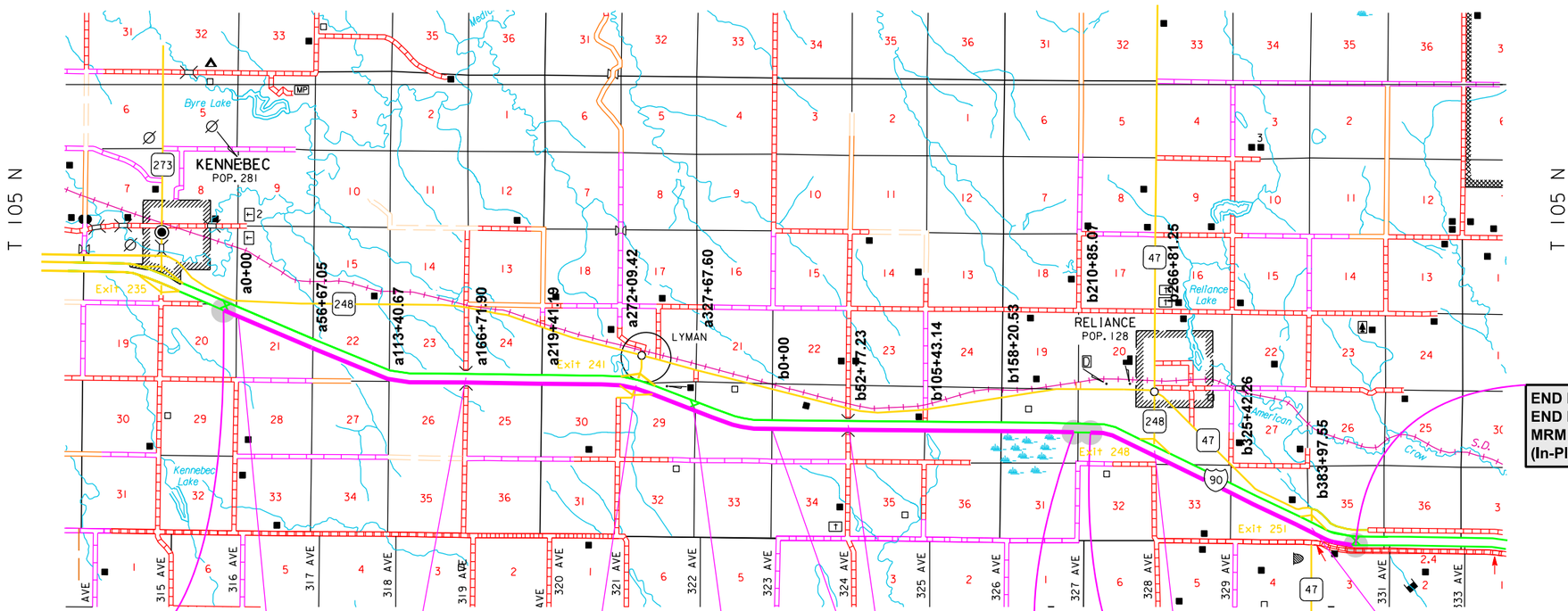
| STATE OF SOUTH DAKOTA | PROJECT | SHEET | TOTAL SHEETS |
|---|---|---|---|
| | IM-CR 0905(121)236 | M1 | M5 |

Plotting Date: 05/05/2025

# SECTION M: PAVEMENT MARKING PLANS

## INDEX OF SHEETS






**BEGIN PROJECT IM 0905(121)236**
**BEGIN EBL RESURFACING at Station 493+00**
**MRM 236.00+0.218 (EB Lanes)**
**(In-Place Median Crossover)**

Equation:
Station 507+11.11 Bk =
Station a0+00 Ah

Str. No. 43-313-221
EBL - MRM 241.90
(Guardrail)

Str. No. 43-290-220
EBL - MRM 239.66
(Guardrail)

Station a308+43
MRM 242.12 + 0.198
(In-Place Median Crossover)

Equation:
Station a382+38.69 Bk
= Station b0+00 Ah

Str. No. 43-340-225
EBL - MRM 244.75
(Guardrail)

**END IM 0905(121)236**
**END EBL RESURFACING**
**Station 209+80**
**MRM 247.00 + 0.679 (EB Lanes)**

**BEGIN IM 0905(121)236**
**BEGIN EBL RESURFACING**
**Station 220+79**
**MRM 247.00 + 0.915 (EB Lanes)**

Str. No. 43-380-228
EBL - MRM 248.79
(For Information Only)

