY BE REDUCED TO 4.5' OR 4' MIN AFTER ALL OTHER OPTIONS HAVE BEEN APPLIED.

⑨ THE PEDESTRIAN ACCESS ROUTE, MAY NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.

⑩ SIDEWALK OFFSET TO BE LESS THAN OR EQUAL TO HALF THE APPROACHING SIDEWALK WIDTH.

⑪ INTEGRAL DRIVEWAY APRON TO BE POURED MONOLITHICALLY/INTEGRAL WITH THE CURB AND GUTTER. SEE SHEET 2 FOR MORE INFORMATION.

⑫ SEE SHEET 2 FOR CURB TYPE INFORMATION.

⑬ 0" CURB IS AT FLOW LINE. SEE DRIVEWAY TABLE FOR BACK OF CURB HEIGHTS.

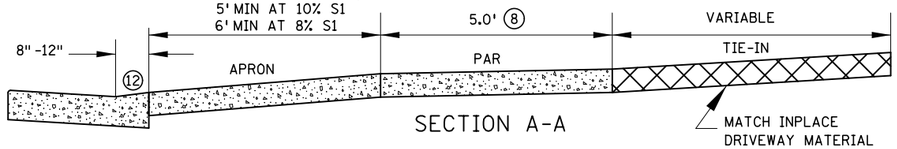
⑭ 3' LONG AT 8-10% PREFERRED FOR INITIAL CURB TAPER. REDUCE CURB TAPER SLOPE IF NECESSARY TO MATCH ADJACENT SIDEWALK GRADES.

⑮ MATCH FULL CURB HEIGHT.

⑯ 1:2 TAPER RATE ON INTEGRAL DRIVEWAY APRONS.

⑰ SEE SHEET 4 FOR WHEN 6" WALK IS REQUIRED.

WITH 4" CURB HEIGHT;
3' MIN AT 10% S1
4' MIN AT 8% S1
WITH 6" CURB HEIGHT;
5' MIN AT 10% S1
6' MIN AT 8% S1



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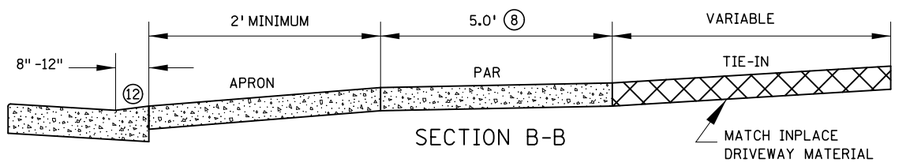

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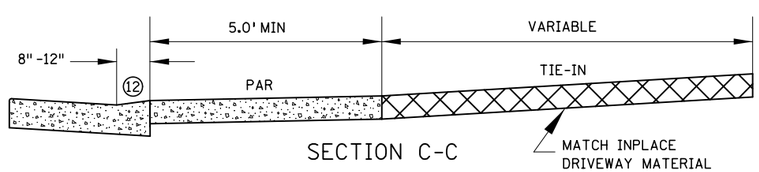

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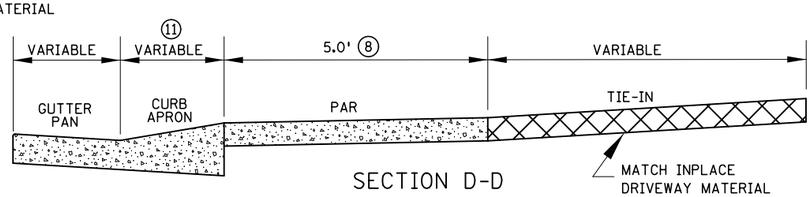

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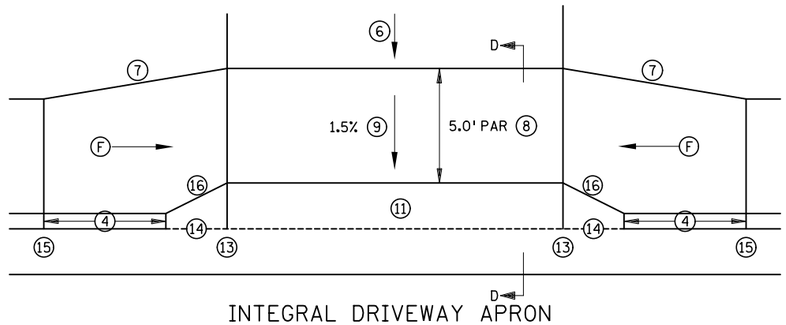
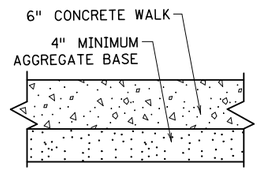
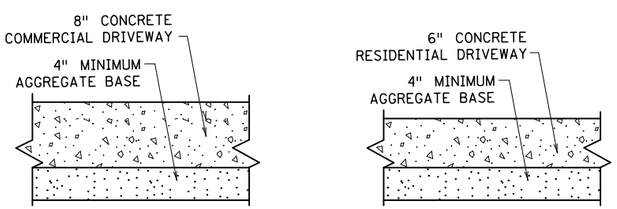


INTEGRAL DRIVEWAY APRON



TYPICAL SIDEWALK SECTION ⑰



TYPICAL DRIVEWAY SECTIONS

REVISION:

APPROVED: 11-04-2021
JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.254 | 1 OF 4

APPROVED: 11-04-2021
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

DRIVEWAY AND SIDEWALK DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 30 OF 97 SHEETS

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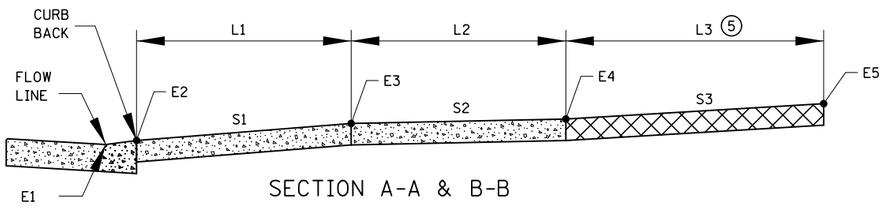
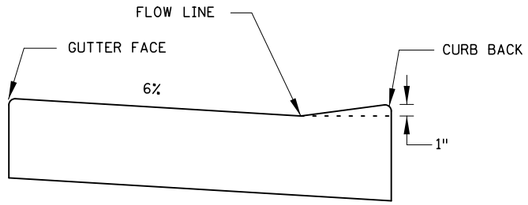
DRIVEWAY TABLE (1)

STATION	SIDE	DRIVEWAY TYPE (2)	CURB TYPE (3)	E1	E2	L1	S1	E3	L2	S2 (4)	E4	L3 (5)	S3	EXISTING (6)	E5	COMMENTS
						FT	%		FT	%		FT	%	%		



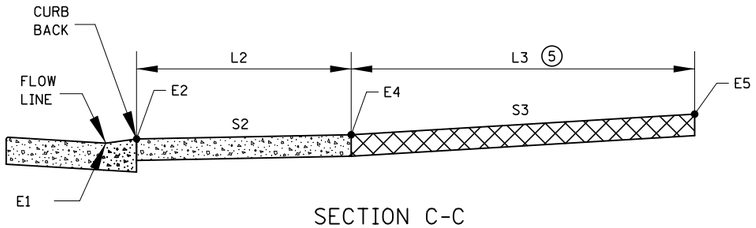
SECTION A-A & B-B

(REFER TO PREVIOUS SHEET)



DW CURB TYPE 1

STANDARD CURB AT DRIVEWAY



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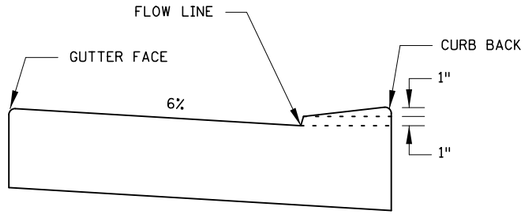
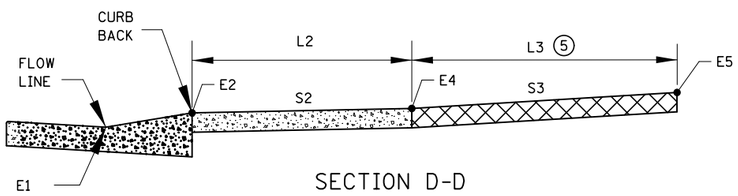


DW CURB TYPE 2

VERTICALLY CONSTRAINED



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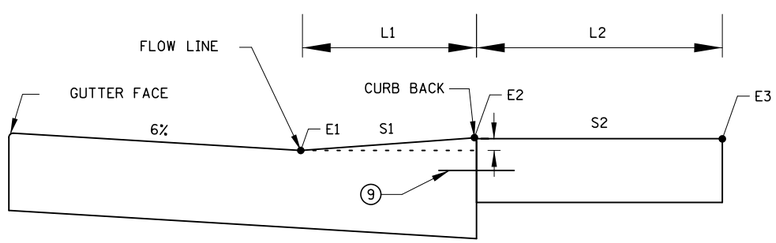

INTEGRAL DRIVEWAY APRON (IDA)

NOTES:

ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.

DW CURB TYPE 1 SHALL BE USED WHEN THE DRIVEWAY ACTS AS A PEDESTRIAN RAMP. THE MAX. APRON SLOPE MUST ADHERE TO ADA CRITERIA AS WELL. DW CURB TYPE 1 SHOULD BE USED IF THERE IS ON STREET PARKING.

WHERE ROADWAY DRAINAGE IS A CONCERN (NEGATIVE SLOPED APRON) DW CURB TYPE 2 CAN BE USED TO HELP KEEP THE WATER ON PUBLIC RIGHT OF WAY.

S1 8% STANDARD, 10% MAX. COMMERCIAL AND 12% MAX. RESIDENTIAL. IF EXISTING GRADES ARE STEEPER DO NOT MAKE GRADES APPRECIABLY WORSE BY USING BEST PRACTICES SUCH AS DRIVEWAY CURB HEIGHTS, EXTENDING L3 AND/OR STEEPEN S3.

S3 8% MAXIMUM, IF THIS SLOPE IS EXCEEDED OR CONTINUED FOR MORE THAN 5', ANALYZE VEHICLE TEMPLATES FOR VERTICAL CLEARANCE. SEE FACILITY DESIGN GUIDE, CHAPTER 6, FOR GEOMETRIC DESIGNS OF DRIVEWAYS.

(1) EXAMPLE SHOWN TO BE INCLUDED IN PLAN FOR EACH DRIVEWAY THAT HAS PAR THROUGH IT.

(2) REFERS TO THE FOLLOWING TYPES; PERPENDICULAR DRIVEWAY, TIERED PERPENDICULAR OFFSET DRIVEWAY, TIERED PERPENDICULAR DRIVEWAY, PARALLEL DRIVEWAY, AND INTEGRAL DRIVEWAY APRON.

(3) DW CURB TYPE 1 IS THE STANDARD AND SHALL BE THE STARTING POINT FOR ALL PERPENDICULAR AND TIERED DRIVEWAYS. DW CURB TYPE 2 SHALL ONLY BE USED AFTER UTILIZING BEST PRACTICES SUCH AS MAXIMIZING S1, S3, AND L3.

(4) SHOULD BE DESIGNED AT 1.5%.

(5) ACQUIRE ADEQUATE L3 TO ALLOW FOR CONTINUOUS PAR PROFILE (UNIFORM SIDEWALK SECTION) THROUGH THE DRIVEWAY APRON.

(6) PROVIDE INPLACE TIE-IN SLOPE INFORMATION AT BACK OF PROPOSED WALK (S3 AREA).

(7) INFORMATION TO BE INCORPORATED INTO DRIVEWAY TABLE WHEN INTEGRAL DRIVEWAY APRON IS USED. OTHER CURB HEIGHTS & CURB APRON LENGTHS CAN BE USED.

(8) L1 & S1 FOR INTEGRAL DRIVEWAY APRON IS TO FLOWLINE. 12.5% IS MAXIMUM PREFERRED SLOPE.

(9) TIE ADJACENT SECTIONS. CONCRETE DRIVEWAY APRON AND CONCRETE DRIVEWAY SIDEWALK SHALL BE CONSTRUCTED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. DRILL AND GROUT OR CAST IN-PLACE THROUGH HOLES IN THE FORMS NO. 4 X 12" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINT.

TYPICAL INTEGRAL DRIVEWAY APRON (7)			
CURB TYPE	L1 FT	E2	S1 (8) %
IDA 216	1.33	+0.16	12.5
IDA 220	1.67	+0.16	10
IDA 324	2	+0.24	12.5
IDA 432	2.67	+0.33	12.5

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REVISION:

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

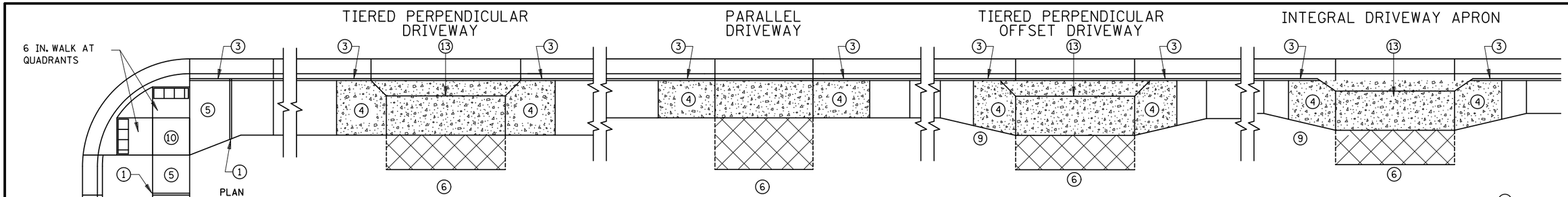
STANDARD PLAN 5-297.254 | 2 OF 4

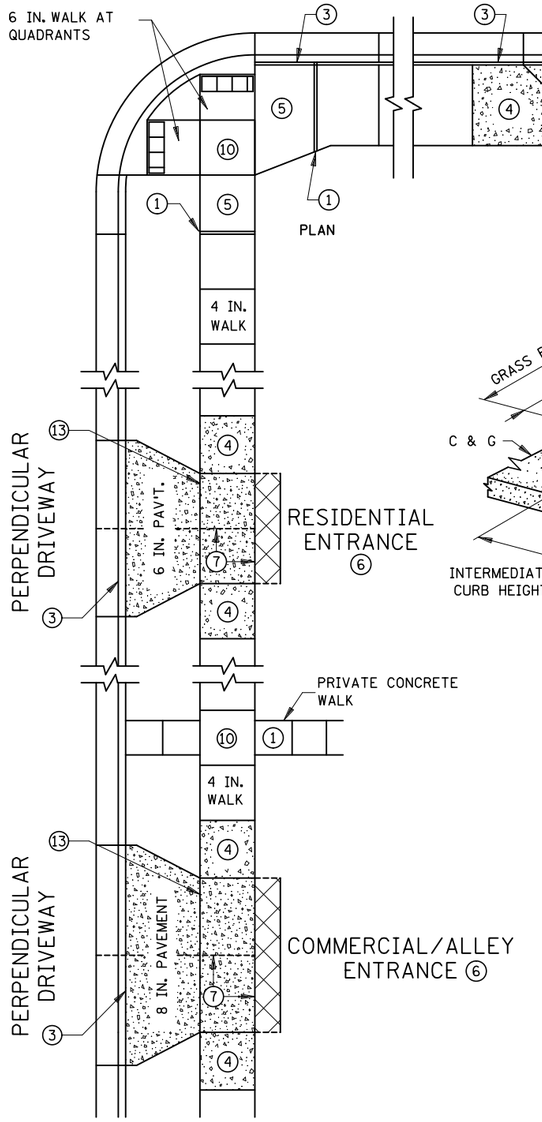
APPROVED: 11-04-2021
REVISED:

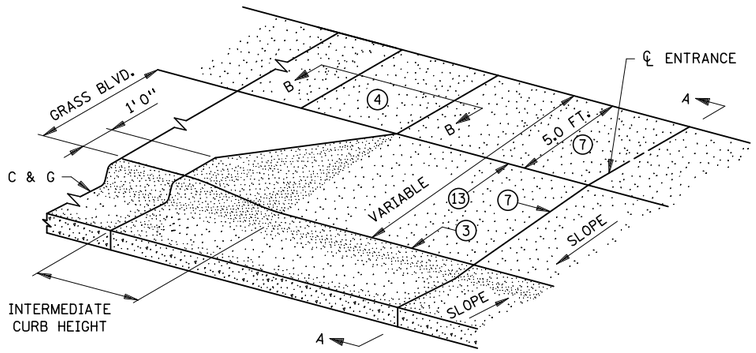
THOMAS STYRBICKI
STATE DESIGN ENGINEER

DRIVEWAY AND SIDEWALK DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 31 OF 97 SHEETS

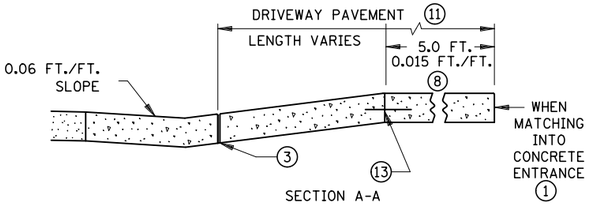




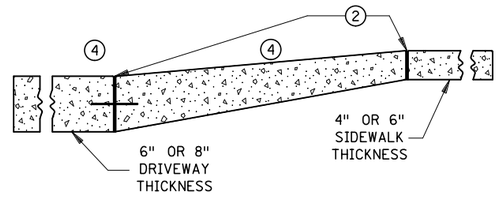


HALF PLAN PERSPECTIVE

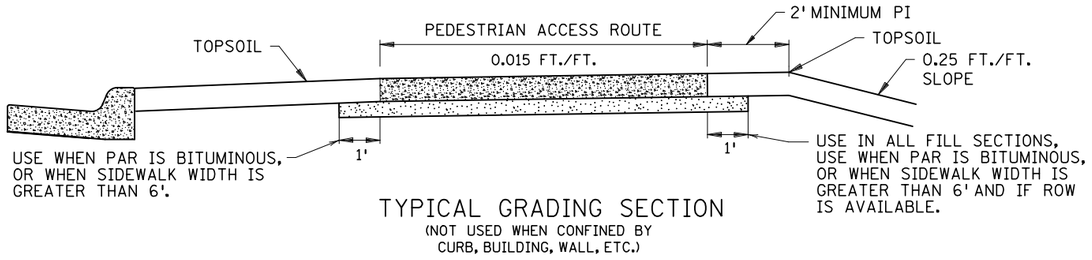
PERPENDICULAR DRIVEWAYS WITH GRASS BOULEVARDS



SECTION THRU DRIVEWAY

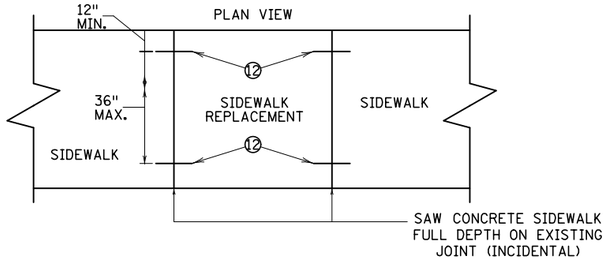


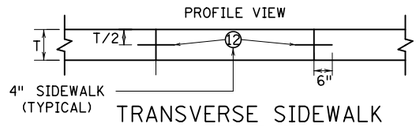
SECTION THRU SIDEWALK THICKNESS TRANSITION



TYPICAL GRADING SECTION

(NOT USED WHEN CONFINED BY CURB, BUILDING, WALL, ETC.)





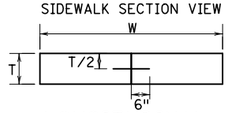
TRANSVERSE SIDEWALK TIE BAR REINFORCEMENT

RETROFITS ONLY

SIDEWALK LONGITUDINAL JOINT TIE BAR TABLE				
SIDEWALK WIDTH, W	SIDEWALK THICKNESS, T	TIE BAR SIZE	LENGTH	SPACING
> 7′	4"	No. 4	12"	24"
>10′	6"	No. 4	12"	36"

FOR 4" CONCRETE ONLY: CAST IN PLACE BARS MUST BE SUPPORTED WITH P-STAKES OR REINFORCEMENT BASKETS FOR FULL WIDTH CONCRETE PLACEMENTS.

FOR 6" CONCRETE ONLY: DRILL AND GROUT OR CAST IN PLACE THROUGH HOLES IN THE FORMS REQUIRED FOR STAGED ADJACENT CONCRETE PLACEMENTS.



LONGITUDINAL SIDEWALK REINFORCEMENT JOINTS

NOTES:

ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.

TO MINIMIZE SIDEWALK "ROLLER COASTER" EFFECT IT IS DESIRABLE TO KEEP THE PAR ELEVATION CONTINUOUS OR AT LEAST IN THE UPPER HALF OF CURB HEIGHT. 4" HIGH CURB SHOULD BE USED INSTEAD OF 6" HIGH CURB TO HELP THIS PROBLEM WHEN APPLICABLE.

4" HIGH ADJACENT CURB IS PREFERRED WHEN BOULEVARDS 4' OR LESS ARE PRESENT MEASURED FROM THE BACK OF CURB. WHEN THE DRIVEWAY IS SLOPING DOWN FROM THE ROADWAY (NEGATIVE) 4" HIGH ADJACENT CURB SHOULD ALSO BE USED.

SEE FACILITY DESIGN GUIDE, CHAPTER 6, FOR GEOMETRIC DESIGN OF DRIVEWAYS.

(1) CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE. DRIVEWAY EXPANSION SHALL BE PLACED AT TOP OR BOTTOM OF TRANSITION PANEL.

(2) CONSTRUCT WITH EXPANSION MATERIAL MNDOT PER SPEC. 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE. MAXIMUM ONE EXPANSION PER DRIVEWAY PLACED AT EITHER TOP OR BOTTOM OF CONCRETE THICKNESS TRANSITION. IF MULTIPLE DRIVEWAYS EXIST PLACE ONE EXPANSION BETWEEN EACH DRIVEWAY. IF NO DRIVEWAY EXIST PLACE A MAXIMUM OF ONE EXPANSION PER 150' OF SIDEWALK RUN.

(3) USE AN APPROVED TYPE F (1/4 INCH THICK) SEPARATION MATERIAL. SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.

(4) TRANSITION DRIVEWAY THICKNESS TO WALK THICKNESS. IF THERE IS A CONSTRUCTION JOINT AND NO EXPANSION IS USED, INSTALL TIE BARS.

(5) TRANSITION CURB RAMP THICKNESS TO WALK THICKNESS.

(6) MATCH INPLACE DRIVEWAY WIDTH, MATERIAL TYPE AND THICKNESS.

(7) FORM CONTRACTION JOINT AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANELS. CONCRETE PANEL SIZE SHOULD NOT EXCEED 1 1/2 : 1 LENGTH X WIDTH. 81 SF FOR 6" CONCRETE DRIVEWAY WITH 9'X9' MAXIMUM PANEL SIZE. 144 SF FOR 8" CONCRETE DRIVEWAY WITH 12'X12' MAXIMUM PANEL SIZE. MATCH DRIVEWAY APRON AND SIDEWALK JOINTS.

(8) THE PEDESTRIAN ACCESS ROUTE CROSS-SLOPE, SHALL NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.

(9) 1:10 MIN. SIDEWALK OFFSET TAPER REQUIRED FOR SIDEWALK REPLACEMENT PROJECTS. 1:3 MIN. AND 1:5 MIN. PREFERRED SIDEWALK OFFSET TAPER FOR DRIVEWAY REPLACEMENT.

(10) LANDING REQUIRED, SEE NEXT SHEET FOR MORE INFORMATION.

(11) CONCRETE DRIVEWAY APRON AND CONCRETE DRIVEWAY SIDEWALK SECTIONS SHALL BE CONSTRUCTED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. ENGINEER'S APPROVAL REQUIRED FOR MONOLITHIC PLACEMENTS.

(12) DRILL AND GROUT NO. 4 X 12" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING BETWEEN BARS COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINTS. 1' MINIMUM FROM ADJACENT CONCRETE JOINTS. BARS TO BE ADJUSTED TO MATCH SIDEWALK GRADES. TO BE PAID BY EACH.

(13) DRILL AND GROUT OR CAST IN-PLACE THROUGH HOLES IN THE FORMS NO. 4 X 12" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING BETWEEN BARS WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINTS. 1' MINIMUM FROM ADJACENT CONCRETE JOINTS.

REVISION: 12-23-2021

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.254 | 3 OF 4

APPROVED: 11-04-2021
REVISED: 12-23-2021

THOMAS STYRBICKI
STATE DESIGN ENGINEER

DRIVEWAY AND SIDEWALK DETAILS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 32 OF 97 SHEETS

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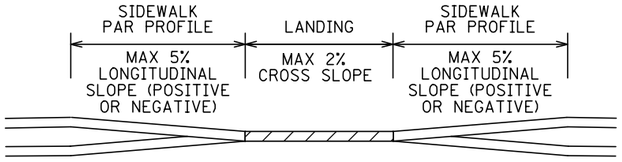
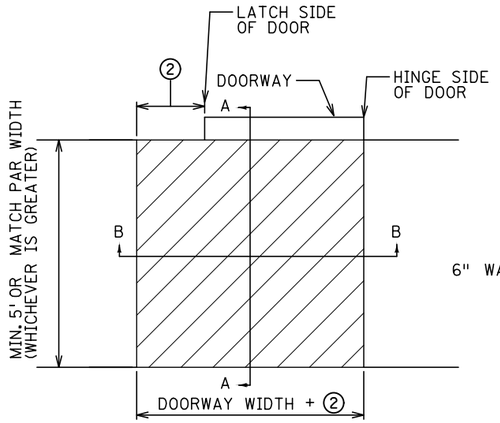
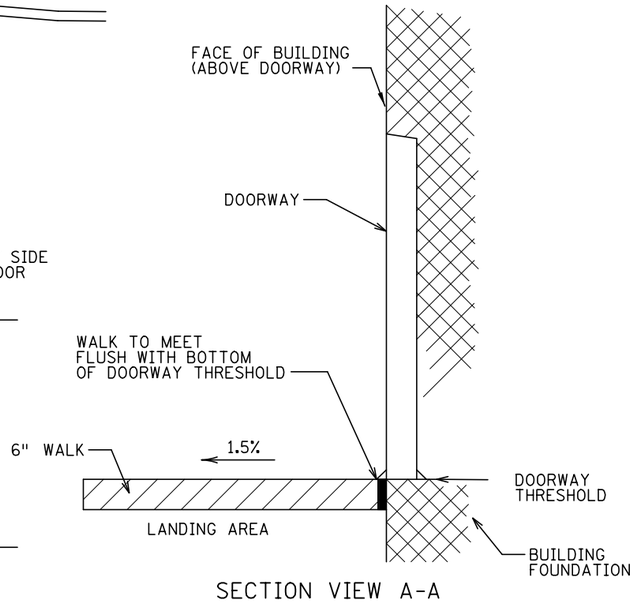


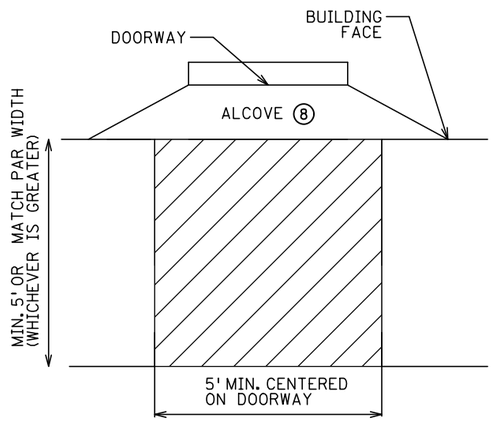
SECTION VIEW B-B



PLAN VIEW DOORWAY

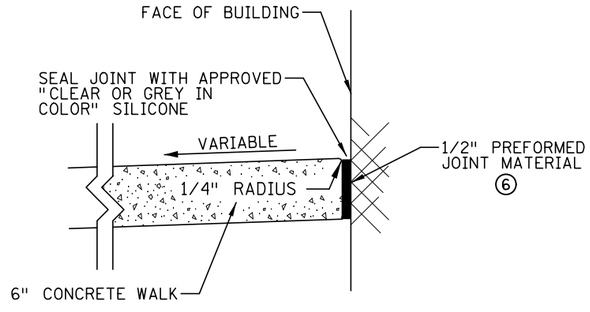


SECTION VIEW A-A

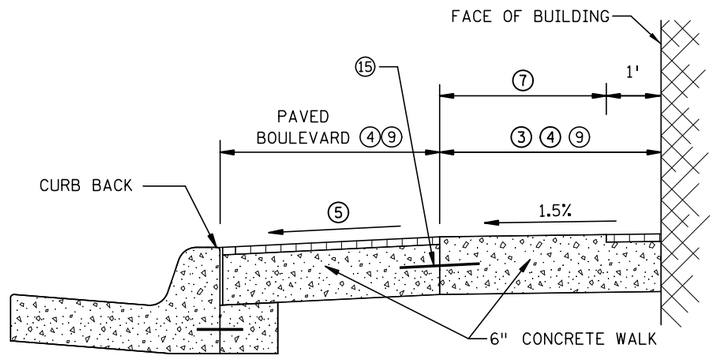


PLAN VIEW DOORWAY WITH ALCOVE

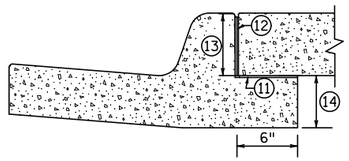
SIDEWALK LANDING REQUIREMENTS ①



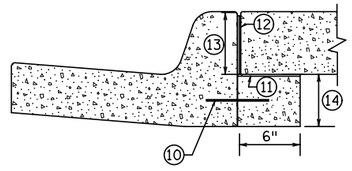
BUILDING JOINT SEAL (INCIDENTAL)



DOWNTOWN SIDEWALK TYPICAL SECTION



SLIP FORM SILL



FIXED FORM SILL

SILL CURB SHOULD BE USED AT ALL LOCATIONS WHEN CONCRETE WALK IS AT BACK OF CURB, INCLUDING PAVED BOULEVARD.

SILL CURB SHALL NOT BE USED IN CURB RAMP AND DRIVEWAY AREAS, INCLUDING CONCRETE FLARES.

SILL CURB WITH 4" WALK CAN USE FIXED OR SLIP FORM OPTIONS.

NOTES:

6" WALK IS REQUIRED:
1) IN ALL SIDEWALK LOCATIONS WHERE VARIABLE SLOPED CONCRETE BOULEVARDS ARE PAVED, SUCH AS COMMERCIAL (STORE FRONT, DOWNTOWN) AREAS.
2) ANYTIME DRILL AND REINFORCEMENT IS USED TO TIE LONGITUDINAL JOINTS TOGETHER.
3) TO ELIMINATE LONGITUDINAL JOINT WHEN INCREASING PANEL SIZE OVER 36SF.
4) AT LOCATIONS WHERE MAINTENANCE EQUIPMENT WILL SUBJECT CONCRETE TO HEAVY LOADS.

ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.

FIELD ADJUST SIDEWALK PROFILES TO MEET ALL DOORWAY THRESHOLDS.

SIDEWALK MUST MAINTAIN POSITIVE DRAINAGE AWAY FROM THE BUILDING TO THE ROADWAY.

SEE SPECIAL PROVISIONS FOR SILICONE SPECIFICATIONS.

① LANDING CRITERIA IS REQUIRED FOR ALL DOORS, STEPS, AND PRIVATE WALKS. FEASIBILITY DECREASES WITH NARROWER BOULEVARDS AND STEEPER SIDEWALK PROFILES.

② 18" MIN. WHEN DOOR SWINGS OUTWARD FROM BUILDING. 12" MIN WHEN DOOR SWINGS INWARD FROM BUILDING.

③ 6' MIN. PAR REQUIRED WHEN ADJACENT TO BUILDINGS.

④ 2/3 PAR TO 1/3 BOULEVARD SHOULD BE USED WHEN FEASIBLE. HOLD UNIFORM BOULEVARD WIDTH. 4' PREFERRED MINIMUM BOULEVARD.

⑤ 1%-5% FOR THE MAJORITY OF THE BLOCK, WITH EXCEPTIONS UP TO 8% IN CONSTRAINED AREAS.

⑥ CONSTRUCT USING APPROVED EXPANSION MATERIAL PER MNDOT TYPE A-E EXPANSION. LEAVE A MINIMUM ½" TOP GAP AND SEAL WITH MNDOT APPROVED SILICONE PER MNDOT SPEC 3722.

⑦ TO MINIMIZE VIBRATION AND ROLLING RESISTANCE, AREA SHALL BE FREE OF PAVERS, STAMPED CONCRETE, AND/OR EXCESSIVE JOINTING.

⑧ 2% MAX. PER BUILDING CODE. IF GREATER THAN 2%, FLATTEN AS FEASIBLE.

⑨ FORM CONTRACTION JOINTS AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANEL SIZE. CONRETE PANEL SIZE SHOULD NOT EXCEED 1½ : 1 LENGTH X WIDTH.

⑩ DRILL AND GROUT NO. 4 X 8" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING BETWEEN BARS WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINTS. 1' MINIMUM FROM ADJACENT CONCRETE JOINTS. TIE BARS SHALL BE EMBEDDED 4" WITH 2" MINIMUM CONCRETE COVER AND ARE INCIDENTAL TO SILL PLACEMENT.

⑪ FURNISH AND INSTALL THE FULL WIDTH OF THE TOP OF SILL A MINIMUM 2ML THICK POLYTHENE SHEETING.

⑫ USE AN APPROVED TYPE F (¼ INCH THICK) SEPARATION MATERIAL. SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.

⑬ DIMENSION TO BE SAME AS SIDEWALK THICKNESS, 4" MIN.

⑭ 6" WALK: 5" MIN. FOR B424; 7" MIN. FOR B624
4" WALK: 7" MIN. FOR B424; 9" MIN. FOR B624

⑮ DRILL AND GROUT NO. 4 X 12" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING BETWEEN BARS WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONCRETE JOINTS.

REVISION:

APPROVED: 11-04-2021

JEFFREY PERKINS
OPERATIONS DIVISION

MINNESOTA DEPARTMENT OF TRANSPORTATION

THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.254 | 4 OF 4

APPROVED: 11-04-2021
REVISED:

DRIVEWAY AND SIDEWALK DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 33 OF 97 SHEETS

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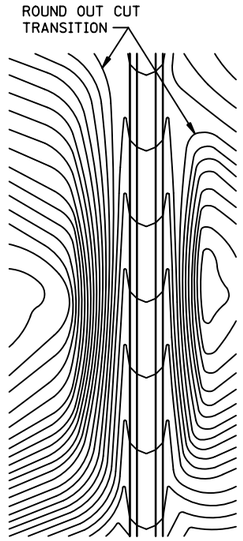
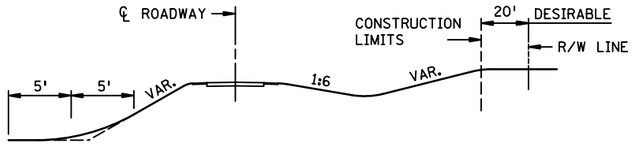
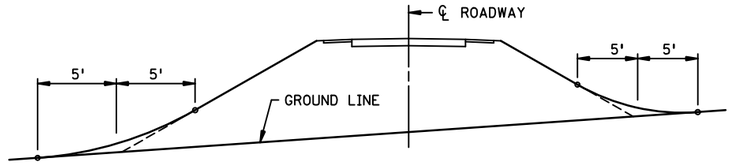


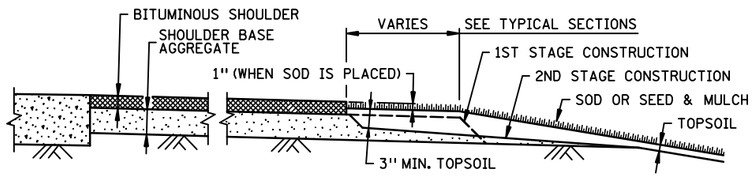
CONTOURING ROAD CUTS



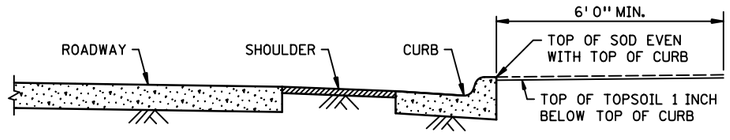
ROUNDING SHOULDERS AND BACKSLOPES



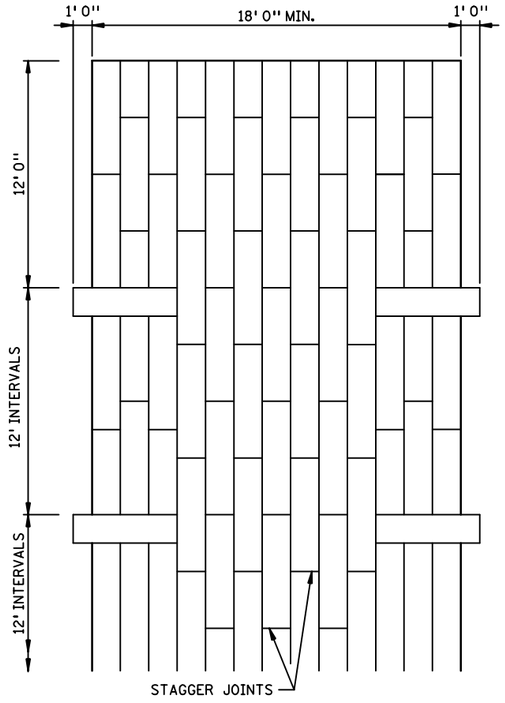
SHAPING FOR DRAINAGE ALONG THE TOE OF FILL SLOPES



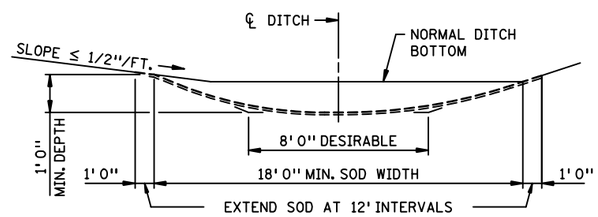
SHAPING AND TOPSOILING INSLOPES



SHAPING ADJACENT TO CURBS WHEN SOD IS PLACED

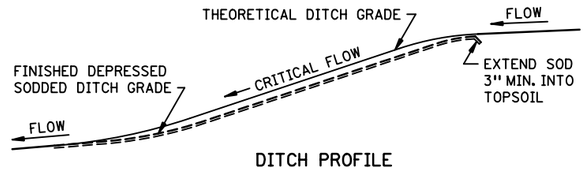


PLAN VIEW



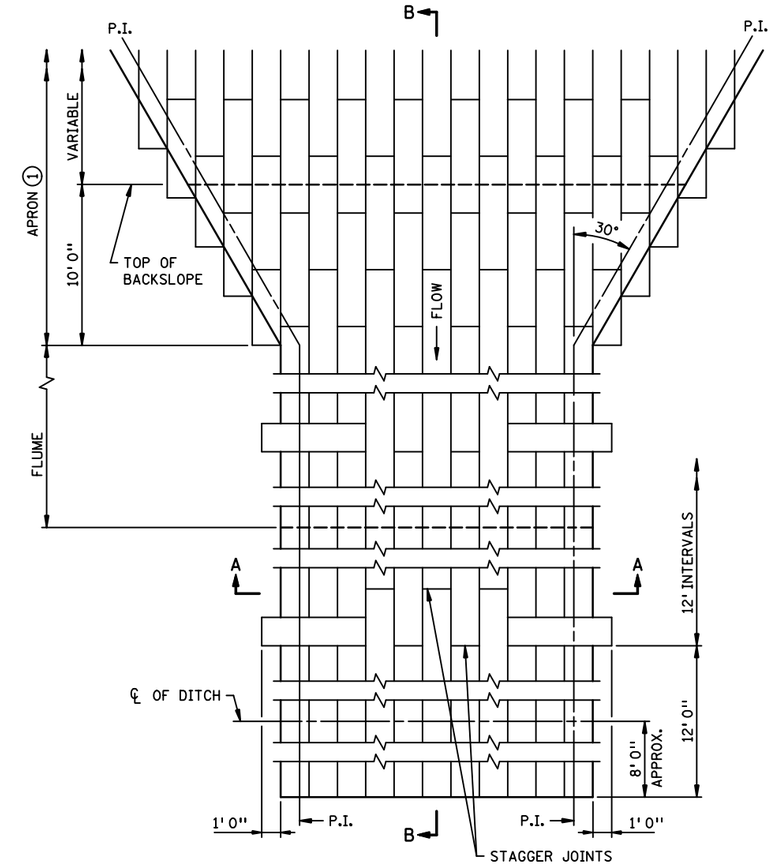
SODDED DITCH CROSS SECTION

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

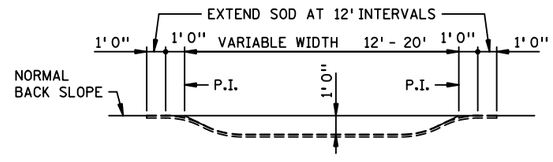


DITCH PROFILE

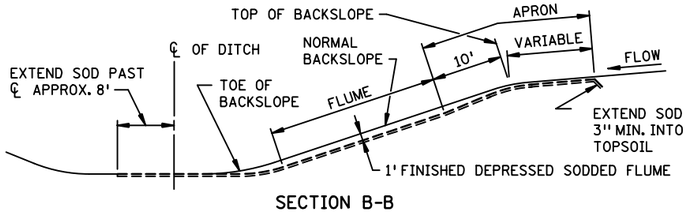
SODDED DITCH DETAILS



PLAN VIEW



SECTION A-A



SECTION B-B

SODDED FLUME DETAILS

NOTES:

SEE SPEC. 2575.3 FOR ADDITIONAL INFORMATION.

① CONSTRUCT TAPER AS DIRECTED BY THE ENGINEER.

REVISION:
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED: 2-28-2017
REVISED:

STANDARD PLAN 5-297.404 | 1 OF 3

PERMANENT EROSION CONTROL

ALONG ROADWAYS, DITCHES AND FLUMES

SAP 002-622-036, SAP 223-020-006 SHEET NO. 34 OF 97 SHEETS

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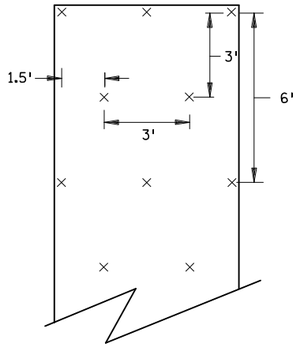
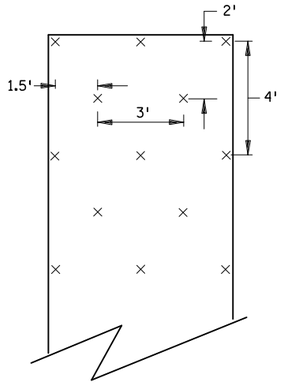
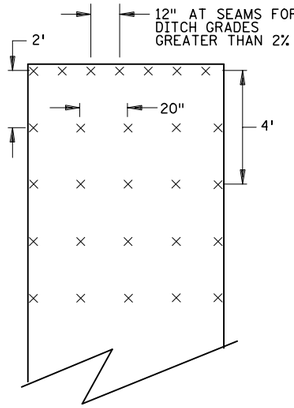


SLOPES FLATTER THAN 1:2
120 STAPLES PER 100 SQ YD

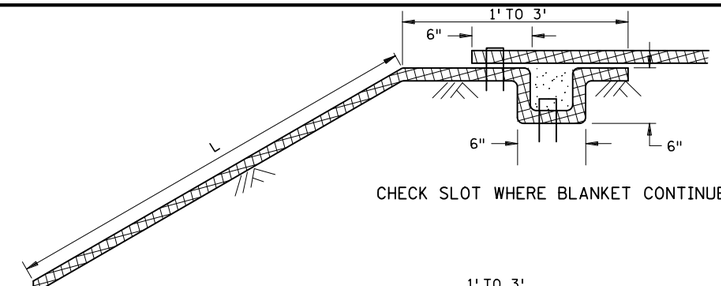


SLOPES 1:2 TO 1:1
170 STAPLES PER 100 SQ YD

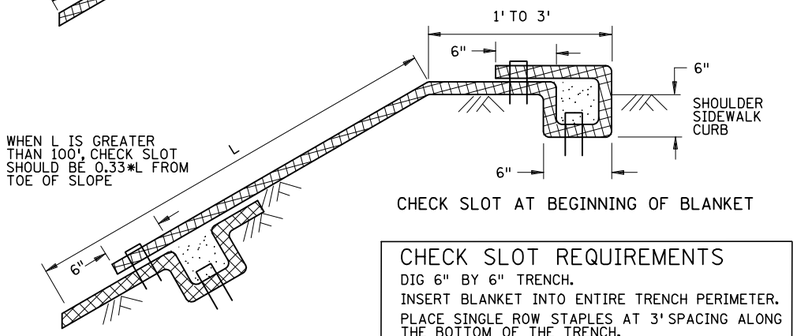


CHANNEL AND DITCH APPLICATIONS
350 STAPLES PER 100 SQ YD

BLANKET STAPLE PATTERN



CHECK SLOT WHERE BLANKET CONTINUES



CHECK SLOT AT BEGINNING OF BLANKET

CHECK SLOT REQUIREMENTS

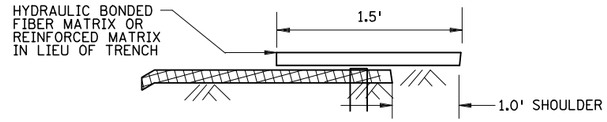
DIG 6" BY 6" TRENCH.

INSERT BLANKET INTO ENTIRE TRENCH PERIMETER.

PLACE SINGLE ROW STAPLES AT 3' SPACING ALONG THE BOTTOM OF THE TRENCH.

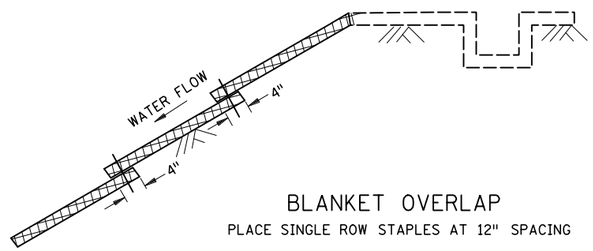
BACKFILL TRENCH WITH SOIL AND TAMP.

PLACE SINGLE ROW STAPLES AT 3' SPACING ON OVERLAP.

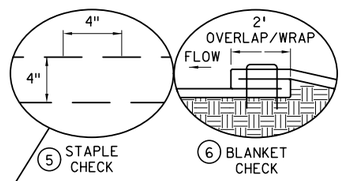


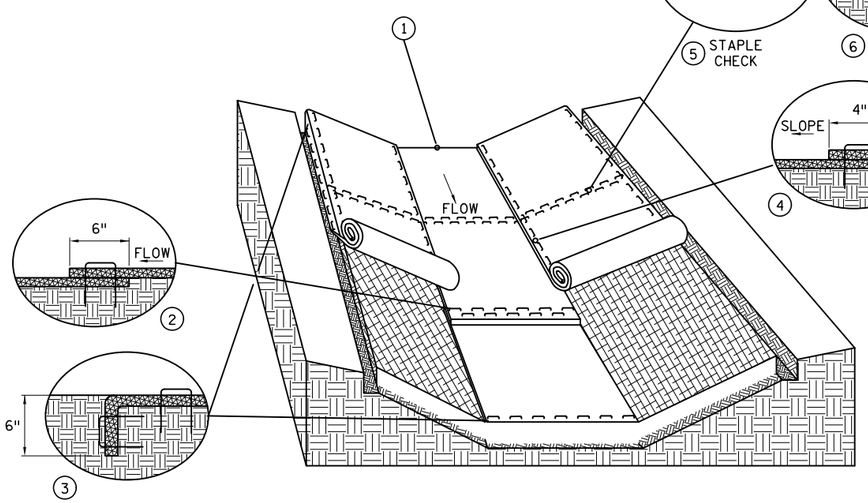
CHECK SLOT ALTERNATIVE
PLACE SINGLE ROW STAPLES AT 12" SPACING

CHECK SLOT DETAILS

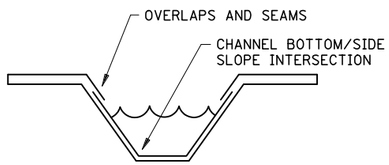


BLANKET OVERLAP
PLACE SINGLE ROW STAPLES AT 12" SPACING





DITCH BLANKET STAPLE DETAIL



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.

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 ⅓ FROM THE BOTTOM OF THE SLOPE.

REVISION:

APPROVED: JANUARY 8, 2020
MARNI KARNOWSKI
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.404 | 3 OF 3

APPROVED: 1-8-2020
REVISED:
THOMAS STYRBICKI
STATE DESIGN ENGINEER

PERMANENT EROSION CONTROL

REPP (BLANKET) STAPLE PATTERN FOR SLOPES

SAP 002-622-036, SAP 223-020-006 SHEET NO. 35 OF 97 SHEETS

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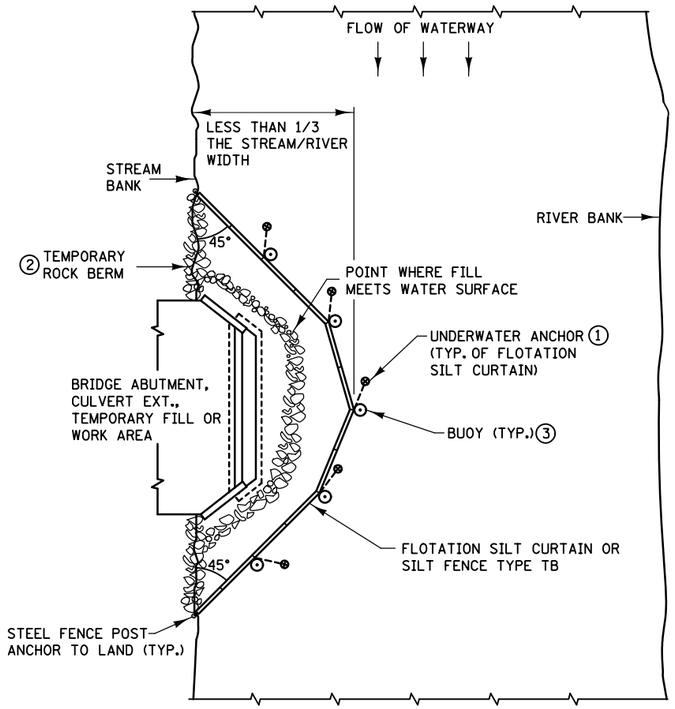
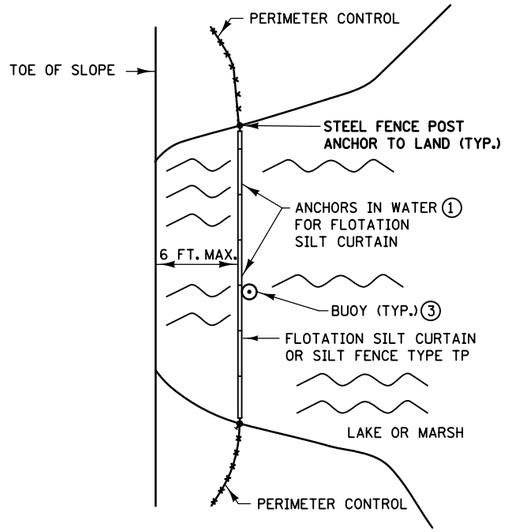
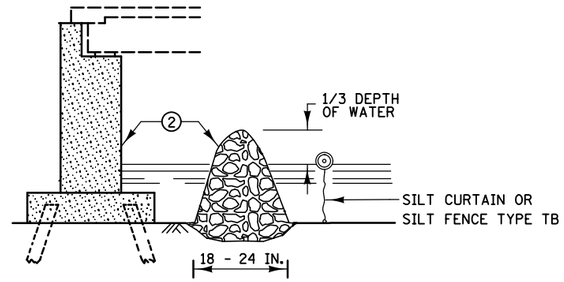


PLAN VIEW FOR STREAM ⑤



PLAN VIEW FOR LAKE OR MARSH ⑤



TEMPORARY ROCK BERM
FOR SEDIMENT CONTROL

INSTALLATION GUIDELINES
SILT FENCE TYPE TB

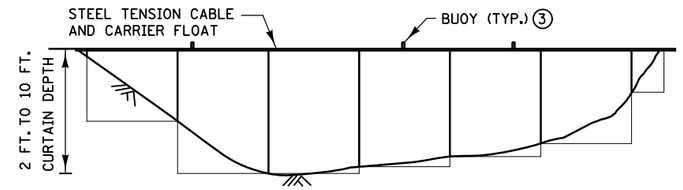
MINIMUM WATER DEPTH: 1 FT.
MAXIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.

INSTALLATION GUIDELINES ④
FLOTATION SILT CURTAIN
TYPE: STILL WATER

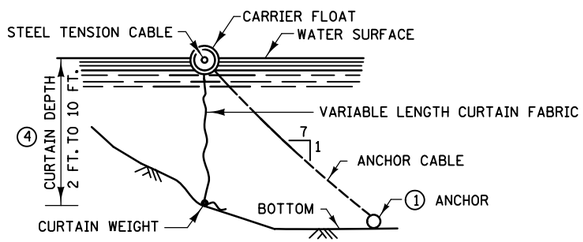
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 10 FT.
MAXIMUM WATER VELOCITY: 2 FT./SEC.
MAXIMUM WAVE HEIGHT: 1 FT

INSTALLATION GUIDELINES ④
FLOTATION SILT CURTAIN
TYPE: MOVING WATER

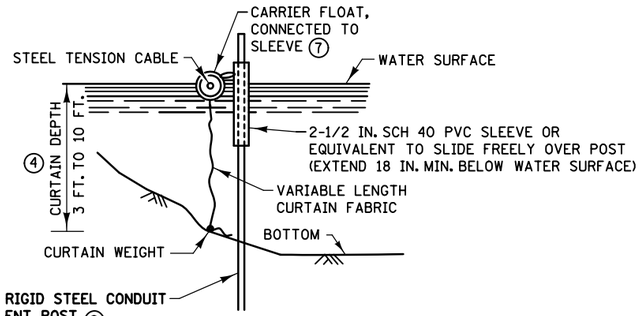
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 10 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.
MAXIMUM WAVE HEIGHT: 2 FT.



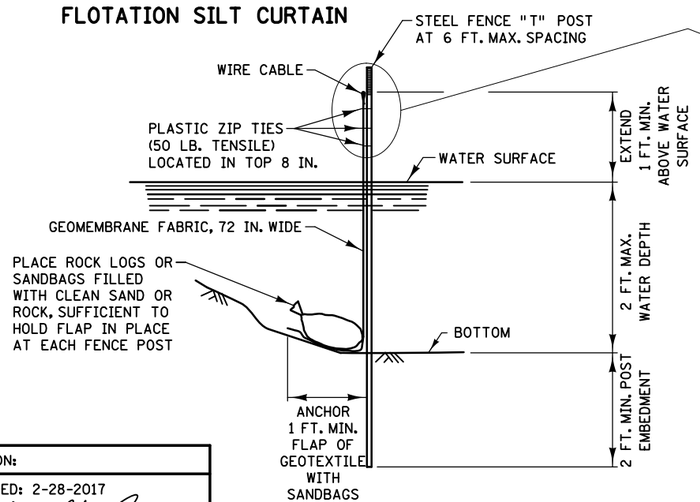
FRONT VIEW FOR FLOTATION SILT CURTAIN



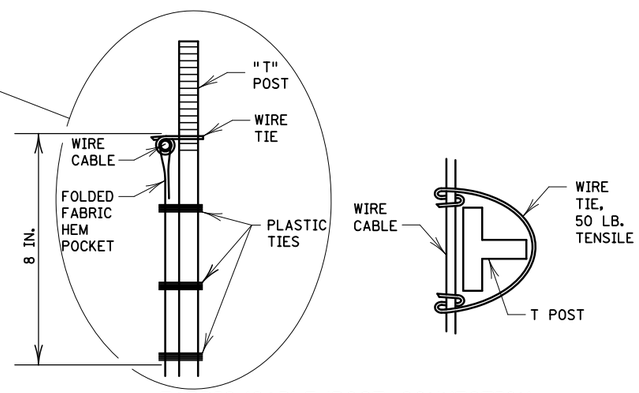
FLOTATION SILT CURTAIN



ALTERNATE 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.

REVISION:

APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.405 | 1 OF 8

APPROVED: 2-28-2017
REVISED:

STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL
SILT CURTAIN OR SILT FENCE TYPE TB

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 36 OF 97 SHEETS

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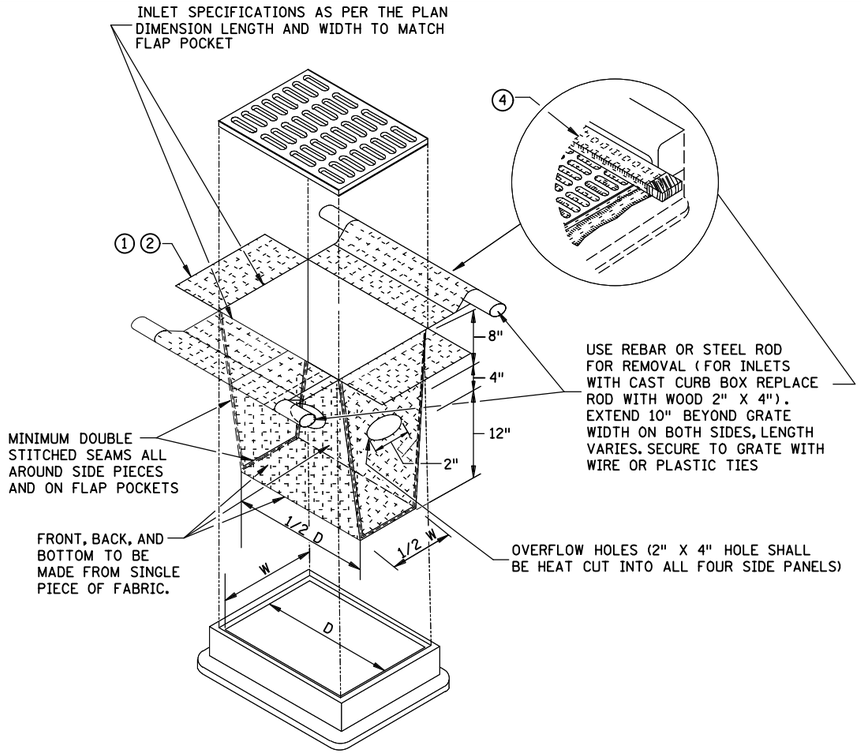
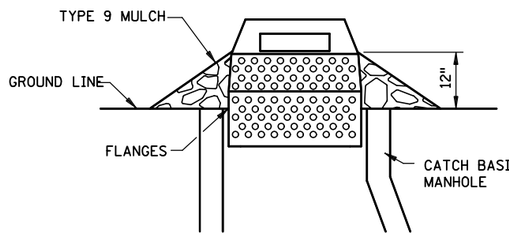


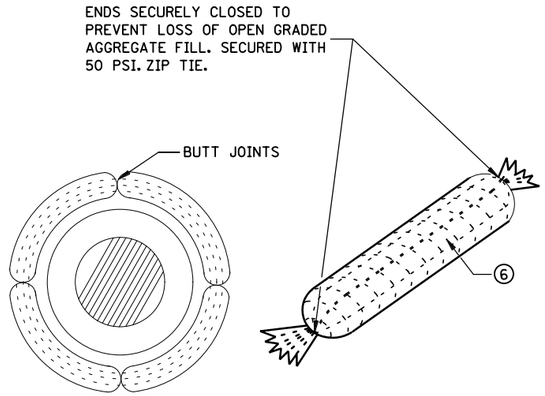
FILTER BAG INSERT ③

(CAN BE INSTALLED IN ANY INLET TYPE
WITH OR WITHOUT A CURB BOX)

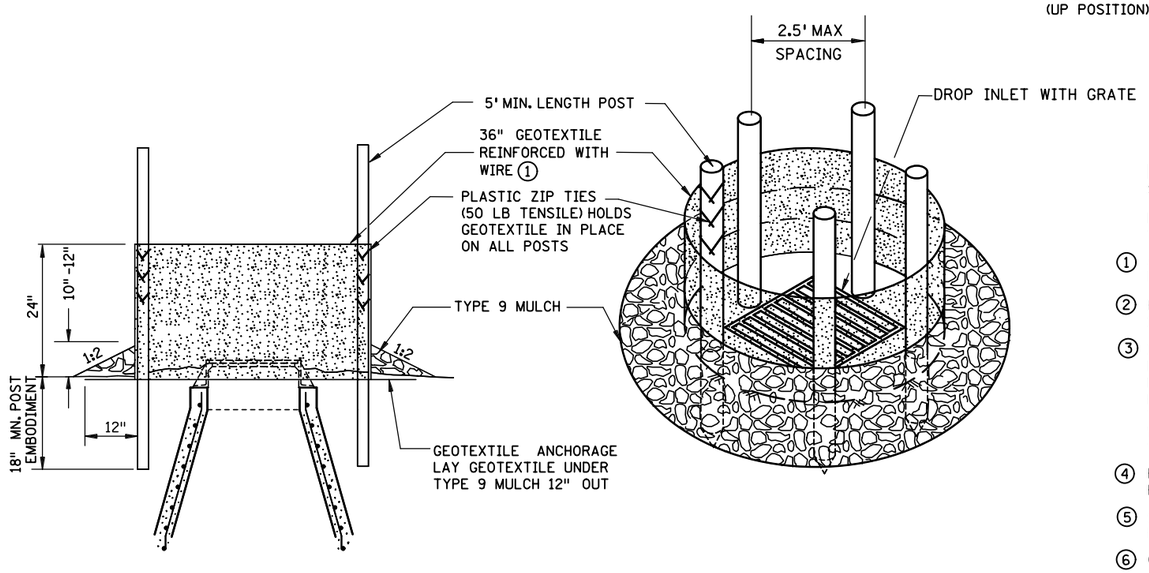


SEDIMENT CONTROL INLET HAT

NOTE:
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.

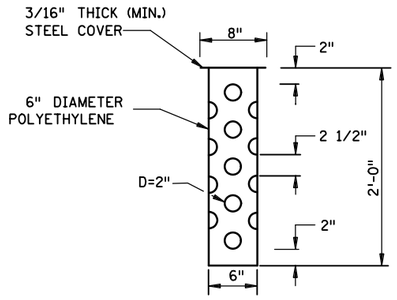


ROCK LOG/COMPOST LOG

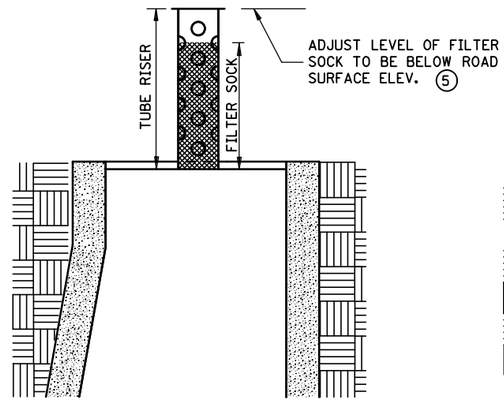


SILT FENCE RING AND ROCK FILTER BERM

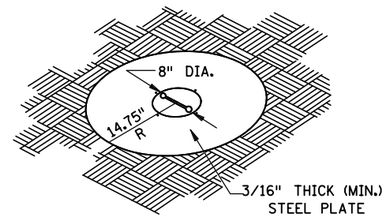
USE WHERE INLET DRAINS IN AN AREA WITH SLOPES AT 1:3 or LESS



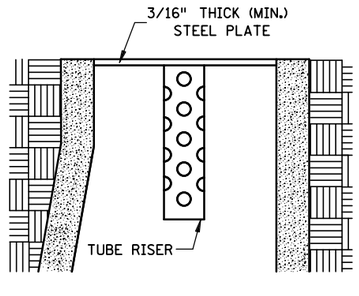
TUBE RISER



SECTION
(UP POSITION)



PERSPECTIVE VIEW



SECTION
(DOWN POSITION)

POP-UP HEAD

NOTES:

SEE SPECS. 2573, 3137, & 3886.

DEVICES MUST BE ADJUSTED ACCORDINGLY AS TO NOT CAUSE FLOODING ON ROADWAY THAT WOULD IMPEED TRAFFIC FLOW.

1. ALL GEOTEXTILE USED FOR INLET PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886.
2. FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED SHALL EXTEND A MINIMUM OF 10 INCHES AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
3. INSTALLATION NOTES:
   DO NOT PLACE FILTER BAG INSERT IN INLETS SHALLOWER THAN 30 INCHES, MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. THE PLACED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE OF 3 INCHES BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES. WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3 INCH SIDE CLEARANCE.
4. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2 INCH X 4 INCH OR USE A ROCK SOCK OR SAND BAGS IN PLACE OF THE FLAP POCKETS.
5. SOCK HEIGHT MUST NOT BE SO HIGH AS TO SLOW DOWN WATER FILTRATION TO CAUSE FLOODING OF THE ROADWAY.
6. GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.

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REVISION:

APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

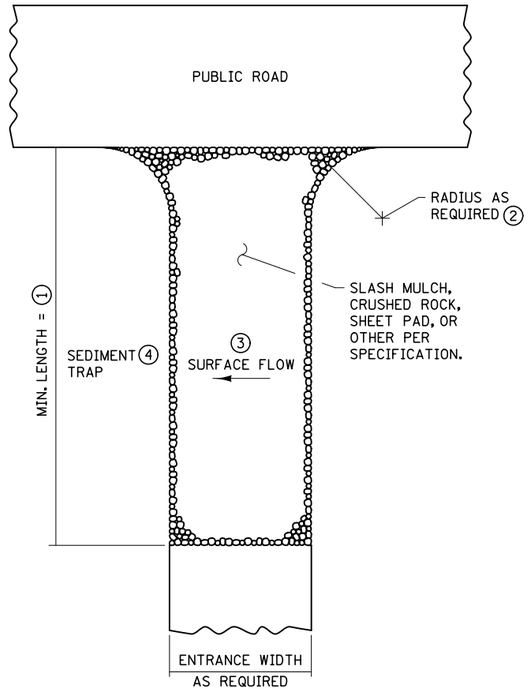
STANDARD PLAN 5-297.405 | 4 OF 8

APPROVED: 2-28-2017
REVISED:
STATE DESIGN ENGINEER

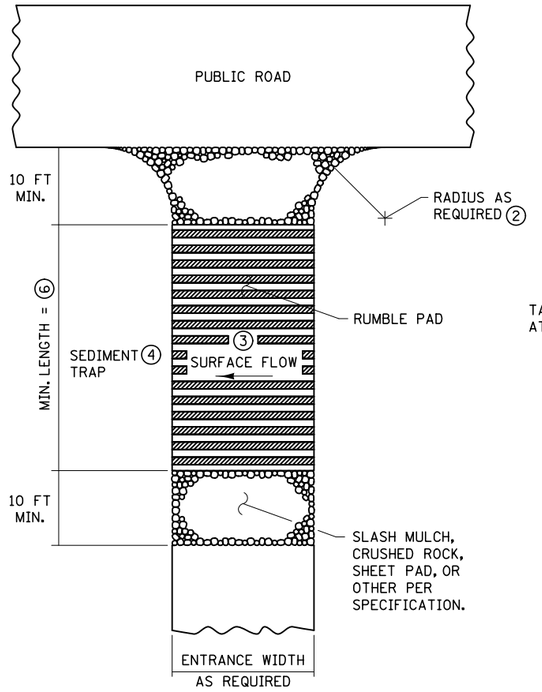
TEMPORARY SEDIMENT CONTROL

STORM DRAIN INLET PROTECTION

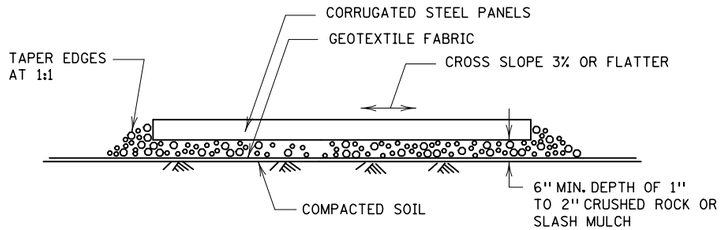
SAP 002-622-036, SAP 223-020-006 SHEET NO. 37 OF 97 SHEETS



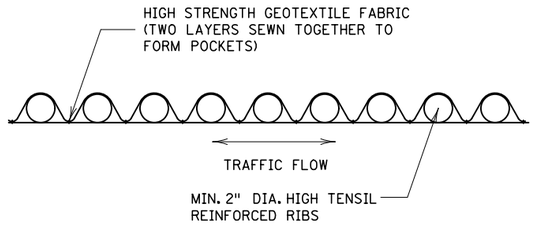
SLASH MULCH, CRUSHED ROCK, OR SHEET PAD CONSTRUCTION EXIT ⑤⑦



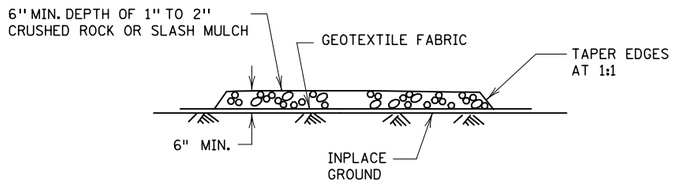
RUMBLE PAD CONSTRUCTION EXIT ⑤⑦



RUMBLE PAD



SHEET PAD



SLASH MULCH OR CRUSHED ROCK

NOTES:

SEE SPECS. 2573 & 3882.

(1) MINIMUM LENGTH SHALL BE THE GREATER OF 50 FEET OR A LENGTH SUFFICIENT TO ALLOW A MINIMUM OF 5 TIRE ROTATIONS ON THE PROVIDED PAD. MINIMUM LENGTH SHALL BE CALCULATED USING THE LARGEST TIRE WHICH WILL BE USED IN TYPICAL OPERATIONS.

(2) PROVIDE RADIUS OR WIDEN PAD SUFFICIENTLY TO PREVENT VEHICLE TIRES FROM TRACKING OFF OF PAD WHEN LEAVING SITE.

(3) IF RUNOFF FROM DISTURBED AREAS FLOWS TOWARD CONSTRUCTION EXITS, PREVENT RUNOFF FROM DRAINING DIRECTLY TO PUBLIC ROAD OVER CONSTRUCTION EXIT BY CROWNING THE EXIT OR SLOPING TO ONE SIDE. IF SURFACE GRADING IS INSUFFICIENT, PROVIDE OTHER MEANS OF INTERCEPTING RUNOFF.

(4) IF RUNOFF FROM CONSTRUCTION EXITS WILL DRAIN OFF OF PROJECT SITE, PROVIDE SEDIMENT TRAP WITH STABILIZED OVERFLOW.

(5) IF A TIRE WASH OFF IS REQUIRED THE CONSTRUCTION EXITS SHALL BE GRADED TO DRAIN THE WASH WATER TO A SEDIMENT TRAP.

(6) MINIMUM LENGTH OF RUMBLE PAD SHALL BE 20 FEET, OR AS REQUIRED TO REMOVE SEDIMENT FROM TIRES. IF SIGNIFICANT SEDIMENT IS TRACKED FROM THE SITE, THE RUMBLE PAD SHALL BE LENGTHENED OR THE DESIGN MODIFIED TO PROVIDE ADDITIONAL VIBRATION. WASH-OFF LENGTH SHALL BE AS REQUIRED TO EFFECTIVELY REMOVE CONSTRUCTION SEDIMENT FROM VEHICLE TIRES.

(7) MAINTENANCE OF CONSTRUCTION EXITS SHALL OCCUR WHEN THE EFFECTIVENESS OF SEDIMENT REMOVAL HAS BEEN REDUCED. MAINTENANCE SHALL CONSIST OF REMOVING SEDIMENT AND CLEANING THE MATERIALS OR PLACING ADDITIONAL MATERIAL (SLASH MULCH OR CRUSHED ROCK) OVER SEDIMENT FILLED MATERIAL TO RESTORE EFFECTIVENESS.

REVISION:

APPROVED: 2-28-2017

CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

STANDARD PLAN 5-297.405 | 5 OF 8

APPROVED: 2-28-2017

REVISED:

TEMPORARY SEDIMENT CONTROL

STABILIZED CONSTRUCTION EXIT

SAP 002-622-036, SAP 223-020-006 SHEET NO. 38 OF 97 SHEETS

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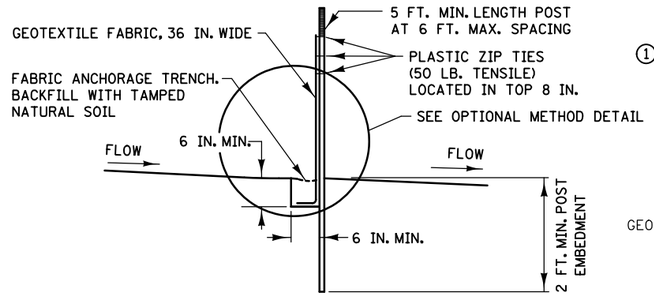
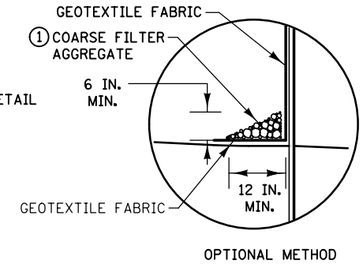
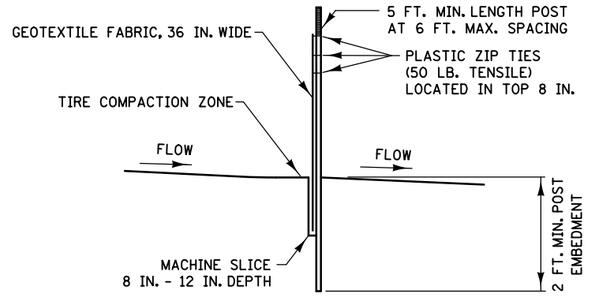
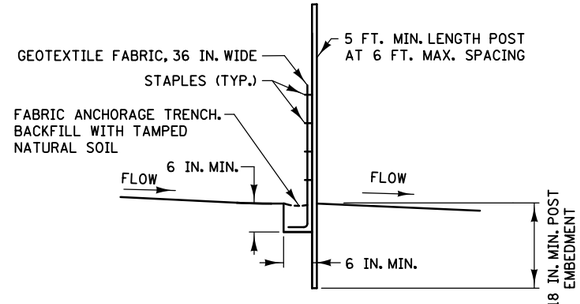




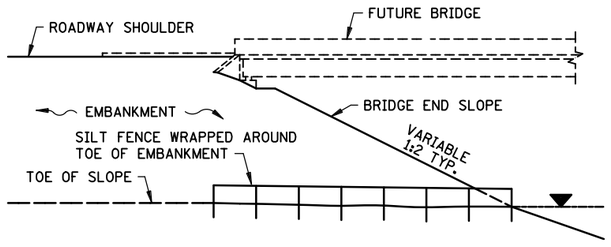
SILT FENCE TYPE HI ②
(HAND INSTALLED)



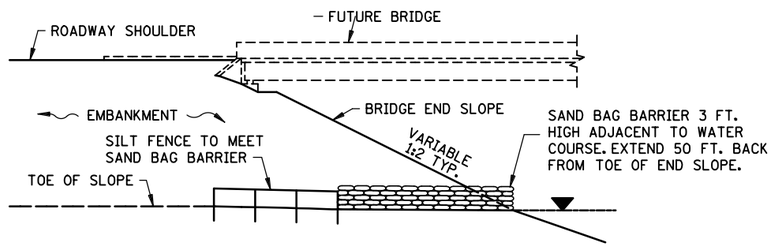
SILT FENCE TYPE MS ②
(MACHINE SLICED)



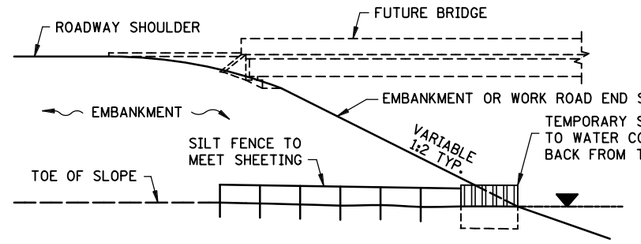
SILT FENCE TYPE PA ③
(PREASSEMBLED)



SILT FENCE ONLY ④

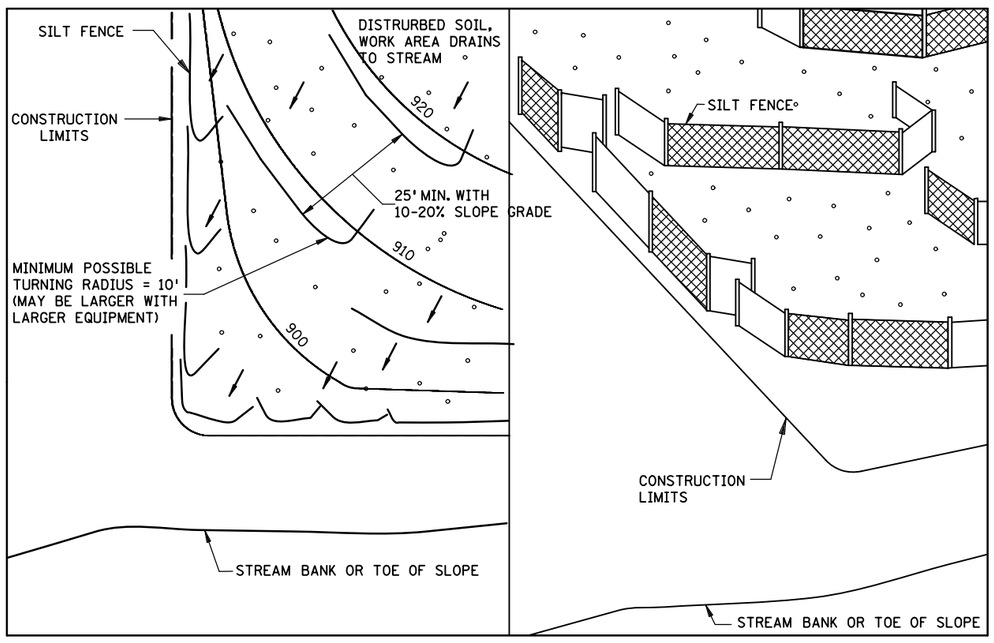


SILT FENCE WITH SAND BAGS ⑤



SILT FENCE WITH SHEETING ⑥

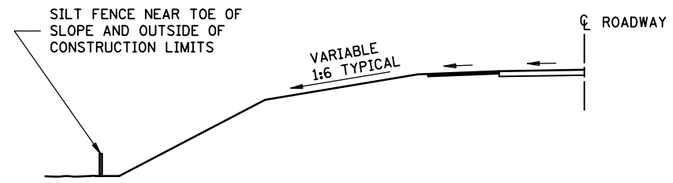
INSTALLATION AT BRIDGE EMBANKMENT ADJACENT TO WATER



PLAN VIEW

PERSPECTIVE VIEW

J-HOOK INSTALLATION



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.

REVISION:

APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.405 | 6 OF 8

APPROVED: 2-28-2017
REVISED:

STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL

SILT FENCE

SAP 002-622-036, SAP 223-020-006 SHEET NO. 39 OF 97 SHEETS

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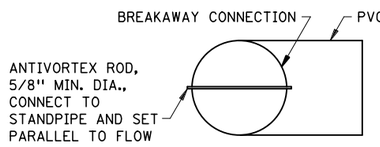
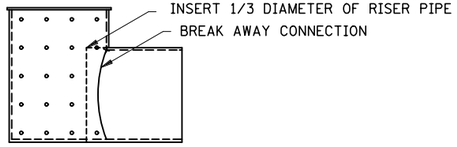
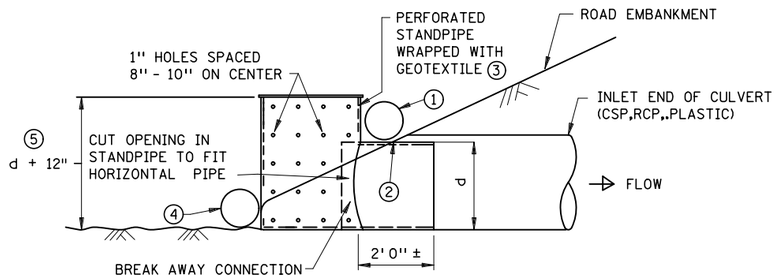


PLAN VIEW



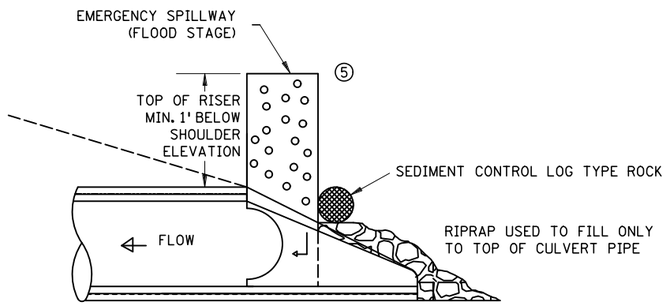
CULVERT STANDPIPE



ELEVATION VIEW OF CULVERT INSTALLATION

CULVERT STANDPIPE INSERT (D-RISER)

d= CULVERT SIZE: 12" - 36"



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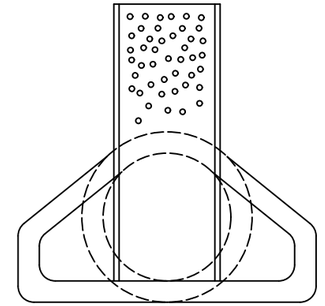
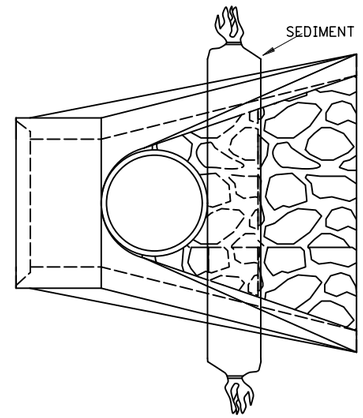


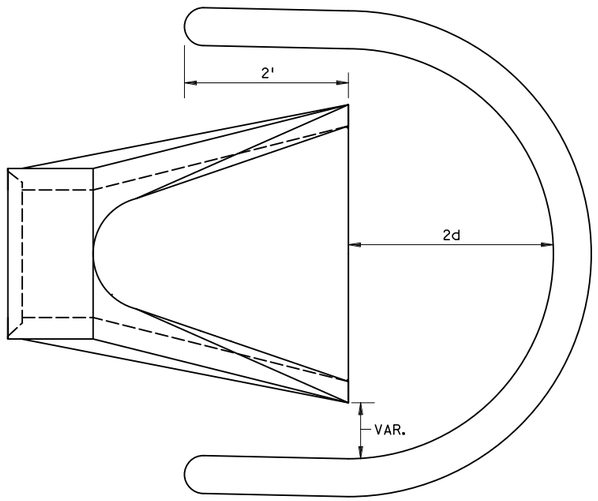
END VIEW



NOTE: SEDIMENT CONTROL LOG TYPE ROCK MAY BE WRAPPED AROUND RISER

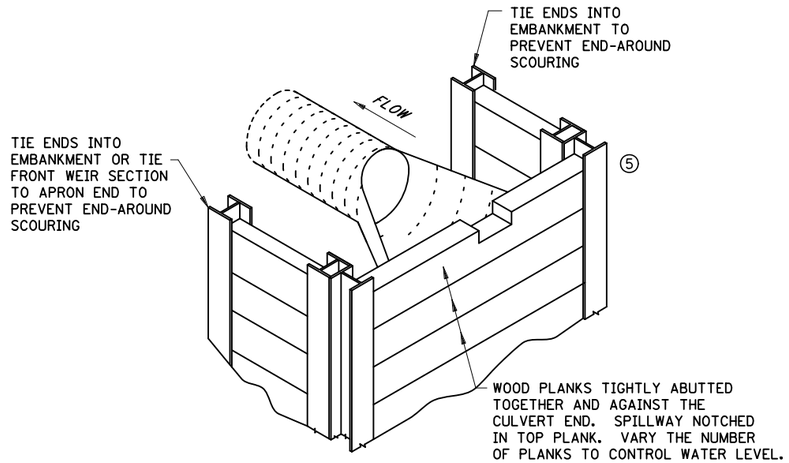
TOP VIEW

CULVERT STANDPIPE INSERT (D-RISER)



SEDIMENT CONTROL LOG WEIR
(COMPOST, WOOD CHIP, OR ROCK)

d = CULVERT SIZE: 12"-36"



WOOD PLANK WEIR

NOTES:

SEE SPECS. 2573, 3891 & 3893.

FOR USE WHEN TEMPORARY PONDING IS NEEDED IN DITCH SECTIONS FOR SEDIMENT CONTROL.

MANUFACTURED ALTERNATIVES LISTED ON MnDOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST.

① ROCK LOG OR SANDBAG TO HOLD STANDPIPE AND ACT AS A SEAL BETWEEN RISER PIPE AND CULVERT.

② PLACE CULVERT APRON AND SLIDE TEMPORARY STANDPIPE INTO CSP OR RCP CULVERT.

③ ALL GEOTEXTILE USED FOR CULVERT PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886 FOR MACHINE SLICED.

④ ROCK LOG OR RIP RAP TO HOLD STANDPIPE AND ACT AS A FILTER BETWEEN RISER PIPE AND CULVERT.

⑤ HEIGHT OVERFLOW NOT TO CAUSE FLOODING OF ROAD OR ADJACENT PROPERTIES.

REVISION:

APPROVED: 2-28-2017

CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.405 | 8 OF 8

APPROVED: 2-28-2017
REVISED:

STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL

CULVERT END CONTROLS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 40 OF 97 SHEETS

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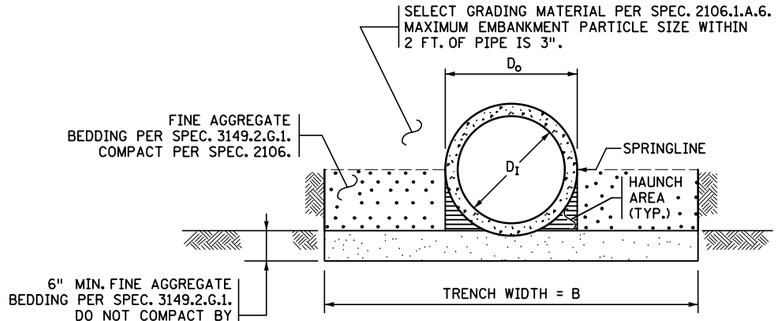
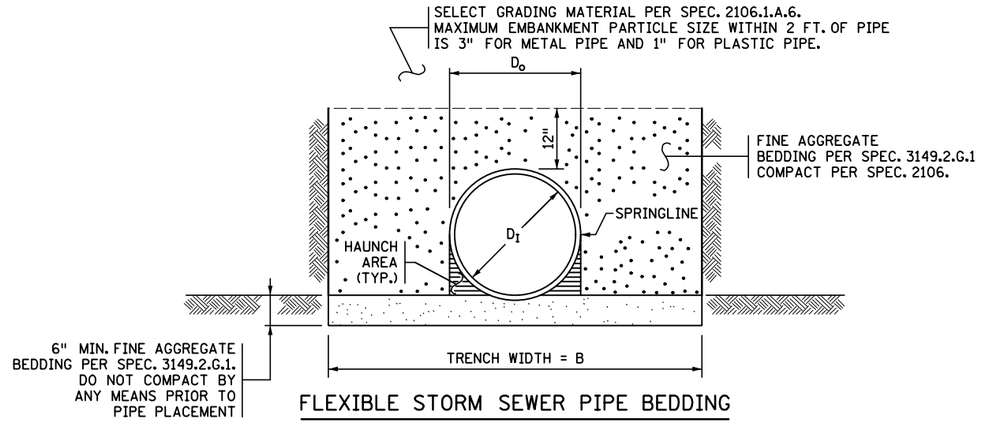


RIGID STORM SEWER PIPE BEDDING

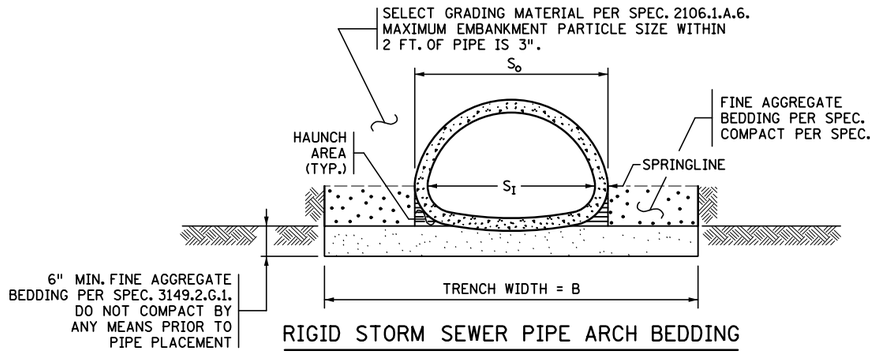
TRENCH BASE WIDTH ①②	
PIPE DIA. D_I OR S_I	TRENCH WIDTH B
< 42"	D_o + 24"
42" TO 54"	1.5 x D_o
> 54"	D_o + 36"

PLASTIC PIPE
WITH H > 10 FT. ①②

PIPE DIA.	TRENCH WIDTH (FEET)
12"	5'-2"
15"	5'-6"
18"	5'-9"
24"	6'-6"
30"	8'-0"
36"	9'-6"
42"	11'-0"
48"	12'-6"



FLEXIBLE STORM SEWER PIPE BEDDING



RIGID STORM SEWER PIPE ARCH BEDDING

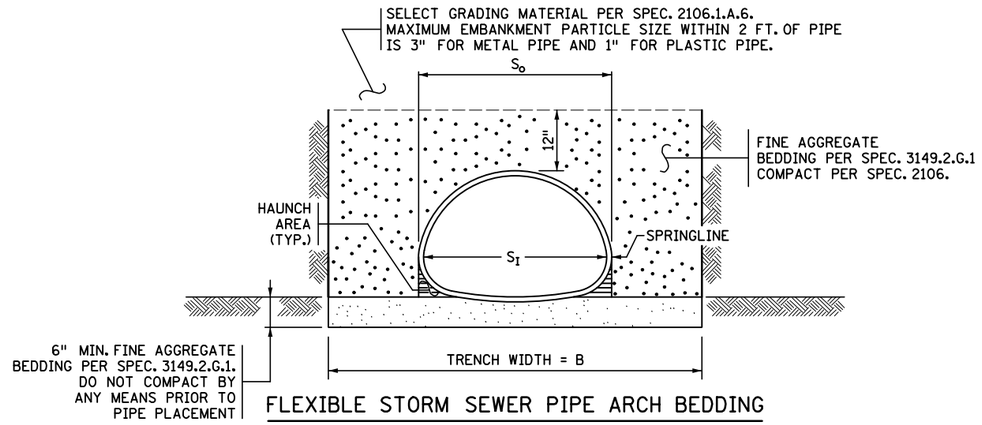
-LEGEND-

D_I = INSIDE DIAMETER OF ROUND PIPE (INCHES).
D_o = OUTSIDE DIAMETER OF ROUND PIPE (INCHES).
S_I = INSIDE SPAN OF PIPE-ARCH (INCHES).
S_o = OUTSIDE SPAN OF PIPE-ARCH (INCHES).
H = FILL COVER HEIGHT OVER PIPE (FEET).

= UNDISTURBED SOIL

= COMPACTED BEDDING

= LOOSE BEDDING, COMPACTED AFTER PIPE PLACEMENT



FLEXIBLE STORM SEWER PIPE ARCH BEDDING

CONSTRUCTION SEQUENCE

1. LOOSELY PLACE 6" OF FINE AGGREGATE BEDDING MATERIAL TO GRADE. DO NOT COMPACT PRIOR TO PIPE PLACEMENT.
2. FOR PIPES WITH BELL, REMOVE MATERIAL IN BELL AREA PRIOR TO PLACEMENT.
3. FURNISH AND INSTALL PIPE TO GRADE.
4. AFTER PLACEMENT OF THE PIPE, PLACE ADDITIONAL FINE AGGREGATE BEDDING AND COMPACT THE FULL LENGTH ON BOTH SIDES OF THE PIPE UNDERNEATH THE HAUNCH AREA BY FIRST SHOVEL SLICING (MANUALLY SHOVE THE BLADE END OF SHOVEL AT AN ANGLE DOWN THE ENTIRE LENGTH OF HAUNCH UNDER THE PIPE). THEN COMPACT THE HAUNCH AT AN ANGLE USING A POWERED MECHANICAL OR PNEUMATIC DEVICE (I.E. POLE TAMPER, JUMPING JACK, OR SIMILAR).
5. COMPACT THE REMAINING MATERIAL OUTSIDE THE HAUNCH AREA TO THE REQUIREMENTS OF SPEC. 2106 ENSURING THAT THE ENTIRE LENGTH OF PIPE IS SUPPORTED UNIFORMLY BY BEDDING.
6. PLACE AND COMPACT BACKFILL EVENLY AND SIMULTANEOUSLY IN 6" LIFTS ON EACH SIDE OF THE PIPE UP TO THE SPRINGLINE FOR RIGID PIPE AND 12" ABOVE THE TOP OF THE PIPE FOR FLEXIBLE PIPE WHEN COMPACTED.
7. COMPLETE REMAINING BACKFILL.

NOTES

EXCAVATE & CONSTRUCT ALL TRENCHES AND SLOPES PER OSHA REQUIREMENTS.

PIPE SIZE IS BASED ON THE NOMINAL INSIDE DIAMETER OR SPAN.

PROTECT ALL PIPE DURING CONSTRUCTION PER SPEC. 2503.

WHEN RIPRAP IS REQUIRED AT THE APRON END, SEE STANDARD PLATE OR PLAN FOR RIPRAP INSTALLATION AND QUANTITIES. FOR APRONS WITHOUT RIPRAP PLACE 6" MIN. FINE AGGREGATE BEDDING UNDER APRONS. USE A TRENCH WIDTH EQUAL TO THE PIPE TRENCH WIDTH.

FINE AGGREGATE BEDDING INCLUDING THE COST OF EXCAVATION, PLACEMENT AND COMPACTION IS INCLUDED IN THE CONTRACT UNIT PRICE OF THE RELEVANT STORM SEWER PAY ITEM.

EXCAVATION AND BACKFILL WITH SELECT GRADING MATERIAL ARE NOT TABULATED SEPARATELY BUT ARE INCLUDED IN THE CONTRACT UNIT PRICE OF THE RELEVANT STORM SEWER PAY ITEM.

RIGID PIPE INCLUDES CONCRETE. FLEXIBLE PIPE INCLUDES METAL, AND PLASTIC MATERIALS SUCH AS CORRUGATED POLYPROPYLENE (PP), CORRUGATED POLYETHYLENE (CP) AND POLYVINYL CHLORIDE (PVC).

① MODIFY TRENCH WIDTH & SLOPE AS NECESSARY TO COMPLY WITH OSHA REQUIREMENTS.

② USE PLASTIC PIPE TABLE FOR TRENCH WIDTHS WHEN FILL HEIGHT IS GREATER THAN 10 FT.

REVISION:

APPROVED: JANUARY 18, 2019
Kim Western
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.442 | 1 OF 1

APPROVED: 01-18-2019
REVISED:

Tom Sorel
STATE DESIGN ENGINEER

STANDARD STORM SEWER BEDDING FOR RIGID AND FLEXIBLE PIPE

SAP 002-622-036, SAP 223-020-006 SHEET NO. 41 OF 97 SHEETS

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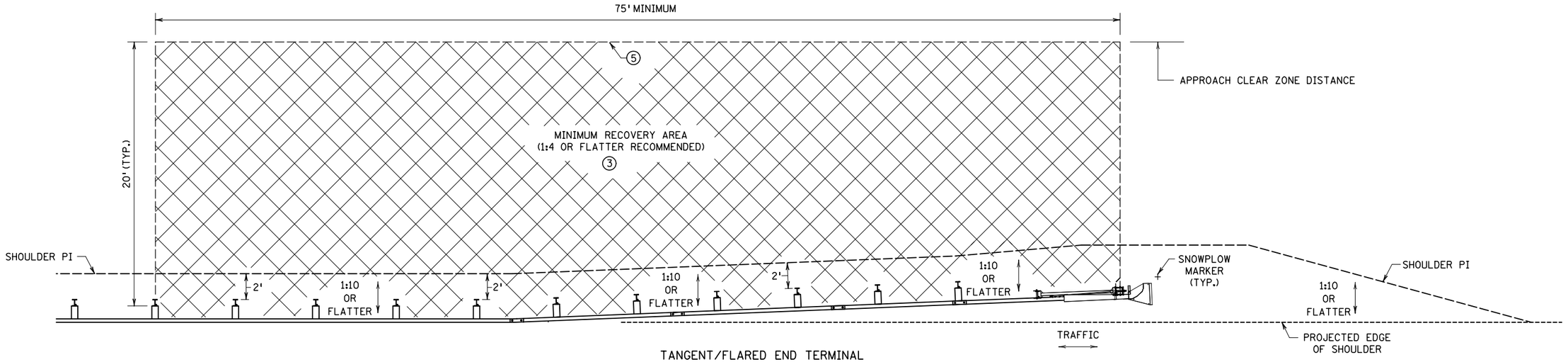
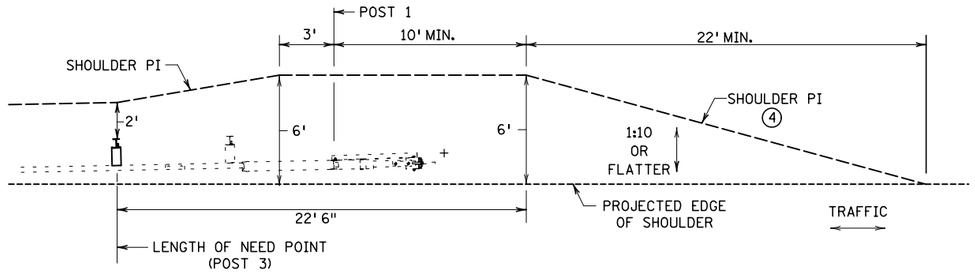
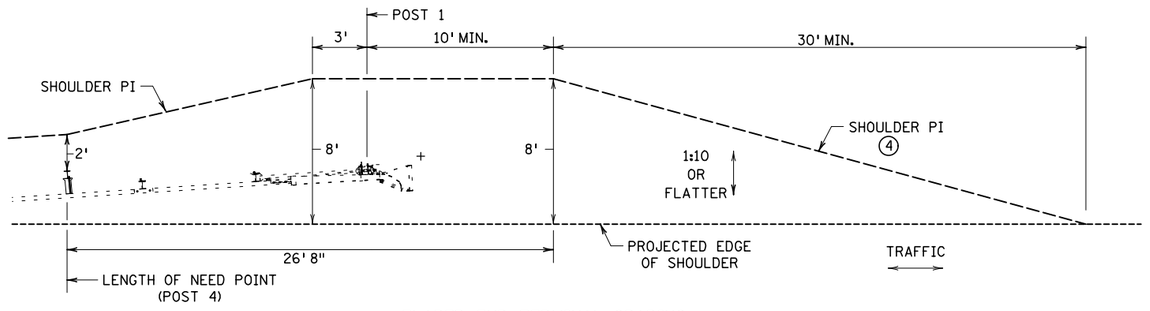


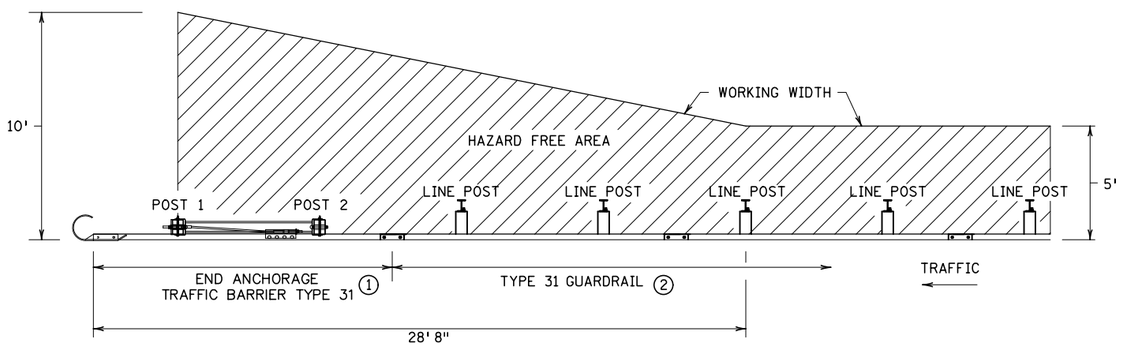
TANGENT/FLARED END TERMINAL
MINIMUM RECOVERY AREA



TANGENT END TERMINAL GRADING
(SOFTSTOP SHOWN)



FLARED END TERMINAL GRADING
(MFLEAT SHOWN)



TYPE 31 END ANCHORAGE
STANDARD POST SPACING
TRAILING END HAZARD FREE AREA

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).

REVISION:

APPROVED: 05-14-2021

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

MINNESOTA
DEPARTMENT OF TRANSPORTATION

THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.601 | 1 OF 4

APPROVED: 05-14-2021
REVISED:

GUARDRAIL / END TREATMENTS MISCELLANEOUS DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 42 OF 97 SHEETS

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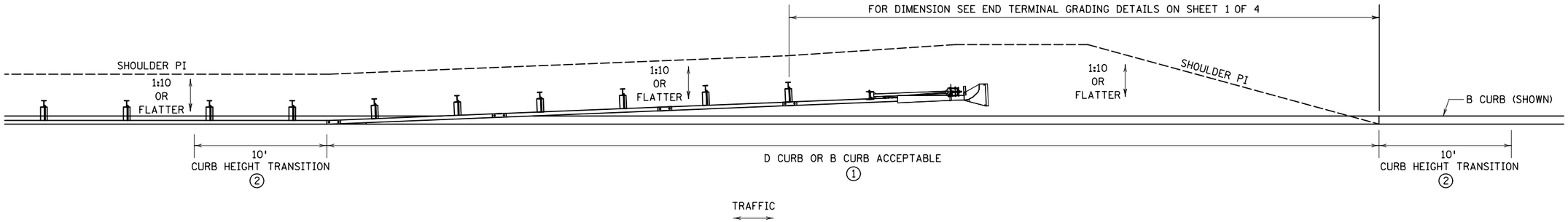
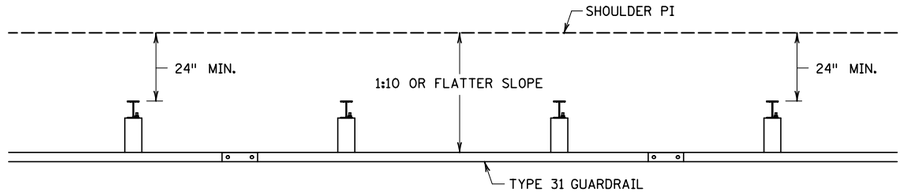
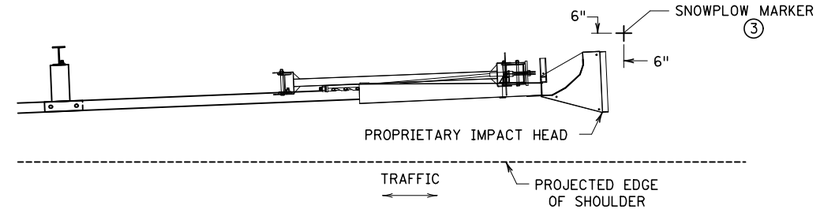
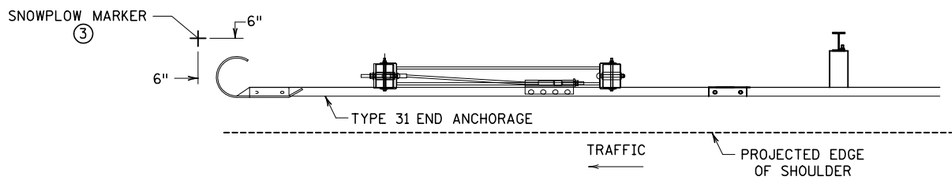


INPLACE CURB AT END TERMINAL

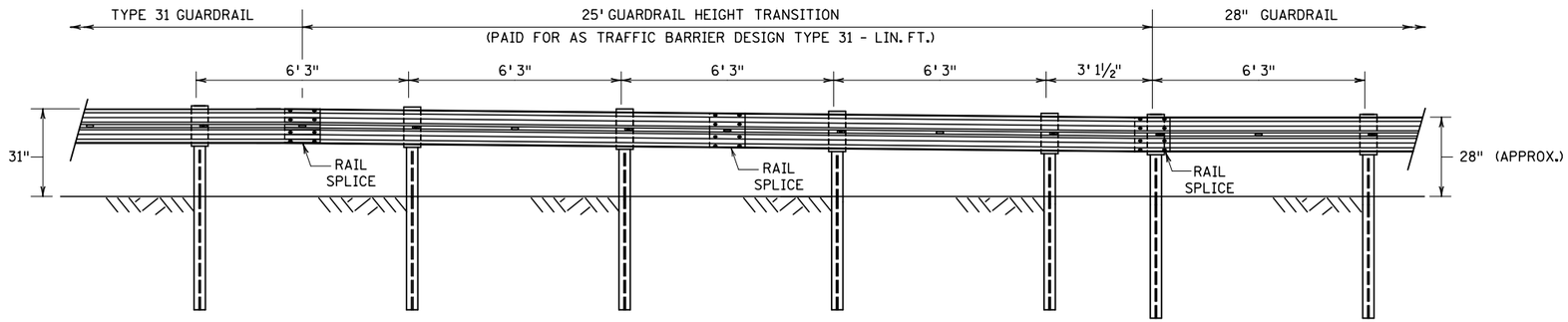


GRADING REQUIREMENTS AT TYPE 31 GUARDRAIL





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.

REVISION:

APPROVED: 05-14-2021

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.601 | 2 OF 4

APPROVED: 05-14-2021
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

GUARDRAIL / END TREATMENTS MISCELLANEOUS DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 43 OF 97 SHEETS

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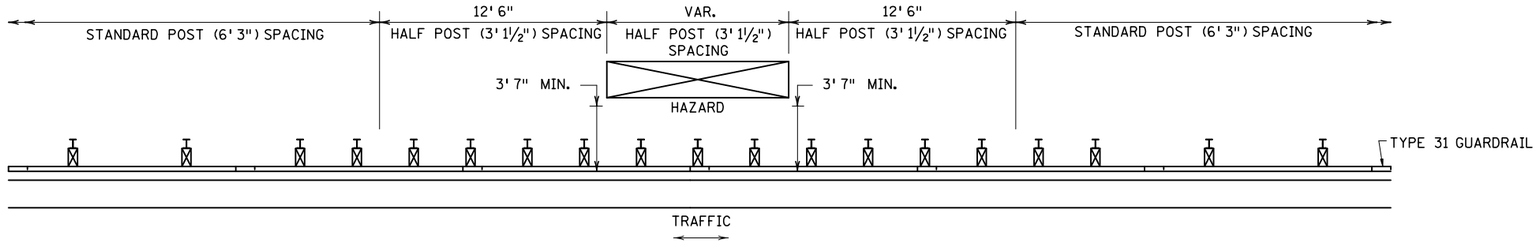
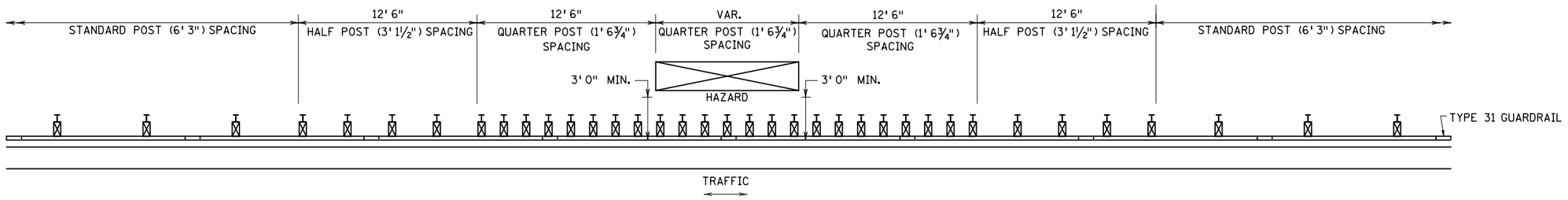
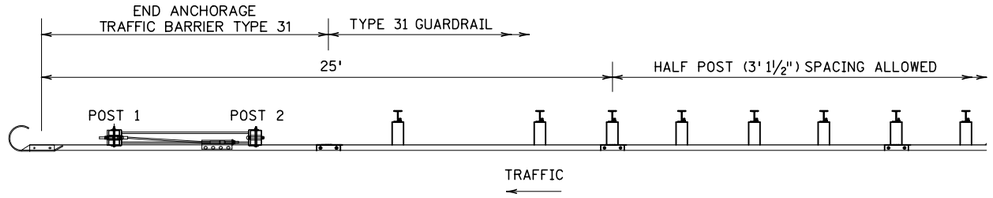


GUARDRAIL STIFFENING GENERAL - HALF POST SPACING

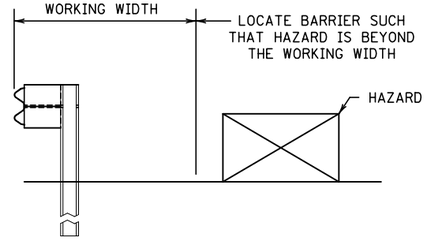


GUARDRAIL STIFFENING GENERAL - QUARTER POST SPACING



GUARDRAIL STIFFENING AT TYPE 31 END ANCHORAGE

ESTIMATED WORKING WIDTH FOR TYPE 31 GUARDRAIL	
STANDARD POST (6' 3") SPACING	5' 0"
STANDARD POST (6' 3") SPACING 9' POST AT 1:2 BREAKLINE	5' 5"
HALF POST (3' 1½") SPACING	3' 7"
QUARTER POST (1' 6¾") SPACING	3' 0"



BARRIER LOCATION / WORKING WIDTH

NOTES:

REGARDLESS OF TRAFFIC DIRECTION, ALL GUARDRAIL STIFFENING SHALL TRANSITION INTO AND OUT OF EACH POST SPACING SEGMENT.

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REVISION:

APPROVED: 05-14-2021

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

MINNESOTA
DEPARTMENT OF TRANSPORTATION

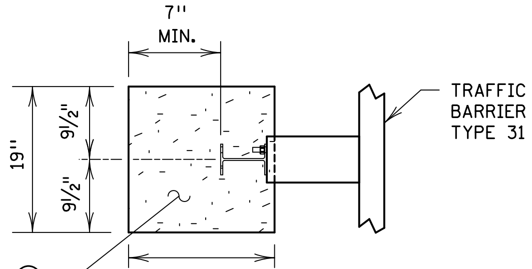
THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.601 | 3 OF 4

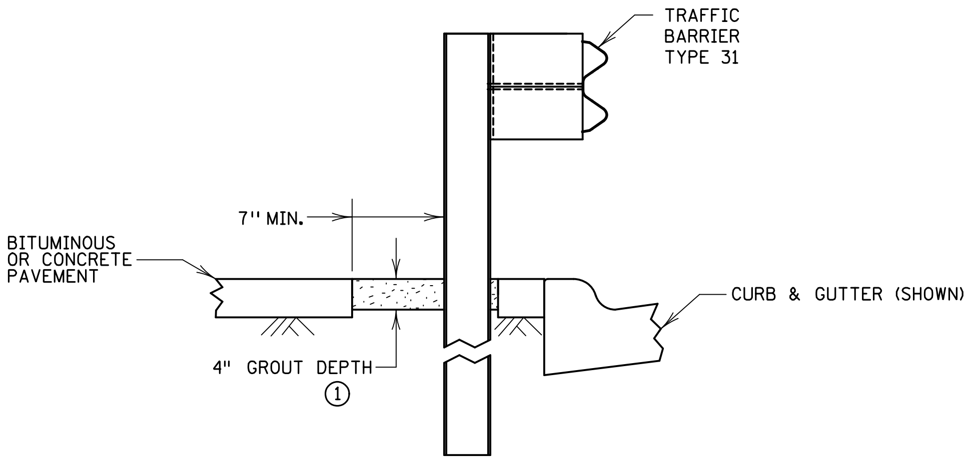
APPROVED: 05-14-2021
REVISED:

GUARDRAIL / END TREATMENTS MISCELLANEOUS DETAILS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 44 OF 97 SHEETS

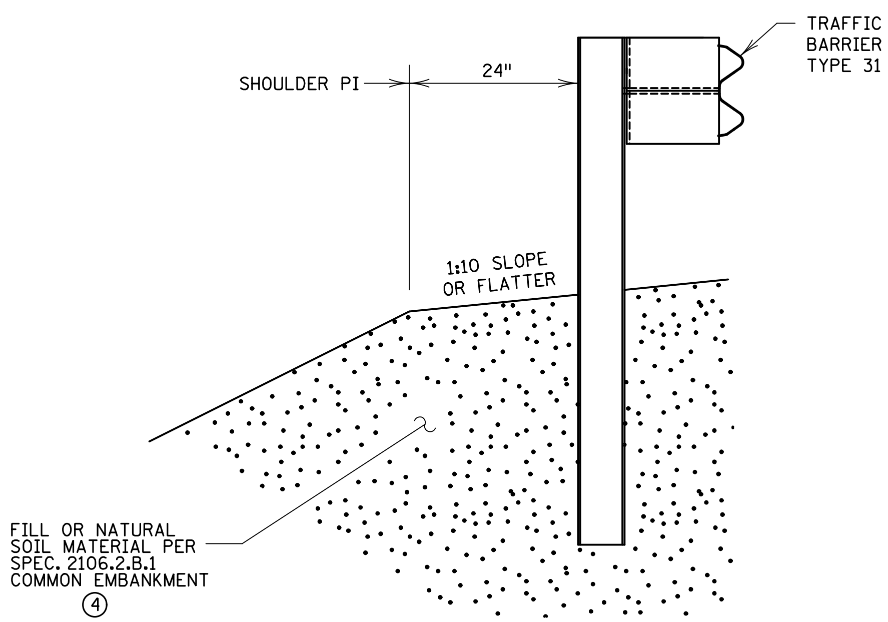


PLAN VIEW

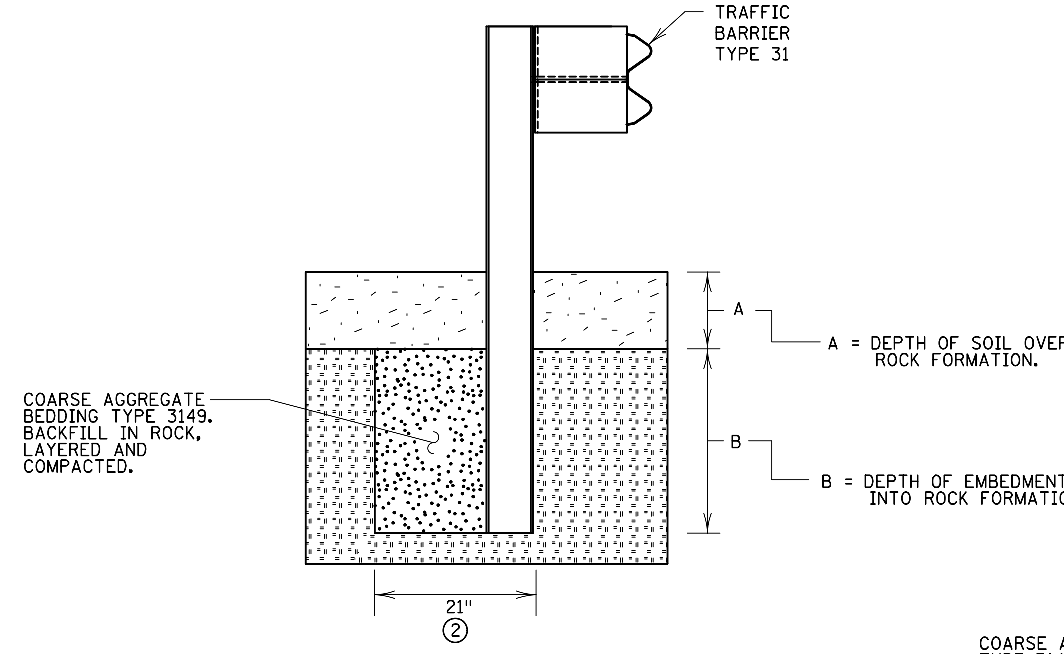


ELEVATION

POST LEAVE-OUT FOR
TRAFFIC BARRIER TYPE 31

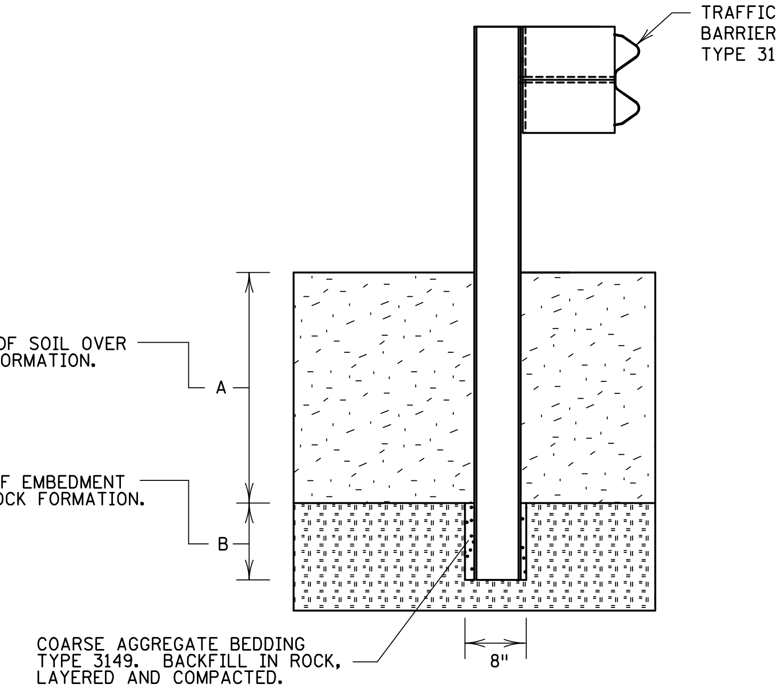


GUARDRAIL POST IN SOIL



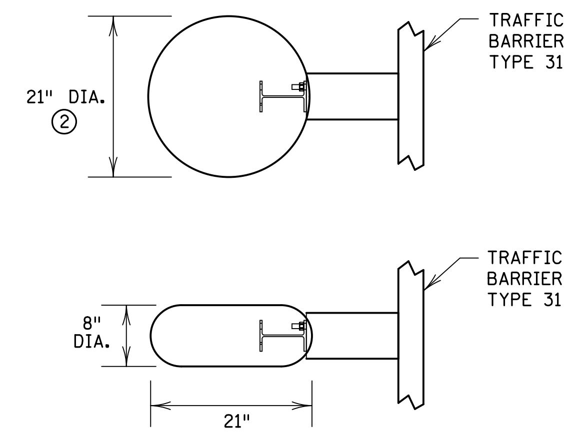
- FOR OVERLYING SOIL DEPTHS (A) RANGING FROM 0" TO 18", THE DEPTH INTO ROCK (B) IS 24".

