

PLAN LEGEND

RIGHT OF WAY LINE	----
DITCH CENTERLINE	----
FENCE LINE	----
RETAINING WALL	----
GRAVEL LINE	----
GUARD RAIL LINE	----
RAILROAD TRACK LINE	+++++
ROAD CENTERLINE	----
TREE LINE	~~~~~
STREAM LINE	~~~~~
WETLAND LINE	~~~~~
EX SANITARY LINE	----
PR SANITARY LINE	----
AB SANITARY LINE	----
EX FORCEMAIN LINE	----
PR FORCEMAIN LINE	----
AB FORCEMAIN LINE	----
EX STORM LINE	----
PR STORM LINE	----
AB STORM LINE	----
EX WATER LINE	----
PR WATER LINE	----
AB WATER LINE	----
EX GAS LINE	----
PR GAS LINE	----
AB GAS LINE	----
EX STEAM LINE	----
PR STEAM LINE	----
AB STEAM LINE	----
UG CABLE TV LINE	----
AB CABLE TV LINE	----
UG ELECTRIC LINE	----
AB ELECTRIC LINE	----
UG FIBEROPTIC LINE	----
AB FIBEROPTIC LINE	----
UG TELEPHONE LINE	----
AB TELEPHONE LINE	----
OH ELECTRIC LINE	----
OH TELEPHONE LINE	----
OH CABLE TV LINE	----

SYMBOLS

EX SANITARY MANHOLE	(SAN)
EX SANITARY CLEANOUT	(X)
EX STORM MANHOLE	(STRM)
EX STORM CATCHBASIN	(W)
EX. WATER MANHOLE	(W)
EX. WATER VALVE	(WV)
EX. WATER HYDRANT	(W&G)
EX. WATER SHUTOFF	(W&G)
EX. WATER & GAS MH	(W&G)
EX. GAS MANHOLE	(GAS)
EX. GAS VALVE	(GAS)
EX. GAS SHUTOFF	(GAS)
EX. STEAM MANHOLE	(STEAM)
EX. TELEPHONE MANHOLE	(T)
EX. ELECTRIC MANHOLE	(E)
EX. POWERPOLE	(P)
EX. LIGHT POLE	(L)
EX. ELECTRIC VAULT	(V)
EX. ANCHOR	(A)
EX. ELECTRIC TRANSFORMER	(ET)
EX. STREET LIGHT	(SL)
EX. SIGNAL W/ STREET LIGHT	(SL)
EX. HANDHOLE	(H.H.)
EX. HANDHOLE	(H.H.)
EX. TELEPHONE PEDESTAL	(P)
EX. WELL	(W)
BENCHMARK	(B)
FOUND CI MONUMENT	(M)
EX. SIGN	(S)
CONTROL POINT	(C)
EX DECIDUOUS TREE	(D)
EX CONIFEROUS TREE	(C)
EX. PARKING METER	(P)
EX. SOIL BORING	(SB#)

MINNESOTA DEPARTMENT OF TRANSPORTATION CITY OF DULUTH DEPARTMENT OF PUBLIC WORKS AND UTILITIES ENGINEERING DIVISION

CONSTRUCTION PLANS FOR: BITUMINOUS OVERLAY, CONCRETE PANEL WORK, SIDEWALK PLACEMENT, AND ADA UPDATES WITH CURB RAMP INSTALLATION

BEGIN

A POINT APPROX. 716' EAST AND
2420' NORTH OF THE S.W. COR. OF
SEC. 27, T 50 N, R 14 W
TO

END

A POINT APPROX. 1,300' WEST AND
770' NORTH OF THE S.E. COR. OF
SEC. 22, T 50 N, R 14 W

LOCATION: 4TH STREET
CITY PROJECT: #1599
SAP: 118-132-010
LOCATED BETWEEN: MESABA AVE AND E 6TH
AVE E.

GROSS LENGTH 4,884.94 FEET 0.925 MILES
NET LENGTH 4,889.94 FEET 0.925 MILES
EXCEPTIONS 0.00 FEET 0.000 MILES

BEGIN
S.A.P. 118-132-010
CITY PROJECT
NO. 1599
STA 10+74.51

END
S.A.P. 118-132-010
CITY PROJECT
NO. 1599
STA 59+60.45

SCALE = 1" = 1500'

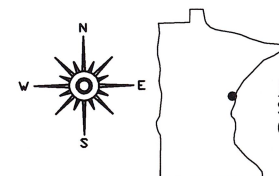
DESIGN DESIGNATION STATE AID PROJECT NO. 118-132-010

R-VALUE	20	EN18	NA
ADT (CURRENT YEAR)	2017	=	6448
ADT (FUTURE YEAR)	2037	=	7738
D (DIRECTIONAL DISTR.)		=	NA
T (HEAVY COMMERCIAL)		=	NA
PROJ. SOIL FACTOR		=	NA
SHOULDER WIDTH		=	NA
DESIGN LOADING		=	NA
DESIGN SPEED	30	MPH	
BASED ON STOPPING SIGHT DISTANCE			
HEIGHT OF EYE	3.5'	HEIGHT OF OBJECT	2.0'
DESIGN SPEED NOT ACHIEVED AT:			
STA.	N/A	TO STA.	N/A MPH N/A

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

WARNING:
LOCATION OF UNDERGROUND UTILITIES TO BE VERIFIED BY
CONTRACTOR. CALL BEFORE DIGGING. GOPHER STATE ONE CALL
1-800-252-1166 REQUIRED BY LAW

STATE AID PROJECT NUMBER 118-132-010



PROJECT LOCATION
ST. LOUIS COUNTY
CITY OF DULUTH

MINN PROJECT NO()

GOVERNING SPECIFICATIONS

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION
"STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN. AVAILABLE
AT:
<http://www.dot.state.mn.us/pre-letting/spec/index.html>

THE 2017 EDITION OF THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES
DEPARTMENT CONSTRUCTION STANDARDS AND SUPPLEMENTS OR ADDENDUMS
SHALL APPLY.
AVAILABLE AT:

<http://www.duluthmn.gov/engineering/standard-construction-specifications/>

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY LEVEL D.
THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF
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REQUIRED BY LAW

INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-7	SEQ AND TABS
8	TYPICAL SECTION
9-15	MISC. DETAILS
16-19	PLAN
20,21	TRAFFIC CONTROL
22-26	PAVEMENT MARKINGS

THIS PLAN CONTAINS 26 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.

DUNCAN SCHWENSOHN

PROJECT ENGINEER (TYPED OR PRINTED NAME)

5/2/17 45486
PROJECT ENGINEER DATE LIC. NO.

CITY APPROVAL

APPROVED CHIEF ENGINEER OF TRANSPORTATION DATE 5-2-17

APPROVED CHIEF ENGINEER OF UTILITIES DATE 5-2-17

APPROVED CITY ENGINEER DATE 5-2-17

STATE APPROVAL

APPROVED FOR FEDERAL AID FUNDING: STATE AID ENGINEER DATE 5/5/17

DISTRICT STATE AID ENGINEER: REVIEWED FOR COMPLIANCE DATE 5/5/17

WITH STATE-AID RULES/POLICY

CITY PROJECT NUMBER 1599

DRAWN BY: SCA SHEET NO. 1 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999-4th_St_Joint_Repair_&_Overlay\23-ACAD-DRAWINGS\1599_SEQ_AND_TABS.dwg

STATEMENT OF ESTIMATED QUANTITIES					S.P. 118-132-010
NOTE	TAB	SPEC. NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY
		2021.501	MOBILIZATION	LUMP SUM	1
	A	2104.501	REMOVE CURB AND GUTTER	LIN FT	636
	A	2104.503	REMOVE CONCRETE WALK	SQ FT	4575
	A	2104.505	REMOVE BITUMINOUS PAVEMENT	SQ YD	82
	A	2104.505	REMOVE CONCRETE PAVEMENT	SQ YD	57
	A	2104.511	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LIN FT	1590
	A	2232.502	MILL CONCRETE SURFACE (2")	SQ YD	955
1,2	E	2301.504	CONCRETE PAVEMENT 8"	SQ YD	82
13	B	2355.502	BITUMINOUS MATERIAL FOR FOG SEAL	GAL	3006
13	B	2356.505	BITUMINOUS MATERIAL FOR SEAL COAT	GAL	8266
13	B	2356.506	BITUMINOUS SEAL COAT	SQ YD	25047
13	B	2360.501	TYPE SP 9.5 WEARING COURSE MIX (3,B)	TON	4145
13,15		2360.505	TYPE SP 9.5 BITUMINOUS MIXTURE FOR PATCHING	TON	100
	C	2503.511	12" RC PIPE SEWER CLASS III	LIN FT	21
14	G	2504.602	PROTECT VALVE COVER	EACH	27
5	G	2504.602	ADJUST VALVE BOX	EACH	27
6	G	2504.602	CASTING SPACERS	EACH	54
	C	2506.502	CONST DRAINAGE STRUCTURE DESIGN G OR H	EACH	1
	C,D	2506.516	CASTING ASSEMBLY	EACH	2
14	G	2506.602	PROTECT CASTING COVER	EACH	54
	C	2506.602	CONNECT INTO EXISTING CATCH BASIN	EACH	1
14	C	2506.603	REPAIR DRAINAGE STRUCTURE	LIN FT	10
7,10	E	2521.501	4" CONCRETE WALK	SQ FT	687
7,10	E	2521.501	6" CONCRETE WALK	SQ FT	4212
4,10,12	E	2531.501	CONCRETE CURB & GUTTER DESIGN B624	LIN FT	659
10,12	E	2531.502	CONCRETE CURB DESIGN V6	LIN FT	196
	E	2531.618	TRUNCATED DOMES	SQ FT	176
8	G	2540.602	ADJUST MONUMENT BOX	EACH	2
9	G	2545.602	ADJUST HANDHOLE	EACH	6
		2563.601	TRAFFIC CONTROL	LUMP SUM	1

STATEMENT OF ESTIMATED QUANTITIES					S.P. 118-132-010
NOTE	TAB	SPEC. NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY
	F	2564.602	SIGN POST SUPPORT	EACH	1
	F	2564.602	RELOCATE SIGN	EACH	1
3		2573.531	STORM DRAIN INLET PROTECTION	LUMP SUM	1
10,12		2575.555	TURF ESTABLISHMENT	LUMP SUM	1
11		2580.603	INTERIM PAVEMENT MARKING	LIN FT	13500
	H	2582.501	PAVEMENT MESSAGE EPOXY	SQ FT	60
	H	2582.502	4" SOLID LINE EPOXY	LIN FT	175
	H	2582.502	12" SOLID LINE EPOXY	LIN FT	1581
	H	2582.502	24" SOLID LINE EPOXY	LIN FT	314
	H	2582.502	4" DOUBLE SOLID LINE EPOXY	LIN FT	4365

NOTES:

- FURNISH, INSTALL, DRILL AND GROUT 18" #4 (EPOXY COATED) REBAR AT 18" O.C. INTO EXISTING CONCRETE PAVEMENT. (INCIDENTAL)
- CLASS 5 SHALL BE INCIDENTAL TO THIS BID ITEM.
- INSTALL AND MAINTAIN AT ALL STORM DRAINS WITHIN AFFECTED AREA.
- FURNISH, INSTALL, DRILL AND GROUT 18" #4 REBAR (EPOXY COATED) AT 18" O.C. INTO EXISTING PAVEMENT. FURNISH, INSTALL DRILL AND GROUT 2 12" #4 REBAR (EPOXY COATED) INTO EXISTING CURB AND GUTTER. (INCIDENTAL)
- 2.5" THICK PAVING RINGS SHALL BE USED
- MANHOLE ADJUSTMENT RINGS SHALL BE A 2.5" THICK. CATCH BASIN ADJUSTING RINGS SHALL BE 1.5" THICK.
- CLASS 5 UNDER WALK SHALL BE INCIDENTAL.
- PRIOR TO COMMENCING THIS WORK CONTACT NATHAN LAVINE WITH THE CITY OF DULUTH (218)348-8814. COORDINATE WORK WITH NATHAN LAVINE.
- CITY SHALL PROVIDE ROUND HANDHOLE COVERS TO REPLACE THE EXISTING SQUARE HANDHOLE COVERS. SALVAGE AND DELIVER SQUARE COVERS TO A LOCATION TO BE DESIGNATED BY THE CITY WITHIN CITY LIMITS. (INCIDENTAL)
- INCLUDES RESTORATION OF ALL DISTURBED TURF AREAS WITH 4" TOPSOIL, SEED, FERTILIZER AND MULCH.
- SHALL BE PLACED AFTER CHIP SEAL AND BOTH BITUMINOUS LIFTS.
- BACKFILLING BEHIND CURB AND GUTTER SHALL BE INCIDENTAL TO THIS BID ITEM.
- SEE PAGE 4 TABS FOR SEAL COAT NOTES AND BASIS FOR QUANTITIES OF SEAL COAT AND BITUMINOUS MATERIAL
- CONTRACTOR TO FIELD VERIFY
- PLACED AT THE DIRECTION OF THE ENGINEER TO FILL VOIDS, CRACKS OR LOW SPOTS PRIOR TO CHIP SEAL.

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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO.: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

SEQ

SHEET NO. 2 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599-4th_St_Joint_Repair_&_Overlay\23-ACAD-DRAWINGS\1599_SEQ_AND_TABS.dwg

A	REMOVALS AND SAWCUTTING							
STATION	LOCATION/ QUADRANT	REMOVE CURB AND GUTTER	REMOVE CONCRETE WALK	REMOVE BITUMINOUS PAVEMENT	REMOVE CONCRETE PAVEMENT	SAWING CONCRETE PAVEMENT (FULL DEPTH)	MILL CONCRETE SURFACE (2")	REMARKS
		2104	2104	2104	2104	2104	2232	
		LIN FT	SQ FT	SQ YD	SQ YD	LIN FT	SQ YD	
MESABI AVE								
10+75 (BOP)	CEN						63	
4TH AVE W								
13+13	LT			9		36	44	
13+13	RT						47	
3RD AVE W								
17+80	LT						47	
17+80	RT						46	
18+48	RT			5		28		
18+75	RT			5		28		
19+40	RT			5		28		
20+55	RT			11		40		
2ND AVE W								
22+47	LT						36	
22+47	RT						46	
22+47	S	62	259		30	100		
	E	58	360		27	93		
23+50	RT			8		34		
1ST AVE W								
27+14	LT						30	
27+14	RT						46	
27+14	N	20	300			37		
LAKE AVE								
31+81	LT						42	
31+81	RT						59	
1ST AVE E								
36+49	LT						40	
36+49	RT						51	
36+49	W	38	127			56		
	N	25	270			42		
	S	22	178			49		
38+55	RT			14		44		
2ND AVE E								
41+16	LT						29	
41+16	RT						33	
41+16	W	27	177			43		
	N	34	187			54		
	S	29	137			47		
	E	23	78			47		
45+50	RT			8		35		

A	REMOVALS AND SAWCUTTING							
STATION	LOCATION/ QUADRANT	REMOVE CURB AND GUTTER	REMOVE CONCRETE WALK	REMOVE BITUMINOUS PAVEMENT	REMOVE CONCRETE PAVEMENT	SAWING CONCRETE PAVEMENT (FULL DEPTH)	MILL CONCRETE SURFACE (2")	REMARKS
		2104	2104	2104	2104	2104	2232	
		LIN FT	SQ FT	SQ YD	SQ YD	LIN FT	SQ YD	
3RD AVE E								
45+83	LT						31	
45+83	RT						40	
45+83	W	26	144			43		
	N	35	310			55		
	S	22	198			40		
	E	23	47			55		
46+15	RT			10		38		
4TH AVE E								
50+50	LT						49	
50+50	RT						43	
50+50	W	20	183			62		
	N	32	432			83		
54+80	RT			7		33		
5TH AVE E								
55+17	LT						42	
55+17	RT						42	
55+17	N	34	337			91		
	S	20	306			49		
	E	25	189			57		
6TH AVE E								
59+60	CEN						49	
59+60 (EOP)	W	32	188			71		
	S	29	168			72		
TOTAL		636	4575	82	57	1590	955	

STANDARD PLATES	
THE FOLLOWING STANDARD PLATES APPROVED	
BY FHWA SHALL APPLY ON THIS PROJECT	
PLATE NO.	DESCRIPTION
4002 F	MANHOLE OR CATCHBASIN MASONRY FIELD CONSTRUCT
4006 L	MANHOLE OR CATCHBASIN PRECAST - DESIGN G & H
4108 F	ADJUSTINGS RINGS FOR MH'S & CB'S
7020 K	CONCRETE CURB DESIGN B, V, S, DR AND BR
7038 A	TRUNCATED DOMES
8000 J	CHANNELIZERS

CITY OF DULUTH STANDARDS	
PLATE NO.	DESCRIPTION
EX-4	CONCRETE STORM SEWER BEDDING
SAN-1	SANITARY CASTING DETAIL
SAN-9	POLYETHYLENE MH ADJUSTING RING -FLAT
SAN-10	POLYETHYLENE MH ADJUSTING RING -WEDGE
STRM -1	STORM MANHOLE CASTING
STRM-3	CATCH BASIN/ CURB BOX CASTINGS
STRM-4	FABRIC WRAPPED CATCH BASIN CASTING
STRM-5	FABRIC WRAPPED MANHOLE
STRM-7	GUTTER STAMP
SUR- 1	SURVEY MONUMENT
STR-3	4" OR 6" CONCRETE WALK WITH CONCRETE CURB DESING V
STR-5	DRIVEWAY & ALLEY ENTRANCES

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SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

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CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

TABS

SHEET NO. 3 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599-4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_SEQ_AND_TABS.dwg

BASIS FOR ESTIMATED QUANTITIES
BITUMINOUS MATERIAL FOR FOG SEAL: (CSS-1H) 0.12 GALLONS PER SQUARE YARD
BITUMINOUS MATERIAL FOR SEAL COAT: (CRS-2P) 0.33 GALLONS PER SQUARE YARD
BITUMINOUS SEAL COAT (FA-2.5): 20 POUNDS PER SQUARE YARD
BITUMINOUS MIX: 120 POUNDS PER SQUARE YARD INCH

B	BITUMINOUS					
STATION	AREA (SF)	BITUMINOUS MATERIAL FOR FOG SEAL	BITUMINOUS MATERIAL FOR SEAL COAT	BITUMINOUS SEAL COAT	TYPE SP 9.5 WEARING COURSE MIX (3,B)	NOTES
		2355	2356	2356	2360	
		GAL	GAL	SQ YD	TON	
10+74.51 (BOP) - 31+82 (LAKE AVE)	97407	1299	3572	10823	490	3/4" LEVELING LIFT
31+82 - 59+60.45 (EOP)	128016	1707	4694	14224	645	3/4" LEVELING LIFT
10+74.51 (BOP) - 31+82 (LAKE AVE)	97407				1300	2" FINAL WEAR LIFT
31+82 - 59+60.45 (EOP)	128016				1710	2" FINAL WEAR LIFT
TOTAL		3006	8266	25047	4145	

D	CASTING ASSEMBLIES			
TYPE OF CASTING	A		B	
TYPE OF ASSEMBLY	STORM MH		CATCH BASIN	
CASTING DESCRIPTION	FRAME	GRATE	FRAME	GRATE
CASTING NUMBER	700-8	715	805	816
STANDARD PLATE NUMBER	STRM-1		STRM-3	
HEIGHT IN FEET	0.67	N/A	0.78	N/A
NUMBER REQUIRED	1		1	

C	STORM SEWER - PIPES AND CATCH BASIN											
STATION	L / R	STRUC. NUMBER	RIM ELEV.	INVERT OUT	12" RC PIPE SEWER CLASS III	CONNECT INTO EXISTING CATCH BASIN	CONST DRAINAGE STRUCTURE DESIGN G OR H	REPAIR DRAINAGE STRUCTURE	CASTING ASSEMBLY	DRAINS TO	DOWN- STREAM INVERT	GRADE
					2503	2506	2506	2506	2506			
					LIN FT	EACH	EACH	LIN FT	EACH			
12+75.62	21.37', RT	NA	NA	NA				2				
12+96.31	36.71', LT	NA	NA	NA				2				
22+07.65	21.49', RT	ICB-1	776.42	772.87		1		2	1	MHST 139	NA	NA
21+87.11	21.29', RT	PCB-1A	777.24	773.42	21		1		1	ICB - 1	773.20	1.0%
27+56.53	21.62', RT	NA	NA	NA				2				
36+43.14	10+61', RT	IMH 050	NA	NA				2				
TOTAL					21	1	1	10	2			

FOG SEAL NOTES:

1. APPLICATION RATES OF THE SEAL COAT AGGREGATE AND THE BITUMINOUS MATERIAL FOR SEAL COAT SHALL BE ADJUSTED IN THE FIELD TO THE SATISFACTION OF THE ENGINEER.

