# STANDARD PLANS

**STATE OF CALIFORNIA**
**CALIFORNIA STATE TRANSPORTATION AGENCY**
**DEPARTMENT OF TRANSPORTATION**

# 2025 Edition

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# STANDARD PLANS 2025

## PREFACE

This 2025 edition of the California Department of Transportation Standard Plans is based on U.S. Customary units. This is the Department's eighth edition Standard Plans since the Department reverted back to U.S. Customary units as its base units. U.S. Customary units ("inch-pound") are defined by the National Institute of Standards and Technology (NIST). The previous edition of the Department's Standard Plans published in U.S. Customary units was the 2024 edition.

This 2025 edition of the Department's Standard Plans is to be used in conjunction with the 2025 edition of the Department's Standard Specifications.

## TABLE OF CONTENTS


| PLAN TITLE | PLAN No. | PAGE |
|---|---|---|
| **ABBREVIATIONS, LINES, SYMBOLS, AND LEGEND** | | |
| ABBREVIATIONS (SHEET 1 OF 3) | A3A | 1 |
| ABBREVIATIONS (SHEET 2 OF 3) | A3B | 2 |
| ABBREVIATIONS (SHEET 3 OF 3) | A3C | 3 |
| LEGEND - LINES AND SYMBOLS (SHEET 1 OF 5) | A10A | 4 |
| LEGEND - LINES AND SYMBOLS (SHEET 2 OF 5) | A10B | 5 |
| LEGEND - LINES AND SYMBOLS (SHEET 3 OF 5) | A10C | 6 |
| LEGEND - LINES AND SYMBOLS (SHEET 4 OF 5) | A10D | 7 |
| LEGEND - LINES AND SYMBOLS (SHEET 5 OF 5) | A10E | 8 |
| LEGEND - SOIL (SHEET 1 OF 2) | A10F | 9 |
| LEGEND - SOIL (SHEET 2 OF 2) | A10G | 10 |
| LEGEND - ROCK | A10H | 11 |
| **PAVEMENT MARKERS, TRAFFIC LINES, AND PAVEMENT MARKINGS** | | |
| PAVEMENT MARKERS AND TRAFFIC LINES - TYPICAL DETAILS | A20A | 12 |
| PAVEMENT MARKERS AND TRAFFIC LINES - TYPICAL DETAILS | A20B | 13 |
| PAVEMENT MARKERS AND TRAFFIC LINES - TYPICAL DETAILS | A20C | 14 |
| PAVEMENT MARKERS AND TRAFFIC LINES - TYPICAL DETAILS | A20D | 15 |
| TRAFFIC LINES - TYPICAL DETAILS FOR CONTRAST STRIPING | A20E | 16 |
| PAVEMENT MARKERS AND TRAFFIC LINES - TYPICAL DETAILS | A20F | 17 |
| EXIT RAMP WITH ENHANCED PAVEMENT MARKERS FOR WRONG WAY DETAILS | A20G | 18 |
| PAVEMENT MARKINGS - ARROWS | A24A | 19 |
| PAVEMENT MARKINGS - ARROWS AND SYMBOLS | A24B | 20 |
| PAVEMENT MARKINGS - SYMBOLS AND NUMERALS | A24C | 21 |
| PAVEMENT MARKINGS - WORDS | A24D | 22 |
| PAVEMENT MARKINGS - WORDS | A24E | 23 |
| PAVEMENT MARKINGS - CROSSWALKS | A24F | 24 |
| PAVEMENT MARKINGS - YIELD LINES, LIMIT LINES, AND WRONG WAY DETAILS | A24G | 25 |
| PAVEMENT MARKINGS - ARROWS | A24H | 26 |
| PAVEMENT MARKINGS - SPEED MEASUREMENT | A24J | 27 |
| PAVEMENT MARKINGS - BICYCLE OBSTRUCTION MARKINGS | A24K | 28 |
| PAVEMENT MARKINGS - SPEED REDUCTION | A24L | 29 |
| **RUMBLE STRIP** | | |
| SHOULDER RUMBLE STRIP DETAILS - GROUND-IN INDENTATIONS | A40B | 30 |
| EDGE LINE RUMBLE STRIP DETAILS - GROUND-IN INDENTATIONS | A40C | 31 |
| CENTER LINE RUMBLE STRIP DETAILS - GROUND-IN INDENTATIONS | A40D | 32 |
| RUMBLE STRIP PLACEMENT AT FREEWAY EXIT RAMPS, FREEWAY ENTRANCE RAMPS, AND INTERSECTIONS | A40E | 33 |
| RUMBLE STRIP PLACEMENT AT INTERSECTIONS WITH LEFT TURN POCKETS, RAILROAD CROSSINGS, PRIVATE ROADS, AND MAJOR DRIVEWAYS | A40F | 34 |
| SINUSOIDAL RUMBLE STRIP DETAILS - GROUND-IN INDENTATIONS | A40G | 35 |
| RUMBLE STRIP PLACEMENT WITH GAPS FOR BICYCLES | A40H | 36 |
| COMBINED RECESSED TRAFFIC STRIPE AND RUMBLE STRIP DETAILS | A40J | 37 |
| RUMBLE STRIP PLACEMENT FOR PAVED MEDIANS | A40K | 38 |
| RUMBLE STRIP PLACEMENT FOR CLASS 2 BICYCLE LANE AND CLASS 4 BIKEWAY | A40L | 39 |

PLAN TITLE PLAN No. PAGE

**EXCAVATION AND BACKFILL**

EXCAVATION AND BACKFILL - MISCELLANEOUS DETAILS ..... A62A ..... 40
LIMITS OF PAYMENT FOR EXCAVATION AND BACKFILL - BRIDGE SURCHARGE AND WALL ..... A62B ..... 41
LIMITS OF PAYMENT FOR EXCAVATION AND BACKFILL - BRIDGE ..... A62C ..... 42
EXCAVATION AND BACKFILL - CONCRETE PIPE CULVERTS ..... A62D ..... 43
EXCAVATION AND BACKFILL - CONCRETE PIPE CULVERTS INDIRECT DESIGN METHOD ..... A62DA ..... 44
EXCAVATION AND BACKFILL - CAST-IN-PLACE REINFORCED CONCRETE BOX AND ARCH CULVERTS ..... A62E ..... 45
EXCAVATION AND BACKFILL - METAL AND PLASTIC CULVERTS ..... A62F ..... 46
EXCAVATION AND BACKFILL - PRECAST REINFORCED CONCRETE BOX CULVERT ..... A62G ..... 47

**PORTABLE CONCRETE BARRIER**

PORTABLE CONCRETE BARRIER (TYPE 60K) ..... A63A ..... 48
PORTABLE CONCRETE BARRIER (TYPE 60K) ..... A63B ..... 49

**OBJECT MARKERS, DELINEATORS, CHANNELIZERS, AND BARRICADES**

OBJECT MARKERS ..... A73A ..... 50
MARKERS ..... A73B ..... 51
DELINEATORS, CHANNELIZERS AND BARRICADES ..... A73C ..... 52

**SURVEYS**

SURVEY MONUMENTS ..... A74 ..... 53
GLOBAL NAVIGATION SATELLITE SYSTEM STATION DETAILS ..... A74A ..... 54

**CONCRETE BARRIER TYPE 60 SERIES**

CONCRETE BARRIER TYPE 60M ..... A76A ..... 55
CONCRETE BARRIER TYPE 60M DETAILS ..... A76AB ..... 56
CONCRETE BARRIER TYPE 60M TRANSITION TO CONCRETE BARRIER TYPE 50 ..... A76AC ..... 57
CONCRETE BARRIER TYPE 60MP ..... A76BA ..... 58
CONCRETE BARRIER TYPE 60PR ..... A76BB ..... 59
CONCRETE BARRIER TYPE 60AP ..... A76BC ..... 60
CONCRETE BARRIER TYPE 60M WITH SMALL POLE ..... A76BM ..... 61
CONCRETE BARRIER TYPE 60MS WITH SMALL POLE ..... A76BN ..... 62
CONCRETE BARRIER TYPES 60M AND 60MS WITH SMALL POLE TRANSITION DETAILS ..... A76BO ..... 63
CONCRETE BARRIER TYPE 60MC WITH SMALL POLE ..... A76BP ..... 64
CONCRETE BARRIER TYPE 60MSC WITH SMALL POLE ..... A76BQ ..... 65
CONCRETE BARRIER TYPES 60MC AND 60MSC WITH SMALL POLE TRANSITION DETAILS ..... A76BR ..... 66
CONCRETE BARRIER TYPE 60MF ..... A76C ..... 67
CONCRETE BARRIER TYPE 60MG ..... A76D ..... 68
CONCRETE BARRIER TYPE 60MG ..... A76E ..... 69
CONCRETE BARRIER TYPE 60MGF ..... A76F ..... 70
CONCRETE BARRIER TYPE 60MS ..... A76G ..... 71
CONCRETE BARRIER TYPE 60MS CONNECTION TO CRASH CUSHION ..... A76HA ..... 72

PLAN TITLE PLAN No. PAGE

**CONCRETE BARRIER TYPE 60 SERIES (CONTINUED)**

CONCRETE BARRIER TYPE 60MS TO TRANSITION RAILING (TYPE AGT) ..... A76HB ..... 73
CONCRETE BARRIER TYPE 60MSF ..... A76I ..... 74

**CONCRETE BARRIER WILDLIFE PASSAGEWAY**

CONCRETE BARRIER - WILDLIFE PASSAGEWAY (TYPE MS) ..... A76J ..... 75
CONCRETE BARRIER - WILDLIFE PASSAGEWAY (TYPE MM) ..... A76K ..... 76
CONCRETE BARRIER - WILDLIFE PASSAGEWAY (TYPE ML) ..... A76L ..... 77

**MIDWEST GUARDRAIL SYSTEM - STANDARD RAILING SECTIONS AND TRANSITION TO METAL BEAM GUARDRAIL**

MIDWEST GUARDRAIL SYSTEM - STANDARD RAILING SECTION (WOOD POST WITH WOOD BLOCK) ..... A77L1 ..... 78
MIDWEST GUARDRAIL SYSTEM - STANDARD RAILING SECTION (STEEL POST WITH NOTCHED WOOD OR NOTCHED RECYCLED PLASTIC BLOCK) ..... A77L2 ..... 79
MIDWEST GUARDRAIL SYSTEM - TRANSITION TO METAL BEAM GUARDRAIL ..... A77L4 ..... 80
MIDWEST GUARDRAIL SYSTEM - STANDARD HARDWARE ..... A77M1 ..... 81
MIDWEST GUARDRAIL SYSTEM - WOOD POST AND WOOD BLOCK DETAILS ..... A77N1 ..... 82
MIDWEST GUARDRAIL SYSTEM - STEEL POST AND BLOCK DETAILS ..... A77N2 ..... 83
MIDWEST GUARDRAIL SYSTEM - TYPICAL LINE POST EMBEDMENT AND HINGE POINT OFFSET DETAILS ..... A77N3 ..... 84
MIDWEST GUARDRAIL SYSTEM - TYPICAL HEIGHT MEASUREMENT, DIKE POSITIONING, AND DELINEATION DETAILS ..... A77N4 ..... 85

**MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM**

MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM ..... A77N5 ..... 86
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM NARROW VEGETATION CONTROL INSTALLATION ..... A77N5A ..... 87
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM FOR TERMINAL SYSTEM END TREATMENTS ..... A77N6 ..... 88
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM AT STRUCTURE APPROACH ..... A77N7 ..... 89
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM AT FIXED OBJECT ..... A77N8 ..... 90
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM AT FIXED OBJECT ..... A77N9 ..... 91
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM AT FIXED OBJECT ..... A77N10 ..... 92
MINOR CONCRETE VEGETATION CONTROL - GUARDRAIL SYSTEM MISCELLANEOUS DETAILS ..... A77N11 ..... 93

**FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM**

FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM ..... A77N12 ..... 94
FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM NARROW VEGETATION CONTROL INSTALLATION ..... A77N13 ..... 95
FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM FOR TERMINAL SYSTEM END TREATMENTS ..... A77N14 ..... 96
FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM AT STRUCTURE APPROACH ..... A77N15 ..... 97
FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM AT FIXED OBJECT ..... A77N16 ..... 98

PLAN TITLE | PLAN No. | PAGE

## FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM (CONTINUED)

FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM AT FIXED OBJECT ..... A77N17 ..... 99
FIBER OR RUBBER MAT VEGETATION CONTROL - GUARDRAIL SYSTEM AT FIXED OBJECT ..... A77N18 ..... 100

## MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS

MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS ..... A77P1 ..... 101
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS ..... A77P2 ..... 102
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS ..... A77P3 ..... 103
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS ..... A77P4 ..... 104
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS ..... A77P5 ..... 105
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR EMBANKMENTS ..... A77P6 ..... 106

## MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR STRUCTURES

MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR STRUCTURE APPROACH ..... A77Q1 ..... 107
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR STRUCTURE APPROACH AND BETWEEN STRUCTURES ..... A77Q2 ..... 108
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR STRUCTURE APPROACH ..... A77Q3 ..... 109
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR STRUCTURE DEPARTURE ..... A77Q4 ..... 110
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR STRUCTURE DEPARTURE ..... A77Q5 ..... 111

## MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR FIXED OBJECTS

MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR FIXED OBJECTS BETWEEN SEPARATE ROADBEDS (TWO-WAY TRAFFIC) ..... A77R1 ..... 112
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR FIXED OBJECTS BETWEEN SEPARATE ROADBEDS (ONE-WAY TRAFFIC) ..... A77R2 ..... 113
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS ..... A77R3 ..... 114
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS ..... A77R4 ..... 115
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS ..... A77R5 ..... 116
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS ..... A77R6 ..... 117
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS ..... A77R7 ..... 118
MIDWEST GUARDRAIL SYSTEM - TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS ..... A77R8 ..... 119

## MIDWEST GUARDRAIL SYSTEM - END ANCHORAGE AND RAIL TENSIONING ASSEMBLY

MIDWEST GUARDRAIL SYSTEM - END ANCHOR ASSEMBLY (TYPE SFT-M) ..... A77S1 ..... 120
MIDWEST GUARDRAIL SYSTEM - RAIL TENSIONING ASSEMBLY ..... A77S2 ..... 121
METAL RAILING ANCHOR CABLE AND ANCHOR PLATE DETAILS ..... A77S3 ..... 122
METAL RAILING END ANCHOR ASSEMBLY (TYPE CA) ..... A77T1 ..... 123
MIDWEST GUARDRAIL SYSTEM - BURIED POST END ANCHOR (TYPE B-F) ..... A77T2 ..... 124
MIDWEST GUARDRAIL SYSTEM - BURIED POST END ANCHOR (TYPE B-S) ..... A77T3 ..... 125

## MINOR CONCRETE VEGETATION CONTROL - THRIE BEAM BARRIER

MINOR CONCRETE VEGETATION CONTROL - SINGLE THRIE BEAM BARRIER ..... A78C3 ..... 126
MINOR CONCRETE VEGETATION CONTROL - DOUBLE THRIE BEAM BARRIER ..... A78C4 ..... 127

PLAN TITLE | PLAN No. | PAGE

## MINOR CONCRETE VEGETATION CONTROL - THRIE BEAM BARRIER (CONTINUED)

MINOR CONCRETE VEGETATION CONTROL - THRIE BEAM BARRIER AT FIXED OBJECTS IN MEDIAN ..... A78C5 ..... 128
MINOR CONCRETE VEGETATION CONTROL - THRIE BEAM BARRIER AT STRUCTURE APPROACH ..... A78C6 ..... 129

## FIBER OR RUBBER MAT VEGETATION CONTROL - THRIE BEAM BARRIER

FIBER OR RUBBER MAT VEGETATION CONTROL - SINGLE THRIE BEAM BARRIER ..... A78C7 ..... 130
FIBER OR RUBBER MAT VEGETATION CONTROL - DOUBLE THRIE BEAM BARRIER ..... A78C8 ..... 131
FIBER OR RUBBER MAT VEGETATION CONTROL - THRIE BEAM BARRIER AT FIXED OBJECTS IN MEDIAN ..... A78C9 ..... 132
FIBER OR RUBBER MAT VEGETATION CONTROL - THRIE BEAM BARRIER AT STRUCTURE APPROACH ..... A78C10 ..... 133

## THRIE BEAM BARRIER (TYPE M) – STANDARD RAILING SECTIONS

THRIE BEAM BARRIER (TYPE M) - STANDARD BARRIER RAILING SECTION ..... A78M1 ..... 134
THRIE BEAM BARRIER (TYPE M) - STANDARD HARDWARE DETAILS ..... A78M2 ..... 135
THRIE BEAM BARRIER (TYPE M) - POST AND BLOCK DETAILS ..... A78M3 ..... 136

## THRIE BEAM BARRIER (TYPE M) – TRANSITIONS

SINGLE AND DOUBLE THRIE BEAM BARRIER (TYPE M) - TRANSITION TO MIDWEST GUARDRAIL SYSTEM ..... A78P1 ..... 137
THRIE BEAM BARRIER (TYPE M) - TRANSITION TO THRIE BEAM RAIL ..... A78P2 ..... 138

## THRIE BEAM BARRIER (TYPE M) – END ANCHORS, EMERGENCY PASSAGEWAYS, AND AT FIXED OBJECTS IN MEDIAN

THRIE BEAM BARRIER (TYPE M) - END ANCHORS ..... A78Q1 ..... 139
DOUBLE THRIE BEAM BARRIER (TYPE M) - EMERGENCY PASSAGEWAY DETAILS ..... A78Q2 ..... 140
THRIE BEAM BARRIER (TYPE M) - AT FIXED OBJECTS IN MEDIAN ..... A78Q3 ..... 141

## THRIE BEAM BARRIER (TYPE M) – TYPICAL LAYOUT FOR CONNECTION TO BRIDGE RAILING

THRIE BEAM BARRIER (TYPE M) - TYPICAL LAYOUT FOR CONNECTION TO BRIDGE RAILING ..... A78R ..... 142

## APPROACH GUARDRAIL TRANSITION (TYPE AGT) AND DEPARTING CONNECTIONS – MIDWEST GUARDRAIL SYSTEM AND THRIE BEAM BARRIER (TYPE M) CONNECTION DETAILS TO BRIDGE RAILINGS, ABUTMENTS, AND WALLS

TRANSITION RAILING (TYPE AGT) ..... A79A1 ..... 143
TRANSITION RAILING (TYPE AGT) TO THRIE BEAM BARRIER (TYPE M) ..... A79A2 ..... 144
TRANSITION RAILING (TYPE AGT) DETAILS ..... A79A3 ..... 145
TRANSITION RAILING (TYPE AGT) TO BRIDGE RAILINGS WITHOUT SIDEWALKS ..... A79B1 ..... 146
TRANSITION RAILING (TYPE AGT) TO BRIDGE RAILINGS WITH SIDEWALKS ..... A79B2 ..... 147
TRANSITION RAILING (TYPE AGT) CONNECTIONS TO ABUTMENTS AND WALLS ..... A79C1 ..... 148
DEPARTING TRANSITION CONNECTIONS TO ABUTMENTS AND WALLS ..... A79C2 ..... 149

PLAN TITLE PLAN No. PAGE

**CRASH CUSHIONS**

CRASH CUSHION - SAND FILLED (UNIDIRECTIONAL) ..... A81A ..... 150
CRASH CUSHION - SAND FILLED (UNIDIRECTIONAL) ..... A81B ..... 151
CRASH CUSHION - SAND FILLED (BIDIRECTIONAL) ..... A81C ..... 152

**FENCES**

TEMPORARY DESERT TORTOISE FENCE ..... A84A ..... 153
DESERT TORTOISE FENCE ..... A84B ..... 154
CHAIN LINK FENCE ..... A85 ..... 155
CHAIN LINK FENCE DETAILS ..... A85A ..... 156
CHAIN LINK FENCE DETAILS ..... A85B ..... 157
BARBED WIRE AND WIRE MESH FENCES ..... A86 ..... 158
BARBED WIRE AND WIRE MESH FENCE DETAIL ON SHARP BREAK IN GRADE ..... A86A ..... 159
BARBED WIRE AND WIRE MESH FENCE DETAILS ..... A86B ..... 160
BARBED WIRE AND WIRE MESH FENCE DETAILS AT DITCH CROSSING ..... A86C ..... 161
BARBED WIRE AND WIRE MESH FENCE - MISCELLANEOUS DETAILS ..... A86D ..... 162

**CURBS, DRIVEWAYS, DIKES, CURB RAMPS AND ACCESSIBLE PARKING**

CURBS AND DRIVEWAYS ..... A87A ..... 163
HOT MIX ASPHALT DIKES ..... A87B ..... 164
CURB RAMP DETAILS ..... A88A ..... 165
CURB RAMP AND ISLAND PASSAGEWAY DETAILS ..... A88B ..... 166
ACCESSIBLE PARKING OFF-STREET ..... A90A ..... 167
ACCESSIBLE PARKING ON-STREET ..... A90B ..... 168

**PAVEMENTS**

JOINTED PLAIN CONCRETE PAVEMENT - NEW CONSTRUCTION ..... P1 ..... 169
JOINTED PLAIN CONCRETE PAVEMENT (WIDENED LANE) - NEW CONSTRUCTION ..... P2 ..... 170
JOINTED PLAIN CONCRETE PAVEMENT -
LANE AND SHOULDER ADDITION OR REPLACEMENT ..... P3A ..... 171
JOINTED PLAIN CONCRETE PAVEMENT (WIDENED LANE) -
LANE AND SHOULDER ADDITION OR REPLACEMENT ..... P3B ..... 172
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT ..... P4 ..... 173
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIDENED LANE) ..... P5A ..... 174
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIDENED LANE) -
LANE AND SHOULDER ADDITION OR REPLACEMENT ..... P5B ..... 175
SPALL REPAIR ..... P6 ..... 176
DOWEL BAR RETROFIT ..... P7 ..... 177
INDIVIDUAL SLAB REPLACEMENT WITH RAPID STRENGTH CONCRETE ..... P8 ..... 178
CONCRETE PAVEMENT - DOWEL BAR DETAILS ..... P10 ..... 179
CONCRETE PAVEMENT - DOWEL BAR BASKET DETAILS ..... P12 ..... 180
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT -
SINGLE PIECE TRANSVERSE BAR ASSEMBLY ..... P13 ..... 181
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT -
TRANSVERSE CONSTRUCTION JOINT ..... P14 ..... 182
CONCRETE PAVEMENT - TIE BAR DETAILS ..... P15 ..... 183
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT -
TIE BARS AND JOINT DETAILS ..... P16 ..... 184

PLAN TITLE PLAN No. PAGE

**PAVEMENTS (CONTINUED)**

CONCRETE PAVEMENT - TIE BAR BASKET DETAILS ..... P17 ..... 185
CONCRETE PAVEMENT - LANE SCHEMATICS AND ISOLATION JOINT DETAIL ..... P18 ..... 186
JOINT SEALS ..... P20 ..... 187
CONCRETE PAVEMENT - END PANEL PAVEMENT TRANSITIONS ..... P30 ..... 188
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT - TERMINAL JOINT DETAILS ..... P31A ..... 189
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT - EXPANSION TERMINAL JOINT SYSTEM ..... P32 ..... 190
CONCRETE PAVEMENT - LANE DROP PAVING DETAILS No. 1 ..... P33 ..... 191
CONCRETE PAVEMENT - LANE DROP PAVING DETAILS No. 2 ..... P34 ..... 192
CONCRETE PAVEMENT - RAMP TRANSITION PAVING DETAILS ..... P35 ..... 193
CONCRETE PAVEMENT - DRAINAGE INLET DETAILS No. 1 ..... P45 ..... 194
CONCRETE PAVEMENT - DRAINAGE INLET DETAILS No. 2 ..... P46 ..... 195
PAVEMENT STRUCTURE - DRAINAGE SYSTEM DETAILS ..... P50 ..... 196
EDGE DRAIN OUTLET AND VENT DETAILS ..... P51 ..... 197
EDGE DRAIN CLEANOUT AND VENT DETAILS ..... P52 ..... 198
CROSS DRAIN INTERCEPTOR DETAILS ..... P53 ..... 199
HOT MIX ASPHALT PAVING (LONGITUDINAL TAPERED NOTCHED WEDGE JOINT) ..... P70 ..... 200
PAVEMENT EDGE TREATMENTS ..... P74 ..... 201
PAVEMENT EDGE TREATMENTS - OVERLAYS ..... P75 ..... 202
PAVEMENT EDGE TREATMENTS - NEW CONSTRUCTION ..... P76 ..... 203

**DRAINAGE INLETS, PIPE INLETS AND GRATES**

DRAINAGE INLET MARKERS ..... D71 ..... 204
CIP DRAINAGE INLETS - TYPES OS, OL AND GOL ..... D72A ..... 205
CIP DRAINAGE INLETS - TYPES G1, G2, G3, G4, G5 AND G6 ..... D72B ..... 206
CIP DRAINAGE INLETS - TYPES G1, G2, G3, G4, G5 AND G6 ..... D72C ..... 207
CIP DRAINAGE INLETS - TYPES GT1, GT2, GT3 AND GT4 ..... D72D ..... 208
CIP DRAINAGE INLETS - TYPES GO AND GDO ..... D72E ..... 209
CIP DRAINAGE INLET NOTES ..... D72F ..... 210
CIP DRAINAGE INLET TABLES ..... D72G ..... 211
PRECAST DRAINAGE INLETS - TYPES OS, OL AND GOL ..... D73A ..... 212
PRECAST DRAINAGE INLETS - TYPES G1, G2, G3, G4, G5 AND G6 ..... D73B ..... 213
PRECAST DRAINAGE INLETS - TYPES G1, G2, G3, G4, G5 AND G6 ..... D73C ..... 214
PRECAST DRAINAGE INLETS - TYPES GT1, GT2, GT3 AND GT4 ..... D73D ..... 215
PRECAST DRAINAGE INLETS - TYPES GO AND GDO ..... D73E ..... 216
PRECAST DRAINAGE INLET NOTES ..... D73F ..... 217
PRECAST DRAINAGE INLET TABLES ..... D73G ..... 218
DRAINAGE INLET DETAILS ..... D74 ..... 219
STEEL PIPE INLETS ..... D75A ..... 220
CONCRETE PIPE INLETS ..... D75B ..... 221
PIPE INLETS - LADDER AND TRASH RACK DETAILS ..... D75C ..... 222
GRATE DETAILS No. 1 ..... D77A ..... 223
GRATE DETAILS No. 2 ..... D77B ..... 224
ALTERNATIVE HINGED COVER FOR TYPE OL AND OS INLETS AND TRASH RACK FOR TYPE OCP INLET ..... D77C ..... 225

PLAN TITLE PLAN No. PAGE

**GUTTER AND INLET DEPRESSIONS**

GUTTER DEPRESSIONS ..... D78A ..... 226
INLET DEPRESSIONS - CONCRETE SHOULDERS ..... D78B ..... 227
INLET DEPRESSIONS - HOT MIX ASPHALT SHOULDERS ..... D78C ..... 228

**CONCRETE PIPE - DIRECT DESIGN METHOD**

PRECAST REINFORCED CONCRETE PIPE - DIRECT DESIGN METHOD ..... D79 ..... 229
PRECAST REINFORCED CONCRETE PIPE - DIRECT DESIGN METHOD ..... D79A ..... 230

**BOX CULVERTS**

CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT ..... D80 ..... 231
CAST-IN-PLACE REINFORCED CONCRETE DOUBLE BOX CULVERT ..... D81 ..... 232
CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT - MISCELLANEOUS DETAILS .. D82 ..... 233
PRECAST REINFORCED CONCRETE BOX CULVERT ..... D83A ..... 234
PRECAST REINFORCED CONCRETE BOX CULVERT - MISCELLANEOUS DETAILS ..... D83B ..... 235
BOX CULVERT WINGWALLS - TYPES A, B AND C ..... D84 ..... 236
BOX CULVERT WINGWALLS - TYPES D AND E ..... D85 ..... 237
BOX CULVERT WARPED WINGWALLS ..... D86A ..... 238

**PIPE AND ARCH CULVERT - ENDWALLS AND WARPED WINGWALLS**

PIPE CULVERT HEADWALLS, ENDWALLS AND WARPED WINGWALLS ..... D86B ..... 239
ARCH CULVERT HEADWALLS, ENDWALLS AND WARPED WINGWALLS ..... D86C ..... 240

**PIPE DOWNDRAINS, ANCHORAGE SYSTEMS AND OVERSIDE DRAINS**

CORRUGATED METAL PIPE DOWNDRAIN DETAILS ..... D87A ..... 241
PLASTIC PIPE DOWNDRAIN DETAILS ..... D87B ..... 242
CABLE ANCHORAGE SYSTEM ..... D87C ..... 243
OVERSIDE DRAINS ..... D87D ..... 244

**CONSTRUCTION LOADS ON CULVERTS AND STRUT DETAILS**

CONSTRUCTION LOADS ON CULVERTS ..... D88 ..... 245
STRUT DETAILS FOR STRUCTURAL STEEL PIPES,
ARCHES AND VEHICULAR UNDERCROSSING ..... D88A ..... 246

**PIPE CULVERT HEADWALLS, ENDWALLS, WINGWALLS AND JUNCTION STRUCTURE**

PIPE CULVERT HEADWALLS - STRAIGHT AND "L" ..... D89A ..... 247
PIPE CULVERT HEADWALLS - STRAIGHT AND "L" ..... D89B ..... 248
PIPE CULVERT HEADWALLS, ENDWALLS AND WINGWALLS - TYPES A, B AND C ..... D90 ..... 249
CAST-IN-PLACE REINFORCED CONCRETE JUNCTION STRUCTURE ..... D91A ..... 250
CAST-IN-PLACE REINFORCED CONCRETE JUNCTION STRUCTURE ..... D91B ..... 251

PLAN TITLE PLAN No. PAGE

**PIPE RISER AND DRAINAGE INLET RISER CONNECTIONS**

PIPE RISER CONNECTIONS ..... D93A ..... 252
DRAINAGE INLET RISER CONNECTIONS ..... D93B ..... 253
PIPE RISER WITH DEBRIS RACK CAGE ..... D93C ..... 254

**FLARED END SECTIONS**

METAL AND PLASTIC FLARED END SECTIONS ..... D94A ..... 255
CONCRETE FLARED END SECTIONS ..... D94B ..... 256

**PIPE COUPLING AND JOINT DETAILS**

CORRUGATED METAL PIPE COUPLING DETAILS No. 1 -
ANNULAR COUPLING BAND, BAR AND STRAP, AND ANGLE CONNECTIONS ..... D97A ..... 257
CORRUGATED METAL PIPE COUPLING DETAILS No. 3 -
HELICAL AND UNIVERSAL COUPLERS ..... D97C ..... 258
CORRUGATED METAL PIPE COUPLING DETAILS No. 4 - HUGGER COUPLING BANDS ..... D97D ..... 259
CORRUGATED METAL PIPE COUPLING DETAILS No. 5 - STANDARD JOINT ..... D97E ..... 260
CORRUGATED METAL PIPE COUPLING DETAILS No. 6 - POSITIVE JOINT ..... D97F ..... 261
CORRUGATED METAL PIPE COUPLING DETAILS No. 7 - DOWNDRAIN ..... D97G ..... 262
REINFORCED CONCRETE PIPE OR NON-REINFORCED CONCRETE PIPE -
STANDARD AND POSITIVE JOINTS ..... D97H ..... 263
CORRUGATED POLYVINYL CHLORIDE PIPE WITH SMOOTH INTERIOR -
STANDARD AND POSITIVE JOINTS ..... D97I ..... 264
COMPOSITE STEEL SPIRAL RIB PIPE WITH SMOOTH INTERIOR - STANDARD JOINT ..... D97J ..... 265

**SLOTTED AND GRATED LINE DRAINS**

SLOTTED CORRUGATED STEEL PIPE DRAIN DETAILS ..... D98A ..... 266
SLOTTED CORRUGATED STEEL PIPE DRAIN DETAILS ..... D98B ..... 267
SLOTTED PLASTIC PIPE DRAIN DETAILS ..... D98D ..... 268
SLOTTED PIPE GRATE EXTENSION DETAILS ..... D98F ..... 269
GRATED LINE DRAIN DETAILS No. 1 - POLYMER CONCRETE, 4" NOMINAL WIDTH ..... D98G ..... 270
GRATED LINE DRAIN DETAILS No. 2 - INLET CONNECTION DETAILS
(ALL TYPES EXCEPT 4" NOMINAL WIDTH POLYMER CONCRETE) ..... D98H ..... 271
GRATED LINE DRAIN DETAILS No. 3 -
(ALL TYPES EXCEPT 4" NOMINAL WIDTH POLYMER CONCRETE) ..... D98I ..... 272
GRATED LINE DRAIN DETAILS No. 4 -
CONNECTION TO EXISTING DRAINAGE STRUCTURE ..... D98J ..... 273

**GABIONS AND UNDERDRAINS**

GABION BASKET DETAILS No. 1 ..... D100A ..... 274
GABION BASKET DETAILS No. 2 ..... D100B ..... 275
UNDERDRAINS ..... D102 ..... 276

**STORMWATER TREATMENT BMPs**

LADDER DETAILS ..... D118 ..... 277
INFILTRATION TRENCH AND OBSERVATION WELL ..... D131 ..... 278
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN LEGEND ..... D139A ..... 279

PLAN TITLE | PLAN No. | PAGE

**STORMWATER TREATMENT BMPs (CONTINUED)**

GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN LAYOUT ..... D139B ..... 280
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 1 ..... D139C ..... 281
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 2 ..... D139D ..... 282
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 3
WALL OPENING DETAILS ..... D139E ..... 283
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 4
WEDGE-WIRE SCREEN ..... D139F1 ..... 284
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 5
WEDGE-WIRE SCREEN ..... D139F2 ..... 285
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 6
PULTRUDED FRP SCREEN ..... D139G1 ..... 286
GROSS SOLIDS REMOVAL DEVICE - INCLINED SCREEN DETAILS No. 7
PULTRUDED FRP SCREEN ..... D139G2 ..... 287
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL LEGEND ..... D140A ..... 288
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL LAYOUT ..... D140B ..... 289
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL DETAILS ..... D140C ..... 290
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL OVERFLOW PIPE DETAILS ..... D140D ..... 291
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL SCREENED PIPE DETAILS ..... D140E ..... 292
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL GRATE PANEL DETAILS ..... D140F ..... 293
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL (HIGH VELOCITY) LAYOUT ..... D140G ..... 294
GROSS SOLIDS REMOVAL DEVICE - LINEAR RADIAL (HIGH VELOCITY) DETAILS ..... D140H ..... 295

**LANDSCAPE AND EROSION CONTROL**

LANDSCAPE AND EROSION CONTROL SYMBOLS ..... H1 ..... 296
LANDSCAPE DETAILS ..... H2 ..... 297
LANDSCAPE DETAILS ..... H3 ..... 298
LANDSCAPE DETAILS (SPRINKLER ASSEMBLY) ..... H4 ..... 299
LANDSCAPE DETAILS (SWING JOINT AND PROTECTOR) ..... H5 ..... 300
LANDSCAPE DETAILS ..... H6 ..... 301
LANDSCAPE DETAILS ..... H7 ..... 302
LANDSCAPE DETAILS ..... H8 ..... 303
LANDSCAPE DETAILS ..... H9 ..... 304
IRRIGATION CONTROLLER ENCLOSURE CABINET ..... H10 ..... 305
EROSION CONTROL DETAILS - FIBER ROLL AND COMPOST SOCK ..... H51 ..... 306
ROLLED EROSION CONTROL PRODUCT ..... H52 ..... 307

**TEMPORARY CRASH CUSHIONS, RAILING AND TRAFFIC SCREEN**

TEMPORARY CRASH CUSHION - SAND FILLED (UNIDIRECTIONAL) ..... T1A ..... 308
TEMPORARY CRASH CUSHION - SAND FILLED (UNIDIRECTIONAL) ..... T1A1 ..... 309
TEMPORARY CRASH CUSHION - SAND FILLED (BIDIRECTIONAL) ..... T1B ..... 310
TEMPORARY CRASH CUSHION - SAND FILLED (SHOULDER INSTALLATIONS) ..... T2 ..... 311
TEMPORARY RAILING (TYPE K) ..... T3A ..... 312
TEMPORARY RAILING (TYPE K) ..... T3B ..... 313
TEMPORARY BARRIER SYSTEM (CROSS BOLT) ..... T3C ..... 314
TEMPORARY BARRIER SYSTEM (CROSS BOLT) ..... T3D ..... 315
TEMPORARY BARRIER SYSTEM (CROSS BOLT) ..... T3E ..... 316
TEMPORARY BARRIER SYSTEM (CAL F-23) ..... T3F ..... 317
TEMPORARY BARRIER SYSTEM (CAL F-23) ..... T3F2 ..... 318

PLAN TITLE PLAN No. PAGE

**TEMPORARY CRASH CUSHIONS, RAILING AND TRAFFIC SCREEN (CONTINUED)**

TEMPORARY BARRIER SYSTEM (STAKING OR ANCHORING) ..... T3G ..... 319
TEMPORARY BARRIER SYSTEM (STAKING OR ANCHORING) ..... T3G2 ..... 320
TEMPORARY TRAFFIC SCREEN ..... T4 ..... 321
TEMPORARY TRAFFIC SCREEN (CROSS BOLT) ..... T4A ..... 322
TEMPORARY BARRIER SYSTEM (CAL F-23) ..... T4B ..... 323
TEMPORARY TERMINAL SECTION (TYPE K) ..... T5 ..... 324

**TEMPORARY TRAFFIC CONTROL SYSTEMS**

TRAFFIC CONTROL SYSTEM TABLES FOR LANE AND RAMP CLOSURES ..... T9 ..... 325
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS ..... T10 ..... 326
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS ..... T10A ..... 327
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS ..... T11 ..... 328
TRAFFIC CONTROL SYSTEM FOR CHANGEABLE LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS AND EXPRESSWAYS ..... T11A ..... 329
TRAFFIC CONTROL SYSTEM FOR HALF ROAD CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS AND EXPRESSWAYS ..... T12 ..... 330
TRAFFIC CONTROL SYSTEM WITH REVERSIBLE CONTROL ON TWO LANE CONVENTIONAL HIGHWAYS ..... T13 ..... 331
TRAFFIC CONTROL SYSTEM TWO LANE CONVENTIONAL HIGHWAYS ..... T13A ..... 332
TRAFFIC CONTROL SYSTEM TWO LANE CONVENTIONAL HIGHWAYS ..... T13B ..... 333
TRAFFIC CONTROL SYSTEM FOR RAMP CLOSURE ..... T14 ..... 334
TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS ..... T15 ..... 335
TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS ..... T16 ..... 336
TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON TWO LANE HIGHWAYS ..... T17 ..... 337
TRAFFIC CONTROL SYSTEM - CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON FREEWAYS AND EXPRESSWAYS ..... T18 ..... 338
TRAFFIC CONTROL SYSTEM - CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON CONVENTIONAL HIGHWAYS ..... T19 ..... 339
TRAFFIC CONTROL SYSTEM - CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION DETAILS ..... T20 ..... 340
TRAFFIC CONTROL SYSTEM - CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION TWENTY-FOUR HOURS A DAY 7 DAYS A WEEK (24/7) ..... T21 ..... 341
TRAFFIC CONTROL SYSTEM FOR CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON TWO LANE CONVENTIONAL HIGHWAYS ..... T22 ..... 342

**MOBILE BARRIER SYSTEMS**

MOBILE BARRIER SYSTEM ..... T24 ..... 343
MOBILE BARRIER SYSTEM ..... T25 ..... 344
TEMPORARY AUTOMATED END OF QUEUE WARNING SYSTEM TYPE 1 (QUEUE ≤ 3.5 MILES) ..... T26 ..... 345
TEMPORARY AUTOMATED END OF QUEUE WARNING SYSTEM TYPE 2 (QUEUE ≤ 7.5 MILES) ..... T27 ..... 346

PLAN TITLE | PLAN No. | PAGE

## TEMPORARY PEDESTRIAN ACCESS ROUTES

TEMPORARY PEDESTRIAN ACCESS ROUTES -
TYPICAL SIDEWALK CLOSURE AND PEDESTRIAN DETOUR ..... T30 ..... 347
TEMPORARY PEDESTRIAN ACCESS ROUTES -
TYPICAL SIDEWALK DIVERSION WITHIN ROADBED ..... T31 ..... 348
TEMPORARY PEDESTRIAN ACCESS ROUTES -
TYPICAL SIDEWALK/CROSSWALK CLOSURE AND PEDESTRIAN DETOUR ..... T32 ..... 349
TEMPORARY PEDESTRIAN ACCESS ROUTES - RAMP ..... T33 ..... 350
TEMPORARY PEDESTRIAN ACCESS ROUTES - CURB RAMP OPTIONS ..... T34 ..... 351

## TEMPORARY WATER POLLUTION CONTROL

TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY SILT FENCE) ..... T51 ..... 352
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY STRAW BALE BARRIER) ..... T52 ..... 353
TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY COVER) ..... T53 ..... 354
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY EROSION CONTROL BLANKET) ..... T54 ..... 355
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY EROSION CONTROL BLANKET) ..... T55 ..... 356
TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY FIBER ROLL) ..... T56 ..... 357
TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CHECK DAM) ..... T57 ..... 358
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY CONSTRUCTION ENTRANCE) ..... T58 ..... 359
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY CONCRETE WASHOUT FACILITY) ..... T59 ..... 360
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY REINFORCED SILT FENCE) ..... T60 ..... 361
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY DRAINAGE INLET PROTECTION) ..... T61 ..... 362
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY DRAINAGE INLET PROTECTION) ..... T62 ..... 363
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY DRAINAGE INLET PROTECTION) ..... T63 ..... 364
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY DRAINAGE INLET PROTECTION) ..... T64 ..... 365
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY HIGH-VISIBILITY FENCE) ..... T65 ..... 366
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY LARGE SEDIMENT BARRIER) ..... T66 ..... 367
TEMPORARY WATER POLLUTION CONTROL DETAILS
(TEMPORARY CONSTRUCTION ROADWAY) ..... T67 ..... 368

## BRIDGE DETAILS

BRIDGE DETAILS ..... B0-1 ..... 369
BRIDGE DETAILS ..... B0-3 ..... 370
BRIDGE DETAILS ..... B0-5 ..... 371
BRIDGE DETAILS ..... B0-13 ..... 372

PLAN TITLE | PLAN No. | PAGE

**PILES**

16" AND 24" CAST-IN-DRILLED-HOLE CONCRETE PILE ..... B2-3 ..... 373
PILE DETAILS - CLASS 90 AND CLASS 140 ..... B2-5 ..... 374
PILE DETAILS - CLASS 200 ..... B2-8 ..... 375
LOAD TEST PILE DETAILS (1) ..... B2-9 ..... 376
LOAD TEST PILE DETAILS (2) ..... B2-10 ..... 377
LOAD TEST PILE DETAILS (3) ..... B2-11 ..... 378

**RETAINING WALLS**

RETAINING WALL TYPE 1 (CASE 1) ..... B3-1A ..... 379
RETAINING WALL TYPE 1 (CASE 2) ..... B3-1B ..... 380
RETAINING WALL TYPE 1 (CASE 3) ..... B3-1C ..... 381
RETAINING WALL TYPE 1A (CASE 1) ..... B3-3A ..... 382
RETAINING WALL TYPE 1A (CASE 2) ..... B3-3B ..... 383
RETAINING WALL TYPE 5 (CASE 1) ..... B3-4A ..... 384
RETAINING WALL TYPE 5 (CASE 2) ..... B3-4B ..... 385
RETAINING WALL TYPE 5 (CASE 3) ..... B3-4C ..... 386
RETAINING WALL DETAILS No. 1 ..... B3-5 ..... 387
RETAINING WALL DETAILS No. 2 ..... B3-6 ..... 388
RETAINING WALL TYPE 6 (CASE 1) ..... B3-7A ..... 389
RETAINING WALL TYPE 6 (CASE 2) ..... B3-7B ..... 390
RETAINING WALL TYPE 6 DETAILS ..... B3-7C ..... 391

**T-BEAM DETAILS**

T-BEAM DETAILS ..... B6-1 ..... 392
UTILITY OPENINGS - T-BEAM ..... B6-10 ..... 393

**JOINT SEALS**

JOINT SEALS (MAXIMUM MOVEMENT RANGE = 2") ..... B6-21 ..... 394

**BOX GIRDER DETAILS**

BOX GIRDER DETAILS ..... B7-1 ..... 395

**DECK DRAINS**

DECK DRAINS ..... B7-5 ..... 396
DECK DRAINS - TYPES D-1 AND D-2 ..... B7-6 ..... 397
DECK DRAIN - TYPE D-3 ..... B7-7 ..... 398
DECK DRAINAGE DETAILS ..... B7-8 ..... 399

**UTILITY OPENING**

UTILITY OPENING - BOX GIRDER ..... B7-10 ..... 400
UTILITY DETAILS ..... B7-11 ..... 401

PLAN TITLE PLAN No. PAGE

**CAST-IN-PLACE POST-TENSIONED GIRDER**

CAST-IN-PLACE POST-TENSIONED GIRDER DETAILS ..... B8-5 ..... 402

**STRUCTURE APPROACH**

STRUCTURE APPROACH - TYPE N (30) ..... B9-1 ..... 403
STRUCTURE APPROACH - TYPE R (30) ..... B9-2 ..... 404
STRUCTURE APPROACH - TYPE R (10) ..... B9-3 ..... 405
STRUCTURE APPROACH - TYPE EQ (10) ..... B9-4 ..... 406
STRUCTURE APPROACH - SLAB DETAILS ..... B9-5 ..... 407
STRUCTURE APPROACH - DRAINAGE DETAILS ..... B9-6 ..... 408

**CHAIN LINK RAILING, CABLE RAILING AND TUBULAR HAND RAILING**

CHAIN LINK RAILING ..... B11-7 ..... 409
CABLE RAILING ..... B11-47 ..... 410
TUBULAR HANDRAILING ..... B11-51 ..... 411
CHAIN LINK RAILING TYPE 7 ..... B11-52 ..... 412

**BRIDGE CONCRETE BARRIERS**

CONCRETE BARRIER TYPE 732SW DETAILS No. 1 ..... B11-58 ..... 413
CONCRETE BARRIER TYPE 732SW DETAILS No. 2 ..... B11-59 ..... 414
CONCRETE BARRIER TYPE 732SW DETAILS No. 3 ..... B11-59A ..... 415

**CONCRETE BARRIERS**

CONCRETE BARRIER TYPE 836 DETAILS No. 1 ..... B11-79 ..... 416
CONCRETE BARRIER TYPE 836 DETAILS No. 2 ..... B11-80 ..... 417
CONCRETE BARRIER TYPE 836 DETAILS No. 3 ..... B11-80A ..... 418
CONCRETE BARRIER TYPE 842 DETAILS No. 1 ..... B11-81 ..... 419
CONCRETE BARRIER TYPE 842 DETAILS No. 2 ..... B11-82 ..... 420
CONCRETE BARRIER TYPE 842 DETAILS No. 3 ..... B11-82A ..... 421
CONCRETE BARRIER TYPE 85 DETAILS No. 1 ..... B11-83 ..... 422
CONCRETE BARRIER TYPE 85 DETAILS No. 2 ..... B11-83A ..... 423
CONCRETE BARRIER TYPE 85 DETAILS No. 3 ..... B11-84 ..... 424
CONCRETE BARRIER TYPE 85 DETAILS No. 4 ..... B11-85 ..... 425
CONCRETE BARRIER TYPE 85 DETAILS No. 5 ..... B11-86 ..... 426
CONCRETE BARRIER TYPE 85 DETAILS No. 6 ..... B11-87 ..... 427

**BRIDGE METAL RAIL BARRIERS**

CALIFORNIA ST-75 BRIDGE RAIL DETAILS No. 1 ..... B11-200 ..... 428
CALIFORNIA ST-75 BRIDGE RAIL DETAILS No. 2 ..... B11-201 ..... 429
CALIFORNIA ST-75 BRIDGE RAIL DETAILS No. 3 ..... B11-202 ..... 430
CALIFORNIA ST-75SW BRIDGE RAIL DETAILS No. 1 ..... B11-205 ..... 431
CALIFORNIA ST-75SW BRIDGE RAIL DETAILS No. 2 ..... B11-206 ..... 432
CALIFORNIA ST-75SW BRIDGE RAIL DETAILS No. 3 ..... B11-207 ..... 433
CALIFORNIA ST-76 BRIDGE RAIL DETAILS No. 1 ..... B11-210 ..... 434
CALIFORNIA ST-76 BRIDGE RAIL DETAILS No. 2 ..... B11-211 ..... 435
CALIFORNIA ST-76 BRIDGE RAIL DETAILS No. 3 ..... B11-212 ..... 436

PLAN TITLE — PLAN No. — PAGE

**BRIDGE METAL RAIL BARRIERS (CONTINUED)**

CALIFORNIA ST-76SW BRIDGE RAIL DETAILS No. 1 ..... B11-215 ..... 437
CALIFORNIA ST-76SW BRIDGE RAIL DETAILS No. 2 ..... B11-216 ..... 438
CALIFORNIA ST-76SW BRIDGE RAIL DETAILS No. 3 ..... B11-217 ..... 439
CALIFORNIA BRIDGE RAIL ST-75, ST-75SW,
ST-76, AND ST-76SW POST AND RAIL DETAILS ..... B11-220 ..... 440
CALIFORNIA BRIDGE RAIL ST-75, ST-75SW,
ST-76, AND ST-76SW RAIL SPLICE DETAILS ..... B11-221 ..... 441
CALIFORNIA BRIDGE RAIL ST-75, ST-75SW,
ST-76, AND ST-76SW PARAPET SHOE DETAILS ..... B11-222 ..... 442

**STRUCTURAL STEEL PLATE VEHICULAR UNDERCROSSING**

STRUCTURAL STEEL PLATE VEHICULAR UNDERCROSSING ..... B14-1 ..... 443

**COMMUNICATION AND SPRINKLER CONTROL CONDUITS (BRIDGE)**

COMMUNICATION AND SPRINKLER CONTROL CONDUITS (CONDUIT LESS THAN 4") ..... B14-3 ..... 444

**WATER SUPPLY LINE (BRIDGE)**

WATER SUPPLY LINE (BRIDGE) (PIPE SIZES LESS THAN 4") ..... B14-4 ..... 445
WATER SUPPLY LINE (DETAILS) (PIPE SIZES LESS THAN 4") ..... B14-5 ..... 446

**SOUND WALLS**

SOUND WALL MASONRY BLOCK ON FOOTING DETAILS (1) ..... B15-1 ..... 447
SOUND WALL MASONRY BLOCK ON FOOTING DETAILS (2) ..... B15-2 ..... 448
SOUND WALL MASONRY BLOCK ON PILE CAP DETAILS (1) ..... B15-3 ..... 449
SOUND WALL MASONRY BLOCK ON PILE CAP DETAILS (2) ..... B15-4 ..... 450
SOUND WALL MASONRY BLOCK ON PILE CAP DETAILS (3) ..... B15-5 ..... 451
SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER DETAILS (1) ..... B15-6 ..... 452
SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER DETAILS (2) ..... B15-7 ..... 453
SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER DETAILS (3) ..... B15-8 ..... 454
SOUND WALL MASONRY BLOCK MISCELLANEOUS DETAILS ..... B15-9 ..... 455
SOUND WALL MASONRY BLOCK ON FOOTING OR PILE CAP -
5'-0" ACCESS GATE DETAILS (1) ..... B15-10 ..... 456
SOUND WALL MASONRY BLOCK ON FOOTING OR PILE CAP -
5'-0" ACCESS GATE DETAILS (2) ..... B15-11 ..... 457
SOUND WALL MASONRY BLOCK ON BARRIER - 5'-0" ACCESS GATE DETAILS (1) ..... B15-12 ..... 458
SOUND WALL MASONRY BLOCK ON BARRIER - 5'-0" ACCESS GATE DETAILS (2) ..... B15-13 ..... 459
SOUND WALL MASONRY BLOCK ACCESS GATE LOCKING DETAILS ..... B15-14 ..... 460
SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER ON PILE FOOTING
FOR SPANNING UTILITIES ..... B15-15 ..... 461

**ROADSIDE SIGNS**

ROADSIDE SIGNS - TYPICAL INSTALLATION DETAILS No. 1 ..... RS1 ..... 462
ROADSIDE SIGNS - WOOD POST - TYPICAL INSTALLATION DETAILS No. 2 ..... RS2 ..... 463
ROADSIDE SIGNS - LAMINATED WOOD BOX POST -
TYPICAL INSTALLATION DETAILS No. 3 ..... RS3 ..... 464

PLAN TITLE — PLAN No. — PAGE

**ROADSIDE SIGNS (CONTINUED)**

ROADSIDE SIGNS - TYPICAL INSTALLATION DETAILS No. 4 ..... RS4 ..... 465
ROADSIDE SIGN - PSST POST - TYPICAL INSTALLATION DETAILS No. 1 ..... RS5 ..... 466
ROADSIDE SIGN - PSST POST - TYPICAL INSTALLATION DETAILS No. 2 ..... RS6 ..... 467

**OVERHEAD SIGNS (TRUSS)**

OVERHEAD SIGNS - WALKWAY DETAILS No. 1 ..... S16 ..... 468
OVERHEAD SIGNS - WALKWAY DETAILS No. 2 ..... S17 ..... 469
OVERHEAD SIGNS - WALKWAY SAFETY RAILING DETAILS ..... S18 ..... 470
OVERHEAD SIGNS - TRUSS, SIGN MOUNTING DETAILS - LAMINATED PANEL - TYPE A ..... S19 ..... 471
OVERHEAD SIGNS - STEEL FRAMES - REMOVABLE SIGN PANEL FRAMES ..... S20 ..... 472
OVERHEAD SIGNS - REMOVABLE SIGN PANEL FRAMES MOUNTING DETAILS ..... S21 ..... 473
OVERHEAD SIGNS - TRUSS, REMOVABLE SIGN PANEL FRAMES - 110" AND 120" SIGN PANELS ..... S22 ..... 474

**OVERHEAD SIGNS (TUBULAR)**

OVERHEAD SIGNS - TUBULAR, INSTRUCTIONS AND EXAMPLES ..... S30 ..... 475
OVERHEAD SIGNS - TUBULAR, SINGLE POST TYPE - LAYOUT AND PIPE SELECTION ..... S31 ..... 476
OVERHEAD SIGNS - TUBULAR, TWO POST TYPE - LAYOUT AND PIPE SELECTION ..... S32 ..... 477
OVERHEAD SIGNS - TUBULAR, STRUCTURAL FRAME - DETAILS No. 1 ..... S33 ..... 478
OVERHEAD SIGNS - TUBULAR, STRUCTURAL FRAME - DETAILS No. 2 ..... S34 ..... 479
OVERHEAD SIGNS - TUBULAR, SINGLE POST AND TWO POST TYPE - BASE PLATE AND ANCHORAGE DETAILS ..... S35 ..... 480
OVERHEAD SIGNS - TUBULAR, GUSSET PLATE DETAILS ..... S35A ..... 481
OVERHEAD SIGNS - TUBULAR, SINGLE POST AND TWO POST TYPE - SQUARE PEDESTAL PILE FOUNDATION ..... S36 ..... 482
OVERHEAD SIGNS - TUBULAR, SINGLE POST AND TWO POST TYPE - ROUND PEDESTAL PILE FOUNDATION ..... S37 ..... 483
OVERHEAD SIGNS - TUBULAR, COMPRESSION STRUT DETAILS AT WALKWAY ..... S38 ..... 484

**OVERHEAD SIGNS (LIGHTWEIGHT)**

OVERHEAD SIGNS - LIGHTWEIGHT POST DETAILS ..... S48 ..... 485
OVERHEAD SIGNS - LIGHTWEIGHT FOUNDATION DETAILS ..... S49 ..... 486
OVERHEAD SIGNS - LIGHTWEIGHT, EXTINGUISHABLE MESSAGE SIGN AND FLASHING BEACONS ..... S50 ..... 487

**OVERHEAD AND ROADSIDE SIGN PANELS**

OVERHEAD LAMINATED SIGN - SINGLE OR MULTIPLE PANEL (TYPE A, 1" THICK) ..... S81 ..... 488
ROADSIDE LAMINATED SIGN - SINGLE OR MULTIPLE PANEL (TYPE B, 1" THICK) ..... S82 ..... 489
ROADSIDE LAMINATED SIGN - SINGLE OR MULTIPLE PANEL (TYPE B, 2½" THICK) ..... S83 ..... 490
ROADSIDE LAMINATED SIGN - SINGLE OR MULTIPLE PANEL (TYPE H, 2½" THICK) ..... S84 ..... 491
SEAM CLOSURE, "H" SECTION EXTRUSION AND POST SPACING TABLES (MULTI-HORIZONTAL LAMINATED PANEL ALUMINUM SIGNS) ..... S85 ..... 492
LAMINATED PANEL DETAILS (EXTRUSIONS FOR TYPE A, B, AND H PANELS) ..... S86 ..... 493

PLAN TITLE PLAN No. PAGE

**OVERHEAD AND ROADSIDE SIGN PANELS (CONTINUED)**

TYPE A-1 MOUNTING HARDWARE FOR OVERHEAD LAMINATED TYPE A PANEL (TRUSS AND LIGHTWEIGHT SIGN STRUCTURES) ..... S87 ..... 494
TYPE A-2 MOUNTING HARDWARE FOR OVERHEAD LAMINATED TYPE A PANEL (BRIDGE MOUNTED AND TUBULAR SIGN STRUCTURES) ..... S88 ..... 495
ROADSIDE SIGN - FORMED SINGLE SHEET ALUMINUM PANEL ..... S89 ..... 496
CHANNEL AND BOLT HOLE LOCATION FOR OVERHEAD FORMED SIGN PANEL ..... S90 ..... 497
OVERHEAD SIGN - FORMED SIGN PANEL, TYPE A-3 MOUNTING HARDWARE ..... S91 ..... 498
OVERHEAD SIGN - FORMED SIGN PANEL ..... S92 ..... 499
FRAMING DETAILS FOR FRAMED SINGLE SHEET ALUMINUM SIGNS, RECTANGULAR SHAPE ..... S93 ..... 500
ROADSIDE FRAMED SINGLE SHEET ALUMINUM SIGNS, RECTANGULAR SHAPE ..... S94 ..... 501
ROADSIDE SINGLE SHEET ALUMINUM SIGNS, DIAMOND SHAPE ..... S95 ..... 502

**OVERHEAD SIGNS - VERSATILE TRUSS**

OVERHEAD SIGNS - VERSATILE TRUSS, ONE AND TWO POST TYPE ..... S100 ..... 503
OVERHEAD SIGNS - VERSATILE TRUSS, ONE POST TYPE, TRUSS LAYOUT ..... S101 ..... 504
OVERHEAD SIGNS - VERSATILE TRUSS, ONE POST TYPE, STEEL POST TYPE AND TRUSS MEMBER TABLE ..... S102 ..... 505
OVERHEAD SIGNS - VERSATILE TRUSS, ONE POST TYPE, STEEL POST BASE PLATE AND ANCHORAGE DETAILS ..... S103 ..... 506
OVERHEAD SIGNS - VERSATILE TRUSS, ONE POST TYPE, CIDH PILE FOUNDATION DETAILS ..... S104 ..... 507
OVERHEAD SIGNS - VERSATILE TRUSS, ONE POST TYPE, CONCRETE PEDESTAL WITH CIDH PILE FOUNDATION DETAILS ..... S105 ..... 508
OVERHEAD SIGNS - VERSATILE TRUSS, TWO POST TYPE, TRUSS LAYOUT ..... S106 ..... 509
OVERHEAD SIGNS - VERSATILE TRUSS, TWO POST TYPE, STEEL POST TYPE AND TRUSS MEMBER TABLE ..... S107 ..... 510
OVERHEAD SIGNS - VERSATILE TRUSS, TWO POST TYPE, STEEL POST BASE PLATE AND ANCHORAGE DETAILS ..... S108 ..... 511
OVERHEAD SIGNS - VERSATILE TRUSS, TWO POST TYPE, CIDH PILE FOUNDATION DETAILS ..... S109 ..... 512
OVERHEAD SIGNS - VERSATILE TRUSS, TWO POST TYPE, CONCRETE PEDESTAL WITH CIDH PILE FOUNDATION DETAILS ..... S110 ..... 513
OVERHEAD SIGNS - VERSATILE TRUSS, TRUSS CONNECTION DETAILS ..... S111 ..... 514
OVERHEAD SIGNS - VERSATILE TRUSS, CHORD SPLICE DETAILS ..... S112 ..... 515
OVERHEAD SIGNS - VERSATILE TRUSS, TRUSS TO STEEL POST CONNECTION DETAILS ..... S113 ..... 516
OVERHEAD SIGNS - VERSATILE TRUSS, CIDH PILE FOUNDATION WITH INSPECTION PIPES ..... S114 ..... 517
OVERHEAD SIGNS - VERSATILE TRUSS, WALKWAY DETAILS No. 1 ..... S115 ..... 518
OVERHEAD SIGNS - VERSATILE TRUSS, WALKWAY DETAILS No. 2 ..... S116 ..... 519
OVERHEAD SIGNS - VERSATILE TRUSS, WALKWAY DETAILS No. 3 ..... S117 ..... 520
OVERHEAD SIGNS - VERSATILE TRUSS, WALKWAY SAFETY RAILING DETAILS ..... S118 ..... 521
OVERHEAD SIGNS - VERSATILE TRUSS, SIGN MOUNTING DETAILS, LAMINATE PANEL - TYPE A ..... S119 ..... 522
OVERHEAD SIGNS - VERSATILE TRUSS, REMOVABLE SIGN PANEL FRAMES DETAILS No. 1 ..... S120 ..... 523
OVERHEAD SIGNS - VERSATILE TRUSS, REMOVABLE SIGN PANEL FRAMES DETAILS No. 2 ..... S121 ..... 524

PLAN TITLE PLAN No. PAGE

**OVERHEAD SIGNS - VERSATILE TRUSS (CONTINUED)**

OVERHEAD SIGNS - VERSATILE TRUSS, EXIT PLAQUE MOUNTING DETAILS ..... S122 ..... 525
OVERHEAD SIGNS - VERSATILE TRUSS, CMS MOUNTING DETAILS ..... S123 ..... 526
OVERHEAD SIGNS - VERSATILE TRUSS, ADDITIONAL DETAILS FOR CMS ..... S123B ..... 527
OVERHEAD SIGNS - VERSATILE TRUSS, EMS AND FLASHING BEACON DETAILS ..... S124 ..... 528

**ELECTRICAL SYSTEMS - LEGEND AND ABBREVIATIONS**

ELECTRICAL SYSTEMS (LEGEND) ..... ES-1A ..... 529
ELECTRICAL SYSTEMS (LEGEND) ..... ES-1B ..... 530
ELECTRICAL SYSTEMS (LEGEND) ..... ES-1C ..... 531

**ELECTRICAL SYSTEMS - SERVICE EQUIPMENT AND WIRING DIAGRAMS**

ELECTRICAL SYSTEMS (SERVICE EQUIPMENT) ..... ES-2A ..... 532
ELECTRICAL SYSTEMS (SERVICE EQUIPMENT) ..... ES-2B ..... 533
ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III - A SERIES) ..... ES-2D ..... 534
ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III - B SERIES) ..... ES-2E ..... 535
ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III - C SERIES) ..... ES-2F ..... 536
ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III - D SERIES) ..... ES-2G ..... 537

**ELECTRICAL SYSTEMS - CONTROLLER CABINETS**

ELECTRICAL SYSTEMS (CONTROLLER CABINET ADAPTER, FOUNDATIONS AND PAD DETAILS) ..... ES-3B ..... 538
ELECTRICAL SYSTEMS (CONTROLLER CABINET FOUNDATION AND PAD DETAILS) ..... ES-3C ..... 539
ELECTRICAL SYSTEMS (CONTROLLER CABINET FOUNDATION AND PAD DETAILS) ..... ES-3C1 ..... 540
ELECTRICAL SYSTEMS (CONTROLLER CABINET FOUNDATION DETAILS) ..... ES-3C2 ..... 541

**ELECTRICAL SYSTEMS - TELEPHONE DEMARCATION CABINETS**

ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE A) ..... ES-3D ..... 542
ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE B) ..... ES-3E ..... 543
ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE C) ..... ES-3F ..... 544
ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE C DETAILS) ..... ES-3G ..... 545

**ELECTRICAL SYSTEMS - IRRIGATION CONTROLLER ENCLOSURE CABINET**

ELECTRICAL SYSTEMS (IRRIGATION CONTROLLER ENCLOSURE CABINET) ..... ES-3H ..... 546

**ELECTRICAL SYSTEMS - ELECTRONICS ASSEMBLY CONNECTION DIAGRAM**

ELECTRICAL SYSTEMS (ELECTRONICS ASSEMBLY CONNECTION DIAGRAM) (BATTERY BACKUP SYSTEM) ..... ES-3K ..... 547

PLAN TITLE PLAN No. PAGE

**ELECTRICAL SYSTEMS - SIGNAL HEADS, SIGNAL FACES AND MOUNTINGS**

ELECTRICAL SYSTEMS (SIGNAL HEAD MOUNTING) ES-4A 548
ELECTRICAL SYSTEMS (PEDESTRIAN SIGNAL HEADS) ES-4B 549
ELECTRICAL SYSTEMS (SIGNAL HEADS AND MOUNTINGS) ES-4C 550
ELECTRICAL SYSTEMS (SIGNAL HEAD MOUNTING) ES-4D 551
ELECTRICAL SYSTEMS (SIGNAL HEADS) ES-4E 552

**ELECTRICAL SYSTEMS - DETECTORS**

ELECTRICAL SYSTEMS (LOOP DETECTORS) ES-5A 553
ELECTRICAL SYSTEMS (DETECTORS) ES-5B 554
ELECTRICAL SYSTEMS (ACCESSIBLE PEDESTRIAN SIGNAL AND PUSH BUTTON ASSEMBLIES) ES-5C 555
ELECTRICAL SYSTEMS (CURB AND SHOULDER TERMINATION, TRENCH, AND HANDHOLE DETAILS) ES-5D 556
ELECTRICAL SYSTEMS (TRENCH IN PAVEMENT AND PIEZOELECTRIC AXLE SENSOR DETAILS) ES-5E 557

**ELECTRICAL SYSTEMS - LIGHTING STANDARDS**

ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 15 AND 21) ES-6A 558
ELECTRICAL SYSTEMS (ELECTROLIER ANCHORAGE AND GROUTING FOR TYPE 15 AND TYPE 21, BARRIER RAIL MOUNTED) ES-6B 559
ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 5 AND 10, OVERHEAD SIGN MOUNTED) ES-6C 560
ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 15D AND 21D, DOUBLE LUMINAIRE MAST ARM) ES-6D 561
ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 30 AND 31) ES-6E 562
ELECTRICAL SYSTEMS (LIGHTING STANDARD, SLIP BASE PLATE) ES-6F 563
ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPE 32) ES-6G 564

**ELECTRICAL SYSTEMS – SIGNAL AND LIGHTING STANDARD, TYPE TS, AND TYPE 2 POST**

ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, TYPE TS, AND TYPE 2 POST) ES-7A 565

**ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARDS**

ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, TYPE 1 AND EQUIPMENT IDENTIFICATION CHARACTERS) ES-7B 566
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 1 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 30') ES-7C 567
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 2 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 30') ES-7D 568
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 3 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 45') ES-7E 569

PLAN TITLE PLAN No. PAGE

**ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARDS (CONTINUED)**

ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 4 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 25' TO 45') ..... ES-7F ..... 570
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 5 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 50' TO 55') ..... ES-7G ..... 571
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 5 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 60' TO 65') ..... ES-7H ..... 572

**ELECTRICAL SYSTEMS - FLASHING BEACONS**

ELECTRICAL SYSTEMS (FLASHING BEACON ON A TYPE 1, TYPE 15-FBS, AND TYPE 40 STANDARD) ..... ES-7J ..... 573
ELECTRICAL SYSTEMS (FLASHING BEACON WITH TYPE 9, 9A, AND 9B SIGN) ..... ES-7K ..... 574
ELECTRICAL SYSTEMS (FLASHING BEACON WITH TYPE 9, 9A, AND 9B SIGN) ..... ES-7L ..... 575

**ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARD DETAILS**

ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, DETAILS No. 1) ..... ES-7M ..... 576
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, DETAILS No. 2) ..... ES-7N ..... 577
ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, DETAILS No. 3) ..... ES-7O ..... 578

**ELECTRICAL SYSTEMS - PEDESTRIAN BARRICADES**

ELECTRICAL SYSTEMS (PEDESTRIAN BARRICADES) ..... ES-7Q ..... 579

**ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING ATTACHMENTS**

ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING ATTACHMENTS) ..... ES-7R ..... 580

**ELECTRICAL SYSTEMS - PULL BOX**

ELECTRICAL SYSTEMS (NON-TRAFFIC PULL BOX) ..... ES-8A ..... 581
ELECTRICAL SYSTEMS (TRAFFIC PULL BOX) ..... ES-8B ..... 582
ELECTRICAL SYSTEMS (VAULTS) ..... ES-8C ..... 583
ELECTRICAL SYSTEMS (VAULTS) ..... ES-8D ..... 584

**ELECTRICAL SYSTEMS - STRUCTURE INSTALLATIONS**

ELECTRICAL SYSTEMS (STRUCTURE PULL BOX INSTALLATIONS) ..... ES-9A ..... 585
ELECTRICAL SYSTEMS (CONDUIT RISER EXPANSION AND DEFLECTION FITTINGS, STRUCTURE INSTALLATIONS) ..... ES-9B ..... 586
ELECTRICAL SYSTEMS (STRUCTURE PULL BOX) ..... ES-9C ..... 587
ELECTRICAL SYSTEMS (STRUCTURE PULL BOX INSTALLATIONS) ..... ES-9D ..... 588
ELECTRICAL SYSTEMS (FLUSH-MOUNTED SOFFIT, PENDANT SOFFIT AND WALL-MOUNTED LUMINAIRE, STRUCTURE INSTALLATIONS) ..... ES-9E ..... 589
ELECTRICAL SYSTEMS (FLUSH-MOUNTED SOFFIT LUMINAIRE DETAILS) ..... ES-9F ..... 590

PLAN TITLE PLAN No. PAGE

**ELECTRICAL SYSTEMS - ISOFOOTCANDLE CURVES AND FOUNDATION DETAILS**

ELECTRICAL SYSTEMS (ISOFOOTCANDLE CURVES) ES-10B 591
ELECTRICAL SYSTEMS (FOUNDATION INSTALLATIONS) ES-11 592

**ELECTRICAL SYSTEMS - SPLICE INSULATION METHODS, KINKING AND BANDING DETAILS**

ELECTRICAL SYSTEMS (SPLICE INSULATION METHODS DETAILS) ES-13A 593
ELECTRICAL SYSTEMS (KINKING AND BANDING DETAIL) ES-13B 594

**ELECTRICAL SYSTEMS - EXTINGUISHABLE MESSAGE SIGN**

ELECTRICAL SYSTEMS (EXTINGUISHABLE MESSAGE SIGN 10" LETTERS) ES-14A 595
ELECTRICAL SYSTEMS (EMS AND FBE WIRING DIAGRAMS) ES-14B 596
ELECTRICAL SYSTEMS (EXTINGUISHABLE MESSAGE SIGN ON A FULL CANTILEVER) ES-14C 597

**ELECTRICAL SYSTEMS - SIGN ILLUMINATION EQUIPMENT AND CONTROLS**

ELECTRICAL SYSTEMS (SIGN ILLUMINATION EQUIPMENT) ES-15A 598
ELECTRICAL SYSTEMS (SIGN ILLUMINATION EQUIPMENT) ES-15C 599
ELECTRICAL SYSTEMS (LIGHTING AND SIGN ILLUMINATION CONTROL) ES-15D 600

**ELECTRICAL SYSTEMS – CAMERA AND VEHICLE DETECTION SYSTEM POLES**

ELECTRICAL SYSTEMS (CAMERA POLE 5' TO 15', OVERHEAD SIGN MOUNTED) ES-16A 601
ELECTRICAL SYSTEMS (CAMERA POLE 25' TO 45') ES-16B 602
ELECTRICAL SYSTEMS (HIGH MAST CAMERA POLE 50' TO 90') ES-16C 603
ELECTRICAL SYSTEMS (VEHICLE DETECTION SYSTEM POLE 30' TO 40') ES-16D 604

**ELECTRICAL SYSTEMS - FIBER OPTIC DETAILS**

ELECTRICAL SYSTEMS (FIBER OPTIC MARKER DETAILS) ES-17A 605

**TEMPORARY WOOD POLES**

TEMPORARY WOOD POLES - GENERAL NOTES ES-18A 606
TEMPORARY WOOD POLES - NON-GUYED - NO SIGNALS ON SPANS ES-18B 607
TEMPORARY WOOD POLES - GUYED - NO SIGNALS ON SPANS ES-18C 608
TEMPORARY WOOD POLES - GUYED - WITH SIGNAL FACES ON SPANS ES-18D 609
TEMPORARY WOOD POLES - NON-GUYED - WITH SIGNAL FACES ON SPAN ES-18E 610
TEMPORARY WOOD POLES - DETAILS No. 1 ES-19A 611
TEMPORARY WOOD POLES - DETAILS No. 2 ES-19B 612
TEMPORARY WOOD POLES - DETAILS No. 3 ES-19C 613
TEMPORARY WOOD POLES - DETAILS No. 4 ES-19D 614
TEMPORARY WOOD POLES - DETAILS No. 5 ES-19E 615

## A

| | |
|---|---|
| AB | AGGREGATE BASE |
| ABBC | ASBESTOS BONDED BITUMINOUS COATED |
| ABM | AIR-BLOWN MORTAR |
| Abn | ABANDON |
| ABS | ACRYLONITRILE-BUTADIENE-STYRENE |
| Abut | ABUTMENT |
| AC | ASPHALT CONCRETE |
| AC+ | UNGROUNDED CONDUCTOR |
| ACB | ASPHALT CONCRETE BASE |
| ACC | ARMOR-CLAD CONDUCTORS |
| ACP | ASBESTOS CEMENT PIPE |
| Adj | ADJUST,<br>ADJUSTABLE,<br>ADJACENT |
| ADL | ADDED DEAD LOAD |
| ADT | AVERAGE DAILY TRAFFIC |
| AFES | ALTERNATIVE FLARED END SECTION |
| AGT | APPROACH GUARDRAIL TRANSITION |
| Ahd | AHEAD |
| AIC | AUXILIARY IRRIGATION CONTROLLER |
| Alt | ALTERNATE,<br>ALTERNATIVE |
| AM | TIME FROM MIDNIGHT TO NOON |
| Amend | AMENDMENT |
| AP | ALTERNATIVE PIPE |
| APC | ALTERNATIVE PIPE CULVERT |
| Approx | APPROXIMATE |
| APS | ACCESSIBLE PEDESTRIAN SIGNAL |
| APU | ALTERNATIVE PIPE UNDERDRAIN |
| ARS | ACCELERATION RESPONSE SPECTRUM |
| ARV | AIR RELEASE VALVE |
| AS | AGGREGATE SUBBASE |
| ASP | ALTERNATIVE SLOTTED PIPE |
| ASRP | ALUMINUM SPIRAL RIB PIPE |
| Assy | ASSEMBLY |
| ATPB | ASPHALT TREATED PERMEABLE BASE |
| ATPM | ASPHALT TREATED PERMEABLE MATERIAL |
| Auto | AUTOMATIC |
| Aux | AUXILIARY |
| AVB | ATMOSPHERIC VACUUM BREAKER |
| Ave | AVENUE |
| Avg | AVERAGE |

## B

| | |
|---|---|
| B & B | BALLED AND BURLAPPED |
| BAGR | BRIDGE APPROACH GUARD RAILING |
| Batt | BATTERY |
| BB | BEGINNING OF BRIDGE |
| B/B | BRASS/BRONZE |
| B/B/Pl | BRASS/BRONZE/PLASTIC |
| B-B | BACK-TO-BACK |
| BBS | BATTERY BACKUP SYSTEM |
| BC | BEGIN HORIZONTAL CURVE,<br>BOLT CIRCLE |
| BCR | BEGIN CURB RETURN |
| Beg | BEGIN |
| BFM | BONDED FIBER MATRIX |
| Bit Ctd | BITUMINOUS COATED |
| Bk | BACK |
| Bkf | BACKFILL |
| Bldg | BUILDING |
| Blk | BLACK |
| BLM | BRIDGE-LOG MILE |
| Blvd | BOULEVARD |
| BM | BENCH MARK |
| BMP | BEST MANAGEMENT PRACTICE |
| Bot | BOTTOM |
| BP | BOOSTER PUMP,<br>BYPASS |
| BPA | BACKFLOW PREVENTER ASSEMBLY |
| BPB | BICYCLE PUSH BUTTON |
| BPE | BACKFLOW PREVENTER ENCLOSURE |
| B/Pl | BRASS/PLASTIC |
| Br | BRIDGE |
| Brg | BEARING |
| BTU | BRITISH THERMAL UNIT |
| BV | BALL VALVE |
| BVC | BEGIN VERTICAL CURVE |
| BW | BARBED WIRE |

## C

| | |
|---|---|
| C | CONDUIT,<br>CHANNEL (STRUCTURAL STEEL SHAPE) |
| CAA | CABLE ANCHOR ASSEMBLY |
| CAP | CORRUGATED ALUMINUM PIPE |
| CAPA | CORRUGATED ALUMINUM PIPE ARCH |
| CARV | COMBINATION AIR RELEASE VALVE |
| CAS | CONSTRUCTION AREA SIGN |
| CB | CONCRETE BARRIER,<br>CIRCUIT BREAKER,<br>COUPLING BAND,<br>COMPOST BERM |
| CBW | CONCRETE BLOCK WALL |
| C-C | CENTER TO CENTER |
| CCA | CAM COUPLER ASSEMBLY |
| CCTV | CLOSED CIRCUIT TELEVISION |
| CEC | CONTROLLER ENCLOSURE CABINET |
| CG | CENTER OF GRAVITY |
| CHDPE | CORRUGATED HIGH DENSITY POLYETHYLENE |
| Chnl | CHANNEL |
| CI | CAST IRON |
| CIDH | CAST-IN-DRILLED-HOLE |
| CIP | CAST-IN-PLACE,<br>CAST IRON PIPE |
| CIPCP | CAST IN PLACE CONCRETE PIPE |
| CISS | CAST-IN-STEEL-SHELL |
| CJP | COMPLETE JOINT PENETRATION |
| Ckt | CIRCUIT |
| CL | CHAIN LINK |
| CL-6 | CHAIN LINK FENCE (6 FT) |
| Cl | CLASS |
| Clr | CLEAR,<br>CLEARANCE |
| CM | CENTER MARGIN LIGHT |
| CMP | CORRUGATED METAL PIPE |
| CMS | CHANGEABLE MESSAGE SIGN |
| CNC | CONTROL AND NEUTRAL CONDUCTORS |
| Cntl | CONTROL |
| Co | COUNTY |
| Col | COLUMN |
| Comm | COMMUNICATION |
| Conc | CONCRETE |
| Conn | CONNECTOR |
| Const | CONSTRUCT,<br>CONSTRUCTION |
| Cont | CONTINUOUS |
| Coord | COORDINATE |
| CP | CANDLEPOWER,<br>CATCH POINT,<br>COPPER PIPE |
| Cr | CREEK |
| CRCP | CONTINUOUSLY REINFORCED CONCRETE PAVEMENT |
| CRSP | CONCRETED ROCK SLOPE PROTECTION |
| CS | COMPOST SOCK |
| CSC | CONDUCTOR SIGNAL CABLE |
| CSP | CORRUGATED STEEL PIPE |
| CSPA | CORRUGATED STEEL PIPE ARCH |
| CST | CENTER STRIP |
| Ct | COURT |
| CTB | CEMENT TREATED BASE |
| CTID | CALTRANS IDENTIFICATION |
| CTPB | CEMENT TREATED PERMEABLE BASE |
| CTPM | CEMENT TREATED PERMEABLE MATERIAL |
| Ctrs | CENTERS |
| Culv | CULVERT |
| CV | CHECK VALVE |

## D

| | |
|---|---|
| D | DEPTH,<br>DIRECTION (IN PERCENT) OF HEAVIER TRAFFIC FLOW |
| Dbl | DOUBLE |
| DD | DOWNDRAIN |
| Deg | DEGREE |
| Del | DELINEATOR |
| Det | DETAIL,<br>DETOUR |
| DF | DOUGLAS FIR |
| DG | DECOMPOSED GRANITE |
| DHV | DESIGN HOURLY VOLUME |
| DI | DRAINAGE INLET,<br>DROP INLET |
| Dia | DIAMETER |
| Diaph | DIAPHRAGM |
| DIP | DUCTILE IRON PIPE |
| Dist | DISTANCE,<br>DISTRICT |
| DIT | DRIP IRRIGATION TUBING |
| DLC | LOOP DETECTOR LEAD-IN CABLE |
| DMBB | DOUBLE METAL BEAM BARRIER |
| DN | DIAMETER NOMINAL |
| Dr | DRIVE |
| DTBB | DOUBLE THRIE BEAM BARRIER |
| DVA | DRIP VALVE ASSEMBLY |
| Dwy | DRIVEWAY |

## E

| | |
|---|---|
| E | EAST |
| Ease | EASEMENT |
| EB | END OF BRIDGE,<br>EASTBOUND |
| EC | END HORIZONTAL CURVE,<br>EROSION CONTROL |
| ECR | END CURB RETURN |
| ECTC | EROSION CONTROL TECHNOLOGY COUNCIL |
| ED | EDGE DRAIN |
| EDC | EDGE DRAIN CLEANOUT |
| EDO | EDGE DRAIN OUTLET |
| EDV | EDGE DRAIN VENT |
| Elec | ELECTROLIER |
| Elect | ELECTRIC,<br>ELECTRICAL |
| Elev | ELEVATION |
| Ell | ELBOW |
| Emb | EMBANKMENT |
| EMS | EXTINGUISHABLE MESSAGE SIGN |
| Encl | ENCLOSURE |
| Engr | ENGINEER |
| EOD | EDGE OF DECK |
| EP | EDGE OF PAVEMENT |
| Eq | EQUATION |
| ERS | EARTH RETAINING STRUCTURE |
| ES | EDGE OF SHOULDER |
| ESA | ENVIRONMENTALLY SENSITIVE AREA |
| ESAL | EQUIVALENT SINGLE AXLE LOADS |
| EST | END STRIP |
| Estb | ESTABLISHMENT |
| ETW | EDGE OF TRAVELED WAY |
| EVC | END VERTICAL CURVE |
| EVUC | EMERGENCY VEHICLE UNIT CABLE |
| EVUD | EMERGENCY VEHICLE UNIT DETECTOR |
| EW | ENDWALL |
| Exc | EXCAVATION |
| Exist | EXISTING |
| Exp | EXPANSION |
| Exp Jt | EXPANSION JOINT |
| Ext | EXTERIOR |
| Exwy | EXPRESSWAY |

## F

| | |
|---|---|
| F | FILL,<br>FULL CIRCLE |
| F & C | FRAME AND COVER |
| F & G | FRAME AND GRATE |
| FB | FLOOR BEAM,<br>FLASHING BEACON |
| FBE | FLASHING BEACON ENCLOSURE |
| FBS | FLASHING BEACON WITH SLIP BASE |
| FCV | FLOW CONTROL VALVE |
| Fdn | FOUNDATION |
| FEBT | FACING EASTBOUND TRAFFIC |
| Fert | FERTILIZER |
| FES | FLARED END SECTION |
| FF | FILTER FABRIC |
| FG | FINISH GRADE |
| FH | FIRE HYDRANT,<br>FLEXIBLE HOSE |
| Fig | FIGURE |
| FIPT | FEMALE IRON PIPE THREAD |
| FIS | FERTILIZER INJECTOR SYSTEM |
| FL | FLOW LINE |
| FNBT | FACING NORTHBOUND TRAFFIC |
| FO | FIBER OPTIC |
| FOB | FREE ON BOARD |
| FOC | FACE OF CONCRETE |
| F/P | FULL/PART CIRCLE |
| FR | FIBER ROLL |
| Fr Rd | FRONTAGE ROAD |
| FS | FAR SIDE,<br>FINISHED SURFACE,<br>FLOW SENSOR |
| FSBT | FACING SOUTHBOUND TRAFFIC |
| FSC | FLOW SENSOR CABLE |
| Ftg | FOOTING |
| FV | FLUSH VALVE |
| FWBT | FACING WESTBOUND TRAFFIC |
| Fwy | FREEWAY |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Davinder Minhas
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Davinder Minhas
No. C70022
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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3. Do not use abbreviations or acronyms where the meaning may be in doubt.
4. Abbreviations and acronyms may be used in callouts, dimensions, and tables.
5. Use upper and lower case letters for abbreviation of a single word.
   e.g., Misc = miscellaneous
   and Bit Ctd = bituminous coated
6. Use all upper case letters for acronyms.
   e.g., BCR = begin curb return

### UNITS OF MEASUREMENT:

1. See Tables A, B and C on Standard Plan A3C.
2. Units of measurement are not part of abbreviations and acronyms. The above abbreviation and acronym general rules do not apply.

### SYMBOLS:

1. See Table D on Standard Plan A3C.

### SLOPES, FLARES, AND TAPERS:

1. Side slopes:
   X:Y - horizontal:vertical
2. Flares and tapers:
   X:Y - longitudinal:lateral

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ABBREVIATIONS (SHEET 1 OF 3)

A3A

2025 STANDARD PLAN A3A

1

7-1-25

Return to Table of Contents

## G

| | |
|---|---|
| G | GROOVE,<br>EQUIPMENT GROUNDING CONDUCTOR |
| g | ACCELERATION DUE TO GRAVITY |
| Ga | GAUGE |
| Galv | GALVANIZED |
| GARV | GARDEN VALVE |
| GARVA | GARDEN VALVE ASSEMBLY |
| GB | GROUND BUS |
| GFCI | GROUND FAULT CIRCUIT INTERRUPTER |
| GM | GRAVEL MULCH |
| GP | GRADING PLANE |
| GPH | GALLONS PER HOUR |
| GPM | GALLONS PER MINUTE |
| GR | GUARD RAILING |
| Grn | GREEN |
| GSP | GALVANIZED STEEL PIPE |
| Gtr | GUTTER |
| GV | GATE VALVE |

## H

| | |
|---|---|
| H | HEIGHT,<br>HALF CIRCLE |
| HAR | HIGHWAY ADVISORY RADIO |
| h, hr | HOUR |
| HD | HORIZONTAL DRAIN |
| HDPE | HIGH DENSITY POLYETHYLENE |
| hdwl | HEADWALL |
| Hex | HEXAGONAL |
| Hex Hd | HEXAGONAL HEAD |
| HMA | HOT MIX ASPHALT |
| Horiz | HORIZONTAL |
| HOV | HIGH OCCUPANCY VEHICLE |
| HP | HINGE POINT,<br>HORSEPOWER |
| HPL | HIGH PRESSURE LINE |
| HPS | HIGH PERFORMANCE STEEL,<br>HIGH PRESSURE SODIUM |
| HS | HIGH STRENGTH |
| HSS | HOLLOW STRUCTURAL SECTION |
| HW | HEADWALL,<br>HIGH WATER |
| HWM | HIGH WATER MARK |
| Hwy | HIGHWAY |

## I

| | |
|---|---|
| IB | IMPORTED BORROW |
| IC | IRRIGATION CONTROLLER |
| ICC | IRRIGATION CONTROLLER(S) IN<br>CONTROLLER ENCLOSURE CABINET |
| ID | INSIDE DIAMETER |
| IF | INSIDE FACE |
| IFS | IRRIGATION FILTRATION SYSTEM |
| IISNS | INTERNALLY ILLUMINATED STREET NAME SIGN |
| Int | INTERIOR |
| Inv | INVERT |
| IPS | IRON PIPE SIZE |
| IPT | IRON PIPE THREAD |
| Irr | IRRIGATION |
| ISL | INDUCTION SIGN LIGHTING |

## J

| | |
|---|---|
| Jct | JUNCTION |
| JP | JOINT POLE |
| JPCP | JOINTED PLAIN CONCRETE PAVEMENT |
| JS | JUNCTION STRUCTURE |
| Jt | JOINT |

## K

## L

| | |
|---|---|
| L | LENGTH,<br>ANGLE (STRUCTURAL STEEL SHAPE) |
| Lat | LATITUDE |
| LCB | LEAN CONCRETE BASE |
| LED | LIGHT EMITTING DIODE |
| LMA | LUMINAIRE MAST ARM |
| Ln | LANE |
| Loc | LOCATION |
| LOL | LAYOUT LINE |
| Long | LONGITUDE |
| Longit | LONGITUDINAL |
| LPS | LOW PRESSURE SODIUM |
| LS | LUMP SUM |
| Lt | LEFT |
| Ltg | LIGHTING |
| Lum | LUMINAIRE |

## M

| | |
|---|---|
| M | METERED |
| Maint | MAINTENANCE |
| MAS | MAST ARM MOUNTING SIDE ATTACHMENT |
| MAT | MAST ARM MOUNTING TOP ATTACHMENT |
| Max | MAXIMUM |
| MB | METAL BEAM |
| MBB | METAL BEAM BARRIER |
| MBGR | METAL BEAM GUARD RAILING |
| MBPS | MANUAL BYPASS SWITCH |
| MCV | MANUAL CONTROL VALVE |
| Med | MEDIAN |
| MGS | MIDWEST GUARDRAIL SYSTEM |
| MH | MANHOLE |
| MIC | MASTER IRRIGATION CONTROLLER |
| Min | MINIMUM |
| MIPT | MALE IRON PIPE THREAD |
| Misc | MISCELLANEOUS |
| Misc I & S | MISCELLANEOUS IRON AND STEEL |
| Mkr | MARKER |
| M/M | MULTIPLE TO MULTIPLE TRANSFORMER |
| Mod | MODIFIED,<br>MODIFY |
| Mon | MONUMENT |
| MP | METAL PLATE |
| MPGR | METAL PLATE GUARD RAILING |
| MR | MOVEMENT RANGE |
| MSE | MECHANICALLY STABILIZED EMBANKMENT |
| Mt | MOUNTAIN,<br>MOUNT |
| Mtg | MOUNTING |
| Mtl | MATERIAL |
| MV | MERCURY VAPOR LIGHTING FIXTURE |
| MVDS | MICROWAVE VEHICLE DETECTION SYSTEM |
| MVP | MAINTENANCE VEHICLE PULLOUT |

## N

| | |
|---|---|
| N | NORTH,<br>NEUTRAL (GROUNDED CONDUCTOR) |
| NB | NORTHBOUND,<br>NEUTRAL BUS |
| NC | NORMALLY CLOSE |

## N continued

| | |
|---|---|
| NCN | NO COMMON NAME |
| NL | NOZZLE LINE |
| NO | NORMALLY OPEN |
| No. | NUMBER (MUST HAVE PERIOD) |
| Nos. | NUMBERS (MUST HAVE PERIOD) |
| NPS | NOMINAL PIPE SIZE |
| NPT | NATIONAL PIPE THREAD |
| NS | NEAR SIDE |
| NTS | NOT TO SCALE |

## O

| | |
|---|---|
| Oblr | OBLITERATE |
| OC | OVERCROSSING |
| O/C | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OF | OUTSIDE FACE |
| OG | ORIGINAL GROUND |
| OGAC | OPEN GRADED ASPHALT CONCRETE |
| OGFC | OPEN GRADED FRICTION COURSE |
| OH | OVERHEAD |
| OHWM | ORDINARY HIGH WATER MARK |
| OL | OVERLAP |
| O-O | OUT TO OUT |
| Opp | OPPOSITE |
| OSD | OVERSIDE DRAIN |

## P

| | |
|---|---|
| P | PAGE,<br>PITCH,<br>PART CIRCLE,<br>NUMBER OF POLES FOR A CIRCUIT BREAKER |
| PAP | PERFORATED ALUMINUM PIPE |
| PB | PULL BOX |
| PBA | PUSH BUTTON ASSEMBLY |
| PC | POINT OF CURVATURE,<br>PRECAST |
| PCC | POINT OF COMPOUND CURVE,<br>PORTLAND CEMENT CONCRETE |
| PCMS | PORTABLE CHANGEABLE MESSAGE SIGN |
| PCP | PERFORATED CONCRETE PIPE,<br>PRESTRESSED CONCRETE PIPE |
| PCVC | POINT OF COMPOUND VERTICAL CURVE |
| PE | POLYETHYLENE |
| PEC | PERMIT TO ENTER AND CONSTRUCT,<br>PHOTOELECTRIC CONTROL |
| Ped | PEDESTRIAN |
| Perm Mtl | PERMEABLE MATERIAL |
| PEU | PHOTOELECTRIC UNIT |
| PG | PROFILE GRADE |
| PI | POINT OF INTERSECTION |
| PJP | PARTIAL JOINT PENETRATION |
| Pkt | PACKET |
| Pkwy | PARKWAY |
| PL | PLATE |
| Pl | PLASTIC |
| P/L | PROPERTY LINE |
| PLS | PURE LIVE SEED |
| Plt | PLANT,<br>PLANTING |
| Plt Estb | PLANT ESTABLISHMENT |

## P continued

| | |
|---|---|
| PM | POST MILE,<br>TIME FROM NOON TO MIDNIGHT |
| PN | PAVING NOTCH |
| POC | POINT OF HORIZONTAL CURVE,<br>PEDESTRIAN OVERCROSSING |
| POT | POINT OF TANGENT |
| POVC | POINT OF VERTICAL CURVE |
| PP | PIPE PILE,<br>PLASTIC PIPE,<br>POWER POLE |
| PPL | PREFORMED PERMEABLE LINER |
| PPP | PERFORATED PLASTIC PIPE |
| PR | PRESSURE RATED |
| PRC | POINT OF REVERSE CURVE |
| PRF | PAVEMENT REINFORCING FABRIC |
| PRLV | PRESSURE RELIEF VALVE |
| PRV | PRESSURE REGULATING VALVE |
| PRVC | POINT OF REVERSE VERTICAL CURVE |
| PS&E | PLANS, SPECIFICATIONS AND ESTIMATES |
| PS | PRESTRESSED |
| P/S | PRESTRESSED |
| PSP | PERFORATED STEEL PIPE |
| PT | POINT OF TANGENCY,<br>CONDUIT WITH PULL TAPE |
| PTR | POWER TRANSFER RELAY |
| PUC | PEDESTRIAN UNDERCROSSING |
| PVC | POLYVINYL CHLORIDE |
| Pvmt | PAVEMENT |

## Q

| | |
|---|---|
| Q | QUARTER CIRCLE |
| QCV | QUICK COUPLING VALVE |
| Qty | QUANTITY |

## R

| | |
|---|---|
| R | RADIUS |
| R & D | REMOVE AND DISPOSE |
| R & S | REMOVE AND SALVAGE |
| R/C | RATE OF CHANGE |
| RCA | REINFORCED CONCRETE ARCH |
| RCB | REINFORCED CONCRETE BOX |
| RCP | REINFORCED CONCRETE PIPE |
| RCPA | REINFORCED CONCRETE PIPE ARCH |
| RCV | REMOTE CONTROL VALVE |
| RCVM | REMOTE CONTROL VALVE (MASTER) |
| RCVMF | REMOTE CONTROL VALVE (MASTER) W/FLOW SENSOR |
| RCVP | REMOTE CONTROL VALVE W/PRESSURE REGULATOR |
| RCW | RECYCLED WATER |
| Rd | ROAD |
| Rdwy | ROADWAY |
| RE | RELOCATED EQUIPMENT |
| RECP | ROLLED EROSION CONTROL PRODUCT |
| Reinf | REINFORCED,<br>REINFORCEMENT,<br>REINFORCING |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Davinder Minhas
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Davinder Minhas
No. C70022
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ABBREVIATIONS (SHEET 2 OF 3)

A3B

2025 STANDARD PLAN A3B

2

7-1-25

Return to Table of Contents

## R continued

| | |
|---|---|
| Rel | RELOCATE |
| Repl | REPLACEMENT |
| Req | REQUIRED |
| Ret | RETAINING |
| Rev | REVISED,<br>REVISION |
| RHMA | RUBBERIZED HOT MIX ASPHALT |
| RICS | REMOTE IRRIGATION CONTROL SYSTEM |
| Riv | RIVER |
| RM | ROAD-MIXED,<br>RAMP METERING |
| RP | RADIUS POINT,<br>REFERENCE POINT |
| RR | RAILROAD |
| RSP | ROCK SLOPE PROTECTION,<br>REVISED STANDARD PLAN |
| Rt | RIGHT |
| Rte | ROUTE |
| RW | REDWOOD,<br>RETAINING WALL |
| R/W | RIGHT OF WAY |
| RWIS | ROADSIDE WEATHER INFORMATION SYSTEM |
| Rwy | RAILWAY |

## S

| | |
|---|---|
| S | SOUTH,<br>SLIP,<br>SUPPLEMENT |
| SAE | STRUCTURE APPROACH EMBANKMENT |
| Salv | SALVAGE |
| SAPP | STRUCTURAL ALUMINUM PLATE PIPE |
| SB | SOUTHBOUND,<br>SLIP BASE |
| SC | SAND CUSHION |
| S/C | SAW CUT LINE |
| Sch | SCHEDULE |
| SCSP | SLOTTED CORRUGATED STEEL PIPE |
| SD | STORM DRAIN |
| Sec | SECOND,<br>SECTION |
| Sep | SEPARATION |
| SG | SUBGRADE |
| Shld | SHOULDER |
| Sht | SHEET |
| SIC | SIGNAL INTERCONNECT CABLE |
| Sig | SIGNAL |
| Sim | SIMILAR |
| SM | SELECTED MATERIAL |
| SMA | SIGNAL MAST ARM |
| SNS | STREET NAME SIGN |
| SP | STAND PIPE,<br>SERVICE POINT |
| Spec | SPECIAL,<br>SPECIFICATION(S) |
| SPP | SLOTTED PLASTIC PIPE |

## S continued

| | |
|---|---|
| Sq | SQUARE |
| SS | SLOPE STAKE |
| SSBM | STRAP AND SADDLE BRACKET METHOD |
| SSD | STRUCTURAL SECTION DRAIN |
| SSPA | STRUCTURAL STEEL PLATE ARCH |
| SSPP | STRUCTURAL STEEL PLATE PIPE |
| SSPPA | STRUCTURAL STEEL PLATE PIPE ARCH |
| SSRP | STEEL SPIRAL RIB PIPE |
| SST | SIDE STRIP |
| St | STREET |
| Sta | STATION |
| STBB | SINGLE THRIE BEAM BARRIER |
| Std | STANDARD |
| Str | STRUCTURE |
| Surf | SURFACING |
| SW | SIDEWALK,<br>SOUND WALL |
| Swr | SEWER |
| Sym | SYMMETRICAL |
| S4S | SURFACE 4 SIDES |

## T

| | |
|---|---|
| T | SEMI-TANGENT,<br>THIRD CIRCLE,<br>THREAD,<br>TRUCK TRAFFIC VOLUME (IN PERCENT)<br>OF DESIGN HOURLY VOLUME |
| Tan | TANGENT |
| TB | TERMINAL BOARD |
| TBB | THRIE BEAM BARRIER |
| Tbr | TIMBER |
| T&B | TOP AND BOTTOM |
| TCB | TRAFFIC CONTROL BOX |
| TCE | TEMPORARY CONSTRUCTION EASEMENT |
| TDC | TELEPHONE DEMARCATION CABINET |
| Temp | TEMPORARY,<br>TEMPERATURE,<br>TEMPERED |
| TG | TOP OF GRADE |
| TI | TRAFFIC INDEX |
| TLS | TRUCK LOADING STAND PIPE |
| TMS | TRAFFIC MONITORING STATION |
| TOS | TRAFFIC OPERATIONS SYSTEM |
| Tot | TOTAL |
| TP | TELEPHONE POLE |
| TPB | TREATED PERMEABLE BASE |
| TPM | TREATED PERMEABLE MATERIAL |
| TQ | THREE-QUARTER CIRCLE |
| Trans | TRANSITION |
| TRM | TURF REINFORCEMENT MAT |
| TS | TRANSVERSE,<br>TRAFFIC SIGNAL,<br>TUBULAR STEEL |
| TT | TWO-THIRDS CIRCLE |
| TWSA | TREE WELL SPRINKLER ASSEMBLY |
| Typ | TYPICAL |

## U

| | |
|---|---|
| UC | UNDERCROSSING |
| UD | UNDERDRAIN |
| UG | UNDERGROUND |
| UON | UNLESS OTHERWISE NOTED |
| UP | UNDERPASS |
| UPS | UNINTERRUPTIBLE POWER SUPPLY |
| UPSC | UNINTERRUPTIBLE POWER SUPPLY CONTROLLER |
| UPSM | UPS MODE |

## V

| | |
|---|---|
| V | VALVE,<br>DESIGN SPEED |
| Var | VARIABLE,<br>VARIES |
| VC | VERTICAL CURVE |
| VCP | VITRIFIED CLAY PIPE |
| Veh | VEHICLE |
| Vert | VERTICAL |
| Via | VIADUCT |
| VIVDS | VIDEO IMAGE VEHICLE<br>DETECTION SYSTEM |
| Vol | VOLUME |

## W

| | |
|---|---|
| W | WEST,<br>WIDTH |
| W/ | WITH |
| W/O | WITHOUT |
| WB | WESTBOUND |
| WH | WEEP HOLE |
| Wht | WHITE |
| WIM | WEIGH-IN-MOTION |
| WM | WIRE MESH,<br>WATER METER |
| WS | WATER SURFACE,<br>WYE STRAINER |
| WSA | WYE STRAINER ASSEMBLY |
| WSP | WELDED STEEL PIPE |
| Wt | WEIGHT |
| WV | WATER VALVE |
| WW | WINGWALL |
| WWLOL | WINGWALL LAYOUT LINE |
| WWM | WELDED WIRE MESH |

## X

| | |
|---|---|
| Xfmr | TRANSFORMER |
| X Sec | CROSS SECTION |
| Xing | CROSSING |

## Y

| | |
|---|---|
| Yr | YEAR |
| Yrs | YEARS |

## Z

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Davinder Minhas
REGISTERED CIVIL ENGINEER

September 19, 2025
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### UNITS OF MEASUREMENT:

Some of the units used in the project plan quantity tables and in the Bid Item List are:

TABLE A

| UNIT | DEFINITION |
|---|---|
| ACRE | ACRE |
| CF | CUBIC FOOT |
| CY | CUBIC YARD |
| EA | EACH |
| GAL | GALLON |
| LB | POUND |
| LF | LINEAR FOOT |
| LNMI | LANE MILE |
| LS | LUMP SUM |
| SQFT | SQUARE FOOT |
| SQYD | SQUARE YARD |
| STA | 100 FEET |
| TON | 2,000 POUNDS |

Some of the units used in the plans other than in the project plan quantity tables are:

TABLE B

| UNIT | DEFINITION |
|---|---|
| ksi | KIPS PER SQUARE INCH |
| ksf | KIPS PER SQUARE FOOT |
| psi | POUNDS PER SQUARE INCH |
| psf | POUNDS PER SQUARE FOOT |
| $lb/ft^3$, pcf | POUNDS PER CUBIC FOOT |
| tsf | TONS PER SQUARE FOOT |
| mph, MPH * | MILES PER HOUR |
| oz | OUNCE |
| lb | POUND |
| kip | 1,000 POUNDS |
| cal | CALORIE |
| ft | FOOT OR FEET |
| gal | GALLON |

* For use on a sign panel only

Some of the units used in the Electrical plans are:

TABLE C

| UNIT | DEFINITION |
|---|---|
| A | AMPERE |
| bps | BITS PER SECOND |
| Bps | BYTES PER SECOND |
| FC | FOOT-CANDLE |
| Hz | HERTZ |
| k * | KILO |
| kV | KILOVOLT |
| kVA | KILOVOLT-AMPERE |
| kW | KILOWATT |
| M * | MEGA |
| m * | MILLI |
| mA | MILLIAMPERE |
| min | MINUTE |
| p * | PICO |
| s | SECOND |
| V | VOLT |
| VA | VOLT-AMPERE |
| V(dc) | VOLT (DIRECT CURRENT) |
| V(ac) | VOLT (ALTERNATING CURRENT) |
| W | WATT |
| Ω | OHM |
| μ * | MICRO |

* Prefix to a unit

### SYMBOLS:

Commonly used symbols for U.S. customary units

TABLE D

| SYMBOL | DEFINITION |
|---|---|
| @ | AT |
| ℄ | CENTERLINE |
| ø | NOMINAL DIAMETER,<br>DIAMETER,<br>PHASE |
| ℙ | PLATE |
| ℒ | STATIONLINE |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ABBREVIATIONS (SHEET 3 OF 3)

A3C

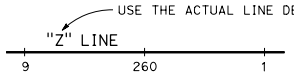
2025 STANDARD PLAN A3C

3

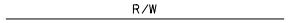
7-1-25

Return to Table of Contents

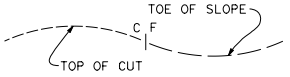
# SYMBOLOGY FOR DESIGN FEATURES




ALIGNMENT LINE
(STATION LINE)



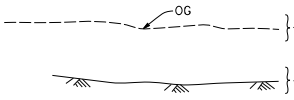

RIGHT OF WAY LINE
*(POSITION LABEL OUTSIDE OF CALTRANS R/W)*
*(NO LEADER LINE OR ARROWHEAD IS NEEDED)*




CATCH LINE FOR CUT AND FILL SLOPES



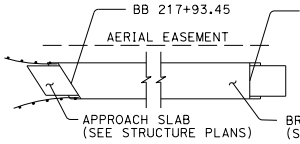

FINISHED GRADE LINE *(USE SOLID LINE)*



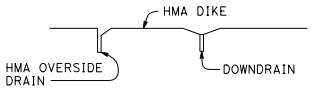

*(USED FOR PROFILES AND TYPICAL SECTIONS)*

ORIGINAL GROUND LINE

*(MAY BE USED ON DETAIL SHEETS)*



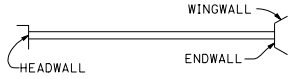

STRUCTURE (BRIDGE)



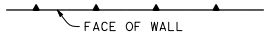

DIKE, DOWNDRAIN AND OVERSIDE DRAIN



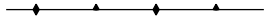

PIPE CULVERT - SINGLE LINE
*(36" OR LESS IN DIAMETER)*
*(PLUS - OTHER DRAINAGE FEATURES)*




PIPE CULVERT - TWO LINES
*(GREATER THAN 36" TO 6' IN DIAMETER*
*PLUS - OTHER DRAINAGE FEATURES)*
*(OVER 6' IN DIAMETER, DRAW TO SCALE)*



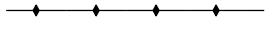

WALL



WALL ON BARRIER



WALL ON RETAINING WALL



CONCRETE (MEDIAN) BARRIER



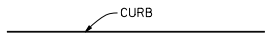
NEW GUARDRAIL



DOUBLE THRIE BEAM BARRIER



TEMPORARY BARRIER SYSTEM




CURB WITHOUT GUTTER



CURB WITH GUTTER
(CURB-LIP, FLOW LINE, TOP-BACK OF CURB)



FENCE



EXISTING WALL - USE ONLY WHEN
WORK IS TO BE PERFORMED ON
EXISTING WALL *(DO NOT DROP OUT)*



EXISTING GUARDRAIL - USE ONLY
WHEN WORK IS TO BE PERFORMED ON
EXISTING RAILING *(DO NOT DROP OUT)*



EXISTING CONCRETE BARRIER - USE
ONLY WHEN WORK IS TO BE PERFORMED
ON EXISTING BARRIER *(DO NOT DROP OUT)*



SOLID TRAFFIC LINE



BROKEN TRAFFIC LINE



CURB RAMP



DIRECTION OF TRAFFIC
*(ARROWS ARE TO BE HOLLOW)*

## STRIPING AND SIGNING



ROADSIDE SIGN - ONE POST, TWO POSTS (EMBEDDED)



ROADSIDE SIGN - ATTACHED TO ELECTROLIER, SIGNAL STANDARD,
SIGN STRUCTURE POST OR BARRIER



EXISTING ROADSIDE SIGN - ONE POST, TWO POSTS (EMBEDDED)



OVERHEAD SIGN - ONE POST



OVERHEAD SIGN - TWO POST



SYMBOL FOR ROADSIDE SIGN NUMBER



SYMBOL FOR OVERHEAD SIGN NUMBERING



SYMBOL FOR TRAFFIC LINE DETAIL



SYMBOL FOR DELINEATOR OR OBJECT MARKER



PAVEMENT MARKING ARROWS
*(ARROWS ARE TO BE HATCHED)*



BEGIN OR END OF TRAFFIC STRIPE



TRANSITION FROM ONE TRAFFIC STRIPE TO ANOTHER

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Vincent Mitchell
No. C85406
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**LEGEND**
**LINES AND SYMBOLS**
**(SHEET 1 OF 5)**

NO SCALE

**A10A**

7-1-25

2025 STANDARD PLAN A10A



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Vincent Mitchell
No. C85406
Exp. 9-30-26
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STATE OF CALIFORNIA

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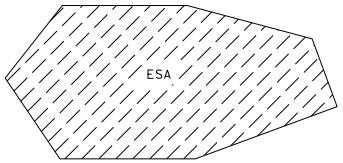
## WATER POLLUTION CONTROL

- Temp HIGH-VISIBILITY FENCE (THVF)
- Temp SILT FENCE (TSF)
- Temp Reinf SILT FENCE (TRSF)
- Temp FIBER ROLL (TFR)
- Temp GRAVEL BAG BERM (TGBB)
- Temp STRAW BALE BARRIER (TSBB)
- Temp SLOPE DRAIN FLEX PIPE
- Temp EARTH BERM
- Temp DITCH/SWALE
- Temp CONCRETE WASHOUT (WASH)
- Temp DRAINAGE INLET PROTECTION
- Temp DRAINAGE OUTLET PROTECTION
- Temp CHECK DAM
- Temp CONSTRUCTION ENTRANCE
- Temp STOCKPILE (SP)

## BOUNDARY LINE

- STATE OR COUNTRY
- COUNTY OR RESERVATION BOUNDARY
- CITY OR MILITARY BOUNDARY
- FOREST
- SUBDIVISION, SECTION, GRANT
- RANCHO

## ENVIRONMENTALLY SENSITIVE AREA (ESA)




## DRAINAGE

- DIRECTION FLOW OF WATER
- DRAINAGE SYSTEM SYMBOL
- DRAINAGE UNIT SYMBOL
- DRAINAGE INLET
- DITCH FLOW LINE

## DRAFTING

- TILDE - DESIGNATES AN AREA
- NORTH ARROW
- ADDENDUM SHEET SYMBOL *(ADDENDUM NUMBER IS INCLUDED INSIDE THE SYMBOL)*
- MATCH LINE
- BREAK LINE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND
# LINES AND SYMBOLS
# (SHEET 2 OF 5)

NO SCALE

A10B

7-1-25

5

2025 STANDARD PLAN A10B

Return to Table of Contents

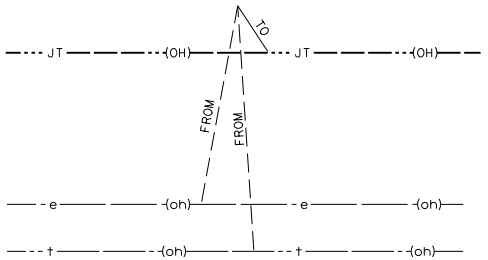
## SUBSURFACE FACILITIES

NEW WATER
Exist WATER
NEW NATURAL GAS
Exist NATURAL GAS
NEW SEWER
Exist SEWER
NEW ELECTRICAL
Exist ELECTRICAL
NEW TELEPHONE
Exist TELEPHONE
NEW GASOLINE
Exist GASOLINE
NEW OIL
Exist OIL
NEW TELEVISION
Exist TELEVISION
NEW STEAM
Exist STEAM
NEW TELEMETER CABLE
Exist TELEMETER CABLE
NEW STORM DRAIN
Exist STORM DRAIN
NEW FIBER OPTIC
Exist FIBER OPTIC
NEW JOINT TRENCH
Exist JOINT TRENCH
NEW RECYCLED WATER
Exist RECYCLED WATER
Exist IRRIGATION CONDUIT
Exist ELECTRICAL SYSTEMS CONDUIT

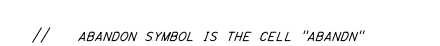
## OVERHEAD FACILITIES

NEW ELECTRICAL
Exist ELECTRICAL
NEW TELEMETER CABLE
Exist TELEMETER CABLE
NEW TELEPHONE
Exist TELEPHONE
NEW TELEVISION
Exist TELEVISION
NEW FIBER OPTIC
Exist FIBER OPTIC
NEW JOINT OVERHEAD
Exist JOINT OVERHEAD

## SHOWING THE RELOCATION OF EXISTING FACILITIES TO THE NEW LOCATION




## ABANDONED FACILITY



// ABANDON SYMBOL IS THE CELL "ABANDN"

*THERE ARE LINE STYLES FOR ABANDONED UNDERGROUND UTILITIES IN THE CALTRANS LINE STYLE RESOURCE FILE (c+lstyle-SS3.rsc)*

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Vincent Mitchell
No. C85406
Exp. 9-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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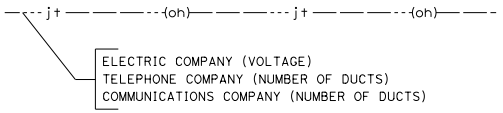
**NOTE:**

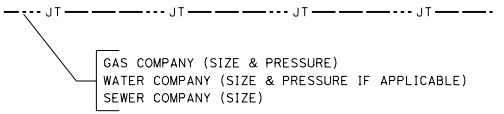
IDENTIFY (LABEL) THE OWNER OF EACH FACILITY PLUS THE SIZE, PRESSURE AND VOLTAGE (IF APPLICABLE) FOR ALL FACILITIES (WHETHER PART OF A JOINT OVERHEAD, JOINT TRENCH OR SOLO INSTALLATION).

THE TYPE OF FACILITY IS IDENTIFIED BY THE SYMBOLOGY OF THE LINE STYLE CHOSEN (SEE LINE STYLES ON THIS STANDARD PLAN SHEET).

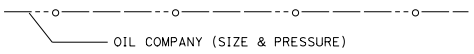
WHEN USING THE JOINT OVERHEAD OR JOINT TRENCH SYMBOLOGY (SEE THE CALTRANS LINE STYLES ON THIS PAGE), USE A BRACKET TO GROUP AND LABEL ALL THE FACILITIES ASSOCIATED WITH THE JOINT OVERHEAD OR TRENCH (SEE THE EXAMPLES BELOW).

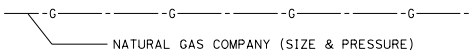
## JOINT OVERHEAD/TRENCH




## SOLO FACILITY




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND
# LINES AND SYMBOLS
# (SHEET 3 OF 5)

NO SCALE

**A10C**

2025 STANDARD PLAN A10C

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Vincent Mitchell
No. C85406
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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## EXISTING UTILITY POINT FEATURES

*THE LEVEL AND COLOR OF AN EXISTING UTILITY POINT FEATURE SYMBOL MATCHES THE UTILITY TYPE LINE STYLE THAT IT IS ASSOCIATED WITH. THE NAME OF THE STANDARD CELLS FOR EACH SYMBOL VARY SLIGHTLY ACCORDING TO THE FACILITY TYPE [e.g., ut-MH-SEWER, ut-MH-GAS]. MULTIPLE VERSIONS OF A PARTICULAR SYMBOL REPRESENTING AN EXISTING UTILITY POINT FEATURE IS USED WHEN EACH IS ASSOCIATED WITH A DIFFERENT FACILITY [e,g., POWER POLE FOR OVERHEAD-ELECTRICAL, TELEPHONE, FIBER OPTIC, JOINT. ETC.]. THIS DIFFERENTIATION FACILITATES ASSET MANAGEMENT OF EXISTING UTILITY FEATURES WITHIN THE CALTRANS RIGHT OF WAY.*

### EXISTING UTILITY CELL SYMBOLOGY REPRESENTING UTILITY POINT FEATURES

ATTRIBUTES (METADATA) FOR UTILITY FEATURES WILL BE LOCATED IN UTILITY DATABASE. ONLY AS-BUILT FACILITIES ARE IN THE UTILITY DATABASE. UTILITY DATABASE DOES NOT INCLUDE NEW FACILITIES TO BE CONSTRUCTED.



CABINET:
ELECTRICAL, FIBER OPTIC, TELECOMMUNICATION, TELEPHONE, TELEVISION



DRAINAGE INLET:
SEWER, STORM DRAIN



FIRE HYDRANT:
WATER



LAMP POST:
ELECTRICAL



METER:
ELECTRICAL, NATURAL GAS, WATER



MANHOLE:
ELECTRICAL, FIBER OPTIC, GAS, JOINT FACILITY, NATURAL GAS, OIL, RECYCLED WATER, SEWER, STEAM, STORM DRAIN, TELECOMMUNICATION, TELEPHONE, TELEVISION, WATER



PULL BOX:
ELECTRICAL, FIBER OPTIC, JOINT FACILITY, TELECOMMUNICATION, TELEPHONE, TELEVISION



POWER POLE:
ELECTRICAL, FIBER OPTIC, JOINT FACILITY, TELECOMMUNICATION, TELEPHONE, TELEVISION



TRANSMISSION TOWER:
ELECTRICAL, FIBER OPTIC, JOINT FACILITY, TELECOMMUNICATION, TELEPHONE, TELEVISION



VALVE:
WATER, NATURAL GAS



VENT:
GAS, NATURAL GAS, SEWER, STEAM



VAULT:
ELECTRICAL, JOINT FACILITY

## POSITIVE LOCATION



POSITIVE LOCATION SYMBOL IDENTIFYING THE POTHOLING NUMBER



POTHOLING SYMBOL MARKING THE EXACT LOCATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND
# LINES AND SYMBOLS
# (SHEET 4 OF 5)

NO SCALE

**A10D**

**2025 STANDARD PLAN A10D**

7

7-1-25

Return to Table of Contents

# TOPOGRAPHIC MAPPING LINES AND SYMBOLS

TOPOGRAPHIC MAPPING IS DROPPED OUT ON FINAL CONTRACT PLANS

- CURB
- LANE STRIPE
- EDGE OF TRAVELED WAY (STATE HIGHWAY)
- EDGE OF TRAVELED WAY (OTHER)
- EDGE OF ASPHALT (SHOULDER)
- CONCRETE
- GUARDRAIL
- MEDIAN BARRIER
- FENCE
- MASONRY WALL
- MASONRY WALL AND FENCE
- RETAINING WALL
- RETAINING WALL AND FENCE
- RETAINING WALL AND MASONRY WALL
- FLOWLINE (NATURAL AND MANMADE)
- EDGE OF BODY OF WATER, SURFACE HATCHED AND SPOT ELEVATION ON SURFACE (73.9)
- DECK, BUILDING, COVERED PORCH OR PARKING (DECK)
- DIRT PILE, ROCK (DP, R)
- POOL, SPA (POOL, P, SPA, S)
- TREES, BRUSH, OR VEGETATION OVER ½ CONTOUR INTERVAL IN HEIGHT
- VINEYARD ROW
- CATTLE GUARD
- OVERHEAD SIGN - SINGLE POST
- OVERHEAD SIGN - TWO POST
- TRAIL
- DIRT ROAD (DIRT)

## SYMBOLS

ENLARGED FOR CLARITY

- LEFT TURN LANE ARROW
- HOV LANE (HIGH OCCUPANCY VEHICLE)
- DROP INLET, ROUND DROP INLET
- MANHOLE
- FIRE HYDRANT
- VALVE COVER, STAND PIPE, WELL, UTILITY BOX, RAILROAD CROSSING STANDARD (VC, SP, WELL, UB, RS)
- UTILITY POLE, POLE AND WIRES, POLE WITH WIRES AND ANCHOR
- TRANSMISSION TOWER
- ELECTROLIER, ELECTROLIER ON POLE
- TRAFFIC SIGNAL, RAILROAD SIGNAL (TS, RS)
- CALL BOX
- SIGNS - SINGLE POST, TWO POSTS
- SINGLE TREE, PALM (P)
- MARSH OR SWAMP
- CRASH CUSHION (CC)
- TANK (TANK, T)
- VOID - OBSTRUCTED AREA, UNABLE TO OBTAIN GROUND INFORMATION PHOTOGRAMMETRICALLY

## RAILROAD

- SCALE: 1" = 100'
- SCALE: 1" = 50', 1" = 20'

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Vincent Mitchell — No. C85406 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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## CONTROL POINTS

- HORIZONTAL AND VERTICAL CONTROL POINT
- HORIZONTAL CONTROL POINT
- VERTICAL CONTROL POINT

## TOPOGRAPHY

- INDEX CONTOUR (180)
- INTERMEDIATE CONTOURS
- INDEX CONTOUR (170) (SCALE: 1" = 50')
- GNV CONTOUR (GROUND NOT VISIBLE)
- DEPRESSION CONTOUR
- GNV DEPRESSION CONTOUR
- SPOT ELEVATION (AT DECIMAL POINT) (657.2)

## WATER WAYS

- RIVERS, STREAMS AND CREEKS - SMALL (ONE LINE)
- RIVERS, STREAMS AND CREEKS - LARGE (TWO LINES) (WHICH DEFINES THE WATER EDGE)
- OCEAN - (GRADUATED LINE WEIGHTS) (Land, Ocean)
- WATER EDGE, LAKE, POND, SWAMP

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND LINES AND SYMBOLS (SHEET 5 OF 5)

NO SCALE

A10E

2025 STANDARD PLAN A10E

8

7-1-25

Return to Table of Contents

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2022)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Chris A. Risden
CERTIFIED ENGINEERING GEOLOGIST

September 19, 2025
PLANS APPROVAL DATE

REGISTERED GEOLOGIST — Chris A. Risden — CERTIFIED ENGINEERING GEOLOGIST — No. 2541 Exp. 9-30-25 — STATE OF CALIFORNIA

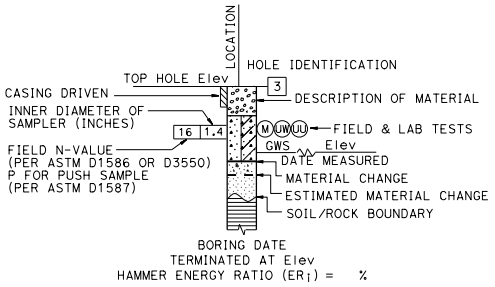
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| CEMENTATION | |
|---|---|
| DESCRIPTION | CRITERIA |
| WEAK | CRUMBLES OR BREAKS WITH HANDLING OR LITTLE FINGER PRESSURE. |
| MODERATE | CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE. |
| STRONG | WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE. |

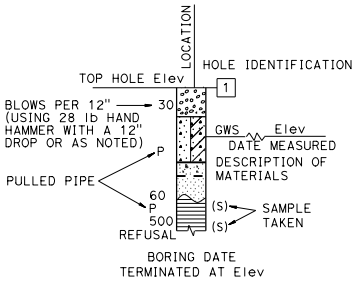
ABBREVIATION:
GWS - GROUND WATER SURFACE

| BOREHOLE IDENTIFICATION | | |
|---|---|---|
| SYMBOL | HOLE TYPE | DESCRIPTION |
| Size | A | AUGER BORING (HOLLOW OR SOLID STEM BUCKET) |
| Size | R | ROTARY DRILLED BORING (CONVENTIONAL) |
| Size | RW | ROTARY DRILLED WITH SELF-CASING WIRE-LINE |
| | RC | ROTARY CORE WITH CONTINUOUSLY-SAMPLED, SELF-CASING WIRE-LINE |
| | P | ROTARY PERCUSSION BORING (AIR) |
| Size | R | ROTARY DRILLED DIAMOND CORE |
| | RC | ROTARY DRILLED DIAMOND CORE, CONTINUOUSLY SAMPLED |
| Size | HD | HAND DRIVEN (1-INCH SOIL TUBE) |
| | HA | HAND AUGER |
| ● | D | DYNAMIC CONE PENETRATION BORING |
| ▲ | CPT | CONE PENETRATION TEST (ASTM D5778) |
| | O | OTHER (NOTE ON LOTB) |
| NOTE: SIZE IN INCHES. | | |

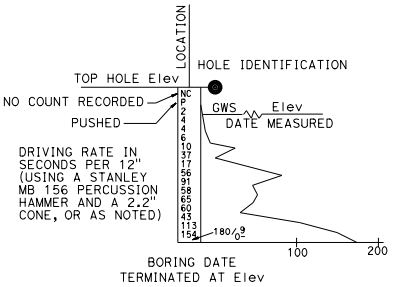
| CONSISTENCY OF COHESIVE SOILS | | | | |
|---|---|---|---|---|
| DESCRIPTION | SHEAR STRENGTH (tsf) | POCKET PENETROMETER MEASUREMENT, PP, (tsf) | TORVANE MEASUREMENT, TV, (tsf) | VANE SHEAR MEASUREMENT, VS, (tsf) |
| VERY SOFT | LESS THAN 0.12 | LESS THAN 0.25 | LESS THAN 0.12 | LESS THAN 0.12 |
| SOFT | 0.12 - 0.25 | 0.25 - 0.5 | 0.12 - 0.25 | 0.12 - 0.25 |
| MEDIUM STIFF | 0.25 - 0.5 | 0.5 - 1 | 0.25 - 0.5 | 0.25 - 0.5 |
| STIFF | 0.5 - 1 | 1 - 2 | 0.5 - 1 | 0.5 - 1 |
| VERY STIFF | 1 - 2 | 2 - 4 | 1 - 2 | 1 - 2 |
| HARD | GREATER THAN 2 | GREATER THAN 4 | GREATER THAN 2 | GREATER THAN 2 |



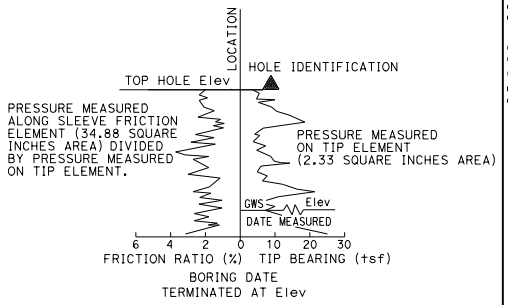

ROTARY BORING




HAND BORING




DYNAMIC CONE PENETRATION BORING




CONE PENETRATION TEST (CPT) BORING

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND - SOIL (SHEET 1 OF 2)

NO SCALE

A10F

7-1-25

2025 STANDARD PLAN A10F



Return to Table of Contents

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2022)

## GROUP SYMBOLS AND NAMES

| GRAPHIC/SYMBOL | GROUP NAMES | GRAPHIC/SYMBOL | GROUP NAMES |
|---|---|---|---|
| GW | WELL-GRADED GRAVEL<br>WELL-GRADED GRAVEL WITH SAND | CL | LEAN CLAY<br>LEAN CLAY WITH SAND<br>LEAN CLAY WITH GRAVEL<br>SANDY LEAN CLAY<br>SANDY LEAN CLAY WITH GRAVEL<br>GRAVELLY LEAN CLAY<br>GRAVELLY LEAN CLAY WITH SAND |
| GP | POORLY-GRADED GRAVEL<br>POORLY-GRADED GRAVEL WITH SAND | | |
| GW-GM | WELL-GRADED GRAVEL WITH SILT<br>WELL-GRADED GRAVEL WITH SILT AND SAND | CL-ML | SILTY CLAY<br>SILTY CLAY WITH SAND<br>SILTY CLAY WITH GRAVEL<br>SANDY SILTY CLAY<br>SANDY SILTY CLAY WITH GRAVEL<br>GRAVELLY SILTY CLAY<br>GRAVELLY SILTY CLAY WITH SAND |
| GW-GC | WELL-GRADED GRAVEL WITH CLAY (OR SILTY CLAY)<br>WELL-GRADED GRAVEL WITH CLAY AND SAND (OR SILTY CLAY AND SAND) | | |
| GP-GM | POORLY-GRADED GRAVEL WITH SILT<br>POORLY-GRADED GRAVEL WITH SILT AND SAND | ML | SILT<br>SILT WITH SAND<br>SILT WITH GRAVEL<br>SANDY SILT<br>SANDY SILT WITH GRAVEL<br>GRAVELLY SILT<br>GRAVELLY SILT WITH SAND |
| GP-GC | POORLY-GRADED GRAVEL WITH CLAY (OR SILTY CLAY)<br>POORLY-GRADED GRAVEL WITH CLAY AND SAND (OR SILTY CLAY AND SAND) | | |
| GM | SILTY GRAVEL<br>SILTY GRAVEL WITH SAND | OL | ORGANIC LEAN CLAY<br>ORGANIC LEAN CLAY WITH SAND<br>ORGANIC LEAN CLAY WITH GRAVEL<br>SANDY ORGANIC LEAN CLAY<br>SANDY ORGANIC LEAN CLAY WITH GRAVEL<br>GRAVELLY ORGANIC LEAN CLAY<br>GRAVELLY ORGANIC LEAN CLAY WITH SAND |
| GC | CLAYEY GRAVEL<br>CLAYEY GRAVEL WITH SAND | | |
| GC-GM | SILTY, CLAYEY GRAVEL<br>SILTY, CLAYEY GRAVEL WITH SAND | OL | ORGANIC SILT<br>ORGANIC SILT WITH SAND<br>ORGANIC SILT WITH GRAVEL<br>SANDY ORGANIC SILT<br>SANDY ORGANIC SILT WITH GRAVEL<br>GRAVELLY ORGANIC SILT<br>GRAVELLY ORGANIC SILT WITH SAND |
| SW | WELL-GRADED SAND<br>WELL-GRADED SAND WITH GRAVEL | | |
| SP | POORLY-GRADED SAND<br>POORLY-GRADED SAND WITH GRAVEL | CH | FAT CLAY<br>FAT CLAY WITH SAND<br>FAT CLAY WITH GRAVEL<br>SANDY FAT CLAY<br>SANDY FAT CLAY WITH GRAVEL<br>GRAVELLY FAT CLAY<br>GRAVELLY FAT CLAY WITH SAND |
| SW-SM | WELL-GRADED SAND WITH SILT<br>WELL-GRADED SAND WITH SILT AND GRAVEL | | |
| SW-SC | WELL-GRADED SAND WITH CLAY (OR SILTY CLAY)<br>WELL-GRADED SAND WITH CLAY AND GRAVEL (OR SILTY CLAY AND GRAVEL) | MH | ELASTIC SILT<br>ELASTIC SILT WITH SAND<br>ELASTIC SILT WITH GRAVEL<br>SANDY ELASTIC SILT<br>SANDY ELASTIC SILT WITH GRAVEL<br>GRAVELLY ELASTIC SILT<br>GRAVELLY ELASTIC SILT WITH SAND |
| SP-SM | POORLY-GRADED SAND WITH SILT<br>POORLY-GRADED SAND WITH SILT AND GRAVEL | | |
| SP-SC | POORLY-GRADED SAND WITH CLAY (OR SILTY CLAY)<br>POORLY-GRADED SAND WITH CLAY AND GRAVEL (OR SILTY CLAY AND GRAVEL) | OH | ORGANIC FAT CLAY<br>ORGANIC FAT CLAY WITH SAND<br>ORGANIC FAT CLAY WITH GRAVEL<br>SANDY ORGANIC FAT CLAY<br>SANDY ORGANIC FAT CLAY WITH GRAVEL<br>GRAVELLY ORGANIC FAT CLAY<br>GRAVELLY ORGANIC FAT CLAY WITH SAND |
| SM | SILTY SAND<br>SILTY SAND WITH GRAVEL | | |
| SC | CLAYEY SAND<br>CLAYEY SAND WITH GRAVEL | OH | ORGANIC ELASTIC SILT<br>ORGANIC ELASTIC SILT WITH SAND<br>ORGANIC ELASTIC SILT WITH GRAVEL<br>SANDY ORGANIC ELASTIC SILT<br>SANDY ORGANIC ELASTIC SILT WITH GRAVEL<br>GRAVELLY ORGANIC ELASTIC SILT<br>GRAVELLY ORGANIC ELASTIC SILT WITH SAND |
| SC-SM | SILTY, CLAYEY SAND<br>SILTY, CLAYEY SAND WITH GRAVEL | | |
| PT | PEAT | OL/OH | ORGANIC SOIL<br>ORGANIC SOIL WITH SAND<br>ORGANIC SOIL WITH GRAVEL<br>SANDY ORGANIC SOIL<br>SANDY ORGANIC SOIL WITH GRAVEL<br>GRAVELLY ORGANIC SOIL<br>GRAVELLY ORGANIC SOIL WITH SAND |
| | COBBLES<br>COBBLES AND BOULDERS<br>BOULDERS | | |

## FIELD AND LABORATORY TESTING

- (C) CONSOLIDATION
- (CR) CORROSIVITY TESTING
- (CU) CONSOLIDATED UNDRAINED TRIAXIAL
- (DS) DIRECT SHEAR
- (EI) EXPANSION INDEX
- (HC) HYDRAULIC CONDUCTIVITY
- (OC) ORGANIC CONTENT-%
- (PA) PARTICLE SIZE ANALYSIS
- (PI) PLASTICITY INDEX<br>LIQUID LIMIT
- (PL) POINT LOAD INDEX
- (UC) UNCONFINED COMPRESSION - SOIL<br>UNCONFINED COMPRESSION - ROCK
- (UU) UNCONSOLIDATED UNDRAINED TRIAXIAL
- (W) 200 SIEVE TEST

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

CERTIFIED ENGINEERING GEOLOGIST

REGISTERED GEOLOGIST
Chris A. Risden
CERTIFIED ENGINEERING GEOLOGIST
No. 2541
Exp. 9-30-25
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

## APPARENT DENSITY OF COHESIONLESS SOILS

| DESCRIPTION | SPT $N_{60}$ (BLOWS/12 INCHES) |
|---|---|
| VERY LOOSE | 0 - 5 |
| LOOSE | 5 - 10 |
| MEDIUM DENSE | 10 - 30 |
| DENSE | 30 - 50 |
| VERY DENSE | GREATER THAN 50 |

## MOISTURE

| DESCRIPTION | CRITERIA |
|---|---|
| DRY | NO DISCERNABLE MOISTURE |
| MOIST | MOISTURE PRESENT, BUT NO FREE WATER |
| WET | VISIBLE FREE WATER |

## PERCENT OR PROPORTION OF SOILS

| DESCRIPTION | CRITERIA |
|---|---|
| TRACE | PARTICLES ARE PRESENT BUT ESTIMATED TO BE LESS THAN 5% |
| FEW | 5% - 10% |
| LITTLE | 15% - 25% |
| SOME | 30% - 45% |
| MOSTLY | 50% - 100% |

## PARTICLE SIZE

| DESCRIPTION | | SIZE |
|---|---|---|
| BOULDER | | GREATER THAN 12" |
| COBBLE | | 3" - 12" |
| GRAVEL | COARSE | 3/4" - 3" |
| | FINE | 1/5" - 3/4" |
| SAND | COARSE | 1/16" - 1/5" |
| | MEDIUM | 1/64" - 1/16" |
| | FINE | 1/300" - 1/64" |
| SILT AND CLAY | | LESS THAN 1/300" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND - SOIL (SHEET 2 OF 2)

NO SCALE

A10G

2025 STANDARD PLAN A10G

7-1-25



Return to Table of Contents

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2022)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

CERTIFIED ENGINEERING GEOLOGIST

September 19, 2025
PLANS APPROVAL DATE

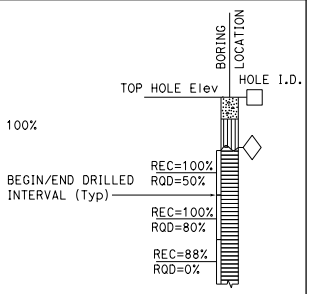
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED GEOLOGIST — Chris A. Risden — CERTIFIED ENGINEERING GEOLOGIST — No. 2541 Exp. 9-30-25 — STATE OF CALIFORNIA

## PERCENT CORE RECOVERY (REC) & ROCK QUALITY DESIGNATION (RQD)

$$REC = \frac{\sum \text{LENGTH OF THE RECOVERED CORE PIECES (INCHES)}}{\text{TOTAL LENGTH OF CORE RUN (INCHES)}} \times 100\%$$

$$RQD = \frac{\sum \text{LENGTH OF INTACT CORE PIECES} \geq 4 \text{ INCHES}}{\text{TOTAL LENGTH OF CORE RUN (INCHES)}} \times 100\%$$




RQD * INDICATES SOUDNESS CRITERIA NOT MET.

## BEDDING SPACING

| DESCRIPTION | THICKNESS/SPACING |
|---|---|
| MASSIVE | GREATER THAN 10′ |
| VERY THICKLY BEDDED | 3′ - 10′ |
| THICKLY BEDDED | 1′ - 3′ |
| MODERATELY BEDDED | 4" - 1′ |
| THINLY BEDDED | 1" - 4" |
| VERY THINLY BEDDED | 1/4" - 1" |
| LAMINATED | LESS THAN 1/4" |

## LEGEND OF ROCK MATERIALS

IGNEOUS ROCK
SEDIMENTARY ROCK
METAMORPHIC ROCK

## ROCK HARDNESS

| DESCRIPTION | CRITERIA |
|---|---|
| EXTREMELY HARD | CANNOT BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK. CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS. |
| VERY HARD | CANNOT BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK. BREAKS WITH REPEATED HEAVY HAMMER BLOWS. |
| HARD | CAN BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE). BREAKS WITH HEAVY HAMMER BLOWS. |
| MODERATELY HARD | CAN BE SCRATCHED WITH POCKETKNIFE OR SHARP PICK WITH LIGHT OR MODERATE PRESSURE. BREAKS WITH MODERATE HAMMER BLOWS. |
| MODERATELY SOFT | CAN BE GROOVED 1/16" DEEP WITH A POCKETKNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE. BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE. |
| SOFT | CAN BE GROOVED OR GOUGED EASILY BY A POCKETKNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL. BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE. |
| VERY SOFT | CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH A POCKETKNIFE. BREAKS WITH LIGHT MANUAL PRESSURE. |

## FRACTURE DENSITY

| DESCRIPTION | OBSERVED FRACTURE DENSITY |
|---|---|
| UNFRACTURED | NO FRACTURES. |
| VERY SLIGHTLY FRACTURED | CORE LENGTHS GREATER THAN 3 ft. |
| SLIGHTLY FRACTURED | CORE LENGTHS MOSTLY FROM 1 TO 3 ft. |
| MODERATELY FRACTURED | CORE LENGTHS MOSTLY FROM 4 INCHES TO 1 ft. |
| INTENSELY FRACTURED | CORE LENGTHS MOSTLY FROM 1 TO 4 INCHES. |
| VERY INTENSELY FRACTURED | MOSTLY CHIPS AND FRAGMENTS. |

## WEATHERING DESCRIPTORS FOR INTACT ROCK

| DESCRIPTION | DIAGNOSTIC FEATURES | | | | | GENERAL CHARACTERISTICS |
|---|---|---|---|---|---|---|
| | CHEMICAL WEATHERING-DISCOLORATION AND/OR OXIDATION | | MECHANICAL WEATHERING-GRAIN BOUNDARY CONDITIONS (DISAGGREGATION) PRIMARILY FOR GRANITICS AND SOME COARSE-GRAINED SEDIMENTS | TEXTURE AND LEACHING | | |
| | BODY OF ROCK | FRACTURE SURFACES | | TEXTURE | LEACHING | |
| FRESH | NO DISCOLORATION, NOT OXIDIZED. | NO DISCOLORATION OR OXIDATION. | NO SEPARATION, INTACT (TIGHT). | NO CHANGE | NO LEACHING | HAMMER RINGS WHEN CRYSTALLINE ROCKS ARE STRUCK. |
| SLIGHTLY WEATHERED | DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES; SOME FELDSPAR CRYSTALS ARE DULL. | MINOR TO COMPLETE DISCOLORATION OR OXIDATION OF MOST SURFACES. | NO VISIBLE SEPARATION, INTACT (TIGHT). | PRESERVED | MINOR LEACHING OF SOME SOLUBLE MINERALS. | HAMMER RINGS WHEN CRYSTALLINE ROCKS ARE STRUCK. BODY OF ROCK NOT WEAKENED. |
| MODERATELY WEATHERED | DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY," FELDSPAR CRYSTALS ARE "CLOUDY." | ALL FRACTURE SURFACES ARE DISCOLORED OR OXIDIZED. | PARTIAL SEPARATION OF BOUNDARIES VISIBLE. | GENERALLY PRESERVED | SOLUBLE MINERALS MAY BE MOSTLY LEACHED. | HAMMER DOES NOT RING WHEN ROCK IS STRUCK. BODY OF ROCK IS SLIGHTLY WEAKENED. |
| INTENSELY WEATHERED | DISCOLORATION OR OXIDATION THROUGHOUT; ALL FELDSPARS AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT; OR CHEMICAL ALTERATION PRODUCES IN-SITU DISAGGREGATION, SEE GRAIN BOUNDARY CONDITIONS. | ALL FRACTURE SURFACES ARE DISCOLORED OR OXIDIZED, SURFACES FRIABLE. | PARTIAL SEPARATION, ROCK IS FRIABLE; IN SEMIARID CONDITIONS GRANITICS ARE DISAGGREGATED. | TEXTURE ALTERED BY CHEMICAL DISINTEGRATION (HYDRATION, ARGILLATION). | LEACHING OF SOLUBLE MINERALS MAY BE COMPLETE. | DULL SOUND WHEN STRUCK WITH HAMMER, USUALLY CAN BE BROKEN WITH MODERATE TO HEAVY MANUAL PRESSURE OR BY LIGHT HAMMER BLOW WITHOUT REFERENCE TO PLANES OF WEAKNESS SUCH AS INCIPIENT OR HAIRLINE FRACTURES, OR VEINLETS. ROCK IS SIGNIFICANTLY WEAKENED. |
| DECOMPOSED | DISCOLORED OR OXIDIZED THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; ALL FELDSPARS AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY. | | COMPLETE SEPARATION OF GRAIN BOUNDARIES (DISAGGREGATED). | RESEMBLES A SOIL, PARTIAL OR COMPLETE REMNANT ROCK STRUCTURE MAY BE PRESERVED; LEACHING OF SOLUBLE MINERALS USUALLY COMPLETE. | | CAN BE GRANULATED BY HAND. RESISTANT MINERALS SUCH AS QUARTZ MAY BE PRESENT AS "STRINGERS" OR "DIKES." |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LEGEND - ROCK

NO SCALE

A10H

7-1-25

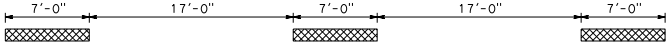
2025 STANDARD PLAN A10H

11

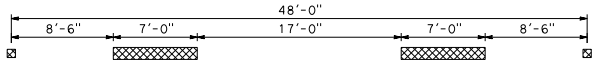
Return to Table of Contents

## CENTERLINES
(2 LANE HIGHWAYS)

DETAIL 1



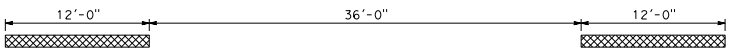

DETAIL 2



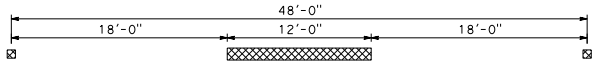

~~DETAIL 3~~ DETAIL 3 DELETED

~~DETAIL 4~~ DETAIL 4 DELETED

DETAIL 5



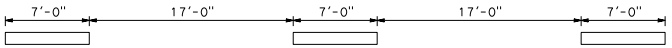

DETAIL 6



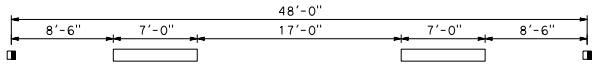

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## LANE LINES
(MULTILANE HIGHWAYS)

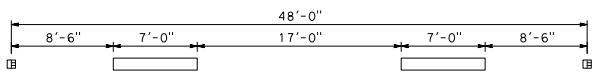
DETAIL 8




DETAIL 9

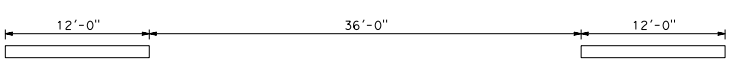



DETAIL 9A

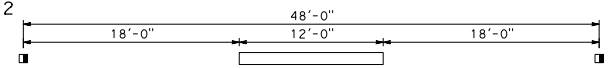



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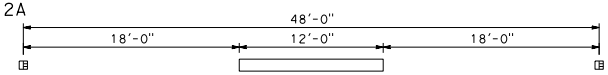
DETAIL 11




DETAIL 12



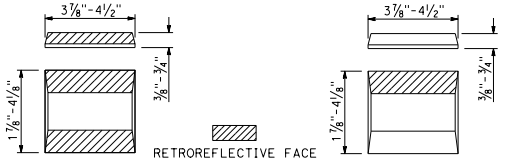

DETAIL 12A




~~DETAIL 13~~ DETAIL 13 DELETED

~~DETAIL 14~~ DETAIL 14 DELETED

~~DETAIL 14A~~ DETAIL 14A DELETED




| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

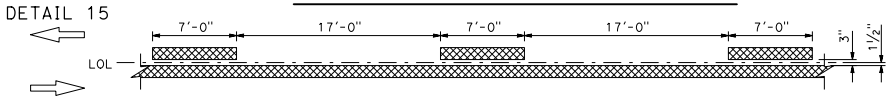
REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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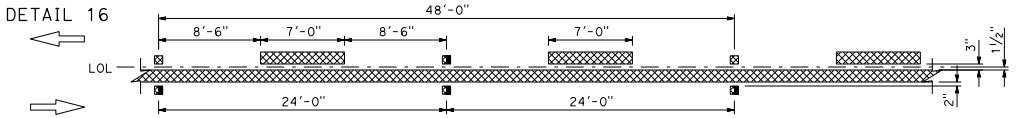
## MARKER DETAILS

### NO PASSING ZONES - ONE DIRECTION

DETAIL 15

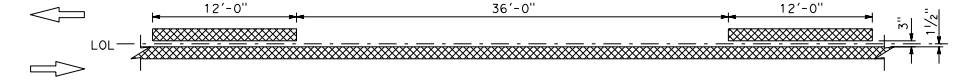



DETAIL 16

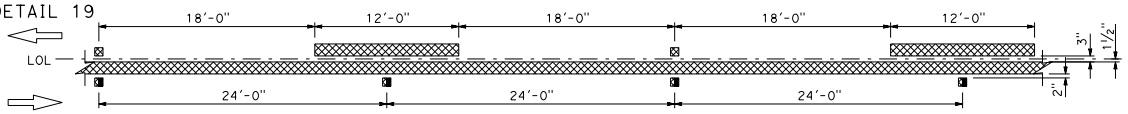



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DETAIL 18



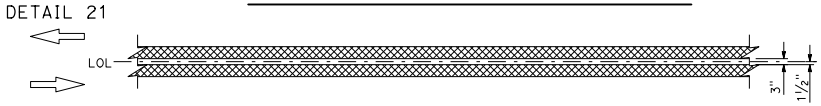

DETAIL 19



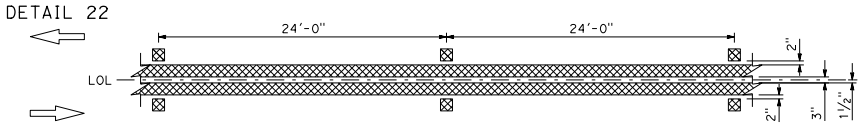

~~DETAIL 20~~ DETAIL 20 DELETED

### NO PASSING ZONES - TWO DIRECTION

DETAIL 21




DETAIL 22




~~DETAIL 23~~ DETAIL 23 DELETED

LEGEND:

- TYPE C RED-CLEAR RETROREFLECTIVE MARKER
- TYPE D TWO-WAY YELLOW RETROREFLECTIVE MARKER
- TYPE G ONE-WAY CLEAR RETROREFLECTIVE MARKER
- TYPE H ONE-WAY YELLOW RETROREFLECTIVE MARKER
- 6" WHITE LINE
- 6" YELLOW LINE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

A20A

7-1-25

2025 STANDARD PLAN A20A

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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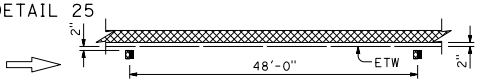
## LEFT EDGE LINES

(DIVIDED HIGHWAYS)
See Note

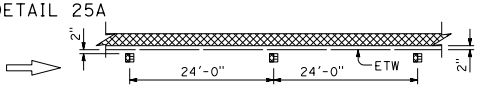
DETAIL 24



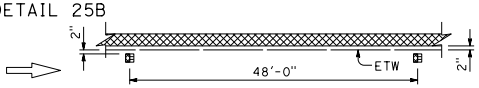

DETAIL 25



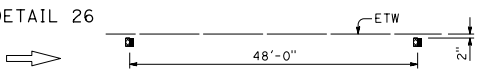

DETAIL 25A



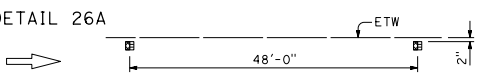

DETAIL 25B



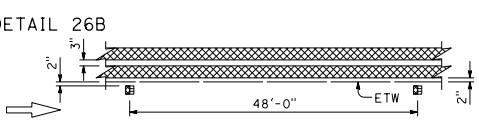

DETAIL 26



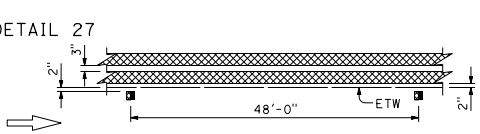

DETAIL 26A




DETAIL 26B



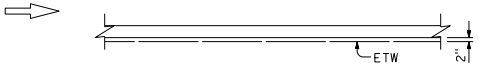

DETAIL 27




## RIGHT EDGE LINES

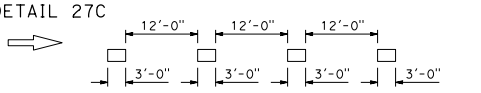
~~DETAIL 27A~~ DETAIL 27A DELETED

DETAIL 27B




## RIGHT EDGE LINE EXTENSION THROUGH INTERSECTIONS

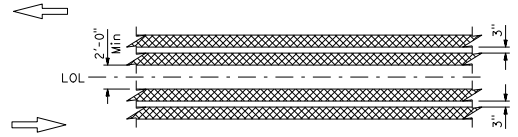
DETAIL 27C



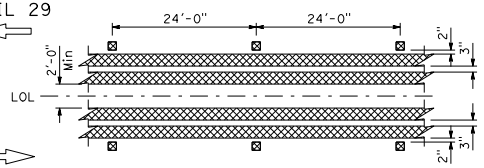

LEFT EDGE LINES NOTE:
On freeways use traffic stripe details with Type RY markers.

## MEDIAN ISLANDS

DETAIL 28



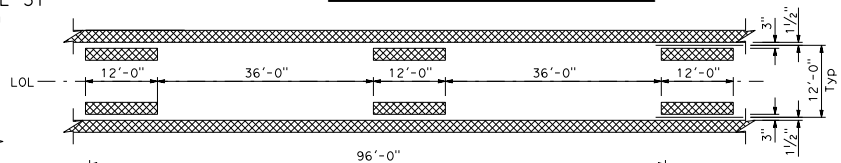

DETAIL 29



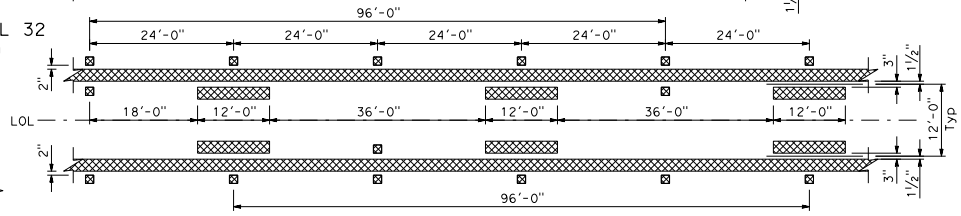

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## TWO-WAY LEFT TURN LANES

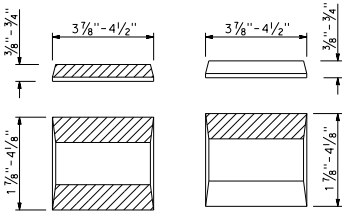
DETAIL 31




DETAIL 32



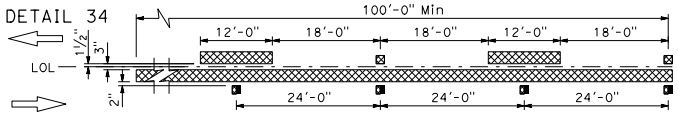

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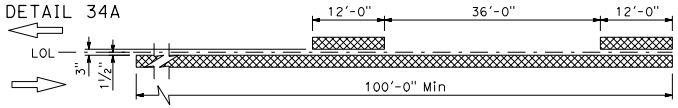

MARKER DETAILS

## INTERSECTION TREATMENTS

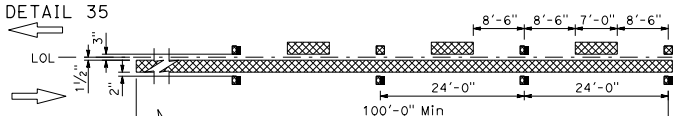
DETAIL 34



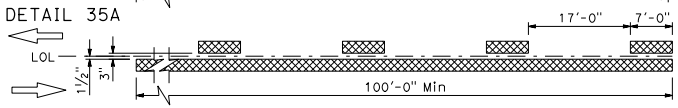

DETAIL 34A



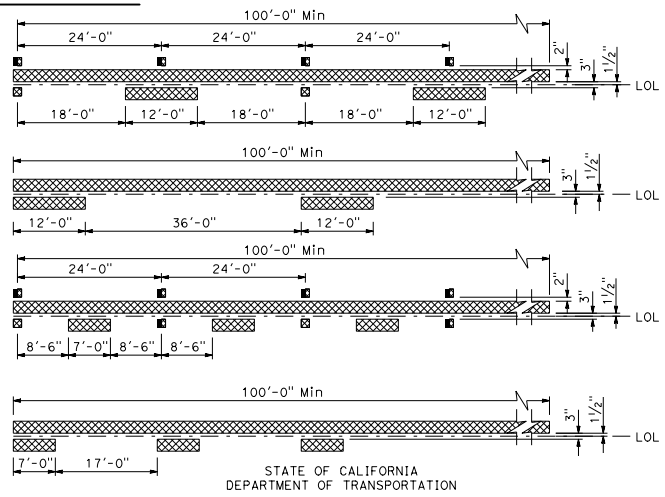

DETAIL 35




DETAIL 35A




CENTERLINE INTERSECTING STREET




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

LEGEND:

- TYPE D TWO-WAY YELLOW RETROREFLECTIVE MARKER
- TYPE H ONE-WAY YELLOW RETROREFLECTIVE MARKER
- TYPE RY RED-YELLOW RETROREFLECTIVE MARKER
- 6" WHITE
- 6" YELLOW

# PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

**A20B**

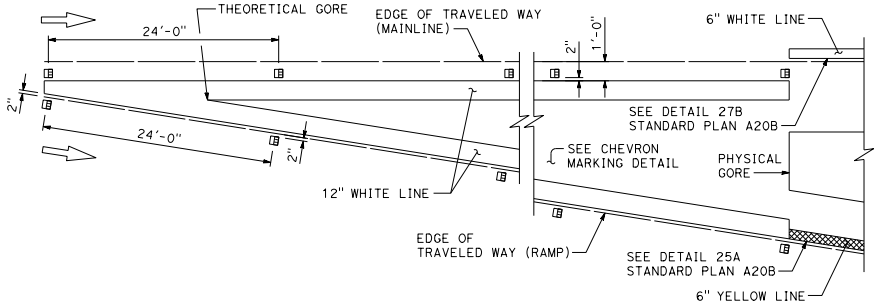
7-1-25

2025 STANDARD PLAN A20B

Return to Table of Contents

## EXIT RAMP NEUTRAL AREA (GORE) TREATMENT

DETAIL 36




NOTES:

1. Install a minimum of 1 chevron in the gore area. If at least 1 chevron will not fit into the gore area, do not install chevrons.
2. Terminate chevron markings at physical gore.
3. Gore area chevron pavement markings shown. For exit and entrance ramp channelizing lines details, see Details 36, 36A, and 36B.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

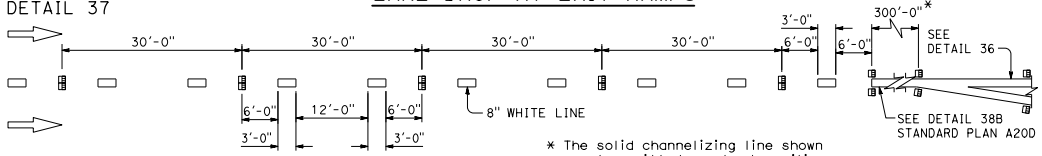
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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## LANE DROP AT EXIT RAMPS

DETAIL 37

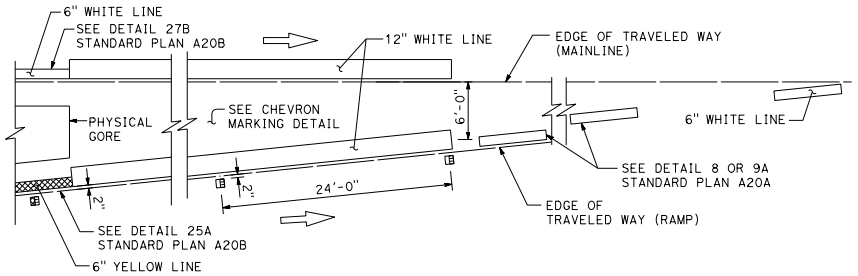



* The solid channelizing line shown may be omitted on short auxiliary lanes where weaving length is critical.

~~DETAIL 37A~~ DETAIL 37A DELETED

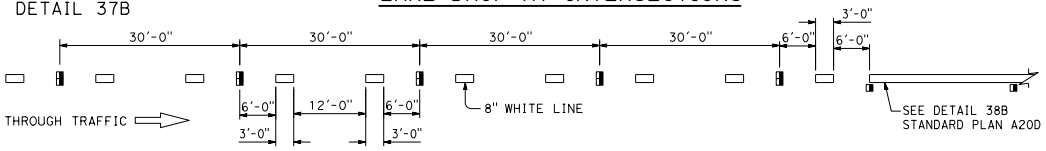
## ENTRANCE RAMP NEUTRAL AREA (MERGE) TREATMENT

DETAIL 36A




## LANE DROP AT INTERSECTIONS

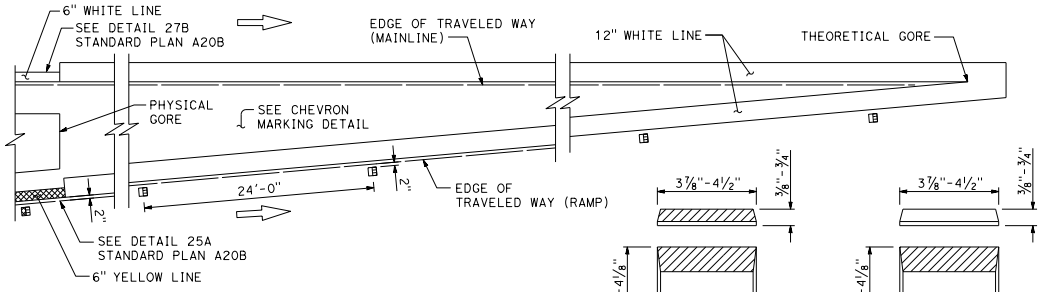
DETAIL 37B




~~DETAIL 37C~~ DETAIL 37C DELETED

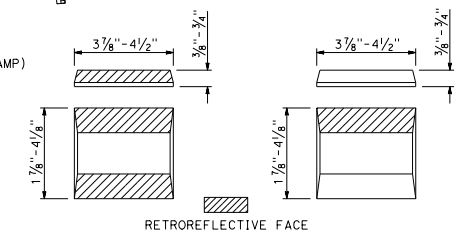
## ENTRANCE RAMP NEUTRAL AREA (ACCELERATION LANE) TREATMENT

DETAIL 36B




LEGEND:

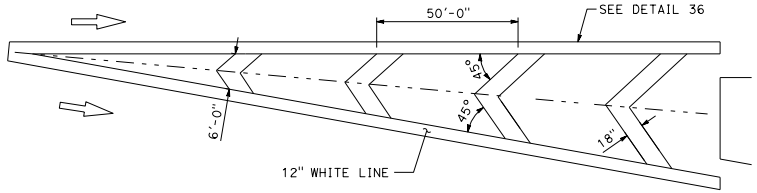
- TYPE C RED-CLEAR RETROREFLECTIVE MARKER
- TYPE G ONE-WAY CLEAR RETROREFLECTIVE MARKER
- TYPE RY RED-YELLOW RETROREFLECTIVE MARKER



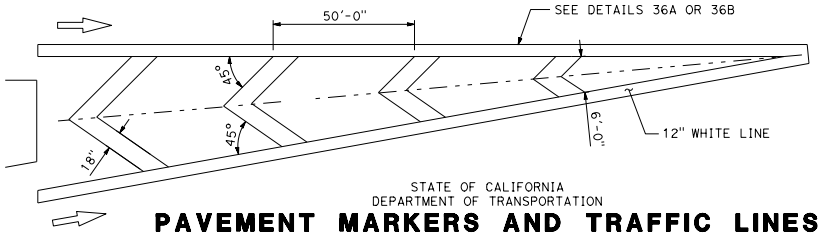

TYPE C AND TYPE RY TYPE G

MARKER DETAILS

## CHEVRON PAVEMENT MARKINGS AT EXIT RAMP GORE AREA




## CHEVRON PAVEMENT MARKINGS AT ENTRANCE RAMP GORE AREA




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

A20C

2025 STANDARD PLAN A20C

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

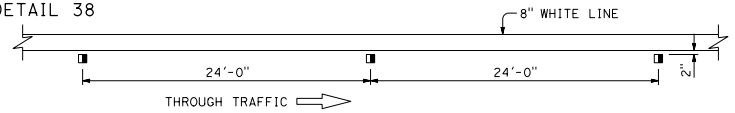
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

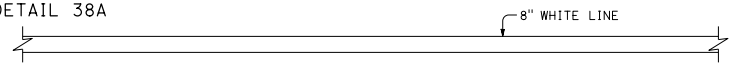
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

## CHANNELIZING LINE

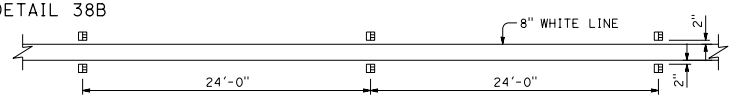
DETAIL 38




DETAIL 38A

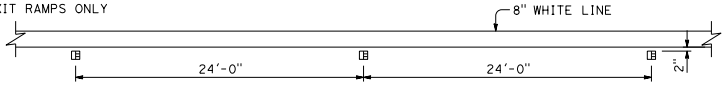


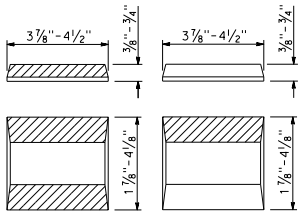

DETAIL 38B




~~DETAIL 38C~~ DETAIL 38C DELETED

DETAIL 38D
EXIT RAMPS ONLY




MARKER DETAILS

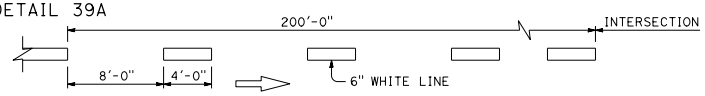
## BIKE LANE LINE

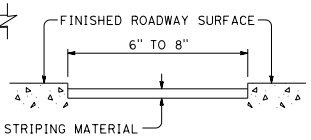
DETAIL 39




INTERSECTION LINE
BIKE LANE

DETAIL 39A




DETAIL FOR RECESSED TRAFFIC STRIPE
See Notes A and B

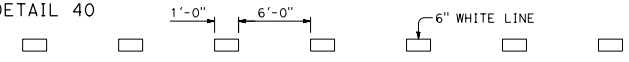
RECESSED NOTES:

A. See typical traffic line details for pavement marking patterns.

B. See Standard Specifications for recess depth and recess striping material thickness.

## LANE LINE EXTENSIONS THROUGH INTERSECTIONS

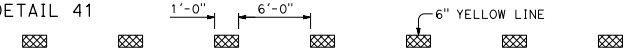
DETAIL 40




~~DETAIL 40A~~ DETAIL 40A DELETED

## CENTERLINE EXTENSIONS THROUGH INTERSECTIONS

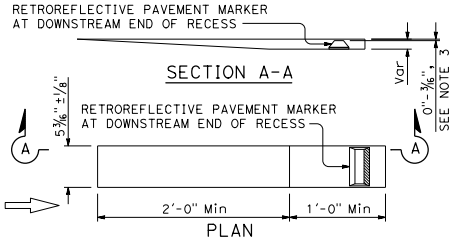
DETAIL 41

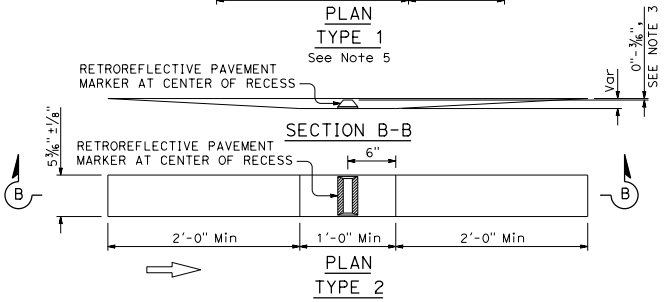



~~DETAIL 41A~~ DETAIL 41A DELETED

LEGEND:

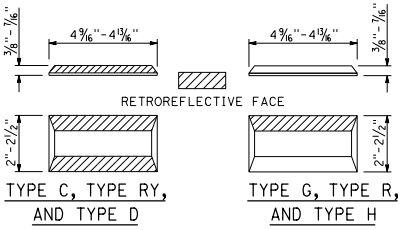
- TYPE C RED-CLEAR RETROREFLECTIVE MARKER
- TYPE G ONE-WAY CLEAR RETROREFLECTIVE MARKER
- 6" YELLOW LINE




## RECESS DETAIL FOR RETROREFLECTIVE PAVEMENT MARKER

See Note 4




RETROREFLECTIVE PAVEMENT MARKER FOR RECESSED INSTALLATION
See Notes 1 and 2

RECESSED MARKER NOTES:

1. See typical traffic line details for marker patterns to be used with recessed pavement markers.
2. The retroreflective pavement markers shown for recessed installations are not to be used for non-recessed installations.
3. The top of pavement markers installed in recesses shall be 0" to 3/16" below the pavement surface.
4. Use Type 1 recess for pavement markers with one-way retroreflective face. Use Type 2 recess for pavement markers with two-way retroreflective face.
5. For exit ramps, use Type 1 recess for Type R markers with one-way retroreflective face. Reverse the orientation of the recess and place the marker at the upstream end of the recess.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

A20D

2025 STANDARD PLAN A20D

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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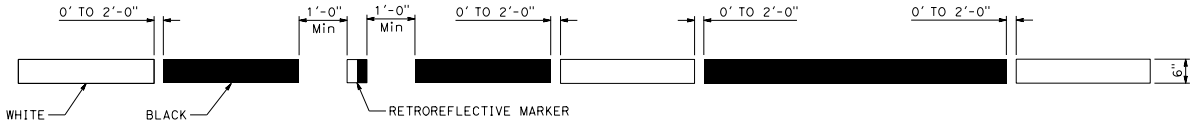

TYPICAL DOUBLE STRIPE CONTRAST DETAIL

NOTES:

1. See Standard Plans A20A, A20B, A20C, A20D and A20F for traffic lines typical details.
2. Detail 9 Traffic stripe shown. See project plans for traffic stripe details.




OPTION 1
TYPICAL LANE LINE OR RIGHT EDGE LINE CONTRAST DETAIL




OPTION 2
TYPICAL LANE LINE CONTRAST DETAIL
See Note 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC LINES TYPICAL DETAILS FOR CONTRAST STRIPING

NO SCALE

A20E

7-1-25

2025 STANDARD PLAN A20E



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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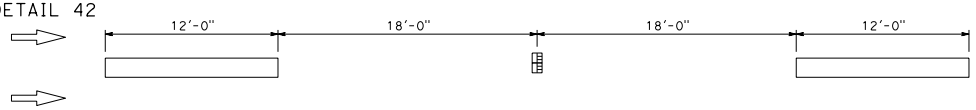
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Malik Rehman
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# PREFERENTIAL LANE LINES

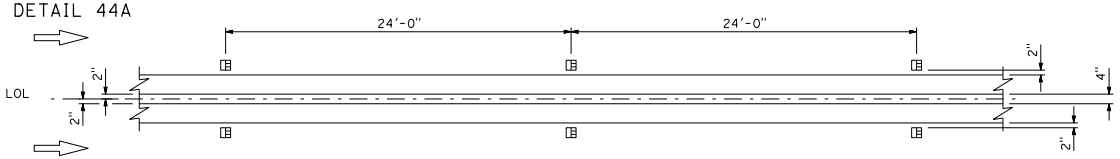
DETAIL 42



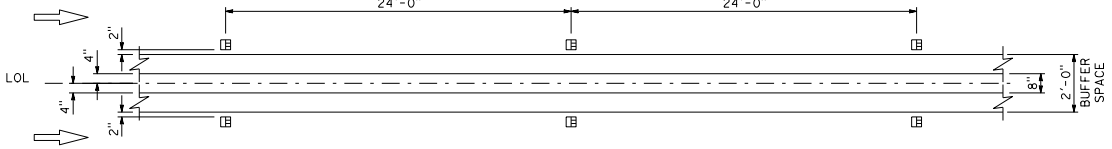

~~DETAIL 43~~ DETAIL 43 DELETED

~~DETAIL 43A~~ DETAIL 43A DELETED

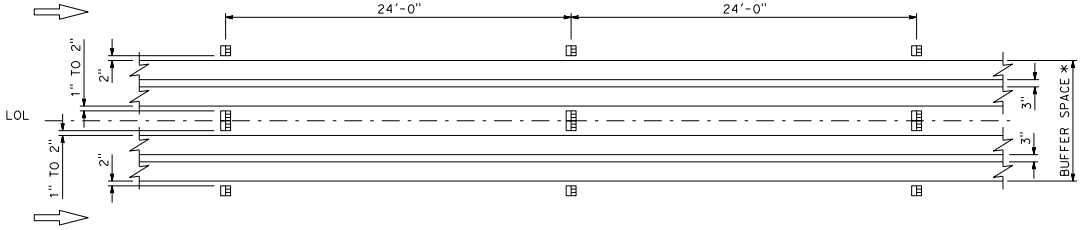
DETAIL 44A




DETAIL 44B




DETAIL 45

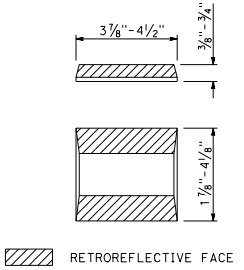



* See pavement delineation plan for dimension.

LEGEND:

TYPE C RED-CLEAR RETROREFLECTIVE MARKER

8" WHITE LINE




TYPE C

MARKER DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

A20F

7-1-25

2025 STANDARD PLAN A20F

17

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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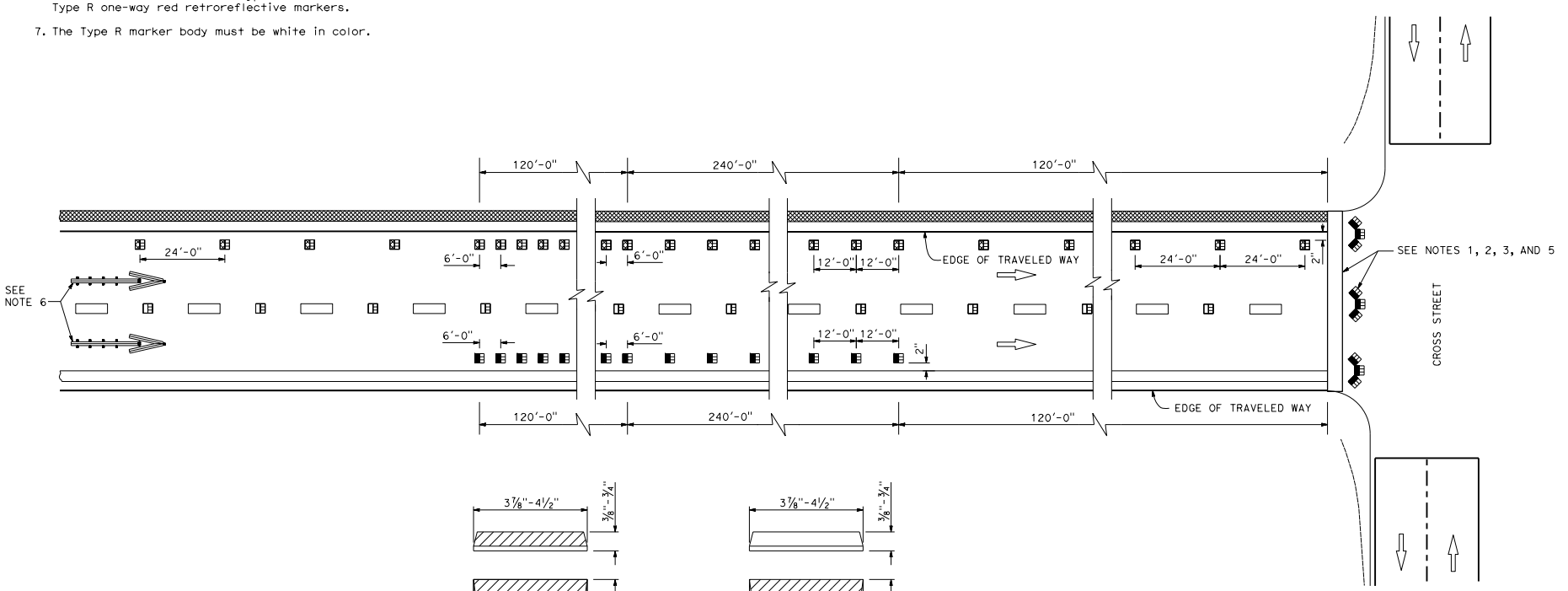
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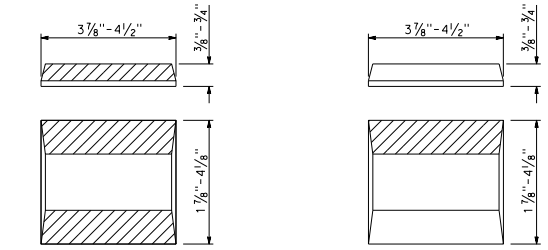
1. May be a limit line or crosswalk.
2. See Standard Plans A24F and A24G for crosswalk and pavement marker details.
3. For raised markers, place Type R one-way red retroreflective markers on outermost limit line or crosswalk line with red facing the intersection. For recessed markers, place Type R one-way retroreflective markers with red facing the intersection and as shown on Standard Plan A24G.
4. The distances and marker spacings may be adjusted based on site specific conditions, exit ramp geometry, or loop detectors.
5. See Standard Plan A20D for recess details.
6. See Standard Plan A24G for Type V arrow detail with Type R one-way red retroreflective markers.
7. The Type R marker body must be white in color.

LEGEND:

MARKERS

- TYPE C TWO-WAY RED-CLEAR RETROREFLECTIVE MARKER
- TYPE RY TWO-WAY RED-YELLOW RETROREFLECTIVE MARKER
- TYPE R ONE-WAY RED RETROREFLECTIVE MARKER
- 6" WHITE LINE
- 6" YELLOW LINE




MARKER DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXIT RAMP WITH ENHANCED PAVEMENT MARKERS FOR WRONG WAY DETAILS

NO SCALE

A20G

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

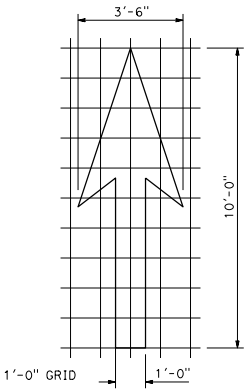
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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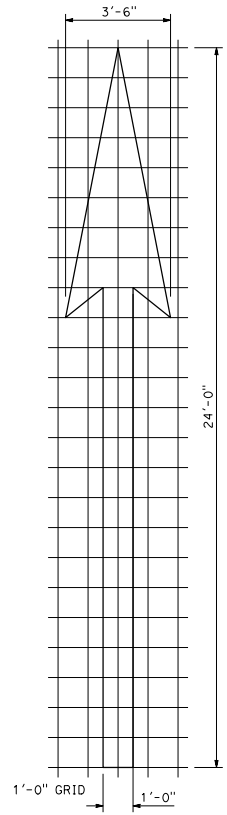
NOTE:

1. Minor variations in dimensions may be accepted by the Engineer.



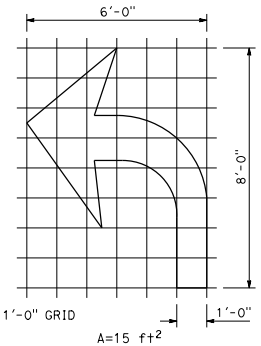

A=14 ft²

TYPE I 10'-0" ARROW




A=31 ft²

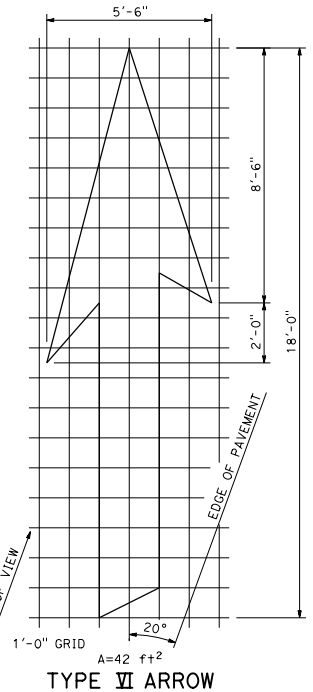
TYPE I 24'-0" ARROW




A=15 ft²

TYPE IV (L) ARROW

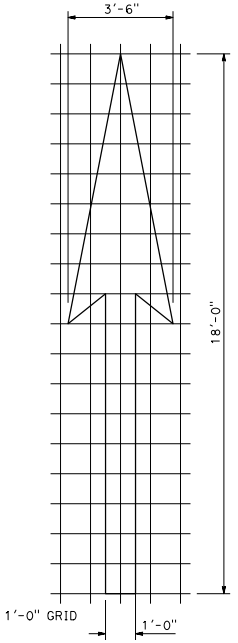
For Type IV (R) arrow, use mirror image.




A=42 ft²

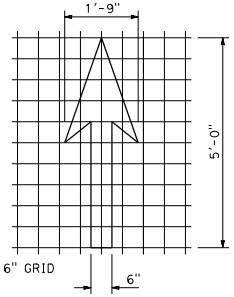
TYPE VI ARROW

Right lane drop arrow.
For left lane, use mirror image.



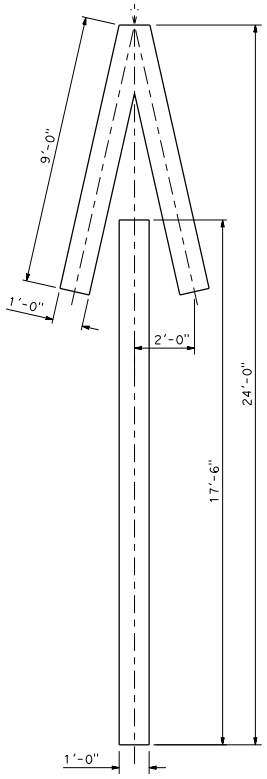

A=25 ft²

TYPE I 18'-0" ARROW



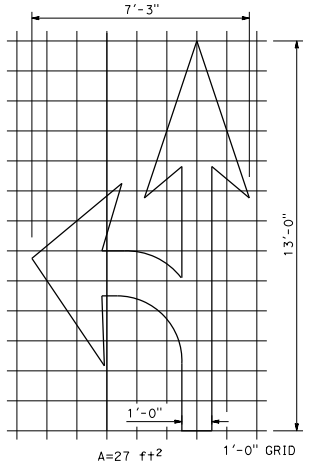

A=3.5 ft²

BIKE LANE ARROW




A=33 ft²

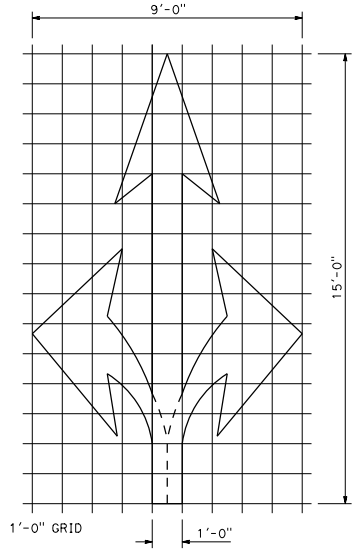
TYPE V ARROW




A=27 ft²

TYPE VII (L) ARROW

For Type VII (R) arrow, use mirror image.




A=36 ft²

TYPE VIII ARROW

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS ARROWS

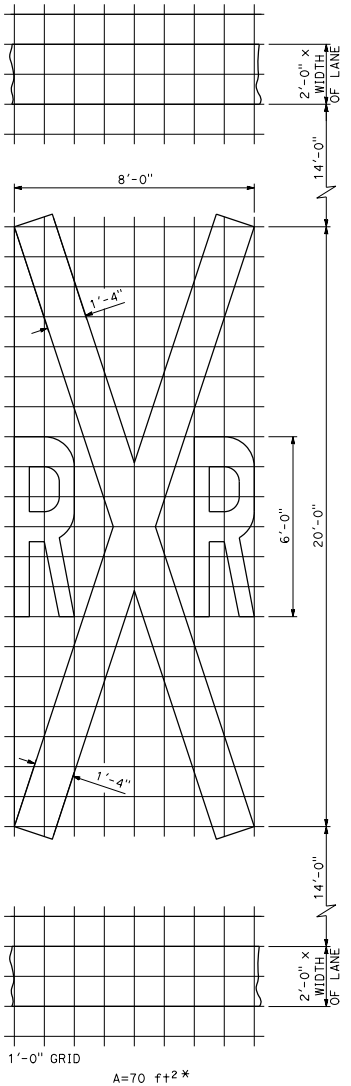
NO SCALE

A24A

7-1-25



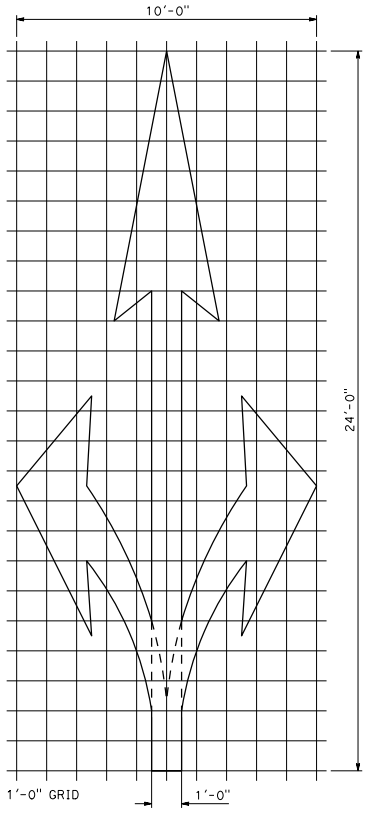
Return to Table of Contents




A=70 ft$^2$*

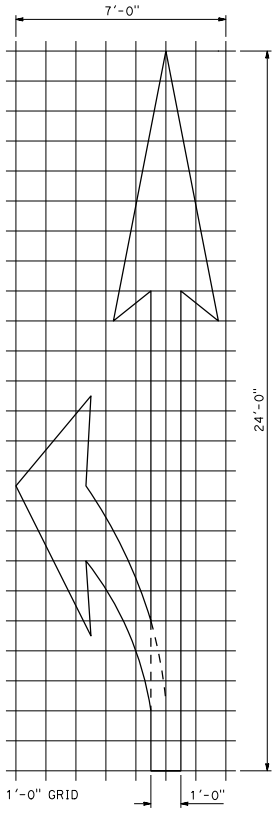
## RAILROAD CROSSING SYMBOL

*70 SQFT does not include the 2'-0" x variable width transverse lines.




A=59 ft$^2$

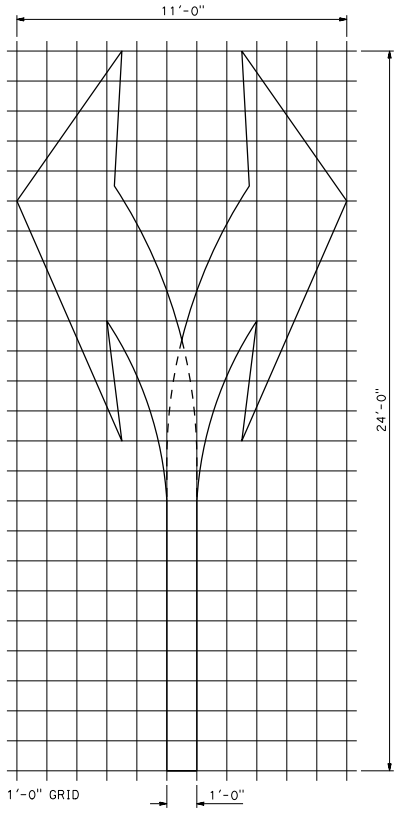
## TYPE II (B) ARROW




A=45 ft$^2$

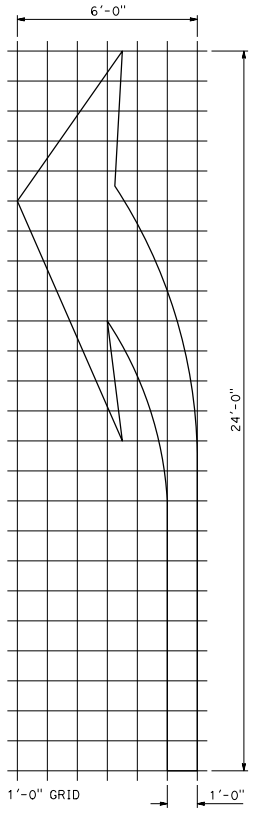
## TYPE II (L) ARROW

For Type II (R) use mirror image.




A=73 ft$^2$

## TYPE III (B) ARROW




A=42 ft$^2$

## TYPE III (L) ARROW

For Type III (R) use mirror image.

NOTE:

1. Minor variations in dimensions may be accepted by the Engineer.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS
# ARROWS AND SYMBOLS

NO SCALE

**A24B**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

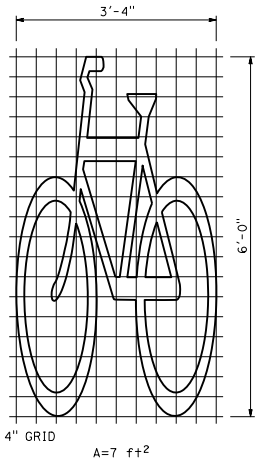
Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

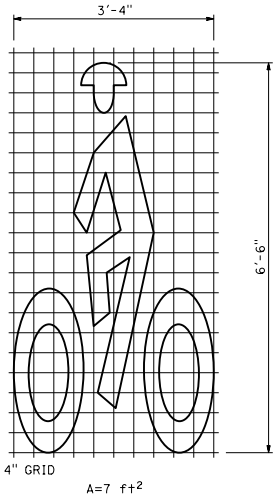
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NOTE:
1. Minor variations in dimensions may be accepted by the Engineer.



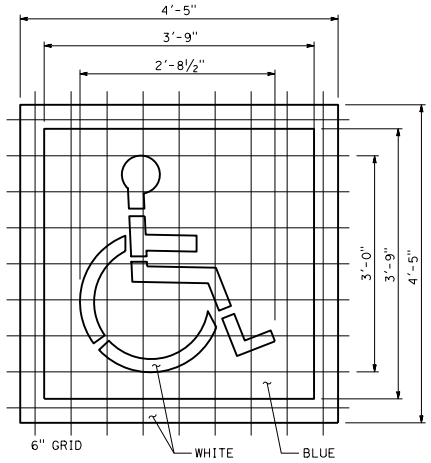

A=7 ft²

BIKE LANE SYMBOL WITHOUT PERSON



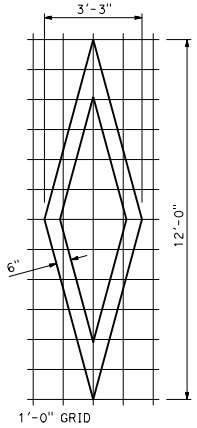

A=7 ft²

BIKE LANE SYMBOL WITH PERSON



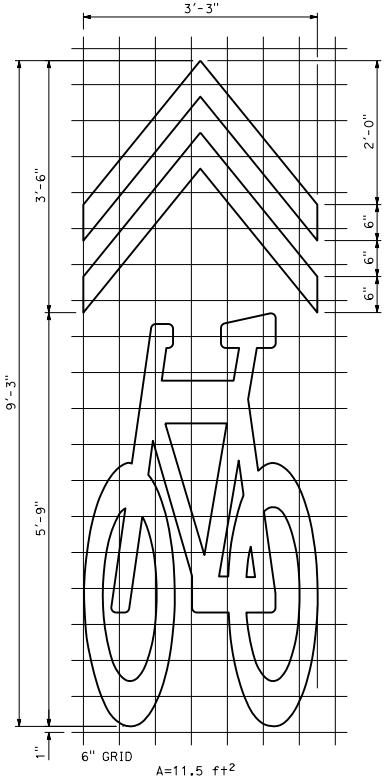

A=9 ft² (WHITE)
A=14 ft² (BLUE)

INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA) MARKING



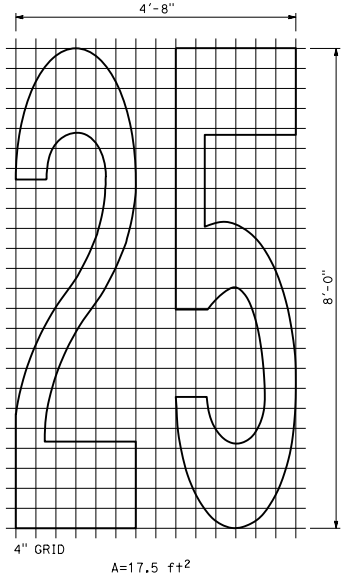

A=11 ft²

DIAMOND SYMBOL

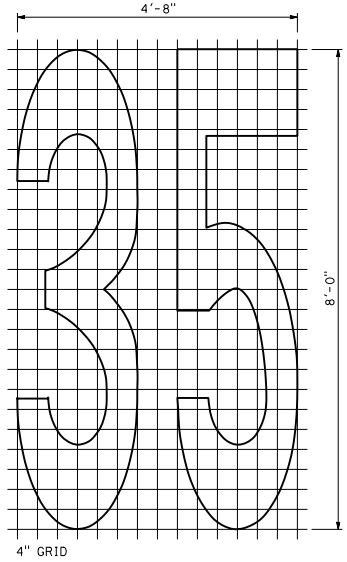



A=11.5 ft²

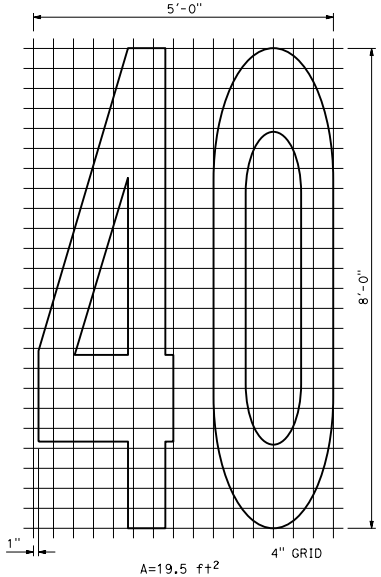
SHARED ROADWAY BICYCLE MARKING




A=17.5 ft²

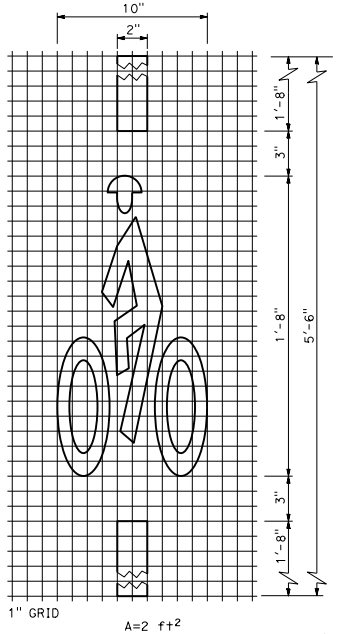



A=16.5 ft²




A=19.5 ft²

NUMERALS




A=2 ft²

BICYCLE LOOP DETECTOR SYMBOL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKINGS SYMBOLS AND NUMERALS**

NO SCALE

A24C

7-1-25



Return to Table of Contents

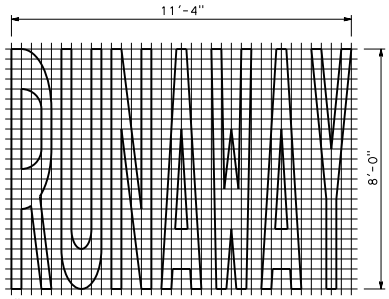
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

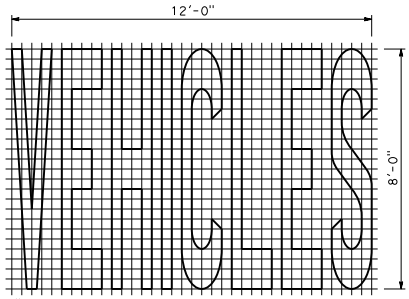
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

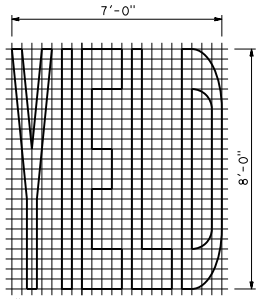
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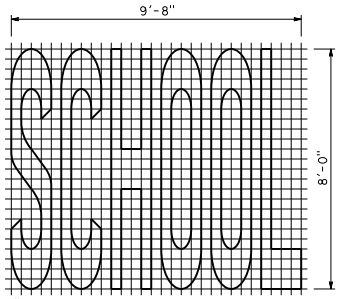
4" GRID
A=43 ft²



4" GRID
A=42 ft²



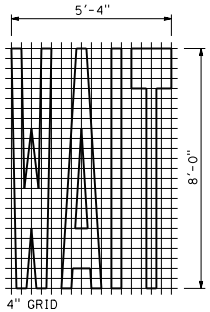
4" GRID
A=24 ft²



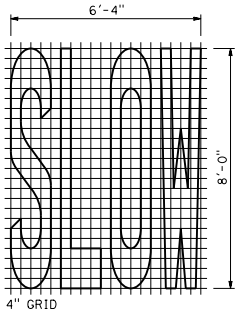
4" GRID
A=35 ft²

NOTES:

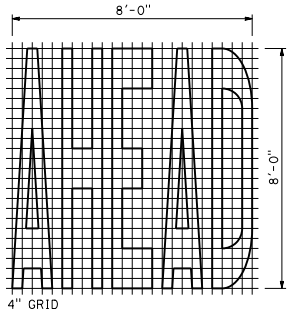
1. If a message consists of more than one word, it must read "UP", i.e., the first word must be nearest the driver.
2. The space between words must be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
3. Minor variations in dimensions may be accepted by the Engineer.
4. Portions of a letter, number or symbol may be separated by connecting segments not to exceed 2" in width.



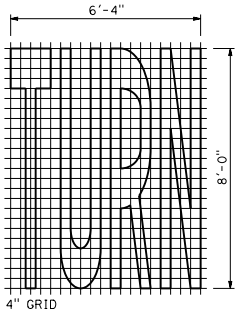
4" GRID
A=19 ft²



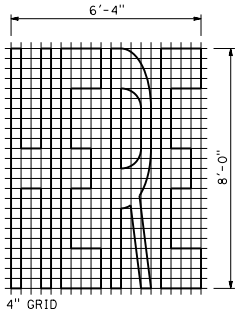
4" GRID
A=23 ft²



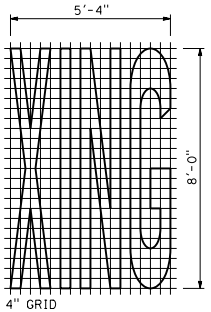
4" GRID
A=31 ft²



4" GRID
A=24 ft²

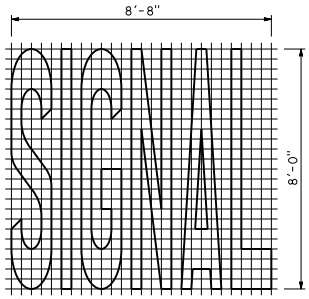


4" GRID
A=26 ft²

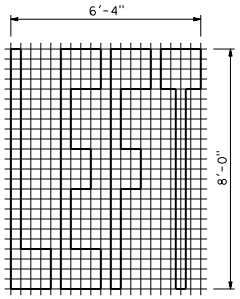


4" GRID
A=21 ft²

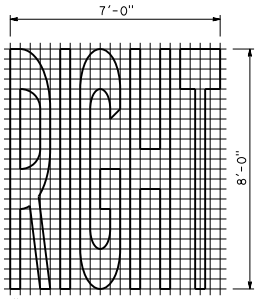
| WORD MARKINGS | | | |
|---|---|---|---|
| ITEM | ft² | ITEM | ft² |
| RUNAWAY | 43 | VEHICLES | 42 |
| YIELD | 24 | SCHOOL | 35 |
| WAIT | 19 | SLOW | 23 |
| AHEAD | 31 | TURN | 24 |
| HERE | 26 | XING | 21 |
| SIGNAL | 32 | LEFT | 19 |
| RIGHT | 26 | STOP | 22 |
| PED | 18 | COMPACT | 10 |
| BIKE | 5 | LANE | 6 |



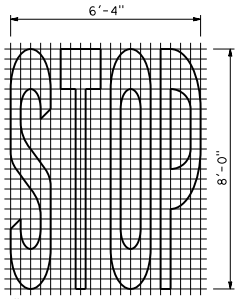
4" GRID
A=32 ft²



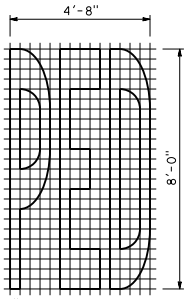
4" GRID
A=19 ft²



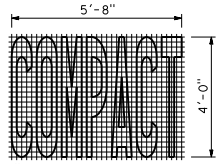
4" GRID
A=26 ft²



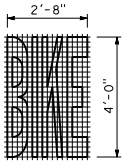
4" GRID
A=22 ft²



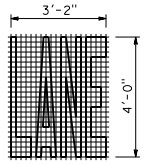
4" GRID
A=18 ft²



2" GRID
A=10 ft²



2" GRID
A=5 ft²



2" GRID
A=6 ft²

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS WORDS

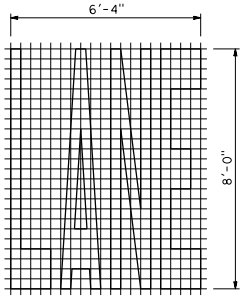
NO SCALE

A24D

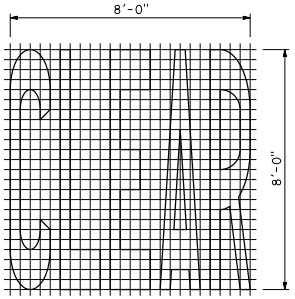
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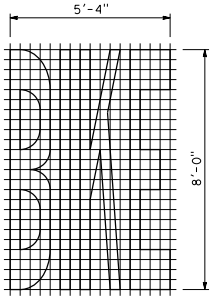
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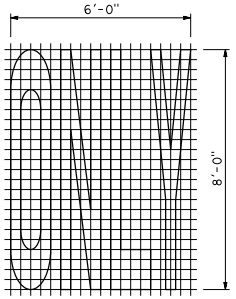
4" GRID
A=24 ft²



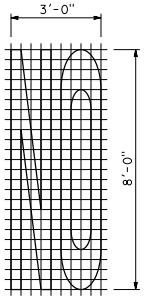
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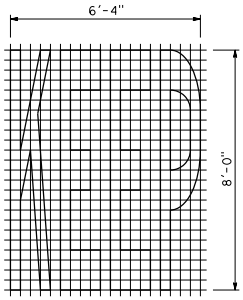
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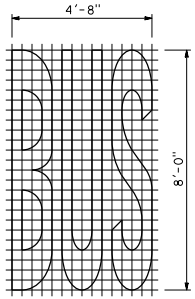
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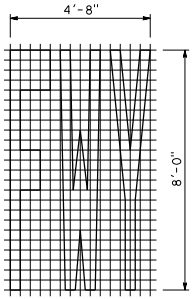
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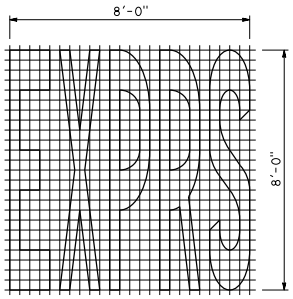
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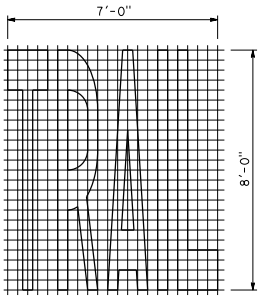
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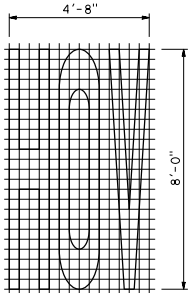
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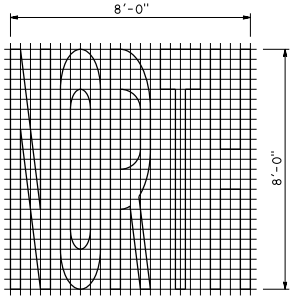
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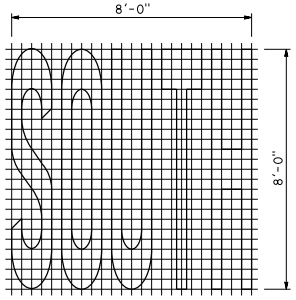
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A=23 ft²



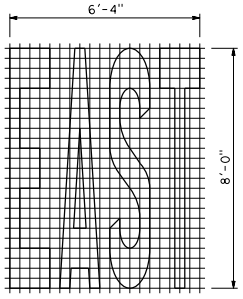
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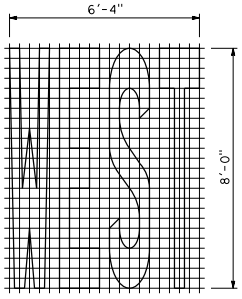
4" GRID
A=31 ft²



4" GRID
A=29 ft²



4" GRID
A=22 ft²



4" GRID
A=24 ft²

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

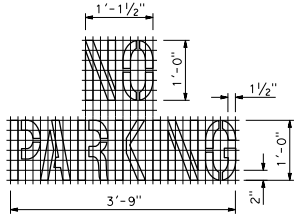
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NOTES:

1. If a message consists of more than one word, it must read "UP",i.e., the first word must be nearest the driver.
2. The space between words must be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
3. Minor variations in dimensions may be accepted by the Engineer.
4. Portions of a letter, number, or symbol may be separated by connecting segments not to exceed 2" in width.
5. The words "NO PARKING" pavement marking is to be used for parking facilities. For typical locations of markings, see Standard Plans A90A and A90B.
6. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high on a contrasting background and located so that it is visible to traffic enforcement officials.

**WORD MARKINGS**

| ITEM | SQFT | ITEM | SQFT | ITEM | SQFT |
|---|---|---|---|---|---|
| LANE | 24 | CLEAR | 27 | BIKE | 21 |
| ONLY | 22 | NO | 14 | KEEP | 24 |
| BUS | 20 | FWY | 16 | EXPRS | 30 |
| TRAIL | 23 | HOV | 18 | NORTH | 31 |
| SOUTH | 29 | EAST | 22 | WEST | 24 |
| NO PARKING | 2 | | | | |



A=2 ft²
See Notes 5 and 6

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS WORDS

NO SCALE

A24E

7-1-25



Return to Table of Contents

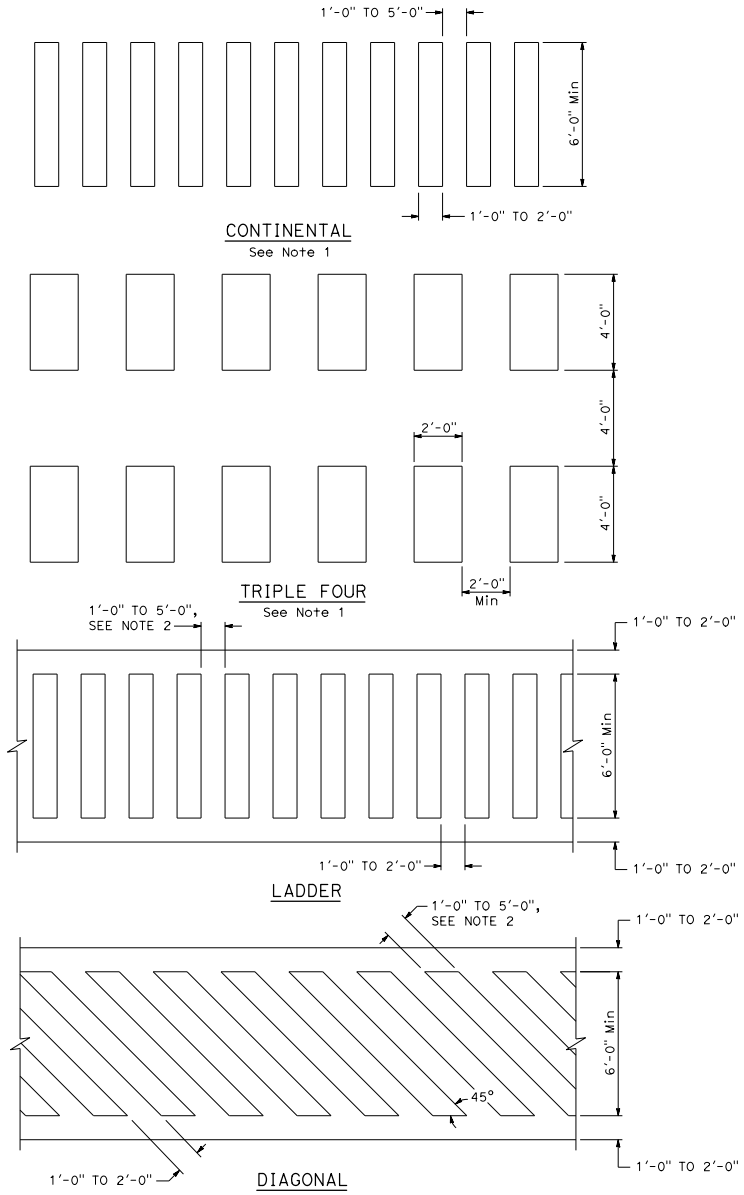
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
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Malik Rehman
No. C83390
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CIVIL
STATE OF CALIFORNIA

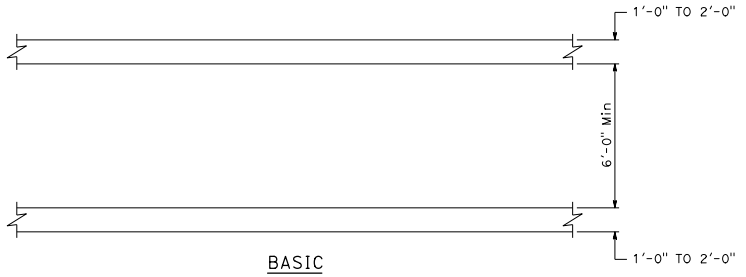
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HIGHER VISIBILITY CROSSWALKS

NOTES:

1. Spaces between markings must be placed in wheel tracks of each lane.
2. Spacings not to exceed 2.5 times width of longitudinal line.
3. All crosswalk markings must be white except those near schools must be yellow.




BASIC

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS CROSSWALKS

NO SCALE

A24F

7-1-25

2025 STANDARD PLAN A24F

Return to Table of Contents

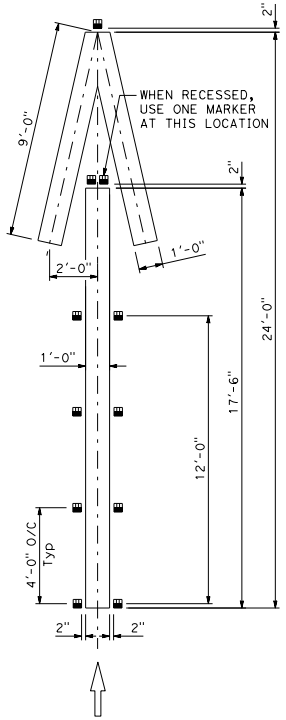
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

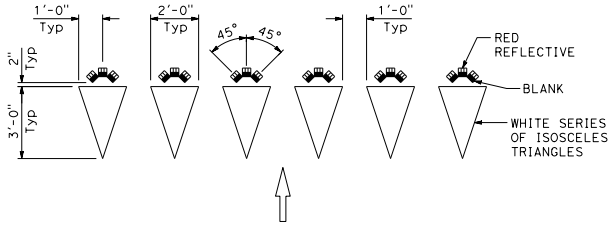
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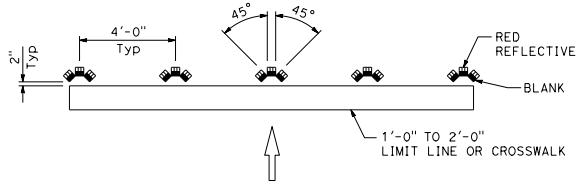

A=33 ft²

TYPE V ARROW AT EXIT RAMP




YIELD LINE AT EXIT RAMP

(Markers are not recessed)




LIMIT LINE (STOP LINE) AT EXIT RAMP

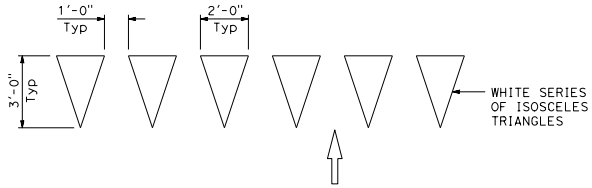
(Markers are not recessed)

NOTE:

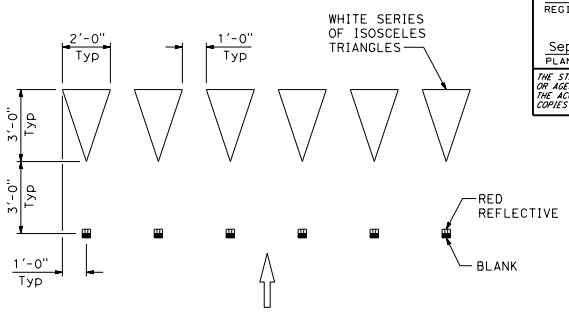
1. If there is crosswalk at the end of the exit ramp, place Type R markers in front of the first line for wrong way vehicle that travels up the ramp with the red reflective side facing the intersection.




LIMIT LINE (STOP LINE)

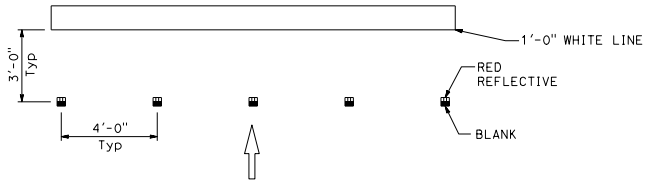



YIELD LINE




YIELD LINE AT EXIT RAMP

(Markers are recessed)

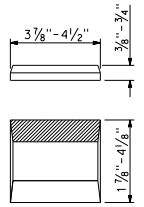



LIMIT LINE (STOP LINE) AT EXIT RAMP

(Markers are recessed)

LEGEND:

TYPE R ONE-WAY RED RETROREFLECTIVE MARKER




TYPE R

MARKER DETAILS

RETROREFLECTIVE FACE ON BACKSIDE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS YIELD LINES, LIMIT LINES, AND WRONG WAY DETAILS

NO SCALE

A24G

7-1-25

2025 STANDARD PLAN A24G

Return to Table of Contents

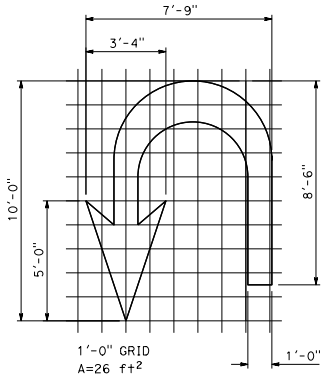
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|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

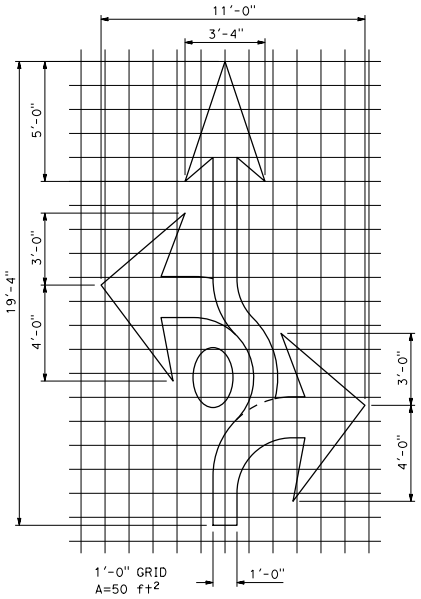
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

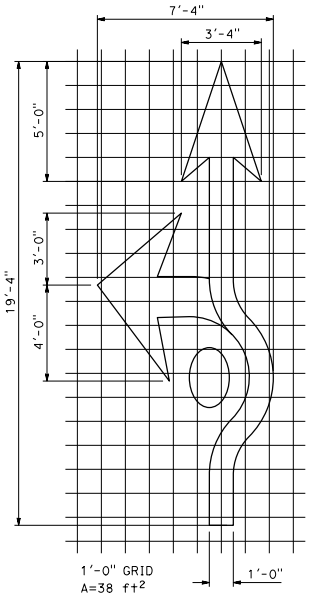
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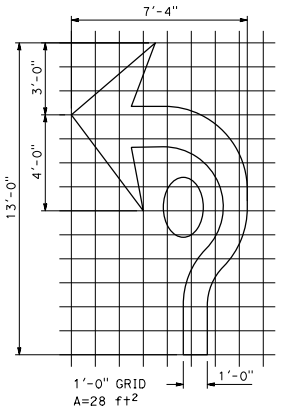

TYPE IX ARROW
U-TURN ARROW



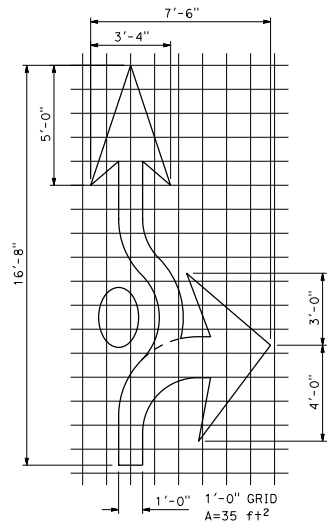

TYPE FH I ARROW



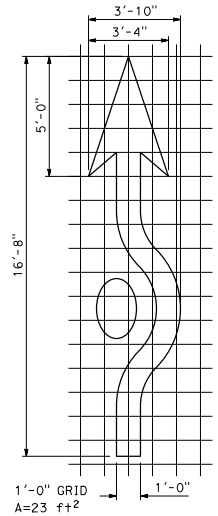

TYPE FH II ARROW




TYPE FH IV ARROW




TYPE FH III ARROW
OPTIONAL LANE USE CIRCULAR ARROWS




TYPE FH V ARROW
MANDATORY LANE USE CIRCULAR ARROWS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS
# ARROWS

NO SCALE

A24H

7-1-25



Return to Table of Contents

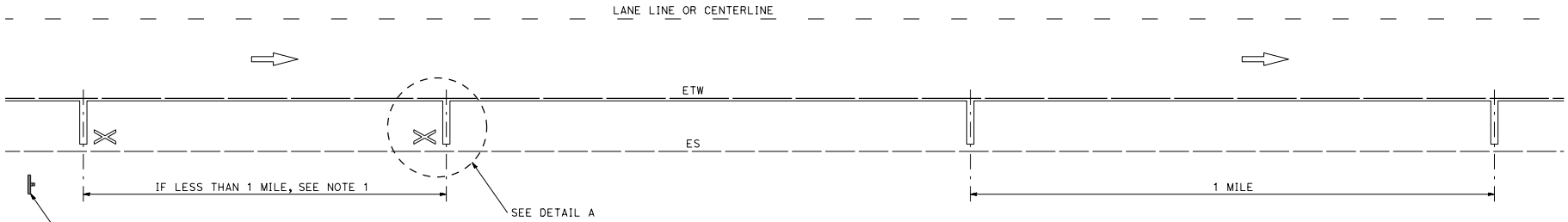
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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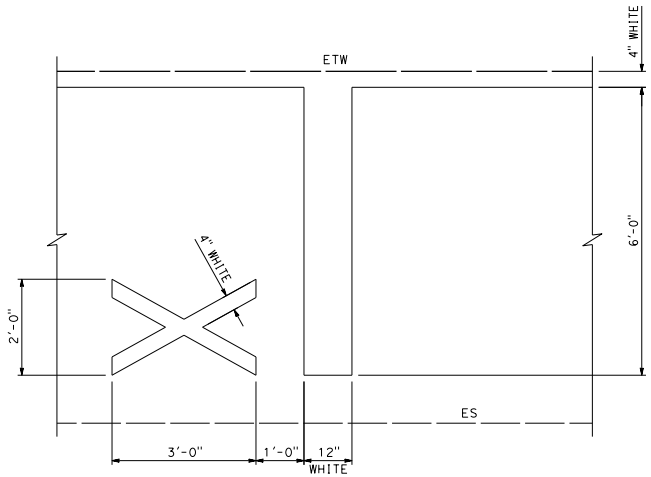

PLAN




R48-2 (CA)

NOTE:

1. Install white "X" pavement marking at each end of the section if the markings are less than 1 mile apart.




DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKINGS**
**SPEED MEASUREMENT**

NO SCALE

**A24J**

7-1-25

2025 STANDARD PLAN A24J



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

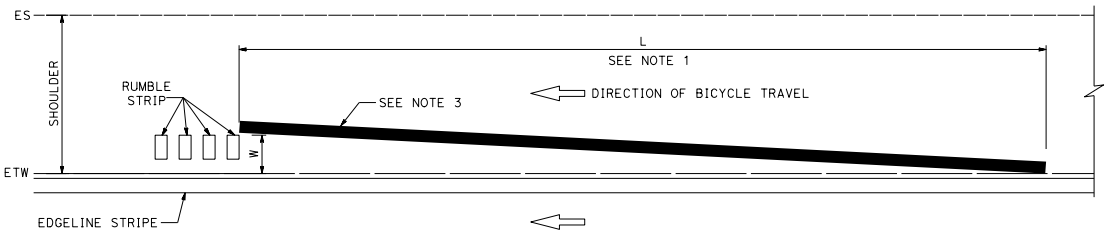
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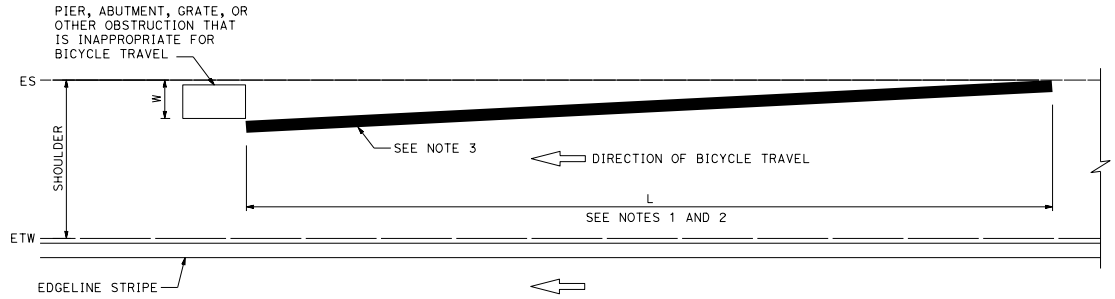
NOTES:

1. L=WS, where W is the offset in feet and S is bicycle approach speed in mph.
2. Provide an additional foot of offset for a raised obstruction and use the formula L=(W+1)S for the taper length.
3. See Standard Plan A20D for Detail 39.
4. Use markings only when there is 5'-0" of clear space.




FLYING WEDGE STRIPE

Placed at beginning of rumble strip at right shoulder only.




FLYING WEDGE STRIPE

Placed at obstruction.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS
# BICYCLE OBSTRUCTION MARKINGS

NO SCALE

A24K

7-1-25





Return to Table of Contents

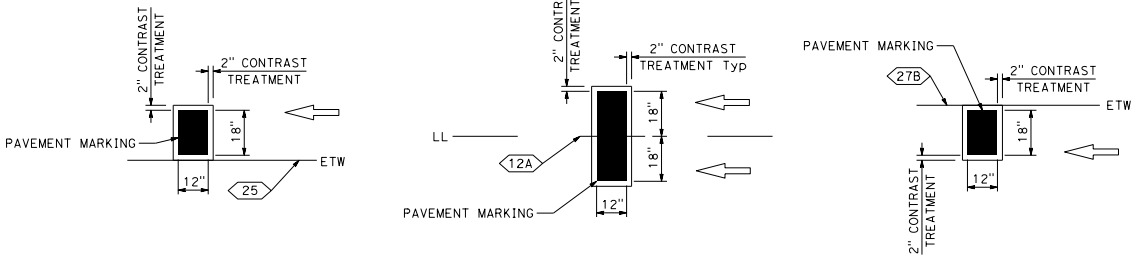
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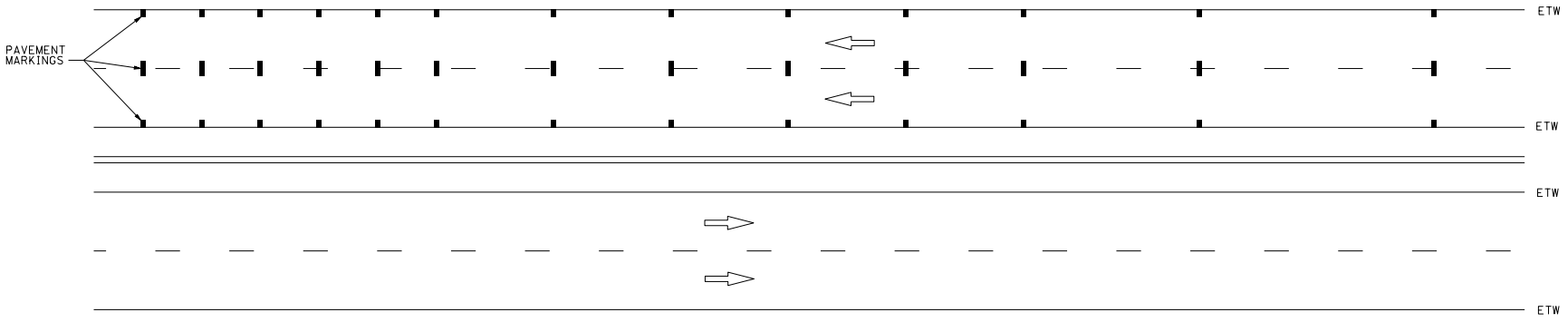

## CONTRAST TREATMENT DETAILS

**NOTES:**

1. Exact location for speed reduction pavement markings will be determined by the Engineer.
2. Do not cover pavement markings.
3. Speed reduction markings are white. Contrast treatment is black.
4. Engineer to determine length and spacing based on approach and target speeds in the field.

**LEGEND:**

DIRECTION OF TRAVEL




PLAN

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKINGS SPEED REDUCTION

NO SCALE

**A24L**

7-1-25

2025 STANDARD PLAN A24L

Return to Table of Contents

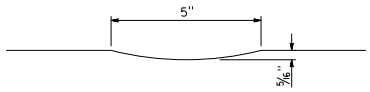
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Malik Rehman
REGISTERED CIVIL ENGINEER

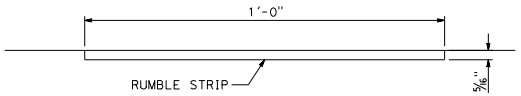
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

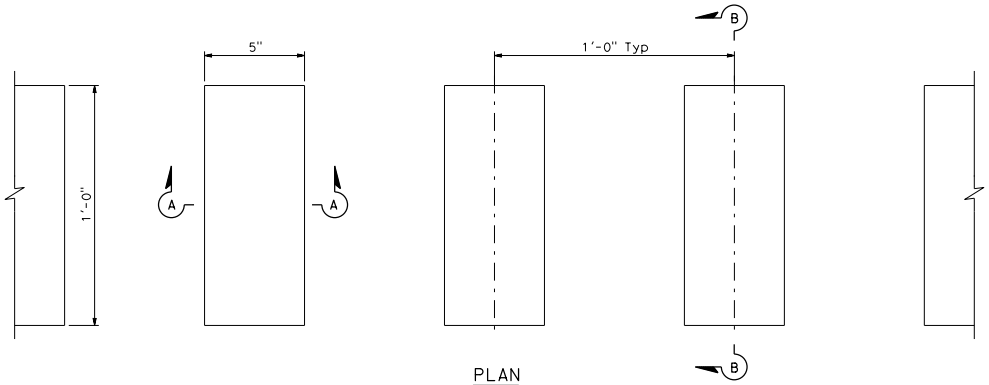
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SECTION A-A




SECTION B-B

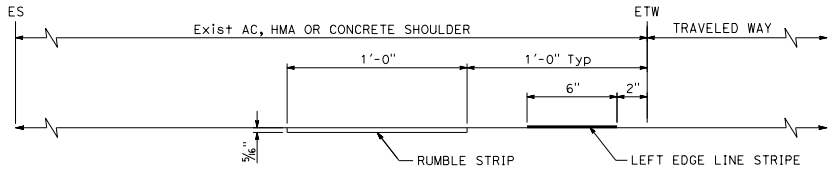



PLAN

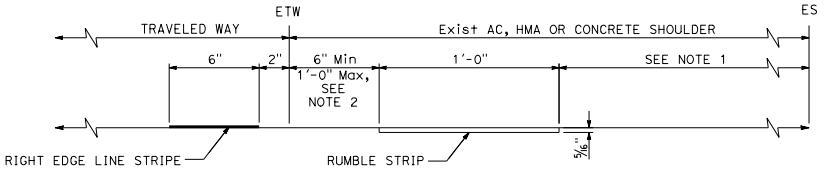
GROUND-IN INDENTATIONS

NOTES:

1. Where bicycles are permitted, shoulder rumble strips should not be used right of direction of travel unless a minimum of 5'-0" of clear shoulder width for bicycle use is available between the rumble strip and the outer edge of the shoulder. Where bicycles are not permitted, a minimum of 4'-0" of distance is required between the rumble strip and the outer edge of the shoulder.
2. Unless otherwise shown on the plans or specified in the special provisions, the 6" offset from the edge of traveled way to the edge of the rumble strip shall be used for rumble strip placement right of the direction of travel.




RUMBLE STRIP PLACEMENT
LEFT OF DIRECTION OF TRAVEL




RUMBLE STRIP PLACEMENT
RIGHT OF DIRECTION OF TRAVEL

TYPICAL GROUND-IN RUMBLE STRIP
SHOULDER PLACEMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SHOULDER RUMBLE STRIP DETAILS
# GROUND-IN INDENTATIONS

NO SCALE

**A40B**

7-1-25



Return to Table of Contents

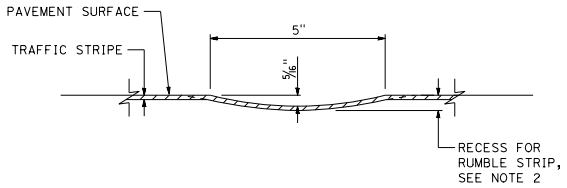
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Malik Rehman
REGISTERED CIVIL ENGINEER

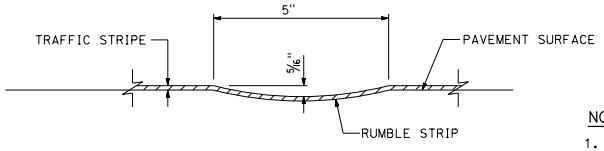
September 19, 2025
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STATE OF CALIFORNIA

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RECESSED STRIPE DETAIL




SURFACE STRIPE DETAIL

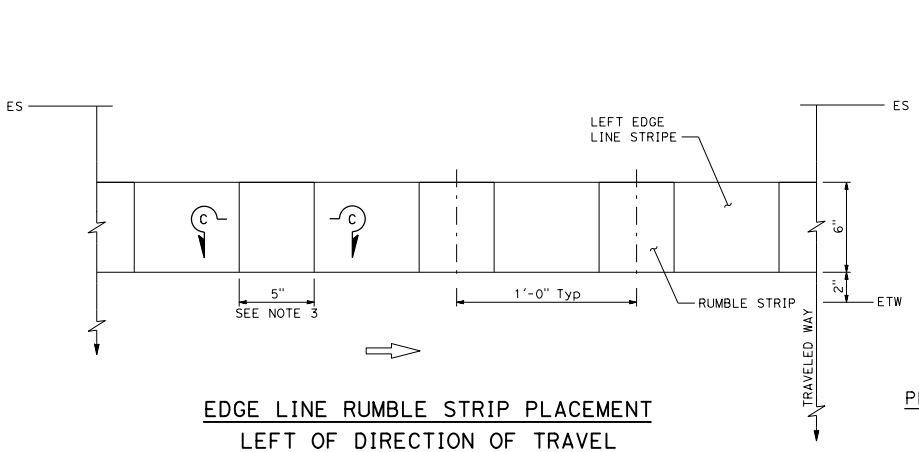
NOTES:

1. See Standard Plan A20D for recessed traffic stripe details.
2. Grind depth as necessary to result in 5/16" deep rumble strip after placing striping.
3. Limits of indentions with recessed stripe not shown.
4. See Standard Plan A40H for facilities where bicyclists are permitted.

LEGEND:

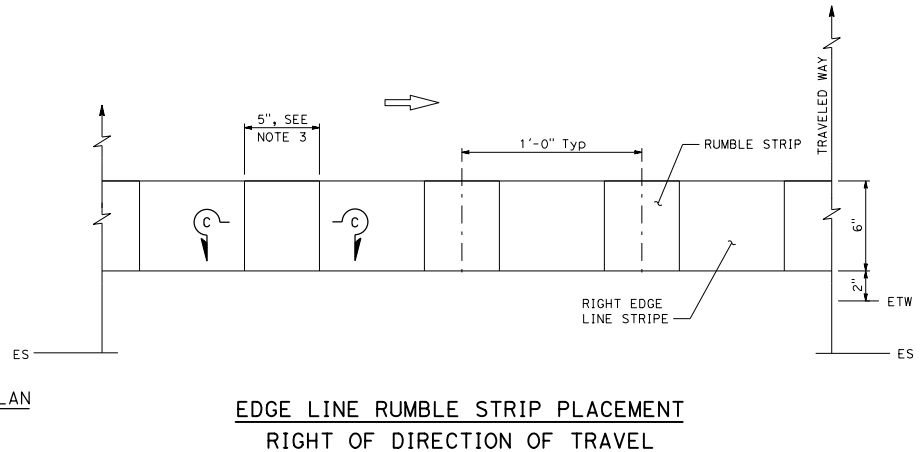
STRIPE MATERIAL

SECTION C-C




EDGE LINE RUMBLE STRIP PLACEMENT
LEFT OF DIRECTION OF TRAVEL

PLAN




EDGE LINE RUMBLE STRIP PLACEMENT
RIGHT OF DIRECTION OF TRAVEL

TYPICAL EDGE LINE RUMBLE STRIP PLACEMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EDGE LINE RUMBLE STRIP DETAILS GROUND-IN INDENTATIONS

NO SCALE

A40C

7-1-25





Return to Table of Contents

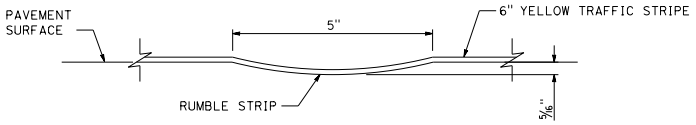
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
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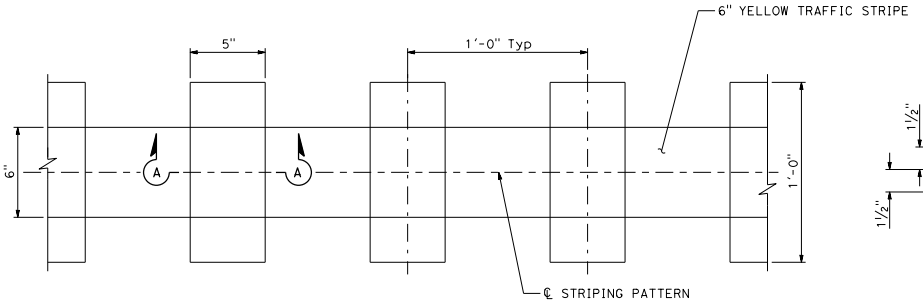
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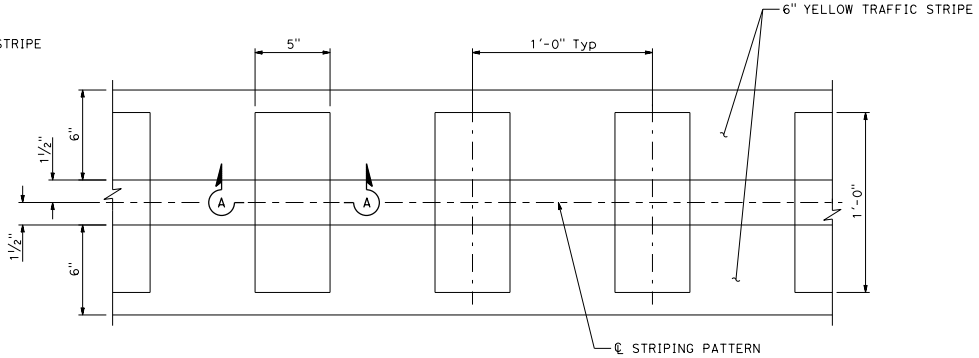

SECTION A-A

NOTE:
Detail 21 and Detail 5 traffic stripes shown, see project plans for traffic stripe details.




PLAN

RUMBLE STRIP PLACEMENT IN PASSING ZONE




PLAN

RUMBLE STRIP PLACEMENT IN NO PASSING ZONE

TYPICAL CENTER LINE RUMBLE STRIP PLACEMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CENTER LINE RUMBLE STRIP DETAILS GROUND-IN INDENTATIONS

NO SCALE

A40D

7-1-25



Return to Table of Contents

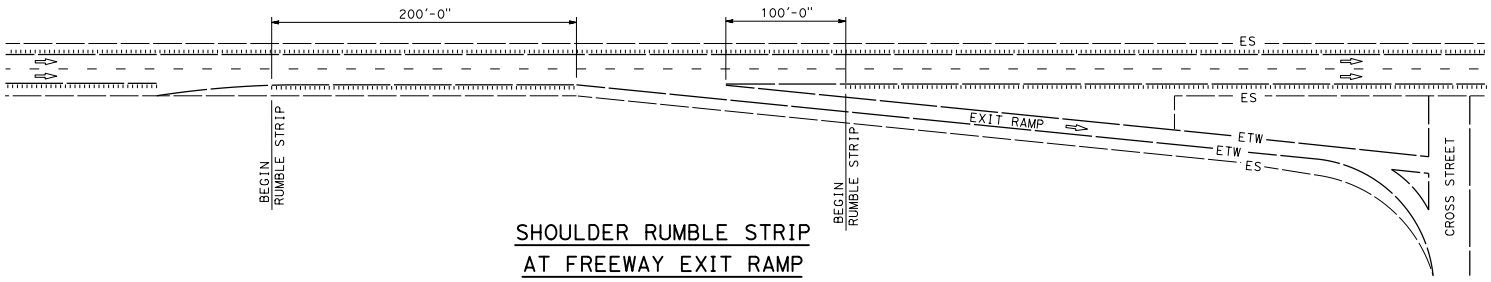
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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Malik Rehman
No. C83390
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CIVIL
STATE OF CALIFORNIA

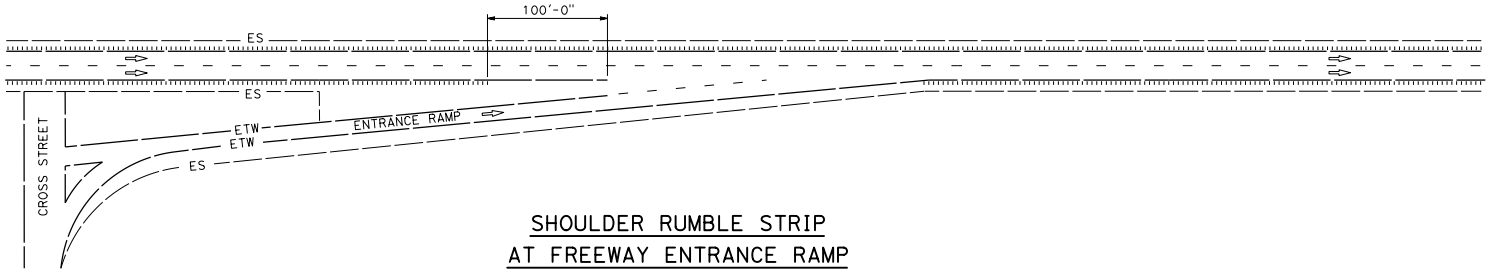
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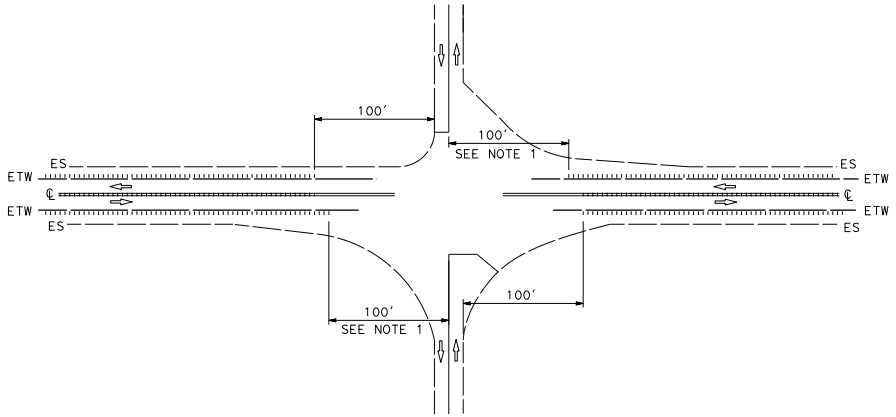

SHOULDER RUMBLE STRIP
AT FREEWAY EXIT RAMP

NOTE:
1. Lengthen to 200' when shoulder has an approach taper.

LEGEND:
RUMBLE STRIP (GROUND-IN)




SHOULDER RUMBLE STRIP
AT FREEWAY ENTRANCE RAMP




CENTER LINE AND SHOULDER RUMBLE STRIP
AT INTERSECTION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**RUMBLE STRIP PLACEMENT AT FREEWAY EXIT RAMPS, FREEWAY ENTRANCE RAMPS, AND INTERSECTIONS**

NO SCALE

**A40E**

**2025 STANDARD PLAN A40E**

7-1-25

Return to Table of Contents

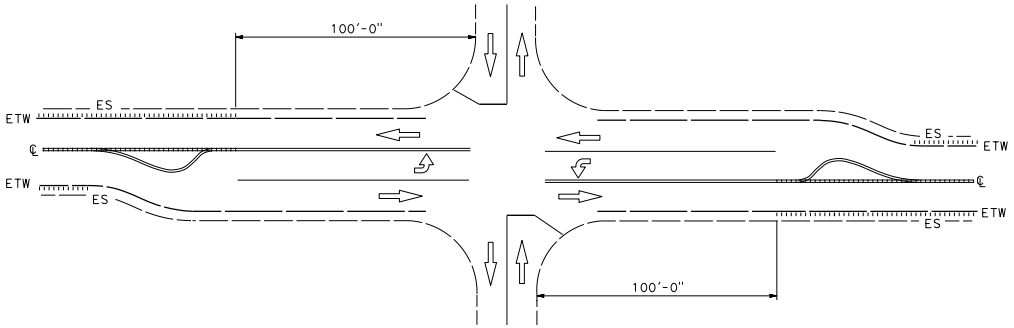
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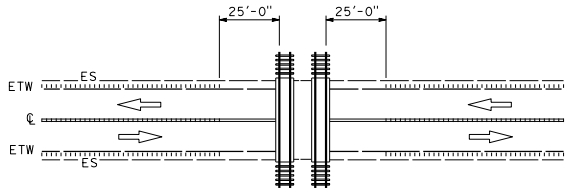
September 19, 2025
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Malik Rehman
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CIVIL
STATE OF CALIFORNIA

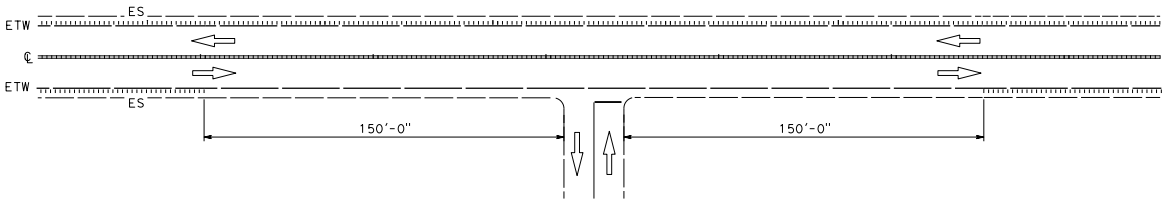
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CENTERLINE AND SHOULDER RUMBLE STRIPS
AT INTERSECTION WITH LEFT TURN POCKETS




CENTERLINE AND SHOULDER RUMBLE STRIPS
AT RAILROAD CROSSING




CENTERLINE AND SHOULDER RUMBLE STRIPS
AT DRIVEWAY/PRIVATE ROAD APPROACH

LEGEND:

RUMBLE STRIPS (GROUND-IN)

RAILROAD TRACKS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RUMBLE STRIP PLACEMENT AT INTERSECTIONS WITH LEFT TURN POCKETS, RAILROAD CROSSINGS, PRIVATE ROADS, AND MAJOR DRIVEWAYS

NO SCALE

A40F

2025 STANDARD PLAN A40F



7-1-25

Return to Table of Contents

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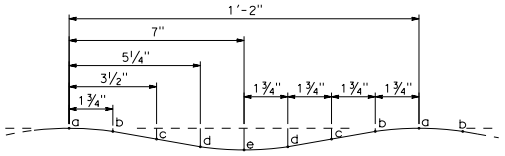
Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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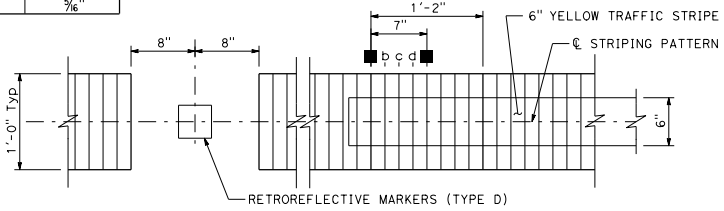





ELEVATION

SECTION A-A

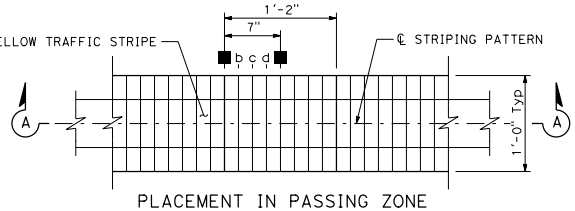
| LOCATION | SHOULDER DEPTH |
|---|---|
| a | 0" |
| b | 1/16" |
| c | 5/32" |
| d | 9/32" |
| e | 5/16" |



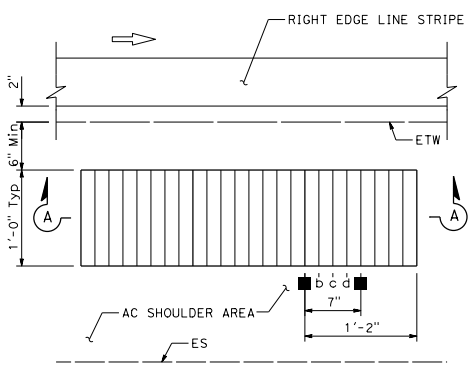

PLACEMENT IN PASSING ZONE - WITH RETROREFLECTIVE MARKERS

NOTES:

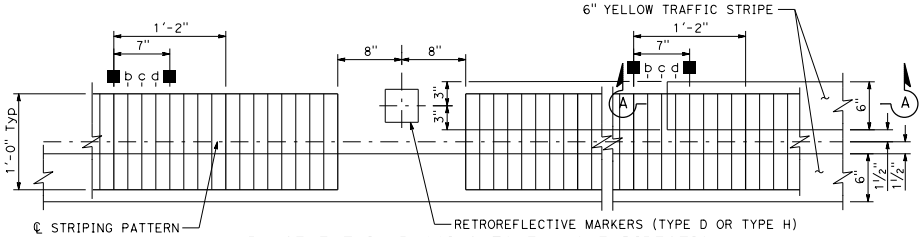
1. For shoulder, edge line, and centerline rumble strip details, see Standard Plans A40B, A40C, and A40D.
2. See Project Plans and Standard Plans A20A and A20B for pavement markers and traffic lines typical details.



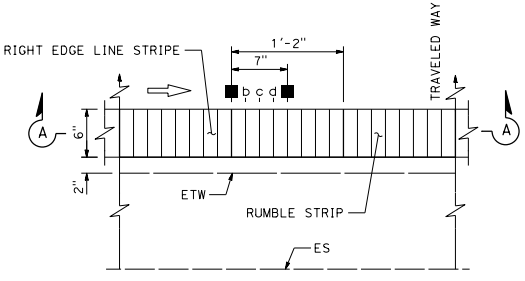

PLACEMENT IN PASSING ZONE



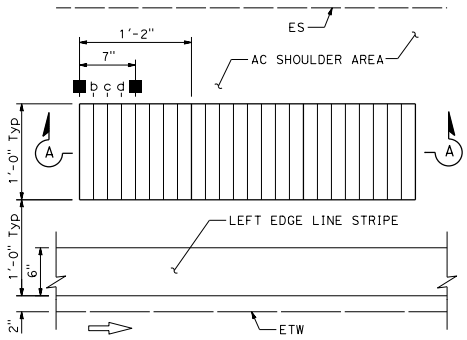

RIGHT OF DIRECTION OF TRAVEL




PLACEMENT IN PASSING ZONE - ONE DIRECTION



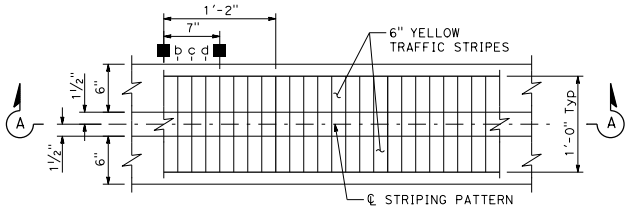

RIGHT OF DIRECTION OF TRAVEL




LEFT OF DIRECTION OF TRAVEL

PLAN

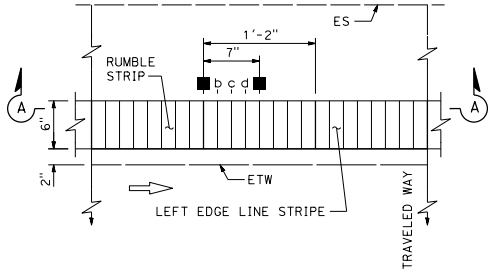
TYPICAL SHOULDER PLACEMENT




PLACEMENT IN NO PASSING ZONE

PLAN

TYPICAL CENTERLINE PLACEMENT




LEFT OF DIRECTION OF TRAVEL

PLAN

TYPICAL EDGE LINE PLACEMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SINUSOIDAL RUMBLE STRIP DETAILS GROUND-IN INDENTATIONS

NO SCALE

**A40G**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
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CIVIL
STATE OF CALIFORNIA

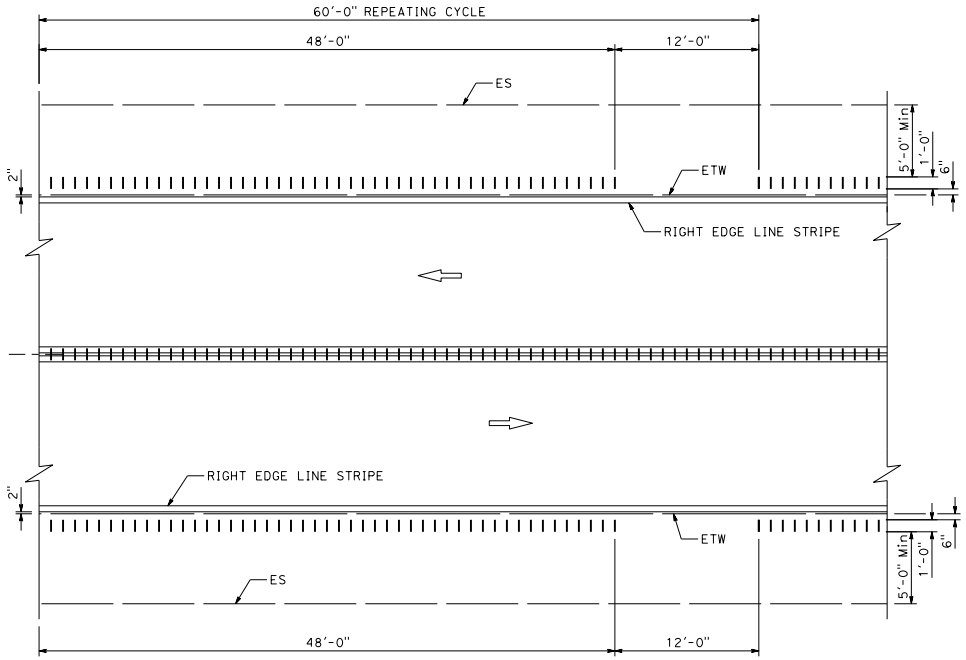
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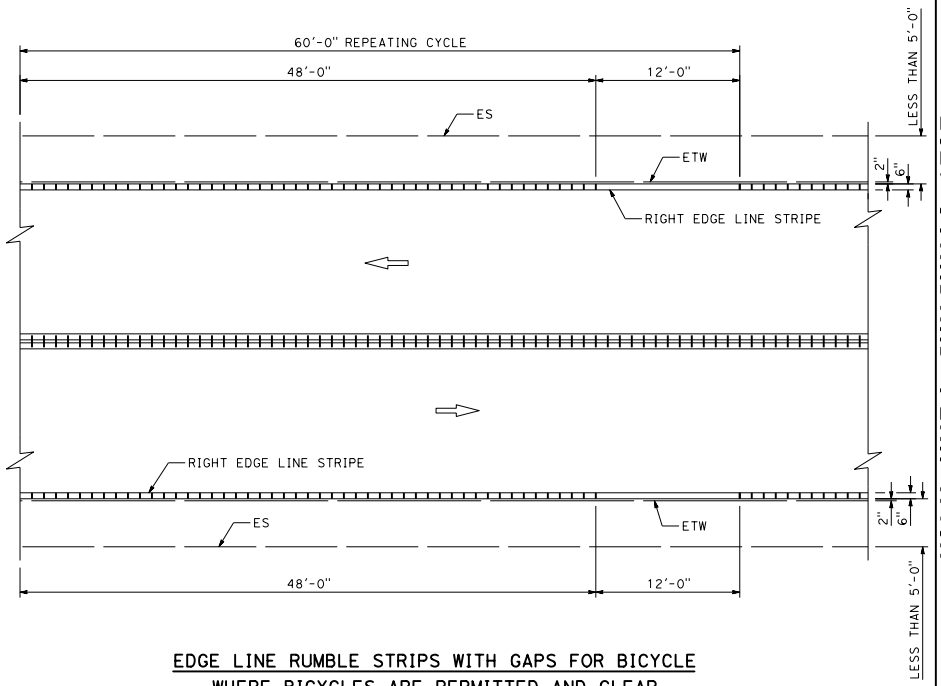
1. For shoulder, edge line, and center line rumble strip details, see Standard Plans A40B, A40C and A40D.
2. Provide gaps for bicycles when rumble strips are used with a striped bicycle lane buffer.

**LEGEND:**

RUMBLE STRIPS (GROUND-IN)




SHOULDER RUMBLE STRIPS WITH GAPS FOR BICYCLE WHERE BICYCLES ARE PERMITTED AND CLEAR SHOULDER WIDTH IS 5 FEET OR GREATER




EDGE LINE RUMBLE STRIPS WITH GAPS FOR BICYCLE WHERE BICYCLES ARE PERMITTED AND CLEAR SHOULDER WIDTH IS LESS THAN 5 FEET

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RUMBLE STRIP PLACEMENT WITH GAPS FOR BICYCLES

NO SCALE

**A40H**

7-1-25

2025 STANDARD PLAN A40H



Return to Table of Contents

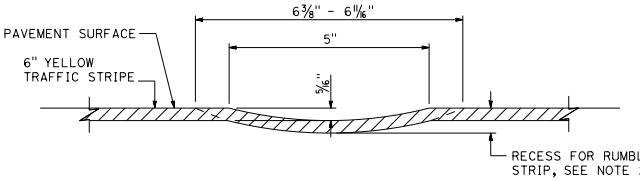
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Malik Rehman
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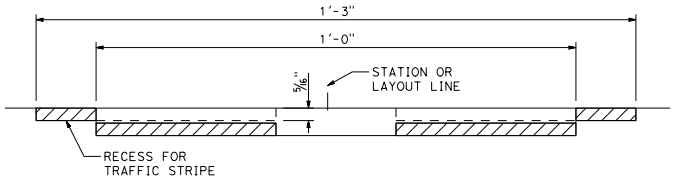
September 19, 2025
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SECTION A-A



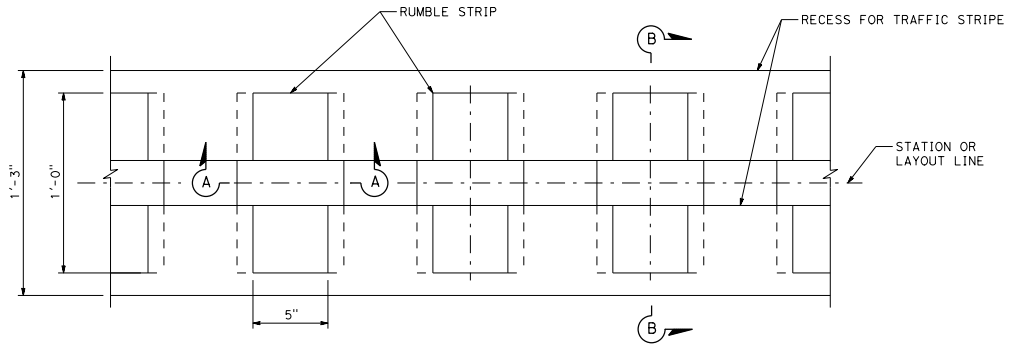

SECTION B-B

NOTES:

1. See Standard Plans A20D and A40D for recessed traffic stripe and center line rumble strip details.
2. Grind depth as necessary to result in 5/16" deep rumble strip after placing striping.

