

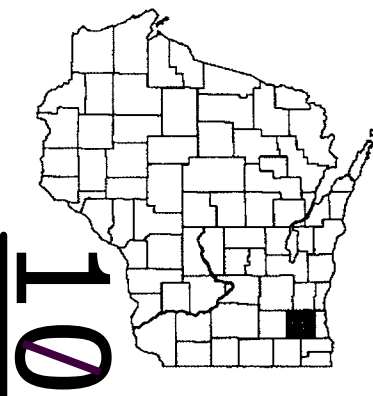
WKE

JULY 2015

ORDER OF SHEETS

|               |                              |
|---------------|------------------------------|
| Section No. 1 | Title                        |
| Section No. 2 | Typical Sections and Details |
| Section No. 3 | Estimate of Quantities       |
| Section No. 3 | Miscellaneous Quantities     |
| Section No. 4 | Right of Way Plat            |
| Section No. 5 | Plan and Profile             |
| Section No. 6 | Standard Detail Drawings     |
| Section No. 7 | Sign Plates                  |
| Section No. 8 | Structure Plans              |
| Section No. 9 | Computer Earthwork Data      |
| Section No. 9 | Cross Sections               |

TOTAL SHEETS = 80



DESIGN DESIGNATION

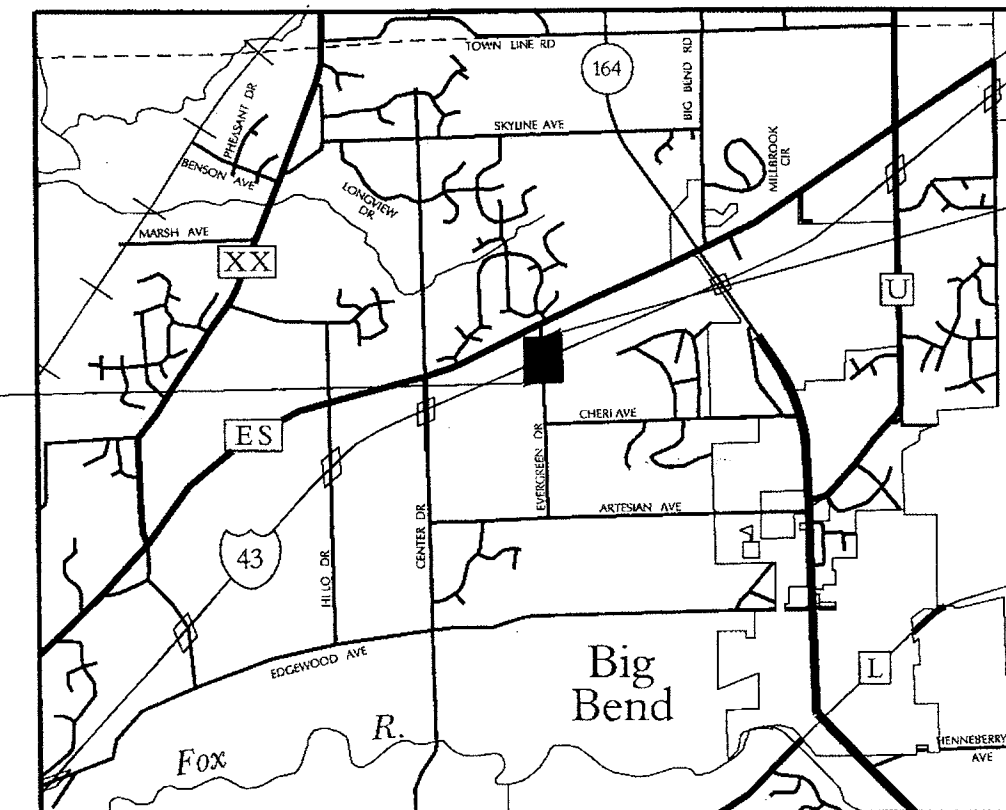
|                 |   |           |
|-----------------|---|-----------|
| A.A.D.T. (2015) | = | 650       |
| A.A.D.T. (2035) | = | 780       |
| D.H.V. (2035)   | = | 21        |
| D.              | = | 59/41     |
| T. (DHV/AADT)   | = | 2.8/3.3   |
| DESIGN SPEED    | = | 40 M.P.H. |
| ESALS           | = | 51,100    |

CONVENTIONAL SYMBOLS

|                                |         |
|--------------------------------|---------|
| PLAN                           |         |
| CORPORATE LIMITS               | ////    |
| PROPERTY LINE                  | ----    |
| LOT LINE                       | ----    |
| LIMITED HIGHWAY EASEMENT       | ----    |
| EXISTING RIGHT OF WAY          | ----    |
| PROPOSED OR NEW R/W LINE       | ----    |
| SLOPE INTERCEPT                | ----    |
| REFERENCE LINE                 | ----    |
| EXISTING CULVERT               | ----    |
| PROPOSED CULVERT (Box or Pipe) | ----    |
| COMBUSTIBLE FLUIDS             | CAUTION |
| MARSH AREA                     | ----    |
| WOODED OR SHRUB AREA           | ----    |

|                                             |       |
|---------------------------------------------|-------|
| PROFILE                                     |       |
| GRADE LINE                                  | ----  |
| ORIGINAL GROUND                             | ----  |
| MARSH OR ROCK PROFILE (To be noted as such) | ----  |
| SPECIAL DITCH                               | ----  |
| GRADE ELEVATION                             | 95.36 |
| CULVERT (Profile View)                      | ----  |
| UTILITIES                                   |       |
| ELECTRIC                                    | ----  |
| FIBER OPTIC                                 | ----  |
| GAS                                         | ----  |
| SANITARY SEWER                              | ----  |
| STORM SEWER                                 | ----  |
| TELEPHONE                                   | ----  |
| WATER                                       | ----  |
| UTILITY PEDESTAL                            | ----  |
| POWER POLE                                  | ----  |
| TELEPHONE POLE                              | ----  |

BEGIN PROJECT 1090-19-77  
STA. 17+42  
Y=122,306.33  
X=682,046.32



LAYOUT  
SCALE 0 1.0 MI.

TOTAL NET LENGTH OF CENTERLINE = 0.102 MI.

Coordinates on this plan are referenced to the Wisconsin County Coordinate System (WCCS), Waukesha County, NAD 1983 (2011).

Elevations shown on the plan are referenced to the North American Vertical Datum of 1988, NAVD 88 (2012).

STATE PROJECT

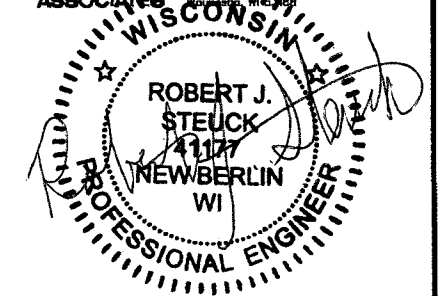
1090-19-77

FEDERAL PROJECT

PROJECT

CONTRACT

ORIGINAL PLANS PREPARED BY  
**AYRES ASSOCIATES**  
11177 New Berlin Rd., Suite 310  
New Berlin, WI 53151



DATE: 1/29/15

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

|                     |                  |
|---------------------|------------------|
| PREPARED BY         |                  |
| Surveyor            | AYRES ASSOCIATES |
| Designer            | AYRES ASSOCIATES |
| Project Manager     | GREG HAFEMAN     |
| District Examiner   |                  |
| District Supervisor | ADETOTE ADENIYI  |
| C.O. Examiner       |                  |

APPROVED FOR DISTRICT OFFICE  
DATE: 1/29/15  
Signature: [Signature]

E

GENERAL NOTES

1. THE LOCATIONS OF EXISTING OR PROPOSED UTILITIES, AS NOTED ON THE PLANS, ARE APPROXIMATE. THERE MAY BE OTHER UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.
2. THE CONTRACTOR SHALL NOTIFY DIGGERS HOTLINE AND AFFECTED UTILITIES PRIOR TO THE START OF WORK. ANY LOCAL MUNICIPALITY OR PUBLIC AGENCY WHICH IS NOT A MEMBER OF DIGGERS HOTLINE MUST BE CONTACTED SEPARATELY.
3. DIMENSIONS GIVEN FOR EXISTING FEATURES ARE APPROXIMATE AND SHOULD BE MEASURED IN THE FIELD FOR PRECISION.
4. THE CONTRACTOR SHALL NOT GO OUTSIDE OF THE EXISTING RIGHT-OF-WAY TO ACCOMMODATE CONSTRUCTION ACTIVITIES.
5. NO TREES OR SHRUBS ARE TO BE REMOVED WITHOUT THE APPROVAL OF THE ENGINEER.
6. RE-TOPSOIL OF GRADED AREAS, AS DESIGNATED BY THE ENGINEER, IMMEDIATELY AFTER GRADING IS COMPLETED WITHIN THOSE AREAS. SEED AND EROSION MAT TOP-SOILED AREAS, AS DESIGNATED BY THE ENGINEER, WITHIN FIVE (5) CALENDAR DAYS AFTER PLACEMENT OF TOPSOIL. IF GRADED AREAS ARE LEFT EXPOSED FOR MORE THAN (14) CALENDAR DAYS, SEED THOSE AREAS WITH TEMPORARY SEED.
7. STOCKPILE EXCESS MATERIAL OR SPOILS ON UPLAND AREAS AWAY FROM WETLANDS, FLOODPLAINS AND WATERWAYS. STOCKPILED SOIL SHALL BE PROTECTED AGAINST EROSION. IF STOCKPILED MATERIAL IS LEFT FOR MORE THAN FOURTEEN (14) CALENDAR DAYS, SEED THE STOCKPILE WITH TEMPORARY SEED.
8. EROSION CONTROL BMP'S ARE AT SUGGESTED LOCATIONS. THE ACTUAL LOCATIONS WILL BE DETERMINED BY THE CONTRACTORS ECIP AND BY THE ENGINEER. EROSION CONTROL BMP'S SHALL BE MAINTAINED UNTIL PERMANENT VEGETATION IS ESTABLISHED OR UNTIL THE ENGINEER DETERMINES THAT THE BMP IS NO LONGER REQUIRED.
9. ALL DISTURBED AREAS WITHIN THE RIGHT-OF-WAY THAT ARE NOT A RESULT OF CONTRACT WORK ITEMS SHALL BE LANDSCAPED AT THE CONTRACTOR'S EXPENSE.
10. A SAWED JOINT IS REQUIRED WHERE NEW ASPHALTIC PAVEMENT MEETS EXISTING ASPHALTIC CONCRETE SURFACE.
11. TRAFFIC CONTROL DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER. NO WORK MAY BEGIN UNTIL PROPER TRAFFIC CONTROL DEVICES ARE PLACED AND APPROVED BY THE ENGINEER.
12. PLACE A LAYER OF TACK COAT BETWEEN ALL ASPHALTIC PAVEMENT LAYERS.
13. THE ENGINEER WILL APPROVE THE LOCATION OF LONGITUDINAL JOINTS IN THE ASPHALTIC OVERLAY.
14. BOTH THE 3/4-INCH BASE AND THE 1 1/4-INCH BASE ARE ACCEPTABLE UNDER THE PAVED SHOULDER AND THE ADJACENT FINISHED SHOULDER. THE TOP 3 INCHES (MINIMUM) OF BASE AGGREGATE DENSE ON SHOULDER SHALL BE 3/4-INCH GRADATION.
15. APRON ENDWALLS AND ADJOINING TWO SECTIONS OF CONCRETE PIPE SHALL BE TIED TOGETHER, FOR NEW AND EXISTING PIPES, AS SHOWN ON THE STANDARD DETAIL DRAWINGS. JOINT TIES ARE INCIDENTAL TO THE VARIOUS ITEMS.
16. MAINTAIN EXISTING MINIMUM VERTICAL CLEARANCE TO STRUCTURES. EXISTING MINIMUM VERTICAL CLEARANCE TO NB IH 43 STRUCTURE B-67-120 IS 15'6". EXISTING MINIMUM VERTICAL CLEARANCE TO SB IH 43 STRUCTURE B-67-121 IS 15'8". SEE PLAN AND PROFILE FOR MORE DETAIL.
17. PRE-DRILL MGS GUARDRAIL POST LOCATIONS TO ENSURE PROPER EMBEDMENT DEPTH CAN BE ACHIEVED. ABANDONED UTILITIES MAY REQUIRE PARTIAL REMOVAL TO ACHIEVE PROPER POST PLACEMENT AND EMBEDMENT.

ASPHALTIC PAVEMENT TABLE

| LOCATION        | DEPTH  | LAYERS             | GRADATION<br>NOMINAL SIZE |
|-----------------|--------|--------------------|---------------------------|
| EVERGREEN DRIVE | 4-INCH | 2-INCH UPPER LAYER | 12.5 mm                   |
|                 |        | 2-INCH LOWER LAYER | 12.5 mm                   |

UTILITIES

**AT & T WISCONSIN**  
ALPER KOLCU  
2005 PEWAUKEE RD  
WAUKESHA, WI 53188  
(262) 970-8494  
(262) 352-3791 CELL  
AK308X@ATT.COM

**TIME WARNER CABLE**  
STEVE CRAMER  
1320 N. MARTIN LUTHER KING JR. DRIVE  
MILWAUKEE, WI 53212  
(414) 277-4045  
(414) 688-2385 CELL  
STEVE.CRAMER@TWCABLE.COM

**WE ENERGIES (CORRESPONDENCE)**  
LATROY BRUMFIELD  
333 W. EVERETT ST – A299  
MILWAUKEE, WI 53203  
(414) 221-5617  
LATROY.BRUMFIELD@WE-ENERGIES.COM

**WE ENERGIES (GAS OPERATIONS)**  
DANIELLE FINK  
500 S. 116<sup>TH</sup> ST  
WEST ALLIS, WI 53214  
(414) 944-5627  
(414) 651-3067  
DANIELLE.FINK@WE-ENERGIES.COM

**WE ENERGIES (ELECTRIC OPERATIONS)**  
TERRY CONNELLY  
S13 W33800 HWY 18  
DELAFIELD, WI 53018  
(262) 968-5771  
(414) 852-9838 CELL  
TERRY.CONNELLY@WE-ENERGIES.COM

ORDER OF PLAN 2 SHEETS

- GENERAL NOTES/ CONTACT LIST
- PROJECT OVERVIEW
- TYPICAL SECTIONS
- CONSTRUCTION DETAILS
- PLAN DETAIL
- FINISHED CONTOURS
- EROSION CONTROL
- CULVERT PIPES
- PAVEMENT MARKING PLAN
- TRAFFIC CONTROL
- FENCING PLAN

CONTACTS

**WISDOT**  
GREG HAFEMAN  
PROJECT MANAGER  
141 NW BARSTOW  
WAUKESHA, WI 53187  
(262) 548-8677

**AYRES ASSOCIATES**  
ROBERT STEUCK  
PROJECT MANAGER  
N17 W24222 RIVERWOOD DRIVE, SUITE 310  
WAUKESHA, WI 53188 1132  
(262) 523-4488

**WISCONSIN DEPT. OF NATURAL RESOURCES**  
CRAIG WEBSTER  
ENVIRONMENTAL COORDINATOR  
141 NW BARSTOW, ROOM 180  
WAUKESHA, WI 53188  
(262) 574-2141

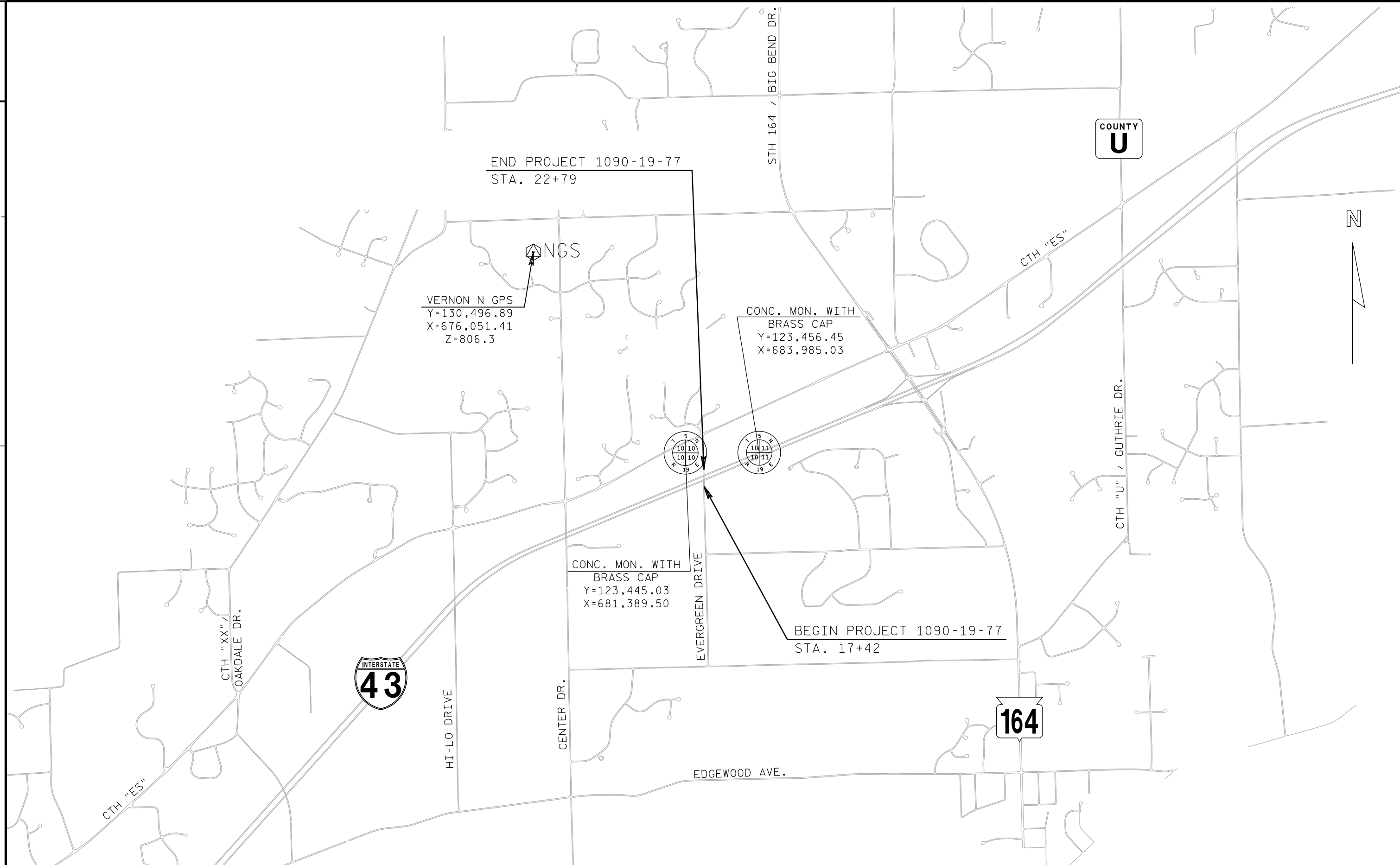
**VILLAGE OF BIG BEND**  
ERIC PEDERSON  
SUPERINTENDENT OF PUBLIC WORKS  
W231 S9110 RIVERSIDE DR.  
BIG BEND, WI 53103  
(262) 662-4903

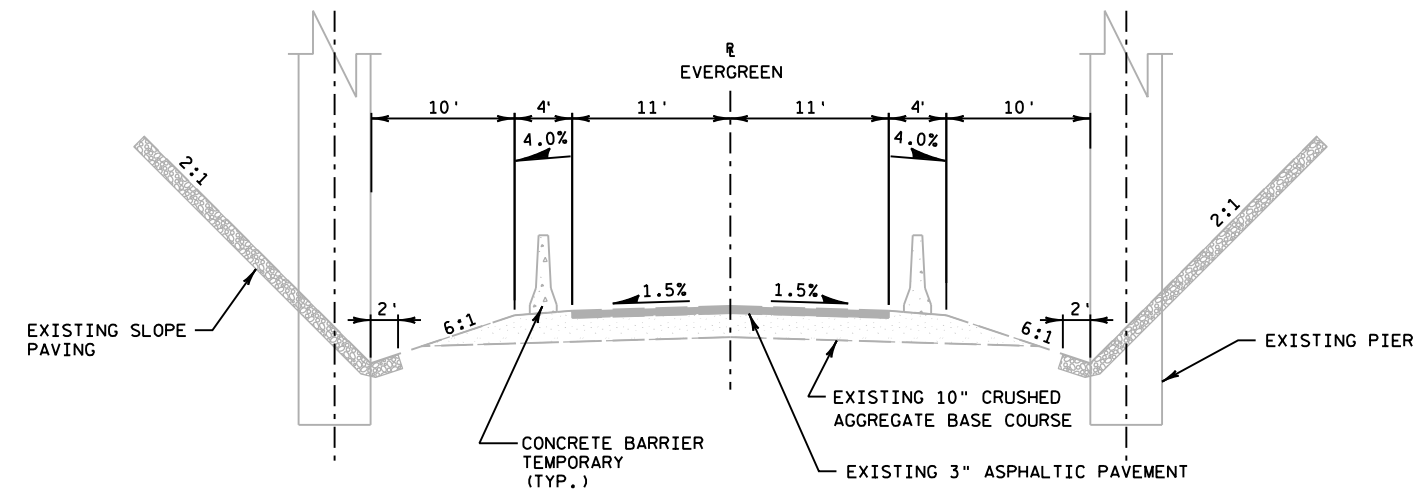
**VILLAGE OF BIG BEND**  
WILLIAM HYNE  
VILLAGE ENGINEER  
APPLIED TECHNOLOGIES, INC.  
16815 W. WISCONSIN AVE.  
BROOKFIELD, WI 53005  
(262) 784-7690

**TOWN OF VERNON**  
DOUG SALENTINE  
DIRECTOR OF PUBLIC WORKS  
W249 S8910 CENTER DR.  
P.O. BOX 309  
BIG BEND, WI 53103  
(262) 662-7785  
dpw@townofvernon.org

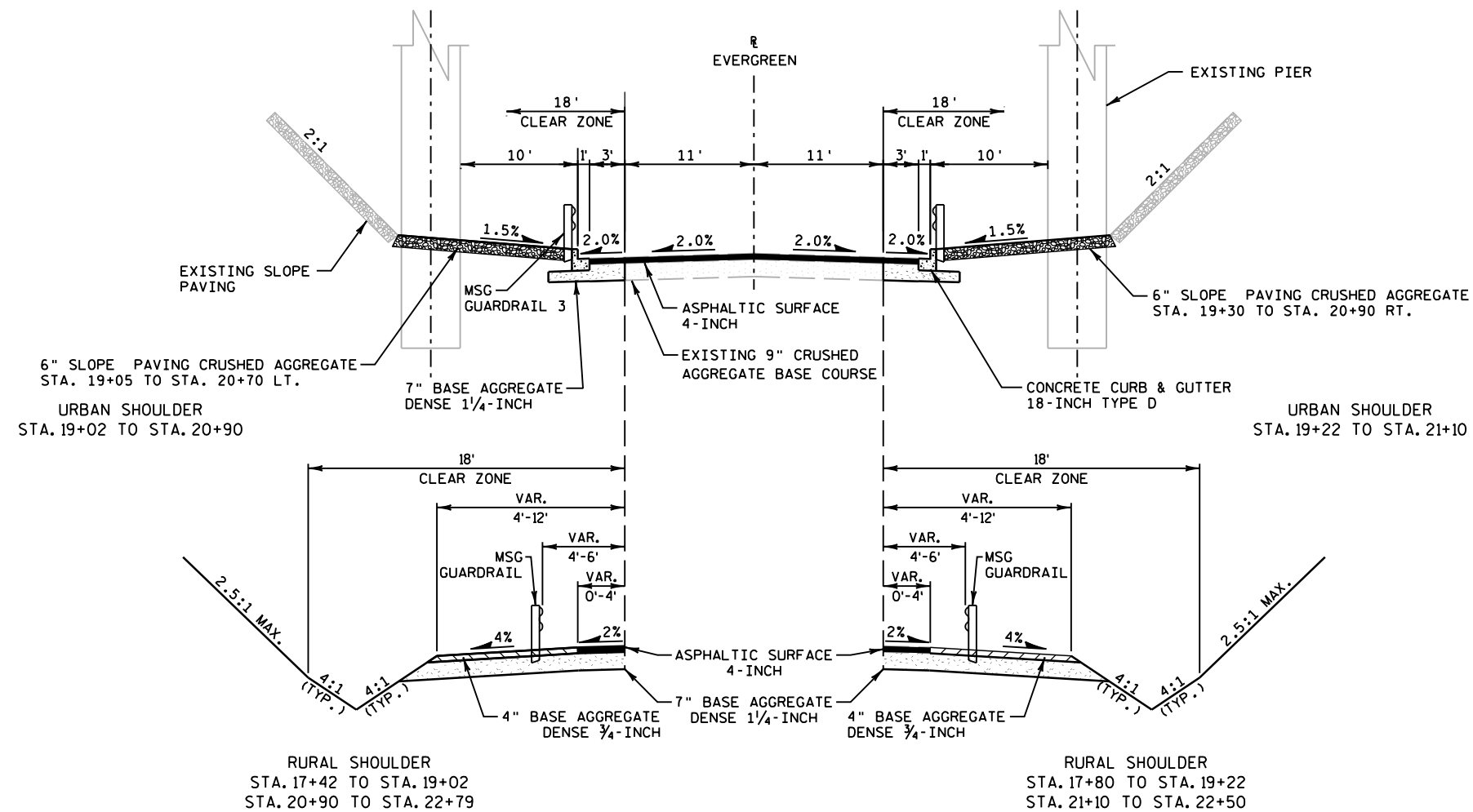
**TOWN OF VERNON**  
MIKE STEINER  
TOWN ENGINEER  
FOTH  
2514 S. 102ND ST., SUITE 278  
WEST ALLIS, WI 53227  
(414) 336-7900

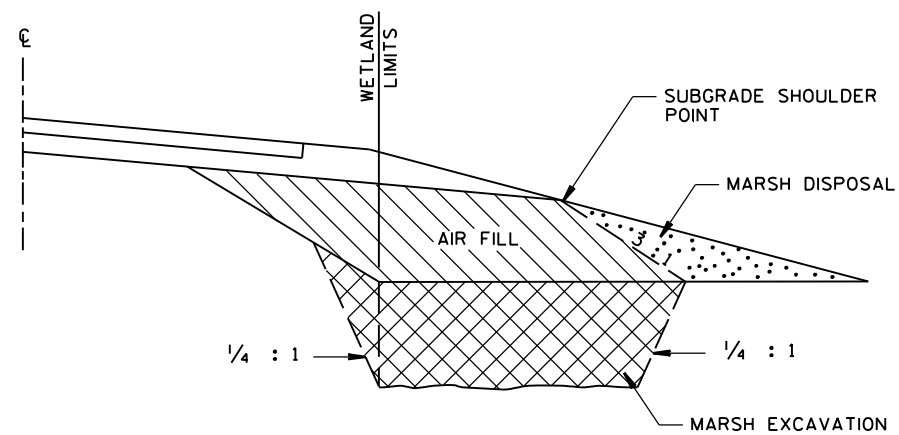




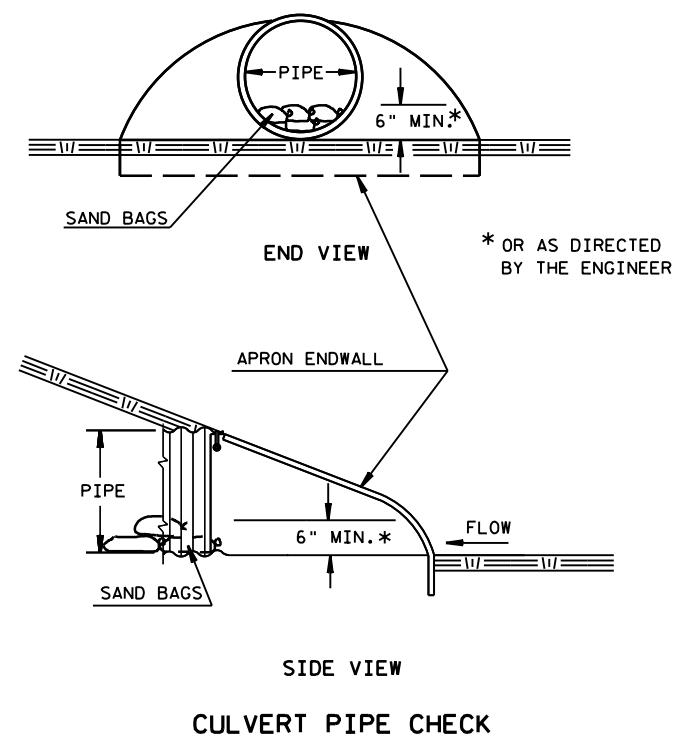


**NOTE:**  
REMOVE CONCRETE BARRIER TEMPORARY  
UNDER BID ITEM REMOVING CONCRETE  
BARRIER TEMPORARY.

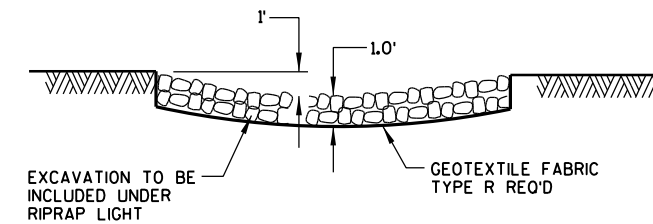




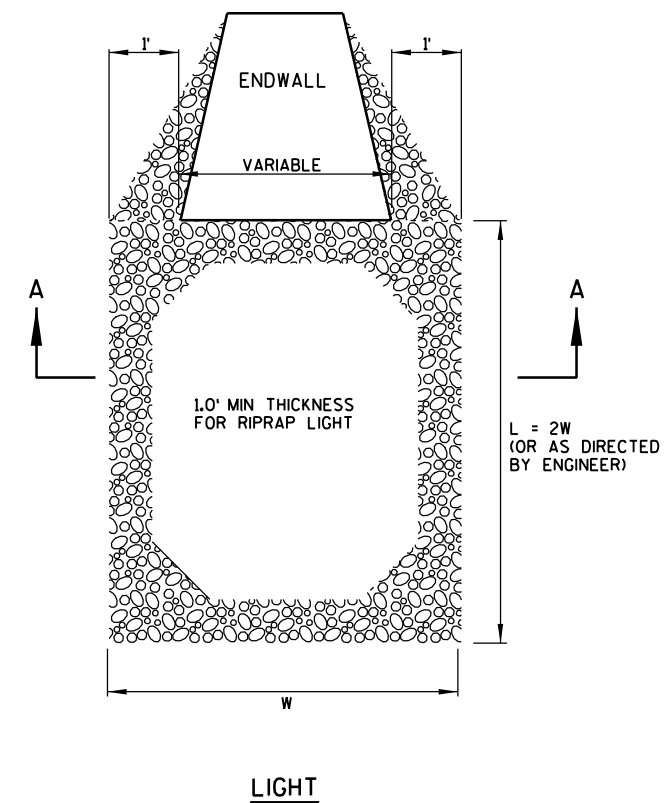
TYPICAL MARSH EXCAVATION IN WIDENING AREAS



CULVERT PIPE CHECK

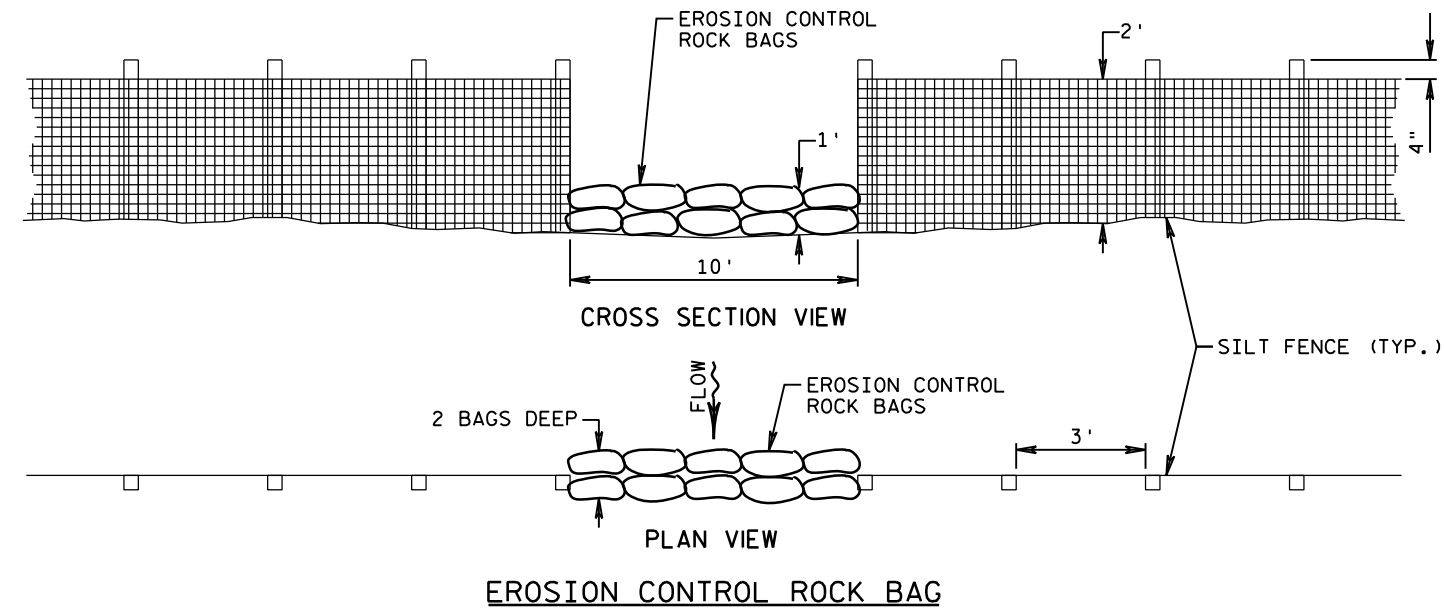


SECTION A-A

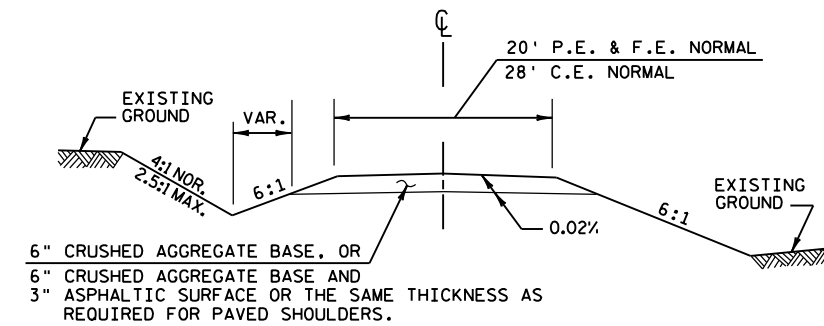
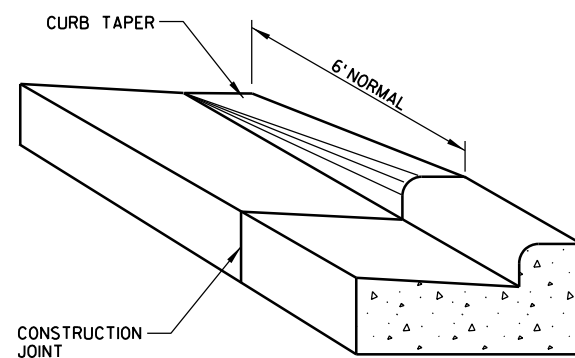


LIGHT

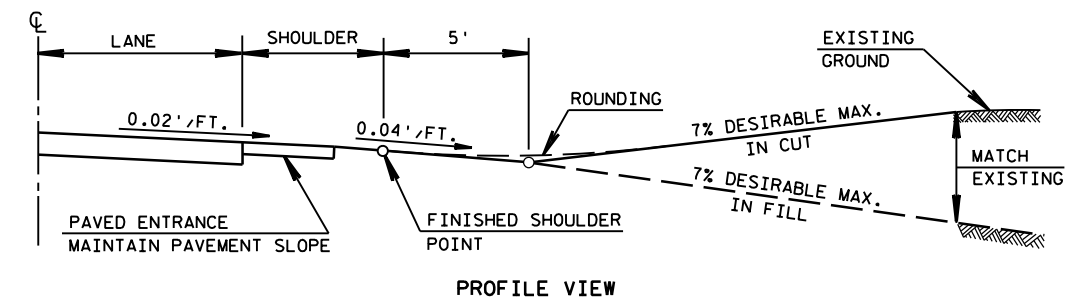
RIPRAP TREATMENT AT CULVERTS



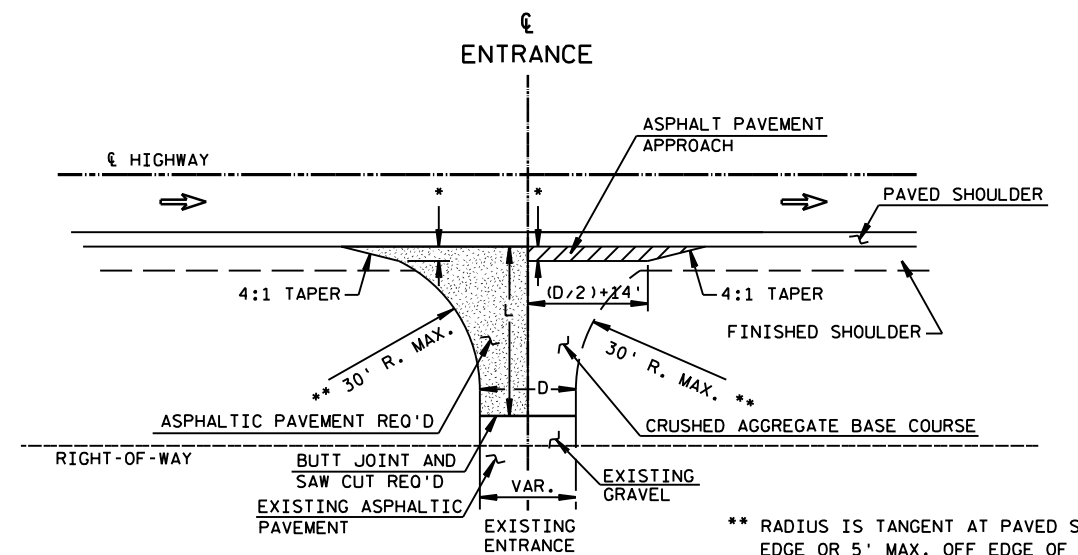
**DETAIL OF CONCRETE CURB & GUTTER TERMINI**



**TYPICAL CROSS SECTION**



**PROFILE VIEW**



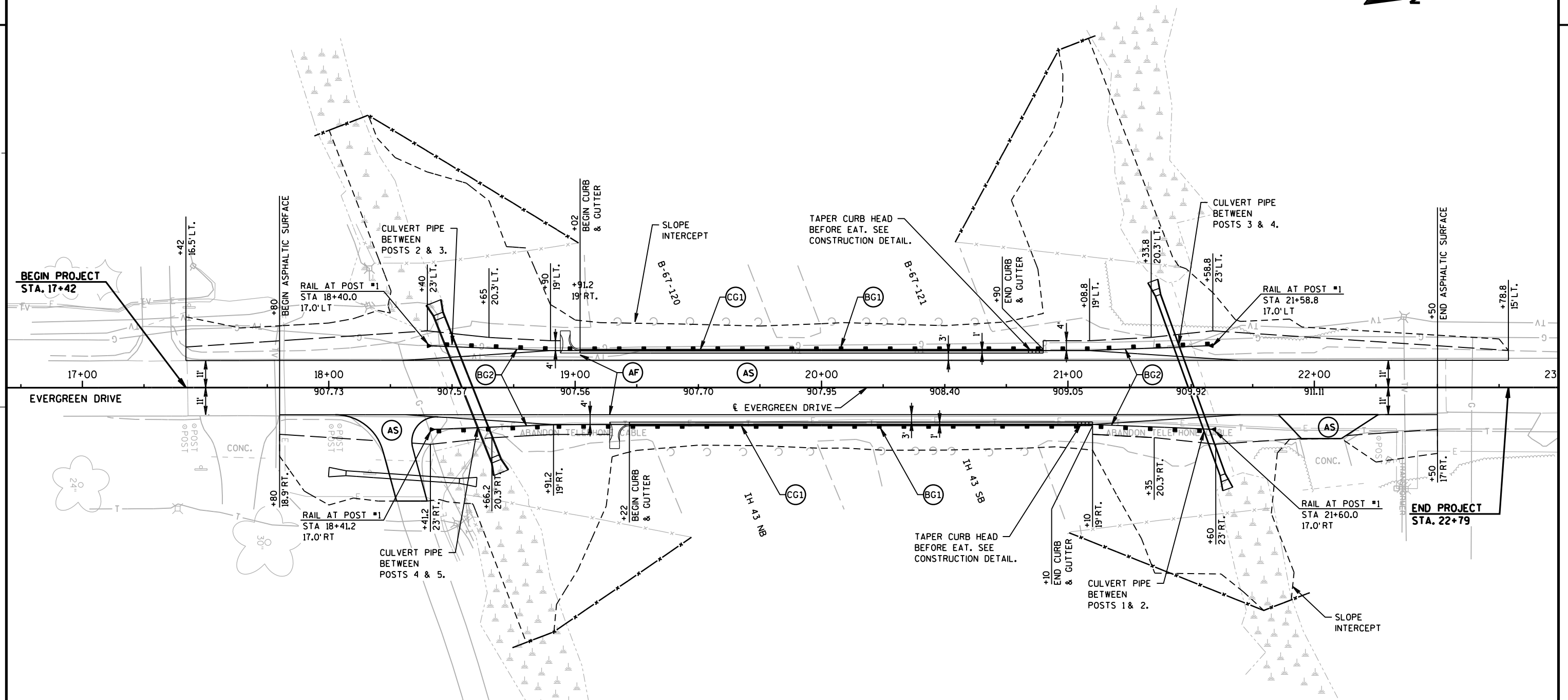
L=VARIABLE, EXACT LENGTH TO BE DETERMINED IN THE FIELD BY THE ENGINEER. BLEND BACK ON THE ENTRANCE FAR ENOUGH TO GET A SMOOTH PROFILE.

D=DRIVEWAY WIDTH  
D=20'TYP. (PE's & FE's) (16'MIN.-24'MAX.)  
D=28'TYP. (CE's & FARM ENT.) (24'MIN.-35'MAX.)

\*\* RADIUS IS TANGENT AT PAVED SHOULDER EDGE OR 5' MAX. OFF EDGE OF MAIN LINE PAVEMENT WHICH EVER IS LESS.  
\* 3' MAX. OR TO FINISHED SHOULDER WHICH EVER IS LESS.

**PLAN VIEW**

**RURAL DRIVEWAY INTERSECTION DETAIL  
(PE's, FE's & CE's)  
(FOR NEW CONSTRUCTION)**



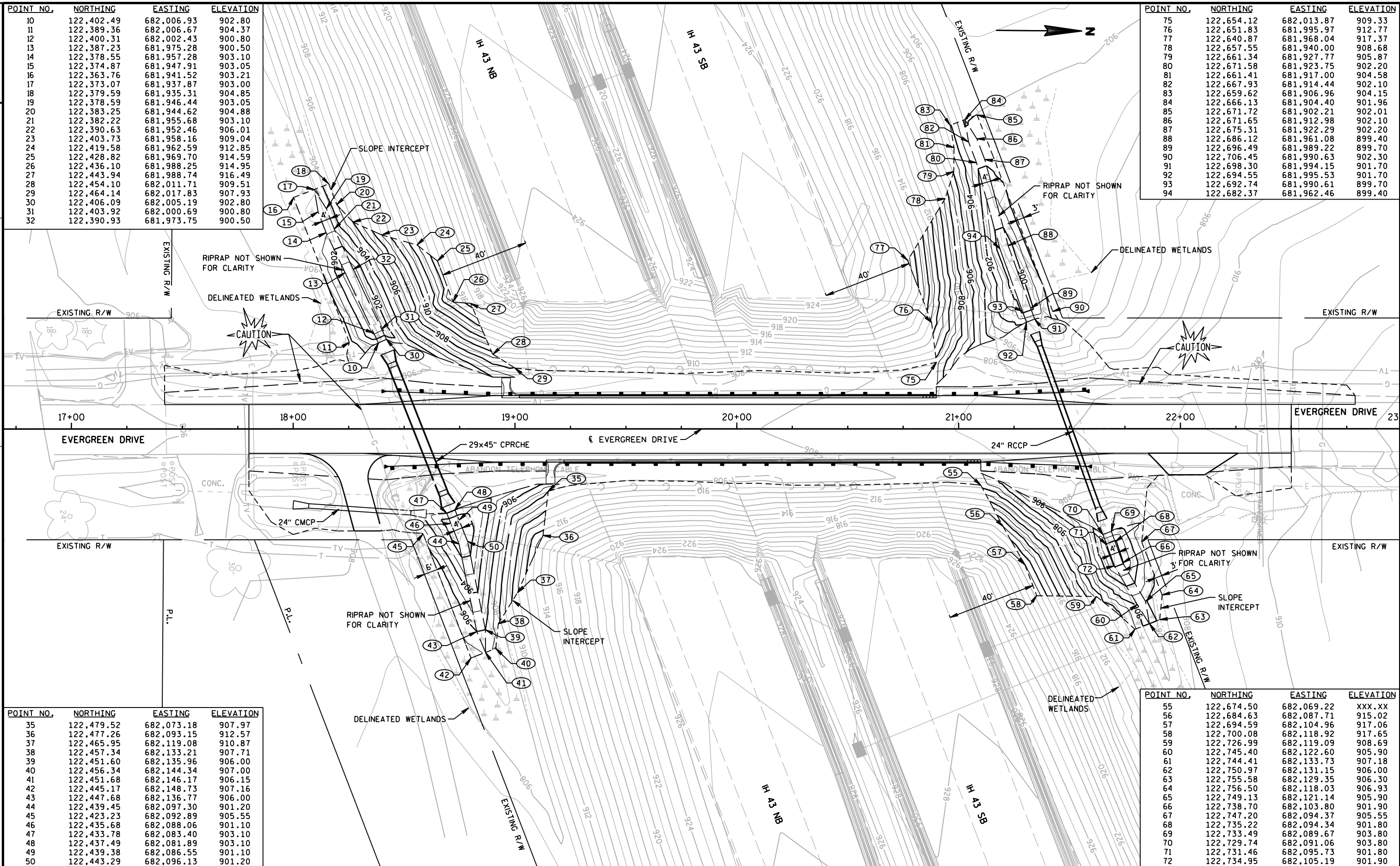
DATA TABLE

| STATION | LEFT FLANGE | RIGHT FLANGE |
|---------|-------------|--------------|
| 19+02   | 907.28      | -----        |
| 19+25   | 907.33      | 907.33       |
| 19+50   | 907.42      | 907.42       |
| 19+75   | 907.52      | 907.52       |
| 20+00   | 907.67      | 907.67       |
| 20+25   | 907.87      | 907.87       |
| 20+50   | 908.12      | 908.12       |
| 20+75   | 908.42      | 908.42       |
| 20+90   | 908.63      | 908.63       |
| 21+00   | -----       | 908.77       |
| 21+10   | -----       | 908.92       |

LEGEND

- AF ASPHALTIC FLUME
- AS ASPHALTIC SURFACE
- CG1 CONCRETE CURB & GUTTER 18-INCH TYPE D
- BG1 MGS GUARDRAIL 3
- BG2 MGS GUARDRAIL E.A.T.

| POINT NO. | NORTHING   | EASTING    | ELEVATION |
|-----------|------------|------------|-----------|
| 10        | 122,402.49 | 682,006.93 | 902.80    |
| 11        | 122,389.36 | 682,006.67 | 904.37    |
| 12        | 122,400.31 | 682,002.43 | 900.80    |
| 13        | 122,387.23 | 681,975.28 | 900.50    |
| 14        | 122,378.55 | 681,957.28 | 903.10    |
| 15        | 122,374.87 | 681,947.91 | 903.05    |
| 16        | 122,363.76 | 681,941.52 | 903.21    |
| 17        | 122,373.07 | 681,937.87 | 903.00    |
| 18        | 122,379.59 | 681,935.31 | 904.85    |
| 19        | 122,378.59 | 681,946.44 | 903.05    |
| 20        | 122,383.25 | 681,944.62 | 904.88    |
| 21        | 122,382.22 | 681,955.68 | 903.10    |
| 22        | 122,390.63 | 681,952.46 | 906.01    |
| 23        | 122,403.73 | 681,958.16 | 909.04    |
| 24        | 122,419.58 | 681,962.59 | 912.85    |
| 25        | 122,428.82 | 681,969.70 | 914.59    |
| 26        | 122,436.10 | 681,988.25 | 914.95    |
| 27        | 122,443.94 | 681,988.74 | 916.49    |
| 28        | 122,454.10 | 682,011.71 | 909.51    |
| 29        | 122,464.14 | 682,017.83 | 907.93    |
| 30        | 122,406.09 | 682,005.19 | 902.80    |
| 31        | 122,403.92 | 682,000.69 | 900.80    |
| 32        | 122,390.93 | 681,973.75 | 900.50    |



| POINT NO. | NORTHING   | EASTING    | ELEVATION |
|-----------|------------|------------|-----------|
| 35        | 122,479.52 | 682,073.18 | 907.97    |
| 36        | 122,477.26 | 682,093.15 | 912.57    |
| 37        | 122,465.95 | 682,119.08 | 910.87    |
| 38        | 122,457.34 | 682,133.21 | 907.71    |
| 39        | 122,451.60 | 682,135.96 | 906.00    |
| 40        | 122,456.34 | 682,144.34 | 907.00    |
| 41        | 122,451.68 | 682,146.17 | 906.15    |
| 42        | 122,445.17 | 682,148.73 | 907.16    |
| 43        | 122,447.68 | 682,136.77 | 906.00    |
| 44        | 122,439.45 | 682,097.30 | 901.20    |
| 45        | 122,423.23 | 682,092.89 | 905.55    |
| 46        | 122,435.68 | 682,088.06 | 901.10    |
| 47        | 122,433.78 | 682,083.40 | 903.10    |
| 48        | 122,437.49 | 682,081.89 | 903.10    |
| 49        | 122,439.38 | 682,086.55 | 901.10    |
| 50        | 122,443.29 | 682,096.13 | 901.20    |

| POINT NO. | NORTHING   | EASTING    | ELEVATION |
|-----------|------------|------------|-----------|
| 55        | 122,674.50 | 682,069.22 | xxx.xx    |
| 56        | 122,684.63 | 682,087.71 | 915.02    |
| 57        | 122,694.59 | 682,104.96 | 917.06    |
| 58        | 122,700.08 | 682,118.92 | 917.65    |
| 59        | 122,726.99 | 682,119.09 | 908.69    |
| 60        | 122,745.40 | 682,122.60 | 905.90    |
| 61        | 122,744.41 | 682,133.73 | 907.18    |
| 62        | 122,750.97 | 682,131.15 | 906.00    |
| 63        | 122,755.58 | 682,129.35 | 906.30    |
| 64        | 122,756.50 | 682,118.03 | 906.93    |
| 65        | 122,749.13 | 682,121.14 | 905.90    |
| 66        | 122,738.70 | 682,103.80 | 901.90    |
| 67        | 122,747.20 | 682,094.37 | 905.55    |
| 68        | 122,735.22 | 682,094.34 | 901.80    |
| 69        | 122,733.49 | 682,089.67 | 903.80    |
| 70        | 122,729.74 | 682,091.06 | 903.80    |
| 71        | 122,731.46 | 682,095.73 | 901.80    |
| 72        | 122,734.95 | 682,105.19 | 901.90    |

PROJECT NO: 1090-19-77

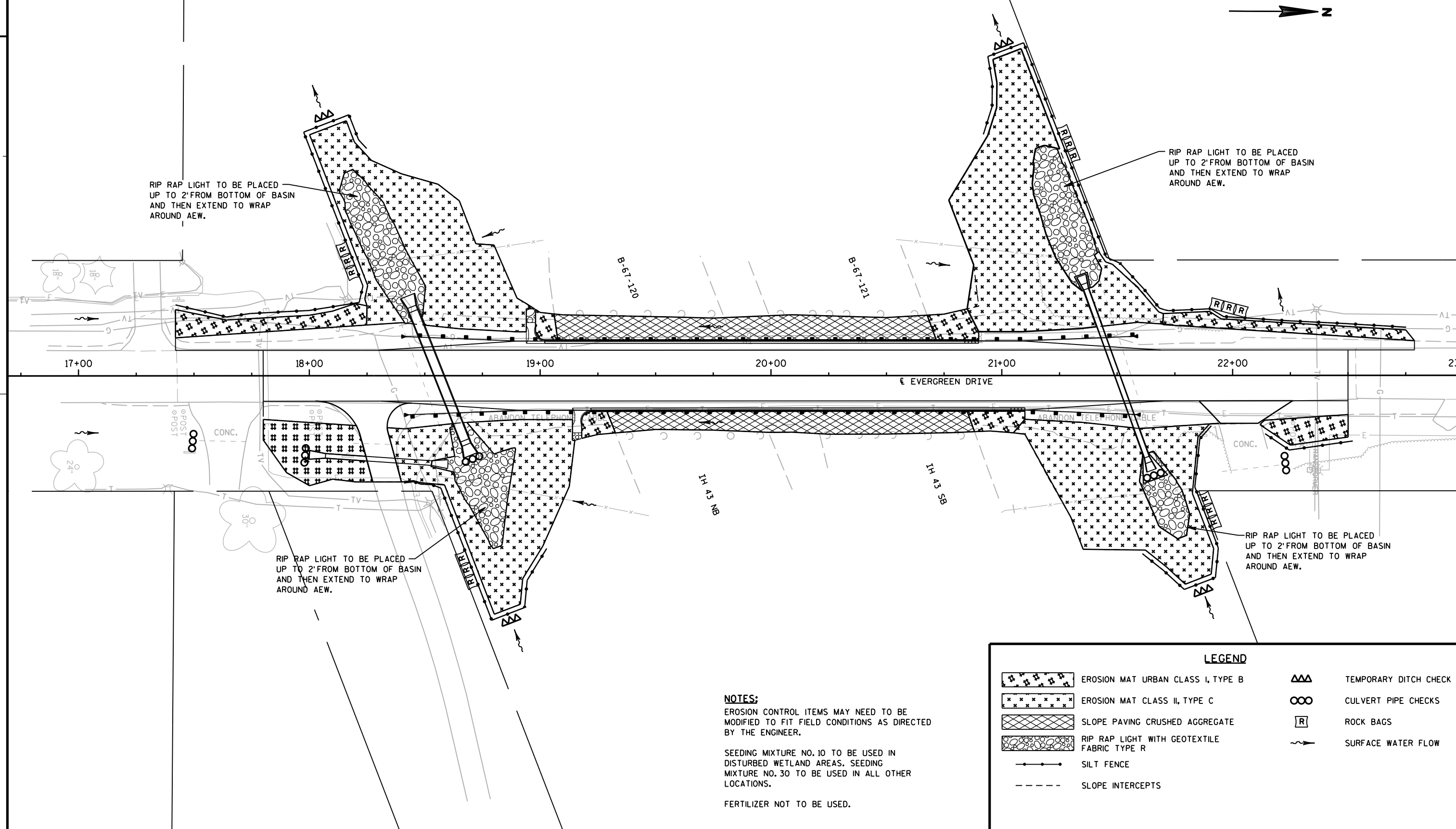
HWY: EVERGREEN DRIVE

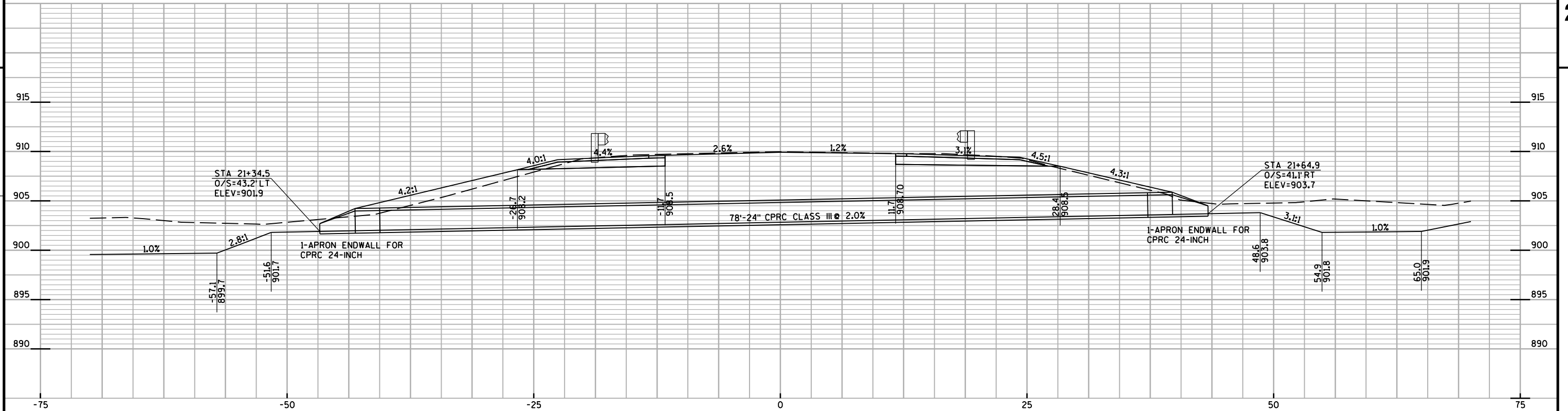
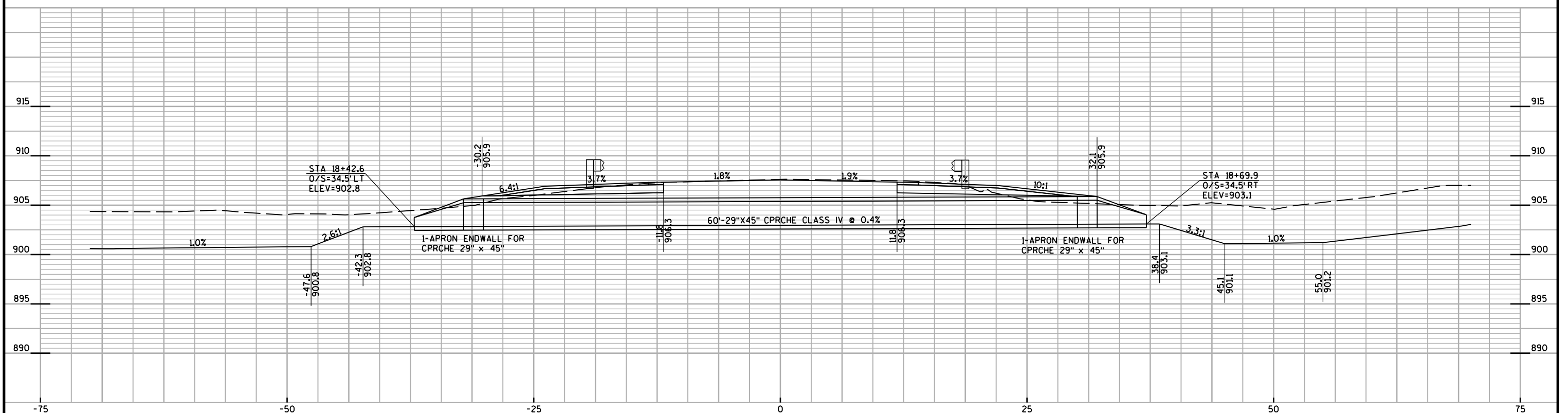
COUNTY: WAUKESHA

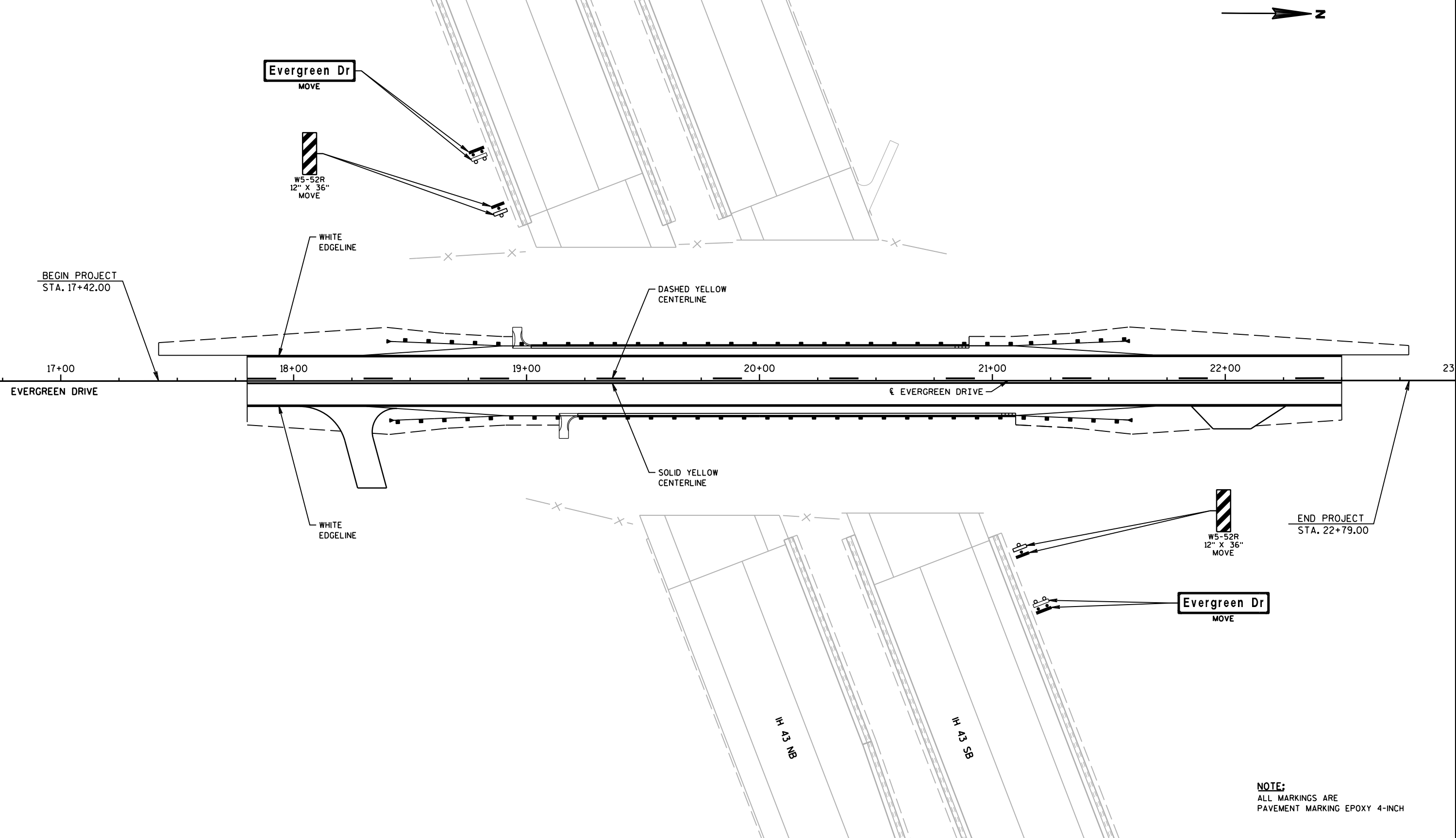
FINISHED CONTOURS

SHEET

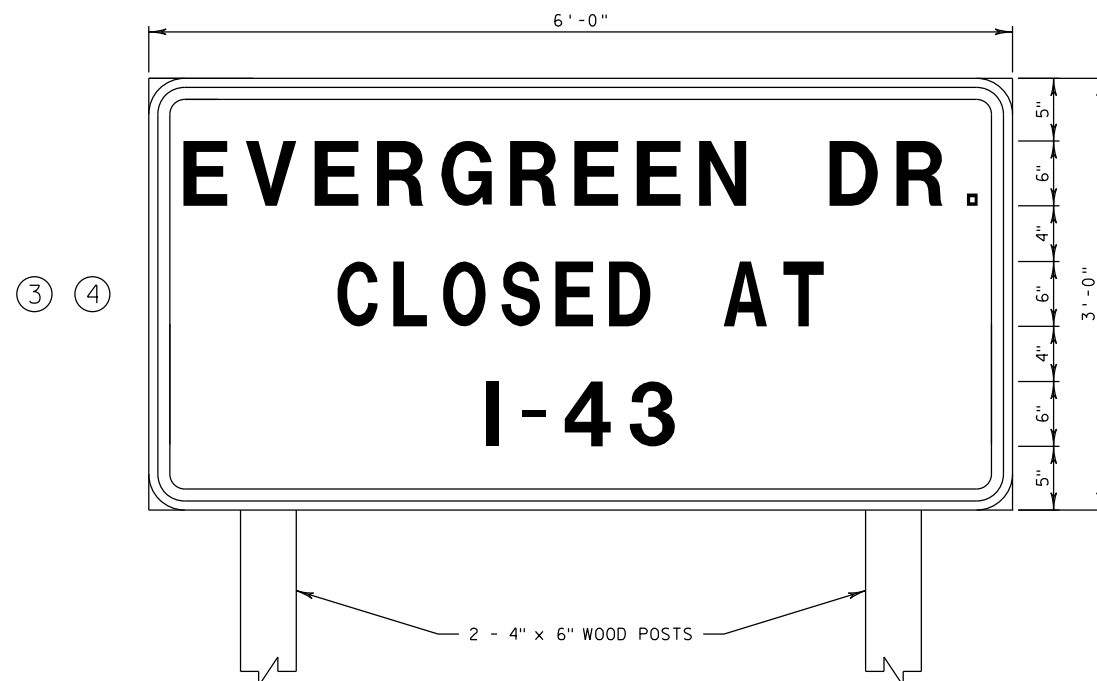
E



STA 21+50 SKEW 19°49'47" RHF  
(CROSS SECTION ALONG SKEW)STA 18+56 SKEW 21°36'26" RHF  
(CROSS SECTION ALONG SKEW)





**NOTES:**

1. ALL SIGNS TO HAVE STANDARD REFLECTIVE SHEETING - REFERENCE: "WISDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," LATEST EDITION.
2. AFTER SIGNS HAVE BEEN LOCATED IN THE FIELD, BUT BEFORE INSTALLATION, THE SIGNING AND MARKING SUPERVISOR SHALL VERIFY EACH SIGN LOCATION.
3. ALL SIGNS TO BE MOUNTED ON WOODEN POST SUPPORTS (4" x 6") UNLESS OTHERWISE NOTED. THE NUMBER OF POSTS REQUIRED FOR EACH LAYOUT IS SHOWN.
4. SIGNS ON THIS SHEET TO BE PAID UNDER THE ITEM "FIXED MESSAGE SIGNS."
5. SIGNS SHALL BE BLACK NON-REFLECTIVE MESSAGE ON ORANGE REFLECTIVE BACKGROUND WITH A BLACK BORDER.
6. ALL SIGNS SHALL HAVE CAPITAL LETTERS AND NUMERALS:  
6" CAPS SHALL BE SERIES "C"
7. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO MANUFACTURING.
8. SIGN BASE MATERIAL SHALL BE ACCORDING TO SECTION 637.2.1.2.
9. 2-ORANGE FLAGS, 16" x 16", TO BE PLACED ON SIGN.  
INCIDENTAL TO ITEM TRAFFIC CONTROL SIGNS FIXED MESSAGE.