2. THE SEAL COATING OR FOG SEALING 2.OPERATIONS SHALL NOT BE STARTED, AND SHALL BE SUSPENDED, IF THE ENGINEER FEELS THAT RAIN IS LIKELY WITHIN 3 HOURS. SEAL COATING OR FOG SEALING OPERATIONS SHALL NOT BE ALLOWED IN FOGGY WEATHER.

3. SEAL COAT AND FOG SEAL OPERATION SHALL NOT START UNLESS THE PAVEMENT AND AIR TEMPERATURES ARE 60 DEGREES FAHRENHEIT AND RISING.

4. CLEAN ALL PAVEMENT SURFACES (FULL WIDTH OF ROAD SURFACE) TO BE SEAL COATED. SWEEP THE SEAL COAT SURFACE WITH A MOTORIZED BROOM TO REMOVE LOOSE MATERIAL. CLEAN BY HAND BROOMING DEPRESSIONS NOT REACHED BY THE POWER BROOM.

5. COVER PAVEMENT MARKINGS (STOP AHEAD) AND IRON (MANHOLES, VALVE COVERS, CATCH BASINS, ETC.) TO PREVENT ADHERENCE OF THE BITUMINOUS MATERIAL. SUITABLE COVERINGS INCLUDE’S PLYWOOD DISKS, SAND, KRAFT

6. CONSTRUCT A TEST STRIP 200 FEET LONG TO ENSURE THE BITUMINOUS MATERIAL APPLICATION RATE IS ADEQUATE. AFTER APPLYING THE BITUMINOUS MATERIAL TO THE TEST STRIP, PLACE THE SEAL COAT AGGREGATE AT THE DESIGN APPLICATION RATE, INSPECT THE AGGREGATE IN THE WHEEL PATHS FOR PROPER EMBEDMENT. MAKE ADJUSTMENTS TO THE BITUMINOUS MATERIAL AND/OR THE SEAL COAT AGGREGATE AS DIRECTED BY THE ENGINEER. CONSTRUCT ONE FULL LANE WIDTH AT A TIME. MAKE ADDITIONAL ADJUSTMENTS TO BITUMINOUS MATERIAL AND/OR THE SEAL COAT AGGREGATE IF NECESSARY AS THE PROJECT PROGRESSES. CONSTRUCTION OF THE TEST STRIP SHALL BE INCIDENTAL TO SEAL COAT FA AND BITUMINOUS MATERIAL FOR SEAL COAT.

7. IN PLACE STRIPING AND PAVEMENT MARKINGS SHALL BE COVERED WITH CRS-2P AT THE RATE OF 0.10 GALLONS PER SQUARE YARD ONE FOOT WIDE JUST PRIOR TO THE START OF SEAL COATING (IN EACH LANE CLOSURE).

8. THE BITUMINOUS MATERIAL FOR THE SEAL COAT SHALL OVERLAP THE CENTER LINE BY 1 FOOT.
9. THE CONTRACTOR SHALL PROVIDE ENOUGH PNEUMATIC-TIRED ROLLERS TO ROLL THE ENTIRE WIDTH OF THE TREATMENT AREA IN ONE PASS OF THE ROLLERS. THE INITIAL ROLLING SHALL BE COMPLETED WITHIN TWO MINUTES AFTER APPLYING THE AGGREGATE. IF ROLLERS ARE UNABLE TO KEEP UP WITH THE SPREADER, AGGREGATE APPLICATION SHALL STOP UNTIL ROLLERS CATCH UP OR ADDITIONAL ROLLERS ARE FURNISHED. THE CONTRACTOR SHALL MAKE A MINIMUM OF THREE COMPLETE PASSES OVER THE AGGREGATE. ADDITIONAL PASSES MAY BE NECESSARY IN COOLER AIR TEMPERATURES.

10. BROOMING SHALL BE PERFORMED IN THE FOLLOWING SEQUENCE:

• LIGHT BROOMING CAN BEGIN ABOUT 2 HOURS AFTER THE COVER AGGREGATE IS PLACED AND SHALL BE PERFORMED AS DIRECTED BY THE ENGINEER. NORMAL BROOMING ON THE FOLLOWING MORNING SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THE FOLLOWING:

• EXCESS AGGREGATE SHALL BE SWEEPED OFF THE ROADWAY ONTO THE AGGREGATE SHOULDER TO THE SATISFACTION OF THE ENGINEER.

• WHERE THERE IS CURB AND GUTTER THE EXCESS AGGREGATE SHALL BE SWEEPED OFF THE ROADWAY AND PICKED UP AND DISPOSED OF, OFF THE RIGHT OF WAY, IN ACCORDANCE WITH MNDOT 2104.3.D3 TO THE SATISFACTION OF THE ENGINEER.

• SEAL COAT OPERATIONS SHALL BE SUSPENDED EACH DAY AT THE DISCRETION OF THE ENGINEER, TO ALLOW SUFFICIENT TIME FOR BROOMING AND PAVEMENT MARKINGS TO BE PLACED.
11. THE CONTRACTOR IS RESPONSIBLE FOR CLAIMS OF DAMAGE TO VEHICLES UNTIL THE ROADWAYS AND SHOULDERS HAVE BEEN SWEEPED FREE OF LOOSE AGGREGATE, THE SEAL COAT HAS BEEN FOG SEALED AND PLACEMENT OF INTERIM PAVEMENT MARKINGS HAS BEEN DONE.

12. INTERIM PAVEMENT MARKINGS TO BE PLACED AT THE END OF EACH DAY’S SEAL COAT OPERATIONS.

13. PERMANENT PAINT STRIPING AND PAVEMENT MARKINGS SHALL NOT BE STARTED UNTIL THE FOG SEAL HAS CURED FOR A MINIMUM OF 15 DAYS.

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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO.: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599 STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

TABS

SHEET NO. 4 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999-1999\4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_SEQ AND TABS.dwg

F	SIGNS								
NUMB.	SIGN DESCRIPTION	SIGN NUMBER	EXISTING LOCATION		PROPOSED LOCATION		SIGN POST SUPPORT	RELOCATE SIGN	REMARKS
			STA	OFFS.	STA	OFFS.	2564	2564	
							EACH	EACH	
1	STOP	R1-1	22+05	24.7	22+08	17.9	1	1	
TOTAL							1	1	

E	PROPOSED CONCRETE, CURB AND GUTTER AND WALKS							
STATION	LOCATION/ QUADRANT	CONCRETE PAVEMENT 8"	4" CONCRETE WALK	6" CONCRETE WALK	CONCRETE CURB & GUTTER DESIGN B624	CONCRETE CURB DESIGN V6	TRUNCATED DOMES	REMARKS
		2301	2521	2521	2531	2531	2531	
		SQ YD	SQ FT	SQ FT	LIN FT	LIN FT	SQ FT	
4TH AVE W								
13+13	LT	9						
3RD AVE W								
18+48	RT	5						
18+75	RT	5						
19+40	RT	5						
20+55	RT	11						
2ND AVE W								
22+47	S			522	73		8	
	E			574	70		8	
23+50	RT	8						
1ST AVE W								
27+14	N		101	98	20	39	8	
1ST AVE E								
36+49	W		47	80	38		8	
	N		106	162	25	30	8	
	S			177	22		8	
38+55	RT	14						
2ND AVE E								
41+16	W		103	77	27	29	8	
	N		89	65	34	16	8	
	S			137	29		8	
	E			105	23		8	
45+50	RT	8						

E	PROPOSED CONCRETE, CURB AND GUTTER AND WALKS							
STATION	LOCATION/ QUADRANT	CONCRETE PAVEMENT 8"	4" CONCRETE WALK	6" CONCRETE WALK	CONCRETE CURB & GUTTER DESIGN B624	CONCRETE CURB DESIGN V6	TRUNCATED DOMES	REMARKS
		2301	2521	2521	2531	2531	2531	
		SQ YD	SQ FT	SQ FT	LIN FT	LIN FT	SQ FT	
3RD AVE E								
45+83	W		79	65	26	13	8	
	N		91	194	35		8	
	S		71	106	22		8	
	E			47	23		8	
46+15	RT	10						
4TH AVE E								
50+50	W			183	20		8	
	N			432	32	25	16	
54+80	RT	7						
5TH AVE E								
55+17	N			337	34		8	
	S			306	20		8	
	E			189	25		8	
6TH AVE E								
59+60 (EOP)	W			188	32	25	8	
	S			168	29	19	8	
TOTAL		82	687	4212	659	196	176	

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CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

TABS

SHEET NO. 5 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599_4th_St_Joint_Repair & Overlay\23-ACAD-DRAWINGS\1599_SEQ AND TABS.dwg

G	HANDHOLES, MANHOLES AND VALVES							
STATION	LT/RT	ADJUST VALVE BOX	CASTING SPACERS	PROTECT VALVE COVER	PROTECT CASTING COVER	ADJUST MONUMENT BOX	ADJUST HANDHOLE	REMARKS
		2504	2504	2504	2506	2540	2565	
		EACH	EACH	EACH	EACH	EACH	EACH	
4TH AVEW								
12+75.4	21.5', LT		1		1			CB - RECTANGLE
12+75.6	21.4', RT		1		1			CB - RECTANGLE
12+88.4	25.0', RT					1		MON
13+07.2	0.3', LT		1		1			STORM
13+12.5	12.6', LT		1		1			SANITARY
13+20.5	34.5', RT	1		1				WW
13+46.8	21.2', LT	1		1				WW
3RD AVEW								
17+42.7	21.7', RT		1		1			CB - RECTANGLE
17+42.8	20.7', LT		1		1			CB - RECTANGLE
17+74.1	0.5', LT		1		1			STORM
17+79.5	12.9', LT		1		1			SANITARY
17+99.1	32.7', LT		1		1			STORM
18+10.2	13.3', RT	1		1				WW
18+14.45	19.5', RT	1		1				WW
20+25.0	12.8', RT	1		1				WW
20+27.2	12.5', RT	1		1				WW
20+43.1	15.3', RT	1		1				WW
2ND AVEW								
22+07.7	21.0', LT		1		1			CB - SQUARE
22+22.6	25.0', RT					1		MON
22+41.5	0.7', RT		1		1			STORM
22+47.8	13.7', LT		1		1			SANITARY
22+56.7	33.8', RT	1		1				WW
22+66.9	12.8', LT		1		1			SANITARY
25+02.4	8.0', RT	1		1				WW
1ST AVEW								
26+76.8	21.7', RT		1		1			CB - RECTANGLE
26+83.6	21.2', LT		1		1			CB - RECTANGLE
26+84.0	7.7', RT	1		1				WW
26+99.3	9.3', RT	1		1				WW
27+07.6	32.6', LT		1		1			STORM
27+20.5	28.0', RT		1		1			SANITARY
27+20.7	13.0', LT		1		1			STORM
27+45.7	21.2', LT		1		1			CB - RECTANGLE
27+56.5	21.6', RT		1		1			CB - RECTANGLE
27+51.3	9.5', RT	1		1				WW

G	HANDHOLES, MANHOLES AND VALVES							
STATION	LT/RT	ADJUST VALVE BOX	CASTING SPACERS	PROTECT VALVE COVER	PROTECT CASTING COVER	ADJUST MONUMENT BOX	ADJUST HANDHOLE	REMARKS
		2504	2504	2504	2506	2540	2565	
		EACH	EACH	EACH	EACH	EACH	EACH	
LAKE AVE								
31+75.1	6.3', LT		1		1			STORM
31+81.6	13.3', LT		1		1			SANITARY
32+16.7	20.8', LT		1		1			CB - SQUARE
32+21.4	21.3', RT		1		1			CB - SQUARE
33+85.3	8.0', RT	1		1				WW
33+87.9	11.1', RT	1		1				WW
1ST AVE E								
36+08.5	8.4', RT	1		1				WW
36+16.6	6.3', RT	1		1				WW
36+31.2	13.0', LT		1		1			SANITARY
36+43.1	10.6', RT		1		1			STORM
36+49.0	16.1', RT		1		1			SANITARY
36+49.1	13.6', LT		1		1			SANITARY
36+83.1	19.5', LT		1		1			CB - RECTANGLE
36+89.3	21.4', RT		1		1			CB - RECTANGLE
2ND AVE E								
40+98.7	16.1', RT		1		1			SANITARY
41+09.9	35.9', LT		1		1			STORM
41+10.2	0.4', RT		1		1			STORM
41+16.0	13.4', LT		1		1			SANITARY
41+33.6	18.8', LT		1		1			TELEPHONE
41+48.2	21.6', RT		1		1			CB - RECTANGLE
41+55.6	21.3', LT		1		1			CB - RECTANGLE
41+55.1	4.1', RT	1		1				WW
3RD AVE E								
45+50.3	5.2', RT	1		1				WW
45+77.1	3.0', RT		1		1			STORM
45+77.4	32.2', LT		1		1			STORM
45+83.6	13.0', LT		1		1			SANITARY
45+95.6	35.3', RT	1		1				WW
45+98.6	32.8', RT	1		1				WW
46+13.8	21.2', LT		1		1			CB - RECTANGLE
46+15.8	5.8', RT	1		1				WW
46+26.1	24.7', RT		1		1			CB - SQUARE
48+08.3	14.9', RT	1		1				WW
48+10.1	14.9', RT	1		1				WW

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SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

TABS

SHEET NO. 6 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599_4th_St_Joint_Repair_&_Overlay\23-ACAD-DRAWINGS\1599_SEQ_AND_TABS.dwg

G	HANDHOLES, MANHOLES AND VALVES							
STATION	LT/RT	ADJUST VALVE BOX	CASTING SPACERS	PROTECT VALVE COVER	PROTECT CASTING COVER	ADJUST MONUMENT BOX	ADJUST HANDHOLE	REMARKS
		2504	2504	2504	2506	2540	2565	
		EACH	EACH	EACH	EACH	EACH	EACH	
4TH AVE E								
50+19.5	28.7', LT						1	HH
50+32.1	15.7', RT		1		1			SANITARY
50+44.4	26.8', RT		1		1			STORM
50+44.6	5.2', RT		1		1			STORM
50+49.6	14.3', LT		1		1			SANITARY
50+77.6	17.6', RT		1		1			CB - SQUARE
50+87.7	21.1', LT		1		1			CB - SQUARE
5TH AVE E								
54+77.8	22.9', RT	1		1				VW
54+85.7	18.5', RT	1		1				VW
54+88.9	28.5', RT						1	HH
55+17.2	13.5', LT		1		1			SANITARY
55+26.2	35.5', RT	1		1				VW
55+35.6	39.4', LT		1		1			CB - SQUARE
55+41.8	37.3', LT						1	HH
55+46.5	15.1', RT		1		1			STORM
55+48.4	28.3', RT						1	HH
55+90.1	4.0', RT	1		1				VW
6TH AVE E								
59+33.7	15.7', RT		1		1			STORM
59+34.6	21.2', RT		1		1			CB - SQUARE
59+35.6	21.1', LT		1		1			CB - SQUARE
59+38.8	29.7', RT						1	HH
59+55.3	38.8', LT						1	HH
TOTAL		27	54	27	54	2	6	

H	PAVEMENT MARKINGS						
STATION	LOCATION/ QUADRANT	PAVEMENT MESSAGE EPOXY	4" SOLID LINE EPOXY	12" SOLID LINE EPOXY	24" SOLID LINE EPOXY	4" DOUBLE SOLID LINE EPOXY	REMARKS
		2582	2582	2582	2582	2582	
		SQ FT	LIN FT	LIN FT	LIN FT	LIN FT	
MESABI AVE							
10+75 (BOP)						195	
4TH AVE W							
13+13				368	47	395	
3RD AVE W							
17+80						395	
2ND AVE W							
22+47				327	71	402	
1ST AVE W							
27+14							
LAKE AVE							
31+81				354	81	401	
1ST AVE E							
36+49						397	
2ND AVE E							
41+16						405	
3RD AVE E							
45+83						409	
4TH AVE E							
50+50		30	100	72		573	
5TH AVE E							
55+17				363	87	398	
6TH AVE E							
59+60 (EOP)		30	75	97	28	395	
TOTAL		60	175	1581	314	4365	

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CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

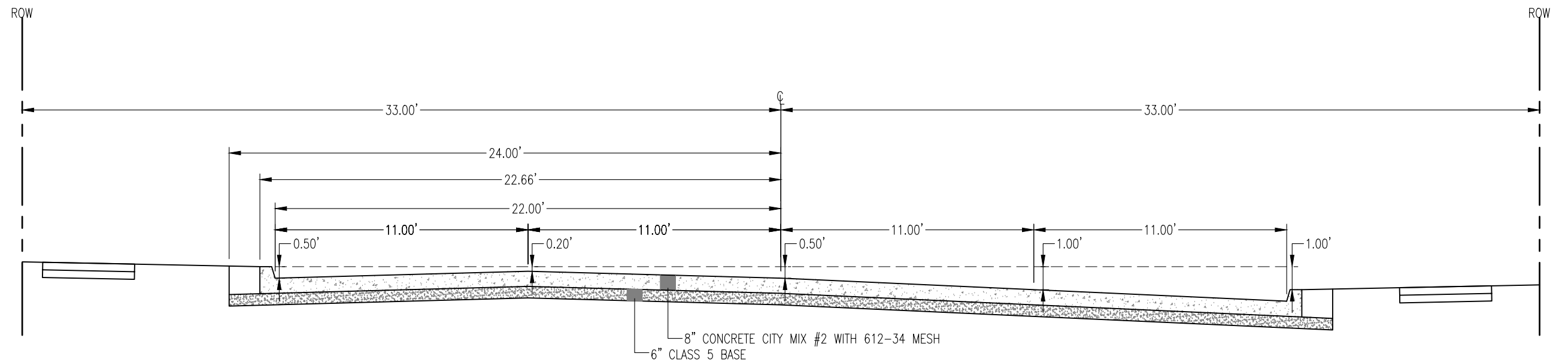
CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