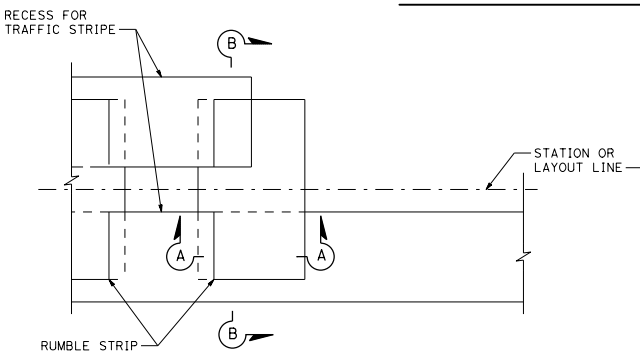
LEGEND:

STRIPE MATERIAL



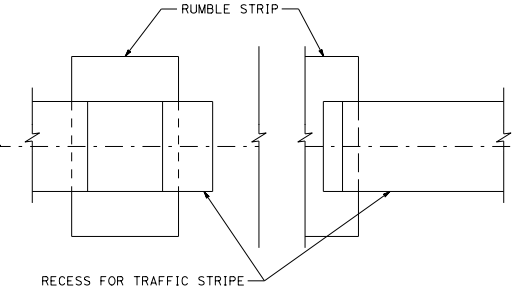

PLAN

NO PASSING ZONE - TWO DIRECTION




PLAN

NO PASSING ZONES - ONE DIRECTION




PLAN

PASSING ZONES - TWO DIRECTION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# COMBINED RECESSED TRAFFIC STRIPE AND RUMBLE STRIP DETAILS

NO SCALE

A40J

7-1-25



Return to Table of Contents

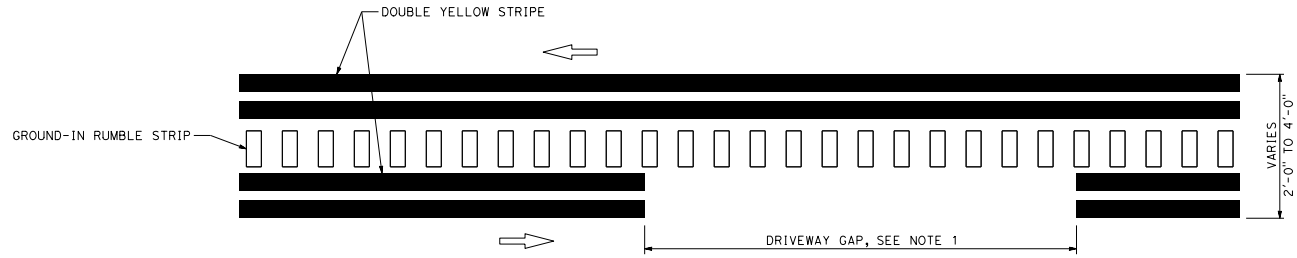
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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STATE OF CALIFORNIA

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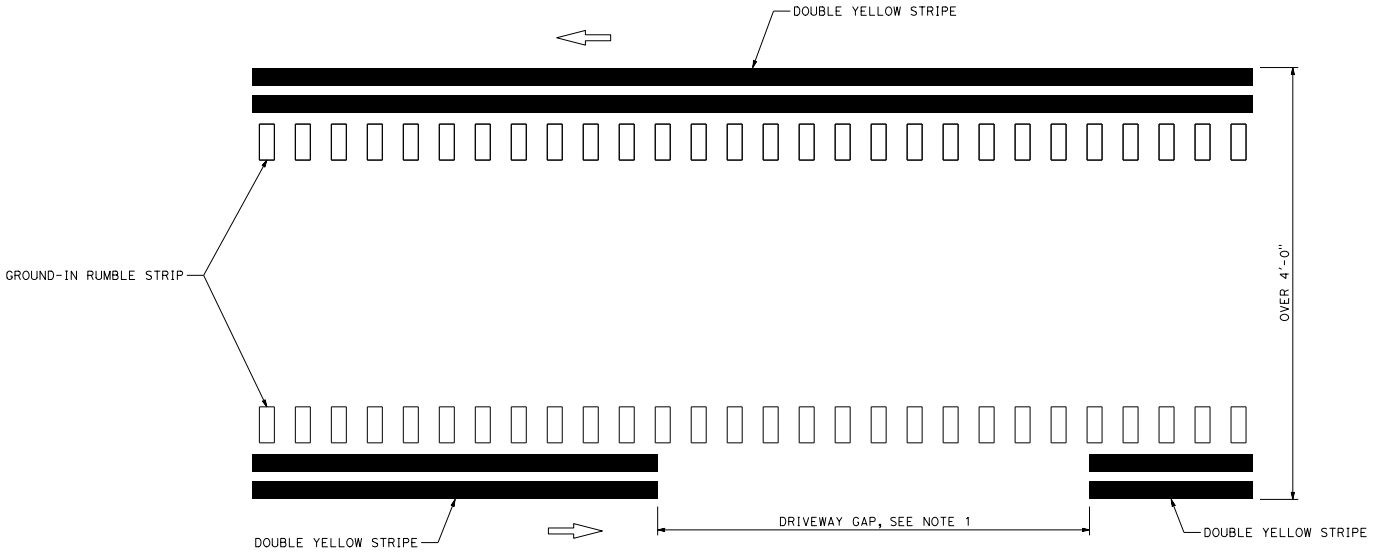



PLAN

CENTERLINE RUMBLE STRIPS
WITH DOUBLE-DOUBLE YELLOW STRIPES

NOTE:

1. Continue rumble strips through gap for driveway.




PLAN

CENTERLINE RUMBLE STRIPS
WITH DOUBLE-DOUBLE YELLOW STRIPES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RUMBLE STRIP PLACEMENT FOR PAVED MEDIANS

NO SCALE

A40K

7-1-25

2025 STANDARD PLAN A40K



Return to Table of Contents

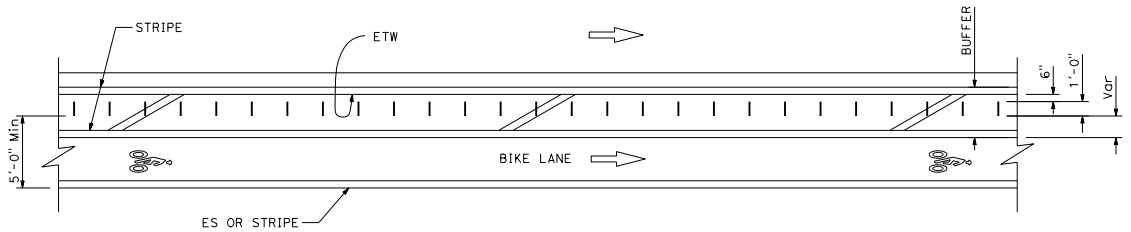
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.




PLAN

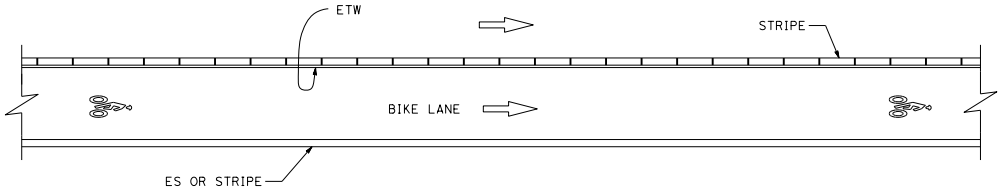
SHOULDER RUMBLE STRIP FOR BUFFERED CLASS 2 BICYCLE LANE AND CLEAR WIDTH OF 5 FEET OR GREATER IS PROVIDED

NOTE:

1. Provide gaps for bicycles when rumble strips are used with a striped bicycle lane buffer. See Standard Plan A40H for spacing details.

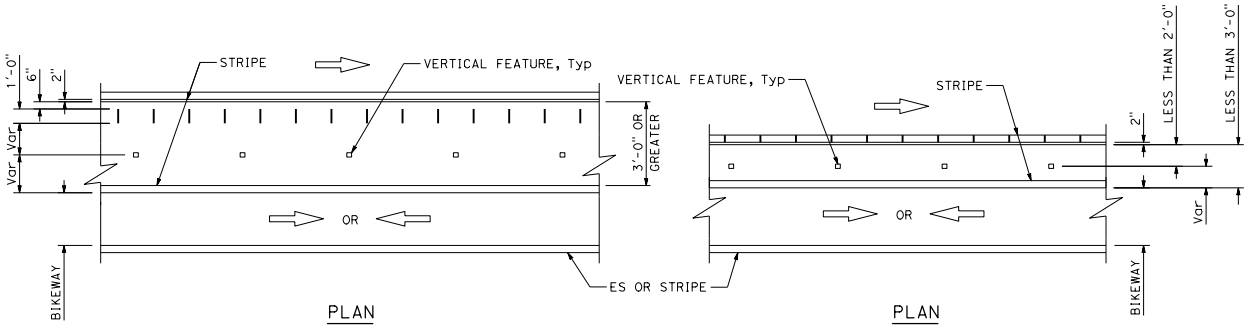
LEGEND:

| | | | RUMBLE STRIPS (GROUND-IN)




PLAN

EDGE LINE RUMBLE STRIP FOR CLASS 2 BICYCLE LANE




PLAN PLAN

SHOULDER RUMBLE STRIP FOR CLASS 4 BIKEWAY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RUMBLE STRIP PLACEMENT FOR CLASS 2 BICYCLE LANE AND CLASS 4 BIKEWAY

NO SCALE

A40L

7-1-25

2025 STANDARD PLAN A40L

Return to Table of Contents

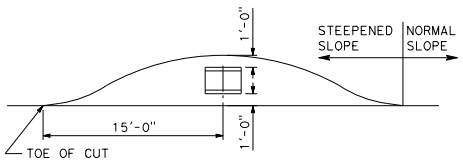
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REGISTERED CIVIL ENGINEER

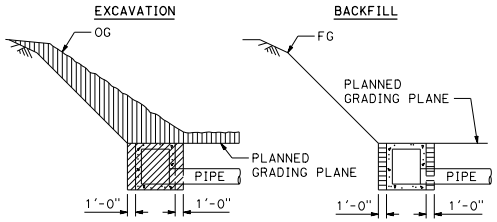
September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

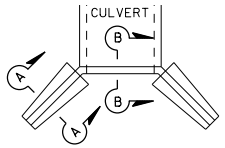
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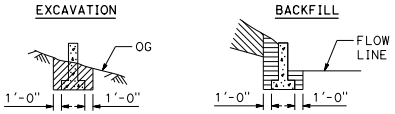

PLAN
See Note 2



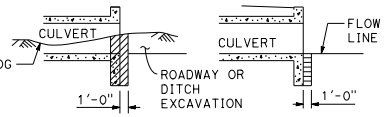

SECTION
RECESSES AT DRAINAGE INLETS



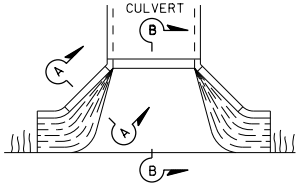

PLAN OF WING WALL



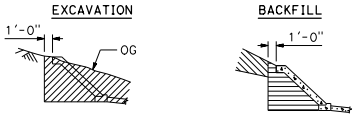

SECTION A-A



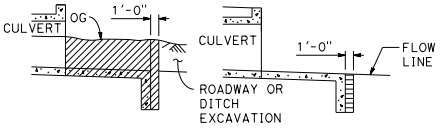

SECTION B-B
WING WALLS




PLAN OF WARPED WING WALL




SECTION A-A



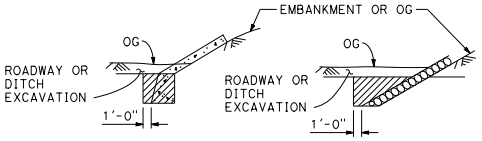

SECTION B-B
WARPED WING WALLS

NOTES:

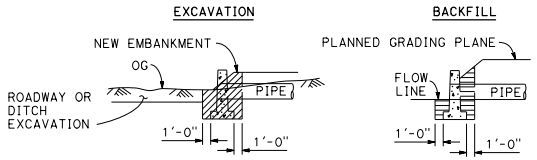
1. This drawing indicates the work to be done and limits of payment for:
   Roadway Excavation
   Ditch Excavation
   Structure Excavation for Slope Protection
2. Slopes and dimensions may vary to fit field conditions.
3. Top limit of structure excavation is original ground if ditch is not excavated.

LEGEND:

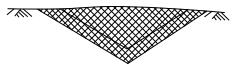
- STRUCTURE EXCAVATION
- STRUCTURE BACKFILL
- DITCH EXCAVATION
- SLOPE PROTECTION
- ROADWAY EXCAVATION
- ROADWAY EMBANKMENT



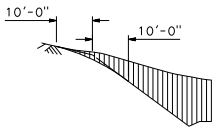

SLOPE PROTECTION
See Note 3



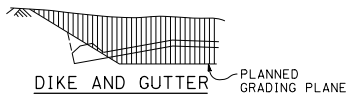

PIPE HEADWALLS



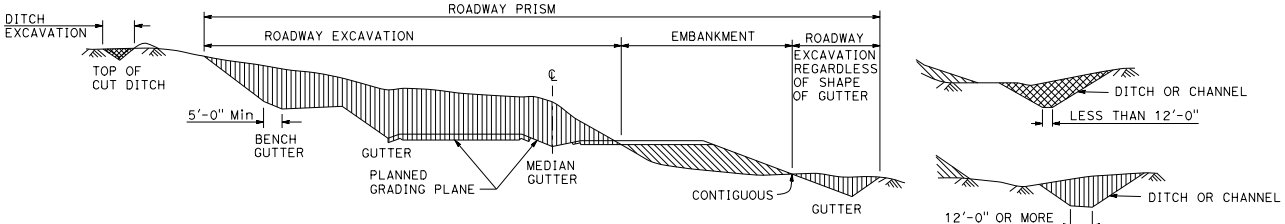
PAVED OR LINED DITCH




SLOPE ROUNDING

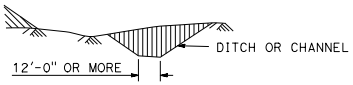



DIKE AND GUTTER




ROADWAY EXCAVATION - DITCH EXCAVATION




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXCAVATION AND BACKFILL MISCELLANEOUS DETAILS

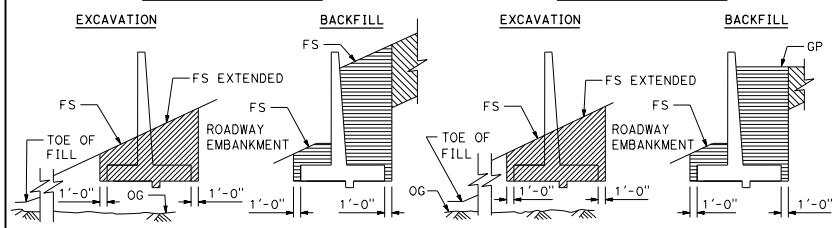
NO SCALE

A62A

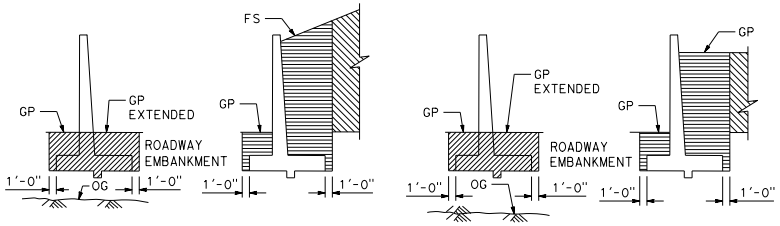
2025 STANDARD PLAN A62A

7-1-25

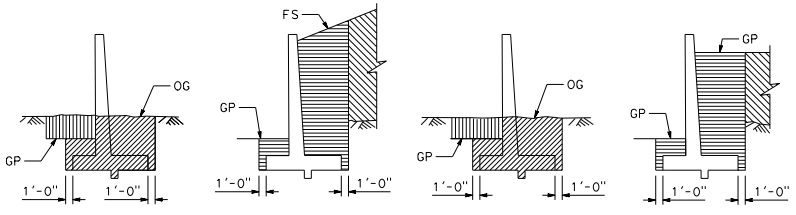
Return to Table of Contents



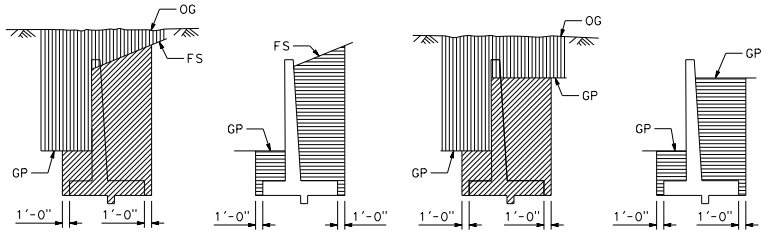

RETAINING WALL IN FILL, ON SLOPE



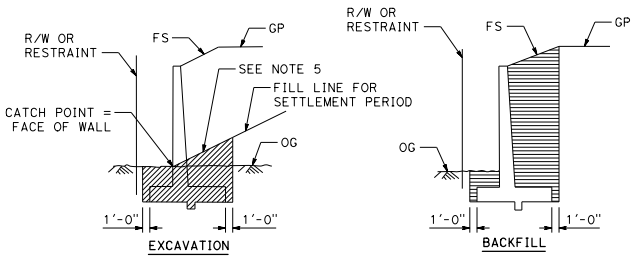

RETAINING WALL IN FILL



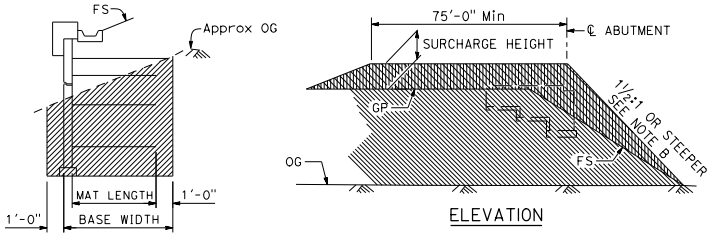

RETAINING WALL IN FILL AND CUT



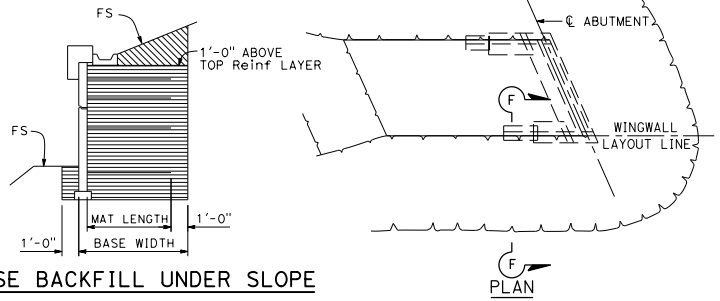

RETAINING WALL IN CUT




RETAINING WALL IN OG WITH SETTLEMENT PERIOD AND NEXT TO R/W LINE OR OTHER RESTRAINTS

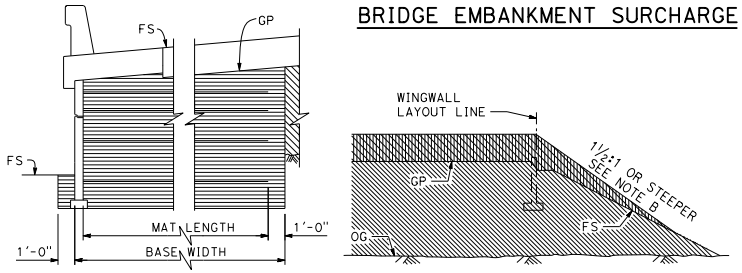



MSE EXCAVATION




MSE BACKFILL UNDER SLOPE

BRIDGE EMBANKMENT SURCHARGE




MSE BACKFILL UNDER ROADWAY

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wong
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER Gary Wong No. C58298 Exp. 6-30-26 CIVIL STATE OF CALIFORNIA

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NOTES:

1. Roadway embankment is not delineated on excavation drawings for clarity.
2. Embankment, if any, must be in place before structure excavation is made.
3. If no roadway or ditch excavation or embankment is involved at the wall, structure excavation will be measured from the original ground.
4. When an embankment settlement period is required, the upper limits of structure excavation are raised to conform to the elevation of the embankment after the settlement period or, when an embankment surcharge is used to the finished surface and grading plane elevations.
5. Embankment slopes to be as steep as material permits. Slope assumed to be 1:1 for purposes of quantity calculations.

LEGEND:

- BRIDGE EMBANKMENT SURCHARGE
- ROADWAY EXCAVATION
- ROADWAY EMBANKMENT
- STRUCTURE EXCAVATION
- STRUCTURE BACKFILL

SURCHARGE NOTES:

A. Bridge embankment surcharges to be placed at locations and to the heights listed in the special provisions.

B. Surcharge slopes to be as steep as stability of material permits.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LIMITS OF PAYMENT FOR EXCAVATION AND BACKFILL BRIDGE SURCHARGE AND WALL

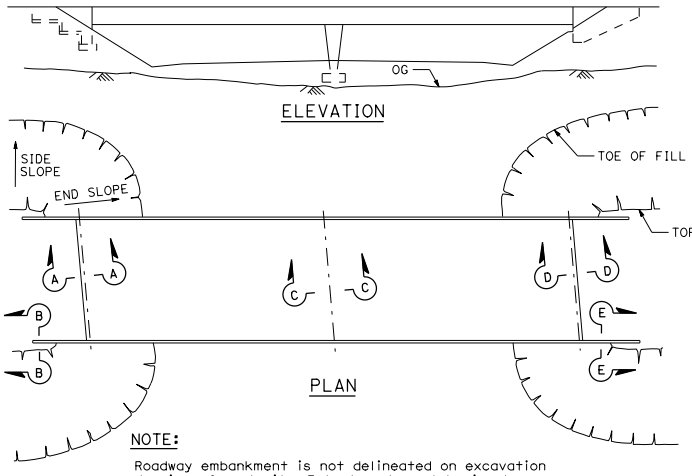
NO SCALE

A62B



7-1-25

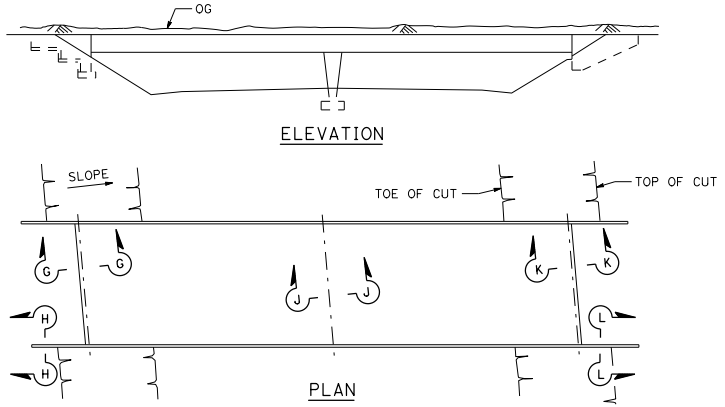
Return to Table of Contents




NOTE:

Roadway embankment is not delineated on excavation drawings for clarity. Embankment must be in place before structure excavation is made.

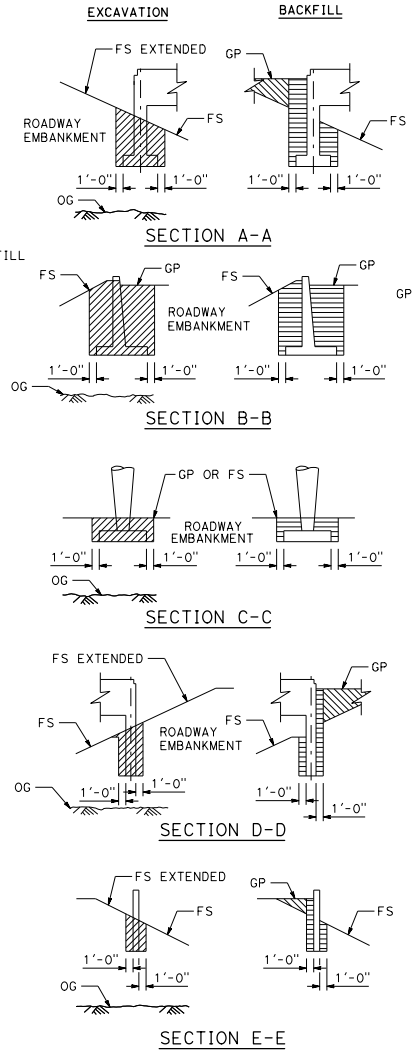
## IN FILL




NOTE:

If no roadway excavation is involved at bridge, structure excavation is measured from original ground.

## IN CUT




| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER
Gary Wang
No. C58298
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

LEGEND:

- STRUCTURE EXCAVATION
- STRUCTURE BACKFILL
- ROADWAY EXCAVATION
- ROADWAY EMBANKMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LIMITS OF PAYMENT FOR EXCAVATION AND BACKFILL BRIDGE

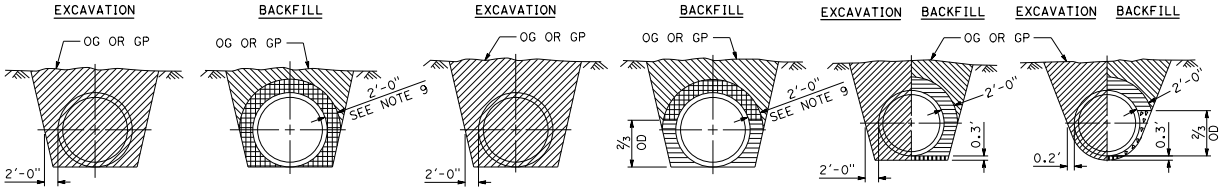
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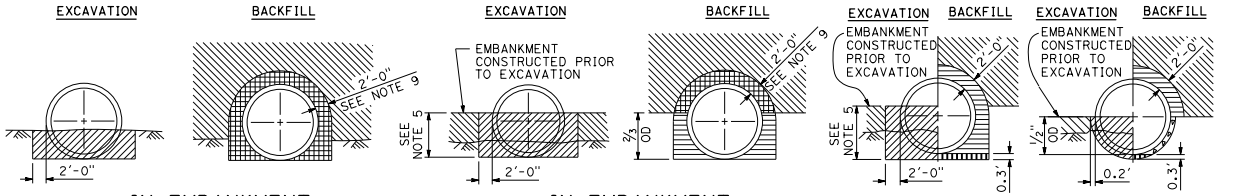
A62C

7-1-25

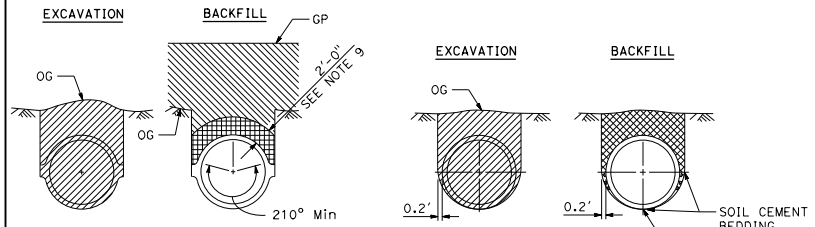


Return to Table of Contents




| REINFORCED CONCRETE PIPE See Notes 1, 2, 7 and 10 | | | | | |
|---|---|---|---|---|---|
| METHOD 1 | | METHOD 2 | | METHOD 3 | |
| MINIMUM ALLOWABLE CLASSES OF RCP FOR METHOD 1 | | MINIMUM ALLOWABLE CLASSES OF RCP FOR METHOD 2 | | MINIMUM ALLOWABLE CLASSES OF RCP FOR METHOD 3 | |
| COVER | MINIMUM CLASS AND D-LOAD | COVER | MINIMUM CLASS AND D-LOAD | COVER | MINIMUM CLASS AND D-LOAD |
| 5.9' | CLASS II 1000D | 15.9' | CLASS II 1000D | 25.9' | CLASS II 1000D |
| 6.0' - 7.9' | CLASS III 1350D | 16.0' - 19.9' | CLASS III 1350D | 26.0' - 31.9' | CLASS III 1350D |
| 8.0' - 9.9' | CLASS III SPECIAL 1700D | 20.0' - 24.9' | CLASS III SPECIAL 1700D | 32.0' - 37.9' | CLASS III SPECIAL 1700D |
| 10.0' - 11.9' | CLASS IV 2000D | 25.0' - 27.9' | CLASS IV 2000D | 38.0' - 44.9' | CLASS IV 2000D |
| 12.0' - 13.9' | CLASS IV SPECIAL 2500D | 28.0' - 34.9' | CLASS IV SPECIAL 2500D | 45.0' - 55.9' | CLASS IV SPECIAL 2500D |
| 14.0' - 16.9' | CLASS V 3000D | 35.0' - 41.9' | CLASS V 3000D | 56.0' - 67.9' | CLASS V 3000D |
| 17.0' - 20.0' | CLASS V SPECIAL 3600D | 42.0' - 50.0' | CLASS V SPECIAL 3600D | 68.0' - 80.0' | CLASS V SPECIAL 3600D |
| SEE NOTES 6 AND 9 | | SEE NOTES 8 AND 9 | | | |




NON-REINFORCED CONCRETE PIPE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTES:

1. Unless otherwise shown on the plans or specified in the special provisions, the Contractor shall have the option of selecting the class of RCP and the method of backfill to be used, provided the height of cover does not exceed the value shown for the RCP selected.
   Example:
   2'-0" RCP culvert with maximum cover of 19'-0" the options are:
   a) Class V Special or stronger with Method 1.
   b) Class III or stronger with Method 2.
   c) Class II or stronger with Method 3.
   Cover is defined as the maximum vertical distance from top of pipe to finished grade within the length of any given culvert.
2. The class of RCP, method of backfill and bedding selected shall be the same throughout the length of any given culvert.
3. The "length of any culvert" is defined as the culvert between:
   a) Successive drainage structures (inlets, junction boxes, headwalls, etc.).
   b) A drainage structure and the inlet or outlet end of the culvert.
   c) The inlet and outlet end of the culvert when there are no intervening drainage structures.
4. Slope or shore excavation sides as necessary.
5. Embankment height prior to excavation for installation of all classes of RCP under Methods 2 and 3A shall be as follows:
   Pipe sizes 1'-0" to 3'-6", ID = 2'-6"
   Pipe sizes 4'-0" to 7'-0", ID = 2/3 OD
   Pipe sizes larger than 7'-0", ID = 5'-0"
6. The maximum size for all classes of RCP placed under Method 1 is 6'-6" ID.
7. Non-reinforced precast pipe sizes 1'-0" or smaller may also be placed under Methods 1, 2 or 3.
8. Elliptical shaped RCP shall be placed under Method 2 only.
9. Embankment compaction requirements govern over the 90% relative compaction backfill requirement within 2'-6" of finished grade.
10. Backfill shall be placed full width of excavation except where dimensions are shown for backfill width or thickness. Dimensions shown are minimums.
11. Where the precast non-reinforced concrete pipe is used as a substitute for the cast-in-place pipe, both the wall thickness and the concrete strength shall be at least as great as that specified for the cast-in-place pipe. The fill height allowed shall not exceed that shown for the cast-in-place pipe.

LEGEND:

- STRUCTURE EXCAVATION (CULVERT)
- STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
- STRUCTURE BACKFILL (CULVERT) 90% RELATIVE COMPACTION
- ROADWAY EMBANKMENT
- LOOSE BACKFILL
- SOIL CEMENT BEDDING
- SAND BEDDING

OD = OUTSIDE DIAMETER FOR CIRCULAR PIPES AND MAXIMUM VERTICAL DIMENSION FOR OTHER SHAPES

ID = INSIDE DIAMETER FOR CIRCULAR PIPES AND MINIMUM VERTICAL DIMENSION FOR OTHER SHAPES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXCAVATION AND BACKFILL CONCRETE PIPE CULVERTS

NO SCALE

A62D

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

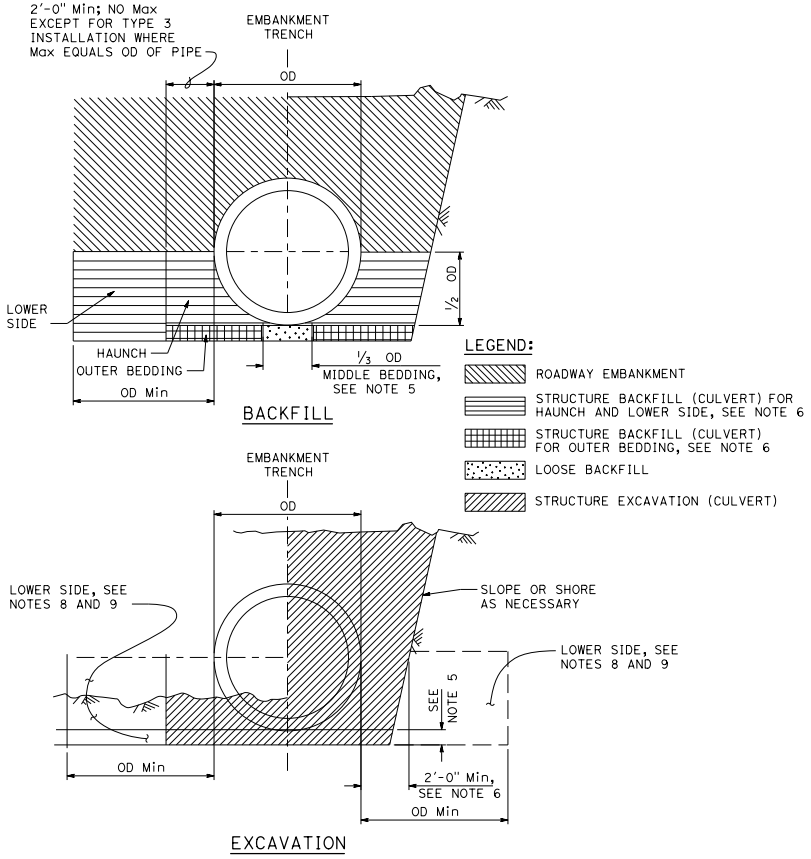
REGISTERED PROFESSIONAL ENGINEER — Carl W. Duan — No. C59976 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

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## DESIGN NOTES:

Design: AASHTO LRFD Bridge Design Specifications, 8th edition with California Amendments. INDIRECT DESIGN METHOD

Soil: w Fe = 162 pcf Installation Type 1
w Fe = 168 pcf Installation Types 2 & 3
w = Unit weight of soil (pcf)
Fe = Soil-structure interaction factor




## INSTALLATION TYPE 1:

The haunch and outer bedding shall be compacted to a minimum 90 percent relative compaction. In addition, the minimum sand equivalent in these areas shall be 30 and the maximum percentage passing the No. 200 sieve size shall be 5.

## INSTALLATION TYPE 2:

The haunch and outer bedding shall be compacted to a minimum 90 percent relative compaction. In addition, the minimum sand equivalent in these areas shall be 25.

## INSTALLATION TYPE 3:

The haunch and outer bedding shall be compacted to a minimum 85 percent relative compaction. 90 percent relative compaction will be required where the fill over the pipe is less than 4'-0" or 1/2 OD. In addition, the minimum sand equivalent in these areas shall be 25.

**INSTALLATION TYPE 1**

| MINIMUM CLASS AND D-LOAD | COVER | |
|---|---|---|
| | 60" Dia AND SMALLER | OVER 60" Dia TO 120" Dia Max |
| CLASS II 1000D | 14.9' | 12.9' |
| CLASS III 1350D | 15.0' - 21.3' | 13.0' - 18.9' |
| CLASS III SPECIAL 1700D | 22.0' - 26.8' | 19.0' - 24.9' |
| CLASS IV 2000D | 28.0' - 31.5' | 25.0' - 29.9' |
| CLASS IV SPECIAL 2500D | 33.0' - 37.8' | 30.0' - 38.9' |
| CLASS V 3000D | 42.0' - 47.5' | 39.0' - 46.9' |
| CLASS V SPECIAL 3600D | 50.0' - 57.3' | 47.0' - 58.0' |

**INSTALLATION TYPE 2**

| MINIMUM CLASS AND D-LOAD | COVER | |
|---|---|---|
| | 60" Dia AND SMALLER | OVER 60" Dia TO 120" Dia Max |
| CLASS II 1000D | 11.9' | 9.9' |
| CLASS III 1350D | 12.0' - 15.9' | 10.0' - 14.9' |
| CLASS III SPECIAL 1700D | 16.0' - 20.5' | 15.0' - 19.9' |
| CLASS IV 2000D | 21.0' - 24.3' | 20.0' - 23.9' |
| CLASS IV SPECIAL 2500D | 25.0' - 30.3' | 24.0' - 30.9' |
| CLASS V 3000D | 32.0' - 36.3' | 31.0' - 37.9' |
| CLASS V SPECIAL 3600D | 38.0' - 43.8' | 38.0' - 46.0' |

**INSTALLATION TYPE 3**

| MINIMUM CLASS AND D-LOAD | COVER | |
|---|---|---|
| | 60" Dia AND SMALLER | OVER 60" Dia TO 120" Dia Max |
| CLASS II 1000D | 8.9' | 5.9' |
| CLASS III 1350D | 9.0' - 11.9' | 6.0' - 10.9' |
| CLASS III SPECIAL 1700D | 12.0' - 15.9' | 11.0' - 13.9' |
| CLASS IV 2000D | 16.0' - 18.9' | 14.0' - 17.9' |
| CLASS IV SPECIAL 2500D | 19.0' - 23.3' | 18.0' - 22.9' |
| CLASS V 3000D | 25.0' - 28.3' | 23.0' - 28.9' |
| CLASS V SPECIAL 3600D | 30.0' - 34.3' | 29.0' - 35.0' |

## NOTES:

1. Unless otherwise shown on the plans or specified in the special provisions, the Contractor shall have the option of selecting the class of RCP and the type of installation to be used, provided the height of cover does not exceed the value shown for the RCP selected.
   Example: 24" RCP culvert with maximum cover of 24'-0" the options are:
   a) Class III Special or stronger with Installation Type 1.
   b) Class IV or stronger with Installation Type 2.
   c) Class IV Special or stronger with Installation Type 3.
   Cover is defined as the maximum vertical distance from top of the pipe to finished grade within the length of any given culvert.
2. The class of RCP and Installation Type selected shall be the same throughout the length of any given culvert.
3. The "length of any culvert" is defined as the culvert between:
   a) Successive drainage structure (inlets, junction boxes, headwalls, etc.).
   b) A drainage structure and the inlet or outlet end of the culvert.
   c) The inlet and outlet end of the culvert when there are no intervening drainage structures.
4. Elliptical shaped RCP shall not be used.
5. Bedding depth: 1/24 OD Min, not less than 3" for soil foundation; 1/12 OD Min, not less 6" for rock foundation.
6. Slurry cement backfill may be substituted for backfill in the outer bedding and haunch areas. If slurry is used, the outer and middle beddings shall be omitted. Prior to installation, the soil under the middle 1/3 of the outside diameter of the pipe shall be softened by scarifying or other means to a minimum depth of 1/24 OD, but not less than 3". Where slurry cement backfill is used, clear distance to trench wall may be reduced as set forth in the Standard Specifications.
7. Backfill shall be placed full width of excavation except where dimensions are shown for backfill width or thickness. Dimensions shown are minimum.
8. Structure backfill for lower side in embankment installations shall be the same as in haunch. Lower side in trench installation shall at least have the same firmness as in haunch.
9. Where the pipe is placed in a trench, if the trench walls are sloped at 5 vertical to 1 horizontal or steeper for at least 90 percent of the trench height or up to not less than 12" from the grading plane, the firmness of the soil in the lower side need not be considered.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXCAVATION AND BACKFILL CONCRETE PIPE CULVERTS INDIRECT DESIGN METHOD

NO SCALE

**A62DA**

7-1-25

2025 STANDARD PLAN A62DA



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

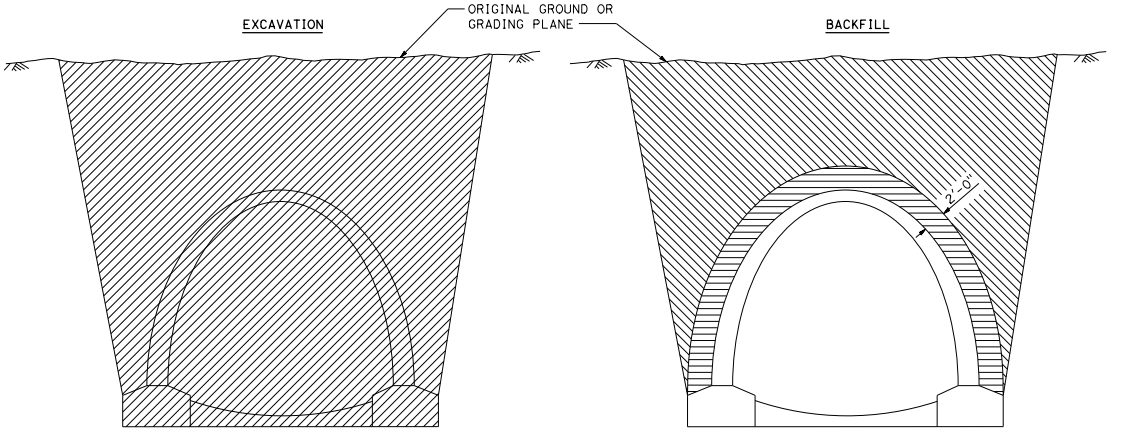
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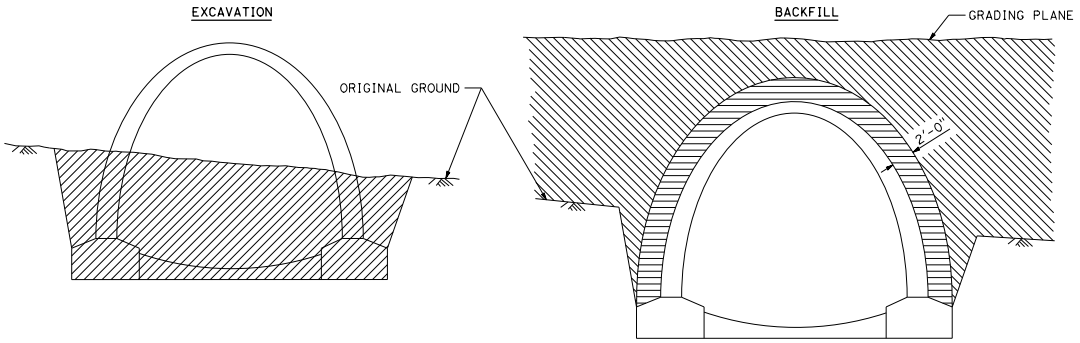
1. Slope or shore excavation sides as necessary.
2. Dimensions shown are minimum.

LEGEND:

- STRUCTURE EXCAVATION (CULVERT)
- STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
- ROADWAY EMBANKMENT

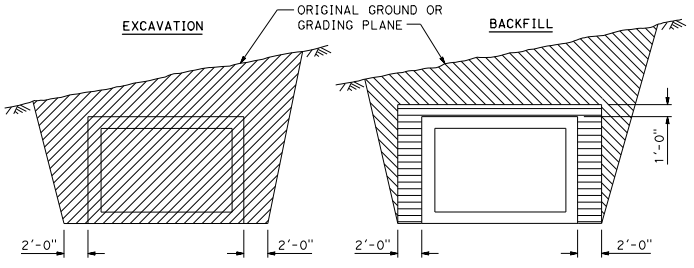



IN TRENCH

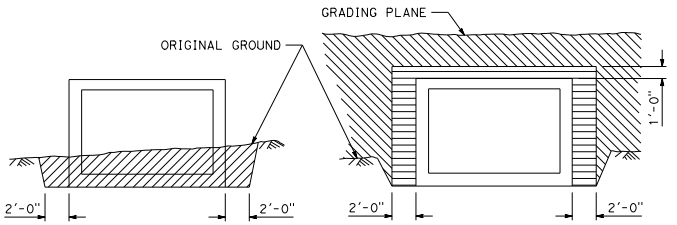



IN EMBANKMENT

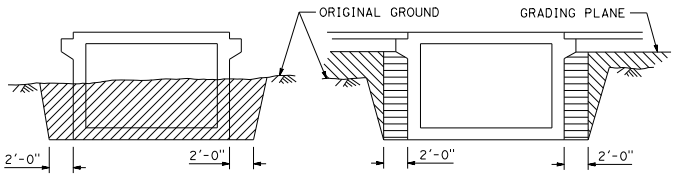
REINFORCED CONCRETE ARCH CULVERT




IN TRENCH




IN EMBANKMENT




EXPOSED TOP

REINFORCED CONCRETE BOX CULVERT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXCAVATION AND BACKFILL CAST-IN-PLACE REINFORCED CONCRETE BOX AND ARCH CULVERTS

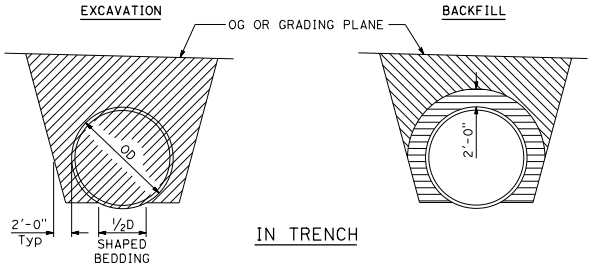
NO SCALE

A62E

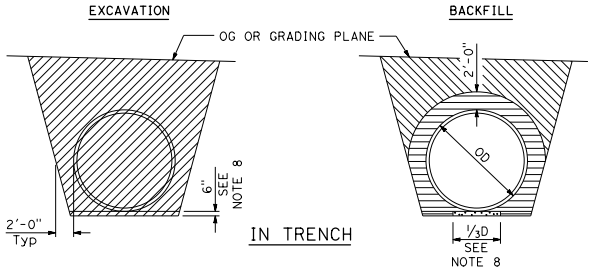
7-1-25

2025 STANDARD PLAN A62E

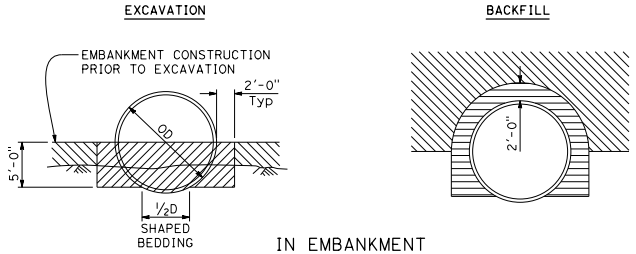
Return to Table of Contents




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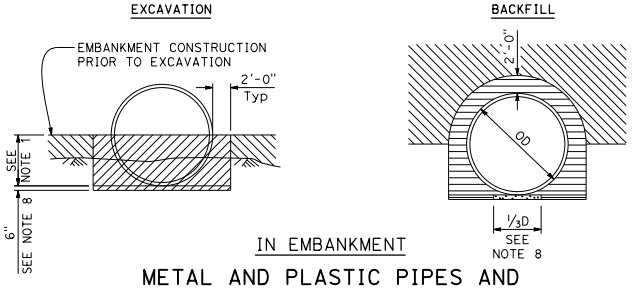

IN TRENCH




IN EMBANKMENT

## PIPES

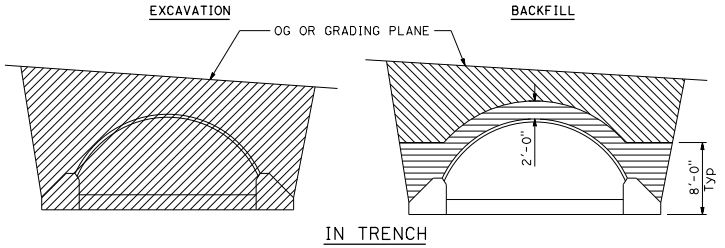
Larger than 84"



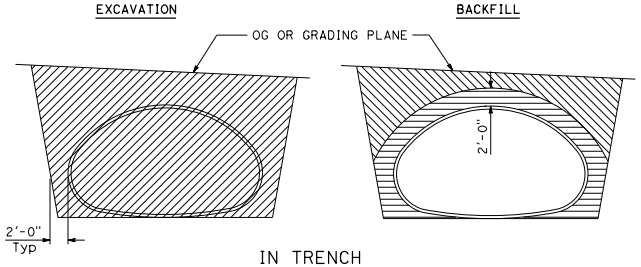

IN EMBANKMENT

## METAL AND PLASTIC PIPES AND CORRUGATED METAL PIPE ARCHES

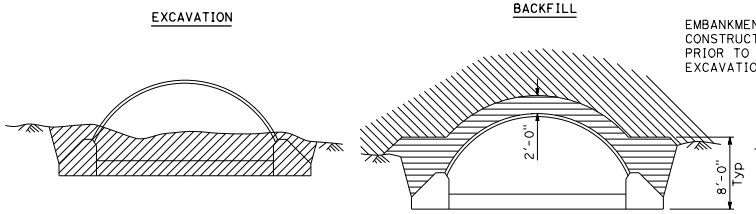
84" or Smaller




IN TRENCH

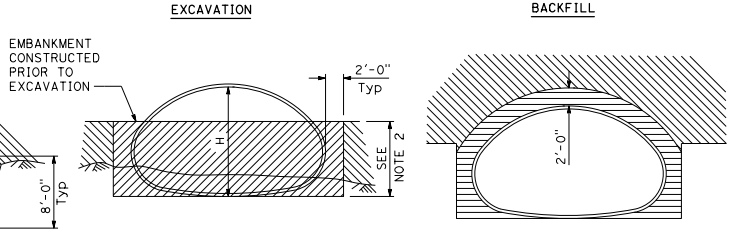



IN TRENCH




IN EMBANKMENT

## STRUCTURAL STEEL PLATE ARCHES




IN EMBANKMENT

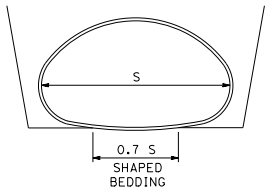
## STRUCTURAL STEEL PLATE PIPE ARCHES AND VEHICULAR UNDERCROSSING

NOTES:

1. PIPES: 30" minimum for diameters up to and including 42" then ⅔ diameter but no more than 60" required. CORRUGATED METAL PIPE ARCHES: 30" maximum.
2. ⅔ H up to 60" maximum.
3. Slope or shore excavation sides as necessary.
4. Backfill shall be placed full width of excavation except as noted.
5. Diagrams do not apply to overside drains.
6. Dimensions shown are minimum.
7. Construction strutting of structural steel plate pipe, arches and vehicular undercrossing to be used when shown on the project plans. When shown, see Standard Plan D88A for strutting requirements.
8. Excavation below pipe and 80% relative compaction requirements for plastic pipes only.
9. D is the inside diameter (ID) of the pipe.

LEGEND:

- STRUCTURE EXCAVATION (CULVERT)
- STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
- STRUCTURE BACKFILL (CULVERT) 80% RELATIVE COMPACTION
- ROADWAY EMBANKMENT




SHAPED BEDDING

S = Larger than 84"

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Carl W. Duan No. C59976 Exp. 6-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXCAVATION AND BACKFILL METAL AND PLASTIC CULVERTS

NO SCALE

A62F

7-1-25

2025 STANDARD PLAN A62F

Return to Table of Contents

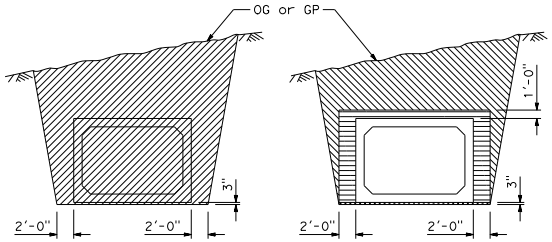
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REGISTERED CIVIL ENGINEER

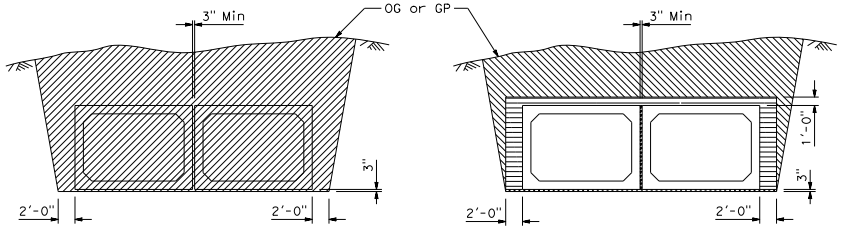
September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

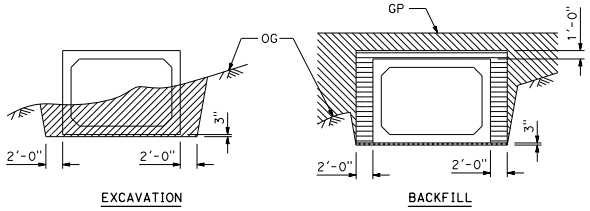
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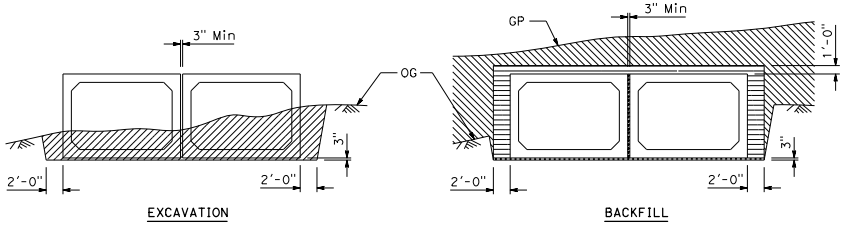

IN TRENCH




IN TRENCH




IN EMBANKMENT




IN EMBANKMENT

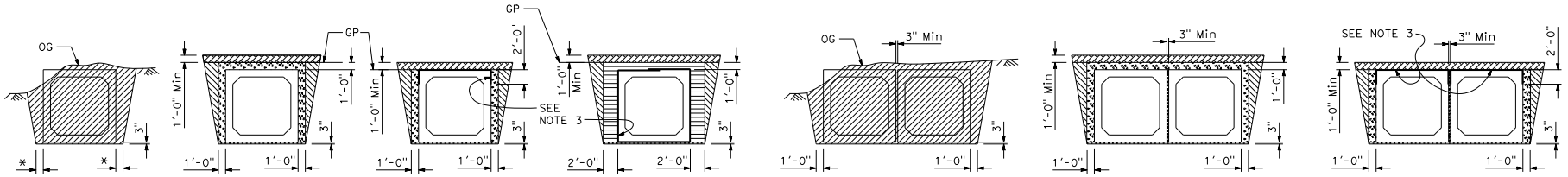
## FILL HEIGHT GREATER THAN 2'-0"

NOTES:

1. Slope or shore excavation sides as necessary.
2. Dimensions shown are minimum.
3. Methods 2 and 3 for single or multiple boxes requires an approved external sealing band. See Standard Plan D83A.
4. Construction of Roadway Pavement Structure in Method 2 or Method 3 shall not disturb the external sealing band installation.

LEGEND:

- STRUCTURE EXCAVATION (CULVERT)
- STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
- ROADWAY EMBANKMENT
- SLURRY CEMENT BACKFILL
- SAND BEDDING (CULVERT)
- ROADWAY PAVEMENT STRUCTURE




## FILL HEIGHT 2'-0" OR LESS

* 1'-0" Where Method 1 or 2 Backfill is used.
2'-0" Where Method 3 Backfill is used.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EXCAVATION AND BACKFILL PRECAST REINFORCED CONCRETE BOX CULVERT

NO SCALE

A62G

7-1-25



Return to Table of Contents

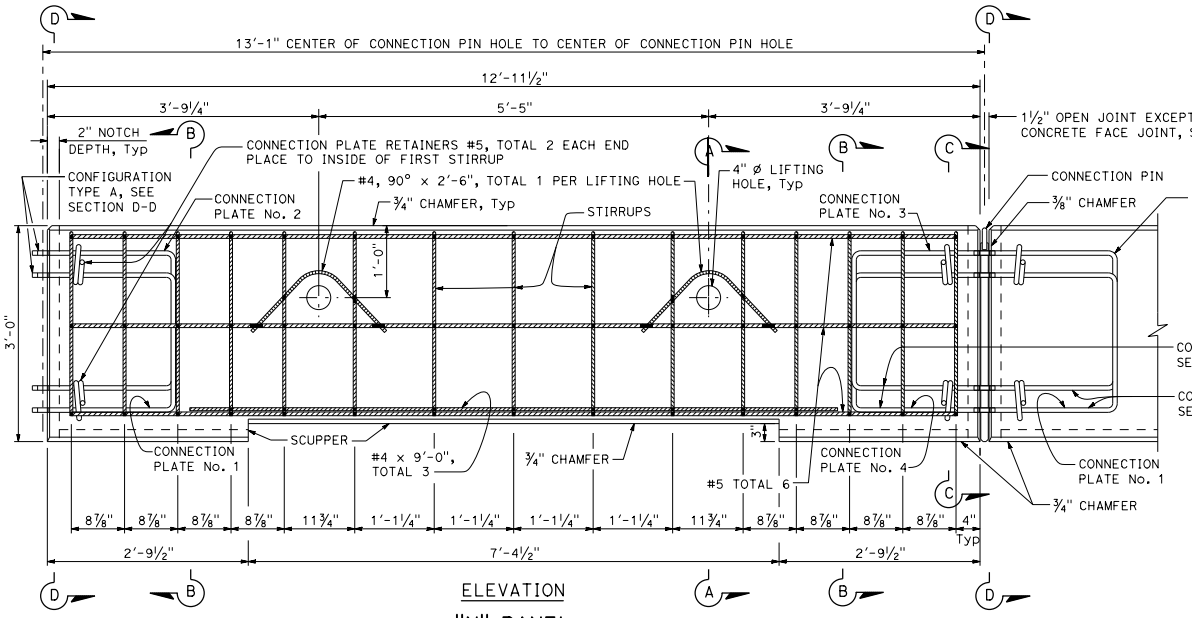
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Malik Rehman
REGISTERED CIVIL ENGINEER

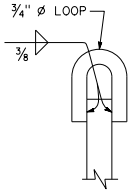
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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ELEVATION
"N" PANEL
See Note 1




DETAIL A

NOTES:

1. Portable concrete barrier (Type 60K) consists of a layout of interconnected precast panels of the following types:

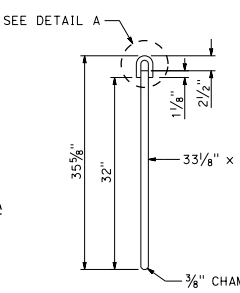
   "N" Panels - Notched concrete end at both ends of panel. Majority of panels used for portable (Type 60K) barrier are "N" Panels.

   "T" Panels - Notched concrete end at one end of the panel and a vertical concrete face at the other end of the panel. Used to connect "N" Panels to the "R" Panels.

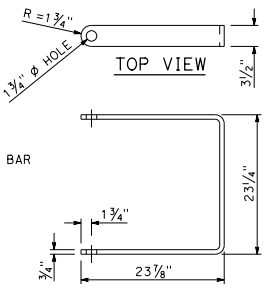
   "R" Panels - Vertical concrete face at both ends of the panel. Used between "T" Panels. Also connects to vertical concrete end of "T" Panels and vertical concrete end of the connection to permanent concrete barrier.

   For Details of "T" and "R" Panels and Typical layouts of portable concrete barrier (Type 60K), see Standard Plan A63B.

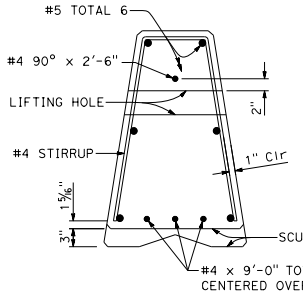
2. Connection Plate Configurations Type A and Type B apply to "N", "T" and "R" Panels. The ends of Connection Plate No. 3 overlap the ends of Connection Plate No. 1. The ends of Connection Plate No. 4 overlap the ends of Connection Plate No. 2. One connection pin inserted through the holes in Connection Plates No. 3 and No. 1 and the other connection pin inserted through the holes in Connection Plates No. 4 and No. 2.



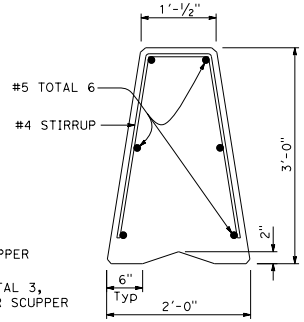

ELEVATION
CONNECTION PIN



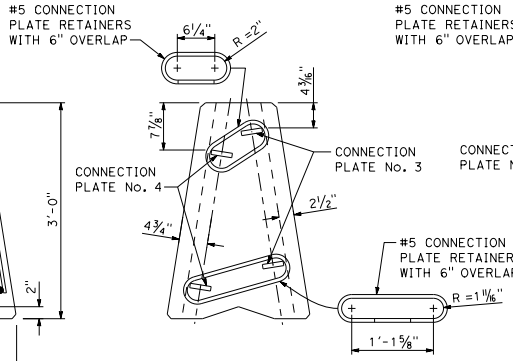

SIDE VIEW
CONNECTION PLATE



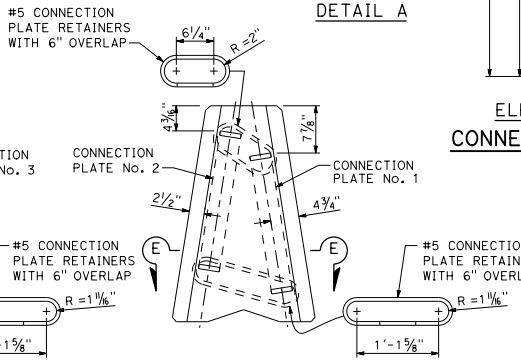

SECTION A-A



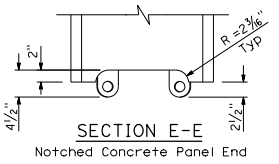

SECTION B-B




SECTION C-C
Connection Plate Configuration Type B, see Note 2




SECTION D-D
Connection Plate Configuration Type A, see Note 2




SECTION E-E
Notched Concrete Panel End

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PORTABLE CONCRETE BARRIER (TYPE 60K)

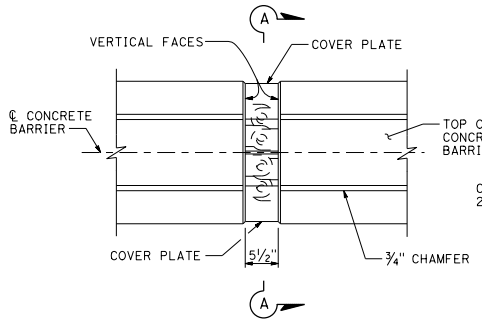
NO SCALE

A63A

2025 STANDARD PLAN A63A

7-1-25

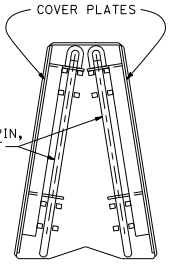
Return to Table of Contents



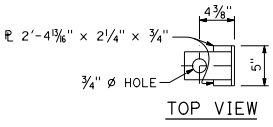

Connection pins not shown in this view.

TOP VIEW

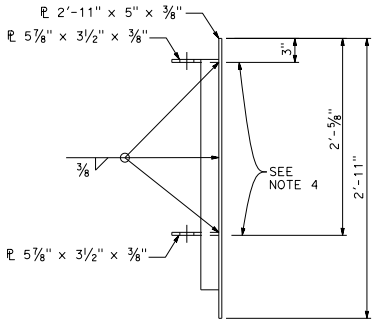
## VERTICAL CONCRETE FACE JOINTS




SECTION A-A




TOP VIEW




SIDE VIEW

## COVER PLATE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

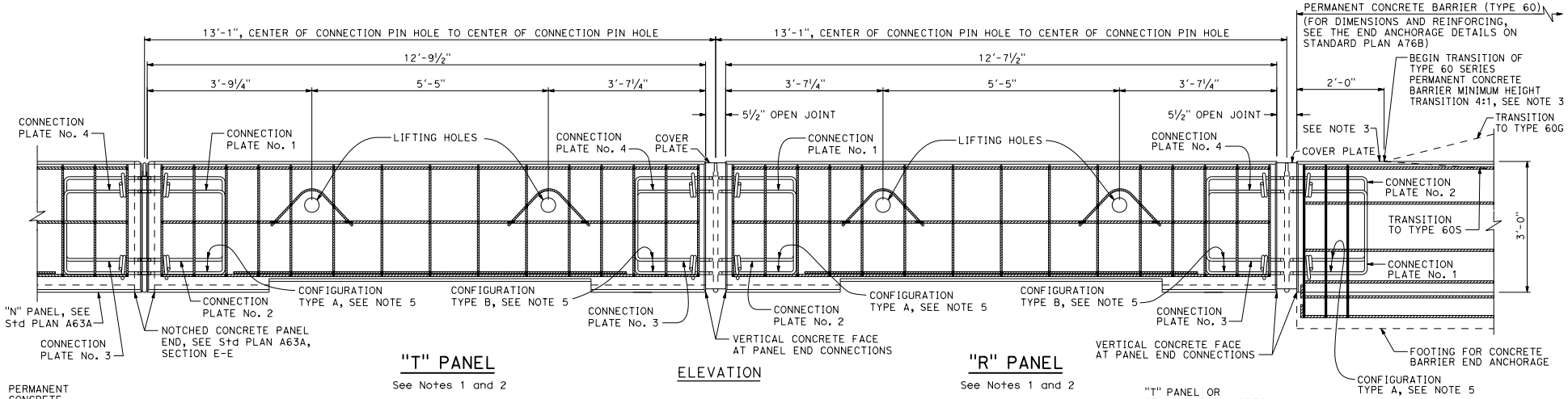
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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NOTES:

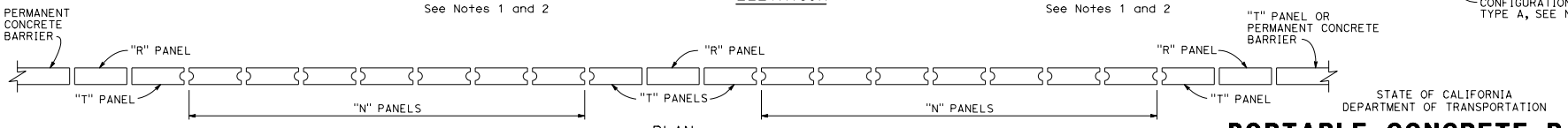
1. "R" Panels are to be placed at a maximum of 10 panel segment intervals and at connections to permanent concrete barrier. "R" panels provide for quick and easy placement and removal by lateral movement of panel (NO Notched Ends). "N" Panels have concrete notches at each end of the panel. "T" panels have a concrete notch at one end of the panel and a vertical face at the other end of the panel. Notched end connections plus overlapping connection plates require longitudinal movement of the panels during placement or removal. If portable concrete barrier (Type 60K) is to be removed after installation, "R" panels are to be removed first to facilitate removal of the remaining panels.
2. Reinforcement and dimensioning details for "R" and "T" Panels are similar to the "N" Panel details shown on Standard Plan A63A.
3. Modify end of permanent concrete barrier with the installation of connection plates for connection pins and cover plates. Remove 2' of existing Type 60 permanent concrete barrier to install connection plates for "R" Panel connection. Where the connection to existing barrier requires a height transition, remove existing barrier to end of the height transition.
4. Dimension to bottom of the 5⅞" x 3½" x ⅜" plate.
5. For additional details of connection plate configurations, see Sections C-C and D-D of Standard Plan A63A.




"T" PANEL
See Notes 1 and 2

ELEVATION

"R" PANEL
See Notes 1 and 2




PLAN

## TYPICAL PORTABLE CONCRETE BARRIER (TYPE 60K) LAYOUT

See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## PORTABLE CONCRETE BARRIER (TYPE 60K)

NO SCALE

A63B

7-1-25



Return to Table of Contents

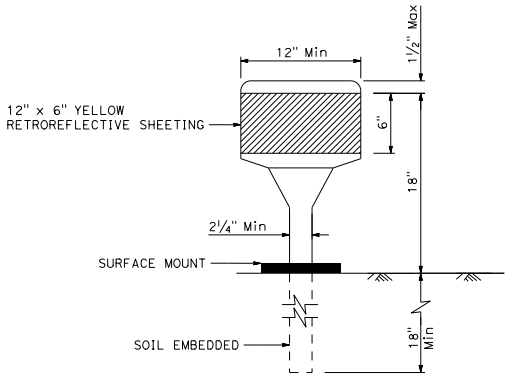
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

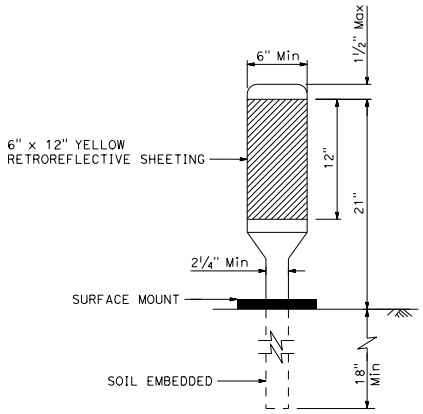
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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TYPE K-1 (CA)

Flexible post with horizonal orientation of sheeting

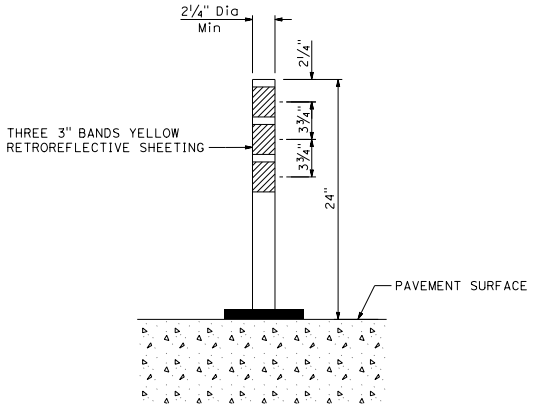



TYPE K-2 (CA)

Flexible post with vertical orientation of sheeting

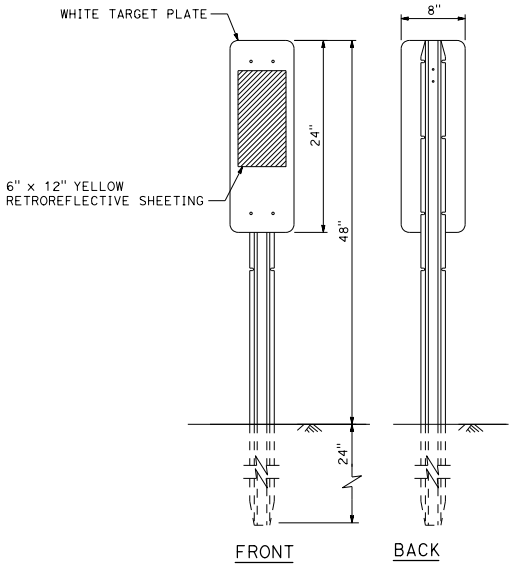
NOTE:

1. See Standard Plan A73B for metal post details and additional markers.



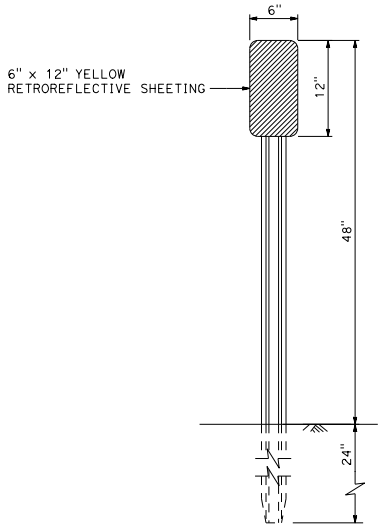

TYPE Q (CA)

Tubular flexible post surface mount




TYPE L-1 (CA)

See Note 1




TYPE L-2 (CA)

See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**OBJECT MARKERS**

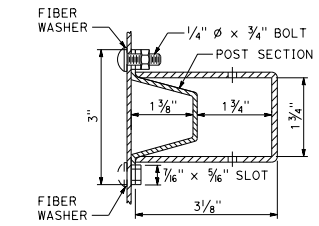
NO SCALE

**A73A**

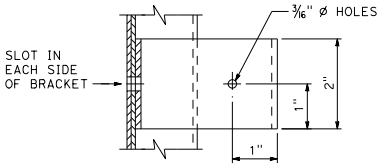
**2025 STANDARD PLAN A73A**

7-1-25

Return to Table of Contents

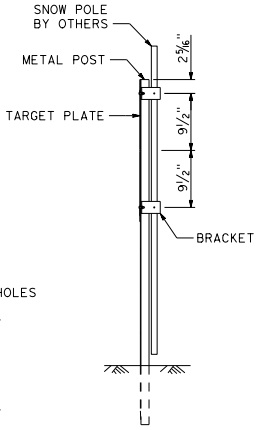



TOP VIEW




Bracket to be 1/8" x 2" mild steel galvanized after fabrication

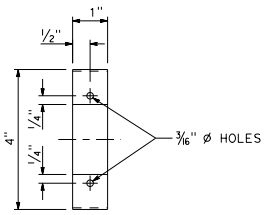
SIDE VIEW



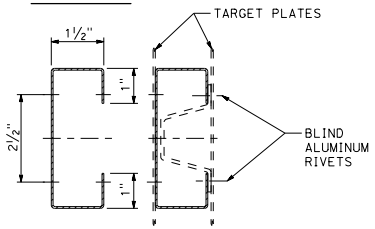

POST

SIDE VIEW

## SNOW POLE BRACKET



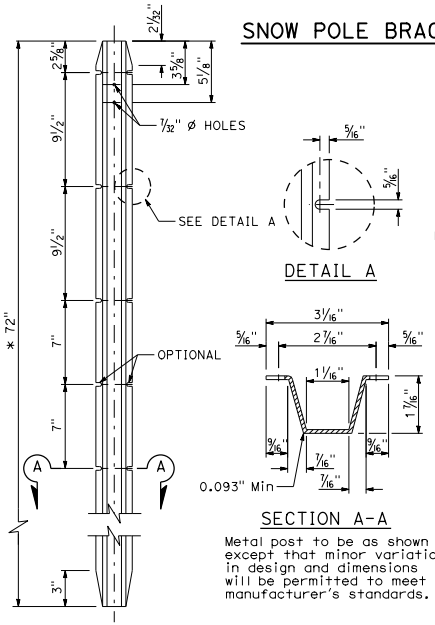

SIDE VIEW




TOP VIEW

Material: Aluminum 0.050" thick (3003-H14 Alloy)

## TWO PLATE POST MOUNT







DETAIL A

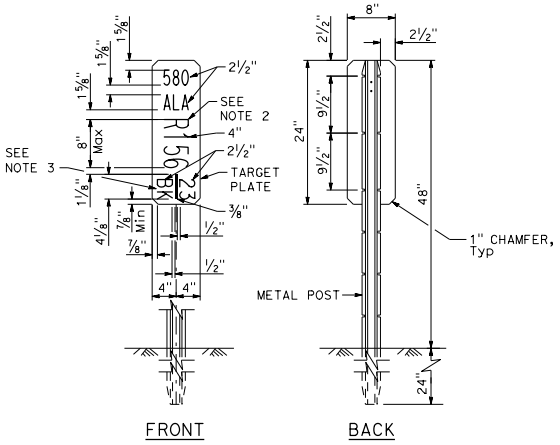



SECTION A-A

Metal post to be as shown except that minor variations in design and dimensions will be permitted to meet manufacturer's standards.

* 8'-0" for Type P object marker

## METAL POST DETAIL

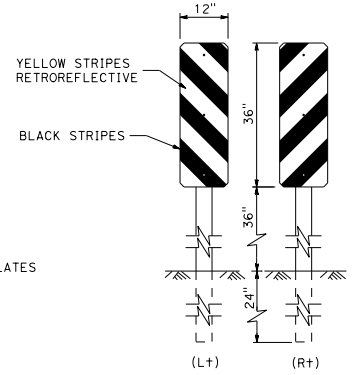



FRONT BACK

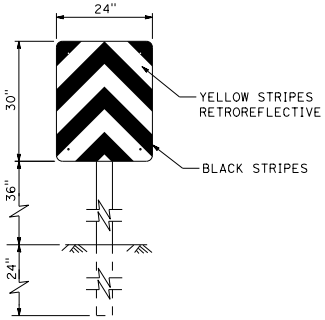
## MILEPOST MARKER

MILEPOST MARKER NOTES:

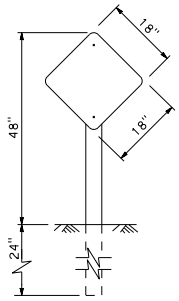
1. The marker shall be white (non-reflective) target plate with black Series D numerals and letters.
2. A post mile prefix, such as "R", shall apply only when directed by the Engineer.
3. "BK" (Back), "AH" (Ahead), or a blank space shall apply as directed by the Engineer.
4. All information shall be in U.S. Customary units (miles).




## TYPE P (CA)




## TYPE R (CA)




## TYPE N-1 (CA), N-2 (CA), N-3 (CA)

N-1(CA). Yellow retroreflective.
N-2(CA). Red retroreflective.
N-3(CA). Orange retroreflective.

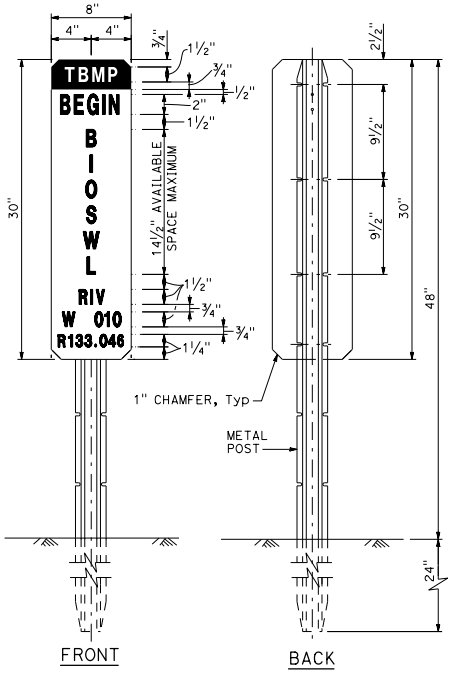
## OBJECT MARKERS

NOTES:

A. See Standard Plan A73A for additional object markers.

B. Type P(CA) and R(CA) markers shall have orange and white retroreflective stripes in work zones.

C. Diagonal stripes on Type P(CA) markers shall be sloped down in the direction of travel.




FRONT BACK

## TBMP MARKER

TREATMENT BEST MANAGEMENT PRACTICE (TBMP) MARKER

NOTES:

1. The marker header shall be green (non-reflective) background with white (non-reflective) Series C letters.
2. The marker body shall be white (non-reflective) target plate with black Series C numbers and letters.
3. "BEGIN" or "END" shall apply as directed by the Engineer.
4. TBMP abbreviations shall be Series D letters up to a maximum of 2" tall, to fit within the available maximum space of 14.5".
5. See Project Plans for TBMP abbreviations.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Mario Lozano-Cisneros No. C94626 Exp. 3-31-27 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MARKERS

NO SCALE

A73B

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

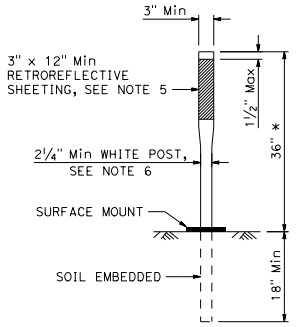
Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

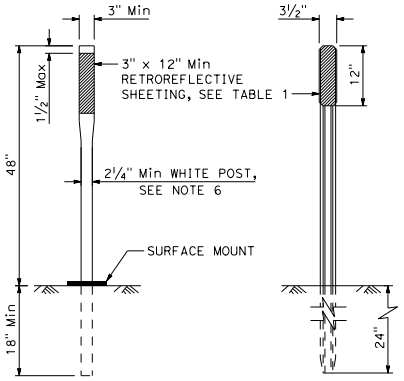
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CHANNELIZERS

* 36" Min where speeds are 40 mph or less.

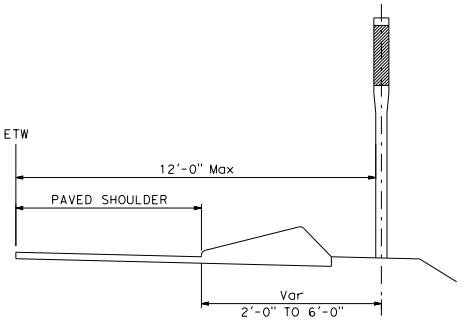



CLASS 1
FLEXIBLE POST




CLASS 2
METAL POST
See Note 4

DELINEATORS

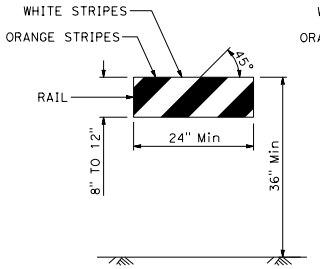



DELINEATOR POSITIONING

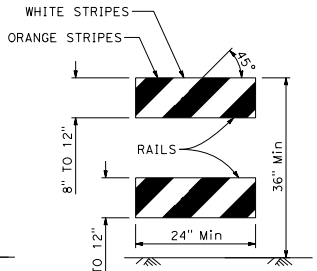
NOTES:

1. The retroreflective sheeting used on the back of delineator shall be a minimum size of 3" x 3".
2. The type of delineator to be installed will be designated on the plans.
3. All barricade stripes shall be retroreflective and sloped downward in the direction of the opened traffic lane.
4. See Standard Plan A73B for metal post details.
5. Unless shown otherwise on the plans, or as directed by the Engineer, the color of the retroreflective sheeting for permanent channelizers shall conform to the color of the pavement markings it supplements.
6. Except Class 1 (Flexible Post), temporary delineators and temporary channelizers in work zones shall be orange post with white retroreflective sheeting.

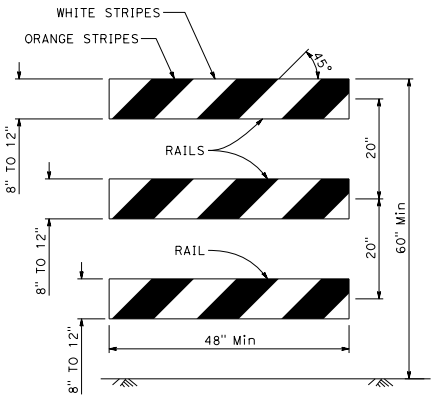
| TABLE 1 DELINEATORS | | |
|---|---|---|
| TYPE | RETROREFLECTIVE SHEETING | |
| | FRONT | BACK |
| E | WHITE | WHITE (SEE NOTE 1) |
| F | WHITE | NONE |
| G | YELLOW | NONE |
| J | RED | NONE |




TYPE I
See Note A




TYPE II




TYPE III

BARRICADES
See Note 3
Only face of rails shown. Barricade construction materials and supports as specified in the specifications.

| TABLE 2 BARRICADES | | | |
|---|---|---|---|
| BARRICADE | TYPE I | TYPE II | TYPE III |
| WIDTH OF RAIL | 8" Min - 12" Max * | 8" Min - 12" Max * | 8" Min - 12" Max * |
| LENGTH OF RAIL | 24" Min | 24" Min | 48" Min |
| WIDTH OF STRIPES * * | 6" | 6" | 6" |
| HEIGHT | 36" Min | 36" Min | 60" Min |
| NUMBER OF RETROREFLECTIVE RAIL FACES | 2 (ONE EACH DIRECTION) | 4 (TWO EACH DIRECTION) | 3 IF FACING TRAFFIC IN ONE DIRECTION<br>6 IF FACING TRAFFIC IN TWO DIRECTIONS |

* For the wooden option dimensions are nominal lumber dimensions.
* * For rails less than 36" long, 4" wide stripes shall be used.

NOTE A:
Barricades to have a minimum of 270 square inches of retroreflective area facing traffic when used on freeways, expressways, and other high speed highways.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DELINEATORS, CHANNELIZERS AND BARRICADES

NO SCALE

A73C

7-1-25

Return to Table of Contents

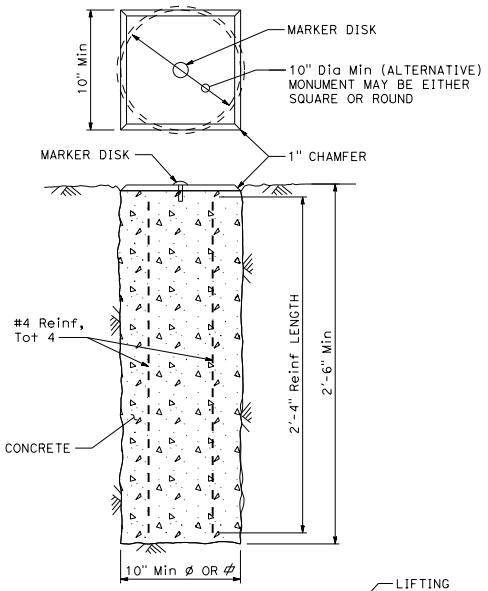
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mark C. Sheahan
PROFESSIONAL LAND SURVEYOR

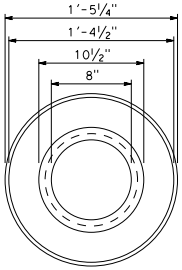
September 19, 2025
PLANS APPROVAL DATE

LICENSED LAND SURVEYOR — Mark C. Sheahan — No. 7610 — Exp. 12-31-26 — STATE OF CALIFORNIA

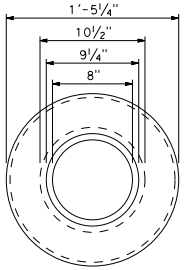
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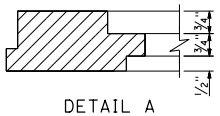

TYPE A




TOP VIEW OF WELL RING

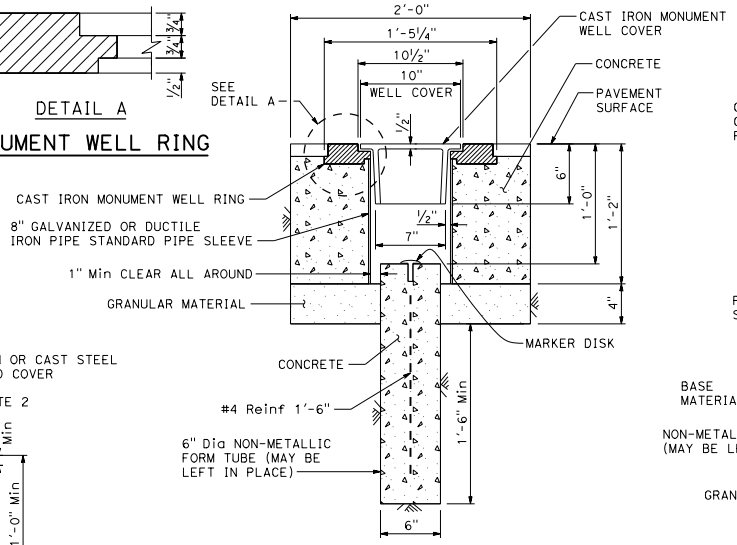



BOTTOM VIEW OF WELL RING

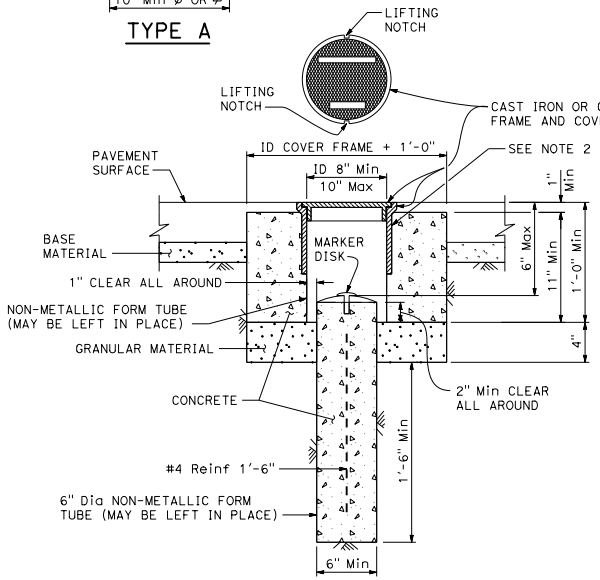



DETAIL A

MONUMENT WELL RING



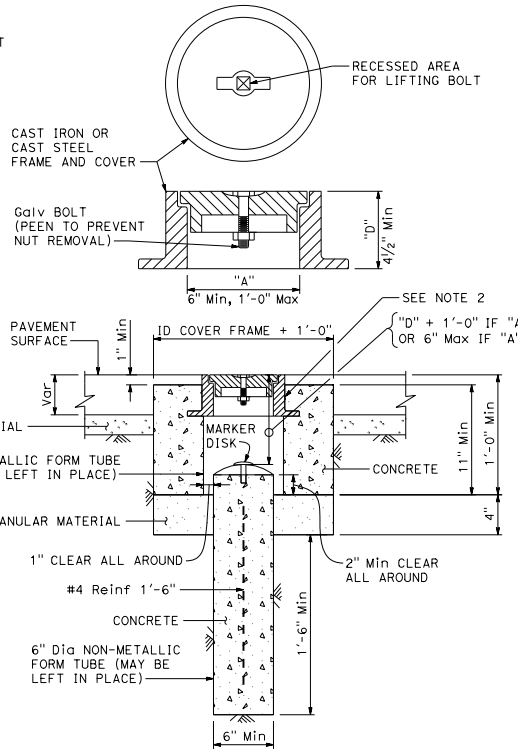

TYPE B




TYPE D
Alternative No. 1

NOTES:

1. The configuration of the cast iron or cast steel frame and cover may vary from that shown.
2. Frame shall be embedded in the concrete a minimum of 3".




TYPE D
Alternative No. 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SURVEY MONUMENTS

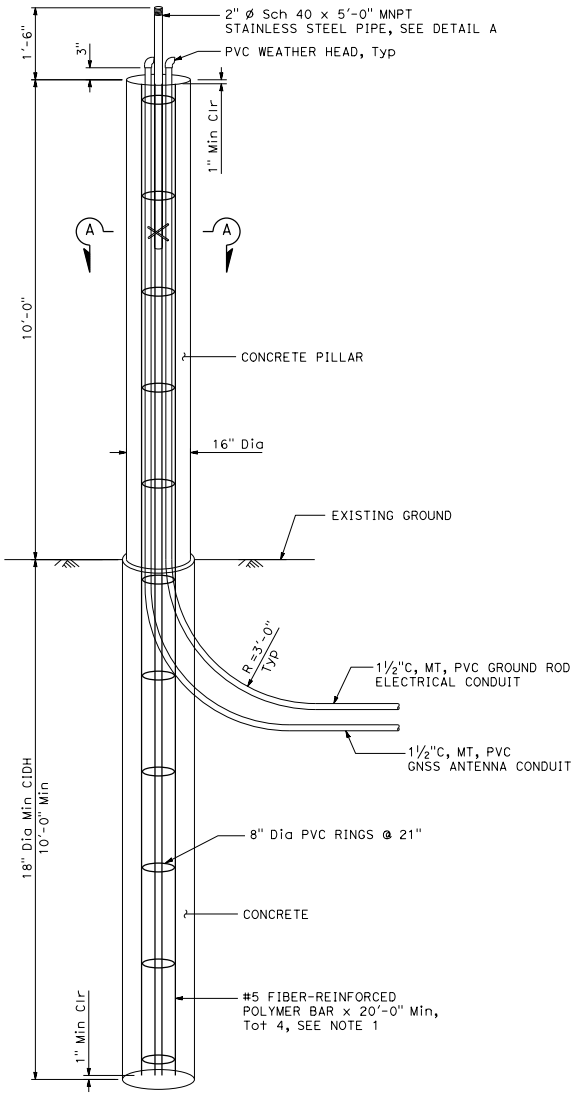
NO SCALE

A74

7-1-25

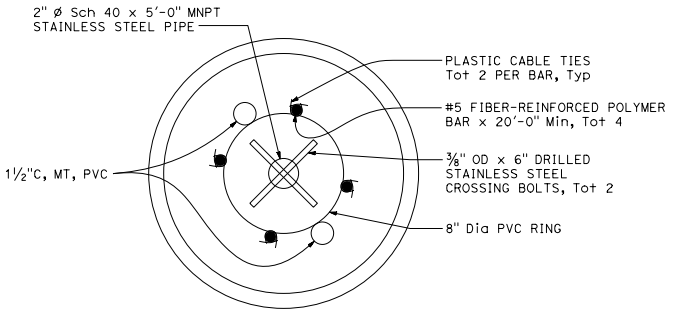
2025 STANDARD PLAN A74

Return to Table of Contents

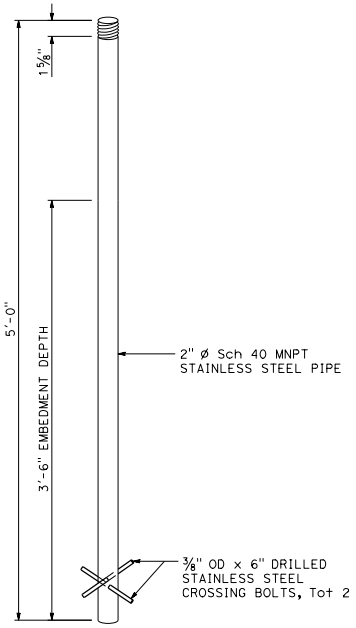



ELEVATION

GLOBAL NAVIGATION SATELLITE SYSTEM STATION




SECTION A-A




DETAIL A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Mark C. Sheahan
PROFESSIONAL LAND SURVEYOR

LICENSED LAND SURVEYOR
Mark C. Sheahan
No. 7610
Exp. 12-31-26
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

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NOTE:

1. Stainless steel or epoxy coated bar of similar diameter may be substituted in place of fiber-reinforced polymer bar.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GLOBAL NAVIGATION SATELLITE SYSTEM STATION DETAILS

NO SCALE

A74A

7-1-25

2025 STANDARD PLAN A74A

Return to Table of Contents

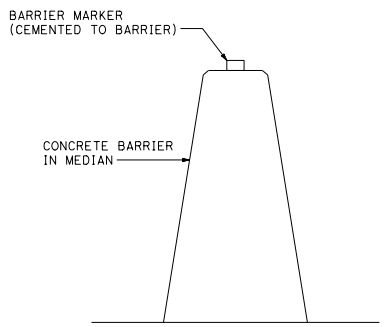
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

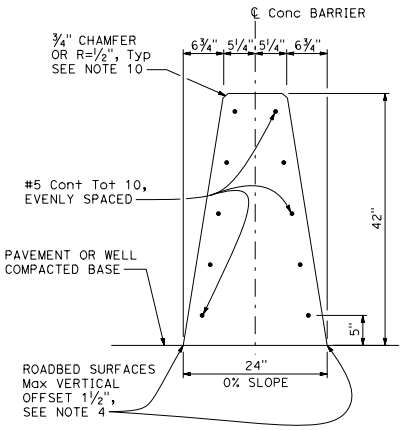
REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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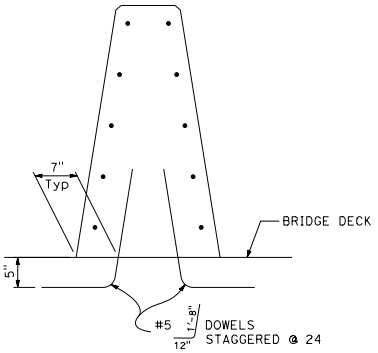



## CONCRETE BARRIER TYPE 60M DELINEATION

See Note 5

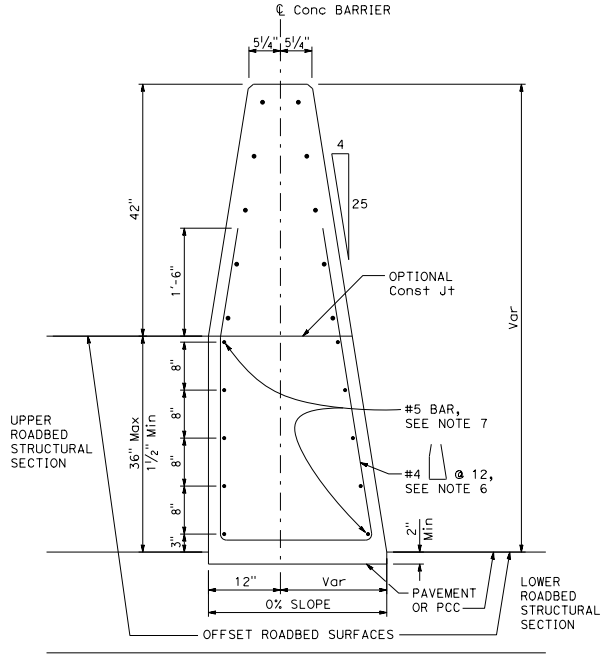



## CONCRETE BARRIER TYPE 60M



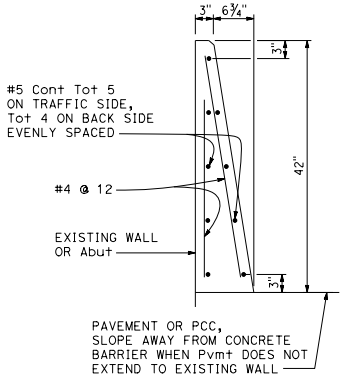

## CONCRETE BARRIER TYPE 60MA

Details similar to Concrete Barrier Type 60M except as noted.




## CONCRETE BARRIER TYPE 60MC

Details similar to Concrete Barrier Type 60M except as noted.
Use concrete barrier end anchor when necessary.
36" roadbed surfaces offset shown.




## CONCRETE BARRIER TYPE 60MD

See Note 8

NOTES:

1. See Standard Plan A76AB and Standard Plan A76AC for details of Concrete Barrier Type 60M end anchors, connection to structures and transitions to concrete barrier Type 50 and Concrete Barrier Type 60MS.
2. See Standard Plan A76C for Concrete Barrier Type 60M transitions at bridge column and sign pedestals.
3. Where glare screen is required on Concrete Barrier Type 60M, use Concrete Barrier Type 60MG.
4. Where roadbed offset is greater than 1½", use concrete barrier Type 60MC.
5. See Project Plans for barrier delineation locations.
6. Reinforcing stirrup not required for roadbed offsets less than 1'-0".
7. For roadbed surfaces offset greater than 1½" and less than or equal to 3", no reinforcement required. For roadbed surfaces offset greater than 3" and less than or equal to 36", use two #5 reinforcement at 3" above the lower roadbed surface and two #5 reinforcement at every 8" increment vertical spacing above the first two #5 reinforcement.
8. For weep hole alignment and drainage details not shown, see Standard Plans B0-3 and B3-5.
9. Minimum length for Concrete Barrier Type 60 series is 100'-0".
10. The ¾" chamfer or ½" radius is typical for all exposed edges for all Type 60 barriers, unless shown otherwise.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60M

NO SCALE

**A76A**

7-1-25

2025 STANDARD PLAN A76A

Return to Table of Contents

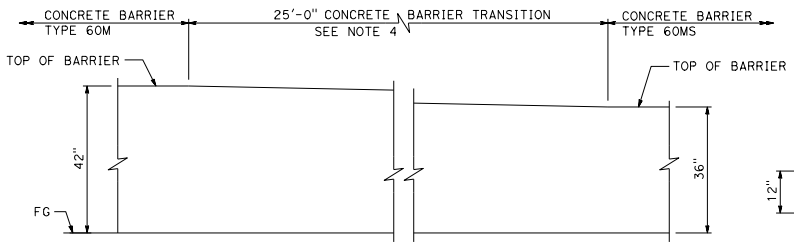
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

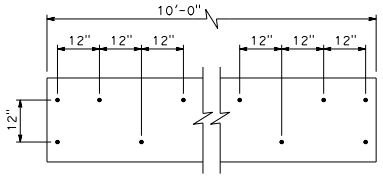
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REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA



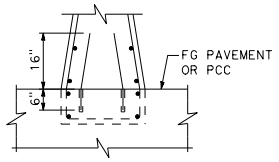

ELEVATION

## TRANSITION CONCRETE BARRIER TYPE 60M TO CONCRETE BARRIER TYPE 60MS



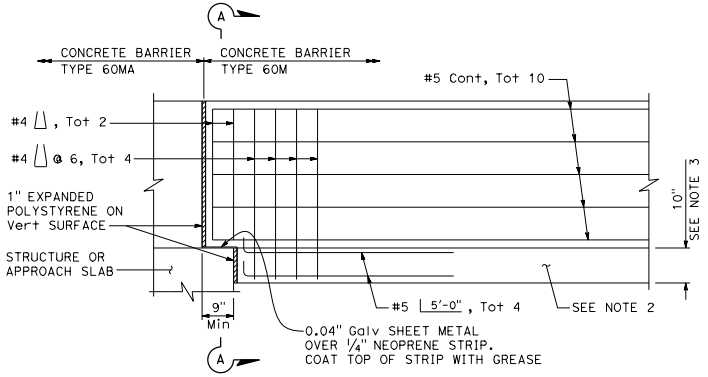

DETAIL A

Drill and Bond #6 dowel 6" deep and extend 16" into Concrete Barrier Type 60M

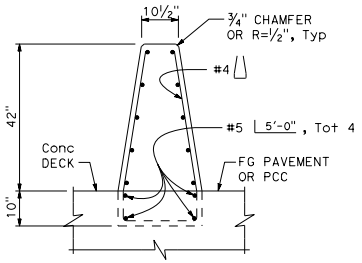



DETAIL B

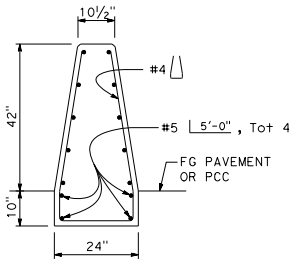
Drill and Bond to existing PCC, see Note 2




## CONCRETE BARRIER TYPE 60M CONNECTION TO STRUCTURE



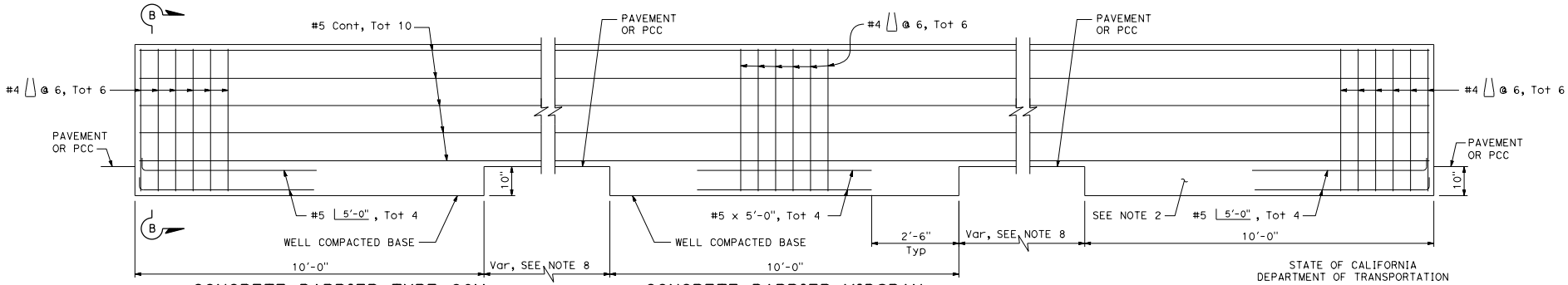

SECTION A-A




SECTION B-B

NOTES:

1. See Standard Plan A76A for Concrete Barrier Type 60M and Type 60MA.
2. Footing monolithic with barrier or Drill and Bond #6 dowel staggered as shown on Detail A and Detail B throughout 10'-0" length of footing. The footing is required at Concrete Barrier ends, midspan footings, and at interruptions in concrete barrier.
3. 10" Concrete Barrier footing extends 10'-0" back from structure.
4. See Standard Plan A76HA for transition to alternative crash cushion.
5. See Standard Plan A76A for details not shown including reinforcement in footing.
6. No scuppers or small animal crossings allowed within midspan footing.
7. Midspan footing is required for concrete barrier length of 1,000 feet or greater.
8. Midspan footings are placed between 400 and 600 feet of Concrete Barrier end and from each other.
9. Minimum length for Concrete Barrier Type 60M series is 100'-0".
10. Drop top lateral #5 horizontal reinforcement of Concrete Barrier Type 60 where transition height reaches 36".




CONCRETE BARRIER TYPE 60M END ANCHORAGE, Typ

CONCRETE BARRIER MIDSPAN FOOTING DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60M DETAILS

NO SCALE

A76AB

7-1-25

2025 STANDARD PLAN A76AB

Return to Table of Contents

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Malik Rehman
REGISTERED CIVIL ENGINEER

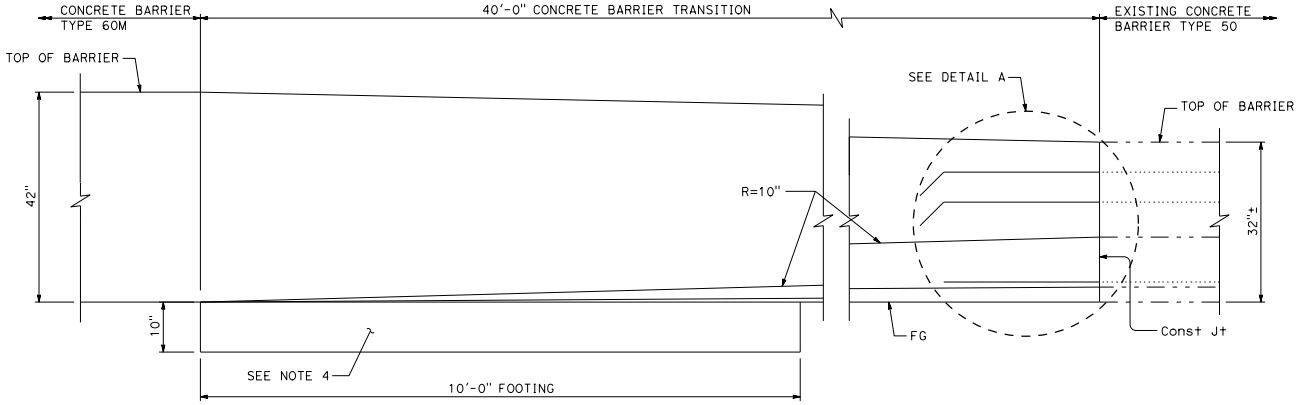
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

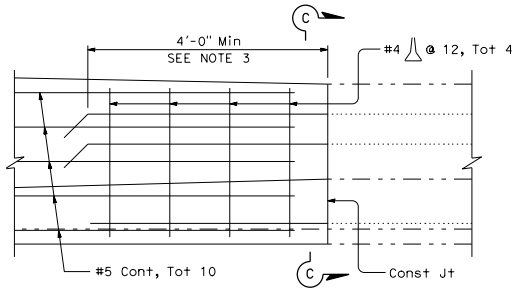
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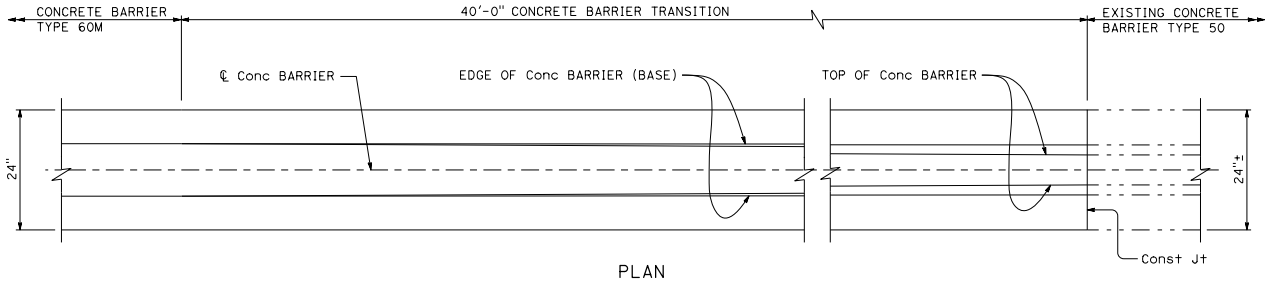
1. See Standard Plan A76A for Concrete Barrier Type 60M and Type 60MA.
2. Footing monolithic or doweled with #6 as shown on Standard Plan A76AB. The footing is required at concrete barrier ends, midspans, and at interruptions in concrete barrier.
3. Saw cut clean 1" deep and break back to preserve in place existing #4 reinforcement. Tie Lap to make continuous reinforcement and add #4 stirrup through splice length to hold in place.
4. See Standard Plan A76A for details not shown including reinforcement in footing.



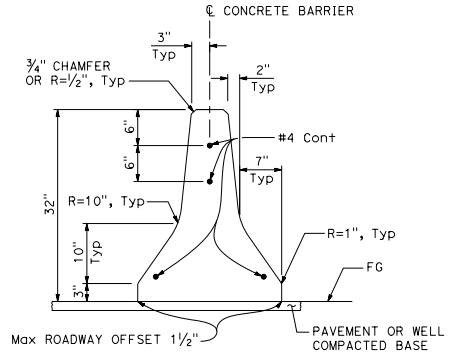

ELEVATION




DETAIL A




PLAN




SECTION C-C

## TRANSITION CONCRETE BARRIER TYPE 60M TO EXISTING CONCRETE BARRIER TYPE 50

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60M TRANSITION TO CONCRETE BARRIER TYPE 50

NO SCALE

A76AC

7-1-25





Return to Table of Contents

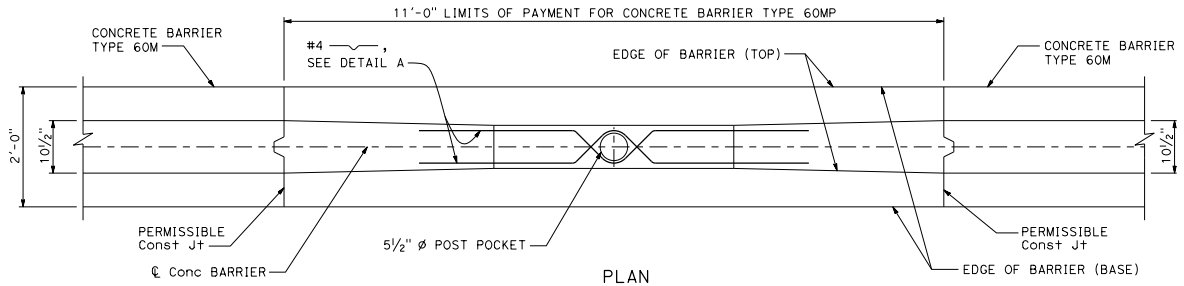
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REGISTERED CIVIL ENGINEER

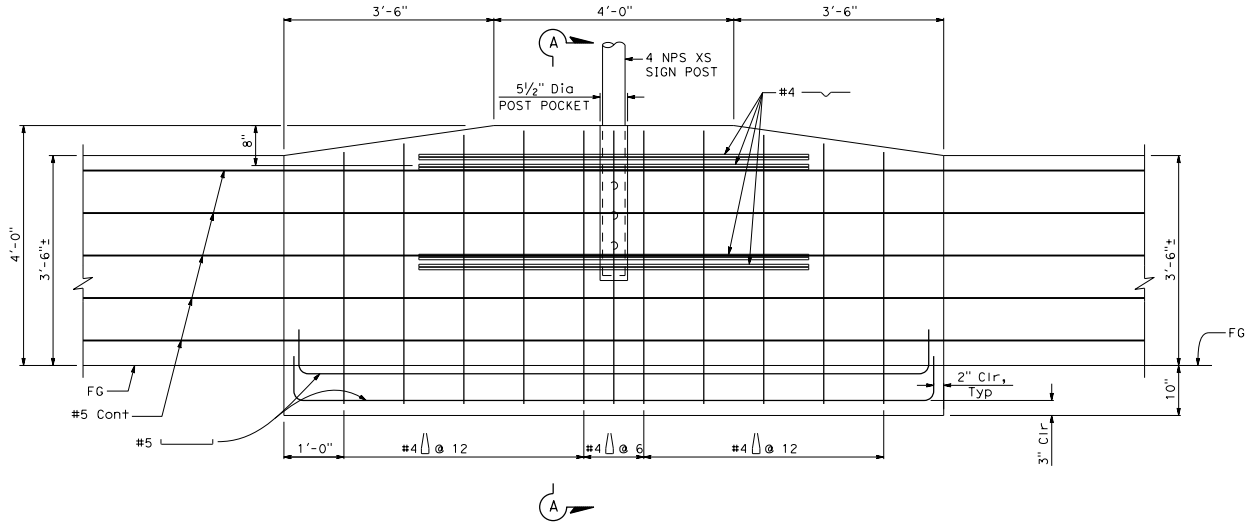
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

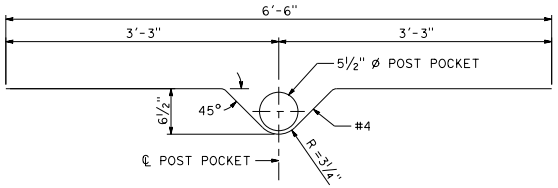
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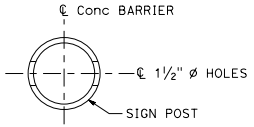

PLAN




ELEVATION



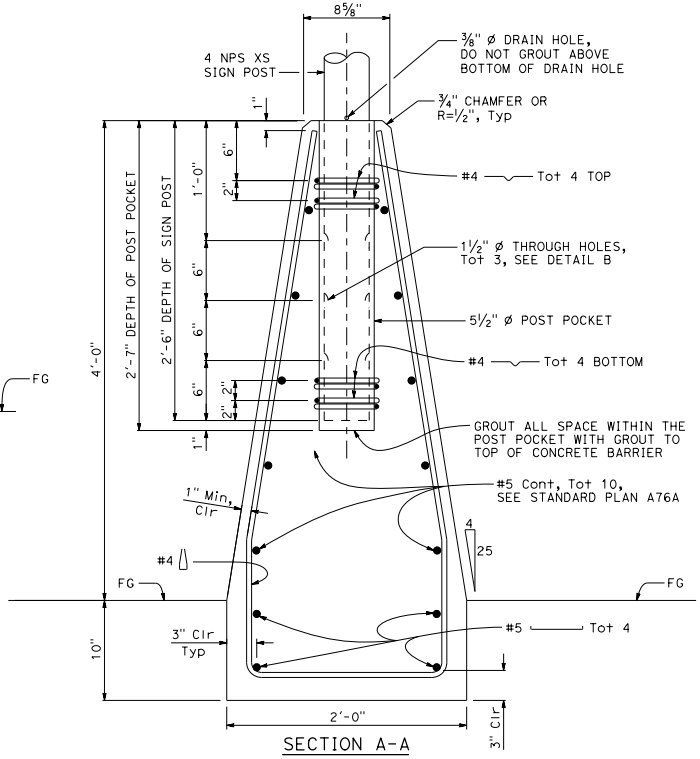

DETAIL A




DETAIL B

NOTE:

For Type 60M Barrier cross section, see Standard Plan A76A.




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MP

NO SCALE

**A76BA**

7-1-25

2025 STANDARD PLAN A76BA

Return to Table of Contents

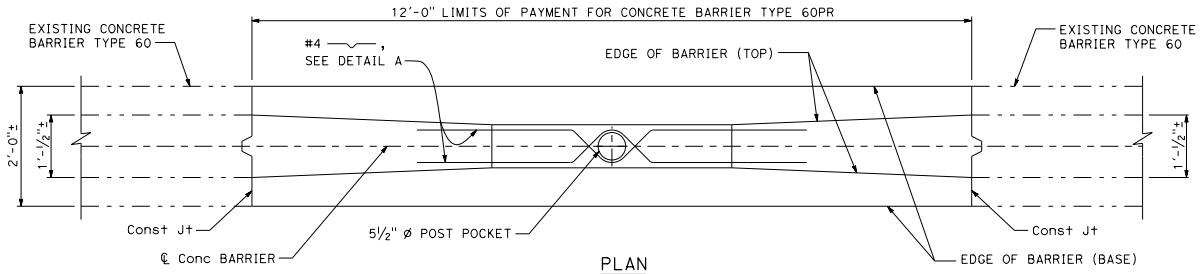
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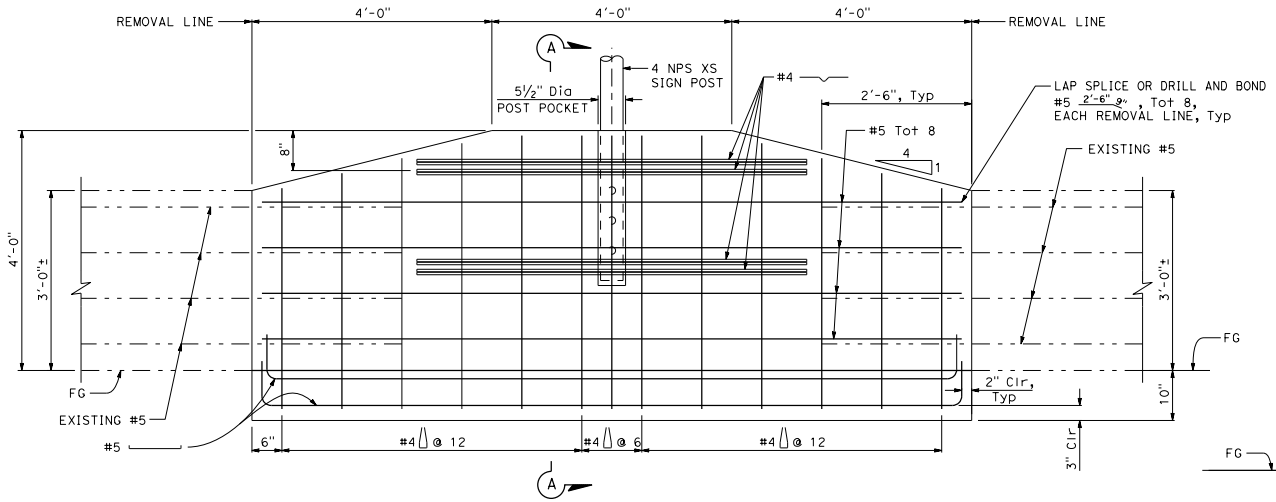
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

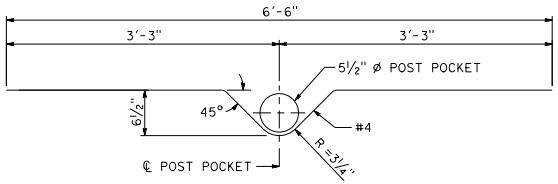
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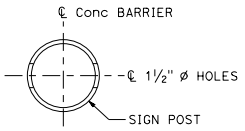

PLAN



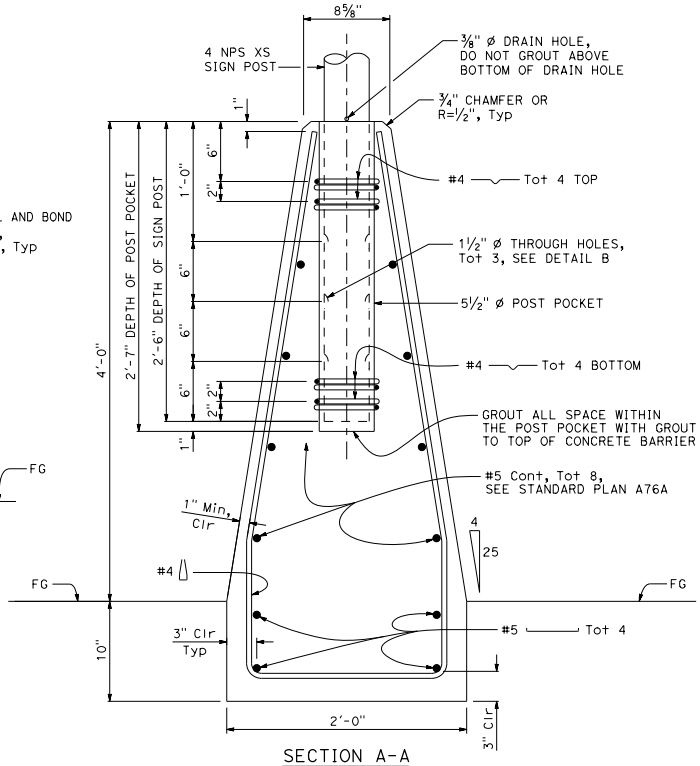

ELEVATION




DETAIL A




DETAIL B




SECTION A-A

NOTE:

THE CONTRACTOR MUST VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60PR

NO SCALE

**A76BB**

7-1-25

2025 STANDARD PLAN A76BB

Return to Table of Contents

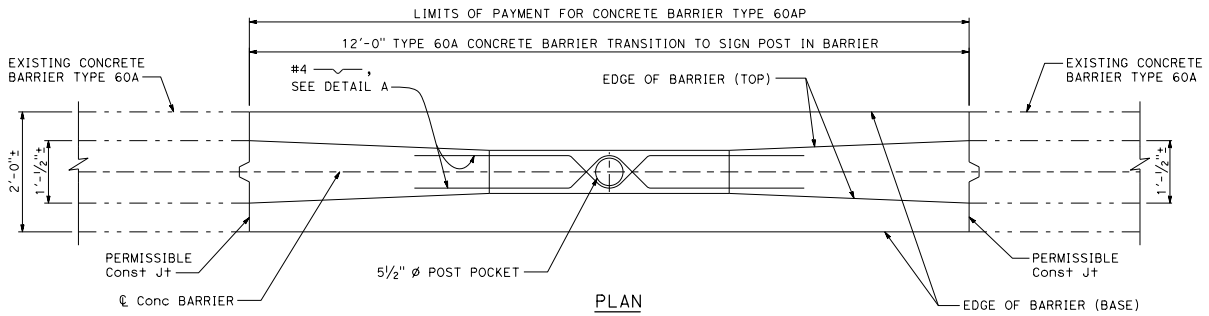
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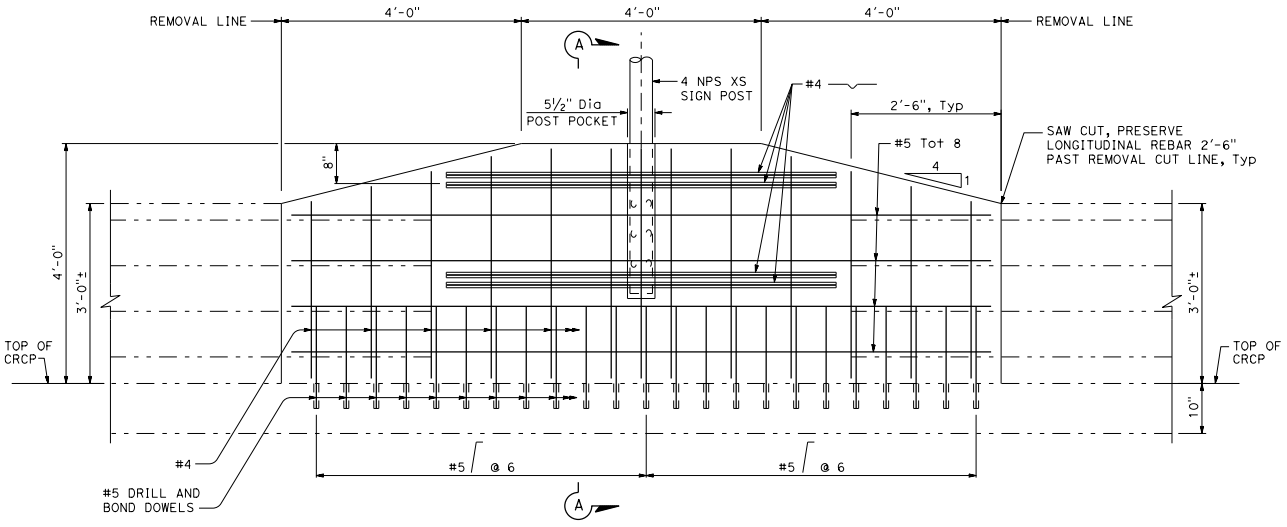
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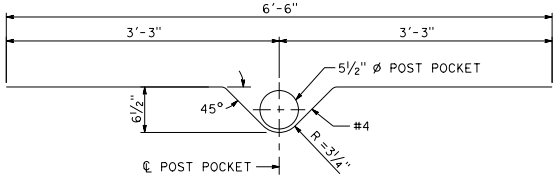
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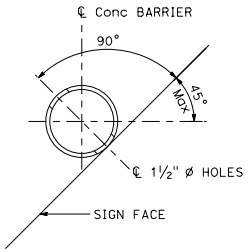

PLAN



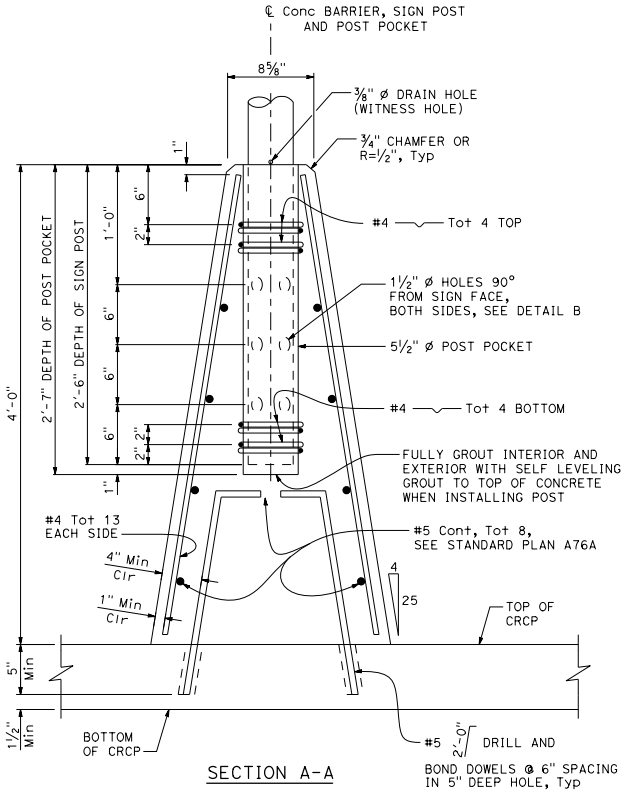

ELEVATION




DETAIL A




DETAIL B




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60AP

NO SCALE

A76BC

7-1-25



Return to Table of Contents

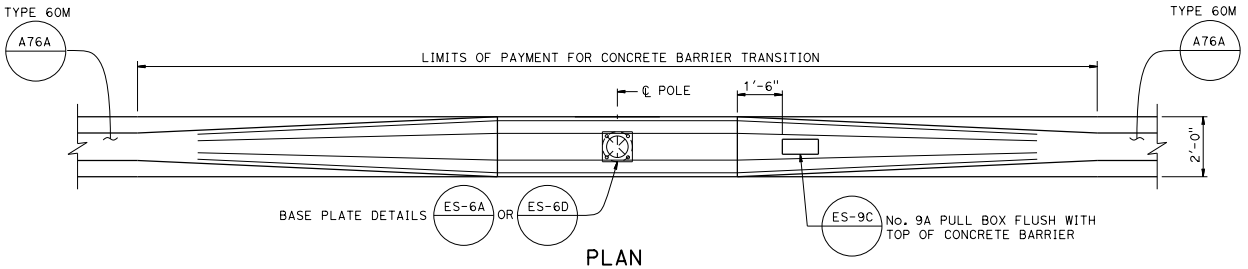
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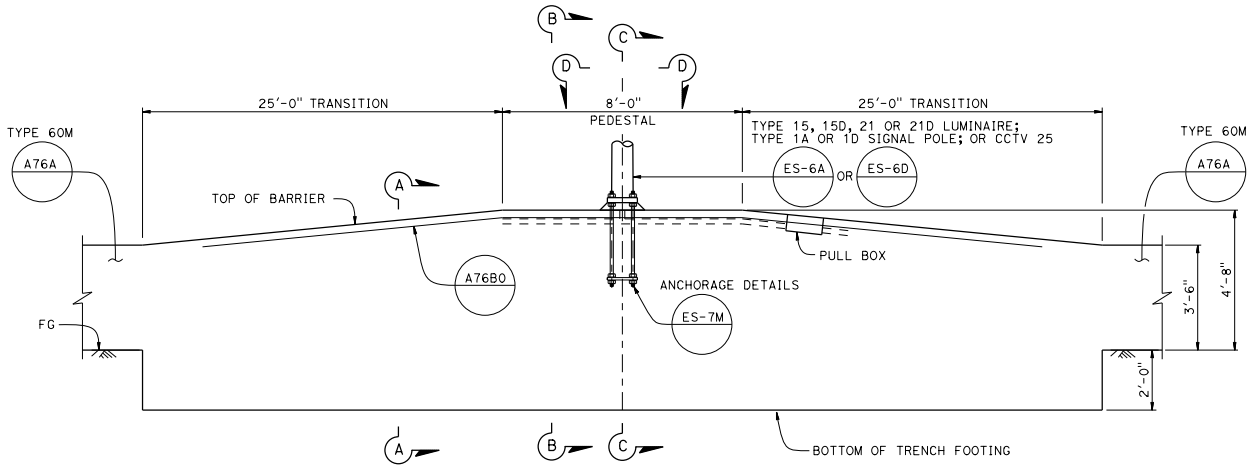
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Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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PLAN

Note: Reinforcement not shown for clarity.




ELEVATION

Note: Reinforcement not shown for clarity.

## GENERAL NOTES:

SPECIFICATIONS

Design: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 with Interim Updates through 2019. (1)

AASHTO LRFD Bridge Design Specifications 2017 8th Edition with California Amendments. (2)

LOADING

Wind Loading: 100 mph (3-second gust) (1)
Vehicular Collision Force: 54 kips (2)

UNIT STRESSES

Reinforced Concrete: f'c = 3,600 psi
fy = 60,000 psi

## NOTES:

1. For Section A-A, Section B-B, Section C-C, and Section D-D, see Standard Plan A76B0.
2. For pole locations, see Electrical Plans.

STANDARD PLAN SHEET No.
DETAIL No.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60M WITH SMALL POLE

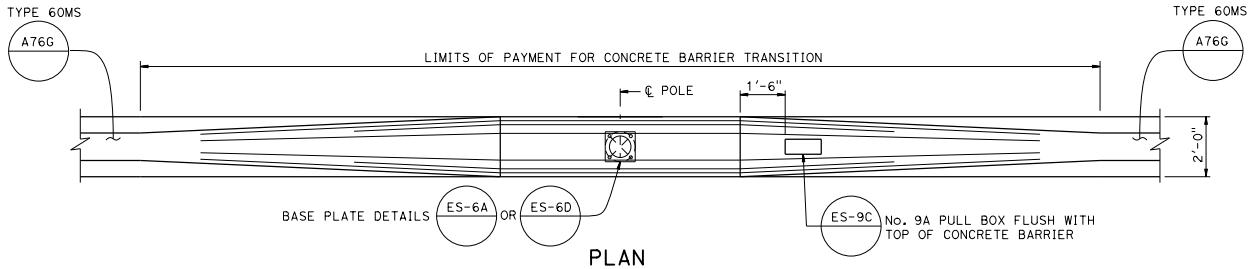
NO SCALE

**A76BM**

2025 STANDARD PLAN A76BM

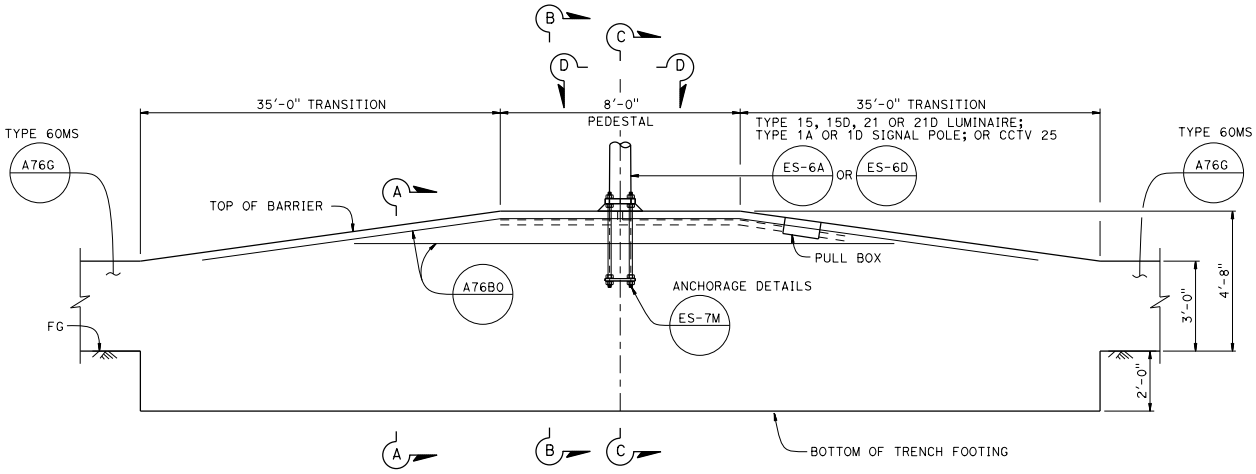
7-1-25

Return to Table of Contents




PLAN

Note: Reinforcement not shown for clarity.




ELEVATION

Note: Reinforcement not shown for clarity.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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## GENERAL NOTES:

SPECIFICATIONS

Design: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 with Interim Updates through 2019. (1)

AASHTO LRFD Bridge Design Specifications 2017 8th Edition with California Amendments. (2)

LOADING

Wind Loading: 100 mph (3-second gust) (1)
Vehicular Collision Force: 54 kips (2)

UNIT STRESSES

Reinforced Concrete: f'c = 3,600 psi
fy = 60,000 psi

## NOTES:

1. For Section A-A, Section B-B, Section C-C, and Section D-D, see Standard Plan A76B0.
2. For pole locations, see Electrical Plans.

STANDARD PLAN SHEET No.
DETAIL No.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MS WITH SMALL POLE

NO SCALE

**A76BN**

7-1-25

2025 STANDARD PLAN A76BN

Return to Table of Contents

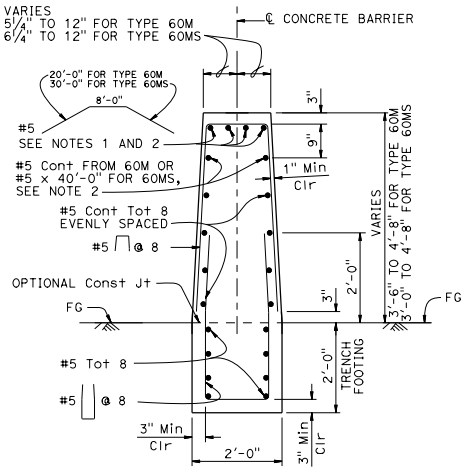
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REGISTERED CIVIL ENGINEER

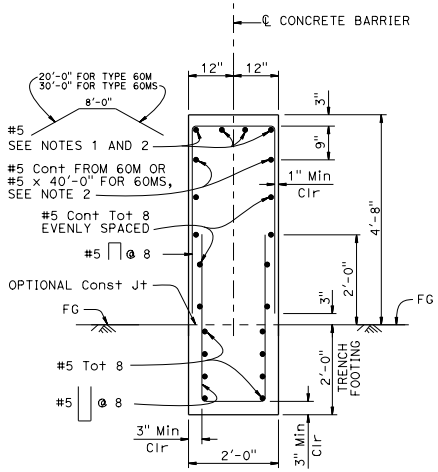
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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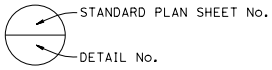

SECTION A-A

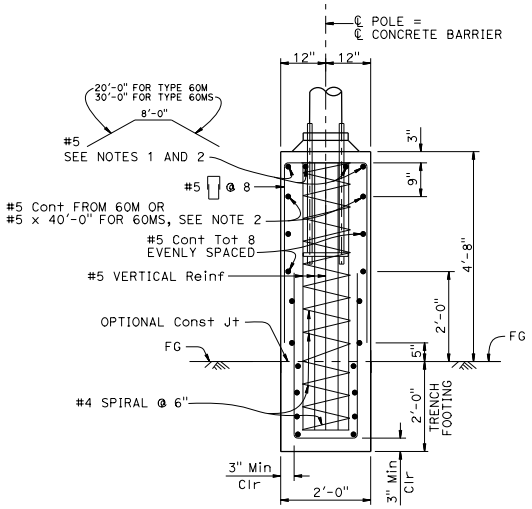



SECTION B-B

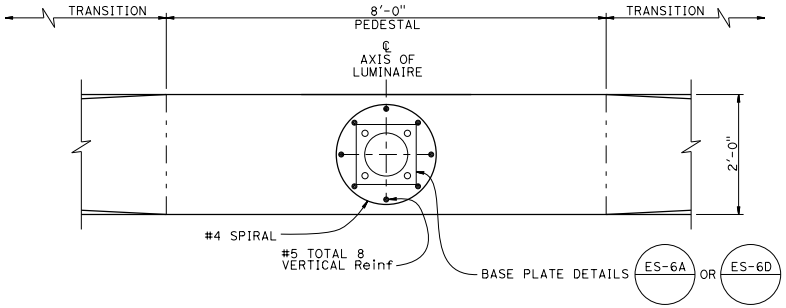
NOTES:

1. See Standard Plan A76BM, "ELEVATION" for Type 60M.
2. See Standard Plan A76BN, "ELEVATION" for Type 60MS.

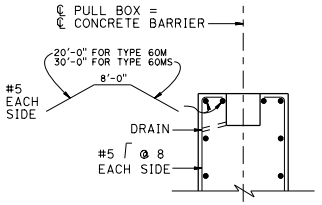



SECTION C-C




SECTION D-D




BARRIER SECTION
AT PULL BOX

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPES 60M AND 60MS WITH SMALL POLE TRANSITION DETAILS

NO SCALE

A76BO

7-1-24



Return to Table of Contents

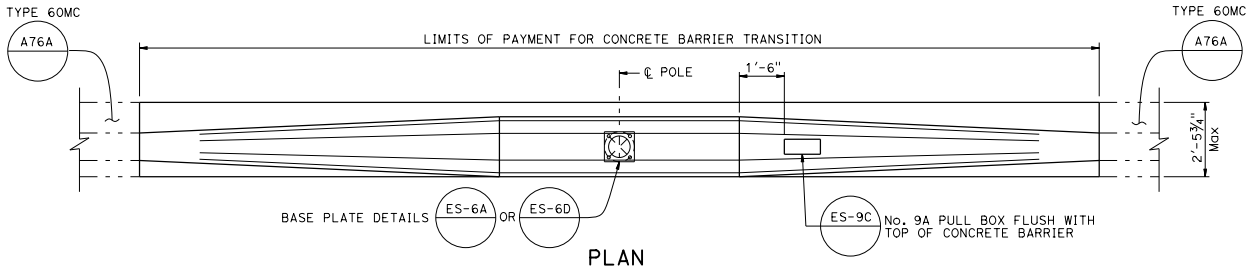
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

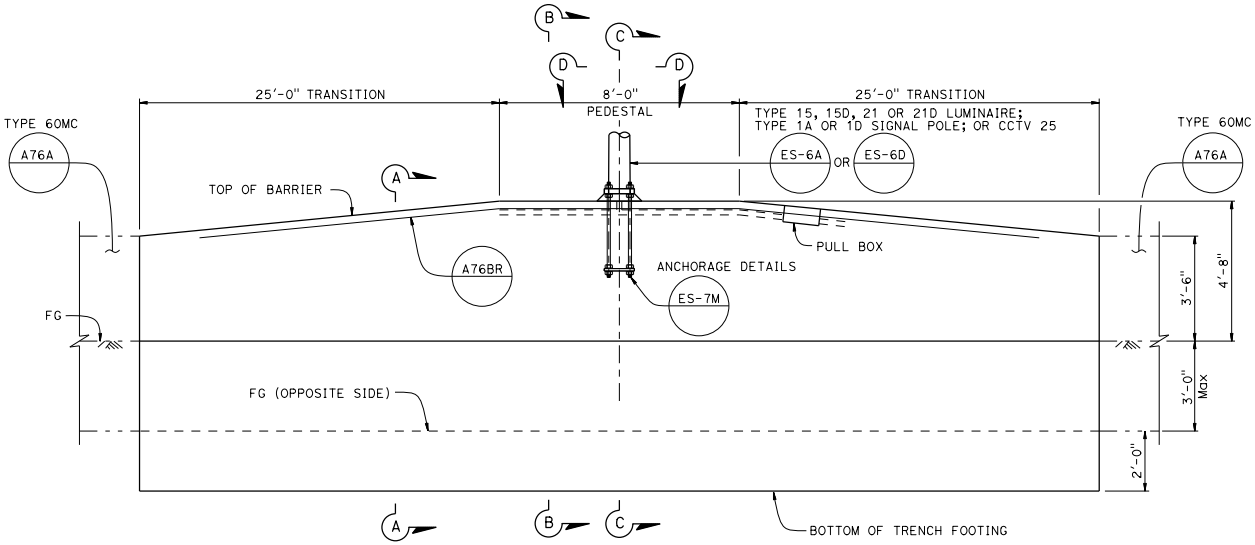
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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PLAN

Note: Reinforcement not shown for clarity.




ELEVATION

Note: Reinforcement not shown for clarity.

## GENERAL NOTES:

SPECIFICATIONS

Design: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 with Interim Updates through 2019. (1)

AASHTO LRFD Bridge Design Specifications 2017 8th Edition with California Amendments. (2)

LOADING

Wind Loading: 100 mph (3-second gust) (1)
Vehicular Collision Force: 54 kips (2)

UNIT STRESSES

Reinforced Concrete: f'c = 3,600 psi
fy = 60,000 psi

## NOTES:

1. For Section A-A, Section B-B, Section C-C, and Section D-D, see Standard Plan A76BR.
2. For pole locations, see Electrical Plans.

STANDARD PLAN SHEET No.
DETAIL No.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MC WITH SMALL POLE

NO SCALE

**A76BP**

7-1-25

Return to Table of Contents

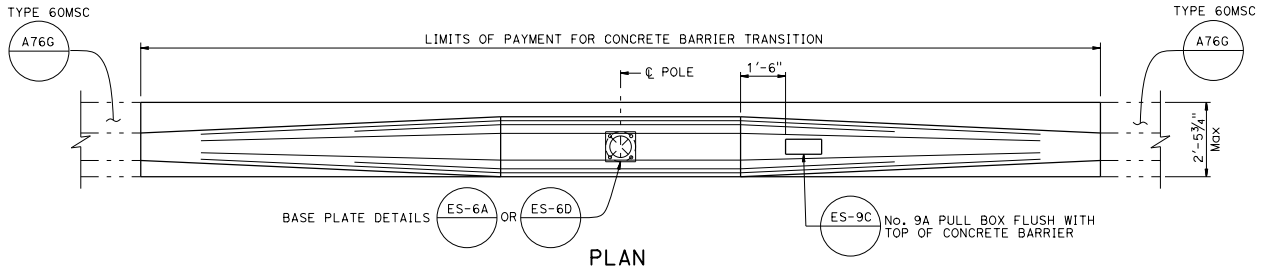
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

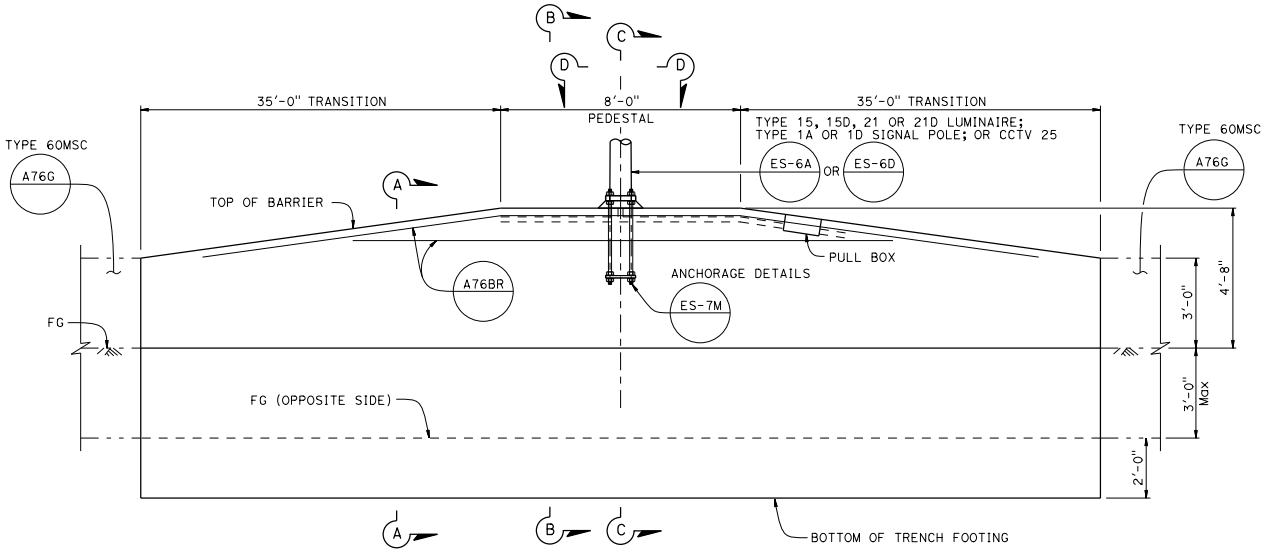
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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PLAN

Note: Reinforcement not shown for clarity.




ELEVATION

Note: Reinforcement not shown for clarity.

## GENERAL NOTES:

SPECIFICATIONS

Design: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 with Interim Updates through 2019. (1)

AASHTO LRFD Bridge Design Specifications 2017 8th Edition with California Amendments. (2)

LOADING

Wind Loading: 100 mph (3-second gust) (1)
Vehicular Collision Force: 54 kips (2)

UNIT STRESSES

Reinforced Concrete: f'c = 3,600 psi
fy = 60,000 psi

## NOTES:

1. For Section A-A, Section B-B, Section C-C, and Section D-D, see Standard Plan A76BR.
2. For pole locations, see Electrical Plans.

STANDARD PLAN SHEET No.
DETAIL No.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MSC WITH SMALL POLE

NO SCALE

**A76BQ**

7-1-25

2025 STANDARD PLAN A76BQ

Return to Table of Contents

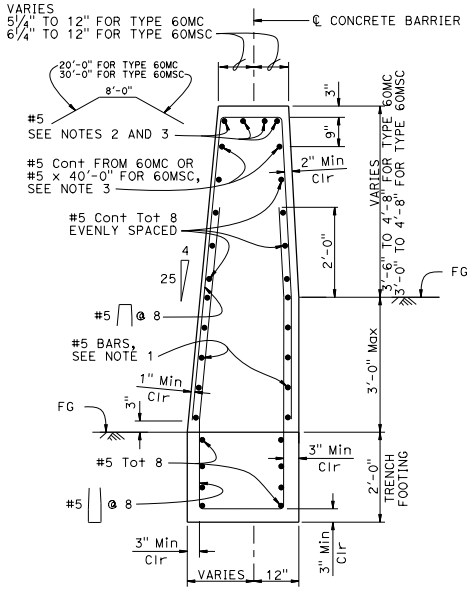
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REGISTERED CIVIL ENGINEER

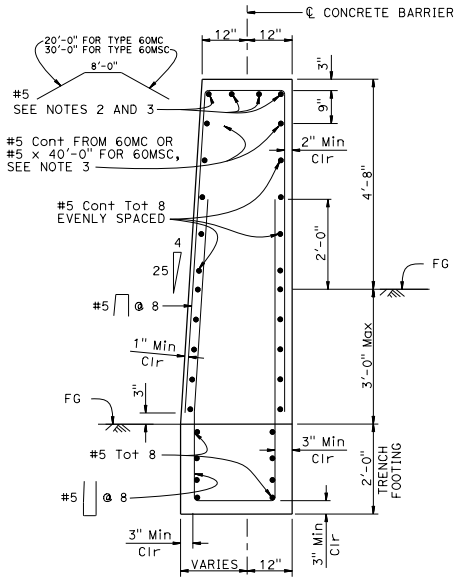
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

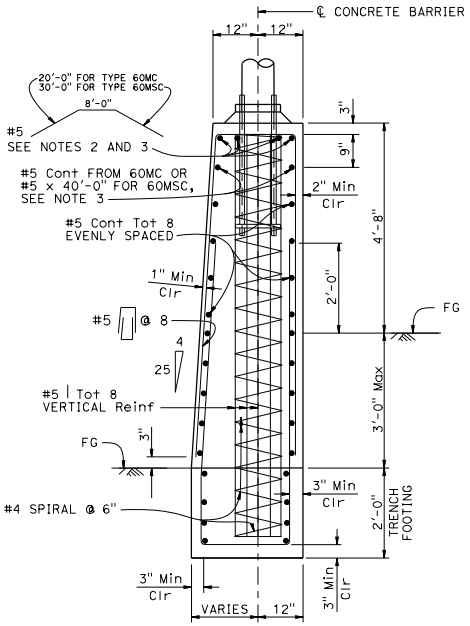
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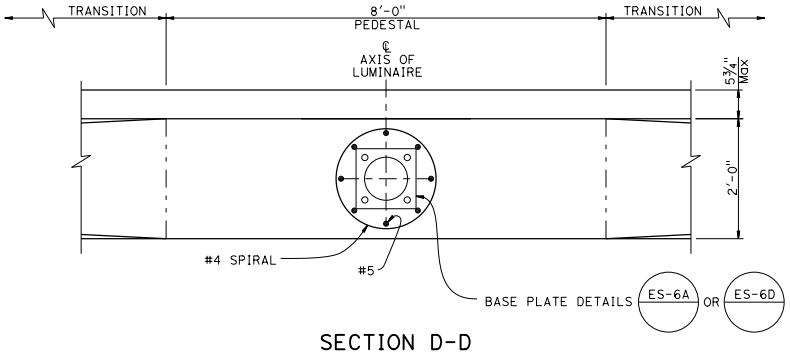

SECTION A-A



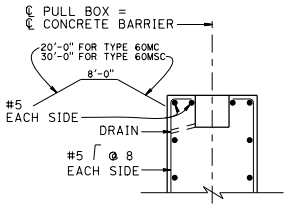

SECTION B-B




SECTION C-C




SECTION D-D




BARRIER SECTION AT PULL BOX

NOTES:

1. For roadbed surfaces offset greater than 1½" and less than or equal to 3", no rebars required. For roadbed surfaces offset greater than 3" and less than or equal to 8", use two #5 rebars at 3" above the lower roadbed surface. For roadbed surfaces offset greater than 8" and less than or equal to 12", use two #5 rebars at 3" above the lower roadbed surface and two #5 rebars at 8" above the lower roadbed surface. For roadbed surfaces offset greater than 12" and less than or equal to 36", use two #5 rebars at 3" above the lower roadbed surface and two #5 rebars at every 8" increment vertical spacing above the first two #5 rebars.
2. See Standard Plan A76BP, "ELEVATION" for Type 60MC.
3. See Standard Plan A76BQ, "ELEVATION" for Type 60MSC.

STANDARD PLAN SHEET No.
DETAIL No.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

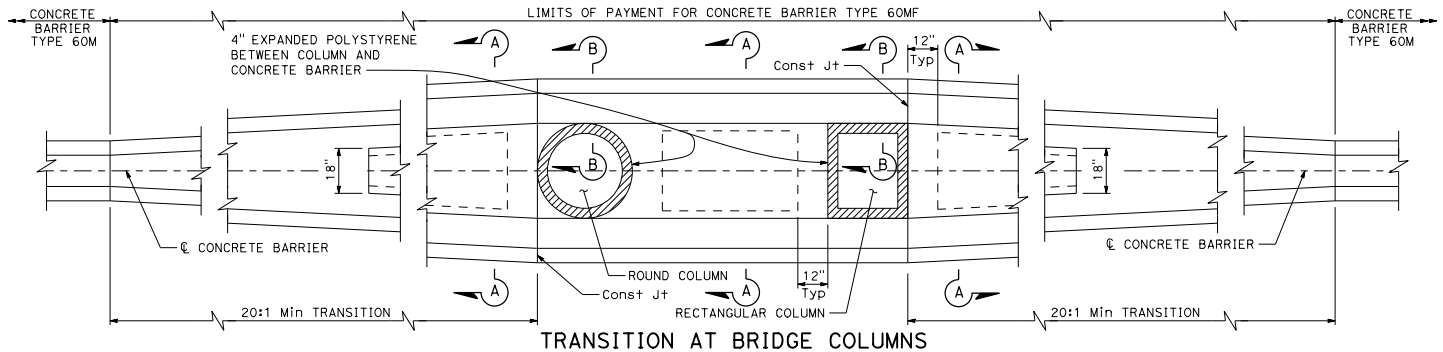
# CONCRETE BARRIER TYPES 60MC AND 60MSC WITH SMALL POLE TRANSITION DETAILS

NO SCALE

A76BR

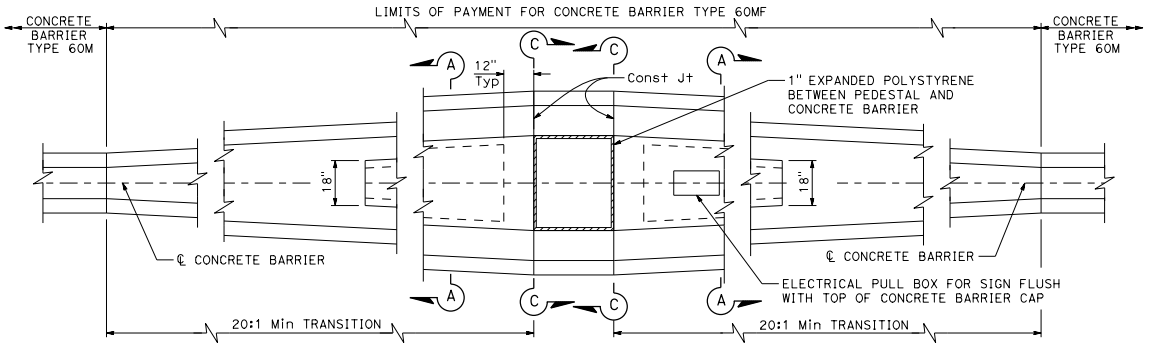
7-1-25

Return to Table of Contents




## TRANSITION AT BRIDGE COLUMNS

Concrete Barrier Type 60MF, see Note 7

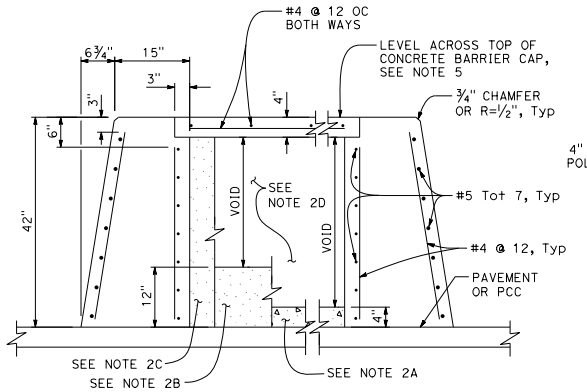



## TRANSITION AT SIGN PEDESTAL

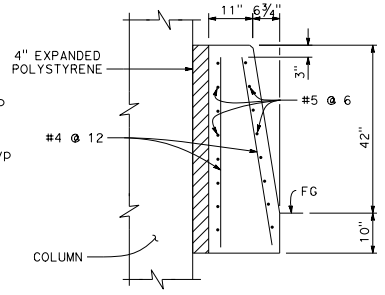
Concrete Barrier Type 60MF, see Note 7

NOTES:

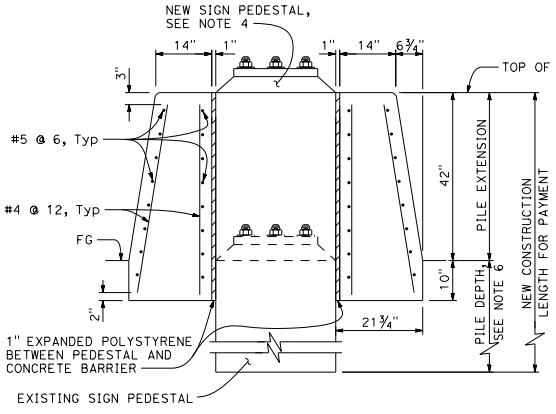
1. See Standard Plan A76A for Concrete Barrier Type 60M.
2. Contractor options for fill between concrete barrier walls:
   A. Place 4" PCC at base between concrete barrier walls.
   B. Place 1'-0" of granular material at base between walls.
   C. Place granular material from base to bottom of 4" cap.
   D. Monolithic concrete with foam blockouts is not permitted.
3. Reinforcing steel shall extend continuous through construction joints.
4. See Overhead Sign plans for sign pedestal elevations on new construction.
5. Adjust height of concrete barrier wall on low side of offset or superelevated roadways to provide level grade across top of concrete barrier cap.
6. See Overhead Signs Standard Plan Pile Foundation Tables.
7. All locations with limited shoulder width available for barrier, see Standard Plan A76F for use of Concrete Barrier Type 60MGF.




SECTION A-A




SECTION B-B




SECTION C-C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MF

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Malik Rehman No. C83390 Exp. 3-31-27 CIVIL
REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

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A76C

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2025 STANDARD PLAN A76C

Return to Table of Contents

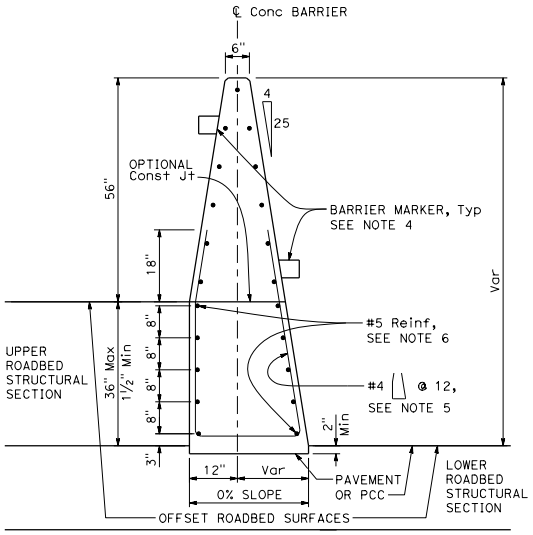
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

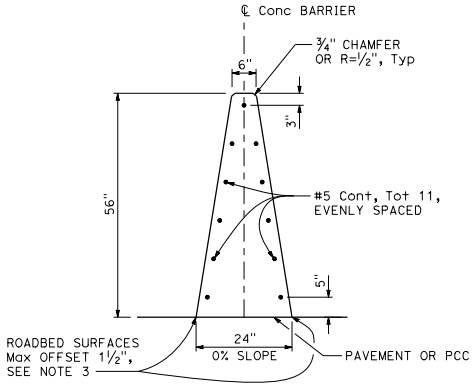
REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
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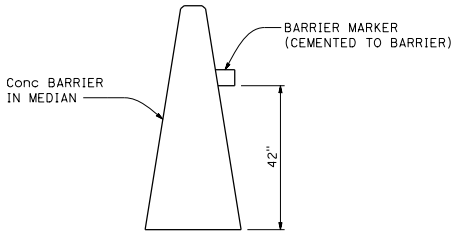

## CONCRETE BARRIER TYPE 60MGC

Details similar to Concrete Barrier Type 60MG except as noted.
36" roadbed surfaces offset shown.



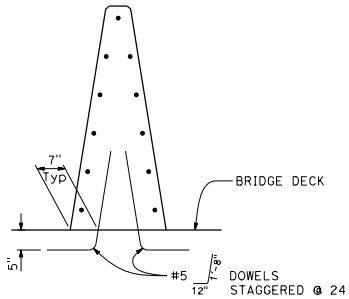

## CONCRETE BARRIER TYPE 60MG

(Monolithic concrete glare screen/barrier)




## CONCRETE BARRIER TYPE 60MG DELINEATION

See Note 4




## CONCRETE BARRIER TYPE 60MGA

Details similar to Type 60MG except as noted.

NOTES:

1. See Standard Plan A76E for details of Concrete Barrier Type 60MG end anchors, connection to structures and transitions to Concrete Barrier Type 60M.
2. See Standard Plan A76F for Concrete Barrier Type 60MG transitions at bridge column and sign pedestals.
3. Where roadbed offset is greater than 1½", see Concrete Barrier Type 60MGC.
4. Barrier marker to be used when required by the Special Provisions. Bottom of barrier marker to be placed 42" above the roadway.
5. Reinforcing stirrup not required for offsets less than 1'-0".
6. For roadbed surfaces offset greater than 1½" and less than or equal to 3", no additional reinforcement required. For roadbed surfaces offset greater than 3" and less than or equal to 36", use two #5 Reinf at 3" above the lower roadbed surface and two #5 Reinf at every 8" increment vertical spacing above the first two #5 Reinf.
7. Minimum length for Concrete Barrier Type 60 series is 100'-0".

STATE OF CALIFORNIA
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# CONCRETE BARRIER TYPE 60MG

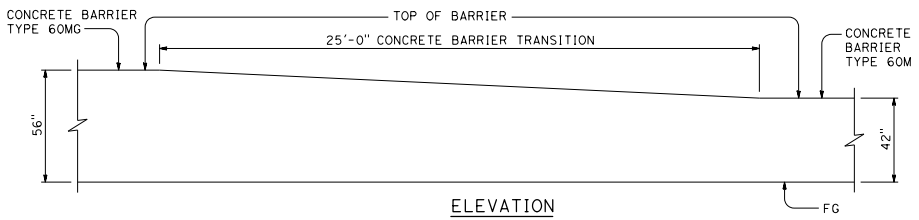
NO SCALE

**A76D**

7-1-25



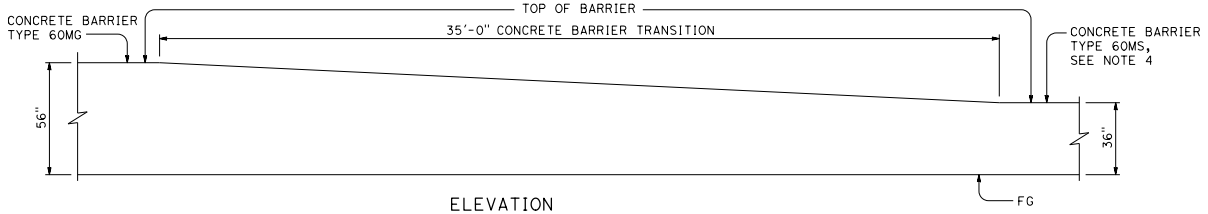
Return to Table of Contents




ELEVATION

## TRANSITION CONCRETE BARRIER TYPE 60MG TO CONCRETE BARRIER TYPE 60M

See Note 7




ELEVATION

## TRANSITION CONCRETE BARRIER TYPE 60MG TO CONCRETE BARRIER TYPE 60MS

See Note 8

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

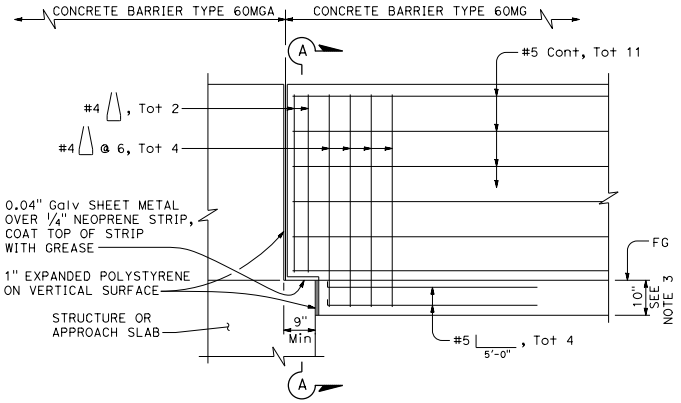
September 19, 2025
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Malik Rehman
No. C83390
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CIVIL
STATE OF CALIFORNIA

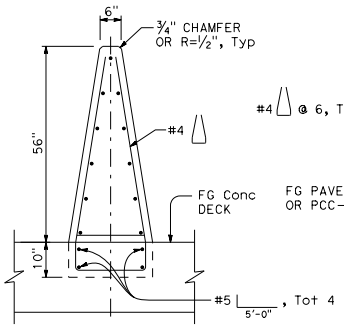
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NOTES:

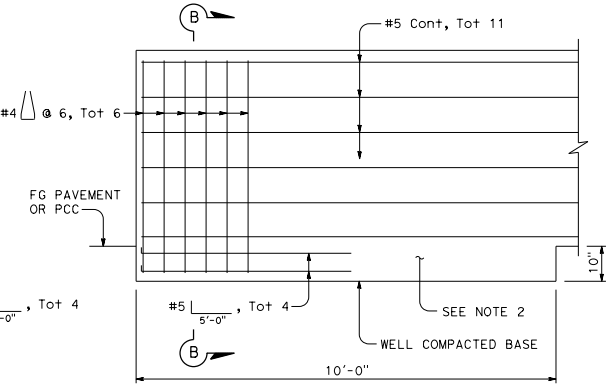
1. See Standard Plan A76D for Concrete Barrier Type 60MG and Type 60MGA.
2. Footing monolithic with barrier or Drill and Bond #6 dowel staggered as shown on Detail A and Detail B throughout 10'-0" length of footing. The footing is required at concrete barrier ends, midspan footings, and at interruptions in concrete barrier.
3. 10" concrete barrier footing extends 10'-0" back from structure.
4. See Standard Plan A76H for transition to crash cushion.
5. See Standard Plan A76AC for transition to existing Type 50 barrier.
6. Top of barrier elevation change should be no less than 20:1 for change of concrete barrier types.
7. Drop top #5 horizontal reinforcement bar of Concrete Barrier Type 60MG at final height of 42".
8. Drop top #5 horizontal reinforcement bar of Concrete Barrier Type 60MG halfway through transition and drop second row of horizontal reinforcement at end of transition.



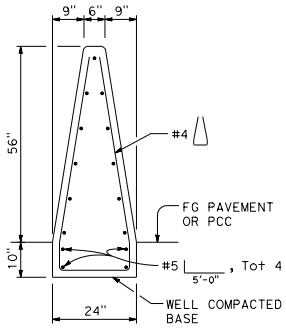

## CONCRETE BARRIER TYPE 60MG CONNECTION TO STRUCTURE



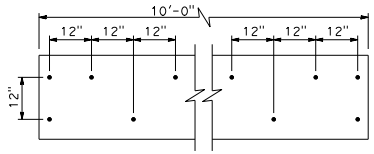

SECTION A-A




## CONCRETE BARRIER TYPE 60MG END ANCHORAGE

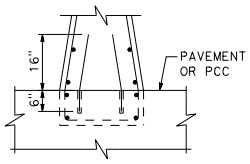



SECTION B-B




DETAIL A

Drill and Bond #6 dowel 6" deep and extend 16" into Concrete Barrier Type 60M




DETAIL B

Drill and Bond to existing PCC, see Note 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MG

NO SCALE

A76E

2025 STANDARD PLAN A76E

7-1-25

Return to Table of Contents

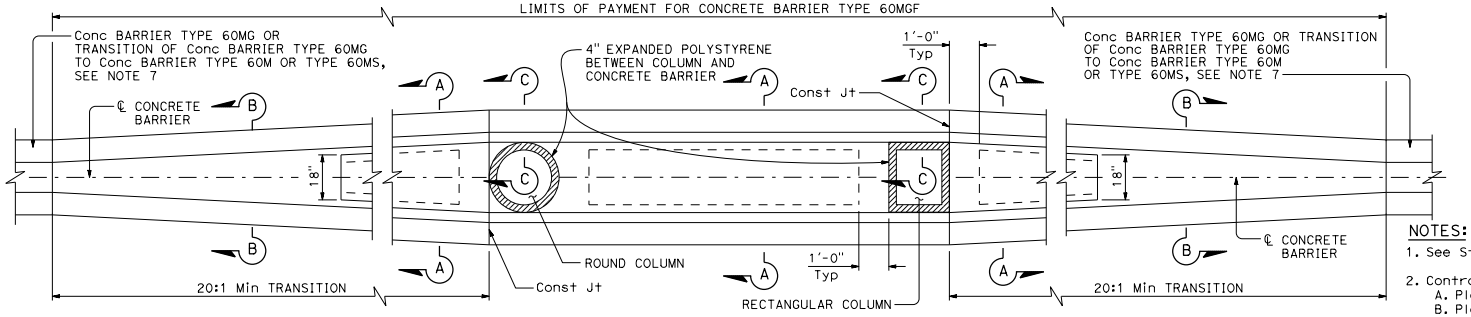
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

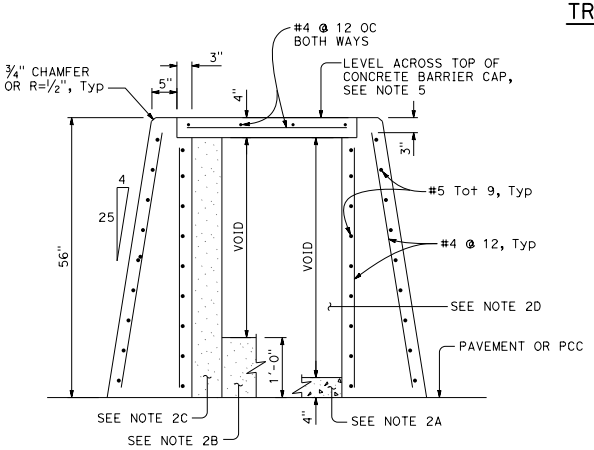
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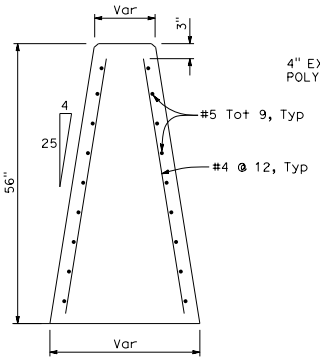



## TRANSITION AT BRIDGE COLUMNS

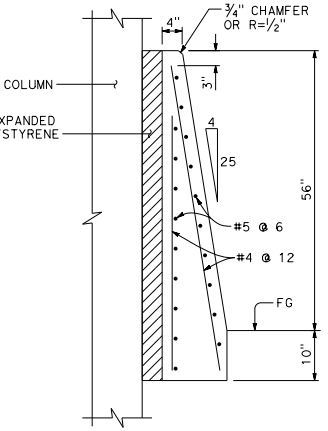
Concrete Barrier Type 60MGF



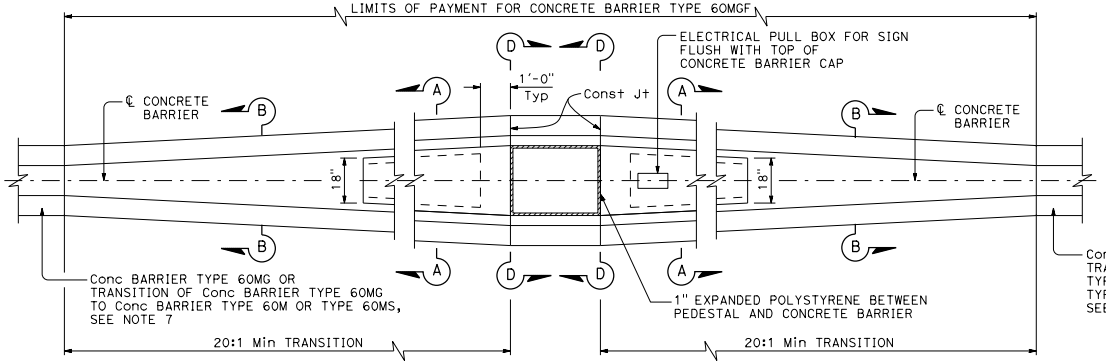

SECTION A-A




SECTION B-B




SECTION C-C

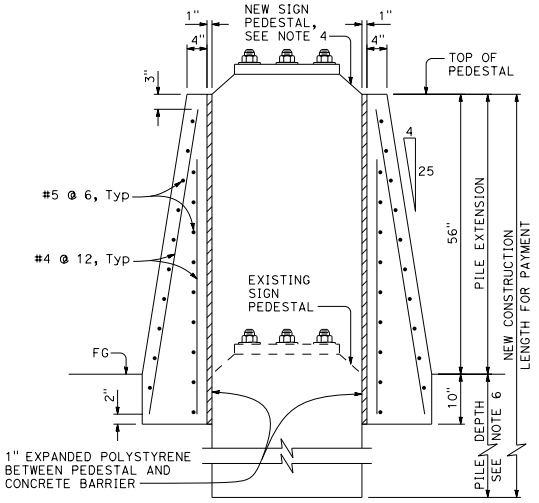



## TRANSITION AT SIGN PEDESTAL

Concrete Barrier Type 60MGF

### NOTES:

1. See Standard Plan A76D for Concrete Barrier Type 60MG.
2. Contractor options for fill between concrete barrier walls:
   A. Place 4" PCC at base between concrete barrier walls.
   B. Place 1'-0" of granular material at base between walls.
   C. Place granular material from base to bottom of 4" cap.
   D. Monolithic concrete with foam blockouts is not permitted.
3. Reinforcing steel shall extend continuous through construction joints.
4. See Overhead Sign plans for sign pedestal elevations on new construction.
5. Adjust height of concrete barrier wall on low side of offset or superelevated roadways to provide level grade across top of concrete barrier cap.
6. See Overhead Signs Standard Plan Pile Foundation Tables.
7. See Standard Plan A76E for concrete barrier transitions.




SECTION D-D

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# CONCRETE BARRIER TYPE 60MGF

NO SCALE

A76F

2025 STANDARD PLAN A76F

7-1-25

Return to Table of Contents

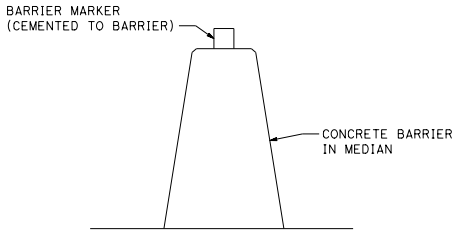
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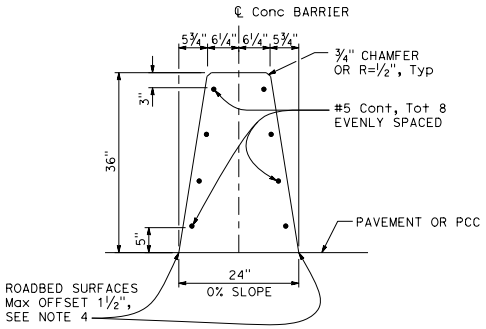
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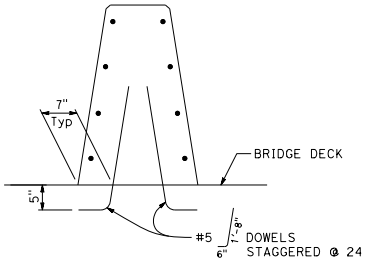



## CONCRETE BARRIER TYPE 60MS DELINEATION

See Note 5

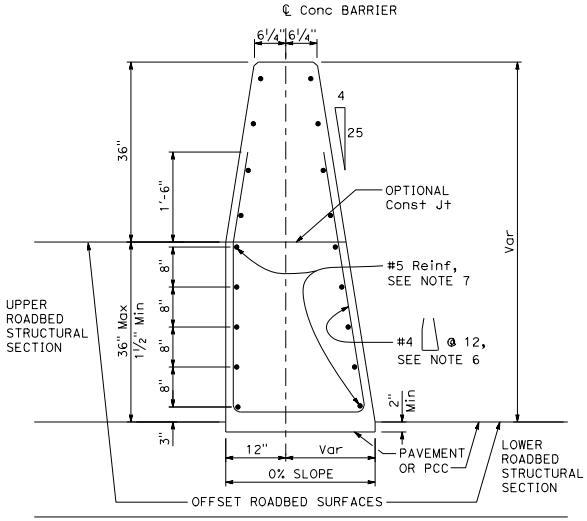



## CONCRETE BARRIER TYPE 60MS




## CONCRETE BARRIER TYPE 60MSA

Details similar to Type 60MS except as noted.




## CONCRETE BARRIER TYPE 60MSC

Details similar to Type 60MS except as noted.
Use concrete barrier end anchor when necessary.
36" roadbed surfaces offset shown.

NOTES:

1. See Standard Plans A76HA and A76HB for details of Concrete Barrier Type 60MS end anchors, connection to structures and transitions to Concrete Barrier Type 50.
2. See Standard Plan A76I for Concrete Barrier Type 60MS transitions at bridge column and sign pedestals.
3. Where glare screen is required on top of concrete barrier, use Concrete Barrier Type 60MG.
4. Where roadbed offset is greater than 1½", see Concrete Barrier Type 60MSC.
5. Barrier delineation to be used when required by the Special Provisions.
6. Reinforcing stirrup not required for roadbed offsets less than 1'-0".
7. For roadbed surfaces offset greater than 1½" and less than or equal to 3", no reinforcement required. For roadbed surfaces offset greater than 3" and less than or equal to 36", use two #5 reinforcement at 3" above the lower roadbed surface and two #5 reinforcement at every 8" increment vertical spacing above the first two #5 reinforcement.

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# CONCRETE BARRIER TYPE 60MS

NO SCALE

A76G

7-1-25

2025 STANDARD PLAN A76G



Return to Table of Contents

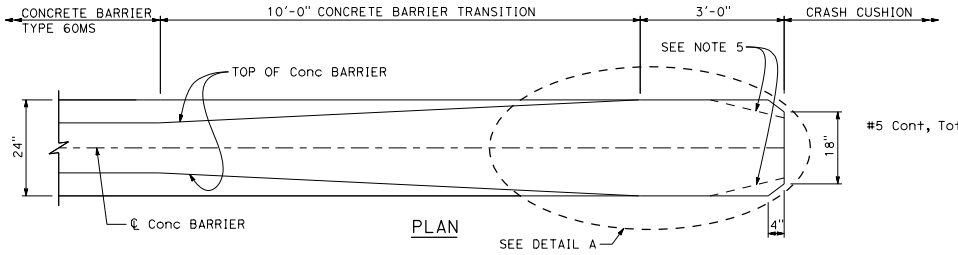
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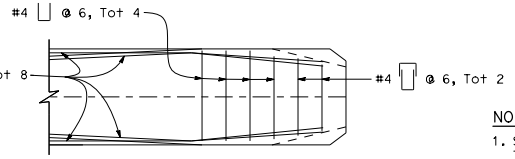
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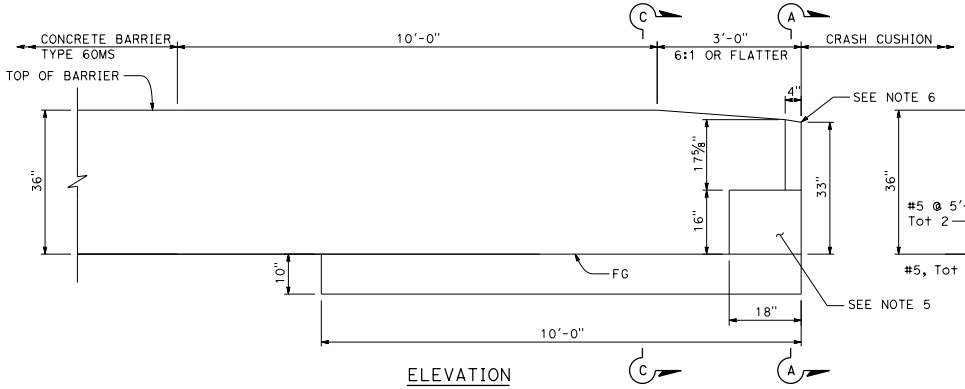
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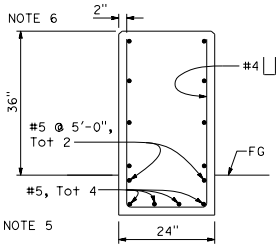
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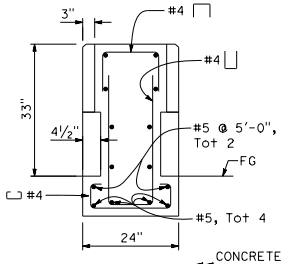



## TRANSITION CONCRETE BARRIER TYPE 60MS TO CRASH CUSHION



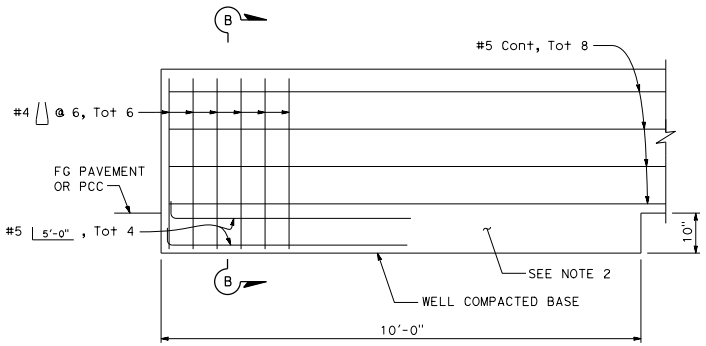



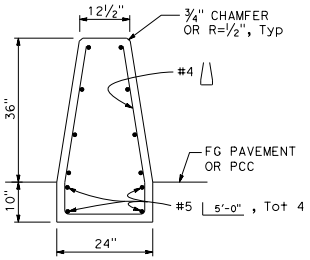




## TRANSITION CONCRETE BARRIER TYPE 60MS TO CRASH CUSHION

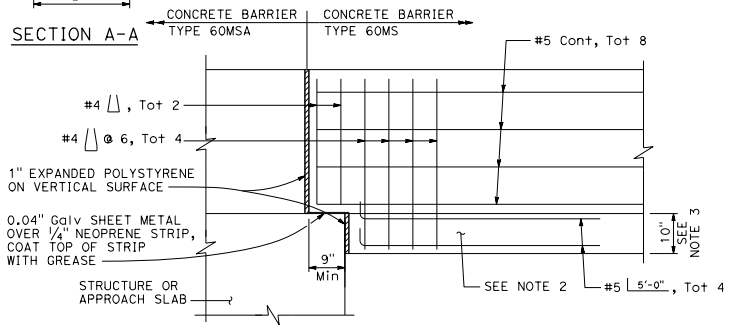
### NOTES:

1. See Standard Plan A76G for Concrete Barrier Type 60MS and Type 60MSA.
2. Footing monolithic or doweled with #6 as shown on Standard Plan A76AB. The footing is required at concrete barrier ends and at interruptions in concrete barrier. 10" concrete barrier footing extends 10'-0" back from end of barrier.
3. 10'-0" transition of concrete barrier from sloped face to vertical occurs before 3' length of vertical face for crash cushion connection and can occur within height transition for other types of concrete barrier to crash cushion connection.
4. Alternative top of barrier vertical transition may taper at maximum 6:1.
5. Lower chamfer size is 16" x 18" and 4½" deep.
6. Upper chamfer is 17⅝" x 4" and 3" deep.
7. Not for use for sand barrel crash cushions.
8. Minimum length for Concrete Barrier Type 60 series is 100'-0".




## CONCRETE BARRIER TYPE 60MS END ANCHORAGE




## CONCRETE BARRIER TYPE 60MS CONNECTION TO STRUCTURE

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# CONCRETE BARRIER TYPE 60MS CONNECTION TO CRASH CUSHION

NO SCALE

**A76HA**

7-1-25



Return to Table of Contents

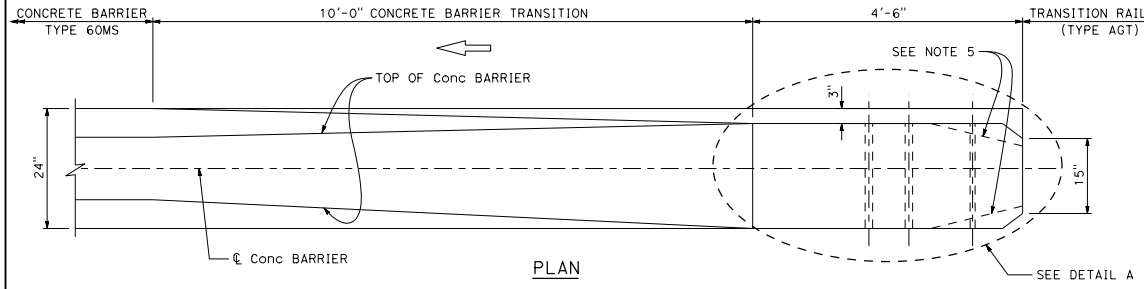
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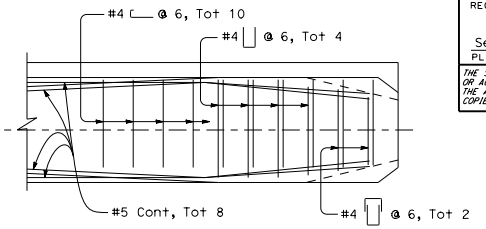
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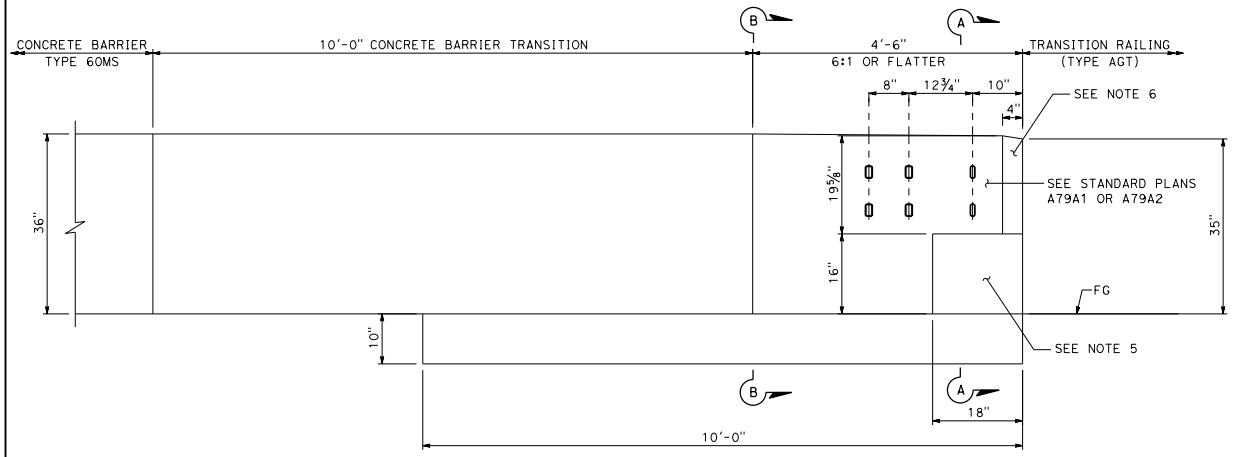
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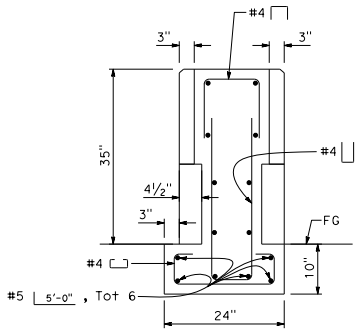

DETAIL A



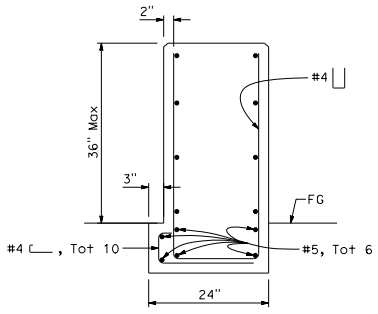

ELEVATION

## TRANSITION CONCRETE BARRIER TYPE 60MS TO AGT

See Note 11




SECTION A-A




SECTION B-B

NOTES:

1. See Standard Plan A76G for concrete barrier Type 60MS.
2. Footing monolithic or doweled with 2-#8 x 8" @ 2'-0". The footing is required at concrete barrier ends and at interruptions in concrete barrier. 10" concrete barrier footing extends 10'-0" back from end of barrier.
3. 10'-0" transition of concrete barrier from sloped face to vertical occurs before 4'-6" length of vertical face for connection and can occur within height transition for other types of concrete barrier connection.
4. Alternative top of barrier vertical transition may taper at maximum 6:1.
5. Lower chamfer size is 16" x 18" and 4½" deep.
6. Upper chamfer is 19⅝" x 4" and 3" deep.
7. Typical reinforcement clearance is 2" unless shown.
8. Adjust reinforcement as needed to clear HSS by minimum 1".
9. Minimum length for concrete barrier Type 60 is 100'-0" to attach AGT.
10. 3" offset on traffic approach side.
11. See Standard Plans A79 series for AGT connection details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MS TO TRANSITION RAILING (TYPE AGT)

NO SCALE

**A76HB**

7-1-25



Return to Table of Contents

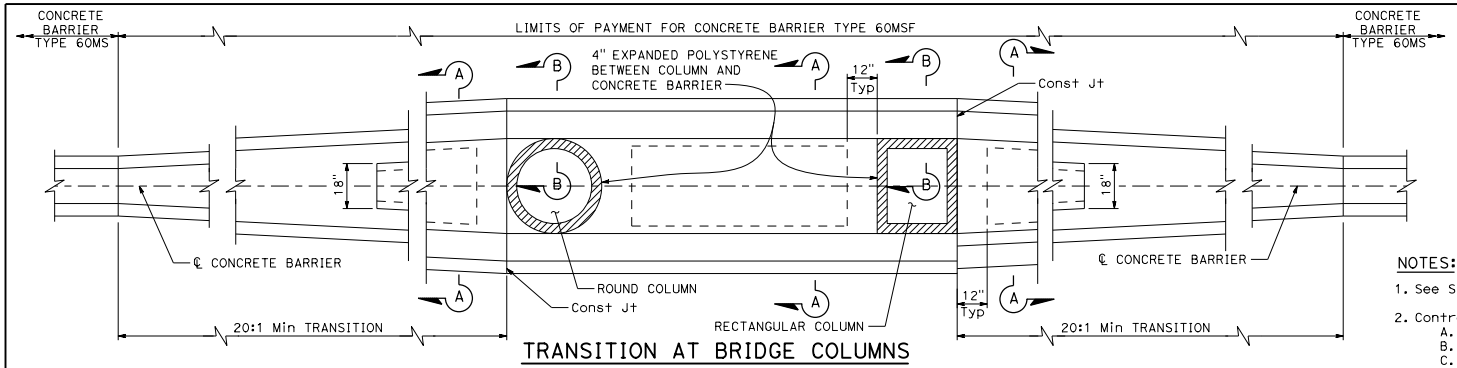
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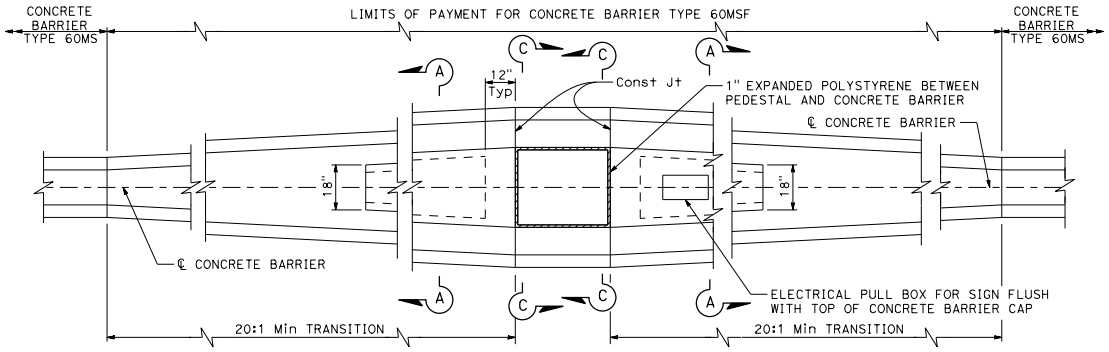
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## TRANSITION AT BRIDGE COLUMNS

Concrete Barrier Type 60MSF, see Note 7

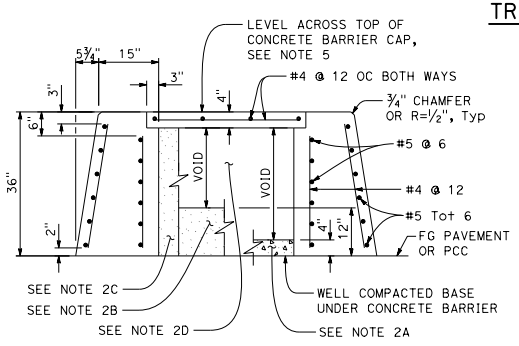



## TRANSITION AT SIGN PEDESTAL

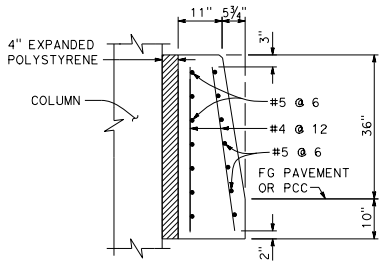
Concrete Barrier Type 60MSF, see Note 7

NOTES:

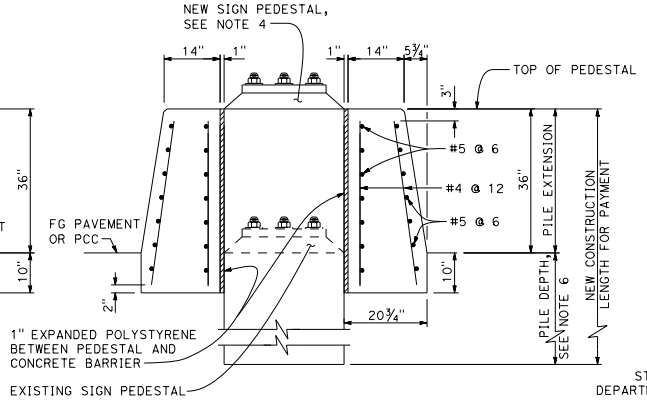
1. See Standard Plan A76G for concrete barrier Type 60MS.
2. Contractor options for fill between concrete barrier walls:
   A. Place 4" PCC at base between concrete barrier walls.
   B. Place 1'-0" of granular material at base between walls.
   C. Place granular material from base to bottom of 4" cap.
   D. Monolithic concrete with foam blockouts is not permitted.
3. Reinforcing steel shall extend continuous through construction joints.
4. See Overhead Sign plans for sign pedestal elevations on new construction.
5. Adjust height of concrete barrier wall on low side of offset or superelevated roadways to provide level grade across top of concrete barrier cap.
6. See Overhead Signs Standard Plan Pile Foundation Tables.
7. All locations with limited shoulder width available for barrier, see Standard Plan A76F for use of Concrete Barrier Type 60MGF.




SECTION A-A




SECTION B-B




SECTION C-C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 60MSF

NO SCALE

A76I

7-1-25



Return to Table of Contents

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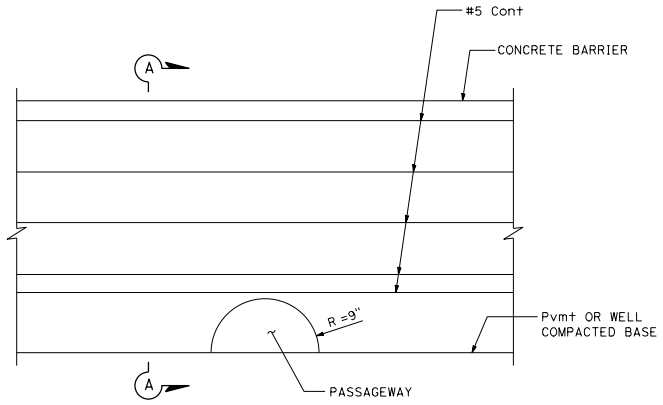
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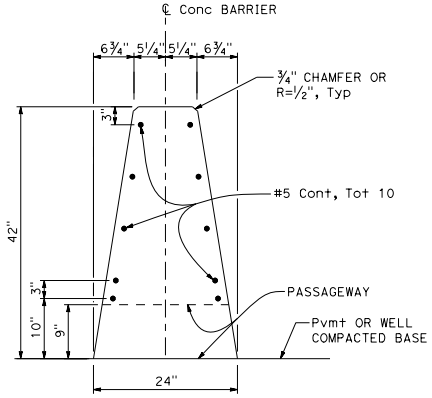
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NOTES:

1. Type MS Passageway typically used for crossing of small size animals.
2. See Standard Plan A76A for typical details of Concrete Barrier Type 60M.
3. Wildlife Passageway (Type MS) should be placed a minimum of 100 feet apart.




ELEVATION
See Notes 1 and 2




SECTION A-A
(Concrete Barrier Type 60M shown)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER WILDLIFE PASSAGEWAY (TYPE MS)

NO SCALE

A76J

7-1-25

2025 STANDARD PLAN A76J

Return to Table of Contents

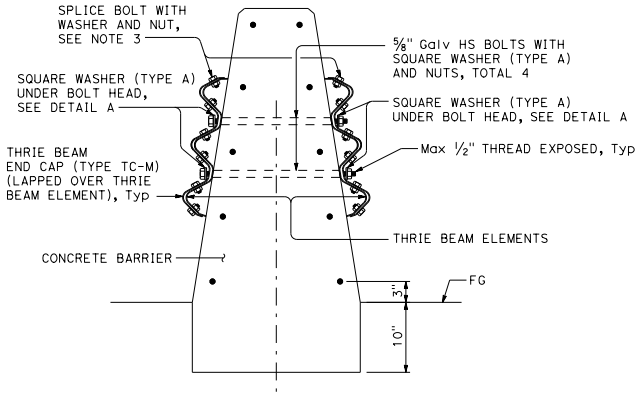
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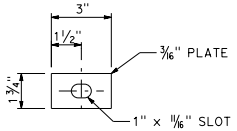
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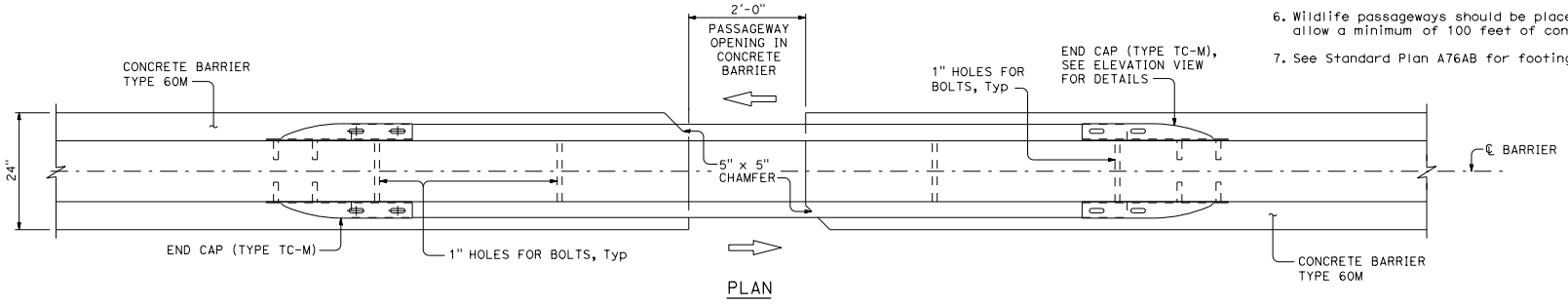

SECTION A-A
See Notes 4, 6, and 7



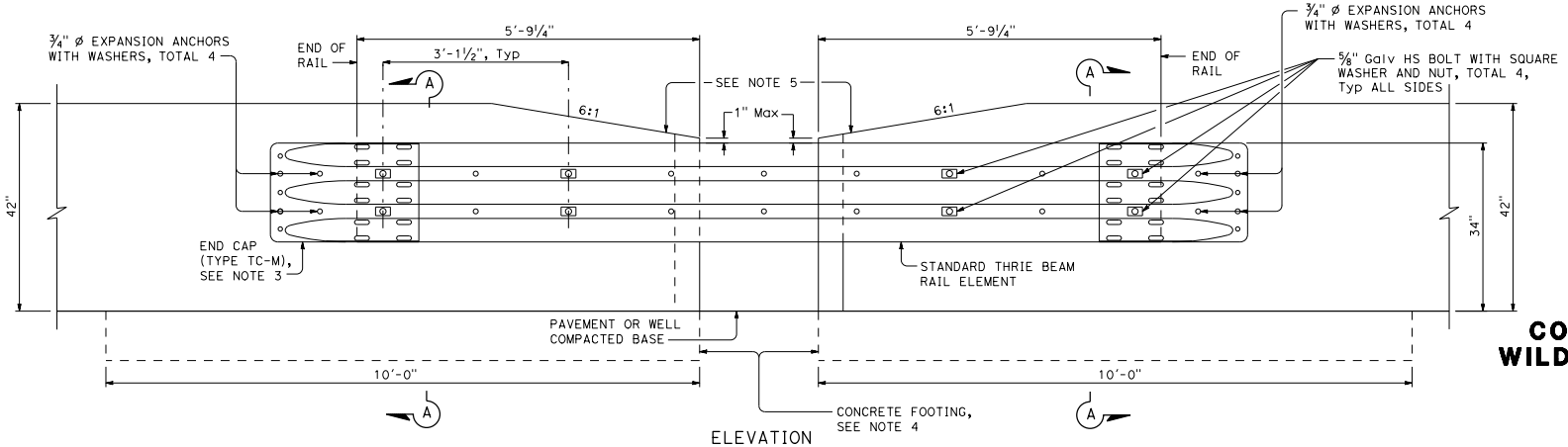

DETAIL A
SQUARE WASHER

NOTES:

1. Type MM Passageway typically used for crossing of medium size animals.
2. For details of the thrie beam element and hardware, see the A78 series of the Standard Plans. For details of concrete barrier Type 60, see the A76 series of the Standard Plans.
3. The end cap, and the thrie beam element may be connected together prior to bolting the elements to the concrete barrier. All splice bolts to connect the end cap to the rail element are required. Torque end cap to be flush with barrier surface.
4. Barrier end anchorage shall be constructed as shown in Section A-A of this plan. For footing reinforcement details, see Standard Plan A76AB.
5. Taper top of concrete barrier at 6:1 to match the top elevation of the thrie beam rail element.
6. Wildlife passageways should be placed a minimum of 100 feet apart to allow a minimum of 100 feet of concrete barrier length between openings.
7. See Standard Plan A76AB for footing reinforcement details.




PLAN




ELEVATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER WILDLIFE PASSAGEWAY (TYPE MM)

NO SCALE

**A76K**

7-1-25

2025 STANDARD PLAN A76K

Return to Table of Contents

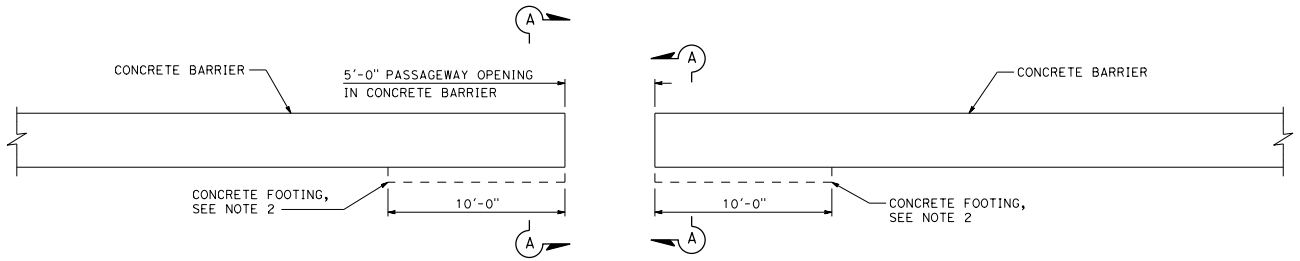
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| | | | | | |

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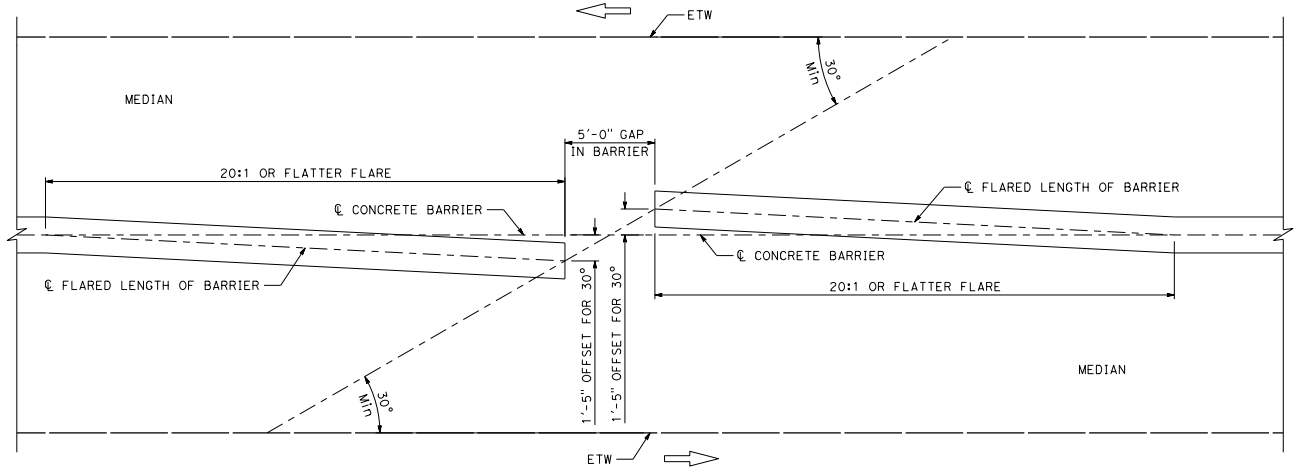
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
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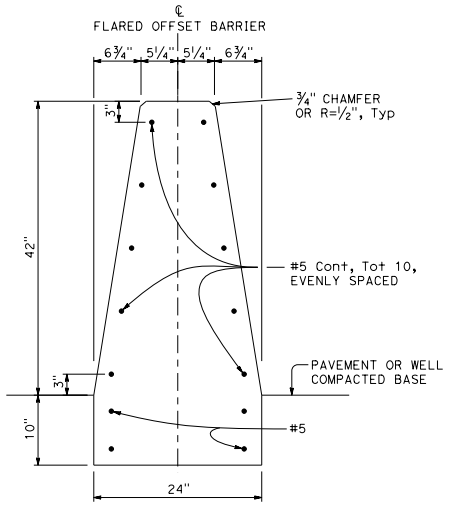

ELEVATION




PLAN

NOTES:

1. Type ML Passageway typically used for crossing of large size animals.
2. Barrier end anchorage and reinforcement shall be constructed as shown in Section A-A of this plan and as shown on Standard Plan A76AB.
3. Minimum length of barrier between wildlife passageways should be 100'-0".
4. See Standard Plan A76AB for footing reinforcement details.




SECTION A-A
See Notes 2 and 4

STATE OF CALIFORNIA
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# CONCRETE BARRIER WILDLIFE PASSAGEWAY (TYPE ML)

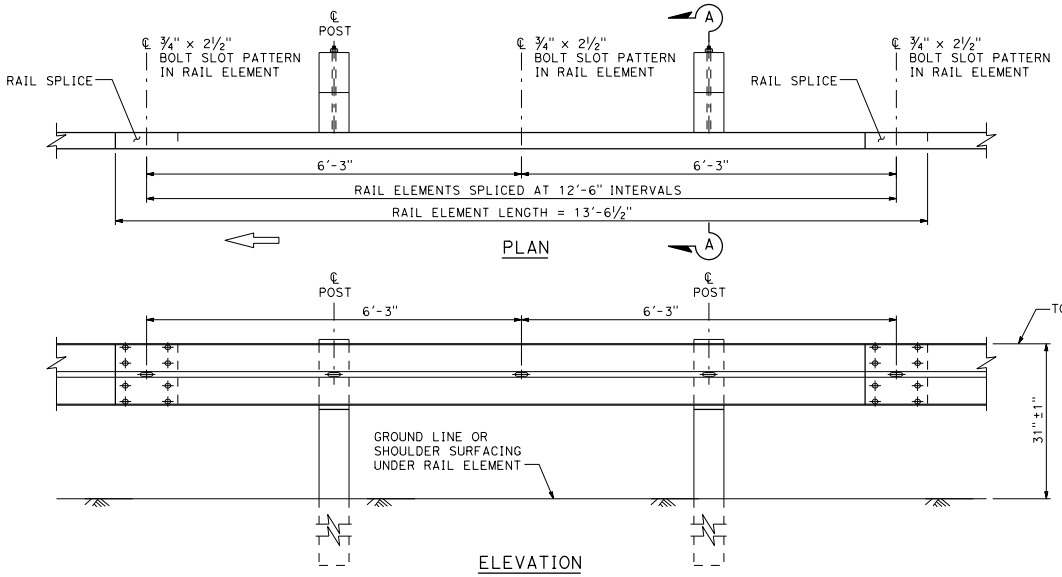
NO SCALE

A76L

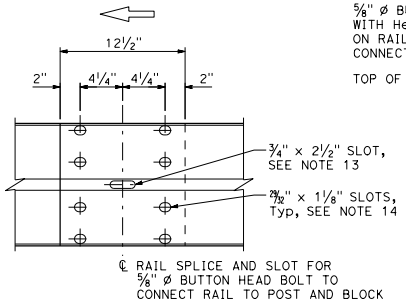
7-1-25

2025 STANDARD PLAN A76L

Return to Table of Contents




## MIDWEST GUARDRAIL SYSTEM WITH WOOD POST AND BLOCKS



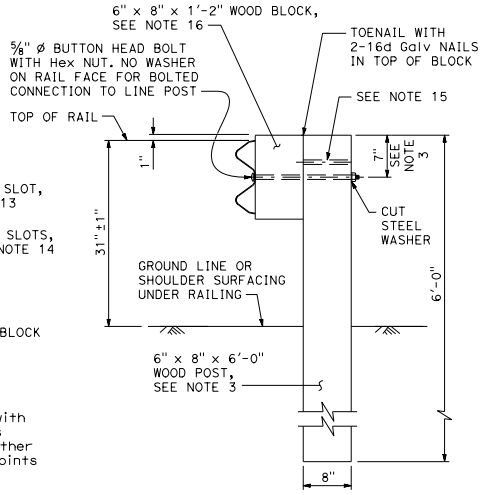

ELEVATION

## RAIL ELEMENT SPLICE DETAIL

a) Connect the overlapped end of the rail elements with ⅝" ø x 1¼" button head oval shoulder splice bolts inserted into the 29/32" x 1⅛" slots and bolted together with ⅝" ø recessed hex nuts. Recess of hex nut points toward rail element. A total of 8 bolts and nuts are to be used at each rail splice connection.

b) The ends of the rail elements are to be overlapped in the direction of traffic, see details.

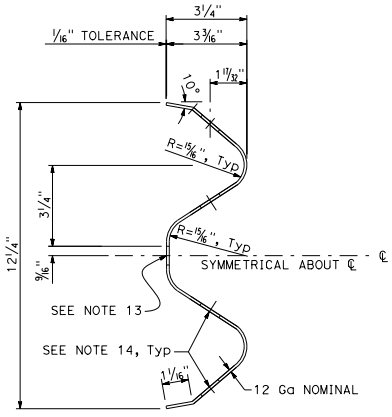
c) Where end cap is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used.




SECTION A-A

## TYPICAL WOOD LINE POST INSTALLATION

See Note 4




SECTION THRU RAIL ELEMENT

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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NOTES:

1. For details of steel post installations, see Standard Plan A77L2.
2. For details of standard hardware used to construct MGS, see Standard Plan A77M1.
3. For details of wood posts and wood blocks used to construct MGS, see Standard Plan A77N1.
4. For additional installation details, see Standard Plan A77N3.
5. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
6. For MGS typical layouts, see the A77P, A77Q and A77R series of Standard Plans.
7. If railing is connected to terminal system end treatment, use 31" height terminal system end treatment.
8. For MGS end anchor details, see Standard Plans A77S1 and A77T2.
9. For details of MGS transition to Approach Guardrail Transition (Type AGT), see Standard Plan A79A1.
10. For details of MGS connection to bridge railing, see Standard Plans A79B1 and A79B2.
11. For MGS connection details to abutments and walls, see Standard Plans A79C1 and A79C2.
12. For typical MGS delineation and dike positioning details, see Standard Plan A77N4.
13. Slotted hole for bolted connection of rail element to block and post.
14. Slotted holes for splice bolts to overlap ends of rail element.
15. Additional hole in uppermost portion of line post is for potential future adjustments of railing height. See Standard Plan A77N1.
16. 6" x 12" x 1'-2" block must be used with 6" Type A dike.
17. Install posts in soil.

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# MIDWEST GUARDRAIL SYSTEM STANDARD RAILING SECTION (WOOD POST WITH WOOD BLOCK)

NO SCALE

**A77L1**

2025 STANDARD PLAN A77L1

7-1-25

Return to Table of Contents

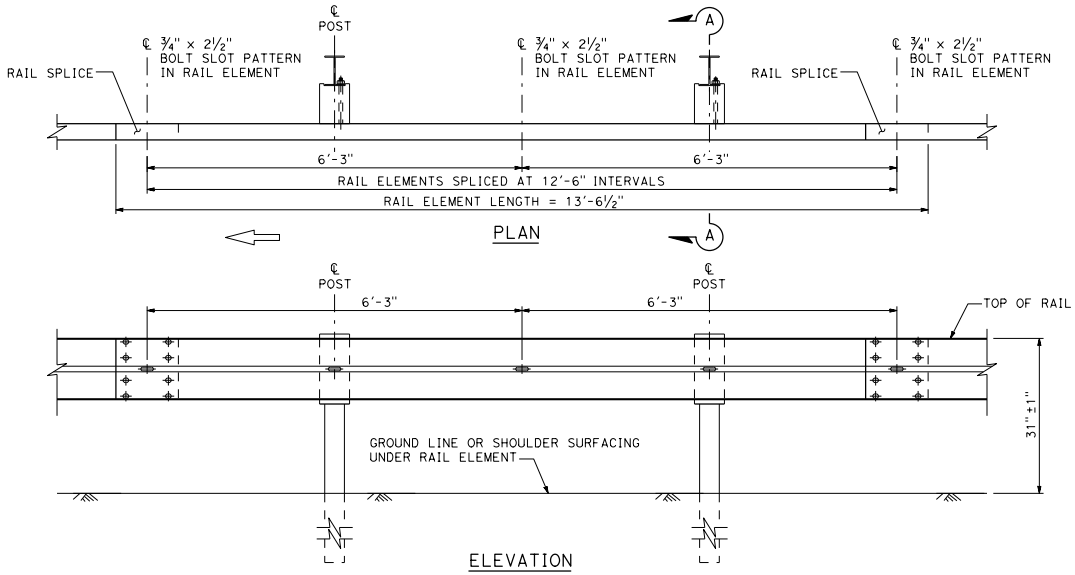
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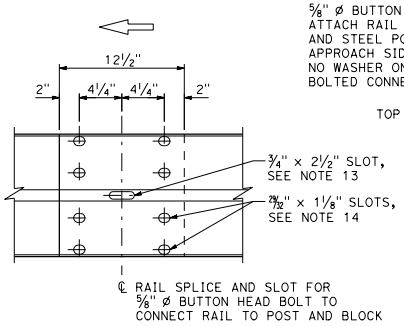
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## MIDWEST GUARDRAIL SYSTEM WITH STEEL POSTS AND NOTCHED WOOD OR NOTCHED RECYCLED PLASTIC BLOCKS



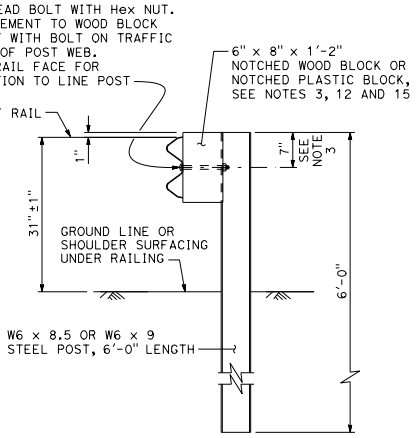

ELEVATION

### RAIL ELEMENT SPLICE DETAIL

a) Connect the overlapped end of the rail elements with ⅝" Ø x 1¼" button head oval shoulder splice bolts inserted into the 29/32" x 1⅛" slots and bolted together with ⅝" Ø recessed hex nuts. Recess of hex nut points toward rail element. A total of 8 bolts and nuts are to be used at each rail splice connection.

b) The ends of the rail elements are to be overlapped in the direction of traffic, see details.

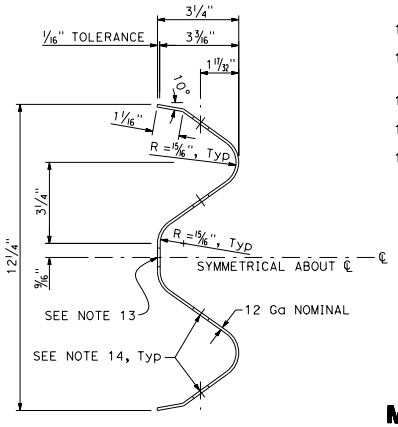
c) Where end cap is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used.




SECTION A-A

### TYPICAL STEEL LINE POST INSTALLATION

See Note 4




SECTION THRU RAIL ELEMENT

NOTES:

1. For details of wood post installations, see Standard Plan A77L1.
2. For details of standard hardware used to construct MGS, see Standard Plan A77M1.
3. For details of steel posts and notched wood blocks used to construct MGS, see Standard Plan A77N2.
4. For additional installation details, see Standard Plan A77N3.
5. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
6. For MGS typical layouts, see the A77P, A77Q and A77R series of Standard Plans.
7. If railing is connected to terminal system end treatment, use 31" height terminal system end treatment.
8. For MGS end anchor details, see Standard Plans A77S1 and A77T2.
9. For details of MGS transition to Approach Guardrail Transition (Type AGT), see Standard Plan A79A1.
10. For details of MGS connection to bridge railings, see Standard Plans A79B1 and A79B2.
11. For dike positioning and MGS delineation details, see Standard Plan A77N4.
12. Notched face of block faces steel post.
13. Slotted hole for bolted connection of rail element to block and post.
14. Slotted holes for splice bolts to overlap ends of rail element.
15. 6" x 12" x 1'-2" block must be used with 6" Type A dike.
16. Install posts in soil.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM STANDARD RAILING SECTION (STEEL POST WITH NOTCHED WOOD OR NOTCHED RECYCLED PLASTIC BLOCK)

NO SCALE

**A77L2**

7-1-25

Return to Table of Contents

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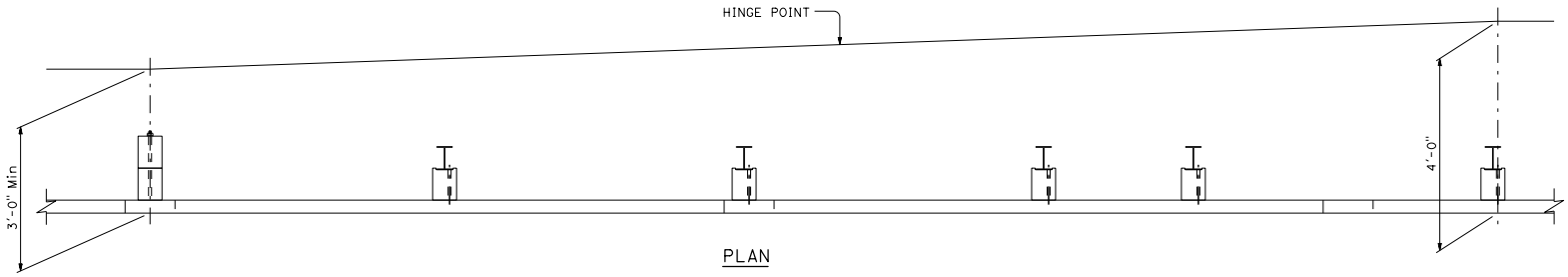
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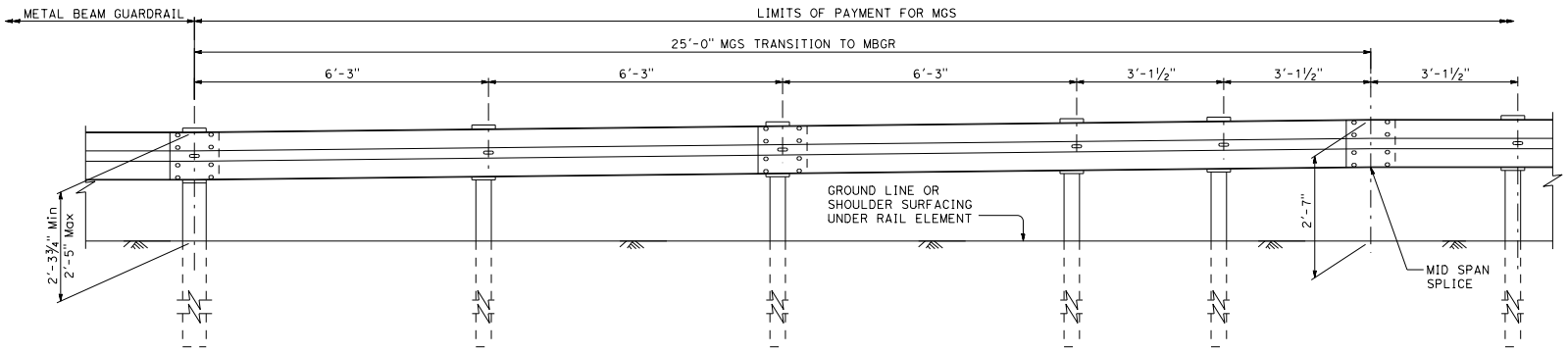
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NOTE:

1. Refer to Standard Plans A77L1 and A77L2 for component details for MGS not shown on this plan.




PLAN




ELEVATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM
# TRANSITION TO METAL BEAM GUARDRAIL

NO SCALE

**A77L4**

7-1-25

2025 STANDARD PLAN A77L4



Return to Table of Contents

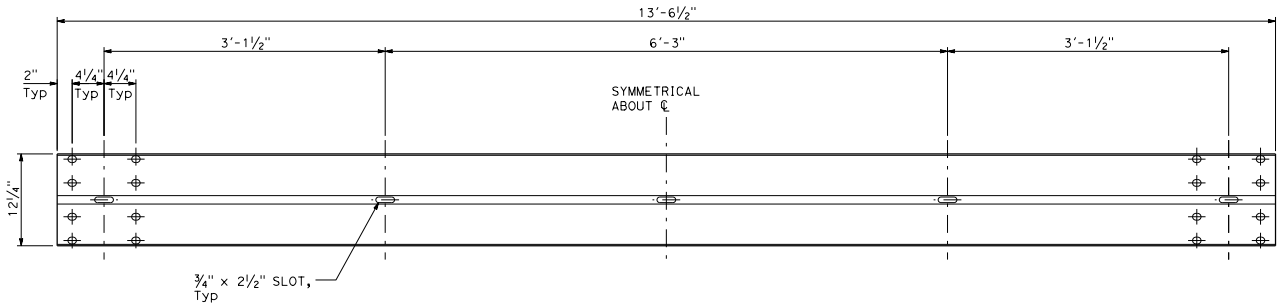
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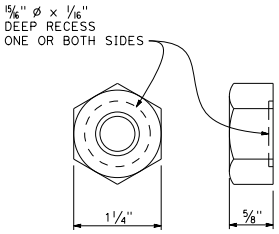
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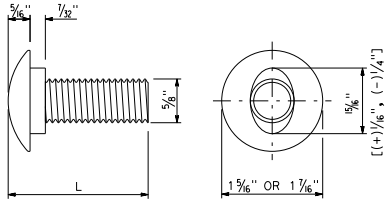

## TYPICAL RAIL ELEMENT

NOTE:

1. Slotted holes for splice bolts to overlap ends of rail element.




## ⅝" ø RECESS NUT



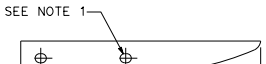

## ⅝" ø BUTTON HEAD BOLT

| BUTTON HEAD BOLT | |
|---|---|
| L | THREAD LENGTH |
| 1¼" | FULL THREAD LENGTH |
| 2" | FULL THREAD LENGTH |
| 10" | 4" Min THREAD LENGTH |
| 18" | 4" Min THREAD LENGTH |
| 20" | 4" Min THREAD LENGTH |
| 22" | 4" Min THREAD LENGTH |
| 26" | 4" Min THREAD LENGTH |
| 36" | 4" Min THREAD LENGTH |
| ** 2¾" | 2" Min THREAD LENGTH |
| ** 19" | 4" Min THREAD LENGTH |

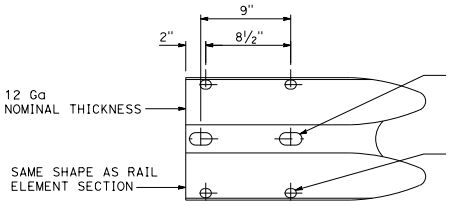
** For nested rail applications

NOMIMAL GAUGE THICKNESS

12 Ga is 0.108"
10 Ga is 0.138"




PLAN

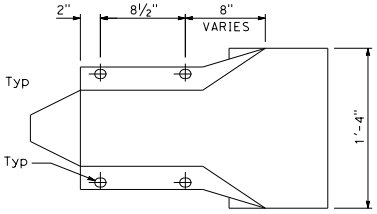



ELEVATION

## END CAP (TYPE A)




PLAN




ELEVATION

## END CAP (TYPE B)

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# MIDWEST GUARDRAIL SYSTEM STANDARD HARDWARE

NO SCALE

A77M1

7-1-25



Return to Table of Contents

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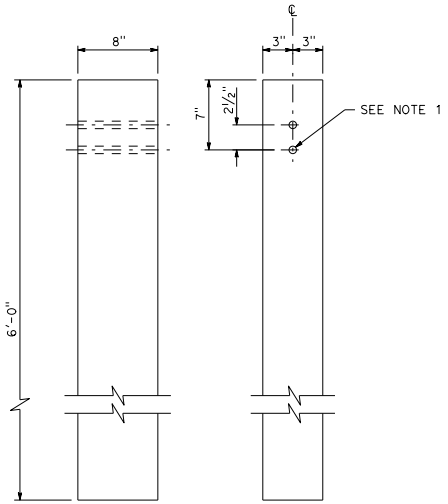
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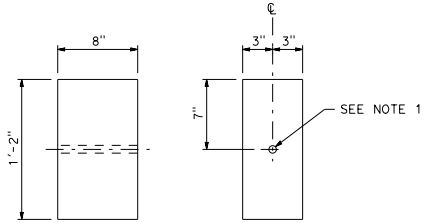
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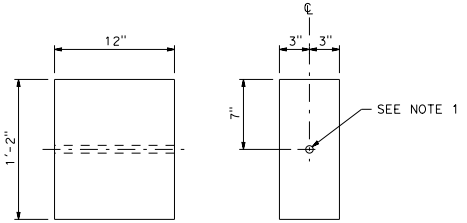
1. All holes in wood posts and blocks shall be ¾" Dia ±1/16".
2. Dimensions shown for wood post are nominal.
3. This post and block combination used for standard line post sections of MGS.
4. Must be used with 6" height Type A dike.




6" x 8" WOOD POST
See Note 3




6" x 8" WOOD BLOCK
See Note 3




6" x 12" WOOD BLOCK
See Note 4

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# MIDWEST GUARDRAIL SYSTEM WOOD POST AND WOOD BLOCK DETAILS

NO SCALE

A77N1

7-1-25

2025 STANDARD PLAN A77N1

Return to Table of Contents

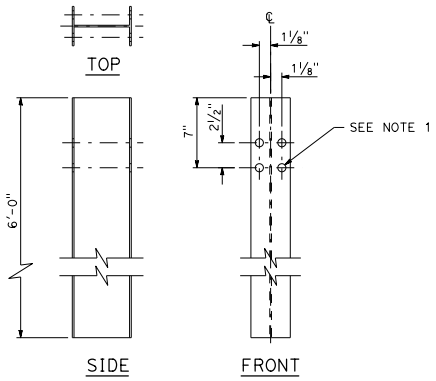
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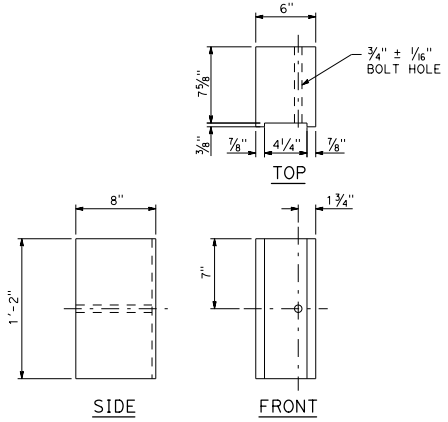
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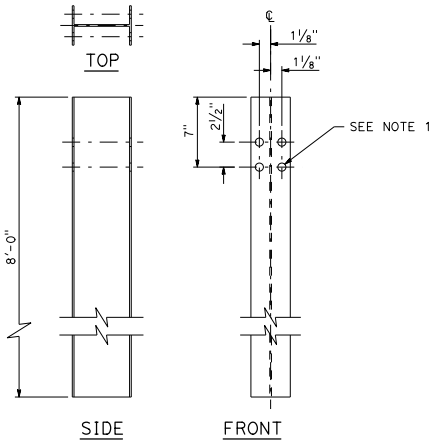
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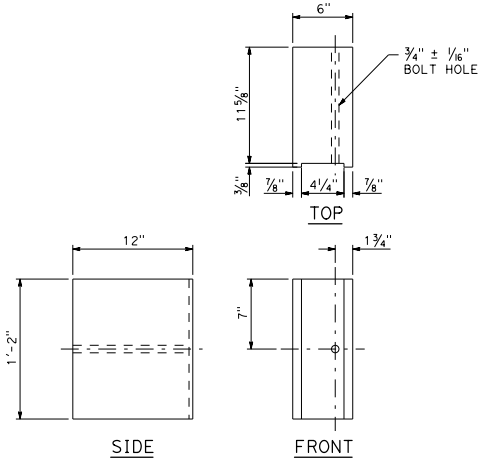

W6 x 8.5 OR W6 x 9
STEEL POST
See Note 4




6" x 8"
NOTCHED WOOD OR PLASTIC BLOCK




W6 x 8.5 OR W6 x 9
STEEL POST
See Note 6




6" x 12"
NOTCHED WOOD OR PLASTIC BLOCK
See Notes 2, 3 and 7

NOTES:

1. All holes in steel post shall be 13/16" ø maximum.
2. Dimensions shown for wood block are nominal.
3. Notched face of block faces steel post.
4. 6'-0" length posts to be used for typical roadway installation. See Standard Plan A77N3.
5. The standard block on W8 x 6.5 or W6 x 9 steel post separates the metal beam guardrail element 8" from the post. The 12" block is an option to the 8" block.
6. This post to be used for line post sections of MGS on narrow roadways. Post longer than 6' must be labeled on post web with 2" letters using black acrylic paint.
7. 6" x 12" block must be used with 6" Type A dike.

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# MIDWEST GUARDRAIL SYSTEM
# STEEL POST AND BLOCK DETAILS

NO SCALE

**A77N2**

7-1-25



Return to Table of Contents

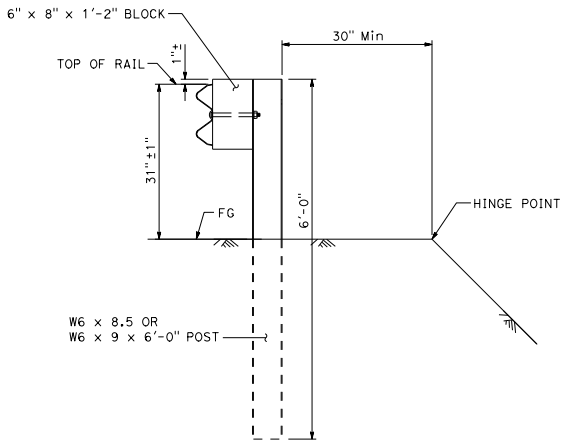
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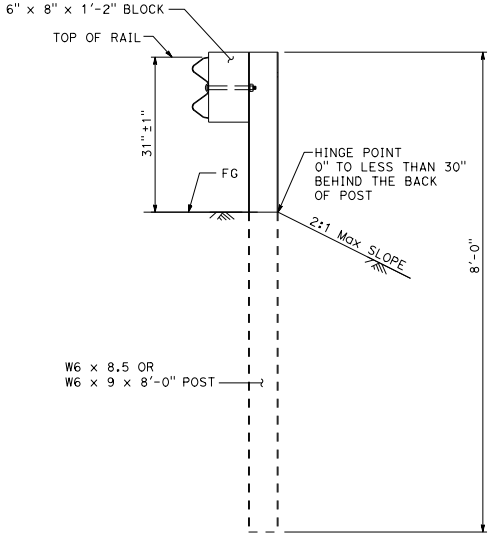
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DETAIL A

## TYPICAL ROADWAY INSTALLATION

See Note 1

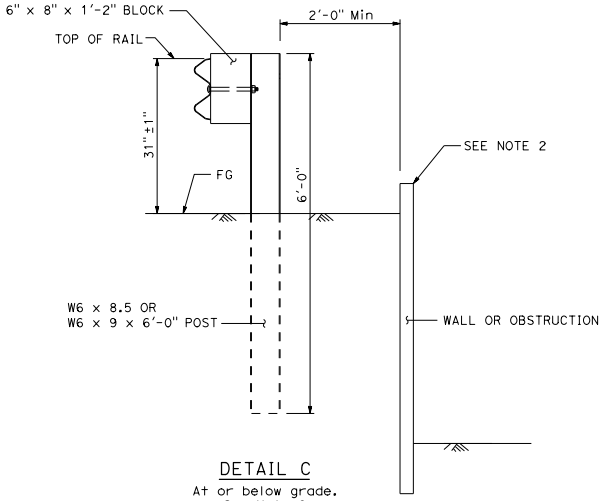



DETAIL B

## NARROW ROADWAY INSTALLATION

See Note 1

## POST EMBEDMENT

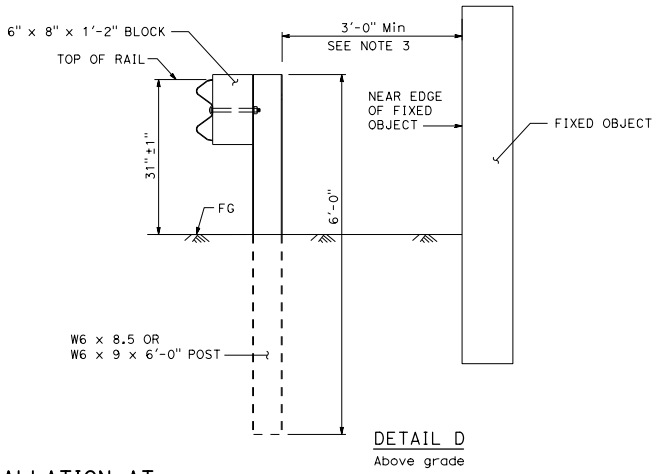



DETAIL C

At or below grade.
See Note 6

NOTES:

1. These installation details are also applicable to wood line post installations. For Detail A, C, and D, where wood post installations are constructed, 6" x 8" x 6'-0" post, with blocks are to be used in place of steel post and block. For Detail B, there is no wood post option. For additional installation details, see Standard Plans A77L1 and A77L2.
2. When maximum height of obstruction behind guardrail post is 6" above grade, see Detail D.
3. If distance from back of post to the near edge of fixed object is less than 3'-0", see Strengthened Rail Section on Standard Plans A77R1 and A77R3.
4. For dike positioning with MGS installations, see Standard Plan A77N4.
5. Typical 6" x 8" notched wood or plastic block shown. 6" x 12" notched wood or plastic block is interchangeable in these details if 6" dike is placed.
6. See Standard Plans B3-7A and B3-7B when placing MGS in front of reinforced masonry walls.




DETAIL D

Above grade

## INSTALLATION AT WALLS OR OBSTRUCTIONS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL LINE POST EMBEDMENT AND HINGE POINT OFFSET DETAILS

NO SCALE

A77N3

7-1-25

Return to Table of Contents

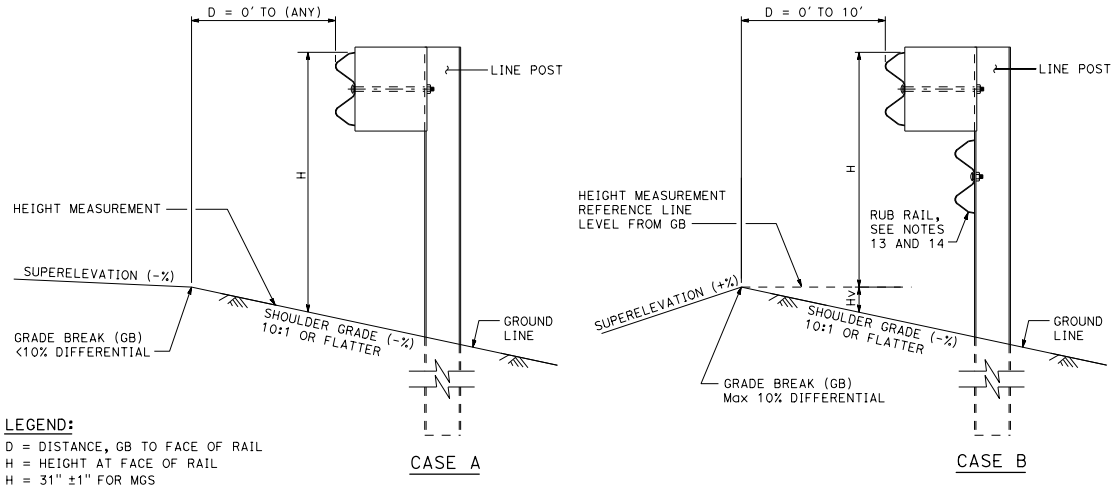
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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CASE A CASE B

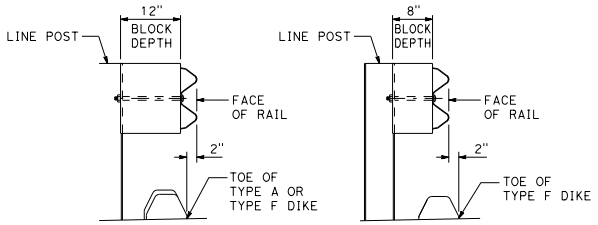
LEGEND:
D = DISTANCE, GB TO FACE OF RAIL
H = HEIGHT AT FACE OF RAIL
H = 31" ±1" FOR MGS
H = 34" ±1" FOR THRIE BEAM (TYPE M) (NOT SHOWN)

## MEASURE HEIGHT DETAIL AT GRADE BREAK (GB)

Place rub rail if Hv is greater than or equal to 3" for MGS.

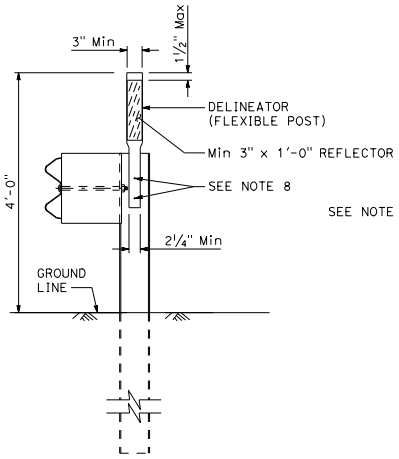
NOTES:

1. Details shown on this sheet apply to W-beam guardrail and thrie beam.
2. Dike must be placed in the standard position unless otherwise shown. For curb and dike details, see Standard Plans A87A and A87B.
3. See Standard Plans for dike type and placement within and near terminal systems.
4. See Standard Plan A77S1 for dike placement near SFT-M end anchor.
5. The maximum height of dike or curb with MGS shall be 6" and use 12" blocks.
6. When shown on project plans, front toe of dike may extend up to 7" in front of rail face when used with 12" blocks.
7. Do not install marker on the trailing end of a guardrail run.
8. Use ¼" - 20 x 1" self-tapping screws in 0.22" ø holes or ¼" bolts in 9/32" ø holes for steel post, or use 16d galv nails for wood post.
9. When guardrail end treatment is placed in a flared or offset configuration, use at least one delineator at location shown. See project plans for other placement of guardrail delineation.
10. When installing MGS with dike in areas requiring snow removal or frequently plowed areas, use 12" blocks.
11. Do not place mountable dike under guardrail.
12. Type C Dike may be placed at any offset in front of guardrail or terminal system.
13. Place rub rail when (H + Hv) is ≥ 34" for MGS, or ≥ 36" for Thrie Beam (Type M). Place MGS elements with no block for rub rail. Field drill post with 1" ø hole and attach rub rail to post with 5/8" ø button head bolt. Use rail element splice detail on Standard Plan A77L2, and bolt element at each post. No rub rail needed for GB differential < 9%. For GB differential = 10%, place rub rail when line rail is 4' to 8' from GB.
14. Maximum height of rail element with rub rail is 6" above standard rail height. Bottom of rub rail shall have a minimum distance of 4" above ground and should be parallel to rail. Maintain a minimum embedment of 36" for the post.
15. On approach end of rub rail, taper rail element behind first post. See Standard Plan A77T3 for details.

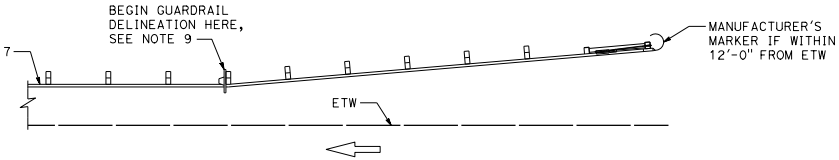



## GUARDRAIL DIKE POSITIONING

Standard position for new or existing dike or curb, see Notes 2 through 6




## GUARDRAIL DELINEATION




## MARKER PLACEMENT GUARDRAIL DELINEATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL HEIGHT MEASUREMENT, DIKE POSITIONING, AND DELINEATION DETAILS

NO SCALE

A77N4

7-1-25



Return to Table of Contents

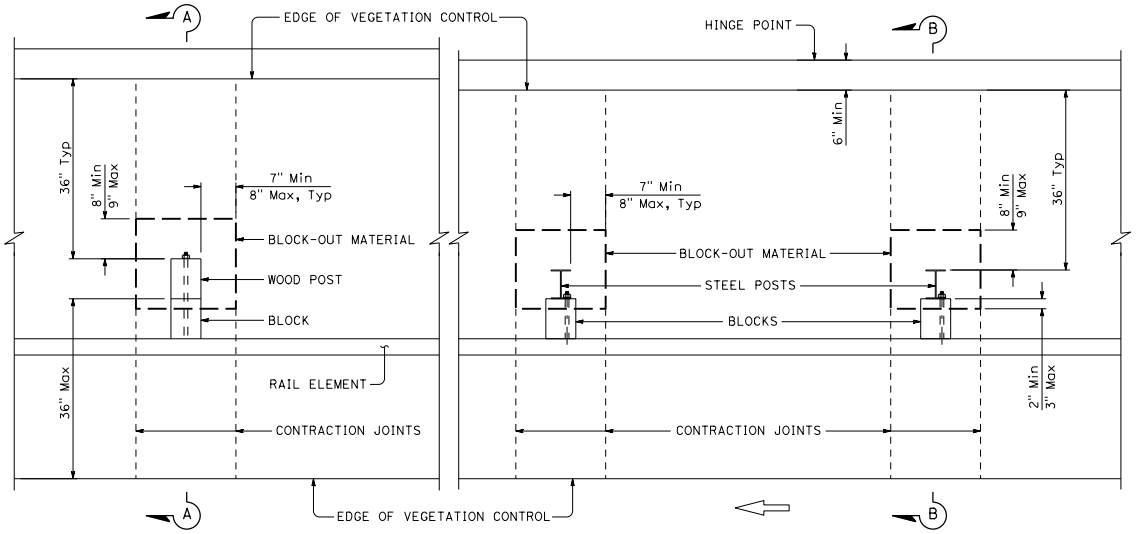
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M. Radhike
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Radhika Mothkuri — No. C95984 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

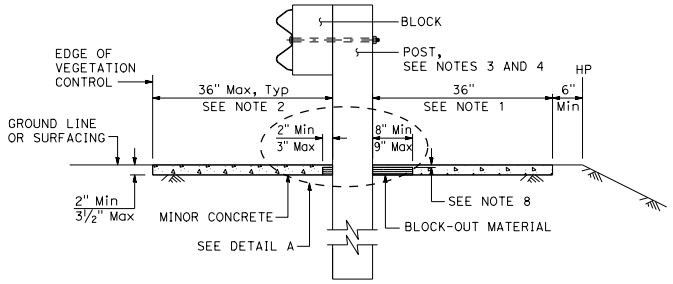
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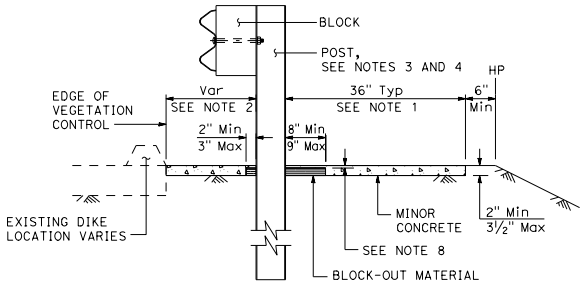

PLAN

NOTES:

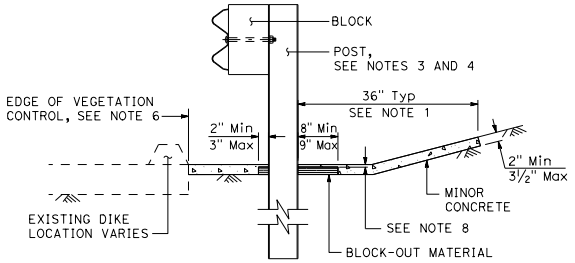
1. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the block-out at back of post.
2. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. For wood post sizes, see Standard Plan A77N1.
4. For steel post sizes, see Standard Plan A77N2.
5. For details not shown, see Standard Plans A77L1 and A77L2.
6. Where vegetation control is adjacent to a dike on a cut slope, and for typical line post application only, vegetation control may be flush with the top edge of dike, see Note 10.
7. Vegetation control must slope to drain water.
8. Concrete over block-out material depth, construct ⅜" Min to ⅝" Max.
9. This plan for vegetation control installation only.
10. Do not place fill material or weed abatement to top of dike as shown in Section B-B within 25'-0" of terminals as shown on Standard Plans A77Q and A77R series.
11. Vegetation control must not cover any bolts, bearing plates, struts, holes in post, or hardware at ground level.



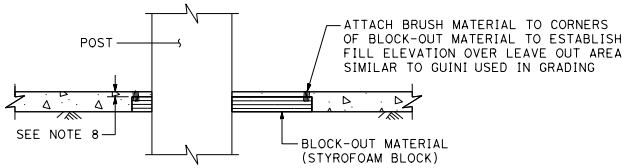

SECTION A-A
Without Existing Dike




SECTION B-B
With Existing Dike




SECTION B-B
With Existing Dike on cut slope




DETAIL A (OPTIONAL)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM

NO SCALE

**A77N5**

7-1-25

2025 STANDARD PLAN A77N5

Return to Table of Contents

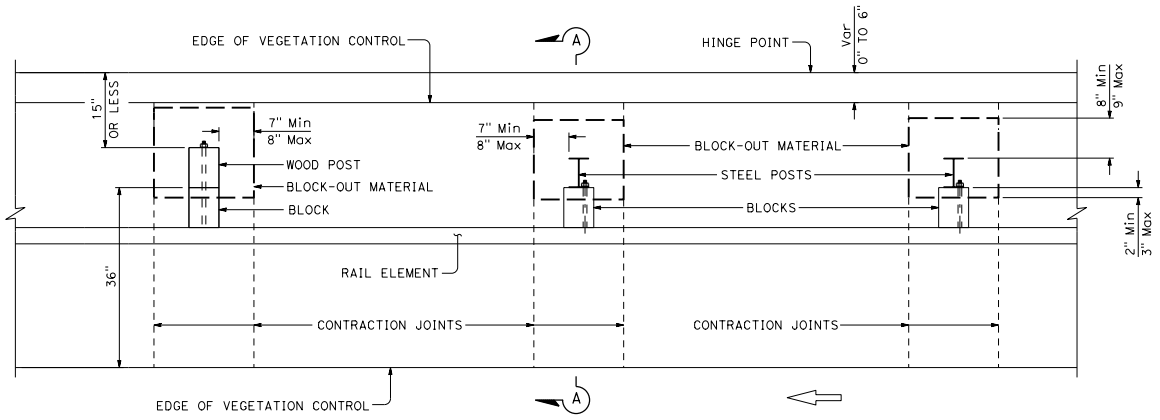
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M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

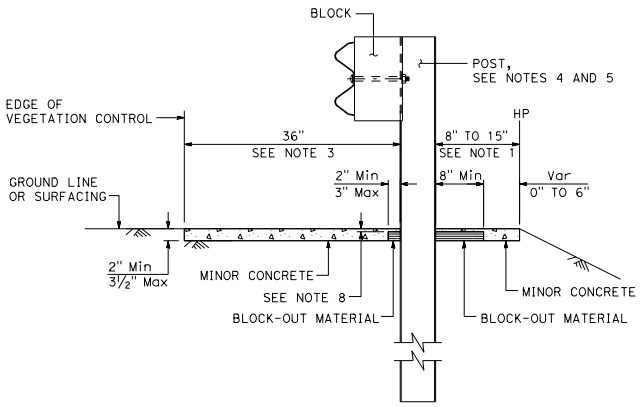
REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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PLAN

See Note 1




SECTION A-A

Without Existing Dike

NOTES:

1. Use the details on this sheet when the distance from the back of post to the hinge point is 15" or less. Use the details on Standard Plan A77N5 when the distance from the back of the post to the hinge point is greater than 15".
2. Construct vegetation control flush with the back edge of post, when distance from back of post to hinge point is less than 6".
3. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
4. For wood post sizes, see Standard Plan A77N1.
5. For steel post sizes, see Standard Plan A77N2.
6. For details not shown, see Standard Plans A77L1 and A77L2.
7. Vegetation control must slope away from post to drain water.
8. Concrete over block-out material depth, construct ⅜" Min to ⅝" Max.
9. This plan for vegetation control installation only.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM NARROW VEGETATION CONTROL INSTALLATION

NO SCALE

**A77N5A**

2025 STANDARD PLAN A77N5A

7-1-25

Return to Table of Contents

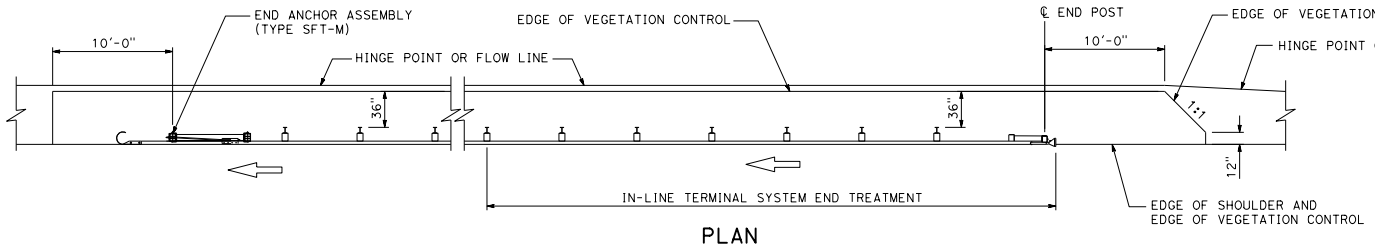
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M. Radhika
REGISTERED CIVIL ENGINEER

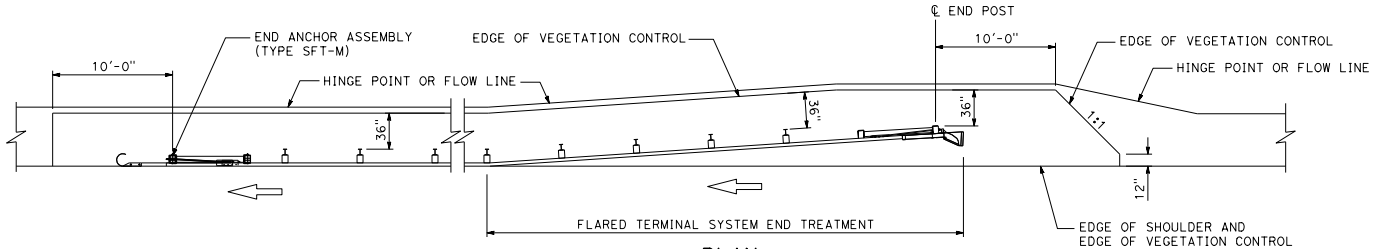
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

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PLAN




PLAN

NOTES:

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post.
3. Vegetation control must slope to drain water.
4. This plan for vegetation control installation only.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM FOR TERMINAL SYSTEM END TREATMENTS

NO SCALE

A77N6

7-1-25

88

2025 STANDARD PLAN A77N6

Return to Table of Contents

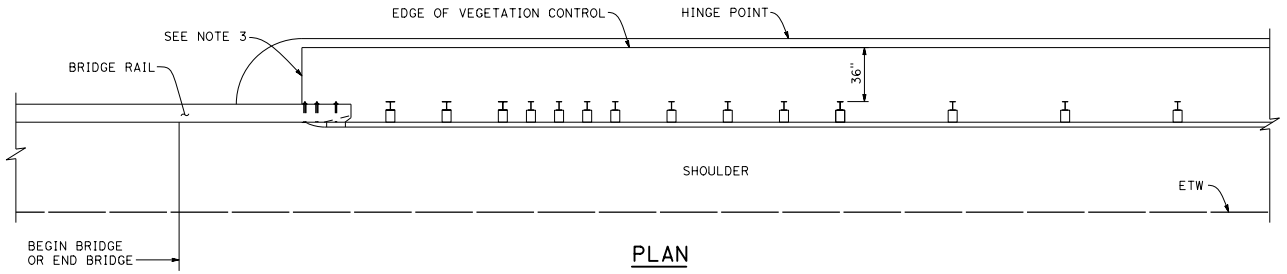
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R. Radhika
REGISTERED CIVIL ENGINEER

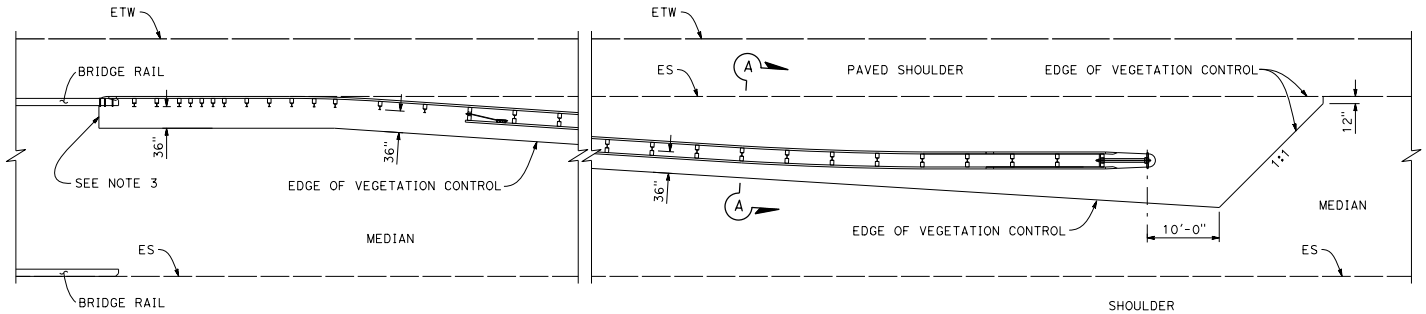
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

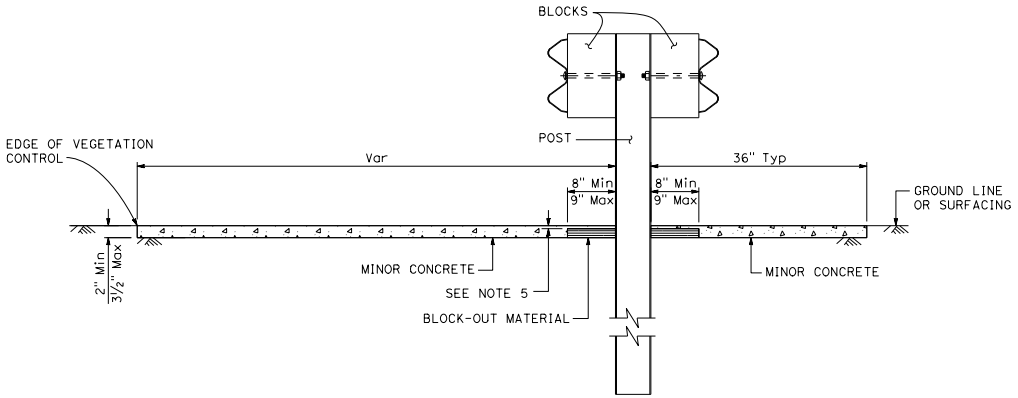
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PLAN




PLAN




SECTION A-A

NOTES:

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post.
3. End vegetation control at end of rail element.
4. Vegetation control must slope to drain water.
5. Concrete over block-out material depth, construct ⅜" Min to ⅝" Max.
6. This plan for vegetation control installation only.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM AT STRUCTURE APPROACH

NO SCALE

A77N7

7-1-25



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M. Radhika
REGISTERED CIVIL ENGINEER

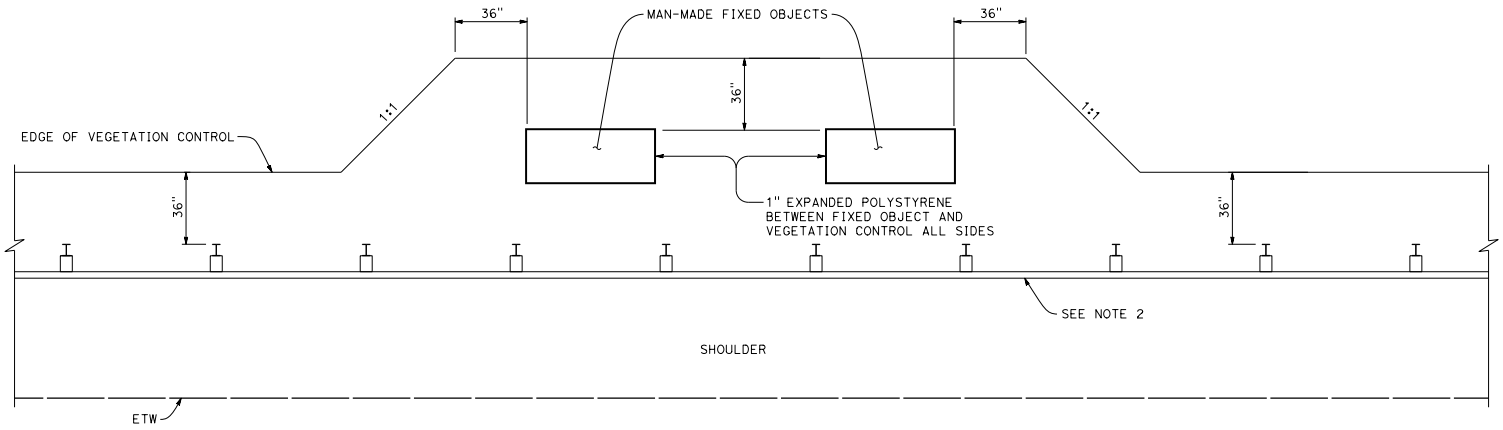
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Radhika Mothkuri
No. C95984
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STATE OF CALIFORNIA

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NOTES:

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. Vegetation control must slope to drain water.
4. This plan for vegetation control installation only.