(X) = SIGN NUMBER



| DATE 21APR15 |            | E S T I M A T E O F Q U A N T I T I E S                                                    |      |           |           |
|--------------|------------|--------------------------------------------------------------------------------------------|------|-----------|-----------|
| LINE         |            | 1090-19-77                                                                                 |      |           |           |
| NUMBER       | ITEM       | ITEM DESCRIPTION                                                                           | UNIT | TOTAL     | QUANTITY  |
| 0010         | 201.0105   | Clearing                                                                                   | STA  | 4.000     | 4.000     |
| 0020         | 201.0205   | Grubbing                                                                                   | STA  | 4.000     | 4.000     |
| 0030         | 203.0100   | Removing Small Pipe Culverts                                                               | EACH | 3.000     | 3.000     |
| 0040         | 204.0170   | Removing Fence                                                                             | LF   | 608.000   | 608.000   |
| 0050         | 204.9060.S | Removing (item description) 01.<br>Existing Beam Guard Posts                               | EACH | 80.000    | 80.000    |
| 0060         | 204.9090.S | Removing (item description) 01.<br>Concrete Barrier Temporary                              | LF   | 633.000   | 633.000   |
| 0070         | 205.0100   | Excavation Common **P**                                                                    | CY   | 1,233.000 | 1,233.000 |
| 0080         | 205.0400   | Excavation Marsh                                                                           | CY   | 37.000    | 37.000    |
| 0090         | 213.0100   | Finishing Roadway (project) 01.<br>1090-19-77                                              | EACH | 1.000     | 1.000     |
| 0100         | 305.0110   | Base Aggregate Dense 3/4-Inch                                                              | TON  | 136.000   | 136.000   |
| 0110         | 305.0120   | Base Aggregate Dense 1 1/4-Inch                                                            | TON  | 388.000   | 388.000   |
| 0120         | 305.0502.S | Shaping Roadway                                                                            | STA  | 5.000     | 5.000     |
| 0130         | 311.0110   | Breaker Run                                                                                | TON  | 370.000   | 370.000   |
| 0140         | 455.0605   | Tack Coat                                                                                  | GAL  | 92.000    | 92.000    |
| 0150         | 465.0105   | Asphaltic Surface                                                                          | TON  | 294.000   | 294.000   |
| 0160         | 465.0315   | Asphaltic Flumes                                                                           | SY   | 19.000    | 19.000    |
| 0170         | 521.0124   | Culvert Pipe Corrugated Steel 24-Inch                                                      | LF   | 46.000    | 46.000    |
| 0180         | 521.1524   | Apron Endwalls for Culvert Pipe Sloped<br>Side Drains Steel 24-Inch 6 to 1                 | EACH | 2.000     | 2.000     |
| 0190         | 522.0124   | Culvert Pipe Reinforced Concrete Class<br>III 24-Inch                                      | LF   | 78.000    | 78.000    |
| 0200         | 522.1024   | Apron Endwalls for Culvert Pipe<br>Reinforced Concrete 24-Inch                             | EACH | 2.000     | 2.000     |
| 0210         | 523.0429   | Culvert Pipe Reinforced Concrete<br>Horizontal Elliptical Class HE-IV<br>29x45-Inch        | LF   | 60.000    | 60.000    |
| 0220         | 523.0529   | Apron Endwalls for Culvert Pipe<br>Reinforced Concrete Horizontal<br>Elliptical 29x45-Inch | EACH | 2.000     | 2.000     |
| 0230         | 601.0407   | Concrete Curb & Gutter 18-Inch Type D                                                      | LF   | 376.000   | 376.000   |
| 0240         | 604.0500   | Slope Paving Crushed Aggregate                                                             | SY   | 340.000   | 340.000   |
| 0250         | 606.0100   | Riprap Light                                                                               | CY   | 130.000   | 130.000   |
| 0260         | 614.2300   | MGS Guardrail 3                                                                            | LF   | 425.000   | 425.000   |
| 0270         | 614.2610   | MGS Guardrail Terminal EAT                                                                 | EACH | 4.000     | 4.000     |
| 0280         | 616.0100   | Fence Woven Wire (height) 01. 6-FT                                                         | LF   | 425.000   | 425.000   |
| 0290         | 619.1000   | Mobilization                                                                               | EACH | 1.000     | 1.000     |
| 0300         | 625.0100   | Topsoil                                                                                    | SY   | 2,370.000 | 2,370.000 |
| 0310         | 627.0200   | Mulching                                                                                   | SY   | 500.000   | 500.000   |
| 0320         | 628.1104   | Erosion Bales                                                                              | EACH | 50.000    | 50.000    |
| 0330         | 628.1504   | Silt Fence                                                                                 | LF   | 970.000   | 970.000   |
| 0340         | 628.1520   | Silt Fence Maintenance                                                                     | LF   | 970.000   | 970.000   |
| 0350         | 628.1905   | Mobilizations Erosion Control                                                              | EACH | 3.000     | 3.000     |
| 0360         | 628.1910   | Mobilizations Emergency Erosion Control                                                    | EACH | 4.000     | 4.000     |
| 0370         | 628.2008   | Erosion Mat Urban Class I Type B                                                           | SY   | 425.000   | 425.000   |
| 0380         | 628.2027   | Erosion Mat Class II Type C                                                                | SY   | 1,940.000 | 1,940.000 |
| 0390         | 628.7504   | Temporary Ditch Checks                                                                     | LF   | 75.000    | 75.000    |
| 0400         | 628.7555   | Culvert Pipe Checks                                                                        | EACH | 60.000    | 60.000    |
| 0410         | 628.7570   | Rock Bags                                                                                  | EACH | 125.000   | 125.000   |
| 0420         | 630.0110   | Seeding Mixture No. 10                                                                     | LB   | 5.000     | 5.000     |
| 0430         | 630.0130   | Seeding Mixture No. 30                                                                     | LB   | 45.000    | 45.000    |
| 0440         | 630.0200   | Seeding Temporary                                                                          | LB   | 40.000    | 40.000    |
| 0450         | 633.5200   | Markers Culvert End                                                                        | EACH | 4.000     | 4.000     |

| DATE 21APR15 |          | E S T I M A T E O F Q U A N T I T I E S                            |      |           |           |
|--------------|----------|--------------------------------------------------------------------|------|-----------|-----------|
| LINE         |          | 1090-19-77                                                         |      |           |           |
| NUMBER       | ITEM     | ITEM DESCRIPTION                                                   | UNIT | TOTAL     | QUANTITY  |
| 0460         | 634.0614 | Posts Wood 4x6-Inch X 14-FT                                        | EACH | 2.000     | 2.000     |
| 0470         | 634.0618 | Posts Wood 4x6-Inch X 18-FT                                        | EACH | 4.000     | 4.000     |
| 0480         | 638.2102 | Moving Signs Type II                                               | EACH | 4.000     | 4.000     |
| 0490         | 642.5001 | Field Office Type B 01. 1090-19-77                                 | EACH | 1.000     | 1.000     |
| 0500         | 643.0100 | Traffic Control (project) 01. 1090-19-77                           | EACH | 1.000     | 1.000     |
|              |          |                                                                    |      |           |           |
| 0510         | 643.0420 | Traffic Control Barricades Type III                                | DAY  | 600.000   | 600.000   |
| 0520         | 643.0705 | Traffic Control Warning Lights Type A                              | DAY  | 1,200.000 | 1,200.000 |
| 0530         | 643.0900 | Traffic Control Signs                                              | DAY  | 450.000   | 450.000   |
| 0540         | 643.1000 | Traffic Control Signs Fixed Message                                | SF   | 72.000    | 72.000    |
| 0550         | 643.1050 | Traffic Control Signs PCMS                                         | DAY  | 14.000    | 14.000    |
|              |          |                                                                    |      |           |           |
| 0560         | 645.0130 | Geotextile Fabric Type R                                           | SY   | 540.000   | 540.000   |
| 0570         | 646.0106 | Pavement Marking Epoxy 4-Inch                                      | LF   | 1,528.000 | 1,528.000 |
| 0580         | 650.4500 | Construction Staking Subgrade                                      | LF   | 537.000   | 537.000   |
| 0590         | 650.5000 | Construction Staking Base                                          | LF   | 537.000   | 537.000   |
| 0600         | 650.5500 | Construction Staking Curb Gutter and Curb & Gutter                 | LF   | 376.000   | 376.000   |
|              |          |                                                                    |      |           |           |
| 0610         | 650.6000 | Construction Staking Pipe Culverts                                 | EACH | 3.000     | 3.000     |
| 0620         | 650.9910 | Construction Staking Supplemental Control (project) 01. 1090-19-77 | LS   | 1.000     | 1.000     |
| 0630         | 650.9920 | Construction Staking Slope Stakes                                  | LF   | 537.000   | 537.000   |
| 0640         | 690.0150 | Sawing Asphalt                                                     | LF   | 44.000    | 44.000    |
| 0650         | SPV.0035 | Special 01. Excavation Below Subgrade                              | CY   | 100.000   | 100.000   |

CLEARING & GRUBBING

|               |    | 201.0105 | 201.0205 |
|---------------|----|----------|----------|
|               |    | CLEARING | GRUBBING |
| LOCATION      |    | STA      | STA      |
| 18+00 - 19+00 | LT | 1        | 1        |
| 18+00 - 19+00 | RT | 1        | 1        |
| 21+00 - 22+00 | LT | 1        | 1        |
| 21+00 - 22+00 | RT | 1        | 1        |
| GRAND TOTAL   |    | 4        | 4        |

REMOVALS

|               |       | 203.0100   | 204.0170 | 204.9060.S.01 | 204.9090.S.01 |
|---------------|-------|------------|----------|---------------|---------------|
|               |       | REMOVING   | REMOVING | REMOVING      | REMOVING      |
|               |       | SMALL PIPE | FENCE    | EXISTING      | CONCRETE      |
|               |       | CULVERTS   |          | BEAM GUARD    | BARRIER       |
|               |       |            |          | POSTS         | TEMPORARY     |
| LOCATION      |       | EACH       | LF       | EACH          | LF            |
| 17+21 - 22+79 | LT/RT | 3          | 608      | 80            | 633           |
| GRAND TOTAL   |       | 3          | 608      | 80            | 633           |

BASE AGGREGATE DENSE

|               |       | 305.0110   | 305.0120     | 305.0502.S |
|---------------|-------|------------|--------------|------------|
|               |       | BASE       | BASE         | SHAPING    |
|               |       | AGGREGATE  | AGGREGATE    | ROADWAY    |
|               |       | DENSE 3/4- | DENSE 1 1/4- |            |
|               |       | INCH       | INCH         |            |
| LOCATION      |       | TON        | TON          | STA        |
| 17+42 - 22+79 | LT/RT | 136        | 388          | 5          |
| GRAND TOTAL   |       | 136        | 388          | 5          |

ASPHALT

|               |       | 455.0605 | 465.0105 | 465.0315  |
|---------------|-------|----------|----------|-----------|
|               |       | TACK     | ASPHAL   | ASPHALTIC |
|               |       | COAT     | TIC      | FLUMES    |
|               |       |          | SURFAC   |           |
| LOCATION      |       | GAL      | TON      | SY        |
| 17+21 - 22+79 | LT/RT | 92       | 294      | 19        |
| GRAND TOTAL   |       | 92       | 294      | 19        |

DRAINAGE PIPES

|             |    | 521.0124 | 521.1524          | 522.0124  | 522.1024      | 523.0429    | 523.0529         | 633.5200 |
|-------------|----|----------|-------------------|-----------|---------------|-------------|------------------|----------|
|             |    | C.P.C.S  | APRON ENDWALL     | C.P.R.C.  | APRON ENDWALL | C.P.R.C.H.E | APRON ENDWALL    | MARKERS  |
|             |    | 24-INCH  | FOR C.P. SLOPED   | CLASS III | FOR C.P.R.C.  | CLASS HE-IV | FOR C.P.R.C.H.E. | CULVERT  |
|             |    |          | SIDE DRAINS STEEL | 24-INCH   | 24-INCH       | 29X45-INCH  | 29X45-INCH       | END      |
|             |    |          | 24-INCH 6 TO 1    |           |               |             |                  |          |
| LOCATION    |    | LT/RT    | LF                | EACH      | LF            | EACH        | LF               | EACH     |
| 18+31       | RT | 46       | 2                 | -         | -             | -           | -                | -        |
| 18+56       | -  | -        | -                 | -         | -             | 60          | 2                | 2        |
| 21+50       | -  | -        | -                 | -         | 78            | 2           | -                | 2        |
| GRAND TOTAL |    | 46       | 2                 | 78        | 2             | 60          | 2                | 4        |

NOTE: ALL QUANTITIES ARE CATEGORY 0010

EARTHWORK

| Division | From / To Station | Location       | Common<br>Excavation<br>(1) | Excavation<br>Below<br>Subgrade | Salvaged /<br>Unusable<br>Pavement<br>Material<br>(4) | Available<br>Material<br>(5) | Marsh<br>Exc.<br>(6) | Red.<br>Marsh<br>in Fill<br>(8) | Red.<br>EBS in<br>Fill<br>(9) | Exp.<br>Marsh<br>Backfill<br>(10) | Exp.<br>EBS<br>Backfill<br>(10) | Unexp.<br>Fill | Exp.<br>Fill<br>(13) | Mass<br>Ordinate<br>+ / -<br>(14) | Breaker<br>Run<br>(10) | Comment: |
|----------|-------------------|----------------|-----------------------------|---------------------------------|-------------------------------------------------------|------------------------------|----------------------|---------------------------------|-------------------------------|-----------------------------------|---------------------------------|----------------|----------------------|-----------------------------------|------------------------|----------|
|          |                   |                | item<br>205.0100            | item<br>SPV.0035.01             |                                                       |                              | item<br>205.0400     | Factor<br>0.60                  | Factor<br>0.80                | Factor<br>1.50                    | Factor<br>1.30                  |                | Factor<br>1.25       |                                   | item<br>311.0110       |          |
|          |                   |                | (2)                         | (3)                             |                                                       |                              |                      |                                 |                               |                                   |                                 |                |                      |                                   |                        |          |
|          |                   |                | CY                          | CY                              | CY                                                    | CY                           | CY                   | CY                              | CY                            | CY                                | CY                              | CY             | CY                   | CY                                | TON                    |          |
|          | 17+42 to 22+78 LT | EVERGREEN ROAD | 660                         | 0                               | 50                                                    | 610                          | 13                   | 8                               | 0                             | 20                                | 0                               | 81             | 92                   | 519                               | 40                     |          |
|          | 17+80 to 22+50 RT | EVERGREEN ROAD | 573                         | 0                               | 48                                                    | 525                          | 23                   | 14                              | 0                             | 35                                | 0                               | 59             | 56                   | 469                               | 70                     |          |
|          |                   | UNDISTRIBUTED  | 0                           | 100                             | 0                                                     | 0                            | 0                    | 0                               | 80                            | 0                                 | 130                             | 0              | 0                    | 0                                 | 260                    |          |
| Total    |                   |                | 1,233                       | 100                             | 98                                                    | 1,135                        | 37                   | 22                              | 80                            | 55                                | 130                             | 140            | 148                  | 987                               | 370                    |          |

- 1) Common Excavation is the sum of the Cut and EBS Excavation columns. Item number 205.0100
- 2) Salvaged/Unsuable Pavement Material is included in Cut.
- 3) EBS Excavation to be backfilled with Breaker Run.
- 4) Salvaged/Unusable Pavement Material
- 5) Available Material = Cut - Salvaged/Unusuable Pavement Material
- 6) Marsh Excavation to be backfilled with Breaker Run.
- 8) Reduced Marsh in Fill - Excavated Marsh material is usable in Fills outside the 2:1 slope. Marsh in Fill Reduction factor = 0.6
- 9) Reduced EBS in Fill - Excavated EBS material is usable in Fills outside the 1:1 slope. EBS in Fill Reduction factor = 0.8
- 10) Expanded Marsh Backfill & Expanded EBS Backfill -This is to be filled with Breaker Run.
- 13) Expanded Fill Factor = 1.25
- Expanded Fill = (Unexpanded Fill - Rock\* Rock Factor - Reduced Marsh - Reduced EBS) \* Fill Factor
- 14) The Mass Ordinate + or - Qty calculated for the Division. Plus quantity indicates an excess of material within the Division. Minus indicates a shortage of material within the Division.

NOTE: ALL QUANTITIES ARE CATEGORY 0010

| GUARDRAIL     |    |                                   |                                                         |
|---------------|----|-----------------------------------|---------------------------------------------------------|
|               |    | 614.2300<br>MGS<br>GUARDRAIL<br>3 | 614.2610<br>MGS<br>GUARDRAIL<br>TERMINAL<br>EAT<br>EACH |
| LOCATION      |    | LF                                |                                                         |
| 18+40 - 21+59 | LT | 212.5                             | 2                                                       |
| 18+41 - 21+60 | RT | 212.5                             | 2                                                       |
| GRAND TOTAL   |    | 425                               | 4                                                       |

| FENCING ITEMS |    |                                                   |  |
|---------------|----|---------------------------------------------------|--|
|               |    | 616.0100<br>FENCE WOVEN WIRE<br>(HEIGHT) 01. 6-FT |  |
| LOCATION      |    | LF                                                |  |
| 17+94 - 19+01 | LT | 125                                               |  |
| 18+75 - 19+47 | RT | 90                                                |  |
| 20+54 - 21+11 | LT | 105                                               |  |
| 21+00 - 21+98 | RT | 105                                               |  |
| GRAND TOTAL   |    | 425                                               |  |

| CURB & GUTTER |    |                                                         |  |
|---------------|----|---------------------------------------------------------|--|
|               |    | 601.0407<br>CONCRETE<br>CURB & GUTTER<br>18-INCH TYPE D |  |
| LOCATION      |    | LF                                                      |  |
| 19+02 - 20+90 | LT | 188                                                     |  |
| 19+22 - 21+10 | RT | 188                                                     |  |
| GRAND TOTAL   |    | 376                                                     |  |

| RESTORATION   |       |           |          |          |          |           |          |          |          |           |            |
|---------------|-------|-----------|----------|----------|----------|-----------|----------|----------|----------|-----------|------------|
|               |       | 604.0500  | 606.0100 | 625.0100 | 627.0200 | 628.2008  | 628.2027 | 630.0110 | 630.0130 | 630.0200  | 645.0130   |
|               |       | SLOPE     |          |          |          | EROSION   | EROSION  |          |          |           |            |
|               |       | PAVING    | RIP RAP  | TOPSOIL  | MULCHING | CONTROL   | CONTROL  | SEEDING  | SEEDING  | SEEDING   | GEOTEXTILE |
|               |       | CRUSHED   | LIGHT    |          |          | MAT URBAN | MAT      | MIXTURE  | MIXTURE  | TEMPORARY | FABRIC     |
|               |       | AGGREGATE |          |          |          | CLASS I   | CLASS II | NO. 10   | NO. 30   |           | TYPE R     |
|               |       |           |          |          |          | TYPE B    | TYPE C   |          |          |           |            |
| LOCATION      |       | SY        | CY       | SY       | SY       | SY        | SY       | LB       | LB       | LB        | SY         |
| 17+21 - 22+79 | LT/RT | 340       | 130      | 1890     | -        | 340       | 1550     | 4        | 35       | 30        | 540        |
| UNDISTRIBUTED |       | -         | -        | 480      | 500      | 85        | 390      | 1        | 10       | 10        | -          |
| GRAND TOTAL   |       | 340       | 130      | 2370     | 500      | 425       | 1940     | 5        | 45       | 40        | 540        |

| EROSION CONTROL |  |          |          |             |               |               |           |          |          |     |
|-----------------|--|----------|----------|-------------|---------------|---------------|-----------|----------|----------|-----|
|                 |  | 628.1104 | 628.1504 | 628.1520    | 628.1905      | 628.1910      | 628.7504  | 628.7555 | 628.7570 |     |
|                 |  | EROSION  | SILT     | SILT FENCE  | MOBILIZATIONS | MOBILIZATIONS | TEMPORARY | CULVERT  | ROCK     |     |
|                 |  | BALES    | FENCE    | MAINTENANCE | EROSION       | EMERGENCY     | DITCH     | PIPE     | BAGS     |     |
|                 |  |          |          |             | CONTROL       | EROSION       | CHECKS    | CHECKS   |          |     |
|                 |  |          |          |             |               | CONTROL       |           |          |          |     |
| LOCATION        |  | EACH     | LF       | LF          | EACH          | EACH          | LF        | EACH     | EACH     |     |
| 17+21 - 22+79   |  | LT/RT    | -        | 770         | 770           | 3             | 4         | 60       | 50       | 100 |
| UNDISTRIBUTED   |  |          | 50       | 200         | 200           | -             | -         | 15       | 10       | 25  |
| GRAND TOTAL     |  | 50       | 970      | 970         | 3             | 4             | 75        | 60       | 125      |     |

NOTE: ALL QUANTITIES ARE CATEGORY 0010

3

3

MISCELLANEOUS ITEMS

|               |                                                    |                          |                                                      |                                                  |
|---------------|----------------------------------------------------|--------------------------|------------------------------------------------------|--------------------------------------------------|
|               | 213.0100<br>FINISHING<br>ROADWAY<br>01. 1090-19-77 | 619.1000<br>MOBILIZATION | 642.5001<br>FIELD OFFICE<br>TYPE B<br>01. 1090-19-77 | 643.0100<br>TRAFFIC<br>CONTROL<br>01. 1090-19-77 |
| LOCATION      | EACH                                               | EACH                     | EACH                                                 | EACH                                             |
| ID 1090-19-77 | 1                                                  | 1                        | 1                                                    | 1                                                |
| GRAND TOTAL   | 1                                                  | 1                        | 1                                                    | 1                                                |

TRAFFIC CONTROL ITEMS

|               |                                    |                                         |                   |                                                       |                                              |
|---------------|------------------------------------|-----------------------------------------|-------------------|-------------------------------------------------------|----------------------------------------------|
|               | 643.0420<br>BARRICADES<br>TYPE III | 643.0705<br>WARNING<br>LIGHTS<br>TYPE A | 643.0900<br>SIGNS | 643.1000<br>TRAFFIC<br>CONTROL SIGNS<br>FIXED MESSAGE | 643.1050<br>TRAFFIC<br>CONTROL<br>SIGNS PCMS |
| LOCATION      | DAYS                               | DAYS                                    | DAYS              | SF                                                    | DAYS                                         |
| ID 1090-19-77 | 600                                | 1200                                    | 450               | 72                                                    | 14                                           |
| GRAND TOTAL   | 600                                | 1200                                    | 450               | 72                                                    | 14                                           |

SIGNS

|                     |                                                  |                                                  |                                        |
|---------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------|
|                     | 634.0614<br>POSTS<br>WOOD<br>4X6-INCH<br>X 14-FT | 634.0618<br>POSTS<br>WOOD<br>4X6-INCH<br>X 18-FT | 638.2102<br>MOVING<br>SIGNS<br>TYPE II |
| LOCATION            | EACH                                             | EACH                                             | EACH                                   |
| 17+42 - 22+79 LT/RT | 2                                                | 4                                                | 4                                      |
| GRAND TOTAL         | 2                                                | 4                                                | 4                                      |

PAVEMENT MARKING ITEMS

|             |   |       |       |                                           |                                  |                   |
|-------------|---|-------|-------|-------------------------------------------|----------------------------------|-------------------|
|             |   |       |       | 646.0106<br>PAVEMENT MARKING EPOXY 4-INCH |                                  |                   |
|             |   |       |       | SOLID<br>YELLOW                           | YELLOW<br>SKIPS<br>(12.5'/37.5') | WHITE<br>EDGELINE |
| LOCATION    |   |       |       | LF                                        | LF                               | LF                |
| 17+80       | - | 22+50 | LT/RT | 470                                       | 118                              | 940               |
| SUBTOTAL    |   |       |       | 470                                       | 118                              | 940               |
| GRAND TOTAL |   |       |       |                                           | 1528                             |                   |

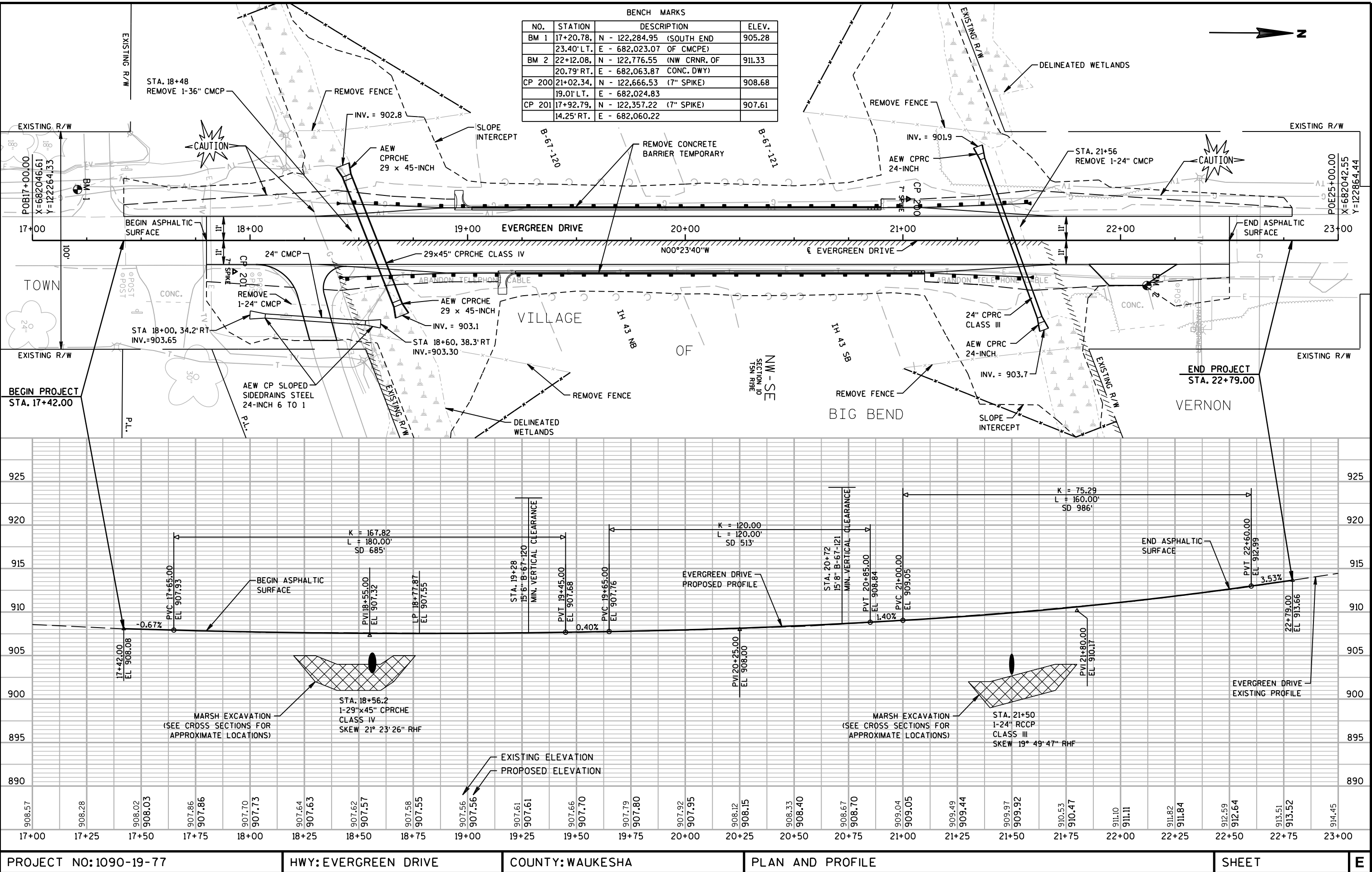
CONSTRUCTION STAKING ITEMS

|                     |                                                 |                                          |                                                                         |                                                     |                                                                                            |                                                     |
|---------------------|-------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------|
|                     | 650.4500<br>CONSTRUCTION<br>STAKING<br>SUBGRADE | 650.5000<br>CONSTRUCTION<br>STAKING BASE | 650.5500<br>CONSTRUCTION<br>STAKING CURB<br>GUTTER AND<br>CURB & GUTTER | 650.6000<br>CONSTRUCTION<br>STAKING PIPE<br>CULVERT | 650.9910<br>CONSTRUCTION<br>STAKING<br>SUPPLEMENTAL<br>CONTROL (PROJECT)<br>01. 1090-19-77 | 650.9920<br>CONSTRUCTION<br>STAKING SLOPE<br>STAKES |
| LOCATION            | LF                                              | LF                                       | LF                                                                      | EACH                                                | LS                                                                                         | LF                                                  |
| 17+42 - 22+79 LT/RT | 537                                             | 537                                      | 376                                                                     | 3                                                   | 1                                                                                          | 537                                                 |
| GRAND TOTAL         | 537                                             | 537                                      | 376                                                                     | 3                                                   | 1                                                                                          | 537                                                 |

SAWING ASPHALT

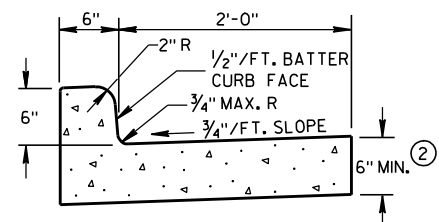
|                     |                               |
|---------------------|-------------------------------|
|                     | 690.0150<br>SAWING<br>ASPHALT |
| LOCATION            | LF                            |
| 17+21 - 22+79 LT/RT | 44                            |
| GRAND TOTAL         | 44                            |

NOTE: ALL QUANTITIES ARE CATEGORY 0010

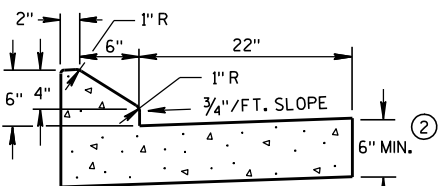


Standard Detail Drawing List

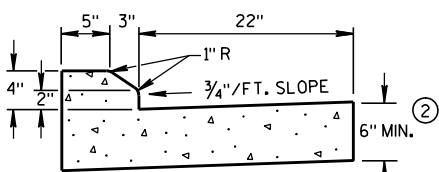
|           |                                                                        |
|-----------|------------------------------------------------------------------------|
| 08D01-17  | CONCRETE CURB, CONCRETE CURB AND GUTTER AND TIES                       |
| 08D04-05  | CONCRETE SURFACE DRAINS & ASPHALTIC FLUMES                             |
| 08E08-03  | TYPICAL INSTALLATIONS OF EROSION BALES / TEMPORARY DITCH CHECKS        |
| 08E09-06  | SILT FENCE                                                             |
| 08F01-11  | APRON ENDWALLS FOR CULVERT PIPE                                        |
| 08F02-01  | APRON ENDWALLS FOR PIPE ARCH AND ELLIPTICAL PIPE                       |
| 08F04-07  | JOINT TIES FOR CONCRETE PIPE AND CONCRETE COLLAR DETAIL                |
| 08F05-01  | CLASS "B" BEDDING FOR CULVERT PIPE OR STORM SEWER                      |
| 08F07-05  | STEEL APRON ENDWALLS FOR CULVERT PIPE AND PIPE ARCH SLOPED SIDE FRAINS |
| 14B42-03A | MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL                               |
| 14B42-03B | MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL                               |
| 14B42-03C | MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL                               |
| 14B44-02A | MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL (MGS)               |
| 14B44-02B | MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL (MGS)               |
| 14B44-02C | MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL (MGS)               |
| 15A03-02A | FLEXIBLE MARKER POST FOR CULVERT END                                   |
| 15A03-02B | FLEXIBLE MARKER POST FOR CULVERT END                                   |
| 15B01-08A | FENCE WOVEN WIRE                                                       |
| 15B01-08B | FENCE WOVEN WIRE                                                       |
| 15C02-05A | BARRICADES AND SIGNS FOR MAINLINE CLOSURES                             |
| 15C02-05B | BARRICADES AND SIGNS FOR MAINLINE CLOSURES                             |
| 15C05-02  | TRAFFIC CONTROL, ADVANCE WARNING SIGNS 40 M.P.H. OR LESS               |
| 15C08-16A | PAVEMENT MARKING (MAINLINE)                                            |
| 15C12-04  | TRAFFIC CONTROL FOR LANE CLOSURE (SUITABLE FOR MOVING OPERATIONS)      |
| 15C19-02A | MOVING PAVEMENT MARKING OPERATION TWO-LANE TWO-WAY ROADWAY             |
| 15D28-02  | TRAFFIC CONTROL, WORK ON SHOULDER OR PARKING LANE, UNDIVIDED ROADWAY   |



TYPES A &amp; D ①



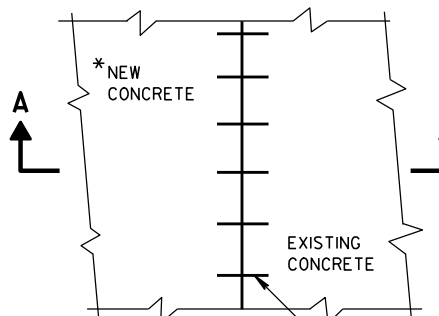
6" SLOPED CURB TYPES G &amp; J ①



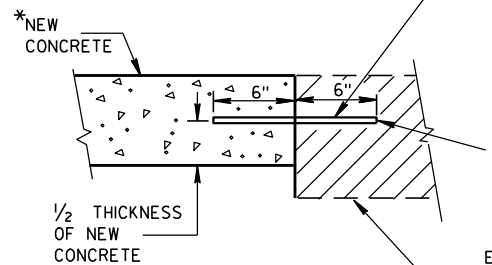
4" SLOPED CURB TYPES G &amp; J ①

CONCRETE CURB &amp; GUTTER 30"

\* NEW CURB & GUTTER,  
SURFACE DRAINS,  
CONCRETE PAVEMENT  
OR OTHER NEW CONCRETE.



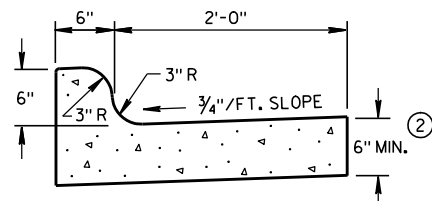
PLAN VIEW

SECTION A-A  
TIE BARS DRILLED  
INTO EXISTING PAVEMENT

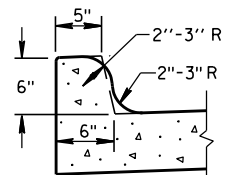
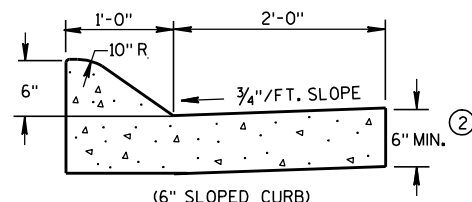
NO. 6 TIE BARS SPACED 2'-6" C-C,  
INSTALLED PERPENDICULAR  
TO THE LONGITUDINAL JOINT.

MAXIMUM DRILL HOLE  
SIZE IS 1/8" GREATER  
THAN TIE BAR DIAMETER

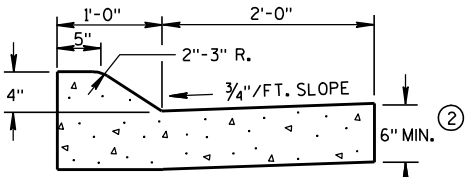
EXISTING  
CONCRETE



TYPES K &amp; L ①

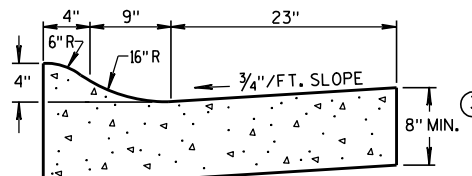
OPTIONAL CURB SHAPE  
FOR TYPES K & L ①

(6" SLOPED CURB)

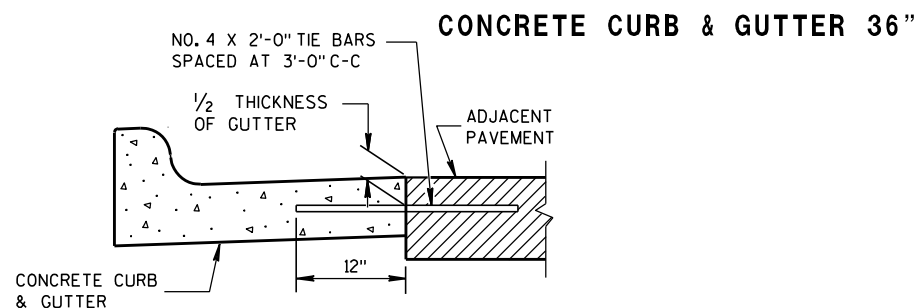


(4" SLOPED CURB)

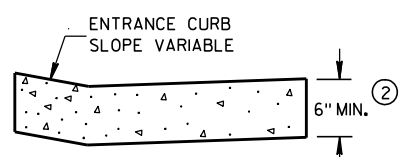
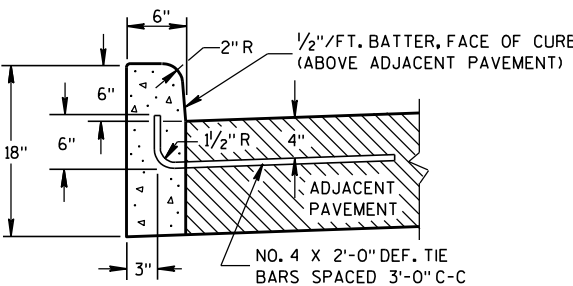
TYPES A &amp; D ①



4" SLOPED CURB TYPES R &amp; T ① ④

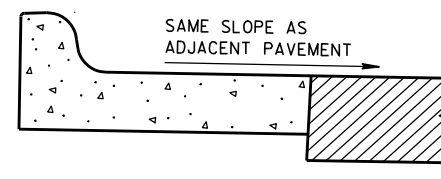
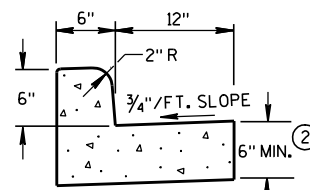
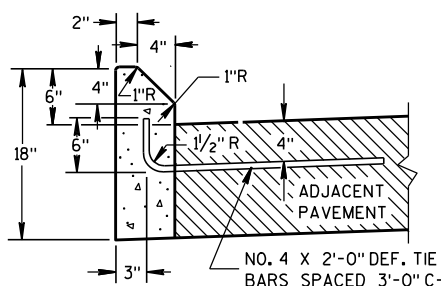


TYPICAL TIE BAR LOCATION ①

DRIVEWAY ENTRANCE CURB  
(WHEN DIRECTED BY THE ENGINEER)

TYPES A &amp; D ①

CONCRETE CURB

REVERSE SLOPE GUTTER ⑤  
(TYPICAL FOR ALL CURB & GUTTER TYPES)TYPES A & D  
CONCRETE CURB & GUTTER 18"

TYPES G &amp; J ①

## GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE CONTRACT.

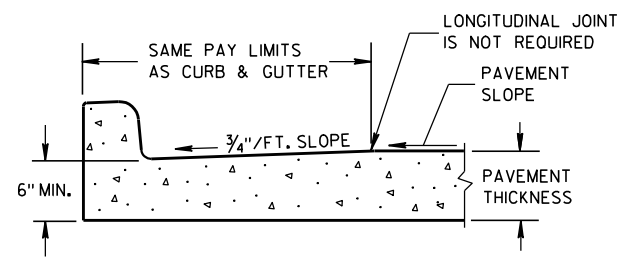
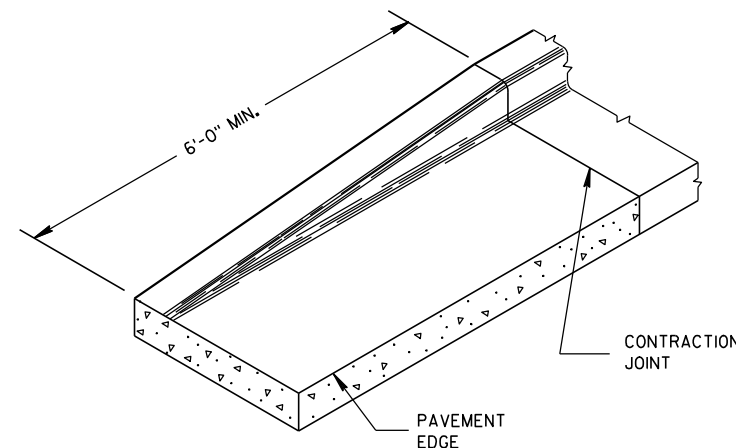
PAVEMENT TIES AND TIE BARS SHALL BE EPOXY COATED IN CONFORMANCE WITH SUBSECTION 505.2.6.2 OF THE STANDARD SPECIFICATIONS.

INTEGRAL CURB & GUTTER SHALL CONFORM TO THE DETAILS SHOWN FOR CONCRETE CURB & GUTTER INCLUDING THE TRANSVERSE GUTTER SLOPE. A LONGITUDINAL CONSTRUCTION JOINT IS NOT REQUIRED WITH INTEGRAL CURB AND GUTTER.

WHERE THE TRANSVERSE JOINTS IN THE PAVEMENT ARE REQUIRED TO BE SEALED, THE JOINTS IN THE INTEGRAL CURB AND GUTTER SHALL BE SEALED TO THE FACE OF CURB WITH THE SAME TYPE OF SEALANT. THE COST OF FURNISHING AND INSTALLING THIS SEALANT SHALL BE INCIDENTAL TO THE ITEM CONCRETE CURB AND GUTTER.

UNLESS OTHERWISE SHOWN ON THE TYPICAL CROSS SECTIONS, THE BASE AGGREGATE AND COMMON EXCAVATION LIMITS ARE 2'-0" BEHIND THE BACK OF CURBS.

- ① TIE BARS ARE REQUIRED FOR CURB AND GUTTER TYPES A, G, K AND R.
- ② THE BOTTOM OF CURB AND GUTTER MAY BE CONSTRUCTED EITHER LEVEL OR PARALLEL TO THE SLOPE OF THE SUBGRADE OR BASE AGGREGATE PROVIDED A 6" MINIMUM GUTTER THICKNESS IS MAINTAINED.
- ③ THE BOTTOM OF CURB AND GUTTER MAY BE CONSTRUCTED EITHER LEVEL OR PARALLEL TO THE SLOPE OF THE SUBGRADE OR BASE AGGREGATE PROVIDED A 8" MINIMUM GUTTER THICKNESS IS MAINTAINED.
- ④ THE FACE OF CURB IS 6" FROM THE BACK OF CURB.
- ⑤ WHEN REVERSE SLOPE GUTTER IS REQUIRED, THE LOCATION(S) WILL BE SHOWN ELSEWHERE IN THE PLAN.

PARTIAL SECTION OF PAVEMENT  
WITH INTEGRAL CURB & GUTTER

END SECTION CURB &amp; GUTTER

CONCRETE CURB, CONCRETE  
CURB & GUTTER AND TIES

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

9/4/08

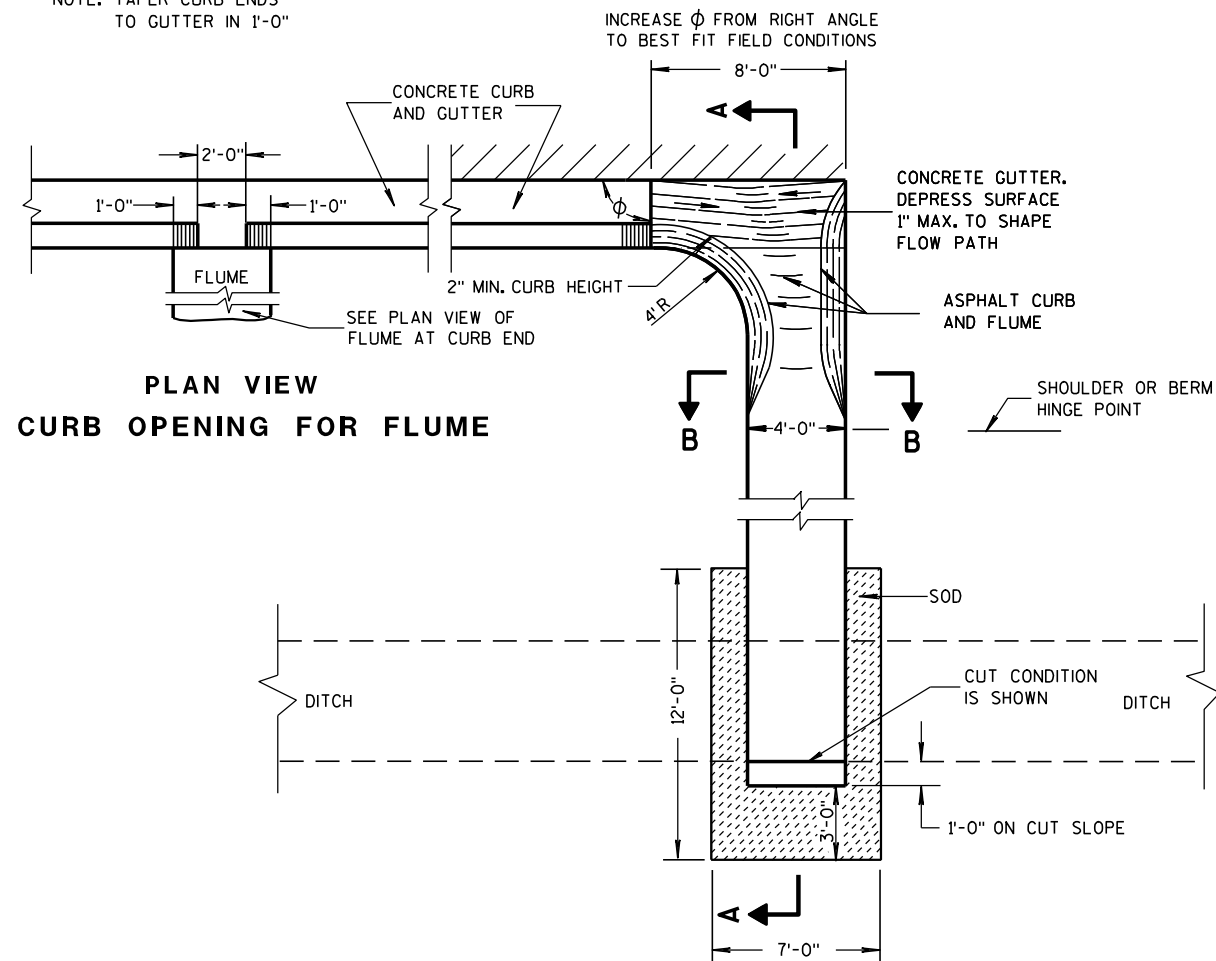
DATE

FHWA

/S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER

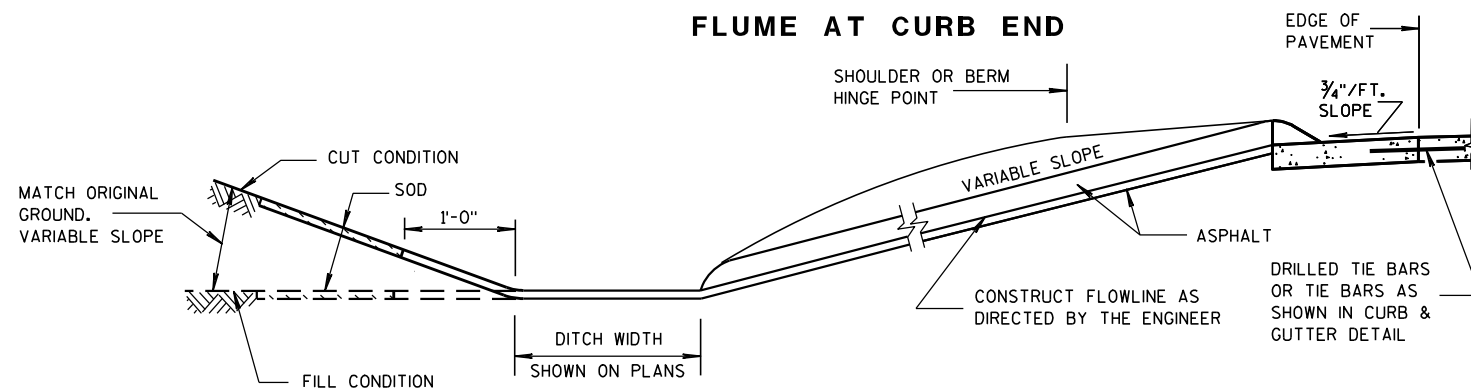
## ASPHALTIC FLUME

NOTE: TAPER CURB ENDS  
TO GUTTER IN 1'-0"

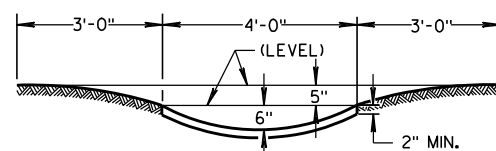


PLAN VIEW  
CURB OPENING FOR FLUME

PLAN VIEW  
FLUME AT CURB END



SECTION A-A



SECTION B-B

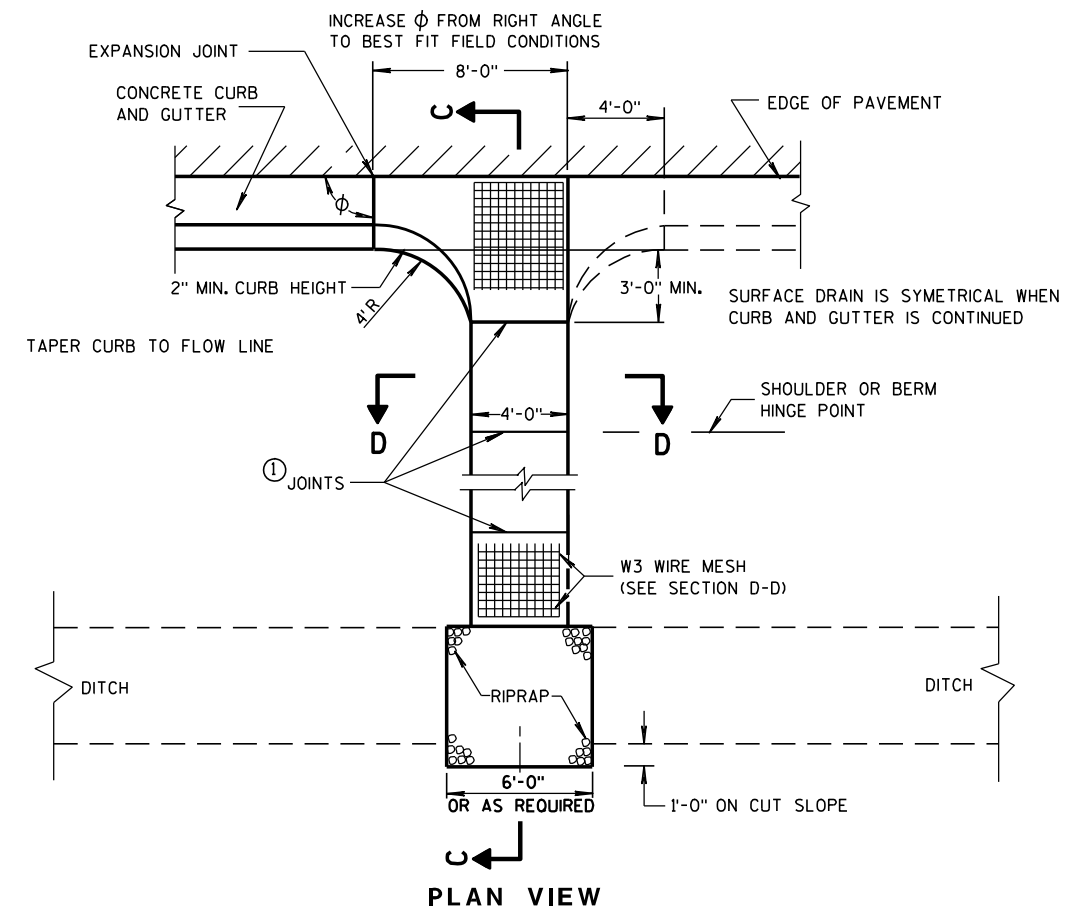
## GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

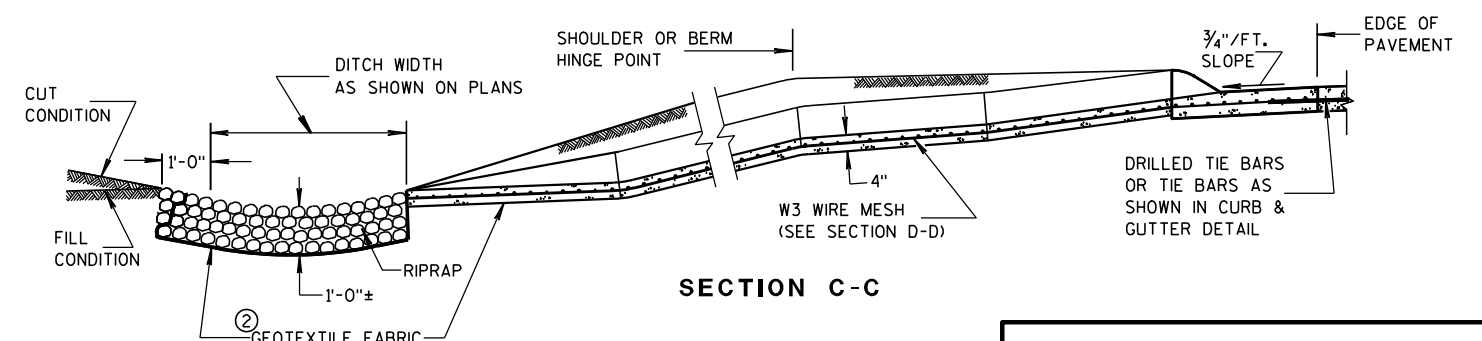
WELDED STEEL WIRE FABRIC SHALL BE IN ACCORDANCE WITH AASHTO SPECIFICATION M55.