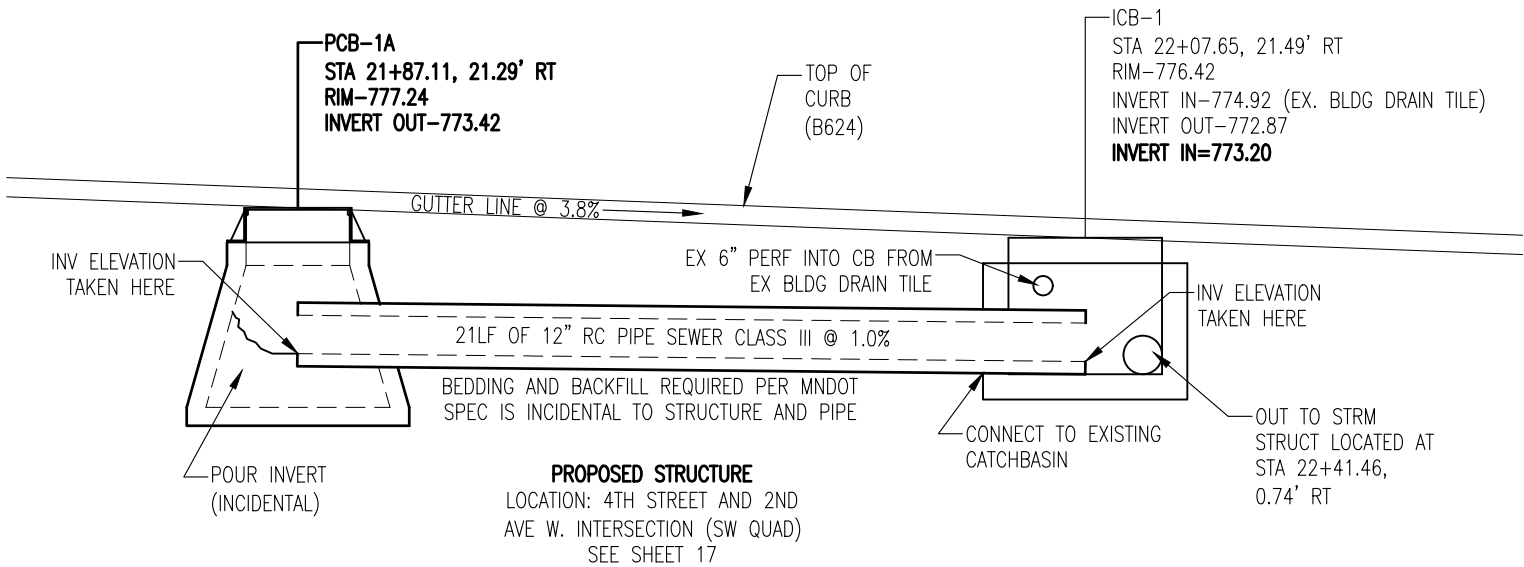
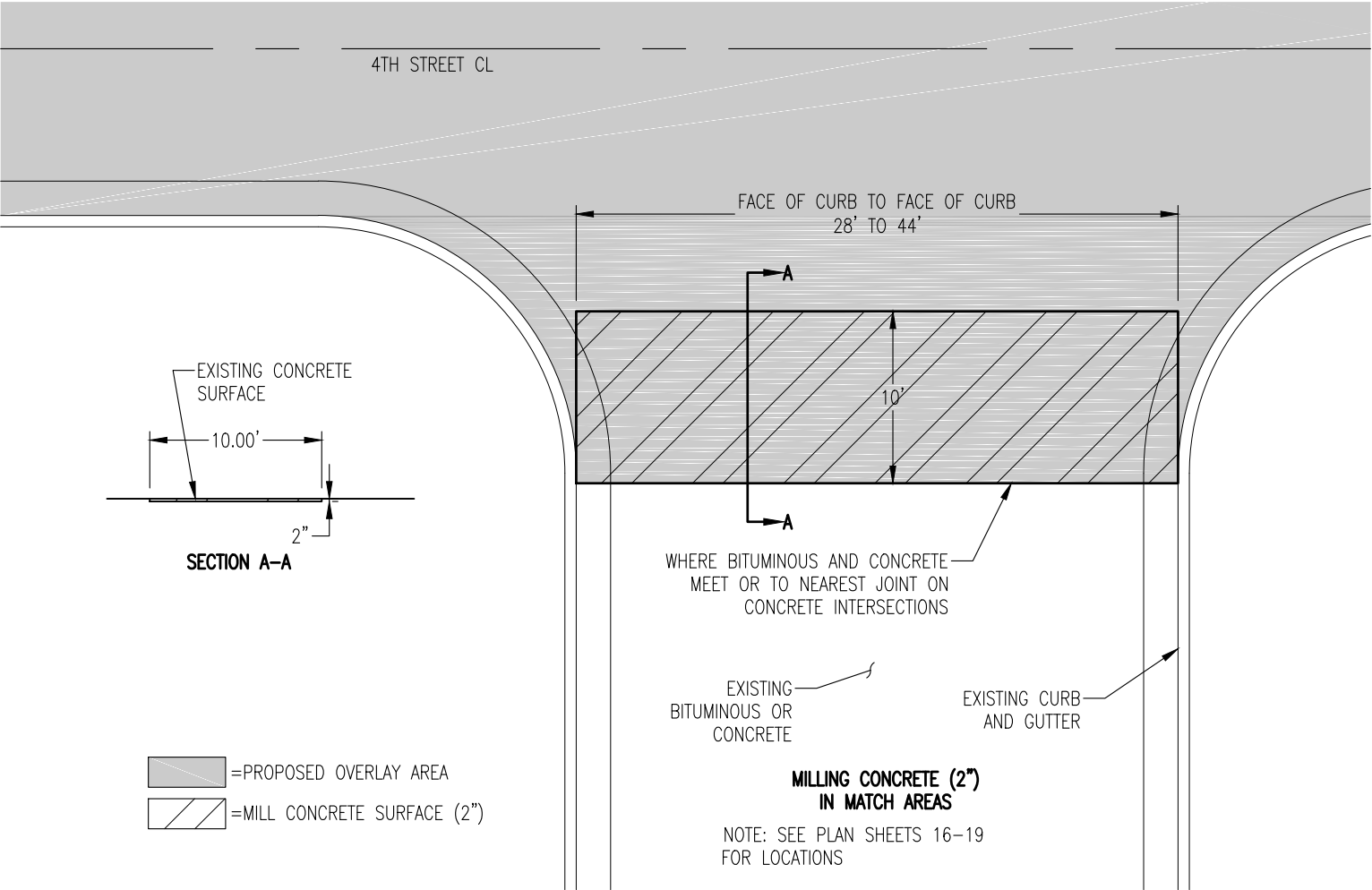
DRAWN BY: SCA

TABS

SHEET NO. 7 OF 26



I:\PW\ENGINEER\PROJECTS\1500-1999-1999_4th_St_Joint_Repair_&_Overlay\23-ACAD-DRAWINGS\1599_DTLS.dwg



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.

SIGNATURE: *Duncan C. Schwensohn*

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

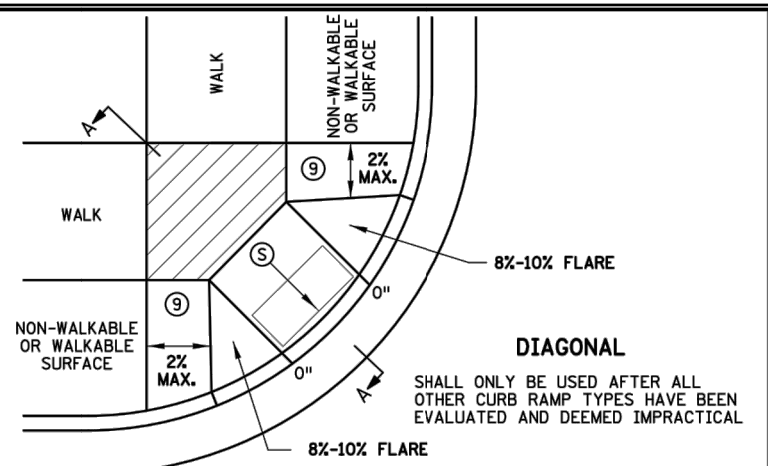
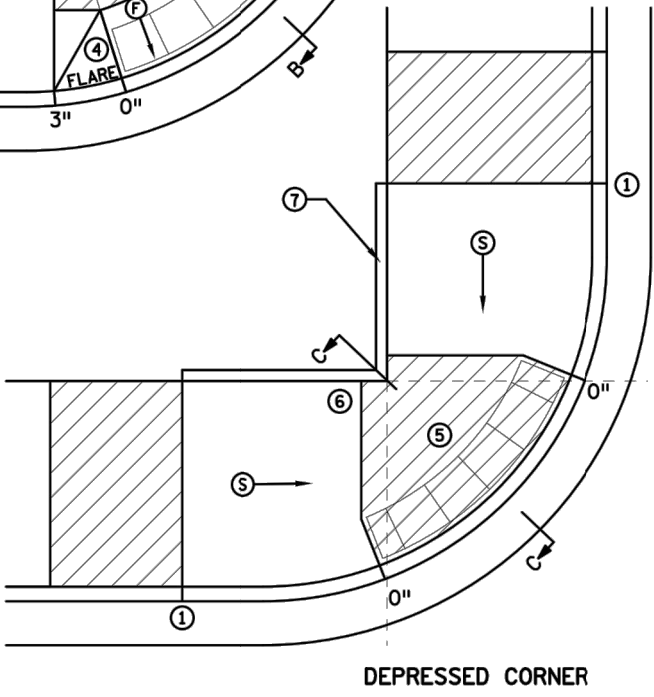
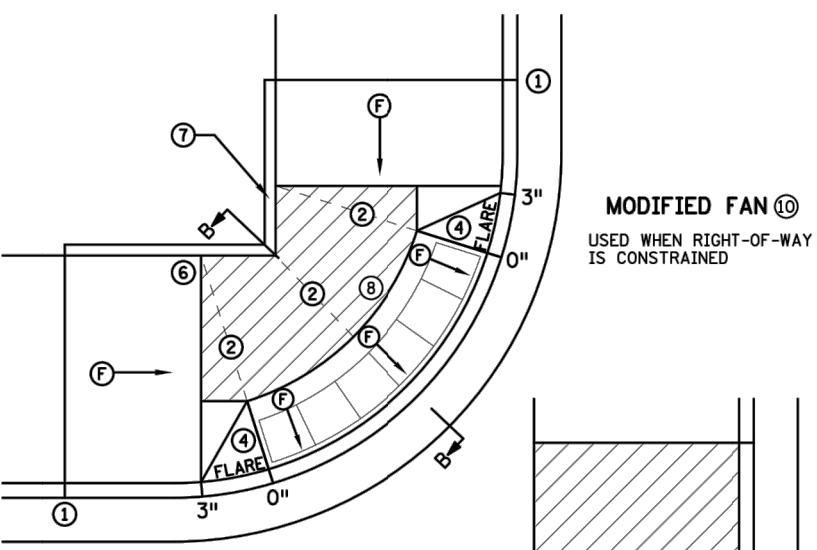
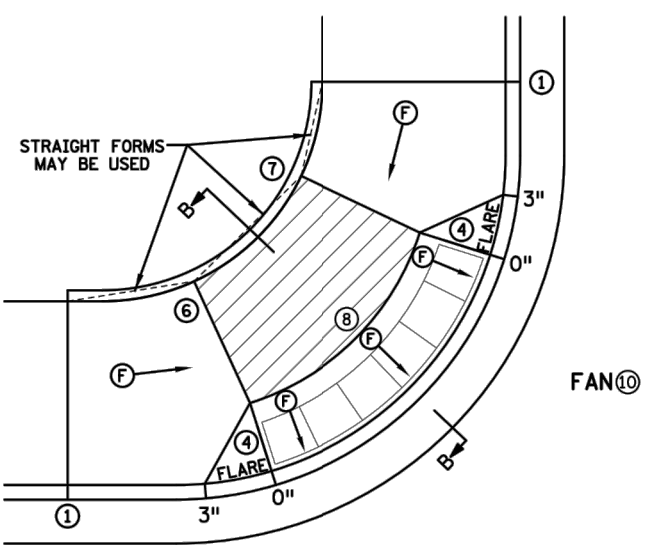
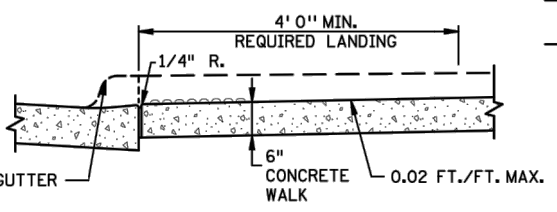
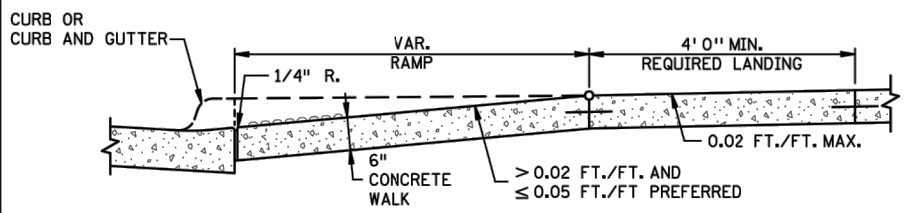
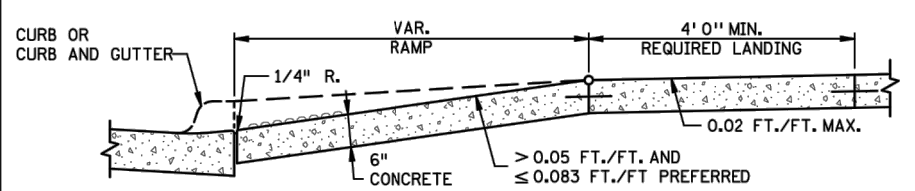
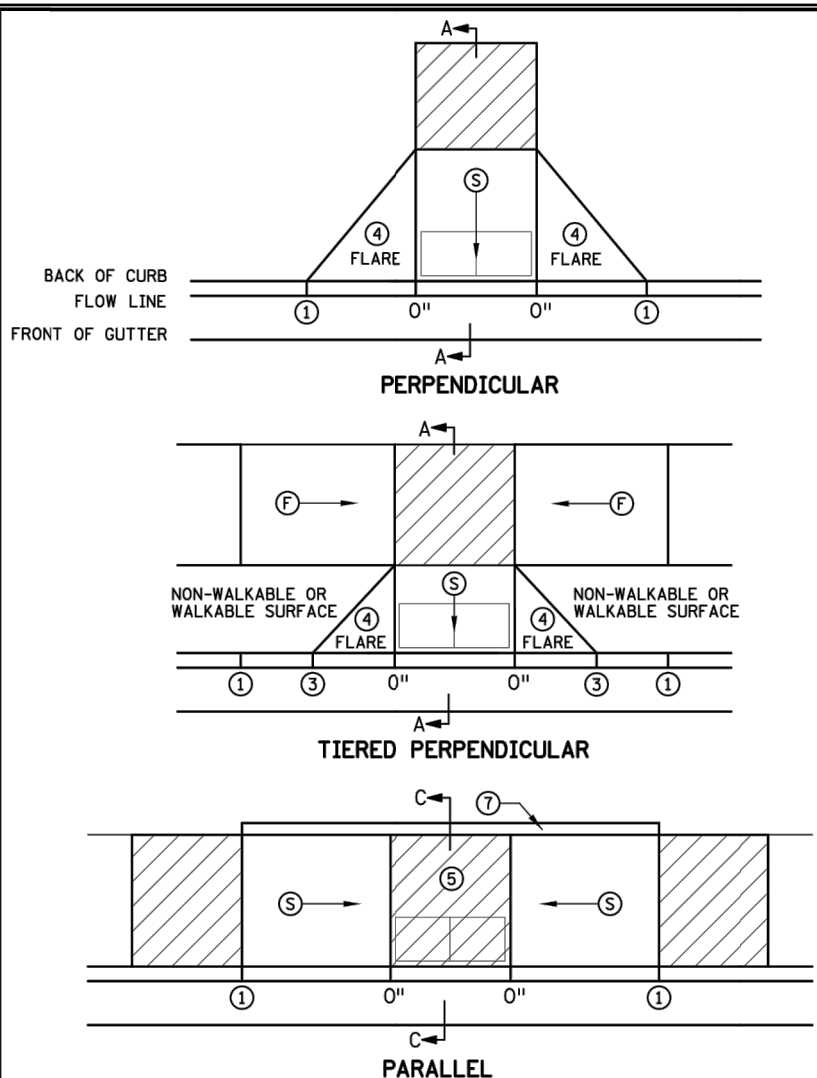
STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

MISC DETAILS

SHEET NO. 9 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999-1999\4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_ADA_Details.dwg



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

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 ENTIRE WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK. DETECTABLE WARNING SHOULD BE 6" LESS THAN THE PAR/TRAIL WIDTH. ARC LENGTH OF 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, WHEN INITIAL LANDING IS AT FULL CURB HEIGHT.
- 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 SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.
- ⑧ A 7' MIN TOP RADIUS GRADE BREAK 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.

LEGEND	
THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.	
⑤	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%.
⑥	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%.
⑦	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 PAR.
X"	CURB HEIGHT

REVISION:

APPROVED: JANUARY 23, 2017

OPERATIONS ENGINEER

REVISION:

APPROVED: 1-23-2017

STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250

1 OF 6

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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN

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DATE: 5/2/17

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CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

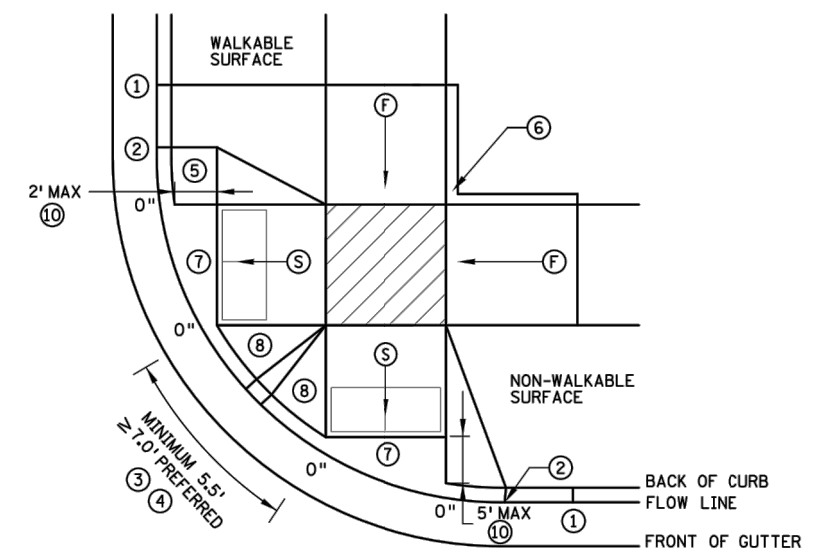
STATE AID PROJECT NO.: 118-132-010

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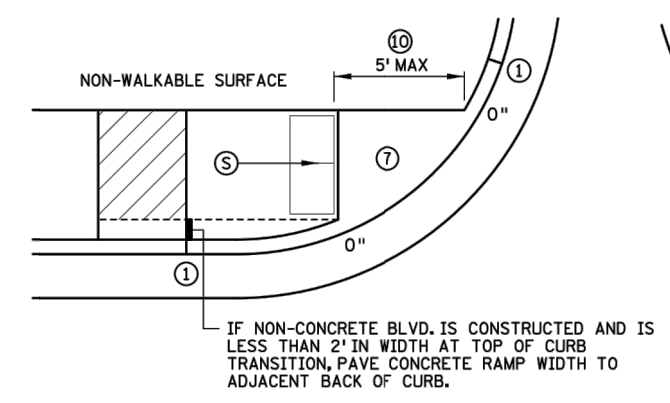
ADA DETAILS 1 OF 6

SHEET NO. 10 OF 26

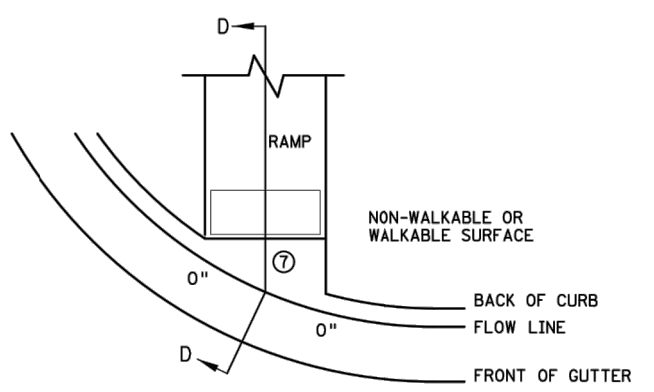
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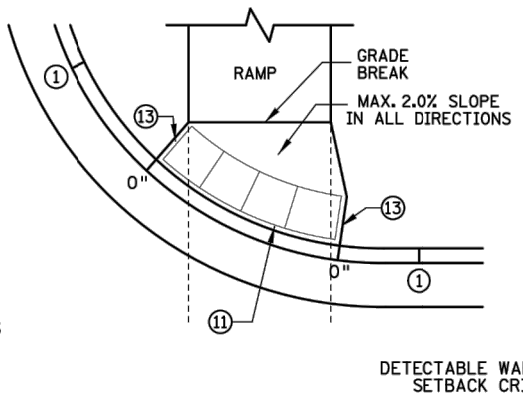
COMBINED DIRECTIONAL ⑨



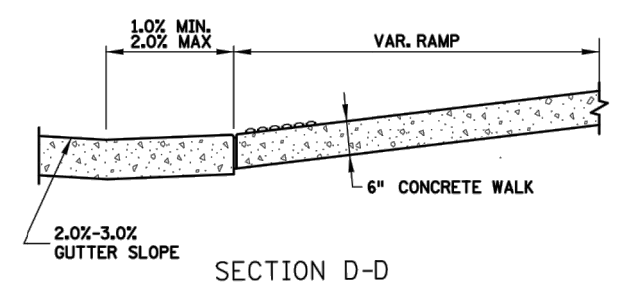
STANDARD ONE-WAY DIRECTIONAL ⑨



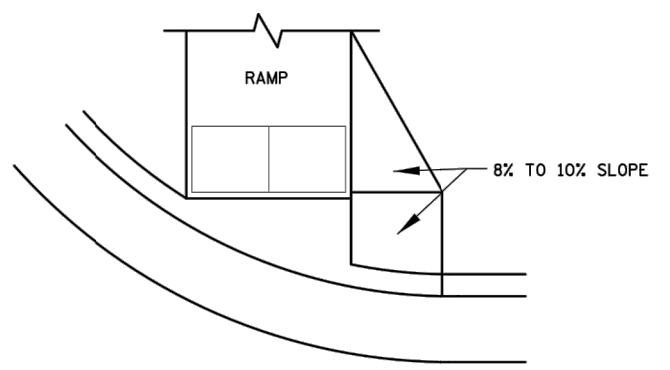
CURB FOR DIRECTIONAL RAMPS ⑭



ONE-WAY DIRECTIONAL WITH DETECTABLE WARNING AT BACK OF CURB



SECTION D-D



DIRECTIONAL RAMP WALKABLE FLARE

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 ENTIRE WIDTH OF SHARED-USE PATH AND THE ENTIRE PAR WIDTH OF THE WALK. DETECTABLE WARNING SHOULD BE 6" LESS THAN THE PAR/PATH WIDTH. ARC LENGTH OF 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 SHOULD 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.