ELEVATION



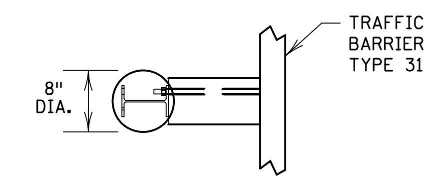
- FOR OVERLYING SOIL DEPTHS (A) RANGING FROM 18" TO FULL POST EMBEDMENT DEPTH. THE REQUIRED DEPTH INTO ROCK (B) IS EQUAL TO FULL POST EMBEDMENT DEPTH MINUS (A). FULL POST EMBEDMENT DEPTH FOR BLOCKED OUT W-BEAM IS APPROXIMATELY 42".

ELEVATION



PLAN VIEWS ③

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

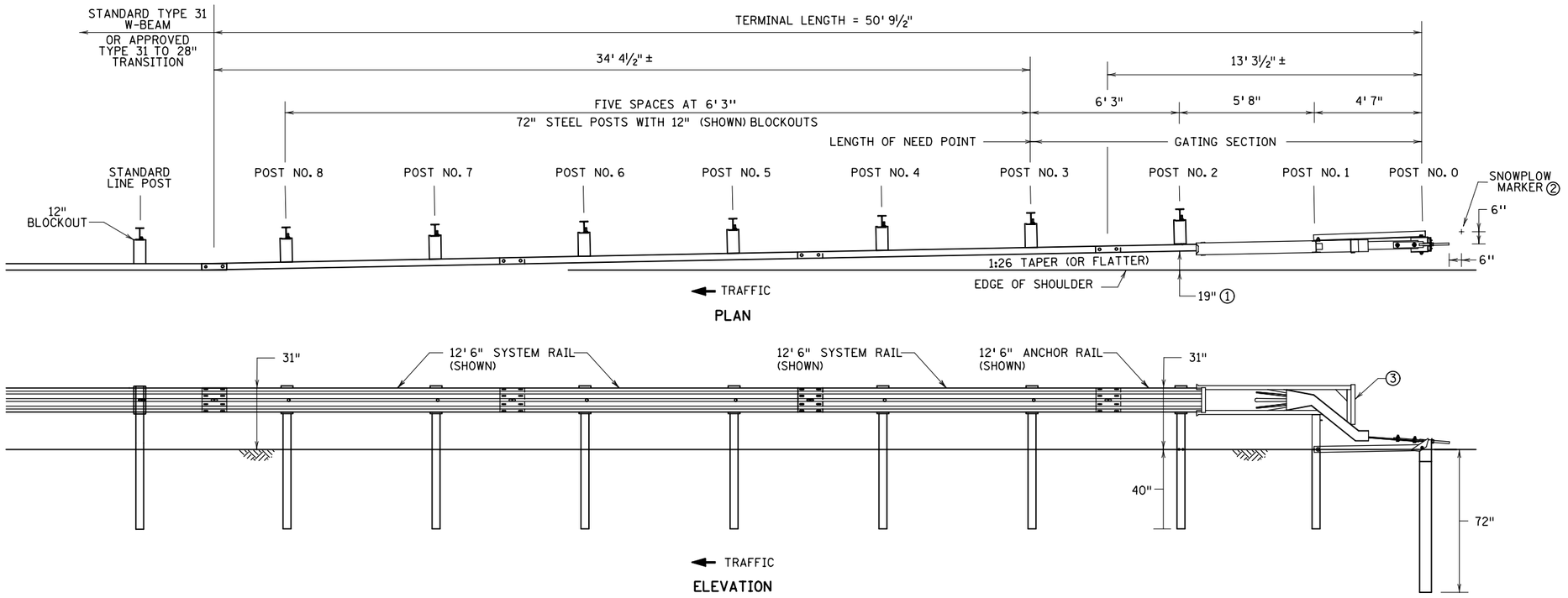


PLAN VIEW

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.



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.

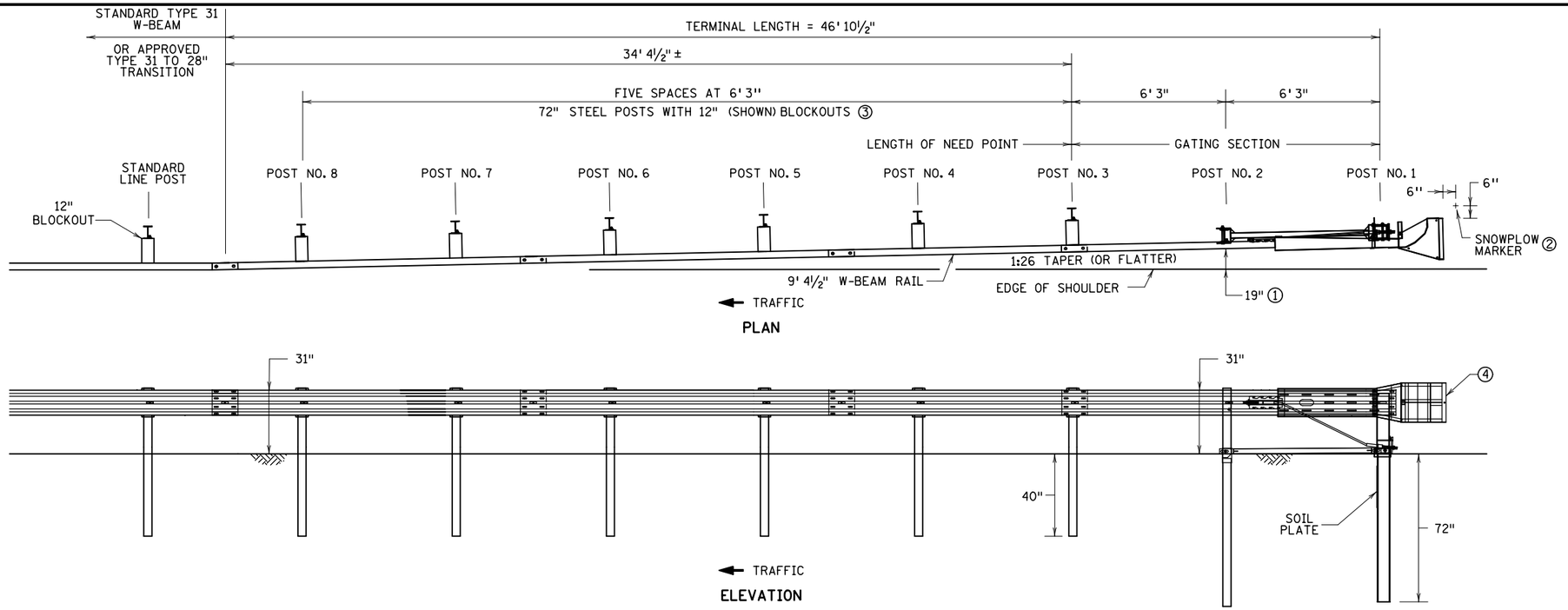
END TERMINAL TO FOLLOW A STRAIGHT TAPER.

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.

REVISION:

APPROVED: 11-02-2021

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.612 | **1 OF 1**

APPROVED: 11-02-2021
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

PROPRIETARY END TERMINAL - TANGENT FOR TYPE 31 GUARDRAIL

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 46 OF 97 SHEETS

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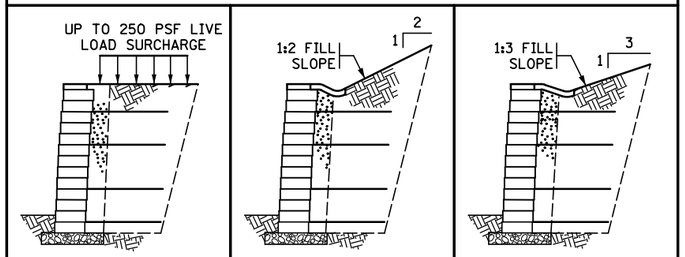
LOADING CASES



250 PSF - LL SURCHARGE	1:2 SLOPED FILL	1:3 SLOPED FILL
CASE 1	CASE 3	CASE 4

CASE 2 IS OMITTED INTENTIONALLY

NOTES TO CONTRACTOR:

APPROVED COMBINATIONS OF MODULAR BLOCK UNIT AND SOIL REINFORCEMENT PRODUCTS LIST WITH MBW REINFORCEMENT CLASS NOTED ARE HELD AND MAINTAINED BY THE FOUNDATIONS UNIT, AND POSTED AT http://www.mrr.dot.state.mn.us/geotechnical/foundations/foundations.asp UNDER FOUNDATIONS UNIT. ONLY APPROVED PRODUCT COMBINATIONS, INCLUDING BLOCK PRODUCED FROM APPROVED SOURCES MEETING DURABILITY AND QUALITY CONTROL REQUIREMENTS, MAY BE USED IN STANDARD DESIGNS.

PROVIDE DETAILED DRAWINGS FOR CONSTRUCTION CONTAINING:

- SUBMIT, WITH THE DETAILED DRAWINGS, A COPY OF Mn/DOT STANDARD SHEETS FOR LOADING CASE(S) USED WITH OPTIONS USED MARKED IN THE TABLE.
- ELEVATION VIEW WITH REINFORCEMENT PLACEMENT REQUIREMENTS, WALL FACING LAYOUT, AND GEOMETRIC INFORMATION. TOP OF WALL MAY EXTEND UP TO 4" ABOVE PLAN TOP OF WALL ELEVATION.
- PLAN VIEW WITH BOTTOM AND TOP OF WALL ALIGNMENT, AND PLAN LIMITS OF WALL ALIGNMENT.
- CROSS SECTIONS DETAILING BATTER, REINFORCEMENT, VERTICAL SPACING, REINFORCEMENT LENGTHS, SUBSURFACE DRAINAGE, SURFACE DRAINAGE, AND WATER RUNOFF COLLECTION ABOVE WALL.
- REINFORCEMENT LAYOUT: REINFORCEMENT SHALL BE PLACED AT 100% COVERAGE RATIO. REINFORCEMENT ELEVATIONS SHALL BE CONSISTENT ACROSS LENGTH OF WALL STRUCTURE.
- NOTE BLOCK, REINFORCEMENT, AND FILL PLACEMENT METHODS AND REQUIREMENTS.
- DETAIL ALL WALL FILL PENETRATIONS AND WALL FACE PENETRATIONS. DETAIL REINFORCEMENT AND/OR WALL FACING UNIT PLACEMENT AROUND PENETRATIONS.
- DETAILS THAT ARE SPECIFIC TO VENDOR PRODUCTS AND THEIR INTERACTION WITH OTHER PROJECT COMPONENTS.
- LIST INFORMATION ON APPROVED COMBINATION OF MBW UNIT AND GEOSYNTHETIC REINFORCEMENT, INCLUDING Mn/DOT CLASSIFICATION CODE, NOMINAL BLOCK WIDTH, PROPERTIES FOR FIELD IDENTIFICATION, AND INSTALLATION INSTRUCTIONS.
- DETAILS OF CAP UNITS AND INSTALLATION/FASTENING INSTRUCTIONS FOR THE CAPS. CAP UNITS SHALL BE SET IN A BED OF ADHESIVE DESIGNED TO WITHSTAND MOISTURE AND TEMPERATURE EXTREMES, REMAIN FLEXIBLE, AND SHALL BE SPECIFICALLY FORMULATED FOR BONDING MASONRY TO MASONRY.
- CERTIFICATION BY PROFESSIONAL ENGINEER THAT THE CONSTRUCTION LAYOUT MEETS THE REQUIREMENTS OF PLANS AND Mn/DOT MSEW STANDARDS. DEVIATION FROM STANDARD DESIGN TABLES ARE PERMITTED BY VALUE ENGINEERING SUBMITTAL ONLY ON PROJECTS WITH OVER 5000 SQ. FT. OF WALL.

DEFINITION OF TERMS

MBW	=	MODULAR BLOCK WALL
LL	=	LIVE LOAD
C.I.P.	=	CAST-IN-PLACE
H	=	WALL HEIGHT
S	=	VERTICAL REINFORCEMENT SPACING
REINFORCEMENT COVERAGE RATIO	=	WIDTH OF SOIL REINFORCEMENTS TO HORIZONTAL SPACING (100% COVERAGE RATIO REQUIRED)

DESIGN CRITERIA

DESIGN CRITERIA FOLLOWS THE AASHTO SPECIFICATION FOR HIGHWAY BRIDGES (16TH EDITION WITH 1998 INTERIMS) EXCEPT FOR THE DEVIATIONS NOTED BELOW. DESIGN CRITERIA ARE IN ACCORDANCE WITH Mn/DOT POLICY, AS RECORDED IN THE Mn/DOT ROAD DESIGN MANUAL.

A. THE MINIMUM REINFORCEMENT LENGTH IS 4 FT. OR 0.7H, WHICHEVER IS GREATER.
B. THE REINFORCEMENT FILL FRICTION ANGLE IS 35°.
C. THE ALLOWABLE CONNECTION LOAD, AT A GIVEN NORMAL LOAD, IS COMPUTED AS THE ULTIMATE CONNECTION STRENGTH REDUCED BY A SAFETY FACTOR EQUAL TO 2.0.
D. THE LATERAL EARTH PRESSURE COMPUTATION FOR EXTERNAL STABILITY CALCULATIONS USES AN INTERFACE ANGLE SET EQUAL TO THE RETAINED BACKFILL ANGLE.
E. THE LATERAL EARTH PRESSURE COMPUTATION FOR INTERNAL STABILITY CALCULATIONS INCORPORATES THE EFFECTS OF WALL FACE BATTER.

MINIMUM FACTORS OF SAFETY:
OVERTURNING: 2.0
SLIDING: 1.5
ECCENTRICITY: $e < L/6$
BEARING CAPACITY: 2.5
DEEP SEATED STABILITY: 1.3

BEARING:
A. SEE FOUNDATION REPORT FOR ALLOWABLE SOIL BEARING PRESSURE.
B. CASES 1 AND 4 - ALLOWABLE SOIL BEARING CAPACITY (ULTIMATE BEARING CAPACITY REDUCED BY A SAFETY FACTOR OF 2.5) OF 2000 PSF IS REQUIRED FOR WALLS UP TO 10 FT. IN HEIGHT. FOR WALLS GREATER THAN 10 FT. IN HEIGHT, THE REQUIRED ALLOWABLE BEARING CAPACITY IS EQUAL TO: 2000 PSF + (H-10)(625 PSF) WITH H IN FEET.
C. CASE 3 - ALLOWABLE SOIL BEARING CAPACITY (ULTIMATE BEARING CAPACITY REDUCED BY A SAFETY FACTOR OF 2.5) OF 2500 PSF IS REQUIRED FOR WALLS UP TO 10 FT. IN HEIGHT. FOR WALLS GREATER THAN 10 FT. IN HEIGHT, THE REQUIRED ALLOWABLE BEARING CAPACITY IS EQUAL TO: 2500 PSF + (H-10)(850 PSF) WITH H IN FEET.

REINFORCED WALL FILL CHARACTERISTICS:
A. SELECT GRANULAR MATERIAL MODIFIED FOLLOWING SPEC. 3149.2B.2. MODIFICATION: SELECT GRANULAR MATERIAL MODIFIED, FOR SPECIAL USE IN EMBANKMENT OR BACKFILL CONSTRUCTION OR OTHER SPECIFIED PURPOSES, MAY BE ANY PIT-RUN OR CRUSHER-RUN MATERIAL THAT IS GRADED FROM COARSE TO FINE, SUCH THAT 100% OF THE MATERIAL MUST PASS THE 2" SIEVE, AND THAT THE RATIO OF THE PORTION PASSING THE #200 SIEVE DIVIDED BY THE PORTION PASSING THE 1" SIEVE MAY NOT EXCEED 10% BY MASS (THAT IS: #200/1" RATIO)
B. INTERNAL ANGLE OF FRICTION (Φ_r) = 35°
C. COHESION (C) = 0
D. MOIST UNIT WEIGHT (γ_r) = 125 PSF

COARSE FILTER AGGREGATE CHARACTERISTICS:
A. COARSE FILTER AGGREGATE TO MEET SPEC. 3149.2H. INCIDENTAL, NO DIRECT PAYMENT WILL BE MADE.

RETAINED BACKFILL CHARACTERISTICS:
A. INTERNAL ANGLE OF FRICTION (Φ_b) = 30°
B. COHESION (C) = 0
C. MOIST UNIT WEIGHT (γ_b) = 120 PSF

FOUNDATION SOILS CHARACTERISTICS:
A. INTERNAL ANGLE OF FRICTION (Φ_f) = 30°
B. COHESION (C) = 0
C. UNIT WEIGHT (γ_f) = 120 PSF

SAMPLE ESTIMATED QUANTITIES FOR MODULAR BLOCK WALLS ③

		UNIT	QUANTITY
	STRUCTURE EXCAVATION CLASS ___	CU. YD.	
	SELECT GRANULAR MATERIAL MODIFIED (CV)	CU. YD.	
	STRUCTURAL CONCRETE (1A43)	CU. YD.	
①②	MODULAR BLOCK RETAINING WALL	SQ. FT.	
	TYPE I GEOTEXTILE FABRIC	SQ. YD.	

① VERTICAL FACE AREA OF MODULAR BLOCK AS MEASURED FROM PLAN TOP OF WALL TO 2 FT. BELOW FINISHED GRADE AT BOTTOM OF WALL.

② PAY ITEM FOR MBW WALLS SHALL BE 2411.

③ REFER TO TABULATIONS / ESTIMATE SHEETS FOR QUANTITIES.

NOTES TO DESIGNER:

HEIGHT AND LOCATION RESTRICTIONS FOR ISSUES SUCH AS FREEZE-THAW DURABILITY ARE GOVERNED BY APPROPRIATE TECHNICAL MEMORANDUMS. CURRENT GOVERNING TECH. MEMO. NO.: 14-03-MAT-01.

IN ADDITION TO THE STANDARD SHEETS, PLAN AND FRONT ELEVATION VIEWS OF THE MODULAR BLOCK RETAINING WALLS SHALL BE INCLUDED IN THE PLANS. THE PLAN VIEW MUST SHOW ALIGNMENT BASELINE, LIMITS OF BOTTOM OF WALL ALIGNMENT, AND LIMITS OF TOP OF WALL ALIGNMENT AS ALIGNMENTS VARY WITH BATTER OF WALL SYSTEM ACTUALLY SUPPLIED. THE FRONT ELEVATION MUST IDENTIFY BOTTOM AND TOP OF WALL ELEVATIONS, EXISTING GRADES, AND FINISHED GRADES.

IF THE WALL IS CURVED, THE RADIUS AT THE BOTTOM AND THE TOP OF EACH WALL SEGMENT AND THE P.C. AND P.T. STATION POINTS OFF OF BASELINE AND LIMITS OF BOTTOM AND TOP OF WALL ALIGNMENT MUST BE SHOWN.

REFERENCE STANDARD PLATES AND PROVIDE DETAILS FOR TRAFFIC BARRIERS, CURB AND GUTTER, HANDRAILS AND FENCING AS REQUIRED BY PROJECT CONDITIONS. SEE AASHTO AND Mn/DOT DESIGN MANUALS, STANDARD PLATES AND DETAILS FOR REQUIREMENTS.

SURFACE DRAINAGE PATTERNS SHALL BE SHOWN IN THE PLAN VIEW. PROVIDE DIMENSIONS FOR WIDTH AND DEPTH OF THE DRAINAGE SWALE AS WELL AS THE TYPE OF IMPERVIOUS LINER MATERIAL. SURFACE WATER RUNOFF SHOULD BE COLLECTED ABOVE AND DIVERTED AROUND WALL FACE.

DETAIL LINES AND GRADES OF THE INTERNAL DRAINAGE COLLECTION PIPE. DETAIL OR NOTE THE DESTINATION OF INTERNAL WALL DRAINS AS WELL AS THE METHOD OF TERMINATION (DAYLIGHT END OF PIPE OR CONNECTION INTO HYDRAULIC STRUCTURE). THE SPACING FOR DRAIN PIPE OUTLET SHALL NOT BE MORE THAN 250 FT.

SOFT SOILS AND/OR HIGH WATER CONDITIONS (DEFINED AS GROUNDWATER WITHIN A DEPTH EQUAL TO THE WALL HEIGHT H) MAY NOT BE SUITABLE FOR APPLICATION OF STANDARD DESIGNS AND REQUIRE SPECIAL CONSIDERATION BY THE FOUNDATIONS UNIT.

STANDARD DESIGN CHARTS ARE NOT APPLICABLE TO:
- PROJECT/SITES WHERE FOUNDATION SOILS SHEAR STRENGTH AND/OR BEARING CAPACITY DO NOT MEET OR EXCEED VALUES USED IN THE DEVELOPMENT OF STANDARD DESIGN CHARTS.
- PROJECTS WITH A LARGE QUANTITY OF FACE AREA WHERE PROJECT SPECIFIC DESIGNS ARE RECOMMENDED, AS DEFINED IN Mn/DOT ROAD DESIGN MANUAL.
- WHERE SLOPES IN FRONT OF WALL ARE STEEPER THAN 1:3.
- WHERE MAXIMUM WALL HEIGHT EXCEEDS 12 FT.
- WHERE WALLS ARE TIERED.
- WALLS WITH NOISE WALLS.

IF USING CONCRETE RAILING, INCLUDE STANDARD BRIDGE DETAIL "CONCRETE RAILING (TYPE F)" IN PLAN SET.

PROVIDE PROJECT SPECIFIC AESTHETIC REQUIREMENTS INCLUDING COLOR AND FASCIA SURFACING IN THE SPECIAL PROVISIONS.

CHAPTER 9 OF THE Mn/DOT "ROAD DESIGN MANUAL" CONTAINS GUIDELINES, TRAFFIC SAFETY AND OTHER ASPECTS.

GENERAL NOTES:

UTILITIES:

EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING FACILITIES AND SHALL EXERCISE CARE IN ADJACENT CONSTRUCTION.

EXCAVATION AND EARTHWORK:

ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO Mn/DOT 2451.

CAST-IN-PLACE CONCRETE:

ALL CONCRETE SHALL CONFORM TO Mn/DOT 2461, EXCEPT AS NOTED.

CONSTRUCTION:

CONSTRUCTION SHALL BE IN ACCORDANCE WITH Mn/DOT 2411, EXCEPT AS NOTED.

GEOMETRICS AND GRADES:

DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL.

THE FILL SLOPE CONVENTION OF 1 VERTICAL TO HORIZONTAL IS USED IN THIS PLAN.

COMPACTION REQUIREMENTS:

COMPACT REINFORCED WALL FILL IN ACCORDANCE WITH Mn/DOT SPEC. 2105.3F1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.

REVISION:

APPROVED: DECEMBER 1, 2014

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.640 | 1 OF 1

APPROVED: 12-1-2014
REVISED:

STATE DESIGN ENGINEER

MODULAR BLOCK RETAINING WALL

GENERAL NOTES

SAP 002-622-036, SAP 223-020-006 SHEET NO. 47 OF 97 SHEETS

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MODULAR BLOCK WALL REINFORCEMENT LAYOUT

CASE 3 - 1:2 FILL SLOPE

MBW REINFORCEMENT CLASS	STRENGTH OF SOIL REINF. (PLF)		① MINIMUM REINFORCEMENT LENGTH, L (FT.)	MAXIMUM WALL HEIGHT (FT.)	② NOMINAL BLOCK WIDTH (IN.)	WALL BATTER RANGE (DEGREES)		③ MAXIMUM UNREINFORCED WALL HT, A (IN.)	ZONE 1		ZONE 2		ZONE 3	
	LG. TERM (T_{al})	DESIGN (T_a)				≥	<		H1 (FT.)	$S1_{MAX}$ (IN.)	H2 (FT.)	$S2_{MAX}$ (IN.)	H3 (FT.)	$S3_{MAX}$ (IN.)
MBW-700	1050	700	0.7 H	12.0	12	0	3	24	4.9	24	5.6	16	1.5	8
						3	7	24	5.9	24	6.1	16		
						7	10	24	9.2	24	2.8	16		
						10	15	24	9.8	24	2.2	16		
					21	0	3	24	4.9	24	5.6	16	1.5	8
						3	7	24	5.9	24	6.1	16		
						7	10	32	4.6	32	5.2	24	2.2	16
						10	15	32	7.2	32	4.3	24	0.5	16
MBW-1050	1575	1050	0.7 H	12.0	12	0	3	24	10.8	24	1.2	18		
						3	7	24	12.0	24				
						7	10	24	12.0	24				
						10	15	24	12.0	24				
					21	0	3	32	6.9	32	3.9	24	1.2	18
						3	7	36	5.6	42	3.3	32	3.1	24
						7	10	42	6.6	42	3.9	32	1.5	24
						10	15	42	8.5	42	3.0	32	0.5	24
MBW-1400	2100	1400	0.7 H	12.0	12	0	3	24	12.0	24				
						3	7	24	12.0	24				
						7	10	24	12.0	24				
						10	15	24	12.0	24				
					21	0	3	42	8.9	42	3.1	32		
						3	7	42	10.8	42	1.2	32		
						7	10	42	12.0	42				
						10	15	42	11.5	42	0.5	32		

NOTES TO CONTRACTOR:

① OR 4 FT. MINIMUM, WHICHEVER IS GREATER.

② WIDTH - AS MEASURED FROM FRONT TO BACK FACE OF BLOCK UNIT.

③ MAXIMUM DISTANCE FROM TOP OF WALL TO FIRST REINFORCEMENT LAYER. UNREINFORCED WALLS ARE NOT INCLUDED IN THIS STANDARD BUT MAY BE CONSTRUCTED UP TO AT LEAST THE HEIGHT GIVEN IN THE TABLE FOR A GIVEN NOMINAL BLOCK WIDTH AND THE SPECIFIED FILL MATERIALS CONTAINED IN THIS STANDARD.

④ PAY LIMITS OF STRUCTURAL EXCAVATION. ACTUAL EXCAVATION SLOPE IS DETERMINED BY OSHA REGULATIONS AND IN-SITU SOILS; EXCAVATION BEYOND "LIMITS OF STRUCTURAL EXCAVATION" AT CONTRACTOR'S EXPENSE.

⑤ THE WRAP LENGTH FOR GEOTEXTILE FABRIC SHALL NOT BE MORE THAN 6".

⑥ INSPECT EXCAVATION SLOPES FOR ACTIVE SEEPAGE AND PLACE ADDITIONAL DRAINS WHERE SEEPAGE OCCURS AS DIRECTED BY THE ENGINEER.

⑦ PLACE DRAIN AT BOTTOM OF REINFORCED SOIL IF PIPE CAN BE SLOPED TO OUTLET. DO NOT OUTLET ONTO A SIDEWALK.

⑧ IF PIPE AT THIS ELEVATION CANNOT BE SLOPED TO DRAIN, OMIT DRAIN AND USE "CONCRETE PAD WITHOUT DRAIN" DETAIL.

⑨ 4" THERMOPLASTIC PERFORATED PIPE, SPEC. 3245, WRAP WITH TYPE I GEOTEXTILE, SPEC. 3733 (TYP.) INSTALLATION AS PER SPEC. 2502, WITH PRECAST CONCRETE HEAD WALL AT OUTLET.

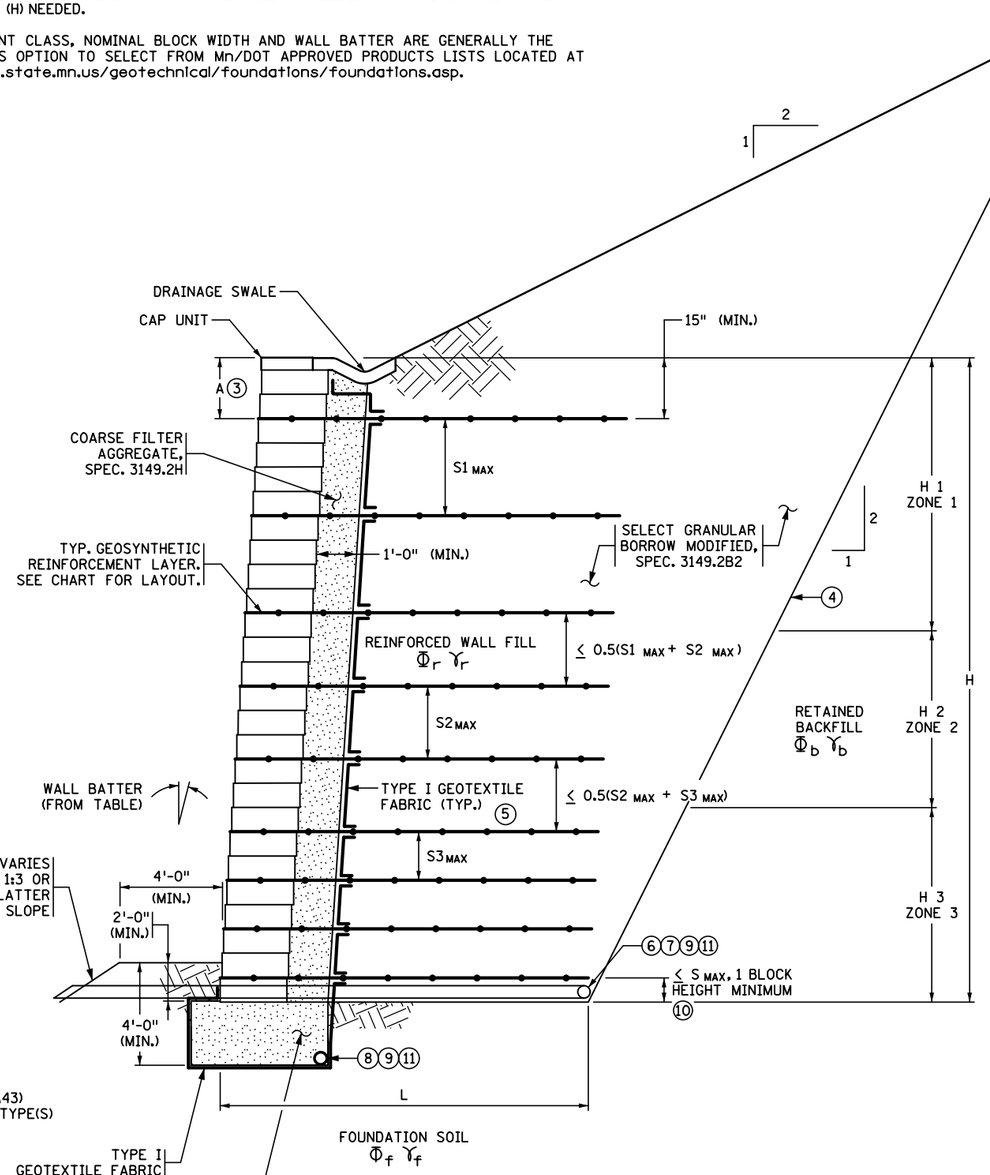
⑩ S_{MAX} = 0.5 $S1_{MAX}$ IF THE WALL HEIGHT IS WITHIN ZONE 1.
S_{MAX} = 0.5 $S2_{MAX}$ IF THE WALL HEIGHT IS WITHIN ZONE 2.
S_{MAX} = 0.5 $S3_{MAX}$ IF THE WALL HEIGHT IS WITHIN ZONE 3.

⑪ THE REINFORCED WALL FILL DRAIN MAY BE CONNECTED INTO FOOTING DRAIN, INSTEAD OF OUT LETTING THROUGH THE WALL, IF CAPACITY IS ADEQUATE TO TRANSMIT THE FLOW.

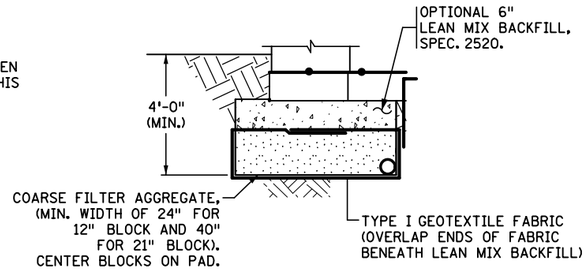
INSTRUCTIONS TO CONTRACTOR:

USE AS MANY ZONES AS WALL HEIGHT REQUIRES, STARTING WITH ZONE 1 AND ADDING ADDITIONAL ZONES TO THE BOTTOM OF THE WALL AS NEEDED TO MAKE UP THE TOTAL WALL HEIGHT (H) NEEDED.

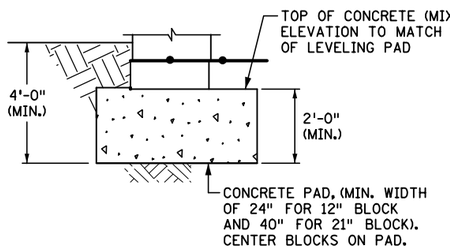
REINFORCEMENT CLASS, NOMINAL BLOCK WIDTH AND WALL BATTER ARE GENERALLY THE CONTRACTOR'S OPTION TO SELECT FROM Mn/DOT APPROVED PRODUCTS LISTS LOCATED AT www.mrr.dot.state.mn.us/geotechnical/foundations/foundations.asp.



TYPICAL SECTION
CASE 3
NOT TO SCALE



OPTIONAL CONCRETE LEVELING PAD
NOT TO SCALE



CONCRETE PAD WITHOUT DRAIN
NOT TO SCALE

REVISION:

APPROVED: 8-6-2014

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.643 | 1 OF 1

APPROVED: 8-6-2014
REVISED:

STATE DESIGN ENGINEER

MODULAR BLOCK RETAINING WALL

SOIL REINFORCEMENT FOR 1:2 FILL SLOPE, CASE 3

SAP 002-622-036, SAP 223-020-006 SHEET NO. 48 OF 97 SHEETS

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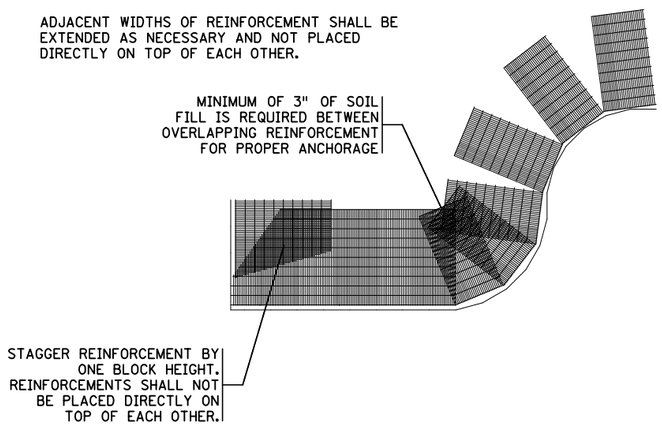
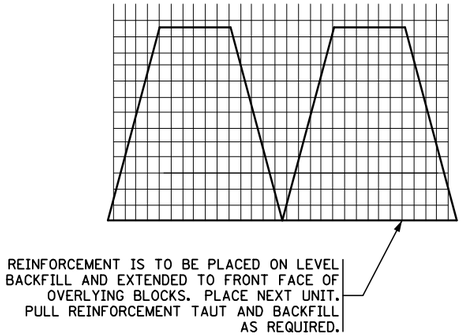
NOTES:

CORRECT ORIENTATION OF GEOSYNTHETIC TO OBTAIN PROPER STRENGTH SHALL BE DETAILED ON CONTRACTOR DRAWINGS.

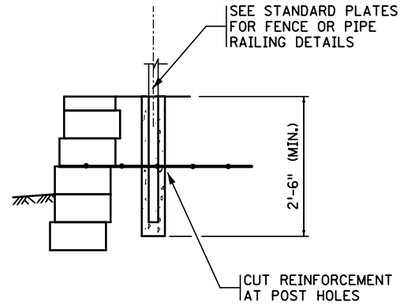
ADJACENT WIDTHS OF REINFORCEMENT SHALL BE EXTENDED AS NECESSARY AND NOT PLACED DIRECTLY ON TOP OF EACH OTHER.



REINFORCEMENT PLACEMENT AROUND CURVES AND CORNERS

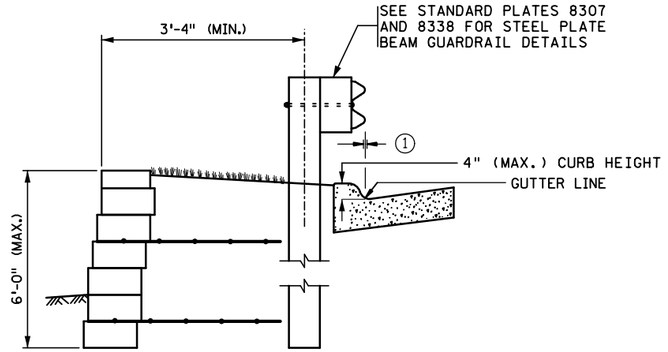


REINFORCEMENT PLACEMENT BETWEEN BLOCK UNITS

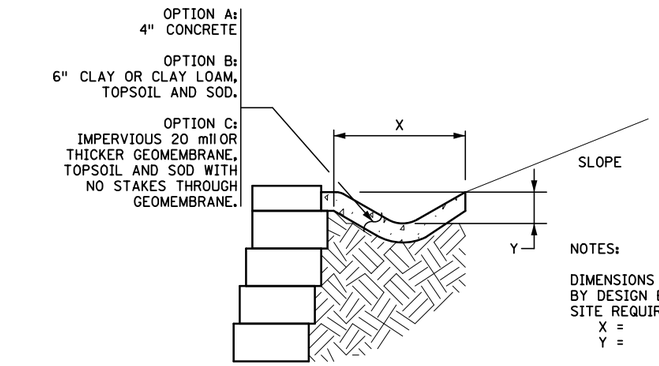


POST DETAIL

TYPICAL HANDRAIL AND/OR FENCE POST



STEEL PLATE BEAM GUARDRAIL DETAIL 1

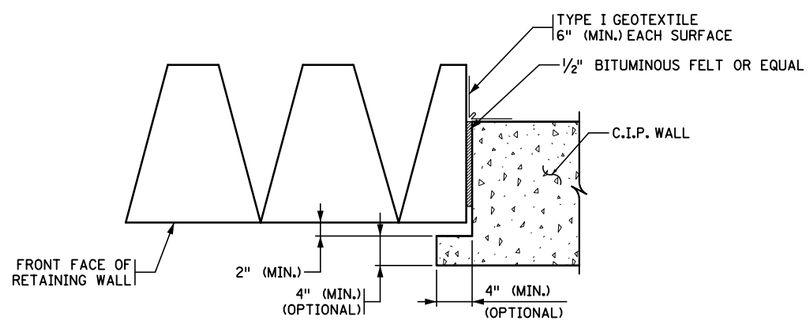


NOTES:

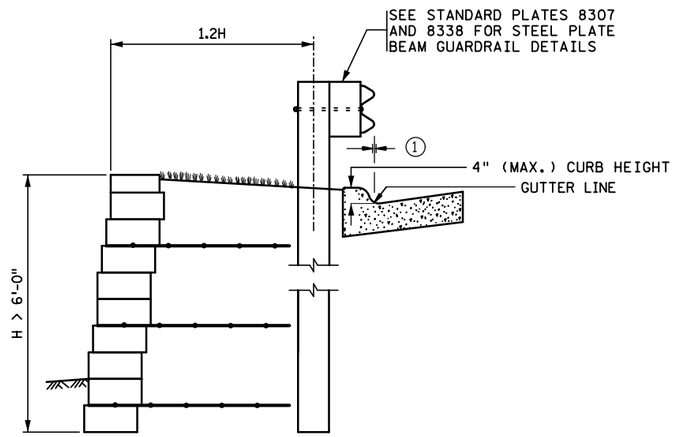
DIMENSIONS TO BE DETERMINED BY DESIGN ENGINEER BASED ON SITE REQUIREMENTS.
X =
Y =

SEE PLAN VIEW FOR SURFACE DRAINAGE PATTERNS.

TYPICAL DRAIN SWALE DETAIL



CONNECTION DETAIL AT JUNCTURE OF MSEW AND C.I.P. STRUCTURE



STEEL PLATE BEAM GUARDRAIL DETAIL 2

(AADT SHALL BE LESS THAN 5000)
STEEL PLATE BEAM GUARDRAIL SHOWN.

NOTES:

(1) USE CAUTION WHEN PLACING CURB WITH GUARDRAIL. CURBS ADVERSELY AFFECT THE PERFORMANCE OF THE GUARDRAIL. GENERALLY PLACE CURB DIRECTLY BELOW GUARDRAIL. SEE PLANS OR REFER TO STANDARD PLAN 5-297.601 (2). FOR CURB LOCATIONS ON NCHRP REPORT NO. 350 APPROVED BRIDGE TRANSITIONS, SEE STANDARD PLANS 5-297.603, .605, .606 ETC..

REVISION:

APPROVED: 8-6-2014

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

STANDARD PLAN 5-297.645 | 1 OF 1

APPROVED: 8-6-2014
REVISED:

MODULAR BLOCK RETAINING WALL

DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 49 OF 97 SHEETS

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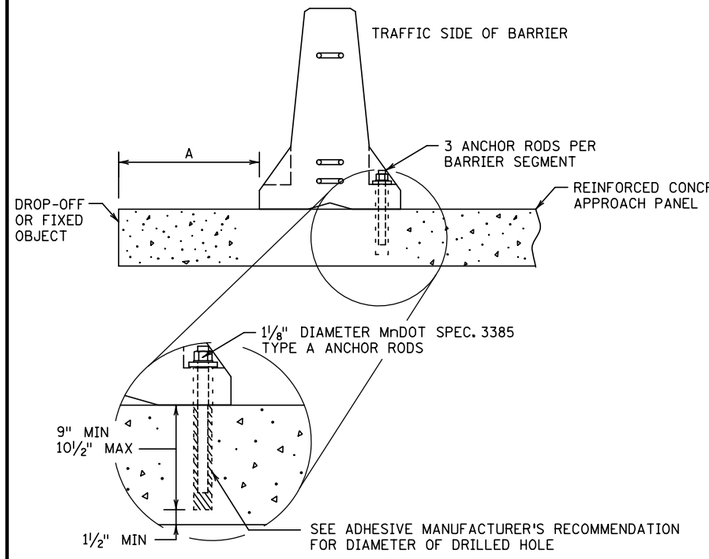
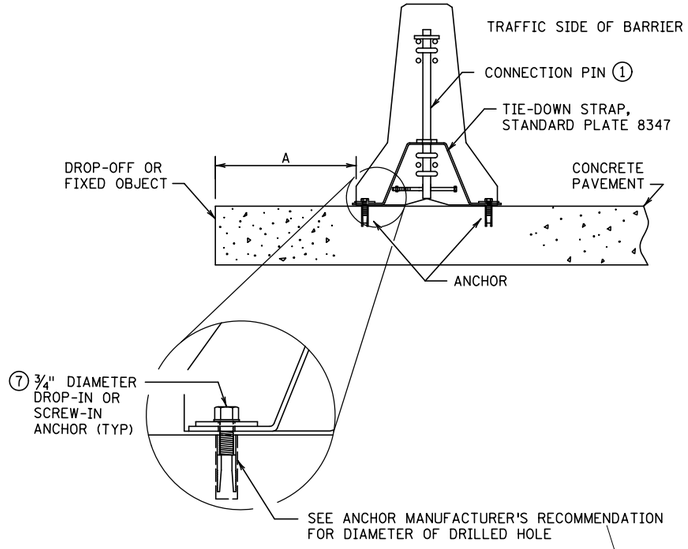
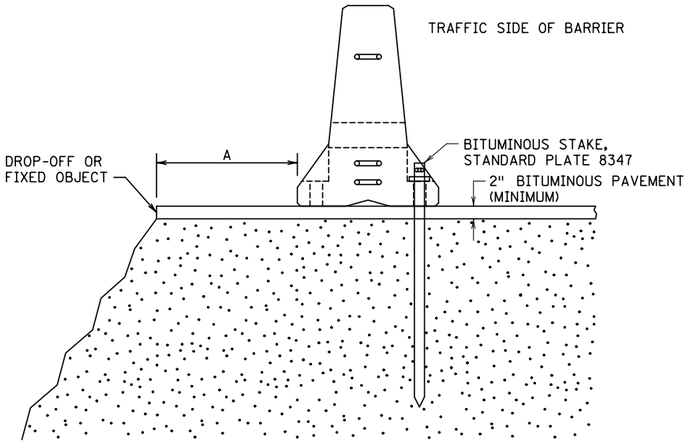


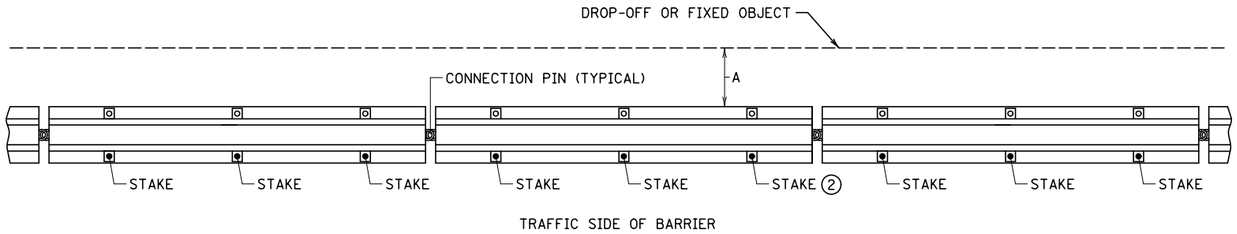
APPROACH PANEL BOLT-DOWN ANCHOR



TIE-DOWN STRAP ANCHOR (8)



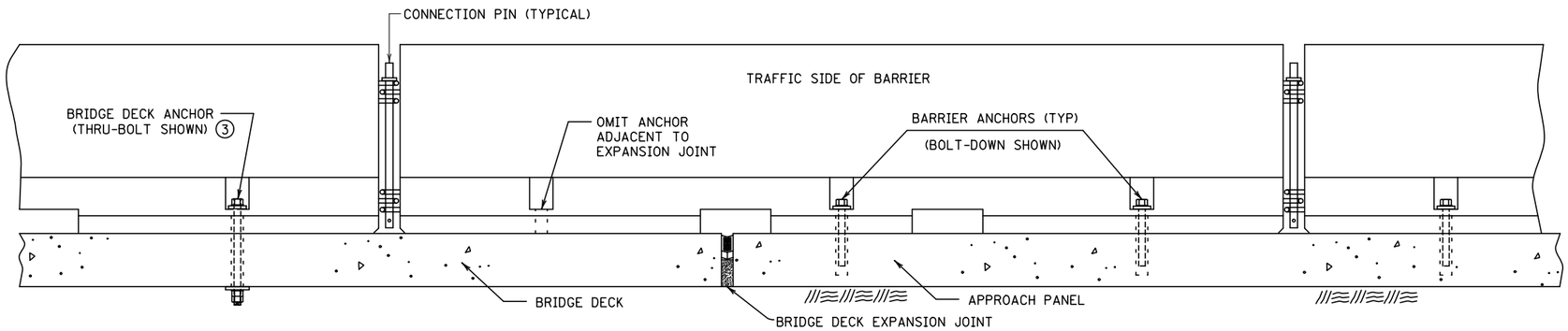
BITUMINOUS ANCHORAGE



BITUMINOUS ANCHORAGE

MINIMUM REQUIRED DEFLECTION DISTANCE (A) BEHIND ANCHORED PORTABLE CONCRETE BARRIER

POSTED SPEED LIMIT	LONGITUDINAL DROP-OFF DEPTH				FIXED OBJECTS (6)
	<1'	1'-3'	>3'-8'	EDGES OF BRIDGES AND DROP-OFFS >8'	
≤30 MPH	(4)	(4)	0.5'	0.5'	0.5'
35-50 MPH	0.5'	0.5'	1.0'	1.5' (2.0' (5)(8))	1.5'(2.0' (5))
≥55 MPH	0.5'	1.0'	2.0'	2.0' (4.0' (5)(8))	2.0'(4.0' (5))



ANCHOR TREATMENT AT BRIDGE DECK EXPANSION JOINT
(EXPANSION LESS THAN 1½")

NOTES:

BARRIER SECTIONS SHALL NOT BE PERMANENTLY INCORPORATED INTO CONSTRUCTION OR MAINTENANCE PROJECTS.

A DROP-OFF IS CONSIDERED A SLOPE STEEPER THAN 1(V):3(H).

FIXED OBJECTS ARE HAZARDS THAT ARE FIRM, UNYIELDING, AND GREATER THAN 4 INCHES IN HEIGHT.

ALL BARRIERS ARE DESIGN 8337 AND SHALL HAVE CONNECTION PINS. SEE STANDARD PLATE 8337.

(1) RETAINER BOLT AND NUT REQUIRED. SEE STANDARD PLATE 8337 FOR DETAILS.

(2) 3 STAKES REQUIRED PER BARRIER SECTION, PLACED ON TRAFFIC SIDE OF BARRIER.

(3) REFER TO MnDOT BRIDGE STANDARD DETAIL B920 FOR ANCHORING BARRIER ONTO BRIDGE.

(4) BARRIER NOT REQUIRED FOR DROP-OFF PROTECTION.

(5) DEFLECTION DISTANCE FOR TIE-DOWN STRAP ANCHOR SYSTEM.

(6) IF THE FIXED OBJECT IS ≥1.5' BEYOND INPLACE CURB AND THE POSTED SPEED IS ≤35 MPH, TEMPORARY BARRIER IS OPTIONAL.

(7) SEE SPEC. 2533.

(8) TIE-DOWN STRAP ANCHOR IS NOT TO BE USED ON BRIDGE DECKS.

REVISION:

APPROVED: JULY 16, 2019

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.680 | **1 OF 2**

APPROVED: 7-16-2019
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

TEMPORARY PORTABLE PRECAST CONCRETE BARRIER ANCHORING

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 50 OF 97 SHEETS

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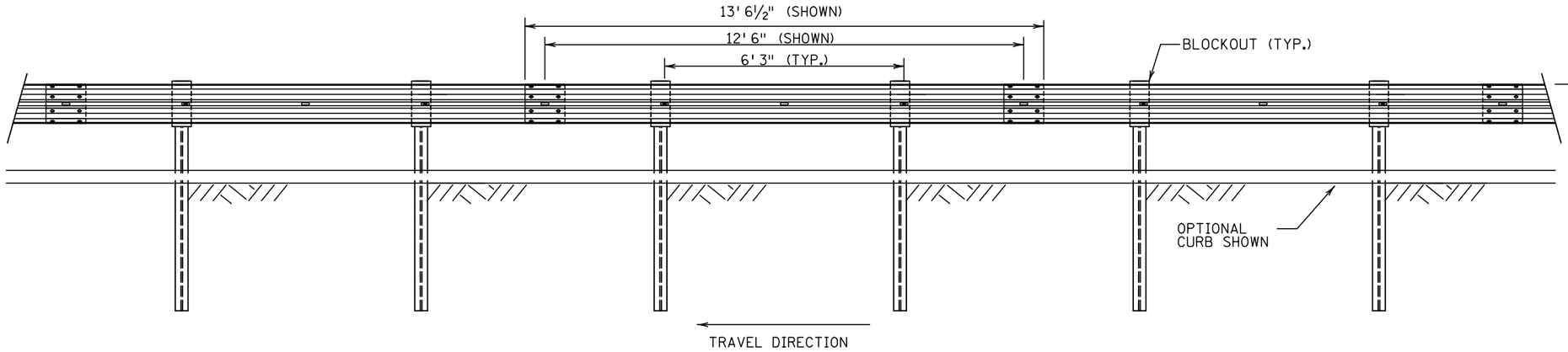
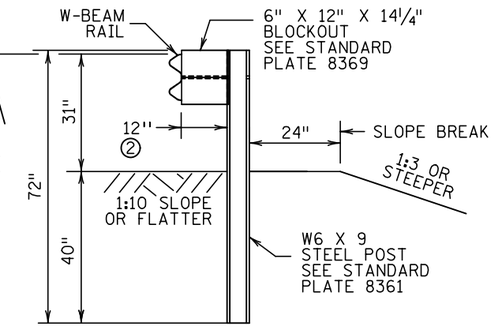
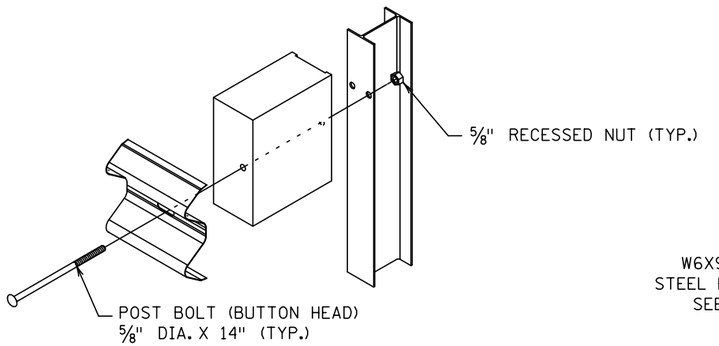


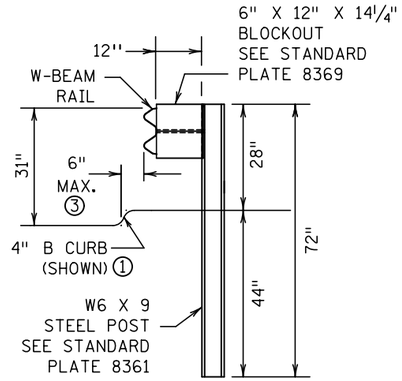
FRONT VIEW



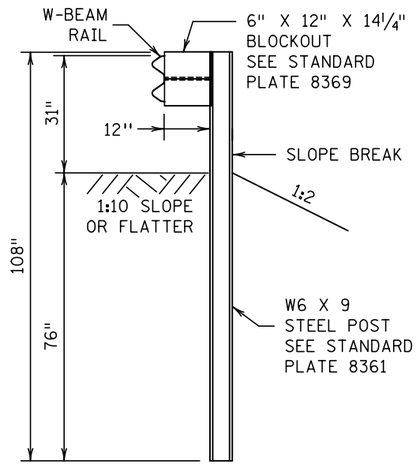
SIDE VIEW



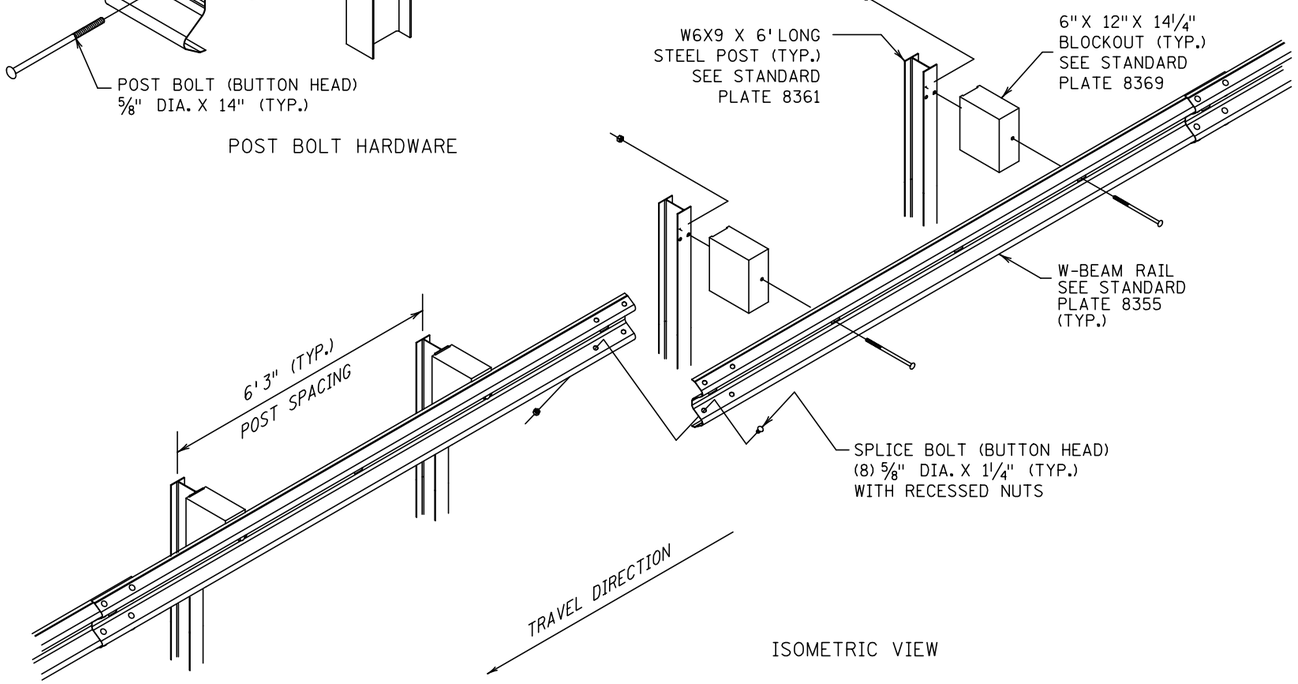
POST BOLT HARDWARE



TYPE 31 GUARDRAIL
WITH CURB



TYPE 31 GUARDRAIL WITH
1:2 INSLOPE AT
BACK OF POST



ISOMETRIC VIEW

NOTES:

GUARDRAIL IS PLACED ON SLOPES 1:10 OR FLATTER WITH SLOPE EXTENDING A MINIMUM 24" BEHIND POST TO SLOPE BREAK POINT.

ALL RAIL AND HARDWARE COMPONENTS IN ACCORDANCE WITH AASHTO SPEC. M 180

① 4" B CURB OR D CURB ACCEPTABLE.

② MAXIMUM OF 24" MAY BE USED WHERE UNDERGROUND POST OBSTRUCTIONS ARE ENCOUNTERED.

③ 0" TO 6" MAXIMUM.

LEAD EXPERT OFFICE

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.690 | **1 OF 1**

APPROVED: 07-05-2022
REVISED:

TRAFFIC BARRIER TYPE 31 ASSEMBLY DETAILS

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 51 OF 97 SHEETS

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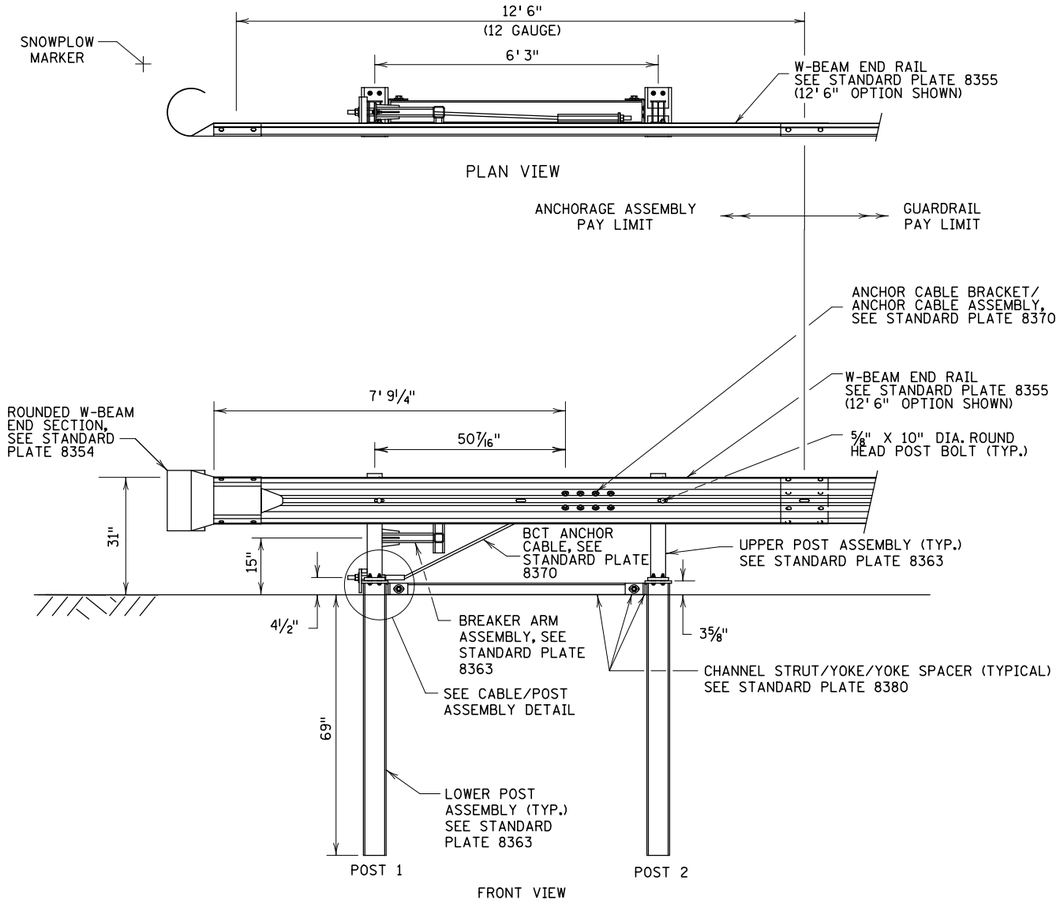
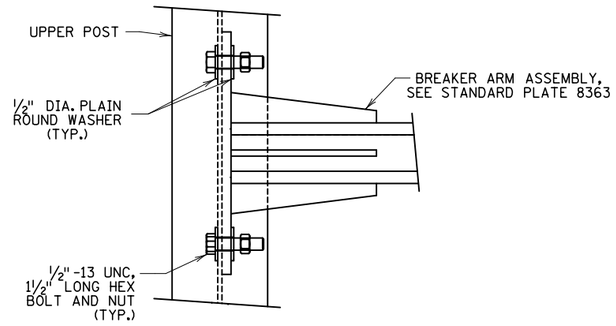
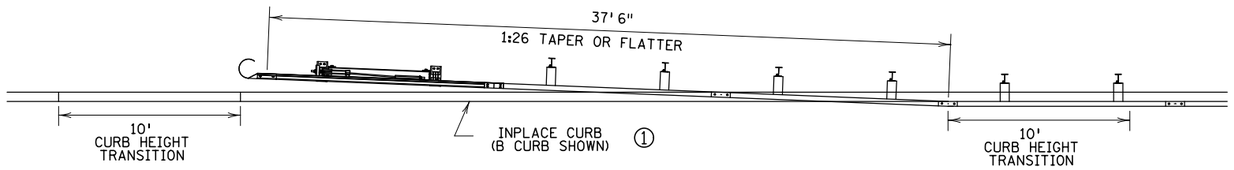


END RAIL DETAIL



BREAKER ARM ASSEMBLY
CONNECTION AT POST

POST 1
CABLE/YOKE ASSEMBLY



CURB AT END ANCHORAGE

NOTES:

ALL RAIL AND HARDWARE COMPONENTS IN ACCORDANCE WITH AASHTO SPEC. M 180.

(1) WHERE INPLACE CURB HEIGHT IS GREATER THAN 4" MILL TO 3" HEIGHT (INCIDENTAL). PROVIDE 10' CURB HEIGHT TRANSITIONS AS SHOWN.

LEAD EXPERT OFFICE

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

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MINNESOTA DEPARTMENT OF TRANSPORTATION

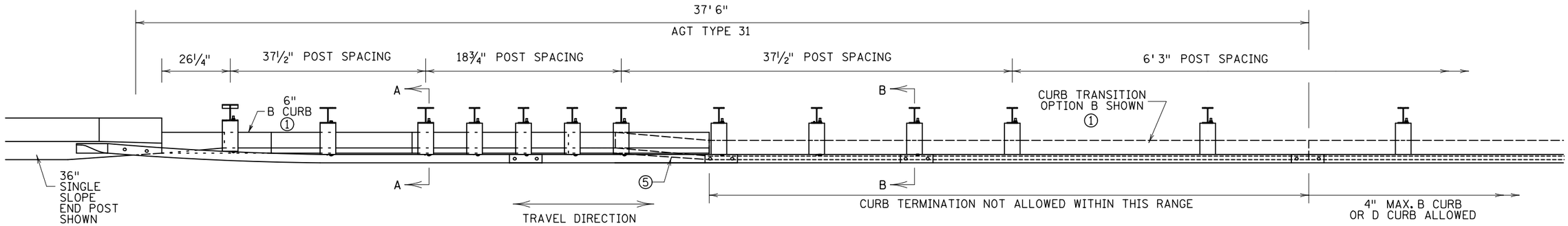
THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.692	1 OF 1
APPROVED: 02-09-2023	
REVISED:	

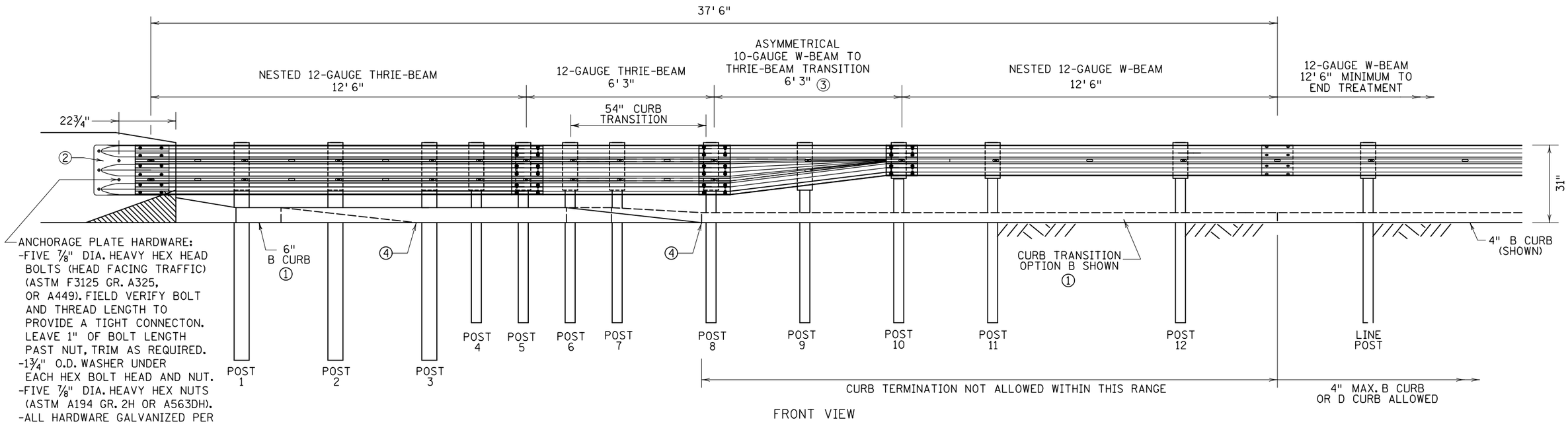
TRAFFIC BARRIER TYPE 31 END ANCHORAGE

ASSEMBLY DETAILS

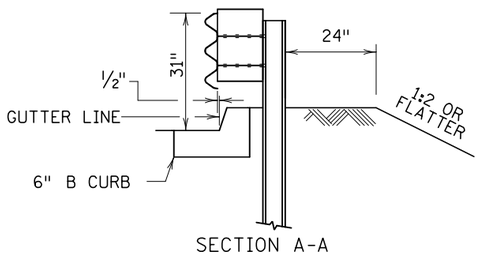
SAP 002-622-036, SAP 223-020-006 SHEET NO. 52 OF 97 SHEETS



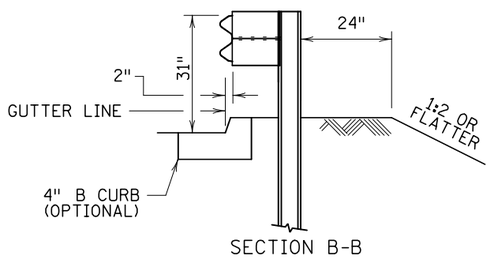
PLAN VIEW



FRONT VIEW



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 14¼"

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 2½" TO MATCH EXTENDED GUTTER LINE FROM BRIDGE.

LEAD EXPERT OFFICE

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.694 | **1 OF 3**

APPROVED: 07-05-2022
REVISED:

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

ASSEMBLY DETAILS

SAP 002-622-036, SAP 223-020-006 SHEET NO. 53 OF 97 SHEETS

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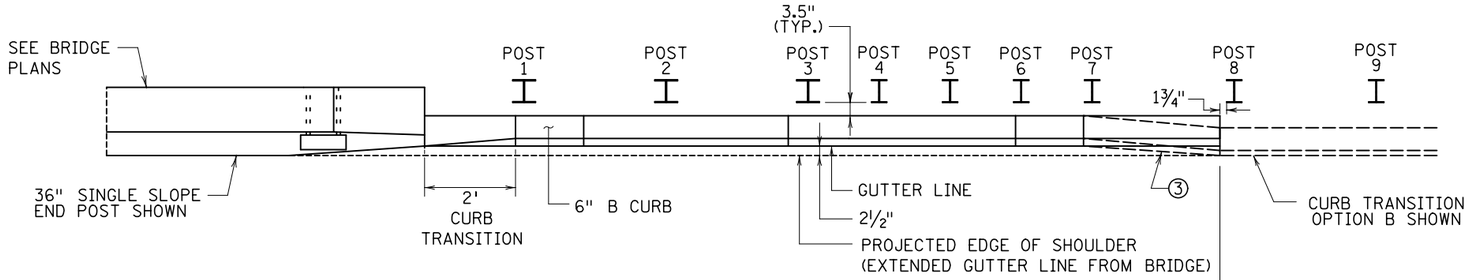
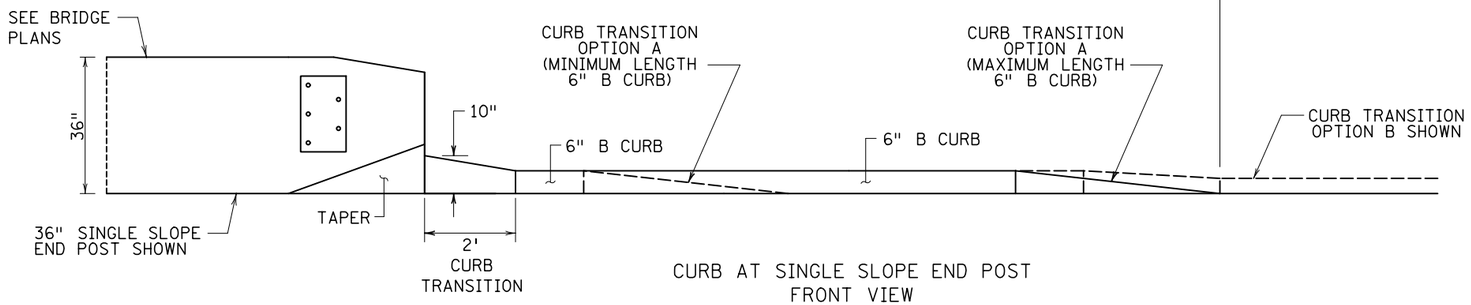
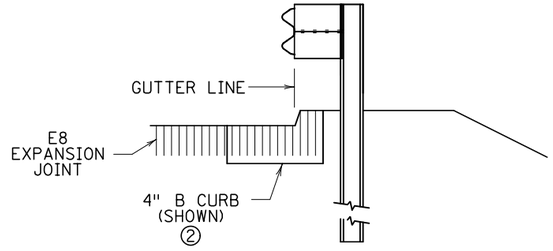


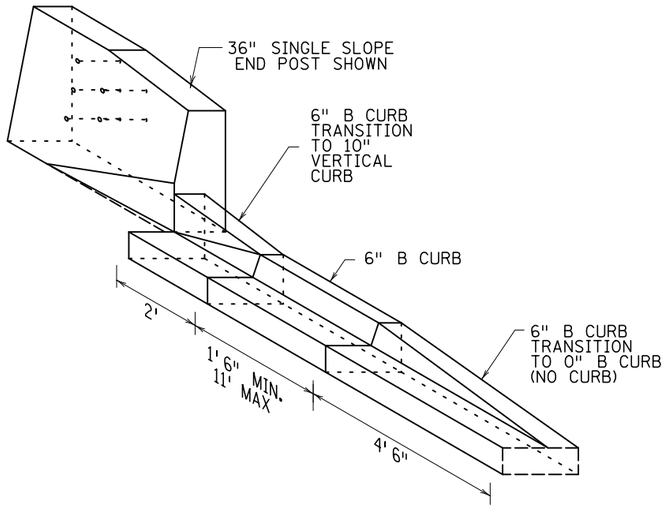
CURB AT SINGLE SLOPE END POST
PLAN VIEW



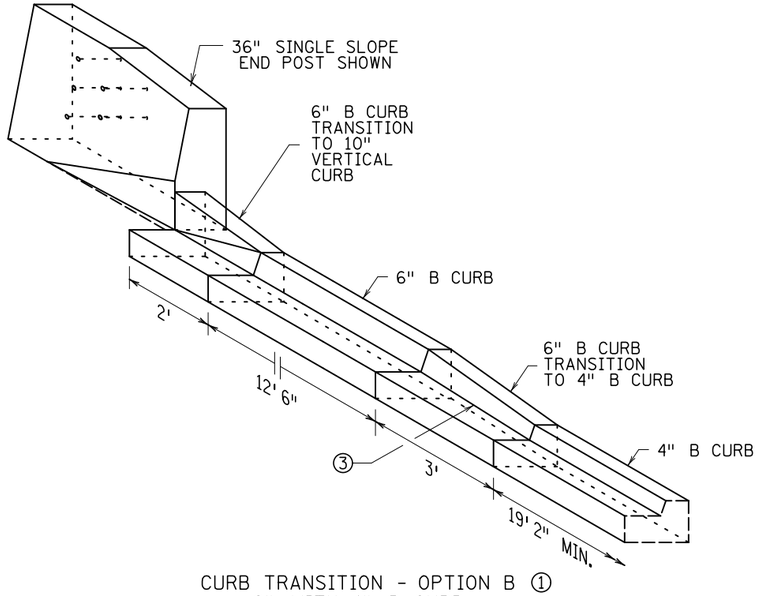
CURB AT SINGLE SLOPE END POST
FRONT VIEW



EXPANSION JOINT AT CURB



CURB TRANSITION - OPTION A
6" B CURB ONLY



CURB TRANSITION - OPTION B ①
6" WITH 4" B 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 2½" TO MATCH EXTENDED GUTTER LINE FROM BRIDGE.

LEAD EXPERT OFFICE

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

THOMAS STYRBICKI
STATE DESIGN ENGINEER

STANDARD PLAN 5-297.694 | 2 OF 3

APPROVED: 07-05-2022
REVISED:

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

SAP 002-622-036, SAP 223-020-006 | SHEET NO. 54 OF 97 SHEETS

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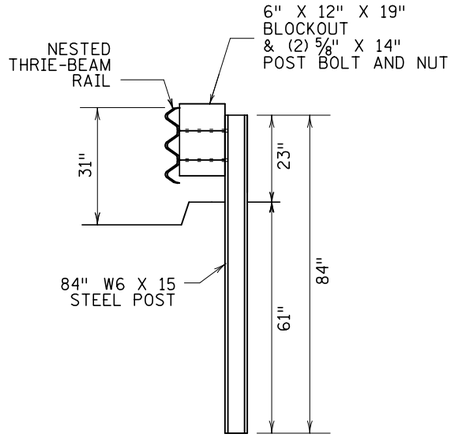
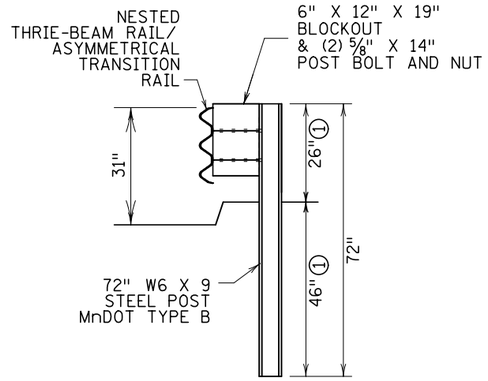
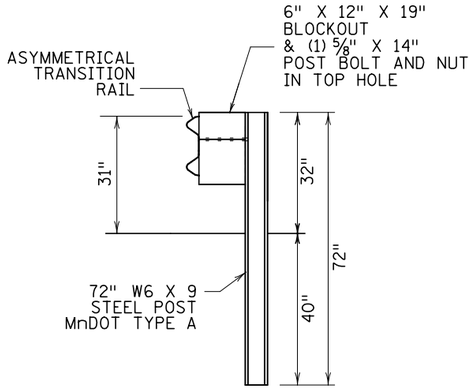


POSTS 1-3



POSTS 4-8



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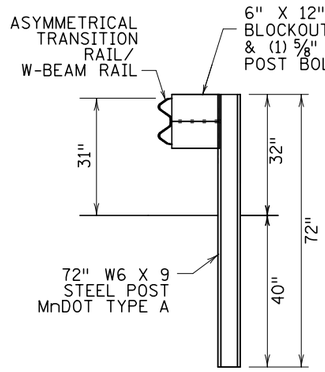
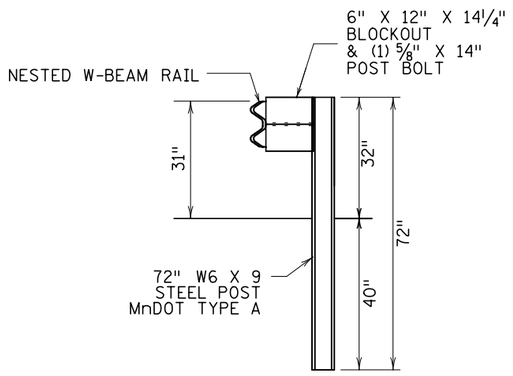
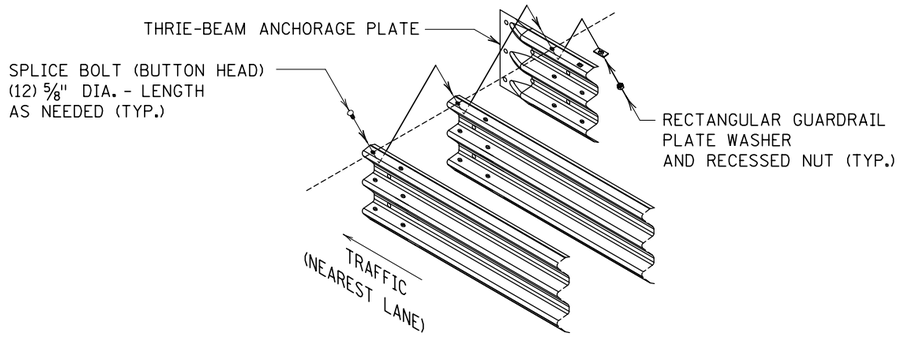


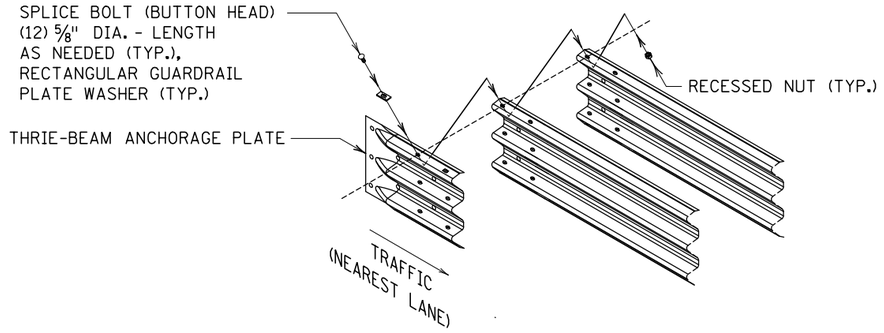
POST 10



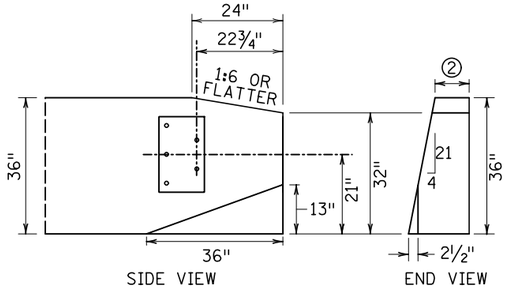
POSTS 11-12

AGT POST COMPONENTS

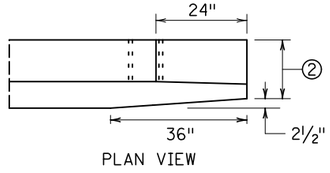




THRIE BEAM RAIL/ANCHORAGE PLATE
SPLICE CONNECTION DETAIL ④

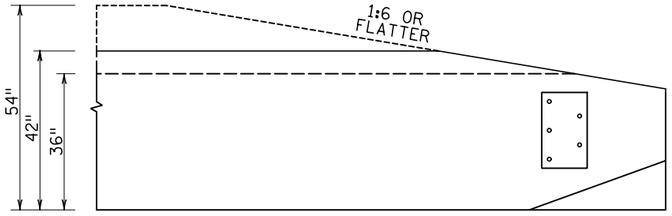


SIDE VIEW END VIEW



PLAN VIEW

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

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.694 | 3 OF 3

APPROVED: 07-05-2022
REVISED:

THOMAS STYRBICKI
STATE DESIGN ENGINEER

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

MISCELLANEOUS AND COMPONENT DETAILS

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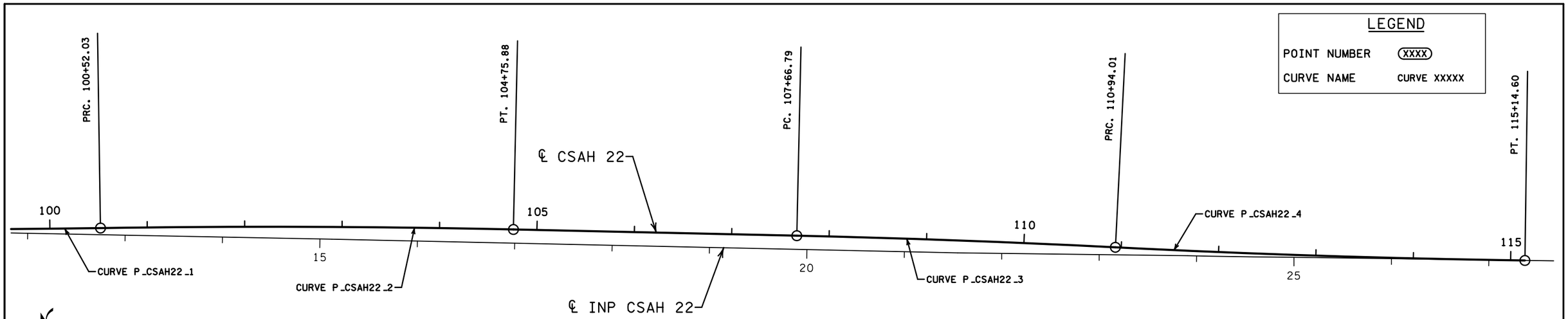

GENERAL NOTES

COORDINATES SHOWN IN THIS PLAN ARE BASED ON ANOKA COUNTY COORDINATE SYSTEM, USING NAD 1983 (HARN 1996 ADJUSTMENT) DATUM.

ALIGNMENT TABULATION - CSAH 22 (P_CSAH22)

POINT / CURVE NUMBER	POINT DESC.	STATION	CURVE DATA					COORDINATES		AZIMUTH	
			DELTA	DEGREE	RADIUS	TANGENT	LENGTH	X	Y		
	PC	96+57.940						471,702.1076	206,592.3658	S 88° 53' 17.27" E	(1)
P_CSAH22_1	PI	98+55.004	1° 58' 13.71" LT	0° 30' 00.02"	11,459.000'	197.064'	394.090'	471,899.1348	206,588.5419	PI	(1)
	CC							471,924.4644	218,049.2082		
	PRC	100+52.030						472,096.1769	206,591.4949	N 89° 08' 29.02" E	
	PRC	100+52.030						472,096.1769	206,591.4949	N 89° 08' 29.02" E	
P_CSAH22_2	PI	102+63.978	2° 07' 09.36" RT	0° 30' 00.02"	11,459.000'	211.948'	423.847'	472,308.1009	206,594.6709	PI	
	CC							472,267.8894	195,133.7814		
	PT	104+75.877						472,519.9975	206,590.0078	S 88° 44' 21.63" E	
	PC	107+66.794						472,810.8437	206,583.6074	S 88° 44' 21.63" E	
P_CSAH22_3	PI	109+30.411	1° 38' 09.92" RT	0° 30' 00.02"	11,459.000'	163.618'	327.213'	472,974.4219	206,580.0077	PI	
	CC							472,558.7356	195,127.3811		
	PRC	110+94.007						473,137.8306	206,571.7391	S 87° 06' 11.71" E	
	PRC	110+94.007						473,137.8306	206,571.7391	S 87° 06' 11.71" E	
P_CSAH22_4	PI	113+04.328	2° 06' 10.79" LT	0° 30' 00.02"	11,459.000'	210.320'	420.594'	473,347.8824	206,561.1102	PI	
	CC							473,716.9256	218,016.0970		
	PT	115+14.601						473,558.1827	206,558.1967	S 89° 12' 22.50" E	

SPECIFIC NOTES

(1) OUTSIDE PROJECT LIMITS. NOT SHOWN ON ALIGNMENT PLAN

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

ALIGNMENT PLAN & TABULATION

SHEET NO. 56 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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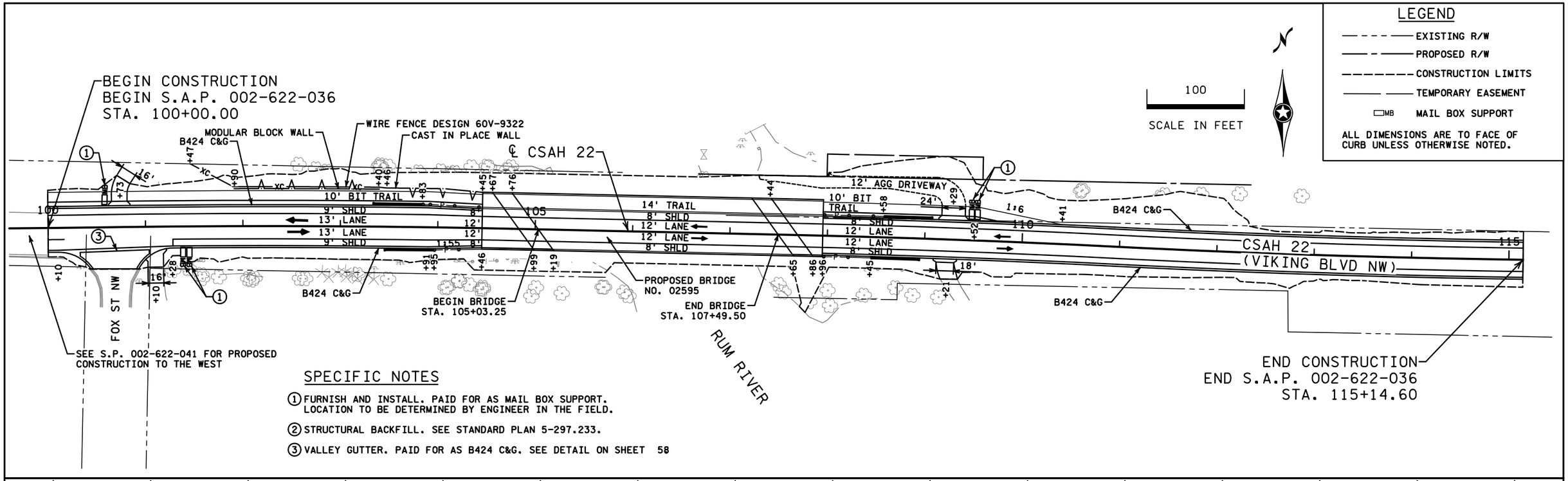
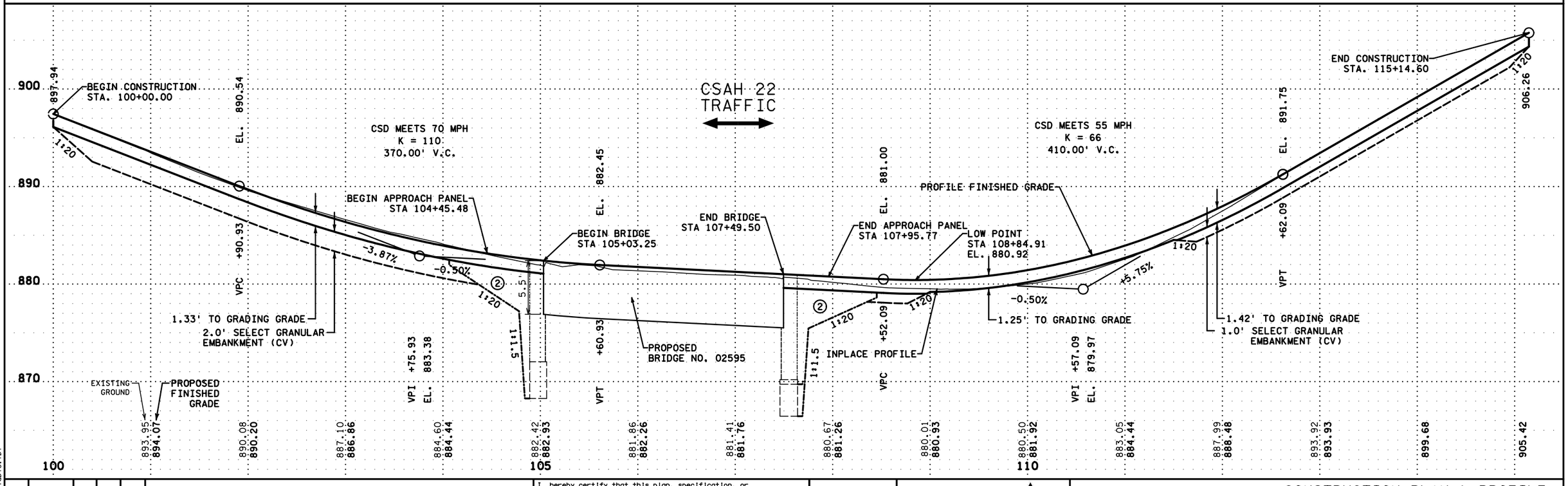


SPECIFIC NOTES

1. FURNISH AND INSTALL. PAID FOR AS MAIL BOX SUPPORT. LOCATION TO BE DETERMINED BY ENGINEER IN THE FIELD.
2. STRUCTURAL BACKFILL. SEE STANDARD PLAN 5-297.233.
3. VALLEY GUTTER. PAID FOR AS B424 C&G. SEE DETAIL ON SHEET 58



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ANOKA COUNTY

CONSTRUCTION PLAN & PROFILE

SHEET NO. 57 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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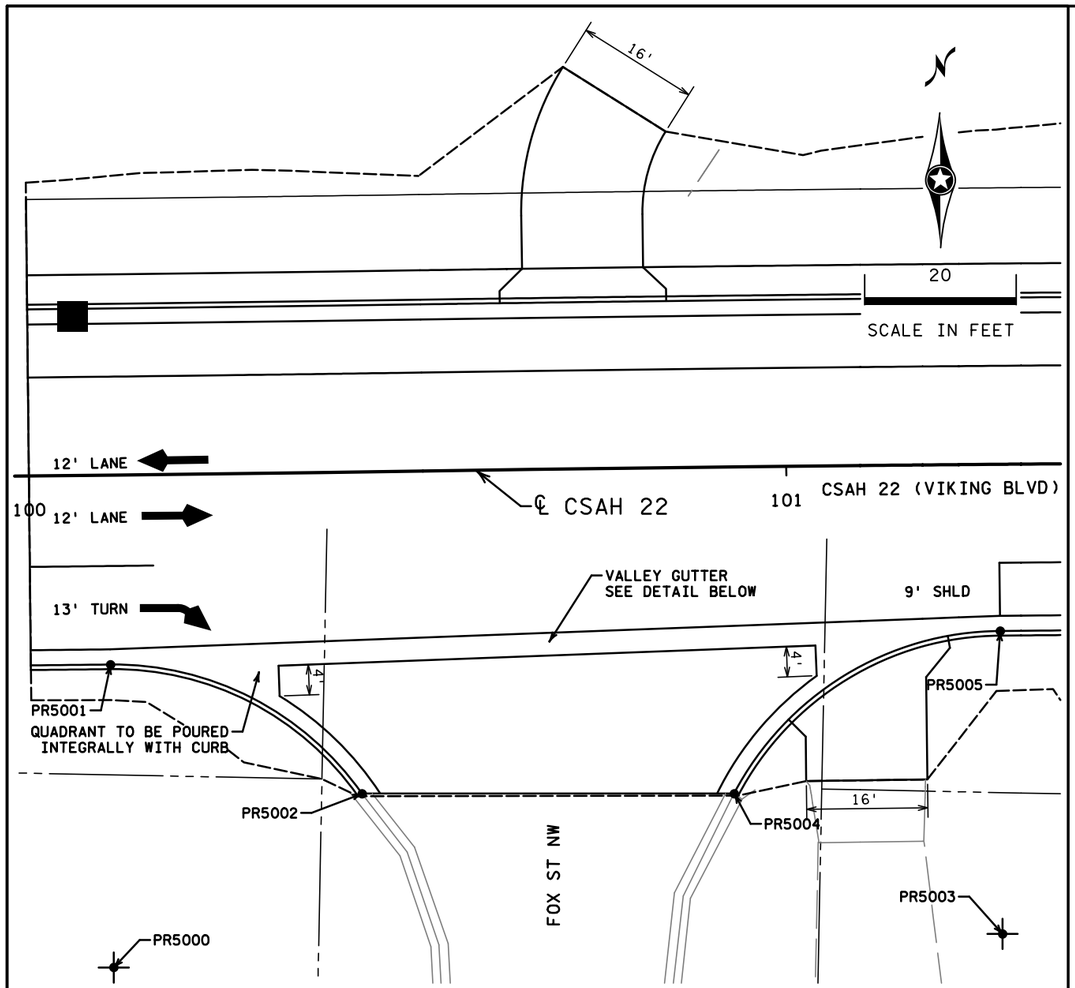
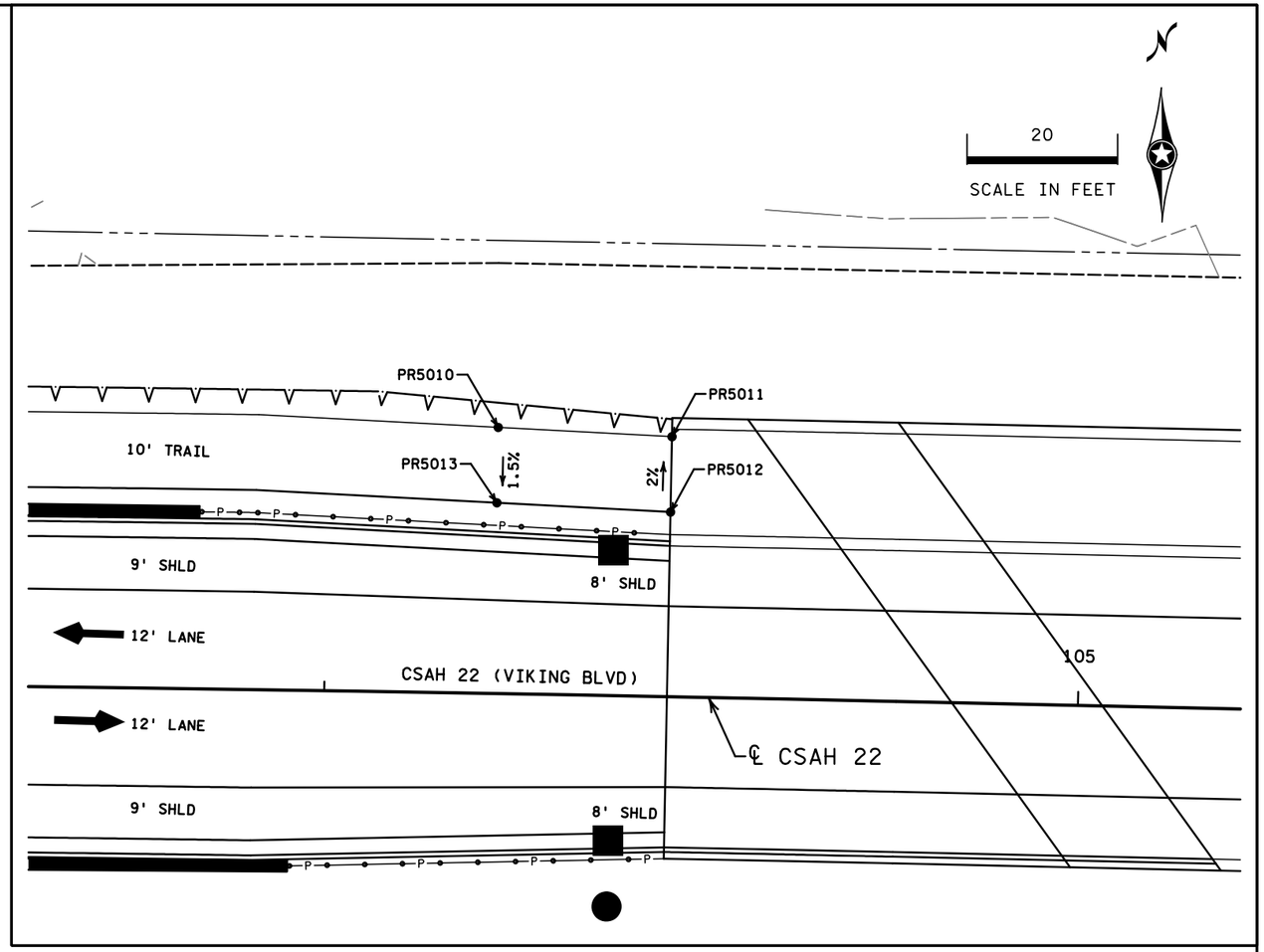
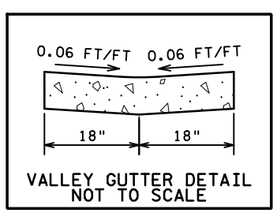




CSAH 22 AT FOX ST NW			
POINT	X	Y	ELEV/RAD
PR5000	472055.360	206525.952	40' RAD
PR5001	472054.944	206565.917	896.95
PR5002	472088.149	206548.884	896.17
PR5003	472172.702	206530.384	40' RAD
PR5004	472137.292	206548.884	894.14
PR5005	472172.406	206570.350	892.32

CSAH 22 WEST OF BRIDGE			
POINT	X	Y	ELEV/RAD
PR5010	472467.223	206626.367	884.11
PR5011	472490.273	206625.139	882.96
PR5012	472490.080	206615.135	883.16
PR5013	472467.050	206616.363	883.96



VALLEY GUTTER DETAIL
NOT TO SCALE

LEGEND

- XXX — CONTROL POINTS
- XXX — RADIUS POINT
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- X" — CURB HEIGHT
- LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- (S) — INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW
- TRAFFIC FLOW ARROW
- PROPOSED DRAINAGE STRUCTURE

NO	DATE	BY	CKD	APPR	REVISION

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DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

INTERSECTION & DRIVEWAY DETAILS

SHEET NO. 58 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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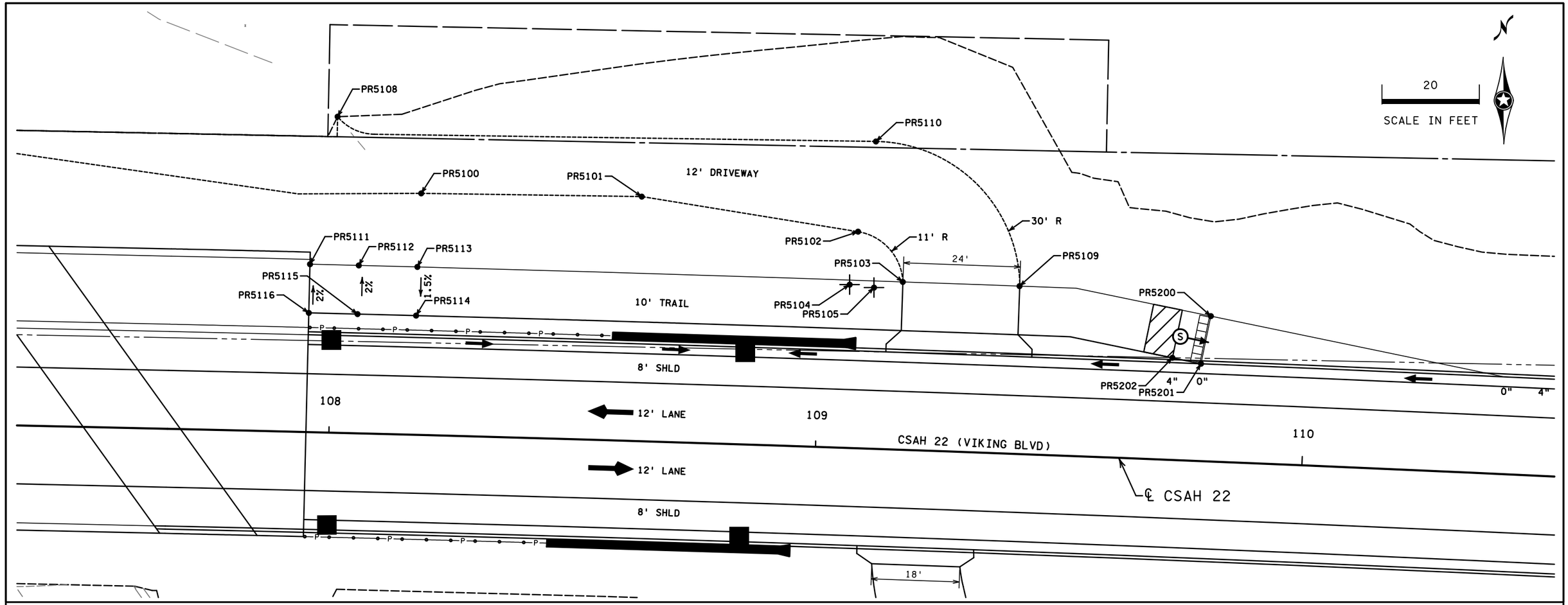

LEGEND

- XXX — CONTROL POINTS
- XXX — RADIUS POINT
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- X" — CURB HEIGHT
- LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- (S) INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW
- TRAFFIC FLOW ARROW
- PROPOSED DRAINAGE STRUCTURE

CSAH 22 EAST OF BRIDGE			
POINT	X	Y	ELEV/RAD
PR5100	472866.194	206632.005	877.93
PR5101	472956.023	206612.635	879.01
PR5102	472952.748	206624.128	880.23
PR5103	472961.939	206613.798	880.96
PR5104	472951.021	206613.239	11' R
PR5105	472956.023	206612.635	30' R
PR5108	472845.814	206647.764	877.05
PR5109	472992.979	206619.189	881.10
PR5110	472956.416	206642.664	879.67
PR5111	472840.147	206617.435	880.52
PR5112	472850.174	206617.185	880.78
PR5113	472862.206	206616.874	881.27
PR5114	472861.938	206606.878	881.12
PR5115	472849.917	206607.189	880.98
PR5116	472839.902	206607.438	880.72
PR5200	473025.230	206606.773	881.13
PR5201	473023.203	206596.981	880.98
PR5202	473017.328	206598.197	881.34

SPECIFIC NOTES

1. SEE POINTS PR5100 TO PR5110 IN POINTS TABLE ON THIS SHEET FOR DRIVEWAY DESIGN.
2. SEE CONSTRUCTION PLAN SHEET 57

DRIVEWAY TABULATION

STATION	SIDE	DRIVEWAY TYPE	CURB TYPE	C/L	E1	E2	L1 FT	S1 %	E3	L2 FT	S2 %	E4	L3 FT	S3 %	EXISTING %	E5	COMMENTS
100+73.46	LT	PERP.	STD.	895.09	894.43	894.51	3.89	8.00	894.82	10.00	1.50	894.97	13.08	4.23	3.40	895.52	2
101+10.23	RT	PERP.	STD.	893.67	893.06	893.14	4.00	8.00	893.46	N/A	N/A	N/A	10.17	5.41	2.28	894.01	2
109+21.45	RT	PERP.	STD.	881.02	880.42	880.50	3.00	8.00	880.74	N/A	N/A	N/A	17.67	-6.73	-8.57	879.55	2
109+28.74	LT	PERP.	STD.	881.03	880.43	880.51	3.89	8.00	880.82	10.00	1.50	880.97	N/A	N/A	N/A	N/A	1

NO	DATE	BY	CKD	APPR	REVISION

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LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

INTERSECTION & DRIVEWAY DETAILS

SHEET NO. 59 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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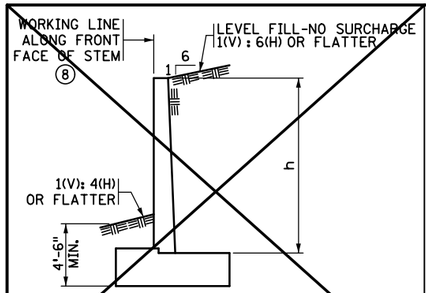
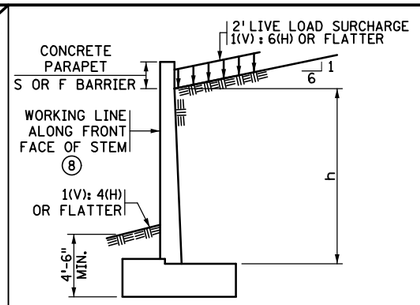
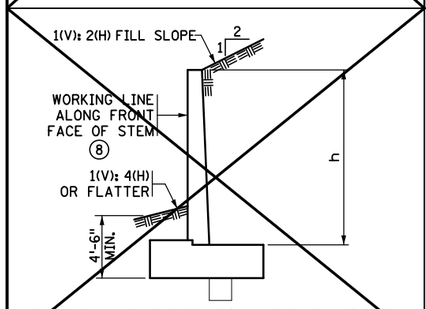


LEVEL FILL
1(V) : 6(H) OR FLATTER



LIVE LOAD SURCHARGE



1(V) : 2(H) SLOPED FILL OR FLATTER

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

LOAD CASES

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.

f'c = 4 ksi
fy = 60 ksi
n = 8

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

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"

SUMMARY OF QUANTITIES FOR RETAINING WALLS

PANEL	STRUCTURAL CONCRETE		REINFORCEMENT BARS		STRUCTURE EXCAVATION		STRUCTURAL BACKFILL (CV)①	AGGREGATE BACKFILL (CV)②⑥	ARCHI-TECTURAL CONCRETE TEXTURE						
	FOOTING	STEM	PLAIN ⑦	EPOXY ⑤	CLASS__	CLASS__									
	1G52 ⑦	3G52													
	CU YD	CU YD	POUND	POUND	CU YD	CU YD	CU YD	CU YD	SQ FT						

NOTES:

~~① STRUCTURAL BACKFILL SPEC. 3149.2.B.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).~~

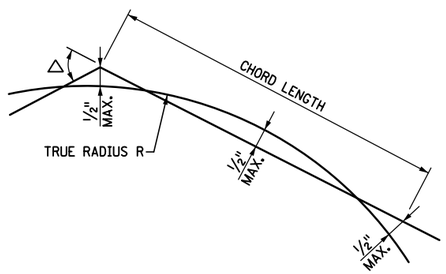
~~⑥ QUANTITIES FOR THE FOUNDATION WITH AGGREGATE BACKFILL OPTION ONLY.~~

~~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.

CURVED RETAINING WALLS ALLOWABLE CHORD LENGTH ④

MAXIMUM DEGREE OF CURVE	RADIUS	ALLOWABLE CHORD LENGTH	DEVIATION FROM TRUE RADIUS	MAXIMUM DEFLECTION ANGLE Δ
4°-00'	1432'	30'-6"	± ½" ③	1°-15'
8°-00'	716'	21'-10"	± ½" ③	1°-45'
16°-30'	347'	15'-3"	± ½" ③	2°-30'
23°-00'	249'	12'-11"	± ½" ③	2°-57'
65°-30'	87'	7'-7½"	± ½"	5°-00' ③
114°-30'	50'	4'-4⅝"	± ¼"	5°-00' ③
250°-00'	23'	2'-0"	± ⅛"	5°-00' ③



SHEET INDEX *

GENERAL NOTES:

UTILITIES:
EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. PRIOR TO EXCAVATIION 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 3Y43 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 91'-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. ⑧

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 (Rn) WERE COMPUTED USING LRFD METHODOLOGY.

REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 21, 2014
Nancy Daubenberger
STATE BRIDGE ENGINEER

*DENOTES MODIFICATION FROM STANDARD PLAN

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.

NAME: TODD A. LANG LIC. NO. 42962
CERTIFIED BY:
LICENSED PROFESSIONAL ENGINEER
8/10/2023
DATE

~~REVISION DATE 9-1-16~~

MODIFIED

~~STANDARD SHEET NO. 5-297.620~~

~~STANDARD APPROVED: AUGUST 21, 2014~~

TITLE:
RETAINING WALL GENERAL NOTES AND SUMMARY OF QUANTITIES

SAP 002-622-036, SAP 223-020-006

SHEET NO. 60 OF 97 SHEETS

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GEOMETRICS FOR CIP RETAINING WALL 2

JOINT NUMBER	ROADWAY STATION	ROADWAY OFFSET	COORDINATES X	COORDINATES Y	GROUND ELEVATION AT F.F. OF WALL	TOP OF WALL ELEVATION	TOP OF BARRIER ELEVATION	STEM HEIGHT (h) DOWNSTATION (FT-IN)	STEM HEIGHT (h) UPSTATION (FT-IN)	TOP OF FOOTING HEEL ELEVATION DOWNSTATION	TOP OF FOOTING HEEL ELEVATION UPSTATION	BOTTOM OF FOOTING HEEL ELEVATION DOWNSTATION	BOTTOM OF FOOTING HEEL ELEVATION UPSTATION	PANEL LENGTH (FT-IN)	PANEL LETTER
1	103+45.93	39.83' LT	472390.4978	206631.9578	882.917	885.645	888.645	-	11'-0 7/8"	-	874.577	-	873.160	-	-
2	103+76.33	39.83' LT	472420.9956	206631.5921	878.178	884.948	887.948	10'-4 1/2"	13'-0 3/4"	874.577	871.886	873.160	870.469	30'-6"	A
3	104+06.72	39.83' LT	472451.4924	206631.1456	875.242	884.363	887.363	12'-5 3/4"	13'-3 1/2"	871.886	871.076	870.469	869.659	30'-6"	B
4	104+45.48	36.83' LT	472490.3178	206627.4594	874.746	882.931	885.931	11'-10 1/4"	-	871.076	-	869.659	-	39'-0"	C
														-	-

(W) SUMMARY OF QUANTITIES FOR CIP RETAINING WALL 2

PANEL	STRUCTURAL CONCRETE FOOTING 1G52	STRUCTURAL CONCRETE STEM 3G52	REINFORCEMENT BARS PLAIN	REINFORCEMENT BARS EPOXY COATED	STRUCTURE EXCAVATION CLASS E	STRUCTURAL BACKFILL (CV)	DRAINAGE 4" PERF TP PIPE DRAIN	DRAINAGE END CAP ②	DRAINAGE 4" DIA. TEE ②	DRAINAGE 4" DIA. NON-PERF PIPE ②	TYPE P-4 (TL-4) BARRIER CONCRETE (3S52)	ORNAMENTAL METAL RAILING DESIGN T-3
	CU YD	CU YD	POUND	POUND	CU YD	CU YD	LIN FT	EACH	EACH	LIN FT	LIN FT	LIN FT
S.A.P. 002-622-036												
A	14.0	20.9	1135	2116	192	193	30.5	1	3	6	30.5	30.5
B	14.0	25.5	1249	2374	168	208	30.5	-	3	6	30.5	30.5
C	20.0	25.4	1538	3271	218	62	39.0	1	3	6	39.0	39.0
TOTAL	48.0	71.8	3922	7761	578	463	100.0	2	9	18	100.0	100.0

(Q) PREFABRICATED MODULAR BLOCK WALL (RETAINING WALL 1)

ROADWAY	ALIGNMENT	STATION TO STATION	OFFSET	NOTES	SELECT GRANULAR EMBANKMENT MOD 10% (CV)	STRUCTURE EXCAVATION CLASS E	PREFABRICATED MODULAR BLOCK WALL ①	COARSE FILTER AGGREGATE (CV)	4" PERF TP PIPE DRAIN	GEOTEXTILE FABRIC TYPE 1	WIRE FENCE DESIGN 60V-9322 ③
					CU YD	CU YD	SQ FT	CU YD	LIN FT	SQ YD	LIN FT
S.A.P. 002-622-036											
CSAH 22	P_CSAH22	101+88.20 - 103+39.15	LT		395	616	1420	77	151	260	206 ④
TOTAL					395	616	1420	77	151	260	206

SPECIFIC NOTES

① BLOCK GRAVITY WALL

② INCIDENTAL TO 4" PERF TP PIPE DRAIN

③ WIRE FENCE DESIGN 60V-9322 SHALL HAVE TOP RAIL IN LIEU OF A TENSION WIRE

④ STATION 101+46.25 TO 103+45.93

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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.

