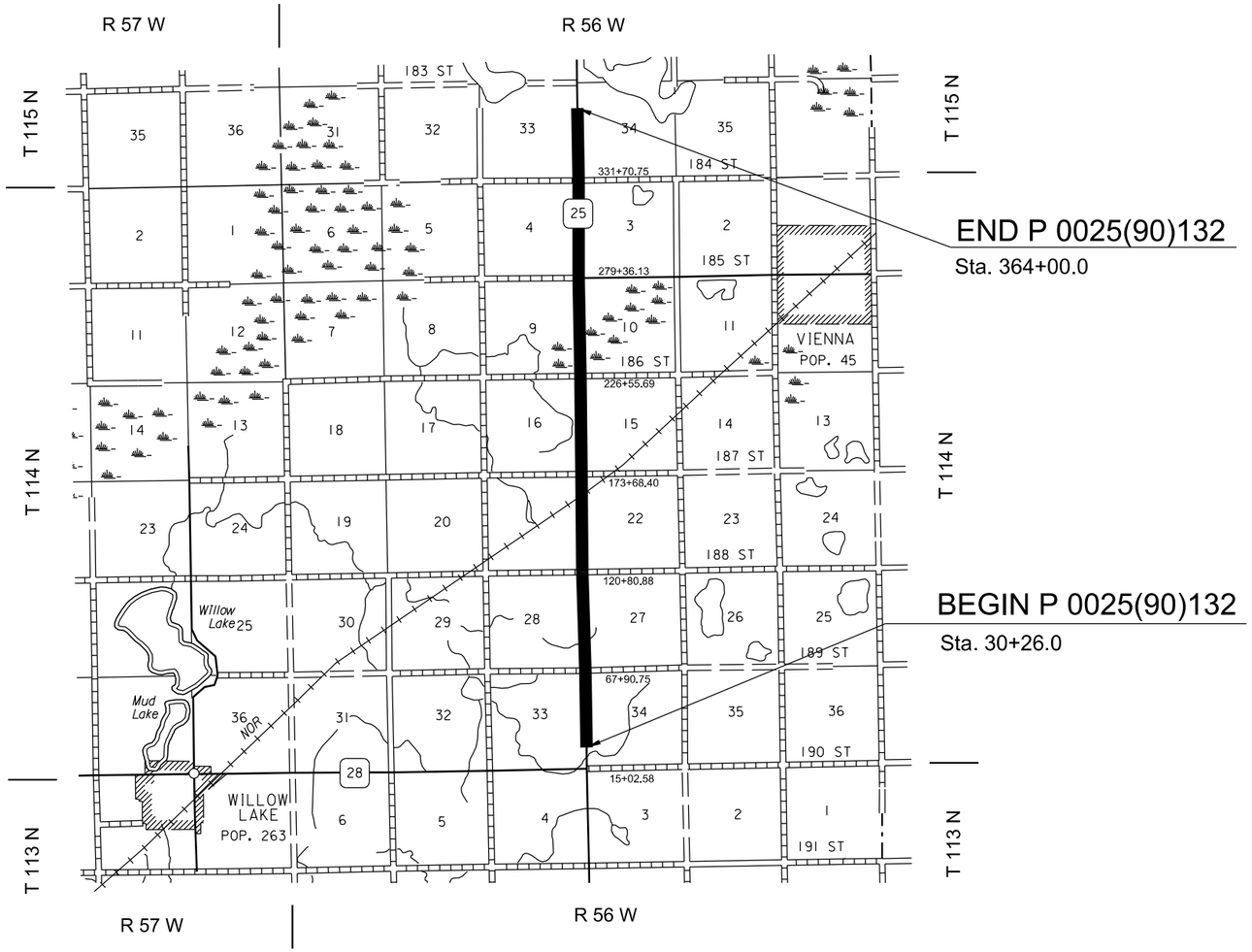
| STATE OF SOUTH DAKOTA | PROJECT | SHEET | TOTAL SHEETS |
|---|---|---|---|
| | P 0025(90)132 | M1 | M6 |