- ① JOINTS SHALL BE  $\frac{1}{8}$  TO  $\frac{1}{4}$  INCH WIDE BY  $1\frac{1}{2}$  INCHES DEEP AND SPACED AT UNIFORM INTERVALS OF APPROXIMATELY 4 FEET.
- ② GEOTEXTILE FABRIC TYPE "R" SHALL UNDERLAY THE FULL LENGTH AND WIDTH OF THE CONCRETE SURFACE DRAIN AND RIPRAP.
- ③ CONCRETE SURFACE DRAIN WITHOUT CURB AND GUTTER MAY BE USED ON BACKSLOPES WHEN SPECIFIED

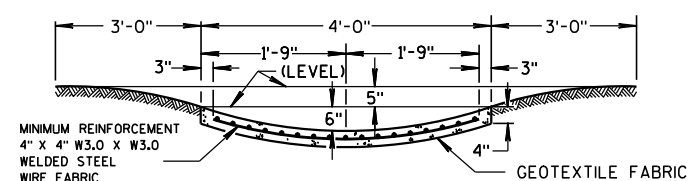
## ③ CONCRETE SURFACE DRAIN



PLAN VIEW



SECTION C-C



SECTION D-D

## CONCRETE SURFACE DRAINS & ASPHALTIC FLUMES

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

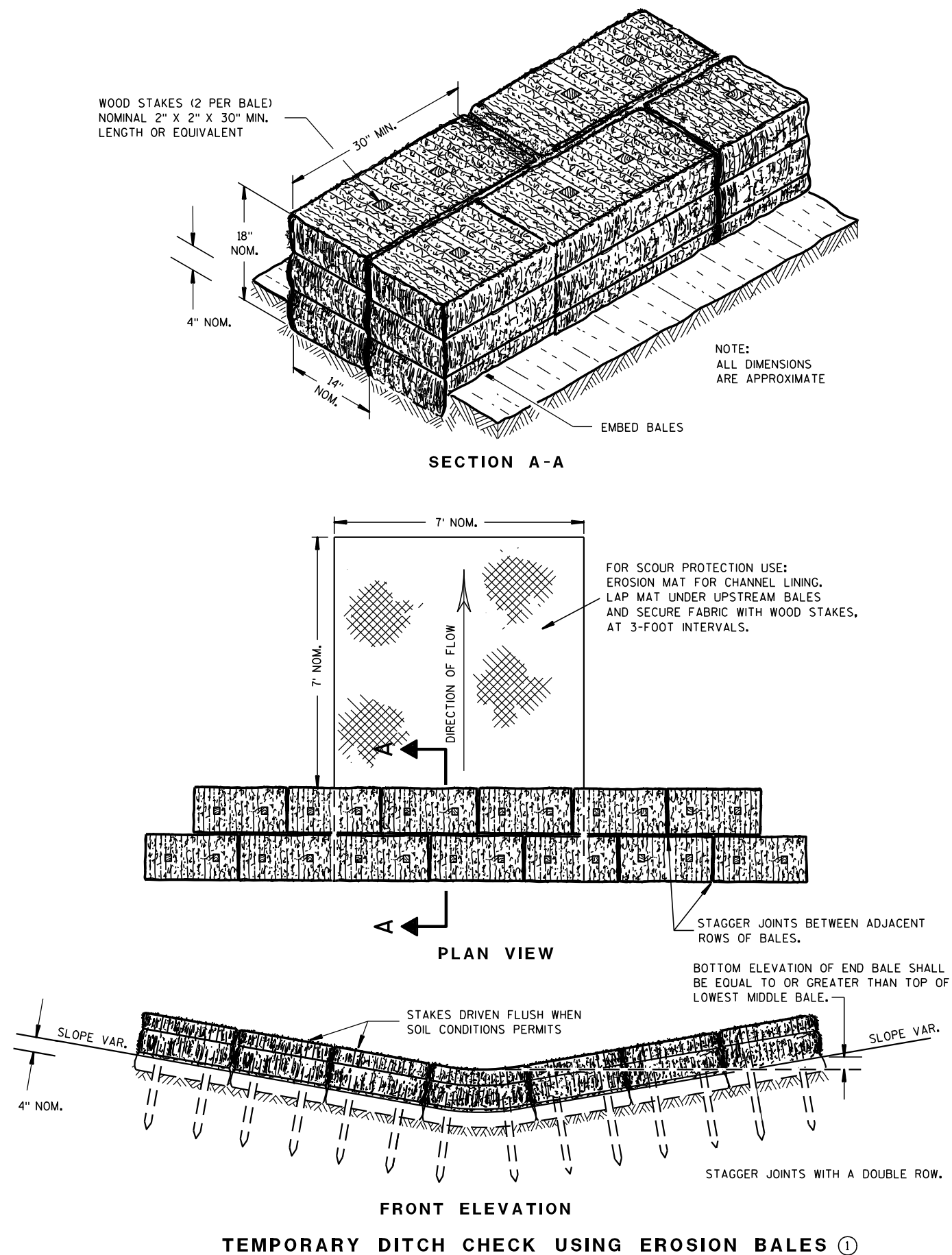
APPROVED

9-4-08

DATE

FHWA

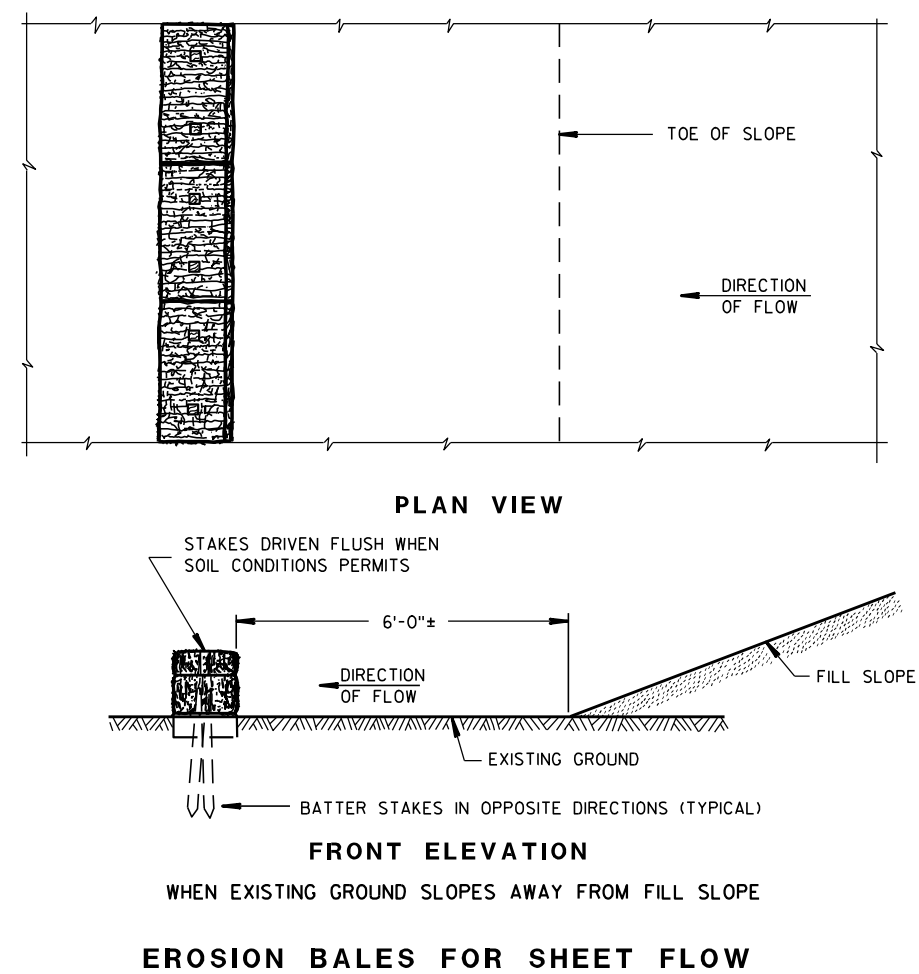
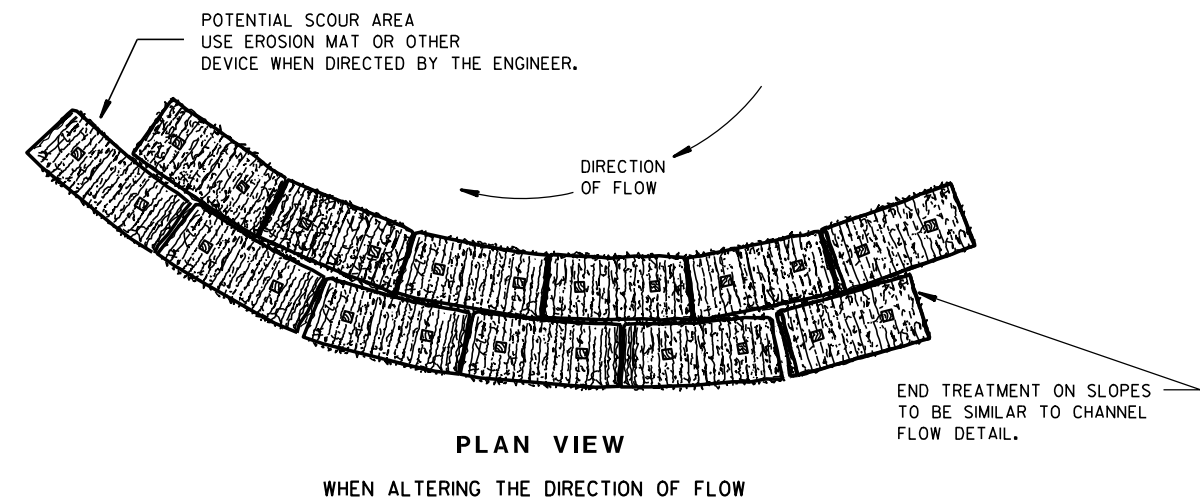
/S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER



## GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

- ① TEMPORARY DITCH CHECKS EITHER EROSION BALES OR MANUFACTURED SHALL BE PAID FOR UNDER THE BID ITEM OF TEMPORARY DITCH CHECK. THE DEPARTMENT WILL NOT PAY FOR TEMPORARY DITCH CHECKS CONSTRUCTED OF A SINGLE ROW OF EROSION BALES.

TYPICAL INSTALLATIONS OF  
EROSION BALES / TEMPORARY  
DITCH CHECKS

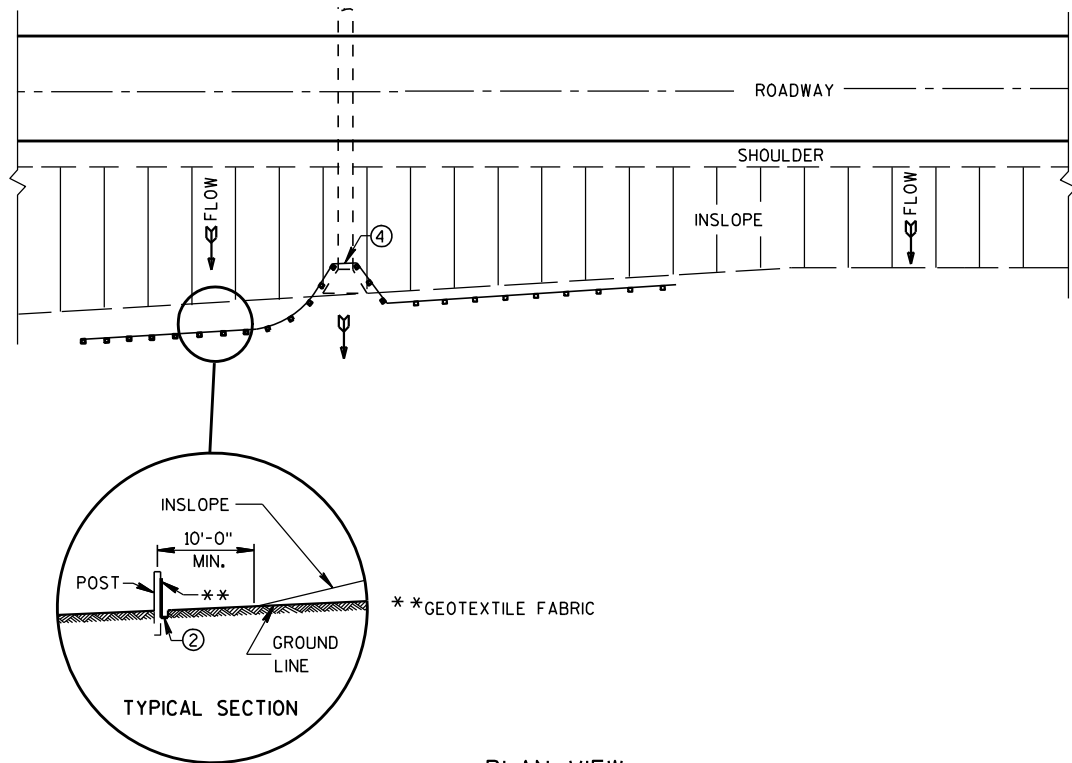
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

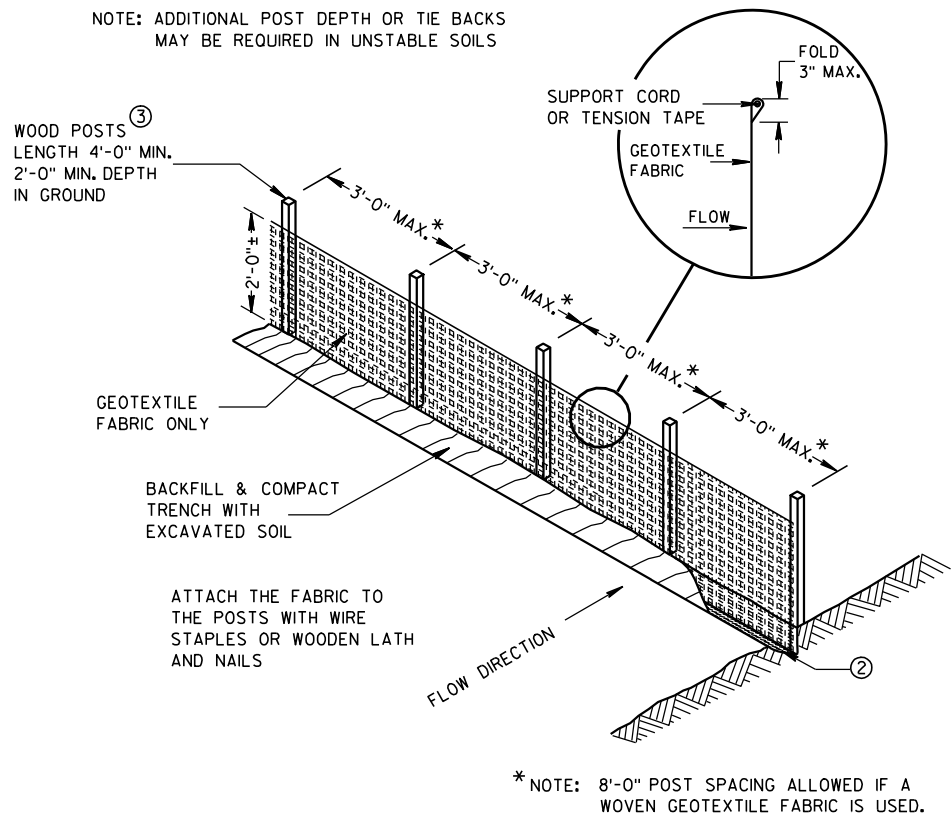
6/04/02  
DATE

FHWA

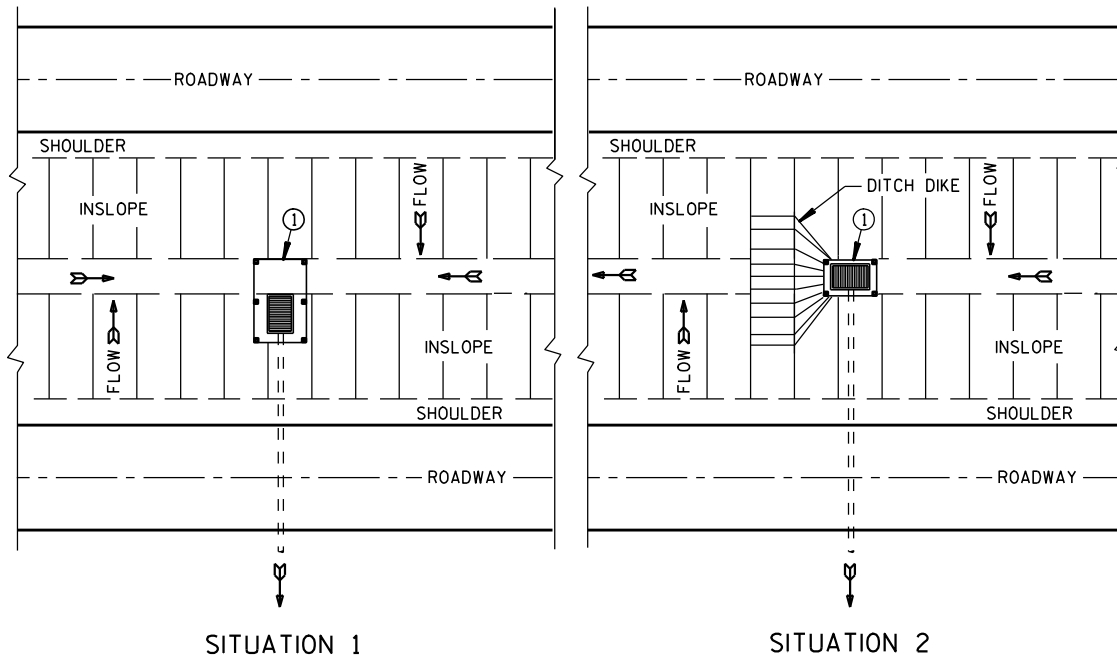
/S/ Beth Canestra  
CHIEF ROADWAY DEVELOPMENT ENGINEER



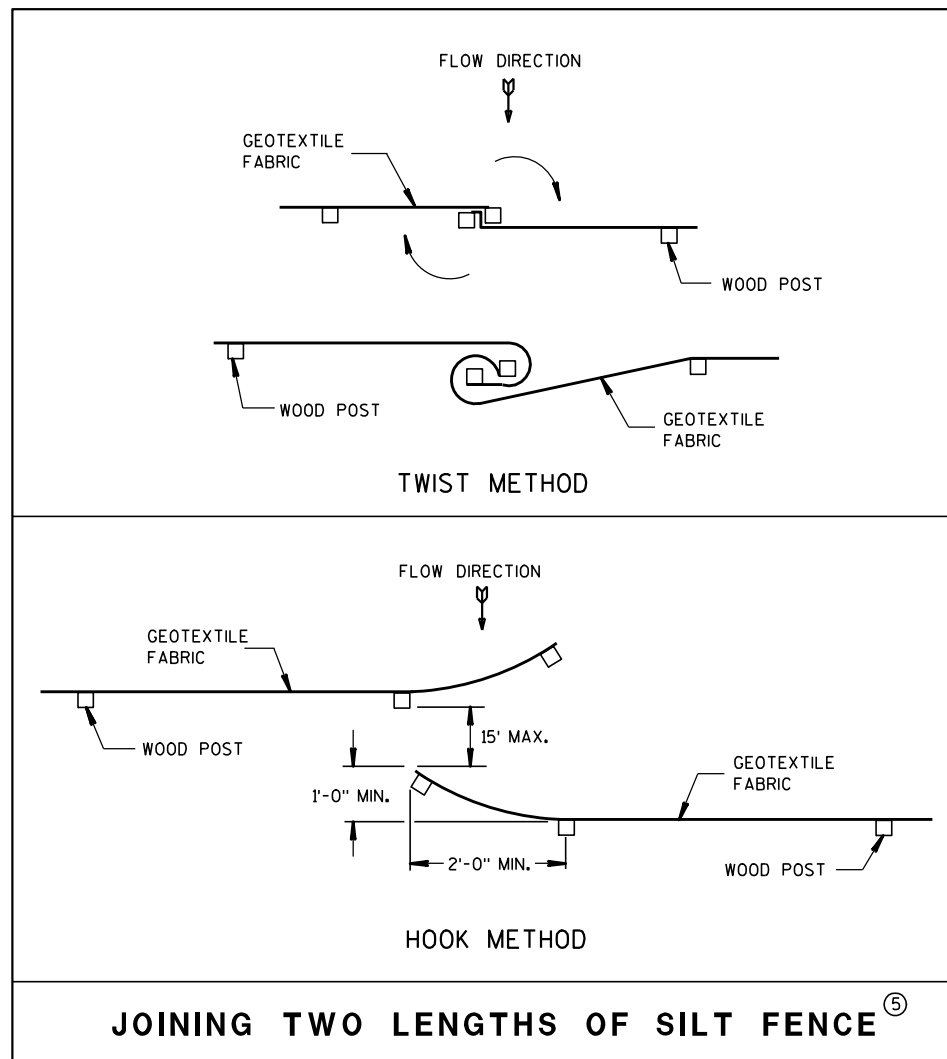
PLAN VIEW  
TYPICAL APPLICATION OF SILT FENCE



SILT FENCE



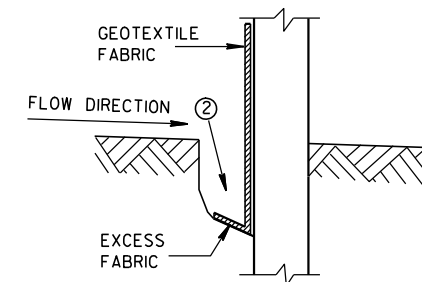
SITUATION 1  
SITUATION 2  
PLAN VIEW  
SILT FENCE AT MEDIAN SURFACE DRAINS



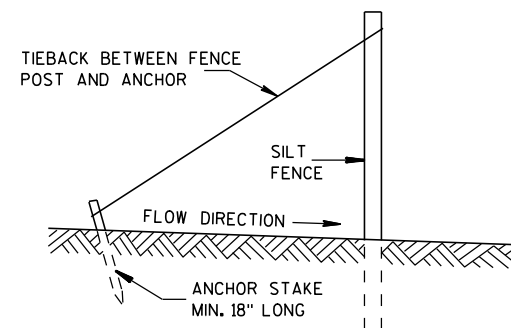
GENERAL NOTES

DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

- ① HORIZONTAL BRACE REQUIRED WITH 2" X 4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS.
- ② FOR MANUAL INSTALLATIONS THE TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
- ③ WOOD POSTS SHALL BE A MINIMUM SIZE OF 1 1/8" X 1 1/8" OF OAK OR HICKORY.
- ④ SILT FENCE TO EXTEND ACROSS THE TOP OF THE PIPE.
- ⑤ CONSTRUCT SILT FENCE FROM A CONTINUOUS ROLL IF POSSIBLE BY CUTTING LENGTHS TO AVOID JOINTS. IF A JOINT IS NECESSARY USE ONE OF THE FOLLOWING TWO METHODS; A) OVERLAP THE END POSTS AND TWIST, OR ROTATE, AT LEAST 180 DEGREES, B) HOOK THE END OF EACH SILT FENCE LENGTH.



TRENCH DETAIL

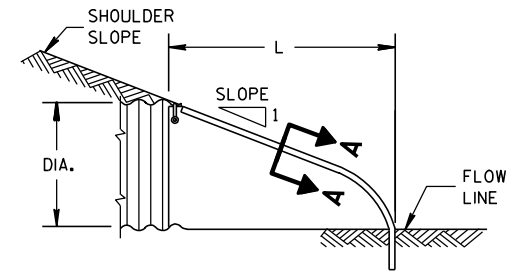
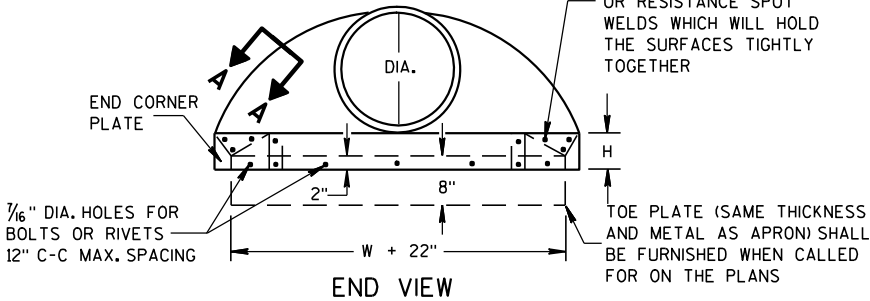
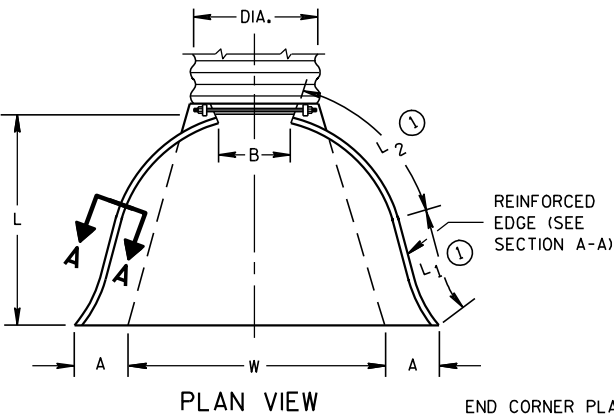


SILT FENCE TIE BACK  
(WHEN REQUIRED BY THE ENGINEER)

| SILT FENCE                                         |                                                         |
|----------------------------------------------------|---------------------------------------------------------|
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |                                                         |
| APPROVED<br>4-29-05<br>DATE                        | /S/ Beth Canestra<br>CHIEF ROADWAY DEVELOPMENT ENGINEER |
| FHWA                                               |                                                         |

| METAL APRON ENDWALLS |                         |       |                     |             |            |                |         |         |            |               |       |
|----------------------|-------------------------|-------|---------------------|-------------|------------|----------------|---------|---------|------------|---------------|-------|
| PIPE DIA.<br>(IN.)   | MIN. THICK.<br>(Inches) |       | DIMENSIONS (Inches) |             |            |                |         |         |            | APPROX. SLOPE | BODY  |
|                      | STEEL                   | ALUM. | A<br>(±1")          | B<br>(MAX.) | H<br>(±1") | L<br>(±1 1/2") | L1<br>① | L2<br>① | W<br>(±2") |               |       |
| 12                   | .064                    | .060  | 6                   | 6           | 6          | 21             | 12      | 17 1/2  | 24         | 2 1/2 to 1    | 1 Pc. |
| 15                   | .064                    | .060  | 7                   | 8           | 6          | 26             | 14      | 21 3/4  | 30         | 2 1/2 to 1    | 1 Pc. |
| 18                   | .064                    | .060  | 8                   | 10          | 6          | 31             | 15      | 28 1/4  | 36         | 2 1/2 to 1    | 1 Pc. |
| 21                   | .064                    | .060  | 9                   | 12          | 6          | 36             | 18      | 29 5/8  | 42         | 2 1/2 to 1    | 1 Pc. |
| 24                   | .064                    | .075  | 10                  | 13          | 6          | 41             | 18      | 37 1/4  | 48         | 2 1/2 to 1    | 1 Pc. |
| 30                   | .079                    | .075  | 12                  | 16          | 8          | 51             | 18      | 52 1/4  | 60         | 2 1/2 to 1    | 1 Pc. |
| 36                   | .079                    | .105  | 14                  | 19          | 9          | 60             | 24      | 59 3/4  | 72         | 2 1/2 to 1    | 2 Pc. |
| 42                   | .109                    | .105  | 16                  | 22          | 11         | 69             | 24      | 75 5/8  | 84         | 2 1/2 to 1    | 2 Pc. |
| 48                   | .109                    | .105  | 18                  | 27          | 12         | 78             | 24      | 81      | 90         | 2 1/4 to 1    | 3 Pc. |
| 54                   | .109                    | .105  | 18                  | 30          | 12         | 84             | 30      | 85 1/2  | 102        | 2 1/4 to 1    | 3 Pc. |
| 60                   | .109x                   | .105x | 18                  | 33          | 12         | 87             | —       | —       | 114        | 2 to 1        | 3 Pc. |
| 66                   | .109x                   | .105x | 18                  | 36          | 12         | 87             | —       | —       | 120        | 2 to 1        | 3 Pc. |
| 72                   | .109x                   | .105x | 18                  | 39          | 12         | 87             | —       | —       | 126        | 2 to 1        | 3 Pc. |
| 78                   | .109x                   | .105x | 18                  | 42          | 12         | 87             | —       | —       | 132        | 1 1/2 to 1    | 3 Pc. |
| 84                   | .109x                   | .105x | 18                  | 45          | 12         | 87             | —       | —       | 138        | 1 1/2 to 1    | 3 Pc. |
| 90                   | .109x                   | .105x | 18                  | 37          | 12         | 87             | —       | —       | 144        | 1 1/2 to 1    | 3 Pc. |
| 96                   | .109x                   | .105x | 18                  | 35          | 12         | 87             | —       | —       | 150        | 1 1/2 to 1    | 3 Pc. |

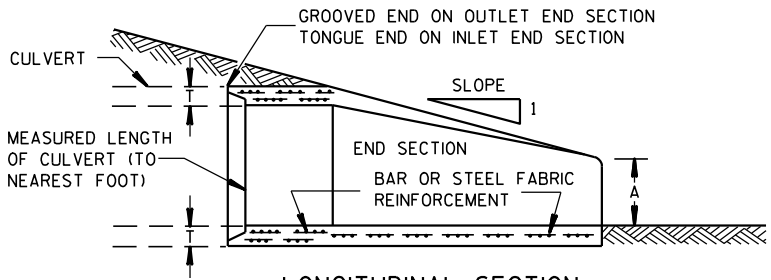
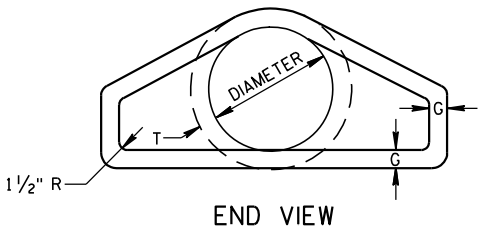
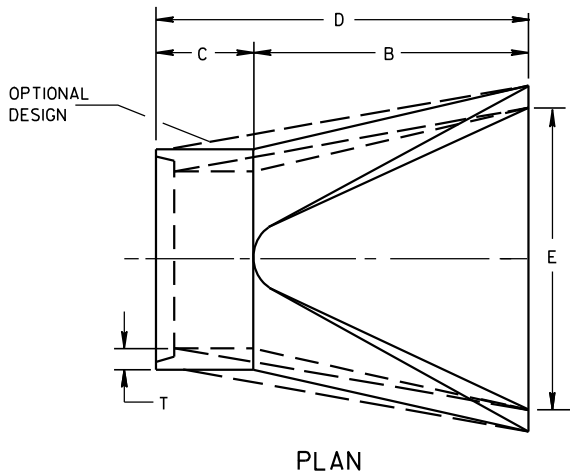
\* EXCEPT CENTER PANEL  
SEE GENERAL NOTES



METAL ENDWALLS

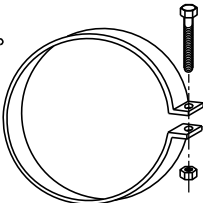
| REINFORCED CONCRETE APRON ENDWALLS |                     |        |        |           |            |     |       |               |  |  |  |
|------------------------------------|---------------------|--------|--------|-----------|------------|-----|-------|---------------|--|--|--|
| PIPE DIA.<br>(IN.)                 | DIMENSIONS (Inches) |        |        |           |            |     |       | APPROX. SLOPE |  |  |  |
|                                    | T                   | A      | B      | C         | D          | E   | G     |               |  |  |  |
| 12                                 | 2                   | 4      | 24     | 48 7/8    | 72 1/8     | 24  | 2     | 3 to 1        |  |  |  |
| 15                                 | 2 1/4               | 6      | 27     | 46        | 73         | 30  | 2 1/4 | 3 to 1        |  |  |  |
| 18                                 | 2 1/2               | 9      | 27     | 46        | 73         | 36  | 2 1/2 | 3 to 1        |  |  |  |
| 21                                 | 2 3/4               | 9      | 36     | 37 1/2    | 73 1/2     | 42  | 2 3/4 | 3 to 1        |  |  |  |
| 24                                 | 3                   | 9 1/2  | 43 1/2 | 30        | 73 1/2     | 48  | 3     | 3 to 1        |  |  |  |
| 27                                 | 3 1/4               | 10 1/2 | 49 1/2 | 24        | 73 1/2     | 54  | 3 1/4 | 3 to 1        |  |  |  |
| 30                                 | 3 1/2               | 12     | 54     | 19 3/4    | 73 1/2     | 60  | 3 1/2 | 3 to 1        |  |  |  |
| 36                                 | 4                   | 15     | 63     | 34 3/4    | 97 3/4     | 72  | 4     | 3 to 1        |  |  |  |
| 42                                 | 4 1/2               | 21     | 63     | 35        | 98         | 78  | 4 1/2 | 3 to 1        |  |  |  |
| 48                                 | 5                   | 24     | 72     | 26        | 98         | 84  | 5     | 3 to 1        |  |  |  |
| 54                                 | 5 1/2               | 27     | 65     | 33 1/4-35 | 98 1/4-100 | 90  | 5 1/2 | 2 1/2 to 1    |  |  |  |
| 60                                 | 6                   | 30-35  | 60     | 39        | 99         | 96  | 5     | 2 to 1        |  |  |  |
| 66                                 | 6 1/2               | 24-30  | 72-78  | 21-27     | 99         | 102 | 5 1/2 | 2 to 1        |  |  |  |
| 72                                 | 7                   | 24-36  | 78     | 21        | 99         | 108 | 6     | 2 to 1        |  |  |  |
| 78                                 | 7 1/2               | 24-36  | 78     | 21        | 99         | 114 | 6 1/2 | 2 to 1        |  |  |  |
| 84                                 | 8                   | 36     | 90 1/2 | 21        | 111 1/2    | 120 | 6 1/2 | 1 1/2 to 1    |  |  |  |
| 90                                 | 8 1/2               | 41     | 87 1/2 | 24        | 111 1/2    | 132 | 6 1/2 | 1 1/2 to 1    |  |  |  |

\* MINIMUM  
\*\* MAXIMUM

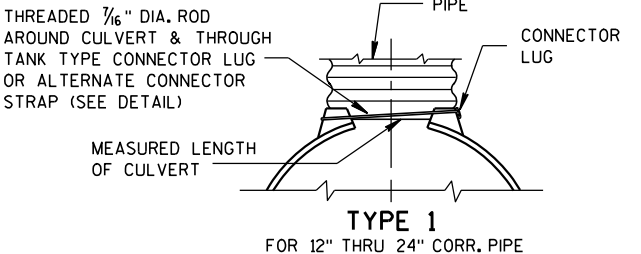


CONCRETE ENDWALLS

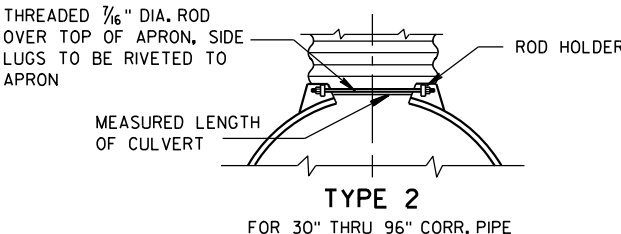
1" WIDE, 12 GA. (0.109" THICK) GALVANIZED STRAP WITH STANDARD 6" X 1/2" BAND BOLT AND NUT



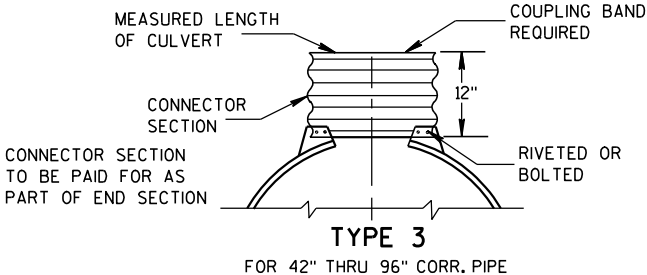
ALTERNATE FOR TYPE 1 CONNECTION  
END SECTION CONNECTOR STRAP



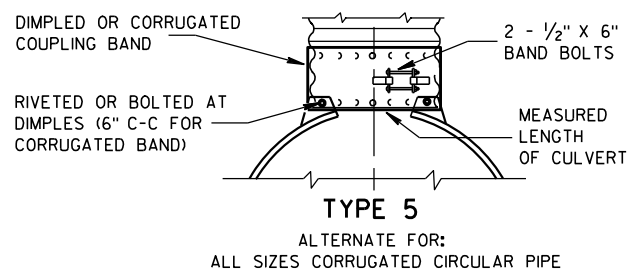
TYPE 1  
FOR 12" THRU 24" CORR. PIPE



TYPE 2  
FOR 30" THRU 96" CORR. PIPE



TYPE 3  
FOR 42" THRU 96" CORR. PIPE



TYPE 5  
ALTERNATE FOR:  
ALL SIZES CORRUGATED CIRCULAR PIPE

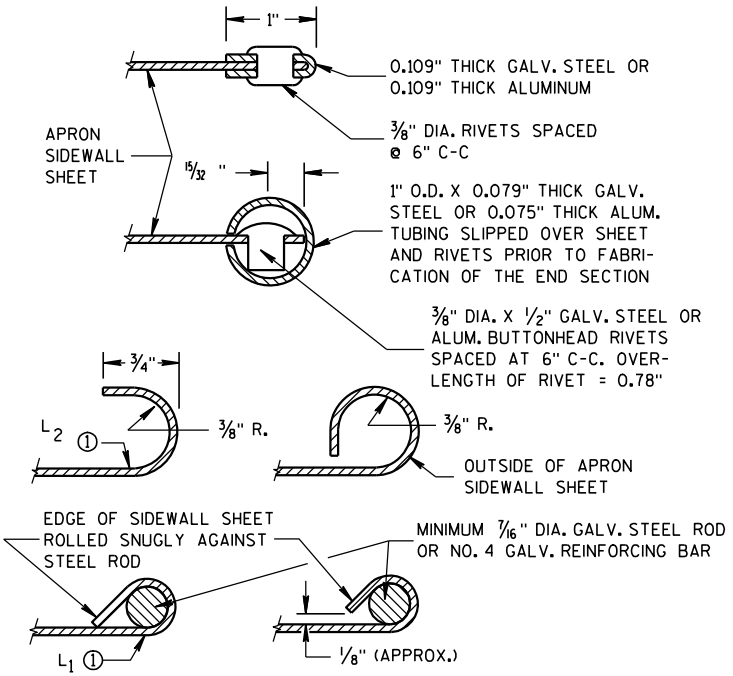
NOTE: DIMPLED BAND FITS OVER OUTSIDE OF ENDWALL, AND CORRUGATED BAND FITS INSIDE ENDWALL. DIMPLED BAND MAY BE USED WITH HELICALLY CORRUGATED PIPE.

FOR CIRCUMFERENTIALLY CORRUGATED PIPE USE ENDWALL CONNECTION DETAILS 1, 2, 3 OR 5 AS APPLICABLE.

FOR HELICALLY CORRUGATED PIPE USE ENDWALL CONNECTION DETAILS 1, 2 OR 5.

FOR HELICALLY CORRUGATED PIPES WITH TWO CIRCUMFERENTIAL CORRUGATIONS AT EACH END USE ENDWALL CONNECTION DETAILS 1, 2 OR 3.

CONNECTION DETAILS



SECTION A-A

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

CONCRETE CULVERT ENDWALLS MAY NOT BE USED WITH GALVANIZED STEEL OR ALUMINUM CULVERT PIPE OR VISE VERSA. GALVANIZED STEEL OR ALUMINUM ENDWALLS SHALL NORMALLY BE INSTALLED ON CULVERT PIPE OF THE SAME METAL.

ALL THREE PIECE STEEL APRON ENDWALLS FOR 60" DIAMETER PIPE AND LARGER SHALL HAVE 0.109" SIDES AND 0.138" CENTER PANELS. ALL THREE PIECE ALUMINUM APRON ENDWALLS FOR 60" DIAMETER PIPE AND LARGER SHALL HAVE 0.105" SIDES AND 0.134" CENTER PANELS. THE WIDTH OF CENTER PANELS SHALL BE GREATER THAN 20 PERCENT OF THE PIPE PERIMETER.

LAP SEAMS SHALL BE TIGHTLY JOINED BY GALVANIZED RIVETS OR BOLTS FOR STEEL UNITS AND ALUMINUM RIVETS AND BOLTS FOR ALUMINUM UNITS. FOR THE 60" THROUGH 96" DIAMETER APRON ENDWALL SIZES, THE REINFORCED EDGES AND CENTER PANEL SEAMS SHALL BE FURTHER REINFORCED WITH GALVANIZED STEEL OR ALUMINUM STIFFENER ANGLES. THE ANGLES SHALL BE ATTACHED BY GALVANIZED NUTS AND BOLTS FOR STEEL UNITS AND ALUMINUM NUTS AND BOLTS FOR ALUMINUM UNITS.

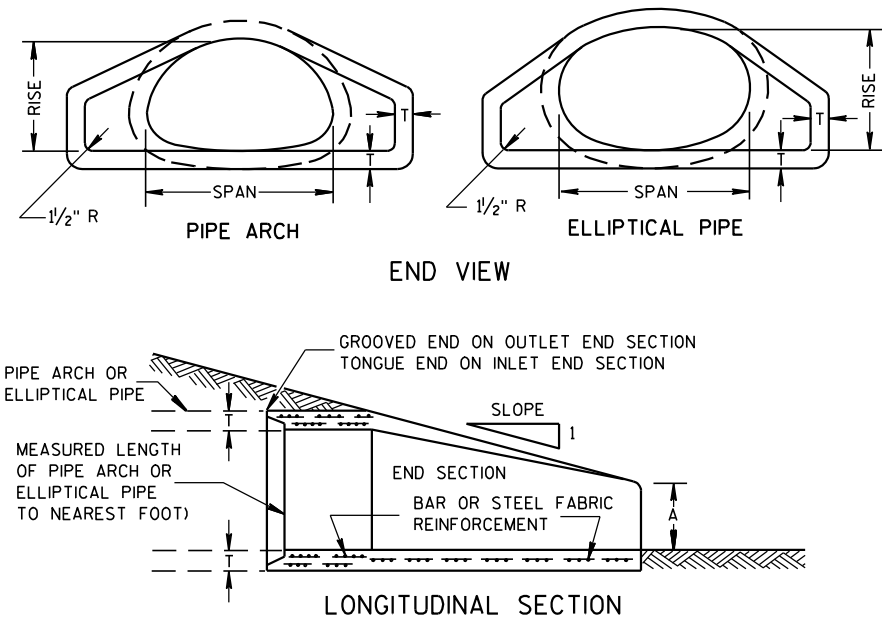
WHERE TWO OR MORE PIPES WITH APRON ENDWALLS ARE LAID ADJACENT TO EACH OTHER, THEY SHALL BE SEPARATED BY A DISTANCE SUFFICIENT TO PROVIDE A MINIMUM CLEARANCE OF 6 INCHES BETWEEN APRON ENDWALLS.

① FOR PIPE SIZES UP TO 60" DIAMETER, A 180° ROLLED EDGE MAY BE USED INSTEAD OF STEEL ROD REINFORCEMENT. SEE SECTION A-A.

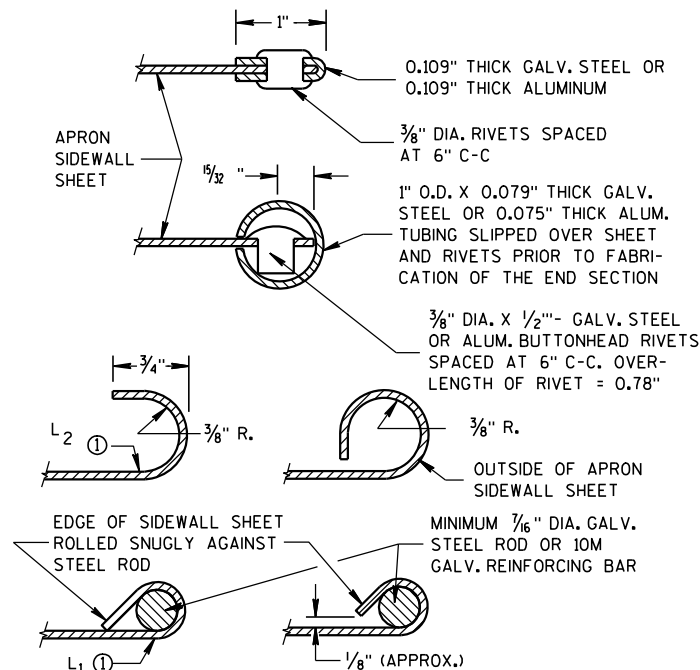
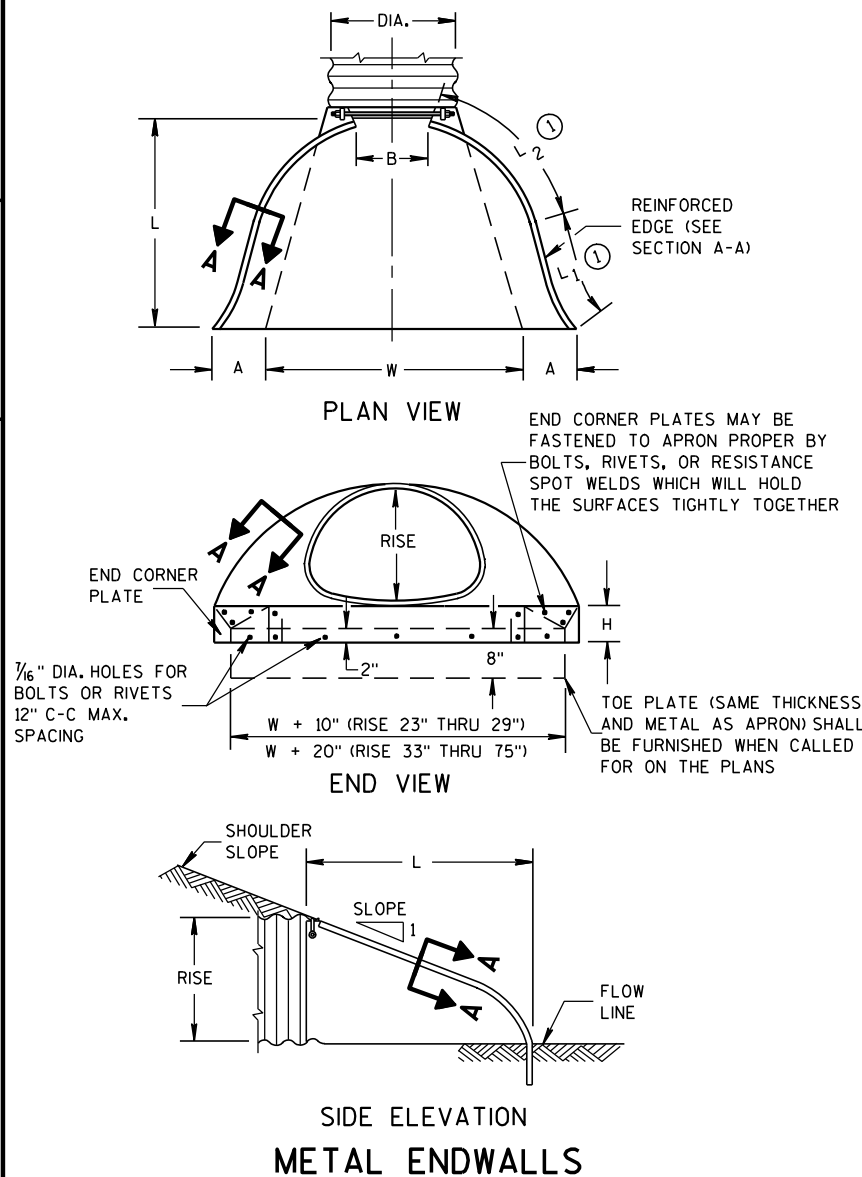
APRON ENDWALLS FOR  
CULVERT PIPE

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
11/30/94  
DATE  
/S/ Rory L. Rhinesmith  
CHIEF ROADWAY DEVELOPMENT ENGINEER  
FHWA



CONCRETE ENDWALLS



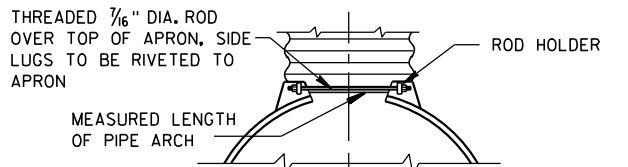
SECTION A-A

| 2- 2⅓" X ½" CORRUGATIONS   |          |      |                         |       |                     |             |            |             |         |          |            |                  |       |
|----------------------------|----------|------|-------------------------|-------|---------------------|-------------|------------|-------------|---------|----------|------------|------------------|-------|
| EQUIV.<br>DIA.<br>(Inches) | (Inches) |      | MIN. THICK.<br>(Inches) |       | DIMENSIONS (Inches) |             |            |             |         |          |            | APPROX.<br>SLOPE | BODY  |
|                            | SPAN     | RISE | STEEL                   | ALUM. | A<br>(±1")          | B<br>(MAX.) | H<br>(±1") | L<br>(±1½") | L1<br>① | L 2<br>① | W<br>(±2") |                  |       |
| 15                         | 17       | 13   | .064                    | .060  | 7                   | 9           | 6          | 19          | 14      | 16       | 30         | 2½ to 1          | 1 Pc. |
| 18                         | 21       | 15   | .064                    | .060  | 7                   | 10          | 6          | 23          | 14      | 19⅜      | 36         | 2½ to 1          | 1 Pc. |
| 21                         | 24       | 18   | .064                    | .060  | 8                   | 12          | 6          | 28          | 18      | 21¾      | 42         | 2½ to 1          | 1 Pc. |
| 24                         | 28       | 20   | .064                    | .060  | 9                   | 14          | 6          | 32          | 18      | 27½      | 48         | 2½ to 1          | 1 Pc. |
| 30                         | 35       | 24   | .079                    | .075  | 10                  | 16          | 6          | 39          | 18      | 37⅝      | 60         | 2½ to 1          | 1 Pc. |
| 36                         | 42       | 29   | .079                    | .075  | 12                  | 18          | 8          | 46          | 24      | 45⅝      | 75         | 2½ to 1          | 1 Pc. |
| 42                         | 49       | 33   | .109                    | .105  | 13                  | 21          | 9          | 53          | 24      | 54¾      | 85         | 2½ to 1          | 2 Pc. |
| 48                         | 57       | 38   | .109                    | .105  | 18                  | 26          | 12         | 63          | 24      | 68       | 90         | 2½ to 1          | 3 Pc. |
| 54                         | 64       | 43   | .109                    | .105  | 18                  | 30          | 12         | 70          | 24      | 72¾      | 102        | 2¼ to 1          | 3 Pc. |
| 60                         | 71       | 47   | .109*                   | .105* | 18                  | 33          | 12         | 77          | 30      | 82¼      | 114        | 2¼ to 1          | 3 Pc. |
| 66                         | 77       | 52   | .109*                   | .105* | 18                  | 36          | 12         | 77          | —       | —        | 126        | 2 to 1           | 3 Pc. |
| 72                         | 83       | 57   | .109*                   | .105* | 18                  | 39          | 12         | 77          | —       | —        | 138        | 2 to 1           | 3 Pc. |

| 3" X 1" CORRUGATIONS       |          |      |                         |       |                     |             |            |                |         |         |            |                  |       |
|----------------------------|----------|------|-------------------------|-------|---------------------|-------------|------------|----------------|---------|---------|------------|------------------|-------|
| EQUIV.<br>DIA.<br>(Inches) | (Inches) |      | MIN. THICK.<br>(Inches) |       | DIMENSIONS (Inches) |             |            |                |         |         |            | APPROX.<br>SLOPE | BODY  |
|                            | SPAN     | RISE | STEEL                   | ALUM. | A<br>(±1")          | B<br>(MAX.) | H<br>(±1") | L<br>(±1 1/2") | L1<br>① | L2<br>① | W<br>(±2") |                  |       |
| 48                         | 53       | 41   | .109                    | .105  | 18                  | 26          | 12         | 63             | 24      | 72¾     | 90         | 2½ to 1          | 2 Pc. |
| 54                         | 60       | 46   | .109                    | .105  | 18                  | 30          | 12         | 70             | 30      | 82¼     | 102        | 2 to 1           | 2 Pc. |
| 60                         | 66       | 51   | .109*                   | .105* | 18                  | 33          | 12         | 77             | —       | —       | 114        | 1½ to 1          | 3 Pc. |
| 66                         | 73       | 55   | .109*                   | .105* | 18                  | 36          | 12         | 77             | —       | —       | 126        | 1½ to 1          | 3 Pc. |
| 72                         | 81       | 59   | .109*                   | .105* | 18                  | 39          | 12         | 77             | —       | —       | 138        | 2 to 1           | 3 Pc. |
| 78                         | 87       | 63   | .109*                   | .105* | 22                  | 38          | 12         | 77             | —       | —       | 148        | 1½ to 1          | 3 Pc. |
| 84                         | 95       | 67   | .109*                   | .105* | 22                  | 34          | 12         | 77             | —       | —       | 162        | 1½ to 1          | 3 Pc. |
| 90                         | 103      | 71   | .109*                   | .105* | 22                  | 38          | 12         | 77             | —       | —       | 174        | 1½ to 1          | 3 Pc. |
| 96                         | 112      | 75   | .109*                   | .105* | 24                  | 40          | 12         | 77             | —       | —       | 174        | 1½ to 1          | 3 Pc. |

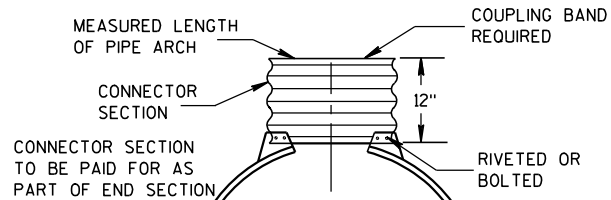
NOTE: ALL SPLICES TO BE LAP RIVETED OR BOLTED.

\* EXCEPT CENTER PANEL SEE GENERAL NOTES



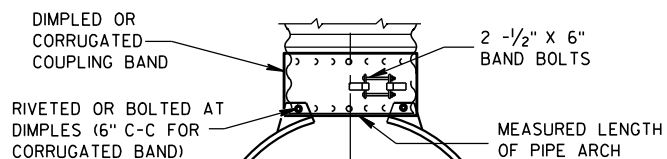
TYPE 2

FOR 17" X 13" THRU 112" X 75" PIPE ARCH



TYPE 3

FOR 64" X 43" THRU 112" X 75" PIPE ARCH



TYPE 5

ALTERNATE FOR:  
ALL SIZES CORRUGATED PIPE ARCHES

NOTE: DIMPLED BAND FITS OVER OUTSIDE OF ENDWALL, AND CORRUGATED BAND FITS INSIDE ENDWALL.

CONNECTION DETAILS

| REINFORCED CONCRETE PIPE ARCH |                     |         |    |     |    |    |     |     |                  |
|-------------------------------|---------------------|---------|----|-----|----|----|-----|-----|------------------|
| EQUIV.<br>DIA.<br>(Inches)    | DIMENSIONS (Inches) |         |    |     |    |    |     |     | APPROX.<br>SLOPE |
|                               | ** SPAN             | ** RISE | T  | A   | B  | C  | D   | E   |                  |
| 24                            | 29                  | 18      | 3  | 8½  | 39 | 33 | 72  | 48  | 3 to 1           |
| 30                            | 36                  | 22      | 3½ | 9½  | 50 | 46 | 96  | 60  | 3 to 1           |
| 36                            | 44                  | 27      | 4  | 11⅞ | 60 | 36 | 96  | 72  | 3 to 1           |
| 42                            | 51                  | 31      | 4½ | 15⅞ | 60 | 36 | 96  | 78  | 3 to 1           |
| 48                            | 58                  | 36      | 5  | 21  | 60 | 36 | 96  | 84  | 3 to 1           |
| 54                            | 65                  | 40      | 5½ | 25½ | 60 | 36 | 96  | 90  | 3 to 1           |
| 60                            | 73                  | 45      | 6  | 31  | 60 | 36 | 96  | 96  | 3 to 1           |
| 72                            | 88                  | 54      | 7  | 31  | 60 | 39 | 99  | 120 | 2 to 1           |
| 84                            | 102                 | 62      | 8  | 28½ | 83 | 19 | 102 | 144 | 2 to 1           |

| REINFORCED CONCRETE ELLIPTICAL PIPE |                     |         |    |     |    |    |    |    |                  |
|-------------------------------------|---------------------|---------|----|-----|----|----|----|----|------------------|
| EQUIV.<br>DIA.<br>(Inches)          | DIMENSIONS (Inches) |         |    |     |    |    |    |    | APPROX.<br>SLOPE |
|                                     | ** SPAN             | ** RISE | T  | A   | B  | C  | D  | E  |                  |
| 24                                  | 30                  | 19      | 3¼ | 8½  | 39 | 33 | 72 | 48 | 3 to 1           |
| 30                                  | 38                  | 24      | 3¾ | 9½  | 54 | 18 | 72 | 60 | 3 to 1           |
| 36                                  | 45                  | 29      | 4½ | 11⅞ | 60 | 24 | 84 | 72 | 2½ to 1          |
| 42                                  | 53                  | 34      | 5  | 15¾ | 60 | 36 | 96 | 78 | 2½ to 1          |
| 48                                  | 60                  | 38      | 5½ | 21  | 60 | 36 | 96 | 84 | 2½ to 1          |
| 54                                  | 68                  | 43      | 6  | 25½ | 60 | 36 | 96 | 90 | 2½ to 1          |
| 60                                  | 76                  | 48      | 6½ | 30  | 60 | 36 | 96 | 96 | 2½ to 1          |

\*\*NOMINAL SIZE

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

CONCRETE APRON ENDWALLS MAY NOT BE USED WITH GALVANIZED STEEL OR ALUMINUM CULVERT PIPE OR VISE VERSA. GALVANIZED STEEL OR ALUMINUM APRON ENDWALLS SHALL NORMALLY BE INSTALLED ON CULVERT PIPE OF THE SAME METAL.

ALL THREE PIECE STEEL APRON ENDWALLS FOR 66" X 51" PIPE ARCH AND LARGER SHALL HAVE 0.109" SIDES AND 0.138" CENTER PANELS. ALL THREE PIECE ALUMINUM APRON ENDWALLS FOR 66" X 51" PIPE ARCH AND LARGER SHALL HAVE 0.105" SIDES AND 0.134" CENTER PANELS. THE WIDTH OF CENTER PANELS SHALL BE GREATER THAN 20 PERCENT OF THE PIPE ARCH PERIMETER.

LAP SEAMS SHALL BE TIGHTLY JOINED BY GALVANIZED RIVETS OR BOLTS FOR STEEL UNITS AND ALUMINUM RIVETS AND BOLTS FOR ALUMINUM UNITS. FOR THE 77" X 52" THROUGH 112" X 75" APRON ENDWALL SIZES, THE REINFORCED EDGES AND CENTER PANEL SEAMS SHALL BE FURTHER REINFORCED WITH GALVANIZED STEEL OR ALUMINUM STIFFENER ANGLES. THE ANGLES SHALL BE ATTACHED BY GALVANIZED NUTS AND BOLTS FOR STEEL UNITS AND ALUMINUM NUTS AND BOLTS FOR ALUMINUM UNITS.

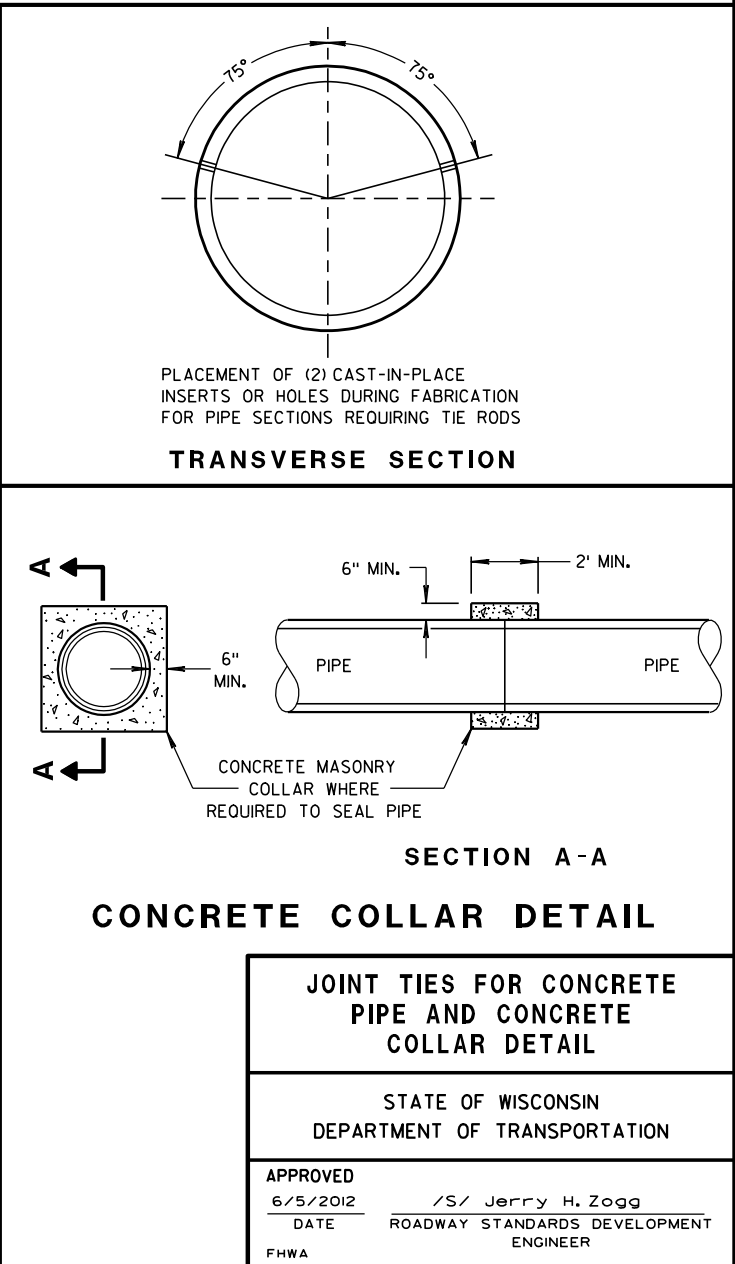
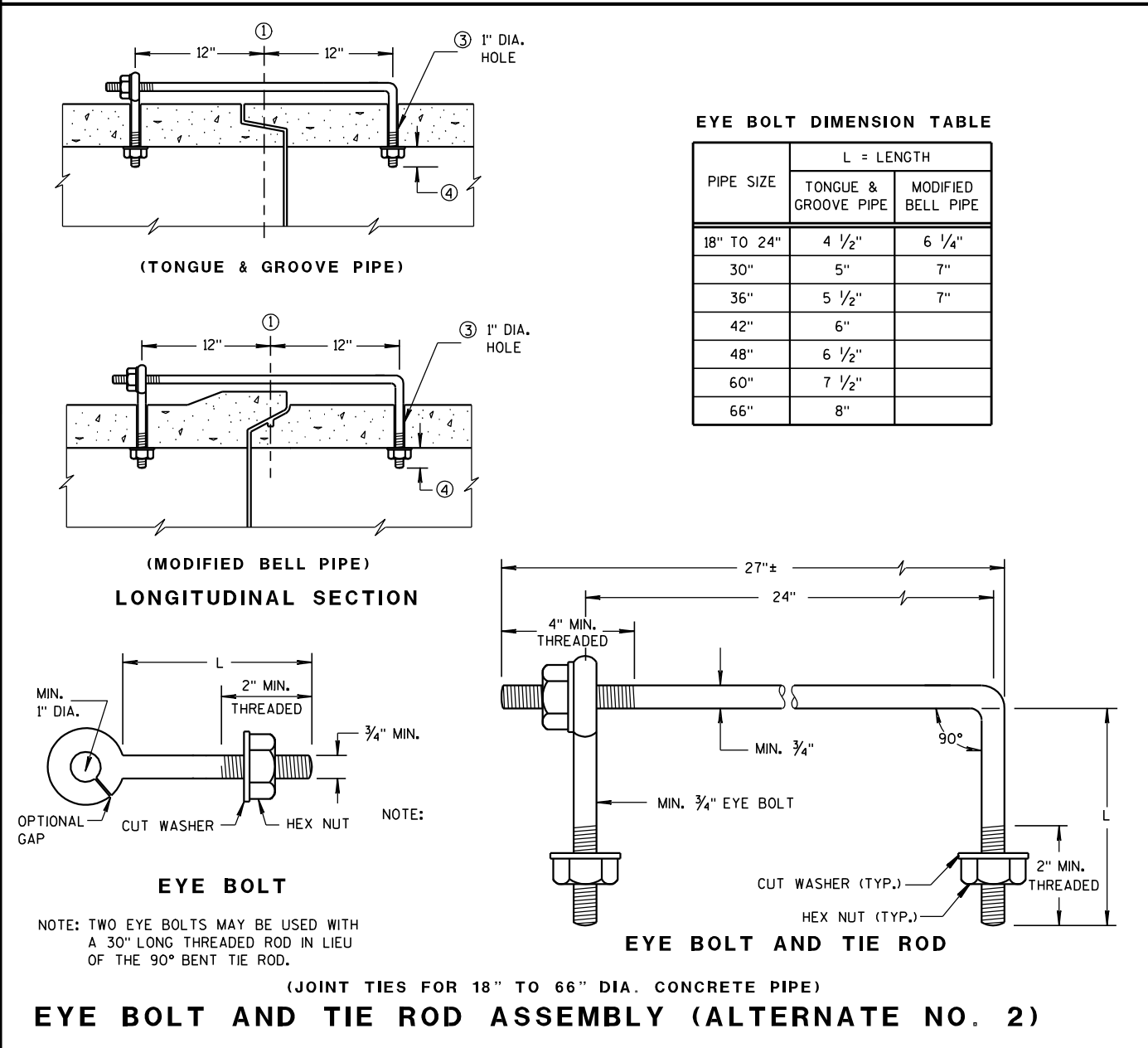
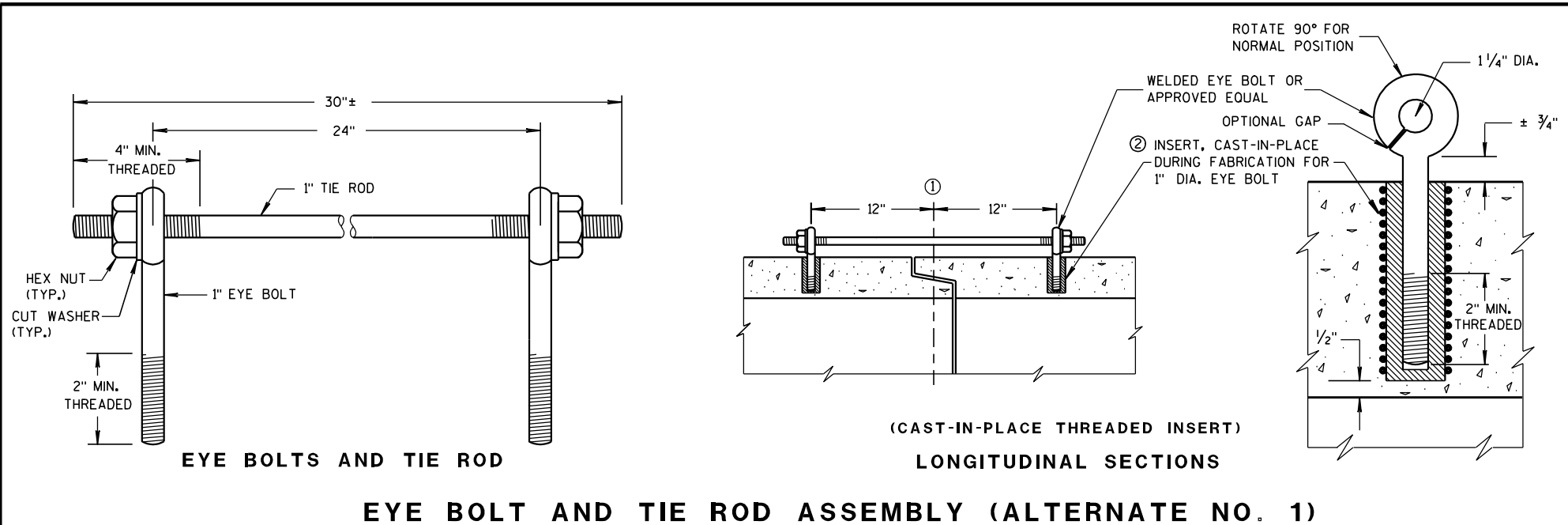
WHERE TWO OR MORE PIPES WITH APRON ENDWALLS ARE LAID ADJACENT TO EACH OTHER, THEY SHALL BE SEPARATED BY A DISTANCE SUFFICIENT TO PROVIDE A MINIMUM CLEARANCE OF 6 INCHES BETWEEN APRON ENDWALLS.

