



Robert St 5/4 Lane to 3 Lane Conversion

04/17/2020

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 State Project: 8825-753 Permanent Pavement Markings Plan.....11-14



Project Location

The project is located on Robert St starting just south of Plato Boulevard in St. Paul through the intersection with Cesar Chavez St.

Project Description and Purpose

Robert St is scheduled to be micro surfaced from Annapolis St to 11th St in St. Paul this summer. Along with the micro surfacing project the road has to be restriped. For the stretch of Robert St from just south of Plato Blvd to Cesar Chavez St, MnDOT is proposing to restripe the corridor from a 5/4 lane section to a 3 lane section (2 through lanes and a center two-way left turn lane). The purpose of converting from 5/4 lanes down to 3 is to improve safety for pedestrians, bicyclists, and vehicles. This section of Robert St has a history of pedestrian crashes. This project will improve pedestrian safety by reducing the number of lanes a pedestrian has to cross, and thus reducing the amount of time a pedestrian is exposed to traffic. Converting the section to a three lane section will minimize the potential for multiple-threat crashes, where a person walking crosses in front of a vehicle stopped for them and is hit by a vehicle in the next lane. Three lane sections have also been shown to improve safety for people driving by reducing vehicle speed differential, reducing crash severity, improving flow of traffic, and reducing conflict points that contribute to rear-end, left-turn, and sideswipe crashes. According to the Federal Highway Administration (FHWA) 4 to 3 lane conversions can reduce overall crashes by 19 to 47 percent.

Figure 1. Multiple Threat

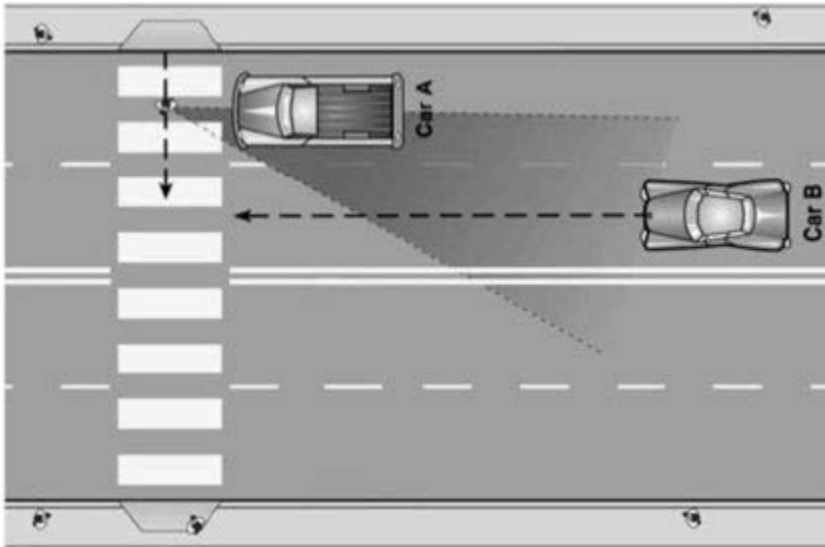
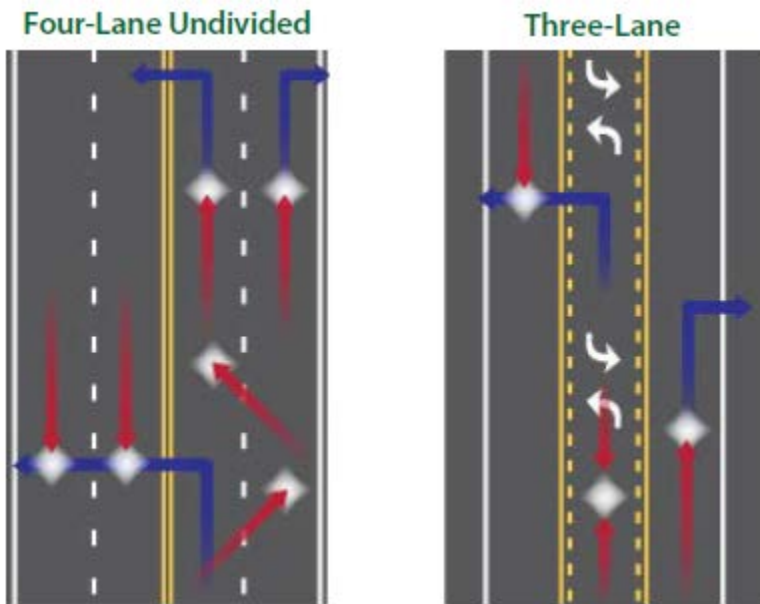
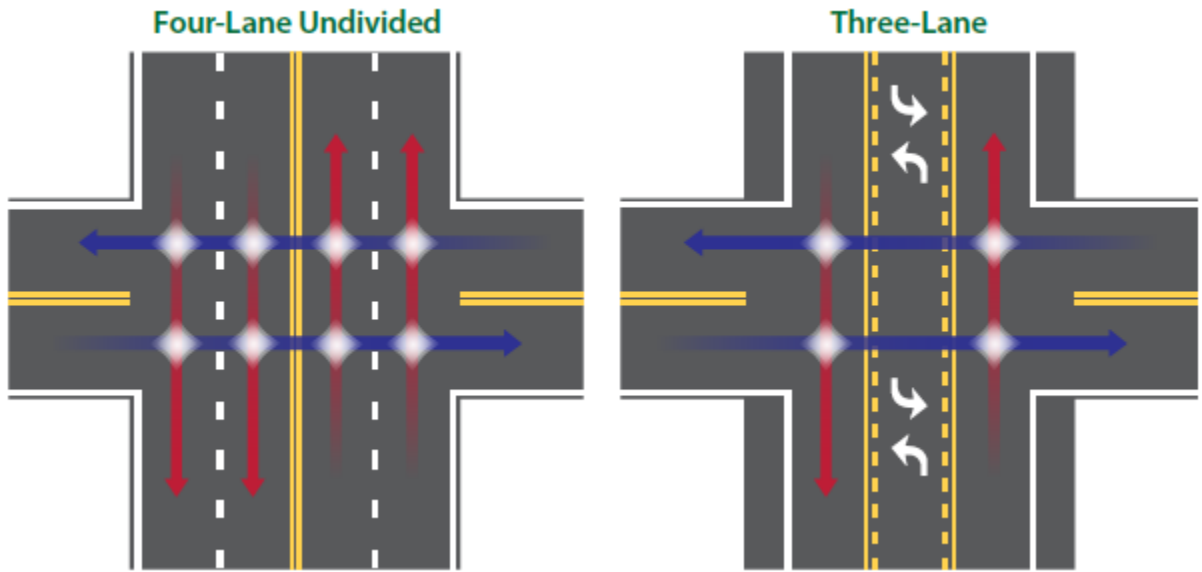


Figure 2. Mid-Block Conflict Points for Four-Lane Undivided Roadway and Three-Lane Cross Section