Plotting Date: 02/27/2024

# Section M: Pavement Marking Plans

## INDEX OF SHEETS






PLOT NAME - 1

FILE - ...\SECTION M\TITLE M 06WY.DGN

## SECTION M ESTIMATE OF QUANTITIES

| BID ITEM NUMBER | ITEM | QUANTITY | UNIT |
|---|---|---|---|
| 633E0055 | Cold Applied Plastic Pavement Marking, Railroad Crossing | 2 | Each |
| 633E1200 | High Build Waterborne Pavement Marking Paint, White | 285 | Gal |
| 633E1206 | High Build Waterborne Pavement Marking Paint with Reflective Elements, Yellow | 105 | Gal |
| 633E5040 | Grooving for Cold Applied Plastic Pavement Marking, Railroad Crossing | 2 | Each |

## GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING

The Contractor will establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving will be vacuumed. Solid residue will be removed from the pavement surfaces before being blown by traffic action or wind. The Contractor will conduct this work to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners. Residue from wet grooving will not be permitted to flow across lanes being used by public traffic or into gutter or drainage facilities. Residue, whether in solid or slurry form, will be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state. The cleaning of the residue for grooving will be to the satisfaction of the Engineer and may require more than one pass to adequately remove material. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per each for “Grooving for Cold Applied Plastic Pavement Marking” contract item.

## 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.

## HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, YELLOW

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 bonded core reflective elements will be adhered to the paint.

The bonded core reflective elements will contain either clear or yellow tinted microcrystalline ceramic beads bonded to the outer surface. The bonded core reflective elements will provide a 50/50 blend of dry to wet ratio of reflective element. All microcrystalline ceramic beads bonded to reflective elements 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.

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 |
|---|---|
| Yellow | 275 mc/m$^2$/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.

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

Solid 4” line = 22.5 Gals/Mile
Dashed 4” line = 6.2 Gal/Mile
Glass Beads = 5.3 Lbs/Gal.
Composite Reflective Elements = 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.

## HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, WHITE

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 will consist of glass beads.

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

Solid 4” line = 22.5 Gals/Mile
Dashed 4” line = 6.2 Gal/Mile
Glass Beads = 8 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.

## RETROREFLECTIVITY FOR PAVEMENT MARKING PAINT, WHITE

The Department may take retroreflectivity readings on the pavement marking lines after 2 days and within 30 days of the line application using either a portable or mobile retroreflectometer that conforms to 30-meter geometry. If the Department chooses to take retroreflectivity readings, three retroreflectivity readings will be taken on each line at each test location. The three readings will be averaged and become the reading for that test location.

If the Department chooses to take retroreflectivity readings, three readings will be taken on the edge lines and lane lines in the direction of application. For combination solid yellow and skip yellow lines for turn lanes and for centerline markings on two-way roadways, three readings will be taken in one direction, the reflectometer will be turned 180 degrees and three more readings will be taken. The six readings for the centerline markings will be averaged and become the test reading for that test location.

If the Department chooses to take readings, the minimum retroreflectivity values will be 275 mc/m$^2$/lux for white.