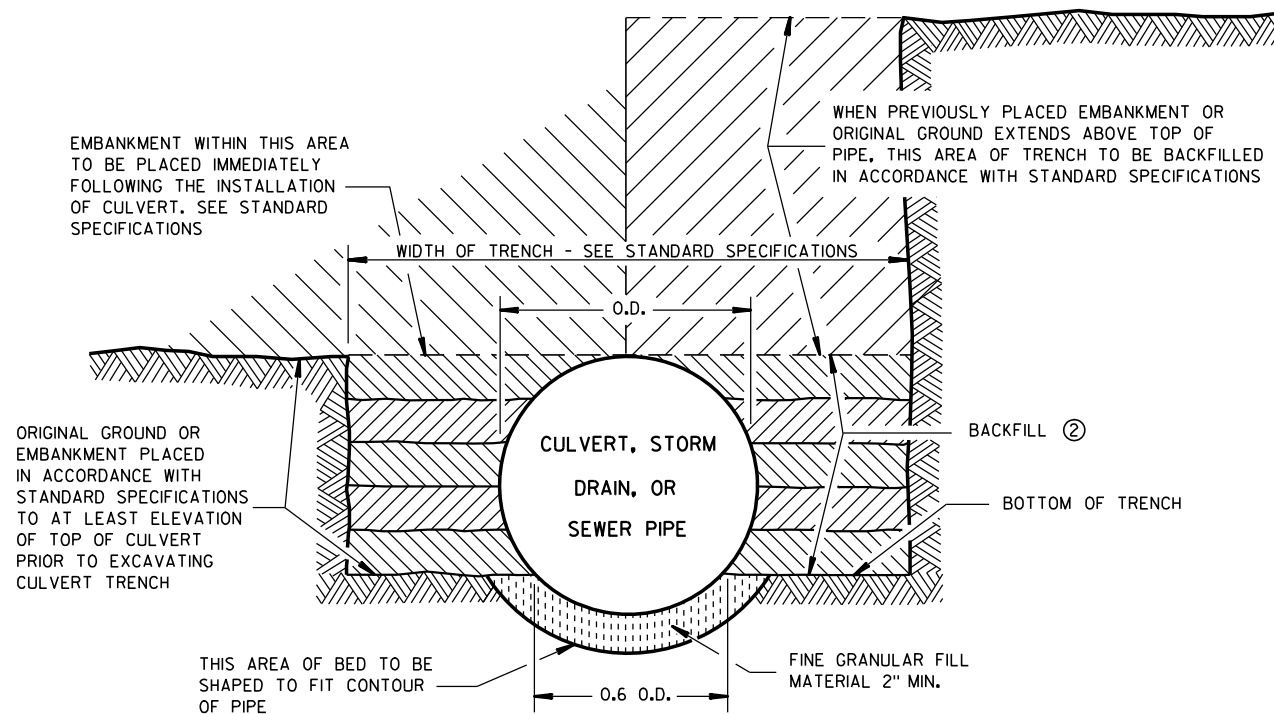
① FOR PIPE ARCH SIZES UP TO 73" X 55" A 180° ROLLED EDGE MAY BE USED INSTEAD OF STEEL ROD REINFORCEMENT. SEE SECTION A-A.

APRON ENDWALLS FOR  
PIPE ARCH AND  
ELLIPTICAL PIPE

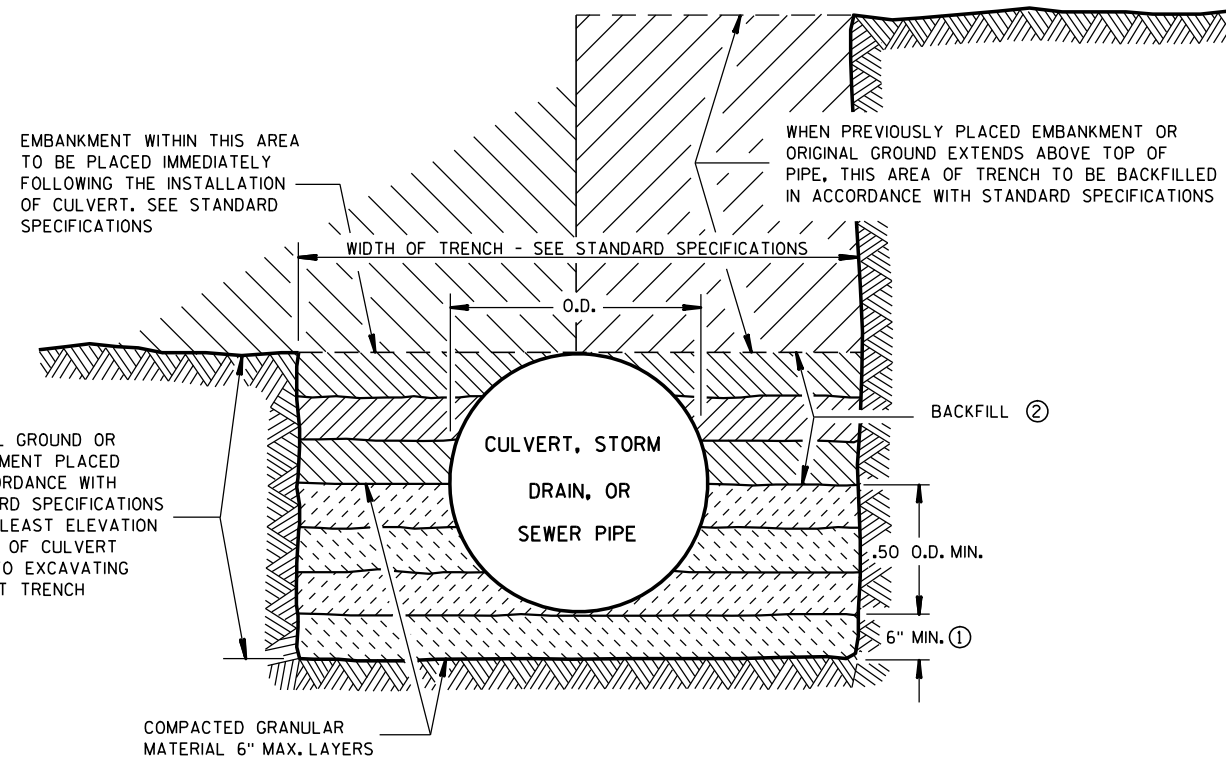
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
11/30/94 /S/ Rory L. Rhinesmith  
DATE CHIEF ROADWAY DEVELOPMENT ENGINEER  
FHWA





SHAPED SUBGRADE WITH GRANULAR FOUNDATION



GRANULAR FOUNDATION

## GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

THE SHAPED SUBGRADE WITH GRANULAR FOUNDATION IS AN EQUAL ALTERNATE TO THE GRANULAR FOUNDATION EXCEPT WHERE ROCK IS ENCOUNTERED.

- ① WHERE ROCK, HARD PAN OR FRAGMENTED MATERIAL IS ENCOUNTERED, THE TRENCH SHALL BE EXCAVATED BELOW THE BOTTOM OF THE PIPE AN AMOUNT EQUAL TO  $\frac{1}{2}$  INCH PER FOOT OF PROPOSED EMBANKMENT ABOVE THE TOP OF THE PIPE, BUT NOT LESS THAN 6 INCHES.
- ② TRENCH SHALL BE BACKFILLED AS REQUIRED BY STANDARD SPECIFICATIONS; SECTION 520 FOR PIPE CULVERTS AND SECTION 607 FOR STORM SEWERS.

## CLASS "B" BEDDING

CLASS "B" BEDDING FOR  
CULVERT PIPE OR STORM SEWER

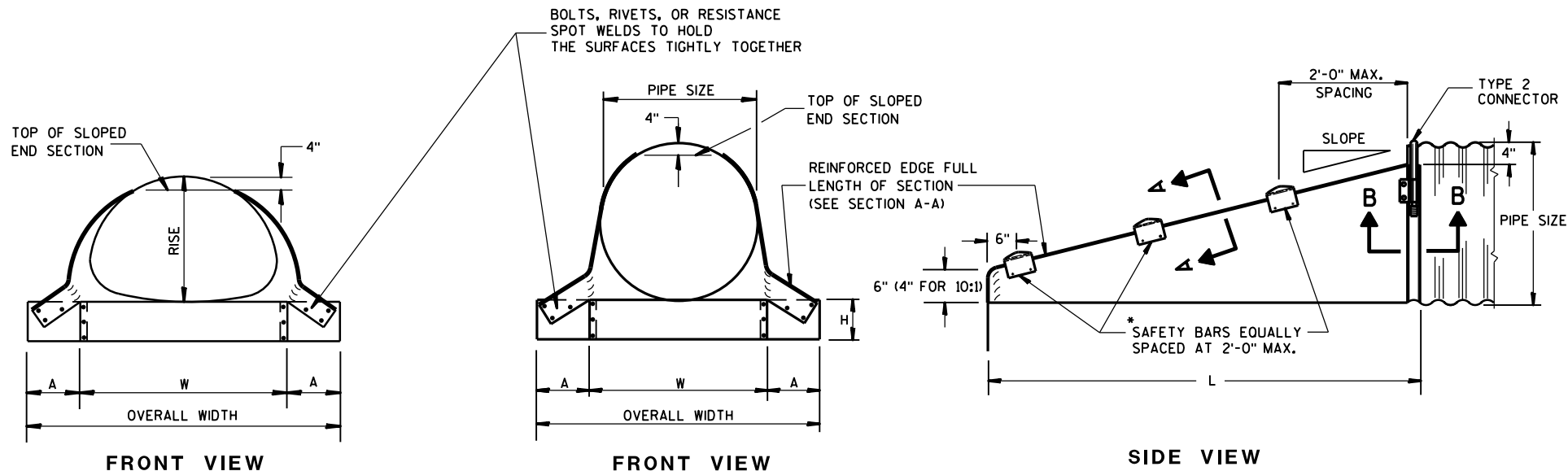
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

4/7/83  
DATE

FHWA

/S/ D.L. Strand  
STATE DESIGN ENGINEER FOR HWYS



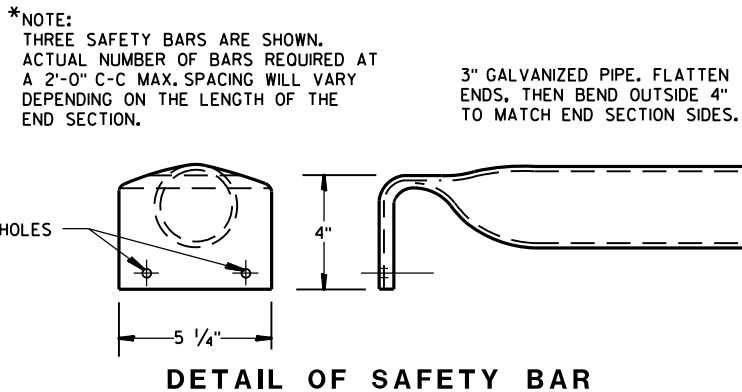
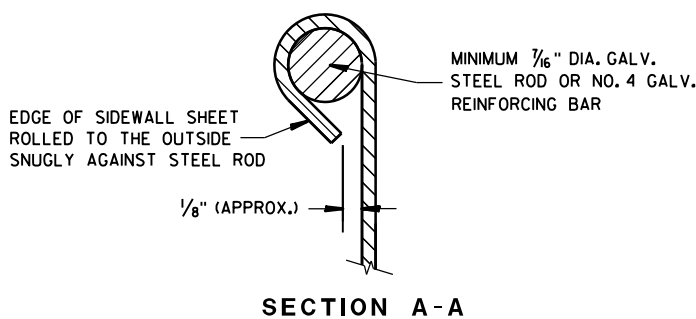
GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

SLOPED END SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, SECTION 521 FOR STEEL APRON ENDWALLS.

SAFETY BARS SHALL BE FABRICATED FROM GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53, GRADE B, SCHEDULE 40 OR APPROVED EQUAL.

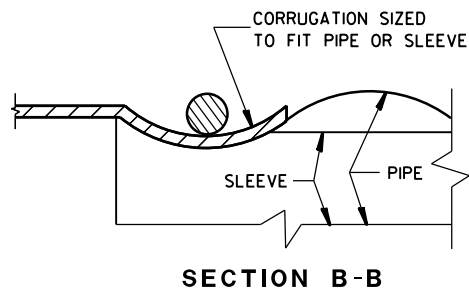
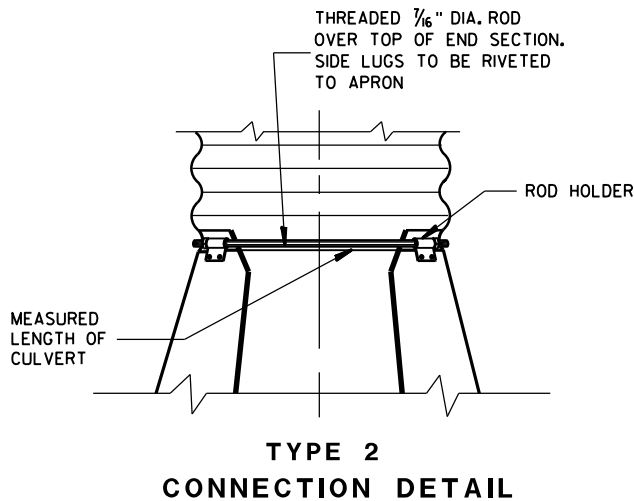
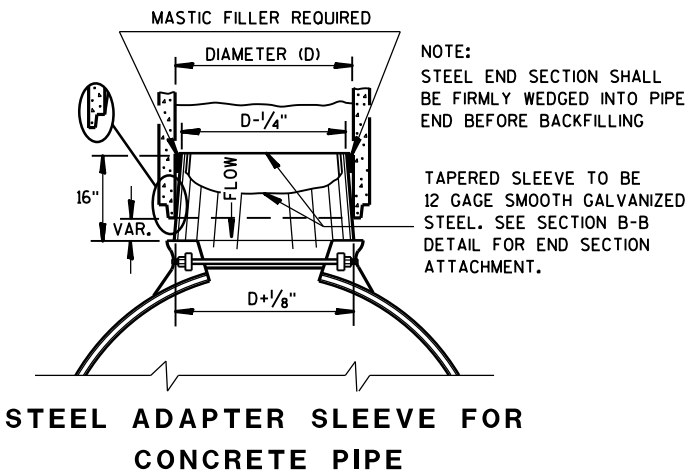
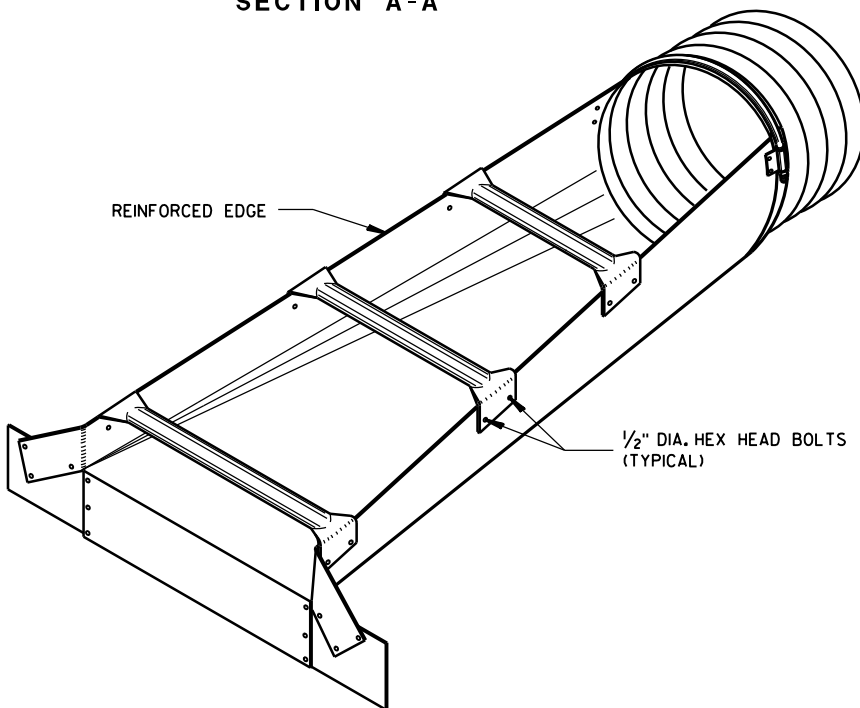
| STEEL APRON ENDWALLS FOR CULVERT PIPE SLOPED SIDE DRAINS |                      |                     |    |    |               |              |               |       |               |       |               |
|----------------------------------------------------------|----------------------|---------------------|----|----|---------------|--------------|---------------|-------|---------------|-------|---------------|
| PIPE DIA. (IN.)                                          | MIN. THICK. (Inches) | DIMENSIONS (Inches) |    |    |               | L DIMENSIONS |               |       |               |       |               |
|                                                          |                      | A                   | H  | W  | OVERALL WIDTH | SLOPE        | LENGTH INCHES | SLOPE | LENGTH INCHES | SLOPE | LENGTH INCHES |
| 15                                                       | .064                 | 8                   | 6  | 21 | 37            | 4:1          | 20            | 6:1   | 30            | 10:1  | 70            |
| 18                                                       | .064                 | 8                   | 6  | 24 | 40            | 4:1          | 32            | 6:1   | 48            | 10:1  | 100           |
| 21                                                       | .064                 | 8                   | 6  | 27 | 43            | 4:1          | 44            | 6:1   | 66            | 10:1  | 130           |
| 24                                                       | .064                 | 8                   | 6  | 30 | 46            | 4:1          | 56            | 6:1   | 84            | 10:1  | 160           |
| 30                                                       | .109                 | 12                  | 9  | 36 | 60            | 4:1          | 80            | 6:1   | 120           | 10:1  | 220           |
| 36                                                       | .109                 | 12                  | 9  | 42 | 66            | 4:1          | 104           | 6:1   | 156           | 10:1  | 280           |
| 42                                                       | .109                 | 16                  | 12 | 48 | 80            | 4:1          | 128           | 6:1   | 192           | —     | —             |
| 48                                                       | .109                 | 16                  | 12 | 54 | 86            | 4:1          | 152           | 6:1   | 228           | —     | —             |
| 54                                                       | .109                 | 16                  | 12 | 60 | 92            | 4:1          | 176           | 6:1   | 264           | —     | —             |
| 60                                                       | .109                 | 16                  | 12 | 66 | 98            | 4:1          | 200           | 6:1   | 300           | —     | —             |



| STEEL APRON ENDWALLS FOR PIPE ARCH<br>SLOPED SIDE DRAINS |          |      |                              |                     |    |    |                  |              |                  |       |                  |        |                  |
|----------------------------------------------------------|----------|------|------------------------------|---------------------|----|----|------------------|--------------|------------------|-------|------------------|--------|------------------|
| EQUIV.<br>DIA.<br>(Inches)                               | (Inches) |      | MIN. THICK.<br>(Inches)<br>① | DIMENSIONS (Inches) |    |    |                  | L DIMENSIONS |                  |       |                  |        |                  |
|                                                          | SPAN     | RISE |                              | A                   | H  | W  | OVERALL<br>WIDTH | SLOPE        | LENGTH<br>INCHES | SLOPE | LENGTH<br>INCHES | SLOPE  | LENGTH<br>INCHES |
| 15                                                       | 17       | 13   | .064 *                       | 7                   | 6  | 30 | 44               | 4:1          | 19               | 6:1   | 30               | 10:1 ② | 70               |
| 18                                                       | 21       | 15   | .064 *                       | 8                   | 6  | 27 | 43               | 4:1          | 20               | 6:1   | 30               | 10:1   | 70               |
| 21                                                       | 24       | 18   | .064 *                       | 8                   | 6  | 30 | 46               | 4:1          | 32               | 6:1   | 48               | 10:1   | 100              |
| 24                                                       | 28       | 20   | .064 *                       | 8                   | 6  | 34 | 50               | 4:1          | 40               | 6:1   | 60               | 10:1   | 120              |
| 30                                                       | 35       | 24   | .079 *                       | 12                  | 9  | 41 | 65               | 4:1          | 56               | 6:1   | 84               | 10:1   | 160              |
| 36                                                       | 42       | 29   | .109 *                       | 12                  | 9  | 48 | 72               | 4:1          | 76               | 6:1   | 114              | 10:1   | 210              |
| 42                                                       | 49       | 33   | .109                         | 16                  | 12 | 55 | 87               | 4:1          | 92               | 6:1   | 138              | —      | —                |
| 48                                                       | 57       | 38   | .109                         | 16                  | 12 | 63 | 95               | 4:1          | 112              | 6:1   | 168              | —      | —                |
| 54                                                       | 64       | 43   | .109                         | 16                  | 12 | 70 | 102              | 4:1          | 132              | 6:1   | 198              | —      | —                |

① \* MINIMUM THICKNESS OF ALL 10:1 SLOPED SIDE DRAINS IS 0.109".

② ACTUAL SLOPE GREATER THAN 10:1.



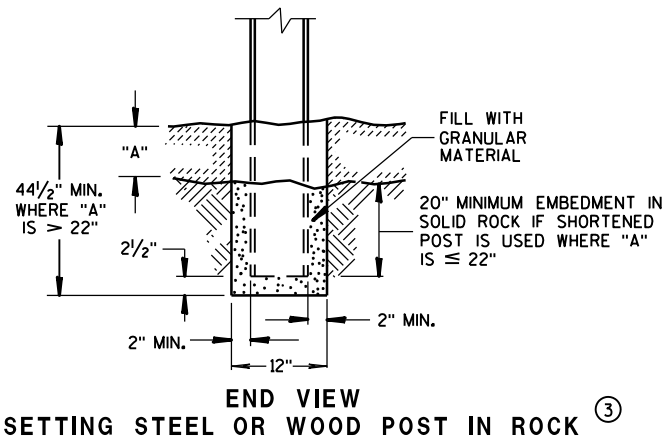
STEEL APRON ENDWALLS FOR CULVERT PIPE AND PIPE ARCH SLOPED SIDE DRAINS

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

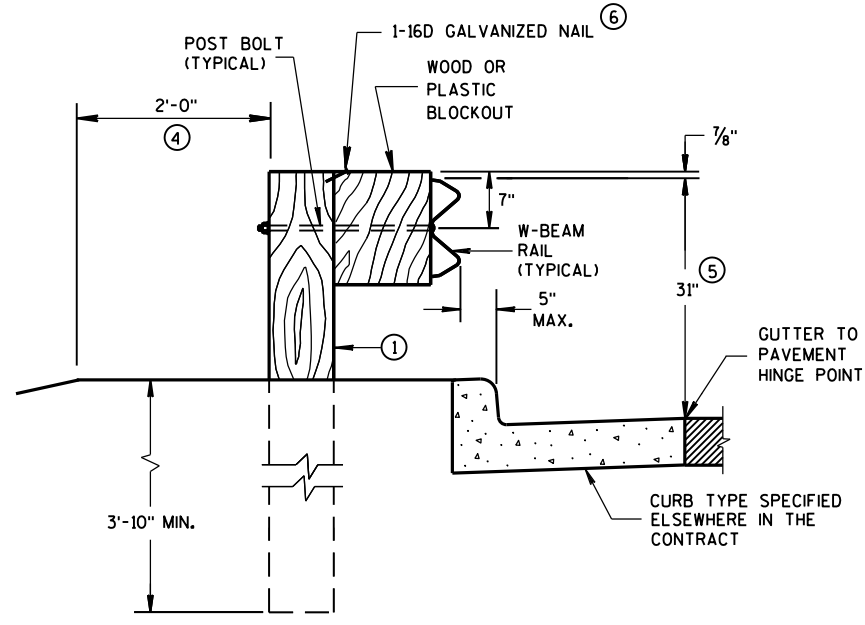
APPROVED  
9/14/2012  
DATE  
/S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER  
FHWA

GENERAL NOTES

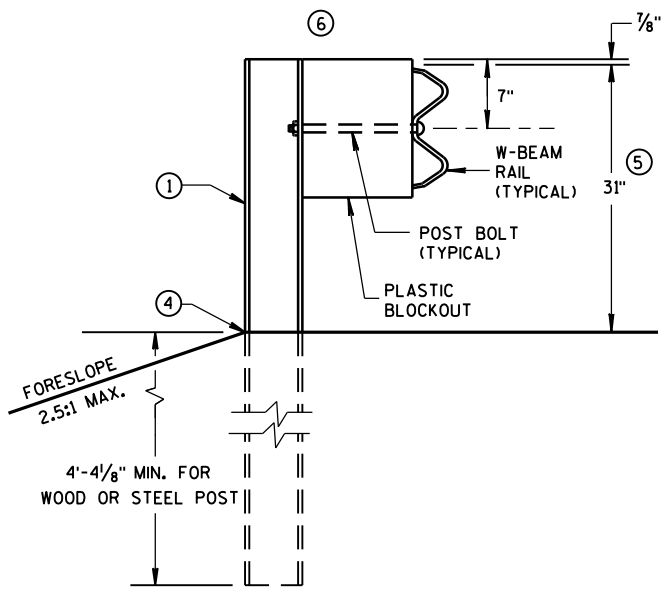
- ① WOOD OR STEEL POSTS (w6X9 OR w6X8.5) MAY BE USED. DO NOT INTERMIX WOOD AND STEEL POSTS. INSTALL STEEL POSTS WITH HOLES ON APPROACHING TRAFFIC SIDE.
- ② USE WOOD OR APPROVED PLASTIC BLOCKOUTS. WOOD BLOCKOUTS MAY BE CONSTRUCTED OUT OF TWO OR MORE WOOD BLOCKOUTS. SEE ALTERNATE WOOD BLOCKOUT DETAIL. DIMENSIONS OF APPROVED PLASTIC BLOCKOUTS MAY VARY.
- ③ IF ROCK IS ENCOUNTERED DURING EXCAVATION, PROVIDE A HOLE 12 INCHES IN DIAMETER EXTENDING 20 INCHES DEEP INTO THE ROCK. PLACE APPROXIMATELY 2 1/2 INCHES OF GRANULAR MATERIAL IN THE BOTTOM OF THE HOLE. CUT THE POSTS THE TO LENGTH AND INSTALL. BACKFILL WITH EXCAVATED MATERIAL AND COMPACT. BACKFILL IS TO BE FREE OF LARGE ROCKS.
- ④ WHEN THE DISTANCE FROM BACK OF POST TO SHOULDER HINGE POINT IS LESS THAN 2 FEET INSTALL LONGER POST AT HALF POST SPACING (K).
- ⑤ FOR NEW MGS INSTALLATION TOP OF W-BEAM RAIL TOLERANCE IS ± 1". FOR EXISTING MGS INSTALLATION TOP OF W-BEAM IS BETWEEN 27 3/4" TO 32".
- ⑥ WHEN USING STEEL POST AND WOOD BLOCKOUTS INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.



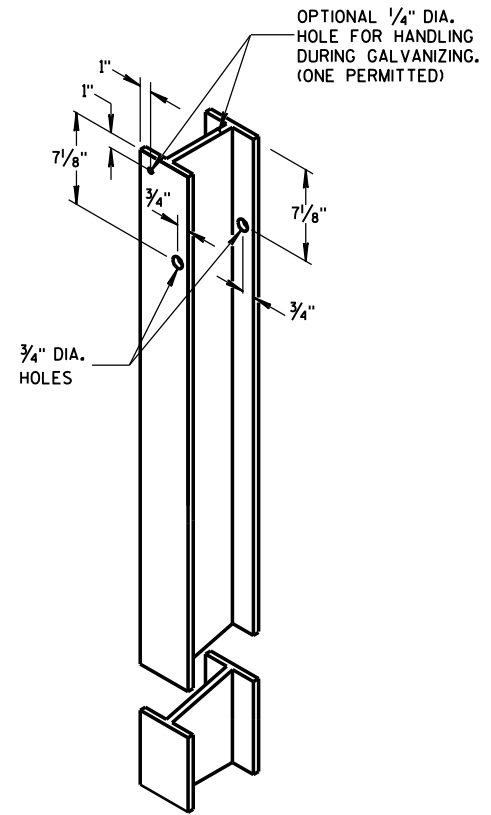
END VIEW  
SETTING STEEL OR WOOD POST IN ROCK ③



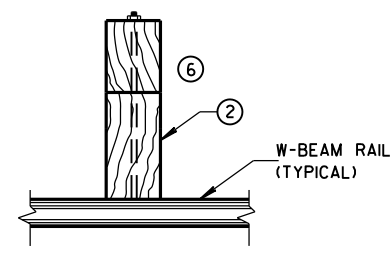
END VIEW  
LOCATED ALONG A CURBED ROADWAY



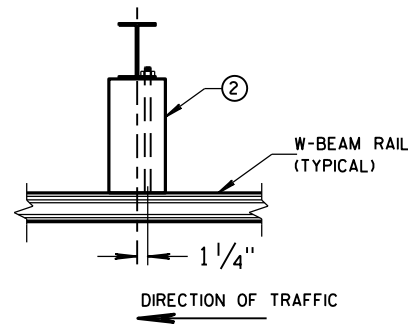
END VIEW  
MGS LONGER POST AT HALFPST SPACING W BEAM (K)



STEEL POST &  
HOLE PUNCHING DETAIL  
(w6X9) ①



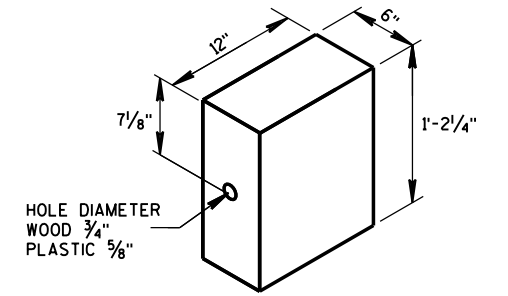
PLAN VIEW  
WOOD POST,  
BLOCKOUT & BEAM



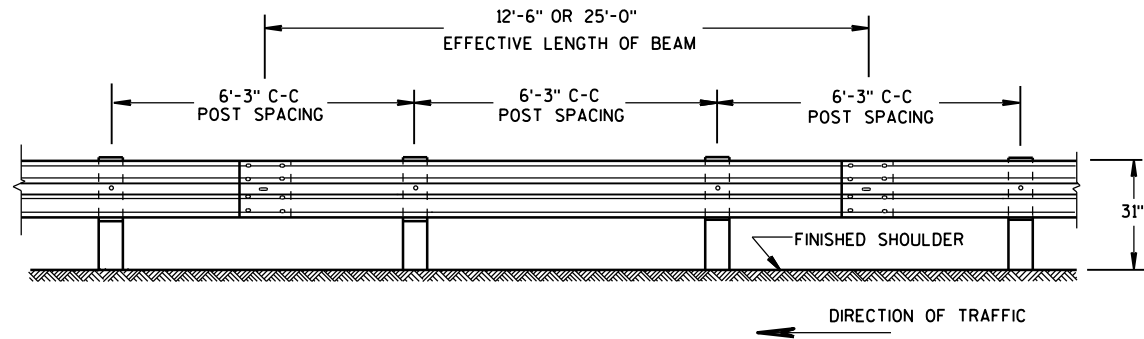
PLAN VIEW  
STEEL POST,  
PLASTIC BLOCKOUT & BEAM



WOOD POST  
(6" X 8") NOMINAL ①

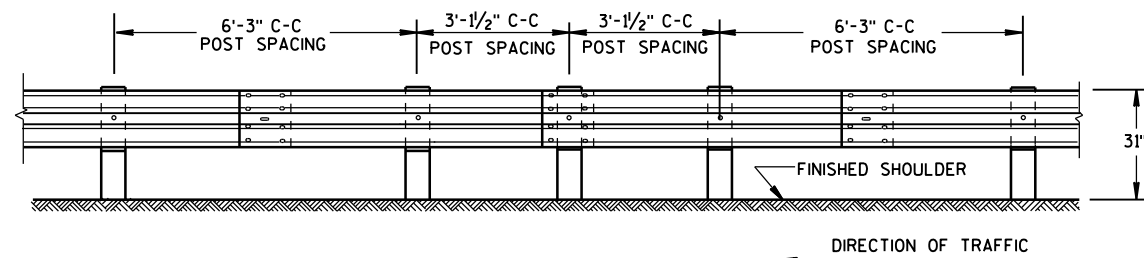


WOOD OR  
PLASTIC BLOCKOUT ②



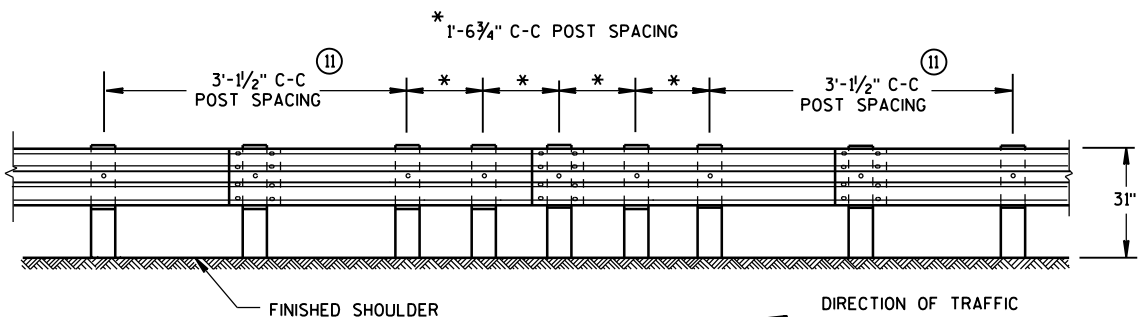
FRONT VIEW

### POST SPACING STANDARD INSTALLATION



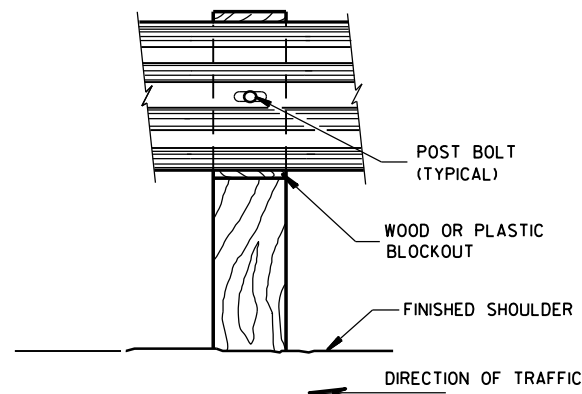
FRONT VIEW

### HALF POST SPACING (HS) AND HALF POST SPACING WITH LONGER POSTS (K)

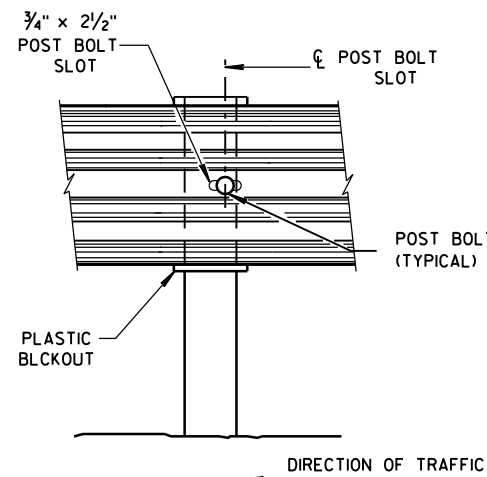


FRONT VIEW

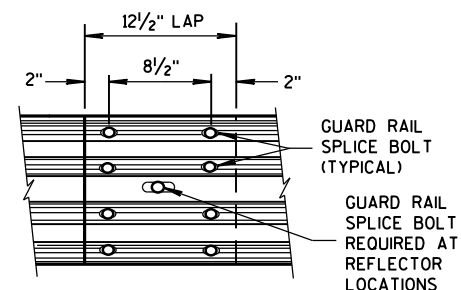
### QUARTER POST SPACING (QS)



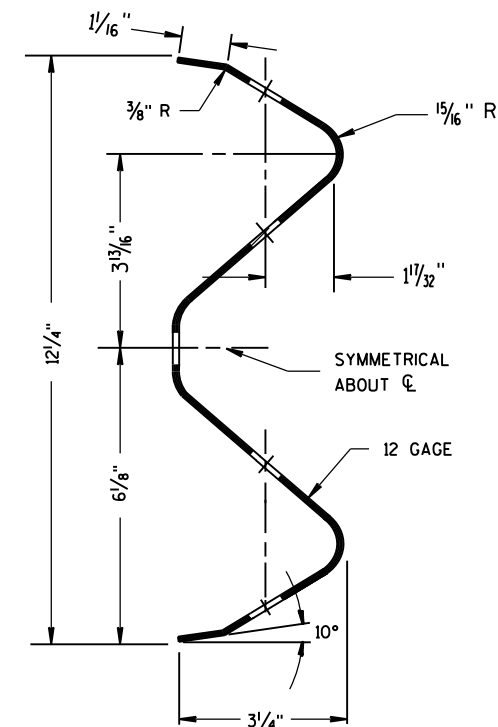
FRONT VIEW AT WOOD POST



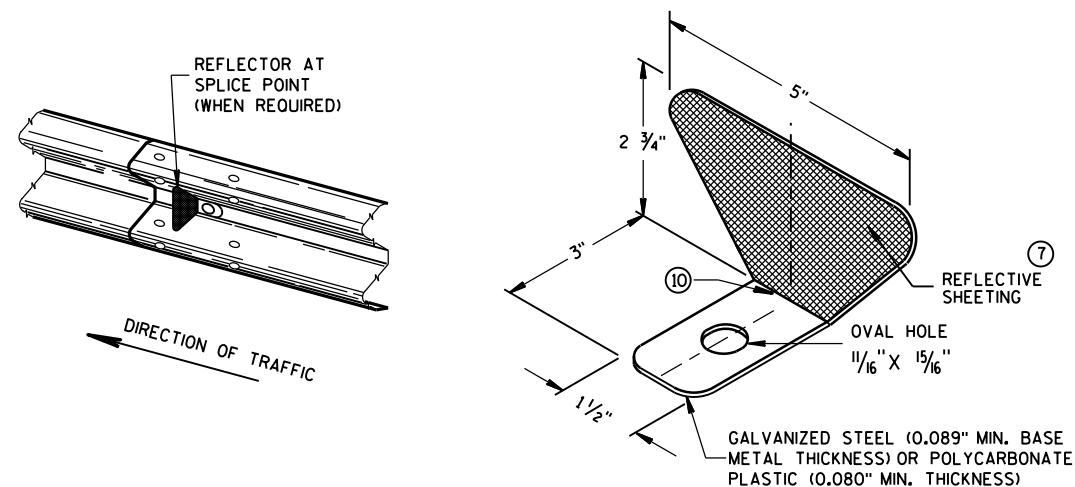
FRONT VIEW AT STEEL POST



FRONT VIEW  
MID-SPAN BEAM SPLICE



SECTION THRU W-BEAM RAIL



ONE SIDED REFLECTOR DETAIL AND TYPICAL INSTALLATION

### GENERAL NOTES

- ⑦ PROVIDE SILVER REFLECTIVE SHEETING ON ALL REFLECTORS EXCEPT THOSE LOCATED ALONG THE LEFT EDGE OF ONE-WAY ROADWAYS, WHICH SHALL BE PROVIDED WITH YELLOW REFLECTIVE SHEETING. SHEETING IS TYPE H. SEE STANDARD SPECIFICATION 637.
- ⑧ DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL. RAIL SPLICE LOCATIONS ARE THE ONLY ACCEPTABLE LOCATIONS FOR REFLECTORS.
- ⑨ REVERSE EVERY OTHER REFLECTOR FOR 2-WAY VISIBILITY. THE CONTRACTOR MAY FURNISH TWO-SIDED REFLECTORS IN LIEU OF ONE-SIDED REFLECTORS.
- ⑩ PROVIDE AN ANGLE OF BEND OF  $90^\circ \pm 1^\circ$  FOR TWO-SIDED REFLECTORS.
- ⑪ 25 FEET OF HALF POST SPACING IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF QUARTER POST SPACING.

POST BOLTS ARE A  $\frac{5}{8}$ " DIAMETER ASTM A307 GUARDRAIL BOLT. A POST BOLT REQUIRES  $\frac{5}{8}$ " DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT AND  $\frac{5}{8}$ " DIAMETER F844 FLAT WASHER. POST BOLTS MAY BE LONGER IF MULTIPLE BLOCKOUTS ARE BEING USED.

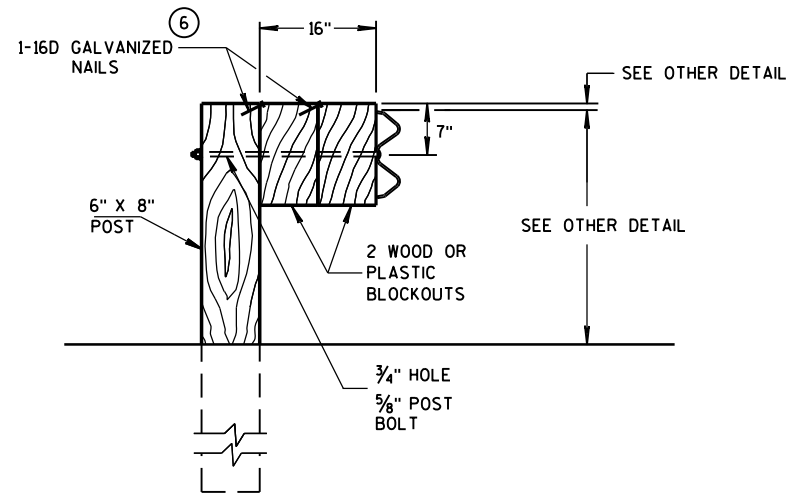
GUARD RAIL SPLICE BOLTS ARE A  $\frac{5}{8}$ " DIAMETER ASTM A307 GUARDRAIL HEAD BOLT. A GUARDRAIL SPLICE BOLT REQUIRES  $\frac{5}{8}$ " DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT.

### REFLECTOR SPACING

|                 | BEAM GUARD LENGTH | REFLECTOR SPACING | NO. SURFACES REFLECTORIZED | MIN. NO. REFLECTORS |
|-----------------|-------------------|-------------------|----------------------------|---------------------|
| ONE WAY TRAFFIC | < 200'            | 50' C-C           | 1                          | 3                   |
|                 | > 200'            | 100' C-C          | 1                          |                     |
| TWO WAY TRAFFIC | < 200'            | 25' C-C           | 1 ⑨                        | 6                   |
|                 | > 200'            | 50' C-C           | 1                          |                     |
| TWO WAY TRAFFIC | < 200'            | 50' C-C           | 2 ⑩                        | 3                   |
|                 | > 200'            | 100' C-C          | 2                          |                     |

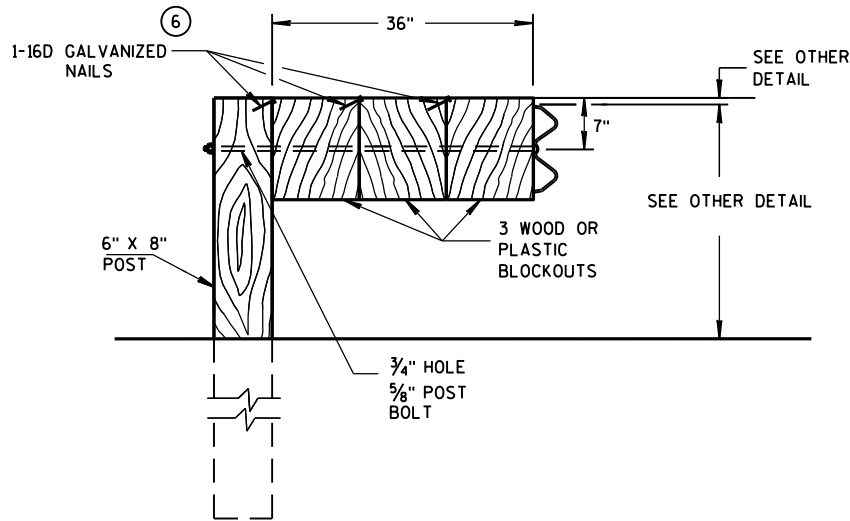
### MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



### DETAIL FOR 16" BLOCKOUT DEPTH

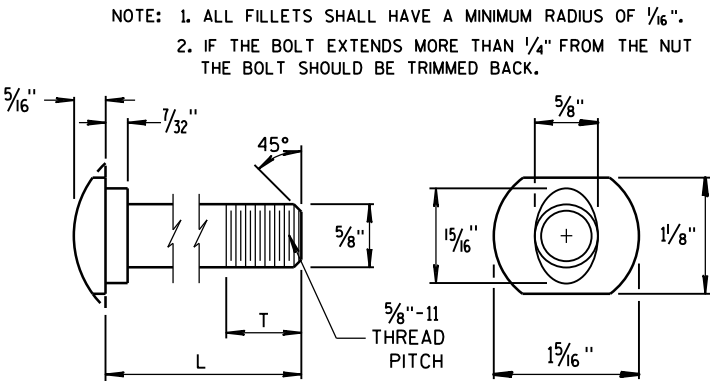
IT IS ACCEPTABLE TO USE BLOCKOUTS UP TO 16" DEEP TO INCREASE THE POST OFFSET TO AVOID UNDERGROUND OBSTACLES. THERE IS NO LIMIT TO THE NUMBER OF POSTS THAT CAN HAVE ADDITIONAL BLOCKOUTS UP TO 16" DEEP.



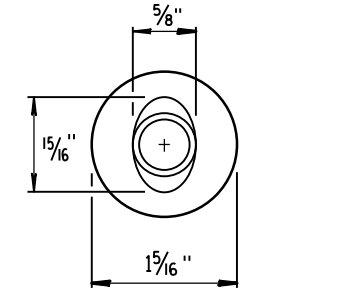
### DETAIL FOR 36" BLOCKOUT DEPTH

NOTES: UNDER SPECIAL CIRCUMSTANCES, SUCH AS AVOIDING OBSTACLES THAT ARE NOT RELOCATED, IT IS ACCEPTABLE TO INSTALL ADDITIONAL BLOCKOUTS TO OBTAIN UP TO 36" DEPTH FOR ONE OR TWO POSTS IN A SECTION OF GUARDRAIL.

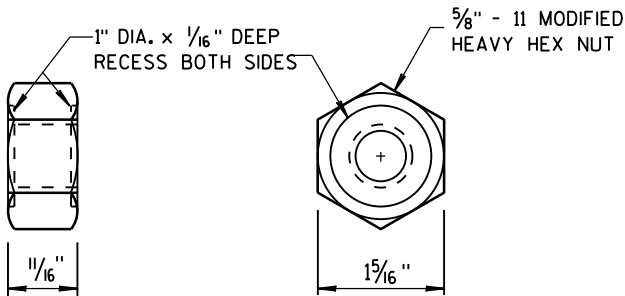
DO NOT USE 16" OR 36" BLOCKOUTS IF IT CAUSES THE POST TO BE DRIVEN BEYOND SHOULDER HINGE POINT OR CAUSES A FIXED OBJECT TO BE WITHIN THE DEFLECTION DISTANCE OF THE BARRIER.



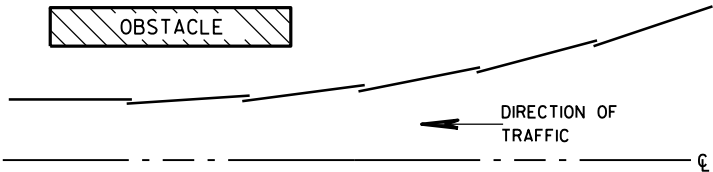
POST BOLT TABLE



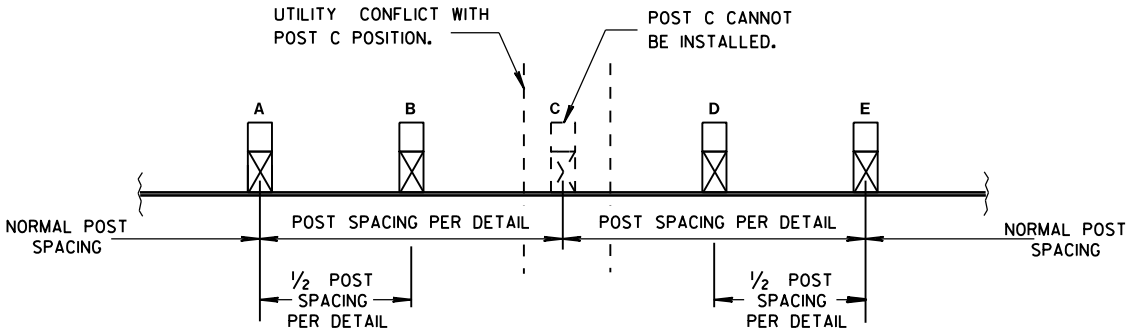
ALTERNATE BOLT HEAD



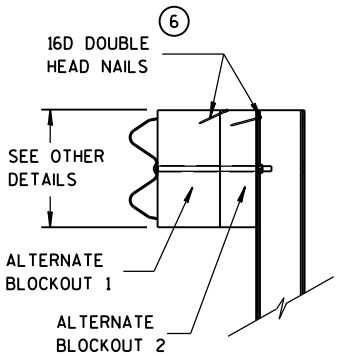
POST BOLT  
AND RECESS NUT



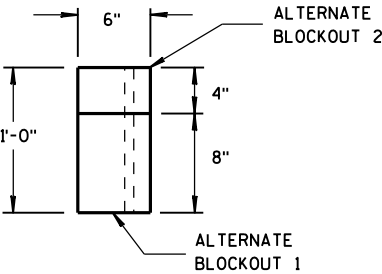
PLAN VIEW  
BEAM LAPPING DETAIL



POST DRIVING FOR CONTINUOUS  
UNDERGROUND OBSTRUCTION



SIDE VIEW



TOP VIEW

ALTERNATE WOOD  
BLOCKOUT DETAIL

MIDWEST GUARDRAIL SYSTEM  
(MGS) GUARDRAIL

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
June 2014  
DATE /S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER  
FHWA

GENERAL NOTES

- (A) THE SLOPE IN THE AREA BOUNDED BY THE GRADELINE, THE HINGE POINT LINE (HPL), AND THE CLEAR ZONE LIMITS (CZL) SHALL BE 4:1 OR FLATTER.
- (B) AFTER FINAL ASSEMBLY, RECHECK CABLE TO BE SURE IT IS TAUT AND HAS NOT RELAXED.
- (C) DIFFERENT MANUFACTURES REQUIRE DIFFERENT PERFORATED W-BEAM RAIL END PANELS. SEE MANUFACTURES INFORMATION.
- (D) THE TOP OF THE STEEL TUBE ON POST 1 AND POST 2 SHALL NOT BE MORE THAN 3" ABOVE THE FINISH GROUND ELEVATION.
- (E) ATTACH ALUMINUM SHEET TO E.A.T. HEAD USING 4 STAINLESS STEEL SELF-TAPPING SCREWS, ONE SCREW PER CORNER.
- (G) 1/2" DIAMETER X 3" LONG LAG BOLT AND WASHER.
- (H) HARDWARE VARIES BETWEEN DIFFERENT MANUFACTURES. SEE MANUFACTURE'S DRAWING FOR INFORMATION.
- (I) DIMENSIONS MAY VARY. SEE MANUFACTURE'S INFORMATION.

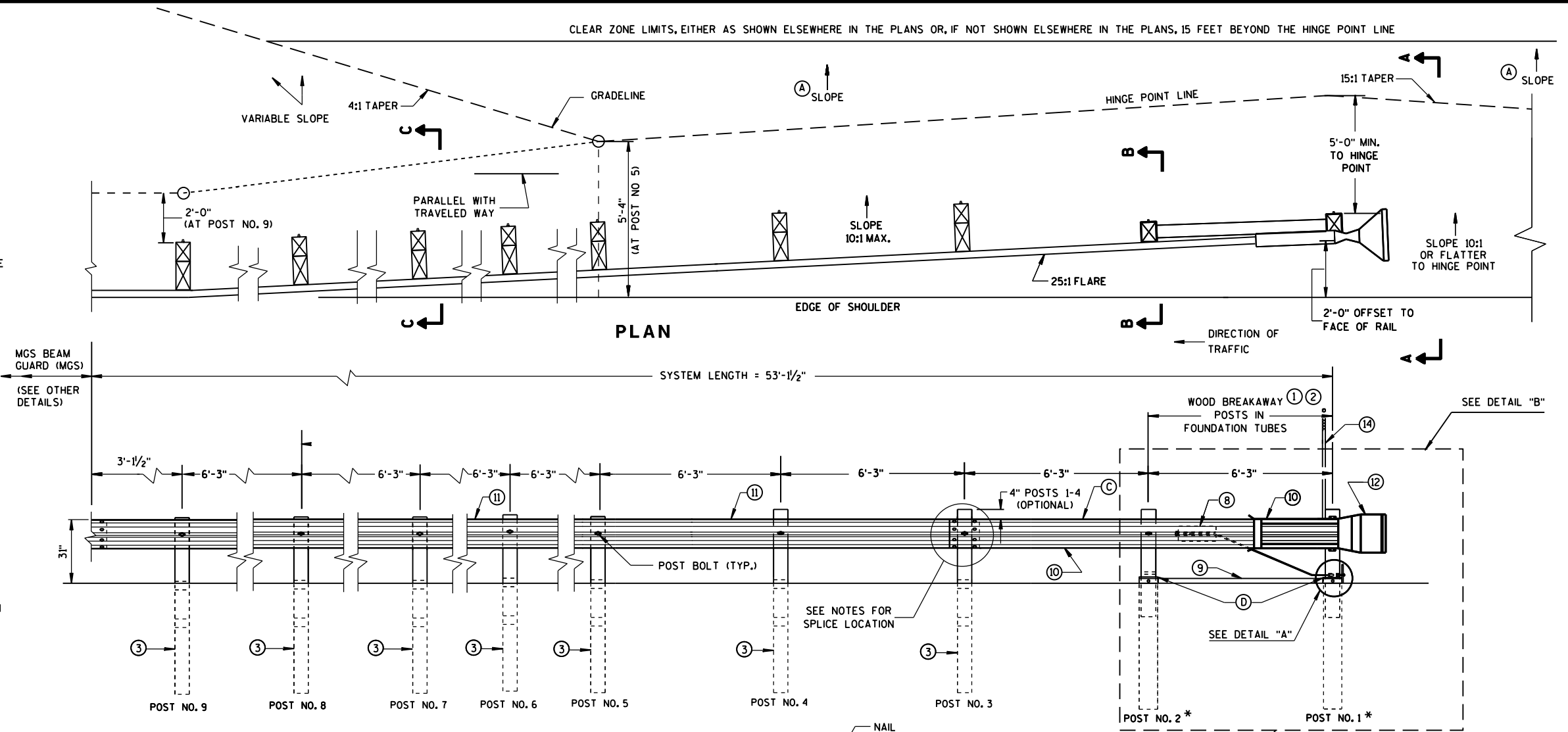
SEE SDD 14B42 FOR MORE INFORMATION.

\* DO NOT ATTACH BLOCKOUTS TO POSTS 1 AND 2.

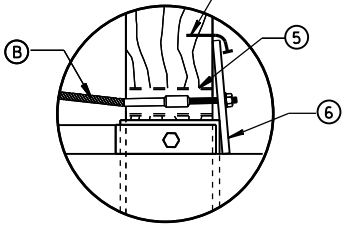
DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL.

W-BEAM RAIL SPLICES ARE LOCATED AT POST NUMBER 3, AND BETWEEN POST 5 AND 6, BETWEEN POSTS 7 AND 8, AND MIDDLE OF THE SPAN AFTER POST 9.

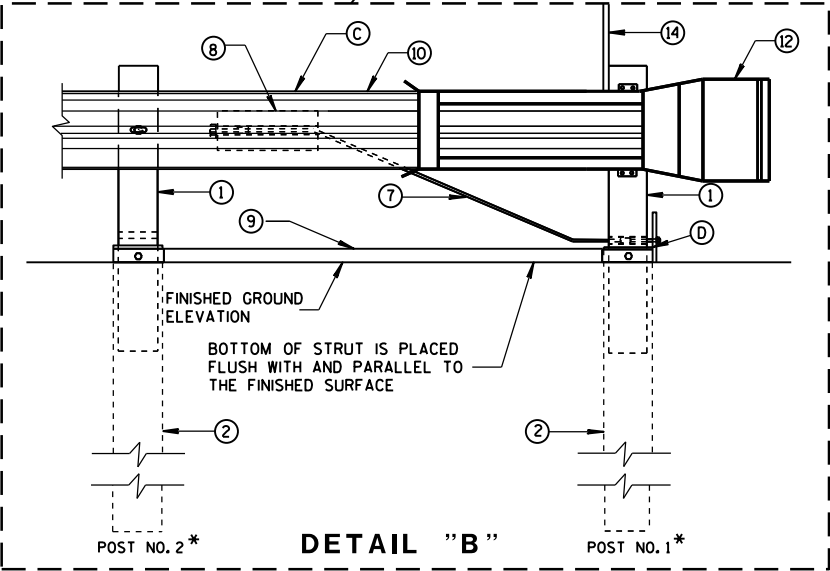
THE CENTER OF THE UPPER 3/2" DIAMETER HOLE ON POST NUMBER 3 THROUGH POST 9 IS TO BE FLUSH WITH THE GROUND LINE UP TO A MAXIMUM OF 2" ABOVE GROUND LINE.