PLAN

Fixed object(s) on shoulder

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM AT FIXED OBJECT

NO SCALE

A77N8

7-1-25

2025 STANDARD PLAN A77N8

90

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M. Radhika
REGISTERED CIVIL ENGINEER

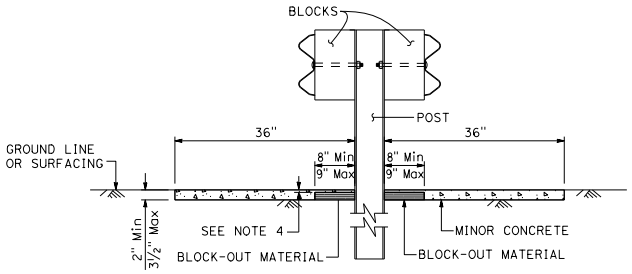
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

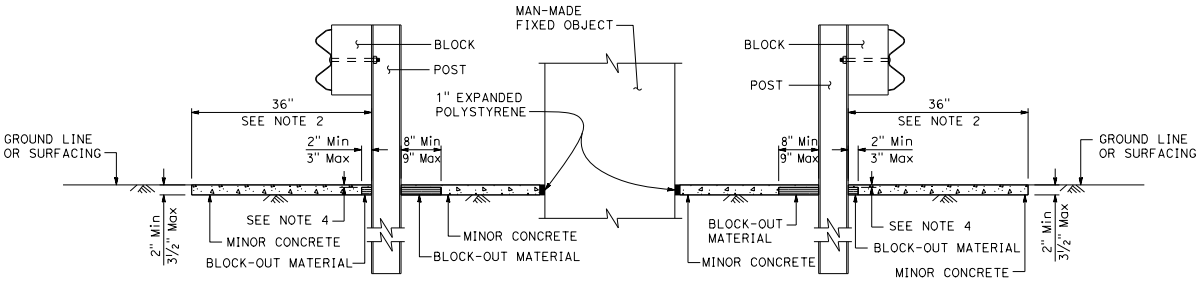
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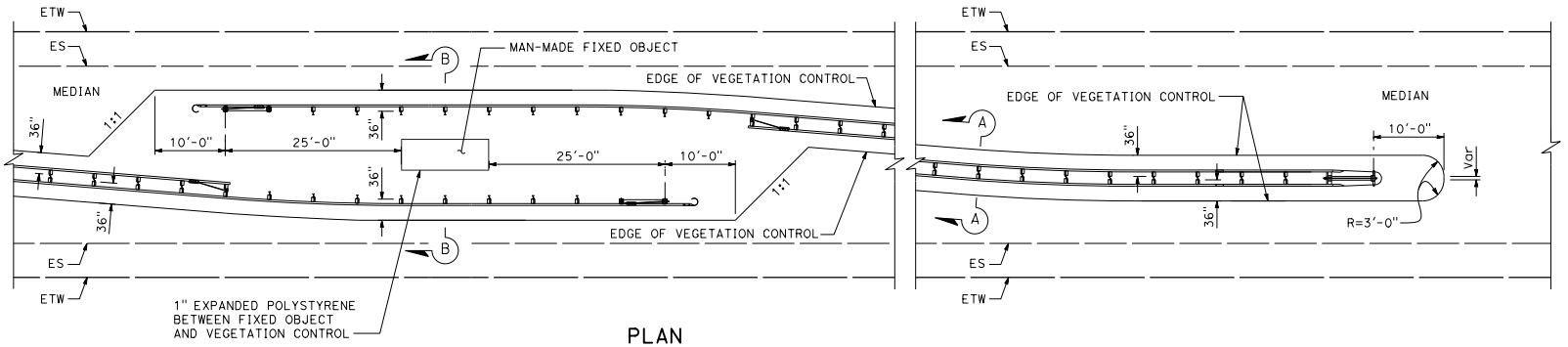
1. See Standard Plan A77N5 for additional vegetation control details.
2. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. Vegetation control must slope to drain water.
4. Concrete over block-out material depth, construct 3/8" Min to 5/8" Max.
5. This plan for vegetation control installation only.




SECTION A-A




SECTION B-B




PLAN

Fixed object(s) in median

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM AT FIXED OBJECT

NO SCALE

A77N9

7-1-25

2025 STANDARD PLAN A77N9



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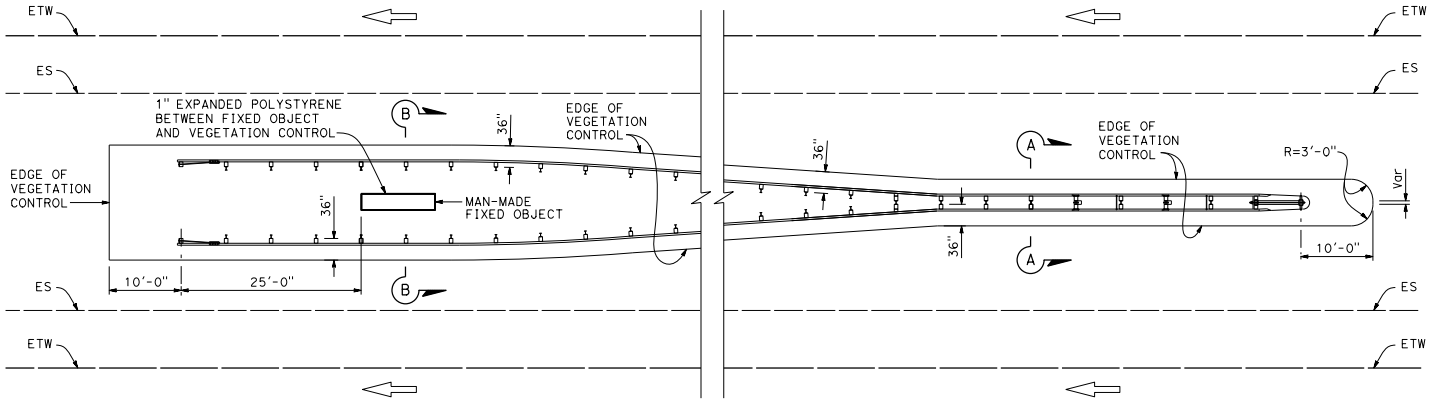
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M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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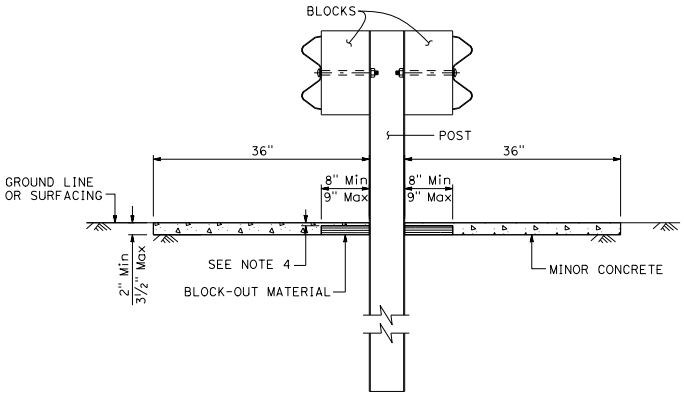



## PLAN

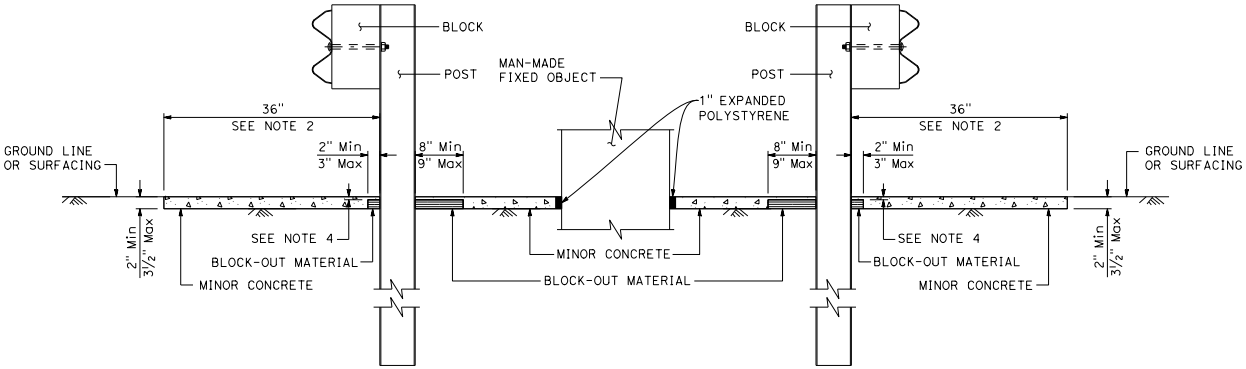
Fixed object(s) between separate roadbeds
(One-Way Traffic)

NOTES:

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. Vegetation control must slope to drain water.
4. Concrete over block-out material depth, construct 3/8" Min to 5/8" Max.
5. This plan for vegetation control installation only.




## SECTION A-A




## SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM AT FIXED OBJECT

NO SCALE

**A77N10**

7-1-25

2025 STANDARD PLAN A77N10

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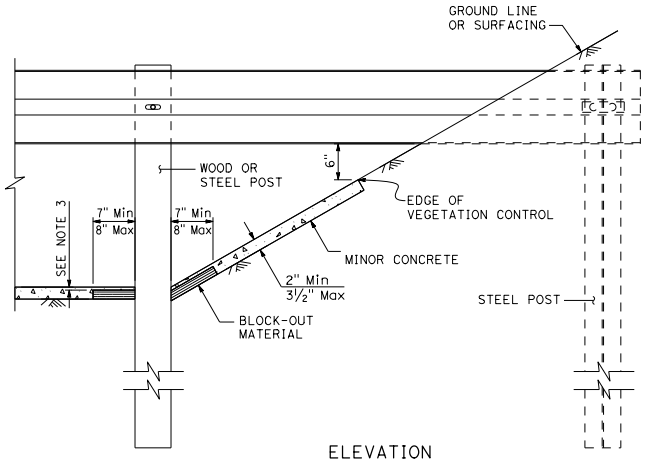
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M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

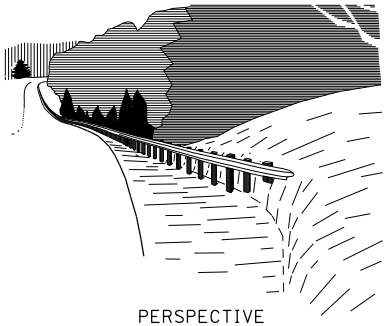
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ELEVATION

## BURIED POST END ANCHOR

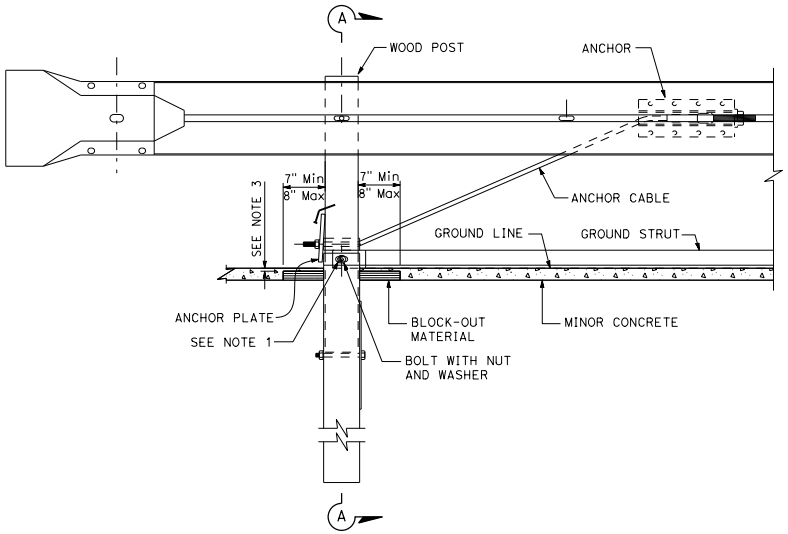
See Note 5



PERSPECTIVE

NOTES:

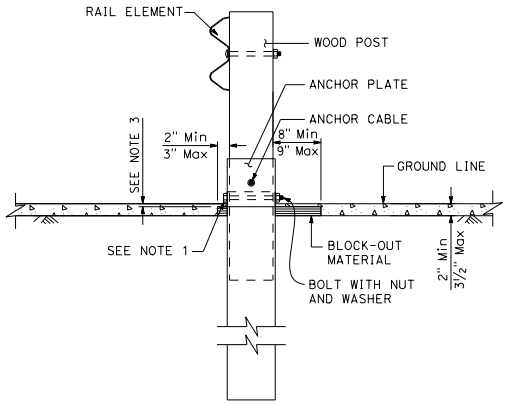
1. Minor concrete for vegetation control must not encounter the safety hardware including the anchor plate, ground strut, or bolts and nuts.
2. Vegetation control must slope to drain water.
3. Concrete over block-out material depth, construct ⅜" Min to ⅝" Max.
4. This plan for vegetation control installation only.
5. For buried post end anchor, refer to Standard Plans A77T2 and A77T3.
6. For End Anchor Assembly (Type SFT-M), refer to Standard Plan A77S1.




ELEVATION

## END ANCHOR ASSEMBLY (TYPE SFT-M)

See Note 6




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL GUARDRAIL SYSTEM MISCELLANEOUS DETAILS

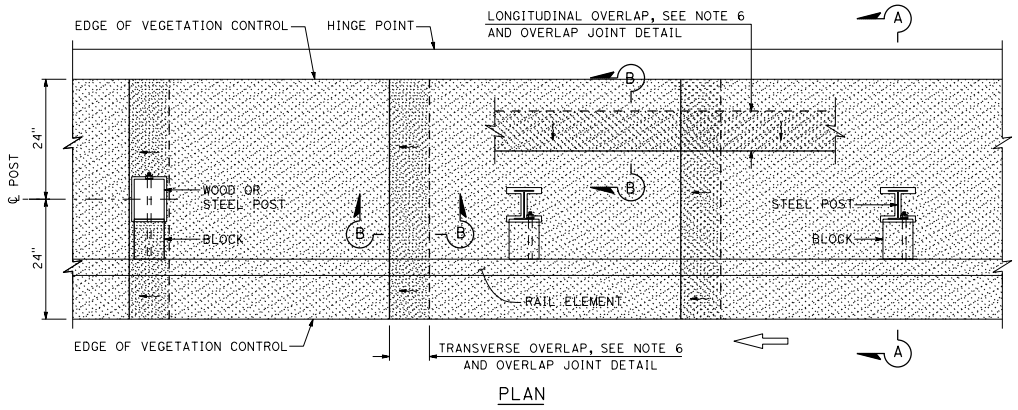
NO SCALE

A77N11

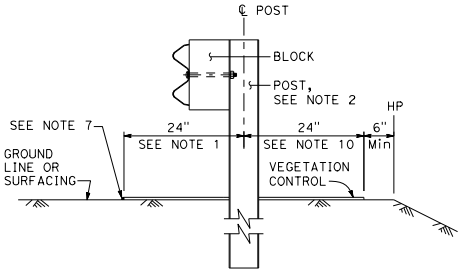
7-1-25



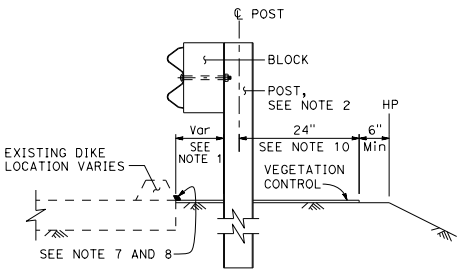
Return to Table of Contents



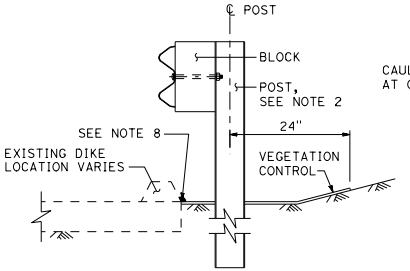

PLAN



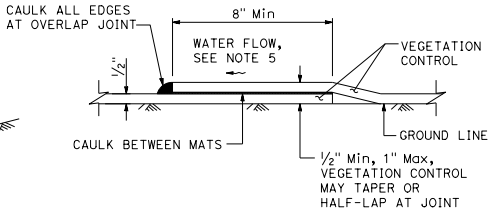

SECTION A-A
Without Existing Dike



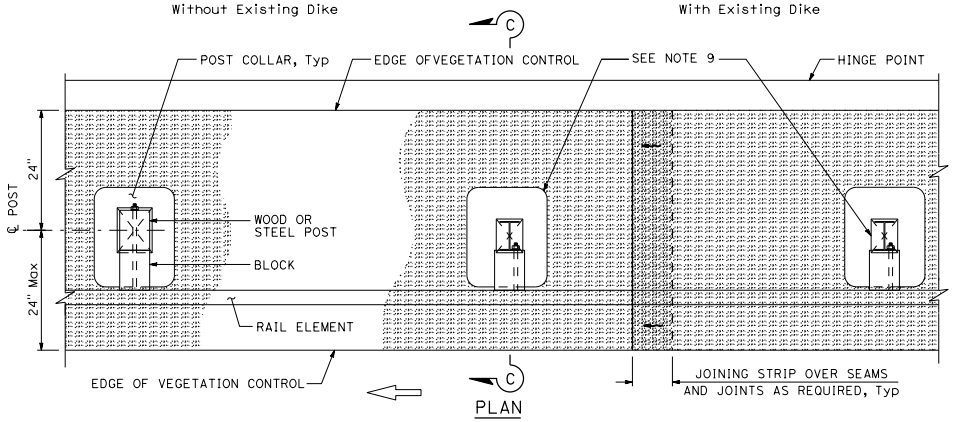

SECTION A-A
With Existing Dike




SECTION A-A
With Existing Dike
on cut slope

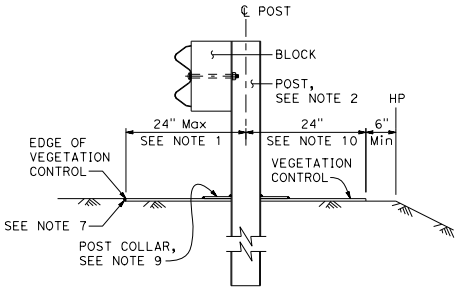



SECTION B-B
OVERLAP JOINT DETAIL
See Note 6




PLAN

FIBER VEGETATION CONTROL POST COLLAR DETAIL




SECTION C-C

NOTES:

1. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
2. For wood and steel post sizes, see Standard Plans A77N1 and A77N2.
3. For MGS details not shown, see Standard Plans A77L1 and A77L2.
4. This plan for vegetation control installation only.
5. Vegetation control must slope in direction of water flow.
6. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable. No longitudinal overlap allowed in front of rail element on traffic side.
7. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
8. Where vegetation control is adjacent to a dike on a cut slope, and for typical line post application only, vegetation control may be flush with the top edge of dike and caulk at the joint.
9. For fiber mat, install post collar at all posts and caulk all edges.
10. Where the distance between center of post and hinge point is less than 30", construct vegetation control to 6" from the hinge point, with a minimum distance for vegetation control at back of post.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM

NO SCALE

A77N12

7-1-25



Return to Table of Contents

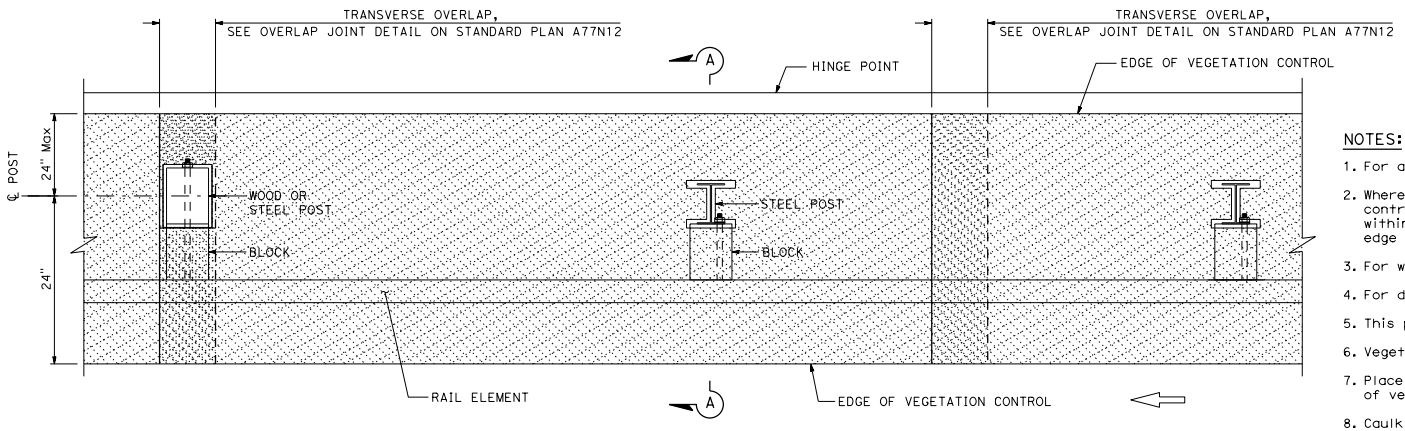
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|---|---|---|---|---|---|
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M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Radhika Mothkuri — No. C95984 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

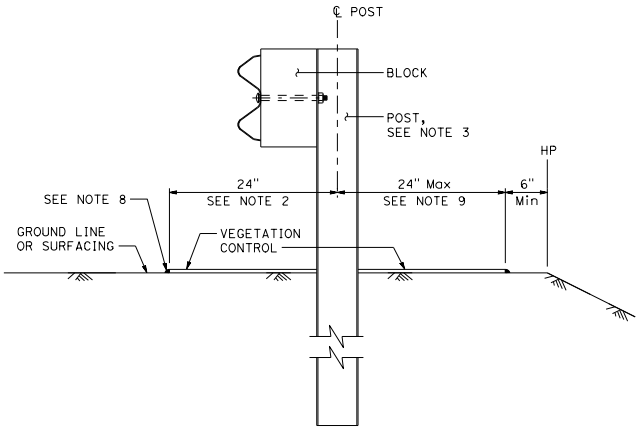
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PLAN

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For wood and steel post sizes, see Standard Plans A77N1 and A77N2.
4. For details not shown, see Standard Plans A77L1 and A77L2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where the distance between center of post and hinge point is 30" or less, construct vegetation control to 6" from the hinge point, with a minimum distance for vegetation control at back of post.




SECTION A-A
Without Existing Dike

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM NARROW VEGETATION CONTROL INSTALLATION

NO SCALE

**A77N13**

7-1-25

2025 STANDARD PLAN A77N13

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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M. Radhika
REGISTERED CIVIL ENGINEER

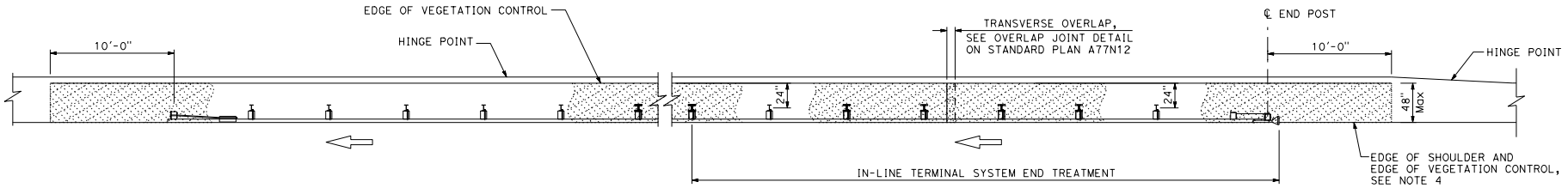
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

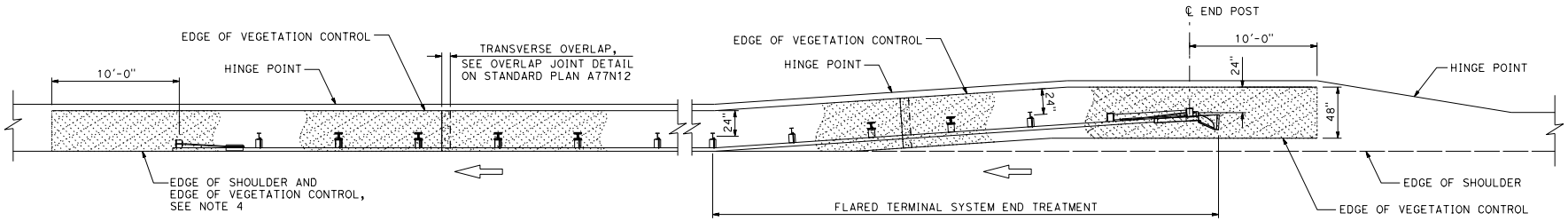
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NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Vegetation control must slope in direction of water flow.
3. This plan for vegetation control installation only.
4. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.




PLAN




PLAN

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM FOR TERMINAL SYSTEM END TREATMENTS

NO SCALE

**A77N14**

7-1-25





Return to Table of Contents

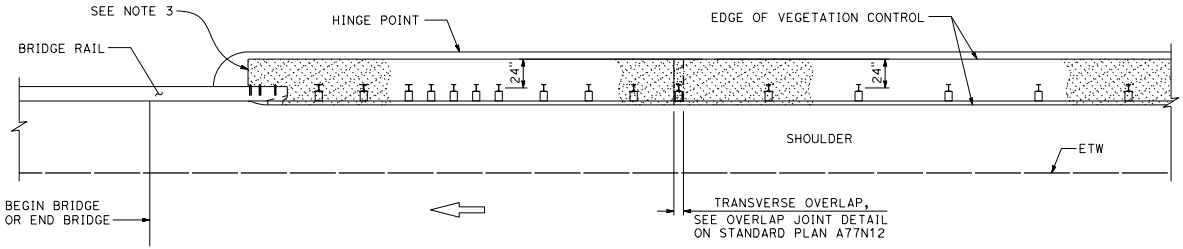
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|---|---|---|---|---|---|
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M. Radhika
REGISTERED CIVIL ENGINEER

Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

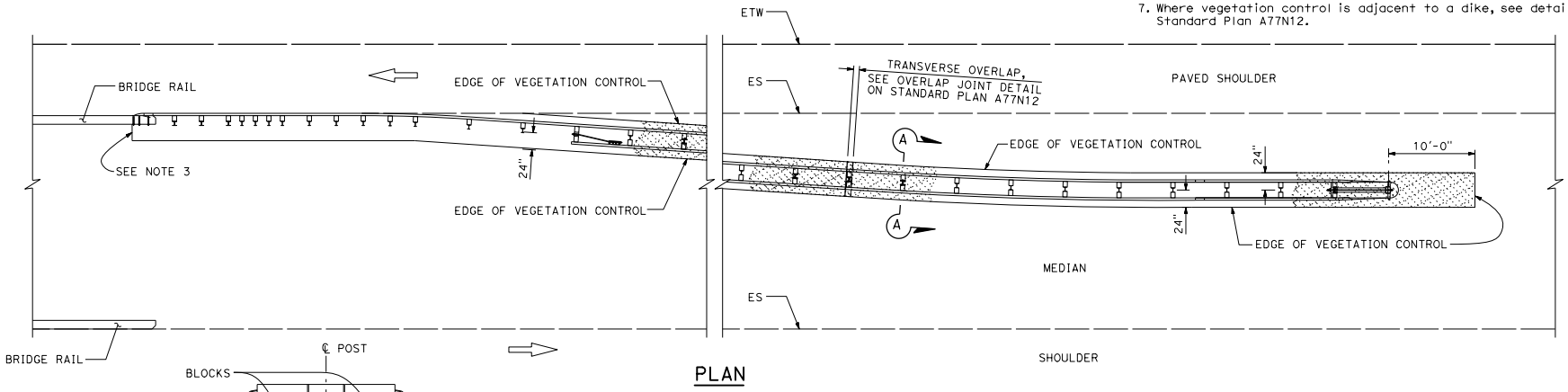
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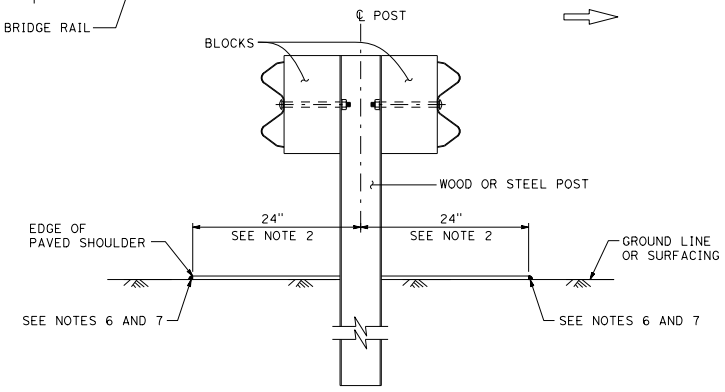

PLAN

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. End vegetation control at end of rail element.
4. Vegetation control must slope in direction of water flow.
5. This plan for vegetation control installation only.
6. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
7. Where vegetation control is adjacent to a dike, see details on Standard Plan A77N12.




PLAN




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM AT STRUCTURE APPROACH

NO SCALE

A77N15

7-1-25

2025 STANDARD PLAN A77N15

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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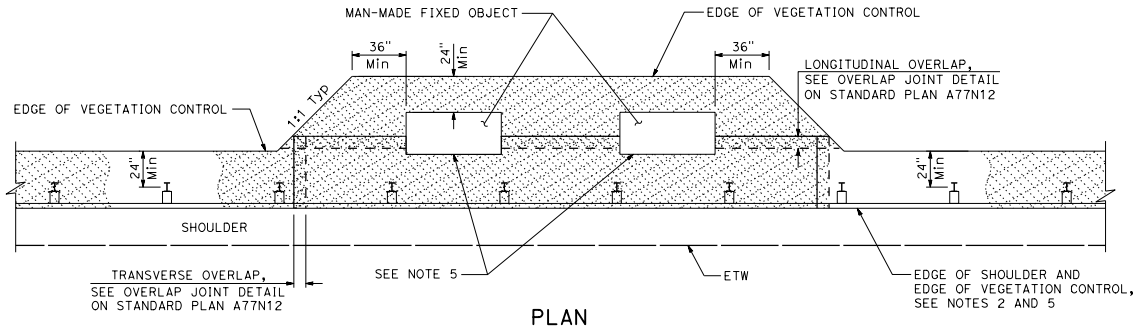
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. Vegetation control must slope in direction of water flow.
4. This plan is for vegetation control installation only. Where fixed objects are within 3'-0" from back of guardrail post, see Strengthened Midwest Guardrail System details on Standard Plan A77R1.
5. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.




PLAN

Fixed object(s) on shoulder

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM AT FIXED OBJECT

NO SCALE

**A77N16**

7-1-25

2025 STANDARD PLAN A77N16

Return to Table of Contents

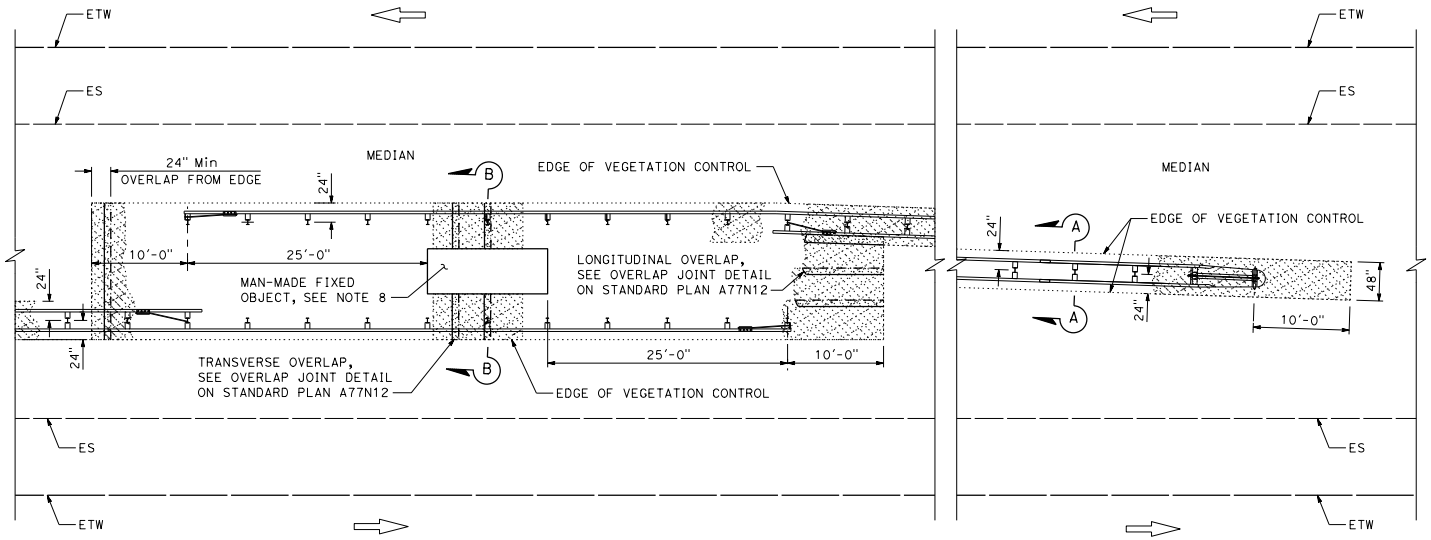
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|---|---|---|---|---|---|
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M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Radhika Mothkuri — No. C95984 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

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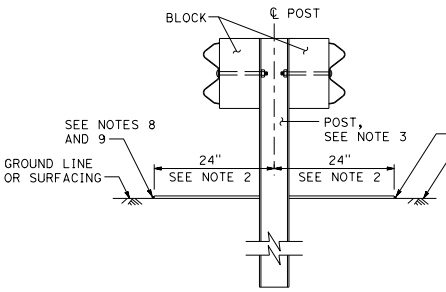



## PLAN

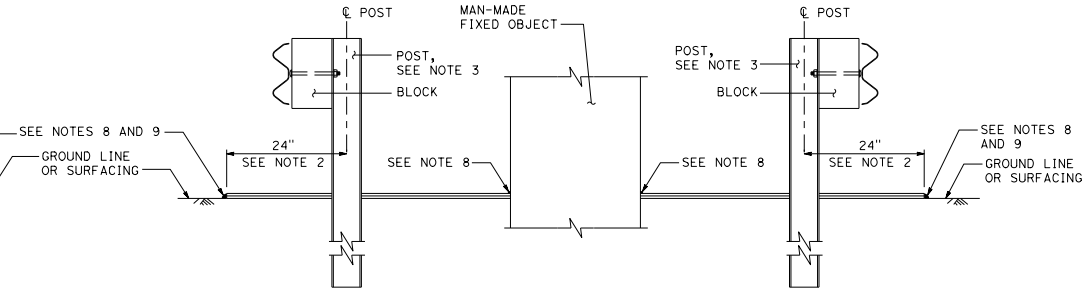
Fixed object(s) in median

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For wood and steel post sizes, see Standard Plans A77N1 and A77N2.
4. For details not shown, see Standard Plans A77L1 and A77L2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where vegetation control is adjacent to a dike, see details on Standard Plan A77N12.




SECTION A-A




SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM AT FIXED OBJECT

NO SCALE

**A77N17**

7-1-25

2025 STANDARD PLAN A77N17

Return to Table of Contents

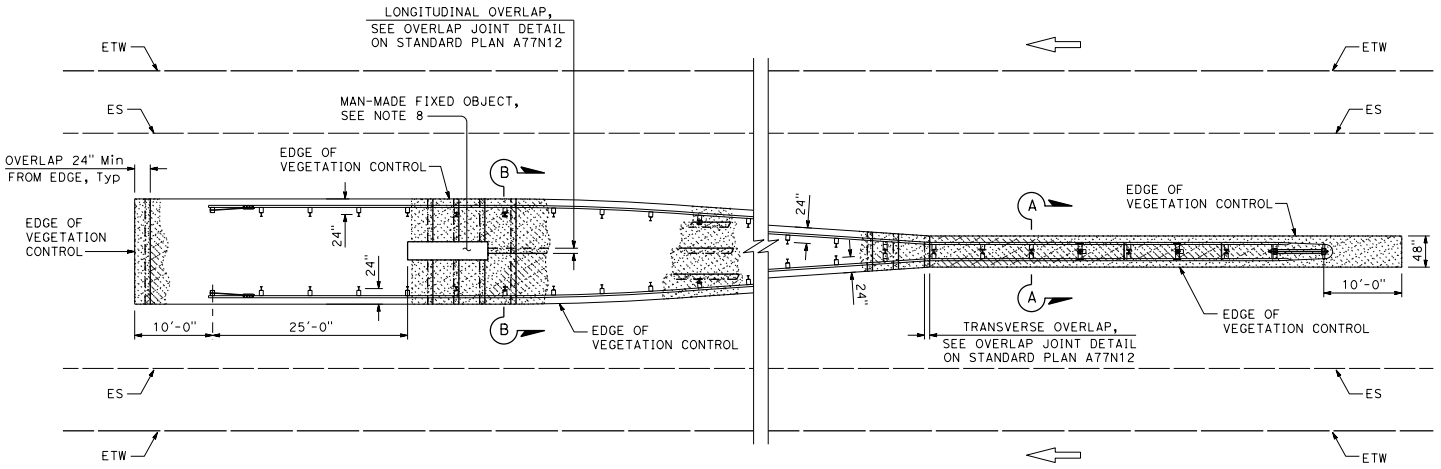
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M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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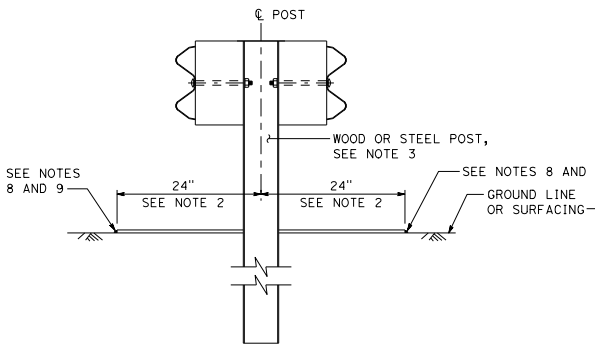



PLAN

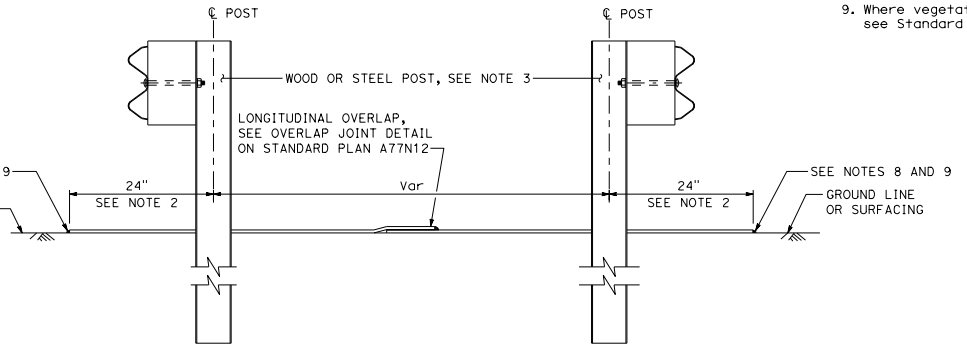
Fixed object(s) between separate roadbeds
(One-way Traffic)

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For wood and steel post sizes, see Standard Plans A77N1 and A77N2.
4. For details not shown, see Standard Plans A77L1 and A77L2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where vegetation control is adjacent to a dike, see Standard Plan A77N12.




SECTION A-A




SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL GUARDRAIL SYSTEM AT FIXED OBJECT

NO SCALE

**A77N18**

7-1-25

2025 STANDARD PLAN A77N18



Return to Table of Contents

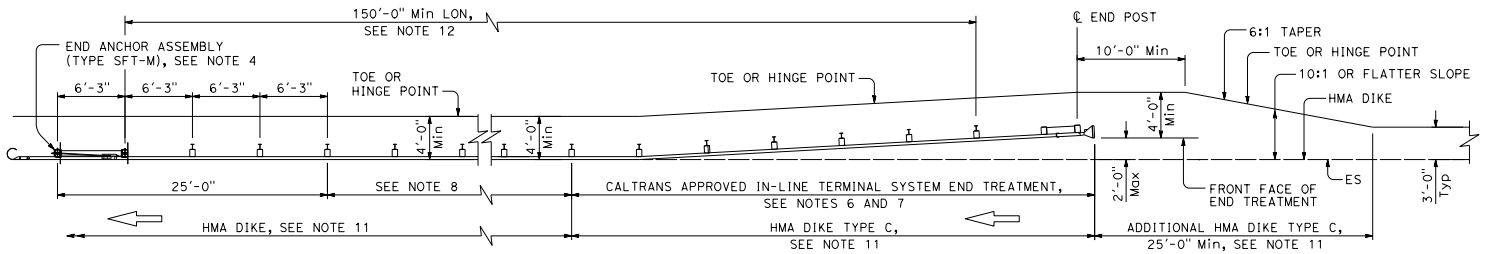
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

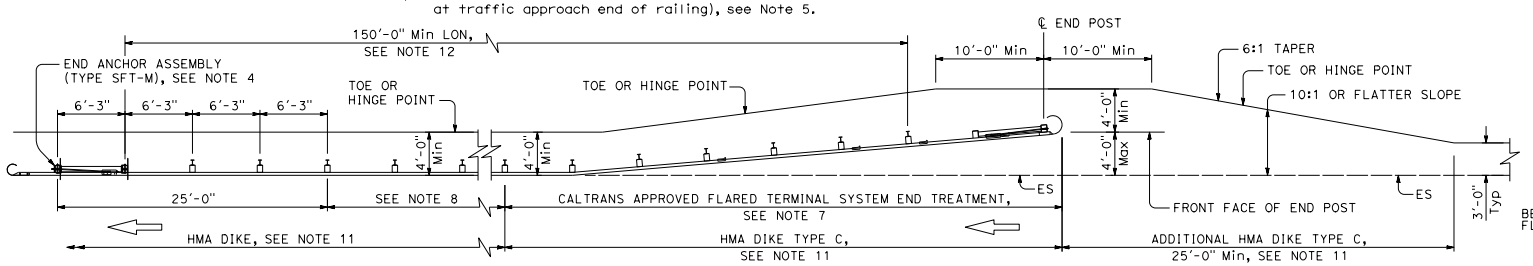
REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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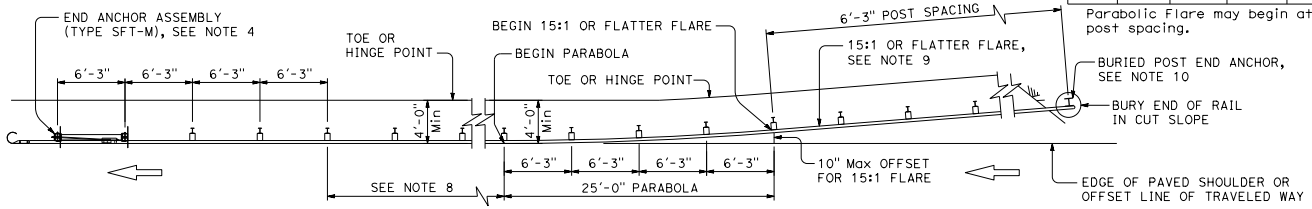

## TYPE 11A LAYOUT

(Embankment MGS installation with in-line end treatment at traffic approach end of railing), see Note 5.




## TYPE 11B LAYOUT

(Embankment MGS installation with flared end treatment at traffic approach end of railing), see Note 5.

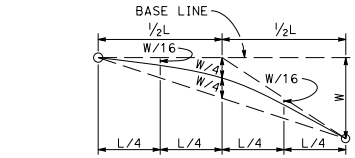



## TYPE 11C LAYOUT

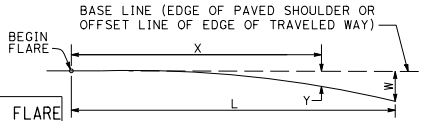
(Embankment MGS installation with buried end anchor treatment at traffic approach end of railing), see Notes 5, 11, and 12.

| PARABOLIC FLARE OFFSETS FOR CONNECTION TO 15:1 FLARE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X= | 0.0' | 6.25' | 9.375' | 12.5' | 15.625' | 18.75' | 21.875' | 25.00' |
| Y= | - | 1" | 2" | 3" | 4" | 6" | 8" | 10" |

Parabolic Flare may begin at full post spacing or at half post spacing.




## TYPICAL PARABOLIC LAYOUT

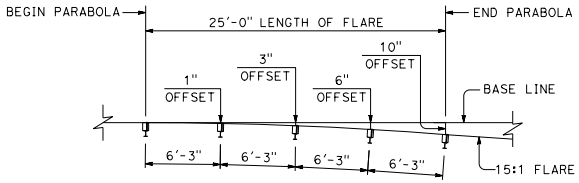



$Y = \frac{WX^2}{L^2}$

Y = OFFSET FROM BASE LINE
W = MAXIMUM OFFSET
X = DISTANCE ALONG BASE LINE
L = LENGTH OF FLARE

## PARABOLIC FLARE OFFSETS

For connection to flare other than 15:1




## TYPICAL FLARE OFFSETS

For connection to 15:1 flare

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. For End Anchor Assembly (Type SFT-M) details, see Standard Plan A77S1.
5. Layout Types 11A, 11B or 11C are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for one direction of traffic.
6. Flare the end of the in-line terminal system end treatments where site conditions will accommodate. Max flare rate is 25:1 unless specified by manufacturer.
7. The type of terminal system end treatment to be used will be shown on the Project Plans.
8. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
9. The 15:1 or flatter flare used is based on the edge of the paved shoulder or offset line of edge of the traveled way.
10. For details of the buried post end anchor used with Type 11C Layout, see Standard Plans A77T2 and A77T3.
11. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
12. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON). Shorter LON is acceptable when buried post end anchors are used.

STATE OF CALIFORNIA
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# MIDWEST GUARDRAIL SYSTEM
# TYPICAL LAYOUTS FOR EMBANKMENTS

NO SCALE

**A77P1**

7-1-25

Return to Table of Contents

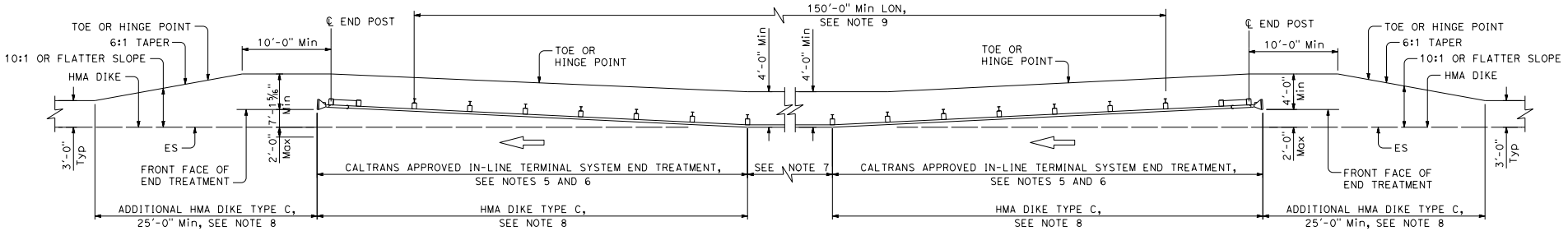
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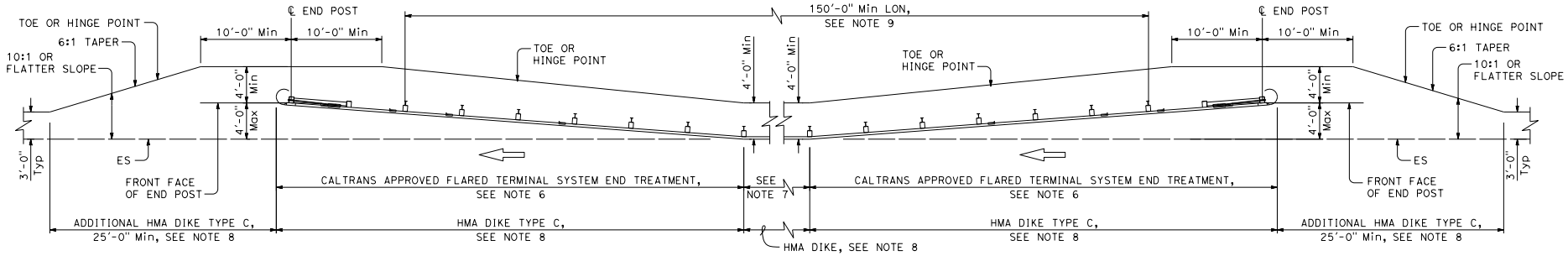
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## TYPE 11D LAYOUT

(Embankment MGS installation with in-line end treatment at each end of railing)
See Note 4




## TYPE 11E LAYOUT

(Embankment MGS installation with flared end treatment at each end of railing)
See Note 4

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. Layout Types 11D through 11L, shown on the Standard Plans A77P Series, are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for both directions of traffic.
5. Flare the end of the in-line terminal system end treatment where site conditions will accommodate.
6. The type of terminal system end treatment to be used will be shown on the Project Plans.
7. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
8. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
9. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR EMBANKMENTS

NO SCALE

**A77P2**

7-1-25





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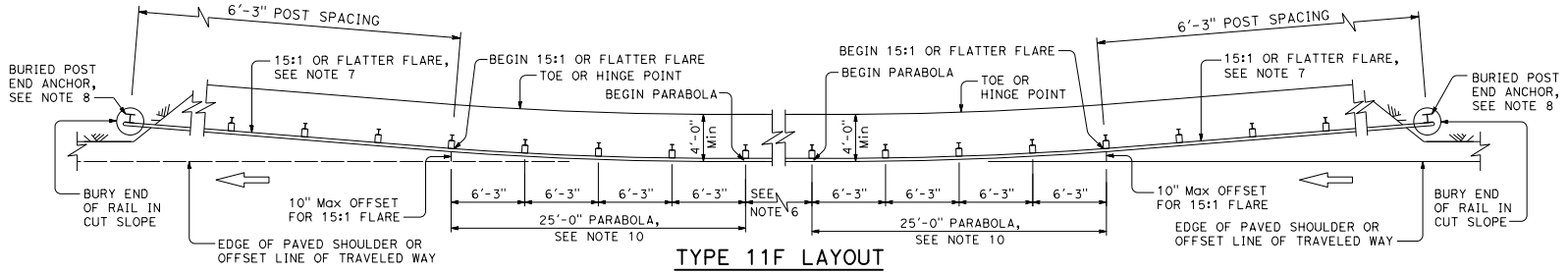
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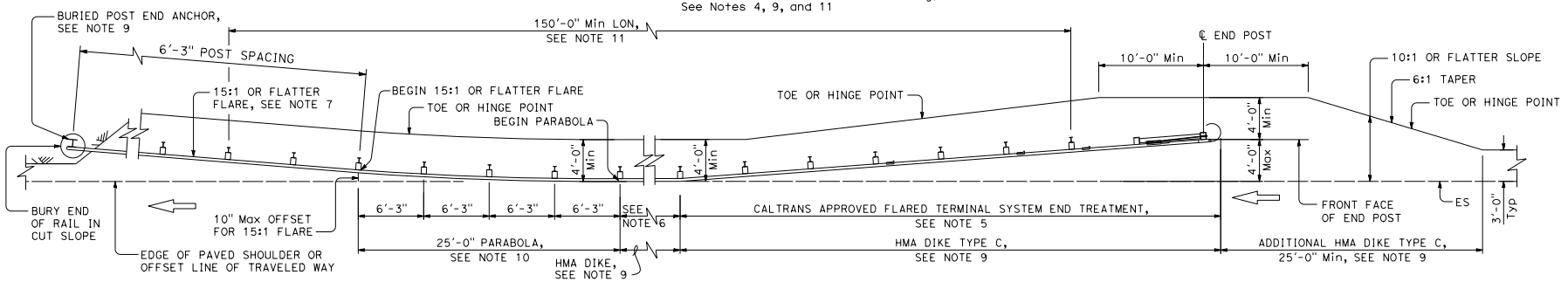
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## TYPE 11F LAYOUT

(Embankment MGS installation with a buried end anchor treatment at each end of railing)
See Notes 4, 9, and 11




## TYPE 11G LAYOUT

(Embankment MGS installation with flared end treatment and a buried end anchor treatment at the ends of railing)
See Notes 4 and 9

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. Layout Types 11D through 11L, shown on the Standard Plans A77P Series, are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for both directions of traffic.
5. The type of terminal system end treatment to be used will be shown on the Project Plans.
6. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
7. The 15:1 or flatter flare is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
8. For details of the buried post end anchor used with Type 11F and 11G Layouts, see Standard Plans A77T2 and A77T3.
9. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
10. For typical flare offsets for 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.
11. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON). 150'-0" minimum LON may not be necessary for use when both ends are buried post end anchor.

STATE OF CALIFORNIA
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# MIDWEST GUARDRAIL SYSTEM
# TYPICAL LAYOUTS FOR EMBANKMENTS

NO SCALE

**A77P3**

7-1-25



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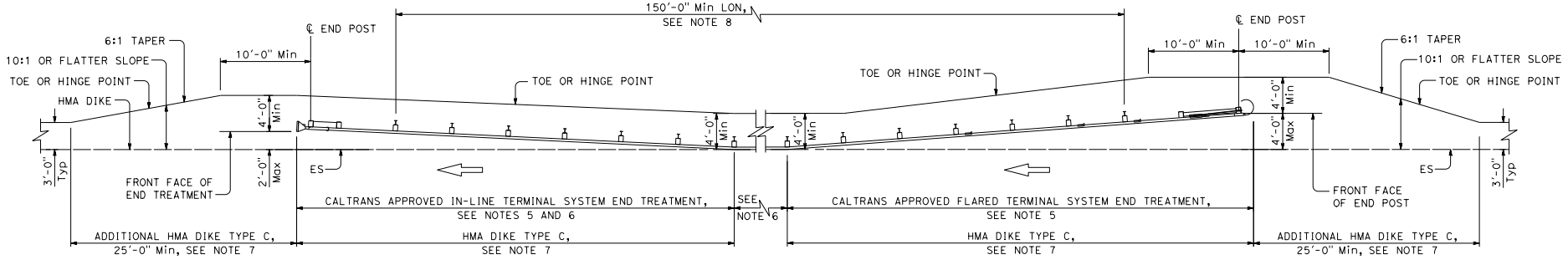
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## TYPE 11H LAYOUT

(Embankment MGS installation with flared end treatment and in-line end treatment at the ends of railing)
See Notes 4 and 7

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. Layout Types 11D through 11L, shown on the Standard Plans A77P Series, are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for both directions of traffic.
5. The type of terminal system end treatment to be used will be shown on the Project Plans.
6. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
7. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
8. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR EMBANKMENTS

NO SCALE

A77P4

7-1-25





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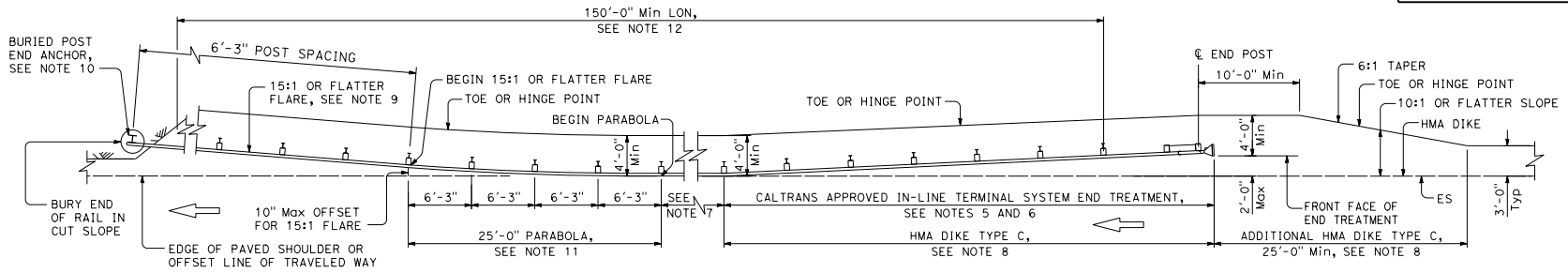
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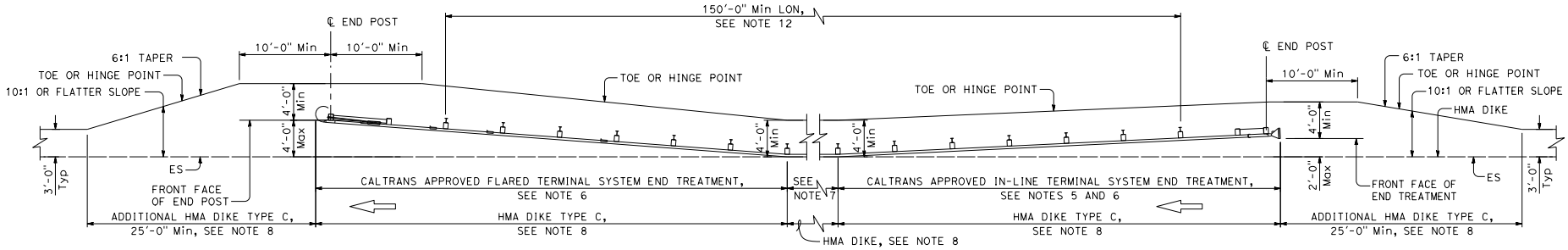
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## TYPE 11I LAYOUT

(Embankment MGS installation with in-line end treatment
and a buried end anchor treatment at the ends of railing)
See Note 4




## TYPE 11J LAYOUT

(Embankment MGS installation with in-line end treatment
and flared end treatment at the ends of railing)
See Note 4

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. Layout Types 11D through 11L, shown on the Standard Plans A77P Series, are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for both directions of traffic.
5. Flare the end of the in-line terminal system end treatment where site conditions accommodate.
6. The type of terminal system end treatment to be used will be shown on the Project Plans.
7. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
8. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
9. The 15:1 or flatter flare is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
10. For details of the buried post end anchor used with Type 11I Layout, see Standard Plans A77T2 and A77T3.
11. For typical flare offsets for 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.
12. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR EMBANKMENTS

NO SCALE

**A77P5**

7-1-25





Return to Table of Contents

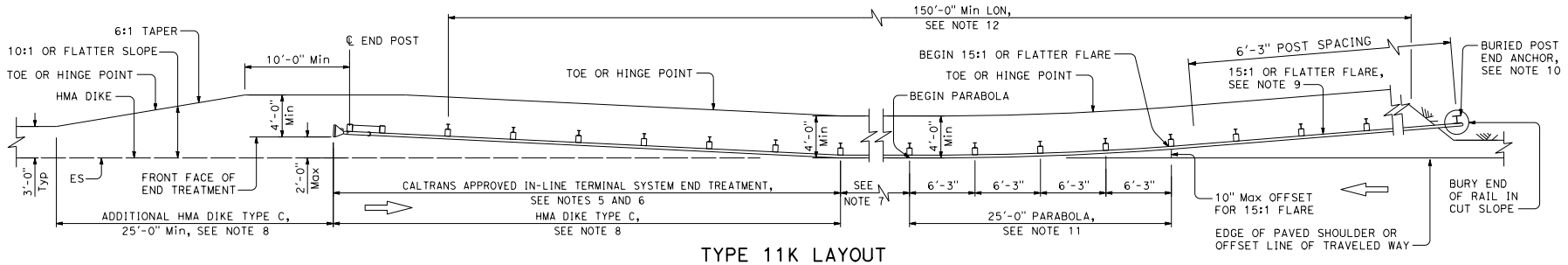
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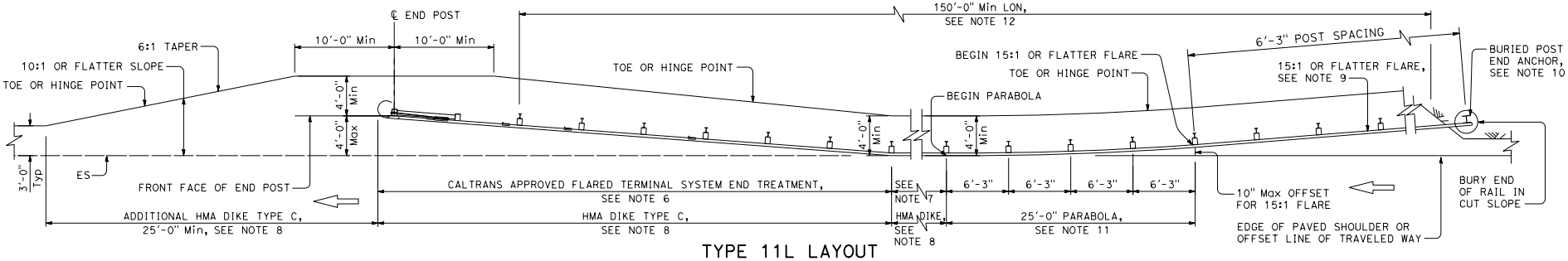
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## TYPE 11K LAYOUT

(Embankment MGS installation with a buried end anchor treatment and an in-line end treatment at the ends of railing)
See Note 4




## TYPE 11L LAYOUT

(Embankment MGS installation with a buried end anchor treatment and a flared end treatment at the ends of railing)
See Note 4

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. Layout Types 11D through 11L, shown on the Standard Plans A77P Series, are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for both directions of traffic.
5. Flare the end of the in-line terminal system end treatment where site conditions will accommodate.
6. The type of terminal system end treatment to be used will be shown on the Project Plans.
7. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
8. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
9. The 15:1 or flatter flare is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
10. For details of the buried post end anchor used with Type 11K and 11L Layouts, see Standard Plans A77T2 and A77T3.
11. For typical flare offsets for 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.
12. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).

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DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR EMBANKMENTS

NO SCALE

**A77P6**

7-1-25



Return to Table of Contents

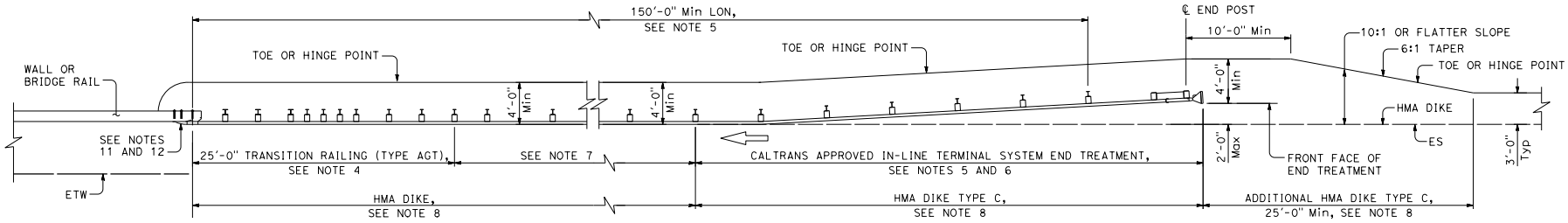
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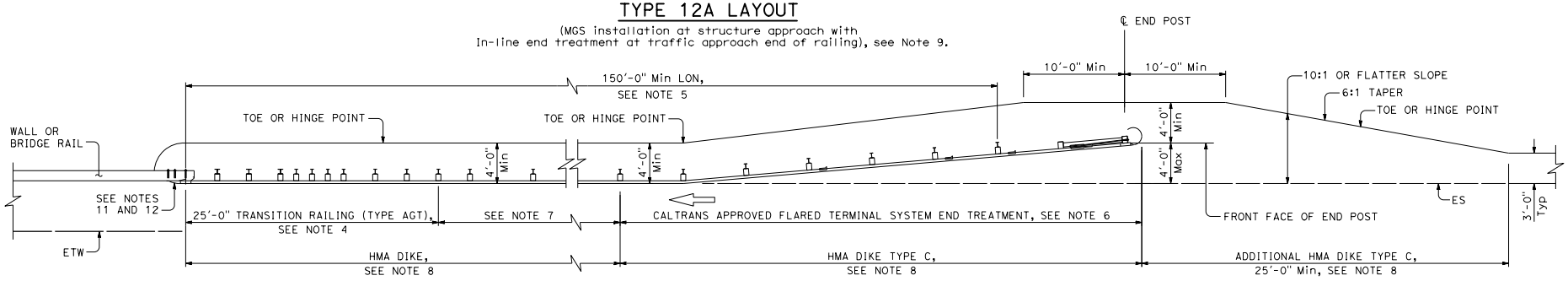
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## TYPE 12A LAYOUT

(MGS installation at structure approach with
In-line end treatment at traffic approach end of railing), see Note 9.




## TYPE 12B LAYOUT

(MGS installation at structure approach with
Flared end treatment at traffic approach end of railing), see Note 9.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. For Transition Railing (Type AGT) details for Types 12A and 12B Layouts, see Standard Plans A79 Series.
5. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).
6. The type of terminal system end treatment to be used will be shown on the Project Plans.
7. Dependent on site conditions (embankment height, side slopes or other fixed objects), it may be advisable to construct additional guard railing (a length equal to multiples of 12'-6" with 6'-3" post spacing) between the transition railing and end treatment.
8. Where placement of dike is required with guard railing installations, see Standard Plan A77N4 for dike positioning details.
9. Type 12A or Type 12B Layouts are typically used at the approach end of a structure, to the right or left on two-lane conventional highway where the roadbed width across the structure is 40 feet or less.
10. See Standard Plan A77Q3 for typical layout used left of approaching traffic at the ends of each structure on multilane freeways or expressways with separate adjacent or parallel bridges.
11. For additional details of typical connections to bridge rail, see Standard Plans A79 series.
12. For additional details of a typical connection to walls or abutments, see Standard Plans A79B1 and A79B2.

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR STRUCTURE APPROACH

NO SCALE

**A77Q1**

7-1-25





Return to Table of Contents

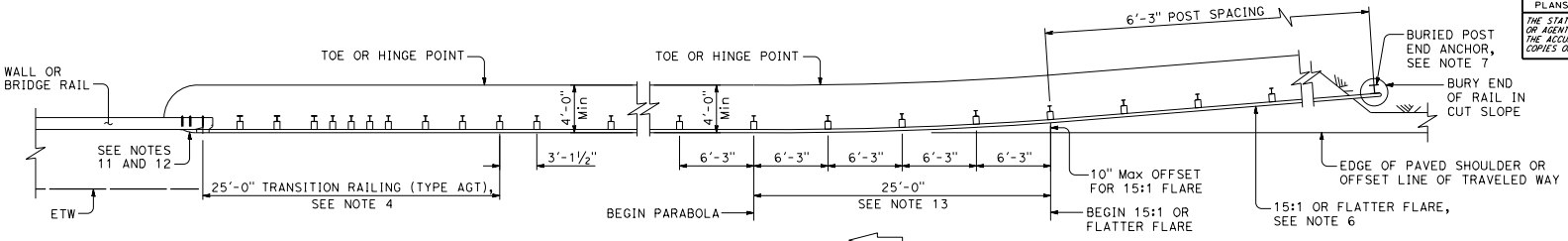
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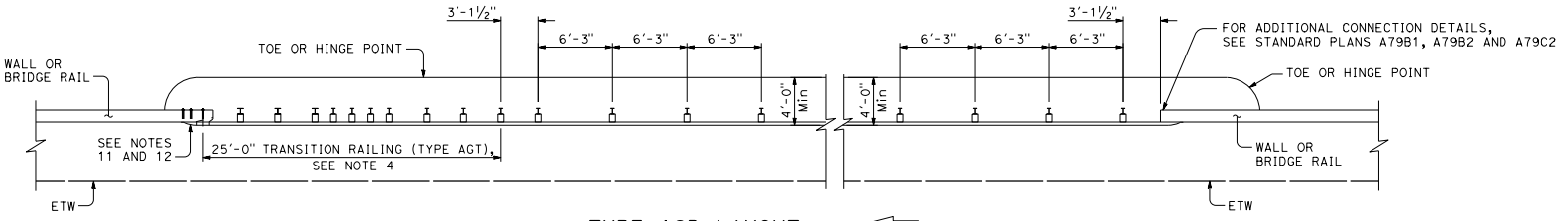
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## TYPE 12C LAYOUT

(MGS installation at structure approach with a Buried end anchor treatment at traffic approach end of railing), see Notes 8 and 9.




## TYPE 12D LAYOUT

(Continuous MGS installation between structures), see Notes 5 and 9.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. For Transition Railing (Type AGT) details for Types 12C and 12D Layouts, see Standard Plans A79 Series.
5. Type 12D layout is typically used where continous MGS is recommended between structures.
6. The 15:1 or flatter flare for Type 12C Layout is based on the edge of offset line of edge of the traveled way. The length of MGS with the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of elements at 12'-6".
7. For details of the buried post end anchor used with Type 12C Layout, see Standard Plans A77T2 and A77T3.
8. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
9. Type 12C Layout is typically used at the approach end of the structure to the right or left, on two-lane conventional highway where the roadbed width across the structure is 40 feet or less.
10. See Standard Plan A7703 for typical layout used left of approaching traffic at the ends of each structure on multilane freeways or expressways with separate adjacent or parallel bridges.
11. For additional details of typical connections to bridge rail, see Standard Plans A79 Series.
12. For additional details of a typical connection to walls or abutments, see Standard Plans A79C1 and A79C2.
13. For typical flare offsets for 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.
14. Where continuous Thrie-beam is recommended between structures, see Standard Plans A79 Series.

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR STRUCTURE APPROACH AND BETWEEN STRUCTURES

NO SCALE

**A77Q2**

7-1-25





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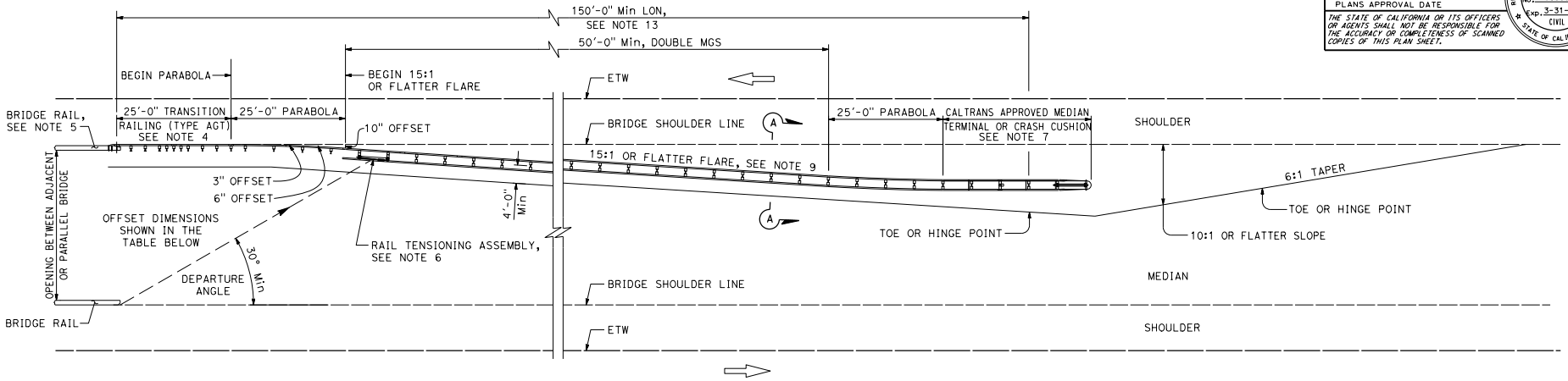
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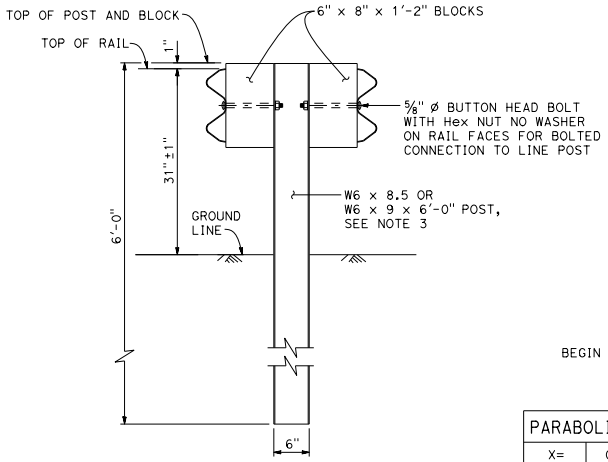
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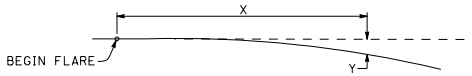

## TYPE 12E LAYOUT

See Note 8




SECTION A-A

## TYPICAL DOUBLE MIDWEST GUARDRAIL SYSTEM




| PARABOLIC FLARE OFFSETS FOR CONNECTION TO 15:1 FLARE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X= | 0.0' | 6.25' | 9.375' | 12.5' | 15.625' | 18.75' | 21.875' | 25.00' |
| Y= | - | 1" | 2" | 3" | 4" | 6" | 8" | 10" |

Parabolic Flare may begin at full post spacing or at half post spacing.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. For Transition Railing (Type AGT) details, see Standard Plans A79A1 and A79A2.
5. For additional details of a typical connection to bridge rail, see Standard Plans A79 Series.
6. For Rail Tensioning Assembly details, see Standard Plan A77S2.
7. The median terminal or crash cushion to be used will be shown on the Project Plans.
8. Type 12E Layout is typically used left of approaching traffic at the end of each structure on multilane freeways or expressways where a median type barrier is not constructed between separated roadbeds.
9. The 15:1 or flatter flare is measured off of the edge of traveled way.
10. For parabolic details, see Standard Plan A77P1.
11. For bolted connection to line post when wood post and blocks are used for double MGS. Use ⅝" Dia button head bolt with Hex nut or ⅝" Dia rod, threaded both ends, with hex nuts. ½" Maximum exposed threads after hex nuts tightened.
12. For Thrie-beam details used in median application, see Standard Plan A78R with Type 25A layout.
13. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR STRUCTURE APPROACH

NO SCALE

**A77Q3**

7-1-25

2025 STANDARD PLAN A77Q3



Return to Table of Contents

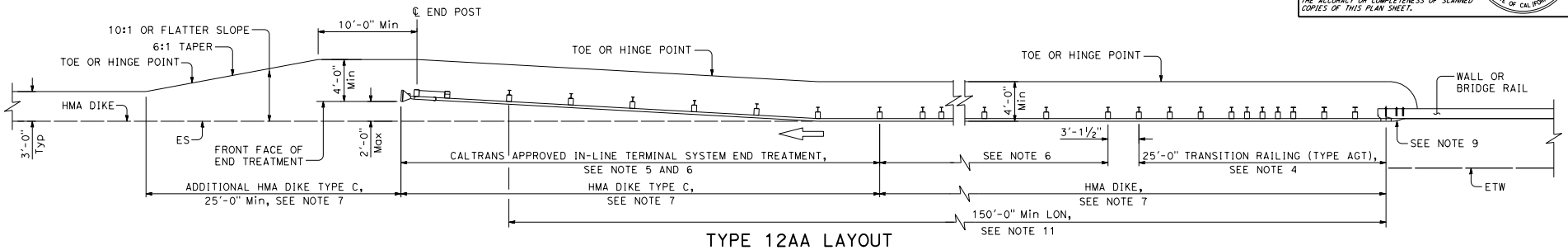
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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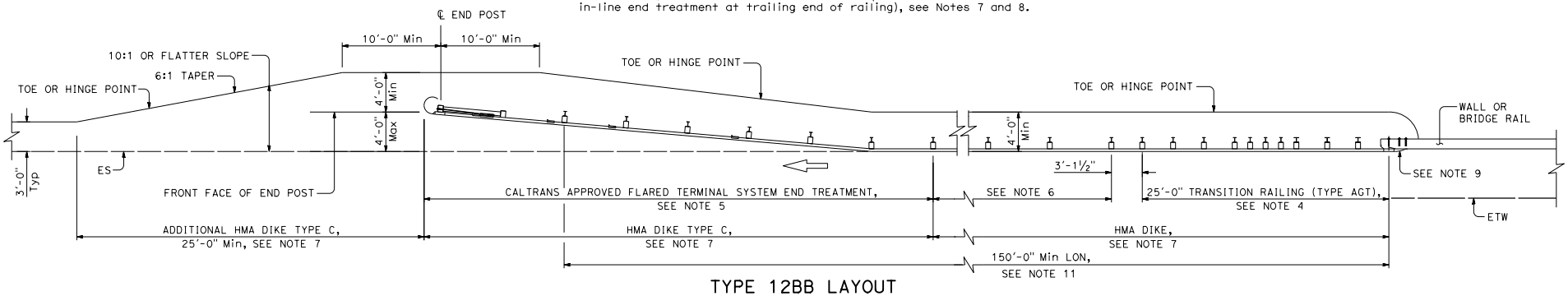
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## TYPE 12AA LAYOUT

(MGS installation at structure departure with in-line end treatment at trailing end of railing), see Notes 7 and 8.




## TYPE 12BB LAYOUT

(MGS installation at structure departure with Flared end treatment at trailing end of railing), see Notes 7 and 8.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. For Transition Railing (Type AGT) details for Types 12AA and 12BB Layouts, see Standard Plans A79A1 and A79A2.
5. The type of terminal system to be used will be shown on the Project Plans.
6. Dependent on site conditions (embankment height, side slopes, other fixed objects), it may be advisable to construct additional MGS (a length equal to multiples of 12'-6" with 6'-3" post spacing) between the transition railing and end treatments.
7. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
8. Type 12AA or Type 12BB Layouts are typically used to the right or left of traffic departing a structure on two-way conventional highways where the roadbed width across the structure is less than 40 feet.
9. For additional details of typical connections to bridge rail, see Standard Plans A79 Series.
10. For roadways with parallel structures and non traversable medians, the Type 12AA or Type 12BB layout may be used.
11. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR STRUCTURE DEPARTURE

NO SCALE

**A77Q4**

7-1-25

2025 STANDARD PLAN A77Q4



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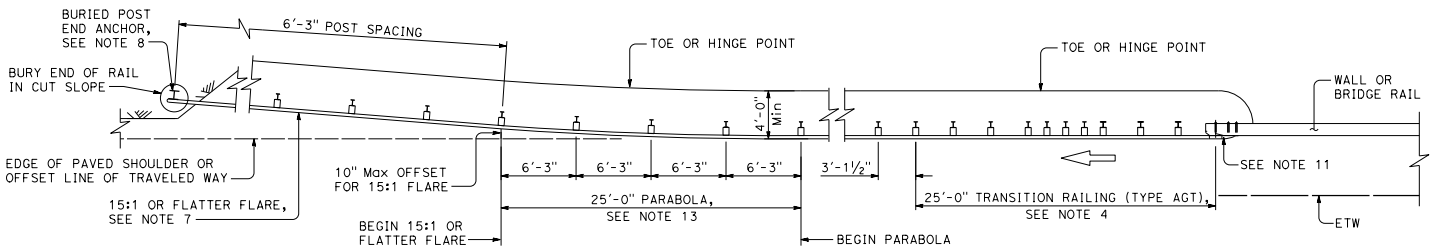
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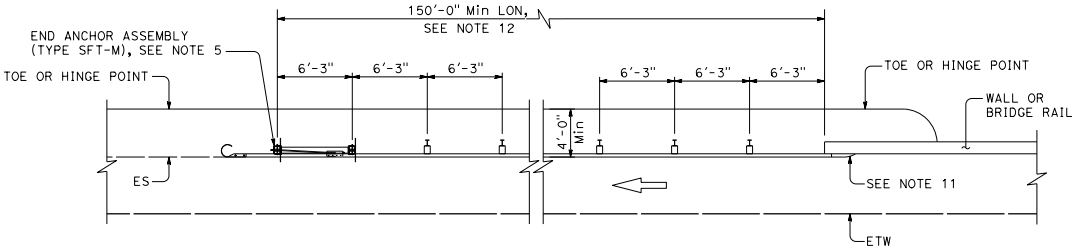
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## TYPE 12CC LAYOUT

(MGS installation at structure departure with a buried end anchor treatment at trailing end of railing), see Notes 9 and 10.




## TYPE 12DD LAYOUT

(MGS installation at structure departure with end anchor assembly at trailing end of railing), see Notes 6 and 9.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MSG post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. For Transition Railing (Type AGT) details for Type 12CC Layout, see Standard Plans A79 Series.
5. For details of End Anchor Assembly (Type SFT-M) used with Type 12DD Layout, see Standard Plan A77S1.
6. Type 12DD layout is typically used to the right of traffic departing a structure on two-way conventional highways where the roadbed width across the structure is equal to or greater than 40 feet and MGS is recommended (embankment height, side slopes or other fixed objects). Length of railing to be equal to multiples of 12'-6". For MGS connection details to bridge rail, see Standard Plans A79B1 and A79B2. For MGS connection details to wall, see Standard Plans A79C1 and A79C2.
7. The 15:1 or flatter flare for Type 12CC Layout is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
8. For details of the buried post end anchor used with Type 12CC Layout, see Standard Plans A77T2 and A77T3.
9. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
10. Type 12CC Layout is typically used to the right of traffic departing a structure on two-way conventional highways where the roadbed width across the structure is less than 40 feet.
11. For additional details of a typical connection to bridge rail for Layout Type 12CC, and Layout Type 12DD, see Connection Details on Standard Plans A79 Series.
12. A minimum of 150'-0" of MGS is needed to develop Length of Need (LON).
13. For typical flare offsets for 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR STRUCTURE DEPARTURE

NO SCALE

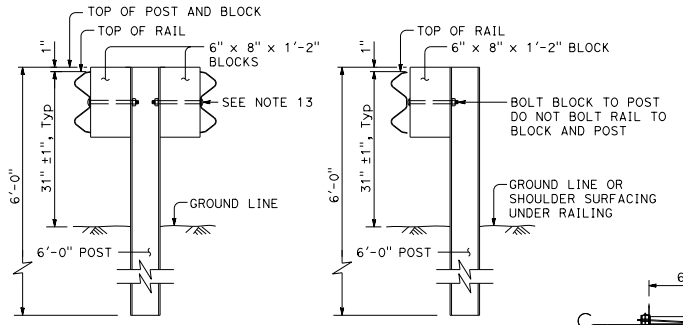
**A77Q5**

7-1-25





Return to Table of Contents



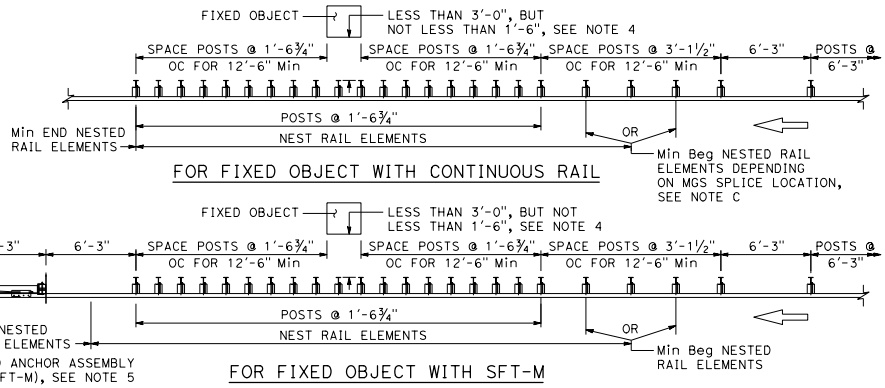

SECTION A-A

BOLTED BLOCK, RAIL AND POST

## TYPICAL DOUBLE MIDWEST GUARDRAIL SYSTEM

BOLT BLOCK TO POST DETAIL

SEE NOTE B




FOR FIXED OBJECT WITH CONTINUOUS RAIL

FOR FIXED OBJECT WITH SFT-M


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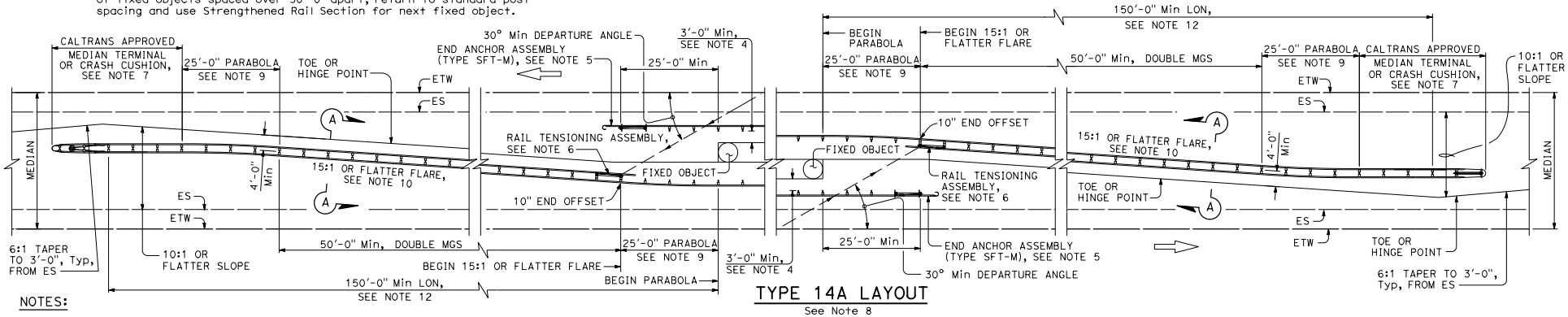

## STRENGTHENED MIDWEST GUARDRAIL SYSTEM

Use strengthened MGS sections with Type 14A, 15A, 16A, 16B, and 16C layouts where minimum clearance between the back of post and the fixed object(s) is less than 3'-0", but not less than 1'-6". End Anchor Assembly (Type SFT-M) shown without 1'-0" flare.

**NOTE A:** For a series of fixed objects 25'-0" or less apart, continue the post spacing at 1'-6¾" OC between fixed objects. For a series of fixed objects 25'-0" to 50'-0" OC space post at 3'-1½" OC until last 12'-6" prior to next fixed object, and space post at 1'-6¾" OC. For a series of fixed objects spaced over 50'-0" apart, return to standard post spacing and use Strengthened Rail Section for next fixed object.

**NOTE B:** Bolt rail element to post through block only when there is a manufactured slot in the rail element, but not at rail splices. Do not bolt rail element to block and post at rail element splices.

**NOTE C:** Nested Rail must continue through entire length of 1'-6¾" post spacing, and minimum 1 post upstream (prior).




TYPE 14A LAYOUT

See Note 8

### NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long steel, W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing of 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with SFT-M" on this plan, where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. For End Anchor Assembly (Type SFT-M) details, see Standard Plan A77S1.
6. For details of Rail Tensioning Assembly, see Standard Plan A77S2.
7. The median terminal or crash cushion to be used will be shown on the Project Plans.
8. Type 14A layout is typically used on multilane freeways or expressways to shield fixed objects where a median type barrier is not constructed between the separated roadbeds.
9. See Standard Plan A77P1 for parabolic flare offset details.
10. The 15:1 or flatter flare is measured off of the edge of traveled way.
11. Standard 6'-0" long steel or wood post with blocks to be used in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".
12. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).
13. For steel posts, use ⅝" ø button head bolt with hex nut. For wood post, use ⅝" ø button head bolt or threaded rod with hex nut. After hex nut(s) are tightened, maximum exposed thread are ½". No washer on rail faces.

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR FIXED OBJECTS BETWEEN SEPARATE ROADBEDS (TWO-WAY TRAFFIC)

NO SCALE

**A77R1**

7-1-25



Return to Table of Contents

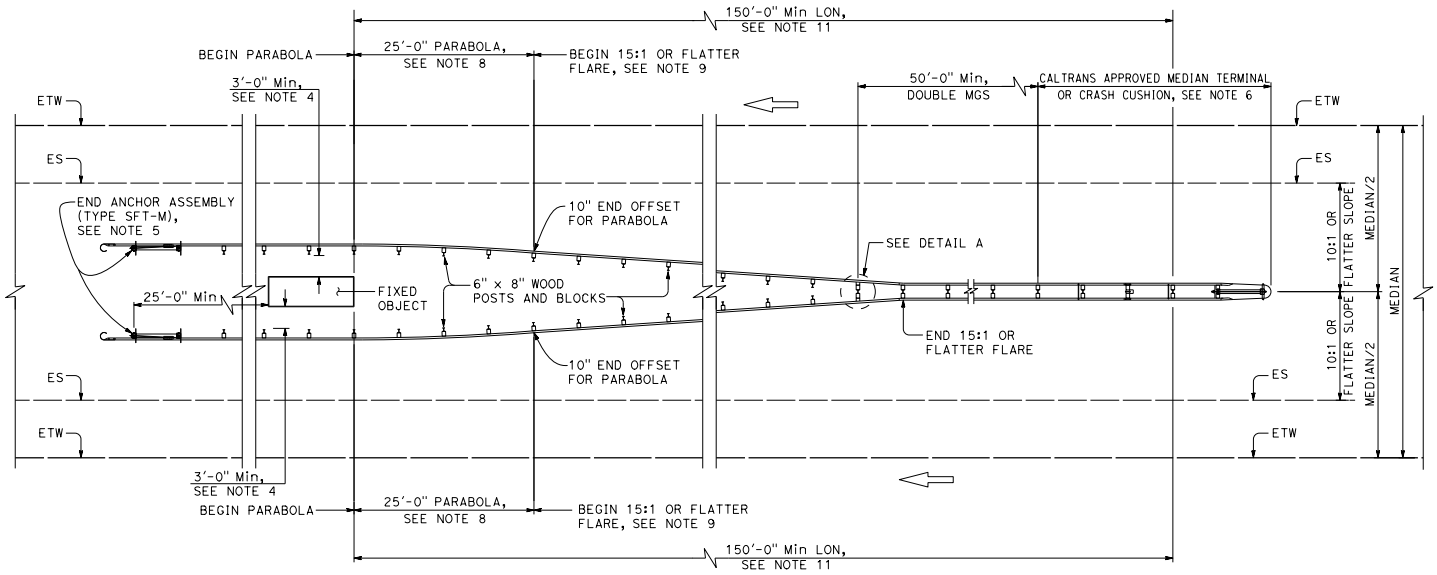
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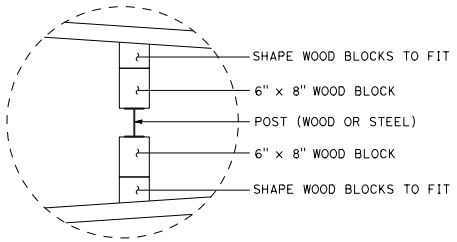
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## TYPE 15A LAYOUT

See Note 7




DETAIL A

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. See Standard Plan A77S1 for clearance distance behind the rail within 50'-0" of End Anchor Assembly (Type SFT-M). Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with SFT-M" on Standard Plan A77R1, where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. For End Anchor Assembly (Type SFT-M) details, see Standard Plan A77S1.
6. The median terminal or crash cushion to be used will be shown on the Project Plans.
7. Type 15A layout is typically used on multilane freeways or expressways to shield fixed objects in the area between separated one-way roadbeds.
8. See Standard Plan A77P1 for parabolic flare offset details.
9. The 15:1 or flatter flare is measured off of the edge of traveled way.
10. Standard 6'-0" long steel or wood post with blocks to be used in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with SFT-M".
11. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR FIXED OBJECTS BETWEEN SEPARATE ROADBEDS (ONE-WAY TRAFFIC)

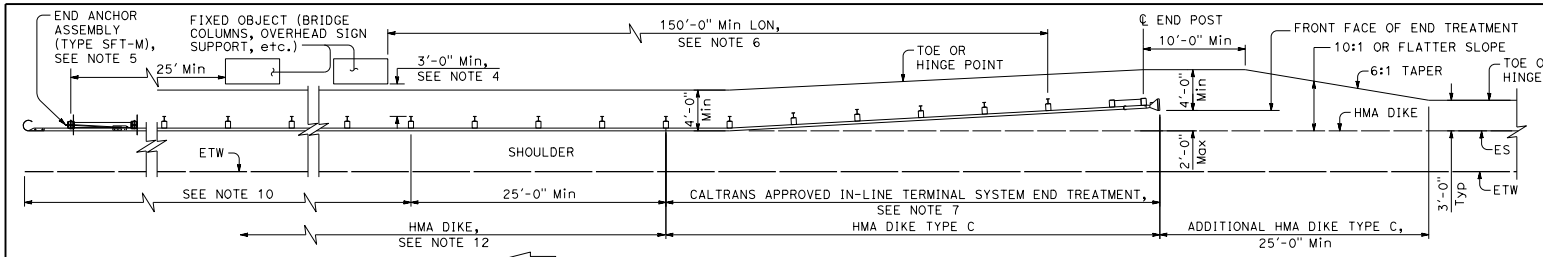
NO SCALE

**A77R2**

7-1-25

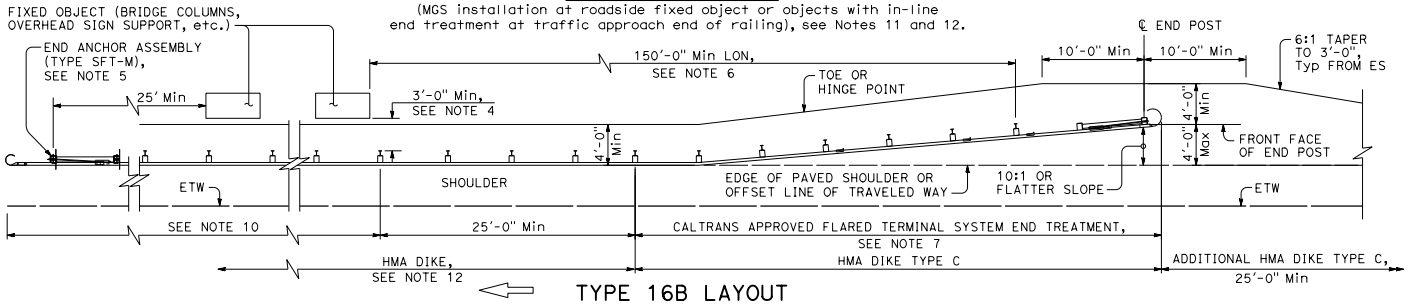


Return to Table of Contents



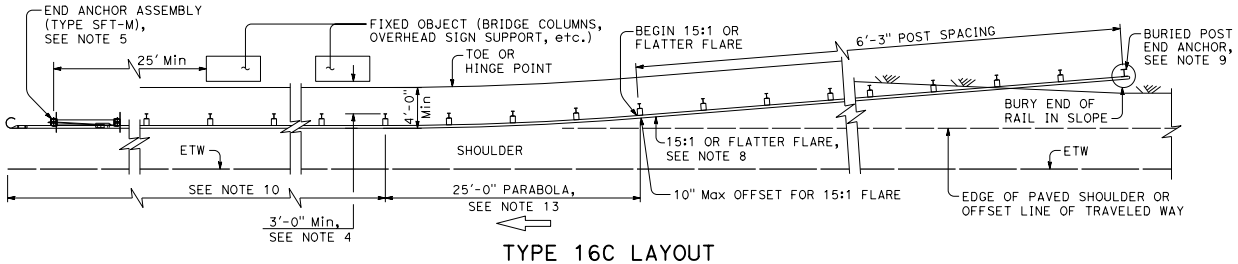

## TYPE 16A LAYOUT

(MGS installation at roadside fixed object or objects with in-line end treatment at traffic approach end of railing), see Notes 11 and 12.




## TYPE 16B LAYOUT

(MGS installation at roadside fixed object or objects with flared end treatment at traffic approach end of railing), see Notes 11 and 12.




## TYPE 16C LAYOUT

(MGS installation at roadside fixed object or objects with a buried end anchor treatment at traffic approach end of railing), see Note 11.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing of 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with SFT-M" on Standard Plan A77R1, where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. For End Anchor Assembly (Type SFT-M) details, see Standard Plan A77S1.
6. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).
7. The type of terminal system to be used will be shown on the Project Plans.
8. The 15:1 or flatter flare used with Type 16C Layout is based on the edge of paved shoulder or offset line of edge of traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
9. For details of the Buried Post End Anchor used with Type 16C Layout, see Standard Plans A77T2 and A77T3.
10. As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3" except as specified in Note 4.
11. Layout Types 16A, 16B or 16C are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy end treatment is required for only one direction of traffic.
12. Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
13. See Standard Plan A77P1 for parabolic flare offset details.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

**A77R3**

7-1-25

2025 STANDARD PLAN A77R3

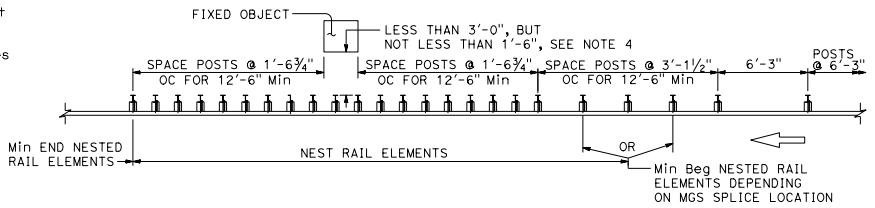


Return to Table of Contents

**NOTE A:** For a series of fixed objects 25'-0" or less apart, continue the post spacing at 1'-6¾" OC between fixed objects. For a series of fixed objects 25'-0" to 50'-0" OC space post at 3'-1½" OC until last 12'-6" prior to next fixed object, and space post at 1'-6¾" OC. For a series of fixed objects spaced over 50'-0" apart, return to standard post spacing and use Strengthened Rail Section for next fixed object.

**NOTE B:** Bolt rail element to post through block only when there is a manufactured slot in the rail element, but not at rail splices. Do not bolt rail element to block and post at rail element splices.

**NOTE C:** Nested Rail must continue through entire length of 1'-6¾" post spacing, and minimum 1 post upstream (prior).




| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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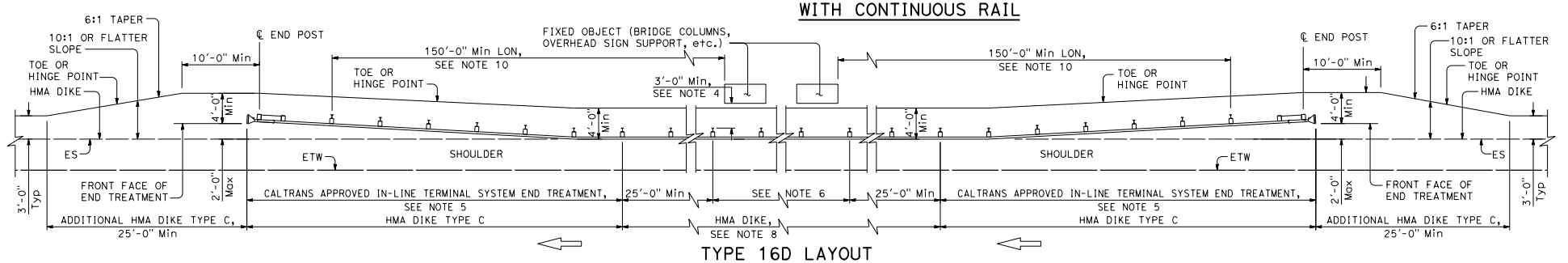
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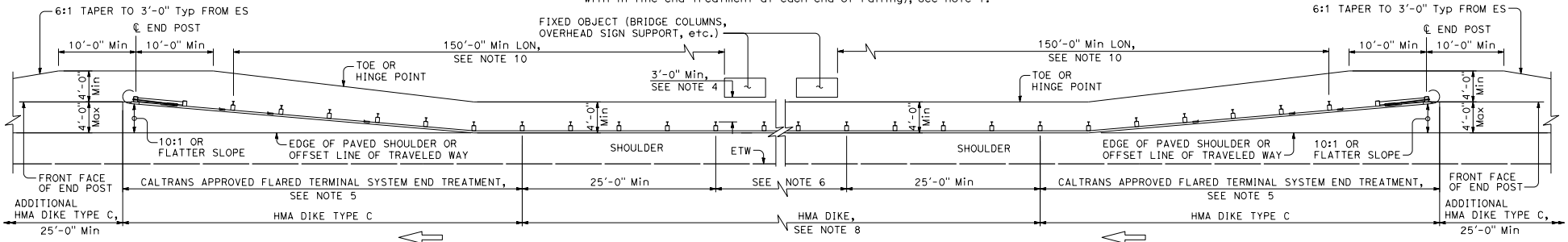
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## STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT WITH CONTINUOUS RAIL




### TYPE 16D LAYOUT

(Guard railing installation at roadside fixed object or objects with in-line end treatment at each end of railing), see note 7.




### TYPE 16E LAYOUT

(Guard railing installation at roadside fixed object or objects with flared end treatment at each end of railing), see Note 7.

**NOTES:**

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with Continuous Rail" on this plan, where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. The type of terminal system to be used will be shown on the Project Plans.
6. As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
7. Layout Types 16D through 16L, shown on the Standard Plans A77R Series, are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy end treatment is required for both directions of traffic.
8. Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
9. Standard 6' long steel or wood post with blocks to be used in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with Continuous Rail".
10. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

**A77R4**

7-1-25





Return to Table of Contents

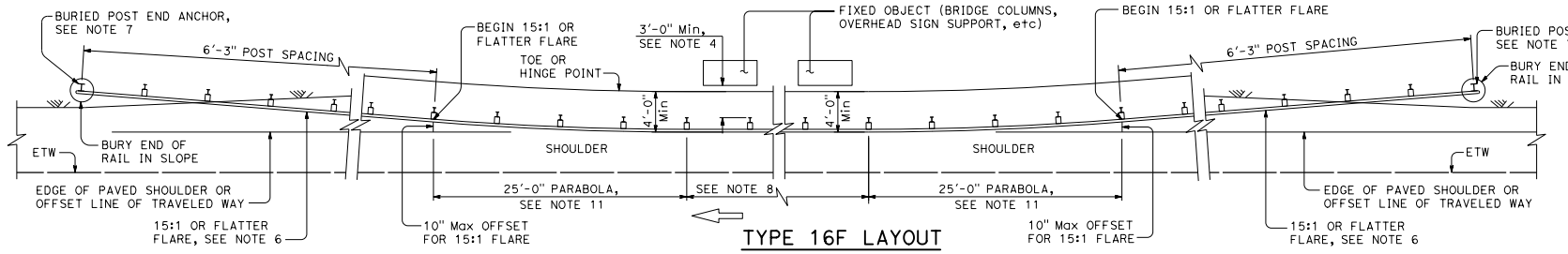
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

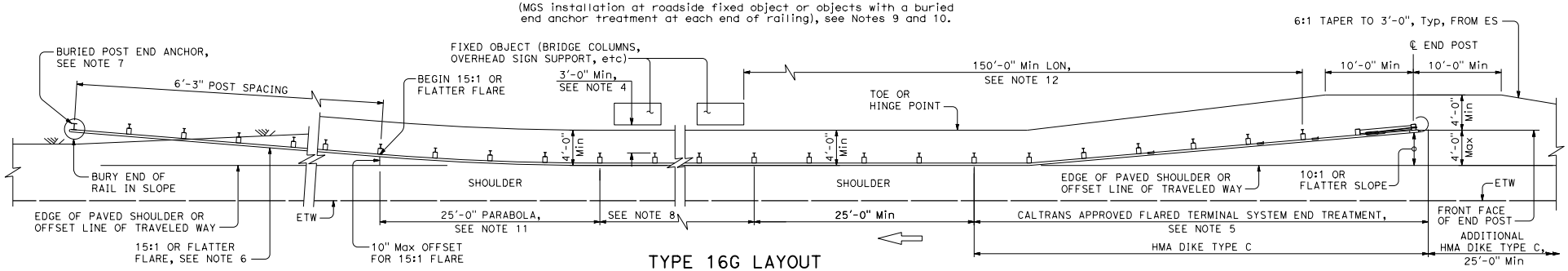
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Malik Rehman
No. C83390
Exp. 3-31-27
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## TYPE 16F LAYOUT

(MGS installation at roadside fixed object or objects with a buried end anchor treatment at each end of railing), see Notes 9 and 10.




## TYPE 16G LAYOUT

(MGS installation at roadside fixed object or objects with in-line end treatment and a buried end anchor treatment at the ends of railing), see Notes 9 and 10.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with Continuous Rail" on Standard Plan A77R4, where the clearance between the back of post the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. The type of terminal system to be used will be shown on the Project Plans.
6. The 15:1 or flatter flare is based on the edge of paved shoulder or offset line of edge of traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
7. For details of the Buried Post End Anchor, see Standard Plans A77T2 and A77T3.
8. As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
9. Layout Types 16D through 16L, shown on the Standard Plans A77R Series, are typically used on highways where MGS is recommended to shield roadside fixed object(s) and a crashworthy end treatment isrequired for both directions of traffic.
10. Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
11. See Standard Plan A77P1 for parabolic flare offset details.
12. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).

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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

**A77R5**

7-1-25



Return to Table of Contents

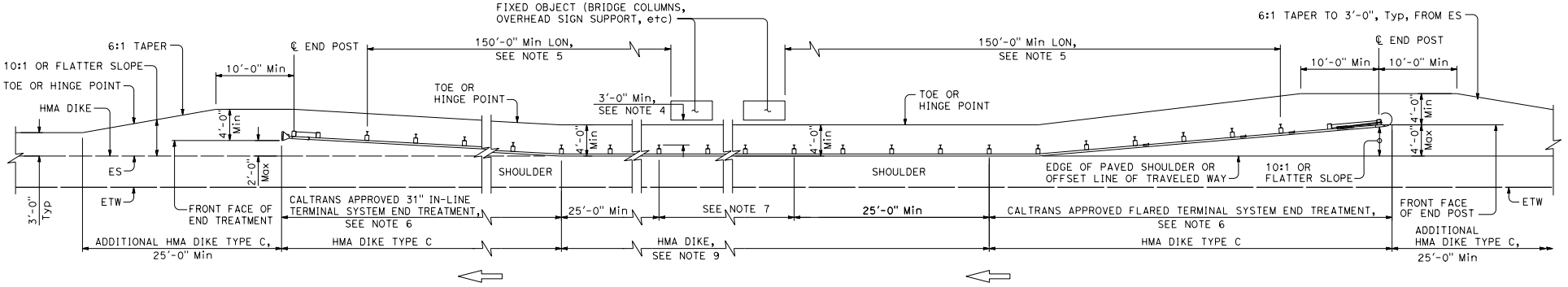
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September 19, 2025
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## TYPE 16H LAYOUT

(MGS installation at roadside fixed object or objects with flared end treatment and in-line end treatment at the ends of railing), see Note 8.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with Continuous Rail" on Standard Plan A77R4, where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).
6. The type of terminal system to be used will be shown on the Project Plans.
7. As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
8. Layout Types 16D through 16L, shown on the Standard Plans A77R Series, are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy end treatment is required for both directions of traffic.
9. Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.

STATE OF CALIFORNIA
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# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

**A77R6**

7-1-25

2025 STANDARD PLAN A77R6



Return to Table of Contents

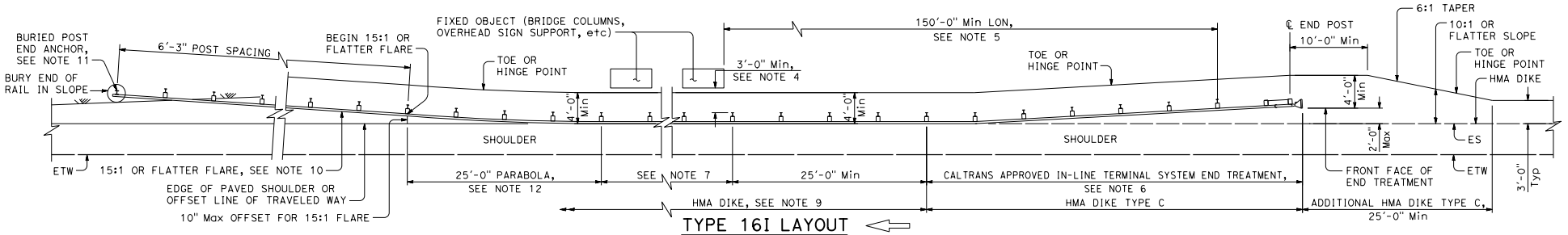
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September 19, 2025
PLANS APPROVAL DATE

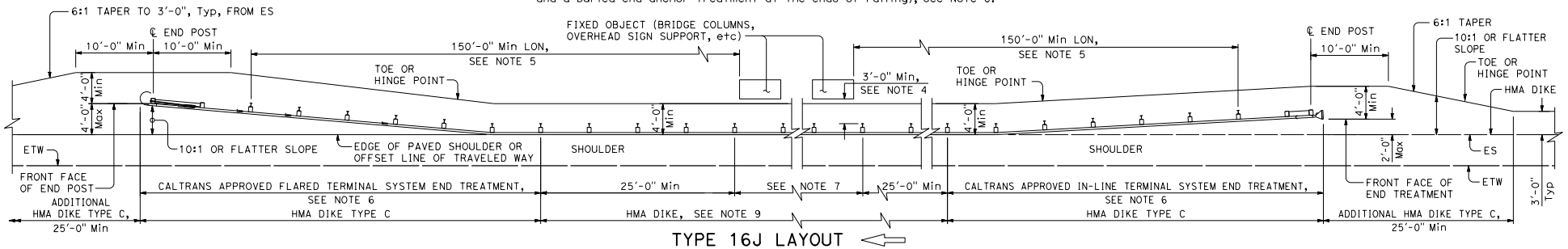
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## TYPE 16I LAYOUT

(MGS installation at roadside fixed object or objects with in-line end treatment and a buried end anchor treatment at the ends of railing), see Note 8.




## TYPE 16J LAYOUT

(MGS installation at roadside fixed object or objects with a in-line end treatment and a flared end treatment at the ends of railing), see Note 8.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object with Continuous Rail" on Standard Plans A77R1 and A77R4 where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).
6. The type of terminal system to be used will be shown on the Project Plans.
7. As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
8. Layout Types 16D through 16L, shown on the Standard Plans A77R Series, are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy end treatment is required for both directions of traffic.
9. Where placement of dike is required with guard railing, see Standard Plan A77N4 for dike positioning details.
10. The 15:1 or flatter flare is based on the edge of the paved shoulder or offset line of edge of traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
11. For details of Buried Post End Anchor, see Standard Plans A77T2 and A77T3.
12. See Standard Plan A77P1 for parabolic flare offset details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

**A77R7**

7-1-25

Return to Table of Contents

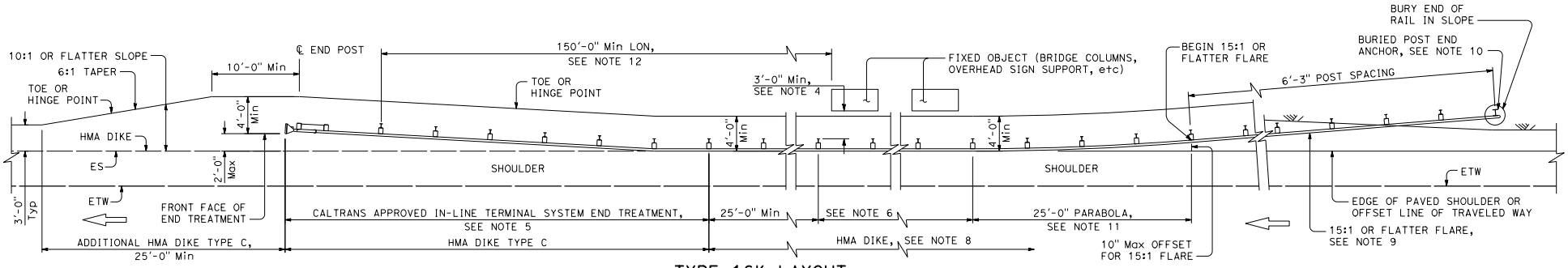
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September 19, 2025
PLANS APPROVAL DATE

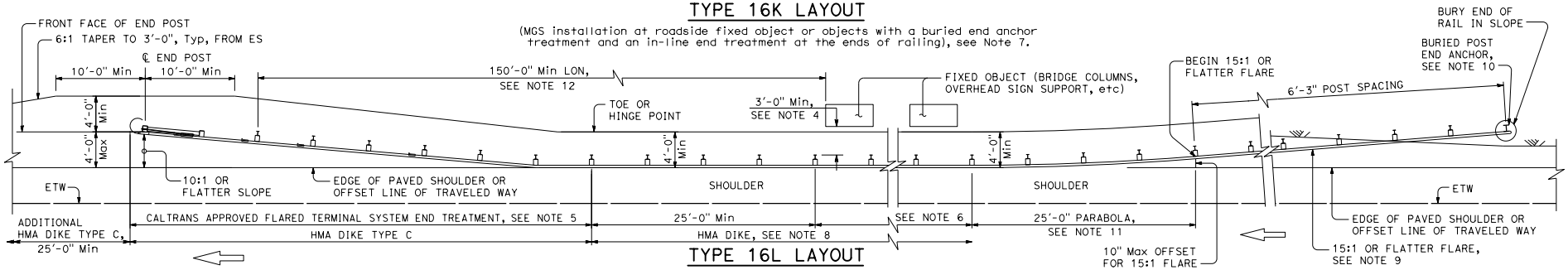
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## TYPE 16K LAYOUT

(MGS installation at roadside fixed object or objects with a buried end anchor treatment and an in-line end treatment at the ends of railing), see Note 7.




## TYPE 16L LAYOUT

(MGS installation at roadside fixed object or objects with a buried end anchor treatment and an in-line end treatment at the ends of railing), see Note 7.

NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6'-0" long Steel W6 x 9 or W6 x 8.5 with blocks, or 6" x 8" x 6'-0" wood with blocks.
4. A minimum clearance is required between the back of post and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Objects with Continuous Rail" on Standard Plan A77R4, where the clearance between the back of post and the face of a fixed object is less than 3'-0", but not less than 1'-6". Where the clearance is less than 1'-6", a concrete wall or barrier should be constructed to shield the fixed object(s).
5. The type of terminal system to be used will be shown on the Project Plans.
6. As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
7. Layout Types 16D through 16L, shown on the Standard Plans A77R Series, are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy end treatment is required for both directions of traffic.
8. Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
9. The 15:1 or flatter flare is based on the edge of paved shoulder or offset line of edge of traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
10. For details of Buried Post End Anchor, see Standard Plans A77T2 and A77T3.
11. See Standard Plan A77P1 for parabolic flare offset details.
12. A minimum of 150'-0" MGS is needed to develop Length of Need (LON).

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DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

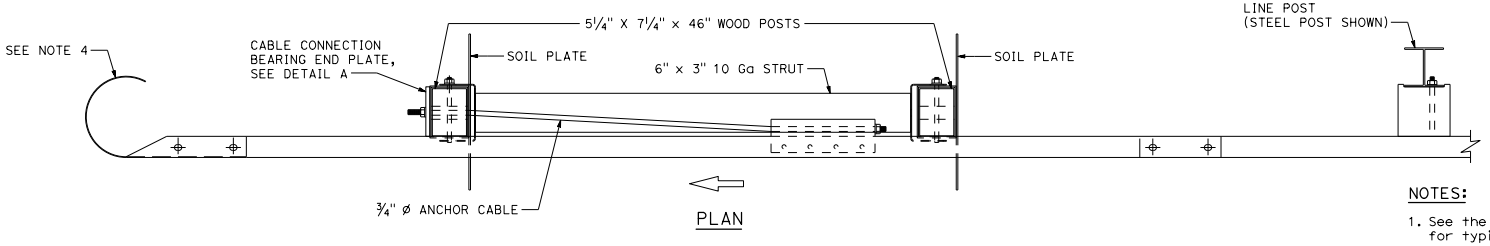
**A77R8**

7-1-25

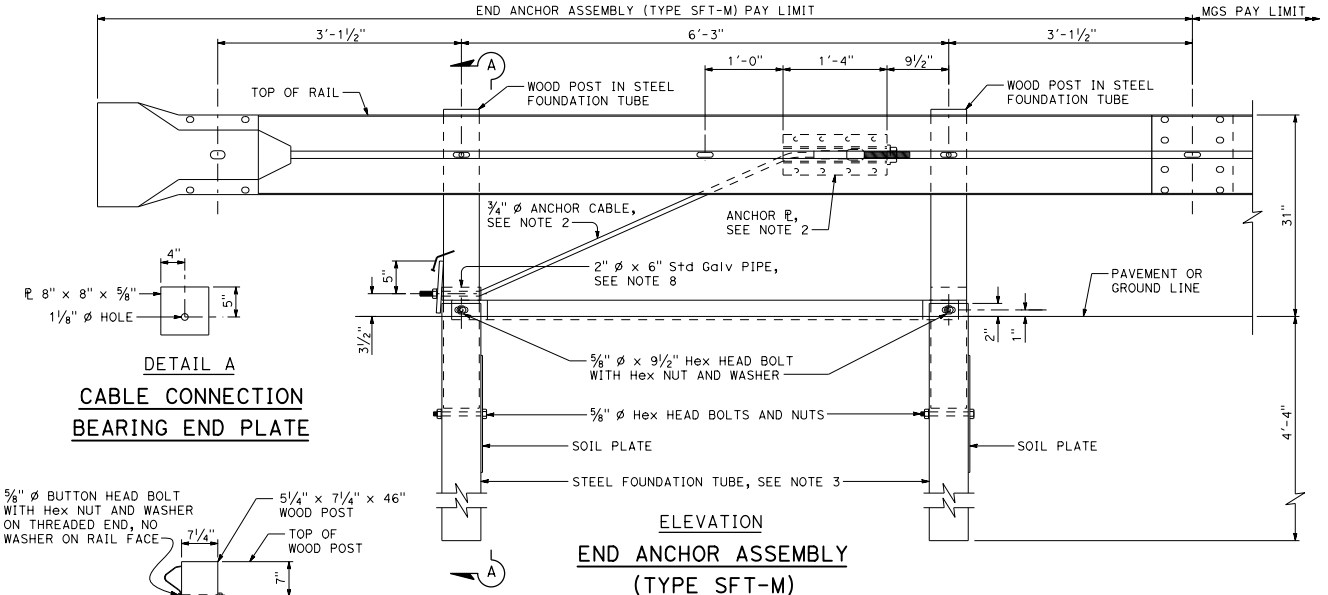




Return to Table of Contents




PLAN



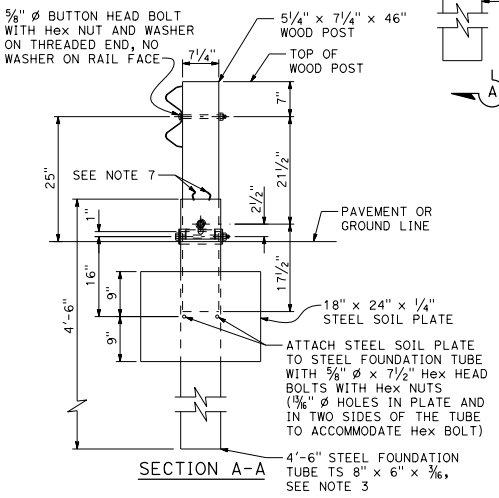

ELEVATION

## END ANCHOR ASSEMBLY (TYPE SFT-M)

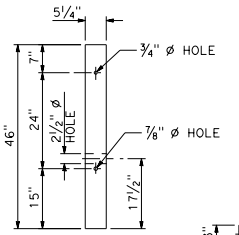



DETAIL A

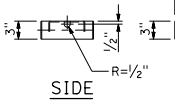
## CABLE CONNECTION BEARING END PLATE



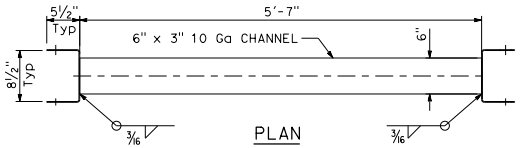

SECTION A-A



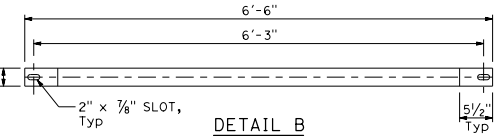

## WOOD POST IN STEEL FOUNDATION TUBE




SIDE




PLAN

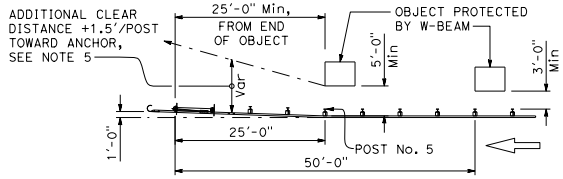



DETAIL B

## STRUT

NOTES:

1. See the Standard Plans A77P, A77Q and A77R series for typical use of End Anchor Assembly (Type SFT-M).
2. For details of the anchor plate and ¾" cable, see Standard Plan A77S3.
3. A 6'-0" length steel foundation tube, TS 8" x 6" x 3/16", without a soil plate, may be furnished and installed in place of the 4'-6" length steel foundation tube and soil plate shown. Minimum embedment of the 6'-0" length tube shall be 5'-9". A ⅝" ø Hex head bolt and nut shall be installed in the hole in the 6'-0" length tube to keep the wood post from dropping into the tube.
4. Place End Cap Type B when pedestrians, bicycles or traffic is within contact of the trailing end of the exposed element, Rail element may be cut 1" past the end of the post. Clean, treat and remove sharp edges.
5. Increased clear distance behind the rail is required from 50' prior to the last post of the End Anchor Assembly (Type SFT-M). Beginning at 50' upstream of the last post of the End Anchor Assembly, the required clear distance increases to 5' at post No. 5. From post No. 5 to the last post of the End Anchor Assembly, the required clear distance increases at a rate of 1.5' for each post.
6. Dike with a maximum height of 4" may be placed under or in front of the End Anchor Assembly (Type SFT-M). If the anchor posts are in conflict with the 4" high dike, the last 25' of rail may be tapered back a maximum of 1'-0" to allow the dike to maintain alignment.
7. Secure End Plate with two 16D nails to maintain orientation.
8. 2" ø standard galvanized pipe or 2⅜" ø galvanized pipe.
9. See Standard Plan A77R1 for placing SFT-M when there is a fixed object within 50'-0" of the end anchor and the distance behind the post is less than 3'-0".




LAYOUT

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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# MIDWEST GUARDRAIL SYSTEM END ANCHOR ASSEMBLY (TYPE SFT-M)

NO SCALE

A77S1

7-1-25



Return to Table of Contents

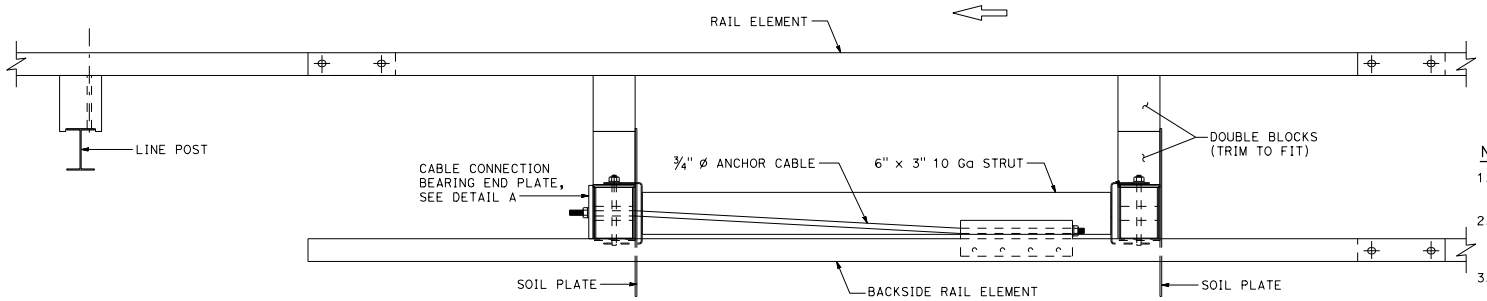
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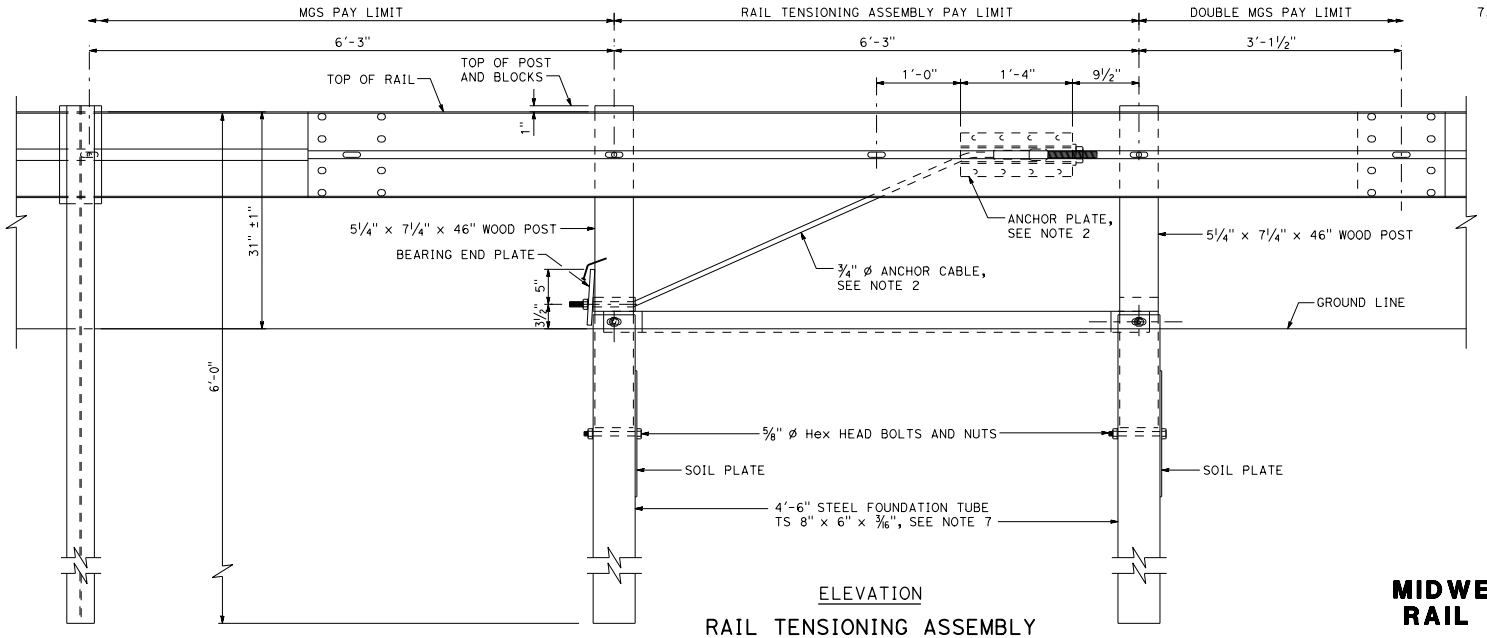
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PLAN



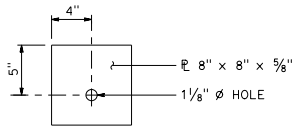

ELEVATION

RAIL TENSIONING ASSEMBLY

See Note 1

NOTES:

1. See Standard Plans A77Q3 and A77R1 for typical use of rail tensioning assembly.
2. For cable, strut, soil tube, wood post in soil tubes, and hardware or details not shown, see Standard Plans A77S1 and A77S3.
3. Nail double blocks together with 2-16D nails to resist block rotation.
4. Cable connection end plate must not be encased in HMA, concrete, or any other material that could restrict the bearing end plate from releasing.
5. Place double blocks on side that rail continues.
6. When steel line posts are used, trim double blocks to fit at rail tensioning assembly.
7. A 6'-0" length steel foundation tube, TS 8" x 6" x 3/16", without a soil plate, may be furnished and installed in place of the 4'-6" length steel foundation tube and soil plate shown. Minimum embedment of the 6'-0" length tube shall be 5'-9". A ⅝" Ø Hex head bolt and nut shall be installed in the hole in the 6'-0" length tube to keep the wood post from dropping into the tube.




DETAIL A

CABLE CONNECTION BEARING END PLATE

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# MIDWEST GUARDRAIL SYSTEM
# RAIL TENSIONING ASSEMBLY

NO SCALE

A77S2

7-1-25

2025 STANDARD PLAN A77S2

Return to Table of Contents

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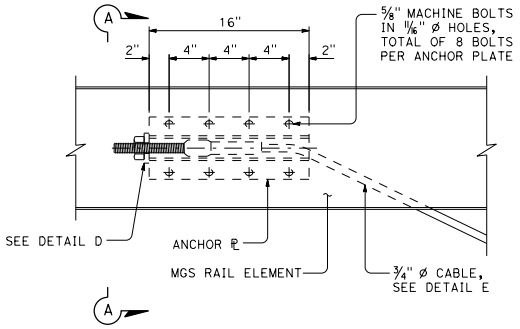
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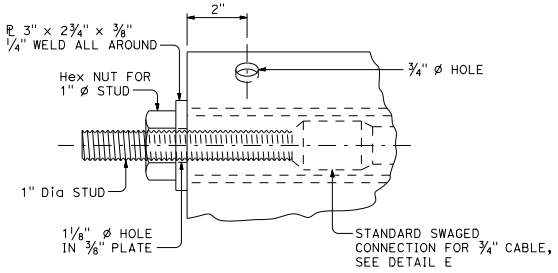
NOTE:

See Standard Plans A77S1, A77S2 and A77T1 for typical use of anchor cable and anchor plate.

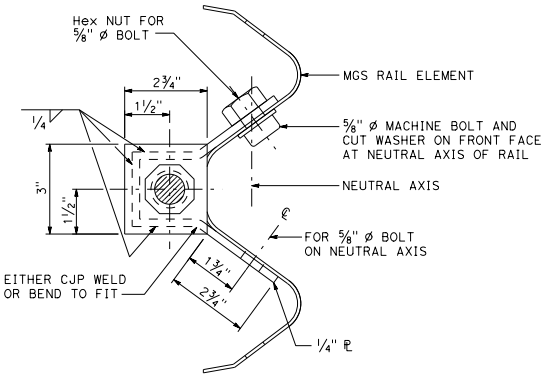



ANCHOR PLATE DETAIL

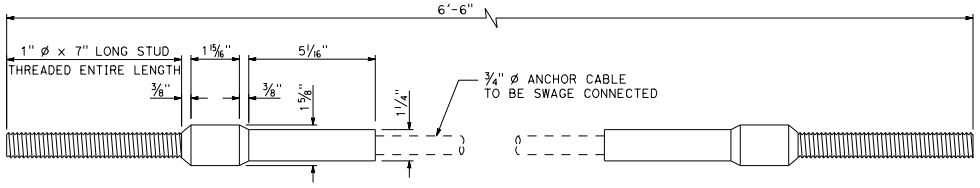
(MGS shown, TBB similar)




DETAIL D




SECTION A-A




DETAIL E

ANCHOR CABLE WITH SWAGED FITTING AND STUD

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# METAL RAILING ANCHOR CABLE AND ANCHOR PLATE DETAILS

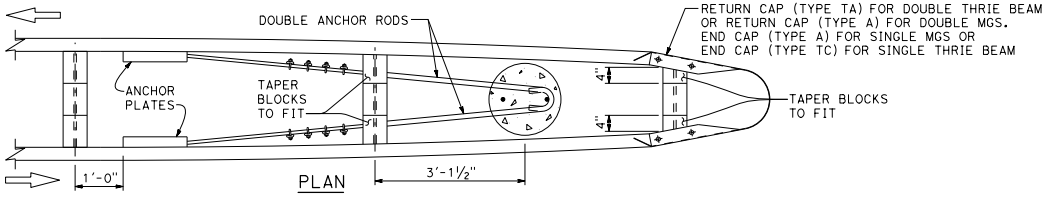
NO SCALE

A77S3

7-1-25

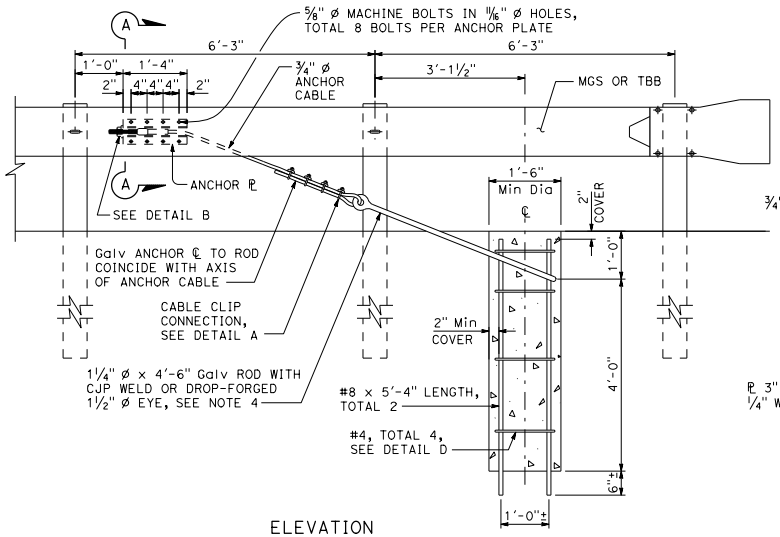
2025 STANDARD PLAN A77S3

Return to Table of Contents




PLAN

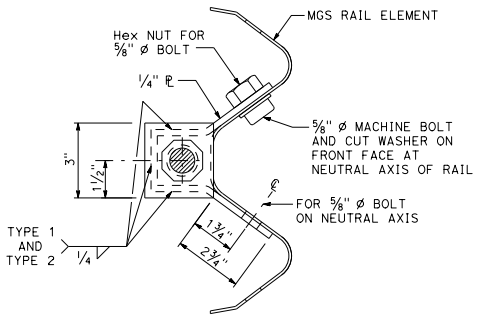
See Note 4




ELEVATION

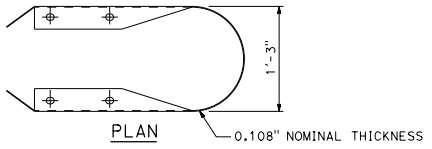
## END ANCHOR ASSEMBLY (TYPE CA)

Wood post, MGS shown, details similar for Thrie Beam Barrier

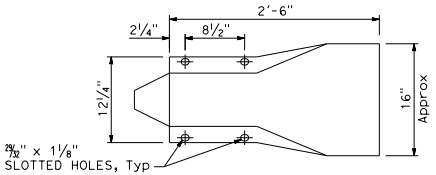



SECTION A-A

## ANCHOR PLATE DETAIL

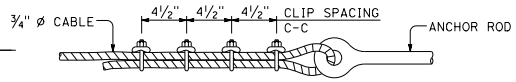



PLAN




ELEVATION

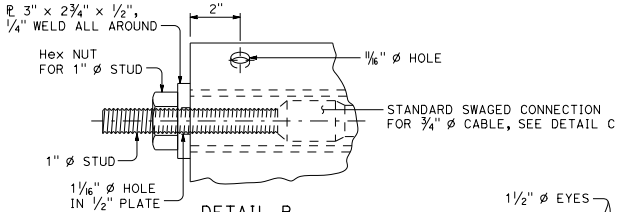
## RETURN CAP (TYPE A)



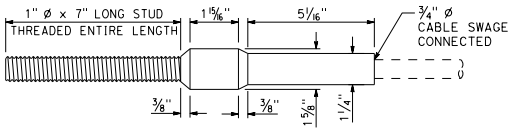

U-Bolts of clip on short end of cable only
U-Bolts tightened to 50 ft/lb torque

DETAIL A

## CABLE CLIP CONNECTION

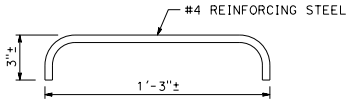



DETAIL B




DETAIL C

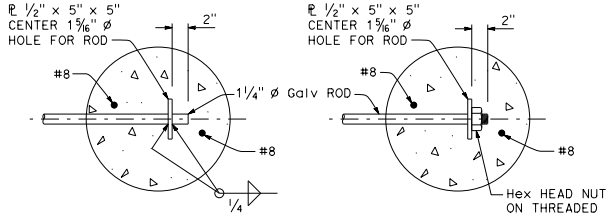
## ANCHOR CABLE WITH SWAGED FITTING AND STUD




DETAIL D

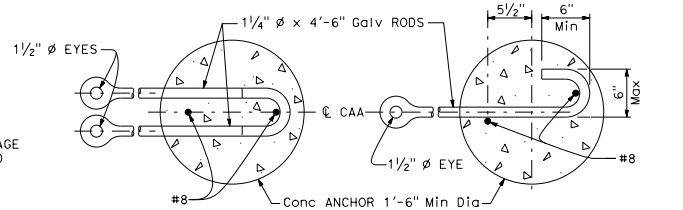
NOTES:

1. For typical use of this type of end anchor, see Standard Plan A78D2.
2. Anchor cable to be parallel to railing for straight runs of rail. Anchor cable may have angle point at anchor plate if railing is curved.
3. Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
4. Single sided railing installations require only one anchor plate, anchor rod, and anchor cable. Single sided railing will not have a rail element or blockouts on backside of line posts as shown in the plan view.




## OPTIONAL ENDS ON SINGLE ANCHOR ROD

Not to be used for double anchors




DOUBLE ANCHOR SINGLE ANCHOR

## ANCHOR RODS

NOTE:

Use two 1¼" ø Galv rods with hook and eye for double MGS anchor.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# METAL RAILING
# END ANCHOR ASSEMBLY (TYPE CA)

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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A77T1

7-1-25

2025 STANDARD PLAN A77T1

Return to Table of Contents

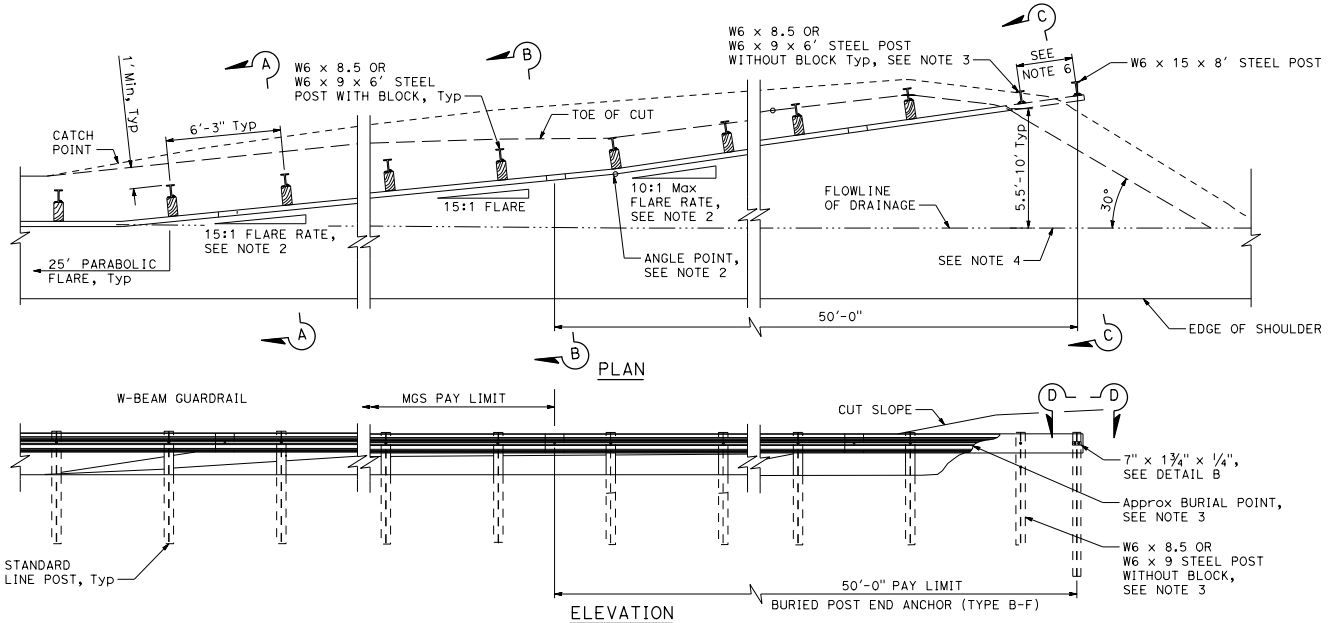
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Malik Rehman
REGISTERED CIVIL ENGINEER

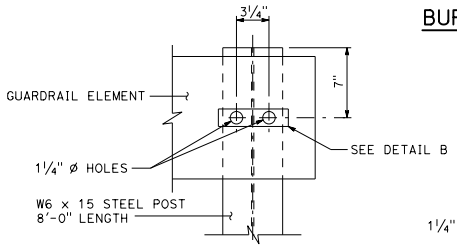
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

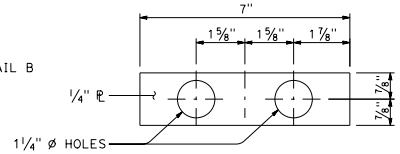
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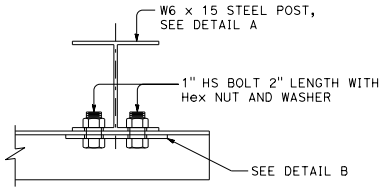

## BURIED POST END ANCHOR (TYPE B-F)



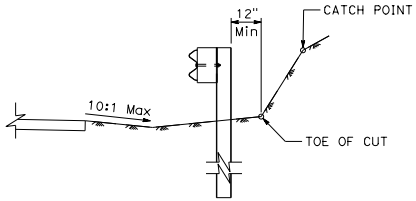

DETAIL A



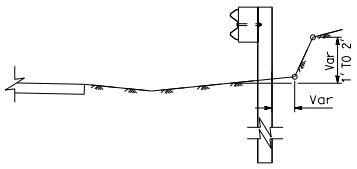

DETAIL B




SECTION D-D

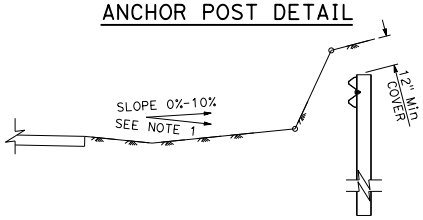



SECTION A-A

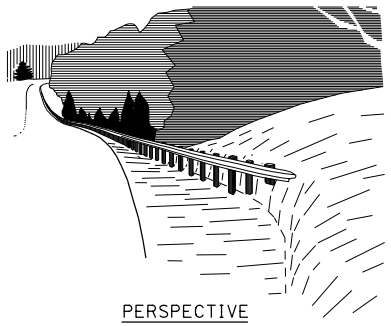



SECTION B-B

## ANCHOR POST DETAIL




SECTION C-C



PERSPECTIVE

NOTES:

1. The buried end anchor for flat slopes (Type B-F) should be installed on slopes between 3:1 and 2:1. Where slopes are steeper than 2:1, use Standard Plan A77T3 buried end anchor for steep slopes (Type B-S).
2. Maximum flare rate of guardrail should be 15:1 based on ETW. The flare rate can be increased up to 10:1 once the toe of cut slope behind the guardrail intersects the back of the guardrail post.
3. Do not place blocks on posts where blocks are in contact with soil. Bolt element directly to the post.
4. For dike details, see Standard Plan A77N4.
5. Elevation of the guardrail should follow the grade of the shoulder within 1'-0" from face of the rail, see Section B-B. Slope for elevation will be determined by the Engineer.
6. W6 x 15 x 8'-0" anchor post with hardware may be shifted up to 3'-1½" from end if authorized.
7. Details not shown for dike and slope treatment.
8. Typical guardrail shown with steel post. Excluding W6 x 15 steel anchor post, wood post may be used when specified.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MIDWEST GUARDRAIL SYSTEM
# BURIED POST END ANCHOR (TYPE B-F)

NO SCALE

**A77T2**

7-1-25

Return to Table of Contents

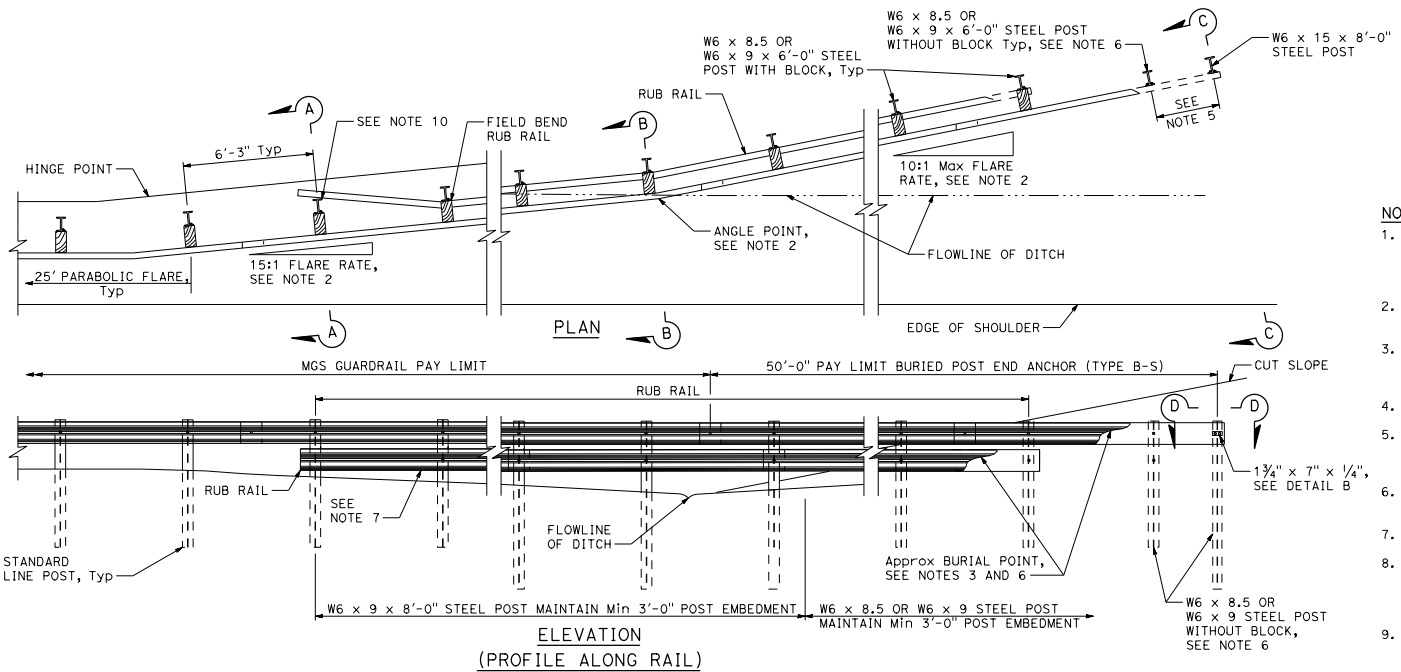
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

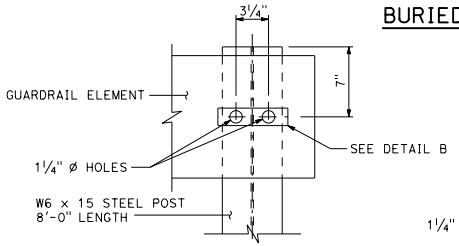
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

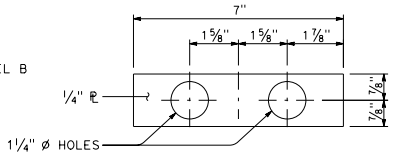
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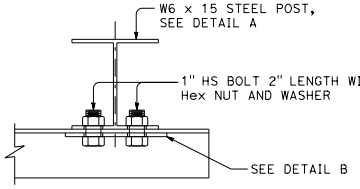

## BURIED POST END ANCHOR (TYPE B-S)




DETAIL A

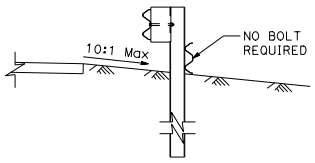



DETAIL B

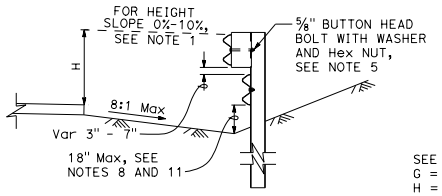



SECTION D-D

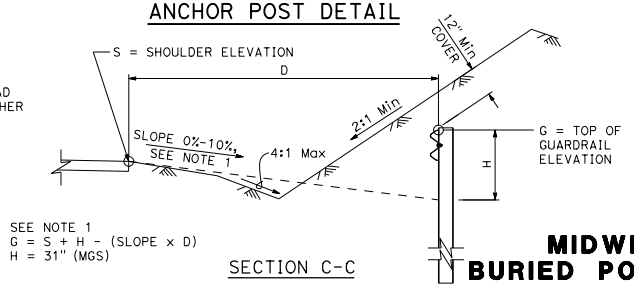
## ANCHOR POST DETAIL




SECTION A-A



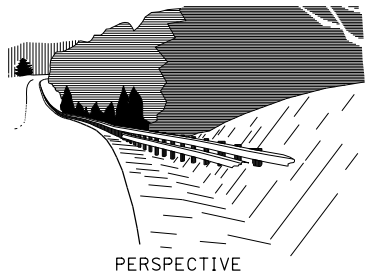

SECTION B-B




SECTION C-C

NOTES:

1. The buried end anchor for steep slopes (Type B-S) should be installed on a 2:1 or steeper slope. Where slopes are 3:1 to 2:1, use Buried End Anchor (Type B-F), see Standard Plan A77T2.
2. Top of guardrail elevation should be no greater than the differential of a 10% shoulder grade, see Note 8.
3. Maximum flare rate of guardrail from the shoulder to the flowline is 15:1 based on ETW. Flare rate can be increased up to 10:1 after crossing the ditch flowline.
4. No Blocks on post where blocks are in contact with soil.
5. W6 x 15 x 8'-0" steel anchor post and hardware may be shifted up to 3'-1½" with minimum 12" cover and maintain minimum post spacing from end if authorized.
6. Do not place blocks on post where blocks are in contact with soil.
7. Use standard guardrail elements with no blocks for rub rail.
8. Begin rub rail when the height of the guardrail is more than 34" above the ground directly below the rail. Holes cut through flange of steel post shall be ¾" Ø and on the trailing side of post.
9. Continue rub rail until the top of rub rail is buried in the backslope.
10. On one way roadways at departure end, rub rail may remain on traffic side of post.
11. Rub rail shall be 6" minimum to 18" maximum above flowline to not restrict flow. Height will be determined by the Engineer.
12. Splice rub rail elements at posts using rail element splice detail and keep rub rail parallel with MGS.



PERSPECTIVE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

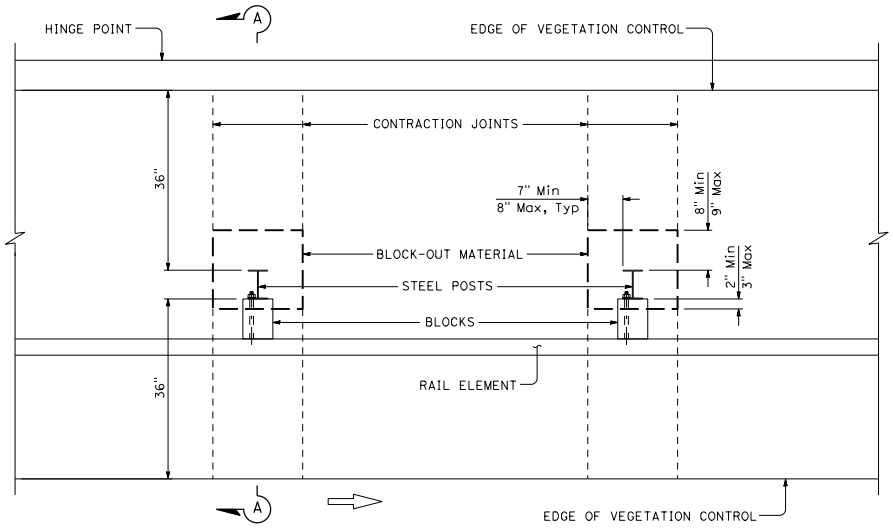
# MIDWEST GUARDRAIL SYSTEM
# BURIED POST END ANCHOR (TYPE B-S)

NO SCALE

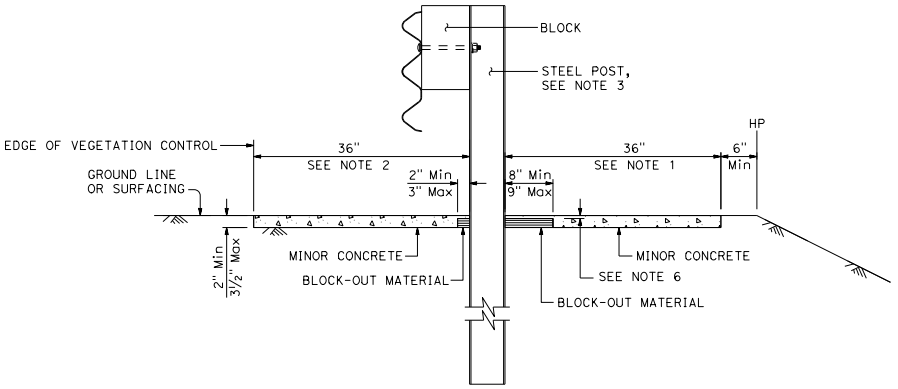
**A77T3**

7-1-25

Return to Table of Contents




PLAN




SECTION A-A

NOTES:

1. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post. Use the detail on Standard Plan A77N5A when the distance from the back of post to the hinge point is less than 15".
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. For steel post sizes, see Standard Plan A78M3.
4. For details not shown, see Standard Plans A78M1 and A78M2.
5. This plan for vegetation control installation only.
6. Concrete over block-out material depth, ⅜" Min to ⅝" Max.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL SINGLE THRIE BEAM BARRIER

NO SCALE

A78C3

7-1-25

2025 STANDARD PLAN A78C3

Return to Table of Contents

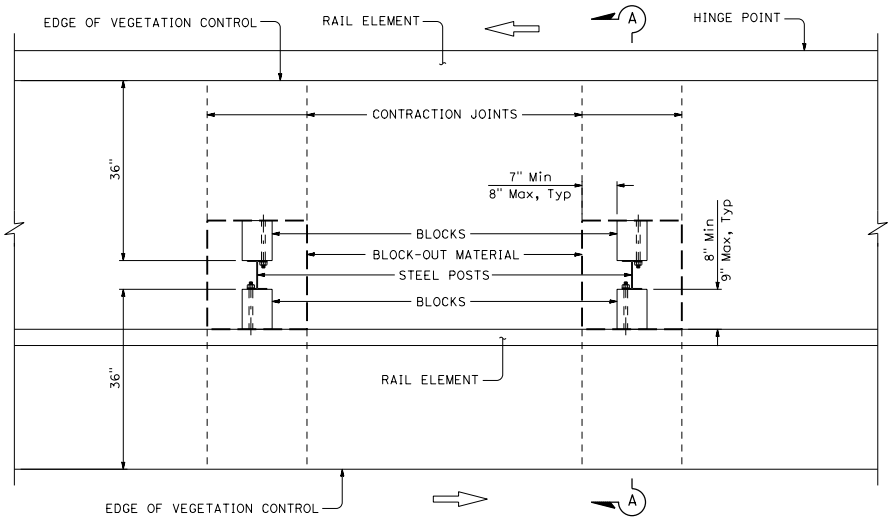
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|---|---|---|---|---|---|
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M. Radhika
REGISTERED CIVIL ENGINEER

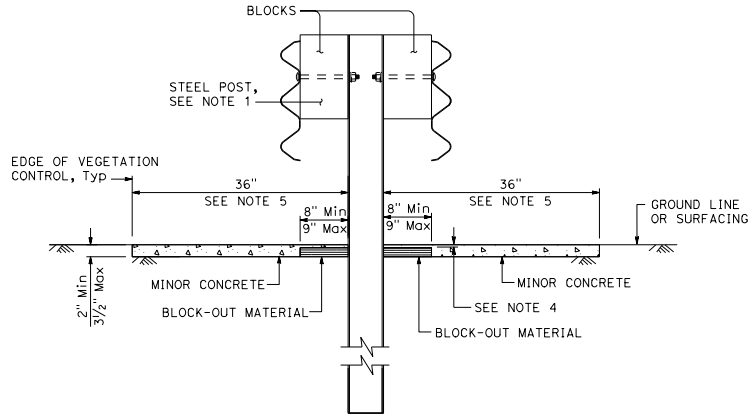
September 19, 2025
PLANS APPROVAL DATE

Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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PLAN




SECTION A-A

NOTES:

1. For steel post sizes, see Standard Plan A78M3.
2. For details not shown, see Standard Plans A78M1 and A78M2.
3. This plan for vegetation control installation only.
4. Concrete over block-out material depth, ⅜" Min to ⅝" Max.
5. Vegetation control must not conflict with drainage facilities.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL DOUBLE THRIE BEAM BARRIER

NO SCALE

A78C4

7-1-25



Return to Table of Contents

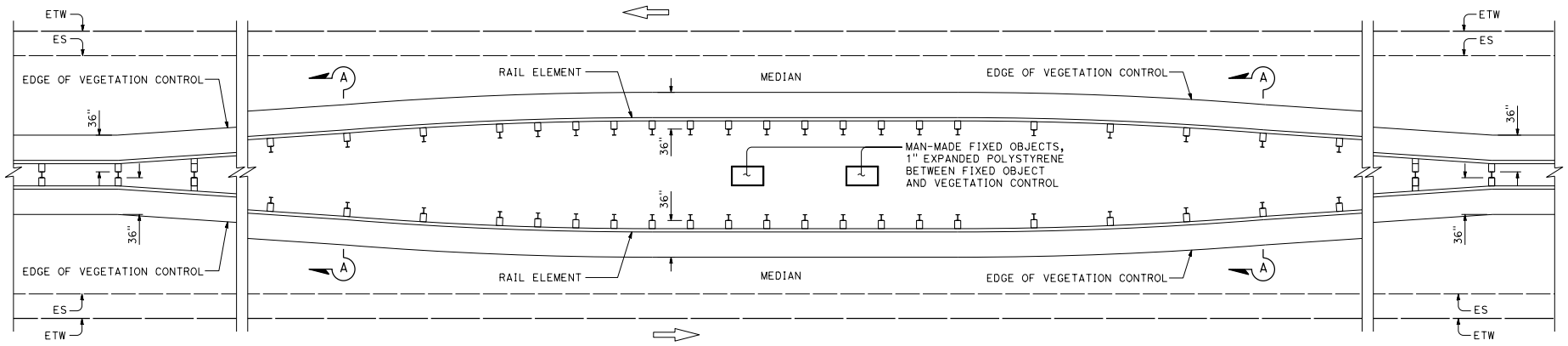
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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M. Radhika
REGISTERED CIVIL ENGINEER

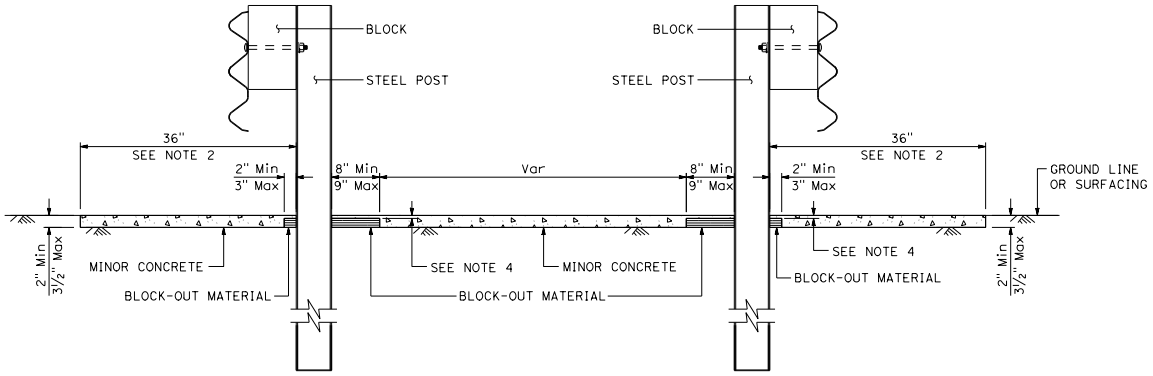
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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PLAN




SECTION A-A

NOTES:

1. See Standard Plan A78C4 for additional vegetation control.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. This plan for vegetation control installation only.
4. Concrete over block-out material depth, ⅜" Min to ⅝" Max.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL THRIE BEAM BARRIER AT FIXED OBJECTS IN MEDIAN

NO SCALE

**A78C5**

7-1-25





Return to Table of Contents

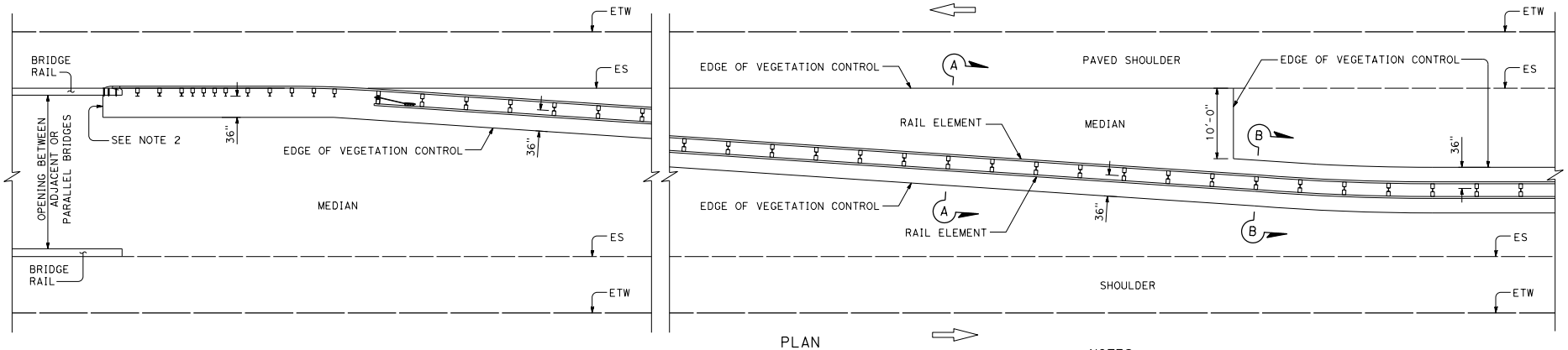
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

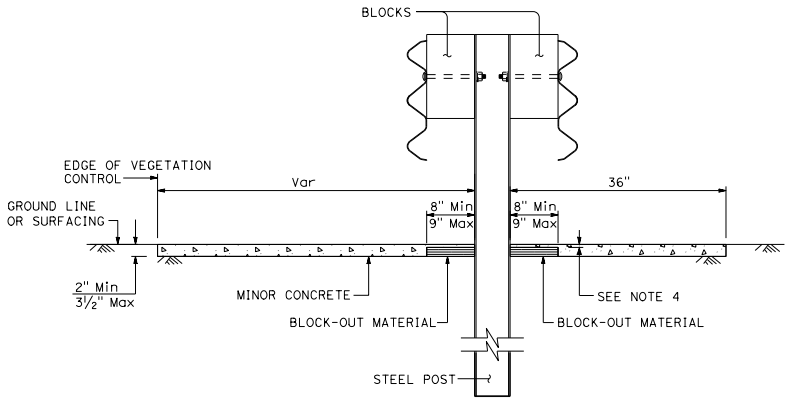
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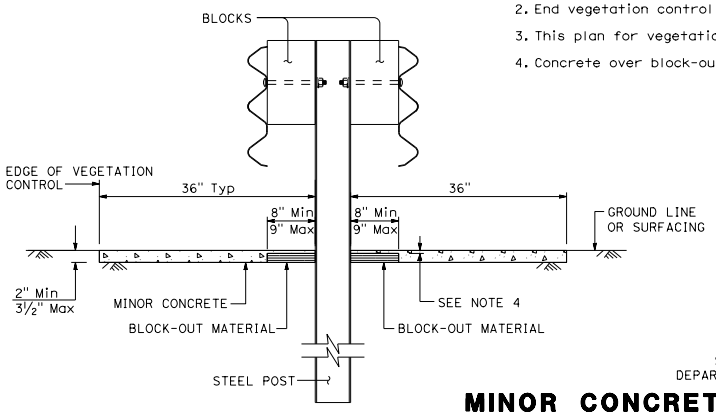

PLAN

NOTES:

1. See Standard Plan A78C4 for additional vegetation control details.
2. End vegetation control at end of rail element attached to bridge railing.
3. This plan for vegetation control installation only.
4. Concrete over block-out material depth, 3/8" Min to 5/8" Max.




SECTION A-A




SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MINOR CONCRETE VEGETATION CONTROL THRIE BEAM BARRIER AT STRUCTURE APPROACH

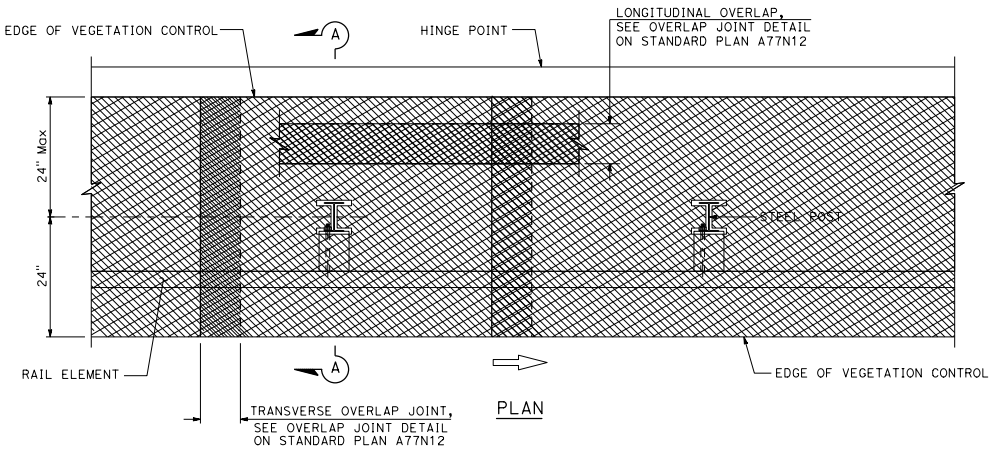
NO SCALE

A78C6

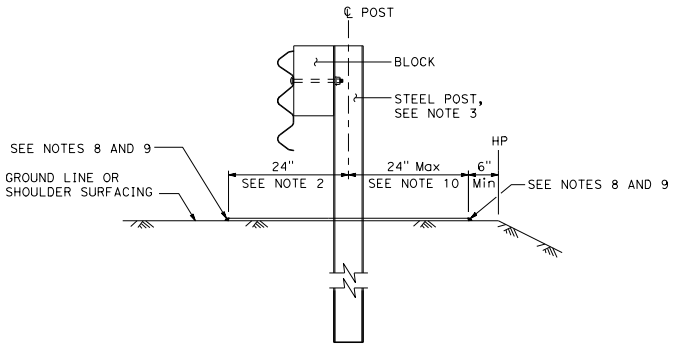
7-1-25

2025 STANDARD PLAN A78C6

Return to Table of Contents




PLAN




SECTION A-A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

M. Radhika
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For steel post sizes, see Standard Plan A78M3.
4. For details not shown, see Standard Plans A78M1 and A78M2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where vegetation control is adjacent to a dike, see details on Standard Plan A77N12.
10. Where the distance between center of post and hinge point is 30" or less, construct vegetation control to 6" from the hinge point. For narrow installation, see Standard Plan A77N13.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL SINGLE THRIE BEAM BARRIER

NO SCALE

A78C7

7-1-25

2025 STANDARD PLAN A78C7

Return to Table of Contents

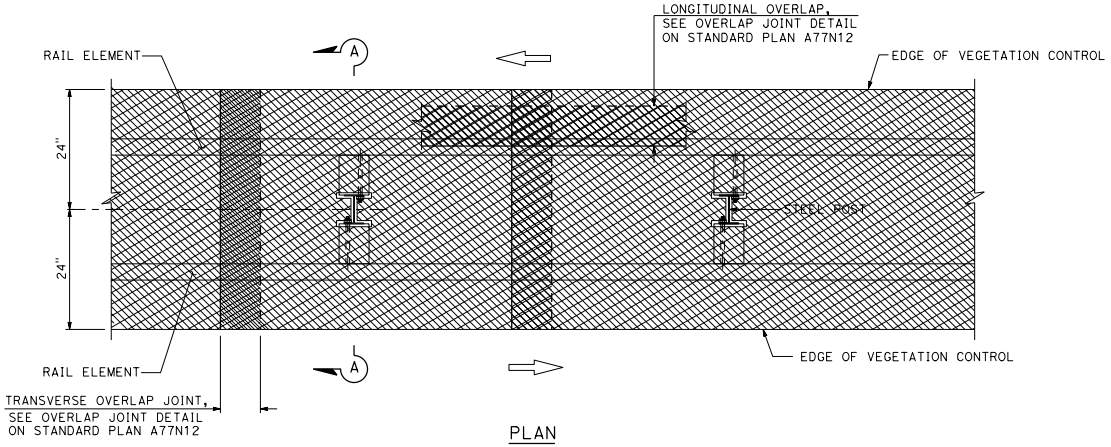
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

M. Radhika
REGISTERED CIVIL ENGINEER

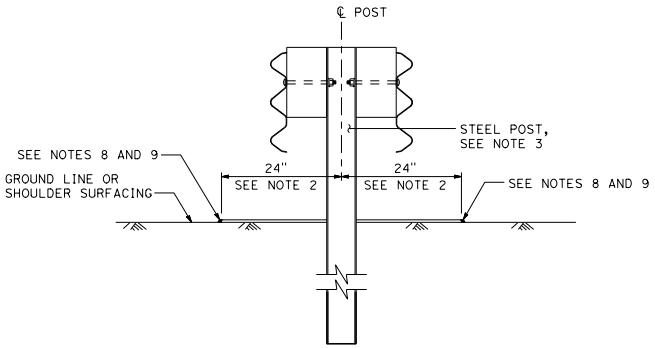
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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PLAN




SECTION A-A

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For steel post sizes, see Standard Plan A78M3.
4. For details not shown, see Standard Plans A78M1 and A78M2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where vegetation control is adjacent to a dike, see details on Standard Plan A77N12.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL DOUBLE THRIE BEAM BARRIER

NO SCALE

**A78C8**

7-1-25

2025 STANDARD PLAN A78C8



Return to Table of Contents

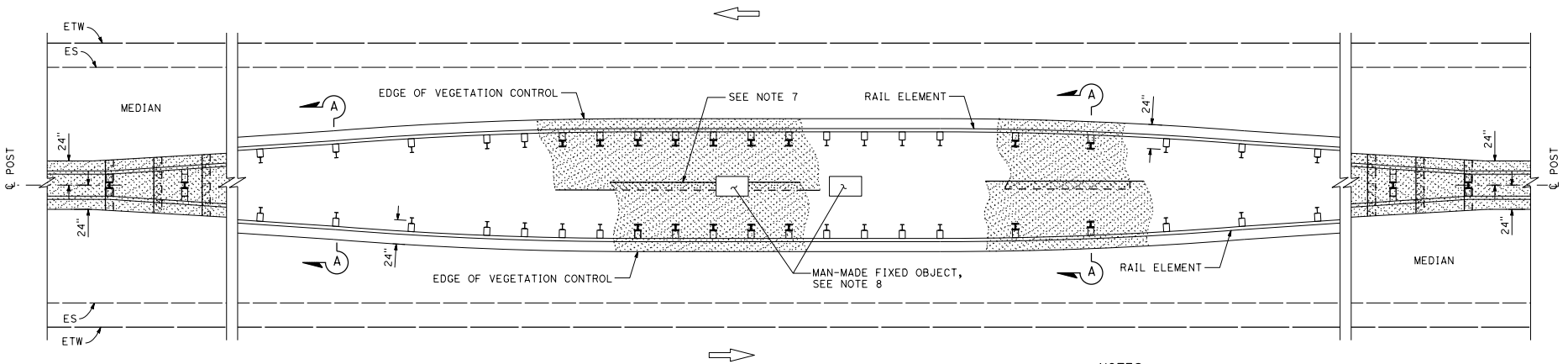
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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M. Radhika
REGISTERED CIVIL ENGINEER

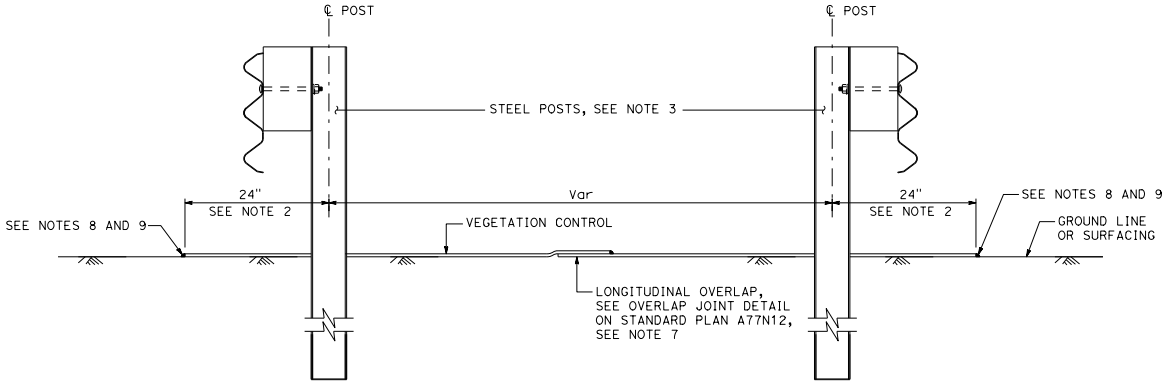
September 19, 2025
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No. C95984
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CIVIL
STATE OF CALIFORNIA

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PLAN




SECTION A-A

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For steel post sizes, see Standard Plan A78M3.
4. For details not shown, see Standard Plans A78M1 and A78M2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place transverse and longitudinal overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where vegetation control is adjacent to a dike, see details on Standard Plan A77N12.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL THRIE BEAM BARRIER AT FIXED OBJECTS IN MEDIAN

NO SCALE

A78C9

7-1-25



Return to Table of Contents

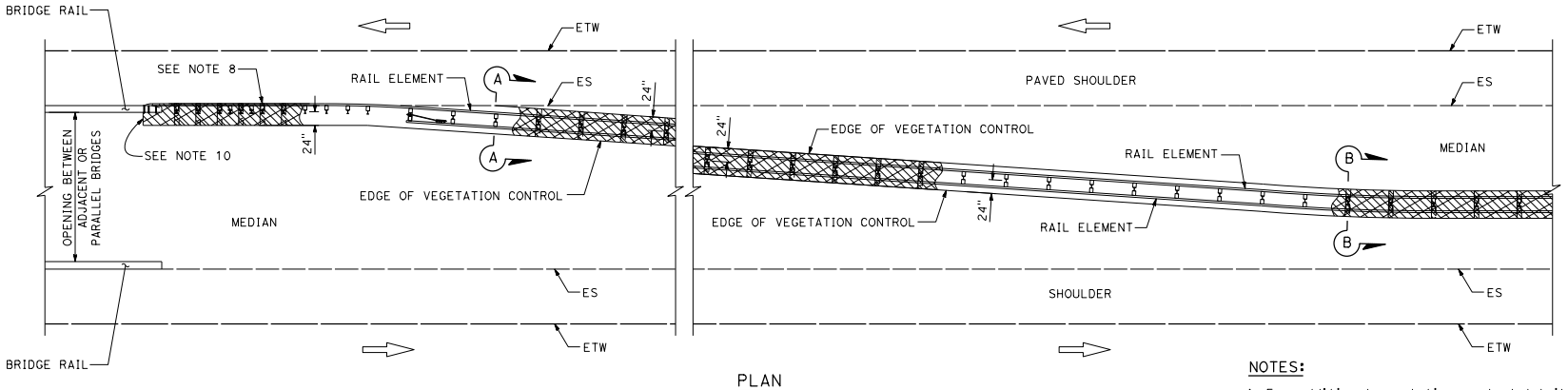
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

M. Radhika
REGISTERED CIVIL ENGINEER

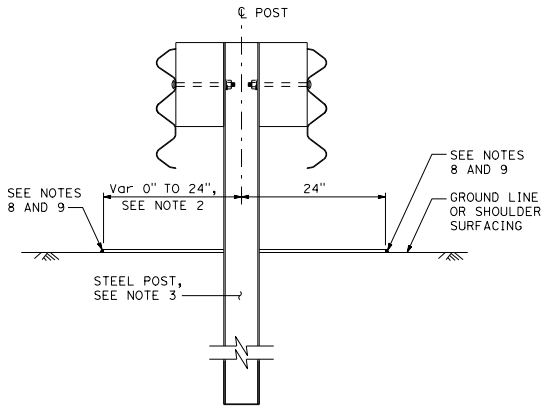
Radhika Mothkuri
No. C95984
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

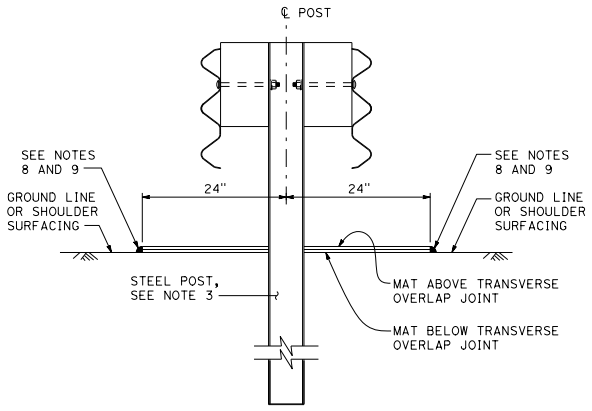
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PLAN




SECTION A-A




SECTION B-B

NOTES:

1. For additional vegetation control details, see Standard Plan A77N12.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 24" of the post center, construct vegetation control to the edge of paved shoulder.
3. For steel post sizes, see Standard Plan A78M3.
4. For details not shown, see Standard Plans A78M1 and A78M2.
5. This plan for vegetation control installation only.
6. Vegetation control must slope in direction of water flow.
7. Place longitudinal and transverse overlap joint within the limits of vegetation control where applicable.
8. Caulk longitudinal and transverse edges of vegetation control mat where it abuts to paved surface or man-made fixed objects, except guardrail posts.
9. Where vegetation control is adjacent to a dike, see details on Standard Plan A77N12.
10. End vegetation control at end of rail element attached to bridge railing.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FIBER OR RUBBER MAT VEGETATION CONTROL THRIE BEAM BARRIER AT STRUCTURE APPROACH

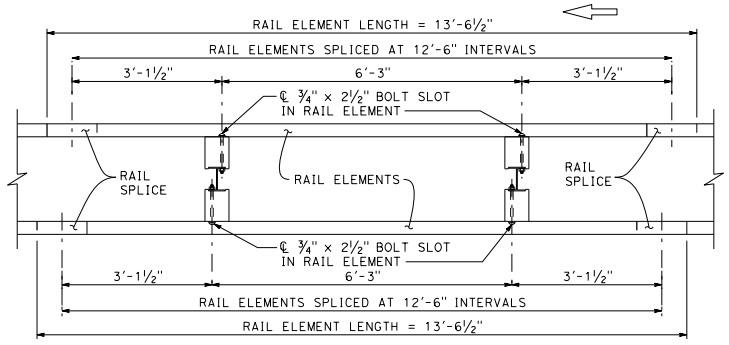
NO SCALE

**A78C10**

7-1-25

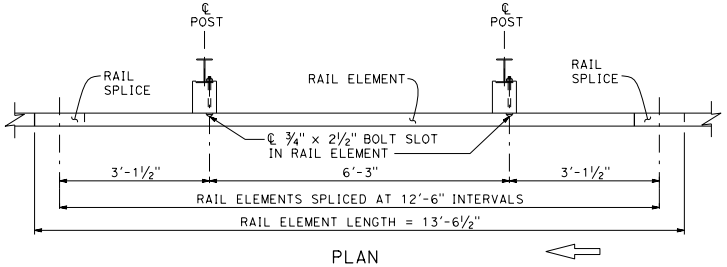
2025 STANDARD PLAN A78C10

Return to Table of Contents



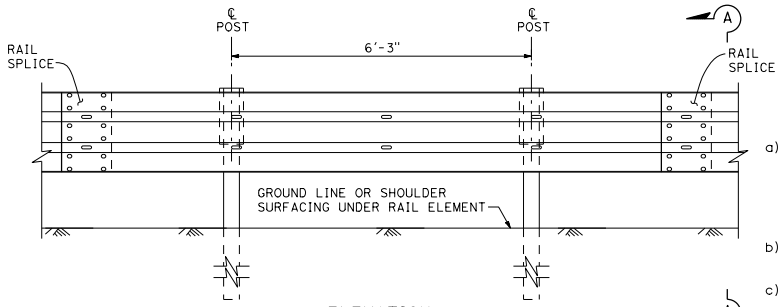

PLAN

## DOUBLE THRIE BEAM BARRIER (TYPE M)




PLAN

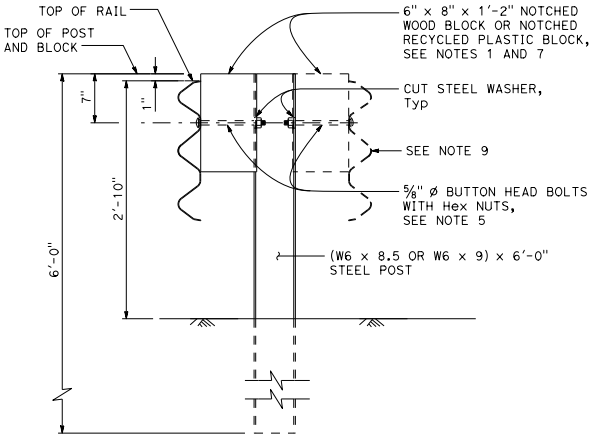
## SINGLE THRIE BEAM BARRIER (TYPE M)




ELEVATION

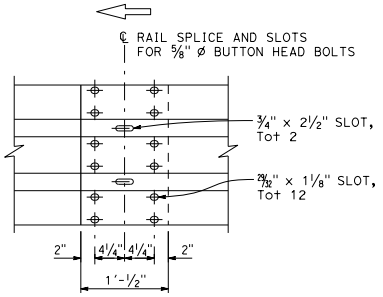
## SINGLE/DOUBLE THRIE BEAM BARRIER (TYPE M)

Steel post with notched wood or notched plastic blocks.




SECTION A-A

## TYPICAL STEEL LINE POST INSTALLATION SINGLE/DOUBLE THRIE BEAM BARRIER (TYPE M)




ELEVATION

## RAIL ELEMENT SPLICE DETAIL

a) Connect the overlapped ends of the thrie beam rail elements with ⅝" ø x 1¼" button head oval shoulder bolts inserted into the ²³⁄₃₂" x 1⅛" slots and bolted together with ⅝" ø recessed hex nuts. Recess of hex nut points toward rail element. A total of 12 bolts and nuts are to be used at each rail splice connection.

b) The ends of the rail elements are to be overlapped in the direction of traffic, see details.

c) Use splice bolts and nuts in all splice holes of the end cap or return cap when attaching the end cap or return cap to the end of rail element.

NOTES:

1. For details of standard hardware, posts and blocks used to construct thrie beam barrier, see Standard Plans A78M2 and A78M3.
2. Thrie beam barrier post spacing to be 6'-3" center to center, except as otherwise noted.
3. Top of barrier rail to be 2'-10" above ground line or shoulder surfacing under the rail element.
4. For barrier end treatments and barrier connections, see Standard Plans A78P1 and A78Q1,
5. Attach rail element to block and steel post with 1 bolt on approaching traffic side of post flange. For double thrie beam, use 1 bolt for connecting each side of post.
6. For details of thrie beam barrier Type (M) at fixed objects, see Standard Plan A78Q3.
7. Notched face of block faces steel post.
8. Install posts in soil.
9. Thrie Beam Barrier (Type M) can be placed as single or double Thrie Beam Barrier (Type M).
10. Thrie Beam Barrier (Type M) may be used either notched wood or notched plastic blocks.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) STANDARD BARRIER RAILING SECTION

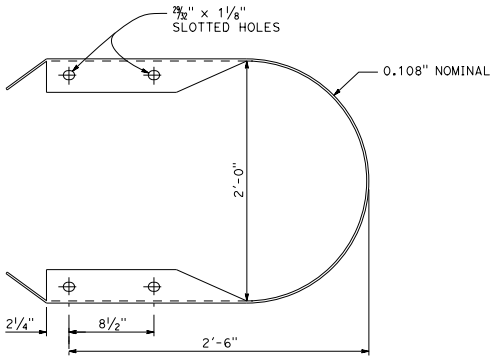
NO SCALE

**A78M1**

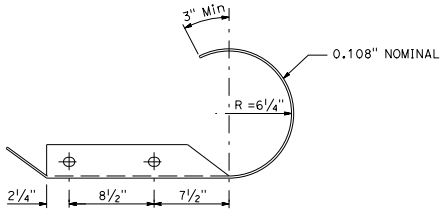
7-1-25



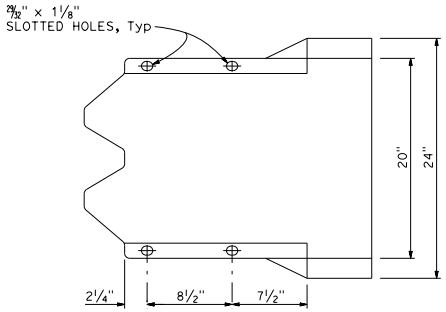
Return to Table of Contents




RETURN CAP (TYPE TA)

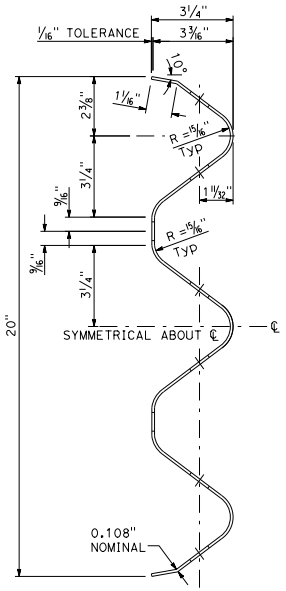



PLAN

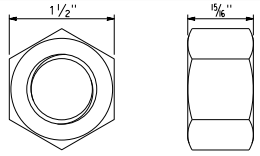



ELEVATION

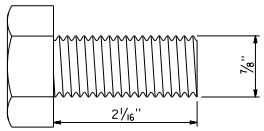
RETURN CAP (TYPE TR)




SECTION VIEW
OF RAIL ELEMENT




7/8" ø Hex HEAD NUT

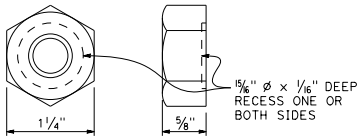



7/8" ø Hex HEAD BOLT

POST NUT AND BOLT

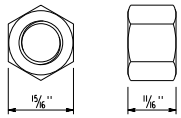
NOTES:

1. For approach guardrail transition (AGT) hardware, see Standard Plan A79A3.
2. Steel washer used on backside of wood posts within end anchors, and at cable anchor plate connections.
3. Recessed portion of nut must be placed towards oblong shoulder of button head bolt.



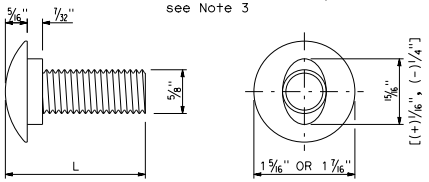

5/8" ø RECESS NUT

For use with button head bolt, see Note 3



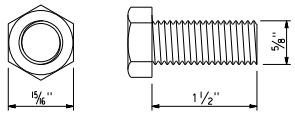

5/8" ø Hex NUT

For use with Anchor Plate




5/8" ø BUTTON HEAD BOLT

Used at splices and rail element to post connection

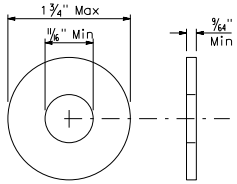



5/8" ø Hex HEAD BOLT

POST NUT AND BOLT

Used with cable Anchor Plate connection

| BUTTON HEAD BOLT | |
|---|---|
| L | THREAD LENGTH |
| 1 1/4" | FULL THREAD LENGTH |
| 2" | FULL THREAD LENGTH |
| 9 1/2" | 4" Min THREAD LENGTH |
| 14" | 4" Min THREAD LENGTH |
| 25" | 4" Min THREAD LENGTH |




STEEL WASHER

Washer used with cable Anchor Plate connection, see Note 2

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
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CIVIL
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) STANDARD HARDWARE DETAILS

NO SCALE

A78M2

2025 STANDARD PLAN A78M2

7-1-25

Return to Table of Contents

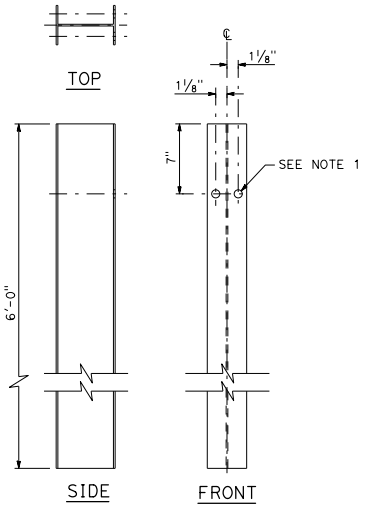
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Malik Rehman
REGISTERED CIVIL ENGINEER

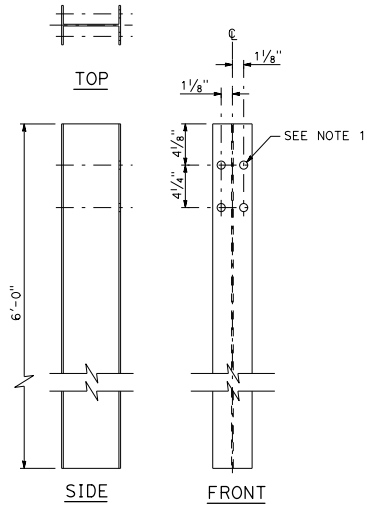
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REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA



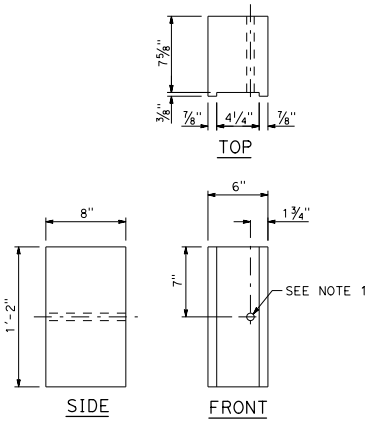

W6 x 8.5 OR W6 x 9
STEEL LINE POST
See Note 6



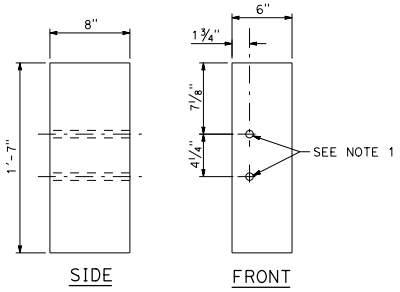

W6 x 8.5 OR W6 x 9 STEEL POST
FOR TRANSITION FROM THRIE BEAM TO MGS

NOTES:

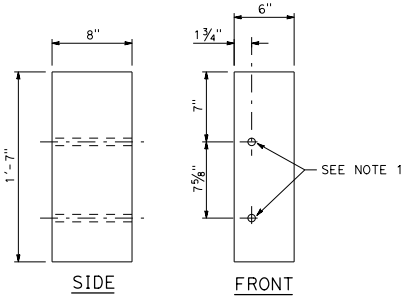
1. All holes in steel post to be ⅞" Dia maximum. Holes in wood blocks to be ¾" Dia ±1/16".
2. Dimensions shown for wood blocks are nominal.
3. For use with W6 x 8.5 or W6 x 9 steel post.
4. Notched face of block faces steel post.
5. For additional information on AGT standard hardware, see Standard Plan A79A3.
6. Standard MGS steel post and block can be used as an alernative to the Thrie Beam Barrier (Type M) post and block as shown on Standard Plan A77N2.
7. Dimensions of plastic blocks vary by manufacturer. See Authorized Material List for dimensions.



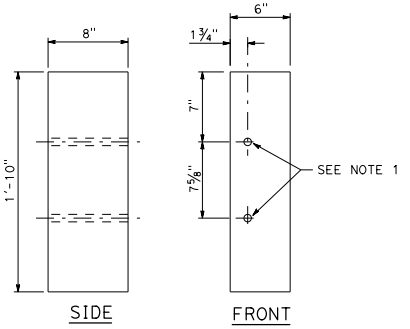

6" x 8"
NOTCHED WOOD OR PLASTIC BLOCK
See Notes 3, 4 and 6




6" x 8"
TRANSITION BLOCK FROM
THRIE BEAM TO MGS




6" x 8"
WOOD BLOCK FOR
END ANCHOR ASSEMBLY
AND HEIGHT TRANSITION




6" x 8"
BLOCK FOR END ANCHOR ASSEMBLY
(TYPE SFT-M)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) POST AND BLOCK DETAILS

NO SCALE

A78M3

7-1-25



Return to Table of Contents

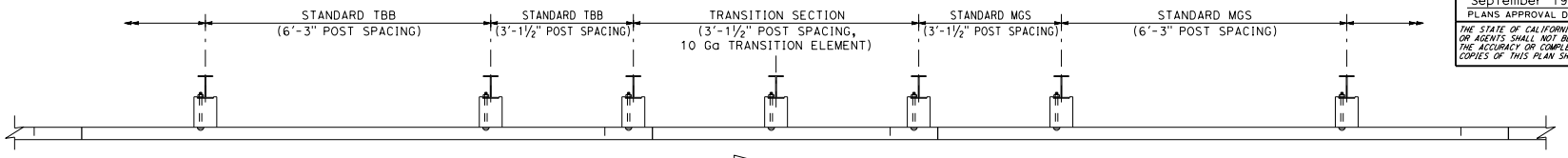
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

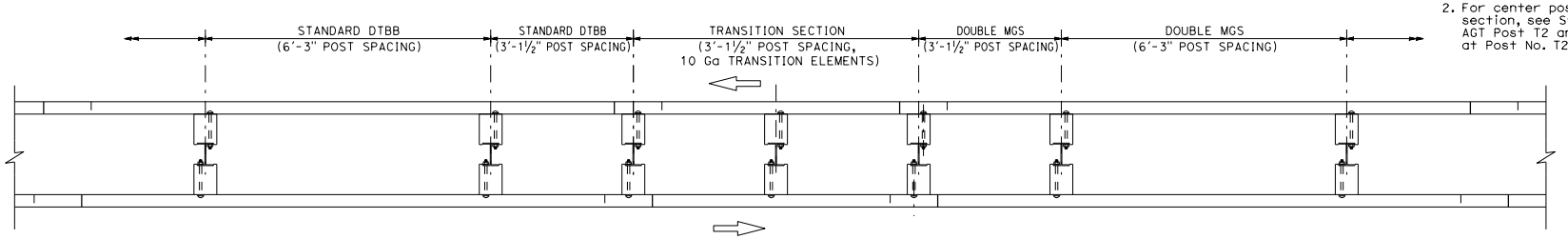
REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
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PLAN

## SINGLE THRIE BEAM BARRIER

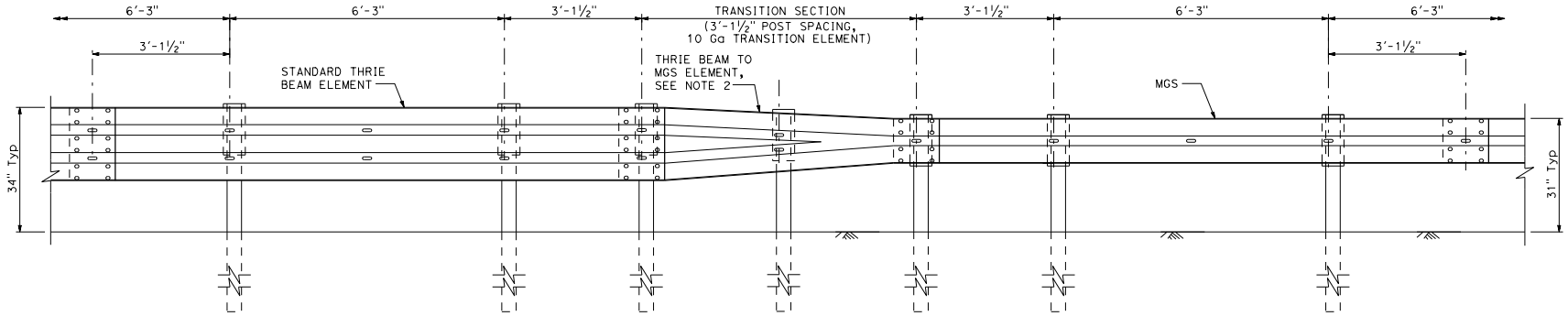



PLAN

## DOUBLE THRIE BEAM BARRIER

NOTES:

1. For details of standard single and double thrie beam barrier, see Standard Plans A78M1, A78M2, and A78M3.
2. For center post and block of transition section, see Standard Plan A79A3, AGT Post T2 and Transition Block at Post No. T2 details.




ELEVATION

## SINGLE/DOUBLE THRIE BEAM BARRIER (TYPE M) TRANSITION TO MIDWEST GUARDRAIL SYSTEM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SINGLE AND DOUBLE THRIE BEAM BARRIER (TYPE M) TRANSITION TO MIDWEST GUARDRAIL SYSTEM

NO SCALE

**A78P1**

7-1-25

2025 STANDARD PLAN A78P1



Return to Table of Contents

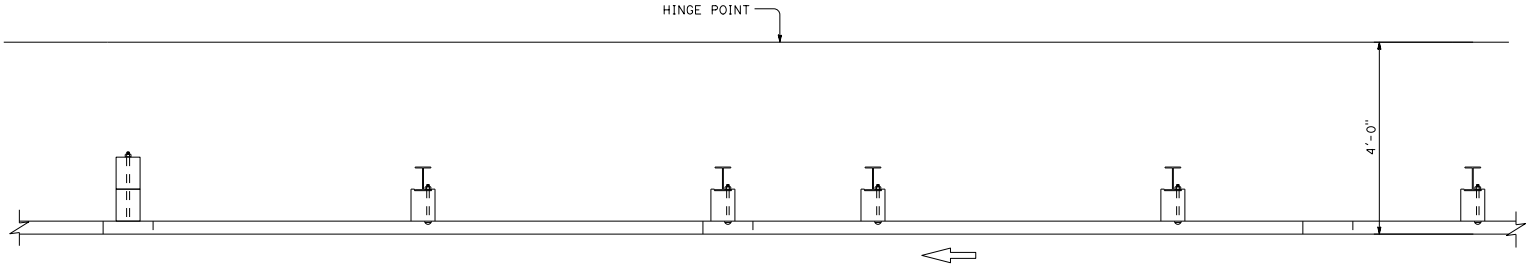
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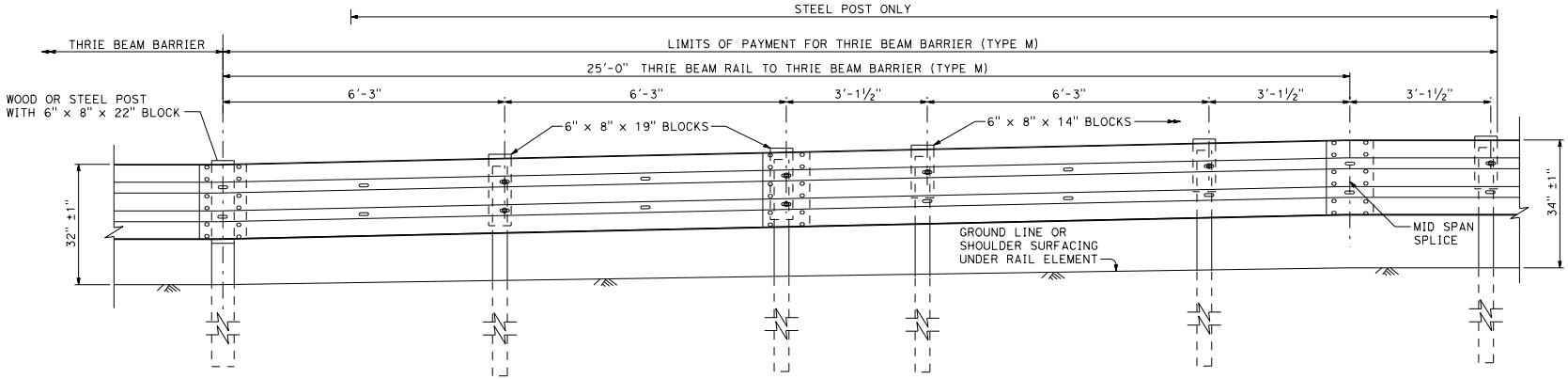
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PLAN




ELEVATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) TRANSITION TO THRIE BEAM RAIL

NO SCALE

**A78P2**

7-1-25

2025 STANDARD PLAN A78P2

Return to Table of Contents

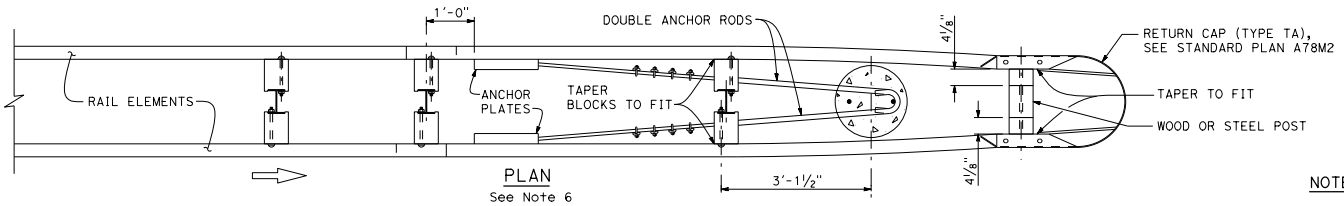
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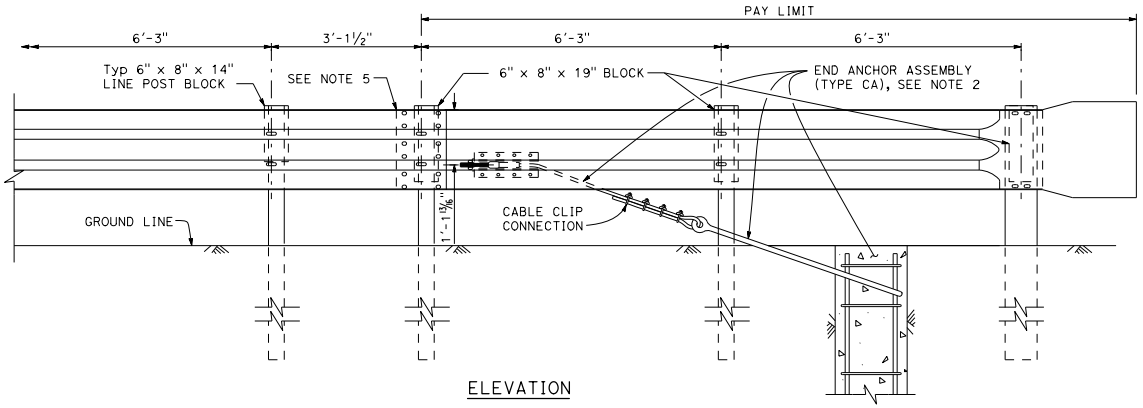
September 19, 2025
PLANS APPROVAL DATE

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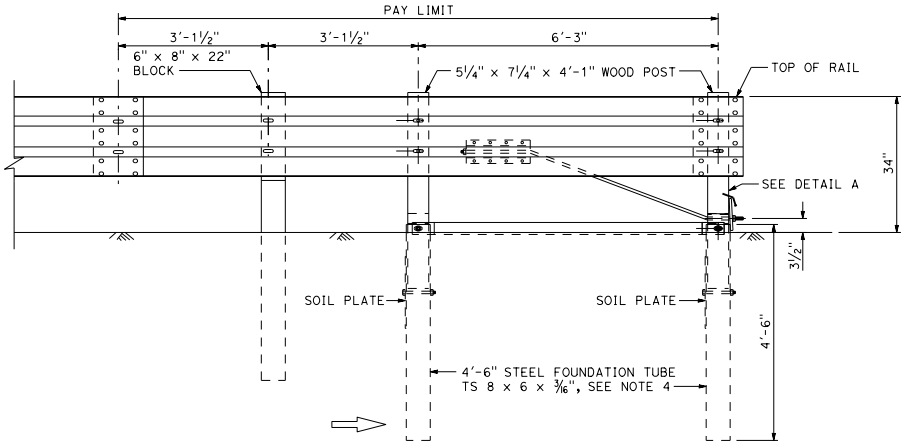



PLAN
See Note 6




ELEVATION

## END ANCHOR ASSEMBLY (TYPE CA) FOR DOUBLE THRIE BEAM BARRIER (TYPE M)

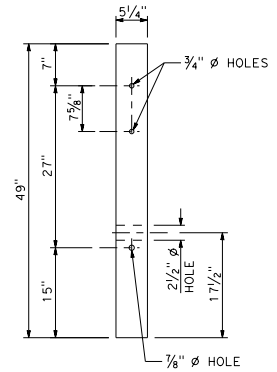



## END ANCHOR ASSEMBLY (TYPE SFT-M) FOR TRAFFIC DEPARTURE END OF SINGLE THRIE BEAM BARRIER (TYPE M)

(For one-way roadways)
See Notes 1 and 7

NOTES:

1. For additional details of End Anchor Assembly (Type SFT-M), see Standard Plan A77S1.
2. For End Anchor Assembly (Type CA) details, see Standard Plan A77T1.
3. The type of terminal system to be used will be shown on the Project Plans.
4. A 6'-0" length steel foundation tube, TS 8 x 6 x ⅜, without a soil plate, may be furnished and installed in place of the 4'-6" length steel foundation tube and soil plate shown. Minimum embedment of the 6'-0" length tube shall be 5'-9". A ⅝" ø hex head bolt and nut shall be installed in the hole in the 6'-0" length tube to keep the wood post from dropping into the tube.
5. Bolt rail element to post at splice at end anchor assembly.
6. End Anchor Assembly for use with double Thrie Beam Barrier (Type M) for trailing end only. End Anchor Assembly must be shielded from head on impacts to the Return Cap (Type TA).
7. When single sided Thrie Beam Barrier (Type M) is used with End Anchor Assembly (Type SFT-M), no blocks are used for the two end posts in steel foundation tubes.




DETAIL A

## WOOD POST IN STEEL FOUNDATION TUBE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) END ANCHORS

NO SCALE

**A78Q1**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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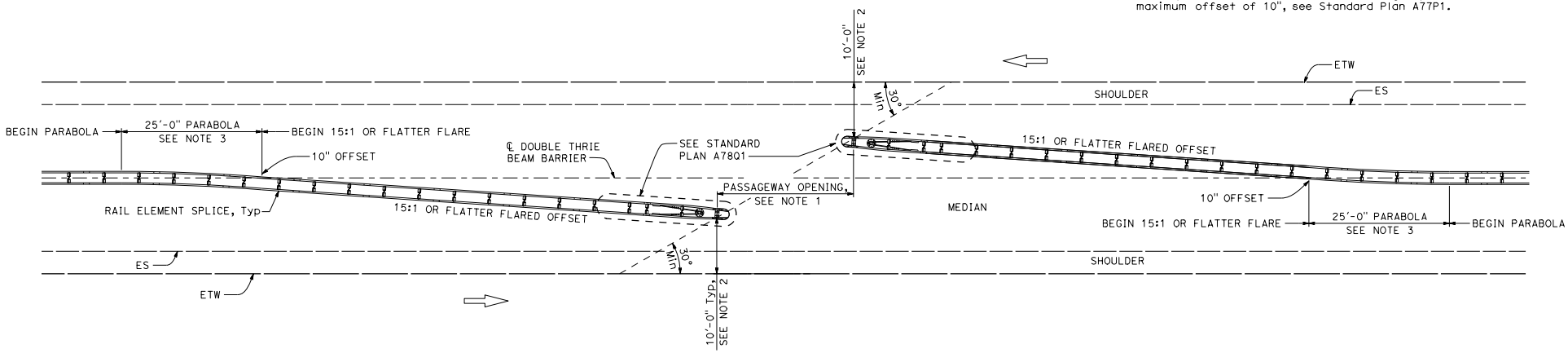
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NOTES:

1. The typical passageway opening for motorcycles is 6'-0" to 8'-0" and requires a minimum of 25'-0" of flared double thrie beam barrier (Type M) past the parabola including the end anchor. Generally, motorcycle passageways are not used where median width is less than 25'-0". The typical passageway opening for motor vehicles is 12'-0" to 16'-0". Generally, motor vehicle passageways are not used where median width is 32'-0" or less. For a 16'-0" wide opening, double thrie beam barrier (Type M) must be offset each side by a minimum of 4'-6". A minimum of 53'-0" of railing past the parabola flared at 15:1 is required on each side of the opening. See Project Plans for width of passageway opening.
2. Barrier end offsets from edge of traveled way vary depending on type of highway facility involved. End offsets other than 10'-0" will be shown on the Project Plans.
3. For typical flare offsets for 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.




PLAN

EMERGENCY PASSAGEWAY IN THRIE BEAM BARRIER

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DOUBLE THRIE BEAM BARRIER (TYPE M) EMERGENCY PASSAGEWAY DETAILS

NO SCALE

A78Q2

7-1-25

Return to Table of Contents

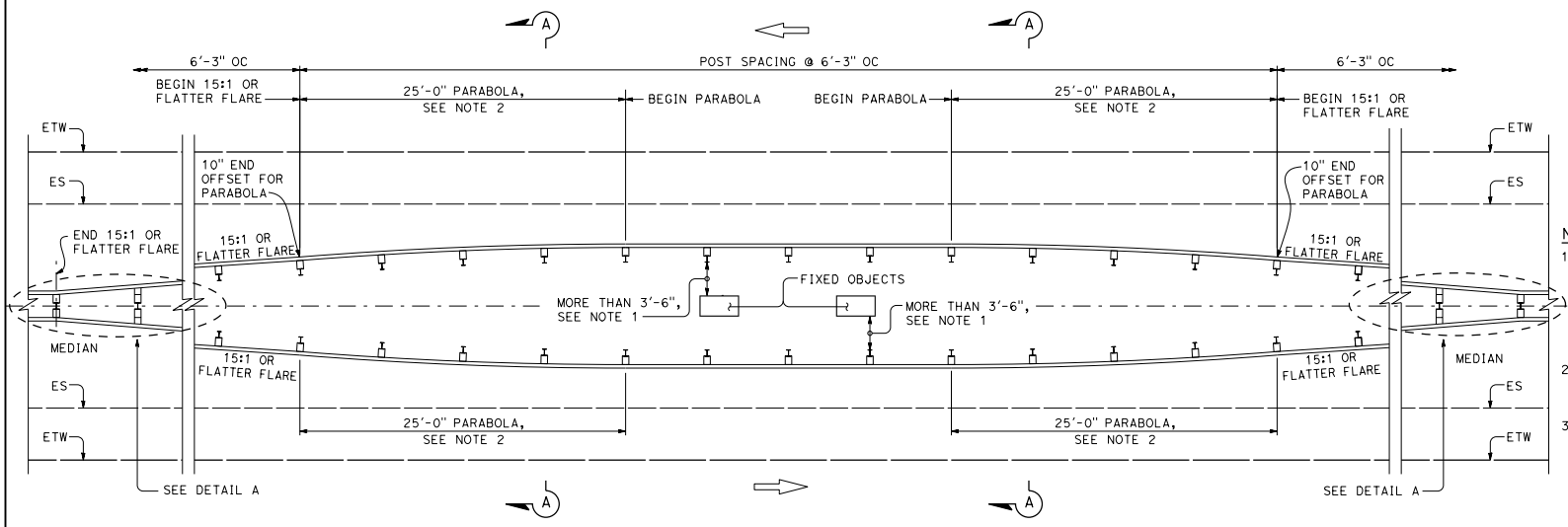
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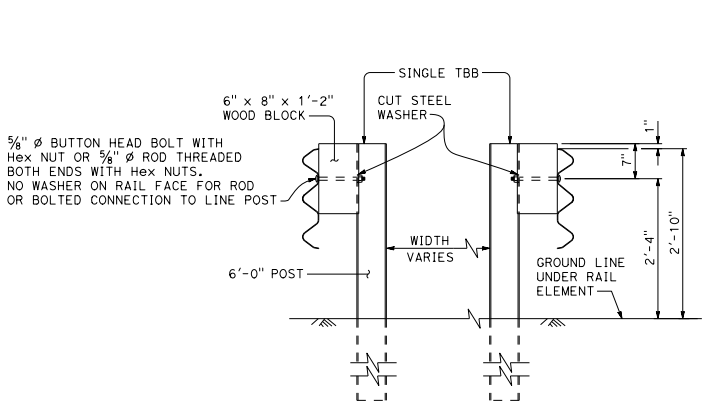

PLAN

## THRIE BEAM BARRIER AT FIXED OBJECTS

Steel post with wood block shown, see Note 1.

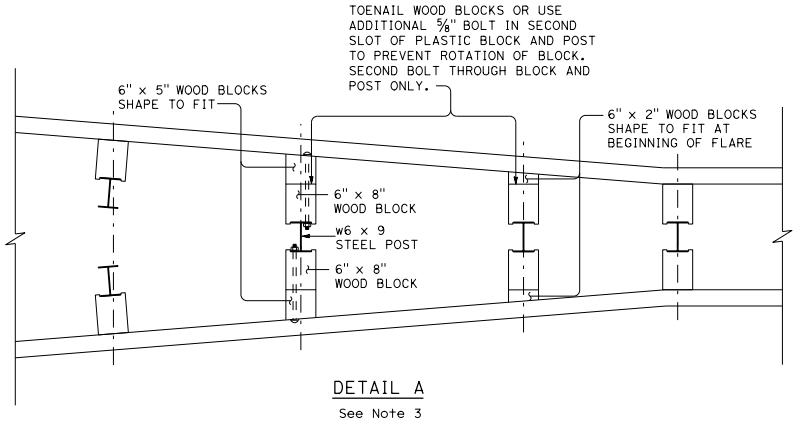
### NOTES:

1. Where the clearance between the back of post and the face of a fixed object is less than 3'-6", use concrete barrier or transition to MGS and use strengthened midwest guardrail system as shown on Standard Plan A77R1 to shield the fixed object(s).
2. For typical flare offsets, use 25'-0" length parabola with maximum offset of 10", see Standard Plan A77P1.
3. At 15:1 flare each stanard post spacing increases by 5". Transition double thrie beam to two runs of single thrie beam by placing an additional 2" block at 1st post of transition and place an additional 5" block at the second post of transition.



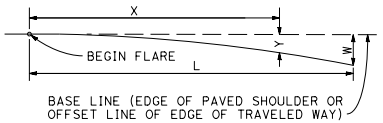

SECTION A-A

Steel post with wood block shown.




DETAIL A

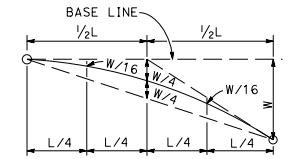
See Note 3




$Y = \frac{WX^2}{L^2}$

Y = OFFSET FROM BASE LINE
W = MAXIMUM OFFSET
X = DISTANCE ALONG BASE LINE
L = LENGTH OF FLARE

PARABOLIC FLARE OFFSETS




TYPICAL PARABOLIC LAYOUT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) AT FIXED OBJECTS IN MEDIAN

NO SCALE

**A78Q3**

7-1-25

2025 STANDARD PLAN A78Q3

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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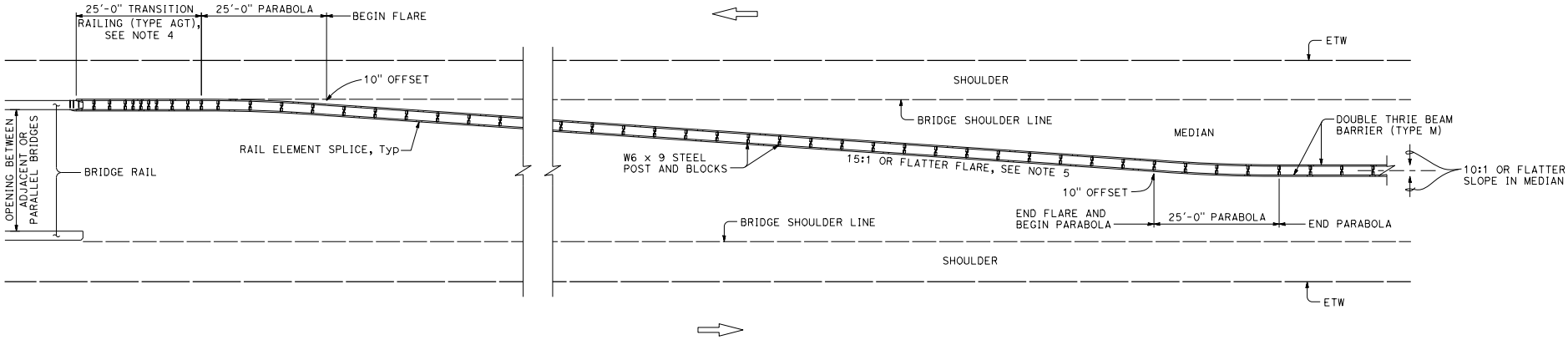
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NOTES:

1. Line post, blocks and hardware to be used are shown on Standard Plans A78M1, A78M2, and A78M3.
2. Post spacing to be 6'-3" center to center, except as otherwise noted.
3. Line posts are W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 8" x 1'-2" notched wood blocks.
4. For Transition Railing (Type AGT) details, see Standard Plan A79A2.
5. The 15:1 or flatter flare is measured off of the edge of traveled way.
6. For approach guardrail transition (AGT) standard hardware, see Standard Plan A79A3.
7. For Parabolic Flare Offset formula, see Standard Plan A78Q3. For Parabolic Flare Offset values, see Standard Plan A77P1.




TYPE 25A CONNECTION LAYOUT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# THRIE BEAM BARRIER (TYPE M) TYPICAL LAYOUT FOR CONNECTION TO BRIDGE RAILING

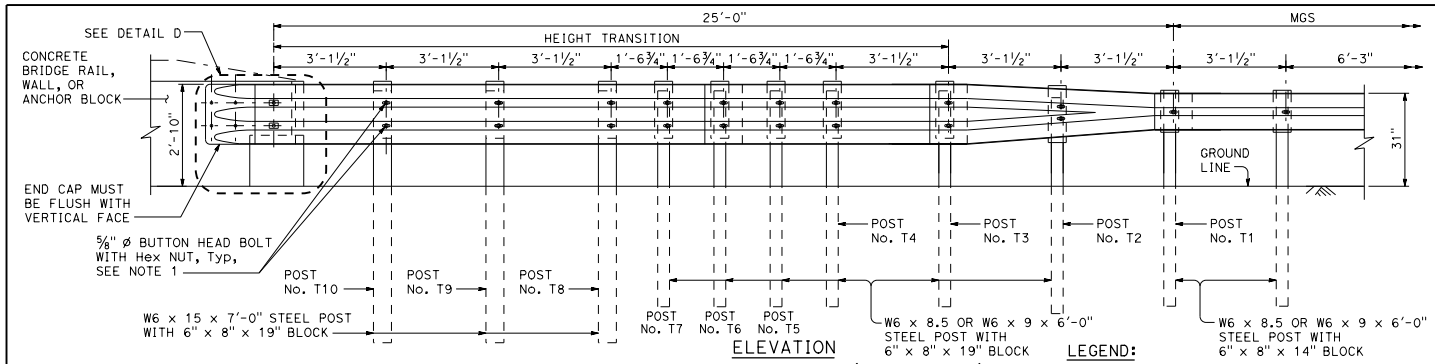
NO SCALE

A78R

7-1-25



Return to Table of Contents

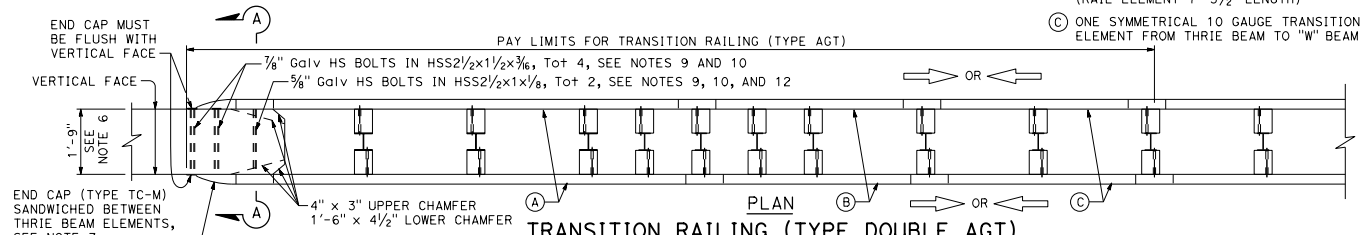



ELEVATION

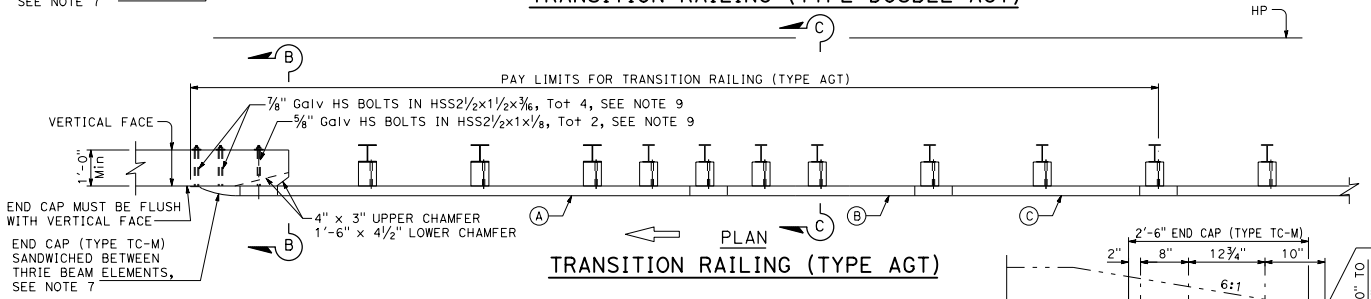
## TRANSITION RAILING (TYPE AGT)

LEGEND:

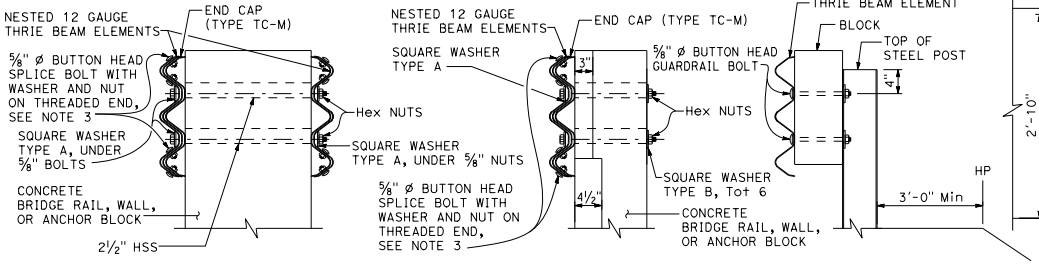
- (A) NESTED 12 GAUGE THRIE BEAM ELEMENTS
- (B) ONE 12 GAUGE THRIE BEAM ELEMENT, (RAIL ELEMENT 7'-3½" LENGTH)
- (C) ONE SYMMETRICAL 10 GAUGE TRANSITION ELEMENT FROM THRIE BEAM TO "W" BEAM

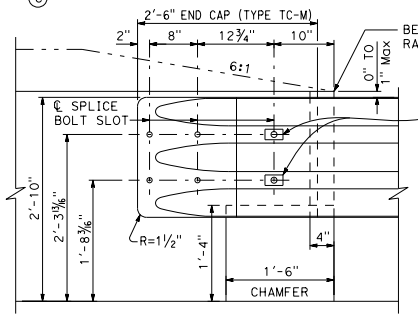


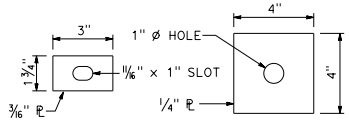

## TRANSITION RAILING (TYPE DOUBLE AGT)




## TRANSITION RAILING (TYPE AGT)




SQUARE WASHERS

### NOTES:

1. Use ⅝" ø button head bolts and hex nuts for connections to posts. No washer on rail face for bolted connections to post.
2. The maximum height of dike is 4" if placed under rail.
3. All 12 splice bolts and nuts are required for rail splices. Splice bolt holes at splices with nested elements may be increased from the standard 29/32" x 1⅛" slot size to 1⅛" ø.
4. The top elevation of bridge rail or wall at connection or blocks shall not project more than 1" above the top elevation of the rail element.
5. Connections to transition railing (Type AGT) will be either standard MGS railing or thrie beam railing as shown here or on Standard Plan A79A2.
6. At Double AGT connection where anchor block or bridge rail width is less than 1'-9", a metal box spacer with a minimum thickness of 1½" or Type B metal plate washers for less than 1½" should be used to complete the width of AGT post and two blocks. Spacers must not be used where snagging is possible from approaching traffic.
7. End cap (Type TC-M) to be installed over 12 gauge thrie beam elements where transition railing is installed on the departure end of bridge railing.
8. Conform standard railing section height to 31" at Post No. T1.
9. Hollow Structural Section (HSS) refers to galvanized metal sleeve.
10. ½" maximum exposed threads.
11. Where AGT is placed on the backside of a curb and sidewalk, the material around the post must be at the level of the sidewalk surface.
12. For Type Double AGT, use Type A washers on the face of both end caps at ⅝" bolted connections.
13. The maximum size of dike is 4" if placed under rail.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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REGISTERED CIVIL ENGINEER

September 19, 2025
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# TRANSITION RAILING (TYPE AGT)

NO SCALE

**A79A1**

7-1-25



Return to Table of Contents

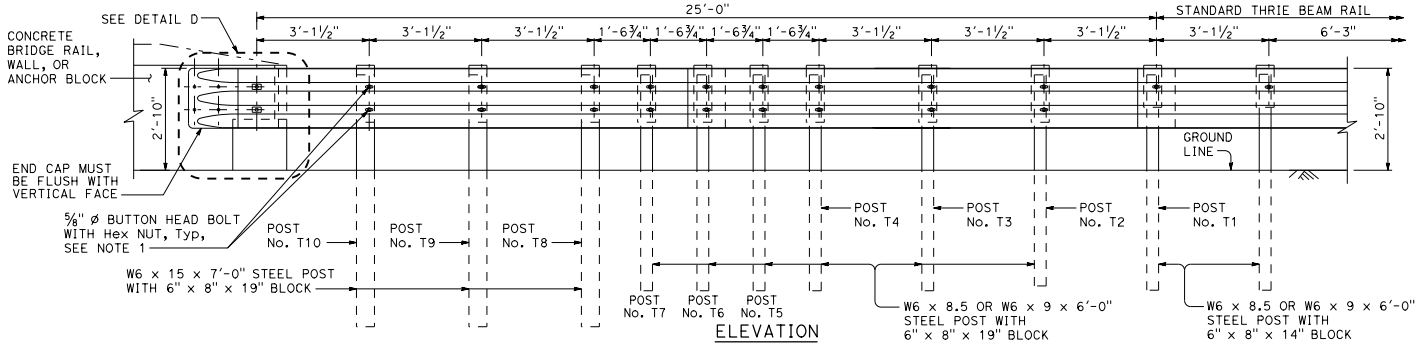
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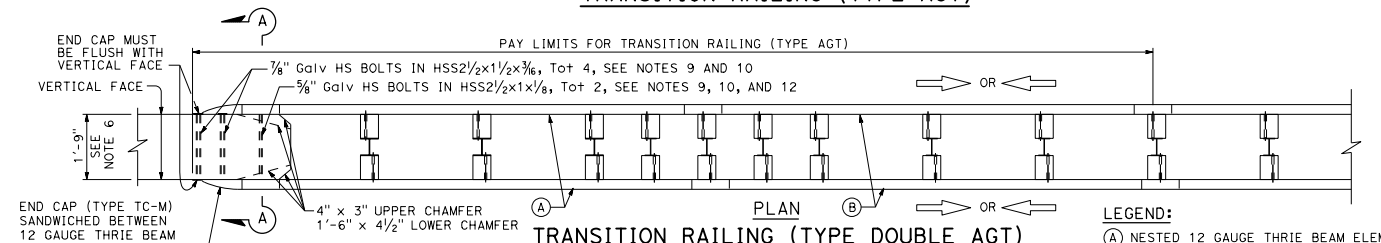
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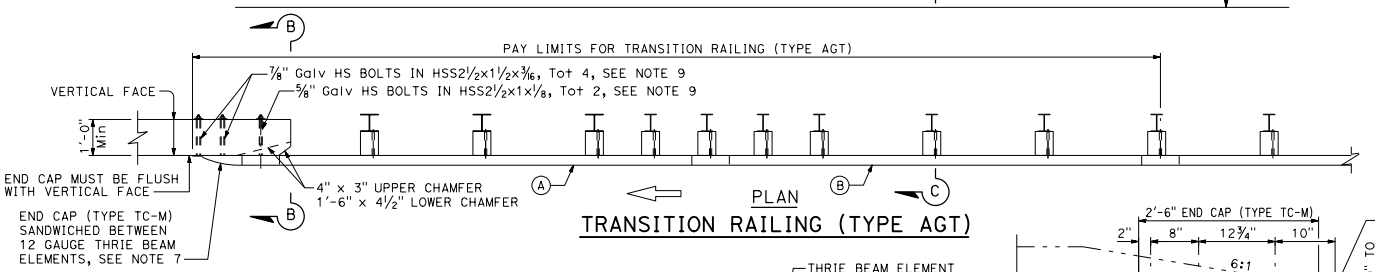

ELEVATION

## TRANSITION RAILING (TYPE AGT)




PLAN

## TRANSITION RAILING (TYPE DOUBLE AGT)



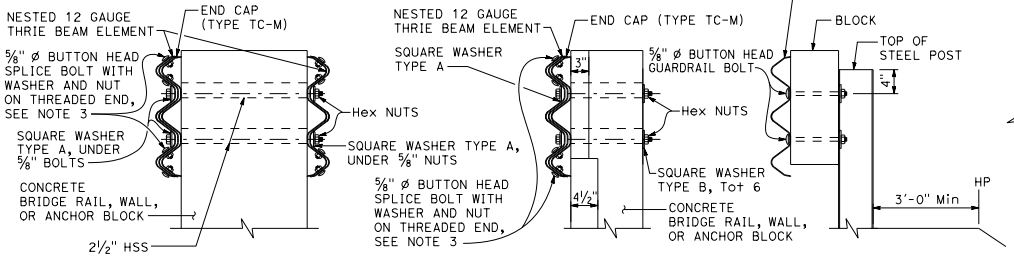

PLAN

## TRANSITION RAILING (TYPE AGT)

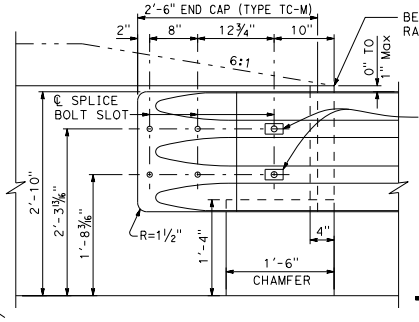
LEGEND:
- (A) NESTED 12 GAUGE THRIE BEAM ELEMENTS
- (B) ONE 12 GAUGE THRIE BEAM ELEMENT

NOTES:

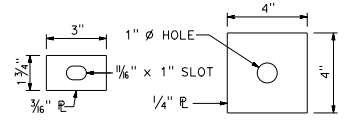
1. Use ⅝" Ø button head bolts and hex nuts for connections to posts. No washer on rail face for bolted connections to post.
2. For Thrie beam details, see Standard Plans A78 series.
3. All 12 splice bolts and nuts are required for rail splices. Splice bolt holes at splices with nested elements may be increased from the standard 29/32" x 1⅛" slot size to 1⅛" Ø.
4. The top elevation of bridge rail or wall at connection or blocks shall not project more than 1" above the top elevation of the rail element.
5. Connections to transition railing (Type AGT) will be either standard railing section of MGS or thrie beam railing as shown here or on Standard Plan A79A1.
6. At Double AGT connection where anchor block or bridge rail width is less than 1'-9", a metal box spacer with a minimum thickness of 1½" or Type B metal plate washers for less than 1½" should be used to complete the width of AGT post and two blocks. Spacers must not be used where snagging is possible from approaching traffic.
7. End cap (Type TC-M) may be installed over 12 gauge thrie beam elements where transition railing is installed on the departure end of bridge railing.
8. For Type Double AGT, use Type A washers on the face of both end caps at ⅝" bolted connections.
9. Hollow Structural Section (HSS) refers to galvanized metal sleeve.
10. ½" maximum exposed threads.
11. The maximum height of dike is 4" if placed under the rail.
12. For Transition Railing (Type AGT) to MGS connection details, see Standard Plan A79A1.




SECTION A-A | SECTION B-B | SECTION C-C
SEE NOTE 11




DETAIL D




SQUARE WASHERS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRANSITION RAILING (TYPE AGT) TO THRIE BEAM BARRIER (TYPE M)

NO SCALE

**A79A2**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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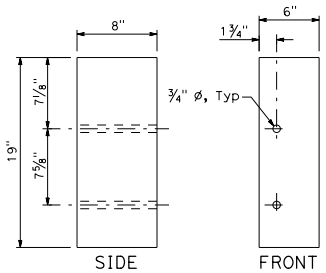
Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

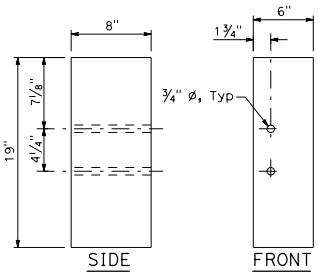
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

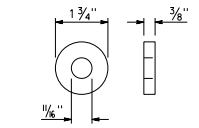
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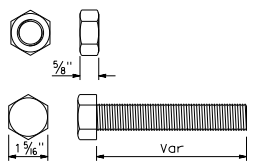

TRANSITION BLOCK
AT POST No. T3 THRU T10



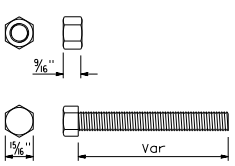

TRANSITION BLOCK
AT POST No. T2
For transition to MGS only



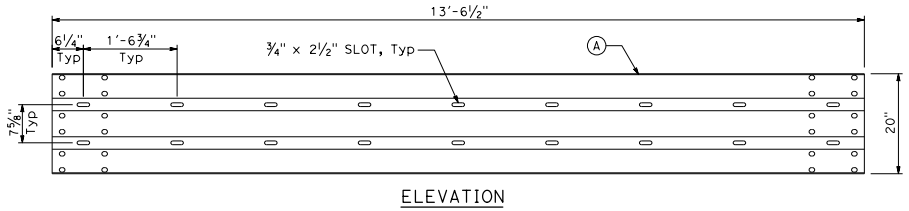

⅝" WASHER FOR
BUTTON HEAD BOLT
AT NESTED SPLICES

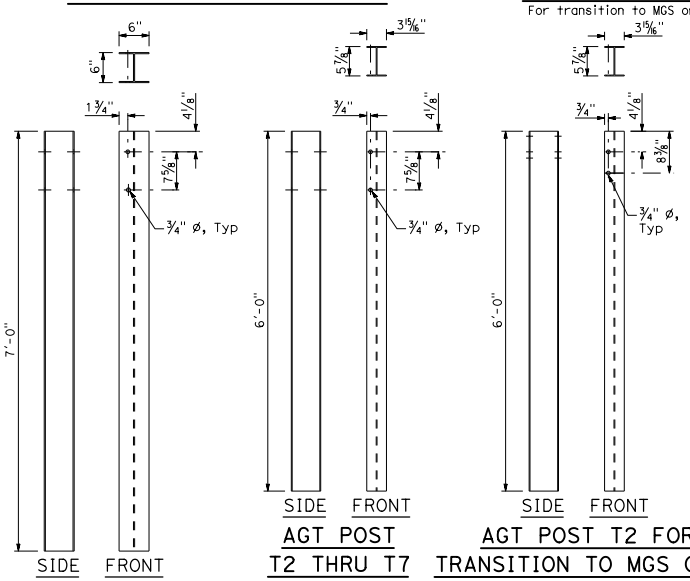



⅞" ø Galv HS Hex HEAD
BOLT AND NUT




⅝" ø Galv HS Hex HEAD
BOLT AND NUT

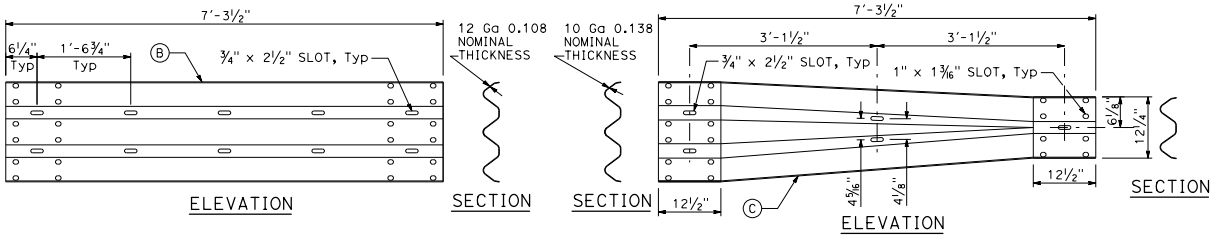


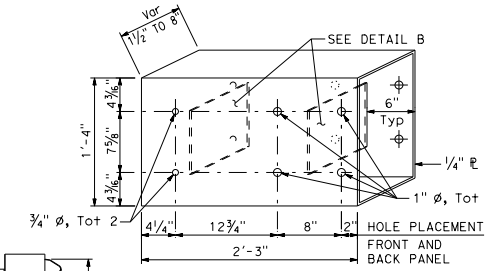




AGT POST
T8 THRU T10

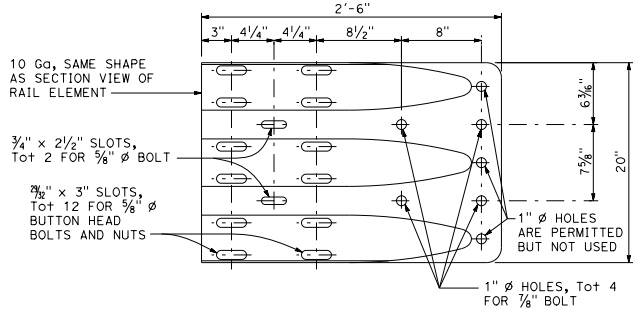
AGT POST
T2 THRU T7

AGT POST T2 FOR
TRANSITION TO MGS ONLY
See Standard Plan A79A1 for details.

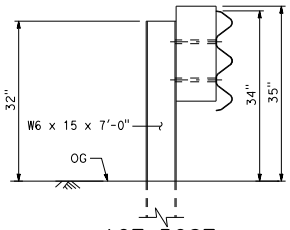


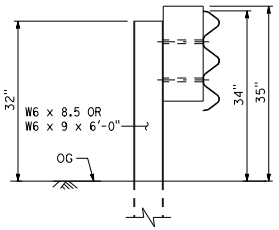

DETAIL A



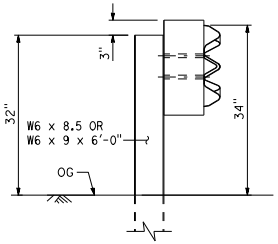

END CAP (TYPE TC-M)



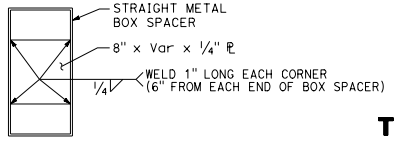

AGT POST
T8 THRU T10




AGT POST T3 THRU T7
For AGT transition to MGS, AGT Posts T3 thru T7.
For AGT transition to Thrie Beam, AGT posts T1 thru T7.




AGT POST T2
For AGT transition to MGS




DETAIL B
STRAIGHT METAL BOX SPACER

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRANSITION RAILING (TYPE AGT) DETAILS

NO SCALE

A79A3

7-1-25



Return to Table of Contents

NOTES:

1. Additional details of posts, blocks and hardware are shown on Standard Plan A79A3.
2. For additional details of Transition Railing (Type AGT), see Standard Plans A79A1 and A79A2.
3. For typical use of Connection Detail AA, see Layout Types 12A and 12B on Standard Plan A77Q1, Layout Types 12C and 12D on Standard Plan A77Q2, and Layout Type 12E on Standard Plan A77Q3. Layout Types 12AA and 12BB on Standard Plan A77Q4 and Layout Type 12CC on Standard Plan A77Q5.
4. For typical use of Connection Detail BB, see Layout Type 12D (Structure Departure Railing Connection) on Standard Plan A77Q2 and Layout Type 12DD on Standard Plan A77Q5.
5. Typical use of Connection Detail CC is for use with thrie beam at structure departure where AGT connection is not needed. For AGT connection at structure departure, see Connection Detail HH on Standard Plan A79B2.
6. Where the height of the railing at the structure connection exceeds the height of the thrie beam railing by more than 1" at Connection Detail AA or Detail CC, taper the top of the end of the concrete railing at 6:1 to be within 1" of the top elevation of the thrie beam rail.
7. Taper top of AGT anchor block to 5'-0" high at approach to structure walls and columns, see Standard Plan A79C1.
8. For details of End Cap (Type TC-M), see Standard Plan A79A3.
9. If not able to place Plate B due to connection to wall or abutment, drill 1" Ø hole 9" deep and bond with epoxy anchors, see Standard Plan A79C2.
10. Hollow Structural Section (HSS) refers to a galvanized metal sleeve.
11. On conventional highways, when trailing end of structure is within 20'-0" of the center line of opposing traffic or 30'-0" for undivided expressways, place transition railing (Type AGT) for opposing direction of traffic. See Standard Plan A79A1.

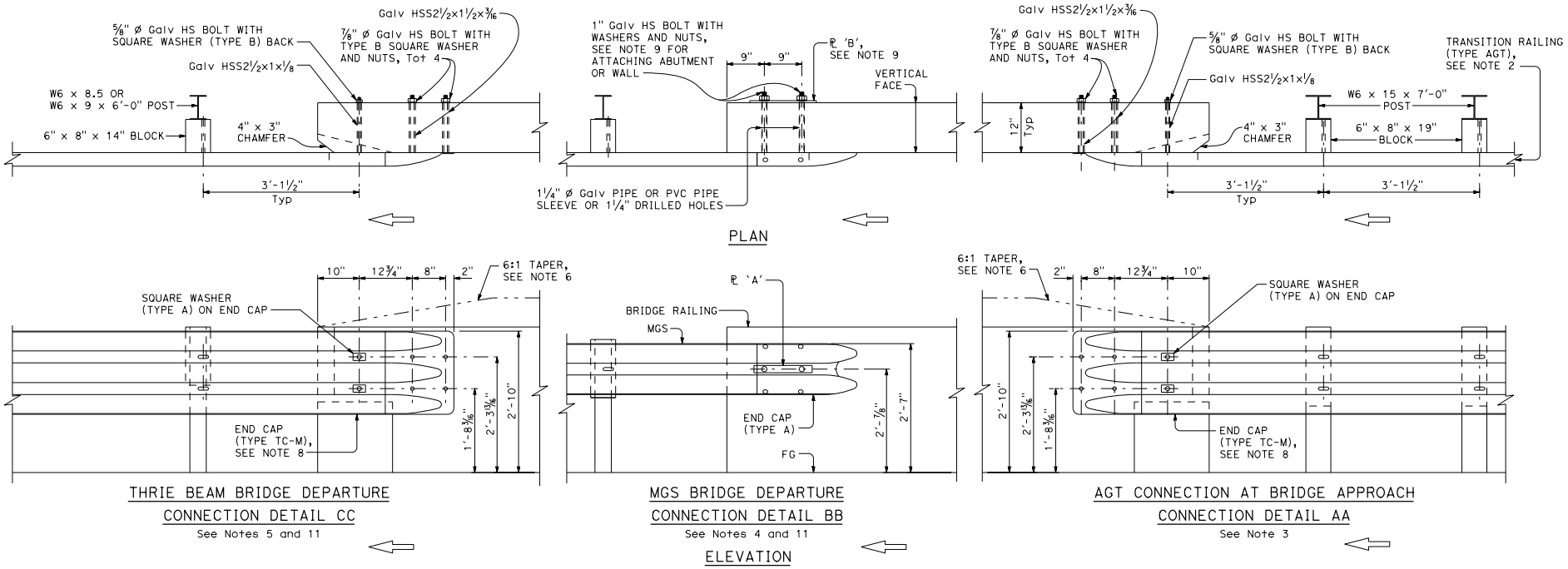
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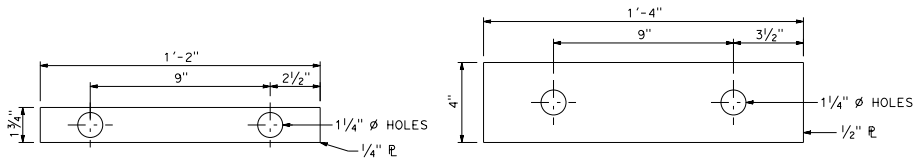
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## MIDWEST GUARDRAIL SYSTEM CONNECTION TO BRIDGE RAILING ABUTMENT OR WALL




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRANSITION RAILING (TYPE AGT) TO BRIDGE RAILINGS WITHOUT SIDEWALKS

NO SCALE

**A79B1**

7-1-25

2025 STANDARD PLAN A79B1



Return to Table of Contents

NOTES:

1. For typical use of AGT Connection Detail FF, see Layout Types 12A-12E on Standard Plans A77Q1 thru A77Q3, and Layout Types 12AA thru 12CC on Standard Plans A77Q4 and A77Q5.
2. For typical use of MGS Bridge Departure Connection Detail GG, see Layout Type 12D on Standard Plan A77Q2 and Layout Type DD on Standard Plan A77Q5.
3. For typical use of Connection Detail HH, where AGT is at departure end of Bridge or Structure, see Layout Types 12AA thru 12CC on Standard Plans A77Q4 and A77Q5.
4. Where the bridge sidewalk is not continued beyond the end of the bridge railing, the sidewalk shall be transitioned down from the sidewalk elevation on the bridge to the roadway elevation at a constant rate for the entire length of the AGT, not to exceed 8.33 percent.
5. If not able to place through bolts due to connection to wall or abutment, drill 1⅛" ø hole 9" deep and bond with epoxy anchors.
6. For sidewalk width 6'-0" or greater, rail height is measured from top of sidewalk.
7. For sidewalk width less than 6'-0", rail height is measured from roadway surface.
8. Hollow Structural Section (HSS) refers to a galvanized metal sleeve.
9. Height of curb is 6" maximum for posted speed greater than 45 MPH.
10. Height of curb may be greater than 6" for posted speed 45 MPH or less.
11. Where the height of the railing at the structure connection exceeds the height of the thrie beam railing by more than 1" at Connection Detail AA or Detail CC, taper the top of the end of the concrete railing at 6:1 to be within 1" of the top elevation of the thrie beam rail.

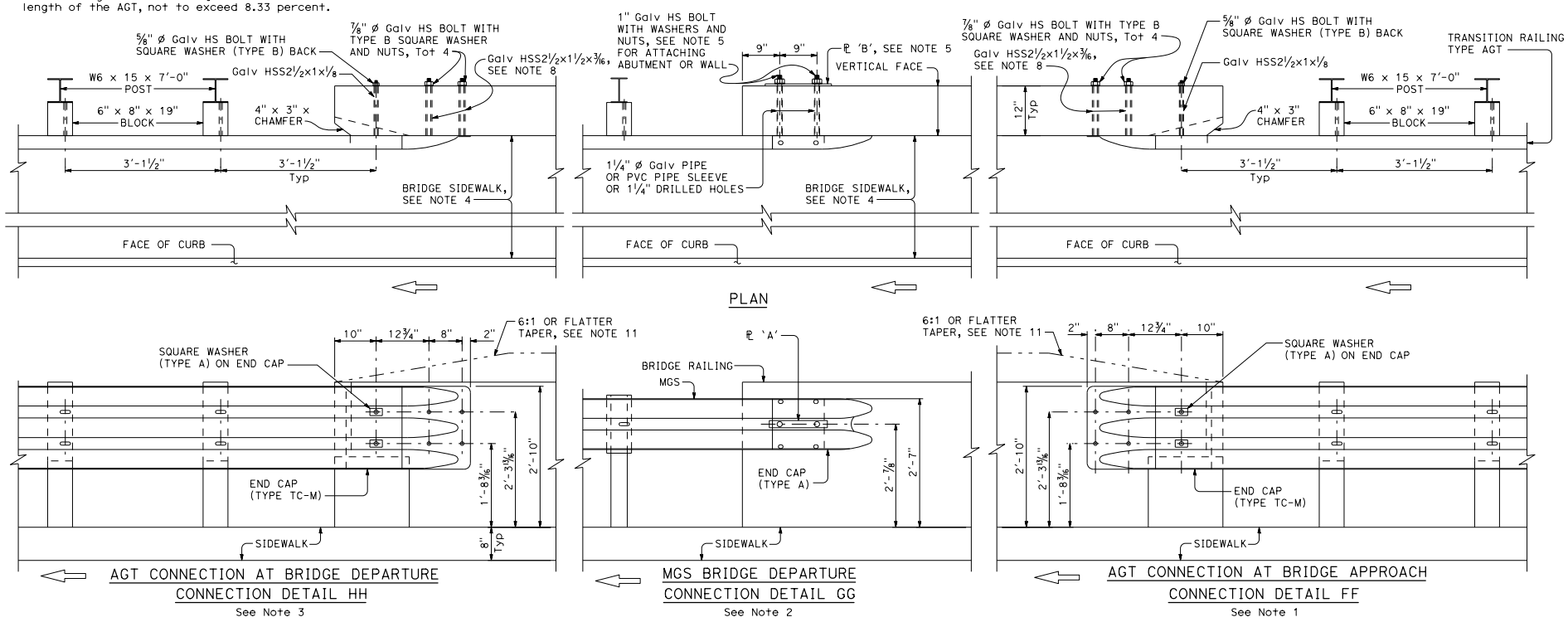
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REGISTERED CIVIL ENGINEER

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## MIDWEST GUARDRAIL SYSTEM CONNECTION TO BRIDGE RAILING WITH SIDEWALKS

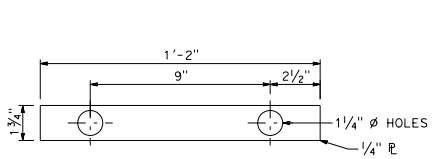



PLATE 'A'

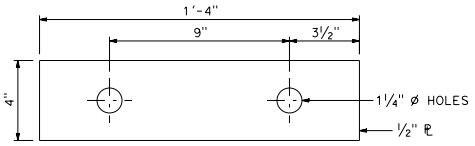
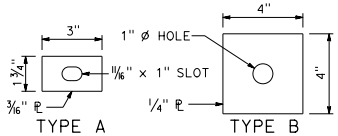



PLATE 'B'
For backside of connection BB




SQUARE WASHERS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRANSITION RAILING (TYPE AGT) TO BRIDGE RAILINGS WITH SIDEWALKS

NO SCALE

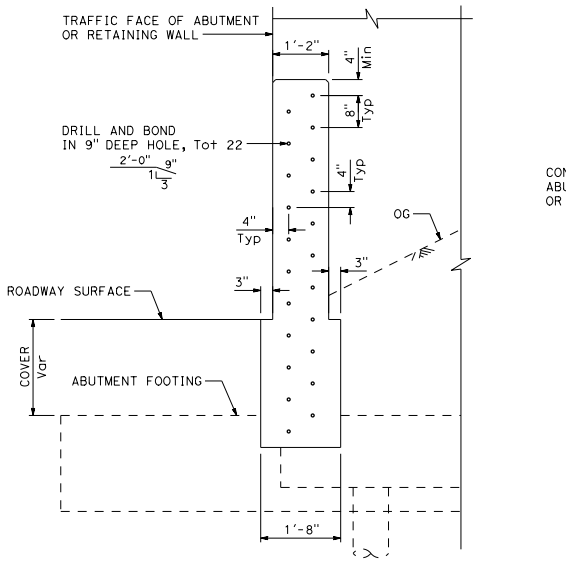
A79B2

7-1-25

2025 STANDARD PLAN A79B2

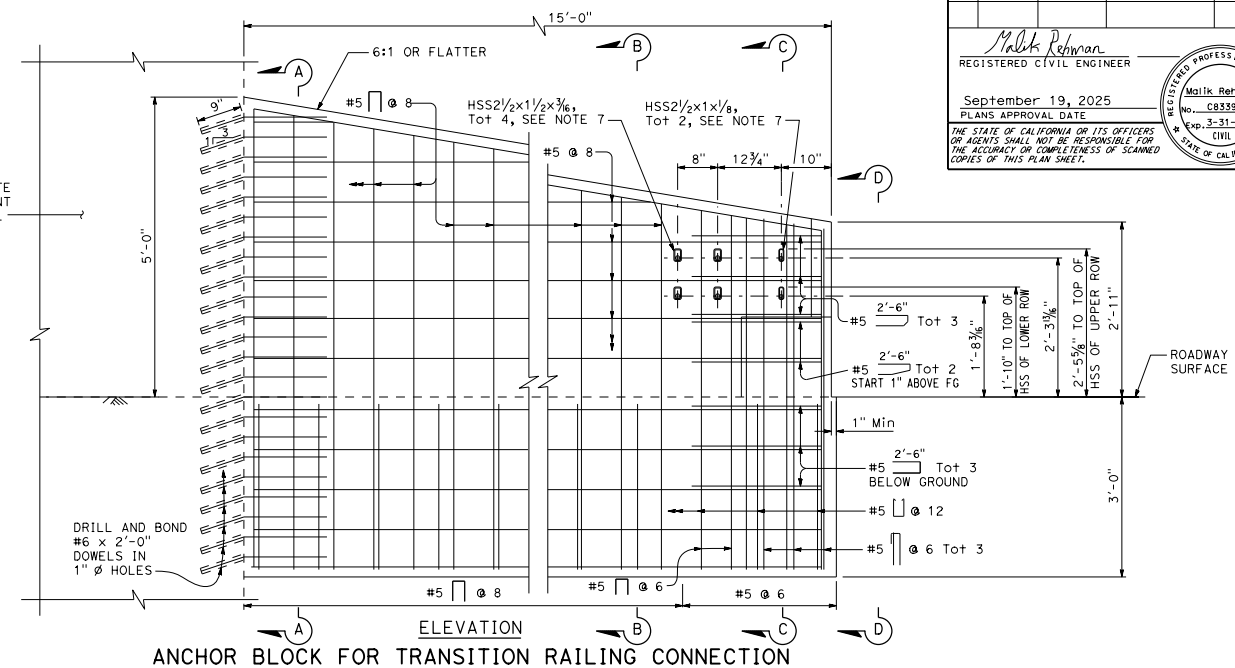


Return to Table of Contents



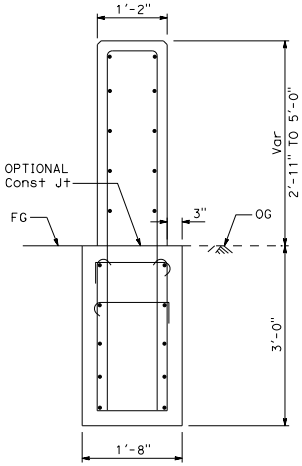

SECTION A-A

Existing Seat type or Diaphragm Abutment and Retaining Wall.



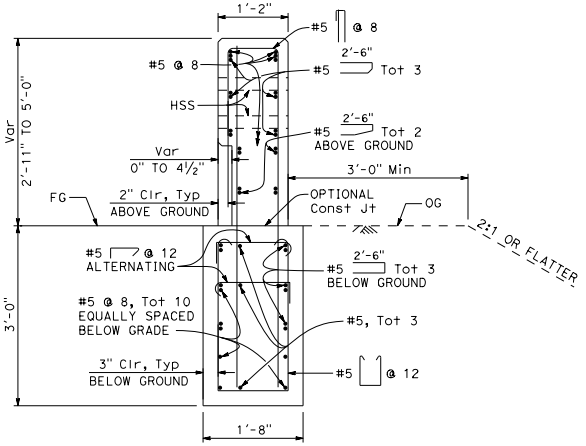

ELEVATION

## ANCHOR BLOCK FOR TRANSITION RAILING CONNECTION




SECTION B-B

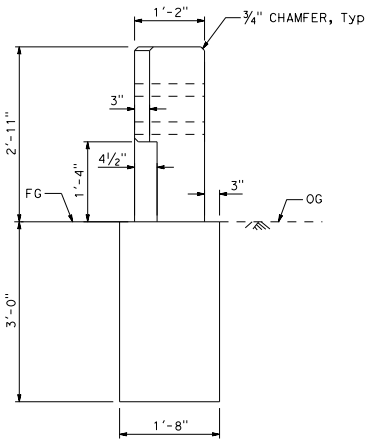
For reinforcement not shown, see Section C-C.




SECTION C-C

Thrie beam not shown.