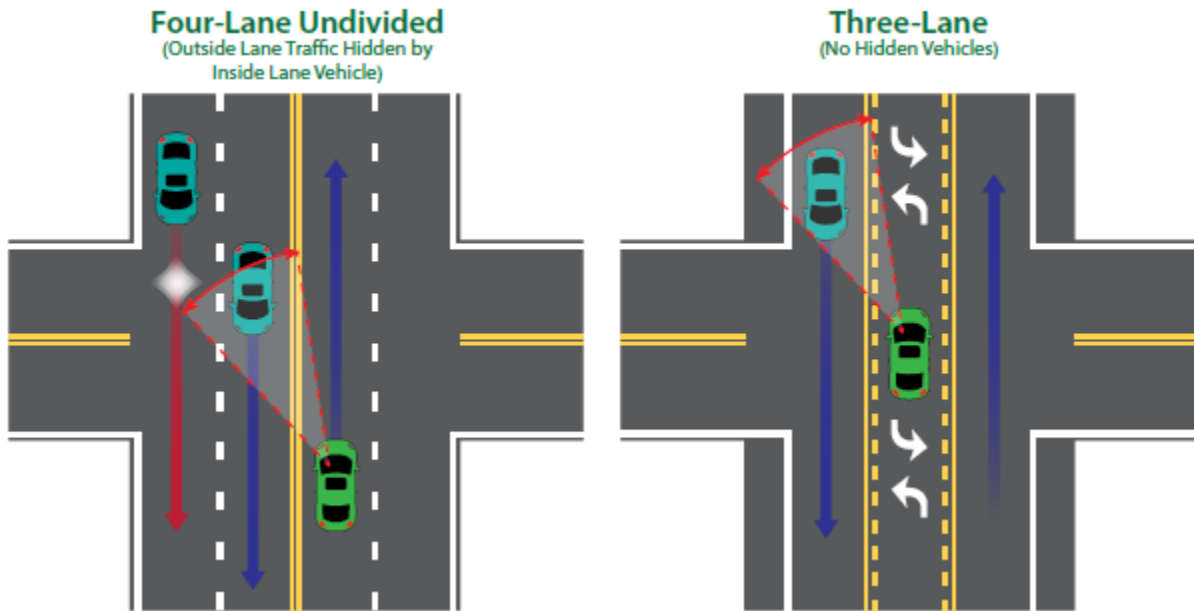
(Adapted from Welch, 1999)

Figure 3. Crossing and Through Traffic Conflict Points at Intersections for a Four-Lane Undivided Roadway and a Three-Lane Cross Section



(Adapted from Welch, 1999)

Figure 4. Major-Street Left-Turn Sight Distance for Four-Lane Undivided Roadway and Three-Lane Cross Section



(Adapted from Welch, 1999)

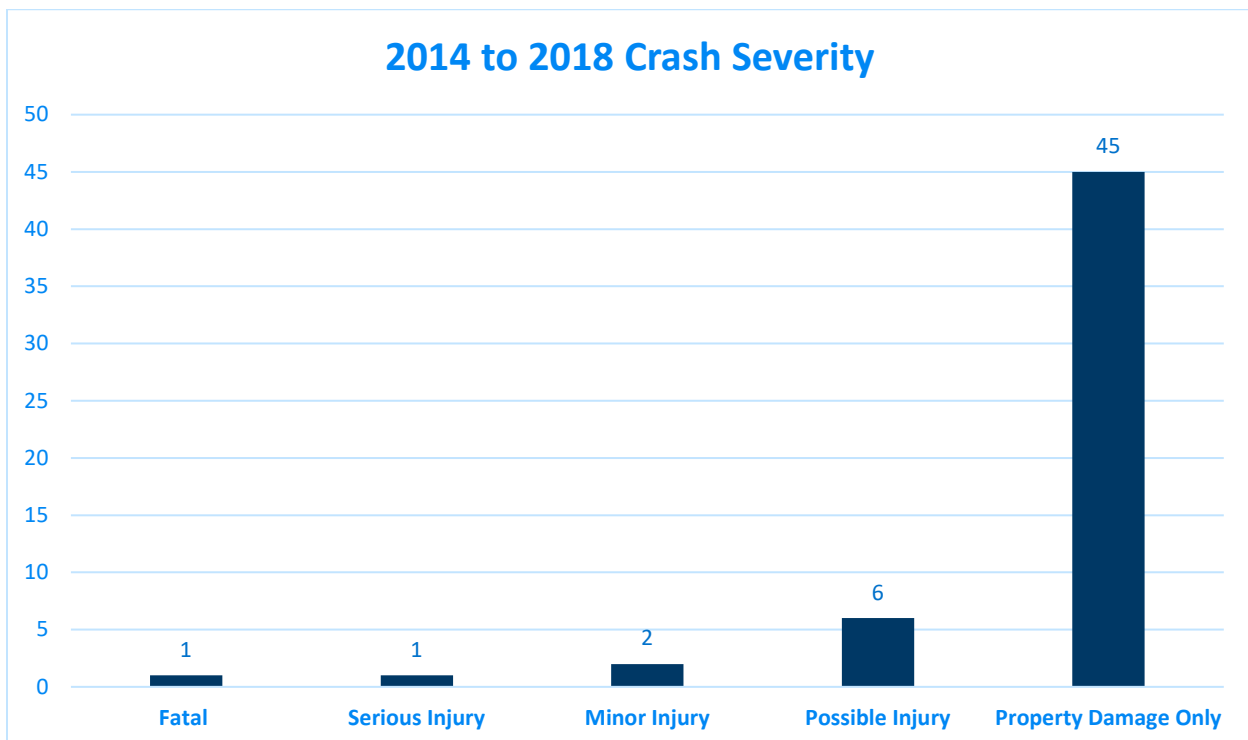
(Figures from [FHWA](#))

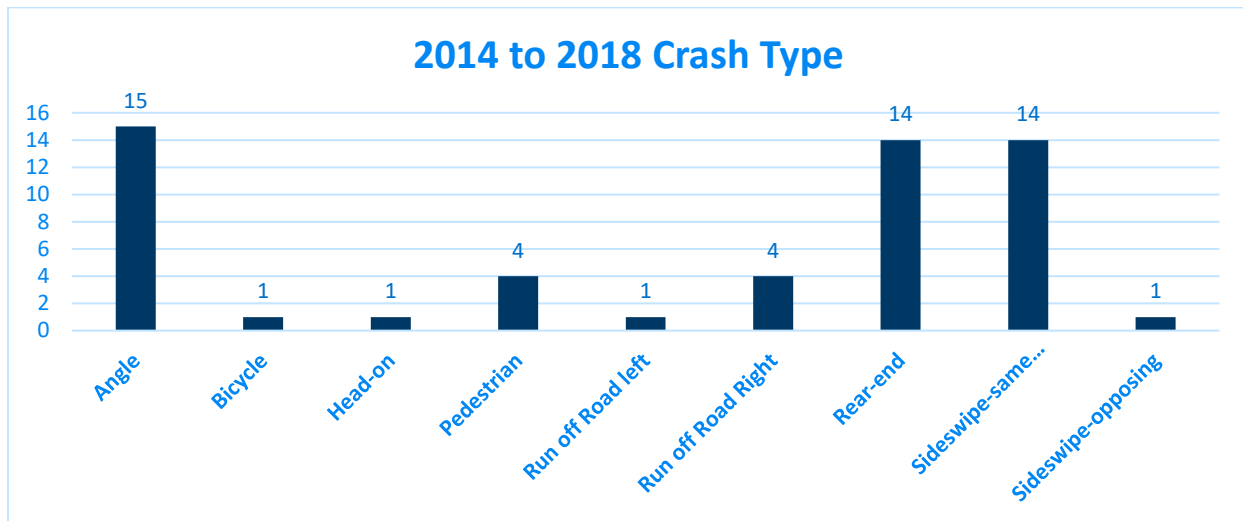
Existing condition

Robert St is a 5 lane section (2 lanes in each direction a center two-way left turn lane) from Wood St to just north of the pedestrian bridge between E Colorado St and E Isabel St. South of that section Robert St changes to a 4 lanes section (2 lanes in both directions). This includes existing parking restrictions on Robert St from Cesar Chavez to Isabel St, and existing no parking from approximately 150' north of Isabel through the intersection with Plato Boulevard. The Annual average daily traffic (AADT) of Robert St at Traffic Count Locations (Active): SEQ# 11411 was 14,000 in 2012. There is a signal at Cesar Chavez St. and the other 5 intersection within the project limits are controlled by a stop sign.