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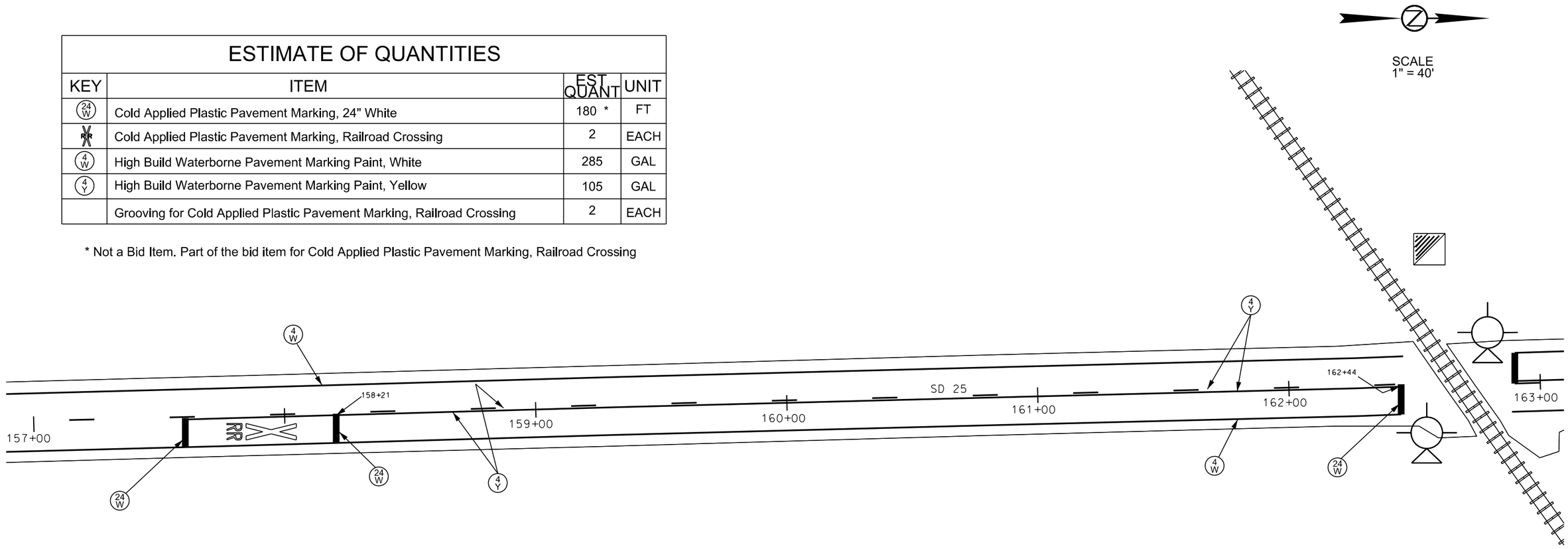
# PAVEMENT MARKING LAYOUT

SD25

| ESTIMATE OF QUANTITIES | | | |
|---|---|---|---|
| KEY | ITEM | EST QUANT | UNIT |
| (24 W) | Cold Applied Plastic Pavement Marking, 24" White | 180 * | FT |
| RR | Cold Applied Plastic Pavement Marking, Railroad Crossing | 2 | EACH |
| (4 W) | High Build Waterborne Pavement Marking Paint, White | 285 | GAL |
| (4 Y) | High Build Waterborne Pavement Marking Paint, Yellow | 105 | GAL |
| | Grooving for Cold Applied Plastic Pavement Marking, Railroad Crossing | 2 | EACH |

* Not a Bid Item. Part of the bid item for Cold Applied Plastic Pavement Marking, Railroad Crossing