DETAIL C




VIEW D-D

NOTES:

1. These connection details apply to abutments and walls.
2. Additional details of posts, blocks and hardware are shown on Standard Plan A79A3.
3. For additional details of Transition Railing (Type AGT), see Standard Plans A79A1 and A79A2.
4. End Cap (Type TC-M) must be flush with the finished surface.
5. Hollow Structural Section (HSS) refers to a galvanized metal sleeve.
6. Doweling not required in seat type abutment below the top of the seat.
7. Adjust reinforcement as needed to clear HSS by minimum 1".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRANSITION RAILING (TYPE AGT) CONNECTIONS TO ABUTMENTS AND WALLS

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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A79C1

7-1-25





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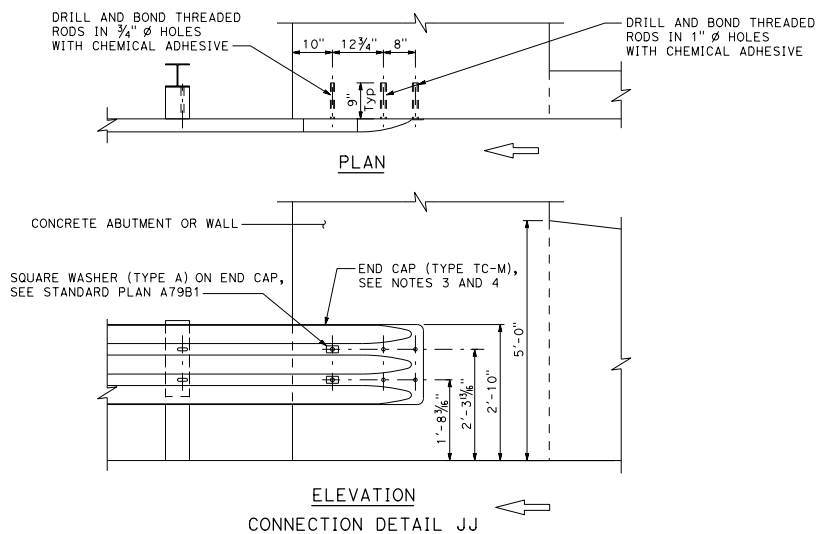
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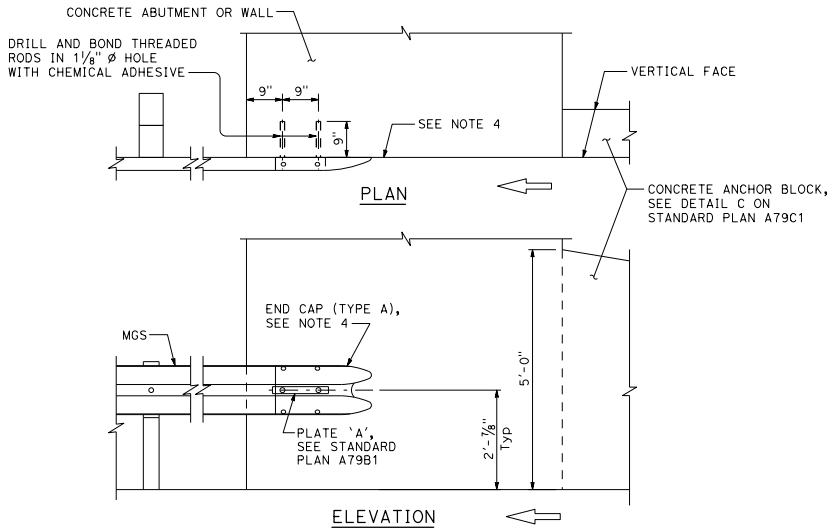
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CONNECTION DETAIL JJ

## SINGLE THRIE BEAM BARRIER CONNECTION TO ABUTMENT OR WALL

See Note 5




CONNECTION DETAIL KK

See Note 6

## MIDWEST GUARDRAIL SYSTEM CONNECTION TO ABUTMENT OR WALL

NOTES:

1. These connection details apply to concrete abutments and walls.
2. For additional details of Transition Railing (Type AGT), see Standard Plans A79A1 and A79A2.
3. For details of End Cap (Type TC-M), see Standard Plan A79A3.
4. End Cap (Type A or Type TC-M) must be flush with the finished surface.
5. Typical use of Detail JJ, Single Thrie Beam Connection to Abutment or Wall is for use with thrie beam at structure departure where AGT connection is not needed.
6. For typical use of Connection Detail KK, at structure departure, see Layout Type 12D on Standard Plan A77Q2 and Layout Type 12DD on Standard Plan A77Q5.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DEPARTING TRANSITION CONNECTIONS TO ABUTMENTS AND WALLS

NO SCALE

A79C2

7-1-25



Return to Table of Contents

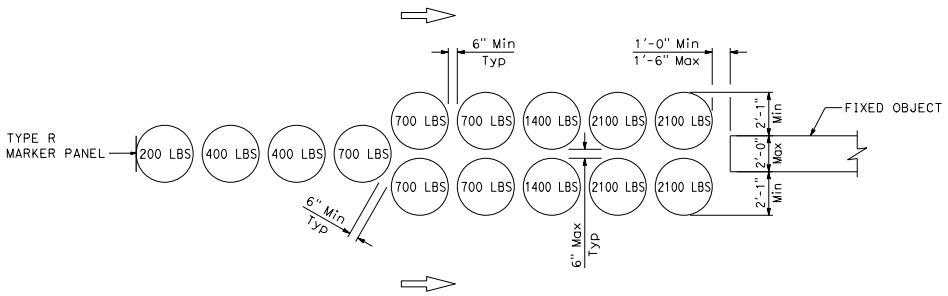
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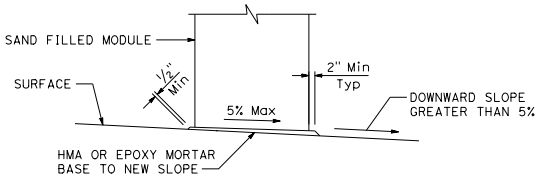



## ARRAY 'U14M'

Approach speed 45 mph or more

NOTES:

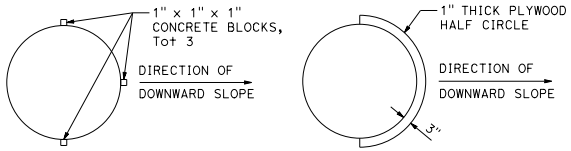
1. (xxx) Indicates module layout and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the modules.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. Modules shall be placed on hot mix asphalt, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
4. Weight of sand and outline of each module shall be painted on the surface at each module location.
5. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
6. Approach speeds indicated conform to MASH criteria.




ELEVATION

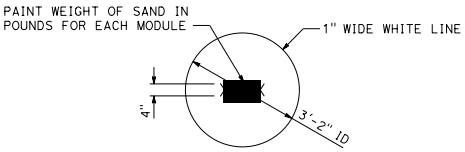
## SLOPED SEAT DETAIL

See Note 3



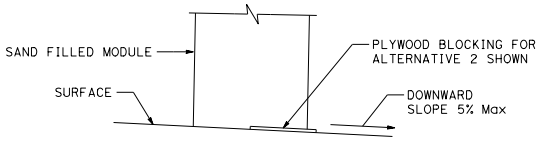

ALTERNATIVE 1 ALTERNATIVE 2

PLAN




## PAINTING DETAIL

See Note 4




ELEVATION

## BRIDGE DECK MODULE BLOCKING DETAILS

See Note 5

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

**A81A**

7-1-25

2025 STANDARD PLAN A81A



Return to Table of Contents

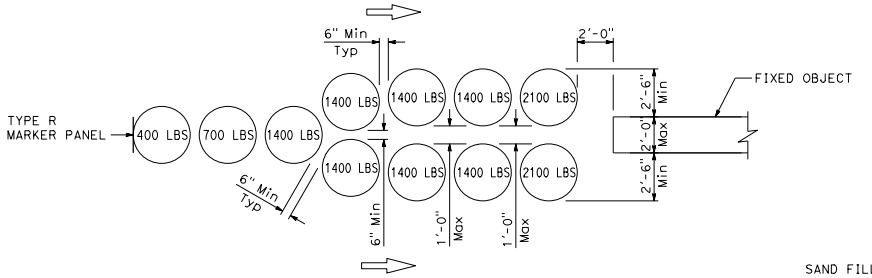
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

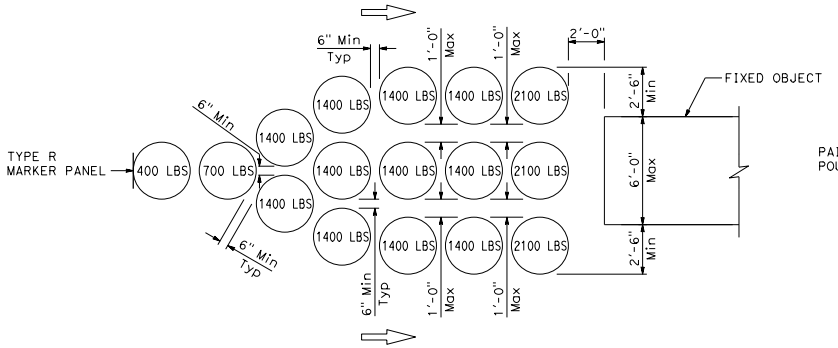
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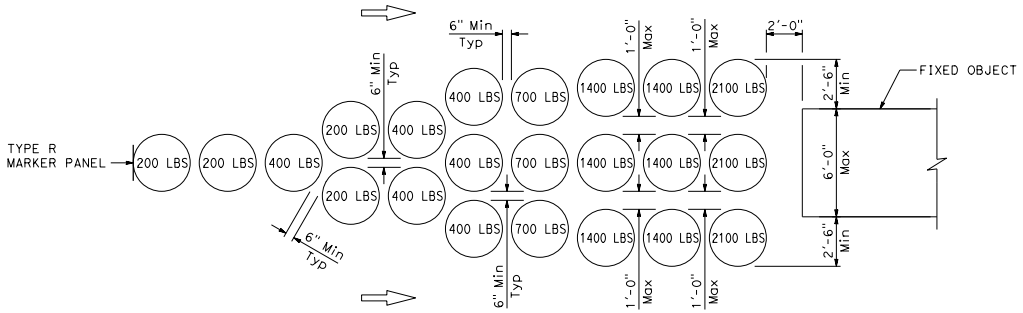

## ARRAY 'U11'

Approach speed less than 45 mph



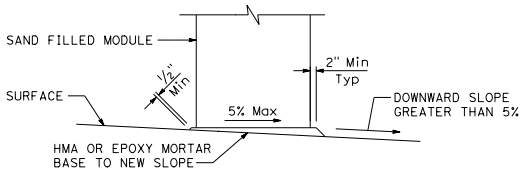

## ARRAY 'U16'

Approach speed less than 45 mph




## ARRAY 'U22'

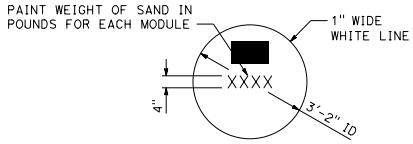
Approach speed 45 mph or more




ELEVATION

## SLOPED SEAT DETAIL

See Note 3

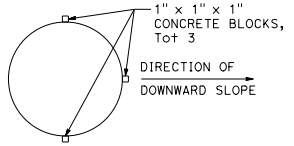



## PAINTING DETAIL

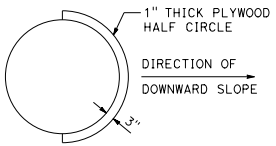
See Note 4

NOTES:

1. (XXX) Indicates module layout and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the modules.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. Modules shall be placed on hot mix asphalt, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
4. Weight of sand and outline of each module shall be painted on the surface at each module location.
5. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
6. Approach speeds indicated conform to NCHRP Report 350 criteria.

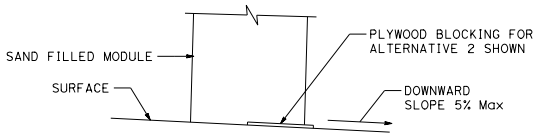



ALTERNATIVE 1




ALTERNATIVE 2

PLAN




ELEVATION

## BRIDGE DECK MODULE BLOCKING DETAILS

See Note 5

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

A81B

7-1-25



Return to Table of Contents

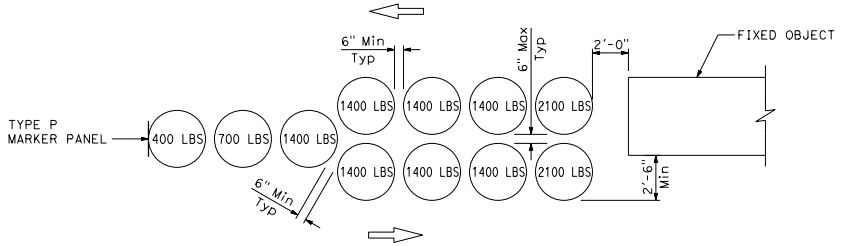
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

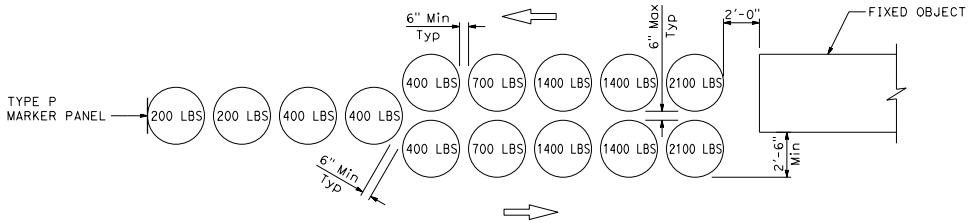
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ARRAY 'B11'

Approach speed less than 45 mph

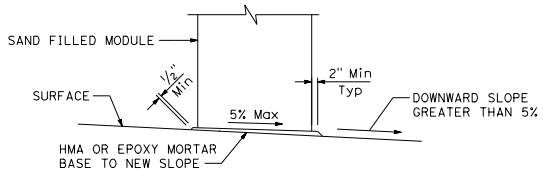



ARRAY 'B14'

Approach speed 45 mph or more

NOTES:

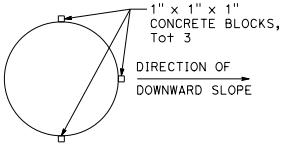
1. (xxx) Indicates module layout and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the modules.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. Bidirectional crash cushion arrays may be angled toward approaching traffic. Amount of angle not to exceed 10 degrees.
4. Modules shall be placed on hot mix asphalt, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
5. Weight of sand and outline of each module shall be painted on the surface at each module location.
6. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
7. Approach speeds indicated conform to NCHRP Report 350 criteria.



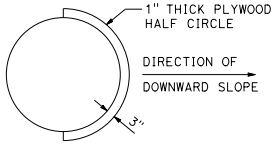

ELEVATION

SLOPED SEAT DETAIL

See Note 4

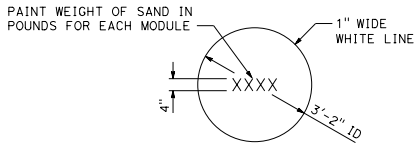



ALTERNATIVE 1



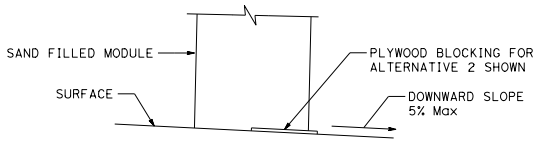

ALTERNATIVE 2

PLAN




PAINTING DETAIL

See Note 5




ELEVATION

BRIDGE DECK MODULE BLOCKING DETAILS

See Note 6

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CRASH CUSHION, SAND FILLED (BIDIRECTIONAL)

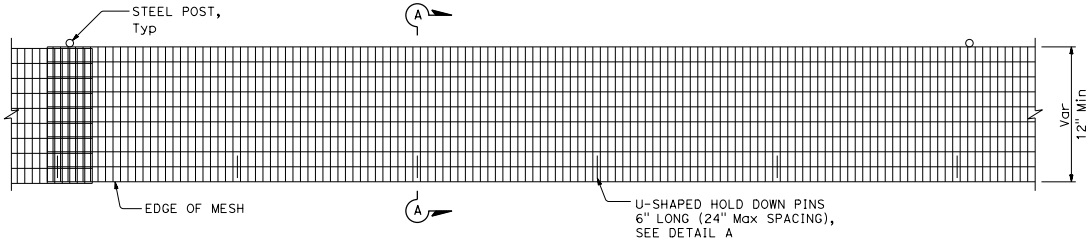
NO SCALE

A81C

7-1-25

2025 STANDARD PLAN A81C

Return to Table of Contents




PLAN VIEW

NOTES:

1. Exact locations for temporary desert tortoise fence are shown on the plans.
2. Horizontal portion of hardware cloth must be on habitat side of posts.

LEGEND:

DESERT TORTOISE HABITAT

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

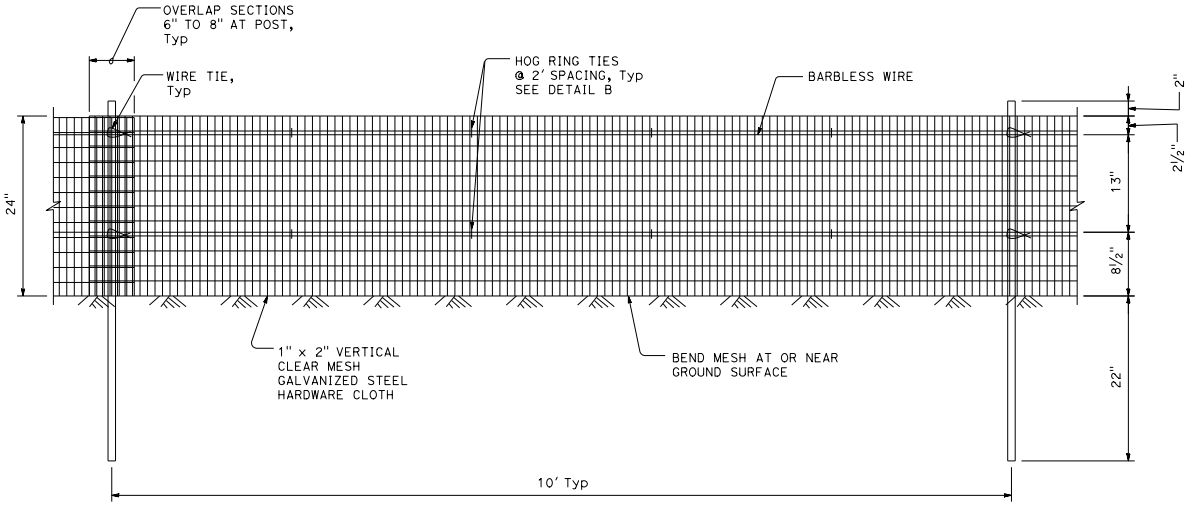
September 19, 2025

PLANS APPROVAL DATE

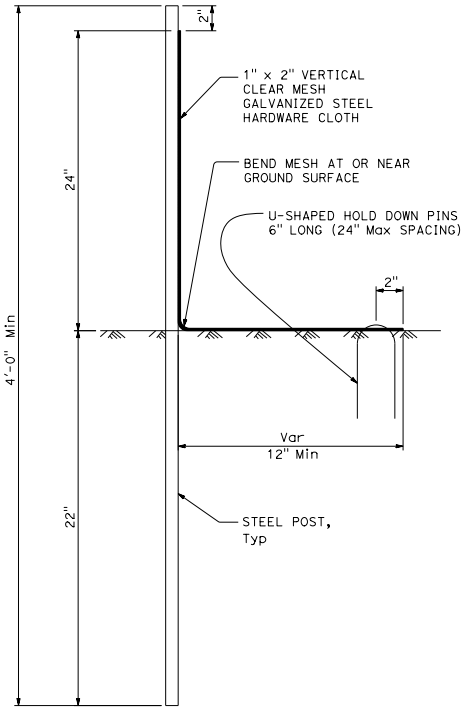
M. Reza Valizadeh No. C51902 Exp. 6-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

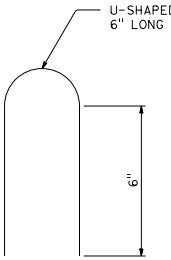
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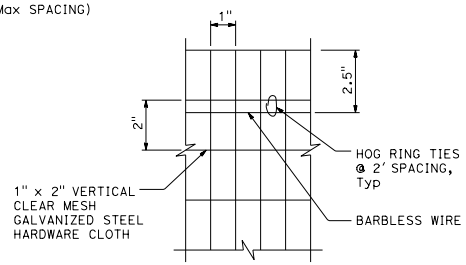

FRONT VIEW



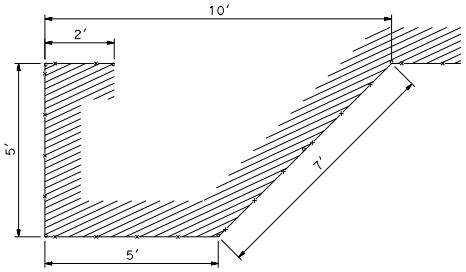

SECTION A-A




DETAIL A




DETAIL B




REDIRECTIONAL CONFIGURATION PLAN VIEW

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY DESERT TORTOISE FENCE

NO SCALE

A84A

7-1-25

2025 STANDARD PLAN A84A



Return to Table of Contents

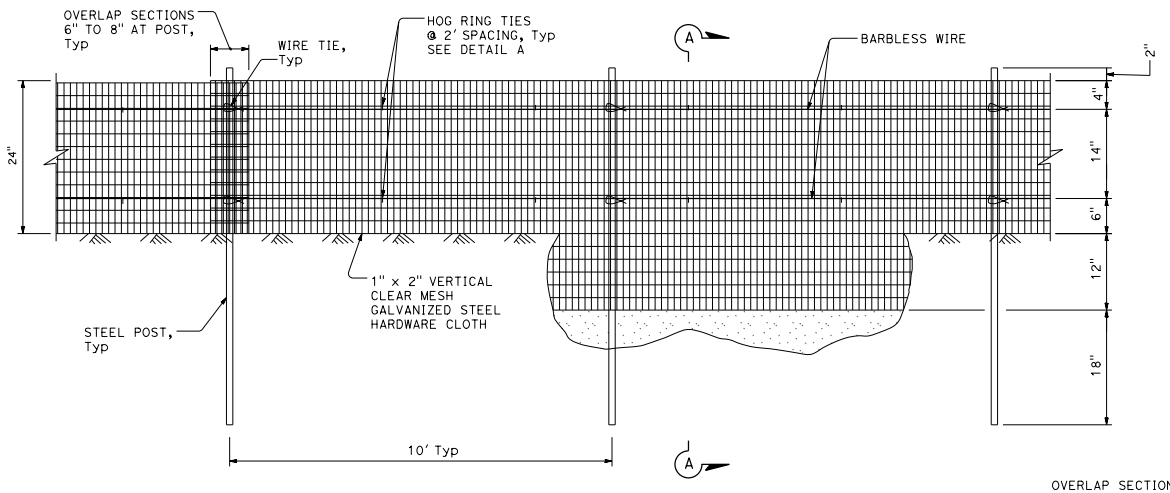
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|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

M. Reza Vallzadeh
No. C51902
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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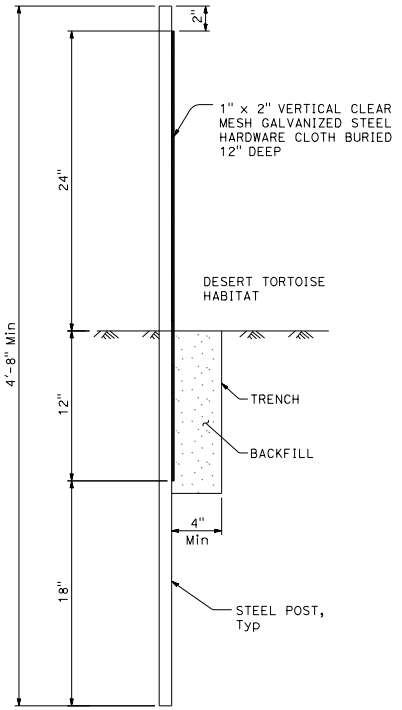



FRONT VIEW

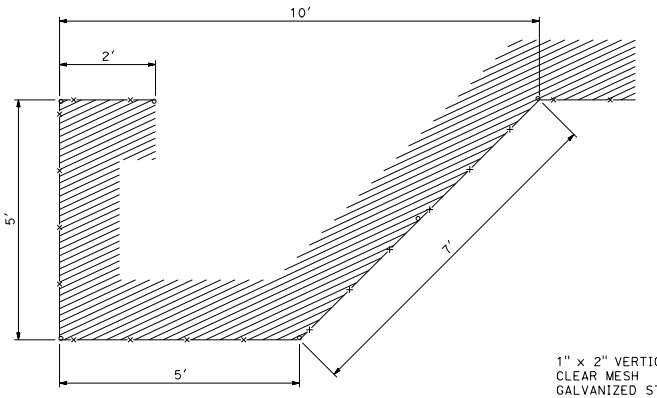
NOTE:
1. Exact locations for desert tortoise fence are shown on the plans.

LEGEND:

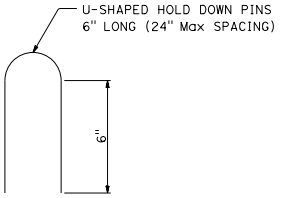
DESERT TORTOISE HABITAT



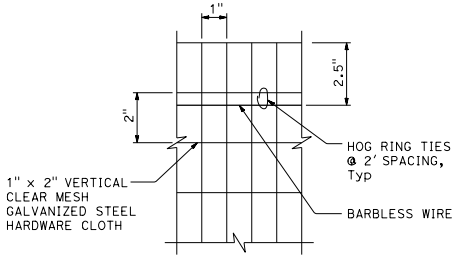

SECTION A-A



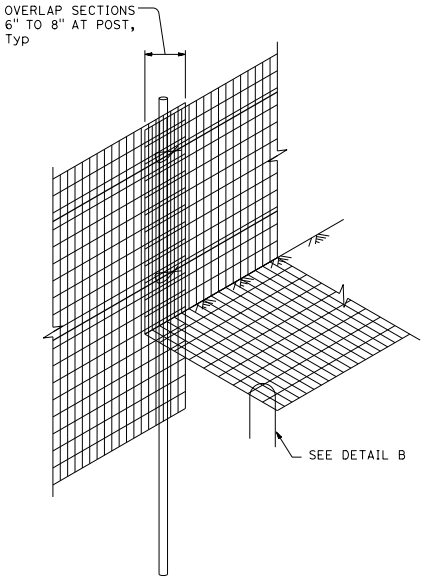

REDIRECTIONAL CONFIGURATION PLAN VIEW




DETAIL B




DETAIL A




FENCE TRANSITION FOR BEDROCK OR CALICHE SUBSTRATE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DESERT TORTOISE FENCE

NO SCALE

**A84B**

7-1-25

**2025 STANDARD PLAN A84B**

Return to Table of Contents

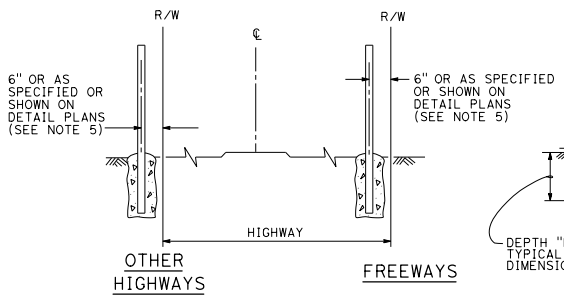
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| | | | | | |

B. Vallzadeh
REGISTERED CIVIL ENGINEER

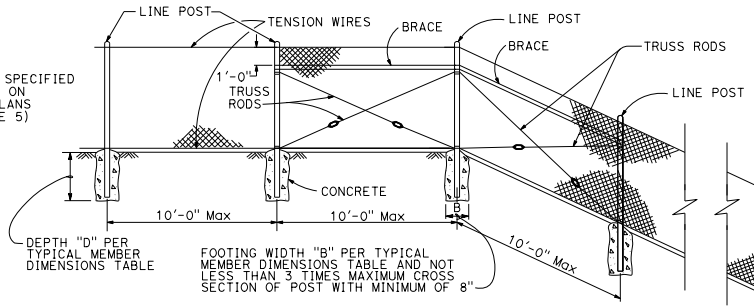
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — M. Reza Vallzadeh — No. C51902 — Exp. 6-30-26 CIVIL — STATE OF CALIFORNIA

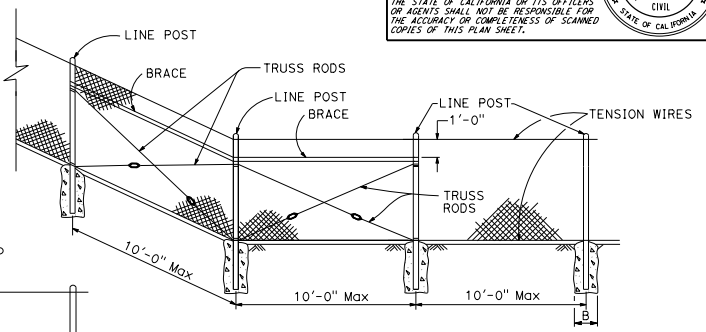
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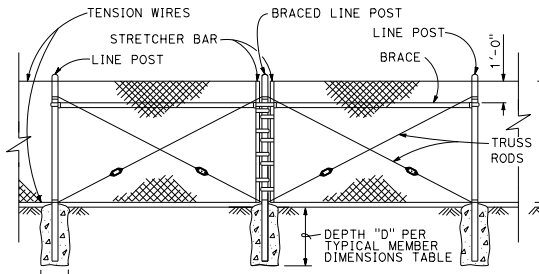



## FENCE LOCATION



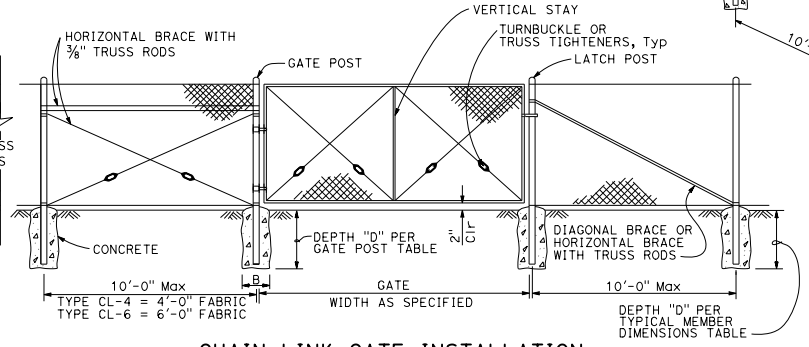

## CHAIN LINK FENCE ON SHARP BREAK IN GRADE




## BRACED LINE POST INSTALLATION

Braced line post at intervals not exceeding 1000'



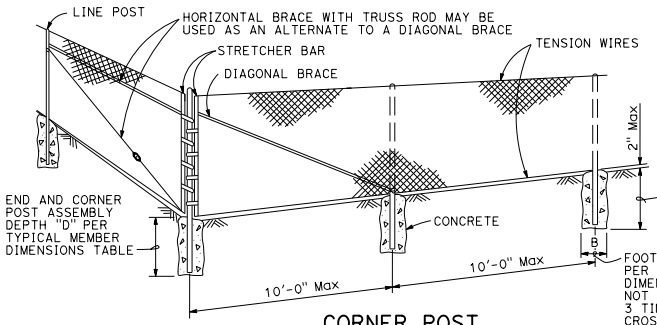

## CHAIN LINK GATE INSTALLATION

Maximum Gate Width is 12'-0"
Vertical Stay is required in middle of gate greater than 8'-0" in width.

### GATE POST

| FENCE HEIGHT (Max) | SLATTED | B (in) | D (ft) | ROUND PIPE | | |
|---|---|---|---|---|---|---|
| | | | | ROUND OD PIPE | GROUP 1A WEIGHT (lb/ft) | GROUP 1C WEIGHT (lb/ft) |
| 5'-0" | NO | 12" | 2'-6" | 3.50" | 7.58 | 5.71 |
| 6'-0" | NO | 12" | 2'-6" | 3.50" | 7.58 | 5.71 |
| 8'-0" | NO | 12" | 3'-0" | 3.50" | 7.58 | 5.71 |
| 10'-0" | NO | 14" | 3'-6" | 3.50" | 7.58 | 5.71 |
| 5'-0" | YES | 12" | 3'-0" | 4.00" | 9.12 | 6.56 |
| 6'-0" | YES | 14" | 3'-6" | 4.50" | 10.80 | - |
| 8'-0" | YES | 18" | 3'-6" | 5.56" | 14.60 | - |
| 10'-0" | YES | 20" | 4'-0" | 6.63" | 19.00 | - |

Above post dimensions and weights are minimums.
Larger sizes may be used upon approval.




## CORNER POST

### TYPICAL MEMBER DIMENSIONS (See Notes)

| FENCE HEIGHT (Max) | SLATTED | B (in) | D (ft) | LINE POSTS | | | | | BRACES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ROUND PIPE | | | ROLL FORMED | | ROUND PIPE | | | ROLL FORMED | |
| | | | | ROUND OD PIPE | GROUP 1A WEIGHT (lb/ft) | GROUP 1C WEIGHT (lb/ft) | SECTION | WEIGHT (lb/ft) | ROUND OD PIPE | GROUP 1A WEIGHT (lb/ft) | GROUP 1C WEIGHT (lb/ft) | SECTION | WEIGHT (lb/ft) |
| 5'-0" | NO | 8" | 2'-6" | 1.90" | 2.72 | 2.28 | 1.875" x 1.625" | 1.85 | 1.90" | 2.72 | 2.28 | 1.625" x 1.250" | 1.35 |
| 6'-0" | NO | 10" | 2'-6" | 2.38" | 3.66 | 3.12 | 1.875" x 1.625" | 2.40 | 2.38" | 3.66 | 3.12 | 1.625" x 1.250" | 1.35 |
| 8'-0" | NO | 12" | 3'-0" | 2.88" | 5.80 | 4.64 | 3.250" x 2.500" | 4.50 | 2.38" | 3.66 | 3.12 | 1.625" x 1.250" | 1.35 |
| 10'-0" | NO | 14" | 3'-6" | 3.50" | 7.58 | 5.71 | 3.250" x 2.500" | 4.50 | 2.88" | 5.80 | 4.64 | 1.625" x 1.250" | 1.35 |
| 5'-0" | YES | 12" | 3'-0" | 4.00" | 9.12 | 6.56 | N/A | - | 2.38" | 3.66 | 3.12 | N/A | - |
| 6'-0" | YES | 14" | 3'-0" | 4.50" | 10.80 | - | N/A | - | 2.38" | 3.66 | 3.12 | N/A | - |
| 8'-0" | YES | 18" | 3'-6" | 5.56" | 14.60 | - | N/A | - | 2.38" | 3.66 | 3.12 | N/A | - |
| 10'-0" | YES | 20" | 4'-0" | 6.63" | 19.00 | - | N/A | - | 2.88" | 5.80 | 4.64 | N/A | - |

NOTES:

1. The table to the right shows minimum sized posts and braces complying with the specifications. Larger or heavier post and brace sizes may be used upon approval.
2. Sections shown in the tables must also comply with the strength requirements and other provisions of the Specifications.
3. Other sections which comply with the strength requirements and other provisions of the Specifications may be used upon approval.
4. Options exercised shall be uniform on any one project.
5. Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.
6. See Standard Plan A85B for Brace, Stretcher Bar, and Truss Tightener Details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CHAIN LINK FENCE

NO SCALE

A85

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

M. Reza Valizadeh
No. C51902
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

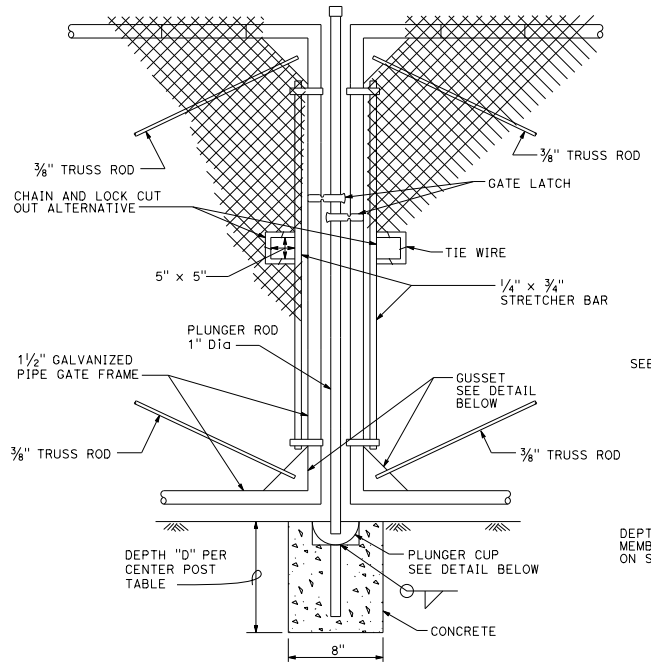
September 19, 2025
PLANS APPROVAL DATE

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NOTES:

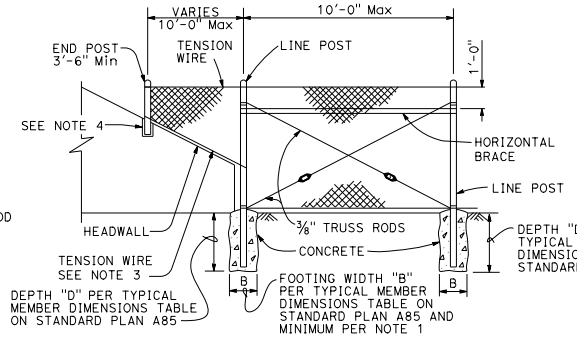
1. B is not less than 3 times maximum cross section of post with minimum of 8".
2. See Standard Plan A85 for chain link fencing dimensions.
3. See Detail A on Standard Plan A86B for connection at headwall.
4. See Detail D on Standard Plan A86B for connection at headwall.

| CENTER POST | | |
|---|---|---|
| FENCE HEIGHT (Max) | SLATTED | D |
| ALL HEIGHTS | NO | 1'-6" |
| 5'-0" | YES | 3'-0" |
| 6'-0" | YES | 3'-0" |
| 8'-0" | YES | 3'-6" |
| 10'-0" | YES | 4'-0" |

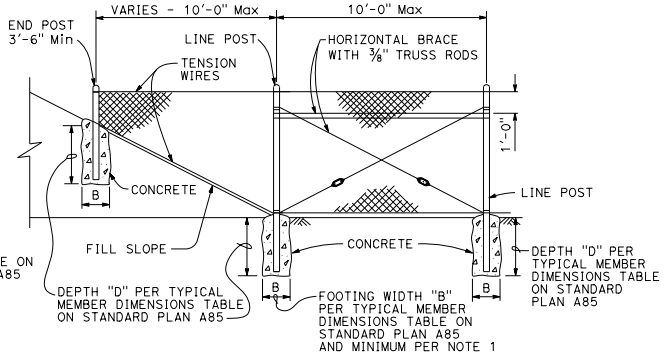



## DOUBLE GATE REMOVABLE CENTER POST

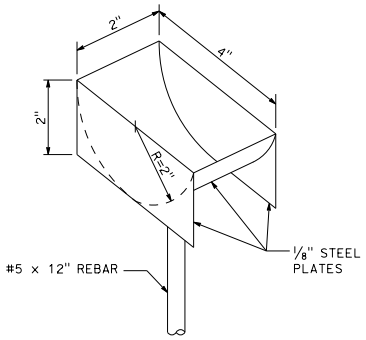
Each gate maximum width is 12'-0"



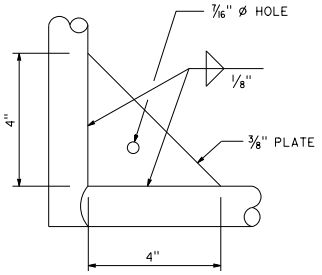

## METHOD OF TYING FENCE TO HEADWALL



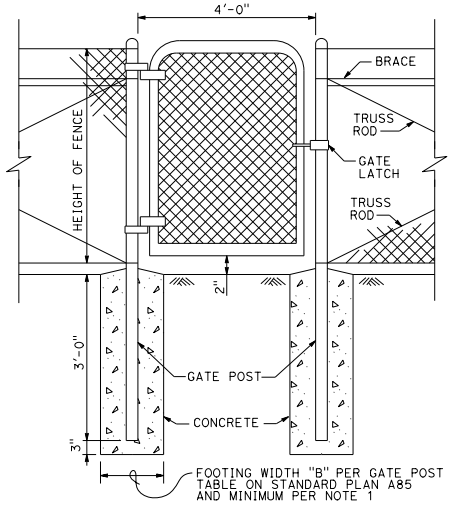

## METHOD OF ERECTING FENCE FOR FILL SLOPE



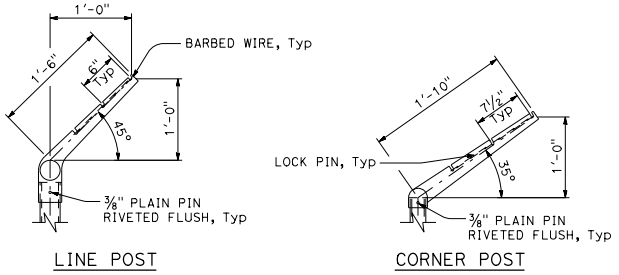

## PLUNGER CUP DETAIL




## GUSSET DETAIL




## WALK GATE




## BARBED WIRE POST TOP

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CHAIN LINK FENCE DETAILS

NO SCALE

A85A

7-1-25



Return to Table of Contents

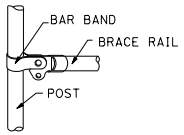
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|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

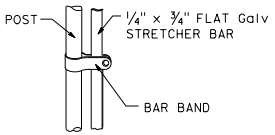
M. Reza Valizadeh No. C51902 Exp. 6-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

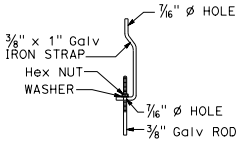
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BRACE RAIL



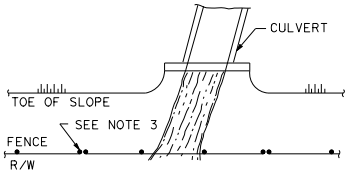

STRETCHER BAR



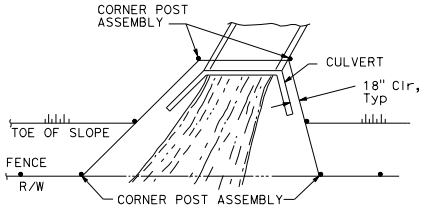

TRUSS TIGHTENER

NOTES:

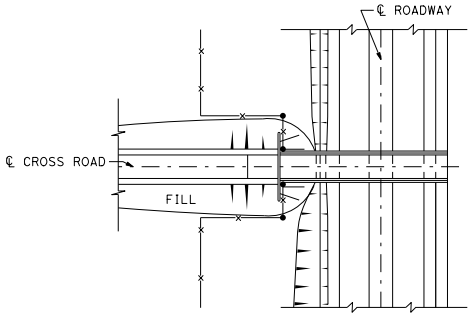
1. All material for abutment connection to be galvanized.
2. The chain link fabric shall be replaced by barbed wire strands at 12" maximum centers between the double posts.
3. When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.
4. Fencing over stream and around headwall may also use Barbed Wire or Wire Mesh fencing with either wood post or steel post installation.
5. See Standard Plan A85 for Chain Link fence dimensions. See Standard Plan A86 for Barbed Wire and Wire Mesh fence dimensions and for wood post and steel post installation.



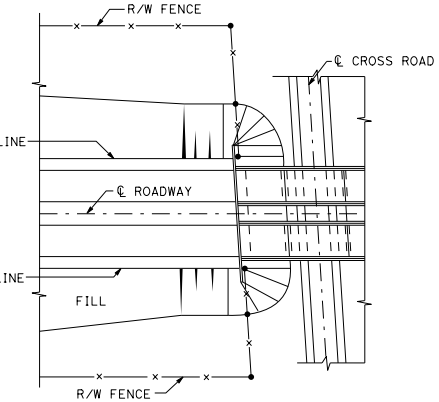

PLAN



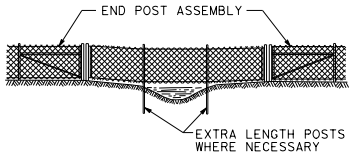

PLAN




PLAN OF ROADWAY - OVERCROSSING

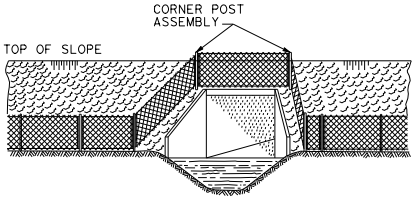



PLAN OF ROADWAY - UNDERCROSSING




ELEVATION

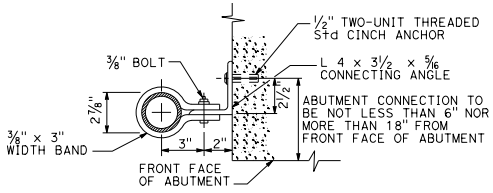
INSTALLATION OVER STREAM




ELEVATION

INSTALLATION AROUND HEADWALL

See Note 4




ABUTMENT CONNECTION

TYPICAL INSTALLATION AT BRIDGES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CHAIN LINK FENCE DETAILS

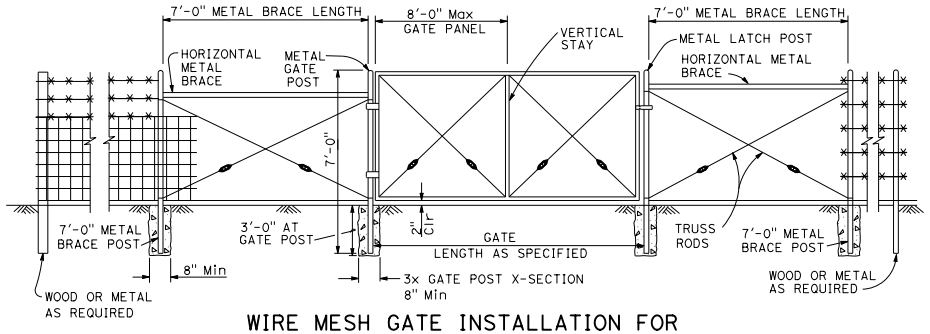
NO SCALE

A85B

7-1-25



Return to Table of Contents




## WIRE MESH GATE INSTALLATION FOR EITHER WOOD OR METAL POST FENCES

| WIRE MESH GATE POST (SEE NOTE 3) | | |
|---|---|---|
| GATE WIDTHS | NOMINAL Dia | WEIGHT PER FOOT |
| UP THRU 6'-0" | 2½" | 5.79 LB |
| OVER 6'-0" THRU 12'-0" | 3½" | 9.11 LB |
| OVER 12'-0" THRU 18'-0" | 5" | 14.62 LB |
| OVER 18'-0" TO 24'-0" Max | 6" | 18.97 LB |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

B. Valizadeh
REGISTERED CIVIL ENGINEER

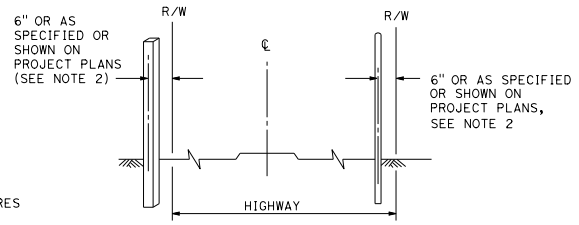
September 19, 2025
PLANS APPROVAL DATE

M. Reza Valizadeh No. C51902 Exp. 6-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

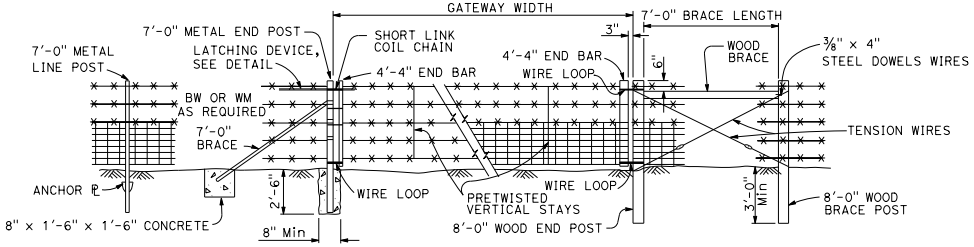
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NOTES:

1. Metal end post and end bar shown. Use wood end post and end bar for wood post installation.
2. Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.
3. Post dimensions and weights are minimums. Larger sizes may be used on approval of the Engineer.

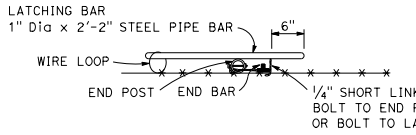



## FENCE LOCATION



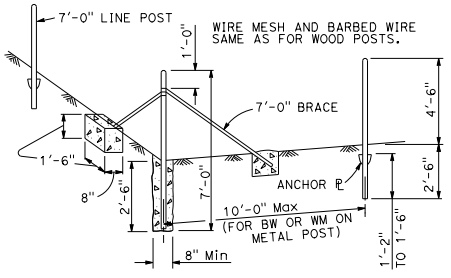

METAL POST INSTALLATION — WOOD POST INSTALLATION

## GATEWAY

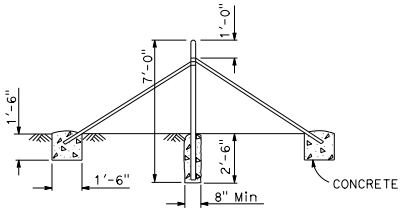



## LATCHING DEVICE FOR GATEWAYS

See Note 1



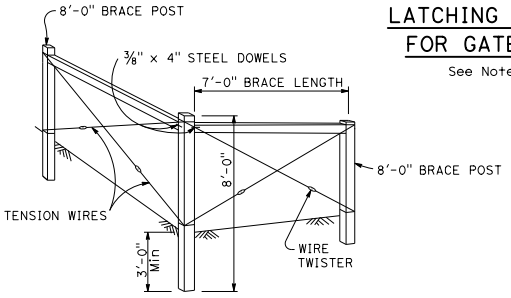

END AND CORNER POST ASSEMBLY



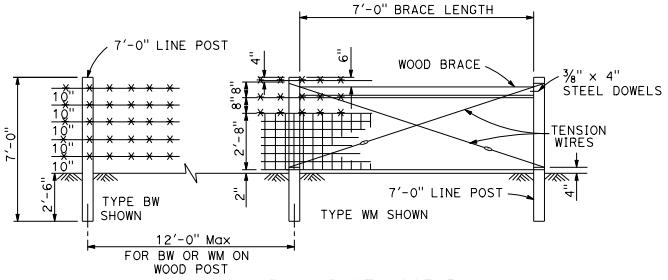

PULL POST ASSEMBLY

At 660'-0" maximum intervals for WM fence.
At 1320'-0" maximum intervals for BW fence.

## METAL POST INSTALLATION




END AND CORNER POST ASSEMBLY




PULL POST ASSEMBLY

At 660'-0" maximum intervals for WM fence.
At 1320'-0" maximum intervals for BW fence.

## WOOD POST INSTALLATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BARBED WIRE AND WIRE MESH FENCES

NO SCALE

A86

7-1-25

2025 STANDARD PLAN A86

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

M. Reza Vallzadeh No. C51902 Exp. 6-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

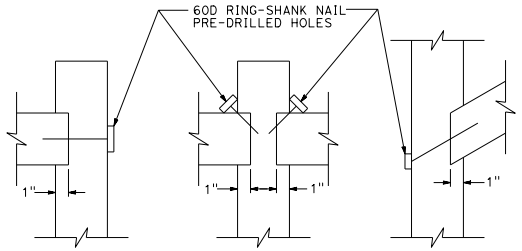
September 19, 2025

PLANS APPROVAL DATE

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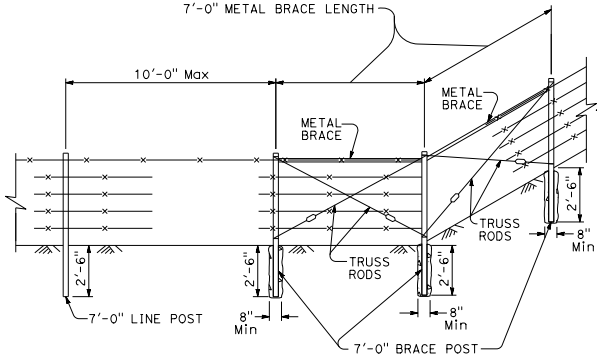
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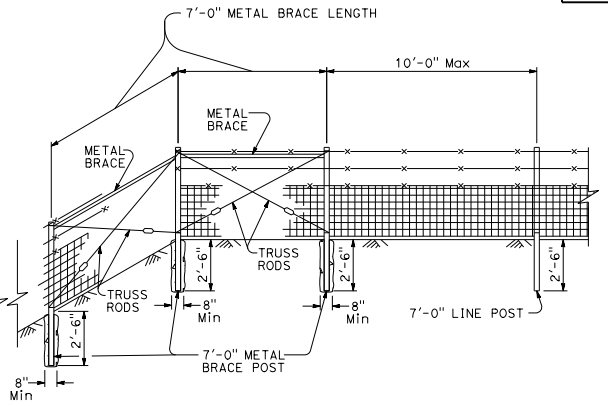
1. Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.
2. See Standard Plan A86 for barbed wire and wire mesh dimensions and for steel post and wood post dimensions and weight.
3. Use wood posts when specified in the Special Provisions or shown on the Project Plans.




WOOD MORTISE DETAIL

See Note 3



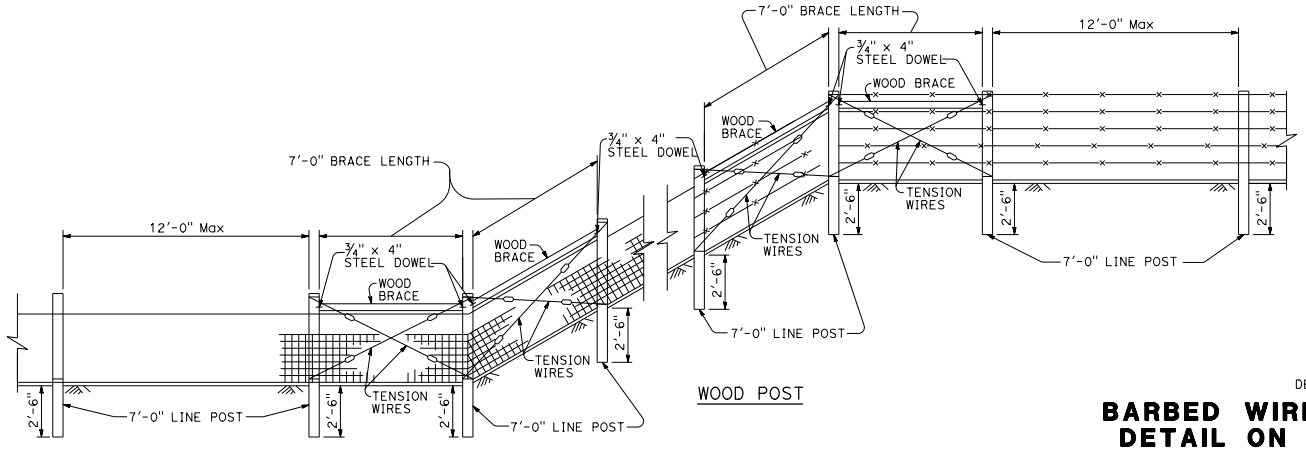




METAL POST

LEGEND

WIRE MESH FENCING

BARBED WIRE FENCING




WOOD POST

FENCE ON SHARP BREAK IN GRADE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BARBED WIRE AND WIRE MESH FENCE DETAIL ON SHARP BREAK IN GRADE

NO SCALE

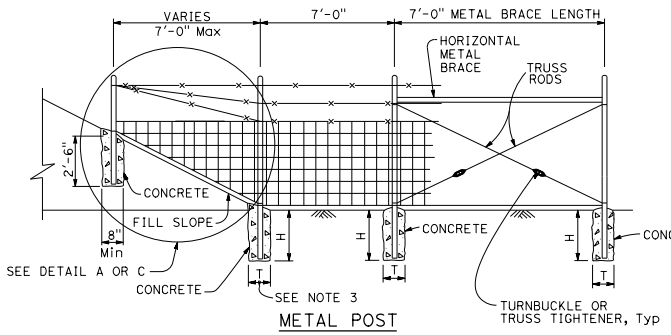
**A86A**

7-1-25

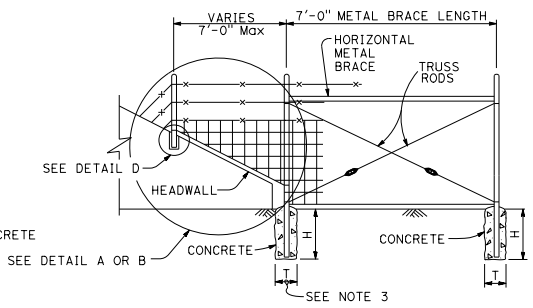
2025 STANDARD PLAN A86A



Return to Table of Contents




METAL POST




METAL POST

NOTES:

1. Wire mesh fencing shown, can also use barbed wire fencing.
2. See Standard Plan A86 for wire mesh and barbed wire fence dimensions.
3. T is not less than 3 times maximum cross section of post with minimum of 8".
4. H is 2'-6" for fabric less than 5'-0" high. H is 3'-0" for fabric 5'-0" and over.
5. May be used when thickness of concrete is 1'-0" or more.
6. May be used when thickness of concrete is 10" or more.

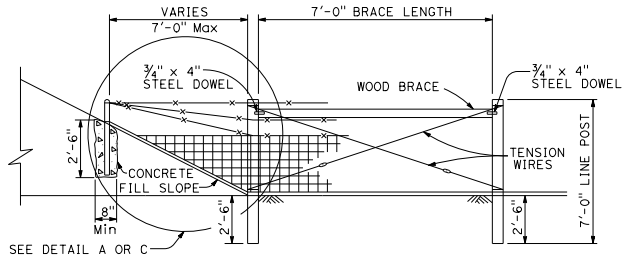
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

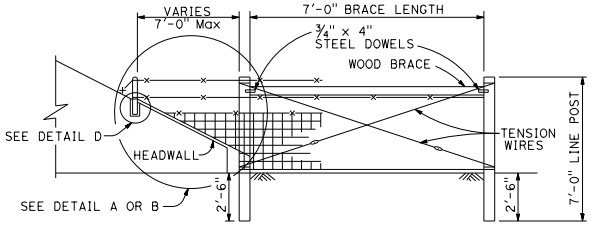
M. Reza Vazizadeh
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CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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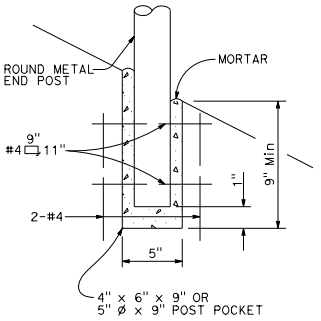

WOOD POST

METHOD OF ERECTING FENCE FOR FILL SLOPE



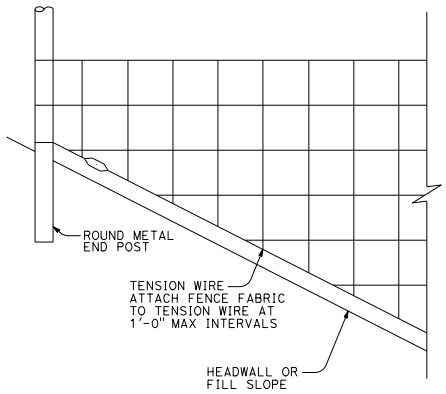

WOOD POST

METHOD OF TYING FENCE TO HEADWALL

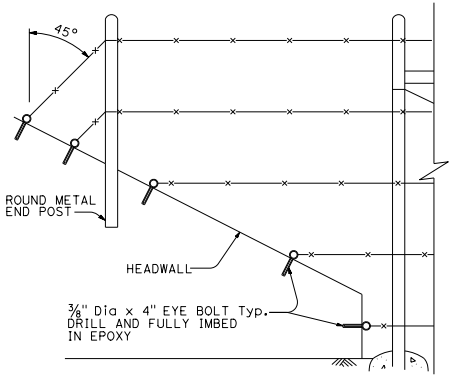



DETAIL D

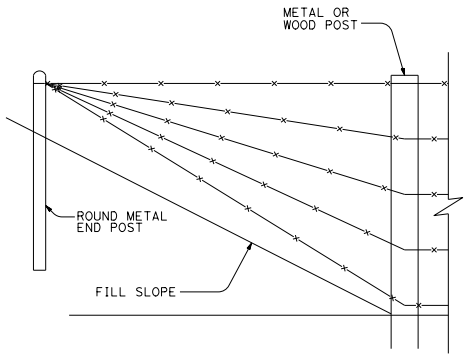
See Note 5



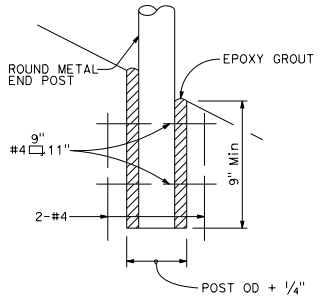

DETAIL A




DETAIL B




DETAIL C




ALTERNATIVE DETAIL D

See Note 6

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BARBED WIRE AND WIRE MESH FENCE DETAILS

NO SCALE

A86B

2025 STANDARD PLAN A86B

7-1-25

Return to Table of Contents

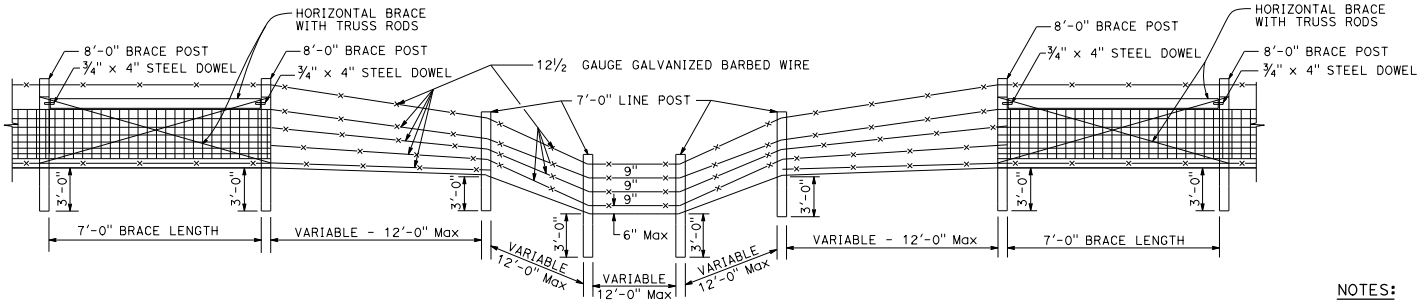
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REGISTERED CIVIL ENGINEER

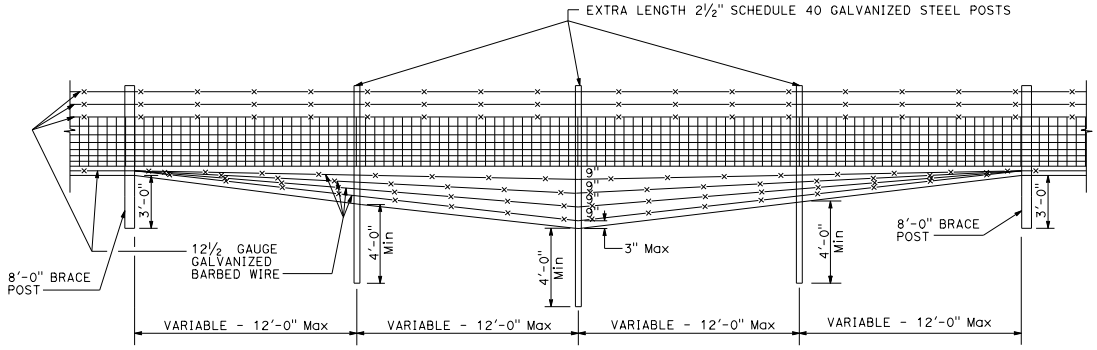
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REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

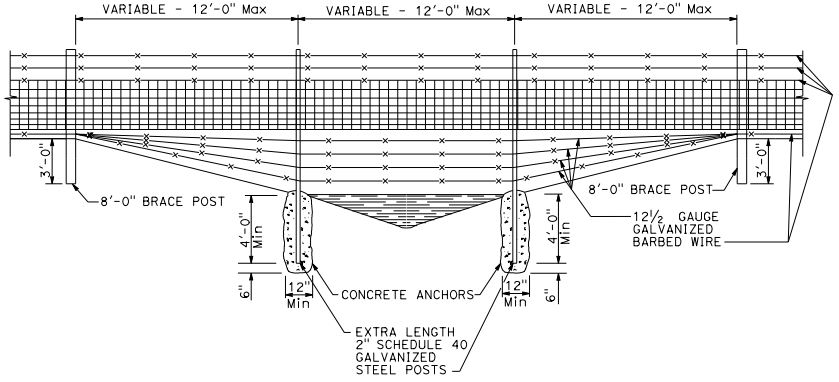
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TYPE I




TYPE II




TYPE III

## DITCH CROSSINGS

NOTES:

1. Type I ditch crossing shows wood posts. Steel posts may be used in place of wood.
2. Ditch crossings show wire mesh fencing. Barbed wire fencing may be used in place of wire mesh.
3. See Standard Plan A86 for wire mesh and barbed wire fence dimensions.
4. See Standard Plan A86 for steel post installation.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BARBED WIRE AND WIRE MESH FENCE DETAILS AT DITCH CROSSING

NO SCALE

A86C

2025 STANDARD PLAN A86C

7-1-25

Return to Table of Contents

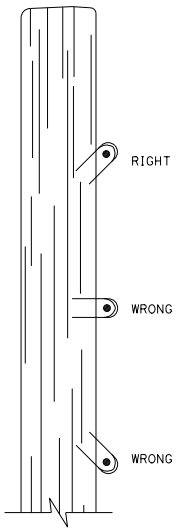
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REGISTERED CIVIL ENGINEER

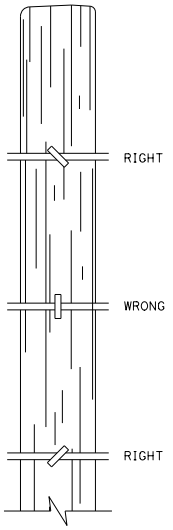
M. Reza Vazizadeh
No. C51902
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

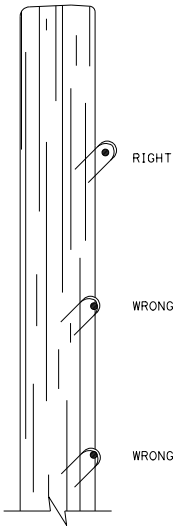
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DRIVE STAPLES AT ANGLE



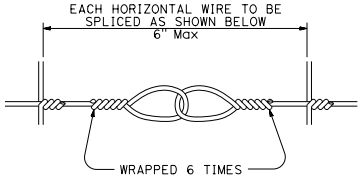

DO NOT DRIVE STAPLES PARALLEL TO SIDE OF POST



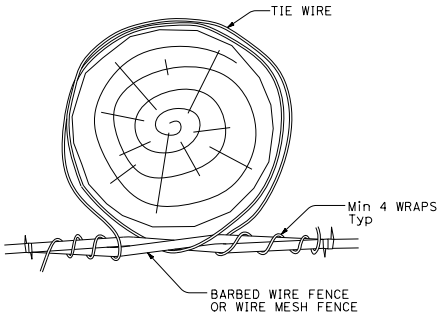

LEAVE WIRE LOOSE IN STAPLE

## LINE POST STAPLING DETAILS

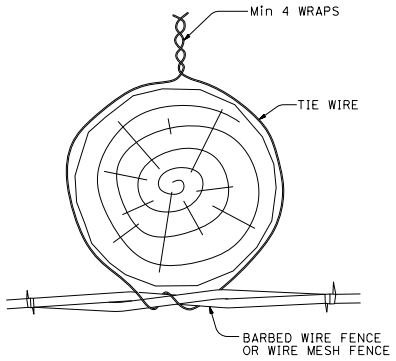
(Apply to rectangular/square and round posts)
Do not staple vertical wire in wire mesh.




## SPLICE DETAIL FOR BARBED WIRE/WIRE MESH FENCE



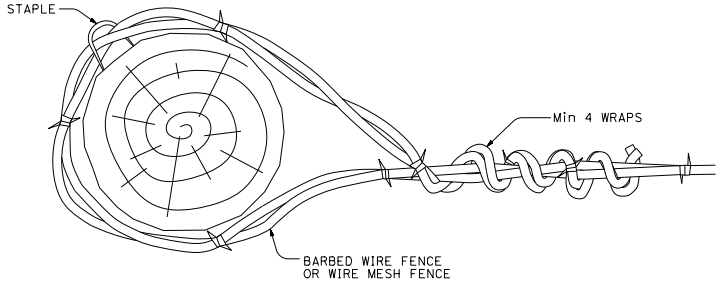

OPTION A




OPTION B

## LINE POST WIRE TIE OPTION DETAILS

(Option details also apply to rectangular/square posts)




## END, LATCH, PULL, AND CORNER POST DETAIL

(Also applies to rectangular/square posts)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BARBED WIRE AND WIRE MESH FENCE MISCELLANEOUS DETAILS

NO SCALE

**A86D**

7-1-25



Return to Table of Contents

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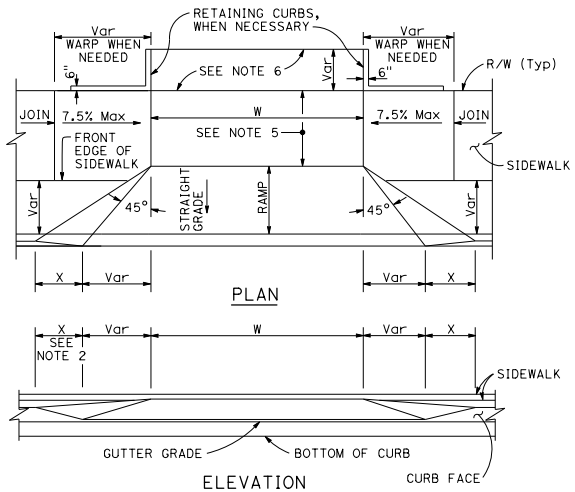
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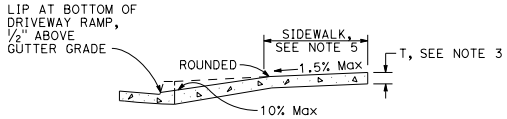
September 19, 2025
PLANS APPROVAL DATE

M. Reza Vazizadeh
No. C51902
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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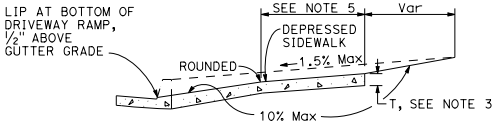





CASE A

Typical driveway, sidewalk not depressed




CASE B

Driveway with depressed sidewalk

SECTIONS

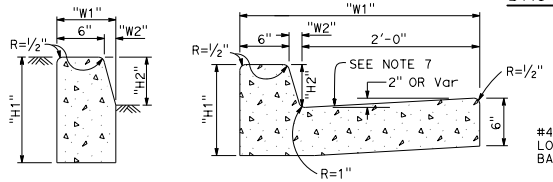
TABLE A

| CURB TYPE | DIMENSIONS | | | |
|---|---|---|---|---|
| | "H1" | "H2" | "W1" | "W2" |
| A1-6 | 1'-2" | 6" | 7½" | 1½" |
| A1-8 | 1'-4" | 8" | 8" | 2" |
| A2-6 | 1'-0" | 6" | 2'-7½" | 1½" |
| A2-8 | 1'-2" | 8" | 2'-8" | 2" |
| A3-6 | 6" | 5" | 7¼" | 1¼" |
| A3-8 | 8" | 7" | 7¾" | 1¾" |
| B1-4 | 1'-0" | 4" | 7½" | 2½" |
| B1-6 | 1'-2" | 6" | 9" | 4" |
| B2-4 | 10" | 4" | 2'-7½" | 2½" |
| B2-6 | 1'-0" | 6" | 2'-9" | 4" |
| B3-4 | 4" | 3" | 7" | 2" |
| B3-6 | 6" | 5" | 8½" | 3½" |
| D-4 | 10" | 4" | 1'-6" | 1'-1" |
| D-6 | 1'-0" | 6" | 2'-2" | 1'-9" |

CURB QUANTITIES

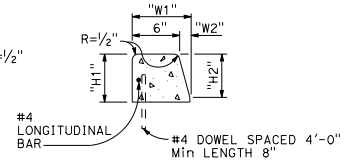
| TYPE | CUBIC YARDS PER LINEAR FOOT |
|---|---|
| A1-6 | 0.02585 |
| A1-8 | 0.03084 |
| A2-6 | 0.05903 |
| A2-8 | 0.06379 |
| A3-6 | 0.01036 |
| A3-8 | 0.01435 |
| B1-4 | 0.02185 |
| B1-6 | 0.02930 |
| B2-4 | 0.05515 |
| B2-6 | 0.06171 |
| B3-4 | 0.00641 |
| B3-6 | 0.01074 |
| B4 | 0.05709 |
| D-4 | 0.04083 |
| D-6 | 0.06804 |
| E | 0.06661 |

## DRIVEWAYS

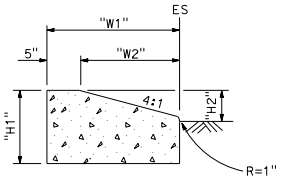



TYPE A1 CURBS
See Table A

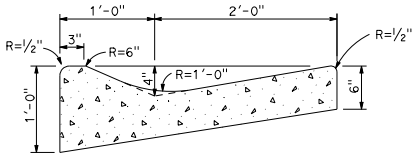
TYPE A2 CURBS
See Table A



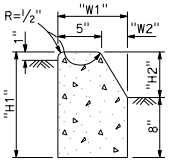

TYPE A3 CURBS
Superimposed on existing pavement
See Table A



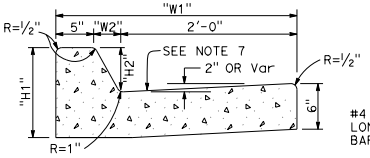

TYPE D CURBS
See Table A



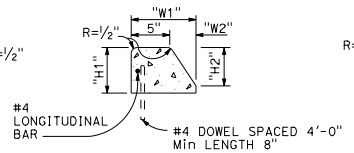

TYPE E CURB



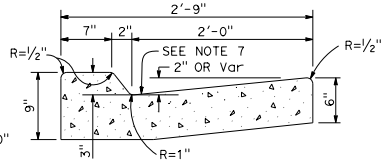

TYPE B1 CURBS
See Table A



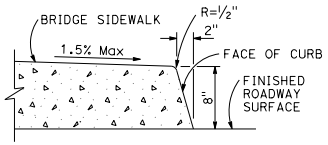

TYPE B2 CURBS
See Table A




TYPE B3 CURBS
Superimposed on existing pavement
See Table A




TYPE B4 CURBS




TYPE H CURB
On Bridges

## CURBS

NOTES:

1. Case A driveway section typically applies.
2. X=3'-0" except for curb heights over 10" where 4:1 slopes shall be used on curb slope.
3. Sidewalk and ramp thickness "T" at driveway shall be 4" for residental and 6" for commercial.
4. Difference in slope of the driveway ramp and the slope of a line between the gutter and a point on the roadway 5'-0" from gutter line shall not exceed 15%. Reduce driveway ramp slope, not gutter slope, where required.
5. Minimum width of clear passageway for sidewalk shall be 4'-2".
6. Retaining curbs and acquisition of construction easement may be necessary for narrow sidewalks or curb heights in excess of 6".
7. Across the pedestrian route at curb ramp locations, the gutter pan slope shall not exceed 1" of depth for each 2'-0" of width.

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# CURBS AND DRIVEWAYS

NO SCALE

A87A

7-1-25

Return to Table of Contents

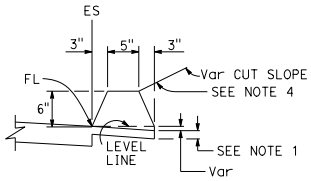
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Joshua Lee
REGISTERED CIVIL ENGINEER

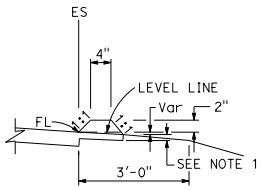
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Joshua Lee
No. C90456
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA

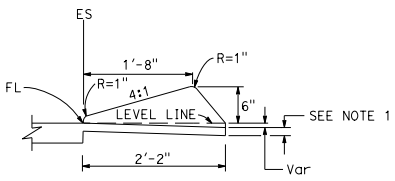
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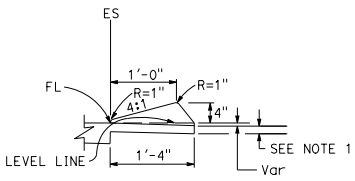

TYPE A
See Notes 3 and 5



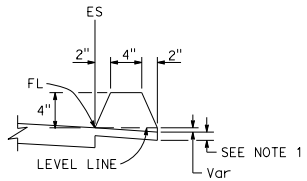

TYPE C




TYPE D

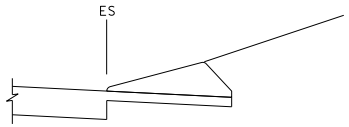



TYPE E

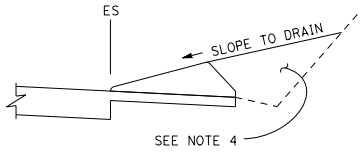



TYPE F
See Note 5

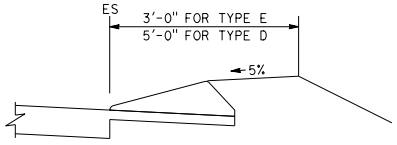
## DIKES



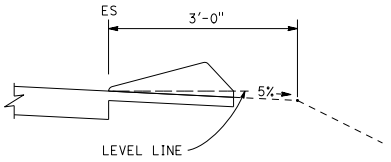

CASE C-1
Cut Slope




CASE C-2
Cut Slope




CASE F




CASE R
See Note 2

## TYPE D AND E BACKFILL DETAILS

NOTES:

1. For HMA shoulders only, extend top layer of HMA placed on the shoulder under dike with no joint at the ES. For projects with OGFC shoulders, do not extend OGFC under dike. See project plans for modified dike detail.
2. Case R applies to retrofit only projects where restrictive conditions do not provide enough width for Case F backfill.
3. Type A dike only to be used where restrictive slope conditions do not provide enough width to use Type D or Type E dike.
4. Fill and compact with excavated material to top of dike.
5. Use Type A or Type F dike, where dike is required with guardrail installations. See Standard Plan A77N4 for dike positioning details. See Standard Plan A77N3 for hinge point offsets with guardrail.

DIKE QUANTITIES

| TYPE | CUBIC YARDS PER LINEAR FOOT |
|---|---|
| A | 0.0135 |
| C | 0.0038 |
| D | 0.0293 |
| E | 0.0130 |
| F | 0.0066 |

Quantities based on 5% cross slope.

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# HOT MIX ASPHALT DIKES

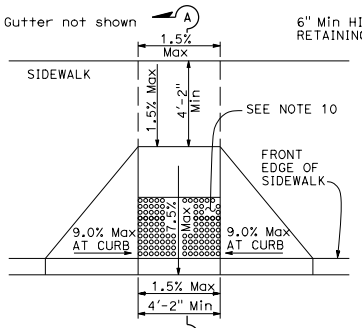
NO SCALE

A87B

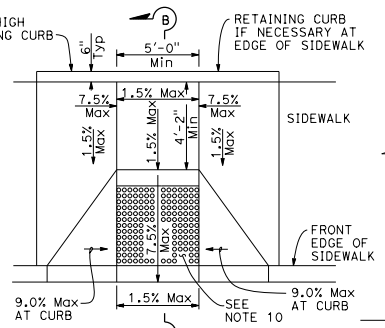
7-1-25



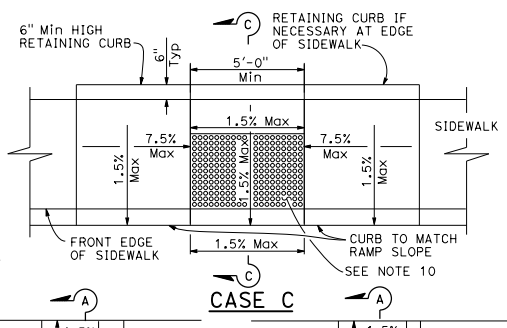
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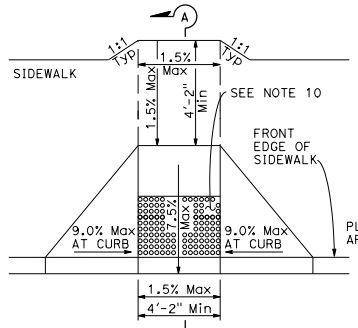

CASE A



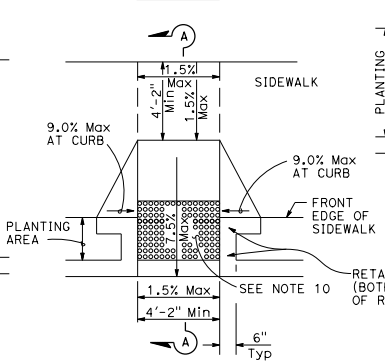

CASE B



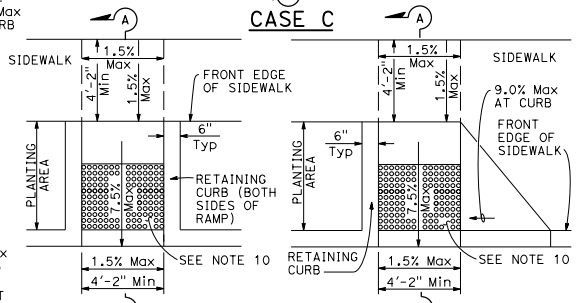

CASE C




CASE D



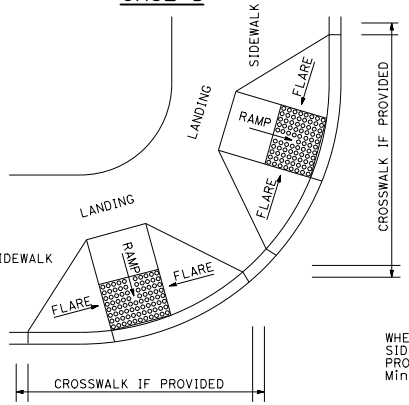

CASE E




CASE F

CASE G

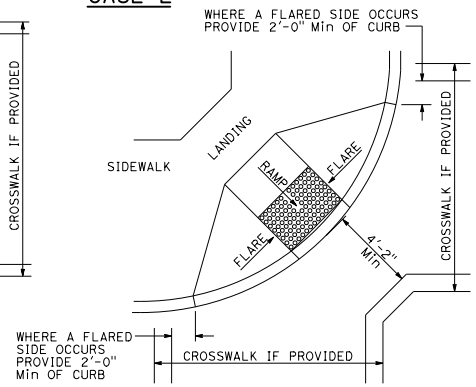
See Note 4




DETAIL A

TYPICAL TWO-RAMP CORNER INSTALLATION

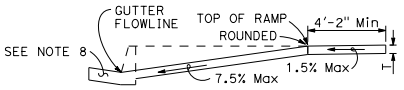
See Note 1



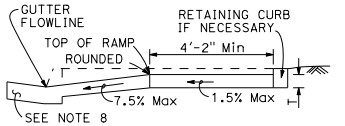

DETAIL B

TYPICAL ONE-RAMP CORNER INSTALLATION

See Notes 1 and 3

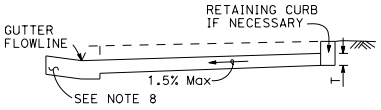



SECTION A-A

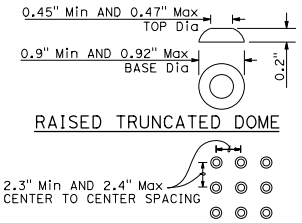



SECTION B-B

Depress entire sidewalk as required




SECTION C-C




RAISED TRUNCATED DOME

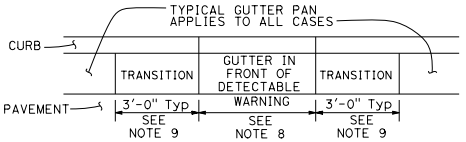
RAISED TRUNCATED DOME PATTERN (IN-LINE)

DETECTABLE WARNING SURFACE

See Note 10

NOTES:

1. As site conditions dictate, Case A through Case G curb ramps may be used for corner installations similar to those shown in Detail A and Detail B. The case of curb ramps used in Detail A do not have to be the same. Case A through Case G curb ramps also may be used at mid block locations, as site conditions dictate. For specific site condition configuration, including the conform to existing sidewalk, see Project Plans.
2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'-2" platform (landing) as shown in Case A, the sidewalk may be depressed longitudinally as in Case B or C or may be widened as in Case D.
3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for Detail B.
4. As site conditions dictate, the retaining curb side and the flared side of the Case G ramp shall be constructed in reversed position.
5. The ramp portion of the curb ramp is a typical rectangle, unless modified in the Project Plans.
6. Side slope of ramp flares vary uniformly from a maximum of 9.0% at curb to conform with longitudinal sidewalk slope adjacent to top of the ramp, except in Case C and Case F.
7. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.
8. Counter slopes of adjoining gutters and road surfaces immediately adjacent to and within 24 inches of the curb ramp shall not be steeper than 1V:20H (5.0%). Gutter pan slope shall not exceed 1" of depth for each 2'-0" of width.
9. Transition gutter pan slope from 1" of depth for each 2'-0" of width to match typical gutter pan slope per Standard Plan A87A.
10. The detectable warning surface will be a rectangle as shown at back of curb, unless modified in the Project Plans. Curb ramps shall have a detectable warning surface that extends the full width and 3'-0" depth of the ramp. Detectable warning surfaces shall extend the full width of the ramp except a maximum gap of 1 inch is allowed on each side of the ramp. Detectable warning surfaces shall conform to the requirements in the Standard Specifications.
11. Sidewalk and ramp thickness "T", shall be 3½" minimum.
12. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
13. Detectable warning surface may have to be cut to allow removal of utility covers while maintaining detectable warning width and depth.




GUTTER PAN TRANSITION

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

M. Reza Vazizadeh No. C51902 Exp. 6-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CURB RAMP DETAILS

NO SCALE

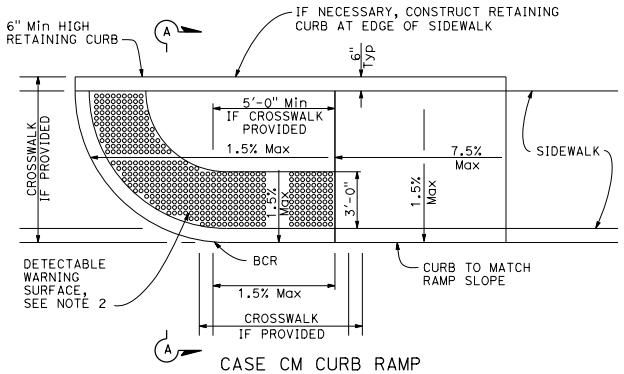
A88A

7-1-25

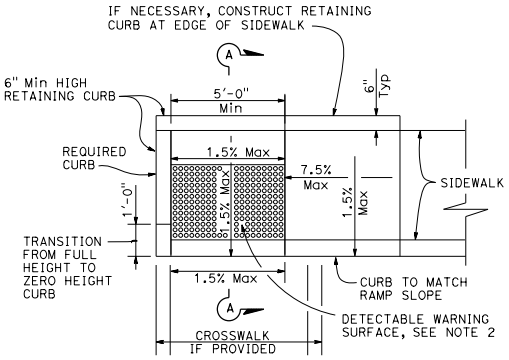


Return to Table of Contents

Gutter not shown




CASE CM CURB RAMP




CASE CH CURB RAMP

NOTES:

1. Sidewalk, ramp and passageway thickness "T", shall be 3½" minimum.
2. For details of detectable warning surfaces, see Standard Plan A88A.
3. Where an island passageway length is greater than or equal to 6'-0", but less than 8'-0", each detectable warning surface shall extend the full width and 2'-0" depth of the passageway length. Where an island passageway length is greater than or equal to 8'-0", each detectable warning surface shall extend the full width and 3'-0" depth of the passageway length. Detectable warning surfaces shall extend the full width of the island passageway except a maximum gap of 1 inch is allowed on each side of the passageway.
4. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.
5. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
6. Detectable warning surface may have to be cut to allow removal of utility covers while maintaining detectable warning width and depth.
7. For additional curb ramp details, see Standard Plan A88A.
8. The detectable warning surface will be a rectangle as shown at the face of curb, unless modified in the Project Plans.

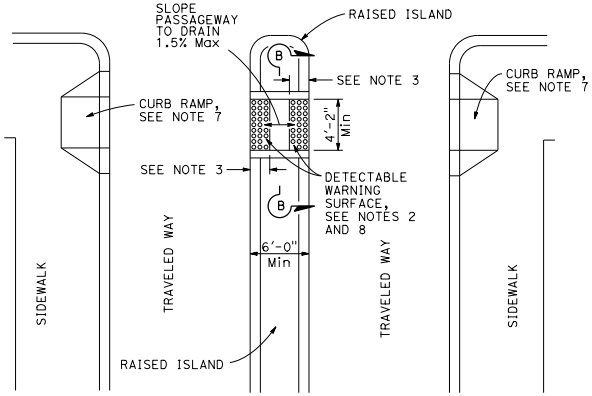
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|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

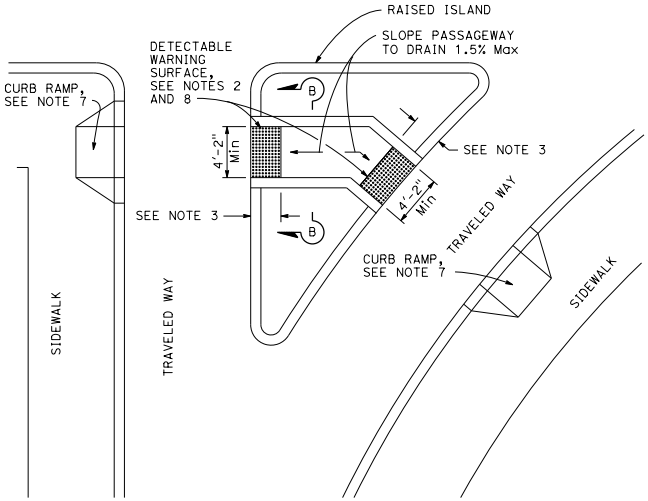
M. Reza Vazizadeh
No. C51902
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

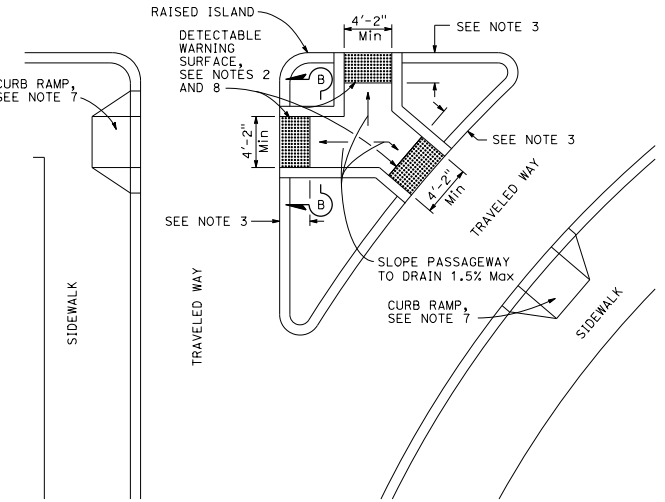
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



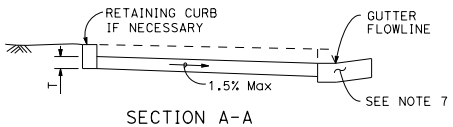

TYPE A PASSAGEWAY



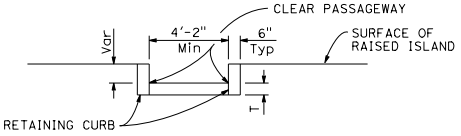

TYPE B PASSAGEWAY




TYPE C PASSAGEWAY




SECTION A-A




SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CURB RAMP AND ISLAND PASSAGEWAY DETAILS

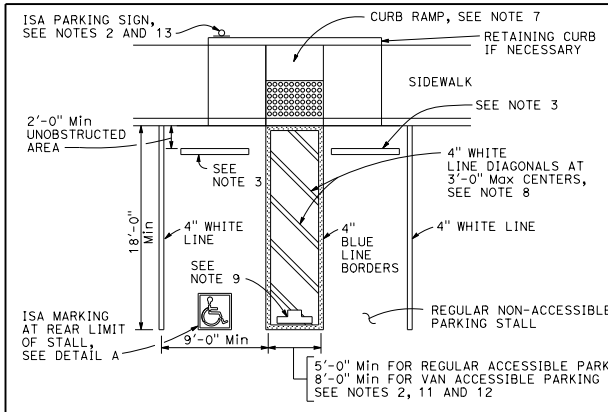
NO SCALE

A88B

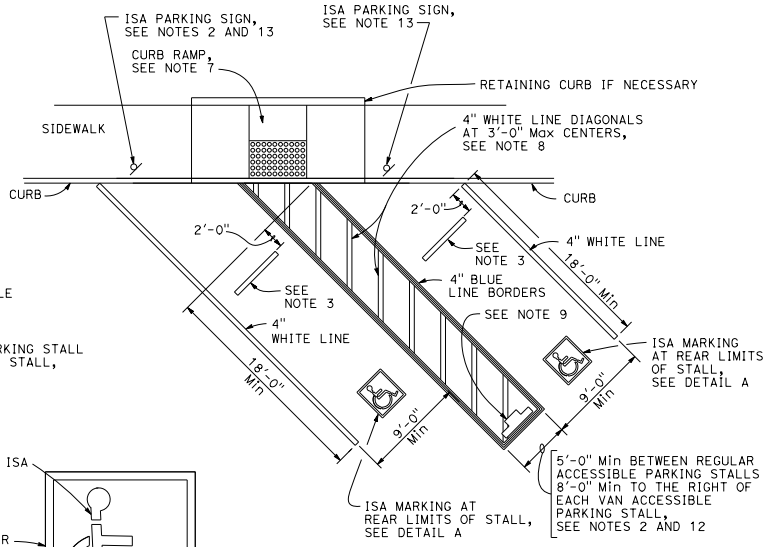
7-1-25

2025 STANDARD PLAN A88B

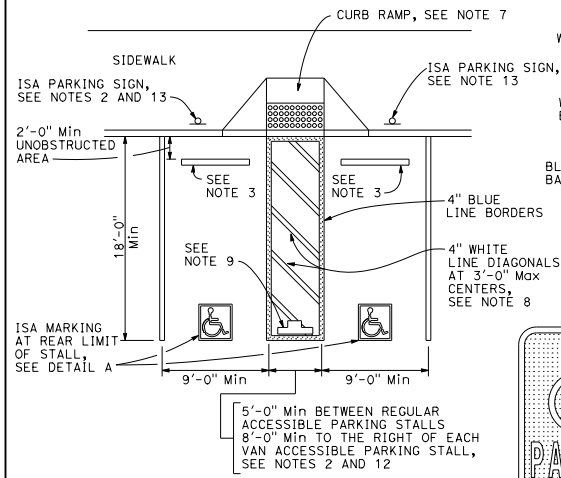
Return to Table of Contents



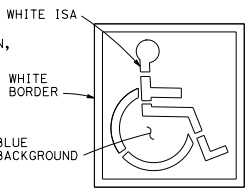

SINGLE PARKING STALL




DIAGONAL DOUBLE PARKING STALLS




DOUBLE PARKING STALL




ISA MARKING, See Standard Plan A24C

DETAIL A

| TABLE A | |
|---|---|
| TOTAL NUMBER OF PARKING SPACES PROVIDED IN PARKING FACILITY | MINIMUM NUMBER OF REQUIRED ACCESSIBLE PARKING SPACES |
| 1-25 | 1 |
| 26-50 | 2 |
| 51-75 | 3 |
| 76-100 | 4 |
| 101-150 | 5 |
| 151-200 | 6 |
| 201-300 | 7 |
| 301-400 | 8 |
| 401-500 | 9 |
| 501-1000 | 2 PERCENT OF TOTAL |
| 1001 AND OVER | 20 PLUS 1 FOR EACH 100 OR FRACTION THEREOF OVER 1000 |




SIGN R99 (CA)




PLAQUE R99B (CA)

SIGN R99 (CA) with PLAQUE R99B (CA), See Note 6




SIGN R99C (CA), See Note 6




SIGN R100B (CA), See Note 10




SIGN R7-8b, See Notes 2 and 6

OFF-STREET PARKING SIGNS

Parking lot or garage, See Note 6

NOTES:

1. Accessible parking spaces serving a particular building shall be located on the shortest accessible route of travel from adjacent parking to an accessible entrance. In parking facilities that do not serve a particular building, accessible parking shall be located on the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility.
2. One in every six accessible off-street parking stalls, but not less than one, shall be served by an accessible aisle of 8'-0" minimum width and shall be signed van accessible. The R7-8b sign shall be mounted below the R99B (CA) plaque or the R99C (CA) sign.
3. In each parking stall, a curb or parking bumper shall be provided if required to prevent encroachment of vehicles over the required width of walkways. Parking stalls shall be so located that persons with disabilities are not compelled to wheel or walk behind parked vehicles other than their own. For more parking bumper requirements, see the Standard Specifications.
4. Parking spaces and access aisles shall be level with surface slopes not exceeding 1.5% in all directions.
5. Table A shall be used to determine the required number of accessible parking stalls in each parking lot or garage.
6. Where Plaque R99B (CA), Sign R99C (CA) or Sign R7-8b are installed, the bottom of the sign or plaque panel shall be a minimum of 7'-0" above the surrounding surface.
7. Curb ramps shall conform to the details shown on Standard Plan A88A.
8. Blue paint, instead of white may be used for marking accessibility aisles in areas where snow may cause white markings to not be visible.
9. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high and located so that it is visible to traffic enforcement officials. See Standard Plan A90B for details of the "NO PARKING" pavement marking.
10. A R100B (CA) sign shall be posted in a conspicuous place at each entrance to off-street parking facilities or immediately adjacent to and visible from each stall. The sign shall include the address where the towed vehicle may be reclaimed and the telephone number of the local traffic law enforcement agency.
11. Where a single (non-van) accessible parking space is provided, the loading and unloading access aisle shall be on the passenger side of the vehicle as the vehicle is going forward into the parking space.
12. Where a van accessible parking space is provided, the loading and unloading access aisle shall be 8'-0" wide minimum, and shall be on the passenger side of the vehicle as the vehicle is going forward into the parking space.
13. Accessible Parking Only Sign shall be Sign R99C (CA) or Sign R99 (CA) with Plaque R99B (CA).

LEGEND

ISA - International Symbol of Accessibility

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

M. Reza Vazizadeh No. C51902 Exp. 6-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ACCESSIBLE PARKING OFF-STREET

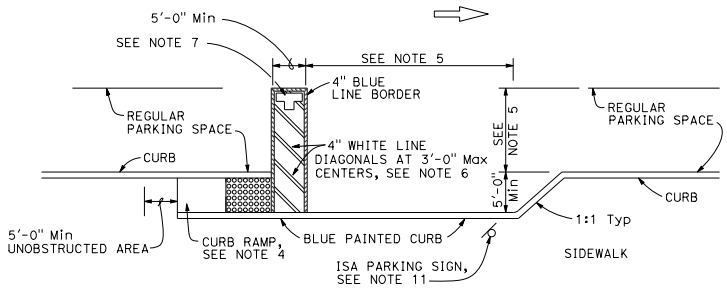
NO SCALE

A90A

7-1-25

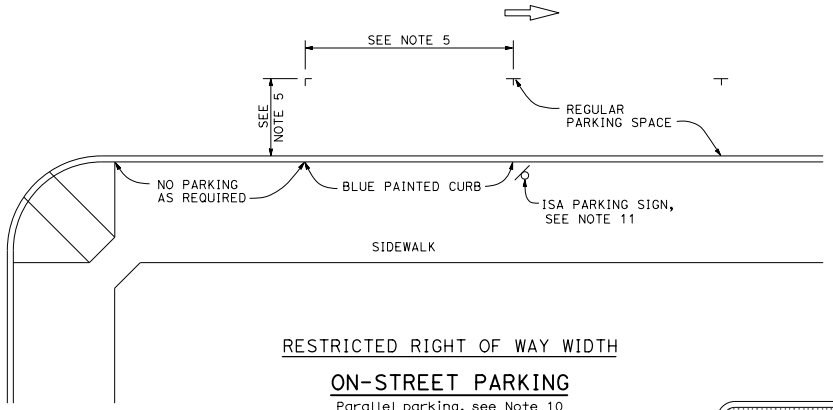


Return to Table of Contents




CONVENTIONAL

See Note 9




RESTRICTED RIGHT OF WAY WIDTH

ON-STREET PARKING

Parallel parking, see Note 10




PAVEMENT MARKING

See Note 7




SIGN R99 (CA)




PLAQUE R99B (CA)

SIGN R99 (CA) with PLAQUE R99B (CA), See Note 3




SIGN R99C (CA)
See Note 3

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

B. Valizadeh
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

M. Reza Valizadeh
No. C51902
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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NOTES:

1. Parking spaces shall be so located that persons with disabilities are not compelled to wheel or walk behind parked vehicles other than their own.
2. Surface slopes of accessible on-street parking spaces shall be the minimum feasible.
3. Where Plaque R99B (CA) or Sign R99C (CA) are installed, the bottom of the sign or plaque panel shall be a minimum of 7'-0" above the surrounding surface.
4. Curb ramps shall conform to the details shown on Standard Plan A88A.
5. Accessible on-street parking spaces shall not be smaller in length or width than that specified by the local jurisdiction for other parking spaces, but not less than 20'-0" in length and not less than 8'-0" in width.
6. Blue paint, instead of white may be used for marking accessibility aisles in areas where snow may cause white markings to not be visible.
7. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high on a contrasting background and located so that it is visible to traffic enforcement officials. See Standard Plan A24E for square foot area for painting the words "NO PARKING".
8. There shall be no obstructions on the sidewalk adjacent to and for the full length of the parking space, except for the ISA parking sign shown.
9. The Conventional detail should be the primary choice of accessible on-street parking. However, if the sidewalk lacks adequate space to construct a standard curb ramp, the Restricted Right of Way detail should be used.
10. If the Restricted Right of Way width detail is selected and it conflicts with a bus stop or other uses, this detail may apply to the other end of the block.
11. Accessible Parking Only Sign shall be Sign R99C (CA) or Sign R99 (CA) with Plaque R99B (CA).

LEGEND

ISA - International Symbol of Accessibility

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ACCESSIBLE PARKING ON-STREET

NO SCALE

A90B

2025 STANDARD PLAN A90B

7-1-25

Return to Table of Contents

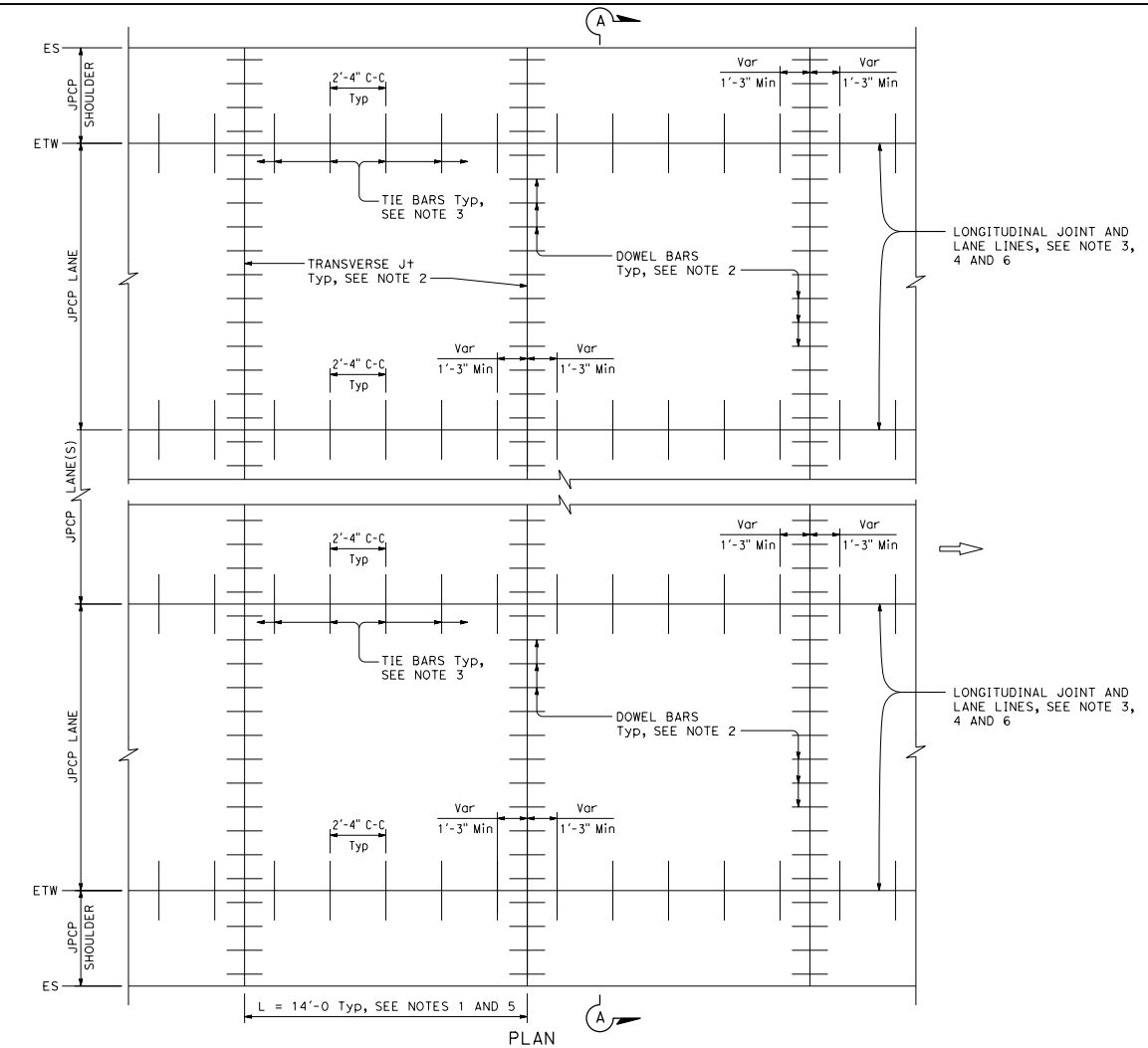
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

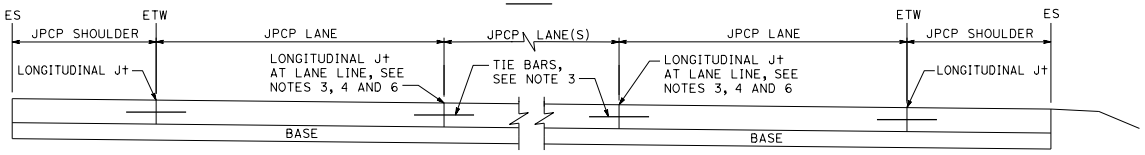
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA

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PLAN




SECTION A-A

NOTES:

1. Transverse joint spacing may be adjusted to no less than 10' and no more than 14' to conform to bridges, change in pavement type, and hardened concrete pavement.
2. For transverse joint and dowel bar details not shown, see Standard Plan P10.
3. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
4. For additional longitudinal joint layout details, see Standard Plan P18.
5. For joint layout at intersections, see Project Plans.
6. For dowel bars at longitudinal joint, see Standard Plan P18.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# JOINTED PLAIN CONCRETE PAVEMENT NEW CONSTRUCTION

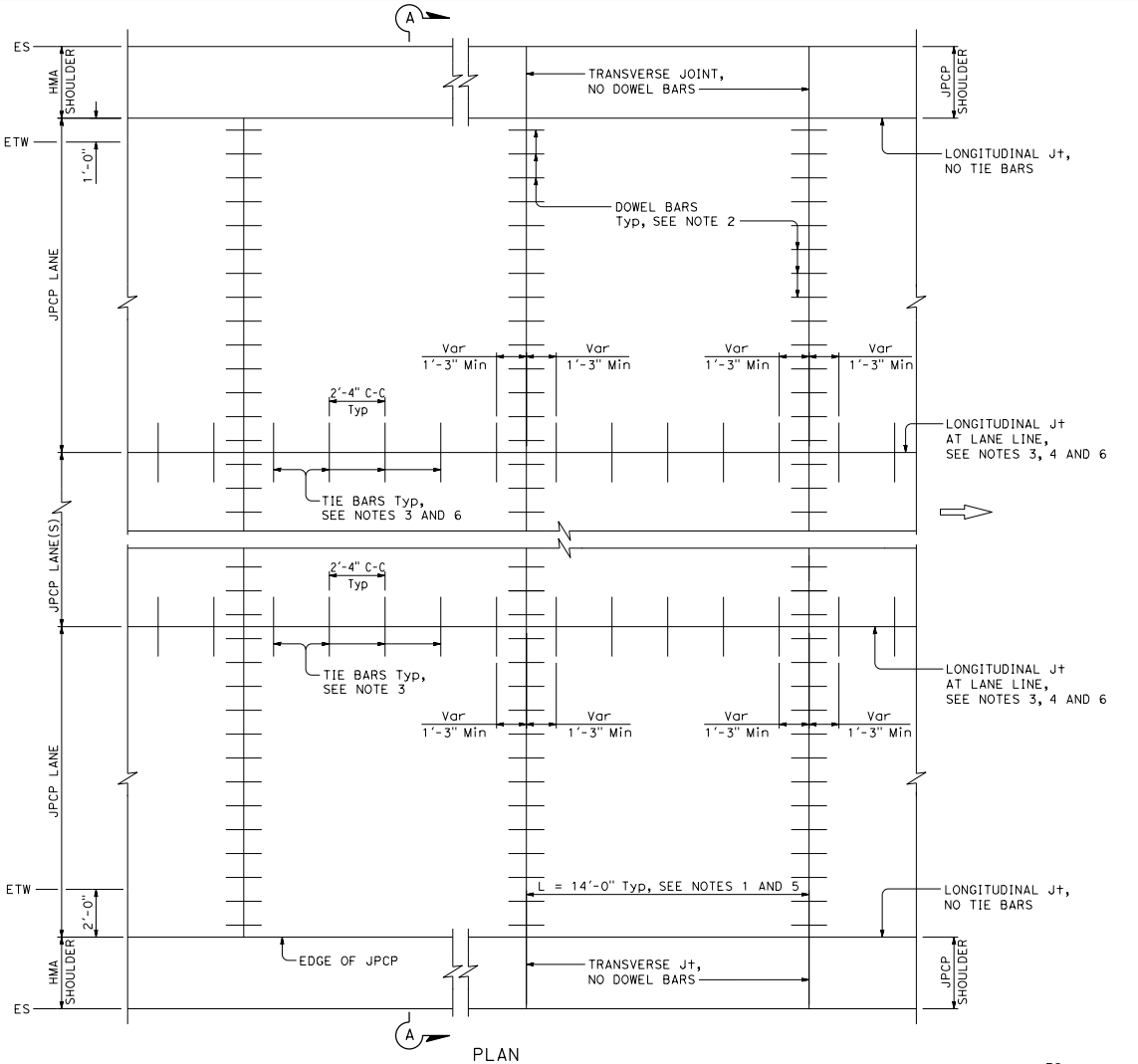
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P1

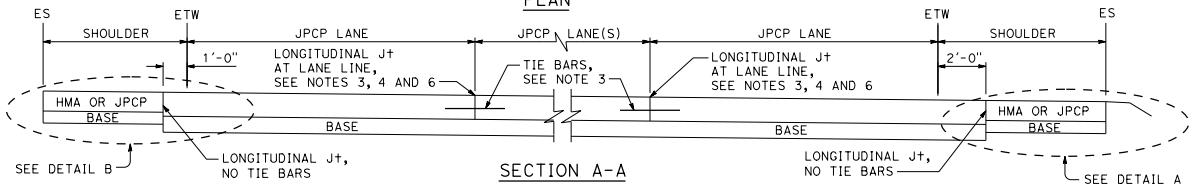
7-1-25



Return to Table of Contents




PLAN




SECTION A-A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

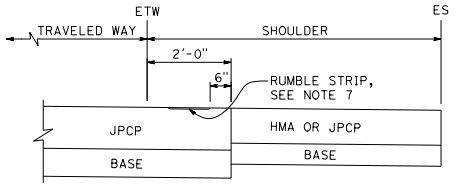
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CIVIL
STATE OF CALIFORNIA

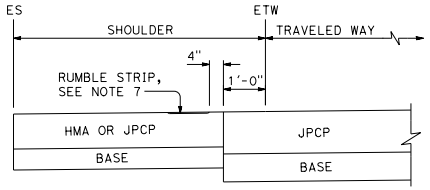
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NOTES:

1. Transverse joint spacing may be adjusted to no less than 10' and no more than 14' to conform to bridges, change in pavement type, and hardened concrete pavement.
2. For transverse joint and dowel bar details not shown, see Standard Plan P10.
3. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
4. For additional longitudinal joint layout details, see Standard Plan P18.
5. For joint layout at intersections, see Project Plans.
6. For dowel bars at longitudinal joint, see Standard Plan P18.
7. For limits of rumble strips, see Projects Plans.




DETAIL A




DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# JOINTED PLAIN CONCRETE PAVEMENT (WIDENED LANE) NEW CONSTRUCTION

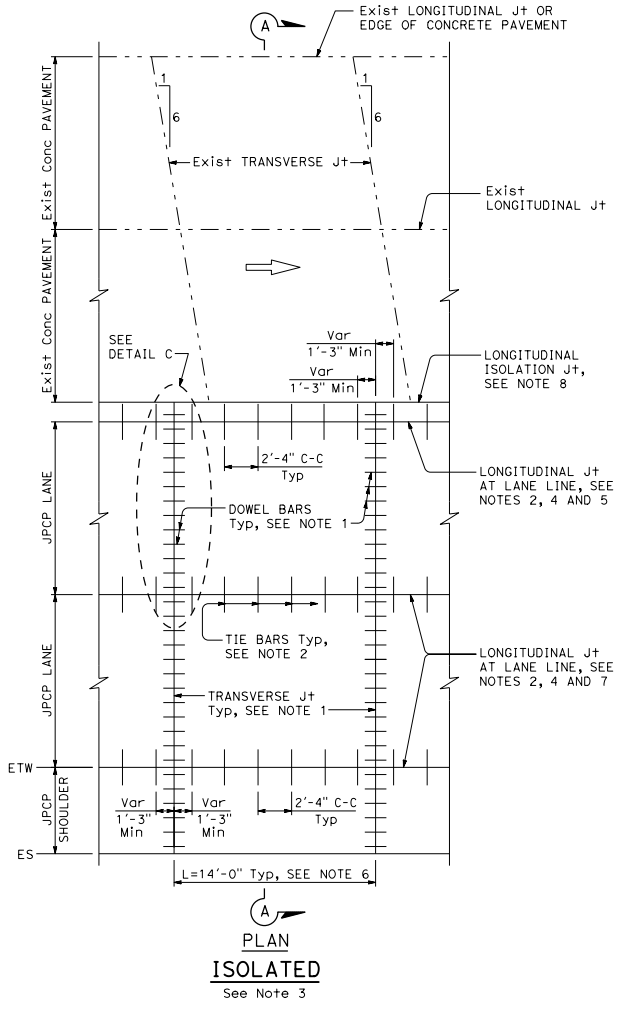
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P2

7-1-25

2025 STANDARD PLAN P2

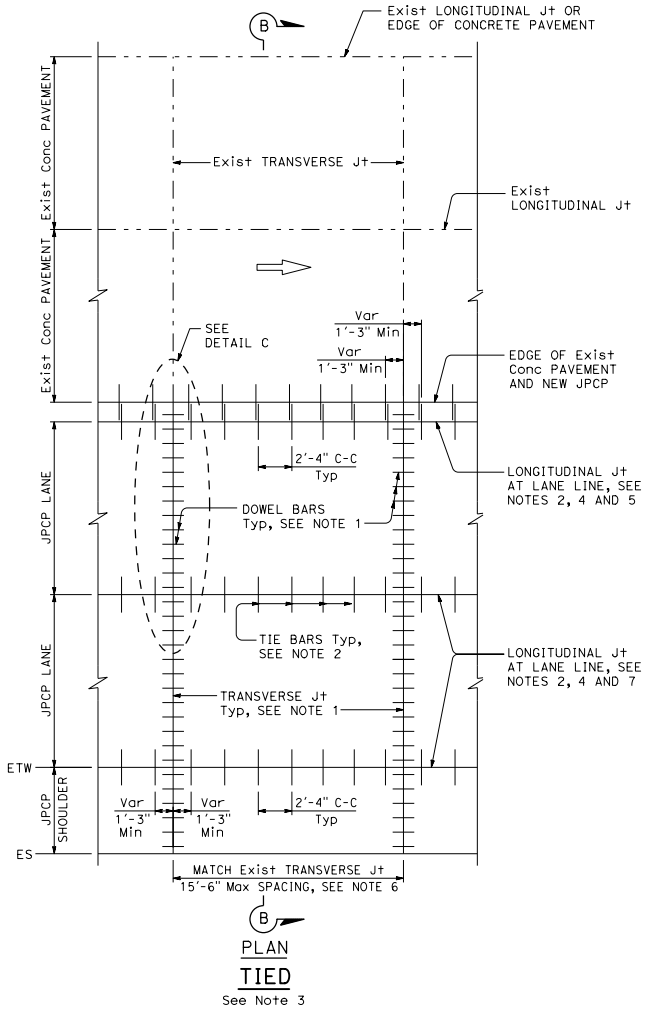
Return to Table of Contents




PLAN

ISOLATED

See Note 3



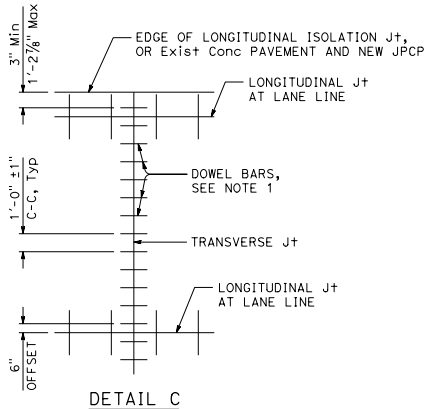

PLAN

TIED

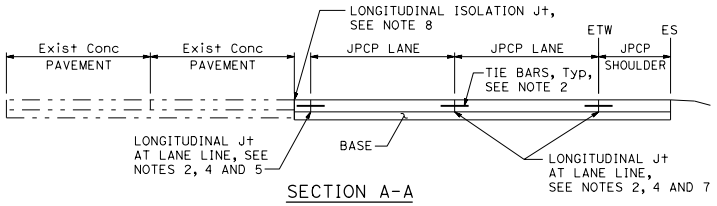
See Note 3

NOTES:

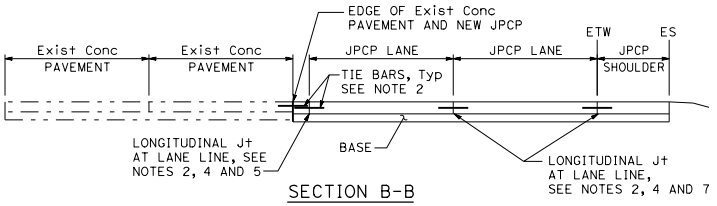
1. For transverse joint and dowel bar details not shown, see Standard Plan P10.
2. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
3. For joint layout at intersections, see Project Plans.
4. For additional longitudinal joint details, see Standard Plan P18.
5. Omit longitudinal joint when edge of new concrete pavement is 3'-3" or less from JPCP lane line.
6. Transverse joint spacing may be adjusted to no less than 10' and no more than 15'-6" to conform to bridges, change in pavement type and existing pavement.
7. For dowel bars at longitudinal joint, see Standard Plan P18.
8. For isolation joints, see Detail A on Standard Plan P18.




DETAIL C




SECTION A-A




SECTION B-B

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# JOINTED PLAIN CONCRETE PAVEMENT LANE AND SHOULDER ADDITION OR REPLACEMENT

NO SCALE

P3A

7-1-25

2025 STANDARD PLAN P3A

Return to Table of Contents

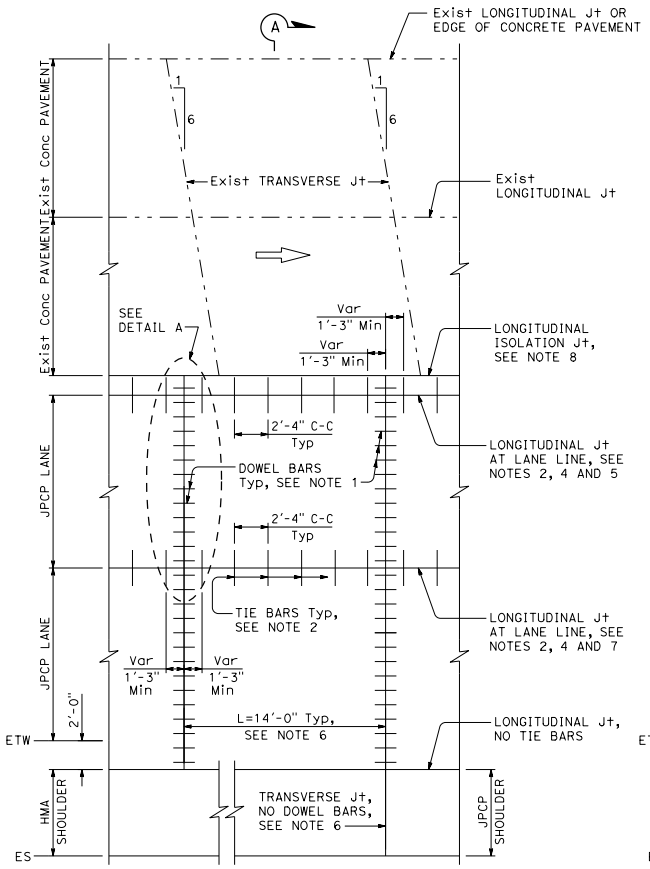
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Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

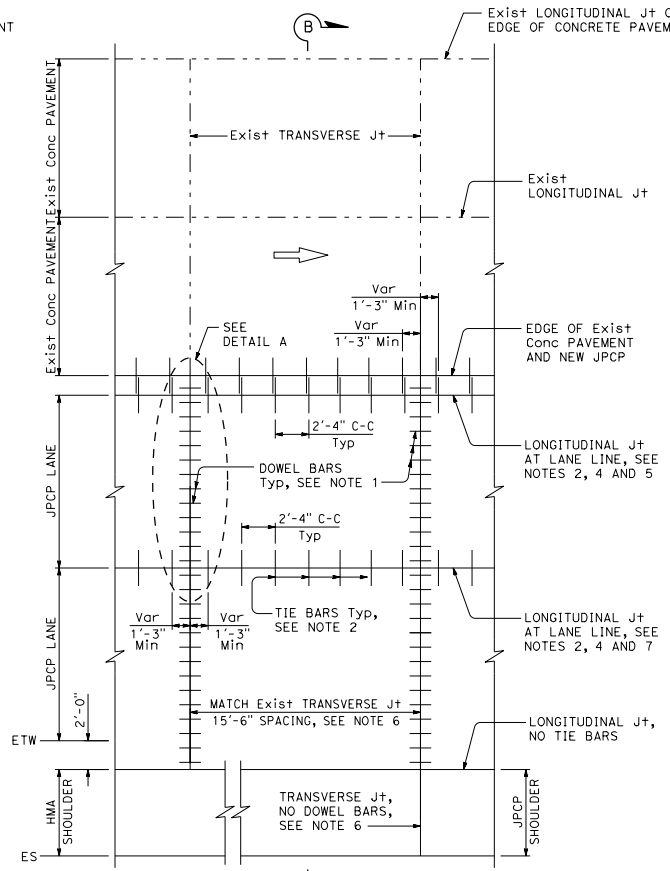
September 19, 2025
PLANS APPROVAL DATE

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Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
CIVIL
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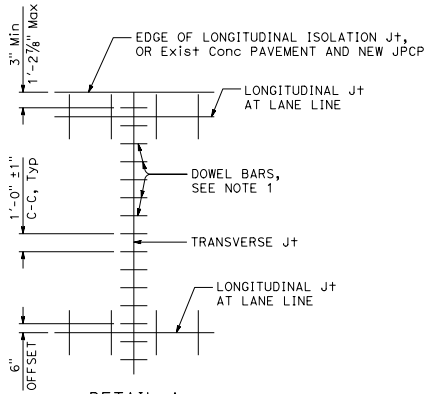

PLAN
ISOLATED
See Note 3



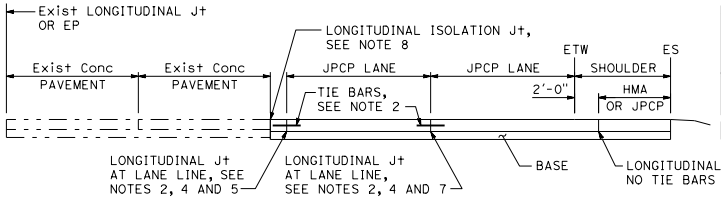

PLAN
TIED
See Note 3

NOTES:

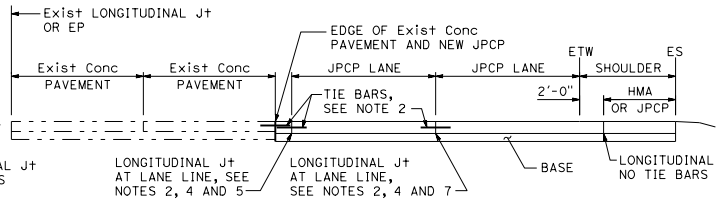
1. For transverse joint and dowel bar details not shown, see Standard Plan P10.
2. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
3. For joint layout at intersections, see Project Plans.
4. For additional longitudinal joint details, see Standard Plan P18.
5. Omit longitudinal joint when edge of new concrete pavement is 3'-3" or less from JPCP lane line.
6. Transverse joint spacing may be adjusted to no less than 10' and no more than 15'-6" to conform to bridges, change in pavement type and existing pavement.
7. For dowel bars at longitudinal joint, see Standard Plan P18.
8. For isolation joints, see Detail A on Standard Plan P18.




DETAIL A




SECTION A-A




SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# JOINTED PLAIN CONCRETE PAVEMENT (WIDENED LANE) LANE AND SHOULDER ADDITION OR REPLACEMENT

NO SCALE

P3B

7-1-25

Return to Table of Contents

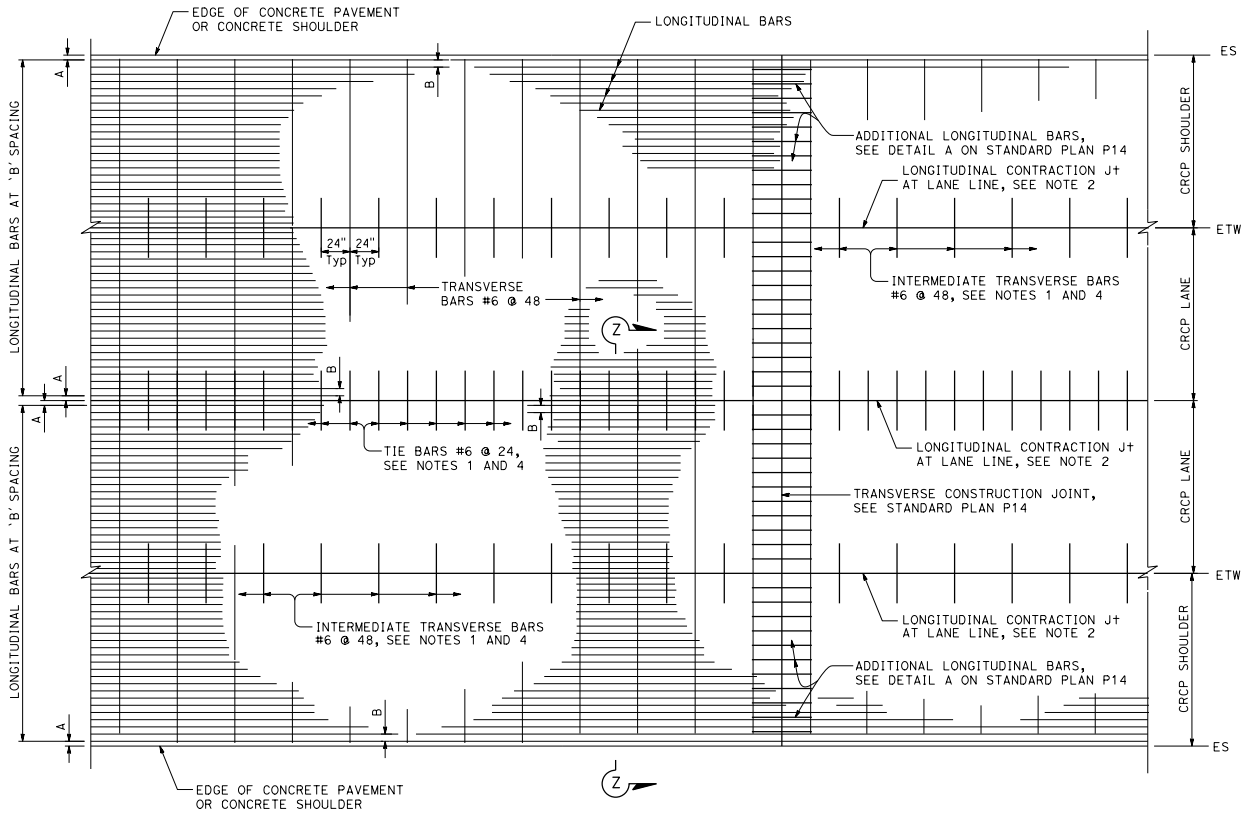
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|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
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No. C81459
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PLAN
See Note 3

NOTES:

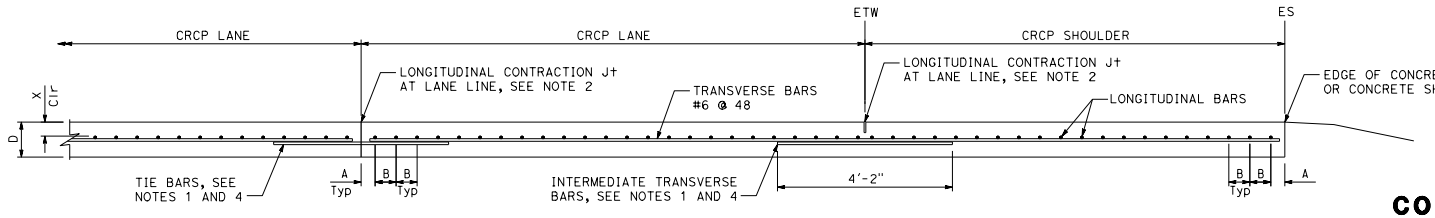
1. Place tie bars and intermediate transverse bars parallel to and in the same plane as transverse bars.
2. For longitudinal contraction and construction joint details, see Standard Plan P16.
3. For curved lane layout, see Standard Plan P16.
4. For tie bar and intermediate transverse bar details, see Standard Plan P16.

ABBREVIATION:

D - Thickness of CRCP

**TABLE No. 1 LONGITUDINAL BAR REINFORCEMENT**

| SLAB THICKNESS AND BAR SIZE | | FIRST SPACING AT EDGE OR JOINT | REGULAR BARS | ADDITIONAL BARS AT TRANSVERSE CONSTRUCTION JOINT | Clr |
|---|---|---|---|---|---|
| D | BAR SIZE | SPACING A | SPACING B | SPACING 2 x B | X |
| 0.75′ | #6 | 3" TO 4" | 7" | 14" | 4" |
| 0.80′ | #6 | 3" TO 4" | 6½" | 13" | 4" |
| 0.85′ | #6 | 3" TO 4" | 6" | 12" | 4" |
| 0.90′ | #6 | 3" TO 4" | 5½" | 11" | 4" |
| 0.95′ | #6 | 3" TO 4" | 5¼" | 10½" | 4" |
| 1.00′ | #6 | 3" TO 4" | 5" | 10" | 5" |
| 1.05′ | #7 | 3" TO 4" | 6½" | 13" | 5" |
| 1.10′ | #7 | 3" TO 4" | 6¼" | 12½" | 5½" |




SECTION Z-Z

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

NO SCALE

P4

7-1-25

2025 STANDARD PLAN P4

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

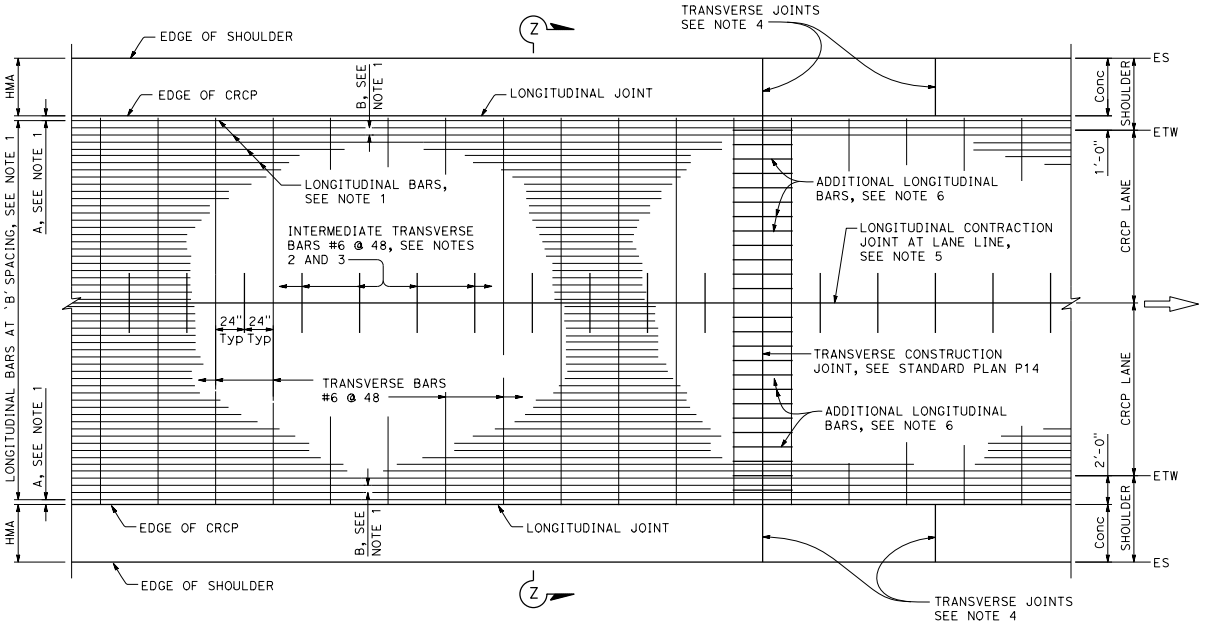
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
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CIVIL
STATE OF CALIFORNIA

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**ABBREVIATION:**

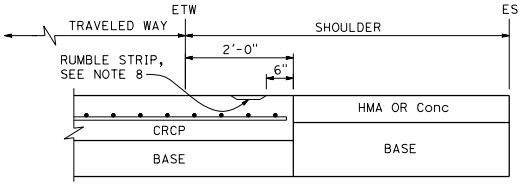
D = Thickness of CRCP



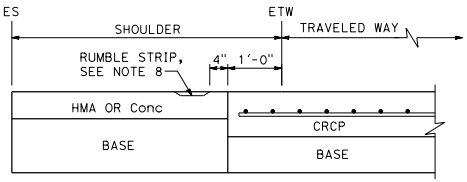

PLAN
See Note 7

**NOTES:**

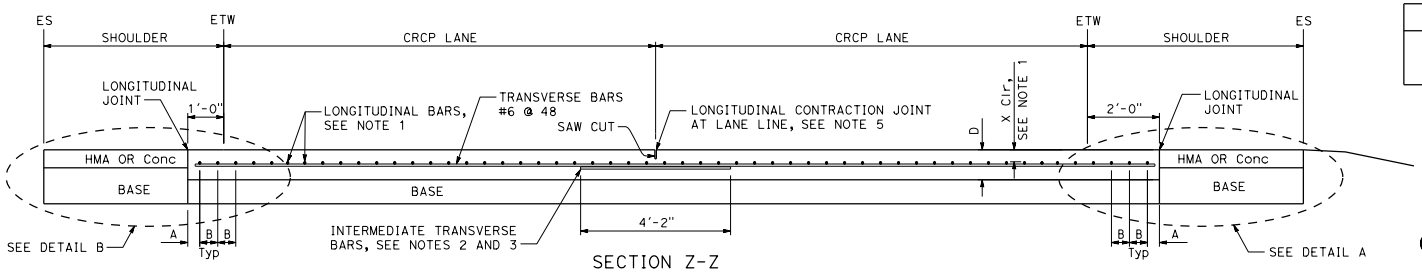
1. For longitudinal bar size, spacing and clearances, see Standard Plan P4.
2. For tie bar and intermediate transverse bar details, see Standard Plan P16.
3. Place intermediate transverse bars parallel to and in the same plane as transverse bars.
4. Construct transverse joints at right angle to the longitudinal joints in adjacent CRCP. Space joints at no less than 10'-0" intervals and no more than 14'-0" intervals. Match location of JPCP transverse joint with CRCP transverse construction joint or expansion joint. Omit dowel bars.
5. For longitudinal contraction joint details, see Standard Plan P16.
6. For additional longitudinal bars detail, see Detail A on Standard Plan P14.
7. For longitudinal construction joint plan layout not shown, see Standard Plan P4. For tie bar details at longitudinal construction joint, see Standard Plan P16.
8. For limits of rumble strips, see Project Plans.




DETAIL A




DETAIL B




SECTION Z-Z

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIDENED LANE)

NO SCALE

P5A

7-1-25



Return to Table of Contents

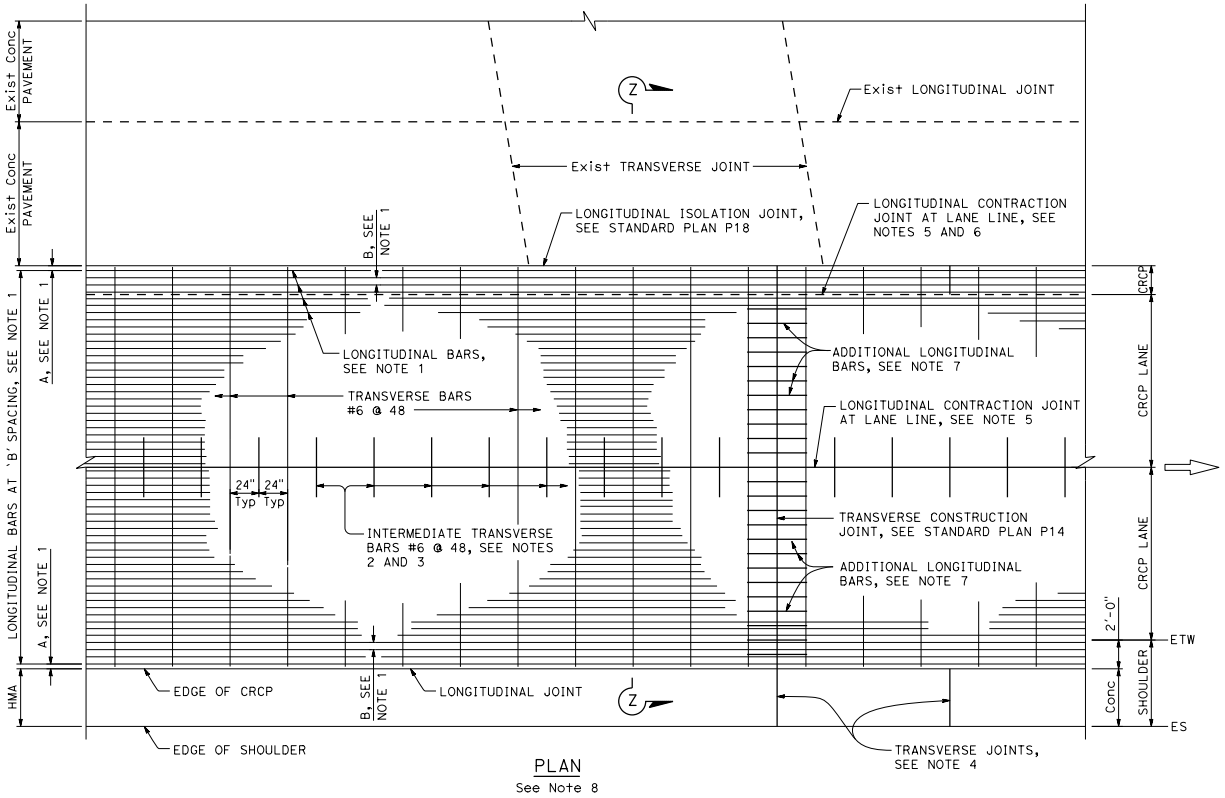
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
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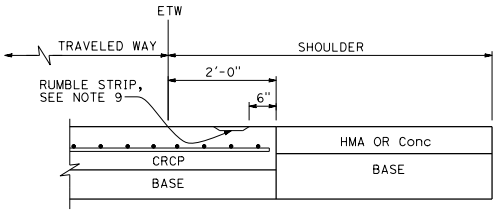

PLAN
See Note 8

ABBREVIATION:

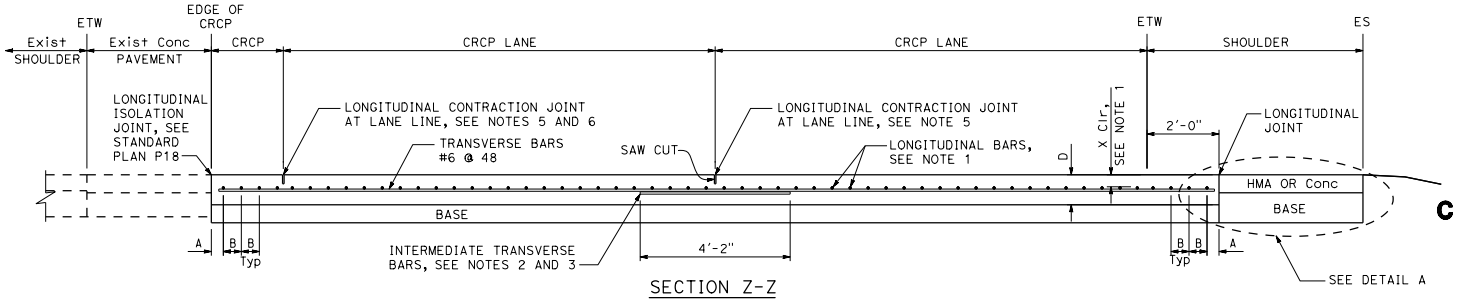
D - Thickness of CRCP

NOTES:

1. For longitudinal bar size, spacing and clearances, see Standard Plan P4.
2. For tie bar and intermediate transverse bar details, see Standard Plan P16.
3. Place Intermediate transverse bars parallel to and in the same plane as transverse bars.
4. Construct transverse joints at right angle to the longitudinal joints in adjacent CRCP. Space joints at no less than 10' intervals and no more than 14' intervals. Match location of JPCP transverse joint with CRCP transverse construction joint, expansion joint or wide flange beam. Omit dowel bars.
5. For longitudinal contraction joint details, see Standard Plan P16.
6. Do not construct longitudinal contraction joint when edge of new CRCP is less than 3'-3" from lane line.
7. For additional longitudinal bars detail, see Detail A on Standard Plan P14.
8. For longitudinal construction joint plan layout not shown, see Standard Plan P4. For tie bar details at longitudinal construction joint, see Standard Plan P16.
9. For limits of rumble strips, see Project Plans.




DETAIL A




SECTION Z-Z

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIDENED LANE) LANE AND SHOULDER ADDITION OR REPLACEMENT

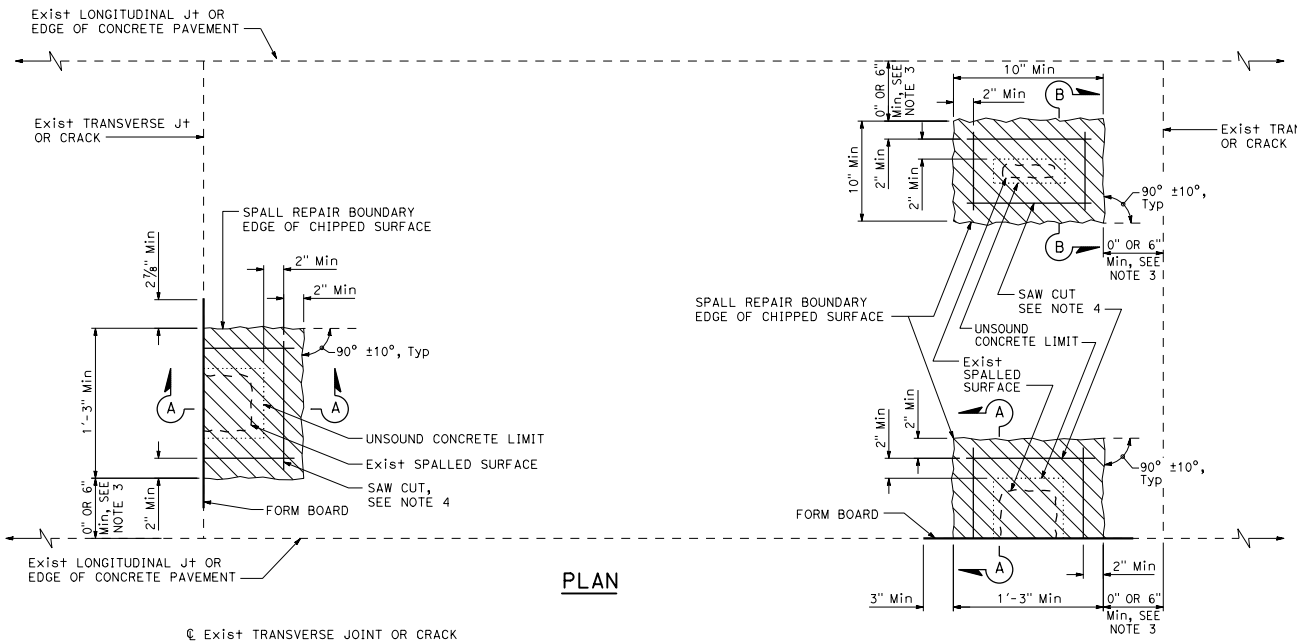
NO SCALE

P5B

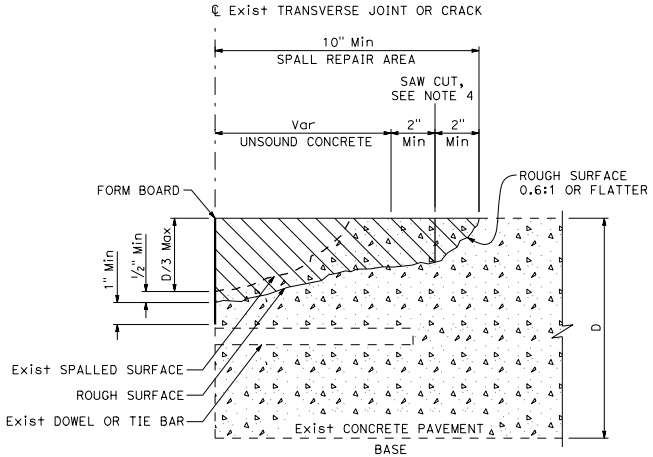
7-1-25

2025 STANDARD PLAN P5B

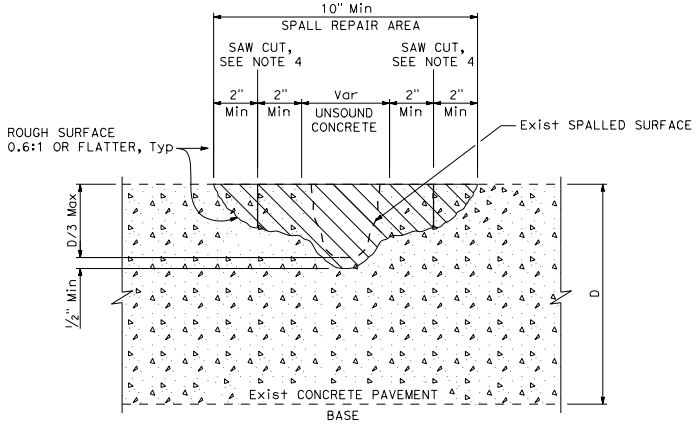
Return to Table of Contents




PLAN




SECTION A-A




SECTION B-B

## JOINT, CRACK, OR EDGE OF CONCRETE PAVEMENT REPAIR

## MISCELLANEOUS SPALL REPAIR

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Andre Totari
No. C94691
Exp. 6-30-27
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. See Project Plans for spall repair locations.
2. Combine spall repair areas closer than 2' apart.
3. If the spall repair area is less than 6" from a joint, extend the repair to the joint.
4. Cut at least 2" beyond the rectangular limits of unsound concrete determined by the Engineer. Determine the saw cut depth using the following table:

| CONCRETE MATERIAL | SAW CUT DEPTH | |
|---|---|---|
| | Min | Max |
| FAST-SETTING | 2" | 3½" |
| POLYESTER | 1½" | 3½" |

LEGEND:

SPALL REPAIR

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**SPALL REPAIR**

NO SCALE

P6

2025 STANDARD PLAN P6

7-1-25

Return to Table of Contents

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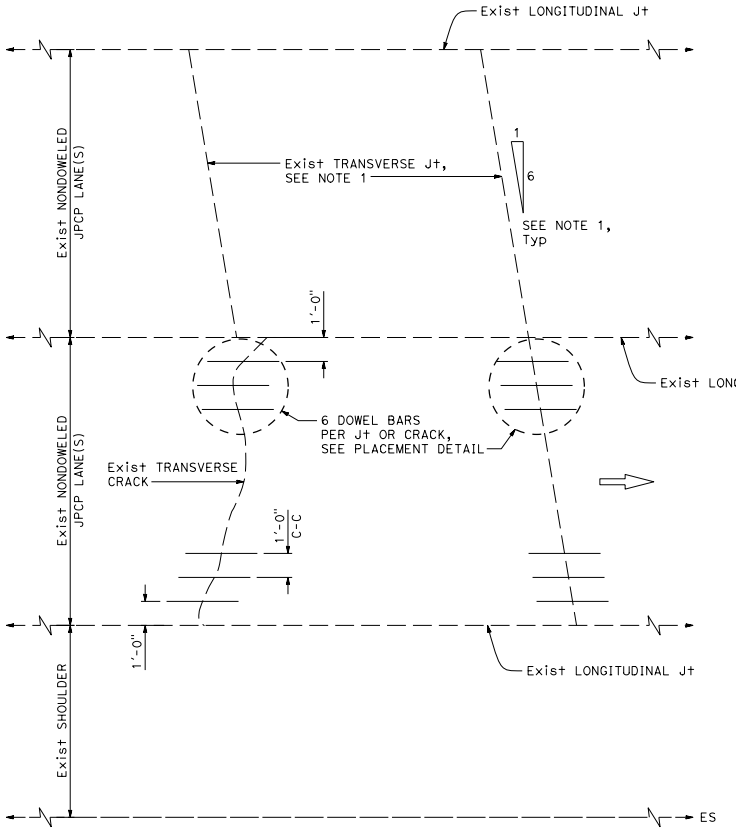
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

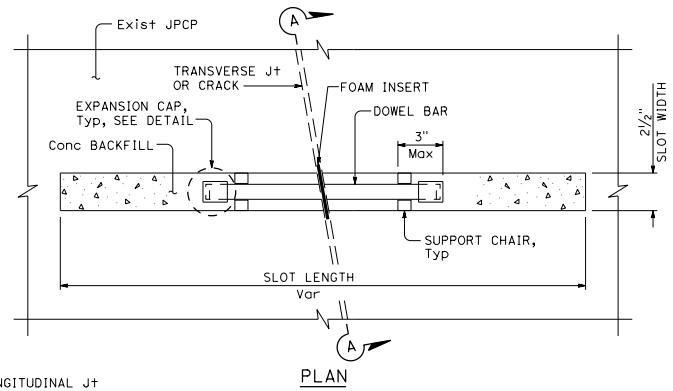
Andre Totari
No. C94691
Exp. 6-30-27
CIVIL

REGISTERED PROFESSIONAL ENGINEER
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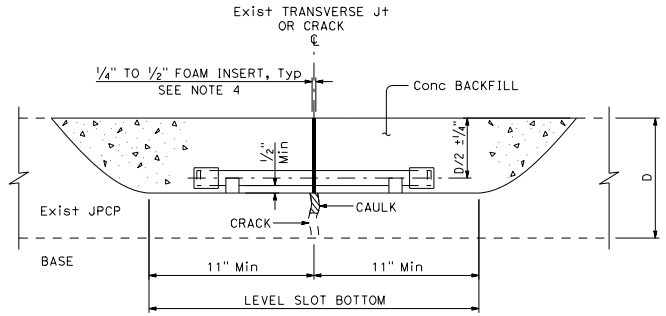

PLAN




PLAN

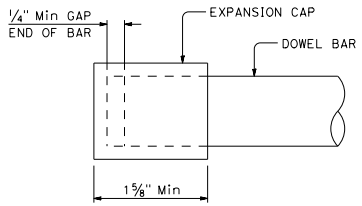
NOTES:

1. Details for skewed joints also apply to perpendicular joints.
2. Use 1'-6" ±¼" long dowel bars with a 1¼" diameter except 1" diameter dowel bars may be used if D < 0.70'.
3. Caulk existing transverse joint at bottom and sides of the dowel bar slot prior to placing dowel bar and foam insert.
4. Foam insert thickness must match width of existing transverse joint or crack.

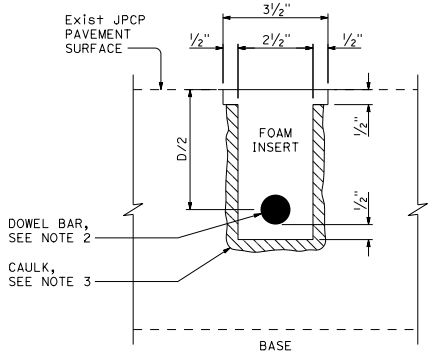



ELEVATION

## DOWEL BAR PLACEMENT DETAIL




EXPANSION CAP DETAIL




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## DOWEL BAR RETROFIT

NO SCALE

P7

2025 STANDARD PLAN P7

7-1-25

Return to Table of Contents

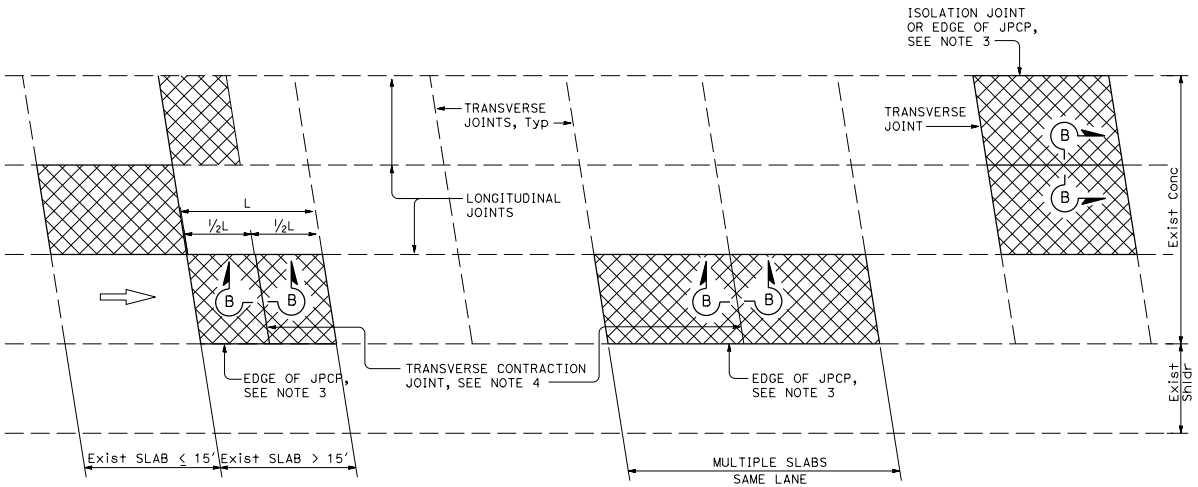
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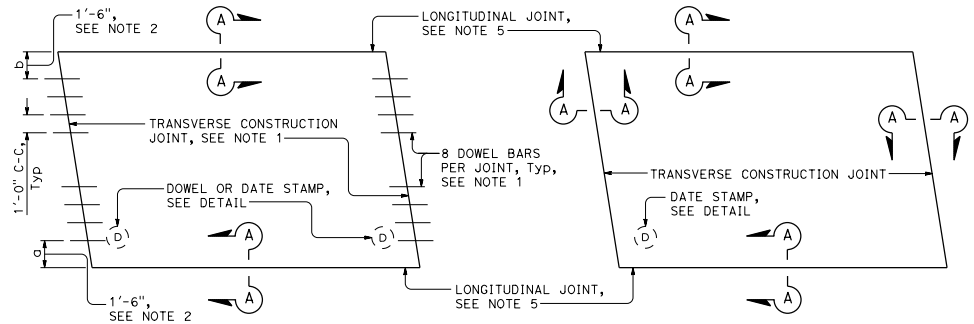
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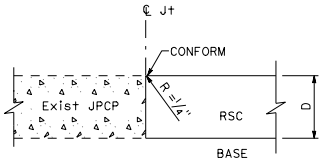

PLAN



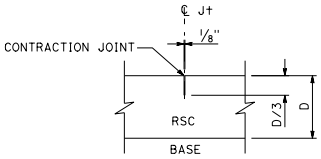

TYPE I
See Design Note 1

TYPE II
See Design Note 2

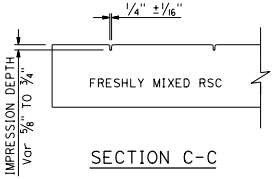
SLAB LAYOUT




SECTION A-A




SECTION B-B




SECTION C-C

NOTES:

1. For details not shown, see Standard Plan P10.
2. Where the existing outside shoulder is asphalt concrete pavement, "a" = 1'-0" and "b" = 2'-0".
3. Use side forms where edge of RSC pavement is adjacent to asphalt concrete.
4. Transverse contraction joint to match skew of existing joint. Omit dowel bars.
5. Do not place tie bars at longitudinal joints.

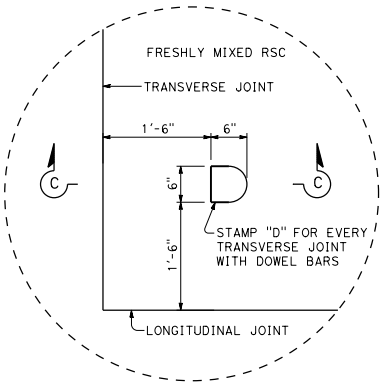
DESIGN NOTES:

1. For concrete slab repair with > 5 years design life.
2. For short term repairs with 5 years or less design life or for slab replacements with cracking and seating.

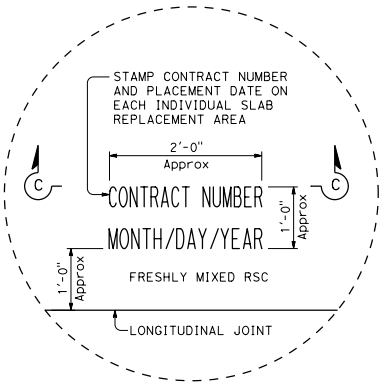
LEGEND:

RSC RAPID STRENGTH CONCRETE

INDIVIDUAL SLAB REPLACEMENT WITH RSC




DOWEL STAMP DETAIL




DATE STAMP DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# INDIVIDUAL SLAB REPLACEMENT WITH RAPID STRENGTH CONCRETE

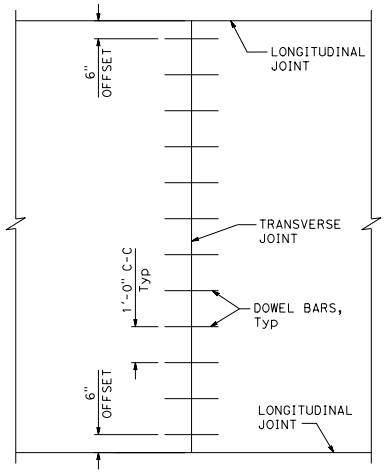
NO SCALE

P8

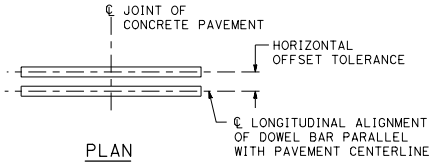
7-1-25



Return to Table of Contents

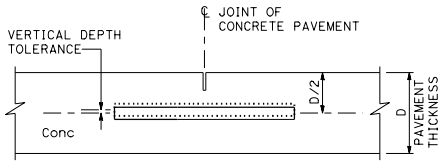



TRANSVERSE JOINT
DOWEL BAR LAYOUT



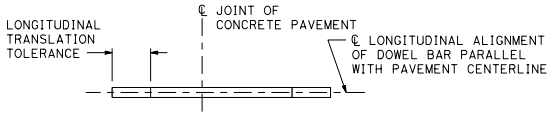

PLAN

HORIZONTAL OFFSET TOLERANCE



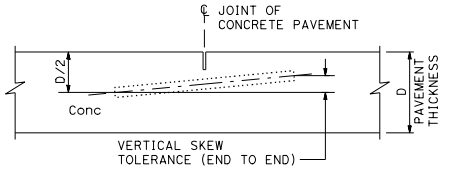

ELEVATION

VERTICAL DEPTH TOLERANCE



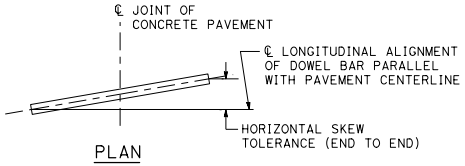

PLAN

LONGITUDINAL TRANSLATION TOLERANCE




ELEVATION

VERTICAL SKEW TOLERANCE




PLAN

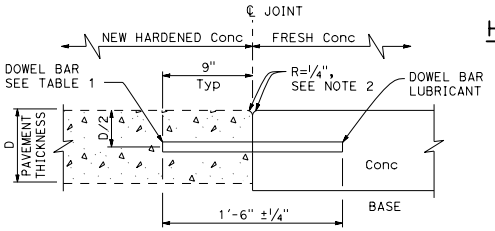
HORIZONTAL SKEW TOLERANCE

NOTES:

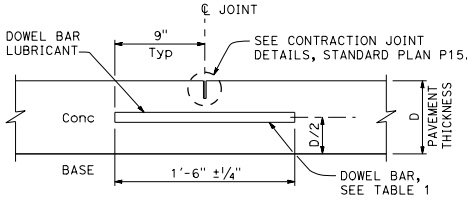
1. See Standard Plan P1 for typical dowel bar placement and locations.
2. Where fresh concrete pavement is placed against new concrete or existing concrete pavement, rounding the corner of the existing concrete pavement is not required.
3. May also use ¾" Dia dowel bars 2'-4" ±¼" in length. Center the length of dowel bars at the centerline of longitudinal joint.

| TABLE 1 | | | |
|---|---|---|---|
| DOWEL BAR DIAMETER TABLE | | | |
| PAVEMENT THICKNESS | 0.65′ | > 0.65′ - 0.85′ | > 0.85′ |
| MINIMUM DOWEL * BAR DIAMETER | 1" | 1¼" | 1½" |

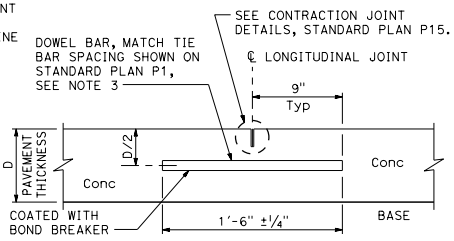
* The drilled hole diameter must be ⅛" to 3/16" larger than the bar diameter.




TRANSVERSE CONSTRUCTION JOINT DETAIL

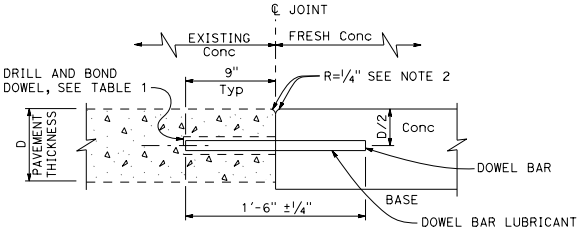



TRANSVERSE CONTRACTION JOINT

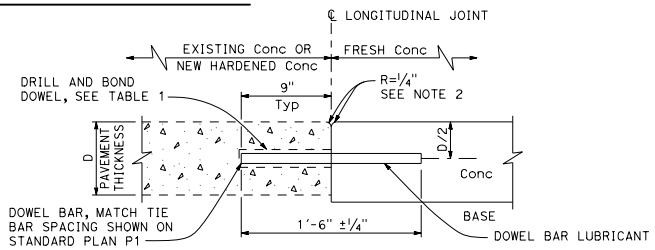



LONGITUDINAL CONTRACTION JOINT WITH DOWEL BARS

See Standard Plan P18




TRANSVERSE CONSTRUCTION JOINT FOR EXISTING CONCRETE PAVEMENT




LONGITUDINAL CONSTRUCTION JOINT WITH DOWEL BARS

See Standard Plan P18

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Dulce Rufino Feldman — No. C81459 — Exp. 9-30-25 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT DOWEL BAR DETAILS

NO SCALE

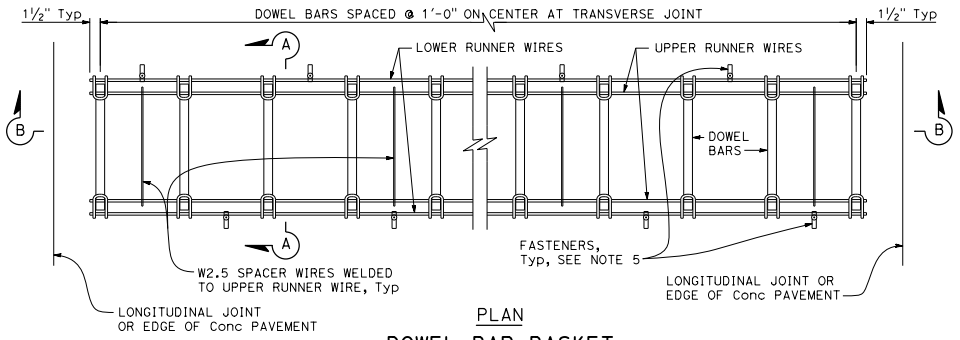
P10

2025 STANDARD PLAN P10

7-1-25



Return to Table of Contents




PLAN

## DOWEL BAR BASKET (TRANSVERSE JOINT)

See Note 1

NOTES:

1. "U" frame shape assembly shown. Use either "U" frame shape or "A" frame shape.
2. Wire sizes shown are the minimum required.
3. Use tie bar spacing for longitudinal dowel bar locations. See Standard Plans P1, P2, P3A, and P3B for tie bar requirements.
4. Weld may be at the top or bottom of the dowel bar.
5. Use anchor pins where soil or granular base is used. See Standard Plan P17 for anchor pin detail.

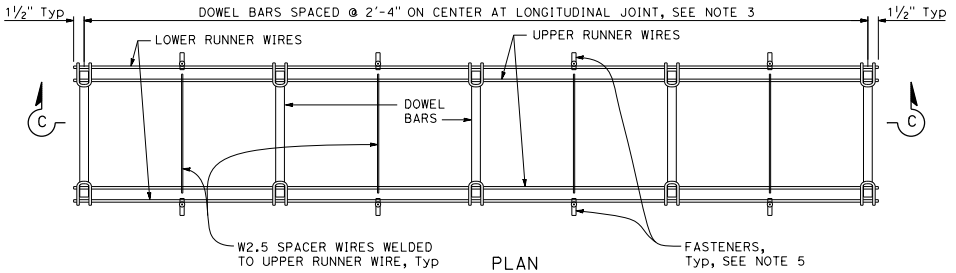
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
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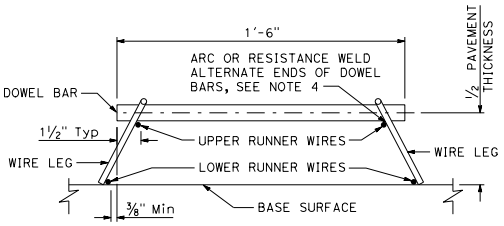
REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA



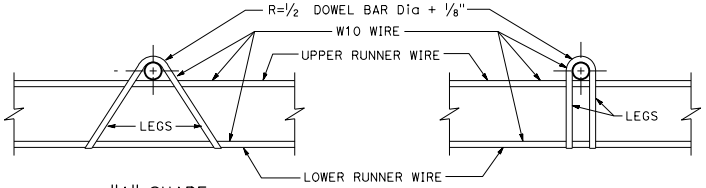

PLAN

## DOWEL BAR BASKET (LONGITUDINAL JOINT)

See Note 1

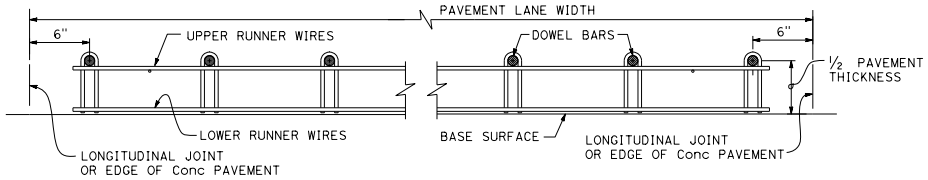



SECTION A-A



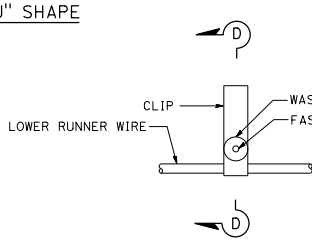

"A" SHAPE "U" SHAPE

ASSEMBLY FRAME DETAILS

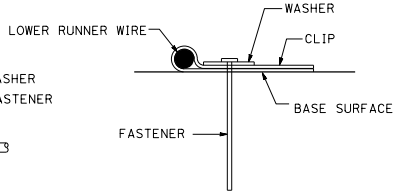



SECTION B-B

See Note 1



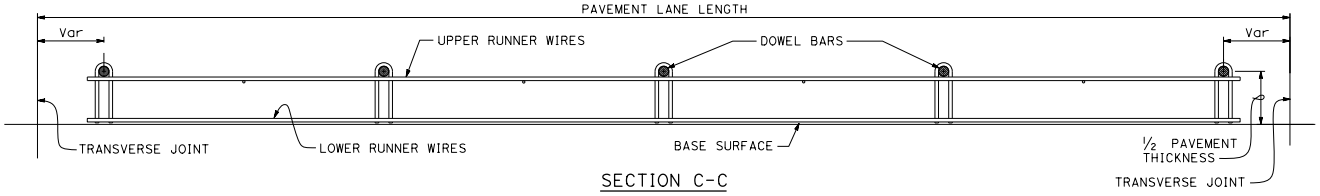

PLAN




SECTION D-D

## FASTENER DETAIL

See Note 5




SECTION C-C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT DOWEL BAR BASKET DETAILS

NO SCALE

P12

7-1-25

2025 STANDARD PLAN P12

Return to Table of Contents

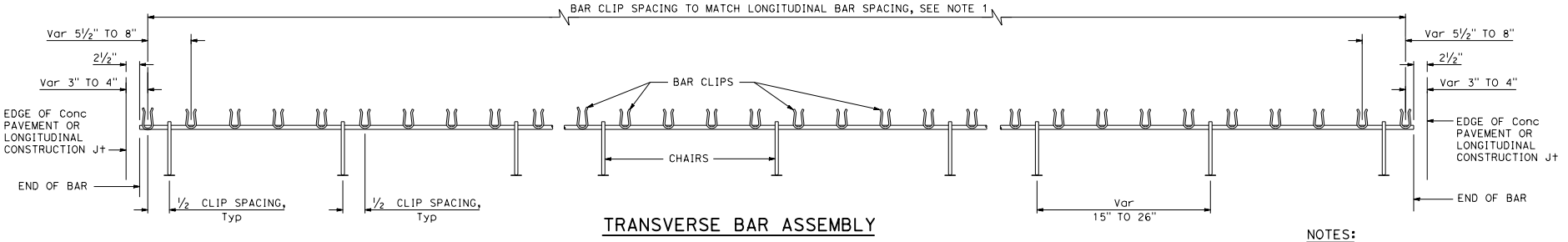
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
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September 19, 2025
PLANS APPROVAL DATE

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Dulce Rufino Feldman
No. C81459
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CIVIL
STATE OF CALIFORNIA

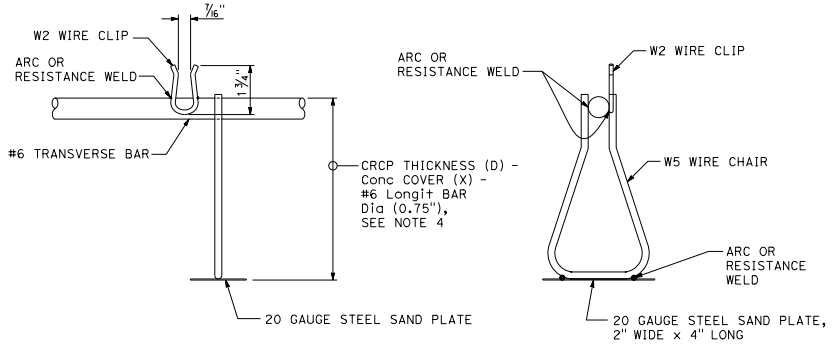
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## TRANSVERSE BAR ASSEMBLY

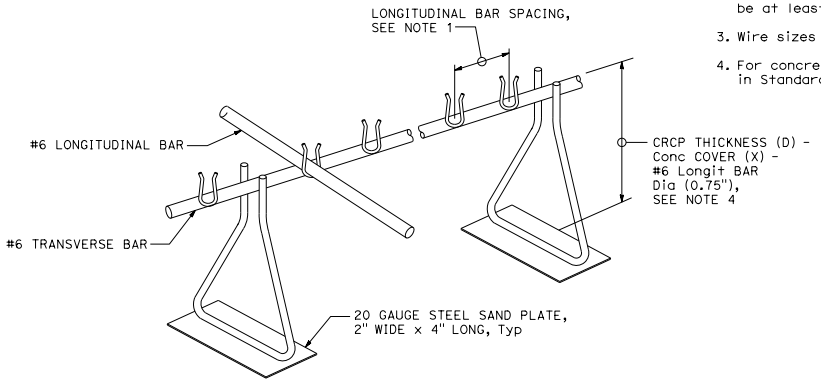
NOTES:

1. See Standard Plan P4 for spacing of longitudinal bars.
2. Tensile strength of chair shall be at least 50,000 psi.
3. Wire sizes shown are minimum required.
4. For concrete cover (X), see Table 1 in Standard Plan P4.




## #6 BAR CLIP DETAIL

## CHAIR DETAIL




## ISOMETRIC VIEW OF CHAIR ASSEMBLY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT SINGLE PIECE TRANSVERSE BAR ASSEMBLY

NO SCALE

P13

7-1-25





Return to Table of Contents

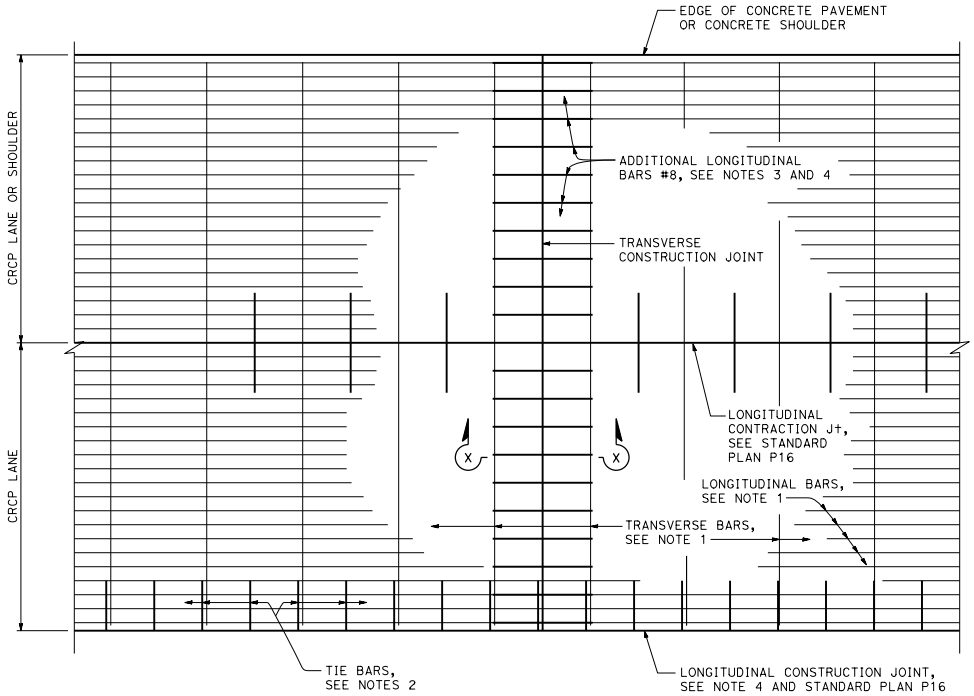
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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DETAIL A

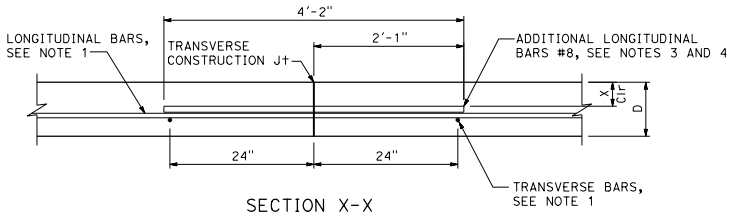
Additional longitudinal bars at transverse construction joint

NOTES:

1. For transverse and longitudinal bar sizes, spacing and clearances, see Table 1 on Standard Plan P4.
2. For tie bars in longitudinal construction joint, see Standard Plan P16.
3. Place additional longitudinal bars parallel to and in the same plane as the longitudinal bars.
4. Place additional longitudinal bars symmetrically about longitudinal construction joint.

ABBREVIATION:

D = Thickness of CRCP




SECTION X-X

TRANSVERSE CONSTRUCTION JOINT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT TRANSVERSE CONSTRUCTION JOINT

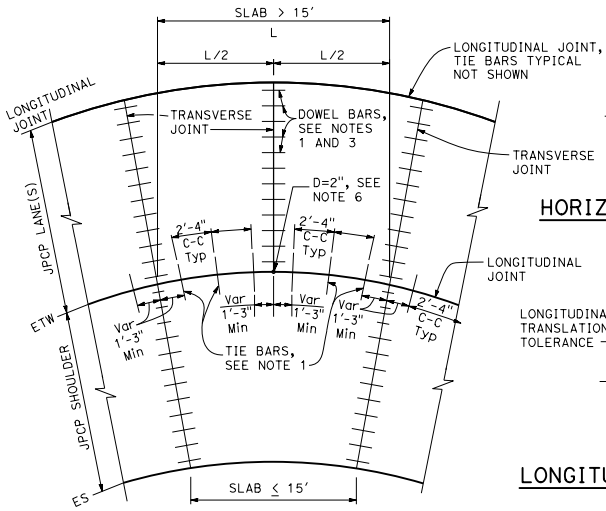
NO SCALE

P14

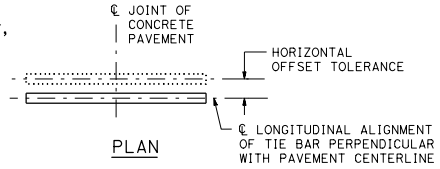
7-1-25

2025 STANDARD PLAN P14

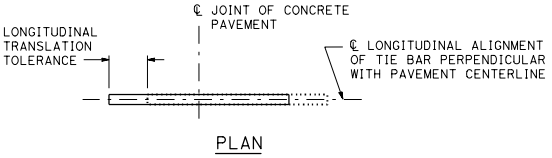
Return to Table of Contents



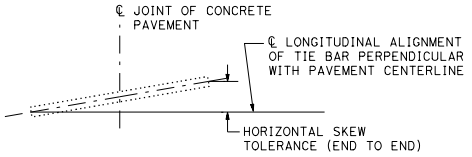

TIE BAR LAYOUT IN CURVED LANES



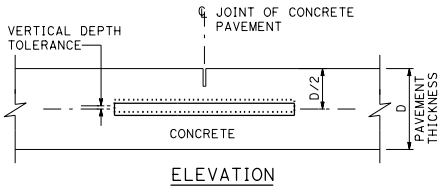

HORIZONTAL OFFSET TOLERANCE



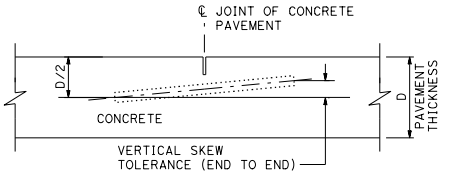

LONGITUDINAL TRANSLATION TOLERANCE



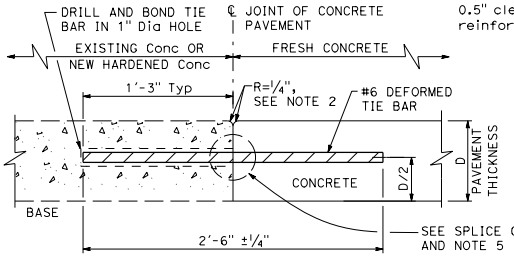

HORIZONTAL SKEW TOLERANCE




VERTICAL DEPTH TOLERANCE



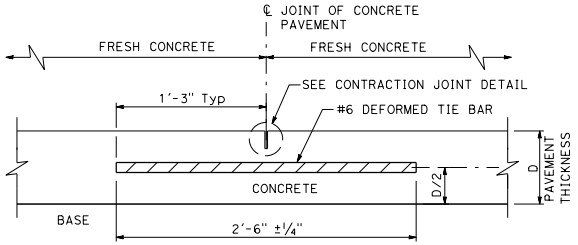

VERTICAL SKEW TOLERANCE



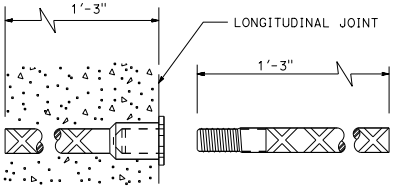

LONGITUDINAL CONSTRUCTION JOINT

NOTES:

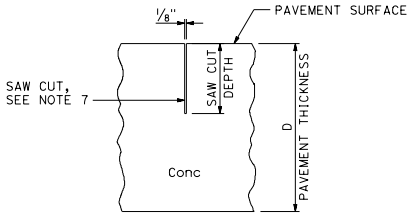
1. See Standard Plan P1 for typical dowel bar and tie bar placement and locations.
2. Where new pavement is placed against existing concrete pavement, rounding the corner is not required.
3. For dowel bar sizes, See Standard Plan P10.
4. Tie bar details apply to inside widenings.
5. Use either drill and bond or splice couplers.
6. Full depth drilled hole. Fill hole with filler material.
7. The bottom of the saw cut must be at least 0.5" clear of any dowel bar, tie bar and bar reinforcement.




LONGITUDINAL CONTRACTION JOINT




ALTERNATIVE SPLICE COUPLER




CONTRACTION JOINT DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT TIE BAR DETAILS

NO SCALE

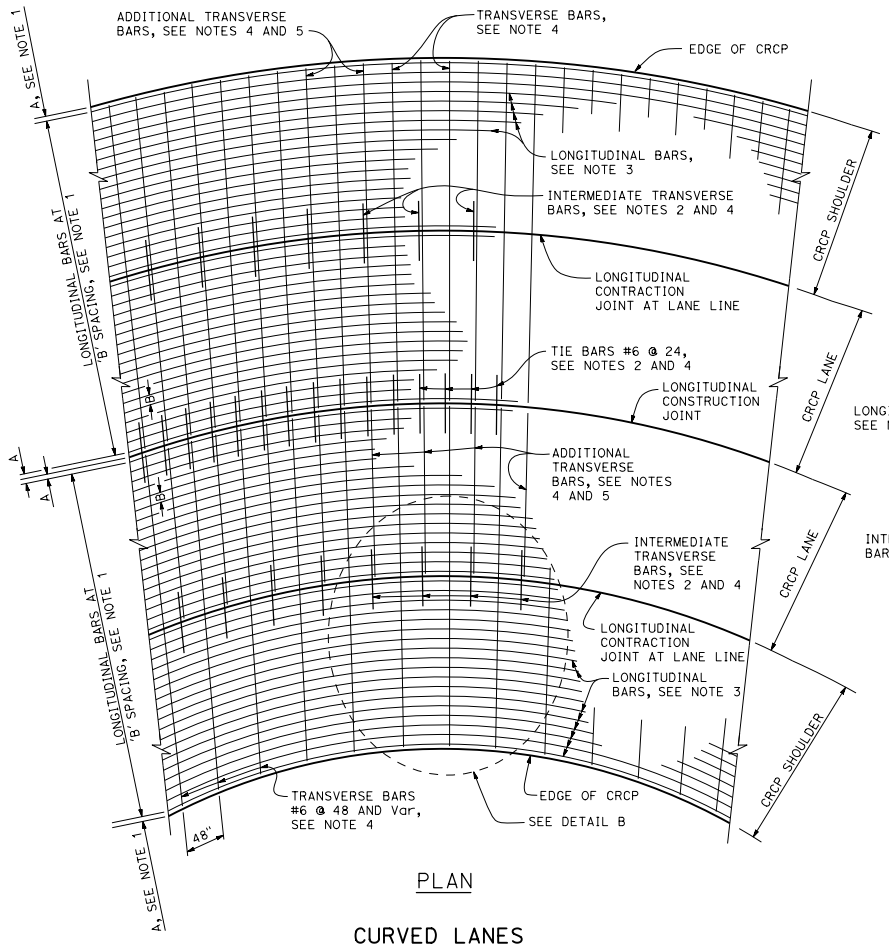
P15

7-1-25

2025 STANDARD PLAN P15

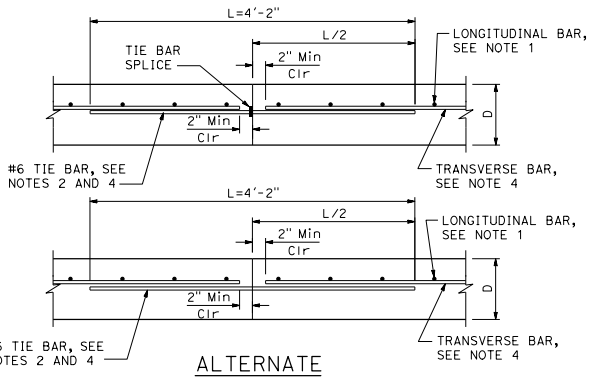


Return to Table of Contents

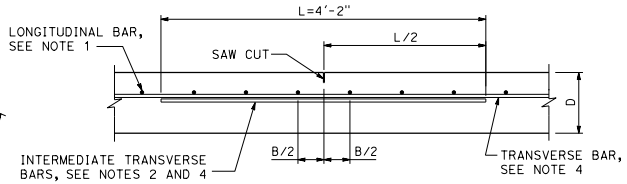



PLAN

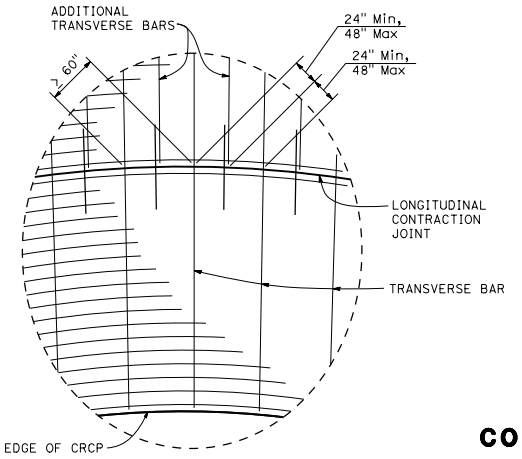
CURVED LANES




LONGITUDINAL CONSTRUCTION JOINT




LONGITUDINAL CONTRACTION JOINT



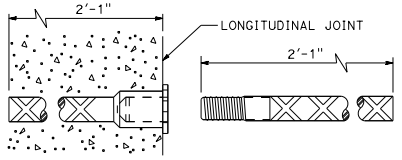

DETAIL B

NOTES:

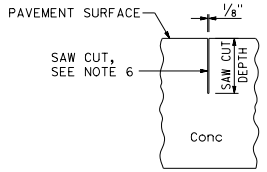
1. For longitudinal bar spacing and clearances, see Table 1 on Standard Plan P4.
2. Place tie bars and intermediate transverse bars parallel to and in the same plane as the transverse bars.
3. Place longitudinal bars parallel to roadway curvature.
4. Place transverse bars, additional transverse bars, tie bars and intermediate transverse bars perpendicular to the pavement curvature.
5. Place additional transverse bars where required, see Detail B.
6. The bottom of the saw cut must be at least 0.5" clear of any dowel bar, tie bar and bar reinforcement.

ABBREVIATION:

D = Thickness of CRCP




TIE BAR SPLICE COUPLER DETAIL




CONTRACTION JOINT SAW CUT

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Dulce Rufino Feldman — No. C81459 — Exp. 9-30-25 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT TIE BARS AND JOINT DETAILS

NO SCALE

P16

2025 STANDARD PLAN P16

7-1-25

Return to Table of Contents

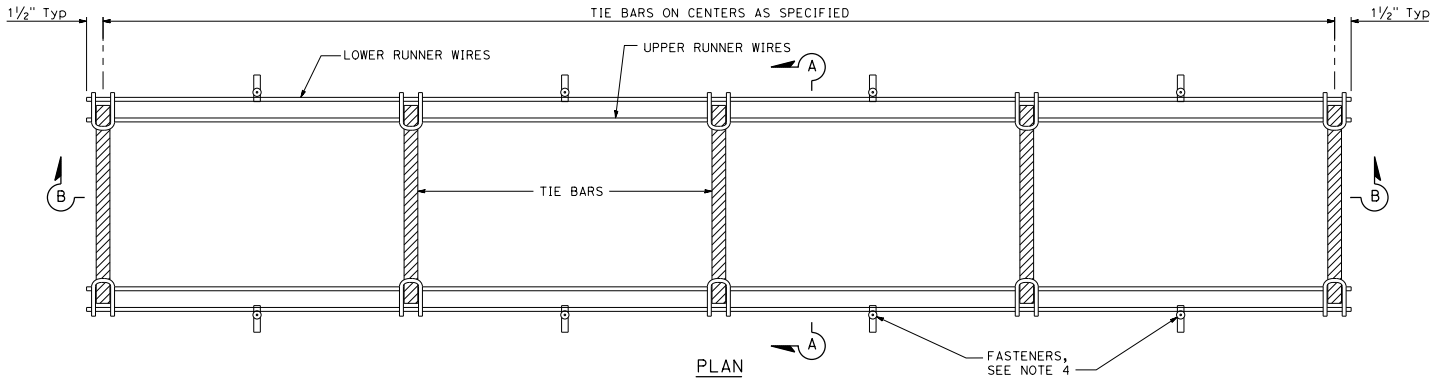
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA

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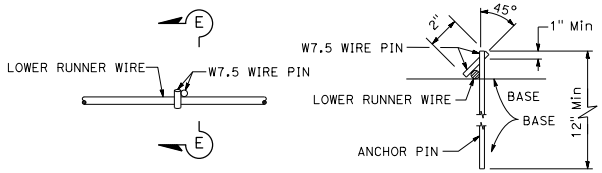

PLAN

## TIE BAR BASKET

(Tie bars at longitudinal joint)
See Note 1

NOTES:

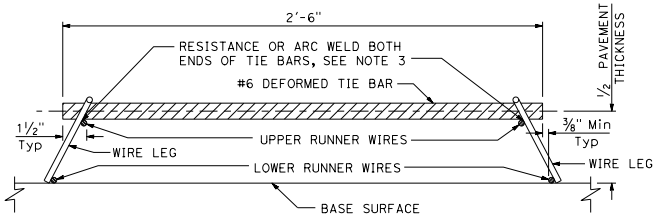
1. "U" frame shape assembly shown. Use either "U" frame shape or "A" frame shape.
2. Wire sizes shown are the minimum required.
3. Weld may be at top or bottom of tie bars.
4. Use anchor pins where soil or granular base is used.



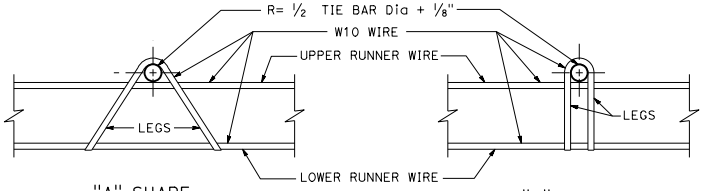

PLAN SECTION E-E

## ANCHOR PIN DETAILS

See Note 4



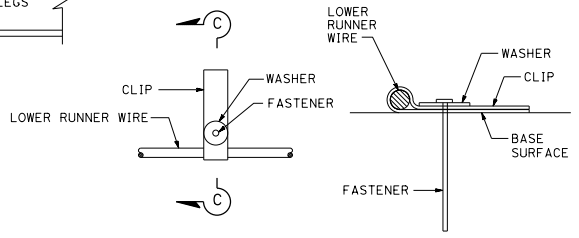

SECTION A-A




"A" SHAPE "U" SHAPE

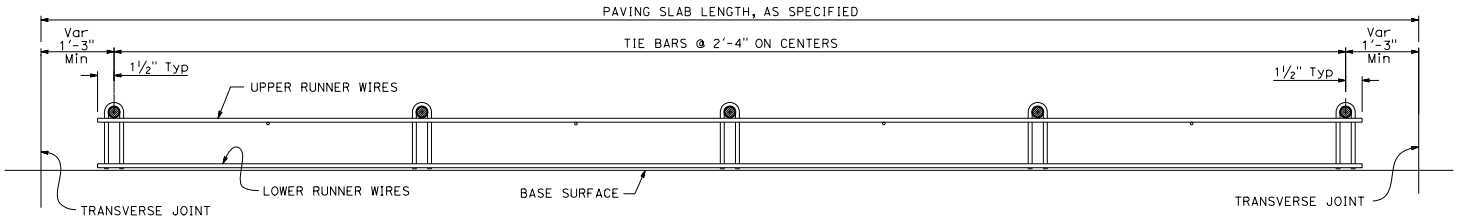
## ASSEMBLY FRAME DETAILS

See Note 1




PLAN SECTION C-C

## FASTENER DETAILS




SECTION B-B
See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT TIE BAR BASKET DETAILS

NO SCALE

P17

2025 STANDARD PLAN P17

7-1-25

Return to Table of Contents

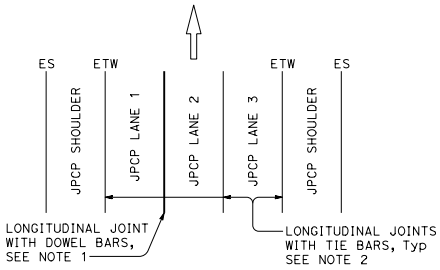
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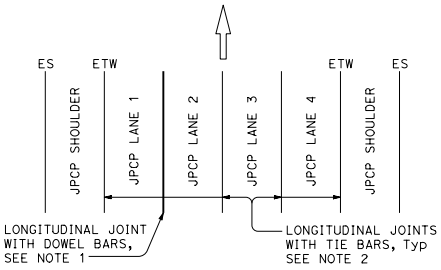
Dulce Rufino Feldman, No. C81459, Exp. 9-30-25, CIVIL, REGISTERED PROFESSIONAL ENGINEER, STATE OF CALIFORNIA

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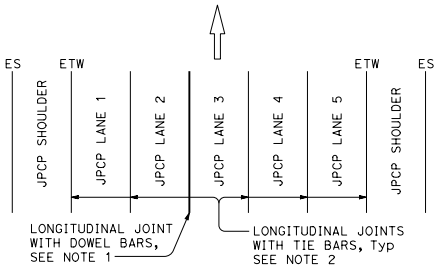

PLAN

3 LANES WITH CONCRETE SHOULDERS




PLAN

4 LANES WITH CONCRETE SHOULDERS

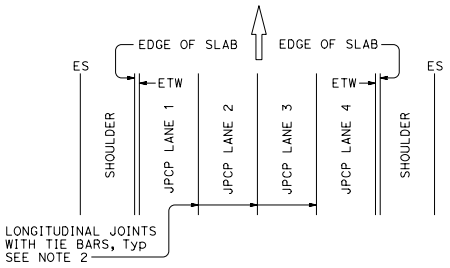



PLAN

5 LANES WITH CONCRETE SHOULDERS

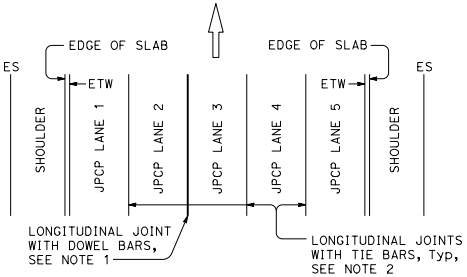
NOTES:

1. See Standard Plan P10 for longitudinal joint with dowel bars.
2. See Standard Plan P15 for longitudinal joint with tie bars.
3. S = Reservoir depth.
   S = 7/8" ±1/16" for asphalt rubber seals
   S = 3/16" ±1/16" for silicone seals
   Preformed compression seals must be 13/16" wide and S = 1 11/16" ±1/16".




PLAN

4 LANES OR LESS WITH AC SHOULDERS

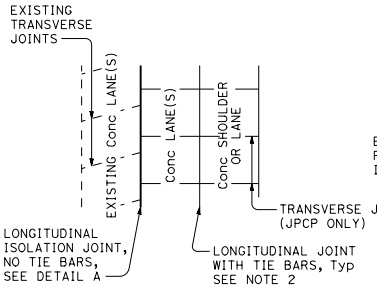



PLAN

5 LANES WITH AC SHOULDERS

## NEW CONSTRUCTION

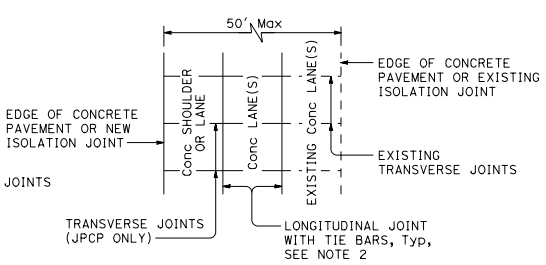
Location of Longitudinal Joints.
For JPCP




PLAN

CASE 1

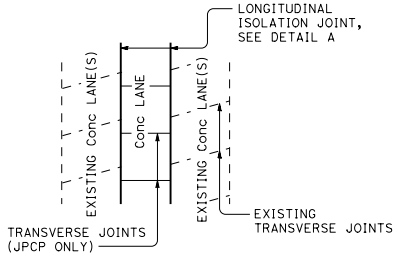
Transverse Joints do not align between new and existing.




PLAN

CASE 2

Transverse Joints align between new and existing.
For JPCP only



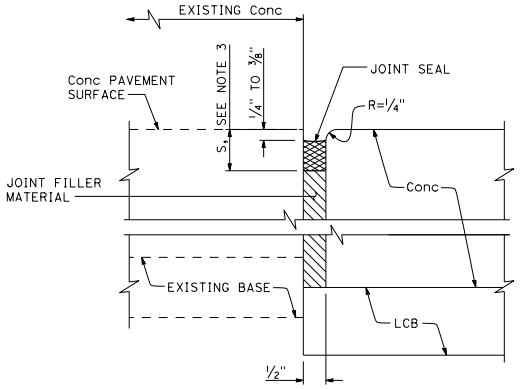

PLAN

CASE 3 (INTERIOR LANE REPLACEMENT)

Transverse Joints do not align between new and existing.

## LANE/SHOULDER ADDITION OR RECONSTRUCTION

For JPCP and CRCP




DETAIL A

ISOLATION JOINT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT LANE SCHEMATICS AND ISOLATION JOINT DETAIL

NO SCALE

P18

7-1-25

2025 STANDARD PLAN P18

Return to Table of Contents

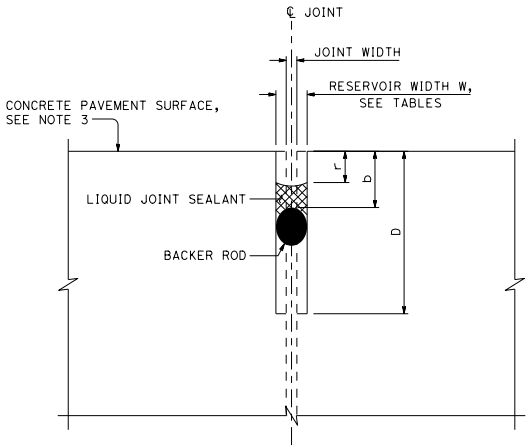
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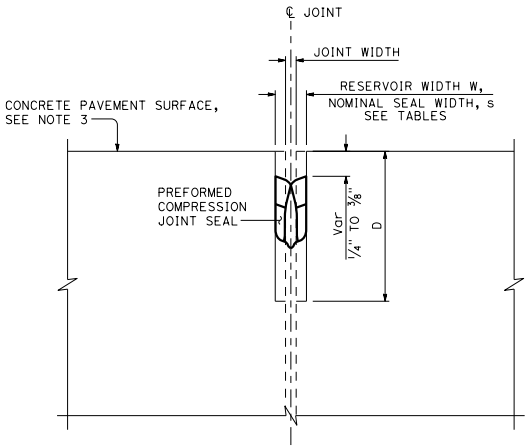
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Andre Totari
No. C94691
Exp. 6-30-27
CIVIL
STATE OF CALIFORNIA

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LIQUID JOINT SEALANT




PREFORMED COMPRESSION JOINT SEAL

NOTES:

1. Details do not apply to isolation joints and longitudinal construction joints.
2. Tie bars, dowel bars, and bar reinforcement are not shown.
3. Depths are measured from the final concrete pavement surface elevation after any grinding.

**LIQUID JOINT SEALANT DIMENSIONS**

| RESERVOIR WIDTH W ±1/16" | BACKER ROD NOMINAL Dia * | DEPTHS (ASPHALT RUBBER) ** | | DEPTHS (SILICONE) | | |
|---|---|---|---|---|---|---|
| | | RESERVOIR D ±1/4" | BACKER ROD b ±1/16" | RESERVOIR D ±1/4" | BACKER ROD b ±1/16" | RECESS r ±1/16" |
| 1/4" | 3/8" | 1 3/4" | 7/8" | 1 3/8" | 1/2" | 1/4" |
| 3/8" | 1/2" | 1 7/8" | 7/8" | 1 1/2" | 1/2" | 1/4" |
| 1/2" | 3/4" | 2" | 7/8" | 1 3/4" | 9/16" | 5/16" |
| 5/8" | 7/8" | 2 1/4" | 1" | 2" | 5/8" | 5/16" |
| 3/4" | 1" | 2 3/4" | 1 1/8" | 2 1/4" | 3/4" | 3/8" |
| 7/8" | 1 1/4" | 3" | 1 1/4" | 2 1/2" | 13/16" | 3/8" |
| 1" | 1 1/2" | 3 1/4" | 1 3/8" | 2 5/8" | 7/8" | 3/8" |
| 1 1/8" | 1 1/2" | 3 1/2" | 1 1/2" | 2 13/16" | 1" | 1/2" |

* Larger diameter backer rods may be substituted according to manufacturer recommendations if reservoir depth is increased equivalently.

** Asphalt rubber sealant recess depth "r" varies from 1/4" to 3/8".

**PREFORMED COMPRESSION JOINT SEAL DIMENSIONS**

| RESERVOIR WIDTH W ±1/16" | NOMINAL SEAL WIDTH s | RESERVOIR DEPTH D ±1/4" |
|---|---|---|
| 1/4" | 7/16" | 1 1/4" |
| 3/8" | 11/16" | 1 7/16" |
| 1/2" | 15/16" | 1 11/16" |
| 5/8" | 1" | 1 7/8" |
| 3/4" | 1 1/4" | 2 1/8" |
| 7/8" | 1 5/8" | 2 5/8" |
| 1" | 1 5/8" | 2 5/8" |
| 1 1/8" | 2" | 2 7/8" |

| CONSTRUCTION SEASON | MINIMUM RESERVOIR WIDTH * W ±1/16" |
|---|---|
| WINTER | 1/4" |
| SPRING | 3/8" |
| SUMMER | |
| FALL | |

* Minimum reservoir width for replace joint seal = existing joint width + 1/8".

STATE OF CALIFORNIA
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## JOINT SEALS

NO SCALE

P20

7-1-25



Return to Table of Contents

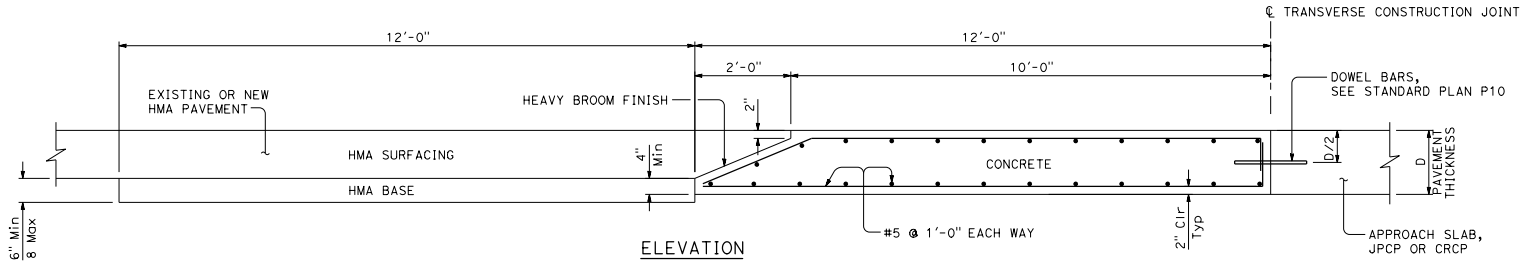
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Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
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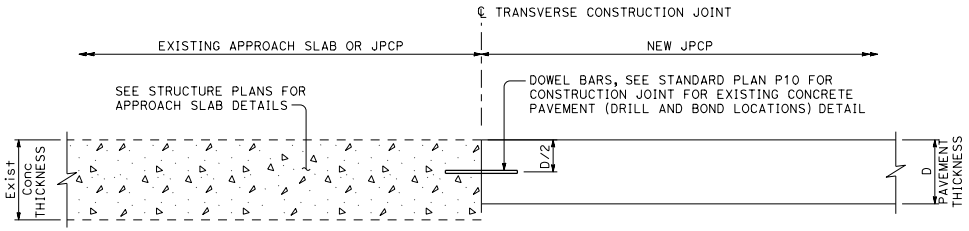



ELEVATION

## CONCRETE PAVEMENT TRANSITION PANEL

NOTE:

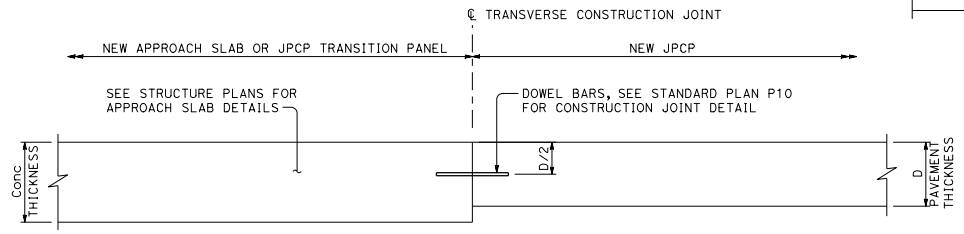
1. Maintain same base thickness as JPCP.




ELEVATION

## TERMINAL JOINT TYPE 1

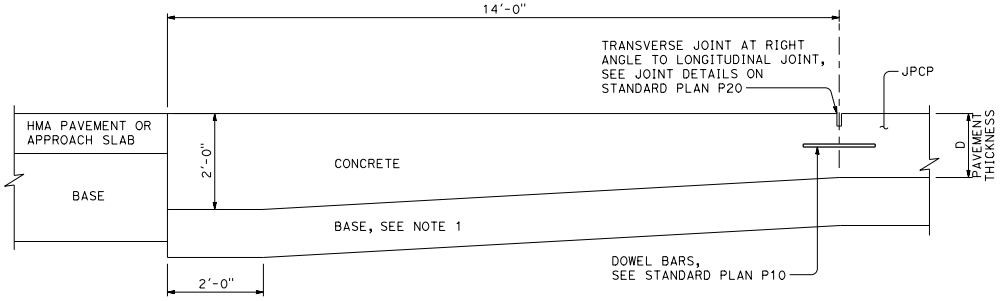
For Exist JPCP or Approach Slab




ELEVATION

## TERMINAL JOINT TYPE 2

For JPCP Transition Panel or Approach Slab




ELEVATION

## PAVEMENT END ANCHOR

For HMA Pavement or Approach Slab

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT END PANEL PAVEMENT TRANSITIONS

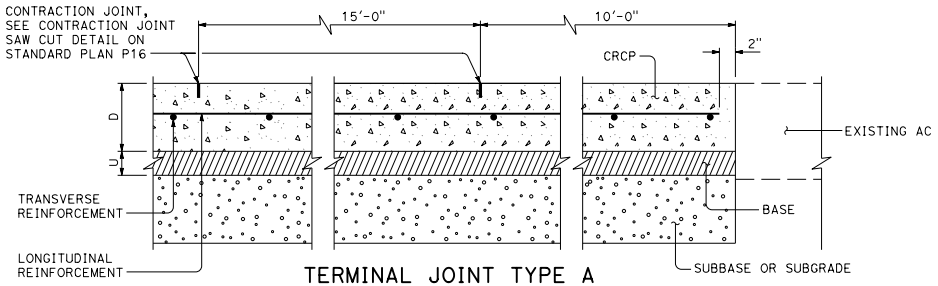
NO SCALE

P30

7-1-25

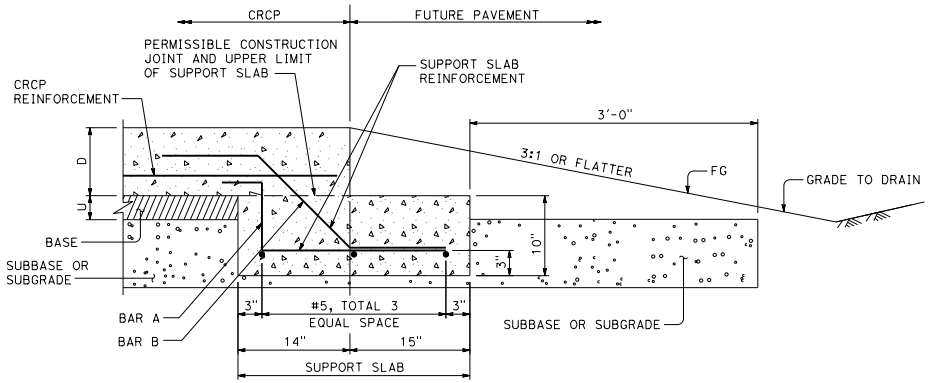


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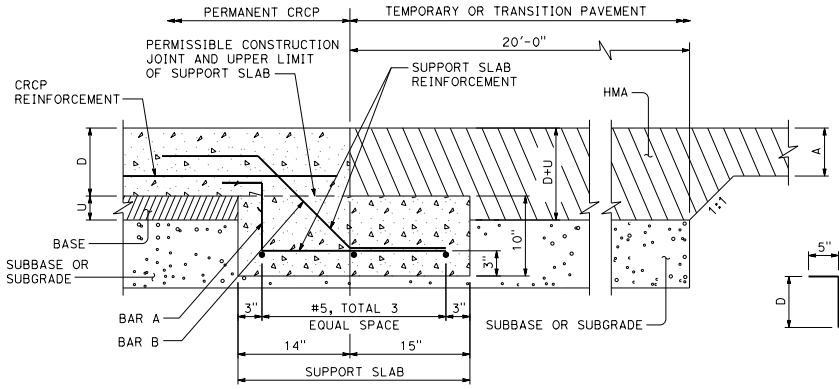

## TERMINAL JOINT TYPE A

For Existing AC



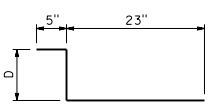

## TERMINAL JOINT TYPE B

For Future Pavement

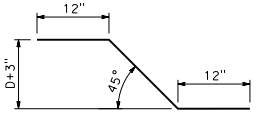



## TERMINAL JOINT TYPE C

For HMA Pavement




#5 BAR A
At 12" C-C




#5 BAR B
At 12" C-C

## REINFORCEMENT DETAIL

**ABBREVIATIONS:**

D = Thickness of CRCP
A = Depth of HMA as shown on Project Plans
U = Thickness of Base

**NOTES:**

1. See Standard Plan B6-21 for "a".
2. For layout, tolerances, and other details not shown, see Standard Plan P10.
3. See Standard Plan P32.

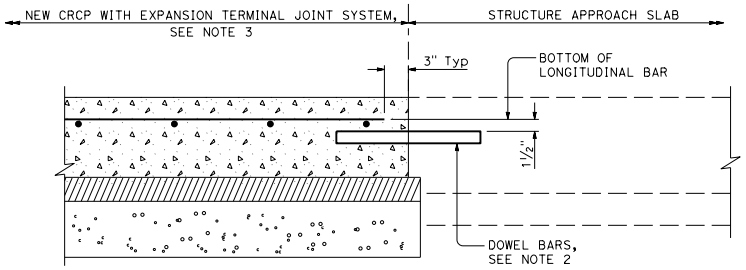
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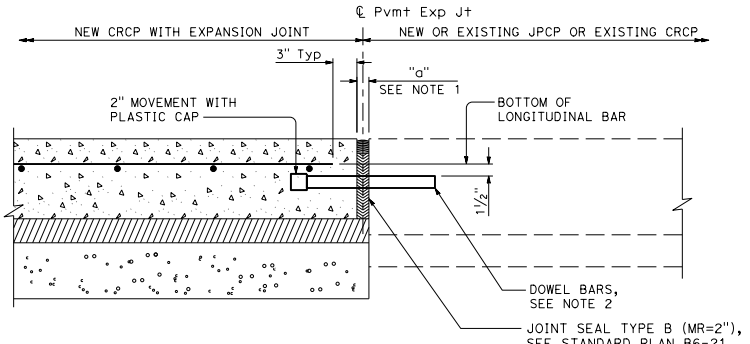
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## TERMINAL JOINT TYPE F

For Structure Approach Slabs




## TERMINAL JOINT TYPE G

For New or Existing JPCP or Existing CRCP

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT TERMINAL JOINT DETAILS

NO SCALE

**P31A**

7-1-25

2025 STANDARD PLAN P31A

Return to Table of Contents

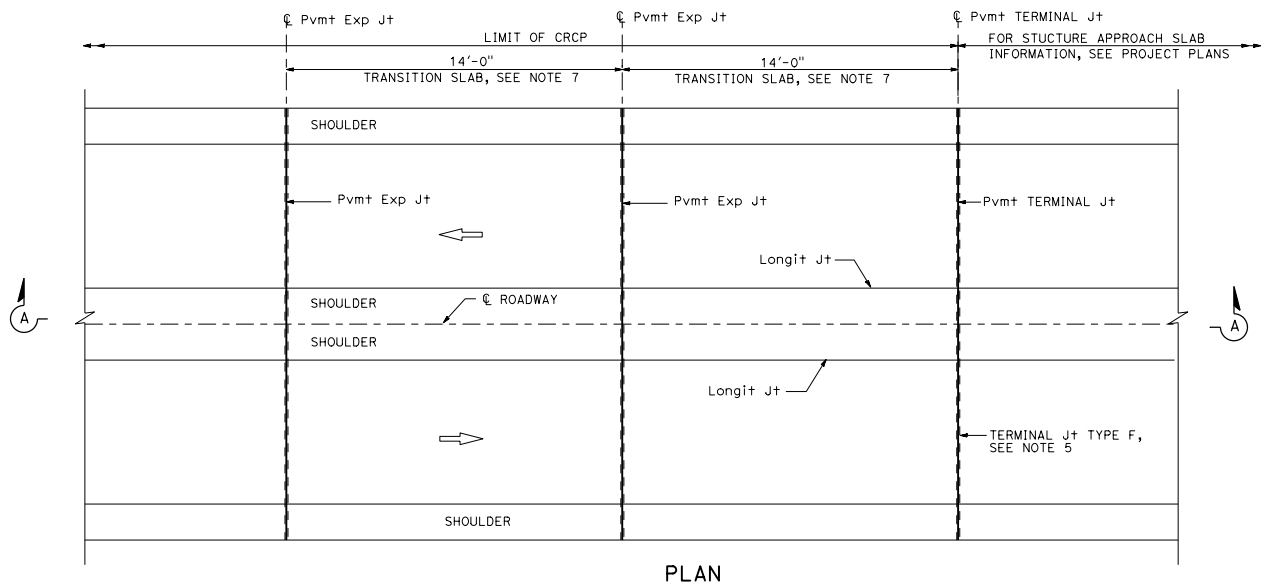
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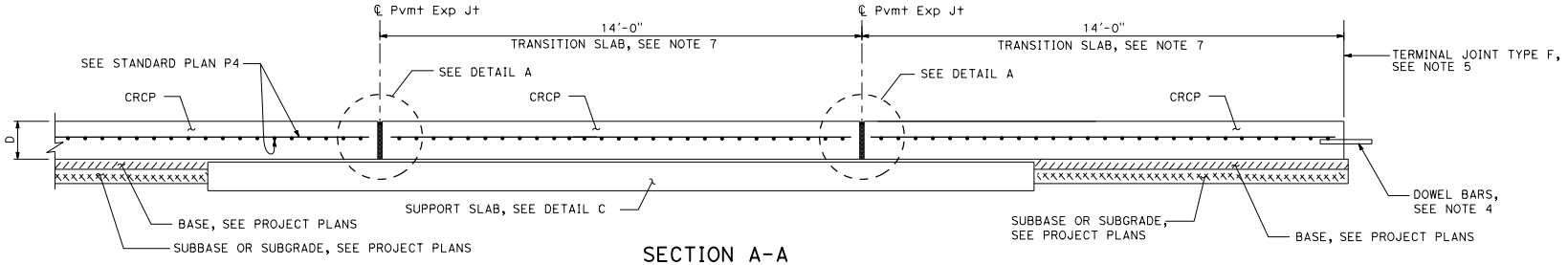
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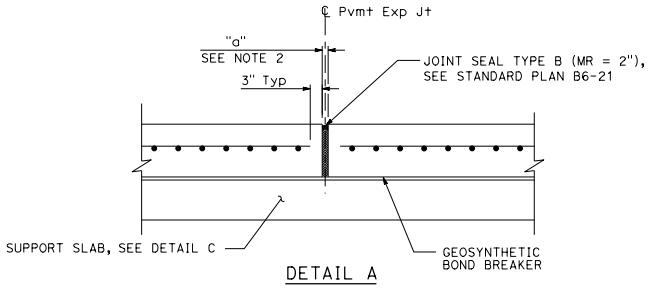

PLAN

NOTES:

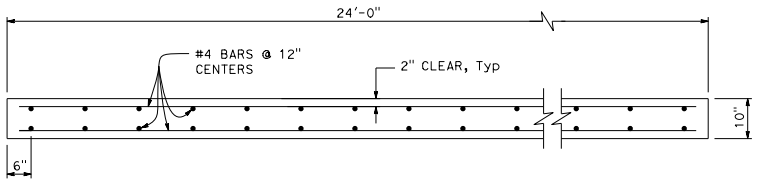
1. D = Thickness of CRCP (See Project Plans).
2. See Standard Plan B6-21 for "a".
3. Extend support slab 2'-0" beyond the outside edges of CRCP.
4. For layout, tolerances, and other details not shown, see Standard Plan P10.
5. For the Pavement Terminal Joint Type F Detail, See Standard Plan P31A.
6. No bar splices allowed within 14'-0" of expansion joints.
7. No bar splices allowed in transition slabs.




SECTION A-A




DETAIL A




DETAIL C
Support slab, see Note 3

STATE OF CALIFORNIA
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# CONTINUOUSLY REINFORCED CONCRETE PAVEMENT EXPANSION TERMINAL JOINT SYSTEM

NO SCALE

P32

7-1-25

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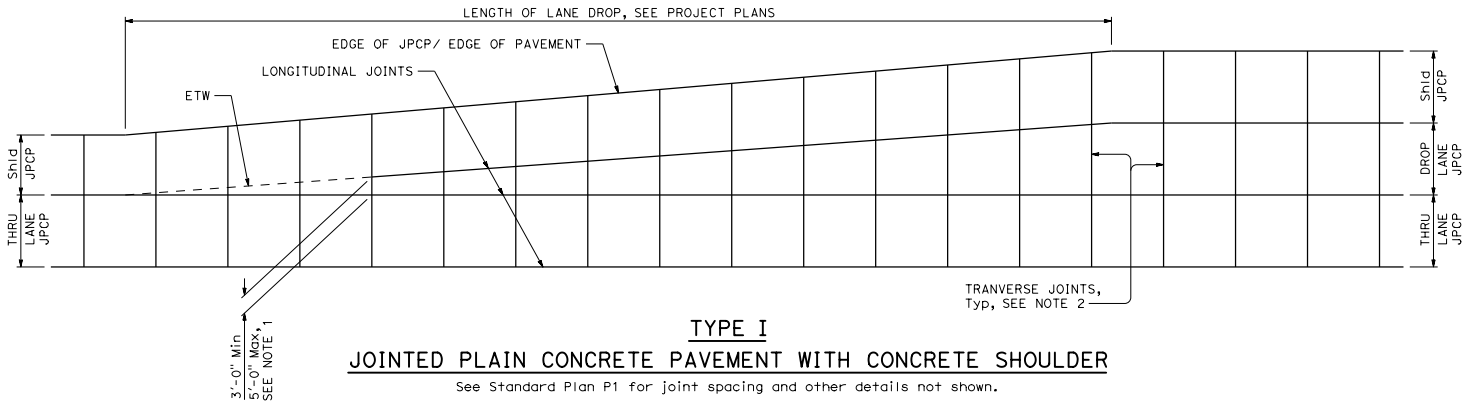
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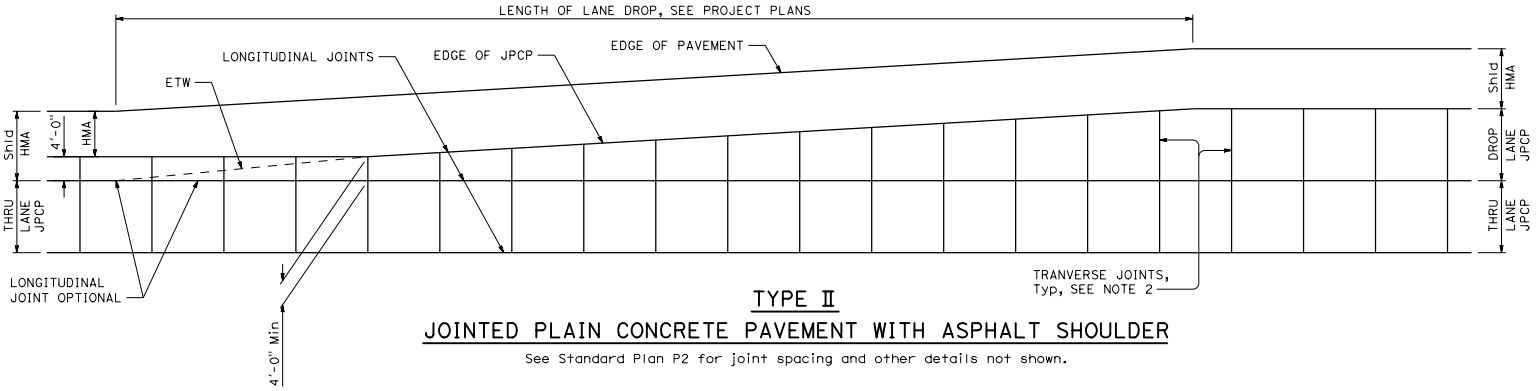
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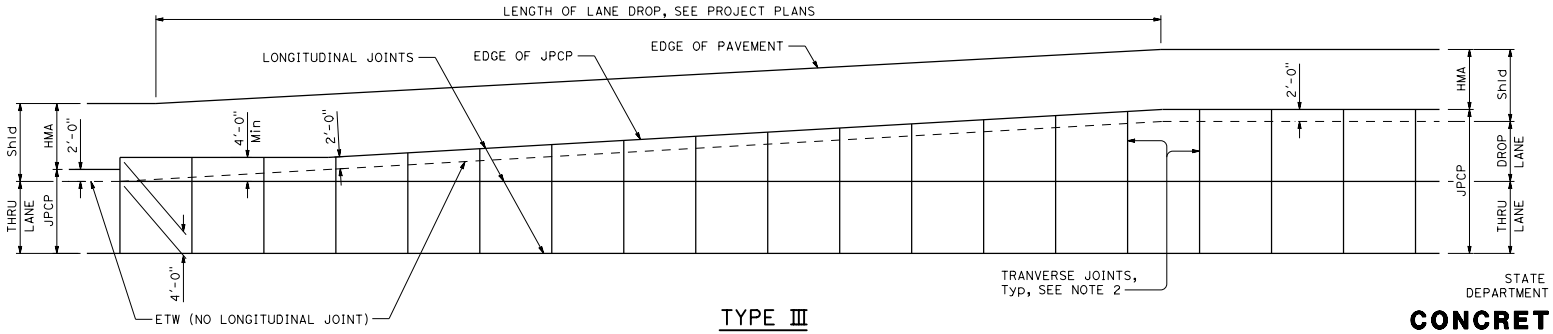

## TYPE I
## JOINTED PLAIN CONCRETE PAVEMENT WITH CONCRETE SHOULDER

See Standard Plan P1 for joint spacing and other details not shown.




## TYPE II
## JOINTED PLAIN CONCRETE PAVEMENT WITH ASPHALT SHOULDER

See Standard Plan P2 for joint spacing and other details not shown.




## TYPE III
## JOINTED PLAIN CONCRETE PAVEMENT WITH WIDENED SLAB AND ASPHALT SHOULDER

See Standard Plan P2 for joint spacing and other details not shown.

NOTES:

1. Location of transverse joint to match transverse joint of adjacent lane.
2. Place transverse joint of lane and shoulder perpendicular to longitudinal joint of thru lane.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT
# LANE DROP PAVING DETAILS No. 1

NO SCALE

P33

7-1-25



Return to Table of Contents

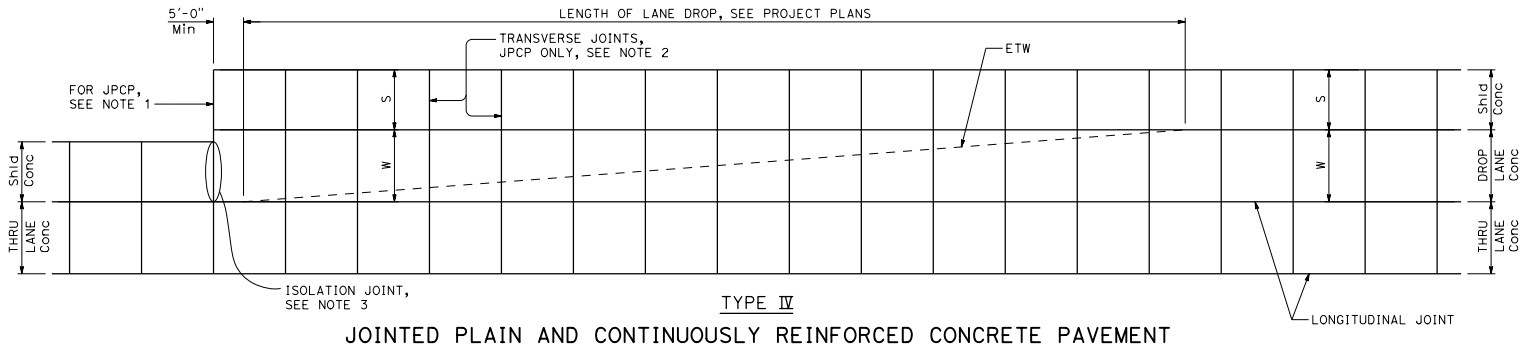
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Dulce Rufino Feldman — No. C81459 — Exp. 9-30-25 — CIVIL — STATE OF CALIFORNIA

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TYPE Ⅳ

## JOINTED PLAIN AND CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

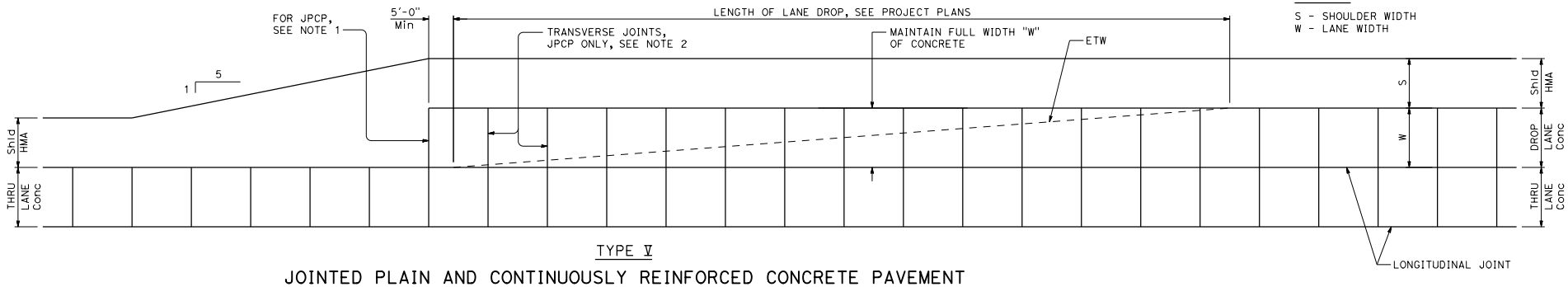
See Standard Plans P1, P2, or P4 for details not shown.

NOTES:

1. Location of transverse joint to match transverse joint of adjacent lane.
2. Place transverse joint of lane and shoulder perpendicular to longitudinal joint of through lane.
3. Isolation joint detail shown on Standard Plan P18.

LEGEND:

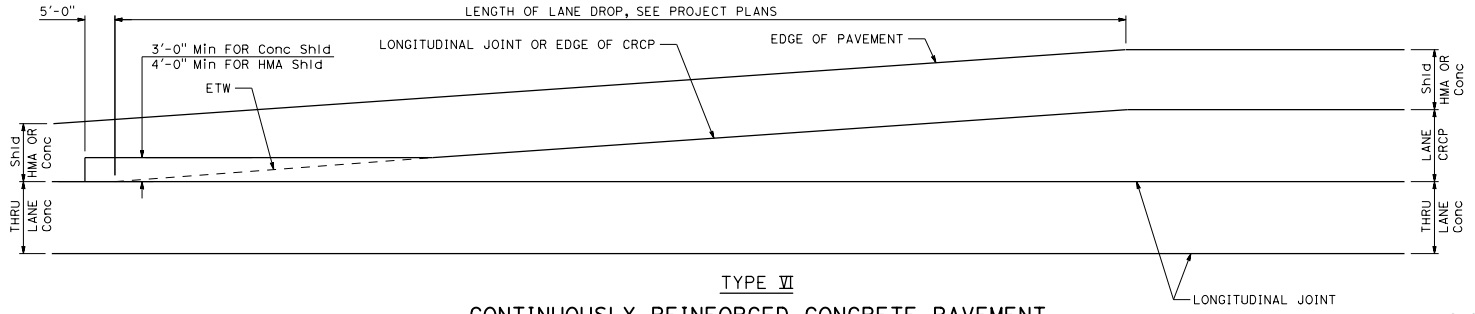
S - SHOULDER WIDTH
W - LANE WIDTH




TYPE Ⅴ

## JOINTED PLAIN AND CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

See Standard Plans P1, P2, or P4 for details not shown.




TYPE Ⅵ

## CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

See Standard Plan P4 for details not shown.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

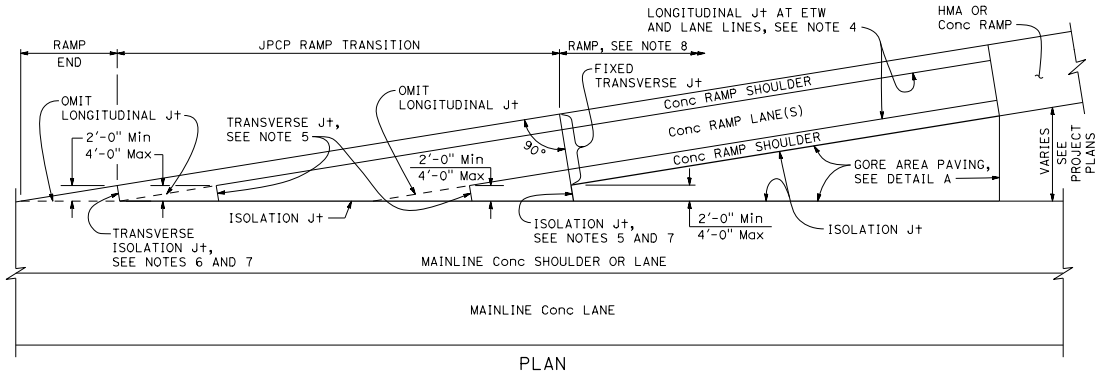
# CONCRETE PAVEMENT
# LANE DROP PAVING DETAILS No. 2

NO SCALE

P34

7-1-25

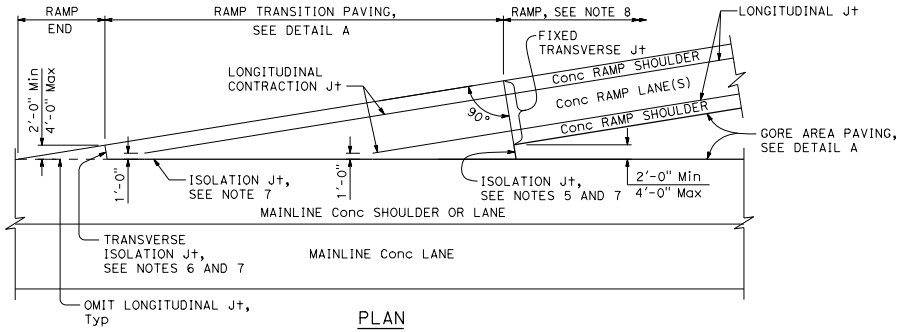
Return to Table of Contents




PLAN

## RAMP TRANSITION DETAIL

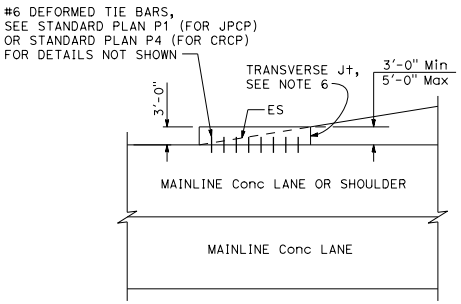
See Note 1




PLAN

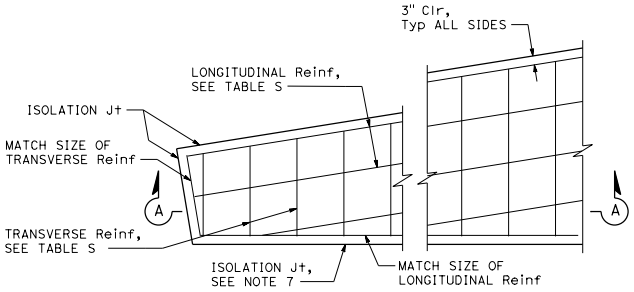
## ALTERNATE RAMP TRANSITION DETAIL

For JPCP and CRCP




PLAN

## ALTERNATE RAMP END DETAIL




DETAIL A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Dulce Rufino Feldman — No. C81459 — Exp. 9-30-25 — CIVIL — STATE OF CALIFORNIA

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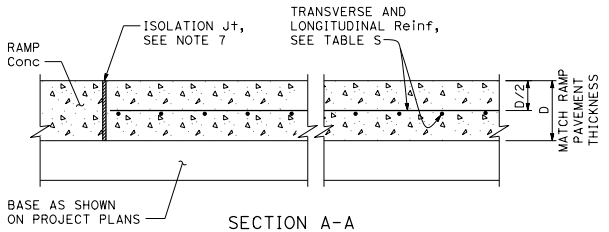
NOTES:

1. Details for gore area paving are applicable to both exit and entrance ramps.
2. Transverse Joint Layouts are not shown. Refer to Standard Plan P1 or Project Plans for details regarding joint layouts, tie bars, and dowel bars not shown.
3. WWF 4 x 4 - W4.0 x W4.0 can be used in place of steel reinforcement for gore area paving only.
4. Omit longitudinal joint when concrete on ramp shoulder is less than 3'-0".
5. Place joint perpendicular to ramp longitudinal joints. Match location of joint with ramp transverse joints.
6. Place joint perpendicular to ramp longitudinal joints. Match location of joint with mainline transverse joints.
7. Isolation joint detail shown on Standard Plan P18.
8. For jointed plain concrete pavement, transverse joints to be spaced from fixed transverse joint and shall follow spacing pattern on Standard Plan P1. Minimum spacing shall be 6'-0".

**TABLE S**

| LOCATION | TRANSVERSE BAR | LONGITUDINAL BAR |
|---|---|---|
| GORE AREA PAVING | #4 @ 1'-0" * | #4 @ 1'-0" * |
| RAMP TRANSITION (JPCP) | #6 @ 1'-6" | #6 @ 9" |
| RAMP TRANSITION (CRCP) | SEE STANDARD PLAN P4, TABLE No. 2 | SEE STANDARD PLAN P4, TABLE No. 1 |

* See Note 3




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT RAMP TRANSITION PAVING DETAILS

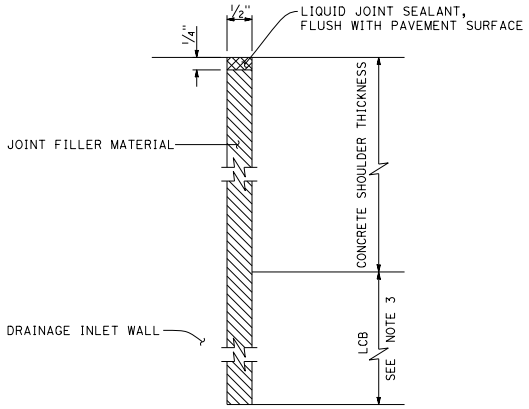
NO SCALE

P35

7-1-25

2025 STANDARD PLAN P35

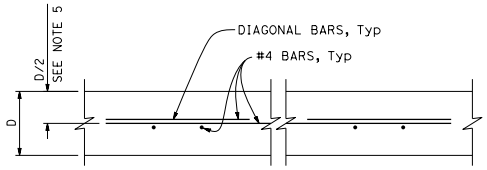
Return to Table of Contents




DETAIL A

## ISOLATION JOINT AROUND DRAINAGE INLET

| TABLE A | |
|---|---|
| DISTANCE X | BARS REQUIRED |
| 2'-0" TO 1'-6" | 2 |
| 1'-6" TO 9" | 1 @ X/2 |
| 9" OR LESS | NONE |




SECTION A-A

D = Pavement Thickness

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

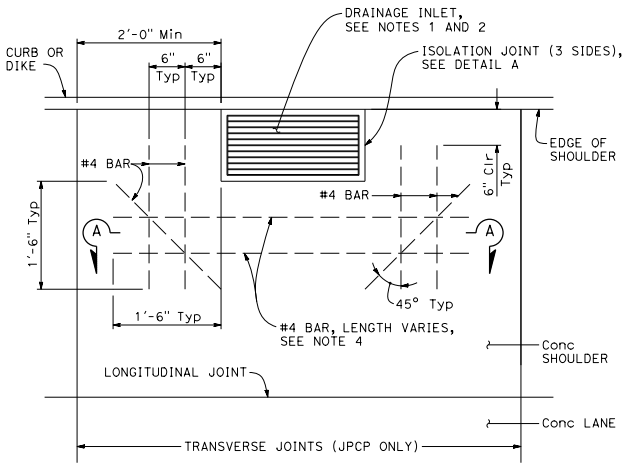
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Deepak R. Maskey
No. C70117
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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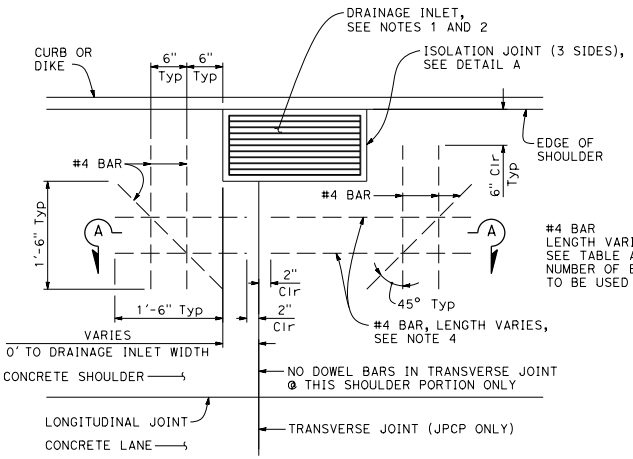
**NOTES:**

1. Refer to Project Plans for location and Type of drainage inlets.
2. Top of inlet shall be flush with shoulder surface.
3. Extend joint filler material to bottom of Lean Concrete Base. Where Lean Concrete Base is not used as base material, the joint filler material shall only extend to the bottom of the new concrete pavement.
4. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, terminate pavement steel reinforcement 2" clear from all outside edges of isolation joint.
5. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, see Standard Plan P4.
6. Dowel and tie bars not shown, see Standard Plan P1.



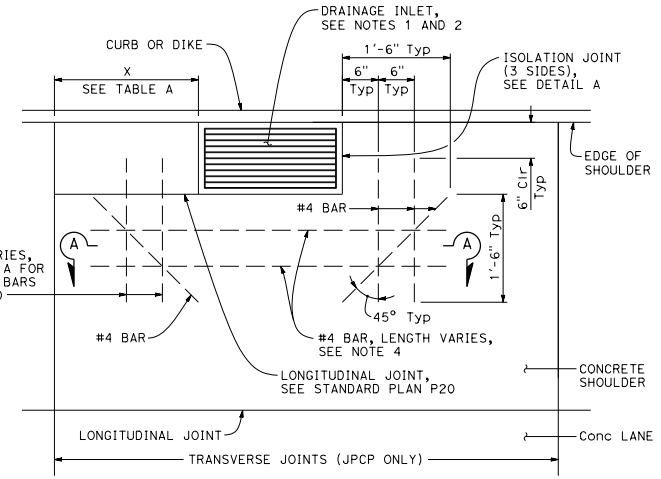

### CASE 1

Transverse joint more than 2'-0" clear of drainage inlet wall or no transverse joint.




### CASE 2

Transverse joint intersects drainage inlet, or matches drainage inlet wall.




### CASE 3

Transverse joint within 2'-0" of drainage inlet wall, or matches drainage inlet wall.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT DRAINAGE INLET DETAILS No. 1

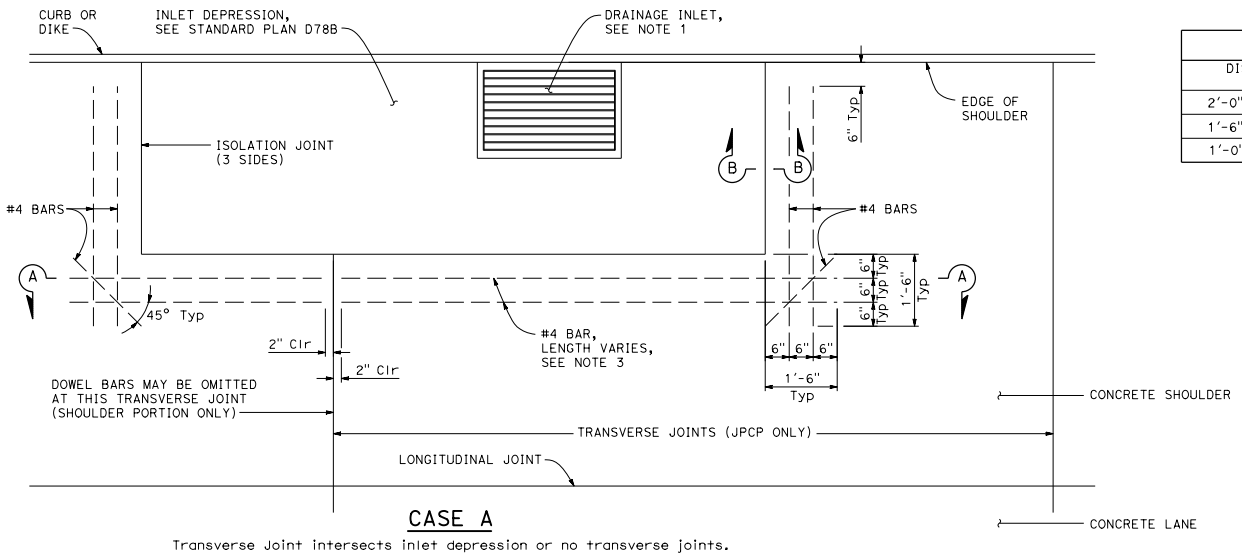
NO SCALE

P45

7-1-25



Return to Table of Contents



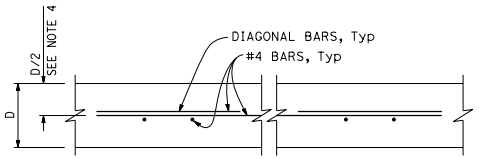

## CASE A

Transverse Joint intersects inlet depression or no transverse joints.

| TABLE A | |
|---|---|
| DISTANCE X | BARS REQUIRED |
| 2'-0" TO 1'-6" | 2 |
| 1'-6" TO 1'-0" | 1 |
| 1'-0" OR LESS | NONE |

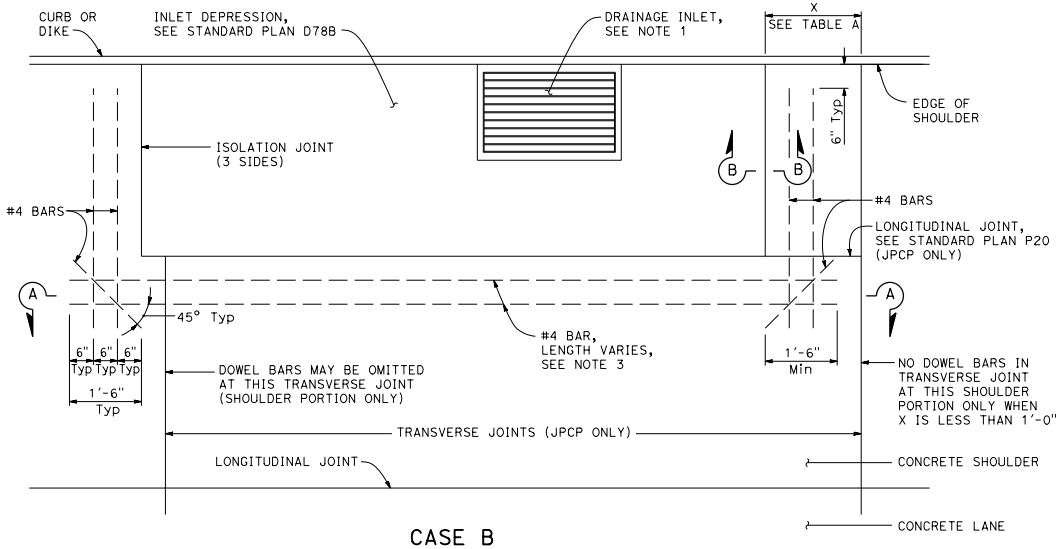
NOTES:

1. Refer to Project Plans for location and type of drainage inlets.
2. Extend joint filler material to bottom of Lean Concrete Base. Where Lean Concrete Base is not used as base material, the joint filler material shall only extend to the bottom of the new concrete pavement.
3. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, terminate pavement steel reinforcement 2" clear from all outside edges of isolation joint.
4. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, see Standard Plan P4.



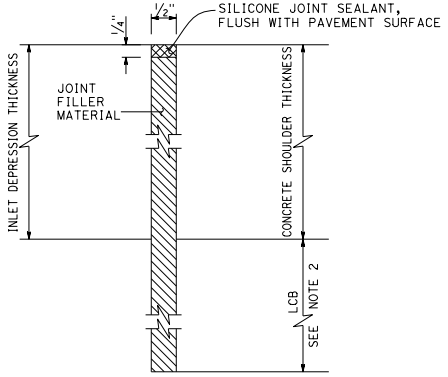

SECTION A-A

D = Pavement Thickness




## CASE B

Transverse Joint within 2'-0" of edge of inlet depression.




SECTION B-B

## ISOLATION JOINT AROUND INLET DEPRESSION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PAVEMENT DRAINAGE INLET DETAILS No. 2

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Deepak R. Maskey — No. C70117 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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P46

7-1-25



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| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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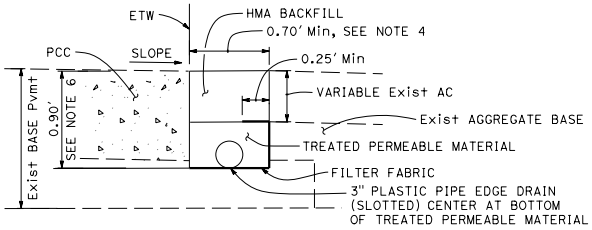
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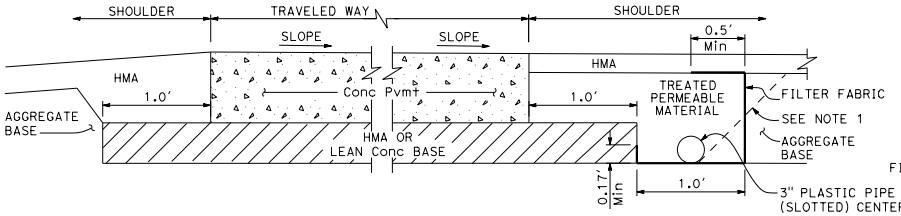
NOTES:

1. At the Contractor's option, on new construction, the vertical jointline (including the filter fabric) between the treated permeable material and the shoulder base/subgrade material may be rotated about its midpoint to a slope not flatter than 1:1 as shown by the dashed lines.
2. See the project plans and typical cross sections for pavement structure details.
3. The plan layout for pavement structure drainage collector and outlet systems for new concrete pavement and new hot mix asphalt pavement is the same as that shown on Standard Plan P51.
4. For plastic pipe edge drain diameter larger than 3", the minimum trench width shall be equal to the outside diameter of the plastic pipe plus 4".
5. For plastic pipe edge drain diameters larger than 3", all details for 3" plastic pipe edge drain shall apply.
6. For pavements thicker than 0.75', the minimum trench depth is 1.0'.



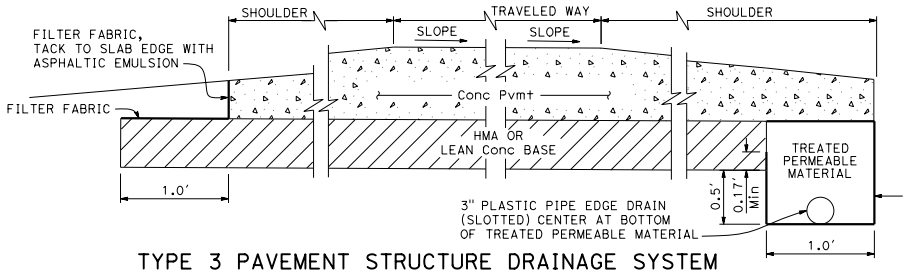

## TYPE 1 PAVEMENT STRUCTURE DRAINAGE SYSTEM

For existing highway facility.



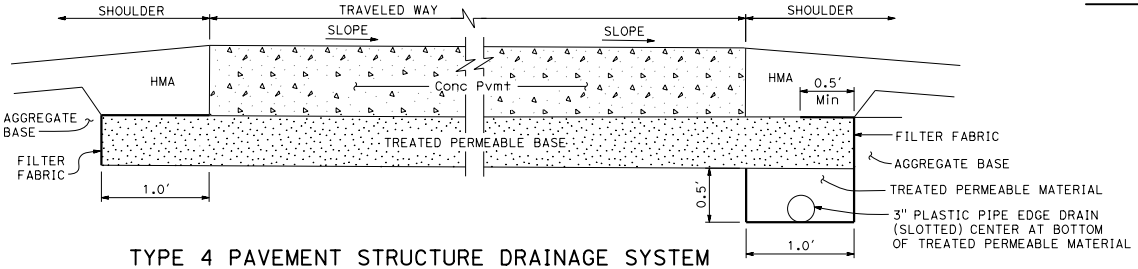

## TYPE 2 PAVEMENT STRUCTURE DRAINAGE SYSTEM

New construction



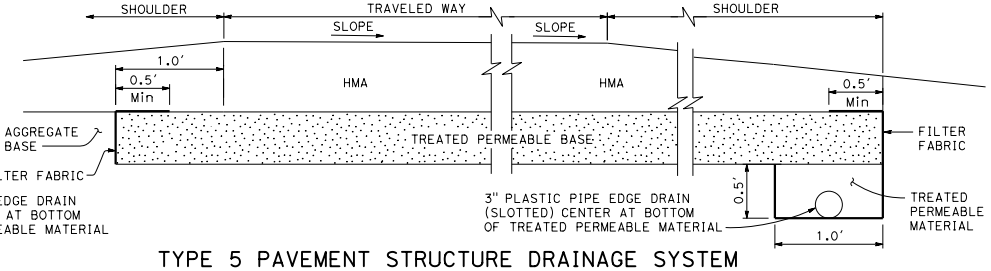

## TYPE 3 PAVEMENT STRUCTURE DRAINAGE SYSTEM

New construction



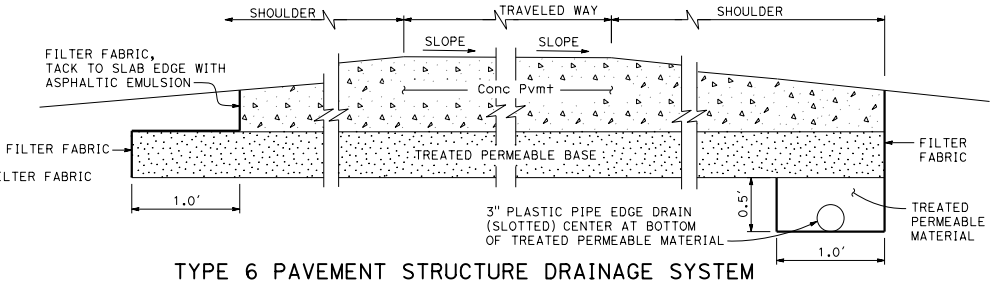

## TYPE 4 PAVEMENT STRUCTURE DRAINAGE SYSTEM

New construction




## TYPE 5 PAVEMENT STRUCTURE DRAINAGE SYSTEM

New construction




## TYPE 6 PAVEMENT STRUCTURE DRAINAGE SYSTEM

New construction

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT STRUCTURE DRAINAGE SYSTEM DETAILS

NO SCALE

**P50**

7-1-25

Return to Table of Contents

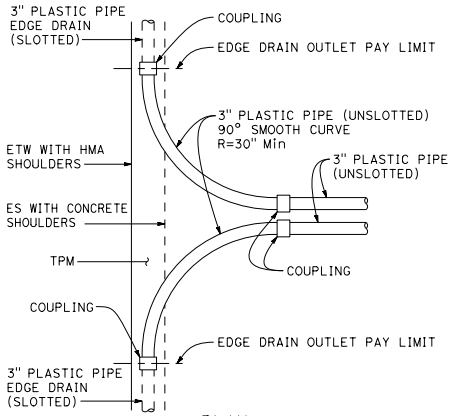
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
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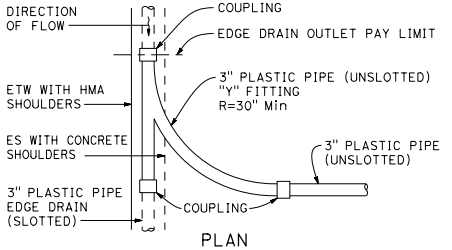
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PLAN

## DUAL OUTLET AND/OR VENT

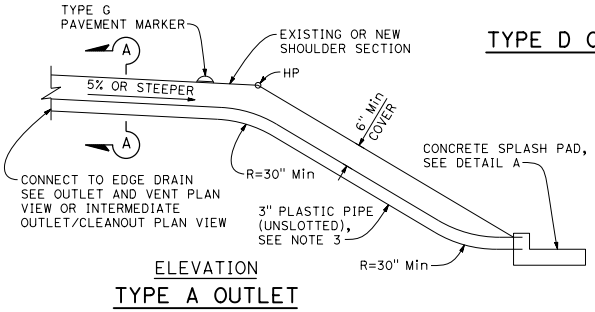
See Note 2




PLAN

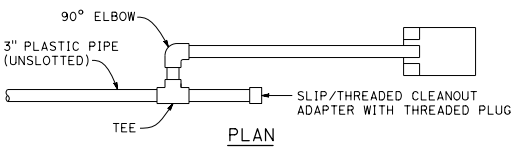
## INTERMEDIATE OUTLET

See Note 2

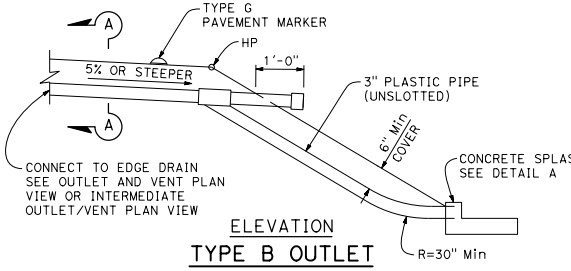



ELEVATION

## TYPE A OUTLET

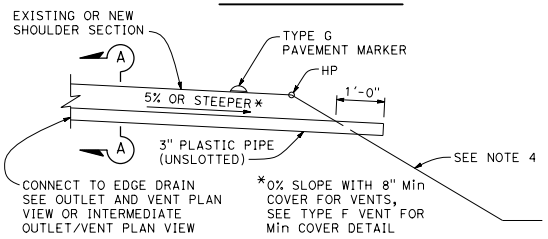



PLAN



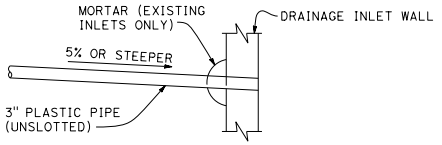

ELEVATION

## TYPE B OUTLET



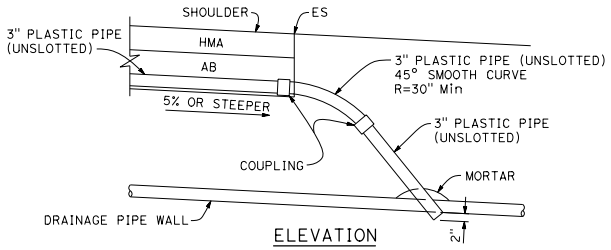

ELEVATION

## TYPE C OUTLET AND/OR VENT



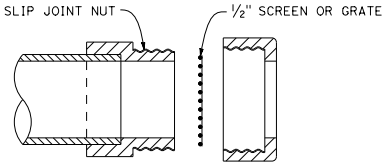

ELEVATION

## TYPE D OUTLET CONNECTION TO DRAINAGE INLET

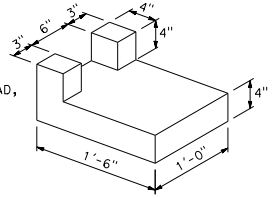



ELEVATION

## TYPE E OUTLET CONNECTION TO DRAINAGE PIPE




## EDGE DRAIN OUTLET AND VENT COVER

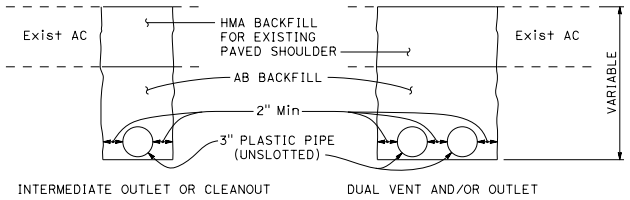



DETAIL A

## CONCRETE SPLASH PAD

NOTES:

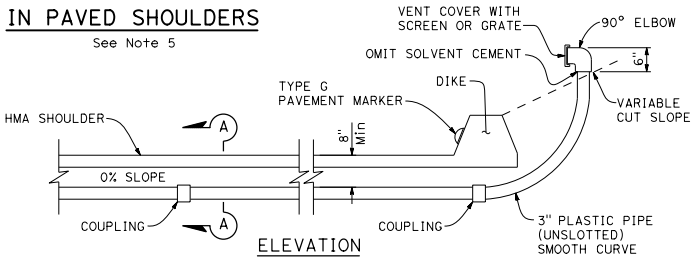
1. See project plans for location and type of outlet and/or vent installations.
2. The position of slotted plastic pipe and limits of treated permeable material shown are for the Type 1 structural section drainage system shown on Standard Plan P50.
3. The maximum length of plastic pipe outlet shall be 50'-0" measured from the longitudinal centerline of the collector trench to the pipe outlet. For pipe lengths greater than 50'-0" use Type B outlets.
4. See project plans for slope protection details at Type C pipe outlets.
5. Backfill with aggregate base from outside edge paved shoulder to hinge point and backfill with native material in slope area.
6. See Standard Plan P52 for Type G vent detail used with concrete shoulders.