Crash History

From 2014 to 2018 there have been 4 pedestrian crashes along this stretch of Robert St. More recently in 2020 there was a serious injury crash involving a 7 year old who was crossing Robert St at Wood St to get to a bus. Below is a table summarizing all the crashes from 2014 to 2018. A map of the crashes can be found in the appendix. 2019 and 2020 crashes have not completed the verification process done by Department of Public Safety (DPS), so they are not included in the analysis.





Proposed Condition

The proposed change can be seen in the Robert St 3 Lane Conversion layout and the project permanent pavement marking plan in the Appendix. The proposed transition begins just south of Plato Boulevard before the railroad bridge where the SB right lane drops and only one lane continues south and leaves the current configuration for northbound traffic. At Wood St the 3 lane section begins, which includes one lane in each direction and a center two-way left turn lane. South of Congress St the lane configuration will stay the same as the existing lane configuration. **No changes to parking** will occur with this project and all existing parking conditions will remain the same. This includes existing parking restrictions on Robert St from Cesar Chavez to Isabel St, and existing no parking from approximately 150' north of Isabel through the intersection with Plato Boulevard.

New traffic counts could not be collected due to the impact CoVID-19 has had on traffic volumes, so this stretch of Robert St. could not be modeled to show the impacts the conversion would have on the corridor. However, there have been successful 4 to 3 lane conversion done in St. Paul on roads with higher AADTs than this stretch of Robert St. For example, Maryland Ave between Payne Ave and Johnson Parkway was converted from 4 to 3 lanes in 2018 and had an AADT of 19,400 from Payne to Arcade St. Research has shown that roads with volumes less than 15,000 ADT are able to be converted to 15,000 without modeling. MnDOT is confident this section of Robert St will safely function as a 3 lane corridor. Also, the section of Robert St south of Cesar Chavez St is already a 3 lane section and has a similar AADT compared to this section. If operational problems do arise the road can be converted back or the design could be approved upon with the programmed 2025/2026 pavement rehabilitation project.

The section north of Wood St., other than transitional pavement markings, was not looked at to convert at this time due to the section having a higher AADT, busier cross street volumes, and different adjacent land uses than the proposed section. It is preferred to have modeling and more information before converting that portion of Robert St. That section will be looked at further when scoping for the 2025/2026 pavement rehabilitation project.

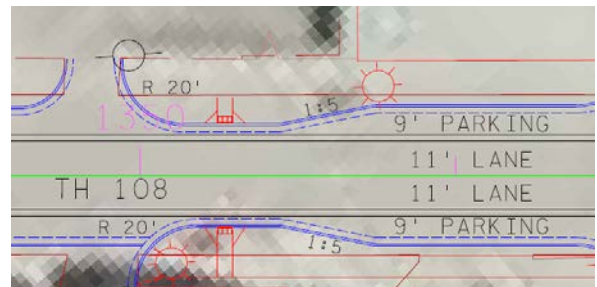
Cost Estimate

This project will be 100% State funded and there **will NOT** be any cost share requirement from the city of Saint Paul. An estimated cost break down of the pavement marking project is provided in the table below.

ITEM DESCRIPTION	COST
PAVEMENT MARKING REMOVAL SQ FT	\$4,022.20
PAVEMENT MARKING REMOVAL LIN FT	\$6,523.08
4" SOLID LINE MULTI COMP GR IN (WR) LIN FT	\$3,111.10
24" SOLID LINE MULTI COMP GR IN (WR) LIN FT	\$5,045.95
4" BROKEN LINE MULTI COMP GR IN (WR) LIN FT	\$264.00
8" DOTTED LINE MULTI COMP GR IN (WR) LIN FT	\$161.28
4" DBLE SOLID LINE MULTI COMP GR IN (WR) LIN FT	\$359.10
PAVT MSSG PREF THERMO GR IN SQ FT	\$6,318.26
CROSSWALK PREF THERMO ESR GR IN SQ FT	\$19,843.20
ESTIMATED TOTAL COST	\$45,648.17

Other Projects within Project Limits

This summer there will be temporary pedestrian improvements constructed at the intersection of Robert St and Isabel St and Robert St and Baker St, which will include flexible delineators to establish bump outs that will shorten the distance a pedestrian is exposed to traffic and to increase the visibility of pedestrians at the intersection. An example of what the bump outs will look like is shown below. If the temporary improvements perform well, the improvements will be explored for permanent inclusion with the 2025/2026 pavement rehabilitation project.



(Temporary Pedestrian Improvement Examples)

Summary of Work

2020

- Make minor drainage and road surface repairs to the historic Robert St. Bridge over the Mississippi River
- Resurface the road between 11th St. in downtown St. Paul to Annapolis St. in West St. Paul
- Temporary pedestrian improvements at Isabel St and Baker St
- Engage the West Side community and Saint Paul to help develop a vision for the future of Robert Street south of the Mississippi River.

2022

- Robert St. bridge deck work over I-94 in downtown St. Paul
- Repair and resurface the Robert St. Flats Bridge over the Union Pacific Railroad and at George St.

2025 or 2026

- Construction of Robert Street corridor improvements south of the Mississippi River begin.