NAME: TODD A. LANG LIC. NO. 42962

CERTIFIED BY: _____ 8/10/2023
LICENSED PROFESSIONAL ENGINEER — DATE

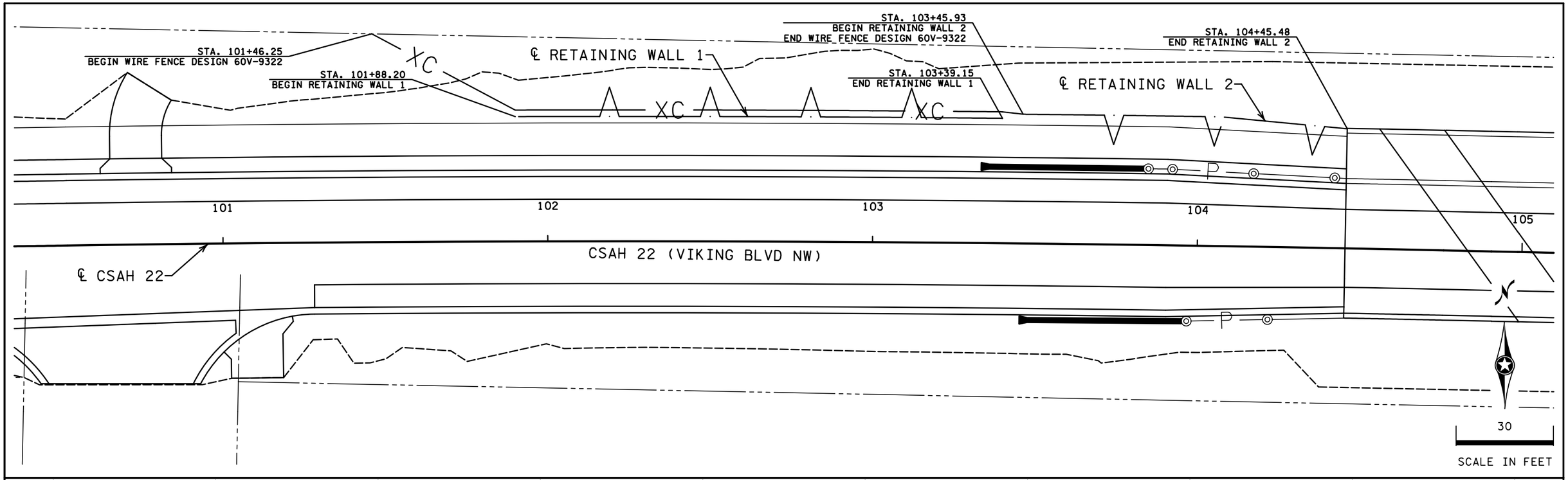
DRAWN BY: JCN
DESIGNED BY: JCN
CHECKED BY: TAL

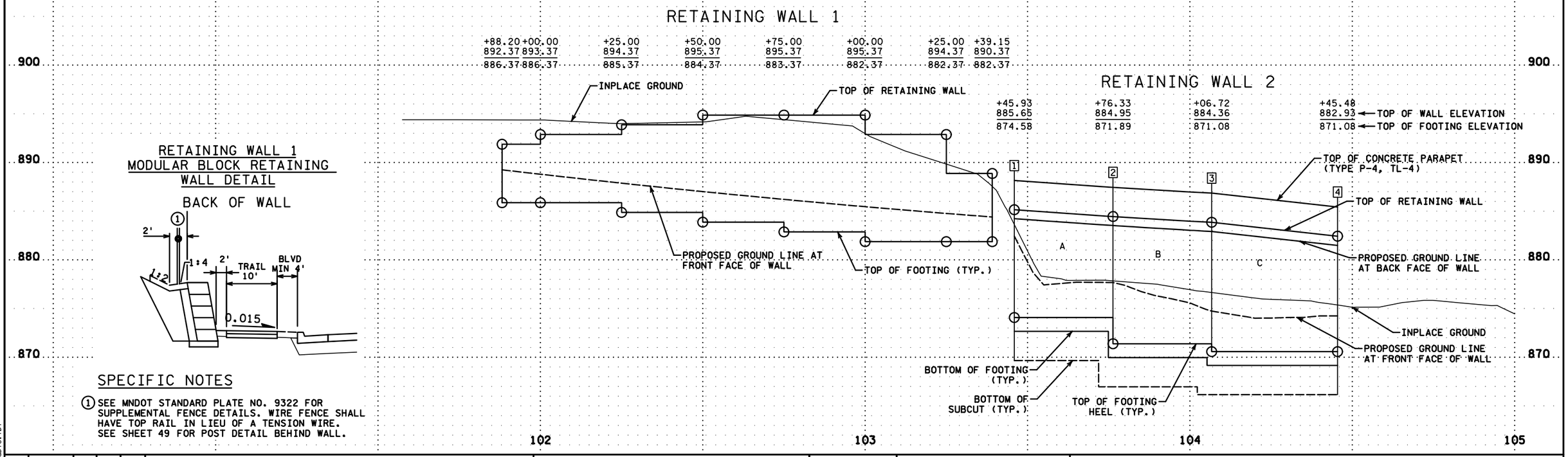
HDR

ANOKA COUNTY

RETAINING WALL GEOMETRICS & QUANTITIES

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006





RETAINING WALL 1 MODULAR BLOCK RETAINING WALL DETAIL

SPECIFIC NOTES

1. SEE MNDOT STANDARD PLATE NO. 9322 FOR SUPPLEMENTAL FENCE DETAILS. WIRE FENCE SHALL HAVE TOP RAIL IN LIEU OF A TENSION WIRE. SEE SHEET 49 FOR POST DETAIL BEHIND WALL.

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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

RETAINING WALL PLAN & PROFILE

SHEET NO. 62 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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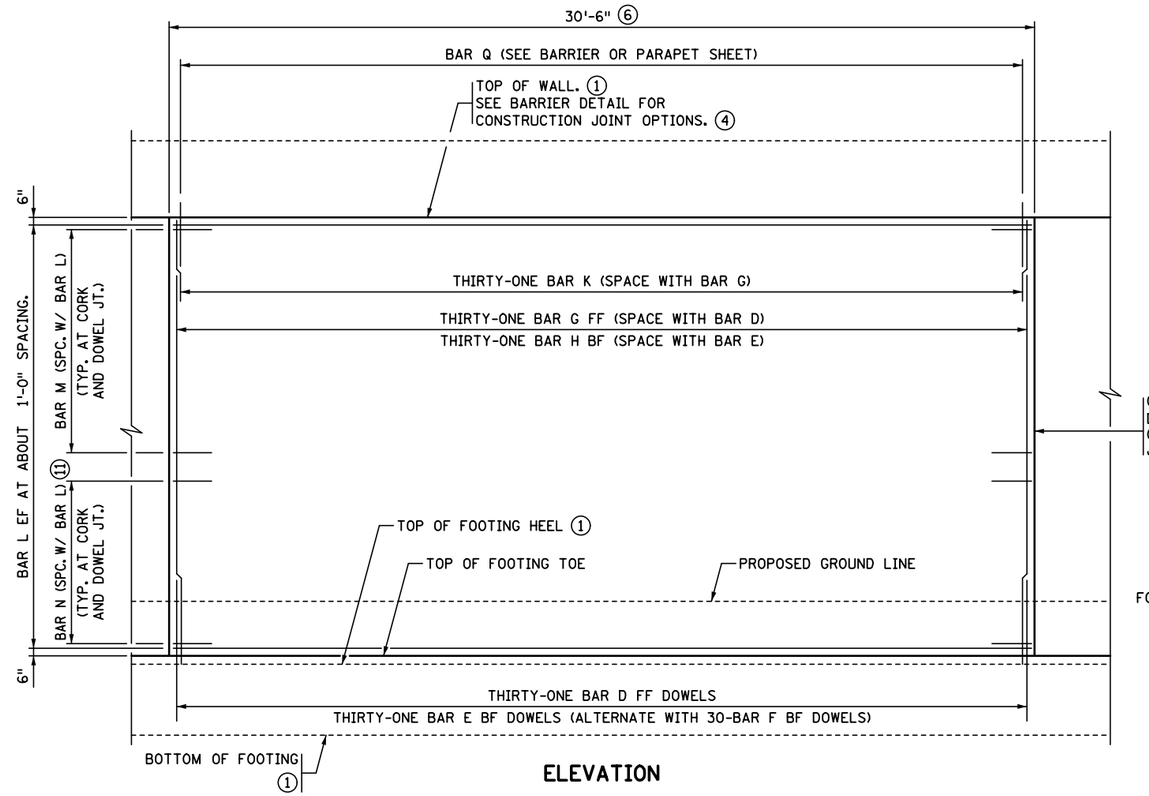

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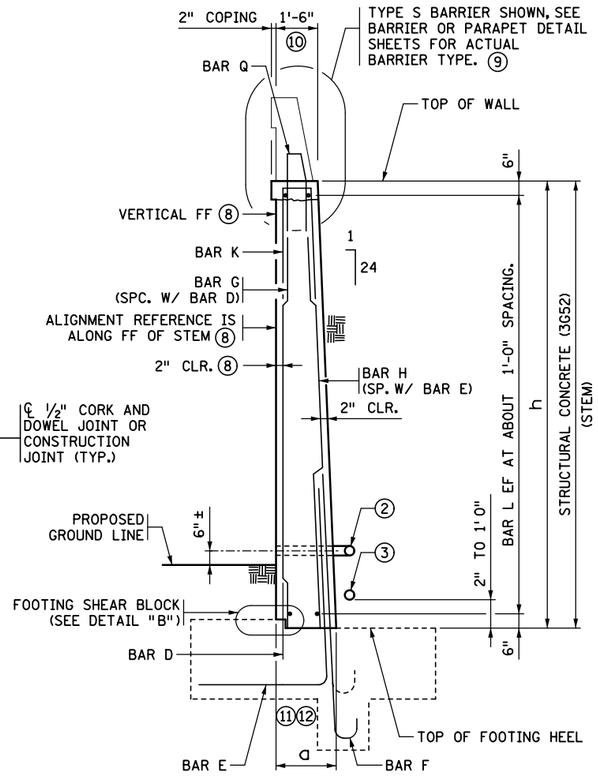
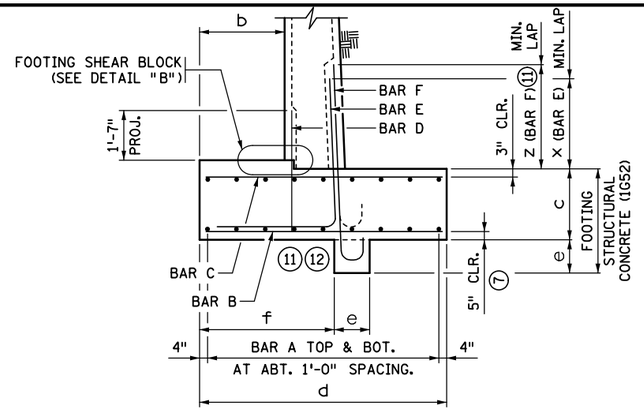
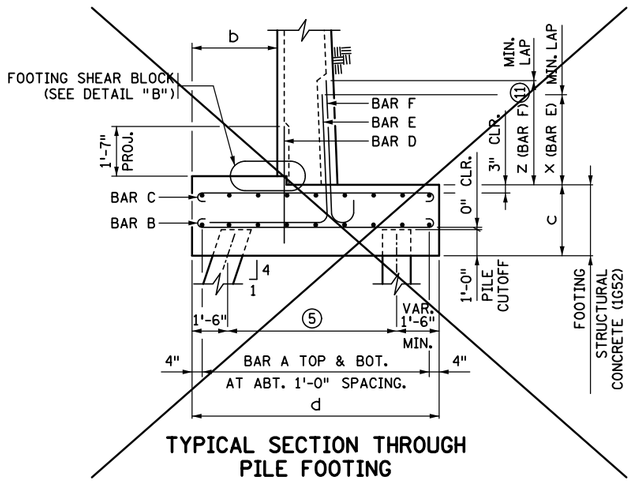


WALL SECTION

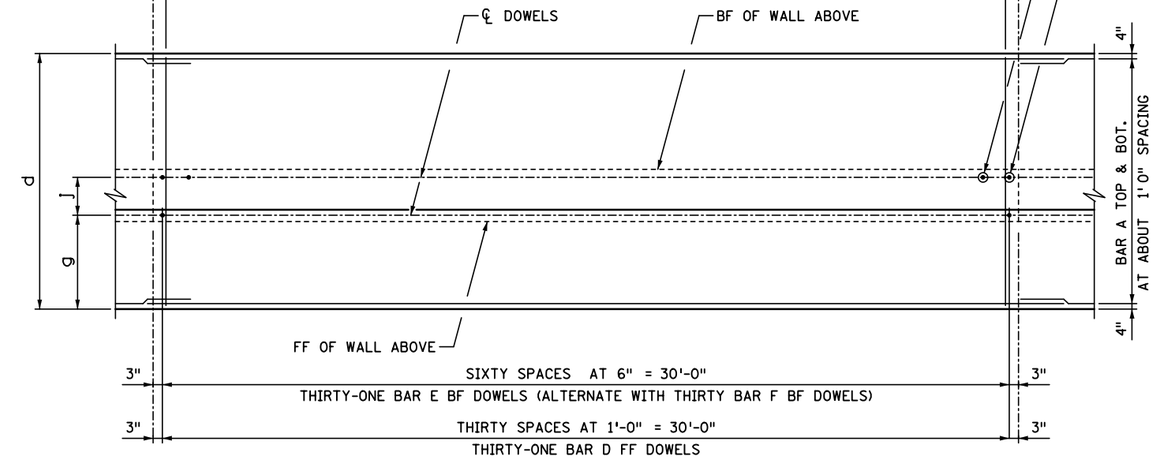
(F BARRIER AND 2" COPING OPTION SHOWN)



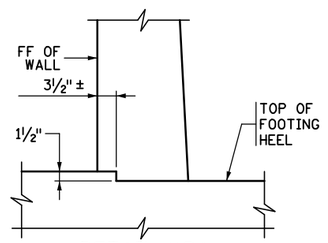
TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING



FOOTING PLAN ~ REINFORCEMENT



DETAIL "B"

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.

MODIFIED

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
Nancy Daubenberger
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.

NAME: TODD A. LANG LIC. NO. 42962
CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER
8/10/2023 DATE

MINNESOTA DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

STANDARD PLAN 5-297.622 | 1 OF 1
APPROVED: 8-27-2014
REVISED: 9-1-2016

RETAINING WALL REINFORCEMENT DETAILS (MEDIUM WALLS) PANELS A & B

SAP 002-622-036, SAP 223-020-006 SHEET NO. 63 OF 97 SHEETS

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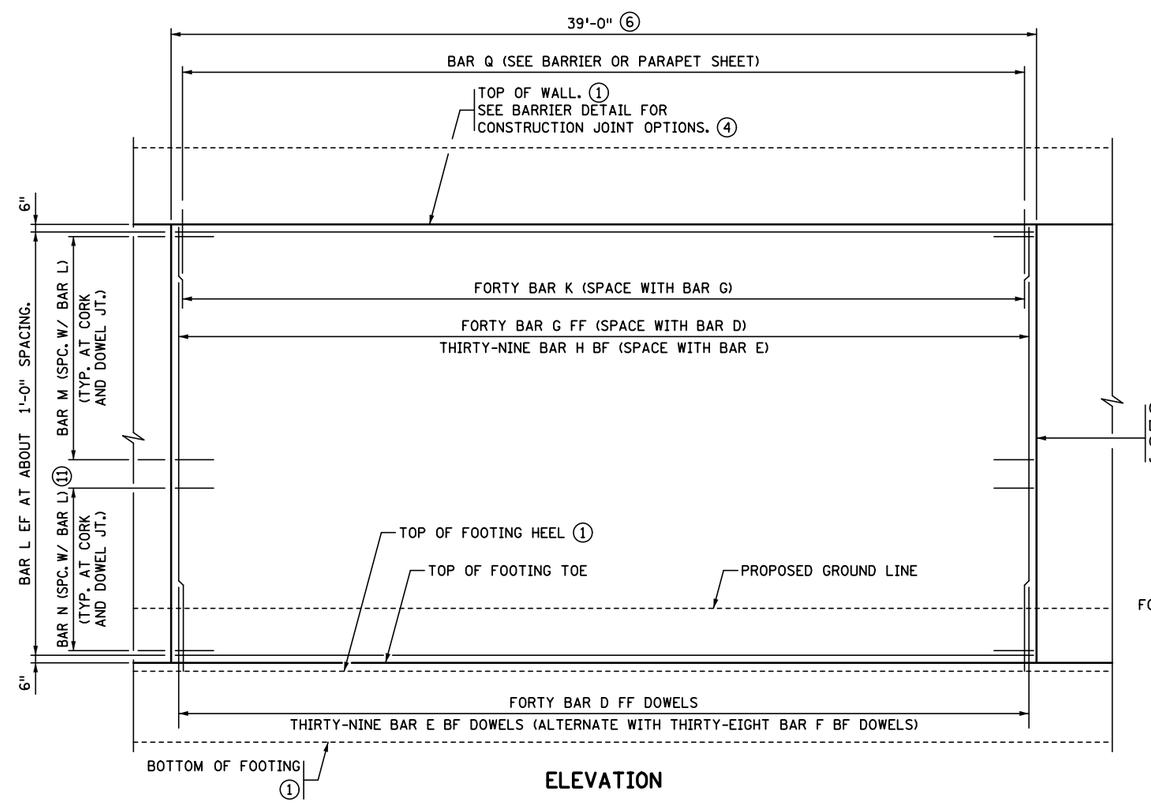
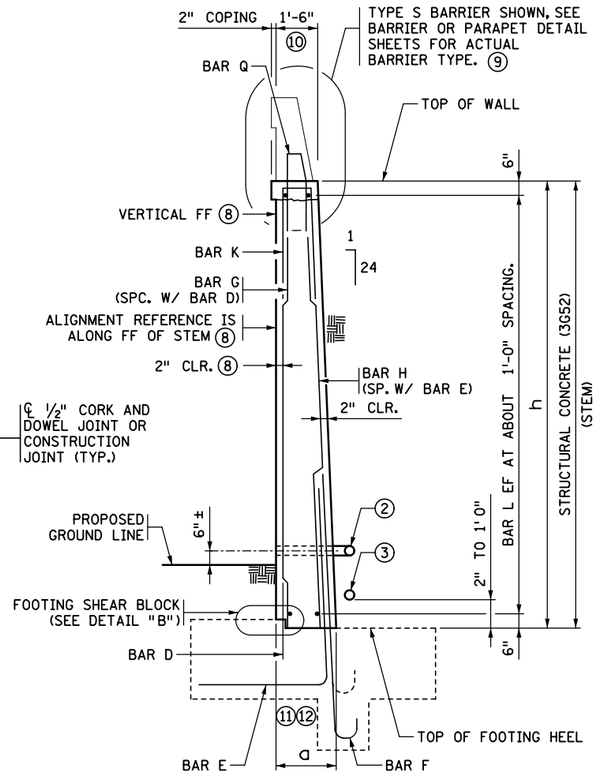
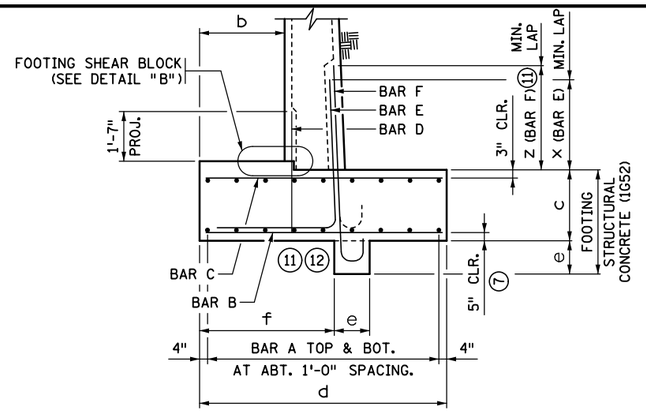


ELEVATION

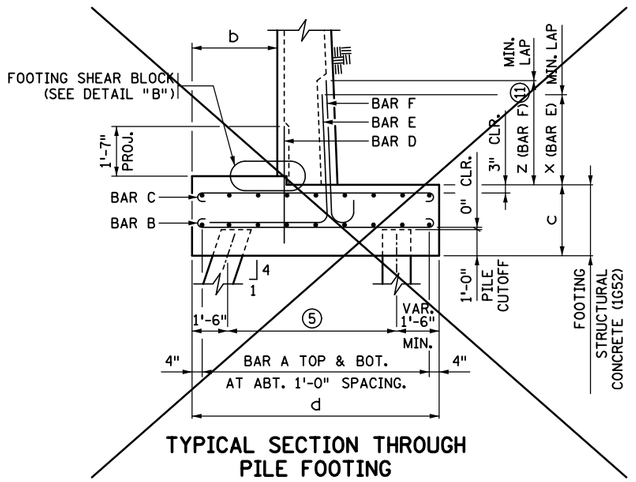


WALL SECTION

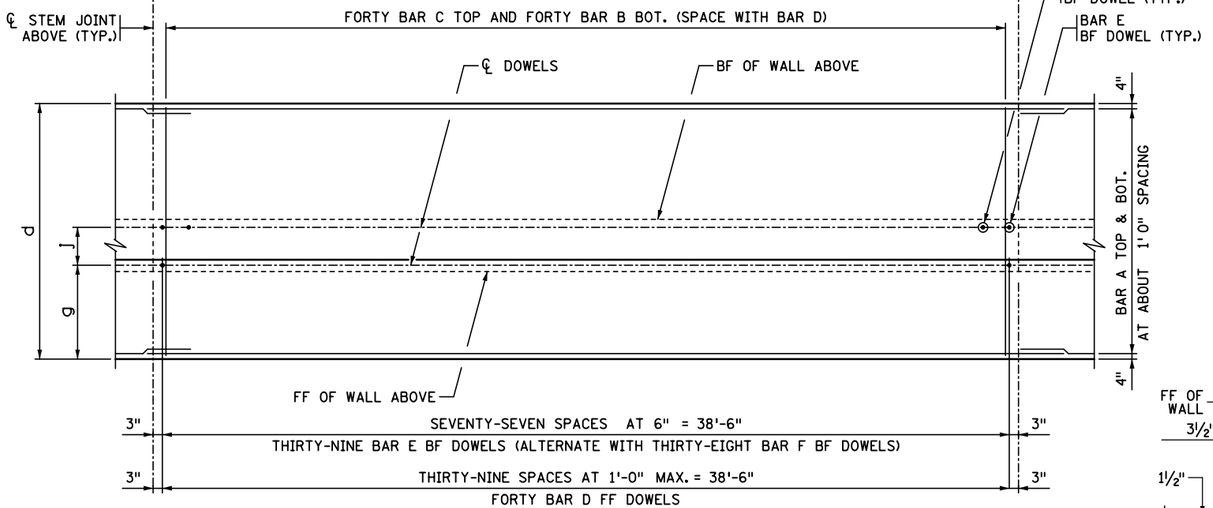
(F BARRIER AND 2" COPING OPTION SHOWN)



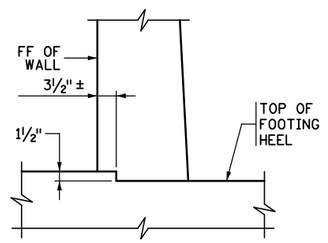
TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING



FOOTING PLAN ~ REINFORCEMENT



DETAIL "B"

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.

MODIFIED LENGTH AND QUANTITIES FOR PANEL LENGTH ADJUSTMENT FROM 30'-6" TO 39'-0"

MODIFIED

**DENOTES MODIFICATION FROM STANDARD PLAN*

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
Nancy Daubenberger
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.
NAME: TODD A. LANG LIC. NO. 42962
CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER
8/10/2023 DATE

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD ~~PLAN 5-297.622~~ 1 OF 1
APPROVED: 8-27-2014
REVISED: 9-1-2016
Christine Ry
STATE DESIGN ENGINEER

RETAINING WALL REINFORCEMENT DETAILS (MEDIUM WALLS) PANEL C

SAP 002-622-036, SAP 223-020-006 SHEET NO. 64 OF 97 SHEETS

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BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = VARIES FROM 11'-0 7/8" TO 10'-4 1/2"					PANEL A		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"

STEM	
a	1'-11 1/2" TO 1'-11 1/4"
j	1'-7" TO 1'-6 3/4"
x	2'-1"
z	2'-3"

FOOTING		DOWELS & STEM REINFORCEMENT					QUANTITIES
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)
E	F505E	31	7'-10"	4'-1"	DOWEL BF	253	(FOOTING)
F	F506E	30	4'-3"	3'-2"	DOWEL BF	133	SPREAD 14.0 CU YD
G	S401E	31	8'-2"	STR.	VERT FF	169	
H	S502E	31	8'-2"	STR.	VERT BF	264	STRUCTURAL CONCRETE (1G52)
J	S503E	----	----	STR.	VERT BF	----	(STEM)
K	S504E	31	10'-8"	4'-9"	P4 BAR. TIE	345	20.9 CU YD
L	S405E	22	30'-0"	STR.	HORIZ EF	441	REINFORCEMENT (PLAIN)
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	SPREAD 1135 LB
N	S507E	2	7'-9"	1'-9"	EXP JT TIE	16	
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	REINFORCEMENT (EPOXY)
Q	S509E	34	6'-11"	3'-1"	P4 BAR. DWL	245	2116 LB

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = VARIES FROM 13'-0 3/4" TO 12'-5 3/4"					PANEL B		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	F603	31	8'-0"	STR.	TRANS TOP	372	c 1'-5" f ----
							d 8'-6" g 2'-9 1/4"

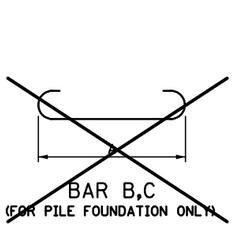
STEM	
a	2'-0 1/2" TO 2'-0 1/4"
j	1'-7 7/8" TO 1'-7 5/8"
x	2'-1"
z	3'-3"

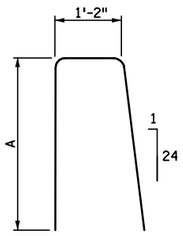
FOOTING		DOWELS & STEM REINFORCEMENT					QUANTITIES
D	F504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURAL CONCRETE (1G52)
E	F505E	31	8'-1"	4'-2"	DOWEL BF	261	(FOOTING)
F	F506E	30	5'-3"	4'-2"	DOWEL BF	164	SPREAD 14.0 CU YD
G	S401E	31	10'-2"	STR.	VERT FF	211	
H	S502E	31	10'-2"	STR.	VERT BF	329	STRUCTURAL CONCRETE (1G52)
J	S503E	----	----	STR.	VERT BF	----	(STEM)
K	S504E	31	10'-8"	4'-9"	P4 BAR. TIE	345	25.5 CU YD
L	S405E	26	30'-0"	STR.	HORIZ EF	521	REINFORCEMENT (PLAIN)
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	SPREAD 1249 LB
N	S507E	6	7'-9"	1'-9"	EXP JT TIE	48	
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	REINFORCEMENT (EPOXY)
Q	S509E	34	6'-11"	3'-1"	S BARRIER DWL	245	2374 LB

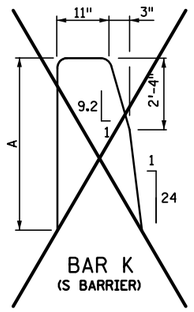
BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = VARIES FROM 13'-3 1/2" TO 11'-10 1/4"					PANEL C		PANEL LENGTH = 39'-0"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	18	38'-6"	STR.	LONG T & B	723	SPREAD FOOTING
B	F502	40	8'-0"	STR.	TRANS BOT	334	b 2'-7" e ----
C	F603	40	8'-0"	STR.	TRANS TOP	481	c 1'-7" f ----
							d 8'-6" g 2'-9 1/4"

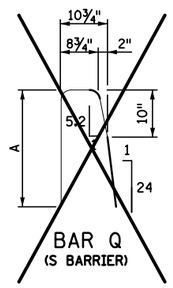
STEM	
a	2'-0 5/8" TO 1'-11 7/8"
j	1'-8" TO 1' 7 1/4"
x	2'-1"
z	4'-4"

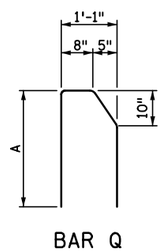
FOOTING		DOWELS & STEM REINFORCEMENT					QUANTITIES
D	F504E	40	3'-0"	STR.	DOWEL FF	125	STRUCTURAL CONCRETE (1G52)
E	F505E	39	8'-2"	4'-3"	DOWEL BF	332	(FOOTING)
F	F606E	38	6'-7"	5'-5"	DOWEL BF	376	SPREAD 20.0 CU YD
G	S401E	40	11'-2"	STR.	VERT FF	298	
H	S502E	39	11'-2"	STR.	VERT BF	454	STRUCTURAL CONCRETE (1G52)
J	S503E	----	----	STR.	VERT BF	----	(STEM)
K	S504E	40	10'-8"	4'-9"	F/P1/P4 BAR. TIE	445	25.4 CU YD
L	S405E	28	38'-6"	STR.	HORIZ EF	720	REINFORCEMENT (PLAIN)
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	SPREAD 1538 LB
N	S507E	8	7'-9"	1'-9"	EXP JT TIE	65	
P	S508E	----	8'-2"	2'-2"	EXP JT TIE	----	REINFORCEMENT (EPOXY)
Q	S509E	42	6'-11"	3'-1"	F/P4 BAR. DWL	303	3271 LB

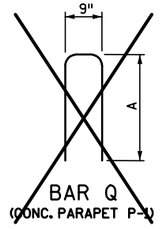


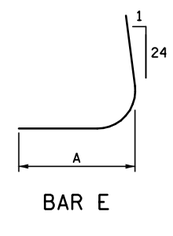


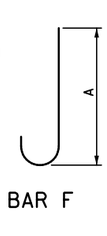


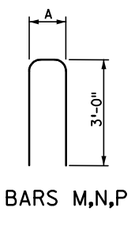












NOTES:

L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.

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.

NAME: TODD A. LANG LIC. NO. 42962

CERTIFIED BY: _____ 8/10/2023
LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN
DESIGNED BY: JCN
CHECKED BY: TAL

HDR

ANOKA COUNTY

RETAINING WALL 2 PANEL TABULATIONS

SHEET NO. 65 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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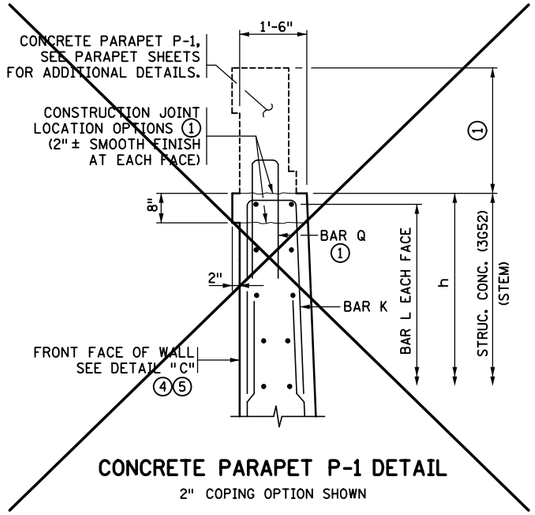
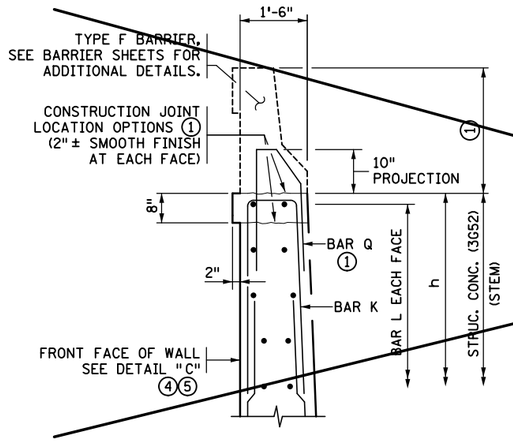


CONCRETE PARAPET P-1 DETAIL

2" COPING OPTION SHOWN



TYPE F BARRIER DETAIL

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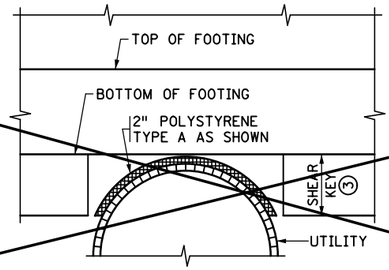
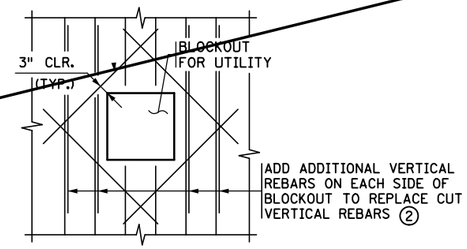
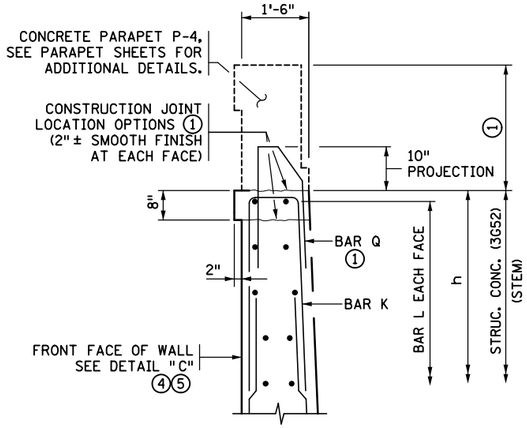


PIPE UNDER SPREAD FOOTING (THROUGH SHEAR KEY)



UTILITY BLOCKOUT DETAIL



CONCRETE PARAPET P-4 DETAIL

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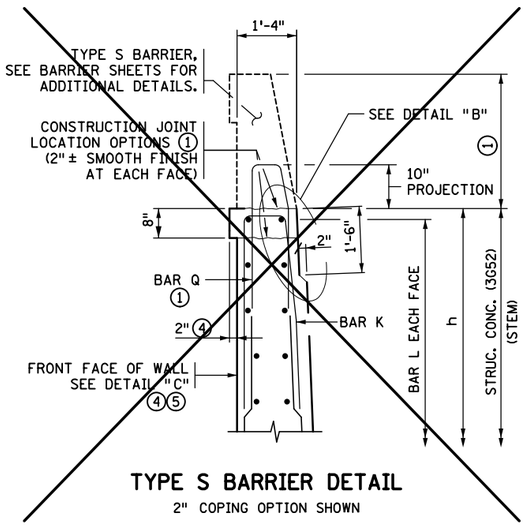

TYPE S BARRIER DETAIL

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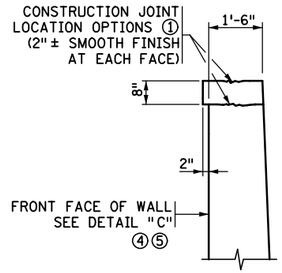
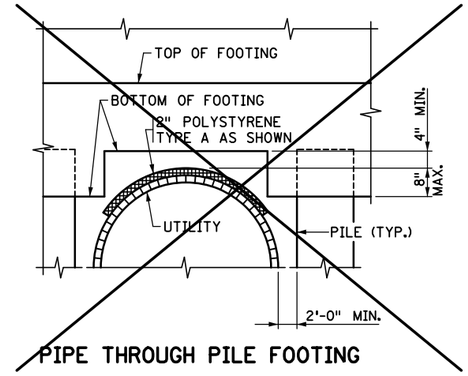
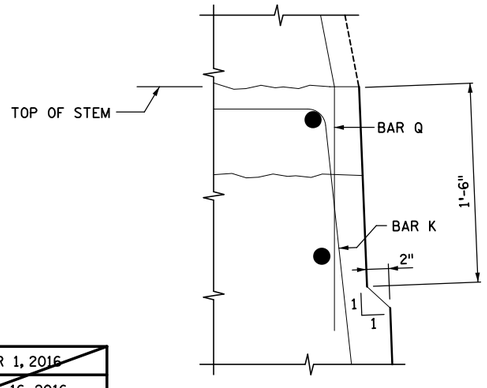


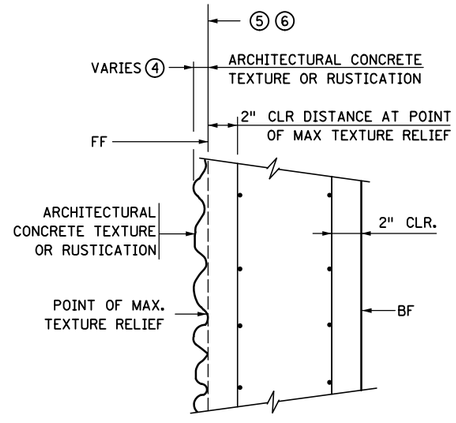
COPING DETAIL



PIPE THROUGH PILE FOOTING



DETAIL "B"



DETAIL "C"

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.

MODIFIED

REVISION: SEPTEMBER 1, 2016

APPROVED: FEBRUARY 16, 2016

STATE BRIDGE ENGINEER

REVISION DATE ~~8-1-16~~

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.

NAME: TODD A. LANG LIC. NO. 42962

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER

8/10/2023 DATE

STANDARD SHEET NO. ~~5-297.624 (1 OF 6)~~

STANDARD APPROVED: ~~FEBRUARY 16, 2016~~

TITLE: RETAINING WALL MISCELLANEOUS DETAILS (1 OF 5)

SAP 002-622-036, SAP 223-020-006 SHEET NO. 66 OF 97 SHEETS

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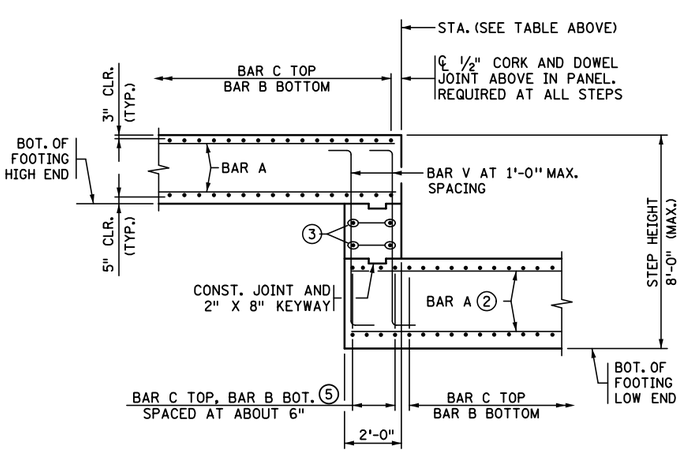

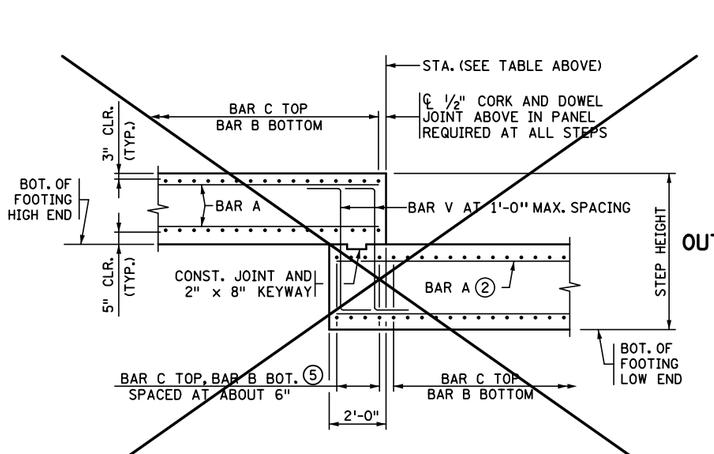

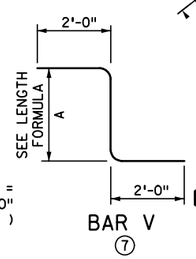

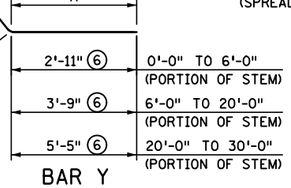

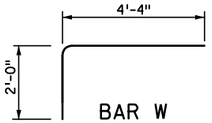

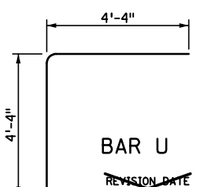

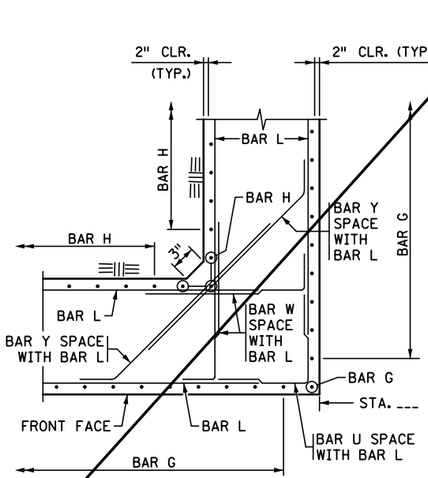

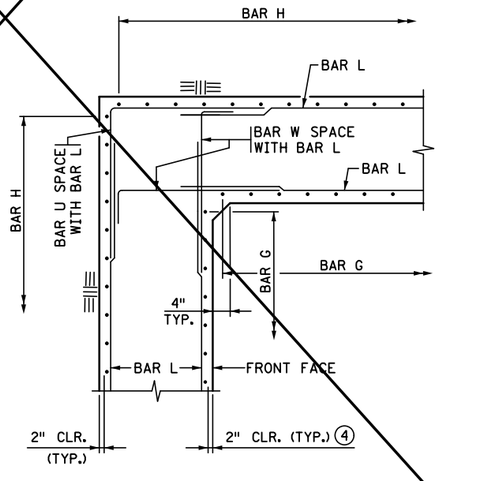

BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS ①②

STATION	STEP TYPE (VAR. OR MIN.)	JOINT	BOT. OF FOOTING EL. LOW END	BOT. OF FOOTING EL. HIGH END	BAR (B, C, V)	MARK	NO.	LENGTH	A- DIMENSION
103+76.33	VAR.	2	870.469	873.160	B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				
					B ⑧				N.A.
					C ⑧		4		N.A.
					V ⑦				

N.A. = NOT APPLICABLE

BILL OF REINFORCEMENT FOR CORNER DETAILS ①

STATION	JOINT	INSIDE OR OUTSIDE CORNER	BAR	MARK	NO.	LENGTH	SHAPE	A- DIMENSION
			U	C4 E		8'-8"	┌	N.A.
			W	C4 E		6'-4"	┌─	N.A.
			Y	C4 E		4'-11"	╲__	2'-11"
			Y	C4 E		5'-9"	╲__	3'-9"
			Y	C4 E		7'-5"	╲__	5'-5"
			U	C4 E		8'-8"	┌	N.A.
			W	C4 E		6'-4"	┌─	N.A.
			Y	C4 E		4'-11"	╲__	2'-11"
			Y	C4 E		5'-9"	╲__	3'-9"
			Y	C4 E		7'-5"	╲__	5'-5"
			U	C4 E		8'-8"	┌	N.A.
			W	C4 E		6'-4"	┌─	N.A.
			Y	C4 E		4'-11"	╲__	2'-11"
			Y	C4 E		5'-9"	╲__	3'-9"
			Y	C4 E		7'-5"	╲__	5'-5"
			U	C4 E		8'-8"	┌	N.A.
			W	C4 E		6'-4"	┌─	N.A.
			Y	C4 E		4'-11"	╲__	2'-11"
			Y	C4 E		5'-9"	╲__	3'-9"
			Y	C4 E		7'-5"	╲__	5'-5"

N.A. = NOT APPLICABLE

STEPPED FOOTING DETAIL - LONGIT. SECTION ①②

VARIABLE STEP TYPE
(SPREAD FOOTING SHOWN)

STEPPED FOOTING DETAIL - LONGIT. SECTION ①②

MINIMUM STEP TYPE
(SPREAD FOOTING SHOWN)

OUTSIDE 90° CORNER DETAIL - PLAN VIEW ①

INSIDE 90° CORNER DETAIL - PLAN VIEW ①

NOTES:

ADDITIONAL REINFORCING BARS, STRUCTURAL CONCRETE, AND OTHER COMPONENTS REQUIRED TO CONSTRUCT CORNERS AND STEPPED FOOTINGS ARE INCIDENTAL.

① CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND SUBMIT TO PROJECT ENGINEER AT LEAST 3 WEEKS PRIOR TO REBAR FABRICATION.

② FOR THE LOWER OF THE TWO FOOTINGS AT A STEP, THE CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE LENGTH OF FOOTING BAR A TO EXTEND BENEATH THE STEP OR USE SPLICED BARS.

③ 6 INCH MAX. SPACING. BARS TO BE SAME SIZE AND LENGTH AS BAR B OF THE LOWER FOOTING.

④ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).

⑤ REFER TO TABLE LABELED "BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS" FOR ADDITIONAL B AND C BARS IN LOWER FOOTING.

⑥ USE THE BAR Y LEG DIMENSION FOR THE PORTION OF STEM LOCATION INDICATED IN THE BAR BEND IN DETAIL. (0'-0" REPRESENTS TOP OF THE STEM).

⑦ BAR V SIZE TO MATCH BAR B. SEE PANEL TABULATIONS FOR SIZE.

⑧ SEE PANEL TABULATIONS FOR BAR SIZE AND LENGTH.

BAR V LENGTH FORMULA =
STEP HEIGHT MINUS 10"
(A-DIMENSION)

BAR BEND DETAILS

MODIFIED

~~REVISION: SEPTEMBER 1, 2016~~
~~APPROVED: AUGUST 27, 2014~~
Nancy Daubenberger
STATE BRIDGE ENGINEER

~~REVISION DATE~~
~~5-1-16~~

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.

NAME: TODD A. LANG
LIC. NO. 42962
CERTIFIED BY: Todd A. Lang
LICENSED PROFESSIONAL ENGINEER
8/10/2023
DATE

~~STANDARD SHEET NO. 5-297.624 (2 OF 6)~~
~~STANDARD APPROVED: AUGUST 27, 2014~~

TITLE:
RETAINING WALL MISCELLANEOUS DETAILS (2 OF 5)

SAP 002-622-036, SAP 223-020-006

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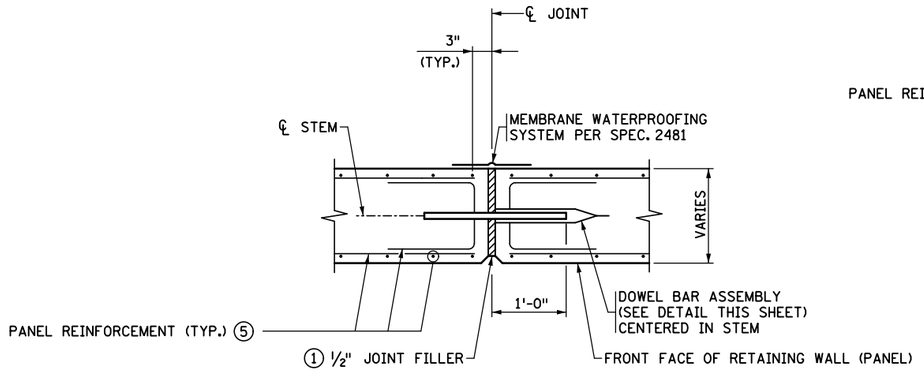
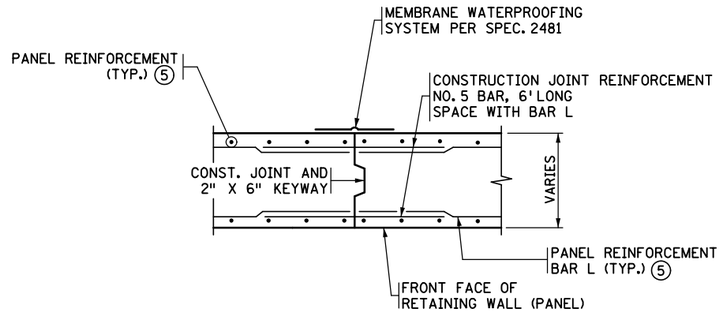


CORK AND DOWELED JOINT DETAIL

(TYPICAL SECTION THROUGH JOINT)

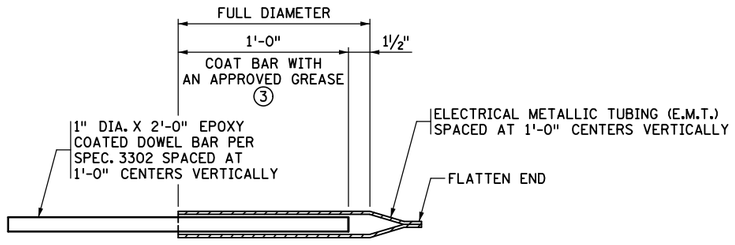
②④



CONSTRUCTION JOINT DETAIL

(TYPICAL SECTION THROUGH JOINT)

②④



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 91'-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.

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REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 27, 2014

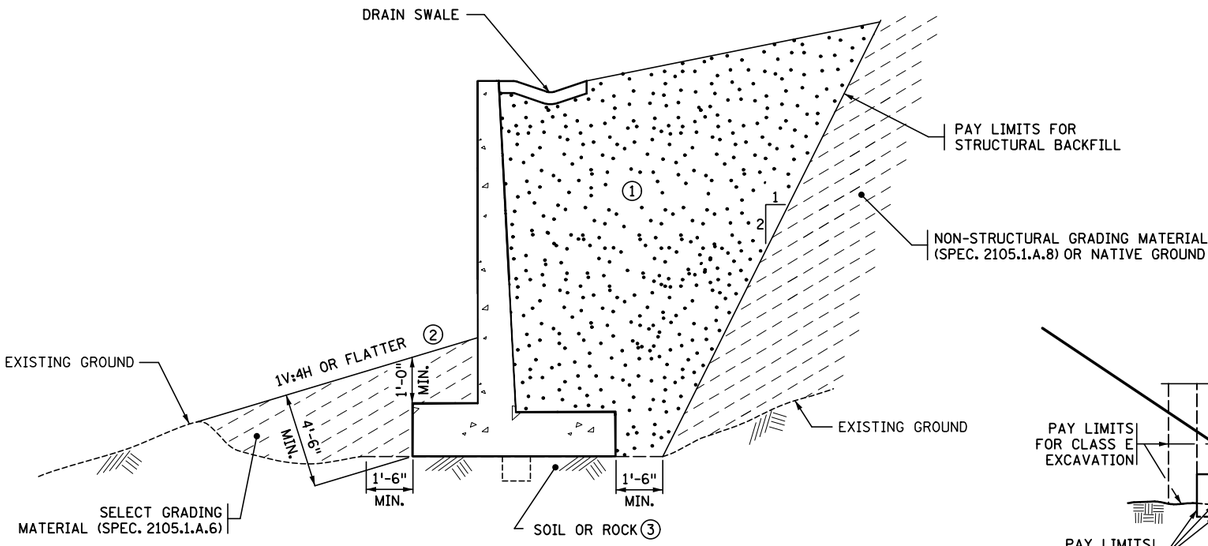
Nancy Dorbenberger
STATE BRIDGE ENGINEER

REVISION DATE
9-1-16

STANDARD SHEET NO.
5-297.624 (3 OF 6)

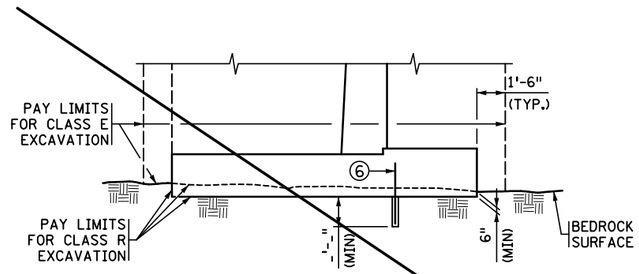
STANDARD APPROVED:
AUGUST 27, 2014

TITLE:
RETAINING WALL MISCELLANEOUS DETAILS (3 OF 5)

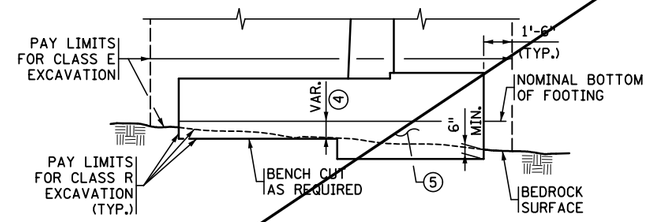


SPREAD FOOTING ON SOIL/ROCK

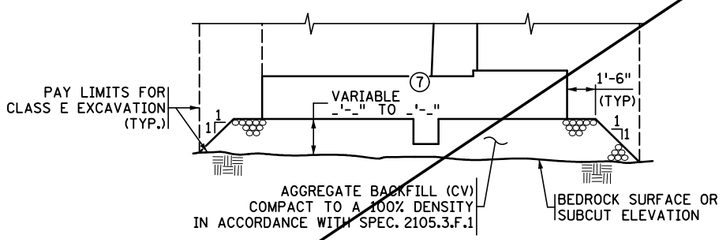
(NOT DRAWN TO SCALE)



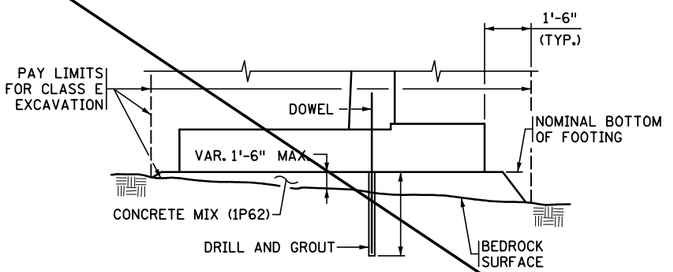
ROCK EXCAVATION OPTION



ROCK SUBCUT WITH CONCRETE BACKFILL OPTION



AGGREGATE BACKFILL OPTION



DOWEL AND LEAN CONCRETE BACKFILL OPTION

ROCK FOUNDATION OPTIONS

1. STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1
2. PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
3. LEVEL FOUNDATION SURFACE AND CLEAR SURFACE OF LOOSE DEBRIS BEFORE PLACING FOUNDATION DIRECTLY ON SOIL OR ROCK.
4. SEE SPECIAL PROVISIONS FOR PAYMENT OF ADDITIONAL CONCRETE.
5. STRUCTURAL CONCRETE (1G52) OR LEAN CONCRETE BACKFILL (1P62), AS APPROVED BY ENGINEER.
6. DRILL HOLES FOR ANCHORS TO KEY FOOTING IN ROCK.
7. MINIMUM DEPTH 1 FT. 6 INCH OR SHEAR KEY DEPTH.

MODIFIED

REVISION:

APPROVED: FEBRUARY 16, 2016

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.

NAME: TODD A. LANG LIC. NO. 42962

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

STANDARD SHEET NO. 5-297.624 (4 OF 6)

STANDARD APPROVED: FEBRUARY 16, 2016

TITLE: RETAINING WALL MISCELLANEOUS DETAILS (4 OF 5) (GEOTECHNICAL DETAILS)

SAP 002-622-036, SAP 223-020-006 SHEET NO. 69 OF 97 SHEETS

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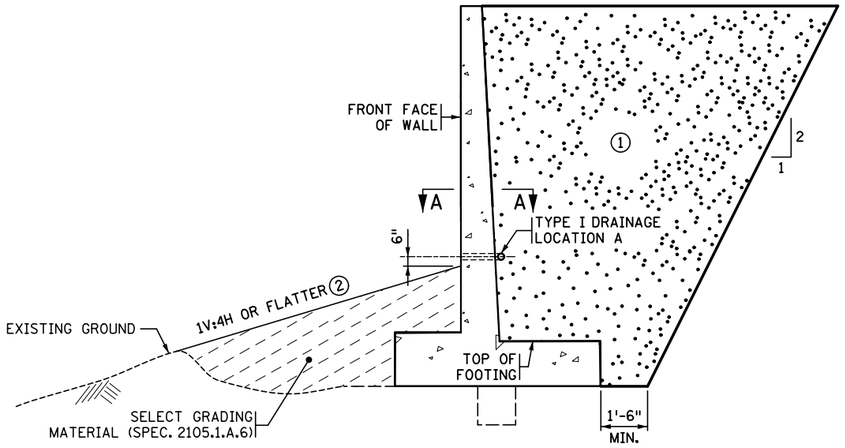
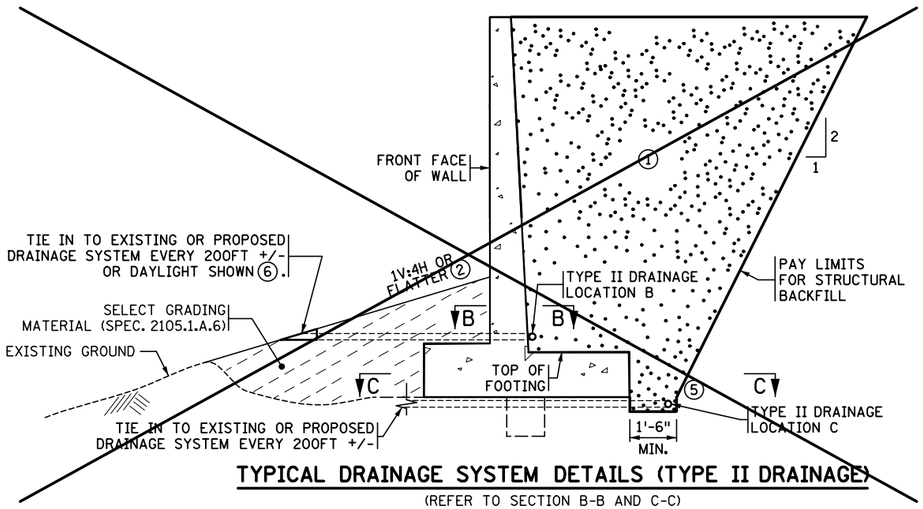


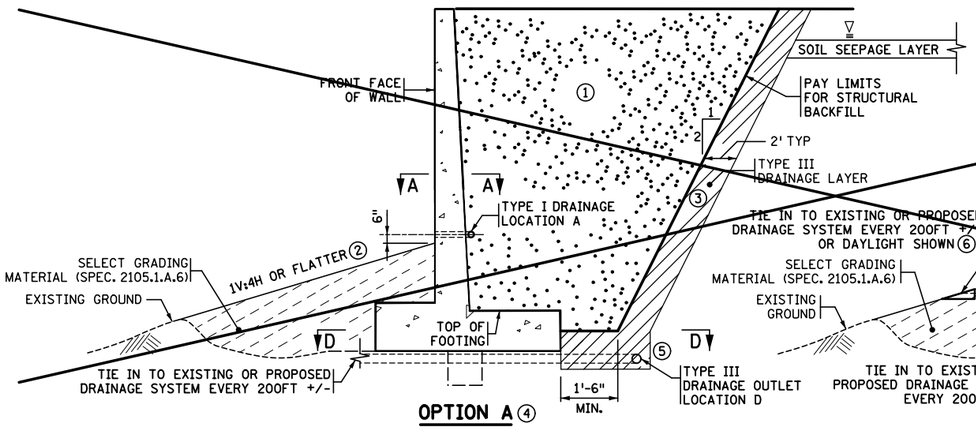
TYPICAL DRAINAGE SYSTEM DETAILS (TYPE I DRAINAGE) (4)

(REFER TO SECTION A-A)



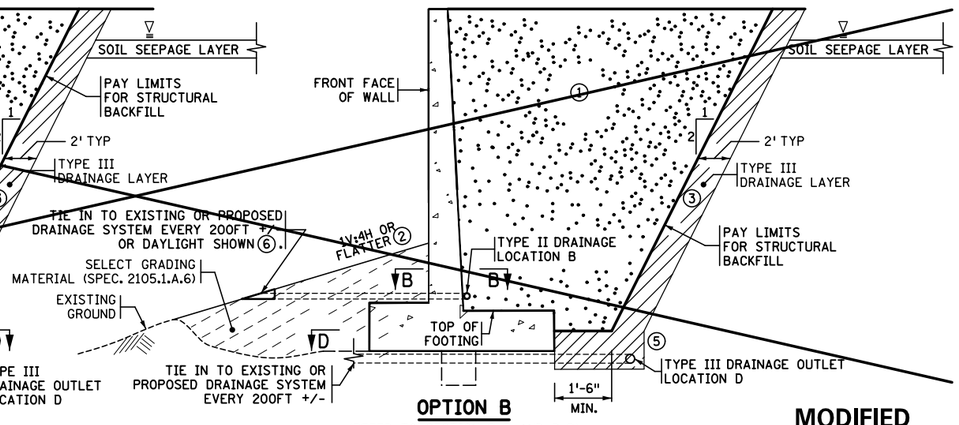
TYPICAL DRAINAGE SYSTEM DETAILS (TYPE II DRAINAGE)

(REFER TO SECTION B-B AND C-C)



OPTION A (4)

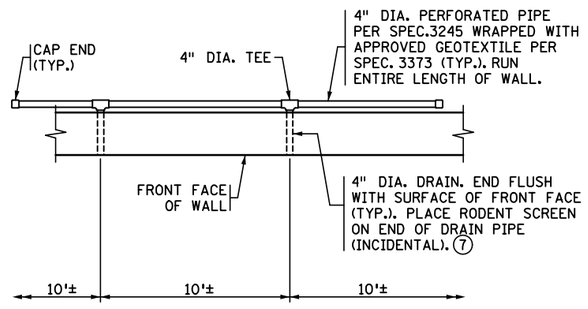
(REFER TO SECTION A-A AND D-D)



OPTION B

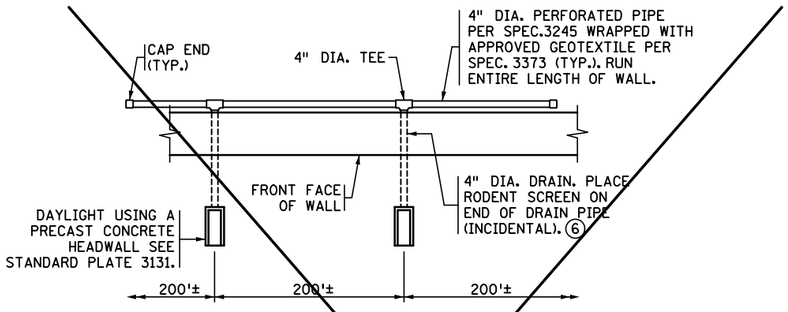
(REFER TO SECTION B-B AND D-D)

TYPICAL DRAINAGE SYSTEM DETAILS (TYPE III DRAINAGE)



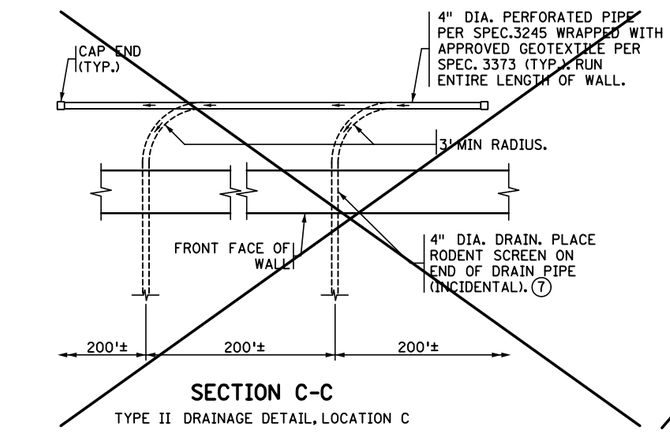
SECTION A-A

TYPE I DRAINAGE DETAIL, LOCATION A



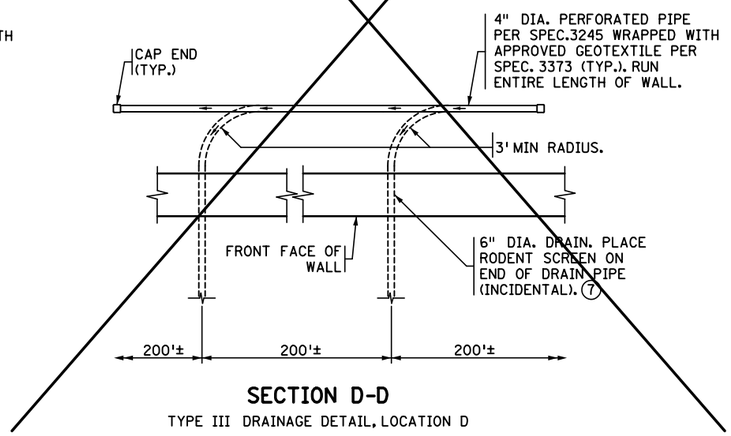
SECTION B-B

TYPE II DRAINAGE DETAIL, LOCATION B



SECTION C-C

TYPE II DRAINAGE DETAIL, LOCATION C



SECTION D-D

TYPE III DRAINAGE DETAIL, LOCATION D

NOTES:

BACKFILL MATERIAL SHALL COMPLETELY SURROUND PIPE AT ALL TIMES.

SLOPE PIPE TO ENSURE PROPER DRAINAGE AT ALL TIMES.

DRAINAGE SYSTEM PAID BY LUMP SUM PER SPEC. 2502.

(1) STRUCTURAL BACKFILL. SEE SHEET 5-297.620. COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1.

(2) PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.

~~(3) TYPE III DRAINAGE LAYER TO BE FINE FILTER AGGREGATE PER SPEC. 3149.2.J.2. FINE FILTER AGGREGATE MAY BE REPLACED WITH TYPE VI DRAINAGE GEOCOMPOSITE MATERIAL.~~

(4) DRAINAGE SYSTEMS INSTALLED AT LOCATION A SHALL NOT BE USED WHEN A SIDEWALK, TRAIL, OR ROADWAY IS LOCATED ADJACENT TO THE FRONT FACE OF THE WALL TO PREVENT PONDING OR ICE ACCUMULATION.

~~(5) EXTEND STRUCTURAL BACKFILL OR FINE FILTER AGGREGATE 8" BELOW BOTTOM OF FOOTING.~~

~~(6) TYPE II LOCATION B DRAINAGE MAY DAYLIGHT DIRECTLY USING PRECAST CONCRETE HEADWALLS OR BE TIED INTO DRAINAGE SYSTEM.~~

(7) THE RODENT SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE ½" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.

MODIFIED

REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 27, 2014

Nancy Daubenberger
STATE BRIDGE ENGINEER

REVISION DATE 9-1-16

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NAME: TODD A. LANG LIC. NO. 42962

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER 8/10/2023 DATE

STANDARD SHEET NO. 5-297.624 (5 OF 6)

STANDARD APPROVED: AUGUST 27, 2014

TITLE: RETAINING WALL MISCELLANEOUS DETAILS (5 OF 5) (GEOTECHNICAL DETAILS)

SAP 002-622-036, SAP 223-020-006 SHEET NO. 70 OF 97 SHEETS

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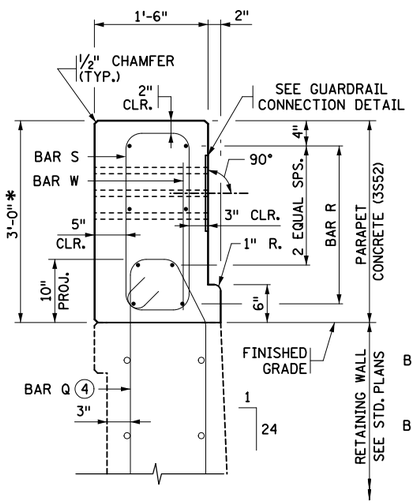
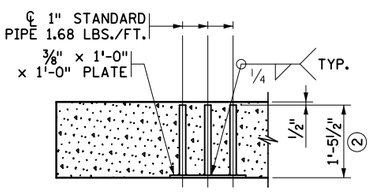
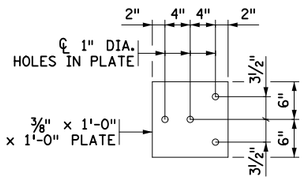


SECTION B-B



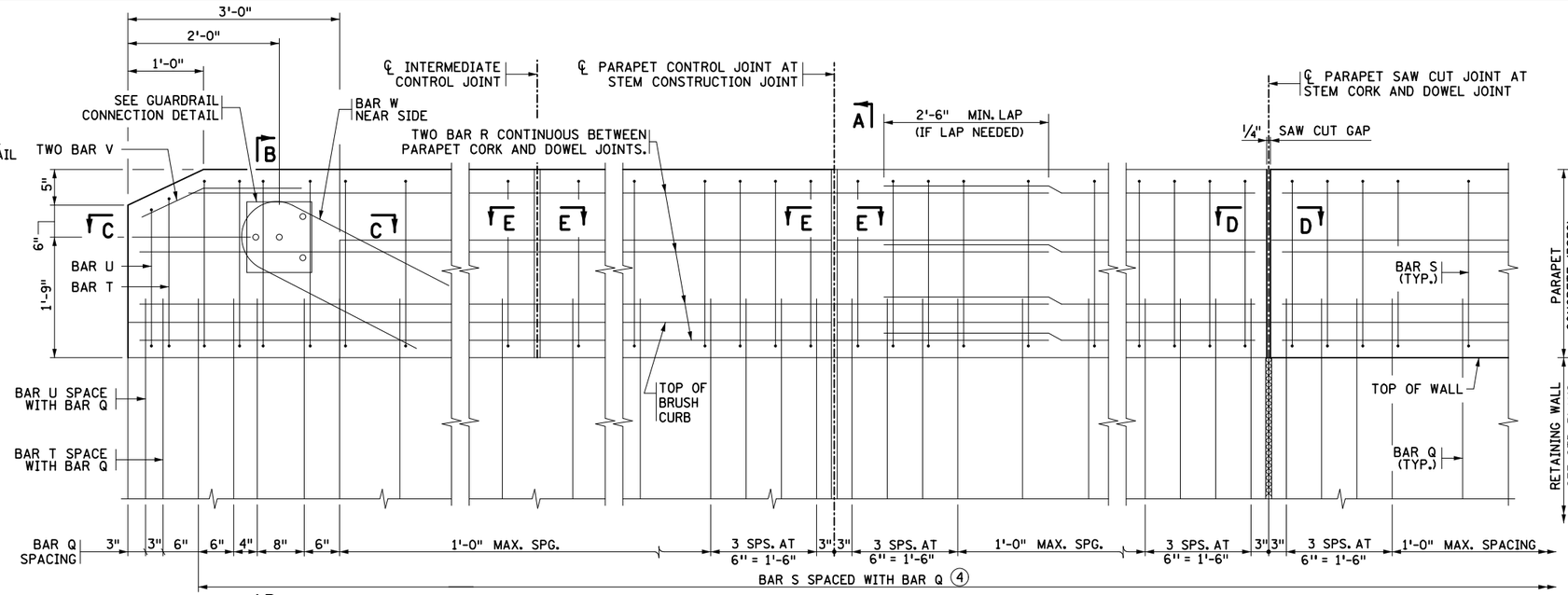
SECTION C-C

(REINFORCEMENT NOT SHOWN)



GUARDRAIL CONNECTION DETAIL

GALVANIZE AFTER FABRICATION PER SPEC. 3394. ESTIMATED WEIGHT = 23 LBS

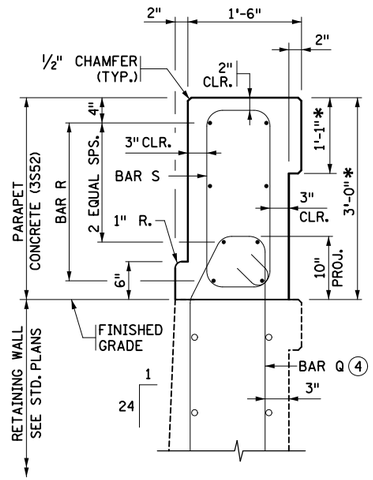


B

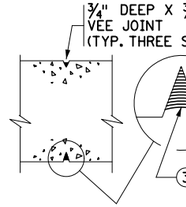
AT GUARDRAIL CONNECTION

A

INSIDE ELEVATION OF PARAPET

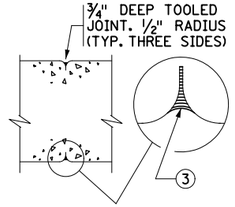


SECTION A-A



SECTION E-E

CONTRACTOR OPTION 1

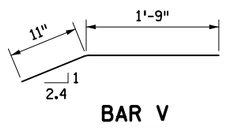


SECTION E-E

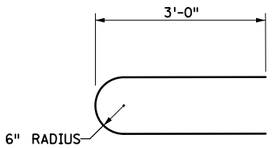
CONTRACTOR OPTION 2

CONTROL JOINT DETAILS

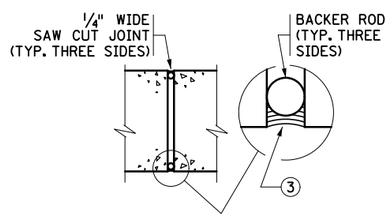
WHEN USING SLIP FORM METHOD TO PLACE THE CONCRETE, CUT JOINT 3 INCHES DEEP USING MARGIN TROWEL OR SIMILAR MEANS IMMEDIATELY AFTER CONCRETE PLACEMENT (TYP. THREE SIDES)



BAR V



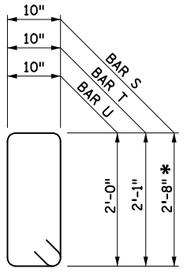
BAR W



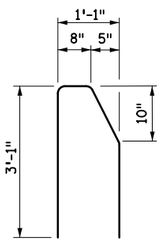
SECTION D-D

PARAPET SAW CUT JOINT

MATCH PARAPET SAW CUT JOINTS WITH RETAINING WALL STEM CORK AND DOWEL JOINTS.



BAR S, T, U



BAR Q

PARAPET MEETS TEST LEVEL 4 REQUIREMENTS OF NCHRP REPORT 350

NOTES:

MATCH PARAPET SAW CUT JOINTS WITH RETAINING WALL STEM CORK AND DOWEL JOINTS.

MATCH PARAPET CONTROL JOINTS WITH RETAINING WALL STEM CONSTRUCTION JOINTS. PLACE INTERMEDIATE PARAPET CONTROL JOINTS AT 10'-0" MAXIMUM SPACING.

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.

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.

THE GUARDRAIL CONNECTION IS INCLUDED IN THE PRICE BID FOR PARAPET CONCRETE (3S52).

PROVIDE GUARDRAIL CONNECTION FROM STRUCTURAL STEEL PER SPEC. 3306, GALVANIZE AFTER FABRICATION PER SPEC. 3394.

FOR TYPICAL RETAINING WALL REINFORCEMENT AND DETAILS, SEE STANDARD RETAINING WALL SHEETS.

CONCRETE PARAPET: 570 LBS/FT (0.141 CU YD/FT) 2'-8" HEIGHT
608 LBS/FT (0.150 CU YD/FT) 2'-10" HEIGHT

PAY FOR CONCRETE PARAPET ON A LINEAL FOOT BASIS.

(1) REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FOOT FOR THE PARAPET.

(2) DIMENSION INCLUDES ⅜" PLATE.

(3) JOINT SEALANT PER MnDOT APPROVED/QUALIFIED PRODUCT LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS.

(4) BAR Q SPACING AND CLEARANCES ARE SHOWN ON THIS SHEET. BAR Q QUANTITIES ARE INCLUDED IN THE WALL PANEL TABULATIONS, EXCEPT FOR A SMALL QUANTITY OF ADDED BARS NEEDED AT A GUARDRAIL CONNECTION.

BILL OF REINFORCEMENT *

TYPICAL PARAPET ON RETAINING WALL
30'-6" PANEL LENGTH, PANELS: A & B

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E	8	30'-2"	——	PARAPET - HORIZONTAL
S	R502E	34	7'-10"	⌐	PARAPET - VERTICAL

PARAPET CONC. (3S52) 4.8 CU YD (1)
REINFORCEMENT BARS (EPOXY) 439 POUND (1)

~~30'-6" PANEL LENGTH WITH GUARDRAIL CONNECTION~~

	BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
(4)	Q	S509E	2	6'-11"	⌐	PARAPET - VERTICAL
	R	R401E	8	30'-2"	——	PARAPET - HORIZONTAL
	S	R502E	34	7'-2"	⌐	PARAPET - VERTICAL
	T	R503E	1	6'-8"	⌐	PARAPET - VERTICAL
	U	R504E	1	6'-8"	⌐	PARAPET - VERTICAL
	V	R405E	2	2'-8"	——	PARAPET END
	W	R706E	1	6'-7"	⌐	PARAPET - VERTICAL

~~PARAPET CONC. (3S52) 4.3 CU YD (1)~~
~~REINFORCEMENT BARS (EPOXY) 461 POUND (1)~~

TYPICAL PARAPET ON RETAINING WALL
39'-0" PANEL LENGTH, PANEL: C

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R401E	8	38'-8"	——	PARAPET - HORIZONTAL
S	R502E	42	7'-10"	⌐	PARAPET - VERTICAL

PARAPET CONC. (3S52) 6.2 CU YD (1)
REINFORCEMENT BARS (EPOXY) 550 POUND (1)

MODIFIED

*DENOTES MODIFICATION FROM STANDARD PLAN

REVISION:

APPROVED: SEPTEMBER 1, 2016
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.

NAME: TODD A. LANG LIC. NO. 42962
CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER 8/10/2023 DATE

STANDARD SHEET NO. ~~5-297.634~~
STANDARD APPROVED: ~~SEPTEMBER 1, 2016~~

TITLE: RETAINING WALL CONCRETE PARAPET (TYPE P-4)

SAP 002-622-036, SAP 223-020-006 SHEET NO. 71 OF 97 SHEETS

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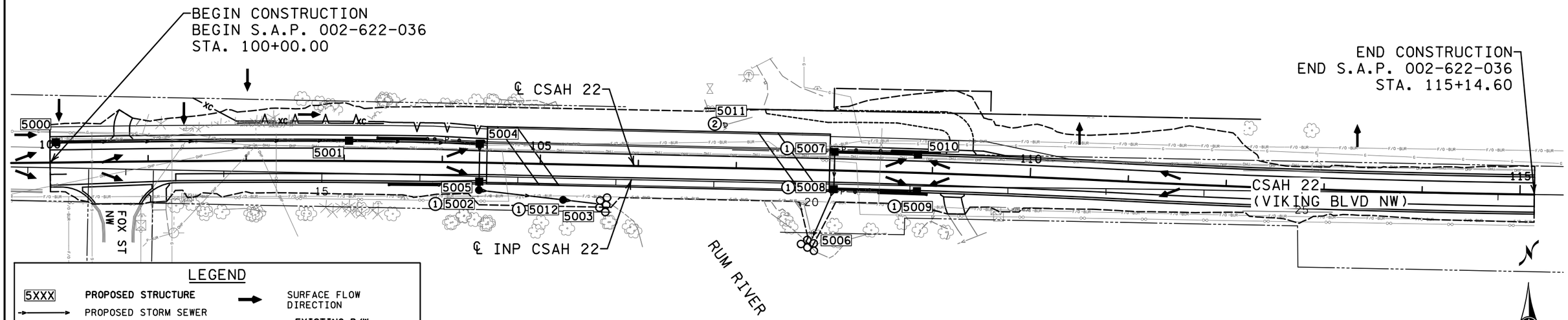


LEGEND

- 5XXX — PROPOSED STRUCTURE
- PROPOSED STORM SEWER
- INPLACE STORM SEWER
- CATCH BASIN/MANHOLE
- INPLACE CATCH BASIN/MANHOLE
- RIPRAP
- SURFACE FLOW DIRECTION
- EXISTING R/W
- PROPOSED R/W
- CONSTRUCTION LIMITS
- TEMPORARY EASEMENT

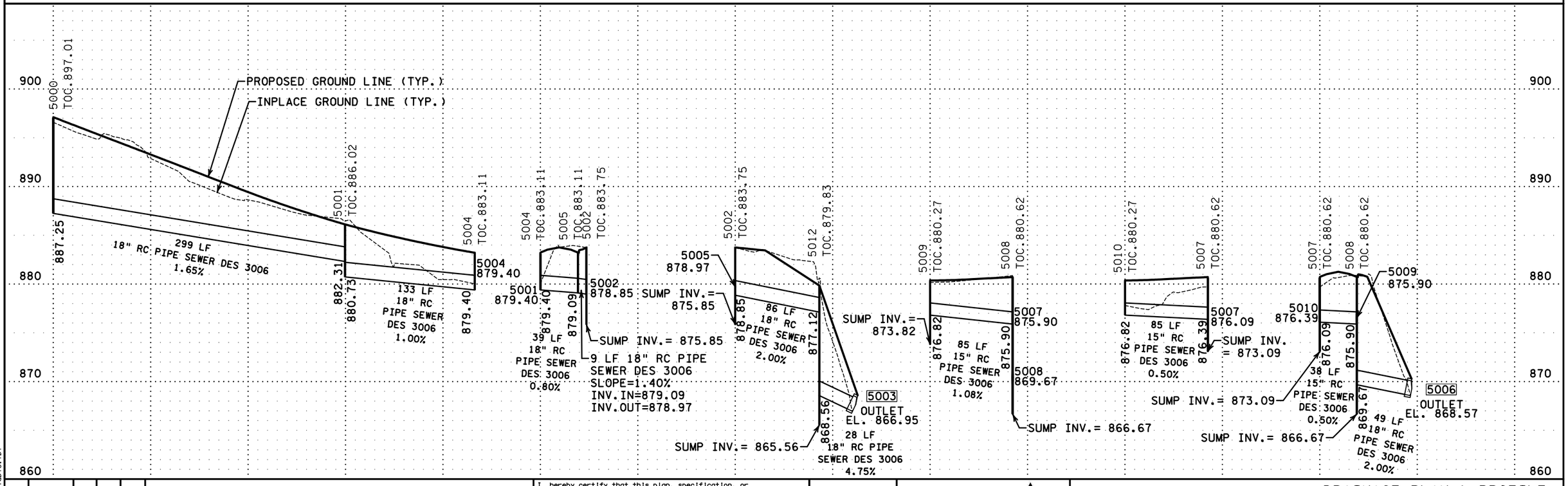
SPECIFIC NOTES

(1) 3' SUMP STRUCTURE

(2) EXISTING PIPE LOCATED IN LIMITS OF PROPOSED BRIDGE RIPRAP GRADING. PROTECT PIPE (INCIDENTAL) DURING RIPRAP PLACEMENT.

100

SCALE IN FEET



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.

NAME: BRETT A. VOTH LIC. NO. 49045

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER DATE 8/10/2023

DRAWN BY: CMK

DESIGNED BY: CMK

CHECKED BY: GEB

HDR

ANOKA COUNTY

DRAINAGE PLAN & PROFILE

SHEET NO. 72 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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STORMWATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE

PROJECT DESCRIPTION/LOCATION

THE PROJECT IS LOCATED ON COUNTY STATE AID HIGHWAY (CSAH) 22 (VIKING BOULEVARD NW) IN THE CITY OF OAK GROVE, ANOKA COUNTY, MINNESOTA. THE PROJECT INVOLVES THE RECONSTRUCTION OF CSAH 22 FROM FOX ST. NW TO 370' WEST OF BLACKFOOT STREET NW AND REMOVAL AND REPLACEMENT OF EXISTING BRIDGE 02519 OVER THE RUM RIVER. RECEIVING WATERS FOR STORMWATER FROM THIS PROJECT IS THE RUM RIVER WHICH IS IN THE MIDDLE OF THE PROJECT.

ENVIRONMENTAL FEATURES

THIS PROJECT IS NOT LOCATED IN A DRINKING WATER SUPPLY MANAGEMENT AREA.

THIS PROJECT IS NOT LOCATED IN A WELLHEAD PROTECTION AREA.

THERE ARE NO KARST FEATURES IN THE PROJECT LIMITS.

SPECIAL AND IMPAIRED WATERS

RUM RIVER (AUID 07010207-503) IS LOCATED ADJACENT TO THE PROJECT AND IS IMPAIRED FOR AQUATIC CONSUMPTION. DUE TO THE PROXIMITY TO THE RUM RIVER, THE BMPS DESCRIBED IN LINES 23.9 AND 23.10 OF THE NPDES PERMIT WILL BE APPLIED TO THIS PROJECT. THOSE BMPS REQUIRE STABILIZATION OF EXPOSED SOILS WITHIN SEVEN (7) CALENDAR DAYS OF CONSTRUCTION ENDING IN THAT PORTION OF THE SITE, AND A TEMPORARY SEDIMENT BASIN FOR COMMON DRAINAGE AREAS THAT SERVE AN AREA WITH FIVE (5) OR MORE ACRES DISTURBED AT ONE TIME.

SOIL INFORMATION

ACCORDING TO THE NRCS WEB SOIL SURVEY, SOILS IN THE PROJECT AREA PRIMARILY CONSIST OF FINE SANDS OR SANDY LOAMS. A GEOTECHNICAL EVALUATION WAS PERFORMED IN OCTOBER 2017. SOIL BORINGS INDICATE THAT THE PROJECT AREA CONSISTS OF SILTY SAND AND POORLY GRADED SAND WITH SILT.

LAND FEATURES

TOTAL DISTURBED AREA = 3.46 ACRES
EXISTING IMPERVIOUS SURFACE AREA = 1.45 ACRES
EXISTING PERVIOUS SURFACE AREA = 1.22 ACRES
PROPOSED IMPERVIOUS SURFACE AREA = 1.88 ACRES
PROPOSED PERVIOUS SURFACE AREA = 1.58 ACRES
NEW IMPERVIOUS SURFACE AREA (FULL RECONSTRUCT AREA) = 0.43 ACRES

LONG TERM OPERATION AND MAINTENANCE

ANOKA COUNTY WILL BE RESPONSIBLE FOR THE LONG TERM OPERATION AND MAINTENANCE OF THE PERMANENT STORMWATER MANAGEMENT SYSTEM.

1440 BUNKER LAKE BOULEVARD
ANDOVER, MN 55304
PHONE: 763-324-3100

PROJECT PERSONNEL AND TRAINING

THIS SWPPP WAS PREPARED BY PERSONNEL THAT ARE CERTIFIED IN THE DESIGN OF CONSTRUCTION SWPPPS. COPIES OF THE CERTIFICATIONS ARE ON FILE WITH ANOKA COUNTY AND ARE AVAILABLE UPON REQUEST.

PROVIDE A CERTIFIED EROSION CONTROL SUPERVISOR IN GOOD STANDING WHO IS KNOWLEDGEABLE AND EXPERIENCED IN THE APPLICATION OF EROSION PREVENTION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES. THE EROSION CONTROL SUPERVISOR WILL WORK WITH THE PROJECT ENGINEER TO OVERSEE THE IMPLEMENTATION OF THE SWPPP AND THE INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMPS BEFORE, DURING AND AFTER CONSTRUCTION UNTIL THE NOTICE OF TERMINATION (NOT) HAS BEEN FILED WITH THE MPCA. PROVIDE PROOF OF CERTIFICATION AT THE PRECONSTRUCITON MEETING. WORK WILL NOT BE ALLOWED TO COMMENCE UNTIL PROOF OF CERTIFICATION HAS BEEN PROVIDED TO THE PROJECT ENGINEER.

THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A CERTIFIED EROSION CONTROL SUPERVISOR THAT IS RESPONSIBLE FOR OVERSEEING THE IMPLEMENTATION OF THE SWPPP. THE CONTRACTOR MUST PROVIDE PROOF OF CERTIFICATION AT THE PRECONSTRUCTION MEETING AND WILL NOT BE ALLOWED TO COMMENCE WORK UNTIL PROOF OF CERTIFICATION HAS BEEN PROVIDED TO THE PROJECT MANAGER.

THE EROSION CONTROL SUPERVISOR IS INCIDENTAL.

PROVIDE AT LEAST ONE CERTIFIED INSTALLER FOR EACH CONTRACTOR OR SUBCONTRACTOR THAT PLACES THE PRODUCTS LISTED IN SPECIFICATION SECTION 2573.3.A.2. PROVIDE PROOF OF CERTIFICATION AT THE PRECONSTRUCTION MEETING. WORK WILL NOT BE ALLOWED TO COMMENCE UNTIL PROOF OF CERTIFICATION HAS BEEN PROVIDED TO THE PROJECT ENGINEER.

PROJECT CONTACTS

THE PROJECT ENGINEER AND CONTRACTOR ARE RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP AND INSTALLATION, INSPECTION AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMPS BEFORE, DURING AND AFTER CONSTRUCTION UNTIL THE NOTICE OF TERMINATION HAS BEEN FILED. ANOKA COUNTY STAFF ARE ALSO AVAILABLE FOR TECHNICAL ASSISTANCE.

ORGANIZATION	CONTACT	PHONE
MPCA	BRANDON DAHL	651-757-2279
ANOKA COUNTY	NICK DOBDA	763-324-3100
CITY OF OAK GROVE	TBD	PHONE #
UPPER RUM RIVER WATERSHED DISTRICT	TBD	PHONE #
HDR, INC.	BRETT VOTH	763-591-5400
MN DNR	WES SAUNDERS-PIERCE	651-259-5822

LOCATION OF SWPPP REQUIREMENTS

THE REQUIRED SWPPP ELEMENTS MAY BE LOCATED IN MANY PLACES WITHIN THE PLAN SET AS WELL AS IN THE SPECIAL PROVISIONS, MNDOT SPEC BOOK (2020 EDITION), 2022 SUPPLEMENTAL SPECIFICATIONS, OR ON FILE WITH ANOKA COUNTY. THE NOTES AND TABLE BELOW ARE INTENDED TO BE A QUICK REFERENCE FOR THE CONTRACTOR AND PROJECT ENGINEER TO USE IN THE FIELD. THERE MAY BE ADDITIONAL REQUIRED SWPPP ELEMENTS INCLUDED ON THE PROJECT THAT ARE NOT LISTED ON THIS SHEET.

DESCRIPTION	LOCATION
TEMPORARY EROSION CONTROL MEASURES	SHEET NO. 75
PERMANENT EROSION AND SEDIMENT CONTROL MEASURES	SHEET NO. 75
DIRECTION OF FLOW	SHEET NO. 72
FINAL STABILIZATION	SHEET NO. 75
DRAINAGE STRUCTURES	SHEET NO. 9
DRAINAGE TABULATIONS	SHEET NO. 9
STORM SEWER TABULATIONS	SHEET NO. 9
STORM SEWER PROFILE SHEETS	SHEET NO. 72
EROSION AND SEDIMENT CONTROL DETAILS	SHEETS NO. 34 - 40
EROSION CONTROL TABULATION	SHEET NO. 9
TURF ESTABLISHMENT TABULATION	SHEET NO. 9

SITE INSPECTION AND MAINTENANCE

THE PERMITTEE MUST INSPECT THE SITE DAILY TO ENSURE THAT BMPS ARE FUNCTIONING PROPERLY AND TO DETERMINE IF ADDITIONAL BMPS ARE REQUIRED. INSPECT ALL TEMPORARY AND PERMANENT WATER QUALITY MANAGEMENT, EROSION PREVENTION AND SEDIMENT CONTROL BMPS UNTIL THE SITE HAS UNDERGONE FINAL STABILIZATION AND THE NOT HAS BEEN SUBMITTED. INSPECT CONSTRUCTION SITE VEHICLE EXIT LOCATIONS FOR EVIDENCE OF TRACKING ONTO PAVED SURFACES. INSPECT SURROUNDING PROPERTIES FOR EVIDENCE OF OFF SITE SEDIMENT ACCUMULATION.

RECORD ALL INSPECTIONS AND MAINTENANCE ACTIVITIES IN WRITING WITHIN 24 HOURS. SUBMIT INSPECTION REPORTS IN A FORMAT THAT IS ACCEPTABLE TO THE PROJECT ENGINEER. INCLUDE THE FOLLOWING IN THE RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY:

A. DATE AND TIME OF INSPECTIONS;
B. NAME OF PERSONS CONDUCTING INSPECTIONS;
C. FINDINGS OF INSPECTION, INCLUDING RECOMMENDATIONS FOR CORRECTIVE ACTIONS;
D. CORRECTIVE ACTION TAKEN INCLUDING DATES, TIMES, AND PARTY COMPLETING MAINTENANCE ACTIVITIES;
E. DATE AND AMOUNT OF ALL RAINFALL EVENTS GREATER THAN 0.5 INCH IN 24 HOURS;
F. DOCUMENTS AND CHANGES MADE TO THE SWPPP.

ENVIRONMENTAL REVIEW

THERE ARE NO STORMWATER MITIGATION MEASURES REQUIRED AS A RESULT OF AN ENVIRONMENTAL, ARCHEOLOGICAL OR AGENCY REVIEW. ALL MITIGATION MEASURES HAVE BEEN ADDRESSED IN THIS PLAN SET OR THE SPECIAL PROVISIONS.

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.

NAME: BRETT A. VOTH LIC. NO. 49045

CERTIFIED BY: Brett Voth 8/10/2023
LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: JCN
DESIGNED BY: GEB
CHECKED BY: BAV

HDR ANOKA COUNTY

STORMWATER POLLUTION PREVENTION PLAN
SHEET NO. 73 OF 97 SHEETS
S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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STORMWATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE

GENERAL SWPPP NOTES FOR CONSTRUCTION ACTIVITY

1. THIS PROJECT DOES REQUIRE A NPDES PERMIT. THE CONTRACTOR IS RESPONSIBLE TO COMPLY WITH ALL ASPECTS OF THE NPDES CONSTRUCTION STORMWATER PERMIT AT ALL TIMES PER MNDOT SPEC 1717. THE CONTRACTOR WILL DEVELOP A CHAIN OF COMMAND WITH ALL OPERATORS ON THE SITE TO ENSURE THAT THE SWPPP WILL BE IMPLEMENTED AND STAY IN EFFECT UNTIL THE CONSTRUCTION PROJECT IS COMPLETE, THE ENTIRE SITE HAS UNDERGONE FINAL STABILIZATION, AND A NOTICE OF TERMINATION (NOT) HAS BEEN SUBMITTED TO THE MPCA.

2. THE CONTRACTOR WILL PREPARE A WRITTEN, NOT ORAL, WEEKLY SCHEDULE OF PROPOSED EROSION CONTROL ACTIVITIES FOR THE PROJECT ENGINEERS APPROVAL AS PER MNDOT SPEC. 1717.

3. THE CONTRACTOR WILL COMPLY WITH THE REQUIREMENTS REGARDING POLLUTION PREVENTION MANAGEMENT DURING CONSTRUCTION, WHICH WILL INCLUDE, BUT IS NOT LIMITED TO, PROVIDING:
   A. CONCRETE WASHOUT AREAS FOR USE BY ALL SUBCONTRACTORS AND MNDOT PERSONNEL. LOCATION OF WASHOUT AREAS MUST BE IDENTIFIED BY SIGNAGE AND MUST BE AT LEAST 200' FROM SITE PLAN REQUIREMENT AREAS OR ENVIRONMENTALLY SENSITIVE AREAS, AND UTLILIZE A LEAK-PROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER THAT PREVENTS RUNOFF ONTO ADJACENT SOILS. AN ENGINEERED COLLECTION SYSTEM CAN ALSO BE USED IF IT IS APPROVED BY THE PROJECT ENGINEER.
   B. SOLID WASTE COLLECTION AND REMOVAL.
   C. SECONDARY CONTAINMENT.
   D. SECURED HAZARDOUS WASTE STORAGE CONTAINERS.
   F. CHEMICAL SPILL KITS.
   G. PORTABLE RESTROOM FACILITIES THAT ARE ANCHORED TO PREVENT TIPPING.

4. CHEMICALS MUST BE KEPT IN A SECURE STORAGE AREA WHEN NOT IN USE. CHEMICAL STORAGE CONTAINERS MUST HAVE SECONDARY CONTAINMENT WHEN BEING USED OR STORED ON THE PROJECT SITE. CHEMICAL SPILLS OF ANY KIND (OIL, FUEL, FERTILIZER, ETC.) MUST BE CLEANED UP AND REMOVED FROM THE SITE IMMEDIATELY. THE CONTRACTOR MUST HAVE A SPILL KIT ON SITE AT ALL TIMES.

5. THE CONTRACTOR IS RESPONSIBLE FOR CREATING AND FOLLOWING A WRITTEN DISPOSAL PLAN FOR ALL WASTE MATERIALS. THE PLAN WILL INCLUDE HOW THE MATERIAL WILL BE DISPOSED OF AND THE LOCATION OF THE DISPOSAL SITE. THE PLAN WILL BE SUBMITTED TO THE ENGINEER.

6. BURNING OF ANY MATERIAL IS NOT ALLOWED WITHIN PROJECT BOUNDARY.

7. THE EROSION PREVENTION AND SEDIMENT CONTROL BMPS WILL BE PLACED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND TO CAPTURE SEDIMENT ON SITE. ALL EROSION CONTROL MEASURES WILL BE IN PLACE PRIOR TO COMMENCEMENT OF ANY REMOVAL WORK AND/OR GROUND DISTURBING ACTIVITIES AND WILL BE MAINTAINED UNTIL THE POTENTIAL FOR EROSION HAS BEEN ELIMINATED.

8. SEDIMENT CONTROL DEVICES MUST BE ESTABLISHED ON ALL DOWN GRADIENT PERIMETERS BEFORE ANY UP GRADIENT LAND DISTURBING ACTIVITIES BEGIN. SEDIMENT CONTROL DEVICES INCLUDE, BUT ARE NOT LIMITED TO:
   A. PERIMETER CONTROL SHALL BE LOCATED ON THE CONTOUR TO CAPTURE OVERLAND, LOW-VELOCITY SHEET FLOWS DOWN GRADIENT OF ALL EXPOSED SOILS AND PRIOR TO DISCHARGING TO SURFACE WATERS WITH THE BMP J-HOOKED AT A MAXIMUM OF 100 FOOT INTERVALS AND SHALL CONTAIN NO MORE THAN 1/4 ACRE OF DRAINAGE AREA.
   B. DITCH CHECKS WILL BE PLACED AS INDICATED ON THE PLANS DURING ALL PHASES OF CONSTRUCTION.
      1. TEMPORARY DITCH CHECKS WILL CONSIST OF USING ROCK DITCH CHECKS, BIOLOGS, AND ROCK WEEPERS IN FRONT OF CULVERT INLETS. IN LIEU OF REMOVING TEMPORARY DITCH CHECKS, THE ROCK MAY BE PUSHED INTO THE GROUND.
      2. FILTER LOGS WILL BE PLACED DURING PERMANENT TURF ESTABLISHMENT AT THE INTERVALS IDENTIFIED IN THE PLAN.
   C. SEDIMENT DAMAGE FROM STOCKPILES WILL BE MINIMIZED BY PLACING A ROW OF SILT FENCE A MINIMUM 5 FEET FROM THE TOE. IF THERE IS NOT ADEQUATE PROJECT AREA TO PLACE THE SILT FENCE MORE THAN 5 FEET FROM THE TOE OF THE SLOPE THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE FOR APPROVAL BY THE PROJECT ENGINEER.

9. STORM SEWER INLETS WILL BE PROTECTED AT ALL TIMES WITH THE APPROPRIATE INLET PROTECTION FOR EACH SPECIFIC PHASE OF CONSTRUCTION. INLET PROTECTION DEVICES MAY NEED TO BE PLACED MULTIPLE TIMES IN THE SAME LOCATION OVER THE LIFE OF THE CONTRACT. INLET PROTECTION DEVICES WILL BE PAID FOR ONCE PER INLET REGARDLESS OF THE NUMBER OF TIMES THE BMP IS PLACED. ALL STORM SEWER INLET PROTECTION DEVICES WILL BE KEPT IN GOOD FUNCTIONAL CONDITION AT ALL TIMES. IF THE PROJECT ENGINEER DEEMS AN INLET PROTECTION DEVICE TO BE NONFUNCTIONAL, IN POOR CONDITION, INEFFECTIVE, OR NOT APPROPRIATE FOR THE CURRENT CONSTRUCTION ACTIVITIES IT WILL BE REPLACED WITH A SUITABLE ALTERNATIVE AT NO COST TO MNDOT.

10. THE CONTRACTOR WILL PLACE CONSTRUCTION EXITS, AS NECESSARY, TO PREVENT TRACKING OF SEDIMENT ONTO PAVED SURFACES AND IN COMPLIANCE WITH PART IV OF THE NPDES PERMIT. CONSTRUCTION EXITS WILL BE SUFFICIENTLY SIZED AND MAINTAINED TO PREVENT TRACK OUT. TYPE 5 MULCH (SLASH MULCH) OR AN APPROVED ENGINEERED PRODUCT WILL BE ALLOWED FOR CONSTRUCTION EXITS IN LIEU OF CRUSHED ROCK.

11. THE CONTRACTOR MUST USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT DISCHARGE OR PLACEMENT OF BITUMINOUS GRINDING, CUTTINGS, MILLINGS, AND OTHER BITUMINOUS WASTES FROM AREAS OF EXISTING OR FUTURE VEGETATED SOILS AND ALL WATER CONVEYANCE SYSTEMS, INCLUDING INLETS.

12. THE CONTRACTOR MUST USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT CONCRETE DUST, PARTICLES, SAW CUT SLURRY, PLANNING WASTE AND OTHER CONRETE WASTES FROM LEAVING ANOKA COUNTY RIGHT OF WAY, DEPOSITING IN EXISITING OR FUTURE VEGETATED AREAS, OR ENTERING STORMWATER CONVEYANCE SYSTEMS, INCLUDING INLETS AND CURB FLOW LINES.

13. DITCHES AND EXPOSED SOILS MUST BE KEPT IN AN EVEN ROUGH GRADED CONDITION IN ORDER TO BE ABLE TO APPLY EROSION CONTROL MULCHES AND BLANKETS.

14. ALL EXPOSED SOIL AREAS MUST BE TEMPORARILY OR PERMANENTLY STABILIZED NO MORE THAN 24 HOURS AFTER CONSTRUCTION ACTIVITY ON THAT PORTION OF THE SITE THAT HAS BEEN TEMPORARILY CEASED. IN MANY INSTANCES, THIS WILL REQUIRE STABILIZATION TO OCCUR MORE THAN ONCE DURING ROUGH GRADING. RAPID STABILIZATION METHOD 3 OR 4 WILL BE USED TO PROVIDE TEMPORARY COVER IN THESE AREAS AS APPROPRIATE.

15. THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH THAT DRAINS WATER FROM THE CONSTRUCTION SITE, OR DIVERTS WATER AROUND THE CONSTRUCTION SITE, MUST BE STABILIZED WITHIN 200 LINEAL FEET FROM THE PROPERTY EDGE OR POINT OF DISCHARGE TO ANY SURFACE WATER. STABILIZATION MUST OCCUR WITHIN 24 HOURS OF CONNECTION TO A SURFACE WATER, EXISTING GUTTER, STORM SEWER INLET, DRAINAGE DITCH, OR OTHER STORMWATER CONVEYANCE SYSTEM ACCORDING TO MNDOT SPEC 1717. THE REMAINDER OF THE DITCH MUST BE STABLILIZED WITHIN 7 DAYS OF CONNECTING TO THE SURFACE WATER. PERMANENT EROSION CONTROL BLANKET WILL BE USED TO STABILIZE THESE AREAS. DISC ANCHORED MULCH AND HYDRAULIC SOIL STABILIZERS ARE NOT ALLOWED FOR PERMANENT DITCH STABILIZATION.

16. OUTLETS INTO SURFACE WATERS SHALL BE STABILIZED WITH ENERGY DISSIPATION WITHIN 24 HOURS OF BEING CONSTRUCTED.

17. ALL EXPOSED SOIL AREAS WILL BE STABILIZED PRIOR TO THE ONSET OF WINTER. ANY WORK STILL BEING PERFORMED WILL BE SNOW MULCHED, SEEDED, OR BLANKETED WITHIN THE TIME FRAMES LISTED IN THE MPCA'S GENERAL NPDES CONSTRUCTION STORMWATER PERMIT.

18. ALL TOPSOIL BERMS SHALL BE STABILIZED WITH HYDROMULCH.

19. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING INSPECTION AND MAINTENANCE REQUIREMENTS:
   A. A SILT FENCE MUST BE REPAIRED, REPLACED OR SUPPLEMENTED WHEN IT BECOME NON-FUNCTIONAL OR 1/2 THE HEIGHT OF THE SILT FENCE. REPAIRS MUST BE MADE WITHIN 24 HOURS OF DISCOVERY.
   B. INLET PROTECTION DEVICES SHOULD BE REPAIRED WHEN THEY BECOME NON-FUNCTIONAL OR SEDIMENT REACHES 1/2 THE HEIGHT AND/OR DEPTH OF THE DEVICE.
   C. TEMPORARY SEDIMENT BASIN MUST HAVE THE SEDIMENT REMOVED ONCE THE SEDIMENT HAS REACHED 1/2 THE STORAGE VOLUME WITHINN 72 HOURS OF DISCOVERY.
   D. TRACKED SEDIMENT MUST BE REMOVED WITHIN 24 HOURS OF DISCOVERY OF TRACKING ONTO PAVED SURFACES.
   E. ALL OTHER NONFUNCTIONAL BMPS MUST BE REPAIRED, REPLACED, OR SUPPLEMENTED WITHIN 24 HOURS OF DISCOVERY.
   F. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL BMPS UNTIL WORK HAS BEEN COMPLETED, SITE HAS GONE UNDER FINAL STABILIZATION, AND THE NOTICE OF TERMINATION HAS BEEN SUBMITTED TO THE MPCA IN ACCORDANCE WITH PART II.B.5 OF THE CONSTRUCTION GENERAL PERMIT.

20. IF SEDIMENT DEPOSITS IN A WATER OF THE STATE, THE MATERIAL MUST BE REMOVED WITHIN 7 DAYS.

21. PAVEMENT SURFACES WILL BE SWEPT WITHIN 24 HOURS OF DISCOVERY OF SEDIMENT OR TRACKING ONTO PAVEMENT THAT DRAINS TO CURB, INLETS, DITCHES, OR PONDS. PAVEMENT WILL BE LIGHTLY WETTED PRIOR TO SWEEPING.(INCIDENTAL)

22. AMEND THE SWPPP AND DOCUMENT ANY AND ALL CHANGES TO THE SWPPP AND ASSOCIATED PLAN SHEETS IN A TIMELY MANNER. STORE THE SWPPP AND ALL AMENDMENTS ON SITE AT ALL TIMES.

23. THE PERMITTEE MUST HAVE A WRITTEN PLAN, KEPT ON SITE THAT SHOWS A PRACTICABLE MEANS OF CONTROL TO PREVENT AN INCREASE IN TSS IN THE WATER. IT MUST INCLUDE METHODS TO MINIMIZE DEGRADATION OF WATER, INCLUDING AVOIDANCE OF IMPACTS, CONSTRUCTION-PHASING, SEASONAL CONSTRUCTION WHERE PRACTICABLE, MINIMIZING THE LENGTH OF TIME SOIL AREAS ARE EXPOSED, PROHIBITIONS, POLLUTION PREVENTION THROUGH ADEQUATE BMPS, AND OTHER MANAGEMENT PRACTICES PUBLISHED BY STATE AGENCIES. THE MPCA IS RESPONSIBLE FOR INTERPRETATION OF THE REQUIREMENTS OF THIS CONDITION INDEPENDENT OF THE RGPS. IF THERE ARE QUESTIONS REGARDING PROPER IMPLEMENTATION OF THIS CONDITION, THE MPCA WILL DETERMINE COMPLIANCE, AS NEEDED, ON A CASE-BY-CASE BASIS. THE POINT OF CONTACT AT THE MPCA FOR QUESTIONS REGARDING THIS CONDITION IS 401CERTIFICATION.PCA@STATE.MN.US.

24. WHERE PRACTICABLE, THE PERMITTEE MUST ESTABLISH AND MAINTAIN AN UNDISTURBED BUFFER ZONE OF AT LEAST 100 LINEAR FEET FROM THE RESTRICTED ORVWS, EXCEPT IN THE IMMEDIATE AREA OF THE IN-WATER WORK.

25. WHENEVER ANY CONSTRUCTION ACTIVITY IS WITHIN 200 FEET OF A RESTRICTED ORVW., THE PERMITTEE MUST STABILIZE ALL EXPOSED SOILS WITHIN 24 HOURS AFTER COMPLETING THE CONSTRUCTION ACTIVITY.

DEWATERING

IT IS ANTICIPATED THAT NEW BRIDGE PIER CONSTRUCTION WILL REQUIRE DEWATERING. THE CONTRACTOR SHALL REMOVE ANY WATER THAT COLLECTS IN WORK AREAS. DEWATERING SYSTEMS MAY INCLUDE SHEET PILING OR COFFERDAMS. THE CONTRACTOR SHALL DEVELOP A DEWATERING PLAN IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. THE DEWATERING PLAN MUST BE SUBMITTED TO AND APPROVED BY UPPER RUM RIVER WATERSHED DISTRICT PRIOR TO THE START OF DEWATERING. DEWATERING SHALL BE INCIDENTAL IF DEEMED NECESSARY BY THE ENGINEER.

SOIL & EROSION CONTROL SCHEDULE

THE CONTRACTOR WILL PREPARE A WRITTEN, WEEKLY SCHEDULE OF PROPOSED EROSION CONTROL ACTIVITIES FOR THE PROJECT ENGINEERS APPROVAL AS PER MNDOT SPEC. 1717.

THE EROSION PREVENTION AND SEDIMENT CONTROL BMPS WILL BE PLACED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND TO CAPTURE SEDIMENT ON SITE. SEDIMENT CONTROL DEVICES WILL BE ESTABLISHED ON ALL DOWN GRADIENT PERIMETERS BEFORE ANY UP GRADIENT LAND DISTURBING ACTIVITIES BEGIN. ALL EROSION PREVENTION AND SEDIMENT CONTROL MEASURES WILL REMAIN IN PLACE AND WILL BE MAINTAINED UNTIL THE POTENTIAL FOR UP GRADIENT EROSION HAS BEEN ELIMINATED.

ALL EXPOSED SOIL AREAS WILL BE TEMPORARILY OR PERMANENTLY STABILIZED NO MORE THAN 24 HOURS AFTER CONSTRUCTION ACTIVITY ON THAT PORTION OF THE SITE THAT HAS BEEN TEMPORARILY OR PERMANENTLY CEASED.

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.

NAME: BRETT A. VOTH LIC. NO. 49045

CERTIFIED BY: _____ 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: GEB

CHECKED BY: BAV

HDR

ANOKA COUNTY

STORMWATER POLLUTION PREVENTION PLAN

SHEET NO. 74 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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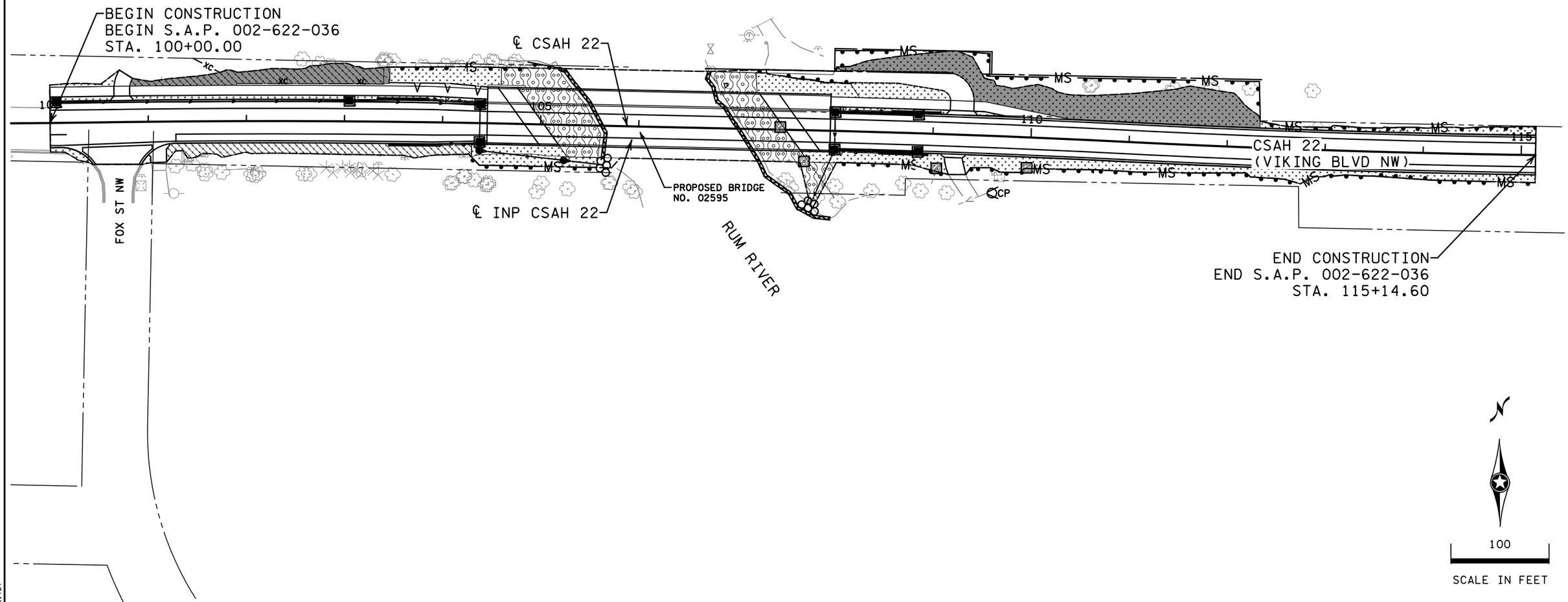
LEGEND

- SEED MIX 35-221 FERTILIZER TYPE 4, 17-10-7 @ 150 LB/ACRE
- SEED MIX 25-121 FERTILIZER TYPE 3, 22-5-10 @ 350 LB/ACRE
- ROLLED EROSION PREVENTION CATEGORY 15
- RAPID STABILIZATION METHOD 4
- STORM DRAIN INLET PROTECTION
- CP CULVERT END CONTROL
- SEDIMENT CONTROL LOG TYPE COMPOST
- MS SILT FENCE - MS
- FLOTATION SILT CURTAIN TYPE MOVING WATER
- EX. RIGHT OF WAY
- CONSTRUCTION LIMITS
- TEMPORARY EASEMENT
- PROPOSED R/W

SEE SHEET72 FOR DRAINAGE LEGEND



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.

NAME: JACOB C. NICHOLS LIC. NO. 60631

CERTIFIED BY: Jacob Nichols 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: JCN

DESIGNED BY: JCN

CHECKED BY: GEB

HDR

ANOKA COUNTY

TURF ESTABLISHMENT & EROSION CONTROL PLAN

SHEET NO. 75 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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NOTES & GUIDELINES

GENERAL INFORMATION:

1. ALL DISTANCES ARE APPROXIMATE.

SIGNING:

1. ALL TEMPORARY SIGNS ARE REQUIRED TO BE CRASHWORTHY PER THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE 2016 (MASH-2016). TEMPORARY SIGN STRUCTURES THAT ARE CRASHWORTHY UNDER THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP-350) MAY BE USED PROVIDED THE DEVICES WERE ACQUIRED BY THE CONTRACTOR PRIOR TO DECEMBER 31ST, 2019. THE MINNESOTA TYPE "C" AND "D" BRACED LEG U-CHANNEL (KNEE BRACE) SIGN SUPPORT IS NOT ALLOWED.
2. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE FINAL SIGNS TO ASSURE THAT THE FINAL SIGNS ARE PLACED AS NEEDED, OR PROVIDE TEMPORARY SIGNING UNTIL THE FINAL SIGNING IS PLACED.
3. WHEN MULTIPLE GROUND MOUNTED SIGN STRUCTURES ARE PLACED ADJACENT TO EACH OTHER THERE SHOULD BE NO MORE THAN 2 POSTS WITHIN 84" OF EACH OTHER. WHEN THIS SPACING CAN NOT BE MAINTAINED, THEN SIGN STRUCTURES SHALL BE OFFSET, AND STAGGERED WITH A MINIMUM OF 4' BETWEEN SIGN STRUCTURES BOTH LATERALLY AND LONGITUDINALLY. EXAMPLE SHOWS DETOUR SIGNAGE, BUT THIS REQUIREMENT APPLIES TO ALL SIGNAGE.
4. WHEN A SIGN OR BARRICADE IS ORIENTED SUCH THAT VISIBILITY TO ROAD USERS INCLUDING BIKES AND PEDESTRIANS IS REDUCED ENOUGH TO CAUSE A HAZARD, DELINEATE THE SIGN/BARRICADE WITH APPROPRIATE DEVICES.
5. TEMPORARY SIGNS SHALL BE PLACED SUCH THAT OBSTACLES DO NOT BLOCK THEM FROM BEING VIEWED BY APPROACHING ROAD USERS. OBSTACLES MAY INCLUDE, BUT ARE NOT LIMITED TO, LIGHT POLES, TREES, SIGNS, AND BUILDINGS.
6. TEMPORARY SIGNS SHALL BE PLACED AND ORIENTED APPROXIMATELY AS SHOWN IN THE PLAN, AT RIGHT ANGLES TO DIRECTION OF AND FACING THE TRAFFIC THEY ARE INTENDED TO SERVE, UNLESS OTHERWISE SPECIFIED.
7. LONGITUDINAL DROPOFFS SHALL BE SIGNED AS SHOWN IN THE "MINNESOTA TEMPORARY TRAFFIC CONTROL FIELD MANUAL" PAGES (6K-aJ) THRU (6K-al) UNLESS OTHERWISE SPECIFIED IN THESE PLANS.
8. AFTER REMOVAL OF SIGN AND/OR SIGN BASE, BACK FILL, COMPACT, AND LEVEL SOIL TO MATCH SURROUNDING SOIL.

PAVEMENT MARKING:

1. MASK OR REMOVE ANY CONFLICTING PAVEMENT MARKINGS AS SHOWN IN THE PLAN OR APPROVED BY THE ENGINEER.
2. ALL TEMPORARY PAVEMENT MARKINGS SHALL BE WET REFLECTIVE. ALL PAVEMENT MARKINGS IN TAPERS AND TRANSITIONS SHALL BE 6" IN WIDTH.
3. SEE 2582 IN THE SPECIAL PROVISIONS FOR PAVEMENT MARKING SPOTTING RESPONSIBILITIES.