LEGEND	
THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.	
⑤	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%.
⑥	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%.
⑦	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 PAR.
X"	CURB HEIGHT

REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

	REVISED:
	APPROVED: 1-23-2017
STATE DESIGN ENGINEER	

PEDESTRIAN CURB RAMP DETAILS	
STANDARD PLAN 5-297.250	2 OF 6

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.

SIGNATURE: Duncan C. Schwensohn DUNCAN SCHWENSOHN TYPE NAME

DATE: 5/2/17
LIC. NO.: 45486

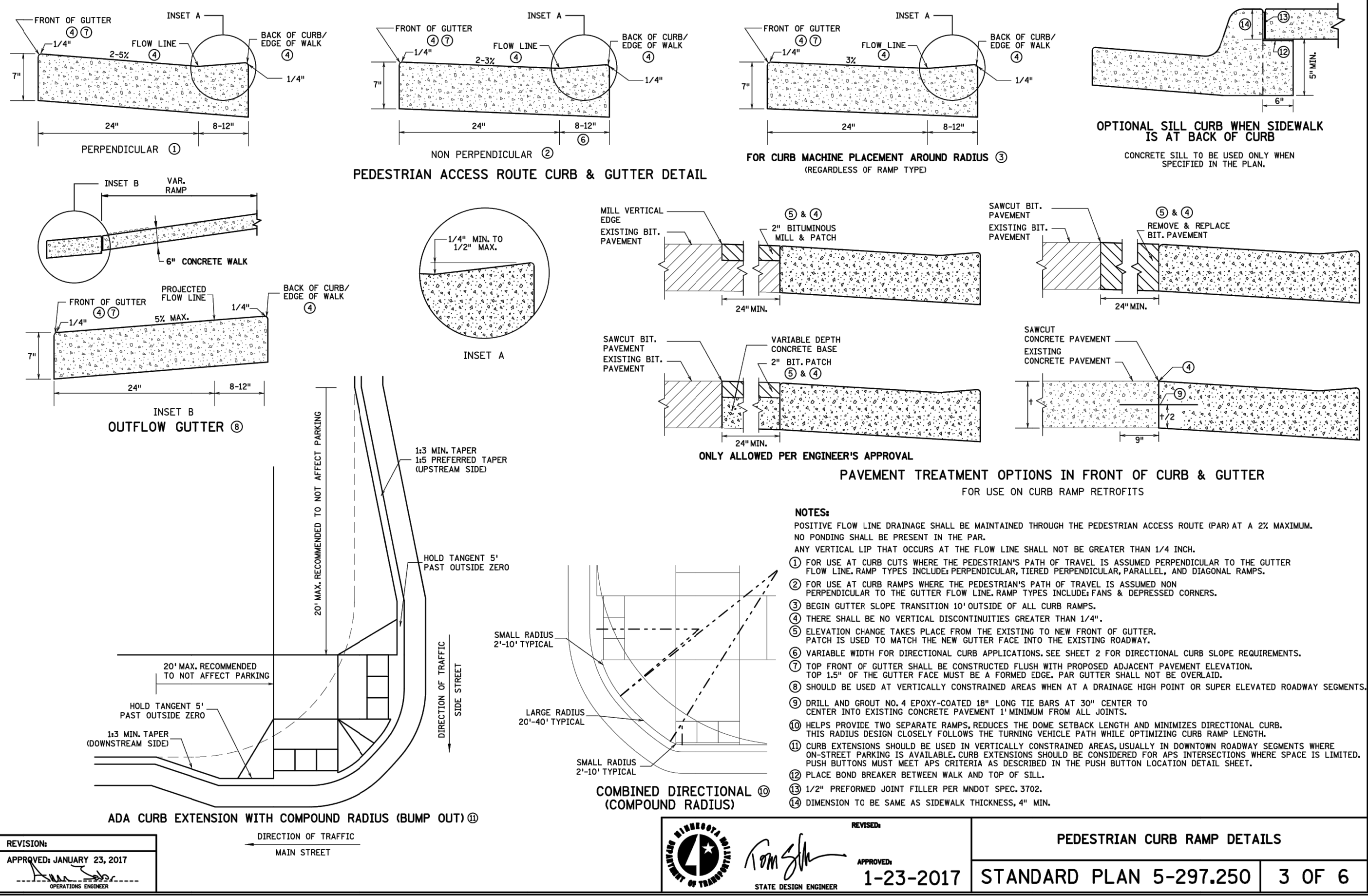


CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET
CITY PROJECT NO.: 1599
STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA
ADA DETAILS 2 OF 6
SHEET NO. 11 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999-1999\4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_ADA_Details.dwg



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.

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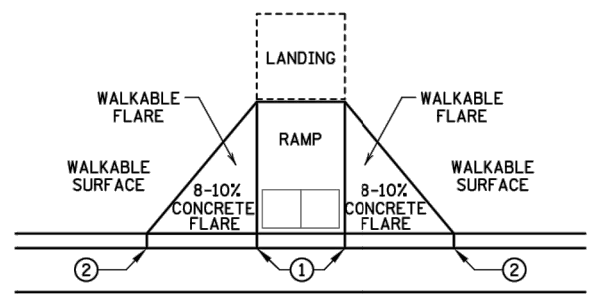


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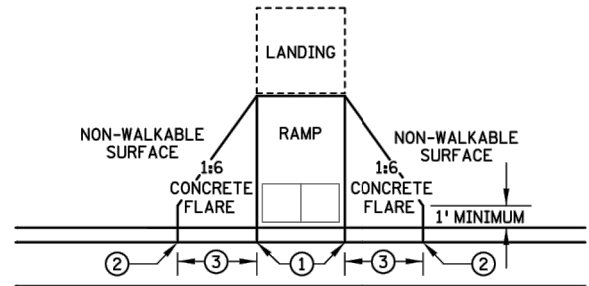
4TH STREET
CITY PROJECT NO.: 1599 STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA
ADA DETAILS 3 OF 6
SHEET NO. 12 OF 26

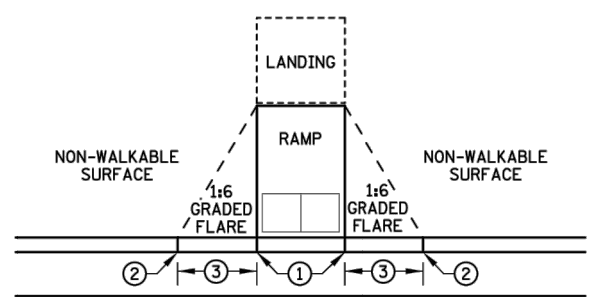
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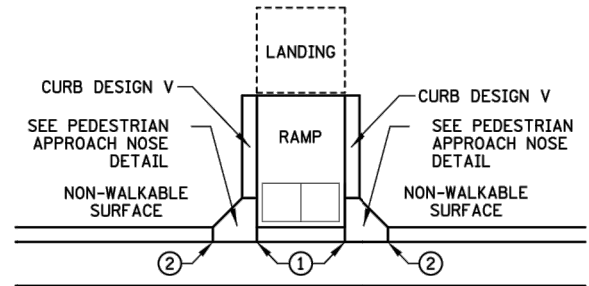
PAVED FLARES
ADJACENT TO WALKABLE SURFACE



PAVED FLARES
ADJACENT TO NON-WALKABLE SURFACE

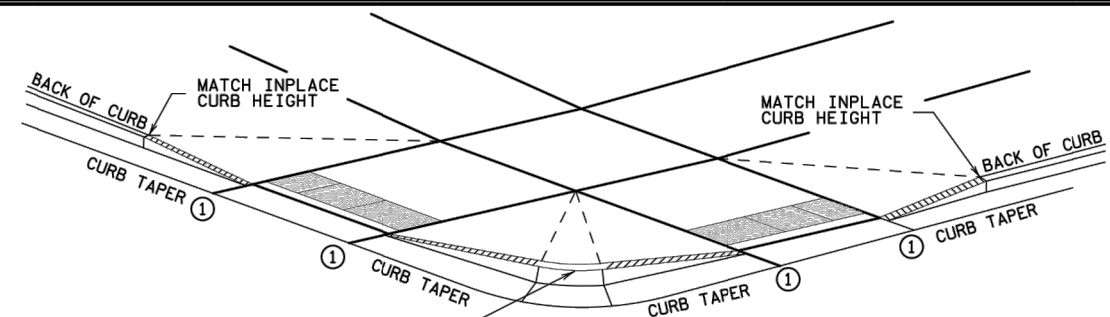


GRADED FLARES



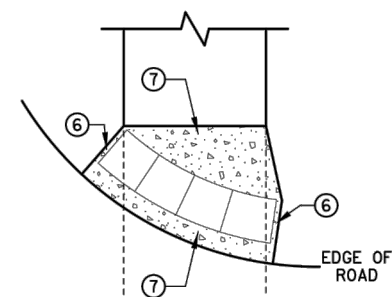
RETURNED CURB ⑤

TYPICAL SIDE TREATMENT OPTIONS ④ ⑪

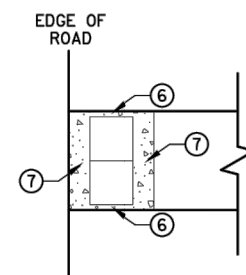


3" MINIMUM CURB HEIGHT, 4" PREFERRED
(MEASURED AT FRONT FACE OF CURB)
FOR A MIN. 6" LENGTH (MEASURED ALONG FLOW LINE)

DETECTABLE EDGE WITH ⑧
CURB AND GUTTER

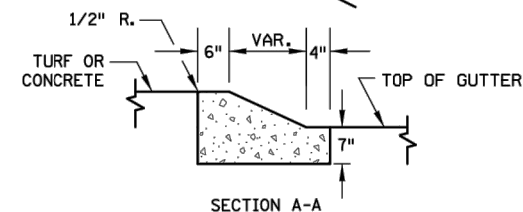
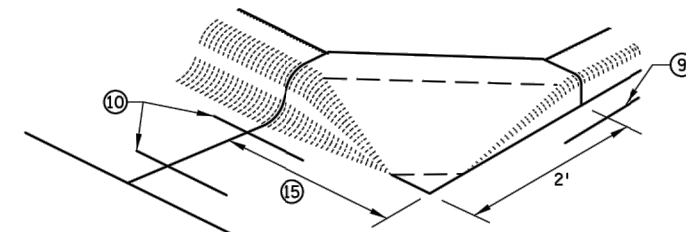


RADIAL DETECTABLE WARNING

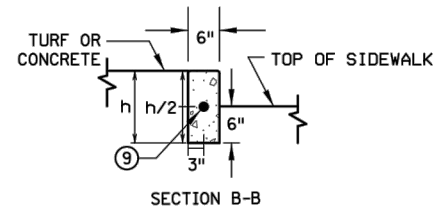


RECTANGULAR DETECTABLE WARNING

DETECTABLE EDGE WITHOUT CURB AND GUTTER

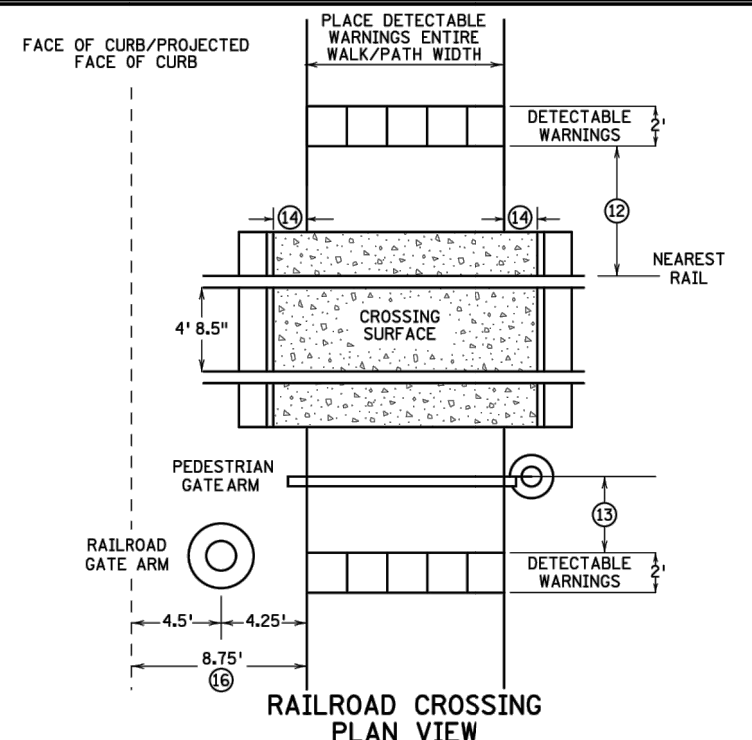
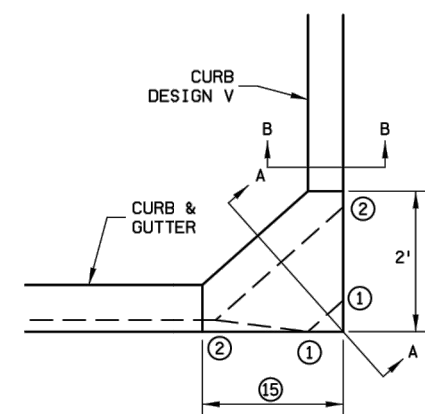


SECTION A-A



SECTION B-B

PEDESTRIAN APPROACH
NOSE DETAIL
(FOR RETURNED CURB
SIDE TREATMENT)



RAILROAD CROSSING
PLAN VIEW

- NOTES:
- 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.
- ② FULL CURB HEIGHT.
- ③ 2' FOR 4" HIGH CURB AND 3' FOR 6" HIGH CURB.
- ④ 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.
- ⑤ TYPICALLY USED FOR MEDIANS AND ISLANDS.
- ⑥ 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.
- ⑦ 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.
- ⑧ 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.
- ⑨ 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.
- ⑩ 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.
- ⑪ 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.
- ⑫ 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.
- ⑬ 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 ⑫.
- ⑭ CROSSING SURFACE SHALL EXTEND 2' MINIMUM PAST THE OUTSIDE EDGE OF WALK OR SHARED-USE PATH.
- ⑮ 3' FOR MEDIANS AND SPLITTER ISLANDS. NOSE CAN BE REDUCED TO 2' ON FREE RIGHT ISLANDS.
- ⑯ 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.

REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

REVISED:
APPROVED:
1-23-2017
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PEDESTRIAN CURB RAMP DETAILS
STANDARD PLAN 5-297.250
4 OF 6

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.

SIGNATURE: *Duncan C. Schwensohn*
DUNCAN SCHWENSOHN
TYPE NAME

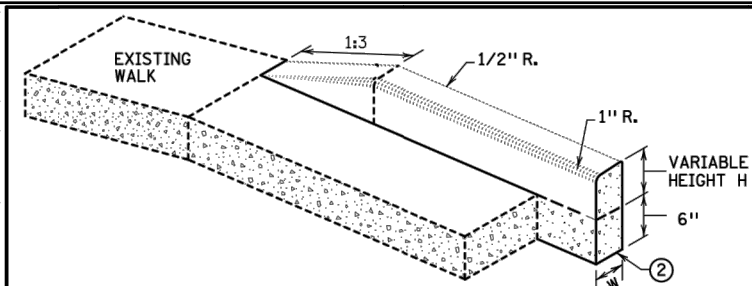
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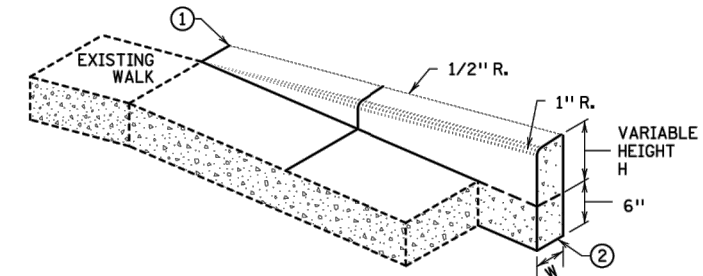
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CITY PROJECT NO.: 1599
STATE AID PROJECT NO.: 118-132-010
DRAWN BY: SCA
ADA DETAILS 4 OF 6
SHEET NO. 13 OF 26

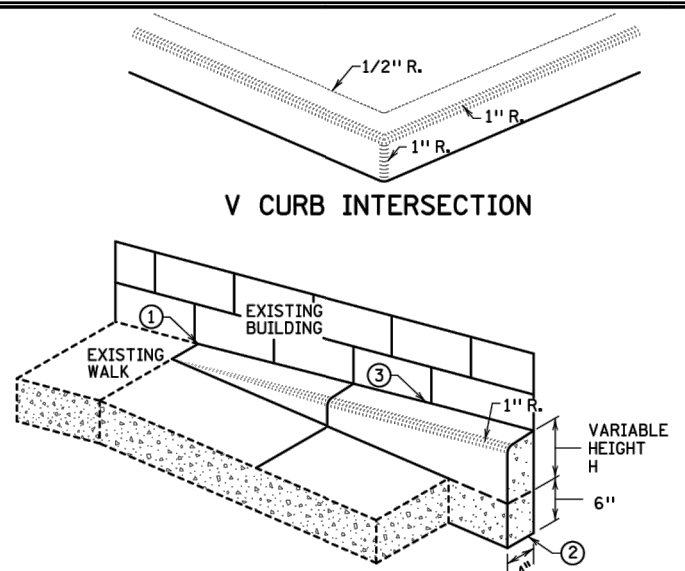
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V CURB ADJACENT TO LANDSCAPE
CURB WITHIN SIDEWALK LIMITS