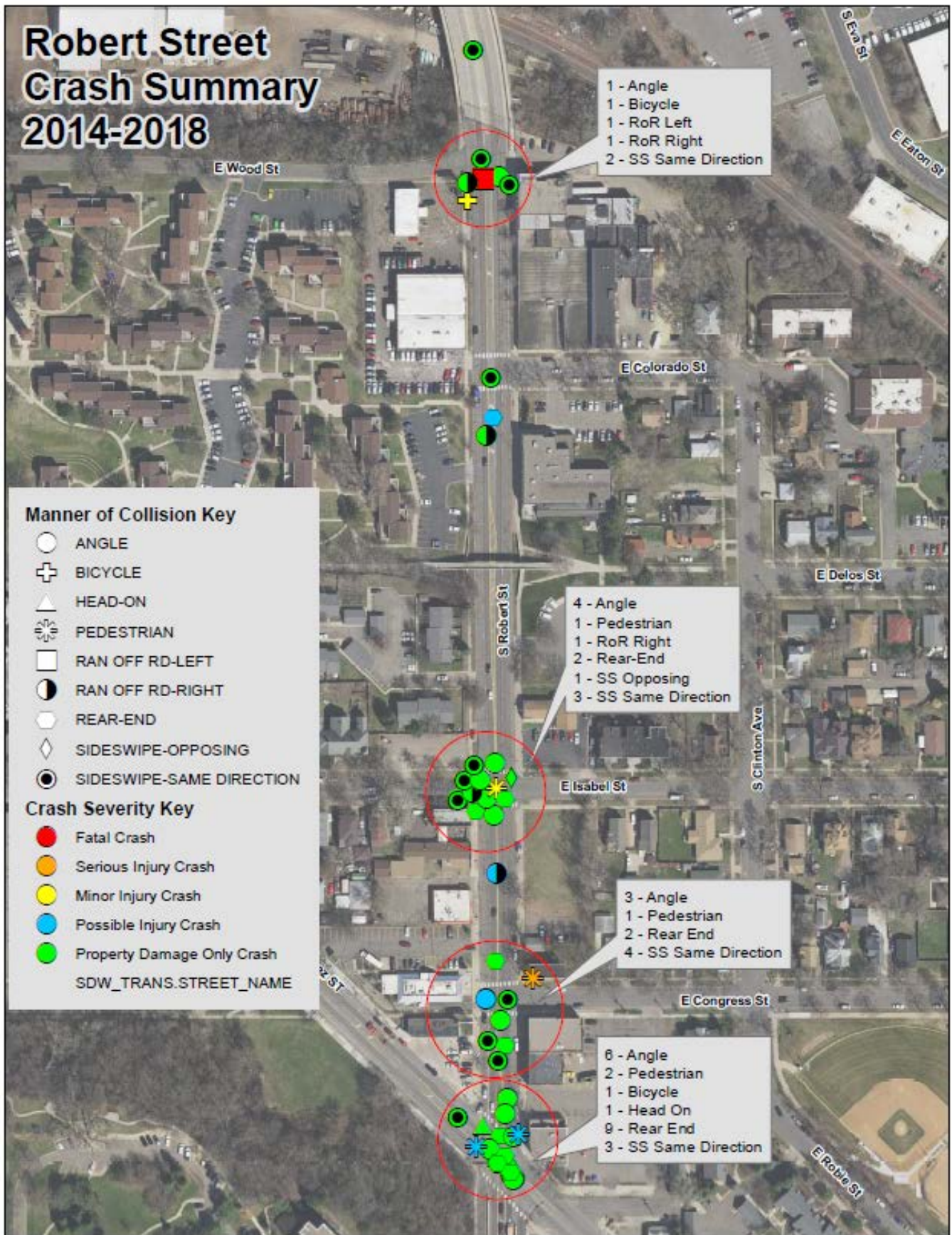
Appendix

Crash Map 2014 to 2018

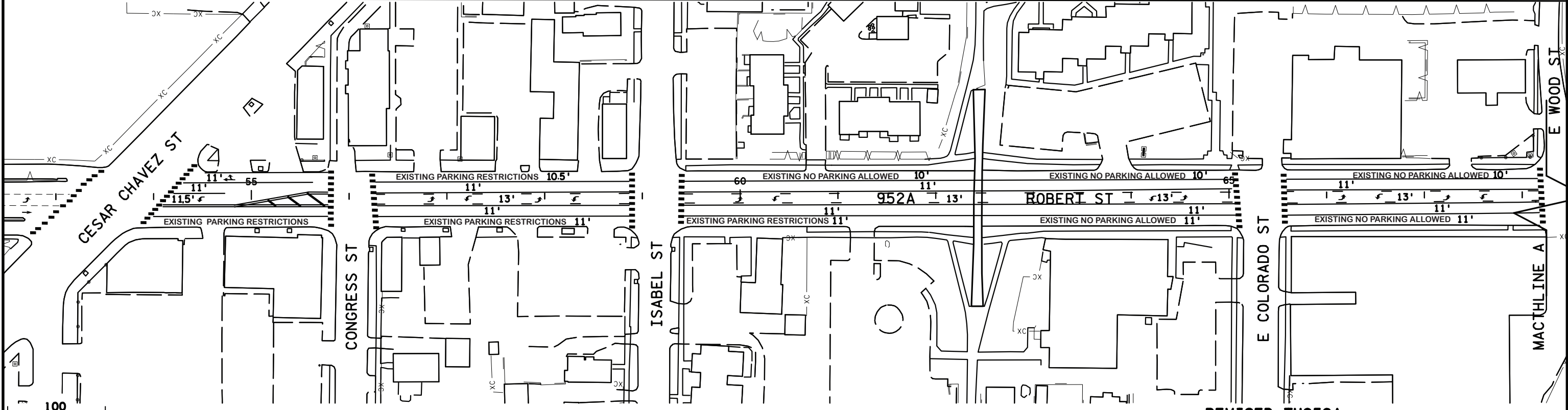
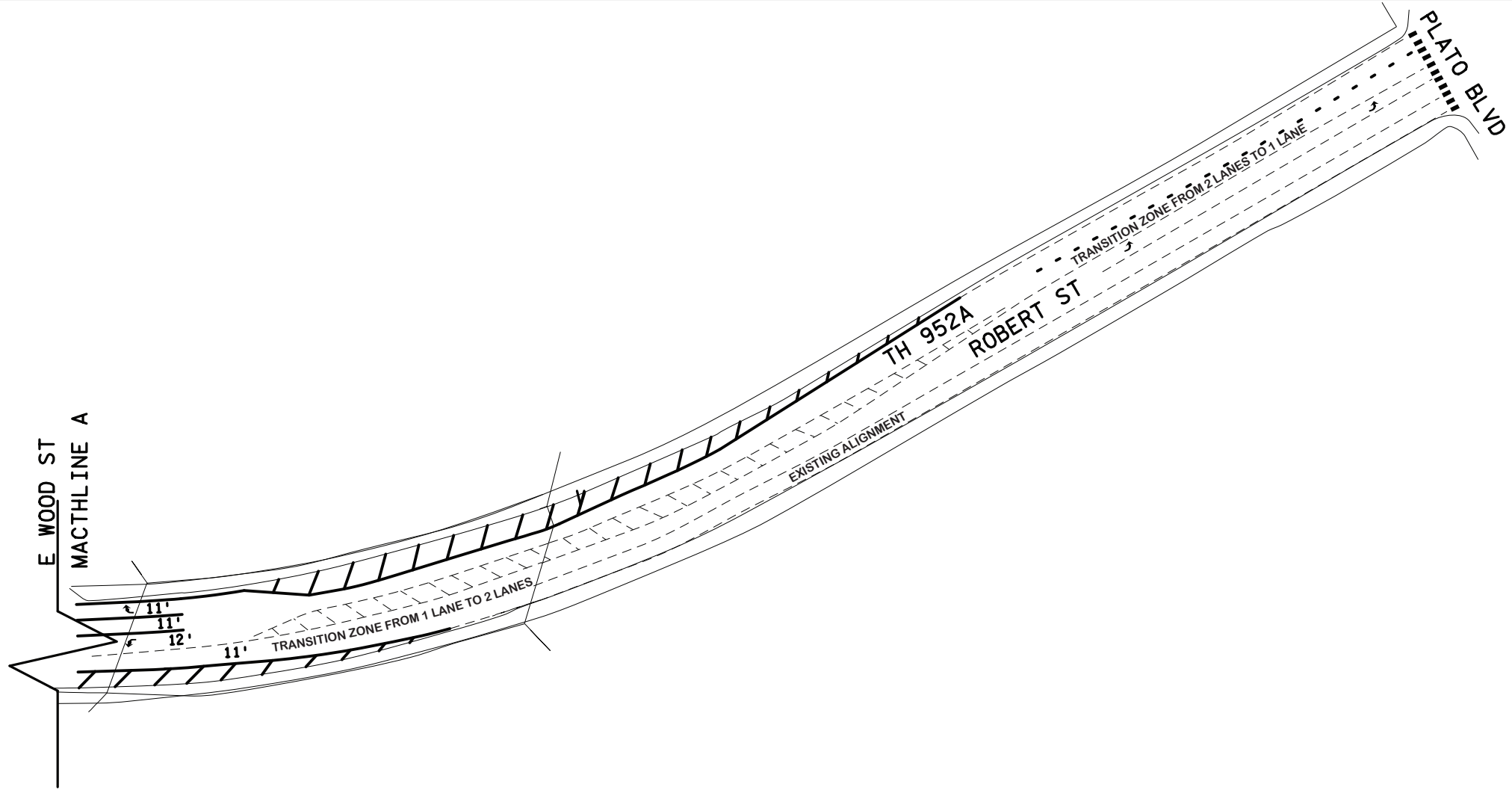
Robert St 3 Lane Conversion Layout