BARRIER & DELINEATION:

1. PLACE AND MAINTAIN PORTABLE BARRIER DELINEATORS ANY TIME TRAFFIC IS WITHIN 10' OF BARRIER. DELINEATORS WILL EACH HAVE A MINIMUM OF 24 SQ IN. OF RETROREFLECTIVE SURFACE ON BOTH SIDES PLACED AT 25' SPACING ON TOP OF THE BARRIER. SIDE MOUNTED PORTABLE BARRIER DELINEATORS WILL HAVE A MINIMUM OF 12 SQ. IN. OF RETROREFLECTIVE SURFACE AREA AND BE PLACED AT 12.5' SPACING. IF A SMALLER APPROVED BARRIER DELINEATOR IS USED IT SHALL BE A MINIMUM OF 6 SQ IN. OF RETROREFLECTIVE SURFACE AREA AND BE PLACED ON BOTH SIDES AT 6.25' SPACING. TEMPORARY BARRIER DELINEATOR COLOR SHALL MATCH APPLICABLE PAVEMENT MARKING.

PAVEMENT MARKING SYMBOLS AND MATERIALS LEGEND

SOLID LINE PAVEMENT MARKING WITH TEMPORARY RAISED PAVEMENT MARKERS AT 10' SPACES

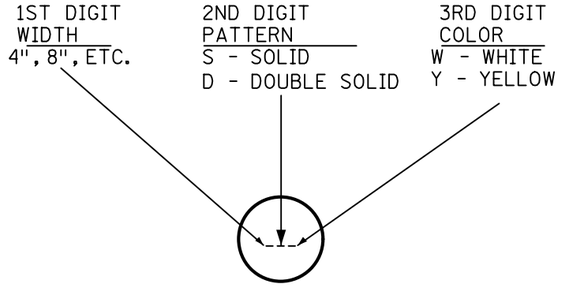
BROKEN LINE-50' CYCLE (10' LINE, 40' GAP)

DOTTED LINE-15' CYCLE (3' LINE, 12' GAP), UNLESS SHOWN OTHER WISE IN THE PLAN

STRIPING KEY

BOX-PREF TAPE

TRIANGLE-PAINT



EXAMPLE: 4SW = 4" SOLID LINE WHITE PREF TAPE

INDEX

STANDARD PLANS

5-297.680	TEMPORARY PORTABLE PRECAST CONCRETE BARRIER ANCHORING

TRAFFIC CONTROL DEVICES & SYMBOLS LEGEND

SYMBOL	DESCRIPTION
	AREA CLOSED TO TRAFFIC / WORK AREA
	TEMPORARY PAVEMENT
	DRUM-LIKE CHANNELIZER (TYPE B) =
	PORTABLE PRECAST CONC BARRIER DES 8337 WITH DELINEATORS AT 25' SPACES (PPCB)
	TEMPORARY IMPACT ATTENUATOR
	FLAGGER
	TRAFFIC CONTROL SIGN
	TYPE III BARRICADE =

TITLE SHEET

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 76 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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TRAFFIC CONTROL TABULATION							TC
TAB	ITEM DESCRIPTION	UNIT	TOTAL QUANTITY	STAGE 1/1A	STAGE 2	STAGE 3	STAGE 4
	PAVEMENT MARKING REMOVAL	LIN FT	6060	6060			
	PORTABLE PRECAST CONCRETE BARRIER DESIGN 8337 - ANCHORED	LIN FT	726	364	362		
	TRAFFIC CONTROL	LUMP SUM	1				
TC-A	RAISED PAVEMENT MARKER TEMPORARY	EACH	798	329	123	190	156
	PORTABLE BARRIER DELINEATOR	EACH	29	15	14		
	FLAGGER	HOUR	624	168	168	144	144
(1)	TEMPORARY IMPACT ATTENUATOR	ASSEMBLY	4	2	2		
	INTERIM PAVEMENT MARKING	LUMP SUM	1				
TC-A	6" REMOVABLE PREFORM PAVEMENT MARKING TAPE WR	LIN FT	17504	3452	9488	1494	3070
	REMOVABLE PREFORM PLASTIC MASK (BLACK)	LIN FT	3380	3380			
TC-A	6" SOLID LINE PAINT	LIN FT	4867	2941		1926	
TC-A	4" DOUBLE SOLID LINE PAINT	LIN FT	2370	1407		963	

(1) ATTENUATORS ARE TL-3 UNLESS NOTED OTHERWISE

TRAFFIC CONTROL ITEM COLOR									TC-A
ITEM DESCRIPTION	UNIT	STAGE 1		STAGE 2		STAGE 3		STAGE 4	
		WHITE	YELLOW	WHITE	YELLOW	WHITE	YELLOW	WHITE	YELLOW
RAISED PAVEMENT MARKER TEMPORARY	EACH	222	107	62	61	116	74	103	53
6" REMOVABLE PREFORM PAVEMENT MARKING TAPE WR	LIN FT	1726	1726	4746	4742	1492	2	1600	1470
6" SOLID LINE PAINT	LIN FT	2941				1926			
4" DOUBLE SOLID LINE PAINT	LIN FT		1407				963		

GENERAL NOTES

SEE SHEET 8 FOR TEMPORARY PAVEMENT DETAILS.

TABULATION PAY ITEM SHEET

NO	DATE	BY	CKD	APPR	REVISION

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ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 77 OF 97 SHEETS

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"M" SERIES

SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (W×H)	ASSEMBLY (IN. X IN.) (W×H)	NUMBER OF POST
DETOUR / EAST WEST / ANOKA 22 COUNTY	M4-8	BLACK ON ORANGE	24 X 12	24 X 48	1
	M3-_	BLACK ON WHITE	24 X 12		
	M1-6M	WHITE AND YELLOW ON BLUE	24 X 24		
END DETOUR / EAST WEST / ANOKA 22 COUNTY	M4-8a	BLACK ON ORANGE	24 X 18	24 X 54	1
	M3-_	BLACK ON WHITE	24 X 12		
	M1-6M	WHITE AND YELLOW ON BLUE	24 X 24		
DETOUR / EAST WEST / ANOKA 22 COUNTY / ⇦ ⇨ ⇦ ⇨	M4-8	BLACK ON ORANGE	24 X 12	24 X 63	1
	M3-_	BLACK ON WHITE	24 X 12		
	M1-6M	WHITE AND YELLOW ON BLUE	24 X 24		
	M6-1, M5-1R OR M5-1L	WHITE ON BLUE	21 X 15		
DETOUR / EAST WEST / ANOKA 22 COUNTY / ↗ ⇦ ⇧	M4-8	BLACK ON ORANGE	24 X 12	24 X 63	1
	M3-_	BLACK ON WHITE	24 X 12		
	M1-6M	WHITE AND YELLOW ON BLUE	24 X 24		
	M6-2R, M5-3 OR M6-3	WHITE ON BLUE	21 X 15		

"G" AND "R" SERIES

SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (W×H)	ASSEMBLY (IN. X IN.) (W×H)	NUMBER OF POST
END ROAD WORK	G20-2	BLACK ON ORANGE	36 X 18	36 X 18	1
	R3-2	BLACK AND RED ON WHITE	24 X 24	24 X 24	1
DO NOT ENTER	R5-1	RED ON WHITE	30 X 30	30 X 30	1
STOP	R1-1	WHITE ON RED	30 X 30	30 X 30	1
ONEWAY	R6-1R	BLACK ON WHITE	36 X 12	36 X 12	1

BARRICADE MOUNTED SIGNS

SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (W×H)
ROAD CLOSED TO THRU TRAFFIC	R11-4	BLACK ON WHITE	60 X 30
ROAD CLOSED 1 MILE AHEAD LOCAL TRAFFIC ONLY	R11-3a	BLACK ON WHITE	60 X 30
DETOUR / DETOUR	M4-10_	BLACK ON ORANGE	48 X 18
⇦ ⇨	W1-6	BLACK ON ORANGE	48 X 24

DEVICES

SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (W×H)
	TYPE III	WHITE ON ORANGE	96" MIN

"W" SERIES

SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (W×H)	ASSEMBLY (IN. X IN.) (W×H)	NUMBER OF POST
BRIDGE CLOSED AHEAD	W20-X4	BLACK ON ORANGE	48 X 48	48 X 48	1
DETOUR AHEAD	W20-2	BLACK ON ORANGE	48 X 48	48 X 48	1
	W20-7	BLACK ON ORANGE	36 X 36	36 X 36	1
ROAD WORK AHEAD	W20-1	BLACK ON ORANGE	36 X 36	36 X 36	1
10 FT	W20-X11	BLACK ON ORANGE	36 X 36	36 X 36	1
⇦ ⇨ / 30 MPH	W24-1_	BLACK ON ORANGE	36 X 36	36 X 60	1
	W13-1P	BLACK ON ORANGE	24 X 24		
↗ / 30 MPH	W1-4R	BLACK ON ORANGE	30 X 30	30 X 48	1
	W13-1P	BLACK ON ORANGE	18 X 18		
⇦	W1-4L	BLACK ON ORANGE	30 X 30	30 X 30	1
ONE LANE ROAD AHEAD	W20-4	BLACK ON ORANGE	36 X 36	36 X 36	1

TRAFFIC CONTROL TABULATION

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY
DESIGNED BY: SY
CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 78 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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GENERAL NOTES:

1. GROUND MOUNTED SQUARE TUBE SIGN STRUCTURES PLACED WITHIN 50' OF THE RADIUS END OF AN INTERSECTION SHALL BE PLACED ON ONE 2" OR 2-1/2" POST.
2. FOR 2" SQUARE TUBE RISER POST IN SOIL, USE FIN BASE PLACED PER MANUFACTURER'S SPECIFICATIONS. USE A 2" X 2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE RISER POST. PLACE 3/8" STAINLESS STEEL BOLT THROUGH THE 5TH HOLE DOWN FROM THE TOP OF THE BASE. RISER POST SHALL REST ON THE BOLT.
3. FOR 2-1/2" SQUARE TUBE RISER POST IN SOIL, USE SLIP BASE PLACED PER MANUFACTURER'S SPECIFICATIONS USING A 10 GAUGE , 2-1/2" X 2-1/2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE RISER POST WITH A 10 GAUGE 2-3/16" X 2-3/16" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE INTERNAL INSERT.

SPECIFIC NOTES:

① IF ANY PART OF A SIGN OR SIGN ASSEMBLY EXTENDS MORE THAN 4" INTO THE PEDESTRIAN FACILITY, THE MINIMUM HEIGHT TO BOTTOM OF THE SIGN OR SIGN ASSEMBLY SHALL BE 7'.

② 6' - 12' FROM EDGE OF ROADWAY, MUST BE A MINIMUM OF 6' FROM EDGE OF PAVED SHOULDER (WHEN PRESENT).

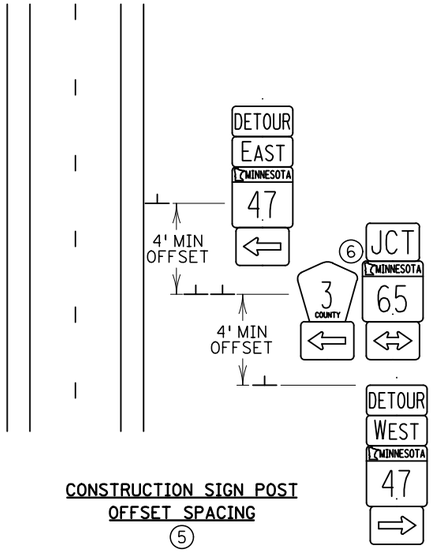
③ IF GROUND MOUNTED TEMPORARY SIGN OR SIGN ASSEMBLY IS PLACED ON 2-1/2" SQUARE TUBE RISER POST(S), THE MINIMUM CLEARANCE FROM THE GROUND LINE TO THE BOTTOM OF THE LOWEST SIGN ON THE ASSEMBLY SHALL BE 7', OR AS SHOWN IN DETAIL, WHICHEVER IS GREATER.

④ 5' MINIMUM IN RURAL. 7' MINIMUM IN BUSINESS, COMMERCIAL, OR RESIDENTIAL AREAS.

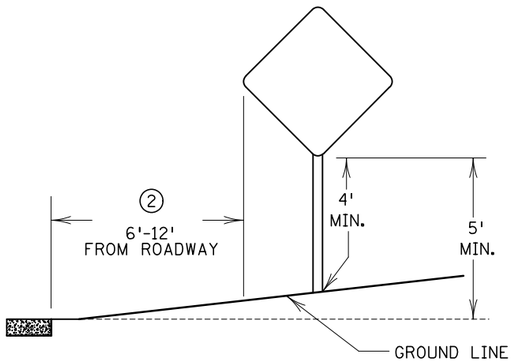
⑤ WHEN MULTIPLE GROUND MOUNTED SIGN STRUCTURES ARE PLACED ADJACENT TO EACH OTHER THERE SHOULD BE NO MORE THAN 2 POSTS WITHIN 84" OF EACH OTHER. WHEN THIS SPACING CAN NOT BE MAINTAINED, THEN SIGN STRUCTURES SHALL BE OFFSET, AND STAGGERED WITH A MINIMUM OF 4' BETWEEN SIGN STRUCTURES BOTH LATERALLY AND LONGITUDINALLY. EXAMPLE SHOWS DETOUR SIGNAGE, BUT THIS REQUIREMENT APPLIES TO ALL SIGNAGE.

⑥ INPLACE AND/OR OTHER CONSTRUCTION SIGNING.

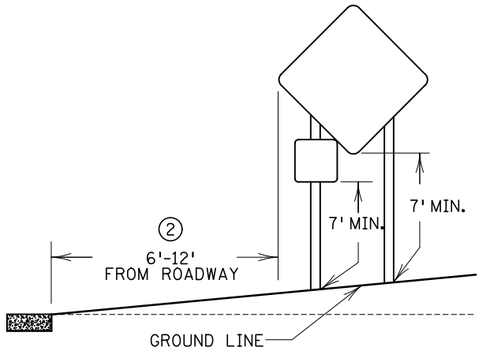
NOT TO SCALE



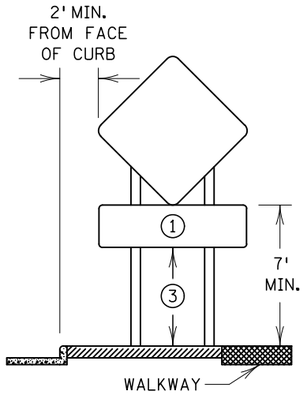
CONSTRUCTION SIGN POST OFFSET SPACING ⑤



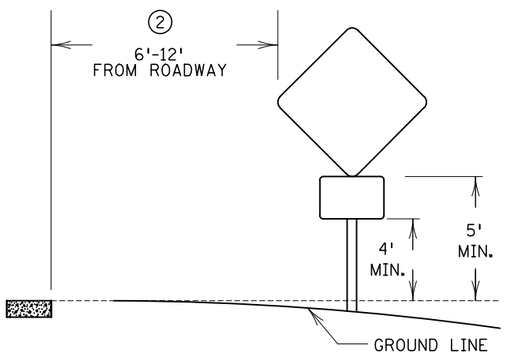
TYPICAL RURAL DESIGN AND 2" RISER POST



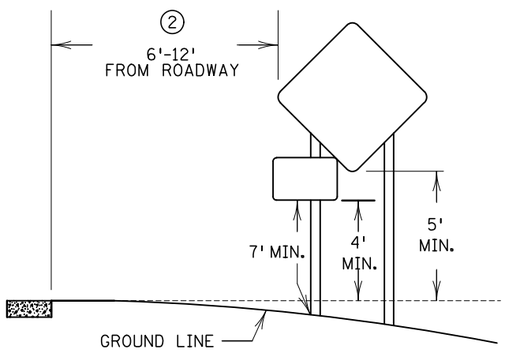
TYPICAL RURAL DESIGN WITH SUPPLEMENTAL PLAQUE AND 2-1/2" RISER POST



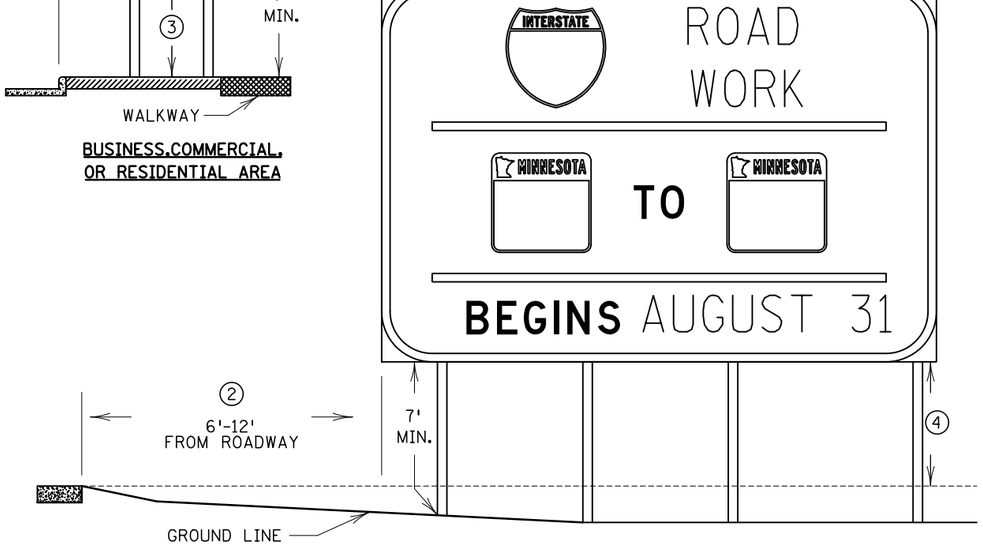
BUSINESS,COMMERCIAL, OR RESIDENTIAL AREA



TYPICAL RURAL DESIGN WITH SUPPLEMENTAL PLAQUE AND 2" RISER POST



TYPICAL RURAL DESIGN 2-1/2" RISER POST



TYPICAL G20-X2 DESIGN

PUBLISHED BY OTE 03/15/2021

TEMPORARY SQUARE TUBE GROUND MOUNTED SIGN PLACEMENT DETAIL

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 79 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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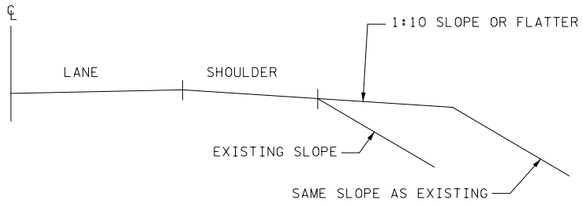
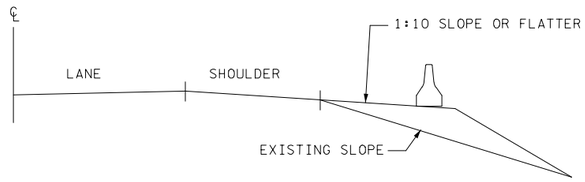
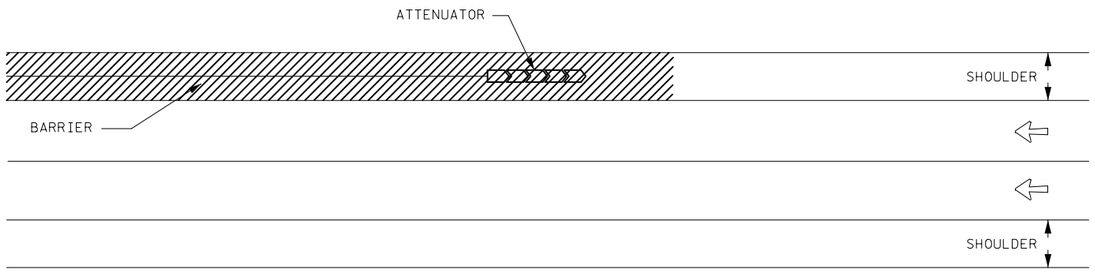


SECTION A-A

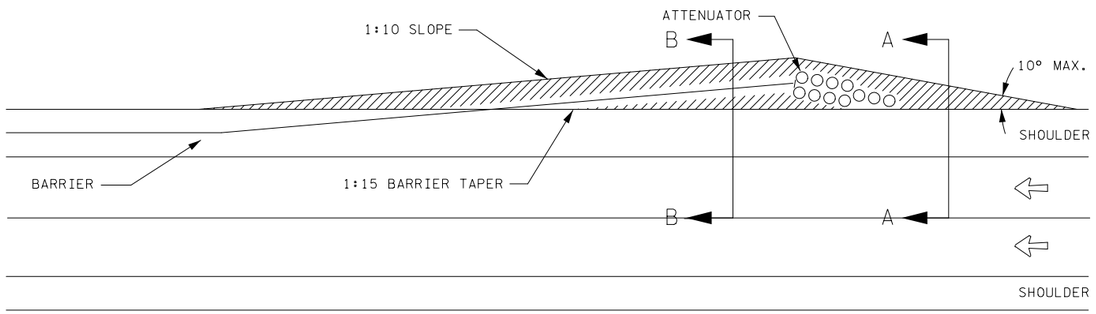


SECTION B-B

NON-GATING, REDIRECTIVE OR GATING, NON-REDIRECTIVE ATTENUATOR



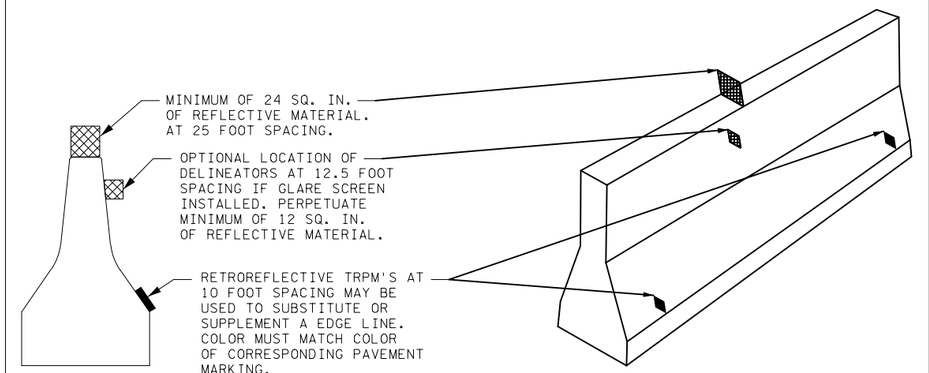
SAND FILLED BARREL ATTENUATOR



= PAVEMENT, IF PAVEMENT IS NOT AVAILABLE, THEN A COMPACTED AGGREGATE SURFACE, ABLE TO BEAR TRAFFIC.

PUBLISHED BY OTE 12/30/2019

DELINEATION OPTIONS FOR BARRIER



TEMPORARY BARRIER END TREATMENT AND DELINEATOR PLACEMENT DETAIL

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

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TRAFFIC CONTROL PLANS

SHEET NO. 80 OF 97 SHEETS

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STAGING NARRATIVE

STAGE 0 (NOT SHOWN ON PLAN):

CONSTRUCTION ACTIVITES:
- REMOVE INPLACE BARRIER ON NORTH SIDE OF C.S.A.H. 22 BRIDGE.
- PLACE ANCHORED PORTABLE CONCRETE BARRIER AS SHOWN IN MNDOT STANDARD PLAN 5-297.680.
- GRADE 20' WIDE BENCH FOR ACCESS TO WEST BANK OF RUM RIVER. SEE CROSS SECTION SHEET X12 TO X14.

TRAFFIC FLOW:
- TRAFFIC ON C.S.A.H. 22 SHALL BE FLAGGED DURING REMOVAL OPERATIONS. REFER TO MNDOT 2018 TEMPORARY TRAFFIC CONTROL FIELD MANUAL LAYOUT 16 FOR ADDITIONAL DETAILS ON FLAGGING AND SIGNING REQUIREMENTS.

STAGE 1:

CONSTRUCTION ACTIVITIES:
- REMOVE TEMPORARY ACCESS TO WEST BANK.
- CONSTRUCT RETAINING WALL ON NORTH SIDE OF CSAH 22, WEST OF THE BRIDGE.
- CONSTRUCT NORTH PORTION OF C.S.A.H. 22 BRIDGE.
- CONSTRUCT TEMPORARY PAVEMENT BETWEEN C.S.A.H. 22 STA. 100+00 - 104+45 AND STA. 107+90 - 109+90.
- CONSTRUCT NORTH PORTION OF C.S.A.H. 22 EXCLUDING THE CURB BETWEEN C.S.A.H. 22 STA. 101+19 TO 104+46 AND STA. 107+96 TO 110+00.

TRAFFIC FLOW:
- TRAFFIC SHALL BE SHIFTED SOUTH ON EXISTING C.S.A.H 22 OUTSIDE OF WORKING HOURS.
- TRAFFIC SHALL BE FLAGGED INTO EASTBOUND LANE WITH WESTBOUND LANE CLOSED, ON C.S.A.H. 22 DURING WORKING HOURS.
- CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTIES AT ALL TIMES.

STAGE 1A:

CONSTRUCTION ACTIVITIES:
- CONSTRUCT THE FULL WIDTH OF CSAH 22 FROM THE EAST END OF THE BRIDGE TO THE EAST PROJECT LIMITS.
- RECLAIM EXISTING BITUMINOUS PAVEMENT FROM STA. 109+00 TO 111+50 TO ACCOMODATE THE PROFILE GRADE RAISE. DUE TO PROFILE GRADE CHANGE, FLAGGING OPERATION IS REQUIRED.
- CONSTRUCTION, INCLUDING REMOVALS, GRADING AND PAVING TO BE COMPLETED IN ONE WEEK AND NOT ALLOWED OVER A WEEKEND.

TRAFFIC FLOW:
- TRAFFIC SHALL BE FLAGGED DURING WORKING HOURS. CONSTRUCTION SHALL ALTERNATE ON THE PROPOSED EASTBOUND AND WESTBOUND SIDE TO MEET DROPOFF REQUIREMENTS.
- TRAFFIC SHALL BE OPEN TO TWO LANES DURING NON-WORKING HOURS. TRAFFIC IS ALLOWED TO RUN ON GRAVEL PRIOR TO PAVING.
- CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTIES AT ALL TIMES.

STAGE 2:

CONSTRUCTION ACTIVITIES:
- CONSTRUCT SOUTH PORTION OF C.S.A.H. 22 BRIDGE.
- CONSTRUCT SOUTH PORTION OF C.S.A.H. 22.

TRAFFIC FLOW:
- TRAFFIC SHALL BE SHIFTED NORTH ON C.S.A.H. 22.
- TRAFFIC SHALL BE FLAGGED INTO WESTBOUND LANE WITH EASTBOUND LANE CLOSED, ON C.S.A.H. 22 DURING THE CONSTRUCTION OF BITUMINOUS PAVEMENT EAST OF BRIDGE.
- CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTIES AT ALL TIMES.

STAGE 3:

CONSTRUCTION ACTIVITIES:
- CONSTRUCT NORTH PORTION OF C.S.A.H. 22 AT THE INTERSECTION OF FOX ST AND REMAINING CURB.
- CONSTRUCT TRAIL NORTH OF C.S.A.H. 22 ON BOTH SIDES OF BRIDGE.

TRAFFIC FLOW:
- TRAFFIC SHALL BE SHIFTED SOUTH ON C.S.A.H. 22 OUTSIDE OF WORKING HOURS.
- TRAFFIC SHALL BE FLAGGED INTO EASTBOUND LANE WITH WESTBOUND LANE CLOSED ON C.S.A.H. 22 DURING WORKING HOURS.
- CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTIES AT ALL TIMES.

STAGE 4:

CONSTRUCTION ACTIVITIES:
- CONSTRUCT SOUTH PORTION OF C.S.A.H. 22 AT THE INTERSECTION OF FOX ST.

TRAFFIC FLOW:
- TRAFFIC SHALL BE SHIFTED NORTH ON C.S.A.H. 22 OUTSIDE OF WORKING HOURS.
- TRAFFIC SHALL BE FLAGGED INTO WESTBOUND LANE WITH EASTBOUND LANE CLOSED ON C.S.A.H. 22 DURING WORKING HOURS.
- CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTIES AT ALL TIMES.
- CONTRACTOR SHALL PROVIDE TEMPORARY EASEMENT TO PROVIDE ACCESS TO FOX ST TRAFFIC AT ALL TIMES.

STAGING NARRATIVE

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY
DESIGNED BY: SY
CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 81 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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08\1\2023
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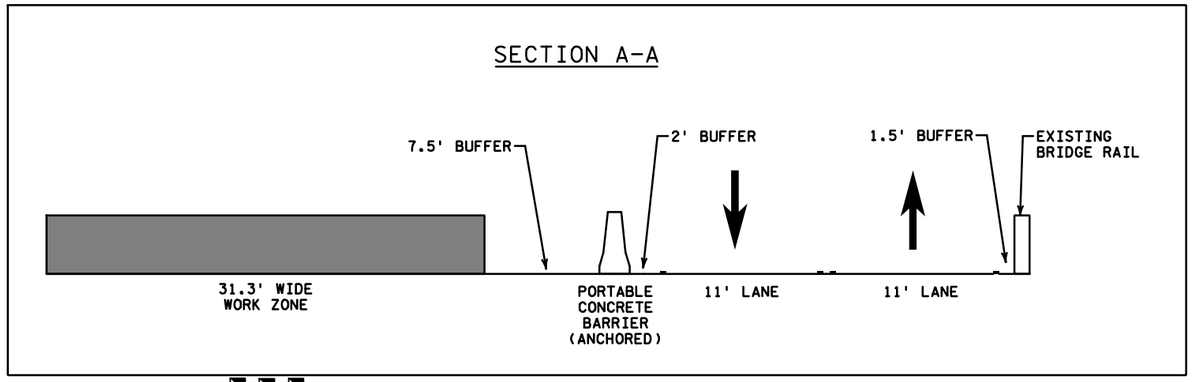
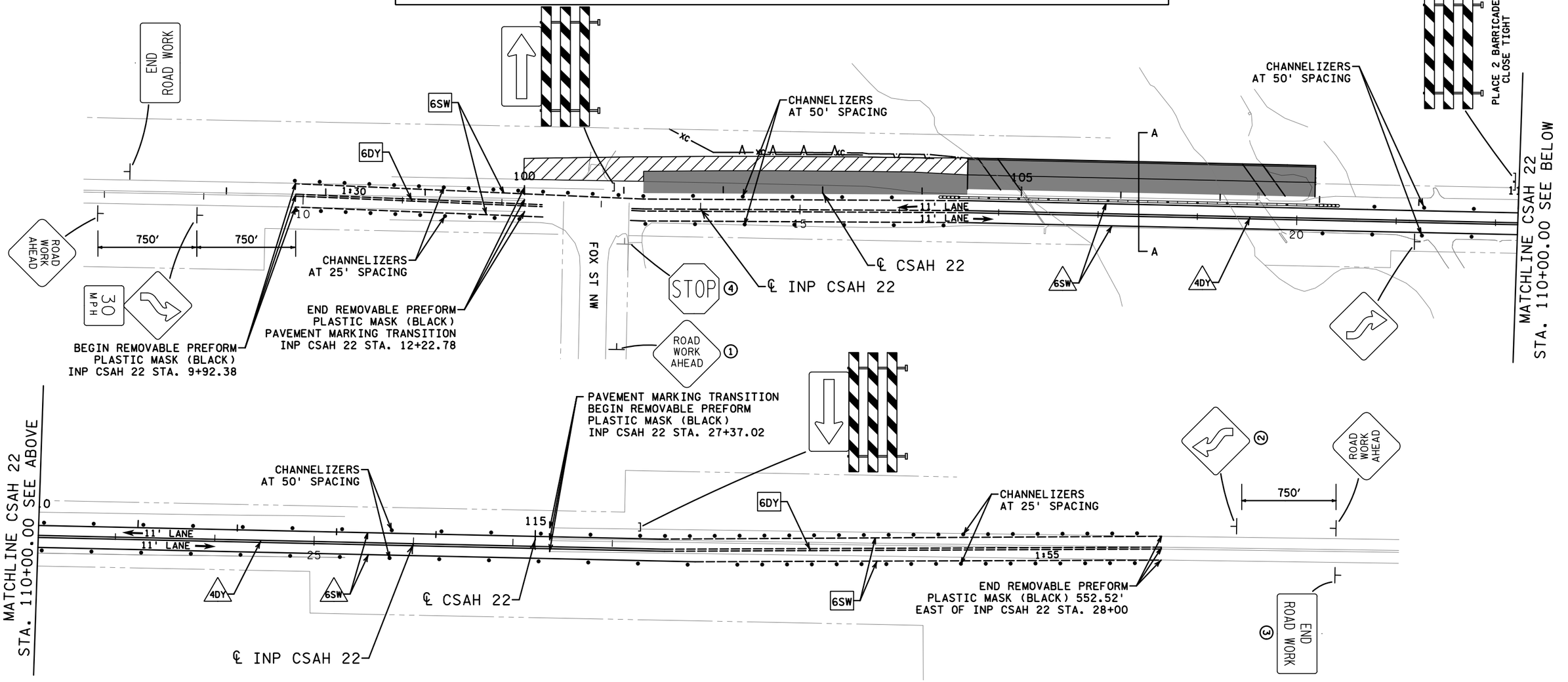
LEGEND

- STAGE 1 - WORK ZONE
- TEMPORARY PAVEMENT

SPECIFIC NOTES

1. PLACE SIGN 100' IN ADVANCE OF INTERSECTION.
2. PLACE SIGN 630' IN ADVANCE OF INP CSAH 22 STA. 28+00.
3. PLACE SIGN 730' EAST OF INP CSAH 22 STA. 28+00.
4. INPLACE STOP SIGN





STAGE 1: (STAGING OUTSIDE OF WORKING HOURS)

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY
DESIGNED BY: SY
CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 82 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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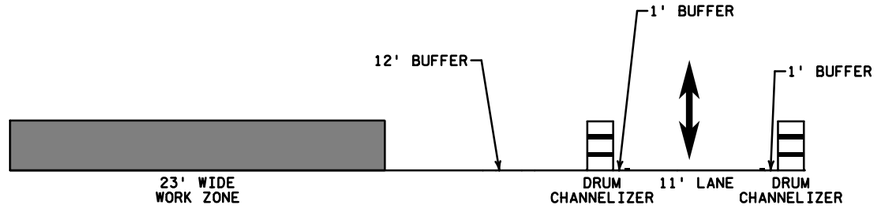
LEGEND

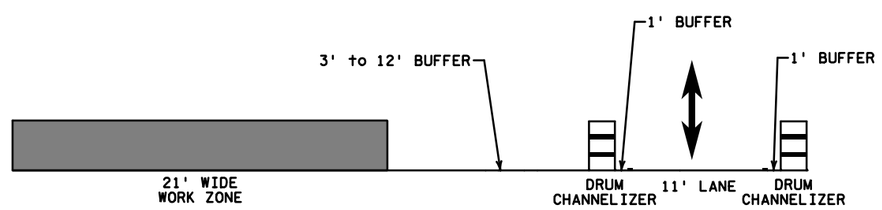
STAGE 1 - WORK ZONE

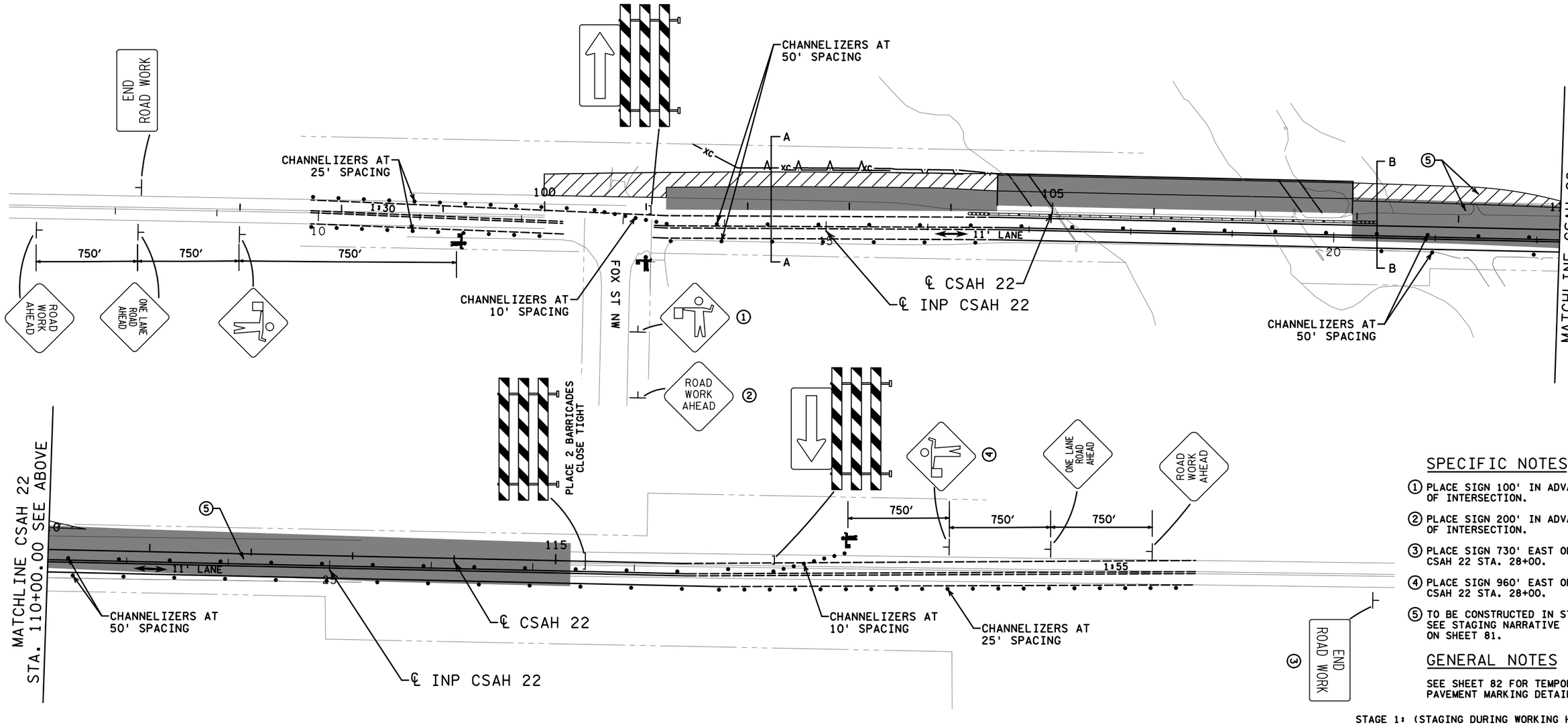
TEMPORARY PAVEMENT

SECTION A-A



SECTION B-B





SPECIFIC NOTES

1. PLACE SIGN 100' IN ADVANCE OF INTERSECTION.
2. PLACE SIGN 200' IN ADVANCE OF INTERSECTION.
3. PLACE SIGN 730' EAST OF INP CSAH 22 STA. 28+00.
4. PLACE SIGN 960' EAST OF INP CSAH 22 STA. 28+00.
5. TO BE CONSTRUCTED IN STAGE 1A. SEE STAGING NARRATIVE ON SHEET 81.

GENERAL NOTES

SEE SHEET 82 FOR TEMPORARY PAVEMENT MARKING DETAILS.

STAGE 1: (STAGING DURING WORKING HOURS)

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 83 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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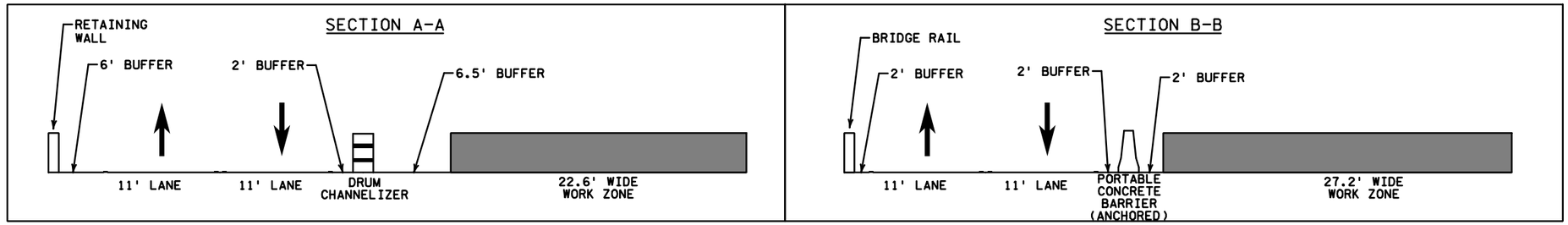
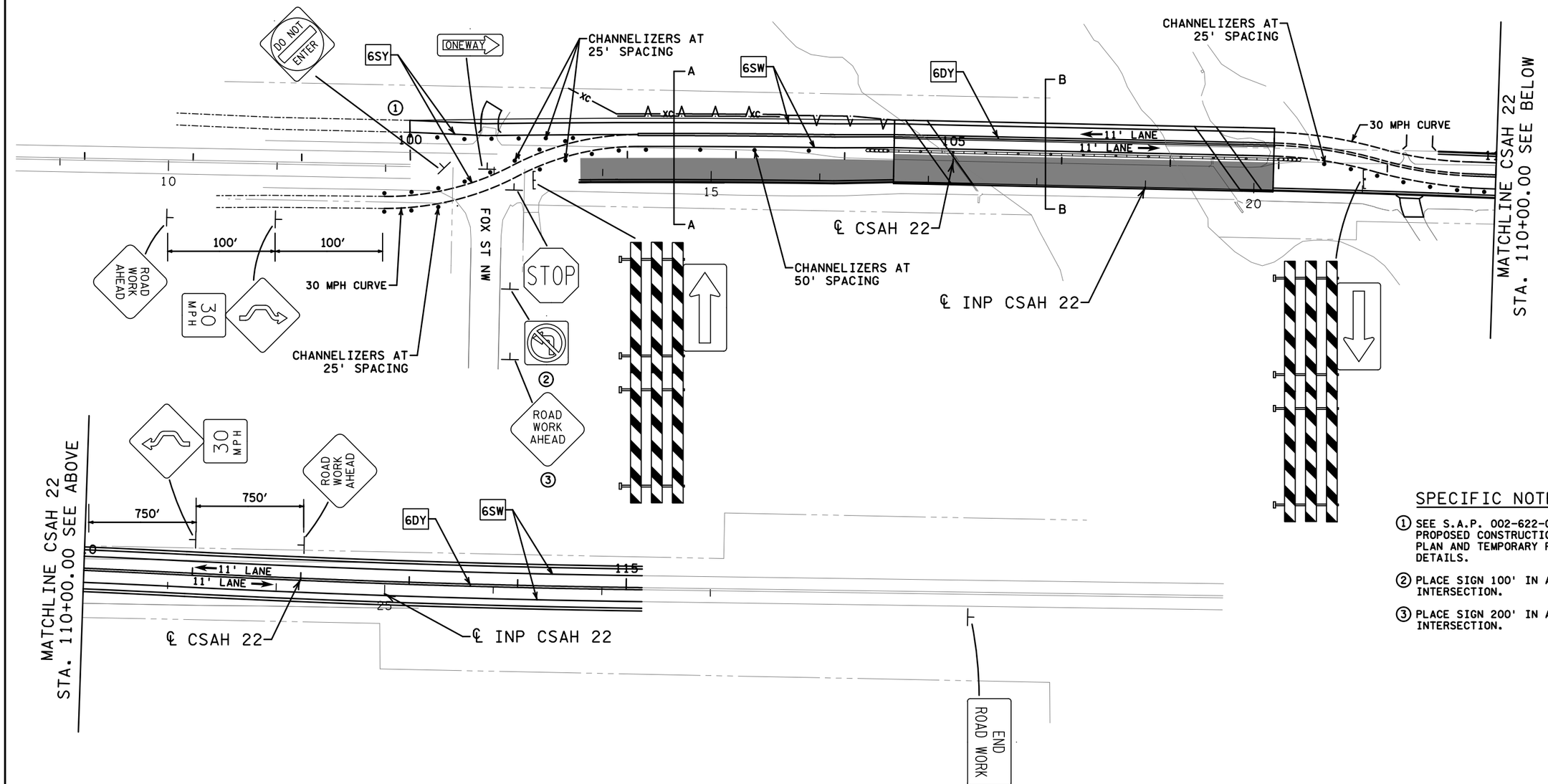
LEGEND

STAGE 2 - WORK ZONE





SPECIFIC NOTES

1. SEE S.A.P. 002-622-041 FOR PROPOSED CONSTRUCTION STAGING PLAN AND TEMPORARY PAVEMENT DETAILS.
2. PLACE SIGN 100' IN ADVANCE OF INTERSECTION.
3. PLACE SIGN 200' IN ADVANCE OF INTERSECTION.

STAGE 2: (STAGING OUTSIDE OF WORKING HOURS)

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 84 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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LEGEND

STAGE 2 - WORK ZONE

SPECIFIC NOTES

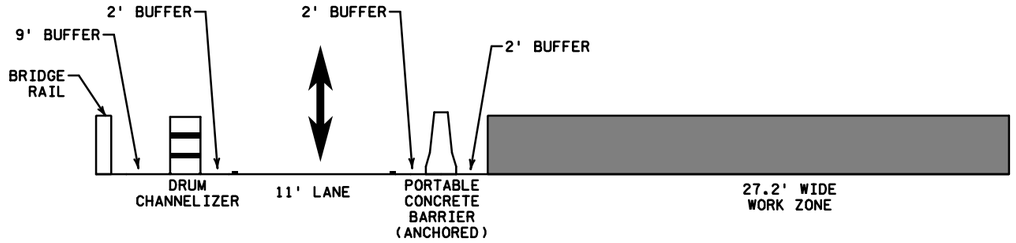
1. SEE S.A.P. 002-622-041 FOR PROPOSED CONSTRUCTION STAGING PLAN AND TEMPORARY PAVEMENT DETAILS.
2. PLACE SIGN 100' IN ADVANCE OF INTERSECTION.
3. PLACE SIGN 200' IN ADVANCE OF INTERSECTION.
4. PLACE SIGN 300' IN ADVANCE OF INTERSECTION.

GENERAL NOTES

SEE SHEET 84 FOR PAVEMENT MARKING DETAILS.

5. PLACE SIGN 100' IN ADVANCE OF FLAGGER ON CSAH 22.
6. PLACE SIGN 400' EAST OF INP CSAH 22 STA. 28+00.

SECTION A-A



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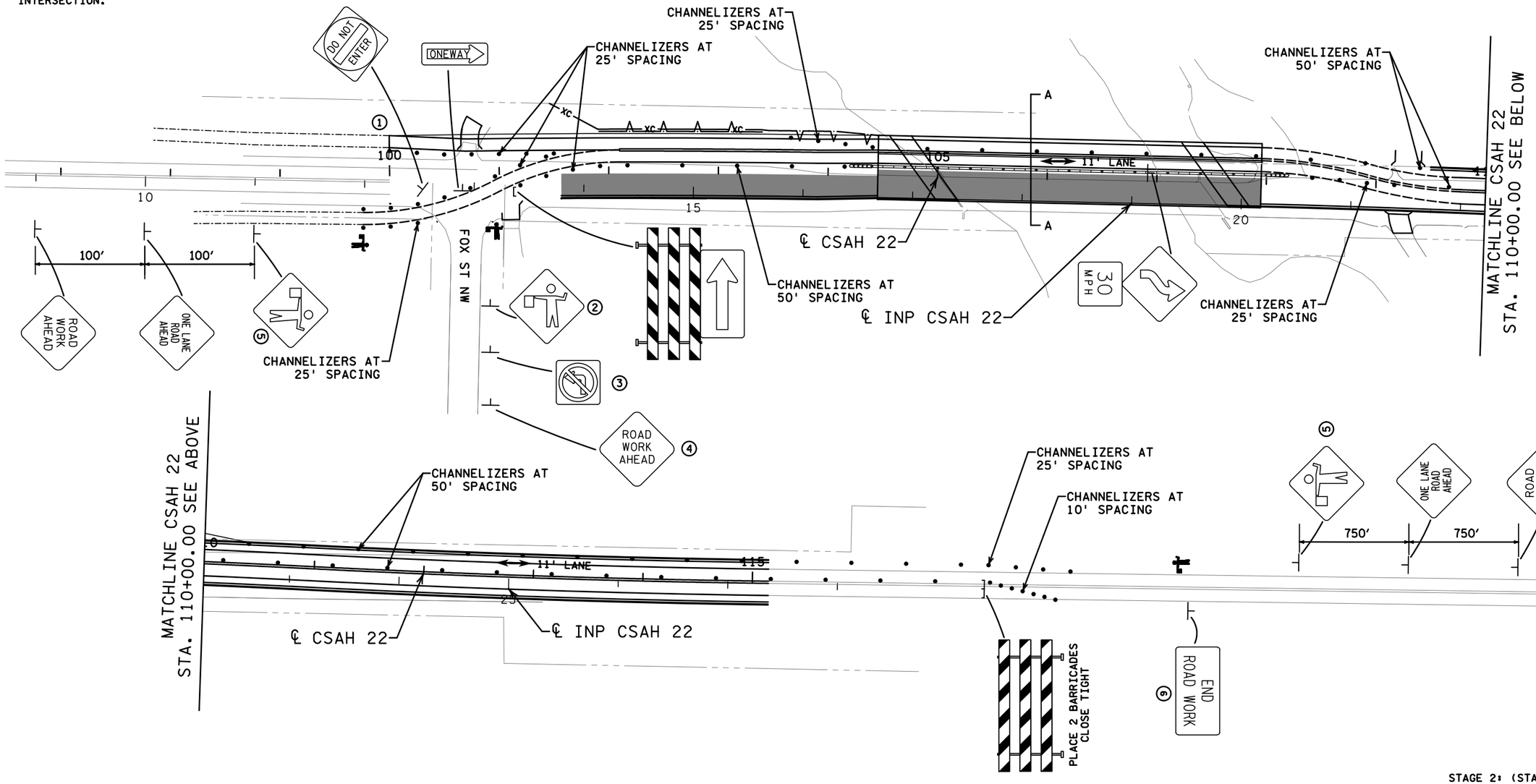
SCALE IN FEET



STAGE 2: (STAGING DURING WORKING HOURS)

NO	DATE	BY	CKD	APPR	REVISION

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LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 85 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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LEGEND

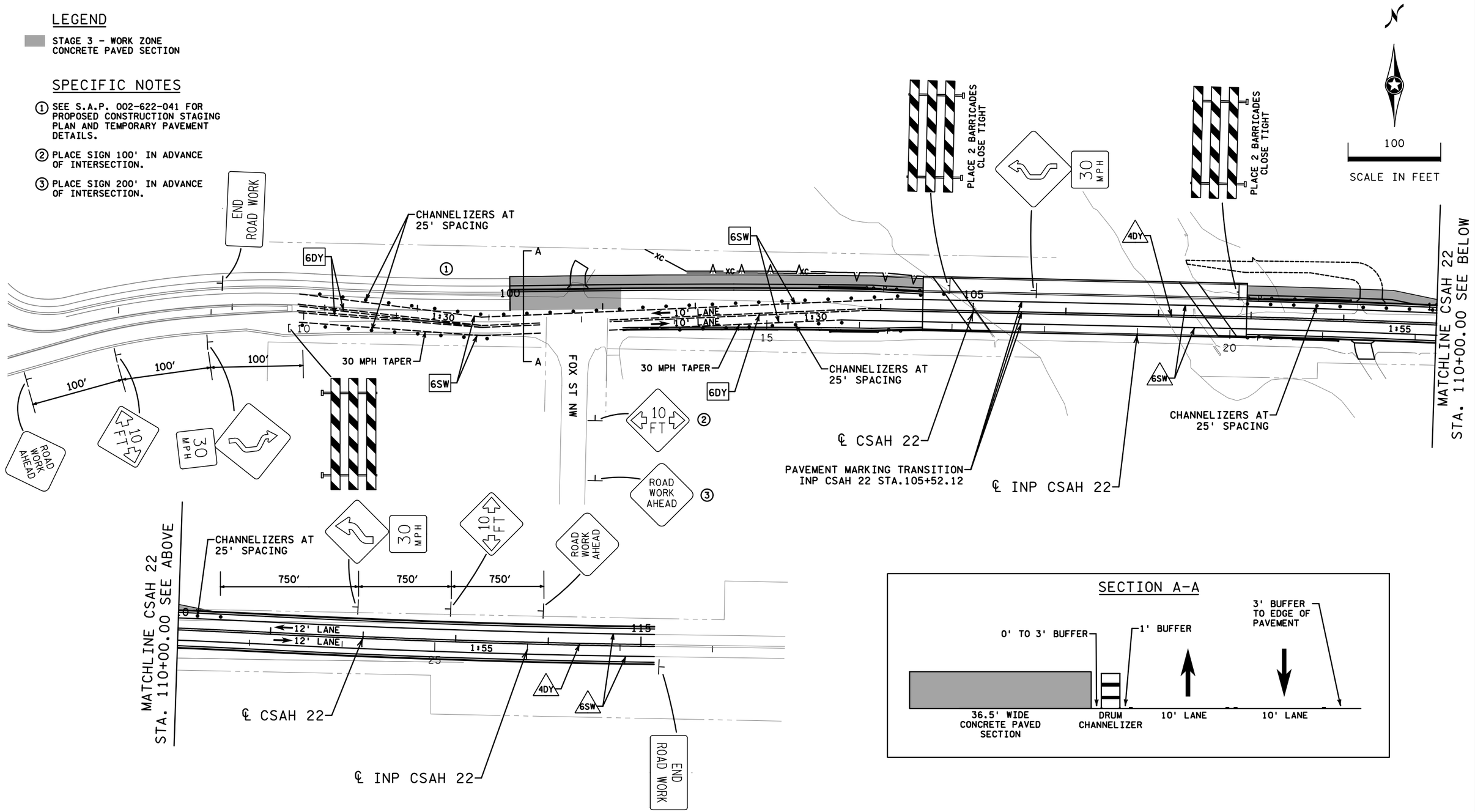
STAGE 3 - WORK ZONE
CONCRETE PAVED SECTION

SPECIFIC NOTES

① SEE S.A.P. 002-622-041 FOR PROPOSED CONSTRUCTION STAGING PLAN AND TEMPORARY PAVEMENT DETAILS.

② PLACE SIGN 100' IN ADVANCE OF INTERSECTION.

③ PLACE SIGN 200' IN ADVANCE OF INTERSECTION.



STAGE 3: (STAGING OUTSIDE OF WORKING HOURS)

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY
DESIGNED BY: SY
CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 86 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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LEGEND

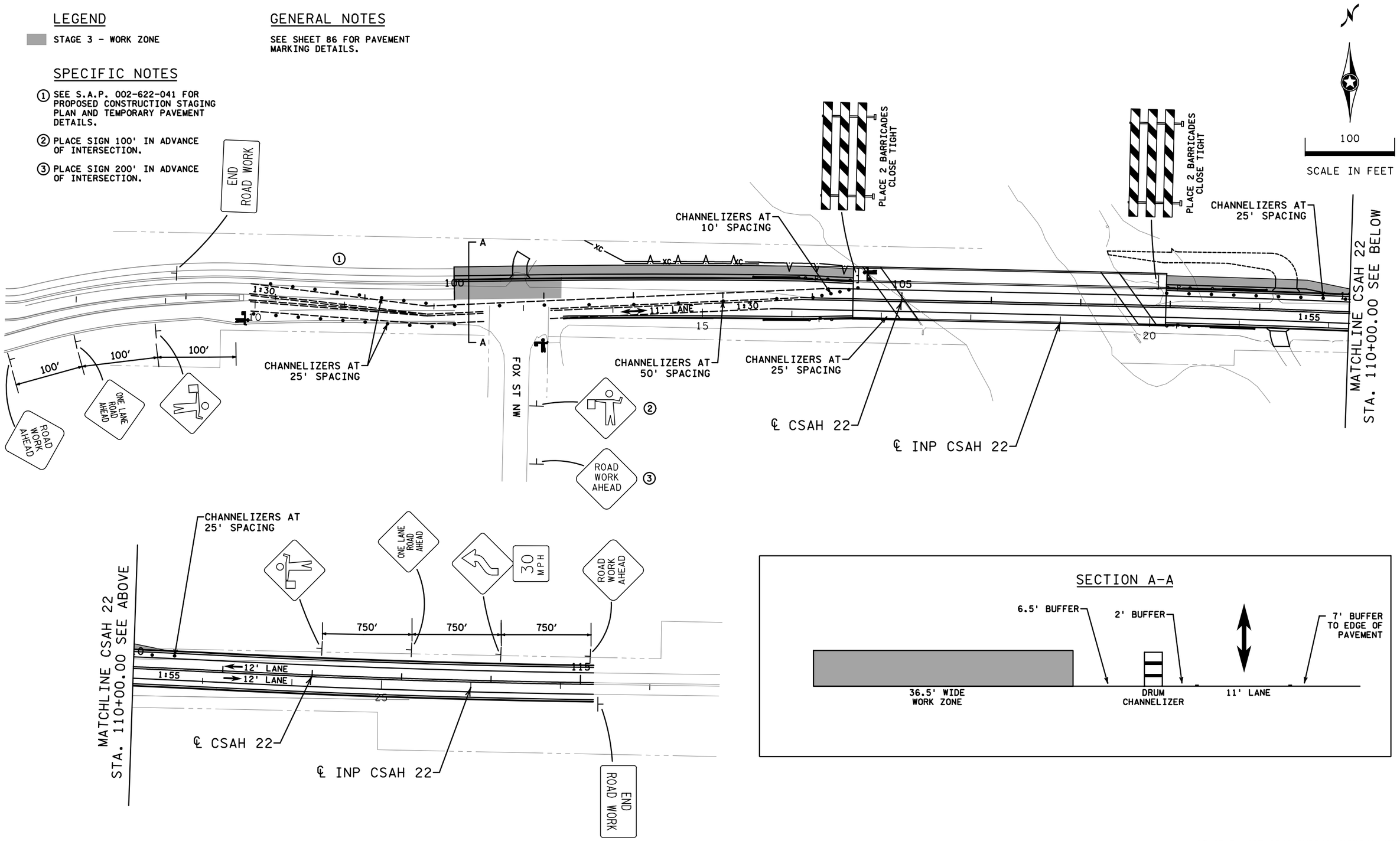
STAGE 3 - WORK ZONE

GENERAL NOTES

SEE SHEET 86 FOR PAVEMENT MARKING DETAILS.

SPECIFIC NOTES

1. SEE S.A.P. 002-622-041 FOR PROPOSED CONSTRUCTION STAGING PLAN AND TEMPORARY PAVEMENT DETAILS.
2. PLACE SIGN 100' IN ADVANCE OF INTERSECTION.
3. PLACE SIGN 200' IN ADVANCE OF INTERSECTION.



SECTION A-A

STAGE 3: (STAGING DURING WORKING HOURS)

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 87 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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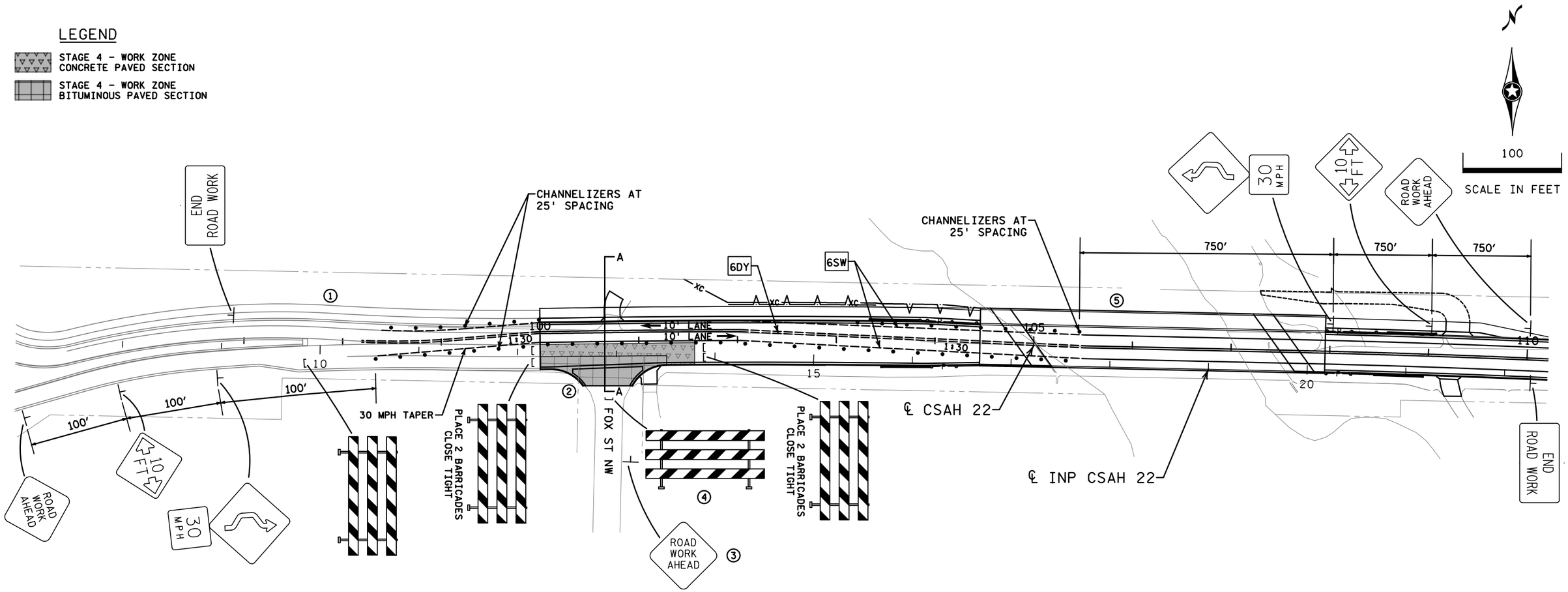
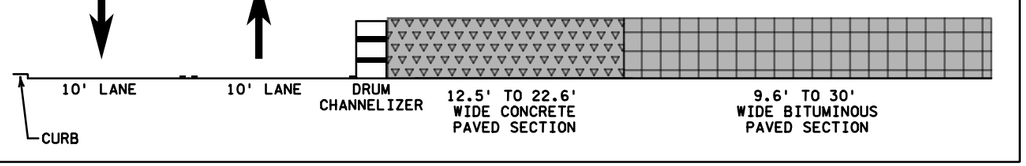
LEGEND

STAGE 4 - WORK ZONE
CONCRETE PAVED SECTION

STAGE 4 - WORK ZONE
BITUMINOUS PAVED SECTION



SECTION A-A



SPECIFIC NOTES

① SEE S.A.P. 002-622-041 FOR PROPOSED CONSTRUCTION STAGING PLAN AND TEMPORARY PAVEMENT DETAILS.

② CONSTRUCT THE INTERSECTION IN HALVES TO MAINTAIN ACCESS TO FOX ST NW AT ALL TIMES.

③ PLACE SIGN 100' IN ADVANCE OF INTERSECTION.

④ PLACE 2 BARRICADES, CLOSE TIGHT, ON HALF OF INTERSECTION BEING CONSTRUCTED TO MAINTAIN ACCESS TO FOX ST NW AT ALL TIMES.

⑤ SEE SHEET 86 FOR PAVEMENT MARKING DETAILS.

STAGE 4: (STAGING OUTSIDE OF WORKING HOURS)

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga 8/10/2023
LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: SY
DESIGNED BY: SY
CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 88 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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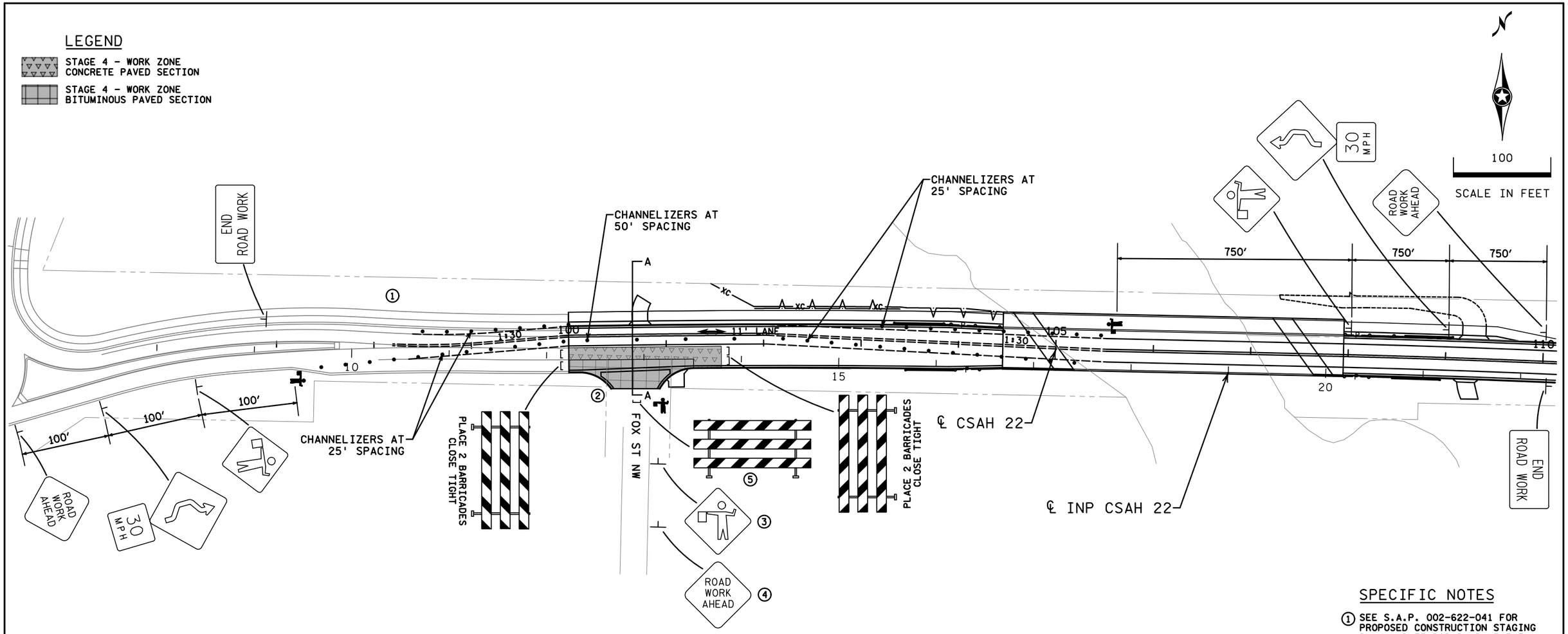
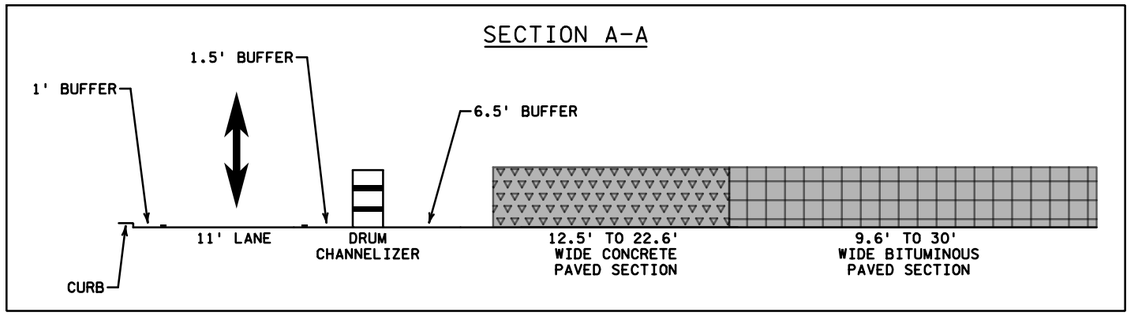
LEGEND

STAGE 4 – WORK ZONE CONCRETE PAVED SECTION

STAGE 4 – WORK ZONE BITUMINOUS PAVED SECTION



SECTION A-A



SPECIFIC NOTES

① SEE S.A.P. 002-622-041 FOR PROPOSED CONSTRUCTION STAGING PLAN AND TEMPORARY PAVEMENT DETAILS.

② CONSTRUCT THE INTERSECTION IN HALVES TO MAINTAIN ACCESS TO FOX ST NW AT ALL TIMES.

③ PLACE SIGN 100' IN ADVANCE OF INTERSECTION.

④ PLACE SIGN 200' IN ADVANCE OF INTERSECTION.

⑤ PLACE 2 BARRICADES, CLOSE TIGHT, ON HALF OF INTERSECTION BEING CONSTRUCTED TO MAINTAIN ACCESS TO FOX ST NW AT ALL TIMES.

GENERAL NOTES

SEE SHEET 88 FOR PAVEMENT MARKING DETAILS.

STAGE 4: (STAGING DURING WORKING HOURS)

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 89 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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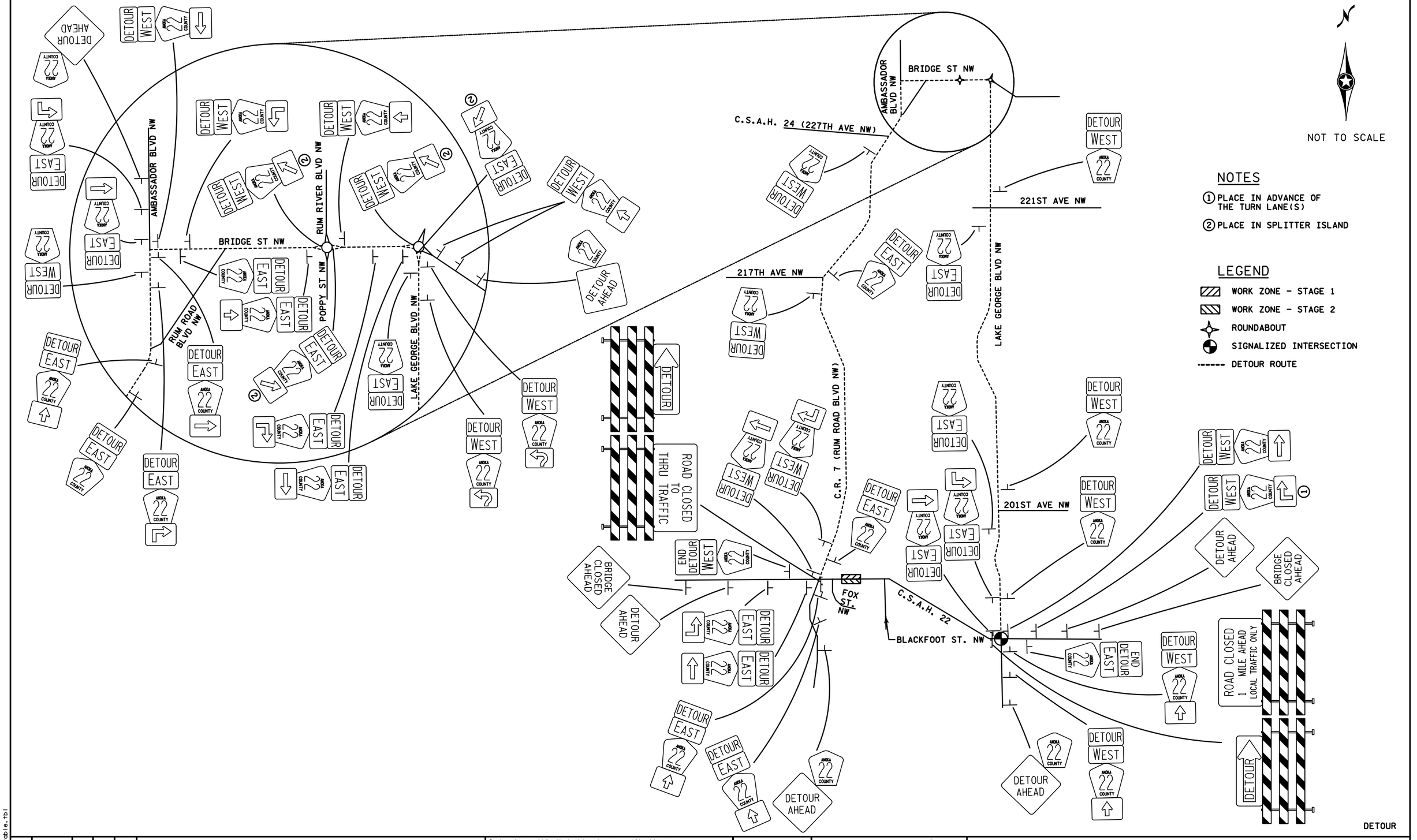

NOTES

1. PLACE IN ADVANCE OF THE TURN LANE(S)
2. PLACE IN SPLITTER ISLAND

LEGEND

- WORK ZONE - STAGE 1
- WORK ZONE - STAGE 2
- ROUNDABOUT
- SIGNALIZED INTERSECTION
- DETOUR ROUTE

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY
DESIGNED BY: SY
CHECKED BY: MJM

HDR

ANOKA COUNTY

TRAFFIC CONTROL PLANS

SHEET NO. 90 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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PERMANENT SIGNING SUMMARY				ST
TAB	SHEET NO	ITEM	UNIT	TOTAL SIGNING QUANTITIES
ST-A	92	REMOVE DELINEATOR / MARKER	EACH	8
ST-A	92	REMOVE SIGN	EACH	7
ST-A	92	DELINEATOR / MARKER	EACH	4
ST-A	92	SIGN	SQ FT	56

SIGNING AND PAVEMENT MARKING INDEX

ABBREVIATIONS

U U-CHANNEL

SIGNING LEGEND

⊥ SIGN

⊥⊥ SIGN BACK TO BACK

GENERAL INFORMATION:

1. MOUNTING HEIGHT IS MINIMUM (WITH A + 6 INCH TOLERANCE)
2. SEE CURRENT MNDOT STANDARD SIGNS AND MARKINGS MANUAL FOR STANDARD SIGN DESIGNS, SPLICE PLATES, STRINGERS AND PUNCHING CODES.

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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga 8/10/2023

LICENSED PROFESSIONAL ENGINEER DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: NJS

HDR

ANOKA COUNTY

SIGNING TITLE SHEET

SHEET NO. 91 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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SIGN AND DELINEATOR/MARKER

ST-A

	SIGN NUMBER	PANEL		SIZE (W X H)	MOUNTING HEIGHT	SUPPORT		REMOVE SIGN	SIGN	REMOVE DELINEATOR/ MARKER	DELINEATOR/ MARKER
		PANEL CODE	LEGEND			TYPE (2)	NUMBER OF POSTS				
				INCH	FEET			EACH	SQ FT	EACH	EACH
	S-1	R8-3	NO PARKING (SYMBOL)	24 X 24	7	U - SOIL	1		4.00		
	S-2	W3-1	STOP AHEAD (SYMBOL)	30 X 30	7	U - SOIL	1	1	6.25		
	S-3	W3-1	STOP AHEAD (SYMBOL)	INPLACE				1			
		W14-3	NO PASSING ZONE	INPLACE							
	S-4	R8-3	NO PARKING (SYMBOL)	24 X 24	7	U - SOIL	1		4.00		
	S-5	W3-1	STOP AHEAD (SYMBOL)	30 X 30	7	U - SOIL	1		6.25		
(1)	S-6	W14-3	NO PASSING ZONE	64 X64X 48	7	U - SOIL	1		9.89		
		R8-3	NO PARKING (SYMBOL)	24 X 24					4.00		
	S-7	OM3-L	TYPE 3 OBJECT MARKER	12 X 36	4	U - SOIL	1			1	1
	S-8	OM3-R	TYPE 3 OBJECT MARKER	12 X 36	4	U - SOIL	1			1	1
	S-9	R12-X1P	BRIDGE	INPLACE				1			
		R12-5	WEIGHT LIMIT 37T, 40T, 40T	INPLACE							
		INPLACE	GROSS WT	INPLACE							
	S-10	OM3-L	TYPE 3 OBJECT MARKER	INPLACE						1	
	S-11	OM3-R	TYPE 3 OBJECT MARKER	INPLACE						1	
	S-12	OM3-R	TYPE 3 OBJECT MARKER	INPLACE						1	
	S-13	OM3-L	TYPE 3 OBJECT MARKER	12 X 36	4	U - SOIL	1			1	1
	S-14	R8-3	NO PARKING (SYMBOL)	INPLACE				1			
		M6-1L	LEFT ARROW	INPLACE							
	S-15	R8-3	NO PARKING (SYMBOL)	24 X 24	7	U - SOIL	1		4.00		
	S-16	R12-X1P	BRIDGE	INPLACE				1			
		R12-5	WEIGHT LIMIT 37T, 40T, 40T	INPLACE							
		INPLACE	GROSS WT	INPLACE							
	S-17	OM3-R	TYPE 3 OBJECT MARKER	12 X 36	4	U - SOIL	1			1	1
	S-18	OM3-L	TYPE 3 OBJECT MARKER	INPLACE						1	
	S-19	W14-3	NO PASSING ZONE	64 X64X 48	7	U - SOIL	1	1	9.89		
	S-20	R8-3	NO PARKING (SYMBOL)	INPLACE				1			
		M6-1R	RIGHT ARROW	INPLACE							
	S-21	R8-3	NO PARKING (SYMBOL)	24 X 24	7	U - SOIL	1		4.00		
	S-22	R8-3	NO PARKING (SYMBOL)	24 X 24	7	U - SOIL	1		4.00		
							TOTAL	7	56	8	4

SPECIFIC NOTES

(1) MOUNT BACK TO BACK.

(2) U-CHANNEL 3 LBS PER FOOT BLACK POST.

NO	DATE	BY	CKD	APPR	REVISION
1	9/6/2023	SY	BAV		REMOVED RISER POST SIZE COLUMN AND ADDED SPECIFIC NOTE NO. 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.

NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: NJS

HDR

ANOKA COUNTY

SIGNING TABULATIONS

SHEET NO. 92 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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PERMANENT PAVEMENT MARKING PLAN

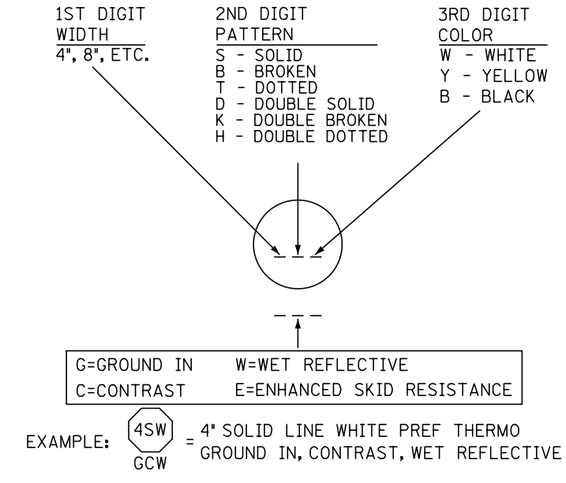
NOTES & GUIDELINES

GENERAL INFORMATION:

1. SEE 2582 IN THE SPECIAL PROVISIONS FOR PAVEMENT MARKING SPOTTING RESPONSIBILITIES.
2. EDGE LINES AND LANE LINES ARE TO BE BROKEN ONLY AT INTERSECTIONS WITH PUBLIC ROADS, AND AT PRIVATE ENTRANCES IF THEY ARE CONTROLLED BY AN AGENCY PLACED YIELD SIGN, STOP SIGN OR TRAFFIC SIGNAL. THE BREAK POINT IS TO BE AT THE START OF THE MAINLINE RADIUS.
3. DO NOT APPLY THE PAVEMENT MARKINGS WHEN WEATHER AND OTHER CONDITIONS CAUSE A FILM OF DUST OR DEBRIS TO BE DEPOSITED ON THE PAVEMENT SURFACE AFTER CLEANING AND BEFORE THE MARKING MATERIAL IS APPLIED.
4. THE FILLING OF TANKS, POURING OF MATERIALS OR CLEANING OF EQUIPMENT SHALL NOT BE PERFORMED ON UNPROTECTED PAVEMENT SURFACES UNLESS ADEQUATE PROVISIONS ARE MADE TO PREVENT SPILLAGE OF MATERIAL.

STRIPING KEY

CIRCLE-MULTI COMP



EXAMPLE: 4SW / GCW = 4" SOLID LINE WHITE PREF THERMO GROUND IN, CONTRAST, WET REFLECTIVE

PERMANENT PAVEMENT MARKING TABULATION					PM
ITEM	UNIT	YELLOW	WHITE	TOTAL QUANTITY	LOCATION
4" SOLID LINE MULTI-COMPONENT GROUND IN (WR)	LIN FT	952		952	CENTERLINES
6" SOLID LINE MULTI-COMPONENT GROUND IN (WR)	LIN FT		3210	3210	EDGELINES
4" BROKEN LINE MULTI-COMPONENT GROUND IN (WR)	LIN FT	190		190	CENTERLINES
4" DOUBLE SOLID LINE MULTI-COMPONENT GROUND IN (WR)	LIN FT	563		563	CENTERLINES

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y. Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: NJS

HDR

ANOKA COUNTY

PAVEMENT MARKING TABULATIONS

SHEET NO. 93 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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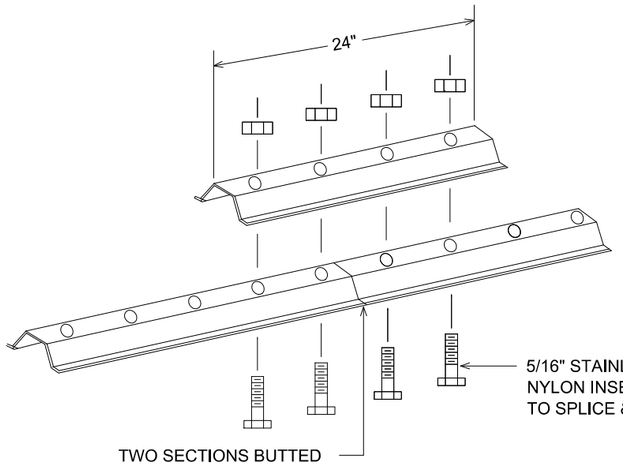
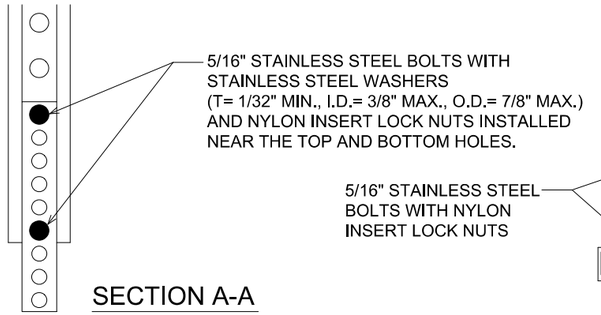
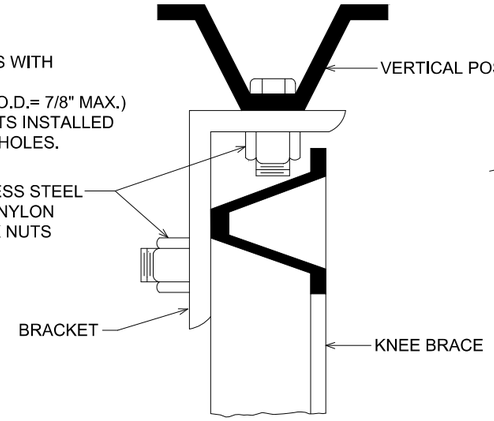
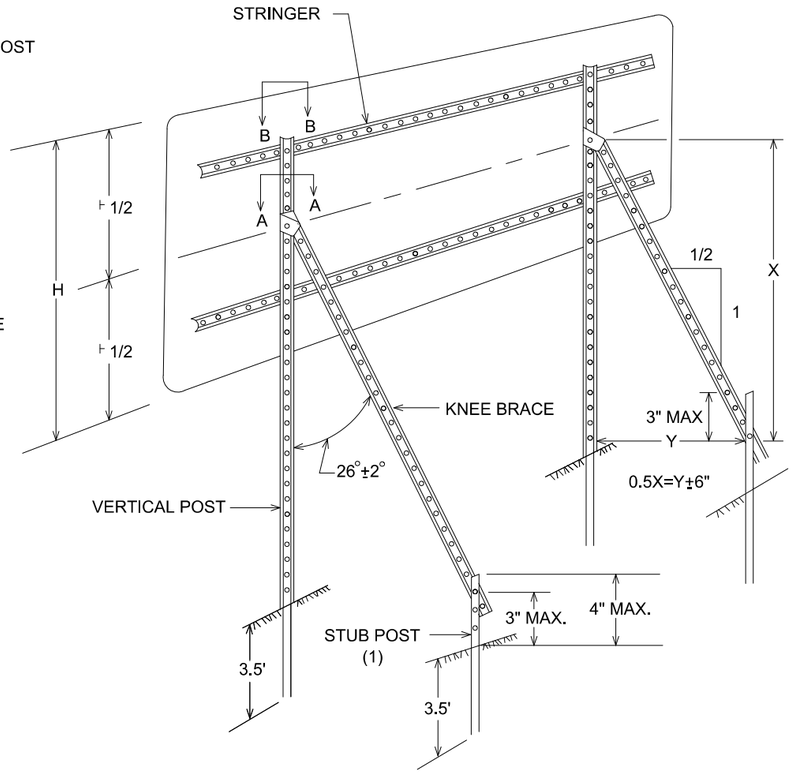


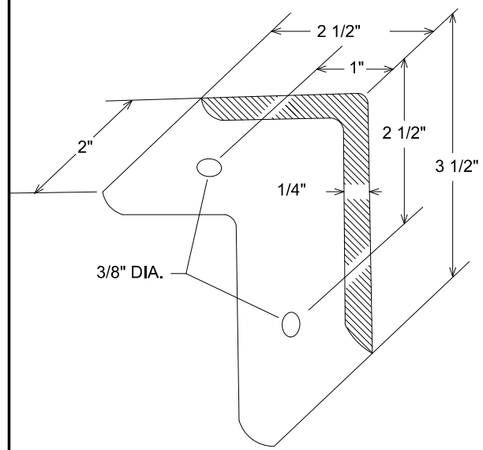


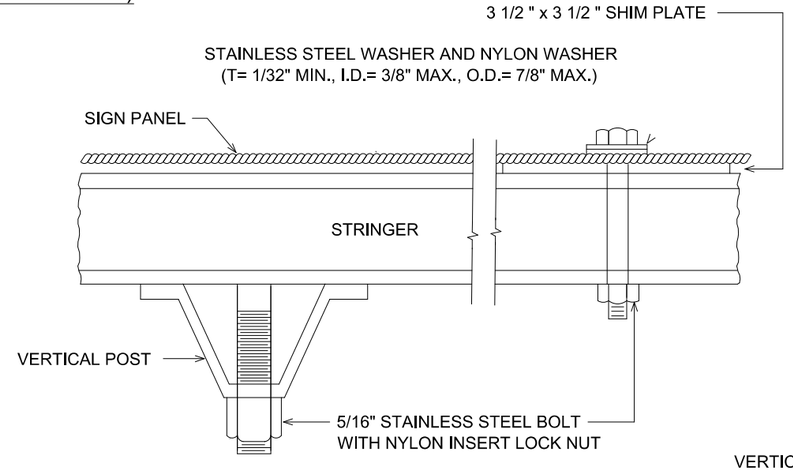
SECTION A-A

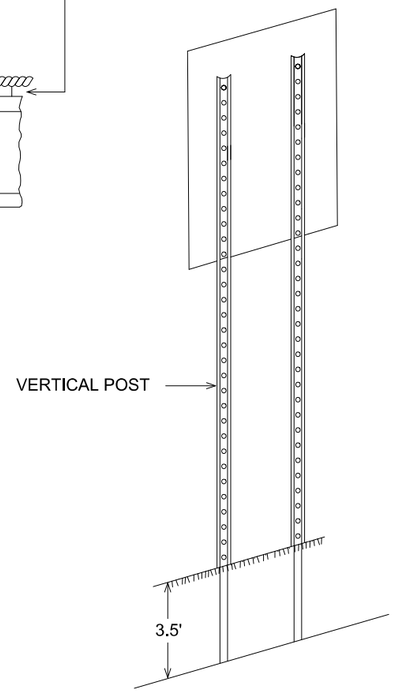




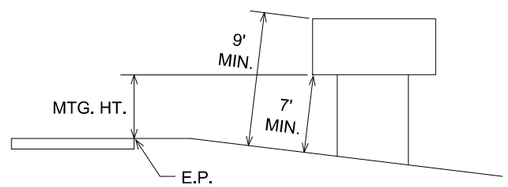
LATERAL BRACE OR STRINGER SPLICE DETAIL (EXPLODED VIEW)







TYPICAL "A-FRAME" INSTALLATION TYPE "D" SIGNS



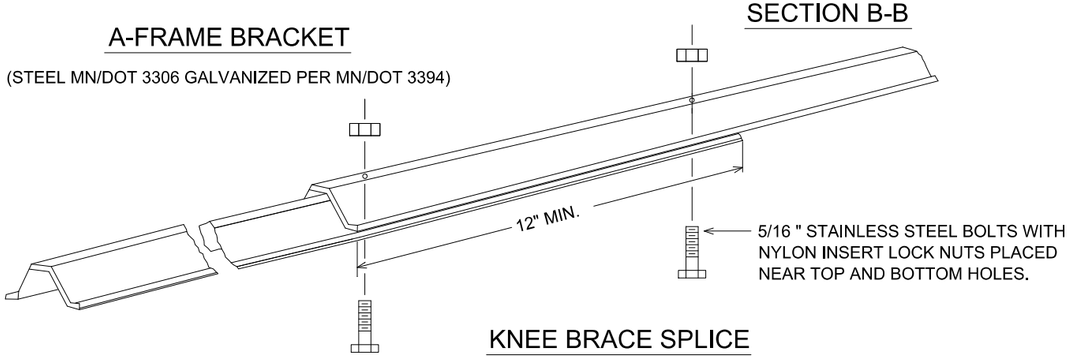
TYPICAL MOUNTING

(1) OFFSET STUB POST 1' TOWARD ROADWAY RELATIVE TO VERTICAL POST.

A-FRAME BRACKET

(STEEL MN/DOT 3306 GALVANIZED PER MN/DOT 3394)

SECTION B-B



KNEE BRACE SPLICE

TYPICAL INSTALLATION 36" AND LARGER TYPE "C" SIGNS

TYPE C & D SIGN STRUCTURAL DETAILS

NO	DATE	BY	CKD	APPR	REVISION

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NAME: SRI DURGA YADA LIC. NO. 58794

CERTIFIED BY: Y Sri Durga 8/10/2023

LICENSED PROFESSIONAL ENGINEER — DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: NJS

HDR

ANOKA COUNTY

DETAILS

SHEET NO. 94 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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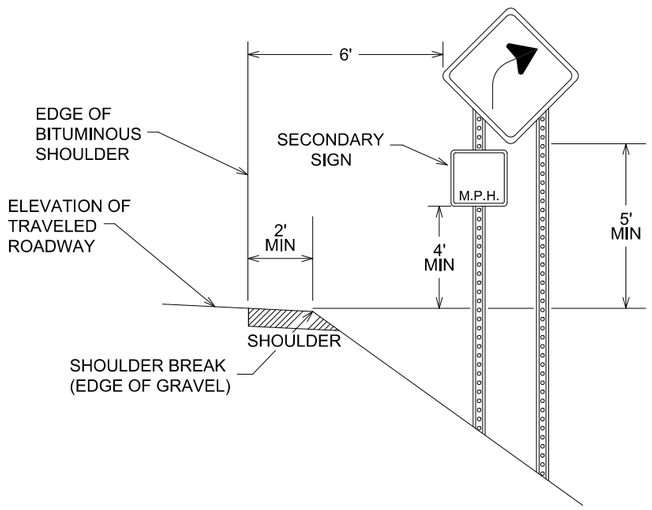
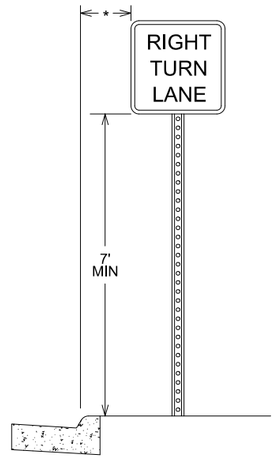
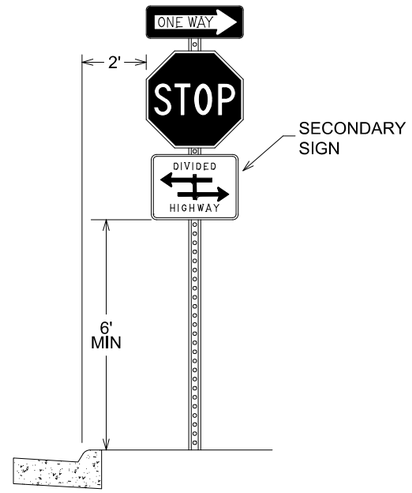
TYPICAL SIGN PLACEMENT
(RURAL)

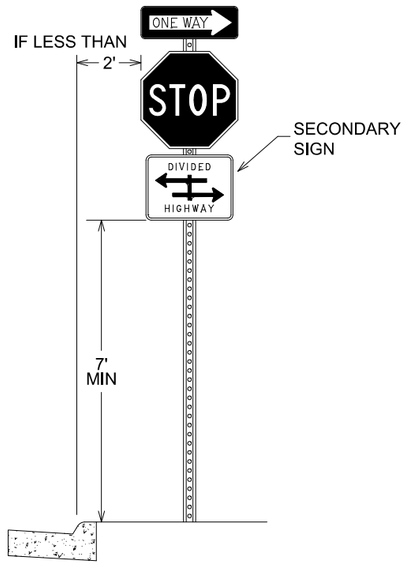


TYPICAL SIGN PLACEMENT
(URBAN)



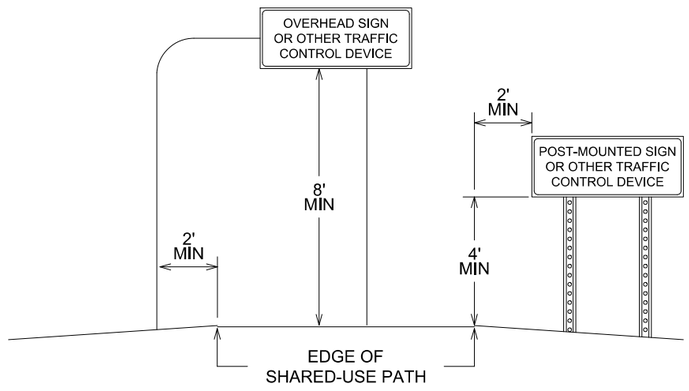
*2' - NARROW BOULEVARD (≤ 8' WIDE)
6' - WIDE BOULEVARD





NOTES:
- ALL DIMENSIONS ARE MINIMUMS
- MAINTAIN A DISTANCE OF 2' BETWEEN SIGNS AND BITUMINOUS TRAIL
- 7' SIGN CLEARANCE IF A 2' DISTANCE BETWEEN SIGN AND BITUMINOUS TRAIL CANNOT BE MAINTAINED

TYPICAL SIGN PLACEMENT
SHARED-USE PATH



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LICENSED PROFESSIONAL ENGINEER DATE

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DESIGNED BY: SY
CHECKED BY: NJS

HDR

ANOKA COUNTY

DETAILS

SHEET NO. 95 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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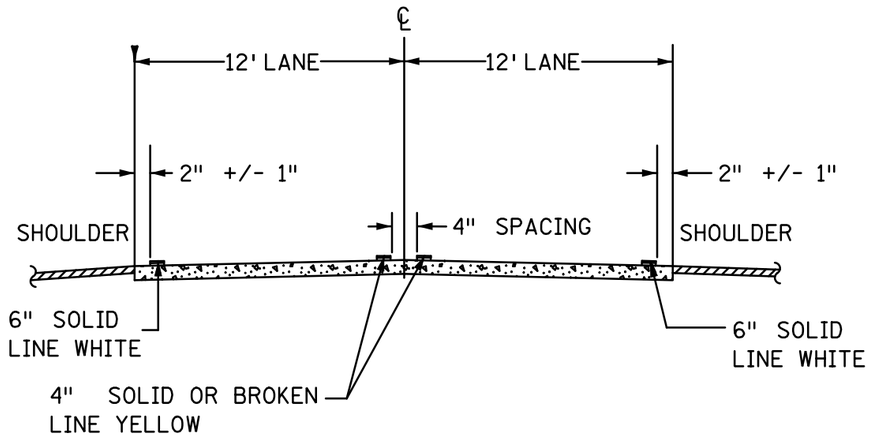
TWO-LANE, TWO-WAY



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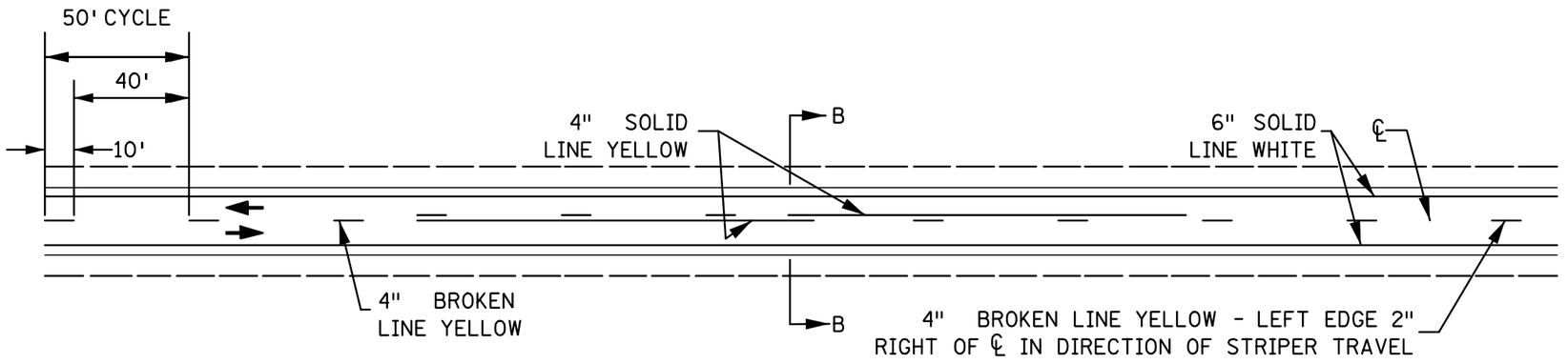

PUBLISHED BY OTE: 16 NOV 2021 | MODIFIED:

NO	DATE	BY	CKD	APPR	REVISION

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CHECKED BY: NJS

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ANOKA COUNTY

DETAILS

SHEET NO. 96 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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NOTES

1. F. & I.
2. INPLACE
4. REMOVE

N

100

SCALE IN FEET

℄ CSAH 22

S-5 (1)

S-6 (1) NO PASSING ZONE

S-3 (4) NO PASSING ZONE

S-4 (1)

8' SHOULDER

S-7 (4)

S-7 (1)

S-10 (4)

S-12 (4)

S-16 (1)

S-16 (4) BRIDGE WEIGHT LIMIT 37T 40T 40T GROSS WT

S-17 (4)

PAVEMENT MARKING TRANSITION
CSAH 22 STA.109+00.00

S-22 (1)

xc

100

12' LANE
12' LANE

105

110

115

FOX ST NW

4SY GW

4BY GW

STOP (2)

S-1 (1)

S-2 (1)

S-2 (4)

S-8 (4)

S-8 (1)

S-9 (4) BRIDGE WEIGHT LIMIT 37T 40T 40T GROSS WT

S-11 (4)

4DY GW

6SW GW

S-13 (4)

S-13 (1)

S-14 (4)

S-15 (1)

S-18 (4)

S-19 (1) NO PASSING ZONE

S-19 (4) NO PASSING ZONE

S-20 (4)

S-21 (1)

4SY GW

4BY GW

MATCH EXISTING
PAVEMENT MARKINGS
CSAH 22
STA. 100+00.00

PAVEMENT MARKING TRANSITION
CSAH 22 STA.103+36.92

MATCH EXISTING
PAVEMENT MARKINGS
CSAH 22 STA. 115+14.60

NO	DATE	BY	CKD	APPR	REVISION

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CERTIFIED BY: Y Sri Durga — LICENSED PROFESSIONAL ENGINEER — 8/10/2023 DATE

DRAWN BY: SY

DESIGNED BY: SY

CHECKED BY: NJS

HDR

ANOKA COUNTY

SIGNING AND PAVEMENT MARKING PLAN

SHEET NO. 97 OF 97 SHEETS

S.A.P. 002-622-036 (CSAH 22), S.A.P. 223-020-006

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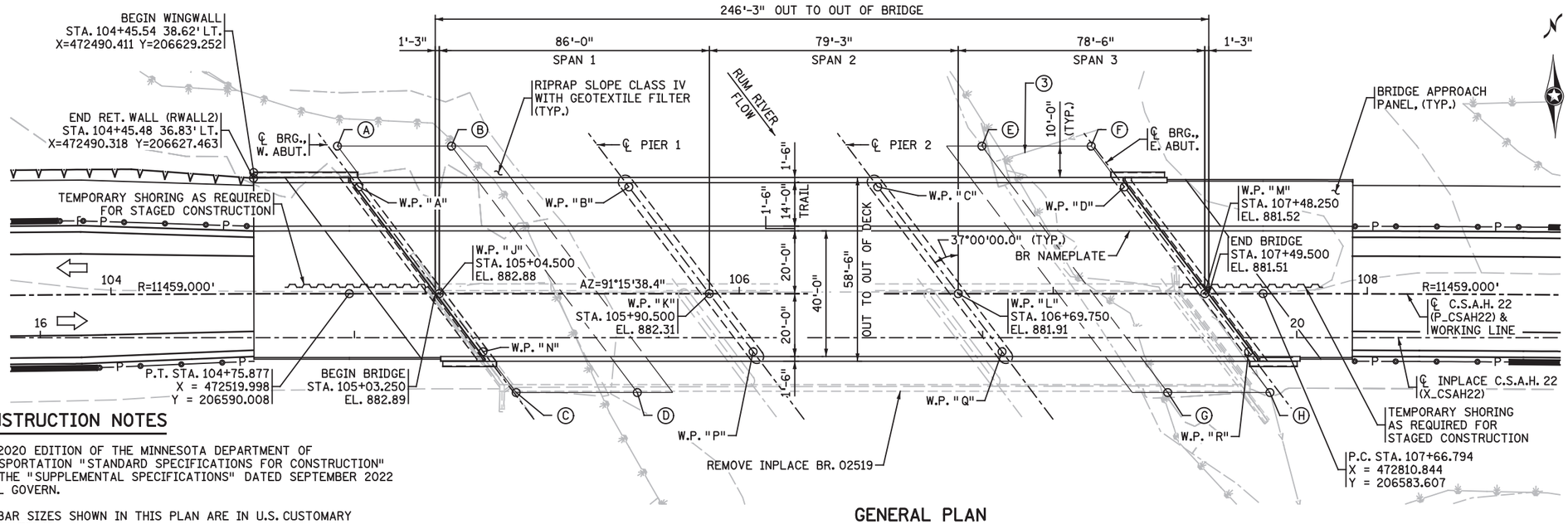


GENERAL PLAN

CONSTRUCTION NOTES

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE "SUPPLEMENTAL SPECIFICATIONS" DATED SEPTEMBER 2022 SHALL GOVERN.

THE BAR SIZES SHOWN IN THIS PLAN ARE IN U.S. CUSTOMARY DESIGNATIONS.

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

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

STAGED CONSTRUCTION, SEE SHEETS B2 & B3 .

2:1 SLOPES ARE NORMAL TO ABUTMENT FACE.

THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCE (Rn) WERE COMPUTED USING LRFD METHODOLOGY. PILE BEARING RESISTANCE DETERMINED IN THE FIELD SHALL INCORPORATE THE METHODS AND/OR FORMULAS DESCRIBED IN THE SPECIAL PROVISIONS.

BRIDGE SEAT REINFORCEMENT SHALL BE CAREFULLY PLACED TO AVOID INTERFERENCE WITH DRILLING HOLES FOR ANCHOR RODS. THE BEAMS SHALL BE ERECTED IN THEIR FINAL POSITION PRIOR TO DRILLING HOLES FOR AND PLACING ANCHOR RODS.

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

NO CUTTING WILL BE PERMITTED UNTIL THE CUTTING LIMITS HAVE BEEN OUTLINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. REMOVAL AND RECONSTRUCTION SHALL CONFORM TO SPEC. 2433.

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

SEE BORINGS SHEET FOR INPLACE UTILITES.

HATCHED AREA TO BE REMOVED UNDER GRADING PORTION OF CONTRACT.

THE EXISTING BRIDGE IS LOAD POSTED. THE CONTRACTOR SHALL COMPLY WITH LEGAL LOAD RESTRICTIONS AND SPECIAL RESTRICTIONS WHEN HAULING OR STORING MATERIAL AND EQUIPMENT ON EXISTING BRIDGE.

(1) ALL EXISTING CONCRETE TO BE REMOVED AT PIERS 1 & 2. EXISTING PIER PILING TO BE CUTOFF A MINIMUM OF 2' BELOW STREAMBED ELEVATION SHOWN IN PLANS.

(2) 3'-0" PASSAGE BENCH. SURFACE WITH COARSE FILTER AGGREGATE (STANDARD DETAIL 5-397.309). TIE BENCHES TO NATURAL GROUNDLINES OUTSIDE OF BRIDGE.

(3) PROTECT PORTIONS OF EXISTING PIPE REMAINING IN PLACE WHEN PLACING RIPRAP. SEE GRADING PLANS FOR ADDITIONAL INFORMATION.

RIPRAP ELEVATIONS

Ⓐ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 104+72.09 47.0' LT.
EL. 876.4±

Ⓑ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 105+08.31 47.0' LT.
EL. 863.0±

Ⓒ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 105+28.99 31.5' RT.
EL. 876.4±

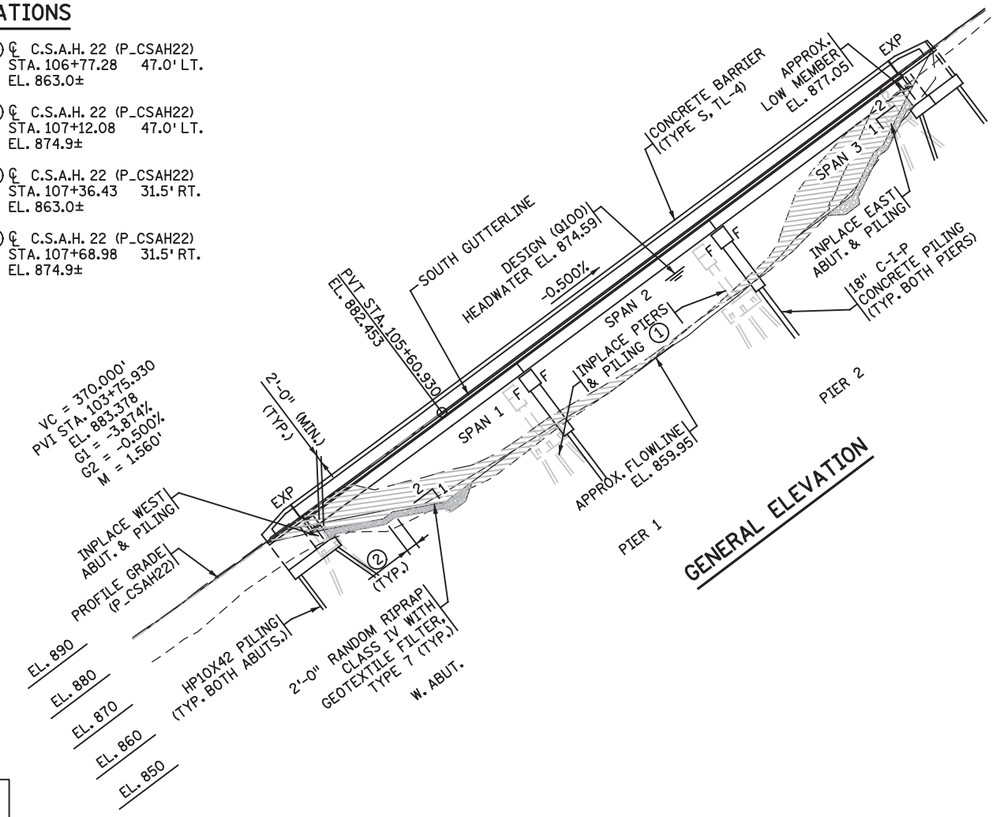
Ⓓ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 105+67.47 31.5' RT.
EL. 863.0±

Ⓔ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 106+77.28 47.0' LT.
EL. 863.0±

Ⓕ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 107+12.08 47.0' LT.
EL. 874.9±

Ⓖ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 107+36.43 31.5' RT.
EL. 863.0±

Ⓗ ℄ C.S.A.H. 22 (P_CSAH22)
STA. 107+68.98 31.5' RT.
EL. 874.9±



GENERAL ELEVATION

EXISTING GROUND PROFILE
40' LT. — — — — —
℄ CSAH 22 (X_CSAH22) ————
33' RT. — — — —

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
fy = 60 KSI PLAIN AND EPOXY COATED BARS
fy = 75 KSI STAINLESS STEEL BARS
n = 8 FOR REINFORCEMENT BARS

PRESTRESSED CONCRETE:
f'c = 9.5 KSI CONCRETE (MAX.)
fpu = 300 KSI LOW RELAXATION STRANDS
n = 1 FOR PRETENSIONING STRANDS
0.72 fpu FOR INITIAL PRESTRESS

9139 ADT FOR YEAR 2024
10,098 PROJ. ADT FOR YEAR 2044

DESIGN SPEED: 55 MPH
APPROXIMATE DECK AREA 14410 SF
HL 93 LRFR
BRIDGE OPERATING RATING FACTOR RF = 1.97

LIST OF SHEETS

APPROVED: Joseph MacPherson — Digitally signed by Joseph MacPherson Date: 2023.08.14 10:02:27 -05'00'
ANOKA COUNTY ENGINEER
DATE: 08/14/23

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
SIGNED: DATE: 8/10/23
LICENSED PROFESSIONAL ENGINEER
NAME: TODD A. LANG LIC. NO. 42962

HDR

ANOKA COUNTY
MINNESOTA DEPARTMENT OF TRANSPORTATION

BRIDGE NO. 02595

0.2 MILES EAST OF JCT. C.R. 7 ON
C.S.A.H. 22 OVER THE RUM RIVER

IDENTIFICATION NO. 501

SEC. 19/30 T33N R24W
CITY OF OAK GROVE ANOKA COUNTY

APPROVED: Edward A. Lutgen — Digitally signed by Edward Lutgen Date: 2023.08.22 12:29:58 -05'00'
STATE BRIDGE ENGINEER DATE

DES: TJC	DR: DM	02595
CHK: TAL	CHK: TAL	

STATE AID PROJ. NO. 002-622-036

SHEET NO. B1 OF B54 SHEETS

user
21:23:28 PM
8/10/2023
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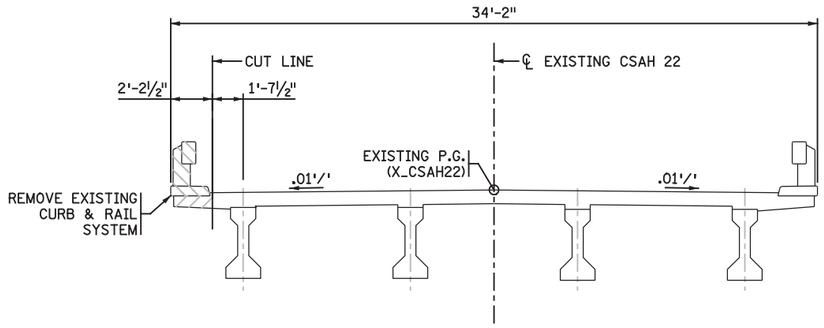
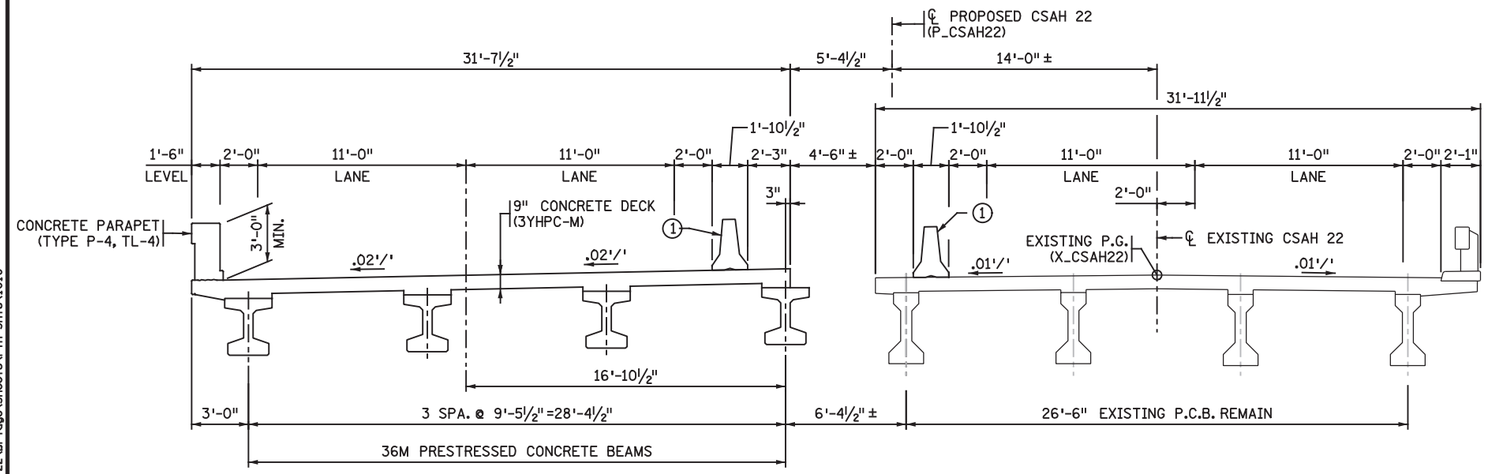


STAGE 1 REMOVAL



STAGE 1 - CONSTRUCTION

SCHEDULE OF QUANTITIES FOR ENTIRE BRIDGE

	ITEM NO.	ITEM	UNIT	QUANTITY	
	2104.601	REMOVE REGULATED WASTE MATERIAL (BRIDGE)	LUMP SUM	1	
(2)	2401.503	TYPE P-4 BARRIER CONCRETE (3S52)	LIN FT	291	(P)
(2)	2401.503	TYPE S (TL-4) 36" BARRIER CONCRETE (3S52)	LIN FT	350	(P)
(2)	2401.503	TYPE S (TL-4) 54" BARRIER CONCRETE (3S52)	LIN FT	274	(P)
	2401.507	STRUCTURAL CONCRETE (1G52)	CU YD	156	(P)
	2401.507	STRUCTURAL CONCRETE (3B52)	CU YD	600	(P)
	2401.508	REINFORCEMENT BARS	POUND	11790	(P)
(3)	2401.508	REINFORCEMENT BARS (EPOXY COATED)	POUND	154770	(P)
	2401.508	REINFORCEMENT BARS (STAINLESS - 75 KSI)	POUND	910	(P)
	2401.518	BRIDGE SLAB CONCRETE (3YHPC-M)	SQ FT	14406	(P)
(4)	2401.601	STRUCTURE EXCAVATION	LUMP SUM	1	
	2401.601	FOUNDATION PREP FOR PILE BENT PIERS	LUMP SUM	1	
(6)	2401.618	BRIDGE DECK PLANING	SQ FT	12826	(P)
	2402.502	BEARING ASSEMBLY	EACH	42	
	2405.503	PRESTRESSED CONCRETE BEAMS 36M	LIN FT	1712	(P)
	2405.503	DIAPHRAGMS FOR TYPE 36M PRESTR BEAMS	LIN FT	368	(P)
(3)	2433.502	ANCHORAGES TYPE REINF BARS (STAINLESS TYPE H)	EACH	365	
(3)	2433.502	ANCHORAGES TYPE REINF BARS (TYPE L)	EACH	365	
(5)	2442.501	REMOVE EXISTING BRIDGE	LUMP SUM	1	
	2452.502	C-I-P CONCRETE TEST PILE 75 FT LONG 18"	EACH	2	
	2452.502	STEEL H-TEST PILE 55 FT LONG 10"	EACH	2	
	2452.502	PILE ANALYSIS	EACH	4	
	2452.502	PILE POINTS 18"	EACH	32	
	2452.502	PILE TIP PROTECTION 10"	EACH	51	
	2452.503	C-I-P CONCRETE PILING 18"	LIN FT	1950	
	2452.503	STEEL H-PILING 10"	LIN FT	2205	
	2472.502	MECHANICAL SPLICE COUPLERS (REINFORCEMENT BARS) T-6	EACH	48	
	2473.503	EXPANSION JOINT DEVICES TYPE 5	LIN FT	143	
	2475.503	ORNAMENTAL METAL RAILING (DESIGN T-3)	LIN FT	291	(P)
	2502.501	DRAINAGE SYSTEM TYPE (B910)	LUMP SUM	1	
	2511.504	GEOTEXTILE FILTER TYPE 7	CU YD	955	
	2511.507	RANDOM RIPRAP CLASS IV	CU YD	659	

(P) DENOTES PLAN QUANTITY PAY ITEM

(2) INCLUDES BARRIER LOCATED ON APPROACH PANELS.

(3) INCLUDES BARRIER REINFORCEMENT LOCATED ON APPROACH PANELS.