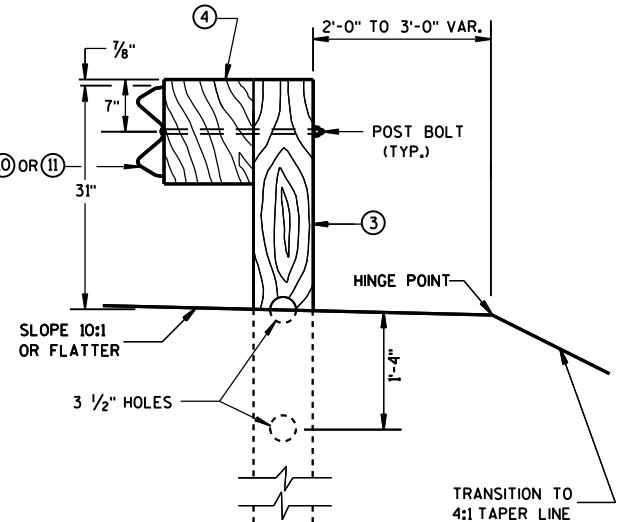
ELEVATION



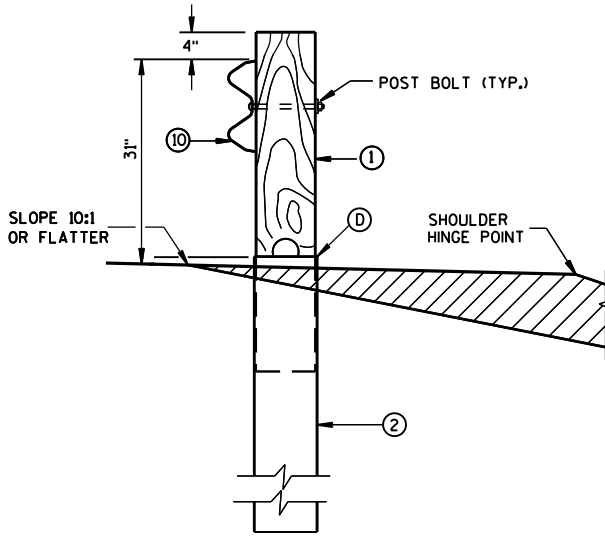
DETAIL "A"



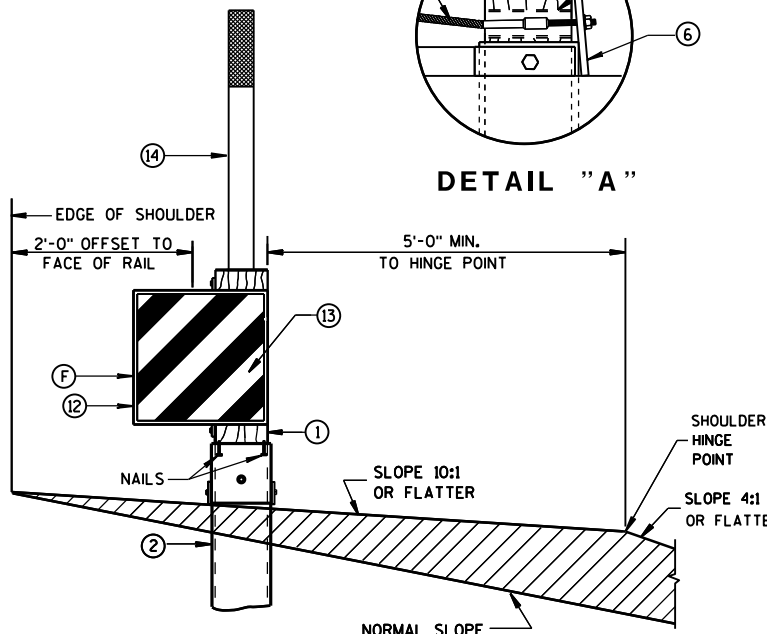
DETAIL "B"



SECTION C-C  
TYPICAL AT POST NOS. 3-9



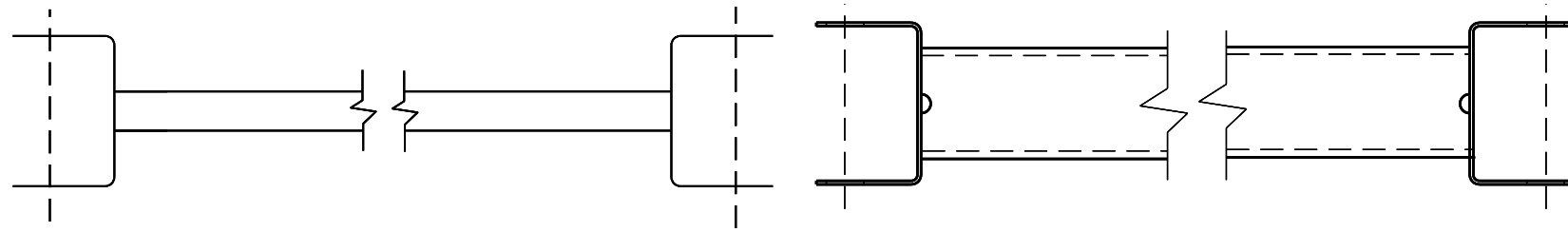
SECTION B-B  
TYPICAL AT POST NO. 2\*



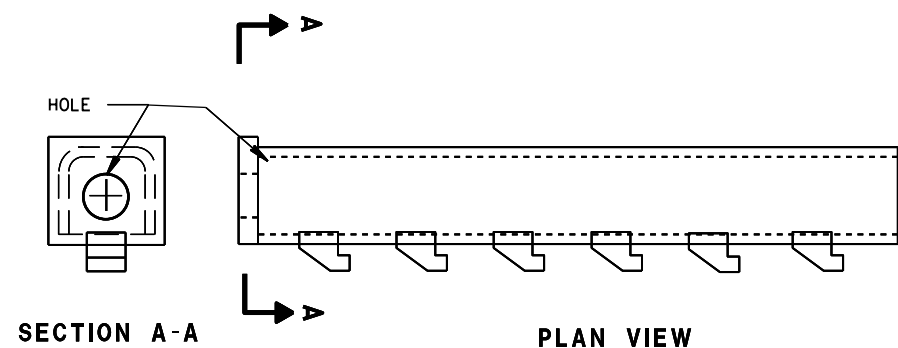
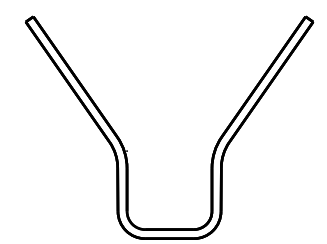
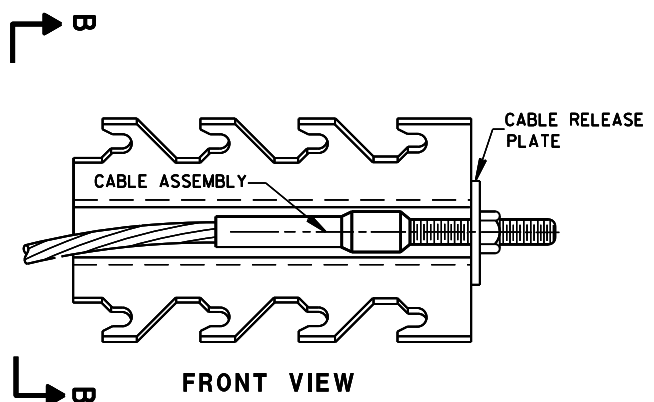
SECTION A-A  
TYPICAL AT POST NO. 1\*

MIDWEST GUARDRAIL SYSTEM  
ENERGY ABSORBING TERMINAL  
(MGS)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



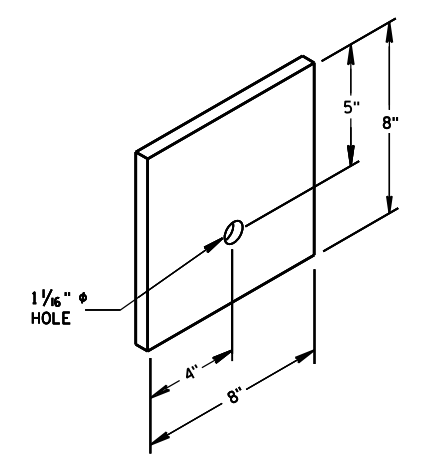
9 H  
GENERIC GROUND STRUT



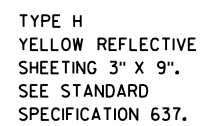
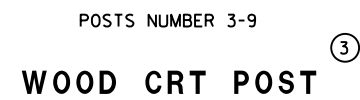
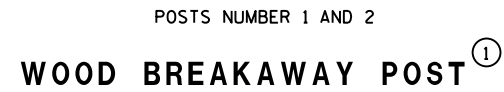
8 H  
GENERIC ANCHOR CABLE BOX

BILL OF MATERIALS

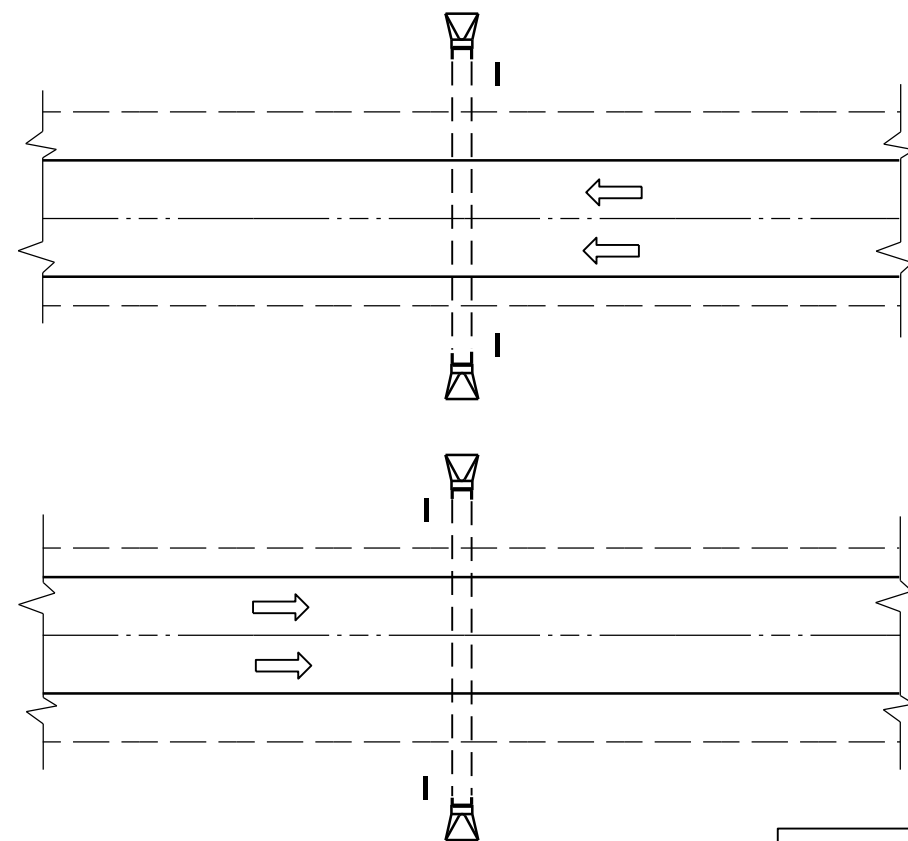
| PART NO.                                                                                     | DESCRIPTION                                                                                          |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| MATERIALS PROVIDED BY MGS EAT MANUFACTURER. SEE MANUFACTURER'S DETAILS FOR MORE INFORMATION. |                                                                                                      |
| ①                                                                                            | WOOD BREAKAWAY POST                                                                                  |
| ②                                                                                            | 6" X 8" X 0.188", 6'-0" LONG FOUNDATION TUBE AT POSTS 1 AND 2                                        |
| ③                                                                                            | WOOD CRT                                                                                             |
| ④                                                                                            | WOOD BLOCKOUT                                                                                        |
| ⑤                                                                                            | PIPE SLEEVE                                                                                          |
| ⑥                                                                                            | BEARING PLATE                                                                                        |
| ⑦                                                                                            | BCT CABLE ASSEMBLY                                                                                   |
| ⑧                                                                                            | ANCHOR CABLE BOX                                                                                     |
| ⑨                                                                                            | GROUND STRUT                                                                                         |
| ⑩                                                                                            | PERFORATED W-BEAM RAIL END PANEL, 12'-6" LONG.                                                       |
| ⑪                                                                                            | STANDARD W-BEAM RAIL. MULTIPLE SECTIONS REQUIRED. SECTIONS VARY IN LENGTH.                           |
| ⑫                                                                                            | END SECTION EAT                                                                                      |
| ⑬                                                                                            | 0.040" ALUMINUM SHEET WITH REFLECTIVE SHEETING TYPE F PER SECTION 637 OF THE STANDARD SPECIFICATIONS |
| ⑭                                                                                            | EAT MARKER POST - YELLOW (SEE APPROVED PRODUCTS LIST)                                                |



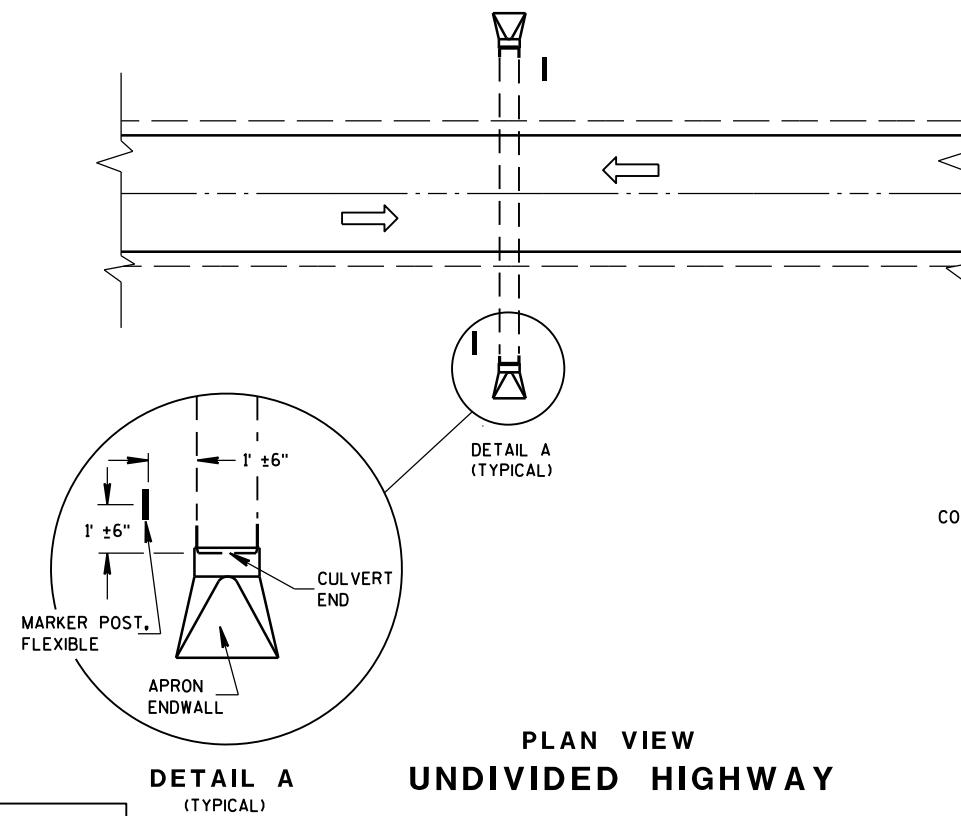
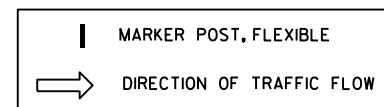
⑥  
BEARING PLATE



|                                                                         |                                                   |
|-------------------------------------------------------------------------|---------------------------------------------------|
| <p>MIDWEST GUARDRAIL SYSTEM<br/>ENERGY ABSORBING TERMINAL<br/>(MGS)</p> |                                                   |
| <p>STATE OF WISCONSIN<br/>DEPARTMENT OF TRANSPORTATION</p>              |                                                   |
| <p>APPROVED<br/>June 2014</p>                                           | <p>/S/ Jerry H. Zogg</p>                          |
| <p>DATE</p>                                                             | <p>ROADWAY STANDARDS DEVELOPMENT<br/>ENGINEER</p> |
| <p>FHWA</p>                                                             |                                                   |



PLAN VIEW  
DIVIDED HIGHWAY

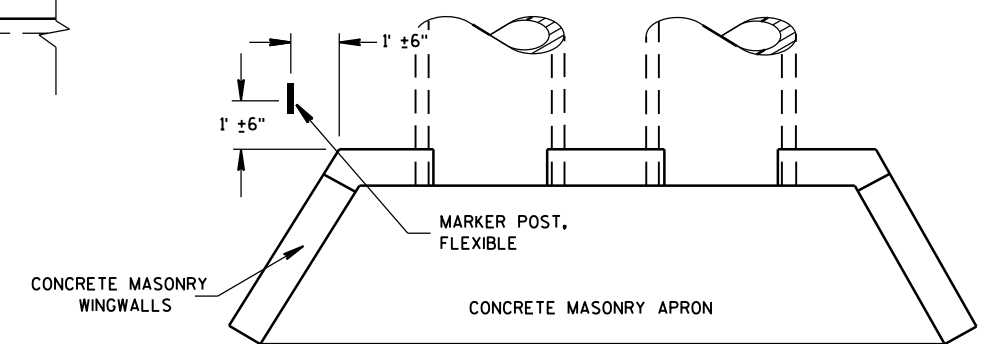


PLAN VIEW  
UNDIVIDED HIGHWAY

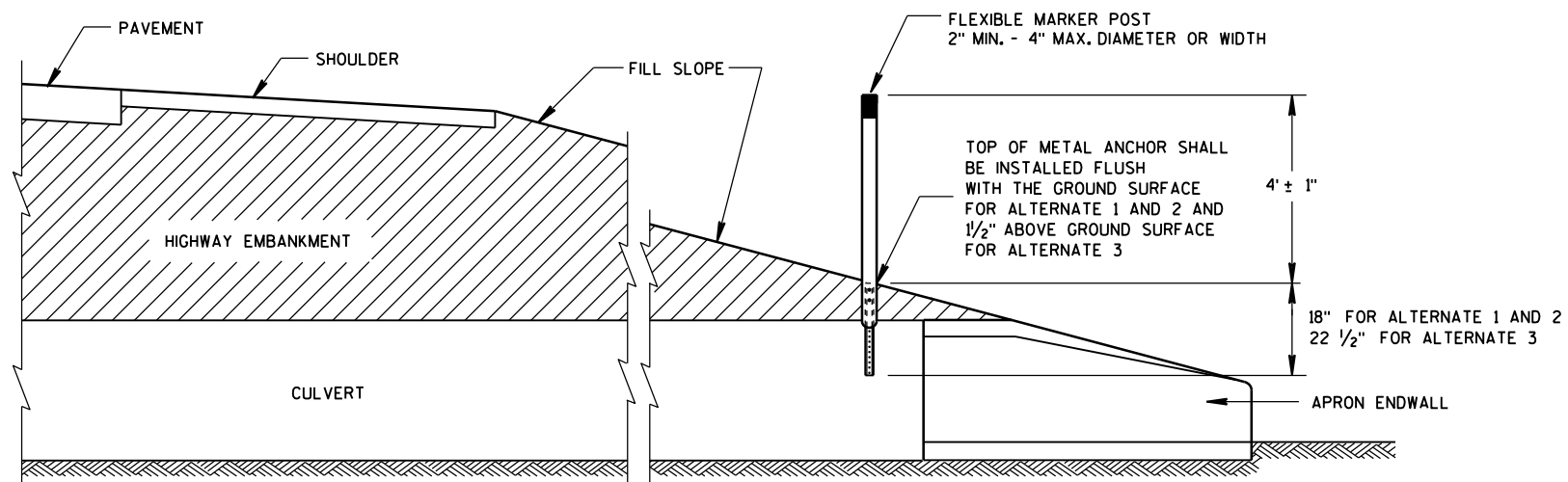
### FLEXIBLE MARKER POST LOCATION

### GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.



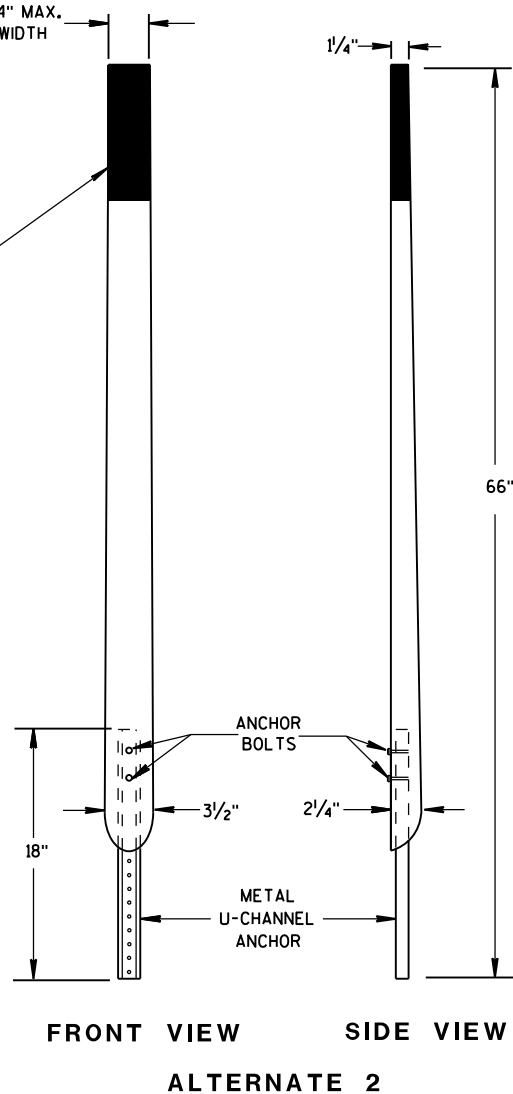
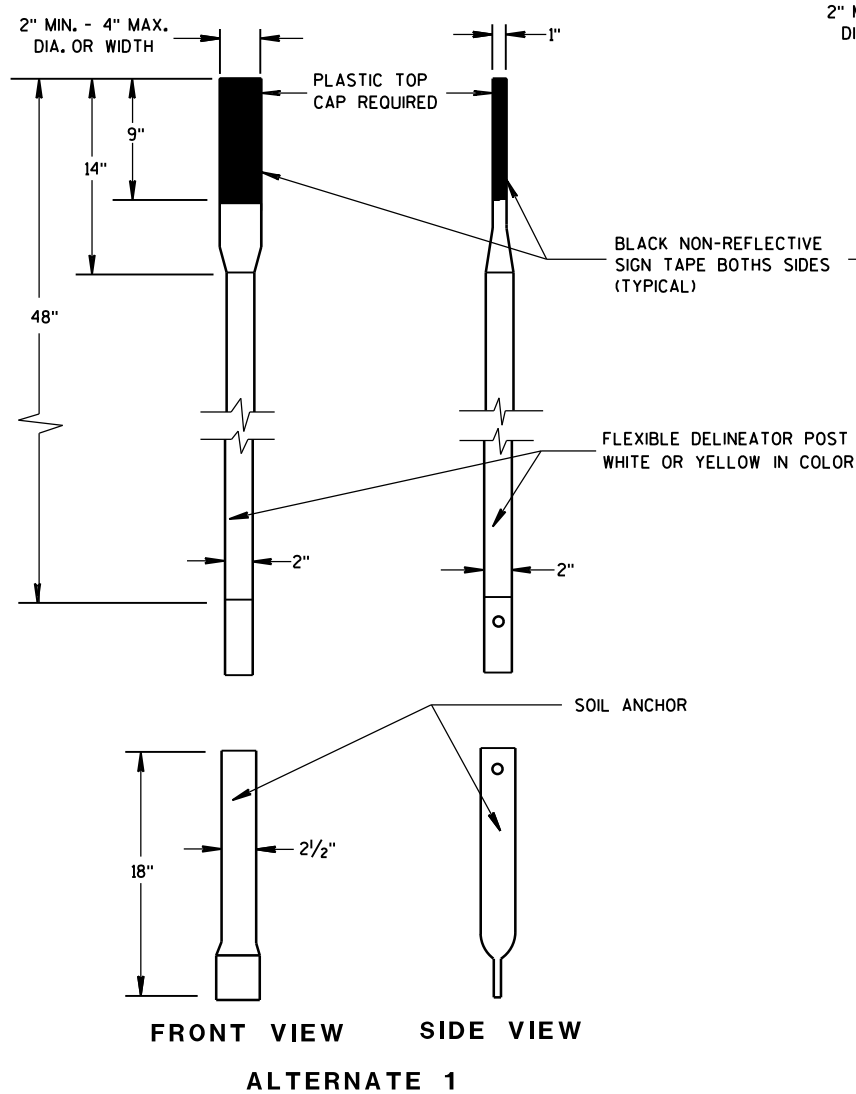
PLAN VIEW  
CONCRETE MASONRY ENDWALLS FOR  
CULVERT PIPE AND PIPE ARCH



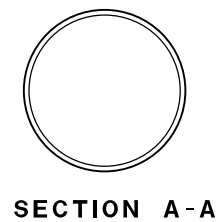
CROSS SECTION  
FLEXIBLE MARKER POST

FLEXIBLE MARKER POST  
FOR CULVERT END

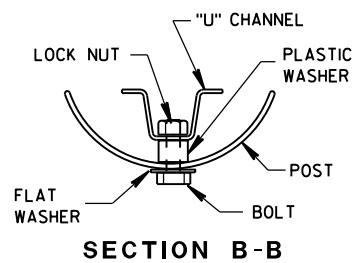
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



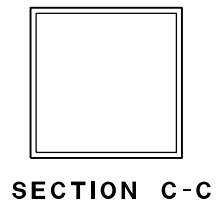
FLEXIBLE MARKER POSTS



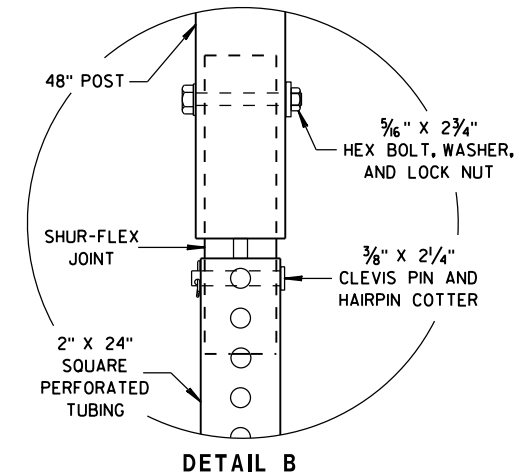
SECTION A-A



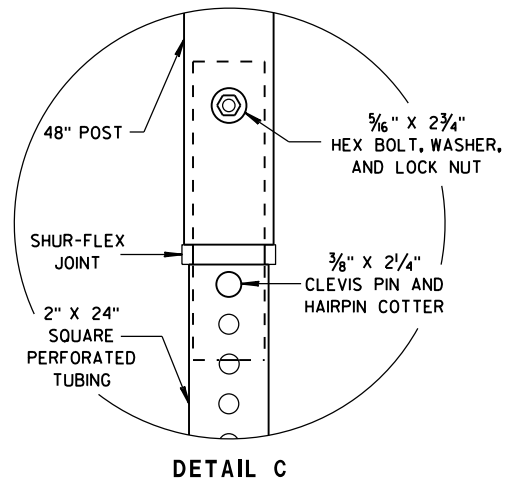
SECTION B-B



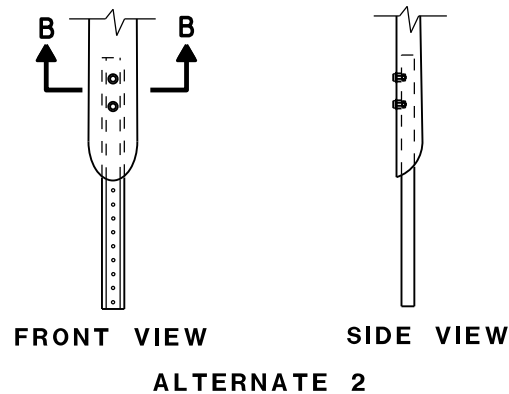
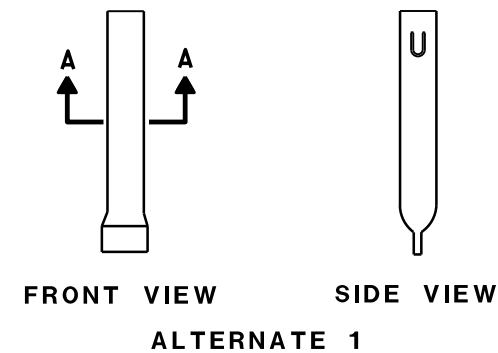
SECTION C-C



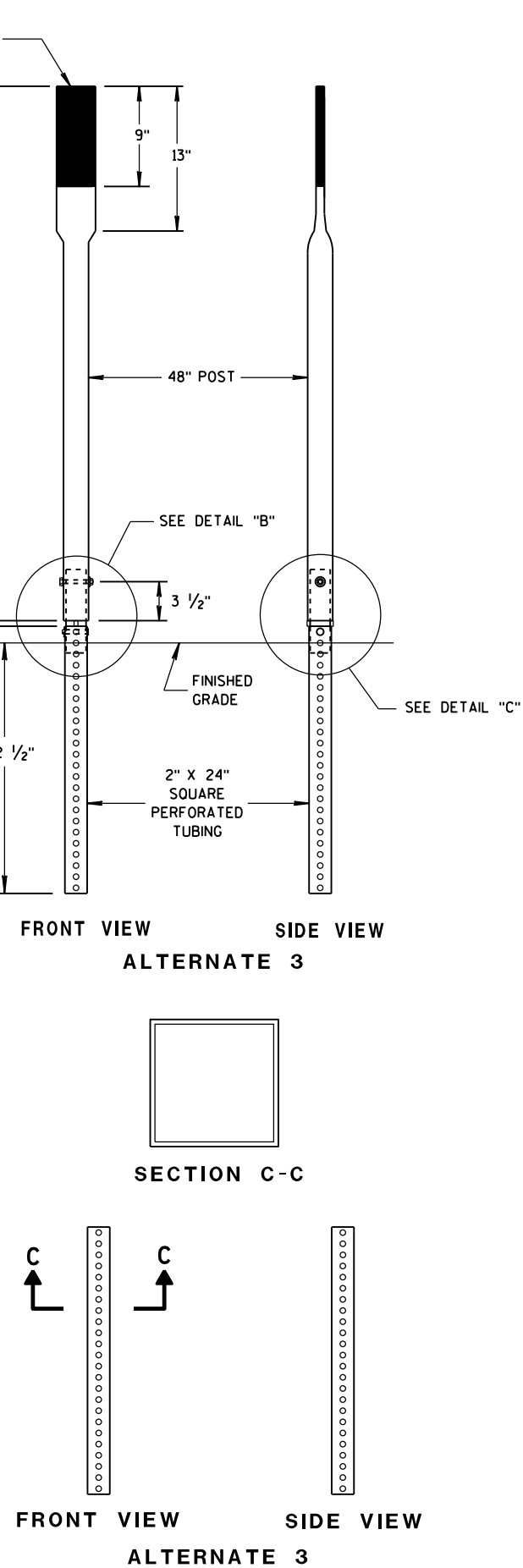
DETAIL B



DETAIL C



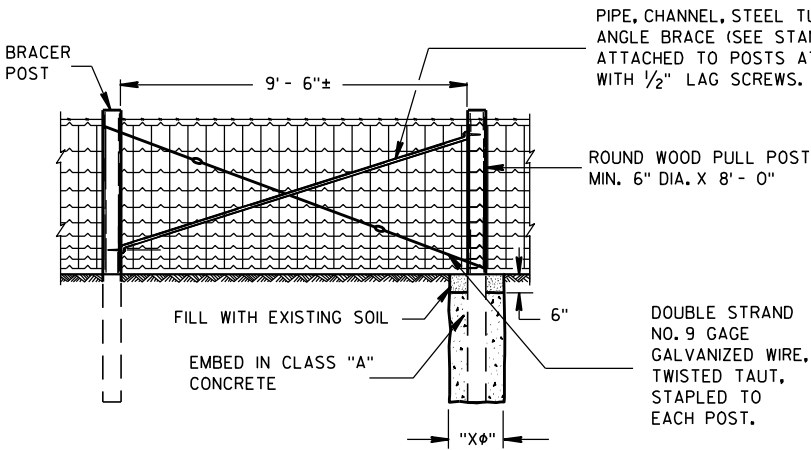
FLEXIBLE MARKER POST ANCHORS



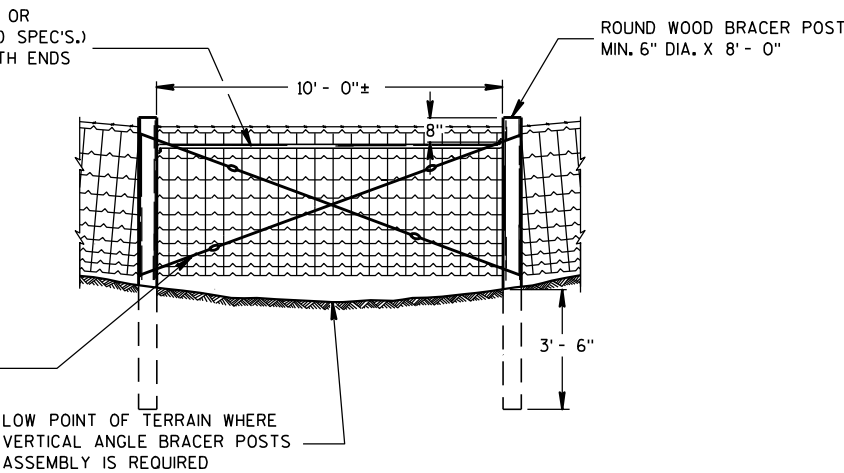
|                                                    |                                                       |
|----------------------------------------------------|-------------------------------------------------------|
| FLEXIBLE MARKER POST FOR CULVERT END               |                                                       |
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION |                                                       |
| APPROVED<br>10/1/2012<br>DATE                      | /S/ Travis Feltes<br>STATE TRAFFIC ENGINEER OF DESIGN |
| FHWA                                               |                                                       |

NOTE: PULL OR STRETCHER POST ASSEMBLIES SHALL BE PLACED MIDWAY BETWEEN END POSTS AND CORNER POSTS WHERE A RUN OF FENCE EXCEEDS 660' BUT IS LESS THAN 1,320'. FOR RUNS OF FENCE IN EXCESS OF 1,320' MAXIMUM SPACING OF PULL OR STRETCHER POST ASSEMBLIES SHALL BE 660'± C-C.

ILLUSTRATION SHOWS POSITION OF STANDARD STEEL BRACE, DOUBLE STRAND GALVANIZED WIRE, AND THE POST TO BE EMBEDDED IN CONCRETE WHEN WIRE FENCE IS INSTALLED FROM LEFT TO RIGHT. THE BRACES SHALL BE POSITIONED ON THE OPPOSITE DIAGONALS AND THE OPPOSITE POST SHALL BE EMBEDDED IN CONCRETE WHEN WIRE FENCE IS INSTALLED FROM RIGHT TO LEFT.



PULL OR STRETCHER POSTS ASSEMBLY



VERTICAL ANGLE BRACER POSTS ASSEMBLY

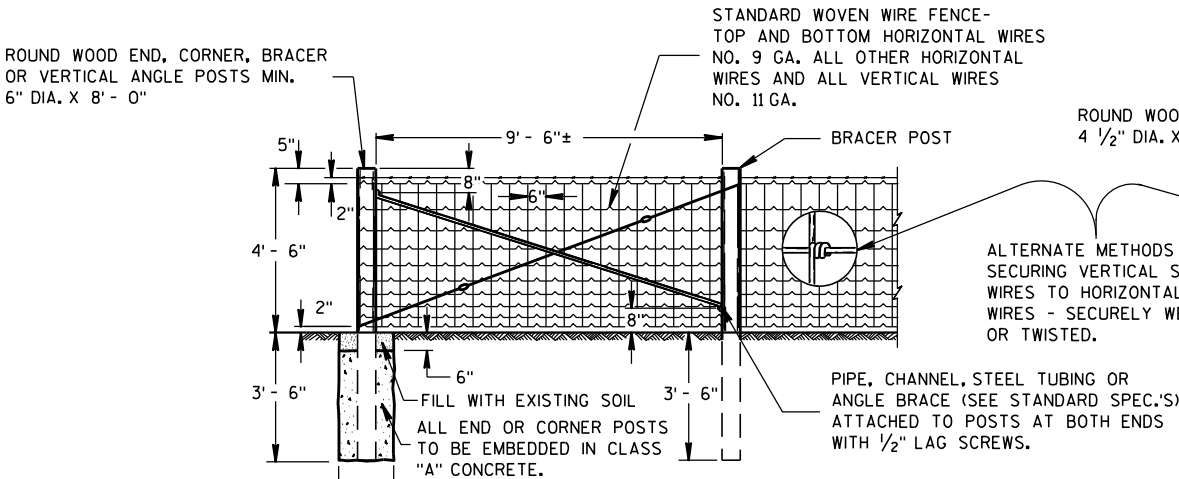
GENERAL NOTES

"Xφ" = DIAMETER OF THE POST PLUS 12".

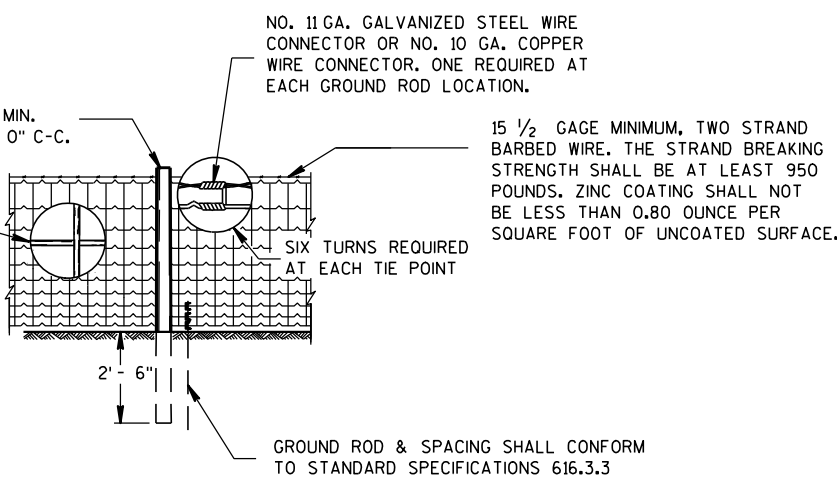
FENCE STAPLES SHOULD NEVER BE DRIVEN VERTICALLY INTO WOOD POSTS (WITH BOTH LEGS PARALLEL WITH THE WOOD GRAIN). DOING SO CAN SEPARATE THE GRAIN AND SIGNIFICANTLY REDUCE THE HOLDING POWER. ROTATING THE STAPLES SLIGHTLY OFF VERTICAL STRADDLES THE GRAIN AND PROVIDES MORE RESISTANCE TO PULL-OUT.

DO NOT STAPLE WIRE TIGHT TO THE LINE POSTS. ALLOW MOVEMENT OF WIRE FOR EXPANSION AND CONTRACTION. STAPLE ARRANGEMENT SHALL BE THE SAME FOR ALL OTHER POSTS EXCEPT THAT THEY SHALL BE DRIVEN TIGHT TO POSTS. ALL STAPLES SHALL BE 2" X 9 GAGE AND SHALL BE MANUFACTURED FROM GALVANIZED WIRE OR HOT DIP GALVANIZED AFTER FORMING. STAPLES SHALL HAVE SLASH-CUT POINTS.

FENCE SHALL BE LOCATED 3'-0" INSIDE THE RIGHT OF WAY LINE UNLESS OTHERWISE INDICATED ON THE PLANS.

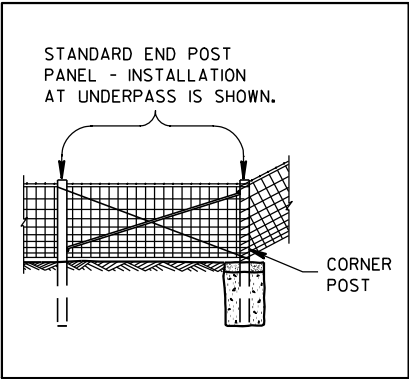


END OR CORNER POSTS ASSEMBLY

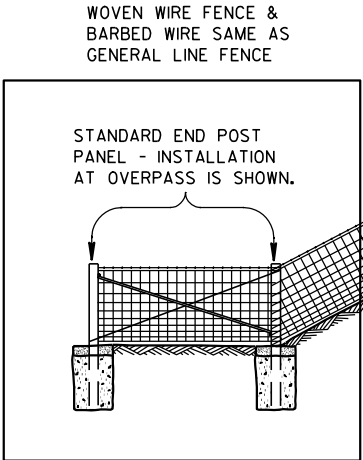


LINE FENCE CONSTRUCTION

GENERAL ROADSIDE VIEW OF WOVEN WIRE FENCE



ALTERNATE FENCE DESIGN AT STRUCTURE



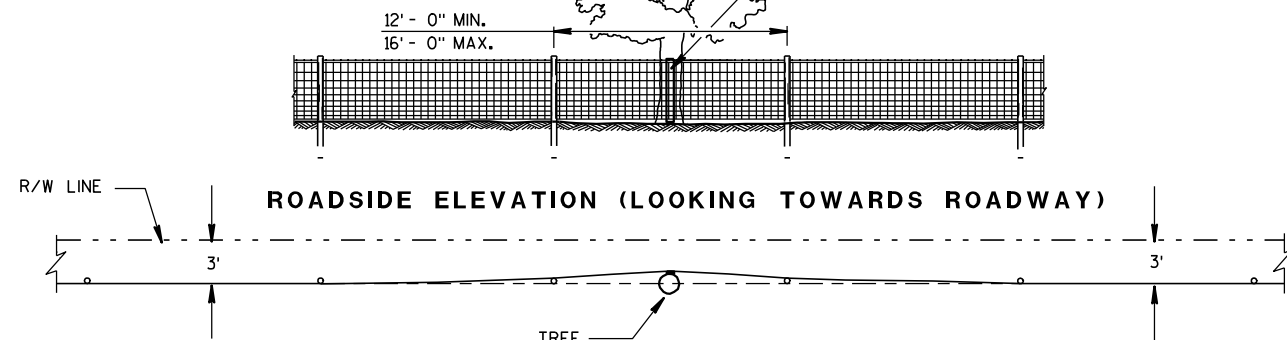
FENCE DESIGN AT STRUCTURE APPROACH

FENCE WOVEN WIRE

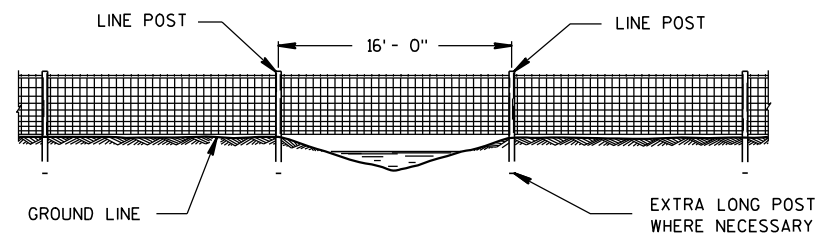
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

NOTE: TREE IN NORMAL FENCE LINE SPECIFICALLY ORDERED BY ENGINEER TO REMAIN IN PLACE.

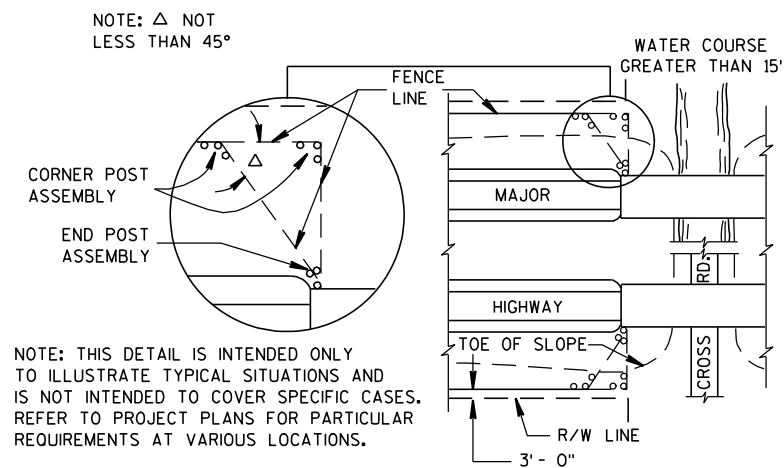
2" X 6" DOUGLAS FIR OR SO. YELLOW PINE PLACED BETWEEN TREE AND WOVEN WIRE FENCE. WOVEN WIRE FENCE AND BARBED WIRE TO BE STAPLED TO 2" X 6" LIKE AS TO LINE POST. 2" X 6" NOT FASTENED TO TREE.



PLAN VIEW  
FENCE DESIGN AT TREES REMAINING  
IN NORMAL FENCE LINE

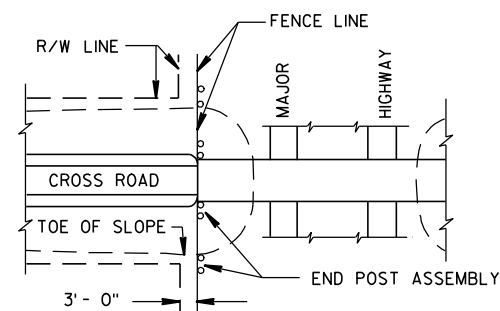


FENCE CONSTRUCTION OVER STREAM  
COURSES OF 15 FT. OR LESS IN WIDTH

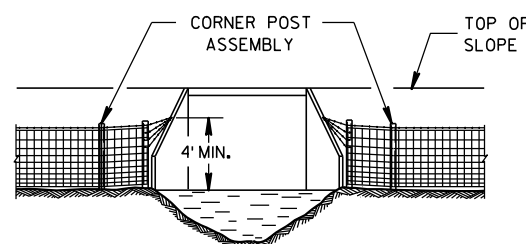


NOTE: THIS DETAIL IS INTENDED ONLY TO ILLUSTRATE TYPICAL SITUATIONS AND IS NOT INTENDED TO COVER SPECIFIC CASES. REFER TO PROJECT PLANS FOR PARTICULAR REQUIREMENTS AT VARIOUS LOCATIONS.

PLAN VIEW  
MAJOR HIGHWAY OVERPASS OR STREAM COURSE  
CROSSING OF GREATER THAN 15 FT. IN WIDTH

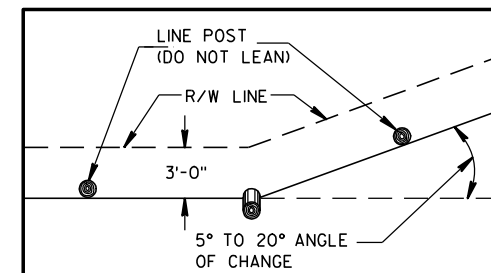


PLAN VIEW  
MAJOR HIGHWAY UNDERPASS

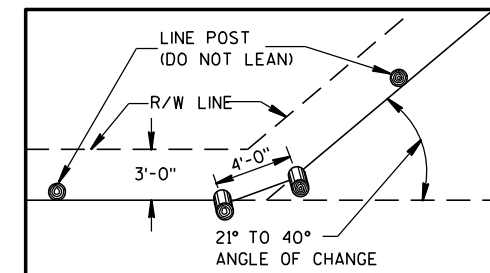


FENCE INSTALLATION TO WINGWALLS

NOTE: PLACE A MINIMUM OF 4 STRANDS OF BARBED WIRE, 6" MAXIMUM CENTERS IN FAN SHAPE CONNECTED TO AN EYE BOLT ON WINGWALL OR SET A LONE POST WHEN NECESSARY TO CONNECT BARBED WIRE.



PLAN VIEW  
SINGLE POST CORNER

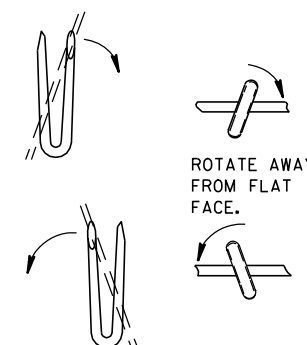


PLAN VIEW  
DOUBLE POST CORNER

## RIGHT OF WAY LINE CHANGE 40° AND LESS

NOTE: SINGLE AND DOUBLE POSTS SHALL BE A MIN. 6" DIA. X 8'-0" WITH A LEAN OF 4" TOWARD THE OUTSIDE OF THE CURVE.

WHEN THE RIGHT OF WAY LINE CHANGE IS MORE THAN 40° USE THE CORNER OR STRETCHER POSTS ASSEMBLY.



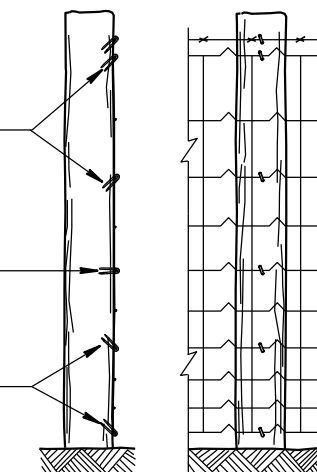
LINE POST

NOTE: WHEN POSTS ARE DRIVEN THE SMALL END SHALL BE DOWN.

STAPLES SLOPED DOWNWARD FOR SUSTAINED GRADES AND OVER KNOLLS.

STAPLES LEVEL FOR LEVEL GROUND.

SLOPE UPWARDS WHEN FENCE TENDS TO LIFT.



END ELEVATION FARM SIDE ELEVATION  
FENCE MOUNTING DETAIL

## FENCE WOVEN WIRE

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

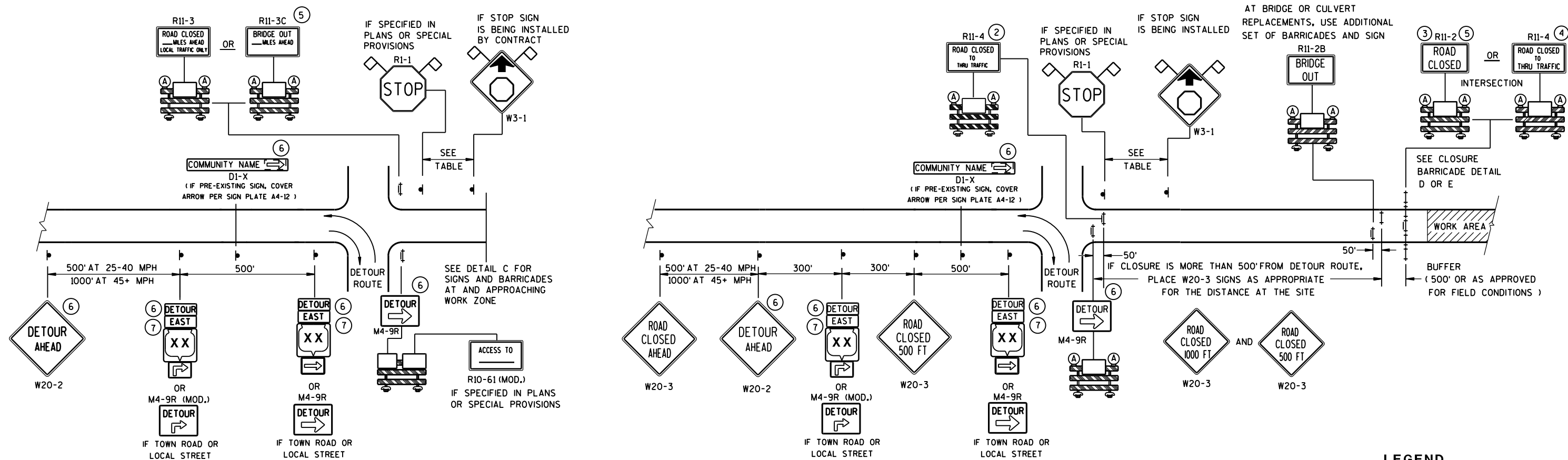
APPROVED

4/4/2008

DATE

FHWA

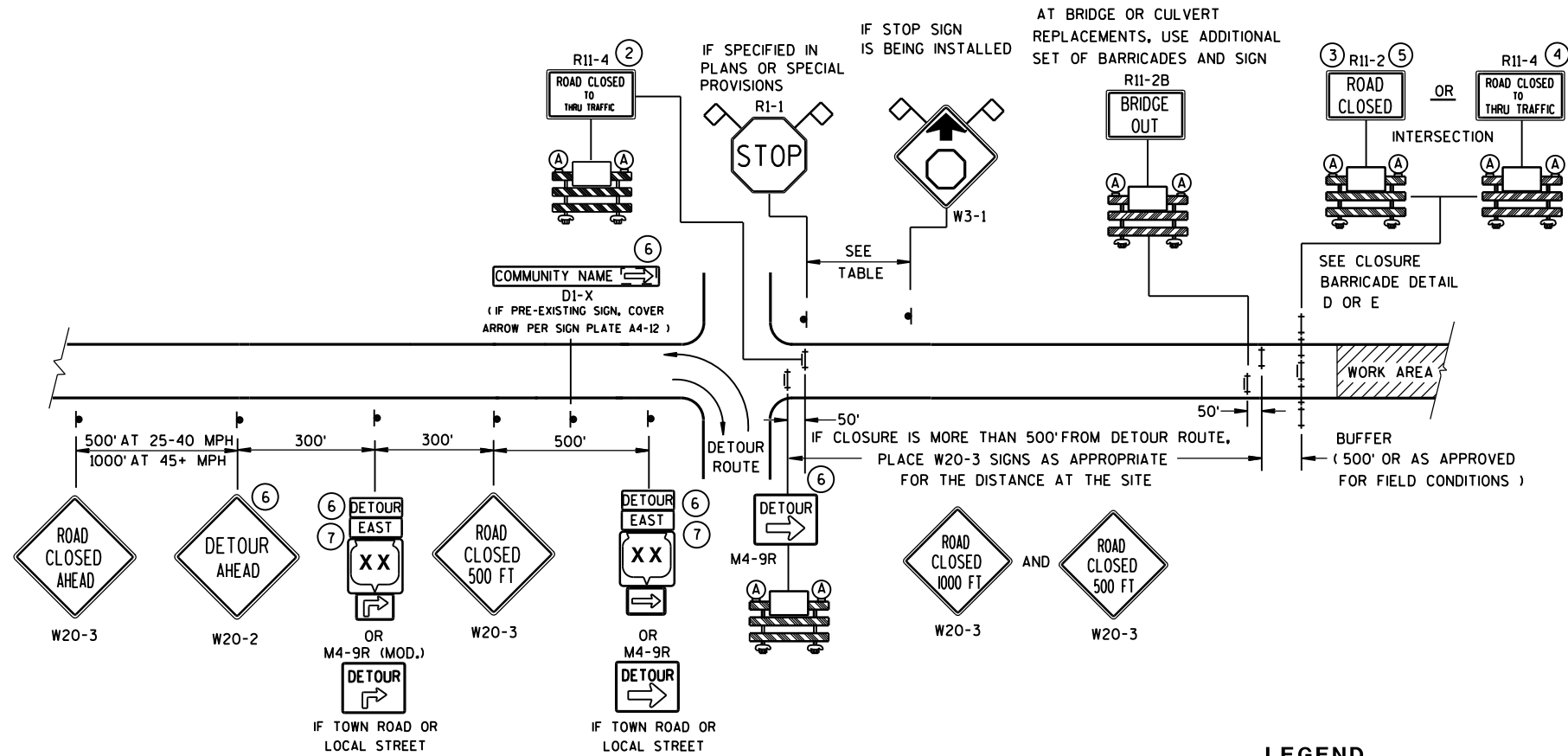
/S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER



DETAIL A

**MAINLINE CLOSURE WITH POSTED DETOUR**

WORK ZONE GREATER THAN 1/2 MILE FROM DETOUR ROUTE ( 1000 FEET IF URBAN )



DETAIL B

**MAINLINE CLOSURE WITH POSTED DETOUR**

WORK ZONE LESS THAN 1/2 MILE FROM DETOUR ROUTE ( 1000 FEET IF URBAN )

### LEGEND

- |                                                                                       |                                          |
|---------------------------------------------------------------------------------------|------------------------------------------|
|  | SIGN ON PERMANENT SUPPORT                |
|  | TYPE III BARRICADE                       |
|  | TYPE III BARRICADE WITH<br>ATTACHED SIGN |
|  | TYPE "A" WARNING LIGHT (FLASHING)        |

 WORK AREA

DETOUR M4-8  
EAST M3-X


 OR
 
 OR
 

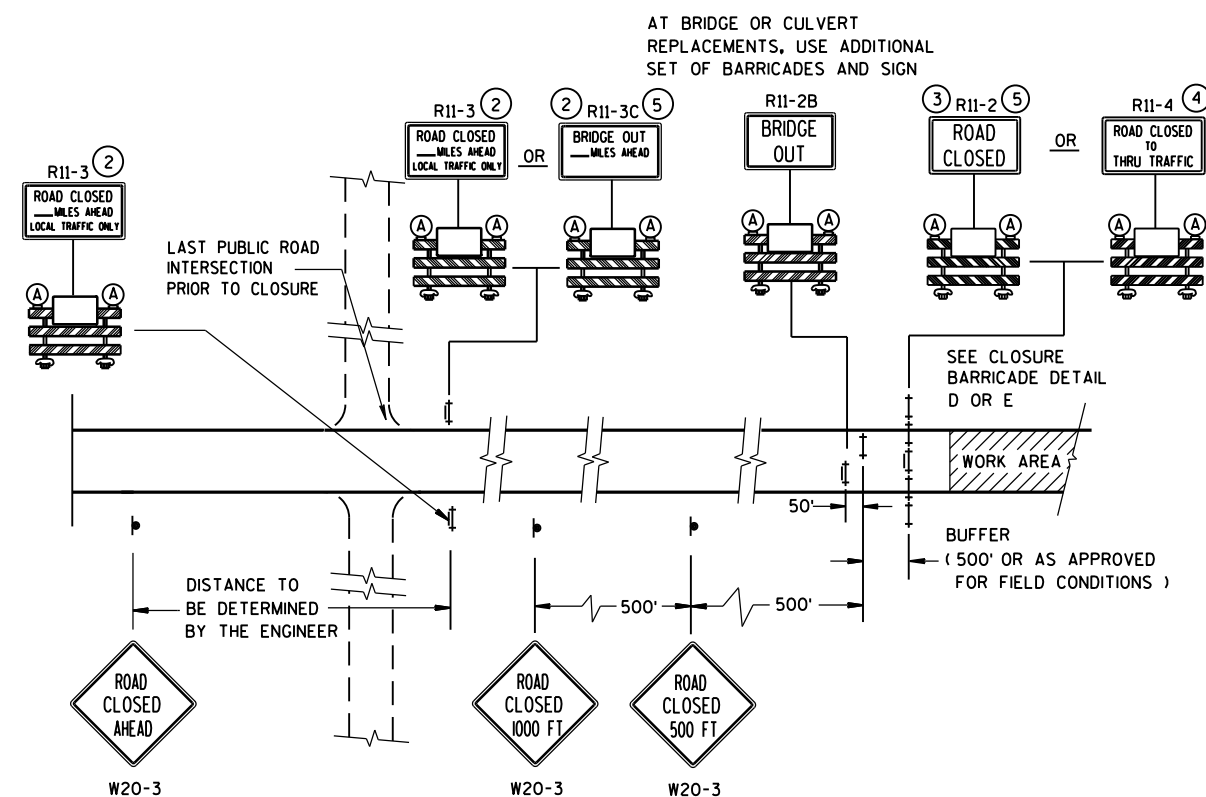
M1-4                      M1-5A                      M1-6

 OR 

M05-1 M06-1

 FLAGS, 16" X 16" MIN., (ORANGE)

| SPEED<br>LIMIT<br>(MPH) | "STOP<br>AHEAD"<br>ADVANCE<br>WARNING<br>DISTANCE<br>(F T) |
|-------------------------|------------------------------------------------------------|
| 25                      | 200                                                        |
| 30                      | 200                                                        |
| 35                      | 350                                                        |
| 40                      | 350                                                        |
| 45                      | 500                                                        |
| 50                      | 550                                                        |
| 55                      | 750                                                        |



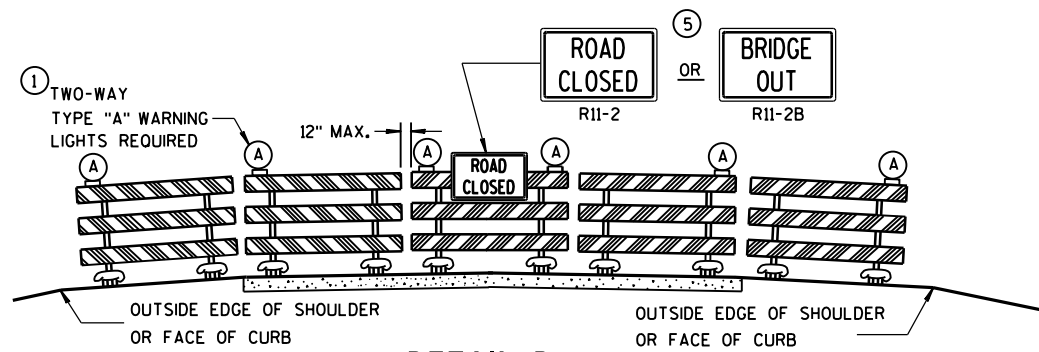
**DETAIL C**  
**MAINLINE CLOSURE, NO POSTED DETOUR**

SEE SDD 15C2-SHEET "b"  
FOR GENERAL NOTES  
AND FOOTNOTES (1) THROUGH (7)

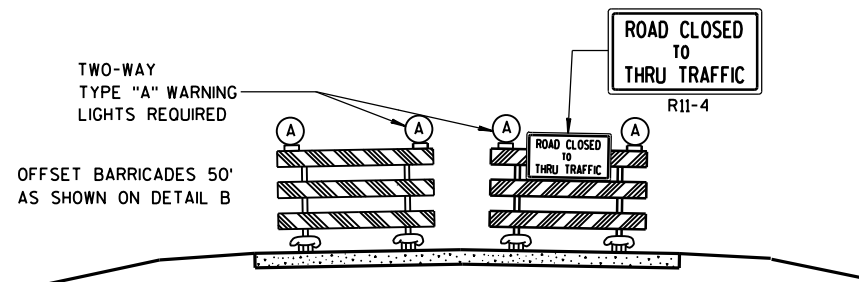
## BARRICADES AND SIGNS FOR MAINLINE CLOSURES

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

8/2013 /S/ Travis Feltes  
DATE STATE TRAFFIC ENGINEER OF DESIGN



DETAIL D  
ROAD CLOSURE BARRICADE DETAIL  
APPROACH VIEW



DETAIL E  
LANE CLOSURE BARRICADE DETAIL  
APPROACH VIEW

SEE SDD 15C2-SHEET "a" FOR LEGEND

### GENERAL NOTES

THE EXACT NUMBER, LOCATION, AND SPACING OF ALL SIGNS AND BARRICADES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

ANY SIGNS TEMPORARY OR EXISTING, WHICH CONFLICT WITH TRAFFIC CONTROL "IN USE" SHALL BE REMOVED OR COVERED AS NEEDED AND AS APPROVED BY THE ENGINEER.