State Project: 8825-753 Permanent Pavement Markings Plan

Robert Street Crash Summary 2014-2018



PLOTTED/REVISED: 15-APR-2020



REVISED TH952A

SCALE IN FEET

PERMENT PAVEMENT MARKINGS

DRAWN BY: ARW

CHECKED BY: KF

CERTIFIED BY _____

LICENSED PROFESSIONAL ENGINEER

LIC. NO. _____

DATE _____

STATE PROJ. NO. 8825-753 (TH952A) SHEET NO. PM2 OF PM4 SHEETS

PERMANENT PAVEMENT MARKING PLAN

NOTES & GUIDELINES

NOTES & GUIDELINES

GENERAL INFORMATION:

- SEE 2582 IN THE SPECIAL PROVISIONS FOR PAVEMENT MARKING SPOTTING RESPONSIBILITIES.
- 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.
- 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.
- 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.

CONTRAST MARKINGS

- CONTRAST MARKINGS ARE DEFINED AS STANDARD LINEAR PAVEMENT MARKINGS, CROSSWALK MARKINGS AND PAVEMENT MESSAGES WITH 1.5 INCH NON REFLECTIVE BLACK BORDERS.

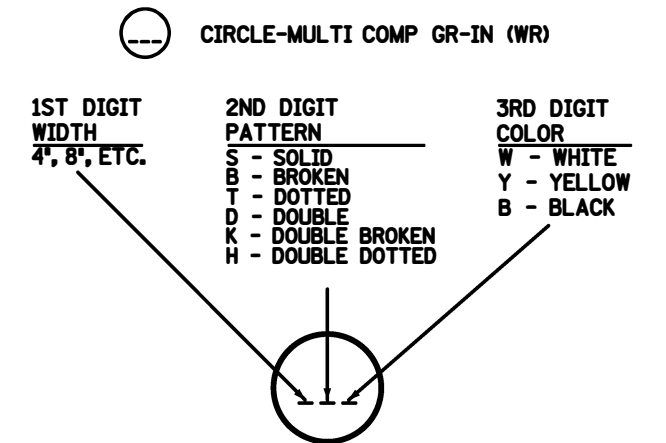
PERMANENT PAVEMENT MARKING PLAN INDEX

- PM1 PERM PAVEMENT MARKING TITLE AND TABULATION
- PM2 PERMANENT PAVING MARKING
- PM3-PM4 TYPICALS

SYMBOLS & MATERIALS LEGEND

- BROKEN LINE-50' CYCLE (10' LINE, 40' GAP)
- DOTTED LINE-15' CYCLE (3' LINE, 12' GAP, UNLESS SHOWN OTHER WISE IN THE PLAN)
- CROSSWALK PREF THERMO ESR GR IN
- PAVEMENT MESSAGE (LEFT ARROW) PREF THERMO GR IN
- PAVEMENT MESSAGE (RIGHT ARROW) PREF THERMO GR IN
- PAVEMENT MESSAGE (RIGHT THRU ARROW) PREF THERMO GR IN

STRIPING KEY



PERMANENT PAVEMENT MARKING TABULATION			PM
TAB	ITEM DESCRIPTION	UNIT	TOTAL QUANTITY
PM-A	PAVEMENT MARKING REMOVAL	SQ FT	1820
PM-B	PAVEMENT MARKING REMOVAL	LIN FT	8583
PM-D	4" SOLID LINE MULTI COMP GR IN (WR)	LIN FT	5870
PM-D	24" SOLID LINE MULTI COMP GR IN (WR)	LIN FT	455
PM-D	4" BROKEN LINE MULTI COMP GR IN (WR)	LIN FT	480
PM-D	8" DOTTED LINE MULTI COMP GR IN (WR)	LIN FT	63
PM-D	4" DBLE SOLID LINE MULTI COMP GR IN (WR)	LIN FT	266
PM-C	PAVT MSSG PREF THERMO GR IN	SQ FT	247
	CROSSWALK PREF THERMO ESR GR IN	SQ FT	1440

PAVEMENT MARKING REMOVAL-MESSAGE			PM-A
MESSAGE	AREA	TOTAL QUANTITY	
	SQ FT	EACH	SQ FT
LEFT ARROW	48	6	288
RIGHT THRU ARROW	91.8	1	91.8
CROSSWALK BLOCK	18	80	1440
			1819.8

PAVT MSSG PREF THERMO GR IN			PM-C
MESSAGE	AREA	TOTAL QUANTITY	
	SQ FT	EACH	SQ FT
RIGHT ARROW	15.5	1	15.5
LEFT ARROW	15.5	13	201.5
RIGHT THRU ARROW	30.1	1	30.1
			247.1

PAVEMENT MARKING REMOVAL-LINE				PM-B
ITEM DESCRIPTION	UNIT	LENGTH	4" EQUIVALENCY FACTOR	TOTAL QUANTITY
4" SOLID LINE	LIN FT	5677	1	5677
4" BROKEN LINE	LIN FT	500	1	500
4" DBLE SOLID LINE	LIN FT	246	2	492
24" SOLID LINE	LIN FT	319	6	1914
	LIN FT			8583

PAVEMENT LINE MARKING				PM-D
ITEM DESCRIPTION	UNIT	YELLOW	WHITE	TOTAL QUANTITY
4" SOLID LINE MULTI COMP GR IN (WR)	LIN FT	2152	3718	5870
4" BROKEN LINE MULTI COMP GR IN (WR)	LIN FT	480		480
4" DBLE SOLID LINE MULTI COMP GR IN (WR)	LIN FT	266		266
8" DOTTED LINE MULTI COMP GR IN (WR)	LIN FT		63	63
24" SOLID LINE MULTI COMP GR IN (WR)	LIN FT	45	410	455

I HEREBY CERTIFY THAT SHEETS PM1 THROUGH PM4 OF THIS PLAN 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: RON RAUCHLE LICENSE #22215
 DATE: 4/15/2020 SIGNATURE: *Ron Rauchle*
 DESIGNER BRIAN TORKELSON