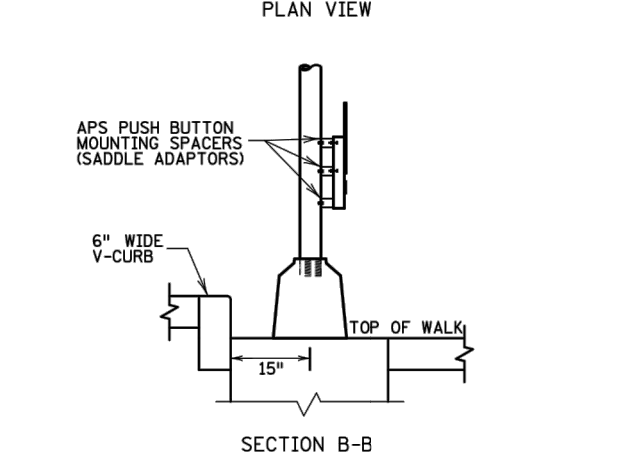
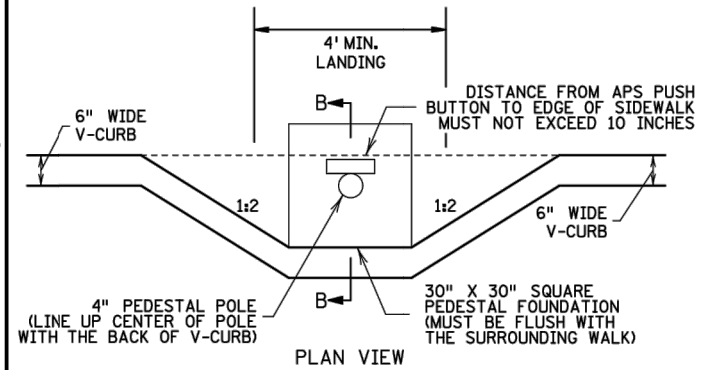


V CURB ADJACENT TO LANDSCAPE
CURB OUTSIDE SIDEWALK LIMITS

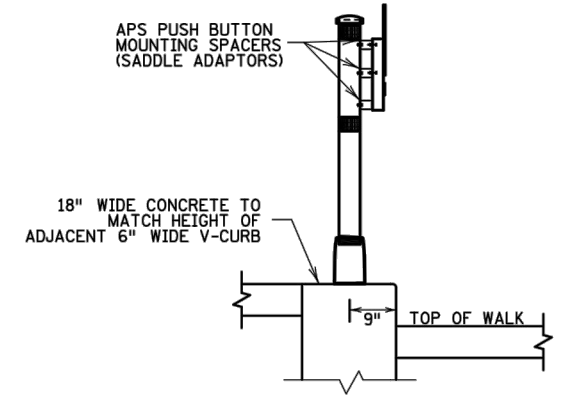
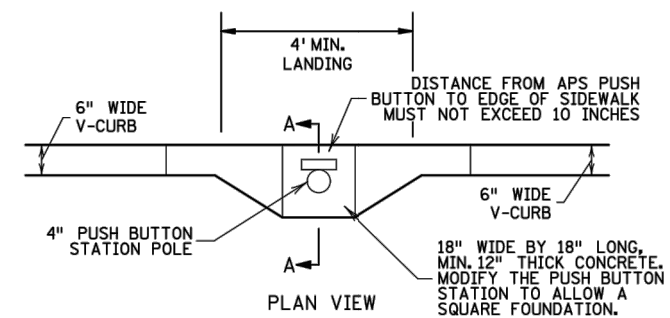


V CURB ADJACENT TO BUILDING
OR BARRIER

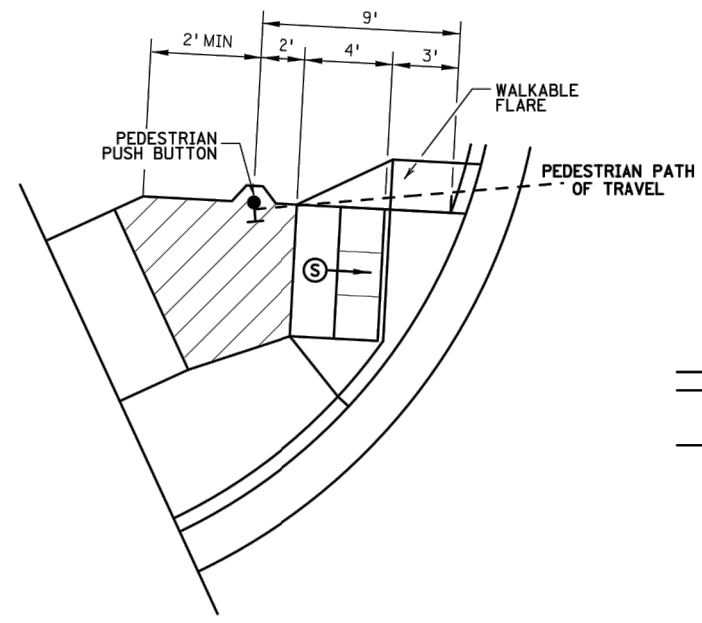
CONCRETE CURB DESIGN V	
CURB HEIGHT H	CURB WIDTH W
< 6"	4"
≥ 6"	6"



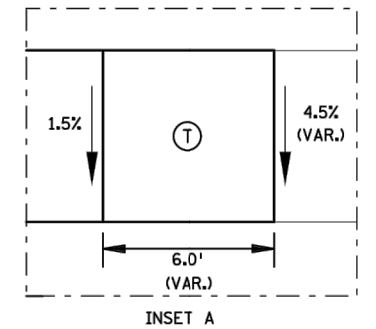
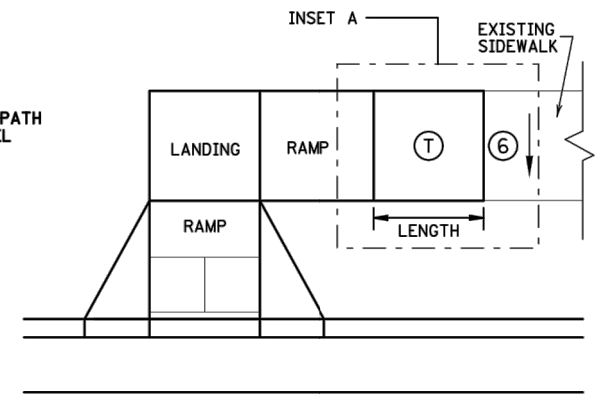
SIGNAL PEDESTAL & PUSH BUTTON (V-CURB)



PUSH BUTTON STATION (V-CURB)



SEMI-DIRECTIONAL RAMP (3,4,9)
3' DOME SETBACK, 4' LONG RAMP AND
PUSH BUTTON 9' FROM THE BACK OF CURB
PRIMARYLY USED FOR APS APPLICATIONS
WHERE THE PAR DOES NOT CONTINUE PAST
THE PUSH BUTTON (DEAD-END SIDEWALK)



TRANSITION PANEL (4,5)

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.
- END TAPERS AT TRANSITION SECTION SHALL MATCH INPLACE SIDEWALK GRADES.
- ALL V CURB SHALL MATCH BOTTOM OF ADJACENT WALK.
- EDGE BETWEEN NEW V CURB AND INPLACE STRUCTURE SHALL BE SEALED AND BOND BREAKER SHALL BE USED BETWEEN EXISTING STRUCTURE AND PLACED V-CURB.
- 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.
- TRANSITION PANELS ARE TO ONLY BE USED AFTER THE RAMP, OR IF NEEDED, LANDING ARE AT THE FULL CURB HEIGHT (TYPICAL SECTION).
- 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 PAR.
 - 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: JANUARY 23, 2017
OPERATIONS ENGINEER



REVISION:

APPROVED:

1-23-2017

STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250

5 OF 6

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.

SIGNATURE: Duncan C. Schwensohn DUNCAN SCHWENSOHN TYPE NAME

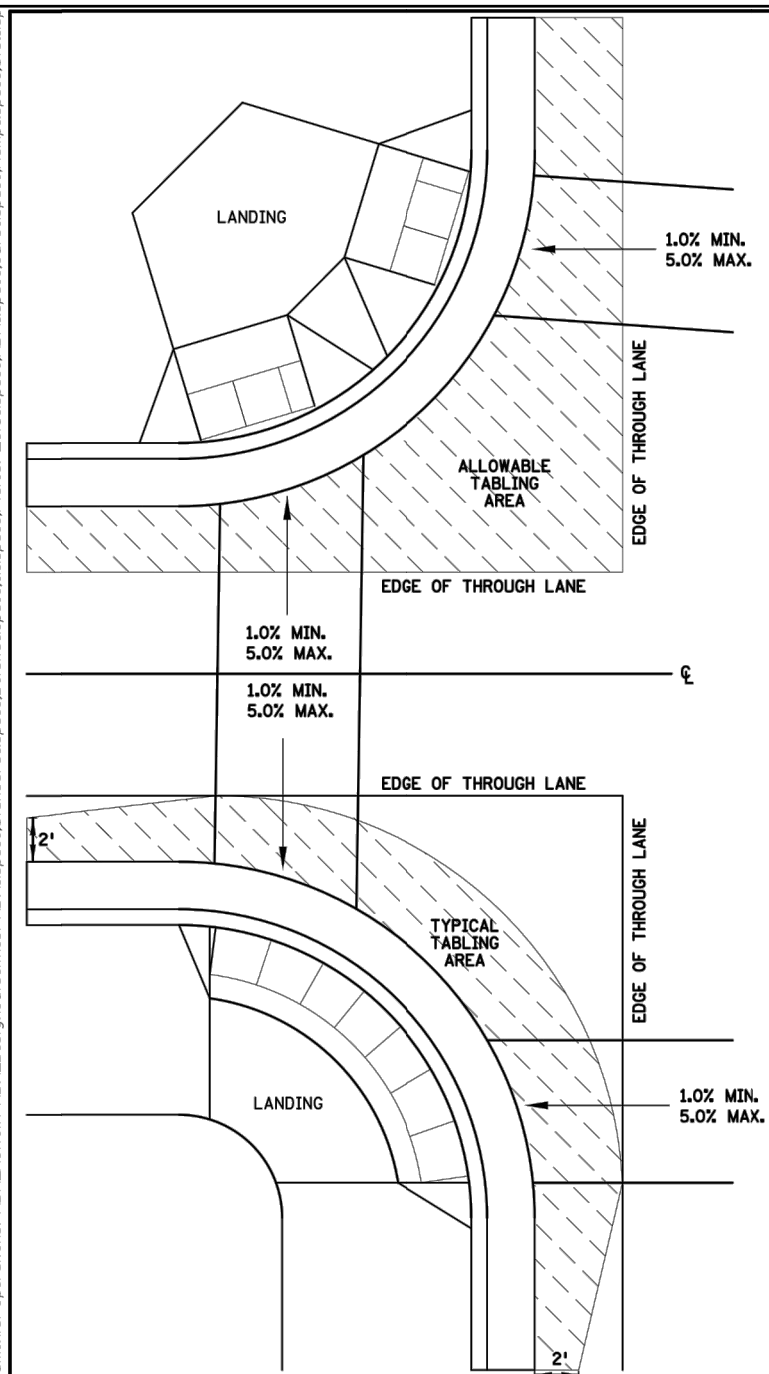
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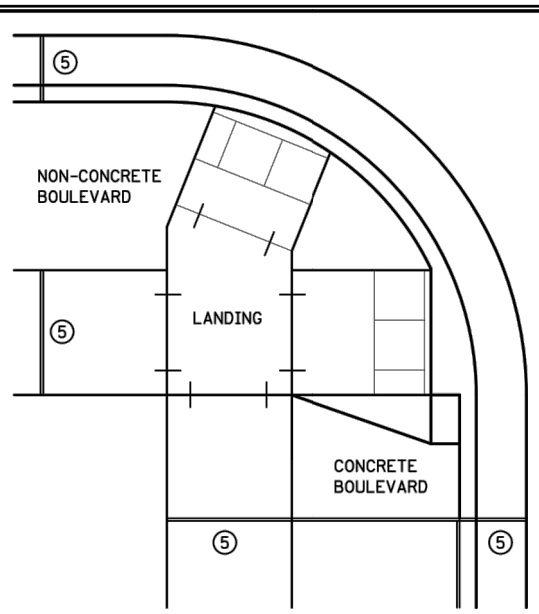
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DULUTH, MN 55802

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CITY PROJECT NO.: 1599		ADA DETAILS 5 OF 6	
STATE AID PROJECT NO.: 118-132-010		SHEET NO. 14 OF 26	

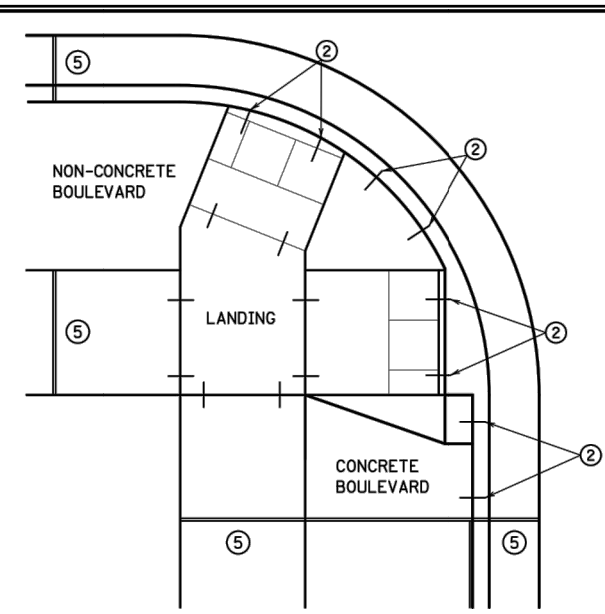
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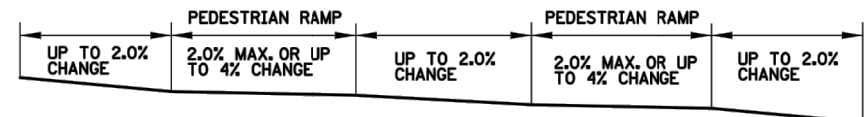
CURB LINE AND ROAD CROSSING ADJUSTMENTS



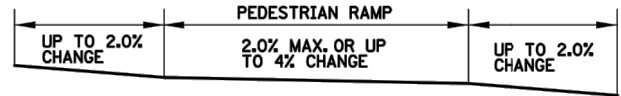
EXPANSION MATERIAL PLACEMENT FOR CONCRETE AND BITUMINOUS ROADWAYS



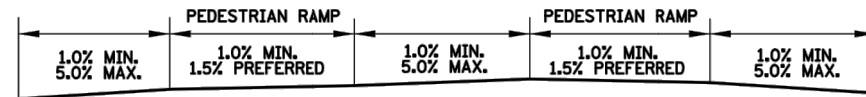
OPTIONAL CURB LINE REINFORCEMENT PLACEMENT ON BITUMINOUS ROADWAYS



FLOW LINE PROFILE "TABLE" - TWIN PERPENDICULARS



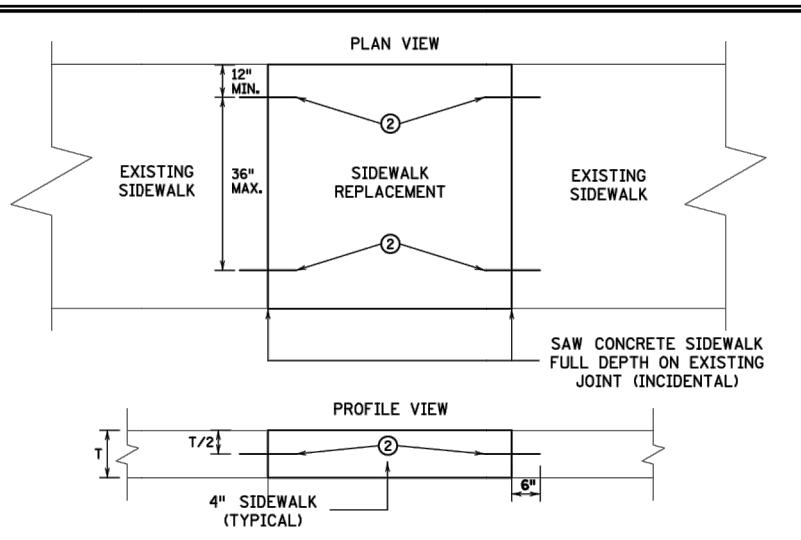
FLOW LINE PROFILE "TABLE" - FAN



FLOW LINE PROFILE RAISE - TWIN PERPENDICULARS

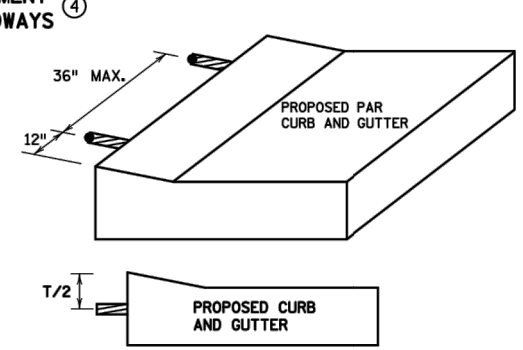


FLOW LINE PROFILE RAISE - FAN

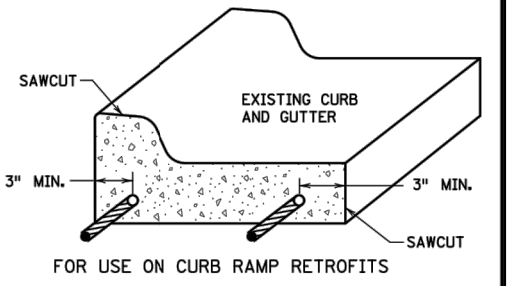


OPTIONAL SIDEWALK REINFORCEMENT

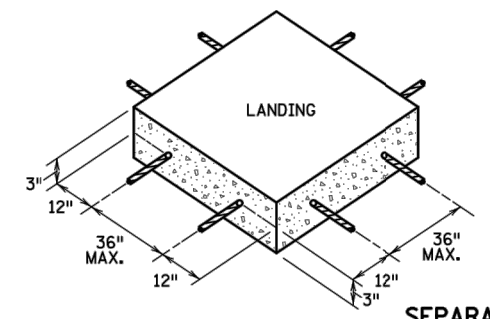
SIDEWALK REINFORCEMENT TO BE USED ONLY WHEN SPECIFIED IN THE PLAN.



OPTIONAL CURB LINE REINFORCEMENT DETAILS



CURB AND GUTTER REINFORCEMENT



SEPARATE LANDING POUR REINFORCEMENT

"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 AT 36" MAXIMUM CENTER TO CENTER (EPOXY COATED). BARS TO BE ADJUSTED TO MATCH RAMP GRADE.
- 3) DRILL AND GROUT 2 - NO. 4 X 12" LONG REINFORCEMENT BARS (EPOXY COATED). REINFORCEMENT REQUIRED FOR ALL CONSTRUCTION JOINTS WITHIN RADIUS.
- 4) THIS OPTIONAL CURB LINE REINFORCEMENT DETAIL SHOULD ONLY BE USED ON BITUMINOUS ROADWAYS WHEN SPECIFIED IN THE PLAN.
- 5) 1/2 IN. PREFORMED JOINT FILLER MATERIAL PER MNDOT SPEC. 3702.