PLOT SCALE - 1:40

PLOT NAME - 2

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| STATE OF SOUTH DAKOTA | PROJECT | SHEET NO. | TOTAL SHEETS |
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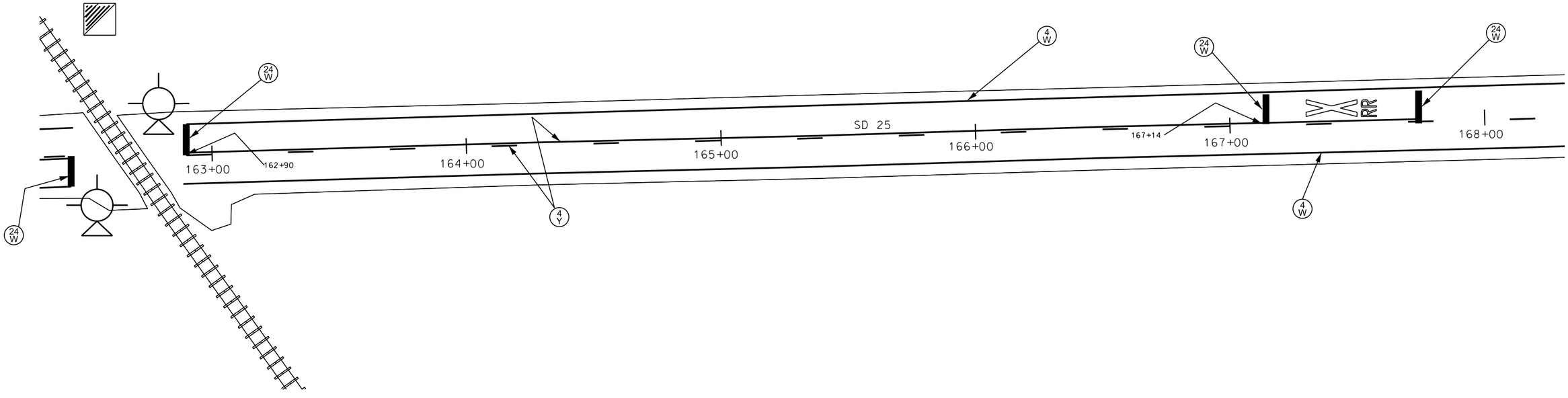
| | P 0025(90)132 | M4 | M6 |
| Plotting Date: 02/27/2024 | | | |

# PAVEMENT MARKING LAYOUT

SD25

SCALE
1" = 40'