TITLE:
**PERMANENT PAVEMENT MARKING
 TITLE SHEET**

LAST REVISED
 MAY/17/2019

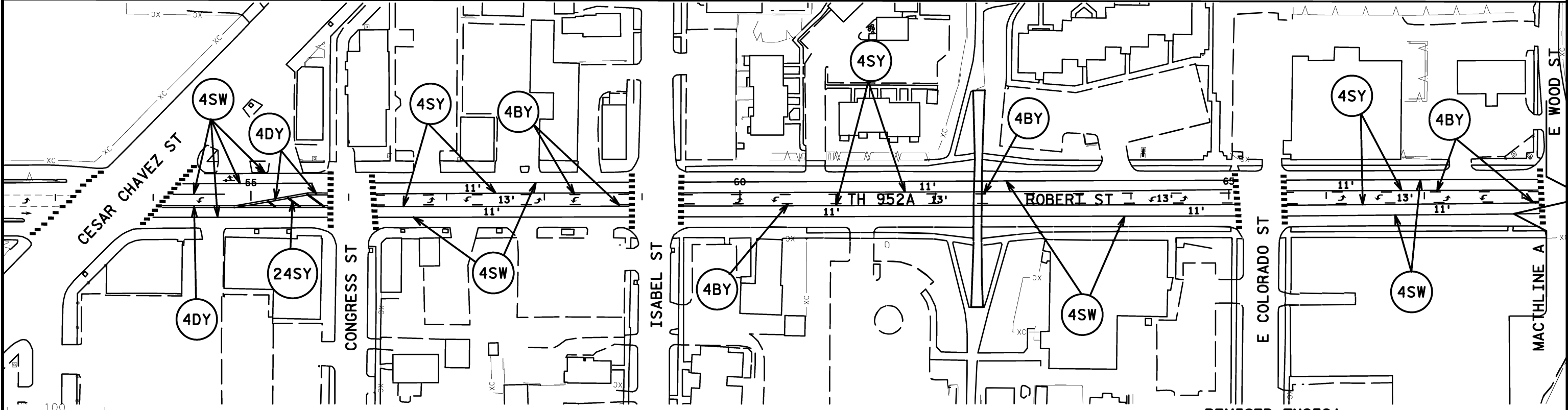
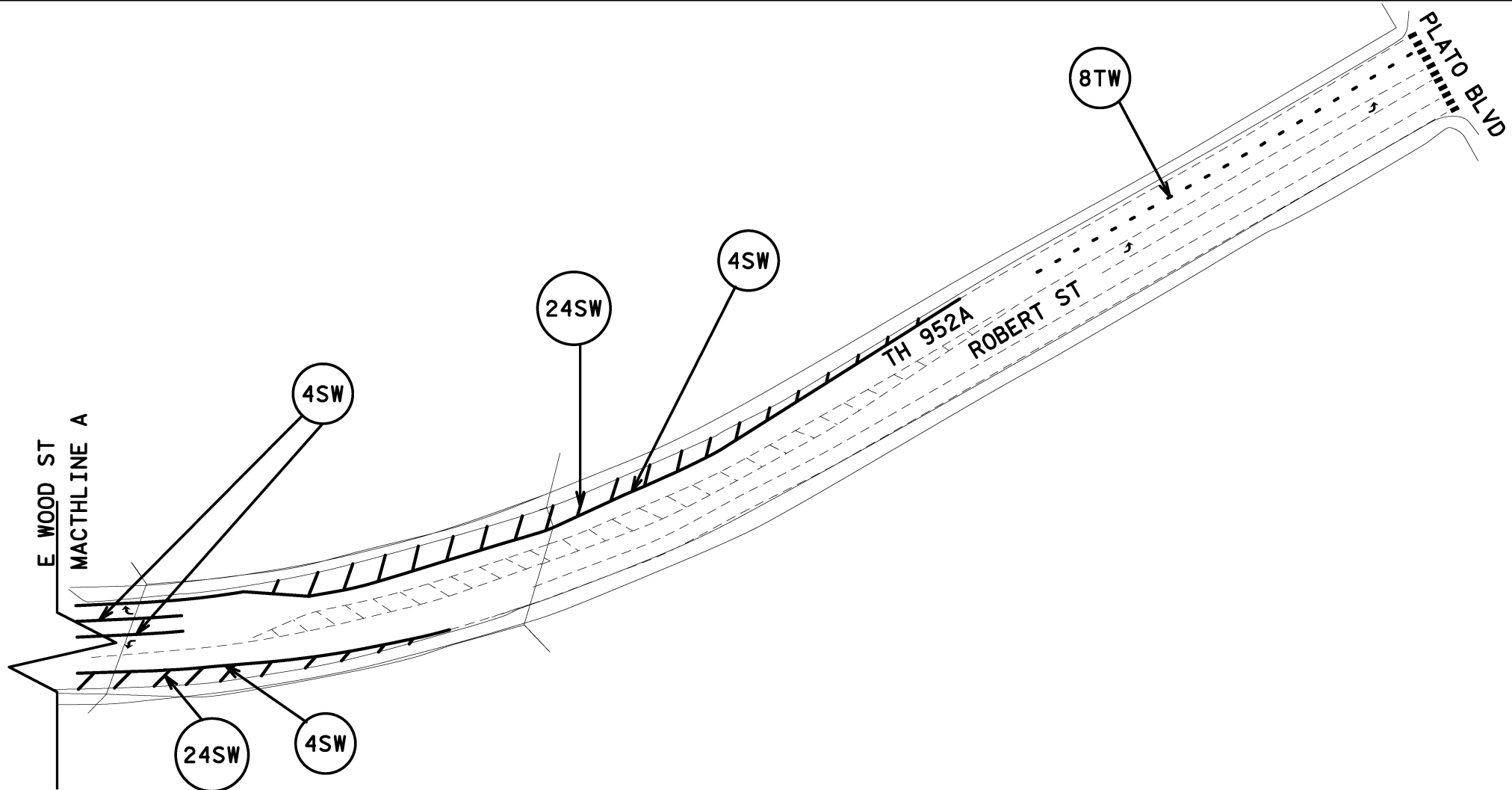
STATE PROJ. NO. 8825-753 (TH 952A) SHEET NO. PM1 OF PM4 SHEETS

PLOTTED/REVISED: 15-APR-2020

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PLOTTED/REVISED: 15-APR-2020

DISTRICT #: Metro
PLOT NAME: 1-8825-753TH3
PATH & FILENAME: Projects\DM_ROS\999\8825753\Traffic\TH3\1952\AN_8825-753TH3.dgn



REVISED TH952A

SCALE IN FEET

PERMENT PAVEMENT MARKINGS

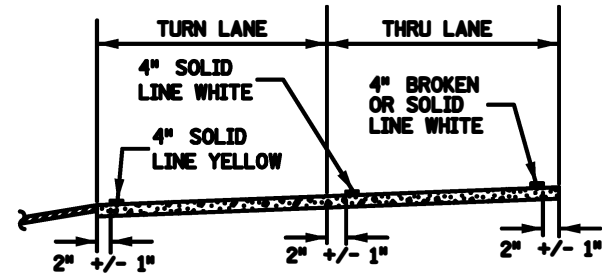
DRAWN BY: BT	CHECKED BY: KF	CERTIFIED BY: <i>Pan Pauclo</i> LIC. NO. 22215	DATE: 4/15/2020	STATE PROJ. NO. 8825-753 (TH952A) SHEET NO. PM2 OF PM4 SHEETS
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PLOTTED/REVISED: 15-APR-2020