Str. No. 43-401-238
EBL - MRM 251.09
(Guardrail)

**END PROJECT IM 0905(121)236**
**END EBL RESURFACING at Station b421+48**
**MRM 251.60 + 0.000 (EB Lanes)**
**(In-Place Crossover)**

05/05/2025 Revision by VAM

## ESTIMATE OF QUANTITIES

| BID ITEM NUMBER | ITEM | QUANTITY | UNIT |
|---|---|---|---|
| 633E0010 | Cold Applied Plastic Pavement Marking, 4" | 1,450 | Ft |
| 633E0025 | Cold Applied Plastic Pavement Marking, 12" | 2,300 | Ft |
| 633E1201 | High Build Waterborne Pavement Marking Paint with Reflective Elements, White | 567 | Gal |
| 633E1206 | High Build Waterborne Pavement Marking Paint with Reflective Elements, Yellow | 450 | Gal |
| 633E5050 | Surface Preparation for Pavement Marking | 195,596 | Ft |

## GENERAL NOTES

Pavement marking application will extend through the structure exception lengths.

The edgelines of the EBL off-ramps and on-ramps at Exits 241 & 251 will have pavement markings applied from I-90 mainline to the frontage road.

## SURFACE PREPARATION FOR PAVEMENT MARKING

The Contractor will prepare the pavement surface prior to applying the durable pavement marking in accordance with the following.

In areas where the existing groove meets the required depth and existing markings are still in place, the Contractor will clean the existing groove without adding additional depth beyond the required depth for the new pavement marking, including reflective media as noted below.

| Description | Specification | Tolerance |
|---|---|---|
| Depth of Groove | Marking Thickness[1] + 15 mils | + 5 mils |

[1] Marking thickness will include the thickness of marking material and reflective media.

The cleaning will result in the existing pavement marking being adequately scuffed, abraded, and removed by light grinding or abrasive blasting or both to allow proper adhesion of the new durable pavement marking as per the manufacturer's recommendations to comply with product warranties.

Existing grooves not meeting the required depth will be re-grooved to the required depth for the new pavement marking, including reflective media. Equipment for grooving will be capable of the following:

- Grooving the total width of the groove in one pass or uniform depths with multiple passes.
- Grooving without causing damage to the pavement joints or joint sealant material.
- Provide uniform alignment and depth.
- Moving continuously to permit a mobile traffic work operation.

All costs associated with cleaning of the existing groove, including re-grooving, if needed, will be included in the contract unit price per foot for "Surface Preparation For Pavement Marking". Surface preparation will be measured as 4" equivalent.

## HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

All materials will be applied as per manufacturer's recommendations. High build waterborne pavement marking paint will conform to the supplemental specifications for Section 980.1 B.

Reflective media consisting of glass beads as well as wet-reflective optics will be adhered to the paint.

The wet-reflective optics will contain either clear, white, amber, or yellow tinted beads composed of glass or a composite consisting of a core made from ceramic or glass with an outer layer of microcrystalline ceramic or glass beads. The wet-reflective optics will provide a 50/50 blend of dry to wet ratio of optics. All beads bonded to wet-reflective optics will have a minimum index of refraction of 1.8 for dry retroreflectivity and 2.4 for wet retroreflectivity when tested using the liquid oil immersion method.

Reflective media will require a Certificate of Compliance for Certification for each type, source, and lot. Acceptance sampling will not be required.

The Department will take retroreflectivity readings on the pavement marking lines no sooner than 3 days and no later than 30 days after the completion of all line applications required for an individual highway route using a portable retroreflectometer conforming to 30-meter geometry. Retroreflectivity readings will be taken on a test location with cleaning being limited to light hand brooming.

Pavement markings not conforming to the retroreflectivity requirements will be removed and replaced. If replacement of markings cannot be applied within the same year, the Contractor will schedule subject work to be completed no later than June 15th in the following year. Upon replacement, the retroreflectivity testing process will be done again requiring new readings.

The Department will randomly select one test location per mile of each edge line including ramps and one test location per mile of centerline (solid and/or skip line will be considered as one centerline). Three retroreflectivity readings will be taken at each test location. The three readings will be averaged and become the reading for that test location.