PLOT SCALE - 1:40

PLOT NAME - 3

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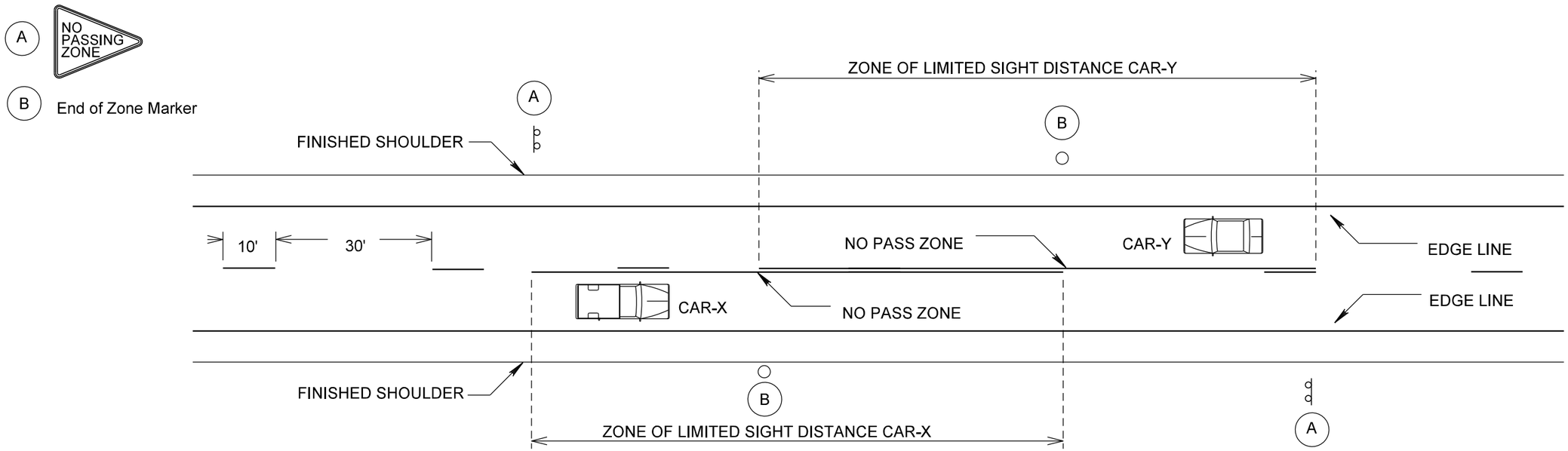
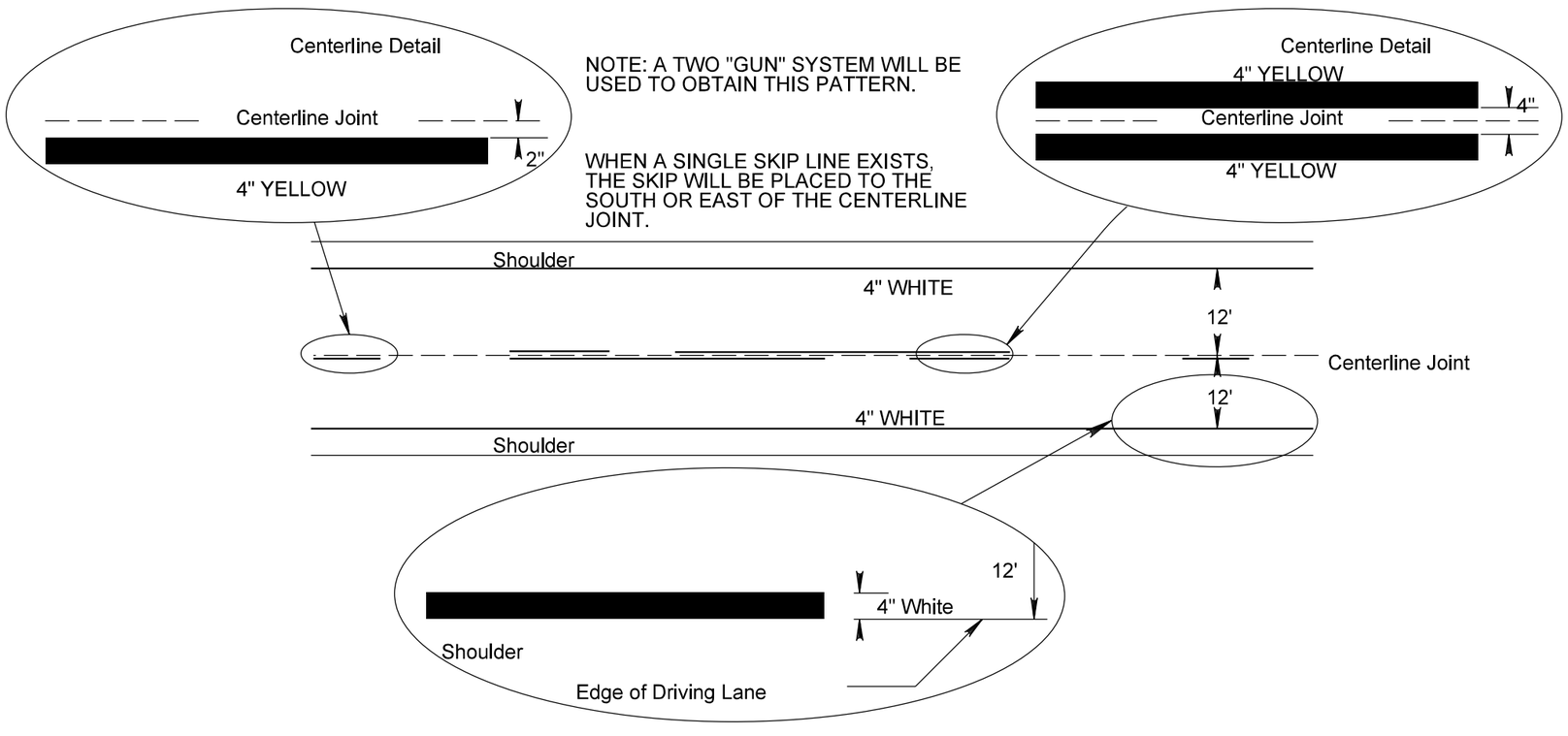
| STATE OF SOUTH DAKOTA | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | P 0025(90)132 | M5 | M6 |
| Plotting Date: 02-27-24 | | | |

# TYPICAL PAVEMENT MARKING LAYOUT



PLOT SCALE - 1:200

| STATE OF SOUTH DAKOTA | PROJECT | SHEET NO. | TOTAL SHEETS |
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| | P 0025(90)132 | M6 | M6 |