REVISION:

APPROVED: JANUARY 23, 2017

OPERATIONS ENGINEER

REVISOR:

APPROVED: 1-23-2017

STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250

6 OF 6

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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO.: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

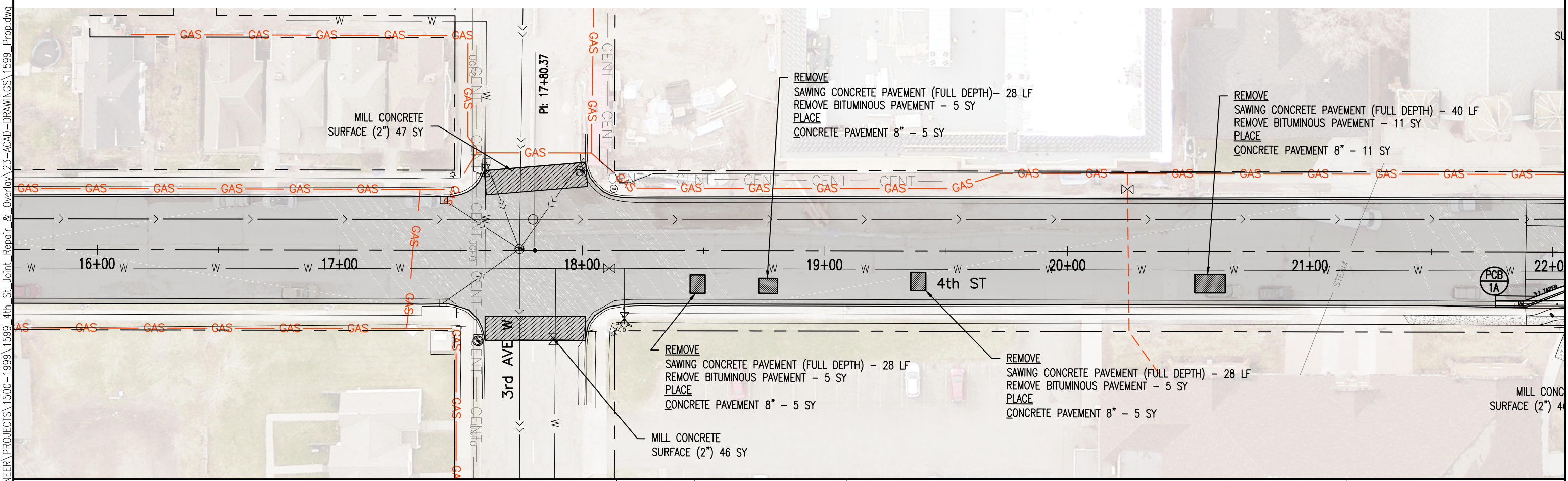
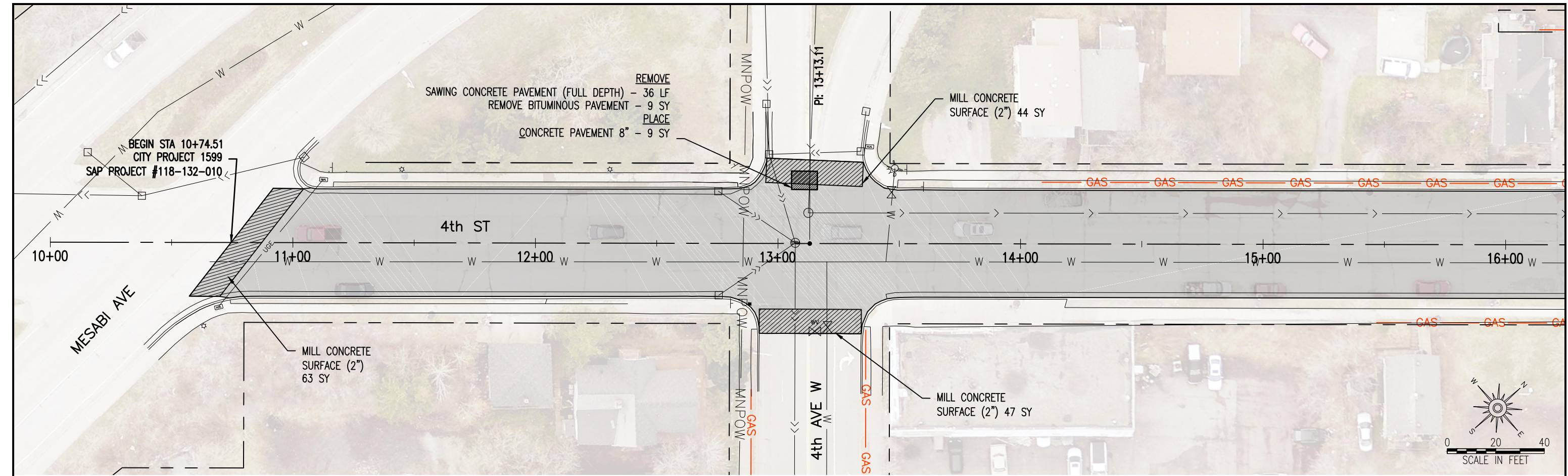
CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

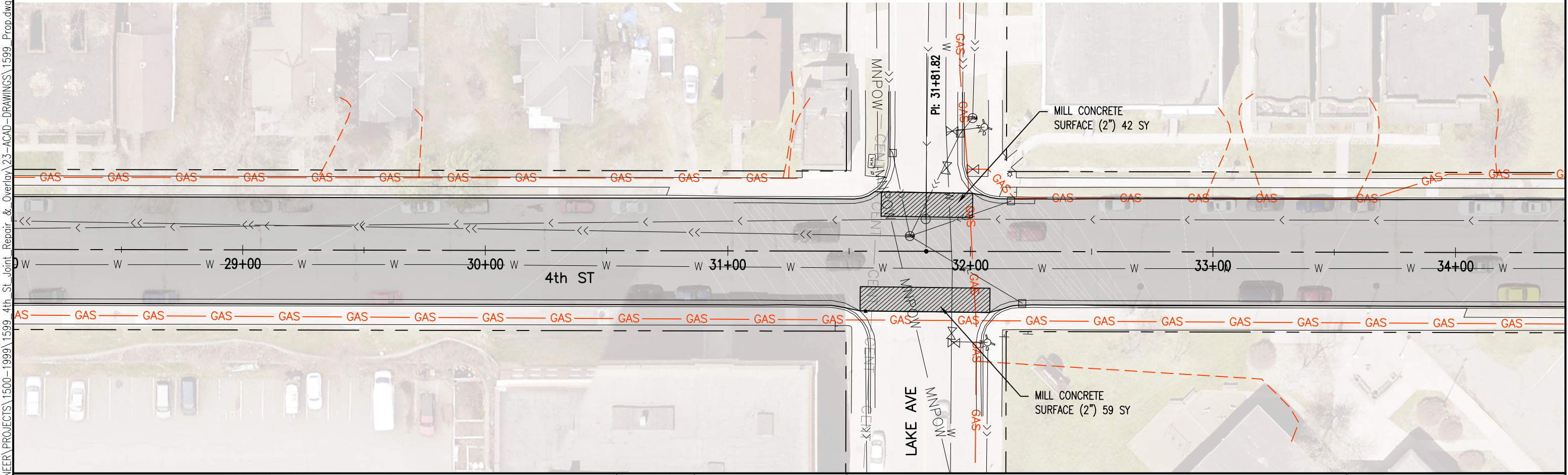
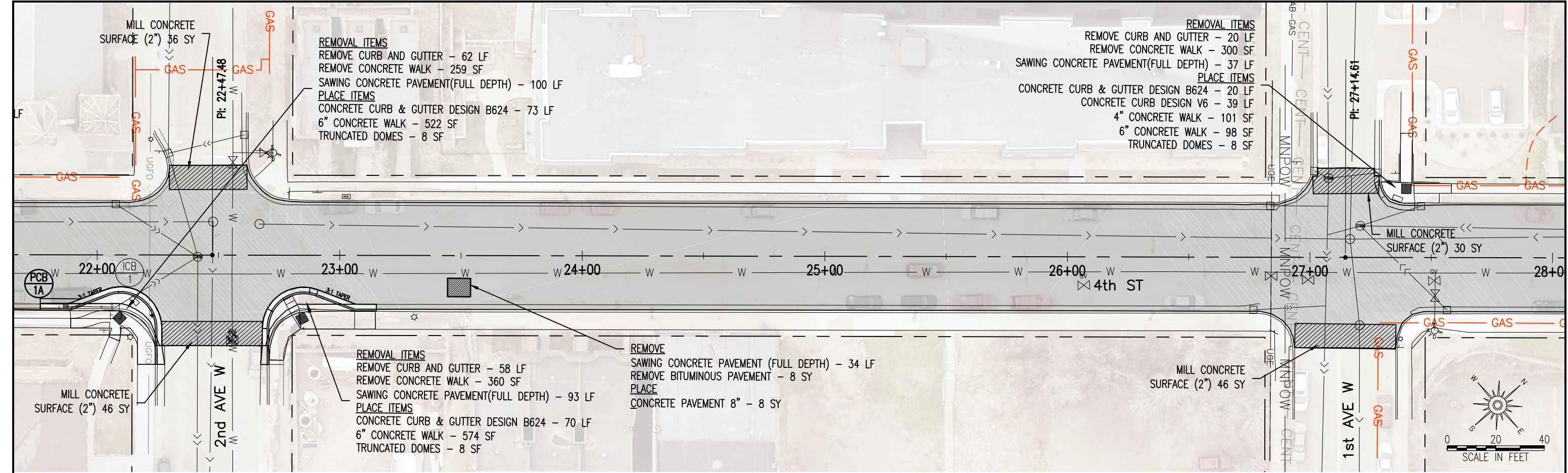
DRAWN BY: SCA

ADA DETAILS 6 OF 6

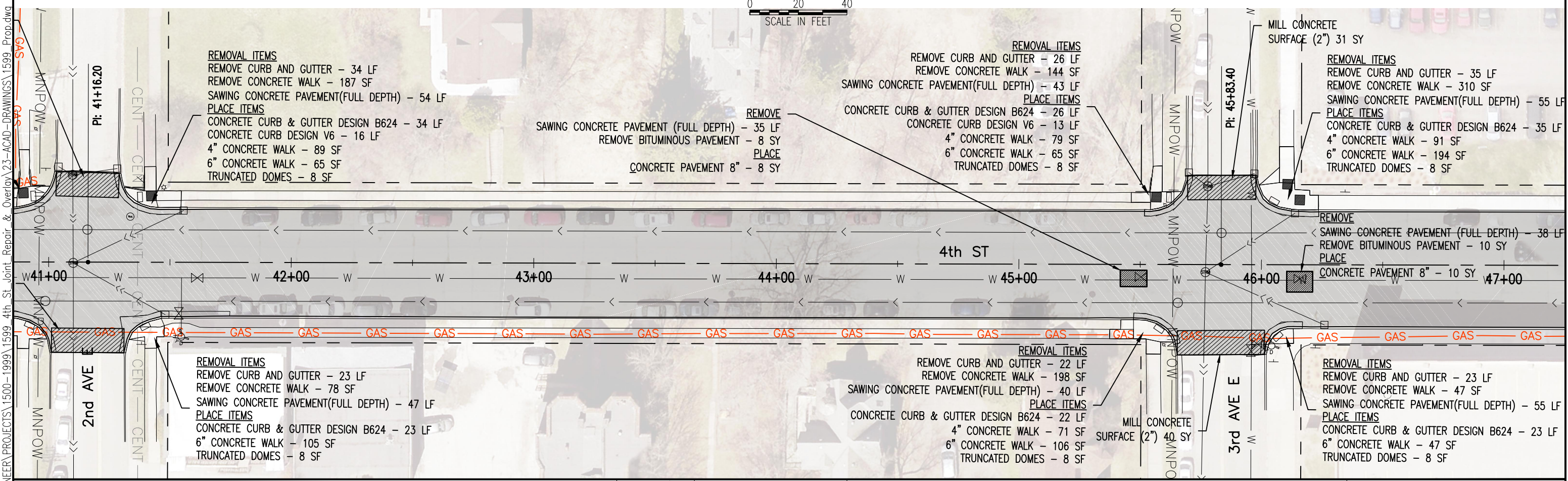
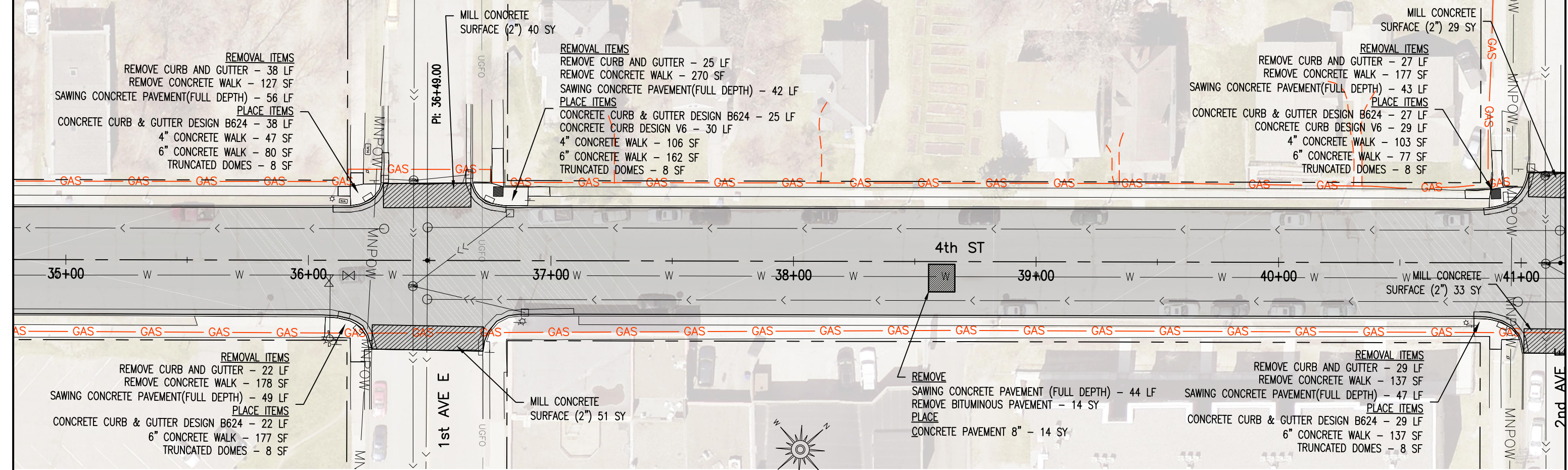
SHEET NO. 15 OF 26

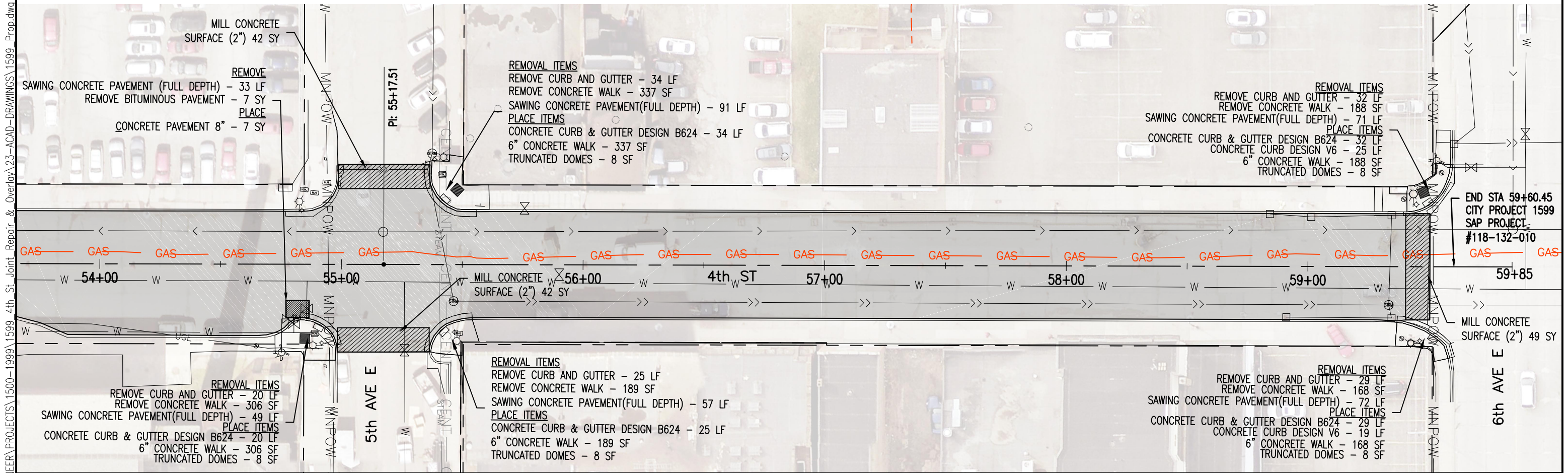
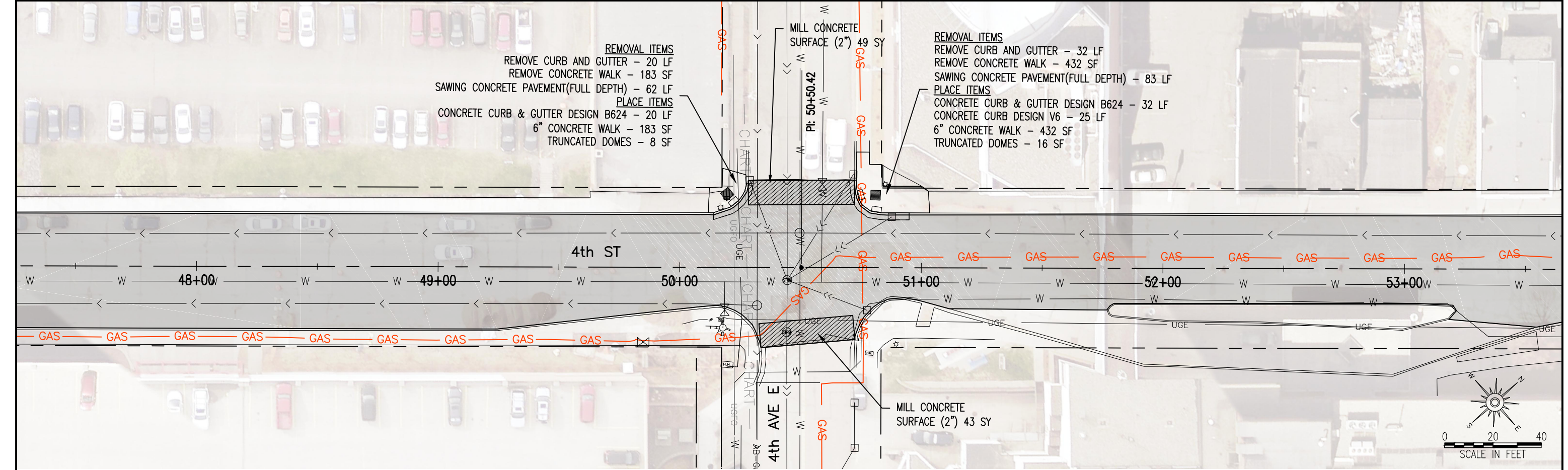


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						PLAN	
				CITY PROJECT NO.: <u>1599</u>	STATE AID PROJECT NO.: <u>118-132-010</u>	SHEET NO. <u>16</u> OF <u>26</u>	

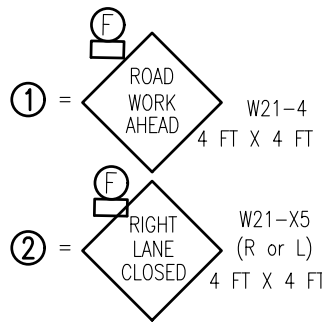


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SIGNATURE: 		DUNCAN SCHWENSOHN TYPE NAME							PLAN	
		LIC. NO: 45486					CITY PROJECT NO.: 1599		STATE AID PROJECT NO.: 118-132-010	



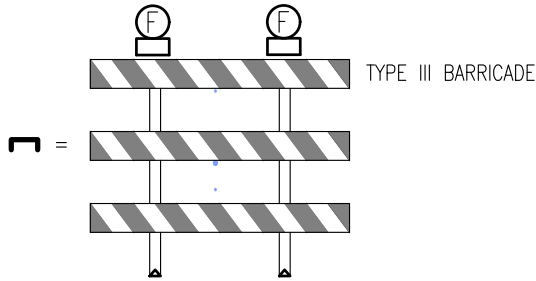
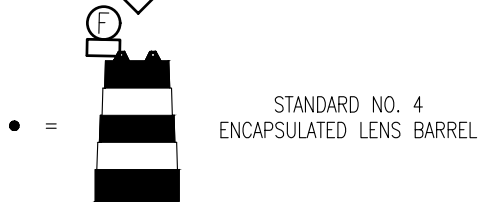
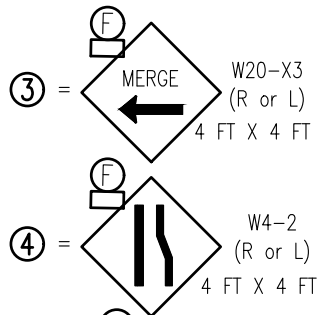