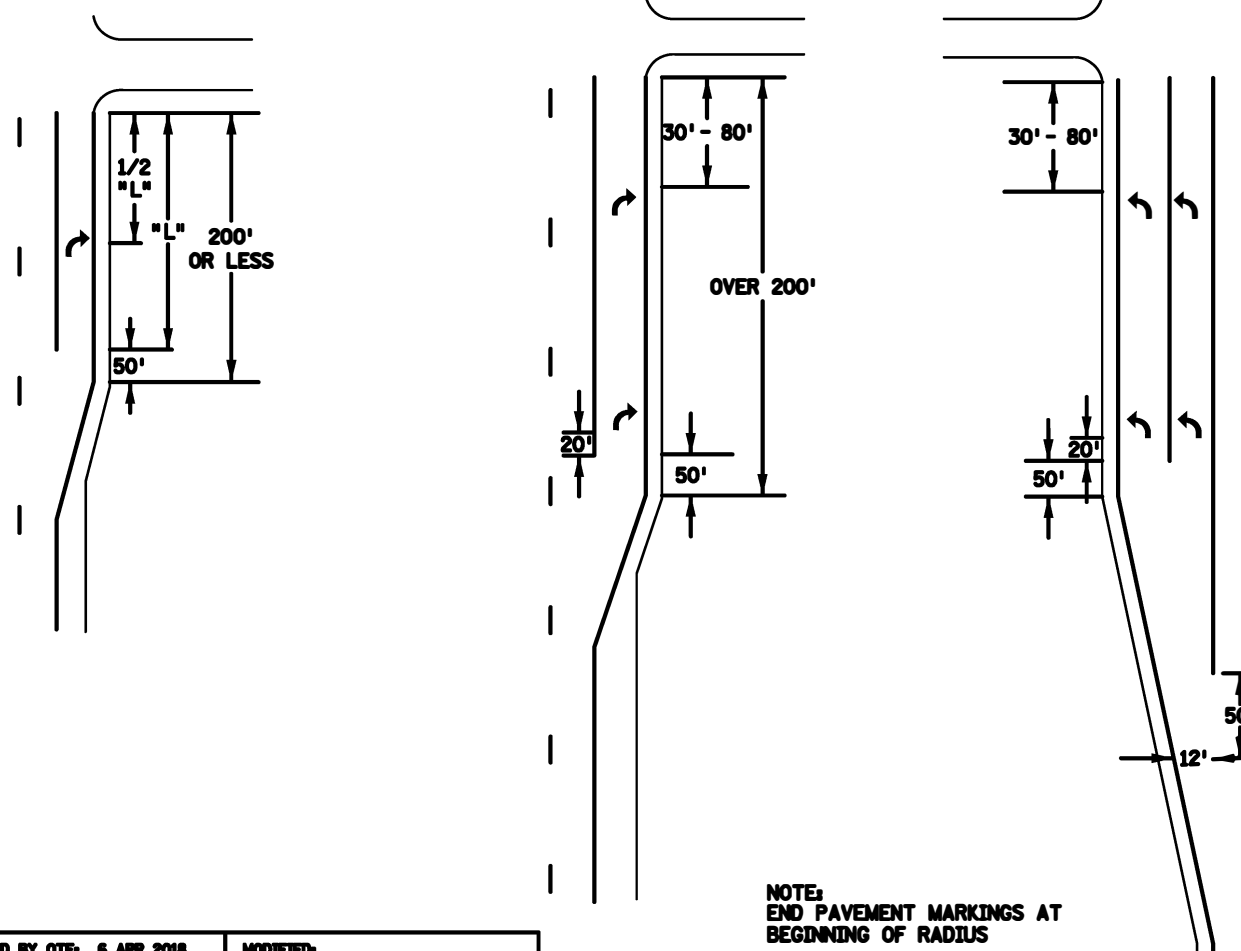
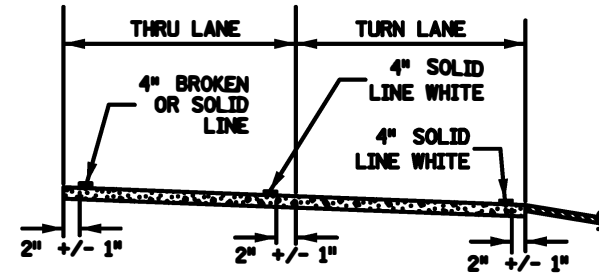
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PLOT NAME: PM-METRO-TYPICALS
PATH & FILENAME: Projects\DM_ROS\999\8825753\Traffic\Stripling\TH 3 (952)ANPM-METRO-TYPICALS.dgn

TURN LANE WITH ARROW MESSAGE

LEFT TURN LANE



RIGHT TURN LANE

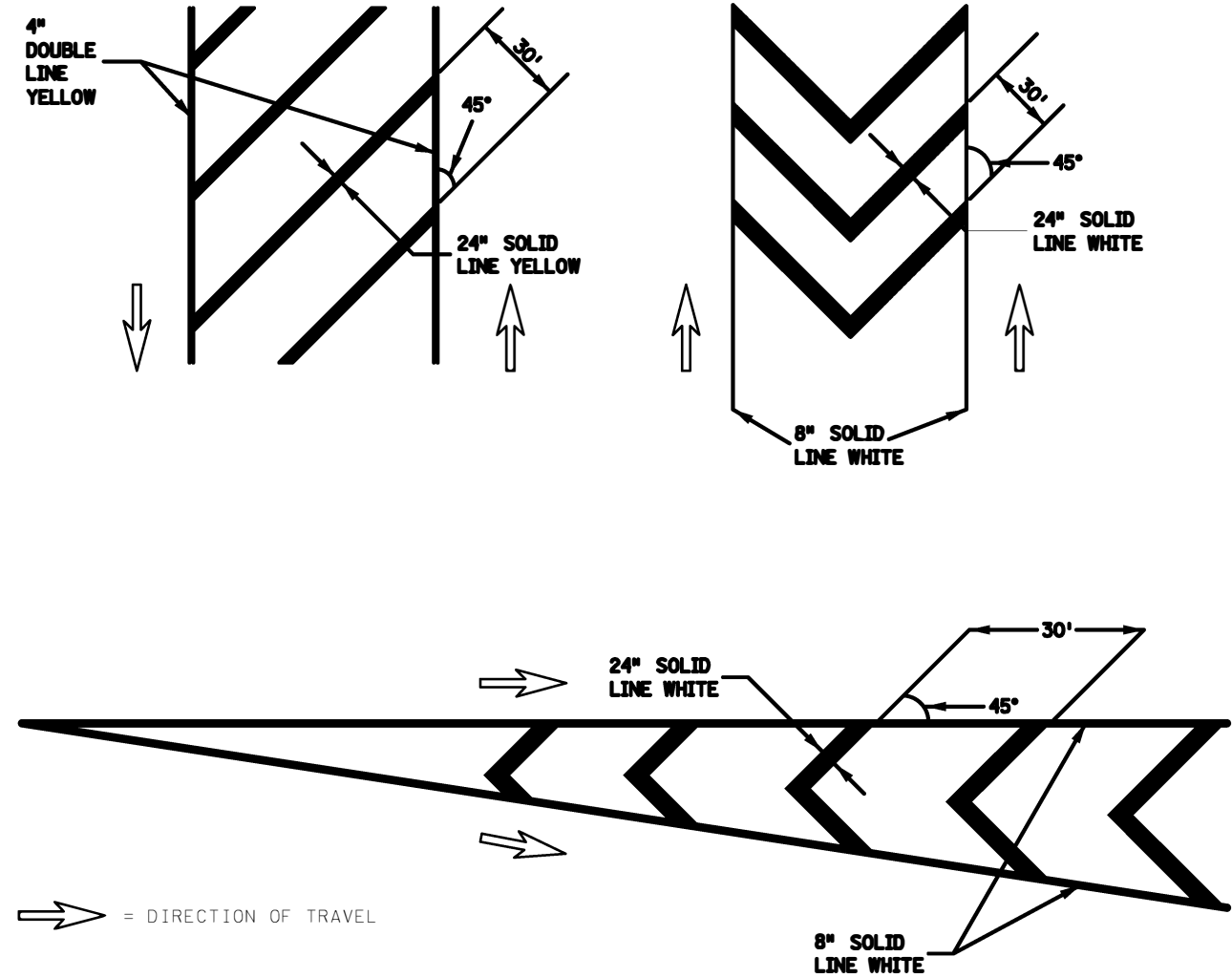


PUBLISHED BY OTE: 6 APR 2018

MODIFIED:

NOTE:
END PAVEMENT MARKINGS AT
BEGINNING OF RADIUS

CROSSHATCHING



➔ = DIRECTION OF TRAVEL

PUBLISHED BY OTE: 22 OCT 2019

MODIFIED:

TYPICALS

DRAWN BY: BT

CHECKED BY: KF

CERTIFIED BY: *Pen Rausch*

LICENSED PROFESSIONAL ENGINEER

LIC. NO. 22215

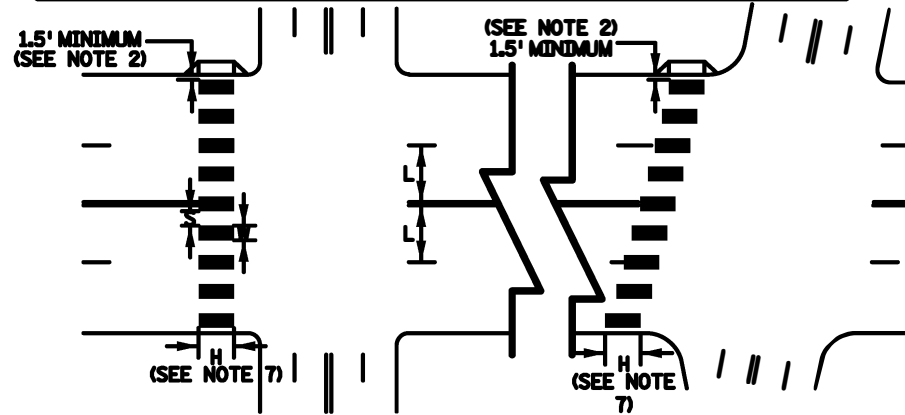
DATE 4/15/2020

STATE PROJ. NO. 8825-753 (TH 0952) SHEET NO. PM3 OF PM4 SHEETS

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 I/PLOT NAME: PM_METRO_TYPICALS
 PATH & FILENAME: Projects\DM_ROS\999\8825\753\Traffic\Sign\TH 3 (952)ANPM\METRO_TYPICALS.dgn
 PLOTTED/REVISED: 15-APR-2020

PEDESTRIAN CROSSWALK MARKINGS

(L) WIDTH OF INSIDE LANE	(W) WIDTH OF PAINTED AREA	(S) WIDTH OF SPACE	ALTERNATE (W) WIDTH OF PAINTED AREA	ALTERNATE (S) WIDTH OF SPACE
9'	2.0'	2.5'	—	—
10'	2.5'	2.5'	2.0'	3.0'
11'	2.5'	3.0'	2.0'	3.5'
12'	3.0'	3.0'	2.5'	3.5'
13'	3.0'	3.5'	—	—



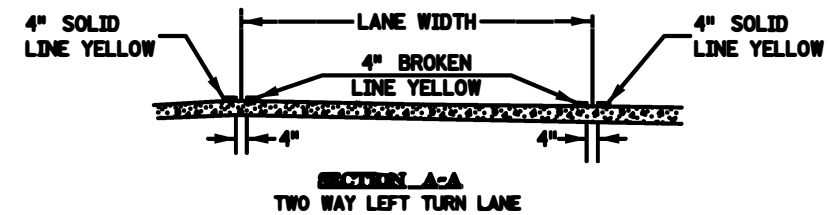
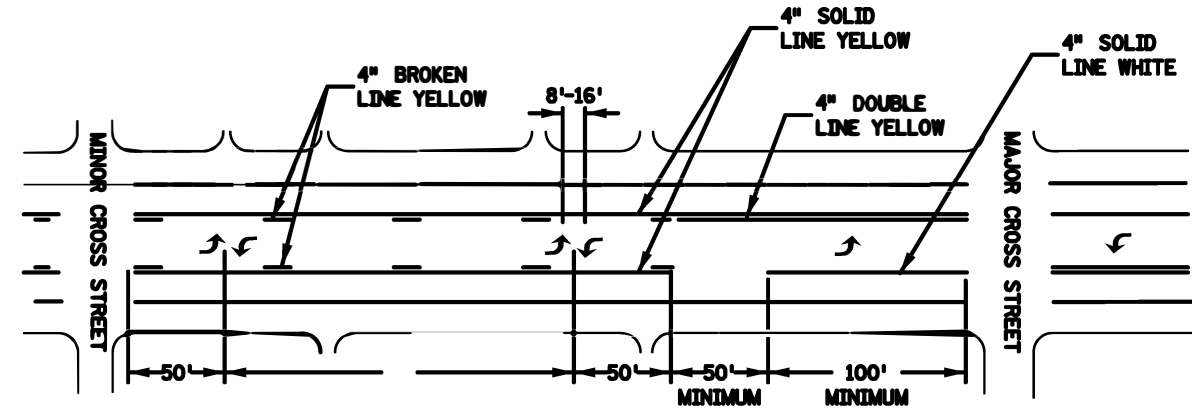
NOTES:

1. PAINTED AREAS TO BE CENTERED ON CENTERLINE AND LANE LINES.
2. A MINIMUM OF 1.5 FT. CLEAR DISTANCE SHALL BE LEFT ADJACENT TO THE CURB FACE. IF LAST PAINTED AREA FALLS INTO THIS DISTANCE IT MUST BE OMITTED.
3. ON TWO LANE TWO WAY STREETS, USE SPACING SHOWN FOR AN 11 FT. INSIDE LANE.
4. FOR DIVIDED ROADWAYS, ADJUSTMENTS IN SPACING OF THE BLOCKS SHOULD BE MADE IN THE MEDIAN SO THAT THE BLOCKS ARE MAINTAINED IN THEIR PROPER LOCATION ACROSS THE TRAVELED PORTION OF THE ROADWAY.
5. AT SKEWED CROSSWALKS, THE BLOCKS ARE TO REMAIN PARALLEL TO THE LANE LINES AS SHOWN.
6. THE BLOCKS SHALL BE PLACED SO THAT THEY ARE NOT LOCATED IN THE WHEEL PATH OF THE VEHICLES.
7. THE BLOCKS SHALL BE A MINIMUM OF 6' LONG AND AT LEAST AS LONG AS THE TRUNCATED DOMES, FOR FANNED TRUNCATED DOMES THE BLOCKS SHALL BE AT LEAST AS LONG AS THE APPROACHING SIDEWALK OR SHARED USE PATH.
8. THE ALTERNATE (W) AND (S) MAY BE USED WHEN BLOCKS LONGER THAN 6' (H) ARE USED.

PUBLISHED BY OTE: 20 NOV 2015

MODIFIED:

TWO-WAY LEFT-TURN LANE



PUBLISHED BY OTE: 14 OCT 2016

MODIFIED BY

TYPICALS

DRAWN BY: BT

CHECKED BY: KF

CERTIFIED BY

Pen Rauscher
LICENSED PROFESSIONAL ENGINEER

LIC. NO. 22215

DATE 4/15/2020

STATE PROJ. NO. 8825-753 (TH 952A SHEET NO. PM4 OF PM4 SHEETS