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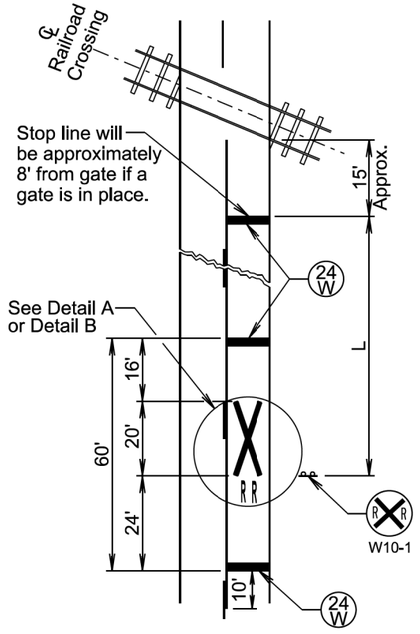


**PLAN VIEW**

| KEY | ITEM |
|---|---|
| 24 W | 24" White |
| R R | White |

| Posted Speed Limit (M.P.H.) | L (Ft.) |
|---|---|
| ≤ 30 | 100 |
| 35 | 100 |
| 40 | 125 |
| 45 | 175 |
| 50 | 250 |
| 55 | 325 |
| 60 | 400 |
| 65 | 475 |
| 70 | 550 |

**GENERAL NOTES:**

The railroad crossing pavement markings will be placed symmetrically about the centerline of the railroad crossing. DETAIL A should be used unless the railroad crossing pavement markings are installed in existing grooves that match DETAIL B.

When pavement markings are used, a portion of the RXR symbol will be placed directly opposite of the advance warning sign W10-1.

On multi-lane roads the transverse bands will extend across all approach lanes and individual RXR symbols will be placed in each approach lane.

The railroad crossing pavement markings will consist of all the transverse bands, stop lines, and RXR symbols.

All costs for furnishing and installing the markings, materials, labor, and necessary equipment for the railroad crossing makings will be paid for at the contract unit price per gallon or per each for the type of marking material specified in the plans.

November 19, 2020

| Published Date: 2024 | SDDOT | PAVEMENT MARKINGS AT RAILROAD CROSSING | PLATE NUMBER 633.10 |
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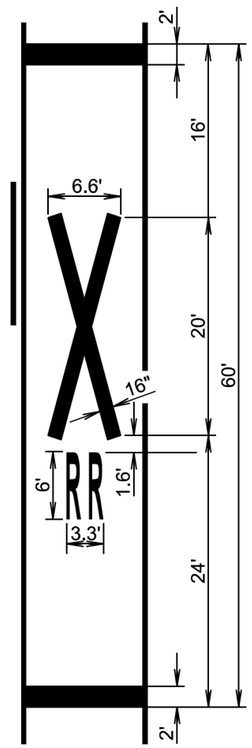
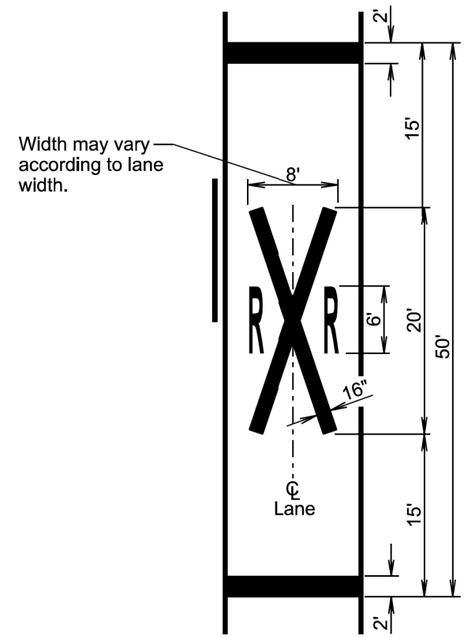
| | | | Sheet 1 of 2 |




**DETAIL A**




**DETAIL B**

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-PLOTTED FROM - TRAB17882