THE SPACING BETWEEN TRAFFIC CONTROL SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND SHOULD PROVIDE A DESIRABLE MINIMUM OF 200 FEET CLEARANCE TO EXISTING SIGNS THAT WILL REMAIN IN PLACE.

BARRICADES THAT MUST BE MOVED FOR A WORK OPERATION SHALL BE IMMEDIATELY RE-ESTABLISHED UPON COMPLETION OF THE OPERATION OR, FOR CONTINUING OPERATIONS, AT THE END OF EACH WORKING DAY.

SIGNS THAT WILL BE IN PLACE LESS THAN 7 CONTINUOUS DAYS AND NIGHTS MAY BE MOUNTED ON PORTABLE SUPPORTS.

ALL TYPE III BARRICADES SHALL HAVE RAILS REFLECTORIZED ON BOTH FACES. STRIPES SHALL BE PROPERLY SLOPED DOWN TOWARD THE TRAFFIC SIDE OR AS SHOWN IN THE ROAD CLOSURE BARRICADE DETAIL D FOR FULL ROAD CLOSURES.

TYPE "A" LOW-INTENSITY FLASHING WARNING LIGHTS SHALL BE VISIBLE ON BOTH SIDES OF THE BARRICADE.

THE R11-2, R11-3, M4-9, R11-4 AND R10-61 SIGNS PLACED ON BARRICADES SHALL COVER NO MORE THAN THE TOP RAIL. THE SIGNS SHALL NOT COVER ANY PORTION OF THE MIDDLE OR BOTTOM RAILS.

"WO" AND "MO" SIGNS ARE THE SAME AS "W" AND "M" SIGNS EXCEPT THE BACKGROUND IS ORANGE.

ALL SIGNS SHALL BE 48" X 48" UNLESS OTHERWISE NOTED BELOW:

R11-2 SHALL BE 48" X 30".

R11-3, R11-4 AND R10-61 SHALL BE 60" X 30".

M4-9 SHALL BE 30" X 24".

M3-X SHALL BE 24" X 12". (36" X 18" IF NEEDED TO MATCH EXISTING SIGNS.)

M4-8 SHALL BE 24" X 12". (30" X 15" IF NEEDED TO MATCH EXISTING SIGNS.)

M1-4, M1-5A, AND M1-6 SHALL BE 24" X 24". (36" X 36" IF NEEDED TO MATCH EXISTING SIGNS.)

M05-1 AND M06-1 SHALL BE 21" X 21". (30" X 30" IF NEEDED TO MATCH EXISTING SIGNS.)

D1-X SHALL BE AS SHOWN ON SPECIFIC PROJECT SIGNING DETAIL SHEETS.

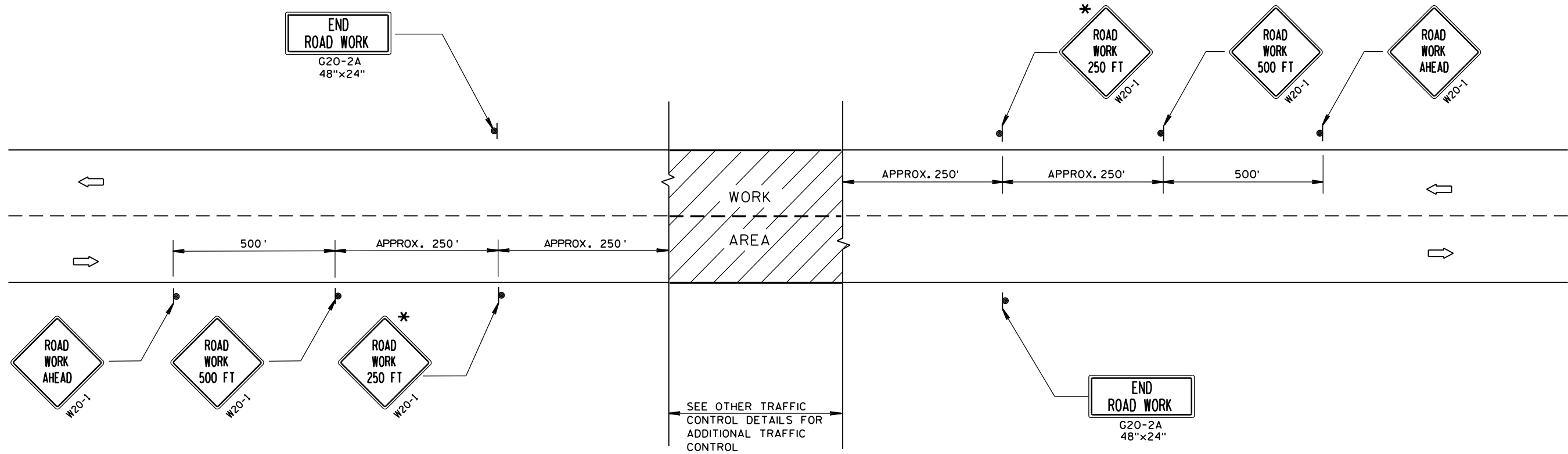
R1-1 SHALL BE 36" X 36".

- 1 TWO WARNING LIGHTS SHALL BE PROVIDED ON THE CENTER BARRICADE AND A MINIMUM OF ONE WARNING LIGHT SHALL BE PROVIDED ON EACH OF THE OTHER BARRICADES WITHIN THE ROADWAY LIMITS. SPACING OF THE WARNING LIGHTS SHALL BE UNIFORM TO THE EDGE OF ROADWAY AS SHOWN (APPROX. 8-FOOT LIGHT SPACING).
- 2 THESE SIGNS AND BARRICADES ARE NOT REQUIRED IF ROAD CLOSURE BEGINS AT INTERSECTION.
- 3 FOR ROAD CLOSURE WITHOUT LOCAL ACCESS TO PROJECT, SEE ROAD CLOSURE BARRICADE DETAIL D.
- 4 FOR ROAD CLOSURE WITH LOCAL ACCESS TO PROJECT, SEE LANE CLOSURE BARRICADE DETAIL E.
- 5 FOR BRIDGE OR CULVERT REPLACEMENTS, SUBSTITUTE "BRIDGE OUT" INSTEAD OF "ROAD CLOSED" ON R11-2 AND R11-3 SIGNS.
- 6 INSTALL DETOUR AND COMMUNITY GUIDE SIGNS AND ARROWS ONLY IF SPECIFIED IN THE CONTRACT. IF THERE ARE EXISTING ROUTE MARKER ASSEMBLIES THAT WILL REMAIN IN PLACE, ADJUST THE LOCATION OF THE DETOUR ROUTE SIGNS TO CORRESPOND WITH THE EXISTING ASSEMBLIES. MODIFY EXISTING SIGNS WHERE POSSIBLE. SEE SPECIFIC PROJECT DETOUR SIGNING DETAIL SHEETS. IF DETOUR SIGNS ARE BEING INSTALLED BY OTHERS, PLACE THE CONTRACTED TRAFFIC CONTROL SIGNS TO ALLOW FOR PLACEMENT OF ALL WARNING, DETOUR AND GUIDE SIGNS AS SHOWN.
- 7 "EAST" CARDINAL DIRECTION MARKERS AND RIGHT TURN ARROWS ARE SHOWN. USE OTHER CARDINAL DIRECTIONS AND ARROWS AS APPROPRIATE.

BARRICADES AND SIGNS  
FOR  
MAINLINE CLOSURES

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

8/2013 /S/ Travis Feltes  
DATE STATE TRAFFIC ENGINEER OF DESIGN  
FHWA



TYPICAL SIDEROAD APPROACH WARNING SIGN DETAIL

## GENERAL NOTES

THE EXACT NUMBER, LOCATION, AND SPACING OF ALL SIGNS AND DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS.

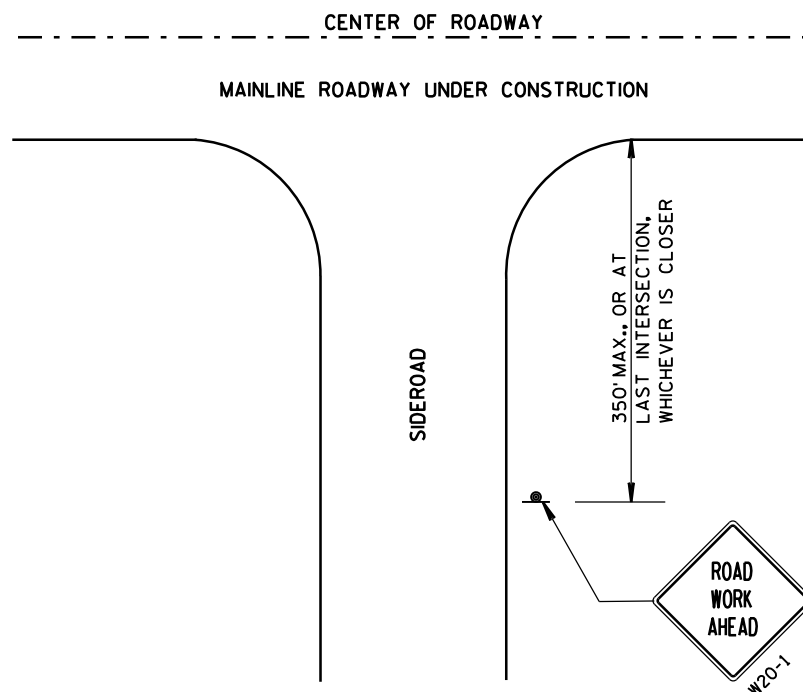
THE SPACING BETWEEN TRAFFIC CONTROL SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND SHOULD PROVIDE A DESIRABLE MINIMUM OF 200 FEET CLEARANCE TO EXISTING SIGNS THAT WILL REMAIN IN PLACE.

ALL SIGNS ARE 48"x48" UNLESS OTHERWISE NOTED. IF NECESSARY DUE TO SPACE CONSTRAINTS, 36"x36" SIGNS MAY BE USED INSTEAD OF 48"x48" SIGNS.

SIGNS THAT WILL BE IN PLACE LESS THAN 7 CONTINUOUS DAYS AND NIGHTS MAY BE MOUNTED ON PORTABLE SUPPORTS.

IF A "STOP" SIGN MUST BE REMOVED FOR A WORK OPERATION, A TEMPORARY "STOP" SIGN SHALL BE PLACED PRIOR TO THE SIGN REMOVAL, OR A FLAGGER SHALL BE PROVIDED UNTIL THE SIGN IS RE-ESTABLISHED.

\* THE THIRD W20-1 SIGN IS REQUIRED ONLY IF THERE IS AN INTERSECTION BETWEEN THE "ROAD WORK 500 FT" SIGN AND THE WORK ZONE. ADJUST THE PLACEMENT OF THIS SIGN BASED ON INTERSECTION LOCATION AND OTHER FIELD CONDITIONS.



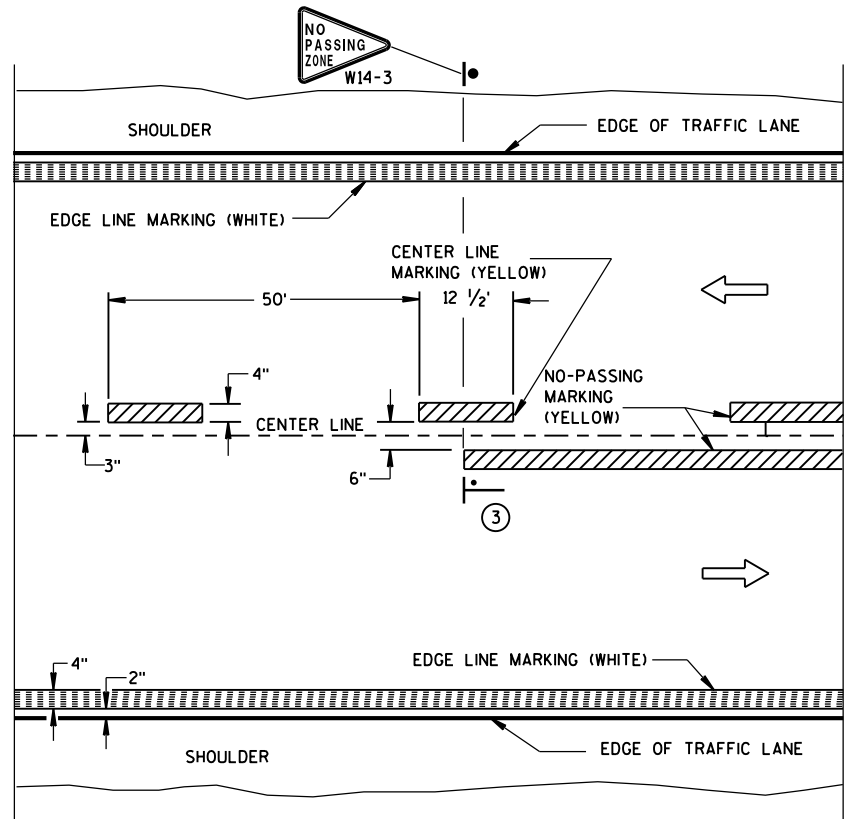
## LEGEND

- SIGN ON PERMANENT SUPPORT
- DIRECTION OF TRAFFIC
- WORK AREA

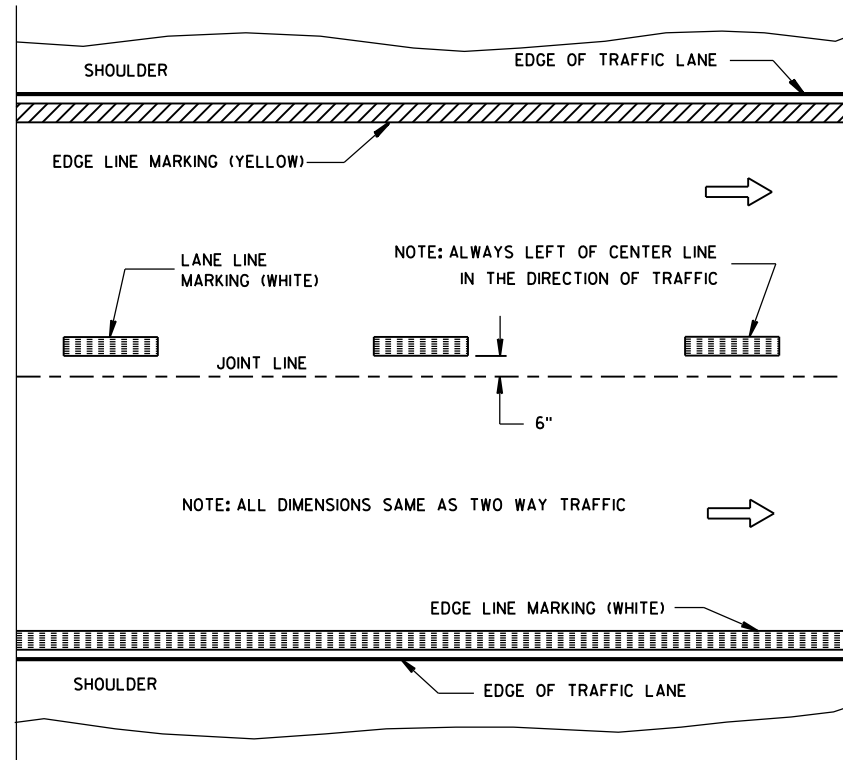
TRAFFIC CONTROL, ADVANCE  
WARNING SIGNS 40 M.P.H.  
OR LESS TWO-WAY UNDIVIDED  
ROAD OPEN TO TRAFFIC

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
8/2013 /S/ Travis Feltes  
DATE STATE TRAFFIC ENGINEER OF DESIGN  
FHWA

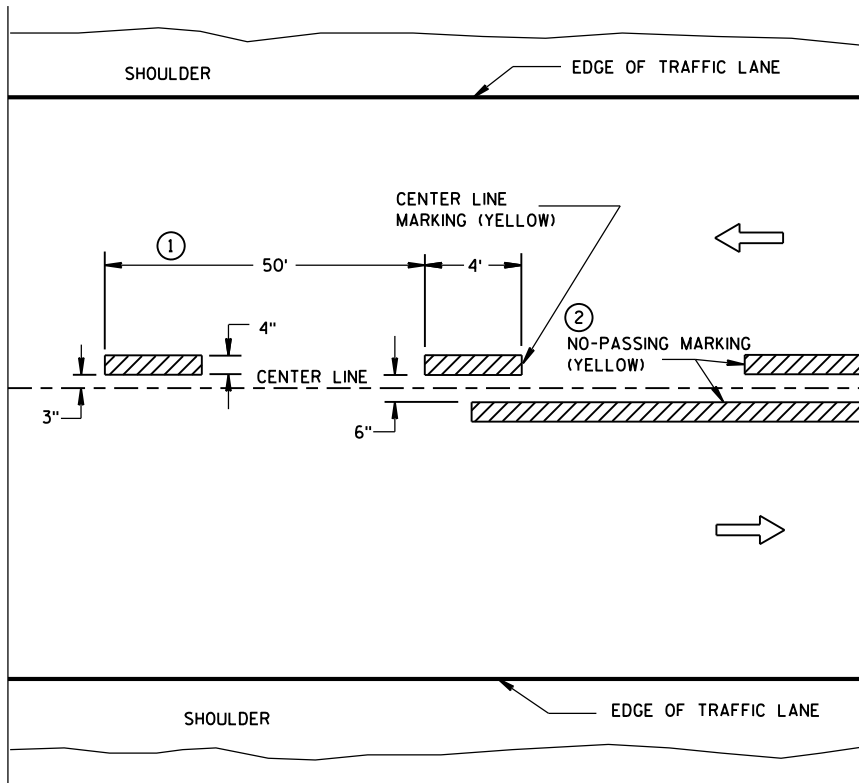


TWO WAY TRAFFIC

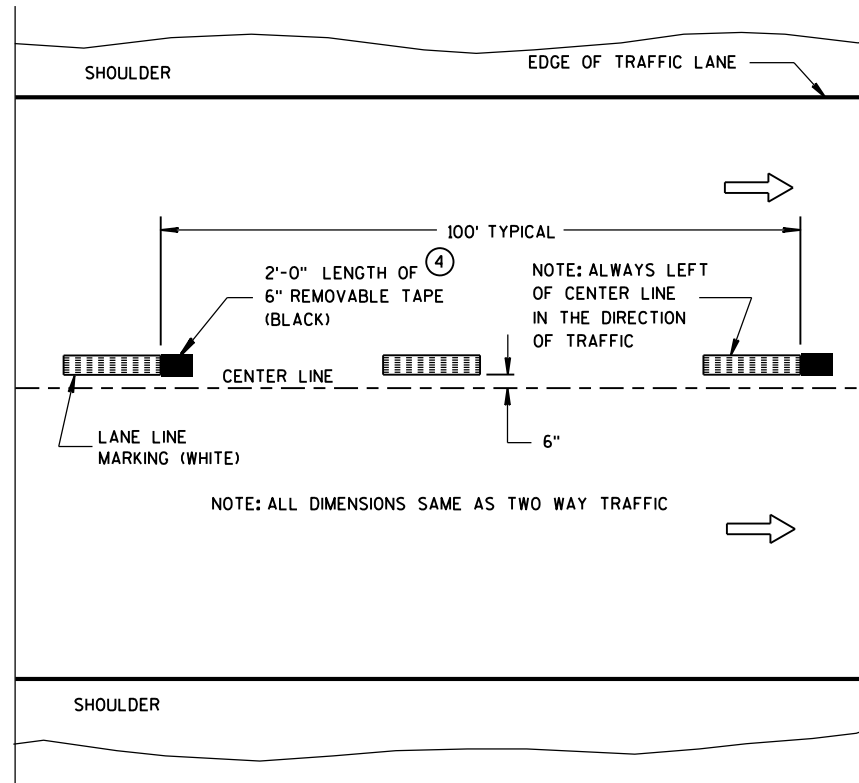


ONE WAY TRAFFIC

PERMANENT PAVEMENT MARKING



TWO WAY TRAFFIC



ONE WAY TRAFFIC

TEMPORARY (INTERMEDIATE) PAVEMENT MARKING  
(SHOWS CYCLE FOR TEMPORARY CENTER LINE OR TEMPORARY LANE LINE MARKING)

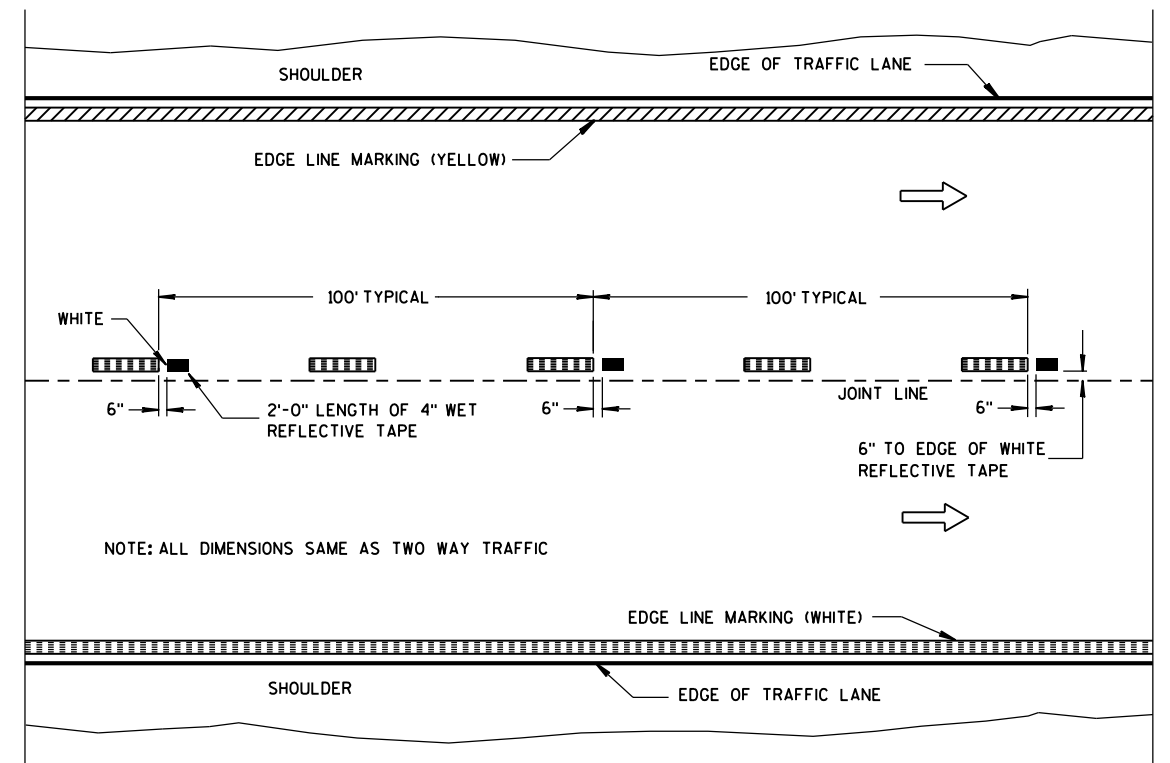
GENERAL NOTES

DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.

- 1 HALF CYCLE LENGTHS (25'±) WITH 2' MINIMUM STRIPE LENGTHS SHALL BE PROVIDED ON ROADWAYS (INCLUDING TEMPORARY TRAVELED WAYS) WITH REVERSE CURVATURE, CURVATURE OF OVER 5 DEGREES OR WHEN DIRECTED BY THE ENGINEER TO MARK UNUSUAL ALIGNMENT OF THE TRAVELED WAY.
- 2 NO PASSING ZONE TEMPORARY PAVEMENT MARKING IS REQUIRED TO BE PLACED, WHERE APPROPRIATE, ALONG WITH CENTERLINE TEMPORARY PAVEMENT MARKING WHEN A SAME DAY PERMANENT PAVEMENT MARKING ITEM IS INCLUDED IN THE CONTRACT.
- 3 NO PASSING ZONE MARKINGS ARE PLACED ACCORDING TO "T" MARKINGS. IF EXISTING NO PASSING ZONE W14-3 SIGNS ARE BEYOND 50 FEET IN EITHER DIRECTION, THE SIGNS SHALL BE MOVED TO THE "T" MARKINGS.
- 4 CONCRETE ONLY.

NOTE

ARROW SYMBOL (→) SHOWS DIRECTION OF TRAVEL



WET REFLECTIVE TAPE SUPPLEMENT TO  
SPRAYED OR NON WET REFLECTIVE TAPE LANE LINE

LEGEND

- "T" MARKING
- POST MOUNTED SIGN

PAVEMENT MARKING  
(MAINLINE)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
5-13-2013 /S/ Travis Feltes  
DATE STATE TRAFFIC ENGINEER  
FHWA

LEGEND

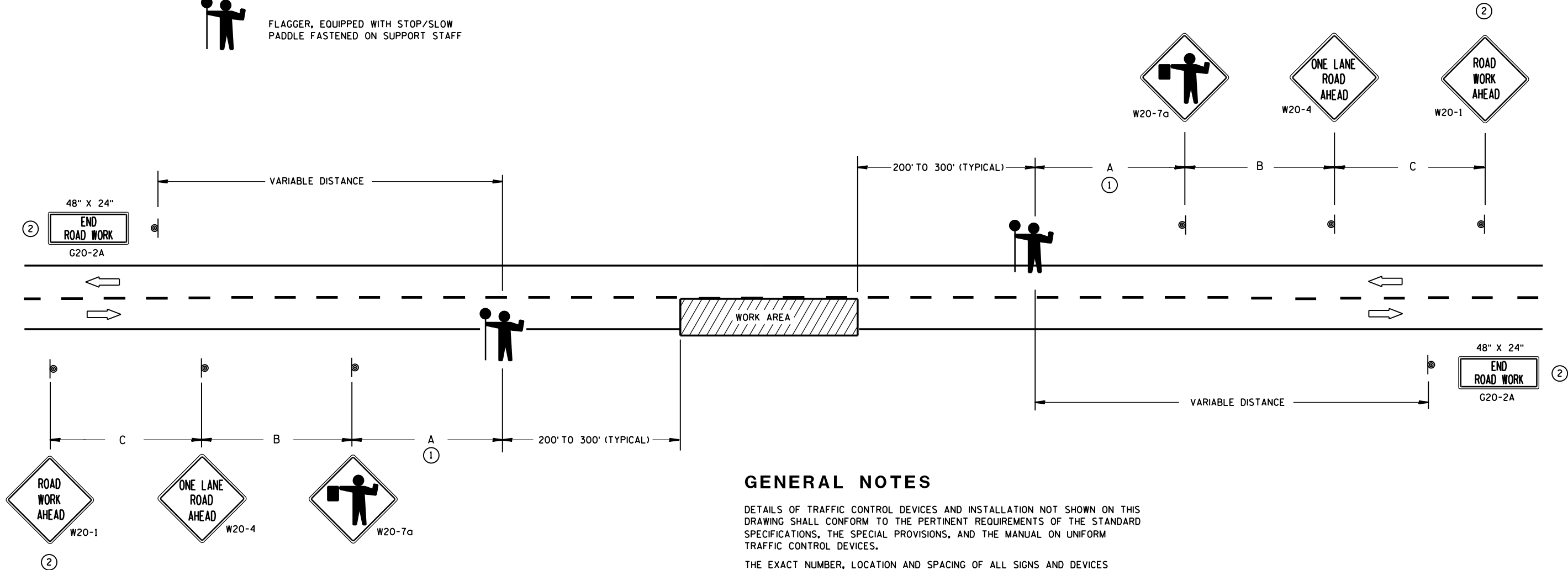
-  SIGN ON PORTABLE OR PERMANENT SUPPORT
-  DIRECTION OF TRAFFIC
-  WORK AREA
-  FLAGGER, EQUIPPED WITH STOP/SLOW PADDLE FASTENED ON SUPPORT STAFF

SIGN SPACING TABLE

| SPEED LIMIT | SIGN SPACING<br>A,B,C |
|-------------|-----------------------|
| 25-35 MPH   | 200'                  |
| 35-40 MPH   | 350'                  |
| 45-55 MPH   | 500'                  |



USE OF THE "BE PREPARED TO STOP" SIGN IS OPTIONAL. WHEN USED, THIS SIGN SHALL BE LOCATED BETWEEN THE W20-7a AND W20-4 SIGNS. A 500' TYPICAL SPACING SHALL BE PROVIDED BETWEEN THE SIGNS.



GENERAL NOTES

DETAILS OF TRAFFIC CONTROL DEVICES AND INSTALLATION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS, THE SPECIAL PROVISIONS, AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

THE EXACT NUMBER, LOCATION AND SPACING OF ALL SIGNS AND DEVICES (AND THE LOCATION OF ALL FLAGGERS) SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

THE FIRST ADVANCE WARNING SIGN SHOULD TYPICALLY BE LOCATED IN ADVANCE OF THE ANTICIPATED TRAFFIC BACKUP OR QUEUE.

WHEN A SIDE ROAD OR RAMP INTERSECTS THE FACILITY ON WHICH THE WORK IS BEING PERFORMED, ADDITIONAL TRAFFIC CONTROLS SHALL BE PROVIDED AS SPECIFIED IN THE PLANS AND/OR THE SPECIAL PROVISIONS OR AS APPROVED BY THE ENGINEER.

FLAGGERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES. THEY SHALL BE EQUIPPED WITH STOP/SLOW PADDLES FASTENED ON SUPPORT STAFFS. WHEN THE FLAGGING OPERATION IS NOT IN EFFECT, COVER OR REMOVE ALL TEMPORARY TRAFFIC CONTROL SIGNS.

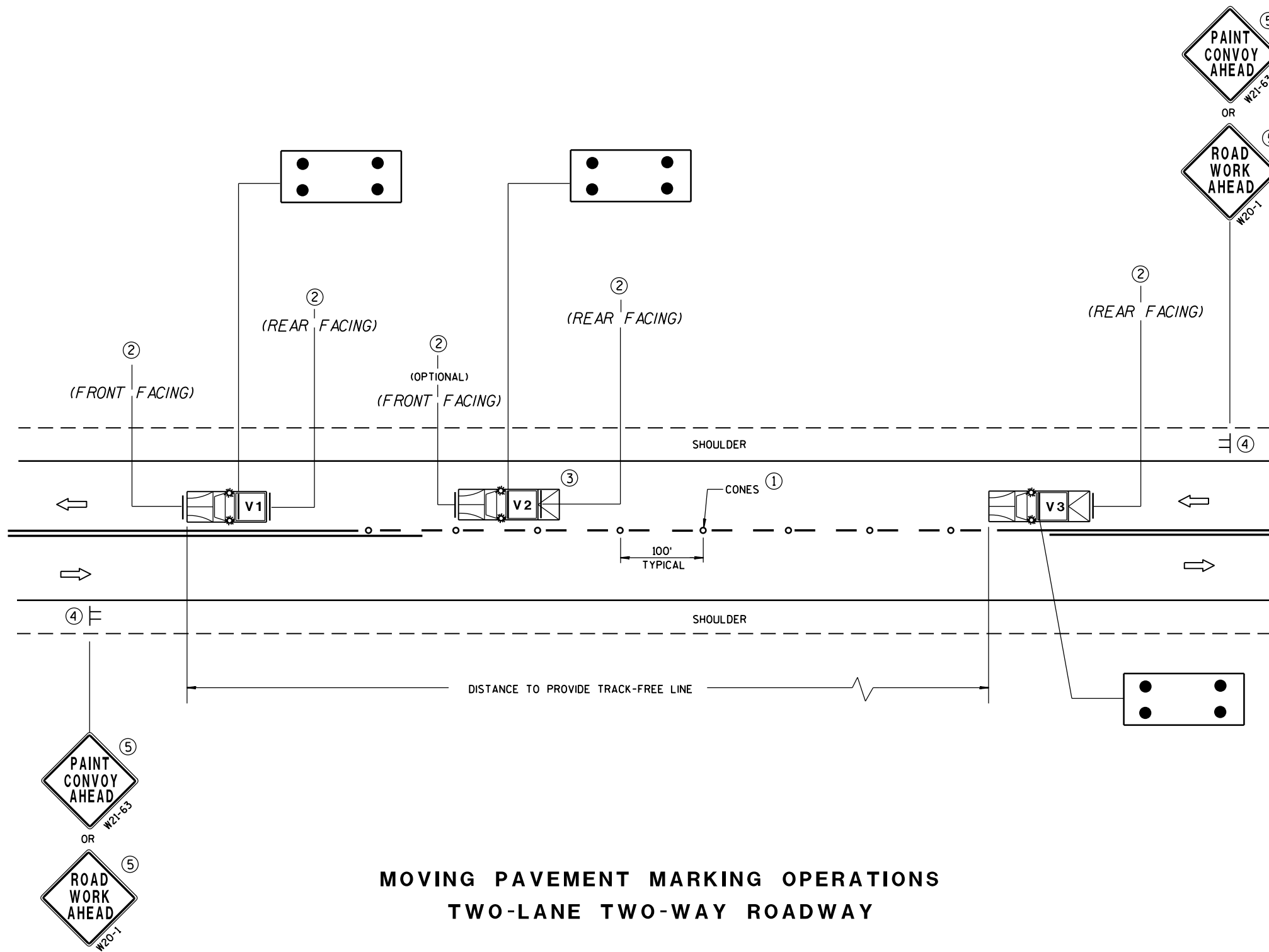
ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE NOTED.

- ① FOR A MOVING WORK OPERATION, SIGNING FOR BOTH DIRECTIONS SHALL BE REESTABLISHED (AS SIMULTANEOUSLY AS PRACTICAL) AT APPROXIMATELY 3500 FOOT INTERVALS IN THE MOVING WORK OPERATION OR AS APPROVED BY THE ENGINEER.
- ② SIGN NOT REQUIRED IF FLAGGING OPERATION OCCURS WITHIN A SIGNED ROAD WORK ZONE AREA.

TRAFFIC CONTROL FOR LANE CLOSURE (SUITABLE FOR MOVING OPERATIONS)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
8/2013 /S/ Travis Feltes  
DATE STATE TRAFFIC ENGINEER OF DESIGN  
FHWA



MOVING PAVEMENT MARKING OPERATIONS  
TWO-LANE TWO-WAY ROADWAY

## GENERAL NOTES

ALL VEHICLES SHALL BE EQUIPPED WITH TWO 360 DEGREE HIGH INTENSITY YELLOW FLASHING LIGHTS OR STROBE LIGHTS AND OPERATED WITH HEADLIGHTS TURNED ON.

VEHICLES SHALL BE EQUIPPED WITH REAR FACING TYPE B OR C FLASHING ARROW PANEL OPERATING IN CAUTION MODE. SIGNS PLACED ON VEHICLES MUST NOT OBSCURE THE ARROW PANEL.

ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE SPECIFIED.

IF SPEED LIMIT IS 40 MPH OR LESS STATIONARY SIGNS MAY BE OMITTED IF CONES ARE USED.

ALTERNATE SIGN MESSAGES, SUCH AS "PAINT CREW AHEAD" OR "ROAD PAINTING AHEAD" MAY BE USED.

DISTANCE BETWEEN VEHICLES MAY VARY ACCORDING TO TERRAIN, SIGHT DISTANCE, PAINT DRYING TIME, AND OTHER FACTORS. WHENEVER ADEQUATE STOPPING SIGHT DISTANCE EXISTS TO THE REAR, SHADOW VEHICLES SHOULD MAINTAIN THE MINIMUM DISTANCE FROM THE WORK VEHICLE AND PROCEED AT THE SAME SPEED AS THE WORK VEHICLE. SHADOW VEHICLES SHOULD SLOW DOWN IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES THAT RESTRICT SIGHT DISTANCE.

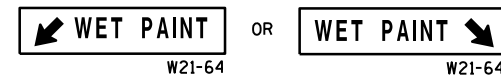
THE WORK AND SHADOW VEHICLES SHOULD PULL OVER PERIODICALLY TO ALLOW TRAFFIC TO PASS.

THIS DRAWING SHALL BE USED FOR CENTERLINE OR EDGELINE MARKING.

WHEN NO WORK ACTIVITY IS TAKING PLACE, REMOVE OR TURN THE STATIONARY WARNING SIGNS AWAY FROM TRAFFIC.

① CONES MAY BE OMITTED ON PAINTED LINE IF APPROVED BY THE ENGINEER. CONSIDER PAVEMENT MARKING DRY OR CURE TIMES AND TRAFFIC VOLUME.

② USE STANDARD SIGN W21-64 WITH APPROPRIATE ARROW.



③ OPTIONAL TRUCK-MOUNTED ATTENUATOR.

④ SIGNS SHALL BE REPEATED APPROXIMATELY EVERY THREE MILES.

⑤ IF CONSTRUCTION WORK ZONE SIGNS ARE IN PLACE, W20-1 OR W21-63 ARE NOT REQUIRED.

## LEGEND

V1 LEAD VEHICLE

V2 SHADOW VEHICLE

V3 TRAIL VEHICLE WITH TMA

TMA TRUCK-MOUNTED ATTENUATOR

SIGN ON TEMPORARY SUPPORT

DIRECTION OF TRAFFIC

CONES

FLASHING ARROW PANEL (CAUTION)

MOVING PAVEMENT MARKING  
OPERATION  
TWO-LANE TWO-WAY ROADWAY

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

5/3/2013  
DATE

/S/ Travis Feltes  
STATE TRAFFIC ENGINEER

FHWA

GENERAL NOTES

THE EXACT NUMBER, LOCATION AND SPACING OF ALL SIGNS AND DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE NOTED. IF NECESSARY DUE TO SPACE CONSTRAINTS IN URBAN AREAS, 36" X 36" SIGNS MAY BE USED IF APPROVED BY DISTRICT TRAFFIC UNIT.

"WO" SIGNS ARE THE SAME AS "W" SIGNS EXCEPT THE BACKGROUND IS ORANGE.

SIGNS THAT WILL BE IN PLACE LESS THAN 7 CONTINUOUS DAYS AND NIGHTS MAY BE MOUNTED ON PORTABLE SUPPORTS.

ANY SIGNS TEMPORARY OR EXISTING, WHICH CONFLICT WITH TRAFFIC CONTROL "IN USE" SHALL BE REMOVED OR COVERED AS NEEDED AND AS APPROVED BY THE ENGINEER.

W20-1 AND G20-2A SIGNS ARE NOT REQUIRED IF THE WORK AREA IS WITHIN A LARGER WORK ZONE WHERE THESE SIGNS ARE ALREADY PRESENT. G20-2A SIGNS MAY ALSO BE OMITTED IF DURATION OF WORK IS LESS THAN 7 CONTINUOUS DAYS AND NIGHTS.

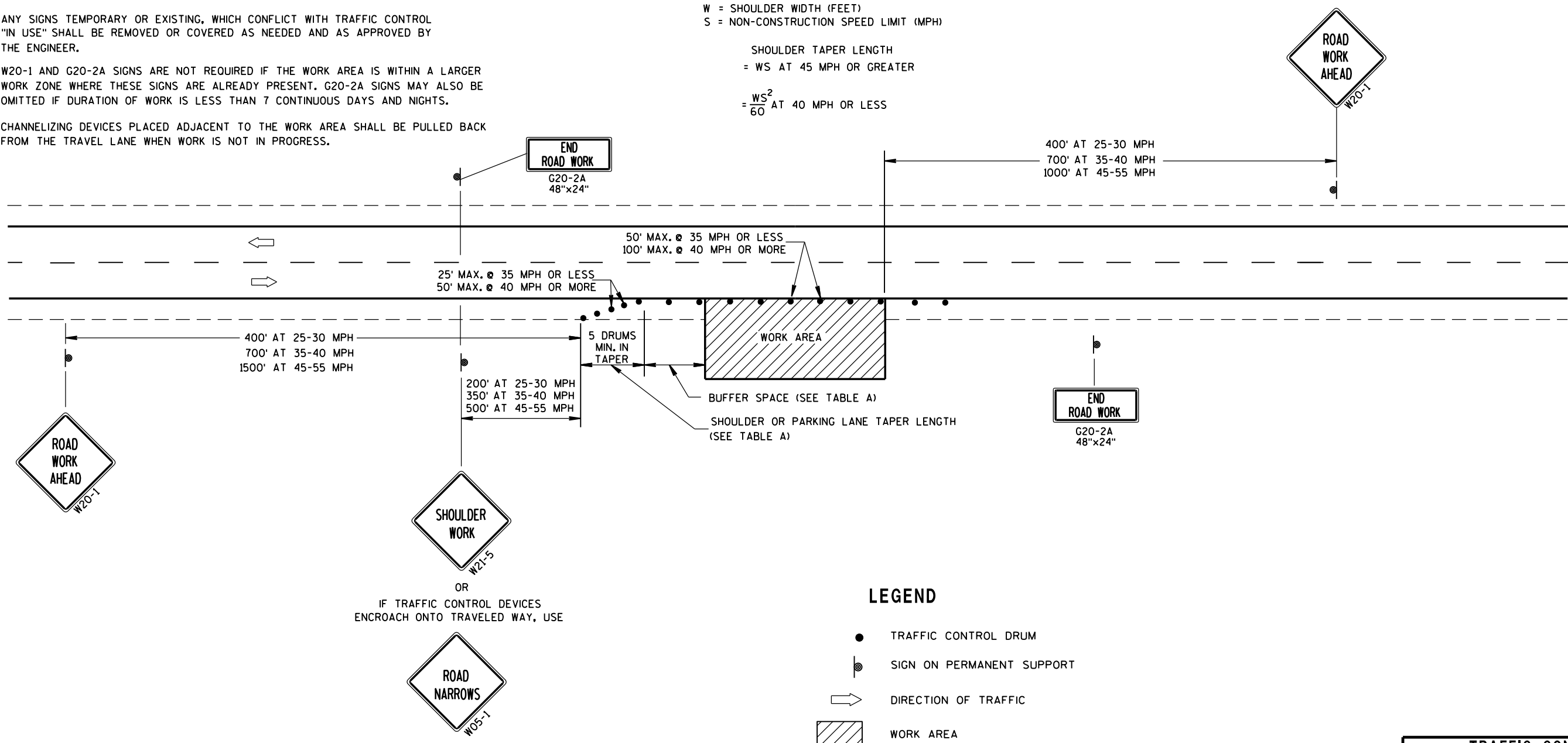
CHANNELIZING DEVICES PLACED ADJACENT TO THE WORK AREA SHALL BE PULLED BACK FROM THE TRAVEL LANE WHEN WORK IS NOT IN PROGRESS.

TABLE A

| SHOULDER TAPER LENGTH (FEET) |    |     |     |     | BUFFER SPACE (FEET) |
|------------------------------|----|-----|-----|-----|---------------------|
| S \ W                        | 4  | 6   | 8   | 10  |                     |
| 30                           | 20 | 30  | 40  | 50  | 85                  |
| 35                           | 30 | 45  | 55  | 70  | 120                 |
| 40                           | 40 | 55  | 75  | 90  | 170                 |
| 45                           | 60 | 90  | 120 | 150 | 220                 |
| 50                           | 70 | 100 | 135 | 170 | 280                 |
| 55                           | 75 | 110 | 150 | 185 | 335                 |

W = SHOULDER WIDTH (FEET)  
S = NON-CONSTRUCTION SPEED LIMIT (MPH)

SHOULDER TAPER LENGTH  
= WS AT 45 MPH OR GREATER  
  
=  $\frac{WS^2}{60}$  AT 40 MPH OR LESS

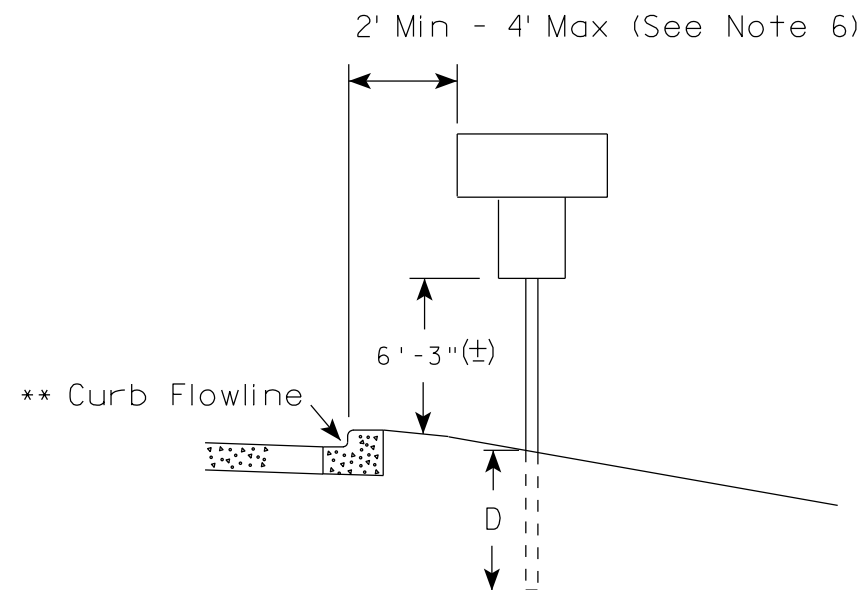
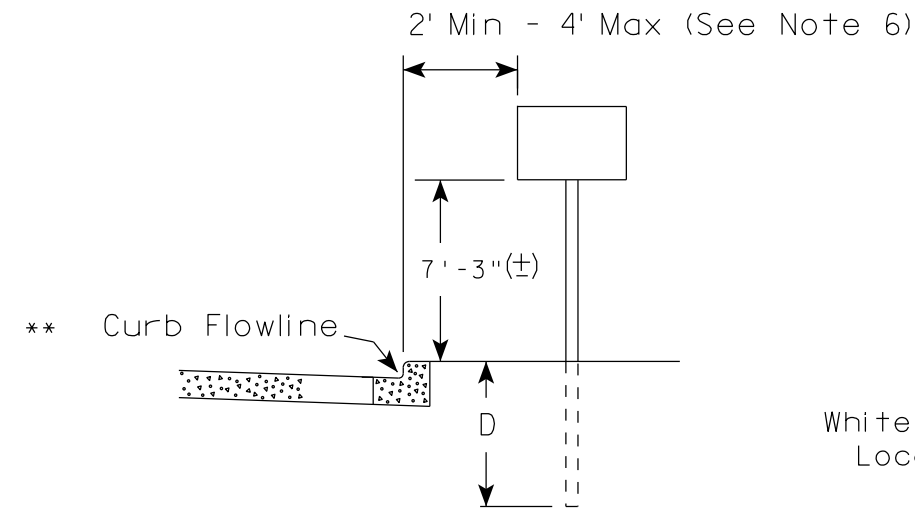


LEGEND

- TRAFFIC CONTROL DRUM
- ⦿ SIGN ON PERMANENT SUPPORT
- ➡ DIRECTION OF TRAFFIC
- ▨ WORK AREA

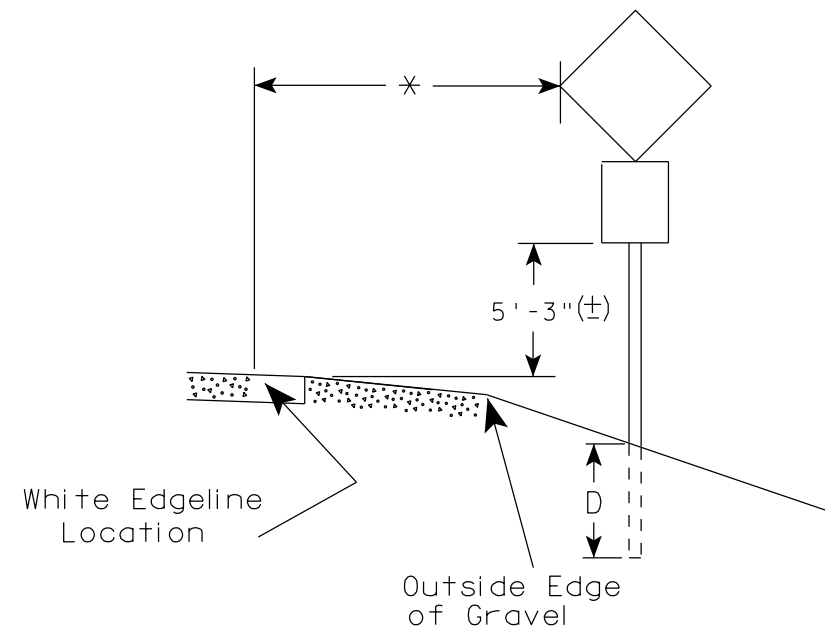
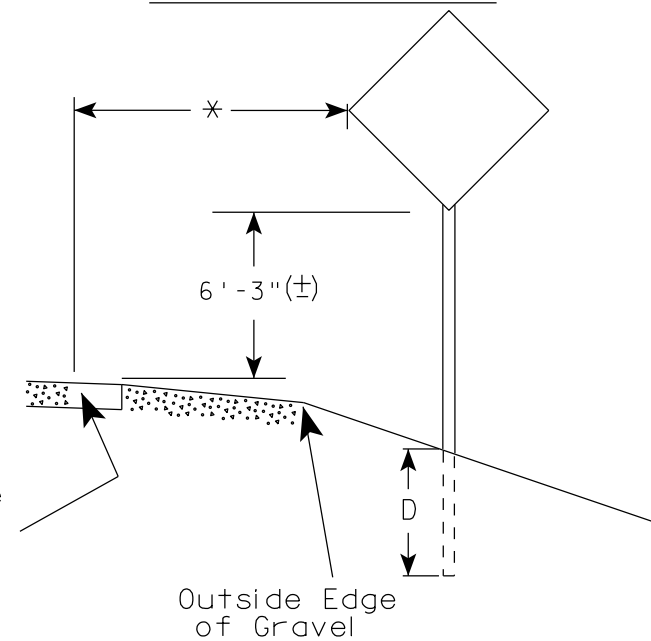
|                                                                               |                                                       |
|-------------------------------------------------------------------------------|-------------------------------------------------------|
| TRAFFIC CONTROL,<br>WORK ON SHOULDER OR<br>PARKING LANE,<br>UNDIVIDED ROADWAY |                                                       |
| STATE OF WISCONSIN<br>DEPARTMENT OF TRANSPORTATION                            |                                                       |
| APPROVED<br>8/2013<br>DATE                                                    | /S/ Travis Feltes<br>STATE TRAFFIC ENGINEER OF DESIGN |
| FHWA                                                                          |                                                       |

## URBAN AREA



White Edgeline Location

## RURAL AREA (See Note 2)



### POST EMBEDMENT DEPTH

| Area of Sign Installation ( Sq. Ft. ) | D ( Min ) |
|---------------------------------------|-----------|
| 20 or Less                            | 4'        |
| Greater than 20                       | 5'        |

×× The existence of curb and gutter does not in itself mandate the vertical clearance illustrated. That height is typically measured where there is sidewalk adjacent to the roadway or parking is permitted. In the absence of sidewalk vertical clearance is measured from the top of the curb. Offset of signs is measured from the flow line.

\* 6 feet from edge of a paved shoulder or 12 feet from the edge of pavement (edge line location) or 2 feet from outside edge of gravel, whichever is greater unless directed by project engineer.

### GENERAL NOTES

1. Signs wider than 4 feet, 20 sq.ft or larger, shall be mounted on multiple posts. Refer to plate A4-4.
2. If signs are mounted on barrier wall, see A4-10 sign plate.
3. For expressways and freeways, mounting height is 7'- 3" (±) or 6'-3" (±) depending upon existence of a sub-sign.
4. Minimum mounting height for J assemblies (A2-1S) is 7'-3" (±) or 6'-3" (±) per urban or rural detail respectively.
5. Minimum mounting height for signs mounted on traffic signal poles is 5'- 3" (±).
6. Offset distance shall be consistent with existing signs or consistent throughout length of project.
7. The (±) tolerance for mounting height is 3 inches.
8. Folding signs shall be mounted at a height of 5'-3" (±) or as directed by the Engineer.
9. The Double Arrow sign (W12-1) shall be mounted at a height of 2'-3" (±). The Chevron sign (W1-8), Roundabout Chevron panel (R6-4B), Enhanced Reference Markers, Clearance Markers (W5-52), Mile Markers (D10 series), In Road Object Markers (W5-54) & End of Road Markers (W5-56) shall be mounted at a height of 4'-3" (±).

TYPICAL INSTALLATION  
OF PERMANENT TYPE II  
SIGNS ON SINGLE POSTS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED

*Matthew R. Rauch*  
for State Traffic Engineer

DATE 11/12/14

PLATE NO. A4-3.19

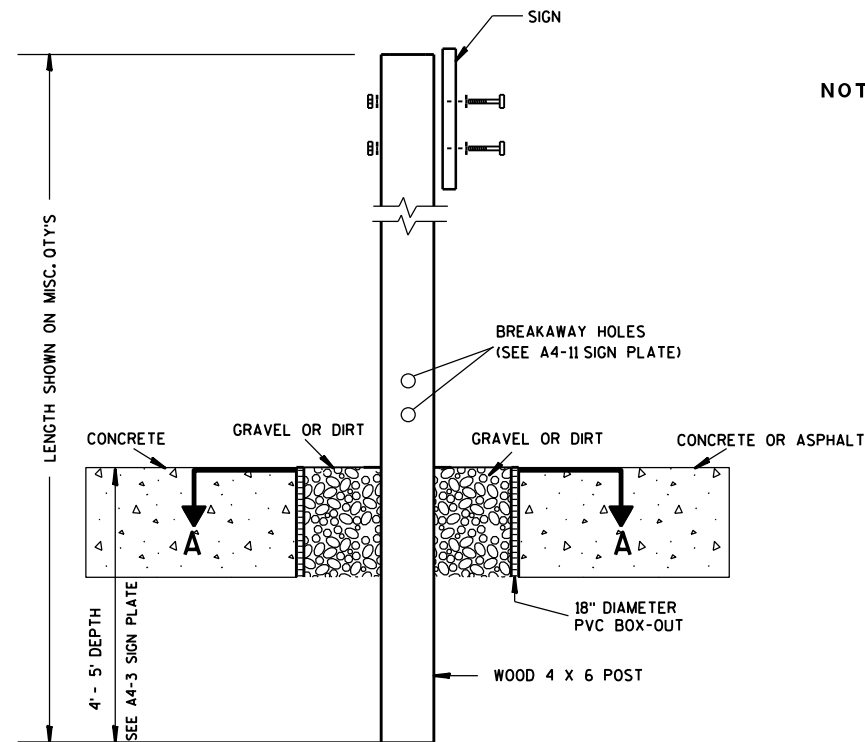
PROJECT NO:

HWY:

COUNTY:

SHEET NO:

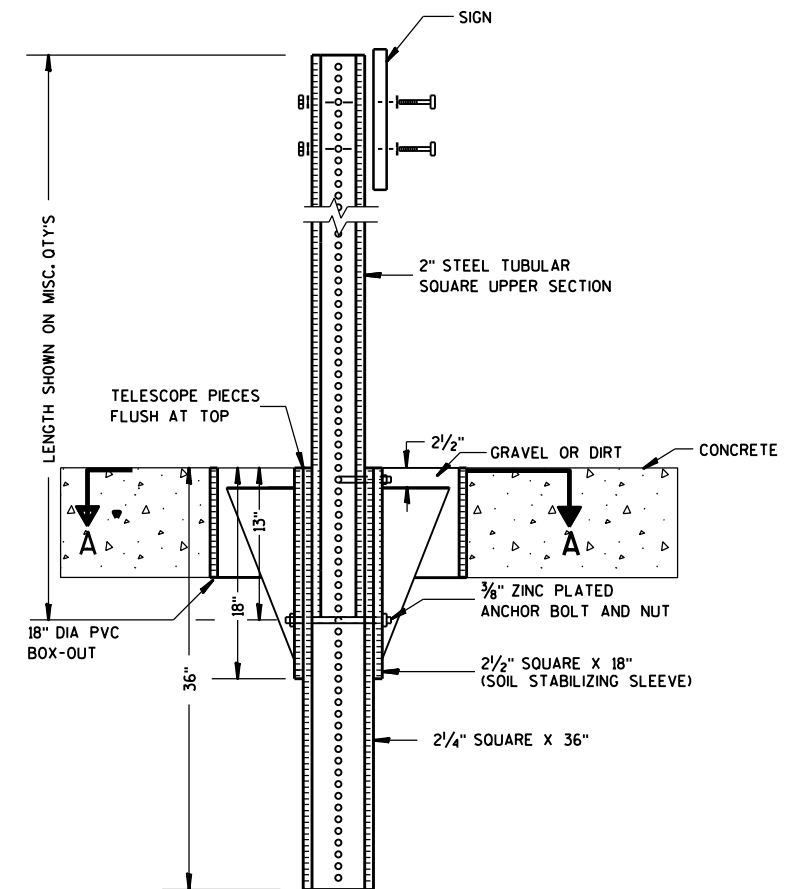
E



### ELEVATION VIEW

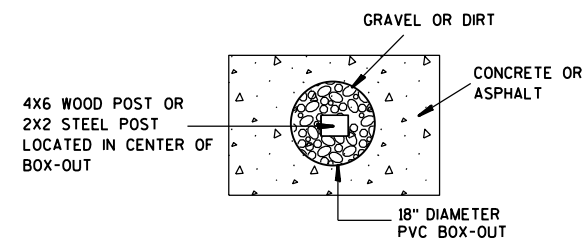
DETAIL OF WOOD 4 X 6 SIGN POST IN BOX-OUT

- NOTES: 1. ALL MATERIAL TO BE APPROVED BY ENGINEER PRIOR TO INSTALLATION
2. SEE SIGN PLATE A4-8 FOR SIGN HARDWARE REQUIREMENTS
3. 18 INCH X 18 INCH SQUARE BOX-OUTS MAY BE USED FOR INSTALLATIONS IN EXISTING CONCRETE OR ASPHALT LOCATIONS.