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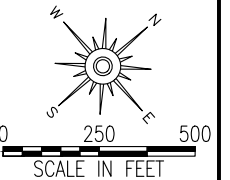
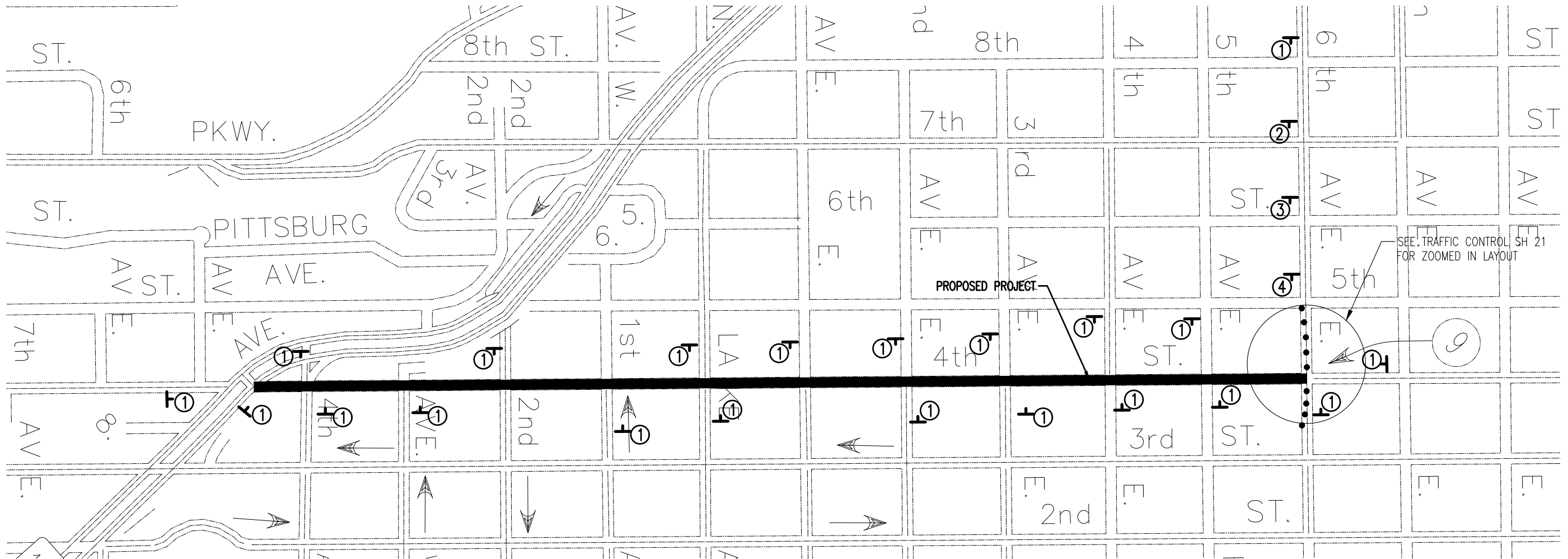


 =TYPE "A" FLASHER

 =SIGN



SIGNAGE ESTIMATED QUANTITIES			
ITEM	DESIGN	NO.	REMARKS
ROAD WORK AHEAD	W20-1	21	48" x 48" DOUBLE POST MOUNTED WITH FLASHER
MERGE	W20-X3	1	48" x 48" DOUBLE POST MOUNTED WITH FLASHER
MERGE	W4-2	1	48" x 48" DOUBLE POST MOUNTED WITH FLASHER
RIGHT LANE CLOSED	W21-X5	1	48" x 48" DOUBLE POST MOUNTED WITH FLASHER
FLASHING AMBER WARNING LIGHTS	LOW INTENSITY	10	AS REQUIRED
BARRELS	-	-	AS REQUIRED



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SIGNATURE: 

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

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CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

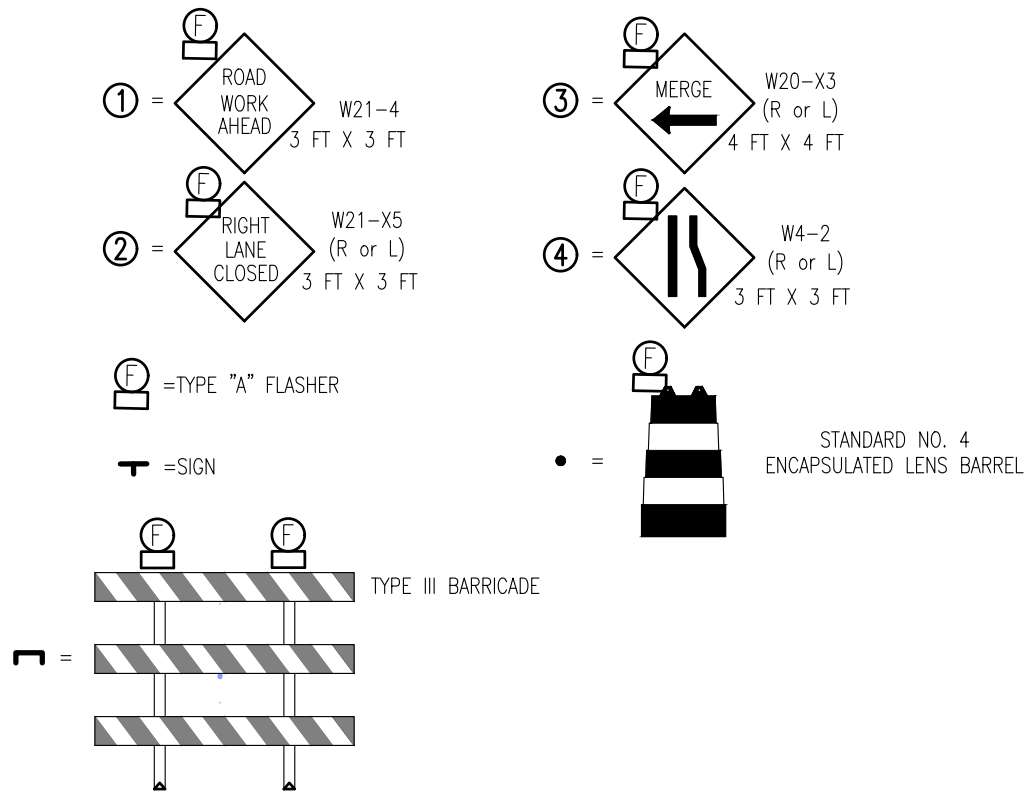
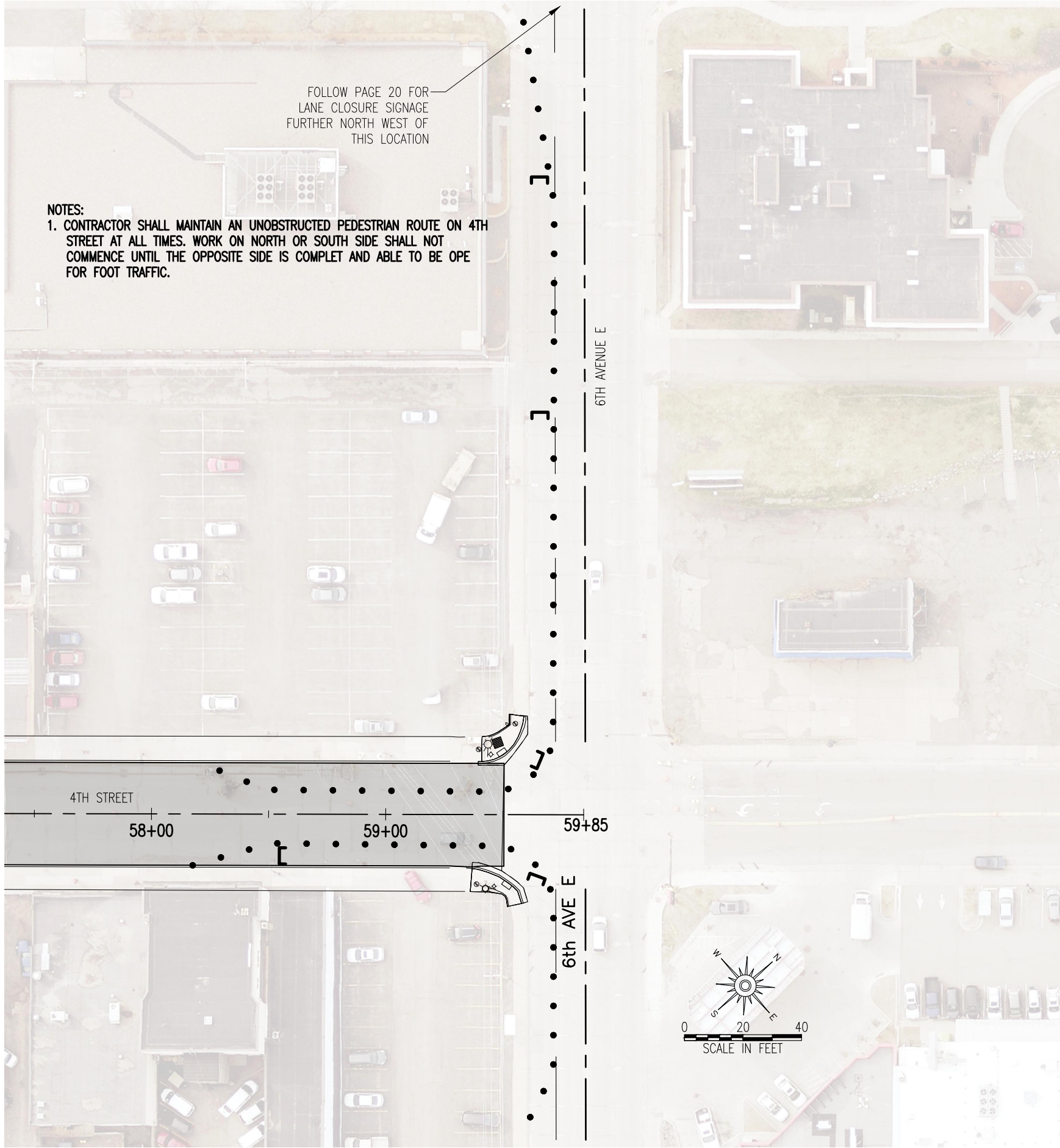
STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

TRAFFIC CONTROL

SHEET NO. 20 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599_4th_St_Joint_Repair_&_Overlay\23-ACAD-DRAWINGS\1599_TRAF N PAINT.dwg



TRAFFIC CONTROL NOTES:

1. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN THE DEVICES IN THIS TRAFFIC CONTROL PLAN UNLESS OTHERWISE NOTED.
2. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) INCLUDING "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS" DATED JANUARY 2014. AVAILABLE AT: (<http://www.dot.state.mn.us/trafficeng/publ/fieldmanual/index.html>)
3. FIELD CONDITIONS MAY REQUIRE MODIFICATIONS OF THIS LAYOUT AS DEEMED NECESSARY BY THE ENGINEER.
4. THE NUMBER AND PLACEMENT OF TRAFFIC CONTROL DEVICES WILL DEPEND UPON THE SEQUENCE OF THE CONTRACTOR'S OPERATION.
5. ALL DISTANCES DICTED ARE APPROXIMATE.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ANY WORK AREAS NEAR TRAFFIC IN ACCORDANCE WITH THE MMUTCD.
7. IF THE CONTRACTOR DECIDES TO PERFORM THE CONSTRUCTION WORK IN A SEQUENCE OTHER THAN SHOWN IN THIS TRAFFIC CONTROL PLAN, THE CONTRACTOR SHALL PROVIDE COMPLETE REVISED TRAFFIC CONTROL PLANS TO BE APPROVED BY THE ENGINEER.
8. ALL TRAFFIC CONTROL DEVICES, INCLUDING OVERHEAD SIGNS ON ROADS OPEN TO TRAFFIC THAT ARE NOT CONSISTENT WITH TRAFFIC OPERATION, SHALL BE COVERED, REMOVED OR REVISED AS DIRECTED BY THE ENGINEER.
9. "ROAD WORK AHEAD" SIGNS SHALL BE MOUNTED APPROX. 300 FT (1 BLOCK) IN ADVANCE OF THE CONSTRUCTION AND SHALL HAVE A TYPE "A" LOW INTENSITY FLASHING AMBER WARNING LIGHT MOUNTED ON THEM.
10. "ROAD CLOSED AHEAD" SIGNS SHALL BE ERECTED APPROX. 300 FT (1 BLOCK) IN ADVANCE OF THE CLOSURE.
11. TYPE "A" LOW INTENSITY AMBER WARNING LIGHTS SHALL BE MOUNTED ON ALL ADVANCE WARNING SIGNS AND ON ALL TYPE I AND TYPE III BARRICADES WHEN USED AT NIGHT OR TO IDENTIFY HAZARDS.
12. ADDITIONAL SIGNING MAY BE REQUIRED FOR SEPARATE LANE CLOSURES. THE SIGNING SHALL BE IN CONFORMANCE WITH "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS" FIELD MANUAL DATED JANUARY 2014 AND SHALL BE CONSIDERED INCIDENTAL.
13. THE CONTRACTOR SHALL PLACE DRUMS THROUGHOUT THE PROJECT TO DELINEATE HAZARDOUS AREAS AND FACILITATE DAY-TO-DAY CHANNELIZATION OF TRAFFIC (INCIDENTAL).

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SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

TRAFFIC CONTROL

SHEET NO. 21 OF 26

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GENERAL CONSTRUCTION REQUIREMENTS

POLY PREFORM

1. THE INSTALLERS OF THIS MATERIAL MUST CARRY A CARD CERTIFYING THAT THEY HAVE ATTENDED A TRAINING SESSION THAT ADDRESSES SURFACE PREPARATIONS AND ALL APPLICATION REQUIREMENTS AND TECHNIQUES NECESSARY FOR SUCCESSFUL APPLICATION.
2. ALL MARKINGS SHALL BE OF THE "INLAY" METHOD UNLESS THE "OVERLAY" PROCEDURE IS SPECIFIED.

INLAY APPLICATION

MAT TEMPERATURE SHALL BE CHECKED USING A THERMOMETER TO MAKE SURE THE INLAY IS BEING DONE IN THE PROPER TEMPERATURE RANGE. THE TEMPERATURE SHOULD MEASURE BETWEEN 150° F (ASPHALT FIRM ENOUGH TO WALK ON) AND 120° F. APPLICATION BELOW 120° F MAY NOT GET A PROPER INLAY. INLAYS ARE NOT RECOMMENDED AFTER SEPTEMBER 15 AS THE ASPHALT COOLS TOO FAST AT THIS TIME OF THE YEAR.

NO PRIMERS ARE USED FOR INLAY APPLICATION. DO NOT INSTALL LANE LINES ON AN ASPHALT SEAM. ROLLING OF ALL THE MARKINGS SHOULD BE LENGTHWISE IN THE DIRECTION THEY WERE LAID.

FOR CROSSWALKS AND STOP BARS, INITIAL TAMPING WITH THE TAMPING CART IS RECOMMENDED USING ONLY 100 LBS. OF WEIGHT.

USE COMPACTION ROLLER TO EMBED (INLAY) MARKINGS INTO PAVEMENT SURFACE. USE MINIMUM SPEED AND WATER ON ROLLER. DO NOT USE VIBRATOR. IF MARKING BUCKLES OR DISTORTS SEVERELY IN FRONT OF ROLLER, MAT TEMPERATURE OR ROLLER SPEED MAY BE TOO HIGH.

IF OVERLAY APPLICATION IS SPECIFIED OR AUTHORIZED BY THE ENGINEER

1. TEMPERATURE REQUIREMENTS
 - . MINIMUM AIR TEMPERATURE 60° F (16° C) AND RISING
 - . MINIMUM PAVEMENT TEMPERATURE 70° F (21° C) AND RISING
 - . MINIMUM OVERNIGHT TEMPERATURE 60° F (16° C) AND RISING
 - . NO OVERLAY APPLICATIONS AFTER SEPTEMBER 1
2. SURFACE PREPARATION
 - A. NEW CONCRETE (LESS THAN 3 MONTHS OLD)
 1. REMOVE CURING COMPOUND BY SANDBLASTING, HYDROBLASTING OR SHOT BLASTING WHERE TAPE IS TO BE APPLIED (HYDRO-BLASTING LEAVES SURFACE WET, TIME SHALL BE ALLOWED FOR PAVEMENT TO DRY)
 2. SWEEP OR BLOW THE BLASTED AREAS
 3. APPLY REQUIRED PRIMER
 - B. ASPHALT-LESS THAN 11 DAYS OLD
 1. ALL - SWEEP OR BLOW CLEAN
 2. 0 - 3 DAYS OLD - NO PRIMER
 3. 4 - 10 DAYS OLD - STAMARK™ SP44 ONLY
 4. 11+ DAYS - STAMARK™ E44 OR SP44 DEPENDING ON APPLICATION. SEE MANUFACTURERS SPECIFICATION
 - C. OLD CONCRETE
 1. SWEEP OR BLOW CLEAN
 2. APPLY REQUIRED PRIMER
3. OLD MARKINGS
 - A. DO NOT APPLY OVER PAINT, EPOXY, OR THERMOPLASTIC UNLESS VERY WELL WORN AND WELL ADHERED TO THE ROAD. OLD MARKINGS MUST BE AT LEAST 75%-80% WORN AWAY
 - B. GRIND OR SANDBLAST OLD MARKINGS AND SWEEP OR BLOW SURFACE CLEAN
 - C. APPLY REQUIRED PRIMER
4. WORN STAMARK™ MARKINGS
 - A. OK TO APPLY NEW MATERIAL OVER WORN STAMARK.™ REMOVE ALL LOOSE MATERIAL WITH SCRAPER OR KNIFE.
 - B. SWEEP OR BLOW SURFACE CLEAN
 - C. APPLY REQUIRED PRIMER

PAINT

AT THE TIME OF APPLYING THE MARKING MATERIAL, THE APPLICATION AREA SHALL BE FREE OF CONTAMINATION. THE CONTRACTOR SHALL CLEAN THE ROADWAY SURFACE PRIOR TO THE LINE APPLICATION IN A MANNER AND TO EXTENT REQUIRED BY THE ENGINEER.

GLASS BEADS SHALL BE APPLIED IMMEDIATELY AFTER APPLICATION OF THE PAINT LINE.

EXCEPT WHEN USED AS A TEMPORARY MARKING, PAVEMENT MARKINGS SHALL ONLY BE APPLIED IN SEASONABLE WEATHER WHEN AIR TEMPERATURE IS 50° DEGREES OR HIGHER AND SHALL NOT BE APPLIED WHEN THE WIND OR OTHER CONDITIONS CAUSE A FILM OF DUST TO BE DEPOSITED ON THE PAVEMENT SURFACE AFTER CLEANING AND BEFORE THE MARKING MATERIAL CAN BE APPLIED.

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.

EPOXY

THE ROAD SURFACE SHALL BE CLEANED AT THE DIRECTION OF THE ENGINEER JUST PRIOR TO APPLICATION. PAVEMENT CLEANING SHALL CONSIST OF AT LEAST BRUSHING WITH A ROTARY BROOM (NON-METALLIC), OR AS RECOMMENDED BY THE MATERIAL MANUFACTURER AND ACCEPTABLE TO THE ENGINEER. NEW PORTLAND CEMENT CONCRETE SURFACES SHALL BE SANDBLAST CLEANED TO REMOVE ANY SURFACE TREATMENTS AND/OR LAITANCE. ON LOW SPEED (SPEED LIMIT 35 OR LESS) URBAN PORTLAND CEMENT CONCRETE ROADWAYS, SANDBLAST CLEANING SHALL BE USED FOR ALL EPOXY PAVEMENT MARKINGS.

THE EPOXY MARKING APPLICATION SHALL IMMEDIATELY FOLLOW THE PAVEMENT CLEANING. GLASS BEADS SHALL BE APPLIED IMMEDIATELY AFTER APPLICATION OF THE EPOXY RESIN LINE TO PROVIDE AN IMMEDIATE NO-TRACK SYSTEM.

AN EPOXY RESIN LINE 4 INCHES WIDE AND 15 MILL THICKNESS (WET), REQUIRES AN APPLICATION RATE OF ONE (1) GALLON OF COMPONENTS PER 620 FEET OF LINE. GLASS BEADS SHALL BE APPLIED AT A POUND PER GALLON RATE SUFFICIENT TO ACHIEVE AN ACCEPTABLE NO-TRACK SYSTEM.