(4) TEMPORARY SHORING TO BE INCLUDED IN THIS BID ITEM.

(5) NON-PARTICIPATING PAY ITEM FOR BRIDGE BOND FUNDS.

(6) INCLUDES 3796 SQ. FT. ON APPROACH PANELS.

NOTES:

HATCHED AREAS DENOTES REMOVALS

FOR DETAILED STAGING PLANS, SEE GRADING PLANS.

(1) INSTALL TEMPORARY PORTABLE PRECAST CONCRETE BARRIER (STD PLATE 8337D) ANCHORED TO DECK.

TEMPORARY BARRIER PAY ITEM AND QUANTITIES INCLUDED IN GRADING PLAN.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

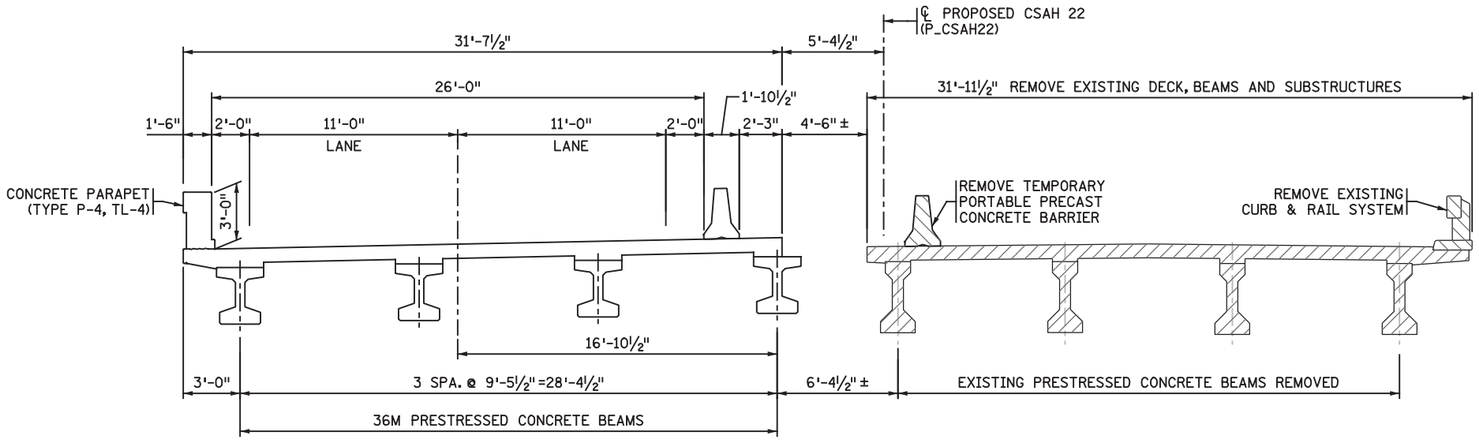
TITLE: TRANSVERSE SECTIONS AND SOQ (SH. 1 OF 2)

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

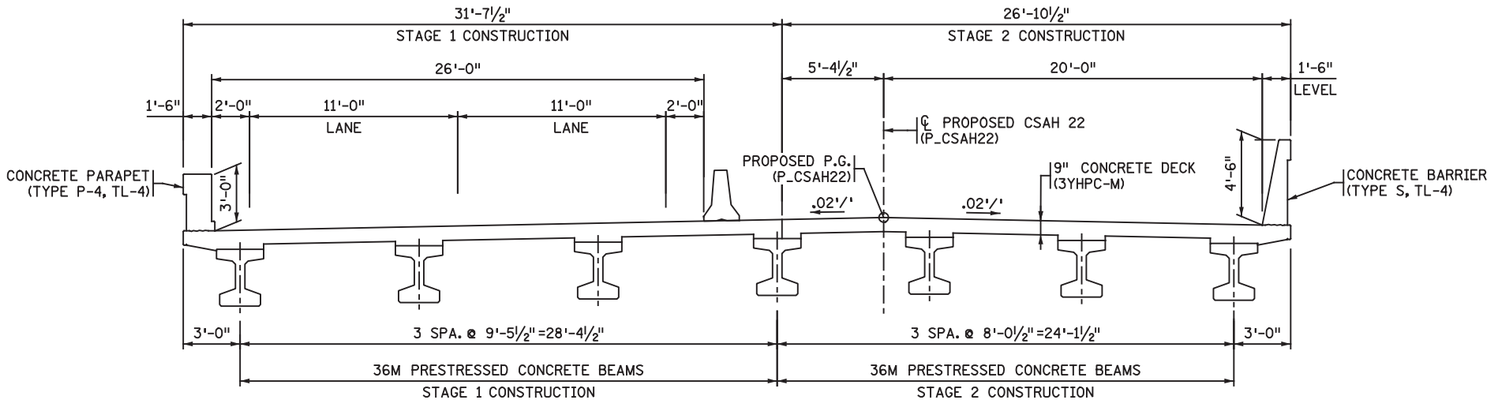
S.A.P. NO. 002-622-036

SHEET NO. B2 OF B54 SHEETS

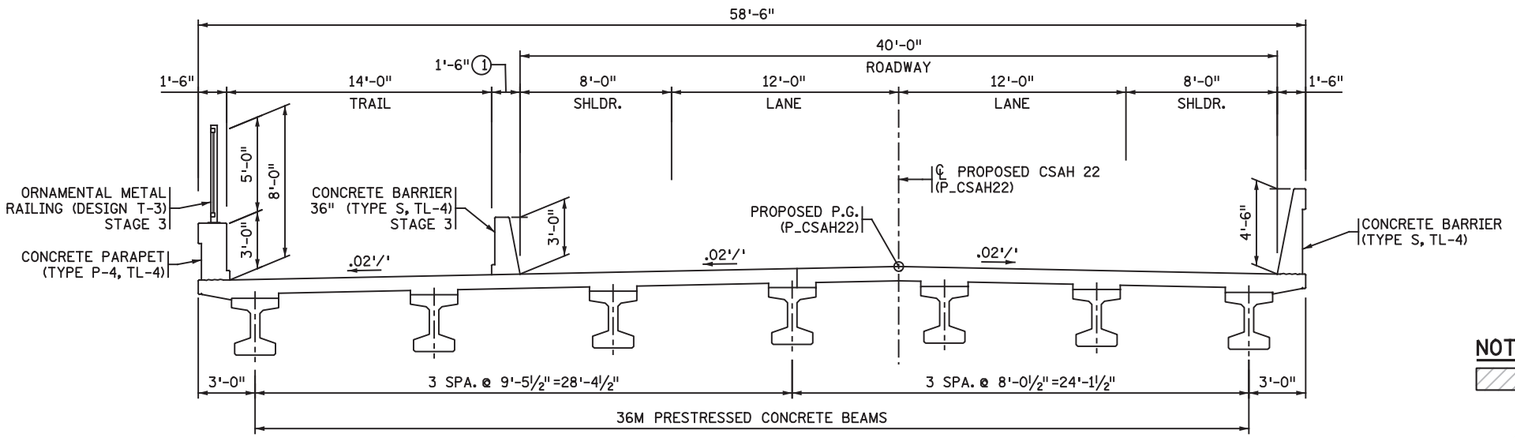
BRIDGE NO. 02595



STAGE 2 - REMOVAL



STAGE 2 - CONSTRUCTION



STAGE 3 - CONSTRUCTION

NOTES:

- HATCHED AREAS DENOTES REMOVALS
- FOR DETAILED STAGING PLANS, SEE GRADING PLANS.
- ① SLOPE UNDER BARRIER IS .02'/'. CONSTRUCT BARRIER VERTICAL.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: Todd A. Lang — LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

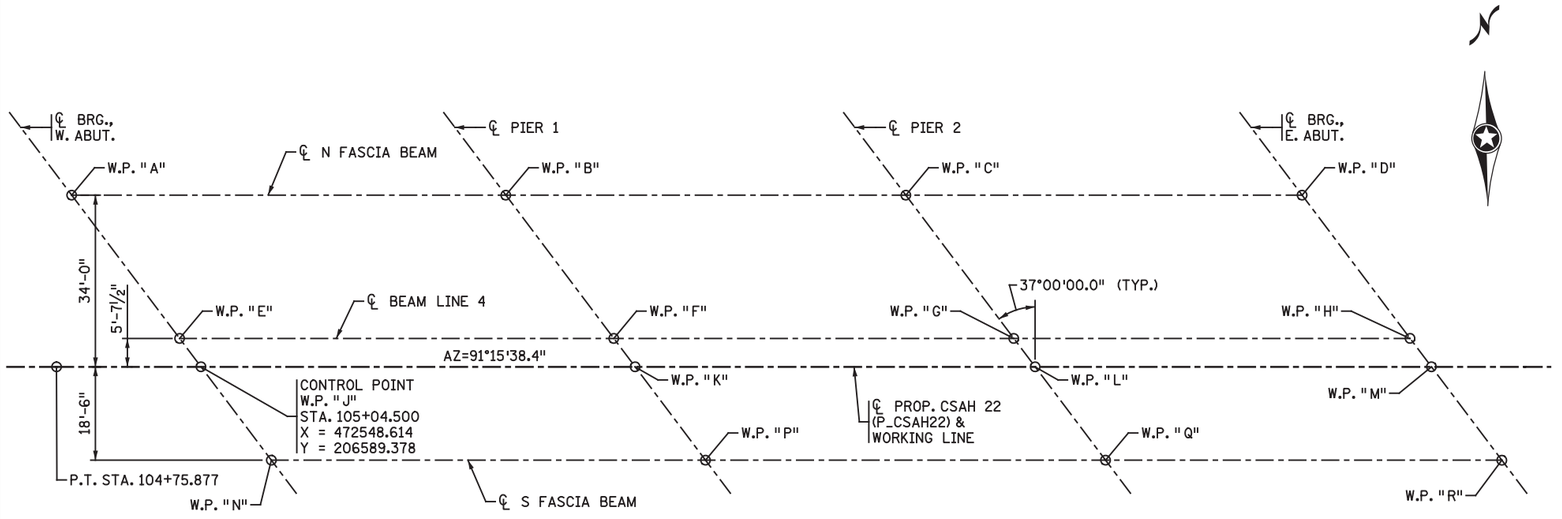
TITLE: TRANSVERSE SECTIONS (SH. 2 OF 2)

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

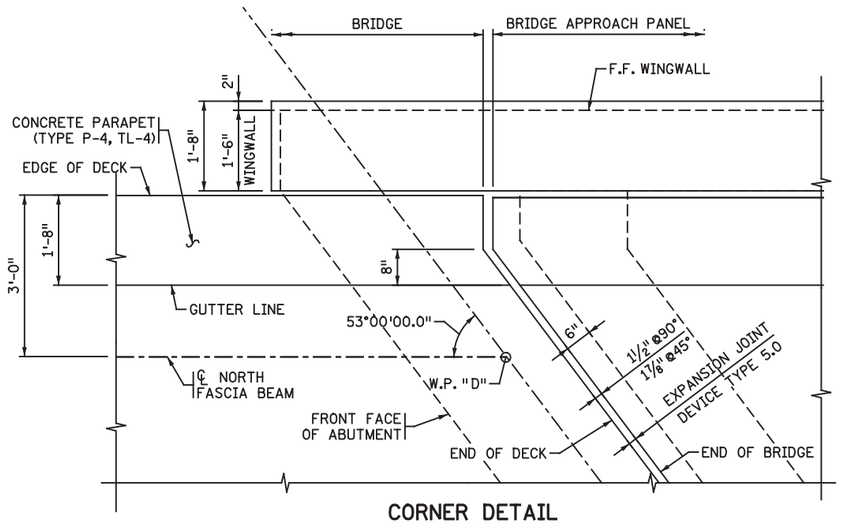
S.A.P. NO. 002-622-036

SHEET NO. B3 OF B54 SHEETS

BRIDGE NO. 02595

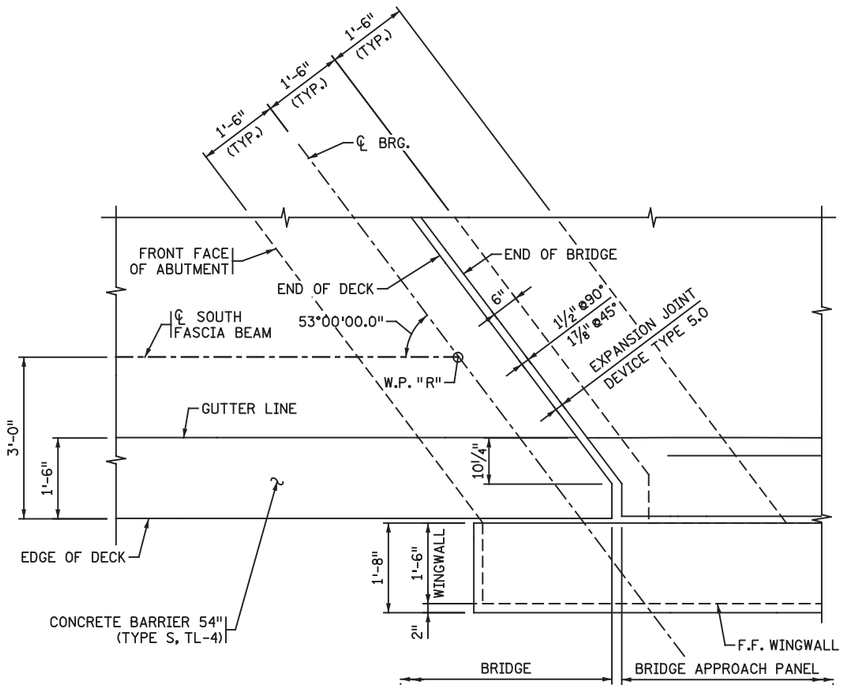


WORKING POINT LAYOUT



CORNER DETAIL

NORTHEAST CORNER SHOWN
NORTHWEST CORNER SIMILAR



CORNER DETAIL

SOUTHEAST CORNER SHOWN
SOUTHWEST CORNER SIMILAR

TOP OF ROADWAY TO BRIDGE SEAT

	DECK THICKNESS	STOOL HEIGHT			BEAM HEIGHT	BEARING HEIGHT	TOTAL N. FASCIA		TOTAL BEAM LINE 4		TOTAL S. FASCIA	
		N. FASCIA	BEAM LINE 4	S. FASCIA			INCHES	FEET	INCHES	FEET	INCHES	FEET
W. ABUT	9"	5⅛"	5"	5"	36"	5¼"	55⅜"	4.61'	55¼"	4.60'	55¼"	4.60'
PIER 1	9"	5"	4⅝"	4¾"	36"	3¼"	53¼"	4.44'	52⅞"	4.41'	53"	4.42'
PIER 2	9"	2⅞"	3"	3⅜"	36"	3¼"	51⅛"	4.26'	51¼"	4.27'	51⅝"	4.30'
E. ABUT.	9"	5⅛"	4¾"	4¾"	36"	5¼"	55⅜"	4.61'	55"	4.58'	55"	4.58'

DIMENSIONS BETWEEN WORKING POINTS

POINT	STATION	X-COORDIN	Y-COORDIN	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
A	104+78.879	472523.747	206623.934																
B	105+64.879	472609.726	206622.042	86.00															
C	106+44.129	472688.957	206620.298		79.25														
D	107+22.629	472767.438	206618.571			78.50													
E	105+00.261	472544.500	206595.095	35.53	70.57														
F	105+86.261	472630.479	206593.203	111.07	35.53	64.45		86.00											
G	106+65.511	472709.710	206591.459		104.56	35.53	63.78		79.25										
H	107+44.011	472788.191	206589.732			103.83	35.53			78.50									
J	105+04.500	472548.614	206589.378	42.57				7.04	81.95										
K	105+90.500	472634.593	206587.486	116.68	42.57			90.41	7.04	75.22		86.00							
L	106+69.750	472713.824	206585.743		110.24	42.57			83.68	7.04	74.47		79.25						
M	107+48.250	472792.305	206584.015			109.53	42.57			82.93	7.04			78.50					
N	105+18.441	472562.144	206570.576	65.74			210.83	30.21				23.16	74.40						
P	106+04.441	472648.123	206568.684	136.10	65.74			106.94	30.21			101.64	23.16	67.88		86.00			
Q	106+83.691	472727.354	206566.940		129.89	65.74			100.37	30.21			95.01	23.16	67.16		79.25		
R	107+62.191	472805.835	206565.213			129.21	65.74			99.64	30.21			94.27	23.16			78.50	

ELEVATIONS

POINT	TOP OF ROADWAY	TOP OF RDWY TO BR. SEAT	BRIDGE SEAT	POINT
A	882.49	4.61	877.88	A
B	881.75	4.44	877.31	B
C	881.36	4.26	877.10	C
D	880.96	4.61	876.35	D
E	882.81	4.60	878.21	E
F	882.21	4.41	877.81	F
G	881.82	4.27	877.55	G
H	881.43	4.58	876.84	H
J	882.88	-	-	J
K	882.31	-	-	K
L	881.91	-	-	L
M	881.52	-	-	M
N	882.38	4.60	877.77	N
P	881.87	4.42	877.45	P
Q	881.47	4.30	877.17	Q
R	881.08	4.58	876.49	R

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

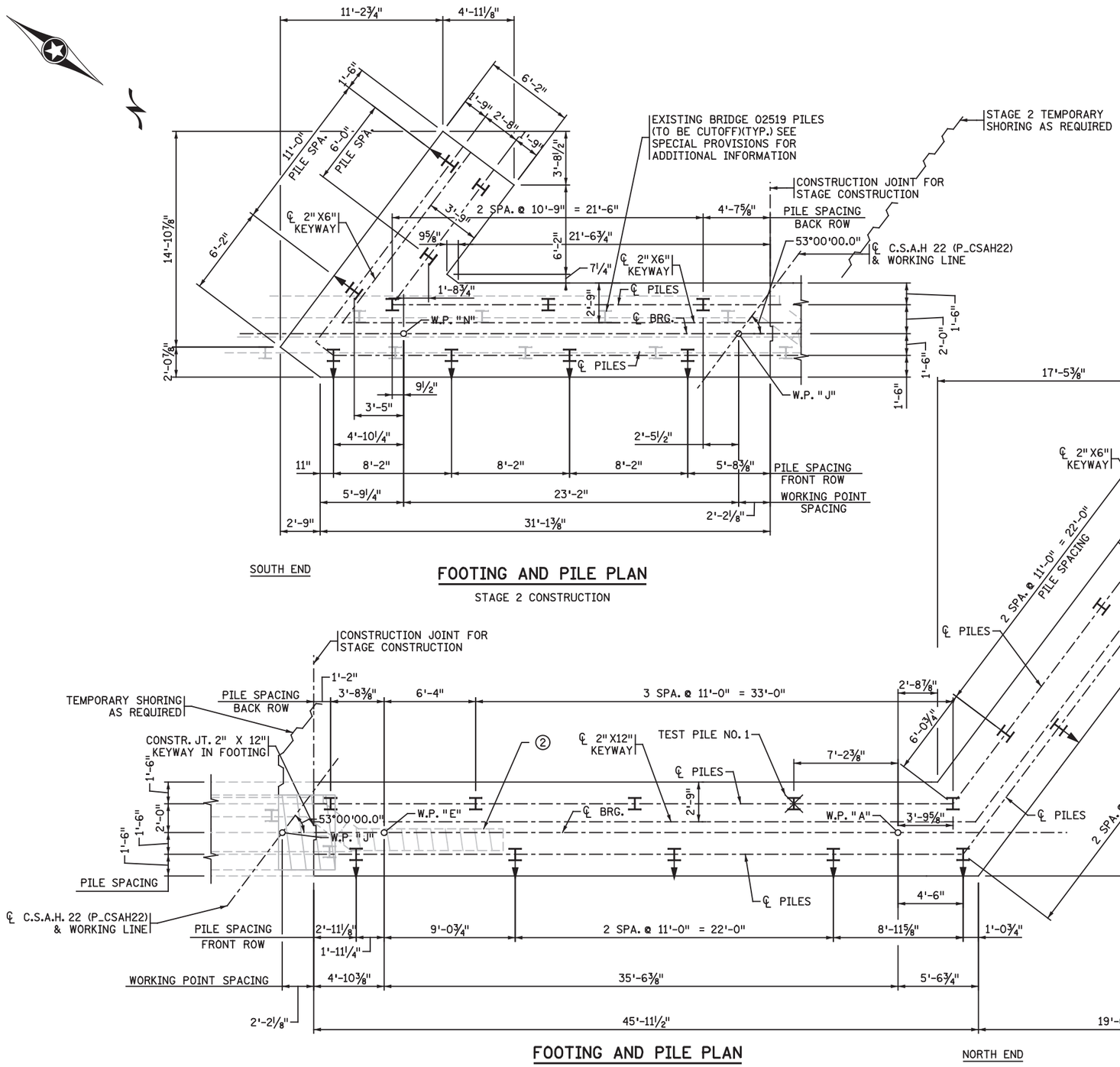
TITLE: BRIDGE LAYOUT

DES: TJC	DR: JRC	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B4 OF B54 SHEETS

BRIDGE NO. 02595



SUMMARY OF QUANTITIES FOR WEST ABUTMENT

		TOTAL
	STRUCTURAL CONCRETE (1G52)	84 CU. YD.
	STRUCTURAL CONCRETE (3B52)	99 CU. YD.
	REINFORCEMENT BARS	6220 POUND
	REINFORCEMENT BARS (EPOXY COATED)	11300 POUND
	REINFORCEMENT BARS (STAINLESS - 75 KSI)	460 POUND
①	STEEL H-PILING 10"	1170 LIN. FT.
	STEEL H-TEST PILE 55FT LONG 10"	1 EACH
	PILE TIP PROTECTION 10"	27 EACH
	MECHANICAL SPLICE COUPLER (REINFORCEMENT BARS) T-6	48 EACH

① DOES NOT INCLUDE TEST PILES

WEST ABUTMENT COMPUTED PILE LOAD - TONS/PILE

FACTORED DEAD LOAD + EARTH PRESSURE	59.6
FACTORED LIVE LOAD	21.3
✳FACTORED DESIGN LOAD	80.9

✳BASED ON STRENGTH I LOAD COMBINATION

WEST ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR H-PILES R_n - TONS/PILE

FIELD CONTROL METHOD	ϕ dyn	✳✳R_n
MNDOT PILE FORMULA 2012 (MPF12) $R_n = 20\sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{S}\right)$	0.60	134.8
PDA	0.65	124.5

✳✳ R_n = (FACTORED DESIGN LOAD) / ϕ dyn

PILE NOTES

1 STEEL H TEST PILES 55 FT. LONG
26 STEEL H PILES EST. LENGTH 45 FT.
27 STEEL H PILES REQ'D FOR WEST ABUT.

PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.

PILES MARKED THUS H← TO BE BATTERED 3" PER FOOT IN DIRECTION SHOWN.

PILES TO BE HP-10X42.

FOR PILE SPLICE DETAILS SEE DETAIL B202.

② EXISTING BRIDGE 02519. REMOVE AS REQUIRED PRIOR TO STAGE 1 CONSTRUCTION. SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: WEST ABUTMENT DETAILS 1 STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

SHEET NO. B5 OF B54 SHEETS

BRIDGE NO. 02595

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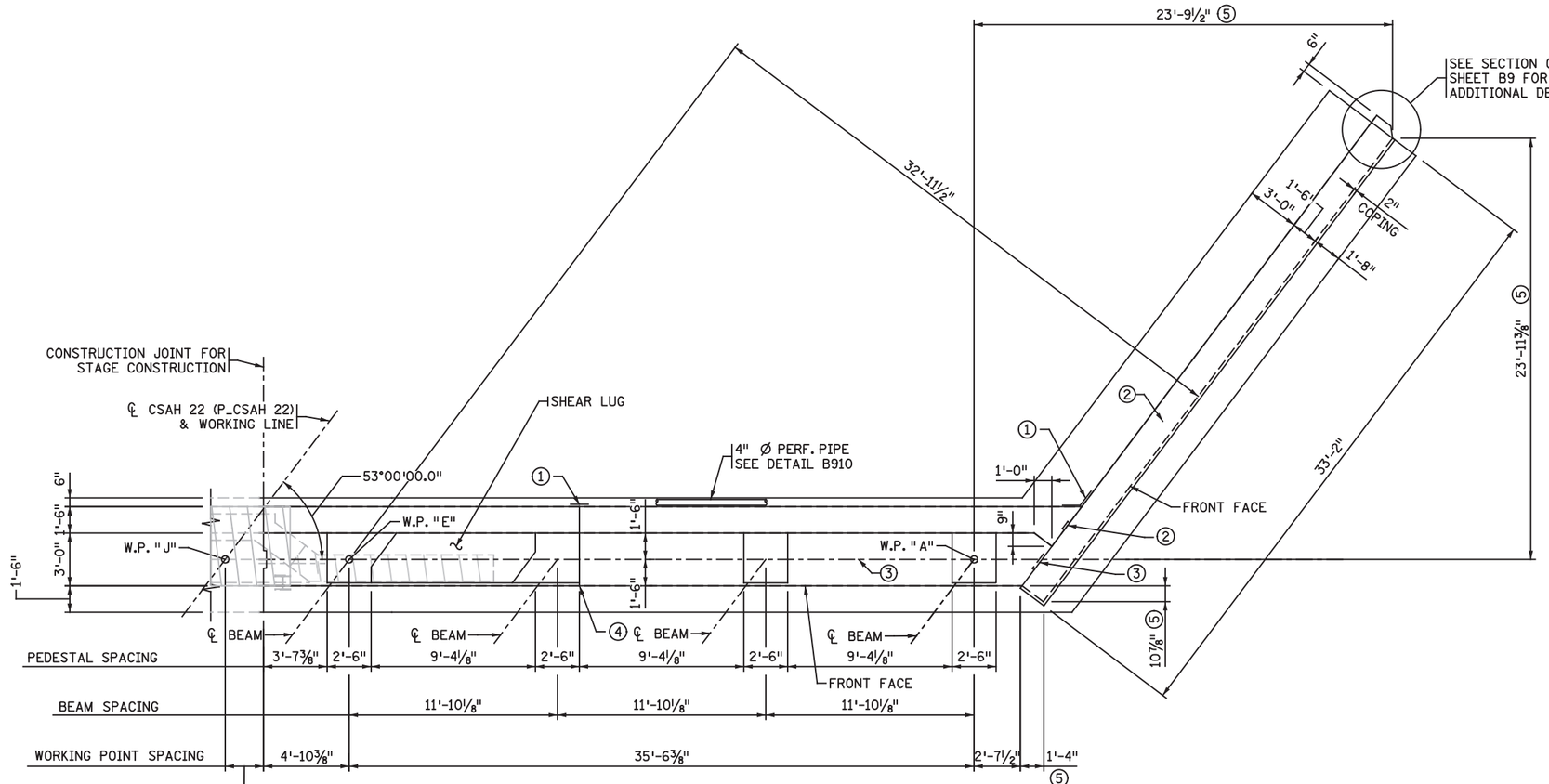
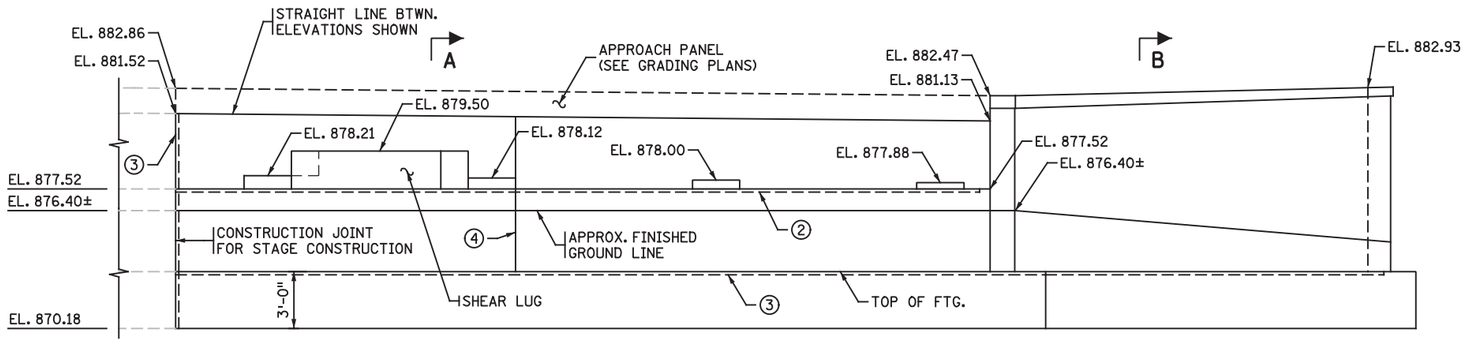


PLAN

STAGE 1 CONSTRUCTION



ELEVATION

STAGE 1 CONSTRUCTION

NOTES:

FOR WING WALL ELEVATIONS, SEE SHEET B9

FOR SECTION A-A & B-B, SEE SHEET B8

PROVIDE 72 HOUR MINIMUM TIME DELAY BETWEEN CONCRETE POURS ON ADJACENT ABUTMENT AND WING WALL SECTIONS

VERTICAL KEYWAYS SHALL STOP 1'-0" ± FROM EXPOSED SURFACES

PILING NOT SHOWN FOR CLARITY

FOR PEDESTAL DETAILS, SEE SHEET B12

FOR SHEAR LUG DETAILS, SEE SHEET B13

① MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B TO BE INCLUDED IN ITEM "STRUCTURAL CONCRETE (3B52)"

② CONSTRUCTION JOINT 2" X 6" KEYWAY

③ CONSTRUCTION JOINT 2" X 12" KEYWAY

④ CONTRACTION JOINT SEE DETAIL ON SHEET B8

⑤ DIMENSION TO FACE OF WINGWALL

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

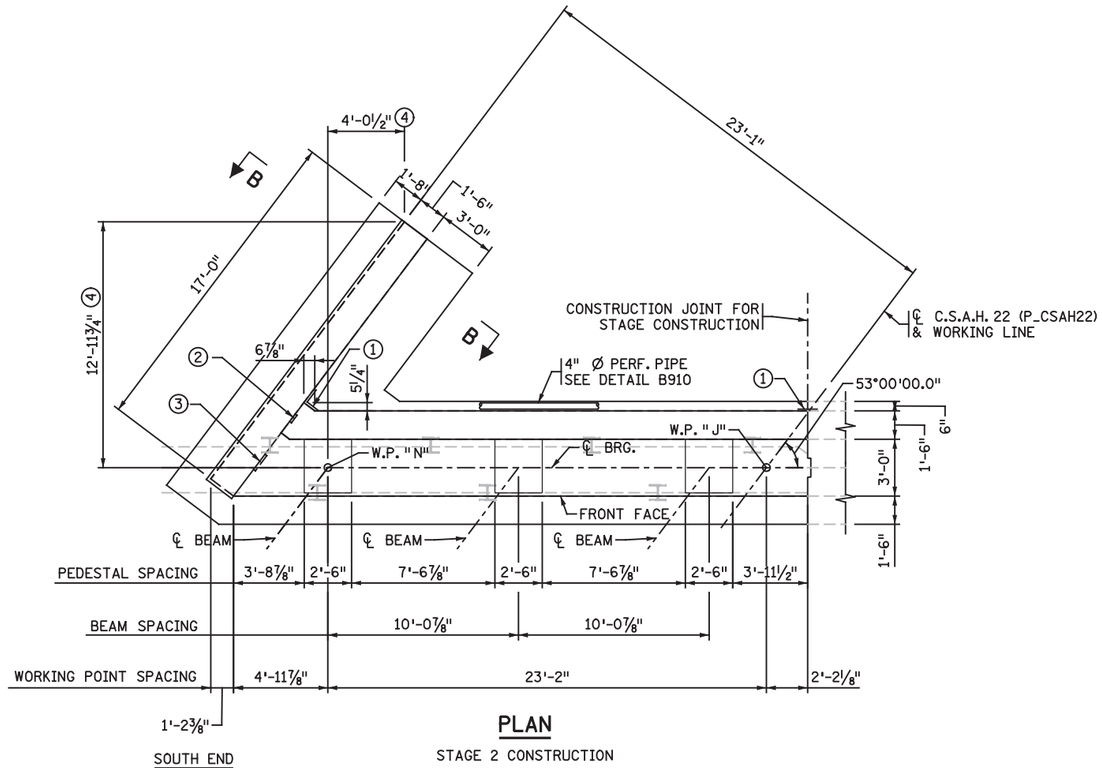
TITLE: WEST ABUTMENT DETAILS 2 STAGE 1 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

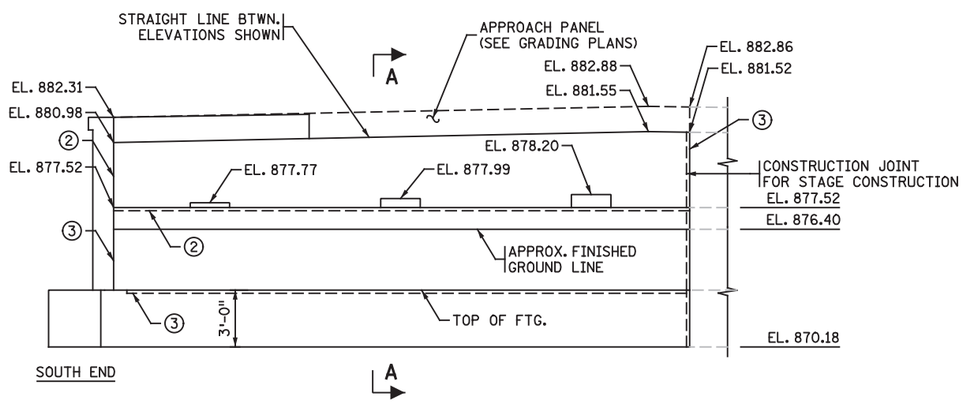
SHEET NO. B6 OF B54 SHEETS

BRIDGE NO. 02595



PLAN

STAGE 2 CONSTRUCTION



ELEVATION

STAGE 2 CONSTRUCTION

NOTES:

FOR WING WALL ELEVATIONS, SEE SHEET B9

FOR SECTION A-A & B-B, SEE SHEET B8

PROVIDE 72 HOUR MINIMUM TIME DELAY BETWEEN CONCRETE POURS ON ADJACENT ABUTMENT AND WING WALL SECTIONS

VERTICAL KEYWAYS SHALL STOP 1'-0" ± FROM EXPOSED SURFACES

PILING NOT SHOWN FOR CLARITY

FOR PEDESTAL DETAILS, SEE SHEET B12

① MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B TO BE INCLUDED IN ITEM "STRUCTURAL CONCRETE (3B52)"

② CONSTRUCTION JOINT 2" X 6" KEYWAY

③ CONSTRUCTION JOINT 2" X 12" KEYWAY

④ DIMENSION TO FACE OF WINGWALL

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

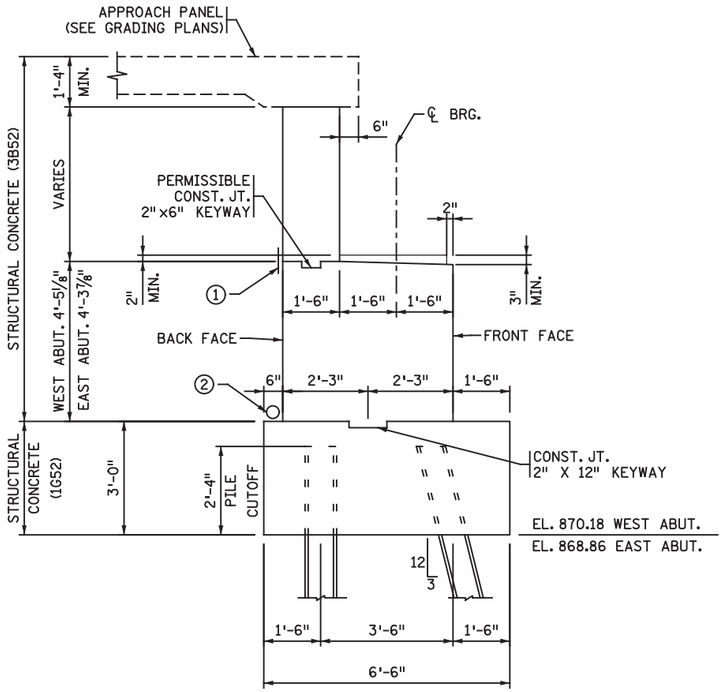
TITLE: WEST ABUTMENT DETAILS 3 STAGE 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

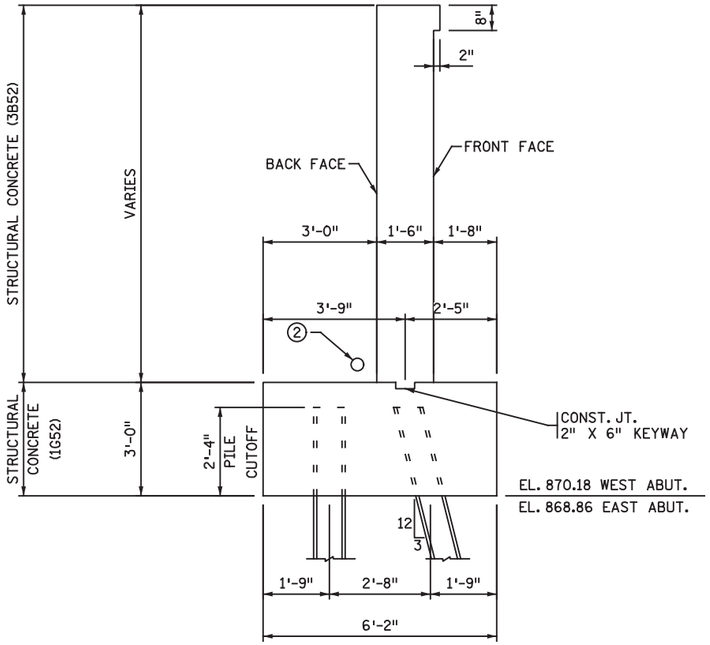
S.A.P. NO. 002-622-036

SHEET NO. B7 OF B54 SHEETS

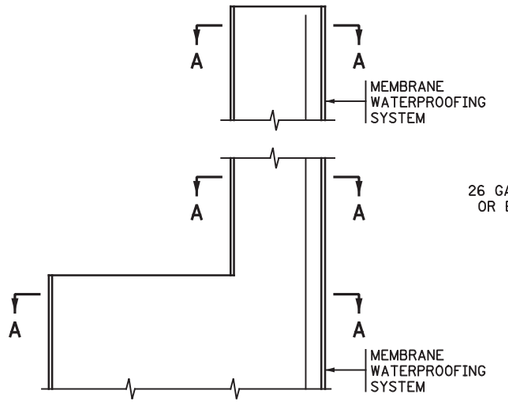
BRIDGE NO. 02595



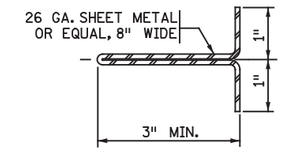
SECTION A-A



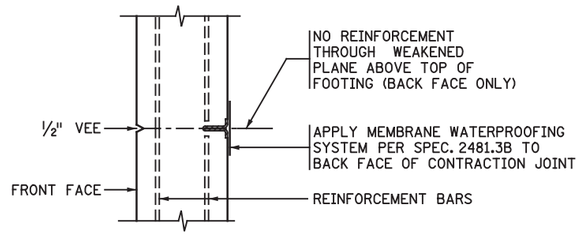
SECTION B-B



PART SECTION THROUGH
ABUTMENT AT JOINT



BACK STRIP



SECTION A-A

CONTRACTION JOINT DETAIL

NOTES:

1. MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B TO BE INCLUDED IN ITEM "STRUCTURAL CONCRETE (3B52)"
2. 4" Ø PERFORATED PIPE. SEE DETAIL B910 FOR DETAILS

CONSIDER THE METHODS AND MATERIALS INDICATED ON THE CONTRACTION JOINT DETAIL AS SUGGESTIONS ONLY. VARIATIONS WILL BE PERMITTED, SUBJECT TO APPROVAL BY THE ENGINEER, BUT MUST PROVIDE DUMMY JOINTS OF A DEPTH SHOWN. PROVIDE A SEPARATION OF THE HORIZONTAL REINFORCEMENT BARS IN THE BACK OF THE PARAPET AND BACK FACE OF THE ABUTMENT THAT IS NOT LESS THAN 1½" NOR MORE THAN 3", CENTERED AS SHOWN, REGARDLESS OF THE PROCEDURE USED FOR FORMING THE DUMMY JOINT.

THE BACK STRIP MAY BE GALVANIZED METAL, A SUITABLE PLASTIC, OR OTHER DURABLE MATERIAL SATISFACTORY TO THE ENGINEER. THE BACK STRIP REMAINS IN PLACE AFTER THE FORMS ARE REMOVED.

THE COST OF FORMING THE JOINT IS INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (3B52)"

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE:

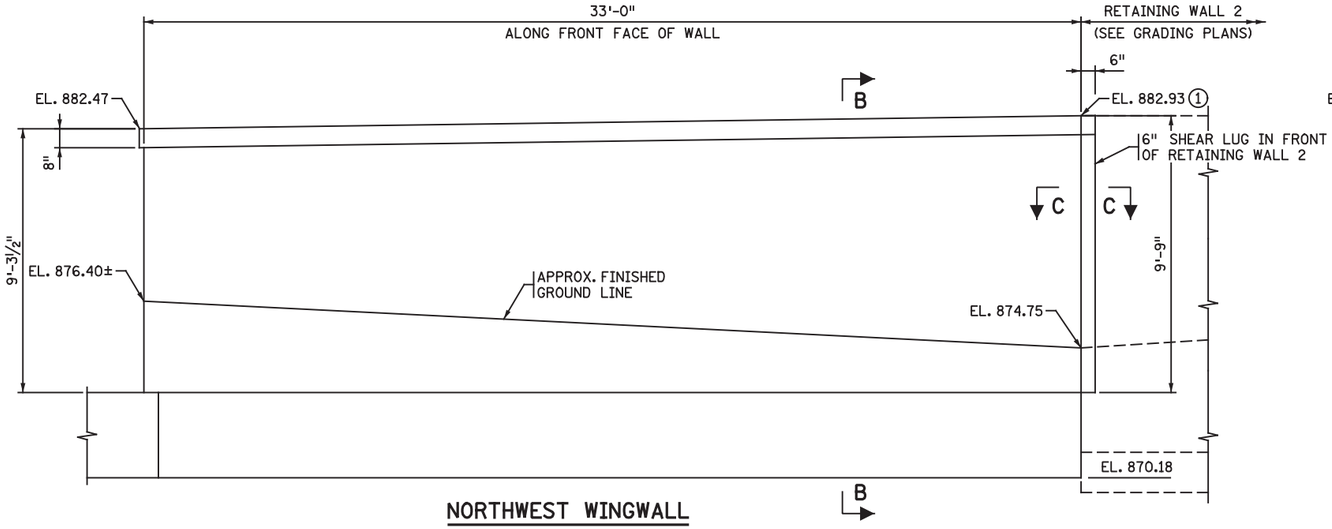
ABUTMENT DETAILS
STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

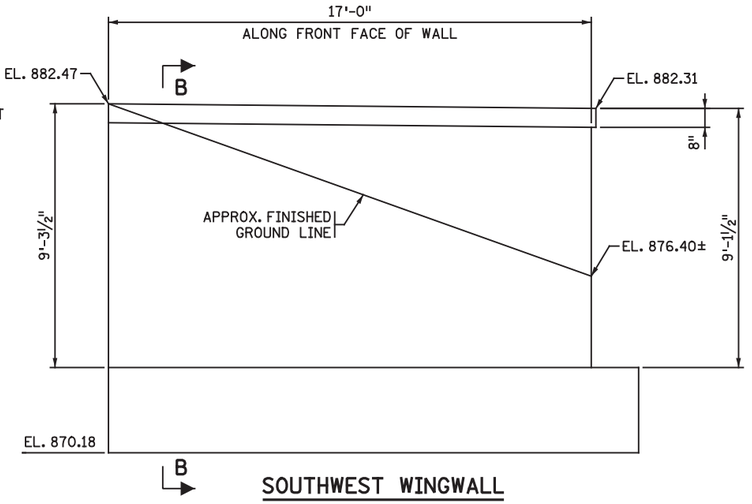
SHEET NO. B8 OF B54 SHEETS

BRIDGE NO. 02595



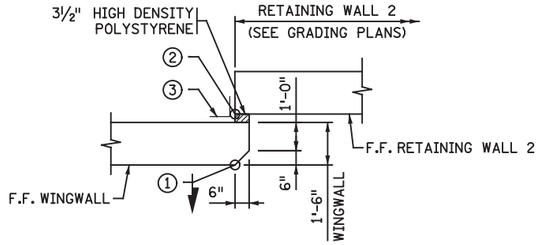
NORTHWEST WINGWALL

(PILING NOT SHOWN FOR CLARITY)

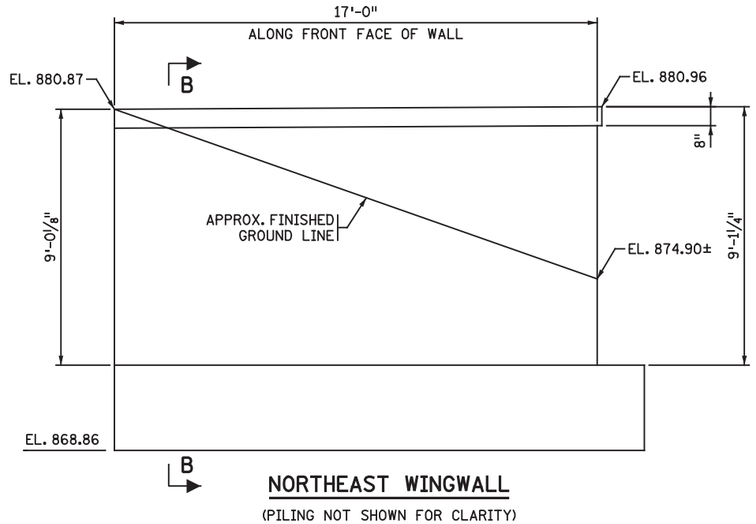


SOUTHWEST WINGWALL

(PILING NOT SHOWN FOR CLARITY)

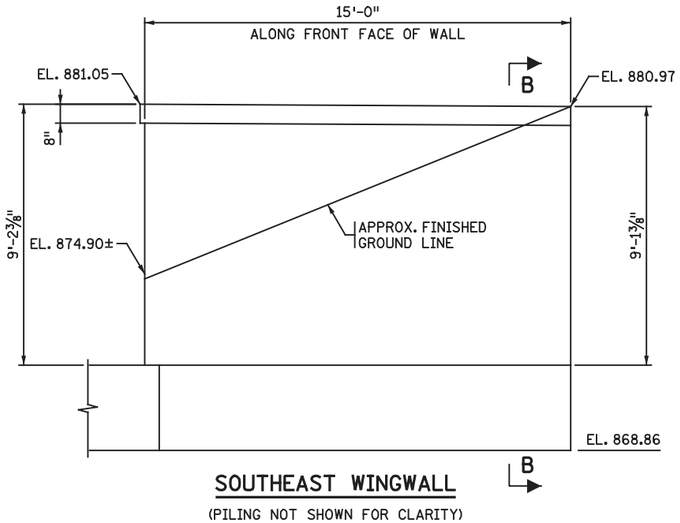


SECTION C-C



NORTHEAST WINGWALL

(PILING NOT SHOWN FOR CLARITY)



SOUTHEAST WINGWALL

(PILING NOT SHOWN FOR CLARITY)

NOTES:

1. BEGIN WINGWALL STA. 104+45.54, 38.62' LT.
2. END RETAINING WALL 2 STA. 104+45.48 36.83' LT.
3. MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B TO BE INCLUDED IN THE ITEM "STRUCTURAL CONCRETE (3B52)".

FOR SECTION B-B, SEE SHEET B8.

FOR ADDITIONAL ABUTMENT NOTES, SEE SHEET B6.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: 8/10/23 DATE

LICENSED PROFESSIONAL ENGINEER

NAME: TODD A. LANG LIC. NO. 42962

TITLE:

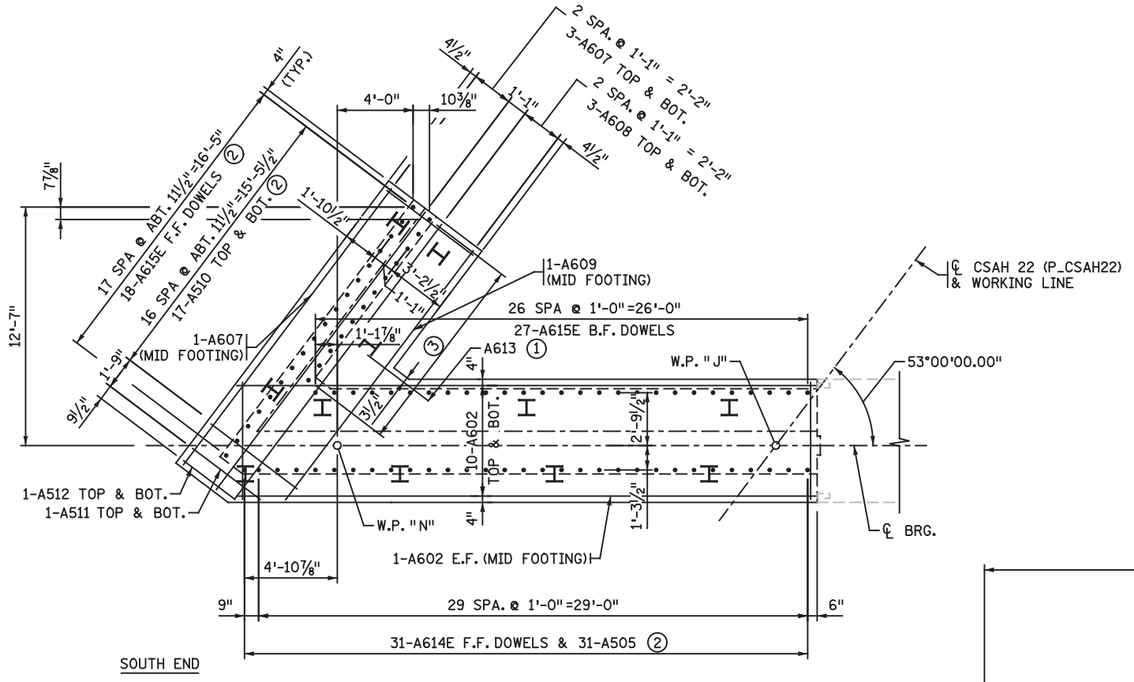
WINGWALL DETAILS
STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: DJR	APPROVED:
CHK: MAM	CHK: TAL	

S.A.P. NO. 002-622-036

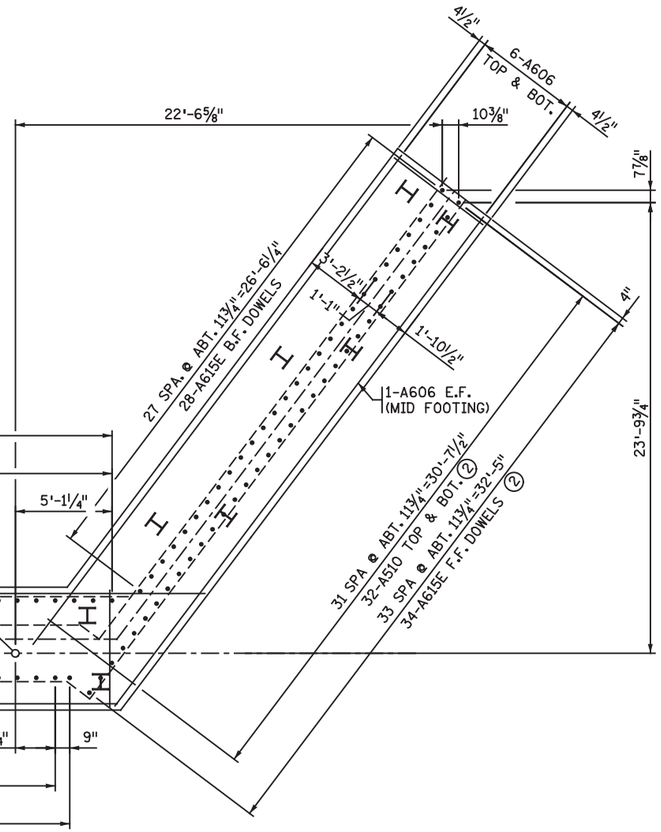
SHEET NO. B9 OF B54 SHEETS

BRIDGE NO. 02595



FOOTING PLAN

STAGE 2 CONSTRUCTION



FOOTING PLAN

STAGE 1 CONSTRUCTION

NOTES:

F.F. DENOTES FRONT FACE

B.F. DENOTES BACK FACE

EXISTING PILES NOT SHOWN FOR CLARITY

① A613 TOP, MIDDLE & BOTTOM, CENTER ON CHAMFER

② ADJUST SPACING AS REQUIRED TO CLEAR PILE, PROVIDE 2" CLEAR.

③ 11 SPA. @ ABT. 11½" =10'-7½"
12-A615E B.F. DOWELS

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: Todd A. Lang — LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

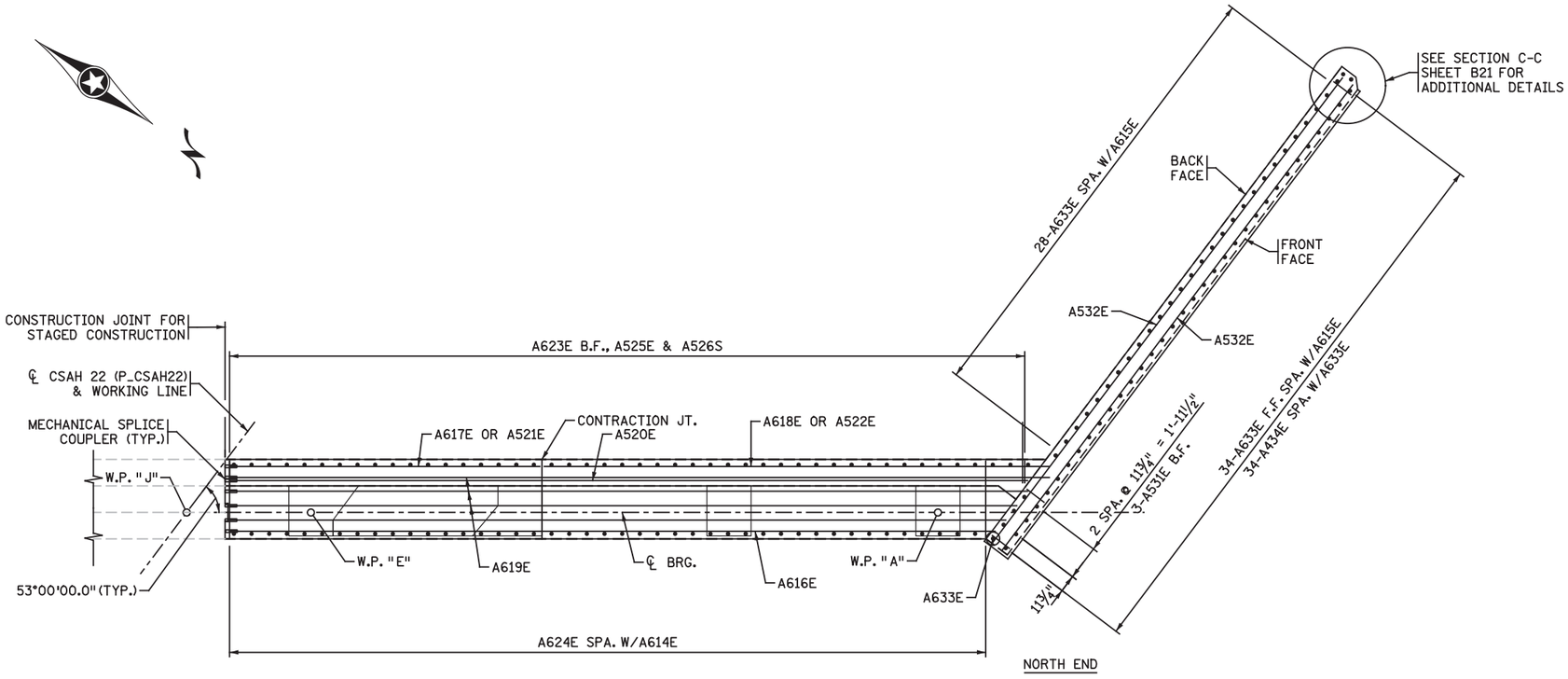
TITLE: WEST ABUTMENT REINFORCEMENT 1 STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

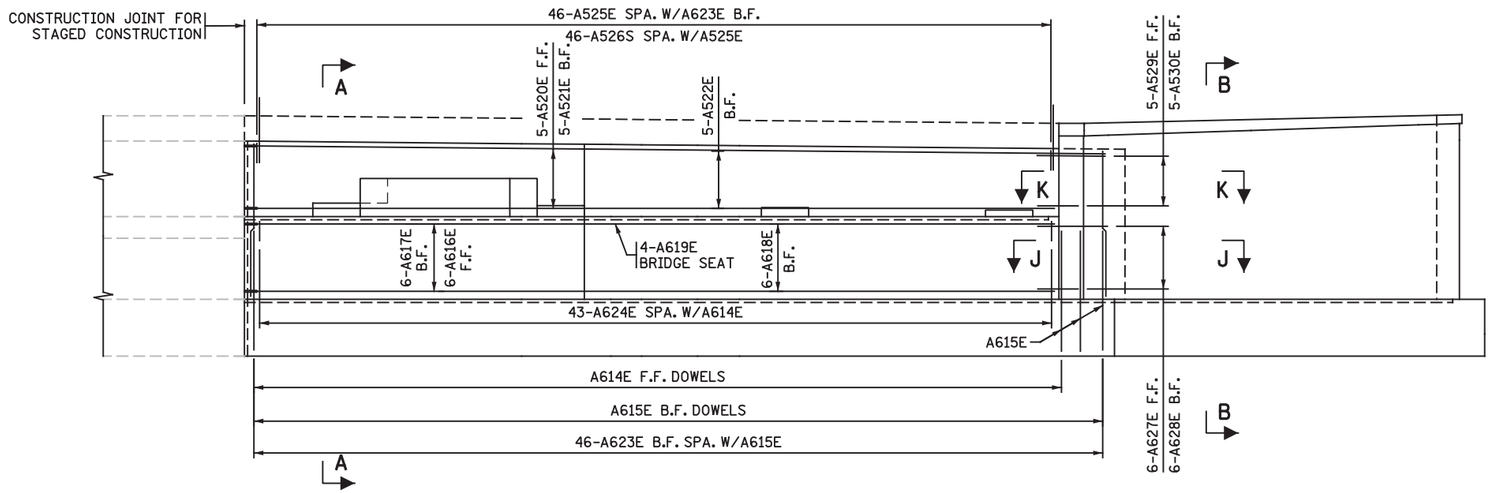
S.A.P. NO. 002-622-036

SHEET NO. B10 OF B54 SHEETS

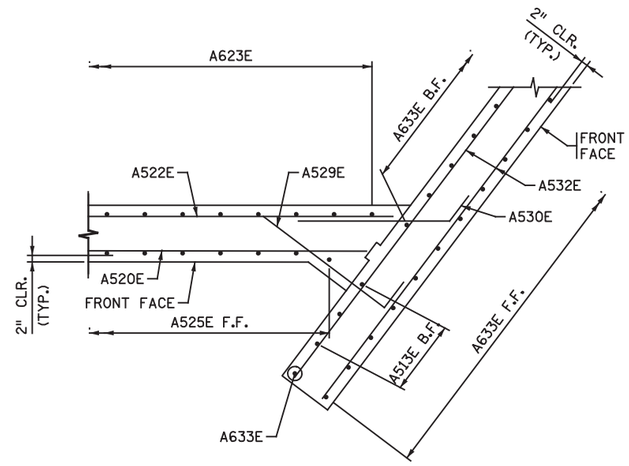
BRIDGE NO. 02595



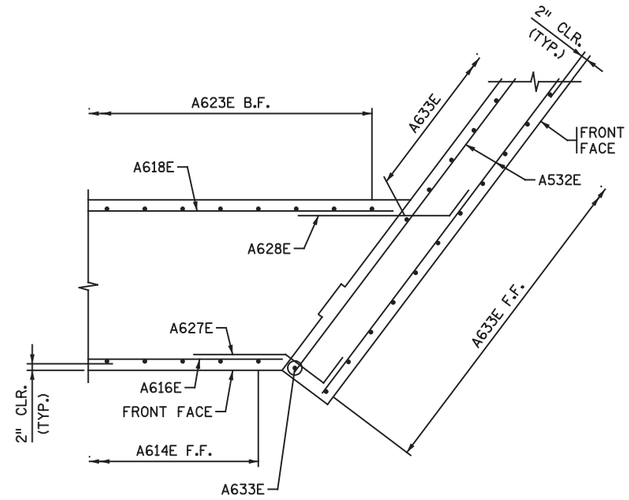
PLAN
STAGE 1 CONSTRUCTION



ELEVATION
STAGE 1 CONSTRUCTION



SECTION K-K



SECTION J-J

NOTES:

F.F. DENOTES FRONT FACE

B.F. DENOTES BACK FACE

EXISTING PILES NOT SHOWN FOR CLARITY

NEW PILES NOT SHOWN FOR CLARITY

FOR PEDESTAL DETAILS, SEE SHEET B12

FOR SECTION A-A AND SECTION B-B, SEE SHEET B13

FOR BILL OF REINFORCEMENT, SEE SHEET B13

FOR SHEAR LUG DETAILS, SEE SHEET B13

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

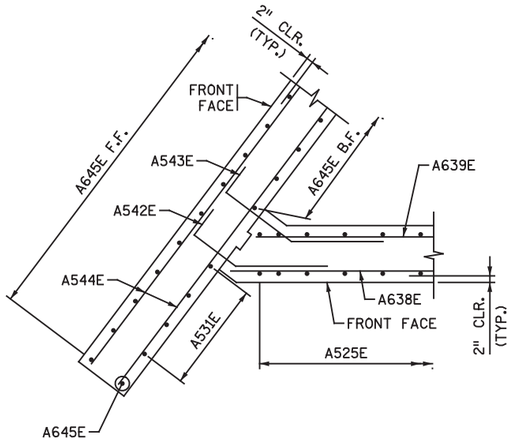
TITLE: WEST ABUTMENT REINFORCEMENT 2
STAGE 1 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

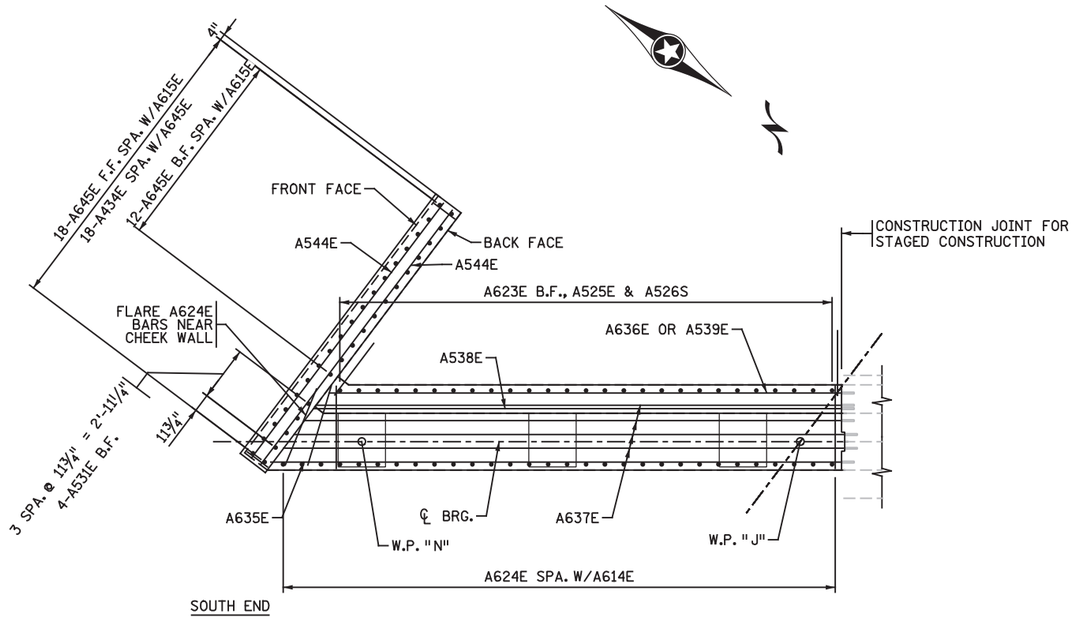
S.A.P. NO. 002-622-036

SHEET NO. B11 OF B54 SHEETS

BRIDGE NO. 02595

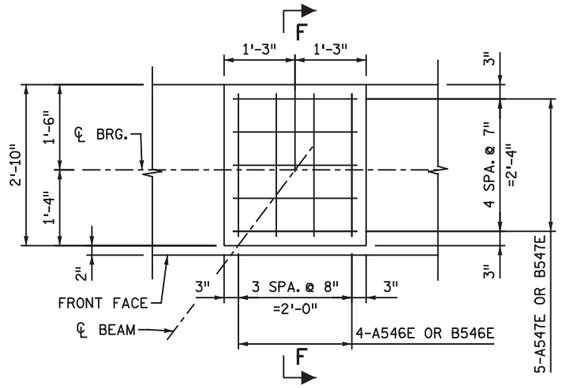


SECTION H-H



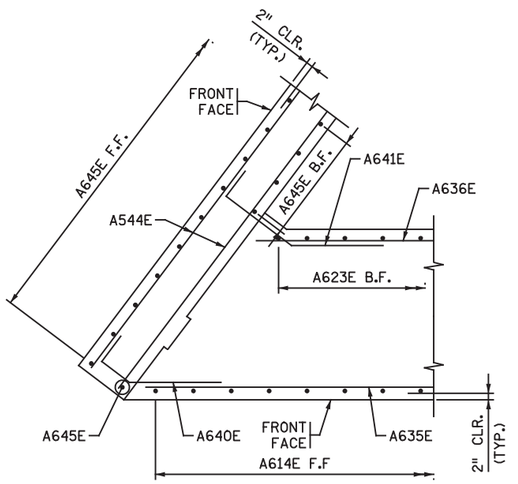
PLAN

STAGE 2 CONSTRUCTION

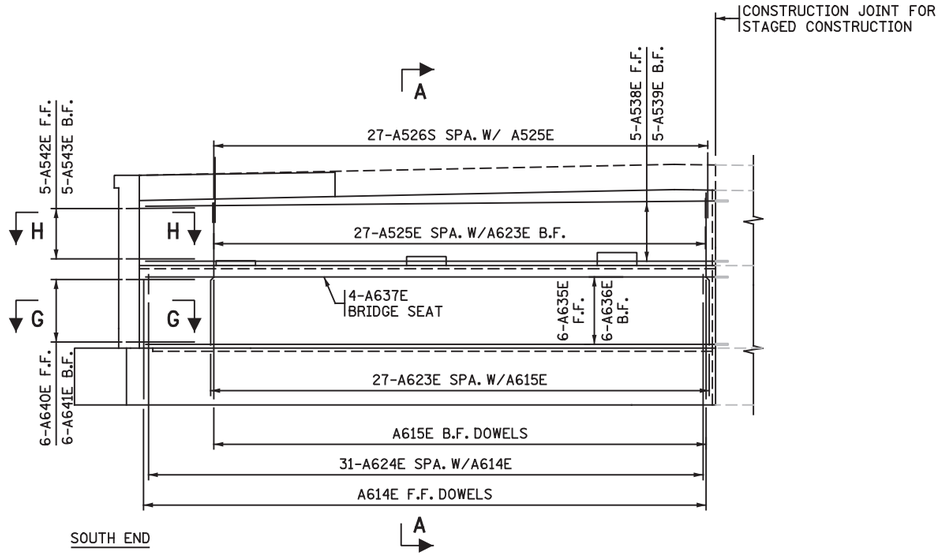


PLAN

B1 SHOWN, OTHERS SIMILAR

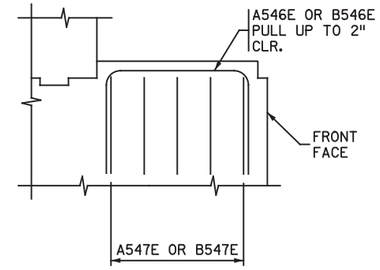


SECTION G-G



ELEVATION

STAGE 2 CONSTRUCTION



SECTION F-F
PEDESTAL DETAIL

NOTES:

F.F. DENOTES FRONT FACE

B.F. DENOTES BACK FACE

EXISTING PILES NOT SHOWN FOR CLARITY

NEW PILES NOT SHOWN FOR CLARITY

FOR SECTION A-A, SEE SHEET B13

FOR BILL OF REINFORCEMENT, SEE SHEET B13

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: WEST ABUTMENT REINFORCEMENT 3 STAGE 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

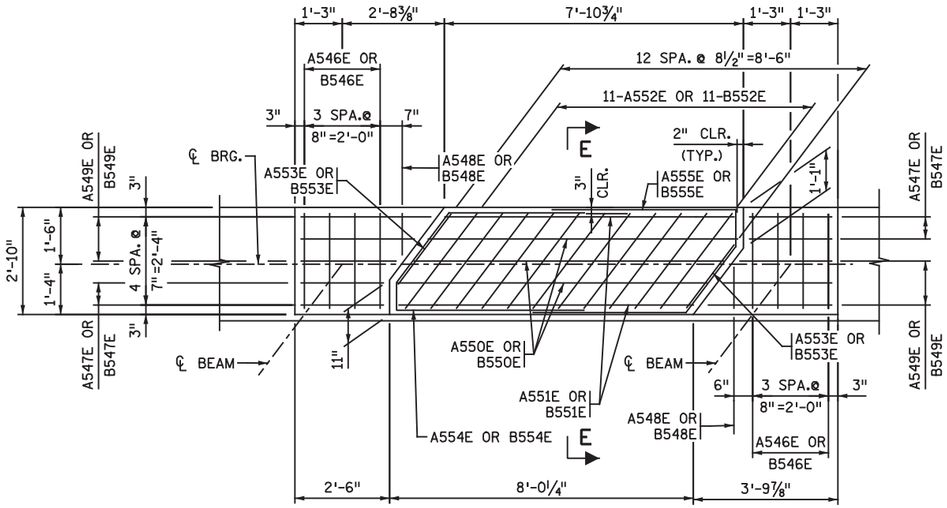
S.A.P. NO. 002-622-036

SHEET NO. B12 OF B54 SHEETS

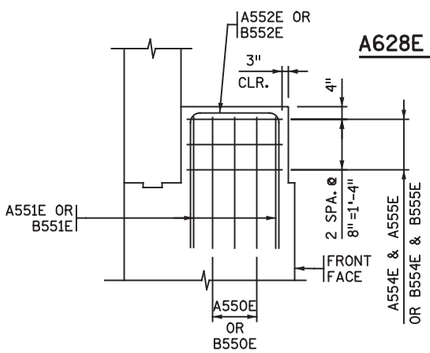
BRIDGE NO. 02595

user 2:23:56 PM 8/10/2023

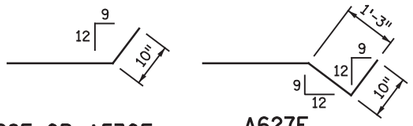
pw:\\pwdrusean01:HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Plan Shts\2030



SHEAR LUG PLAN

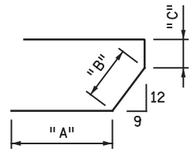


SECTION E-E

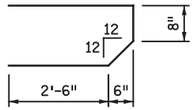


A628E OR A530E

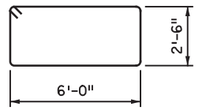
A627E



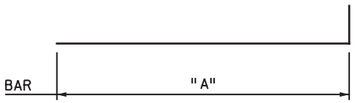
BAR	"A"	"B"	"C"
A554E	5'-4"	2'-1"	0'-9"
A555E	5'-5"	2'-0"	0'-11"



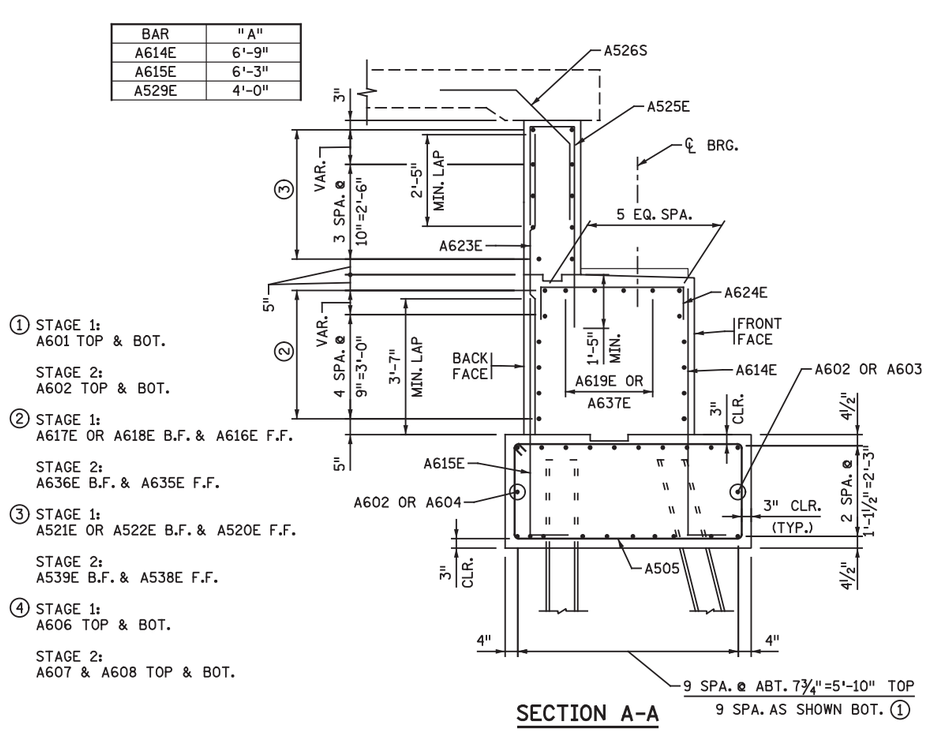
A557E



A505



BAR	"A"
A614E	6'-9"
A615E	6'-3"
A529E	4'-0"



① STAGE 1:
A601 TOP & BOT.

STAGE 2:
A602 TOP & BOT.

② STAGE 1:
A617E OR A618E B.F. & A616E F.F.

STAGE 2:
A636E B.F. & A635E F.F.

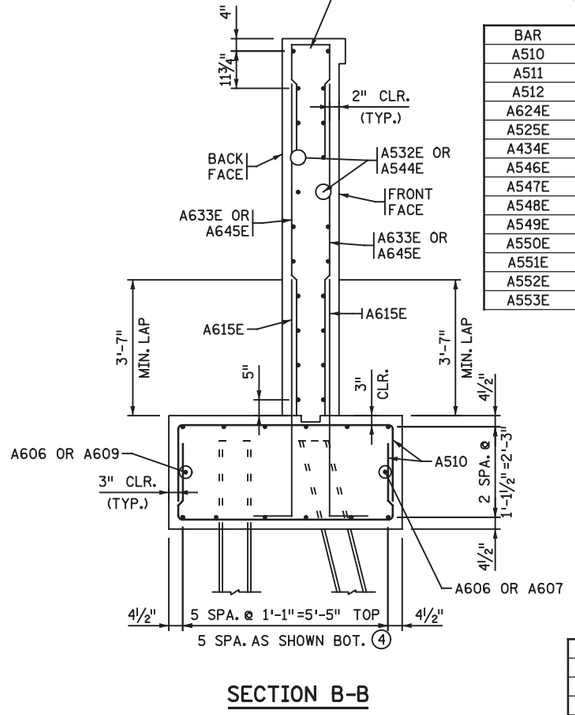
③ STAGE 1:
A521E OR A522E B.F. & A520E F.F.

STAGE 2:
A539E B.F. & A538E F.F.

④ STAGE 1:
A606 TOP & BOT.

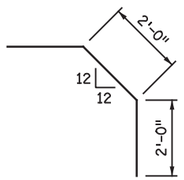
STAGE 2:
A607 & A608 TOP & BOT.

SECTION A-A

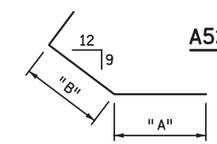


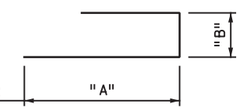
SECTION B-B

BAR	"A"	"B"
A510	2'-6"	5'-8"
A511	2'-6"	4'-5"
A512	2'-6"	3'-2"
A624E	4'-2"	0'-6"
A525E	5'-4"	1'-2"
A434E	3'-2"	1'-2"
A546E	3'-8"	2'-6"
A547E	3'-8"	2'-2"
A548E	3'-8"	1'-2"
A549E	3'-8"	VARIES 2'-5" TO 3'-3"
A550E	4'-11"	8'-3"
A551E	4'-11"	7'-8"
A552E	4'-11"	3'-2"
A553E	4'-11"	2'-4"



A526S





BAR	"A"	"B"
A640E	2'-5"	0'-11"
A641E	2'-5"	2'-2"
A542E	2'-5"	1'-4"
A543E	2'-5"	2'-2"

BILL OF REINFORCEMENT FOR WEST ABUTMENT

BAR	NO. STAGE 1	NO. STAGE 2	LENGTH	SHAPE	LOCATION
A601	2 SER OF 10		45'-6" TO 50'-0"		FTG LONG TOP & BOT
A602		22	30'-6"		FTG LONG TOP & BOT
A603	1		45'-6"		FTG LONG MID
A604	1		50'-0"		FTG LONG MID
A505	46	31	18'-0"		FTG STIRRUPS
A606	14		32'-0"		WW FTG LONG
A607		7	18'-2"		WW FTG LONG
A608		2 SER OF 3	16'-4" TO 18'-0"		WW FTG LONG
A609		1	16'-4"		WW FTG LONG
A510	64	34	10'-8"		WW FTG STIRRUPS
A511		2	9'-5"		WW FTG STIRRUPS
A512		2	8'-2"		WW FTG STIRRUPS
A613		3	4'-0"		FTG CHAMFER
A614E	44	31	7'-9"		ABUT FF DOWELS
A615E	108	57	7'-3"		ABUT BF & WW DOWELS
A616E	6		43'-10"		ABUT HORIZ FF
A617E	6		17'-6"		ABUT HORIZ BF
A618E	6		28'-1"		ABUT HORIZ BF
A619E	1 SER OF 4		43'-6" TO 45'-2"		ABUT HORIZ TOP
A520E	5		45'-6"		PAR. HORIZ FF
A521E	5		17'-7"		PAR. HORIZ BF
A522E	5		28'-1"		PAR. HORIZ BF
A623E	46	27	7'-7"		ABUT VERT BF
A624E	43	31	5'-2"		ABUT TOP TIES
A525E	46	27	9'-6"		ABUT PAR. TIES
A526S	46	27	6'-0"		APPROACH TIE BARS
A627E	6		4'-6"		ABUT CORNER FF
A628E	6		4'-10"		ABUT CORNER BF
A529E	5		4'-10"		PAR. CORNER FF
A530E	5		4'-10"		PAR. CORNER BF
A531E	3	4	7'-10"		CHEEK WALL BF
A532E	20		32'-8"		WW HORIZ
A633E	63		9'-1"		WW VERT
A434E	34	18	7'-6"		WW TOP TIES
A635E		6	30'-0"		ABUT HORIZ FF
A636E		6	27'-5"		ABUT HORIZ BF
A637E		1 SER OF 4	27'-9" TO 29'-5"		ABUT HORIZ TOP
A538E		5	27'-10"		PAR. HORIZ FF
A539E		5	27'-3"		PAR. HORIZ BF
A640E		6	4'-2"		ABUT CORNER FF
A641E		6	5'-5"		ABUT CORNER BF
A542E		5	4'-7"		PAR. CORNER FF
A543E		5	5'-5"		PAR. CORNER BF
A544E		20	16'-8"		WW HORIZ
A645E		30	8'-11"		WW VERT
A546E	16	12	9'-10"		PEDESTAL
A547E	14	15	9'-6"		PEDESTAL
A548E	2		9'-9"		PEDESTAL
A549E	2 SER OF 3		8'-6" TO 10'-7"		PEDESTAL
A550E	3		18'-1"		SHEAR LUG
A551E	2		17'-6"		SHEAR LUG
A552E	11		13'-0"		SHEAR LUG
A553E	2		12'-2"		SHEAR LUG
A554E	3		13'-7"		SHEAR LUG
A555E	3		13'-8"		SHEAR LUG
A556E	2		9'-5"		NW WW END VERT
A557E	10		6'-7"		NW WW END HORIZ

NOTES:

ALL BENT BAR DIMENSIONS ARE GIVEN OUT-TO-OUT

FOR LOCATION OF SECTION A-A, SEE SHEET B11 & B12

FOR LOCATION OF SECTION B-B, SEE SHEET B11

FOR PEDESTAL REINFORCEMENT, SEE SHEET B12

FOR SHEAR LUG LOCATIONS, SEE SHEETS B6 AND B15

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

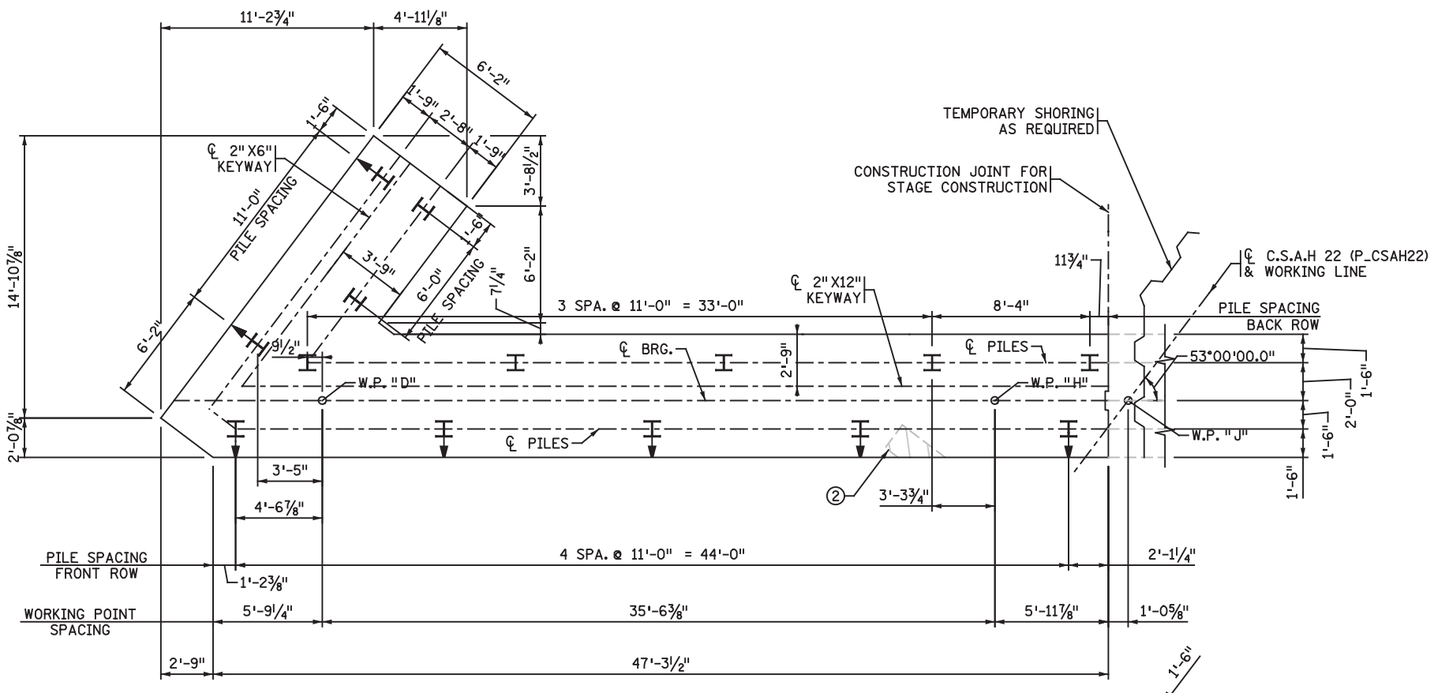
TITLE: WEST ABUTMENT REINFORCEMENT 4 STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

SHEET NO. B13 OF B54 SHEETS

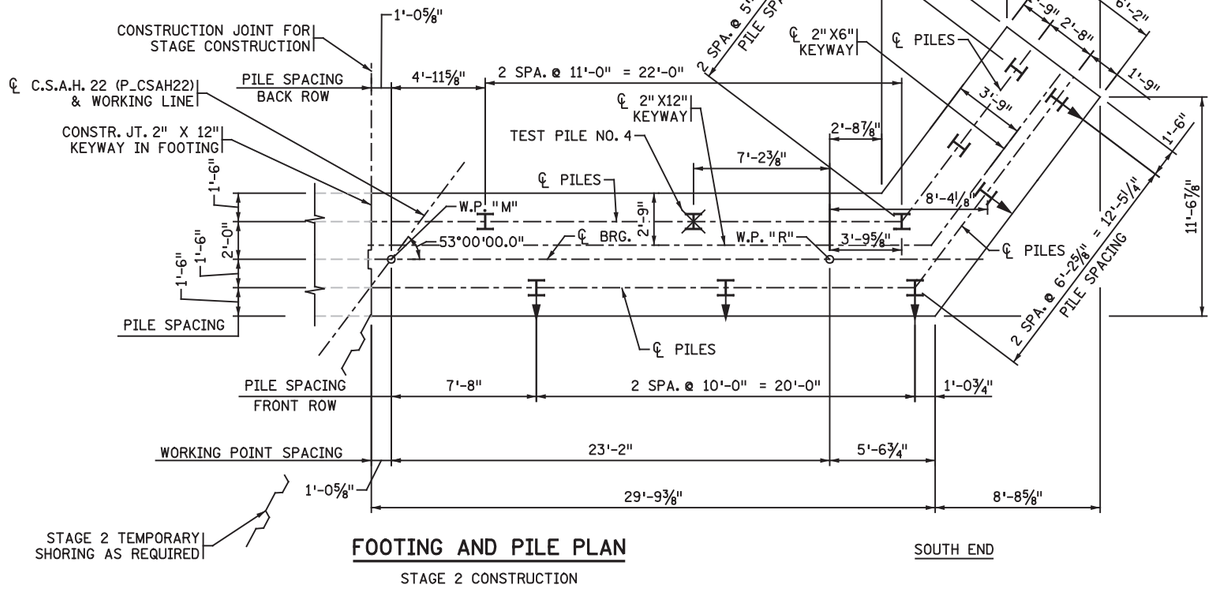
BRIDGE NO. 02595



NORTH END

FOOTING AND PILE PLAN

STAGE 1 CONSTRUCTION



FOOTING AND PILE PLAN

STAGE 2 CONSTRUCTION

SOUTH END

SUMMARY OF QUANTITIES FOR EAST ABUTMENT

		TOTAL
	STRUCTURAL CONCRETE (1G52)	72 CU. YD.
	STRUCTURAL CONCRETE (3B52)	87 CU. YD.
	REINFORCEMENT BARS	5570 POUND
	REINFORCEMENT BARS (EPOXY COATED)	9980 POUND
	REINFORCEMENT BARS (STAINLESS - 75 KSI)	450 POUND
①	STEEL H-PILING 10"	1035 LIN. FT.
	STEEL H-TEST PILE 55FT LONG 10"	1 EACH
	PILE TIP PROTECTION 10"	24 EACH

① DOES NOT INCLUDE TEST PILES

EAST ABUTMENT COMPUTED PILE LOAD - TONS/PILE

FACTORED DEAD LOAD + EARTH PRESSURE	59.6
FACTORED LIVE LOAD	21.3
✳FACTORED DESIGN LOAD	80.9

✳BASED ON STRENGTH I LOAD COMBINATION

EAST ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR H-PILES R_n - TONS/PILE

FIELD CONTROL METHOD	ϕ dyn	✳✳R_n
MNDOT PILE FORMULA 2012 (MPF12) $R_n = 20\sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{S}\right)$	0.60	134.8
PDA	0.65	124.5

✳✳ R_n = (FACTORED DESIGN LOAD) / ϕ dyn

PILE NOTES

1 STEEL H TEST PILES 55 FT. LONG
23 STEEL H PILES EST. LENGTH 45 FT.
24 STEEL H PILES REQ'D FOR EAST ABUT.

PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.

PILES MARKED THUS H— TO BE BATTERED 3" PER FOOT IN DIRECTION SHOWN.

PILES TO BE HP-10X42.

FOR PILE SPLICE DETAILS SEE DETAIL B202.

② EXISTING BRIDGE 02519. REMOVE AS REQUIRED PRIOR TO STAGE 1 CONSTRUCTION. SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

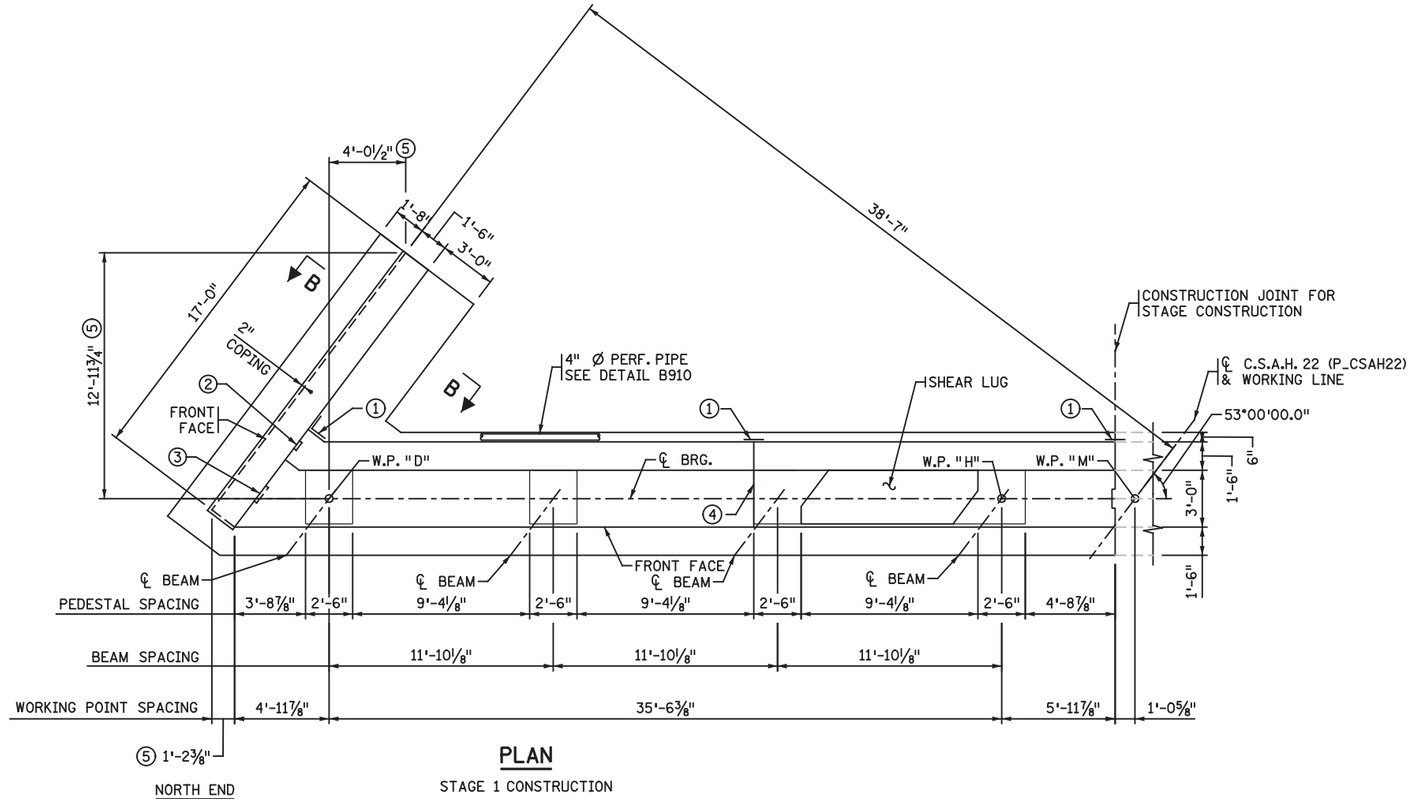
TITLE: EAST ABUTMENT DETAILS 1 STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

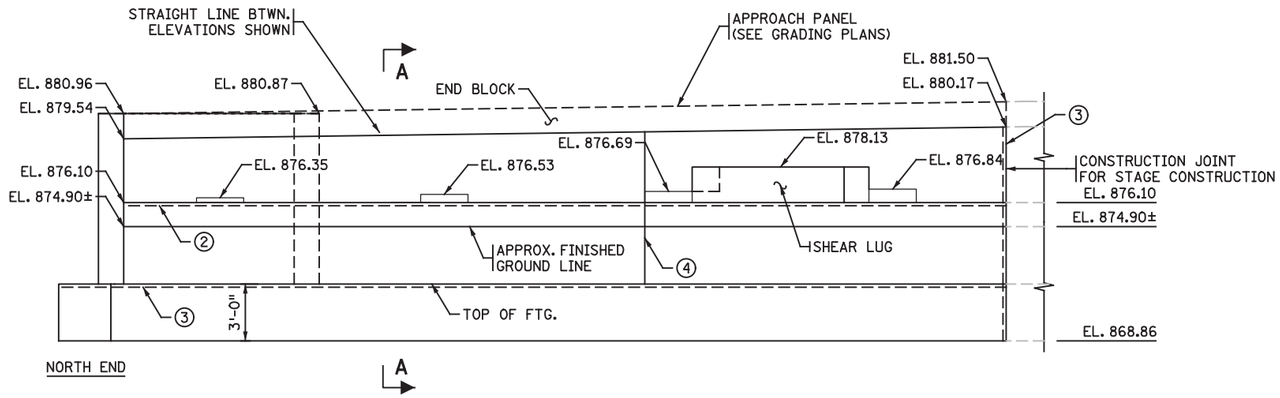
SHEET NO. B14 OF B54 SHEETS

BRIDGE NO. 02595



PLAN

STAGE 1 CONSTRUCTION



ELEVATION

STAGE 1 CONSTRUCTION

NOTES:

FOR WING WALL ELEVATIONS, SEE SHEET B9

FOR SECTION A-A & B-B, SEE SHEET B8

PROVIDE 72 HOUR MINIMUM TIME DELAY BETWEEN CONCRETE POURS ON ADJACENT ABUTMENT AND WING WALL SECTIONS

VERTICAL KEYWAYS SHALL STOP 1'-0"± FROM EXPOSED SURFACES

PILING NOT SHOWN FOR CLARITY

FOR PEDESTAL DETAILS, SEE SHEET B12

① MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B TO BE INCLUDED IN ITEM "STRUCTURAL CONCRETE (3B52)"

② CONSTRUCTION JOINT 2" X 6" KEYWAY

③ CONSTRUCTION JOINT 2" X 12" KEYWAY

④ CONTRACTION JOINT SEE DETAIL ON SHEET B8

⑤ DIMENSION TO FACE OF WINGWALL

FOR SHEAR LUG DETAILS SEE SHEET B13

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

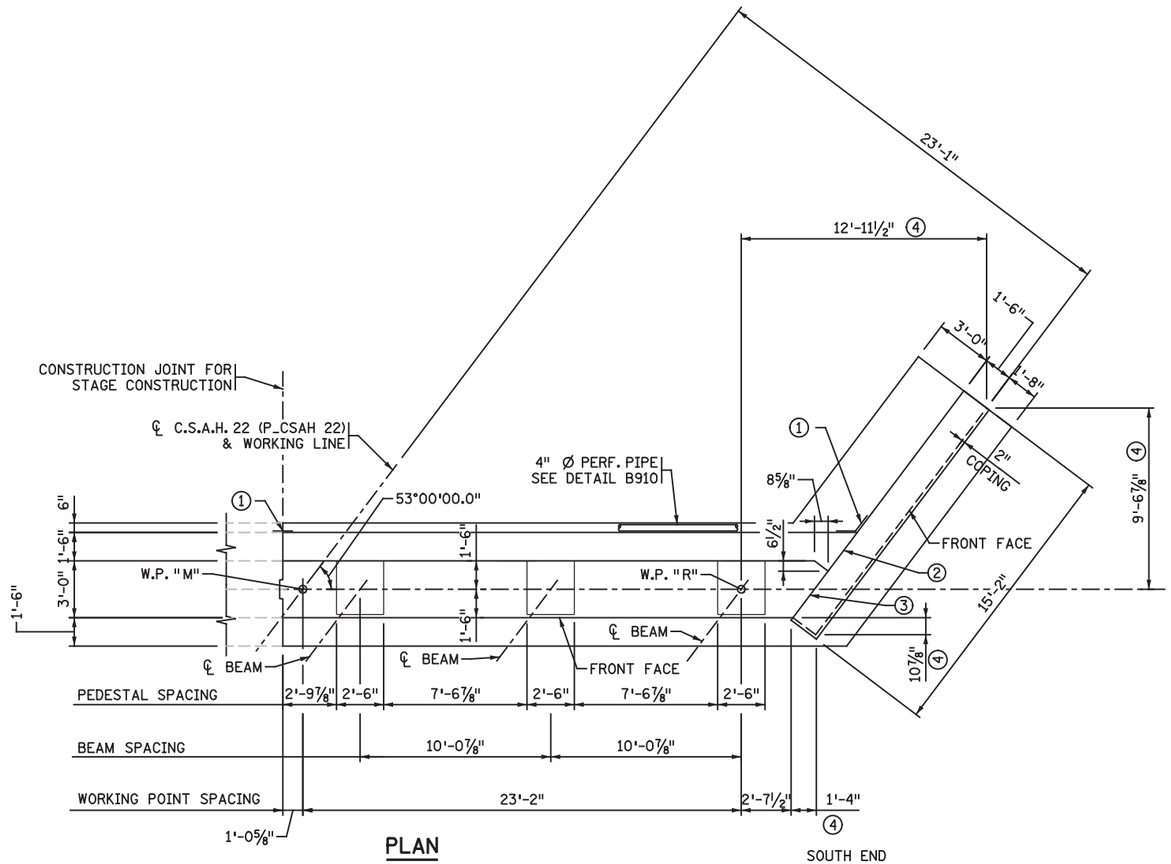
TITLE: EAST ABUTMENT DETAILS 2 STAGE 1 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

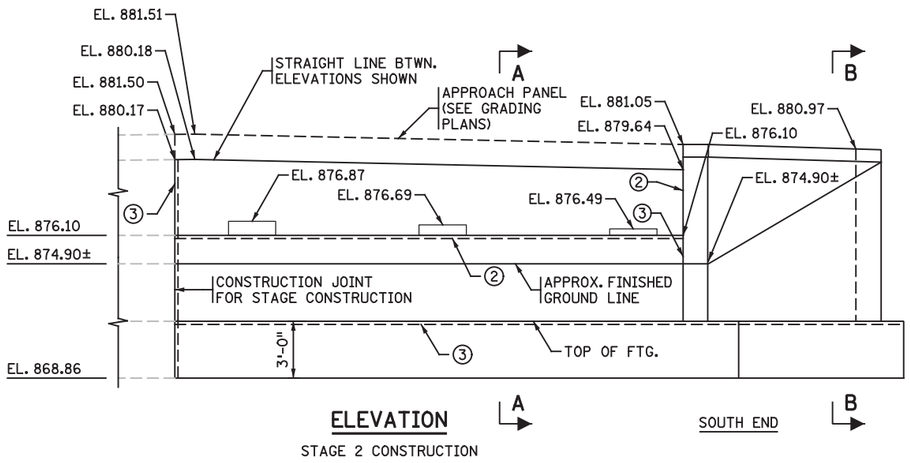
SHEET NO. B15 OF B54 SHEETS

BRIDGE NO. 02595



PLAN

STAGE 2 CONSTRUCTION



ELEVATION

STAGE 2 CONSTRUCTION

NOTES:

FOR WING WALL ELEVATIONS, SEE SHEET B9

FOR SECTION A-A & B-B, SEE SHEET B8

PROVIDE 72 HOUR MINIMUM TIME DELAY BETWEEN CONCRETE POURS ON ADJACENT ABUTMENT AND WING WALL SECTIONS

VERTICAL KEYWAYS SHALL STOP 1'-0"± FROM EXPOSED SURFACES

PILING NOT SHOWN FOR CLARITY

FOR PEDESTAL DETAILS, SEE SHEET B12

① MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B TO BE INCLUDED IN ITEM "STRUCTURAL CONCRETE (3B52)"

② CONSTRUCTION JOINT 2" X 6" KEYWAY

③ CONSTRUCTION JOINT 2" X 12" KEYWAY

④ DIMENSION TO FACE OF WINGWALL

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: EAST ABUTMENT DETAILS 3 STAGE 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

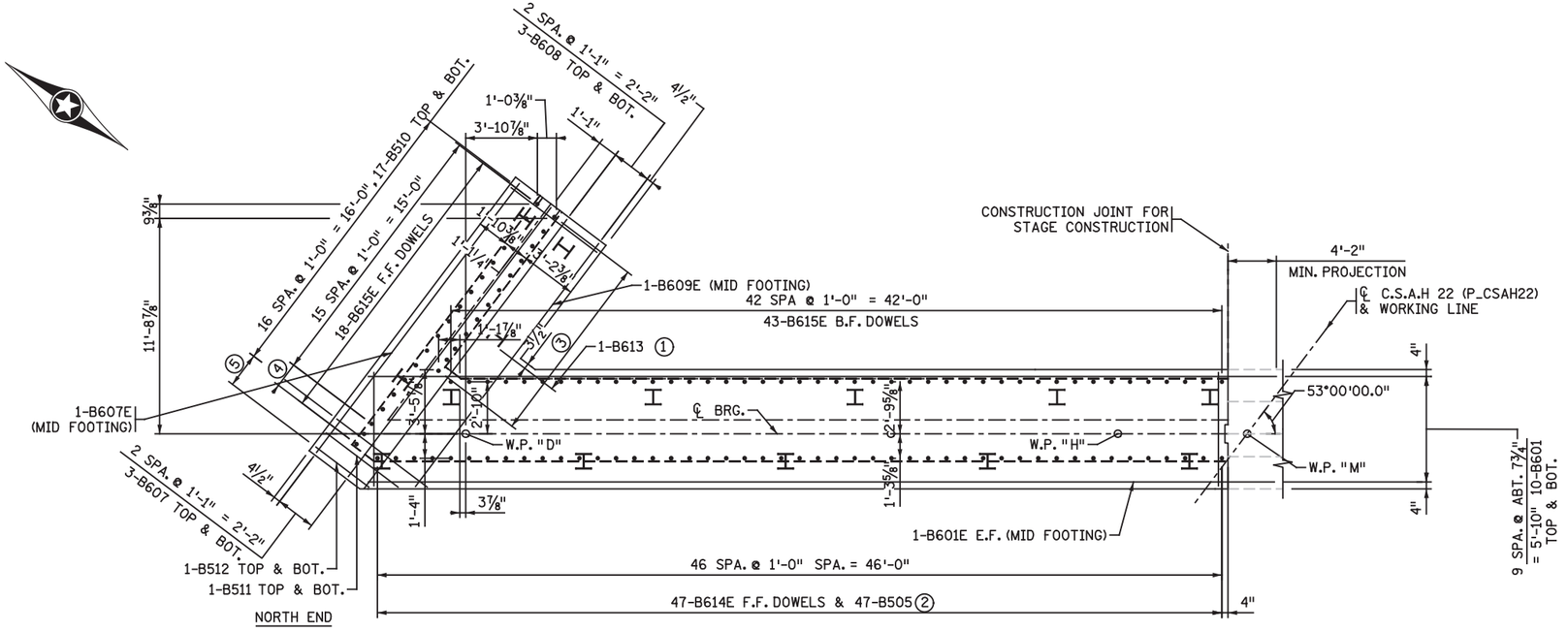
S.A.P. NO. 002-622-036

SHEET NO. B16 OF B54 SHEETS

BRIDGE NO. 02595

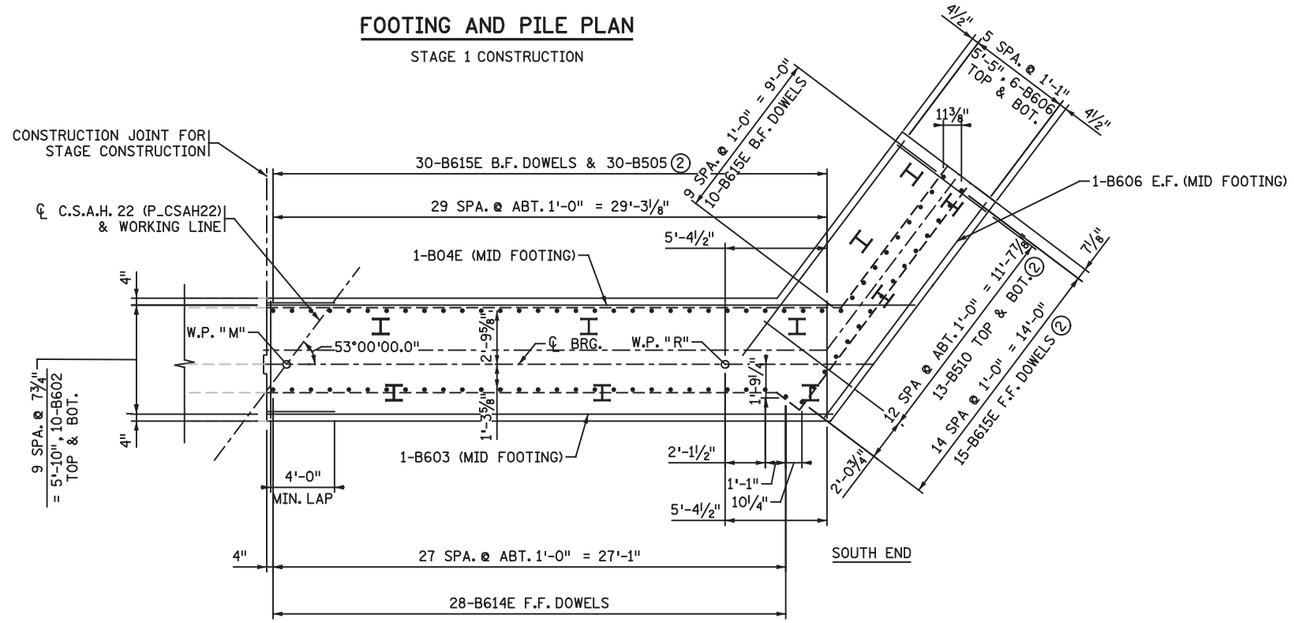
User 2:24:06 PM 8/10/2023

pw:\\pwhdrusceno1:HDR_US_Central_01\Documents\7341\10270644\V6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Plan Sht\2110



FOOTING AND PILE PLAN

STAGE 1 CONSTRUCTION



FOOTING AND PILE PLAN

STAGE 2 CONSTRUCTION

NOTES:

F.F. DENOTES FRONT FACE

B.F. DENOTES BACK FACE

EXISTING PILES NOT SHOWN FOR CLARITY

① B613 TOP, MIDDLE & BOTTOM, CENTER ON CHAMFER

② ADJUST SPACING AS REQUIRED TO CLEAR PILE, PROVIDE 2" CLEAR

③ 11 SPA. @ ABT. 11½" = 10'-7½"
12-B615E B.F. DOWELS

④ 2 SPA. @ 8¼"

⑤ 2 SPA. @ 11½"

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

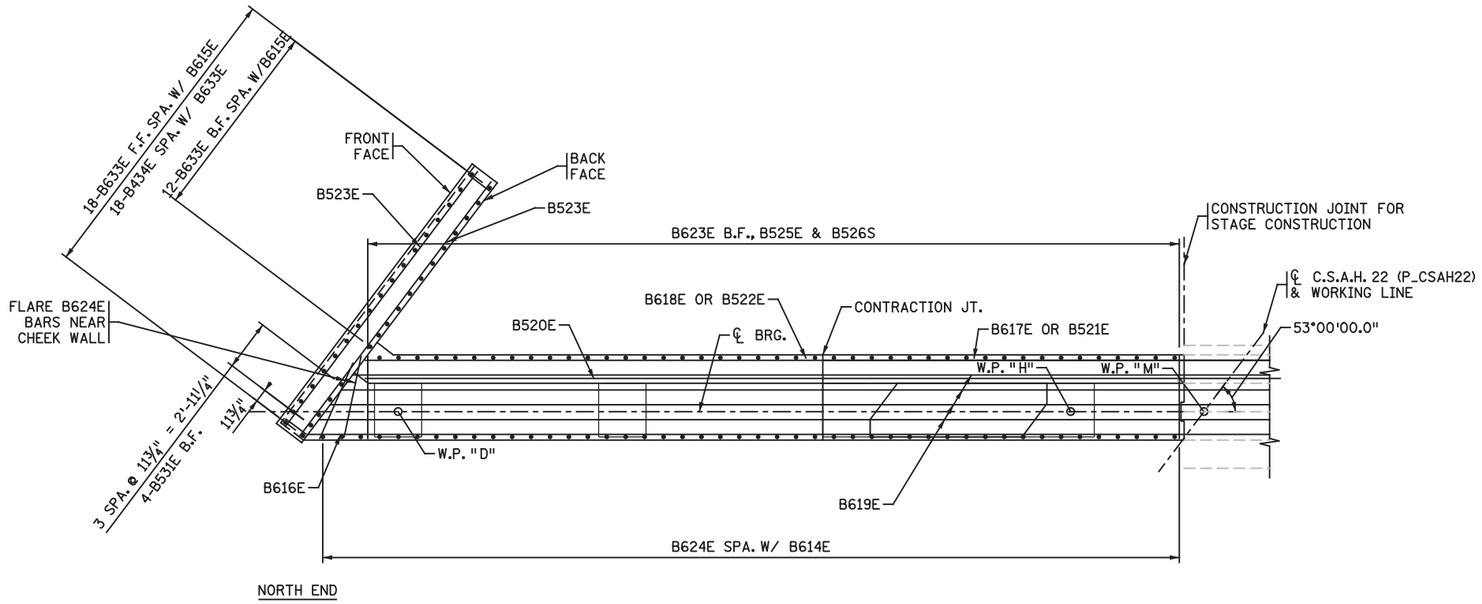
TITLE: EAST ABUTMENT REINFORCEMENT 1 STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

S.A.P. NO. 002-622-036

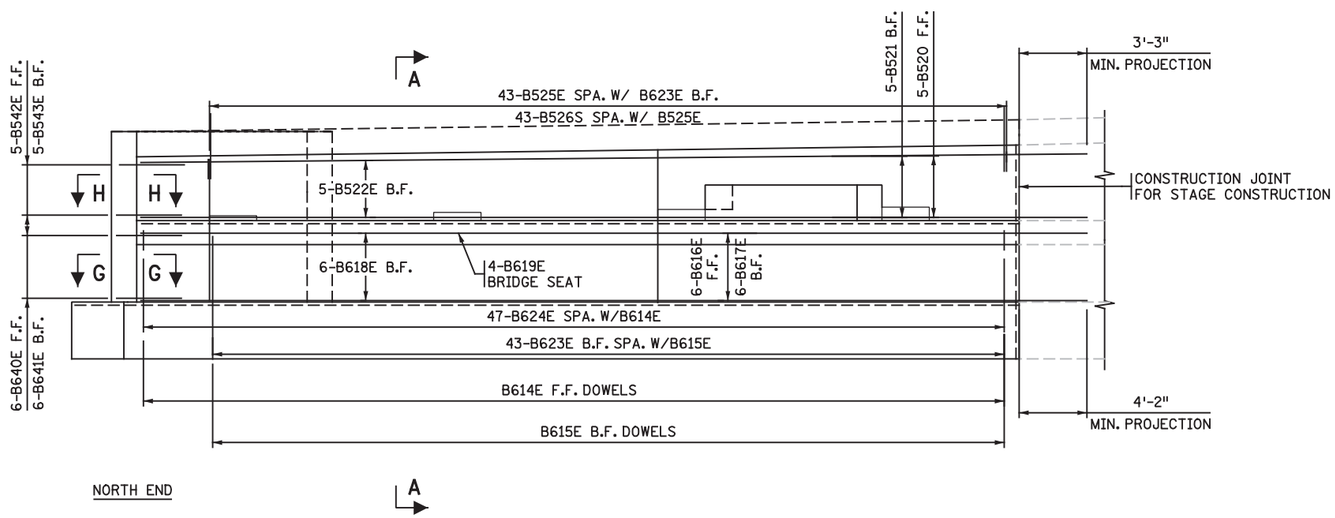
SHEET NO. B17 OF B54 SHEETS

BRIDGE NO. 02595



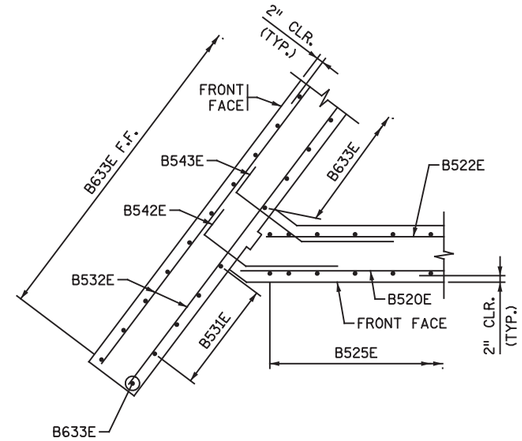
PLAN

STAGE 1 CONSTRUCTION

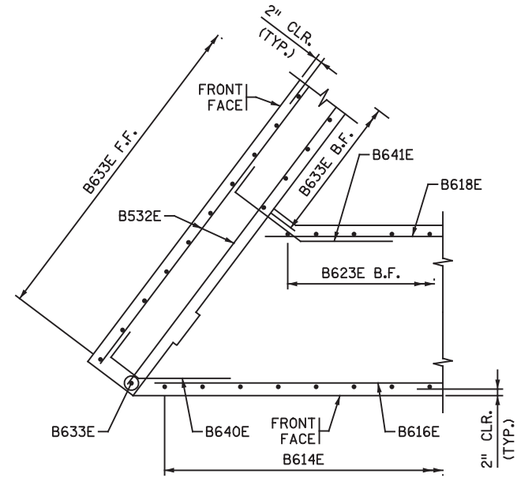


ELEVATION

STAGE 1 CONSTRUCTION



SECTION H-H



SECTION G-G

NOTES:

F.F. DENOTES FRONT FACE

B.F. DENOTES BACK FACE

EXISTING PILES NOT SHOWN FOR CLARITY

NEW PILES NOT SHOWN FOR CLARITY

FOR SECTION A-A, SEE SHEET B20

FOR BILL OF REINFORCEMENT, SEE SHEET B20

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

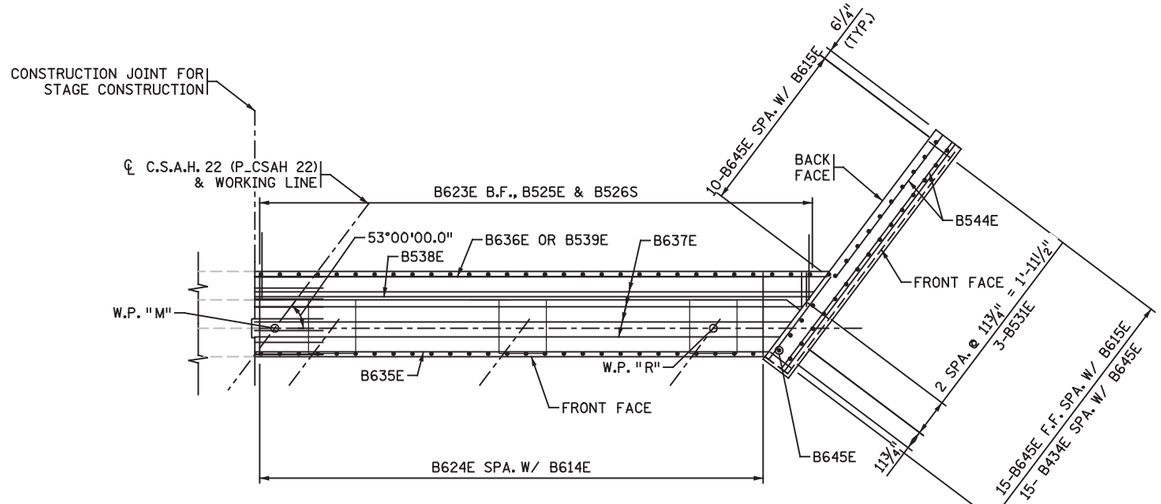
TITLE: EAST ABUTMENT REINFORCEMENT 2 STAGE 1 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

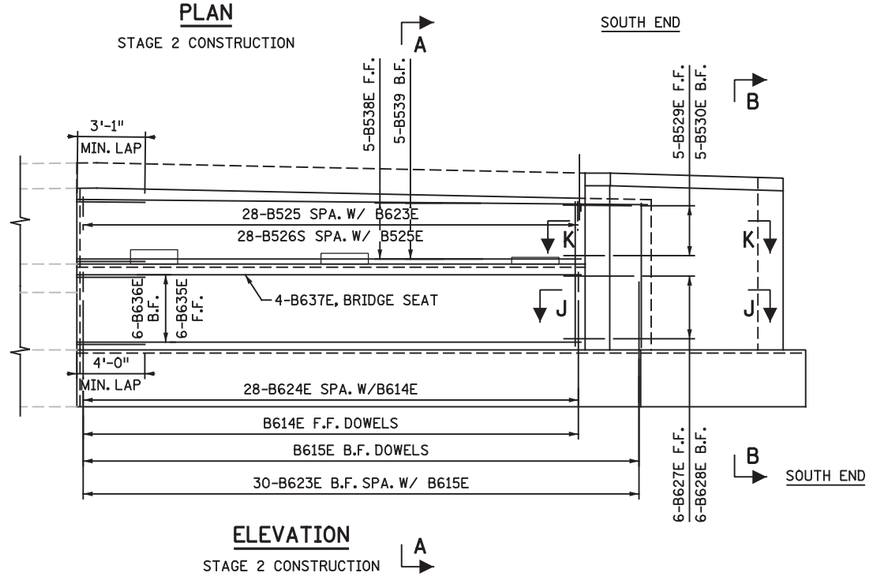
S.A.P. NO. 002-622-036

SHEET NO. B18 OF B54 SHEETS

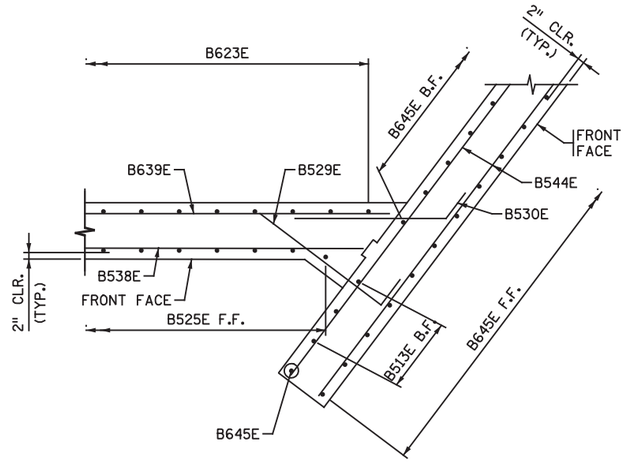
BRIDGE NO. 02595



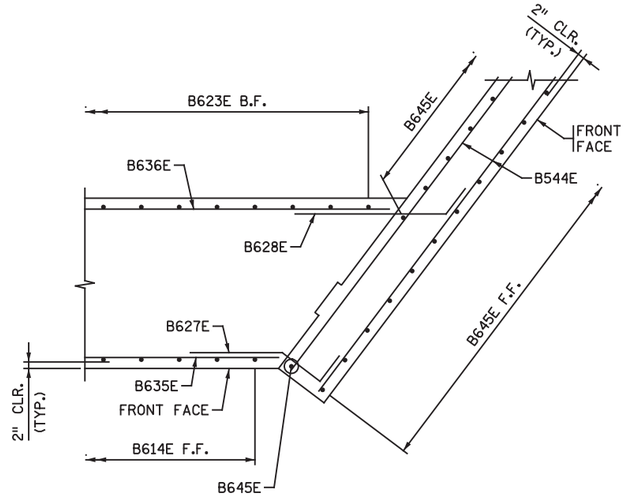
PLAN
STAGE 2 CONSTRUCTION



ELEVATION
STAGE 2 CONSTRUCTION



SECTION K-K



SECTION J-J

NOTES:

F.F. DENOTES FRONT FACE

B.F. DENOTES BACK FACE

EXISTING PILES NOT SHOWN FOR CLARITY

NEW PILES NOT SHOWN FOR CLARITY

FOR SECTION A-A & B-B, SEE SHEET B20

FOR BILL OF REINFORCEMENT, SEE SHEET B20

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE:

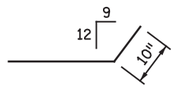
EAST ABUTMENT REINFORCEMENT 3 STAGE 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

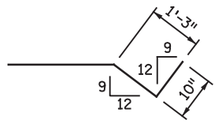
S.A.P. NO. 002-622-036

SHEET NO. B19 OF B54 SHEETS

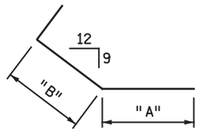
BRIDGE NO. 02595



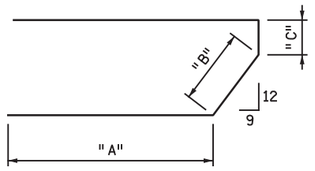
B628E & B530E



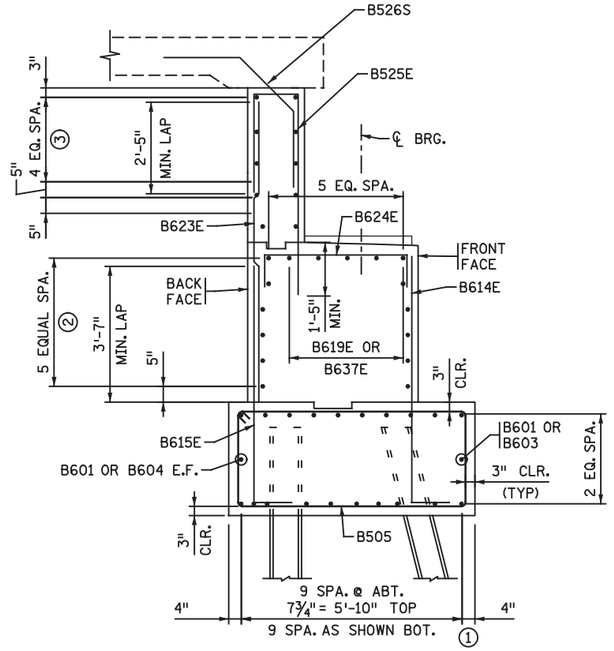
B627E



BAR	"A"	"B"
B640E	2'-5"	0'-11"
B641E	2'-5"	2'-2"
B542E	2'-5"	1'-4"
B543E	2'-5"	2'-2"



BAR	"A"	"B"	"C"
B554E	5'-4"	2'-1"	0'-9"
B555E	5'-5"	2'-0"	0'-11"



SECTION A-A

① STAGE 1:
B601E TOP & BOT.