Initial readings:

| Pavement Marking Color | Minimum Value |
|---|---|
| White | 350 mc/m²/lux |
| Yellow | 275 mc/m²/lux |

All pavement markings not conforming to the requirements provided in these plans will be considered deficient and will be removed and replaced. Additional retroreflectivity readings will be taken by the Department to determine the limits of removal. The removal will be accomplished using suitable sand blasting or grinding equipment unless the Engineer authorizes other means. The removal process will remove at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width will be one inch wider all around the nominal width of the pavement marking to be removed. Removal and replacement of the pavement markings will be at the Contractor's expense, with no cost incurred by the State.

## COLD APPLIED PLASTIC PAVEMENT MARKING

All materials will be applied as per the manufacturer's recommendations.

Cold Applied Plastic Pavement Markings will be 3M Series 380 AW or an approved equal.

## RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 27.8 Gals/Mile
Dashed 4" line = 7.6 Gal/Mile
Glass Beads = 5.3 Lbs/Gal.
Wet-Reflective Optics = 2.1 Lbs/Gal.

All cost for materials, labor, and equipment necessary to furnish and install the pavement markings will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

## TABLE OF PAVEMENT MARKING QUANTITIES

| LOCATION I-90 EBL | PAINT (solid) 4" W | PAINT (solid) 4" Y | PAINT (dashed) 4" W | TAPE (dashed) 4" W | TAPE (solid) 12" W |
|---|---|---|---|---|---|
| I-90 EBL Mainline | | | | | |
| Median edgeline | - | 81,798' | - | - | - |
| Rdwy centerline | - | - | * 81,798' | - | - |
| Outside edgeline | 81,798' | - | - | - | - |
| Exit 241 | | | | | |
| Off-ramp taper & gore area | - | - | - | 175' | 400' |
| Off-ramp edgelines to frontage road | 1,000' | 1,000' | - | - | - |
| On-ramp edgelines to frontage road | 1,000' | 1,000' | - | - | - |
| On-ramp taper & gore area | - | - | - | 300' | 375' |
| Exit 248 | | | | | |
| Off-ramp taper & gore area | - | - | - | 175' | 350' |
| Off-ramp edgelines to frontage road | - | - | - | - | - |
| On-ramp edgelines to frontage road | - | - | - | - | - |
| On-ramp taper & gore area | - | - | - | 300' | 375' |
| Exit 251 | | | | | |
| Off-ramp taper & gore area | - | - | - | 175' | 450' |
| Off-ramp edgelines to frontage road | 1,100' | 1,100' | - | - | - |
| On-ramp edgelines to frontage road | 800' | 800' | - | - | - |
| On-ramp taper & gore area | - | - | - | 325' | 350' |
| **Totals:** | **85,698'** | **85,698'** | *** 81,798'** | **1,450'** | **2,300'** |

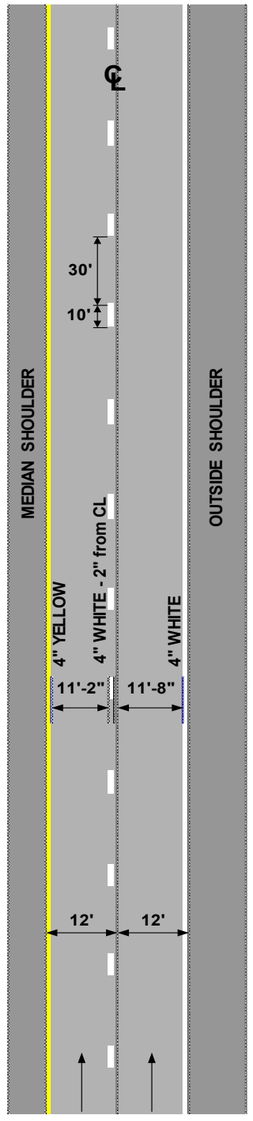
* The length will determine the dashed paint quantity based upon the applicable dashed centerline rate. One-quarter of the length will be the total length of actual painted dashed line.

# PAVEMENT MARKING PAINT DETAILS

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | IM-CR 0905(121)236 | M3 | M5 |

05/05/2025 Revision by VAM

**DIVIDED ROADWAY**
**(ONE DIRECTION SHOWN)**




**PAVEMENT MARKING**

Typical pavement marking as shown on this sheet will be applied throughout the entire length of divided roadway.

Traffic Control will be incidental to the cost of application. The striper and advance or trailing warning vehicle will be equipped with flashing amber lights and advance warning arrow board.