### ELEVATION VIEW

DETAIL OF STEEL 2 X 2 SIGN POST IN BOX-OUT



### PLAN VIEW

FOR NEW CONCRETE/ASPHALT INSTALLATIONS

SIGN POST  
BOX-OUTS  
A4-3B

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 1/27/14 PLATE NO. A4-3B.1

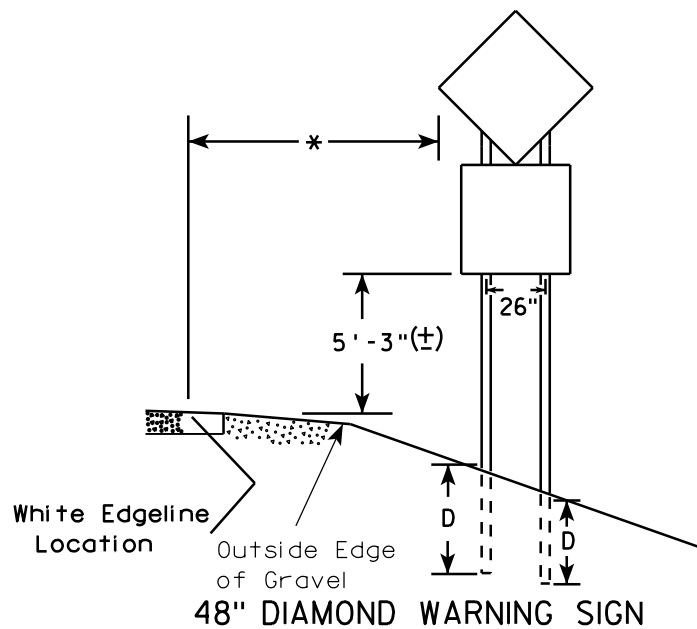
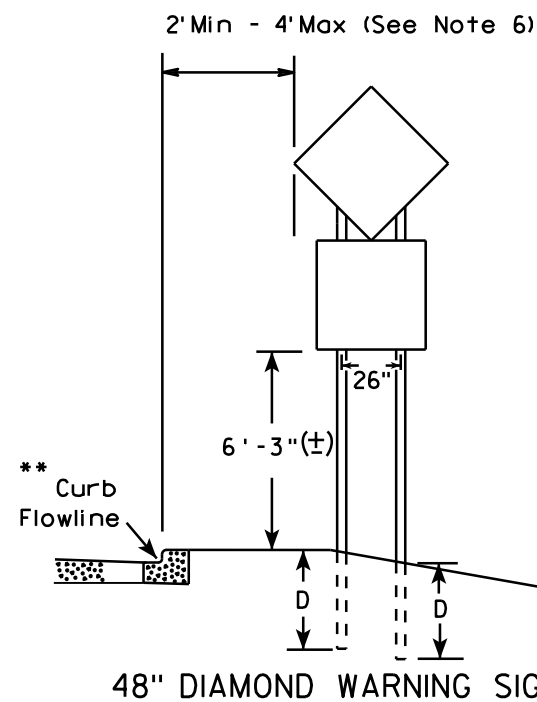
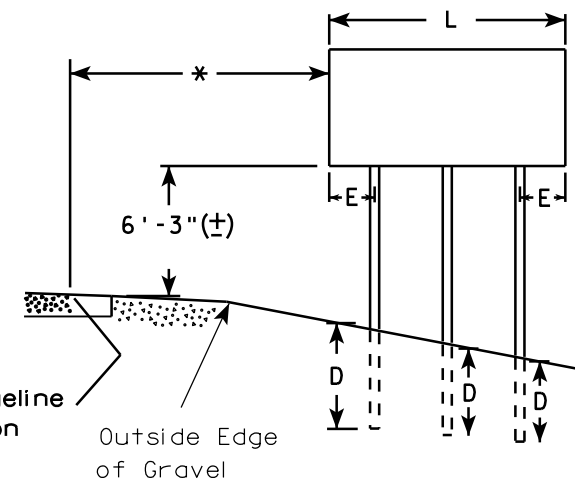
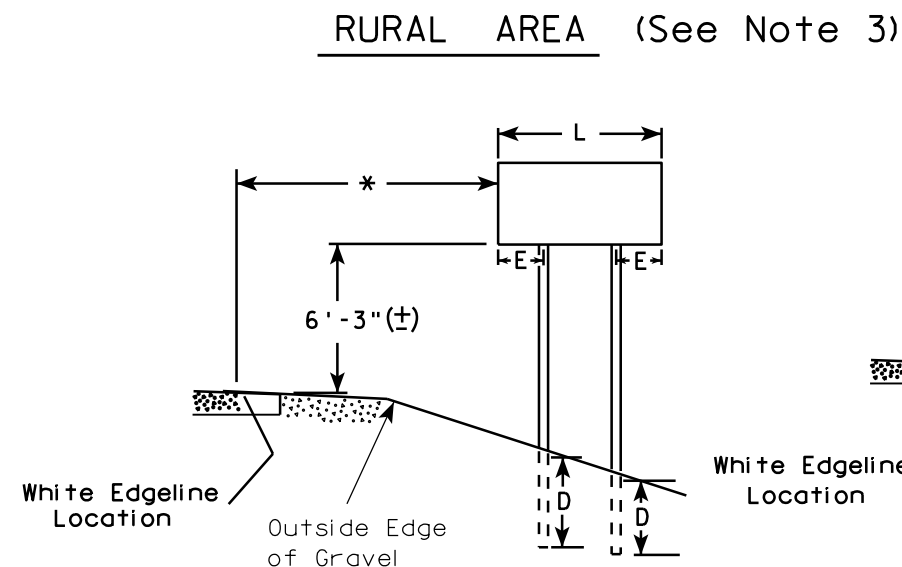
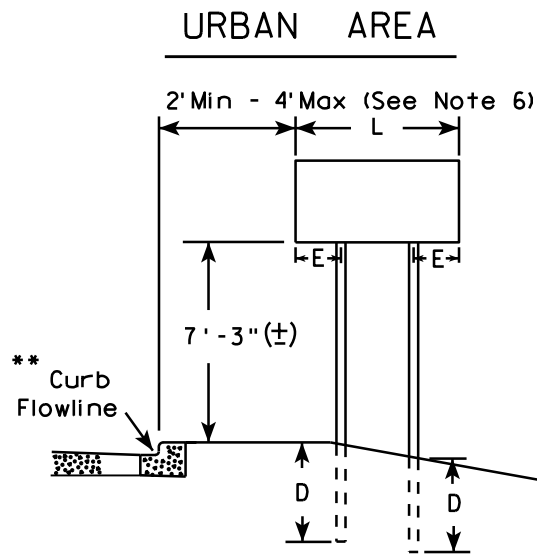
PROJECT NO:

HWY:

COUNTY:

SHEET NO:

E



- GENERAL NOTES**
1. For 3 or 4 post installations, individual post spacing shall be greater than 3'-6".
  2. See tables below for required number of posts.
  3. For expressways and freeways, mounting height is 7'-3" (±) or 6'-3" (±) depending upon existence of sub-sign.
  4. The (±) tolerance for mounting height is 3 inches.
  5. Minimum mounting height for J assemblies (A2-1S) is 7'-3" (±) or 6'-3" (±) per urban or rural detail respectively.
  6. Offset distance shall be consistent with existing signs or consistent throughout length of project.
  7. Folding signs shall be mounted at a height of 5'-3" (±) or as directed by the engineer.
  8. The Double Arrow sign (W12-1) shall be mounted at a height of 2'-3" (±). The Chevron sign (W1-8), Roundabout Chevron panel (R6-4B), Clearance Markers (W5-52), Mile Markers (D10 series), In Road Object Markers (W5-54) & End of Road Markers (W5-56) shall be mounted at a height of 4'-3" (±).

\* 6 feet from edge of a paved shoulder or 12 feet from the edge of pavement (edge line location) or 2 feet from outside edge of gravel, whichever is greater unless directed by project engineer.

\*\* The existence of curb and gutter does not in itself mandate the vertical clearance illustrated. That height is typically measured where there is sidewalk adjacent to the roadway or parking is permitted. In the absence of sidewalk vertical clearance is measured from the top of the curb. Offset of signs is measured from the flow line.

\*\*\* See A4-3 sign plate for signs 4' or less in width or less than 20 S.F. in area.

\*\*\*

| SIGN SHAPE OTHER THAN DIAMOND<br>(TWO POSTS REQUIRED) |     |
|-------------------------------------------------------|-----|
| L                                                     | E   |
| Greater than 48"<br>Less than 60"                     | 12" |
| 60" to 120"                                           | L/5 |

| SIGN SHAPE OTHER THAN DIAMOND<br>(THREE POSTS REQUIRED) |     |
|---------------------------------------------------------|-----|
| L                                                       | E   |
| Greater than 120"<br>less than 168"                     | 12" |

| SIGN SHAPE OTHER THAN DIAMOND<br>(FOUR POSTS REQUIRED) |     |
|--------------------------------------------------------|-----|
| L                                                      | E   |
| 168" and greater                                       | 12" |

POST EMBEDMENT DEPTH

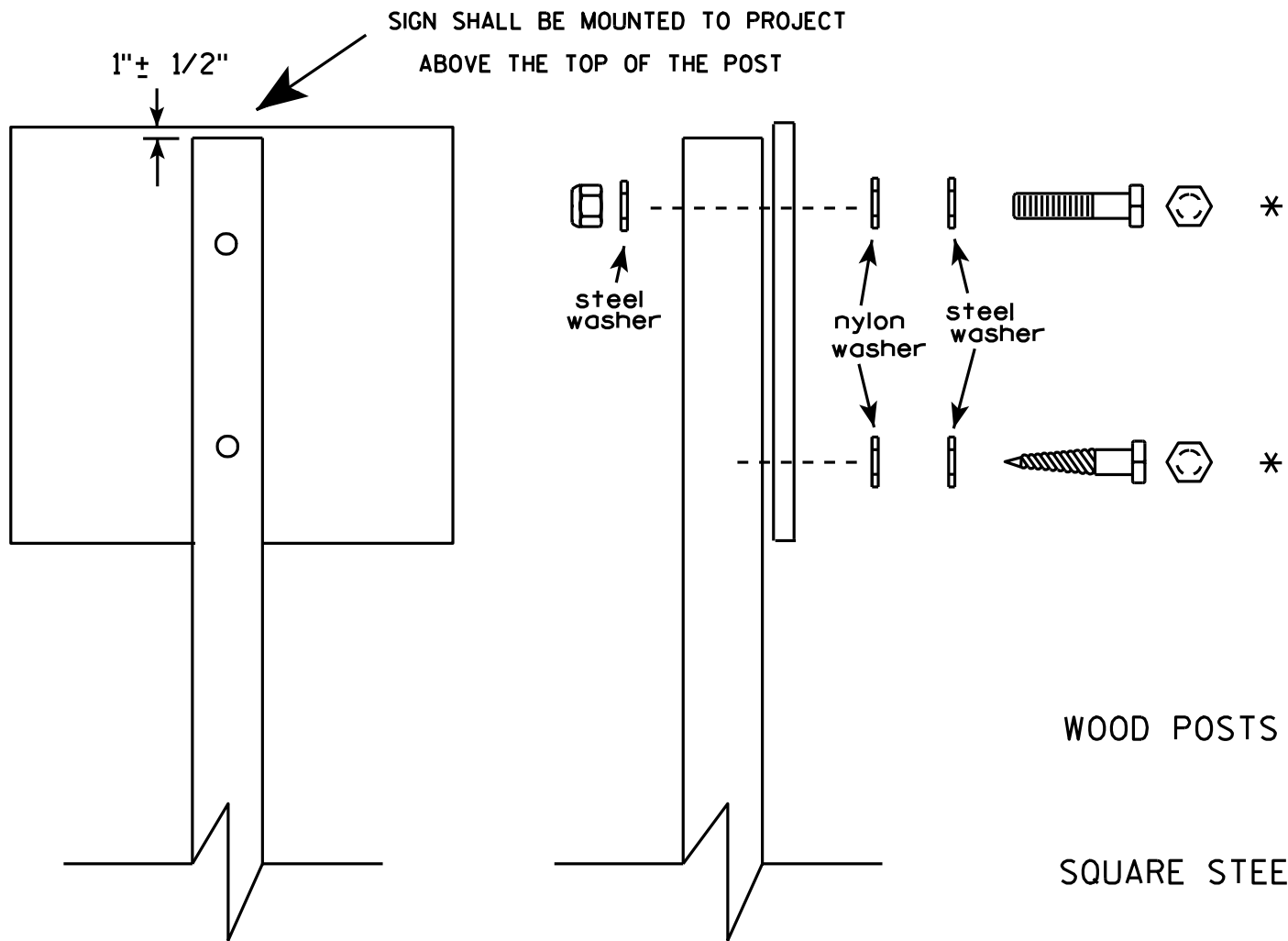
| Area of Sign<br>Installation<br>( Sq. Ft. ) | D<br>( Min ) |
|---------------------------------------------|--------------|
| 20 or Less                                  | 4'           |
| Greater than 20                             | 5'           |

TYPICAL INSTALLATION  
OF TYPE II SIGNS  
ON MULTIPLE POSTS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 11/12/14 PLATE NO. A4-4.13

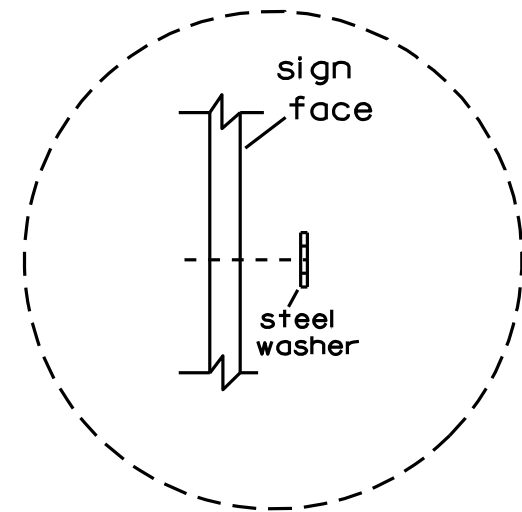


Nuts, bolts and lags used for mounting signs shall have hexagonal heads and shall be either :

- a. Hot dip galvanized in accordance with ASTM Designation: A 153, Class D, or SC 3
- b. Electro-galvanized in accordance with ASTM Designation : B 633, TYPE III, SC 3.

Threads on bolts and nuts shall be manufactured with sufficient allowance for the cadmium plate or galvanized coating to permit the nuts to run freely on the bolts.

- WOOD POSTS (4" x 4" or 4" x 6")  
LAG SCREWS - 3/8" X 3"  
MACHINE BOLTS - 5/16" X 6-1/2" or 7" Length w/ nuts
- SQUARE STEEL POSTS (2" x 2")  
MACHINE BOLTS - 3/8" X 3-1/4" Length w/ nuts  
RIVETS - 9/32" (6605-9-6) BULB-TITE, TRI-FOLD, ALUMINUM BODY/MANDREL  
O.D. FLANGE .720-.765 INCH, GRIP RANGE .042-.375 INCH
- WASHERS (ALL POSTS) -  
1-1/4" O.D. X 3/8" I.D. X 1/16" STEEL  
1-1/4" O.D. X 3/8" I.D. X .080 NYLON for all Type H signs.

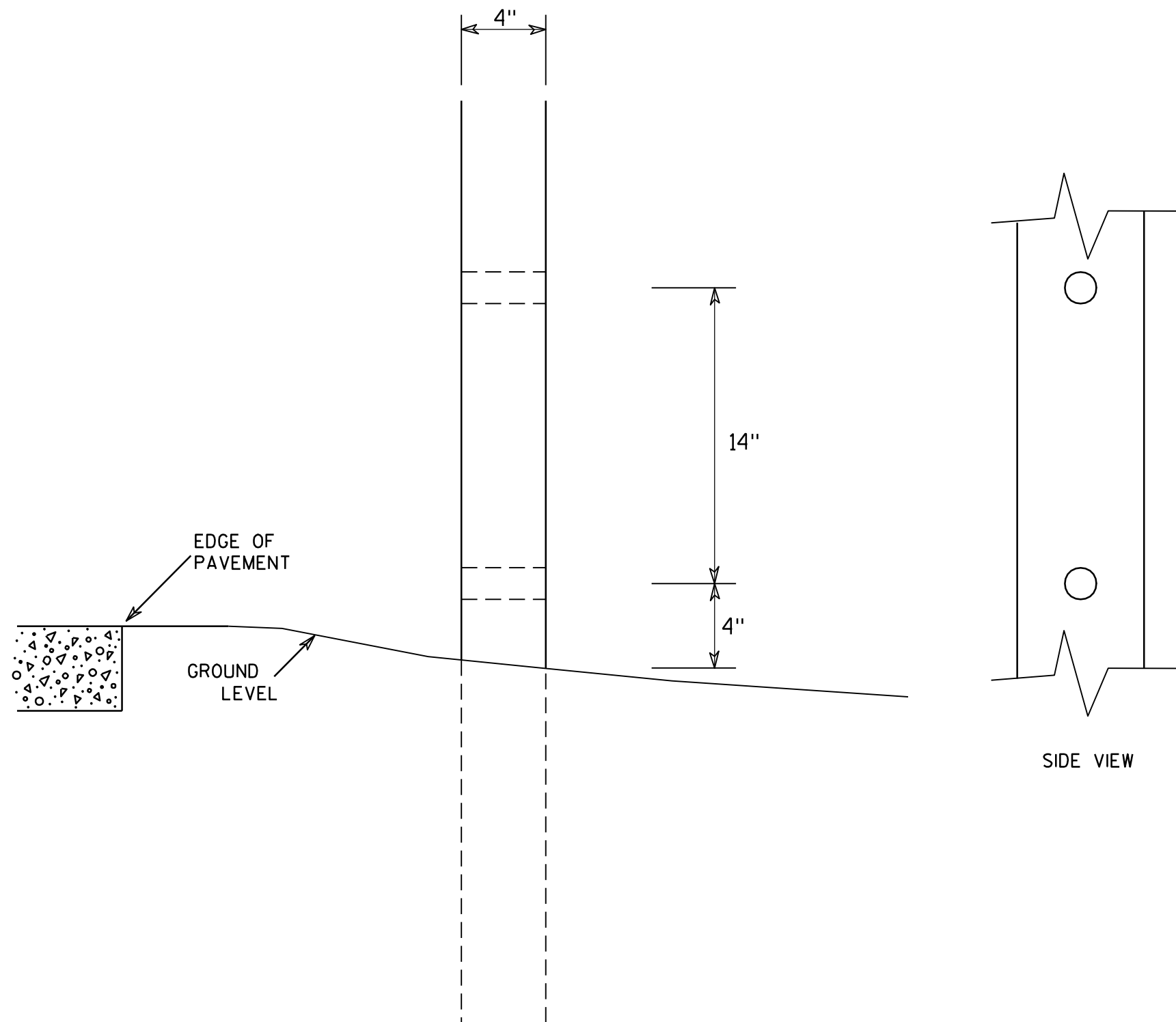


Washer Placement when Sign Has Other Than Type H or Type F Face

\* Two different fastening systems are shown for illustration purposes. On any individual sign, either one or the other system shall be used. Actual number of fasteners per sign varies with the sign area, but normally there are two. For a single post installation, all signs greater than 9 sq. ft. require the use of 3 fasteners.

|                                  |                                                       |
|----------------------------------|-------------------------------------------------------|
| ATTACHMENT OF SIGNS<br>TO POSTS  |                                                       |
| WISCONSIN DEPT OF TRANSPORTATION |                                                       |
| APPROVED                         | <i>Matthew R. Rauch</i><br>For State Traffic Engineer |
| DATE 3/23/10                     | PLATE NO. A4-8.7                                      |

7



### GENERAL NOTES

1. All 4 x 6 Wood Posts shall be modified by having two 1 1/2" diameter holes drilled perpendicular to the roadway centerline.

7

### 4 X 6 WOOD POST MODIFICATIONS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED

*Chester J. Spang*  
for State Traffic Engineer

DATE 3/27/97

PLATE NO. A4-11.2

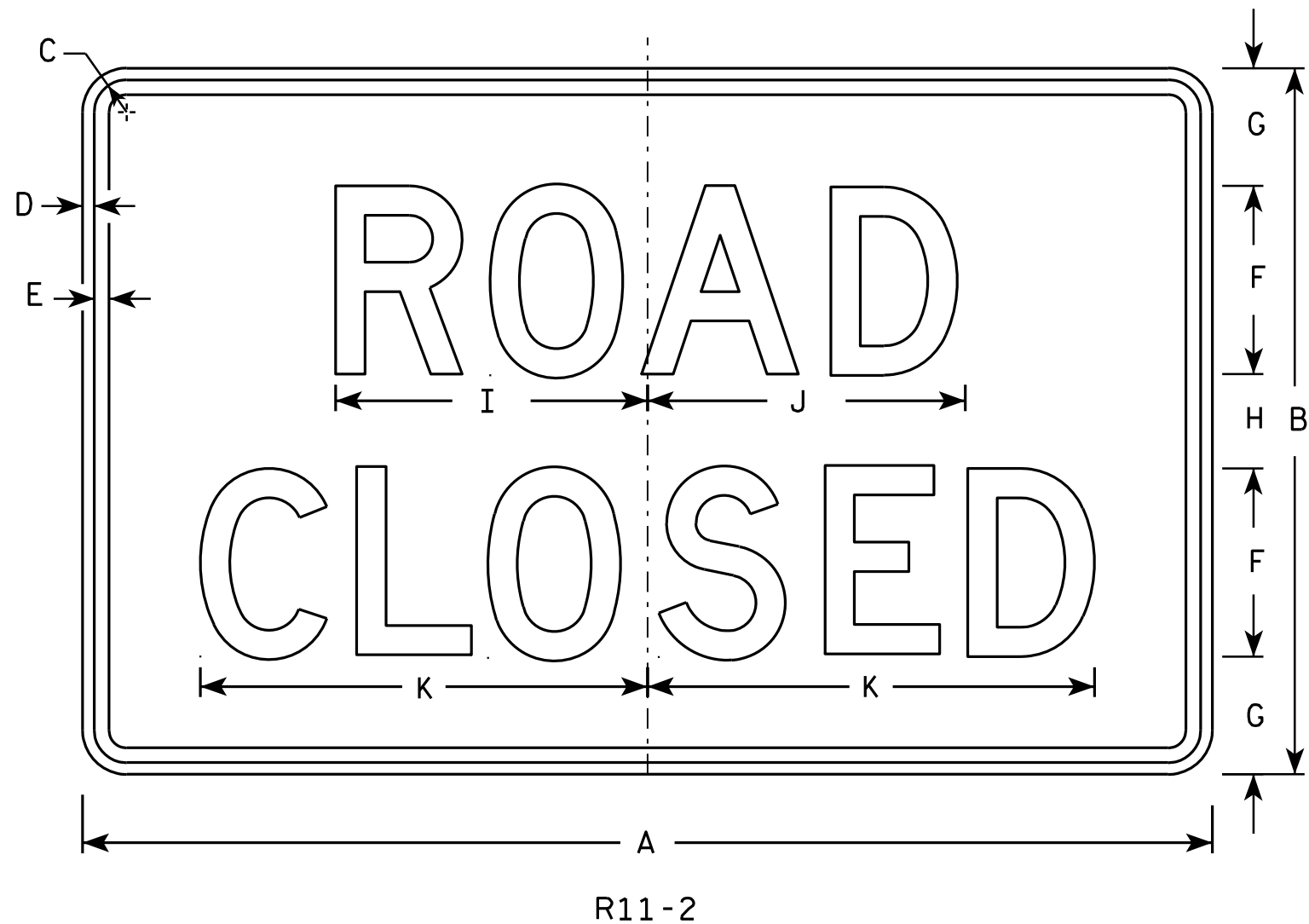
PROJECT NO:

HWY:

COUNTY:

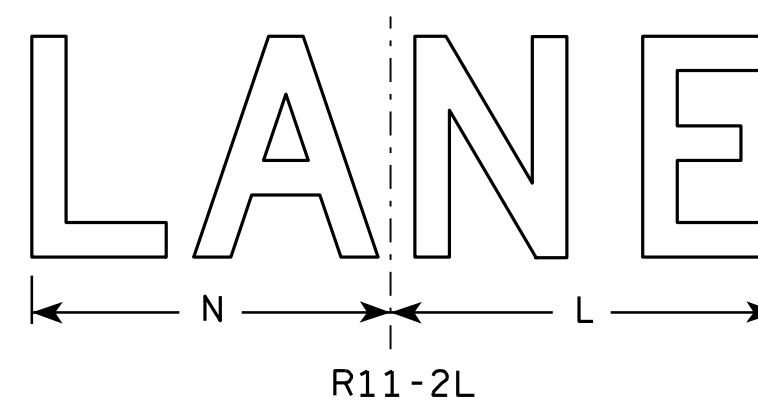
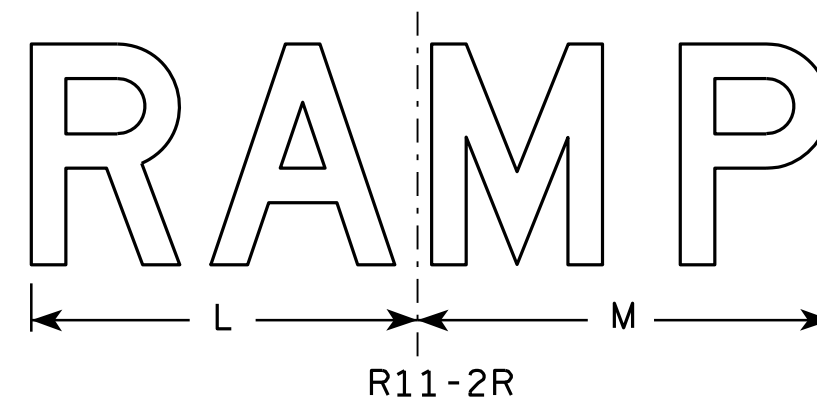
SHEET NO:

E



### NOTES

- Sign is Type II - Type H Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
- Color:  
Background - White  
Message - Black
- Message Series - D
- Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.
- Modify the message as required.



| SIZE | A  | B  | C     | D   | E   | F | G | H | I      | J      | K  | L  | M  | N  | O | P | Q | R | S | T | U | V | W | X | Y | Z | Area<br>sq. ft. |
|------|----|----|-------|-----|-----|---|---|---|--------|--------|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|-----------------|
| 1    |    |    |       |     |     |   |   |   |        |        |    |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |                 |
| 2S   | 48 | 30 | 1 3⁄8 | 1⁄2 | 5⁄8 | 8 | 5 | 4 | 13 1⁄4 | 13 1⁄2 | 19 | 14 | 15 | 13 |   |   |   |   |   |   |   |   |   |   |   |   | 10.0            |
| 2M   | 48 | 30 | 1 3⁄8 | 1⁄2 | 5⁄8 | 8 | 5 | 4 | 13 1⁄4 | 13 1⁄2 | 19 | 14 | 15 | 13 |   |   |   |   |   |   |   |   |   |   |   |   | 10.0            |
| 3    | 48 | 30 | 1 3⁄8 | 1⁄2 | 5⁄8 | 8 | 5 | 4 | 13 1⁄4 | 13 1⁄2 | 19 | 14 | 15 | 13 |   |   |   |   |   |   |   |   |   |   |   |   | 10.0            |
| 4    | 48 | 30 | 1 3⁄8 | 1⁄2 | 5⁄8 | 8 | 5 | 4 | 13 1⁄4 | 13 1⁄2 | 19 | 14 | 15 | 13 |   |   |   |   |   |   |   |   |   |   |   |   | 10.0            |
| 5    | 48 | 30 | 1 3⁄8 | 1⁄2 | 5⁄8 | 8 | 5 | 4 | 13 1⁄4 | 13 1⁄2 | 19 | 14 | 15 | 13 |   |   |   |   |   |   |   |   |   |   |   |   | 10.0            |

STANDARD SIGN  
R11-2

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 4/1/11 PLATE NO. R11-2.10

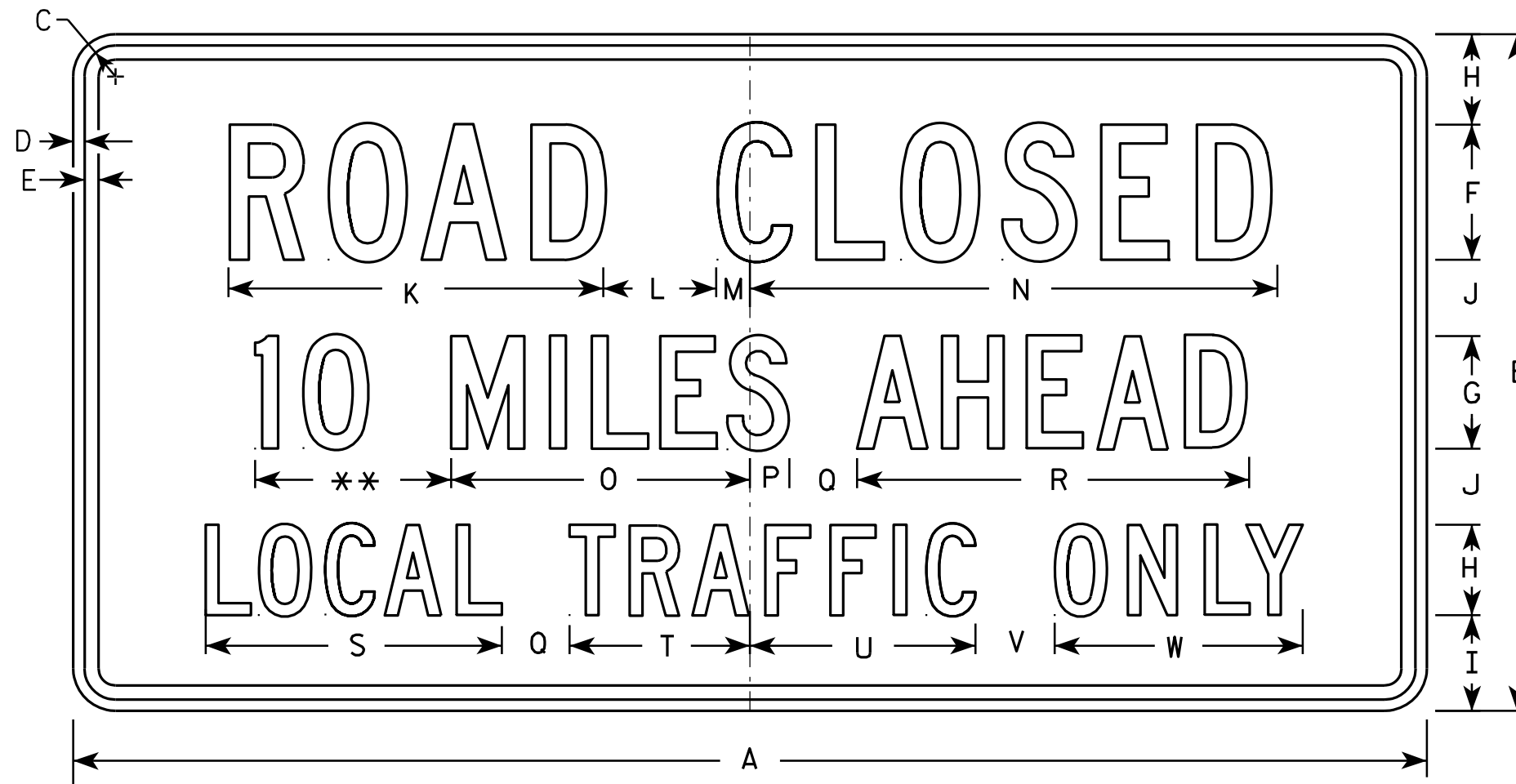
PROJECT NO:

HWY:

COUNTY:

SHEET NO:

E



R11-3

#### NOTES

1. Sign is Type II - Type H Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
2. Color:  
Background - White  
Message - Black
3. Message Series - C
4. Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.
5. Substitute appropriate numerals and optically adjust spacing to achieve proper balance.

\*\* See Note 5

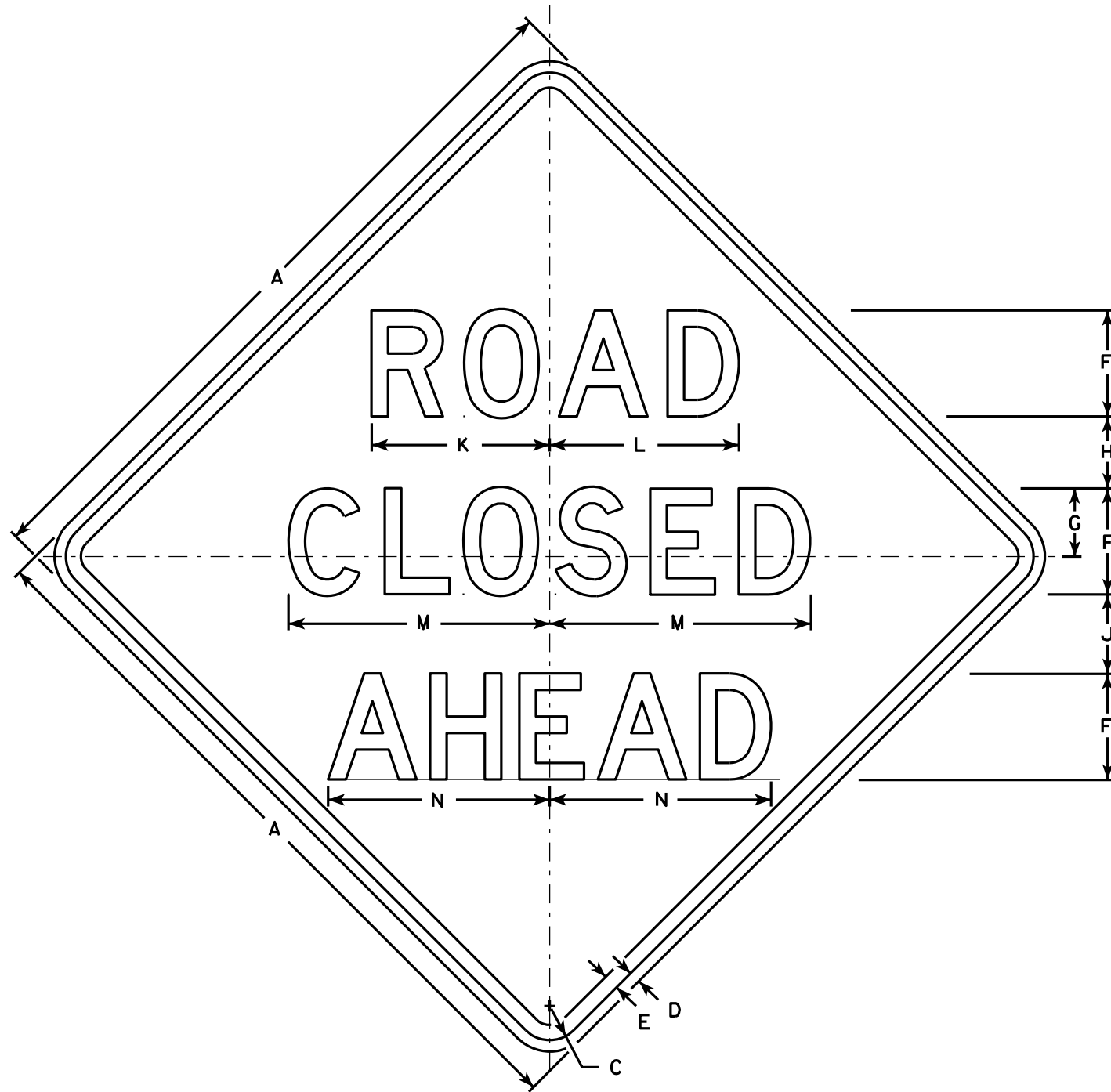
| SIZE | A  | B  | C     | D   | E   | F | G | H     | I     | J     | K      | L | M     | N      | O      | P     | Q | R      | S      | T     | U     | V     | W     | X | Y | Z | Area<br>sq. ft. |
|------|----|----|-------|-----|-----|---|---|-------|-------|-------|--------|---|-------|--------|--------|-------|---|--------|--------|-------|-------|-------|-------|---|---|---|-----------------|
| 1    | 36 | 18 | 1 3/8 | 1/2 | 5/8 | 4 | 3 | 2 1/2 | 2     | 2     | 11 1/8 | 3 | 1 1/8 | 15 1/4 | 8      | 1 1/2 | 2 | 10 3/4 | 8 3/8  | 4 3/4 | 6 1/2 | 2     | 6 3/4 |   |   |   | 4.5             |
| 2S   | 60 | 30 | 1 3/8 | 1/2 | 5/8 | 6 | 5 | 4     | 4 1/4 | 3 3/8 | 16 5/8 | 5 | 1 1/2 | 23     | 13 1/4 | 1 3/4 | 3 | 17 3/8 | 13 1/8 | 8     | 10    | 3 1/2 | 11    |   |   |   | 12.5            |
| 2M   | 60 | 30 | 1 3/8 | 1/2 | 5/8 | 6 | 5 | 4     | 4 1/4 | 3 3/8 | 16 5/8 | 5 | 1 1/2 | 23     | 13 1/4 | 1 3/4 | 3 | 17 3/8 | 13 1/8 | 8     | 10    | 3 1/2 | 11    |   |   |   | 12.5            |
| 3    |    |    |       |     |     |   |   |       |       |       |        |   |       |        |        |       |   |        |        |       |       |       |       |   |   |   |                 |
| 4    |    |    |       |     |     |   |   |       |       |       |        |   |       |        |        |       |   |        |        |       |       |       |       |   |   |   |                 |
| 5    |    |    |       |     |     |   |   |       |       |       |        |   |       |        |        |       |   |        |        |       |       |       |       |   |   |   |                 |

#### STANDARD SIGN R11-3

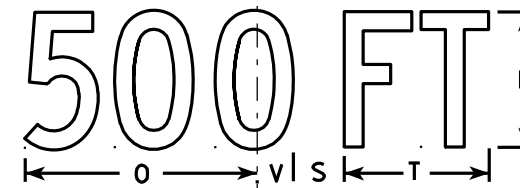
WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
For State Traffic Engineer  
DATE 4/1/11 PLATE NO. R11-3.6

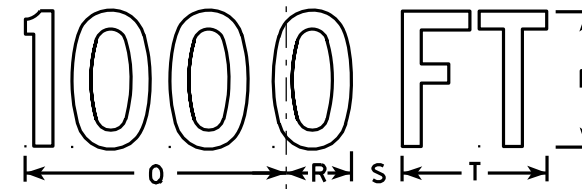
PROJECT NO: HWY: COUNTY: SHEET NO: E



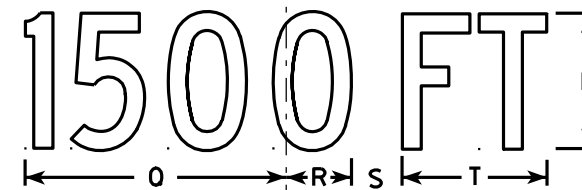
W20-3A



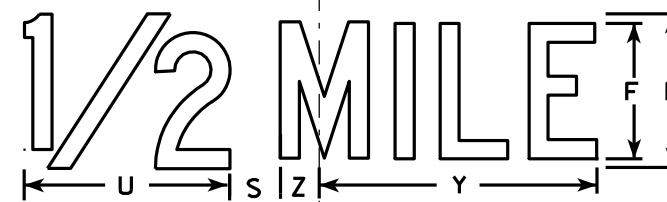
W20-3D



W20-3C



W20-3B



W20-3G



W20-3F

# NOTES

- Sign is Type II - Type F Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
- Color:  
Background - Orange  
Message - Black
- Message Series - see note 5
- Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.
- Lines 1 and 2 are Series D.  
Line 3 is Series D for AHEAD and Series C for all other distances.

| SIZE | A  | B | C     | D   | E   | F | G     | H     | I     | J     | K      | L      | M      | N      | O  | P | Q      | R     | S     | T     | U      | V     | W     | X     | Y      | Z     | Area<br>sq. ft. |
|------|----|---|-------|-----|-----|---|-------|-------|-------|-------|--------|--------|--------|--------|----|---|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-----------------|
| 1    | 36 |   | 1 5/8 | 5/8 | 3/4 | 5 | 3 3/8 | 3 1/2 | 1 1/8 | 4     | 8 3/8  | 8 7/8  | 12 1/2 | 11     | 9  | 6 | 10 1/8 | 2 1/2 | 1 7/8 | 5 5/8 | 8      | 1 3/8 | 4 1/2 | 3 1/2 | 10 3/4 | 1 3/4 | 9.0             |
| 2S   | 48 |   | 2 1/4 | 3/4 | 1   | 7 | 4 1/2 | 4 3/4 | 1 1/2 | 5 1/4 | 11 3/4 | 12 1/2 | 17 1/4 | 14 5/8 | 12 | 8 | 13 1/2 | 3 3/8 | 2 5/8 | 7 1/2 | 10 5/8 | 1 7/8 | 6     | 4 5/8 | 14 3/8 | 2 3/8 | 16.0            |
| 2M   | 48 |   | 2 1/4 | 3/4 | 1   | 7 | 4 1/2 | 4 3/4 | 1 1/2 | 5 1/4 | 11 3/4 | 12 1/2 | 17 1/4 | 14 5/8 | 12 | 8 | 13 1/2 | 3 3/8 | 2 5/8 | 7 1/2 | 10 5/8 | 1 7/8 | 6     | 4 5/8 | 14 3/8 | 2 3/8 | 16.0            |
| 3    | 48 |   | 2 1/4 | 3/4 | 1   | 7 | 4 1/2 | 4 3/4 | 1 1/2 | 5 1/4 | 11 3/4 | 12 1/2 | 17 1/4 | 14 5/8 | 12 | 8 | 13 1/2 | 3 3/8 | 2 5/8 | 7 1/2 | 10 5/8 | 1 7/8 | 6     | 4 5/8 | 14 3/8 | 2 3/8 | 16.0            |
| 4    | 48 |   | 2 1/4 | 3/4 | 1   | 7 | 4 1/2 | 4 3/4 | 1 1/2 | 5 1/4 | 11 3/4 | 12 1/2 | 17 1/4 | 14 5/8 | 12 | 8 | 13 1/2 | 3 3/8 | 2 5/8 | 7 1/2 | 10 5/8 | 1 7/8 | 6     | 4 5/8 | 14 3/8 | 2 3/8 | 16.0            |
| 5    | 48 |   | 2 1/4 | 3/4 | 1   | 7 | 4 1/2 | 4 3/4 | 1 1/2 | 5 1/4 | 11 3/4 | 12 1/2 | 17 1/4 | 14 5/8 | 12 | 8 | 13 1/2 | 3 3/8 | 2 5/8 | 7 1/2 | 10 5/8 | 1 7/8 | 6     | 4 5/8 | 14 3/8 | 2 3/8 | 16.0            |

STANDARD SIGN  
W20-3A, B, C, D, F & G

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
For State Traffic Engineer

DATE 3/18/11 PLATE NO. W20-3.7

PROJECT NO:

HWY:

COUNTY:

SHEET NO:

E

EARTHWORK STATION-BY-STATION

| STATION          | REAL STATION | Distance | AREA (SF)                 |            |      |      | Incremental Vol (CY) (Unadjusted) |            |          |     | Cumulative Vol (CY) |           |                |              |               |             | Mass Ordinate |
|------------------|--------------|----------|---------------------------|------------|------|------|-----------------------------------|------------|----------|-----|---------------------|-----------|----------------|--------------|---------------|-------------|---------------|
|                  |              |          | Salvaged / Unusable Marsh |            |      |      | Salvaged / Unusable Marsh         |            |          |     | Exp.                |           | Exp.           |              | Red.          | Red.        |               |
|                  |              |          | Cut                       | Pave. Mat. | Fill | Exc  | Cut                               | Pave. Mat. | Fill     | Exc | Cut                 | Exp. Fill | Marsh Backfill | EBS Backfill | Marsh in Fill | EBS In Fill |               |
|                  |              |          |                           |            |      |      |                                   |            |          |     |                     |           |                |              |               |             |               |
|                  |              |          |                           |            |      |      | (Note 1)                          | (Note 2)   | (Note 3) |     |                     |           |                |              |               |             |               |
| EVERGREEN (LEFT) |              |          |                           |            |      |      |                                   |            |          |     |                     |           |                |              |               |             |               |
| 17+42            | 1742         |          | 13.3                      | 0.0        | 0.0  | 0.0  | 0                                 | 0          | 0        | 0   | 0                   | 0         | 0              | 0            | 0             | 0           | 0             |
| 17+50            | 1750         | 8        | 12.3                      | 0.0        | 0.0  | 0.0  | 4                                 | 0          | 0        | 0   | 4                   | 0         | 0              | 0            | 0             | 0           | 4             |
| 18+00            | 1800         | 50       | 8.9                       | 2.8        | 0.5  | 0.0  | 20                                | 3          | 0        | 0   | 23                  | 1         | 0              | 0            | 0             | 0           | 20            |
| 18+10            | 1810         | 10       | 9.2                       | 2.8        | 2.8  | 0.0  | 3                                 | 1          | 1        | 0   | 27                  | 1         | 0              | 0            | 0             | 0           | 22            |
| 18+20            | 1820         | 10       | 53.2                      | 2.8        | 2.3  | 0.0  | 12                                | 1          | 1        | 0   | 38                  | 3         | 0              | 0            | 0             | 0           | 31            |
| 18+30            | 1830         | 10       | 126.2                     | 2.8        | 3.6  | 8.2  | 33                                | 1          | 1        | 2   | 72                  | 3         | 2              | 0            | 1             | 0           | 63            |
| 18+40            | 1840         | 10       | 130.5                     | 2.8        | 9.8  | 25.9 | 48                                | 1          | 2        | 6   | 119                 | 1         | 12             | 0            | 5             | 0           | 111           |
| 18+50            | 1850         | 10       | 118.9                     | 2.8        | 0.2  | 0.0  | 46                                | 1          | 2        | 5   | 165                 | 0         | 19             | 0            | 8             | 0           | 158           |
| 18+60            | 1860         | 10       | 83.0                      | 2.8        | 0.0  | 0.0  | 37                                | 1          | 0        | 0   | 203                 | 0         | 19             | 0            | 8             | 0           | 194           |
| 18+65            | 1865         | 5        | 67.1                      | 2.8        | 0.2  | 0.0  | 14                                | 1          | 0        | 0   | 217                 | 0         | 19             | 0            | 8             | 0           | 207           |
| 18+70            | 1870         | 5        | 62.5                      | 2.8        | 0.0  | 0.0  | 12                                | 1          | 0        | 0   | 229                 | 0         | 19             | 0            | 8             | 0           | 219           |
| 18+80            | 1880         | 10       | 43.8                      | 2.8        | 0.2  | 0.0  | 20                                | 1          | 0        | 0   | 248                 | 0         | 19             | 0            | 8             | 0           | 238           |
| 18+90            | 1890         | 10       | 13.4                      | 2.8        | 1.3  | 0.0  | 11                                | 1          | 0        | 0   | 259                 | 0         | 19             | 0            | 8             | 0           | 247           |
| 19+00            | 1900         | 10       | 9.4                       | 2.8        | 11.0 | 0.0  | 4                                 | 1          | 2        | 0   | 263                 | 3         | 19             | 0            | 8             | 0           | 247           |
| 19+50            | 1950         | 50       | 9.8                       | 2.8        | 6.4  | 0.0  | 18                                | 5          | 16       | 0   | 281                 | 23        | 19             | 0            | 8             | 0           | 240           |
| 20+00            | 2000         | 50       | 10.1                      | 2.8        | 5.1  | 0.0  | 18                                | 5          | 11       | 0   | 299                 | 37        | 19             | 0            | 8             | 0           | 240           |
| 20+50            | 2050         | 50       | 10.3                      | 2.8        | 5.3  | 0.0  | 19                                | 5          | 10       | 0   | 318                 | 49        | 19             | 0            | 8             | 0           | 241           |
| 20+80            | 2080         | 30       | 12.5                      | 2.8        | 5.7  | 0.0  | 13                                | 3          | 6        | 0   | 331                 | 56        | 19             | 0            | 8             | 0           | 243           |
| 20+90            | 2090         | 10       | 46.4                      | 2.8        | 1.8  | 0.0  | 11                                | 1          | 1        | 0   | 342                 | 58        | 19             | 0            | 8             | 0           | 252           |
| 21+00            | 2100         | 10       | 131.8                     | 2.8        | 0.1  | 0.0  | 33                                | 1          | 0        | 0   | 375                 | 58        | 19             | 0            | 8             | 0           | 283           |
| 21+10            | 2110         | 10       | 204.3                     | 2.8        | 0.0  | 0.0  | 62                                | 1          | 0        | 0   | 437                 | 58        | 19             | 0            | 8             | 0           | 344           |
| 21+20            | 2120         | 10       | 231.0                     | 2.8        | 0.0  | 0.0  | 81                                | 1          | 0        | 0   | 518                 | 58        | 19             | 0            | 8             | 0           | 424           |
| 21+30            | 2130         | 10       | 100.8                     | 2.8        | 0.0  | 0.0  | 61                                | 1          | 0        | 0   | 579                 | 58        | 19             | 0            | 8             | 0           | 484           |
| 21+34            | 2134         | 4        | 45.6                      | 2.8        | 6.2  | 0.0  | 11                                | 0          | 0        | 0   | 590                 | 59        | 19             | 0            | 8             | 0           | 494           |
| 21+40            | 2140         | 6        | 18.6                      | 2.8        | 27.8 | 2.3  | 7                                 | 1          | 4        | 0   | 597                 | 64        | 19             | 0            | 8             | 0           | 496           |
| 21+50            | 2150         | 10       | 13.6                      | 2.8        | 24.4 | 0.0  | 6                                 | 1          | 10       | 0   | 603                 | 75        | 20             | 0            | 8             | 0           | 489           |
| 21+59            | 2159         | 9        | 14.6                      | 2.8        | 9.6  | 0.0  | 5                                 | 1          | 6        | 0   | 608                 | 82        | 20             | 0            | 8             | 0           | 486           |
| 22+00            | 2200         | 41       | 14.3                      | 2.8        | 0.0  | 0.0  | 22                                | 4          | 7        | 0   | 630                 | 92        | 20             | 0            | 8             | 0           | 495           |
| 22+50            | 2250         | 50       | 10.2                      | 2.8        | 0.0  | 0.0  | 23                                | 5          | 0        | 0   | 652                 | 92        | 20             | 0            | 8             | 0           | 512           |
| 22+79            | 2279         | 29       | 4.1                       | 0.0        | 0.0  | 0.0  | 8                                 | 1          | 0        | 0   | 660                 | 92        | 20             | 0            | 8             | 0           | 519           |
|                  |              |          |                           |            |      |      | 660                               | 50         | 81       | 13  |                     |           |                |              |               |             |               |

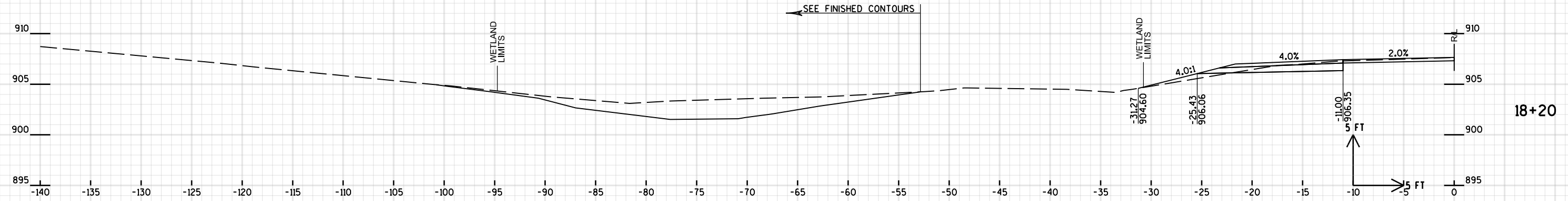
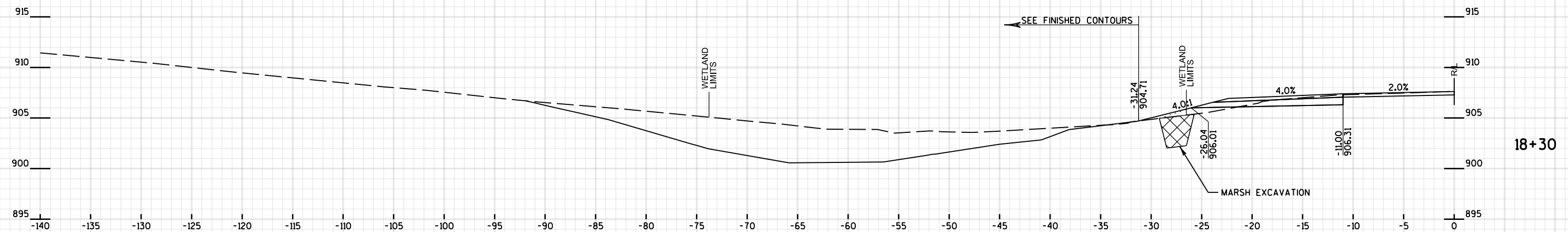
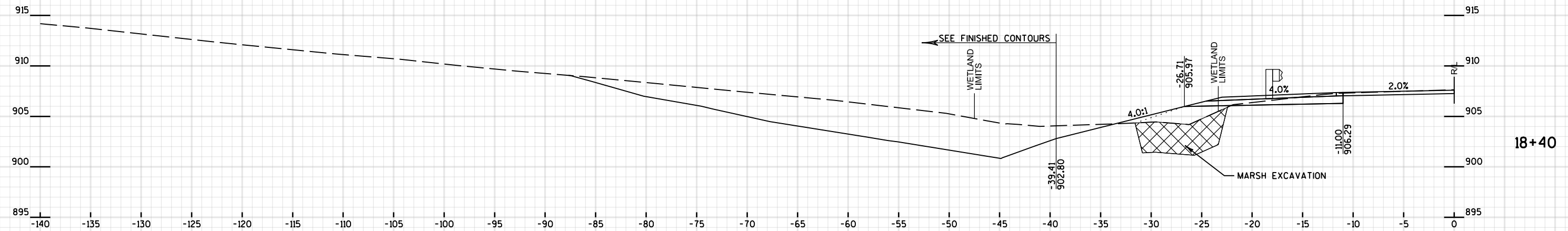
- NOTES:
- 1 Cut includes Salvaged/Unusable Pavement material
  - 2 This does not show up in cross sections
  - 3 Does not include Unusable Pavement Exc volume

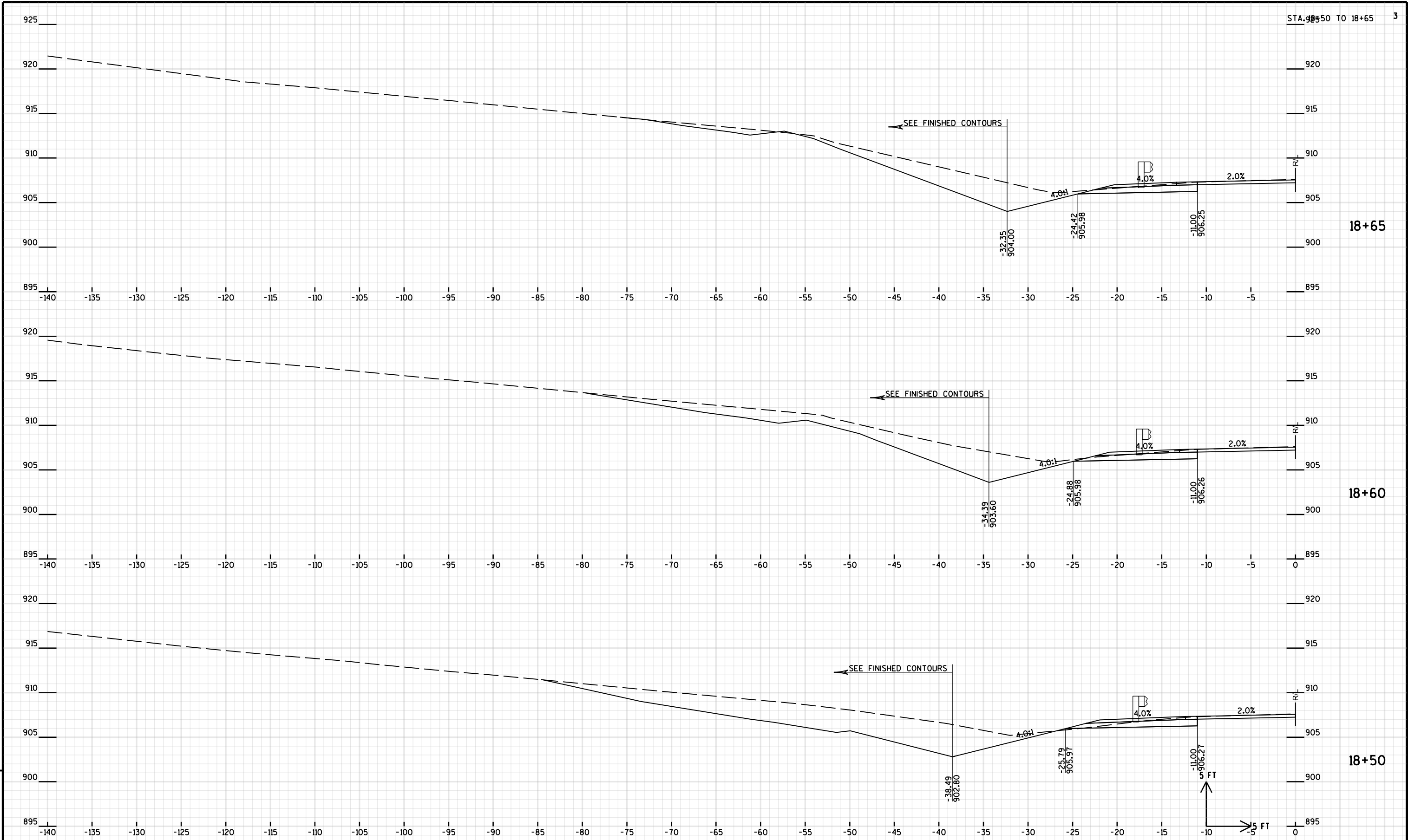
EARTHWORK STATION-BY-STATION

| STATION           | REAL STATION | Distance | AREA (SF) |                                         |      |              | Incremental Vol (CY) (Unadjusted) |                                                         |                      |              | Cumulative Vol (CY)         |                      |                                             |                                           |                                            |                                          | Mass Ordinate |
|-------------------|--------------|----------|-----------|-----------------------------------------|------|--------------|-----------------------------------|---------------------------------------------------------|----------------------|--------------|-----------------------------|----------------------|---------------------------------------------|-------------------------------------------|--------------------------------------------|------------------------------------------|---------------|
|                   |              |          | Cut       | Salvaged /<br>Unusable<br>Pave.<br>Mat. | Fill | Marsh<br>Exc | Cut<br><br>(Note 1)               | Salvaged /<br>Unusable<br>Pave.<br>Mat.<br><br>(Note 2) | Fill<br><br>(Note 3) | Marsh<br>Exc | Cut<br><br>1.00<br>(Note 1) | Exp.<br>Fill<br>1.25 | Exp.<br>Marsh<br>Backfill<br>1.50<br>Note 4 | Exp.<br>EBS<br>Backfill<br>1.30<br>Note 5 | Red.<br>Marsh<br>in Fill<br>0.60<br>Note 6 | Red.<br>EBS<br>In Fill<br>0.80<br>Note 7 |               |
|                   |              |          |           |                                         |      |              |                                   |                                                         |                      |              |                             |                      |                                             |                                           |                                            |                                          |               |
| EVERGREEN (RIGHT) |              |          |           |                                         |      |              |                                   |                                                         |                      |              |                             |                      |                                             |                                           |                                            |                                          |               |
| 17+80             | 1780         |          | 15.0      | 2.8                                     | 0.0  | 0.0          | 0                                 | 0                                                       | 0                    | 0            | 0                           | 0                    | 0                                           | 0                                         | 0                                          | 0                                        |               |
| 18+00             | 1800         | 20       | 31.7      | 2.8                                     | 3.1  | 0.0          | 17                                | 2                                                       | 1                    | 0            | 17                          | 1                    | 0                                           | 0                                         | 0                                          | 14                                       |               |
| 18+33             | 1833         | 33       | 42.4      | 2.8                                     | 0.0  | 0.0          | 45                                | 3                                                       | 2                    | 0            | 63                          | 4                    | 0                                           | 0                                         | 0                                          | 53                                       |               |
| 18+40             | 1840         | 7        | 32.6      | 2.8                                     | 0.2  | 0.0          | 10                                | 1                                                       | 0                    | 0            | 72                          | 4                    | 0                                           | 0                                         | 0                                          | 62                                       |               |
| 18+50             | 1850         | 10       | 17.3      | 2.8                                     | 14.6 | 20.9         | 9                                 | 1                                                       | 3                    | 4            | 82                          | 4                    | 6                                           | 0                                         | 2                                          | 70                                       |               |
| 18+60             | 1860         | 10       | 25.4      | 2.8                                     | 16.0 | 28.1         | 8                                 | 1                                                       | 6                    | 9            | 89                          | 5                    | 19                                          | 0                                         | 8                                          | 77                                       |               |
| 18+66             | 1866         | 6        | 60.2      | 2.8                                     | 2.1  | 4.7          | 10                                | 1                                                       | 2                    | 4            | 99                          | 4                    | 25                                          | 0                                         | 10                                         | 86                                       |               |
| 18+70             | 1870         | 4        | 106.2     | 2.8                                     | 0.0  | 0.0          | 12                                | 0                                                       | 0                    | 0            | 111                         | 4                    | 25                                          | 0                                         | 10                                         | 98                                       |               |
| 18+80             | 1880         | 10       | 223.9     | 2.8                                     | 0.1  | 0.0          | 61                                | 1                                                       | 0                    | 0            | 172                         | 4                    | 25                                          | 0                                         | 10                                         | 158                                      |               |
| 18+90             | 1890         | 10       | 135.2     | 2.8                                     | 0.0  | 0.0          | 67                                | 1                                                       | 0                    | 0            | 239                         | 4                    | 25                                          | 0                                         | 10                                         | 223                                      |               |
| 19+00             | 1900         | 10       | 51.7      | 2.8                                     | 0.0  | 0.0          | 35                                | 1                                                       | 0                    | 0            | 274                         | 4                    | 25                                          | 0                                         | 10                                         | 257                                      |               |
| 19+10             | 1910         | 10       | 26.1      | 2.8                                     | 0.0  | 0.0          | 14                                | 1                                                       | 0                    | 0            | 288                         | 4                    | 25                                          | 0                                         | 10                                         | 270                                      |               |
| 19+50             | 1950         | 40       | 9.8       | 2.8                                     | 3.9  | 0.0          | 27                                | 4                                                       | 3                    | 0            | 315                         | 8                    | 25                                          | 0                                         | 10                                         | 289                                      |               |
| 20+00             | 2000         | 50       | 9.5       | 2.8                                     | 5.1  | 0.0          | 18                                | 5                                                       | 8                    | 0            | 332                         | 18                   | 25                                          | 0                                         | 10                                         | 292                                      |               |
| 20+50             | 2050         | 50       | 9.6       | 2.8                                     | 5.9  | 0.0          | 18                                | 5                                                       | 10                   | 0            | 350                         | 31                   | 25                                          | 0                                         | 10                                         | 291                                      |               |
| 21+00             | 2100         | 50       | 9.1       | 2.8                                     | 5.2  | 0.0          | 17                                | 5                                                       | 10                   | 0            | 367                         | 44                   | 25                                          | 0                                         | 10                                         | 291                                      |               |
| 21+10             | 2110         | 10       | 8.9       | 2.8                                     | 10.0 | 0.0          | 3                                 | 1                                                       | 3                    | 0            | 371                         | 48                   | 25                                          | 0                                         | 10                                         | 290                                      |               |
| 21+20             | 2120         | 10       | 26.7      | 2.8                                     | 0.0  | 0.0          | 7                                 | 1                                                       | 2                    | 0            | 377                         | 50                   | 25                                          | 0                                         | 10                                         | 293                                      |               |
| 21+30             | 2130         | 10       | 50.4      | 2.8                                     | 0.0  | 0.0          | 14                                | 1                                                       | 0                    | 0            | 392                         | 50                   | 25                                          | 0                                         | 10                                         | 306                                      |               |
| 21+35             | 2135         | 5        | 67.0      | 2.8                                     | 0.0  | 0.0          | 11                                | 1                                                       | 0                    | 0            | 402                         | 50                   | 25                                          | 0                                         | 10                                         | 316                                      |               |
| 21+40             | 2140         | 5        | 78.6      | 2.8                                     | 0.0  | 0.0          | 13                                | 1                                                       | 0                    | 0            | 416                         | 50                   | 25                                          | 0                                         | 10                                         | 329                                      |               |
| 21+50             | 2150         | 10       | 76.8      | 2.8                                     | 0.0  | 0.0          | 29                                | 1                                                       | 0                    | 0            | 445                         | 50                   | 25                                          | 0                                         | 10                                         | 357                                      |               |
| 21+60             | 2160         | 10       | 66.3      | 2.8                                     | 2.1  | 0.0          | 27                                | 1                                                       | 0                    | 0            | 471                         | 50                   | 25                                          | 0                                         | 10                                         | 382                                      |               |
| 21+70             | 2170         | 10       | 90.8      | 2.8                                     | 16.0 | 17.2         | 29                                | 1                                                       | 3                    | 3            | 500                         | 52                   | 30                                          | 0                                         | 12                                         | 408                                      |               |
| 21+80             | 2180         | 10       | 53.3      | 2.8                                     | 5.6  | 0.0          | 27                                | 1                                                       | 4                    | 3            | 527                         | 55                   | 35                                          | 0                                         | 14                                         | 432                                      |               |
| 21+90             | 2190         | 10       | 15.6      | 2.8                                     | 1.0  | 0.0          | 13                                | 1                                                       | 1                    | 0            | 540                         | 56                   | 35                                          | 0                                         | 14                                         | 442                                      |               |
| 22+00             | 2200         | 10       | 15.8      | 2.8                                     | 0.0  | 0.0          | 6                                 | 1                                                       | 0                    | 0            | 546                         | 56                   | 35                                          | 0                                         | 14                                         | 446                                      |               |
| 22+50             | 2250         | 50       | 14.1      | 2.8                                     | 0.0  | 0.0          | 28                                | 5                                                       | 0                    | 0            | 573                         | 56                   | 35                                          | 0                                         | 14                                         | 469                                      |               |
|                   |              |          |           |                                         |      |              | 573                               | 48                                                      | 59                   | 23           |                             |                      |                                             |                                           |                                            |                                          |               |