SECTION A-A

## OUTLET EXCAVATION AND BACKFILL IN PAVED SHOULDERS

See Note 5




ELEVATION

## TYPE F VENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EDGE DRAIN OUTLET AND VENT DETAILS

NO SCALE

**P51**

7-1-25

Return to Table of Contents

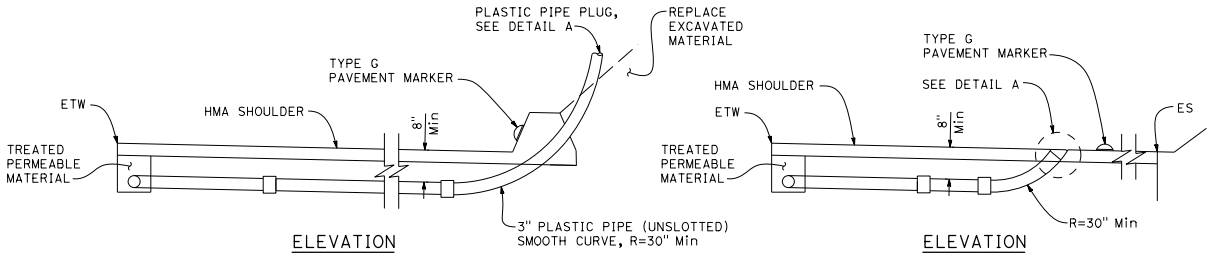
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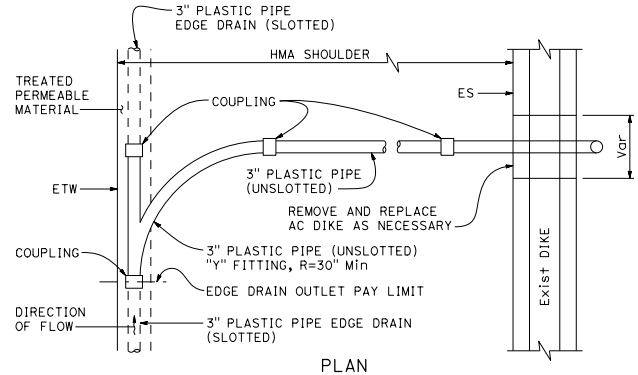
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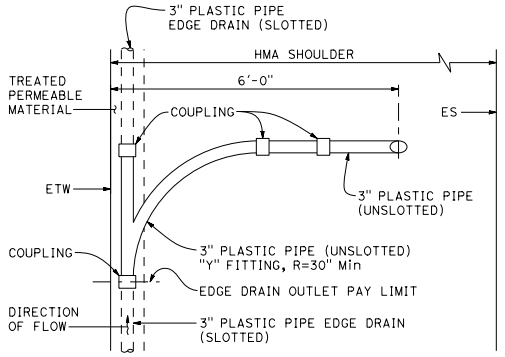
September 19, 2025
PLANS APPROVAL DATE

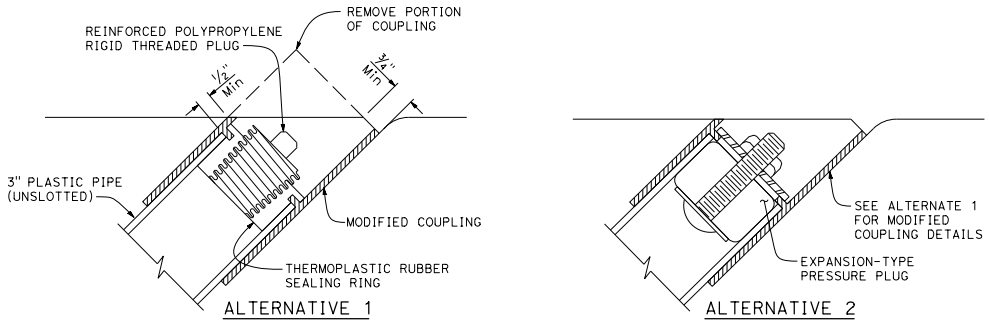
Deepak R. Maskey
No. C70117
Exp. 9-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
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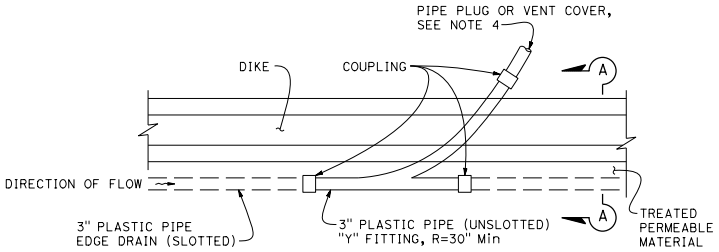



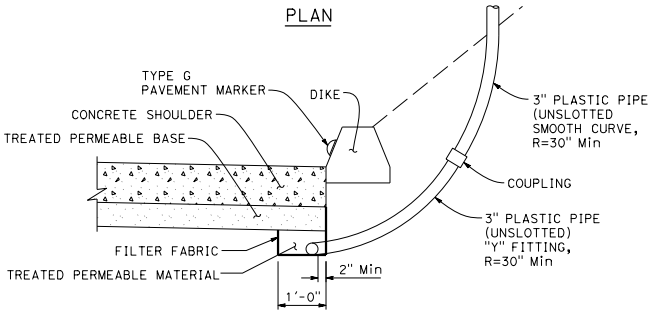




NOTES:

1. See project plans for location and type of cleanout or vent installations.
2. The position of slotted plastic pipe and limits of treated permeable material shown are for the Type 1 structural section drainage system shown on Standard Plan P50.
3. Other types of plugs may be substituted with the Engineer's approval.
4. The Type 3 cleanout and Type G vent is for use with concrete shoulders. The Type 6 structural section drainage system from Standard Plan P50 is shown. Use plastic pipe plug shown in Detail A with Type 3 cleanouts. Use vent cover shown on Standard Plan P51 with Type G vents.




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EDGE DRAIN CLEANOUT AND VENT DETAILS

NO SCALE

P52

7-1-25

2025 STANDARD PLAN P52

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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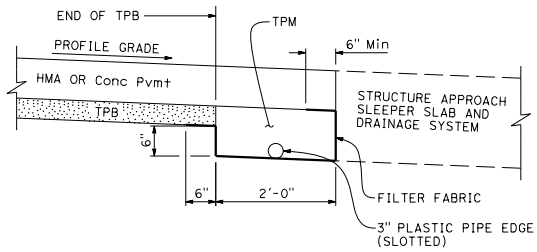
September 19, 2025

PLANS APPROVAL DATE

Deepak R. Maskey No. C70117 Exp. 9-30-26 CIVIL

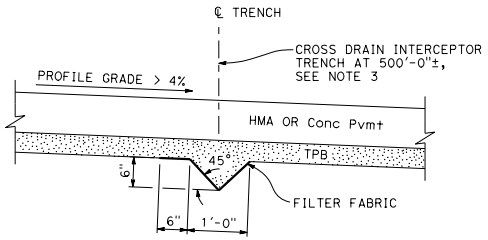
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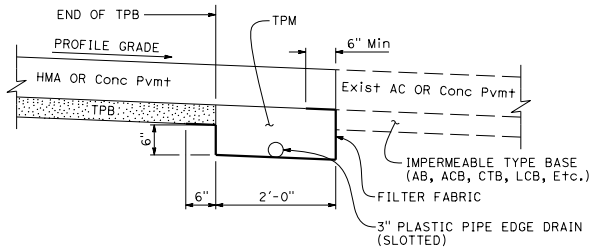

LONGITUDINAL SECTION

## CROSS DRAIN INTERCEPTOR AT STRUCTURE APPROACH



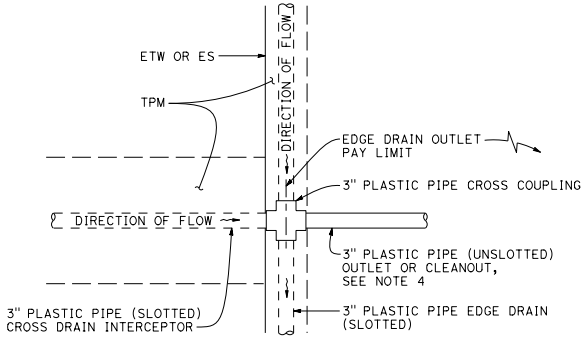

LONGITUDINAL SECTION

## INTERMEDIATE CROSS DRAIN INTERCEPTOR




LONGITUDINAL SECTION

## TERMINAL CROSS DRAIN INTERCEPTOR

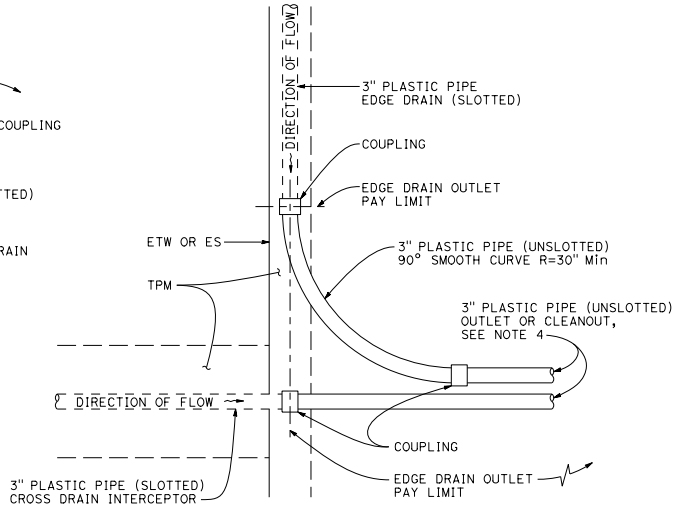



PLAN

## CROSS DRAIN INTERCEPTOR OUTLET CONNECTION DETAILS

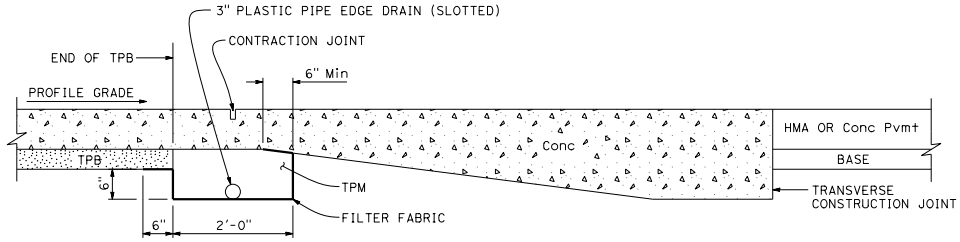
NOTES:

1. Cross drain interceptors are for use with treated permeable bases.
2. See Standard Plan P30 for Pavement End Anchor details. A typical pavement end anchor is shown.
3. The cross drain interceptor trench shall slope to drain. See project plans for location and skew of cross drains.
4. See Standard Plans P51 and P52 for pavement structure drainage system outlet and cleanout details, respectively.




PLAN

## COMBINED CROSS DRAIN INTERCEPTOR/EDGE DRAIN OUTLET DETAILS




LONGITUDINAL SECTION

## CROSS DRAIN INTERCEPTOR AT END ANCHOR

See Note 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CROSS DRAIN INTERCEPTOR DETAILS

NO SCALE

P53

7-1-25

Return to Table of Contents

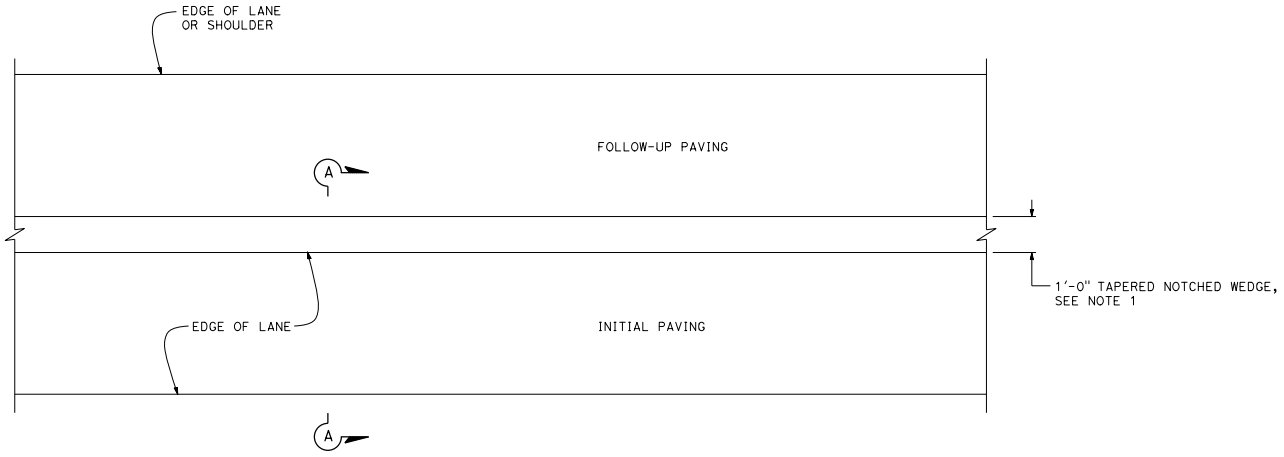
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|---|---|---|---|---|---|
| | | | | | |

Dulce Rufino Feldman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Dulce Rufino Feldman
No. C81459
Exp. 9-30-25
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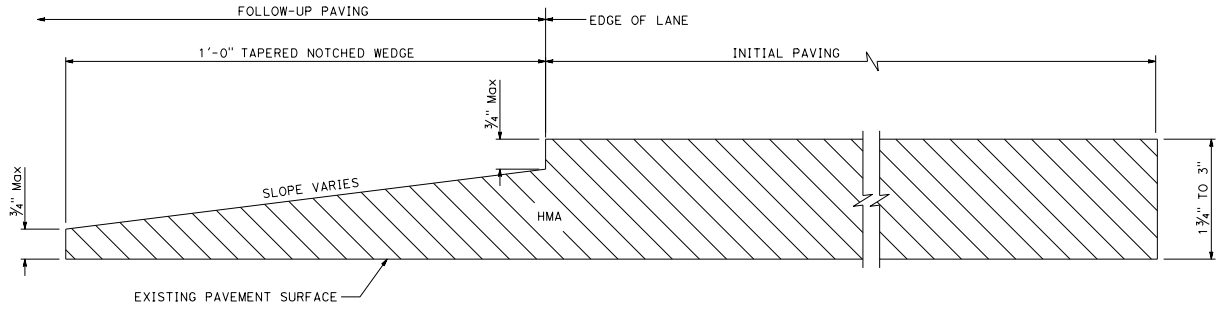



PLAN

DIVIDED MULTILANE HIGHWAY

NOTE:

1. Tapered notch wedge shall extend 1'-0" into adjacent lane or shoulder to receive follow-up paving.




SECTION A-A

LONGITUDINAL TAPERED NOTCHED WEDGE JOINT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# HOT MIX ASPHALT PAVING (LONGITUDINAL TAPERED NOTCHED WEDGE JOINT)

NO SCALE

P70

2025 STANDARD PLAN P70

7-1-25

Return to Table of Contents

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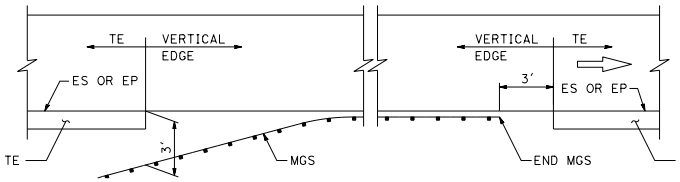
REGISTERED CIVIL ENGINEER

September 19, 2025

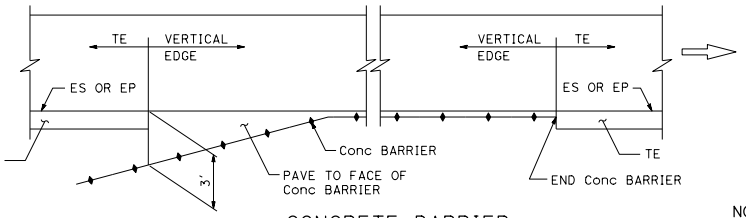
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REGISTERED PROFESSIONAL ENGINEER — Reimond Garcia — No. C74873 — Exp. 12-31-25 — CIVIL — STATE OF CALIFORNIA




MIDWEST GUARDRAIL SYSTEM



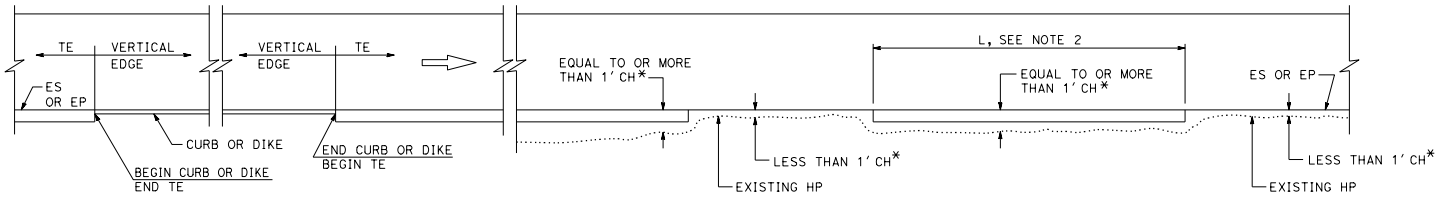

CONCRETE BARRIER

NOTES:

1. For details not shown, see Standard Plans P75 and P76.
2. Tapered edge is optional when L is less than 30'.

ABBREVIATION:

TE - TAPERED EDGE

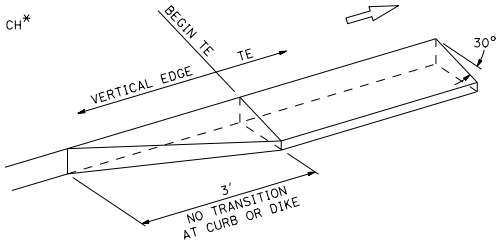



CURB OR DIKE

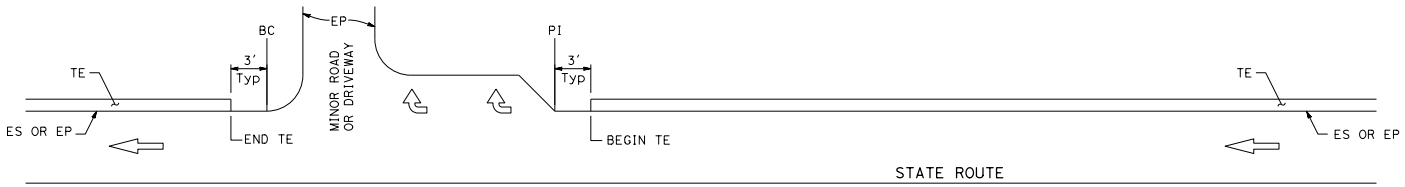


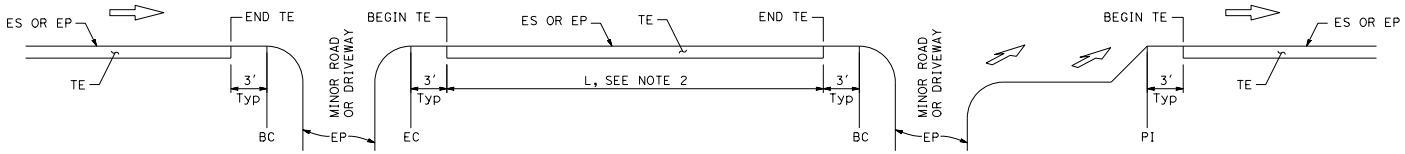

NARROW SIDE SLOPE

CH* = Distance from ES or EP to existing HP




TRANSITION DETAIL FOR CONCRETE ONLY




INTERSECTION

MINOR ROADWAY OR DRIVEWAY

DRIVEWAY AND INTERSECTION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT EDGE TREATMENTS

NO SCALE

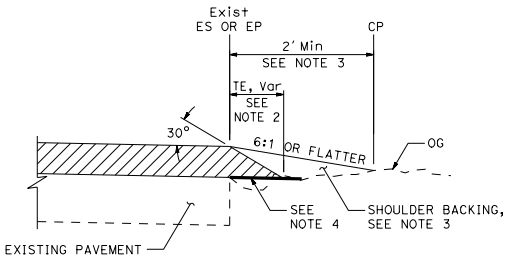
P74

7-1-25

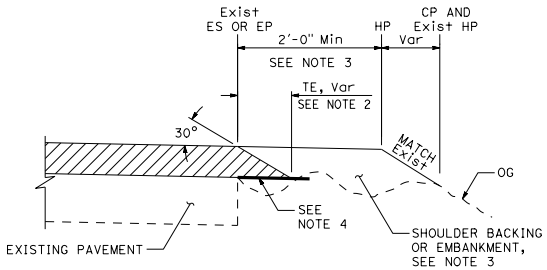
2025 STANDARD PLAN P74



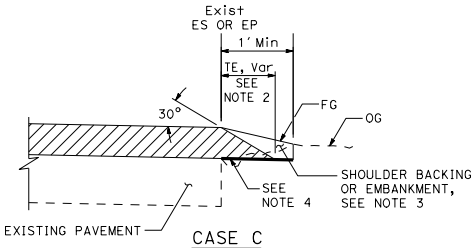
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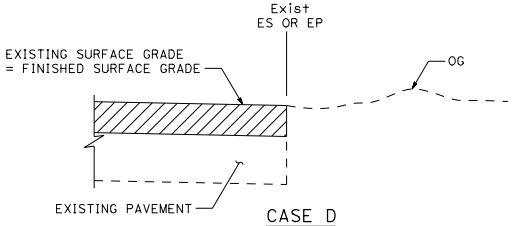

CASE A
Tapered Edge



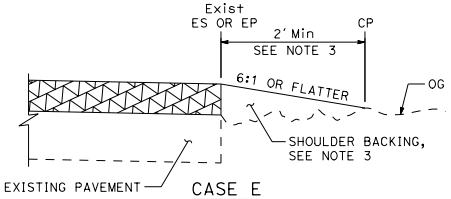

CASE B
Tapered Edge



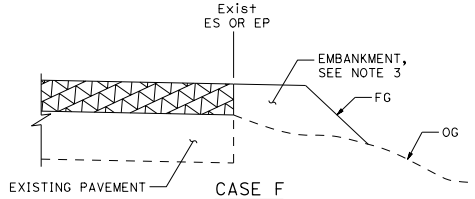

CASE C
Tapered Edge



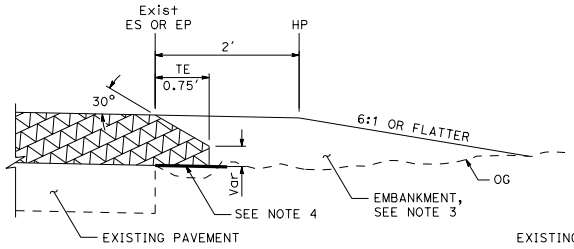

CASE D
Vertical Edge



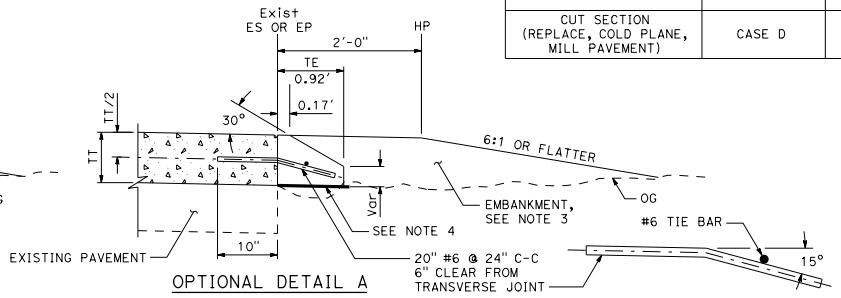

CASE E
Vertical Edge




CASE F
Vertical Edge,
* See Table A and Standard Plan P74




DETAIL A
For HMA overlay thickness more than 0.43' or concrete overlay




OPTIONAL DETAIL A
For concrete overlay,
see Note 5

## LEGEND:

HMA OVERLAY

HMA OR CONCRETE OVERLAY

CONCRETE OVERLAY

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Reimond Garcia
No. C74873
Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

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## NOTES:

1. For limits of tapered edge and vertical edge treatments, see Standard Plan P74.
2. Details shown for HMA overlay thickness less than 0.43'. See Detail A for HMA overlay thickness more than 0.43' or concrete overlay.
3. For locations and limits of shoulder backing or embankment, see project plans.
4. Grade existing ground to place tapered edge, 1' minimum width.
5. Tapered edge transverse joint must match overlay transverse joint. End of #6 tie bar must be 2" ±½" clear from transverse joint.
6. Tapered edge is not needed in the area of MGS, barrier, right turn lane and acceleration lane, see Standard Plan P74.

## ABBREVIATIONS:

TE - TAPERED EDGE
TT - TOTAL THICKNESS OF TE

**TABLE A**
**EDGE TREATMENT FOR VARIOUS OVERLAY THICKNESS AND CONDITIONS**

| FIELD CONDITION | OVERLAY THICKNESS | |
|---|---|---|
| | LESS THAN 0.15' | 0.15' OR MORE |
| Exist SLOPE 6:1 OR FLATTER | CASE E | CASE A |
| Exist SLOPE 3:1 TO 6:1 | CASE E | CASE B |
| Exist SLOPE STEEPER THAN 3:1 | CASE F | CASE F |
| CUT SECTION (REPLACE, COLD PLANE, MILL PAVEMENT) | CASE D | CASE C |

**ADDITIONAL HMA OR CONCRETE QUANTITIES FOR TE/SIDE/MILE**

| TYPICAL CROSS SECTION | TT | TOTAL ADDITIONAL MATERIAL FOR TE/SIDE/MILE | | |
|---|---|---|---|---|
| | | HMA (TON) | CONCRETE (CY)* | CONCRETE (CY)** |
| TT | 0.15' | 7.7 | NA | NA |
| | 0.20' | 13.7 | NA | NA |
| | 0.30' | 30.9 | NA | NA |
| | 0.40' | 54.9 | NA | NA |
| | 0.45' | 69.4 | NA | NA |
| 0.43' / TT | 0.50' | 84.2 | NA | NA |
| | 0.60' | 113.9 | NA | NA |
| | 0.70' | 143.6 | 70.9 | 94.2 |
| | 0.80' | 173.3 | 85.6 | 112.2 |
| | 0.90' | 203.0 | 100.3 | 130.2 |
| | 1.00' | 232.7 | 114.9 | 148.2 |
| | 1.10' | 262.4 | 129.6 | 166.2 |
| | 1.20' | 292.1 | 144.3 | 184.2 |

* For Detail A
** For Optional Detail A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PAVEMENT EDGE TREATMENTS AND OVERLAYS

NO SCALE

P75

7-1-25



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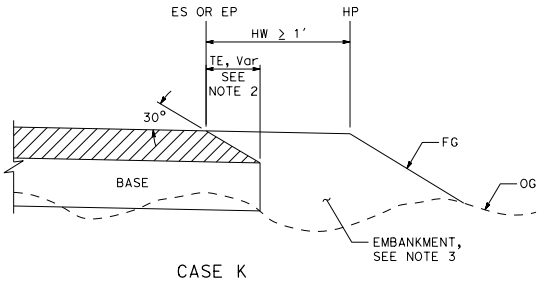
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September 19, 2025
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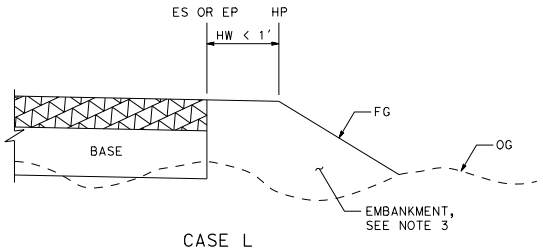
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Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

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CASE K

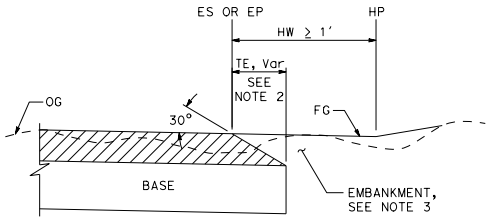
Tapered Edge - Fill Section, HW ≥ 1′




CASE L

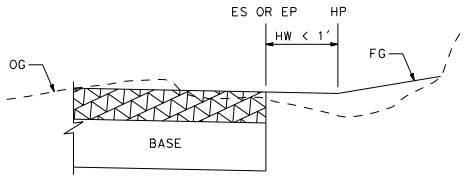
Vertical Edge - Fill Section, HW < 1′

## FILL SECTION




CASE M

Tapered Edge - Cut Section, HW ≥ 1′




CASE N

Vertical Edge - Cut Section, HW < 1′

## CUT SECTION

### NOTES:

1. For limits of tapered edge and vertical edge treatments, see Standard Plan P74.
2. Details shown for HMA pavement thickness less than 0.43′. See Detail B for HMA pavement thickness more than 0.43′ or concrete pavement.
3. For locations and limits of embankment, see project plans.
4. Tapered edge transverse joint must match pavement transverse joint. End of #6 tie bar must be 2" ±½" clear from transverse joint.
5. Tapered edge is not needed in the area of MGS, barrier, right turn lane and acceleration lane, see Standard Plan P74.

### ABBREVIATIONS:

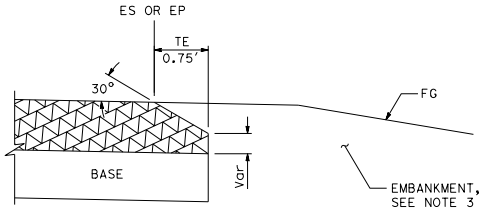
HW - HINGE WIDTH, DISTANCE FROM ES OR EP TO HP
TE - TAPERED EDGE
TT - TOTAL THICKNESS OF TE

### LEGEND:

HMA PAVEMENT

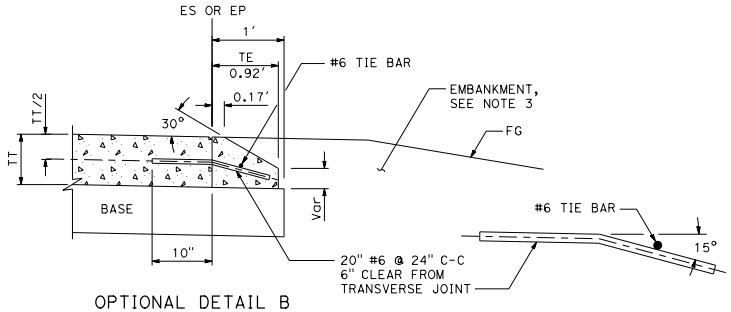
HMA OR CONCRETE PAVEMENT

CONCRETE PAVEMENT




DETAIL B

For HMA pavement thickness more than 0.43′ or concrete pavement.




OPTIONAL DETAIL B

For concrete pavement, see Note 4.

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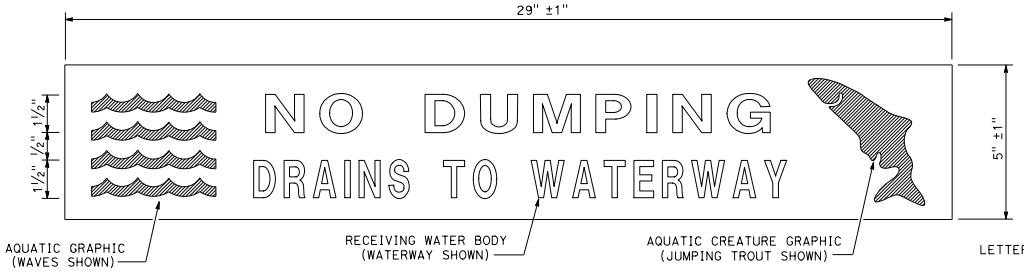
# PAVEMENT EDGE TREATMENTS NEW CONSTRUCTION

NO SCALE

P76

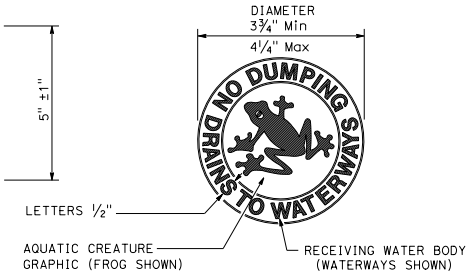
7-1-25

Return to Table of Contents



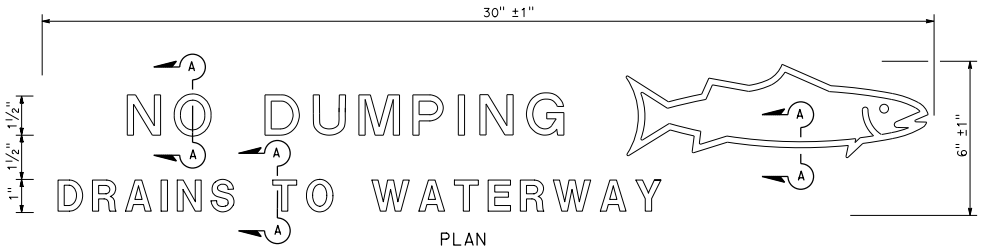

PLAN

DRAINAGE INLET MARKER
(PREFABRICATED THERMOPLASTIC)



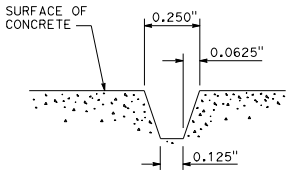

PLAN

DRAINAGE INLET MARKER (MEDALLION)



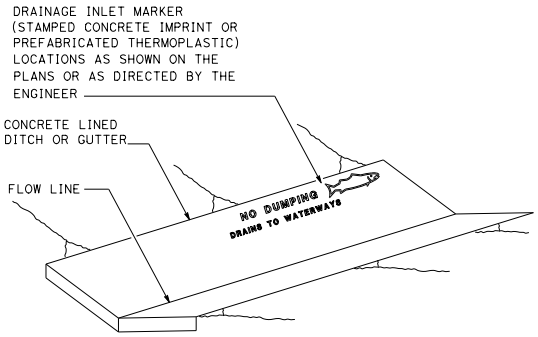

PLAN

DRAINAGE INLET MARKER
(STAMPED CONCRETE IMPRINT)



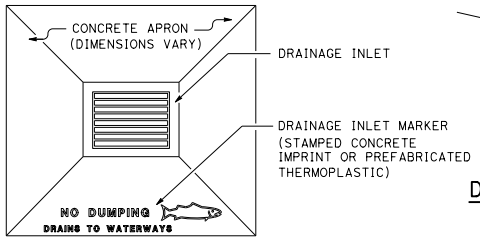

SECTION A-A

STAMPED CONCRETE
IMPRINT DETAIL



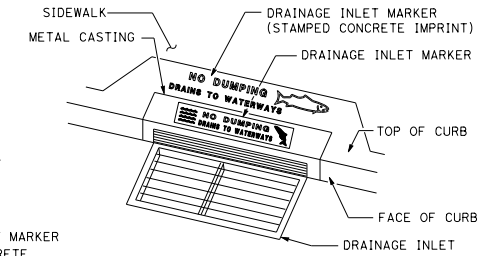

PERSPECTIVE

DRAINAGE INLET MARKER ON
CONCRETE LINED DITCH



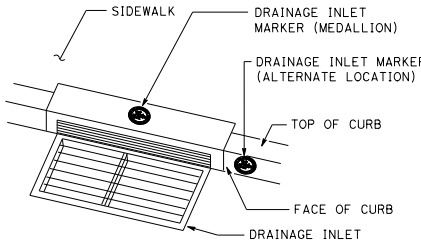

PLAN

DRAINAGE INLET MARKER ON
DRAINAGE INLET APRON




PERSPECTIVE

DRAINAGE INLET MARKER ON
DRAINAGE INLET




PERSPECTIVE

DRAINAGE INLET MARKER (MEDALLION)
ON DRAINAGE INLET

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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# DRAINAGE INLET MARKERS

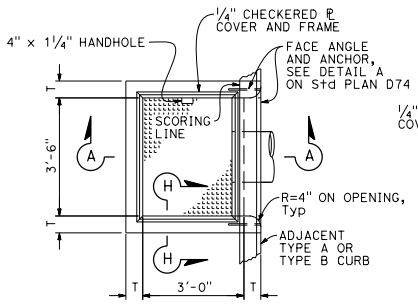
NO SCALE

D71

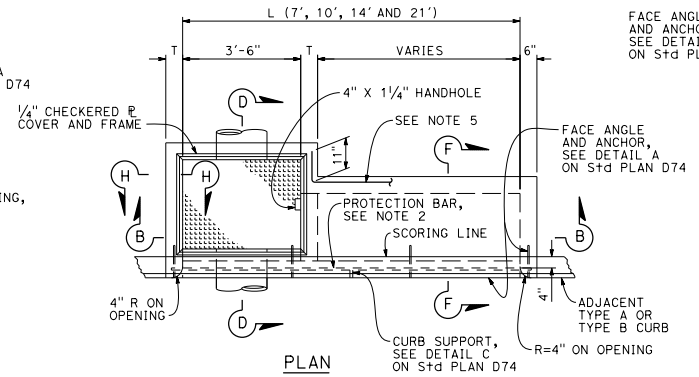
7-1-25



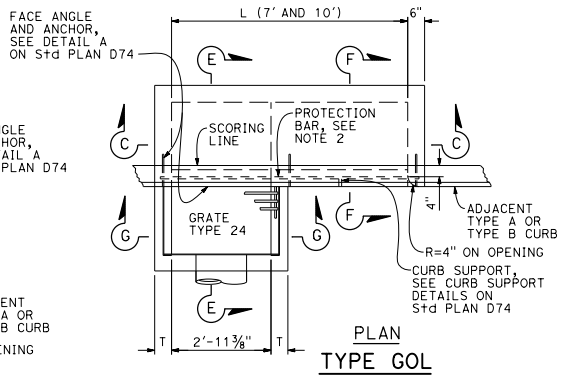
Return to Table of Contents




PLAN
TYPE OS




PLAN
TYPE OL




PLAN
TYPE GOL

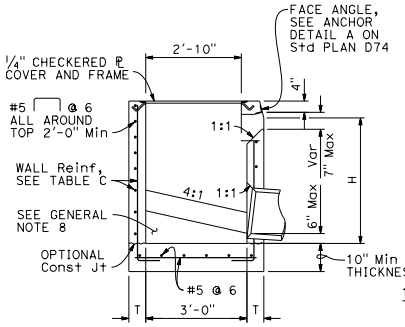
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REGISTERED CIVIL ENGINEER

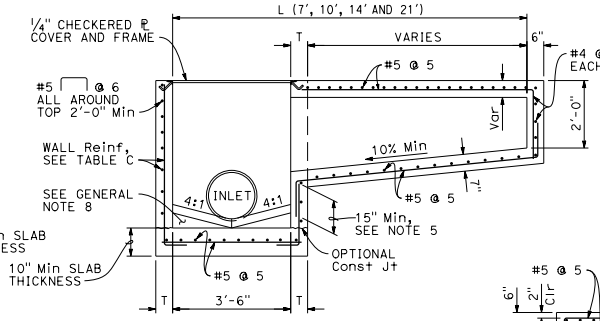
September 19, 2025
PLANS APPROVAL DATE

Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

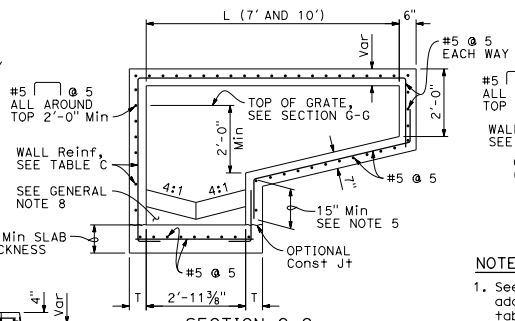
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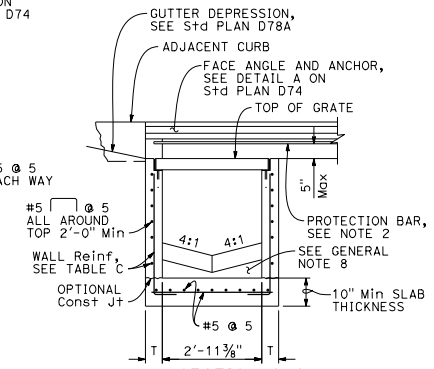

SECTION A-A



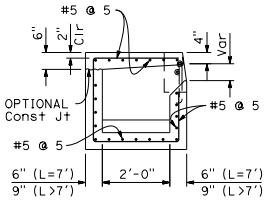

SECTION B-B



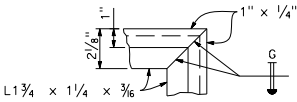

SECTION C-C



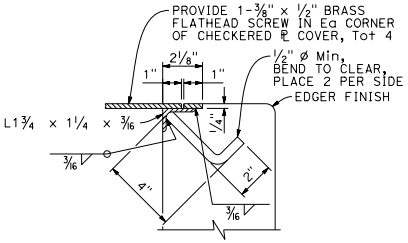

SECTION G-G



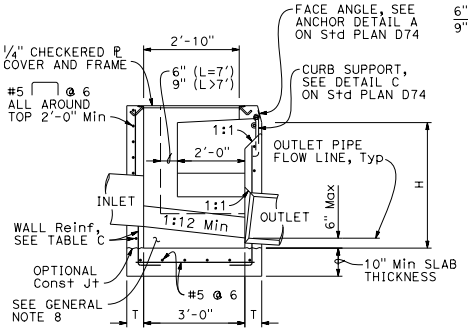

SECTION F-F
(See Note 5)



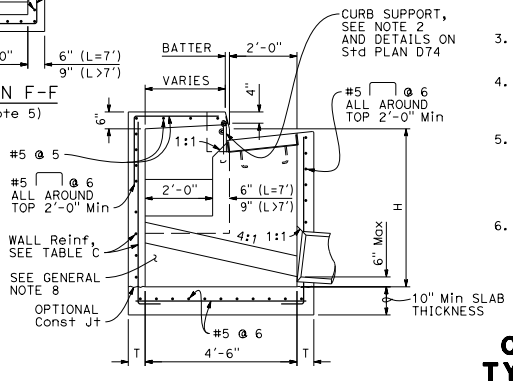

COVER FRAME
Typical each corner
(Checkered ℄ cover not shown)




SECTION H-H




SECTION D-D




SECTION E-E

NOTES:

1. See Standard Plan D72F for General Notes and additional details. See Standard Plan D72G for tables, wall thickness T and quantities.
2. Where shown on the project plans, place a ¾" ø plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
3. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
4. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
5. Extend all horizontal bars from inlet extensions into adjacent concrete elements of main inlet box a minimum of 15". Where shown, bend horizontal bars into box. If necessary rotate bars to maintain 2" clear coverage.
6. Height of curb opening will vary with the type of curb and the depth of the local depression.

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# CIP DRAINAGE INLETS TYPES OS, OL AND GOL

NO SCALE

**D72A**

7-1-25





Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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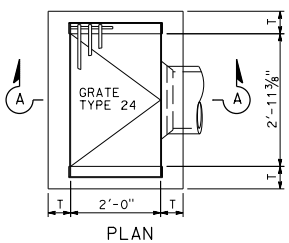
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

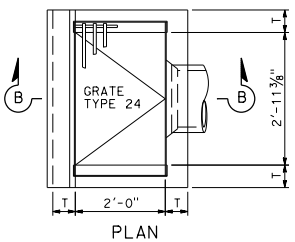
Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

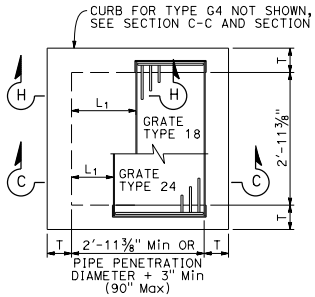
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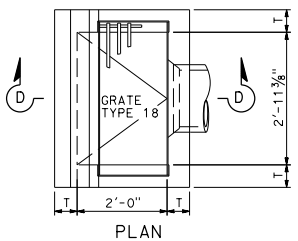

PLAN
TYPE G1



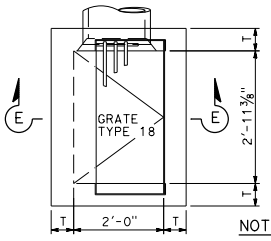

PLAN
TYPE G3




PLAN
STANDARD
TYPE G2 OR G4



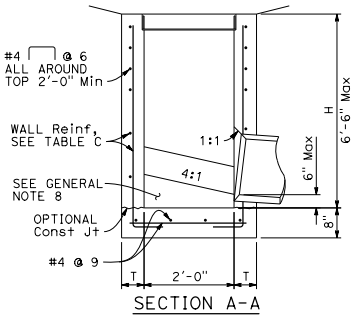

PLAN
TYPE G5



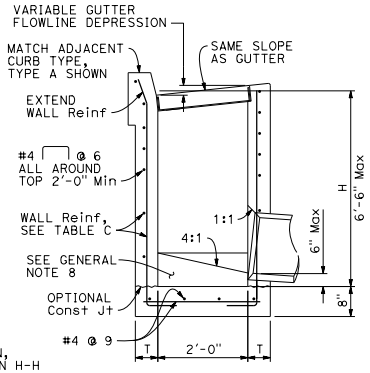

PLAN
TYPE G6

NOTES:
1. For notes and Table 2, see Standard Plan D72C.
2. For $L_1$ or $L_2$ greater than 2'-10", see Table 1 for wall thickness dimension and see Table C in Standard Plan D72G for reinforcement. Otherwise, see Table C in Standard Plan D72G for wall thickness and reinforcement.

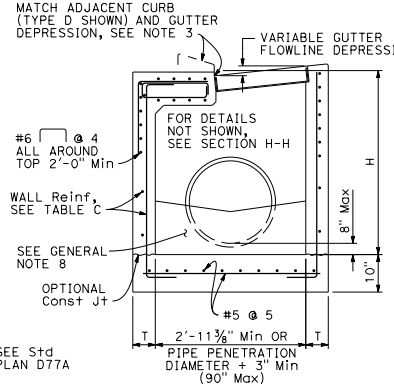
| TABLE 1 | |
|---|---|
| | T |
| $L_1$ OR $L_2$ > 2'-10" | 12" |



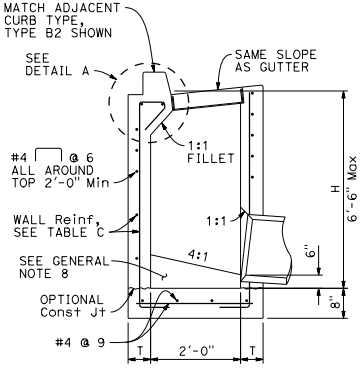

SECTION A-A



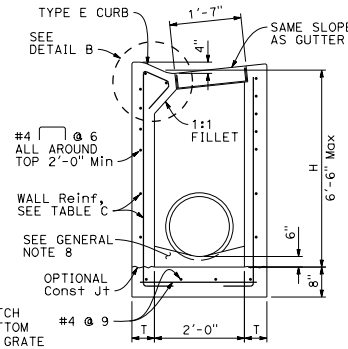

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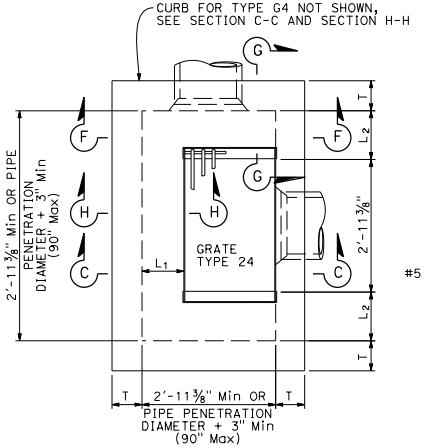

SECTION C-C



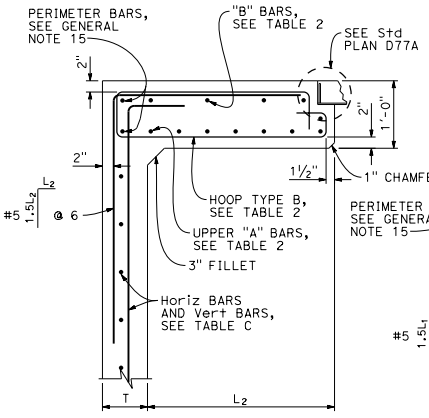

SECTION D-D



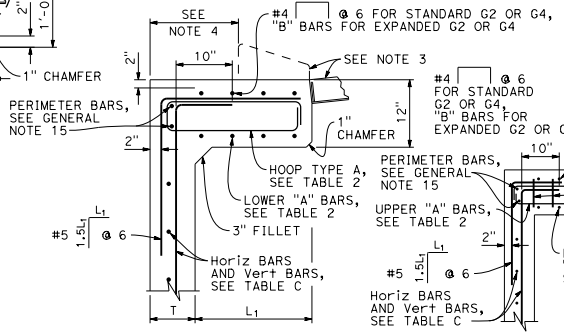

SECTION E-E



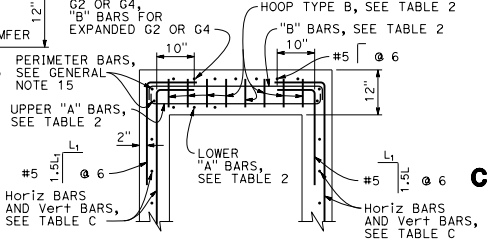

PLAN
EXPANDED
TYPE G2 OR G4



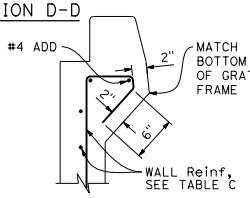

SECTION G-G



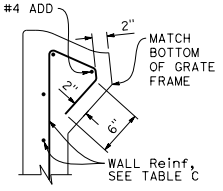

SECTION H-H




SECTION F-F




DETAIL A




DETAIL B

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# CIP DRAINAGE INLETS TYPES G1, G2, G3, G4, G5 AND G6

NO SCALE

D72B

7-1-25

2025 STANDARD PLAN D72B

Return to Table of Contents

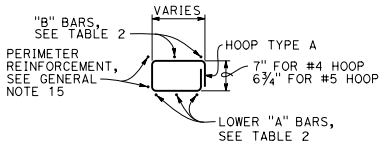
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REGISTERED CIVIL ENGINEER

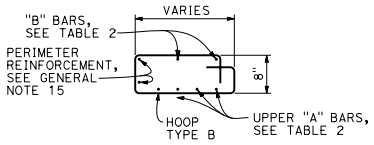
September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
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HOOP TYPE A

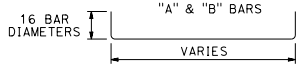



HOOP TYPE B

NOTES:

1. See Standard Plan D72F for General Notes and additional details. See Standard Plan D72G for tables and quantities.
2. Type G4 inlet can use Grate Type 18 or 24. Type G2 inlet uses Grate Type 24.
3. Type G4 inlet details are similar to Type G2 inlet details, except for the addition of a curb and sloped grate to match the adjacent curb and gutter depression.
4. Dimension will vary with different grates, curb types, box width and wall thickness.

TABLE 2 - TOP SLAB REINFORCEMENT




| | W/ CURB | W/O CURB |
|---|---|---|
| "A" BARS | #4 @ 5 (2 BARS Min) | #5 @ 5 (3 BARS Min) |
| "B" BARS | #4 @ 10 (2 BARS Min) | #4 @ 12 (2 BARS Min) |
| HOOPS ("A" & "B") | #4 @ 5 | #5 @ 5 |

ROTATE "A" AND "B" BARS SO HOOKED ENDS WILL MAINTAIN 2" CLEAR COVERAGE.

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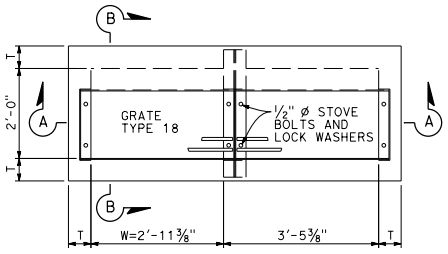
# CIP DRAINAGE INLETS TYPES G1, G2, G3, G4, G5 AND G6

NO SCALE

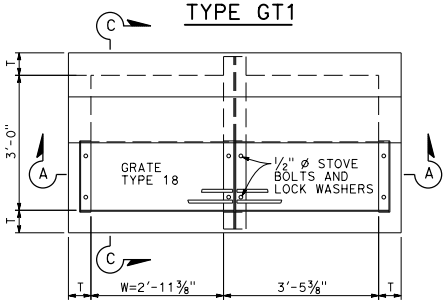
D72C

7-1-25

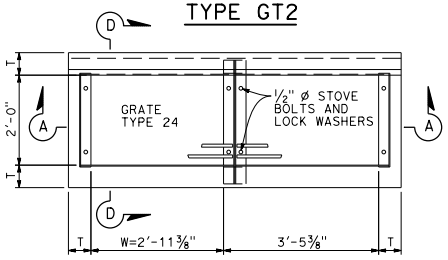
Return to Table of Contents



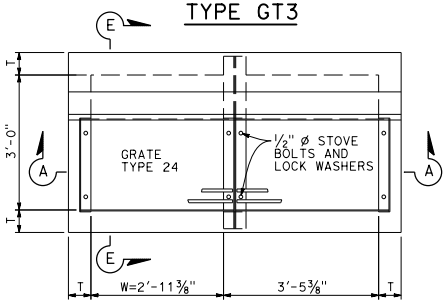

PLAN
TYPE GT1



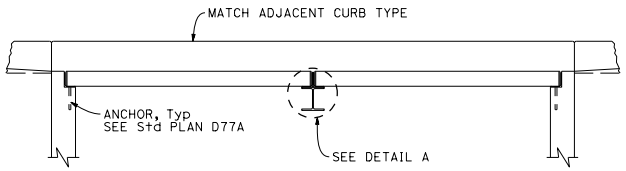

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TYPE GT2



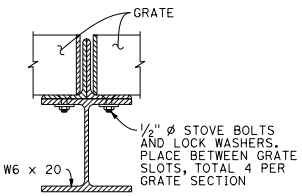

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TYPE GT3



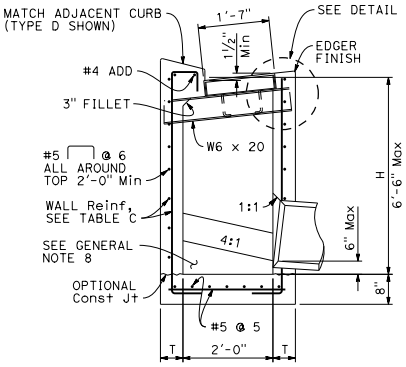

PLAN
TYPE GT4



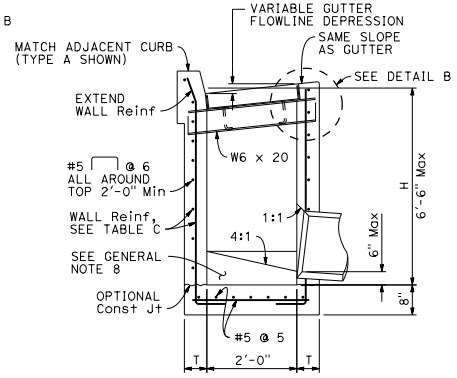

SECTION A-A



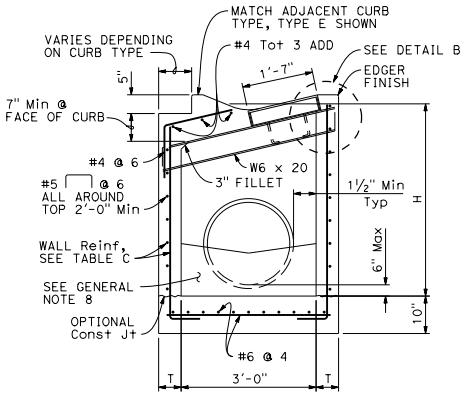

DETAIL A



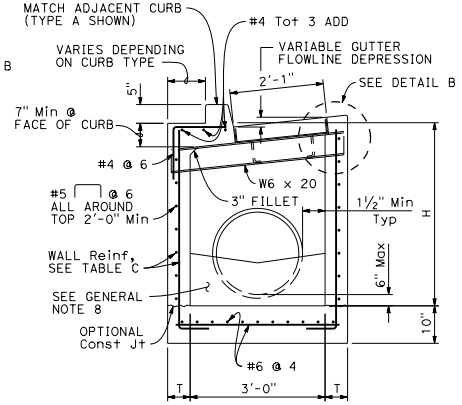

SECTION B-B




SECTION D-D



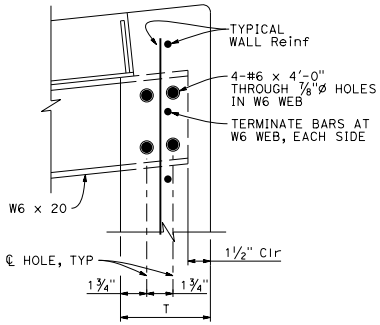

SECTION C-C




SECTION E-E

NOTES:

1. See Standard Plan D72F for General Notes and additional details. See Standard Plan D72G for tables, wall thickness "T" and quantities.
2. W=2'-11⅜" for one grate. Add 3'-5⅜" for additional grates in tandem.
3. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
4. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.




DETAIL B

(Similar opposite end of W6)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA
REGISTERED PROFESSIONAL ENGINEER

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CIP DRAINAGE INLETS TYPES GT1, GT2, GT3 AND GT4

NO SCALE

D72D

7-1-25



Return to Table of Contents

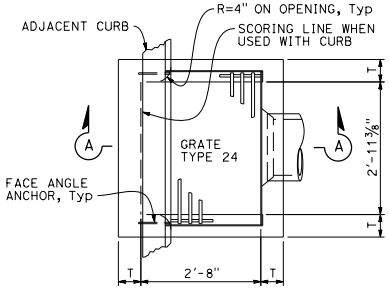
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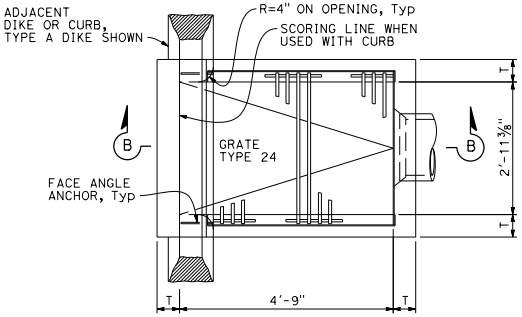
September 19, 2025
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STATE OF CALIFORNIA

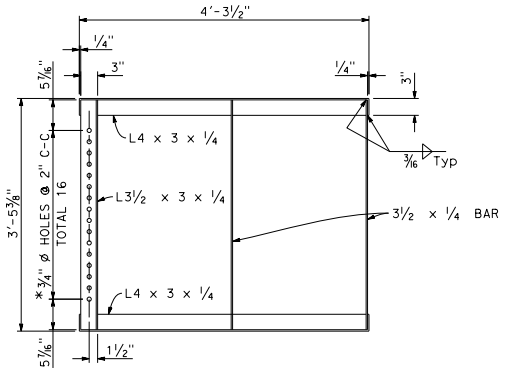
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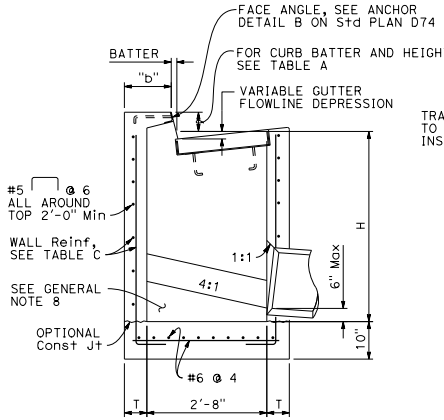

PLAN
TYPE GO



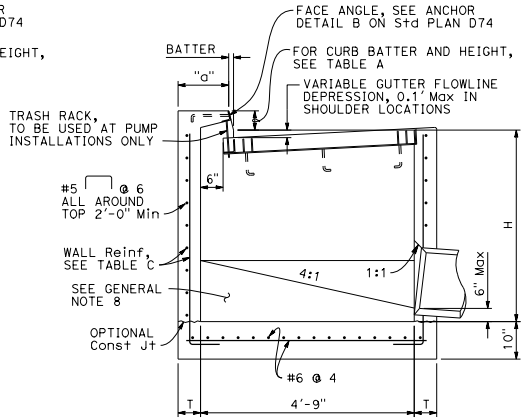

PLAN
TYPE GDO



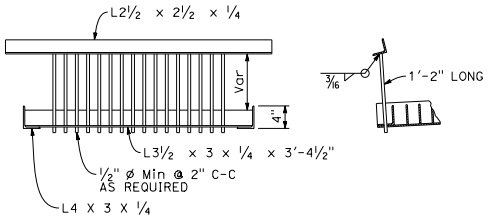

GRATE FRAME FOR TYPE GDO INLET
* HOLES REQUIRED ONLY WITH TRASH RACK




SECTION A-A




SECTION B-B




TRASH RACK
(FOR USE WITH PUMP INSTALLATION)

| TABLE A | | | | |
|---|---|---|---|---|
| CURB TYPE | NORMAL CURB HEIGHT | CURB BATTER | "a" DIMENSION | "b" DIMENSION |
| A1-6 | 6" | 1½" | T+7½" | T+6½" |
| A1-8 | 8" | 2" | T+7" | T+6" |
| B1-6 | 6" | 4" | T+5" | T+4" |
| TYPE A DIKE | 6" | 3" | T+6" | T+5" |

Height of curb opening will vary with the type of curb and the depth of the local depression.

NOTES:

1. See Standard Plan D72F for General Notes and additional details. See Standard Plan D72G for tables, wall thickness "T" and quantities.
2. Where shown on the project plans, place a ¾"Ø plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
3. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
4. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CIP DRAINAGE INLETS TYPES GO AND GDO

NO SCALE

D72E

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

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STATE OF CALIFORNIA

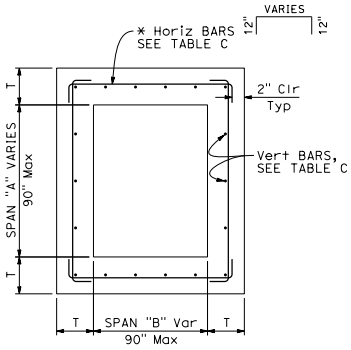
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## GENERAL NOTES:

1. "H" is measured from top of bottom slab to the normal gutter grade line undepressed at the curb face.
2. For "T" wall thickness and reinforcement, see Table C on Standard Plan D72G.
3. Wall reinforcement must be placed in the center of the wall thickness with horizontal bars placed on the exterior face. Bottom slab concrete cover must be 3" clear on the interior face unless otherwise noted. Top slab concrete cover must be 2" clear on the exterior face unless otherwise noted. Reinforcement spacing is in inches unless otherwise noted.
4. Steps - None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below bottom of lid. The distance between steps must not exceed 1'-0" and be uniform throughout the length of the wall. Place steps in the wall without an opening. Steps inserts may be substituted for the bar steps. Step inserts must comply with State Industrial Safety Requirements. See Standard PlaN D74 for step details.
5. Pipe(s) can be placed in any wall. Adjacent to each side of the opening, place additional reinforcement equivalent to half the interupted main reinforcement. For larger pipes greater than or equal to 42" diameter, also add 4 diagonal bars, 1 bar each side. Bars must be the same size as the larger of the main vertical or horizontal bars. Extend bars one development length past the intersection with the adjacent diagonal bar, or where bars intersect mid thickness of adjacent wall bottom or top of non-continuous wall, bend ends as required into same plane.
6. Set inlet so that grate bars are parallel to direction of principal surface flow.
7. Curb section must match adjacent curb.
8. Except for inlets used as junction boxes, basin floors must have wood trowel finish and a minimum slope of 4:1, unless otherwise noted, from all directions toward outlet pipe by casting grout fill on top of the bottom slab. The additional volume to achieve the 4:1 slope may also be achieved by casting the bottom slab and fill as a composite concrete element.
9. See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
10. See Standard Plans D78A and D78B for gutter depression details.
11. See Standard PlanS A87A and A87B for curb and dike details.
12. Details shown apply to metal, concrete and plastic pipe(s).
13. The Contractor may use WWR instead of bar reinforcement. The ratio of bar reinforcement to WWR shall be based on the yield strength ratio.
14. Cast-in-place (CIP) inlets to be formed around all pipes/stubs intersecting the inlet, and concrete poured in one continuous operation.
15. Perimeter reinforcement must not be smaller than main bars and #4 and serves as a rigid frame to position and attach the required structural reinforcement and may be tack welded at outer corners when using ASTM A706 weldable bars.

## DESIGN NOTES:

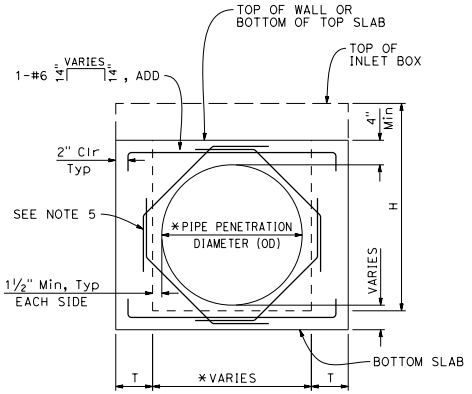
1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 6th edition with 2012 Interims and Errata and CA Amendments.
2. Live Load (AASHTO LRFD 3.6.1.2):
   HL-93, consists of design truck or tandem, and design lane load.
   Dynamic Load Allowance, IM = 33%
   Multiple Presence Factor, m = 1.0
   Design lane load was excluded in Top Slab design.
   A wheel load of 8 kips without impact factor was used for top slabs that are above a curb.
3. Earth Load:
   Vertical pressure = 140 pcf
   Lateral pressure:
   = 100 pcf for walls with flat embankment
   = 140 pcf For walls with slope embankment, 1.5:1 Max
4. Downdrag: $\phi$ = 34°and $\gamma_E$ = 120 pcf.
5. Buoyancy: $\gamma_W$ = 62.4 pcf to finished grade
6. Reinforced Concrete: f'c = 3.6 ksi, fy = 60.0 ksi.
7. Soil pressures shown are factored per AASHTO LRFD and include self-weight, live load and downdrag.




TYPICAL INLET PLAN

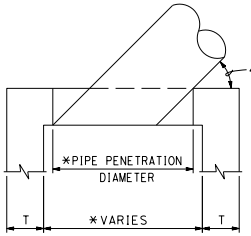
* ALTERNATIVE HORIZONTAL BARS




TYPICAL WALL W/ PIPE OPENING

* SEE "SKEWED PIPE PLAN"




SKEWED PIPE PLAN

* ADJUST PIPE PENETRATION AND BOX WIDTH FOR SKEWED PIPES.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CIP DRAINAGE INLET NOTES

NO SCALE

D72F

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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**TABLE A - CONCRETE QUANTITIES**

| TYPE | H=3'-0" TO 8'-0" | | H=8'-1" TO 20'-0" | |
|---|---|---|---|---|
| | H=3'-0" (CY) | ADDITIONAL CONCRETE PER FOOT (CY) | H=8'-1" (CY) | ADDITIONAL CONCRETE PER FOOT (CY) |
| G1 | 0.95 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| G2* | 2.00 | 0.411 | 5.11 | 0.525 |
| G3 | 1.03 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| G4 (TYPE 18)* | 2.02 | 0.411 | 5.14 | 0.525 |
| G4 (TYPE 24)* | 1.99 | 0.411 | 5.10 | 0.525 |
| G5 | 1.02 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| G6 | 1.04 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| OS | 1.53 | 0.278 | 5.08 | 0.504 |
| OL7 | 2.06 | 0.278 | 6.17 | 0.566 |
| OL10 | 2.85 | 0.278 | 6.85 | 0.566 |
| OL14 | 3.81 | 0.278 | 7.78 | 0.566 |
| OL21 | 5.71 | 0.278 | 9.62 | 0.566 |
| GOL7 | 2.48 | 0.313 | 6.89 | 0.630 |
| GOL10 | 3.41 | 0.313 | 7.85 | 0.630 |
| GT1 | 1.72 | 0.248 | SEE NOTE 2 | SEE NOTE 2 |
| GT2 | 2.93 | 0.530 | 7.73 | 0.762 |
| GT3 | 1.74 | 0.348 | SEE NOTE 2 | SEE NOTE 2 |
| GT4 | 2.83 | 0.530 | 7.62 | 0.762 |
| GO | 1.26 | 0.245 | 4.90 | 0.506 |
| GDO | 1.74 | 0.322 | 6.33 | 0.647 |

* Quantities are based on the minimum interior dimensions.

**TABLE B - REINFORCEMENT QUANTITIES**

| TYPE | H=3'-0" TO 8'-0" | | H=8'-1" TO 20'-0" | |
|---|---|---|---|---|
| | H=3'-0" (LB) | ADDITIONAL REINFORCEMENT PER FOOT (LB) | H=8'-1" (LB) | ADDITIONAL REINFORCEMENT PER FOOT (LB) |
| G1 | 118 | 22.20 | SEE NOTE 2 | SEE NOTE 2 |
| G2* | 729 | 86.48 | 1794 | 171.79 |
| G3 | 118 | 22.20 | SEE NOTE 2 | SEE NOTE 2 |
| G4 (TYPE 18)* | 647 | 86.48 | 1675 | 171.79 |
| G4 (TYPE 24)* | 647 | 86.48 | 1675 | 171.79 |
| G5 | 118 | 22.20 | SEE NOTE 2 | SEE NOTE 2 |
| G6 | 118 | 22.20 | SEE NOTE 2 | SEE NOTE 2 |
| OS | 245 | 49.88 | 1057 | 120.77 |
| OL7 | 458 | 50.53 | 1324 | 126.75 |
| OL10 | 729 | 50.53 | 1595 | 126.75 |
| OL14 | 982 | 50.53 | 1849 | 126.75 |
| OL21 | 1453 | 50.53 | 2320 | 126.75 |
| GOL7 | 644 | 83.57 | 1969 | 148.79 |
| GOL10 | 883 | 83.57 | 2208 | 148.79 |
| GT1 | 486 | 96.91 | SEE NOTE 2 | SEE NOTE 2 |
| GT2 | 1040 | 117.08 | 2543 | 233.37 |
| GT3 | 486 | 96.91 | SEE NOTE 2 | SEE NOTE 2 |
| GT4 | 1001 | 117.08 | 2556 | 237.88 |
| GO | 308 | 32.44 | 1013 | 96.56 |
| GDO | 519 | 57.09 | 1654 | 165.66 |

* Quantities are based on the minimum interior dimensions.

**TABLE D**

| INLET | CURB USED IN QUANTITIES |
|---|---|
| G1 | - |
| G2 | - |
| G3 | A1-6 |
| G4 (Type 18) | A1-6 |
| G4 (Type 24) | A1-6 |
| G5 | B1-4 |
| G6 | ½E |
| OS | - |
| OL7 | - |
| OL10 | - |
| OL14 | - |
| OL21 | - |
| GOL7 | - |
| GOL10 | - |
| GT1 | D-6 |
| GT2 | E |
| GT3 | A2-8 |
| GT4 | A2-8 |
| GO | - |
| GDO | - |

NOTES:

1. No deduction or adjustment was made to the quantities of concrete and reinforcement for pipe openings, floor alternatives or curb type.
2. Maximum allowable height is 6'-6".
3. Quantities are approximate and for design purposes only.
4. Design is based on envelope of level and sloped ground.

**TABLE C - WALL REINFORCEMENT**

| TYPE | H≤8 (T=6",UON) | | 8<H≤20 (T=11",UON) | |
|---|---|---|---|---|
| | HORIZ | VERTICAL | HORIZ | VERTICAL |
| OS | #4 @ 8 | #4 @ 6 | #5 @ 6 | #6 @ 4.5 |
| OL | #4 @ 6 | #4 @ 6 | #5 @ 6 | #6 @ 4.5 |
| GOL | #5 @ 6 | #5 @ 8 | #6 @ 5 | #6 @ 4.5 |
| G1 (H≤6-6") | #3 @ 6 | #3 @ 6 | - | - |
| G2 | T=9" #5 @ 5 | #5 @ 5 | T=11" #6 @ 4 | #6 @ 4.5 |
| G3 (H≤6-6") | #3 @ 6 | #3 @ 6 | - | - |
| G4 | T=9" #5 @ 5 | #5 @ 5 | T=11" #6 @ 4 | #6 @ 4.5 |
| G5 (H≤6-6") | #3 @ 6 | #3 @ 6 | - | - |
| G6 (H≤6-6") | #3 @ 6 | #3 @ 6 | - | - |
| GT1 (H≤6-6") | #5 @ 6 | #5 @ 6 | - | - |
| GT2 | T=8" #5 @ 6 | #5 @ 6 | #6 @ 4 | #6 @ 4.5 |
| GT3 (H≤6-6") | #5 @ 6 | #5 @ 6 | - | - |
| GT4 | T=8" #5 @ 6 | #5 @ 6 | #6 @ 4 | #6 @ 4.5 |
| GO | #4 @ 9 | #4 @ 6 | #4 @ 6 | #6 @ 4.5 |
| GDO | #4 @ 6 | #4 @ 6 | #5 @ 4 | #6 @ 4.5 |

**TABLE E**

| SOIL PRESSURE BELOW BASE SLAB (ksf) | | |
|---|---|---|
| TYPE | H=8'-0" | 8'-0"< H ≤20'-0" |
| OS | 2.93 | 5.56 |
| OL* | 2.93 | 5.56 |
| GOL* | 2.50 | 5.06 |
| G1 | 3.67 | - |
| G2 | 2.99 | 5.91 |
| G3 | 3.67 | - |
| G4 | 2.99 | 5.91 |
| G5 | 3.67 | - |
| G6 | 3.67 | - |
| GT1 | 3.66 | - |
| GT2 | 3.91 | 6.07 |
| GT3 | 3.86 | - |
| GT4 | 3.91 | 6.07 |
| GO | 3.42 | 6.11 |
| GDO | 2.52 | 6.95 |

* Main Box

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CIP DRAINAGE INLET TABLES

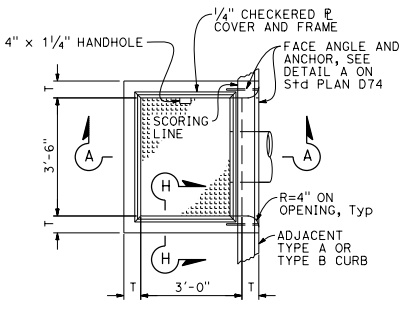
**D72G**

7-1-25

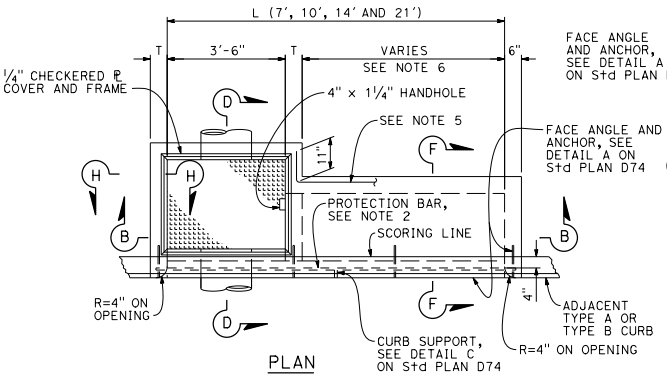
2025 STANDARD PLAN D72G



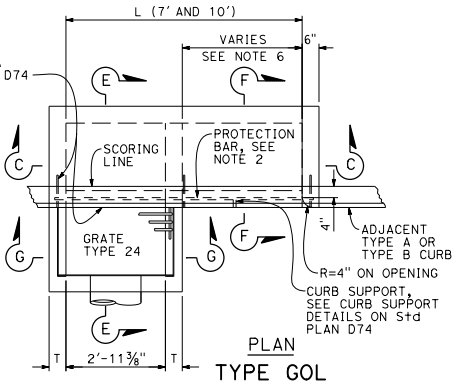
Return to Table of Contents




PLAN
TYPE OS




PLAN
TYPE OL




PLAN
TYPE GOL

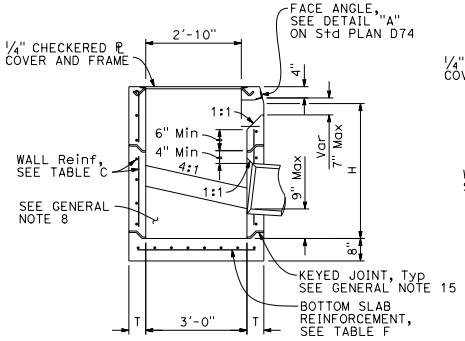
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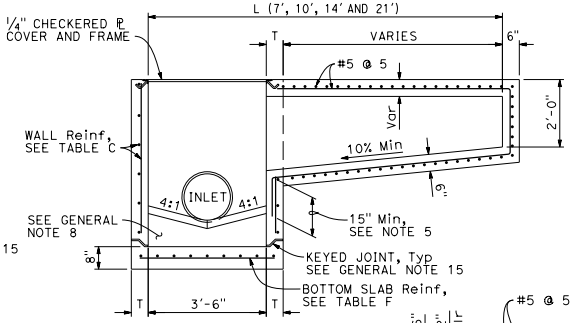
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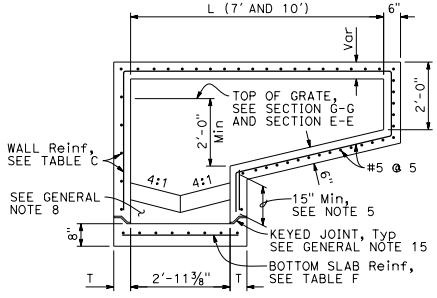
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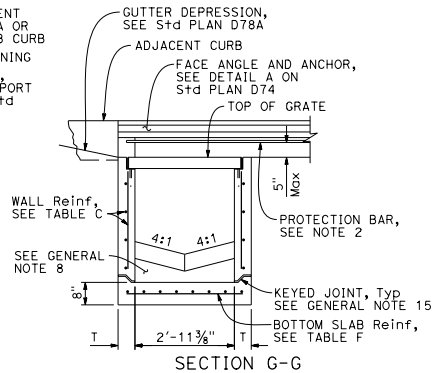

SECTION A-A



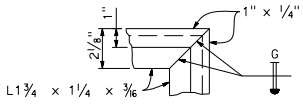

SECTION B-B



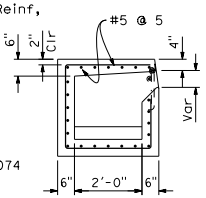

SECTION C-C



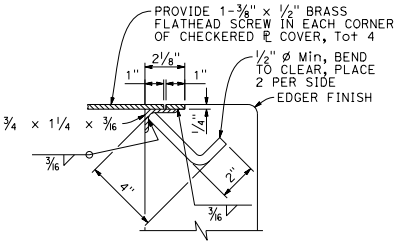

SECTION G-G



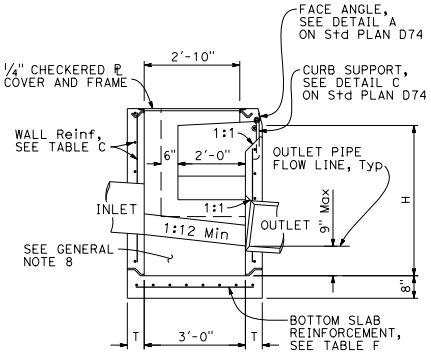

COVER FRAME
Typical each corner
(Checkered ℄ cover not shown)



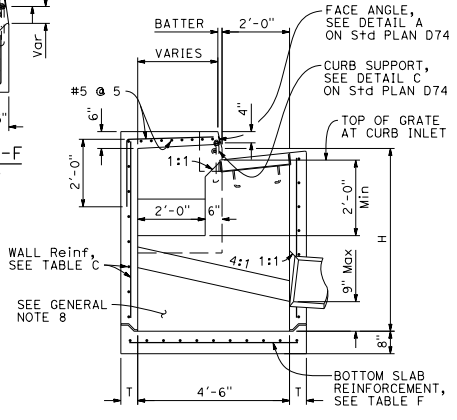

SECTION F-F
See Note 5




SECTION H-H




SECTION D-D




SECTION E-E

NOTES:

1. See Standard Plan D73F for General Notes and additional details. See Standard Plan D73G for tables, wall thickness "T" and quantities.
2. When shown on the project plans, place a ¾" ø plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
3. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
4. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
5. Extend all horizontal bars from inlet extensions into adjacent concrete elements of main inlet box a minimum of 15". Where shown, bend horizontal bars into box. If necessary rotate bars to maintain 2" clear coverage.
6. Height of curb opening will vary with the type of curb and the depth of the local depression.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST DRAINAGE INLETS TYPES OS, OL AND GOL

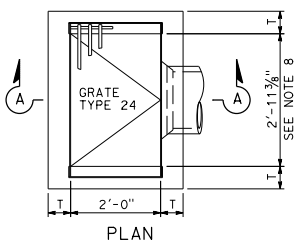
NO SCALE

D73A

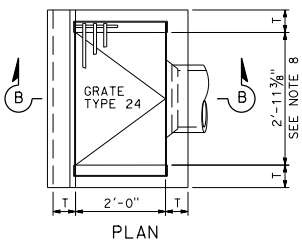
7-1-25



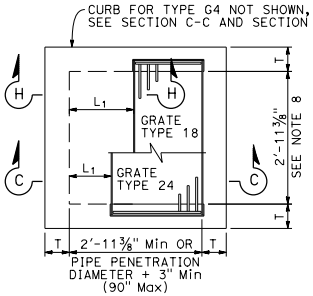
Return to Table of Contents



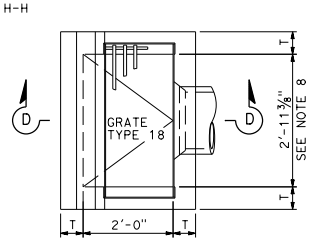

PLAN
TYPE G1



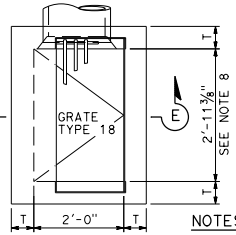

PLAN
TYPE G3




PLAN
STANDARD TYPE G2 OR G4
(Integral top alternative)
For "L" and "T" values, see Table 1




PLAN
TYPE G5



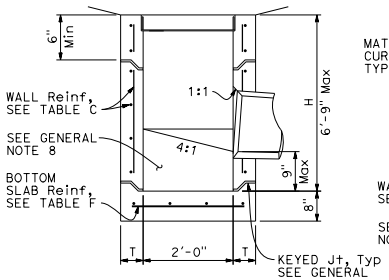

PLAN
TYPE G6

NOTES:
1. For notes and Table 2, see Standard Plan D73C.
2. For $L_1$ or $L_2$ greater than 2'-10", see Table 1 for wall thickness dimension and see Table C in Standard Plan D73G for reinforcement. Otherwise, see Table C in Standard Plan D73G for wall thickness and reinforcement.

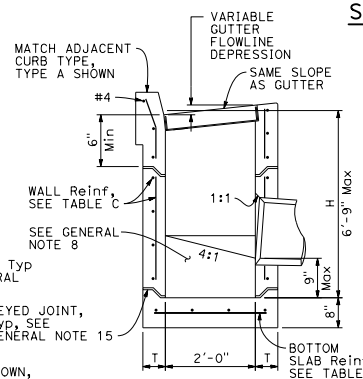
| TABLE 1 | |
|---|---|
| | T |
| $L_1$ OR $L_2$ > 2'-10" | 12" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

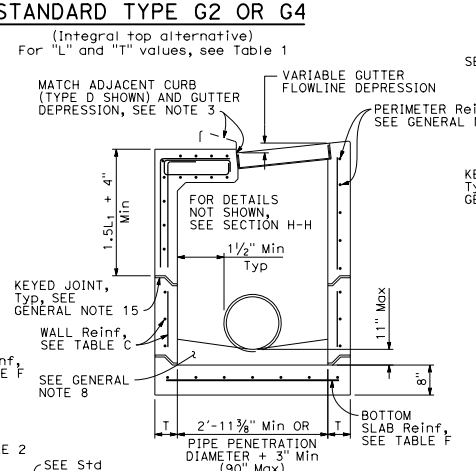
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Carl W. Duan No. C59976 Exp. 6-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
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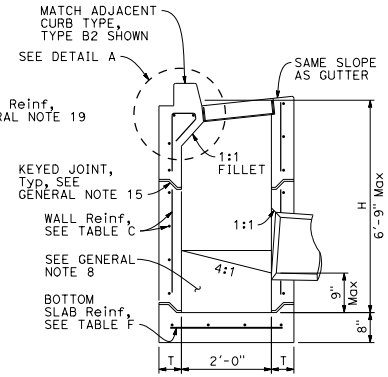

SECTION A-A



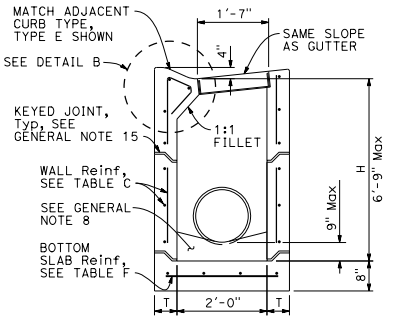

SECTION B-B



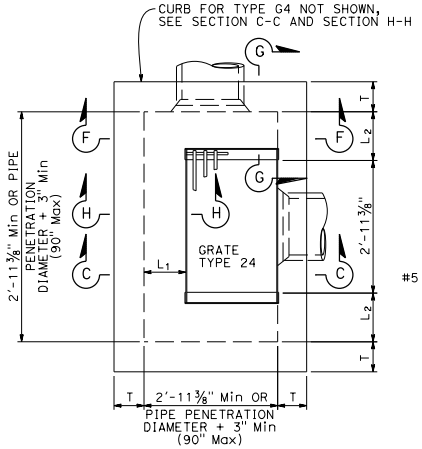

SECTION C-C
FOR "$L_1$", "$L_2$" AND "$T_1$" VALUES, SEE TABLE 1



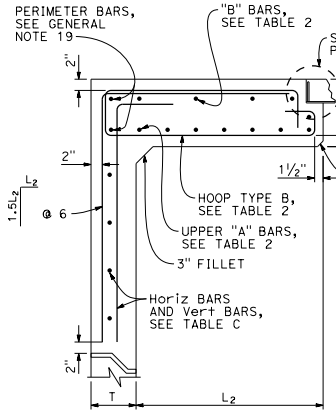

SECTION D-D



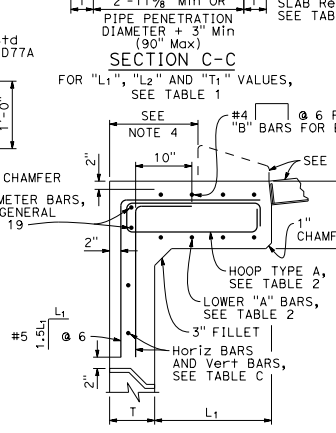

SECTION E-E



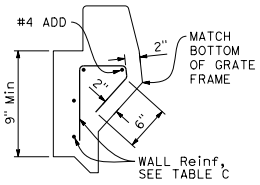

PLAN
EXPANDED
TYPE G2 OR G4



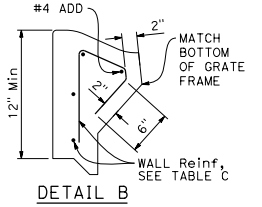

SECTION G-G



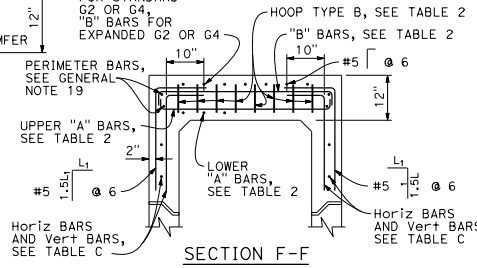

SECTION H-H




DETAIL A




DETAIL B




SECTION F-F

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST DRAINAGE INLETS TYPES G1, G2, G3, G4, G5 AND G6

NO SCALE

D73B

7-1-25



Return to Table of Contents

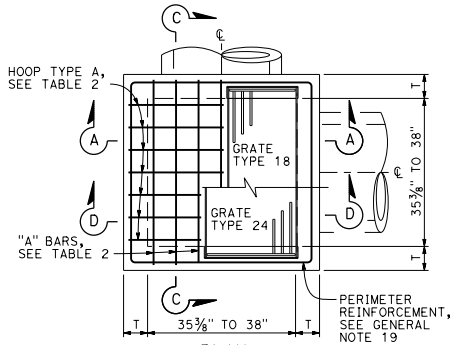
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

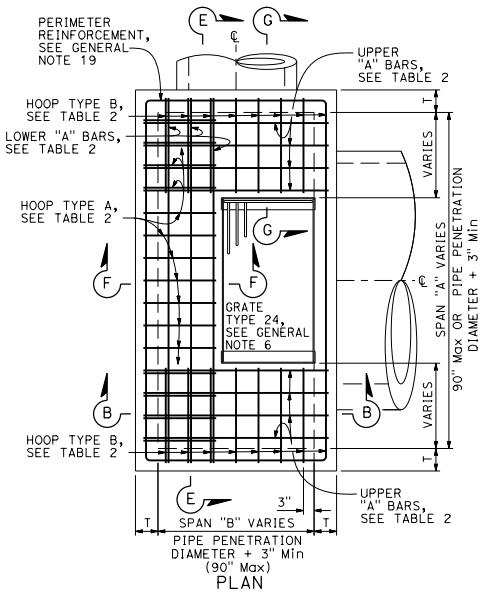
Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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PLAN

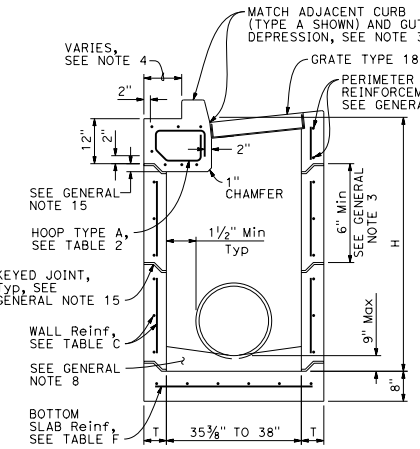
## STANDARD TYPE G2 OR G4




PLAN

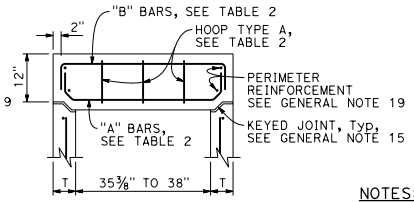
## EXPANDED TYPE G2 OR G4

(Top rebar not shown)

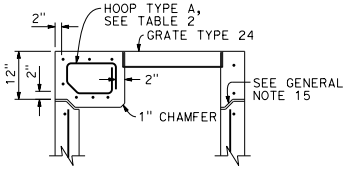



SECTION A-A

(With G4 Top)




SECTION C-C

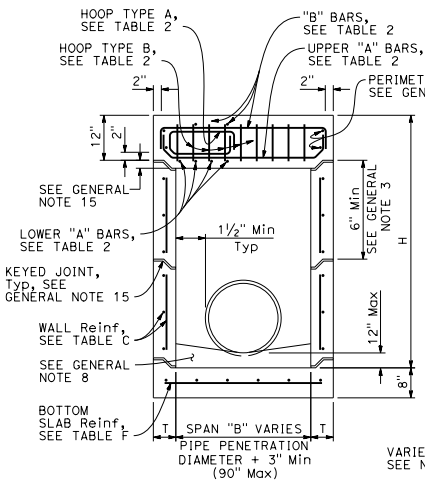



SECTION D-D

(With G2 Top)

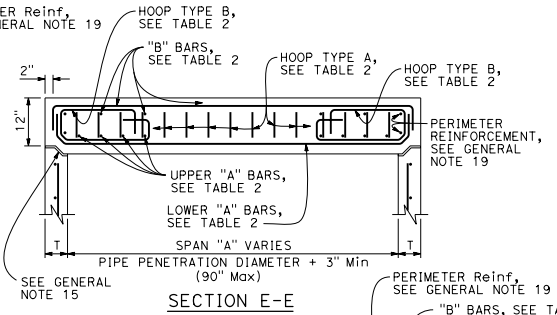
### NOTES:

1. See Standard Plan D73F for General Notes and additional details. See Standard Plan D73G for additional tables, wall thickness "T" and quantities.
2. Type G4 inlet can use Grate Type 18 or 24. Type G2 inlet uses Grate Type 24.
3. G4 inlet details are the same as the G2 with the addition of a curb and sloped grate that matches the adjacent curb and gutter depression.
4. Dimension will vary with different grates, curb types, box width and wall thickness.
5. 2" unless inlet is expanded in the Span "A" direction, then clearance is 2" plus the diameter of the lower "A" bar.
6. See Standard Plan D73B for integral top slab alternative.
7. Interior dimension of lower sections of inlet for Types G2 and G4 may be 3'-0" provided top section conforms to the requirements for frame and grate types on Standard Plan D77A. The wall thickness of top sections may transition from "T" to "T"+5/16" to meet this requirement. Minimum height of thickened wall shall = "T".




SECTION B-B

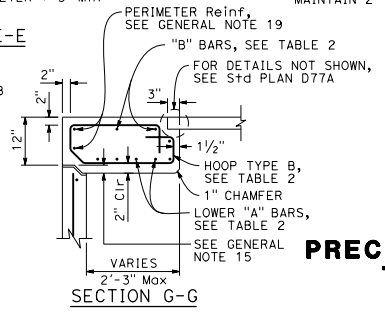
(With G2 Top)



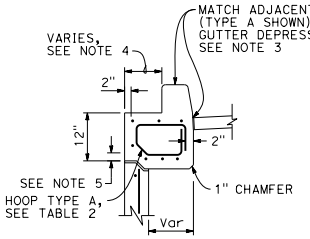

SECTION E-E

| TABLE 2 - TOP SLAB REINFORCEMENT | | |
|---|---|---|
| 16 BAR DIAMETERS | "A" & "B" BARS VARIES | BEND TO AVOID KEYED JOINT WHERE SHOWN |
| | W/ CURB | W/O CURB |
| "A" BARS | #4 @ 5 (2 BARS Min) | #5 @ 5 (3 BARS Min) |
| "B" BARS | #4 @ 10 (2 BARS Min) | #4 @ 10 (2 BARS Min) |
| HOOPS ("A" & "B") | #4 @ 5 | #5 @ 5 |

ROTATE "A" AND "B" BARS SO HOOKED ENDS WILL MAINTAIN 2" CLEAR COVERAGE.

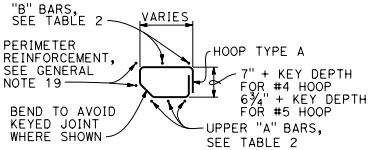



SECTION G-G

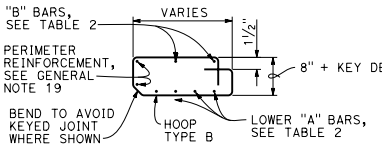



SECTION F-F

(With G4 Top)




HOOP TYPE A




HOOP TYPE B

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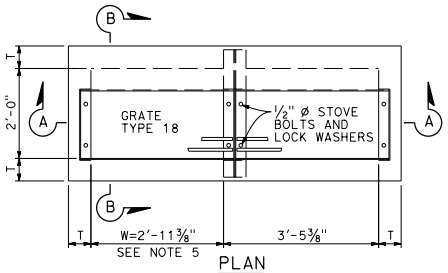
# PRECAST DRAINAGE INLETS TYPES G1, G2, G3, G4, G5 AND G6

NO SCALE

**D73C**

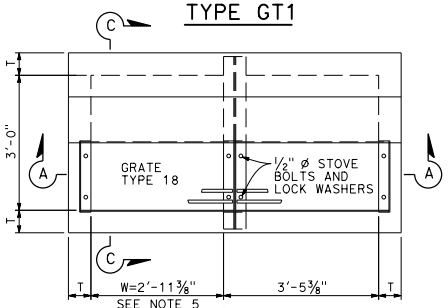
7-1-25

Return to Table of Contents



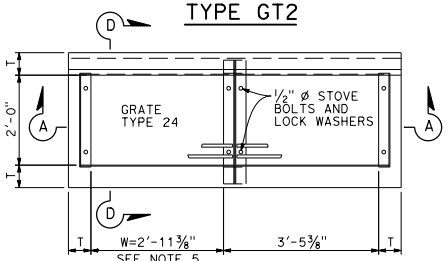

PLAN

TYPE GT1



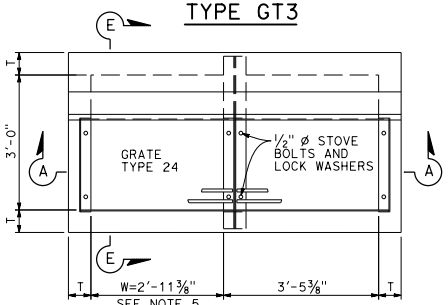

PLAN

TYPE GT2



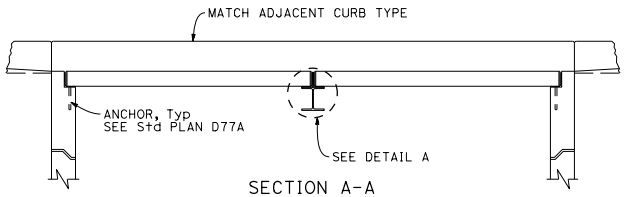

PLAN

TYPE GT3

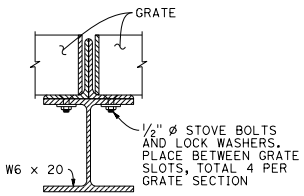



PLAN

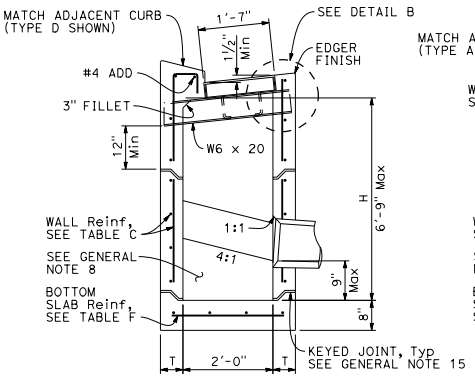
TYPE GT4



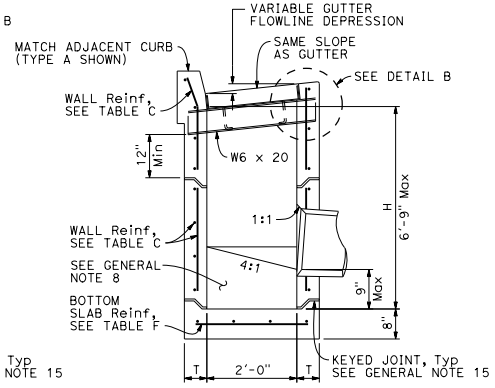

SECTION A-A



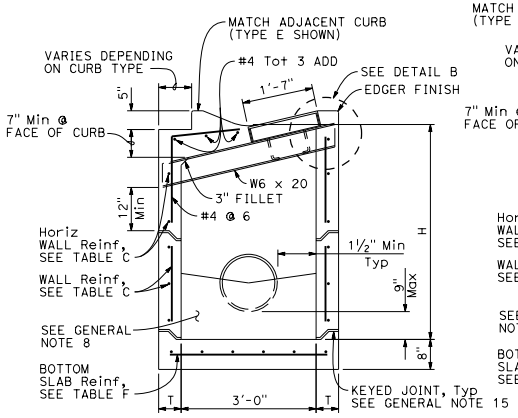

DETAIL A



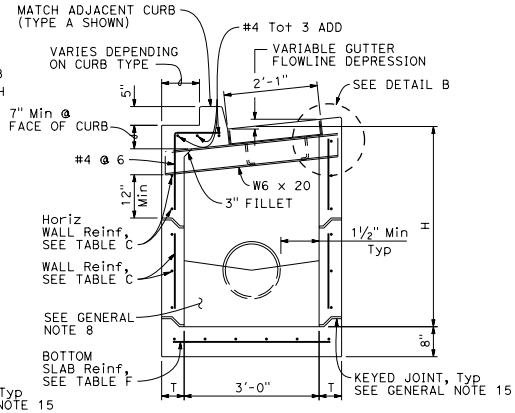

SECTION B-B




SECTION D-D



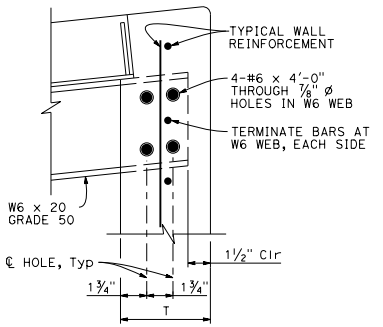

SECTION C-C




SECTION E-E

NOTES:

1. See Standard Plan D73F for General Notes and additional details. See Standard Plan D73G for tables, wall thickness "T" and quantities.
2. W=2'-11⅜" for one grate. Add 3'-5⅜" for additional grates in tandem.
3. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
4. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
5. Overall interior length of lower sections may be 6'-6" provided top section conforms to the requirements for frame and grate types on Standard Plan D77A. The wall thickness of top sections may transition from "T" to "T"+5⅛" to meet this requirement. Minimum height of thickened wall shall = "T".




DETAIL B

(Similar opposite end of W6)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST DRAINAGE INLETS
# TYPES GT1, GT2, GT3 AND GT4

NO SCALE

**D73D**

7-1-25

2025 STANDARD PLAN D73D



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

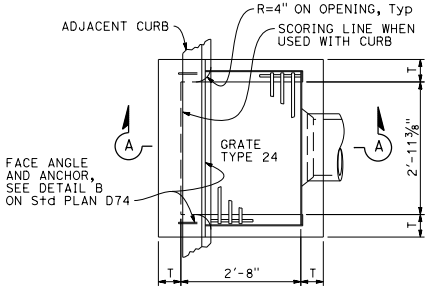
REGISTERED CIVIL ENGINEER

September 19, 2025

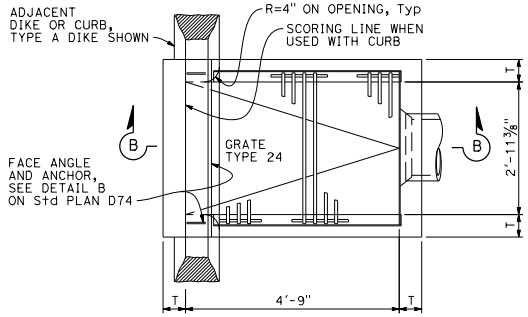
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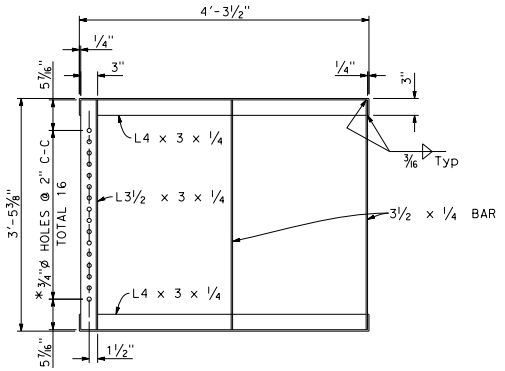
REGISTERED PROFESSIONAL ENGINEER — Carl W. Duan — No. C59976 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA




PLAN
TYPE GO

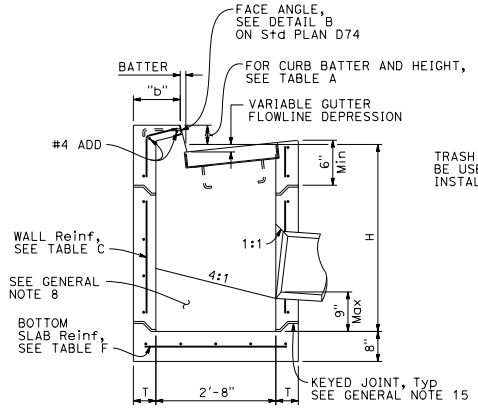



PLAN
TYPE GDO

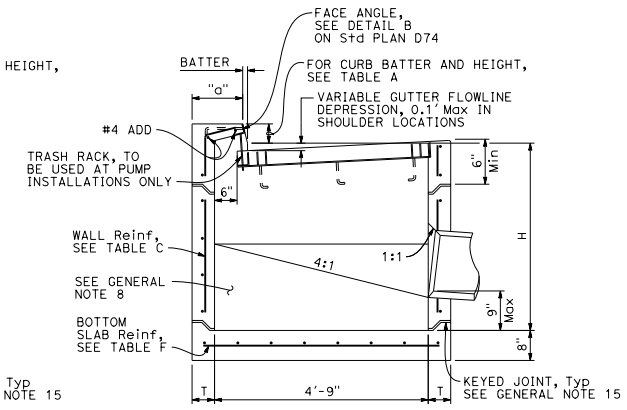



GRATE FRAME FOR TYPE GDO INLET

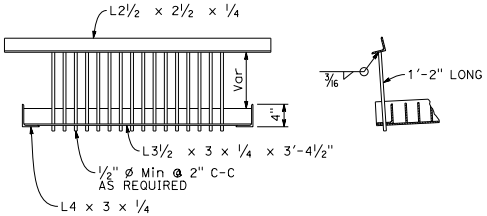
* Holes required only with trash rack




SECTION A-A




SECTION B-B




TRASH RACK

FOR USE WITH PUMP INSTALLATION

| TABLE A | | | | |
|---|---|---|---|---|
| CURB TYPE | NORMAL CURB HEIGHT | CURB BATTER | "a" DIMENSION | "b" DIMENSION |
| A1-6 | 6" | 1½" | T+7½" | T+6½" |
| A1-8 | 8" | 2" | T+7" | T+6" |
| B1-6 | 6" | 4" | T+5" | T+4" |
| TYPE A DIKE | 6" | 3" | T+6" | T+5" |

Height of curb opening will vary with the type of curb and the depth of the local depression.

NOTES:

1. See Standard Plan D73F for General Notes and additional details. See Standard Plan D73G for tables, wall thickness "T" and quantities.
2. Where shown on the project plans, place a ¾"ø plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
3. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
4. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST DRAINAGE INLETS TYPES GO AND GDO

NO SCALE

D73E

7-1-25

Return to Table of Contents

## GENERAL NOTES:

1. "H" is measured from top of bottom slab to the normal gutter grade line undepressed at the curb face.
2. For "T" wall thickness and reinforcement, see Table C on Standard Plan D73G.
3. Wall reinforcement must be placed at the center of wall thickness with horizontal bars placed on the exterior face. Bottom slab concrete cover must be 3" clear on the interior side face unless otherwise noted. Top slab concrete cover must be 2" clear on the exterior face unless otherwise noted. Short independent wall sections or height adjustment rings 6" to 24" high must have a minimum of two #4 horizontal bars. Reinforcement spacing is in inches unless otherwise noted.
4. Steps - None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below bottom of lid. The distance between steps must not exceed 1'-0" and be uniform throughout the length of the wall. Place steps in the wall without an opening. Steps inserts may be substituted for the bar steps. Step inserts must comply with State Industrial Safety Requirements. See Standard Plan D74 for step details.
5. Pipe(s) can be placed in any wall. Adjacent to each side of the opening, place additional reinforcement equivalent to half the interupted main reinforcement. For larger pipes greater than or equal to 42" diameter, also add 4 diagonal bars, 1 bar each side. Bars must be the same size as the larger of the main vertical or horizontal bars. Extend bars one development length past the intersection with the adjacent diagonal bar, or where bars intersect mid thickness of adjacent wall bottom or top of non-continuous wall, bend ends as required into same plane.
6. Set inlet so that grate bars are parallel to direction of principal surface flow.
7. Curb section must match adjacent curb.
8. Except for inlets used as junction boxes, basin floors must have wood trowel finish and a minimum slope of 4:1, unless otherwise noted, from all directions toward outlet pipe by casting grout on top of the bottom slab. Grout must be placed prior to backfill.
9. See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
10. See Standard Plans D78A and D78B for gutter depression details.
11. See Standard Plans A87A and A87B for curb and dike details.
12. Details shown apply to metal, concrete and plastic pipe(s).
13. The Contractor may use WWR instead of bar reinforcement. The ratio of bar reinforcement to WWR shall be based on the yield strength ratio.
14. Seal precast inlets connection openings between wall and pipe with non-shrink grout or resilient connectors as specified in the Special Provisions. Precast inlets shall have mortared connections conforming to details for Type GCP Inlet shown on Standard Plan D75B. See Standard Specifications for mortar composition.
15. Where shown, provide precast inlets with separate top sections for final grade adjustment. Provide keyed joints with butyl rubber sealant between the top section and wall, multiple wall sections, and wall and bottom slab. Joint design may vary but must be 1" to 3" in depth. For tongue type joints, tongue down orientation is not allowed. For keyed joints, keyway up, keyway down or tongue up configurations are allowed. Only one key type is allowed for each drainage inlet.
16. Non-shrink grout can be used for upper most joint to facilitate final top grade adjustment.
17. Provide a level and firm sand bedding on which to place precast inlets. Extend sand bedding under all structure backfill.
18. For Integral Base, see Detail A.
19. Perimeter reinforcement must not be smaller than main bars and #4 and serves as a rigid frame to position and attach the required structural reinforcement and may be tack welded at outer corners when using ASTM A706 weldable bars.
20. Inlet extensions may be cast in place after placement of main box and placement and compaction of backfill. Concrete strength must be 3.6 ksi minimum. All slab and wall thicknesses must be per Standard Plan D72A. All reinforcement shall extend a minimum of 24" from precast main inlet box.

## DESIGN NOTES:

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 6th edition with 2012 Interims and Errata and CA Amendments.
2. Live Load (AASHTO LRFD 3.6.1.2):
   HL-93, consists of design truck or tandem, and design lane load.
   Dynamic Load Allowance, IM = 33%
   Multiple Presence Factor, m = 1.0
   Design lane load was excluded in Top Slab design.
   A wheel load of 8 kips without impact factor was used for top slabs that are above a curb.
3. Earth Load:
   Vertical pressure = 140 pcf
   Lateral pressure:
   = 100 pcf for walls with flat embankment
   = 140 pcf For walls with slope embankment, 1.5:1 Max
4. Downdrag: $\phi$ = 34°and $\gamma_E$ = 120 pcf.
5. Buoyancy: $\gamma_w$ = 62.4 pcf to finished grade.
6. Reinforced Concrete: f'c = 5.0 ksi, fy = 60.0 ksi.
7. Tables are based on the worst case from the level ground and sloped ground.
8. Soil pressures shown are factored per AASHTO LRFD and include self-weight, live load and downdrag.

| SPAN "A" OR "B" (IN) | L (IN) |
|---|---|
| <38 | 34 |
| 38 TO 50 | 40 |
| 51 TO 64 | 47 |
| 65 TO 76 | 53 |
| 77 TO 90 | 60 |

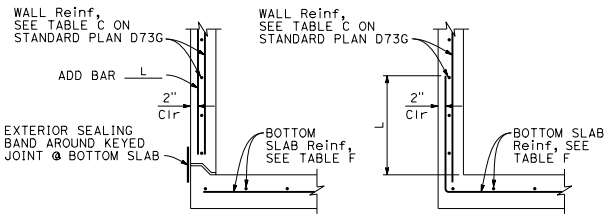
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

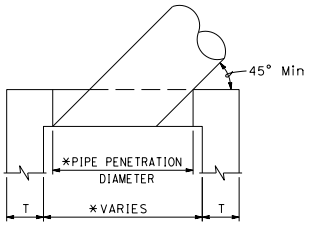
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BASE WITH KEYED JOINT  INTEGRAL BASE

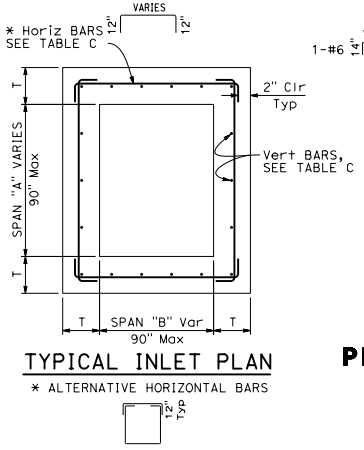
### DETAIL "A"

FOR INTEGRAL BASE, CLEARANCE BETWEEN PIPE PENETRATION AND BASE SLAB MAY BE AS SHOWN IN CIP ALTERNATIVE STANDARD PLAN SHEET.




### SKEWED PIPE PLAN

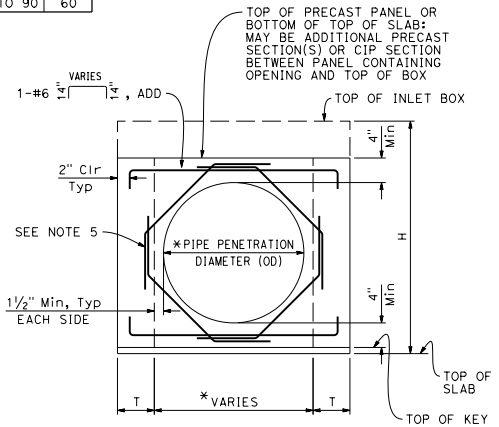
* ADJUST PIPE PENETRATION AND BOX WIDTH FOR SKEWED PIPES.



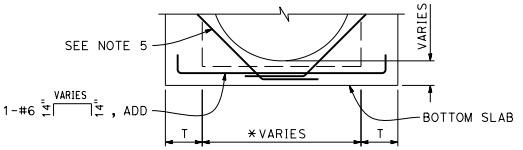

### TYPICAL INLET PLAN

* ALTERNATIVE HORIZONTAL BARS






BASE WITH KEYED JOINT




INTEGRAL BASE

For details not shown, see "BASE WITH KEYED JOINT"

### TYPICAL WALL W/ PIPE OPENING

* See "SKEWED PIPE PLAN"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST DRAINAGE INLET NOTES

NO SCALE

D73F

7-1-25

2025 STANDARD PLAN D73F



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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## TABLE A - CONCRETE QUANTITIES

| TYPE | H=3'-0" TO 8'-0" | | H=8'-1" TO 20'-0" | |
|---|---|---|---|---|
| | H=3'-0" (CY) | ADDITIONAL CONCRETE PER FOOT (CY) | H=8'-1" (CY) | ADDITIONAL CONCRETE PER FOOT (CY) |
| G1 | 0.95 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| G2* | 1.25 | 0.255 | 2.55 | 0.255 |
| G3 | 1.06 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| G4 (TYPE 18)* | 1.41 | 0.255 | 2.71 | 0.255 |
| G4 (TYPE 24)* | 1.36 | 0.255 | 2.65 | 0.255 |
| G5 | 1.09 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| G6 | 1.14 | 0.220 | SEE NOTE 2 | SEE NOTE 2 |
| OS | 1.28 | 0.278 | 2.69 | 0.278 |
| OL7 | 1.92 | 0.278 | 3.33 | 0.278 |
| OL10 | 2.43 | 0.278 | 3.84 | 0.278 |
| OL14 | 3.16 | 0.278 | 4.57 | 0.278 |
| OL21 | 4.58 | 0.278 | 5.99 | 0.278 |
| GOL7 | 2.36 | 0.313 | 4.04 | 0.434 |
| GOL10 | 2.84 | 0.313 | 4.53 | 0.434 |
| GT1 | 2.30 | 0.480 | SEE NOTE 2 | SEE NOTE 2 |
| GT2 | 2.71 | 0.530 | 5.40 | 0.530 |
| GT3 | 2.29 | 0.480 | SEE NOTE 2 | SEE NOTE 2 |
| GT4 | 2.69 | 0.530 | 5.39 | 0.530 |
| GO | 1.25 | 0.245 | 2.37 | 0.245 |
| GDO | 1.64 | 0.322 | 3.37 | 0.446 |

* Quantities are based on the minimum interior dimensions.

## TABLE B - REINFORCEMENT QUANTITIES

| TYPE | H=3'-0" TO 8'-0" | | H=8'-1" TO 20'-0" | |
|---|---|---|---|---|
| | H=3'-0" (LB) | ADDITIONAL REINFORCEMENT PER FOOT (LB) | H=8'-1" (LB) | ADDITIONAL REINFORCEMENT PER FOOT (LB) |
| G1 | 88.5 | 21.90 | SEE NOTE 2 | SEE NOTE 2 |
| G2* | 151.5 | 24.54 | 277.4 | 38.64 |
| G3 | 92.9 | 21.90 | SEE NOTE 2 | SEE NOTE 2 |
| G4 (TYPE 18)* | 134.4 | 24.54 | 260.3 | 38.64 |
| G4 (TYPE 24)* | 125.1 | 24.54 | 251.0 | 38.64 |
| G5 | 92.5 | 21.90 | SEE NOTE 2 | SEE NOTE 2 |
| G6 | 92.5 | 21.90 | SEE NOTE 2 | SEE NOTE 2 |
| OS | 145.8 | 35.57 | 327.8 | 49.60 |
| OL7 | 328.0 | 35.57 | 510.0 | 49.60 |
| OL10 | 467.5 | 35.57 | 649.5 | 49.60 |
| OL14 | 667.5 | 35.57 | 849.5 | 49.60 |
| OL21 | 1056.1 | 35.57 | 1238.1 | 49.60 |
| GOL7 | 474.7 | 45.17 | 706.8 | 74.02 |
| GOL10 | 604.9 | 45.17 | 836.9 | 74.02 |
| GT1 | 349.0 | 80.48 | SEE NOTE 2 | SEE NOTE 2 |
| GT2 | 403.7 | 86.82 | 849.1 | 135.15 |
| GT3 | 347.0 | 80.48 | SEE NOTE 2 | SEE NOTE 2 |
| GT4 | 403.7 | 86.82 | 849.1 | 135.15 |
| GO | 99.8 | 23.75 | 221.7 | 37.46 |
| GDO | 208.8 | 46.22 | 446.2 | 75.61 |

* Quantities are based on the minimum interior dimensions.

## TABLE D

| INLET | CURB USED IN QUANTITIES |
|---|---|
| G1 | - |
| G2 | - |
| G3 | A1-6 |
| G4 (Type 18) | A1-6 |
| G4 (Type 24) | A1-6 |
| G5 | B1-4 |
| G6 | 1/2E |
| OS | - |
| OL7 | - |
| OL10 | - |
| OL14 | - |
| OL21 | - |
| GOL7 | - |
| GOL10 | - |
| GT1 | D-6 |
| GT2 | E |
| GT3 | A2-8 |
| GT4 | A2-8 |
| GO | - |
| GDO | - |

NOTES:

1. No deduction or adjustment was made to the quantities of concrete and reinforcement for pipe openings, floor alternatives or curb type.
2. Maximum allowable height is 6'-9".
3. Quantities are approximate and for design purposes only.
4. Design is based on envelope of level and sloped ground.

## TABLE C - WALL REINFORCEMENT

| TYPE | H ≤8'-0" (T=6", UON) | | | 8'-0"< H ≤20'-0" (T=8", UON) | | |
|---|---|---|---|---|---|---|
| | HORIZONTAL | VERTICAL | *ADD | HORIZONTAL | VERTICAL | *ADD |
| OS | #4@6 | #3@8 | #3@8 | #4@4 (T=6") | #3@8 | #3@8 |
| OL | #4@6 | #3@8 | #3@8 | #4@4 (T=6") | #3@8 | #3@8 |
| GOL | #4@5 | #3@8 | #3@8 | #5@5 | #3@6 | #3@6 |
| G1 (H ≤6'-9") | #4@9 | #3@8 | #3@8 | - | - | - |
| G2 & G4 (a** ≤38") | #4@9 | #3@8 | #3@8 | #4@5 (T=6") | #3@8 | #3@8 |
| G2 & G4 (38" < a** ≤50") | #4@6 | #3@8 | #3@8 | #4@4 (T=6") | #3@8 | #3@8 |
| G2 & G4 (50" < a** ≤64") | #4@5 | #3@8 | #3@8 | #5@5 | #3@6 | #3@6 |
| G2 & G4 (64"< a** ≤76") | #5@7 (T=8") | #3@6 | #3@6 | #5@4 | #3@6 | #5@6 |
| G2 & G4 (76" < a** ≤90") | #5@5 (T=8") | #3@6 | #3@6 | #5@3 | #3@6 | #5@6 |
| G3 (H ≤6'-9") | #4@9 | #3@8 | #3@8 | - | - | - |
| G5 (H ≤6'-9") | #4@9 | #3@8 | #3@8 | - | - | - |
| G6 (H ≤6'-9") | #4@9 | #3@8 | #3@8 | - | - | - |
| GT1 (H ≤6'-9") | #5@5 (T=8") | #3@6 | #3@6 | - | - | - |
| GT2 | #5@5 (T=8") | #3@6 | #3@6 | #5@3 | #3@6 | #5@6 |
| GT3 (H ≤6'-9") | #5@5 (T=8") | #3@6 | #3@6 | - | - | - |
| GT4 | #5@5 (T=8") | #3@6 | #3@6 | #5@3 | #3@6 | #5@6 |
| GO | #4@9 | #3@8 | #3@8 | #4@5 (T=6") | #3@8 | #3@8 |
| GDO | #4@5 | #3@8 | #3@8 | #5@5 | #3@6 | #3@6 |

* See Detail A on Standard Plan D73F for additional vertical bars at the base.
** a = Larger interior span

## TABLE E

| SOIL PRESSURE BELOW BASE SLAB (ksf) | | |
|---|---|---|
| TYPE | H ≤8'-0" | 8'-0"< H ≤20'-0" |
| OS | 2.89 | 5.68 |
| OL* | 2.89 | 5.68 |
| GOL* | 2.36 | 4.93 |
| G1 (H ≤6'-9") | 3.51 | - |
| G2 & G4 (a** ≤38") | 2.96 | 5.79 |
| G2 & G4 (38" < a** ≤50") | 2.21 | 4.51 |
| G2 & G4 (50" < a** ≤64") | 3.19 | 4.89 |
| G2 & G4 (64"< a** ≤76") | 2.50 | 4.23 |
| G2 & G4 (76" < a** ≤90") | 2.04 | 3.56 |
| G3 (H ≤6'-9") | 3.51 | - |
| G5 (H ≤6'-9") | 3.51 | - |
| G6 (H ≤6'-9") | 3.51 | - |
| GT1 (H ≤6'-9") | 3.41 | - |
| GT2 | 3.60 | 6.42 |
| GT3 (H ≤6'-9") | 3.41 | - |
| GT4 | 3.60 | 6.42 |
| GO | 3.37 | 6.46 |
| GDO | 2.48 | 7.30 |

* Main Box
** a = Larger interior span

## TABLE F

| BASE SLAB REINFORCEMENT (T=8", UON) | | |
|---|---|---|
| TYPE | H ≤8'-0" | 8'-0"< H ≤20'-0" |
| OS | #4@8 (EW) | #4@5 (EW) |
| OL* | #4@8 (EW) | #4@5 (EW) |
| GOL* | #4@6 (EW) | #4@4 (EW) |
| G1 (H ≤6'-9") | #4@10 (EW) | - |
| G2 & G4 (a** ≤38") | #4@10 (EW) | #4@6 (EW) |
| G2 & G4 (38" < a** ≤50") | #4@8 (EW) | #4@5 (EW) |
| G2 & G4 (50" < a** ≤64") | #4@6 (EW) | #4@4 (EW) |
| G2 & G4 (64"< a** ≤76") | #4@5 (EW) | #4@3 (EW) |
| G2 & G4 (76" < a** ≤90") | #4@4 (EW) | #5@3 (EW) |
| G3 (H ≤6'-9") | #4@10 (EW) | - |
| G5 (H ≤6'-9") | #4@10 (EW) | - |
| G6 (H ≤6'-9") | #4@10 (EW) | - |
| GT1 (H ≤6'-9") | #4@4 (EW) | - |
| GT2 | #4@4 (EW) | #5@3 (EW) |
| GT3 (H ≤6'-9") | #4@4 (EW) | - |
| GT4 | #4@4 (EW) | #5@3 (EW) |
| GO | #4@10 (EW) | #4@6 (EW) |
| GDO | #4@6 (EW) | #4@4 (EW) |

(EW) Each Way
* Main Box
** a = Larger interior span

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST DRAINAGE INLET TABLES

D73G

7-1-25





Return to Table of Contents

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|---|---|---|---|---|---|
| | | | | | |

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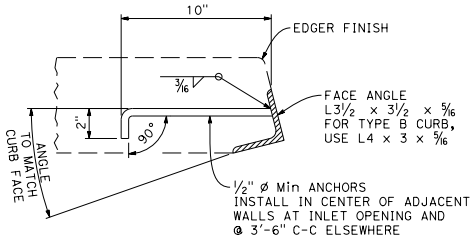
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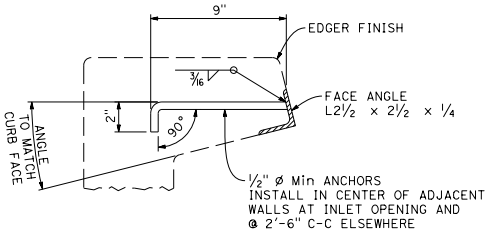
Carl W. Duan No. C59976 Exp. 6-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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| FACE ANGLE DETAIL "A" | |
|---|---|
| LENGTH OF CURB OPENING | No. OF ANCHORS |
| 3'-6" OR LESS | 2 |
| 7'-0" | 3 |
| 10'-0" | 4 |
| 14'-0" | 5 |
| 21'-0" | 7 |




DETAIL A

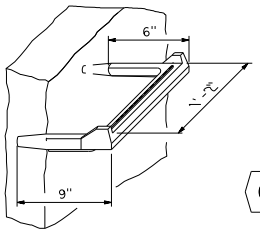



DETAIL B

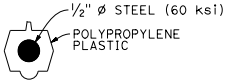
## FACE ANGLE AND ANCHOR

NOTE:

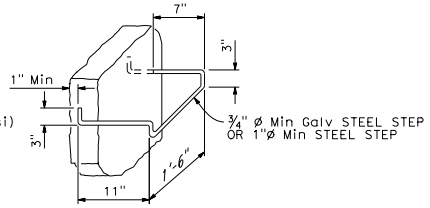
1. When shown on the project plans, place a ¾" ø plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.




STEP INSERT

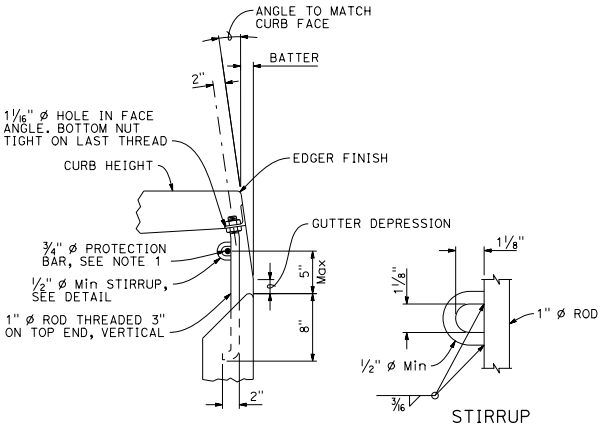



TYPICAL SECTION
(Step insert)




BAR STEP

## STEP DETAILS

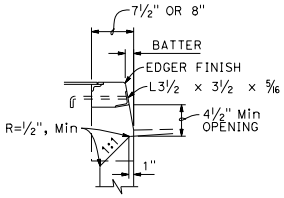



DETAIL C

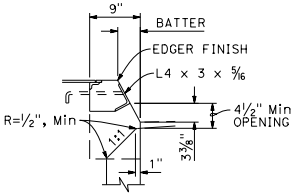
STIRRUP

## CURB SUPPORT

CURB SUPPORTS SHALL BE EVENLY SPACED AND MINIMAL IN NUMBER SUCH THAT MAXIMUM SPAN OF UNSUPPORTED CURB IS 7'-0".




TYPE A CURBS




TYPE B CURBS

## CURB OPENING DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DRAINAGE INLET DETAILS

NO SCALE

D74

7-1-25

2025 STANDARD PLAN D74



Return to Table of Contents

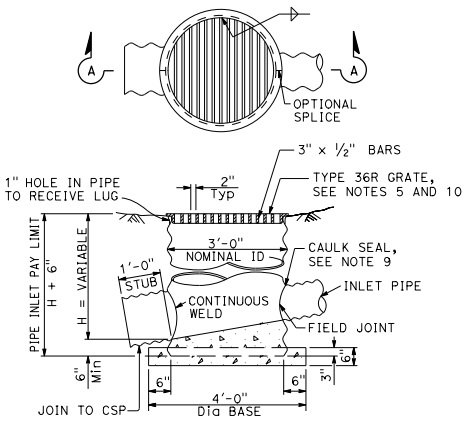
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

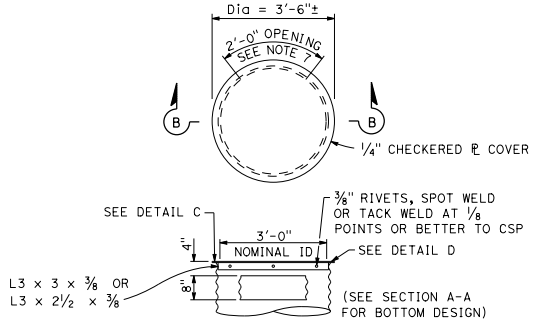
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SECTION A-A

## TYPE GMP

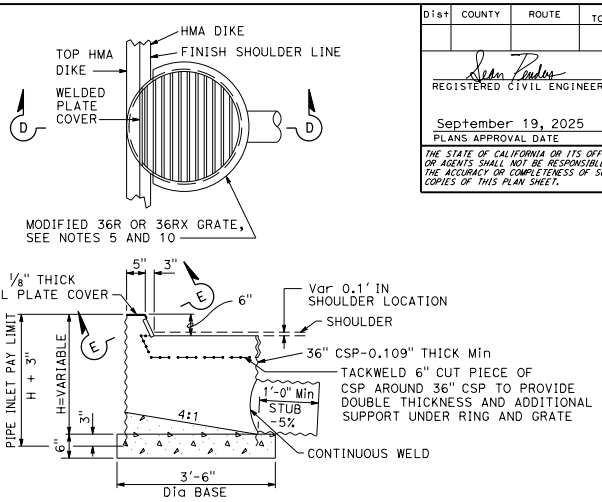
Steel pipe inlet with grate




SECTION B-B

## TYPE OMP or OMPI

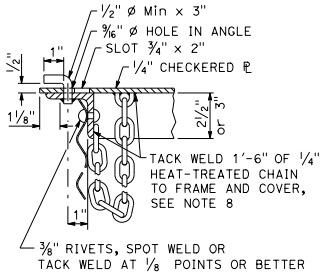
Steel pipe inlet with side opening and steel cover (see Note 6)



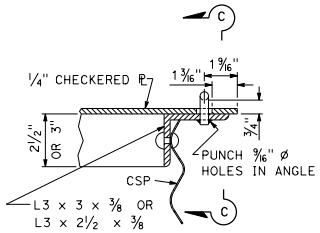

SECTION D-D

## TYPE ODI

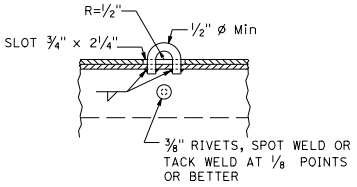
Steel pipe inlet with grate and raised opening at HMA dike flowline



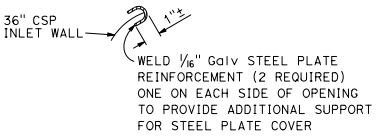

DETAIL C



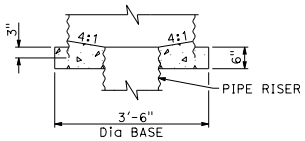

DETAIL D




SECTION C-C




SECTION E-E




## TYPE ODI BASE DETAIL FOR PIPE RISER CONNECTION

NOTES:

1. For Details of concrete pipe inlets, see Standard Plan D75B.
2. For details of ladder and steps and when ladder or steps are required, see Standard Plan D75C.
3. Inlet pipes shall not protrude into basin.
4. Except for inlets used for junction boxes, basin floors shall have minimum slope of 4:1 from all directions toward outlet pipe, and a wood trowel finish.
5. See Standard Plans D77A and D77B for Grate and Frame Details and weights of Miscellaneous Iron and Steel.
6. Designation of Type OMPI pipe inlets on plans indicates trash racks are to be furnished and installed on all side openings. See Standard Plan D75C for trash rack details.
7. More than one side opening may be required. Location and number as ordered by the Engineer.
8. Chain to be provided when specified.
9. Caulk seal with pliable mixture of sand, portland cement, and emulsified asphalt (Mixture of 1 part portland cement, 3-5 parts sand, and 1½" parts SSI emulsified asphalt).
10. Place pipe so bars of grate will be parallel with main surface flow.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# STEEL PIPE INLETS

NO SCALE

**D75A**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

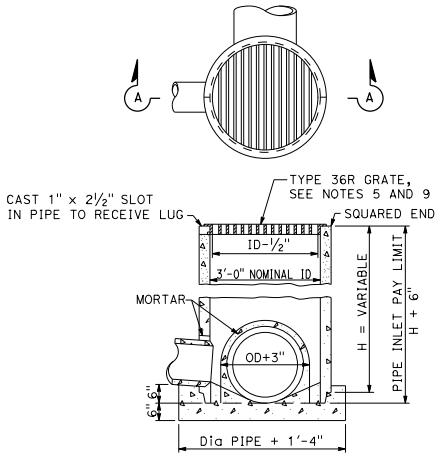
Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

September 19, 2025

PLANS APPROVAL DATE

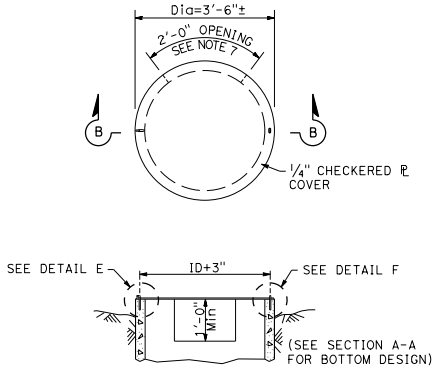
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SECTION A-A

## TYPE GCP

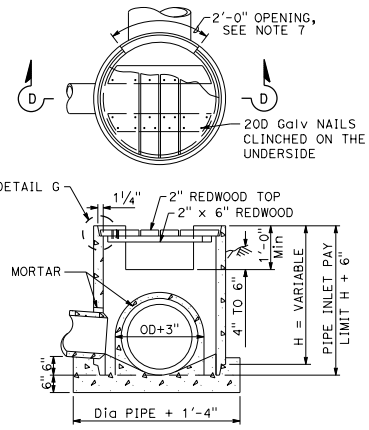
Concrete pipe inlet with grate




SECTION B-B

## TYPE OCP or OCPI

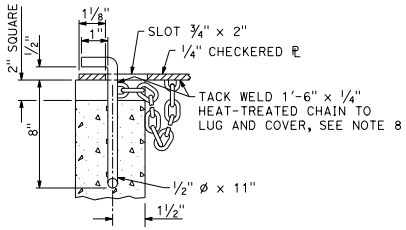
Concrete pipe inlet with steel cover
(See Note 6)



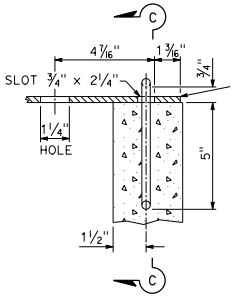

SECTION D-D

## TYPE OCP OR OCPI

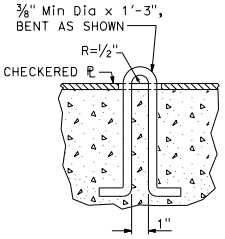
Concrete pipe inlet with redwood cover
(See Notes 6 and 10)



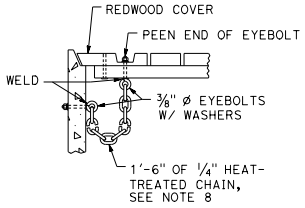

DETAIL E




DETAIL F




SECTION C-C




DETAIL G

NOTES:

1. For details of steel pipe inlets, see Standard Plan D75A.
2. For details of ladder and steps and when ladder or steps are required, see Standard Plan D75C.
3. Inlet pipes shall not protrude into basin.
4. Except for inlets used for junction boxes, basin floors shall have minimum slope of 4:1 from all directions toward outlet pipe, and a wood trowel finish.
5. See Standard Plan D77A and Standard Plan D77B for Grate and Frame Details and Weights of Miscellaneous Iron and Steel.
6. Designation of Type OCPI pipe inlets on plans indicates trash racks are to be furnished and installed on all side openings. See Standard Plan D75C for Trash Rack details.
7. More than one side opening may be required. Location and number as ordered by the Engineer. Opening may be cast in pipe.
8. Chain to be provided when specified.
9. Place pipe so bars of grate will be parallel with main surface flow.
10. Redwood covers shall only be placed at locations designated on the plans.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE PIPE INLETS

NO SCALE

**D75B**

7-1-25



Return to Table of Contents

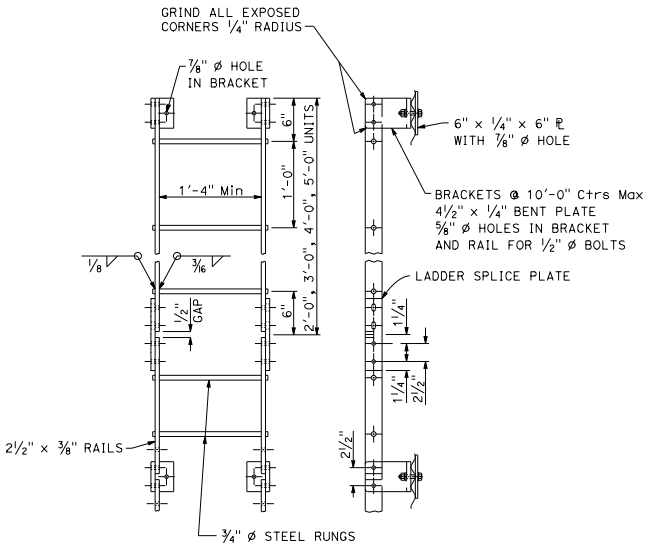
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

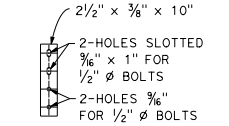
REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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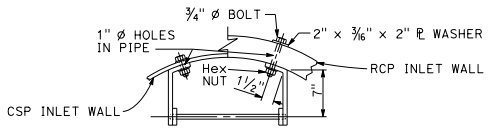

## LADDER DETAILS

See Notes 1, 2, 3 and 4




## LADDER SPLICE PLATE

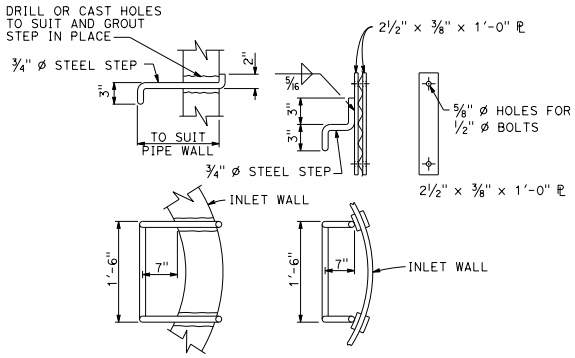
(See Note 4)




## LADDER CONNECTION TO INLET

### NOTES:

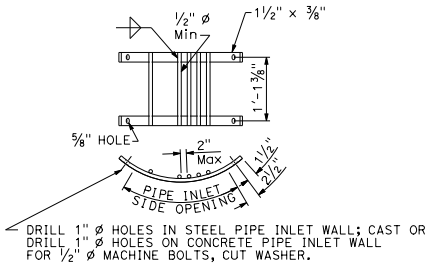
1. Ladders and Steps - None required where "H" dimension of pipe inlet is less than 2'-6". Where "H" is 2'-6" or more, install steps or ladder with lowest rung not more than 1'-0" above the floor and highest rung not more than 1'-0" below top of inlet. The distance between steps or rungs shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps or ladder in the wall without an opening.
2. Ladder may be constructed in one length at contractor's option on RCP inlet.
3. On CSP inlet, connect ladder splice plate so joint can compress 1/2".
4. Ladder splice plate to be connected with 1/2" Ø bolts with double nuts.
5. Trash racks used on Type OCPI and OMPI inlets. Trash racks required for pumping installations.




## RCP INLET CSP INLET

## STEP DETAILS

(See Note 1)




## TRASH RACK DETAILS

(See Note 5)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PIPE INLETS LADDER AND TRASH RACK DETAILS

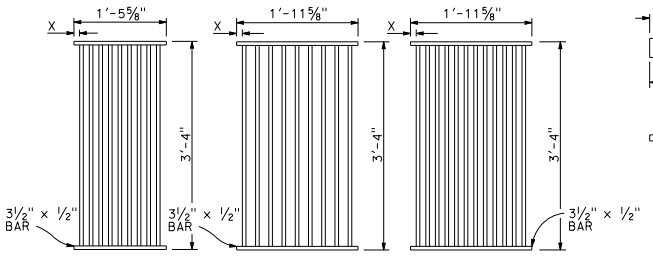
NO SCALE

D75C

2025 STANDARD PLAN D75C

7-1-25

Return to Table of Contents

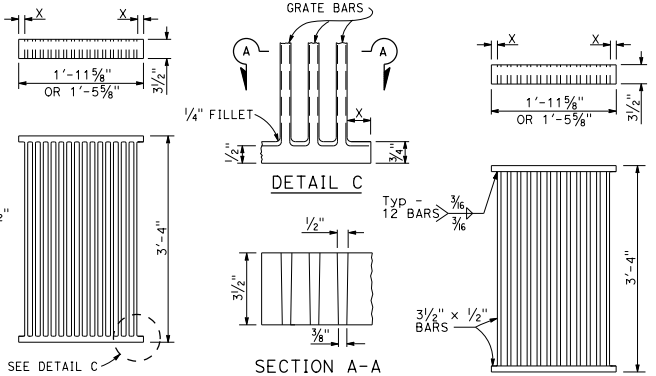



**TYPE 18-9**
1⅜" Clear spacing. Use within the roadbed on highways where bicycles and pedestrians are excluded.

**TYPE 24-9**
2" Clear spacing. Use in locations off the roadbed on all types of highways.

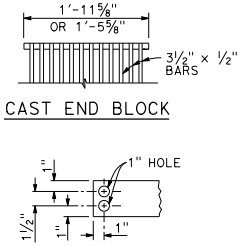
**TYPE 24-12**
1⅜" Clear spacing. Use within the roadbed on highways where bicycles and pedestrians are excluded.

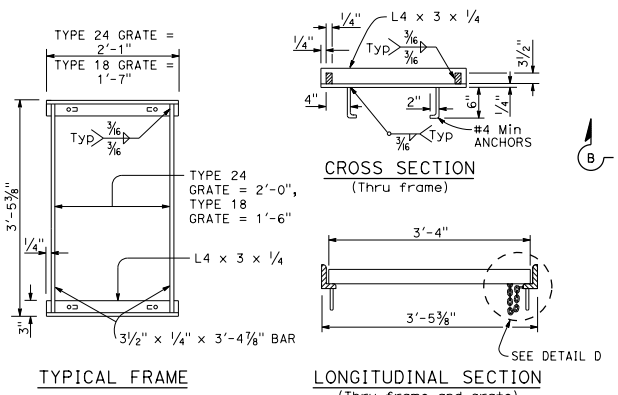
## RECTANGULAR GRATE DETAILS
(See table below)



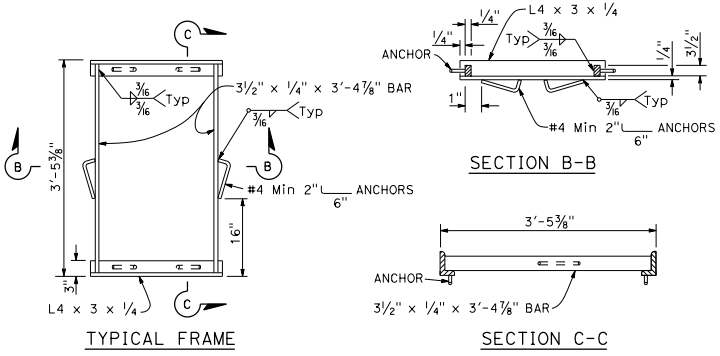

## ALTERNATIVE CAST DUCTILE IRON GRATE OR CAST CARBON STEEL GRATE

## ALTERNATIVE WELDED GRATE

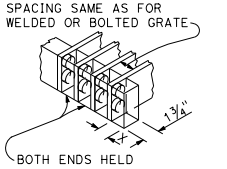



## RECTANGULAR FRAME DETAILS
(For all rectangular grates)




## ALTERNATIVE ANCHOR FOR RECTANGULAR FRAME
(For details not shown, See Rectangular Frame Details)




## ALTERNATIVE CAST DUCTILE IRON OR CAST CARBON STEEL END BLOCK GRATE

### NOTES:

1. Grate type numbers refer to approximate width of grate in inches and number of bars, respectively.
2. Rounded top of bars optional on all grates.
3. Pipe inlets with a grate shall be placed so that bars parallel direction of principle surface flow.
4. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
5. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
6. Grate and frame weights are based on welded grates (weights of face angles, steps, protection bars, etc. are not included).
7. Connect chain to grate and frame only at locations shown on the plans. When chain is required, do not use cast ductile iron grates.

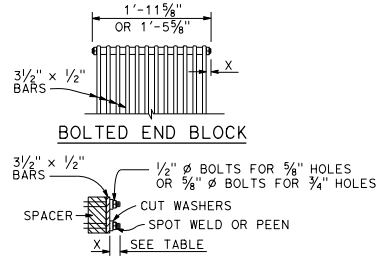
### GRATE BAR SPACING TABLE

| TYPE | No. OF BARS | CLEAR BAR SPACING | X |
|---|---|---|---|
| 18-9 | 9 | 1⅜" | 1⅛" |
| 24-9 | 9 | 2" | 1⅜" |
| 24-12 | 12 | 1⅜" | 1¼" |

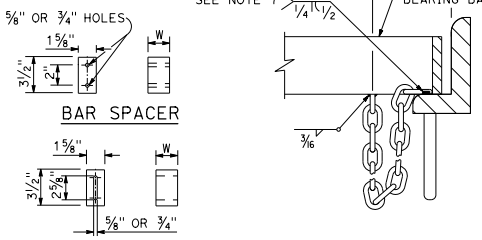
| INLET TYPE | COVER TYPE | WEIGHT LB |
|---|---|---|
| OS | PLATE | 174 |
| OL-7 | PLATE | 170 |
| OL-10 | PLATE | 170 |
| OL-14 | PLATE | 170 |
| OL-21 | PLATE | 170 |
| OCP | PLATE | 112 |
| OCPI | PLATE | 112 |
| OCPI | REDWOOD | 42 |
| OMP | PLATE | 177 |
| OMPI | PLATE | 177 |

| INLET TYPE | GRATE TYPE | No. OF GRATES | WEIGHT LB |
|---|---|---|---|
| GDO | 24-12 | 2 | 634 |
| | | | |
| GOL-7 | 24-12 | 1 | 326 |
| | | | |
| GOL-10 | 24-12 | 1 | 326 |
| | | | |
| GO,G1,G2,G3,G4 (TYPE 24) | 24-9 | 1 | 263 |
| | 24-12 | 1 | 326 |
| | | | |
| G4 (TYPE 18),G5,G6 | 18-9 | 1 | 249 |
| GT1 | 18-9 | 2 | 498 |
| GT2 | 18-9 | 2 | 498 |
| GT3 | 24-12 | 2 | 652 |
| | | | |
| GT4 | 24-12 | 2 | 652 |
| | | | |
| TRASH RACK | | | 22 |
| GRATE CHAIN | | | 3 |

## BASIS FOR Misc IRON AND STEEL FINAL PAY WEIGHTS FOR DRAINAGE INLETS
(See Note 6)




## ALTERNATIVE BOLTED GRATE




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## GRATE DETAILS No. 1

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

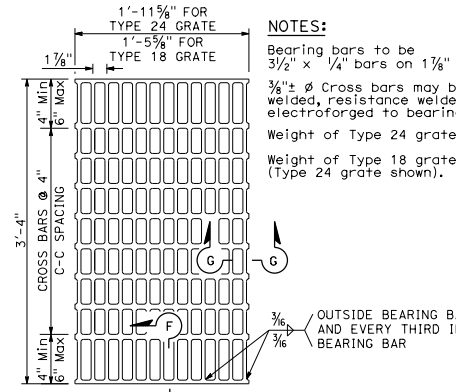
Sean Penders
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
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D77A

7-1-25



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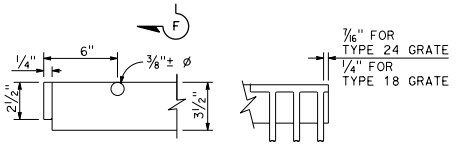

NOTES:

Bearing bars to be 3½" x ¼" bars on 1⅞" centers.

⅜"± ø Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

Weight of Type 24 grate = 141 LBS.

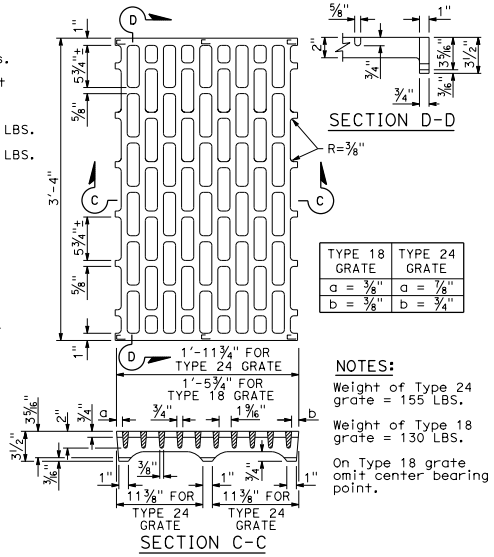
Weight of Type 18 grate = 107 LBS. (Type 24 grate shown).




SECTION F-F SECTION G-G

## TYPE 18-10 AND 24-13 GRATE

(Welded Steel)




SECTION C-C




| TYPE 18 GRATE | TYPE 24 GRATE |
|---|---|
| a = ⅜" | a = ⅞" |
| b = ⅜" | b = ¾" |

NOTES:

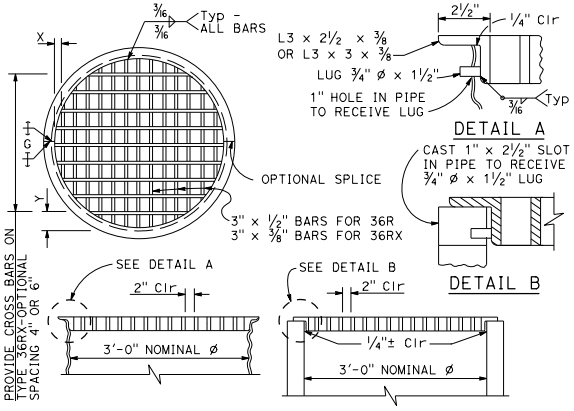
Weight of Type 24 grate = 155 LBS.

Weight of Type 18 grate = 130 LBS.

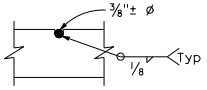
On Type 18 grate omit center bearing point.

## TYPE 18-8C AND 24-10C GRATE

(Cast ductile iron)

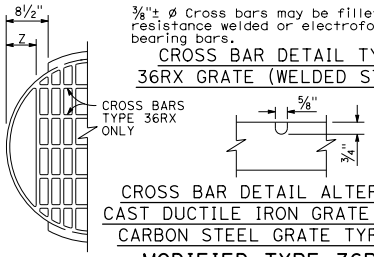



## TYPE 36R AND 36RX GRATE DETAILS



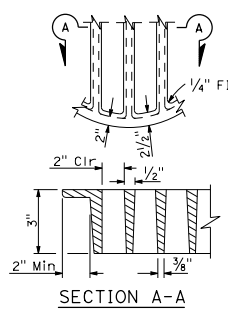

⅜"± ø Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

CROSS BAR DETAIL TYPE 36RX GRATE (WELDED STEEL)




CROSS BAR DETAIL ALTERNATIVE CAST DUCTILE IRON GRATE OR CAST CARBON STEEL GRATE TYPE 36RX

## MODIFIED TYPE 36R AND 36RX GRATE FOR ODI INLET

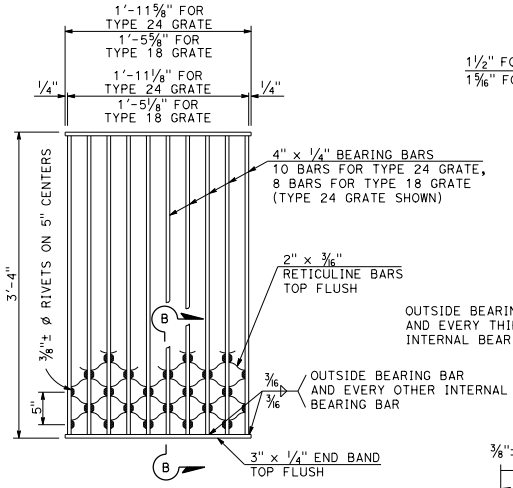


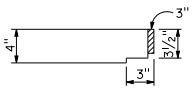

SECTION A-A

## ALTERNATIVE CAST DUCTILE IRON GRATE OR CAST CARBON STEEL GRATE TYPE 36R AND 36RX

BASIS FOR Misc IRON AND STEEL FINAL PAY WEIGHTS FOR DRAINAGE INLETS

| INLET TYPE | GRATE TYPE | No. OF GRATES | WEIGHT LB |
|---|---|---|---|
| GDO (SEE NOTE 4) | 24-10C | 2 | 391 |
| | 24-10S | 2 | 456 |
| | 24-12X | 2 | 473 |
| | 24-13 | 2 | 374 |
| GO,GOL,G1,G2, G3,G4 (TYPE 24) | 24-10C | 1 | 202 |
| | 24-10S | 1 | 229 |
| | 24-12X | 1 | 239 |
| | 24-13 | 1 | 188 |
| G4 (TYPE 18) G5,G6 | 18-8S | 1 | 187 |
| | 18-9X | 1 | 187 |
| | 18-10 | 1 | 149 |
| GT1,GT2 | 18-8S | 2 | 374 |
| | 18-9X | 2 | 374 |
| | 18-10 | 2 | 298 |
| GT3,GT4 | 24-10C | 2 | 404 |
| | 24-10S | 2 | 458 |
| | 24-12X | 2 | 478 |
| | 24-13 | 2 | 376 |
| ODI | 36RX (Mod) | 1 | 196 |
| GMP,GCP,GCPI | 36RX | 1 | 215 |
| ODI | 36R (Mod) | 1 | 220 |
| GMP,GCP,GCPI | 36R | 1 | 236 |
| TRASH RACK | | | 22 |
| GRATE CHAIN | | | 3 |



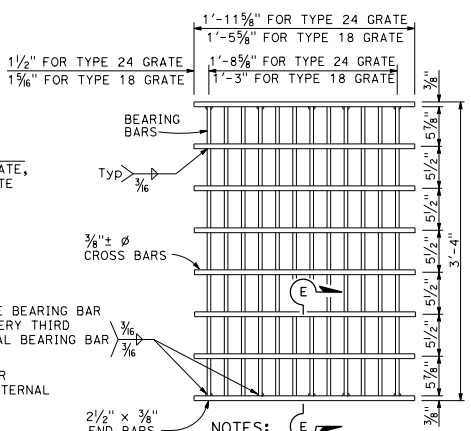

SECTION B-B

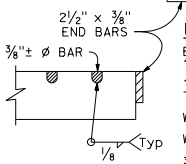
NOTES:

Weight of Type 24 grate = 182 LBS.
Weight of Type 18 grate = 145 LBS.

## TYPE 18-8S AND 24-10S GRATE

(Welded Steel) Reticuline type




SECTION E-E

NOTES:

Bearing bars to be 3½" x ⅜" bars on 1⅞" centers.

12 Bars for Type 24 grate - 9 bars for Type 18 grates. (Type 24 grate shown).

Weight of Type 24 grate = 192 LBS.

Weight of Type 18 grate = 145 LBS.

⅜"± ø Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

## TYPE 18-9X AND 24-12X GRATE

(Welded Steel)

NOTES:

1. When alternative grates are allowed - Final pay based on alternative with the lesser weight.
2. Use frame shown on Standard Plan D74A, D74B or D77A as appropriate.
3. When Type 24-10S, 24-12X or 24-13 grates are used with GDO Inlets, a ¼" x 3½" x 3'-4⅞" steel bar shall be welded across the center of inlet frame to separate the individual grates.
4. See Standard Plan D77A for connecting chain to welded grate and frame. When chain is required, do not use cast ductile iron grate.

GRATE BAR SPACING TABLE

| TYPE | No. OF BARS | CLEAR BAR SPACING | X | Y | | Z |
|---|---|---|---|---|---|---|
| | | | | 4" SPACING | 6" SPACING | |
| 36R | 13 | 2" | 2⅛" | - | - | - |
| 36RX (STEEL) | 15 | 2" | 1⅜" | 3¾" | 5¾" | - |
| 36RX (CAST) | 13 | 2" | 2⅛" | 3¾" | 5¾" | - |
| 36R Mod | 12 | 2" | 2⅛" | - | - | 5" |
| 36RX Mod (STEEL) | 13 | 2" | 1⅜" | 3¾" | 5¾" | 5⅛" |
| 36RX Mod (CAST) | 12 | 2" | 2⅛" | 3¾" | 5¾" | 5" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GRATE DETAILS No. 2

NO SCALE

D77B

7-1-25

2025 STANDARD PLAN D77B

Return to Table of Contents

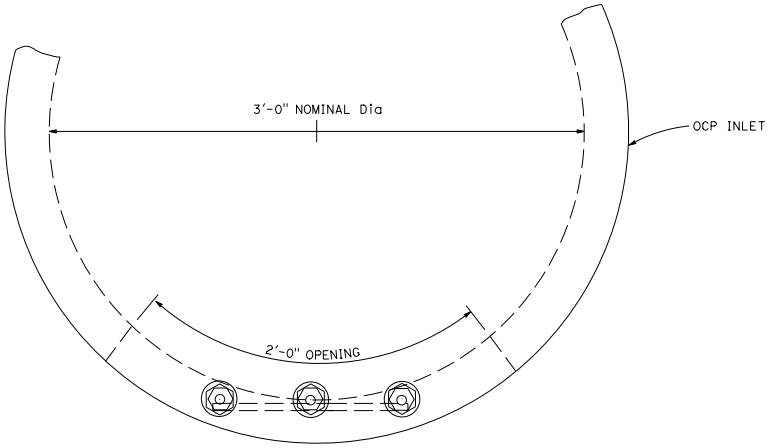
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

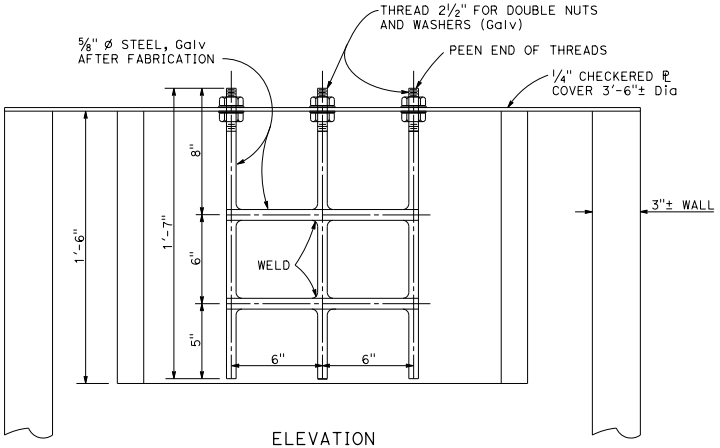
September 19, 2025
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Sean T. Penders
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STATE OF CALIFORNIA

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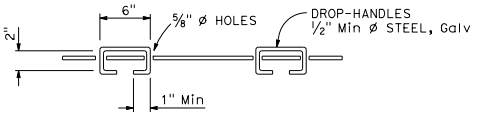

PLAN



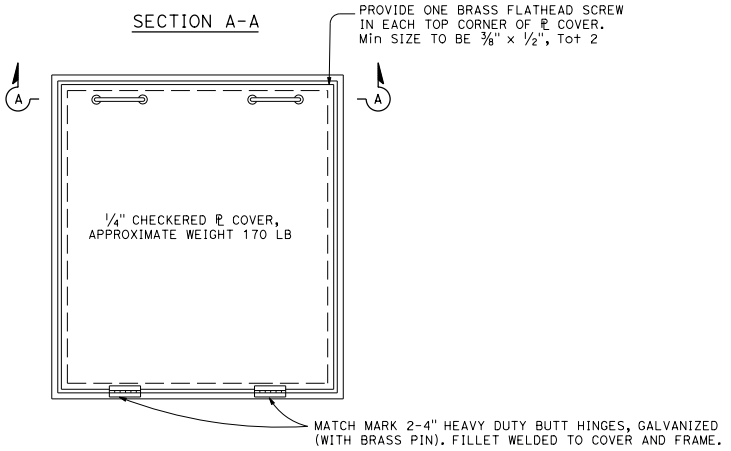

ELEVATION

## ALTERNATIVE TRASH RACK FOR TYPE OCP INLET

Single or double opening




SECTION A-A




PLAN

## HINGED COVER FOR TYPE OL AND OS INLETS

NOTES:

1. Alternative methods of securing drop-handles to cover will be acceptable.
2. This hinged cover is to be used only on embankment or steep slopes.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ALTERNATIVE HINGED COVER FOR TYPE OL AND OS INLETS AND TRASH RACK FOR TYPE OCP INLET

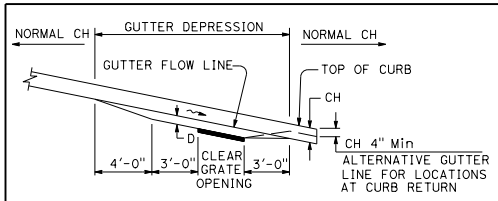
NO SCALE

**D77C**

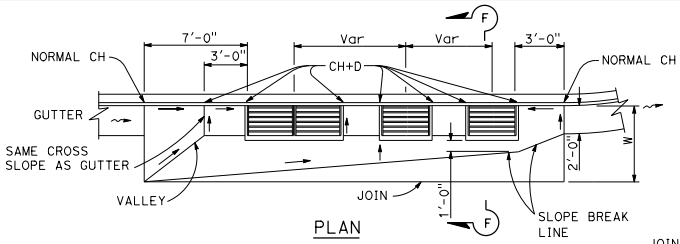
7-1-25



Return to Table of Contents

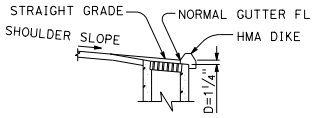



PROFILE



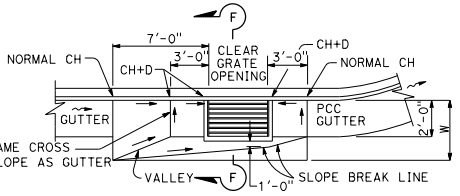

PLAN

## GRATE INLET SERIES



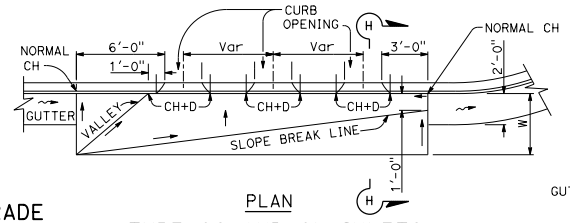

## DETAIL OF INLET WITH DIKE

(Single grate shown)



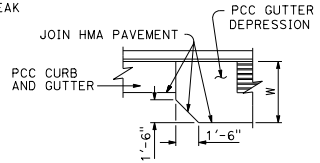

PLAN

## TYPE GO AND G1 THRU G6 INLETS ON GRADE




PLAN

## TYPE OS AND OL INLETS IN SERIES ON GRADE

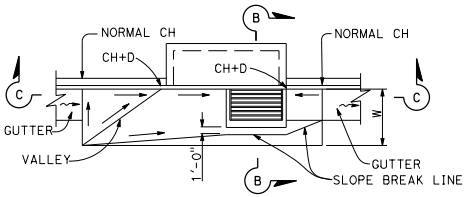



## DETAIL OF HOT MIX ASPHALT PAVEMENT

(See Note 4)

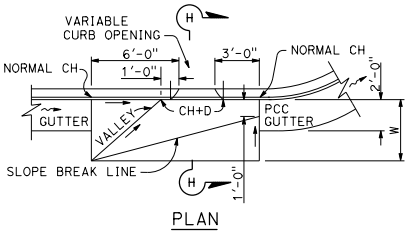
### NOTES:

1. W = Width of depressed apron. Depressed aprons shall be 4'-0" on shoulder and 4'-0" to 6'-0" in city street gutters unless otherwise shown.
   D = Gutter depression. The gutter depression shall be 1¼" for shoulder and 1¼" to 3" in city street gutter or locations outside of shoulder unless otherwise shown.
   CH = Curb Height.
   → = Straight grade, downward slope.
   ⇝ = Gutter or shoulders direction of flow.
2. Gutter depressions shall be 8" thick.
3. Establish curb opening height at midpoint of grate.
4. Details shown for concrete pavement. When hot mix asphalt pavement is used, corners to be cut off as shown on Detail of Hot Mix Asphalt Pavement.



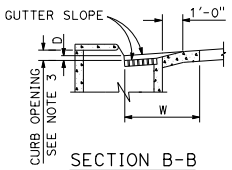

PLAN

## TYPE GOL INLET ON GRADE

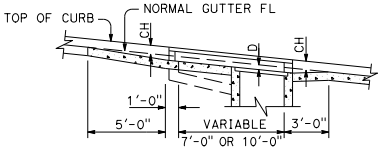



PLAN

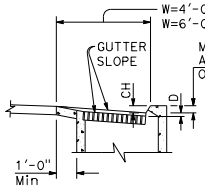
## TYPE OS AND OL INLETS ON GRADE



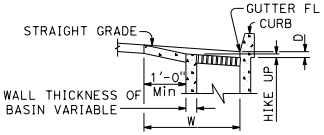

## SECTION B-B



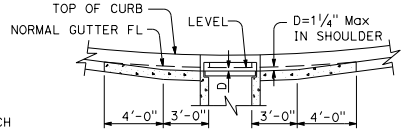

## SECTION C-C



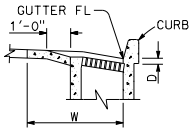

## SECTION E-E



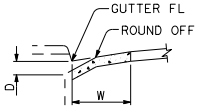

## SECTION G-G



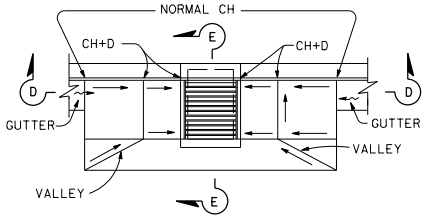

## SECTION D-D




## SECTION F-F



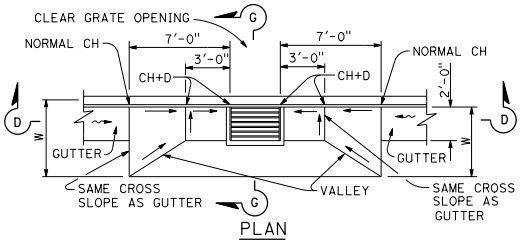

## SECTION H-H




PLAN

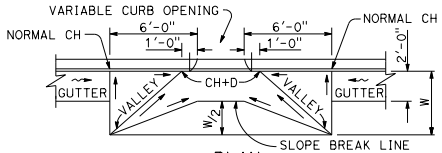
## TYPE GO AND GDO INLET GRADE SAG

(GDO shown)




PLAN

## TYPE G1 THRU G6 GT3 AND GT4 INLETS IN GRADE SAG




PLAN

## TYPE OS AND OL INLETS IN GRADE SAG

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GUTTER DEPRESSIONS

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

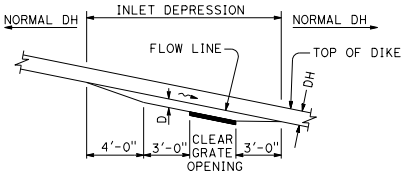
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D78A

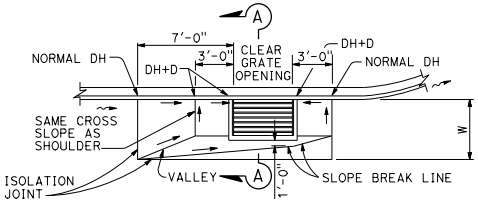
7-1-25

2025 STANDARD PLAN D78A

Return to Table of Contents

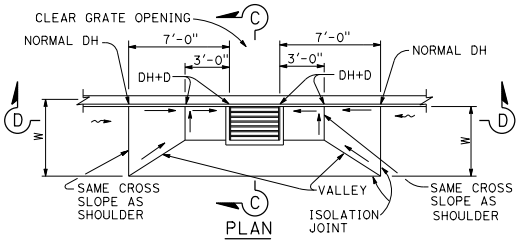



PROFILE



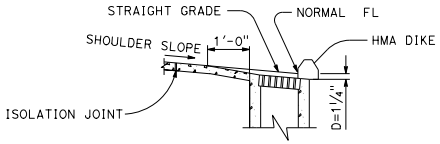

PLAN

## TYPE G0 AND G1 THRU G6 INLETS ON GRADE



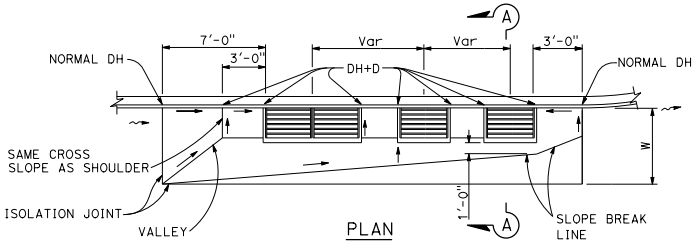

PLAN

## TYPE G1 THRU G6 GT3 AND GT4 INLETS IN GRADE SAG



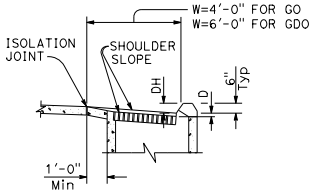

SECTION A-A

(Single grate shown)

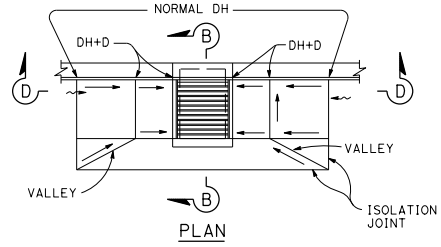



PLAN

## GRATE INLET SERIES



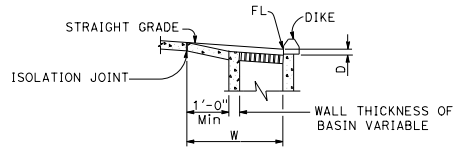

SECTION B-B



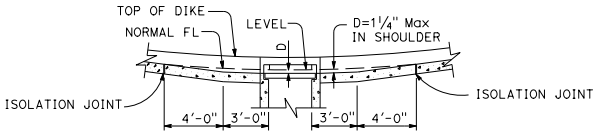

PLAN

## TYPE GO AND GDO INLET GRADE SAG

(GDO shown)




SECTION C-C




SECTION D-D

NOTES:

1. W = Width of depressed apron. Depressed aprons shall be 4'-0" unless indicated otherwise.

   D = Inlet depression. The inlet depression shall be 1¼" unless indicated otherwise.

   DH = Dike Height.

   → = Straight grade, downward slope.

   ~→ = Direction of flow.

2. Apron shall be portland cement concrete and match thickness of adjacent shoulder pavement.
3. Establish curb opening height of Type GO or GDO at midpoint of grate.
4. See Standard Plans P45 and P46 for Isolation Joint Details.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# INLET DEPRESSIONS CONCRETE SHOULDERS

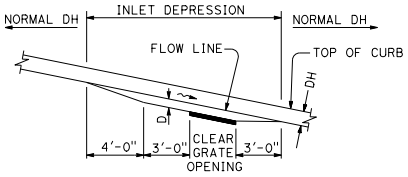
NO SCALE

D78B

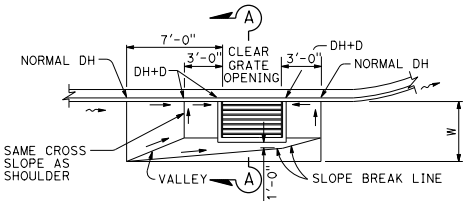
7-1-25



Return to Table of Contents

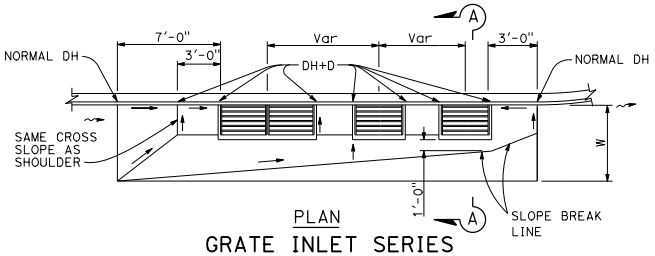



PROFILE



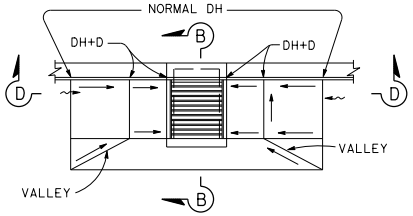

PLAN

## TYPE GO AND G1 THRU G6 INLETS ON GRADE




PLAN

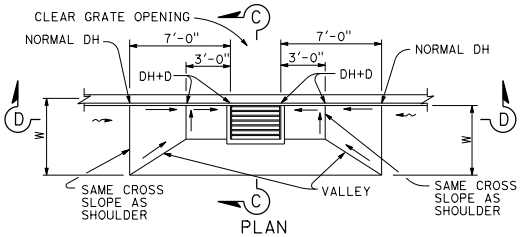
## GRATE INLET SERIES




PLAN

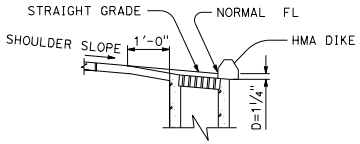
## TYPE GO AND GDO INLET GRADE SAG

(GDO shown)



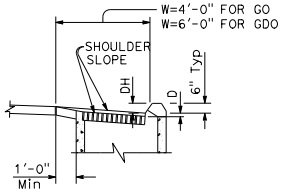

PLAN

## TYPE G1 THRU G6 GT3 AND GT4 INLETS IN GRADE SAG

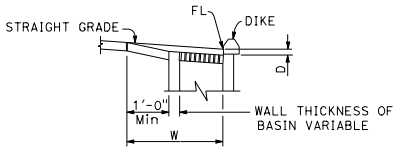



SECTION A-A

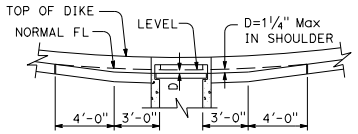
(Single grate shown)




SECTION B-B




SECTION C-C




SECTION D-D

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTES:

1. W = Width of depressed apron. Depressed aprons shall be 4'-0" unless indicated otherwise.

   D = Inlet depression. The inlet depression shall be 1¼" unless indicated otherwise.

   DH = Dike Height.

   → = Straight grade, downward slope.

   ⇝ = Direction of flow.

2. Apron shall be hot mix asphalt and match thickness of adjacent shoulder pavement.

3. Establish curb opening height of Type GO or GDO at midpoint of grate.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# INLET DEPRESSIONS
# HOT MIX ASPHALT SHOULDERS

NO SCALE

D78C

7-1-25



Return to Table of Contents

## WALL A

| | ID | t | MINIMUM COVER TO 10'-0" Max COVER | | | | | | | | | 20'-0" Max COVER | | | | | | | | | 40'-0" Max COVER | | 40'-0" Max COVER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | METHOD 1 | | | METHOD 2 | | | METHOD 3A | | | METHOD 1 | | | METHOD 2 | | | METHOD 3A | | | METHOD 3A | | METHOD 3B | |
| | | | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{si}$ | $A_{so}$ |
| $f'_c$ = 6 ksi | 24" | 2½" | 0.23 | - | 0.21 | 0.16 | - | 0.16 | 0.14 | - | 0.14 | 0.25 | - | 0.27 | 0.17 | - | 0.18 | 0.14 | - | 0.14 | 0.25 | 0.20 | 0.24 | 0.16 |
| | 30" | 2¾" | 0.29 | - | 0.27 | 0.21 | - | 0.20 | 0.18 | - | 0.17 | 0.40 | 0.20 | 0.41 | 0.25 | - | 0.23 | 0.19 | - | 0.18 | 0.37 | 0.25 | 0.31 | 0.22 |
| | 36" | 3" | 0.28 | 0.16 | 0.31 | 0.22 | 0.15 | 0.22 | 0.19 | 0.13 | 0.20 | – | – | – | 0.29 | 0.19 | 0.29 | 0.21 | 0.14 | 0.23 | 0.47 | 0.32 | 0.37 | 0.27 |
| | 42" | 3½" | 0.32 | 0.20 | 0.36 | 0.21 | 0.15 | 0.22 | 0.19 | 0.13 | 0.21 | – | – | – | 0.33 | 0.21 | 0.33 | 0.24 | 0.15 | 0.27 | 0.53 | 0.40 | 0.42 | 0.29 |
| | 48" | 4" | 0.44 | 0.26 | 0.48 | 0.20 | 0.16 | 0.23 | 0.20 | 0.14 | 0.22 | – | – | – | 0.37 | 0.23 | 0.37 | 0.28 | 0.19 | 0.30 | - | - | 0.47 | 0.31 |
| | 54" | 4½" | 0.53 | 0.31 | 0.58 | 0.20 | 0.16 | 0.24 | 0.21 | 0.14 | 0.23 | – | – | – | 0.41 | 0.25 | 0.42 | 0.30 | 0.23 | 0.32 | – | – | 0.57 | 0.34 |
| | 60" | 5" | 0.59 | 0.34 | 0.61 | 0.22 | 0.17 | 0.25 | 0.22 | 0.15 | 0.25 | – | – | – | 0.46 | 0.27 | 0.46 | 0.32 | 0.26 | 0.34 | – | – | 0.63 | 0.37 |
| | 66" | 5½" | 0.66 | 0.39 | 0.68 | 0.24 | 0.17 | 0.27 | 0.23 | 0.16 | 0.27 | – | – | – | 0.51 | 0.29 | 0.52 | 0.33 | 0.27 | 0.35 | – | – | 0.65 | 0.39 |
| | 72" | 6" | 0.68 | 0.45 | 0.70 | 0.26 | 0.18 | 0.28 | 0.24 | 0.17 | 0.28 | – | – | – | 0.56 | 0.31 | 0.57 | 0.34 | 0.28 | 0.37 | – | – | 0.68 | 0.42 |
| | 78" | 6½" | 0.72 | 0.50 | 0.74 | 0.28 | 0.19 | 0.29 | 0.25 | 0.17 | 0.30 | – | – | – | 0.61 | 0.34 | 0.62 | 0.35 | 0.28 | 0.38 | – | – | 0.74 | 0.45 |
| | 84" | 7" | 0.74 | 0.56 | 0.76 | 0.30 | 0.20 | 0.31 | 0.27 | 0.18 | 0.31 | – | – | – | 0.67 | 0.36 | 0.68 | 0.37 | 0.29 | 0.39 | – | – | – | – |
| | 90" | 7½" | 0.76 | 0.65 | 0.78 | 0.33 | 0.21 | 0.34 | 0.29 | 0.19 | 0.32 | – | – | – | 0.73 | 0.39 | 0.74 | 0.40 | 0.30 | 0.41 | – | – | – | – |
| | 96" | 8" | 0.78 | 0.66 | 0.81 | 0.35 | 0.23 | 0.36 | 0.32 | 0.19 | 0.33 | – | – | – | 0.79 | 0.41 | 0.80 | 0.42 | 0.31 | 0.43 | – | – | – | – |
| | 102" | 8½" | 0.80 | 0.68 | 0.84 | 0.38 | 0.24 | 0.39 | 0.36 | 0.20 | 0.38 | – | – | – | 0.85 | 0.44 | 0.86 | 0.45 | 0.32 | 0.46 | – | – | – | – |
| | 108" | 9" | 0.83 | 0.70 | 0.87 | 0.41 | 0.26 | 0.42 | 0.38 | 0.21 | 0.42 | – | – | – | – | – | – | 0.48 | 0.34 | 0.49 | – | – | – | – |
| | 114" | 9½" | 0.86 | 0.72 | 0.90 | 0.44 | 0.28 | 0.47 | 0.40 | 0.24 | 0.47 | – | – | – | – | – | – | 0.51 | 0.36 | 0.52 | – | – | – | – |
| | 120" | 10" | 0.89 | 0.74 | 0.93 | 0.53 | 0.34 | 0.54 | 0.44 | 0.27 | 0.52 | – | – | – | – | – | – | 0.54 | 0.38 | 0.56 | – | – | – | – |

## WALL AA

| | ID | t | 40'-0" Max COVER | |
|---|---|---|---|---|
| | | | METHOD 3B | |
| | | | $A_{si}$ | $A_{so}$ |
| $f'_c$ = 7 ksi | 84" | 7" | 0.75 | 0.46 |
| | 90" | 7½" | 0.81 | 0.49 |
| | 96" | 8" | 0.87 | 0.52 |
| | 102" | 8½" | 0.93 | 0.55 |
| | 108" | 9½" | 0.94 | 0.56 |
| | 114" | 10½" | 0.96 | 0.57 |
| | 120" | 11" | 1.02 | 0.60 |

## WALL B

| | ID | t | MINIMUM COVER TO 10'-0" Max COVER | | | | | | | | | 20'-0" Max COVER | | | | | | | | | 40'-0" Max COVER | | 40'-0" Max COVER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | METHOD 1 | | | METHOD 2 | | | METHOD 3A | | | METHOD 1 | | | METHOD 2 | | | METHOD 3A | | | METHOD 3A | | METHOD 3B | |
| | | | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{si}$ | $A_{so}$ |
| $f'_c$ = 5 ksi | 24" | 3" | 0.18 | - | 0.16 | 0.14 | - | 0.12 | 0.12 | - | 0.11 | 0.22 | - | 0.25 | 0.15 | - | 0.14 | 0.12 | - | 0.11 | 0.21 | 0.18 | 0.19 | 0.12 |
| | 30" | 3½" | 0.27 | - | 0.19 | 0.17 | - | 0.14 | 0.15 | - | 0.15 | 0.30 | - | 0.27 | 0.21 | - | 0.17 | 0.18 | - | 0.12 | 0.25 | 0.20 | 0.29 | 0.14 |
| | 36" | 4" | 0.24 | 0.14 | 0.26 | 0.15 | 0.09 | 0.17 | 0.13 | 0.08 | 0.13 | 0.28 | 0.15 | 0.29 | 0.20 | 0.12 | 0.20 | 0.15 | 0.09 | 0.15 | 0.29 | 0.23 | 0.30 | 0.17 |
| | 42" | 4½" | 0.28 | 0.17 | 0.31 | 0.16 | 0.09 | 0.18 | 0.14 | 0.08 | 0.14 | 0.35 | 0.18 | 0.36 | 0.23 | 0.14 | 0.24 | 0.17 | 0.11 | 0.17 | 0.34 | 0.25 | 0.32 | 0.21 |
| | 48" | 5" | 0.33 | 0.19 | 0.38 | 0.17 | 0.10 | 0.19 | 0.15 | 0.09 | 0.16 | 0.43 | 0.22 | 0.44 | 0.27 | 0.16 | 0.27 | 0.19 | 0.13 | 0.20 | 0.38 | 0.32 | 0.35 | 0.24 |
| | 54" | 5½" | 0.40 | 0.24 | 0.44 | 0.18 | 0.10 | 0.20 | 0.16 | 0.10 | 0.17 | 0.51 | 0.27 | 0.52 | 0.30 | 0.19 | 0.31 | 0.22 | 0.14 | 0.22 | 0.40 | 0.43 | 0.42 | 0.27 |
| | 60" | 6" | 0.47 | 0.28 | 0.53 | 0.20 | 0.11 | 0.21 | 0.18 | 0.10 | 0.18 | 0.60 | 0.31 | 0.61 | 0.34 | 0.21 | 0.34 | 0.25 | 0.16 | 0.25 | – | – | 0.50 | 0.35 |
| | 66" | 6½" | 0.56 | 0.33 | 0.62 | 0.21 | 0.13 | 0.22 | 0.20 | 0.12 | 0.18 | – | – | – | 0.37 | 0.23 | 0.38 | 0.27 | 0.18 | 0.28 | – | – | 0.58 | 0.38 |
| | 72" | 7" | 0.61 | 0.38 | 0.64 | 0.23 | 0.14 | 0.23 | 0.21 | 0.12 | 0.19 | – | – | – | 0.41 | 0.26 | 0.42 | 0.30 | 0.20 | 0.30 | – | – | 0.59 | 0.45 |
| | 78" | 7½" | 0.65 | 0.45 | 0.67 | 0.25 | 0.15 | 0.26 | 0.22 | 0.12 | 0.22 | – | – | – | 0.46 | 0.28 | 0.47 | 0.32 | 0.22 | 0.33 | – | – | 0.60 | 0.50 |
| | 84" | 8" | 0.67 | 0.50 | 0.69 | 0.28 | 0.17 | 0.28 | 0.23 | 0.13 | 0.26 | – | – | – | 0.52 | 0.31 | - | 0.35 | 0.24 | 0.36 | – | – | - | - |
| | 90" | 8½" | 0.69 | 0.52 | 0.71 | 0.30 | 0.18 | 0.31 | 0.25 | 0.16 | 0.30 | – | – | – | 0.59 | 0.33 | - | 0.38 | 0.26 | 0.39 | – | – | – | – |
| | 96" | 9" | 0.71 | 0.57 | 0.73 | 0.33 | 0.20 | 0.34 | 0.29 | 0.17 | 0.34 | – | – | – | 0.65 | 0.36 | - | 0.41 | 0.28 | 0.42 | – | – | – | – |
| | 102" | 9½" | 0.75 | 0.68 | 0.75 | 0.35 | 0.22 | 0.38 | 0.36 | 0.20 | 0.38 | – | – | – | 0.72 | 0.39 | - | 0.44 | 0.30 | 0.45 | – | – | – | – |
| | 108" | 10" | 0.76 | 0.69 | 0.77 | 0.38 | 0.23 | 0.43 | 0.38 | 0.22 | 0.43 | – | – | – | 0.79 | 0.42 | - | 0.47 | 0.32 | 0.48 | – | – | – | – |
| | 114" | 10½" | 0.78 | 0.70 | 0.79 | 0.41 | 0.25 | 0.48 | 0.41 | 0.24 | 0.48 | – | – | – | – | – | – | 0.50 | 0.34 | - | – | – | – | – |
| | 120" | 11" | 0.80 | 0.72 | 0.82 | 0.49 | 0.30 | 0.53 | 0.45 | 0.27 | 0.53 | – | – | – | – | – | – | 0.53 | 0.36 | - | – | – | – | – |

## WALL BB

| | ID | t | 80'-0" Max COVER | |
|---|---|---|---|---|
| | | | METHOD 3B | |
| | | | $A_{si}$ | $A_{so}$ |
| $f'_c$ = 6 ksi | 24" | 5¾" | 0.31 | 0.18 |
| | 30" | 6" | 0.33 | 0.22 |
| | 36" | 6½" | 0.39 | 0.36 |
| | 42" | 7½" | 0.48 | 0.45 |
| | 48" | 8½" | 0.57 | 0.55 |
| | 54" | 10" | 0.61 | 0.58 |
| $f'_c$ = 7 ksi | 60" | 11" | 0.63 | 0.61 |
| | 66" | 11½" | 0.65 | 0.63 |
| | 72" | 12½" | 0.73 | 0.71 |
| | 78" | 13½" | 0.80 | 0.78 |
| | 84" | 14¾" | 0.83 | 0.81 |
| | 90" | 16" | 0.86 | 0.84 |
| | 96" | 17¼" | 0.90 | 0.88 |

## WALL X

| | ID | t | Min COVER TO 10'-0" Max COVER | | | | | | 20'-0" Max COVER | | | | | | 30'-0" Max COVER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | METHOD 3A | | | METHOD 3B | | | METHOD 3A | | | METHOD 3B | | | METHOD 3B | | | |
| | | | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{si}$ | $A_{so}$ |
| $f'_c$ = 6 ksi | 24" | 1⅞" | 0.19 | - | 0.19 | 0.18 | - | 0.18 | 0.19 | - | 0.19 | 0.18 | - | 0.18 | 0.22 | 0.17 | 0.18 | 0.15 |
| | 30" | 2⅛" | 0.23 | - | 0.21 | 0.22 | - | 0.20 | 0.23 | - | 0.21 | 0.22 | - | 0.20 | 0.23 | 0.19 | 0.20 | 0.17 |
| | 36" | 2⅜" | 0.23 | 0.17 | 0.25 | 0.21 | 0.16 | 0.22 | 0.23 | 0.17 | 0.23 | 0.21 | 0.16 | 0.22 | 0.25 | 0.21 | 0.21 | 0.18 |
| | 42" | 2¾" | 0.26 | 0.19 | 0.27 | 0.24 | 0.18 | 0.25 | 0.26 | 0.19 | 0.26 | 0.24 | 0.18 | 0.25 | 0.35 | 0.27 | 0.26 | 0.24 |
| | 48" | 2⅞" | 0.28 | 0.21 | 0.28 | 0.26 | 0.20 | 0.27 | 0.28 | 0.21 | 0.28 | 0.26 | 0.20 | 0.27 | 0.43 | 0.33 | 0.30 | 0.28 |
| | 54" | 3¼" | 0.29 | 0.22 | 0.31 | 0.27 | 0.20 | 0.29 | 0.29 | 0.21 | 0.30 | 0.27 | 0.20 | 0.29 | 0.47 | 0.34 | 0.32 | 0.29 |
| | 60" | 3½" | 0.30 | 0.23 | 0.32 | 0.28 | 0.21 | 0.31 | 0.30 | 0.24 | 0.30 | 0.27 | 0.21 | 0.29 | 0.56 | 0.42 | 0.40 | 0.33 |
| | 66" | 3¾" | 0.31 | 0.24 | 0.34 | 0.29 | 0.21 | 0.33 | 0.36 | 0.27 | 0.37 | 0.28 | 0.24 | 0.30 | 0.66 | 0.50 | 0.48 | 0.39 |
| | 72" | 4¼" | 0.33 | 0.24 | 0.36 | 0.31 | 0.22 | 0.35 | 0.37 | 0.27 | 0.37 | 0.30 | 0.24 | 0.32 | 0.68 | 0.52 | 0.48 | 0.40 |
| | 78" | 4⅜" | 0.34 | 0.25 | 0.38 | 0.32 | 0.23 | 0.37 | 0.37 | 0.27 | 0.38 | 0.32 | 0.24 | 0.33 | 0.70 | 0.53 | 0.49 | 0.41 |
| | 84" | 5¼" | 0.36 | 0.25 | 0.39 | 0.33 | 0.24 | 0.38 | 0.38 | 0.28 | 0.39 | 0.33 | 0.24 | 0.36 | 0.71 | 0.55 | 0.50 | 0.41 |
| | 90" | 5¾" | 0.37 | 0.26 | 0.40 | 0.34 | 0.24 | 0.39 | 0.39 | 0.30 | 0.40 | 0.34 | 0.26 | 0.37 | 0.73 | 0.57 | 0.52 | 0.42 |
| | 96" | 6" | 0.38 | 0.27 | 0.42 | 0.36 | 0.25 | 0.40 | 0.43 | 0.31 | 0.44 | 0.36 | 0.28 | 0.38 | 0.77 | 0.58 | 0.55 | 0.42 |
| | 102" | 6½" | 0.40 | 0.29 | 0.43 | 0.38 | 0.26 | 0.42 | 0.48 | 0.34 | 0.49 | 0.38 | 0.30 | 0.39 | 0.84 | 0.60 | 0.62 | 0.43 |
| | 108" | 7" | 0.41 | 0.29 | 0.45 | 0.40 | 0.26 | 0.44 | 0.53 | 0.36 | 0.54 | 0.39 | 0.32 | 0.41 | – | – | 0.68 | 0.46 |
| | 114" | 7½" | 0.42 | 0.30 | 0.47 | 0.41 | 0.27 | 0.45 | 0.57 | 0.38 | 0.58 | 0.42 | 0.34 | 0.45 | – | – | 0.75 | 0.50 |
| | 120" | 8" | 0.43 | 0.31 | 0.50 | 0.43 | 0.27 | 0.50 | 0.62 | 0.41 | 0.64 | 0.45 | 0.36 | 0.50 | – | – | 0.81 | 0.53 |

## NOTES:

1. For details of the method of excavation, backfill and bedding (Method 1, Method 2, etc.), see Standard Plan A62D.
2. The tables for minimum allowable classes and D-loads of RCP on Standard Plan A62D shall not apply to direct design RCP.
3. Notes 3, 9 and 10 on Standard Plan A62D shall apply to direct design RCP.
4. Throughout the length of any given culvert, the direct design selected by the Contractor shall be the same, including the method of excavation, backfill and bedding.
5. The embankment height prior to excavation specified in note 5 of the Standard Plan A62D shall apply to the direct design RCP installation when Method 2, 3A or 3B are used.
6. For single circular cage reinforcement, minimum clearance shall be 40% of the wall thickness (t). For elliptical and double circular cage reinforcement where the wall thickness (t) is less than 2½", the minimum clearance (Clr) for reinforcement shall be ¾", and where the wall thickness (t) is 2½" or more, the minimum clearance (Clr) for reinforcement shall be 1".
7. Minimum cover measured at the Edge of Traveled Way (ETW) shall be 2'-0" to top of HMA or existing AC pavement and 1'-0" to bottom of rigid pavement.
8. Cover greater than the table maximum requires a special design.

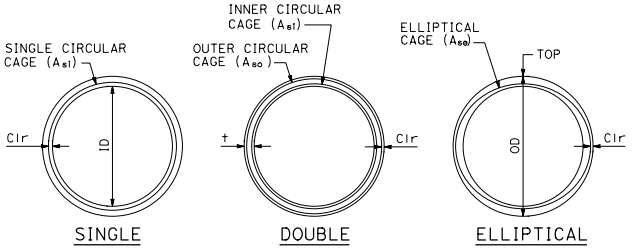
## DESIGN NOTES:

Design: AASHTO LRFD Bridge Design Specifications, 8th edition with California Amendments. DIRECT DESIGN METHOD

Earth Loading: Paris/Uniform Soil Pressure Distribution
Vertical: 140 pcf
Horizontal: Varies, see design lateral pressure chart (Circular Pipe only)

Unit Stresses: (Used in Design Tables)
$f_y$ = 65 ksi
$f'_c$ = See Tables

The RCP as shown on this sheet is not intended to be used in a corrosive environment. A special design may be required.




## CAGE REINFORCEMENT

t = Pipe barrel wall thickness, inches

$A_{si}$ = Inner cage reinforcement, or single circular cage reinforcement, square inches/LF

$A_{so}$ = Outer cage reinforcement, square inches/LF

$A_{se}$ = Elliptical single cage reinforcement, square inches/LF

Clr = Design clearance, inches (see Note 6)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST REINFORCED CONCRETE PIPE DIRECT DESIGN METHOD

NO SCALE

D79

7-1-25

Return to Table of Contents

## WALL B

| $f'_c$ | ID | † | MINIMUM COVER TO 10'-0" Max COVER | | | | | | | | | 20'-0" Max COVER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | INSTALLATION TYPE 1 | | | INSTALLATION TYPE 2 | | | INSTALLATION TYPE 3 | | | INSTALLATION TYPE 1 | | | INSTALLATION TYPE 2 | | | INSTALLATION TYPE 3 | | |
| | | | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ |
| 6 ksi | 24" | 3" | 0.17 | – | 0.16 | 0.19 | – | 0.17 | 0.21 | – | 0.19 | 0.17 | – | 0.16 | 0.19 | – | 0.17 | 0.21 | – | 0.19 |
| | 30" | 3½" | 0.21 | – | 0.17 | 0.22 | – | 0.18 | 0.25 | – | 0.21 | 0.21 | – | 0.17 | 0.22 | – | 0.18 | 0.25 | – | 0.24 |
| | 36" | 4" | 0.17 | 0.09 | 0.18 | 0.18 | 0.10 | 0.19 | 0.21 | 0.11 | 0.22 | 0.17 | 0.09 | 0.18 | 0.21 | 0.11 | 0.22 | 0.28 | 0.16 | 0.30 |
| | 42" | 4½" | 0.18 | 0.09 | 0.19 | 0.21 | 0.12 | 0.23 | 0.22 | 0.12 | 0.23 | 0.19 | 0.10 | 0.19 | 0.25 | 0.14 | 0.26 | 0.36 | 0.19 | 0.36 |
| | 48" | 5" | 0.19 | 0.10 | 0.20 | 0.24 | 0.14 | 0.27 | 0.23 | 0.13 | 0.24 | 0.22 | 0.12 | 0.23 | 0.29 | 0.16 | 0.31 | 0.44 | 0.23 | 0.45 |
| | 54" | 5½" | 0.20 | 0.11 | 0.22 | 0.29 | 0.17 | 0.32 | 0.24 | 0.14 | 0.25 | 0.25 | 0.14 | 0.28 | 0.33 | 0.20 | 0.37 | 0.52 | 0.28 | 0.53 |
| | 60" | 6" | 0.21 | 0.12 | 0.23 | 0.34 | 0.20 | 0.38 | 0.25 | 0.15 | 0.27 | 0.29 | 0.17 | 0.32 | 0.40 | 0.23 | 0.44 | – | – | – |
| | 66" | 6½" | 0.21 | 0.13 | 0.24 | 0.41 | 0.24 | 0.45 | 0.32 | 0.19 | 0.35 | 0.36 | 0.22 | 0.40 | 0.48 | 0.28 | 0.53 | – | – | – |
| | 72" | 7" | 0.22 | 0.14 | 0.25 | 0.49 | 0.29 | 0.54 | 0.37 | 0.22 | 0.41 | 0.43 | 0.25 | 0.47 | 0.57 | 0.34 | 0.63 | – | – | – |
| | 78" | 7½" | 0.23 | 0.15 | 0.26 | 0.57 | 0.34 | 0.63 | 0.42 | 0.25 | 0.47 | 0.50 | 0.30 | 0.55 | 0.66 | 0.39 | 0.66 | – | – | – |
| | 84" | 8" | 0.26 | 0.16 | 0.31 | 0.64 | 0.38 | 0.69 | 0.48 | 0.29 | 0.54 | 0.57 | 0.34 | 0.63 | 0.69 | 0.45 | – | – | – | – |
| | 90" | 8½" | 0.34 | 0.21 | 0.38 | 0.69 | 0.41 | 0.72 | 0.54 | 0.33 | 0.61 | 0.63 | 0.37 | 0.70 | 0.72 | 0.51 | – | – | – | – |
| | 96" | 9" | 0.39 | 0.24 | 0.44 | 0.70 | 0.45 | 0.74 | 0.61 | 0.36 | 0.68 | 0.70 | 0.41 | 0.74 | – | – | – | – | – | – |
| | 102" | 9½" | 0.48 | 0.29 | 0.49 | 0.72 | 0.54 | 0.76 | 0.73 | 0.44 | 0.74 | 0.75 | 0.50 | 0.78 | – | – | – | – | – | – |
| | 108" | 10" | 0.57 | 0.30 | 0.55 | 0.75 | 0.65 | 0.79 | 0.76 | 0.53 | 0.80 | 0.77 | 0.60 | 0.80 | – | – | – | – | – | – |
| | 114" | 10½" | 0.66 | 0.31 | 0.60 | 0.78 | 0.76 | 0.81 | 0.80 | 0.62 | 0.83 | 0.79 | 0.69 | 0.82 | – | – | – | – | – | – |
| | 120" | 11" | 0.75 | 0.31 | 0.66 | 0.81 | 0.86 | 0.83 | 0.84 | 0.72 | 0.86 | 0.81 | 0.79 | 0.84 | – | – | – | – | – | – |

## WALL C

| $f'_c$ | ID | † | MINIMUM COVER TO 10'-0" Max COVER | | | | | | | | | 20'-0" Max COVER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | INSTALLATION TYPE 1 | | | INSTALLATION TYPE 2 | | | INSTALLATION TYPE 3 | | | INSTALLATION TYPE 1 | | | INSTALLATION TYPE 2 | | | INSTALLATION TYPE 3 | | |
| | | | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ |
| 5 ksi | 24" | 3¾" | 0.15 | – | 0.12 | 0.15 | – | 0.13 | 0.18 | – | 0.14 | 0.15 | – | 0.12 | 0.15 | – | 0.13 | 0.18 | – | 0.14 |
| | 30" | 4¼" | 0.18 | – | 0.14 | 0.19 | – | 0.14 | 0.21 | – | 0.16 | 0.18 | – | 0.14 | 0.19 | – | 0.14 | 0.25 | – | 0.19 |
| | 36" | 4¾" | 0.14 | 0.07 | 0.14 | 0.15 | 0.08 | 0.16 | 0.17 | 0.09 | 0.17 | 0.14 | 0.07 | 0.14 | 0.18 | 0.09 | 0.18 | 0.23 | 0.12 | 0.23 |
| | 42" | 5¼" | 0.15 | 0.07 | 0.16 | 0.16 | 0.09 | 0.17 | 0.18 | 0.10 | 0.20 | 0.16 | 0.08 | 0.16 | 0.21 | 0.11 | 0.22 | 0.27 | 0.14 | 0.28 |
| | 48" | 5¾" | 0.16 | 0.07 | 0.17 | 0.19 | 0.10 | 0.21 | 0.19 | 0.11 | 0.21 | 0.19 | 0.10 | 0.19 | 0.25 | 0.13 | 0.25 | 0.32 | 0.17 | – |
| | 54" | 6¼" | 0.17 | 0.08 | 0.18 | 0.21 | 0.12 | 0.23 | 0.20 | 0.12 | 0.22 | 0.22 | 0.11 | 0.22 | 0.28 | 0.15 | 0.29 | 0.40 | 0.21 | – |
| | 60" | 6¾" | 0.18 | 0.09 | 0.19 | 0.24 | 0.15 | 0.27 | 0.22 | 0.15 | 0.24 | 0.25 | 0.14 | 0.26 | 0.32 | 0.18 | 0.33 | 0.49 | 0.25 | – |
| | 66" | 7¼" | 0.22 | 0.11 | 0.20 | 0.31 | 0.19 | 0.34 | 0.25 | 0.16 | 0.28 | 0.28 | 0.17 | 0.31 | 0.37 | 0.23 | – | – | – | – |
| | 72" | 7¾" | 0.24 | 0.15 | 0.26 | 0.36 | 0.21 | 0.40 | 0.31 | 0.19 | 0.34 | 0.34 | 0.20 | 0.37 | 0.44 | 0.26 | – | – | – | – |
| | 78" | 8¼" | 0.28 | 0.18 | 0.31 | 0.42 | 0.24 | 0.47 | 0.36 | 0.22 | 0.41 | 0.40 | 0.23 | 0.44 | 0.51 | 0.30 | – | – | – | – |
| | 84" | 8¾" | 0.32 | 0.18 | 0.35 | 0.50 | 0.30 | 0.56 | 0.43 | 0.25 | 0.47 | 0.47 | 0.28 | 0.52 | 0.62 | 0.37 | – | – | – | – |
| | 90" | 9¼" | 0.38 | 0.23 | 0.41 | 0.59 | 0.35 | 0.66 | 0.51 | 0.30 | 0.56 | 0.56 | 0.33 | 0.62 | 0.65 | 0.44 | – | – | – | – |
| | 96" | 9¾" | 0.42 | 0.25 | 0.47 | 0.65 | 0.42 | 0.68 | 0.59 | 0.35 | 0.65 | 0.64 | 0.40 | 0.65 | 0.68 | 0.51 | – | – | – | – |
| | 102" | 10¼" | 0.44 | 0.27 | 0.54 | 0.67 | 0.50 | 0.70 | 0.68 | 0.40 | 0.71 | 0.67 | 0.47 | 0.69 | – | – | – | – | – | – |
| | 108" | 10¾" | 0.46 | 0.28 | 0.60 | 0.69 | 0.59 | 0.72 | 0.71 | 0.50 | 0.73 | 0.69 | 0.55 | – | – | – | – | – | – | – |
| | 114" | 11¼" | 0.47 | 0.31 | 0.67 | 0.71 | 0.68 | 0.74 | 0.73 | 0.59 | 0.75 | 0.71 | 0.64 | – | – | – | – | – | – | – |
| | 120" | 11¾" | 0.49 | 0.35 | 0.73 | 0.73 | 0.77 | 0.76 | 0.75 | 0.59 | 0.77 | 0.73 | 0.73 | – | – | – | – | – | – | – |

## WALL X

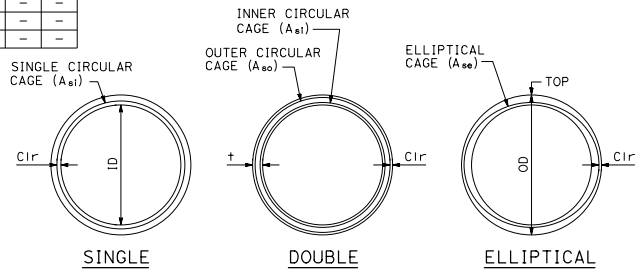
| $f'_c$ | ID | † | 10'-0" Max COVER | | | 20'-0" Max COVER | | |
|---|---|---|---|---|---|---|---|---|
| | | | INSTALLATION TYPE 1 | | | INSTALLATION TYPE 1 | | |
| | | | $A_{si}$ | $A_{so}$ | $A_{se}$ | $A_{si}$ | $A_{so}$ | $A_{se}$ |
| 6 ksi | 24" | 2" | 0.25 | 0.16 | 0.25 | 0.25 | 0.16 | 0.25 |
| | 30" | 2⅜" | 0.26 | 0.16 | 0.26 | 0.26 | 0.16 | 0.26 |
| | 36" | 2¾" | 0.31 | 0.20 | 0.32 | 0.31 | 0.20 | 0.32 |
| | 42" | 3" | 0.32 | 0.21 | 0.34 | 0.41 | 0.25 | 0.44 |
| | 48" | 3½" | 0.33 | 0.22 | 0.35 | 0.46 | 0.27 | 0.51 |
| | 54" | 3¾" | 0.34 | 0.24 | 0.36 | 0.54 | 0.28 | 0.55 |
| | 60" | 4¼" | 0.35 | 0.26 | 0.38 | 0.56 | 0.29 | 0.57 |
| | 66" | 4¾" | 0.36 | 0.27 | 0.40 | 0.59 | 0.31 | 0.60 |
| | 72" | 5¼" | 0.38 | 0.28 | 0.42 | 0.62 | 0.32 | 0.63 |
| | 78" | 5¾" | 0.39 | 0.28 | 0.43 | 0.66 | 0.34 | 0.67 |
| | 84" | 6¼" | 0.41 | 0.29 | 0.44 | 0.70 | 0.36 | 0.71 |
| | 90" | 7" | 0.42 | 0.31 | 0.46 | 0.71 | 0.37 | 0.73 |
| | 96" | 7½" | 0.44 | 0.32 | 0.48 | 0.72 | 0.38 | 0.74 |
| | 102" | 8" | 0.45 | 0.32 | 0.50 | 0.77 | 0.40 | 0.79 |
| | 108" | 8½" | 0.47 | 0.33 | 0.51 | 0.82 | 0.43 | – |
| | 114" | 9¼" | 0.49 | 0.34 | 0.52 | 0.85 | 0.44 | – |
| | 120" | 9¾" | 0.50 | 0.35 | 0.54 | 0.87 | 0.45 | – |

## WALL BB

| $f'_c$ | ID | † | 40'-0" Max COVER INSTALLATION TYPE 1 | |
|---|---|---|---|---|
| | | | $A_{si}$ | $A_{so}$ |
| 6 ksi | 24" | 3" | 0.22 | 0.13 |
| | 30" | 3½" | 0.27 | 0.14 |
| | 36" | 4" | 0.33 | 0.17 |
| | 42" | 4½" | 0.42 | 0.22 |
| | 48" | 5" | 0.52 | 0.27 |
| | 54" | 5¾" | 0.54 | 0.29 |
| | 60" | 6½" | 0.57 | 0.34 |
| | 66" | 7¼" | 0.60 | 0.38 |
| | 72" | 8½" | 0.62 | 0.40 |
| | 78" | 9½" | 0.64 | 0.42 |
| | 84" | 10¼" | 0.65 | 0.43 |
| 7 ksi | 90" | 10½" | 0.66 | 0.44 |
| | 96" | 10¾" | 0.79 | 0.46 |
| | 102" | 11¾" | 0.80 | 0.48 |
| | 108" | 12¼" | 0.88 | 0.53 |
| | 114" | 13¼" | 0.90 | 0.55 |
| | 120" | 14" | 0.93 | 0.56 |

## WALL CC

| $f'_c$ | ID | † | 80'-0" Max COVER INSTALLATION TYPE 1 | |
|---|---|---|---|---|
| | | | $A_{si}$ | $A_{so}$ |
| 6 ksi | 24" | 6½" | 0.21 | 0.19 |
| | 30" | 7½" | 0.35 | 0.30 |
| | 36" | 8½" | 0.45 | 0.42 |
| | 42" | 10¼" | 0.49 | 0.45 |
| 7 ksi | 48" | 10½" | 0.52 | 0.49 |
| | 54" | 11½" | 0.60 | 0.58 |
| | 60" | 12¾" | 0.65 | 0.63 |
| | 66" | 14½" | 0.68 | 0.67 |
| | 72" | 16½" | 0.70 | 0.68 |
| | 78" | 18" | 0.73 | 0.72 |
| | 84" | 19½" | 0.76 | 0.75 |
| | 90" | 20¾" | 0.80 | 0.79 |
| | 96" | 22½" | 0.82 | 0.81 |




### CAGE REINFORCEMENT

† = Pipe barrel wall thickness, inches

$A_{si}$ = Inner cage reinforcement, or single circular cage reinforcement, square inches/LF

$A_{so}$ = Outer cage reinforcement, square inches/LF

$A_{se}$ = Elliptical single cage reinforcement, square inches/LF

Clr = Design clearance, inches (see Note 5)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

### NOTES:

1. For details of the method of excavation, backfill and bedding (Installation Type 1, Installation Type 2, etc.), see Standard Plan A62DA.
2. The tables for minimum allowable classes and D-loads of RCP on Standard Plan A62DA shall not apply to direct design RCP.
3. Notes 3 and 7 on Standard Plan A62DA shall apply to direct design RCP.
4. Throughout the length of any given culvert, the direct design selected by the Contractor shall be the same, including the method of excavation, backfill and bedding.
5. For single circular cage reinforcement, minimum clearance shall be 40% of the wall thickness (t). For elliptical and double circular cage reinforcement where the wall thickness (t) is less than 2½", the minimum clearance (Clr) for reinforcement shall be ¾", and where the wall thickness (t) is 2½" or more, the minimum clearance (Clr) for reinforcement shall be 1".
6. Minimum cover measured at the Edge of Traveled Way (ETW) shall be 2'-0" to top of HMA or existing AC pavement and 1'-0" to bottom of rigid pavement.
7. Cover greater than the table maximum requires a special design.

### DESIGN NOTES:

Design: AASHTO LRFD Bridge Design Specifications, 8th edition with California Amendments. DIRECT DESIGN METHOD

Earth Loading: Heger Soil Pressure Distribution
$\gamma$ = 140 pcf
VAF & HAF modification factor = 0.86

Unit Stresses: (Used in Design Tables)
$f_y$ = 65 ksi
$f'_c$ = See Tables

The RCP as shown on this sheet is not intended to be used in a corrosive environment. A special design may be required.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST REINFORCED CONCRETE PIPE DIRECT DESIGN METHOD

NO SCALE

**D79A**

7-1-25

2025 STANDARD PLAN D79A

Return to Table of Contents

| SPAN, S | | 4′ | | | | 5′ | | | | | 6′ | | | | | 7′ | | | | | 8′ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEIGHT, H | | 2′ | 3′ | 4′ | | 2′ | 3′ | 4′ | 5′ | | 3′ | 4′ | 5′ | 6′ | | 3′ | 4′ | 5′ | 6′ | 7′ | | 4′ | 5′ | 6′ | 7′ | 8′ |
| MAXIMUM EARTH COVER | | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ |
| Conc ROOF | $T_1$ | 7½" 7" | 8" 7" | 8" 7" | | 8" 8" | 8" 8" | 7½" 8" | 8" 8" | | 9" 8½" | 9½" 8" | 9" 8" | 9" 8" | | 9" 11" | 9" 11" | 9" 11" | 9" 10½" | 9" 10½" | | 9½" 12½" | 9½" 11½" | 9½" 11½" | 9" 11½" | 9" 11½" |
| Conc WALLS | $T_2$ | 6" 6" | 6" 6" | 7" 7" | | 6" 6" | 6½" 6½" | 7" 7½" | 7" 9" | | 7" 7" | 7" 7½" | 7½" 9" | 8½" 10½" | | 6½" 7" | 6½" 7½" | 7" 9½" | 8½" 10½" | 10" 12" | | 6½" 8" | 7" 9½" | 8½" 11" | 10" 12" | 11" 13½" |
| Conc INVERT | $T_3$ | 7" 7" | 7" 7½" | 7" 7½" | | 7½" 8" | 7½" 8" | 7½" 9" | 7½" 9½" | | 8" 10" | 8" 10½" | 8" 10½" | 8" 10" | | 8" 11½" | 8" 10½" | 8" 11" | 8½" 11" | | | 8½" 13" | 8½" 13" | 8½" 12" | 8½" 13" | 8½" 12" |
| Reinf "a" | SIZE BAR | #5 #5 | #5 #5 | #5 #4 | #5 | #5 #5 | #5 #5 | #5 #5 | #5 #5 | #5 | #5 #6 | #5 #5 | #5 #5 | #5 #5 | #5 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 | #6 #6 | #6 #6 | #6 #6 | #6 #6 | #5 #6 |
| Reinf "a" | SPACING | 6" 5" | 6" 5" | 5" 5" | 5" | 5½" 4½" | 5" 4½" | 5" 4½" | 5" 4½" | 5" | 5" 5" | 5" 4½" | 4½" 4½" | 4½" 5" | 5" | 4½" 4½" | 4½" 5" | 4½" 5" | 4½" 5" | 5" 4½" | 4½" | 5" 4½" | 5" 4½" | 5" 4½" | 4½" 5" | 4½" 5" |
| Reinf "b" | SIZE BAR | #4 #5 | #4 #5 | #5 #5 | #5 | #5 #5 | #5 #5 | #5 #5 | #5 #5 | #5 | #5 #5 | #5 #5 | #5 #5 | #6 #5 | #5 | #5 #5 | #5 #5 | #6 #5 | #6 #5 | #6 #6 | #6 | #5 #5 | #6 #5 | #6 #5 | #6 #5 | #9 #6 |
| Reinf "b" | SPACING | 5½" 6" | 6" 6" | 6" 4½" | 5" | 5" 4½" | 6" 5½" | 6" 5½" | 4½" 5½" | 5½" | 5½" 4½" | 6" 5" | 5" 5½" | 5" 4½" | 4½" | 5" 4½" | 5" 5" | 5" 5" | 4½" 5" | 4½" 5" | 5" | 4½" 4½" | 5" 4½" | 4½" 4½" | 4½" 4½" | 4½" 4½" |
| Reinf "e" | SIZE BAR | #4 #4 | #4 #4 | #4 #4 | #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #5 |
| Reinf "e" | SPACING | 13½" 13½" | 13½" 13½" | 13½" 9" | 7" | 13½" 13½" | 13½" 13½" | 12" 11" | 6½" 7½" | 12½" | 12½" 12" | 11" 9" | 8½" 6½" | 6" 13½" | 12½" | 12½" 11" | 11" 9" | 8" 7" | 7" 6" | 5" 11" | 10" | 9" 8" | 7½" 6½" | 7" 6" | 5" 7" | |
| DIMENSION "B" ft-inch | | 2-4 | 2-0 | 2-4 | 2-1 | 2-4 | 2-6 | 2-6 | 2-1 | 2-7 | 2-4 | 2-9 | 2-8 | 2-9 | 2-10 | 2-9 | 2-3 | 2-9 | 2-4 | 3-0 | 2-11 | 3-4 | 3-1 | 2-11 | 2-6 | 2-11 | 2-9 | 3-5 | 2-11 | 3-6 | 3-3 | 3-7 | 3-7 | 3-1 | 2-9 | 3-4 | 2-8 | 3-7 | 3-3 | 5-8 | 3-6 | 5-9 | 3-10 |
| QUANTITIES CONCRETE | CF/LF | 8.0 | 7.8 | 9.3 | 9.0 | 11.1 | 10.9 | 9.8 | 10.0 | 11.1 | 11.4 | 12.4 | 13.9 | 13.8 | 17.0 | 13.1 | 14.8 | 14.5 | 17.1 | 15.9 | 19.7 | 18.4 | 22.8 | 14.7 | 18.8 | 15.8 | 19.8 | 17.4 | 23.3 | 20.4 | 26.5 | 23.9 | 30.1 | 18.0 | 25.2 | 19.6 | 27.5 | 22.6 | 30.3 | 25.8 | 34.4 | 29.0 | 38.1 |
| QUANTITIES REINFORCEMENT | LB/LF | 79 | 84 | 84 | 96 | 104 | 127 | 107 | 110 | 112 | 114 | 123 | 128 | 154 | 140 | 126 | 147 | 132 | 139 | 159 | 153 | 206 | 186 | 145 | 162 | 155 | 169 | 203 | 186 | 232 | 205 | 245 | 244 | 193 | 197 | 229 | 210 | 262 | 234 | 491 | 242 | 527 | 309 |
| ** SOIL PRESSURE (ksf), Ser | | 2.4 | 3.5 | 2.4 | 3.5 | 2.4 | 3.5 | 2.1 | 3.5 | 2.1 | 3.5 | 2.1 | 3.6 | 2.1 | 3.6 | 1.9 | 3.5 | 1.9 | 3.6 | 1.9 | 3.6 | 2.0 | 3.7 | 1.9 | 3.6 | 1.9 | 3.6 | 1.9 | 3.6 | 2.0 | 3.7 | 2.0 | 3.7 | 1.9 | 3.6 | 1.9 | 3.7 | 2.0 | 3.7 | 2.0 | 3.7 | 2.0 | 3.8 |
| ** SOIL PRESSURE (ksf), Str | | 3.9 | 4.5 | 3.0 | 4.5 | 3.9 | 4.6 | 3.3 | 4.5 | 3.3 | 4.5 | 3.3 | 4.6 | 3.4 | 4.7 | 2.9 | 4.6 | 2.9 | 4.6 | 3.0 | 4.7 | 3.0 | 4.7 | 2.6 | 4.6 | 2.6 | 4.6 | 2.7 | 4.7 | 2.7 | 4.8 | 2.7 | 4.8 | 2.5 | 4.7 | 2.5 | 4.7 | 2.5 | 4.8 | 2.6 | 4.8 | 2.6 | 4.9 |

| SPAN, S | | 10′ | | | | | | | 12′ | | | | | | | | | | 14′ | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEIGHT, H | | 5′ | 6′ | 7′ | | 8′ | 9′ | 10′ | | 6′ | 7′ | 8′ | 9′ | 10′ | 11′ | 12′ | | 7′ | 8′ | 9′ | | 10′ | 11′ | 12′ | 13′ | 14′ | | | | | | |
| MAXIMUM EARTH COVER | | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | | | | | |
| Conc ROOF | $T_1$ | 10" 15" | 9½" 14" | 9½" 13½" | | 9½" 14" | 10" 15" | 10" 15" | | 11½" 17" | 11½" 16½" | 11½" 16" | 11" 16" | 11½" 17" | 11½" 17½" | 12" 18" | | 13" 19½" | 13" 19" | 13" 17½" | | 13" 18" | 13" 19" | 13½" 20" | 13½" 19½" | 13½" 20½" | | | | | | |
| Conc WALLS | $T_2$ | 8½" 10" | 8½" 11½" | 10" 12½" | | 11½" 14" | 12" 15½" | 13½" 16½" | | 9" 12" | 10½" 13" | 11½" 14½" | 12½" 16" | 14" 16½" | 15" 18" | 16½" 20" | | 9½" 13½" | 11½" 15" | 12½" 16½" | | 14" 16½" | 15½" 16½" | 16½" 19½" | 18" 22" | 19½" 24½" | | | | | | |
| Conc INVERT | $T_3$ | 10" 15" | 10" 15" | 10" 15" | | 10" 15½" | 10" 16" | 10½" 15" | | 11" 17½" | 11" 17" | 11" 17" | 11" 17" | 11½" 16" | 12" 19" | 12½" 20" | | 12½" 19½" | 12½" 19½" | 12½" 19" | | 12½" 19" | 12½" 20" | 13" 21" | 13½" 22" | 14" 21½" | | | | | | |
| Reinf "a" | SIZE BAR | #6 #7 | #6 #7 | #6 #7 | | #6 #6 | #6 #6 | #5 #6 | | #7 #7 | #7 #7 | #7 #7 | #7 #7 | #6 #7 | #6 #6 | #6 #6 | | #8 #8 | #7 #8 | #7 #8 | | #7 #8 | #7 #7 | #6 #7 | #6 #7 | #6 #7 | | | | | | |
| Reinf "a" | SPACING | 4½" 5" | 4½" 5" | 5" 5" | | 5" 4½" | 5" 4½" | 4½" 5" | | 4½" 4½" | 5" 4½" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 4½" | 4½" 4½" | | 5" 5" | 4½" 5" | 4½" 5" | | 5" 5" | 5" 4½" | 4½" 4½" | 4½" 4½" | 4½" 5" | | | | | | |
| Reinf "b" | SIZE BAR | #5 #5 | #6 #6 | #6 #6 | | #7 #5 | #7 #6 | #7 #6 | | #6 #6 | #6 #6 | #7 #6 | #7 #6 | #7 #7 | #7 #6 | #7 #6 | | #7 #6 | #7 #6 | #7 #6 | | #7 #6 | #8 #6 | #8 #6 | #8 #6 | #8 #7 | | | | | | |
| Reinf "b" | SPACING | 4½" 4½" | 5" 5" | 4½" 5" | | 5" 4½" | 4½" 5" | 4½" 4½" | | 4½" 5" | 4½" 4½" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 4½" | 4½" 4½" | | 4½" 4½" | 5" 4½" | 4½" 4½" | | 4½" 4½" | 5" 4½" | 5" 4½" | 5" 5" | 5" 4½" | | | | | | |
| Reinf "e" | SIZE BAR | #4 #4 | #4 #4 | #4 #5 | | #5 #5 | #5 #5 | #5 #5 | | #4 #4 | #4 #4 | #5 #4 | #5 #4 | #5 #4 | #5 #5 | #5 #6 | | #4 #4 | #4 #5 | #4 #5 | | #5 #5 | #5 #5 | #5 #6 | #6 #6 | #6 #6 | | | | | | |
| Reinf "e" | SPACING | 9½" 7½" | 8½" 6" | 7½" 5½" | | 6" 5" | 5" 6½" | 6" 5" | | 8½" 6" | 7" 5½" | 6" 7½" | 5½" 6½" | 6½" 5" | 6½" 5½" | 5" 4½" | | 6" 7½" | 5" 6" | 7" 5½" | | 6½" 5" | 6½" 7" | 5" 5½" | 4½" 4½" | 4½" 6" | | | | | | |
| DIMENSION "B" ft-inch | | 3-10 | 3-10 | 3-9 | 3-3 | 4-0 | 3-6 | 4-9 | 4-5 | 4-9 | 4-11 | 4-10 | 4-7 | 4-3 | 4-1 | 4-3 | 4-1 | 5-0 | 4-3 | 5-3 | 5-1 | 5-3 | 6-2 | 5-4 | 5-6 | 5-4 | 5-7 | 4-8 | 4-6 | 5-0 | 4-5 | 5-4 | 5-0 | 5-8 | 5-4 | 6-5 | 5-9 | 6-5 | 5-11 | 6-6 | 6-10 | 6-6 | 6-11 |
| QUANTITIES CONCRETE | CF/LF | 26.1 | 27.5 | 27.1 | 40.3 | 30.6 | 43.3 | 34.7 | 49.0 | 38.0 | 55.8 | 43.4 | 59.4 | 34.3 | 52.3 | 38.0 | 55.3 | 41.4 | 59.0 | 44.6 | 64.3 | 50.8 | 68.1 | 55.9 | 78.6 | 63.1 | 88.6 | 44.2 | 68.6 | 49.2 | 72.9 | 52.9 | 75.7 | 58.0 | 79.1 | 63.7 | 84.7 | 70.0 | 97.9 | 77.3 | 108.8 | 85.0 | 120.5 |
| QUANTITIES REINFORCEMENT | LB/LF | 251 | 284 | 285 | 318 | 307 | 338 | 375 | 313 | 418 | 375 | 425 | 404 | 381 | 381 | 382 | 397 | 469 | 418 | 497 | 455 | 488 | 534 | 526 | 479 | 548 | 515 | 526 | 492 | 498 | 512 | 550 | 540 | 560 | 563 | 652 | 562 | 651 | 596 | 691 | 674 | 730 | 753 |
| ** SOIL PRESSURE (ksf), Ser | | 2.0 | 3.7 | 2.0 | 3.7 | 2.0 | 3.8 | 2.0 | 3.8 | 2.1 | 3.9 | 2.1 | 3.9 | 2.2 | 3.8 | 2.3 | 3.8 | 2.3 | 3.8 | 2.3 | 3.9 | 2.3 | 3.9 | 2.4 | 4.0 | 2.5 | 4.1 | 2.2 | 3.9 | 2.3 | 3.9 | 2.3 | 3.9 | 2.3 | 3.9 | 2.4 | 4.0 | 2.4 | 4.1 | 2.5 | 4.1 | 2.5 | 4.2 |
| ** SOIL PRESSURE (ksf), Str | | 2.5 | 4.8 | 2.5 | 4.8 | 2.6 | 4.9 | 2.6 | 4.9 | 2.7 | 5.0 | 2.7 | 5.1 | 3.0 | 4.9 | 3.0 | 4.9 | 3.1 | 5.0 | 3.1 | 5.0 | 3.2 | 5.1 | 3.2 | 5.2 | 3.3 | 5.3 | 3.0 | 5.0 | 3.1 | 5.0 | 3.1 | 5.0 | 3.1 | 5.1 | 3.2 | 5.1 | 3.2 | 5.3 | 3.3 | 5.3 | 3.4 | 5.4 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Carl W. Duan No. C59976 Exp. 6-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

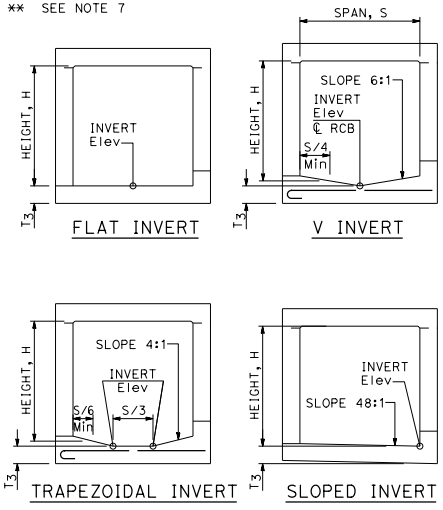
NOTES:

1. For boxes with span or height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
2. Quantities are approximate and for design purposes only.
3. For boxes with span or height or cover greater than those shown in tables, a special design is required.
4. It is permissible to eliminate the 180° hooks on every other "a" bar.
5. Provide paving notch when top is exposed and when pavement is concrete, and adjust quantities.
6. For design and details not shown, see Standard Plan D82.
7. Soil pressures shown are per AASHTO LRFD BDS and include soil weight of fill over box, self weight of box, and live load where applicable.
8. Stagger rebars for wall thickness less than 8".
9. 2" concrete cover are typical except as shown.

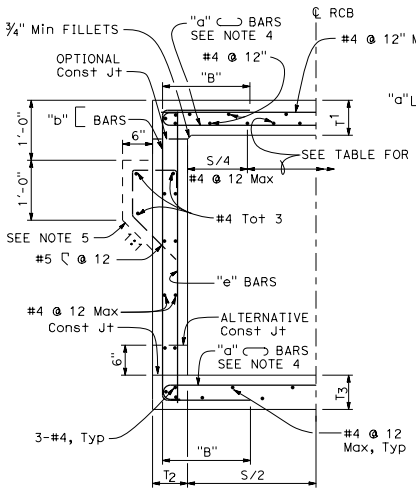
| "i" BARS, FOR EARTH COVERS UP TO AND INCLUDING 10′-0" | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SPAN | 4′ | 5′ | 6′ | 7′ | 8′ | 10′ | 12′ | 14′ |
| NUMBER | 7 | 8 | 9 | 10 | 11 | 12 | 15 | 20 |

NOTE: For earth cover over 10′-0", use #4 @ 12 Max spacing for "i" bars.

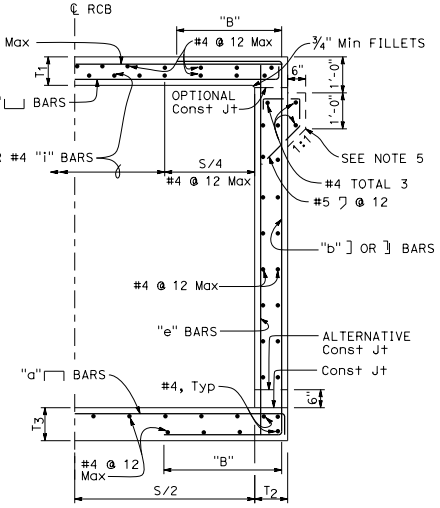
** SEE NOTE 7




ALTERNATIVE INVERTS




TYPICAL SECTION SPANS 4′ THRU 8′




TYPICAL SECTION SPANS 10′ THRU 14′

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT

NO SCALE

D80

2025 STANDARD PLAN D80

231

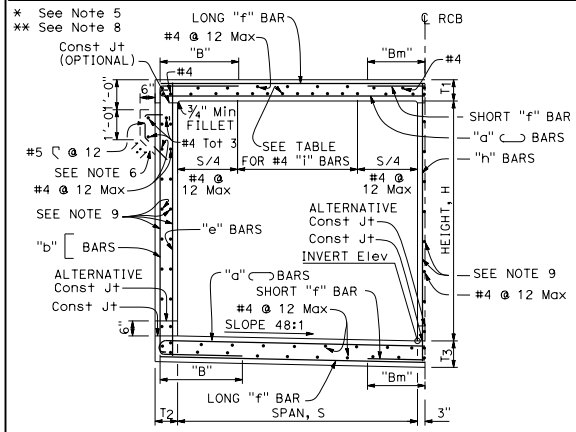
7-1-25

Return to Table of Contents

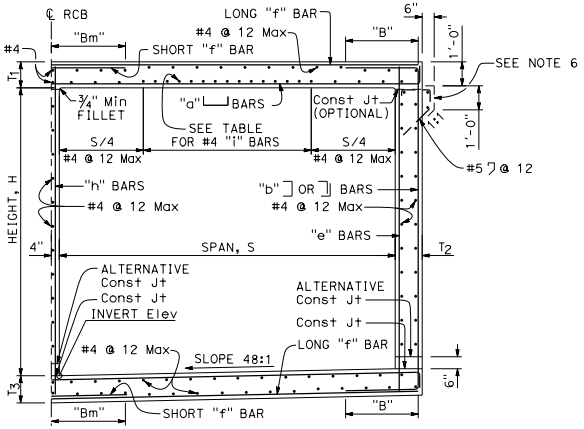
| SPAN, S | | | 4′ | | | | 5′ | | | | | 6′ | | | | | | 7′ | | | | | | 8′ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEIGHT, H | | | 2′ | 3′ | 4′ | | 2′ | 3′ | 4′ | 5′ | | 3′ | 4′ | 5′ | 6′ | | | 3′ | 4′ | 5′ | 6′ | 7′ | | 4′ | 5′ | 6′ | 7′ | 8′ | |
| MAXIMUM EARTH COVER | | | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | |
| Conc | ROOF | $T_1$ | 8" 8½" | 8" 8½" | 8" 8½" | | 7½" 10" | 7½" 10" | 8" 10" | 8" 10" | | 7½" 12" | 7½" 11½" | 8" 11½" | 8" 11½" | | | 9" 13½" | 8½" 13½" | 8½" 13" | 8½" 13" | 8½" 13" | | 10" 15" | 9½" 15" | 9½" 14½" | 9½" 14½" | 9½" 14½" | |
| | WALLS | $T_2$ | 6" 6½" | 6½" 7" | 7" 8" | | 6" 6½" | 6½" 7½" | 7½" 8" | 8" 9½" | | 6½" 7½" | 7" 8½" | 7½" 10" | 8½" 11" | | | 6½" 7½" | 7½" 8" | 7½" 9½" | 8½" 11" | 9½" 13" | | 6½" 8" | 7½" 9½" | 8½" 11½" | 9½" 13" | 11" 15" | |
| | INVERT | $T_3$ | 7" 9½" | 7" 9½" | 7" 9½" | | 7½" 11" | 7½" 11" | 8" 11" | 8" 11" | | 8½" 12½" | 8½" 12½" | 8½" 13" | 8½" 12½" | | | 9½" 14" | 9½" 14" | 9½" 14" | 9½" 14½" | 10½" 15½" | | 10½" 15½" | 10½" 15½" | 10½" 16" | 10½" 16" | 10½" 16" | |
| REINFORCEMENT | "a" | SIZE BAR | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #5 #4 | #5 #4 | | #5 #4 | #5 #4 | #5 #4 | #5 #4 | | | #5 #4 | #5 #4 | #5 #4 | #5 #4 | #5 #4 | | #5 #4 | #5 #5 | #5 #5 | #5 #5 | #5 #5 | |
| | | SPACING | 5" 5½" | 5" 5½" | 5" 5½" | | 5½" 5½" | 5½" 5½" | 6" 5½" | 6" 5½" | | 5½" 5" | 5½" 5" | 5" 5" | 5" 5" | | | 5½" 6" | 5" 6" | 5" 6" | 5" 6" | 5½" 6" | | 5½" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | |
| | "b" | SIZE BAR | #4 #4 | #4 #4 | #4 #5 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | #5 #4 | #4 #4 | #5 #4 | #5 #4 | | | #5 #4 | #5 #4 | #5 #4 | #5 #5 | #5 #5 | | #5 #5 | #5 #5 | #5 #5 | #5 #5 | #6 #5 | |
| | | SPACING | 5½" 6½" | 6" 6" | 6½" 6" | | 5" 5½" | 5½" 6" | 5½" 5½" | 5½" 5" | | 5½" 6" | 5" 5½" | 5" 5" | 4½" 5" | | | 5" 6" | 5" 5" | 5" 5" | 5" 5" | 5½" 6" | | 5" 7" | 5" 6" | 5½" 5½" | 5" 5½" | 5" 5½" | |
| | "e" | SIZE BAR | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | |
| | | SPACING | 13½" 13½" | 13½" 12½" | 9½" 9½" | | 13½" 13½" | 13½" 11" | 11" 10" | 8½" 8" | | 13½" 11" | 12½" 9½" | 9" 7½" | 7" 6½" | | | 13½" 11" | 11" 10" | 10½" 8" | 8" 6½" | 6" 5½" | | 13" 10" | 11" 8" | 9" 6" | 7" 5½" | 5½" 7" | |
| | *"f" | SIZE BAR | #5 #5 | #5 #6 | #6 #6 | | #6 #6 | #6 #6 | #6 #6 | #6 #6 | | #7 #6 | #7 #6 | #7 #6 | #7 #6 | | | #7 #7 | #7 #7 | #7 #7 | #7 #7 | #7 #6 | | #7 #7 | #7 #7 | #7 #7 | #7 #7 | #7 #7 | |
| | | SPACING | 4½" 4½" | 4½" 5" | 5" 4½" | | 4½" 5" | 4½" 5" | 5" 6" | 5" 5" | | 5" 4½" | 5" 4½" | 5" 5" | 5" 4½" | | | 5" 5" | 5" 5" | 5" 5" | 5" 5" | 4½" 5" | | 5" 5" | 5" 5" | 5" 5" | 5" 5" | 5" 5" | |
| | "h" | SIZE BAR | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | |
| | | SPACING | 6" 13½" | 7½" 13½" | 8" 13½" | | 6" 13½" | 6" 13½" | 6" 13½" | 6½" 13½" | | 5" 13½" | 5½" 13½" | 6" 13½" | 6" 13½" | | | 5½" 13½" | 5½" 13½" | 5½" 13½" | 6" 13½" | 6½" 13½" | | 6½" 13½" | 6½" 13½" | 6½" 13½" | 7" 13½" | 7½" 13½" | |
| | DIM "B" ft-inch | | 2-8 2-6 | 2-8 2-7 | 2-10 2-8 | | 2-10 2-9 | 2-10 2-10 | 2-11 2-10 | 3-0 3-1 | | 3-1 3-2 | 3-1 3-3 | 3-3 3-8 | 3-6 3-8 | | | 3-4 3-5 | 3-5 3-5 | 3-5 3-7 | 3-8 3-8 | 3-10 4-1 | | 3-8 3-8 | 3-8 3-11 | 3-9 3-11 | 4-0 4-1 | 4-5 4-5 | |
| | DIM "Bm" ft-inch | | 2-5 2-10 | 2-9 2-10 | 2-10 2-10 | | 2-11 3-0 | 2-11 3-1 | 3-0 3-1 | 3-2 3-2 | | 3-8 3-3 | 3-8 3-4 | 3-9 3-5 | 3-10 3-5 | | | 3-10 4-0 | 3-11 4-0 | 3-10 3-10 | 3-1 3-10 | 4-2 3-10 | | 4-1 4-3 | 4-2 4-4 | 4-2 4-5 | 4-5 4-6 | 4-5 4-7 | |
| QUANTITIES | CONCRETE | CF/LF | 14.9 17.5 | 16.7 19.5 | 18.8 22.1 | | 17.4 23.4 | 19.2 25.8 | 22.7 28.0 | 25.0 31.6 | | 22.9 33.3 | 24.9 35.5 | 27.7 39.8 | 30.6 43.3 | | | 28.8 41.4 | 30.6 44.3 | 32.4 47.3 | 35.4 50.8 | 38.7 57.6 | | 36.4 52.7 | 38.3 56.4 | 41.4 61.3 | 44.7 66.1 | 49.2 72.3 | |
| | REINFORCEMENT | LB/LF | 145 131 | 157 156 | 205 158 | | 212 169 | 221 182 | 224 196 | 261 215 | | 268 209 | 287 232 | 333 244 | 362 297 | | | 327 264 | 333 276 | 355 311 | 377 338 | 406 348 | | 373 339 | 388 367 | 399 395 | 429 414 | 509 441 | |
| ** SOIL PRESSURE (ksf), Ser | | | 1.8 3.5 | 1.9 3.5 | 1.9 3.5 | | 2.1 3.5 | 2.2 3.5 | 2.2 3.6 | 2.2 3.6 | | 2.2 3.6 | 2.2 3.6 | 2.2 3.6 | 2.2 3.7 | | | 2.2 3.6 | 2.2 3.6 | 2.2 3.6 | 2.3 3.7 | 2.3 3.7 | | 2.2 3.7 | 2.3 3.7 | 2.3 3.7 | 2.3 3.8 | 2.3 3.8 | |
| ** SOIL PRESSURE (ksf), Str | | | 2.9 4.4 | 2.9 4.5 | 2.9 4.5 | | 2.9 4.5 | 2.9 4.5 | 2.9 4.5 | 2.9 4.6 | | 2.9 4.5 | 2.9 4.6 | 2.9 4.6 | 3.0 4.6 | | | 2.9 4.6 | 2.9 4.6 | 3.0 4.6 | 3.0 4.6 | 3.0 4.7 | | 3.0 4.6 | 3.0 4.7 | 3.0 4.7 | 3.0 4.7 | 3.0 4.8 | |

| SPAN, S | | | 10′ | | | | 12′ | | | | | 14′ | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEIGHT, H | | | 5′ | 6′ | 7′ | 8′ | 9′ | 10′ | 6′ | 7′ | 8′ | 9′ | 10′ | 11′ | 12′ | | 7′ | 8′ | 9′ | 10′ | 11′ | 12′ | 13′ | 14′ | | | | | |
| MAXIMUM EARTH COVER | | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | 10′ 20′ | | | | | | |
| Conc | ROOF | $T_1$ | 12" 19" | 12" 18½" | 11½" 18½" | 11½" 18½" | 11½" 18½" | 11½" 18" | 13½" 22" | 13½" 22" | 13½" 22" | 13" 22" | 13" 21½" | 14½" 21½" | 14½" 21½" | | 16½" 25½" | 16½" 25½" | 16½" 25" | 16" 25" | 16" 24½" | 16" 24½" | 16" 24½" | 15½" 24½" | | | | | | |
| | WALLS | $T_2$ | 8½" 10" | 8½" 11½" | 10" 12½" | 11" 14" | 11½" 15½" | 13" 16½" | 8½" 11½" | 10" 13" | 11" 14½" | 12" 16" | 13" 16½" | 14½" 17½" | 16" 19½" | | 10" 13" | 11" 14½" | 12" 16½" | 13½" 16½" | 14½" 17½" | 16" 19½" | 16½" 21" | 19" 23½" | | | | | | |
| | INVERT | $T_3$ | 10½" 19" | 10½" 19" | 10½" 19" | 10½" 19" | 11" 19½" | 11" 19½" | 12½" 22" | 12" 22" | 12" 22½" | 12" 22½" | 12" 22½" | 13½" 23" | 13½" 22½" | | 15" 25" | 15" 25½" | 15" 25½" | 15" 25½" | 15" 25½" | 15" 25½" | 15" 26" | 15½" 26" | | | | | | |
| REINFORCEMENT | "a" | SIZE BAR | #5 #5 | #5 #5 | #5 #5 | #5 #5 | #5 #5 | #5 #5 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #5 #6 | | | | | | |
| | | SPACING | 5" 5" | 5" 5" | 5" 5" | 5" 5" | 5" 5" | 5" 5" | 4½" 5½" | 4½" 5½" | 4½" 5½" | 4½" 5½" | 4½" 5½" | 4½" 5½" | 4½" 5½" | | 5" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | 5½" 5½" | | | | | | |
| | "b" | SIZE BAR | #5 #5 | #5 #5 | #5 #6 | #5 #6 | #5 #7 | #5 #7 | #5 #5 | #5 #6 | #5 #7 | #5 #7 | #5 #7 | #5 #7 | #5 #7 | | #5 #6 | #5 #6 | #5 #6 | #5 #6 | #6 #6 | #6 #6 | #6 #7 | #6 #7 | | | | | | |
| | | SPACING | 5½" 6" | 4½" 5½" | 5" 6½" | 4½" 5½" | 5" 5" | 5½" 4½" | 4½" 4½" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 5" | 5" 4½" | 5" 4½" | | 5" 5" | 6" 5" | 5½" 4½" | 5½" 5" | 5" 5½" | 5½" 5" | 5" 5½" | 4½" 5" | | | | | | |
| | "e" | SIZE BAR | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #5 | #4 #5 | #4 #4 | #4 #4 | #4 #5 | #4 #5 | #4 #5 | #5 #5 | #5 #5 | | #4 #4 | #4 #4 | #4 #5 | #4 #5 | #5 #5 | #5 #5 | #5 #6 | #6 #6 | | | | | | |
| | | SPACING | 9½" 7½" | 9½" 6½" | 7½" 5½" | 6½" 5" | 5" 7" | 6½" 6" | 9½" 6" | 7½" 5½" | 6½" 7½" | 6" 6½" | 5" 6" | 6½" 5" | 5½" 4½" | | 7½" 5½" | 6½" 7½" | 6" 6½" | 5" 6½" | 7" 5½" | 6" 5" | 4½" 4½" | 6" 5½" | | | | | | |
| | "f" | SIZE BAR | #9 #7 | #9 #7 | #9 #7 | #9 #7 | #8 #7 | #8 #7 | #9 #8 | #9 #8 | #9 #8 | #9 #8 | #9 #8 | #8 #8 | #8 #8 | | #9 #8 | #9 #8 | #9 #8 | #9 #8 | #9 #8 | #8 #8 | #8 #8 | #8 #8 | | | | | | |
| | | SPACING * | 4½" 4½" | 4½" 4½" | 4½" 4½" | 4½" 4½" | 4½" 4½" | 4½" 4½" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 5" | 4½" 5" | | 5" 4½" | 5" 4½" | 5" 4½" | 5" 4½" | 5" 4½" | 5" 4½" | 4½" 4½" | 4½" 4½" | | | | | | |
| | "h" | SIZE BAR | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | #4 #4 | | | | | | |
| | | SPACING | 7½" 10" | 7½" 10" | 8" 10" | 8" 10" | 8½" 10" | 10" 7" | 10" 7½" | 10" 7½" | 10" 8" | 10" 8" | 10" 8" | 8" 10" | 8" 10" | | 10" 10" | 10" 10" | 10" 10" | 9½" 10" | 9" 10" | 9½" 10" | 9½" 10" | 9½" 10" | | | | | | |
| | DIM "B" ft-inch | | 4-3 4-5 | 4-3 4-7 | 4-3 4-7 | 4-4 4-7 | 4-6 4-9 | 4-8 5-0 | 4-10 5-2 | 4-10 5-2 | 4-10 5-3 | 4-10 5-3 | 4-10 5-2 | 5-4 5-9 | 5-4 5-11 | | 5-4 5-9 | 5-6 5-10 | 5-7 5-9 | 5-7 6-0 | 5-9 5-11 | 5-10 6-2 | 6-1 6-5 | 6-2 6-7 | | | | | | |
| | DIM "Bm" ft-inch | | 5-10 4-9 | 5-10 4-9 | 5-10 4-10 | 6-1 4-11 | 6-3 5-0 | 5-7 5-2 | 6-3 5-9 | 6-4 5-10 | 6-4 5-11 | 6-4 6-0 | 6-6 6-0 | 6-1 6-2 | 6-1 6-4 | | 6-8 6-3 | 6-9 6-4 | 6-9 6-5 | 6-10 6-5 | 7-0 6-6 | 7-2 6-7 | 7-3 6-10 | 5-7 6-11 | | | | | | |
| QUANTITIES | CONCRETE | CF/LF | 51.8 82.4 | 53.9 86.1 | 57.3 90.4 | 61.3 95.9 | 65.6 102.9 | 71.2 107.4 | 69.0 113.0 | 72.3 118.2 | 76.3 125.1 | 79.6 131.4 | 85.4 134.7 | 97.1 141.7 | 103.8 149.4 | | 96.0 149.6 | 100.1 156.8 | 104.5 163.0 | 109.0 166.4 | 114.2 171.0 | 121.0 180.0 | 125.6 189.5 | 135.9 201.3 | | | | | | |
| | REINFORCEMENT | LB/LF | 614 465 | 642 491 | 690 512 | 727 532 | 715 557 | 773 608 | 733 671 | 766 692 | 817 718 | 886 744 | 919 764 | 861 804 | 921 881 | | 804 833 | 824 874 | 856 901 | 921 920 | 968 950 | 1046 984 | 1126 1041 | 1107 1114 | | | | | | |
| ** SOIL PRESSURE (ksf), Ser | | | 2.2 3.9 | 2.3 3.9 | 2.3 3.9 | 2.3 3.9 | 2.3 4.0 | 2.4 4.0 | 2.2 4.0 | 2.3 4.0 | 2.3 4.0 | 2.3 4.0 | 2.3 4.1 | 2.4 4.1 | 2.4 4.1 | | 2.3 4.1 | 2.3 4.1 | 2.3 4.1 | 2.3 4.1 | 2.3 4.1 | 2.3 4.2 | 2.4 4.2 | 2.4 4.3 | | | | | | |
| ** SOIL PRESSURE (ksf), Str | | | 2.9 4.9 | 3.0 4.9 | 3.0 5.0 | 3.0 5.0 | 3.0 5.0 | 3.0 5.0 | 2.9 5.0 | 2.9 5.0 | 2.9 5.0 | 3.0 5.1 | 3.0 5.1 | 3.0 5.1 | 3.0 5.2 | | 2.9 5.1 | 2.9 5.1 | 2.9 5.2 | 2.9 5.2 | 2.9 5.2 | 3.0 5.2 | 3.0 5.3 | 3.0 5.3 | | | | | | |

* See Note 5
** See Note 8




TYPICAL SECTION SPANS 4′ THRU 8′




TYPICAL SECTION SPANS 10′ THRU 14′

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA
REGISTERED PROFESSIONAL ENGINEER

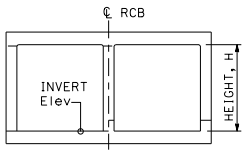
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NOTES:

1. For boxes with span or height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
2. For boxes with span or height or cover greater than those shown in tables, a special design is required.
3. Quantities are approximate and for design purposes only.
4. It is permissible to eliminate the 180° hooks on every other "a" bar.
5. Spacing shown is between long and short "f" bars.
6. Provide paving notch when top is exposed and when pavement is concrete, and adjust quantities.
7. For design and details not shown, see Standard Plan D82.
8. Soil pressures shown are per AASHTO LRFD BDS and include soil weight of fill over box, self weight of box, and live load where applicable.
9. Stagger rebars for wall thickness less than 8".
10. 2" concrete cover are typical except as shown.

| "i" BARS, FOR EARTH COVERS UP TO AND INCLUDING 10′-0" | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SPAN | 4′ | 5′ | 6′ | 7′ | 8′ | 10′ | 12′ | 14′ |
| NUMBER | 5 | 6 | 8 | 10 | 13 | 14 | 16 | 19 |

NOTE: For earth cover over 10′-0", use #4 @ 12 Max spacing for "i" bars.




FLAT INVERT ALTERNATIVE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CAST-IN-PLACE REINFORCED CONCRETE DOUBLE BOX CULVERT

NO SCALE

D81

2025 STANDARD PLAN D81

7-1-25



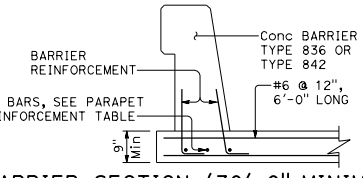
Return to Table of Contents

## DESIGN NOTES:

Design Specifications:
AASHTO LRFD Bridge Design Specifications, 8th Edition and CA Amendments.
Loading:
Live load: (AASHTO LRFD 3.6.1.2) and CA Amendments 3.6.1.8:
HL-93 design truck or design tandem
P15 Permit Design Vehicle
Impact Factor: (Apply to roof slab only)
$IM = 33(1.0-0.125D_E) \geq 0\%$ (AASHTO LRFD 3.6.2.2)
$D_E$ = minimum depth of earth cover
Earth load:
Earth pressure for two conditions:
140 pcf vertical, 36 pcf horizontal
140 pcf vertical, 120 pcf horizontal
Load Factors:
AASHTO-CA BDS-8 Table 3.4.1.1 & Table 3.4.1.2
Unit stresses:
$f'_c$ = 3600 psi
$f_y$ = 60,000 psi
Distribution "i" bars:
Up to and including 10'-0" cover
Express as a percentage of main positive reinforcement required: $\frac{100}{\sqrt{S}}$, Max 50%,
Over 10'-0" cover, # 4 @ 12 maximum
Shear:
For Slabs less than 16" thick and fill $\geq$ 2'-0"
$V_c = \{0.0676\lambda\sqrt{f'_c}+4.6\frac{A_s}{bd_e}\frac{V_u d_e}{M_u}\}bd_e \leq 0.126\lambda\sqrt{f'_c}bd_e$(Kips)
$V_c$ shall not be less than $0.0948\lambda\sqrt{f'_c}bd_e$ for frame
For all other members
$Vc = 0.0316\beta\lambda\sqrt{f'_c}bd_v$(kips)
$\beta$ = 2.0 for members less than 16" thick
= based on iterative $\theta$ and $\beta$ method for all other cases
Control of cracking by distribution of reinforcement:
Class 2 exposure environment Service Limit State

## CONSTRUCTION NOTES:

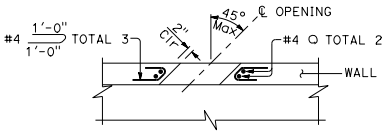
Construction loads:
Strutting required as shown on Standard Plan D88. Strutting may be required on culvert extensions when existing parapet is removed.
Expansion joints:
Invert:
No expansion joints shall be permitted.
Roof and Walls:
When cover is less than span length-
Place ½" premolded expansion joint filler at 30'-0" ± centers outside the paved roadway lanes and place Bridge Detail 3-2, Standard Plan B0-3, at 30'-0" centers under paved roadway lanes.
When cover is more than span length-
Place ½" premolded expansion joint filler at 30'-0"± centers and additional ½" premolded expansion joints at locations of change in foundation character, as directed by the Engineer.
Construction joints:
Temporary joints may be permitted if normal (or radial) to ℄ of RCB. Otherwise, the contractor is to submit a proposal for consideration.
Cutoff walls:
4'-0" cutoff walls are to be provided at inlet and/or outlet unless adjacent channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant.
Earthwork:
See Standard Plan A62E.
Backfill:
See Standard Specifications, except that the difference in level of backfill (against outside walls) shall not exceed 2'-0".



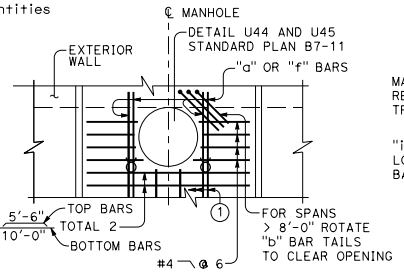

BARRIER SECTION (30'-0" MINIMUM)

## GENERAL NOTES:

Designation:
Standard single or multiple box culverts are shown on plans as span times height with maximum cover over roof thus: 8' x 5' RCB with 10' or double 10' x 5' RCB with 20', followed by alternatives.
Alternatives:
Single cell: Invert will be sloped unless "trapezoidal invert", "flat invert", or "V invert" is included in designation.
Multiple cell: Invert will be vee unless "flat invert" is specified. Ends of culvert will be rounded unless "square ends" are designated. Parapets will be as shown unless designated in plans. Such designations may be different for inlet and outlet ends.
Quantities:
Quantities do not include the following:
• Concrete for parapet, paving notches, and cut-off wall.
• Reinforcement for 2% splices, parapets, paving notches, cut-off wall, and additional required bars for exposed top slab.
Reinforcement placement:
Main reinforcement is to be placed transversely or, for curved culverts, radially. When radial, reinforcing spacing of the "a" and "f" bars is measured along the centerline. Stagger splices not shown. Hooks may be rotated or tilted, as necessary, for clearance.
Special reinforcement coverage:
Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.
Special design:
Required for culverts with conditions, loads, design bearing pressures, or sizes greater than those given on this plan or Standard Plans D80 AND D81. Also required for multiple cell culverts with unequal spans. For culverts with railroad loading, see the current AREMA design specification.
Three or more cells:
For culverts with more than two cells, use dimensions and reinforcement for the standard "double box culvert". Reduce spacing of "f" bars and "b" bars by ½" and adjust quantities accordingly.