Application rates will be as follows:

| DIVIDED ROADWAY (Rates for one line) |
|---|
| Solid Yellow Edgeline<br>Rate = 27.8 Gals./Pass-Mile |
| Dashed White Centerline<br>Rate = 7.6 Gals./Pass-Mile |
| Solid White Edgeline<br>Rate = 27.8 Gals./Pass-Mile |

| ESTIMATED QUANTITIES (BASED ON ONE APPLICATION) | |
|---|---|
| PAINT | QUANTITY |
| WHITE | 567 GALLONS |
| YELLOW | 450 GALLONS |

| Included in the above quantities are: | | | |
|---|---|---|---|
| Additional White (1 Application) | | Additional Yellow (1 Application) | |
| Description | Gallons | Description | Gallons |
| 4" Lines - | - | Transitions - - | - |
| 8" Lines - | - | 4" Skip Lines - | - |
| 12" Gore Lines - | - | 8" Lines - | - |
| Crosswalks - - | - | 12" Lines - | - |
| 24" Stop Lines - | - | 24" Hatches - | - |
| 24" Hatches - | - | Solid Areas - | - |
| Solid Areas - | - | Additional Yellow: | - |
| Arrows | | | |
| Left Arrows - | - | | |
| Right Arrows - | - | | |
| Straight Arrows - | - | | |
| Combo Arrows - | - | | |
| Lane Drop Arrows - | - | | |
| Messages | | | |
| STOP - | - | | |
| STOP AHEAD - | - | | |
| R X R with Bars - | - | | |
| SCHOOL X-ING - | - | | |
| Additional White: | - | | |

Additional Quantities

| Rates of Coverage: | SqFt/Gal |
|---|---|
| 4", 8" and 12" Lines - | 80 |
| 24" Lines and Bars - | 50 |
| Arrows, Messages and Solid Areas - | 30 |

All pavement marking dimensions are based on 12' driving lanes.

Pavement marking at On Ramps and at Off Ramps will be applied as detailed in these plans.

| ESTIMATED QUANTITIES (BASED ON ONE APPLICATION) | | | | |
|---|---|---|---|---|
| PAINT | Project No. 1 GALLONS | Project No. 2 GALLONS | Project No. 3 GALLONS | TOTALS GALLONS |
| WHITE | 567 | - | - | 567 |
| YELLOW | 450 | - | - | 450 |

| STATE OF SOUTH DAKOTA | PROJECT | SHEET | TOTAL SHEETS |
|---|---|---|---|
| | IM-CR 0905(121)236 | M4 | M5 |

Plotting Date: 05/05/2025

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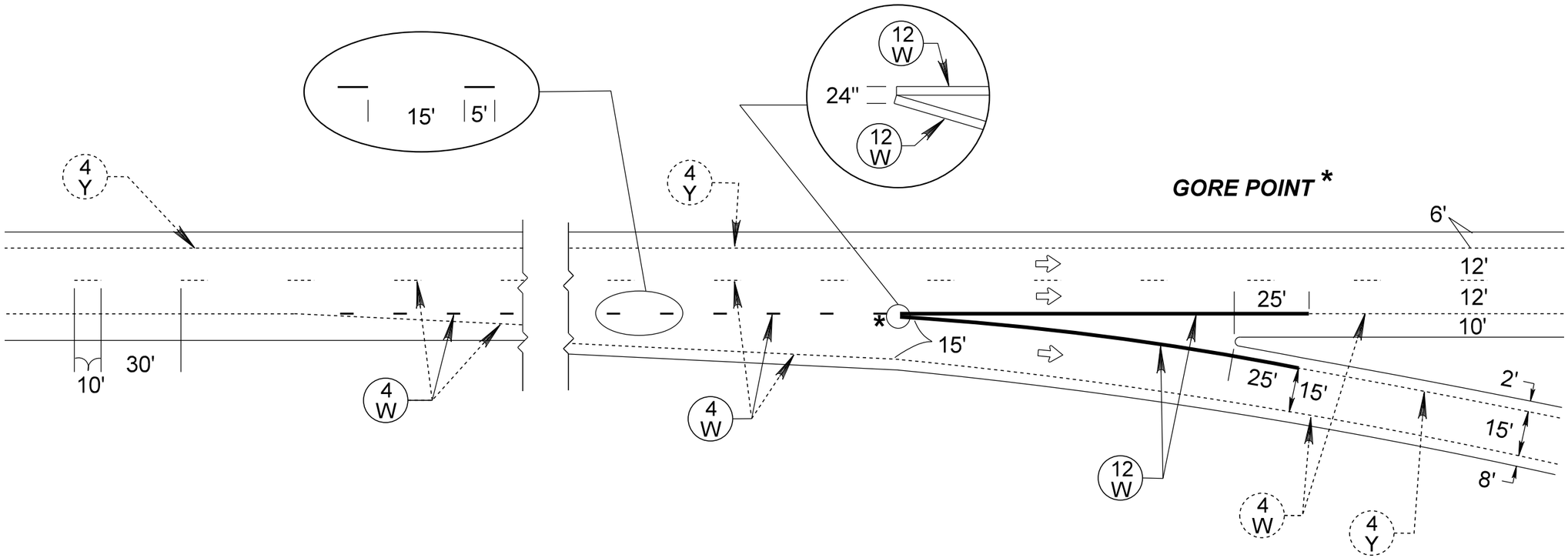
# PAVEMENT MARKING DETAILS