- NOTES:
- 1 Cut includes Salvaged/Unusable Pavement material
  - 2 This does not show up in cross sections
  - 3 Does not include Unusable Pavement Exc volume







PROJECT NO: 1090-19-17

HWY: EVERGREEN

COUNTY: WAUKESHA

CROSS SECTIONS: EVERGREEN

SHEET

E

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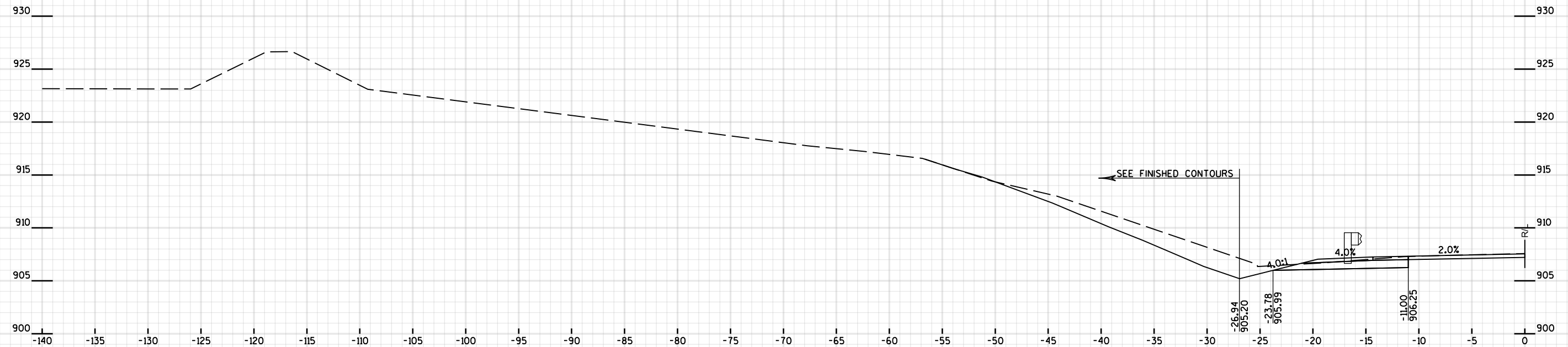
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PLOT BY : piojdae

PLOT NAME :

PLOT SCALE : 1:10

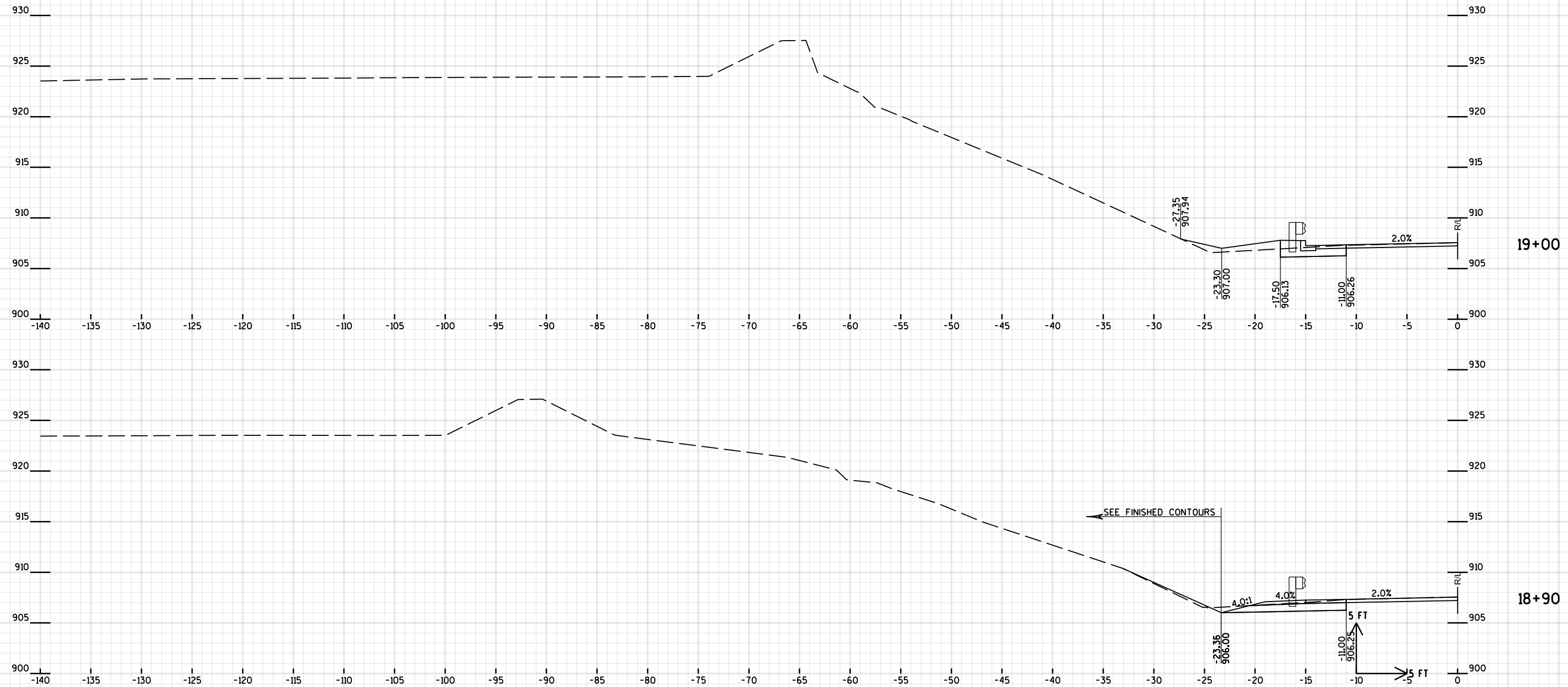
WISDOT/CADDs SHEET 21

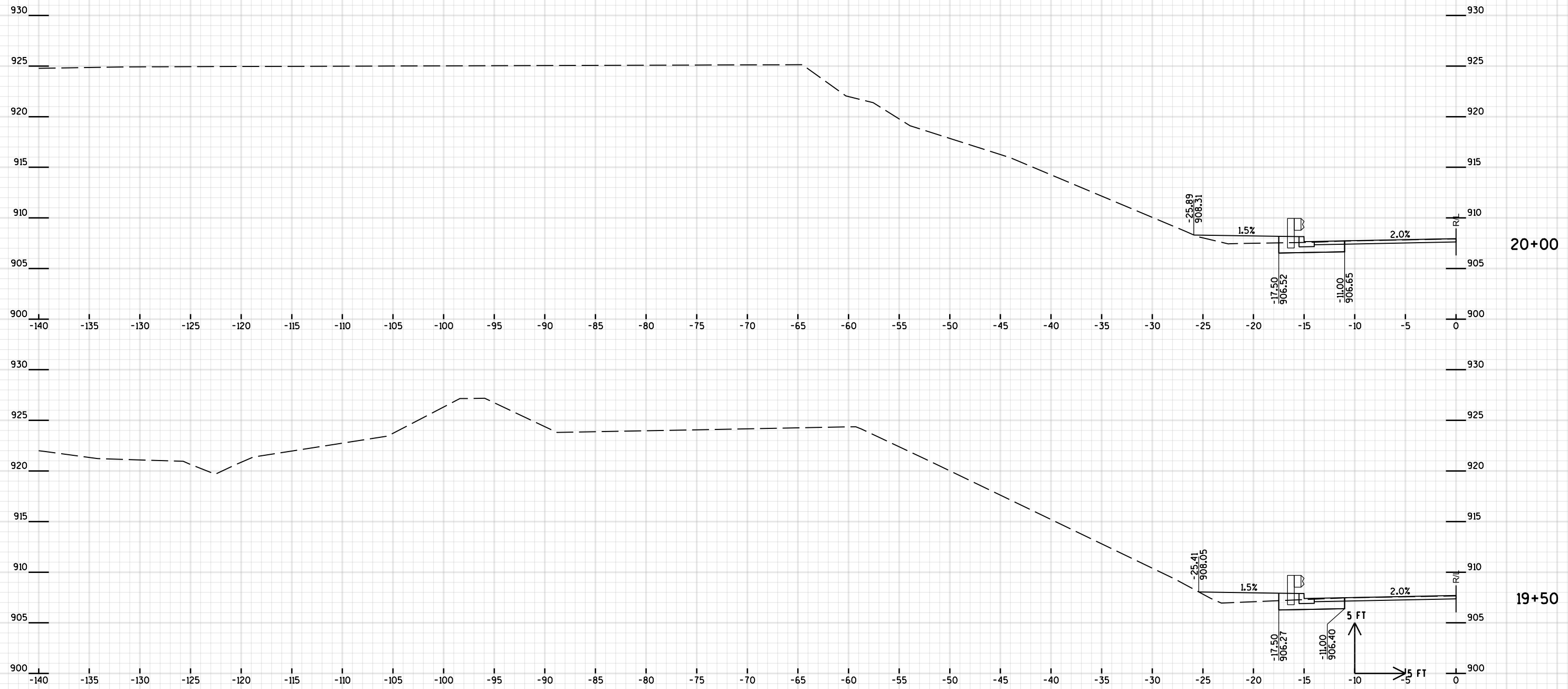


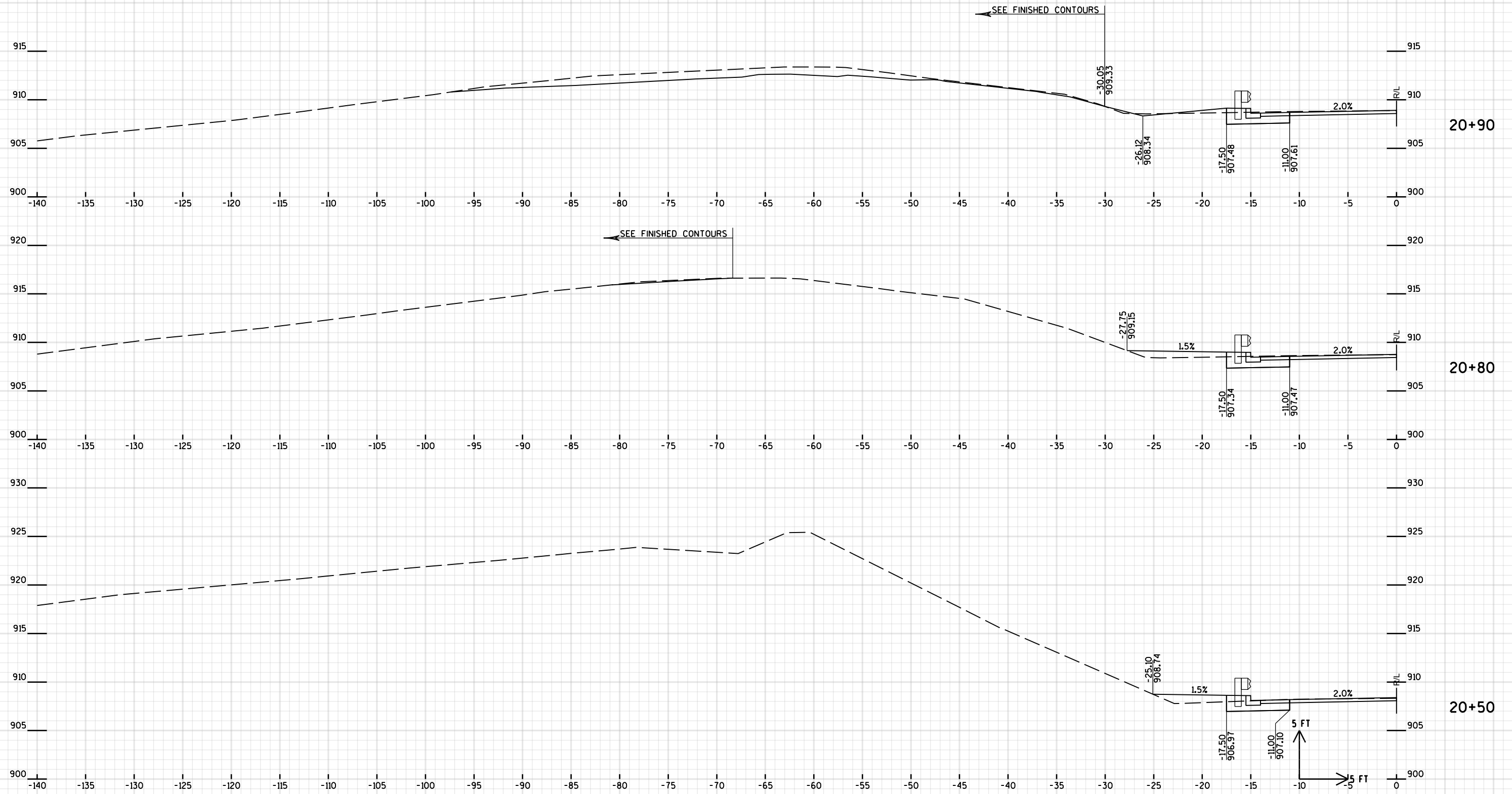
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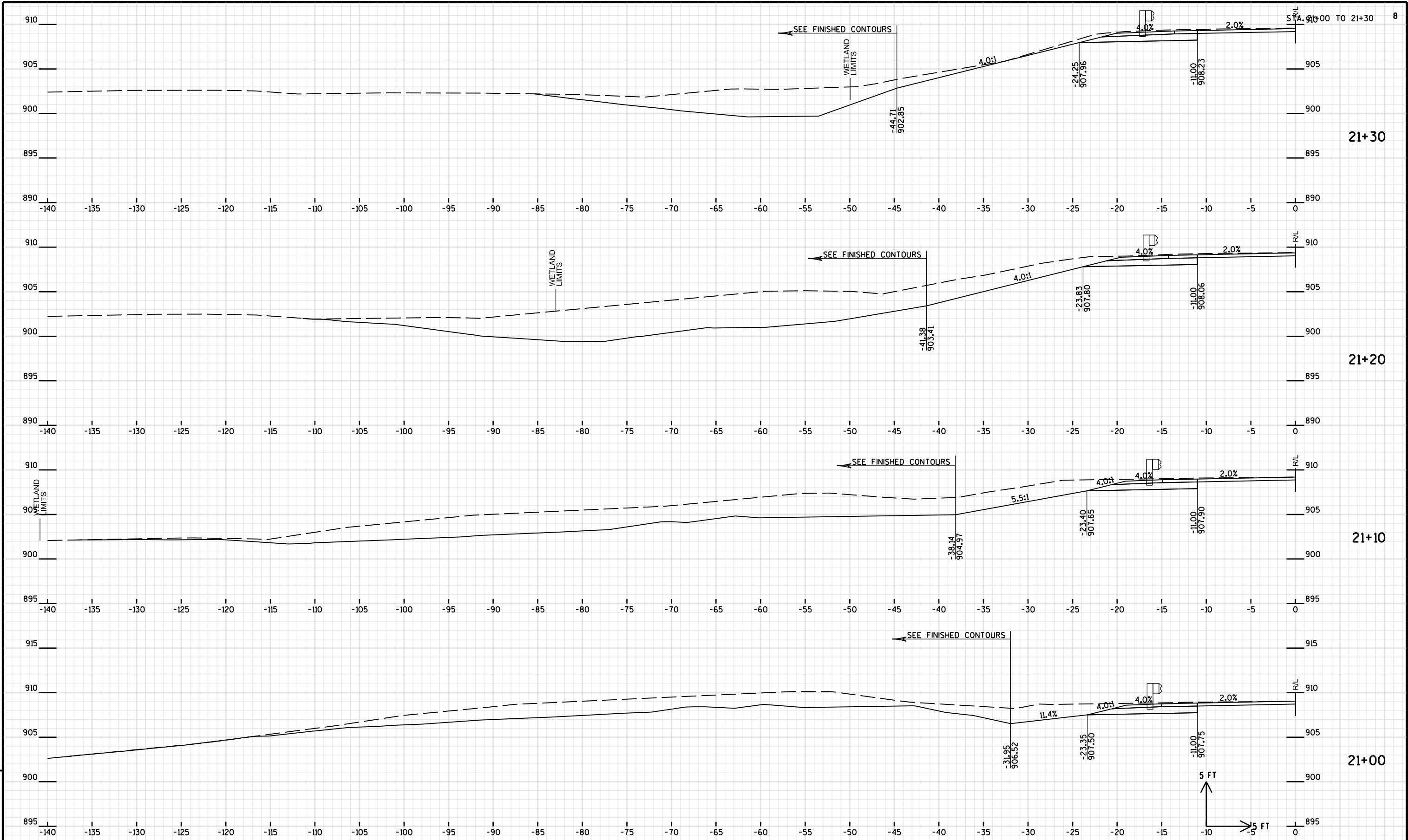


18+70









PROJECT NO: 1090-19-17

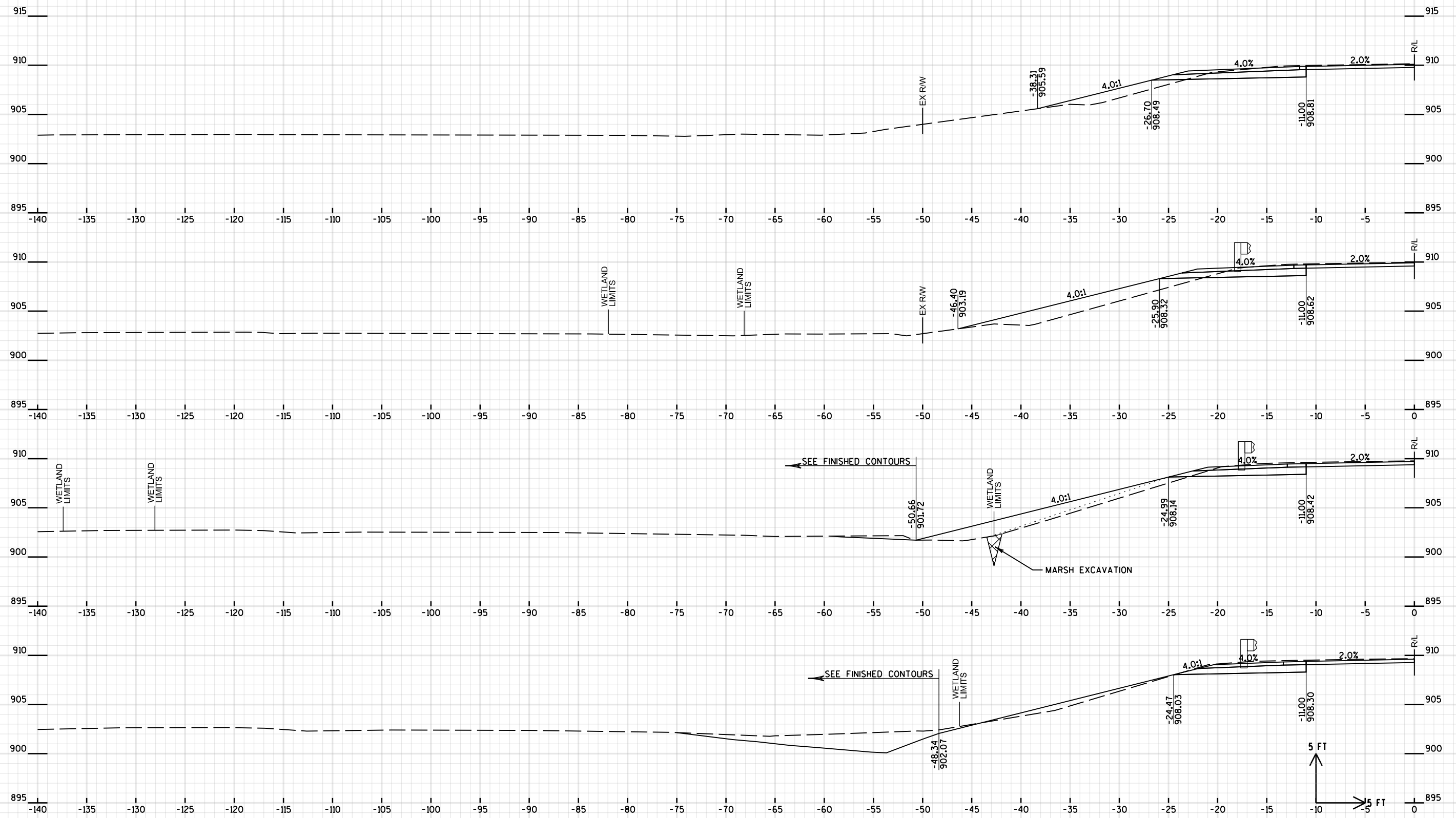
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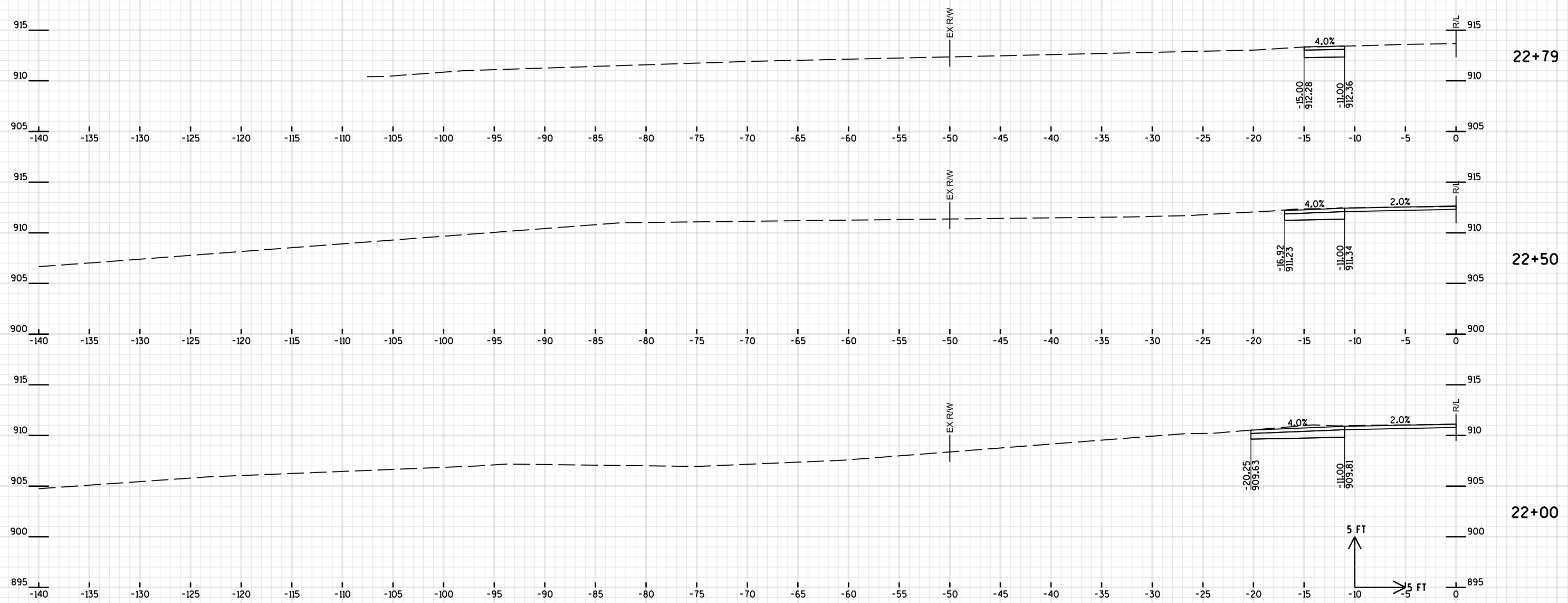
COUNTY: WAUKESHA

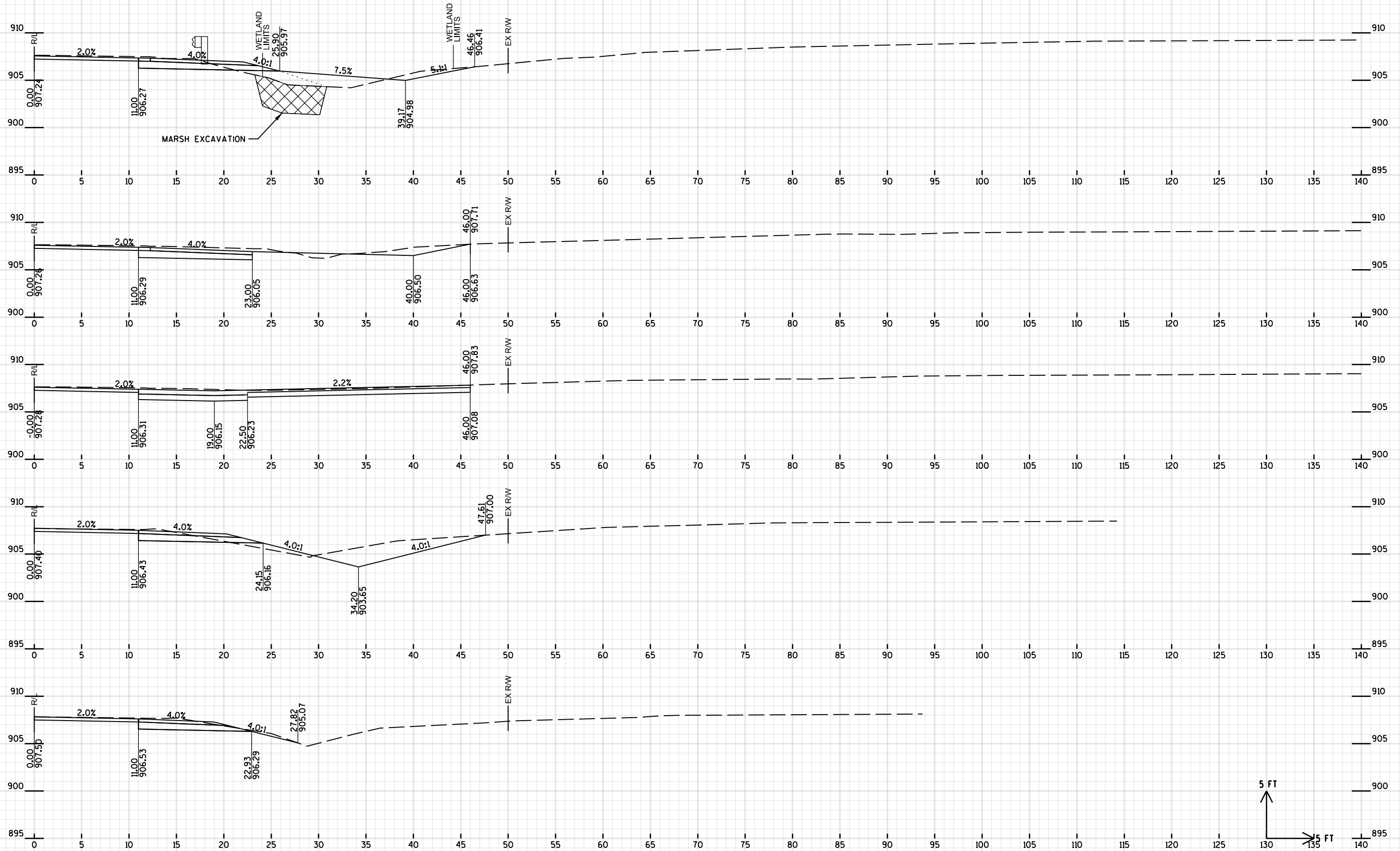
CROSS SECTIONS: EVERGREEN

SHEET

E

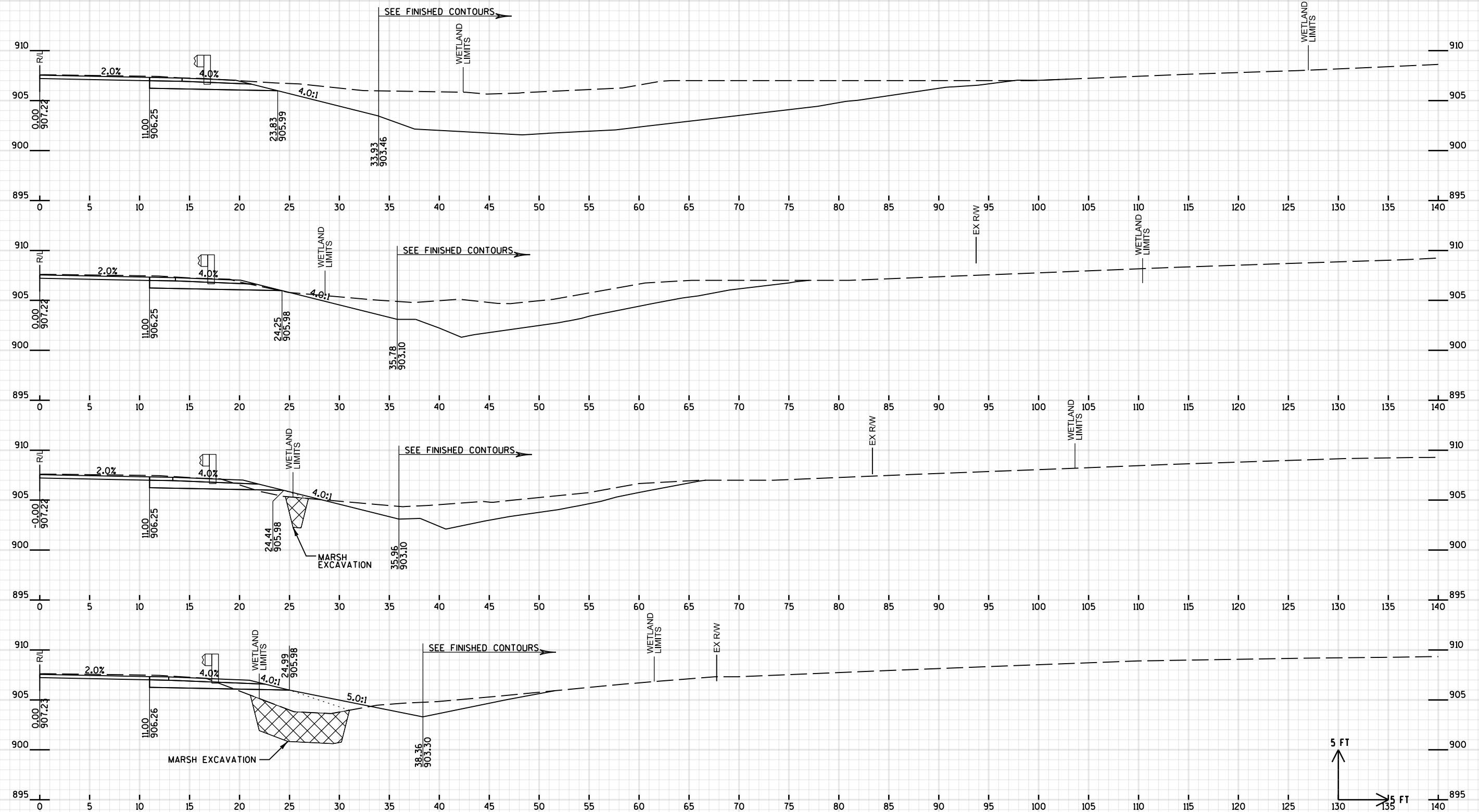


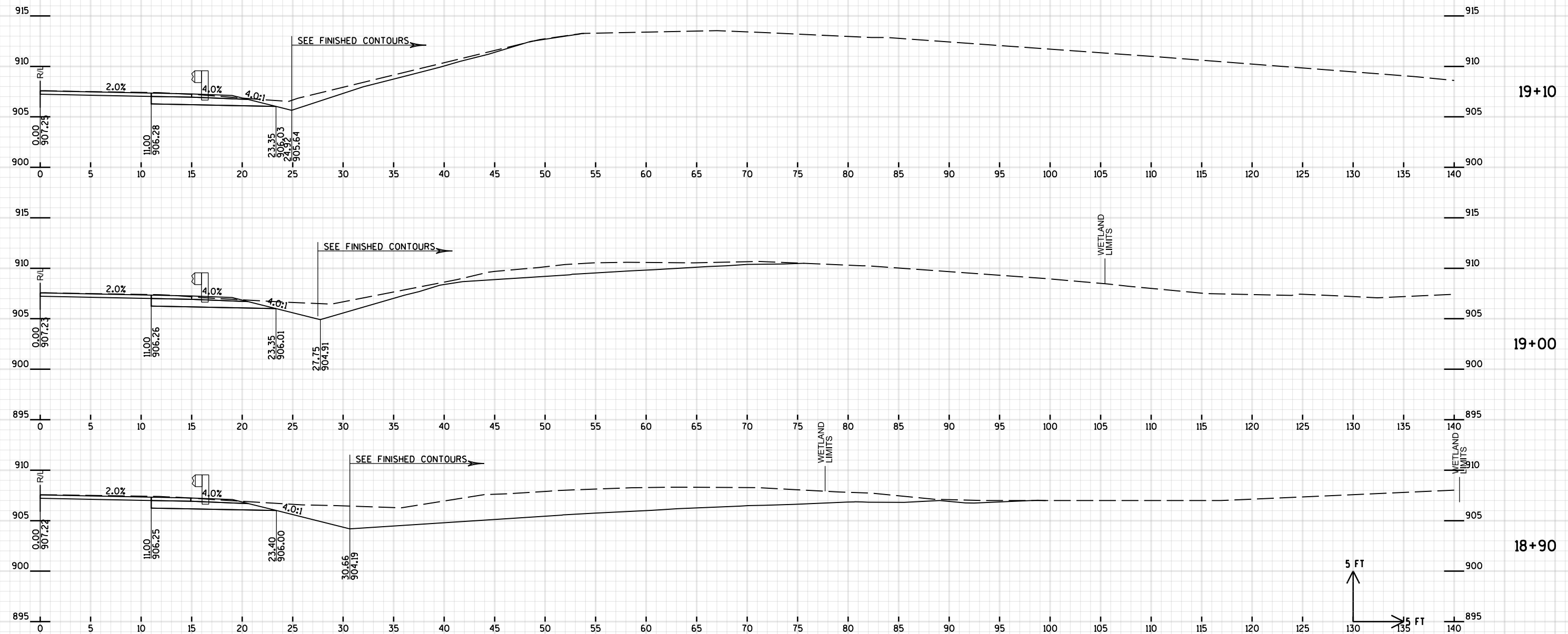


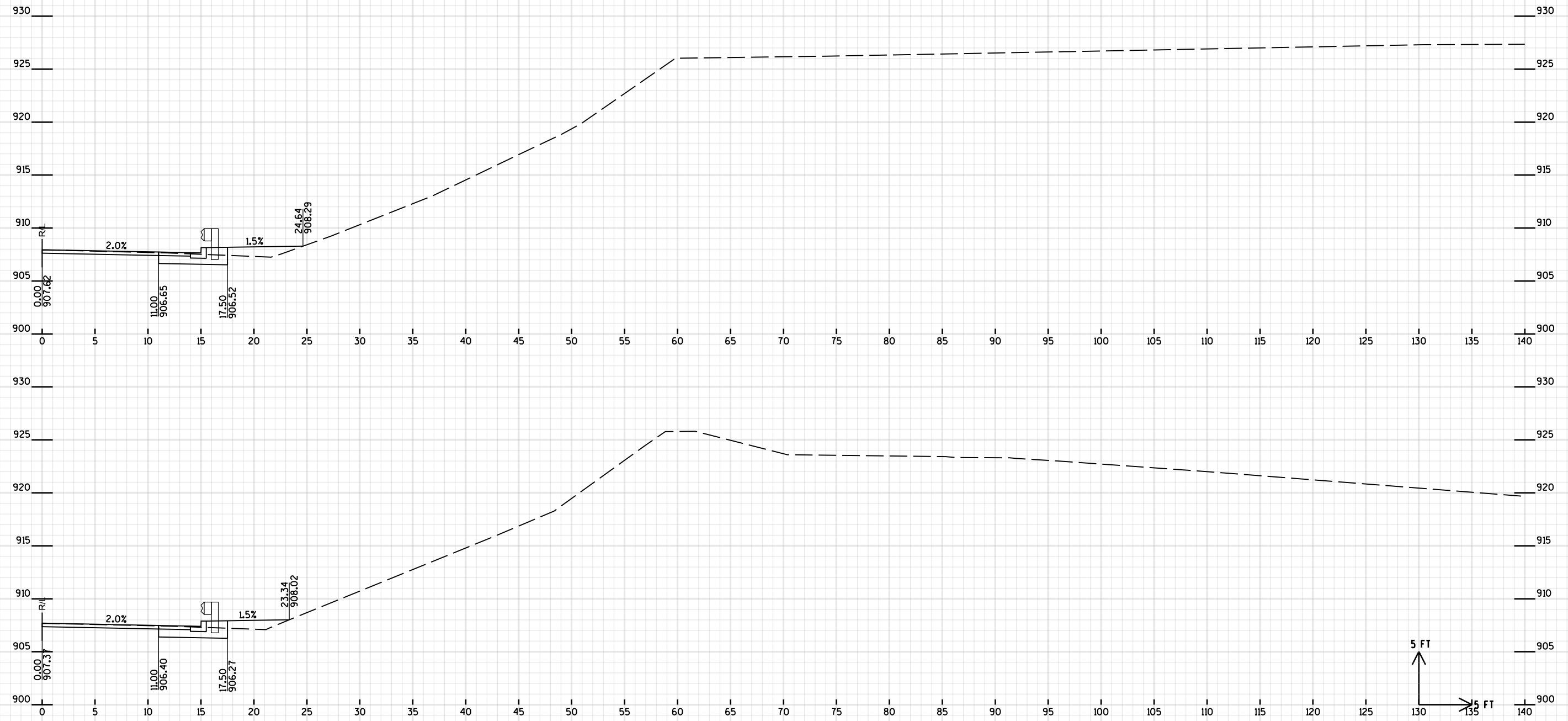


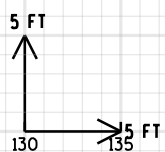
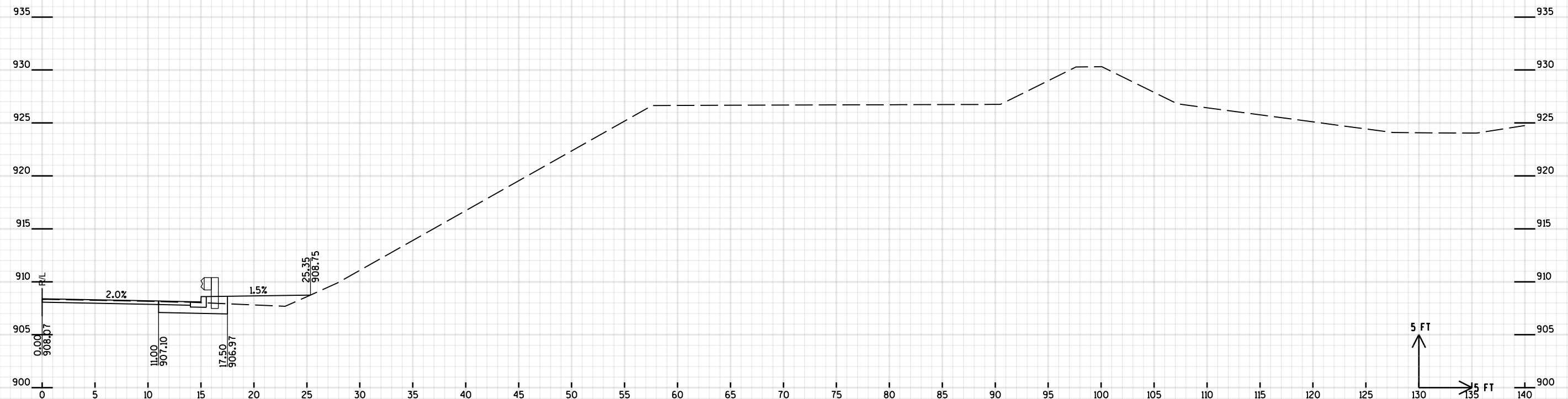
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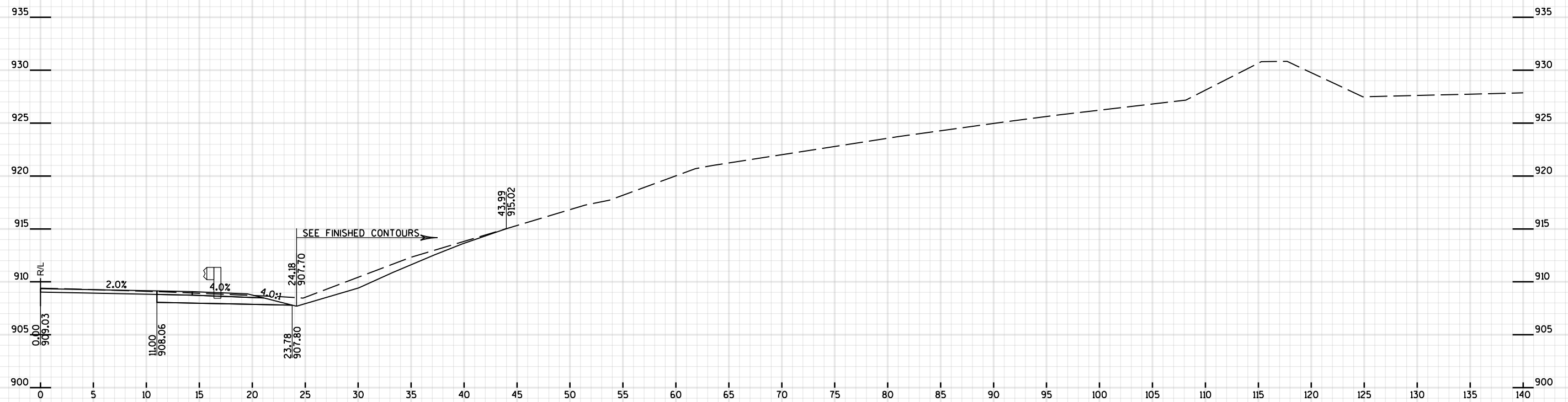
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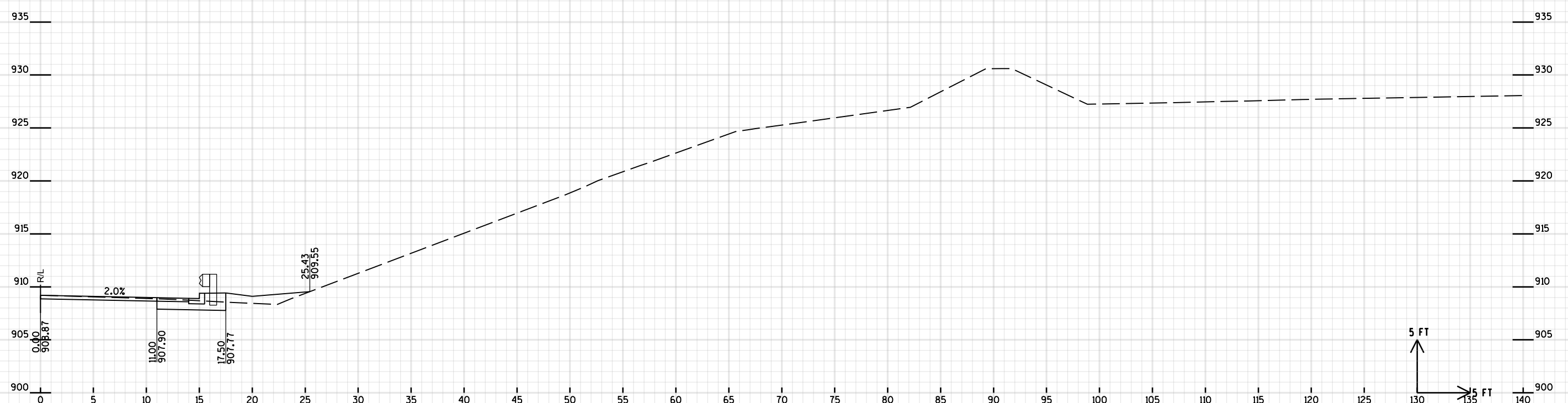




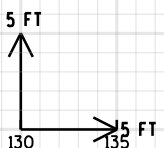


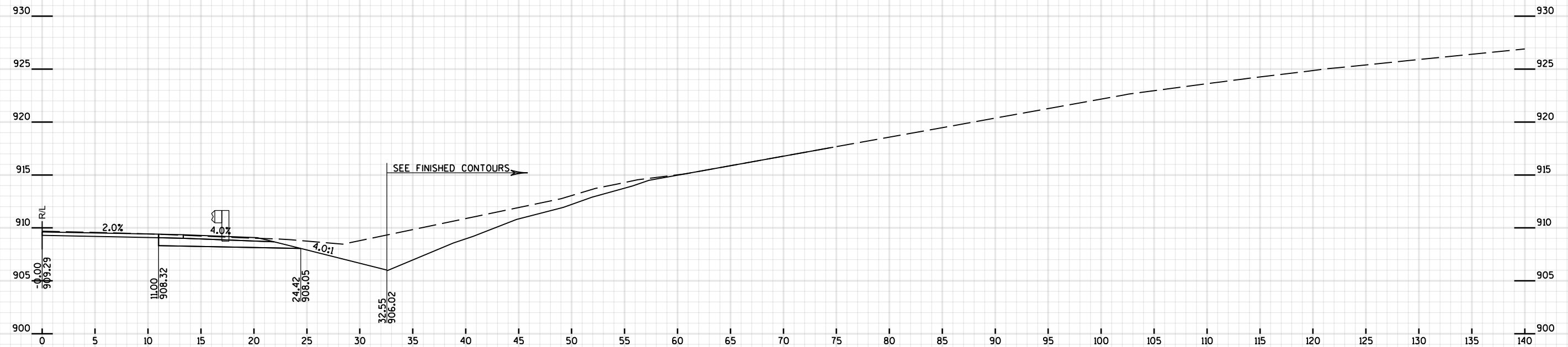


21+20

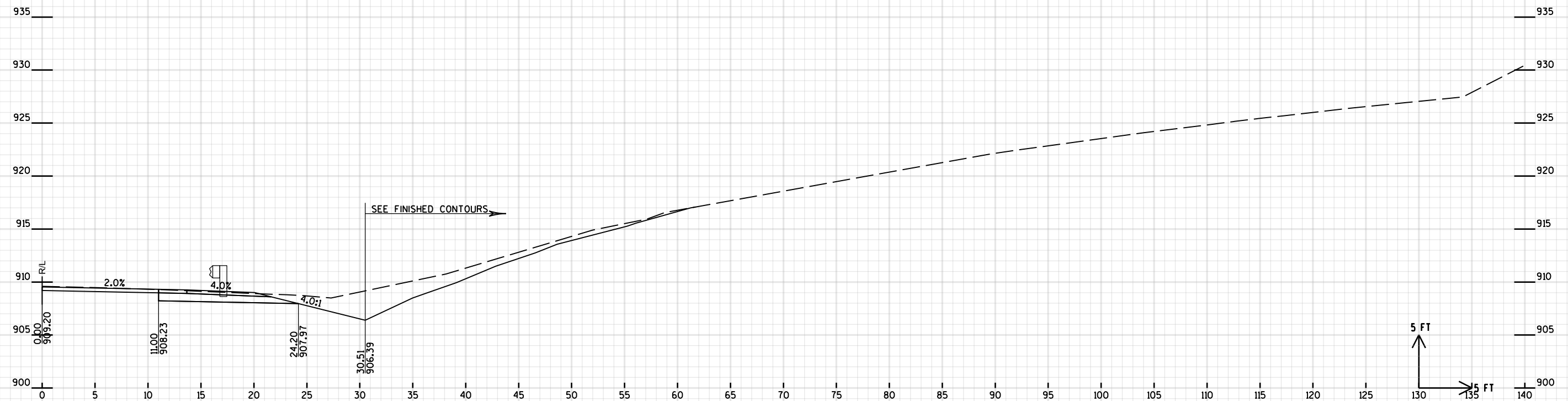


21+10

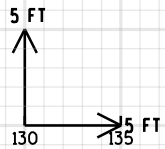


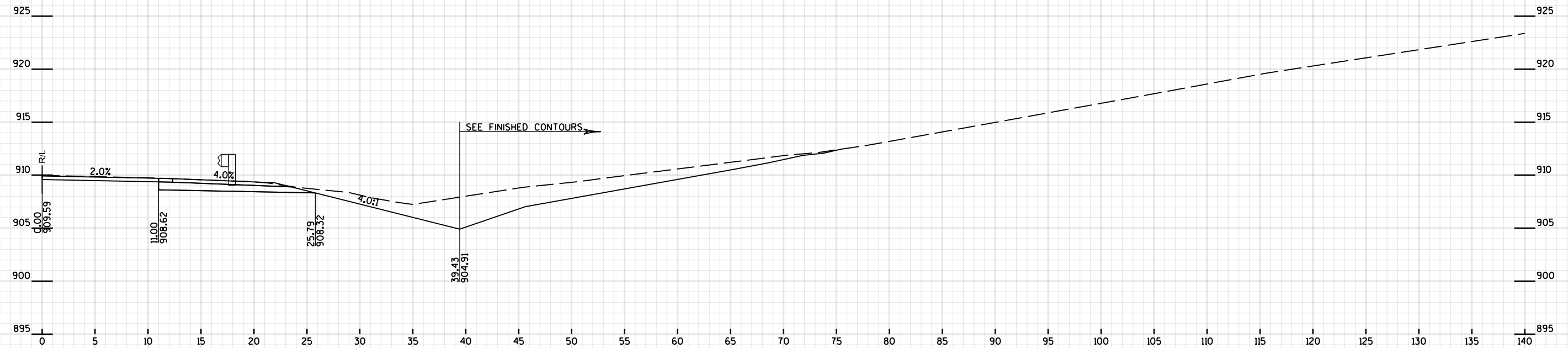


21+35

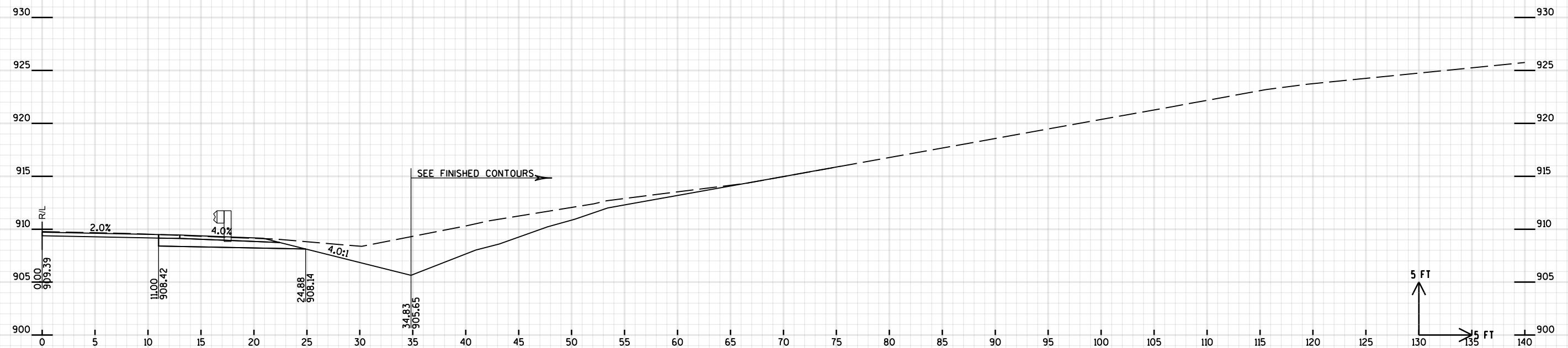


21+30

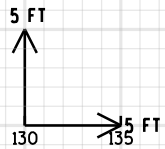


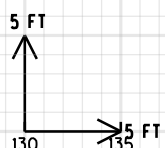
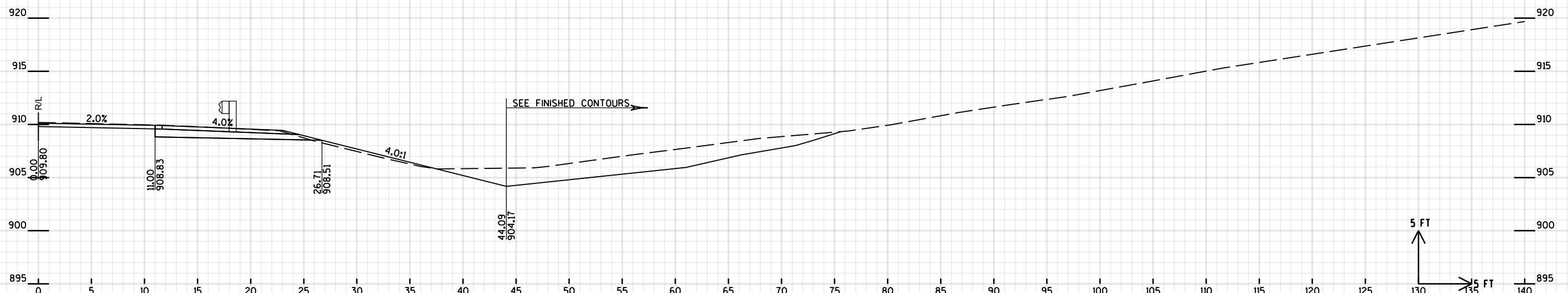
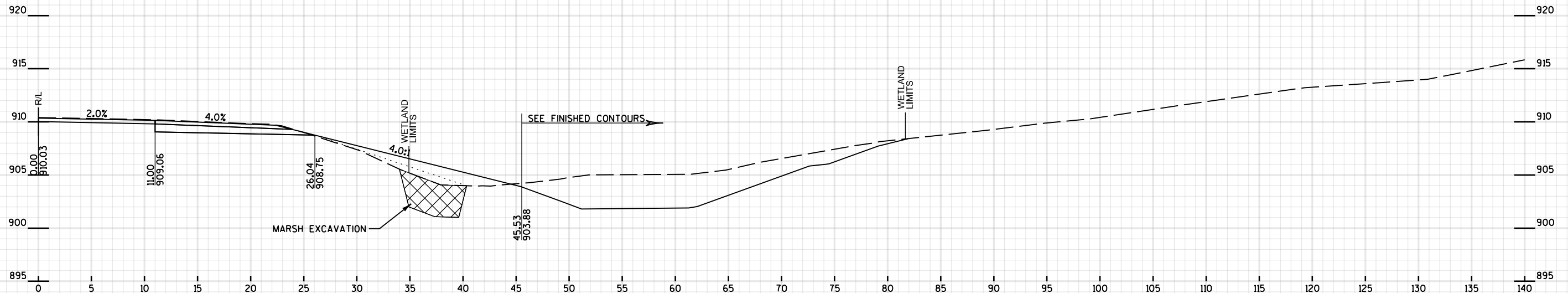
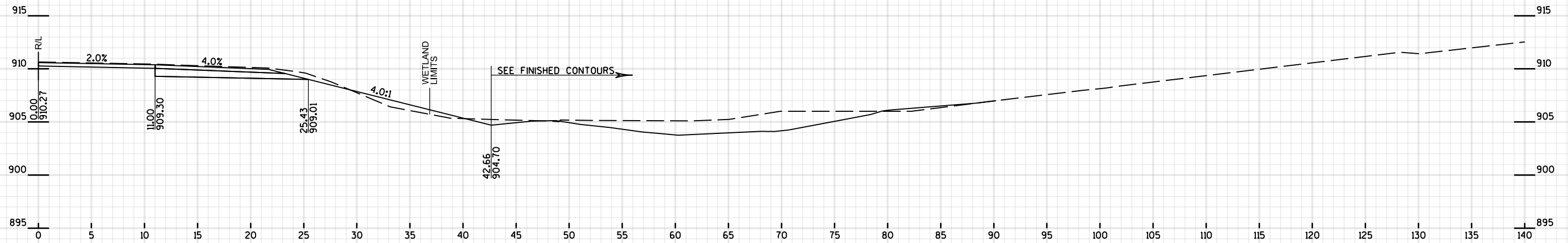


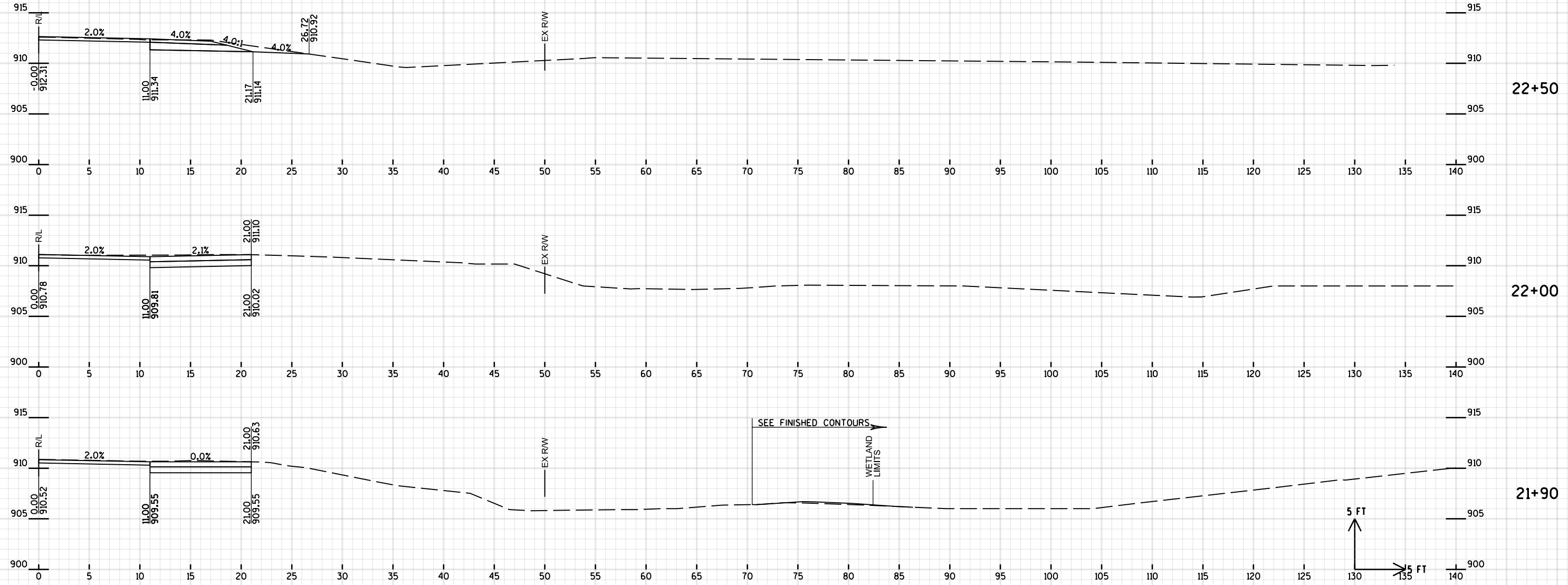
21+50



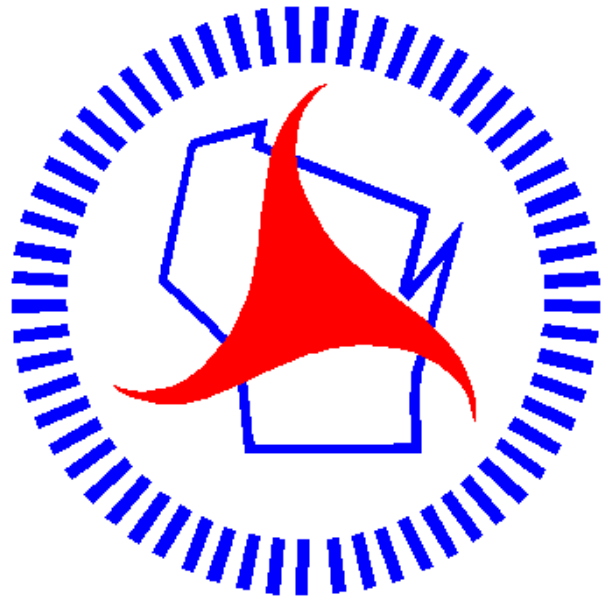
21+40







## Notes



## ***Wisconsin Department of Transportation***

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