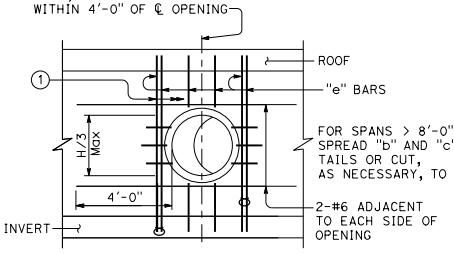



PART PLAN-SECTION




PART PLAN

BRIDGE DETAIL 3-2 STANDARD PLAN B0-3, NO EXPANSION JOINT WITHIN 4'-0" OF ℄ OPENING

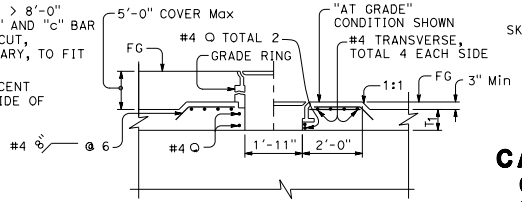



LONGITUDINAL SECTION

UTILITY OPENING-WALL

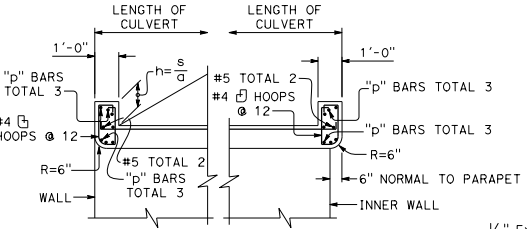
H=Height of box

① Adjacent to each side of the opening, place additional bars equivalent to half the interrupted main reinforcement.




PART LONGITUDINAL SECTION

MANHOLE




SINGLE SPAN MULTIPLE SPAN

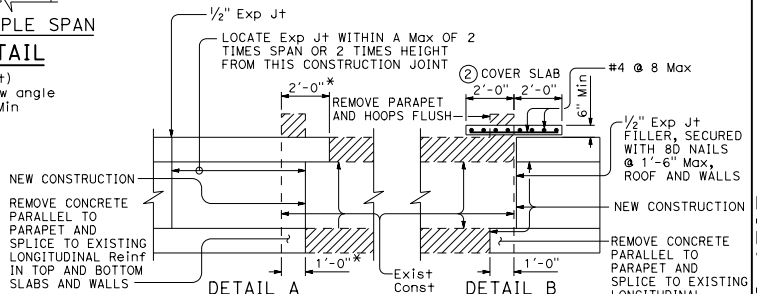
PARAPET DETAIL

s = Clear span (ft)
a = 12 cosine skew angle
h = Height, 1'-0" Min

**PARAPET "p" BARS**

| SPAN | SKEW ANGLE 0° TO 15° | 16° TO 30° | 31° TO 45° |
|---|---|---|---|
| 4'-0" | #4 | #4 | #4 |
| 6'-0" | #4 | #4 | #5 |
| 8'-0" | #4 | #5 | #6 |
| 10'-0" | #5 | #6 | #7 |
| 12'-0" | #6 | #7 | #8 |
| 14'-0" | #7 | #8 | #9 |

PARAPET REINFORCEMENT




DETAIL A

20° maximum skew as shown. If existing longitudinal and transverse reinforcing bars in top slab are lap spliced with new longitudinal and transverse reinforcing bars, the 20° skew may be exceeded. Lap splicing may require removal of top slab in excess of 2'-0" shown.

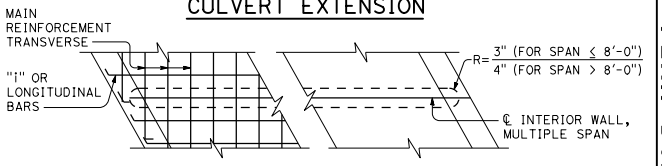
DETAIL B

Single cell only, no skew allowed, 1'-0" minimum cover.

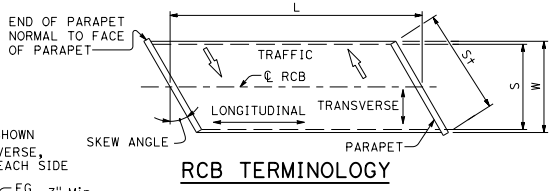
* Measured perpendicular to parapet

② Cover slab is anchored to the existing buried top slab by two #5 drill and bond dowel bars in 4" holes.

CULVERT EXTENSION




PART PLAN-SKEWED




RCB TERMINOLOGY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS

NO SCALE

D82

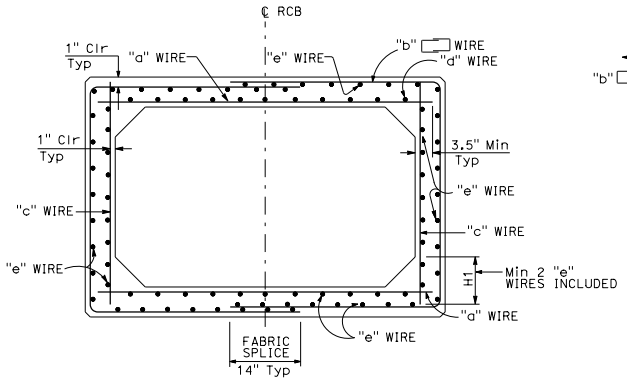
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Carl M. Duan No. C59976 Exp. 6-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
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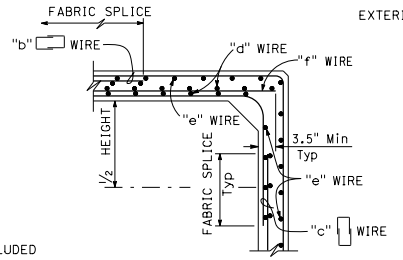


7-1-25

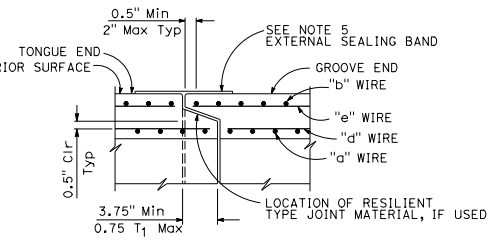
Return to Table of Contents



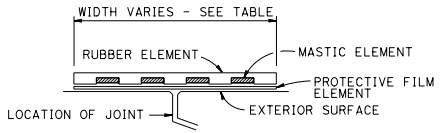

TYPICAL SECTION - SPANS 4'-0" THRU 12'-0"



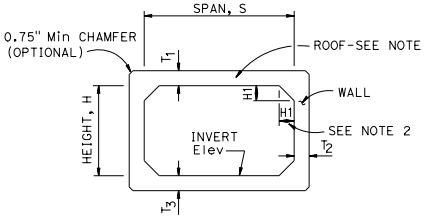

ALTERNATIVE DETAILING OPTION




END JOINT DETAIL




EXTERNAL SEALING BAND SCHEMATIC




SCHEMATIC

| TABLE | |
|---|---|
| SPAN | EXTERNAL SEALING BAND WIDTH, Min |
| 4'-6' | 9" |
| 7'-8' | 11" |
| 10'-12' | 13" |

| SPAN, S | | | 4' | | | | | | 5' | | | | | | | | 6' | | | | | | | | 7' | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEIGHT, H | | | 2' | | 3' | | 4' | | 2' | | 3' | | 4' | | 5' | | 3' | | 4' | | 5' | | 6' | | 3' | | 4' | | 5' | | 6' | | 7' | |
| MAXIMUM EARTH COVER | | | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' |
| CONCRETE (INCH) | ROOF | $T_1$ | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 7" | 7" | 7" | 7" | 7" | 7" | 7" | 7" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" |
| | SIDE WALL | $T_2$ | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 7" | 7" | 7" | 7" | 7" | 7" | 7" | 7" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" |
| | INVERT | $T_3$ | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 7" | 7" | 7" | 7" | 7" | 7" | 7" | 7" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" | 8" |
| MINIMUM WELDED WIRE FABRIC ($inch^2/ft$) | | "a" | .33 | .47 | .34 | .49 | .34 | .50 | .40 | .62 | .41 | .62 | .42 | .64 | .43 | .64 | .44 | .67 | .45 | .70 | .46 | .71 | .47 | .72 | .47 | .72 | .48 | .75 | .50 | .78 | .50 | .79 | .51 | .80 |
| | | "b" | .23 | .28 | .23 | .25 | .21 | .23 | .26 | .36 | .24 | .36 | .24 | .33 | .24 | .30 | .28 | .44 | .27 | .40 | .27 | .37 | .27 | .38 | .33 | .52 | .31 | .48 | .30 | .45 | .30 | .43 | .30 | .48 |
| | | "c" | .11 | .11 | .11 | .12 | .18 | .24 | .11 | .11 | .11 | .11 | .13 | .23 | .24 | .34 | .11 | .11 | .11 | .12 | .19 | .27 | .27 | .42 | .11 | .11 | .11 | .11 | .13 | .20 | .26 | .31 | .30 | .50 |
| | | "d" | .16 | .11 | .16 | .11 | .16 | .11 | .17 | .11 | .18 | .11 | .18 | .11 | .18 | .11 | .17 | .11 | .18 | .11 | .18 | .11 | .18 | .11 | .17 | .11 | .17 | .11 | .18 | .11 | .18 | .11 | .18 | .11 |
| | | "e" | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 |
| | | "f" | .22 | .36 | .23 | .37 | .22 | .26 | .29 | .51 | .30 | .51 | .29 | .41 | .26 | .30 | .33 | .56 | .34 | .58 | .27 | .44 | .21 | .30 | .36 | .61 | .37 | .64 | .37 | .57 | .25 | .48 | .21 | .30 |
| * QUANTITY | Conc | CY/LF | .31 | | .34 | | .38 | | .37 | | .41 | | .44 | | .48 | | .51 | | .56 | | .60 | | .64 | | .63 | | .68 | | .73 | | .78 | | .83 | |
| | Reinf | LB/LF | 35 | 41 | 39 | 45 | 45 | 51 | 49 | 58 | 49 | 62 | 54 | 69 | 62 | 78 | 60 | 79 | 64 | 83 | 72 | 93 | 80 | 107 | 72 | 98 | 76 | 102 | 81 | 110 | 92 | 120 | 101 | 143 |
| ** SOIL PRESSURE (ksf) | | | 2.3 | 4.4 | 2.4 | 4.5 | 2.4 | 4.5 | 3.1 | 4.4 | 3.1 | 4.5 | 3.1 | 4.5 | 3.2 | 4.5 | 2.7 | 4.5 | 2.8 | 4.5 | 2.8 | 4.6 | 2.8 | 4.6 | 2.5 | 4.5 | 2.5 | 4.6 | 2.5 | 4.6 | 2.5 | 4.6 | 2.6 | 4.6 |

| SPAN, S | | | 8' | | | | | | | | 10' | | | | | | | | 12' | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEIGHT, H | | | 4' | | 5' | | 6' | | 7' | | 8' | | 5' | | 6' | | 7' | | 8' | | 9' | | 10' | | 6' | | 7' | | 8' | | 9' | | 10' | |
| MAXIMUM EARTH COVER | | | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' |
| CONCRETE (INCH) | ROOF | $T_1$ | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" |
| | SIDE WALL | $T_2$ | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" |
| | INVERT | $T_3$ | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 8.5" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" |
| MINIMUM WELDED WIRE FABRIC ($inch^2/ft$) | | "a" | .55 | .87 | .56 | .90 | .57 | .92 | .58 | .93 | .58 | .94 | .66 | 1.07 | .67 | 1.10 | .69 | 1.13 | .70 | 1.14 | .70 | 1.16 | .71 | 1.16 | .73 | 1.21 | 1.21 | 1.24 | .77 | 1.27 | 1.24 | 1.29 | 1.27 | 1.31 | .78 | 1.32 | 1.29 | 1.32 |
| | | "b" | .37 | .59 | .35 | .55 | .33 | .52 | .33 | .52 | .36 | .57 | .45 | .74 | .43 | .70 | .41 | .67 | .40 | .64 | .43 | .67 | .48 | .67 | .51 | .85 | .85 | .81 | .49 | .77 | .81 | .74 | .77 | .77 | .53 | .79 | .74 | .79 |
| | | "c" | .11 | .11 | .11 | .11 | .20 | .31 | .31 | .42 | .38 | .62 | .11 | .11 | .11 | .11 | .22 | .31 | .36 | .42 | .40 | .62 | .54 | .86 | .11 | .11 | .11 | .11 | .23 | .30 | .37 | .42 | .42 | .60 | .54 | .82 | .42 | 1.06 |
| | | "d" | .19 | .11 | .19 | .11 | .20 | .11 | .20 | .11 | .20 | .11 | .20 | .11 | .20 | .11 | .21 | .11 | .21 | .11 | .21 | .11 | .21 | .11 | .20 | .11 | .20 | .11 | .21 | .11 | .22 | .11 | .22 | .11 | .22 | .11 | .22 | .11 |
| | | "e" | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 | .11 |
| | | "f" | .44 | .76 | .45 | .79 | .37 | .61 | .27 | .52 | .20 | .31 | .55 | .96 | .56 | .99 | .47 | .81 | .34 | .73 | .31 | .53 | .16 | .30 | .62 | 1.10 | 1.10 | 1.13 | .64 | .97 | 1.13 | .87 | .97 | .71 | .40 | .50 | .87 | .26 |
| * QUANTITY | Conc | CY/LF | .78 | | .83 | | .88 | | .94 | | .99 | | 1.10 | | 1.17 | | 1.23 | | 1.29 | | 1.35 | | 1.41 | | 1.56 | | 1.63 | | 1.70 | | 1.78 | | 1.85 | | 1.93 | | 2.00 | |
| | Reinf | LB/LF | 93 | 129 | 97 | 133 | 105 | 148 | 117 | 161 | 131 | 189 | 133 | 191 | 138 | 196 | 148 | 212 | 191 | 225 | 176 | 253 | 201 | 282 | 174 | 255 | 179 | 261 | 191 | 279 | 207 | 293 | 223 | 323 | 249 | 357 | 281 | 393 |
| ** SOIL PRESSURE (ksf) | | | 2.5 | 4.6 | 2.5 | 4.6 | 2.5 | 4.6 | 2.5 | 4.6 | 2.5 | 4.6 | 3.8 | 4.6 | 3.8 | 4.7 | 3.8 | 4.7 | 4.6 | 4.7 | 3.9 | 4.7 | 3.9 | 4.8 | 3.6 | 4.7 | 3.7 | 4.7 | 3.7 | 4.8 | 3.7 | 4.8 | 3.7 | 4.8 | 3.8 | 4.9 | 3.8 | 4.9 |

* See Note 3
** See Note 6

NOTES:

1. The inside and outside surfaces of the RCB roof shall be marked "TOP".
2. H1 minimum shall equal the wall thickness. H1 maximum shall be 8" for spans through 8' and 14" for spans over 8'.
3. Quantities are approximate and for design purposes only.
4. For design and details not shown, see Standard Plan D83B.
5. For external sealing band applications see Standard Plan A62G.
6. Soil pressures shown are factored per AASHTO LRFD and include soil weight of fill over box, self weight of box and live load where applicable.
7. If earth cover is less than 2', the concrete cover for the reinforcement at the top of top slab shall be 2". T1 in the Table shall have an additional 1" and quantities shall be revised accordingly in this case.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Carl W. Duan — No. C59976 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PRECAST REINFORCED CONCRETE BOX CULVERT

NO SCALE

D83A

7-1-25

2025 STANDARD PLAN D83A



Return to Table of Contents

## DESIGN NOTES:

Specifications:

AASHTO LRFD Bridge Design Specifications, 6th Edition with California Amendments.

Earth load:

Earth pressures for two conditions:
140 pcf Vert, 36 pcf Horiz
140 pcf Vert, 120 pcf Horiz

Unit stresses:

f'c = 5.0 ksi
fy = 65.0 ksi for weld wire fabric
n = 7

Shear:

Based on

$V_c = \{2.14\sqrt{f'_c} + 4600 \frac{A_s}{b d_e} \frac{V_u d_e}{M_u}\} b.d_e \leq 4.0\sqrt{f'_c} b.d_e$ (Pounds)

$V_c$ shall not be less than $3.00\sqrt{f'_c} b.d_e$

for frame members and $2.5\sqrt{f'_c} b.d_e$

for simply supported members.

Exclusion:

Axial loading on the members has not been considered.

## GENERAL NOTES:

Designation:

Standard single or multiple precast box culverts are shown on the plans as span times height with maximum cover over roof thus: 8' x 5' RCB with 10'-0" or double 10' x 5' RCB with 20'-0", followed by alternatives.

Alternatives:

Single cell:

Standard dimensions of AASHTO Material Specification 'M259' or 'M273'.

Multiple cell:

Constructed by placing single cells adjacent to each other. Inlet and outlet ends of culvert will be rounded unless square ends are designated. Parapet will be shown unless designated in plans. Such designation may be different for inlet and outlet ends.

Limitations:

Where the overfill is less than 12", Precast RCB culverts are not to be used. Precast RCB culverts are not to be used in siphon or pressurized installations unless appropriate "watertight" jointing is provided.

Special reinforcement coverage:

Precast RCB culvert standard plans are not to be used in a corrosive environment or where there is a severe abrasive flow condition or freeze-thaw locations.

Special design:

Required for culvert with different conditions, loads or design bearing pressures greater than those given on these plans. Required for culverts where end details need higher skew angles, higher parapets or barrier sections.

## CONSTRUCTION NOTES:

Cutoff walls:

4'-0" Cutoff walls are to be provided at inlet and/or outlet unless channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant. See Standard Plans D84, D85 and D86A.

Wingwalls:

Wingwalls shall be cast-in-place and shall conform to standard plan details for box culvert wingwalls. See Standard Plans D84, D85 and D86A.

Earthwork:

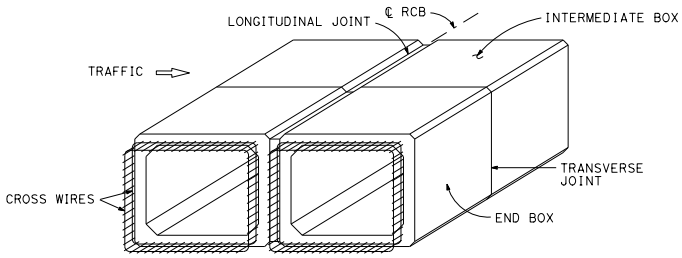
See Standard Plan A62G.

Construction loads:

Strutting may be required near temporary ends. For construction loads on culverts, see Standard Plan D88.

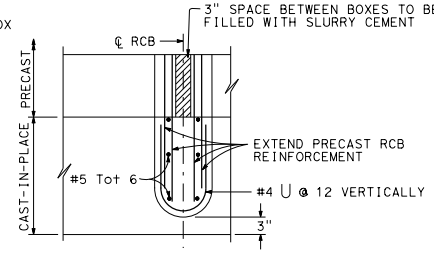
| PARAPET "P" BARS | | | |
|---|---|---|---|
| SKEW ANGLE / SPAN | 0° TO 15° | 16° TO 30° | 31° TO 45° |
| 4'-0" | #5 | #5 | #5 |
| 5'-0" | #5 | #5 | #6 |
| 6'-0" | #6 | #6 | #6 |
| 7'-0" | #7 | #7 | #7 |
| 8'-0" | #7 | #7 | #8 |
| 10'-0" | #8 | #8 | #9 |
| 12'-0" | #9 | #9 | #10 |

BARRIER PARAPET REINFORCEMENT

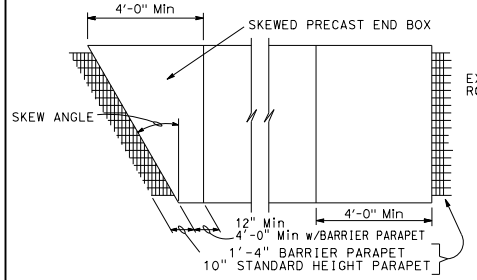



PRECAST RCB TERMINOLOGY

NOTE: Inner and outer reinforcement to be exposed as required to tie to cast-in-place construction. A minimum of two cross wires shall be exposed on all sides.

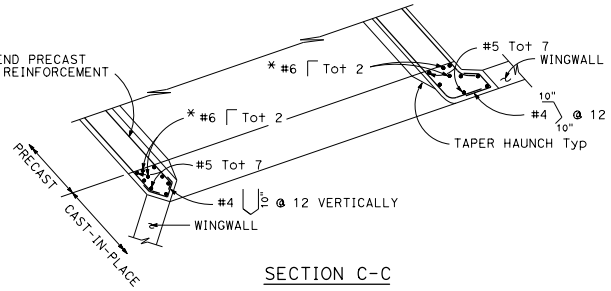



PARTIAL PLAN INTERIOR WALL MULTI CELL CULVERT



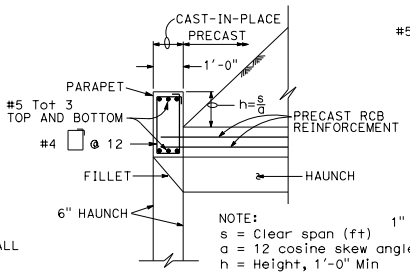

PARTIAL PLAN VIEW

For illustrative purposes only.
For correct skew direction see plans.



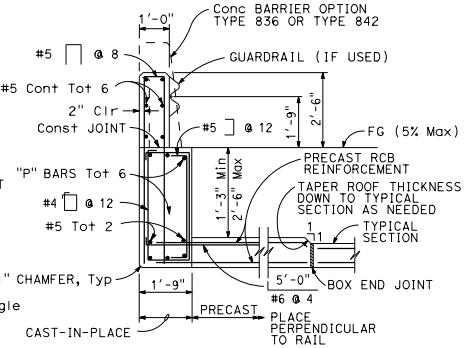

SECTION C-C

* Reinforcing required for barrier parapet application only.




NOTE:
s = Clear span (ft)
a = 12 cosine skew angle
h = Height, 1'-0" Min

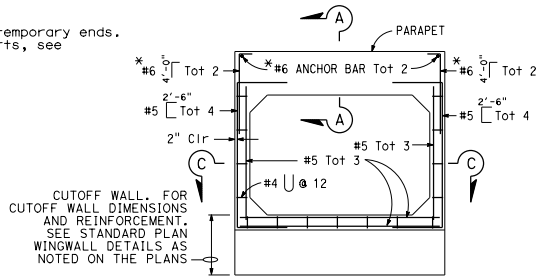
SECTION A-A
Standard Height Parapet




SECTION A-A
Barrier Parapet

TYPICAL CULVERT END DETAILS

For wall and invert reinforcement not shown, see "End Elevation" detail.




CAST-IN-PLACE END ELEVATION

* Reinforcing required for barrier parapet application only.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
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No. C59976
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CIVIL
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STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# PRECAST REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS

NO SCALE

D83B

7-1-25



Return to Table of Contents

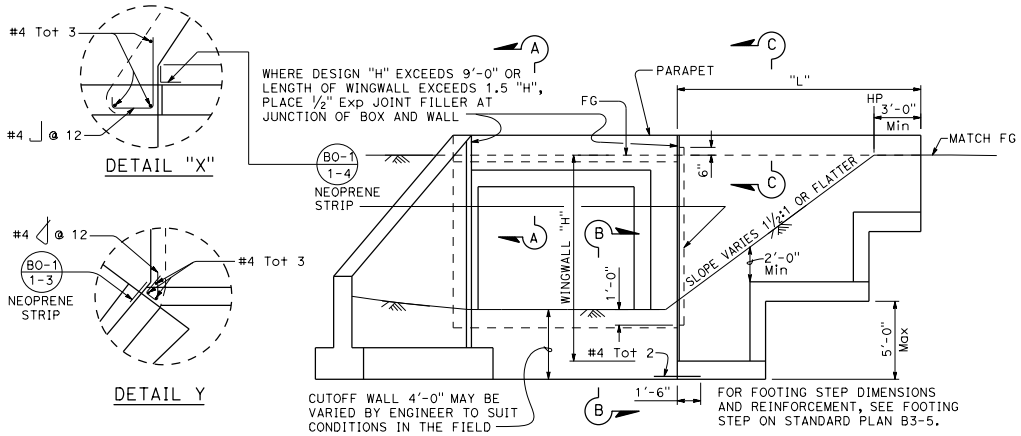
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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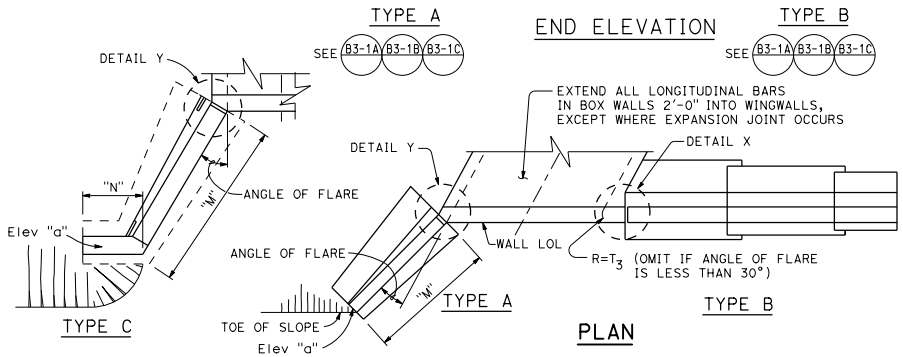
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## STRAIGHT WINGWALLS

### DESIGN NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019

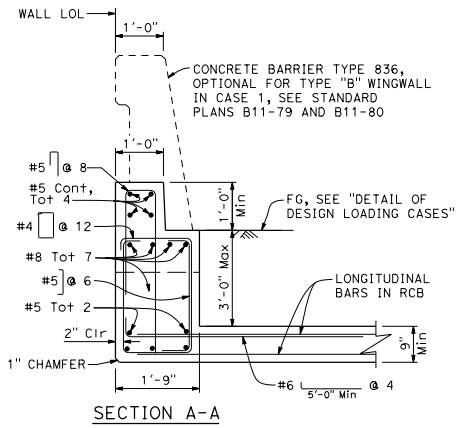
SOIL: $\gamma$ = 120 pcf, $\phi$ = 34°

LS: Varied live load surcharge on level ground surface

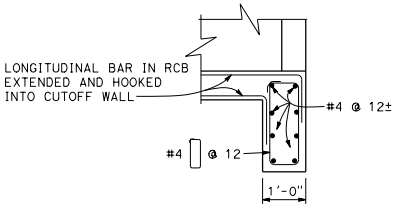
REINFORCED CONCRETE: $f'_c$ = 3,600 psi
$f_y$ = 60,000 psi

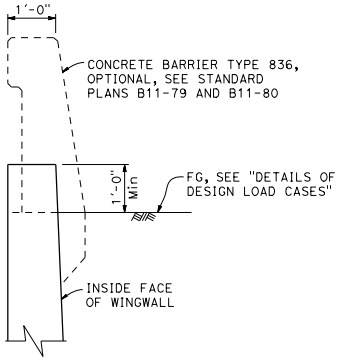
### NOTES:

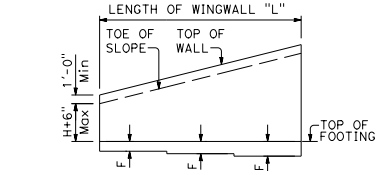
1. For Design Notes on Type A, Type B and Type C wingwalls, see Standard Plans B3-1A, B3-1B and B3-1C.
2. For CASE 1 in Type B wall, concrete barrier can be installed on top of the headwall and wingwall as an option.
3. Elevations, length and angle of flare of wingwalls may be varied by the Engineer to suit conditions encountered in the field.
4. Dimensions "H", "L", "M", "N", Elev "a" and Angle of flare (as applicable) are shown on the plans.
5. Wall height may be exceeded by 6" before going to next greater "H".
6. Eliminate cutoff wall if adjacent channel is paved and skew is 20° maximum.

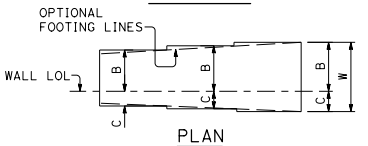



**NOTE:**
Reinforcing steel in RCB not shown completely for clarity.

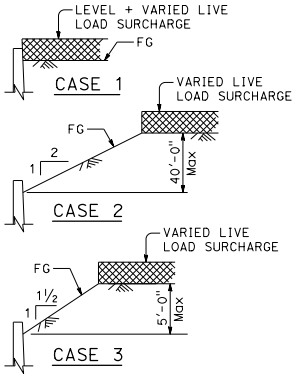



## TYPICAL LAYOUT




## DETAIL OF DESIGN LOADING CASES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BOX CULVERT WINGWALLS TYPES A, B AND C

NO SCALE

D84

7-1-25

Return to Table of Contents

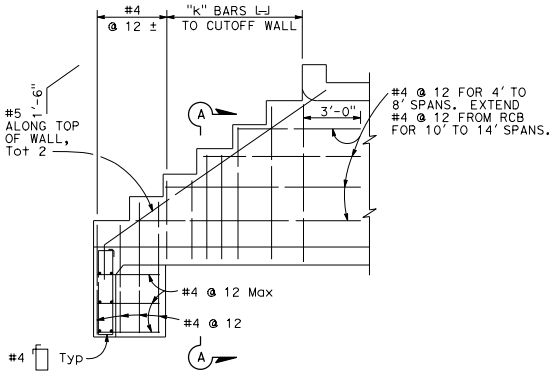
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

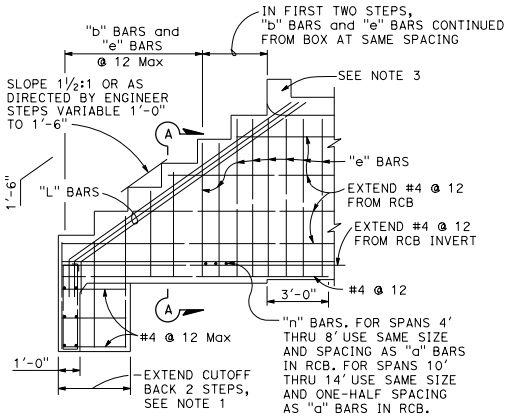
September 19, 2025
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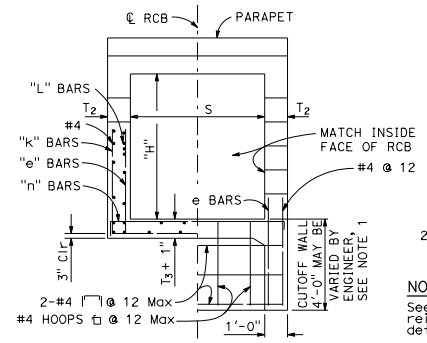
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LONGITUDINAL SECTION
Outside face reinforcement shown

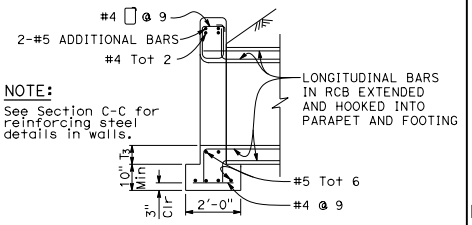



LONGITUDINAL SECTION
Inside face reinforcement shown

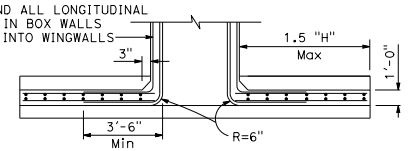



HALF SECTION A-A END ELEVATION

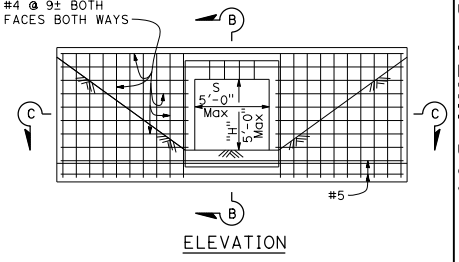
Dimensions S and $T_3$ to be same as adjacent RCB.
$T_2$ = Same as adjacent RCB (8" Min).




SECTION B-B




SECTION C-C

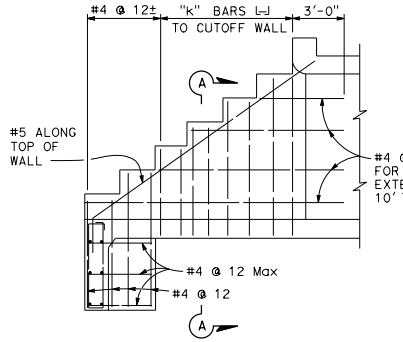



ELEVATION

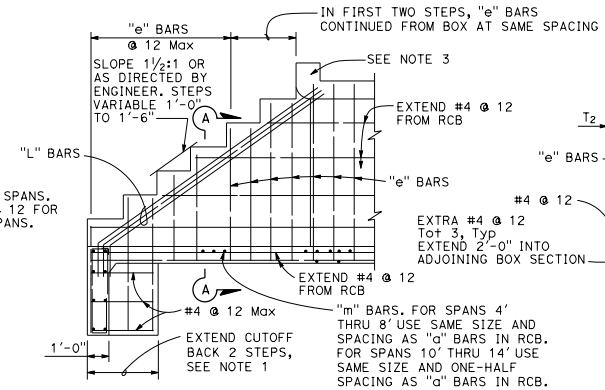
## TYPE D STRAIGHT WINGWALL

Details similar for multiple span boxes.
See Note 3.

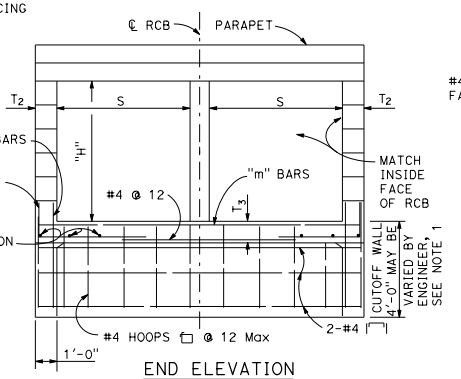
## TYPE E STEPPED WINGWALL (SINGLE BOX CULVERT)




LONGITUDINAL SECTION
Outside face reinforcement shown




LONGITUDINAL SECTION
Inside face reinforcement shown




END ELEVATION

Dimensions S and $T_3$ to be same as adjacent RCB.
$T_2$ = Same as adjacent RCB (8" Min).

## TYPE E STEPPED WINGWALL (MULTIPLE BOX CULVERT)

### DESIGN NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019

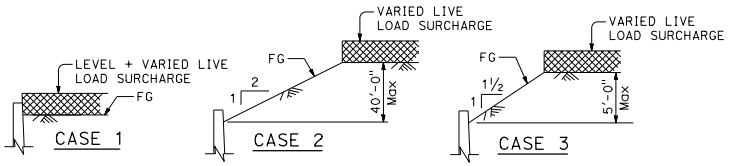
SOIL: $\gamma$ = 120 pcf, $\phi$ = 34°

LS: Varied live load surcharge on level ground surface

REINFORCED CONCRETE: $f'_c$ = 3,600 psi
$f_y$ = 60,000 psi

### NOTES:

1. Eliminate cutoff walls if adjacent channel is paved and reinforcing steel is connected to the bottom slab of RCB.
2. For "H" not shown, use reinforcement for next greater height.
3. For parapet details not shown, see Standard Plan D82.




DETAIL OF DESIGN LOADING CASES
TYPE D

| TABLE OF REINFORCEMENT FOR TYPE "E" WINGWALLS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| "H" (SEE NOTE 2) | | 3' | 4' | 5' | 6' | 7' | 8' | 10' | 12' | 14' |
| "k" BARS | BAR No. | #4 | #4 | #5 | #5 | #5 | #5 | #5 | #5 | #5 |
| | SPACING | @ 12 | @ 12 | @ 12 | @ 10 | @ 9 | @ 8 | @ 7 | @ 5 | @ 4 |
| "L" BARS | BAR No. | #5 | #5 | #6 | #6 | #7 | #7 | #7 | #7 | #7 |
| | NUMBER EACH WALL | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

STATE OF CALIFORNIA
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# BOX CULVERT WINGWALLS TYPES D AND E

NO SCALE

D85

7-1-25

Return to Table of Contents

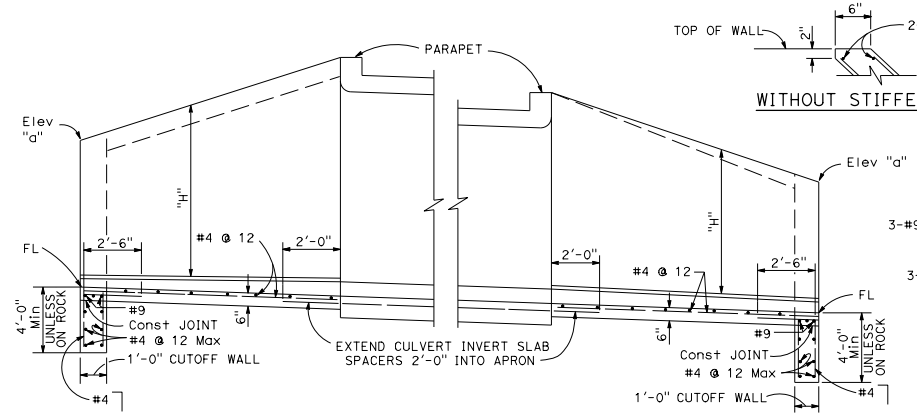
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

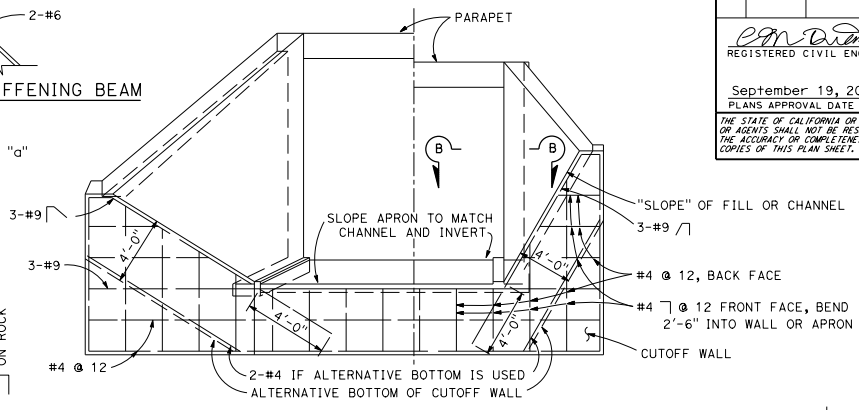
Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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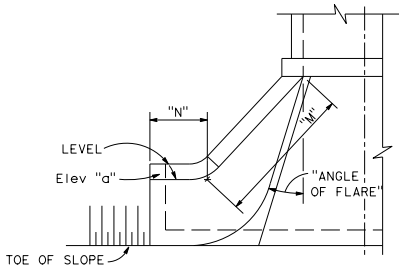



TYPICAL WITH STIFFENING BEAM  TYPICAL WITHOUT STIFFENING BEAM

## PART LONGITUDAL SECTION

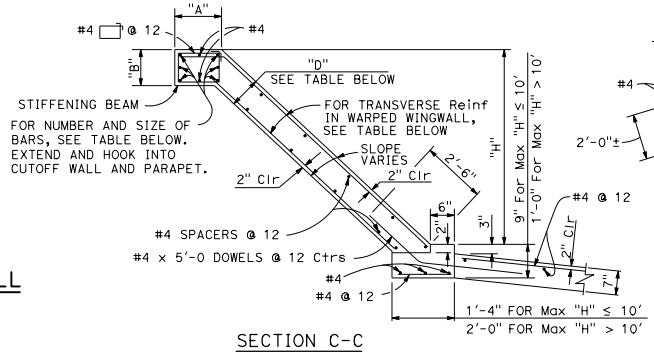



## END ELEVATION

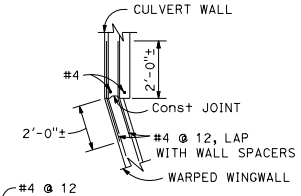



## ALTERNATIVE WARPED WINGWALL

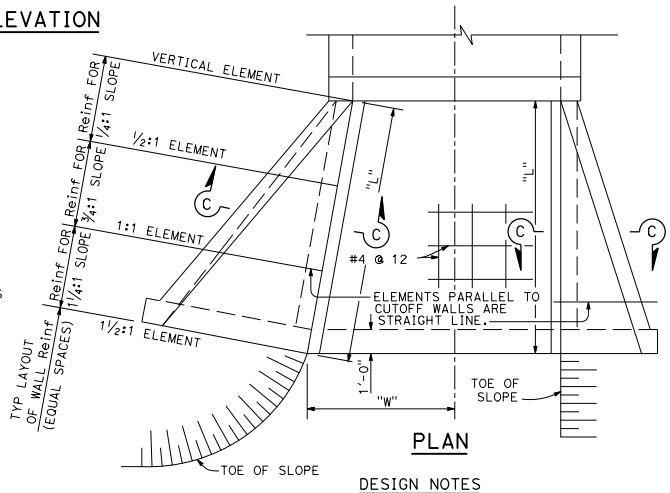
Use where additional protection to toe of embankment is required.




## SECTION C-C




## SECTION B-B




## PLAN

### DESIGN NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019

SOIL: $\gamma$ = 120 pcf, $\phi$ = 34°

LS: 2 ft surcharge on level ground surface

REINFORCED CONCRETE: $f'_c$ = 3,600 psi, $f_y$ = 60,000 psi

**WARPED WINGWALLS**

**WALL DIMENSIONS AND REINFORCING**

| ELEMENT SLOPE | "H" | 8' OR LESS | 10' | 12' | 14' | 16' | 18' | 20' |
|---|---|---|---|---|---|---|---|---|
| ¼:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 7 | #5 @ 7 | #5 @ 5 | #6 @ 6 | #7 @ 7 | #7 @ 6 |
| | REAR FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 |
| ¾:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 8 | #4 @ 8 | #4 @ 8 | #4 @ 6 | #4 @ 6 |
| | REAR FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 10 | #4 @ 7 | #4 @ 6 | #5 @ 8 |
| 1¼:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 |
| | REAR FACE Reinf | #4 @ 8 | #4 @ 8 | #4 @ 5 | #5 @ 6 | #6 @ 7 | #6 @ 6 | #7 @ 6 |
| "D" AT CUTOFF WALL | | 6½" | 6½" | 6½" | 8" | 8½" | 10" | 11½" |
| "D" AT CULVERT | | 6½" | 6½" | 6½" | 8½" | 10" | 11½" | 1'-1½" |

**STIFFENING BEAM DIMENSIONS AND REINFORCING**

| "H" Max \ "L" Max | 12' | 14' | 16' | 18' | 20' | 25' | 30' | 35' | 40' |
|---|---|---|---|---|---|---|---|---|---|
| 6' | NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL. | | | | | | | | |
| 8' | | | "A"= 1'-0" | | | | | | |
| 10' | | | "B"= 9" | | | "A"= 1'-6" | | | |
| 12' | | | | | | | "A"= 1'-10" | | |
| 14' | TOTAL 6-#6 | | "B"= 1'-0" | | | "B"= 1'-3" | | "A"= 2'-2" | |
| 16' | | | | TOTAL 6-#7 | | TOTAL 8-#8 | | "B"= 1'-6" | |
| 18' | | | | | | | | | |
| 20' | | | | | | | | TOTAL 8-#9 | |

NOTES: Walls designed for equivalent fluid pressure = 36 pcf.
Vary "D" of warped wall uniformly from that at cutoff wall to that at culvert, for maximum "H" > 12'-0".
Dimensions "L", "W", "H", "M", "N", Elevation "a", "Angle of flare", and end "Slope" (as applicable) are shown on the plans.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BOX CULVERT WARPED WINGWALLS

NO SCALE

**D86A**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

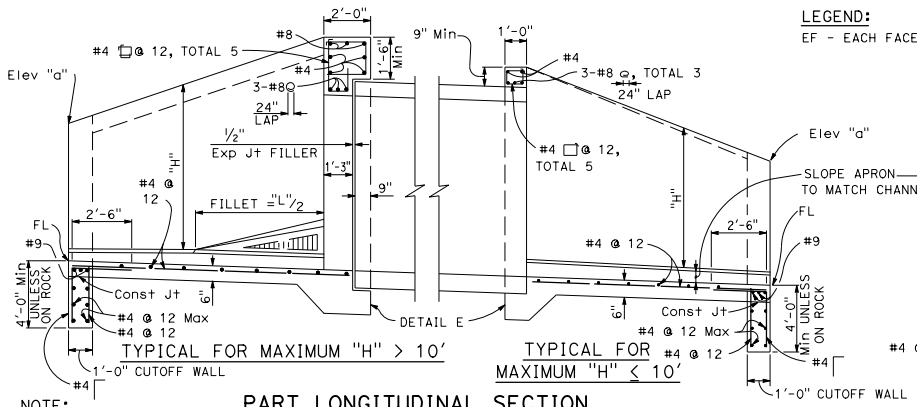
September 19, 2025
PLANS APPROVAL DATE

Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

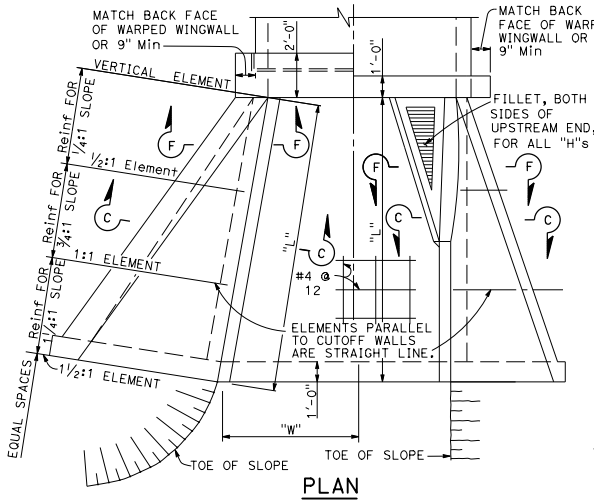
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LEGEND:
EF - EACH FACE

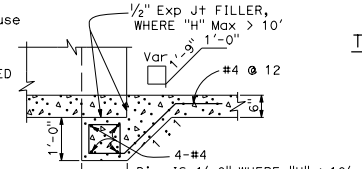



PART LONGITUDINAL SECTION

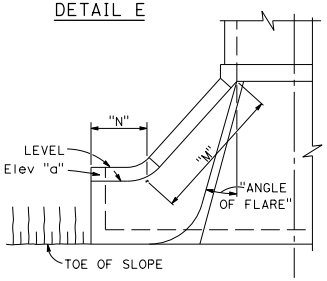
NOTE:
RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 1'-7" ± spacing. Size and length provided by manufacturer.




PLAN

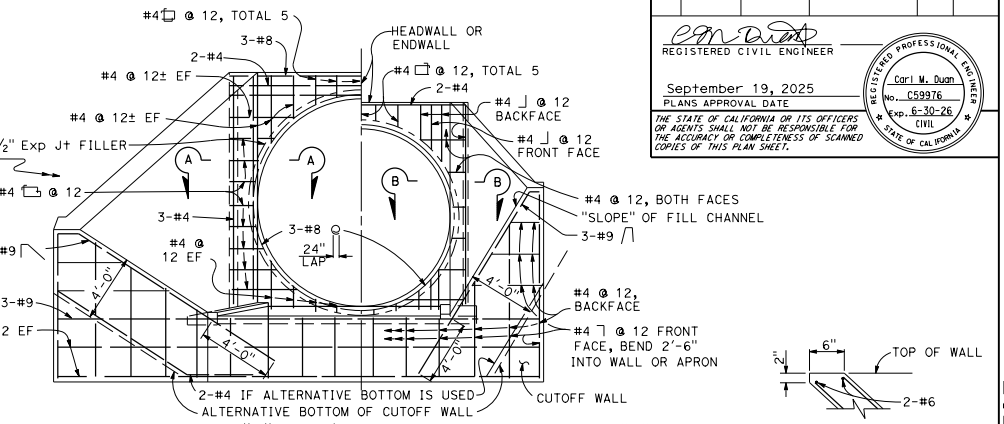



DETAIL E




ALTERNATIVE WARPED WINGWALL

Use where additional protection to toe of embankment is required. If at upstream end, fillet is not shown.



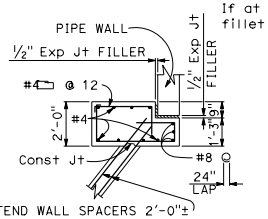




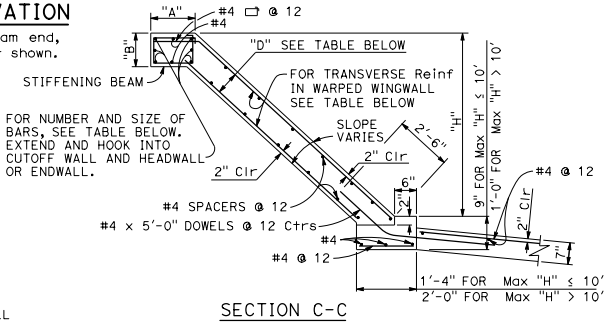
WITHOUT STIFFENING BEAM

END ELEVATION

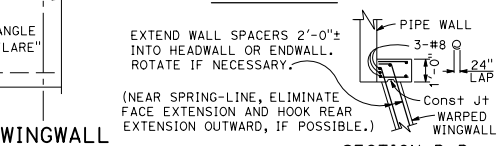
If at upstream end, fillet is not shown.



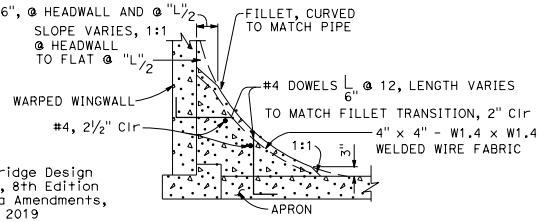

SECTION A-A




SECTION C-C




SECTION B-B




SECTION F-F

WARPED WINGWALLS

| WALL DIMENSIONS AND REINFORCING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ELEMENT SLOPE | "H" | 8' OR LESS | 10' | 12' | 14' | 16' | 18' | 20' |
| 1/4:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 7 | #5 @ 7 | #5 @ 5 | #6 @ 6 | #7 @ 7 | #7 @ 6 |
| | REAR FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 |
| 3/4:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 8 | #4 @ 8 | #4 @ 8 | #4 @ 6 | #4 @ 6 |
| | REAR FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 10 | #4 @ 7 | #4 @ 6 | #5 @ 8 |
| 1 1/4:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 |
| | REAR FACE Reinf | #4 @ 8 | #4 @ 8 | #4 @ 5 | #5 @ 6 | #6 @ 7 | #6 @ 6 | #7 @ 6 |
| "D" AT CUTOFF WALL | | 6 1/2" | 6 1/2" | 6 1/2" | 8" | 8 1/2" | 10" | 11 1/2" |
| "D" AT CULVERT | | 6 1/2" | 6 1/2" | 6 1/2" | 8 1/2" | 10" | 11 1/2" | 1'-1 1/2" |

| STIFFENING BEAM DIMENSIONS AND REINFORCING | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| "H" Max | "L" 12' | 14' | 16' | 18' | 20' | 25' | 30' | 35' | 40' |
| 6' | NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL. | | | | | | | | |
| 8' | | "A"= 1'-0" | | | | | | | |
| 10' | | "B"= 9" | | | "A"= 1'-6" | | | | |
| 12' | | | | | | | | "A"= 1'-10" | |
| 14' | TOTAL 6-#6 | | "B"= 1'-0" | | | | "B"= 1'-3" | | |
| 16' | | | | | | | | | "A"= 2'-2" |
| 18' | | | TOTAL 6-#7 | | | TOTAL 8-#8 | | | "B"= 1'-6" |
| 20' | | | | | | | | TOTAL 8-#9 | |

NOTES: Walls designed for equivalent fluid pressure = 36 pcf.
Vary "D" of warped wall uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'-0".
Dimensions "L", "W", "H", "M", "N", Elevation "a", "Angle of flare", and end "Slope" (as applicable) are shown on the plans.

DESIGN NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019
SOIL: $\gamma$ = 120 pcf, $\phi$ = 34°
LS: 2 ft surcharge on level ground surface
REINFORCED CONCRETE: $f'_c$ = 3,600 psi, $f_y$ = 60,000 psi

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PIPE CULVERT HEADWALLS, ENDWALLS AND WARPED WINGWALLS

NO SCALE

D86B

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

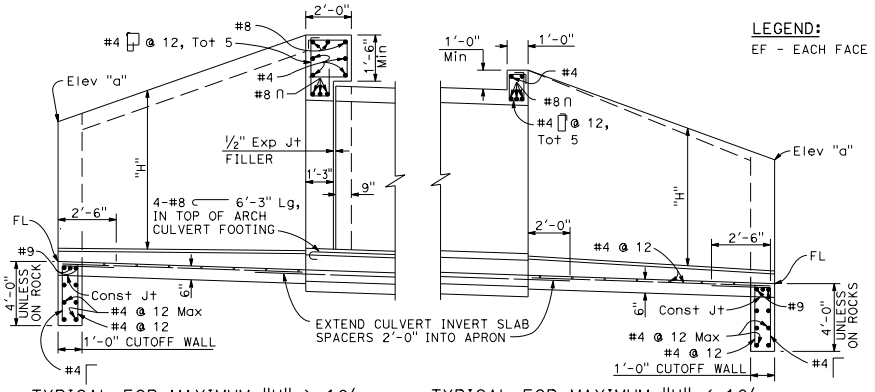
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
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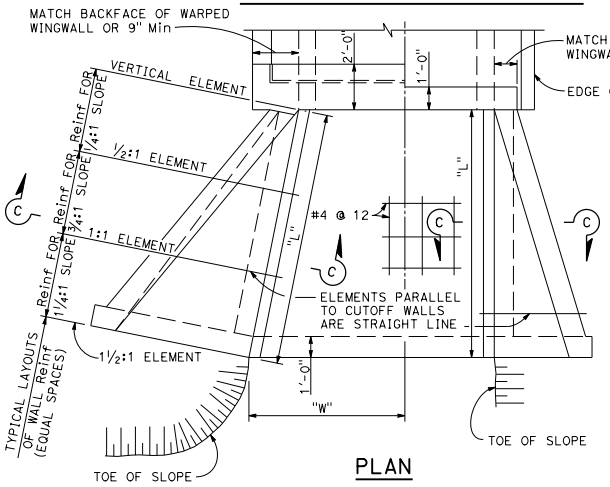
LEGEND:
EF - EACH FACE



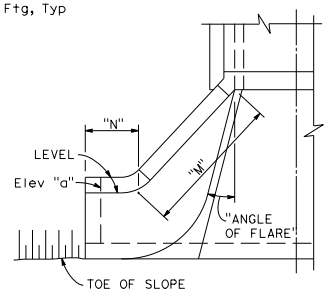

TYPICAL FOR MAXIMUM "H" > 10'

TYPICAL FOR MAXIMUM "H" ≤ 10'

## PART LONGITUDINAL SECTION

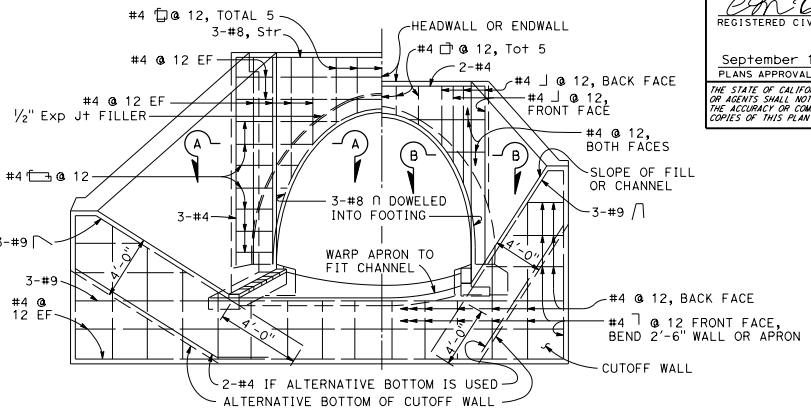



PLAN




## ALTERNATIVE WARPED WINGWALL

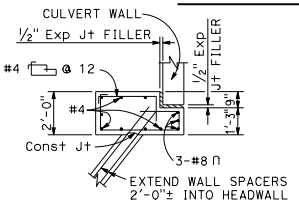
Use where additional protection to toe of embankment is required.



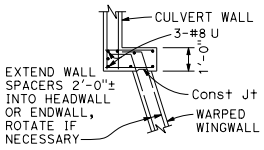

TYPICAL FOR MAXIMUM "H" > 10'

TYPICAL FOR MAXIMUM "H" ≤ 10'

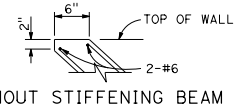
## END ELEVATION



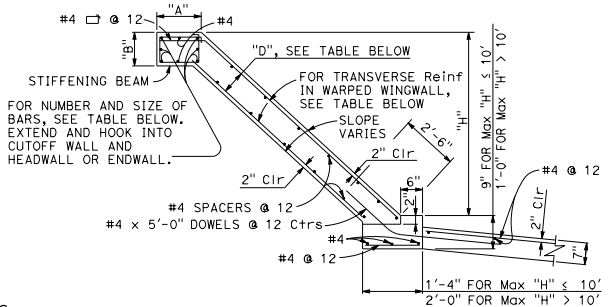

SECTION A-A




SECTION B-B




WITHOUT STIFFENING BEAM




FOR NUMBER AND SIZE OF BARS, SEE TABLE BELOW. EXTEND AND HOOK INTO CUTOFF WALL AND HEADWALL OR ENDWALL.

SECTION C-C

## WARPED WINGWALLS

| ELEMENT SLOPE | "H" | WALL DIMENSIONS AND REINFORCING 8' OR LESS | 10' | 12' | 14' | 16' | 18' | 20' |
|---|---|---|---|---|---|---|---|---|
| 1/4:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 7 | #5 @ 7 | #5 @ 5 | #6 @ 6 | #7 @ 7 | #7 @ 6 |
| | REAR FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 |
| 3/4:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 8 | #4 @ 8 | #4 @ 8 | #4 @ 6 | #4 @ 6 |
| | REAR FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 10 | #4 @ 7 | #4 @ 6 | #5 @ 8 |
| 1 1/4:1 | FRONT FACE Reinf | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 |
| | REAR FACE Reinf | #4 @ 8 | #4 @ 8 | #4 @ 5 | #5 @ 6 | #6 @ 7 | #6 @ 6 | #7 @ 6 |
| "D" AT CUTOFF WALL | | 6 1/2" | 6 1/2" | 6 1/2" | 8" | 8 1/2" | 10" | 11 1/2" |
| "D" AT CULVERT | | 6 1/2" | 6 1/2" | 6 1/2" | 8 1/2" | 10" | 11 1/2" | 1'-1 1/2" |

| "H" Max | "L" | STIFFENING BEAM DIMENSIONS AND REINFORCING 12' | 14' | 16' | 18' | 20' | 25' | 30' | 35' | 40' |
|---|---|---|---|---|---|---|---|---|---|---|
| 6' | | NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL. | "A"= 1'-0" | | | | | | | |
| 8' | | | | | | | | | | |
| 10' | | | "B"= 9" | | | "A"= 1'-6" | | | "A"= 1'-10" | |
| 12' | | | | | | | | | | |
| 14' | | TOTAL 6-#6 | | "B"= 1'-0" | | | | "B"= 1'-3" | | "A"= 2'-2" |
| 16' | | | | | TOTAL 6-#7 | | TOTAL 8-#8 | | | "B"= 1'-6" |
| 18' | | | | | | | | | TOTAL 8-#9 | |
| 20' | | | | | | | | | | |

NOTES:
Walls designed for equivalent fluid pressure = 36 pcf.
Vary "D" of warped wall uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'.
Dimensions "L", "W", "H", "M", "N", Elev "a", "Angle of flare", and "Slope" (as applicable) are shown on the plans.

## DESIGN NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019
SOIL: γ = 120 pcf, Ø = 34°
LS: 2 ft surcharge on level ground surface
REINFORCED CONCRETE: $f'_c$ = 3,600 psi, $f_y$ = 60,000 psi

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ARCH CULVERT HEADWALLS, ENDWALLS AND WARPED WINGWALLS

NO SCALE

D86C

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

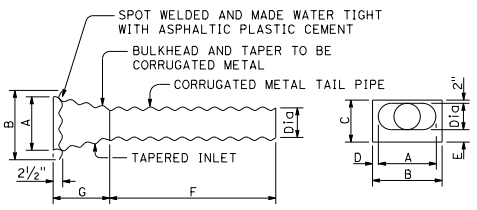
REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

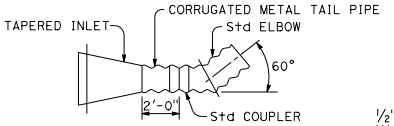
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.




PLAN END VIEW

Bulkhead and taper of same thickness as tail pipe with 0.079" maximum. Tail pipe of same thickness as downdrain pipe.

## ENTRANCE TAPER - TYPE 1 ALTERNATIVE A



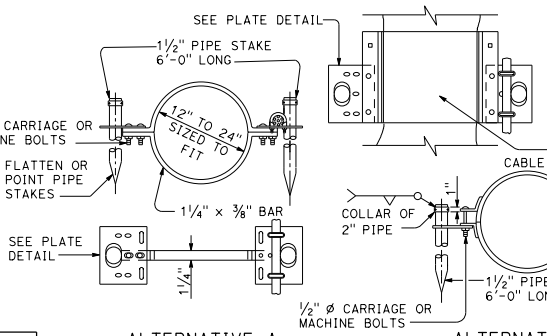

Tapered inlet of same construction and dimensions as Type 1 - Alternative A or B except tail pipe length will be 2'-0".

## ENTRANCE TAPER - TYPE 2

Taper joints may be welded or riveted. Dimensions to be as tabulated below for Type 1 Alternatives A and B.

| Dia | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 8" | 1'-4" | 2'-1½" | 1'-3" | 4¾" | 5" | 6'-0" | 2'-0" |
| 12" | 1'-6" | 2'-1½" | 1'-7" | 3¾" | 5" | 6'-0" | 2'-0" |
| 15" | 1'-9" | 2'-6" | 1'-11" | 4½" | 6" | 6'-0" | 2'-0" |
| 18" | 2'-0" | 2'-10" | 2'-3" | 5" | 7" | 6'-0" | 2'-0" |
| 24" | 2'-10" | 3'-10" | 2'-11" | 6" | 9" | 4'-0" | 4'-0" |

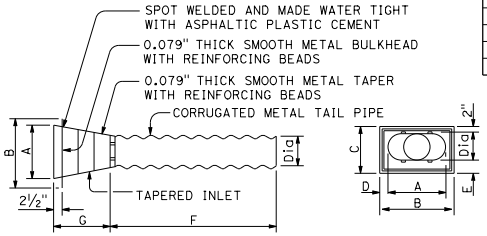
## ENTRANCE TAPER - TYPE 1 ALTERNATIVE A AND B




ALTERNATIVE A ALTERNATIVE B

## CORRUGATED METAL PIPE DOWNDRAIN ANCHOR ASSEMBLY

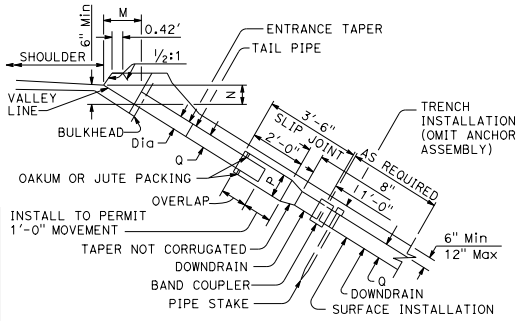
Cable and cable clamps to be used when required by the Special Provisions.




PLAN END VIEW

Tail pipe of same thickness as downdrain pipe.

## ENTRANCE TAPER - TYPE 1 ALTERNATIVE B




SECTION A-A TYPE 1

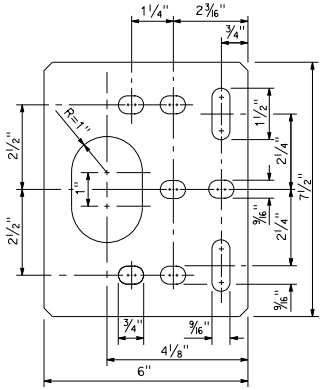



PLATE DETAIL

Material to be ¼" plate galvanized after fabrication.

NOTES:

1. Either Alternative A or Alternative B anchor assemblies and pipe stakes may be used at Contractor's option for corrugated steel pipe or corrugated aluminum pipe. Alternative A anchor assembly only to be placed in annular corrugation. Alternative A anchor assembly may be placed on annular coupling band if securely fastened on downstream side of joint. Alternative B anchor assembly to be fastened to pipe sections and not to a band coupler used to join sections.
2. For cable anchorage system details, see Standard Plan D87C.

CMP dimensions as tabulated below

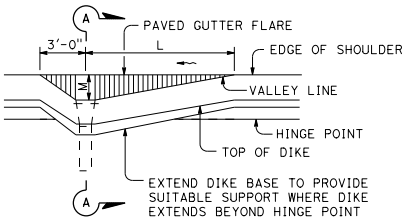
| | | | | | |
|---|---|---|---|---|---|
| P | 10" | 15" | 18" | 21" | 27" |
| Q | 8" | 12" | 15" | 18" | 24" |

Slip joint to be same thickness as downdrain pipe.

| Dia | Min L | M | N |
|---|---|---|---|
| 8" | 10'-0" | 1'-6" | 8" |
| 12" | 15'-0" | 1'-8" | 1'-0" |
| 15" | 25'-0" | 2'-0" | 1'-3" |
| 18" | 30'-0" | 2'-6" | 1'-4" |
| 24" | 40'-0" | 3'-0" | 1'-6" |

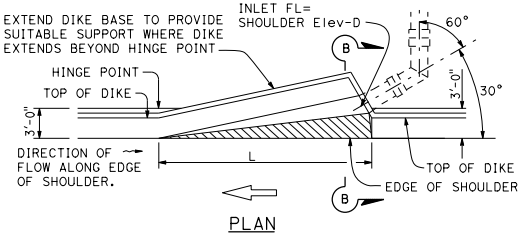
NOTES:

1. Cable, slip joint or anchor assembly to be used when specified.
2. Slip joint to be omitted when completely buried.
3. Slip joint for Type 1 entrance taper shown. Type 2 similar.




PLAN

## MOUNTABLE DIKE TYPE 1

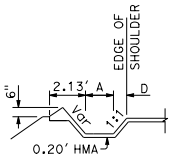



PLAN

## MOUNTABLE DIKE TYPE 2

(For use on full freeway sections ONLY with grades of 2% or greater)

| Dia D | Min L |
|---|---|
| 8" | 15' |
| 12" | 20' |
| 15" | 30' |
| 18" | 35' |
| 24" | 45' |




SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE DOWNDRAIN DETAILS

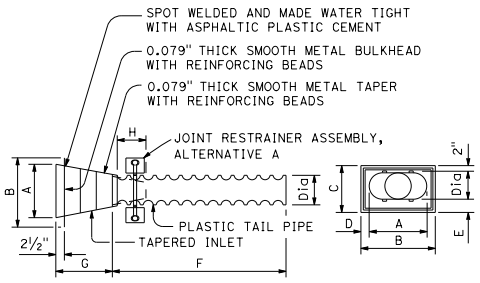
NO SCALE

## ENTRANCE TAPER AND PIPE DOWNDRAIN

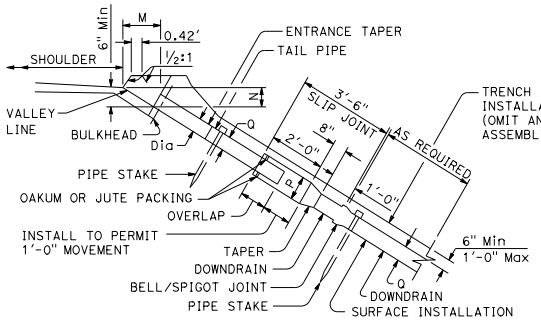
D87A

7-1-25

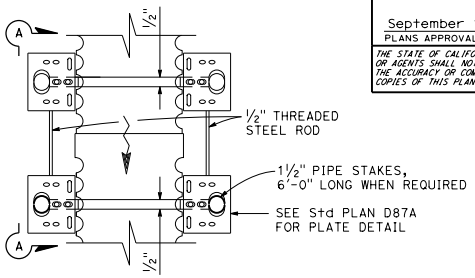
Return to Table of Contents




## ENTRANCE TAPER - TYPE 1




## SECTION - TYPE 1




PLASTIC PIPE DIMENSIONS AS TABULATED BELOW.

| P | 10" | 15" | 18" | 21" | 27" |
|---|---|---|---|---|---|
| Q | 8" | 12" | 15" | 18" | 24" |

| Dia | Min L | M | N |
|---|---|---|---|
| 8" | 10'-0" | 1'-6" | 8" |
| 12" | 15'-0" | 1'-8" | 1'-0" |
| 15" | 25'-0" | 2'-0" | 1'-3" |
| 18" | 30'-0" | 2'-6" | 1'-4" |
| 24" | 40'-0" | 3'-0" | 1'-6" |

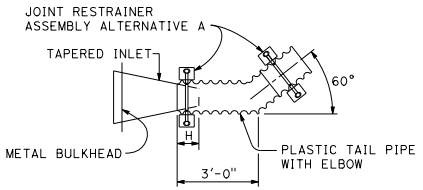
TAPER JOINTS MAY BE WELDED OR RIVETED.
DIMENSIONS TO BE AS TABULATED BELOW.

| Dia | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 8" | 1'-4" | 2'-1½" | 1'-3" | 4¾" | 5" | 6'-0" | 2'-0" | 1'-0" |
| 12" | 1'-6" | 2'-1½" | 1'-7" | 3¾" | 5" | 6'-0" | 2'-0" | 1'-0" |
| 15" | 1'-9" | 2'-6" | 1'-11" | 4½" | 6" | 6'-0" | 2'-0" | 1'-2" |
| 18" | 2'-0" | 2'-10" | 2'-3" | 5" | 7" | 6'-0" | 2'-0" | 1'-4" |
| 24" | 2'-10" | 3'-10" | 2'-11" | 6" | 9" | 4'-0" | 4'-0" | 1'-6" |

## ENTRANCE TAPER - TYPE 1

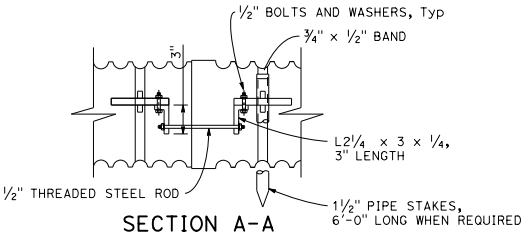
NOTES:

1. Cable or slip joint to be used when specified.
2. Slip joint to be omitted when completely buried.

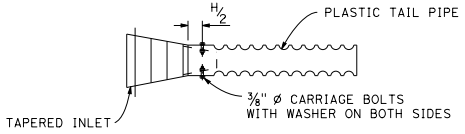



Tapered inlet of same construction and dimensions as type 1.

## ENTRANCE TAPER - TYPE 2



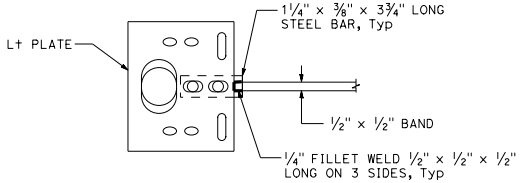

## SECTION A-A
## PLASTIC PIPE
## JOINT RESTRAINER ASSEMBLY
Alternative B



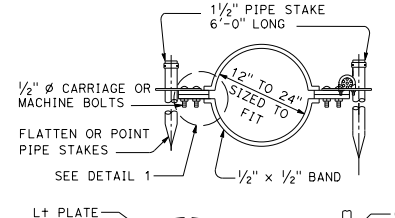

PLAN

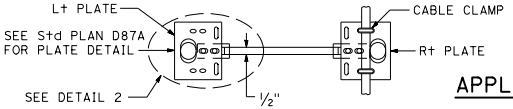
Alternative tail pipe to entrance pipe connection

## DETAIL "A"
See Note 5

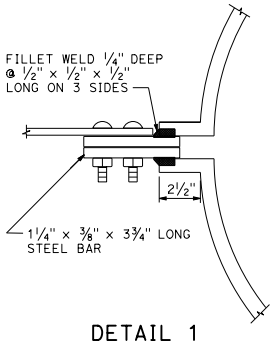



## DETAIL 2
## APPLIES TO BOTH L AND R PLATE




## PLASTIC PIPE
## JOINT RESTRAINER ASSEMBLY
Alternative A




## DETAIL 1
## APPLIES TO BOTH L AND R PLATE

NOTES:

1. See Standard Plan D87A for details of entrance taper placement at dike.
2. Pipe stakes to be used with joint restrainer when specified.
3. Entrance taper "H" dimension is length of insertion of metal taper into plastic pipe.
4. For cable anchorage system details, see Standard Plan D87C.
5. At contractors option, tail pipe and tapered inlet may be supplied from manufacturer as a pre-connected unit as shown in Detail "A".

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PLASTIC PIPE DOWNDRAIN DETAILS

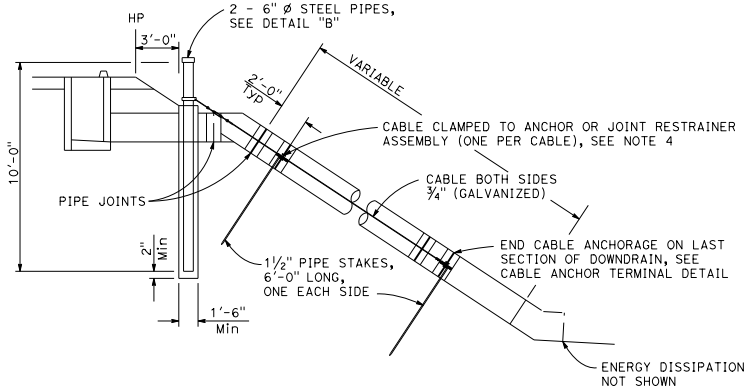
NO SCALE

**D87B**

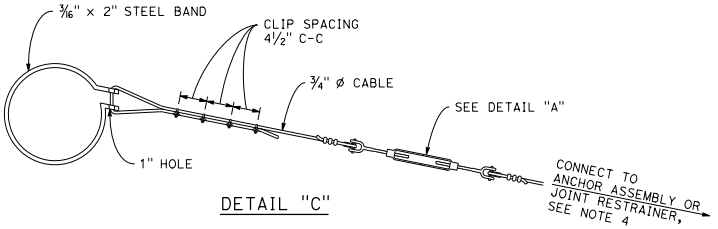
7-1-25



Return to Table of Contents

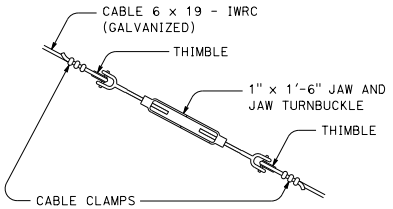



CABLE ANCHORAGE SYSTEM

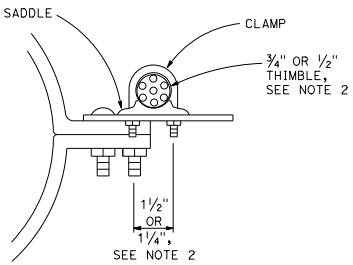



DETAIL "C"

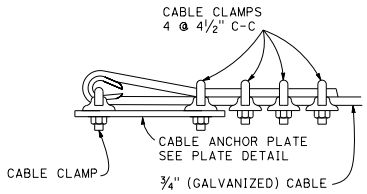
BAND AND CABLE ASSEMBLY DETAIL FOR CABLE ANCHORAGE SYSTEM



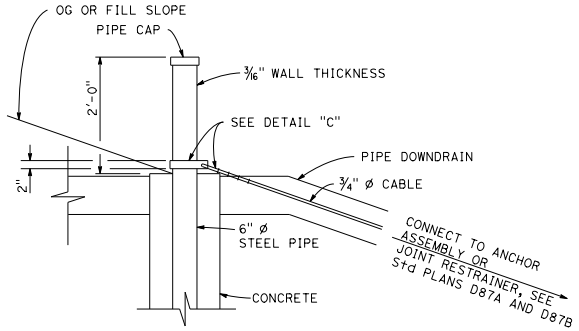

DETAIL "A"




END VIEW




CABLE ANCHOR TERMINAL DETAIL




DETAIL "B"

STEEL PIPE PILE DETAILS FOR CABLE ANCHORAGE SYSTEM

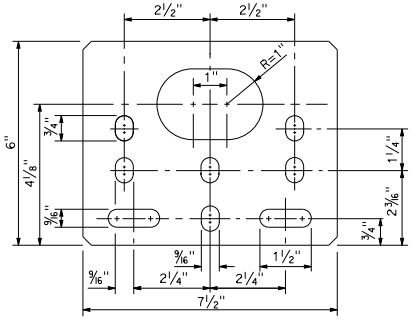



PLATE DETAIL

NOTES:

1. Diameter of downdrain 24" maximum.
2. ¾" ø cable shown, ½" ø cable is allowable for pipe downdrain diameters of 8" to 15". Use 1½" dimension for ¾" cable and 1¼" dimension for ½" cable.
3. Slip joints not shown.
4. See Standard Plan D87A for Corrugated Metal Pipe Downdrain Anchor Assembly. See Standard Plan D87B for Plastic Pipe Joint Restrainer Assembly.
5. Cable shall not contact soil in finished position. Either adjust position, or replace affected portion of cable with galvanized steel rod of equivalent diameter.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**CABLE ANCHORAGE SYSTEM**

NO SCALE

**D87C**

7-1-25

2025 STANDARD PLAN D87C

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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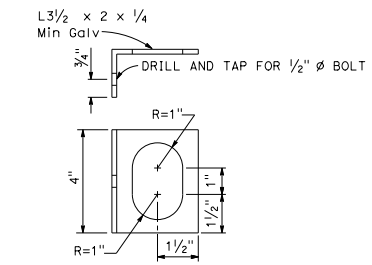
REGISTERED CIVIL ENGINEER

September 19, 2025

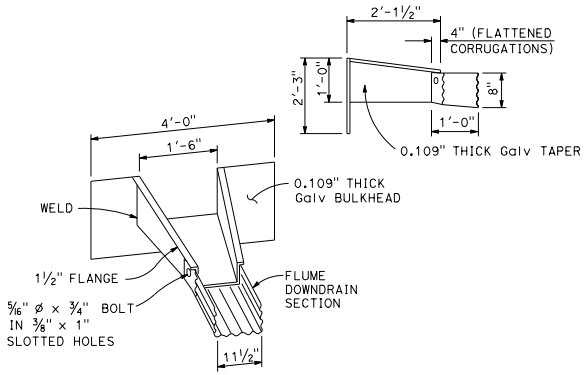
PLANS APPROVAL DATE

Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

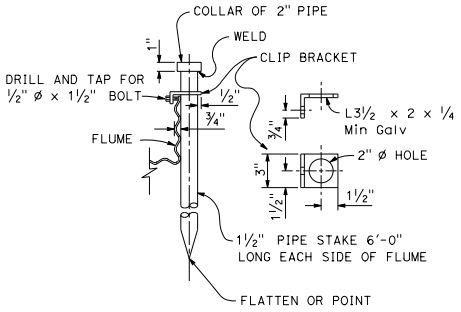
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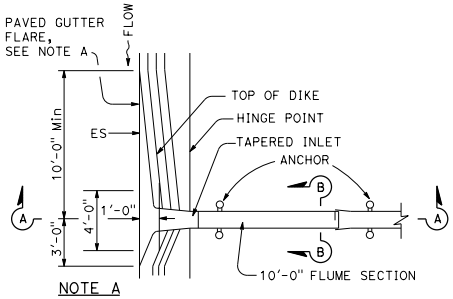

ALTERNATIVE CLIP BRACKET DETAIL




TAPERED INLET

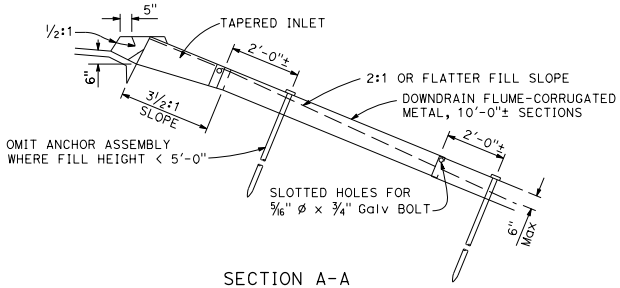



PIPE STAKE ANCHOR DETAIL

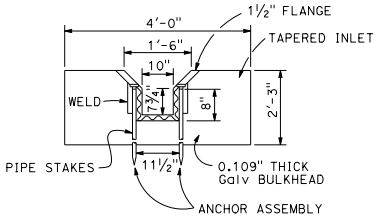



NOTE A
In sag location, use 10'-0" length of paved gutter flare on both sides of inlet.

PLAN

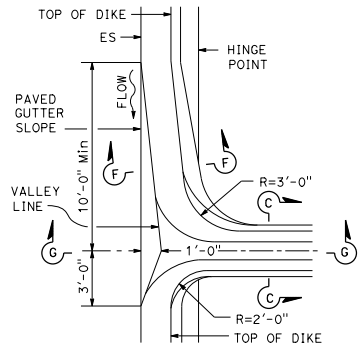



SECTION A-A




SECTION B-B

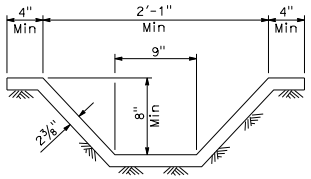
TAPERED INLET AND FLUME DOWNDRAIN



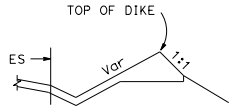

PLAN

MOUNTABLE DIKE

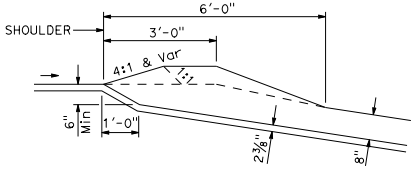
HOT MIX ASPHALT OVERSIDE DRAINS




SECTION C-C
See Note 1




SECTION F-F




SECTION G-G

NOTE:
1. Cross section of slope ditch may be semicircular, vee or trapezoidal.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**OVERSIDE DRAINS**

NO SCALE

**D87D**

7-1-25

Return to Table of Contents

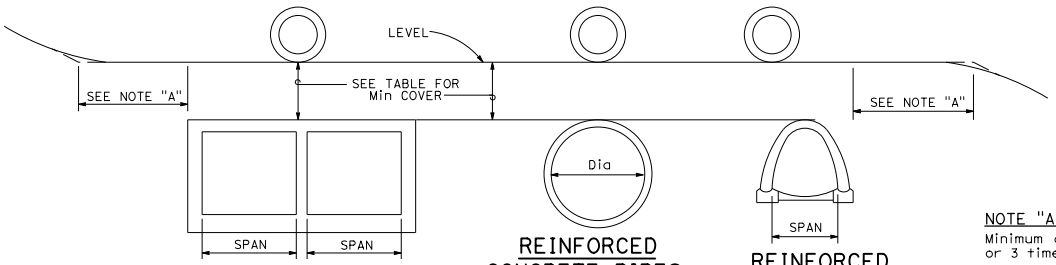
## TABLE OF MINIMUM COVER AND STRUTTING REQUIREMENTS FOR CONSTRUCTION LOADS

| TYPE | | | | | 18-50 k AXLE | | 50-75 k AXLE | | 75-110 k AXLE | | 110-150 k AXLE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MAXIMUM DESIGN FILL | SPAN | CELLS | Min COVER | STRUTS REQUIRED | STRUT SIZE AND SPACING | STRUTS REQUIRED | STRUT SIZE AND SPACING | STRUTS REQUIRED | STRUT SIZE AND SPACING | STRUTS REQUIRED | STRUT SIZE AND SPACING |
| BOX CULVERTS | 10'-0" AND 20'-0" | 4'-0" TO 8'-0" | SINGLE AND MULTIPLE | 5'-0" | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| | 10'-0" | 10'-0" TO 14'-0" | SINGLE AND MULTIPLE | 5'-0" | ——— | ——— | ⅓ Points | STRUTS 6" x 6" @ 3'-6" SILLS 6" x 8" | ⅓ Points | STRUTS 6" x 8" @ 3'-6" SILLS 6" x 8" | ⅓ Points | STRUTS 6" x 8" @ 3'-6" SILLS 6" x 8" |
| | 20'-0" | 10'-0" TO 14'-0" | SINGLE AND MULTIPLE | 5'-0" | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

## TABLE OF MINIMUM COVER FOR CONSTRUCTION LOADS

| TYPE | | Dia OR SPAN | 18-50 k AXLE | 50-75 k AXLE | 75-110 k AXLE | 110-150 k AXLE |
|---|---|---|---|---|---|---|
| REINFORCED CONCRETE CULVERTS | PIPES | Dia 12" TO 39" | 2'-0" | 3'-0" | 3'-0" | 3'-0" |
| | | Dia 42" TO 108" | $\frac{Dia}{1.75}$ OR 3'-0" | $\frac{Dia}{1.75}$ OR 3'-0" | $\frac{Dia}{1.75}$ OR 3'-0" | $\frac{Dia}{1.75}$ OR 3'-0" |
| | ARCHES | SPANS TO 14'-0" | $\frac{SPAN}{2.5}$ OR 4'-0" | $\frac{SPAN}{2.5}$ OR 4'-0" | $\frac{SPAN}{2.5}$ OR 4'-0" | $\frac{SPAN}{2.5}$ or 4'-0" |
| | | SPANS 15'-0" TO 22'-0" | $\frac{SPAN}{3.5}$ OR 6'-0" | $\frac{SPAN}{3.5}$ OR 6'-0" | $\frac{SPAN}{3.5}$ OR 6'-0" | $\frac{SPAN}{3.5}$ OR 6'-0" |
| METAL CULVERTS | PIPES | Dia TO 120" | $\frac{Dia}{1.75}$ OR 4'-0" | $\frac{Dia}{1.75}$ OR 4'-0" | $\frac{Dia}{1.75}$ OR 4'-0" | $\frac{Dia}{1.75}$ OR 4'-0" |
| | | Dia OVER 120" | $\frac{Dia}{3}$ OR 6'-0" | $\frac{Dia}{3}$ OR 6'-0" | $\frac{Dia}{3}$ OR 6'-0" | $\frac{Dia}{3}$ OR 6'-0" |
| | PIPE ARCHES | All Spans | $\frac{SPAN}{3}$ OR 4'-0" | $\frac{SPAN}{3}$ OR 4'-0" | $\frac{SPAN}{3}$ OR 4'-0" | $\frac{SPAN}{3}$ OR 4'-0" |
| | STRUCTURAL PLATE PIPE, ARCHES AND VEHICULAR UNDERCROSSINGS | ALL SPANS | $\frac{SPAN}{3}$ OR 5'-0" | $\frac{SPAN}{3}$ OR 5'-0" | $\frac{SPAN}{3}$ OR 5'-0" | $\frac{SPAN}{3}$ OR 5'-0" |
| PLASTIC PIPE | | Dia 12" TO 60" | $\frac{Dia}{1.75}$ OR 4'-0" | $\frac{Dia}{1.75}$ OR 4'-0" | $\frac{Dia}{1.75}$ OR 4'-0" | $\frac{Dia}{1.75}$ OR 4'-0" |

NOTE: Minimum cover shall be the greater value of alternatives shown. The diameter and spans shown in the table to calculate the minimum cover (Example: $\frac{Dia}{1.75}$) is the diameter or span of the facility expressed in number of feet.

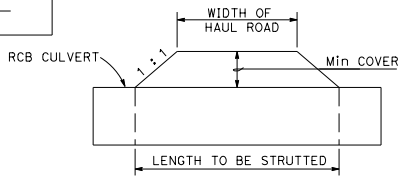



BOX CULVERTS

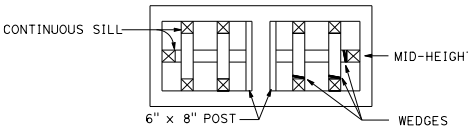
REINFORCED CONCRETE PIPES, PLASTIC PIPES AND METAL CULVERTS

REINFORCED CONCRETE ARCH CULVERTS

NOTE "A":
Minimum distance equals 3 times the span or 3 times the diameter.




MINIMUM LENGTH OF STRUTTING




RCB STRUTTING DETAILS

NOTES:

Length of strutting to be determined by the Engineer, but shall not be less than as shown in the sketch above.

Assumed tire patterns:
50 k axle 2'-0" x 1'-6"
75 k axle 3'-0" x 2'-0"
110 k axle 3'-0" x 2.5'
150 k axle 3'-0" x 3'-0"
Impact = 10%

Sills to be glue-laminated or solid timber.

For strutting requirements of Structural Steel Plate Vehicular Undercrossing, Structural Steel Plate Arches and Structural Steel Plate Pipes during construction, see Standard Plan D88A.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# CONSTRUCTION LOADS ON CULVERTS

NO SCALE

D88

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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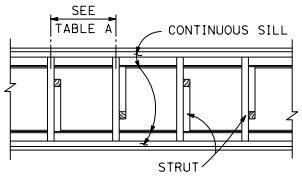
TABLE A

| TIMBER STRUTS FOR STRUCTURAL STEEL PLATE PIPE | | | |
|---|---|---|---|
| PIPE Dia | STRUT SIZE | HEIGHT OF FILL | |
| | | 0 TO 20'-0" | GREATER THAN 20'-0" |
| 240" THRU 252" | 8" x 8" | 5'-0" SPACING | 3'-0" SPACING |
| | 10" x 10" | 8'-0" SPACING | 4'-6" SPACING |

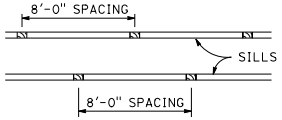
TABLE B

| TIMBER STRUTS FOR STRUCTURAL STEEL PLATE VEHICULAR UNDERCROSSING | | |
|---|---|---|
| SPAN | STRUT SIZE | SILL SIZE |
| 13'-2" - 15'-6" | 4" x 4" | 4" x 6" |
| 15'-9" - 17'-3" | 4" x 4" | 4" x 8" |
| Over 17'-3" | 6" x 6" | 6" x 8" |

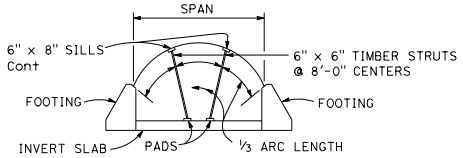
Tabular data in Table B based on 6" x 2" corrugations, (Structural steel plate).




SECTION A-A



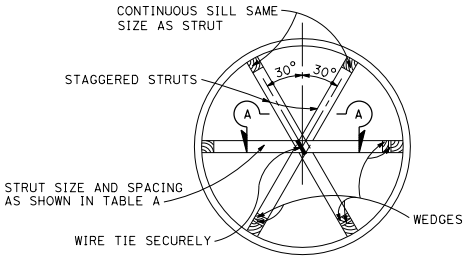

SECTION B-B




TYPICAL SECTION

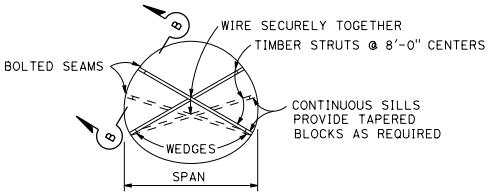
## STRUCTURAL STEEL PLATE ARCHES

Struts required when span of structural steel plate arch exceeds 18'-0" pad size as directed by Engineer.




TYPICAL SECTION

## STRUCTURAL STEEL PLATE PIPES




TYPICAL SECTION

## STRUCTURAL STEEL PLATE VEHICULAR UNDERCROSSING

NOTES:

1. Struts shown are minimum required during construction when construction vehicle loading exceeds 32 kip/axle, and minimum cover is less than that shown for metal culverts in the table on Standard Plan D88.
2. Backfill shall be brought up uniformly on both sides of the structure.
3. For minimum cover over structure for construction loads, see Standard Plan D88.
4. Strut all situations where overfill is removed in an unbalanced manner.

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DEPARTMENT OF TRANSPORTATION

# STRUT DETAILS FOR STRUCTURAL STEEL PIPES, ARCHES AND VEHICULAR UNDERCROSSING

NO SCALE

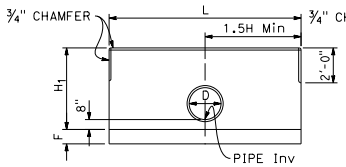
**D88A**

7-1-25

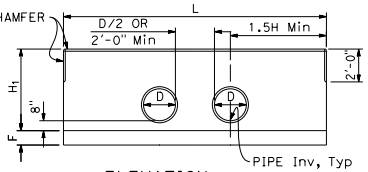
2025 STANDARD PLAN D88A



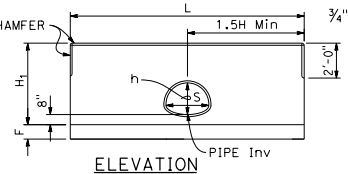
Return to Table of Contents



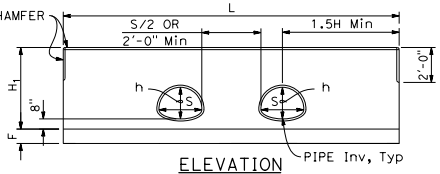

ELEVATION
STRAIGHT HEADWALL
SINGLE CIRCULAR PIPE




ELEVATION
STRAIGHT HEADWALL
DOUBLE CIRCULAR PIPE




ELEVATION
STRAIGHT HEADWALL
SINGLE CMP




ELEVATION
STRAIGHT HEADWALL
DOUBLE CMP

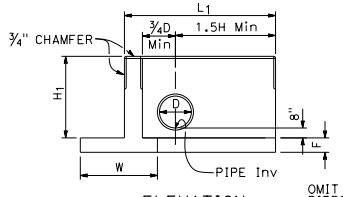
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

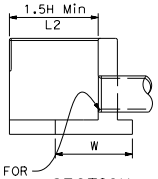
September 19, 2025
PLANS APPROVAL DATE

Carl M. Duan
No. C59976
Exp. 6-30-26
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ELEVATION
"L" HEADWALL



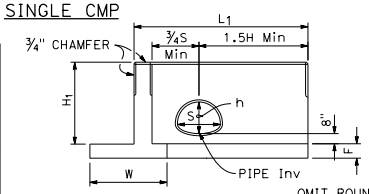

OMIT ROUNDING FOR PIPES < 48" Dia

SECTION
"L" HEADWALL

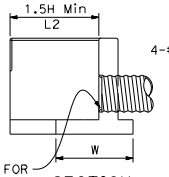
| H (Min) | CIRCULAR PIPE SIZE D | CMP ARCH SIZE S x h |
|---|---|---|
| 3'-11" | 12" | - |
| 4'-2" | 15" | 21" x 15" |
| 4'-5" | 18" | 24" x 18" |
| 4'-8" | 21" | 28" x 20" |
| 4'-11" | 24" | 35" x 24" |
| 5'-2" | 27" | - |
| 5'-5" | 30" | 42" x 29" |
| 5'-8" | 33" | 49" x 33" |
| 5'-11" | 36" | - |
| 6'-2" | 39" | 57" x 38" |
| 6'-5" | 42" | 64" x 43" |
| 6'-8" | 45" | - |
| 6'-11" | 48" | 71" x 47" |

## CIRCULAR PIPE CULVERT HEADWALLS

SEE NOTE 2




ELEVATION
"L" HEADWALL

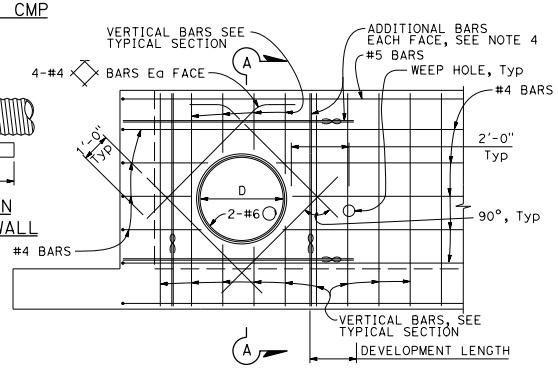



OMIT ROUNDING FOR PIPES < 48" Dia

SECTION
"L" HEADWALL

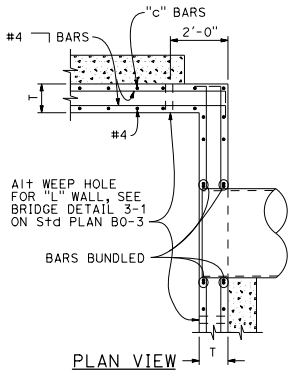
## CMP ARCH CULVERT HEADWALLS

See Note 2



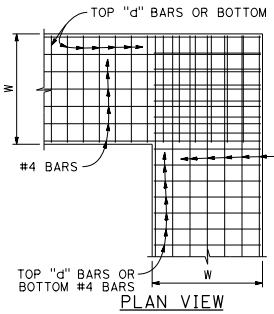

## REINFORCEMENT MODIFICATION

"L" headwall shown. Straight headwall similar.
Circular pipe shown. CMP arch similar.



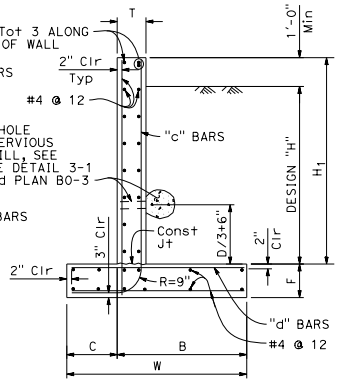

PLAN VIEW
## STEM WALL

"L" headwall shown.
Straight headwall similar.

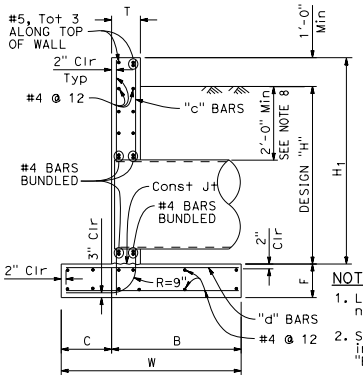



PLAN VIEW
## FOOTING

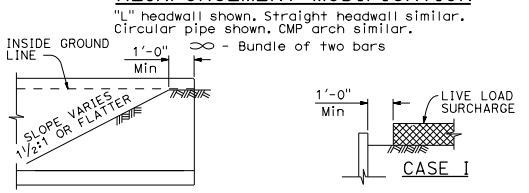
"L" headwall shown.
Straight headwall similar.




## TYPICAL SECTION




## SECTION A-A




## DETAIL OF DESIGN LOADING CASES

NOTES:

1. Length of wall from ℄ pipe to end of wall is 1.5H Min. The ends of headwall need to be embedded into the slope by one foot.
2. Single circular pipe or single CMP shown for "L" headwall. For double pipe in "L" headwall, see "ELEVATION STRAIGHT HEADWALL DOUBLE CIRCULAR PIPE" or "ELEVATION STRAIGHT HEADWALL DOUBLE CMP" detail for additional information.
3. Cable railing to be installed on top of headwall when shown on Project Plans. See Standard Plan B11-47 for cable railing details.
4. Adjacent to each side of the opening, place additional reinforcement equivalent to half the interrupted main reinforcement.
5. Quantities are approximate and for design purposes only. No deduction is made for pipe or arch occupancy.
6. Provide necessary erosion protection in front of wall.
7. If precast construction is used, the design standard shall be equal to or exceed that shown here, and the bottom of footing must be roughened.
8. Minimum earth cover of two feet at ETW of the roadway without cap protection to pipe.

| H | 3'-11" | 4'-2" | 4'-5" | 4'-8" | 4'-11" | 5'-2" | 5'-5" | 5'-8" | 5'-11" | 6'-2" | 6'-5" | 6'-8" | 6'-11" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 1'-0" | 1'-0" | 1'-0" | 1'-0" |
| W | 4'-10" | 4'-10" | 5'-0" | 5'-4" | 5'-4" | 5'-4" | 5'-4" | 5'-4" | 5'-4" | 5'-4" | 5'-6" | 5'-9" | 6'-0" |
| C | 1'-0" | 1'-0" | 1'-0" | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-6" | 1'-6" | 1'-6" |
| B | 3'-10" | 3'-10" | 4'-0" | 4'-0" | 4'-0" | 4'-0" | 4'-0" | 4'-0" | 4'-0" | 4'-0" | 4'-0" | 4'-3" | 4'-6" |
| F | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-2" | 1'-2" | 1'-2" | 1'-2" |
| "c" BARS | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 9 | #5 @ 9 |
| "d" BARS | #5 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 8 | #5 @ 8 | #5 @ 8 | #5 @ 8 | #6 @ 8 | #6 @ 8 | #6 @ 8 | #6 @ 6 | #6 @ 6 | #6 @ 6 |
| * Conc CY/LF | 0.33 | 0.34 | 0.35 | 0.37 | 0.38 | 0.39 | 0.40 | 0.40 | 0.41 | 0.50 | 0.51 | 0.53 | 0.55 |
| * Reinf LB/LF | 32 | 32 | 33 | 37 | 38 | 39 | 39 | 43 | 47 | 48 | 53 | 58 | 60 |
| **CASE I Ser (q'o, B') | 0.87, 4.68 | 0.88, 4.69 | 0.88, 4.75 | 0.89, 4.80 | 0.90, 4.95 | 0.92, 5.09 | 0.95, 5.00 | 0.96, 4.90 | 1.05, 4.80 | 1.10, 4.67 | 1.12, 4.70 | 1.14, 5.05 | 1.15, 5.32 |
| Str (q'o, B') | 1.45, 4.60 | 1.49, 4.65 | 1.50, 4.71 | 1.52, 4.78 | 1.53, 4.81 | 1.55, 4.99 | 1.62, 4.50 | 2.10, 3.15 | 2.20, 2.50 | 2.38, 1.63 | 2.15, 1.65 | 2.10, 2.20 | 2.04, 2.41 |

* Quantities include 1'-0" extension above the design "H" limit.
** q'o = net bearing stress (ksf), B' = effective footing width (ft)
Ser - service limit
Str - strength limit

REINFORCED CONCRETE HEADWALL
Quantities do not include added diagonals and do not consider pipe occupancy.

NOTE: Reinforced Concrete: fy = 60,000 psi
f'c = 3,600 psi
Earth Density: 120 pcf
Equivalent Fluid Pressure: 36 pcf

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DEPARTMENT OF TRANSPORTATION

# PIPE CULVERT HEADWALLS STRAIGHT AND "L"

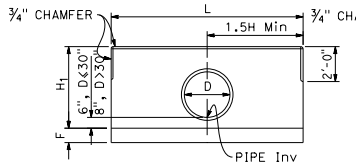
NO SCALE

**D89A**

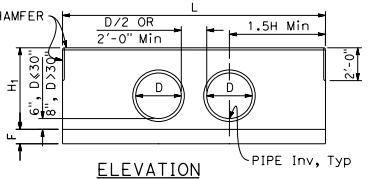
7-1-25

2025 STANDARD PLAN D89A

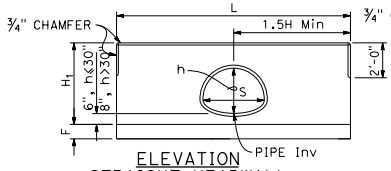
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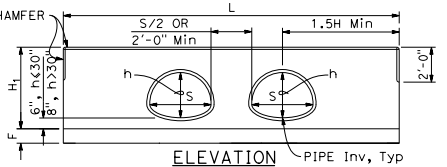

ELEVATION
STRAIGHT HEADWALL
SINGLE CIRCULAR PIPE




ELEVATION
STRAIGHT HEADWALL
DOUBLE CIRCULAR PIPE




ELEVATION
STRAIGHT HEADWALL
SINGLE CMP




ELEVATION
STRAIGHT HEADWALL
DOUBLE CMP

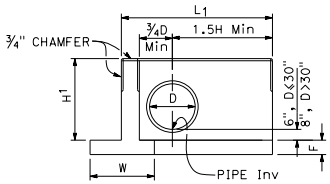
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

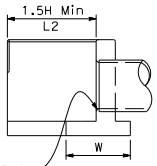
September 19, 2025
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA



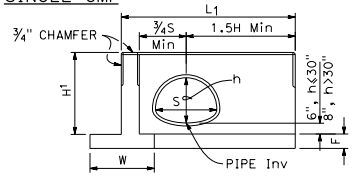

ELEVATION
"L" HEADWALL



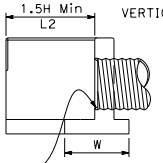

OMIT ROUNDING FOR PIPES < 48" Dia

SECTION
"L" HEADWALL

| H | CIRCULAR PIPE SIZE D | CMP ARCH SIZE S x h |
|---|---|---|
| 2'-8" | 12" | - |
| 2'-11" | 15" | 21" x 15" |
| 3'-2" | 18" | 24" x 18" |
| 3'-5" | 21" | 28" x 20" |
| 3'-8" | 24" | 35" x 24" |
| 3'-11" | 27" | - |
| 4'-2" | 30" | 42" x 29" |
| 4'-8" | 33" | 49" x 33" |
| 4'-11" | 36" | - |
| 5'-2" | 39" | 57" x 38" |
| 5'-5" | 42" | 64" x 43" |
| 5'-8" | 45" | - |
| 5'-11" | 48" | 71" x 47" |
| 6'-2" | 51" | - |
| 6'-5" | 54" | - |




ELEVATION
"L" HEADWALL

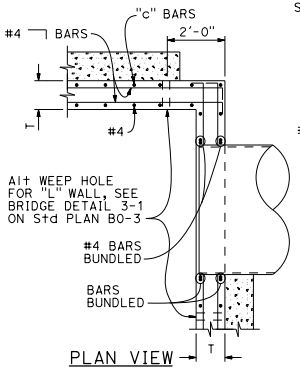



OMIT ROUNDING FOR PIPES < 48" Dia

SECTION
"L" HEADWALL

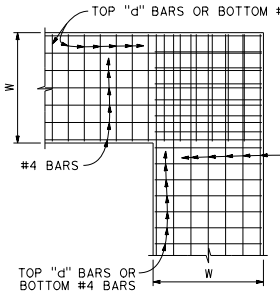
## CIRCULAR PIPE CULVERT HEADWALLS

SEE NOTE 2



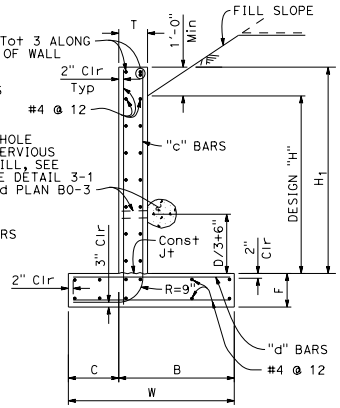

PLAN VIEW
STEM WALL

"L" headwall shown.
Straight headwall similar.




PLAN VIEW
FOOTING

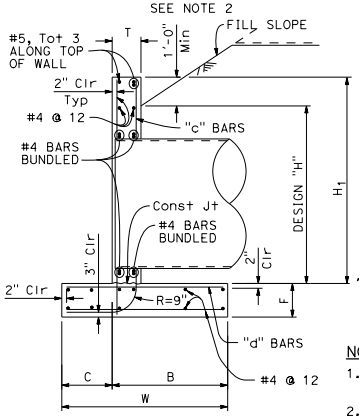
"L" headwall shown.
Straight headwall similar.



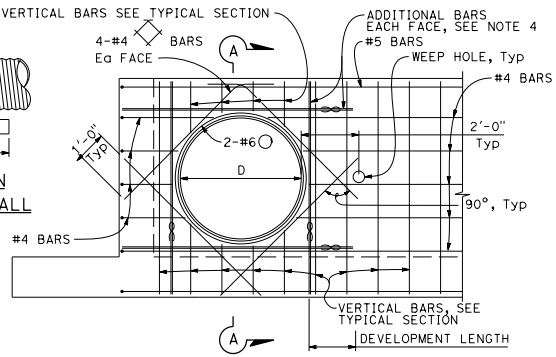

TYPICAL SECTION

## CMP ARCH CULVERT HEADWALLS

SEE NOTE 2

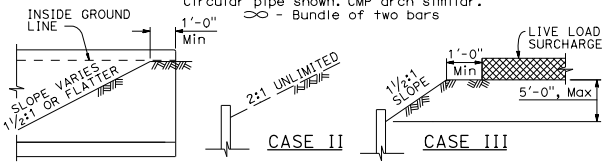



SECTION A-A




## REINFORCEMENT MODIFICATION

"L" headwall shown. Straight headwall similar.
Circular pipe shown. CMP arch similar.
∞ - Bundle of two bars




## DETAIL OF DESIGN LOADING CASES

NOTES:

1. Length of wall from ℄ pipe to end of wall is 1.5H Min. The ends of headwall need to be embedded into the slope by one foot.
2. Single circular pipe or single CMP shown for "L" headwall. For double pipe in "L" headwall, see "ELEVATION STRAIGHT HEADWALL DOUBLE CIRCULAR PIPE" or "ELEVATION STRAIGHT HEADWALL DOUBLE CMP" detail for additional information.
3. Cable railing to be installed on top of headwall when shown on Project Plans. See Standard Plan B11-47 for cable railing details.
4. Adjacent to each side of the opening, place additional reinforcement equivalent to half the interrupted main reinforcement.
5. Quantities are approximate and for design purposes only. No deduction is made for pipe or arch occupancy.
6. Provide necessary erosion protection in front of wall.
7. If precast construction is used, the design standard shall be equal to or exceed that shown here, and the bottom of footing must be roughened.

| H | | 2'-8" | 2'-11" | 3'-2" | 3'-5" | 3'-8" | 3'-11" | 4'-2" | 4'-8" | 4'-11" | 5'-2" | 5'-5" | 5'-8" | 5'-11" | 6'-2" | 6'-5" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T | | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 10" | 1'-0" | 1'-0" | 1'-0" |
| W | | 2'-3" | 2'-3" | 2'-3" | 2'-6" | 2'-6" | 2'-6" | 3'-0" | 3'-0" | 3'-3" | 3'-9" | 4'-0" | 4'-2" | 4'-2" | 4'-6" | 4'-9" |
| C | | 6" | 6" | 6" | 6" | 6" | 6" | 9" | 9" | 9" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-3" |
| B | | 1'-9" | 1'-9" | 1'-9" | 2'-0" | 2'-0" | 2'-0" | 2'-3" | 2'-3" | 2'-3" | 2'-9" | 3'-0" | 3'-2" | 3'-2" | 3'-6" | 3'-6" |
| F | | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-2" | 1'-2" | 1'-2" | 1'-2" | 1'-2" | 1'-2" | 1'-2" | 1'-2" | 1'-2" | 1'-2" |
| "c" BARS | | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 9 | #5 @ 9 | #5 @ 9 | #5 @ 9 |
| "d" BARS | | #4 @ 12 | #4 @ 12 | #4 @ 12 | #4 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 12 | #5 @ 9 | #5 @ 9 | #5 @ 9 | #5 @ 9 | #6 @ 12 | #6 @ 9 | #6 @ 9 | #6 @ 9 |
| * Conc CY/LF | | 0.20 | 0.20 | 0.21 | 0.23 | 0.24 | 0.26 | 0.29 | 0.30 | 0.32 | 0.35 | 0.37 | 0.39 | 0.44 | 0.46 | 0.48 |
| * Reinf LB/LF | | 19 | 20 | 21 | 22 | 24 | 24 | 27 | 32 | 33 | 36 | 38 | 39 | 43 | 47 | 49 |
| **CASE II | Ser (q'o, B') | 0.41, 1.85 | 0.48, 1.89 | 0.55, 1.91 | 0.60, 1.95 | 0.62, 2.08 | 0.62, 2.20 | 0.63, 2.44 | 0.67, 2.61 | 0.71, 2.72 | 0.75, 2.87 | 0.80, 2.93 | 0.84, 3.10 | 0.88, 3.20 | 0.91, 3.44 | 0.95, 3.78 |
| | Str (q'o, B') | 1.07, 1.80 | 1.12, 1.83 | 1.20, 1.85 | 1.32, 1.89 | 1.34, 2.05 | 1.36, 2.19 | 1.39, 2.36 | 1.45, 2.48 | 1.50, 2.64 | 1.55, 2.77 | 1.62, 2.91 | 1.69, 3.16 | 1.72, 3.23 | 1.79, 3.33 | 1.82, 3.67 |
| **CASE III | Ser (q'o, B') | 0.56, 2.05 | 0.62, 2.08 | 0.70, 2.10 | 0.75, 2.12 | 0.81, 2.20 | 0.83, 2.38 | 0.85, 2.49 | 0.91, 2.60 | 0.94, 2.75 | 0.97, 2.81 | 1.02, 2.91 | 1.09, 3.05 | 1.12, 3.12 | 1.18, 3.23 | 1.22, 3.50 |
| | Str (q'o, B') | 0.91, 2.01 | 0.98, 2.05 | 1.06, 2.04 | 1.19, 2.06 | 1.22, 2.28 | 1.30, 2.34 | 1.36, 2.40 | 1.41, 2.51 | 1.49, 2.59 | 1.55, 2.68 | 1.65, 2.76 | 1.71, 2.90 | 1.79, 3.03 | 1.85, 3.07 | 1.90, 3.33 |

* Quantities include 1'-0" extension above the design "H" limit.
** q'o = net bearing stress (ksf), B' = effective footing width (ft)
Ser - service limit
Str - strength limit

### REINFORCED CONCRETE HEADWALL

Quantities do not include added diagonals and do not consider pipe occupancy.

NOTE: Reinforced Concrete: fy = 60,000 psi, f'c = 3,600 psi
Earth Density: 120 pcf
Equivalent Fluid Pressure: 36 pcf

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PIPE CULVERT HEADWALLS STRAIGHT AND "L"

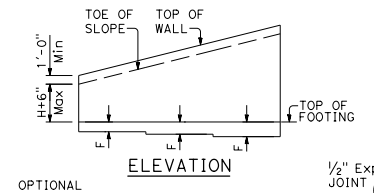
NO SCALE

**D89B**

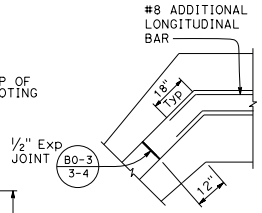
7-1-25



Return to Table of Contents

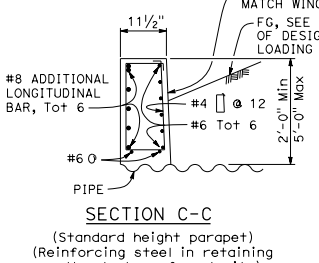



TYPICAL LAYOUT



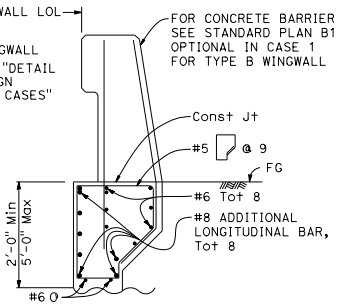

SECTION A-A

Retaining wall rebar are not shown.



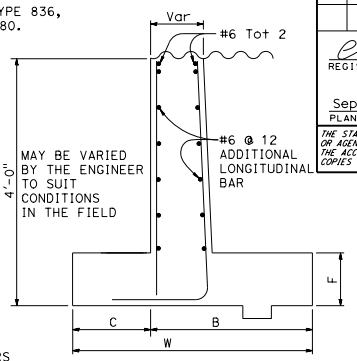

SECTION C-C

(Standard height parapet)
(Reinforcing steel in retaining wall not shown for clarity)




OPTIONAL SECTION C-C

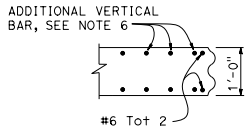
Barrier parapet




SECTION D-D

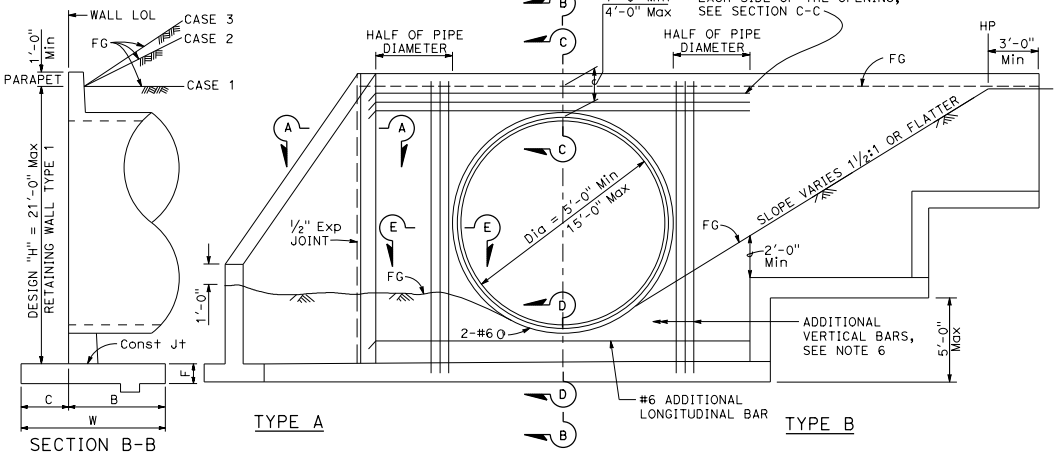
For reinforcing steel in wall and in footing and for dimensions C, B, F and W, see Standard Plans

B3-1A B3-1B B3-1C




SECTION E-E

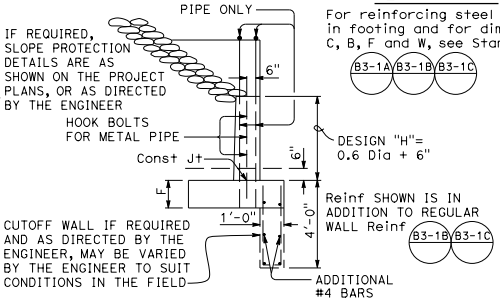
Retaining wall rebar are not shown.




SECTION B-B

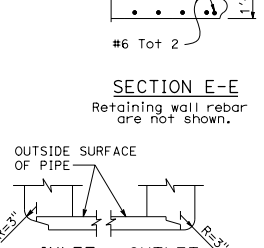
For information about dimensions C, B, F and W see Standard Plans

B3-1A B3-1B B3-1C

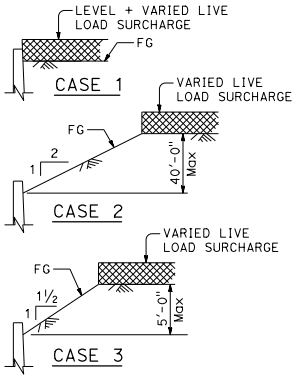



SECTION F-F

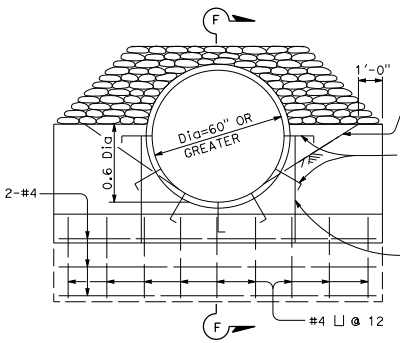
See note 3



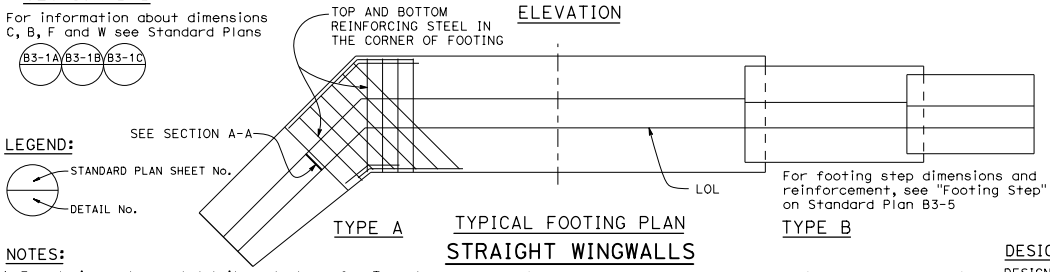

RC PIPE DETAILS




DETAIL OF DESIGN LOADING CASES




TYPE C WALL




TYPICAL FOOTING PLAN

STRAIGHT WINGWALLS

LEGEND:

STANDARD PLAN SHEET No.

DETAIL No.

NOTES:

1. For design notes and details not shown for Type A and Type B wingwalls and headwalls, see Standard Plans B3-1A, B3-1B and B3-1C.
2. For Case 1 in Type B wall, concrete barrier can be installed on top of the headwall and wingwall as an option.
3. For details not shown for Type C wall, see Standard Plans B3-1B or B3-1C.
4. Elevation, length and angle of flare of wingwalls may be varied by The Engineer to suit conditions encountered in the field.
5. Wall height may be exceeded by 6" before going to the next greater "H".
6. Adjacent to each side of the pipe opening, place additional vertical bars bent into footing equivalent to half of the cutoff main bars by the pipe.

DESIGN NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019

SOIL: $\gamma$ = 120 pcf, $\phi$ = 34°

LS: Varied live load surcharge on level ground surface

REINFORCED CONCRETE: $f'_c$ = 3,600 psi, $f_y$ = 60,000 psi

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Carl M. Duan No. C59976 Exp. 6-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PIPE CULVERT HEADWALLS, ENDWALLS AND WINGWALLS TYPES A, B AND C

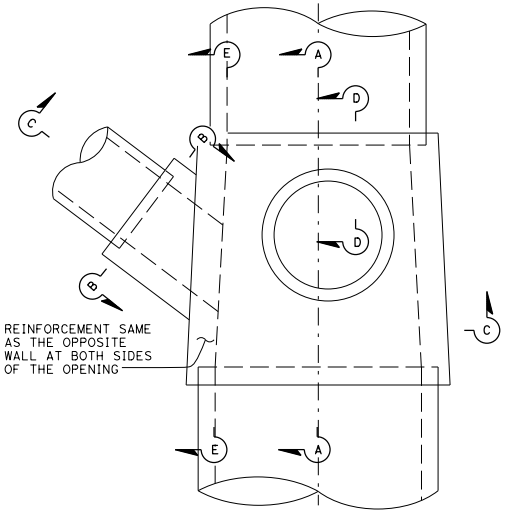
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D90

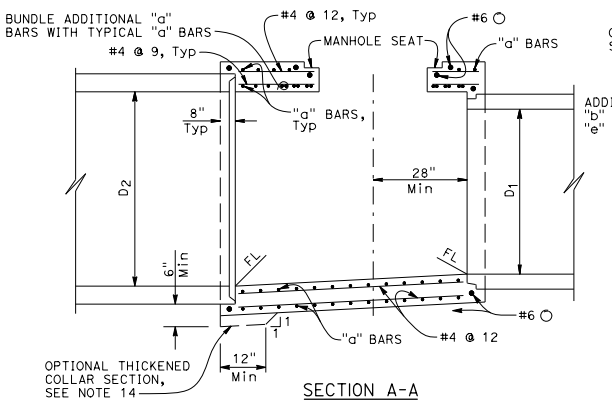
7-1-25



Return to Table of Contents

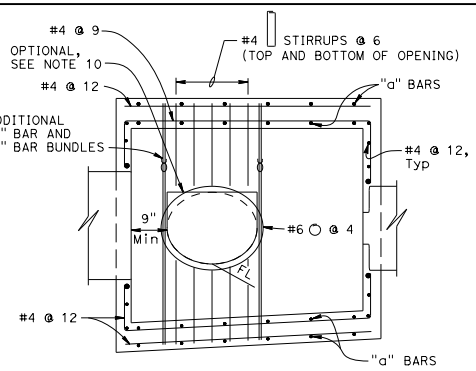



PLAN



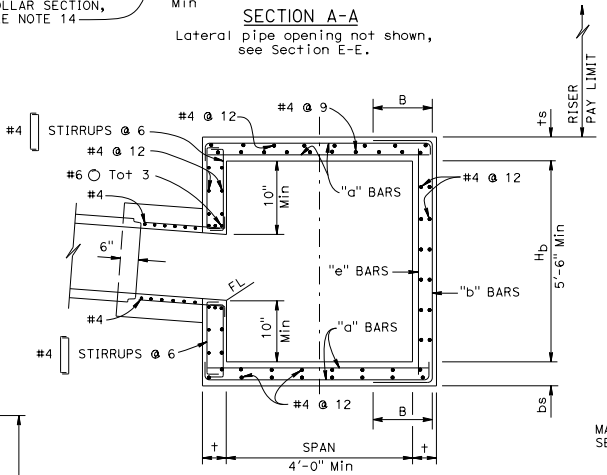

SECTION A-A

Lateral pipe opening not shown, see Section E-E.

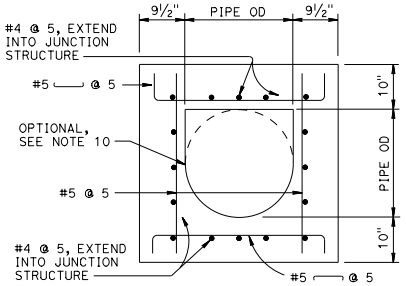



SECTION E-E

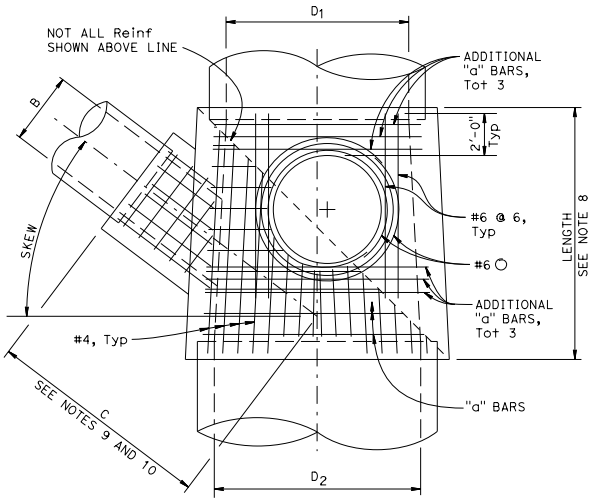
Not all the "b" BARS and "e" BARS in the wall are shown for clarity.




SECTION C-C

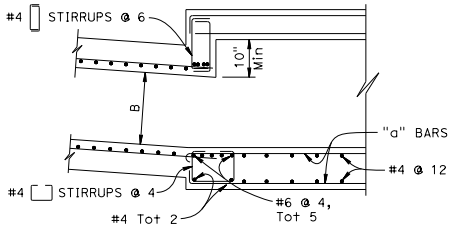



SECTION B-B



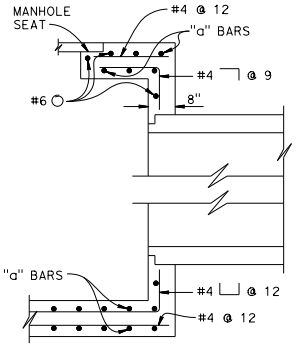

PLAN

Not all reinforcement shown for clarity




SECTION C-C (OPTIONAL)

Maximum fill height = 10.0'
For reinforcement and details not shown, see Section C-C.




SECTION D-D

NOTE:

For Design Notes, General Notes, Design Tables and additional details, see Standard Plan D91B.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CAST-IN-PLACE REINFORCED CONCRETE JUNCTION STRUCTURE

NO SCALE

D91A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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7-1-25

Return to Table of Contents

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## DESIGN NOTES:

Design Specifications:
AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated 2019

Loading:
Live load: (AASHTO LRFD Chapter 3.6.1.2)
HL-93 consists of design truck or design tandem and design lane load

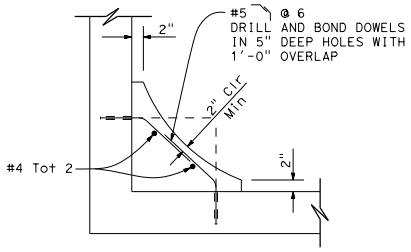
Dynamic Load Allowance: (Apply to top slab only)
$IM = 33(1.0-0.125D_E) \geq 0\%$
$D_E$ = minimum depth of earth cover

Earth load:
Unfactored earth pressure:
120 pcf vertical
60 pcf horizontal

Max load factors: 1.35 vertical, 2.0 horizontal
Min load factors: 0.9 vertical, 0.5 horizontal

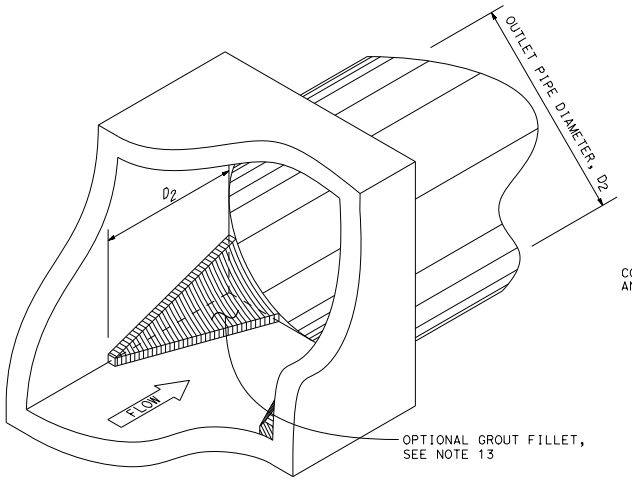
Unit stresses:
$f'_c$ = 3,600 psi
$f_y$ = 60,000 psi

Shear:
$V_c$ = Beta$\sqrt{f'_c}\, b_v d_v$ (Pounds)

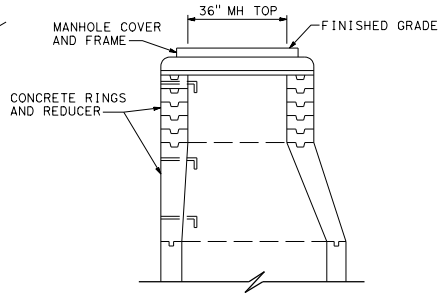



## TYPICAL FILLET SECTION

Reinforcing steel in the junction structure not shown for clarity.




## ISOMETRIC FILLET DETAIL




TYPE MH

## UPPER STRUCTURE

## GENERAL NOTES:

1. Each riser shall have a ladder. For details, see Standard Plan D93A.
2. Thickness of top slab shall vary as necessary to provide a level manhole seat. Hb is equal to the largest inside height dimension between the top and bottom slabs.
3. Reinforcing steel shall be placed with 2" clearance, except as shown.
4. Maximum skew for lateral pipe B is 45°.
5. Lateral pipe may be placed in either side of wall.
6. $D_1$ and $D_2$ are limited to 12' maximum diameter.
7. Side walls shall be flush with the inside of the inlet and outlet pipes when pipe diameters are 3.5' or more. Span is equal to the larger inside width dimension between the side walls.
8. Junction structure length shall be 6'-0" minimum.
9. When C is not specified, bring the lateral pipe directly into the wall of the structure.
10. When C is specified, the Contractor may, at his option, bring the lateral pipe directly into the wall for use as an inside form. A collar conforming with the wall thickness and reinforcement as shown in section B-B shall be poured around the pipe.
11. When the lateral pipe is extended directly into the wall, it shall be mitered as necessary to be flush with wall.
12. Adjacent to each side of the opening, place additional reinforcement equivalent to half the interrupted main reinforcement.
13. Optional fillet at outlet pipe placed at the direction of the Engineer.
14. Minimum thickness around pipe connections shall be 8". Wall and slab thicknesses may be increased beyond the minimums shown in the design tables or a thickened collar may be added to the local pipe connection area to achieve the minimum connection thickness. If a thickened collar is used, minimum width shall be one half of the corresponding pipe diameter and centered on the pipe section.
15. Soil pressures include soil weight of fill over junction structure, self weight of junction structure, and live load where applicable.

## CIP JUNCTION STRUCTURE TABLE

| HEIGHT, $H_b$ | 5'-6" | | 6' | | 7' | | 8' | | 9' | | 10' | | 11' | | 12' | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPAN | 4' | | 5' | | 6' | | 7' | | 8' | | 9' | | 10' | | 11' | | 12' | |
| Max EARTH COVER | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' | 10' | 20' |
| CONCRETE | | | | | | | | | | | | | | | | | | |
| TOP SLAB THICKNESS (ts) | 8" | 8" | 8" | 8" | 8" | 9" | 8" | 10" | 8" | 11" | 9" | 12" | 11" | 13" | 11" | 14" | 12" | 16" |
| WALL THICKNESS (t) | 8" | 8" | 8" | 8" | 8" | 9" | 8" | 10" | 8" | 12" | 9" | 13" | 12" | 14" | 13" | 18" | 14" | 20" |
| BOTTOM SLAB THICKNESS (bs) | 8" | 8" | 8" | 8" | 8" | 9" | 8" | 10" | 8" | 12" | 10" | 13" | 11" | 14" | 12" | 15" | 13" | 17" |
| REINFORCEMENT | | | | | | | | | | | | | | | | | | |
| "a" BARS (SLABS, TOP AND BOTTOM) | #4 @ 10 | #4 @ 6 | #4 @ 6 | #4 @ 5 | #4 @ 5 | #5 @ 6 | #4 @ 5 | #5 @ 5 | #5 @ 6 | #5 @ 5 | #5 @ 5 | #5 @ 5 | #5 @ 5 | #6 @ 6 | #5 @ 5 | #6 @ 6 | #6 @ 6 | #7 @ 6 |
| "e" BARS (WALL Ext) | #4 @ 10 | #4 @ 6 | #4 @ 6 | #4 @ 5 | #4 @ 5 | #4 @ 6 | #4 @ 5 | #4 @ 5 | #4 @ 6 | #4 @ 5 | #4 @ 5 | #5 @ 5 | #5 @ 5 | #6 @ 6 | #4 @ 5 | #6 @ 6 | #5 @ 6 | #5 @ 6 |
| "b" BARS (WALL Int) | #4 @ 10 | #4 @ 6 | #4 @ 6 | #4 @ 6 | #4 @ 5 | #4 @ 6 | #4 @ 5 | #4 @ 5 | #4 @ 6 | #4 @ 5 | #4 @ 5 | #5 @ 5 | #4 @ 5 | #5 @ 6 | #4 @ 5 | #6 @ 6 | #5 @ 6 | #5 @ 6 |
| DIMENSION "B" | 2'-4" | 2'-4" | 2'-7" | 2'-3" | 2'-7" | 2'-5" | 3'-0" | 2'-9" | 2'-11" | 3'-3" | 3'-6" | 3'-8" | 4'-0" | 4'-1" | 4'-4" | 4'-5" | 4'-10" | 5'-0" |
| SOIL PRESSURES | | | | | | | | | | | | | | | | | | |
| SOIL PRESSURE (ksf), Ser | 1.5 | 2.8 | 1.5 | 2.8 | 1.5 | 2.8 | 1.5 | 2.8 | 1.6 | 2.9 | 1.6 | 3.0 | 1.7 | 3.0 | 1.7 | 3.1 | 1.8 | 3.2 |
| SOIL PRESSURE (ksf), Str | 2.2 | 4.1 | 2.2 | 4.1 | 2.2 | 4.1 | 2.2 | 4.1 | 2.3 | 4.2 | 2.3 | 4.3 | 2.4 | 4.4 | 2.5 | 4.5 | 2.5 | 4.6 |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CAST-IN-PLACE REINFORCED CONCRETE JUNCTION STRUCTURE

NO SCALE

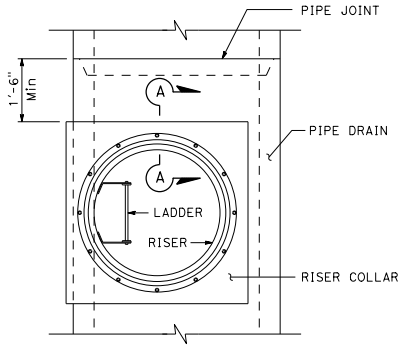
**D91B**

7-1-25

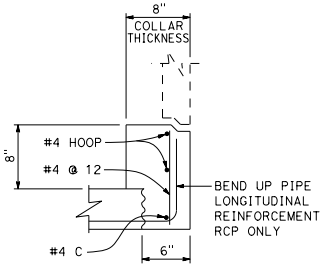




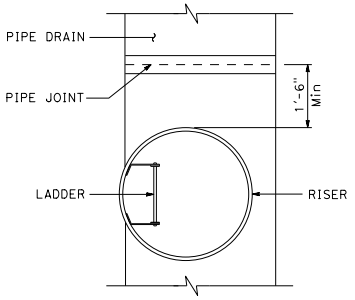
Return to Table of Contents



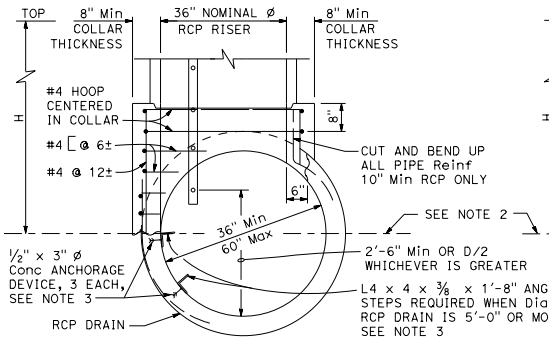

PLAN



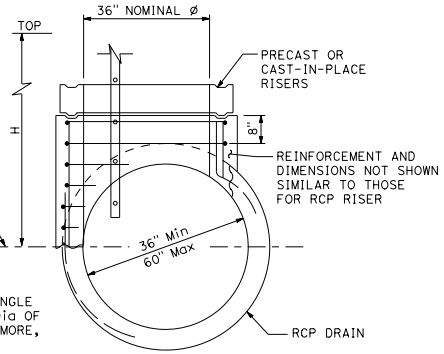

SECTION A-A



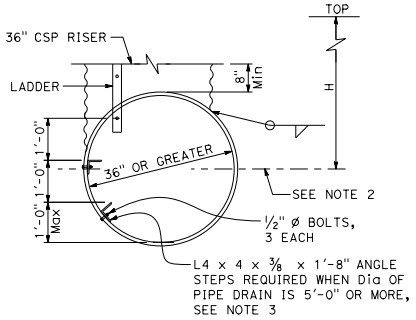

PLAN




WITH 36" RCP RISER

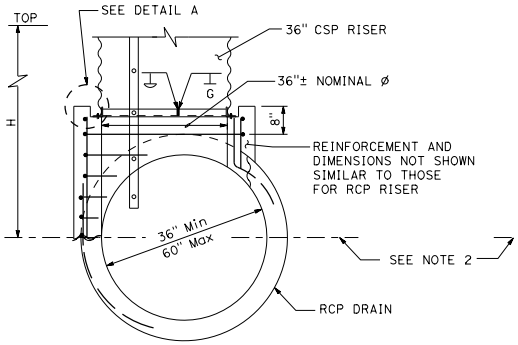



WITH 36" PRECAST RISERS

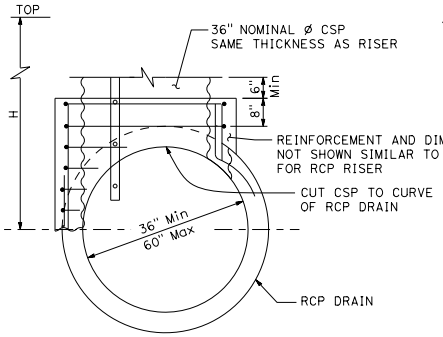



WITH 36" CSP RISER

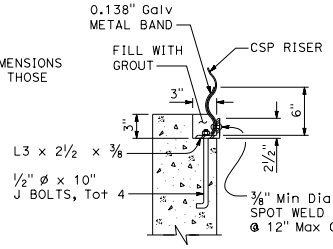
## CORRUGATED STEEL PIPE OR STRUCTURAL PLATE PIPE DRAIN




WITH 36" CSP RISER




WITH 36" CSP RISER
ALTERNATIVE COLLAR DETAIL




DETAIL A

## REINFORCED CONCRETE PIPE DRAIN

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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### NOTES:

1. Ladder may be constructed in one length at contractor's option on reinforced concrete pipe risers.
2. Pay limit for 36" risers to centerline of cross pipe.
3. Where angle steps are required, the lowest angle shall not be more than 1'-0" above the flowline of the drain. The distance between the uppermost angle step and the lowest rung of the ladder shall not exceed 1'-0".
4. Minimum earth cover = 2'-0".
5. Maximum earth cover = 20'-0".
6. Reinforcing steel shall be placed with 2" clearance, except as shown.
7. Refer to Standard Plan D75C for ladder details not shown.

### DESIGN NOTES:

DESIGN SPECIFICATIONS:

AASHTO LRFD Bridge Design Specifications, 8th Edition
California Amendments, Preface dated 2019.

SOIL:

Friction Value: 34 Degrees
Unit Weight: 120 pcf

REINFORCED CONCRETE:

Compressive Strength: f'c = 3,000 psi
Yield Strength: fy = 60,000 psi

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## PIPE RISER CONNECTIONS

NO SCALE

D93A

2025 STANDARD PLAN D93A

7-1-25

Return to Table of Contents

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REGISTERED CIVIL ENGINEER

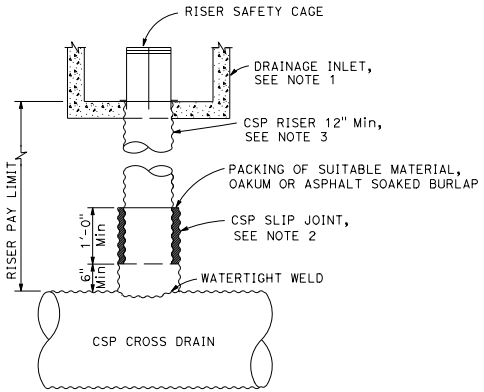
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No. C63744
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CIVIL
STATE OF CALIFORNIA

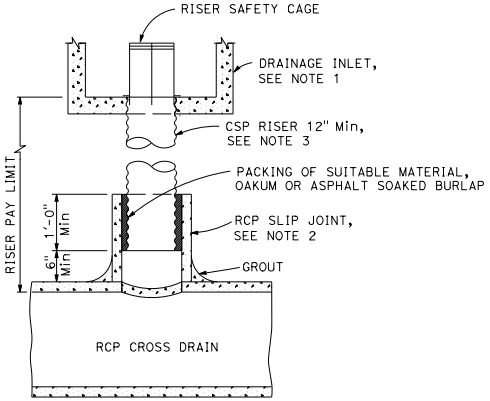
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NOTES:

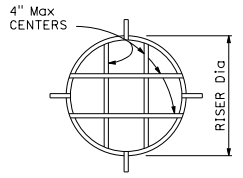
1. Structure at top of riser may be any standard drainage inlet or pipe inlet.
2. Diameter of slip joint to be 3" greater than diameter of riser.
3. Plastic pipe riser may be substituted for CSP riser shown. Slip joint diameter to be as necessary to accommodate plastic pipe outside diameter.
4. For plastic pipe cross drain, use fabricated reducing tee of same material as cross drain as appropriate to provide watertight connection.




CSP RISER FOR DRAINAGE INLET

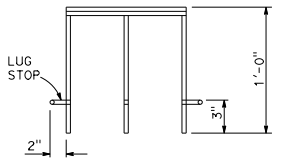



CSP RISER FOR DRAINAGE INLET




PLAN

#3 Bars throughout with welded joints




ELEVATION

RISER SAFETY CAGE DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DRAINAGE INLET RISER CONNECTIONS

NO SCALE

D93B

7-1-25

2025 STANDARD PLAN D93B

Return to Table of Contents

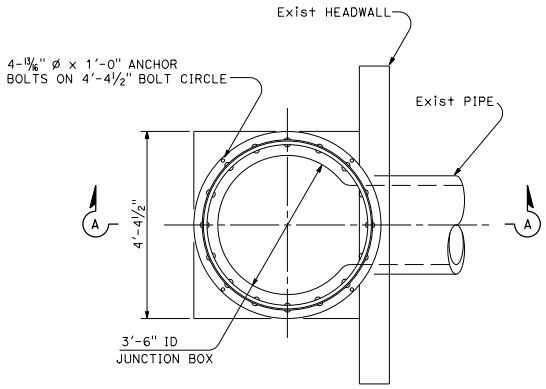
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REGISTERED CIVIL ENGINEER

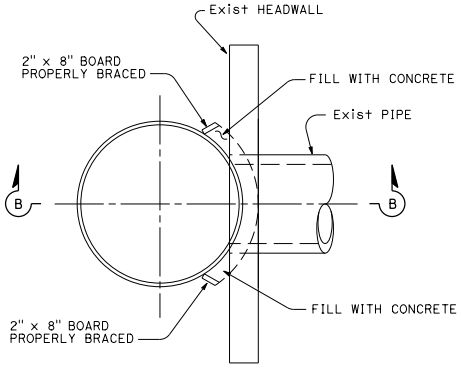
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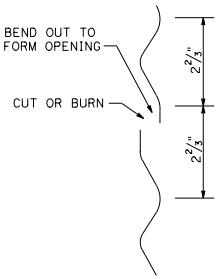
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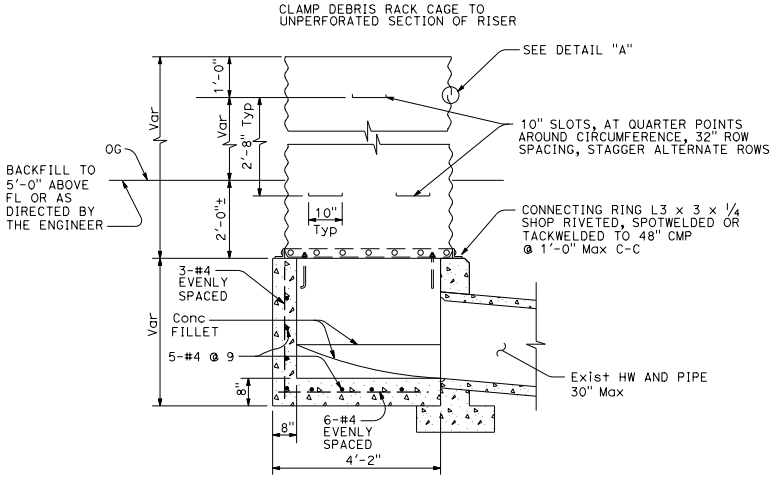

PLAN




PLAN




DETAIL "A"

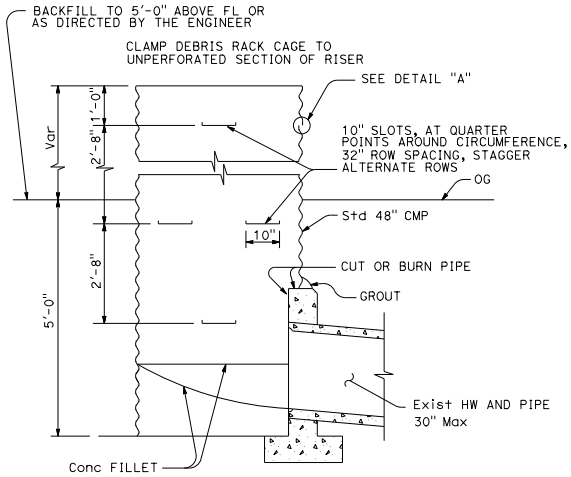



SECTION A-A

CMP RISER

And junction box

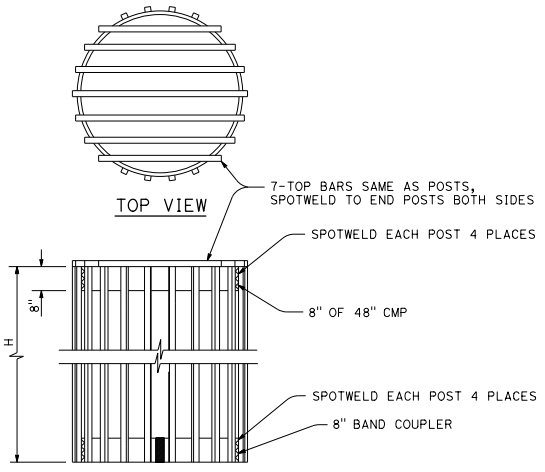
TYPE A




SECTION B-B

CMP RISER

TYPE B




H = 22 Posts- 6'-0" or 8'-0" lengths use 2" pipe or L2 x 2 x 3/16 (Galvanized steel or aluminum)

DEBRIS RACK CAGE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# PIPE RISER WITH DEBRIS RACK CAGE

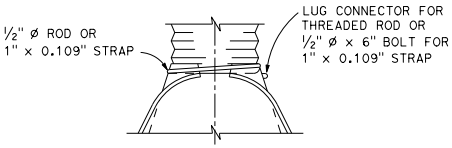
NO SCALE

D93C

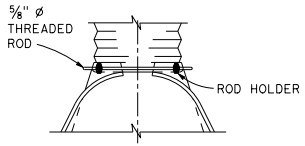
7-1-25

2025 STANDARD PLAN D93C

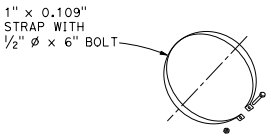
Return to Table of Contents



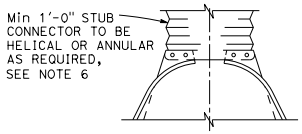

TYPE I



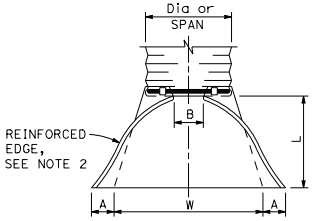

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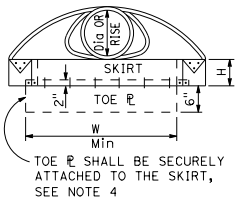

CONNECTOR STRAP DETAIL




TYPE III



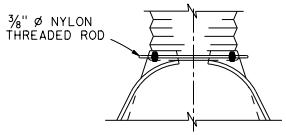

PLAN



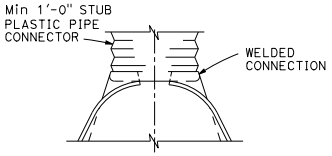

ELEVATION

## ALTERNATIVE CONNECTIONS FOR PIPE TO METAL FLARED END SECTIONS

See Note 7

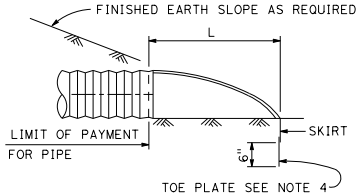



TYPE A
12" - 24"




TYPE B
30" - 36"

## ALTERNATIVE CONNECTIONS FOR PIPE TO PLASTIC FLARED END SECTIONS



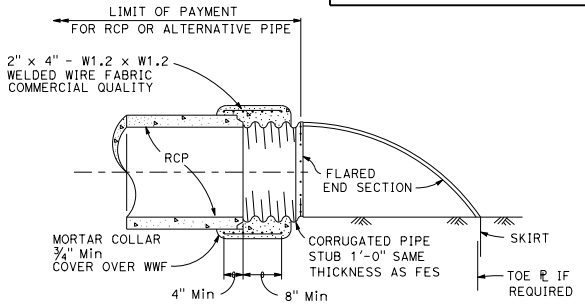

TYPICAL CROSS-SECTION

| CIRCULAR PIPES | | | | | | | |
|---|---|---|---|---|---|---|---|
| PIPE Dia | END SECTION THICKNESS | DIMENSION | | | | | |
| | | A | B | H | L | W | |
| | | 1"± | Max | 1"± | 1½"± | 2"± | |
| 12"* | 0.064" | 6" | 6" | 6" | 1'-9" | 2'-0" | |
| 15"* | 0.064" | 7" | 8" | 6" | 2'-2" | 2'-6" | |
| 18"* | 0.064" | 8" | 10" | 6" | 2'-7" | 3'-0" | |
| 21" | 0.064" | 9" | 1'-0" | 6" | 3'-0" | 3'-6" | |
| 24"* | 0.064" | 10" | 1'-1" | 6" | 3'-5" | 4'-0" | |
| 30"* | 0.079" | 1'-0" | 1'-4" | 8" | 4'-3" | 5'-0" | |
| 36"* | 0.079" | 1'-2" | 1'-7" | 9" | 5'-0" | 6'-0" | |
| 42" | 0.109" | 1'-4" | 1'-10" | 11" | 5'-9" | 7'-0" | |
| 48" | 0.109" | 1'-6" | 2'-3" | 1'-0" | 6'-6" | 7'-6" | |
| 54" | 0.109" | 1'-6" | 2'-6" | 1'-0" | 7'-0" | 8'-6" | |
| 60" | 0.109" | 1'-6" | 2'-9" | 1'-0" | 7'-3" | 9'-6" | |
| 66" | 0.109" | 1'-6" | 3'-0" | 1'-0" | 7'-3" | 10'-0" | |
| 72" | 0.109" | 1'-6" | 3'-3" | 1'-0" | 7'-3" | 10'-6" | |
| 78" | 0.109" | 1'-6" | 3'-6" | 1'-0" | 7'-3" | 11'-0" | |
| 84" | 0.109" | 1'-6" | 3'-9" | 1'-0" | 7'-3" | 11'-6" | |

* Equivalent plastic FES to meet AASHTO M-294 and ASTM D-1248 Specifications, and shall conform to all dimensions shown above except for end section thickness, which may be 0.004" thinner.

| PIPE-ARCHES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DESIGNATION | | END SECTION THICKNESS | DIMENSION | | | | | |
| | | | A | B | H | L | W | |
| SPAN | RISE | | 1"± | Max | 1"± | 1½"± | 2"± | |
| 21" | 15" | 0.064" | 7" | 10" | 6" | 1'-11" | 3'-0" | |
| 24" | 18" | 0.064" | 8" | 1'-0" | 6" | 2'-4" | 3'-6" | |
| 28" | 20" | 0.064" | 9" | 1'-2" | 6" | 2'-8" | 4'-0" | |
| 35" | 24" | 0.079" | 10" | 1'-4" | 6" | 3'-3" | 5'-0" | |
| 42" | 29" | 0.079" | 1'-0" | 1'-6" | 8" | 3'-10" | 6'-3" | |
| 49" | 33" | 0.109" | 1'-1" | 1'-9" | 9" | 4'-5" | 7'-1" | |
| 57" | 38" | 0.109" | 1'-6" | 2'-2" | 1'-0" | 5'-3" | 7'-6" | |
| 64" | 43" | 0.109" | 1'-6" | 2'-6" | 1'-0" | 5'-10" | 8'-6" | |
| 71" | 47" | 0.109" | 1'-6" | 2'-9" | 1'-0" | 6'-5" | 9'-6" | |
| 77" | 52" | 0.109" | 1'-6" | 3'-0" | 1'-0" | 6'-5" | 10'-6" | |
| 83" | 57" | 0.109" | 1'-6" | 3'-3" | 1'-0" | 6'-5" | 11'-6" | |

## FLARED END SECTIONS FOR CORRUGATED METAL AND PLASTIC PIPE CULVERTS




## FLARED END SECTION CONNECTION TO RCP

NOTES:

1. All 3-piece bodies to have 0.109" thick sides and 0.138" thick center panels. Width of center panels to be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams which are to be tightly joined by rivets or bolts.
2. Reinforced edges to be supplemented with stiffener angles for the 60" thru 84" round, 77" x 52" and 83" x 57" pipe-arch sizes. The angles will be 2" x 2" x ¼" for the 60" thru 72" round, 77" x 52" and 83" x 57" pipe-arch sizes and 2½" x 2½" x ¼" for 78" and 84" round. The angles to be attached by ⅜" ø nuts and bolts.
3. Angle reinforcement shall be placed under the center panel seams on the 77" x 52" and 83" x 57" pipe-arch sizes.
4. Toe plate to be available as an accessory when specified.
5. End of pipe to be finished with annular corrugations to conform flared end section so that minimal leakage results from the connection. Other designs may be used with approval of the Engineer.
6. For 12" thru 24" helical end section connection, a universal coupling band attached to the metal end section by rivets, bolts or 1" long shop tack welds spaced at same intervals as dimples may be used in place of the 12" stub. See Standard Plan D97C.
7. The types of alternative connections for pipe to metal flared end sections shall conform to the following:

CIRCULAR PIPES -
12" thru 24" Type I or III
30" thru 84" Type II or III

PIPE-ARCHES -
21" x 15" thru 57" x 38" Type II or III
64" x 43" thru 83" x 57" Type III

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# METAL AND PLASTIC FLARED END SECTIONS

NO SCALE

D94A

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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REGISTERED CIVIL ENGINEER

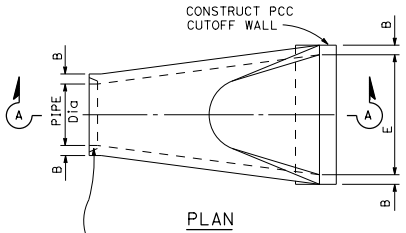
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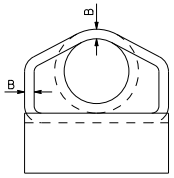
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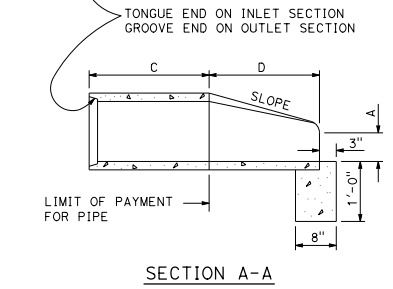
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NOTES:

1. Contractor has the option of using either Type A or B precast concrete flared end section.
2. "C" dimension varies by manufacturer and will be paid for as concrete pipe.

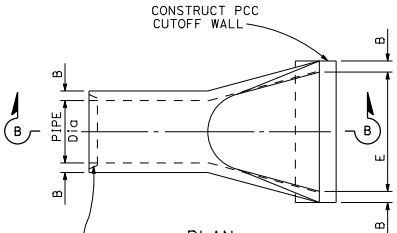


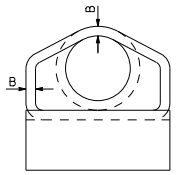



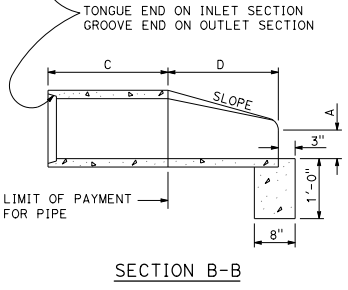




| MINIMUM DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| PIPE Dia | A | B | C | D | E | SLOPE |
| 12" | 4" | 1¾" | SEE NOTE 2 | 2'-0" | 2'-0" | 2:1 OR FLATTER |
| 18" | 9" | 2¼" | | 2'-3" | 3'-0" | |
| 24" | 9½" | 2¾" | | 3'-7½" | 4'-0" | |
| 30" | 1'-0" | 3¼" | | 4'-6" | 5'-0" | |
| 36" | 1'-3" | 3¾" | | 5'-3" | 6'-0" | |
| 42" | 1'-9" | 4¼" | | 5'-3" | 6'-6" | |
| 48" | 2'-0" | 4¾" | | 6'-0" | 7'-0" | |
| 54" | 2'-3" | 5¼" | | 5'-5" | 7'-6" | |

PRECAST CONCRETE FLARED END SECTION TYPE A




| MINIMUM DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| PIPE Dia | A | B | C | D | E | SLOPE |
| 12" | 4" | 1½" | SEE NOTE 2 | 1'-10" | 2'-0" | 2:1 OR FLATTER |
| 18" | 9" | 1¾" | | 2'-1" | 3'-0" | |
| 24" | 9½" | 2¼" | | 3'-6" | 4'-0" | |
| 30" | 1'-0" | 2¾" | | 4'-5" | 5'-0" | |
| 36" | 1'-3" | 3¼" | | 5'-2" | 6'-0" | |
| 42" | 1'-9" | 3½" | | 5'-3" | 6'-6" | |
| 48" | 2'-0" | 4" | | 6'-0" | 7'-0" | |
| 54" | 2'-3" | 4⅜" | | 5'-6" | 6'-10" | |

PRECAST CONCRETE FLARED END SECTION TYPE B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE FLARED END SECTIONS

NO SCALE

D94B

7-1-25

2025 STANDARD PLAN D94B

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

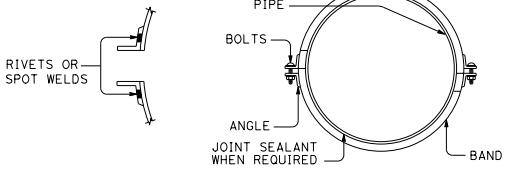
Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
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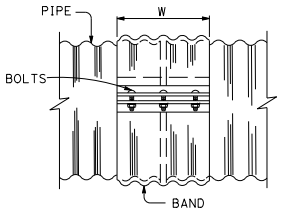
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Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
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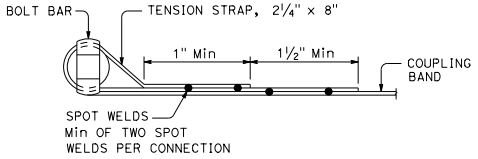



END VIEW

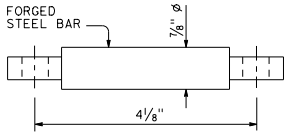



SIDE VIEW

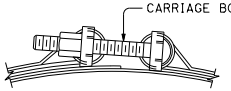
## ANNULAR BAND



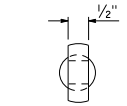

STRAP DETAIL



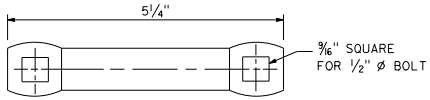

TOP VIEW




BOLT DETAIL



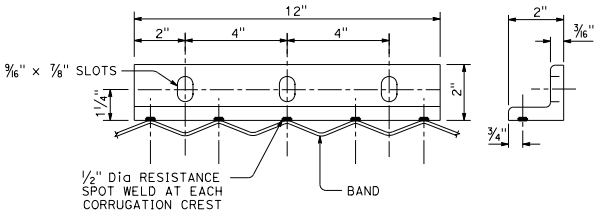

LEFT SIDE VIEW




FRONT VIEW

BAR DETAIL

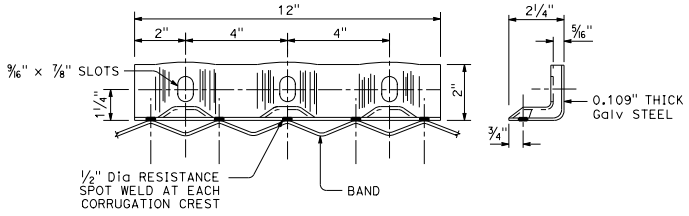
## BAR AND STRAP CONNECTOR




SIDE VIEW END VIEW

2" x 2" x ⅜" ANGLE

See tables on Standard Plans D97E, D97F and D97G for width, W=12" shown.




SIDE VIEW END VIEW

DIE-FORMED ANGLE

See tables on Standard Plans D97E and D97G for width, W=12" shown.

Alternate only for standard joints on pipes through 72" diameter and downdrains through 24" diameter.

## ANGLE CONNECTORS

NOTES:

1. All ferrous metal coupling band connection hardware shall be galvanized or electroplated in accordance with the Standard Specifications.
2. Dimensions and thicknesses shown are minimum.
3. Spot welds shall develop minimum required strength of strap.
4. Fillet welds of equivalent strength may be substituted for spot welds or rivets.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE COUPLING DETAILS No. 1
# ANNULAR COUPLING BAND, BAR AND STRAP, AND ANGLE CONNECTIONS

NO SCALE

**D97A**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

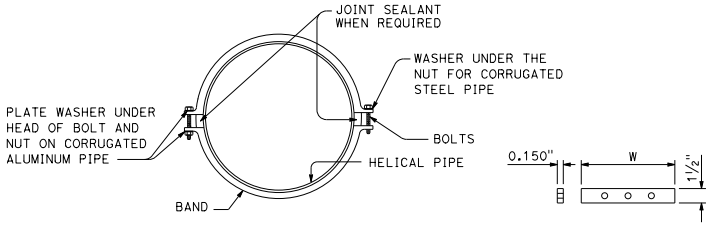
Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

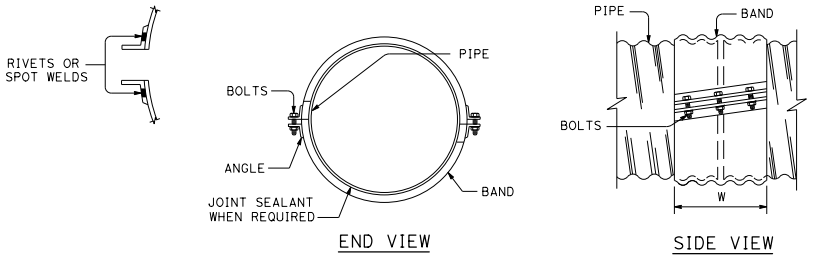
Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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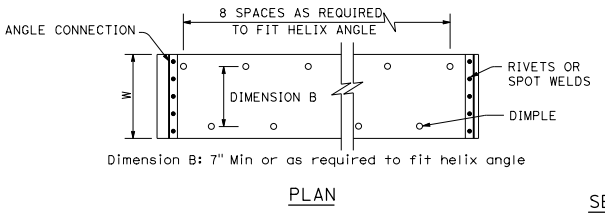


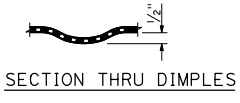

## TWO PIECE INTEGRAL FLANGE DIE FORMED BAND

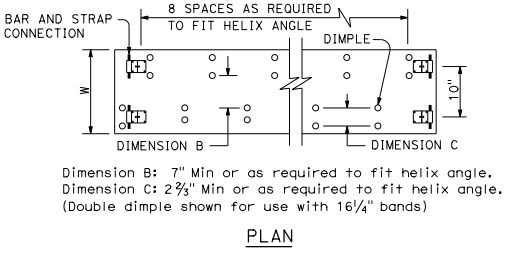



## HELICAL COUPLING BANDS

## HELICAL BAND

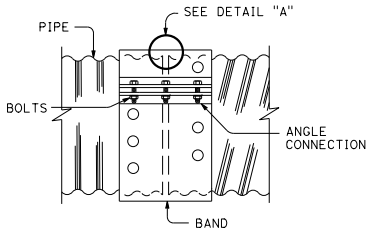


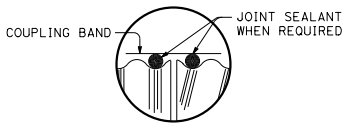



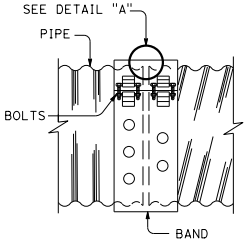




NOTES:

1. All ferrous metal coupling band connection hardware shall be galvanized or electroplated in accordance with the Standard specifications.
2. Dimensions and thicknesses shown are minimum.
3. Spot welds shall develop minimum required strength of strap.
4. Fillet welds of equivalent strength may be substituted for spot welds or rivets.




## UNIVERSAL COUPLING BANDS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE COUPLING DETAILS No. 3
# HELICAL AND UNIVERSAL COUPLERS

NO SCALE

**D97C**

7-1-25

Return to Table of Contents

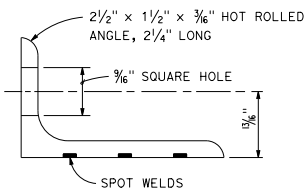
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Sean Penders
REGISTERED CIVIL ENGINEER

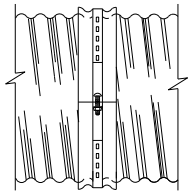
September 19, 2025
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Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

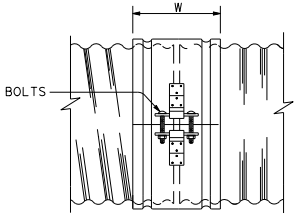
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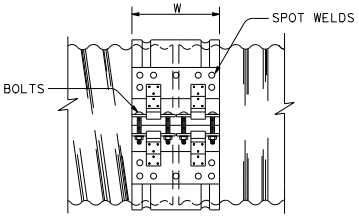

ANGLE



SIDE VIEW
ANGLE



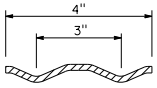

SIDE VIEW
SINGLE BAR AND STRAP




SIDE VIEW
DOUBLE BAR AND STRAP

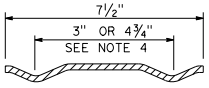
NOTES:

1. Dimensions and thicknesses shown are minimum.
2. Spot welds shall develop minimum required strength of strap.
3. Fillet welds of equivalent strength may be substituted for spot welds or rivets.
4. Dimension depends upon whether end condition is lips up or lips down.



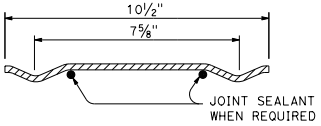

SECTION

H-4 HUGGER BAND



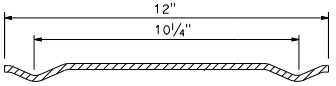

SECTION

H-7 HUGGER BAND




SECTION

H-10 HUGGER BAND




SECTION

H-12 HUGGER BAND

HUGGER COUPLING BANDS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE COUPLING DETAILS No. 4 HUGGER COUPLING BANDS

NO SCALE

D97D

7-1-25

Return to Table of Contents

## ANNULAR AND HELICAL PROFILE

| COUPLING TYPE | PIPE CORRUGATION | PIPE SIZE | W OR A | PIPE WALL THICKNESS CSP | PIPE WALL THICKNESS CAP | BAND THICKNESS CSP | BAND THICKNESS CAP | BAR AND STRAP (CSP ONLY) STRAP THICKNESS | BOLTS Dia | BAR Dia | BAR YIELD STRENGTH | ANGLE DIMENSIONS CSP | ANGLE DIMENSIONS CAP | BOLTS (No.- Dia) CSP | BOLTS (No.- Dia) CAP | RIVETS ANGLE TO BAND CSP | RIVETS ANGLE TO BAND CAP | SPOT WELDS ANGLE TO BAND CSP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TWO PIECE INTEGRAL FLANGE | 1½' x ¼" | 6"-10" | 7" | 0.052"-0.079" | 0.048"-0.060" | 0.052" | 0.060" | | | | | | | 2-⅜" | 2-⅜" | | | |
| | | 12"-18" | 7" | 0.052"-0.079" | | 0.064" | | | | | | | | 2-½" | | | | |
| | 2⅔" x ½" | 12"-24" | 7" | 0.052"-0.079" | 0.060"-0.105" | 0.064" | 0.060" | | | | | | | 2-½" | 2-½" | | | |
| UNIVERSAL | 2⅔" x ½" | THROUGH 36" | 12" | 0.052"-0.138" | 0.060"-0.135" | 0.052" | 0.060" | | | | | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 3-½" |
| | | 42"-60" | 12" | 0.052"-0.168" | 0.075"-0.164" | 0.052" | 0.060" | | | | | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | THROUGH 72" | 12" | 0.052"-0.168" | 0.164" | 0.052" | 0.105" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 78"-84" | 16¼" | 0.168" | | 0.079" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| ANNULAR | 2⅔" x ½" | THROUGH 36" | 7" | 0.064"-0.138" | 0.060"-0.135" | 0.052" | 0.060" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 2-½" | 2-½" | 3-⅜" | 3-⅜" | 3-½" |
| | | 42"-72" | 12" | 0.064"-0.168" | 0.075"-0.164" | 0.052" | 0.105" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 78"-84" | 12" | 0.168" | | 0.079" | | 0.109" | ½" | ⅞" | 45 ksi | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | 3" x 1" | 48"-90" | 14" | 0.064"-0.109" | | 0.052" | | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | | 96"-120" | 14" | 0.079"-0.109" | | 0.052" | | 0.109" | ½" | ⅞" | 45 ksi | 2" x 2" x 3/16" | | 3-½" | | 4-⅜" | | |
| | | 42"-108" | 14" | | 0.060"-0.135" | | 0.060" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | |
| HELICAL | 2⅔" x ½" | THROUGH 36" | 12" | 0.052"-0.138" | 0.060"-0.135" | 0.052" | 0.060" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 3-½" |
| | | 42"-72" | 12" | 0.052"-0.168" | 0.075"-0.164" | 0.052" | 0.060" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 78"-84" | 12" | 0.168" | | 0.079" | | 0.109" | ½" | ⅞" | 45 ksi | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | 3" x 1" | 48"-90" | 14" | 0.064"-0.109" | | 0.052" | | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | | 96"-120" | 14" | 0.079"-0.109" | | 0.052" | | 0.109" | ½" | ⅞" | 45 ksi | 2" x 2" x 3/16" | | 3-½" | | 4-⅜" | | |
| | | 42"-108" | 14" | | 0.060"-0.135" | | 0.060" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | |
| HUGGER | 2⅔" x ½" REROLLED END | 12"-54" | 4" | 0.052"-0.109" | | 0.052" | | | | | | 2½" x 1½" x 3/16" | 2½" x 1½" x 3/16" | 1-½" | | | | 3-½" |
| | | 60"-66" | 4" | 0.109" | | 0.064" | | | | | | 2½" x 1½" x 3/16" | 2½" x 1½" x 3/16" | 1-½" | | | | 3-½" |
| | | 36"-48" | 4" | 0.138" | | 0.064" | | | | | | 2½" x 1½" x 3/16" | 2½" x 1½" x 3/16" | 1-½" | | | | 3-½" |
| | | THROUGH 72" | 10½" | 0.052"-0.168" | | 0.052" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 78"-84" | 10½" | 0.168" | | 0.079" | | 0.109" | ½" | ⅞" | 45 ksi | | | | | | | |
| | 3" x 1" REROLLED END | 48"-90" | 10½" | 0.064"-0.109" | | 0.052" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 96"-120" | 10½" | 0.079"-0.109" | | 0.052" | | 0.109" | ½" | ⅞" | 45 ksi | | | | | | | |
| | 5" x 1" REROLLED END | 48"-66" | 7½" | 0.064"-0.109" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | 2½" x 1½" x 3/16" | 2½" x 1½" x 3/16" | 1-½" | | | | 3-½" |
| | | 72"-90" | 7½" | 0.064"-0.079" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | 2½" x 1½" x 3/16" | 2½" x 1½" x 3/16" | 1-½" | | | | 3-½" |
| | | 48"-90" | 7½" | 0.064"-0.138" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 48"-120" | 12") SEE | 0.064"-0.109" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 48"-84" | 12" NOTE | 0.138" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 90"-120" | 12") 10 | 0.138" | | 0.064" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |

## SPIRAL RIB PROFILE

| COUPLING TYPE | PIPE CORRUGATION | PIPE SIZE | W | PIPE WALL THICKNESS SSRP | PIPE WALL THICKNESS ASRP | BAND THICKNESS SSRP | BAND THICKNESS ASRP | BAR AND STRAP (SSRP ONLY) STRAP THICKNESS | BOLTS Dia | BAR Dia | BAR YIELD STRENGTH | ANGLE DIMENSIONS SSRP | ANGLE DIMENSIONS ASRP | BOLTS (No.- Dia) SSRP | BOLTS (No.- Dia) ASRP | RIVETS ANGLE TO BAND SSRP | RIVETS ANGLE TO BAND ASRP | SPOT WELDS ANGLE TO BAND SSRP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANNULAR | 2⅔" x ½" * REROLLED END | 24"-36" | 12" | 0.064"-0.109" | 0.060"-0.105" | 0.052" | 0.060" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 42"-60" | 12" | 0.064"-0.109" | 0.075"-0.105" | 0.052" | 0.105" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 66"-72" | 12" | 0.064"-0.109" | | 0.052" | | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 78"-114" | 12" | 0.079"-0.109" | | 0.079" | | 0.109" | ½" | ⅞" | 45 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| HUGGER | 2⅔" x ½" * REROLLED END | 24"-72" | 10½" | 0.064"-0.109" | | 0.052" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 78"-84" | 10½" | 0.109" | | 0.079" | | 0.109" | ½" | ⅞" | 45 ksi | | | | | | | |

* See Note 13.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTES:

1. For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.
2. Tension strap may be connected to band with either spot welds or fillet welds that develop minimum required strength of strap.
3. Use 1¼" gage line dimension on attached angle leg for rivets and spot welds.
4. Band thickness shall not be less than:
   a. 3 standard thicknesses lighter than the thickness of the pipe for Corrugated Steel Pipe.
   b. 2 standard thicknesses lighter than the thickness of the pipe and in no case lighter than 0.060" for Corrugated Aluminum Pipe.
5. Dimensions, thicknesses and strengths shown are minimum.
6. For pipe arches use same width band as for round pipe of equal periphery.
7. Fillet welds of equivalent strength may be substituted for spot welds or rivets.
8. Spot welds shall develop minimum required strength of strap.
9. Pipe with rerolled ends having at least two 2⅔" x ½" annular corrugations at each end with or without an upturned flange may be connected with any of the annular coupling bands shown for pipe of the same diameter and wall thickness and having 2⅔" x ½" corrugations.
10. In the case of H-12 huggerbands, two piece bands are required for diameters through 96" and three piece bands are required for diameters 102" through 120".
11. Two piece bands are required for pipes greater than 42" diameter.
12. The 2¼" x 2" x 0.109" thick galvanized die-formed angle connector may be used in lieu of the 2" x 2" x 3/16" angle connector for standard joints only on pipes through 72" diameter.
13. All profiles of Spiral Rib Pipe (¾" x ¾" ribs at 7½" pitch and ¾" x 1" ribs at 11½" pitch in both steel and aluminum and ¾" x 1" ribs at 8½" pitch in steel only) shall be manufactured with rerolled ends. Corrugation profile of the rerolled ends shall be 2⅔" x ½" annual corrugations with a minimum of two full corrugations at each end.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE COUPLING DETAILS No. 5 STANDARD JOINT

D97E



7-1-25

Return to Table of Contents

## ANNULAR AND HELICAL PROFILE

| COUPLING TYPE | PIPE CORRUGATION | PIPE SIZE | W OR A | PIPE WALL THICKNESS | | BAND THICKNESS | | BAR AND STRAP (CSP ONLY) | | | | ANGLE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | DIMENSIONS | | BOLTS (No. - Dia) | | RIVETS ANGLE TO BAND | | SPOT WELDS ANGLE TO BAND |
| | | | | CSP | CAP | CSP | CAP | STRAP THICKNESS | BOLTS Dia | BAR Dia | BAR YIELD STRENGTH | CSP | CAP | CSP | CAP | CSP | CAP | CSP |
| TWO PIECE INTEGRAL FLANGE | 1½" x ¼" | 6"-10" | 7" | 0.064"-0.079" | 0.060" | 0.064" | 0.060" | | | | | | | 2-⅜" | 2-⅜" | | | |
| | 2⅔" x ½" | 12"-24" | 12" | | 0.060"-0.105" | | 0.060" | | | | | | | | 3-½" | | | |
| UNIVERSAL | 2⅔" x ½" | THROUGH 36" | 12" | 0.064"-0.138" | 0.060"-0.135" | 0.064" | 0.060" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 42"-60" | 16¼" | 0.064"-0.168" | 0.060"-0.164" | 0.064" | 0.060" | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x ¼" | 2" x 2" x ¼" | 4-½" | 4-½" | 5-⅜" | 5-⅜" | |
| ANNULAR | 2⅔" x ½" | THROUGH 36" | 12" | 0.064"-0.138" | 0.060"-0.135" | 0.064" | 0.060" | | | | | 2" x 2" x 5/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 42"-60" | 12" | 0.064"-0.079" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | | 42"-60" | 12" | 0.109"-0.168" | 0.135"-0.164" | 0.064" | 0.075" | | | | | 2" x 2" x ¼" | 2" x 2" x ¼" | 3-½" | 3-½" | 5-⅜" | 5-⅜" | |
| | | 66"-72" | 24" | | 0.164" | | 0.105" | | | | | | 2" x 2" x ¼" | | 5-½" | | 5-½" | |
| | | 66"-84" | 24" | 0.109"-0.168" | | 0.064" | | | | | | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | | |
| | | 42"-54" | 12" | | 0.060"-0.105" | | 0.060" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | |
| | 3" x 1" | 48"-60" | 14" | 0.064"-0.079" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | | 48"-60" | 14" | 0.109" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 5-⅜" | | |
| | | 66"-120" | 25" | 0.064"-0.109" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 5-½" | | 9-⅜" | | |
| | | 42"-60" | 14" | | 0.060"-0.105" | | 0.060" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 5-⅜" | |
| | | 42"-60" | 14" | | 0.135" | | 0.075" | | | | | | 2" x 2" x ¼" | | 3-½" | | 5-⅜" | |
| | | 66"-96" | 25" | | 0.060"-0.135" | | 0.060" | | | | | | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | |
| | | 96"-108" | 25" | | 0.135" | | 0.075" | | | | | | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | |
| HELICAL | 2⅔" x ½" | THROUGH 36" | 12" | 0.064"-0.138" | 0.060"-0.135" | 0.064" | 0.060" | | | | | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 42"-54" | 12" | | 0.060"-0.105" | | 0.060" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | |
| | | 42"-60" | 12" | 0.064"-0.079" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | | 42"-60" | 12" | 0.109"-0.168" | 0.135"-0.164" | 0.064" | 0.075" | | | | | 2" x 2" x ¼" | 2" x 2" x ¼" | 3-½" | 3-½" | 5-⅜" | 5-⅜" | |
| | | 66'-84" | 24" | 0.109"-0.168" | | 0.064" | | | | | | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | | |
| | | 66"-72" | 24" | | 0.164" | | 0.105" | | | | | | 2" x 2" x ¼" | | 5-½" | | 5-⅜" | |
| | 3" x 1" | 48"-60" | 14" | 0.064"-0.079" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 3-⅜" | | 5-½" |
| | | 48"-60" | 14" | 0.109" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 5-⅜" | | |
| | | 66"-120" | 25" | 0.064"-0.109" | | 0.064" | | | | | | 2" x 2" x 3/16" | | 5-½" | | 9-⅜" | | |
| | | 42"-60" | 14" | | 0.060"-0.105" | | 0.060" | | | | | | 2" x 2" x 3/16" | | 3-½" | | 5-⅜" | |
| | | 42"-60" | 14" | | 0.135" | | 0.075" | | | | | | 2" x 2" x ¼" | | 3-½" | | 5-⅜" | |
| | | 66"-96" | 25" | | 0.060"-0.135" | | 0.060" | | | | | | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | |
| | | 96"-108" | 25" | | 0.135" | | 0.075" | | | | | | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | |
| HUGGER | 2⅔" x ½" REROLLED END | THROUGH 48" | 10½" | 0.109" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 54"- 66" | 10½" | 0.109" | | 0.064" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | THROUGH 54" | 10½" | 0.064"-0.079" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | THROUGH 60" | 10½" | 0.138" | | 0.079" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 66"-72" | 10½" | 0.138" | | 0.109" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | THROUGH 72" | 10½" | 0.168" | | 0.109" | | DOUBLE 0.109" | ½" | ⅞" | 45 ksi | | | | | | | |
| | 3" x 1" REROLLED END | 48"-84" | 10½" | 0.109" | | 0.079" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 48"-90" | 10½" | 0.064"-0.079" | | 0.064" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 96"-102" | 10½" | 0.079" | | 0.079" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 90"-120" | 10½" | 0.109" | | 0.109" | | DOUBLE 0.109" | ½" | ⅞" | 45 ksi | | | | | | | |

## SPIRAL RIB PROFILE

| COUPLING TYPE | PIPE CORRUGATION | PIPE SIZE | W | PIPE WALL THICKNESS | | BAND THICKNESS | | BAR AND STRAP (SSRP ONLY) | | | | ANGLE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | DIMENSIONS | | BOLTS (No.- Dia) | | RIVETS ANGLE TO BAND | | SPOT WELDS ANGLE TO BAND |
| | | | | SSRP | ASRP | SSRP | ASRP | STRAP THICKNESS | BOLTS Dia | BAR Dia | BAR YIELD STRENGTH | SSRP | ASRP | SSRP | ASRP | SSRP | ASRP | SSRP |
| ANNULAR | 2⅔" x ½" * REROLLED END | 24"-36" | 12" | 0.064"-0.109" | 0.060"-0.105" | 0.064" | 0.060" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 42"-60" | 12" | 0.064"-0.079" | 0.075"-0.105" | 0.064" | 0.075" | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x 3/16" | 2" x 2" x 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 5-½" |
| | | 42"-60" | 12" | 0.109" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x ¼" | | 3-½" | | 5-⅜" | | |
| | | 66"-84" | 24" | 0.109" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | 2" x 2" x ¼" | | 5-½" | | 7-⅜" | | |
| HUGGER | 2⅔" x ½" * REROLLED END | 24"-54" | 10½" | 0.064"-0.079" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 24"-48" | 10½" | 0.109" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |
| | | 54"-66" | 10½" | 0.109" | | 0.064" | | DOUBLE 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |

* See Note 12.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTES:

1. For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.
2. Tension strap may be connected to band with either spot welds or fillet welds that develop minimum required strength of strap.
3. Use 1¼" gage line dimension on attached angle leg for rivets and spot welds.
4. Band thickness shall not be less than:
   a. 3 standard thicknesses lighter than the thickness of the pipe for Corrugated Steel Pipe.
   b. 2 standard thicknesses lighter than the thickness of the pipe and in no case lighter than 0.060" for Corrugated Aluminum Pipe.
5. Dimensions, thicknesses and strengths shown are minimum.
6. For pipe arches use same width band as for round pipe of equal periphery.
7. Fillet welds of equivalent strength may be substituted for spot welds or rivets.
8. Spot welds shall develop minimum required strength of strap.
9. Pipe with rerolled ends having at least two 2⅔" x ½" annular corrugations at each end with or without an upturned flange may be connected with any of the annular coupling bands shown for pipe of the same diameter and wall thickness and having 2⅔" x ½" corrugations.
10. In the case of H-12 huggerbands, two piece bands are required for diameters through 96" and three piece bands are required for diameters 102" through 120".
11. Two piece bands are required for pipes greater than 42" diameter.
12. All profiles of Spiral Rib Pipe (¾" x ¾" ribs at 7½" pitch and ¾" x 1" ribs at 11½" pitch in both steel and aluminum and ¾" x 1" ribs at 8½" pitch in steel only) shall be manufactured with rerolled ends. Corrugation profile of the rerolled ends shall be 2⅔" x ½" annual corrugations with a minimum of two full corrugations at each end.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE COUPLING DETAILS No. 6 POSITIVE JOINT

D97F

7-1-25

2025 STANDARD PLAN D97F



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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## ANNULAR AND HELICAL PROFILE

| COUPLING TYPE | PIPE CORRUGATION | PIPE SIZE | W OR A | PIPE WALL THICKNESS | | BAND THICKNESS | | BAR AND STRAP (CSP ONLY) | | | | ANGLE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | DIMENSIONS | | BOLTS (No.- Dia) | | RIVETS ANGLE TO BAND | | SPOT WELDS ANGLE TO BAND |
| | | | | CSP | CAP | CSP | CAP | STRAP THICKNESS | BOLTS Dia | BAR Dia | BAR YIELD STRENGTH | CSP | CAP | CSP | CAP | CSP | CAP | CSP |
| TWO PIECE INTEGRAL FLANGE | 1½′ × ¼" | 6" | 7" | 0.064"-0.168" | | 0.052" | | | | | | | | 3-⅜" | | | | |
| | 1½′ × ¼" | 8"-10" | 7" | 0.064"-0.168" | 0.060"-0.164" | 0.064" | 0.060" | | | | | | | 3-⅜" | 3-⅜" | | | |
| ANNULAR | 2⅔" × ½" | THROUGH 24" | 12" | 0.064"-0.168" | 0.060"-0.164" | 0.064" | 0.060" | | | | | 2" × 2" × 3/16" | 2" × 2" × 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 3-½" |
| HUGGER | 2⅔" × ½" REROLLED END | THROUGH 24" | 10½" | 0.064"-0.168" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |

## SPIRAL RIB PROFILE

| COUPLING TYPE | PIPE CORRUGATION | PIPE SIZE | W | PIPE WALL THICKNESS | | BAND THICKNESS | | BAR AND STRAP (SSRP ONLY) | | | | ANGLE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | DIMENSIONS | | BOLTS (No.- Dia) | | RIVETS ANGLE TO BAND | | SPOT WELDS ANGLE TO BAND |
| | | | | SSRP | ASRP | SSRP | ASRP | STRAP THICKNESS | BOLTS Dia | BAR Dia | BAR YIELD STRENGTH | SSRP | ASRP | SSRP | ASRP | SSRP | ASRP | SSRP |
| ANNULAR | 2⅔" × ½" * REROLLED END | 24" | 12" | 0.064"-0.168" | 0.060"-0.164" | 0.064" | 0.060" | | | | | 2" × 2" × 3/16" | 2" × 2" × 3/16" | 3-½" | 3-½" | 3-⅜" | 3-⅜" | 3-½" |
| HUGGER | 2⅔" × ½" * REROLLED END | 24" | 10½" | 0.064"-0.168" | | 0.064" | | 0.079" | ½" | ⅞" | 32 ksi | | | | | | | |

* See Note 11.

NOTES:

1. For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.
2. Tension strap may be connected to band with either spot welds or fillet welds that develop minimum required strength of strap.
3. Use 1¼" gage line dimension on attached angle leg for rivets and spot welds.
4. Band thickness shall not be less than:
   a. 3 standard thicknesses lighter than the thickness of the pipe for Corrugated Steel Pipe.
   b. 2 standard thicknesses lighter than the thickness of the pipe and in no case lighter than 0.060" for Corrugated Aluminum Pipe.
5. Dimensions, thicknesses and strengths shown are minimum.
6. For pipe arches use same width band as for round pipe of equal periphery.
7. Fillet welds of equivalent strength may be substituted for spot welds or rivets.
8. Spot welds shall develop minimum required strength of strap.
9. Pipe with rerolled ends having at least two 2⅔" × ½" annular corrugations at each end with or without an upturned flange may be connected with any of the annular coupling bands shown for pipe of the same diameter and wall thickness and having 2⅔" × ½" corrugations.
10. For downdrain applications, two piece integral flange couplers shall have factory applied sleeve type rubber gaskets with a minimum length of 7" measured along the length of the pipe.
11. All profiles of Spiral Rib Pipe (¾" × ¾" ribs at 7½" pitch and ¾" × 1" ribs at 11½" pitch in both steel and aluminum and ¾" × 1" ribs at 8½" pitch in steel only) shall be manufactured with rerolled ends. Corrugation profile of the rerolled ends shall be 2⅔" × ½" annual corrugations with a minimum of two full corrugations at each end.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED METAL PIPE COUPLING DETAILS No. 7 DOWNDRAIN

D97G

7-1-25



Return to Table of Contents

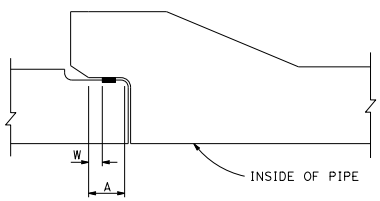
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Sean Penders
REGISTERED CIVIL ENGINEER

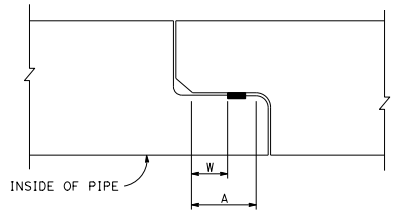
September 19, 2025
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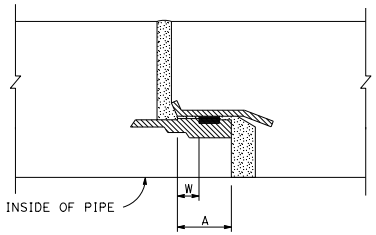

CONCRETE JOINT-FLARED BELL DESIGN



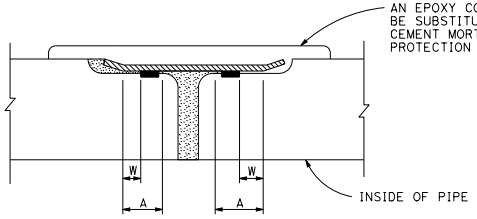

CONCRETE JOINT-FLUSH BELL DESIGN

LEGEND

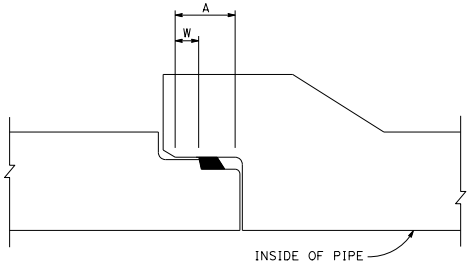
- CEMENT MORTAR
- RUBBER GASKET
- STEEL




STEEL JOINT-FLUSH BELL DESIGN

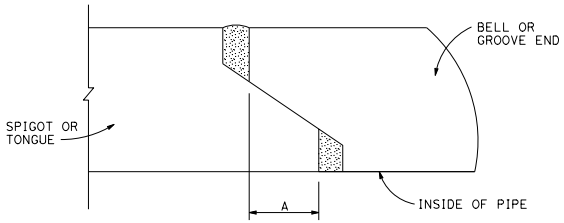



CONCRETE JOINT-DOUBLE GASKET DESIGN



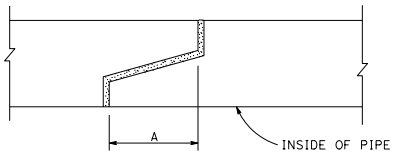

CONCRETE JOINT-SINGLE OR DOUBLE OFFSET DESIGN

Flared or Flush Bell




SELF-CENTERING TONGUE & GROOVE

See Note 4




TONGUE & GROOVE DESIGN

NOTES:

1. For pipe sections installed on straight alignment, the pipe sections shall be joined to provide maximum joint overlap at all points on the joint periphery, but in no case less than the values shown in Table A for "W" if the installation is required to be watertight or "A" for all other installations.
2. For pipe sections installed on curved alignment, the pipe sections shall be joined to provide maximum joint overlap on one side of the joint and not less than 1/4" overlap on the other. The 1/4" overlap shall be the "W" dimension for installations required to be watertight, or the "A" dimension for all other installations.
3. Watertight joint requirement shall typically be met with the use of rubber gaskets as shown. Pipe installed with rubber gaskets shall have a minimum overlap meeting or exceeding the indicated "W" dimension shown in Table A or indicated in Note 2. Joints shown with rubber gaskets may be installed without gaskets in non-watertight applications, in which case the joint shall be sealed with sealing materials and the minimum joint overlap shall meet or exceed the "A" dimension shown in Table A or indicated in Note 2.
4. For Self-Centering Tongue and Groove Joints, the mortar shall be applied after the pipe ends are pushed together. The mortar shall be applied to the joint gap on the inside of the pipe for pipe diameters of 24" or more, or to the gap on the outside of the pipe for pipe smaller than 24" in diameter.
5. When watertight joints are required (See Note 3) and cement mortar joints are not allowed, the taper on surfaces within the "W" dimension at full joint closure and the opposing sealing surfaces of the bells and spigots on which the rubber gaskets may bear during closure of the joint and at any degree of partial closure shall form an angle of not more than 2 degrees with the longitudinal axis of the pipe.

TABLE A

| PIPE DIAMETER LIMITS | MINIMUM JOINT OVERLAP | | | |
|---|---|---|---|---|
| | STANDARD "A" | POSITIVE "A" | STANDARD "W" | POSITIVE "W" |
| 6" THROUGH 12" | 1/4" | 1/2" | 1/4" | 3/8" |
| 15" THROUGH 33" | 1/2" | 3/4" | 1/4" | 1/2" |
| GREATER THAN 33" | 3/4" | 1" | 3/8" | 5/8" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# REINFORCED CONCRETE PIPE OR NON-REINFORCED CONCRETE PIPE STANDARD AND POSITIVE JOINTS

NO SCALE

D97H

7-1-25

2025 STANDARD PLAN D97H

Return to Table of Contents

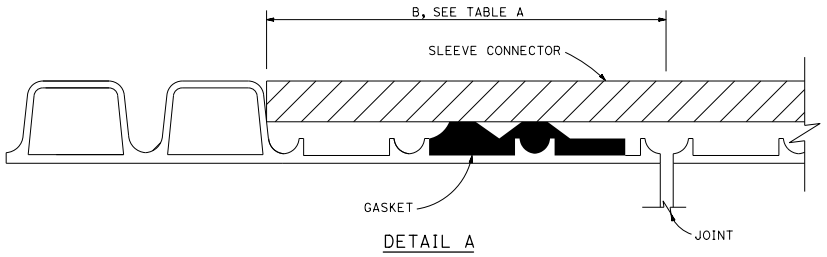
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Sean Penders
REGISTERED CIVIL ENGINEER

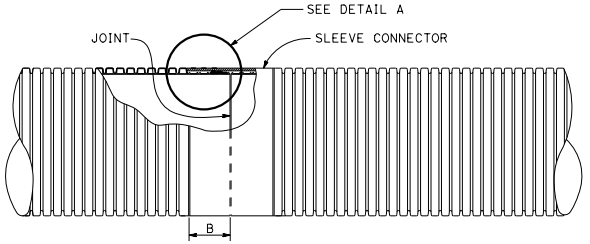
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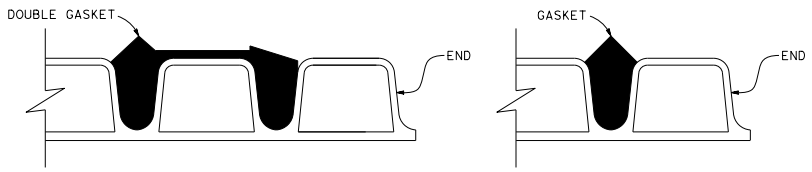
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DETAIL A

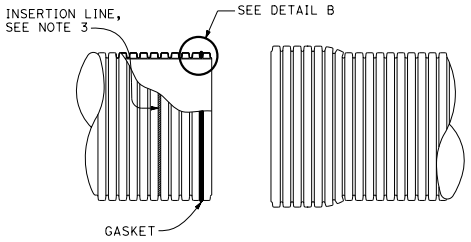



PLAN VIEW
LINER INSERT
See Note 4

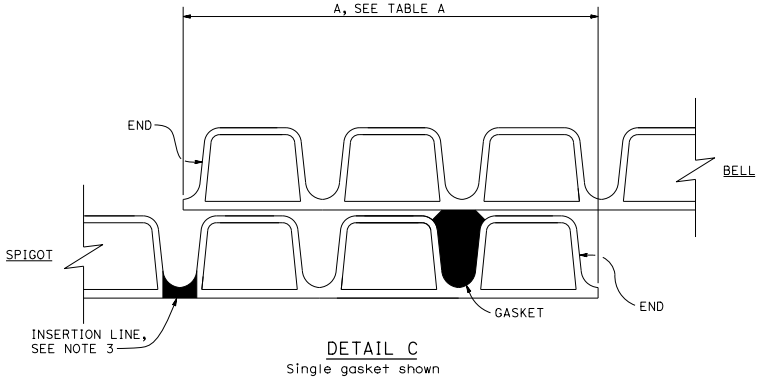



DOUBLE GASKET SINGLE GASKET

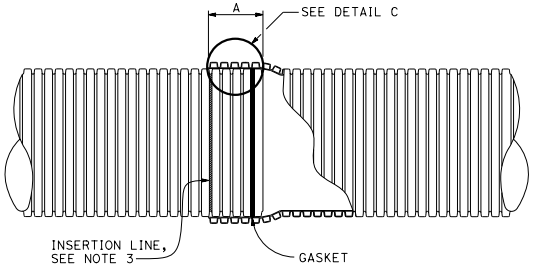
DETAIL B




SPIGOT BELL




DETAIL C
Single gasket shown




BELL AND SPIGOT JOINT

NOTES:

1. For pipe sections installed on straight alignment, the pipe sections shall be joined to achieve maxium joint overlap at all points on the periphery as indicated in Table A where the plans call for positive or watertight joints. Maxium joint overlap is recommended where the plans call for standard joints, but in no case shall the joint overlap be less than 3½".
2. For pipe sections installed on curved alignment, the maxium angle of deflection from straight alignment at any joint shall not exceed two degrees. Where the plans call for watertightness, field testing for compliance is required. Where plans call for positive joints, the pipe sections shall be joined to achieve Table A Dimensions on one side of the joint. Joints classified as standard shall have no less than 3½" joint overlap at any point on the periphery.
3. Factory applied insertion line limit shall be placed on spigot.
4. Liner insert to be used inside of existing pipe.

TABLE A

| JOINT OVERLAP DIMENSIONS | | |
|---|---|---|
| PIPE Dia (NOMINAL) | A | B |
| 12" | 5¾" | 4¼" |
| 15" | 6¾" | 5⅝" |
| 18" | 6¾" | 5⅝" |
| 21" | 8½" | 5⅝" |
| 24" | 8½" | 6⅛" |
| 30" | 8½" | 7⅛" |
| 36" | 8½" | 8⅛" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CORRUGATED POLYVINYL CHLORIDE PIPE WITH SMOOTH INTERIOR STANDARD AND POSITIVE JOINTS

NO SCALE

D97I

2025 STANDARD PLAN D97I

7-1-25

Return to Table of Contents

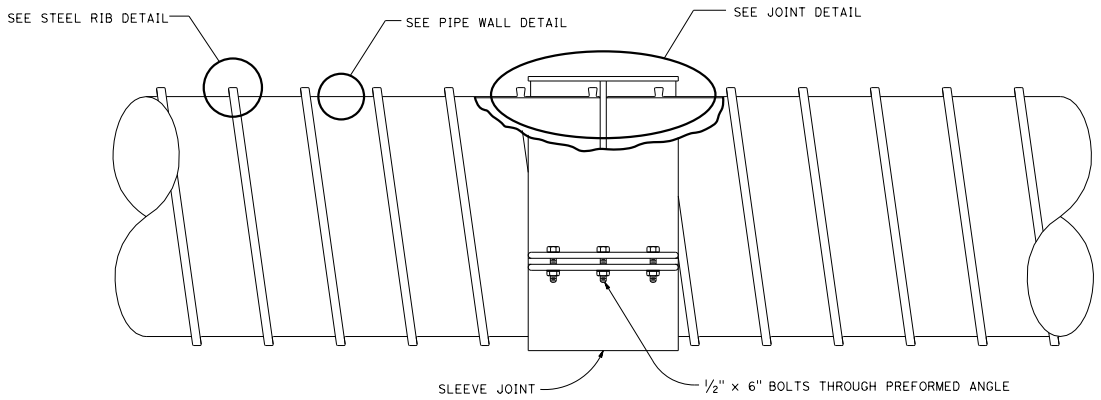
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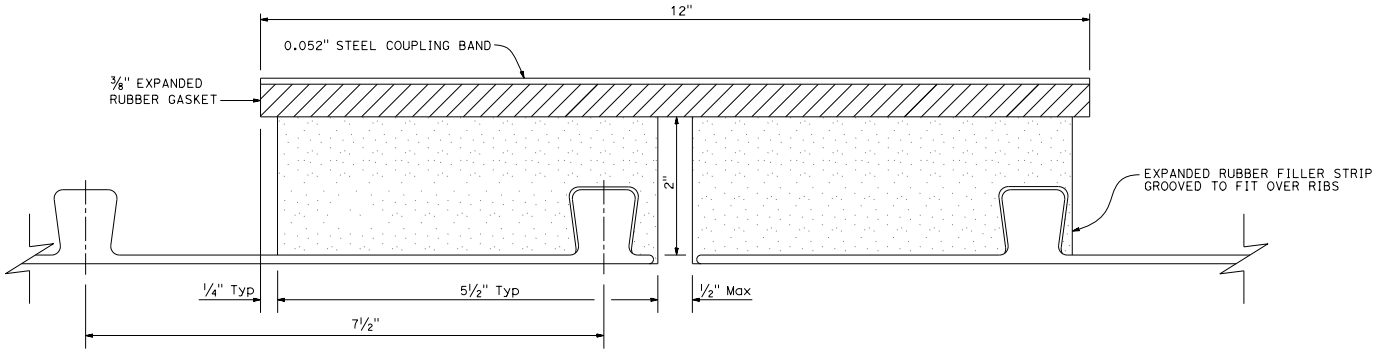
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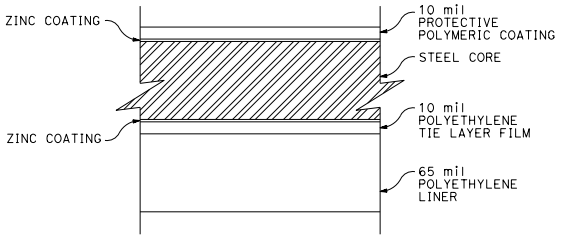
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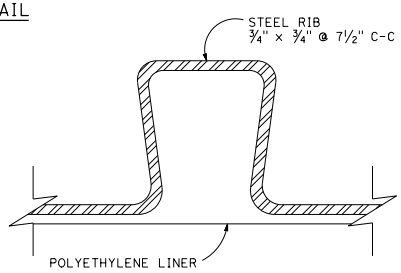

COMPOSITE STEEL SPIRAL RIB PIPE




JOINT DETAIL




PIPE WALL DETAIL




STEEL RIB DETAIL

NOTES:

1. See Standard Plan A62F for backfill details.
2. See Standard Plan D97C for Universal Coupling details.
3. Strap joint connection shall consist of 2 separate bolted preformed connectors joined to form one strap when pipe inside diameter is greater than or equal to 60".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

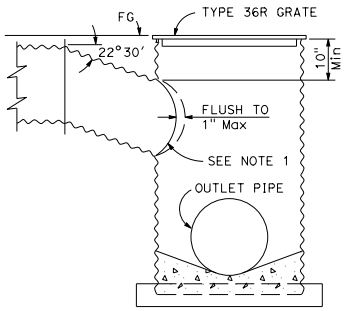
# COMPOSITE STEEL SPIRAL RIB PIPE WITH SMOOTH INTERIOR STANDARD JOINT

NO SCALE

**D97J**

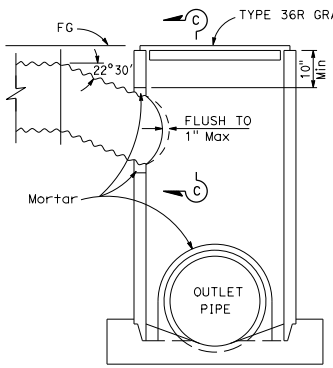
7-1-25

Return to Table of Contents



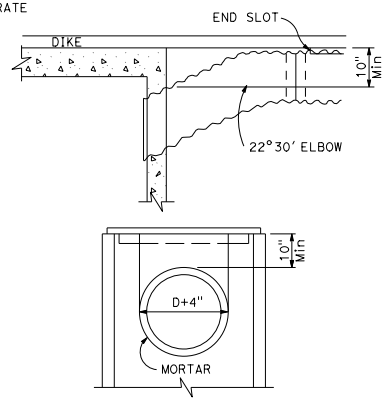

TYPE GMP INLET

See Standard Plans D75A, D75C and D77B for additional inlet details.



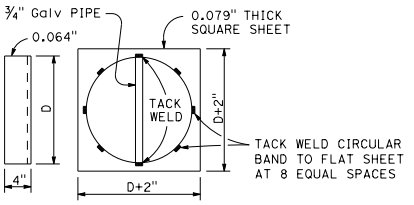

TYPE GCP INLET

See Standard Plans D75B, D75C and D77B for additional inlet details.




SECTION C-C

SLOTTED DRAIN CONNECTIONS TO STANDARD INLET STRUCTURES




METAL CAP DETAIL

See Note 2

NOTES:

1. Either field joint sealed with a pliable mixture of sand, portland cement and emulsified asphalt (mixture of 1 part portland cement, 3-5 parts sand and 1½ parts SSI emulsified asphalt) or continuous weld.
2. "D" equals nominal pipe diameter.

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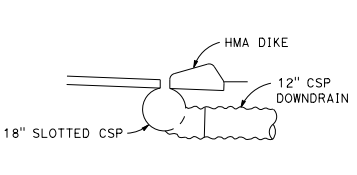
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September 19, 2025

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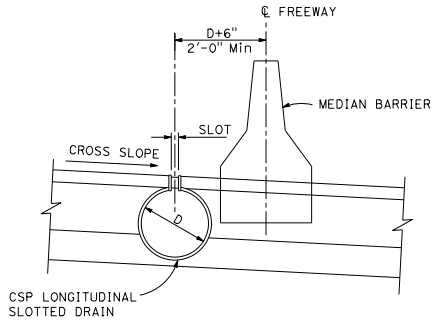
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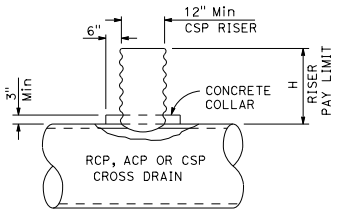



ELEVATION PLAN

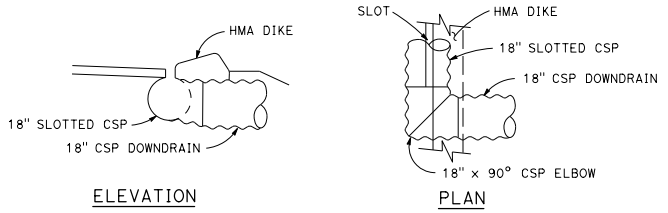
SHOULDER INSTALLATION 18" SLOTTED CSP TO 12" DOWNDRAIN




TYPICAL CROSS SECTION

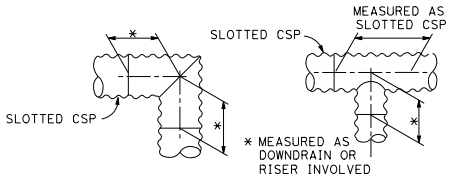



RISER CONNECTION DETAIL

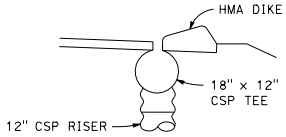



ELEVATION PLAN

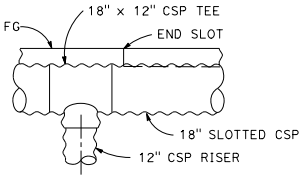
SHOULDER INSTALLATION 18" SLOTTED CSP TO 18" CSP DOWNDRAIN




MEASUREMENT OF CORRUGATED STEEL PIPE ELBOWS AND TEES USED WITH SLOTTED DRAINS




ELEVATION-END VIEW




ELEVATION-SIDE VIEW

SHOULDER INSTALLATION 18" SLOTTED CSP TO 12" CSP RISER

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**SLOTTED CORRUGATED STEEL PIPE DRAIN DETAILS**

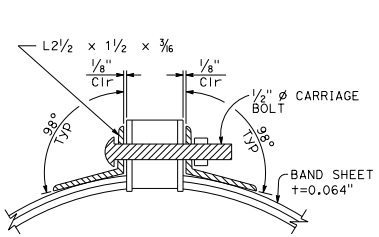
NO SCALE

**D98A**

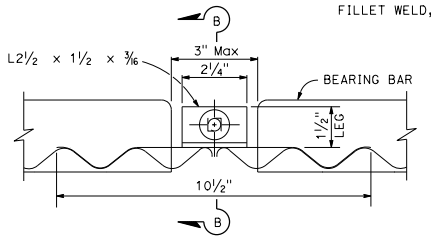
7-1-25



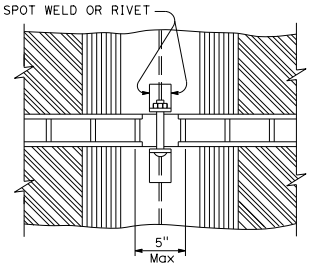
Return to Table of Contents




SECTION B-B

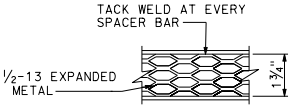



ELEVATION

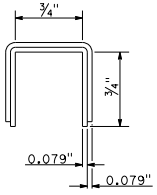



PART PLAN

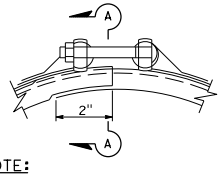
## MODIFIED HUGGER BAND




HEEL GUARD
See Note 8

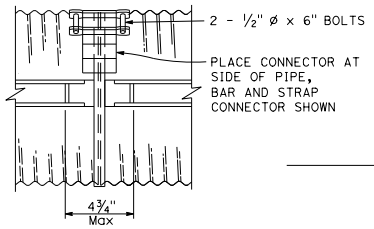



PARTIAL SECTION A-A

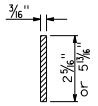



SIDE VIEW

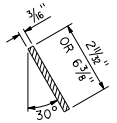
NOTE:
As an alternate to swagged end an oversized bridge clip may be used.



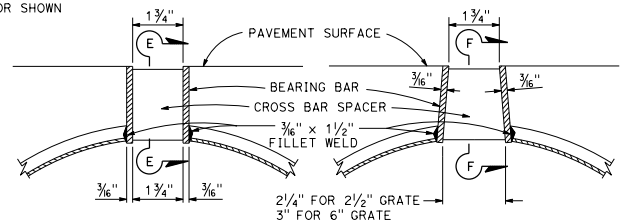

PART PLAN




SECTION E-E

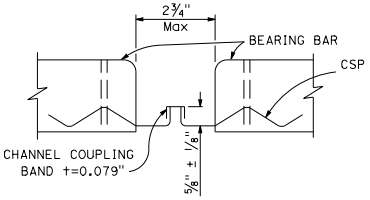



SECTION F-F




RECTANGULAR SPACER TAPERED SPACER

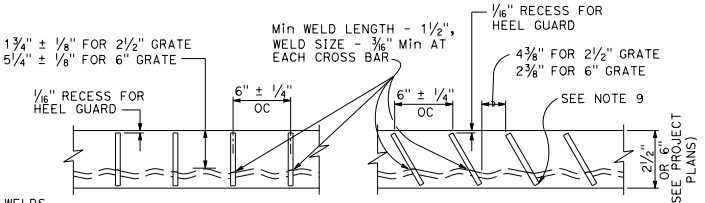
## GRATE SLOT-SECTION




ELEVATION

## BAR & STRAP CONNECTOR

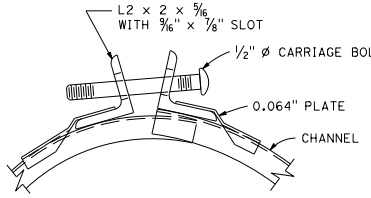
See Standard Plan D97A



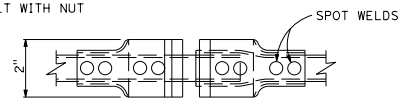

RECTANGULAR SPACER TAPERED SPACER

## GRATE SLOT-LONGITUDINAL ELEVATION VIEW

See Note 10



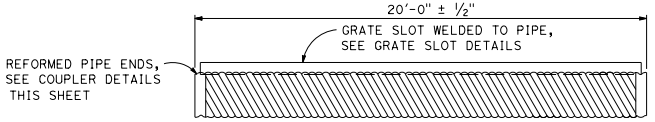

SIDE VIEW



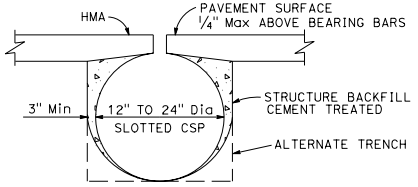

PART PLAN

ANGLE CONNECTOR

## CHANNEL COUPLING BAND




## SLOTTED CORRUGATED STEEL PIPE




## BACKFILL

NOTES:

1. Drain pipe seams may be continuous helical lock seam or helical weld seam.
2. Drain sections shall be assembled with either of the coupling bands shown.
3. The cross bar spacer shall be welded to the bearing bars in such a manner as to develop a minimum tensile strength of 12,000 LBS normal to the longitudinal axis of the bearing bars.
4. The maximum variance from a straight line between the extreme top corners of the bearing bars shall be ½" in 20'-0".
5. Spot welds shall develop minimum required strength of strap.
6. Dimensions shown are minimums.
7. Minimum pipe wall thickness is 0.064".
8. Use heel guard when specified.
9. Bottom edge of cross bar spacer offset in direction of flow.
10. Unless otherwise shown on the plans or specified in the special provisions, cross bar spacers shall be either rectangular or tapered at the contractor's option.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SLOTTED CORRUGATED STEEL PIPE DRAIN DETAILS

NO SCALE

D98B

7-1-25



Return to Table of Contents

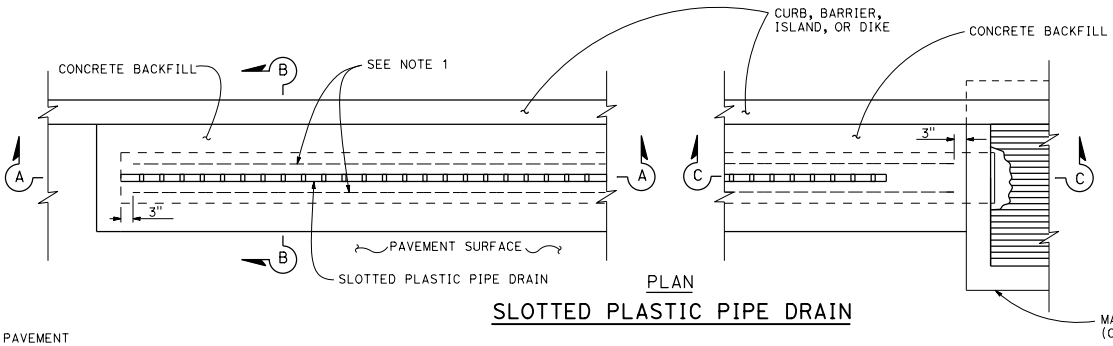
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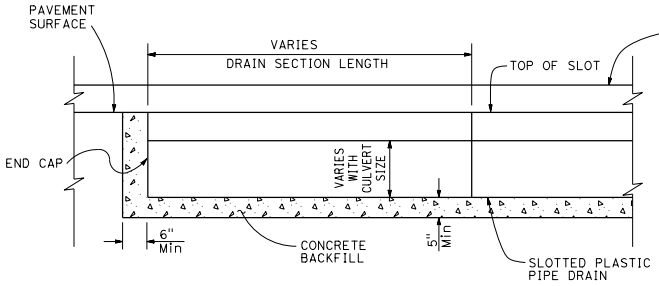



PLAN

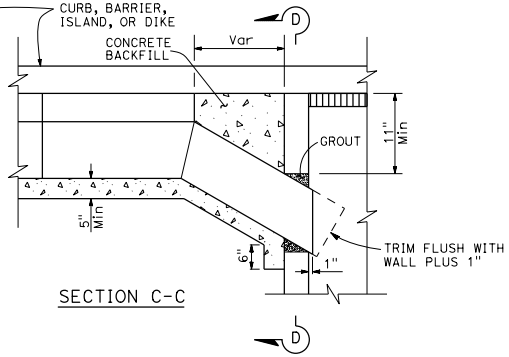
## SLOTTED PLASTIC PIPE DRAIN

NOTES:

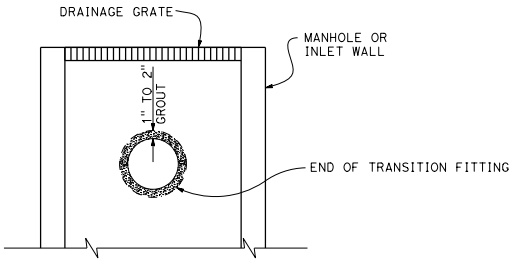
1. Lateral support, #4 bar, to be placed on both sides of slotted plastic pipe throat.
2. Slot plastic pipe cross section is a generic shape. Shape shall conform to allowable manufacturer's cross sections.



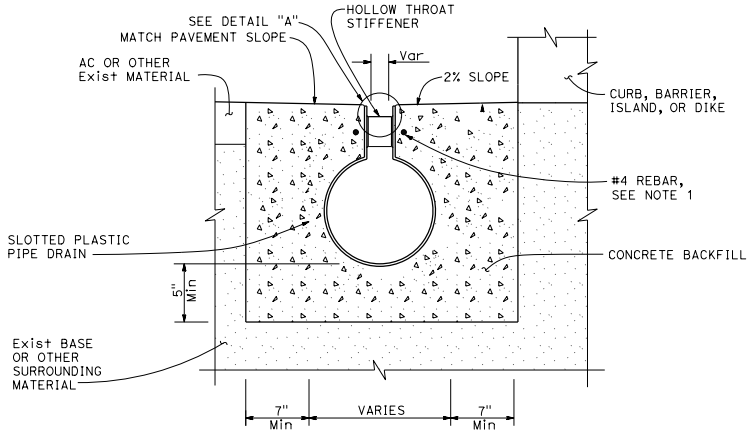

SECTION A-A



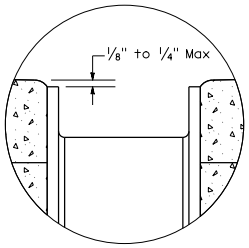

SECTION C-C




SECTION D-D




SECTION B-B




DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

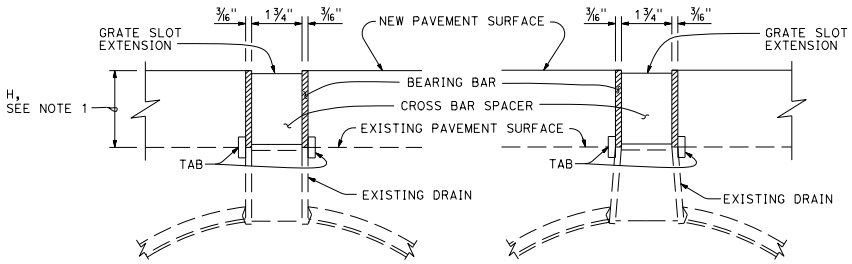
## SLOTTED PLASTIC PIPE DRAIN DETAILS

NO SCALE

D98D

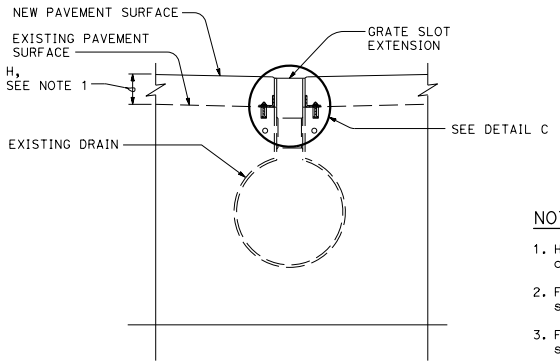
7-1-25

Return to Table of Contents




## SLOTTED CORRUGATED STEEL PIPE

Grate slot extension




SECTION

## SLOTTED PLASTIC PIPE

Grate slot extension

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

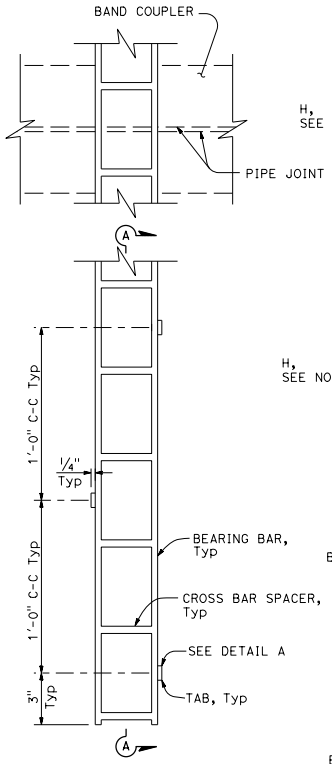
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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## NOTES:

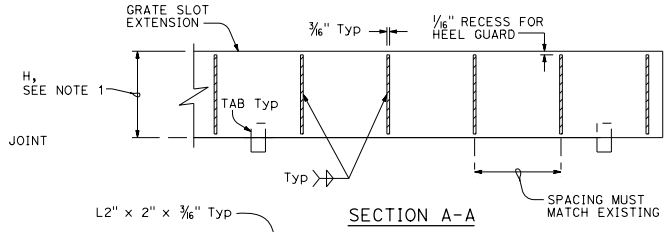
1. H must be a minimum of 2½", or otherwise shown on the plans.
2. For Slotted Plastic Pipe Drain Details, see Standard Plan D98D.
3. For Slotted Corrugated Steel Pipe Drain Details, see Standard Plans D98A and D98B.
4. Use heel guard when shown. See Standard Plan D98B for heel guard details.
5. Minimum grate slot extension length is 80".
6. The top corners of the grate slot extension's bearing bars must not vary from a straight line more than ½" in 20'-0".
7. Cross bar spacers must be welded to the grate slot extension's bearing bars to achieve a minimum tensile strength of 12,000 LB normal to the longitudinal axis of the bearing bars.



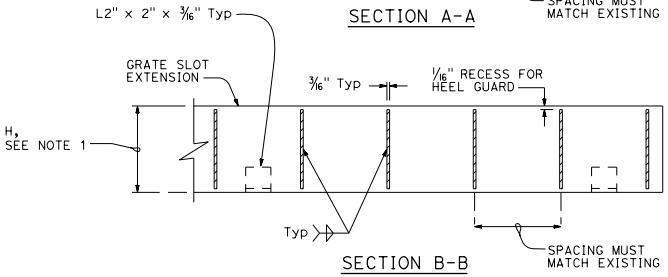

PLAN

## SLOTTED CORRUGATED STEEL PIPE

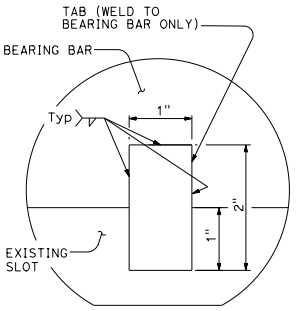
Grate slot extension




SECTION A-A

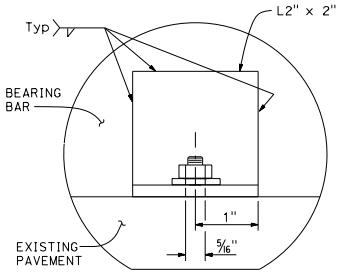



SECTION B-B



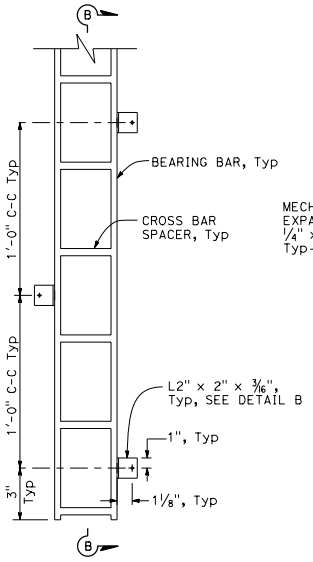

DETAIL A

Tab alignment




DETAIL B

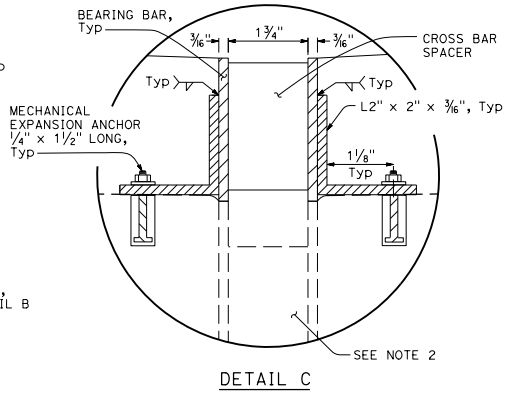
Angle alignment




PLAN

## SLOTTED PLASTIC PIPE

Grate slot extension




DETAIL C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## SLOTTED PIPE GRATE EXTENSION DETAILS

NO SCALE

D98F

2025 STANDARD PLAN D98F

7-1-25

Return to Table of Contents

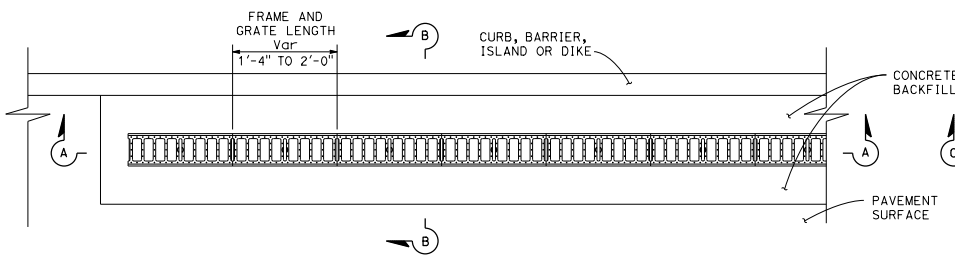
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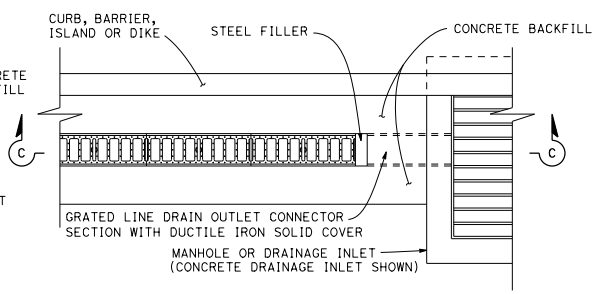
REGISTERED CIVIL ENGINEER

Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

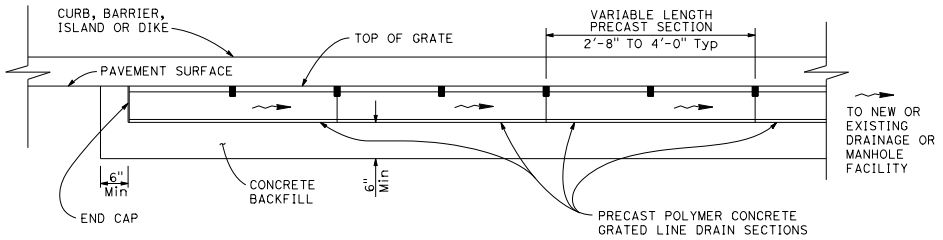
September 19, 2025
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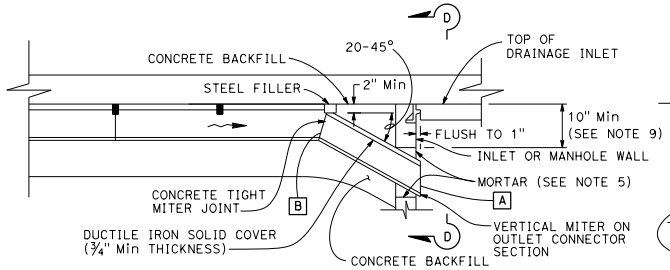


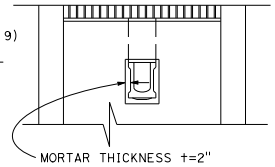

PLAN



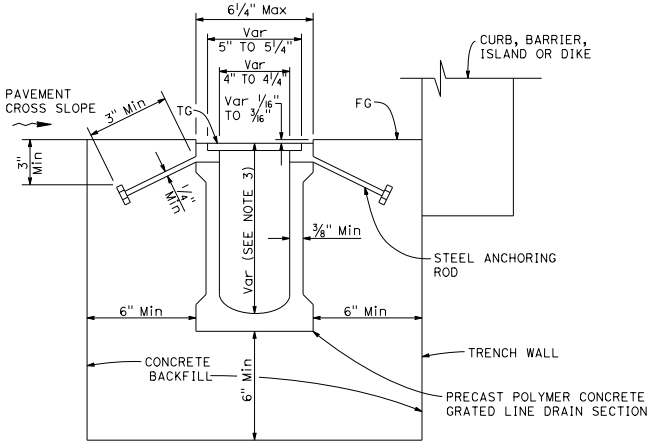

SECTION A-A



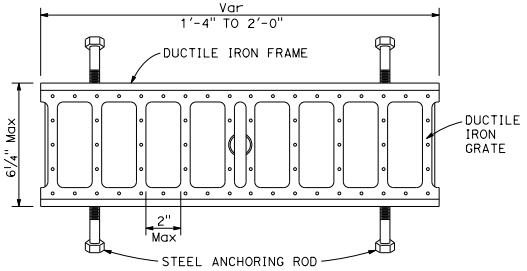

SECTION C-C




SECTION D-D




SECTION B-B
(Precast grated line drain with non-integral frame)




FRAME AND GRATE DETAIL
See Notes 6, 7 and 8

NOTES:

1. See Quantity Sheets for discharge capacity requirements.
2. Discharge capacity (cfs) at point A must be equivalent to maximum channel discharge capacity of grated line drain at point B.
3. Precast polymer concrete drain sections are available in non-sloped uniform depth sections 4⅞" to 12" or in 0.6 percent pre-sloped sections with graduated depths from 4⅞" to 12". See Project Plans for trench sections to be installed.
4. Nominal dimensions shown. Allowable tolerance ± 2%.
5. For GMP inlet connection, seal field joint with a pliable mixture of sand, portland cement and emulsified asphalt (mixture of 1 part portland cement, 3-5 parts sand and 1½ part SSI emulsified asphalt).
6. Within designated pedestrian paths of travel, the maximum grate opening in the direction of pedestrian traffic must not exceed ½".
7. Grate patterns may vary from detail shown. See Special Provisions.
8. ⅜" maximum gap between adjacent gratings.
9. Contractor to field verify minimum depth to avoid conflict with inlet top.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

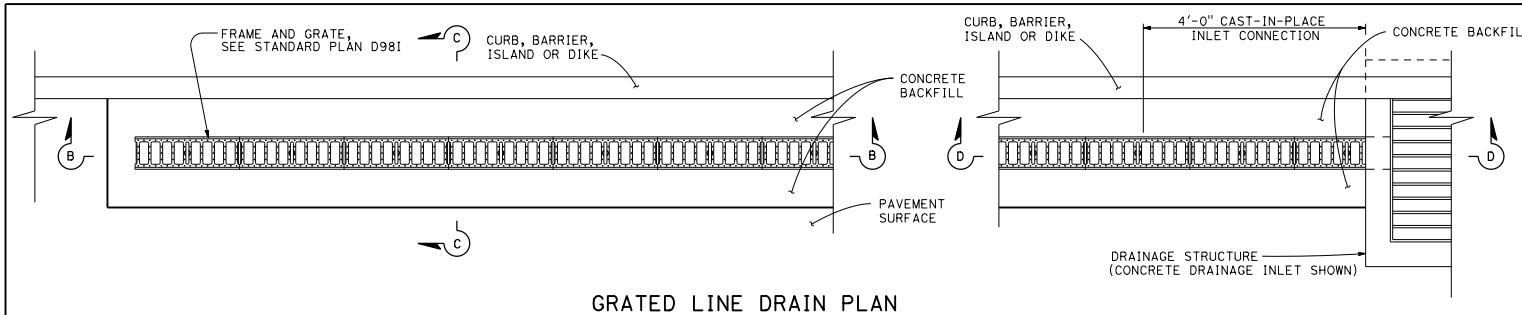
# GRATED LINE DRAIN DETAILS No. 1 POLYMER CONCRETE, 4" NOMINAL WIDTH

NO SCALE

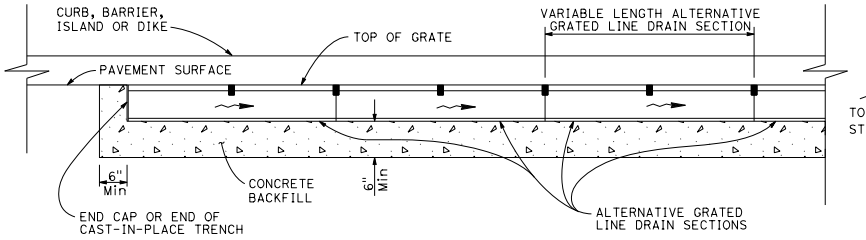
D98G

7-1-25

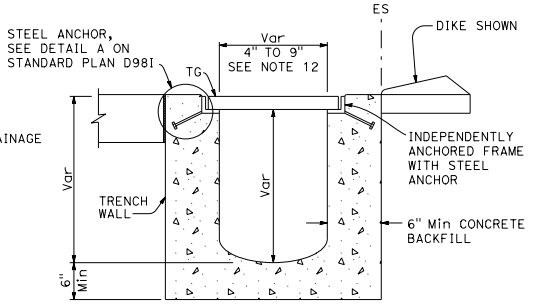
Return to Table of Contents



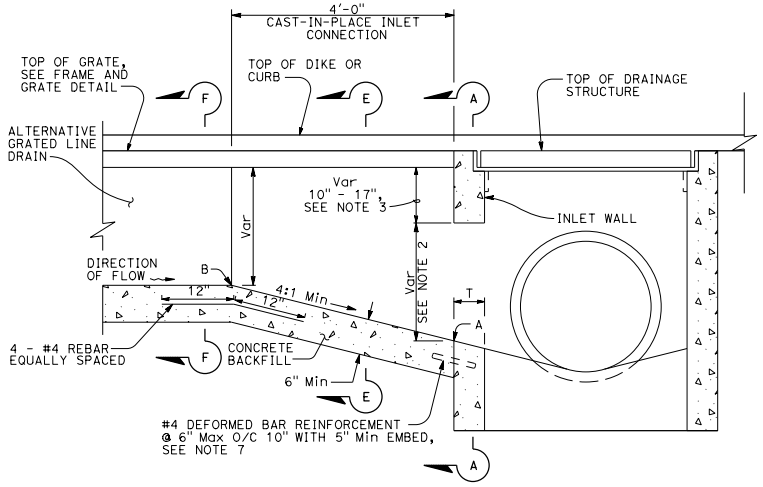

## GRATED LINE DRAIN PLAN



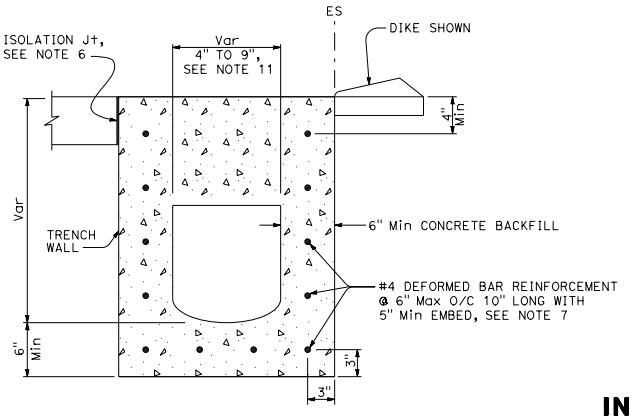

SECTION B-B




SECTION E-E




SECTION D-D




SECTION A-A

NOTES:

1. See Quantity Sheets for discharge capacity requirements.
2. Discharge capacity (cfs) at point A must be equivalent to maximum channel discharge capacity of grated line drain at point B.
3. Contractor to field verify minimum depth to avoid conflict with inlet top.
4. Grate patterns may vary from details shown. See special provisions.
5. See Standard Plan D98G for 4" polymer concrete grated line details.
6. Within PCC pavement, a 0.5" isolation joint must be made between pavement and concrete backfill. See isolation joint details on Standard Plans P45 and P46.
7. Bottom row of dowels to match inlet connection slope with 2" Min clear to inside of box. Place other dowels normal to inlet wall with 1½" Min clear to inside of box. (When T = 6" use 4½" Min embed)
8. Channel section shape and frame and grate configuration may vary.
9. Nominal dimensions shown. Allowable tolerances ±2%.
10. 3/16" maximum gap between adjacent grates.
11. Minimum channel width must be equal or greater than maximum channel width of grated line drain section.
12. See Standard Plan D98I for Section C-C and Section F-F.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GRATED LINE DRAIN DETAILS No. 2 INLET CONNECTION DETAILS (ALL TYPES EXCEPT 4" NOMINAL WIDTH POLYMER CONCRETE)

NO SCALE

D98H

2025 STANDARD PLAN D98H



7-1-25

Return to Table of Contents

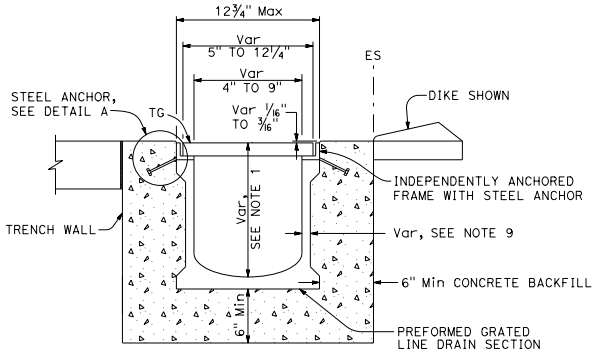
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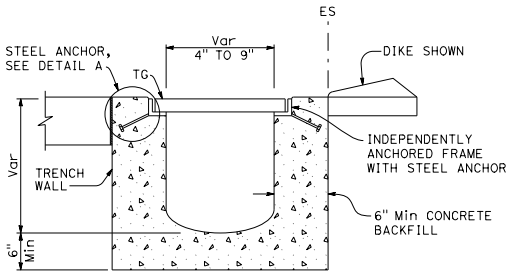
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SECTION C-C
See Note 1

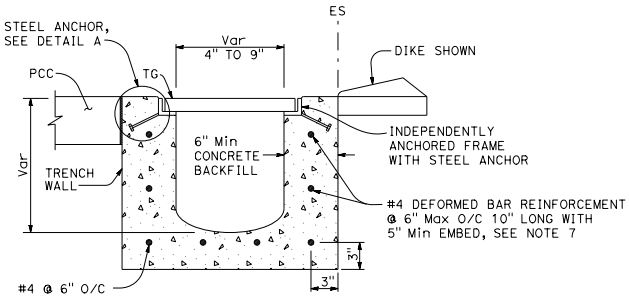



CAST-IN-PLACE ALTERNATIVE

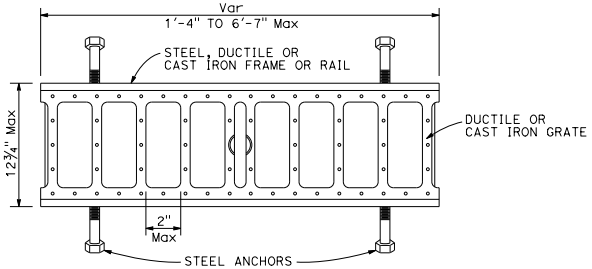
SECTION C-C
See Note 1

NOTE:

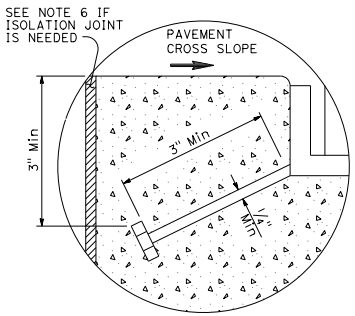
1. See Standard Plan D98H for corresponding notes.




SECTION F-F
For cast-in-place and precast inlets, see Note 1




FRAME AND GRATE DETAIL
See Note 1




DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GRATED LINE DRAIN DETAILS No. 3 (ALL TYPES EXCEPT 4" NOMINAL WIDTH POLYMER CONCRETE)

NO SCALE

D98I

7-1-25

2025 STANDARD PLAN D98I

Return to Table of Contents

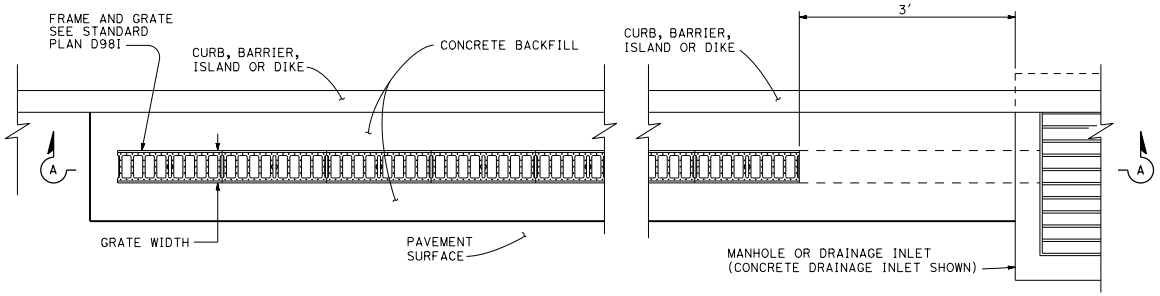
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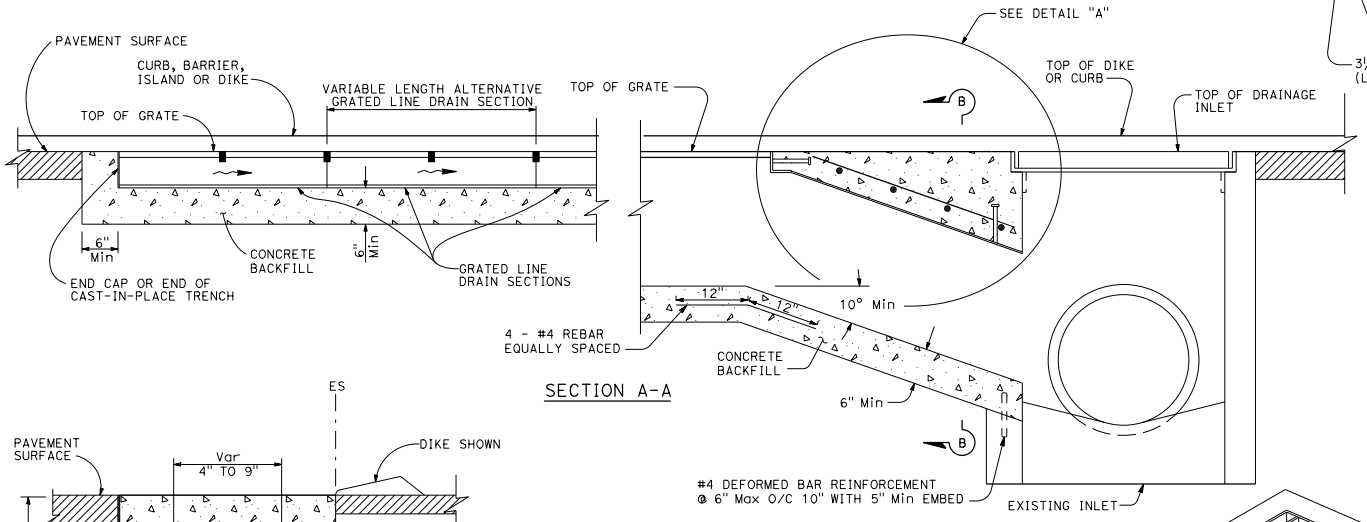
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Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

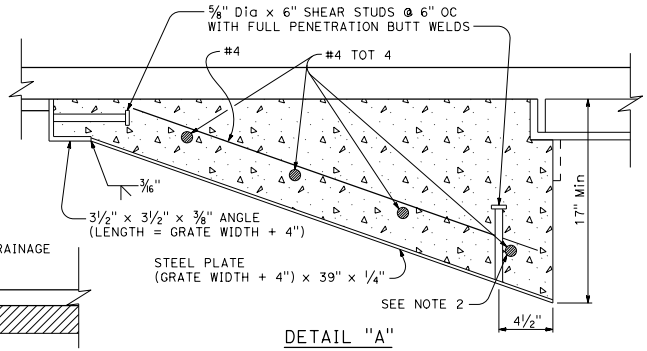
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## GRATED LINE DRAIN PLAN




SECTION A-A




DETAIL "A"

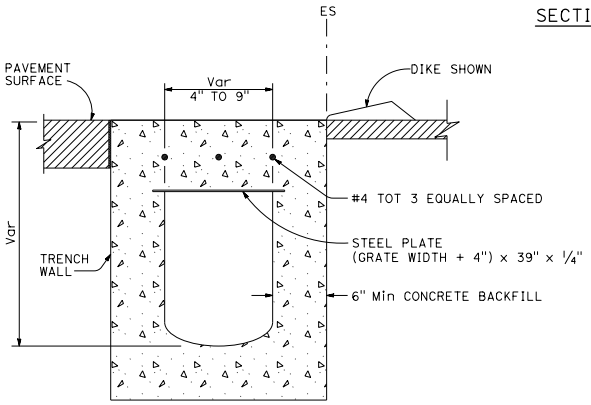
LEGEND

Pavement

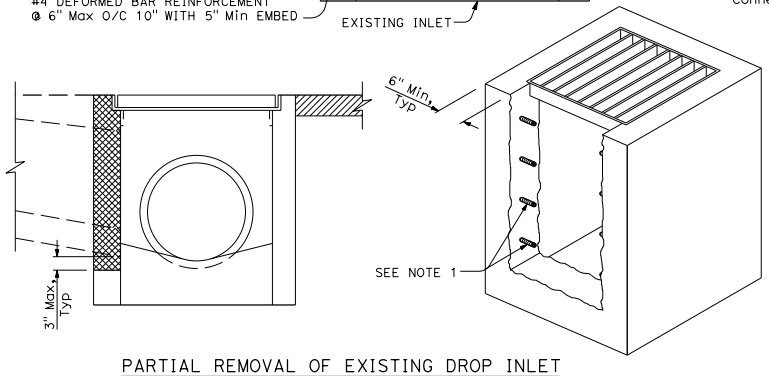
Limits of Removal

NOTES:

1. Preserve existing rebar during removal of side wall to tie to trench drain reinforcement. Install additional rebar to facilitate connection to drop inlet and replace damaged existing rebar. Doweling perpendicular to side wall in lieu of connecting to existing rebar is not permitted.
2. Drill rebar ends 3" into existing concrete, overlap and connect with double barrel mechanical coupler.




SECTION B-B




PARTIAL REMOVAL OF EXISTING DROP INLET

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GRATED LINE DRAIN DETAILS No. 4 CONNECTION TO EXISTING DRAINAGE STRUCTURE

NO SCALE

**D98J**

7-1-25

Return to Table of Contents

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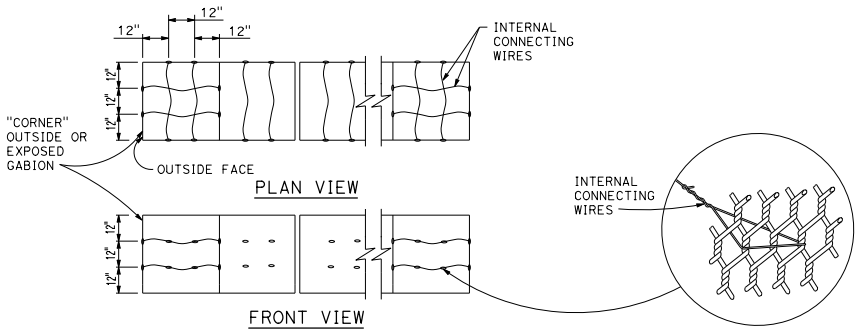
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Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

September 19, 2025
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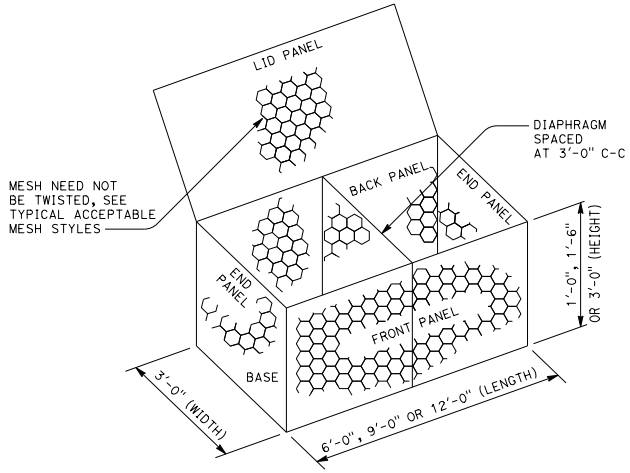
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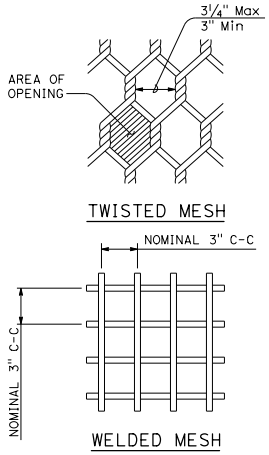

13.5-GAGE INTERNAL CONNECTING WIRES

| STANDARD GABION SIZES | | | | | |
|---|---|---|---|---|---|
| LETTER CODE | LENGTH | WIDTH | HEIGHT | NUMBER OF DIAPHRAGMS | VOLUME CY |
| A | 6'-0" | 3'-0" | 3'-0" | 1 | 2.0 |
| B | 9'-0" | 3'-0" | 3'-0" | 2 | 3.0 |
| C | 12'-0" | 3'-0" | 3'-0" | 3 | 4.0 |
| D | 6'-0" | 3'-0" | 1'-6" | 1 | 1.0 |
| E | 9'-0" | 3'-0" | 1'-6" | 2 | 1.5 |
| F | 12'-0" | 3'-0" | 1'-6" | 3 | 2.0 |
| G | 6'-0" | 3'-0" | 1'-0" | 1 | 0.66 |
| H | 9'-0" | 3'-0" | 1'-0" | 2 | 1.0 |
| I | 12'-0" | 3'-0" | 1'-0" | 3 | 1.33 |




TYPICAL GABION BASKET

NOTE:
Area of opening not to exceed 10.3 square inches.




TYPICAL ACCEPTABLE MESH STYLES

NOTES:

1. Internal connecting wire (13.5-gage) to be installed across width of interior gabions and across width and length of end gabions.
2. Internal connecting wires required on all gabions 3'-0" high.
3. Preformed stiffeners (11-gage or 9-gage) are an acceptable alternative to internal connecting wires. Install them as recommended by manufacturer or as directed by the Engineer at ⅓ points.
4. Place rock in end gabion cell first, and continue by filling interior gabion cells.
5. For gabion dimensions, refer to table "Standard Gabion Sizes".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GABION BASKET DETAILS No. 1

NO SCALE

D100A

7-1-25

Return to Table of Contents

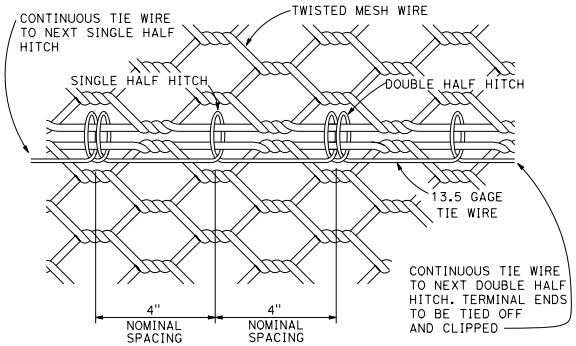
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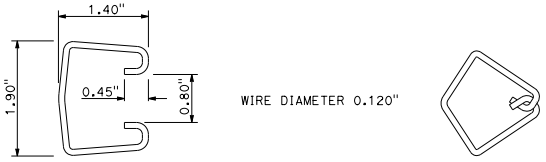
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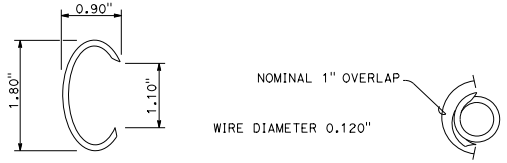



## STANDARD TIE WIRE DETAIL

Alternating single and double half hitches (locked loops), see Note 2




## INTERLOCKING FASTENER



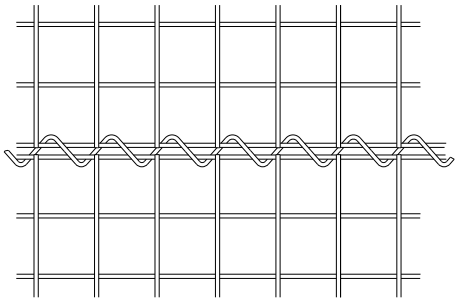

## OVERLAPPING FASTENER

## ALTERNATIVE GABION JOINT MATERIAL FASTENERS

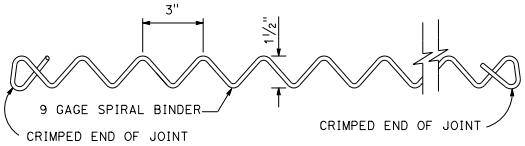
Fastener dimensions nominal, see Note 3

NOTES:

1. A joint connection must be made where any panel edge meets another panel. This includes adjacent gabion baskets, individual panels within a basket, diaphragm edges, etc.
2. Standard tie wire may be used as a joint connector for either twisted or welded mesh. Spiral binder is to be used with welded mesh only.
3. When alternative gabion joint material fasteners are not capable of enclosing all wires along a joint, especially at Basket-To-Basket Joints, either standard tie wire or spiral binder, as applicable, must be used.

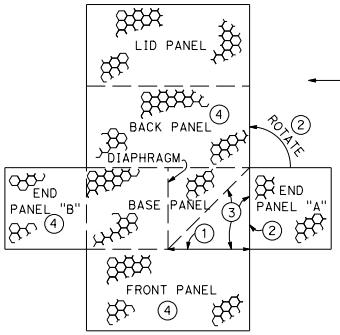


## SPIRAL BINDER LACING




## STANDARD SPIRAL BINDER

See Note 2



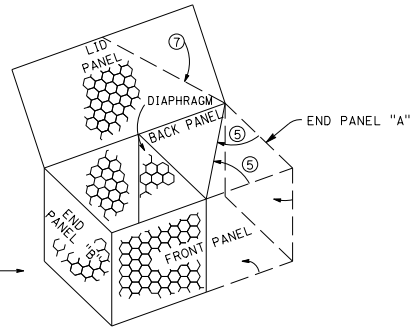

## FLAT LAYOUT OF GABION BASKET

To Assemble Transitional Gabion Basket:

- Step 1: Cut mesh along joint between Front Panel and Base Panel.
- Step 2: Unfasten End Panel "A" from Base Panel and rotate End Panel "A". Fasten End Panel Panel "A" to Back Panel.
- Step 3: Fold the cut portion of the Base Panel into upright position along diagonal from the diaphragm to the corner of the Back Panel.
- Step 4: Fold the Back Panel, Front Panel and End Panel "B" into upright positions. Fasten End Panel "B" to the Back Panel and the Front Panel.
- Step 5: Rotate End Panel "A" and the cut portion of the Front Panel inward against the upturned portion of the Base Panel. Fasten along the overlapped portion of the Front Panel and End Panel "A". Fasten the overlapped portion of the Front Panel and End Panel "A" to the folded upright portion of the Base Panel along the diagonal (described in Step 3).
- Step 6: Fill the Transitional Gabion Basket with rock as per specifications.
- Step 7: Close lid and fold over corner of Lid Panel. Fasten along Lid Panel edges.