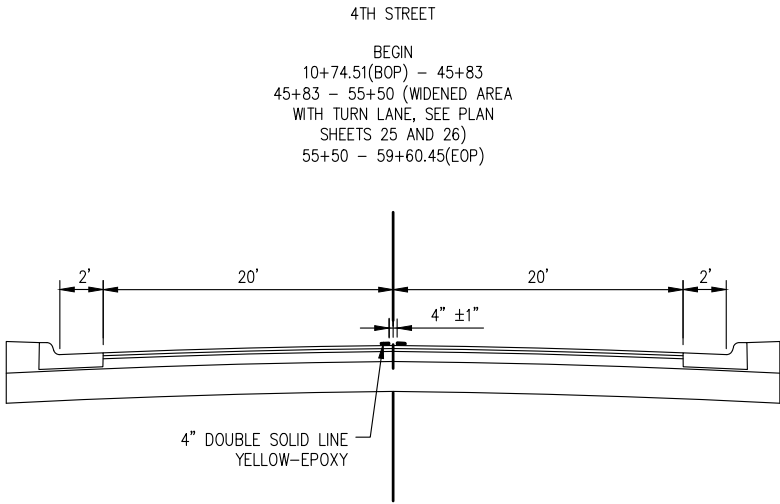
OPERATIONS SHALL BE CONDUCTED ONLY WHEN THE ROAD PAVEMENT SURFACE TEMPERATURES ARE 50 DEGREES F OR GREATER.

PERMANENT PAVEMENT MARKINGS SHALL NOT BE PLACED OVER TEMPORARY MARKINGS EXCEPT WHEN SPECIFIED IN SPECIFICATIONS OR SPECIAL PROVISIONS.

GENERAL REQUIREMENTS

THE ENGINEERS INVOLVEMENT IN THE APPLICATION OF THE MATERIAL SHALL BE LIMITED TO FIELD SPOTTING, LOCATION AND INSPECTION. THE ENGINEER WILL PLACE NECESSARY "SPOTTING" AT APPROPRIATE POINTS TO PROVIDE HORIZONTAL CONTROL FOR STRIPING AND TO DETERMINE NECESSARY STARTING AND CUTOFF POINTS. BROKEN LINE INTERVALS WILL NOT BE MARKED. LONGITUDINAL JOINTS, PAVEMENT EDGES, AND EXISTING MARKINGS SHALL SERVE AS HORIZONTAL CONTROL WHEN SO DIRECTED. EDGE LINES IN ALL AREAS AND LANE LINES IN URBAN AREAS ARE TO BE BROKEN ONLY AT INTERSECTIONS WITH PUBLIC ROADS AND AT PRIVATE ENTRANCES IF THEY ARE CONTROLLED BY A YIELD SIGN, STOP SIGN, OR TRAFFIC SIGNAL. THE BREAK POINT IS TO BE AT THE START OF THE RADIUS FOR THE INTERSECTION OR AT MARKED STOP LINES OR CROSSWALKS.

A TOLERANCE OF 1/4 INCH UNDER OR 1/4 INCH OVER THE SPECIFIED WIDTH WILL BE ALLOWED FOR STRIPING PROVIDED THE VARIATION IS GRADUAL AND DOES NOT DETRACT FROM THE GENERAL APPEARANCE. BROKEN LINE SEGMENTS MAY VARY UP TO 1/2 FOOT FROM THE SPECIFIED LENGTHS PROVIDED THE OVER AND UNDER VARIATIONS ARE REASONABLY COMPENSATORY. ALIGNMENT DEVIATIONS FROM THE CONTROL GUIDE SHALL NOT EXCEED 2 INCHES. MATERIAL SHALL NOT BE APPLIED OVER LONGITUDINAL JOINT. ESTABLISHMENT OF APPLICATION TOLERANCES SHALL NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO COMPLY AS CLOSELY AS PRACTICABLE WITH THE PLANNED DIMENSIONS.



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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO.: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

CITY PROJECT NO.: 1599

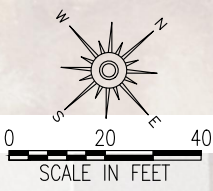
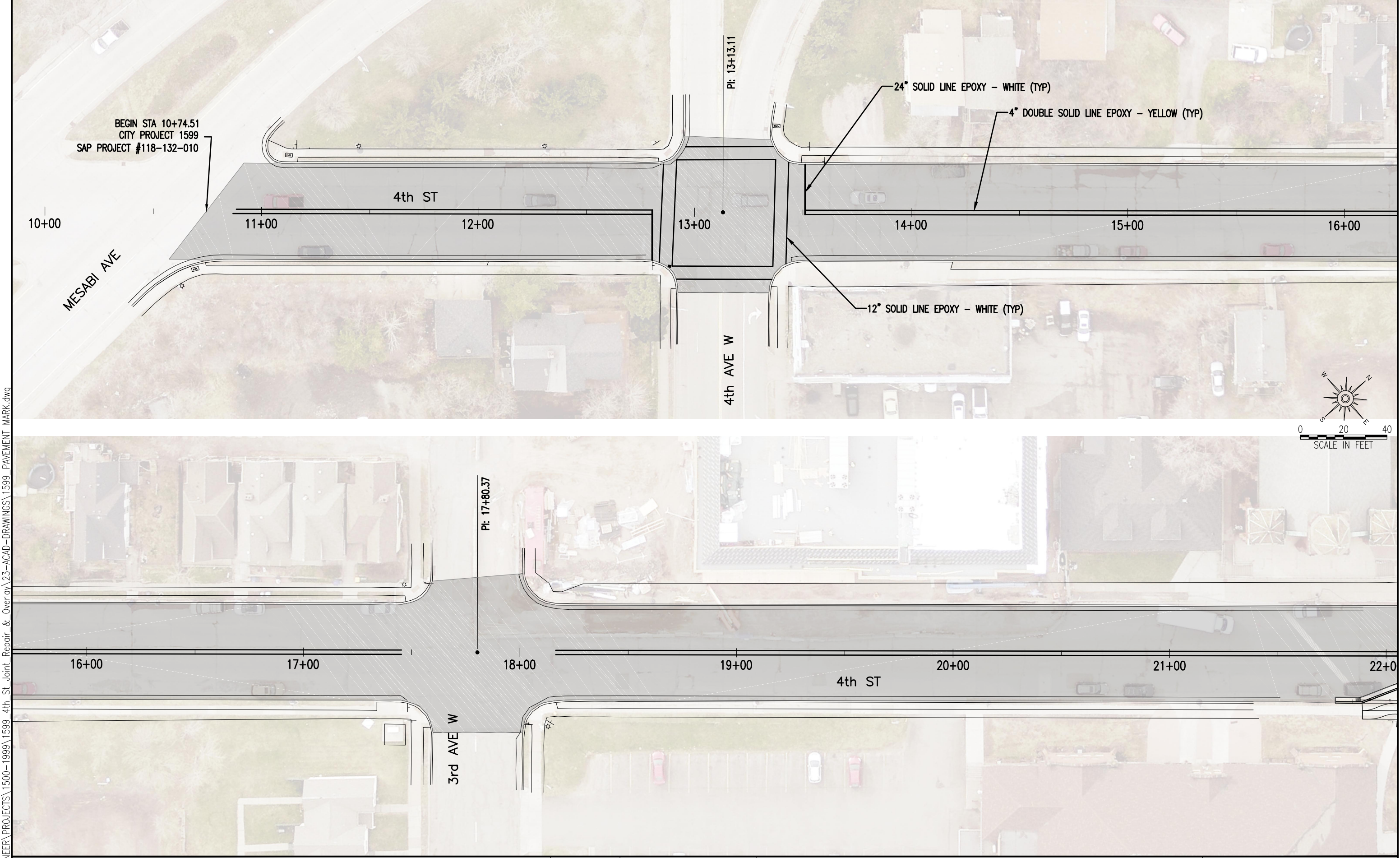
4TH STREET

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

PAVEMENT MARKING NOTES AND DETAILS

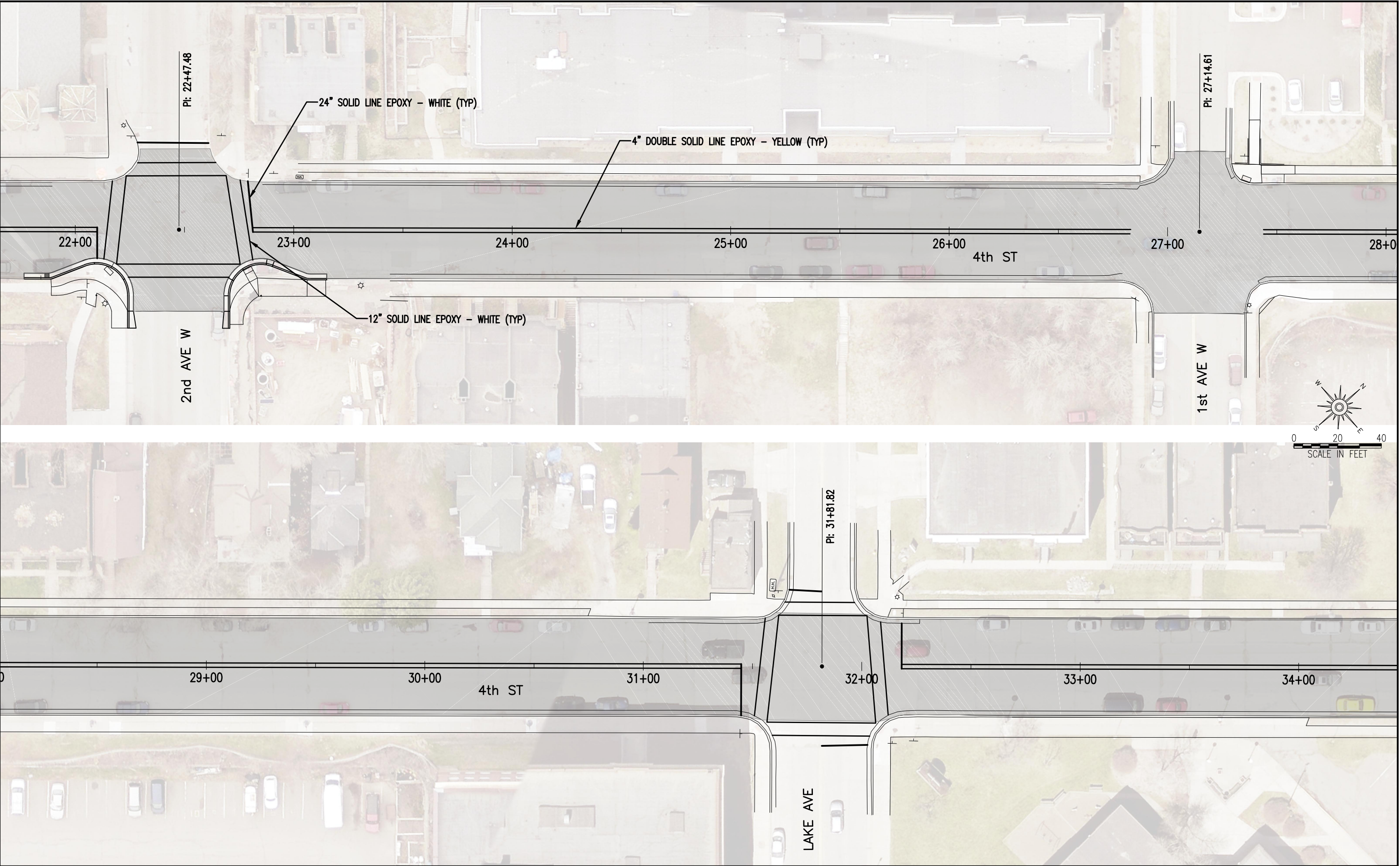
SHEET NO. 22 OF 26



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.	DATE: 5/2/17		CITY OF DULUTH ENGINEERING DIVISION 411 W. 1ST ST. STE. 211 DULUTH, MN 55802	4TH STREET		DRAWN BY: SCA			
						PAVEMENT MARKINGS			
				SIGNATURE: 	LIC. NO: 45486	DUNCAN SCHWENSOHN TYPE NAME	CITY PROJECT NO.: 1599	STATE AID PROJECT NO.: 118-132-010	SHEET NO. 23 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599_4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_PAVEMENT MARK.dwg

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ENGINEERING DIVISION
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DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

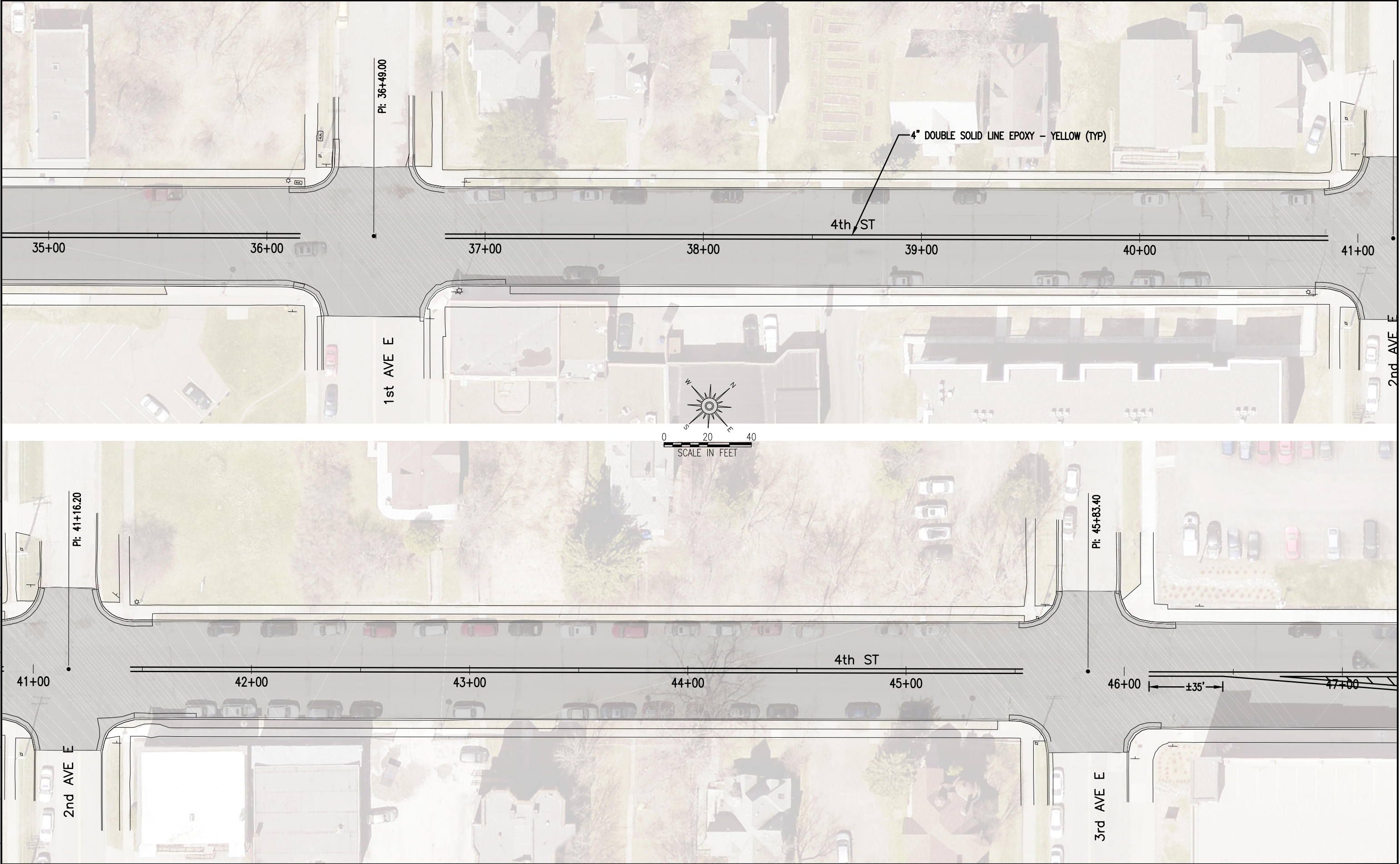
STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

PAVEMENT MARKINGS

SHEET NO. 24 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999\1599_4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_PAVEMENT MARK.dwg



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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

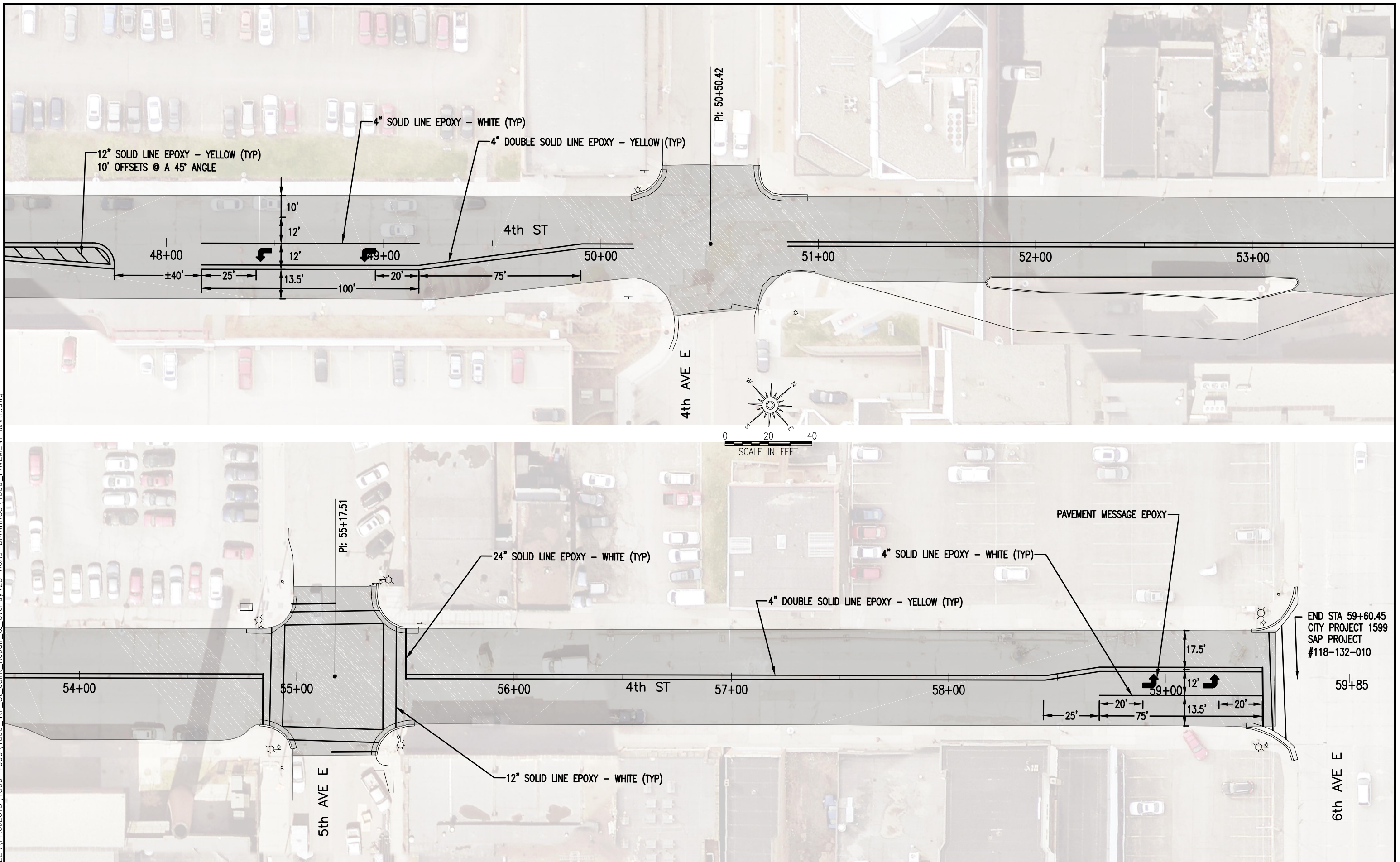
STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

PAVEMENT MARKINGS

SHEET NO. 25 OF 26

I:\PW\ENGINEER\PROJECTS\1500-1999-1999\4th St Joint Repair & Overlay\23-ACAD-DRAWINGS\1599_PAVEMENT MARK.dwg



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.

SIGNATURE: Duncan C. Schwensohn

DUNCAN SCHWENSOHN
TYPE NAME

DATE: 5/2/17

LIC. NO.: 45486



CITY OF DULUTH
ENGINEERING DIVISION
411 W. 1ST ST. STE. 211
DULUTH, MN 55802

4TH STREET

CITY PROJECT NO.: 1599

STATE AID PROJECT NO.: 118-132-010

DRAWN BY: SCA

PAVEMENT MARKINGS

SHEET NO. 26 OF 26