STAGE 2:
B602 TOP & BOT.

② STAGE 1:
B617E OR B618E B.F. & B616E F.F.

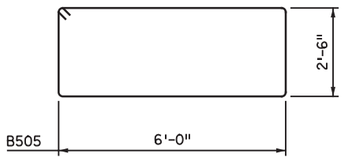
STAGE 2:
B636E B.F. & B635E F.F.

③ STAGE 1:
B521E OR B522E B.F. & B520E F.F.

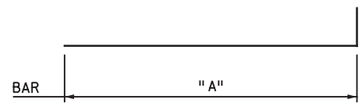
STAGE 2:
B539E B.F. & B538E F.F.

④ STAGE 1:
B606 TOP & BOT.

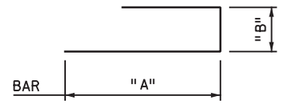
STAGE 2:
B607 & B608 TOP & BOT.



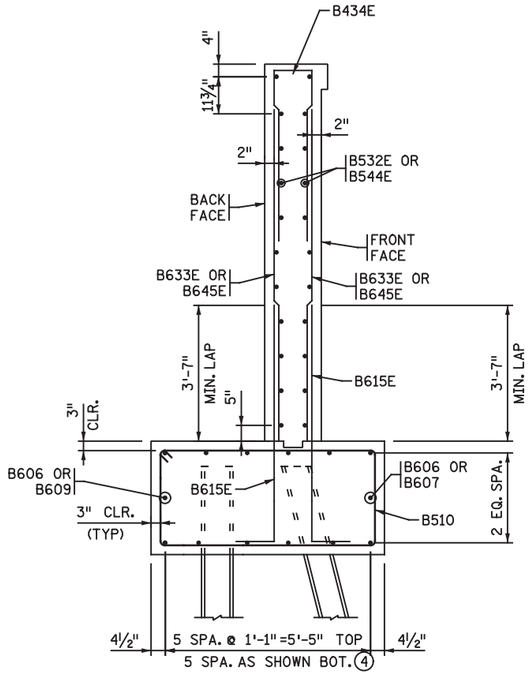
B505



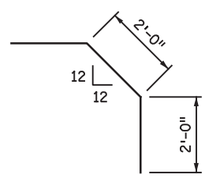
BAR	"A"
B614E	6'-9"
B615E	6'-3"
B529E	4'-0"



BAR	"A"	"B"
B510	2'-6"	5'-8"
B511	2'-6"	4'-5"
B512	2'-6"	3'-2"
B624E	4'-2"	0'-6"
B525E	5'-6"	1'-2"
B434E	3'-2"	1'-2"
B546E	3'-8"	2'-6"
B547E	3'-8"	2'-2"
B548E	3'-8"	1'-2"
B549E	3'-8"	VARIES 2'-5" TO 3'-3"
B550E	4'-11"	8'-3"
B551E	4'-11"	7'-8"
B552E	4'-11"	3'-2"
B553E	4'-11"	2'-4"



SECTION B-B



B526S

BILL OF REINFORCEMENT FOR EAST ABUTMENT

BAR	NO. STAGE 1	NO. STAGE 2	LENGTH	SHAPE	LOCATION
B601	22		50'-10"		FTG LONG TOP & BOT
B602		2 SER OF 10	29'-7" TO 34'-2"		FTG LONG TOP & BOT
B603		1	29'-7"		FTG LONG MID.
B604		1	34'-2"		FTG LONG MID.
B505	47	30	18'-0"		FTG STIRRUPS
B606		14	14'-2"		WW FTG LONG
B607	7		18'-2"		WW FTG LONG
B608	2 SER OF 3		16'-4" TO 18'-0"		WW FTG LONG
B609	1		16'-4"		WW FTG LONG
B510	34	26	10'-8"		WW FTG STIRRUPS
B511	2		9'-5"		WW FTG STIRRUPS
B512	2		8'-2"		WW FTG STIRRUPS
B613	3		4'-0"		FTG CHAMFER
B614E	47	28	7'-9"		ABUT FF DOWELS
B615E	73	55	7'-3"		ABUT BF & WW DOWELS
B616E	6		50'-6"		ABUT HORIZ FF
B617E	6		23'-2"		ABUT HORIZ BF
B618E	6		23'-11"		ABUT HORIZ BF
B619E	1 SER OF 4		47'-11" TO 49'-9"		ABUT HORIZ TOP
B520E	5		46'-4"		PAR. HORIZ FF
B521E	5		22'-4"		PAR. HORIZ BF
B522E	5		23'-10"		PAR. HORIZ BF
B623E	47	30	7'-6"		ABUT VERT BF
B624E	43	28	5'-2"		ABUT TOP TIES
B525E	43	28	9'-9"		ABUT PAR. TIES
B526S	43	28	6'-0"		APPROACH TIE BARS
B627E		6	4'-6"		ABUT CORNER FF
B628E		6	4'-10"		ABUT CORNER BF
B529E		5	4'-10"		PAR. CORNER FF
B530E		5	4'-10"		PAR. CORNER BF
B531E	4	3	7'-10"		CHEEK WALL BF
B532E	20		16'-8"		WW HORIZ
B633E	31		8'-10"		WW VERT
B434E	18	15	7'-6"		WW TOP TIES
B635E		6	27'-0"		ABUT HORIZ FF
B636E		6	30'-1"		ABUT HORIZ BF
B637E		1 SER OF 4	27'-5" TO 29'-5"		ABUT HORIZ TOP
B538E		5	29'-2"		PAR. HORIZ FF
B539E		5	30'-0"		PAR. HORIZ BF
B640E	6		4'-2"		ABUT CORNER FF
B641E	6		5'-5"		ABUT CORNER BF
B542E	5		4'-7"		PAR. CORNER FF
B543E	5		5'-5"		PAR. CORNER BF
B544E		20	14'-10"		WW HORIZ
B645E		26	8'-11"		WW VERT
B546E	16	12	9'-10"		PEDESTAL
B547E	14	15	9'-6"		PEDESTAL
B548E	2		9'-9"		PEDESTAL
B549E	2 SER OF 3		8'-6" TO 10'-7"		PEDESTAL
B550E	3		18'-1"		SHEAR LUG
B551E	2		17'-6"		SHEAR LUG
B552E	11		13'-0"		SHEAR LUG
B553E	2		12'-2"		SHEAR LUG
B554E	3		13'-7"		SHEAR LUG
B555E	3		13'-8"		SHEAR LUG

NOTES:

ALL BENT BAR DIMENSIONS ARE GIVEN OUT-TO-OUT

FOR PEDESTAL REINFORCEMENT, SEE SHEET B12

FOR LOCATION OF SECTION A-A, SEE SHEETS B18 & B19.

FOR LOCATION OF SECTION B-B, SEE SHEET B19

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

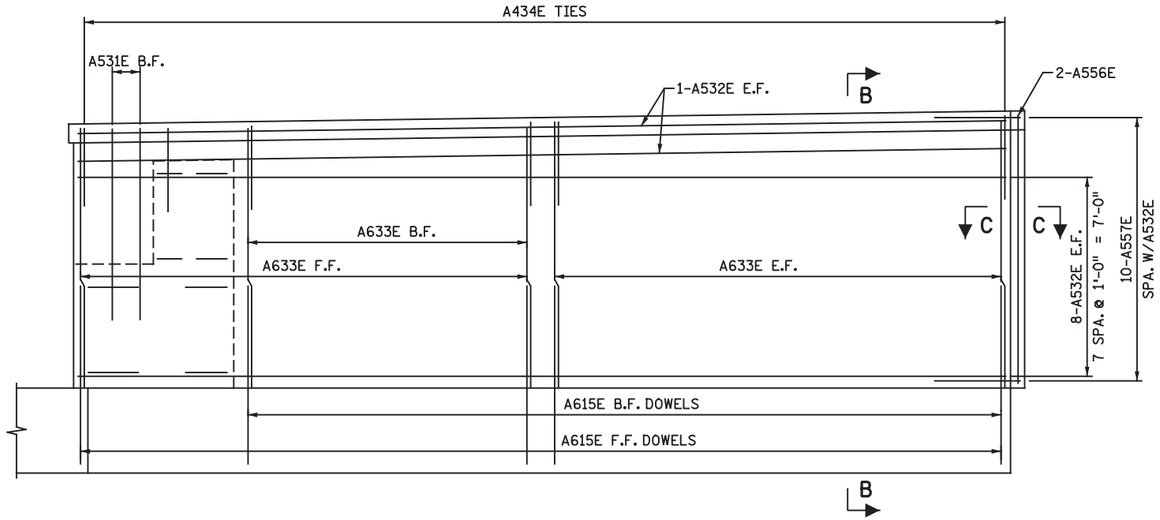
TITLE: EAST ABUTMENT REINFORCEMENT 4 STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: TJC	APPROVED:
CHK: MAM	CHK: MAM	

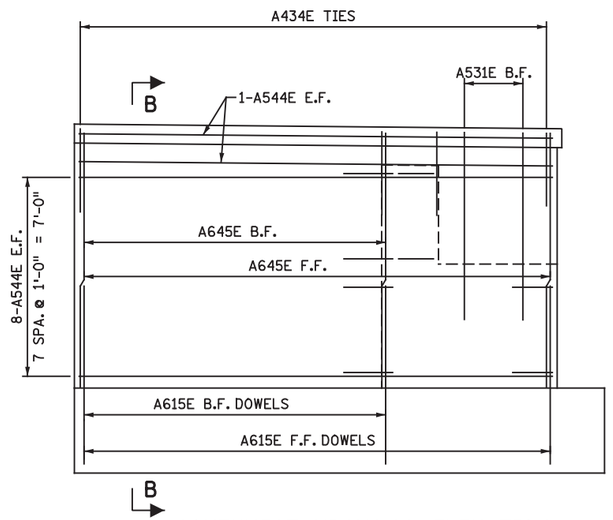
S.A.P. NO. 002-622-036

SHEET NO. B20 OF B54 SHEETS

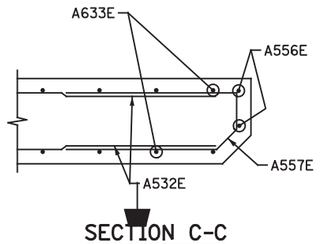
BRIDGE NO. 02595



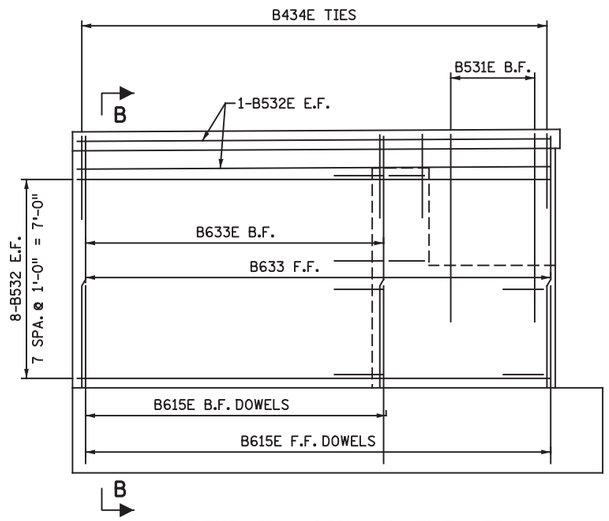
NORTHWEST WINGWALL ELEVATION



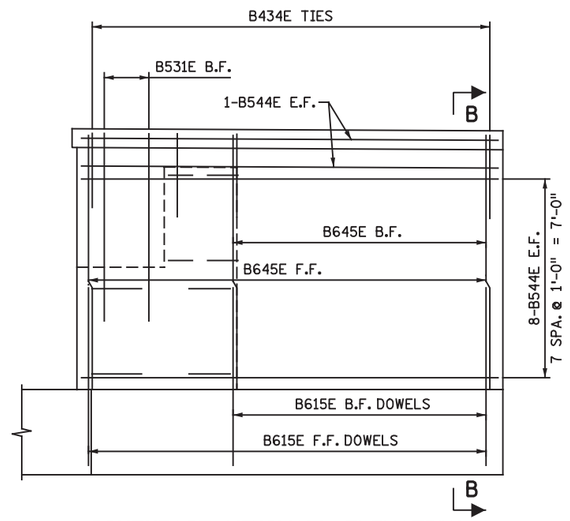
SOUTHWEST WINGWALL ELEVATION



SECTION C-C



NORTHEAST WINGWALL ELEVATION



SOUTHEAST WINGWALL ELEVATION

NOTES:

FOR SECTION B-B, SEE SHEET B13 OR SHEET B20.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: WINGWALL REINFORCEMENT STAGE 1 AND 2 CONSTRUCTION

DES: TJC	DR: DJR	APPROVED:
CHK: MAM	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B21 OF B54 SHEETS

BRIDGE NO. 02595

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User
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8/10/2023

PIER 1 & 2 COMPUTED PILE LOAD - TONS/PILE

FACTORED DEAD LOAD	91.5
FACTORED LIVE LOAD	45.9
FACTORED OVERTURNING	2.0
✳FACTORED DESIGN LOAD	139.3

✳BASED ON STRENGTH I LOAD COMBINATION

PIER 1 & 2 REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R_n - TONS/PILE

FIELD CONTROL METHOD	ϕ dyn	✳✳R_n
MNDOT PILE FORMULA 2012 (MPF12) $R_n = 20\sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{S}\right)$	0.50	278.7
PDA	0.65	214.4

✳✳ R_n = (FACTORED DESIGN LOAD) / ϕ dyn

SUMMARY OF QUANTITIES FOR TWO PIERS

	STRUCTURAL CONCRETE (3B52)	414 CU. YD.
	REINFORCEMENT BARS (EPOXY COATED)	36260 POUND
(1)	C-I-P CONCRETE PILING 18"	1950 LIN. FT.
	C-I-P CONCRETE TEST PILE 75 FT. LONG 18"	2 EACH
	PILE POINTS 18"	32 EACH
	PILE ANALYSIS	2 EACH

(1) DOES NOT INCLUDE TEST PILES.

PILE NOTES

2 CAST-IN-PLACE CONC. TEST PILES 75 FT. LONG
30 CAST-IN-PLACE CONC. PILES EST. LENGTH 65 FT.
32 CAST-IN-PLACE CONC. PILES REQ'D FOR PIERS 1 & 2

PILE SPACING SHOWN IS AT BOTTOM OF PIER CAP.

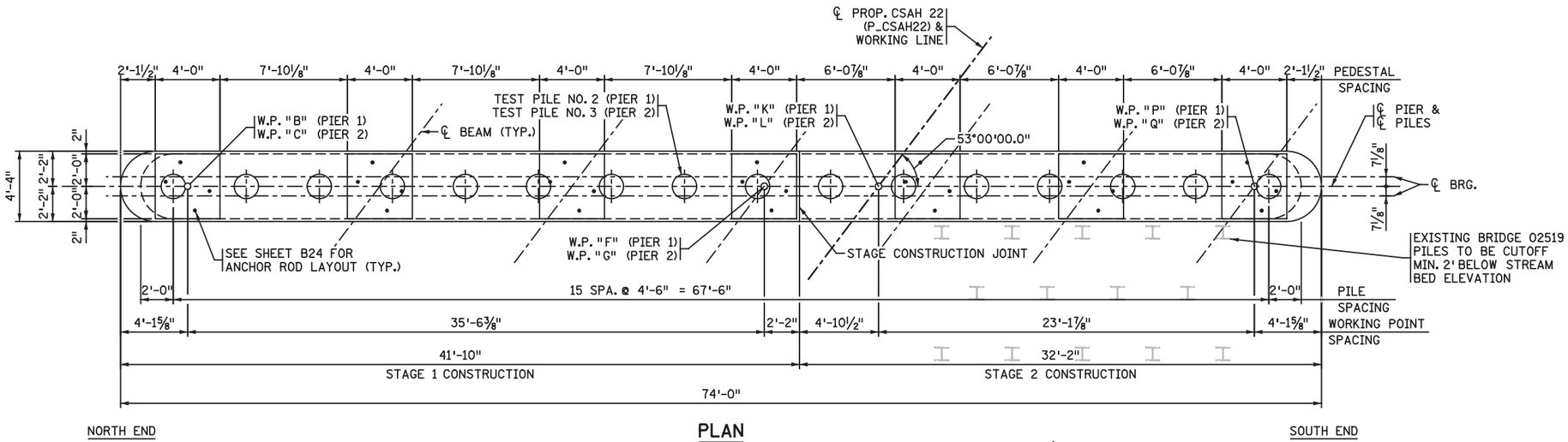
PILES TO HAVE A NOMINAL DIAMETER OF 18" (AND A THICKNESS OF ½").

FOR PILE SPLICE DETAILS SEE DETAIL B201.

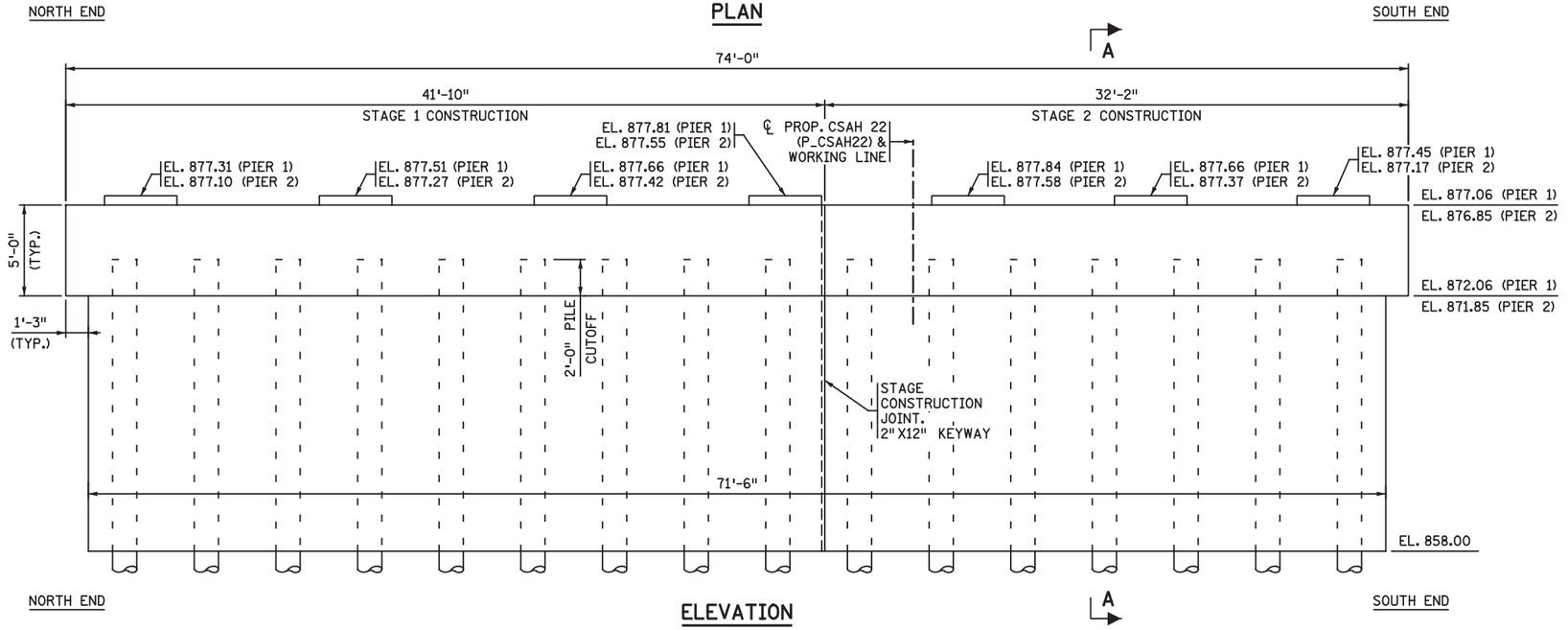
DRIVE PILE TIPS TO AN ELEVATION OF 824.00 OR LOWER.

NOTES:

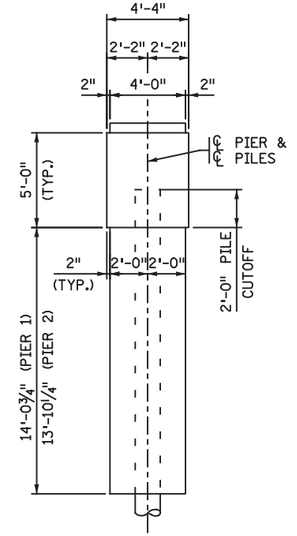
FOR PEDESTAL DETAILS, SEE SHEET B24.



NORTH END **PLAN** SOUTH END



NORTH END **ELEVATION** SOUTH END



SECTION A-A

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TREVOR M. LEACH LIC. NO. 60544

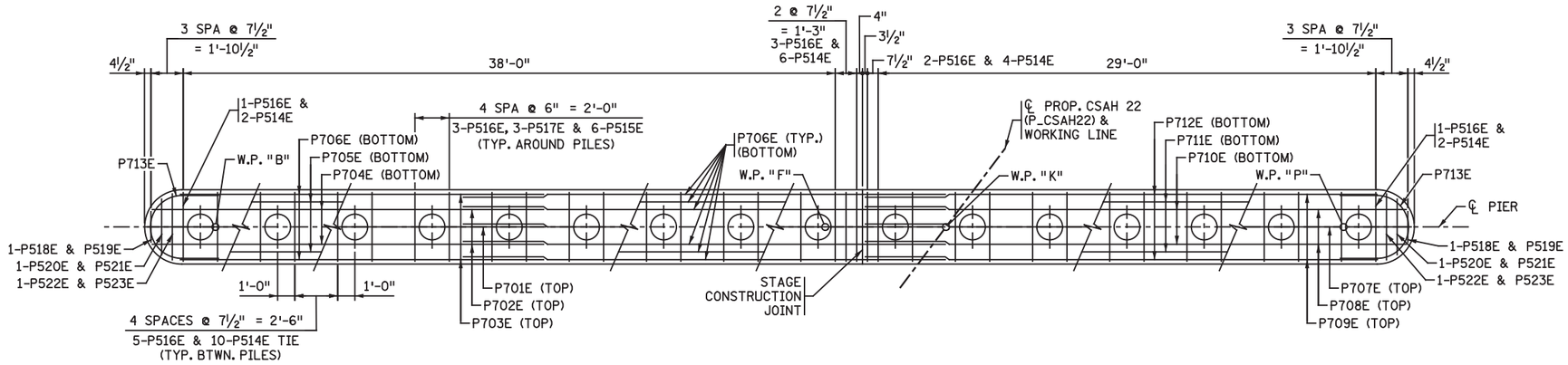
TITLE: PIER DETAILS

DES: TML DR: JRC APPROVED:
CHK: JCR CHK: TAL

S.A.P. NO. 002-622-036

SHEET NO. B22 OF B54 SHEETS

BRIDGE NO. 02595



NORTH END

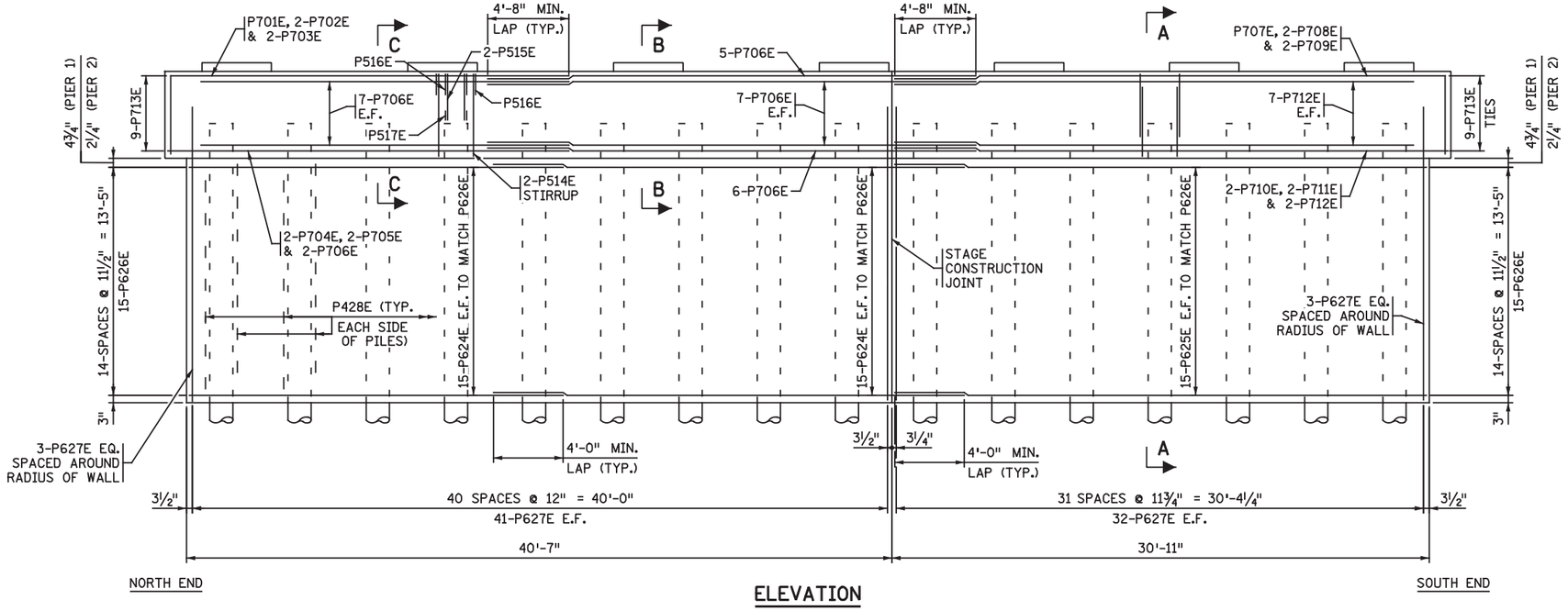
PLAN

(PIER 1 SHOWN, PIER 2 SIMILAR)

SOUTH END

NOTES:

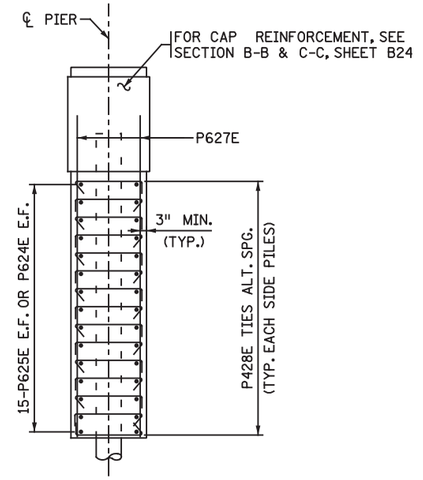
FOR PEDESTAL DETAILS, SEE SHEET B24.



NORTH END

ELEVATION

SOUTH END



SECTION A-A

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TREVOR M. LEACH LIC. NO. 60544

TITLE: PIER REINFORCEMENT 1

DES: TML	DR: JRC	APPROVED:
CHK: JCR	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B23 OF B54 SHEETS

BRIDGE NO. 02595

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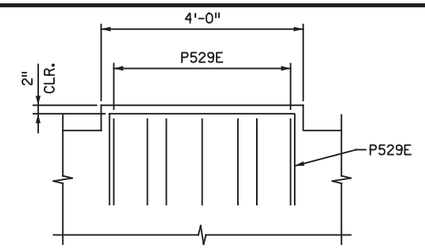
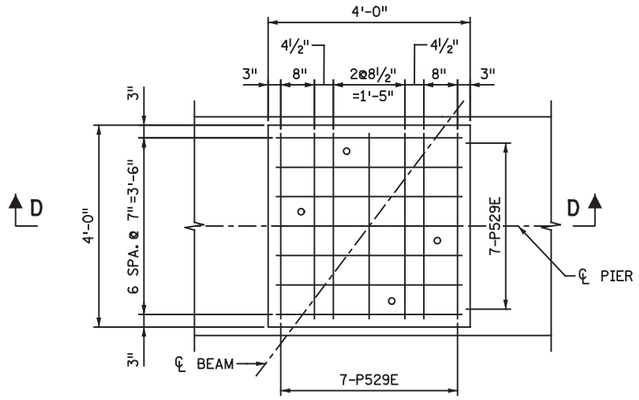
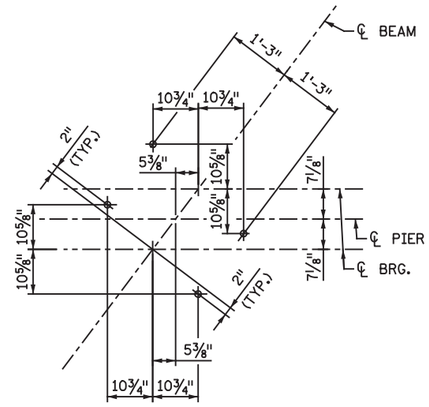


SECTION D-D

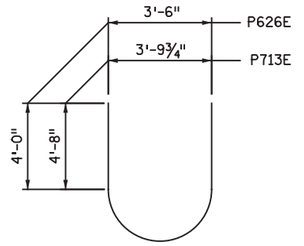


PEDESTAL REINFORCEMENT DETAILS



ANCHOR ROD LAYOUT ①

① PROVIDE A TEMPLATE DEMONSTRATING THAT ANCHOR RODS WILL HAVE 2" CLEAR DISTANCE TO ALL REINFORCEMENT. REFER TO SPEC. 2472.3.C.1 FOR MORE DETAILED INSTRUCTIONS.



P626E & P713E

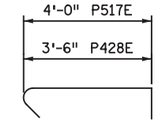
NOTES:

FOR LOCATION OF SECTION B-B & C-C, SEE SHEET B23.

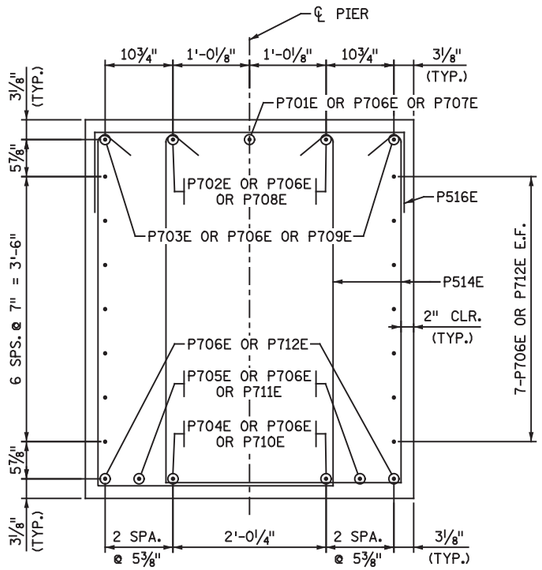
BILL OF REINFORCEMENT
FOR TWO PIERS

BAR	NO. STAGE 1	NO. STAGE 2	LENGTH	SHAPE	LOCATION
P701E	2	-	31'-1"		CAP HORIZONTAL
P702E	4	-	30'-10"		CAP HORIZONTAL
P703E	4	-	29'-1"		CAP HORIZONTAL
P704E	4	-	26'-7"		CAP HORIZONTAL
P705E	4	-	26'-4"		CAP HORIZONTAL
P706E	82	-	24'-7"		CAP HORIZONTAL
P707E	-	2	36'-3"		CAP HORIZONTAL
P708E	-	4	36'-0"		CAP HORIZONTAL
P709E	-	4	34'-3"		CAP HORIZONTAL
P710E	-	4	31'-9"		CAP HORIZONTAL
P711E	-	4	31'-6"		CAP HORIZONTAL
P712E	-	32	29'-9"		CAP HORIZONTAL
P713E	18	18	15'-4"		CAP END TIES
P514E	176	132	13'-3"		CAP STIRRUPS
P515E	108	84	11'-3"		CAP STIRRUPS
P516E	142	108	5'-0"		CAP TOP TIE
P517E	54	42	5'-0"		CAP TIE
P518E	2	2	12'-0"		CAP STIRRUPS
P519E	2	2	2'-10"		CAP TOP TIE
P520E	2	2	13'-5"		CAP STIRRUPS
P521E	2	2	4'-3"		CAP TOP TIE
P522E	2	2	14'-0"		CAP STIRRUPS
P523E	2	2	4'-10"		CAP TOP TIE
P624E	120	-	23'-5"		WALL HORIZONTAL
P625E	-	60	28'-9"		WALL HORIZONTAL
P626E	30	30	13'-6"		WALL END TIES
P627E	170	134	16'-1"		WALL VERTICAL
P428E	272	212	4'-7"		WALL TIES
P529E	112	84	6'-10"		PEDESTAL TIES

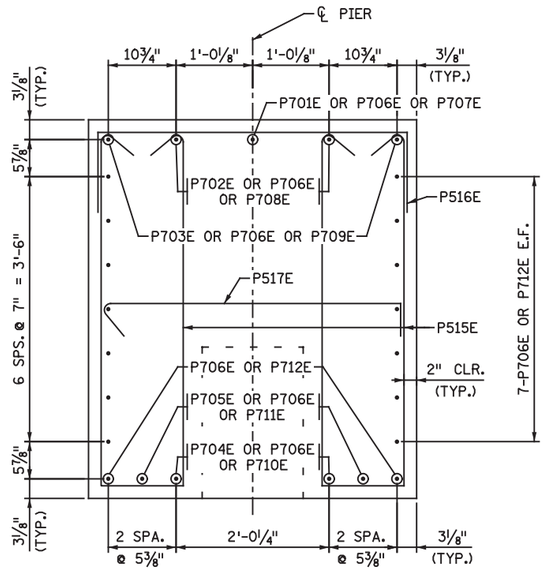
P701E, P702E, P703E, P707E, P708E & P709E



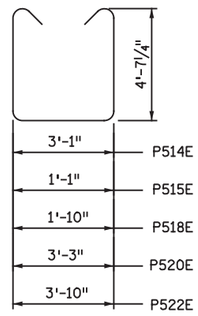
P517E & P428E



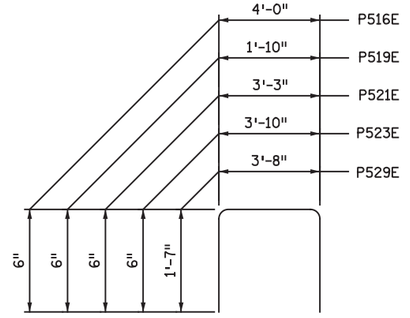
SECTION B-B
(BETWEEN PILING, TYP.)



SECTION C-C
(AT PILING, TYP.)



P514E, P515E, P518E, P520E & P522E



P516E, P519E, P521E, P523E & P529E

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TREVOR M. LEACH LIC. NO. 60544

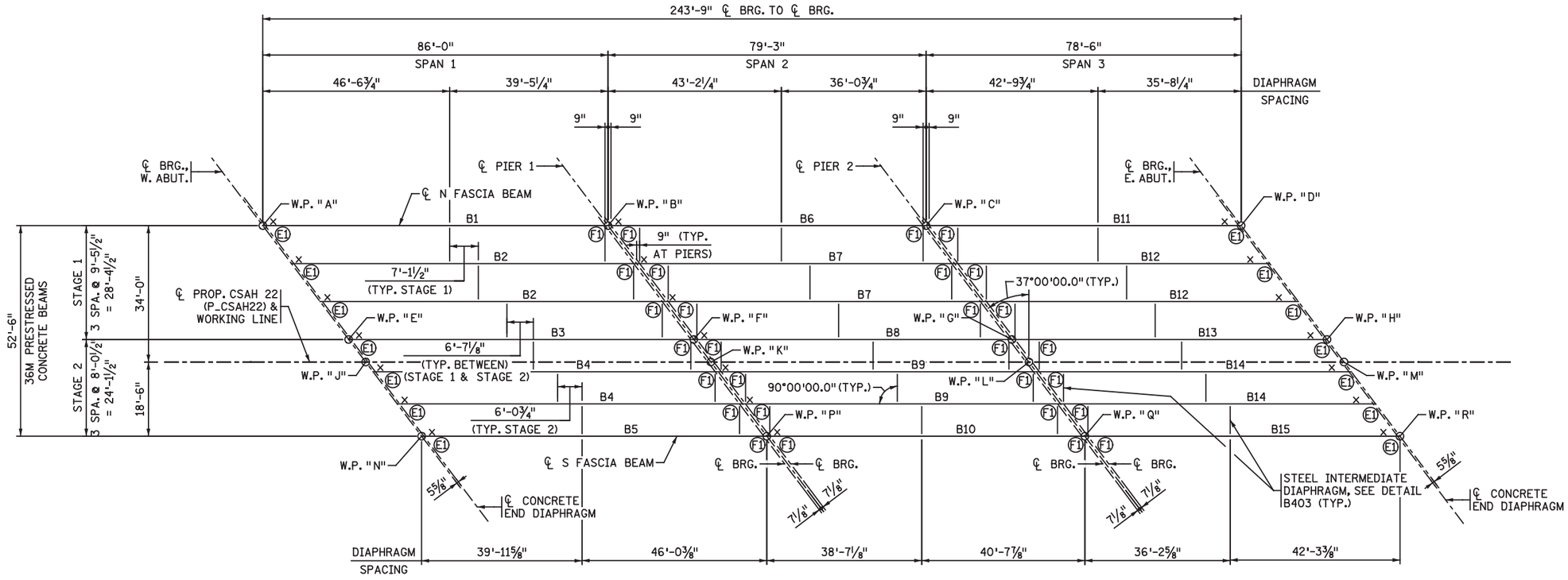
TITLE: PIER REINFORCEMENT 2

DES: TML	DR: JRC	APPROVED:
CHK: JCR	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B24 OF B54 SHEETS

BRIDGE NO. 02595



FRAMING PLAN

NOTES:

"X" DENOTES X END OF BEAM.

(F1) DENOTES FIXED CURVE PLATE BEARING ASSEMBLY TYPE F1. SEE DETAIL B310.

(E1) DENOTES EXPANSION CURVE PLATE BEARING ASSEMBLY TYPE E1. SEE DETAIL B311.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: Robert E Mateega 8/10/23
LICENSED PROFESSIONAL ENGINEER DATE

NAME: ROBERT E. MATEEGA LIC. NO. 44447

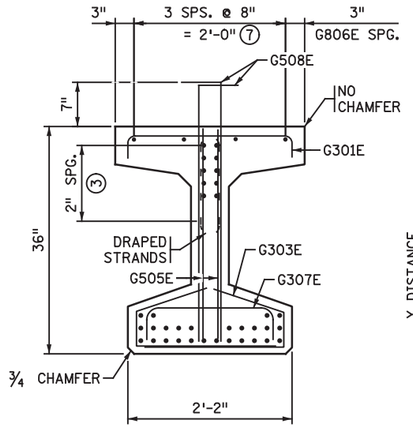
TITLE: FRAMING PLAN

DES: TJC	DR: JRC	APPROVED:
CHK: REM	CHK: REM	

S.A.P. NO. 002-622-036

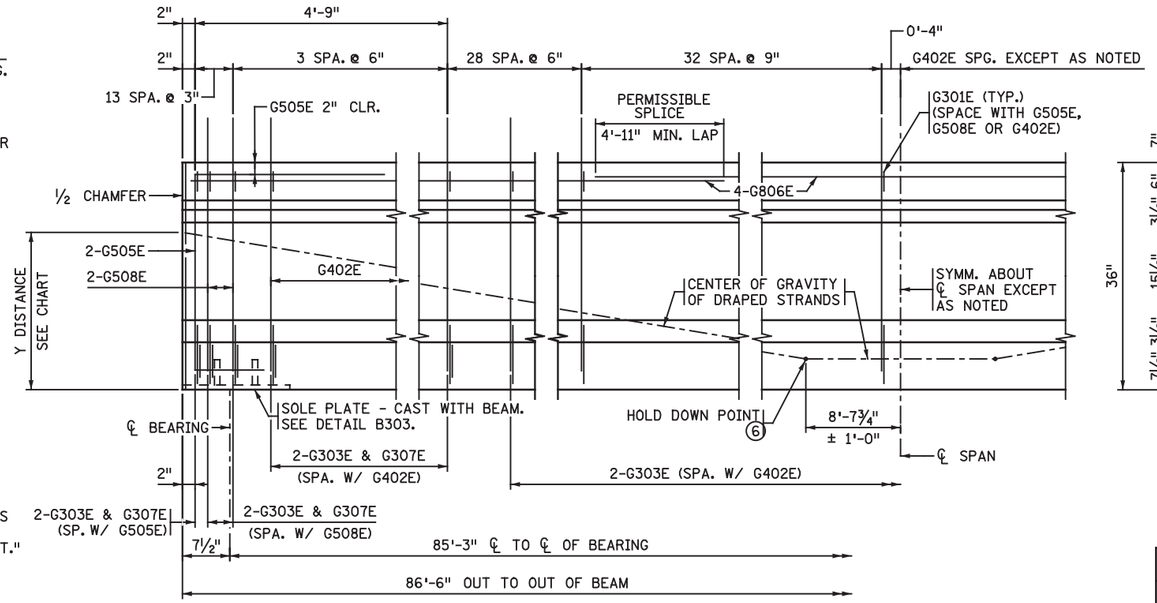
SHEET NO. B25 OF B54 SHEETS

BRIDGE NO. 02595

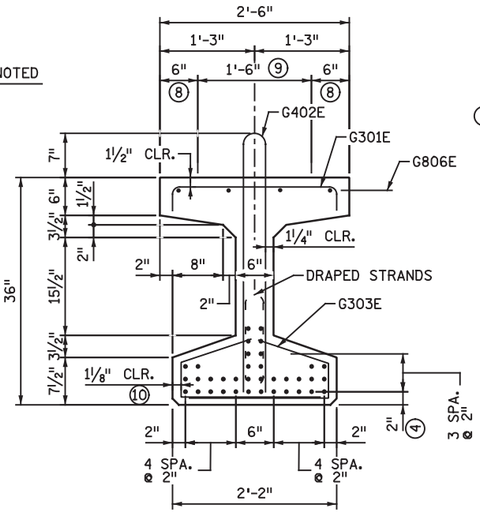


END VIEW

CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH SEALANT PER APPROVED PRODUCTS LIST "BRIDGE-PRESTRESSED BEAMS-CUT STRAND SEALANT."



BEAM ELEVATION



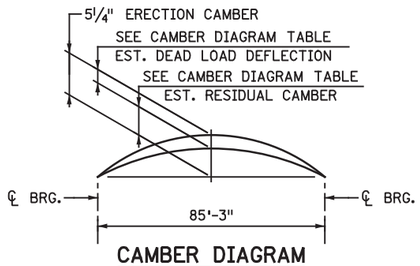
SECTION AT ℄ SPAN

Y DISTANCES (INCHES)	NO.	℄ SPAN	END
STRAIGHT STRANDS	26	3.38	
DRAPED STRANDS	10	8.00	29.00 ▫
(5) TOTAL STRANDS	36	4.67	

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

2 OPTIONAL ½" MIN. DIA. STRAIGHT STRANDS ARE NOT INCLUDED IN THIS TABLE.

▫ A TOLERANCE OF ± 1" WILL BE PERMITTED IN THIS DIMENSION.



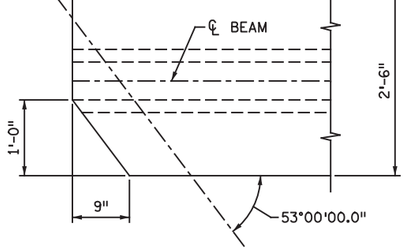
CAMBER DIAGRAM

CAMBER DIAGRAM TABLE		
BEAM NO.	EST. DEAD LOAD DEFLECTION	EST. RESIDUAL CAMBER
B1	3"	2¼"
B2	3⅜"	1⅞"
B3	3⅛"	2⅛"
B4	2⅞"	2⅜"
B5	2¾"	2½"

ERECTION CAMBER SHOWN IS AFTER DIAPHRAGMS ARE IN PLACE.

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.



TOP FLANGE COPING DETAIL

AT "X" END ONLY

INITIAL PRESTRESS
1,687,400 LB.
2 OPTIONAL ½" MIN. DIA. STRAIGHT TOP STRANDS ARE NOT INCLUDED IN THIS FORCE.
☒ $0.72f_{pu}$
☐ $0.75f_{pu}$

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	27.5 KSI
LONG TERM LOSSES	24.8 KSI
TOTAL LOSSES	52.3 KSI

MINIMUM CONCRETE STRENGTH - KSI	
(1) f'ci	(2) f'c
8.0 KSI	9.0 KSI

GENERAL NOTES

PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.

AT THE CONTRACTORS OPTION, 2 SYMMETRIC ½" MIN. DIA. STRANDS PULLED UP TO 5 KIPS EACH MAY BE ADDED TO THE TOP FLANGE. MAINTAIN THE VERTICAL PROFILE OF THESE STRANDS WITH A TOLERANCE OF ± 1" ALONG THE LENGTH OF THE BEAM AND MAINTAIN A MIN. OF 1¼" CLEAR COVER.

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" AND DIAPHRAGM SPACING.

REFER TO "PRESTRESSED CONCRETE BEAM DIAPHRAGM CONNECTION DETAILS" SHEET INCLUDED IN THIS PLAN SET FOR CONCRETE END DIAPHRAGM AND STEEL INTERMEDIATE DIAPHRAGM DETAILS.

APPLY AN APPROVED SEALER TO THE SIDES OF THE BEAM NEAR EACH END PER THE SPECIAL PROVISIONS.

(1) MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.

(2) MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.

(3) DRAPED STRANDS.

(4) STRAIGHT STRANDS.

(5) USE MNDOT GRADE 300, 0.6" DIA. 7-WIRE LOW RELAXATION PRESTRESSING STRAND, IN ACCORDANCE WITH ASTM A416 AS MODIFIED IN THE SPECIAL PROVISIONS.

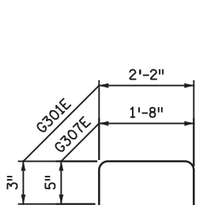
(6) CENTER OF GRAVITY OF HOLD DOWNS WHEN MULTIPLE HOLD DOWNS ARE USED.

(7) TWO INSIDE BARS MAY BE PLACED ADJACENT TO VERTICAL STIRRUP FOR TYING CONVENIENCE.

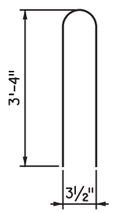
(8) STEEL TROWEL TO SMOOTH FINISH AND APPLY BOND BREAKER PER APPROVED PRODUCTS LIST.

(9) ROUGH FLOAT AND BROOM TRANSVERSELY FOR BOND IN ACCORDANCE WITH SPEC. 2405.3D.

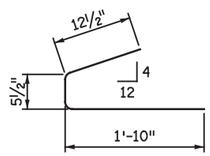
(10) TYP. CLR. FOR ENTIRE BOTTOM FLANGE.



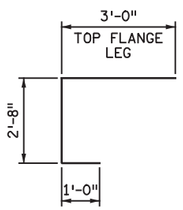
G301E & G307E



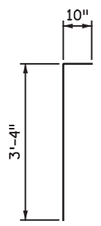
G402E



G303E



G505E



G508E

REVISED: DECEMBER 21, 2022
APPROVED: JANUARY 13, 2015 Nancy Daubenberger 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 Robert E Mateega 8/10/23
LICENSED PROFESSIONAL ENGINEER DATE

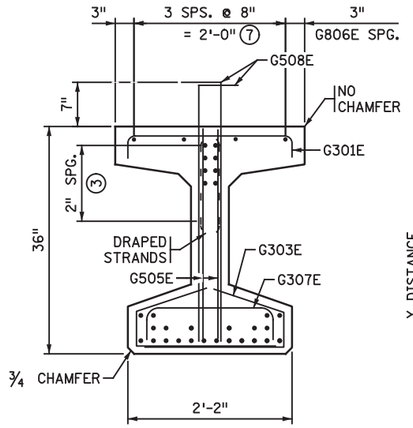
NAME: ROBERT E. MATEEGA LIC. NO. 44447

S.A.P. 002-622-036 BEAMS B1-B5 FIG. 5-397.505

TITLE: 36" PRESTRESSED CONCRETE BEAM (PRETENSIONED) 36M-87

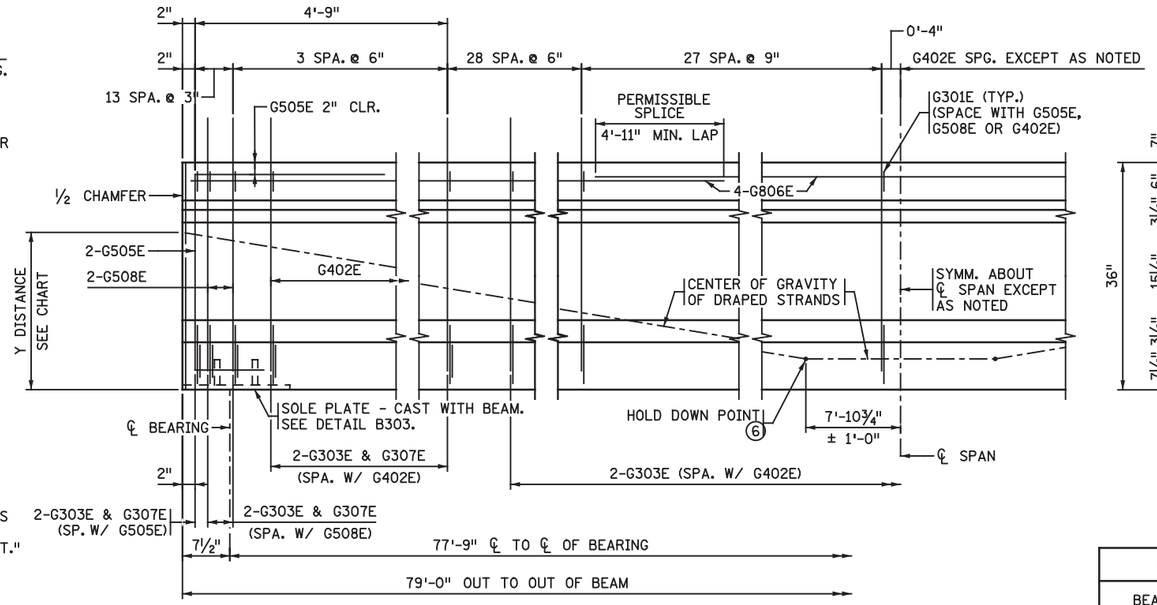
DES: TJC	DR: JRC	APPROVED:	BRIDGE NO. 02595
CHK: REM	CHK: REM		

SHEET NO B26 OF B54 SHEETS

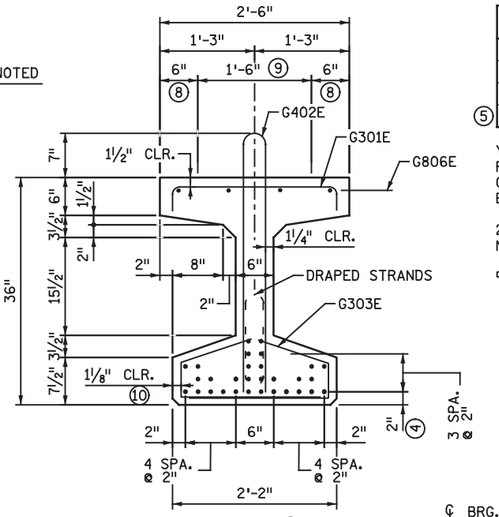


END VIEW

CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH SEALANT PER APPROVED PRODUCTS LIST "BRIDGE-PRESTRESSED BEAMS-CUT STRAND SEALANT."



BEAM ELEVATION



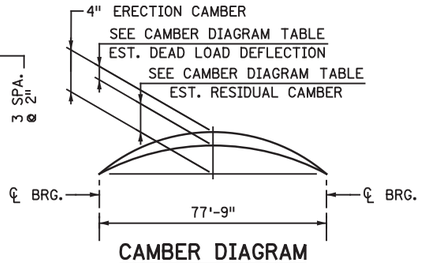
SECTION AT ℄ SPAN

Y DISTANCES (INCHES)			
	NO.	℄ SPAN	END
STRAIGHT STRANDS	22	3.27	
DRAPED STRANDS	8	7.00	30.00 □
(5) TOTAL STRANDS	30	4.27	

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

2 OPTIONAL ½" MIN. DIA. STRAIGHT STRANDS ARE NOT INCLUDED IN THIS TABLE.

□ A TOLERANCE OF ± 1" WILL BE PERMITTED IN THIS DIMENSION.



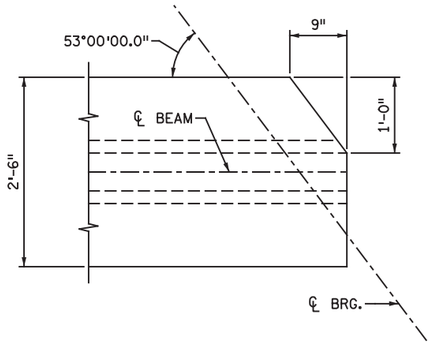
CAMBER DIAGRAM

CAMBER DIAGRAM TABLE		
BEAM NO.	EST. DEAD LOAD DEFLECTION	EST. RESIDUAL CAMBER
B6, B9, B11 & B14	2"	2"
B7 & B12	2¼"	1¾"
B8 & B13	2⅛"	1⅞"
B10 & B15	1⅞"	2⅛"

ERECTION CAMBER SHOWN IS AFTER DIAPHRAGMS ARE IN PLACE.

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.



TOP FLANGE COPING DETAIL

B11-B15 ONLY AT "X" END ONLY

INITIAL PRESTRESS
1,406,200 LB.
2 OPTIONAL ½" MIN. DIA. STRAIGHT TOP STRANDS ARE NOT INCLUDED IN THIS FORCE.
☒ $0.72f_{pu}$
☐ $0.75f_{pu}$

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	24.7 KSI
LONG TERM LOSSES	23.3 KSI
TOTAL LOSSES	48.0 KSI

MINIMUM CONCRETE STRENGTH - KSI	
(1) f'ci	(2) f'c
7.5 KSI	9.0 KSI

GENERAL NOTES

PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.

AT THE CONTRACTORS OPTION, 2 SYMMETRIC ½" MIN. DIA. STRANDS PULLED UP TO 5 KIPS EACH MAY BE ADDED TO THE TOP FLANGE. MAINTAIN THE VERTICAL PROFILE OF THESE STRANDS WITH A TOLERANCE OF ± 1" ALONG THE LENGTH OF THE BEAM AND MAINTAIN A MIN. OF 1¼" CLEAR COVER.

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.

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SEE FRAMING PLAN FOR BEAM END MARKED "X" AND DIAPHRAGM SPACING.

REFER TO "PRESTRESSED CONCRETE BEAM DIAPHRAGM CONNECTION DETAILS" SHEET INCLUDED IN THIS PLAN SET FOR CONCRETE END DIAPHRAGM AND STEEL INTERMEDIATE DIAPHRAGM DETAILS.

APPLY AN APPROVED SEALER TO THE SIDES OF THE BEAM NEAR EACH END PER THE SPECIAL PROVISIONS.

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(2) MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.

(3) DRAPED STRANDS.

(4) STRAIGHT STRANDS.

(5) USE MNDOT GRADE 300, 0.6" DIA. 7-WIRE LOW RELAXATION PRESTRESSING STRAND, IN ACCORDANCE WITH ASTM A416 AS MODIFIED IN THE SPECIAL PROVISIONS.

(6) CENTER OF GRAVITY OF HOLD DOWNS WHEN MULTIPLE HOLD DOWNS ARE USED.

(7) TWO INSIDE BARS MAY BE PLACED ADJACENT TO VERTICAL STIRRUP FOR TYING CONVENIENCE.

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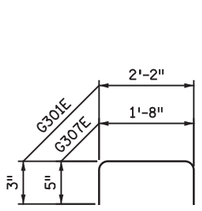
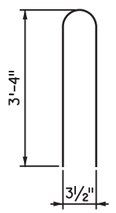
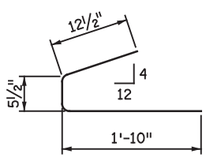
(10) TYP. CLR. FOR ENTIRE BOTTOM FLANGE.



G301E & G307E



G402E



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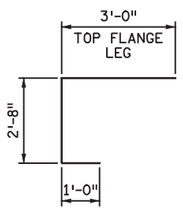
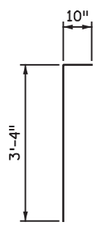


G505E



G508E

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

REV. NO.	DATE	REVISION DESCRIPTION	BY
1	---		

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 Robert E Mateega 8/10/23
LICENSED PROFESSIONAL ENGINEER DATE

NAME: ROBERT E. MATEEGA LIC. NO. 44447

S.A.P. 002-622-036

BEAMS B6-B15

FIG. 5-397.505

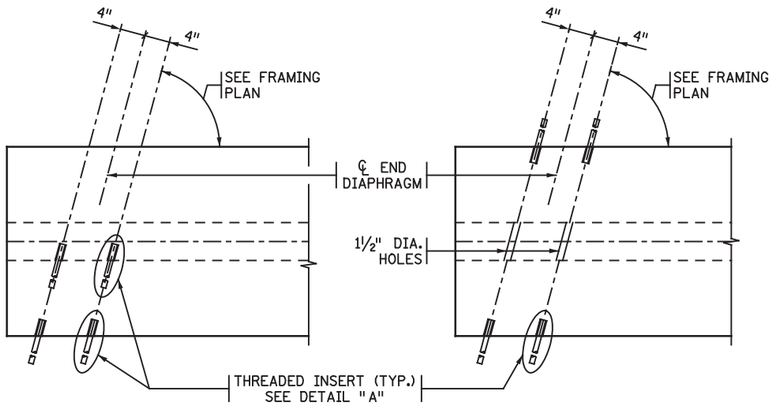
TITLE: 36" PRESTRESSED CONCRETE BEAM (PRETENSIONED) 36M-79

DES: TJC	DR: JRC	APPROVED:
CHK: REM	CHK: REM	

SHEET NO. B27 OF B54 SHEETS

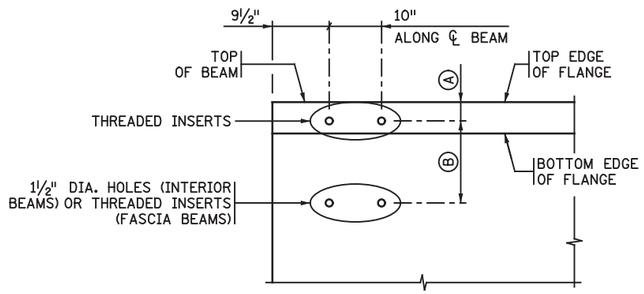
BRIDGE NO. 02595

BEAM SIZE	DIAPHRAGM DIMENSION TABLE						
	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓧ	Ⓨ
~~27M~~	~~4"~~	~~10"~~	~~4"~~	~~1'-0"~~	~~7½"~~	~~NOT APPLICABLE (NA)~~	~~(NA)~~
~~30MH~~	~~3"~~	~~11"~~	~~3½"~~	~~1'-1¼"~~	~~7½"~~	~~NOT APPLICABLE (NA)~~	~~(NA)~~
~~35MH~~	~~3"~~	~~1'-1"~~	~~6"~~	~~1'-4"~~	~~7½"~~	~~NOT APPLICABLE (NA)~~	~~(NA)~~
~~40MH~~	~~3"~~	~~1'-1"~~	~~2 SPS. @ 5" = 10"~~	~~1'-4"~~	~~7½"~~	~~7"~~	~~1'-5"~~
36M	4"	1'-0"	9"	1'-2½"	7½"	7"	1'-3"
~~MN45~~	~~2"~~	~~1'-2"~~	~~2 SPS. @ 6" = 1'-0"~~	~~1'-7"~~	~~7½"~~	~~7"~~	~~1'-7¾"~~
~~MN54~~	~~2"~~	~~1'-6"~~	~~2 SPS. @ 9" = 1'-6"~~	~~1'-7¾"~~	~~7½"~~	~~2 SPS. @ 9" = 1'-6"~~	~~1'-7¾"~~
~~MN63~~	~~2"~~	~~1'-6"~~	~~2 SPS. @ 1'-1½" = 2'-3"~~	~~1'-7¾"~~	~~7½"~~	~~2 SPS. @ 1'-1½" = 2'-3"~~	~~1'-7¾"~~
~~82MW~~	~~1¾"~~	~~2'-2¼"~~	~~3 EQ. SPS. = 3'-8"~~	~~1'-9½"~~	~~8½"~~	~~3 EQ. SPS. = 3'-8"~~	~~1'-9½"~~
~~96MW~~	~~1¾"~~	~~2'-2¼"~~	~~3 EQ. SPS. = 4'-10"~~	~~1'-9½"~~	~~8½"~~	~~3 EQ. SPS. = 4'-10"~~	~~1'-9½"~~



PLAN AT FASCIA BEAMS

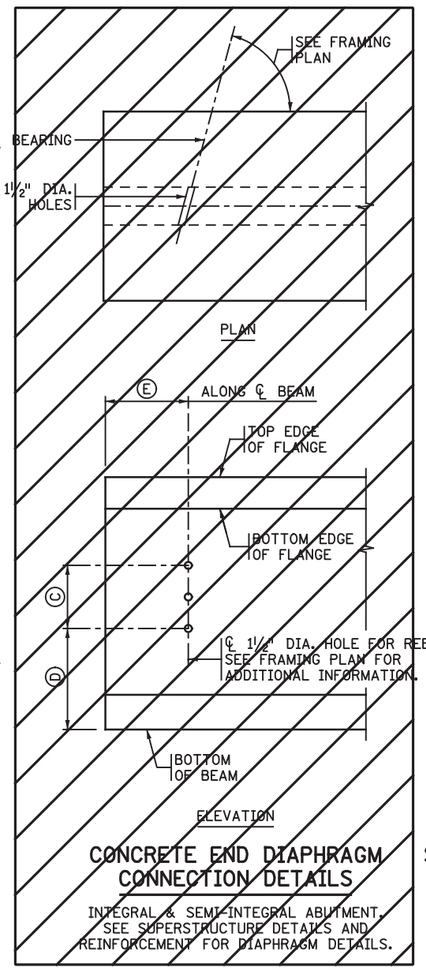
PLAN AT INTERIOR BEAMS



ELEVATION

CONCRETE END DIAPHRAGM CONNECTION DETAILS

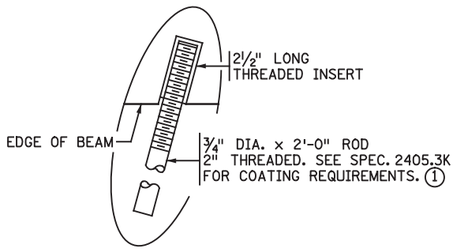
PARAPET ABUTMENT
(SEE DETAIL B814 FOR DIAPHRAGM DETAILS)



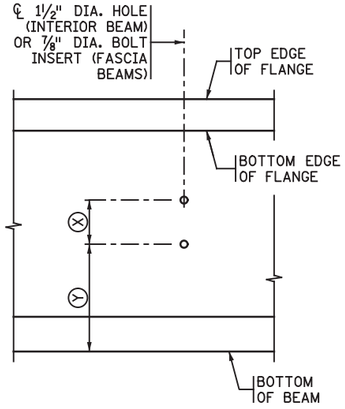
ELEVATION

CONCRETE END DIAPHRAGM CONNECTION DETAILS

INTEGRAL & SEMI-INTEGRAL ABUTMENT.
SEE SUPERSTRUCTURE DETAILS AND REINFORCEMENT FOR DIAPHRAGM DETAILS.



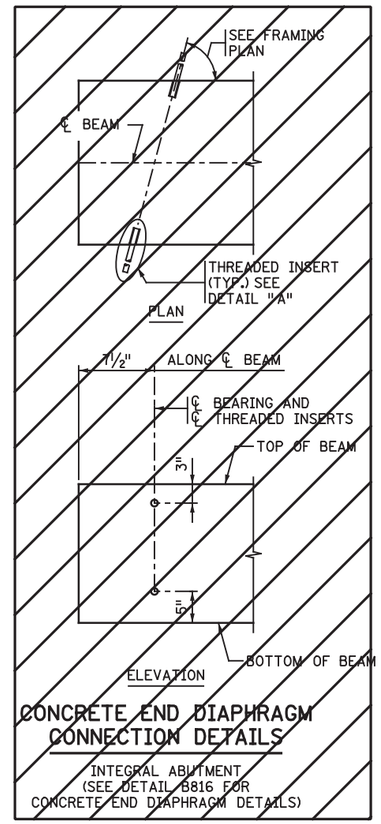
DETAIL "A"



ELEVATION

STEEL INTERMEDIATE DIAPHRAGM CONNECTION DETAILS

(SEE DETAIL B403 FOR DIAPHRAGM DETAILS)



CONCRETE END DIAPHRAGM CONNECTION DETAILS

INTEGRAL ABUTMENT
(SEE DETAIL B816 FOR CONCRETE END DIAPHRAGM DETAILS)

RECTANGULAR PRESTRESSED CONCRETE BEAM DETAILS

GENERAL NOTES

AS AN ALTERNATE TO THE END DIAPHRAGM CONNECTION INSERTS SHOWN, THE CONTRACTOR MAY SUBMIT DETAILS OF A CAST-IN-PLACE CONNECTION INSERT TO THE ENGINEER FOR APPROVAL. CONNECTION INSERT MUST PROVIDE AN ULTIMATE PULL OUT STRENGTH OF 15 KIPS EACH, EXCEPT FOR 82MW AND 96MW SHAPES WHICH REQUIRE AN ULTIMATE PULL OUT STRENGTH OF 24 KIPS PER CONNECTION INSERT.

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

① FOR RECTANGULAR BEAMS ONLY, ADJUST THE ROD LENGTH FOR INSERTS IN THE OUTSIDE FASCIA BEAM ACCORDING TO THE OVERHANG DIMENSION.

REVISION:

APPROVED: DECEMBER 21, 2022
Edward A. Sadtgen
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
1			

PRESTRESSED CONCRETE BEAM DETAILS

S.A.P. 002-622-036

FIG. 5-397.560

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 Robert E Mateega 8/10/23
LICENSED PROFESSIONAL ENGINEER — DATE

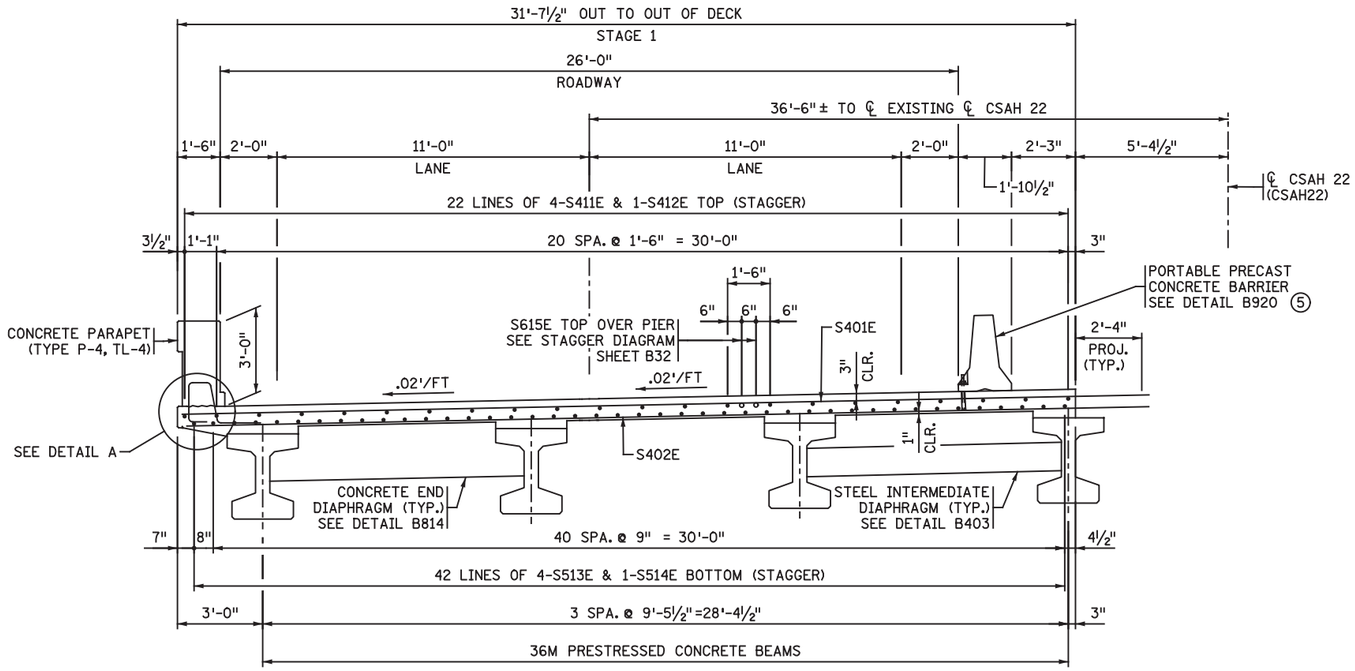
NAME: ROBERT E. MATEEGA LIC. NO. 44447

TITLE: PRESTRESSED CONCRETE BEAM DIAPHRAGM CONNECTION DETAILS

DES: TJC	DR: TJC	APPROVED:	BRIDGE NO. 02595
CHK: REM	CHK: REM		
SHEET NO. B28 OF B54 SHEETS			

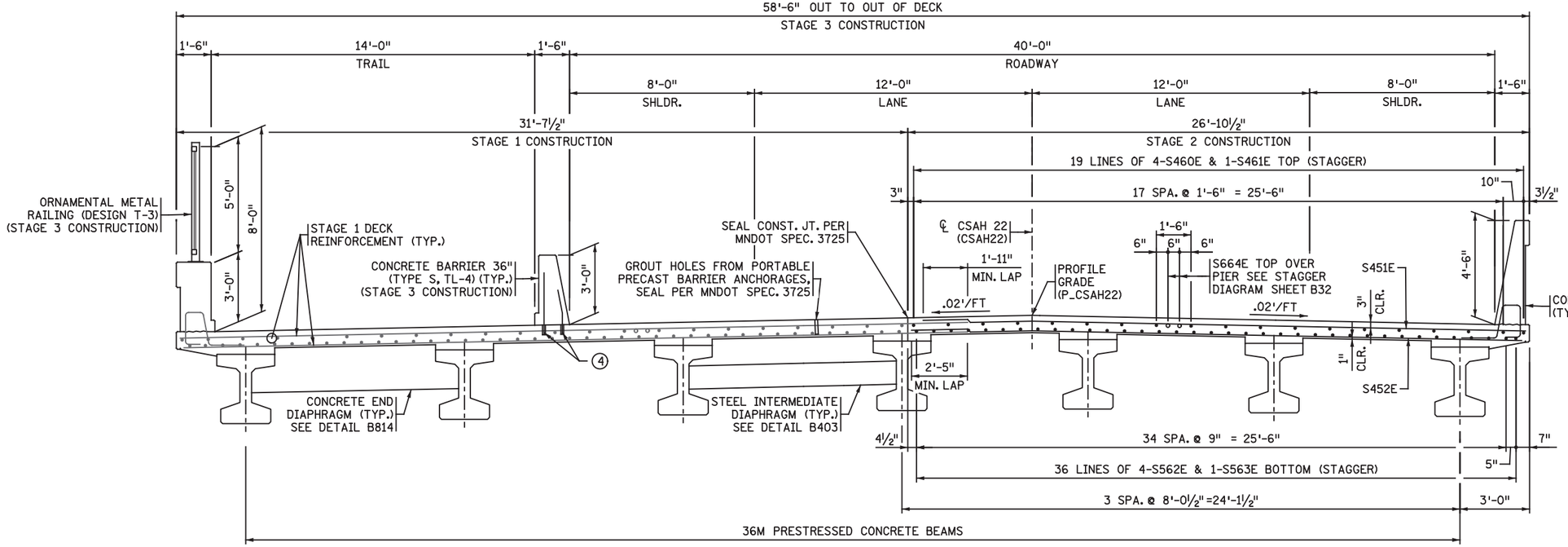
user
2:24:44 PM
8/10/2023

pw:\\pwhdrusoen01:HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Pln Sht#\3020



TRANSVERSE SECTION

STAGE 1 CONSTRUCTION



TRANSVERSE SECTION

STAGE 2 & 3 CONSTRUCTION

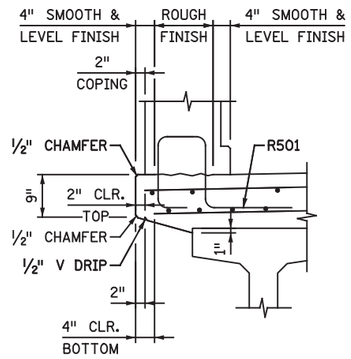
SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE

	TYPE P-4 (TL-4) BARRIER CONCRETE (3S52)	291	LIN FT
	TYPE S (TL-4) 36" BARRIER CONCRETE (3S52)	350	LIN FT
	TYPE S (TL-4) 54" BARRIER CONCRETE (3S52)	274	LIN FT
①	BRIDGE SLAB CONCRETE (3YHPC-M)	14406	SQ FT
②	REINFORCEMENT BARS (EPOXY COATED)	97230	POUND
	EXPANSION JOINT DEVICES TYPE 5	143	LIN FT
	BEARING ASSEMBLY	42	EACH
	ORNAMENTAL METAL RAILING (DESIGN T-3)	291	LIN FT
	PRESTRESSED CONCRETE BEAMS 36M	1712	LIN FT
	DIAPHRAGMS FOR 36M PRESTRESSED BEAMS	368	LIN FT
	ANCHORAGES TYPE REINF BARS (STAINLESS TYPE H)	365	EACH
	ANCHORAGES TYPE REINF BARS (TYPE L)	365	EACH
③	BRIDGE NAME PLATE	1	EACH

① INCLUDES END DIAPHRAGM.

② INCLUDES SLAB, END DIAPHRAGM AND BARRIER REINFORCEMENT.

③ PAYMENT SHALL BE CONSIDERED INCIDENTAL TO "TYPE S (TL-4) 36" BARRIER CONCRETE (3S52)".



DETAIL A

NOTES:

SEE SHEETS B2 AND B3 FOR ADDITIONAL STAGED CONSTRUCTION DETAILS.

REMOVE ALL NON-GALVANIZED AND NON-EPOXY COATED FERROUS METAL, EXCLUDING SHEAR STUDS, TO WITHIN ½" OF THE TOP FLANGE PRIOR TO CASTING.

④ DRILL AND GROUT ANCHORAGE BARS FOR BARRIER. SEE BARRIER DETAILS SHEET B39 FOR SPACING AND ADDITIONAL DETAILS.

⑤ SEE GRADING PORTION OF CONTRACT FOR PAY ITEM AND QUANTITIES FOR PORTABLE PRECAST CONCRETE BARRIER.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: Todd A. Lang — LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

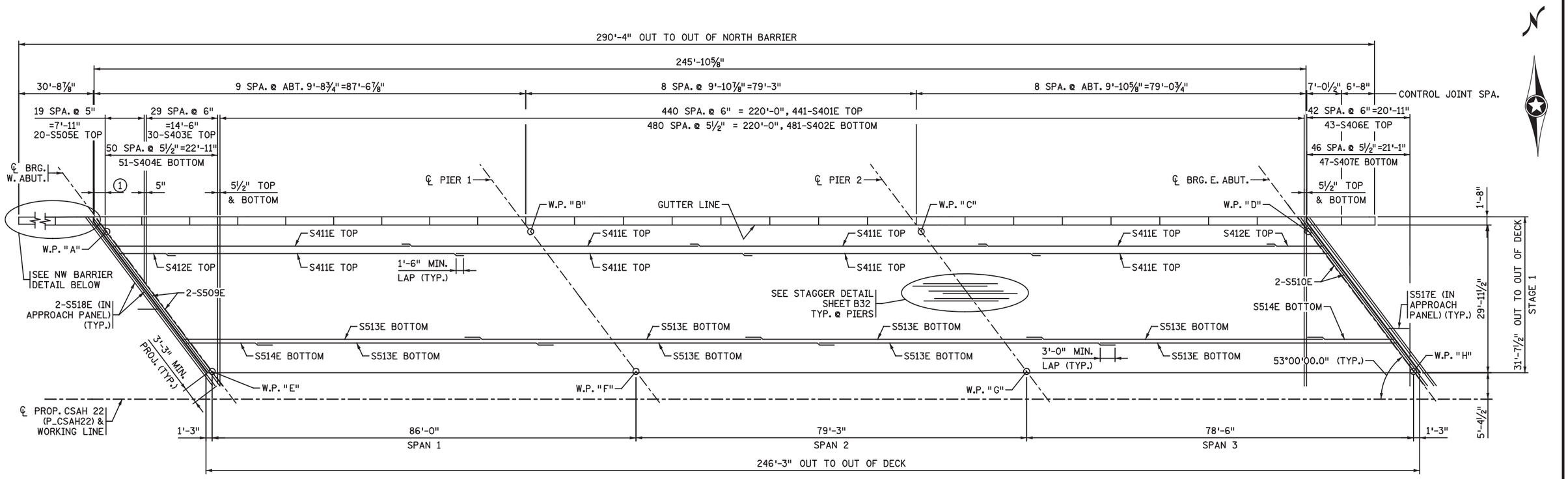
TITLE: SUPERSTRUCTURE DETAILS I

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B29 OF B54 SHEETS

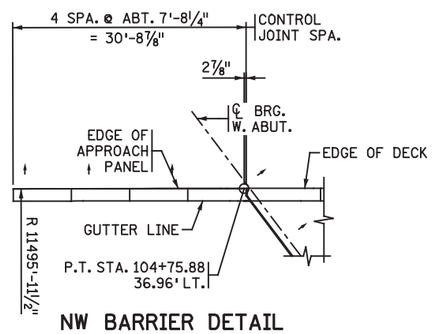
BRIDGE NO. 02595



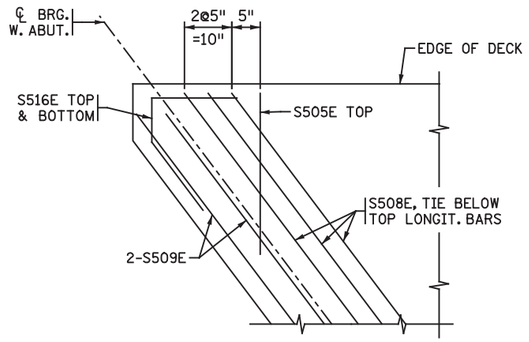
DECK PLAN

(STAGE 1)

① 2'-3" TOP
2'-2" BOTTOM



NW BARRIER DETAIL



NW DECK CORNER

LONGITUDINAL REINFORCEMENT NOT SHOWN

NOTES:

DIMENSIONS MEASURED ALONG EDGE OF DECK OR APPROACH PANEL EXCEPT AS NOTED.

DIMENSIONS SHOWN ARE BASED ON 1½" OPEN JOINT AT 90° MEASURED PERPENDICULAR TO THE JOINT.

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

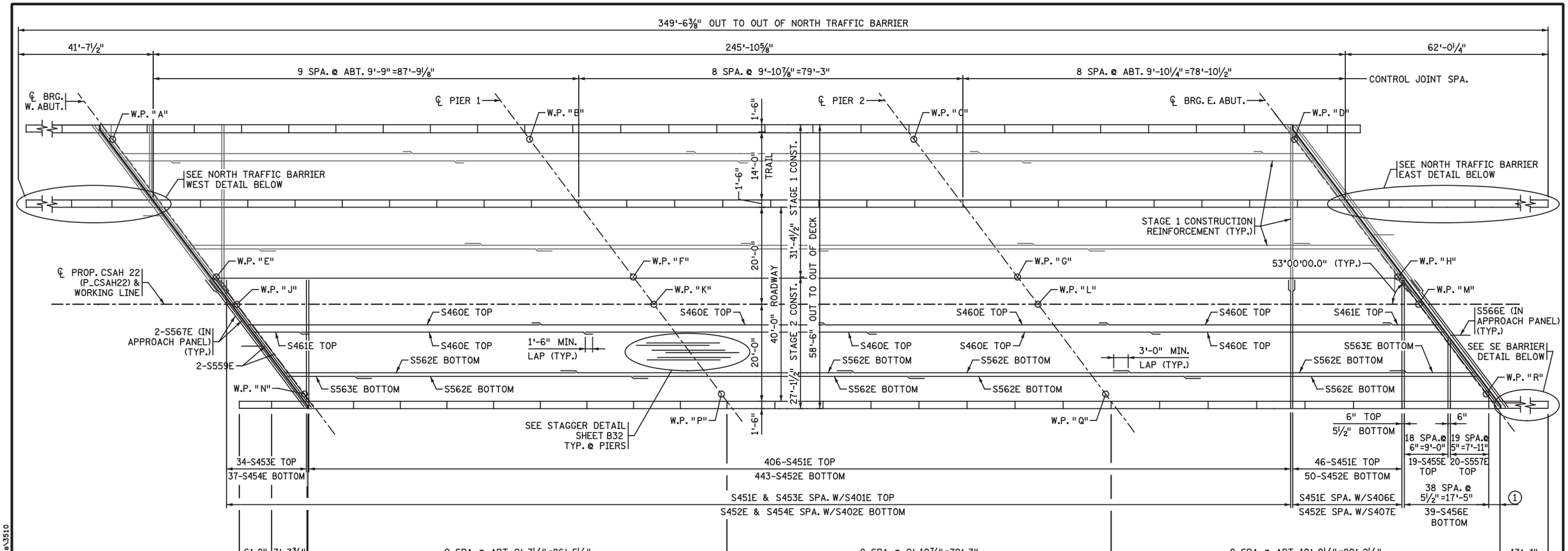
TITLE: SUPERSTRUCTURE DETAILS II STAGE 1 CONSTRUCTION

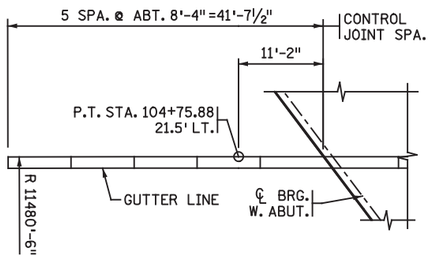
DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

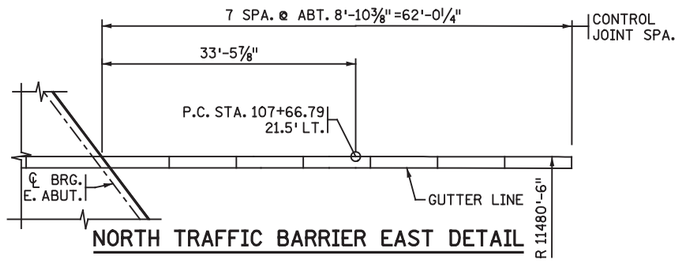
SHEET NO. B30 OF B54 SHEETS

BRIDGE NO. 02595

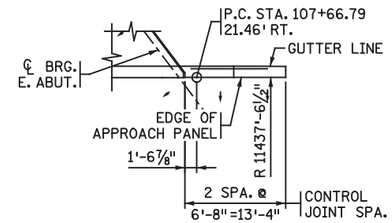




NORTH TRAFFIC BARRIER WEST DETAIL



NORTH TRAFFIC BARRIER EAST DETAIL

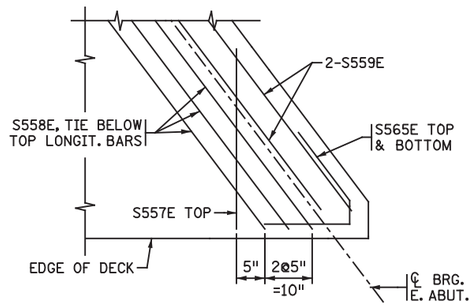


SE BARRIER DETAIL

DECK PLAN

(STAGE 2)

① 2'-3⅞" TOP
2'-4⅛" BOTTOM



SE DECK CORNER

LONGITUDINAL REINFORCEMENT NOT SHOWN

NOTES:

DIMENSIONS MEASURED ALONG EDGE OF DECK OR APPROACH PANEL EXCEPT AS NOTED.

DIMENSIONS SHOWN ARE BASED ON 1½" OPEN JOINT AT 90° MEASURED PERPENDICULAR TO THE JOINT.

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

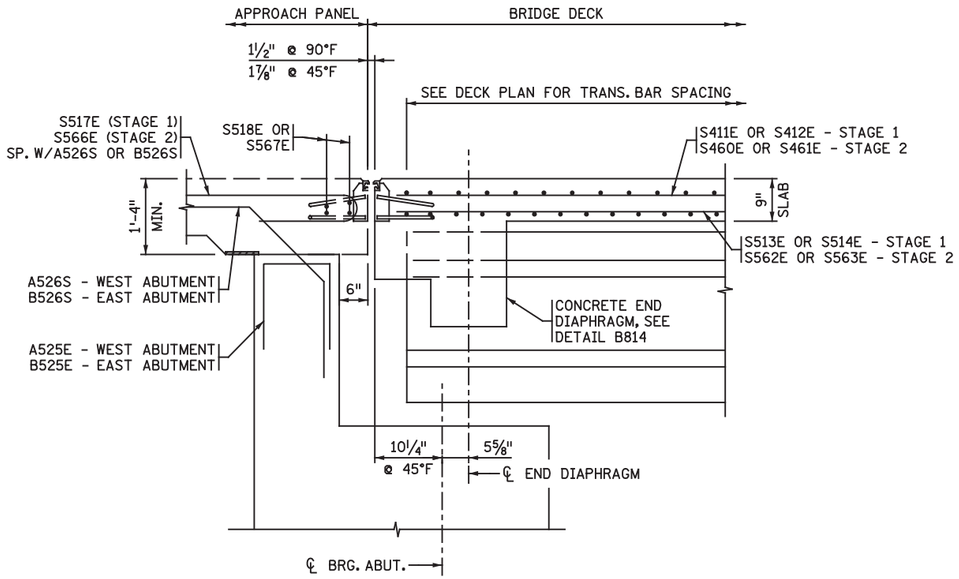
TITLE: SUPERSTRUCTURE DETAILS III STAGE 2 CONSTRUCTION

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

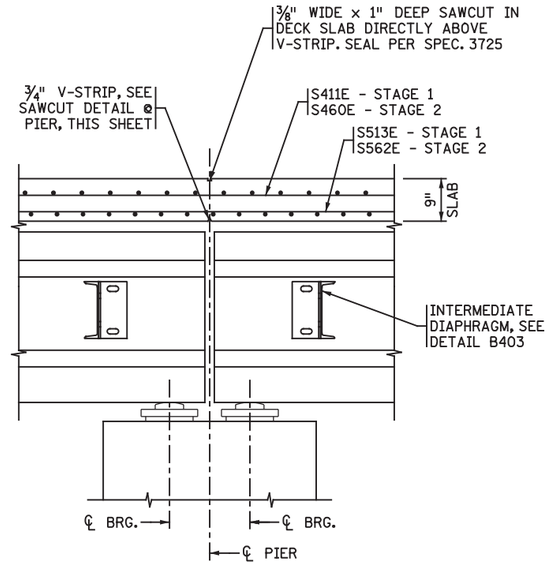
SHEET NO. B31 OF B54 SHEETS

BRIDGE NO. 02595



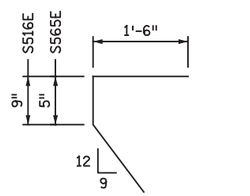
ABUTMENT

(DIMENSIONS NORMAL TO ABUTMENT)

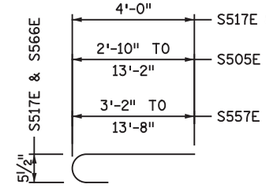


SECTION AT PIER

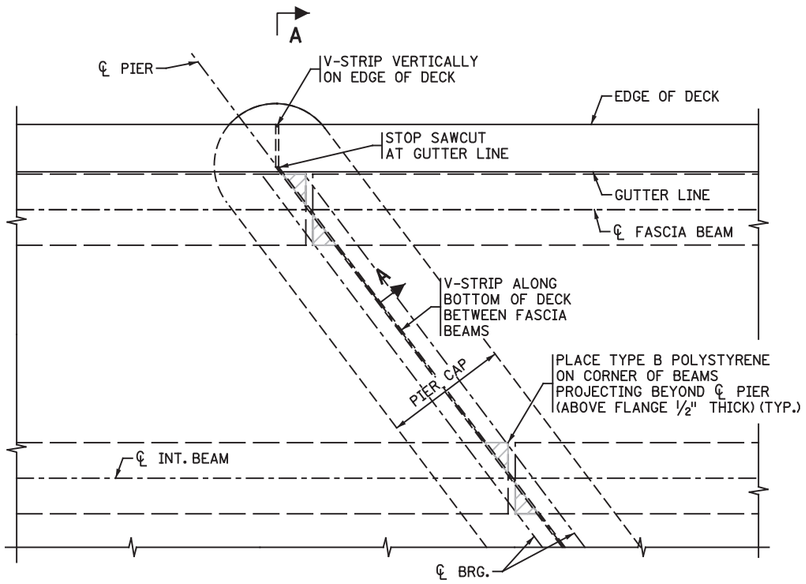
PART LONGITUDINAL SECTION



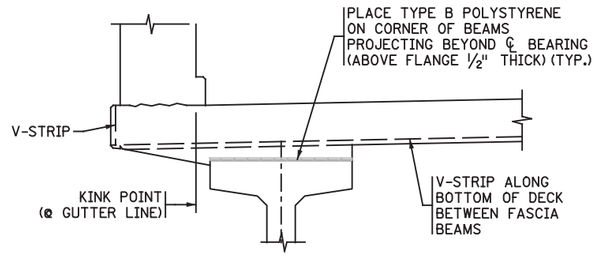
S516E & S565E



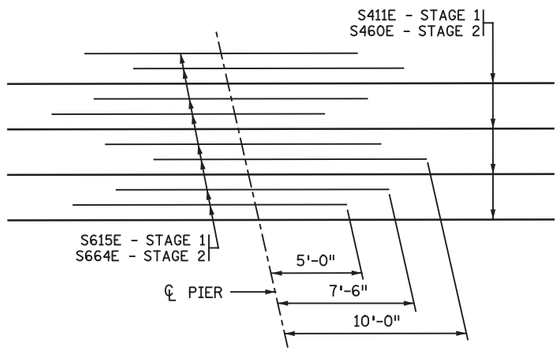
S505E, S557E, S517E & S566E



SAWCUT DETAIL PLAN



SECTION A-A



STAGGER DIAGRAM

BILL OF REINFORCEMENT - SUPERSTRUCTURE

STAGE 1 CONSTRUCTION

BAR	NO.	LENGTH	SHAPE	LOCATION
S401E	441	34'-1"	——	DECK TRANSV. TOP
S402E	481	33'-11"	——	DECK TRANSV. BOTTOM
S403E	1 SER	13'-9" TO	——	DECK TRANSV. TOP
	OF 30	33'-4"		
S404E	1 SER	2'-8" TO	——	DECK TRANSV. BOTTOM
	OF 51	33'-2"		
S505E	1 SER	3'-5" TO	⊃	DECK TRANSV. TOP
	OF 20	13'-9"		
S406E	1 SER	4'-6" TO	——	DECK TRANSV. TOP
	OF 43	32'-5"		
S407E	1 SER	4'-3" TO	——	DECK TRANSV. BOTTOM
	OF 47	32'-3"		
S508E	3	10'-0"	——	DECK TRANSV. @ END
S509E	4	42'-3"	——	DECK TRANSV. @ END
S510E	4	42'-7"	——	DECK TRANSV. @ END
S411E	88	60'-0"	——	DECK LONGIT. TOP
S412E	22	11'-7"	——	DECK LONGIT. TOP
S513E	168	60'-0"	——	DECK LONGIT. BOTTOM
S514E	42	17'-7"	——	DECK LONGIT. BOTTOM
S615E	80	15'-0"	——	DECK LONGIT. OVER PIERS
S516E	2	3'-9"	⊃	DECK LONGIT. @ END
S517E	89	6'-6"	⊃	APPROACH PANEL - LONGIT.
S518E	8	42'-7"	——	APPROACH PANEL - TRANSV.

STAGE 2 CONSTRUCTION

BAR	NO.	LENGTH	SHAPE	LOCATION
S451E	452	26'-1"	——	DECK TRANSV. TOP
S452E	493	26'-6"	——	DECK TRANSV. BOTTOM
S453E	1 SER	2'-10" TO	——	DECK TRANSV. TOP
	OF 34	24'-9"		
S454E	1 SER	3'-4" TO	——	DECK TRANSV. BOTTOM
	OF 37	25'-2"		
S455E	1 SER	14'-4" TO	——	DECK TRANSV. TOP
	OF 19	26'-1"		
S456E	1 SER	3'-1" TO	——	DECK TRANSV. BOTTOM
	OF 39	26'-2"		
S557E	1 SER	3'-9" TO	⊃	DECK TRANSV. TOP
	OF 20	14'-3"		
S558E	3	10'-0"	——	DECK TRANSV. @ END
S559E	8	33'-1"	——	DECK TRANSV. @ END
S460E	76	60'-0"	——	DECK LONGIT. TOP
S461E	19	11'-7"	——	DECK LONGIT. TOP
S562E	144	60'-0"	——	DECK LONGIT. BOTTOM
S563E	36	17'-7"	——	DECK LONGIT. BOTTOM
S664E	68	15'-0"	——	DECK LONGIT. OVER PIERS
S565E	2	3'-5"	⊃	DECK LONGIT. @ END
S566E	55	6'-6"	⊃	APPROACH PANEL - LONGIT.
S567E	8	33'-1"	——	APPROACH PANEL - TRANSV.

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

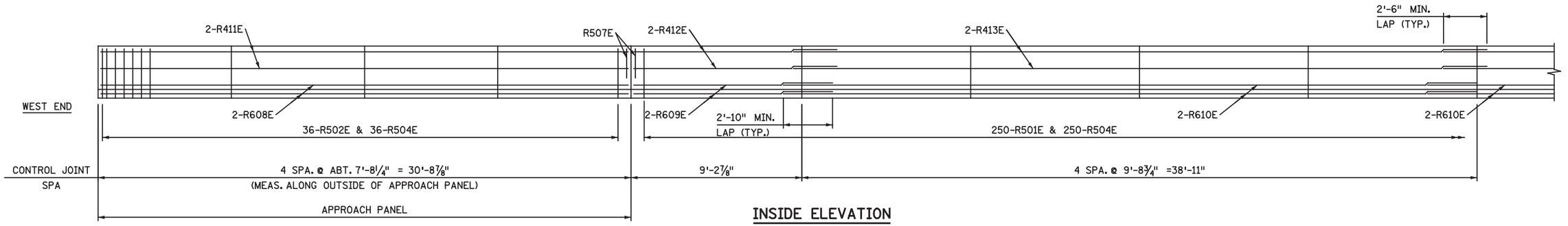
TITLE: SUPERSTRUCTURE DETAILS IV

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

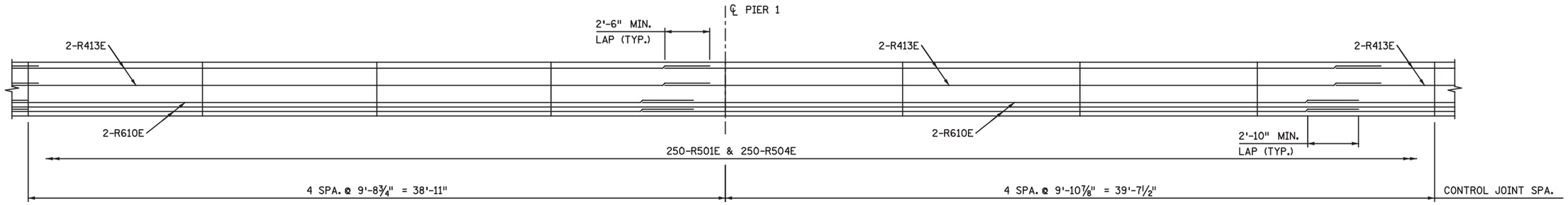
S.A.P. NO. 002-622-036

SHEET NO. B32 OF B54 SHEETS

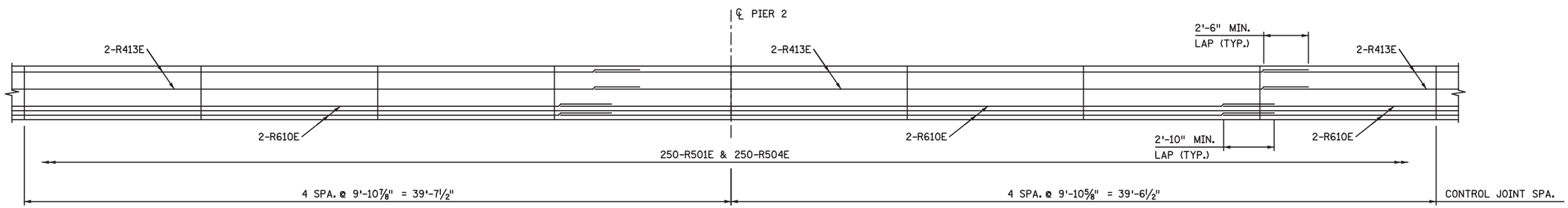
BRIDGE NO. 02595



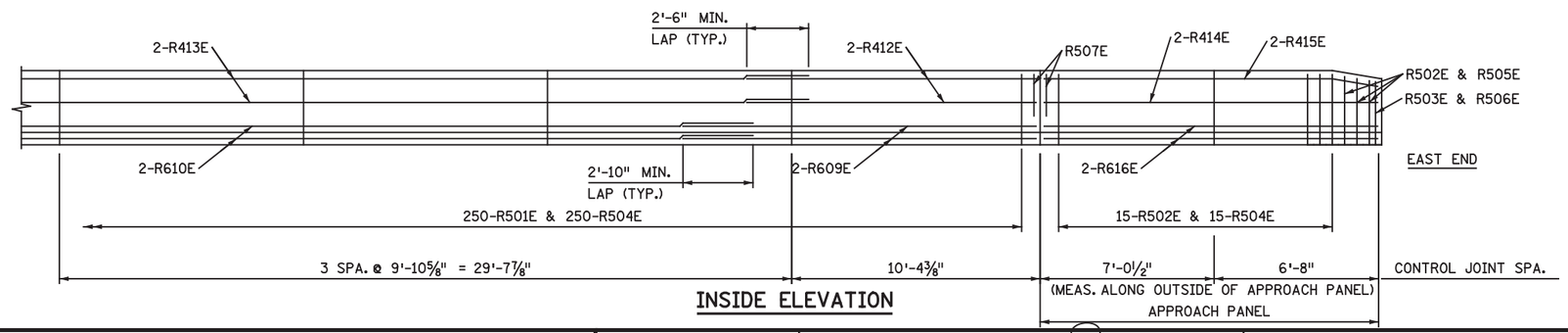
INSIDE ELEVATION



INSIDE ELEVATION



INSIDE ELEVATION



INSIDE ELEVATION

NOTES:

DIMENSIONS SHOWN ARE MEASURED ALONG THE INSIDE OF BARRIER UNLESS NOTED OTHERWISE

FOR BARRIER CROSS SECTION AND REINFORCEMENT DETAILS, SEE SHEET **B36**

BARRIER TO BE CONSTRUCTED WITH STAGE 1 CONSTRUCTION. FOR DETAILS OF ORNAMENTAL METAL RAILING TO BE ATTACHED TO BARRIER DURING STAGE 3, SEE SHEETS B37 & B38

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE:

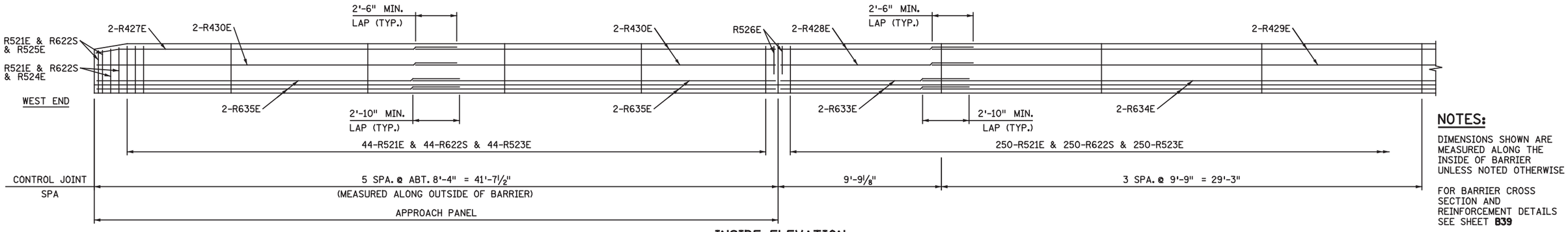
NORTH TRAIL BARRIER LAYOUT
CONCRETE PARAPET (TYPE P-4, TL-4)

DES: TJC	DR: TJC	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B33 OF B54 SHEETS

BRIDGE NO. 02595

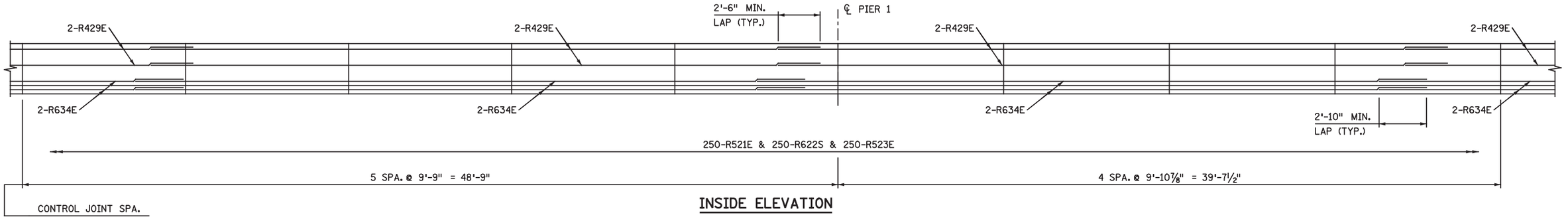


INSIDE ELEVATION

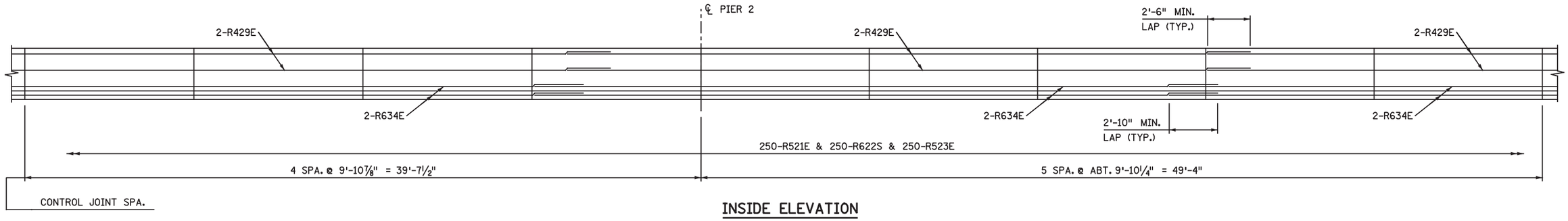
NOTES:

DIMENSIONS SHOWN ARE MEASURED ALONG THE INSIDE OF BARRIER UNLESS NOTED OTHERWISE

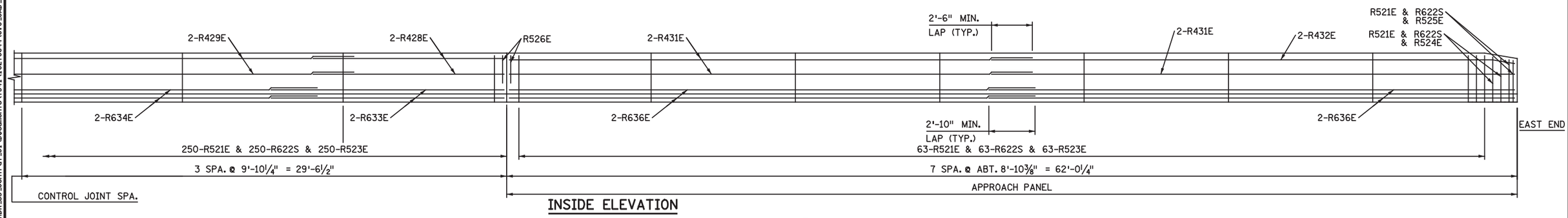
FOR BARRIER CROSS SECTION AND REINFORCEMENT DETAILS SEE SHEET **B39**



INSIDE ELEVATION



INSIDE ELEVATION



INSIDE ELEVATION

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE:

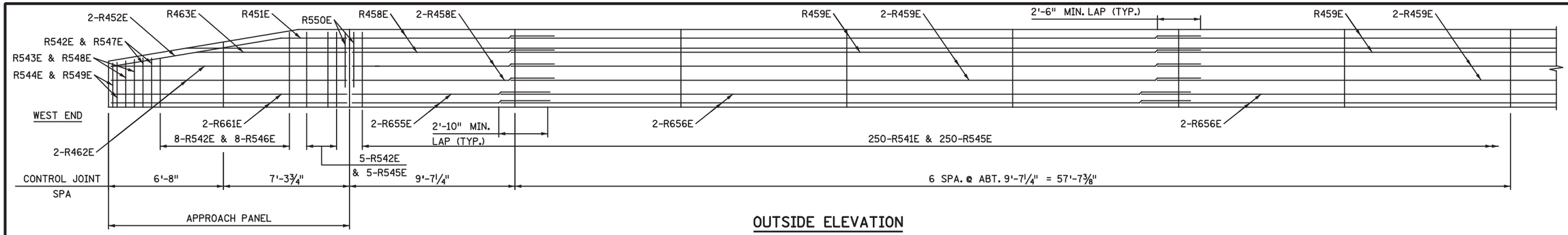
NORTH TRAFFIC BARRIER LAYOUT CONCRETE BARRIER 36" (TYPE S, TL-4)

DES: TJC	DR: TJC	APPROVED:
CHK: TAL	CHK: TAL	

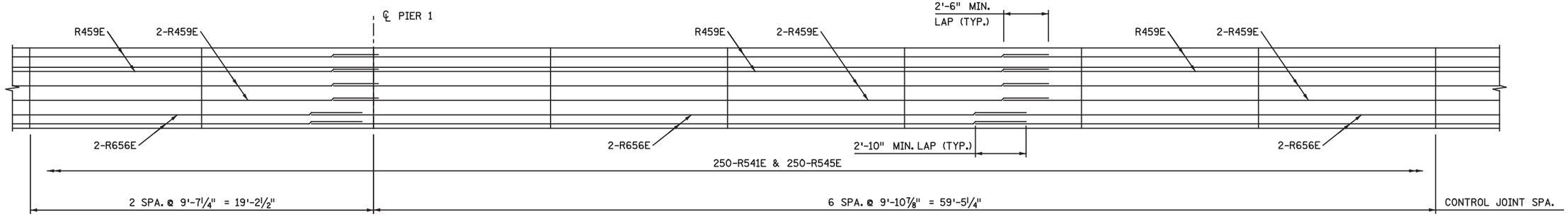
S.A.P. NO. 002-622-036

SHEET NO. B34 OF B54 SHEETS

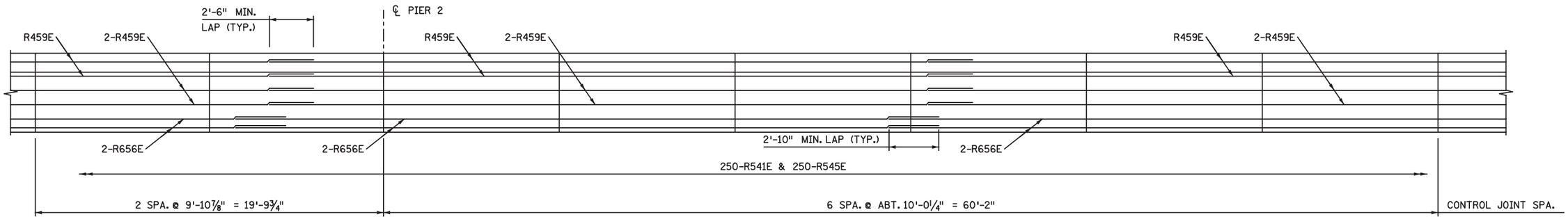
BRIDGE NO. 02595



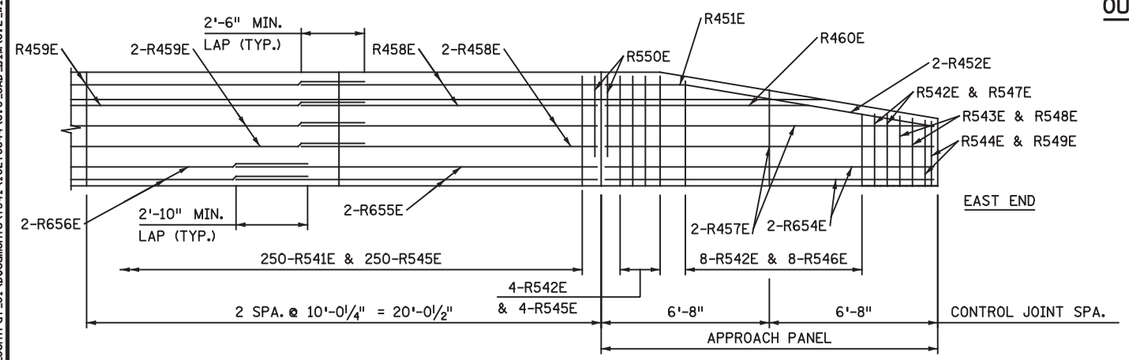
OUTSIDE ELEVATION



OUTSIDE ELEVATION



OUTSIDE ELEVATION



OUTSIDE ELEVATION

NOTES:

DIMENSIONS SHOWN ARE MEASURED ALONG THE OUTSIDE OF BARRIER UNLESS NOTED OTHERWISE

FOR BARRIER CROSS SECTION AND REINFORCEMENT DETAILS SEE SHEET **B40**

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

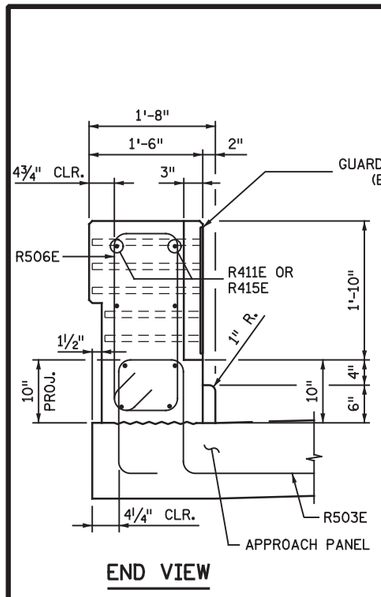
TITLE: SOUTH TRAFFIC BARRIER LAYOUT CONCRETE BARRIER 54" (TYPE S, TL-4)

DES: TJC	DR: TJC	APPROVED:
CHK: TAL	CHK: TAL	

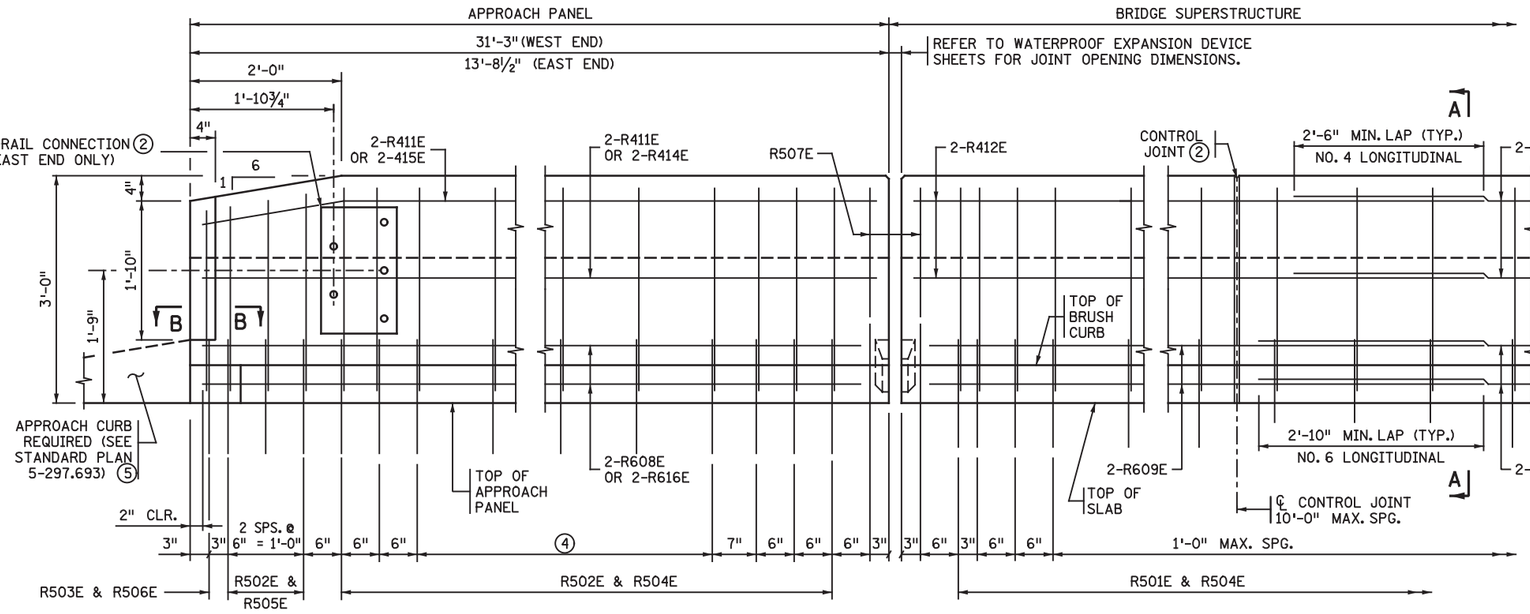
S.A.P. NO. 002-622-036

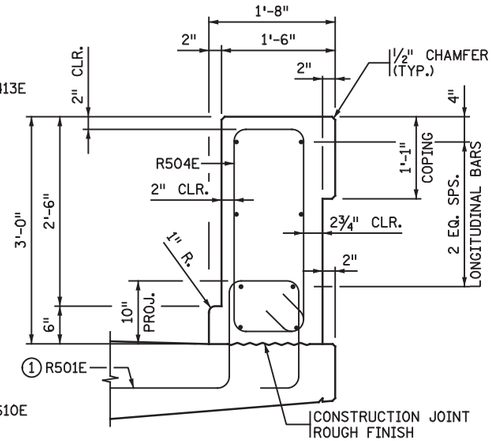
SHEET NO. B35 OF B54 SHEETS

BRIDGE NO. 02595



END VIEW





SECTION A-A

④ 26 SPS. @ 1'-0" MAX. = 25'-11" (WEST END)
9 SPS. @ 1'-0" MAX. = 8'-4½" (EAST END)

⑤ (EAST END ONLY) PARAPET CONTINUES ON RETAINING WALL AT WEST END. NO TAPERED HEIGHT OR GUARDRAIL CONNECTION AT WEST END.