## (TYPICAL)

### *OFF-RAMP*




LEGEND:

—— TAPE

- - - - PAINT

⇦ - DIRECTION OF TRAFFIC

(4 Y) - 4" Yellow Pavement Marking

(4 W) - 4" White Pavement Marking

(12 W) - 12" White Pavement Marking

Plot Scale - 1:43.737

Plotted From - TRPR226947

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| STATE OF SOUTH DAKOTA | PROJECT | SHEET | TOTAL SHEETS |
|---|---|---|---|
| | IM-CR 0905(121)236 | M5 | M5 |

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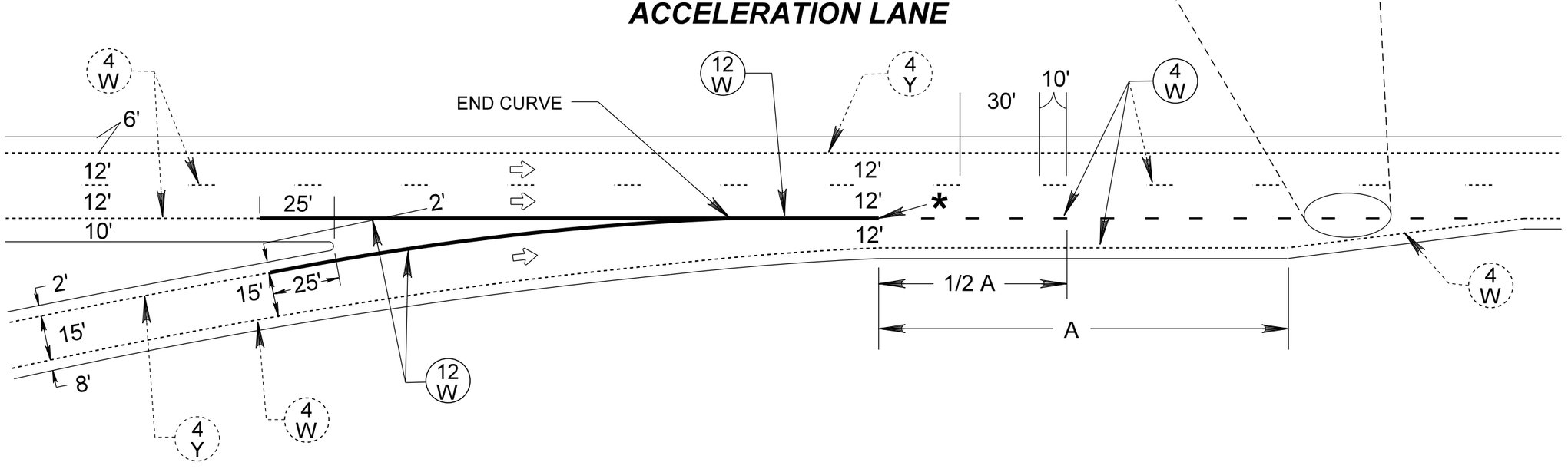
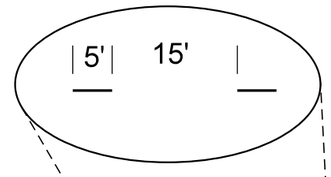
# PAVEMENT MARKING DETAILS

## (TYPICAL)

**** GORE POINT***

### *ON-RAMP WITH ACCELERATION LANE*




LEGEND:

— TAPE

---- PAINT

⇦ - DIRECTION OF TRAFFIC

A = LENGTH OF PARALLEL ACCELERATION LANE

(4 Y) - 4" Yellow Pavement Marking

(4 W) - 4" White Pavement Marking

(12 W) - 12" White Pavement Marking

Plot Scale - 1:43.737

Plotted From - TRPR26947

File - ...\PavementMarkingDetails.dgn