EXPANSION JOINT ②

EXPANSION DEVICE NOT SHOWN

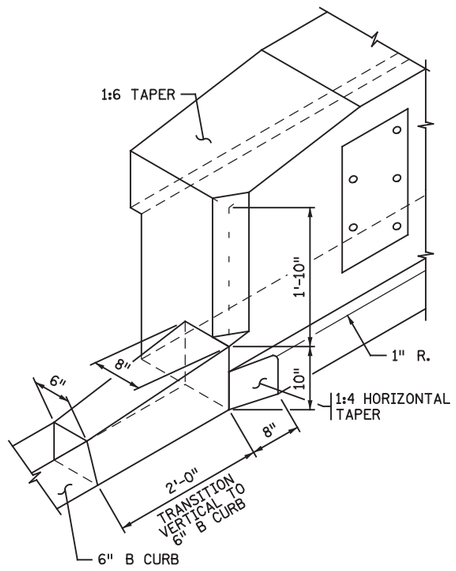
CONTROL JOINT ②

INSIDE ELEVATION OF PARAPET

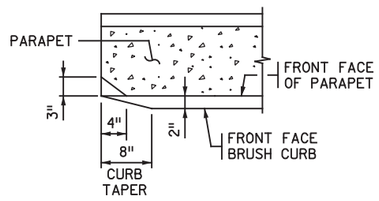
PARAPET MEETS MASH TL-4 REQUIREMENTS ON BRIDGE DECK AND TL-3 ON APPROACH PANEL

BILL OF REINFORCEMENT FOR PARAPET

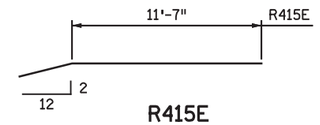
BAR	NO.	LENGTH	SHAPE	LOCATION
R501E	250	6'-3"		PARAPET DOWEL
R502E	54	6'-5"		PARAPET DOWEL
R503E	1	6'-5"		PARAPET DOWEL
R504E	301	8'-1"		PARAPET VERTICAL
R505E	1 SER. OF 3	7'-7" TO 7'-11"		PARAPET VERTICAL
R506E	1	7'-3"		PARAPET VERTICAL
R507E	4	6'-1"		PARAPET VERTICAL
R608E	4	30'-11"		PARAPET LONGIT.
R609E	8	14'-3½"		PARAPET LONGIT.
R610E	24	40'-0"		PARAPET LONGIT.
R411E	4	30'-11"		PARAPET LONGIT.
R412E	8	11'-10½"		PARAPET LONGIT.
R413E	24	40'-0"		PARAPET LONGIT.
R414E	2	13'-4"		PARAPET LONGIT.
R415E	2	13'-4"		PARAPET LONGIT.
R616E	4	13'-4"		PARAPET LONGIT.



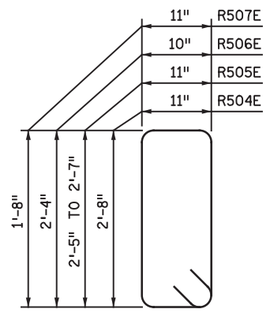
ISOMETRIC VIEW
(END OF PARAPET)



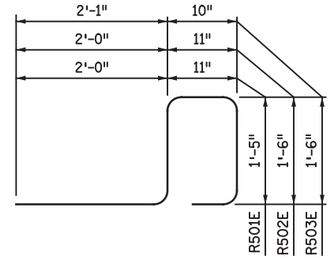
SECTION B-B



R415E



R504E, R505E, R506E, R507E



R501E, R502E, R503E

GENERAL NOTES

FOR SLIPFORM CONSTRUCTION, TIE 100% OF THE REINFORCEMENT BAR INTERSECTIONS IN THE PARAPET.

CONCRETE PARAPET = 639 LBS./FT. (0.158 CU. YDS./FT.)

FINISH ALL EDGES OF PARAPET WITH ½" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.

SPACE CONTROL JOINTS AT 10 FT. MAXIMUM. REFER TO SUPERSTRUCTURE SHEET FOR SPECIFIC SPACING INFORMATION.

PARAPET 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.

REVISED: DECEMBER 21, 2022

APPROVED: APRIL 09, 2020
Kevin Western
STATE BRIDGE ENGINEER

NOTE: CURB AND GUARDRAIL CONNECTION AT EAST END ONLY. PARAPET ON RETAINING WALL AT WEST END

REV. NO.	DATE	REVISION DESCRIPTION	BY
1			

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: LICENSED PROFESSIONAL ENGINEER — DATE: 8/10/23

NAME: TODD A. LANG — LIC. NO. 42962

TITLE: CONCRETE PARAPET (TYPE P-4, TL-4)
PARAPET ABUTMENT
(WITHOUT CONCRETE WEARING COURSE)

DES:	TJC	DR:	TJC	APPROVED:
CHK:	TAL	CHK:	TAL	

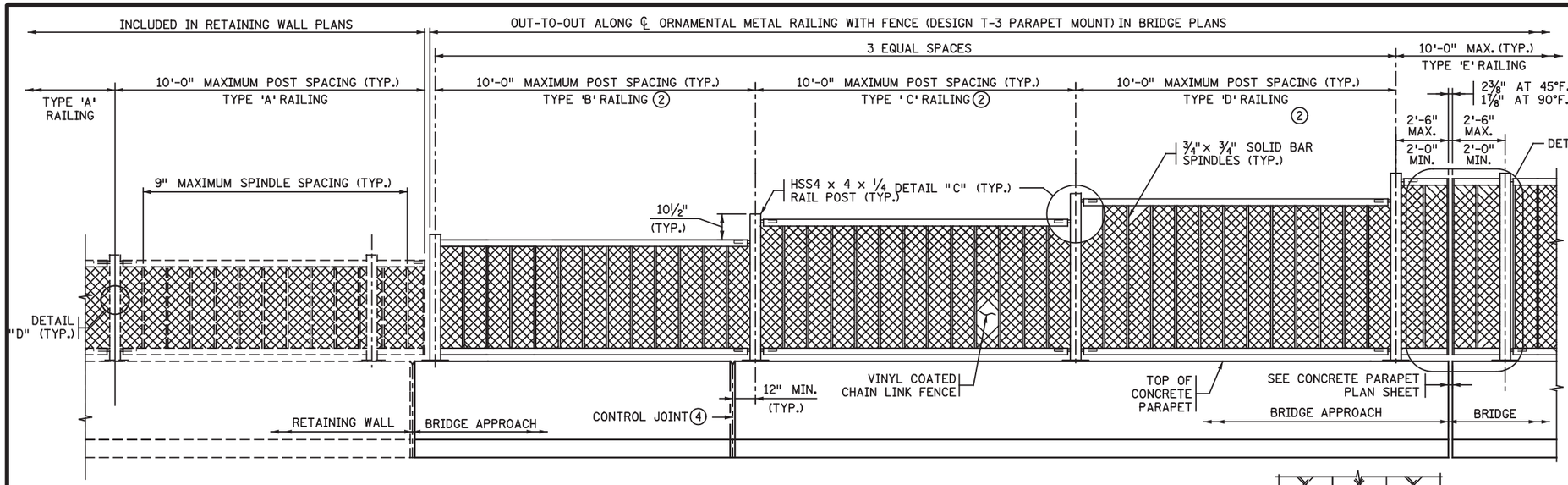
SHEET NO. B36 OF B54 SHEETS

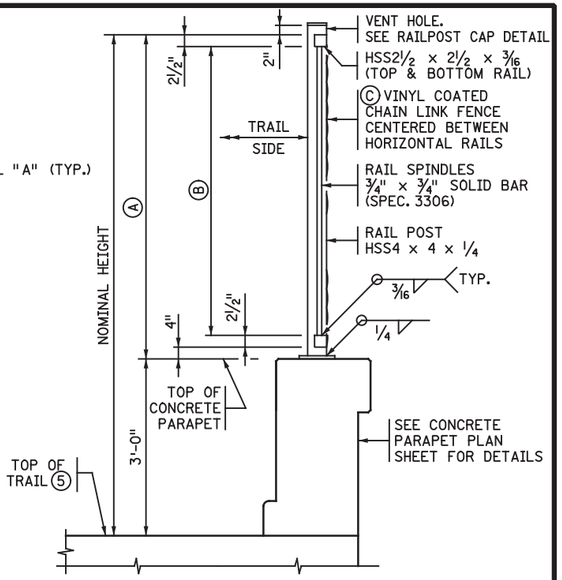
CODE 70

S.A.P. NO. 002-622-036

FIG. 5-397.173(C)

BRIDGE NO. 02595

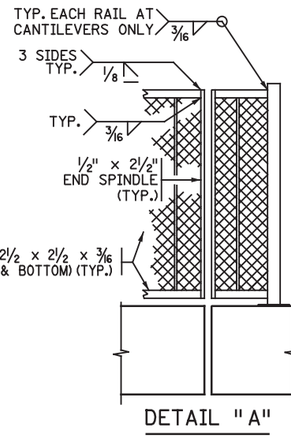




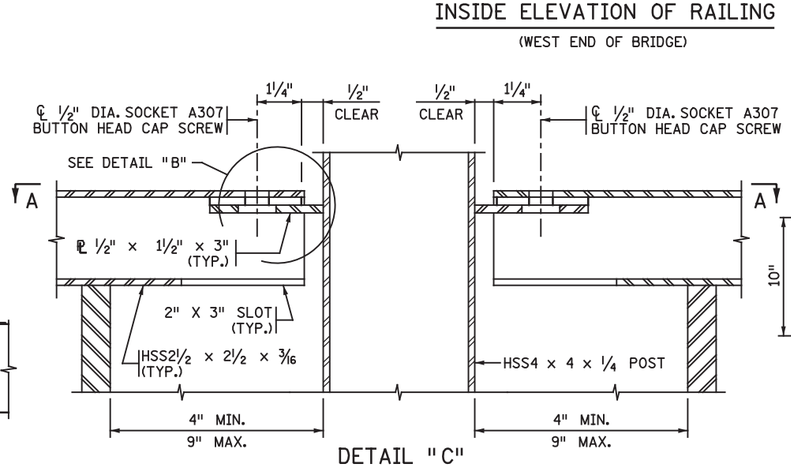
SECTION THROUGH RAILING

INSIDE ELEVATION OF RAILING

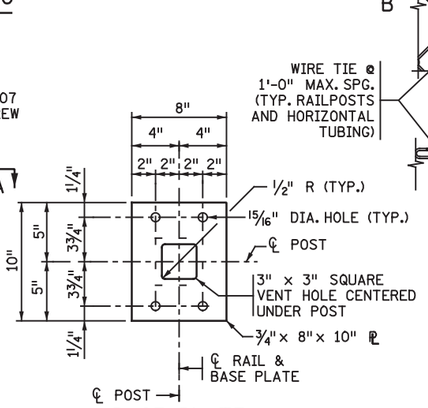
(WEST END OF BRIDGE)



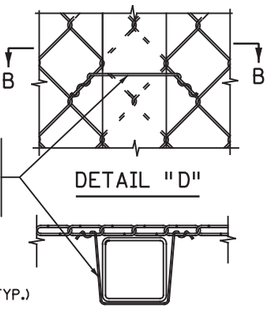
DETAIL "A"



DETAIL "C"



BASE PLATE



DETAIL "D"

SECTION B-B

GENERAL NOTES

CONTINUOUSLY GROUND ALL METAL RAILINGS; SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.

USE A500, GRADE B STRUCTURAL STEEL TUBING (HSS) IN THE RAIL IN ACCORDANCE WITH SPEC. 3361. PROVIDE ALL OTHER STEEL IN ACCORDANCE WITH SPEC. 3306.

GALVANIZE BOLTS, NUTS, WASHERS AND ANCHORS IN ACCORDANCE WITH SPEC. 3392. GALVANIZE ALL OTHER STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3394, AFTER FABRICATION.

REFER TO SPEC. 2475 AND THE SPECIAL PROVISIONS FOR COATING AND OTHER REQUIREMENTS NOT INCLUDED ON THIS SHEET.

INSTALL RAIL POSTS AND SPINDLES PLUMB

CURVE HORIZONTAL RAILS WHERE APPLICABLE AND PLACE RAILS PARALLEL TO THE EDGE OF SIDEWALK PROFILE.

ALWAYS USE CHAIN LINK FENCE WITH THIS RAILING. REFER TO SPEC. 2557 FOR CHAIN LINK FABRIC AND TIE REQUIREMENTS.

DRILL ½" DIA. MAX. VENT HOLES ON THE UNDERSIDE OF RAIL TUBES AS NECESSARY TO FACILITATE GALVANIZING.

(1) DRILL VENT HOLE IN THE RAIL POST WITHIN 2" OF THE UNDERSIDE OF THE CAP, ON THE NON-TRAFFIC SIDE OF THE POST AS NECESSARY TO FACILITATE GALVANIZING. MAXIMUM HOLE SIZE IS ½" DIA.

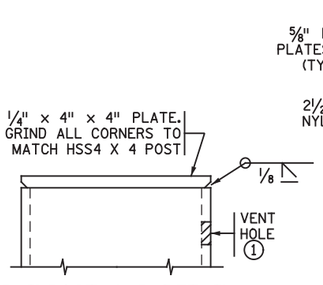
(2) ONLY ONE SECTION EACH REQUIRED OF TYPES "B","C" AND "D".

(4) SEE SUPERSTRUCTURE AND CONCRETE PARAPET PLAN SHEETS FOR CONTROL JOINT SPACING.

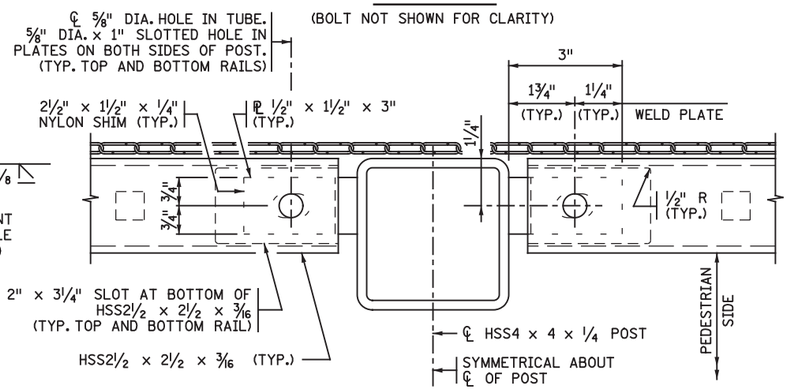
(5) FOR NON-RAISED SIDEWALK, SEE CONCRETE PARAPET PLAN SHEET.

(6) ADHESIVE ANCHORAGE WITH ⅝" DIA. ANCHOR ROD IN ACCORDANCE WITH SPEC. 3385, TYPE A OR B WITH HEX NUT AND WASHER. PROVIDE AN ADHESIVE WITH A MINIMUM CHARACTERISTIC BOND STRENGTH IN UNCRACKED CONCRETE OF 1.5 KSI. EMBED THE ANCHORAGE NO LESS THAN 6" REGARDLESS OF CHARACTERISTIC BOND STRENGTH. DRILL THROUGH REINFORCEMENT (IF ENCOUNTERED) TO ACHIEVE MINIMUM EMBEDMENT. ENSURE HEX NUT IS IN CONTACT WITH THE ADJACENT SURFACE AND TORQUE TO 60 FT-LBS UNLESS A HIGHER TORQUE IS RECOMMENDED BY THE MANUFACTURER. PROOF LOAD TO 7.7 KIPS. REFER TO THE APPROVED/QUALIFIED PRODUCTS LIST AND THE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

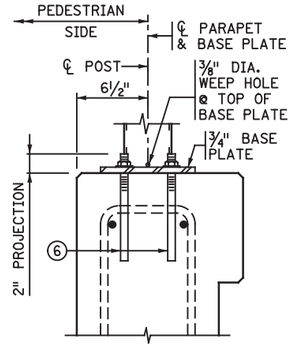
RAILING HEIGHT TABLE				
TYPE	NOMINAL HEIGHT	Ⓐ	Ⓑ	Ⓒ
A	4'-6"	1'-6"	0'-9"	1'-2"
B	5'-4½"	2'-4½"	1'-7½"	2'-0½"
C	6'-3"	3'-3"	2'-6"	2'-11"
D	7'-1½"	4'-1½"	3'-4½"	3'-9½"
E	8'-0"	5'-0"	4'-3"	4'-8"



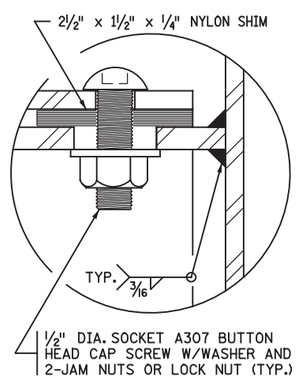
RAILPOST CAP DETAIL



SECTION A-A



ANCHOR DETAIL



DETAIL "B"

S.A.P. NO. 002-622-036

MODIFIED

~~FIG. 5-397.160(C)~~

REVISION: DECEMBER 21, 2022
APPROVED: FEBRUARY 08, 2022
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
1			

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 _____ LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

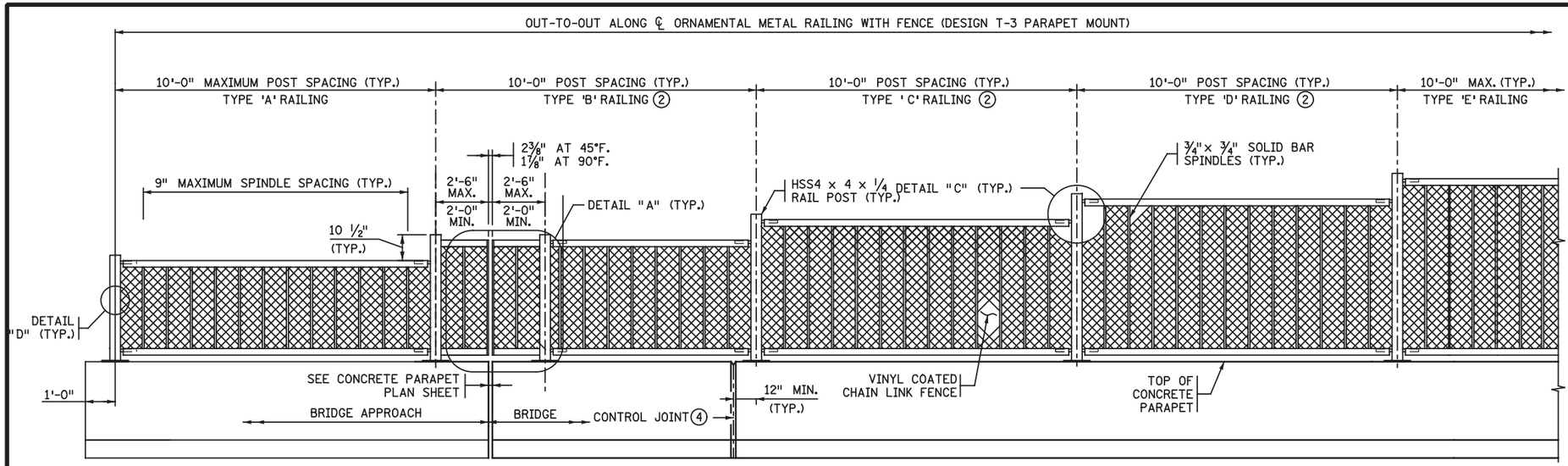
NAME: TODD A. LANG LIC. NO. 42962

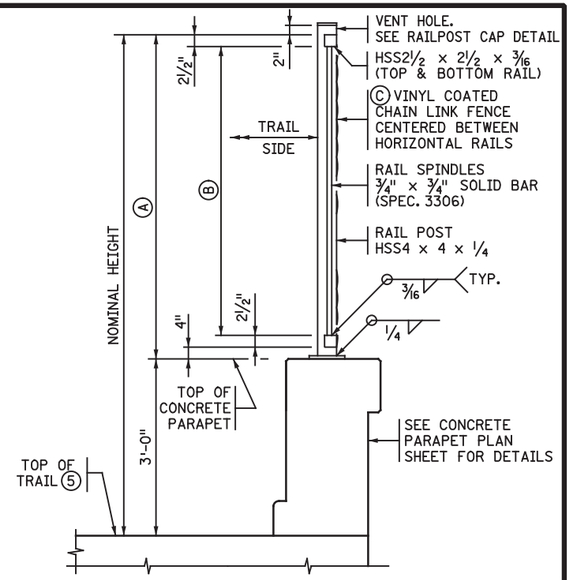
TITLE: ORNAMENTAL METAL RAILING WITH FENCE (DESIGN T-3 PARAPET MOUNT)
PARAPET ABUTMENT (WITHOUT GUARDRAIL CONNECTION)

DES: TJC	DR: TJC	APPROVED:
CHK: TAL	CHK: TAL	

SHEET NO. B37 OF B54 SHEETS

BRIDGE NO. 02595

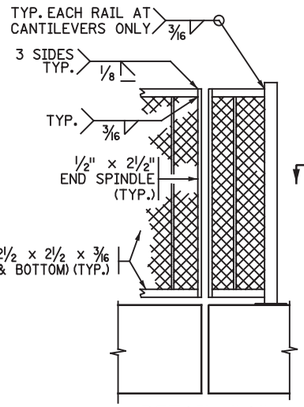




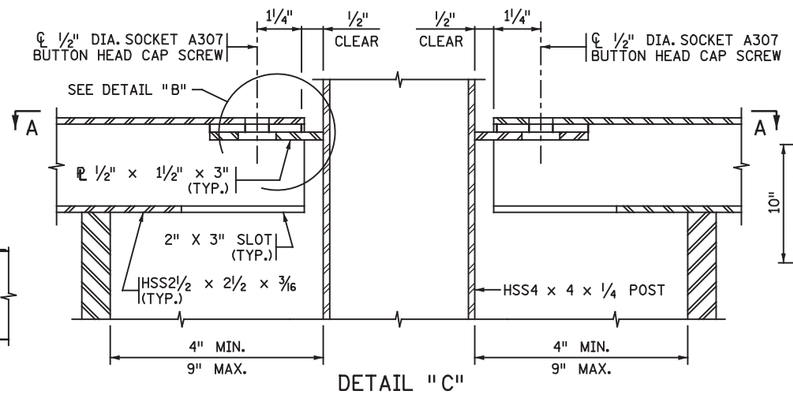
SECTION THROUGH RAILING

OUTSIDE ELEVATION OF RAILING

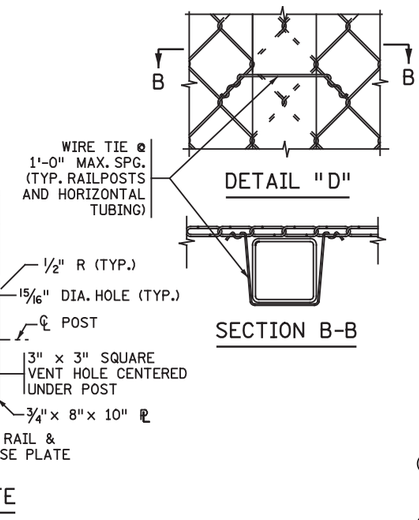
(EAST END OF BRIDGE)



DETAIL "A"



DETAIL "C"



BASE PLATE

DETAIL "D"

SECTION B-B

GENERAL NOTES

CONTINUOUSLY GROUND ALL METAL RAILINGS; SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.

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REFER TO SPEC. 2475 AND THE SPECIAL PROVISIONS FOR COATING AND OTHER REQUIREMENTS NOT INCLUDED ON THIS SHEET.

INSTALL RAIL POSTS AND SPINDLES PLUMB

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ALWAYS USE CHAIN LINK FENCE WITH THIS RAILING. REFER TO SPEC. 2557 FOR CHAIN LINK FABRIC AND TIE REQUIREMENTS.

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(2) ONLY ONE SECTION EACH REQUIRED OF TYPES "B", "C" AND "D".

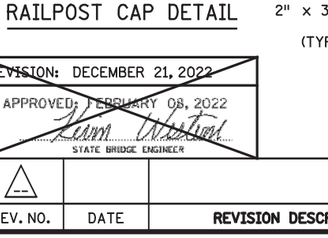
(4) SEE SUPERSTRUCTURE AND CONCRETE PARAPET PLAN SHEETS FOR CONTROL JOINT SPACING.

(5) FOR NON-RAISED SIDEWALK, SEE CONCRETE PARAPET PLAN SHEET.

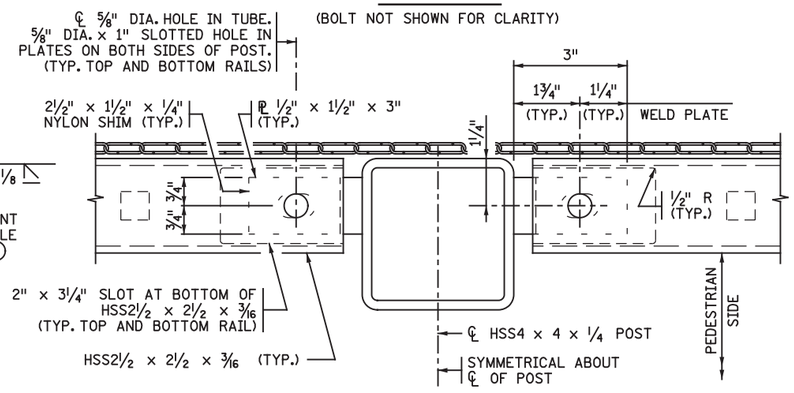
(6) ADHESIVE ANCHORAGE WITH ⅝" DIA. ANCHOR ROD IN ACCORDANCE WITH SPEC. 3385, TYPE A OR B WITH HEX NUT AND WASHER. PROVIDE AN ADHESIVE WITH A MINIMUM CHARACTERISTIC BOND STRENGTH IN UNCRACKED CONCRETE OF 1.5 KSI. EMBED THE ANCHORAGE NO LESS THAN 6" REGARDLESS OF CHARACTERISTIC BOND STRENGTH. DRILL THROUGH REINFORCEMENT (IF ENCOUNTERED) TO ACHIEVE MINIMUM EMBEDMENT. ENSURE HEX NUT IS IN CONTACT WITH THE ADJACENT SURFACE AND TORQUE TO 60 FT-LBS UNLESS A HIGHER TORQUE IS RECOMMENDED BY THE MANUFACTURER. PROOF LOAD TO 7.7 KIPS. REFER TO THE APPROVED/QUALIFIED PRODUCTS LIST AND THE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

RAILING HEIGHT TABLE

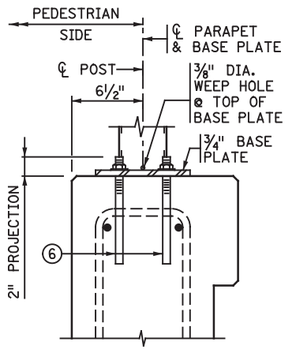
TYPE	NOMINAL HEIGHT	Ⓐ	Ⓑ	Ⓒ
A	4'-6"	1'-6"	0'-9"	1'-2"
B	5'-4½"	2'-4½"	1'-7½"	2'-0½"
C	6'-3"	3'-3"	2'-6"	2'-11"
D	7'-1½"	4'-1½"	3'-4½"	3'-9½"
E	8'-0"	5'-0"	4'-3"	4'-8"



RAILPOST CAP DETAIL

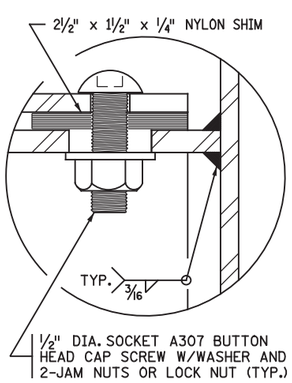


SECTION A-A



ANCHOR DETAIL

S.A.P. NO. 002-622-036



DETAIL "B"

MODIFIED

~~FIG. 5-397.160(C)~~

REVISION: DECEMBER 21, 2022

APPROVED: FEBRUARY 08, 2022

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 LICENSED PROFESSIONAL ENGINEER 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: ORNAMENTAL METAL RAILING WITH FENCE (DESIGN T-3 PARAPET MOUNT)

PARAPET ABUTMENT (WITHOUT GUARDRAIL CONNECTION)

DES: TJC	DR: TJC
CHK: TAL	CHK: TAL

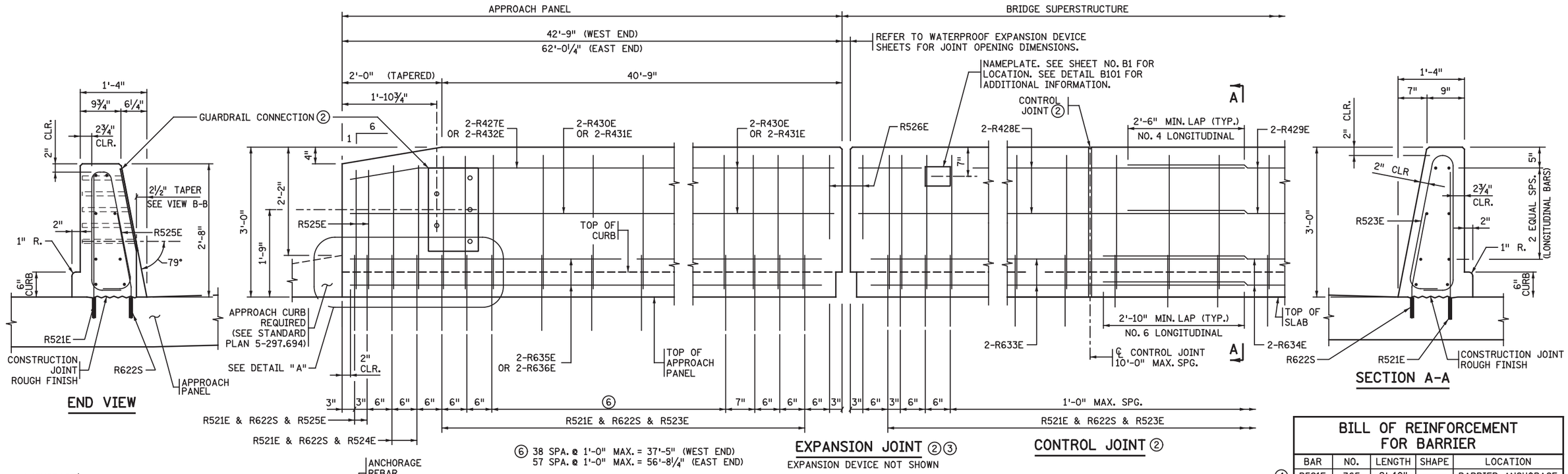
SHEET NO. B38 OF B54 SHEETS

APPROVED:

BRIDGE NO. 02595

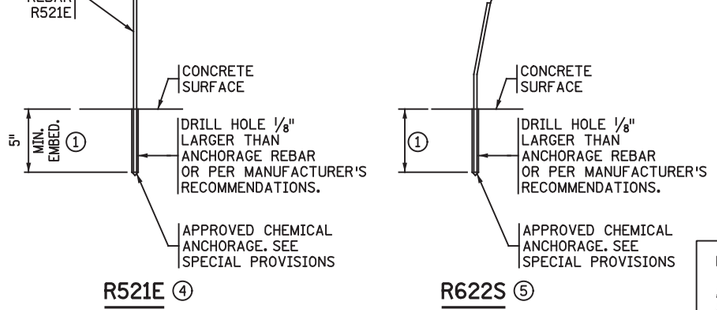
pw:\\pwdrusceN01:HDR_US_Central_01\Documents\7341\102706446\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Plan Sht=\4010

user 2:25:13 PM 8/10/2023



BILL OF REINFORCEMENT FOR BARRIER				
BAR	NO.	LENGTH	SHAPE	LOCATION
④ R521E	365	2'-10"	—	BARRIER ANCHORAGE
⑤ R622S	365	3'-0"	⌐	BARRIER ANCHORAGE
R523E	357	7'-1"	▭	BARRIER VERTICAL
R524E	4	6'-9"	▭	BARRIER VERTICAL
R525E	4	6'-5"	▭	BARRIER VERTICAL
R526E	4	5'-1"	▭	BARRIER VERTICAL
R427E	2	22'-6"	⌒	BARRIER LONGIT.
R428E	8	11'-7"	—	BARRIER LONGIT.
R429E	24	40'-0"	—	BARRIER LONGIT.
R430E	6	22'-6"	—	BARRIER LONGIT.
R431E	6	32'-4"	—	BARRIER LONGIT.
R432E	2	32'-2"	⌒	BARRIER LONGIT.
R633E	8	12'-9"	—	BARRIER LONGIT.
R634E	24	40'-0"	—	BARRIER LONGIT.
R635E	8	22'-8"	—	BARRIER LONGIT.
R636E	8	32'-4"	—	BARRIER LONGIT.

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

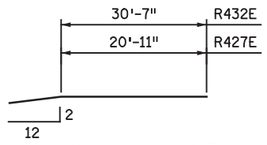


ANCHORAGE DETAIL

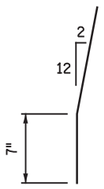
MODIFICATIONS:

ADDED DRILL AND GROUT ANCHORAGE DETAILS.

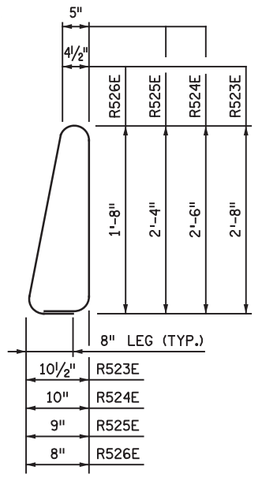
ADDED FULL WIDTH BLOCK OUT FOR FUTURE GLAND REPLACEMENT.



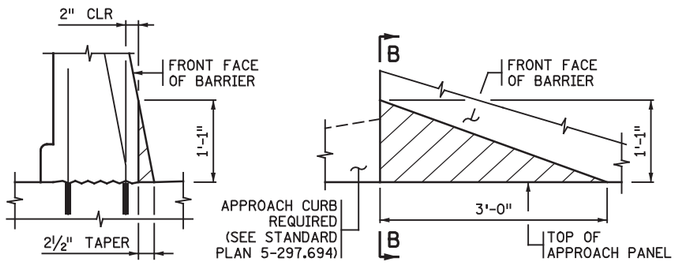
R427E & R432E



R622S



R523E, R524E, R525E, R526E



⑤ ANCHORAGE BARS NOT INCLUDED IN REINFORCEMENT QUANTITIES. PAYMENT FOR ANCHORAGES ARE INCLUDED IN "ANCHORAGES TYPE REINF BARS (STAINLESS TYPE H)".

GENERAL NOTES

FOR SLIPFORM CONSTRUCTION, TIE 100% OF THE REINFORCEMENT BAR INTERSECTIONS IN THE BARRIER.

CONCRETE BARRIER = 481 LBS./FT. (0.119 CU. YDS./FT.)

FINISH ALL EDGES OF BARRIER WITH ½" 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 5" MIN. EMBEDMENT INTO DECK SLAB

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.

③ REFER TO "WATERPROOF EXPANSION DEVICE" STANDARD PLANS FOR COVER PLATE DETAILS.

④ ANCHORAGE BARS NOT INCLUDED IN REINFORCEMENT QUANTITIES. PAYMENT FOR ANCHORAGES ARE INCLUDED IN "ANCHORAGES TYPE REINF BARS (TYPE L)".

REVISION: DECEMBER 21, 2022

APPROVED: AUGUST 24, 2016
Kevin Western
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
1			

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 _____ LICENSED PROFESSIONAL ENGINEER — DATE 8/10/23

NAME: TODD A. LANG LIC. NO. 42962

TITLE: CONCRETE BARRIER 36" (TYPE S, TL-4)
PARAPET ABUTMENT WITH BRIDGE SLAB SIDEWALK AND GUARDRAIL CONNECTION (WITHOUT CONCRETE WEARING COURSE)

DES:	TJC	DR:	TJC
CHK:	TAL	CHK:	TAL

APPROVED:

SHEET NO. B39 OF B54 SHEETS

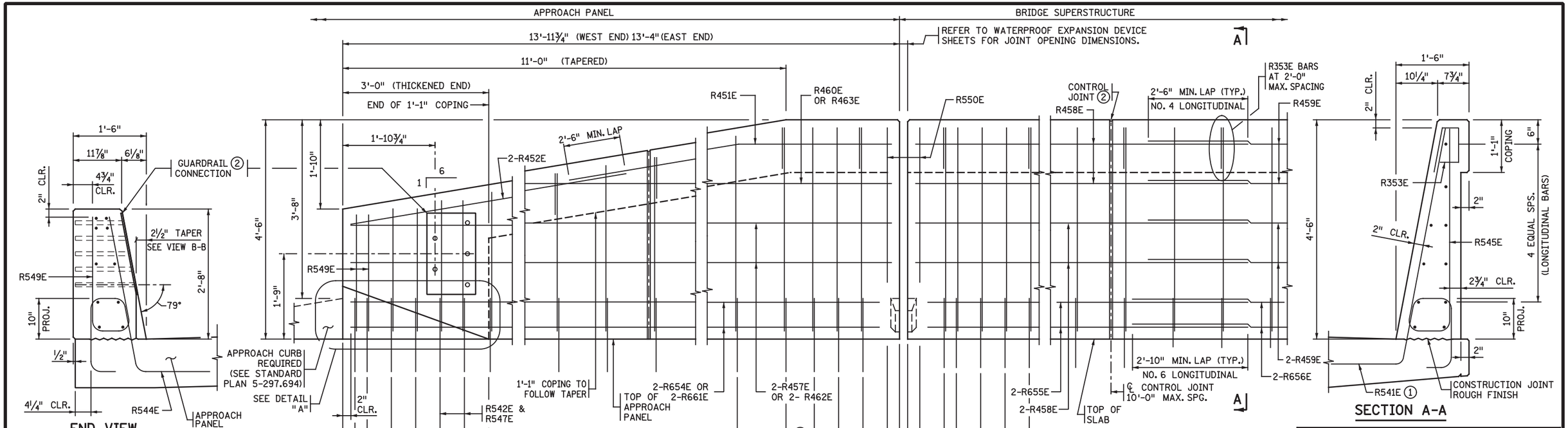
CODE 58

FIG. 5-397.139(C) MOD.

S.A.P. NO. 002-622-036

BRIDGE NO. 02595

user
2:25:16 PM
8/10/2023
pw:\\pwdrusceo01:HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Br-Idge\Sheets\Pln Shts\4015

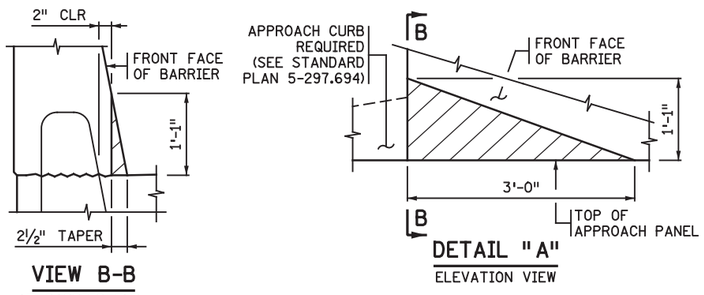


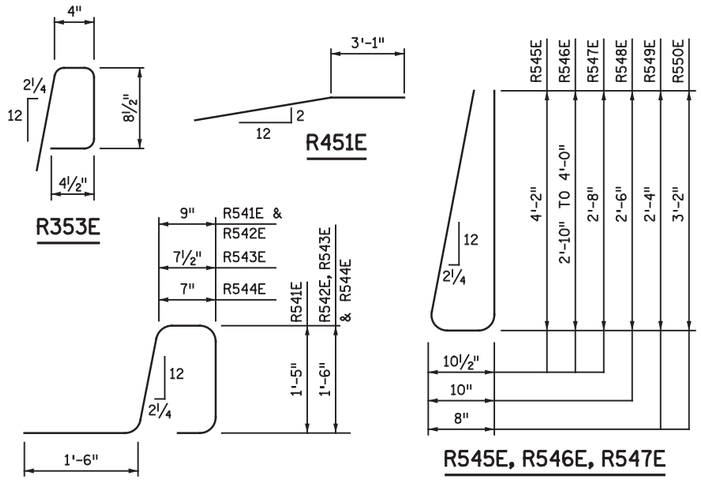
INSIDE ELEVATION OF BARRIER

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
R541E	250	5'-7"		BARRIER DOWEL
R542E	29	5'-9"		BARRIER DOWEL
R543E	4	5'-8"		BARRIER DOWEL
R544E	4	5'-7"		BARRIER DOWEL
R545E	259	9'-2"		BARRIER VERTICAL
R546E	2 SER. OF 8	6'-6" TO 8'-10"		BARRIER VERTICAL
R547E	4	6'-2"		BARRIER VERTICAL
R548E	4	5'-10"		BARRIER VERTICAL
R549E	4	5'-4"		BARRIER VERTICAL
R550E	4	7'-0"		BARRIER VERTICAL
R451E	2	6'-1"		BARRIER LONGIT.
R452E	4	10'-1"		BARRIER LONGIT.
R353E	125	2'-4"		COPING VERTICAL
R654E	4	12'-9"		BARRIER LONGIT.
R655E	8	12'-9"		BARRIER LONGIT.
R656E	24	40'-0"		BARRIER LONGIT.
R457E	4	12'-11"		BARRIER LONGIT.
R458E	12	11'-7"		BARRIER LONGIT.
R459E	36	40'-0"		BARRIER LONGIT.
R460E	1	9'-10"		BARRIER LONGIT.
R661E	4	13'-4"		BARRIER LONGIT.
R462E	4	13'-6"		BARRIER LONGIT.
R463E	1	10'-5"		BARRIER LONGIT.





GENERAL NOTES

FOR SLIPFORM CONSTRUCTION, TIE 100% OF THE REINFORCEMENT BAR INTERSECTIONS IN THE BARRIER.

CONCRETE BARRIER = 639 LBS./FT. (0.158 CU. YDS./FT.)

FINISH ALL EDGES OF BARRIER WITH ½" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.

SPACE CONTROL JOINTS AT 10 FT. MAXIMUM. REFER TO SUPERSTRUCTURE SHEET FOR SPECIFIC SPACING INFORMATION.

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.

③ REFER TO "WATERPROOF EXPANSION DEVICE" STANDARD PLANS FOR COVER PLATE DETAILS.

REVISION: DECEMBER 21, 2022

APPROVED: AUGUST 24, 2016
Kevin Western
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
1			

S.A.P. NO. 002-622-036

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 _____ LICENSED PROFESSIONAL ENGINEER 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

CODE 60

FIG. 5-397.143(A)

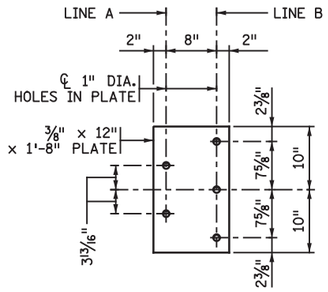
TITLE: CONCRETE BARRIER 54" (TYPE S, TL-4)
PARAPET ABUTMENT WITH GUARDRAIL CONNECTION (WITHOUT CONCRETE WEARING COURSE)

DES: TJC	DR: TJC	APPROVED:
CHK: TAL	CHK: TAL	

SHEET NO. B40 OF B54 SHEETS

BRIDGE NO. 02595

GUARDRAIL CONNECTION



NOTES

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

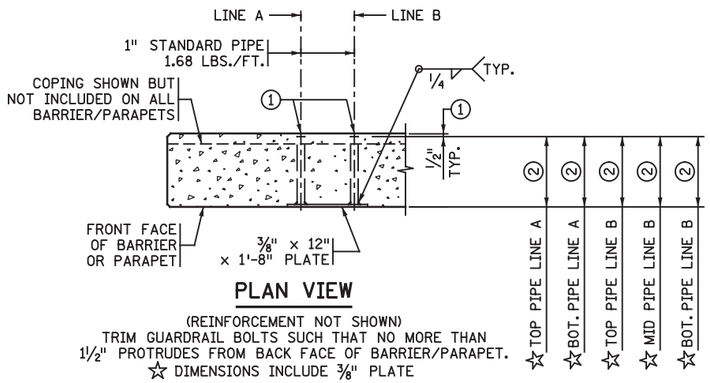
GUARDRAIL CONNECTION IS INCIDENTAL.

① REMOVE CONCRETE FROM PIPE ENDS AFTER SLIPFORMING OR FORM REMOVAL.

② SEE PIPE LENGTH TABLE.

GUARDRAIL CONNECTION DETAIL

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



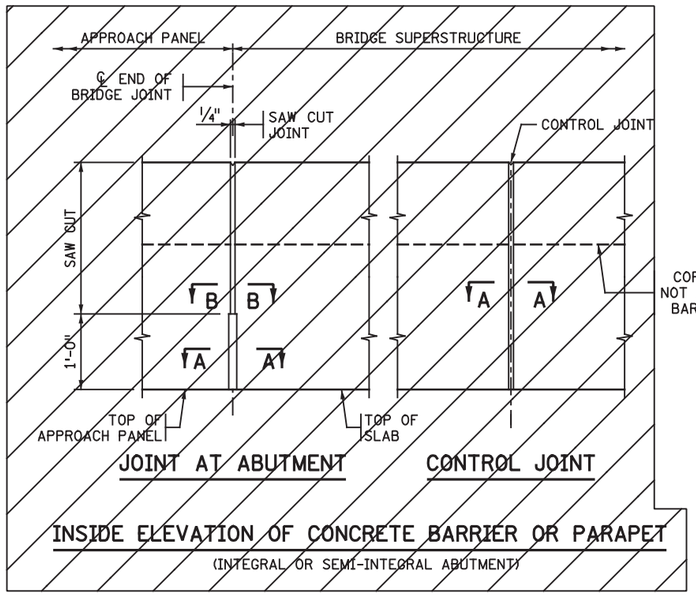
PLAN VIEW

(REINFORCEMENT NOT SHOWN)
TRIM GUARDRAIL BOLTS SUCH THAT NO MORE THAN 1½" PROTRUDES FROM BACK FACE OF BARRIER/PARAPET.
☆ DIMENSIONS INCLUDE 3/8" PLATE

PIPE LENGTH TABLE

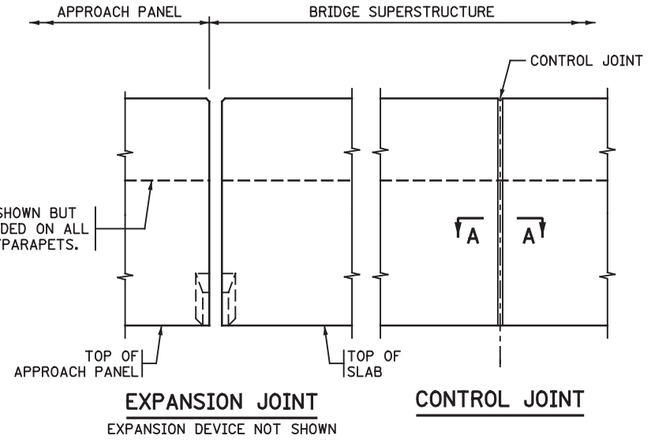
BARRIER/PARAPET TYPE STD FIGURE 5-397.	PIPE LENGTH					WEIGHT
	TOP PIPE LINE A	BOT. PIPE LINE A	TOP PIPE LINE B	MID. PIPE LINE B	BOT. PIPE LINE B	
36" SINGLE SLOPE						
138(A),(B),(E), 139(A),(B)	1'-0 3/4"	1'-0 1/4"	1'-0"	11 1/2"	1'-1"	34 LBS.
138(C),(D), 139(C),(D)	10 3/4"	1'-0 1/4"	10"	11 1/2"	1'-1"	34 LBS.
42" SINGLE SLOPE						
140(A),(B), 141(A),(B)	1'-0 3/4"	1'-2 1/4"	1'-0"	1'-1 1/2"	1'-3"	35 LBS.
140(C),(D), 141(C),(D)	10 3/4"	1'-0 1/4"	10"	11 1/2"	1'-1"	34 LBS.
54" SINGLE SLOPE						
142(A),(B), 143(A),(B)	1'-0 3/4"	1'-2 1/4"	1'-0"	1'-1 1/2"	1'-3"	35 LBS.
142(C),(D), 143(C),(D)	10 3/4"	1'-0 1/4"	10"	11 1/2"	1'-1"	34 LBS.
TYPE P-1 PARAPET						
166(B),(D),(F),(H)	1'-2 1/2"	1'-0 1/2"	1'-2 1/2"	1'-2 1/2"	1'-0 1/2"	34 LBS.
TYPE P-2 PARAPET						
157(A)-(H)	1'-3 1/2"	1'-3 1/2"	1'-3 1/2"	1'-3 1/2"	1'-3 1/2"	37 LBS.
TYPE P-4 PARAPET						
173(A),(B),(C),(D)	1'-5 1/2"	1'-3 1/2"	1'-5 1/2"	1'-3 1/2"	1'-3 1/2"	37 LBS.

CONTROL JOINT AND ABUTMENT JOINT



INSIDE ELEVATION OF CONCRETE BARRIER OR PARAPET

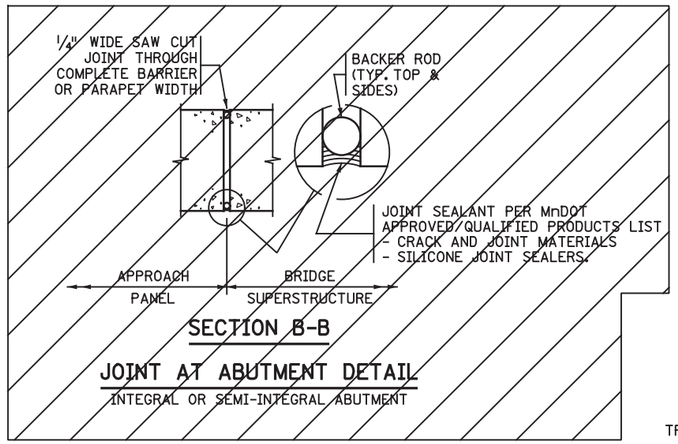
(INTEGRAL OR SEMI-INTEGRAL ABUTMENT)



EXPANSION DEVICE NOT SHOWN

INSIDE ELEVATION OF CONCRETE BARRIER OR PARAPET

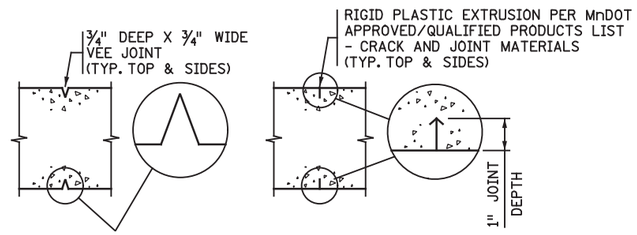
(PARAPET ABUTMENT)



SECTION B-B

JOINT AT ABUTMENT DETAIL

INTEGRAL OR SEMI-INTEGRAL ABUTMENT



SECTION A-A

CAST-IN-PLACE CONSTRUCTION

SECTION A-A

SLIPFORM CONSTRUCTION

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 1/8" BELOW THE SURFACE; FINISH OVER GROOVE COMPLETELY HIDING THE EXTRUSION.

REVISION:

APPROVED: DECEMBER 21, 2022
Edward A. Sutgen
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
1	---		

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 — LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

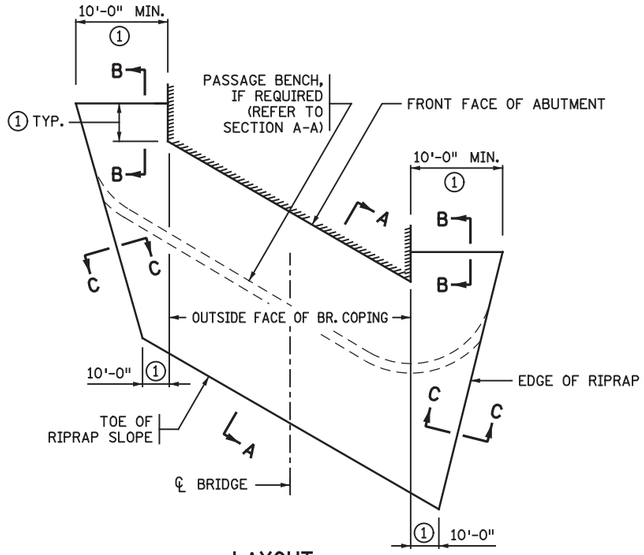
TITLE: MISCELLANEOUS CONCRETE BARRIER AND PARAPET DETAILS

S.A.P. NO. 002-622-036

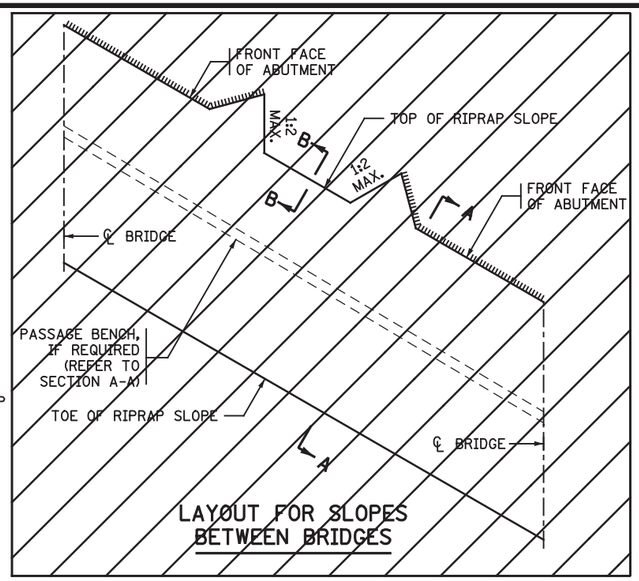
FIG. 5-397.174

DES: TJC	DR: TJC	APPROVED:	BRIDGE NO. 02595
CHK: TAL	CHK: TAL		

SHEET NO. B41 OF B54 SHEETS



LAYOUT



LAYOUT FOR SLOPES BETWEEN BRIDGES

GENERAL NOTES

GEOTEXTILE TYPE 7 IN ACCORDANCE WITH SPEC. 3733, BY THE SQ. YD.

RIPRAP IN ACCORDANCE WITH SPEC. 2511, RANDOM RIPRAP CLASS IV 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.

(1) SEE PLAN SHEET NO. B1 FOR DIMENSIONS, AND FOR ELEVATIONS OF RIPRAP TOE AND PASSAGE BENCHES.

(2) 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.

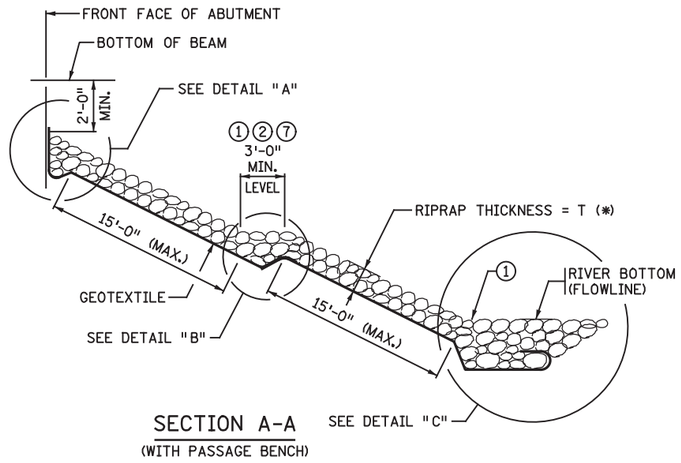
(3) OVERLAP GEOTEXTILE 2'-0" MINIMUM.

(4) 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.

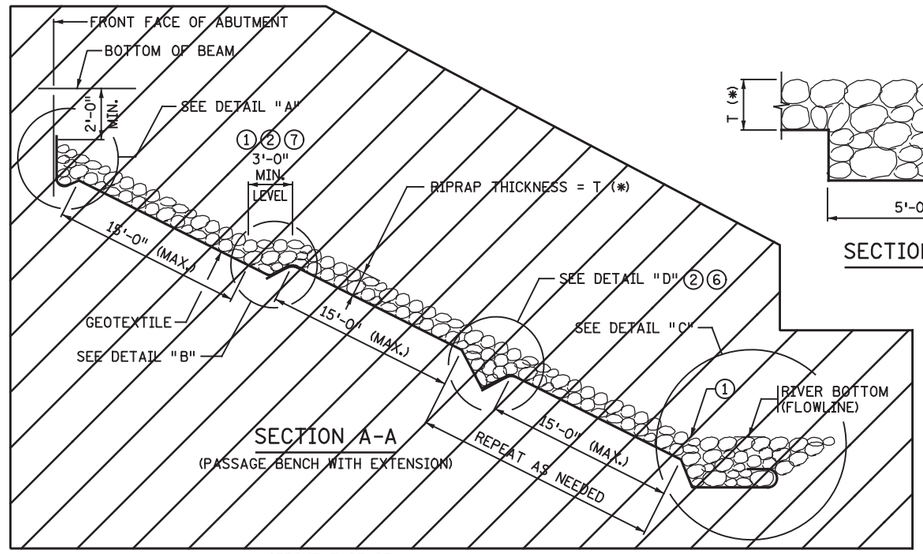
(5) BURY EDGES OF GEOTEXTILE TO DIRECT WATER FLOW OVER THE FABRIC WITHOUT UNDERMINING.

(6) ~~OMIT THE TRENCH SHOWN IN DETAIL "D" AND THE 15'-0" MAXIMUM SPACING BETWEEN TRENCHES FOR SLOPES 1:3 OR FLATTER.~~

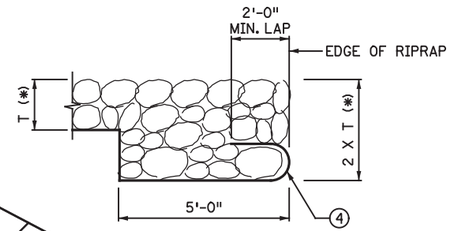
(7) SURFACE BENCHES WITH COARSE FILTER AGGREGATE IN ACCORDANCE WITH SPEC. 3149.2H (INCLUDED IN PRICE BID FOR RANDOM RIPRAP). TIE BENCHES TO NATURAL GROUNDLINES OUTSIDE OF BRIDGE.



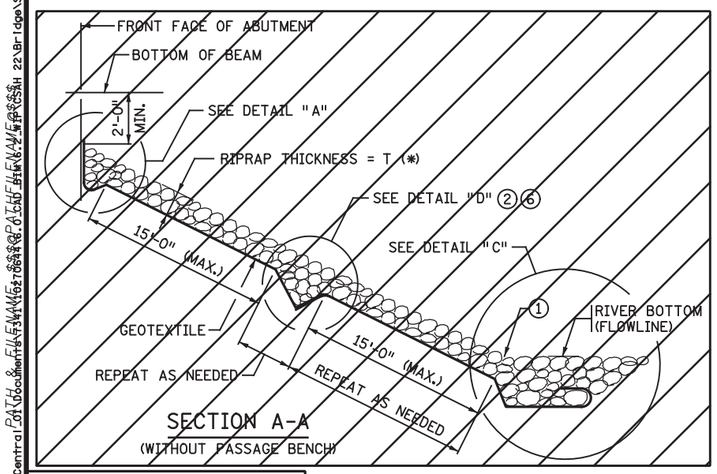
SECTION A-A
(WITH PASSAGE BENCH)



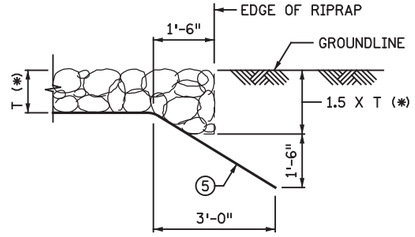
SECTION A-A
(PASSAGE BENCH WITH EXTENSION)



SECTION C-C

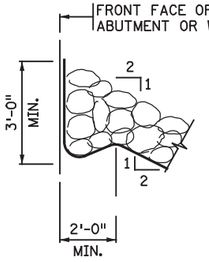


SECTION A-A
(WITHOUT PASSAGE BENCH)

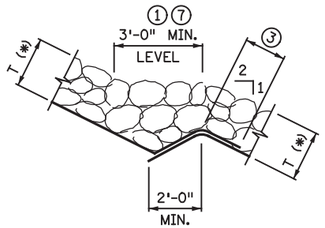


SECTION B-B

* DIMENSION T
~~CLASS III = 1'-6"~~
CLASS IV = 2'-0"
~~CLASS V = 2'-6"~~



DETAIL "A"



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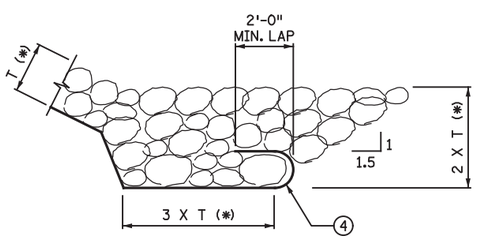

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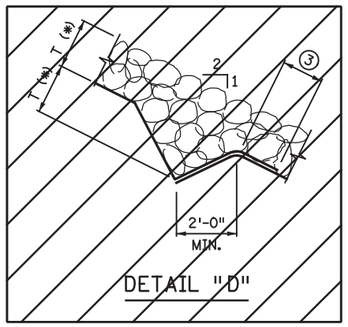


DETAIL "D"

REVISED: DECEMBER 21, 2022
APPROVED: MAY 24, 2011 — Nancy Daubenberger, 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 — LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

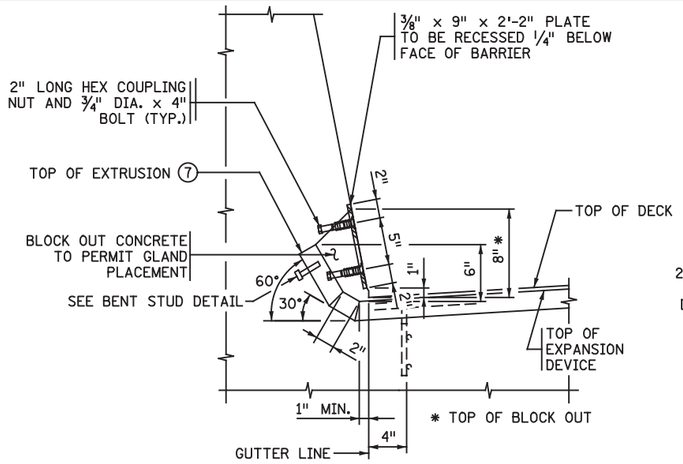
TITLE: RIPRAP SLOPE WITH GEOTEXTILE (SLOPES 1:2 AND FLATTER)

S.A.P. NO. 002-622-036

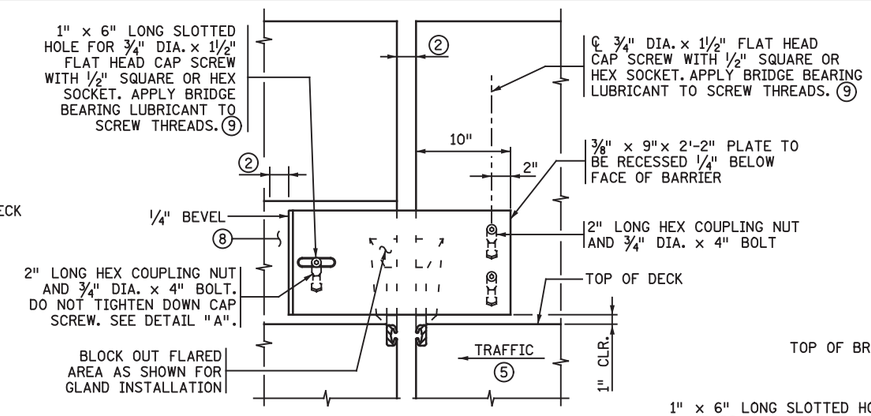
FIG. 5-397.309

DES: TJC	DR: TJC	APPROVED:	BRIDGE NO. 02595
CHK: TAL	CHK: TAL		

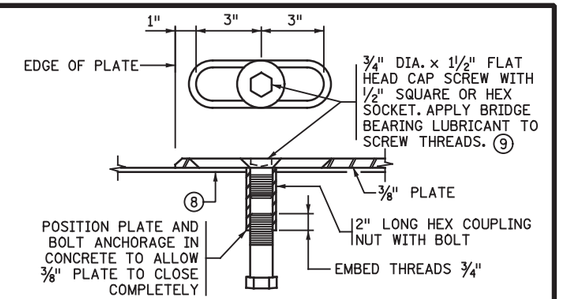
SHEET NO. B42 OF B54 SHEETS



SECTION THROUGH BARRIER



BARRIER ELEVATION



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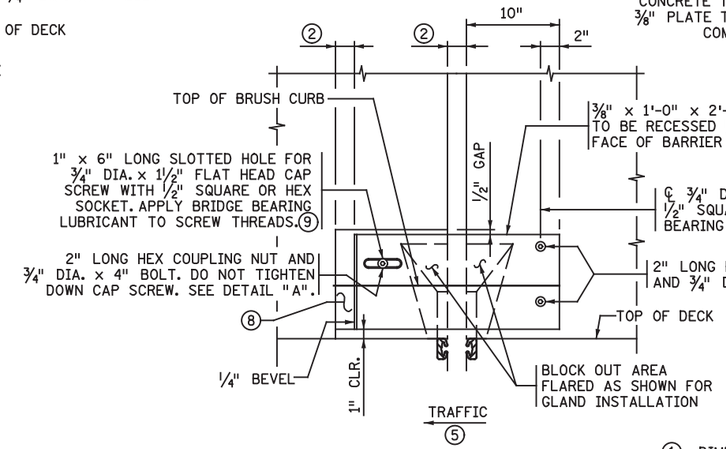
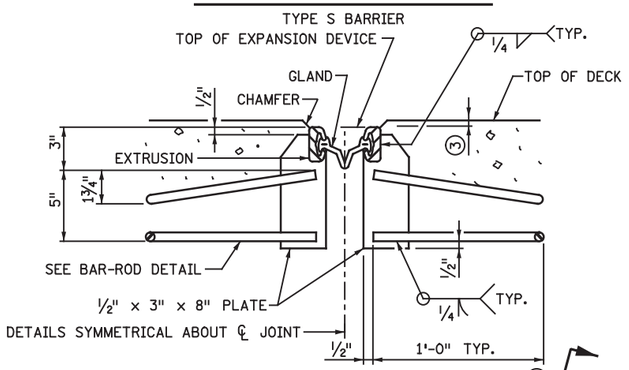


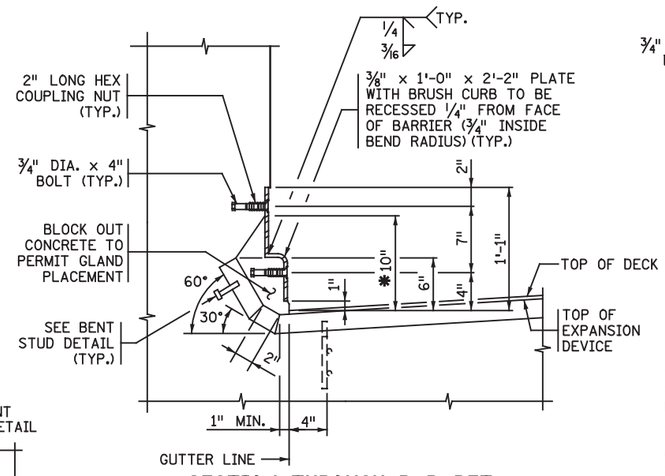
PARAPET ELEVATION

MODIFICATIONS:

ADDED SECTION AND ELEVATION DETAILS FOR PARAPET ON NORTH SIDE REMOVED UNUSED DETAILS



SECTION A-A



SECTION THROUGH PARAPET

* TOP OF BLOCK OUT

GENERAL NOTES

FURNISH AND INSTALL WATERPROOF EXPANSION JOINT DEVICES IN ACCORDANCE WITH SPEC. 2473.

GALVANIZE STRUCTURAL STEEL AFTER FABRICATION IN ACCORDANCE WITH SPEC. 3394. GALVANIZE FASTENERS IN ACCORDANCE WITH SPEC. 3392.

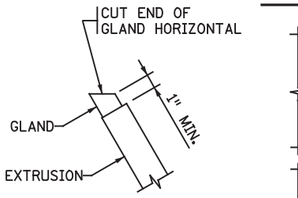
LOCATE JOINTS IN EXTRUSION AT BREAKS IN TRANSVERSE PROFILE AND AS OTHERWISE REQUIRED, WITH CLOSE FIT, WELDED JOINTS. REPAIR AFTER WELDING IN ACCORDANCE WITH SPEC. 2471.3L.

PROVIDE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306 OR SPEC. 3310.

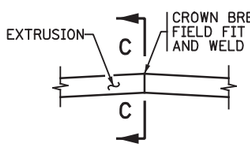
STRAIGHTEN EXPANSION DEVICE TO A TOLERANCE OF 1/8" IN 10 FT.

3/4" DIA. X 1 1/2" FLAT HEAD CAP SCREW WITH 1/2" SQUARE OR HEX SOCKET IN ACCORDANCE WITH SPEC 3391. COUNTERSINK CAP SCREWS 1/16" BELOW TOP OF PLATE. APPLY BRIDGE BEARING LUBRICANT TO SCREW THREADS. (9)

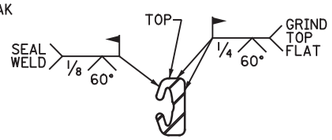
1. DIMENSIONS ARE ALONG CENTERLINE OF JOINT.
2. 2 3/8" AT 45°F; 1 7/8" AT 90°F, ALONG ROADWAY.
3. SNOWPLOW FINGERS ARE REQUIRED FOR SKEWS OVER 15 AND LESS THAN 50 DEGREES. SET THE TOP OF EXTRUSION AT 7/8" BELOW PROPOSED DRIVING SURFACE WITHIN 40' FINAL ROADWAY WIDTH AND AT 5/8" BELOW SURFACE WITHIN 14' TRAIL WIDTH. TRANSITION DEPTH TO TOP OF EXTRUSION UNDER BARRIER. SEE SHEET B44.
4. ~~SEE SUPERSTRUCTURE DETAILS FOR RADIUS.~~
5. SEE SHEET NO. B1 FOR DIRECTION OF TRAFFIC.
6. PLACE BAR-ROD NORMAL TO JOINT ON NEW BRIDGES AND JOINT REPLACEMENTS. ON JOINT REPLACEMENTS WHEN SKEW IS OVER 15° AND LESS THAN 50° BEND RODS PARALLEL TO ℄ ROADWAY.
7. EXTEND GLAND 1" MIN. BEYOND THE END OF THE EXTRUSION. SEE DETAIL "C".
8. 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.
9. LUBRICANT PER MNDOT APPROVED/QUALIFIED PRODUCTS LIST: BRIDGE GREASE.
10. EXTEND STAGE 1 JOINT BEYOND LIMITS OF DECK TO FACILITATE JOINT CONNECTION BETWEEN STAGES 1 AND 2.



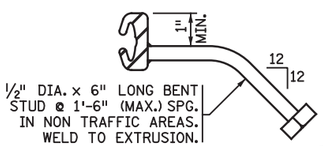
DETAIL "C"



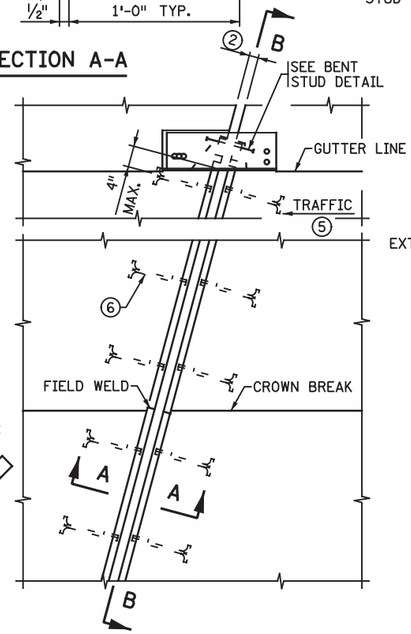
DETAIL "B"



SECTION C-C

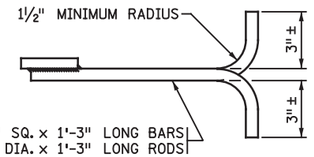


BENT STUD DETAIL

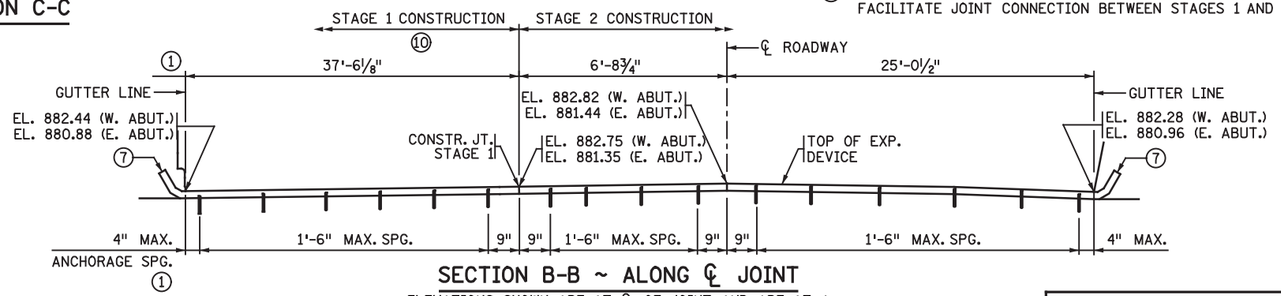


PLAN VIEW @ EXPANSION DEVICE

WITH STRAIGHT DEVICE



BAR-ROD DETAIL



SECTION B-B ~ ALONG ℄ JOINT

ELEVATIONS SHOWN ARE AT ℄ OF JOINT AND ARE AT A DEPTH BELOW THE TOP OF SLAB AS SPECIFIED IN NOTE (3).

REVISION: DECEMBER 21, 2022

APPROVED: AUGUST 24, 2016
Kevin Western
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
--			

S.A.P. NO. 002-622-036

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 _____ LICENSED PROFESSIONAL ENGINEER 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: WATERPROOF EXPANSION DEVICE

DES:	TJC	DR:	TJC	APPROVED:
CHK:	TAL	CHK:	TAL	

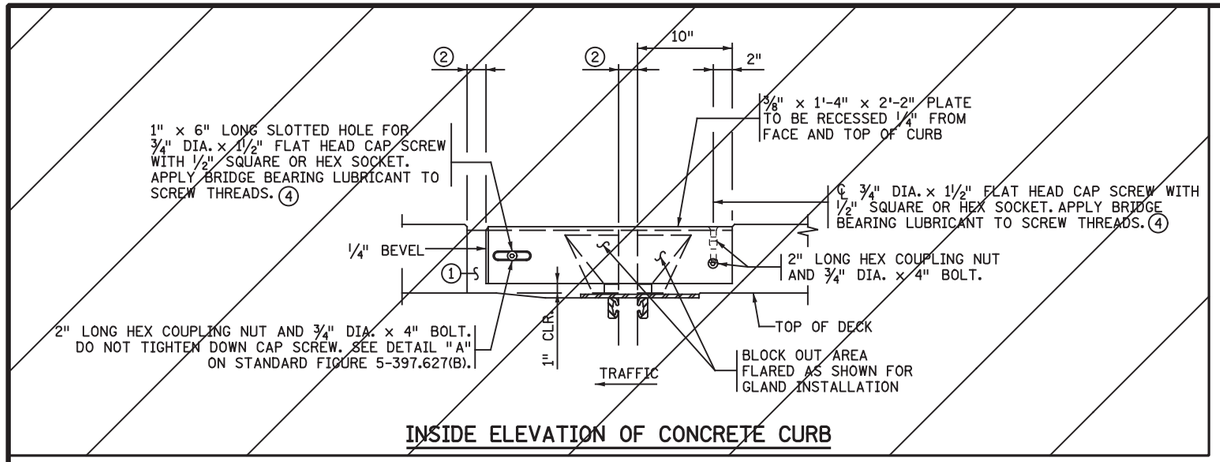
SHEET NO. B43 OF B54 SHEETS

FIG. 5-397.627(B) MOD.

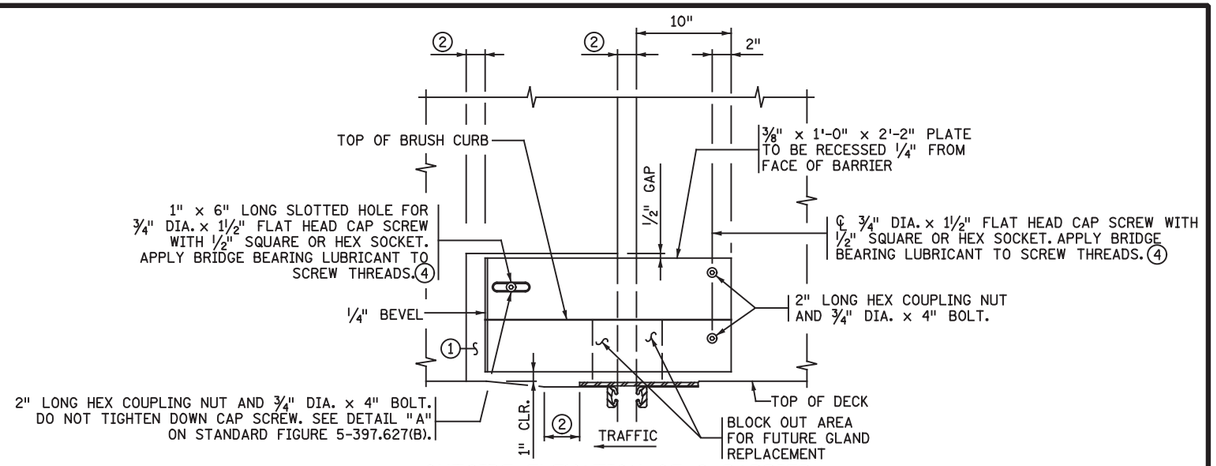
BRIDGE NO. 02595

user 2:25:32 PM 8/10/2023

pw:\\pwhdruscen01:HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Pln Shts\4035

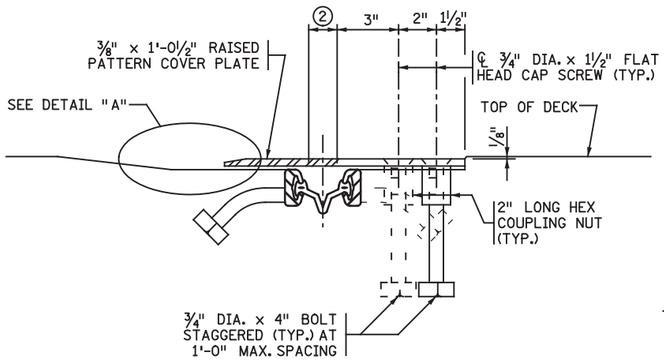


INSIDE ELEVATION OF CONCRETE CURB



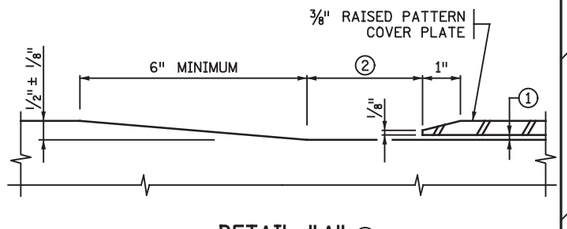
OUTSIDE ELEVATION OF S BARRIER

(BACK OF TYPE S BARRIER)

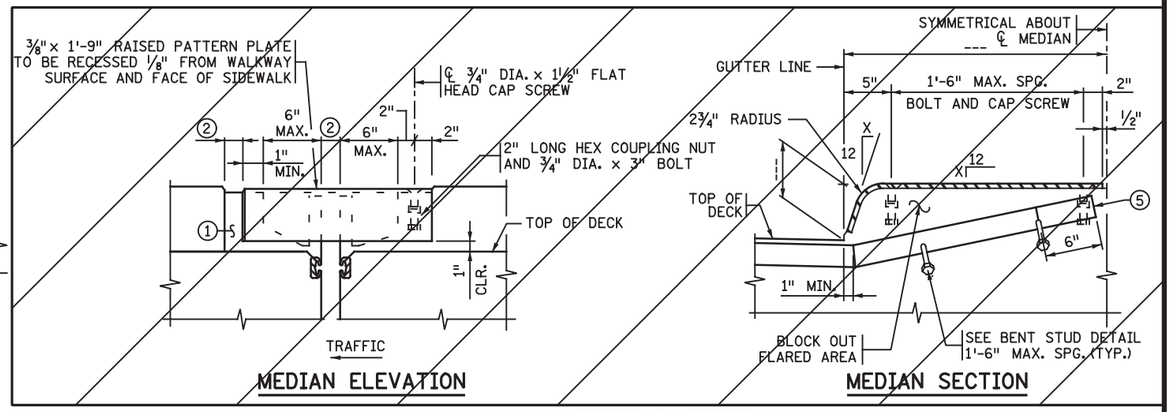


SECTION D-D (3)

(INTEGRAL SIDEWALK)

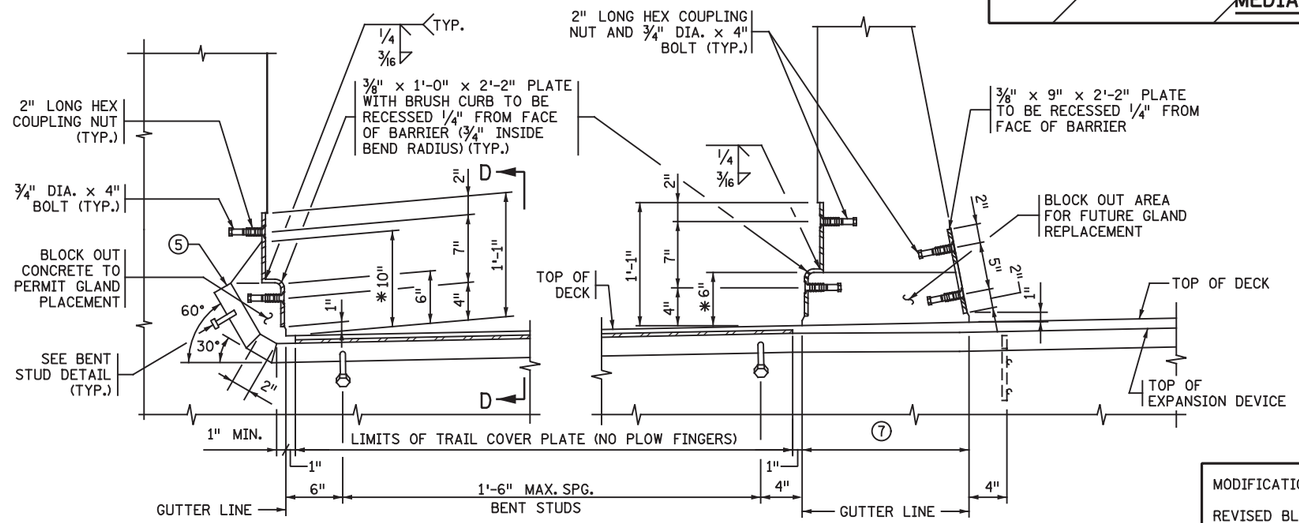


DETAIL "A" (3)



MEDIAN ELEVATION

MEDIAN SECTION



TYPE P-4 PARAPET

TYPE S BARRIER (6)

SECTION THROUGH BARRIER - INTEGRAL SIDEWALK

*TOP OF BLOCK OUT

GENERAL NOTES

SEE OTHER WATERPROOF EXPANSION DEVICE SHEET FOR ADDITIONAL DETAILS AND NOTES. SEE SHEET B45 FOR PLOW FINGER DETAILS.

PROVIDE RAISED PATTERN PLATE IN ACCORDANCE WITH SPEC. 3310, ASTM A709, GRADE 50, GALVANIZED IN ACCORDANCE WITH SPEC. 3394.

TRANSVERSE DECK REINFORCEMENT MAY BE SHIFTED THE MINIMUM DISTANCE REQUIRED FOR EXPANSION DEVICE PLACEMENT.

3/4" DIA. X 1 1/2" FLAT HEAD CAP SCREW WITH 1/2" SQUARE OR HEX SOCKET IN ACCORDANCE WITH SPEC 3391. COUNTERSINK CAP SCREWS 1/16" FROM TOP OF PLATE. APPLY BRIDGE BEARING LUBRICANT TO SCREW THREADS. (4)

(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) SEE NOTE (2) ON OTHER WATERPROOF EXPANSION DEVICE SHEET.

(3) DIMENSIONS SHOWN ARE REQUIRED TO COMPLY WITH A.D.A. STANDARDS.

(4) LUBRICANT PER MNDOT APPROVED/QUALIFIED PRODUCTS LIST: BRIDGE GREASE.

(5) SEE NOTE (7) ON OTHER WATERPROOF EXPANSION DEVICE SHEET.

(6) DECK AND EXPANSION DEVICE TO BE CONSTRUCTED DURING STAGE 1 CONSTRUCTION. BARRIER TO BE CONSTRUCTED DURING STAGE 3.

(7) TRANSITION DISTANCE FROM TOP OF DECK TO TOP OF EXTRUSION FROM 7/8" ON ROADWAY SIDE OF BARRIER TO 5/8" ON TRAIL SIDE OF BARRIER.

MODIFICATIONS:

REVISED BLOCK OUT IN BARRIER BETWEEN TRAIL AND ROADWAY, EXTRUSION LIMITS AND NOTES.

REVISION: DECEMBER 21, 2022

APPROVED: AUGUST 24, 2016

Kevin Western
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 _____ LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

S.A.P. NO. 002-622-036

FIG. 5-397.632(B) MOD.

TITLE: WATERPROOF EXPANSION DEVICE (RAISED MEDIAN OR INTEGRAL SIDEWALK WITH S BARRIER AND CURB)

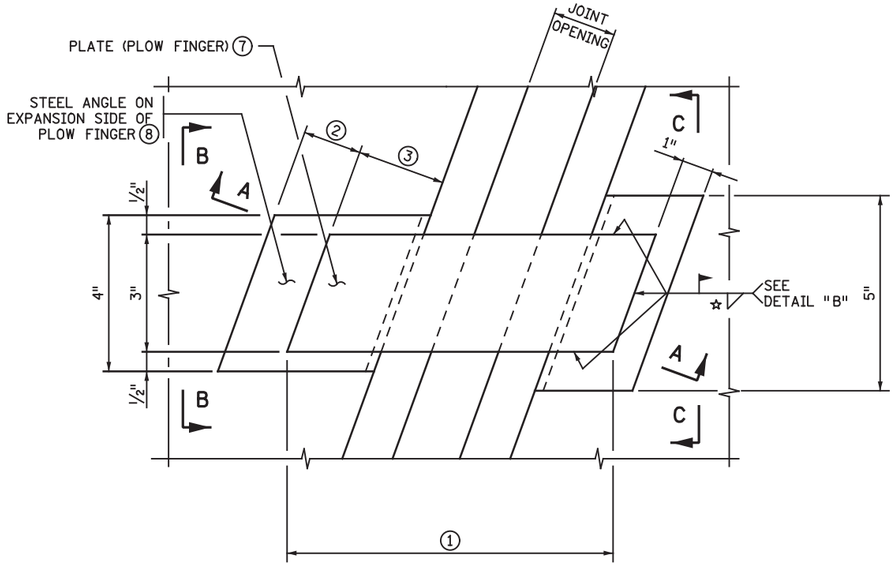
DES:	TJC	DR:	TJC	APPROVED:
CHK:	TAL	CHK:	TAL	

SHEET NO.B44 OF B54 SHEETS

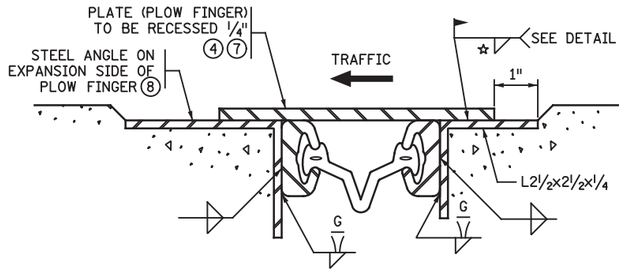
BRIDGE NO. 02595

User: 2:11:23 PM 8/17/2023

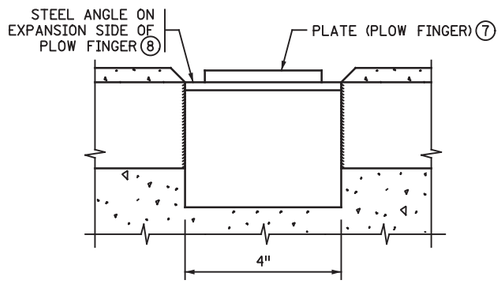
pw:\\pwhdruscen01:HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Pin Shre\4037



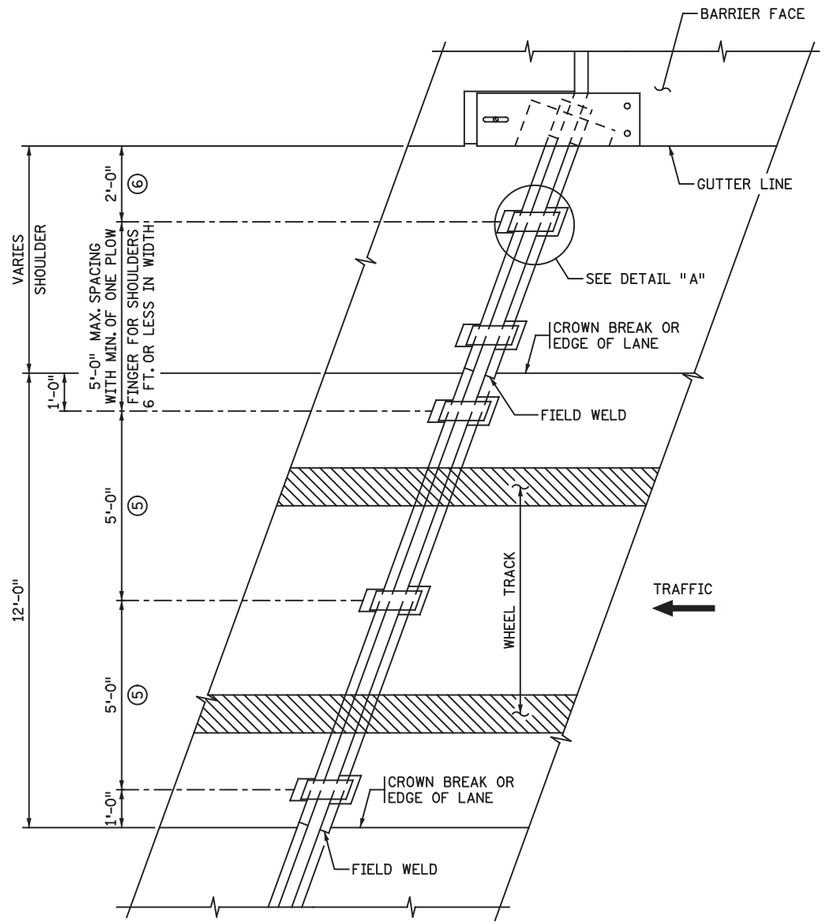
DETAIL "A"



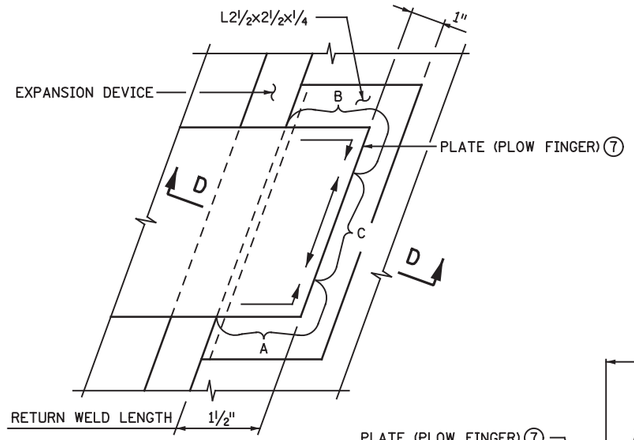
SECTION A-A



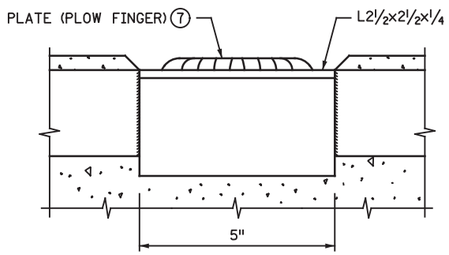
VIEW B-B
(EXPANSION SIDE)



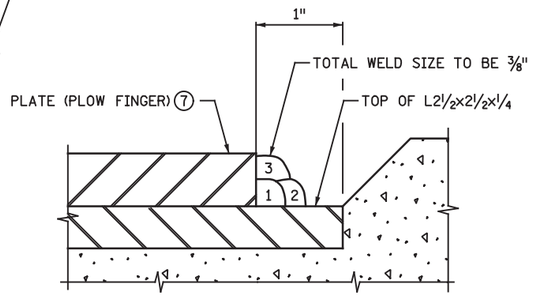
PLAN VIEW AT EXPANSION DEVICE



DETAIL "B"



VIEW C-C
(WELDED SIDE)



SECTION D-D

☆ WELDING PROCEDURE FOR PLATE (PLOW FINGER)

I. USE ⅛" DIAMETER LOW HYDROGEN SMAW ELECTRODES TYPE E7016 OR E7018 FOR WELDING.

II. PRIOR TO WELDING, REMOVE THE GALVANIZED COATING IN THE WELD AREA BY GRINDING.

III. WELD PASS ONE IN AREAS A AND B FIRST, THEN AREA C, FOLLOW WITH PASSES TWO AND THREE IN SAME ORDER, AS SHOWN IN DETAIL "B".

IV. REMOVE ALL WELD SLAG AND OTHER RESIDUE BETWEEN PASSES.

V. ALLOW AT LEAST 5 MINUTES COOLING TIME BETWEEN EACH OF THE NINE WELDING PASSES.

GENERAL NOTES

PLOW FINGERS ONLY TO BE PROVIDED WITHIN THE FINAL 40' ROADWAY WIDTH. NO PLOW FINGERS WITHIN THE 14' TRAIL.

DO NOT GALVANIZE PLATE (PLOW FINGER).

① VARIES WITH SKEW AND EXPANSION OPENING.

② ½" MINIMUM IN CLOSED POSITION.

③ ½" MINIMUM IN OPEN POSITION.

④ ENSURE FULL AND DIRECT BEARING ON THE STEEL ANGLE LOCATED UNDER THE MOVEMENT SIDE OF PLATE (PLOW FINGER).

⑤ MODIFY IF LANE WIDTH DIFFERS FROM 12 FT.

⑥ OMIT LAST PLATE (PLOW FINGER) ON DEVICE WITH CURVED END.

⑦ SELECT PLATE (PLOW FINGER) THICKNESS (⅜" MIN.) TO MAINTAIN ¼" RECESS BETWEEN TOP OF DECK AND TOP OF PLOW FINGER. CONTACT ENGINEER IF THICKNESS WILL EXCEED ½" TO ACHIEVE ¼" RECESS. REFER TO WATERPROOF EXPANSION DEVICE PLAN SHEETS FOR DEPTH OF EXTRUSION BELOW THE TOP OF DECK.

⑧ L4x3x5/16 LONG LEG HORIZONTAL.

REVISION: DECEMBER 21, 2022

APPROVED: SEPTEMBER 26, 2003
STATE BRIDGE ENGINEER

REV. NO.	DATE	REVISION DESCRIPTION	BY
1			

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 _____ LICENSED PROFESSIONAL ENGINEER — DATE 8/10/23

NAME: TODD A. LANG — LIC. NO. 42962

S.A.P. NO. 002-622-036

TITLE: WATERPROOF EXPANSION DEVICE SNOWPLOW PROTECTION (USE ON SKEWS OVER 15° AND LESS THAN 50°)

DES: TJC	DR: TJC	APPROVED:
CHK: TAL	CHK: TAL	

SHEET NO. B45 OF B54 SHEETS

FIG. 5-397.628

BRIDGE NO. 02595

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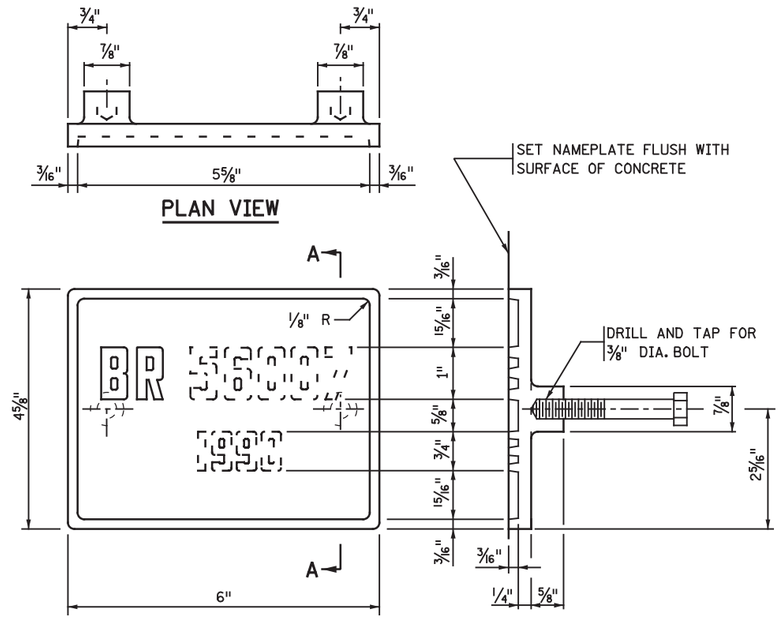
pw:\\pwhdrusea01:HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Pln Sht\4040



THE DASHED NUMBERS SHOWN ABOVE ARE FOR ILLUSTRATION.
DATA TO BE SHOWN ON NAMEPLATE IS AS FOLLOWS:

BRIDGE 02595

YEAR 2023

NUMBERS FOR NAMEPLATE

NOTES:

MATERIAL SHALL COMPLY WITH SPEC. 3327.

LETTERS AND NUMBERS SHALL CONFORM TO THOSE SHOWN.

DRAFT ON LETTERS AND NUMBERS SHALL NOT BE MORE THAN 3" IN 12".

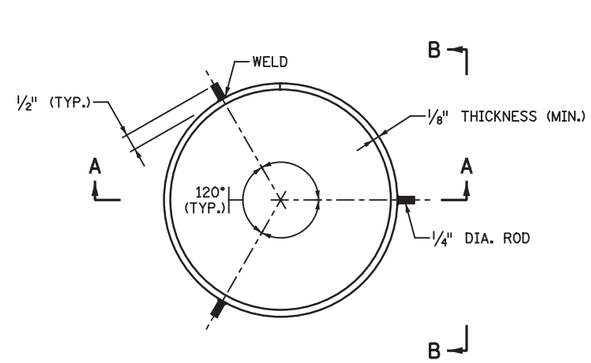
HORIZONTAL SPACING OF LETTERS AND NUMBERS SHALL PRODUCE A BALANCED LAYOUT IN PROPORTION TO SPACING SHOWN.

TOP SURFACE OF LETTERS, NUMBERS AND FRAMES SHALL BE BURNISHED.

FURNISH 2 STEEL BOLTS 3/8" DIA. x 3" LONG WITH EACH PLATE.

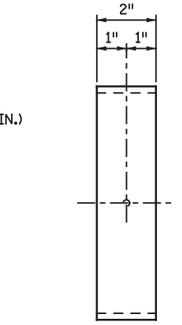
ALL DIMENSIONS FOR 3/4" HIGH LETTERS AND NUMBERS SHALL BE IN DIRECT PROPORTION TO THOSE SHOWN FOR THE 1" HIGH LETTERS AND NUMBERS.

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 09-11-2014	DETAIL NO.
Daniel D Hagyan STATE BRIDGE ENGINEER	BRIDGE NAMEPLATE (FOR NEW BRIDGES)		B101



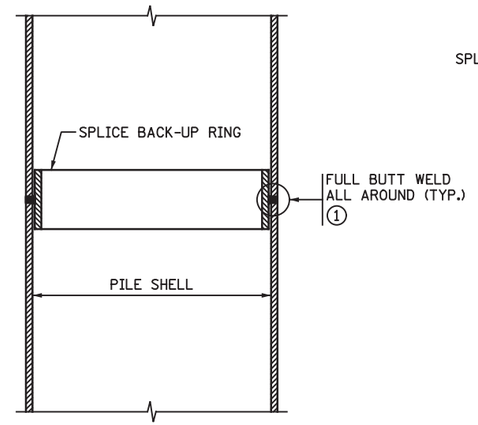
PLAN VIEW - SPLICE BACK-UP RING

PILE NOT SHOWN

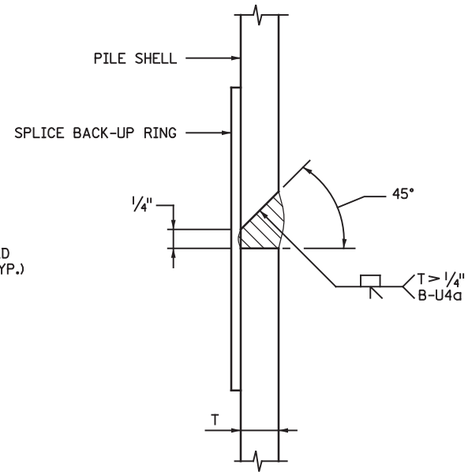


SECTION B-B

PILE NOT SHOWN



SECTION A-A



DETAIL "A" 1

NOTES:

APPROVED COMMERCIAL PILE SPLICE BACK-UP RING MAY BE USED IN LIEU OF THE TYPE DETAILED, PROVIDED THAT 1/4" ROOT IS MAINTAINED. BACK-UP RING SHALL HAVE A TIGHT FIT.

WELDING ELECTRODES SHALL BE CELLULOSIC TYPE ELECTRODES E-6010 OR E-6011.

ELECTRODES WHICH HAVE BECOME WET, SOILED OR DAMAGED SHALL NOT BE USED.

WELDING SHALL NOT BE DONE 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., THE PILE METAL IN THE AREA OF THE WELD SHALL BE HEATED TO A MINIMUM TEMPERATURE OF 70° F. AND MAINTAINED AT THIS TEMPERATURE DURING WELDING.

1 FOR PILE SHELL THICKNESSES GREATER THAN 1/4", USE A B-U4a WELD CONFIGURATION. SEE DETAIL "A".

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION: 11-06-2013	DETAIL NO.
Daniel D Hagyan STATE BRIDGE ENGINEER	PILE SPLICE (CAST-IN-PLACE CONCRETE PILES)		B201

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: Todd A. Lang 8/10/23
LICENSED PROFESSIONAL ENGINEER — DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: BRIDGE DETAILS

DES: TJC	S.A.P. NO. 002-622-036	APPD:
CHK: TAL		BRIDGE NO. 02595
DR: TJC	SHEET NO. B46 OF B54 SHEETS	
CHK: TAL		

pw:\\pwdrusceN01.HDR_US_Central_01\Documents\7341\10270644\6.0_CAD_BIM\6.2_WIP\CSAH 22\Bridge\Sheets\Plan Shts\4045
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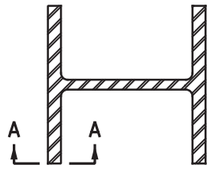
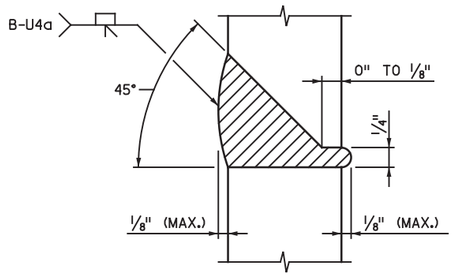


SECTION AT SPLICE



SECTION A-A

100% BUTT WELDED PILE SPLICE

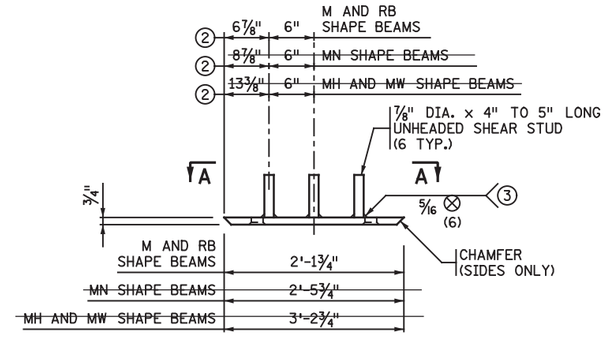
NOTES:

CELLULOSIC TYPE ELECTRODES E-6010 OR E-6011 SHALL BE USED FOR 100% BUTT WELDED SPLICES.

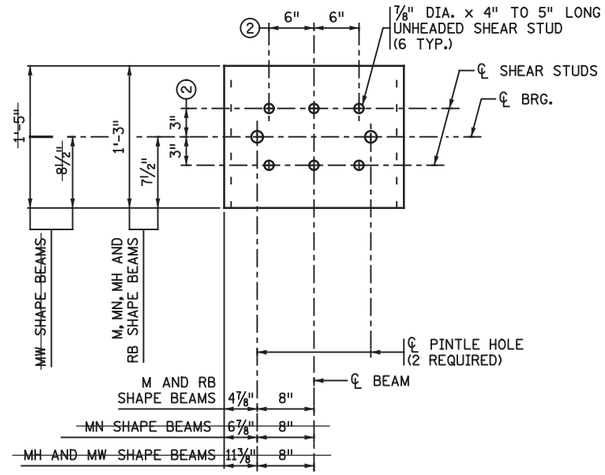
ELECTRODES WHICH HAVE BECOME WET, SOILED OR DAMAGED SHALL NOT BE USED.

WELDING SHALL NOT BE DONE 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., THE PILE METAL IN THE AREA OF THE WELD SHALL BE HEATED TO A MINIMUM TEMPERATURE OF 70° F. AND MAINTAINED AT THIS TEMPERATURE DURING WELDING.

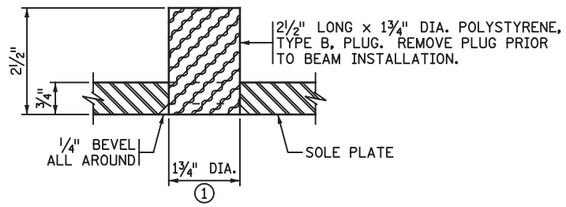
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION: 11-06-2013	DETAIL NO.
Daniel L Worgan STATE BRIDGE ENGINEER	PILE SPLICE (STEEL H BEARING PILES 10" TO 14")		B202



FRONT ELEVATION



SECTION A-A



PINTLE HOLE DETAIL

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.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 01-05-2017 12-20-2018 02-08-2022	DETAIL NO.
Nancy Daubenberger STATE BRIDGE ENGINEER	SOLE PLATE (PRESTRESSED CONCRETE BEAMS)		B303

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: Todd A. Lang 8/10/23
LICENSED PROFESSIONAL ENGINEER — DATE
NAME: TODD A. LANG LIC. NO. 42962

TITLE: BRIDGE DETAILS

DES: TJC	S.A.P. NO. 002-622-036
CHK: TAL	
DR: TJC	SHEET NO. B47 OF B54 SHEETS
CHK: TAL	

APPD:
BRIDGE NO. 02595

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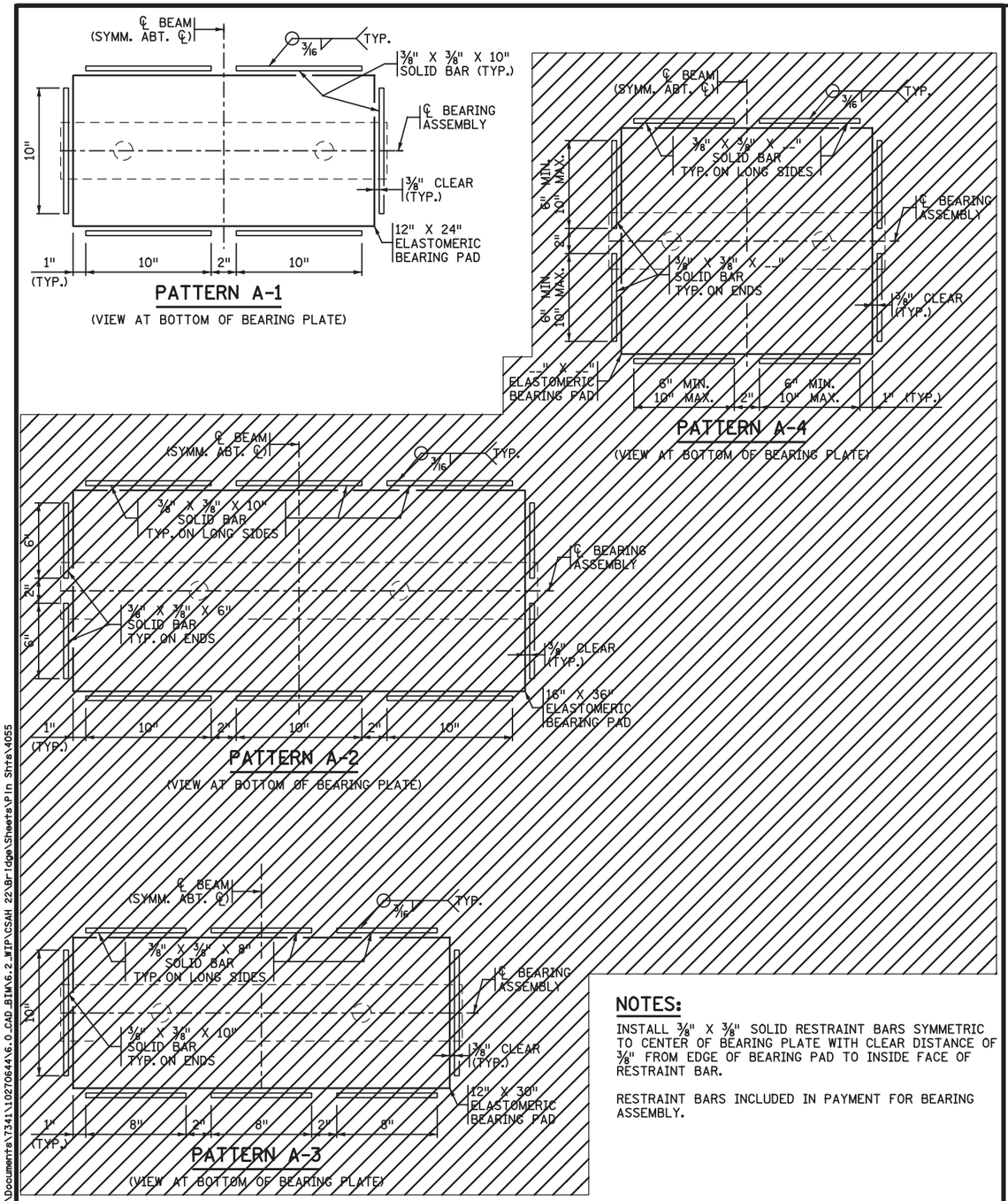
8/10/2023

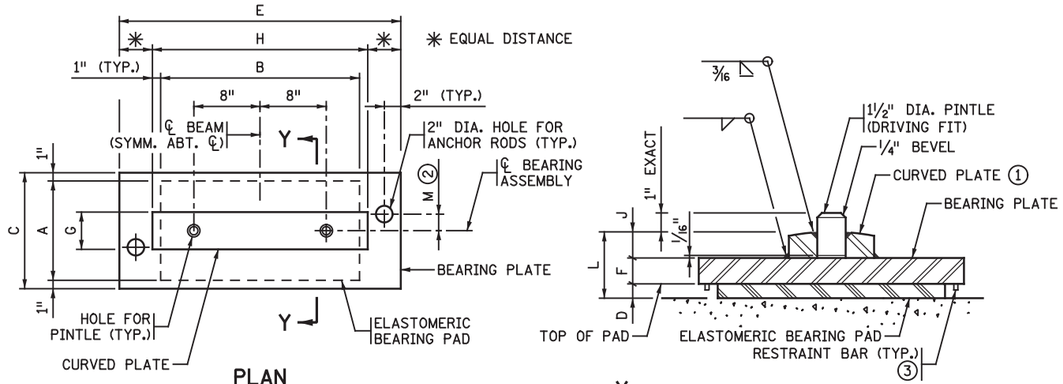


NOTES:

INSTALL 3/8" X 3/8" SOLID RESTRAINT BARS SYMMETRIC TO CENTER OF BEARING PLATE WITH CLEAR DISTANCE OF 3/8" FROM EDGE OF BEARING PAD TO INSIDE FACE OF RESTRAINT BAR.

RESTRAINT BARS INCLUDED IN PAYMENT FOR BEARING ASSEMBLY.

APPROVED: NOVEMBER 02, 2017	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 11-08-2018 12-20-2018	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	BEARING PAD RESTRAINT		B307



TABLE

ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE A	B	D	SHAPE FACTOR	BEARING PLATE SIZE C	E	F	CURVED PLATE SIZE G	H	J	R (1)	ANCHOR ROD OFFSET +/- (2)	M	ASSY. HEIGHT L	RESTRAINT PATTERN (3)
F1	PIERS	36M	12"	24"	1/2"	8.0	14"	34"	1 1/2"	4 1/2"	26"	1 1/4"	16"	-	2"	3 1/4"	A-1
		~~--MW~~	~~16"~~	~~36"~~	~~1/2"~~	~~11.1~~	~~18"~~	~~47"~~	~~1 1/2"~~	~~4 1/2"~~	~~38"~~	~~1 1/4"~~				~~3 1/4"~~	~~A-2~~
		~~--MH~~	~~12"~~	~~30"~~	~~1/2"~~	~~8.6~~	~~14"~~	~~47"~~	~~1 1/2"~~	~~4 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: DECEMBER 20, 2018	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 10-22-2019 12-21-2022	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	CURVED PLATE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (FIXED)		B310

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

CERTIFIED BY: _____ LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: BRIDGE DETAILS

DES: TJC	S.A.P. NO. 002-622-036	APPD:
CHK: TAL		BRIDGE NO. 02595
DR: TJC	SHEET NO. B48 OF B54 SHEETS	
CHK: TAL		

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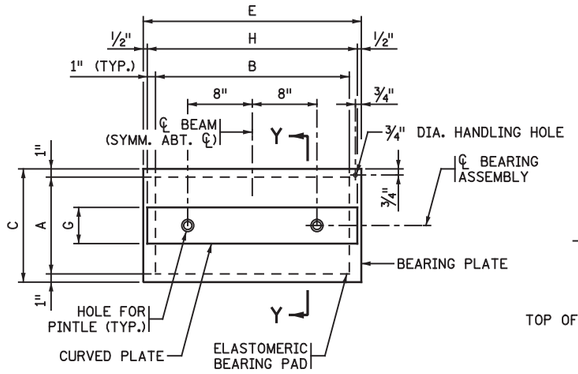
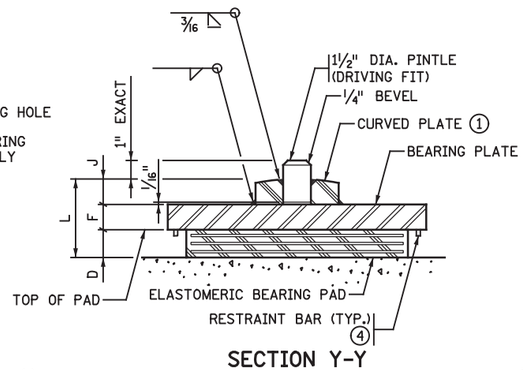
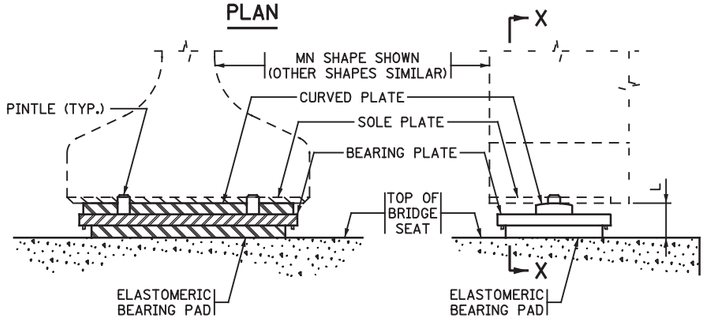


PLAN

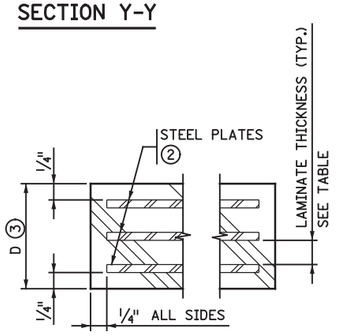


SECTION Y-Y



SECTION X-X

SIDE ELEVATION



SECTION THROUGH
ELASTOMERIC BEARING PAD

TABLE

ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE A	BEARING PAD SIZE B	BEARING PAD SIZE D	STEEL PLATES NO.	STEEL PLATES THICK.	LAMINATES NO.	LAMINATES THICK.	SHAPE FACTOR	BEARING PLATE SIZE C	BEARING PLATE SIZE E	BEARING PLATE SIZE F	CURVED PLATE SIZE G	CURVED PLATE SIZE H	CURVED PLATE SIZE J	CURVED PLATE SIZE R ①	ASSY. HEIGHT L	RESTRAINT PATTERN ④
E1	ABUT.	36M	12"	24"	2½"	4	⅛"	3	½"	8.0	14"	27"	1½"	4½"	26"	1¼"	16"	5¼"	A-1
		~~MW~~	~~16"~~	~~36"~~			⅛"		¾"	~~7.4~~	~~18"~~	~~39"~~	~~1½"~~	~~4½"~~	~~38"~~	~~1¼"~~			~~A-2~~
		~~MH~~	~~12"~~	~~30"~~			⅛"		½"	~~8.6~~	~~14"~~	~~33"~~	~~1½"~~	~~4½"~~	~~32"~~	~~1¼"~~			~~A-3~~

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION IN ACCORDANCE WITH SPEC. 3741.

PROVIDE STEEL PLATES IN ACCORDANCE WITH SPEC. 3306.

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.

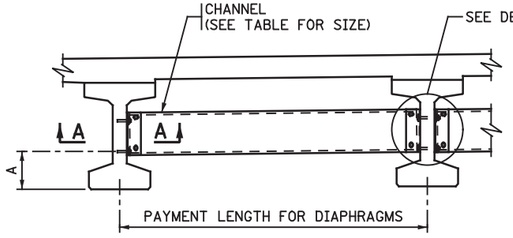
① THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

② DO NOT GALVANIZE THESE PLATES.

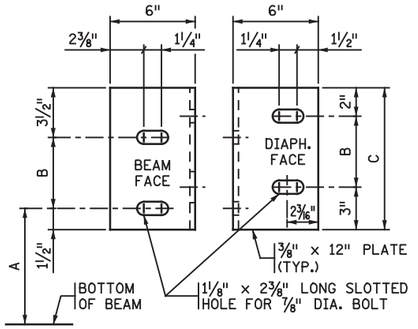
③ THE TOTAL THICKNESS SHOWN INCLUDES THE STEEL PLATES.

④ REFER TO BEARING PAD RESTRAINT B-DETAIL FOR ADDITIONAL INFORMATION AND DETAILS.

APPROVED: DECEMBER 20, 2018	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	CURVED PLATE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (EXPANSION)	10-22-2019 12-02-2020 12-21-2022	B311

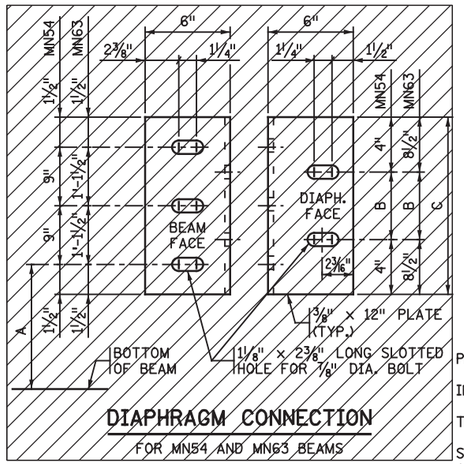


PART TRANSVERSE SECTION AT DIAPHRAGM



DIAPHRAGM CONNECTION

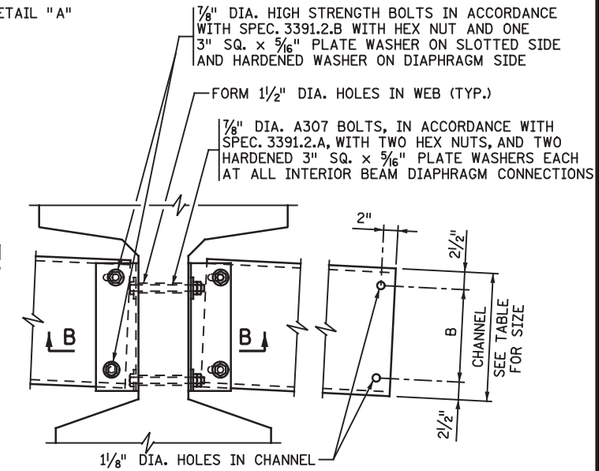
FOR 36M, 40MH AND MN45 BEAMS



DIAPHRAGM CONNECTION

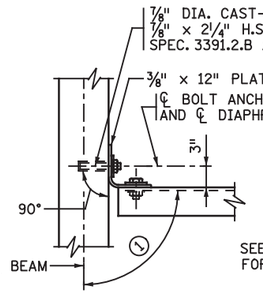
FOR MN54 AND MN63 BEAMS

BEAM HEIGHT	DISTANCE A	DISTANCE B	DISTANCE C	CHANNEL SIZE
36M	1'-3"	7"	1'-0"	C12x20.7
~~40MH~~	~~1' 5"~~	~~7"~~	~~1' 0"~~	~~C12x20.7~~
~~MN45~~	~~1' 7¾"~~	~~7"~~	~~1' 0"~~	~~C12x20.7~~
~~MN54~~	~~1' 7¾"~~	~~1' 1"~~	~~1' 3"~~	~~MC18x42.7~~
~~MN63~~	~~1' 7¾"~~	~~1' 1"~~	~~2' 6"~~	~~MC18x42.7~~



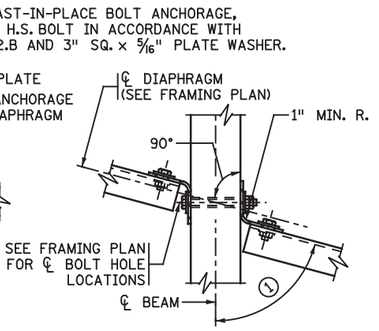
DETAIL "A"

INTERIOR BEAM WITH
CONTINUOUS LINE OF DIAPHRAGMS



SECTION A-A

TYPICAL SECTION AT
ALL FASCIA BEAMS



SECTION B-B

TYPICAL SECTION AT INTERIOR BEAM
WITH CONTINUOUS OR STAGGERED
INTERMEDIATE DIAPHRAGMS

NOTES:

PROVIDE STEEL IN ACCORDANCE WITH SPEC. 3306.

INSTALL IN ACCORDANCE WITH SPEC. 2405.3.K.

TORQUE ALL BOLTS, INCLUDING ANCHOR BOLTS TO 80 FT.-LBS.

SHOP BEND THE LEG OF THE 12" PLATE TO CONFORM TO THE DIAPHRAGM. A ⅜" × 6" × 6" ANGLE MAY BE USED FOR DIAPHRAGMS PERPENDICULAR TO BEAMS.

INCLUDE ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, IN UNIT PRICE BID FOR DIAPHRAGMS FOR PRESTRESSED BEAMS.

BENT PLATES MAY BE USED IN PLACE OF CHANNELS IF THE BENT PLATES HAVE THE SAME HEIGHT AS THE CHANNELS THEY REPLACE, ARE 5/16" IN THICKNESS, AND HAVE LEGS 5" LONG.

GALVANIZE STEEL PLATES AND SHAPES IN ACCORDANCE WITH SPEC. 3394.

GALVANIZE BOLTS, NUTS AND WASHERS IN ACCORDANCE WITH SPEC. 3392.

① FOR SKEW ANGLES UNDER 20°, USE 90° LESS THE SKEW ANGLE. FOR SKEW ANGLES OVER 20°, USE 90°.

APPROVED: APRIL 21, 2021	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	STEEL INTERMEDIATE DIAPHRAGM (FOR 36M, 40MH, MN45 - MN63 PRESTRESSED CONCRETE BEAMS)		B403

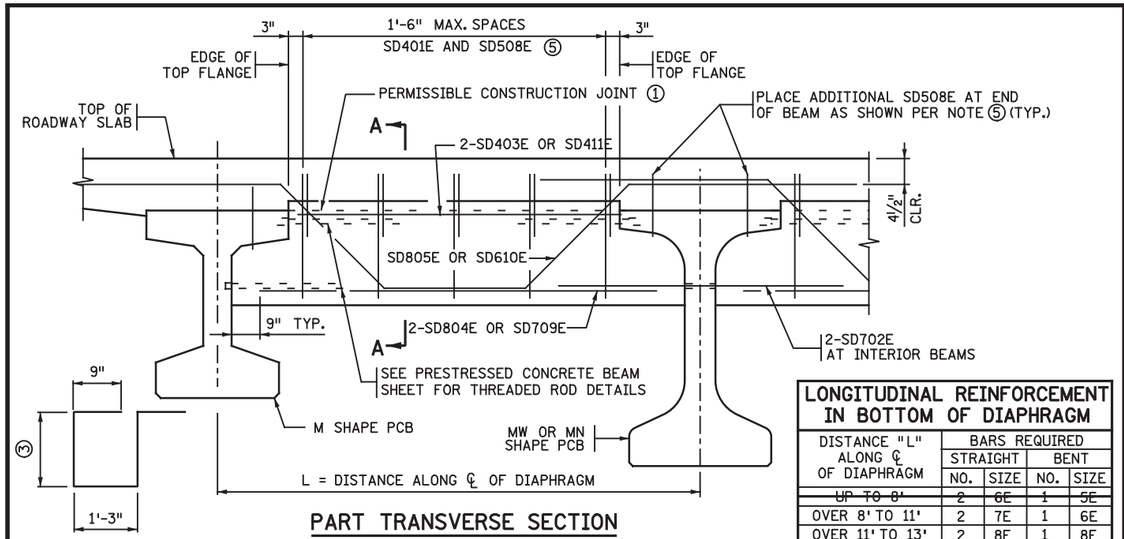
REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: BRIDGE DETAILS

DES: TJC	S.A.P. NO. 002-622-036	APPD:
CHK: TAL		BRIDGE NO. 02595
DR: TJC	SHEET NO. B49 OF B54 SHEETS	
CHK: TAL		



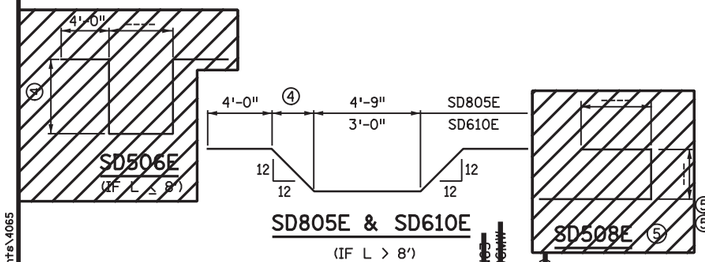
PART TRANSVERSE SECTION

(L > 8' SHOWN)

SD401E

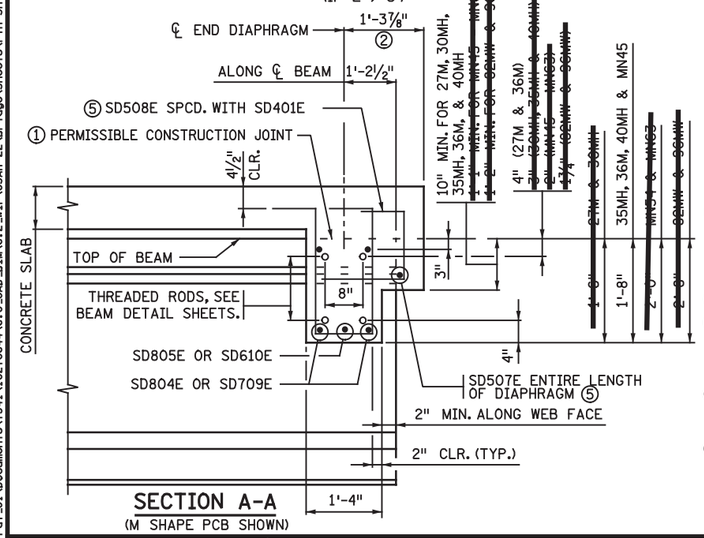
LONGITUDINAL REINFORCEMENT IN BOTTOM OF DIAPHRAGM

DISTANCE "L" ALONG ℄ OF DIAPHRAGM	BARS REQUIRED			
	STRAIGHT		BENT	
	NO.	SIZE	NO.	SIZE
~~UP TO 8'~~	~~2~~	~~6E~~	~~1~~	~~5E~~
OVER 8' TO 11'	2	7E	1	6E
OVER 11' TO 13'	2	8E	1	8E
~~OVER 13' TO 15'~~	~~2~~	~~9E~~	~~1~~	~~10E~~
~~OVER 15' TO 18'~~	~~2~~	~~11E~~	~~1~~	~~11E~~



BILL OF REINFORCEMENT FOR END DIAPHRAGM

BAR	NO.	LENGTH	SHAPE	LOCATION
SD401E	39	7'-1"		VERTICAL TIE
SD702E	10	5'-0"		LONG. THRU BEAM
SD403E	6	8'-6"		LONG. TOP
SD804E	6	9'-9"		LONG. BOTTOM
SD805E	3	18'-8"		LONGITUDINAL
SD709E	6	8'-0"		LONG. BOTTOM
SD610E	3	16'-11"		LONGITUDINAL
SD411E	6	6'-9"		LONG. TOP



SECTION A-A

(M SHAPE PCB SHOWN)

NOTES:

CONCRETE FOR END DIAPHRAGMS SHALL BE THE SAME MIX AS USED IN DECK.

QUANTITIES FOR END DIAPHRAGM CONCRETE AND REINFORCEMENT SHOWN ON THIS DETAIL SHALL BE LISTED IN SUPERSTRUCTURE QUANTITIES.

THREADED RODS ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.

① USE OF CONSTRUCTION JOINT REQUIRES CLEARANCE FOR EXPANSION DEVICE. WHEN CONSTRUCTION JOINT IS USED AT THIS LOCATION, DIAPHRAGM FALSEWORK SHALL REMAIN INPLACE UNTIL COMPLETION OF SLAB CURING PERIOD.

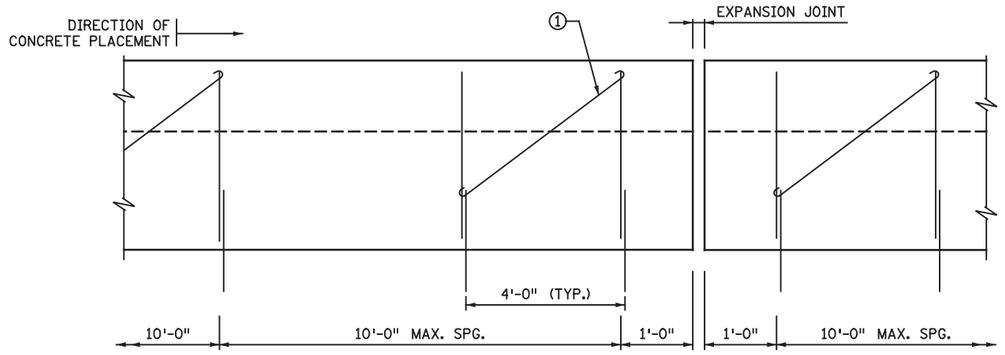
② PERPENDICULAR TO CENTERLINE OF DIAPHRAGM.

③ ~~1'-11" (27M & 30MH),~~ 2'-2" (35MH, 36M, 40MH AND MN45); ~~2'-5" (MN54 AND MN63), 3'-1" (82MW AND 96MW).~~ BASED ON 4" STOOL AND 9" DECK.

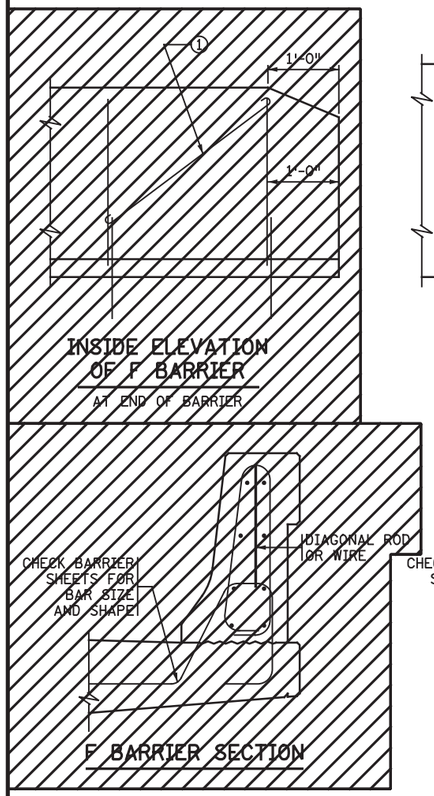
④ ~~1'-10" (27M, 30MH),~~ 2'-1" (36M, 35MH, 40MH AND MN45); ~~2'-4" (MN54 AND MN63), 3'-0" (82MW AND 96MW).~~ BASED ON NOTE ③.

⑤ ADD SD507E AND SD508E ONLY IF NO. OF BARS AND LENGTHS ARE INCLUDED IN BILL OF REINFORCEMENT. SPACE SD508E AT 1'-6" MAX. FOR ENTIRE LENGTH OF DIAPHRAGM. REFER TO "PART TRANSVERSE SECTION" ABOVE.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 04-17-2013 11-06-2013 12-20-2018	DETAIL NO.
Nancy Daubenberger STATE BRIDGE ENGINEER	CONCRETE END DIAPHRAGM (27M, 30MH, 35MH, 36M, 40MH, MN45 - MN63, 82MW & 96MW PRESTRESSED CONCRETE BEAMS) (PARAPET ABUTMENT)		B814



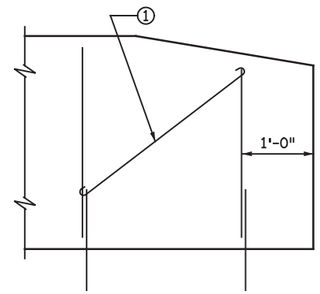
INSIDE ELEVATION OF BARRIER OR PARAPET



INSIDE ELEVATION OF F BARRIER

AT END OF BARRIER

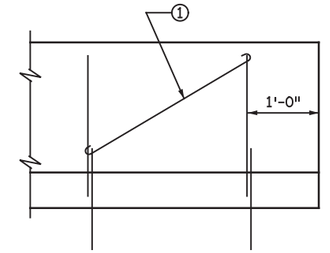
F BARRIER SECTION



INSIDE ELEVATION OF S BARRIER

AT END OF BARRIER

S BARRIER SECTION



INSIDE ELEVATION OF PARAPET

AT END OF PARAPET

PARAPET SECTION

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: AUGUST 24, 2016	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 04-09-2020 04-21-2021 02-08-2022	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	CONCRETE BARRIER OR PARAPET (SLIPFORM ALTERNATE)		B830

REVISION NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

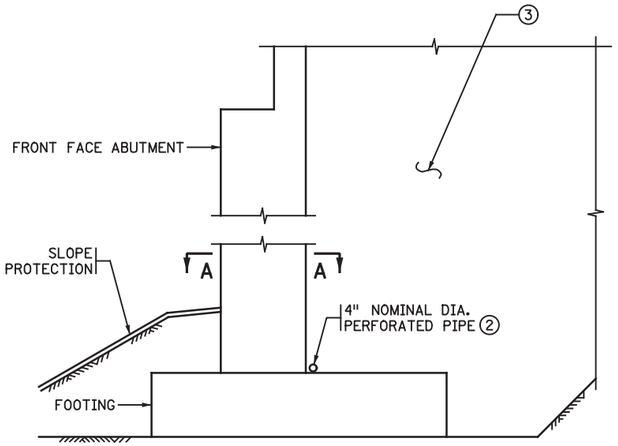
HDR

CERTIFIED BY: Todd A. Lang LICENSED PROFESSIONAL ENGINEER 8/10/23 DATE

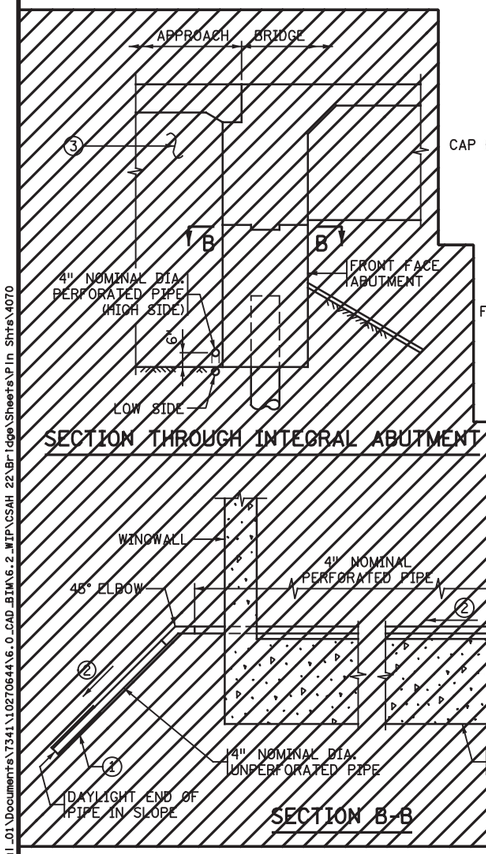
NAME: TODD A. LANG LIC. NO. 42962

TITLE: BRIDGE DETAILS

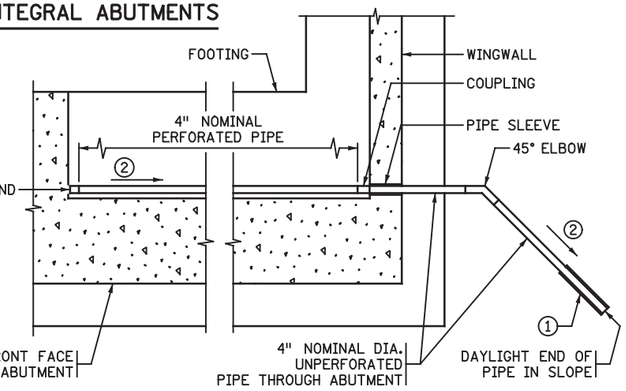
DES: TJC	S.A.P. NO. 002-622-036	APPD:
CHK: TAL		BRIDGE NO. 02595
DR: TJC	SHEET NO. B50 OF B54 SHEETS	
CHK: TAL		



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.

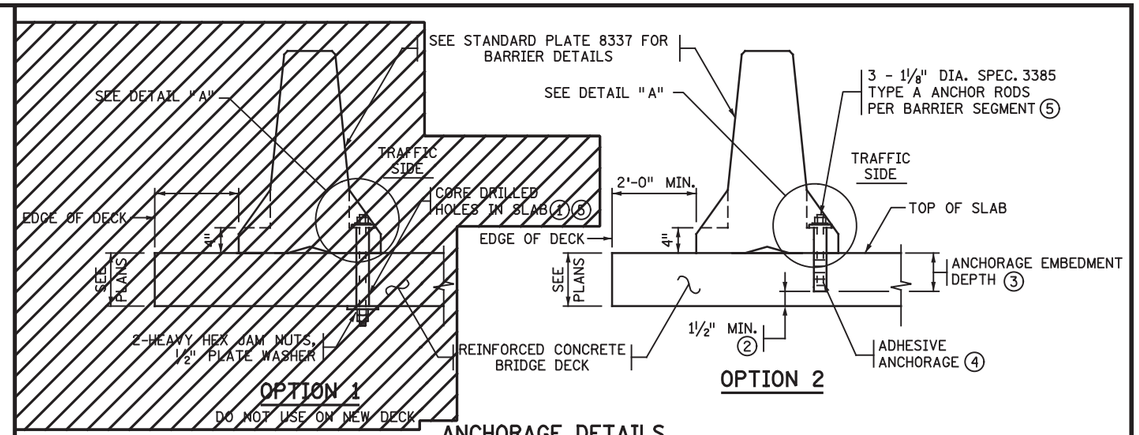
ALL PIPE TO COMPLY WITH SPEC. 3245.2(5).

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.**

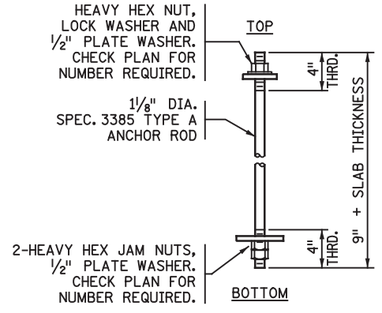
(2) 1/8" PER FT. MINIMUM SLOPE.

(3) REFER TO GRADING PLANS FOR ABUTMENT BACKFILL REQUIREMENTS.



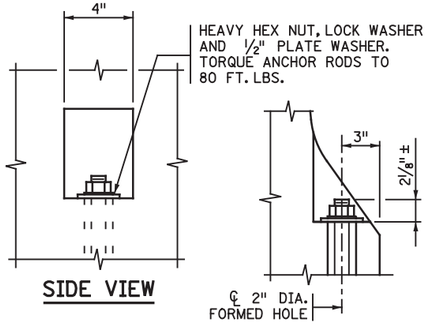
ANCHORAGE DETAILS

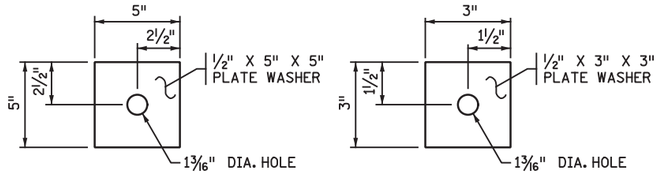
REINFORCEMENT NOT SHOWN



OPTION 1 ANCHOR

(3 PER BARRIER SEGMENT)





ANCHORED BARRIER MEETS MASH TL-3 REQUIREMENTS

NOTES:

ALL HARDWARE TO BE GALVANIZED IN ACCORDANCE WITH SPEC. 3392.

PLATE WASHERS TO BE STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3306.

PIN BARRIERS TOGETHER PER STANDARD PLATE 8337.

THROUGH BOLT ANCHOR RODS MUST BE USED IF THE DECK UNDERSIDE IS PENETRATED DURING DRILLING PROCESS.

DO NOT USE OPTION 2 ON BRIDGES WITH A BITUMINOUS OVERLAY.

REFER TO TRAFFIC CONTROL PLANS FOR DEPLOYMENT LENGTH AND BARRIER TERMINATION REQUIREMENTS.

REFER TO STANDARD FIGURE 5-297.680 (1 OF 2) REGARDING ANCHORING BARRIER OVER BRIDGE EXPANSION JOINTS.

ANCHOR ON TRAFFIC SIDE OF BARRIER ONLY.

SEE SPECIAL PROVISIONS FOR BARRIER INSTALLATION AND REMOVAL REQUIREMENTS.

(1) HAMMER DRILLING OF THESE HOLES IS NOT PERMITTED.

(2) 1 1/2" MINIMUM TO PREVENT BOTTOM OF SLAB FROM SPALLING OR FRACTURING DURING DRILLING.

(3) 6" MINIMUM FOR BRIDGE DECKS WITH TOP MAT REINFORCEMENT AND SOUND CONCRETE.

(4) PROVIDE AN ADHESIVE WITH A MINIMUM CHARACTERISTIC BOND STRENGTH IN UNCRACKED CONCRETE OF 1.0 KSI. EMBED THE ANCHORAGE NO LESS THAN 6" REGARDLESS OF CHARACTERISTIC BOND STRENGTH. DRILL THROUGH REINFORCEMENT (IF ENCOUNTERED) TO ACHIEVE MINIMUM EMBEDMENT. ENSURE HEX NUT IS IN CONTACT WITH THE ADJACENT SURFACE. PROOF LOAD TO 7.0 KIPS. REFER TO THE APPROVED/QUALIFIED PRODUCTS LIST AND THE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

(5) HOLE DIAMETER 1 3/16" MIN., 1 1/2" MAX.

APPROVED: JANUARY 13, 2015	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Nancy Daubenberger STATE BRIDGE ENGINEER	DRAINAGE SYSTEM	12-02-2015 02-22-2018 11-08-2018 12-21-2022	B910

APPROVED: APRIL 09, 2020	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	TEMPORARY PORTABLE PRECAST CONCRETE BARRIER ANCHORAGE TO CONCRETE (TEMPORARY USAGE IN LIMITED BARRIER DISPLACEMENT AREAS)	04-21-2021	B920

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

CERTIFIED BY: Todd A. Lang — LICENSED PROFESSIONAL ENGINEER — 8/10/23 DATE

NAME: TODD A. LANG LIC. NO. 42962

TITLE: BRIDGE DETAILS

DES: TJC	S.A.P. NO. 002-622-036	APPD:
CHK: TAL		BRIDGE NO. 02595
DR: TJC	SHEET NO. B51 OF B54 SHEETS	
CHK: TAL		

WEARING COURSE

☐ LOW SLUMP

☐ OTHER _____
TYPE OR MANUFACTURER

EXPANSION JOINTS

JOINT MANUFACTURER

MANUFACTURER'S IDENTIFICATION _____
MFR'S No. AND/OR LETTER DESIGNATION FOR JOINT USED

GLAND MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)

SIZE OF GLAND _____

MANUFACTURER'S IDENTIFICATION _____
MFR'S No. AND/OR LETTER DESIGNATION FOR GLAND USED

ELASTOMERIC BEARING PADS

PAD MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)

SPECIAL SURFACE FINISH

PRODUCT NAME: _____ COLOR & TEXTURE: _____

FINISHING ROADWAY FACES OF BARRIER OR PARAPET

PRODUCT NAME: _____ COLOR & TEXTURE: _____

ANTI-GRAFFITI COATING

MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)

PRODUCT NAME: _____ LOCATION: _____

PAINT SYSTEM

MnDOT SPECIFICATION NUMBER _____
2478 OR 2479 OR OTHER

MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)

PRIME COAT _____
MnDOT MATERIAL SPECIFICATION NUMBER

INTERMEDIATE COAT _____
MnDOT MATERIAL SPECIFICATION NUMBER

FINISH COAT _____ _____
MnDOT MATERIAL SPECIFICATION NUMBER COLOR

PLAN QUALITY

RATE 1 (AGREE), 2 (NEUTRAL), OR 3 (DISAGREE, PLEASE COMMENT BELOW)

DIMENSIONING AND DETAILING ADEQUATELY DESCRIBED REQUIRED CONSTRUCTION. _____

BAR LISTS AND QUANTITIES WERE TYPICALLY COMPLETE AND FREE OF ERRORS. _____

SCALE OF DRAWINGS AND OVERALL LEGIBILITY OF LINES AND TEXT WAS GOOD. _____

(SB) SPECIAL PROVISIONS ADEQUATELY DESCRIBED SPECIAL WORK AND PAYMENT. _____

COMMENTS: _____

NUMBER OF BRIDGE
SUPPLEMENTAL AGREEMENTS: _____ COST: $ _____

LIST SIGNIFICANT ERRORS OR OMISSIONS IN PLAN DETAILS OR PAY QUANTITIES IN THE SPACE PROVIDED AT RIGHT.

NOTIFICATION TO ADD, REMOVE, OR REHAB A STRUCTURE

PLEASE GO TO THE FOLLOWING WEBSITE AND COMPLETE THE FORM WHEN ADDING, REMOVING OR REHABILITATING A STRUCTURE:
(CONTACT THE BRIDGE INVENTORY MANAGEMENT UNIT AT 651-366-4557 IF YOU HAVE QUESTIONS)
- WHEN ADDING A NEW STRUCTURE - (SEND WHEN THE BRIDGE IS OPEN TO TRAFFIC)
http://www.dot.state.mn.us/bridge/new-structure.html
- WHEN REMOVING A STRUCTURE - (SEND WHEN THE BRIDGE IS NO LONGER IN SERVICE)
http://www.dot.state.mn.us/bridge/remove-structure.html
- WHEN REHABILITATING A STRUCTURE - (SEND WHEN THE REHABILITATION IS COMPLETE)
http://www.dot.state.mn.us/bridge/rehab-structure.html

CHANGE OF VERTICAL CLEARANCE

PLEASE GO TO THE FOLLOWING WEBSITE WHEN CHANGING THE VERTICAL CLEARANCE OF EXISTING BRIDGE STRUCTURE:
(CONTACT THE BRIDGE INVENTORY MANAGEMENT UNIT AT 651-366-4557 IF YOU HAVE QUESTIONS)
http://www.dot.state.mn.us/bridge/pdf/clearanceform.pdf

OTHER ITEMS ①

① UTILITIES ADDED DURING CONSTRUCTION AND SPECIALTY ITEMS.

FINAL QUANTITIES ENTERED ON SCHEDULE OF QUANTITIES: YES ☐ NO ☐

REMOVE & PATCH QUANTITIES (SF)						CONCRETE SURFACE REPAIR (SF)	CLEAN & PAINT REINF. (SF)
TYPE A:	TYPE B:	TYPE C:	TYPE D:	TYPE E:	TYPE F:		

SUMMARY OF SIGNIFICANT AS-BUILT CHANGES

THE AS-BUILT INFORMATION WAS ADDED TO THE PLAN BY:

_____ _____
INSPECTOR(S) SIGNATURE DATE

CHECKED BY: _____ _____
PROJECT ENGINEER/SUPERVISOR SIGNATURE DATE

WHEN BRIDGE IS OPEN TO TRAFFIC, COMPLETE THIS AS-BUILT BRIDGE DATA SHEET AND SUBMIT TO THE BRIDGE OFFICE VIA EMAIL AT: BridgeForms.dot@state.mn.us.

REVISION:

APPROVED: MAY 10, 2017
Kevin Western
STATE BRIDGE ENGINEER

AS-BUILT DETAILS
(AS NEEDED)

THIS FORM IS AVAILABLE IN AN ELECTRONIC FORMAT AT:
http://www.dot.state.mn.us/bridge/pdf/as-built-bridge-data-r0.xlsx

TITLE: AS-BUILT BRIDGE DATA

S.A.P. NO. 002-622-036

FIG. 5-397.900

APPROVED:

SHEET NO. B52 OF B54 SHEETS

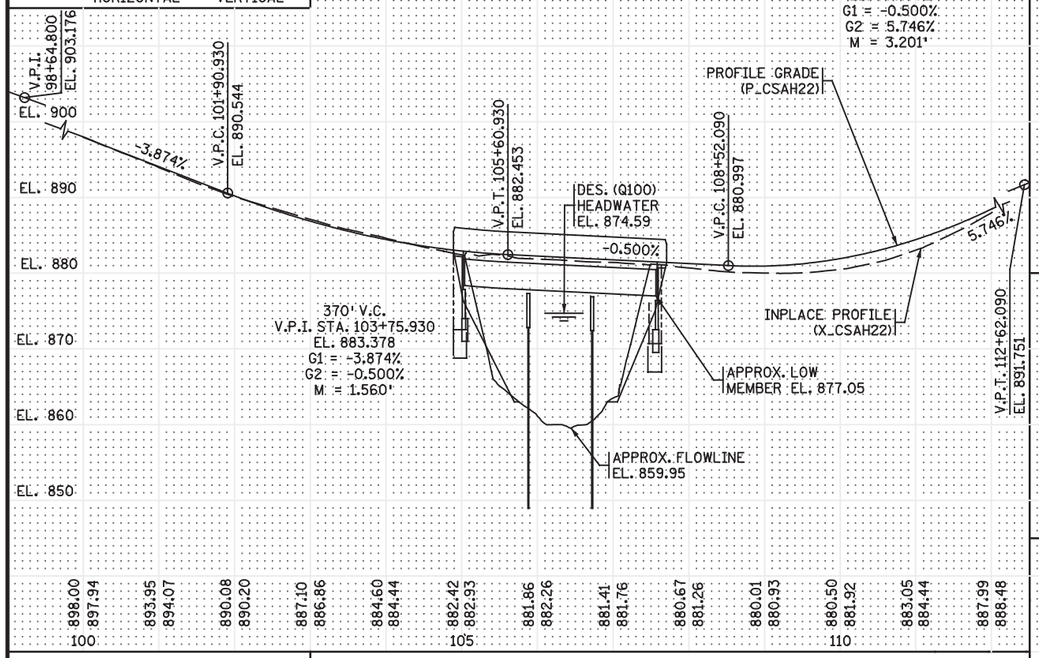
BRIDGE NO. 02595

FILENAME: $$$$FILENAME@$$$$
TIME : $@TIME@$
PLOTTED : $$$$@DATE@$$$$$
PATH & FILENAME: $$$$PATH&FILENAME@$$$$
pw:\\pwdrusoen01:HDR_US_Central_01\Documents\6731\1627884\6.0 CAD Files\Bridge Sheets\SAP 002-622-036 SH 22\Bridge\Sheets\Plan Sht\5000
User
2:26:02 PM
8/10/2023

CONTRACTED PROFILE

SCALE : 0 50' 100' HORIZONTAL; 0 5' 10' VERTICAL

C.S.A.H. 22 PROFILE (P_CSAH22)



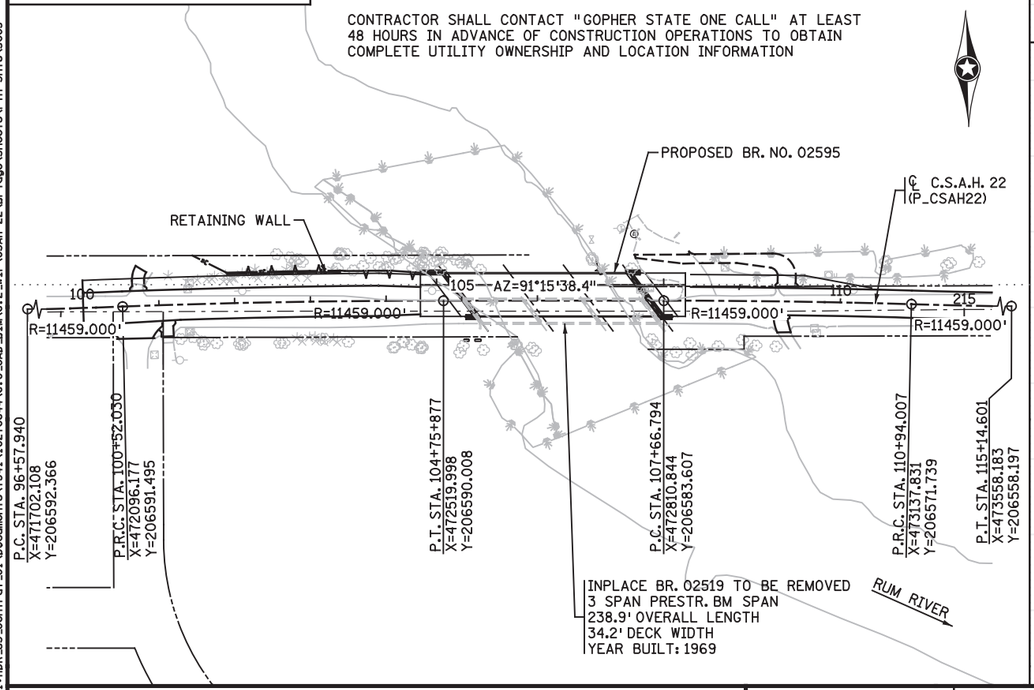
PLAT

SCALE: 0 50' 100'

SEE BORINGS SHEET FOR INPLACE UTILITIES

SEE ROADWAY PLANS FOR BYPASS ALIGNMENT DATA

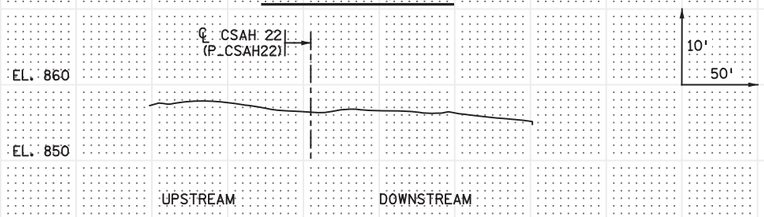
CONTRACTOR SHALL CONTACT "GOPHER STATE ONE CALL" AT LEAST 48 HOURS IN ADVANCE OF CONSTRUCTION OPERATIONS TO OBTAIN COMPLETE UTILITY OWNERSHIP AND LOCATION INFORMATION

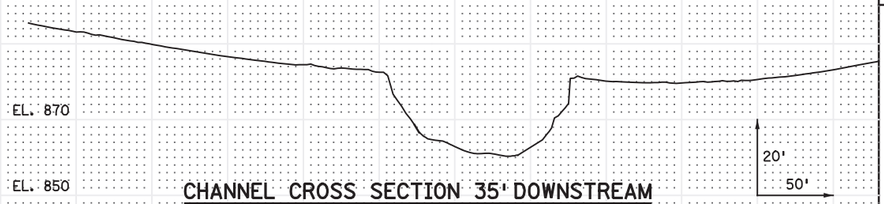


TYPICAL SECTIONS & PERTINENT DATA

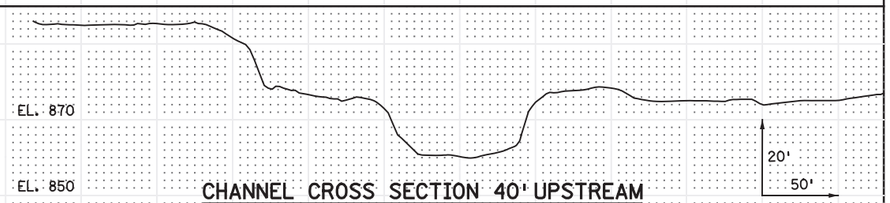
SCALES AS SHOWN

CHANNEL PROFILE

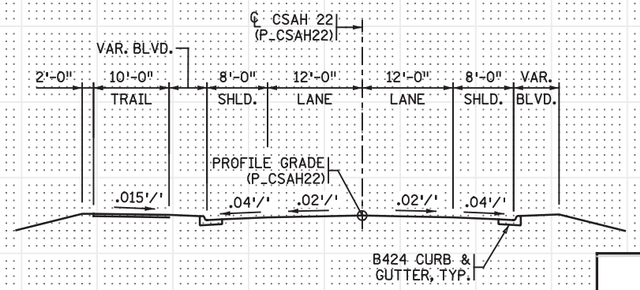




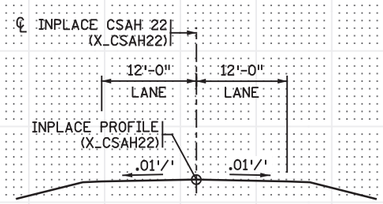
CHANNEL CROSS SECTION 35' DOWNSTREAM



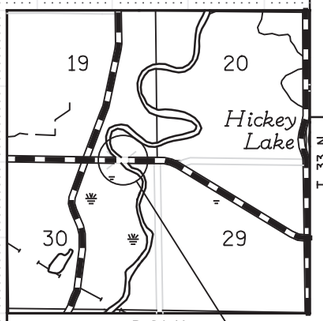
CHANNEL CROSS SECTION 40' UPSTREAM



PROPOSED TYPICAL SECTION



EXISTING TYPICAL SECTION



INDEX MAP (FOUR SECTIONS)

LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

1. SPECIAL FEATURES: ~~WATERFALLS, DAMS,~~ FLOODS, ICE, DEBRIS, ~~SLIDING BANKS, RECREATIONAL BOATING.~~
2. 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. NONE
3. APPARENT HIGHWATER ELEVATION 872.76 OBTAINED FROM: BRIDGE HYDRAULIC REPORT
4. OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY. N/A

HYDRAULIC ENGINEERS RECOMMENDATION

DATE: 4-11-23

STREAM OR DITCH DESIGNATION: RUM RIVER
DRAINAGE AREA: 1360 SQ. MI.
MAX. FLOOD ON RECORD: 10,100 C.F.S.
MAXIMUM OBSERVED HIGHWATER ELEVATION: 872.76 FT.
DESIGN FLOOD (100 YR. FREQ.): 14,000 C.F.S.
- HEADWATER ELEVATION: 874.59 FT.
- DESIGN MEAN VELOCITY THROUGH STRUCTURE: 7.2 F.P.S.
- TOTAL STAGE INCREASE: 0.02 FT.
- LOW MEMBER AT OR ABOVE ELEVATION: 877.05 FT.

WATERWAY AREA REQUIRED BELOW ELEV. 874.59=1943 SQ. FT. AT RIGHT ANGLES TO CHANNEL
BASIC FLOOD (100 YR. FREQ.): 14,000 C.F.S.
- HEADWATER ELEVATION: 874.59 FT.
- TOTAL STAGE INCREASE: 0.02 FT.
- MEAN VELOCITY THROUGH STRUCTURE: 7.2 F.P.S.

FLOWLINE ELEVATION: 859.95 FT. SKEW ANGLE: 37°
ESTIMATED TOTAL SCOUR AT PIER EL. 847.5 (100 YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION

DATE: 04-11-23

ESTIMATED
TOTAL SCOUR AT PIER EL. 845.6 (500 YR. FREQ.)
SCOUR CODE: P - STABLE DUE TO PROT.

BRIDGE SURVEY SHEETS MADE FROM :

FILES:
JOBd22.GPK, CSAH22_AL.DGN, CSAH22_GM.DGN
CSAH22_HTPO-SURVEY.DGN, CSAH22_WETLAND.DGN,
CSAH22_RW.DGN, CSAH22_UT.DGN

BENCH MARK ELEVATION 911.812 (N.A.V.D. 88 ADJ.)
GSID STATION #102716, MNDOT NAME 0206 AG
T.H. 47 & C.S.A.H. 22. X = 465067.731, Y = 206718.548

ANOKA COUNTY
MINNESOTA DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

0.2 MI EAST OF JCT C.R. 7 ON C.S.A.H. 22 OVER THE RUM RIVER

SEC. 19/30 TWP. 33 N. R. 24 W.

COUNTY: ANOKA

CITY: OAK GROVE

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

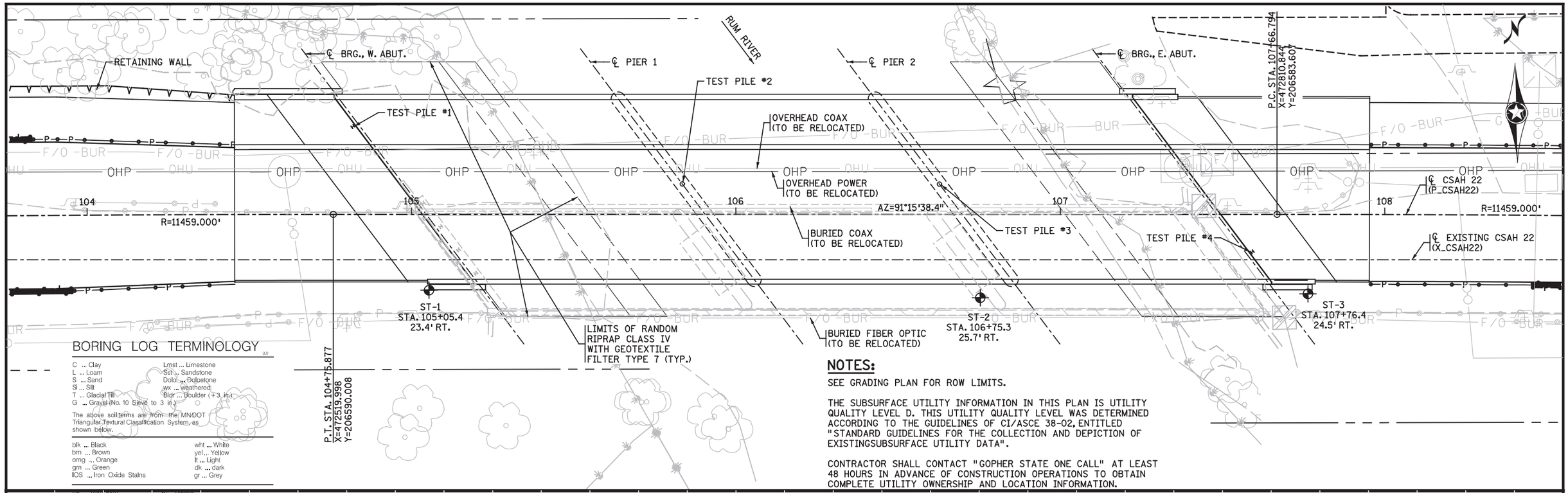
TITLE: BRIDGE SURVEY

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B53 OF B54 SHEETS

BRIDGE NO. 02595



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
wx ... weathered
Bldr ... Boulder (+3 in.)

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

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

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

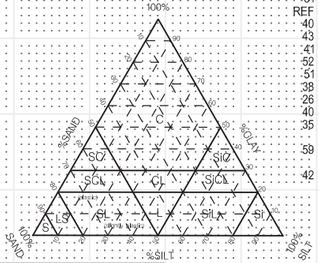
vf ... Very Fine
F ... Fine
Cr ... Coarse

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 providede 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



EXISTING GROUND PROFILE
40' LT. — — — —
℄ C.S.A.H. 22 (X_CSAH22) ————
33' RT. — — —

REVISION					
NO.	DATE	DESCRIPTION	DR.	CHK.	APP'D.

HDR

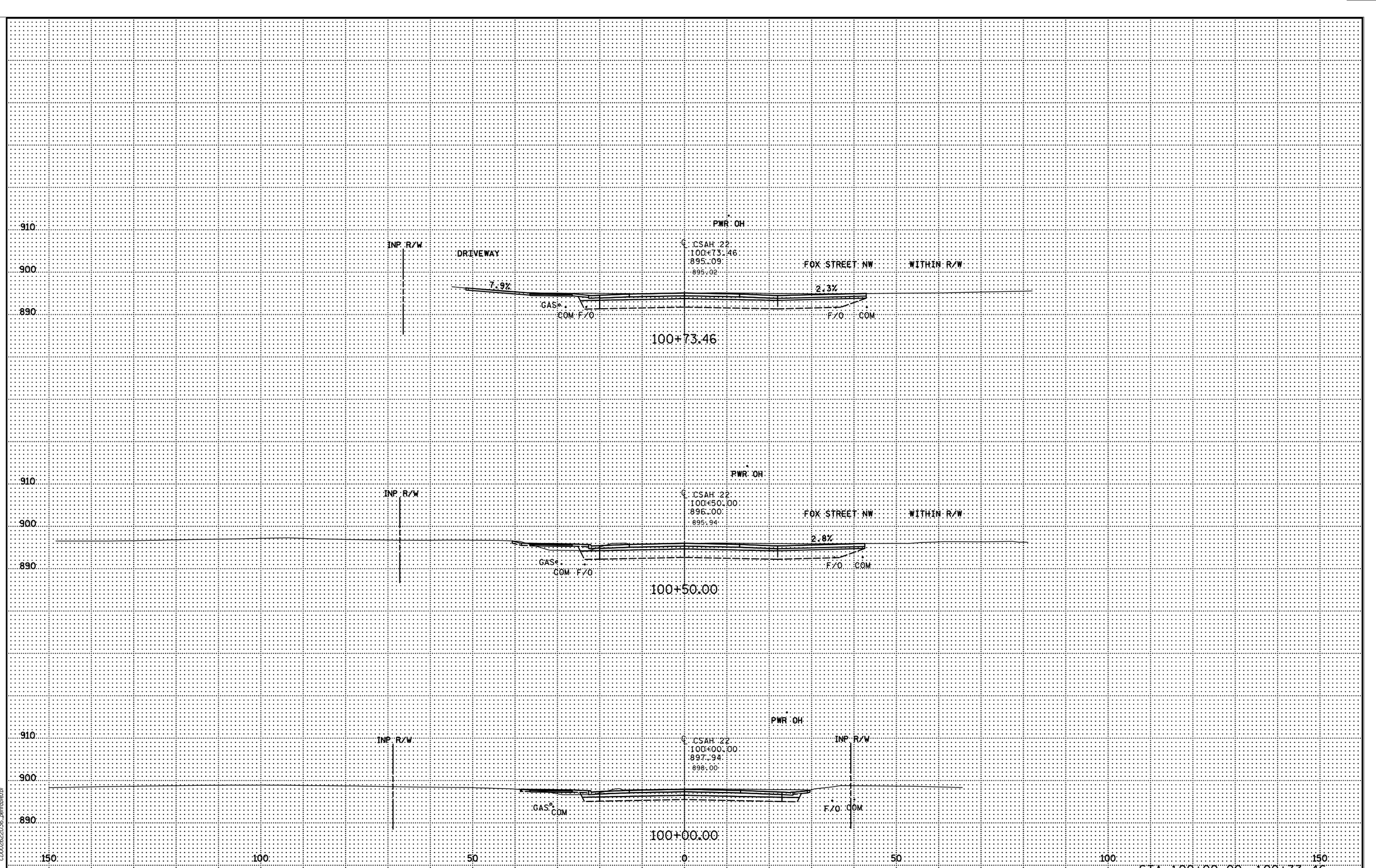
TITLE: BORINGS

DES: TJC	DR: DM	APPROVED:
CHK: TAL	CHK: TAL	

S.A.P. NO. 002-622-036

SHEET NO. B54 OF B54 SHEETS

BRIDGE NO. 02595



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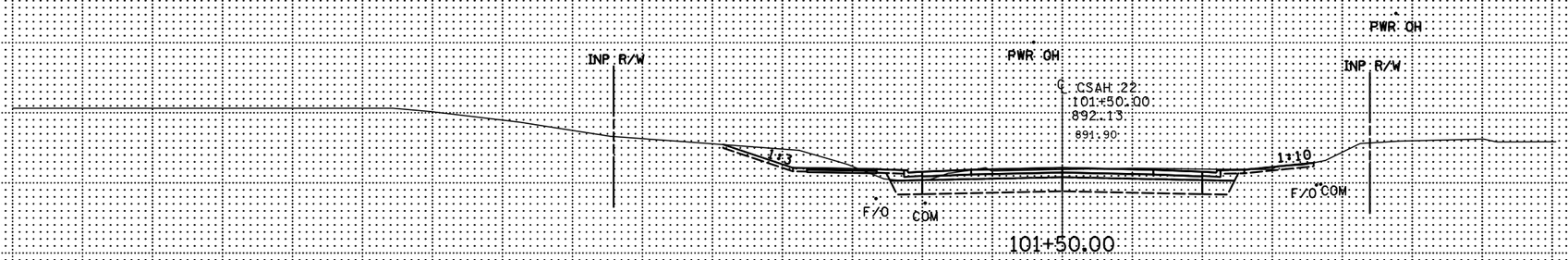

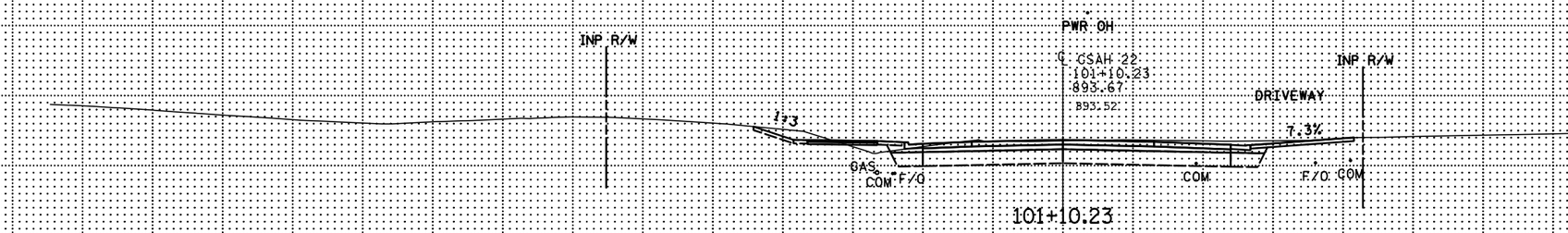

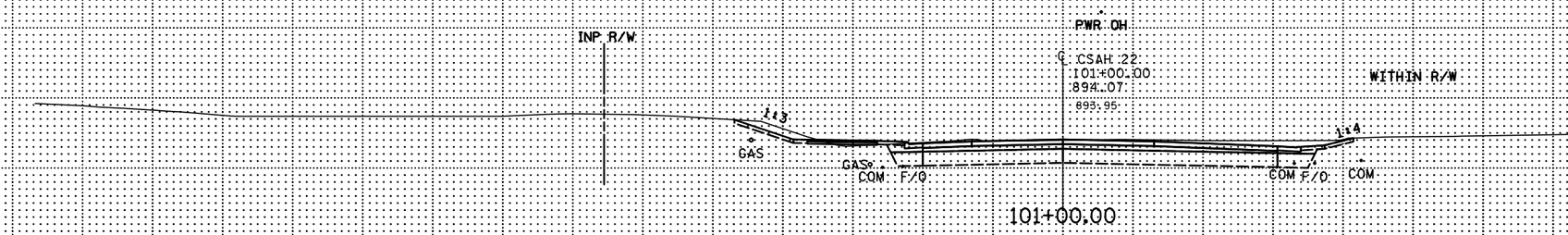

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STA.101+00.00 -101+50.00

CSAH 22 | SAP 002-622-036, SAP 223-020-006 SHEET NO. X2 OF X17 SHEETS

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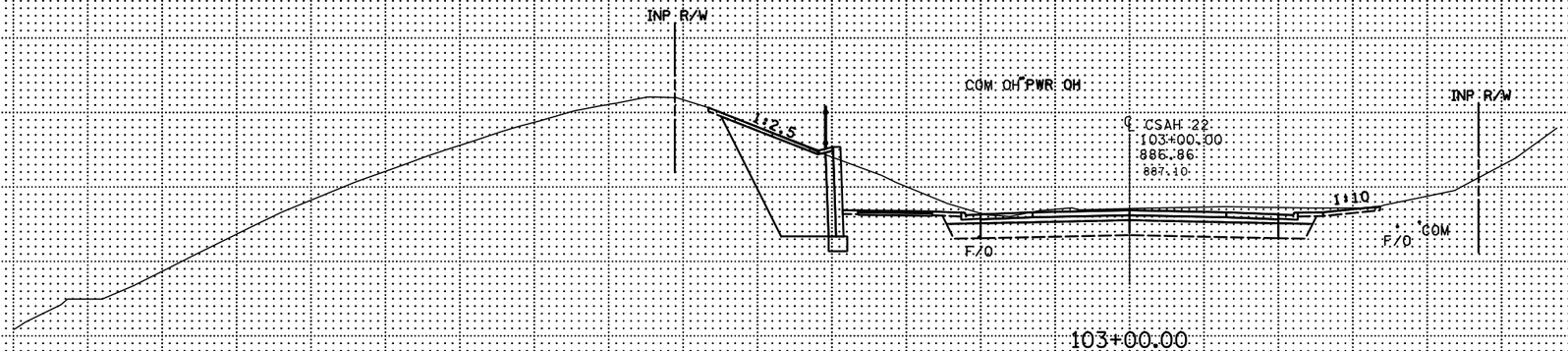

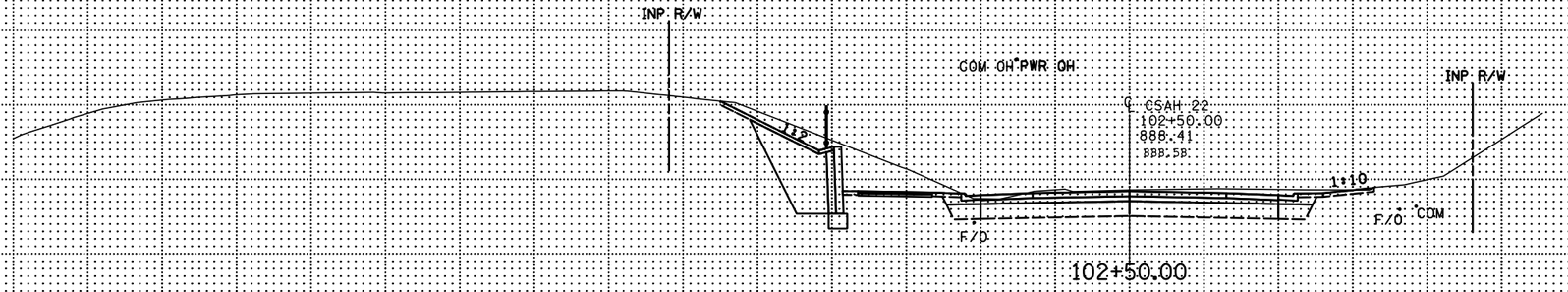

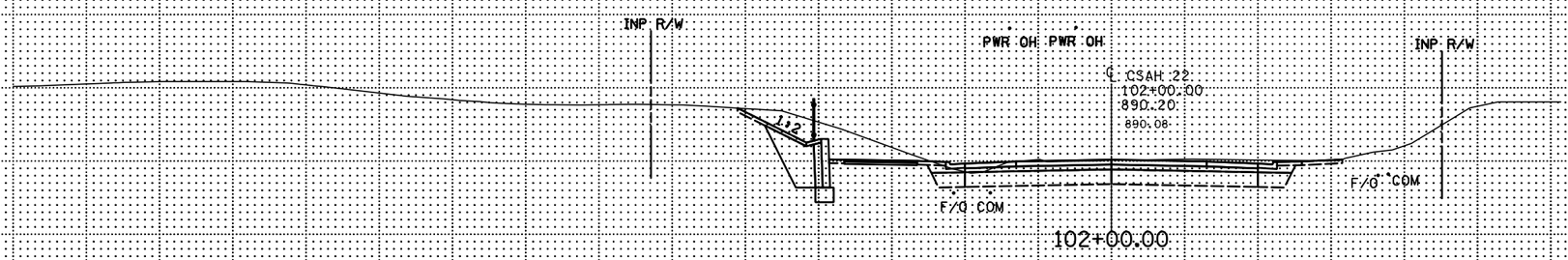

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STA. 102+00.00 – 103+00.00

CSAH 22 | SAP 002-622-036, SAP 223-020-006 SHEET NO. X3 OF X17 SHEETS

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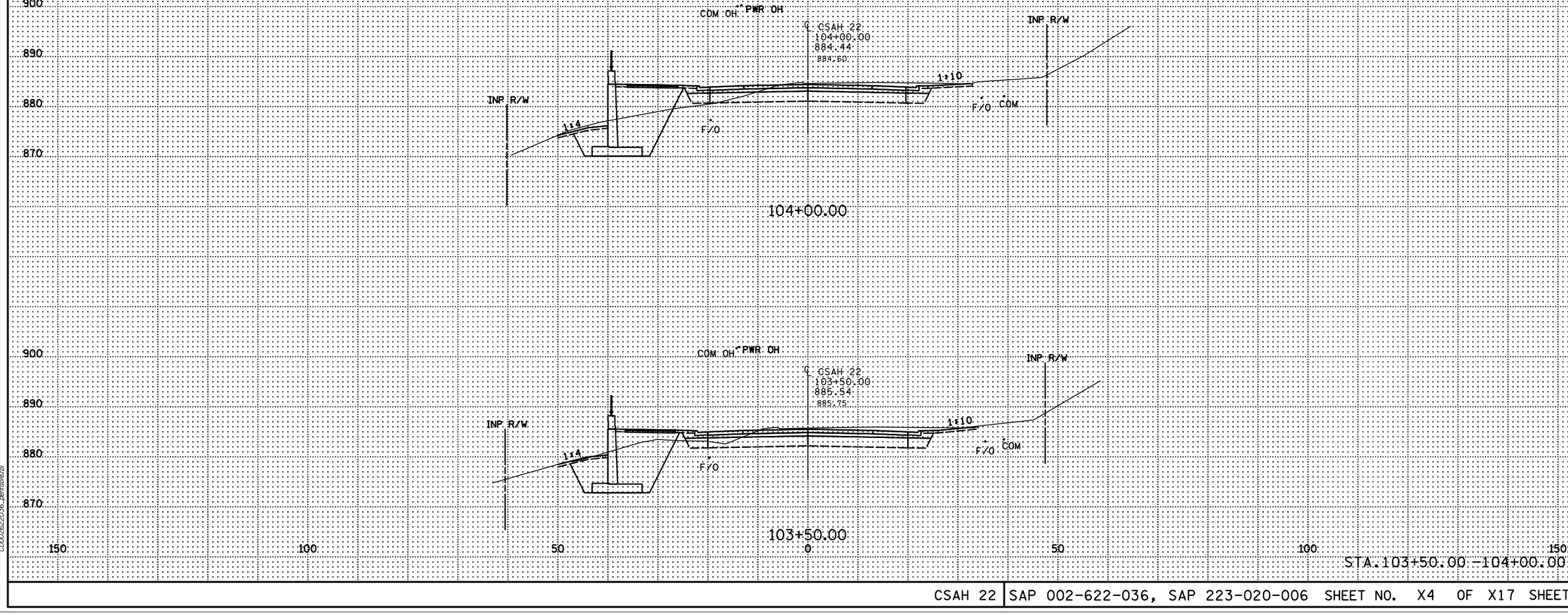

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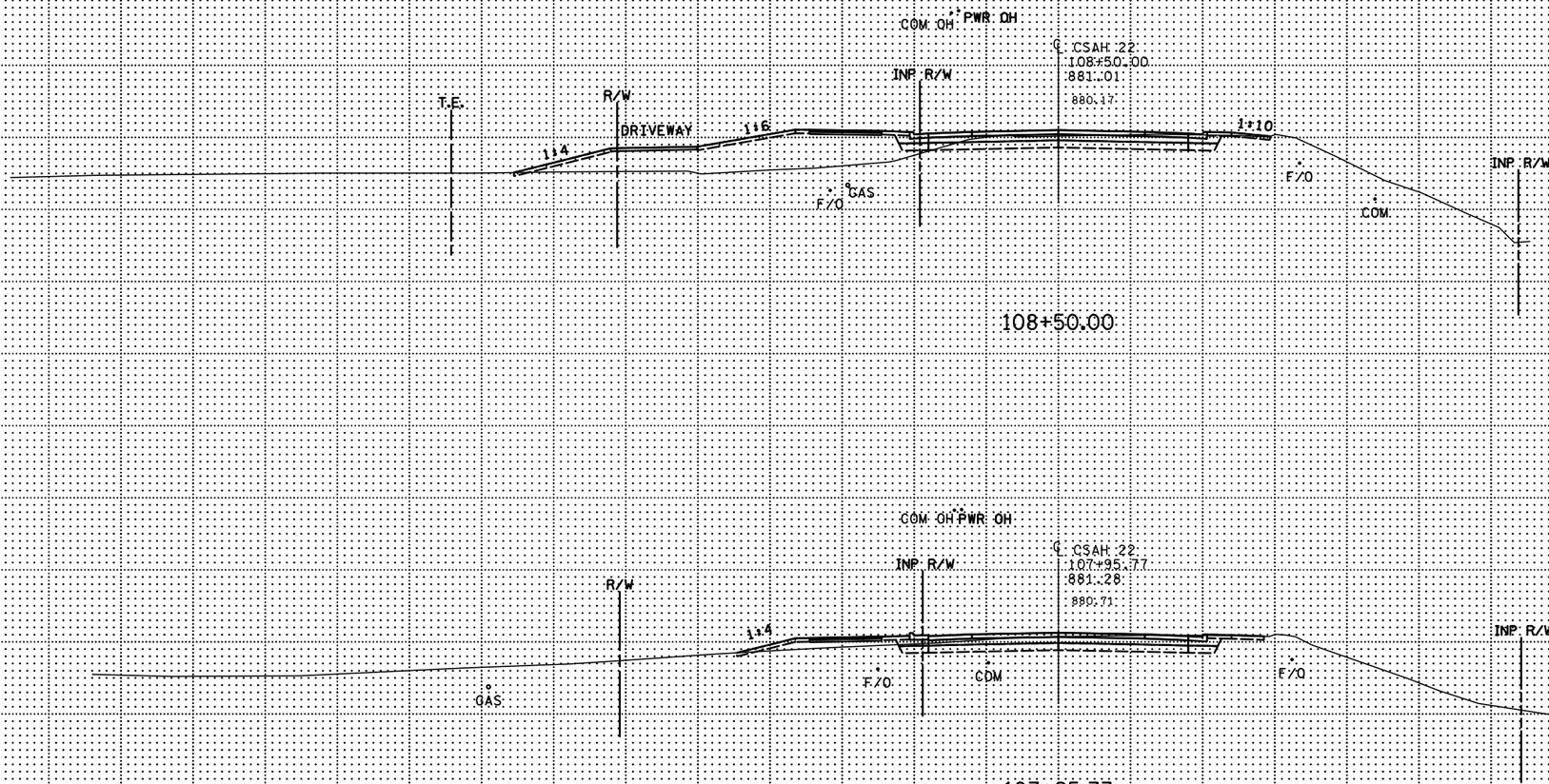
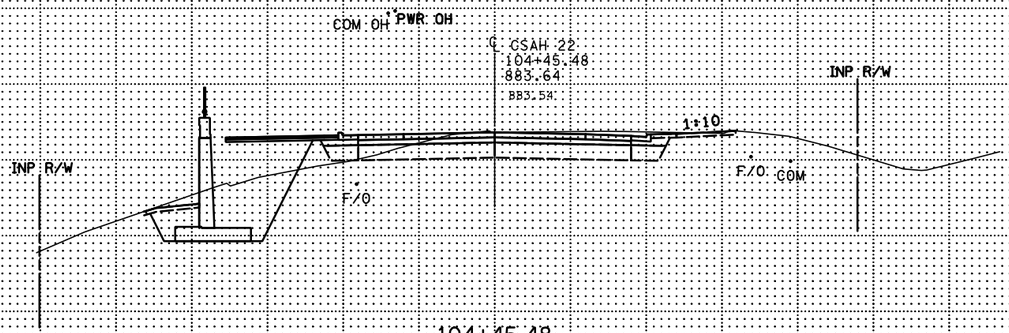


108+50.00

107+95.77

BRIDGE 02595
STA. 105+03.25 TO 107+49.50



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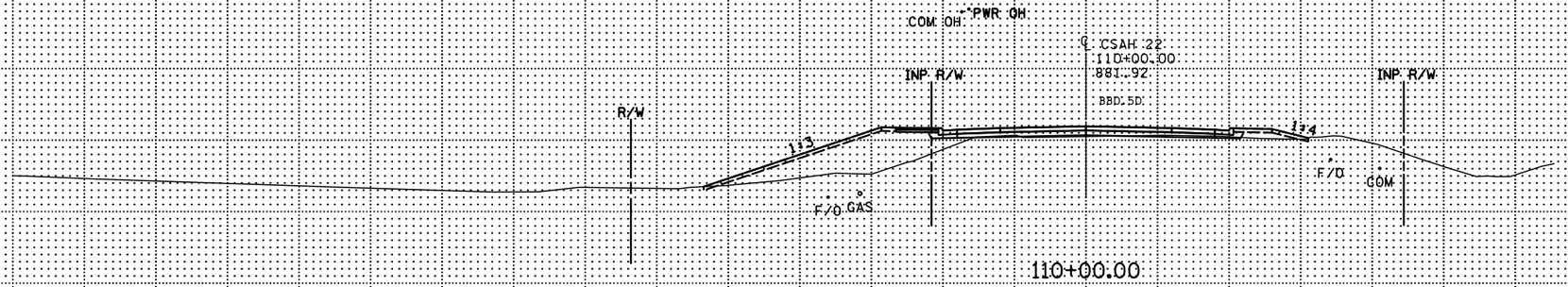
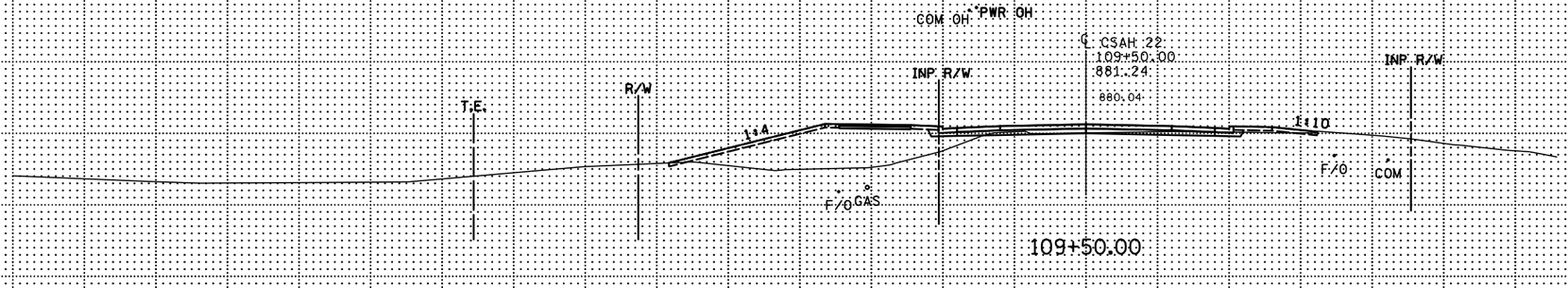
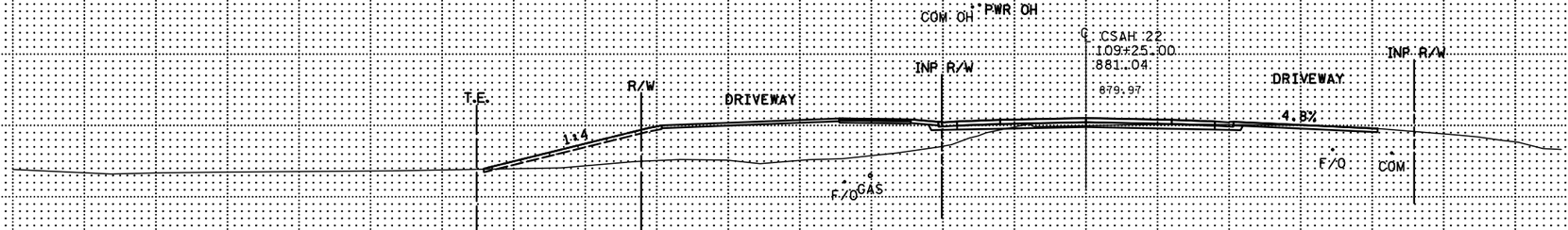
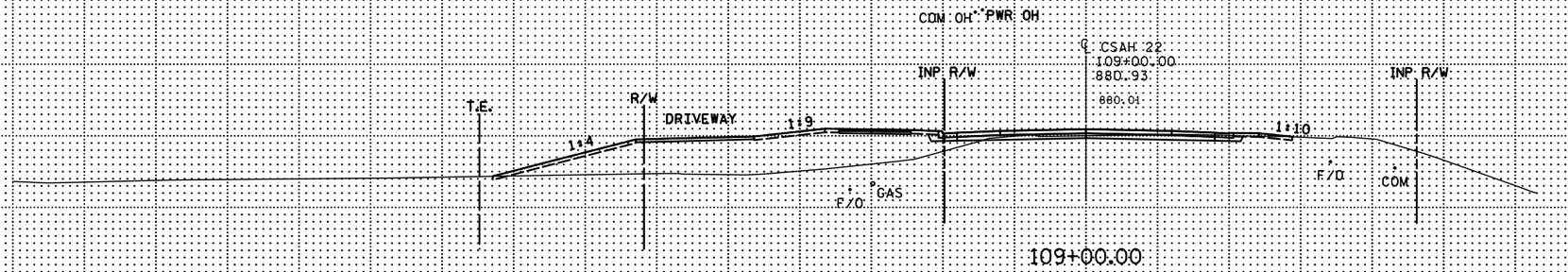
STA.104+45.48 -108+50.00









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STA.109+00.00 –110+00.00

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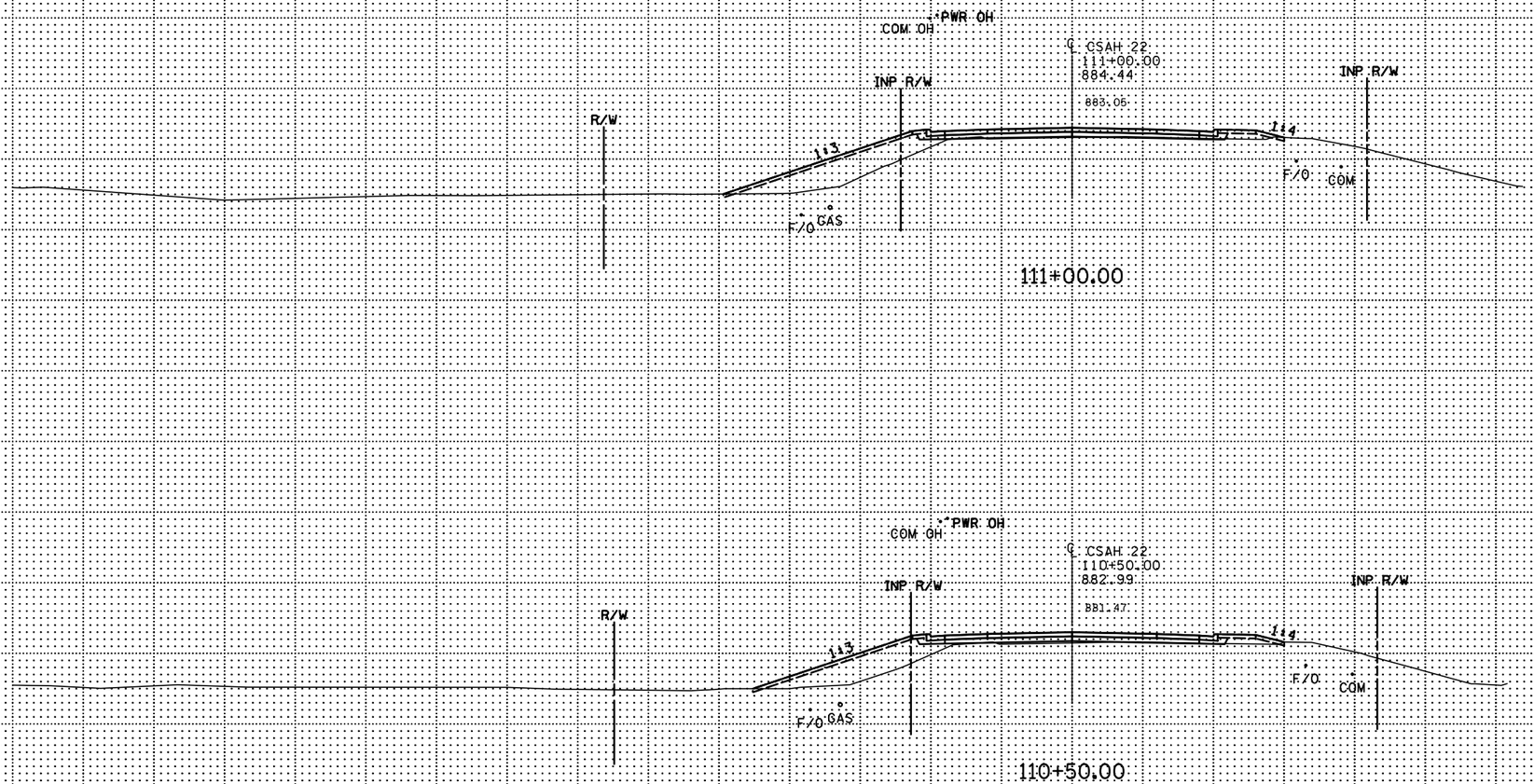
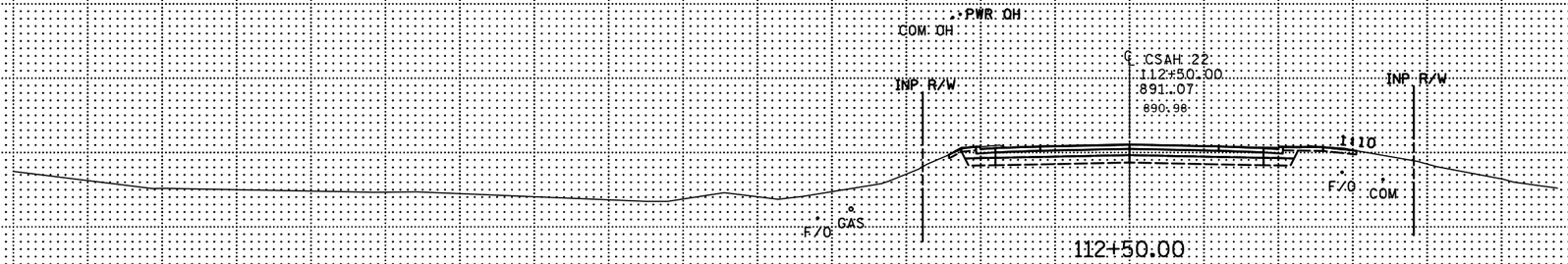
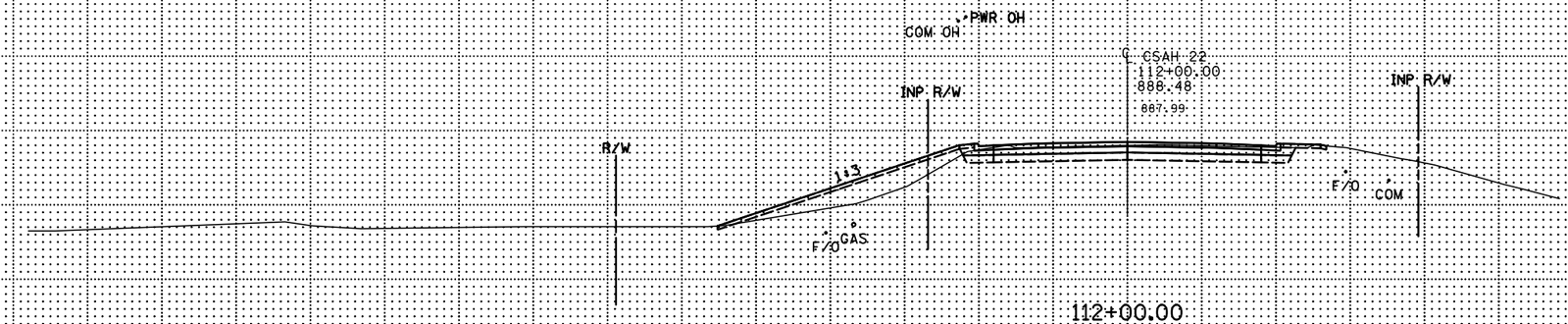
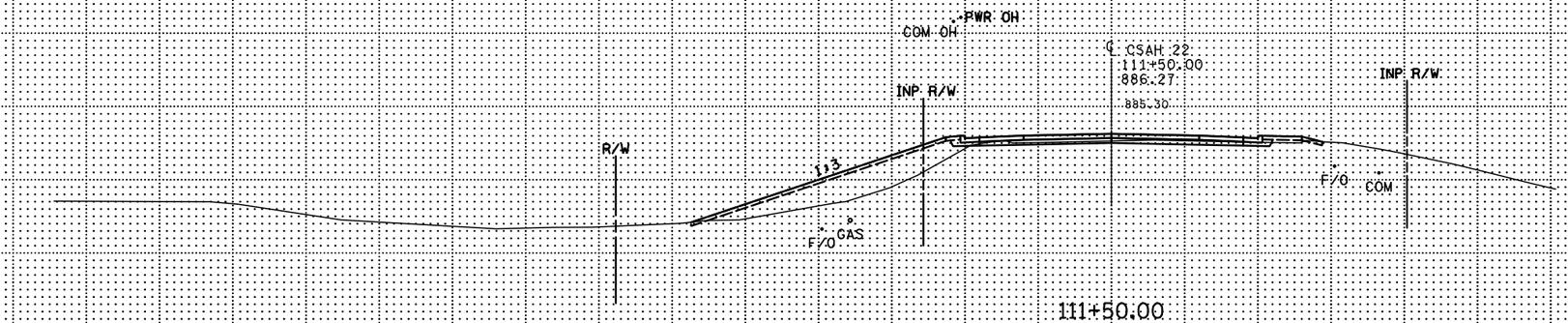




112+50.00



112+00.00



111+50.00

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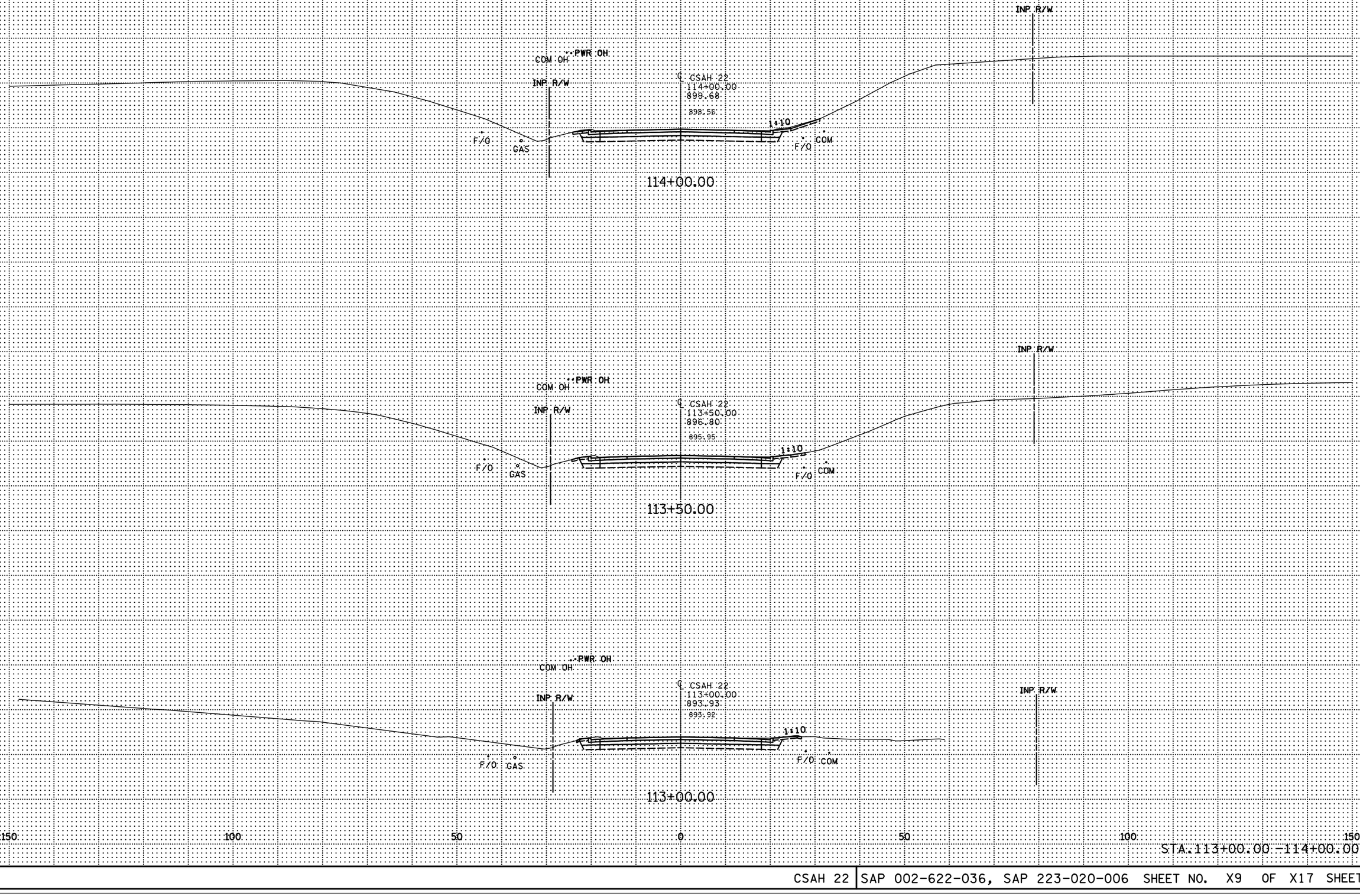
STA.111+50.00 -112+50.00



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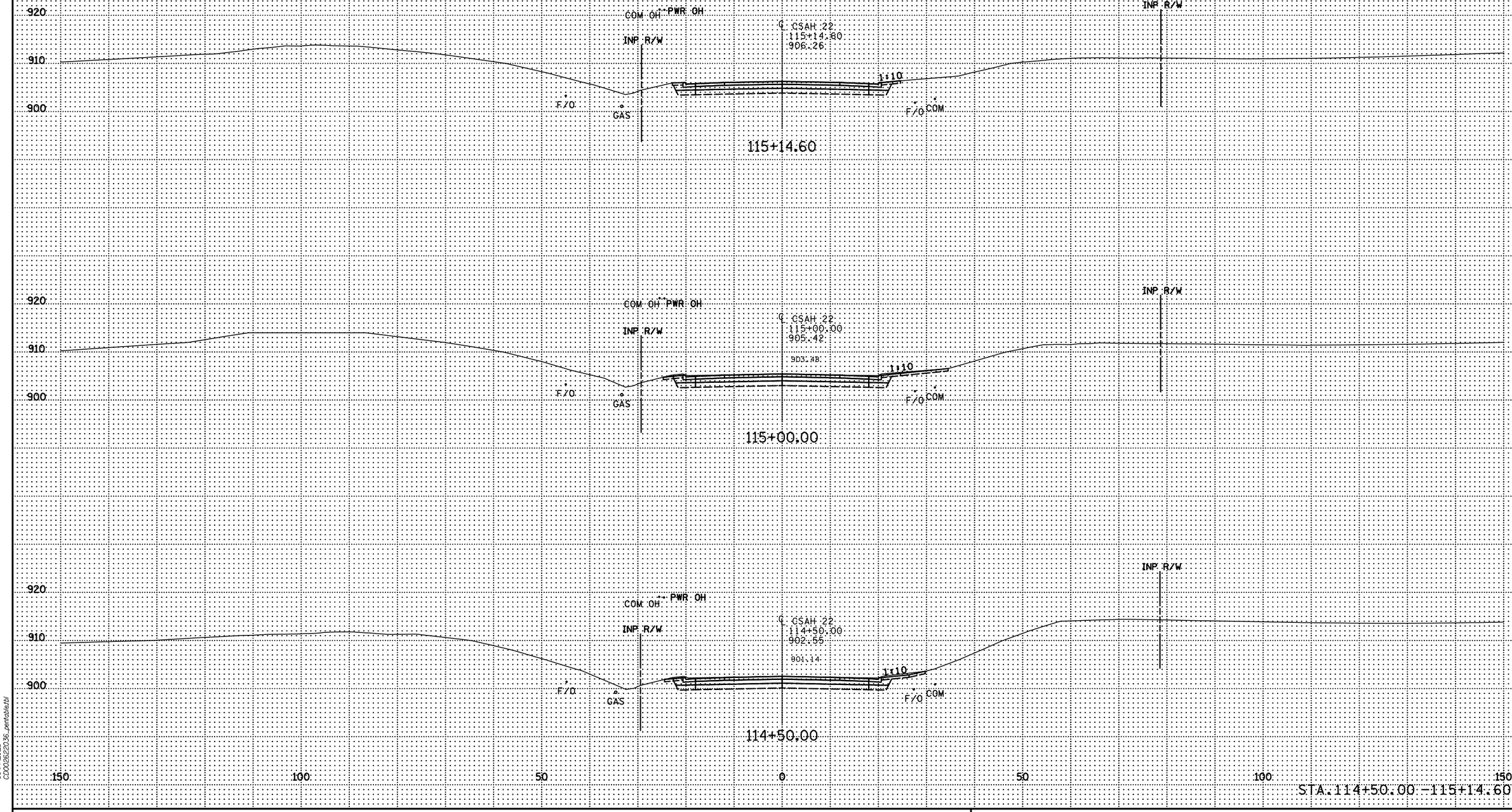

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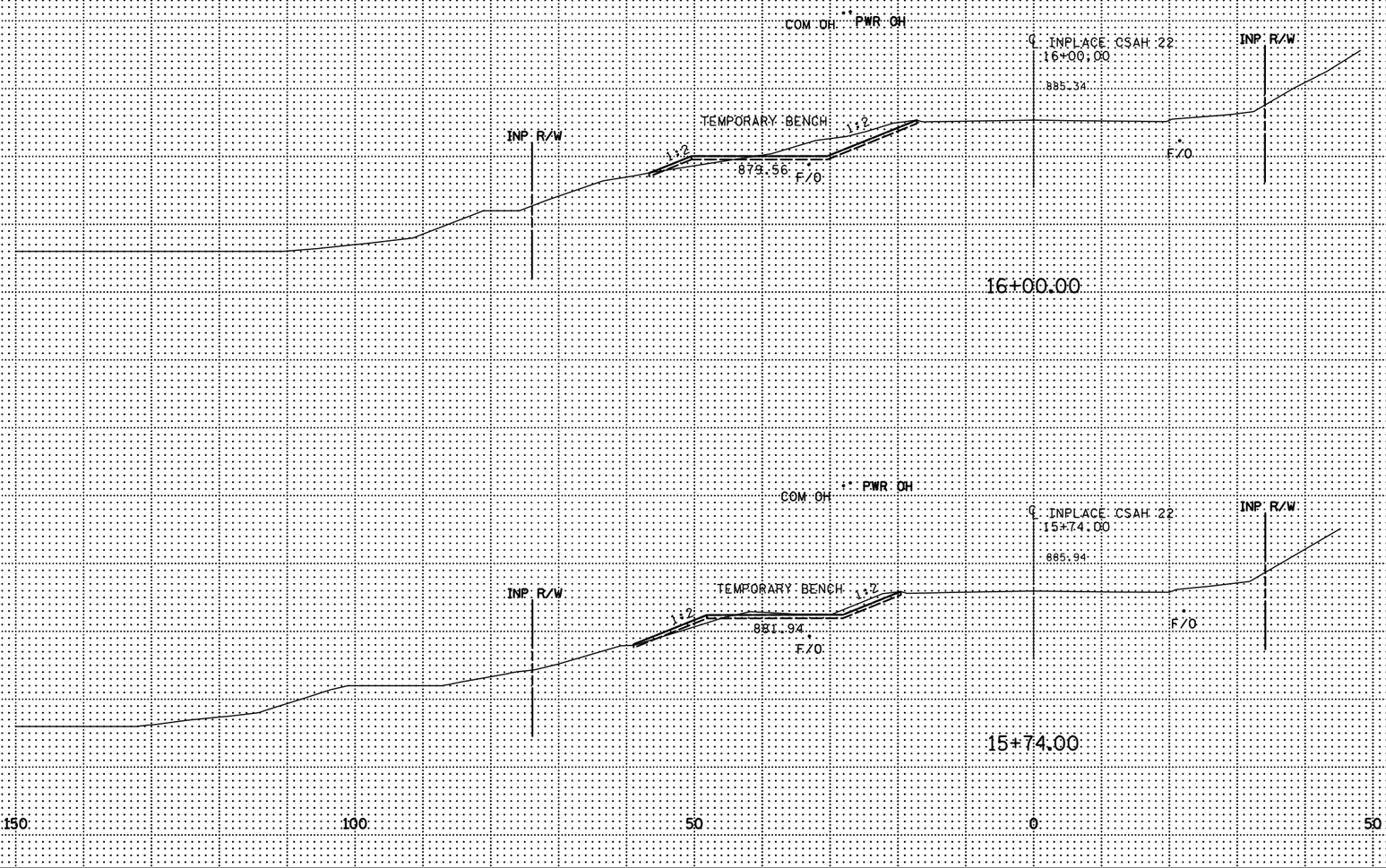

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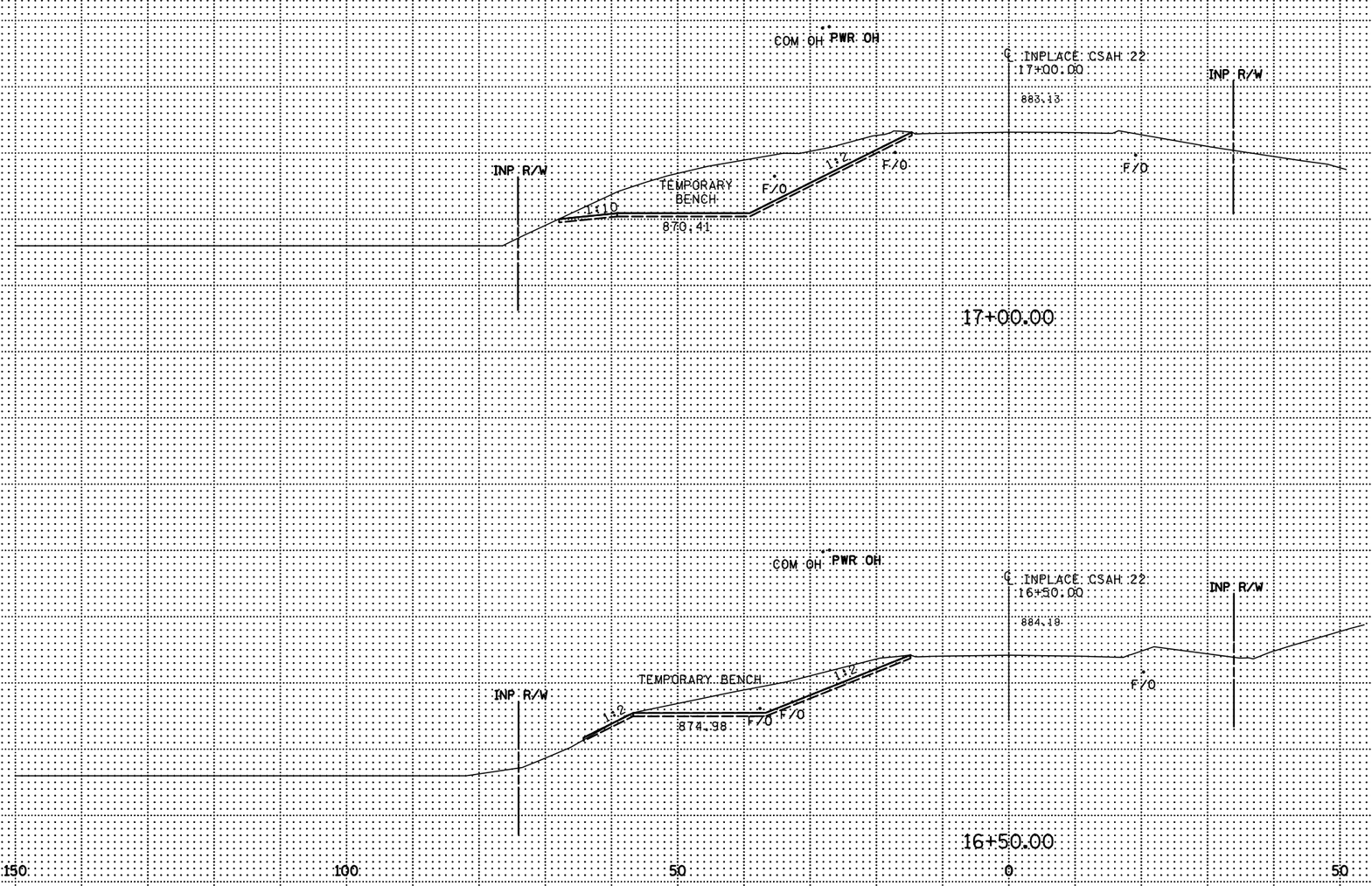
TEMPORARY BENCH | SAP 002-622-036, SAP 223-020-006 SHEET NO. X11 OF X17 SHEETS



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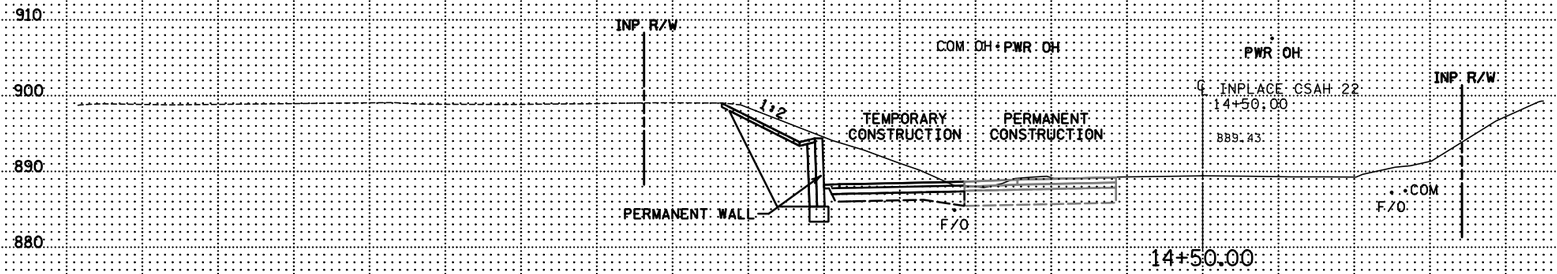
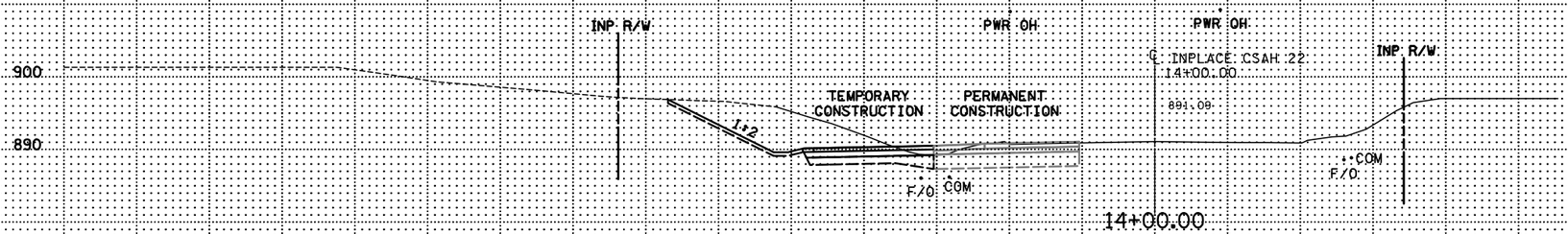
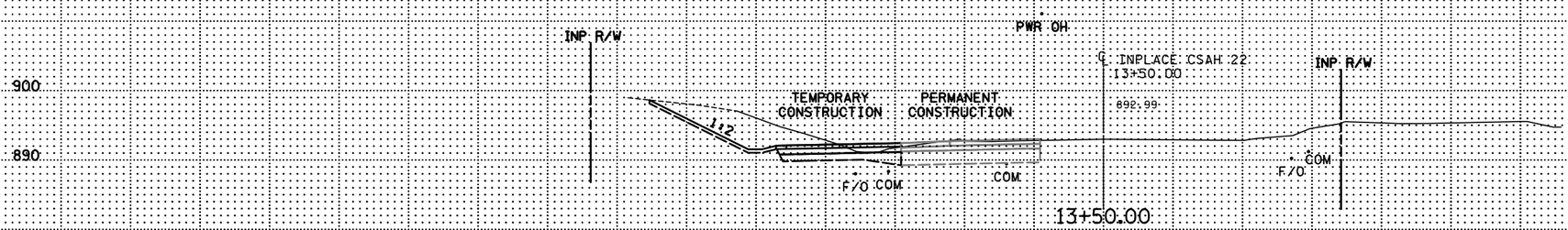
STAGE 1 TEMPORARY PAVEMENT | SAP 002-622-036, SAP 223-020-006 SHEET NO. X14 OF X17 SHEETS







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STA.13+50.00 -14+50.00

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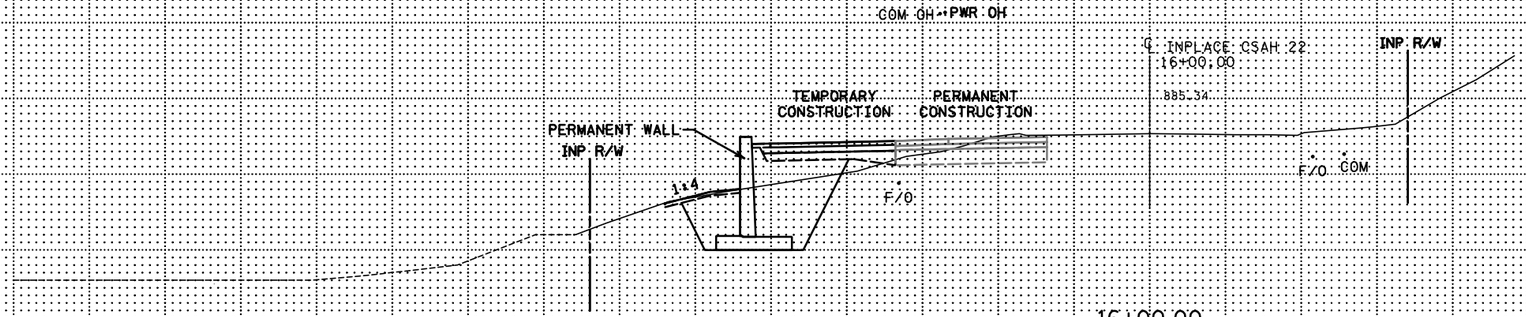

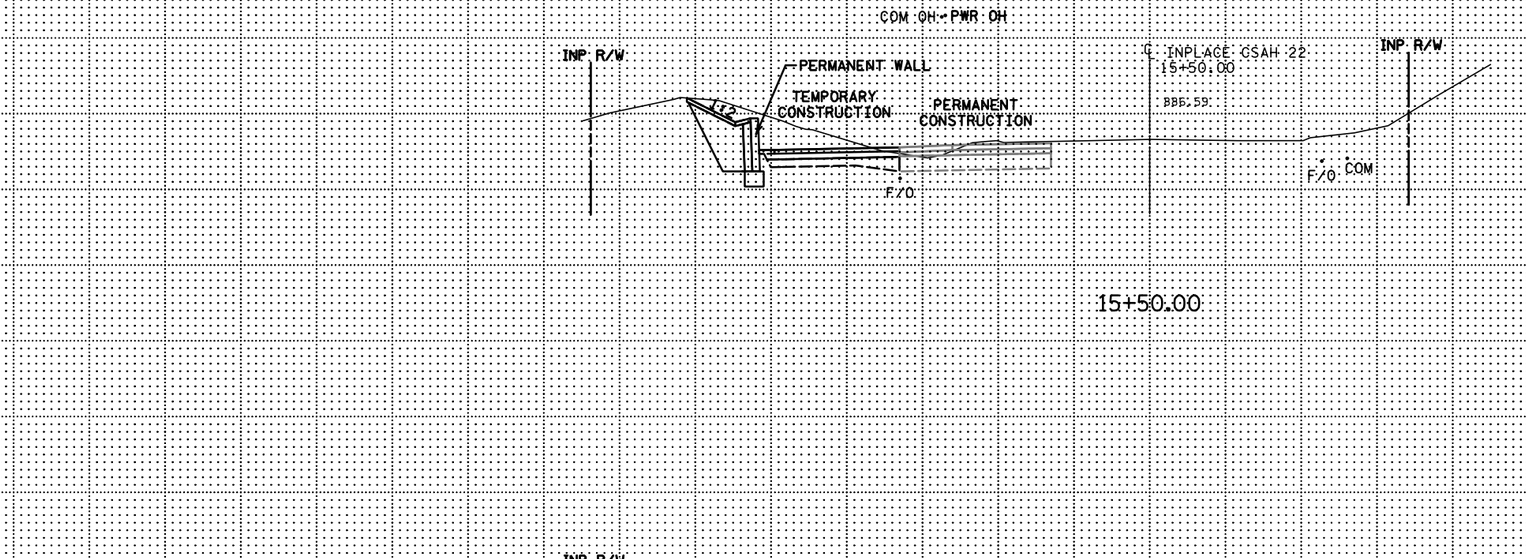

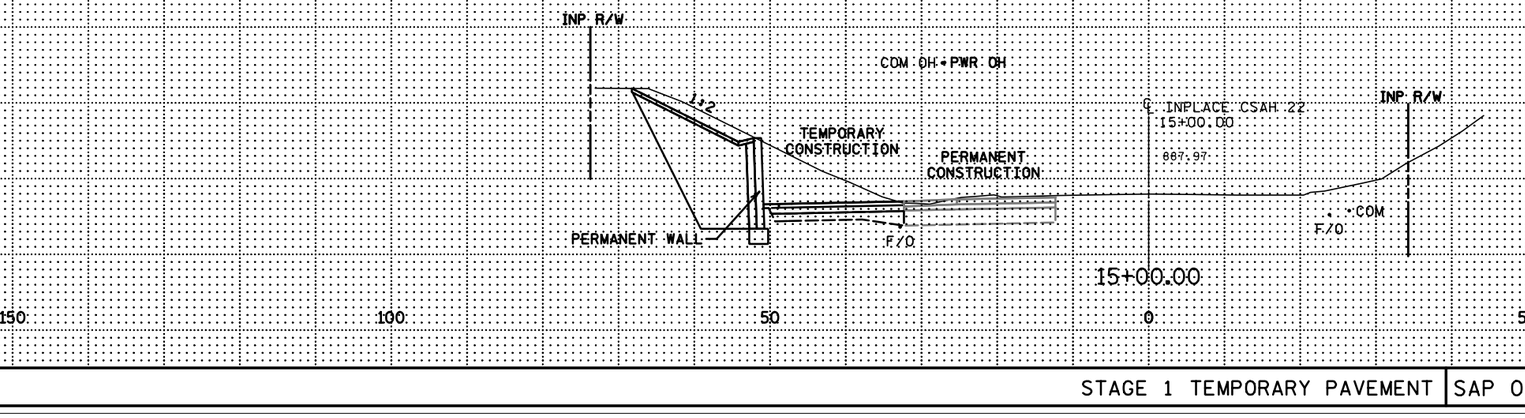

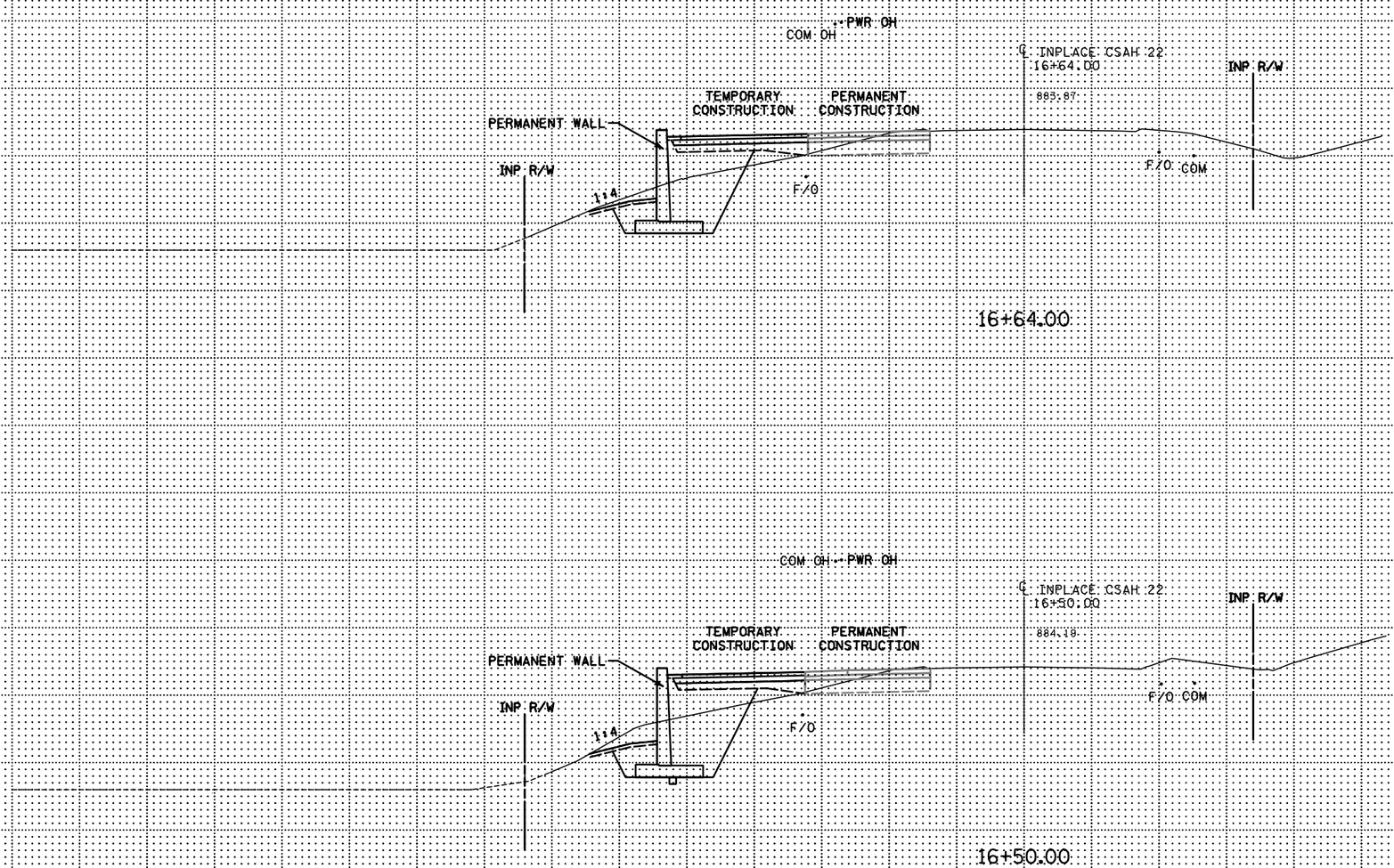

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STAGE 1 TEMPORARY PAVEMENT	SAP 002-622-036, SAP 223-020-006 SHEET NO. X17 OF X17 SHEETS