## TRANSITIONAL GABION BASKET

(For 6'-0", 9'-0" or 12'-0" gabion)




## ASSEMBLED TRANSITIONAL GABION BASKET

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GABION BASKET DETAILS No. 2

NO SCALE

D100B

2025 STANDARD PLAN D100B

7-1-25

Return to Table of Contents

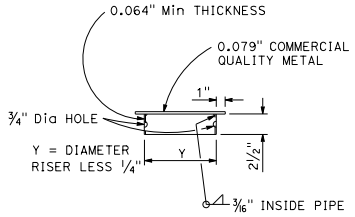
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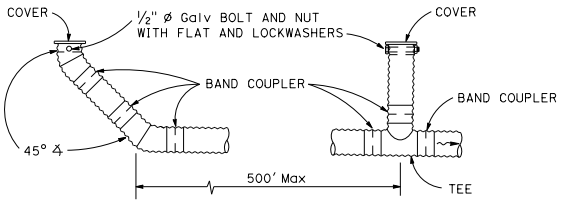
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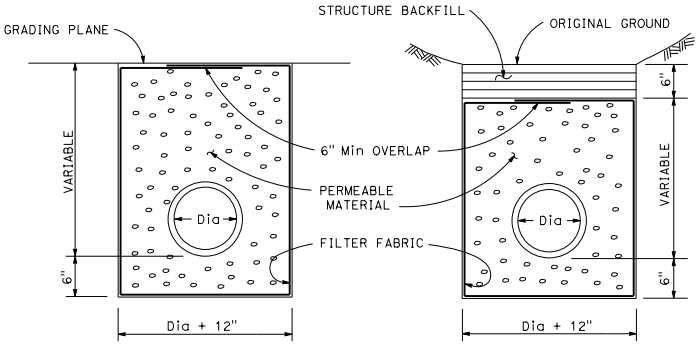



WELDED METAL COVER

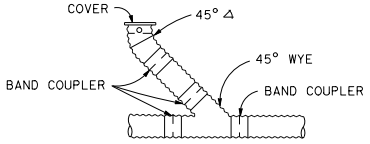



TERMINAL RISER VERTICAL RISER

Metal pipe risers and perforated metal pipe underdrain shown. Use type of pipe specified.

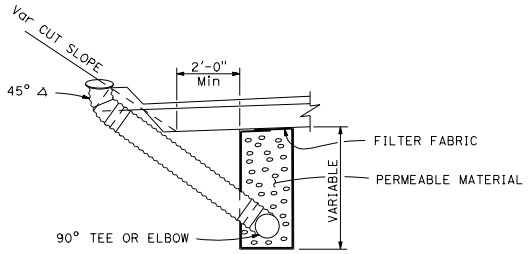



EXCAVATION AND BACKFILL




45° RISER

UNDERDRAIN RISERS




UNDERDRAIN LOCATION AND RISERS ANGLED TO CUT SLOPE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**UNDERDRAINS**

NO SCALE

**D102**

7-1-25



Return to Table of Contents

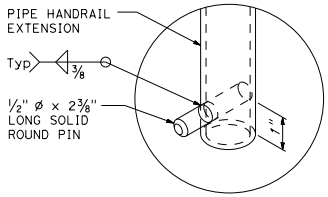
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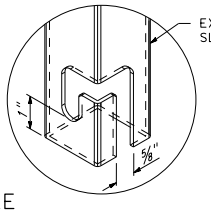
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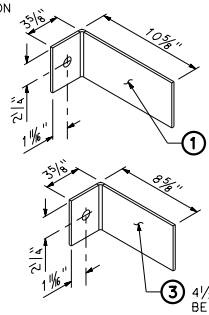
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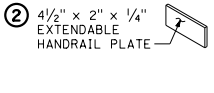
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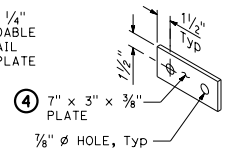



EXTENDABLE HANDRAIL LATCH



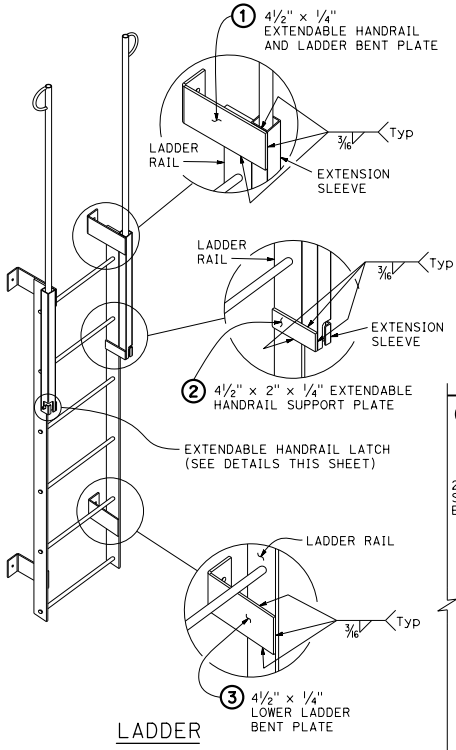



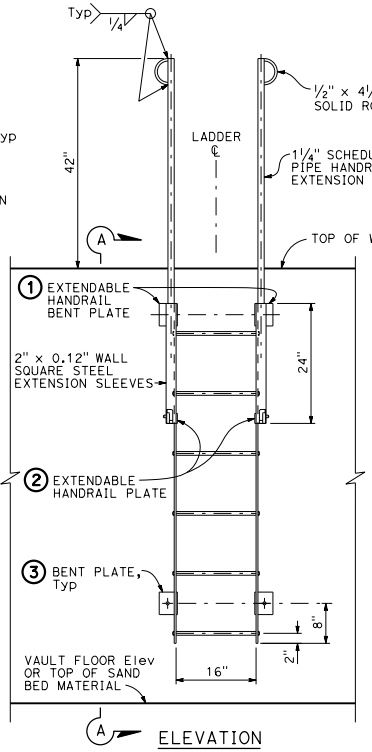

BRACKET DETAILS

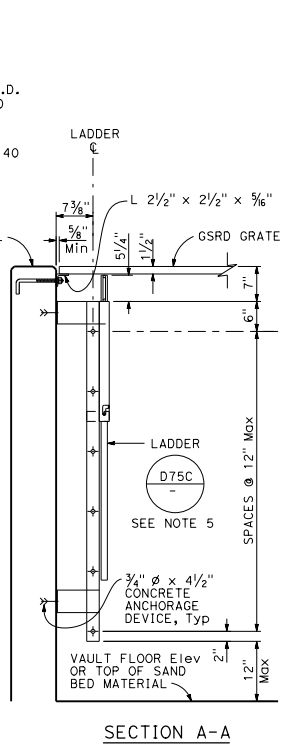
NOTES (THIS SHEET ONLY):

1. Rungs must be skid resistant.
2. Use wall mounted handrails for vault depths between 4'-0" and 6'-6". For deeper vaults use extendable handrails detail. Vault depth is distance between top of wall and either top of floor slab or top of filter media material (use which ever distance is less). Ladders must not extend into filter media material.
3. No handrail required for Linear Radial GSRD 4'-0" depth, due to grate conflict.
4. At ladder locations provide a ladder on the outside of the wall if landing area finished grade elevations is 24" or greater from the top of wall elevation. use Standard Plan D75C.
5. Bolted ladder, see Standard Plan D75C is optional.

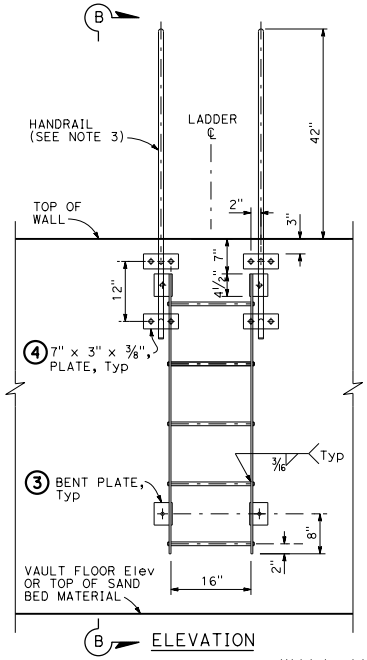


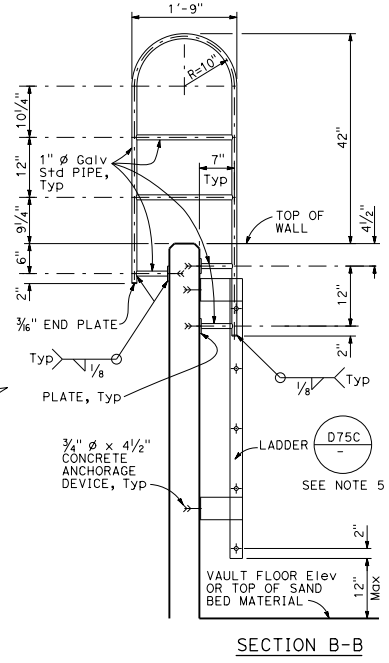

LADDER




EXTENDABLE HANDRAIL




WALL MOUNTED HANDRAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LADDER DETAILS

NO SCALE

D118

7-1-25

Return to Table of Contents

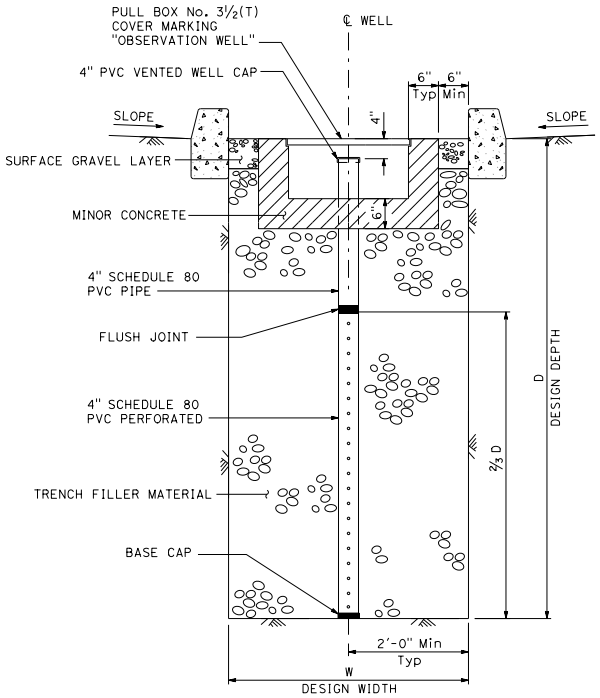
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

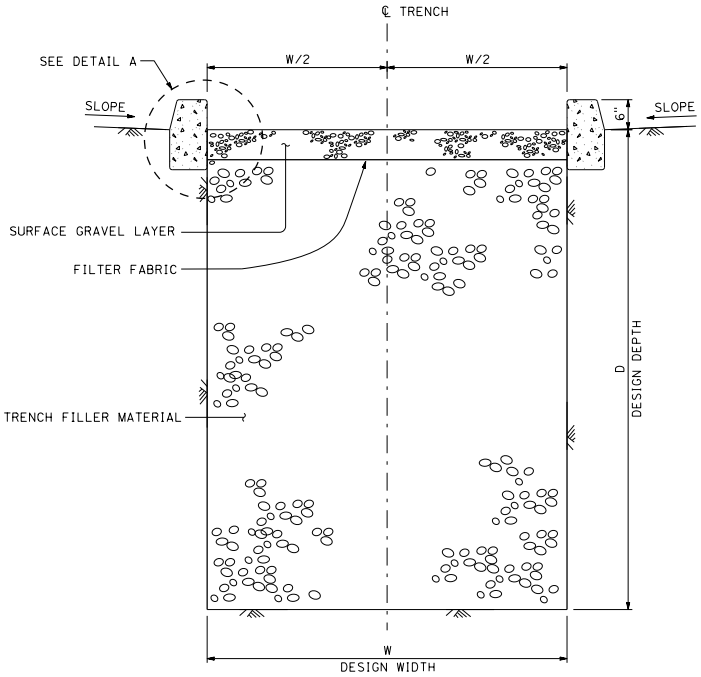
REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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SECTION

OBSERVATION WELL

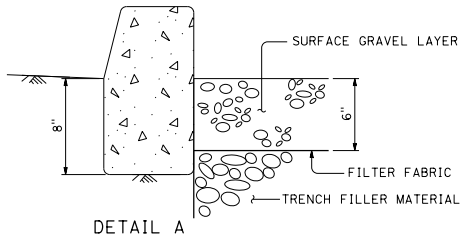



SECTION

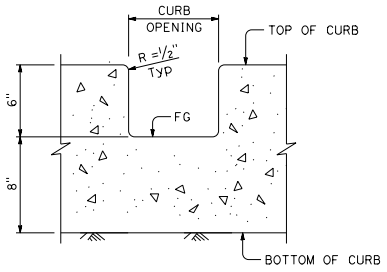
INFILTRATION TRENCH

NOTES:

1. Filter fabric shall be placed between trench filler material and surface gravel layer of the infiltration trench.
2. Place concrete curb if shown on the plans, see Standard Plan A87A for details not shown.
3. Centerline of observation well to be placed a minimum of 2'-0" from edge of trench, when shown on the plans.
4. The pull box cover shall be flush with the top of the surface gravel layer, see Standard Plan ES-8B for details not shown.




DETAIL A
See Note 2




CURB OPENING DETAIL

## MODIFIED TYPE A1-6 CURB

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# INFILTRATION TRENCH AND OBSERVATION WELL

NO SCALE

**D131**

7-1-25

2025 STANDARD PLAN D131

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
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## GENERAL NOTES:

Designation:
Types of Gross Solids Removal Devices (GSRDs) are Linear Radial (LR) and Inclined Screen. The Linear Radial has either a standard or high velocity configuration noted as Linear Radial or Linear Radial (HV). All GSRD BMP Detail Drawings are applicable for velocities up to 20 fps.

Special Reinforcement Coverage:
GSRD BMP Detail Drawings are not to be used in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.

Special Design:
Required for ground water conditions above bottom of GSRD, surcharge loads exceeding HS20 truck load, design bearing pressures or sizes greater than those on this plan.

Traffic Loading:
No traffic load is allowed over GSRDs. As determined by the Engineer, barriers or MBGR shall be provided between GSRDs and traffic lanes.

**INCLINED SCREEN DESIGN CHART**

| GSRD TYPE | TOTAL SCREEN LENGTH "C" | FLOW RATE (cfs) |
|---|---|---|
| A | 3'-4" | 5.83 |
| B | 5'-0" | 8.74 |
| C | 6'-8" | 11.65 |
| D | 8'-4" | 14.57 |
| E | 10'-0" | 17.48 |
| F | 11'-8" | 20.39 |

NOTE:
1. The total screen length "C" is shown on Standard Plans D139B, D139F1 and D139G1.

## DESIGN NOTES:

Specifications:
Design:
Bridge Design Specification April 2000 (LFD) (1996 AASHTO) with interims and revisions by Caltrans

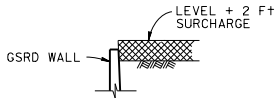
Wall (LFD) : 1.5D + 1.5E and 1.5D + W
Footing (LFD): 1.5D + 1.5E
Where: D = Dead Load
E = Earth Load

Capacity reduction factor is included.

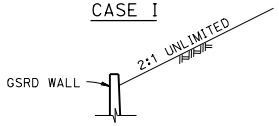
Earth Load: 125 lb/ft vertical,
Water Load: 62.4 lb/ft horizontal,

Equivalent Fluid Pressure = 100 lb/ft horizontal (Case I).

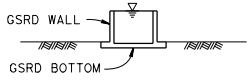
Earth pressure for 2:1 unlimited slope determined from Rankine's formula with ø = 33°42' (Case II).



CASE I



CASE II



CASE III

## DETAIL OF DESIGN LOADING CASES

CASE I Level + 2'-0" surcharge, GSRD empty
CASE II 2:1 Unlimited slope, GSRD empty
CASE III GSRD full of water, no soil pressure

Grating (LL) Load :
0.5 psi

Unit Stresses:
$f'_c$ = 4.0 ksi
$f_y$ = 60 ksi (bar reinforcing)

Design Soil Bearing Pressure (Service Load) = 20 psi

## ABBREVIATIONS:

| | |
|---|---|
| cfs | CUBIC FEET PER SECOND |
| EWT&B | EACH WAY TOP AND BOTTOM |
| fps | FEET PER SECOND |
| GSRD | GROSS SOLIDS REMOVAL DEVICE |
| LL | LIVE LOAD |
| FRP | FIBERGLASS REINFORCED PLASTIC |

## LEGEND

DESIGN WATER DEPTH

STANDARD PLAN SHEET No.
DETAIL No.

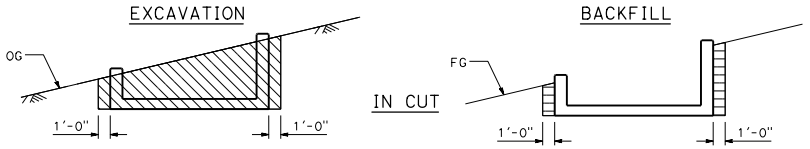
## NOTES:

Expansion joints:
Inverts - No expansion joints permitted.
Walls - Place ½" expansion joint filler vertically at 26'-0" centers with strip water stop (B0-1 / 1-3).

Construction Joints:
Construction joints may be permitted if normal (or radial) to ℄ of GSRD.

Backfill:
See Standard Specifications, except the difference in backfill will not exceed 4 ft between side walls and will not exceed the lesser of wall height "H" or 4 ft between inlet and outlet walls.

Earthwork:
Excavation and Backfill with Cut and Exposed conditions:




## INCLINED SCREEN

### LEGEND

STRUCTURE EXCAVATION

STRUCTURE BACKFILL 90% RELATIVE COMPACTION

### NOTES:

1. Slope or shore excavation sides as necessary.
2. Dimensions shown are minimum.

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# GROSS SOLIDS REMOVAL DEVICE INCLINED SCREEN LEGEND

NO SCALE

**D139A**

7-1-25

2025 STANDARD PLAN D139A



Return to Table of Contents

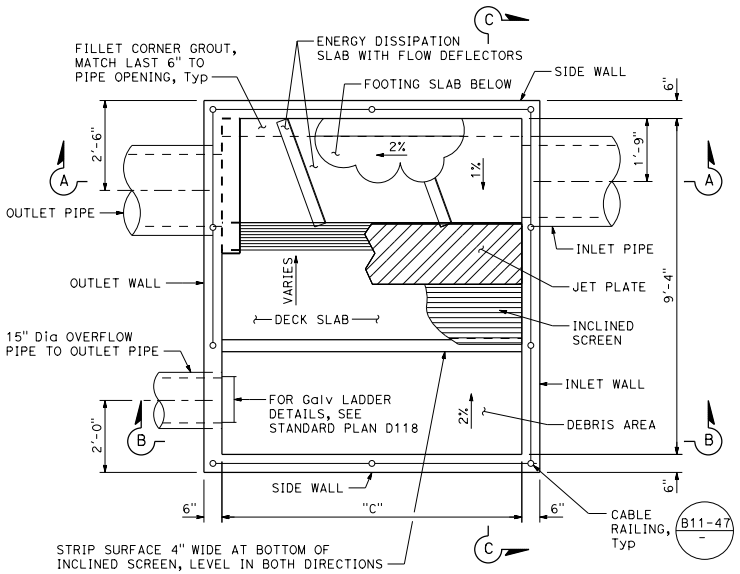
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Sean Penders
REGISTERED CIVIL ENGINEER

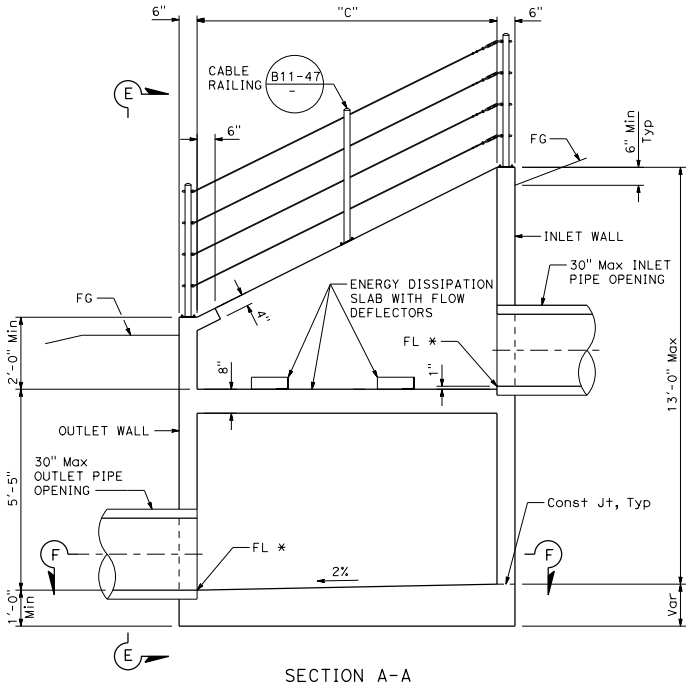
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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PLAN



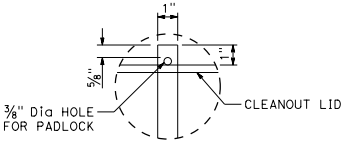

SECTION A-A

* For FL elevations, see "Drainage Profiles".

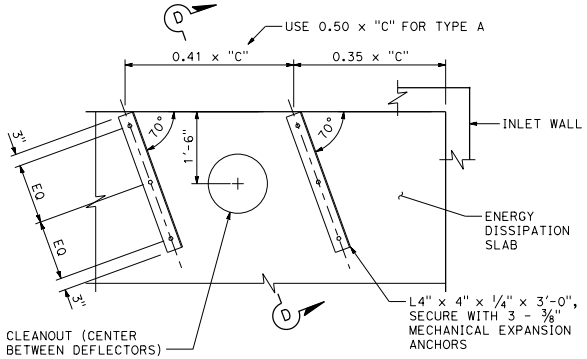
Jet plate not shown for clarity, see Standard Plan D139D.

NOTES (THIS SHEET ONLY):

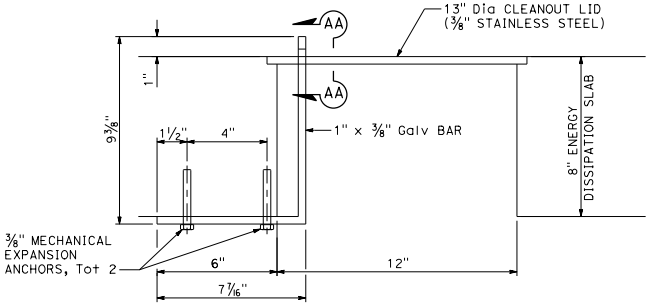
1. See Drainage Plans for additional details.
2. Inlet and outlet pipe opening sizes are shown on Drainage Plans. The overflow and outlet piping must be connected via standard elbows and tees.
3. For Sections B-B and C-C, see Standard Plans D139F1 and D139G1.
4. For reinforcing details which include Sections A-A, B-B, C-C and F-F, see Standard Plan D139D.
5. For inlet and outlet pipe details not shown, see Standard Plan D139C.
6. For View E-E, see Standard Plan D139C.



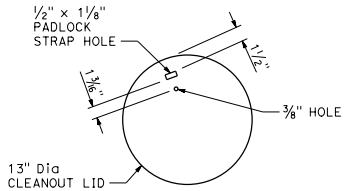

VIEW AA-AA




DEFLECTOR PLAN




SECTION D-D




CLEANOUT LID DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

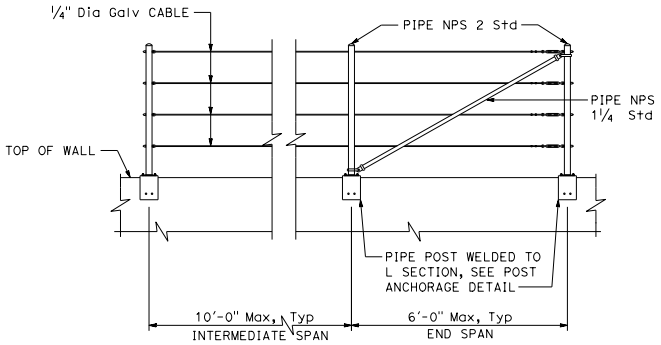
# GROSS SOLIDS REMOVAL DEVICE INCLINED SCREEN LAYOUT

NO SCALE

**D139B**

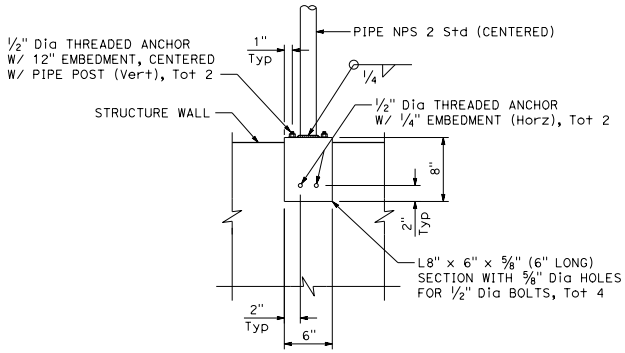
7-1-25

Return to Table of Contents




## CABLE RAILING

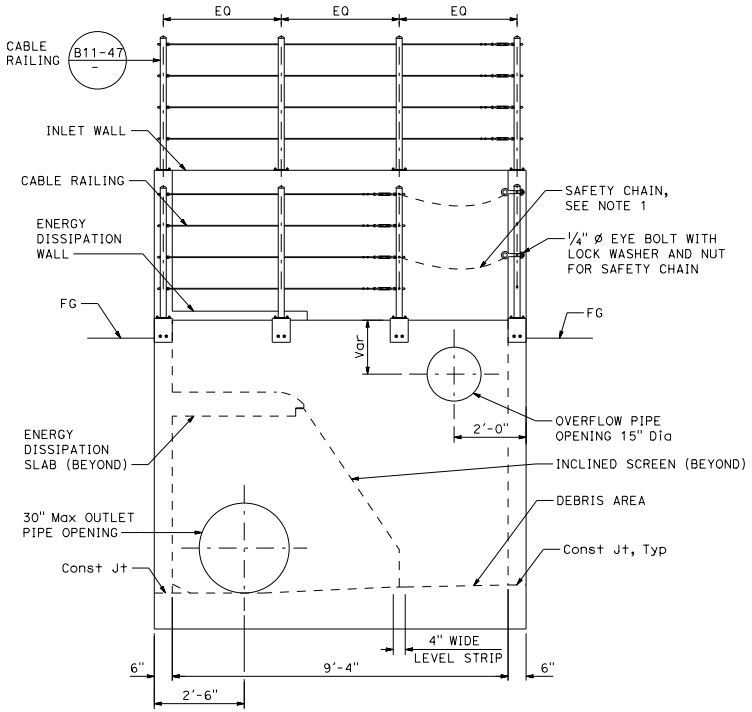
NOTE:
Refer to Standard Plan B11-47 for additonal information.




## POST ANCHORAGE

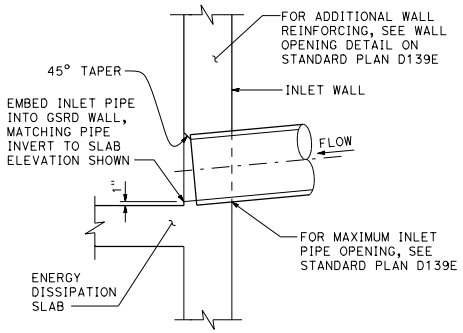
NOTES:

1. Safety chain must be ¼" galvanized steel coil chain, approximately 12 links per foot. Length must be minimum which allows lock-up of safety railing. Minimum of two safety chains per safety railing. Material must be grade 43 high test chain ASTM A413.
2. For View E-E location, see Standard Plan D139B.



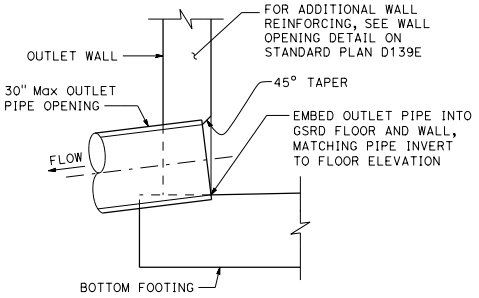

## VIEW E-E

NOTE:
Jet plate and flow deflectors not shown for clarity.




## INLET DETAIL

Pipe entrance at wall




## OUTLET DETAIL

Pipe exit at wall - Inclined Screen

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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# GROSS SOLIDS REMOVAL DEVICE INCLINED SCREEN DETAILS No. 1

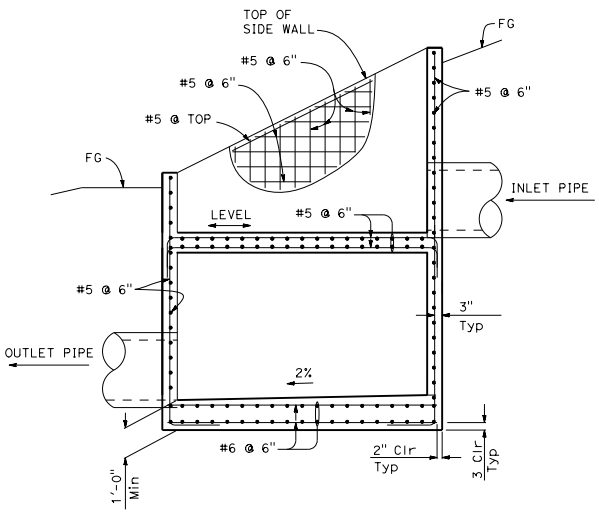
NO SCALE

D139C

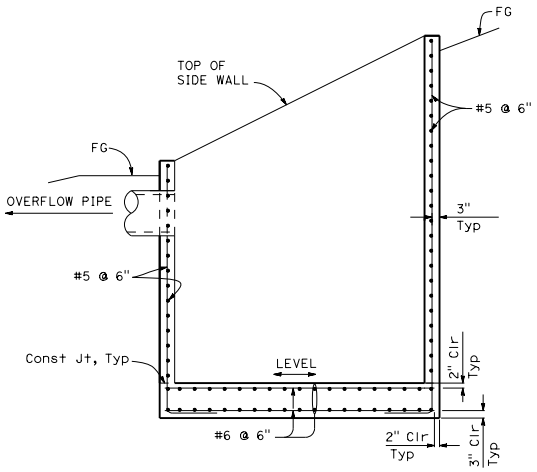
7-1-25



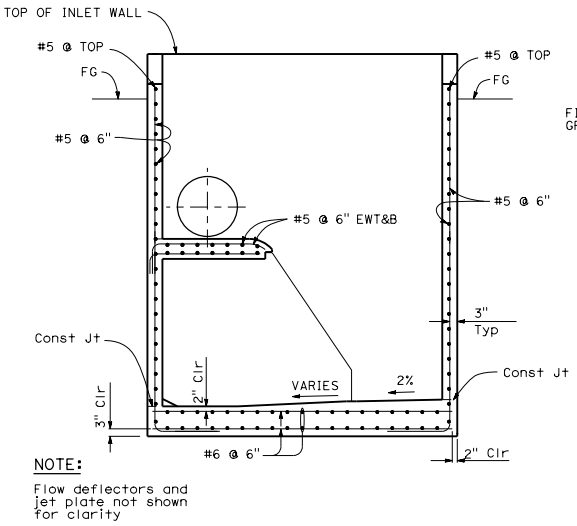
Return to Table of Contents




SECTION A-A - REINFORCEMENT

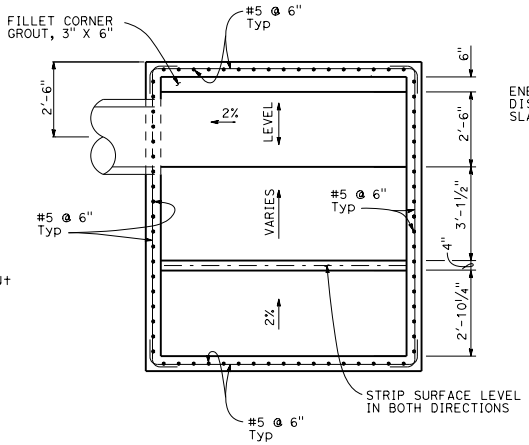



SECTION B-B - REINFORCEMENT




NOTE:
Flow deflectors and jet plate not shown for clarity

SECTION C-C - REINFORCEMENT

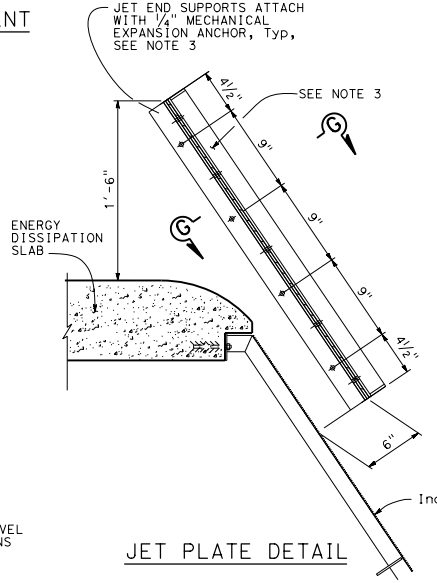



SECTION F-F

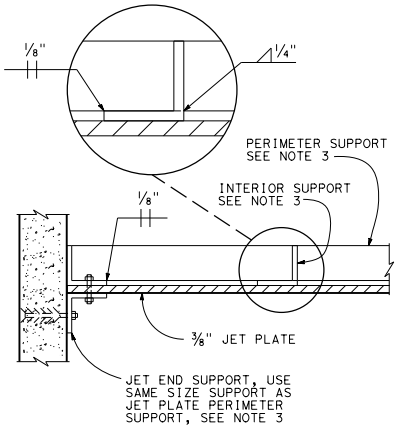
WALL REINFORCEMENT AND GRADES AT FOOTING SLAB

NOTES:

1. For additional reinforcing at openings, see Standard Plan D139E.
2. For section locations, see Standard Plan D139B.
3. ⅜" jet plate with L2" x 2" x ¼" braced supports around perimeter for screen lengths up to 6'-8". For longer screen lengths use L3" x 2" x ¼". Use additional interior supports at 2'-6" Max O.C. equally spaced. Fillet weld brace supports to plate @ 1'-6" O.C. Fasten jet plate assembly to jet end supports with five ¼" machine bolts A307 equally spaced. Start bolt pattern @ 2¼" Max from edge.




JET PLATE DETAIL




SECTION G-G

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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September 19, 2025
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DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE INCLINED SCREEN DETAILS No. 2

NO SCALE

D139D

7-1-25



Return to Table of Contents

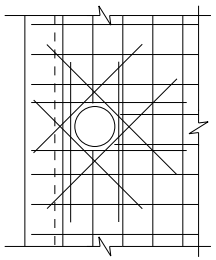
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
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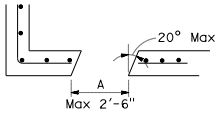
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Sean T. Penders
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Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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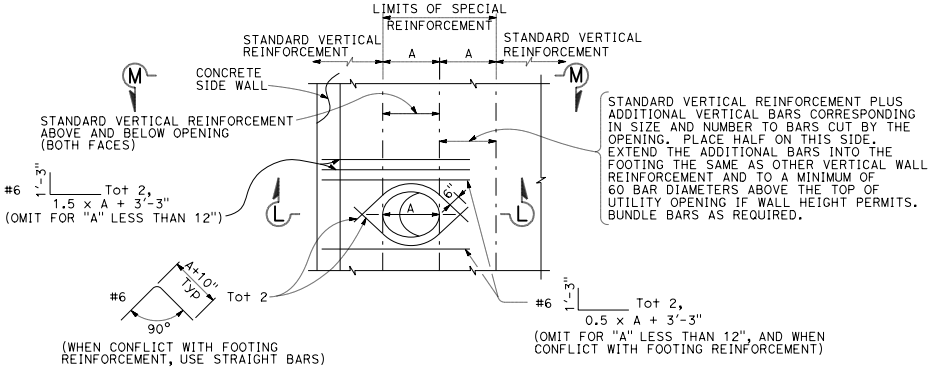


## ENERGY DISSIPATION SLAB

To be used at cleanout
(Place 8 - #5 as shown top and bottom. Extend bars 1'-3" past the opening or use 6" hook if development length is not available.)

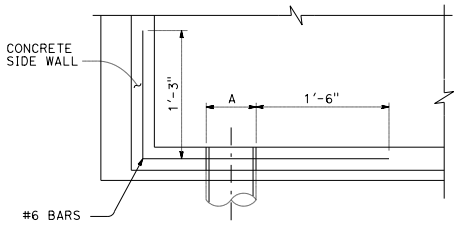



## SECTION L-L




## WALL OPENING

To be used at inlet and outlet pipe locations




## SECTION M-M

(Only specified horizontal bars are shown)

NOTE:
In all opening locations, horizontal reinforcement to be standard except as shown. All reinforcement to clear opening by 2" minimum.

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DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# INCLINED SCREEN
# DETAILS No. 3
# WALL OPENING DETAILS

NO SCALE

**D139E**



7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

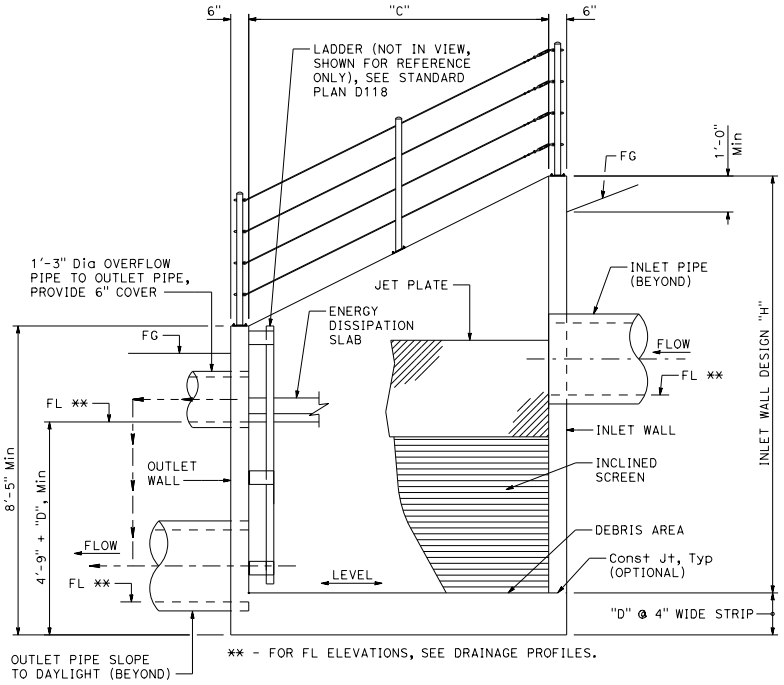
Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

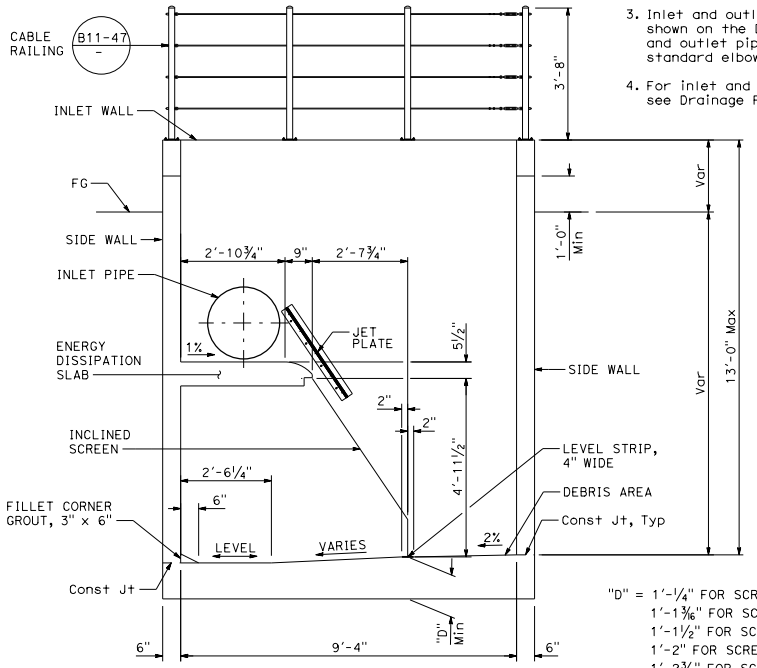
REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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SECTION B-B
Flow deflectors not shown for clarity




SECTION C-C
Flow deflectors not shown for clarity

NOTES:

1. See Drainage Plans for additional details.
2. For Section B-B and C-C locations, see Standard Plan D139B.
3. Inlet and outlet piping opening sizes are shown on the Drainage Plans. The overflow and outlet piping shall be connected via standard elbows and tees.
4. For inlet and outlet pipe details not shown, see Drainage Plans.

"D" = 1'-¼" FOR SCREEN LENGTH OF 3'-4⅛"
1'-1⅜" FOR SCREEN LENGTH OF 5'-0"
1'-1½" FOR SCREEN LENGTH OF 6'-8"
1'-2" FOR SCREEN LENGTH OF 8'-4"
1'-2⅜" FOR SCREEN LENGTH OF 10'-0"
1'-2¾" FOR SCREEN LENGTH OF 11'-8⅛"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

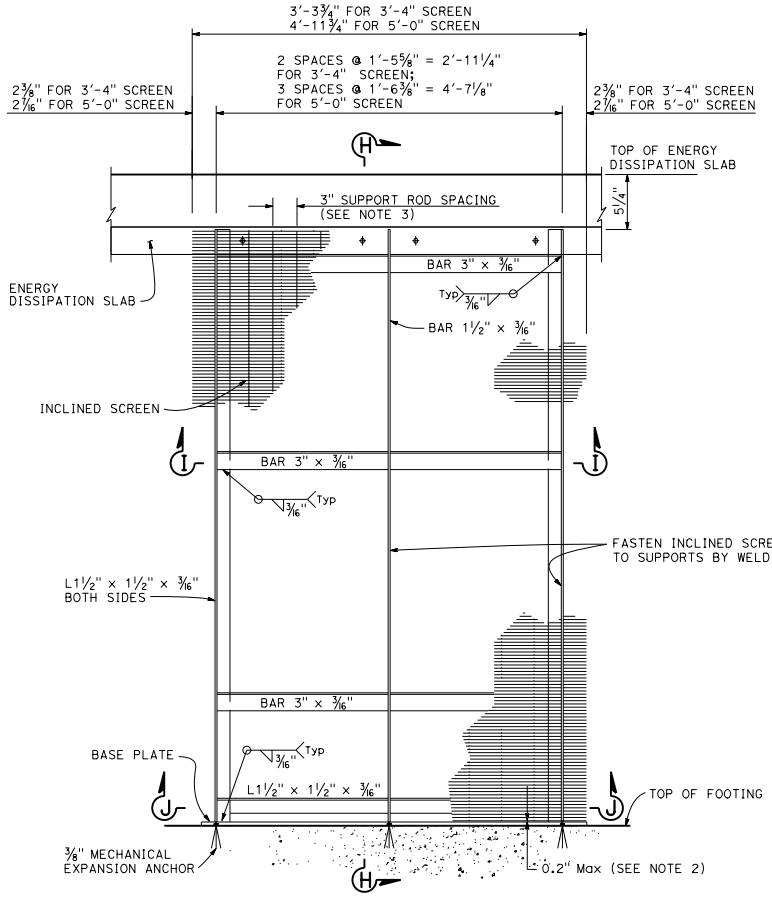
# GROSS SOLIDS REMOVAL DEVICE INCLINED SCREEN DETAILS No. 4 WEDGE-WIRE SCREEN

NO SCALE

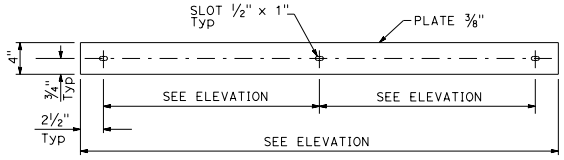
D139F1

7-1-25

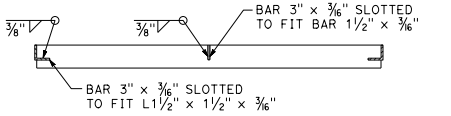
Return to Table of Contents



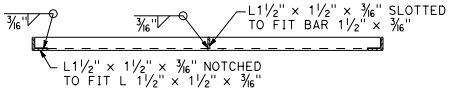

ELEVATION



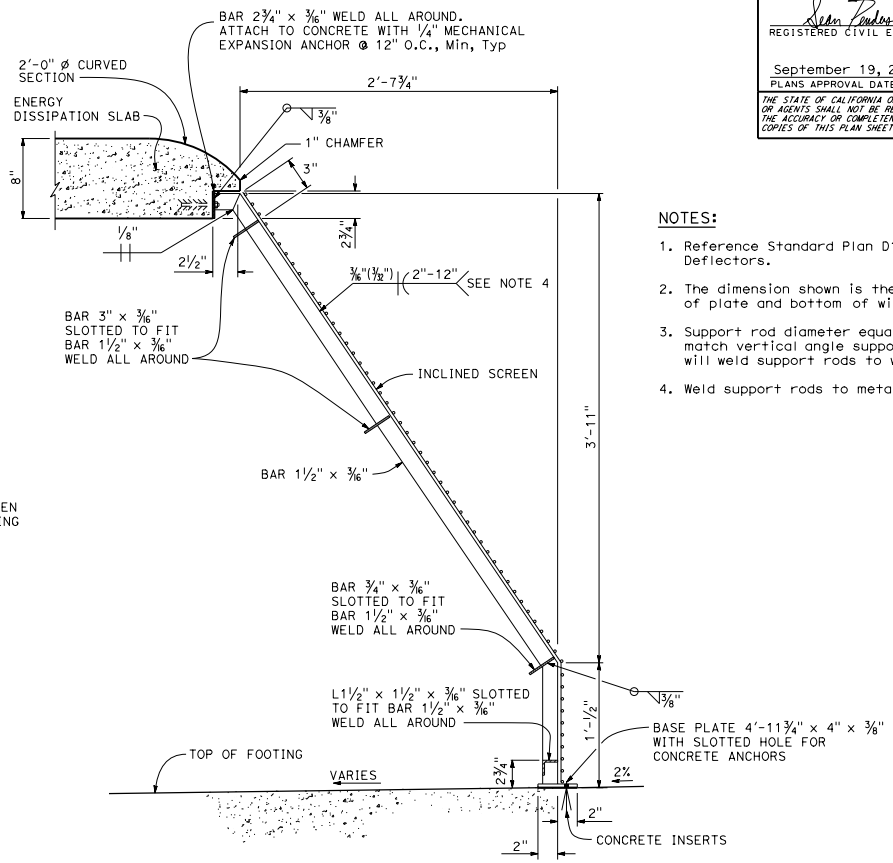

BASE PLATE




SECTION I-I




SECTION J-J




SECTION H-H

NOTES:

1. Reference Standard Plan D139D for Jet and Deflectors.
2. The dimension shown is the distance between top of plate and bottom of wire.
3. Support rod diameter equals ⅜". Align rods to match vertical angle supports. Screen manufacturer will weld support rods to wedge wire.
4. Weld support rods to metal frame (all around).

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# INCLINED SCREEN
# DETAILS No. 5
# WEDGE-WIRE SCREEN

NO SCALE

D139F2

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

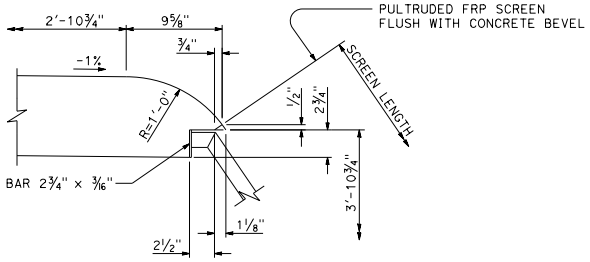
Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

September 19, 2025

PLANS APPROVAL DATE

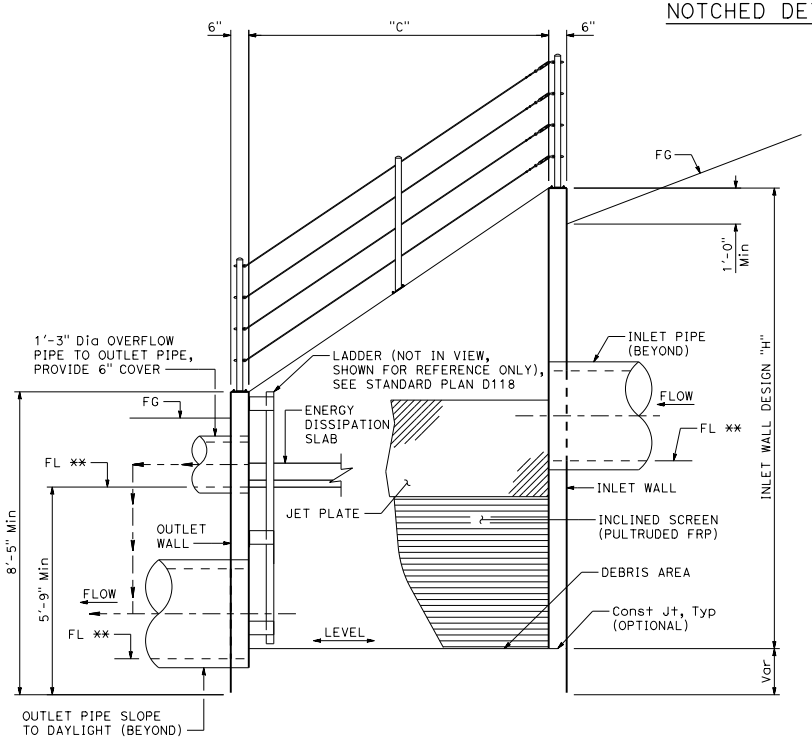
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NOTCHED DETAIL

NOTES:

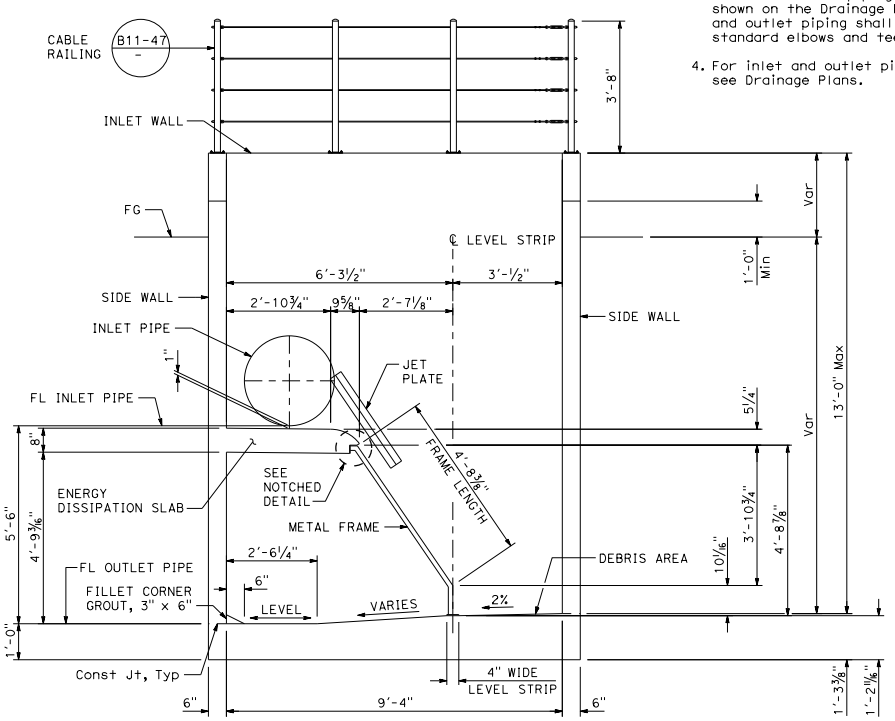
1. See Drainage Plans for additional details.
2. For Section B-B and C-C locations, see Standard Plan D139B.
3. Inlet and outlet piping opening sizes are shown on the Drainage Plans. The overflow and outlet piping shall be connected via standard elbows and tees.
4. For inlet and outlet pipe details not shown, see Drainage Plans.




SECTION B-B

Flow deflectors not shown for clarity

** - FOR FL ELEVATIONS, SEE DRAINAGE PROFILES




SECTION C-C

Flow deflectors not shown for clarity

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE INCLINED SCREEN DETAILS No. 6 PULTRUDED FRP SCREEN

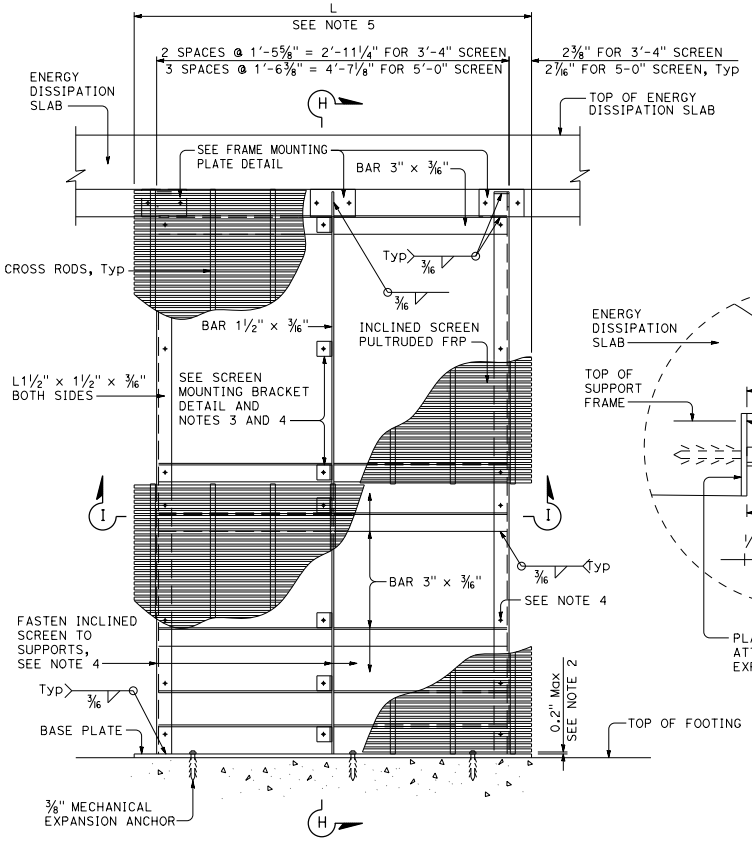
NO SCALE

D139G1

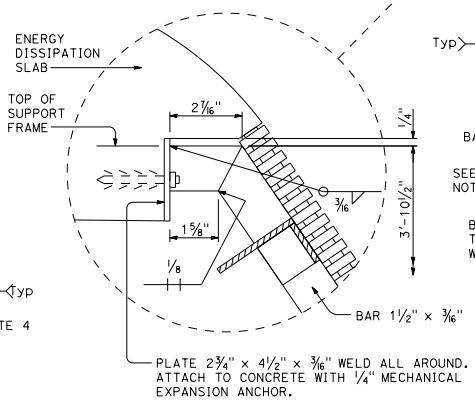
7-1-25

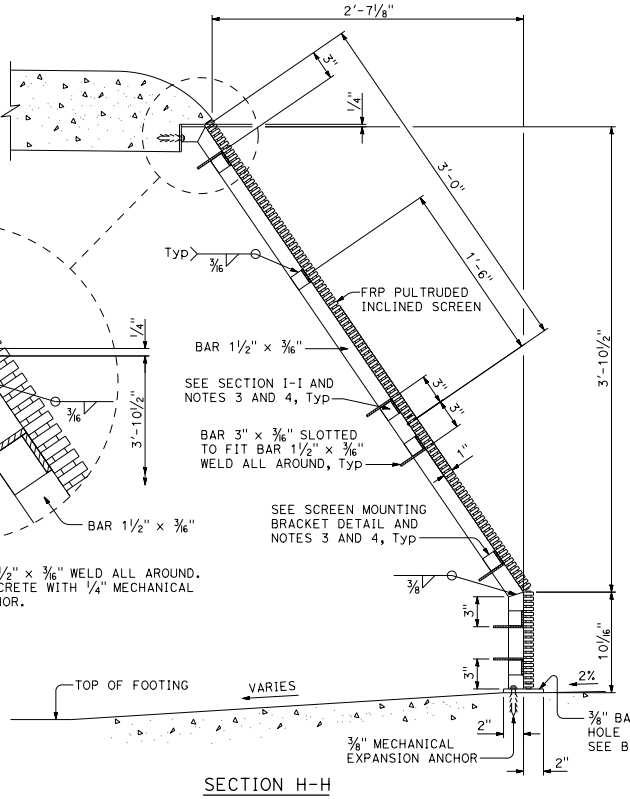
2025 STANDARD PLAN D139G1

Return to Table of Contents




ELEVATION



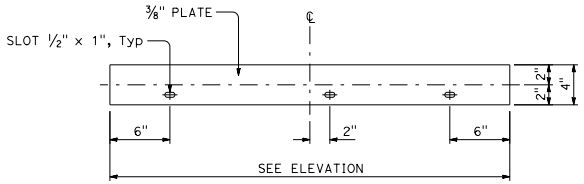

SECTION H-H

NOTES:

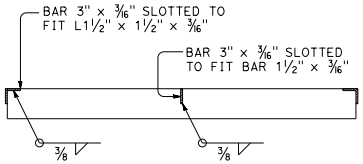
1. Reference Standard Plan D139D for Jet and Deflectors.
2. The dimension shown is the distance between top of plate and bottom of screen.
3. Weld L1½" x 1½" x 3/16" to metal frame.
4. Mount screen to metal frame using stainless steel tamper proof bolt/clip assembly. Field locate and drill 7/32" ø hole in the support beam and screen mounting bracket to install the hold down clip assembly. Use a minimum of 9 clip assemblies for top 3' width FRP screen. Use 6 clip assemblies for FRP screens that are less than 3'. Adjust screen mounting bracket locations as needed. Place bracket in between tie rods.
5. Pultruded FRP screen length is:

| TYPE | L (ft) |
|---|---|
| A | 3'-3¾" |
| B | 4'-11¾" |
| C | 6'-7¾" |
| D | 8'-3¾" |
| E | 9'-11¾" |
| F | 11'-7¾" |

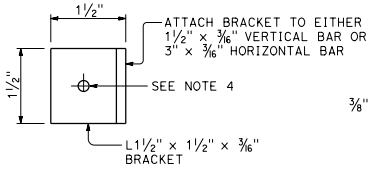
6. Use silicone at all edges of screen and concrete where gap is > 0.2".



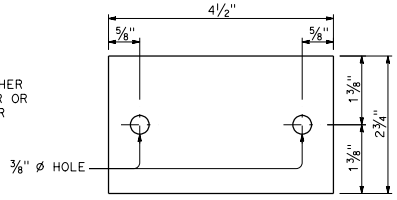

BASE PLATE




SECTION I-I




SCREEN MOUNTING BRACKET




FRAME MOUNTING PLATE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# INCLINED SCREEN
# DETAILS No. 7
# PULTRUDED FRP SCREEN

NO SCALE

D139G2

7-1-24

2025 STANDARD PLAN D139G2

Return to Table of Contents

## GENERAL NOTES

Designation:
Types of Gross Solids Removal Devices (GSRDs) are Linear Radial (LR) and Inclined Screen. The Linear Radial has either a standard or high velocity configuration noted as Linear Radial or Linear Radial (HV). All GSRD BMP Detail Drawings are applicable for velocities up to 20 fps.

Special Reinforcement Coverage:
GSRD BMP Detail Drawings are not to be used in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.

Special Design:
Required for ground water conditions above bottom of GSRD, surcharge loads exceeding HS20 truck load, design bearing pressures or sizes greater than those on this plan.

Traffic Loading:
No traffic load is allowed over GSRDs. As determined by the Engineer, barriers or MBGR shall be provided between GSRDs and traffic lanes.

**LINEAR RADIAL DESIGN CHART**

| GSRD TYPE | TOTAL SCREENED PIPE LENGTH "$T_S$" | FLOW RATE (cfs) | INSIDE LENGTH "L" | HIGH VELOCITY INSIDE LENGTH "$L_{HV}$" * | No. OF INTERMEDIATE SCREENED PIPES |
|---|---|---|---|---|---|
| LR-1 | 5′-6" | 3.54 | 11′-11" | 14′-3¾" | 0 |
| LR-2 | 10′-6" | 7.07 | 16′-11" | 19′-3¾" | 1 |
| LR-3 | 15′-6" | 10.96 | 21′-11" | 24′-3¾" | 2 |
| LR-4 | 20′-6" | 14.49 | 26′-11" | 29′-3¾" | 3 |
| LR-5 | 25′-6" | 18.38 | 31′-11" | 34′-3¾" | 4 |
| LR-6 | 30′-6" | 21.91 | 36′-11" | 39′-3¾" | 5 |

* High velocity is achieved when inlet Velocity exceeds 8.2 fps.

## NOTES:

1. The total screened pipe length "$T_S$" is the sum of the end screened and intermediate screened pipes. For dimension "$T_S$" and location of end screened pipe and intermediate screened pipes, see Standard Plan D140B.
2. Example of Linear Radial nomenclature is LR-1 (6′-0"); for high velocity type LR(HV)-3 (3′-0"). The wall height is the number represented in the parentheses.
3. The inside length "L" is shown on Standard Plan D140B, see plan view. Likewise, the inside length "$L_{HV}$" is shown on Standard Plan D140G, see plan view.

## DESIGN NOTES

Specifications:
Design:
Bridge Design Specification April 2000 (LFD)
(1996 AASHTO) with interims and revisions by Caltrans

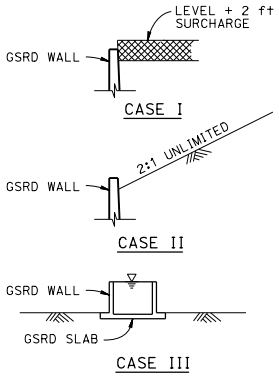
Wall (LFD) : 1.5 D + 1.5 E and 1.5 D + W
Footing (LFD) : 1.5 D + 1.5 E
Where: D = Dead Load
E = Earth Load
Capacity reduction factor is included.

Earth Load:
125 lb/ft$^3$ vertical,

Water Load:
62.4 lb/ft$^3$ horizontal,

Equivalent Fluid Pressure =
100 lb/ft$^3$ horizontal (Case I).

Earth pressure for 2:1 unlimited slope determined from Rankine's formula with ø = 33°42′ (Case II).




## DETAIL OF DESIGN LOADING CASES

CASE I Level + 2′-0" surcharge, GSRD empty
CASE II 2:1 Unlimited slope, GSRD empty
CASE III GSRD full of water, no soil pressure

Grating (LL) Load :
0.5 psi

Unit Stresses:
$f'_c$ = 3.6 ksi
$f_y$ = 60 ksi (bar reinforcing)

Design Soil Bearing Pressure (Service Load) = 20 psi

## ABBREVIATIONS

| | |
|---|---|
| cfs | CUBIC FEET PER SECOND |
| fps | FEET PER SECOND |
| GSRD | GROSS SOLIDS REMOVAL DEVICE |
| HV | HIGH VELOCITY |
| LL | LIVE LOAD |
| LR | LINEAR RADIAL |

## LEGEND

DESIGN WATER DEPTH
STANDARD PLAN SHEET No.
DETAIL No.

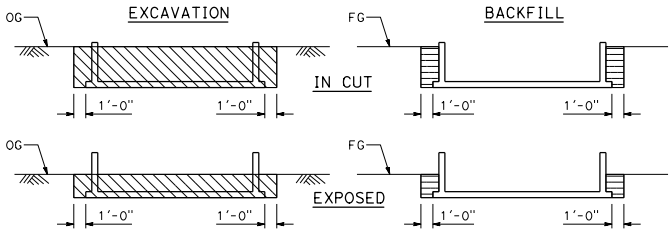
## NOTES:

Expansion joints:
Inverts - No expansion joints shall be permitted.
Walls - Place ½" expansion joint filler vertically at 26′-0" centers with strip water stop (B0-1 / 1-3).

Construction Joints:
Construction joints may be permitted if normal (or radial) to ℄ of GSRD.

Backfill:
See Standard Specifications, except the difference in backfill shall not exceed 4 ft between side walls and shall not exceed the lesser of wall height "H" or 4 ft between inlet and outlet walls.

Earthwork:
Excavation and Backfill with Cut and Exposed conditions:




## LINEAR RADIAL

LEGEND
STRUCTURE EXCAVATION
STRUCTURE BACKFILL 90% RELATIVE COMPACTION

NOTES:
1. Slope or shore excavation sides as necessary.
2. Dimensions shown are minimum.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER
September 19, 2025
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# LINEAR RADIAL LEGEND

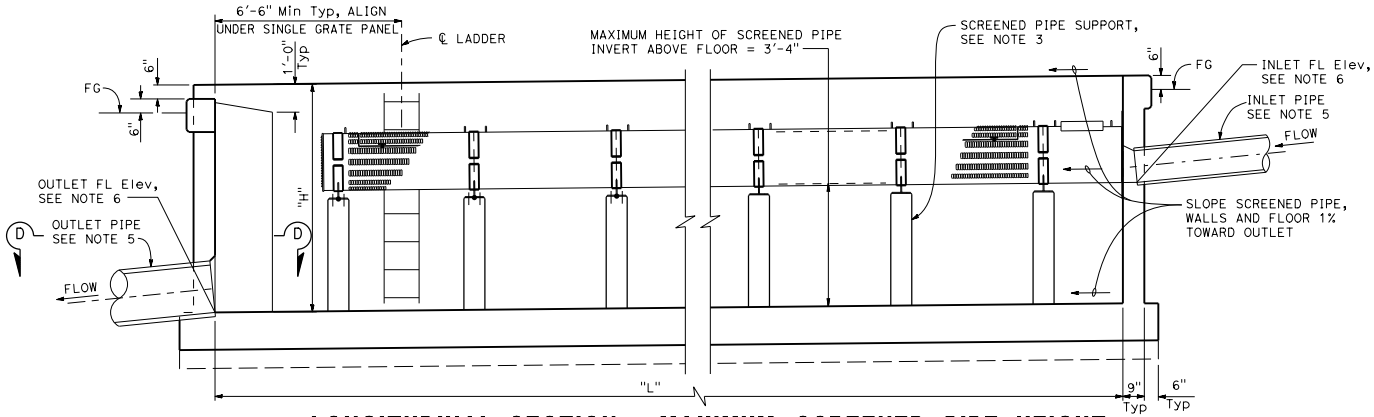
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**D140A**

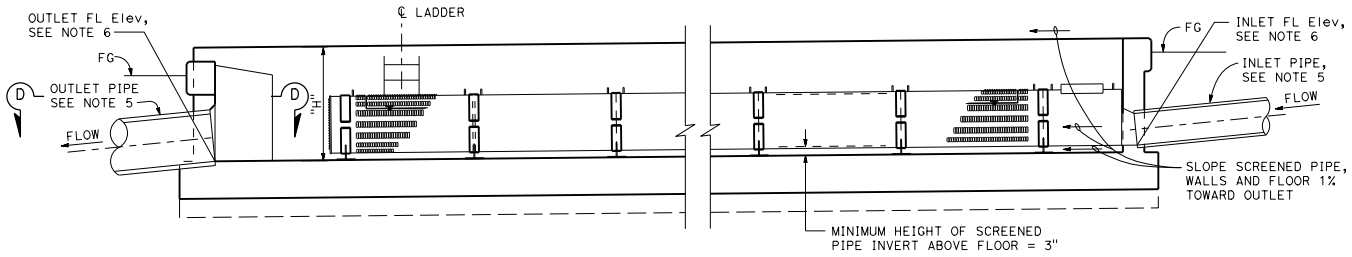
7-1-25



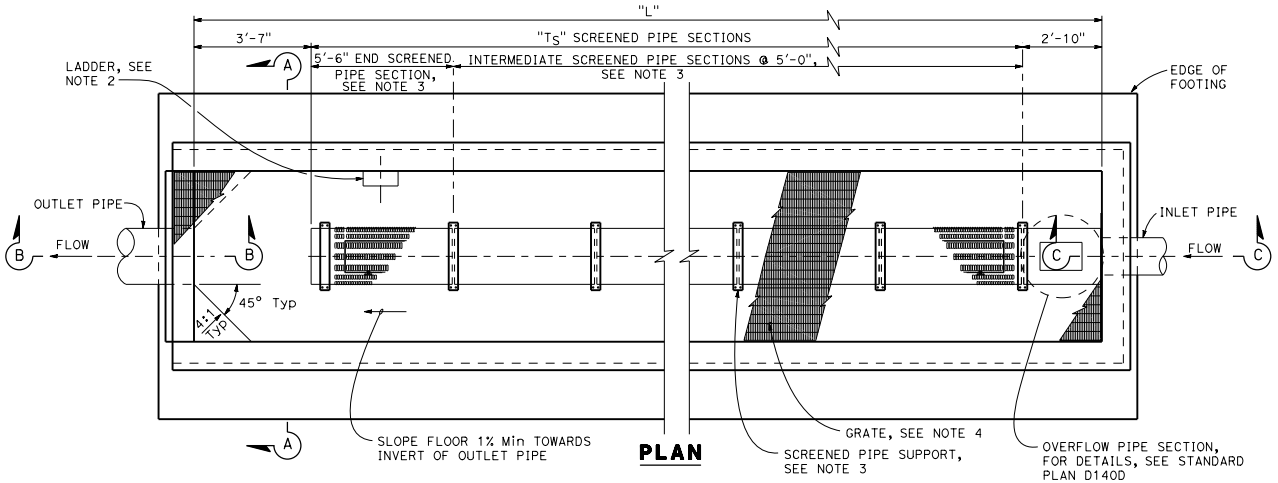
Return to Table of Contents




## LONGITUDINAL SECTION - MAXIMUM SCREENED PIPE HEIGHT



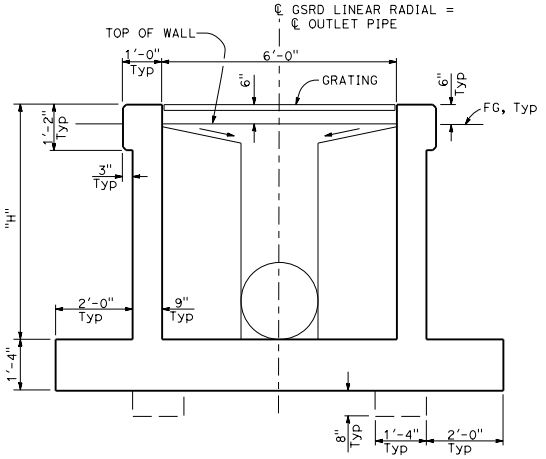

## LONGITUDINAL SECTION - MINIMUM SCREENED PIPE HEIGHT




## PLAN

NOTES (THIS SHEET ONLY):

1. For Sections A-A, B-B, C-C and D-D, see Standard Plan D140C.
2. For ladder details, see Standard Plan D118.
3. For end and intermediate screened pipe details, see Standard Plan D140E.
4. For grate details, see Standard Plan D140F.
5. For layout of inlet and outlet pipes, see "Drainage Plans".
6. For FL elevation of inlet and outlet pipes, see "Drainage Profiles".
7. For dimension "L", "$T_S$" and other design data, see Standard Plan D140A.
8. For dimension "H", see Standard Plan D140C.




## TYPICAL SECTION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE LINEAR RADIAL LAYOUT

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER — Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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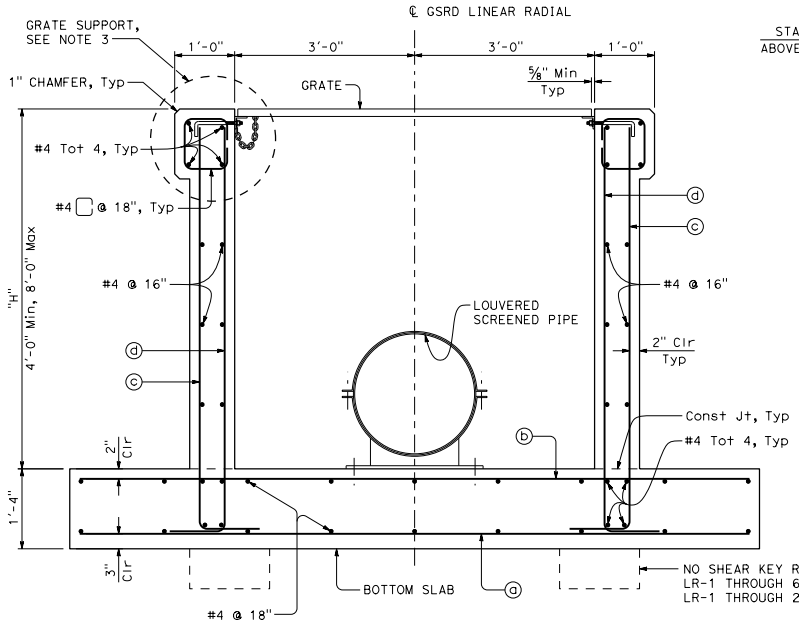
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D140B

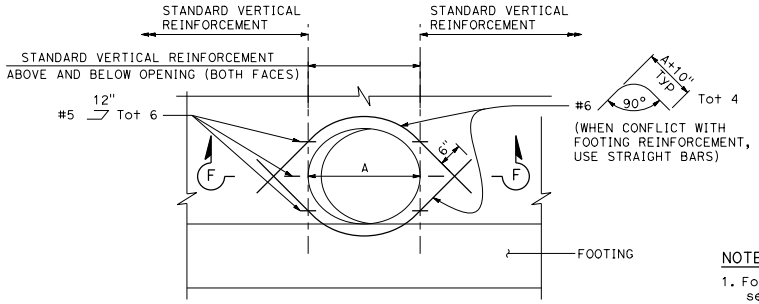
7-1-25



Return to Table of Contents



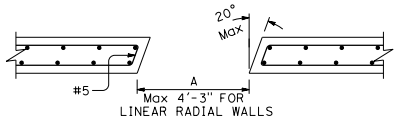

SECTION A-A




## WALL OPENING DETAILS

To be used at Linear Radial inlet and outlet pipe locations

NOTE:
In all opening locations, horizontal reinforcement to be standard except as shown. All reinforcement to clear opening by 2" minimum.

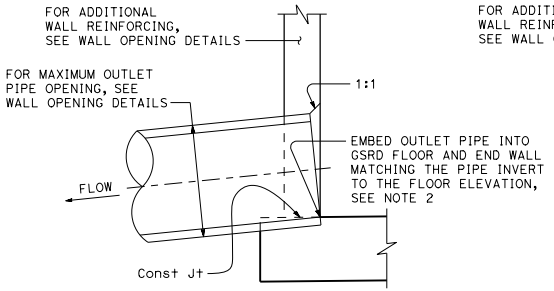



SECTION F-F

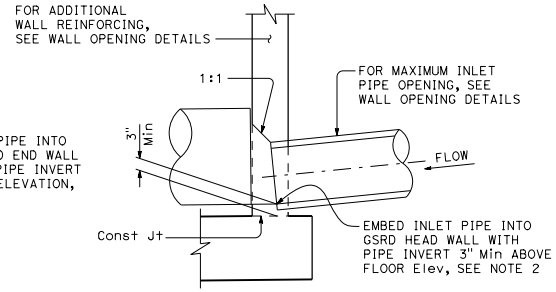
NOTES (THIS SHEET ONLY):

1. For location of Sections A-A, B-B, C-C, and D-D, see Standard Plan D140B.
2. For invert elevation differential between inlet and outlet, see Drainage Profiles sheets.
3. For grate support details, see Standard Plan D140F.

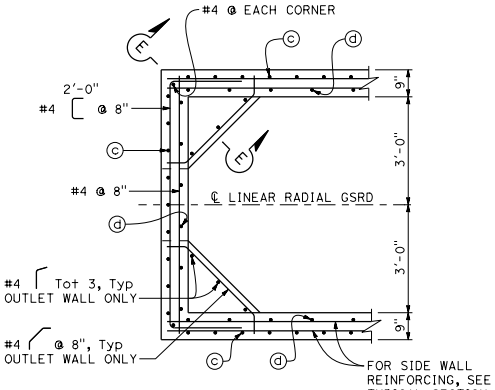
| REINFORCING STEEL AND DATA FOR WALLS | | | |
|---|---|---|---|
| DESIGN "H" | 4'-0" | 6'-0" | 8'-0" |
| ⓐ BARS | #4 @ 18" | #5 @ 12" | #5 @ 8" |
| ⓑ BARS | #4 @ 18" | #4 @ 18" | #5 @ 16" |
| ⓒ BARS ⌊ | #5 @ 14" | #5 @ 9" | #5 @ 4" |
| ⓓ BARS ⌋ | #5 @ 14" | #5 @ 14" | #5 @ 12" |




SECTION B-B

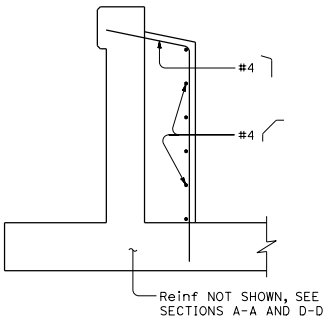



SECTION C-C




SECTION D-D

Outlet wall shown, inlet wall similar.




SECTION E-E

Outlet end only

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE LINEAR RADIAL DETAILS

NO SCALE

D140C

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

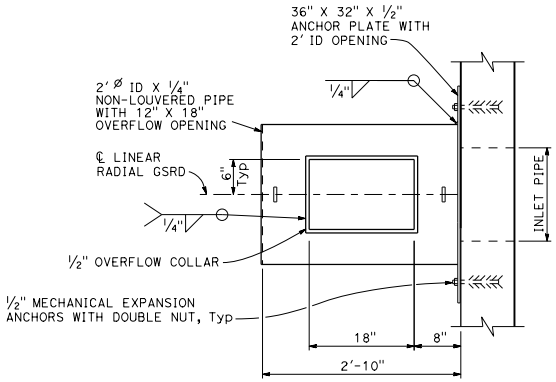
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

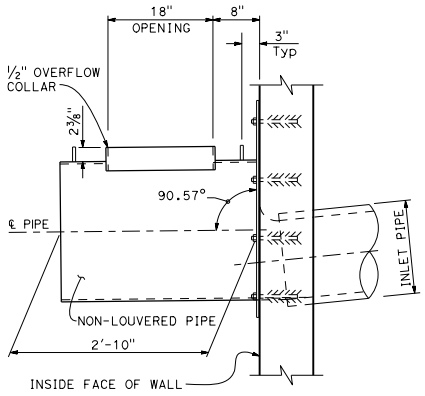
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NOTE (THIS SHEET ONLY):

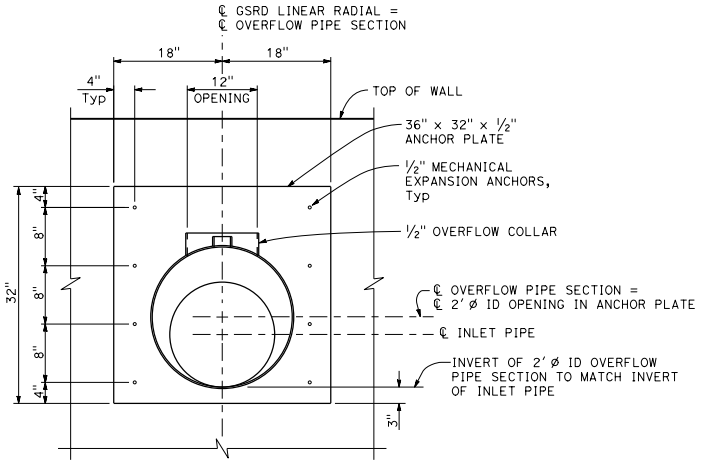
1. All metal components of screen pipe including connections to concrete must be stainless steel.




TOP VIEW




SIDE VIEW




END VIEW

## OVERFLOW PIPE AND ANCHOR PLATE DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# LINEAR RADIAL OVERFLOW PIPE DETAILS

NO SCALE

**D140D**

7-1-25



Return to Table of Contents

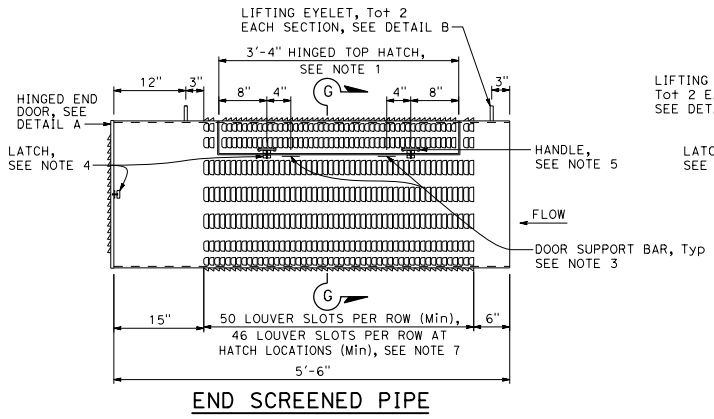
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|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

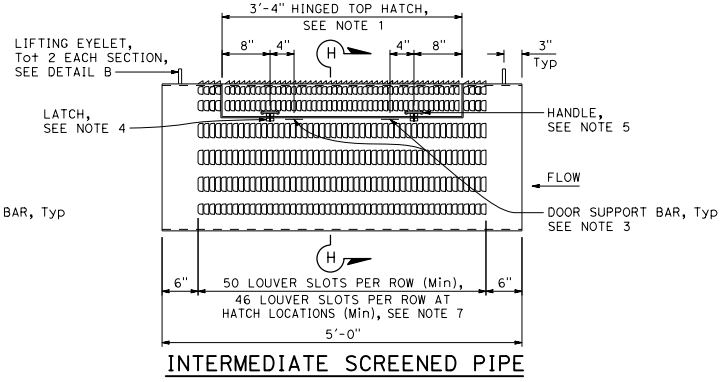
Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

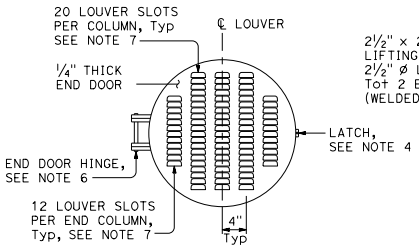
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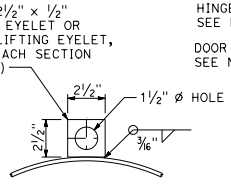

END SCREENED PIPE



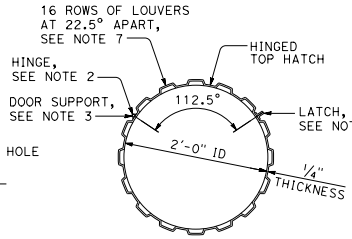

INTERMEDIATE SCREENED PIPE



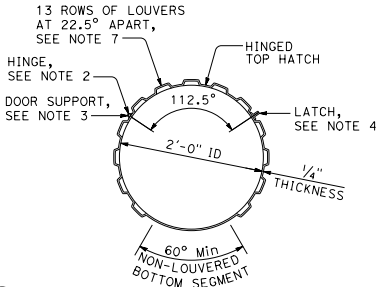

DETAIL A



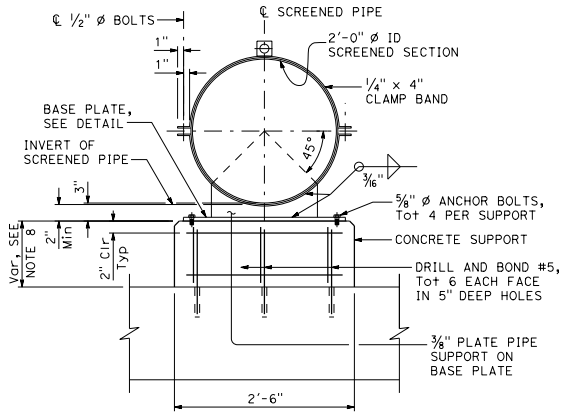

DETAIL B



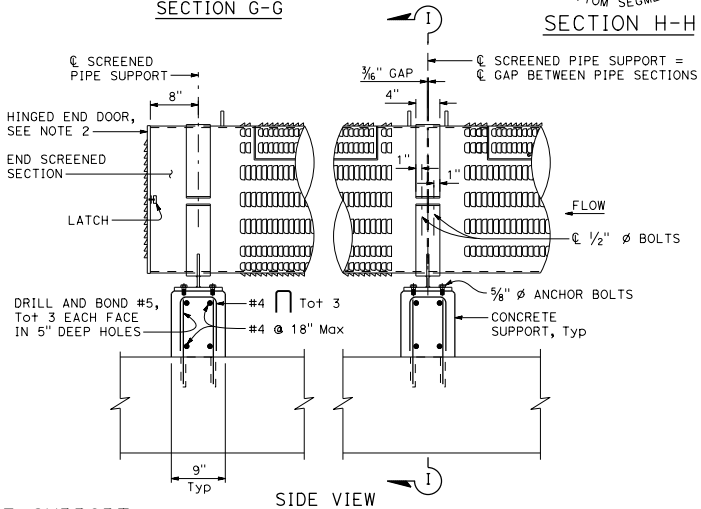

SECTION G-G




SECTION H-H




SECTION I-I




SIDE VIEW

SCREENED PIPE SUPPORT

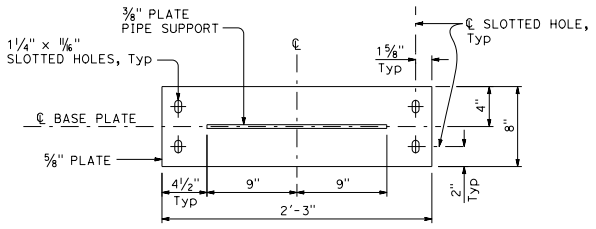
NOTES (THIS SHEET ONLY):

1. Provide 1" x ⅜" stainless steel bar at all cut edges to provide a seat and support for all doors when closed.
2. Provide stainless steel ¼" thick heavy duty hinges 4" x 4" thick with ⅝" Ø pin. Use fillet weld at cover and frame. Total 2 each door, evenly spaced.
3. Attach 2 - 1" x 1" x 3" stainless steel bars (or fabricator equivalent design) to support doors when in an open position. Mechanical stops can be welded on hinges.
4. Provide latch. Latch must have threaded U-bolt for adjustment. Latch to have ⅜" total adjustability and 1 3/16" drawing movement and be rated at 360 LB.
5. Provide stainless steel handles at locations indicated.
6. End door to be secured to end screen with ⅜" Ø x 10" continuous bolt with lock nut through flat bars.
7. The aperture size of each louver slot must be ⅜" wide x 2½" long. Louver slot apertures must meet the following requirements:

| Width: | % of Total |
|---|---|
| 0.189" - 0.200" | 90 |
| 0.181" - 0.200" | 95 |
| 0.169" - 0.200" | 100 |

| Length: | % of Total |
|---|---|
| 2.250" - 2.750" | 90 |
| 2.000" - 3.000" | 100 |

8. When invert height above floor is under 7", use anchor bolts to mount the plate pipe support base to the floor. Otherwise, use with concrete supports if height is between 7" to 10" with single layer reinforcement. When height is over 10", use 2 layers of reinforcement.




BASE PLATE DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# LINEAR RADIAL
# SCREENED PIPE DETAILS

NO SCALE

**D140E**

7-1-25

Return to Table of Contents

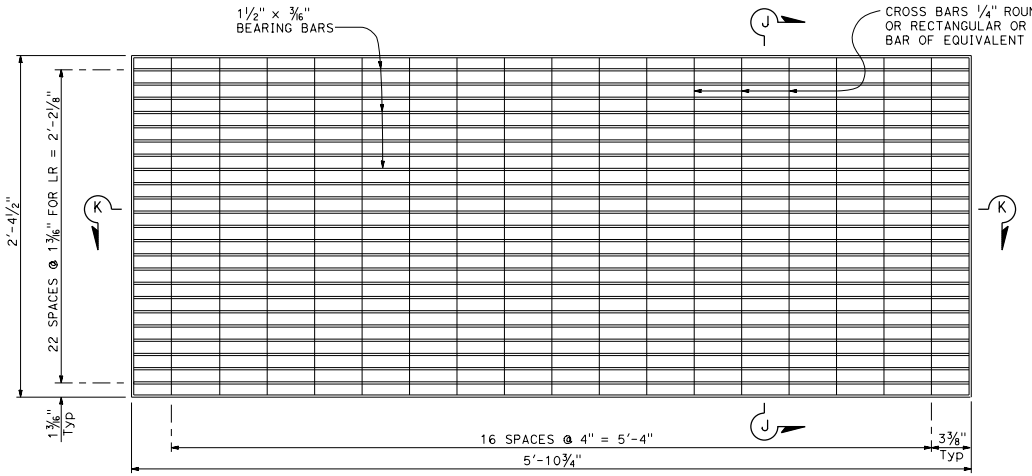
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

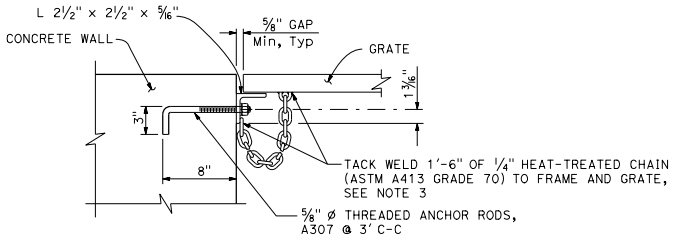
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

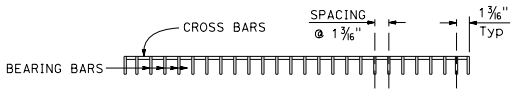
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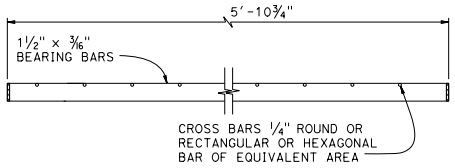

GRATE PANEL




GRATE SUPPORT




SECTION J-J



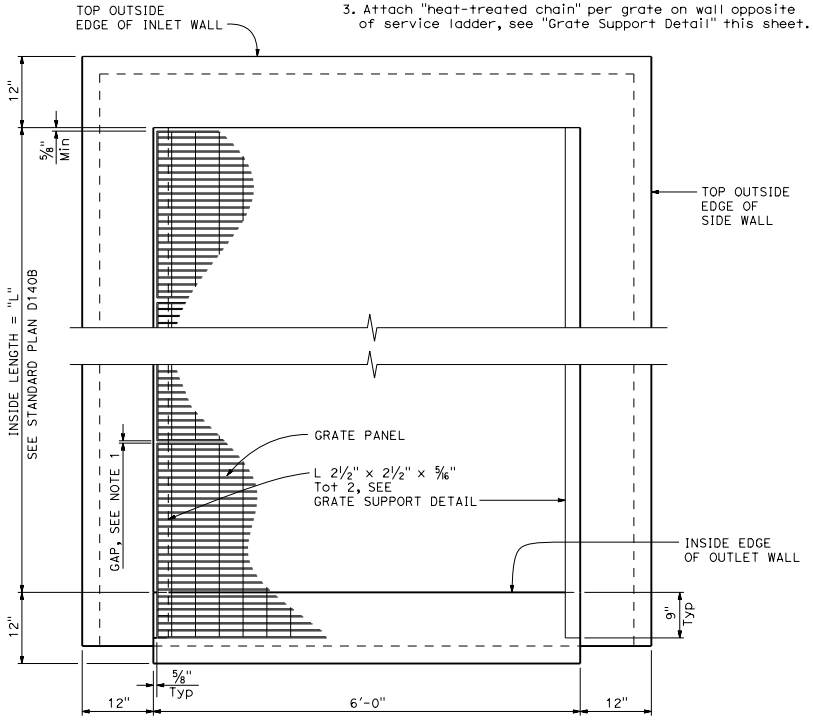

SECTION K-K

NOTE: CROSS BARS MAYBE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.

| No. OF INTERMEDIATE SCREENED PIPES | LR No. OF GRATES | LR(HV) No. OF GRATES |
|---|---|---|
| 0 | 5 | 6 |
| 1 | 7 | 8 |
| 2 | 9 | 10 |
| 3 | 11 | 12 |
| 4 | 13 | 14 |
| 5 | 15 | 16 |

NOTES (THIS SHEET ONLY):

1. Gap between grate panels is 1".
2. All metal components of grating including connections to wall must be galvanized.
3. Attach "heat-treated chain" per grate on wall opposite of service ladder, see "Grate Support Detail" this sheet.




GRATE LAYOUT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

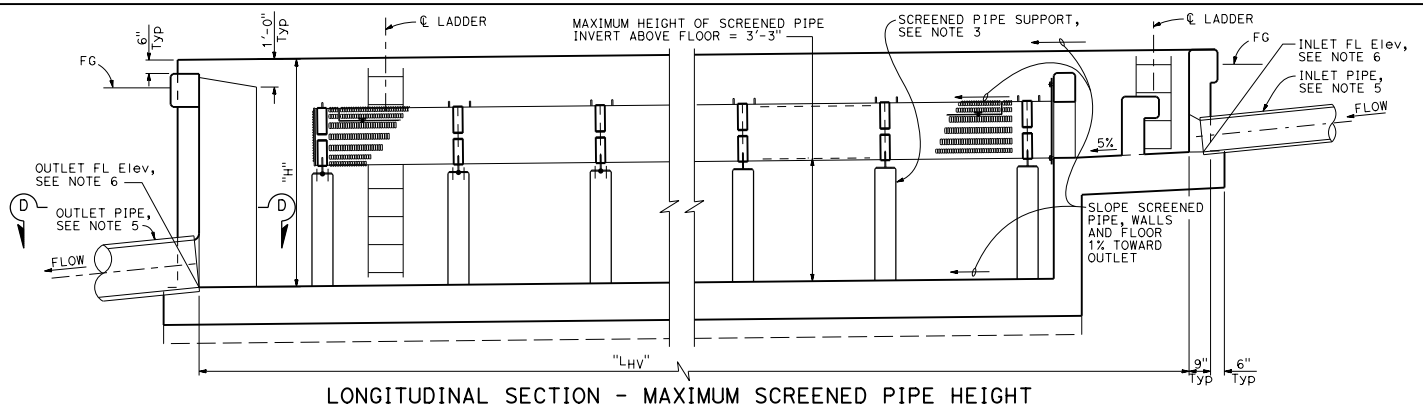
# GROSS SOLIDS REMOVAL DEVICE
# LINEAR RADIAL GRATE PANEL DETAILS

NO SCALE

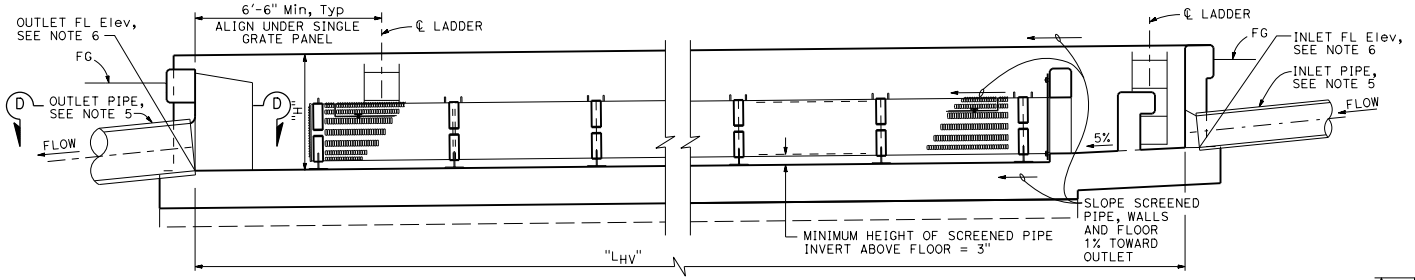
D140F

7-1-25

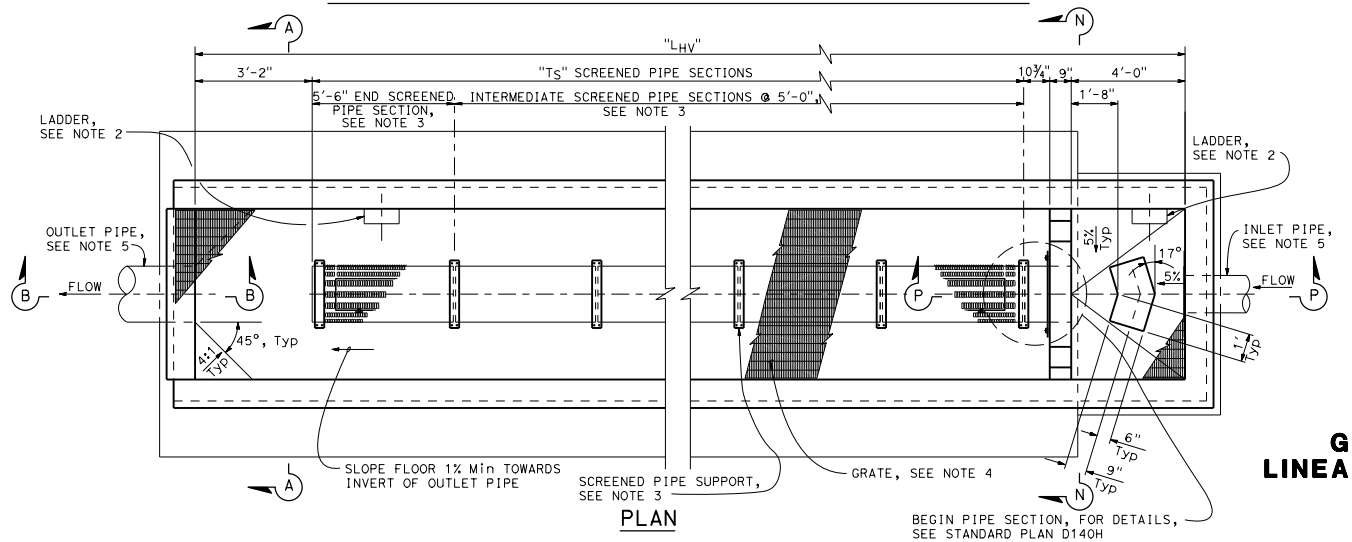
Return to Table of Contents




LONGITUDINAL SECTION - MAXIMUM SCREENED PIPE HEIGHT



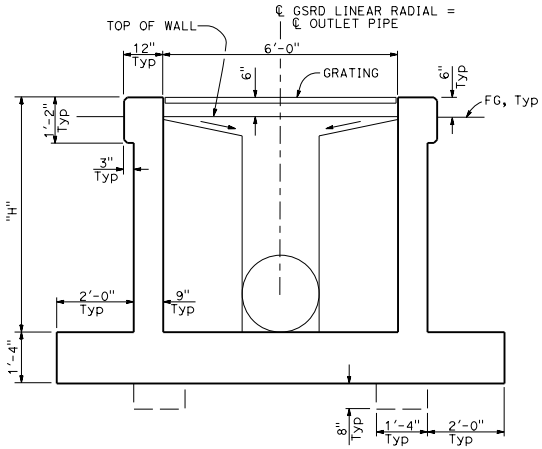

LONGITUDINAL SECTION - MINIMUM SCREENED PIPE HEIGHT




PLAN

NOTES (THIS SHEET ONLY):

1. For Section A-A, B-B, and D-D, see Standard Plan D140C.
2. For ladder details, see Standard Plan D118.
3. For end and intermediate screened pipe details, see Standard Plan D140E.
4. For grate details, see Standard Plan D140F.
5. For layout of inlet and outlet pipes, see "Drainage Plans".
6. For FL elevations of inlet and outlet pipes, see "Drainage Profiles".
7. For dimension "$L_{HV}$", "$T_S$" and other design data, see Design Chart on Standard Plan D140A.
8. For dimension "H", see Standard Plan D140C.
9. For Sections N-N and P-P, see Standard Plan D140H.




TYPICAL SECTION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE
# LINEAR RADIAL (HIGH VELOCITY) LAYOUT

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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**D140G**

7-1-25



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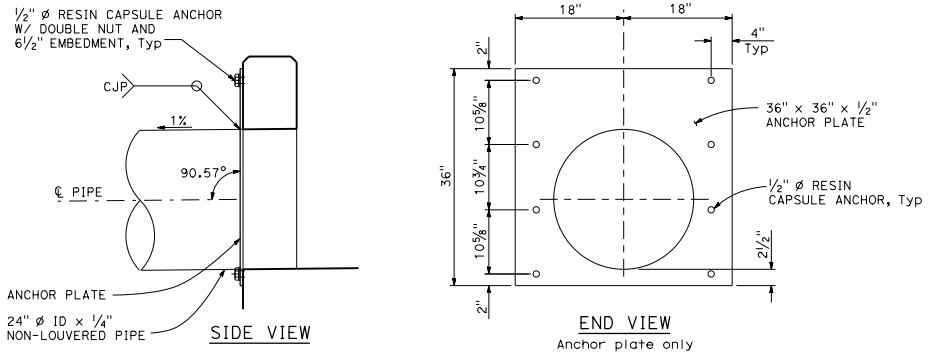
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|---|---|---|---|---|---|
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Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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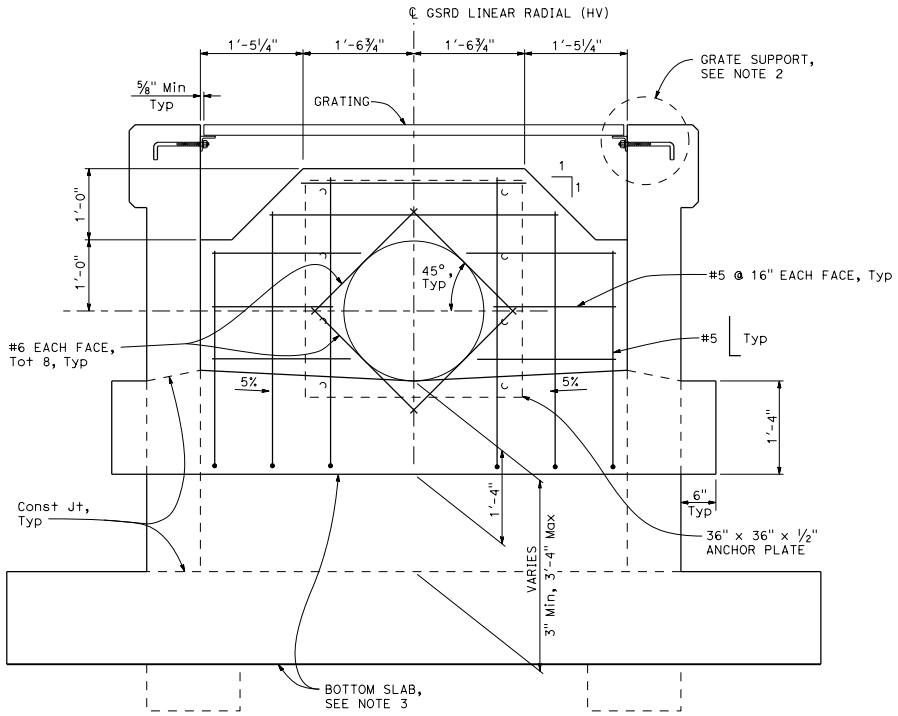
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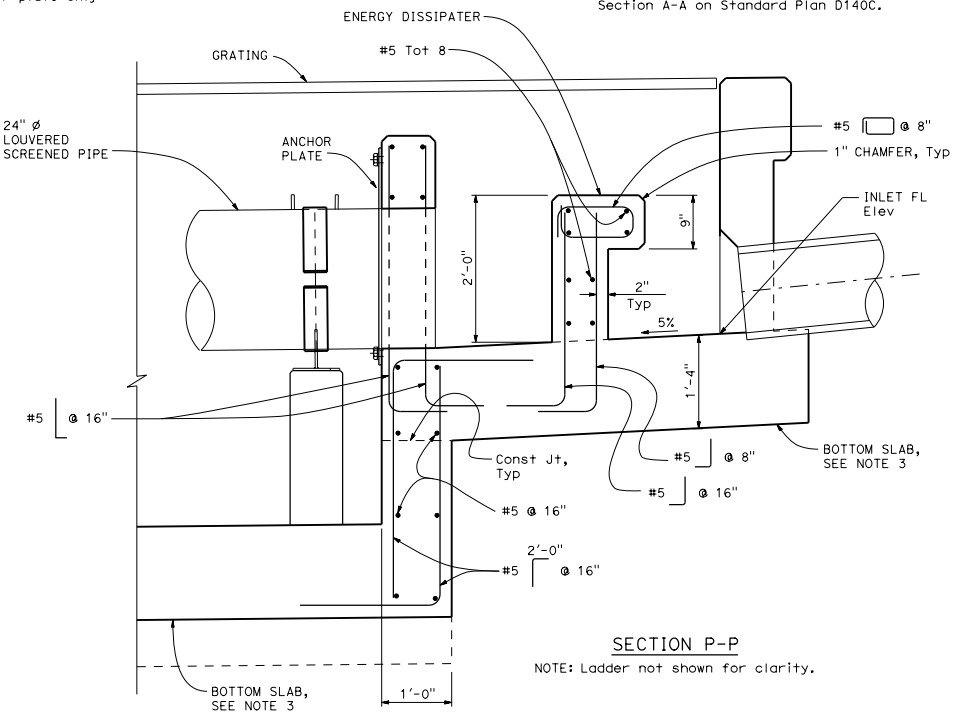

## ANCHOR PLATE DETAILS

NOTES:

1. For location of Sections N-N and P-P, see Standard Plan D140G.
2. For Grate Support Details, see Standard Plan D140F.
3. For bottom slab details not shown, see Section A-A on Standard Plan D140C.




SECTION N-N




SECTION P-P

NOTE: Ladder not shown for clarity.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# GROSS SOLIDS REMOVAL DEVICE LINEAR RADIAL (HIGH VELOCITY) DETAILS

NO SCALE

**D140H**

7-1-25



Return to Table of Contents

| EXISTING | NEW | ITEM DESCRIPTION |
|---|---|---|
| | | WATER METER (WM) |
| | | BACKFLOW PREVENTER ASSEMBLY (BPA) |
| | | BACKFLOW PREVENTER ENCLOSURE (BPE) |
| | | BOOSTER PUMP (BP) |
| | | TRUCK LOADING STANDPIPE (TLS) |
| | FS | FLOW SENSOR (FS) |
| | | MASTER IRRIGATION CONTROLLER (MIC) |
| | | AUXILIARY IRRIGATION CONTROLLER (AIC) |
| | | IRRIGATION CONTROLLER (IC)<br>IRRIGATION CONTROLLER (IC) (BATTERY)<br>IRRIGATION CONTROLLER (IC) (SOLAR)<br>IRRIGATION CONTROLLER (IC) (TWO WIRE) |
| | | IRRIGATION CONTROLLER(S) IN CONTROLLER ENCLOSURE CABINET (ICC) |
| acc | ACC | ARMOR-CLAD CONDUCTORS (ACC) |
| | | CONTROL AND NEUTRAL CONDUCTORS (CNC) |
| | | IRRIGATION CONDUIT |
| | | IRRIGATION SLEEVE |
| dip | DIP | DUCTILE IRON PIPE (SUPPLY LINE) (MAIN) (DIP) |
| | | GALVANIZED STEEL PIPE (SUPPLY LINE) (MAIN) (GSP) |
| | | GALVANIZED STEEL PIPE (SUPPLY LINE) (LATERAL) (GSP) |
| | | PLASTIC PIPE (SUPPLY LINE) (MAIN) |
| | | PLASTIC PIPE (SUPPLY LINE) (LATERAL) |
| cp | CP | COPPER PIPE (SUPPLY LINE) |
| dit | DIT | DRIP IRRIGATION TUBING |
| | | REMOTE CONTROL VALVE (RCV)<br>REMOTE CONTROL VALVE (MASTER) (RCVM)<br>REMOTE CONTROL VALVE (MASTER) W/FLOW METER (RCVMF) |
| | | REMOTE CONTROL VALVE W/PRESSURE REGULATOR (RCVP) |
| | | EXISTING MANUAL CONTROL VALVE (MCV) |
| | | DRIP VALVE ASSEMBLY (DVA) |
| | | WYE STRAINER ASSEMBLY (WSA) |

| EXISTING | NEW | ITEM DESCRIPTION |
|---|---|---|
| | | GATE VALVE (GV) |
| | | BALL VALVE (BV) |
| | | QUICK COUPLING VALVE (QCV) |
| | | CAM COUPLER ASSEMBLY (CCA) |
| | | GARDEN VALVE ASSEMBLY (GARVA) |
| | | PRESSURE REGULATING VALVE (PRV) |
| | | PRESSURE RELIEF VALVE (PRLV) |
| | | FLOW CONTROL VALVE (FCV) |
| | | COMBINATION AIR RELEASE VALVE (CARV) |
| | | CHECK VALVE (CV) |
| | | FLUSH VALVE (FV) |
| | | EXISTING NOZZLE LINE W/TURNING UNION |
| | | EXISTING IRRIGATION SYSTEM |
| | | EXISTING IRRIGATION SYSTEM TO BE REMOVED |
| | | CHAIN LINK GATE |
| | | QUICK COUPLING VALVE W/SPRINKLER PROTECTOR |
| | 3 | SPRINKLER W/SPRINKLER PROTECTOR |
| | C | CONNECT TO EXISTING SYSTEM |
| | | CAP |
| | | CAP EXISTING |
| | FR | FIBER ROLL |
| | CS | COMPOST SOCK |

RCV SIZE
IRRIGATION CONTROLLER
CONTROLLER STATION
VALVE IN PARALLEL (IF APPLICABLE)
GPM
QUANTITY OF SPRINKLERS (WHEN SHOWN)

* (2½"-A-2b-40-60)

VALVE CODE

* VALVE CODES FOR EXISTING VALVES ARE SHOWN IN A DASHED ENCLOSURE.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

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LICENSED LANDSCAPE ARCHITECT
CATHERINE B. BANNER-ROSES
Signature
6-30-27
Renewal Date
Date
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LANDSCAPE AND EROSION CONTROL SYMBOLS

NO SCALE

H1

7-1-25

2025 STANDARD PLAN H1



Return to Table of Contents

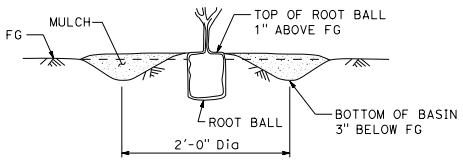
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|---|---|---|---|---|---|
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LICENSED LANDSCAPE ARCHITECT

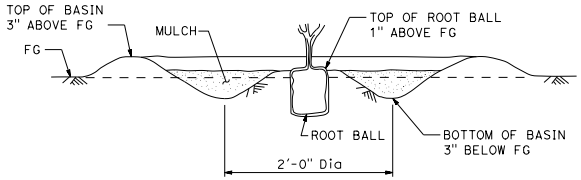
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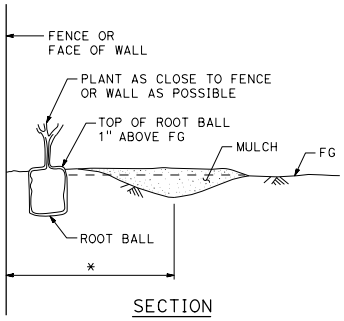
LICENSED LANDSCAPE ARCHITECT
CATHERINE B. BANNER REYES
Signature
6-30-27
Renewal Date
Date
STATE OF CALIFORNIA



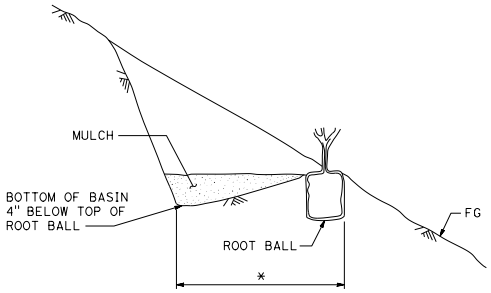

SECTION
(Flat Area)




SECTION
(Flat Area)

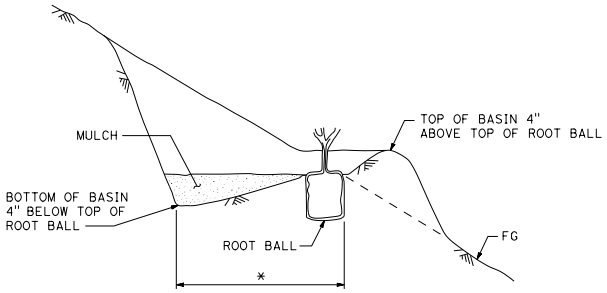



SECTION
(Flat Area)



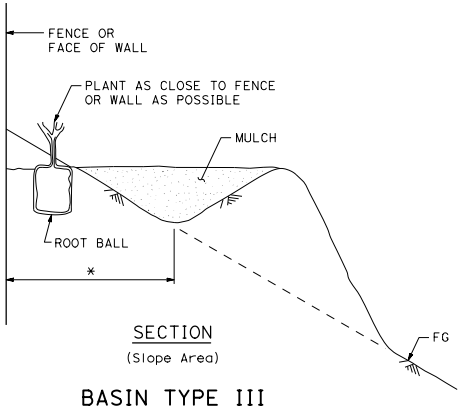

SECTION
(Slope Area)

BASIN TYPE I




SECTION
(Slope Area)

BASIN TYPE II




SECTION
(Slope Area)

BASIN TYPE III

* Basin area equivalent to 2'-0" Dia.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**LANDSCAPE DETAILS**

NO SCALE

**H2**

7-1-25



Return to Table of Contents

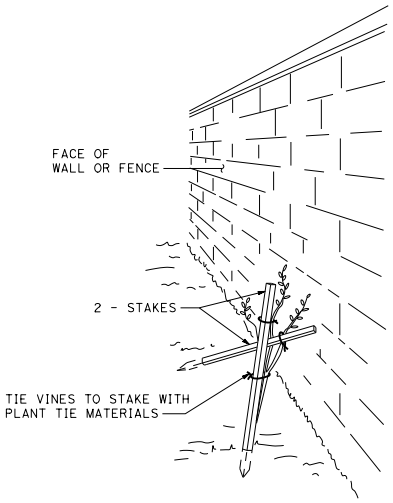
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

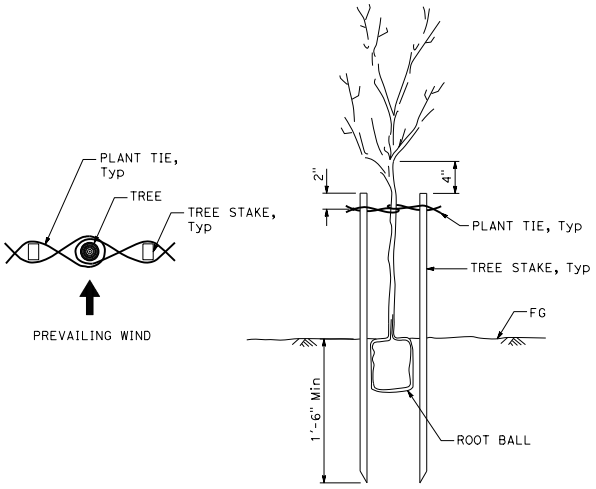
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LICENSED LANDSCAPE ARCHITECT
CATHERINE B. BANNER-ROSES
Signature
6-30-27
Renewal Date
Date
STATE OF CALIFORNIA




PERSPECTIVE

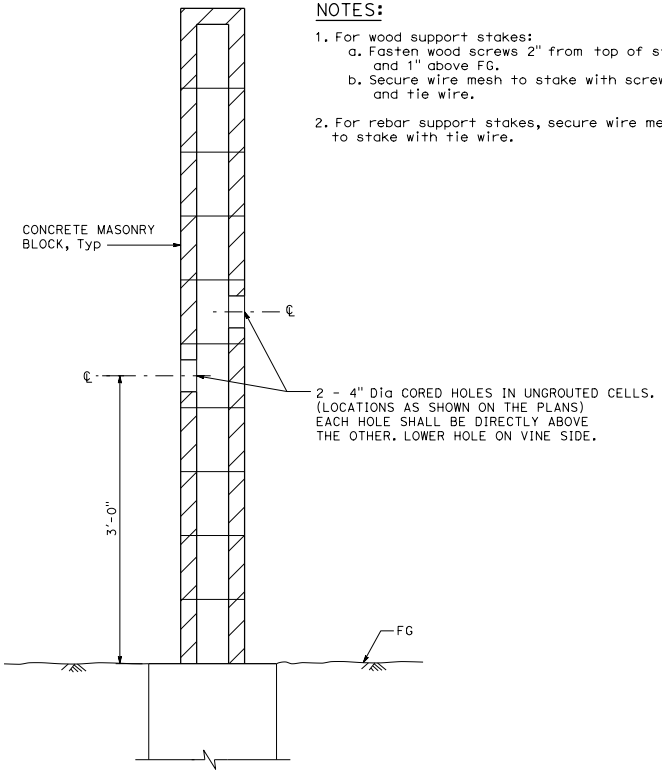
## VINE STAKING




## TREE STAKING

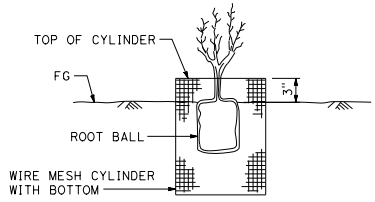
NOTES:

1. For wood support stakes:
   a. Fasten wood screws 2" from top of stake and 1" above FG.
   b. Secure wire mesh to stake with screws and tie wire.
2. For rebar support stakes, secure wire mesh to stake with tie wire.



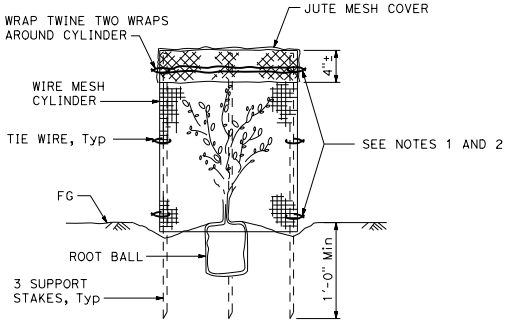

SECTION

## CORE HOLE (VINE)




SECTION

## ROOT PROTECTOR




SECTION

## FOLIAGE PROTECTOR

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## LANDSCAPE DETAILS

NO SCALE

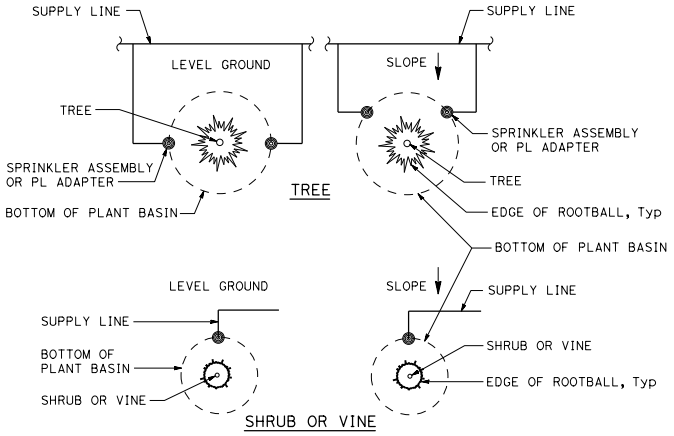
H3

7-1-25

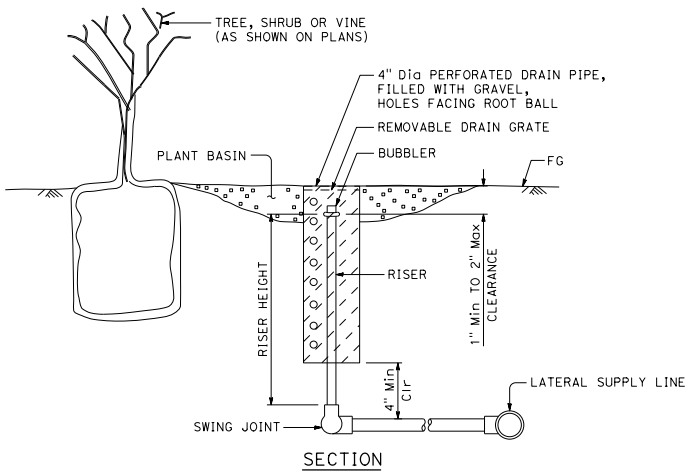
2025 STANDARD PLAN H3



Return to Table of Contents




TREE WELL ASSEMBLY AND RISER TYPE V DIAGRAM




TREE WELL SPRINKLER ASSEMBLY

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

LICENSED LANDSCAPE ARCHITECT

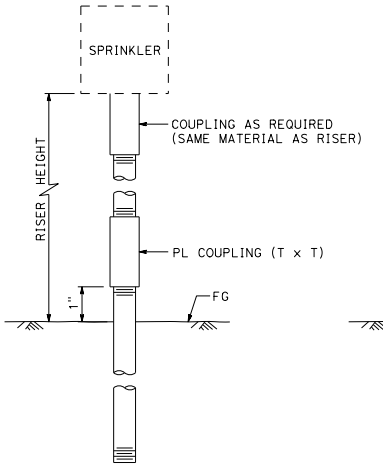
September 19, 2025
PLANS APPROVAL DATE

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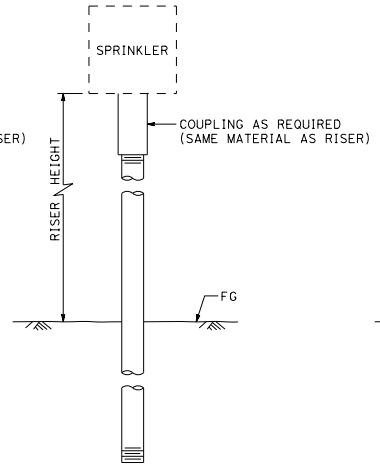
LICENSED LANDSCAPE ARCHITECT — CATHERINE B. BANNER-ROSES — Signature — 6-30-27 Renewal Date — Date — STATE OF CALIFORNIA

NOTES:

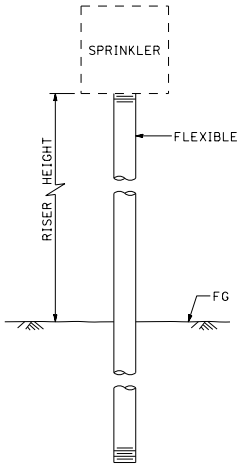
1. See Project Plans for type and quantity of sprinklers.
2. Refer to plant legend and Standard Plan H2 for plant basin dimensions.



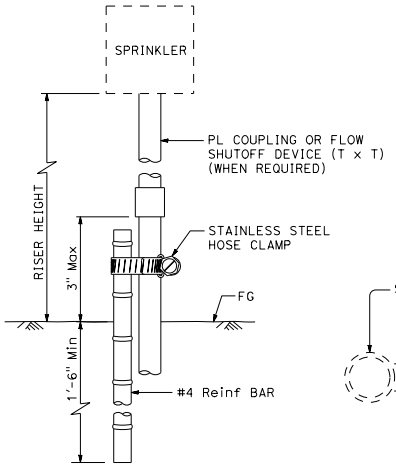

RISER TYPE I



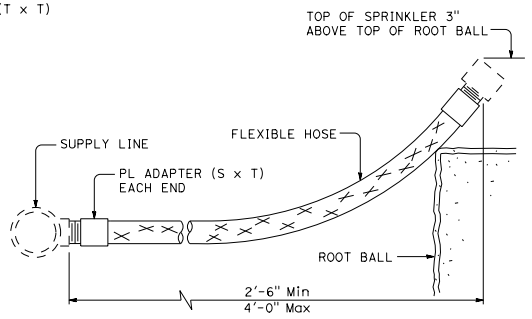

RISER TYPE II




RISER TYPE III




RISER TYPE IV




RISER TYPE V

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LANDSCAPE DETAILS (SPRINKLER ASSEMBLY)

NO SCALE

H4

7-1-25



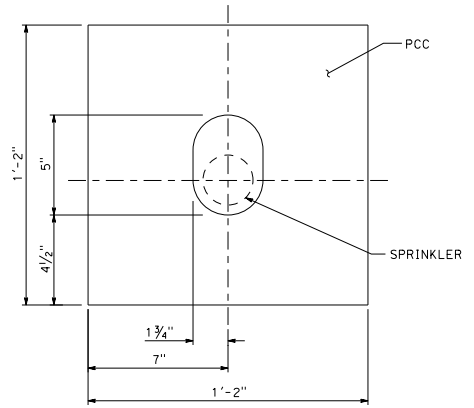
Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

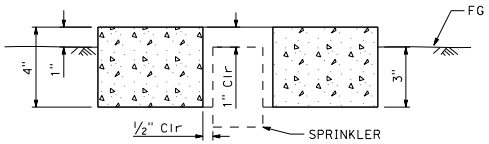
LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

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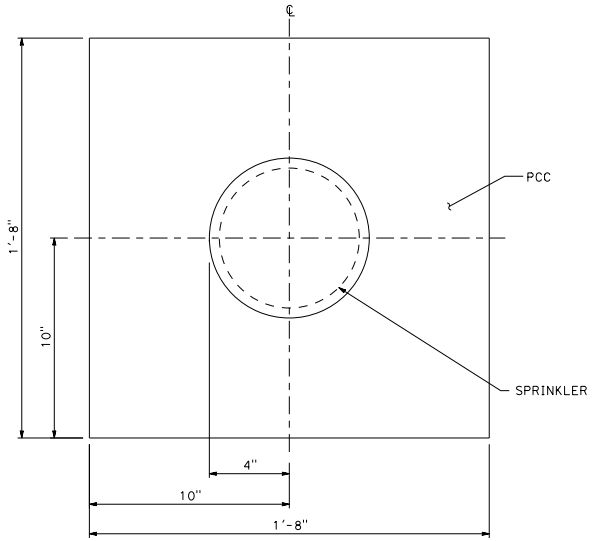



PLAN

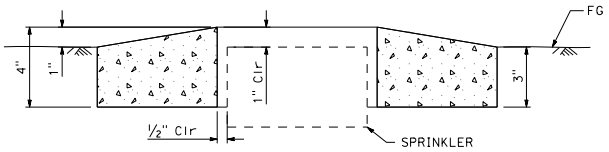



SECTION

SPRINKLER PROTECTOR TYPE I

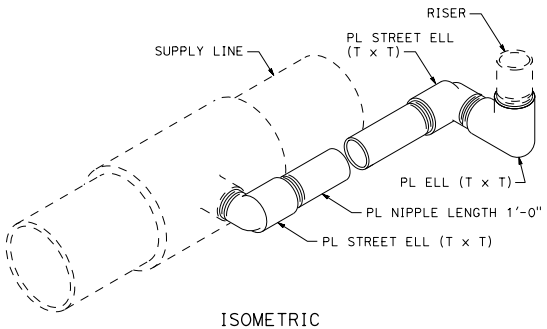



PLAN



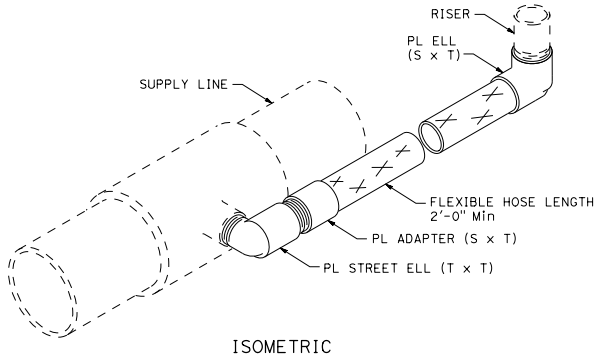

SECTION

SPRINKLER PROTECTOR TYPE II



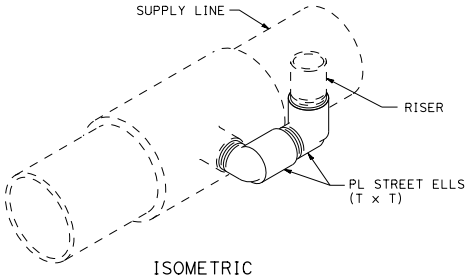

ISOMETRIC

SWING JOINT TYPE I




ISOMETRIC

SWING JOINT TYPE II




ISOMETRIC

SWING JOINT TYPE III

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LANDSCAPE DETAILS (SWING JOINT AND PROTECTOR)

NO SCALE

H5

7-1-25



Return to Table of Contents

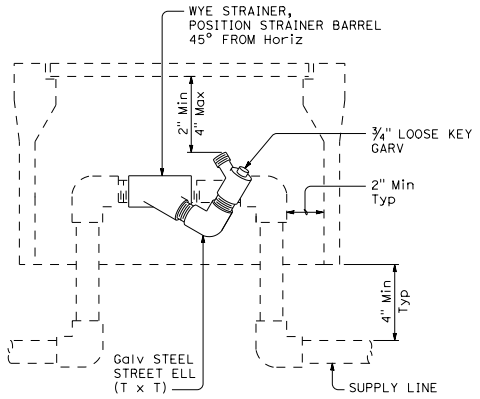
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

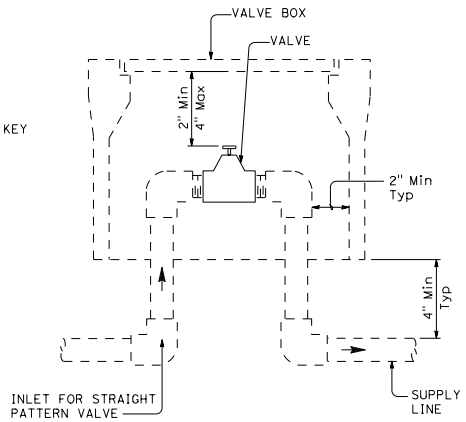
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LICENSED LANDSCAPE ARCHITECT — CATHERINE B. BANNER — Signature — 6-30-27 Renewal Date — Date — STATE OF CALIFORNIA



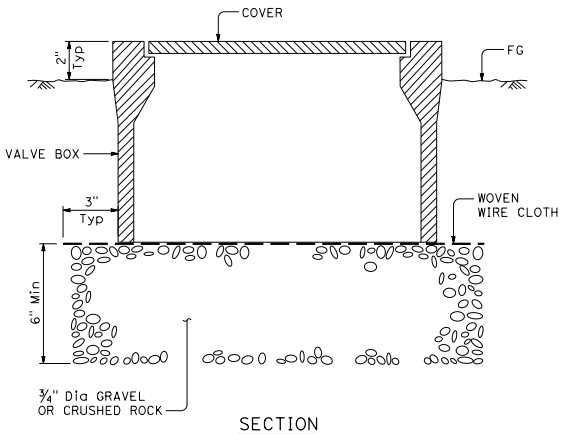

ELEVATION

## WYE STRAINER ASSEMBLY



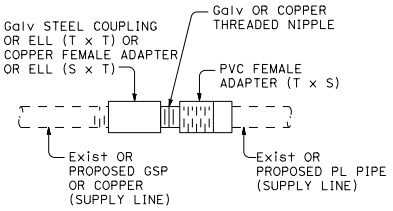

ELEVATION

## VALVE

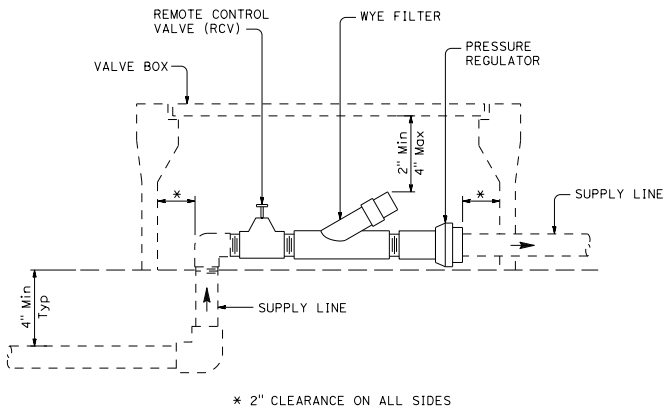



SECTION

## VALVE BOX

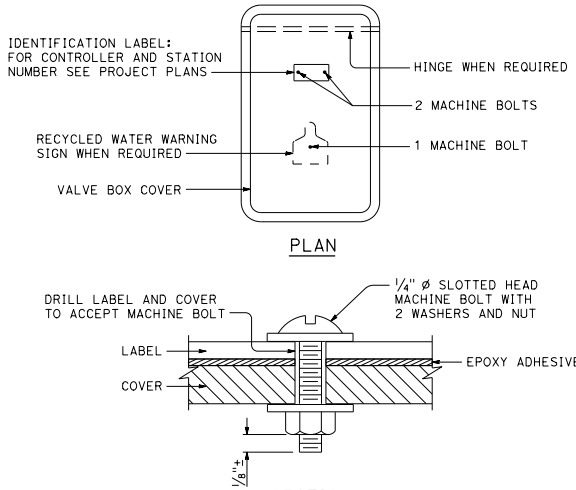



## GALVANIZED OR COPPER PIPE CONNECTION TO PLASTIC PIPE

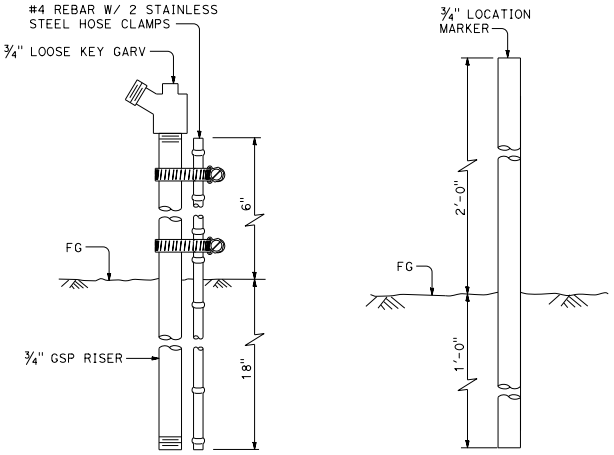



ELEVATION

## DRIP VALVE ASSEMBLY




## VALVE BOX IDENTIFICATION




## GARDEN VALVE ASSEMBLY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LANDSCAPE DETAILS

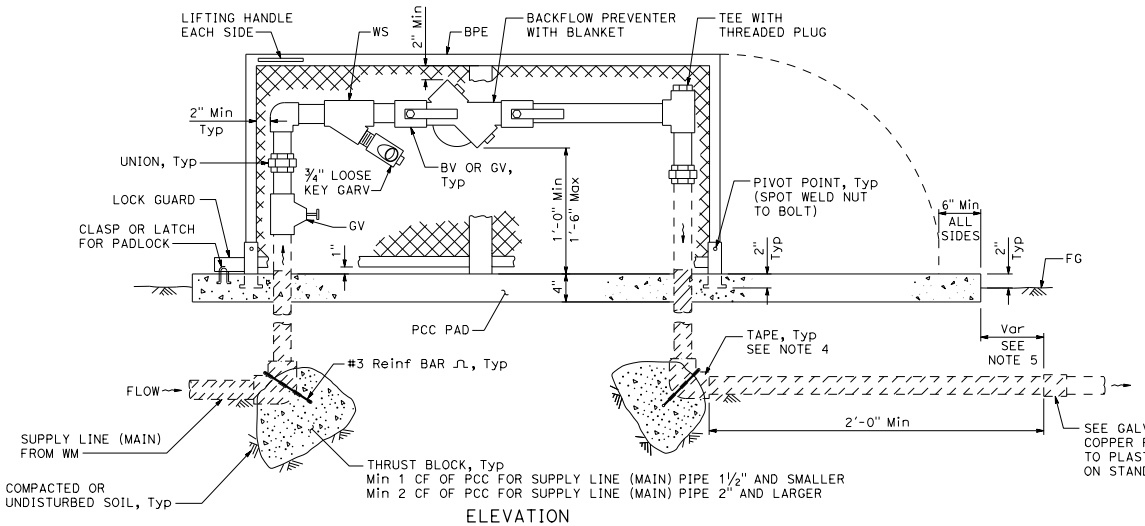
NO SCALE

H6

7-1-25

2025 STANDARD PLAN H6

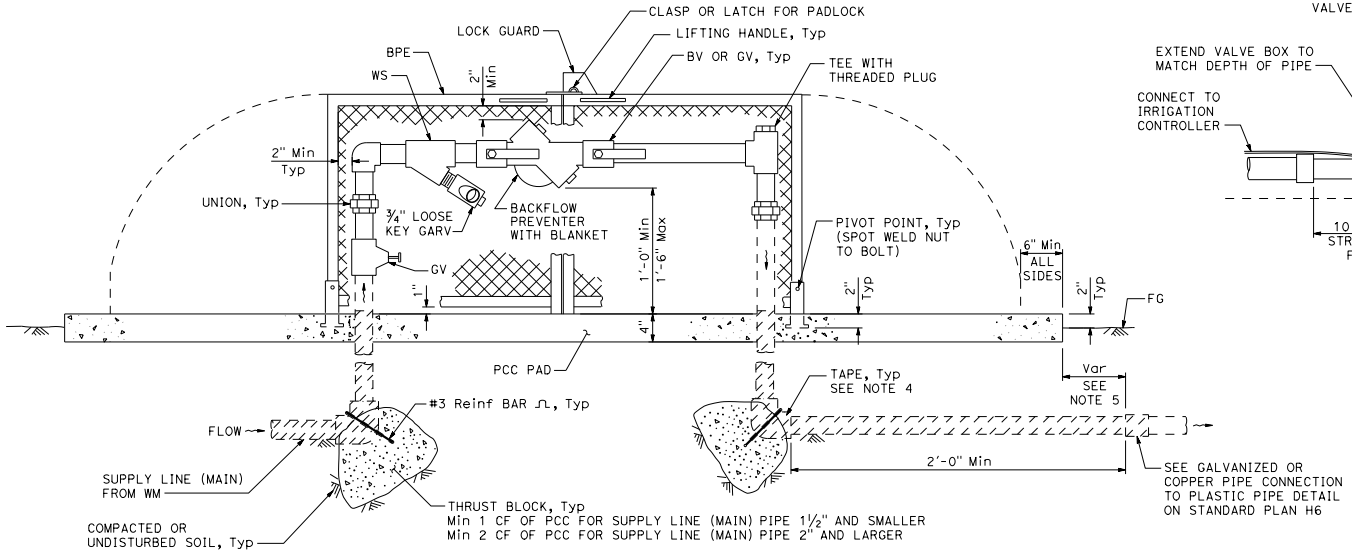
Return to Table of Contents




ELEVATION

## BACKFLOW PREVENTER ASSEMBLY

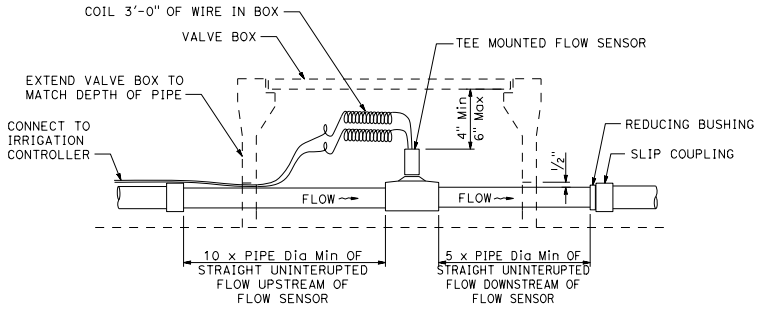
In one piece enclosure




ELEVATION

## BACKFLOW PREVENTER ASSEMBLY

In two piece enclosure




SECTION

## FLOW SENSOR

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

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LICENSED LANDSCAPE ARCHITECT
CATHERINE B. BANNER-ROSES
Signature
6-30-27
Renewal Date
Date
STATE OF CALIFORNIA

NOTES:

1. Wye strainer and fittings must be the same size as the backflow preventer shown on the plans.
2. Wye strainer must be located and fitted in accordance with local water ordinance.
3. Supply line (main) pipe installed from the water meter to the backflow preventer assembly must be the same type of pipe used for the backflow preventer assembly manifold pipe.
4. All metal in contact with soil and portland cement concrete must be wrapped with 2" wide plastic backed adhesive polyethylene tape 20 mil thick with ½" overlap.
5. The connector must be located 6 to 9 inches away from the edge of PCC pad.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LANDSCAPE DETAILS

NO SCALE

H7

7-1-25

2025 STANDARD PLAN H7

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

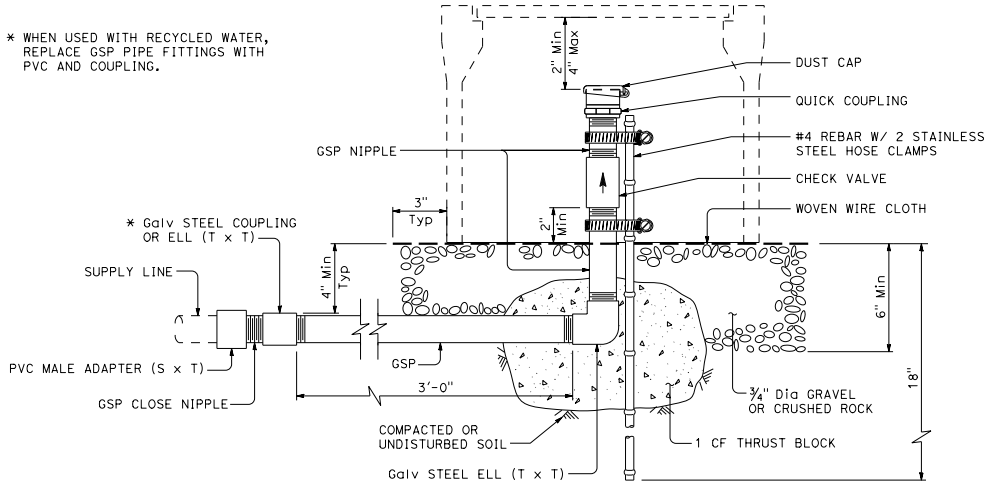
LICENSED LANDSCAPE ARCHITECT

September 19, 2025
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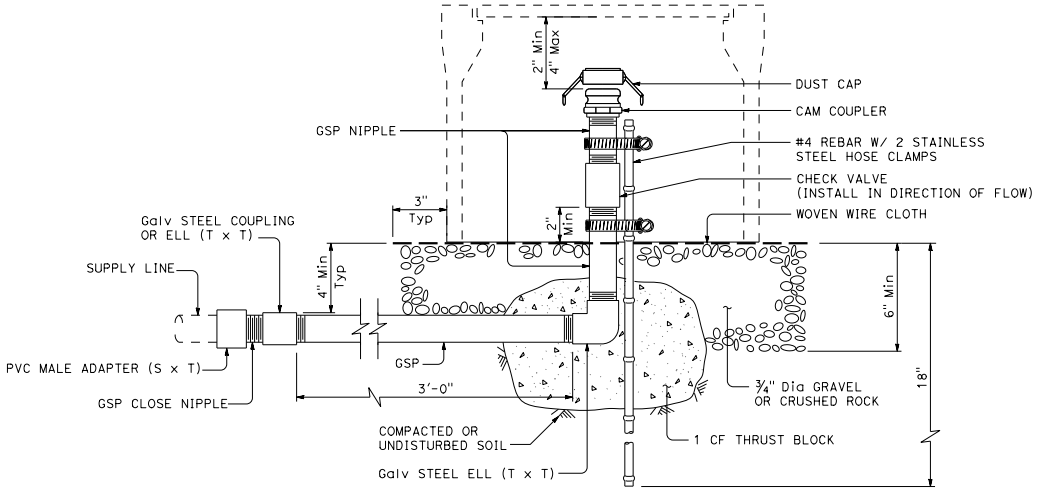
LICENSED LANDSCAPE ARCHITECT — CATHERINE B. BANNER ROSES — Signature — 6-30-27 Renewal Date — Date — STATE OF CALIFORNIA

* WHEN USED WITH RECYCLED WATER, REPLACE GSP PIPE FITTINGS WITH PVC AND COUPLING.




ELEVATION

## QUICK COUPLING VALVE

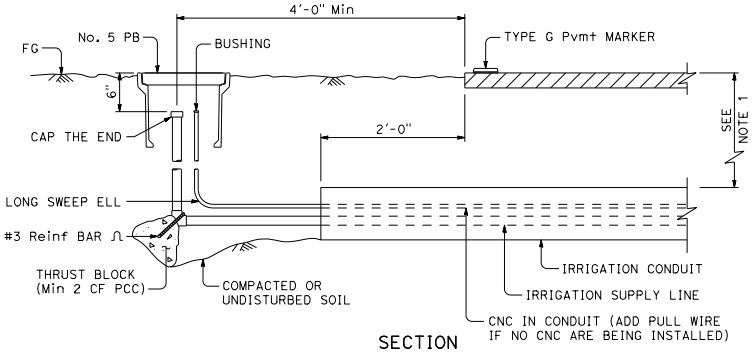



ELEVATION

## CAM COUPLER ASSEMBLY

NOTES:

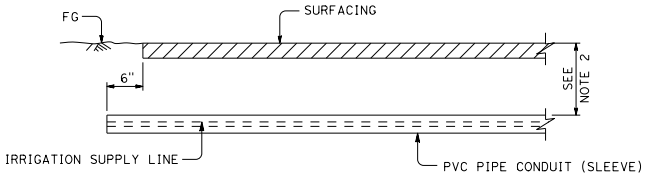
1. 40" to 50".
2. 12" downstream of RCV, 18" upstream of RCV.




SECTION

## IRRIGATION CONDUIT

Under traveled way




SECTION

## PVC PIPE CONDUIT (SLEEVE)

Under sidewalks, driveways pavement, slope paving, paved ditches and paths

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## LANDSCAPE DETAILS

NO SCALE

H8

2025 STANDARD PLAN H8

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

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LICENSED LANDSCAPE ARCHITECT — CATHERINE B. BANNER-ROSES — Signature — 6-30-27 Renewal Date — Date — STATE OF CALIFORNIA

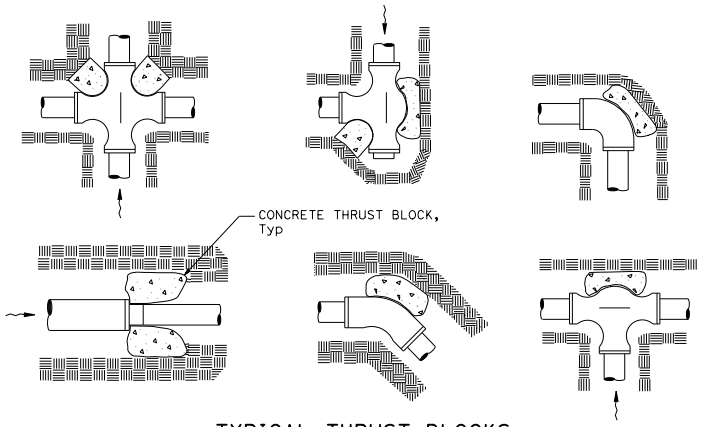
## THRUST BLOCK SCHEDULE

| PIPE SIZE | BEARING AREA (SQFT) | | | | | |
|---|---|---|---|---|---|---|
| | TEE | PLUG | WYE | 90° | 45° | CROSS / 22.5° |
| 3" | 1.0 | 1.0 | 1.0 | 1.5 | 1.0 | 0.5 |
| 4" | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.0 |
| 6" | 2.0 | 2.0 | 2.0 | 1.5 | 1.5 | 1.0 |

NOTES:

Use for non-solvent welded pipe.

Thrust block must be poured against undisturbed soil.



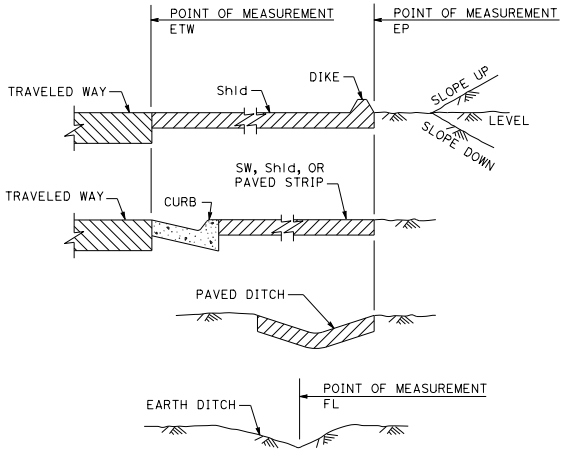

TYPICAL THRUST BLOCKS

NOTES:

1. 12" downstream of RCV, 18" upstream of RCV.
2. Width sufficent to allow snaking of pipe and CNC bundles without stacking.
3. 1'-0" minimum to back of sidewalk.
4. 2" minimum or Dia of largest pipe in trench.

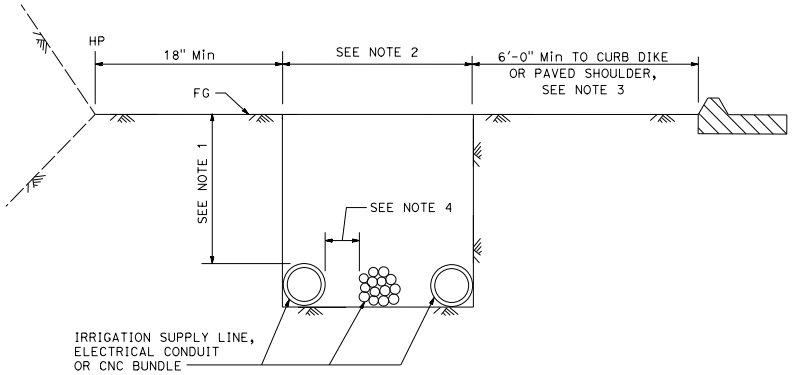
LEGEND:

DIRECTION OF FLOW




SECTION

POINTS OF MEASUREMENT




SECTION

IRRIGATION TRENCH DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**LANDSCAPE DETAILS**

NO SCALE

**H9**

7-1-25

2025 STANDARD PLAN H9

Return to Table of Contents

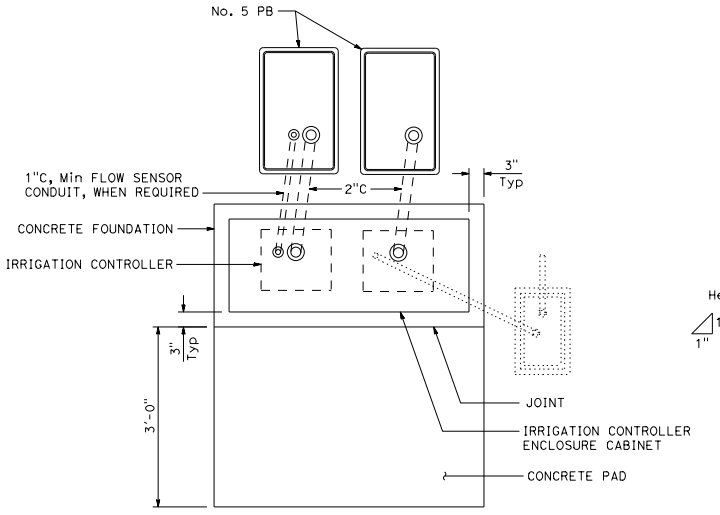
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LICENSED LANDSCAPE ARCHITECT

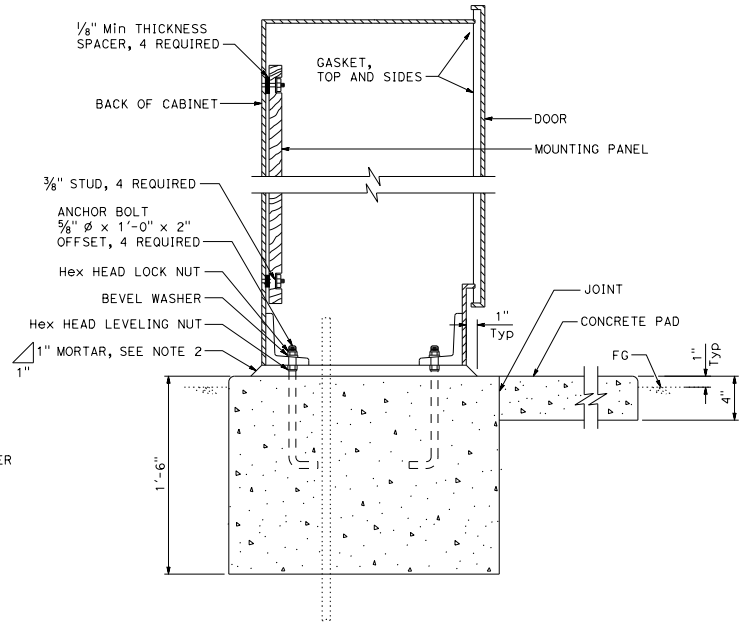
September 19, 2025
PLANS APPROVAL DATE

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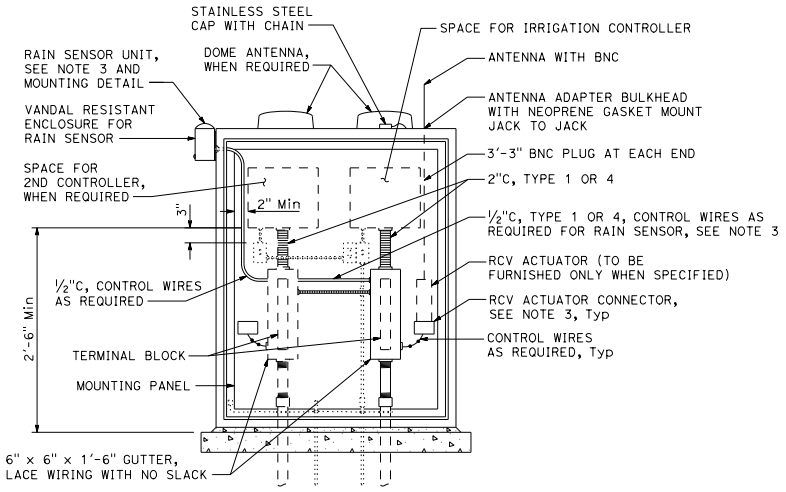
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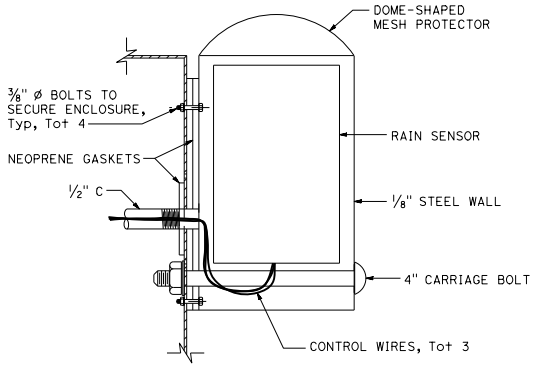

PLAN




CABINET SECTION




ELEVATION




RAIN SENSOR UNIT

NOTES:

1. All dimensions are nominal.
2. Mortar shall be 1-part cement, 2-parts plaster sand.
3. Rain sensor unit and remote control valve actuator connectors to be provided when specified.
4. See project plans for location and number of irrigation controllers for each cabinet. Install the cabinet with the back facing the direction of oncoming traffic in the nearest traffic lane.
5. The electrical items shown in dropout are not labeled. See Standard Plan ES-3H for electrical requirements.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# IRRIGATION CONTROLLER ENCLOSURE CABINET

NO SCALE

H10

7-1-25

2025 STANDARD PLAN H10

Return to Table of Contents

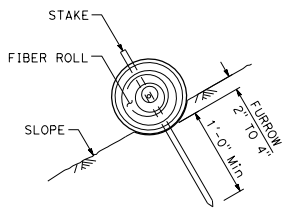
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LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

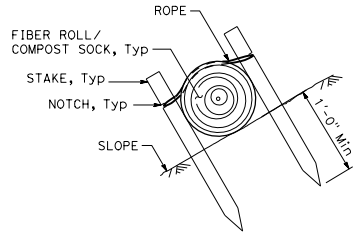
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LICENSED LANDSCAPE ARCHITECT — CATHERINE B. BANNER ROSES — Signature — 6-30-27 Renewal Date — Date — STATE OF CALIFORNIA

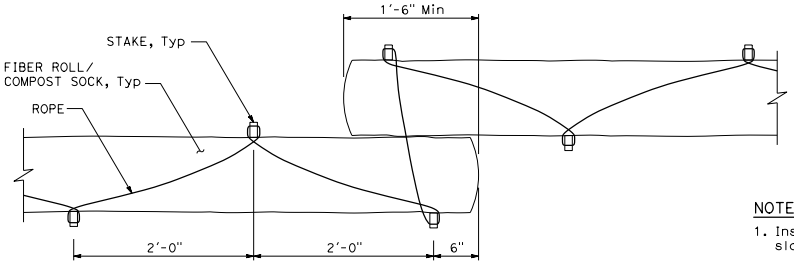



SECTION

FIBER ROLL (TYPE 1)




SECTION

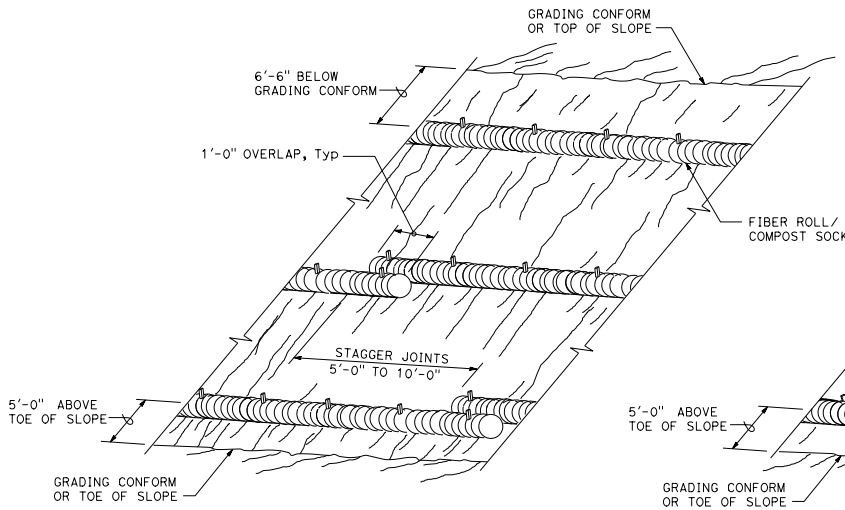



PLAN

FIBER ROLL/COMPOST SOCK (TYPE 2)

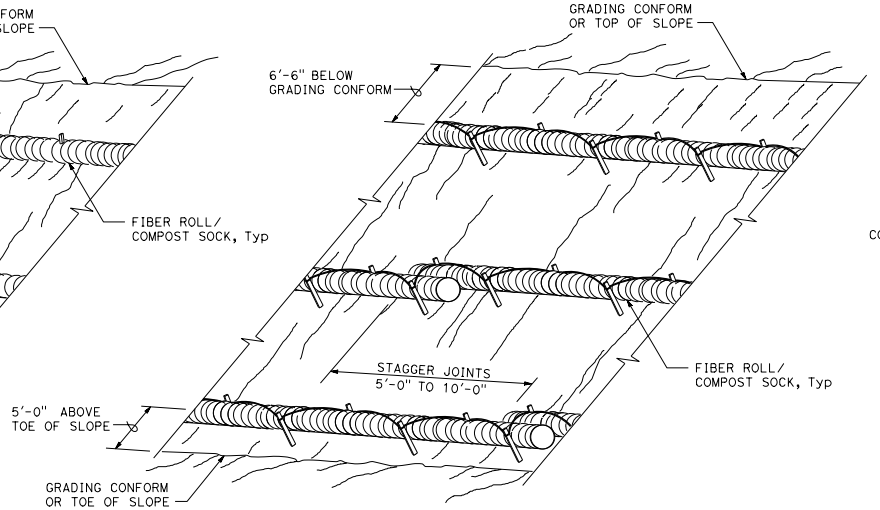
NOTES:

1. Installations shown in the perspectives are for slope inclination of 10:1 (Horiz:Vert) and steeper.
2. May install stake adjacent to bottom edge of compost sock.



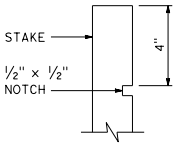

PERSPECTIVE

FIBER ROLL/COMPOST SOCK (TYPE 1)



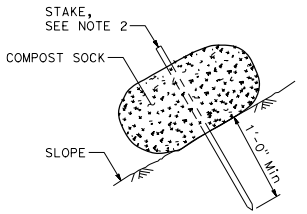

PERSPECTIVE

FIBER ROLL/COMPOST SOCK (TYPE 2)




ELEVATION

STAKE NOTCH DETAIL




SECTION

COMPOST SOCK (TYPE 1)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# EROSION CONTROL DETAILS
# FIBER ROLL AND COMPOST SOCK

NO SCALE

H51

7-1-25

Return to Table of Contents

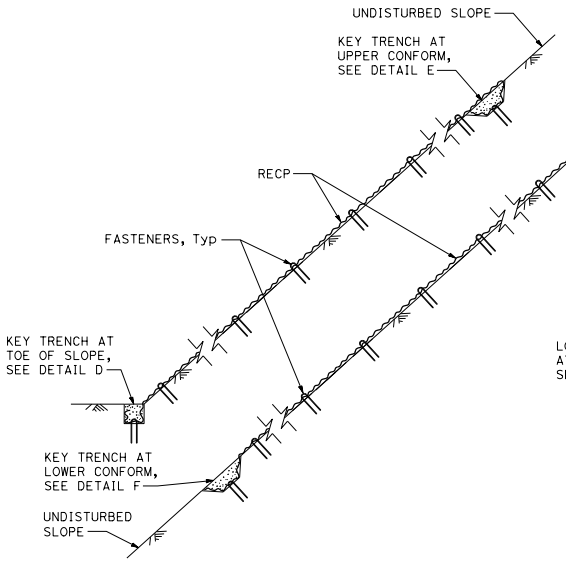
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LICENSED LANDSCAPE ARCHITECT

September 19, 2025
PLANS APPROVAL DATE

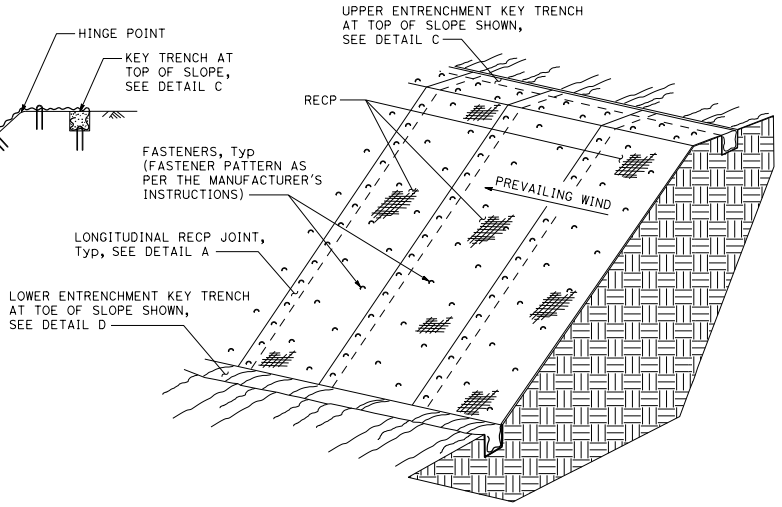
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LICENSED LANDSCAPE ARCHITECT
CATHERINE B. BANNER ROSES
Signature
6-30-27
Renewal Date
Date
STATE OF CALIFORNIA




SECTION

## ROLLED EROSION CONTROL PRODUCT ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS

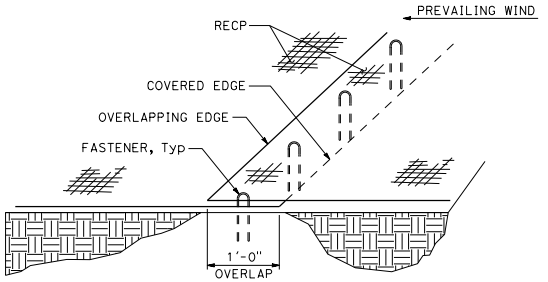



ISOMETRIC

## ROLLED EROSION CONTROL PRODUCT ON SLOPE

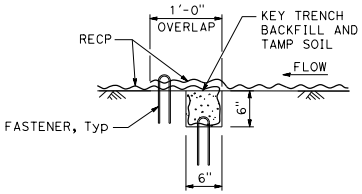
NOTES:

1. Fiber roll/compost sock shown for reference purposes only.
2. If transverse rolled erosion control product joints are required on slopes, see Detail B.



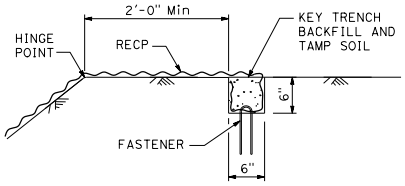

PERSPECTIVE

## DETAIL A
## LONGITUDINAL ROLLED EROSION CONTROL PRODUCT JOINT



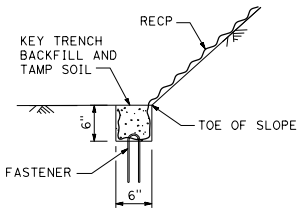

SECTION

## DETAIL B
## TRANSVERSE ROLLED EROSION CONTROL PRODUCT JOINT



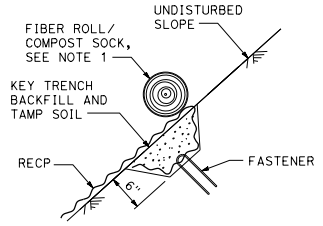

SECTION

## DETAIL C
## KEY TRENCH AT TOP OF SLOPE



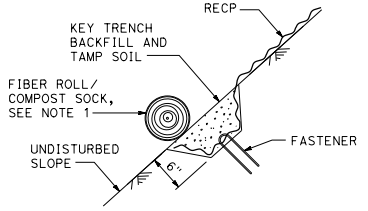

SECTION

## DETAIL D
## KEY TRENCH AT TOE OF SLOPE




SECTION

## DETAIL E
## KEY TRENCH AT UPPER CONFORM




SECTION

## DETAIL F
## KEY TRENCH AT LOWER CONFORM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROLLED EROSION CONTROL PRODUCT

NO SCALE

H52

7-1-25



Return to Table of Contents

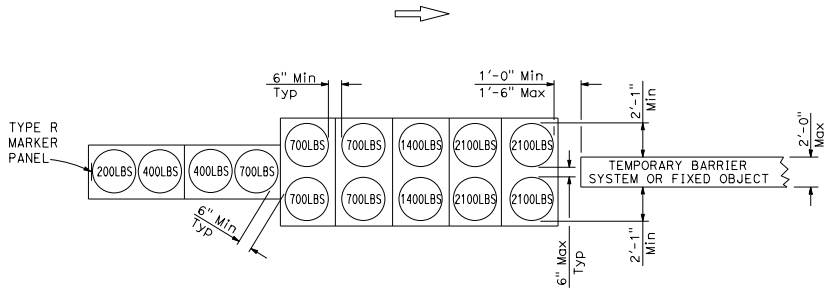
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|---|---|---|---|---|---|
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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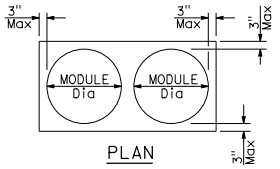



## ARRAY 'TU14M'

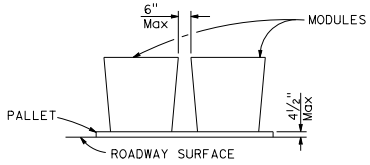
Approach speed 45 mph or more

NOTES:

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. Refer to Standard Plan A73B for marker details.
4. Approach speeds indicated conform to MASH criteria.




PLAN




ELEVATION

## CRASH CUSHION PALLET DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY CRASH CUSHION, SAND FILLED (UNIDRECTIONAL)

NO SCALE

**T1A**

7-1-25



Return to Table of Contents

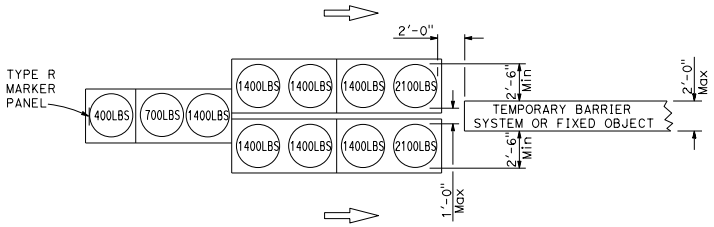
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

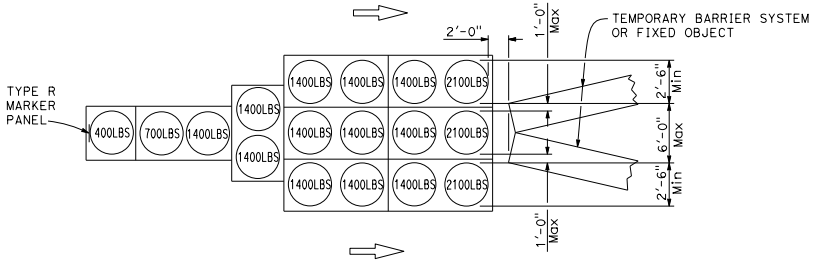
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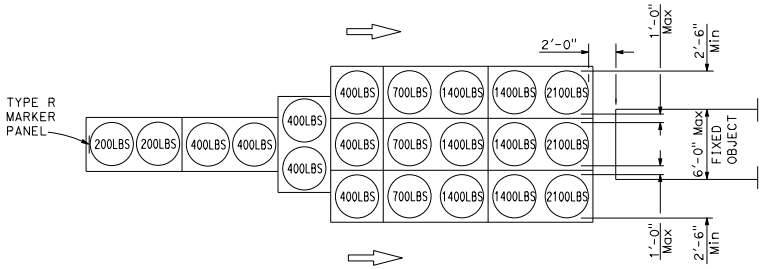

## ARRAY 'TU11'

Approach speed less than 45 mph



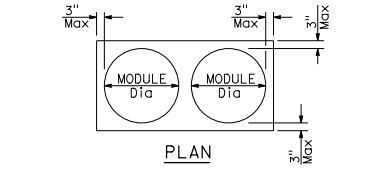

## ARRAY 'TU17'

Approach speed less than 45 mph

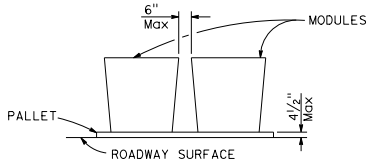



## ARRAY 'TU21'

Approach speed 45 mph or more




PLAN




ELEVATION

## CRASH CUSHION PALLET DETAIL

NOTES:

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. Refer to Standard Plan A73B for marker details.
4. Approach speeds indicated conform to NCHRP Report 350 criteria.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

**T1A1**

7-1-25

2025 STANDARD PLAN T1A1

Return to Table of Contents

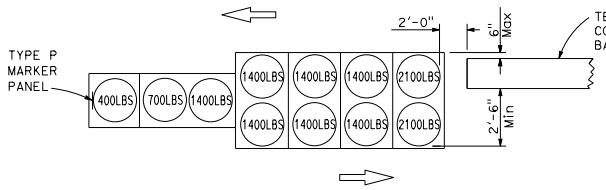
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|---|---|---|---|---|---|
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

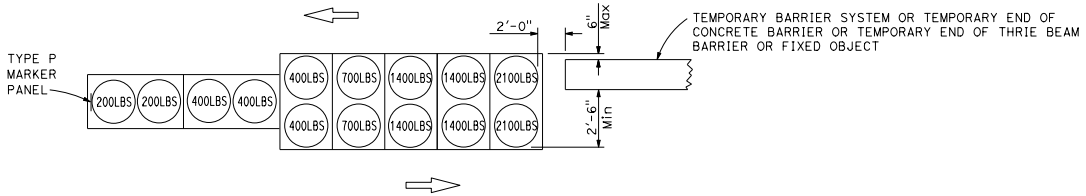
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Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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## ARRAY 'TB11'

Approach speed less than 45 mph

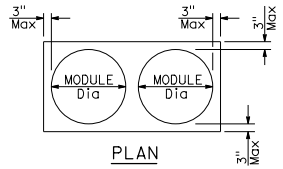



## ARRAY 'TB14'

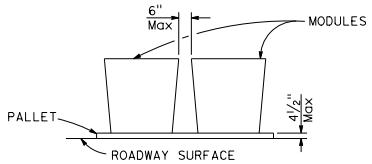
Approach speed 45 mph or more

NOTES:

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the modules.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. Refer to Standard Plan A73B for marker details.
4. Approach speeds indicated conform to NCHRP Report 350 criteria.




PLAN




ELEVATION

## CRASH CUSHION PALLET DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY CRASH CUSHION, SAND FILLED (BIDIRECTIONAL)

NO SCALE

T1B

7-1-25



Return to Table of Contents

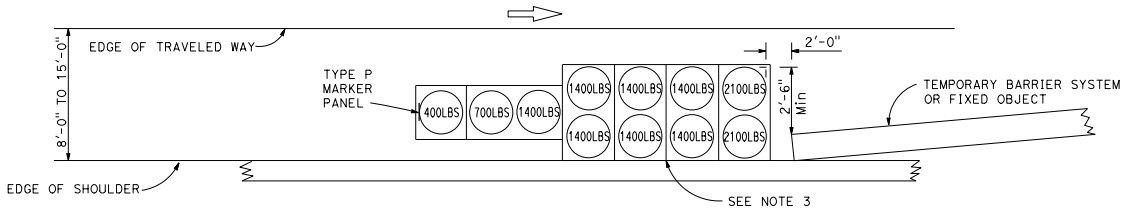
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

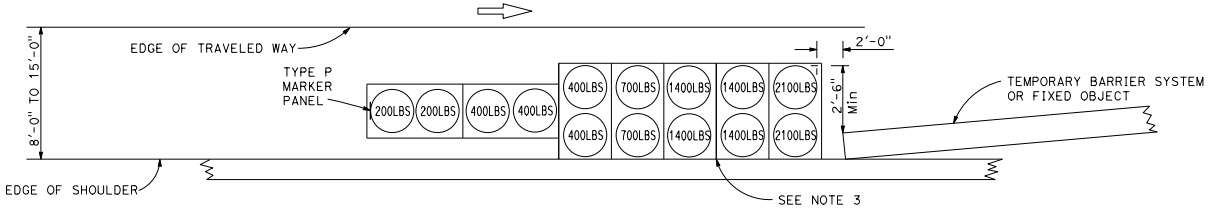
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Malik Rehman
No. C83390
Exp. 3-31-27
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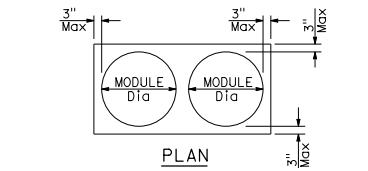

## ARRAY 'TS11'

Approach speed less than 45 mph, See Note 6

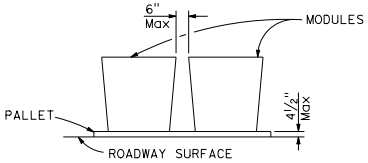



## ARRAY 'TS14'

Approach speed 45 mph or more, See Note 6




PLAN




ELEVATION

## CRASH CUSHION PALLET DETAIL

NOTES:

1. (xxx) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal. Sand must contain no more than 7 percent water.
3. The temporary crash cushion arrays shown on this plan shall be used only in locations where there will be traffic on one side of the temporary crash cushion array.
4. Arrays for median shoulders shall conform to details shown on this plan for outside shoulders.
5. Refer to Standard Plan A73B for marker details.
6. For shoulder widths less than 8'-0", appropriate approved crash cushion protection, other than sand filled modules, shall be provided at fixed objects and at approach ends of temporary railing. The specific type of crash cushion shall be as shown on the project plans or as specified in the Special Provisions, or if not shown on the project plans or specified in the Special Provisions, shall be as approved by the Engineer.
7. Approach speeds indicated conform to NCHRP Report 350 criteria.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY CRASH CUSHION, SAND FILLED (SHOULDER INSTALLATIONS)

NO SCALE

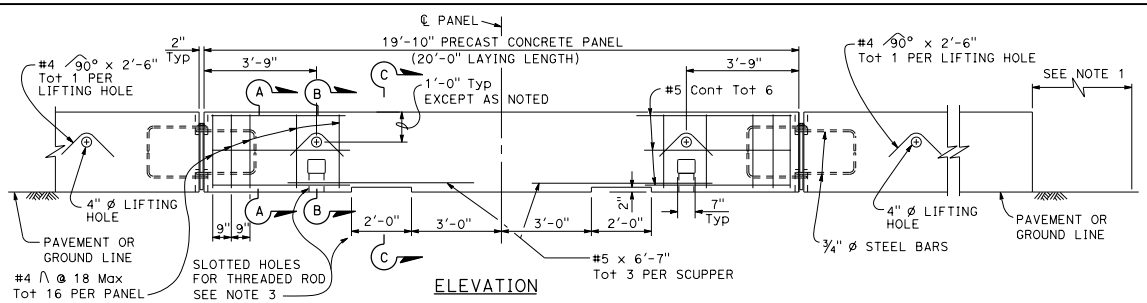
T2

7-1-25

2025 STANDARD PLAN T2



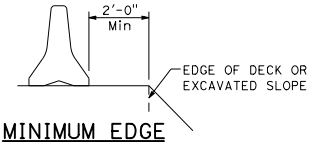
Return to Table of Contents




ELEVATION

## TYPICAL PANEL

Weight per panel: 3.9 tons




## MINIMUM EDGE DISTANCE

See Note 3

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

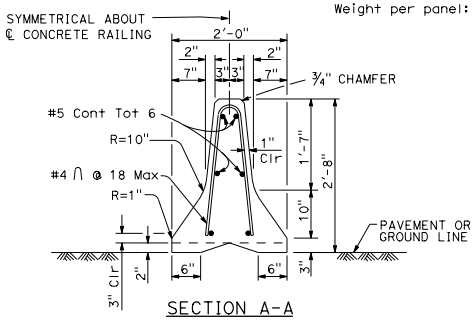
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

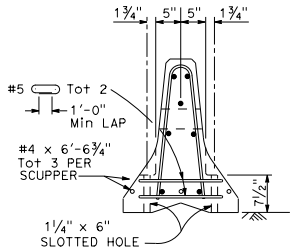
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**NOTES:**

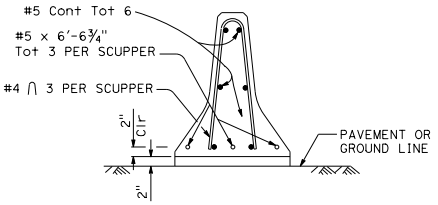
1. For end treatment, layout and crash cushions, where needed, see Project Plans or Special Provisions.
2. All 3½" gaps at removable panels are to be backed at the base with #8 x 10" dowel or 1" ø pin each side of joint, see Section G-G.
3. Where the offset distance from the exposed edge of deck to the closest edge of the temporary railing is less than 2'-0", attach each panel to deck slab with 1" diameter threaded rods (total four per panel) inserted through the slotted holes of the panel and bond in drilled holes 6" deep in the deck slabs. See "Bridge Memo to Designers" manual.



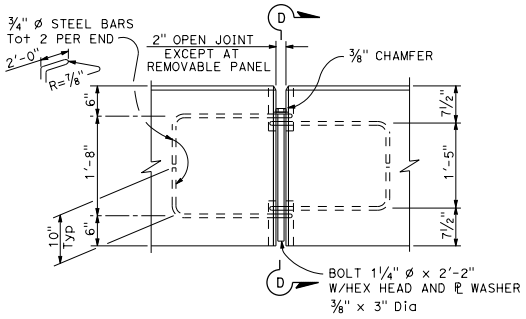

SECTION A-A



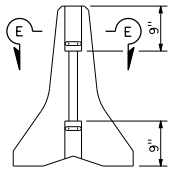

SECTION B-B



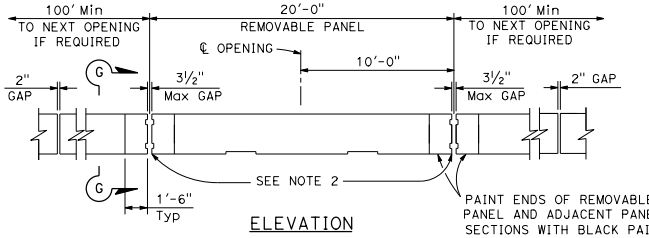

SECTION C-C




ELEVATION

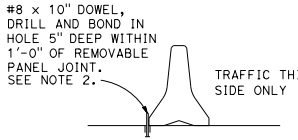


SECTION D-D



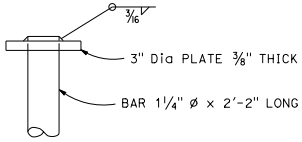

ELEVATION

## TYPICAL OPENING DETAIL

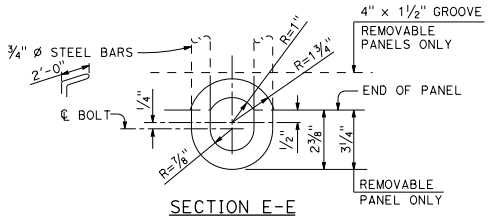



SECTION G-G *

* Section G-G is for concrete pavement. Alternative detail, 1" ø pins 2'-0" long driven in existing AC or HMA.

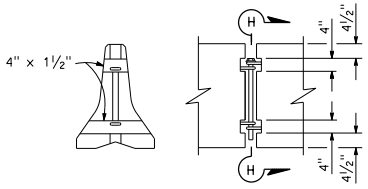



ALTERNATIVE HEAD DETAIL




SECTION E-E

## BOLT CONNECTION DETAIL




SECTION H-H ELEVATION

## REMOVABLE PANEL GROOVE DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY RAILING (TYPE K)

NO SCALE

T3A

7-1-25



Return to Table of Contents

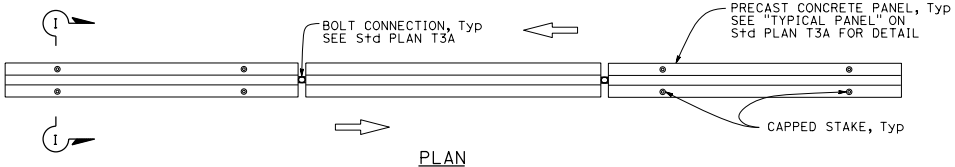
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

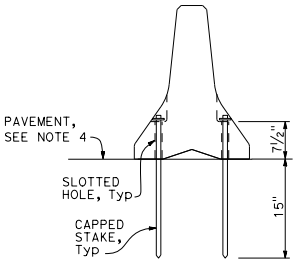
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PLAN

## RAILING STAKING CONFIGURATION FOR TWO-WAY TRAFFIC

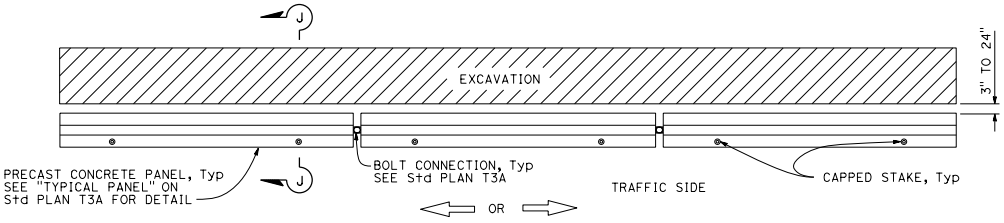
See Note 2




SECTION I-I

NOTES:

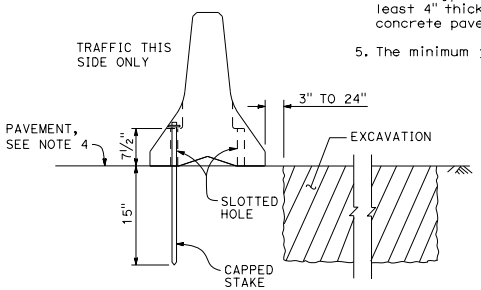
1. Where Type K temporary railing is placed on curves and radii that are too severe to connect panels with bolted joints, the railing must be backed continuously with earth fill. See Section F-F.
2. Where Type K temporary railing is placed as a temporary or long term barrier in two-way traffic on highways with less than 24" from the edge of traveled way, use four capped stakes per every other panel with end panels staked.
3. Where Type K temporary railing is placed 3" to 24" from the edge of an excavation on highways, use two capped stakes per panel along the traffic side.
4. Staked Type K temporary railing must be supported by at least 4" thick concrete, hot mix asphalt or existing asphalt concrete pavement.
5. The minimum yield strength for the washer must be 60,000 psi.



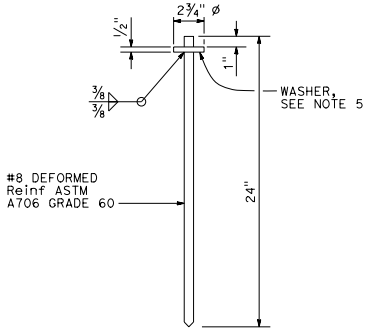

PLAN

## RAILING STAKING CONFIGURATION ADJACENT TO AN EXCAVATION

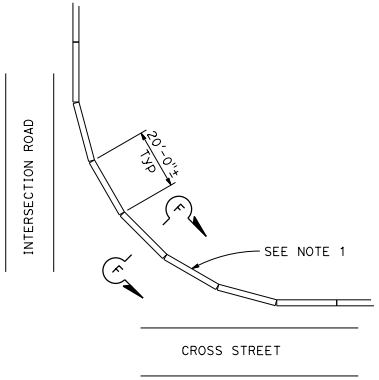
See Note 3



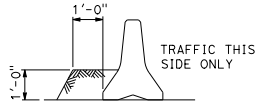

SECTION J-J




CAPPED STAKE DETAIL




CURVED LAYOUT




SECTION F-F

See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY RAILING (TYPE K)

NO SCALE

T3B

7-1-25

2025 STANDARD PLAN T3B

Return to Table of Contents

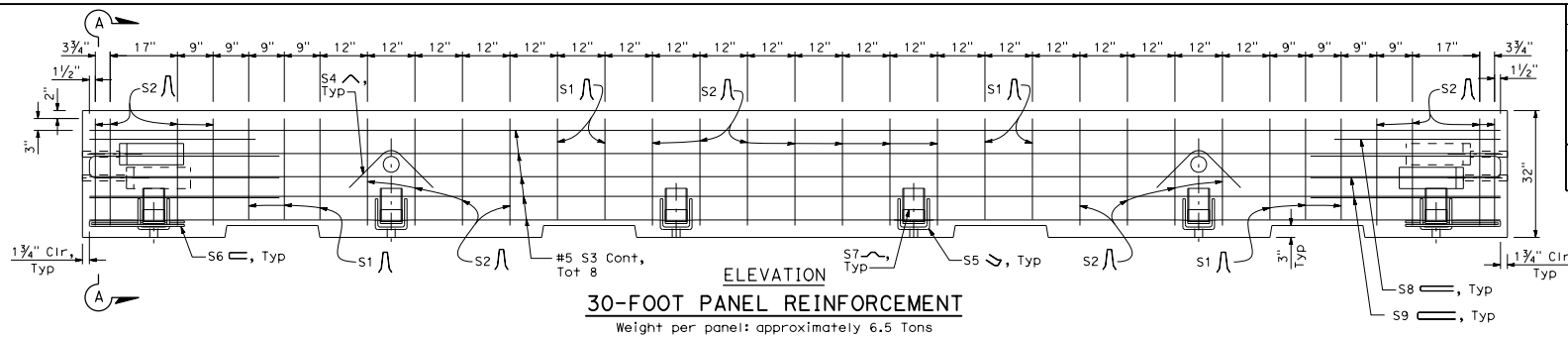
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Mohan V. Bonala
No. C63046
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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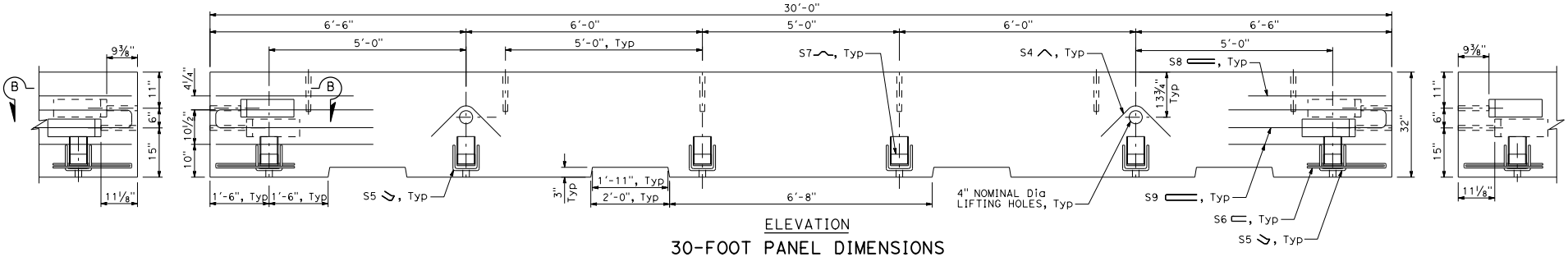

ELEVATION

## 30-FOOT PANEL REINFORCEMENT

Weight per panel: approximately 6.5 Tons

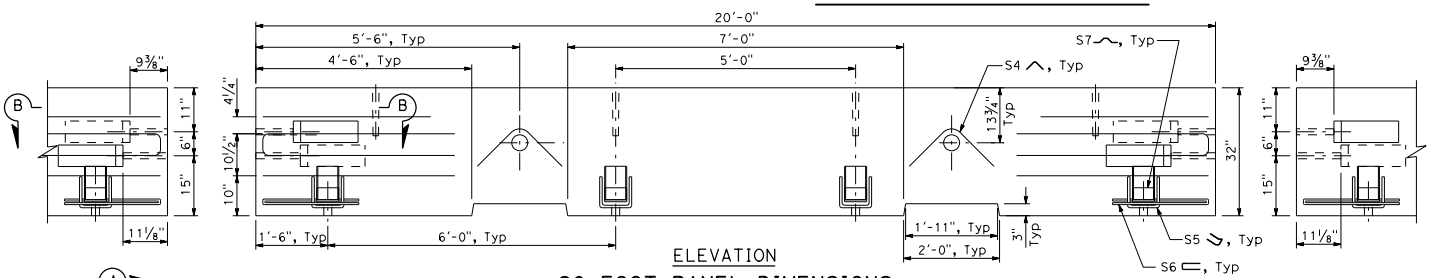
NOTES:

1. For Section A-A and Section C-C, see Standard Plan T3D.
2. For Section B-B, see Standard Plan T3E.



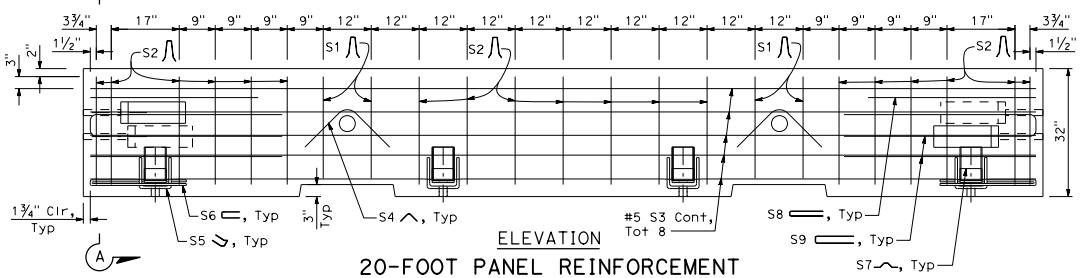

ELEVATION

## 30-FOOT PANEL DIMENSIONS




ELEVATION

## 20-FOOT PANEL DIMENSIONS




ELEVATION

## 20-FOOT PANEL REINFORCEMENT

Weight per panel: approximately 4.5 Tons

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (CROSS BOLT)

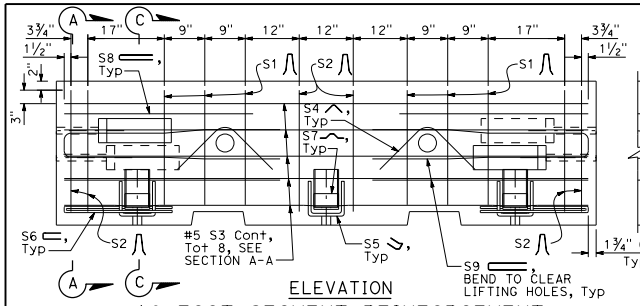
NO SCALE

T3C

7-1-25



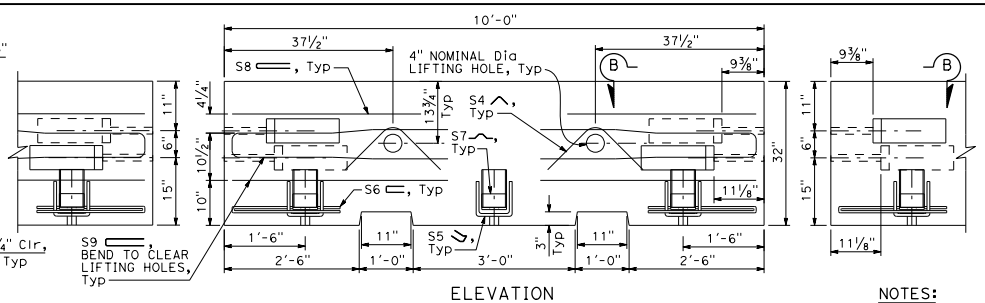
Return to Table of Contents




ELEVATION

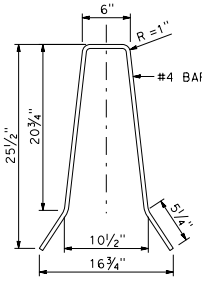
## 10-FOOT SEGMENT REINFORCEMENT

Weight per panel: approximately 2 Tons

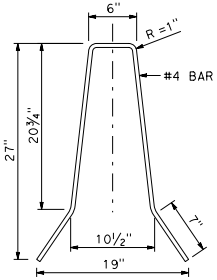



ELEVATION

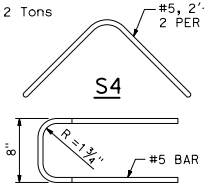
## 10-FOOT PANEL DIMENSIONS



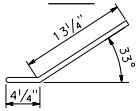

S1




S2

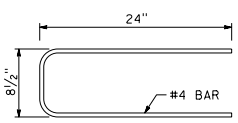



PLAN

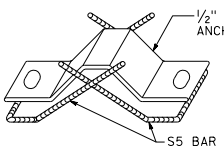



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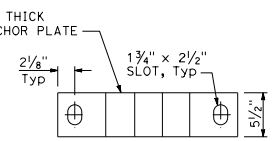
S5



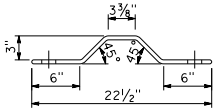

S6




ISOMETRIC

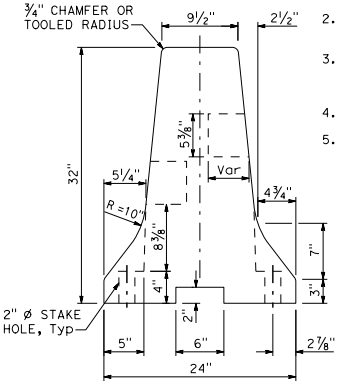



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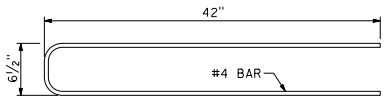



ELEVATION

S7 ANCHOR PLATE

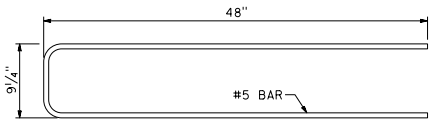



SHAPE TYPE F



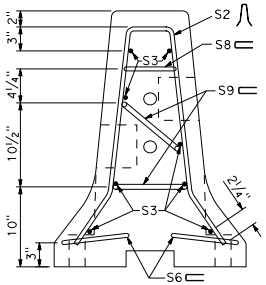

PLAN

S8

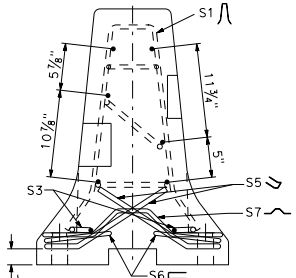



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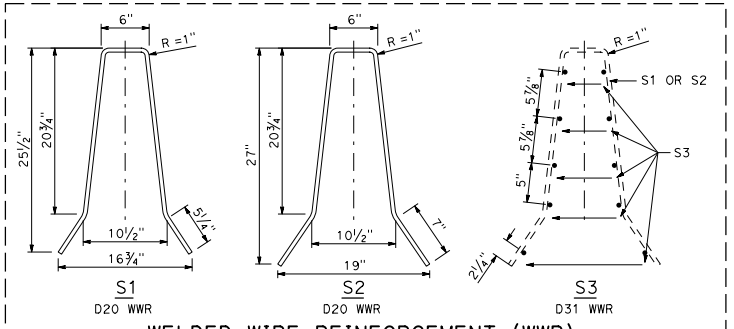
S9




SECTION A-A



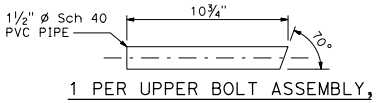

SECTION C-C



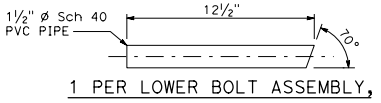

WELDED WIRE REINFORCEMENT (WWR)
OPTION FOR S1, S2 AND S3

NOTES:

1. Steel reinforcement may be bent and WWR may be cut or bent to accommodate joint connection hardware, leave-outs, staking holes, drain holes, and lifting holes.
2. Distance from the end of the barrier to the first wire must not exceed 3 inches.
3. Steel reinforcement must have a minimum 1" concrete coverage except, no coverage is required for S5, S6, and S7 at the stake hole.
4. S5, S6, and S7 must be galvanized post fabrication.
5. For Section B-B, see Standard Plan T3E.

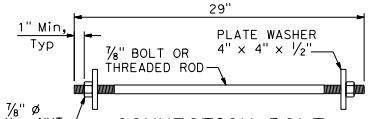



1 PER UPPER BOLT ASSEMBLY,
2 PER JOINT




1 PER LOWER BOLT ASSEMBLY,
2 PER JOINT

CONNECTION PIPE




CONNECTION BOLT

1 per bolt assembly, 2 per joint

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (CROSS BOLT)

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mohan V. Bonala
No. C63046
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

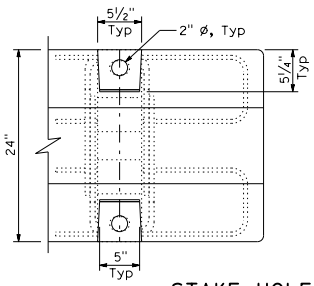
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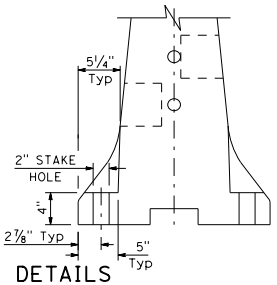
T3D

7-1-25

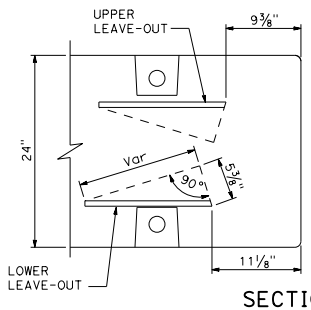
2025 STANDARD PLAN T3D

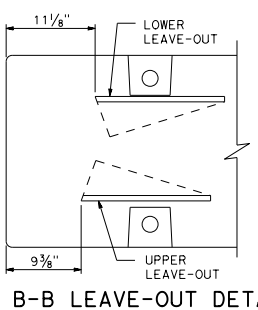
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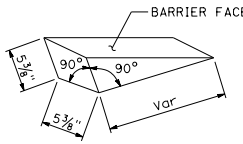



STAKE HOLE DETAILS



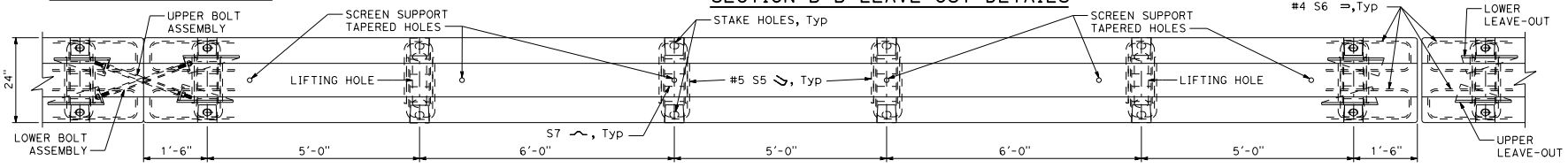




LEAVE-OUT DIMENSIONS

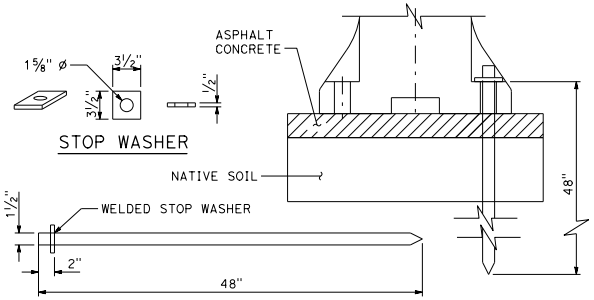
SECTION B-B LEAVE-OUT DETAILS

NOTE:

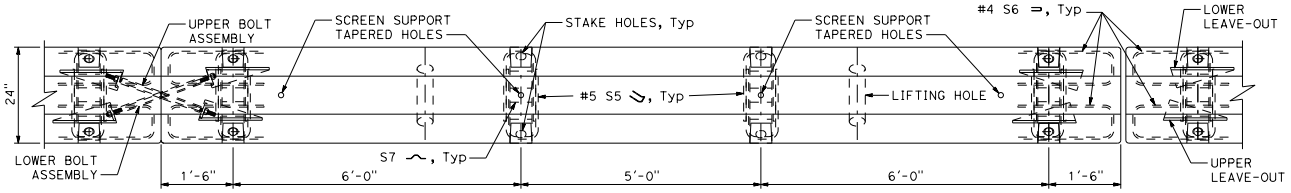
1. For Section B-B, see Standard Plan T3C.



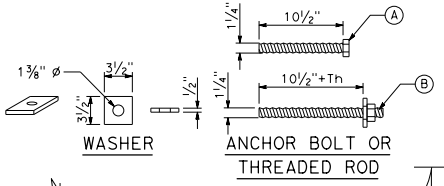

PLAN
30-FOOT PANEL




STOP WASHER

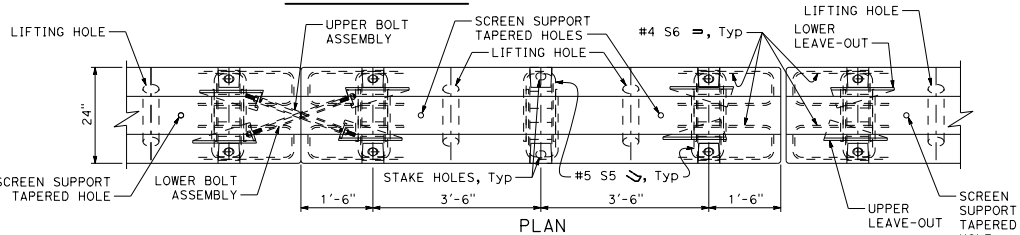



PLAN
20-FOOT PANEL

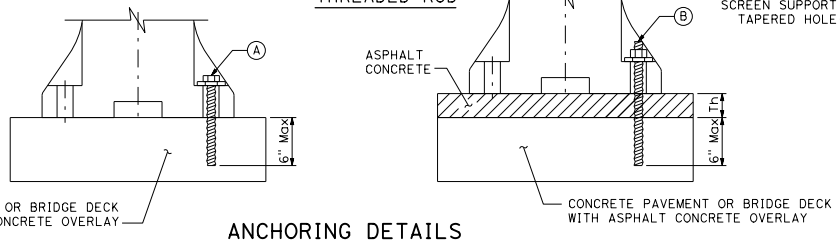



WASHER

ANCHOR BOLT OR THREADED ROD




PLAN
10-FOOT PANEL




ANCHORING DETAILS

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mohan V. Bonala
No. C63046
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (CROSS BOLT)

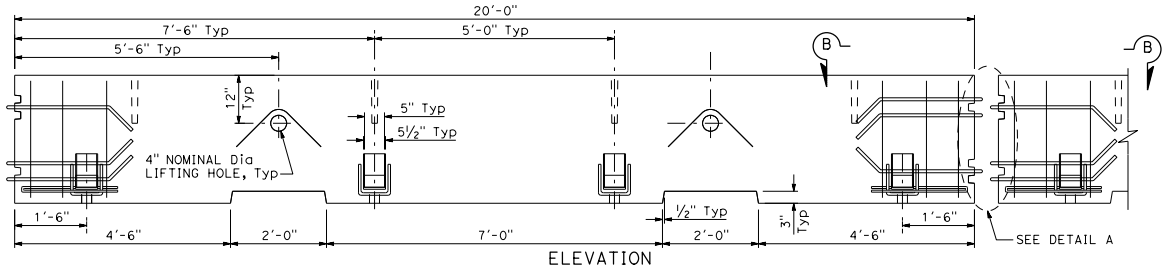
NO SCALE

T3E

2025 STANDARD PLAN T3E

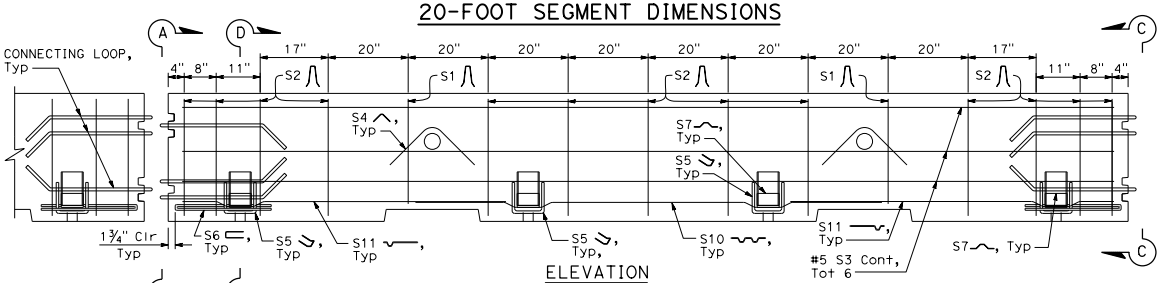
7-1-25

Return to Table of Contents




ELEVATION

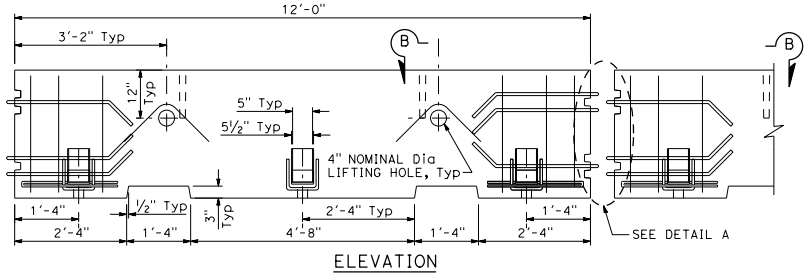
## 20-FOOT SEGMENT DIMENSIONS




ELEVATION

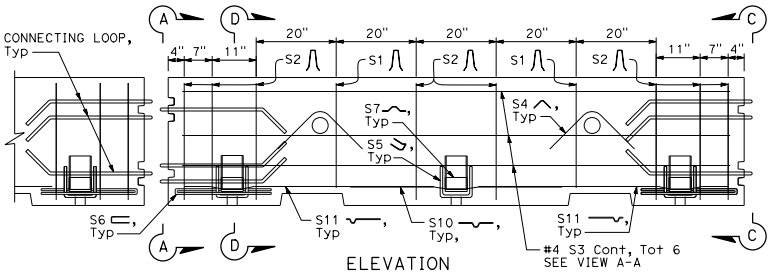
## 20-FOOT SEGMENT REINFORCEMENT

Weight per panel: approximately 4.8 Tons




ELEVATION

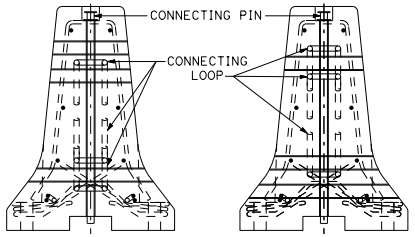
## 12-FOOT SEGMENT DIMENSIONS




ELEVATION

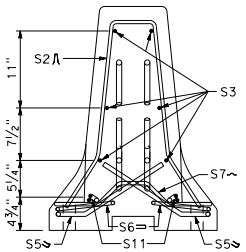
## 12-FOOT SEGMENT REINFORCEMENT

Weight per panel: approximately 2.9 Tons

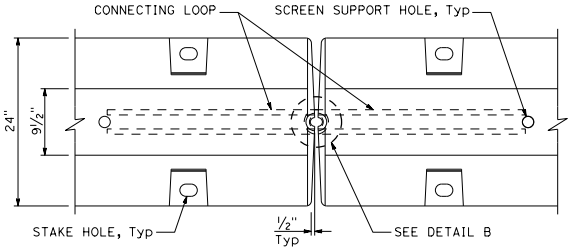



VIEW A-A

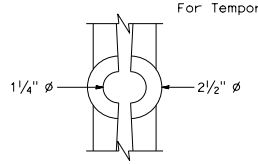
VIEW C-C



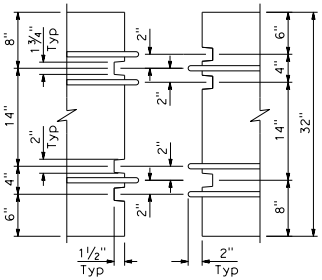

SECTION D-D




VIEW B-B



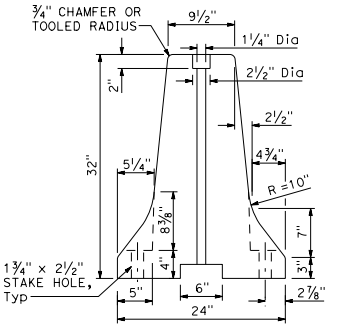

DETAIL B




DETAIL A

NOTES:

1. Barrier segment edges must be chamfered ¾" or tooled radius.
2. Steel reinforcement must have a minimum 1" concrete coverage except, no coverage is required for S5, S6, and S7 at the stake hole.
3. Steel reinforcement may be bent to accommodate joint connection hardware, staking holes, and lifting holes.
4. A continuous steel reinforcement bar may be used instead of S10 and S11.




## TYPICAL SECTION TYPE F

For Temporary Barrier Cal-F23

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

Sebtember 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mohan V. Bonala
No. C63046
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (CAL F-23)

NO SCALE

T3F

2025 STANDARD PLAN T3F

7-1-25

Return to Table of Contents

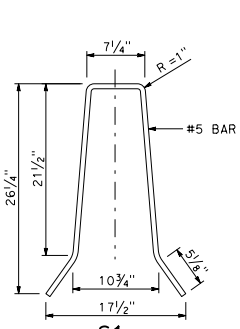
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REGISTERED CIVIL ENGINEER

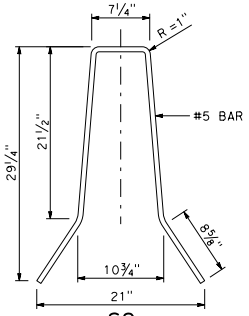
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STATE OF CALIFORNIA

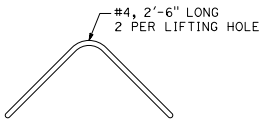
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



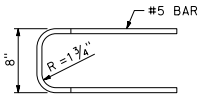

S1



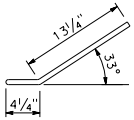

S2




S4

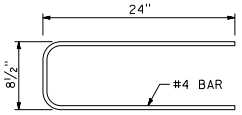



PLAN




ELEVATION

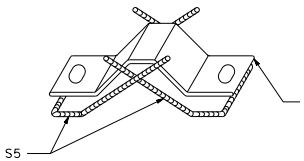
S5



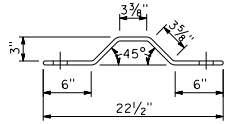

S6

NOTE:

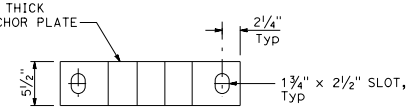
1. Reinforcement S5, S6, and S7 must be galvanized post fabrication.




ISOMETRIC

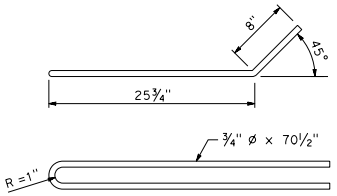



ELEVATION



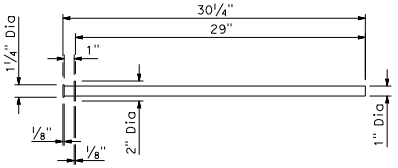

PLAN

S7 ANCHOR PLATE



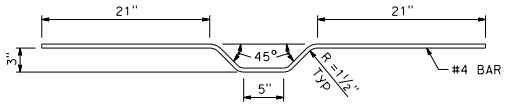

CONNECTING LOOP

3 per segment end (Total 6)

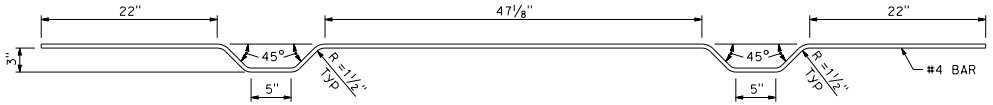



CONNECTING PIN

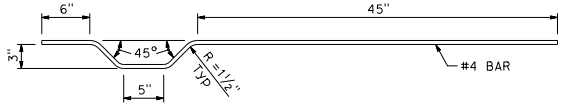
1 per joint




S10

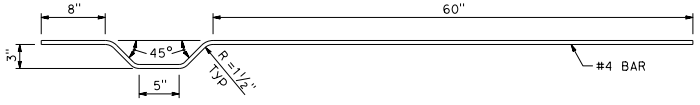



S10




S11

12-FOOT SEGMENT




S11

20-FOOT SEGMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (CAL F-23)

NO SCALE

T3F2

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

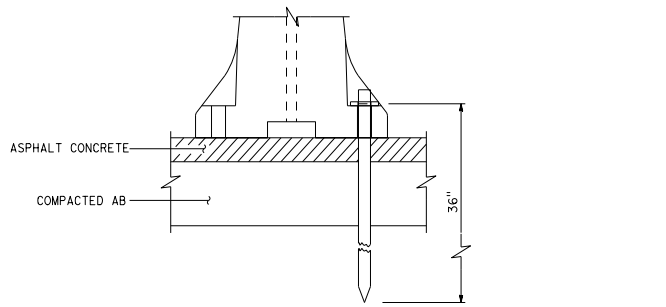
Sebtember 19, 2025
PLANS APPROVAL DATE

Mohan V. Bonala
No. C63046
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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NOTES:

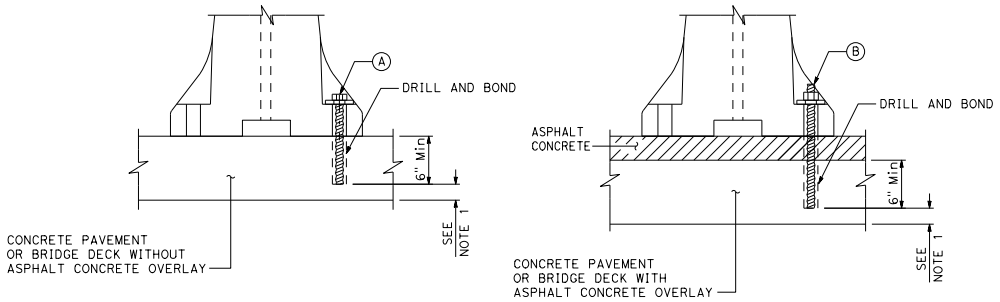
1. Maintain a minimum 1½" clearance from bottom for bridge decks.
2. Staked temporary barrier systems must be supported by a minimum 4" thick asphalt concrete or existing asphalt concrete pavement.

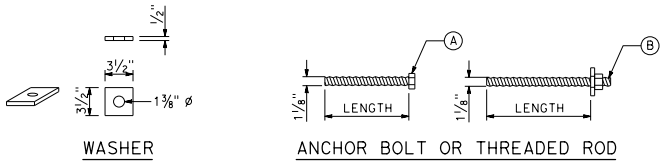



WELDED WASHER (RIM)

STAKE

STAKE DETAILS

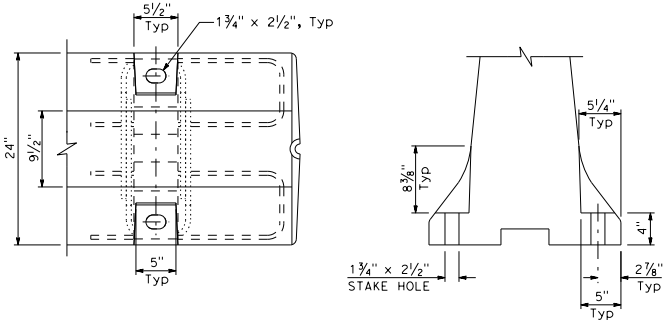



WASHER

ANCHOR BOLT OR THREADED ROD

ANCHOR DETAILS




STAKE HOLE DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (STAKING OR ANCHORING)

NO SCALE

T3G

7-1-25



Return to Table of Contents

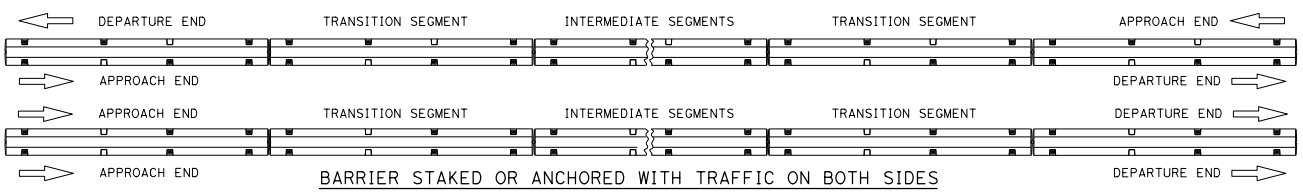
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

Sebtember 19, 2025
PLANS APPROVAL DATE

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BARRIER STAKED OR ANCHORED WITH TRAFFIC ON BOTH SIDES

BARRIER FREESTANDING WITH TRAFFIC ON ONE SIDE

BARRIER STAKED OR ANCHORED WITH TRAFFIC ON ONE SIDE

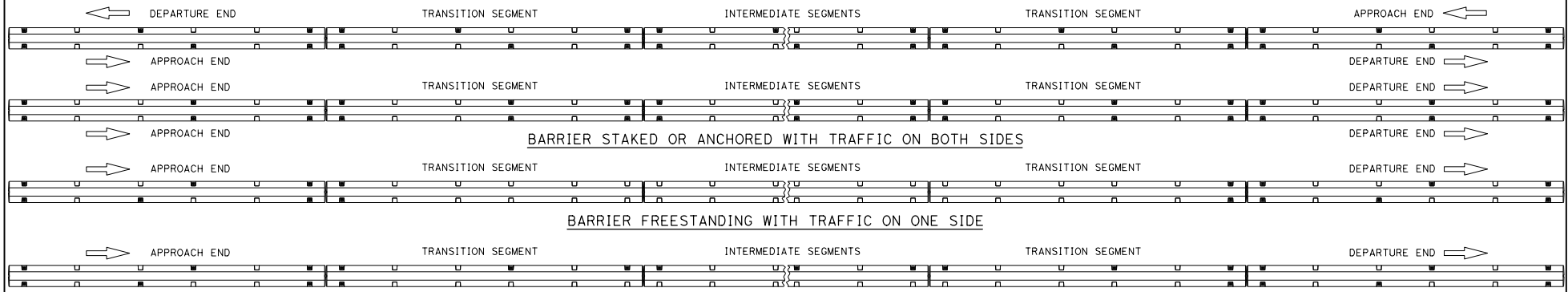
**20-FOOT CROSS BOLT OR CAL F-23**

**NOTE:**

1. Staked temporary barrier systems must be supported by a minimum 4" thick asphalt concrete or existing asphalt concrete pavement.

**LEGEND**

- • STAKE OR ANCHOR
- ⇨ DIRECTION OF TRAFFIC

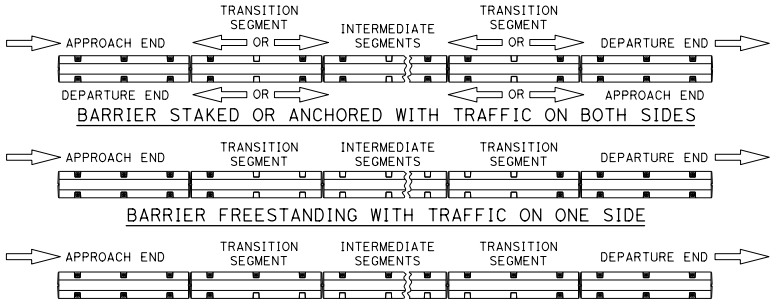



BARRIER STAKED OR ANCHORED WITH TRAFFIC ON BOTH SIDES

BARRIER FREESTANDING WITH TRAFFIC ON ONE SIDE

BARRIER STAKED OR ANCHORED WITH TRAFFIC ON ONE SIDE

**30-FOOT CROSS BOLT**




BARRIER STAKED OR ANCHORED WITH TRAFFIC ON BOTH SIDES

BARRIER FREESTANDING WITH TRAFFIC ON ONE SIDE

BARRIER STAKED OR ANCHORED WITH TRAFFIC ON ONE SIDE

**10-FOOT CROSS BOLT OR 12-FOOT CAL F-23**

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY BARRIER SYSTEM (STAKING OR ANCHORING)

NO SCALE

**T3G2**

7-1-25



Return to Table of Contents

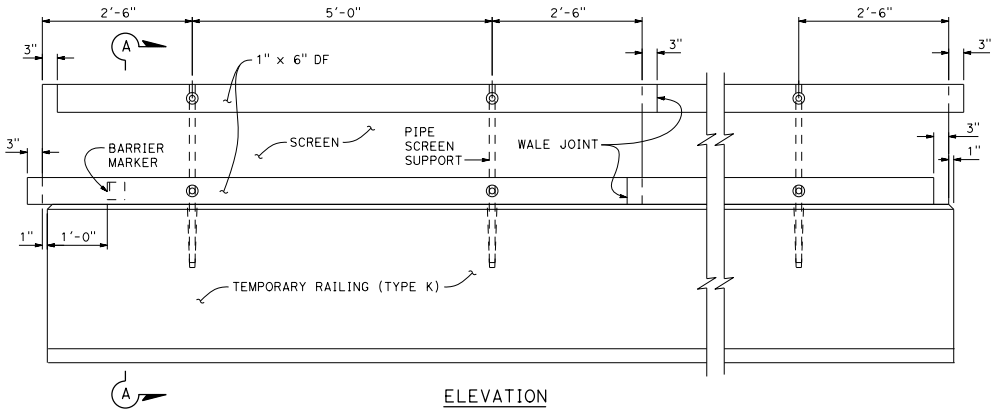
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

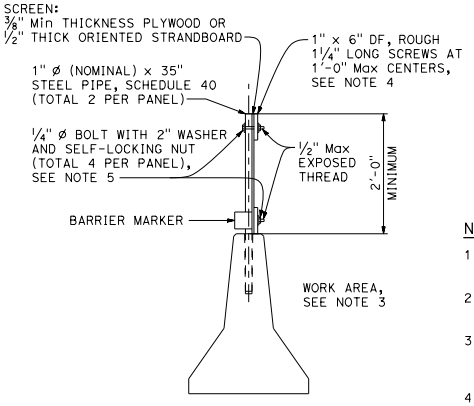
September 19, 2025
PLANS APPROVAL DATE

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Mohan V. Bonala
No. C63046
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CIVIL
STATE OF CALIFORNIA

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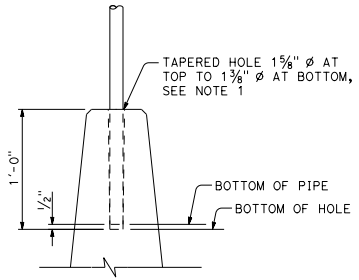

ELEVATION



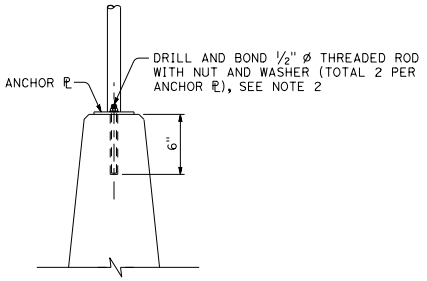

SECTION A-A

NOTES:

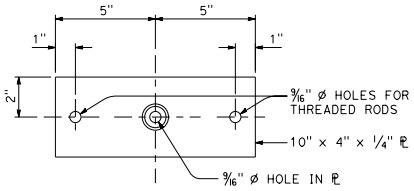
1. Straight holes 1½" ø of the depth shown may be used in lieu of the tapered holes.
2. Resin capsule-type anchorage devices may be substituted for threaded rods.
3. Place screen on work area side of the temporary railing where traffic will only be on one side of the temporary railing.
4. Clinched 8d box nails may be substituted for screws. The nails shall be clinched on the work area side of the screen where traffic will only be on one side of the temporary railing.
5. U-bolts may be substituted for ¼" ø bolts.
6. Barrier delineation to be used when required by the Special Provisions.



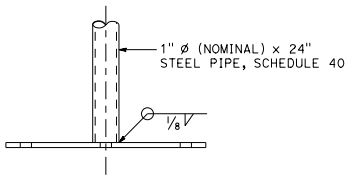

SCREEN ANCHORAGE DETAIL




SCREEN ANCHORAGE DETAIL
ALTERNATIVE "A"




PLAN




ELEVATION

ANCHOR PLATE DETAIL
ALTERNATIVE "A"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY TRAFFIC SCREEN

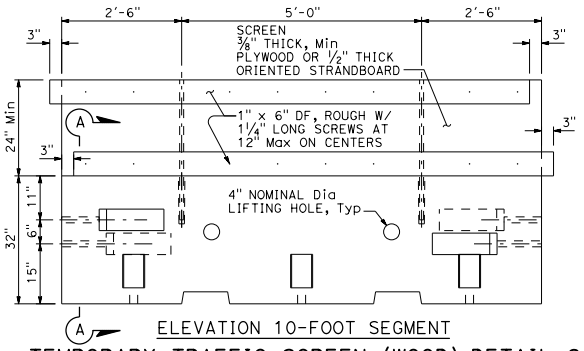
NO SCALE

**T4**

7-1-25

2025 STANDARD PLAN T4

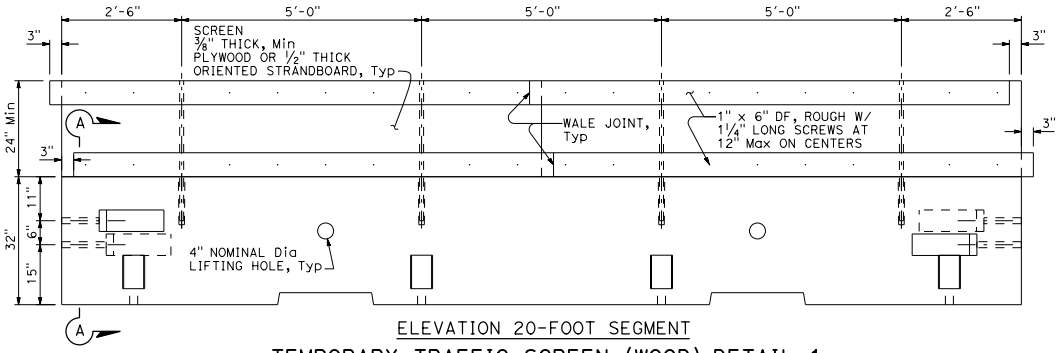
Return to Table of Contents




ELEVATION 10-FOOT SEGMENT

## TEMPORARY TRAFFIC SCREEN (WOOD) DETAIL 2

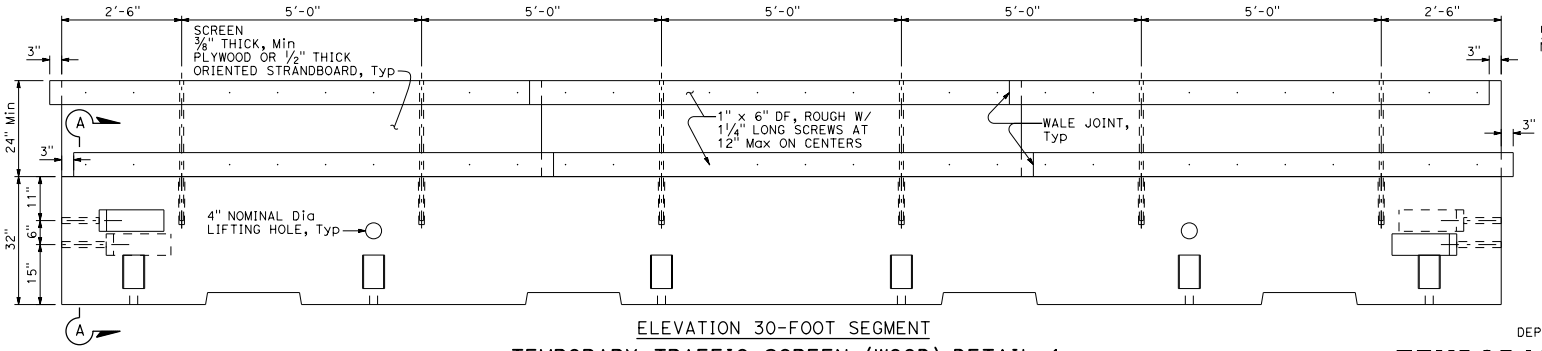
1 Panel per barrier segment




ELEVATION 20-FOOT SEGMENT

## TEMPORARY TRAFFIC SCREEN (WOOD) DETAIL 1

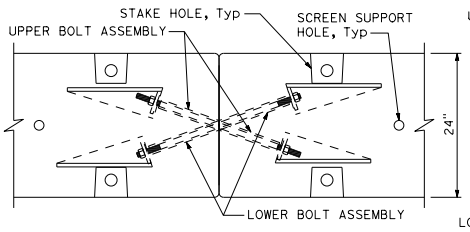
2 Panels per barrier segment



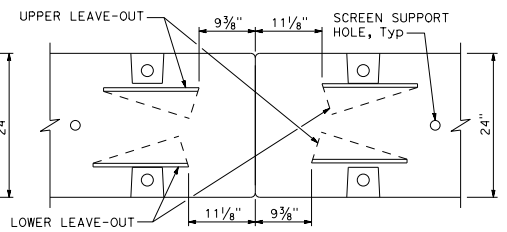

ELEVATION 30-FOOT SEGMENT

## TEMPORARY TRAFFIC SCREEN (WOOD) DETAIL 1

3 Panels per barrier segment

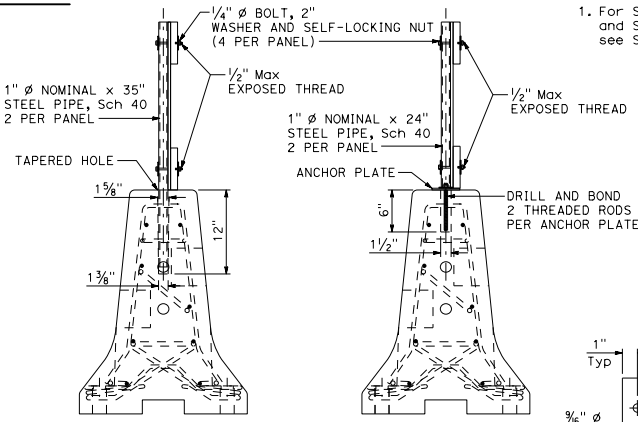



CROSS BOLT CONNECTION




SCREEN SUPPORT HOLES

SECTION B-B

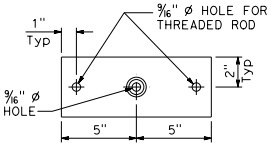



OPTION 1 OPTION 2

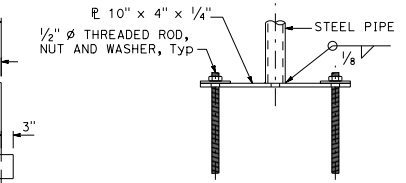
SCREEN ANCHORAGE

NOTE:

1. For Section A-A detail and Section B-B location, see Standard Plan T3D.




PLAN




ELEVATION

ANCHOR PLATE

For screen anchorage option 2

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mohan V. Bonala
No. C63046
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY TRAFFIC SCREEN (CROSS BOLT)

NO SCALE

T4A

7-1-25



Return to Table of Contents

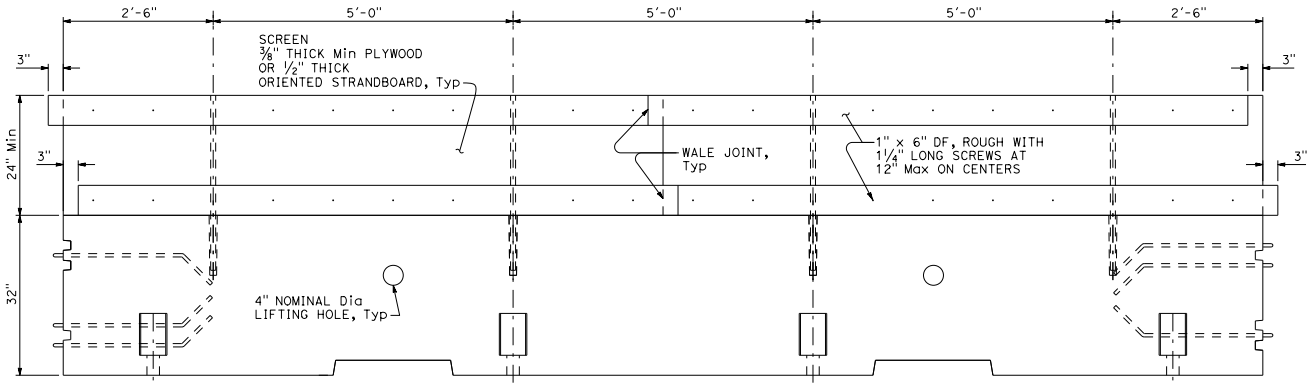
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

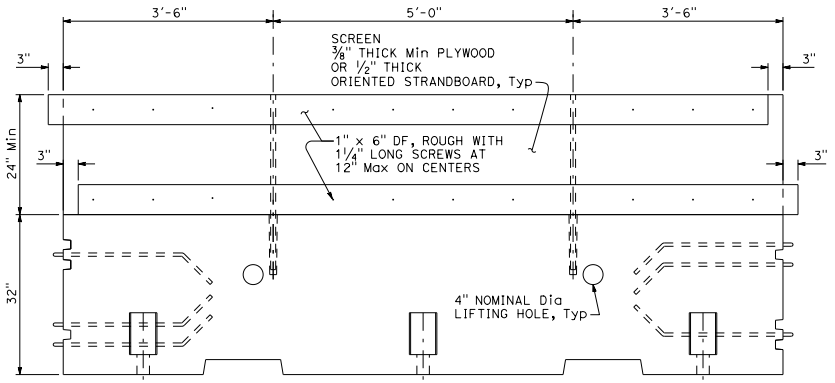
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ELEVATION 20-FOOT SEGMENT

## TEMPORARY TRAFFIC SCREEN (WOOD) DETAIL 1

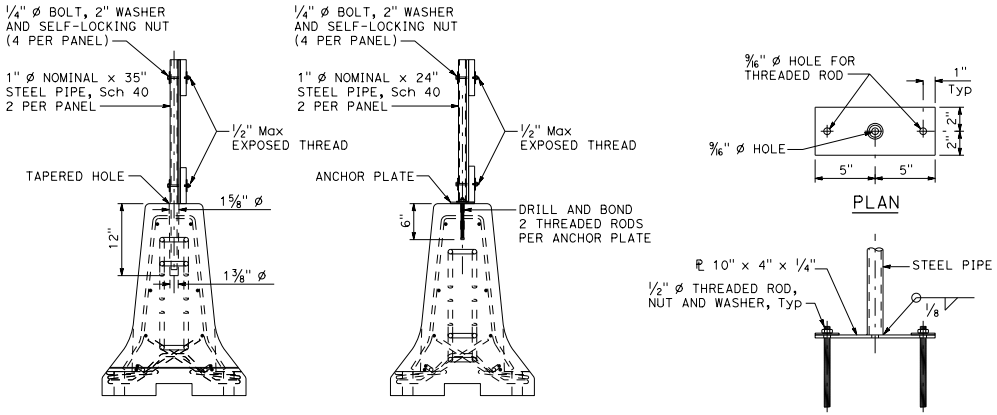
2 Panels per barrier segment




ELEVATION 12-FOOT SEGMENT

## TEMPORARY TRAFFIC SCREEN (WOOD) DETAIL 2

1 Panel per barrier segment




OPTION 1 OPTION 2

## SCREEN ANCHORAGE

## ANCHOR PLATE

For screen anchorage option 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY TRAFFIC SCREEN (CAL F-23)

NO SCALE

**T4B**

7-1-25

Return to Table of Contents

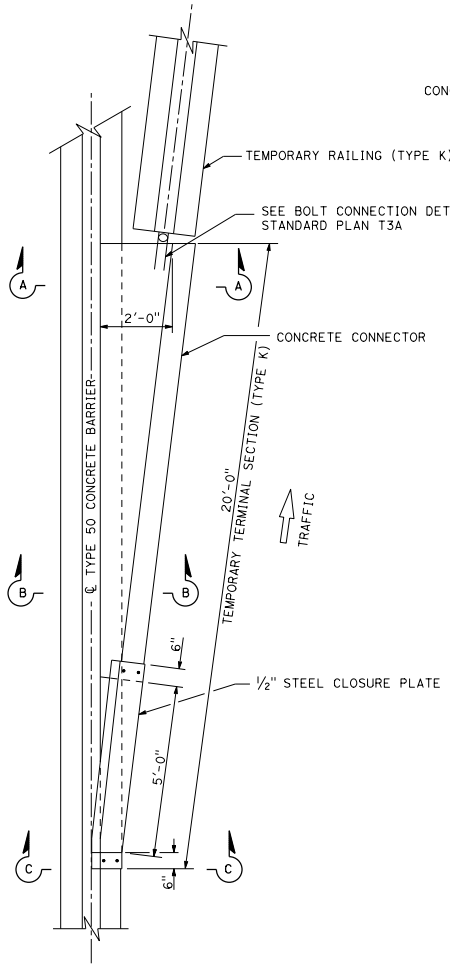
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

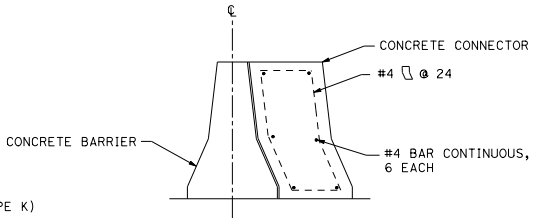
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

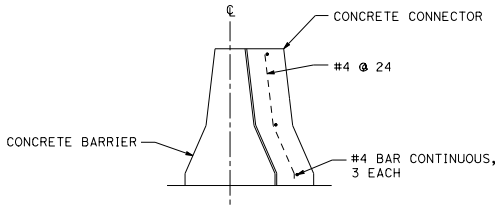
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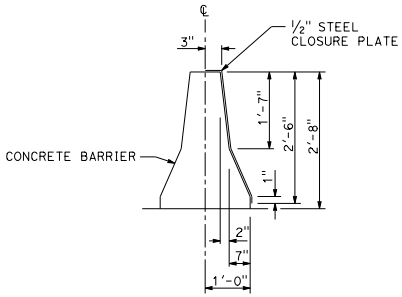

PLAN



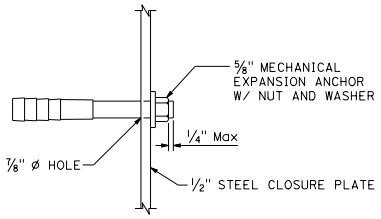

SECTION A-A




SECTION B-B



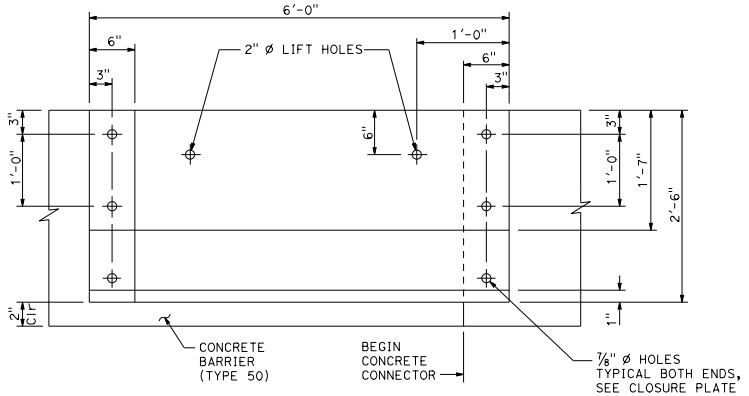

SECTION C-C




CLOSURE PLATE ANCHOR BOLT DETAIL

NOTE:

1. If lifting holes are used with the concrete connector, they shall conform to the lifting hole details shown on Standard Plan T3A.




CLOSURE PLATE (SIDE VIEW)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY TERMINAL SECTION (TYPE K)

NO SCALE

T5

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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TABLE 1

**TAPER LENGTH CRITERIA AND CHANNELIZING DEVICE SPACING**

| SPEED (S) | MINIMUM TAPER LENGTH * FOR WIDTH OF OFFSET 12 FEET (W) | | | | MAXIMUM CHANNELIZING DEVICE SPACING | | |
|---|---|---|---|---|---|---|---|
| | | | | | X | Y | Z ** |
| | TANGENT 2L | MERGING L | SHIFTING L/2 | SHOULDER L/3 | TAPER | TANGENT | CONFLICT |
| mph | ft | ft | ft | ft | ft | ft | ft |
| 20 | 160 | 80 | 40 | 27 | 20 | 40 | 10 |
| 25 | 250 | 125 | 63 | 42 | 25 | 50 | 12 |
| 30 | 360 | 180 | 90 | 60 | 30 | 60 | 15 |
| 35 | 490 | 245 | 123 | 82 | 35 | 70 | 17 |
| 40 | 640 | 320 | 160 | 107 | 40 | 80 | 20 |
| 45 | 1080 | 540 | 270 | 180 | 45 | 90 | 22 |
| 50 | 1200 | 600 | 300 | 200 | 50 | 100 | 25 |
| 55 | 1320 | 660 | 330 | 220 | 50 | 100 | 25 |
| 60 | 1440 | 720 | 360 | 240 | 50 | 100 | 25 |
| 65 | 1560 | 780 | 390 | 260 | 50 | 100 | 25 |
| 70 | 1680 | 840 | 420 | 280 | 50 | 100 | 25 |
| 75 | 1800 | 900 | 450 | 300 | 50 | 100 | 25 |

* - For other offsets, use the following merging taper length formula for L:
For speed of 40 mph or less, $L = WS^2/60$
For speed of 45 mph or more, $L = WS$

Where: L = Taper length in feet
W = Width of offset in feet
S = Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

** - Use for taper and tangent sections where there are no pavement markings or where there is a conflict between existing pavement markings and channelizers (CA).

TABLE 2

**LONGITUDINAL BUFFER SPACE AND FLAGGER STATION SPACING**

| SPEED * | Min D ** | DOWNGRADE Min D *** | | |
|---|---|---|---|---|
| | | -3% | -6% | -9% |
| mph | ft | ft | ft | ft |
| 20 | 115 | 116 | 120 | 126 |
| 25 | 155 | 158 | 165 | 173 |
| 30 | 200 | 205 | 215 | 227 |
| 35 | 250 | 257 | 271 | 287 |
| 40 | 305 | 315 | 333 | 354 |
| 45 | 360 | 378 | 400 | 427 |
| 50 | 425 | 446 | 474 | 507 |
| 55 | 495 | 520 | 553 | 593 |
| 60 | 570 | 598 | 638 | 686 |
| 65 | 645 | 682 | 728 | 785 |
| 70 | 730 | 771 | 825 | 891 |
| 75 | 820 | 866 | 927 | 1003 |

* - Speed is posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

** - Longitudinal buffer space or flagger station spacing

*** - Use on sustained downgrade steeper than -3 percent and longer than 1 mile.

TABLE 3

**ADVANCE WARNING SIGN SPACING**

| ROAD TYPE | DISTANCE BETWEEN SIGNS * | | |
|---|---|---|---|
| | A | B | C |
| | ft | ft | ft |
| URBAN - 25 mph OR LESS | 100 | 100 | 100 |
| URBAN - MORE THAN 25 mph TO 40 mph | 250 | 250 | 250 |
| URBAN - MORE THAN 40 mph | 350 | 350 | 350 |
| RURAL | 500 | 500 | 500 |
| EXPRESSWAY / FREEWAY | 1000 | 1500 | 2640 |

* - The distances are approximate, are intended for guidance purposes only, and should be applied with engineering judgment. These distances should be adjusted by the Engineer for field conditions, if necessary, by increasing or decreasing the recommmended distances.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM TABLES FOR LANE AND RAMP CLOSURES

T9





7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

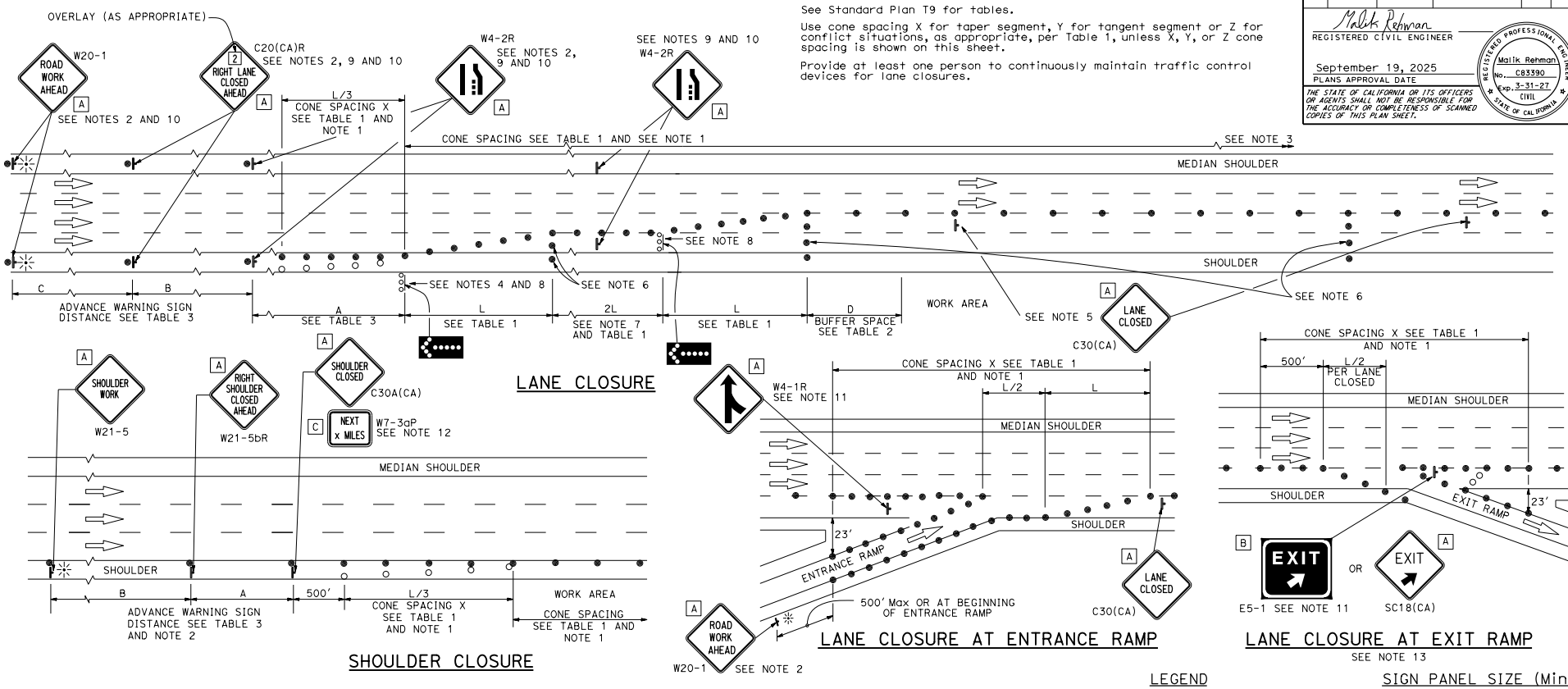
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## NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.




## NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, with minimum size of 48" x 24" as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest verticle curve or on a horizontal curve.
5. Place a C30(CA) sign every 1000' throughout length of lane closure.
6. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder at each location where a taper across a traffic lane ends and every 1000' as shown on the "Lane Closure" detail. Two type II barricades may be used instead of the 3 cones. The transverse alignment of the cones or barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.
7. The 2L tangent shown along lane lines shall be used between the L tapers required for each closed traffic lane.
8. Use one flashing arrow sign for each lane closed. The flashing arrow sign shall be Type I.
9. Median lane closures shall conform to the details as shown except that C20(CA)L and W4-2L signs shall be used.
10. Duplicate sign installations are not required:
    a) On opposite shoulder if at least one-half of the available lanes remain open to traffic.
    b) In the median if the width of the median shoulder is less than 8' and the outside lanes are to be closed.
11. The E5-1 or SC18(CA) and W4-1 signs shall be used as shown.
12. A W7-3aP "NEXT _____ MILES" plaque must be used if the shoulder closure extends beyond the distance that can be perceived by road users.
13. For the warning sign requirements at the Exit Ramp, when work is proposed on the local street, see CA MUTCD Figure 6H-22 to 6H-27.

### LEGEND

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

### SIGN PANEL SIZE (Min)

| | |
|---|---|
| A | 48" x 48" |
| B | 72" x 60" |
| C | 36" x 30" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS

NO SCALE

**T10**

7-1-25

2025 STANDARD PLAN T10

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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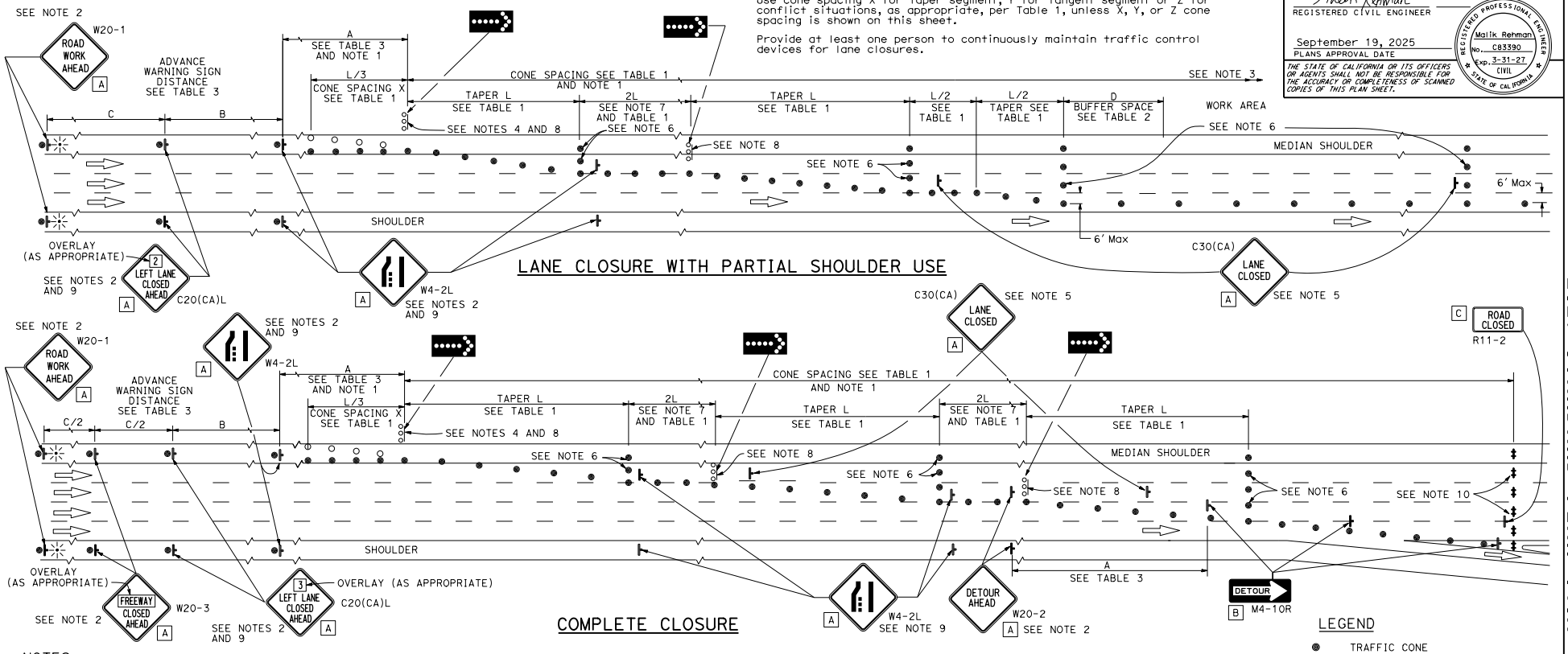
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## NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.




## NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, with minimum size of 48" x 24" as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within a larger project's limits.
4. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
5. Place a C30(CA) sign every 1000 ' throughout length of lane closure.
6. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder at each location where a taper across a traffic lane ends and every 1000' as shown on the "Lane Closure with Partial Shoulder USE" detail. Two type II barricades may be used instead of the 3 cones. The transverse alignment of the cones or barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.
7. The 2L tangent shown along lane lines shall be used between the L tapers required for each closed traffic lane.
8. Use one flashing arrow sign for each lane closed. The flashing arrow sign shall be Type I.
9. Lane closures on the right side using partial median shoulder as a traffic lane shall conform to the details shown except that C20(CA)R and W4-2R signs shall be used.
10. A minimum of Two Type II or III barricades shall be placed across each closed lane and shoulder at the location shown and every 2000' within the complete closure area. Within the complete closure area, the transverse alignment of the barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.

## SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 48" x 18"
- C 48" x 30"

## LEGEND

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS

NO SCALE

**T10A**

7-1-25



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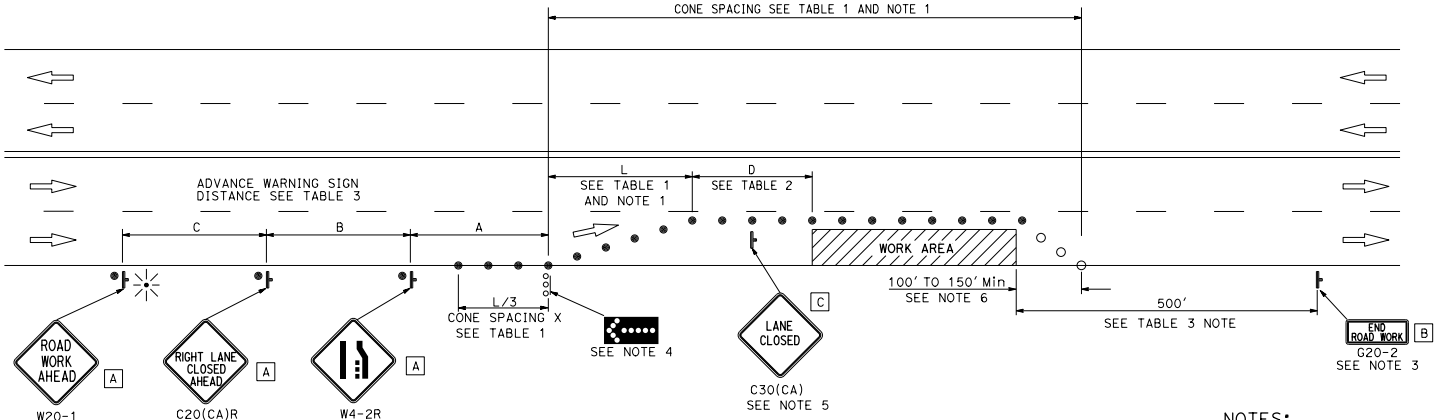
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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## TYPICAL LANE CLOSURE

### NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

### LEGEND

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

### SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 36" x 18"
- C 30" x 30"

### NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
5. Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work area.
6. Length may be reduced by the Engineer to address site conditions.
7. Median lane closures shall conform to the details shown except that C20(CA)L and W4-2L signs shall be used.
8. For approach speeds over 50 MPH, use the "Traffic Control System for Lane Closure on Freeways and Expressways" plan for lane closure details and requirements.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS

NO SCALE

**T11**

7-1-25





Return to Table of Contents

## LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

## SIGN PANEL SIZE (Min)

- [A] 48" x 48"
- [B] 24" x 24"
- [C] 36" x 18"

## NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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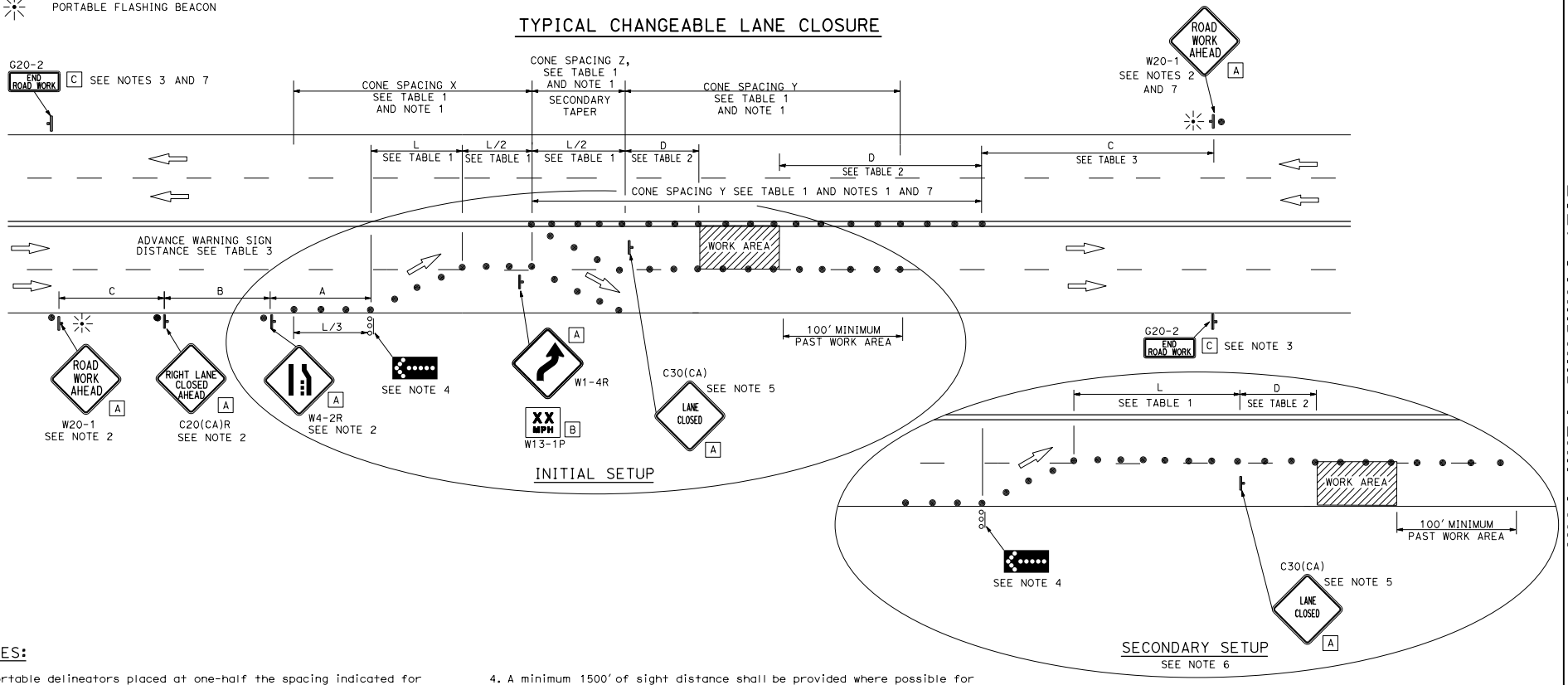
Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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## TYPICAL CHANGEABLE LANE CLOSURE




## NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacon shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
5. Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work area.
6. Relocate secondary taper to tangent location and relocate C30(CA) sign. Remove W1-4R/W13-1P sign package.
7. Sign installations and cones are not required when a median barrier is in place.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR CHANGEABLE LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS AND EXPRESSWAYS

NO SCALE

**T11A**

7-1-25



Return to Table of Contents

## LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON

## SIGN PANEL SIZE (Min)

- [A] 48" x 48"
- [B] 24" x 24"
- [C] 36" x 18"

## NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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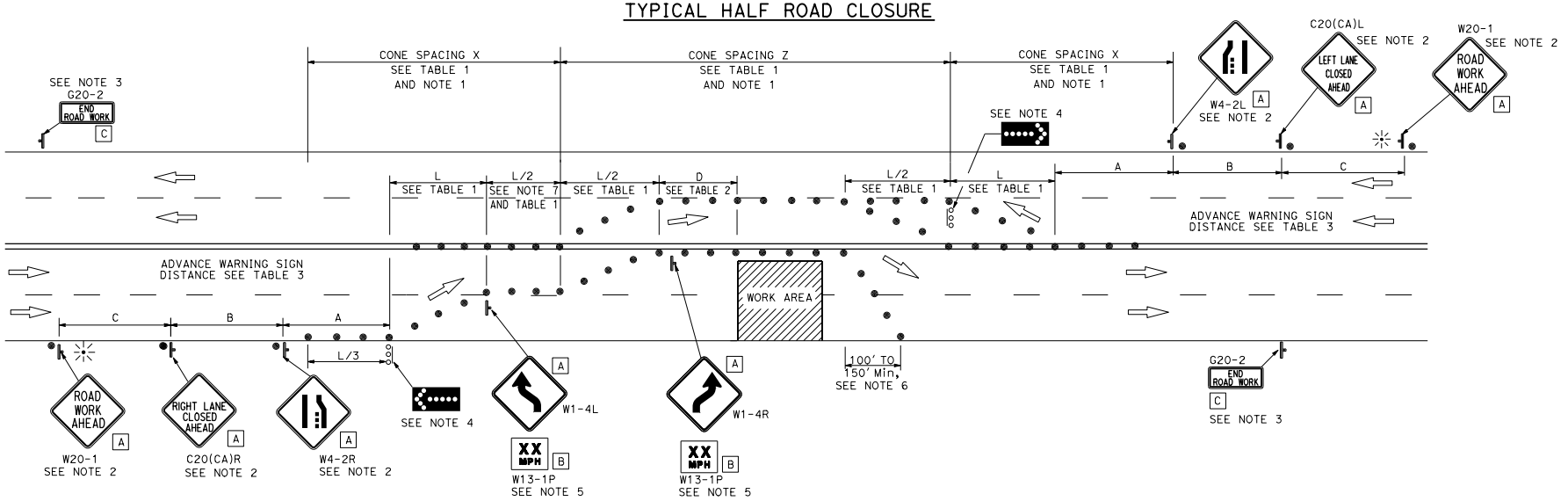
Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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## TYPICAL HALF ROAD CLOSURE




## NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. A minimum 1500' sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest verticle curve or on a horizontal curve.
5. Advisory speed will be determined by the Engineer. The W13-1P Plaque will not be required when advidory speed is more than the posted or maximum speed limit.
6. Length may be reduced by the Engineer to address site conditions.
7. The tangent (L/2) shall be used.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR HALF ROAD CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS AND EXPRESSWAYS

NO SCALE

**T12**

7-1-25





Return to Table of Contents

## NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

## SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 30" x 30"
- C 36" x 18"
- D 36" x 42"
- E 20" x 7"

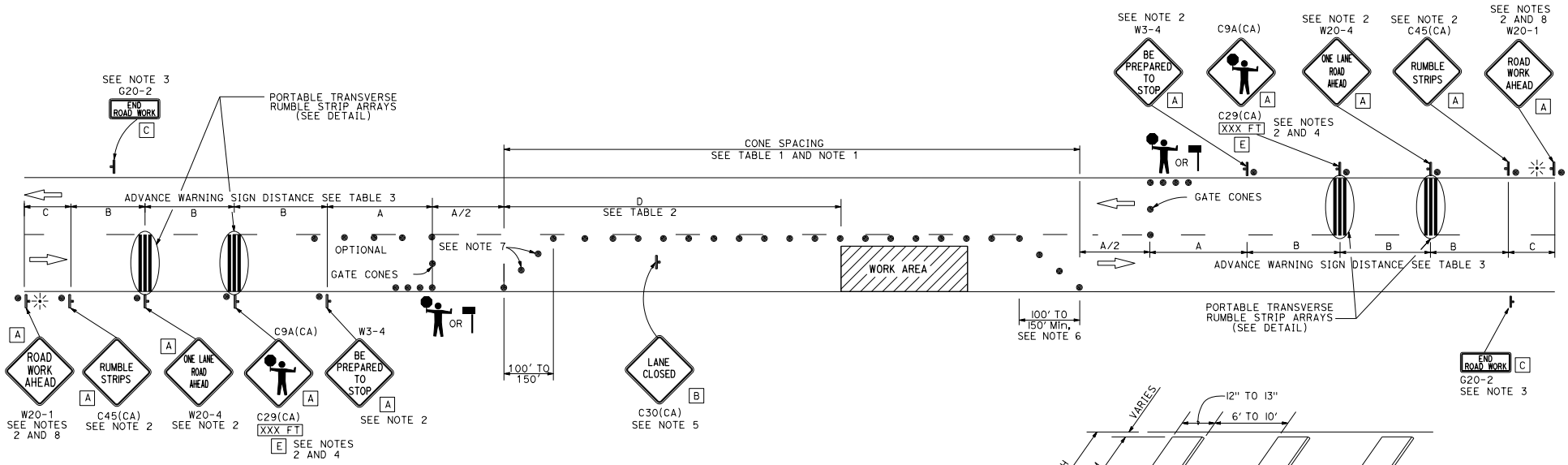
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
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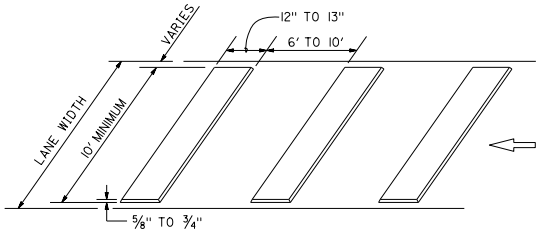



## NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Sign must be equipped with at least two flags for daytime closures. Flags must be orange in color and at least 16 inches by 16 inches in size. Place flashing beacons as shown for closures during hours of darkness.
3. A G20-2 "END ROAD WORK" sign, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within the larger project's limits.
4. An optional C29(CA) sign may be placed below the C9A(CA) sign.
5. Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work area. They are optional if the work area is visible from the flagger station.
6. Length may be reduced by the Engineer to address site conditions.
7. Either traffic cones or barricades shall be placed on the taper. Barricades shall be Type I, II, or III.
8. If C45(CA) is not used, measure distance C from W20-4.

## LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- FLAGGER
- AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)




PORTABLE TRANSVERSE RUMBLE STRIP ARRAY DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM WITH REVERSIBLE CONTROL ON TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

**T13**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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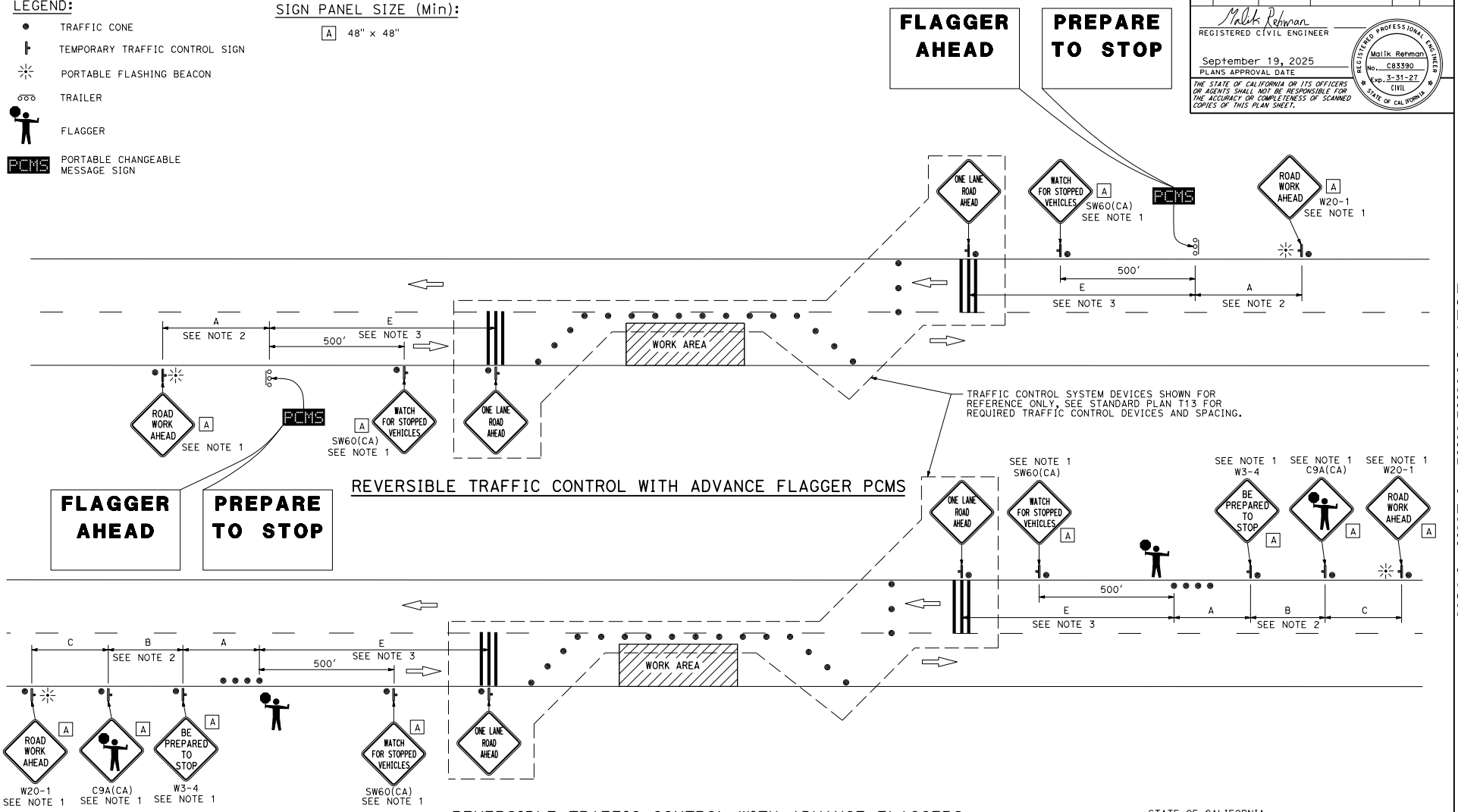
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LEGEND:

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- TRAILER
- FLAGGER
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN

SIGN PANEL SIZE (Min):

[A] 48" x 48"




NOTES:

1. Sign must be equiped with at least two flags for daytime closures. Flags must be orange in color and at least 16 inches by 16 inches in size. Place flashing beacons as shown for closures during hours of darkness.
2. See Standard Plan T9, Table 3 for advanced warning sign spacing.
3. See Standard Specification 12-4.02C.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

**T13A**



7-1-25

Return to Table of Contents

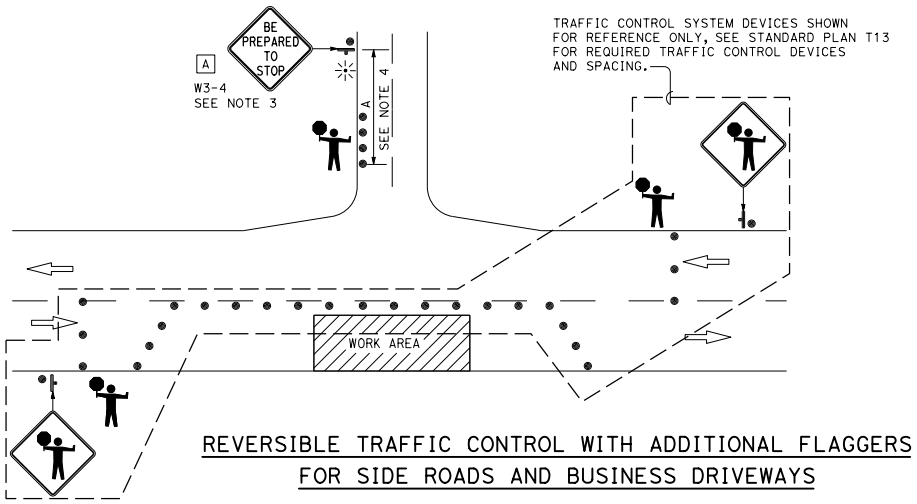
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Malik Rehman
REGISTERED CIVIL ENGINEER

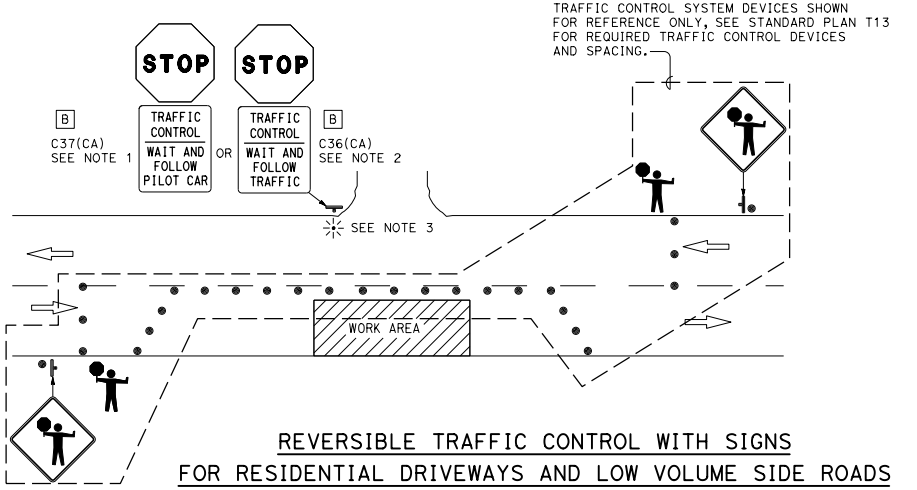
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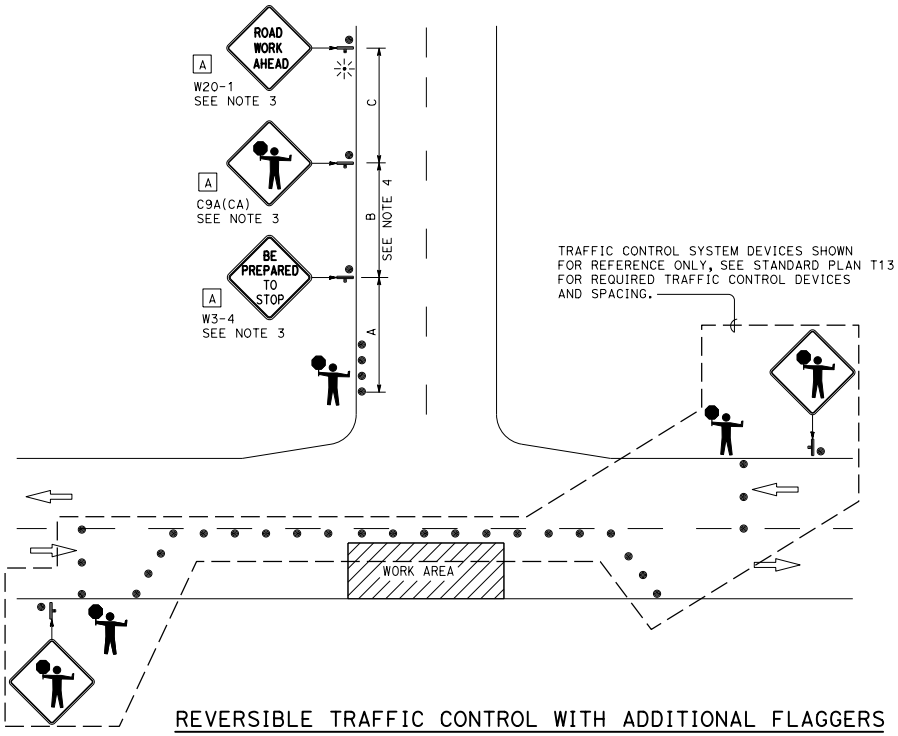
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REVERSIBLE TRAFFIC CONTROL WITH ADDITIONAL FLAGGERS
FOR SIDE ROADS AND BUSINESS DRIVEWAYS




REVERSIBLE TRAFFIC CONTROL WITH SIGNS
FOR RESIDENTIAL DRIVEWAYS AND LOW VOLUME SIDE ROADS




REVERSIBLE TRAFFIC CONTROL WITH ADDITIONAL FLAGGERS
AT HIGH VOLUME INTERSECTIONS

NOTES:

1. Place C37(CA) sign when pilot car is used.
2. Place C36(CA) sign when pilot car is not used.
3. Sign must be equipped with at least two flags for daytime closures. Flags must be orange in color and at least 16 inches by 16 inches in size. Place flashing beacons as shown for closures during hours of darkness.
4. See Standard Plan T9, Table 3 for advance warning sign spacing.

LEGEND:

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- FLAGGER

SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 36" x 42"

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

**T13B**

7-1-25

Return to Table of Contents

# TYPICAL RAMP CLOSURES

SIGN PANEL SIZE (Min)

| | |
|---|---|
| A | 48" x 48" |
| B | 48" x 30" |
| C | 36" x 36" |
| D | 48" x 36" |

LEGEND

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- BARRICADES
- PORTABLE FLASHING BEACON

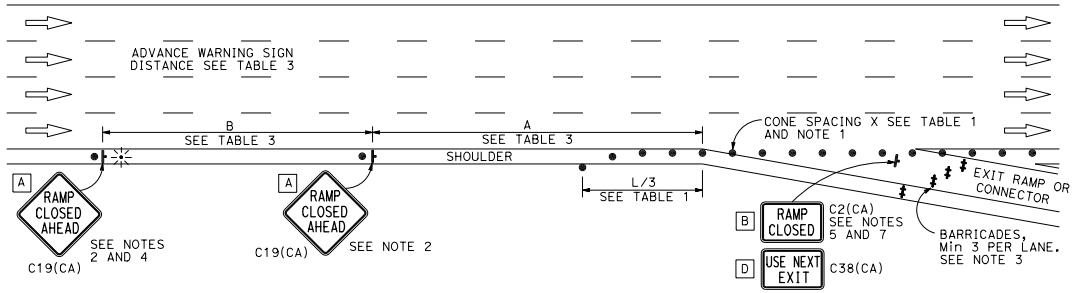
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Malik Rehman
REGISTERED CIVIL ENGINEER

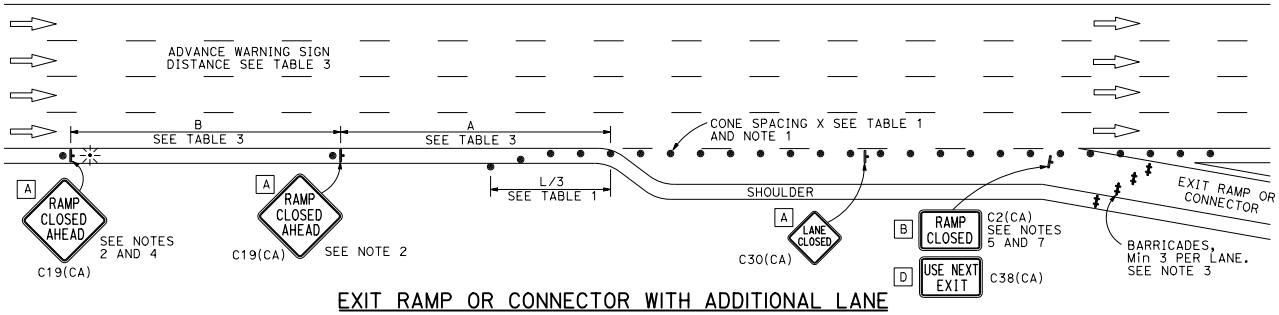
September 19, 2025
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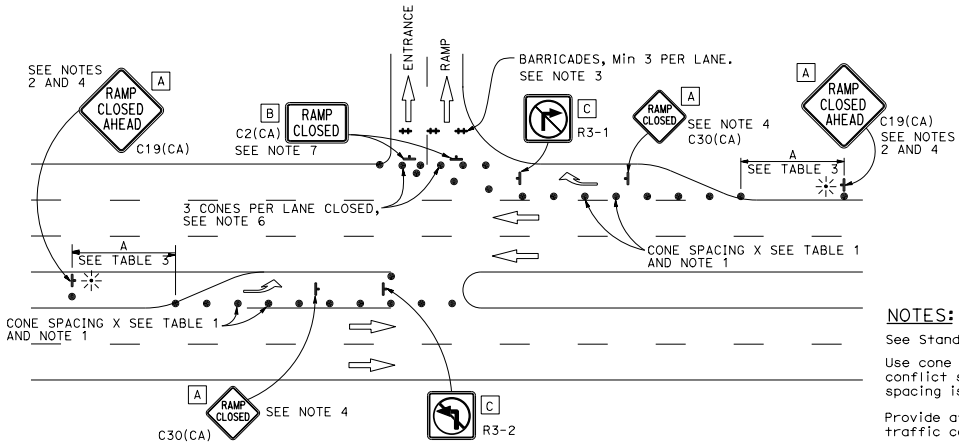
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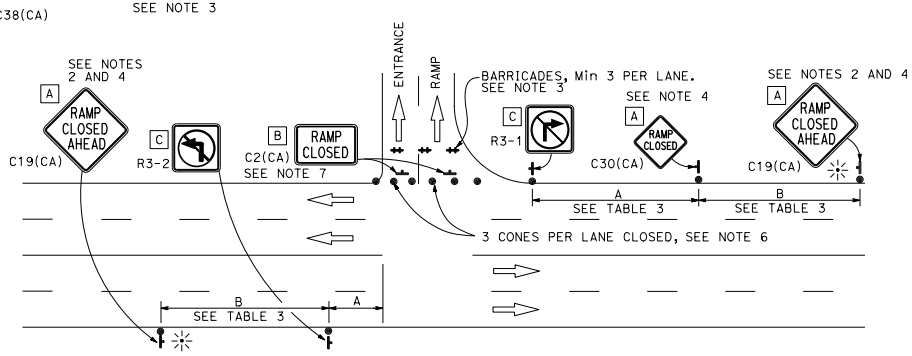

EXIT RAMP OR CONNECTOR




EXIT RAMP OR CONNECTOR WITH ADDITIONAL LANE




ENTRANCE RAMP WITH TURNING POCKETS




ENTRANCE RAMP WITHOUT TURNING POCKETS

NOTES:

1. Portable delineators placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.
2. Each advance warning C19(CA) "RAMP CLOSED AHEAD" sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. A flashing beacon shall be placed on top of the first C19(CA) sign during hours of darkness.
3. Barricades shall be Type I, II or III for closures lastind one week or less and Type III for closures lasting longer than one week.
4. In addition to placing the C19(CA) "RAMP CLOSED AHEAD" and C30(CA) "RAMP CLOSED" signs, black on orange overlay plates with the word "closed" may be mounted. As directed by the Engineer on all guide signs that refer to the closed ramp. The letter size on the overlay shall be the same as the guide sign.
5. The existing "EXIT" signs shall be covered during ramp closures.
6. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder.
7. C2(CA) sign shall be black and white.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

Provide at least one person to continuously maintain traffic control devices for lane closures.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

## TRAFFIC CONTROL SYSTEM FOR RAMP CLOSURE

NO SCALE

T14

7-1-25

2025 STANDARD PLAN T14



Return to Table of Contents

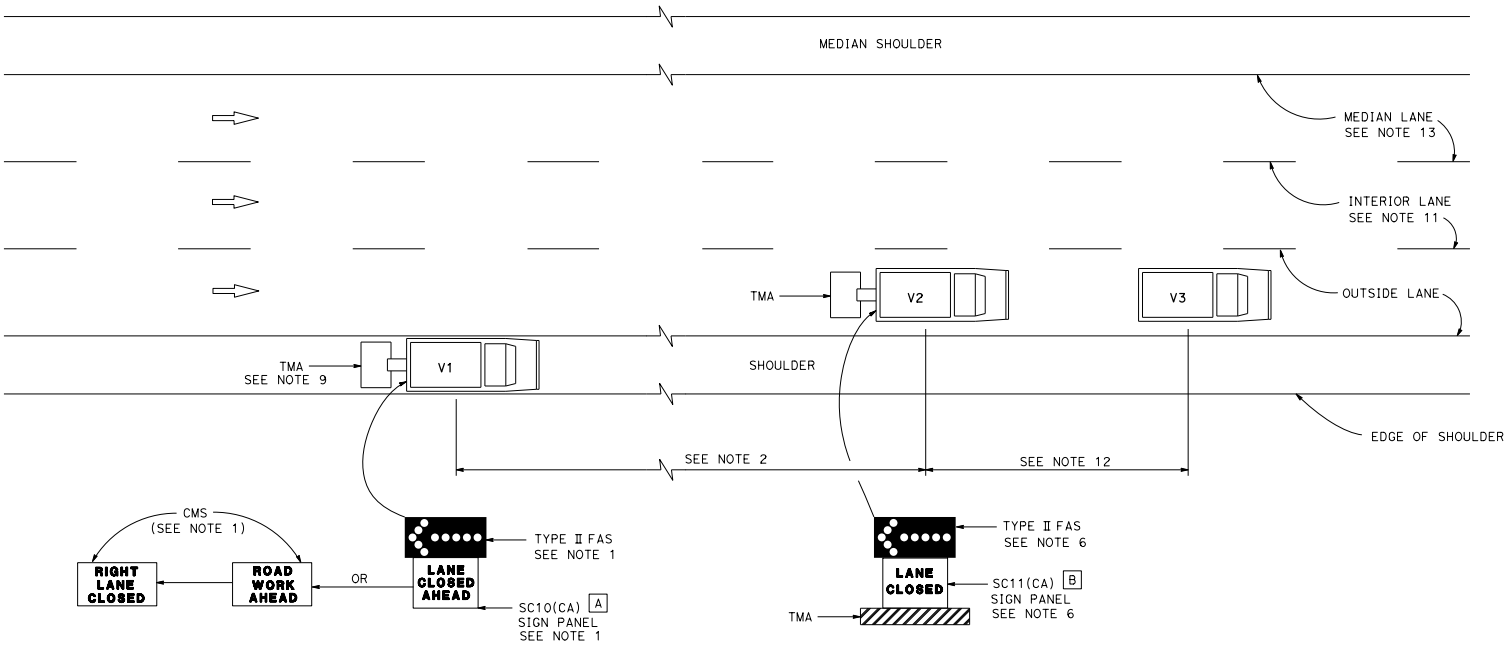
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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## MOVING LANE CLOSURE ON MEDIAN LANE OR OUTSIDE LANE OF MULTILANE HIGHWAYS

SIGN PANEL SIZE (Min)

A 66" x 36"
B 54" x 42"

LEGEND

| | |
|---|---|
| V1 | SIGN VEHICLE |
| V2 | SHADOW VEHICLE |
| V3 | WORK/APPLICATION VEHICLE |
| | FLASHING ARROW SIGN (FAS) |
| CMS | CHANGEABLE MESSAGE SIGN |
| TMA | TRUCK-MOUNTED ATTENUATOR |

NOTES:

1. Either a changeable message sign or a SC10(CA) sign panel and a Type II flashing arrow sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "ROAD WORK AHEAD" message first, followed by the "RIGHT LANE CLOSED" message. For median lane closure, the flashing arrow symbol shall be reversed with the arrowhead on the right and the changeable message sign shall show "LEFT LANE CLOSED".
2. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue. Sign vehicle V1 shall be positioned where highly visible when shoulders are not available.
3. A minimum sight distance of 1500' should be provided in advance of sign vehicle V1.
4. Sign vehicle V1 should remain at the beginning of horizontal or vertical curves until the other vehicles (V2 and V3) are far enough beyond the curve to resume the minimum sight distance of 1500'.
5. Vehicle-mounted sign panels shall have Type III or above retroreflective sheeting, black on white, or black on fluorescent orange, with 6" minimum series D letters per Caltrans sign specifications.
6. Shadow vehicle V2 shall be equipped with a truck-mounted attenuator. The sign panel shown and a Type II flashing arrow sign shall be mounted on the rear of shadow vehicle V2. For median lane closure the flashing arrow sign symbol shall be displayed with the arrowhead on the right.
7. All vehicles used for lane closures shall be equipped with two-way radios, and the vehicle operators shall maintain communication during the work or application operation.
8. All vehicles shall be equipped with flashing or rotating amber lights.
9. If sign vehicle V1 encroaches into the traffic lane due to insufficient shoulder width, sign vehicle V1 shall be equipped with a truck-mounted attenuator. Sign vehicle V1 shall stay as close to the edge of shoulder as practicable.
10. Where workers would be on foot in the work area, a stationary type lane closure (Standard Plan T10, T11, etc., as applicable) shall be used instead of this plan.
11. For moving lane closure on interior lane of multilane highways, use Standard Plan T16.
12. The spacing between work vehicle(s) and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.
13. When the work/application vehicle V3 occupies the median lane, sign vehicle V1 should drive in the median shoulder and indicate left lane closed ahead.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS

NO SCALE

**T15**

7-1-25



Return to Table of Contents

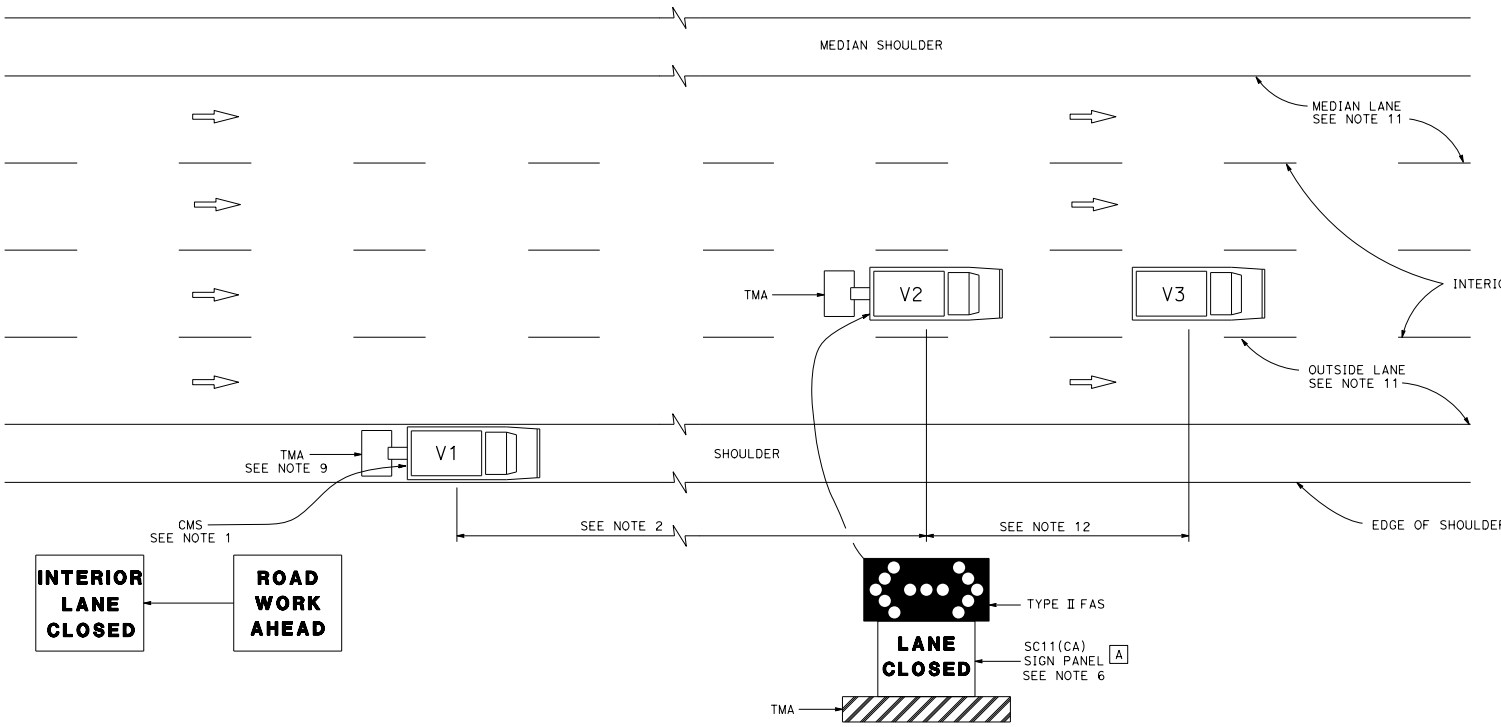
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
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CIVIL
STATE OF CALIFORNIA

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SIGN PANEL SIZE (Min)

A 54" x 42"

LEGEND

| | |
|---|---|
| V1 | SIGN VEHICLE |
| V2 | SHADOW VEHICLE |
| V3 | WORK/APPLICATION VEHICLE |
| | FLASHING ARROW SIGN (FAS) IN FLASHING DOUBLE ARROW MODE |
| CMS | CHANGEABLE MESSAGE SIGN |
| TMA | TRUCK-MOUNTED ATTENUATOR |

## MOVING LANE CLOSURE ON INTERIOR LANE OF MULTILANE HIGHWAYS

NOTES:

1. A changeable message sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "ROAD WORK AHEAD" message first, followed by the "INTERIOR LANE CLOSED" message. The message "CENTER LANE CLOSED" may be used in place of the "INTERIOR LANE CLOSED" message.
2. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue. Sign vehicle V1 shall be positioned where highly visible when shoulders are not available.
3. A minimum sight distance of 1500' should be provided in advance of sign vehicle V1.
4. Sign vehicle V1 should remain at the beginning of horizontal or vertical curves until the other vehicles (V2 and V3) are far enough beyond the curve to resume the minimum sight distance of 1500'.
5. Vehicle-mounted sign panels shall have Type III or above retroreflective sheeting, black on white, or black on fluorescent orange, with 6" minimum series D letters per Caltrans sign specifications.
6. Shadow vehicle V2 shall be equipped with a truck-mounted attenuator. The sign panel shown and a Type II flashing arrow sign shall be mounted on the rear of shadow vehicle V2.
7. All vehicles used for lane closures shall be equipped with two-way radios, and the vehicle operators shall maintain communication during the work or application operation.
8. All vehicles shall be equipped with flashing or rotating amber lights.
9. If sign vehicle V1 encroaches into the traffic lane due to insufficient shoulder width, sign vehicle V1 shall be equipped with a truck-mounted attenuator. Sign vehicle V1 shall stay as close to the edge of shoulder as practicable.
10. Where workers would be on foot in the work area, a stationary type lane closure (Standard Plan T10, T11 etc., as applicable) shall be used instead of this plan.
11. For moving lane closure on median lane or outside lane of multilane highways, use Standard Plan T15.
12. The spacing between work vehicle(s) and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS

NO SCALE

**T16**

7-1-25



Return to Table of Contents

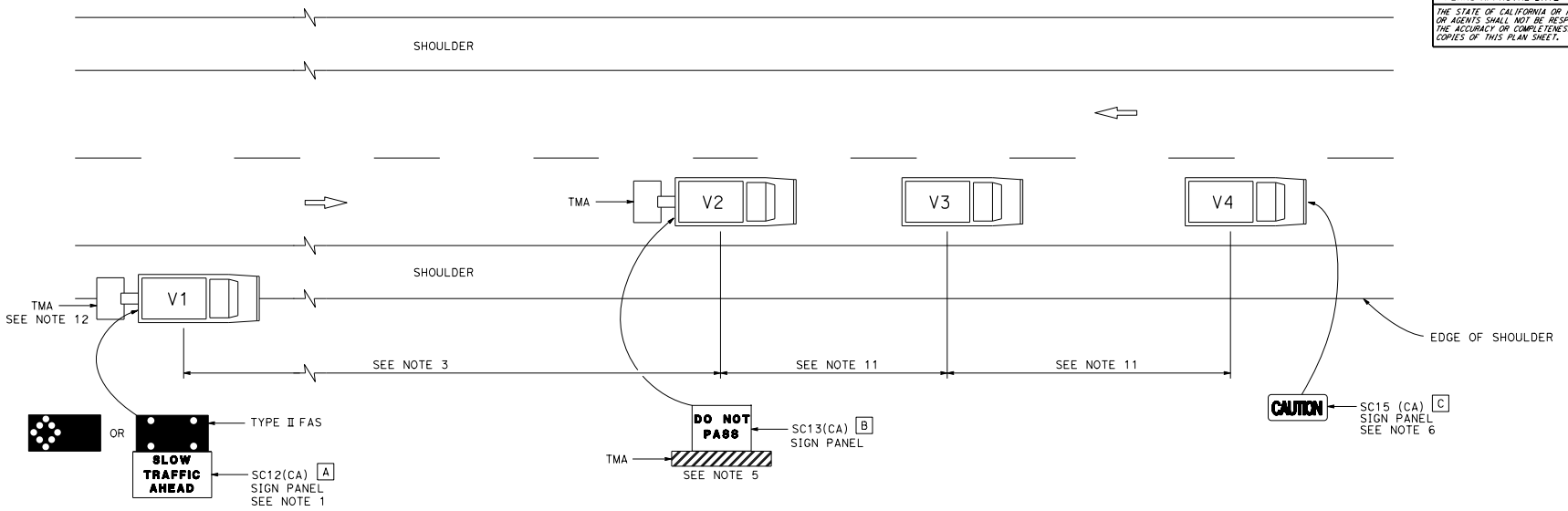
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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## LEGEND

| | |
|---|---|
| V1 | SIGN VEHICLE |
| V2 | SHADOW VEHICLE |
| V3 | WORK/APPLICATION VEHICLE |
| V4 | SIGN VEHICLE |
| TMA | TRUCK-MOUNTED ATTENUATOR |
| | FLASHING ARROW SIGN (FAS) IN FLASHING CAUTION MODE |
| | FLASHING ARROW SIGN (FAS) IN ALTERNATING DIAMOND CAUTION |

## SIGN PANEL SIZE (Min)

| | |
|---|---|
| A | 72" x 42" |
| B | 54" x 42" |
| C | 54" x 24" |

## NOTES:

1. Either a changeable message sign or a SC12(CA) "SLOW TRAFFIC AHEAD" sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "CAUTION" message first, follow by the "SLOW TRAFFIC AHEAD" message. A Type II flashing arrow sign may be used with the SC12(CA) sign panel.
2. Sign vehicle V1 should be positioned where highly visible when shoulders are not available.
3. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue.
4. Vehicle-mounted sign panels shall have Type III or above retroreflective sheeting, black on white, or black on fluorescent orange, with 6" minimum series D letters per Caltrans sign specifications.
5. Shadow vehicle shall be equipped with a truck-mounted attenuator. The sign panel shown shall be mounted on the rear of shadow vehicle V2. The message "LANE CLOSED" may be used in place of the "DO NOT PASS" message.
6. The sign panel shown shall be mounted on the front of sign vehicle V4, facing opposing traffic.
7. All vehicles shall be equipped with flashing or rotating amber lights.
8. Sign vehicle V4 will not be required when the work and vehicles V2 and V3 are 2' or more from the centerline of the highway during the work or application operations.
9. All vehicles used for lane closures shall be equipped with two-way radios and the vehicle operators shall maintain communication during the work or application operation.
10. This plan shall not be used where workers would be on foot in the work area. Use a stationary type lane closure (Standard Plan T13) for this condition.
11. Minimize spacing between vehicles V2 and V3 and vehicles V3 and V4 to deter road users from driving in between them.
12. If sign vehicle V1 encroaches into the traffic lane due to insufficient shoulder width, sign vehicle V1 shall be equipped with a truck-mounted attenuator. Sign vehicle V1 shall stay as close to the edge of shoulder as practicable.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON TWO LANE HIGHWAYS

NO SCALE

**T17**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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REGISTERED CIVIL ENGINEER

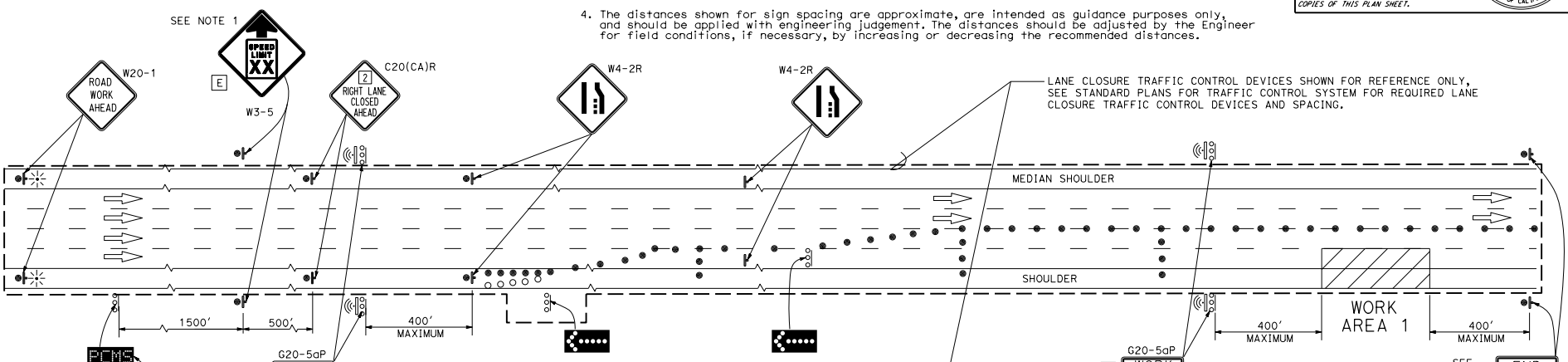
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PLANS APPROVAL DATE

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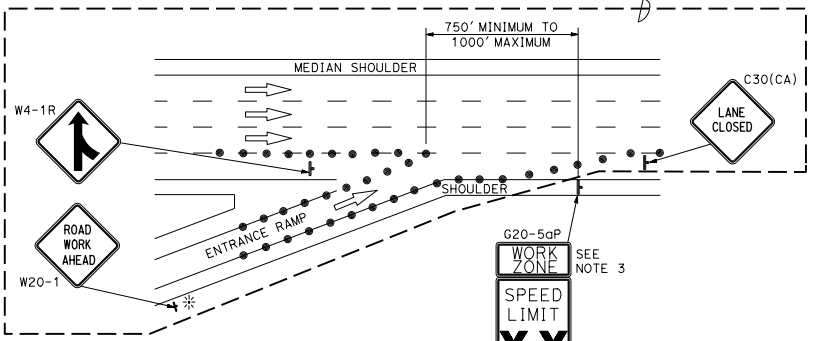
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## NOTES:

1. Duplicate sign installations are not required:
   a) On opposite shoulder if at least one-half of the available lanes remain open to traffic.
   b) In the median if the width of the median shoulder is less than 8′ and the outside lanes are to be closed.
2. Where speed limit reduction zones are longer than 3 miles, place intermediate R2-1 sign and G20-5aP plaque at approximate 3-mile spacing throughout the speed limit reduction zone,
3. Place an R2-1 sign and G20-5aP plaque at each entrance ramp within the speed limit reduction zone.
4. The distances shown for sign spacing are approximate, are intended as guidance purposes only, and should be applied with engineering judgement. The distances should be adjusted by the Engineer for field conditions, if necessary, by increasing or decreasing the recommended distances.




## FREEWAY SPEED LIMIT SIGNS




## ENTRANCE RAMP SPEED LIMIT SIGN

**XX ZONE AHEAD**

**WILL BE ENFORCED**

| SIGN SIZE FREEWAY AND EXPRESSWAY (Min) | |
|---|---|
| A | 36 x 48 |
| B | 36 x 24 |
| C | 36 x 54 |
| D | 36 x 36 |
| E | 48 x 48 |

LEGEND:

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON FREEWAYS AND EXPRESSWAYS

NO SCALE

**T18**

7-1-25



Return to Table of Contents

## LEGEND:

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEM

## SIGN PANEL SIZE (Min)

| | |
|---|---|
| A | 48" x 48" |
| B | 36" x 18" |
| C | 24" x 30" |
| D | 24" x 18" |
| E | 24" x 36" |
| F | 24" x 24" |

## NOTES:

1. See Standard Plan T9 for Table 3 showing advanced warning sign spacing.
2. If the PCMS is outside the W20-1 construction area sign, place a W20-1 sign in advance of the PCMS.
3. Place additional R2-1 sign and G20-5aP plaque:
   a. Where speed limit reduction zones are longer than 3 miles. Place intermediate signs at approximately 3-mile spacing throughout the speed limit reduction zone.
   b. Approximately 500 feet downstream from major intersections within the speed limit reduction zone.

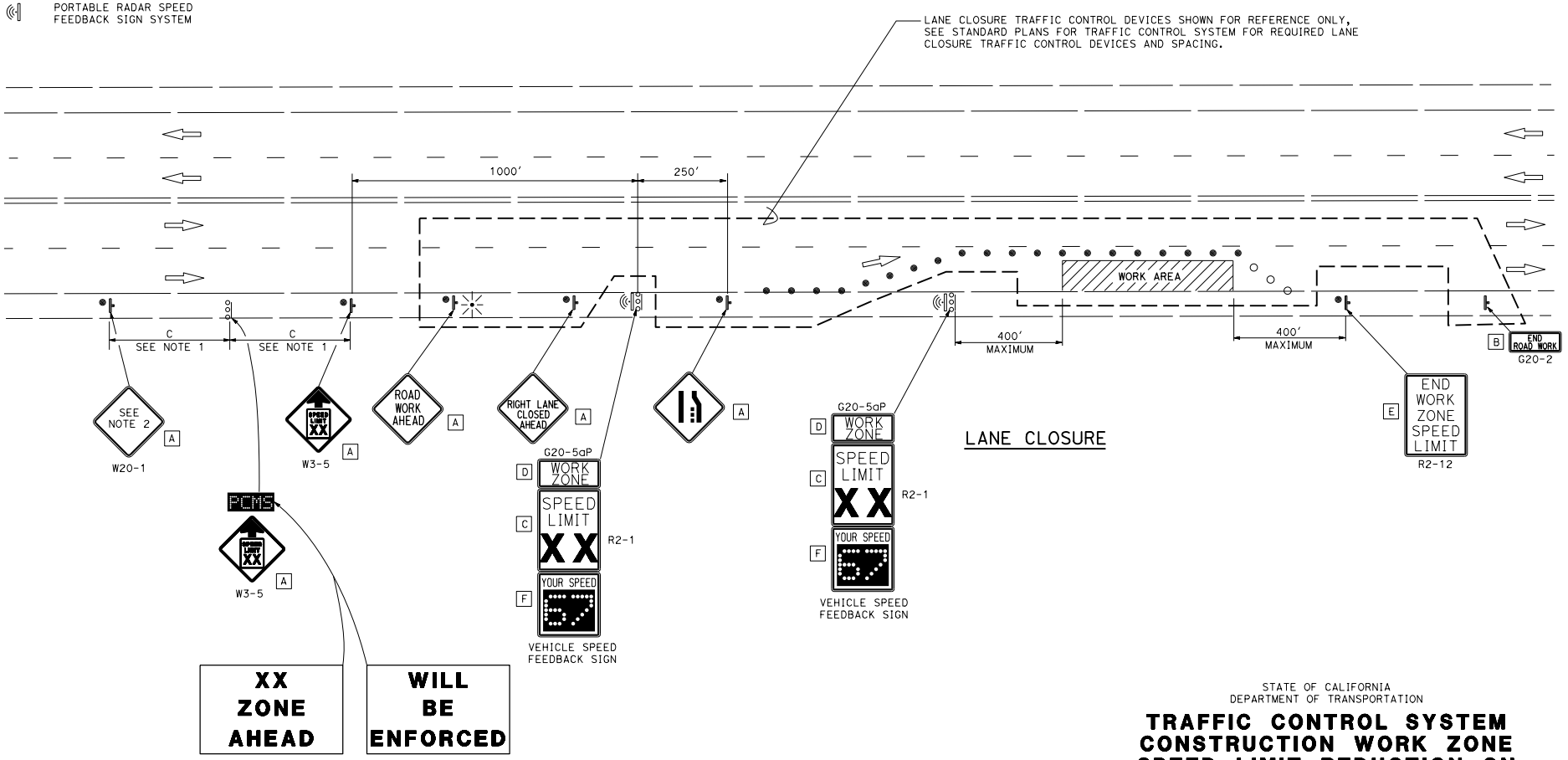
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Malik Rehman — No. C83390 — Exp. 3-31-27 CIVIL — STATE OF CALIFORNIA

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## LANE CLOSURE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON CONVENTIONAL HIGHWAYS

NO SCALE

**T19**

7-1-25





Return to Table of Contents

## LEGEND:

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEM

| | SIGN SIZE (Min) | |
|---|---|---|
| | FREEWAY AND EXPRESSWAY | CONVENTIONAL SINGLE LANE AND MULTILANE |
| A | 36 x 48 | 24 x 30 |
| B | 36 x 24 | 24 x 18 |
| C | 36 x 54 | 24 x 36 |
| D | 36 x 36 | 24 x 24 |
| E | 48 x 48 | 48 x 48 |

## NOTES:

1. See Standard Plan T9 for Table 3 showing advanced warning sign spacing.
2. Duplicate sign installations are not required:
   a) On opposite shoulder if at least one-half of the available lanes remain open to traffic.
   b) In the median if the width of the median shoulder is less than 8' and the outside lanes are to be closed.
3. If the PCMS is outside the W20-1 construction area sign, place a W20-1 sign in advance of the PCMS.
4. Place the R3(CA) sign 400 feet downstream from the end of the last work area and place an additional vehicle speed feedback sign system 400 feet upstream from the beginning of each work area with a separtion of more than 2 miles.
5. The distances shown for sign spacing are approximate, are intended as guidance purposes only, and should be applied with engineering judgement. The distances should be adjusted by the Engineer for field conditions, if necessary, by increasing or decreasing the recommended distances.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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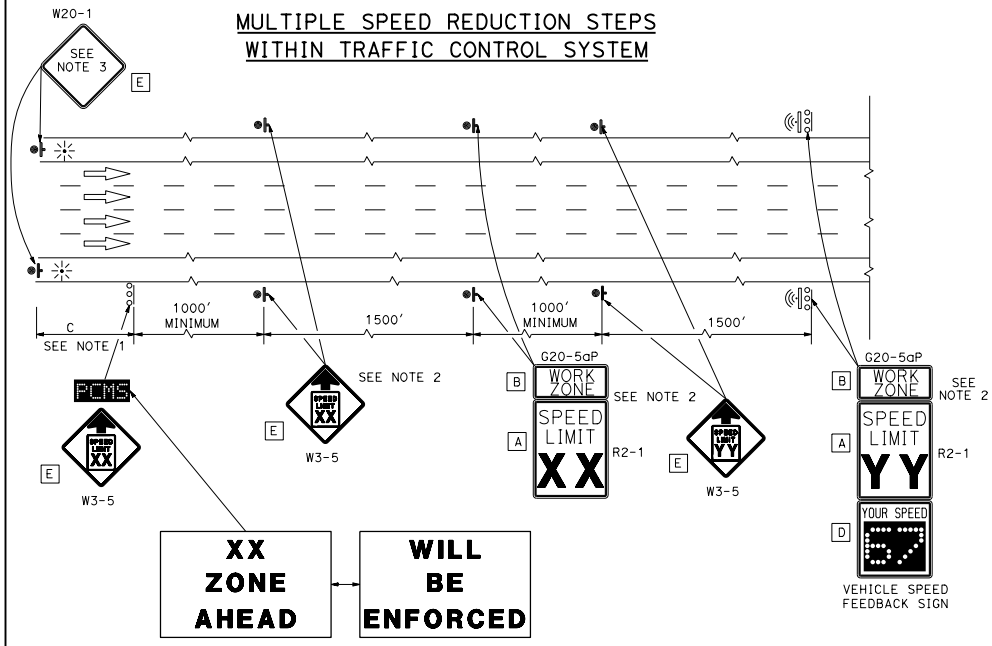
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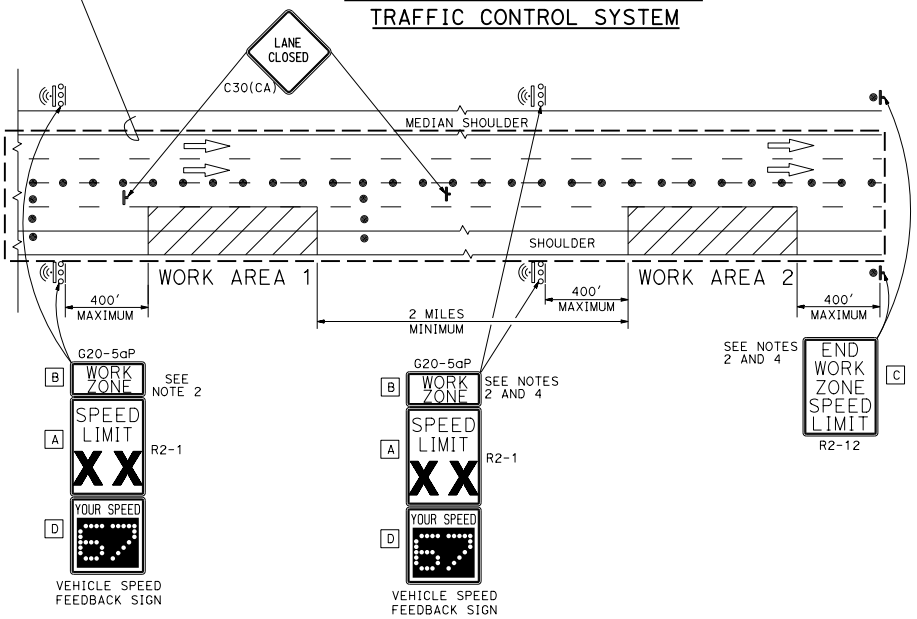
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LANE CLOSURE TRAFFIC CONTROL DEVICES SHOWN FOR REFERENCE ONLY, SEE STANDARD PLANS FOR TRAFFIC CONTROL SYSTEM FOR REQUIRED LANE CLOSURE TRAFFIC CONTROL DEVICES AND SPACING.

### MULTIPLE SPEED REDUCTION STEPS WITHIN TRAFFIC CONTROL SYSTEM




### MULTIPLE WORK AREAS WITHIN TRAFFIC CONTROL SYSTEM




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION DETAILS

NO SCALE

**T20**

7-1-25

2025 STANDARD PLAN T20

Return to Table of Contents

## LEGEND:

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- TEMPORARY TRAFFIC CONTROL SIGN
- FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- PORTABLE FLASHING BEACON
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
- TEMPORARY RADAR SPEED FEEDBACK SIGN SYSTEM

| SIGN SIZE (Min) | FREEWAY AND EXPRESSWAY | CONVENTIONAL SINGLE LANE AND MULTILANE |
|---|---|---|
| A | 36 x 48 | 24 x 30 |
| B | 36 x 24 | 24 x 18 |
| C | 36 x 54 | 24 x 36 |
| D | 36 x 36 | 24 x 24 |
| E | 48 x 48 | 48 x 48 |

## NOTES:

1. See Standard Plan T9 for Table 3 showing advanced warning sign spacing.
2. Duplicate sign installations are not required:
   a. On opposite shoulder if at least one-half of the available lanes remain open to traffic.
   b. In the median if the width of the median shoulder is less than 8′ and the outside lanes are to be closed.
3. Place additional R2-1 sign and G20-5aP plaque:
   a. Where speed limit reduction zones are longer than 3 miles. Place intermediate sign at approximately 3-mile spacing throughout the speed limit reduction zone.
   b. At each entrance ramp within the speed limit reduction zone.
   c. Approximately 500 feet downstream from major intersections within the speed limit reduction zone.
4. Place appropriate advanced warning sign for the roadway condition that requires the construction work zone speed limit reduction.
5. Where speed limit reduction zones are longer than 3 miles, place additional appropriate advanced warning signs intermediate at approximately 3-mile spacing throughout the speed reduction zone.

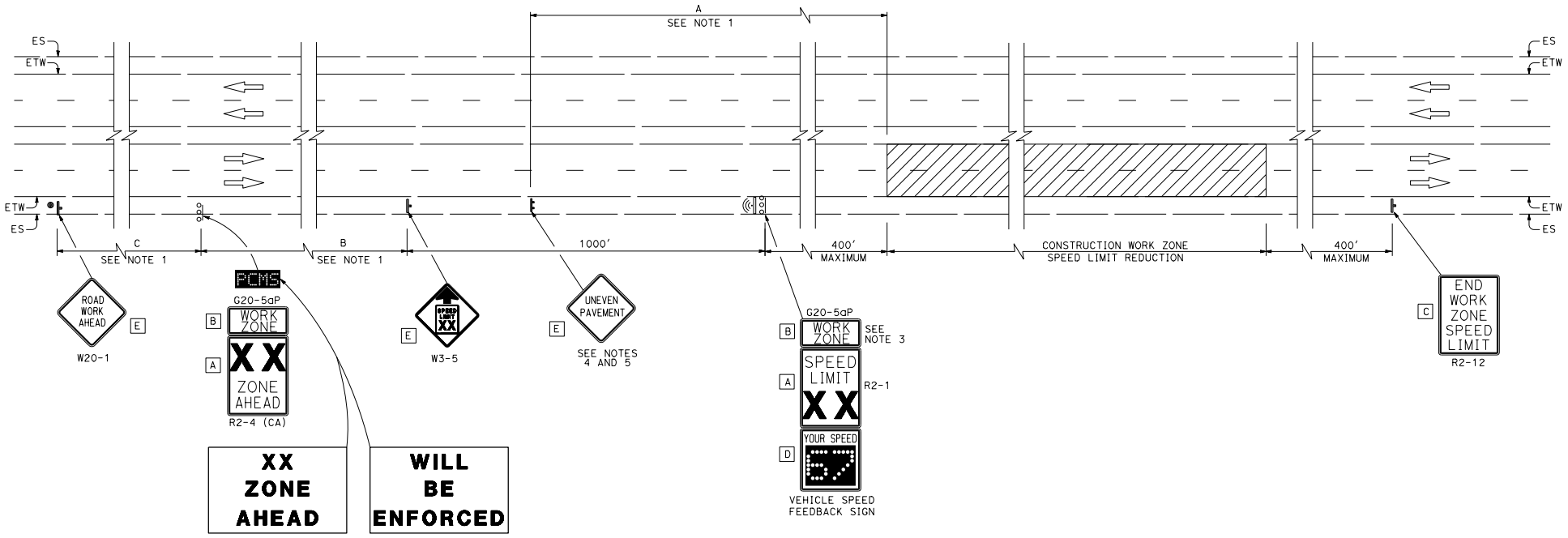
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM
# CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION
# TWENTY-FOUR HOURS A DAY 7 DAYS A WEEK (24/7)

NO SCALE

**T21**

7-1-25



Return to Table of Contents

LEGEND:

- TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- PORTABLE FLASHING BEACON
- FLAGGER
- PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEM (PRSFSS)
- PRSFSS SUPPORT OR TRAILER
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

SIGN PANEL SIZE (Min)

| | |
|---|---|
| A | 48" x 48" |
| B | 24" x 30" |
| C | 24" x 18" |
| D | 24" x 24" |
| E | 24" x 36" |

NOTES:

1. See Standard Plan T9, Table 3 for advanced warning sign spacing.
2. The distance B to the PRSFS is measured from the C29 (CA) sign or the PCMS at the Advance Flagger Station.
3. If rumble strips are not used, the distance B to PRSFS is measured from W20-4.

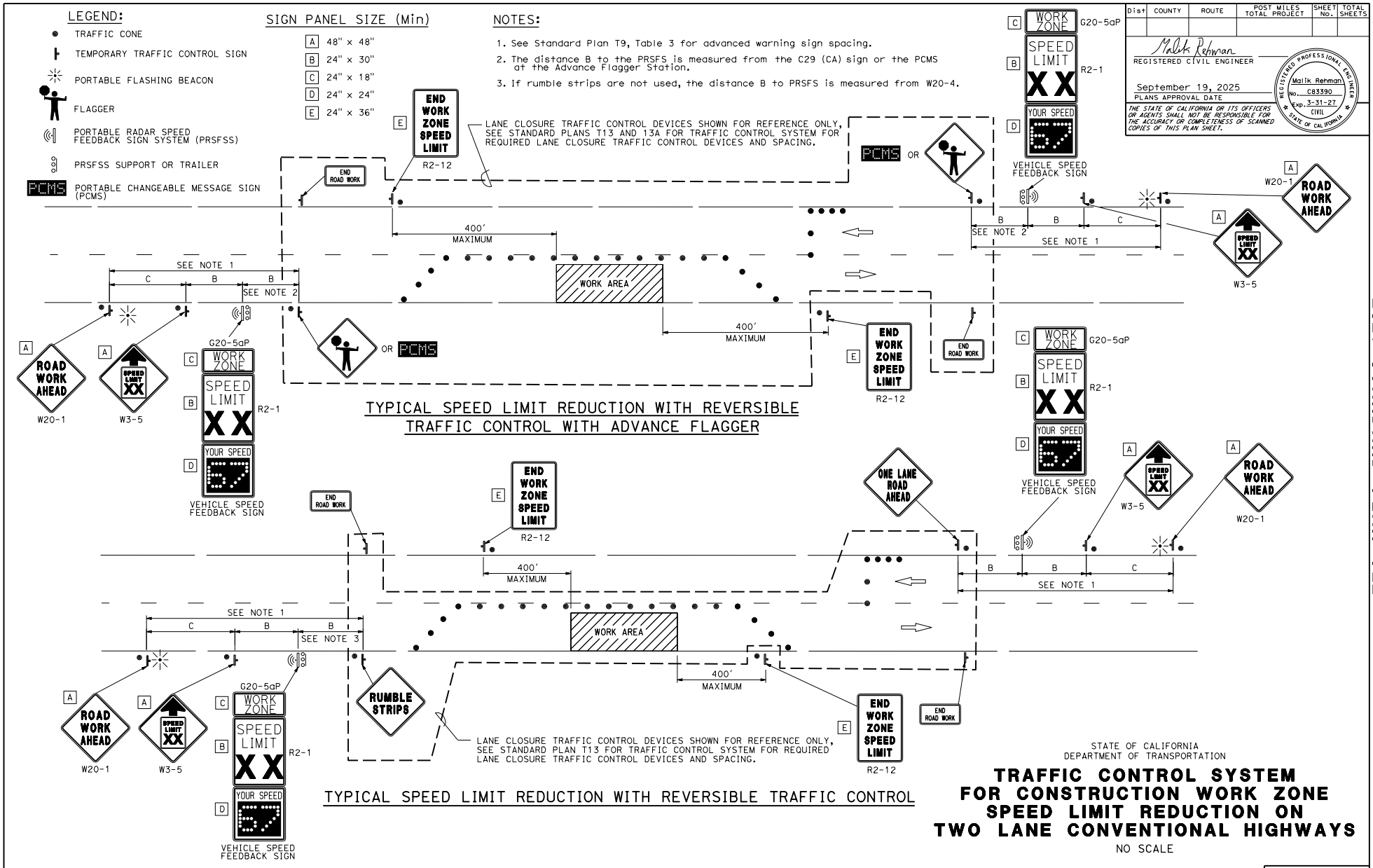
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
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TYPICAL SPEED LIMIT REDUCTION WITH REVERSIBLE TRAFFIC CONTROL WITH ADVANCE FLAGGER

TYPICAL SPEED LIMIT REDUCTION WITH REVERSIBLE TRAFFIC CONTROL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TRAFFIC CONTROL SYSTEM FOR CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON TWO LANE CONVENTIONAL HIGHWAYS

NO SCALE

T22

7-1-25



Return to Table of Contents

NOTES:

1. Channelizing devices shown adjacent to the mobile barrier may be removed or not placed while the mobile barrier is stationary, but must be placed or replaced as the barrier moves within the work area.
2. See Standard Plan T9 for tables.
3. One impact attenuator vehicle per closed internal lane adjacent to the mobile barrier.

LEGEND:

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL)
- TEMPORARY TRAFFIC CONTROL SIGN
- TYPE II FLASHING ARROW SIGN
- FAS SUPPORT OR TRAILER
- PCMS PORTABLE CHANGEABLE MESSAGE SIGN
- REPOSITIONING MOBILE BARRIER
- IMPACT ATTENUATOR
- TYPE II FLASHING ARROW SIGN FLASHING CAUTION MODE
- TYPE II FLASHING ARROW SIGN ALTERNATING DIAMONDS

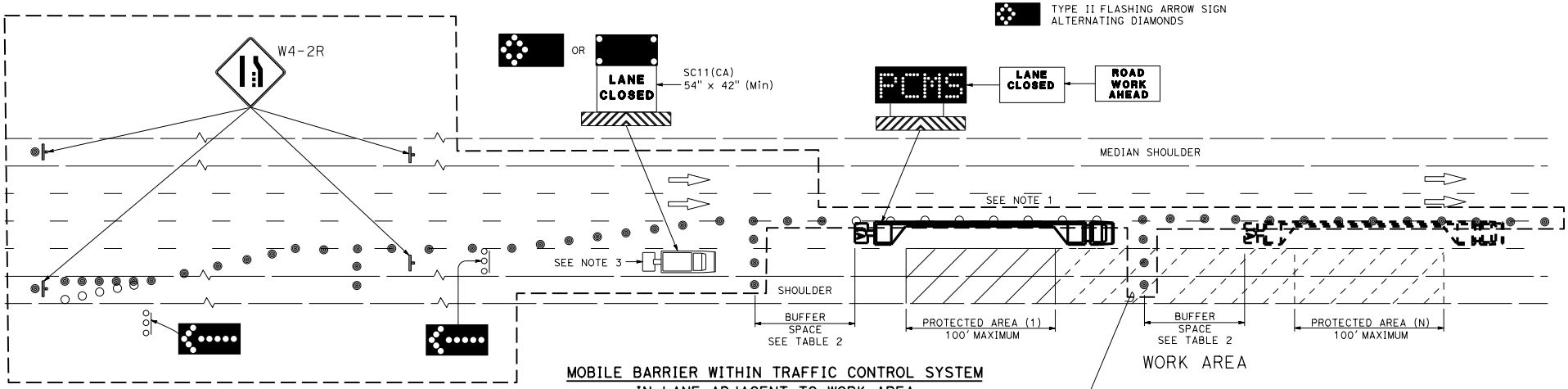
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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September 19, 2025
PLANS APPROVAL DATE

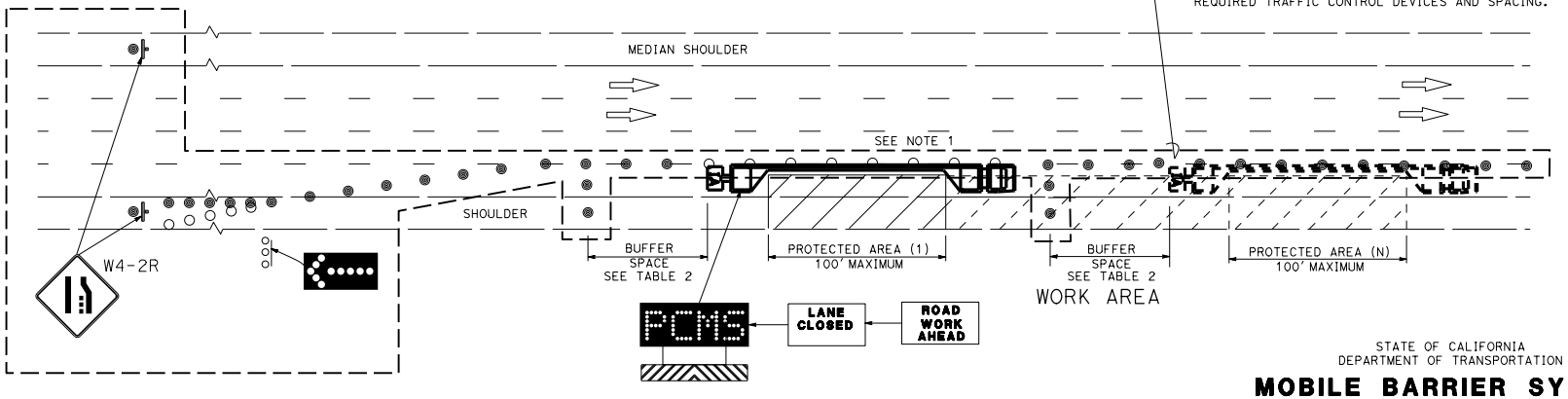
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MOBILE BARRIER WITHIN TRAFFIC CONTROL SYSTEM IN LANE ADJACENT TO WORK AREA

TRAFFIC CONTROL SYSTEM DEVICES SHOWN FOR REFERENCE ONLY, SEE TRAFFIC CONTROL SYSTEM STANDARD PLANS FOR REQUIRED TRAFFIC CONTROL DEVICES AND SPACING.




MOBILE BARRIER WITHIN TRAFFIC CONTROL SYSTEM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MOBILE BARRIER SYSTEM

NO SCALE

T24

7-1-25

2025 STANDARD PLAN T24

Return to Table of Contents

NOTES:

1. Channelizing devices shown adjacent to the mobile barrier may be removed or not placed while the mobile barrier is stationary, but must be placed or replaced as the barrier moves within the work area.
2. See Standard Plan T9 for tables.

LEGEND:

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL)
- TEMPORARY TRAFFIC CONTROL SIGN
- TYPE II FLASHING ARROW SIGN
- FAS SUPPORT OR TRAILER
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN
- REPOSITIONING MOBILE BARRIER

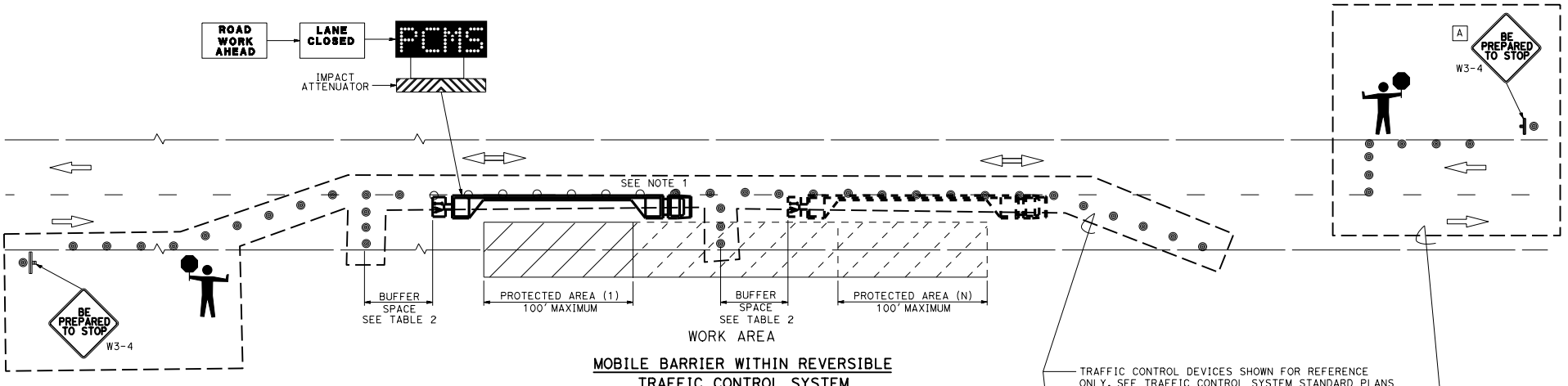
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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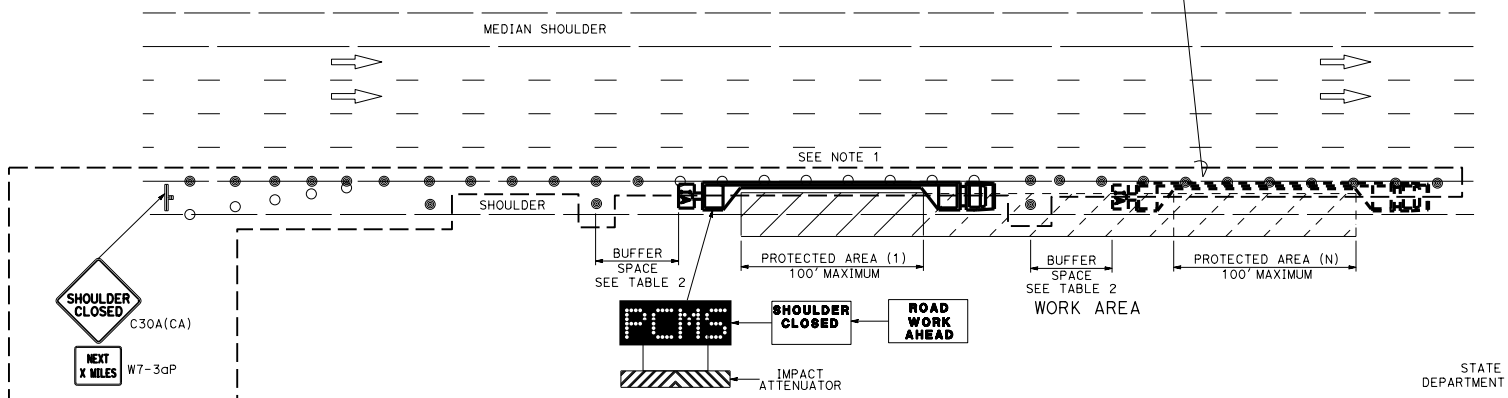
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MOBILE BARRIER WITHIN REVERSIBLE TRAFFIC CONTROL SYSTEM




MOBILE BARRIER WITHIN SHOULDER TRAFFIC CONTROL SYSTEM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MOBILE BARRIER SYSTEM

NO SCALE

T25

7-1-25

2025 STANDARD PLAN T25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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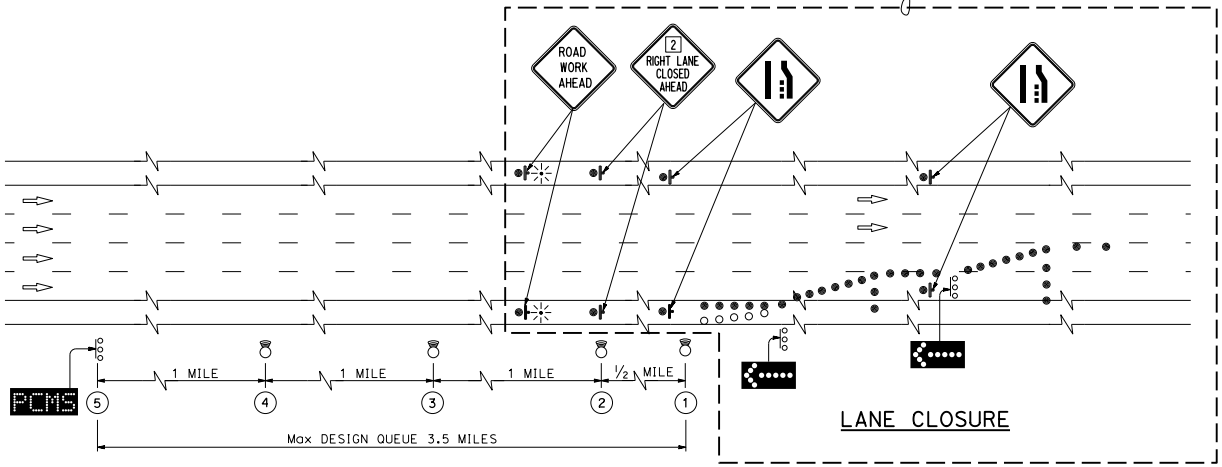
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LEGEND:

- PORTABLE VEHICLE SPEED SENSOR
- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- PORTABLE FLASHING BEACON
- SIGN
- SUPPORT OR TRAILER
- (1) LOCATION
- FLASHING ARROW SIGN
- PCMS PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

THIS IS NOT PART OF THE TEMPORARY AUTOMATED END OF QUEUE WARNING SYSTEM. SEE STANDARD PLANS FOR TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE COMPONENTS.




OPERATIONAL GUIDELINE FOR PCMS MESSAGES FOR POSTED SPEED LIMIT 55 MPH

| MESSAGE AT (5) | LAST 5 Min SPEED AVERAGES, V(MPH) | | | |
|---|---|---|---|---|
| | SENSOR AT (4) | SENSOR AT (3) | SENSOR AT (2) | SENSOR AT (1) |
| ROAD WORK AHEAD | > 45 | > 45 | > 45 | => 45 |
| SLOW TRAFFIC 3 MILES | > 45 | > 45 | => 45 | 25 < V < 45 |
| SLOW TRAFFIC 2 MILES | > 45 | => 45 | 25 < V < 45 | --- |
| SLOW TRAFFIC 1 MILE | => 45 | 25 < V < 45 | --- | --- |
| SLOW TRAFFIC AHEAD | 25 < V < 45 | --- | --- | --- |
| STOPPED TRAFFIC 3 MILES | > 25 | > 25 | > 25 | <= 25 |
| STOPPED TRAFFIC 2 MILES | > 25 | > 25 | <= 25 | --- |
| STOPPED TRAFFIC 1 MILE | > 25 | <= 25 | --- | --- |
| STOPPED TRAFFIC AHEAD | <= 25 | --- | --- | --- |

For other posted speed limits adjust speeds shown on the table by adding or subtracting the calculated speed adjustment using the following formula:

Speed Adjustment = X posted speed limit - 55 mph

Add speed adjustments to speed averages.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY AUTOMATED END OF QUEUE WARNING SYSTEM TYPE 1 (QUEUE <= 3.5 MILES)

NO SCALE

T26

7-1-25

2025 STANDARD PLAN T26



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
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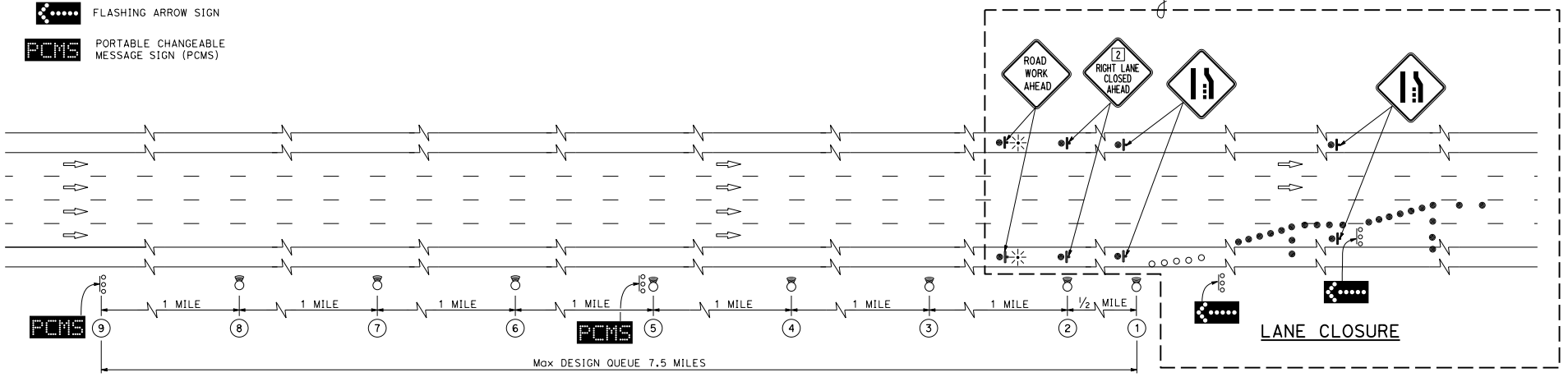
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LEGEND:

- PORTABLE VEHICLE SPEED SENSOR
- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- PORTABLE FLASHING BEACON
- SIGN
- SUPPORT OR TRAILER
- (1) LOCATION
- FLASHING ARROW SIGN
- PCMS PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

THIS IS NOT PART OF THE TEMPORARY AUTOMATED END OF QUEUE WARNING SYSTEM. SEE STANDARD PLANS FOR TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE COMPONENTS.




## OPERATIONAL GUIDELINE FOR PCMS MESSAGES FOR POSTED SPEED LIMIT 55 MPH

| MESSAGE AT (9) | LAST 5 Min SPEED AVERAGES, V(MPH) SENSOR AT (8) | SENSOR AT (7) | SENSOR AT (6) | SENSOR AT (5) | MESSAGE AT (5) | LAST 5 Min SPEED AVERAGES, V(MPH) SENSOR AT (4) | SENSOR AT (3) | SENSOR AT (2) | SENSOR AT (1) |
|---|---|---|---|---|---|---|---|---|---|
| ROAD WORK AHEAD | > 45 | > 45 | > 45 | => 45 | ROAD WORK AHEAD | > 45 | > 45 | > 45 | => 45 |
| SLOW TRAFFIC 3 MILES | > 45 | > 45 | => 45 | 25 < V < 45 | SLOW TRAFFIC 3 MILES | > 45 | > 45 | => 45 | 25 < V < 45 |
| SLOW TRAFFIC 2 MILES | > 45 | => 45 | 25 < V < 45 | --- | SLOW TRAFFIC 2 MILES | > 45 | => 45 | 25 < V < 45 | --- |
| SLOW TRAFFIC 1 MILE | => 45 | 25 < V < 45 | --- | --- | SLOW TRAFFIC 1 MILE | => 45 | 25 < V < 45 | --- | --- |
| SLOW TRAFFIC AHEAD | 25 < V < 45 | --- | --- | --- | SLOW TRAFFIC AHEAD | 25 < V < 45 | --- | --- | --- |
| STOPPED TRAFFIC 3 MILES | > 25 | > 25 | > 25 | <= 25 | STOPPED TRAFFIC 3 MILES | > 25 | > 25 | > 25 | <= 25 |
| STOPPED TRAFFIC 2 MILES | > 25 | > 25 | <= 25 | --- | STOPPED TRAFFIC 2 MILES | > 25 | > 25 | <= 25 | --- |
| STOPPED TRAFFIC 1 MILE | > 25 | <= 25 | --- | --- | STOPPED TRAFFIC 1 MILE | > 25 | <= 25 | --- | --- |
| STOPPED TRAFFIC AHEAD | <= 25 | --- | --- | --- | STOPPED TRAFFIC AHEAD | <= 25 | --- | --- | --- |

For other posted speed limits adjust speeds shown on the table by adding or subtracting the calculated speed adjustment using the following formula:

Speed Adjustment = X posted speed limit - 55 mph

Add speed adjustments to speed averages.

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# TEMPORARY AUTOMATED END OF QUEUE WARNING SYSTEM TYPE 2 (QUEUE <= 7.5 MILES)

NO SCALE

T27

7-1-25

2025 STANDARD PLAN T27

Return to Table of Contents

NOTES:

1. Only signs related to pedestrians are shown. For all other signs see appropriate T-sheets.
2. Barricades closing sidewalk shall cover the full width of the sidewalk. Use R9-11 sign when there are destination points between the detour and the work area. Locate the R9-11 sign to allow pedestrian access.
3. Advance warning sign is not required if the work area is within the limits of a larger work zone. Sign shall be equipped with at least two flags for daytime closure. Each flag shall be orange or fluorescent red-orange in color.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1 unless X,Y, or Z cone spacing is shown on this sheet.

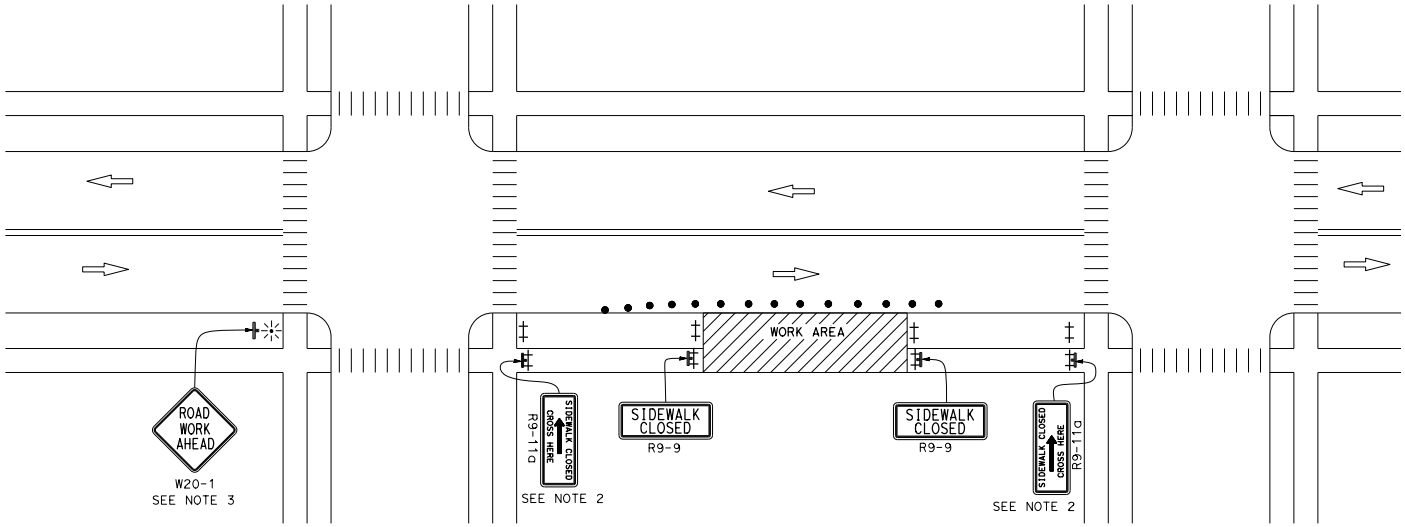
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Malik Rehman
No. C83390
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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LEGEND:

- BARRICADE
- TRAFFIC CONE
- PORTABLE FLASHING BEACON
- SIGN
- TEMPORARY TRAFFIC CONTROL SIGN ON BARRICADE

SIGN PANEL SIZE (Min)

| SIGN DESIGNATION | SIGN OR PLAQUE | SIGN SIZE |
|---|---|---|
| R9-9 | SIDEWALK CLOSED | 24" x 12" |
| R9-11 | SIDEWALK CLOSED AHEAD CROSS HERE | 24" x 18" |
| R9-11a | SIDEWALK CLOSED CROSS HERE | 24" x 12" |
| W20-1 | ROAD WORK AHEAD | 36" x 36" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY PEDESTRIAN ACCESS ROUTES TYPICAL SIDEWALK CLOSURE AND PEDESTRIAN DETOUR

NO SCALE

T30

7-1-25





Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Malik Rehman
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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Malik Rehman
No. C83390
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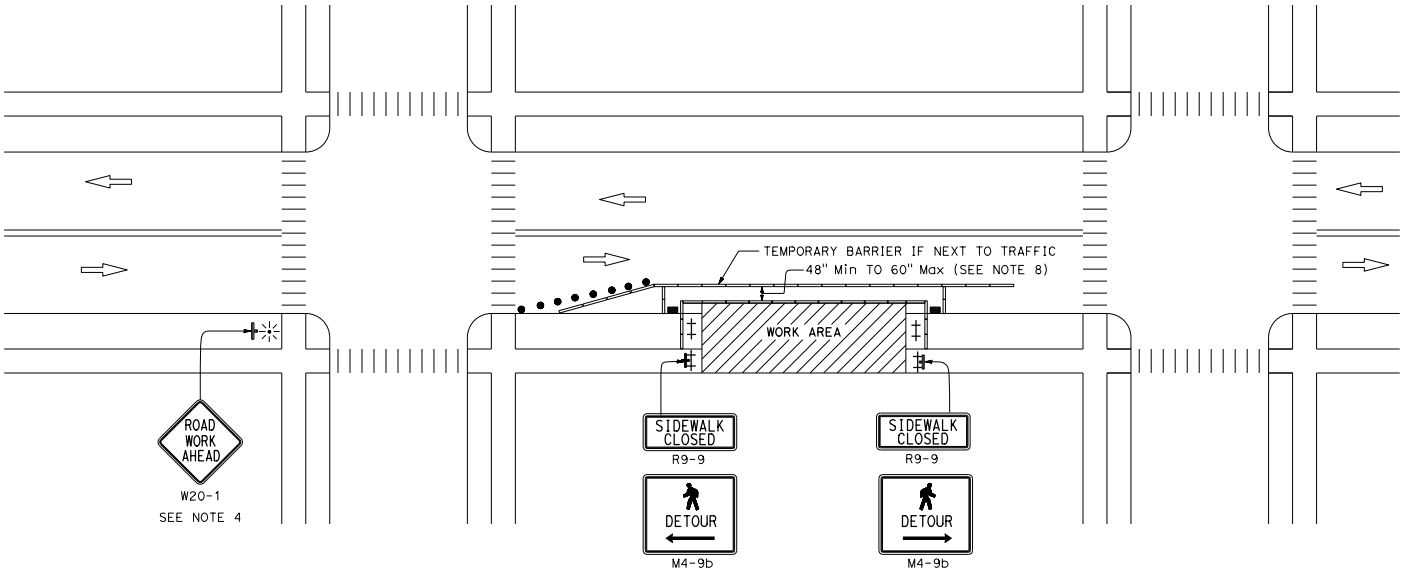
NOTES:

1. Only signs related to pedestrians are shown. For all other signs see appropriate T-sheets.
2. Separate pedestrian walkway from traffic and work zone activities, when temporary walkway is adjacent to traffic.
3. The temporary pedestrian access route must not lead into conflict with vehicles or work.
4. Advance warning sign is not required if the work area is within the limits of a larger work zone. Sign shall be equipped with at least two flags for daytime closure. Each flag shall be orange or fluorescent red-orange in color.
5. All devices used to channelize pedestrian flow must connect such that gaps do not allow pedestrians to stray from the channelized path.
6. Barricades closing sidewalk shall cover the full width of the sidewalk.
7. Separate the temporary pedestrian access route from traffic using a temporary barrier and a crash cushion if necessary.
8. When it is not possible to maintain a minumum of 60 inches throughout the length of the pedestrian route, maintain a minimum width of 48 inches and provide a 60 X 60-inch passing space at least every 200 feet.
9. See Standard Plan A88A for detectable warning surface for curb ramps to apply to temporary curb ramps.
10. See Standard Plan T34 for temporary curb ramp options.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1 unless X,Y, or Z cone spacing is shown on this sheet.




LEGEND:

- BARRICADE
- TEMPORARY CURB RAMP
- CHANNELIZING DEVICE
- TRAFFIC CONE
- PORTABLE FLASHING BEACON
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY TRAFFIC CONTROL SIGN ON BARRICADE

SIGN PANEL SIZE (Min)

| SIGN DESIGNATION | SIGN OR PLAQUE | SIGN SIZE |
|---|---|---|
| M4-9b | PEDESTRIAN DETOUR | 30" x 24" |
| R9-9 | SIDEWALK CLOSED | 24" x 12" |
| W20-1 | ROAD WORK AHEAD | 36" x 36" |

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# TEMPORARY PEDESTRIAN ACCESS ROUTES TYPICAL SIDEWALK DIVERSION WITHIN ROADBED

NO SCALE

T31

7-1-25





Return to Table of Contents

NOTES:

1. Only signs related to pedestrians are shown. For all other signs see appropriate T-sheets.
2. Barricades closing sidewalk shall cover the full width of the sidewalk. Use R9-11 sign when there are destination points between the detour and the work area. Locate the R9-11 sign to allow pedestrian access.
3. Advance warning sign is not required if the work area is within the limits of a larger work zone. Sign shall be equipped with at least two flags for daytime closure. Each flag shall be orange or fluorescent red-orange in color.

NOTES:

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1 unless X,Y, or Z cone spacing is shown on this sheet.

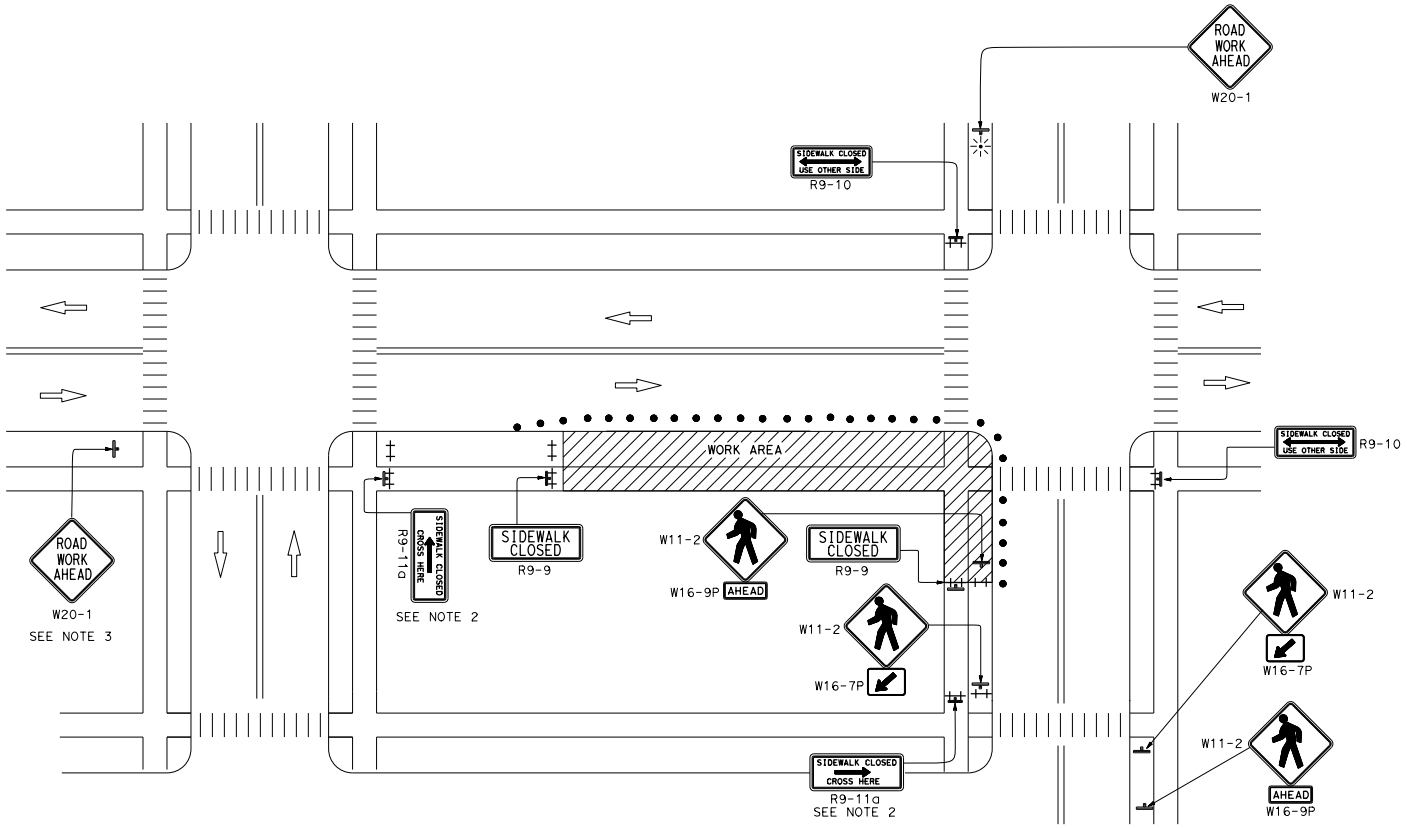
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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September 19, 2025
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LEGEND:

- BARRICADE
- TRAFFIC CONE
- PORTABLE FLASHING BEACON
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY TRAFFIC CONTROL SIGN ON BARRICADE

SIGN PANEL SIZE (Min)

| SIGN DESIGNATION | SIGN OR PLAQUE | SIGN SIZE |
|---|---|---|
| R9-9 | SIDEWALK CLOSED | 24" x 12" |
| R9-10 | SIDEWALK CLOSED USE OTHER SIDE | 24" x 12" |
| R9-11 | SIDEWALK CLOSED AHEAD CROSS HERE | 24" x 18" |
| R9-11a | SIDEWALK CLOSED CROSS HERE | 24" x 12" |
| W11-2 | PEDESTRIAN | 36" x 36" |
| W16-7P | DIAGONAL DOWNWARD POINTING ARROW (PLAQUE) | 24" x 12" |
| W16-9P | AHEAD (PLAQUE) | 24" x 12" |
| W20-1 | ROAD WORK AHEAD | 36" x 36" |

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# TEMPORARY PEDESTRIAN ACCESS ROUTES TYPICAL SIDEWALK/CROSSWALK CLOSURE AND PEDESTRIAN DETOUR

NO SCALE

T32

7-1-25





Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

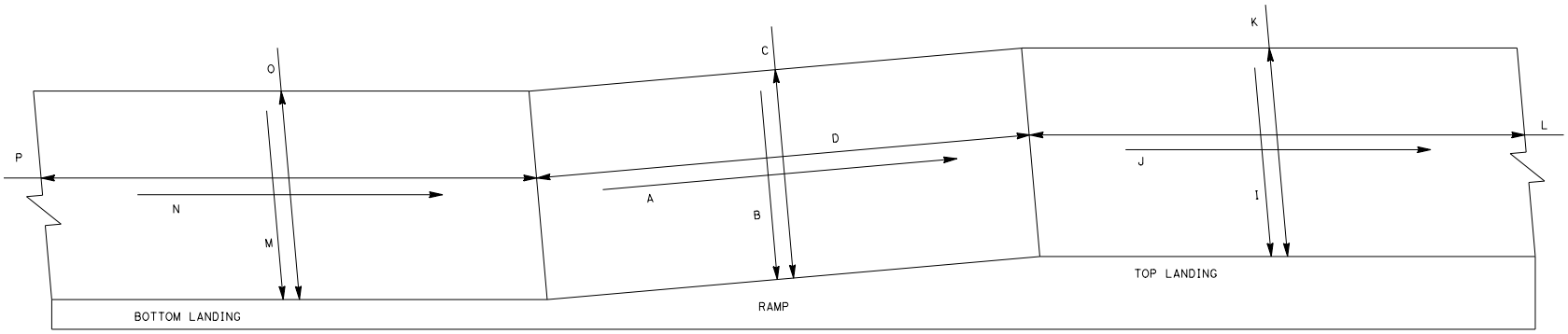
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September 19, 2025
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Malik Rehman
No. C83390
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STATE OF CALIFORNIA

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| RAMP | | | | HAND RAIL | | EDGE PROTECTION | |
|---|---|---|---|---|---|---|---|
| SLOPE | CROSS SLOPE | WIDTH | LENGTH | HEIGHT RIGHT SIDE | HEIGHT LEFT SIDE | RAIL RIGHT SIDE | RAIL LEFT SIDE |
| A | B | C | D | E | F | G | H |
| 8.3% OR LESS | 2.0% OR LESS | 48 INCHES OR GREATER | 30 FEET OR LESS | 34 TO 38 INCHES | 34 TO 38 INCHES | WITHIN 2 INCHES FROM GROUND | WITHIN 2 INCHES FROM GROUND |
| TOP LANDING | | | | BOTTOM LANDING | | | |
| CROSS SLOPE | SLOPE | WIDTH | DEPTH | CROSS SLOPE | SLOPE | WIDTH | DEPTH |
| I | J | K | L | M | N | O | P |
| 2.0% OR LESS | 2.0% OR LESS | 48 INCHES OR GREATER | 60 INCHES OR GREATER | 2.0% OR LESS | 2.0% OR LESS | 48 INCHES OR GREATER | 60 INCHES OR GREATER |




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY PEDESTRIAN ACCESS ROUTES
## RAMP

NO SCALE

T33

7-1-25

2025 STANDARD PLAN T33

Return to Table of Contents

| CURB RAMP | | | TOP LANDING | | | | DETECTABLE WARNING SURFACE |
|---|---|---|---|---|---|---|---|
| SLOPE | CROSS SLOPE | WIDTH | CROSS SLOPE | SLOPE | WIDTH | DEPTH | DEPTH |
| A | B | C | D | E | F | G | K |
| 8.3% OR LESS | 2.0% OR LESS | 48 INCHES OR GREATER | 2.0% OR LESS | 2.0% OR LESS | 48 INCHES OR GREATER | 60 INCHES OR GREATER | MINIMUM 36 INCHES |

NOTES: If the above requirements cannot be met, on existing sites with space limitations, the following slopes are allowed:

For a maximum rise of 6 inches a slope between 1:12 to 1:10 is allowed.
For a maximum rise of 3 inches a slope between 1:10 to 1:8 is allowed.

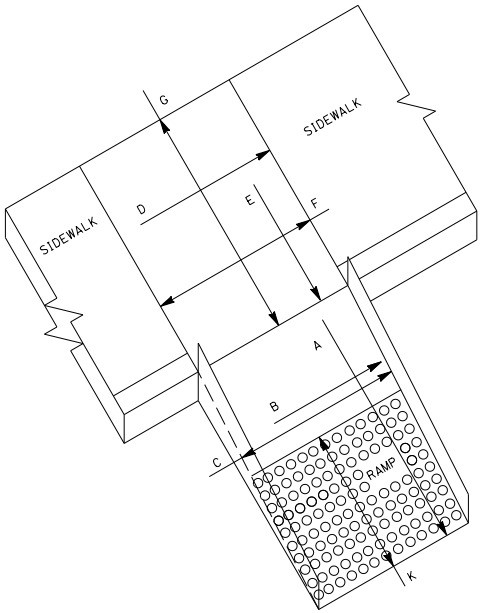
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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September 19, 2025
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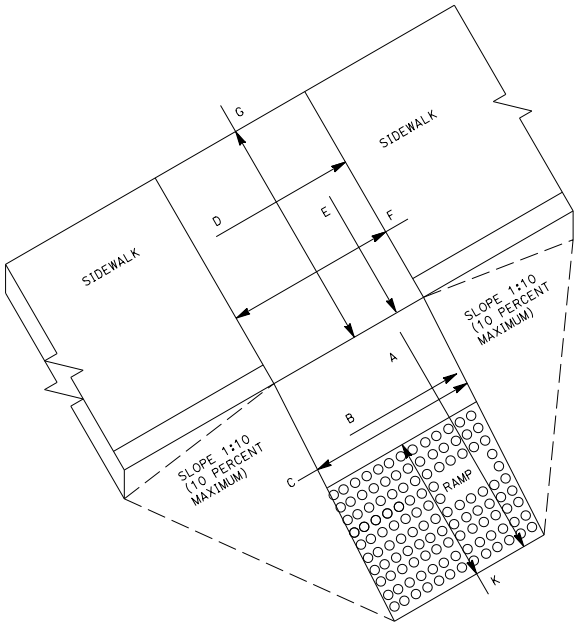
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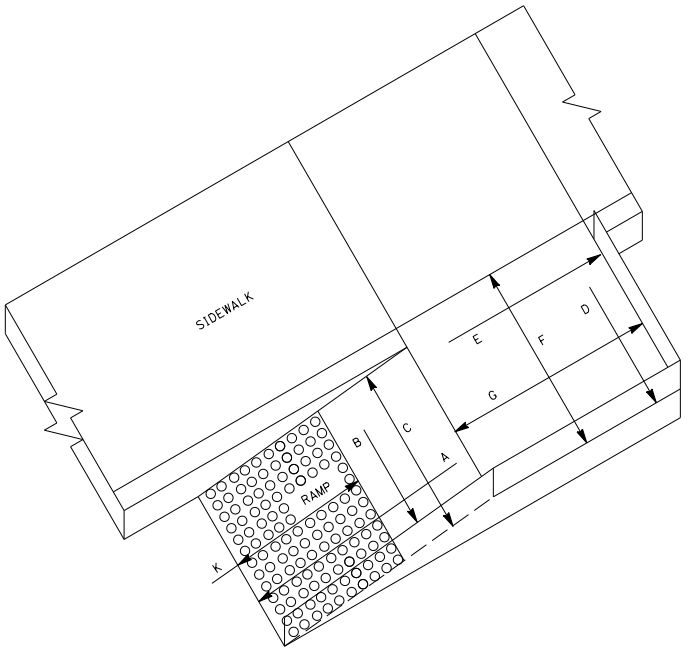

OPTION A

SHOWN WITH SIDE EDGE




OPTION B

SHOWN WITH SIDE APRON




OPTION C

PARALLEL RAMP

SHOWN WITH SIDE EDGE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY PEDESTRIAN ACCESS ROUTES CURB RAMP OPTIONS

NO SCALE

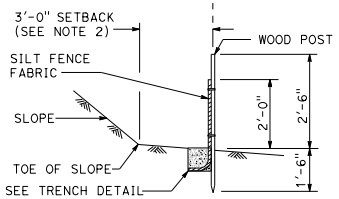
T34

7-1-25

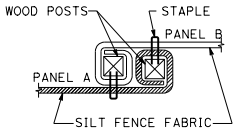




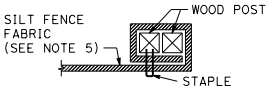
Return to Table of Contents



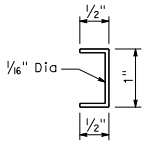

SECTION A-A
TEMPORARY SILT FENCE



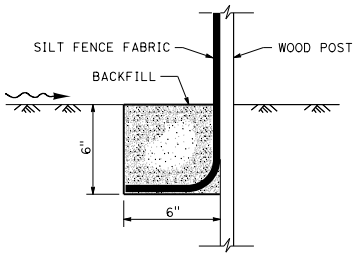

PLAN
POST AT JOINTS
(SEE NOTE 3)



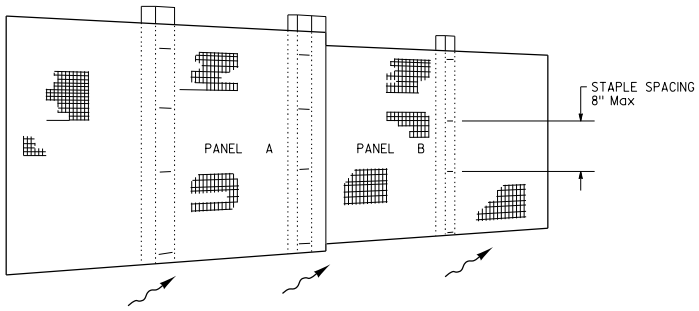

PLAN
END POST DETAIL



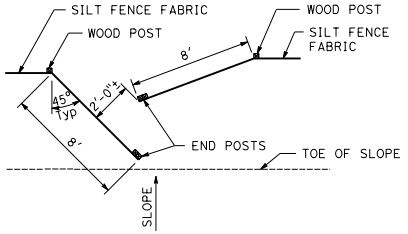

STAPLE DETAIL
(SEE NOTE 6)



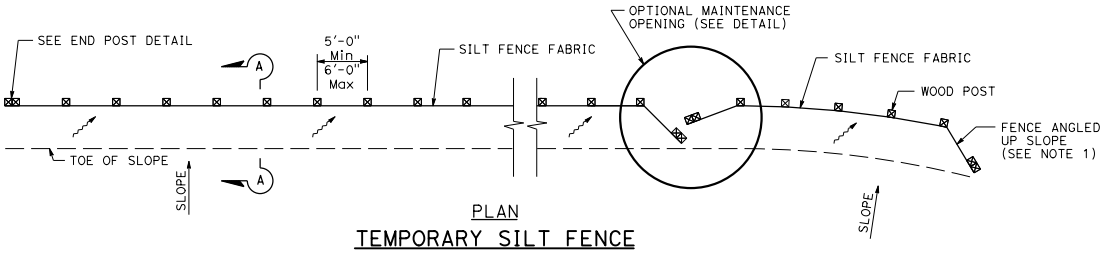

SECTION
TRENCH DETAIL




PERSPECTIVE
SILT FENCE PANELS AT JOINTS




PLAN
OPTIONAL MAINTENANCE OPENING DETAIL




PLAN
TEMPORARY SILT FENCE

NOTES:

1. The down stream end of the temporary silt fence shall have the last 8' angled up slope.
2. Setback dimensions may vary to fit field conditions.
3. Posts to overlap and fence fabric to fold around each post one full turn. Secure fabric with 4 staples for each post.
4. Posts shall be driven tightly together to prevent potential flow-through of sediment at the joint. The tops of the posts shall be secured to each other with wire.
5. For each end post, fence fabric shall be folded around two posts one full turn and secured with 4 staples.
6. Minimum of 4 staples shall be installed per post. Dimensions shown are typical.
7. Maintenance openings shall be constructed in a manner to ensure that sediment is retained by the temporary silt fence.
8. Joint sections shall not be placed at sump locations.

LEGEND

- TAMPED BACKFILL
- SLOPE DIRECTION
- DIRECTION OF FLOW

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY SILT FENCE)

NO SCALE

T51

7-1-25



Return to Table of Contents

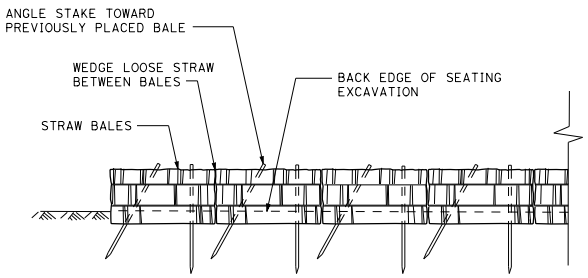
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

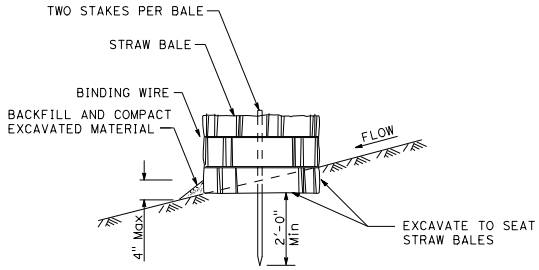
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FRONT ELEVATION

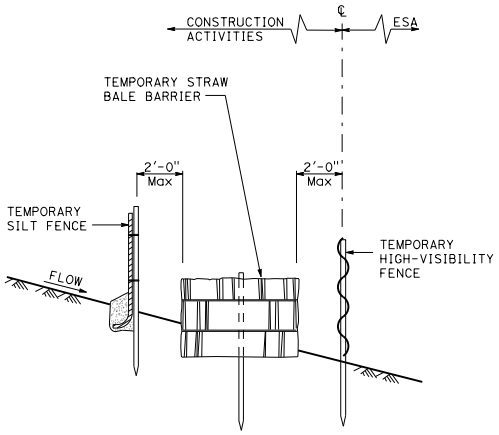



SECTION

## TEMPORARY STRAW BALE BARRIER

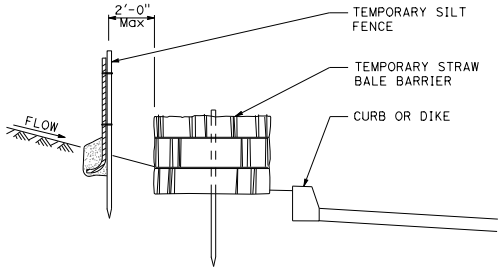
NOTE:

1. Temporary silt fence and temporary high-visibility fence shown for reference purposes only.




SECTION

PLACEMENT DETAIL
FOR TEMPORARY SILT FENCE
AND TEMPORARY HIGH-VISIBILITY FENCE
USED WITH TEMPORARY STRAW BALE BARRIER
(See Note 1)




SECTION

PLACEMENT DETAIL
FOR TEMPORARY SILT FENCE
USED WITH TEMPORARY
STRAW BALE BARRIER
(See Note 1)

STATE OF CALIFORNIA
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# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY STRAW BALE BARRIER)

NO SCALE

T52

2025 STANDARD PLAN T52

7-1-25

Return to Table of Contents

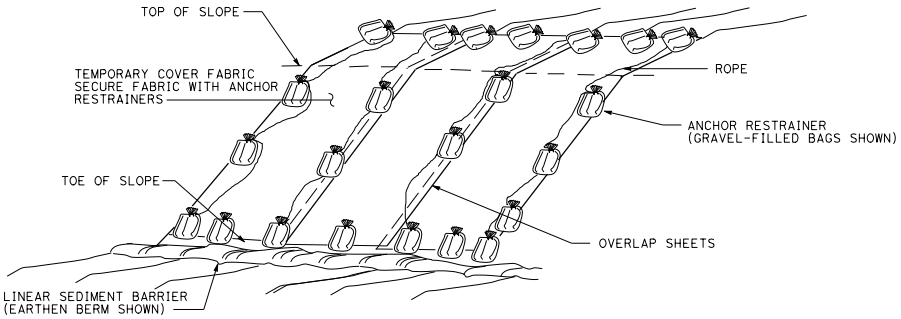
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

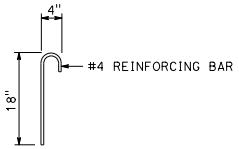
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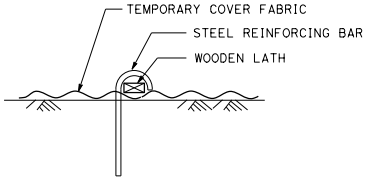
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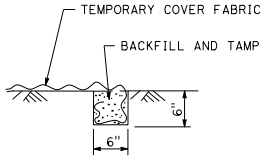

PERSPECTIVE
## TEMPORARY COVER ON SLOPE



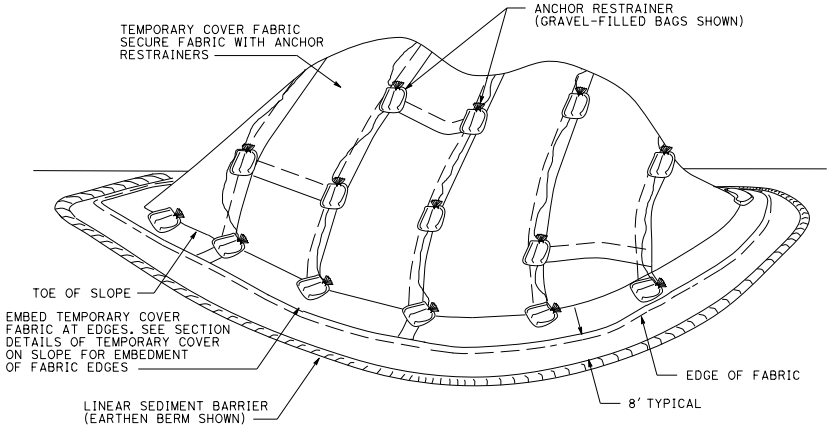

## STEEL REINFORCING BAR DETAIL



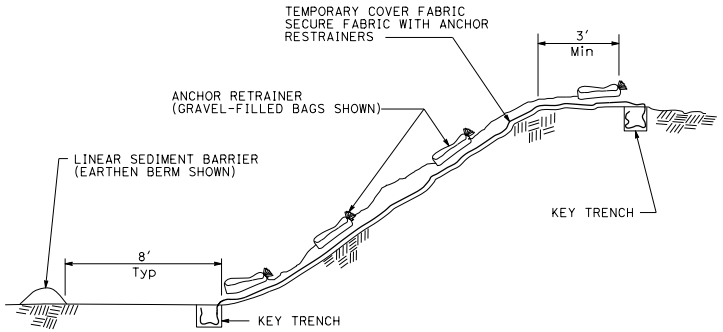

SECTION
## ANCHOR RESTRAINER
(Steel bar and wooden lath)




SECTION
## KEY TRENCH DETAIL




PERSPECTIVE
## TEMPORARY COVER ON STOCKPILE




SECTION
## TEMPORARY COVER ON SLOPE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY COVER)

NO SCALE

**T53**

7-1-25



Return to Table of Contents

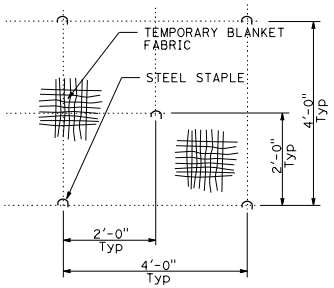
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Sean T. Penders
REGISTERED CIVIL ENGINEER

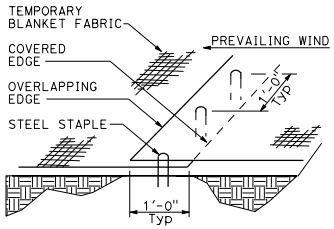
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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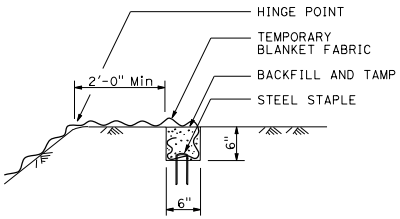



STAPLE PATTERN




LONGITUDINAL BLANKET JOINT

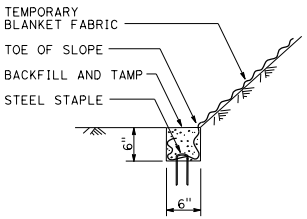
DETAIL B




SECTION

KEY TRENCH AT TOP OF SLOPE

DETAIL C



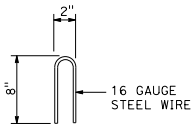

SECTION

KEY TRENCH AT TOE OF SLOPE

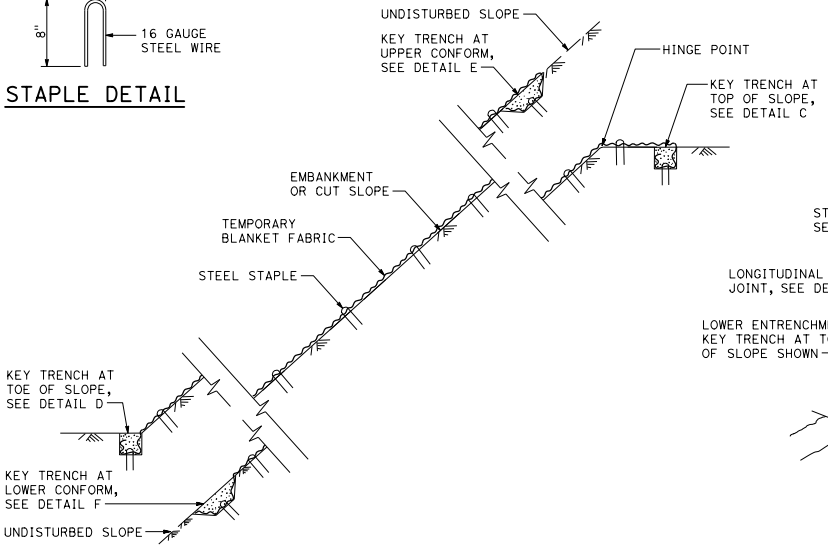
DETAIL D

NOTE:

1. Temporary fiber roll shown for reference purposes only.

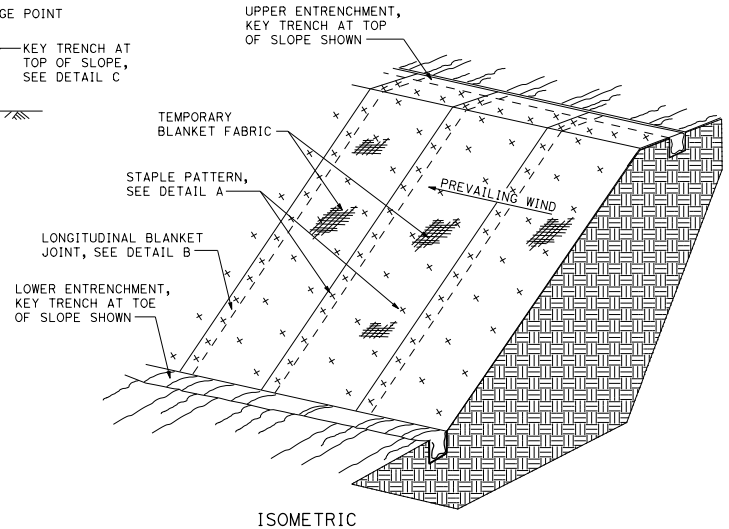



STAPLE DETAIL



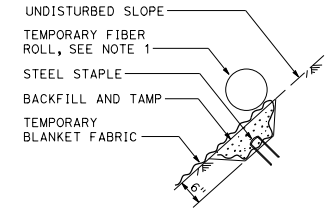

SECTION

TEMPORARY EROSION CONTROL BLANKET ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS




ISOMETRIC

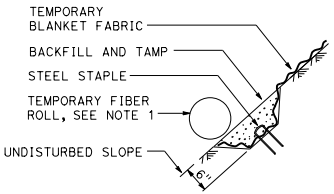
TEMPORARY EROSION CONTROL BLANKET ON SLOPE




SECTION

KEY TRENCH AT UPPER CONFORM

DETAIL E




SECTION

KEY TRENCH AT LOWER CONFORM

DETAIL F

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY EROSION CONTROL BLANKET)

NO SCALE

T54

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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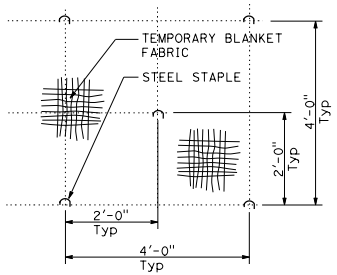
REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL STATE OF CALIFORNIA

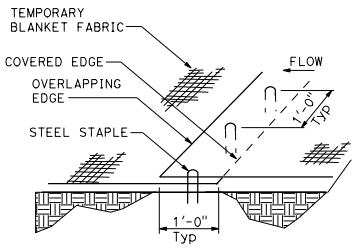
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PLAN

## STAPLE PATTERN

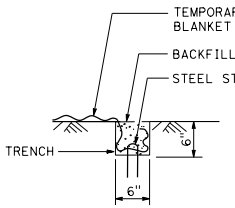
DETAIL A




PERSPECTIVE

## LONGITUDINAL BLANKET JOINT

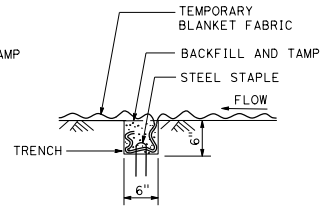
DETAIL B




SECTION

## KEY TRENCH

DETAIL C



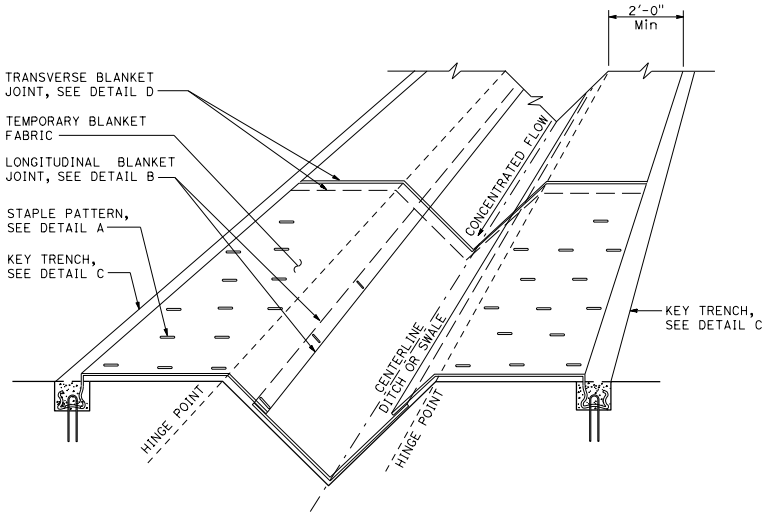

SECTION

## TRANSVERSE BLANKET JOINT

DETAIL D

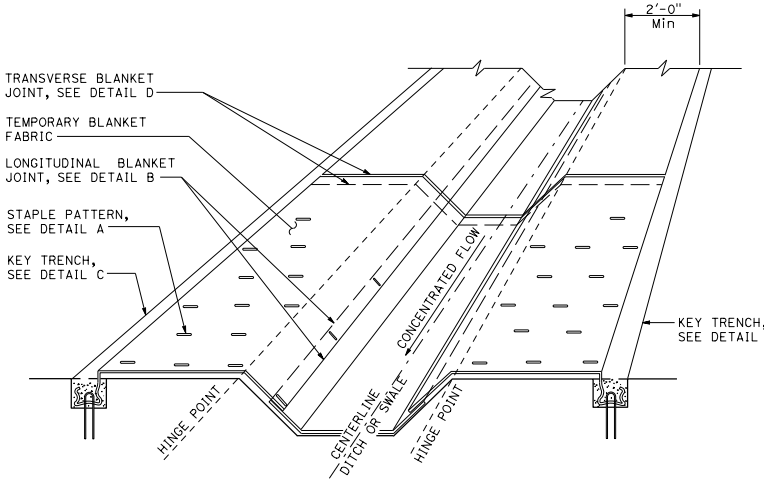
NOTE:

1. For clarity, perspective view does not show all staples.



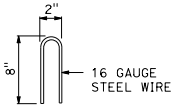

PERSPECTIVE

## TEMPORARY EROSION CONTROL BLANKET IN V-DITCH OR SWALE




PERSPECTIVE

## TEMPORARY EROSION CONTROL BLANKET IN TRAPEZOIDAL DITCH OR SWALE




STAPLE DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY EROSION CONTROL BLANKET)

NO SCALE

T55

7-1-25



Return to Table of Contents

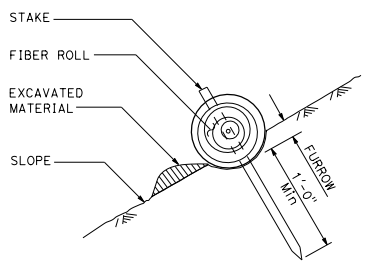
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

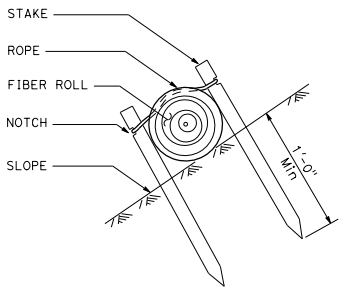
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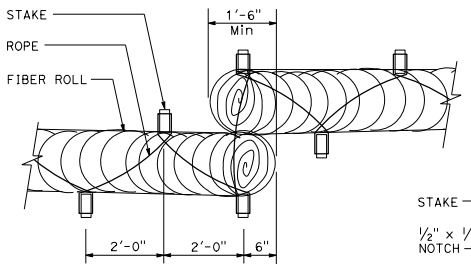

SECTION

TEMPORARY FIBER ROLL (TYPE 1)

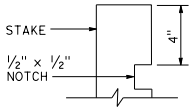



SECTION

TEMPORARY FIBER ROLL (TYPE 2)




PLAN

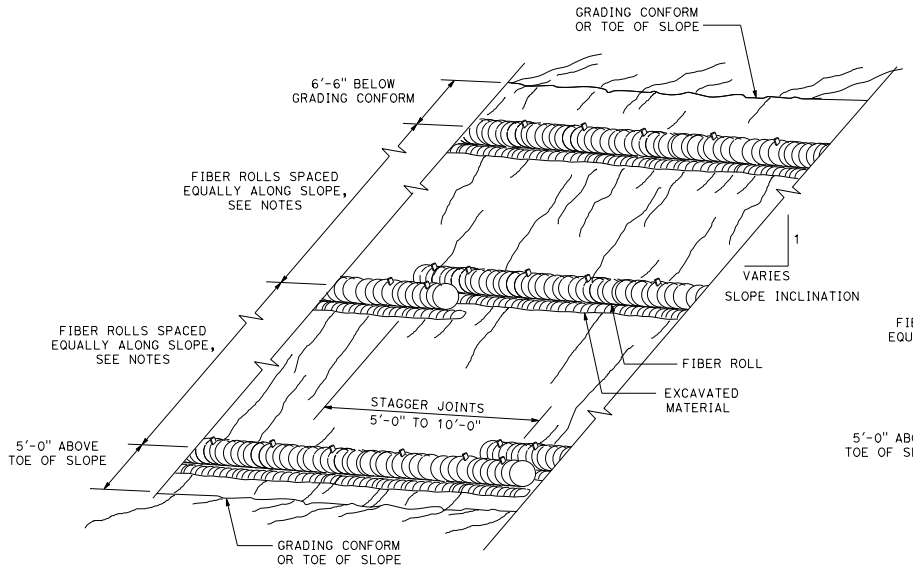



ELEVATION

STAKE NOTCH DETAIL

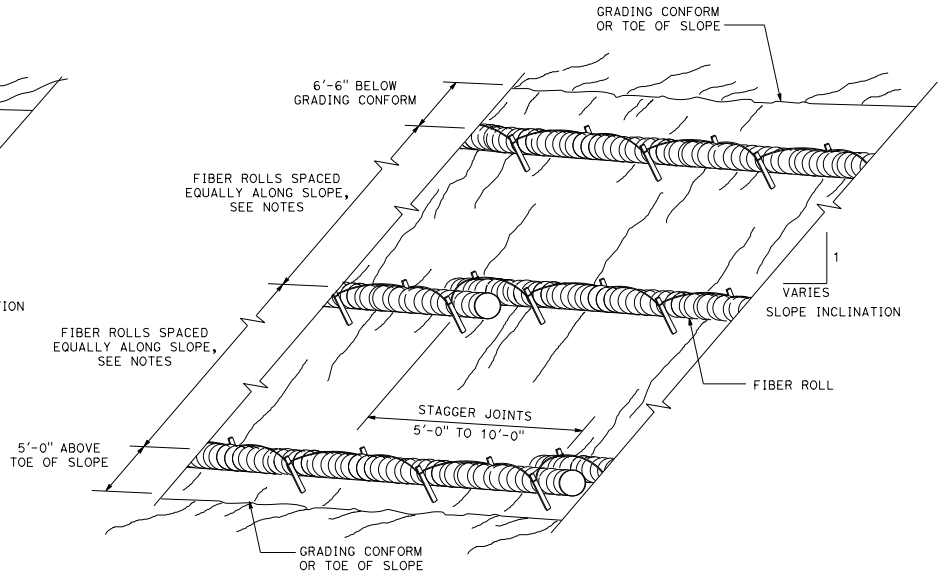
NOTES:

1. Temporary fiber roll spacing varies depending upon slope inclination.
2. Installations shown in the perspectives are for slope inclination of 10:1 and steeper.




PERSPECTIVE

TEMPORARY FIBER ROLL (TYPE 1)




PERSPECTIVE

TEMPORARY FIBER ROLL (TYPE 2)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY FIBER ROLL)

NO SCALE

T56

7-1-25

Return to Table of Contents

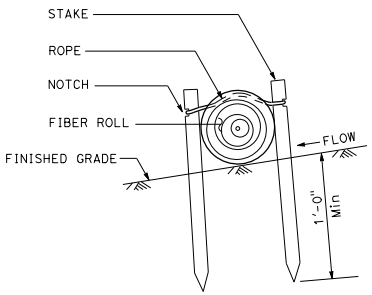
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Sean Penders
REGISTERED CIVIL ENGINEER

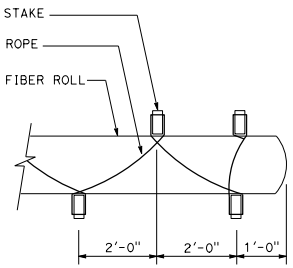
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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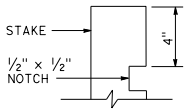



SECTION



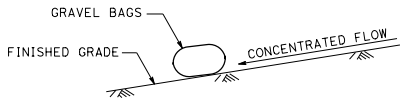

PLAN

STAKING AND LASHING DETAIL




ELEVATION

STAKE NOTCH DETAIL

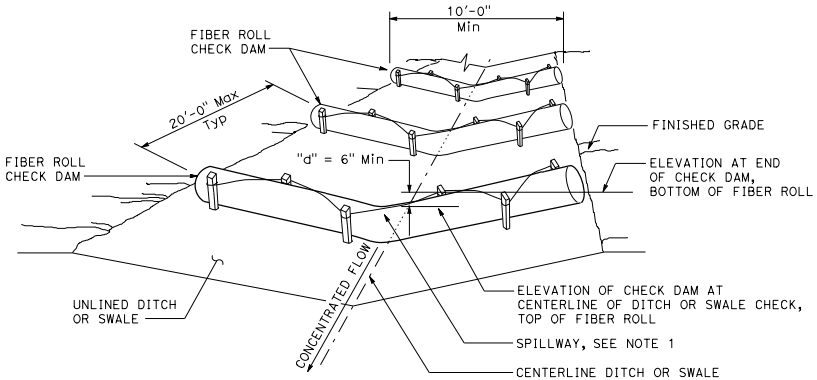



SECTION

TEMPORARY CHECK DAM (TYPE 2)

NOTE:

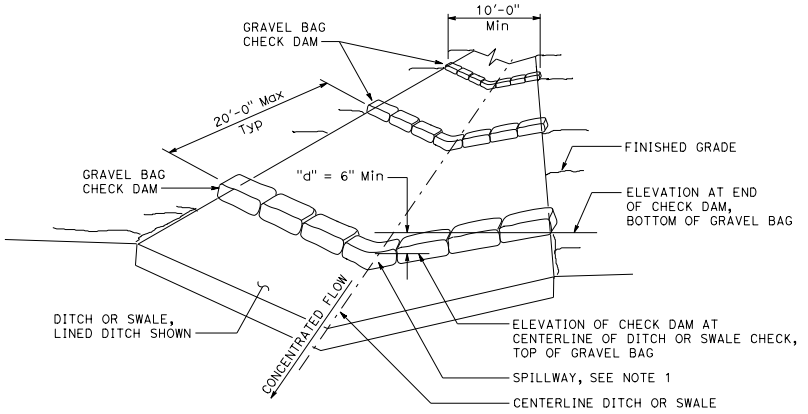
1. Spillway depth "d" shall be maintained to prevent flanking of concentrated flow around the ends of each check dam.




PERSPECTIVE

TEMPORARY CHECK DAM (TYPE 1)

Total of 3 check dams shown




PERSPECTIVE

TEMPORARY CHECK DAM (TYPE 2)

Total of 3 check dams shown

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CHECK DAM)

NO SCALE

T57

7-1-25

Return to Table of Contents

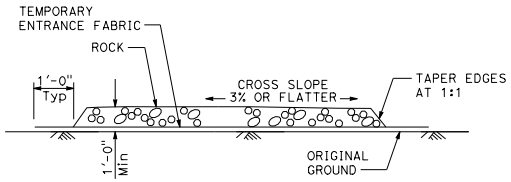
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Sean Penders
REGISTERED CIVIL ENGINEER

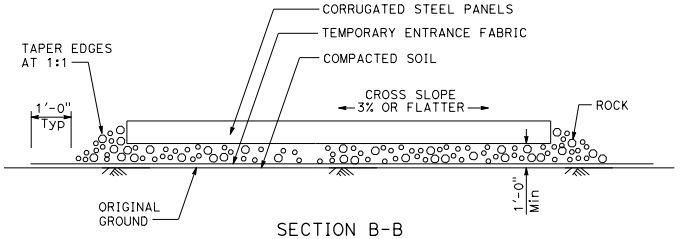
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

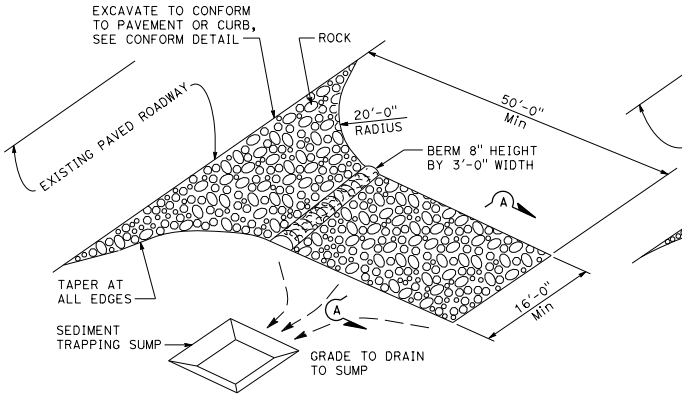
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SECTION A-A

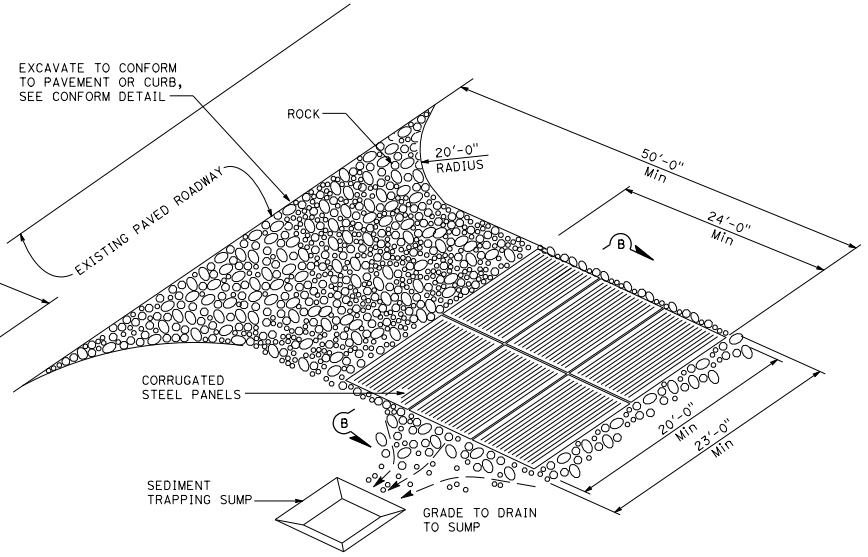



SECTION B-B



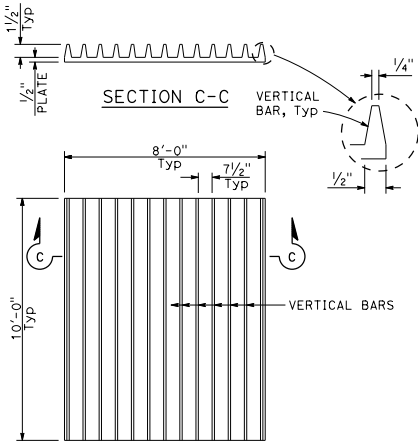

PERSPECTIVE

TEMPORARY CONSTRUCTION ENTRANCE (TYPE 1)



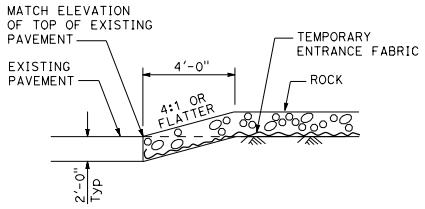

PERSPECTIVE

TEMPORARY CONSTRUCTION ENTRANCE (TYPE 2)



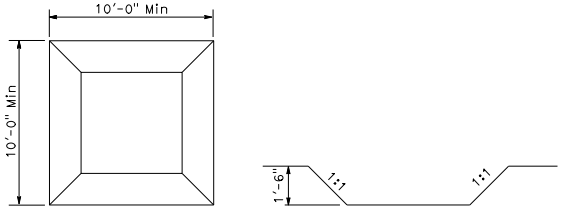

PLAN

TYPICAL CORRUGATED STEEL PANEL DETAIL




SECTION

CONFORM DETAIL




PLAN ELEVATION

SEDIMENT TRAPPING SUMP

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CONSTRUCTION ENTRANCE)

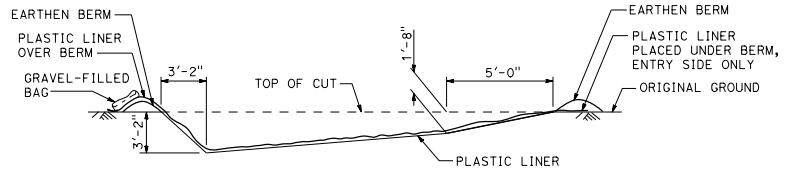
NO SCALE

T58

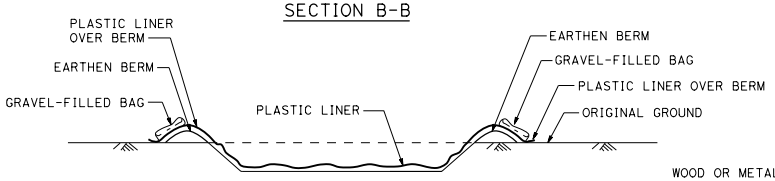
2025 STANDARD PLAN T58

7-1-25

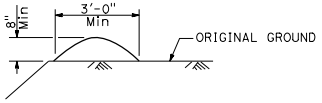
Return to Table of Contents




SECTION B-B

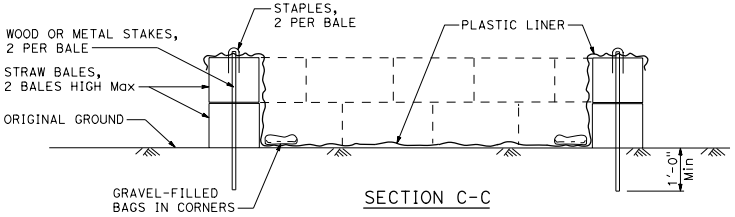



SECTION A-A

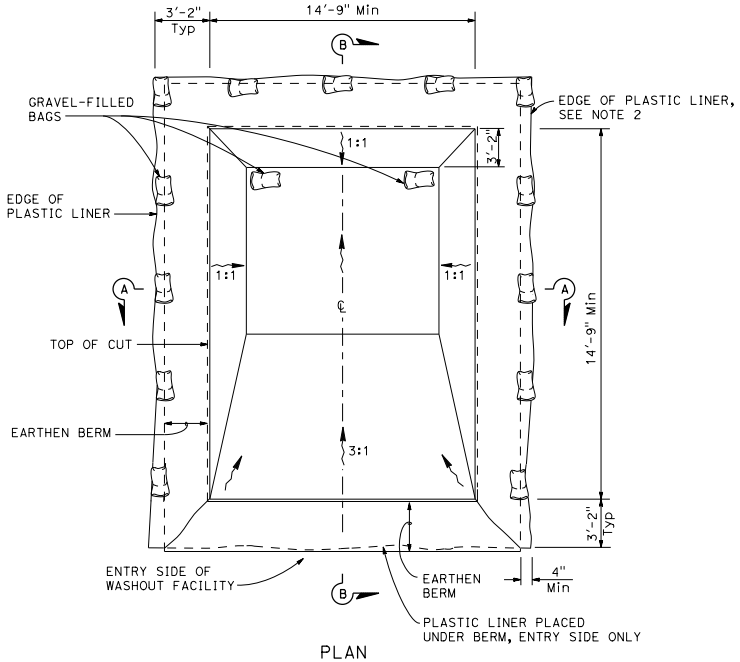



TYPICAL SECTION

EARTHEN BERM



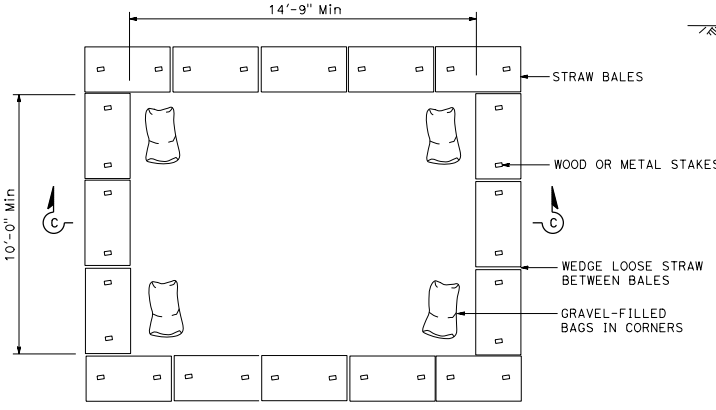

SECTION C-C




PLAN

TEMPORARY CONCRETE WASHOUT FACILITY

Below Grade



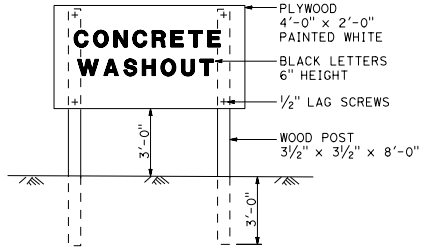

PLAN

TEMPORARY CONCRETE WASHOUT FACILITY

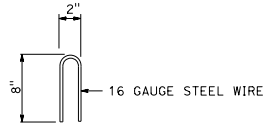
On Grade

NOTES:

1. The concrete washout sign shall be installed within 32'-10" of the temporary concrete washout facility.
2. Plastic liner shall be anchored with gravel-filled bags for below grade concrete washout facility.




CONCRETE WASHOUT SIGN DETAIL




STAPLE DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Sean T. Penders No. C63744 Exp. 9-30-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CONCRETE WASHOUT FACILITY)

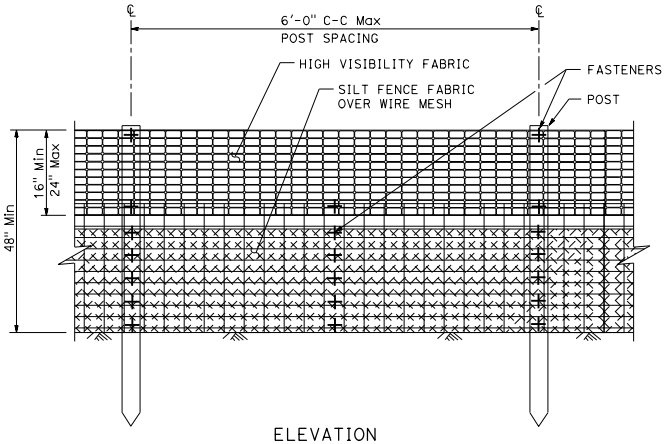
NO SCALE

T59

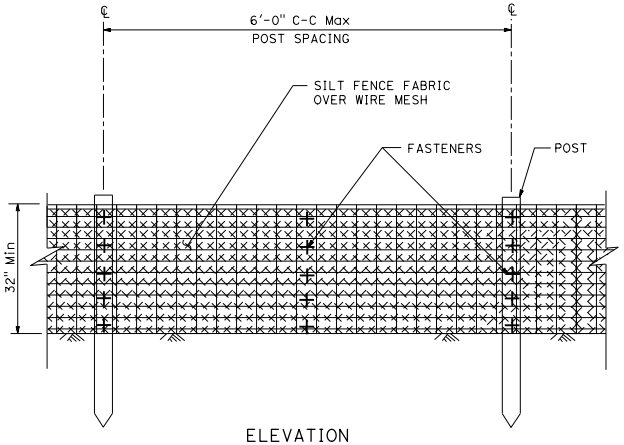


7-1-25

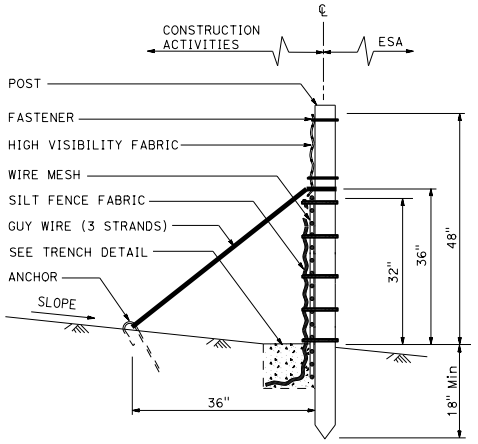
Return to Table of Contents




ELEVATION

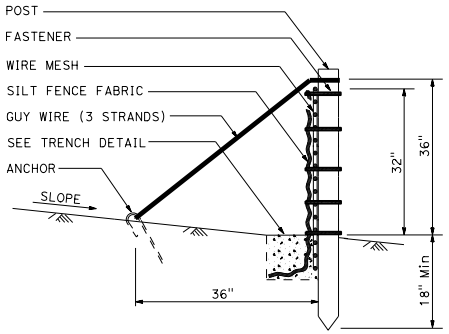



ELEVATION



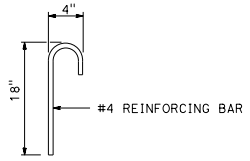

SECTION

TEMPORARY REINFORCED SILT FENCE (TYPE 1)

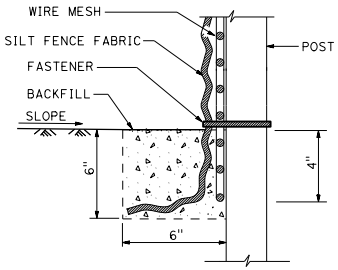



SECTION

TEMPORARY REINFORCED SILT FENCE (TYPE 2)




ANCHOR




SECTION

TRENCH DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY REINFORCED SILT FENCE)

NO SCALE

T60

7-1-25

2025 STANDARD PLAN T60

Return to Table of Contents

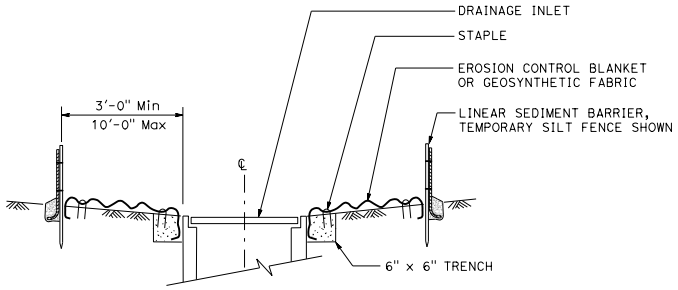
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

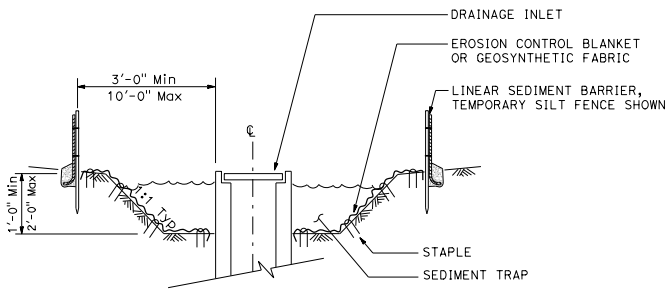
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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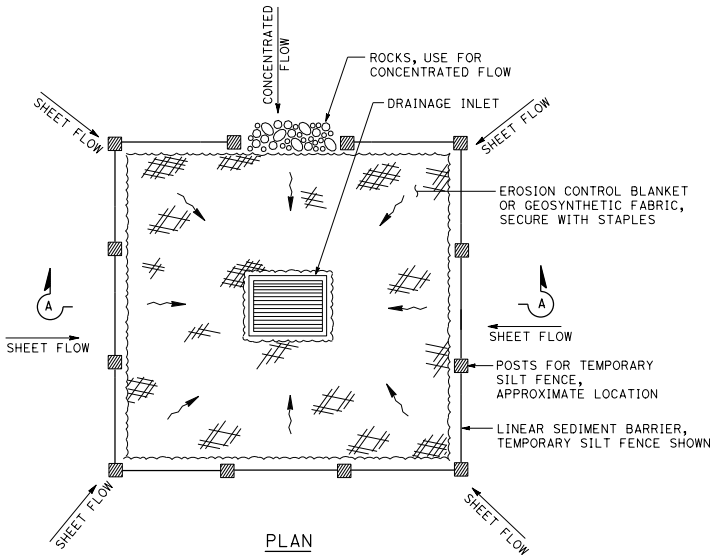

SECTION A-A




SECTION B-B

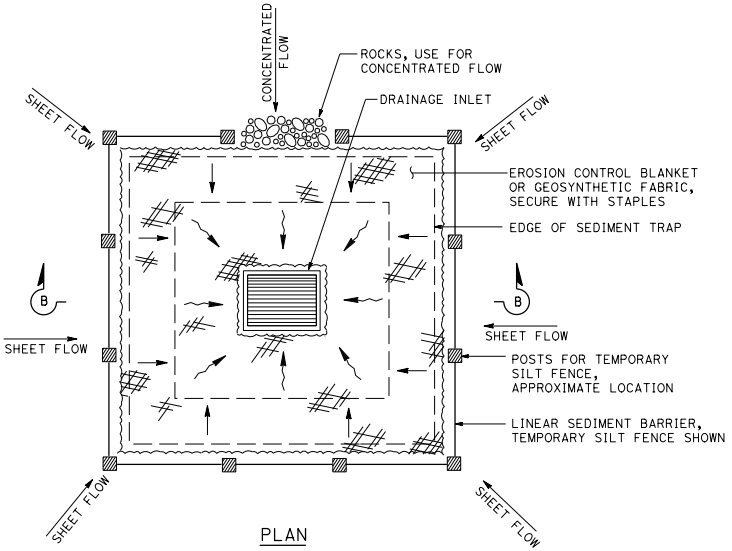
NOTES:

1. See Standard Plan T51 for temporary silt fence.
2. Dimensions may vary to fit field conditions.



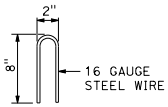

PLAN

TEMPORARY DRAINAGE INLET PROTECTION (TYPE 1)




PLAN

TEMPORARY DRAINAGE INLET PROTECTION (TYPE 2) (EXCAVATED SEDIMENT TRAP)




STAPLE DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)

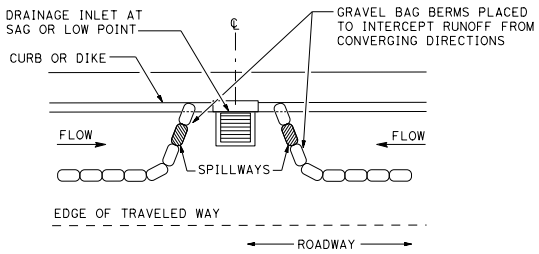
NO SCALE

T61

2025 STANDARD PLAN T61

7-1-25

Return to Table of Contents



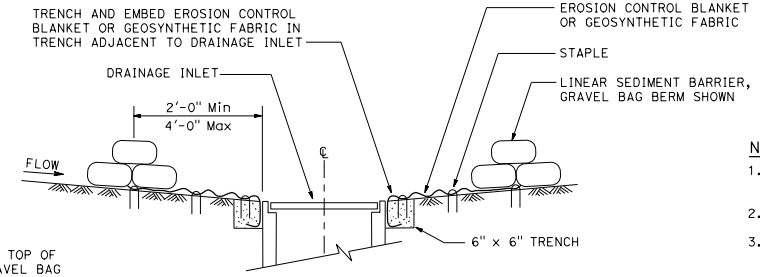

PLAN

## CONFIGURATION FOR SAG POINT INLET (GRAVEL BAG BERM)

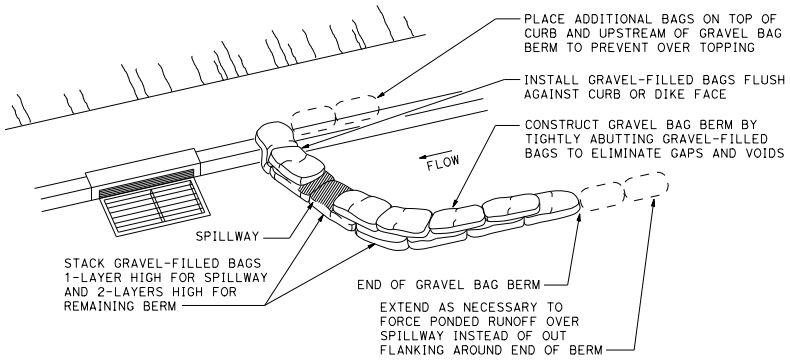
### GRAVEL BAG BERM (TYPE 3A) SPACING TABLE

| SLOPE OF ROADWAY (PERCENT) | 1 TO 3.9 | 4 TO 5.9 | 6 TO 7.9 | 8 TO 10 | 10+ |
|---|---|---|---|---|---|
| INTERVAL BETWEEN BERM | 100′ | 75′ | 50′ | 25′ | 12′ |

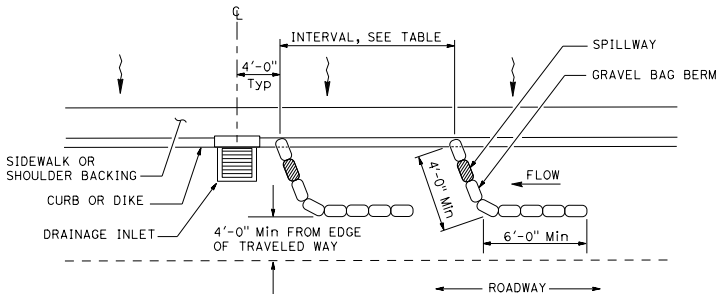
For slope of less than 1%, install barriers only if erosion/sediment is prevalent




SECTION A-A

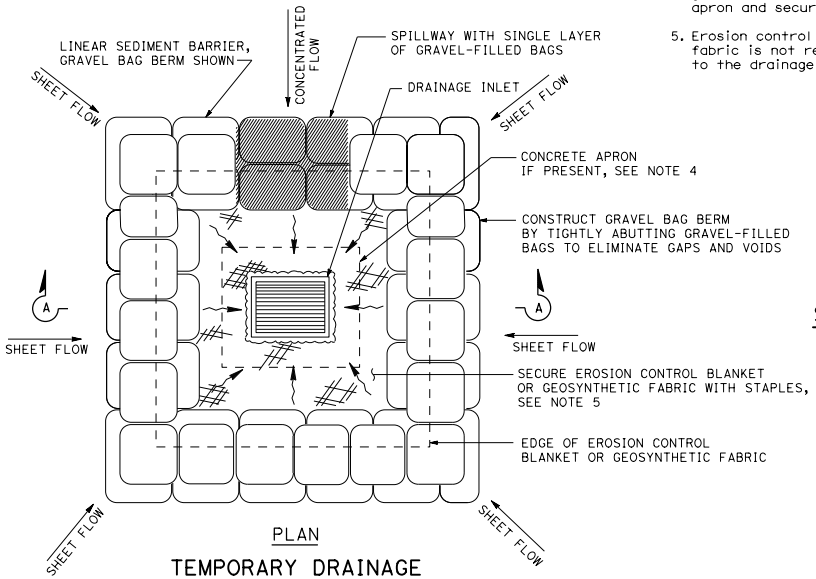



PERSPECTIVE




PLAN

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 3A) (GRAVEL BAG BERM)

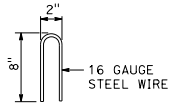



PLAN

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 3B)

NOTES:

1. Place safety cones adjacent to drainage inlet protection.
2. Dimensions may vary to fit field conditions.
3. Install a minimum of 3 gravel bag berms upstream of each drainage inlet to be protected.
4. Position erosion control blanket or geosynthetic fabric at edge of concrete apron and secure in trench.
5. Erosion control blanket or geosynthetic fabric is not required if the area adjacent to the drainage inlet is vegetated or paved.




STAPLE DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Sean T. Penders — No. C63744 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)

NO SCALE

T62

2025 STANDARD PLAN T62

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

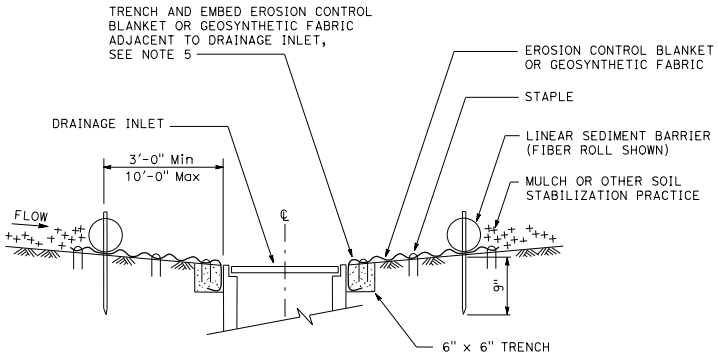
September 19, 2025
PLANS APPROVAL DATE

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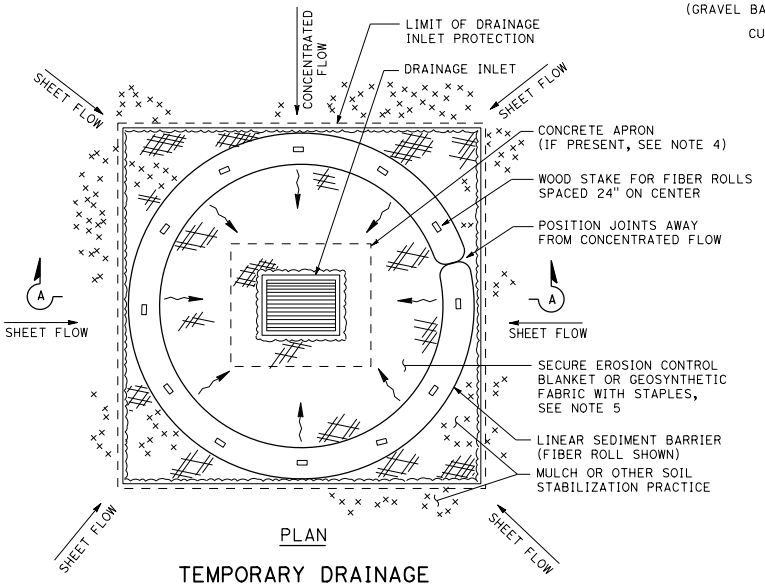
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## FLEXIBLE SEDIMENT BARRIER SPACING TABLE

| SLOPE OF ROADWAY (PERCENT) | 0 TO 0.9 | 1 TO 1.9 | 2 TO 2.9 | 3 TO 4 | 5+ |
|---|---|---|---|---|---|
| INTERVAL BETWEEN BARRIERS | 50′ | 35′ | 30′ | 25′ | 20′ |
| ANGLE FROM FACE OF CURB | 70° | 70° | 70° | 45° | 45° |
| SUGGESTED BARRIER LENGTH | 6′ | 6′ | 6′ | 6′ | 6′ |

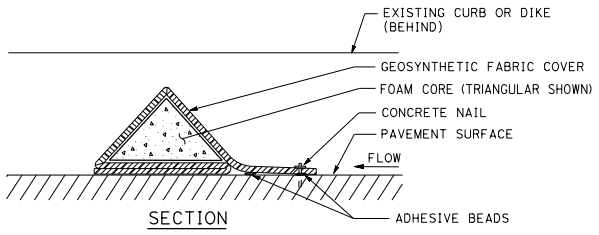



SECTION A-A



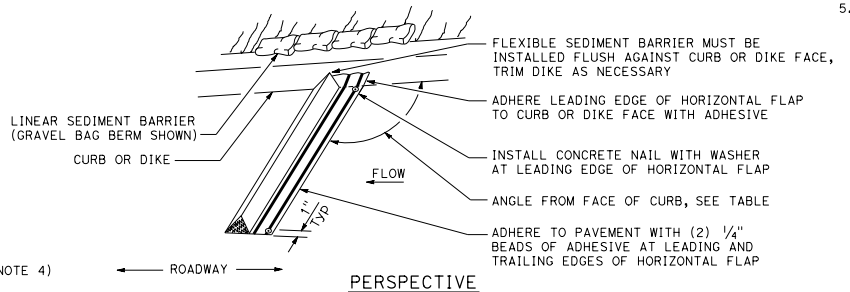

PLAN

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 4A)

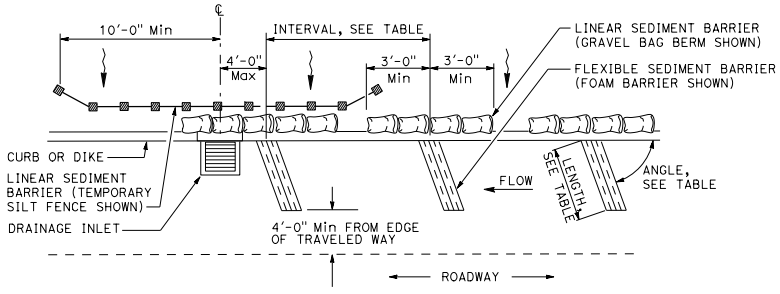



SECTION

## FLEXIBLE SEDIMENT BARRIER DETAIL (FOAM BARRIER SHOWN)




PERSPECTIVE

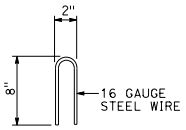



PLAN

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 4B) FLEXIBLE SEDIMENT BARRIER

NOTES:

1. See Standard Plan T51 for temporary silt fence.
2. Dimensions may vary to fit field conditions.
3. Install a minimum of 3 flexible sediment barriers upstream of each drainage inlet to be protected.
4. Position erosion control blanket or geosynthetic fabric at edge of concrete apron and secure in trench.
5. Erosion control blanket or geosynthetic fabric is not required if the area adjacent to the drainage inlet is vegetated.




STAPLE DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)

NO SCALE

T63

2025 STANDARD PLAN T63

7-1-25

Return to Table of Contents

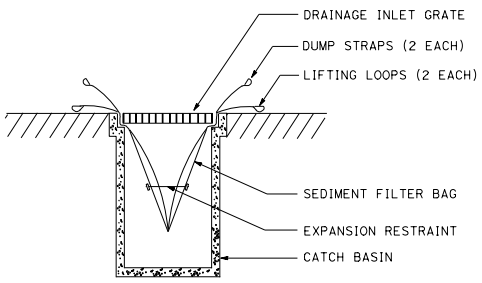
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

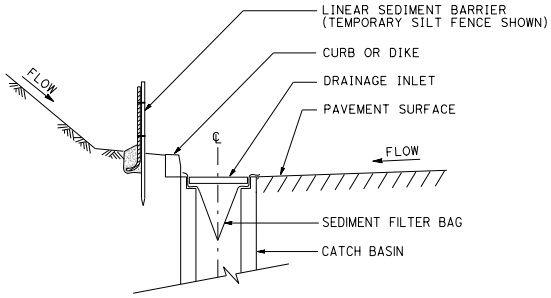
REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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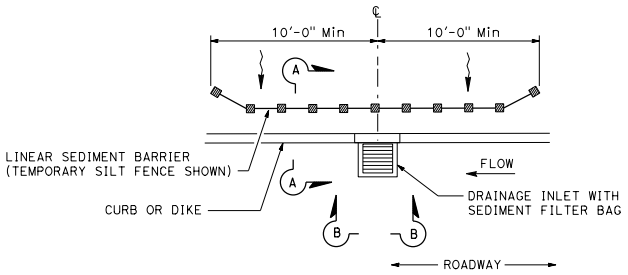



SECTION B-B

## SEDIMENT FILTER BAG DETAIL

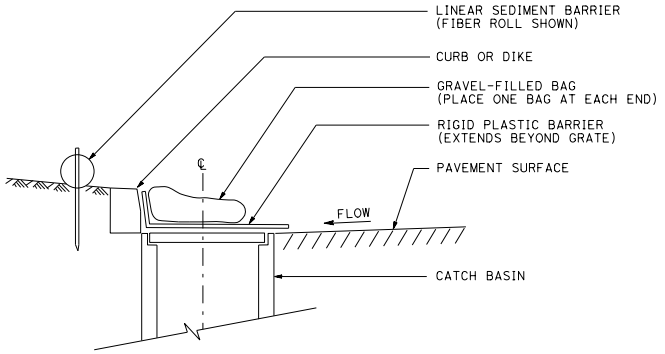



SECTION A-A




PLAN

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 5) (SEDIMENT FILTER BAG)

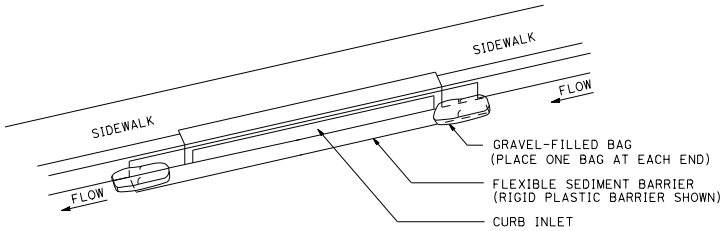



SECTION

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 6A) (CATCH BASIN WITH GRATE)

NOTES:

1. See Standard Plan T51 for temporary silt fence.
2. Dimensions may vary to fit field conditions.




PERSPECTIVE

## TEMPORARY DRAINAGE INLET PROTECTION (TYPE 6B) (CURB INLET WITHOUT GRATE)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)

NO SCALE

T64



7-1-25

Return to Table of Contents

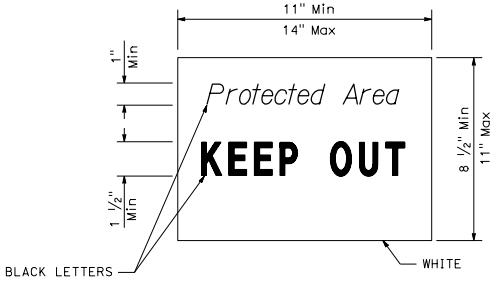
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

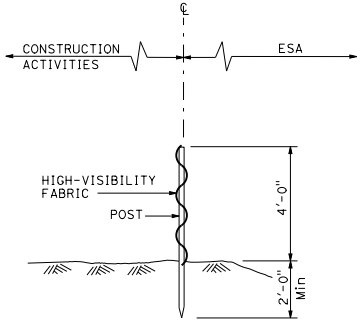
September 19, 2025
PLANS APPROVAL DATE

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Sean T. Penders
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Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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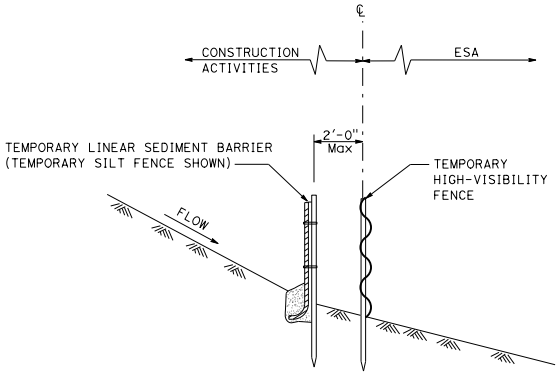



SIGN DETAIL



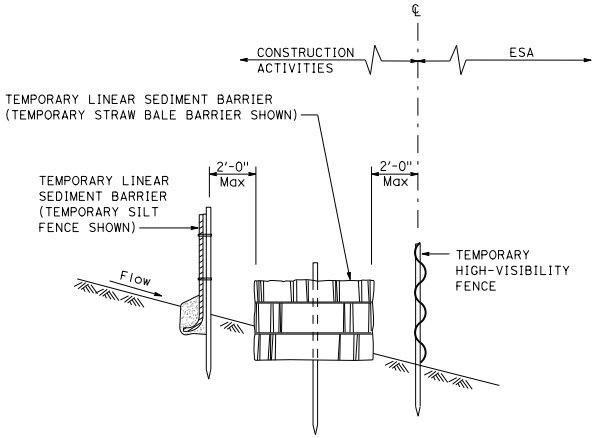

SECTION

TEMPORARY HIGH-VISIBILITY FENCE




SECTION

PLACEMENT DETAIL FOR TEMPORARY LINEAR SEDIMENT BARRIER USED WITH TEMPORARY HIGH-VISIBILITY FENCE




SECTION

PLACEMENT DETAIL FOR TEMPORARY SILT FENCE AND TEMPORARY STRAW BALE BARRIER USED WITH TEMPORARY HIGH-VISIBILITY FENCE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY HIGH-VISIBILITY FENCE)

NO SCALE

T65

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

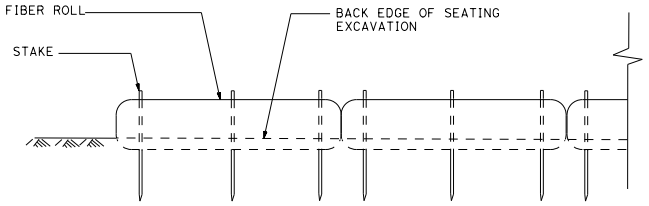
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STATE OF CALIFORNIA

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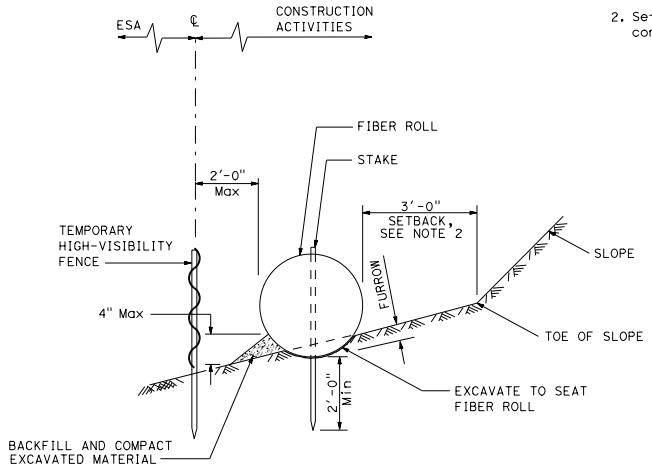
NOTES:

1. Temporary high-visibility fence shown for reference purposes only.
2. Setback dimension may vary according to field conditions or as designated on plans.




FRONT ELEVATION

TEMPORARY LARGE SEDIMENT BARRIER




SECTION

PLACEMENT DETAIL FOR TEMPORARY HIGH-VISIBILITY FENCE USED WITH TEMPORARY LARGE SEDIMENT BARRIER

See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY LARGE SEDIMENT BARRIER)

NO SCALE

T66

7-1-25

Return to Table of Contents

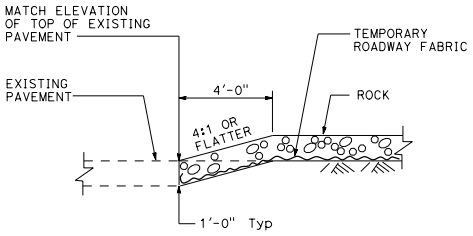
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Sean Penders
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

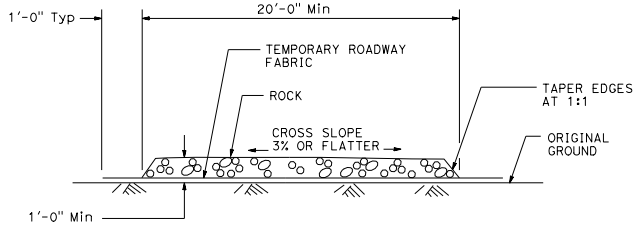
REGISTERED PROFESSIONAL ENGINEER
Sean T. Penders
No. C63744
Exp. 9-30-26
CIVIL
STATE OF CALIFORNIA

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SECTION

CONFORM DETAIL




SECTION

TEMPORARY CONSTRUCTION ROADWAY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CONSTRUCTION ROADWAY)

NO SCALE

T67

2025 STANDARD PLAN T67

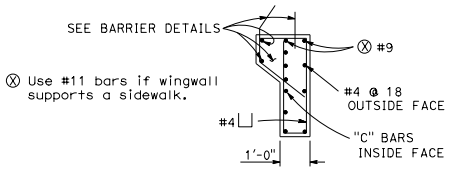
7-1-25

Return to Table of Contents

## BRIDGE DESIGNATIONS AND ABBREVIATIONS

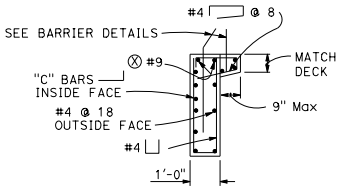
See Standard Plans A3A, A3B, and A3C for additional or standard abbreviations

| | |
|---|---|
| J | Outer, outer left bridge |
| K | Outer left bridge |
| S | Outer right bridge |
| T | Outer, outer right bridge |
| RWLOL | Retaining Wall Layout Line |
| WWLOL | Wingwall Layout Line |

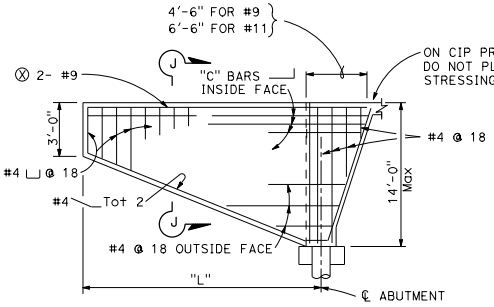



Ⓧ Use #11 bars if wingwall supports a sidewalk.

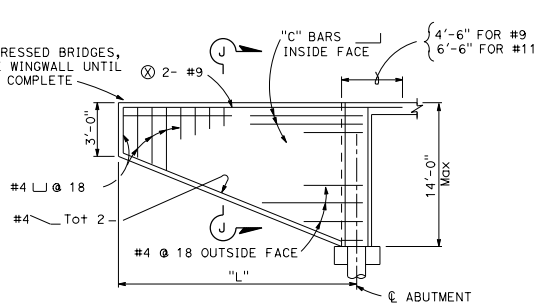
SECTION J-J
Without overhang




SECTION J-J
With overhang



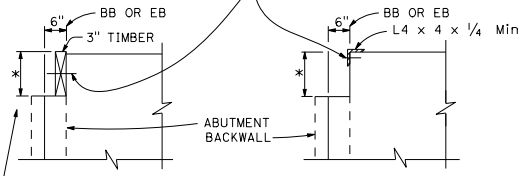

ELEVATION
SLOPING ABUTMENT




ELEVATION
VERTICAL ABUTMENT

* Depth of paving notch or dimension to abutment backwall construction joint. Varies, see abutment details.

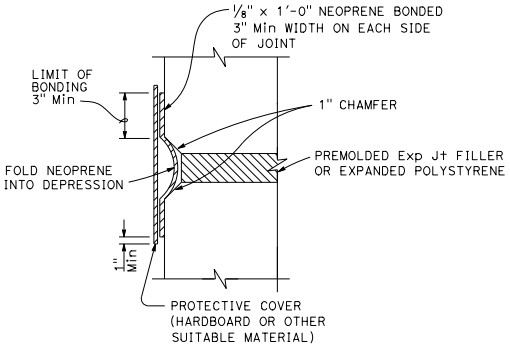
½" Min Dia BOLT, 3'-0" Max SPACING, 3" Min EMBEDMENT INSERT ASSEMBLY MAY BE USED UPON ENGINEER'S APPROVAL




TEMPORARY BUMPERS
BRIDGE DETAIL 1-2

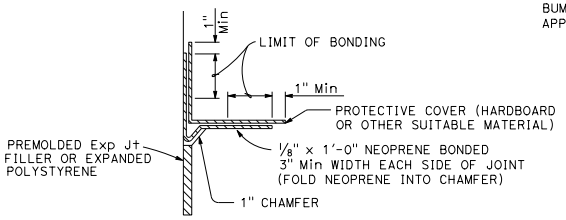
**ALTERNATIVE 1** **ALTERNATIVE 2**

TOP OF BUMPER TO BE AT OR ABOVE THE TOP OF DECK CONCRETE. BUMPERS AND BOLTS TO BE REMOVED IMMEDIATELY PRIOR TO PLACING APPROACH PAVEMENT



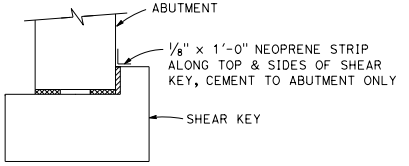

BRIDGE DETAIL 1-3
STRIP WATERSTOP DETAIL

When used on CIP prestressed bridges, do not apply waterstop until stressing is complete.

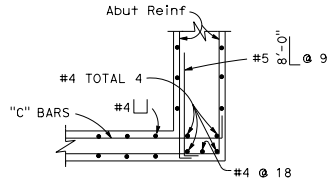


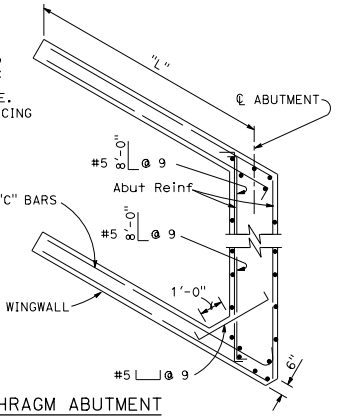

BRIDGE DETAIL 1-4
STRIP WATERSTOP CORNER DETAIL

When used on CIP prestressed bridges, do not apply waterstop until stressing is complete.




BRIDGE DETAIL 1-6
SHEAR KEY JOINT PROTECTION




WINGWALLS FOR DIAPHRAGM ABUTMENT
BRIDGE DETAIL 1-5

**CORNER DETAIL FOR SKEW 20° AND LESS**

| "L" | "C" BARS |
|---|---|
| 12'-0" | #5 @ 9" |
| 14'-0" | #6 @ 9" |
| 16'-0" | #7 @ 9" |
| 18'-0" | #8 @ 9" |
| 20'-0" | #9 @ 9" |

**CORNER DETAIL FOR SKEW OVER 20°**

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BRIDGE DETAILS

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Peter W. Norboe
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Peter W. Norboe — No. C57519 — Exp. 12-31-25 — CIVIL — STATE OF CALIFORNIA

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B0-1

7-1-25

2025 STANDARD PLAN B0-1



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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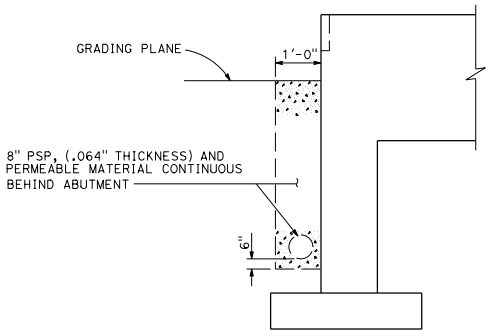
Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

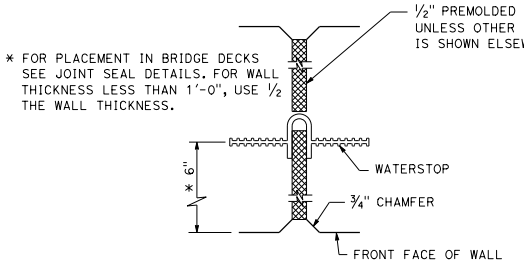
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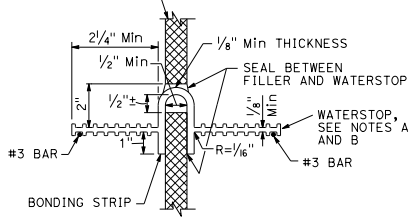

BRIDGE DETAIL 3-5

## 8" PSP AND PERMEABLE MATERIAL




BRIDGE DETAIL 3-4

## WALL EXPANSION JOINT



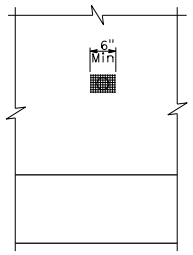

BRIDGE DETAIL 3-6

## WATERSTOP

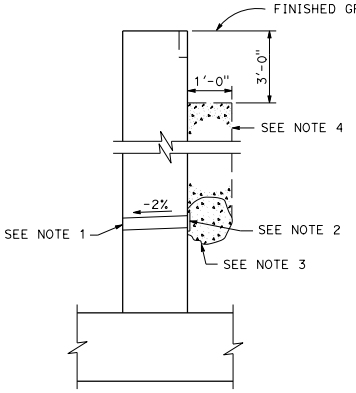
NOTES:

A. Holes will be permitted in the outer ½" of the web for wire, rings, etc. Tie web to #3 reinforcing bars @ 12 maximum intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the Engineer.

B. Waterstop to have 5 or more pairs of raised ribs to provide 0.1 square inch minimum rib cross-section area on each half of the waterstop.

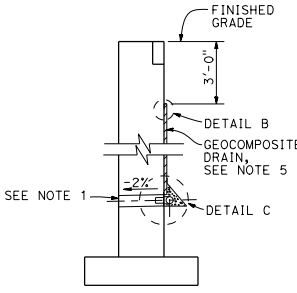



ELEVATION

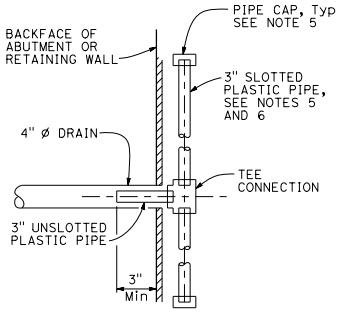



SECTION

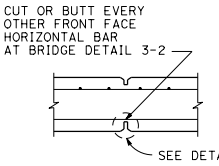
BRIDGE DETAIL 3-1



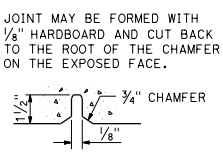

WALL SECTION




SECTION A-A



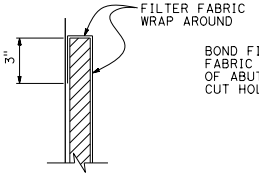

SECTION



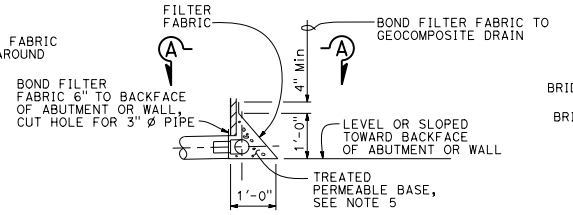

DETAIL A

BRIDGE DETAIL 3-2

## WEAKENED PLANES

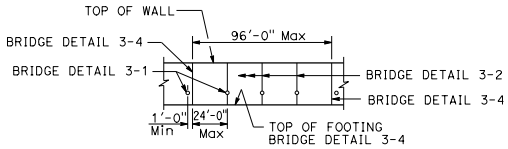



DETAIL B




DETAIL C

BRIDGE DETAIL 3-7




BRIDGE DETAIL 3-3

## WALL EXPANSION JOINTS AND WEAKENED PLANES

## WEEP HOLE, PERVIOUS BACKFILL AND GEOCOMPOSITE DRAIN

NOTES:

1. 4" Ø Drains at intermediate sag points and 25'-0" maximum center to center. For walls adjacent to sidewalks or curbs, provide 4" plastic pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 3"± above finished grade.
2. 6" square aluminum or galvanized steel wire ¼" mesh hardware cloth, minimum wire diameter 0.025". Anchor firmly to backface.
3. One cubic foot pervious backfill material in a nonwoven filter fabric, securely tied.
4. Pervious backfill material continuous behind retaining wall or abutment.
5. Geocomposite drain, treated permeable base and 3" Ø slotted plastic pipe continuous behind retaining wall or abutment. Cap ends of pipe. Provide "Tee" connection at each 4" Ø drain.
6. Connect the low end of plastic pipe to the main outlet pipe as applicable.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**BRIDGE DETAILS**

NO SCALE

**B0-3**

7-1-25

Return to Table of Contents

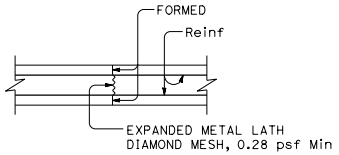
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Peter W. Norboe
REGISTERED CIVIL ENGINEER

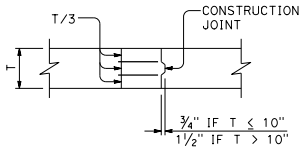
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Peter W. Norboe
No. C57519
Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

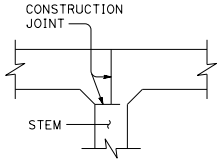
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ALTERNATIVE
DECK CONSTRUCTION JOINTS




BRIDGE DETAIL 5-2
Top or bottom slab

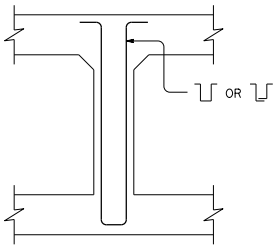



BRIDGE DETAIL 5-3

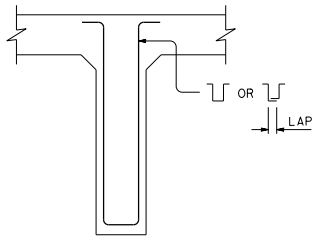
DECK CONSTRUCTION JOINTS

NOTES:

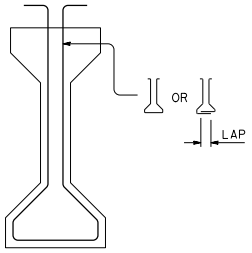
1. In simple spans, transverse joints are not permitted unless approved by the Engineer.
2. In continuous spans, transverse joints may be located at about the ¼ point of the span.
3. Reinforcing steel shall be continuous through all construction joints.
4. Longitudinal joints shall be located at the edge of a traffic lane unless otherwise permitted by the Engineer.




REINFORCED BOX GIRDER
Girder or diaphragm




T-BEAM
Girder, bent cap or diaphragm



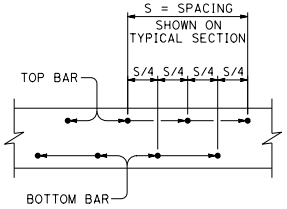

PRECAST GIRDER

| STIRRUP SIZE | LAP |
|---|---|
| #4 | 5" |
| #5 | 6" |
| #6 | 7½" |
| #7 | 9" |
| #8 | 10" |

A reinforcement bar must be placed inside of each stirrup hook or 90° bend.

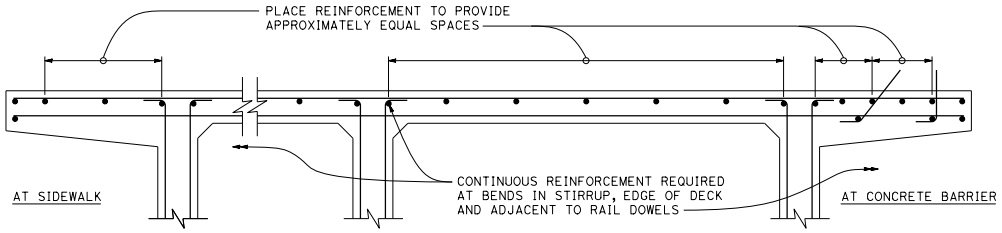
BRIDGE DETAIL 5-5

ALTERNATIVE STIRRUPS




BRIDGE DETAIL 5-11

TRANSVERSE DECK REINFORCEMENT SPACING DIAGRAM




BRIDGE DETAIL 5-15

TOP GIRDER REINFORCEMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**BRIDGE DETAILS**

NO SCALE

**B0-5**

7-1-25



Return to Table of Contents

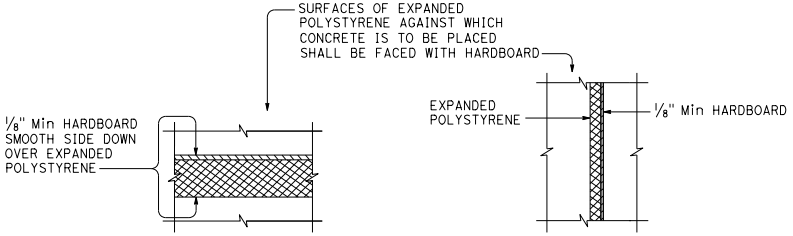
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Peter W. Norboe
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

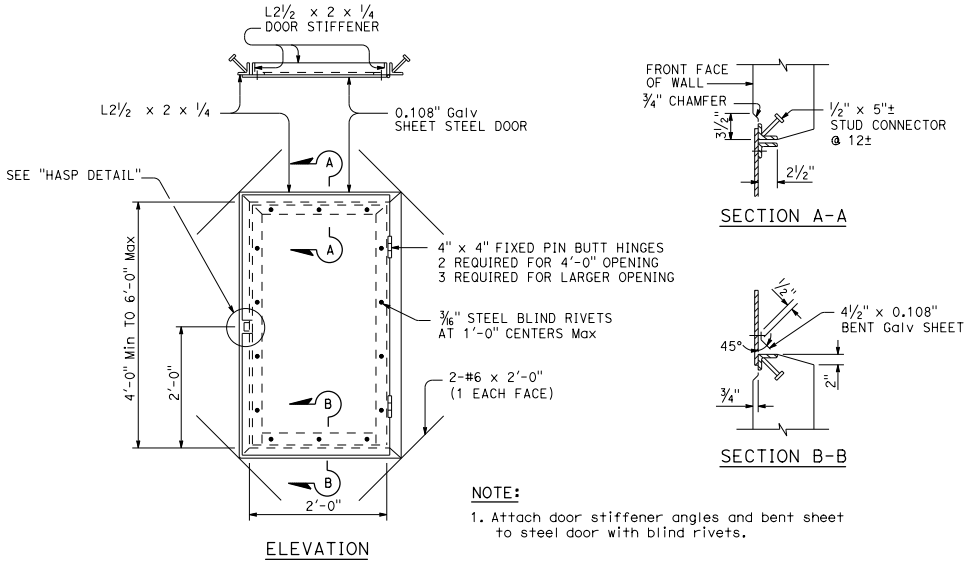
Peter W. Norboe No. C57519 Exp. 12-31-25 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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BRIDGE DETAIL 13-1
PROTECTION OF HORIZONTAL POLYSTYRENE

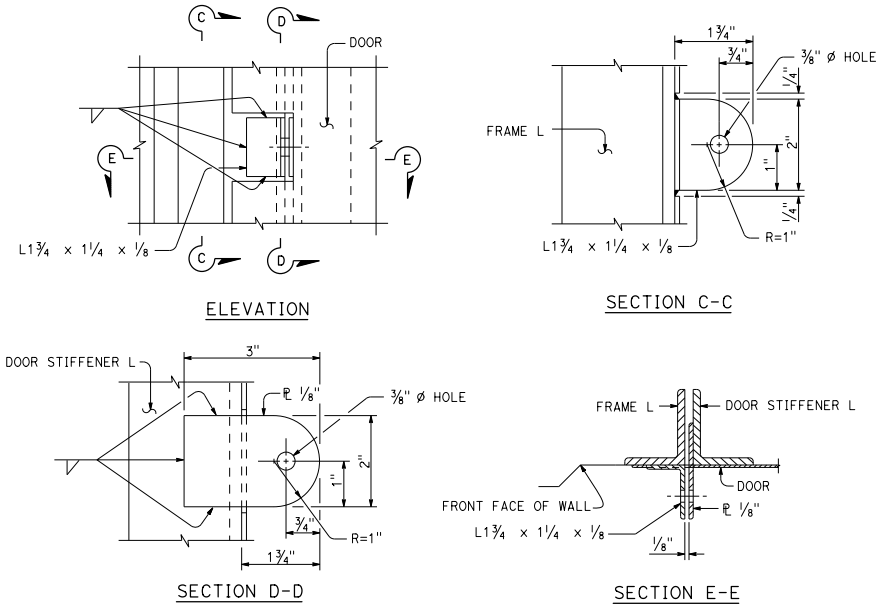
BRIDGE DETAIL 13-2
PROTECTION OF VERTICAL POLYSTYRENE




NOTE:
1. Attach door stiffener angles and bent sheet to steel door with blind rivets.

ELEVATION

BRIDGE DETAIL 13-3
ACCESS DOOR




HASP DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**BRIDGE DETAILS**
NO SCALE

**B0-13**

7-1-25



Return to Table of Contents

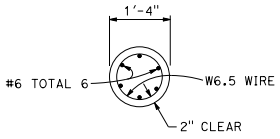
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

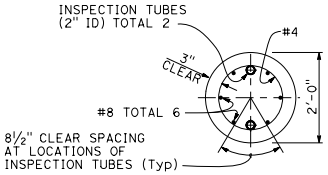
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Amir M. Malek
No. C62397
Exp. 9-30-25
CIVIL
STATE OF CALIFORNIA

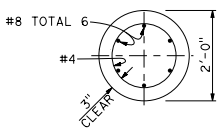
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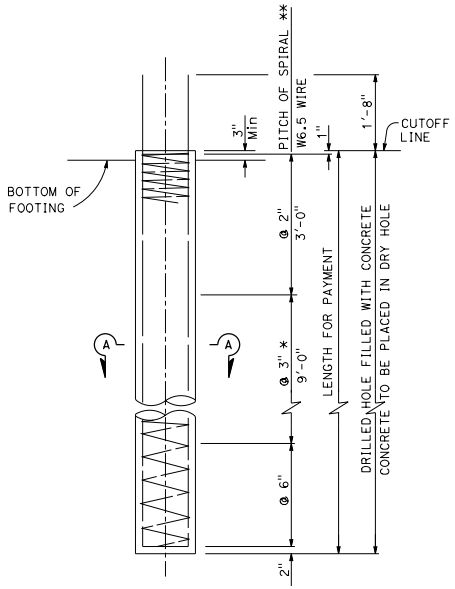

SECTION A-A



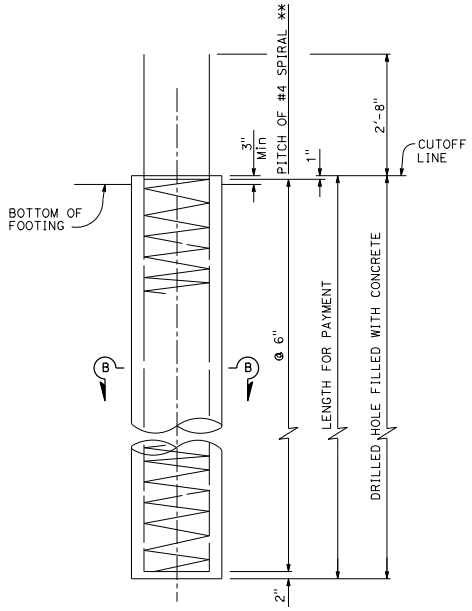

SECTION B-B
With inspection tubes




SECTION B-B
Without inspection tubes




ELEVATION
90 kip AND 140 kip
DESIGN CAPACITY




ELEVATION
200 kip
DESIGN CAPACITY

* @ 2" at option of Contractor

** Extend at 2" pitch to top of anchor piles and load test piles. For longitudinal reinforcement for anchor piles and load test piles, see "Load Test Pile Details (2)", Standard Plan B2-10.

NOTES:

1. Reinforcement extending into footing shall be hooked as required to provide clearance to top of footing.
2. Piles shall be extended only in accordance with details shown on the Project Plans.

DESIGN NOTES:

REINFORCED CONCRETE

$f_y$ = 60,000 psi

$f'_c$ = 4,000 psi

DESIGN CAPACITY

90 kip and 140 kip PILE

COMPRESSION:

140 kip (Service state)
280 kip (Nominal axial structural resistance)

TENSION:

56 kip (Service state)
140 kip (Nominal axial structural resistance)

200 kip PILE

COMPRESSION:

200 kip (Service state)
400 kip (Nominal axial structural resistance)

TENSION:

80 kip (Service state)
200 kip (Nominal axial structural resistance)

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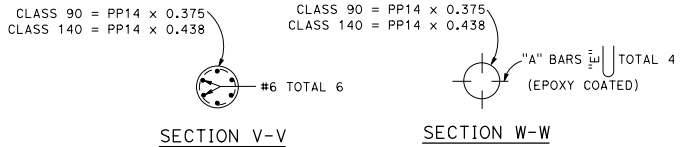
# 16" AND 24" CAST-IN-DRILLED-HOLE CONCRETE PILE

NO SCALE

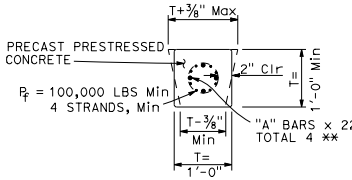
B2-3

7-1-25

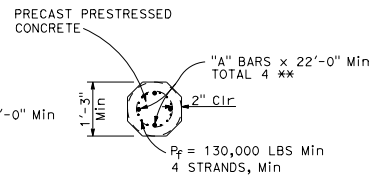
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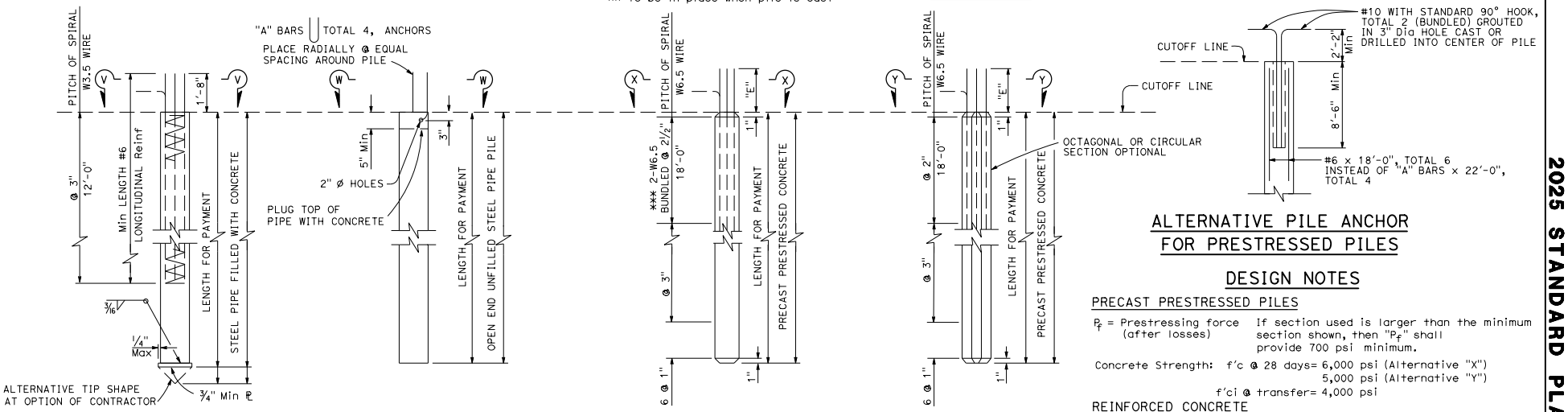


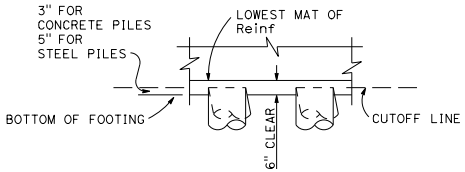

PP = Steel pipe pile




** To be in place when pile is cast




## PILE EMBEDMENT

| | REQUIRED NOMINAL RESISTANCE (TENSION) * | |
|---|---|---|
| | 60 kips OR LESS | GREATER THAN 60 kips |
| "A" BARS | #6 | #8 |
| "E" DIMENSION | 1'-8" | 2'-8" |

* See Pile Data Table on the Project Plans for Nominal Resistance (Tension) Requirements

## NOTES:

1. Details are the same for both Class 90 and Class 140 piles unless noted otherwise.
2. At the Contractor's option, alternative steel pipe with at least the diameter and wall thickness shown on these plans may be used. The diameter shall not exceed 1'-6".
3. Pile reinforcement and steel pile anchor bars extending into a footing shall be hooked as required to provide clearance to top of footing. Piles shall be extended only with details shown on the Project Plans.
4. 2" clearance to spiral reinforcement shall be maintained if section used is larger than the minimum section shown.
5. Maximum cutoff length at the top of the Alternative "X" and Alternative "Y" Piles is 10'-0".
6. For longitudinal reinforcement and prestressing for anchor piles and load test piles, see "Load Test Pile Details (2)", Standard Plan B2-10.

## ALTERNATIVE PILE ANCHOR FOR PRESTRESSED PILES

## DESIGN NOTES

### PRECAST PRESTRESSED PILES

$P_f$ = Prestressing force (after losses)

If section used is larger than the minimum section shown, then "$P_f$" shall provide 700 psi minimum.

Concrete Strength: f'c @ 28 days= 6,000 psi (Alternative "X")
5,000 psi (Alternative "Y")
f'ci @ transfer= 4,000 psi

### REINFORCED CONCRETE

f'c = 4,000 psi
fy = 60,000 psi

### STEEL PIPE PILE

Fy (Minimum yield strength) = 45,000 psi
Fu (Minimum tensile strength) = 66,000 psi

### DESIGN CAPACITY

Class 90
Compression = 90 kip (Service state)
= 180 kip (Nominal axial structural resistance)
Tension = 36 kip (Service state)
= 90 kip (Nominal axial structural resistance)

Class 140
Compression = 140 kip (Service state)
= 280 kip (Nominal axial structural resistance)
Tension = 56 kip (Service state)
= 140 kip (Nominal axial structural resistance)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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September 19, 2025
PLANS APPROVAL DATE
Amir M. Malek No. C62397 Exp. 9-30-25 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
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# PILE DETAILS
# CLASS 90 AND CLASS 140

NO SCALE

B2-5

7-1-25

2025 STANDARD PLAN B2-5

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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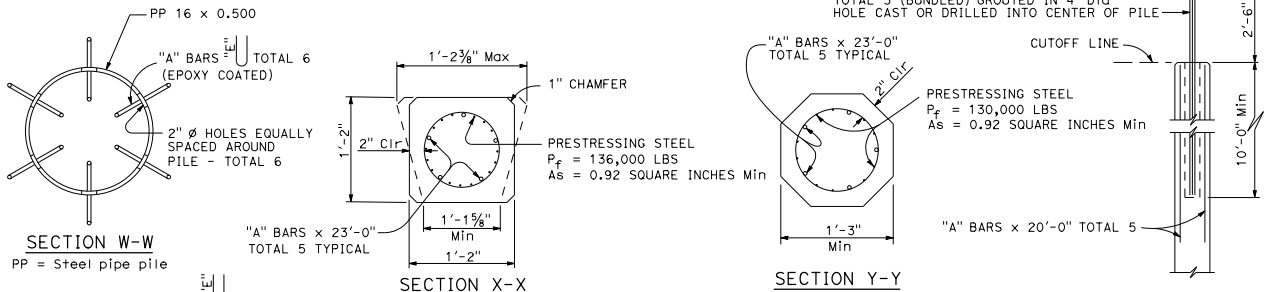
September 19, 2025

PLANS APPROVAL DATE

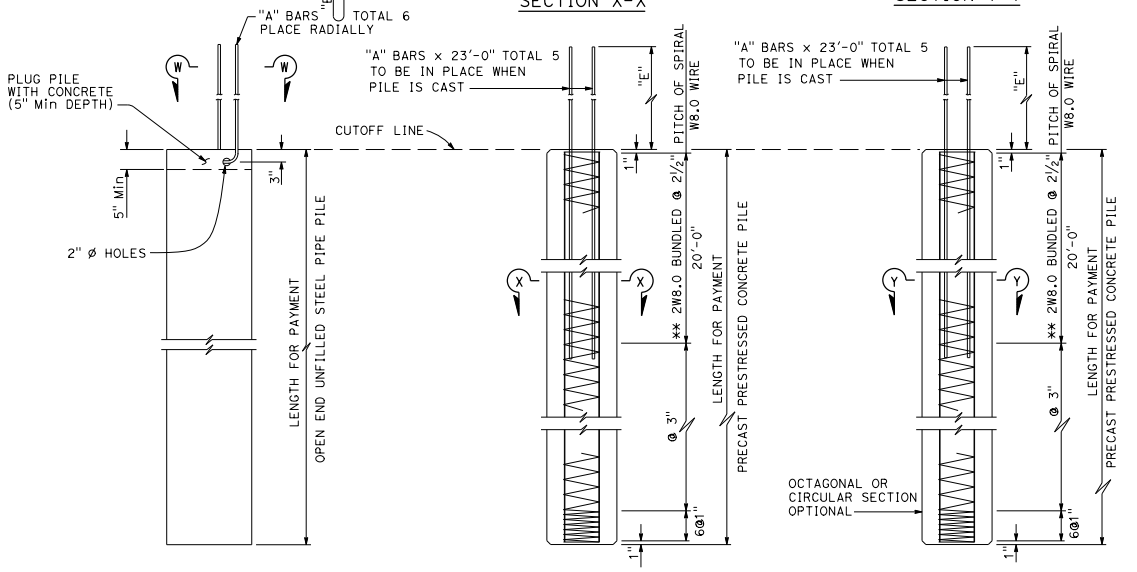
Amir M. Malek No. C62397 Exp. 9-30-25 CIVIL

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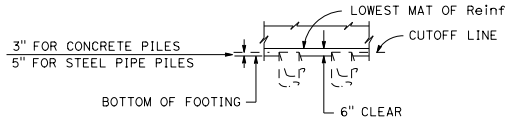



## ALTERNATIVE PILE ANCHOR FOR PRESTRESSED PILE




| | REQUIRED NOMINAL RESISTANCE (TENSION) * | |
|---|---|---|
| | 75 kips OR LESS | GREATER THAN 75 kips |
| "A" BARS | #6 | #8 |
| "E" DIMENSION | 1'-8" | 2'-8" |

* See Pile Data Table on the Project Plans for Nominal Resistance (Tension) Requirements




PILE EMBEDMENT

## DESIGN NOTES:

DESIGN CAPACITY

Compression = 200 kip (Service state)
= 400 kip (Nominal axial structural resistance)
Tension = 80 kip (Service state)
= 200 kip (Nominal axial structural resistance)

REINFORCED CONCRETE

$f'_c$ = 4,000 psi
$f_y$ = 60,000 psi

PRECAST PRESTRESSED PILES

$P_f$ = Prestress Force (After losses)
Concrete Strength $f'_c$ @ 28 days = 7,000 psi
$f'_{ci}$ @ transfer = 4,000 psi

STEEL PIPE PILE

Fy (minimum yield strength) = 45,000 psi
Fu (minimum tensile strength) = 66,000 psi

NOTES:

1. Pile reinforcement extending into footing shall be hooked as required to provide clearance to top of footing. Piles shall be extended only with details shown on the Project Plans.
2. At the Contractor's option, alternative steel pipe with at least the diameter and wall thickness shown on these plans may be used. The diameter shall not exceed 1'-6".
3. Maximum cut-off length at the top of the Alternative "X" and Alternative "Y" piles is 10'-0".
4. 2" clearance to spiral reinforcement shall be maintained if section used is larger than the minimum section shown.

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# PILE DETAILS CLASS 200

NO SCALE

B2-8

7-1-25



Return to Table of Contents

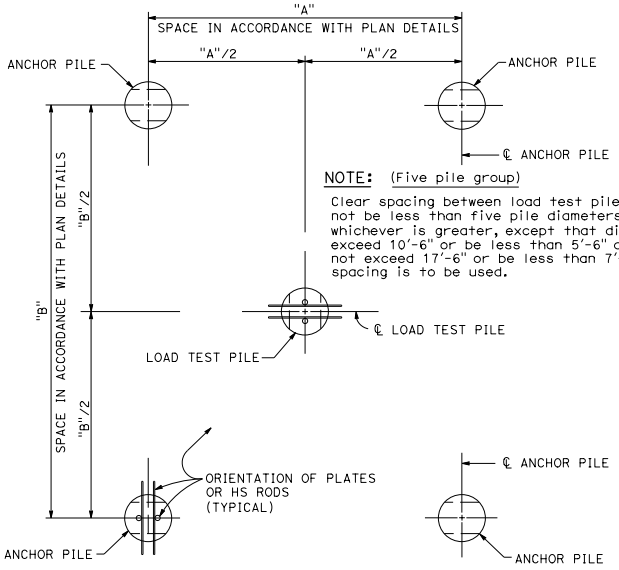
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PLANS APPROVAL DATE

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Amir M. Malek
No. C62397
Exp. 9-30-25
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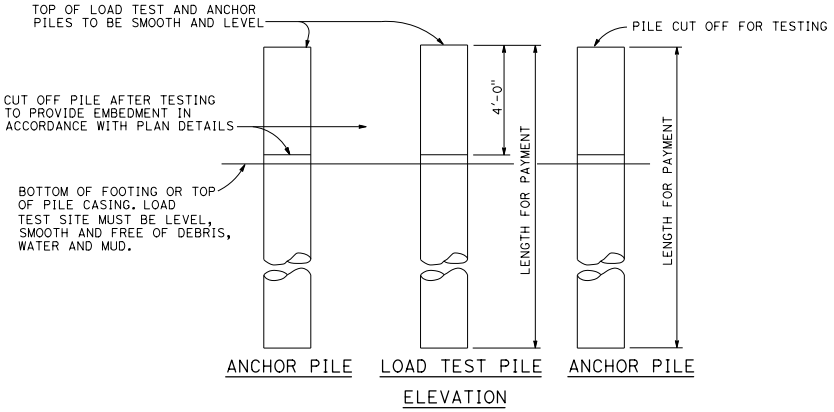
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PLAN

**NOTE:** (Five pile group)

Clear spacing between load test pile and anchor pile shall not be less than five pile diameters or 7'-0", whichever is greater, except that dimension "A" shall not exceed 10'-6" or be less than 5'-6" and dimension "B" shall not exceed 17'-6" or be less than 7'-6". When possible, maximum spacing is to be used.



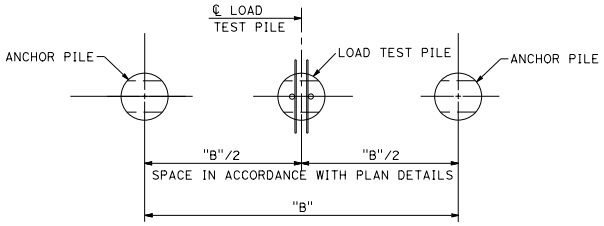

ELEVATION

## FIVE - PILE LOAD TEST PILE GROUP

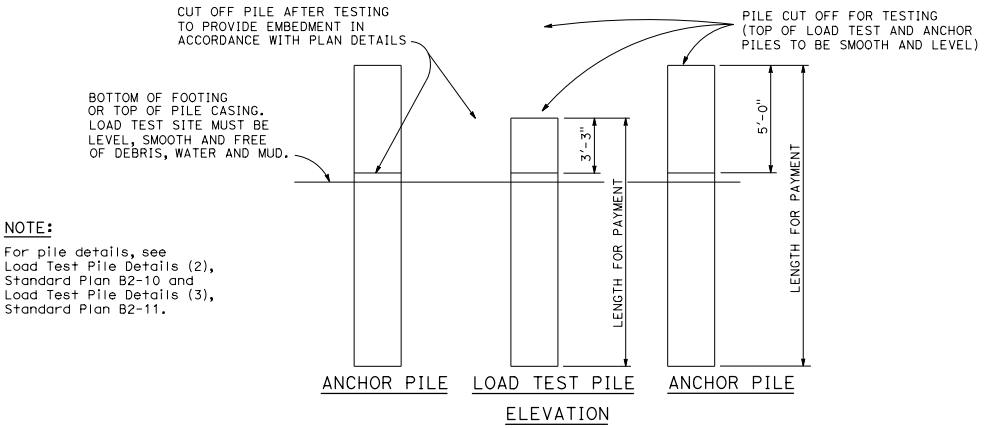
(FOR COMPRESSION - TENSION PILE LOAD TESTS)

**NOTE:** (Three pile group)

Clear spacing between load test pile and anchor pile shall not be less than five pile diameters or 7'-0", whichever is greater, except that dimension "B" shall not exceed 17'-6" or be less than 6'-6". When possible, maximum spacing is to be used.




PLAN




ELEVATION

## THREE - PILE LOAD TEST PILE GROUP

(FOR TENSION PILE LOAD TESTS ONLY)

**NOTE:**

For pile details, see Load Test Pile Details (2), Standard Plan B2-10 and Load Test Pile Details (3), Standard Plan B2-11.

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# LOAD TEST PILE DETAILS (1)

NO SCALE

B2-9

7-1-25

Return to Table of Contents

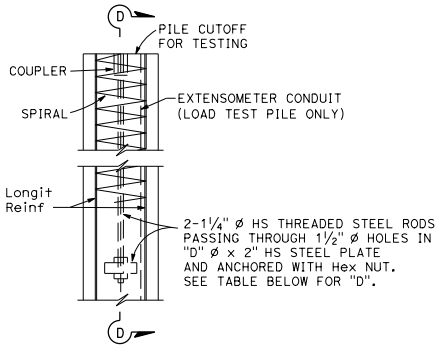
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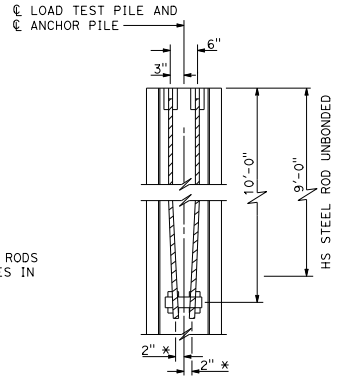
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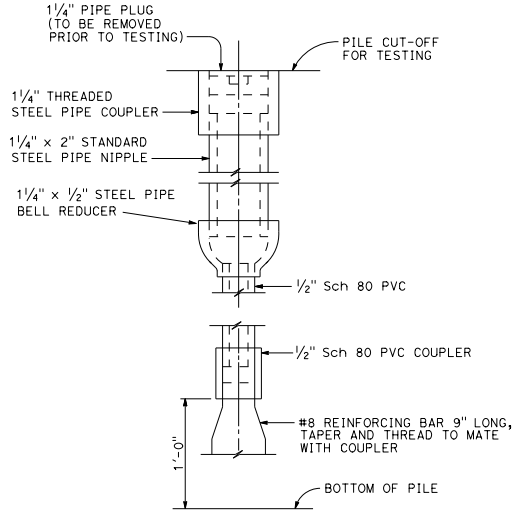



ELEVATION

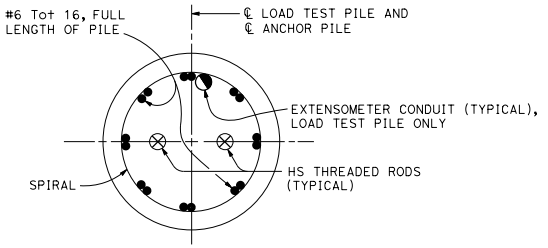



SECTION D-D

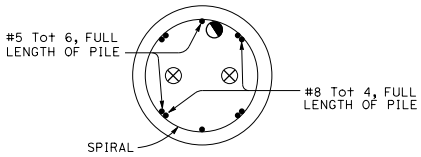
* 1½" for Alt "X"



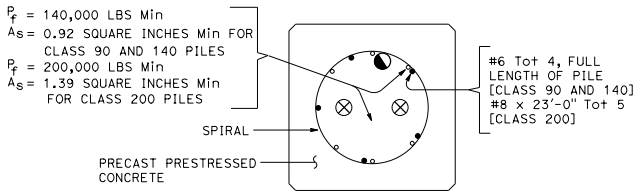

EXTENSOMETER CONDUIT DETAILS



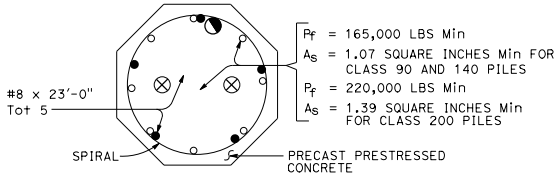

16" CIDH CONCRETE PILE




ALTERNATIVE "V"




ALTERNATIVE "X"




ALTERNATIVE "Y"

## CONCRETE PILE DETAILS

| PILE TYPE | "D" | MAXIMUM TENSILE TEST FORCE PER PILE |
|---|---|---|
| CLASS 90 AND 140 Alt "V","Y" | 7" | 210 kips |
| CLASS 90 AND 140 Alt "X" | 6" | 210 kips |
| CLASS 200 Alt "X","Y" | 6¾" | 300 kips |
| CIDH | 8" | 300 kips |

NOTES:

1. For details not shown, see applicable pile details shown on the Project Plans.
2. For the additional top 4'-0" of pile for testing, the spiral reinforcement shall be the same size and placed at the same pitch as detailed for the top of piles shown in the Project Plans.
3. Details applicable for load test and anchor piles.

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# LOAD TEST PILE DETAILS (2)

NO SCALE

B2-10

7-1-25

2025 STANDARD PLAN B2-10

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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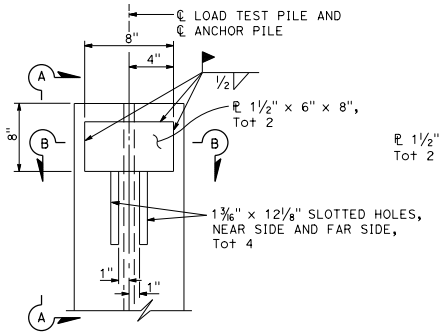
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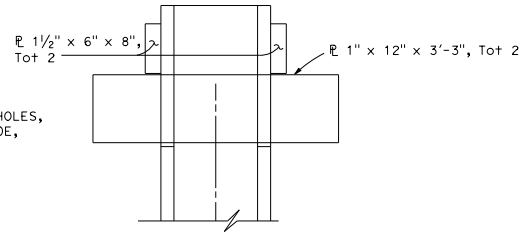
September 19, 2025
PLANS APPROVAL DATE

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No. C62397
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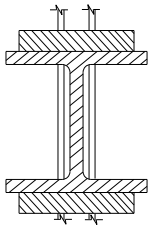
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SECTION A-A



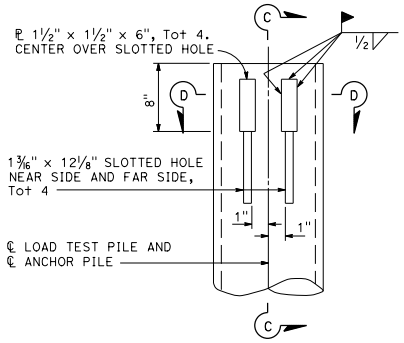
SECTION B-B

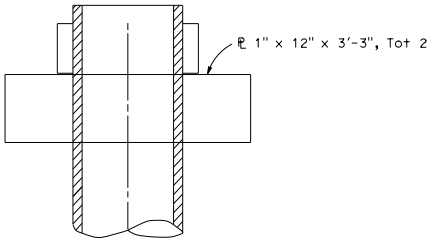
Maximum Tensile Test Force Per Pile : HP 10 x 42 = 180 kips
HP 10 x 57 = 245 kips
HP 14 x 89 = 300 kips

## STEEL H-PILE DETAILS

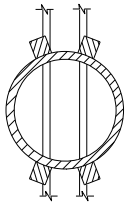
NOTE:

Alignment of slots and 1½" ℄'s shall permit a ℄ 1" x 12" x 3'-3" to pass through pile parallel to ℄ web of pile and achieve a snug fit. Details applicable for load test and anchor piles. Slots to be cut after piles are driven.




SECTION C-C



SECTION D-D

Maximum Tensile Test Force Per Pile : Class 90 (PP 14 x 0.375) = 180 kips
Class 140 (PP 14 x 0.438) = 280 kips
Class 200 (PP 16 x 0.50) = 300 kips

## ALTERNATIVE "W" STEEL PIPE - PILE

NOTE:

Alignment of slots and 1½" ℄'s shall permit a ℄ 1" x 12" x 3'-3" to pass through pile.
Details applicable for load test and anchor piles.
Slots to be cut after piles are driven.

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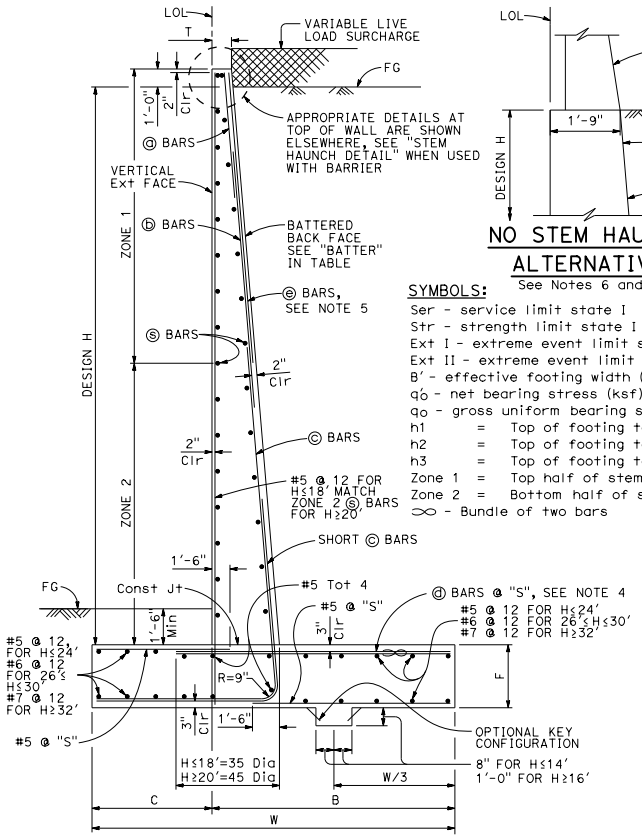
# LOAD TEST PILE DETAILS (3)

NO SCALE

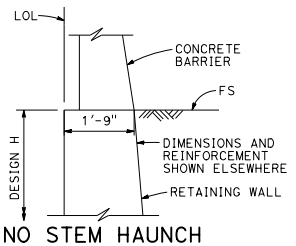
B2-11

7-1-25

Return to Table of Contents

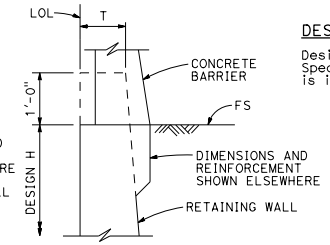



## TYPICAL SECTION




## NO STEM HAUNCH ALTERNATIVE

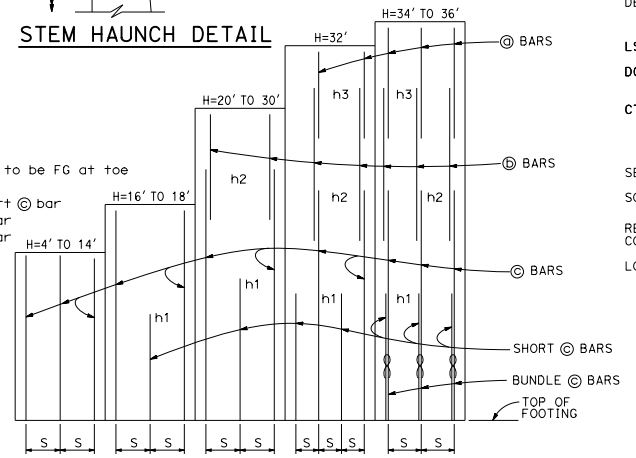
See Notes 6 and 7




## STEM HAUNCH DETAIL

### SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
Ext II - extreme event limit state II
B' - effective footing width (ft)
$q_o'$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)
h1 = Top of footing to top of short ⓒ bar
h2 = Top of footing to top of ⓒ bar
h3 = Top of footing to top of ⓑ bar
Zone 1 = Top half of stem height
Zone 2 = Bottom half of stem height
∞ - Bundle of two bars




ELEVATION

### DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

### DESIGN NOTES:

**DESIGN:** AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019

**LS:** Variable live load surcharge on level ground surface

**DC:** Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

**CT:** 54 kip transverse force applied at 32" above FS, distributed over 10 feet at the top of wall and 1 : 1 distribution down and outward. Distribution below footing taken no less than 40'.

SEISMIC: $k_h$ = 0.2, $k_v$ = 0.0

SOIL BACKFILL: ø = 34°, γ = 120 pcf SOIL FOR BASE FRICTION: ø = 32° γ = 120 pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+βEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |
| Extreme II | Q = 1.00DC+1.00EV+1.00EH+0.5LS+1.0CT |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |
| CT: | Vehicular Collision Force |

### NOTES:

1. For details not shown and drainage notes, see B3-5.
2. For wall stem joint details, see B0-3 3-3 and B0-3 3-4.
3. At ⓒ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.
4. Bundle ⓓ bars from H = 22' to 36'.
5. Provide #6 @ 10" x 18'-0" ⓔ bars over a distance of 8'-0" measured from all expansion joints, begin wall and end wall locations. For H ≤ 16', hook ⓔ bar into footing and reduce bar length as needed to maintain Min Clr cover.
6. For no stem haunch alternative, where H ≤ 18': Increase stem thickness, "T", to constant 1'-9" with no batter.
7. For no stem haunch alternative, where H > 18': Adjust stem batter to maintain original stem thickness at top of footing according to data defined in table.

### TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 4' | 6' | 8' | 10' | 12' | 14' | 16' | 18' | 20' | 22' | 24' | 26' | 28' | 30' | 32' | 34' | 36' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | 6'-9" | 6'-6" | 6'-7" | 7'-4" | 8'-3" | 9'-3" | 9'-9" | 10'-8" | 11'-8" | 12'-9" | 13'-9" | 14'-10" | 15'-11" | 17'-3" | 18'-3" | 19'-3" | 20'-3" |
| C | 2'-6" | 2'-6" | 2'-4" | 2'-4" | 2'-6" | 3'-0" | 3'-3" | 3'-8" | 3'-8" | 3'-9" | 4'-0" | 4'-4" | 4'-8" | 5'-3" | 5'-6" | 6'-0" | 6'-6" |
| B | 4'-3" | 4'-0" | 4'-3" | 5'-0" | 5'-9" | 6'-3" | 6'-6" | 7'-0" | 8'-0" | 9'-0" | 9'-9" | 10'-6" | 11'-3" | 12'-0" | 12'-9" | 13'-3" | 13'-9" |
| F | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-6" | 1'-8" | 1'-8" | 1'-9" | 1'-9" | 1'-11" | 2'-2" | 2'-5" | 2'-10" | 3'-3" | 3'-6" | 4'-7" | 4'-9" |
| T | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 1'-1" | 1'-1" |
| BATTER | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.5:12 | 0.625:12 | 0.625:12 | 0.75:12 | 1:12 | 1:12 | 1.2:12 | 1.2:12 |
| SPACING "S" | 12" | 12" | 12" | 11" | 9" | 8" | 6" | 5" | 6" | 5" | 5" | 5" | 5" | 5" | 6" | 10" | 8" |
| ⓐ BARS | - | - | - | - | - | - | - | - | - | - | - | - | - | - | #7 | #6 | #6 |
| ⓑ BARS | - | - | - | - | - | - | - | - | #7 | #6 | #6 | #6 | #6 | #6 | #9 | #9 | #8 |
| ⓒ BARS | #6 | #6 | #6 | #6 | #6 | #6 | #7 | #7 | #8 | #8 | #8 | #9 | #9 | #9 | #10 | #11 | #11 |
| ⓓ BARS | #5 | #5 | #5 | #6 | #6 | #6 | #6 | #6 | #8 | #7 | #8 | #9 | #9 | #9 | #10 | #11 | #11 |
| h1 | - | - | - | - | - | - | 9'-5" | 9'-7" | 12'-8" | 12'-7" | 13'-7" | 14'-8" | 15'-8" | 15'-8" | 19'-5" | 16'-6" | 14'-8" |
| h2 | - | - | - | - | - | - | - | - | 14'-2" | 16'-10" | 17'-7" | 20'-5" | 21'-11" | 23'-8" | 21'-9" | 21'-6" | 21'-6" |
| h3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 24'-10" | 24'-5" | 26'-4" |
| ZONE 1 Ⓢ BARS | #4 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 12" | #5 @ 12" | #5 @ 12" |
| ZONE 2 Ⓢ BARS | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #4 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #6 @ 12" | #6 @ 12" | #7 @ 12" | #7 @ 12" |
| Ser: B', $q_o'$ | 6.5, 0.8 | 6.1, 1.0 | 5.4, 1.4 | 5.7, 1.8 | 6.2, 2.1 | 7.0, 2.2 | 7.1, 2.5 | 7.7, 2.7 | 8.4, 3.0 | 9.1, 3.4 | 9.7, 3.7 | 10.5, 4.0 | 11.1, 4.3 | 12.3, 4.4 | 12.9, 4.7 | 13.2, 5.2 | 13.9, 5.4 |
| Str: B', $q_o$ | 6.4, 1.6 | 3.6, 1.7 | 2.7, 2.8 | 2.7, 3.6 | 3.1, 4.1 | 3.7, 4.3 | 3.5, 5.2 | 4.0, 5.4 | 4.4, 5.8 | 4.9, 6.3 | 5.2, 7.0 | 5.7, 7.5 | 6.0, 8.2 | 6.8, 8.3 | 7.1, 8.9 | 6.8, 10.7 | 7.1, 11.2 |
| Ext I: B', $q_o$ | 5.3, 1.1 | 4.6, 1.5 | 3.9, 2.2 | 4.0, 2.8 | 4.3, 3.4 | 4.9, 3.8 | 4.8, 4.5 | 5.3, 4.9 | 5.6, 5.5 | 6.0, 6.3 | 6.3, 7.0 | 6.8, 7.5 | 7.2, 8.2 | 8.1, 8.4 | 8.4, 9.1 | 8.5, 10.4 | 9.1, 10.8 |
| Ext II: B', $q_o$ | 2.5, 2.4 | 2.2, 3.3 | 2.3, 3.9 | 3.4, 3.4 | 4.7, 3.2 | 6.3, 3.0 | 7.2, 3.1 | 8.6, 3.0 | 9.8, 3.2 | 11.3, 3.4 | 12.4, 3.6 | 13.7, 3.8 | 14.9, 4.1 | 16.5, 4.2 | 17.5, 4.5 | 18.4, 4.9 | 19.6, 5.1 |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 1 (CASE 1)

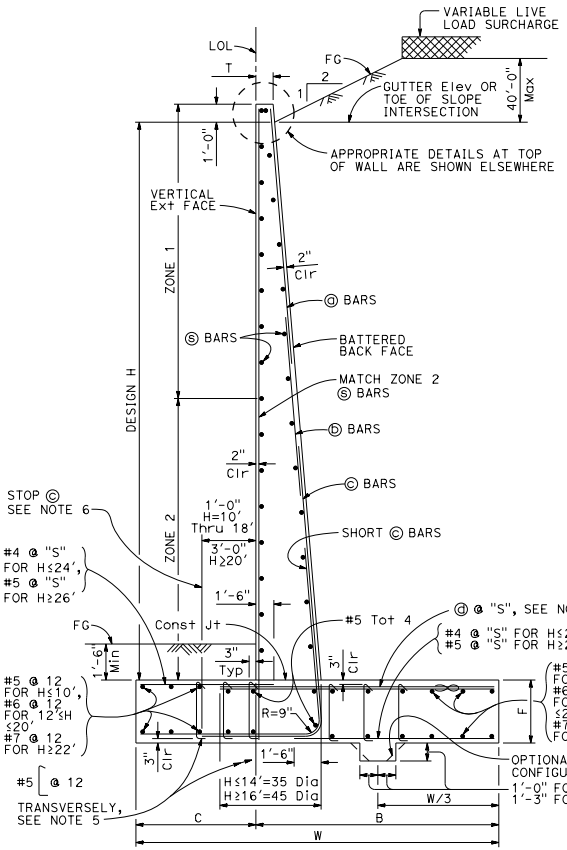
NO SCALE

**B3-1A**

2025 STANDARD PLAN B3-1A

7-1-25

Return to Table of Contents




## TYPICAL SECTION

## DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

## DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019

LS: Variable live load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

SEISMIC: $k_h = 0.2$, $k_v = 0.0$

SOIL BACKFILL: $\phi = 34°$, $\gamma = 120$ pcf

SOIL FOR BASE FRICTION: $\phi = 32°$, $\gamma = 120$ pcf

REINFORCED f'c = 3,600 psi
CONCRETE: fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

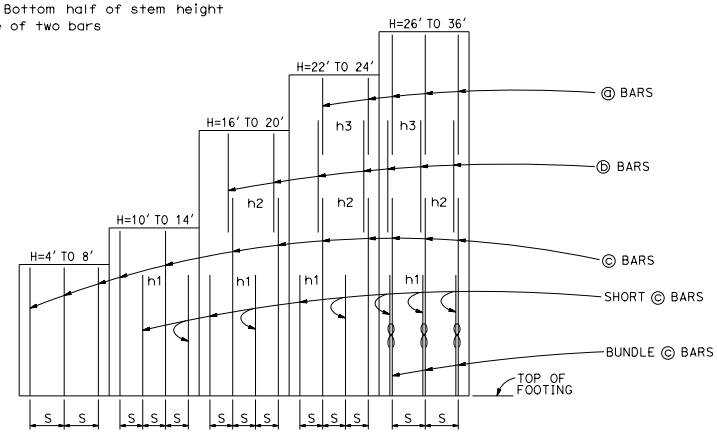
| | |
|---|---|
| Service I | $Q = 1.00DC+1.00EV+1.00EH+1.00LS$ |
| Strength I | $Q = \alpha DC+\beta EV+\eta EH+1.75LS$ |
| Extreme I | $Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE$ |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

## SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
B' - effective footing width (ft)
$q'_o$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)
h1 = Top of footing to top of short ⓒ bar
h2 = Top of footing to top of ⓒ bar
h3 = Top of footing to top of ⓑ bar
Zone 1 = Top half of stem height
Zone 2 = Bottom half of stem height
∞ - Bundle of two bars




ELEVATION

## NOTES:

1. For details not shown and drainage notes, see B3-5.
2. For wall stem joint details, see B0-3 3-3 and B0-3 3-4.
3. At ⓒ and short ⓒ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.
4. Bundle ⓓ bars for H ≥ 26'.
5. Hook stirrups around & space with alternating transverse reinforcement at 2 x "S". For required number of toe or heel stirrup rows, see table. The first stirrups are placed adjacent to the stem as shown.
6. Extend ⓒ bars to end of toe for H=4' to 8'.

## TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 4' | 6' | 8' | 10' | 12' | 14' | 16' | 18' | 20' | 22' | 24' | 26' | 28' | 30' | 32' | 34' | 36' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | 6'-6" | 6'-6" | 7'-8" | 8'-9" | 10'-0" | 11'-7" | 14'-0" | 16'-3" | 16'-3" | 17'-6" | 19'-0" | 20'-3" | 21'-6" | 22'-9" | 23'-6" | 24'-6" | 25'-6" |
| C | 2'-3" | 2'-3" | 2'-10" | 3'-0" | 3'-6" | 3'-10" | 4'-9" | 5'-0" | 5'-0" | 5'-6" | 5'-9" | 6'-3" | 6'-6" | 6'-9" | 7'-0" | 7'-6" | 8'-0" |
| B | 4'-3" | 4'-3" | 4'-10" | 5'-9" | 6'-6" | 7'-9" | 9'-3" | 11'-3" | 11'-3" | 12'-0" | 13'-3" | 14'-0" | 15'-0" | 16'-0" | 16'-6" | 17'-0" | 17'-6" |
| F | 1'-6" | 1'-6" | 2'-0" | 2'-3" | 2'-6" | 2'-8" | 2'-10" | 3'-0" | 3'-4" | 3'-6" | 3'-6" | 3'-7" | 3'-7" | 3'-7" | 3'-9" | 4'-0" | 4'-4" |
| T | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 1'-0" | 1'-0" | 1'-1" | 1'-4" | 1'-6" | 1'-10" | 2'-1" | 2'-9" | 3'-7" |
| BATTER | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.625: 12 | 0.875:12 | 0.875: 12 | 1.125:12 | 1.125: 12 | 1.125: 12 | 1.125: 12 | 1.2: 12 | 1.2: 12 | 1.2: 12 | 1.2: 12 |
| SPACING "S" | 16" | 14" | 10" | 7" | 7" | 7" | 7" | 7" | 7" | 6" | 6" | 10" | 8" | 8" | 7" | 7" | 7" |
| ⓐ BARS | - | - | - | - | - | - | - | - | - | #5 | #5 | #5 | #5 | #5 | #5 | #5 | #5 |
| ⓑ BARS | - | - | - | - | - | - | #6 | #6 | #6 | #7 | #7 | #7 | #7 | #7 | #7 | #7 | #7 |
| ⓒ BARS | #5 | #5 | #6 | #6 | #7 | #8 | #8 | #9 | #10 | #10 | #11 | #11 | #11 | #11 | #11 | #11 | #11 |
| ⓓ BARS | #5 | #6 | #5 | #6 | #6 | #7 | #8 | #10 | #10 | #10 | #10 | #10 | #10 | #10 | #10 | #10 | #10 |
| h1 | - | - | - | 8'-3" | 10'-0" | 10'-7" | 12'-2" | 12'-11" | 13'-8" | 12'-7" | 13'-9" | 14'-6" | 15'-0" | 16'-3" | 17'-0" | 17'-9" | 18'-8" |
| h2 | - | - | - | - | - | - | 15'-1" | 17'-8" | 20'-3" | 19'-4" | 21'-9" | 21'-9" | 21'-4" | 22'-3" | 22'-6" | 23'-0" | 23'-6" |
| h3 | - | - | - | - | - | - | - | - | - | 20'-4" | 22'-1" | 22'-7" | 22'-10" | 23'-10" | 28'-7" | 30'-1" | 31'-0" |
| No. of Toe Stirrups | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 6 |
| No. of Heel Stirrups | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 4 | 6 | 7 | 7 | 8 | 8 | 8 | 8 |
| ZONE 1 Ⓢ BARS | #4 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #6 @ 12" | #6 @ 12" | #7 @ 12" | #7 @ 12" |
| ZONE 2 Ⓢ BARS | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #6 @ 12" | #6 @ 12" | #6 @ 12" | #7 @ 12" | #7 @ 12" | #7 @ 12" | #8 @ 12" | #8 @ 12" | |
| Ser: B', $q_o$ | 6.2, 0.6 | 6.5, 0.8 | 7.5, 1.1 | 8.2, 1.5 | 9.3, 1.7 | 10.8, 2.0 | 13.6, 2.1 | 15.9, 2.4 | 15.1, 2.9 | 16.2, 3.1 | 17.6, 3.4 | 18.8, 3.7 | 19.9, 4.0 | 21.0, 4.3 | 21.4, 4.6 | 22.3, 4.9 | 23.0, 5.2 |
| Str: B', $q_o$ | 6.0, 1.3 | 6.4, 1.6 | 7.3, 2.1 | 8.1, 2.6 | 9.1, 3.0 | 10.5, 3.5 | 13.3, 3.6 | 15.6, 4.1 | 14.7, 4.8 | 15.8, 5.2 | 17.2, 5.6 | 18.3, 5.9 | 19.4, 6.3 | 20.4, 6.8 | 20.8, 7.3 | 21.6, 7.7 | 22.2, 8.1 |
| Ext I: B', $q_o$ | 5.8, 1.7 | 4.8, 2.6 | 5.2, 3.5 | 5.5, 4.5 | 6.1, 5.1 | 7.2, 5.6 | 9.7, 5.3 | 11.7, 5.6 | 10.4, 7.0 | 11.2, 7.5 | 12.3, 7.9 | 13.2, 8.2 | 14.0, 8.7 | 14.7, 9.2 | 14.8, 9.9 | 15.4, 10.4 | 15.9, 11.0 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.
REGISTERED PROFESSIONAL ENGINEER Gary Wang No. C58298 Exp. 6-30-26 CIVIL STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

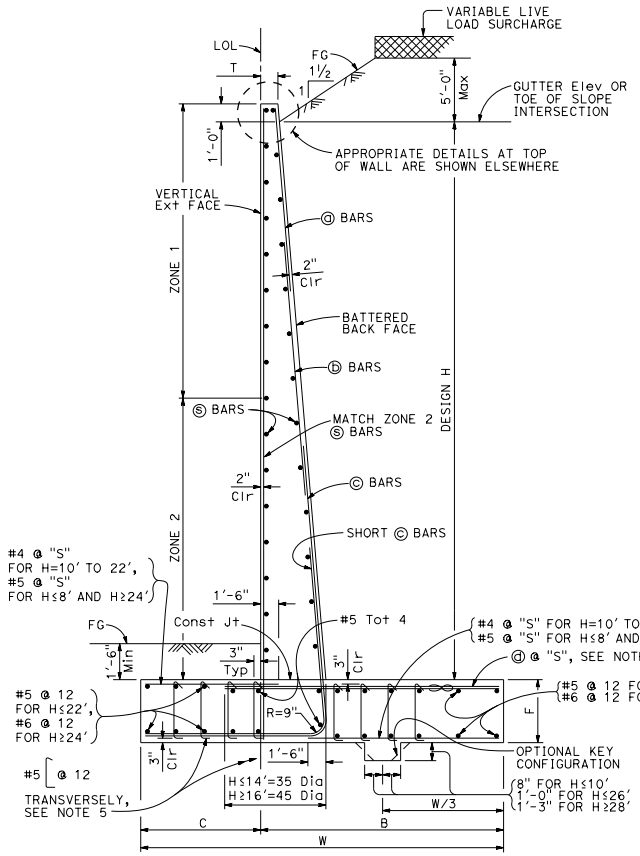
# RETAINING WALL TYPE 1 (CASE 2)

NO SCALE

**B3-1B**

7-1-25

Return to Table of Contents




## TYPICAL SECTION

## DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

## DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019

LS: Variable live load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

SEISMIC: $k_h = 0.2$, $k_v = 0.0$

SOIL BACKFILL: $\phi = 34°$, $\gamma = 120$ pcf  SOIL FOR BASE FRICTION: $\phi = 32°$, $\gamma = 120$ pcf

REINFORCED CONCRETE: $f'c = 3{,}600$ psi, $fy = 60{,}000$ psi

LOAD COMBINATIONS AND LIMIT STATES:

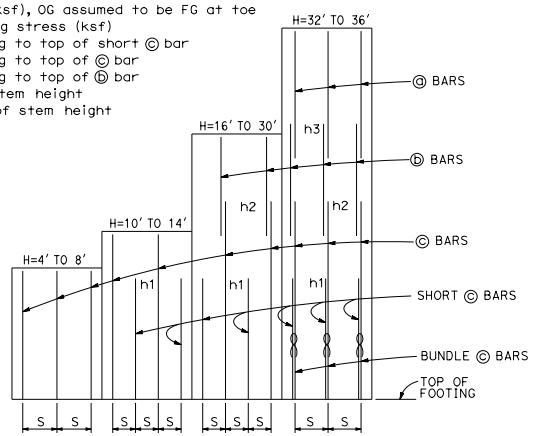
| | |
|---|---|
| Service I | $Q = 1.00DC+1.00EV+1.00EH+1.00LS$ |
| Strength I | $Q = \alpha DC+\beta EV+\eta EH+1.75LS$ |
| Extreme I | $Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE$ |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

## SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
B' - effective footing width (ft)
$q_o'$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)
h1 = Top of footing to top of short ⓒ bar
h2 = Top of footing to top of ⓒ bar
h3 = Top of footing to top of ⓑ bar
Zone 1 = Top half of stem height
Zone 2 = Bottom half of stem height
⋈ - Bundle of two bars




## ELEVATION

## NOTES:

1. For details not shown and drainage notes, see B3-5.
2. For wall stem joint details, see B0-3 / 3-3 and B0-3 / 3-4.
3. At ⓒ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.
4. Bundle ⓓ bars for H = 36'.
5. Hook stirrups around & space with alternating transverse reinforcement at 2 x "S". For required number of toe or heel stirrup rows, see table. The first stirrups are placed adjacent to the stem as shown.

## TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 4' | 6' | 8' | 10' | 12' | 14' | 16' | 18' | 20' | 22' | 24' | 26' | 28' | 30' | 32' | 34' | 36' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | 5'-9" | 6'-0" | 6'-9" | 8'-2" | 9'-9" | 11'-1" | 12'-6" | 13'-5" | 14'-5" | 15'-4" | 16'-3" | 17'-6" | 19'-3" | 20'-0" | 21'-0" | 22'-3" | 23'-6" |
| C | 1'-9" | 2'-0" | 2'-3" | 2'-8" | 3'-0" | 3'-6" | 3'-9" | 4'-3" | 4'-9" | 5'-0" | 5'-3" | 6'-0" | 7'-6" | 7'-9" | 8'-0" | 8'-6" | 9'-3" |
| B | 4'-0" | 4'-0" | 4'-6" | 5'-6" | 6'-9" | 7'-7" | 8'-9" | 9'-2" | 9'-8" | 10'-4" | 11'-0" | 11'-6" | 11'-9" | 12'-3" | 13'-0" | 13'-9" | 14'-3" |
| F | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-6" | 1'-8" | 1'-10" | 2'-1" | 2'-2" | 2'-3" | 2'-10" | 2'-10" | 2'-10" | 3'-0" | 3'-3" | 3'-3" | 3'-3" |
| T | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 11.5" | 1'-3" | 1'-6" | 1'-8" | 2'-1" |
| BATTER | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.5: 12 | 0.75: 12 | 0.875:12 | 0.75: 12 | 1: 12 | 1.125: 12 | 1.2: 12 | 1.2: 12 | 1.2: 12 | 1.2: 12 |
| SPACING "S" | 16" | 16" | 14" | 8" | 8" | 7" | 6" | 6" | 6" | 6" | 6" | 7" | 7" | 6" | 6" | 6" | 5" | 8" |
| ⓐ BARS | - | - | - | - | - | - | - | - | - | - | - | - | - | - | #5 | #6 | #6 |
| ⓑ BARS | - | - | - | - | - | - | #5 | #5 | #5 | #6 | #7 | #7 | #7 | #7 | #8 | #9 | #9 |
| ⓒ BARS | #5 | #5 | #6 | #5 | #7 | #6 | #7 | #8 | #8 | #9 | #10 | #10 | #10 | #10 | #10 | #10 | #11 |
| ⓓ BARS | #5 | #5 | #6 | #6 | #8 | #7 | #10 | #9 | #8 | #9 | #11 | #10 | #10 | #10 | #11 | #11 | #11 |
| h1 | - | - | - | 7'-3" | 10'-6" | 9'-8" | 11'-2" | 12'-7" | 13'-4" | 14'-6" | 17'-10" | 18'-5" | 17'-4" | 18'-4" | 19'-1" | 16'-10" | 16'-9" |
| h2 | - | - | - | - | - | - | 13'-11" | 16'-8" | 18'-1" | 19'-5" | 22'-2" | 23'-4" | 23'-4" | 24'-10" | 23'-7" | 19'-7" | 19'-6" |
| h3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 28'-1" | 27'-5" | 27'-8" |
| No. of Toe Stirrups | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 4 | 5 | 5 | 6 | 6 |
| No. of Heel Stirrups | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| ZONE 1 Ⓢ BARS | #4 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #4 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #6 @ 12" | #6 @ 12" |
| ZONE 2 Ⓢ BARS | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #5 @ 18" | #4 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #5 @ 12" | #6 @ 12" | #6 @ 12" | #7 @ 12" | #7 @ 12" | #7 @ 12" | #7 @ 12" |
| Ser: B', $q_o$ | 5.5, 0.6 | 4.4, 1.2 | 4.5, 1.7 | 5.5, 1.9 | 6.5, 2.2 | 7.4, 2.4 | 8.4, 2.7 | 9.1, 2.9 | 9.8, 3.2 | 10.5, 3.4 | 11.2, 3.7 | 12.3, 3.8 | 14.5, 3.6 | 14.5, 4.0 | 15.2, 4.3 | 16.5, 4.4 | 17.7, 4.5 |
| Str: B', $q_o$ | 5.5, 1.3 | 3.1, 2.3 | 2.7, 3.4 | 3.1, 3.9 | 3.6, 4.5 | 4.0, 5.1 | 4.5, 5.5 | 4.7, 6.2 | 4.9, 6.9 | 5.3, 7.3 | 5.7, 7.7 | 6.4, 7.8 | 8.1, 6.8 | 7.7, 8.1 | 8.1, 8.7 | 9.1, 8.6 | 10.0, 8.5 |
| Ext I: B', $q_o$ | 4.4, 1.3 | 3.1, 2.1 | 4.1, 2.5 | 4.9, 2.8 | 5.8, 3.3 | 6.6, 3.6 | 7.3, 4.2 | 7.7, 4.7 | 8.1, 5.2 | 8.4, 5.7 | 8.7, 6.4 | 9.4, 6.8 | 11.6, 6.1 | 11.6, 6.7 | 12.0, 7.4 | 12.9, 7.6 | 13.9, 7.6 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
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REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 1 (CASE 3)

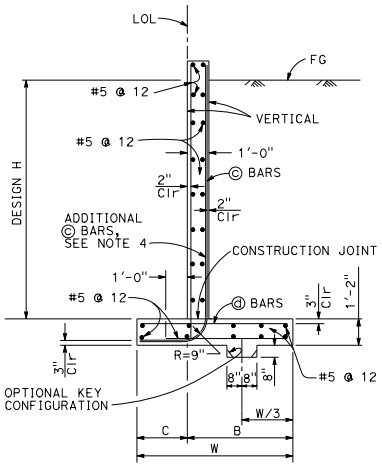
NO SCALE

**B3-1C**

7-1-25

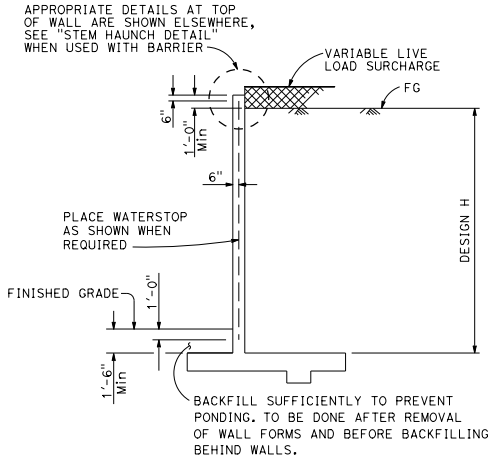


Return to Table of Contents

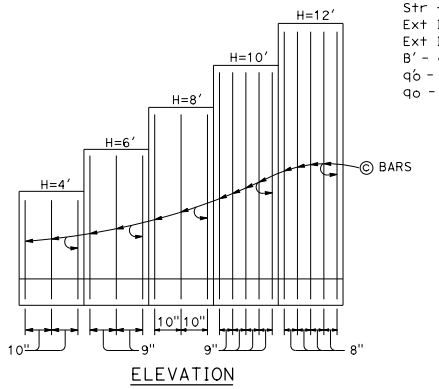



## SPREAD FOOTING SECTION

Place concrete in toe against undisturbed material, except as permitted by the Engineer.



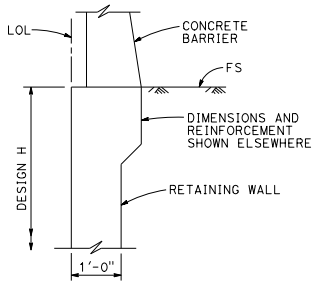

## DESIGN SECTION



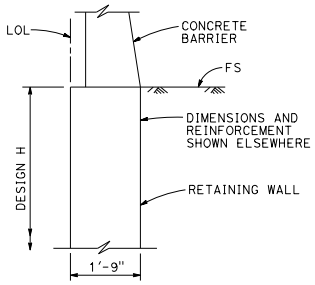

## ELEVATION

SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
Ext II - extreme event limit state II
B' - effective footing width (ft)
$q_o'$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)




## STEM HAUNCH DETAIL




## NO STEM HAUNCH ALTERNATIVE

| TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA | | | | | |
|---|---|---|---|---|---|
| DESIGN H | 4' | 6' | 8' | 10' | 12' |
| W | 6'-0" | 6'-3" | 6'-6" | 7'-4" | 8'-2" |
| C | 2'-0" | 2'-0" | 2'-0" | 2'-4" | 2'-7" |
| B | 4'-0" | 4'-3" | 4'-6" | 5'-0" | 5'-7" |
| Ⓒ BARS | #6 @ 10 | #6 @ 9 | #7 @ 10 | #7 @ 9 | #7 @ 8 |
| ⓓ BARS | #5 @ 10 | #5 @ 9 | #6 @ 10 | #7 @ 9 | #7 @ 8 |
| Ser: B', $q_o'$ | 6.0, 0.8 | 5.6, 1.1 | 5.2, 1.5 | 5.7, 1.7 | 6.2, 2.0 |
| Str: B', $q_o$ | 4.5, 1.4 | 3.2, 1.9 | 2.5, 3.0 | 2.8, 3.4 | 3.1, 3.9 |
| Ext I: B', $q_o$ | 4.4, 1.2 | 4.1, 1.7 | 3.7, 2.4 | 4.1, 2.8 | 4.4, 3.2 |
| Ext II: B', $q_o$ | 1.1, 4.7 | 1.6, 4.3 | 2.0, 4.3 | 3.4, 3.3 | 4.6, 3.1 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019

LS: Variable live load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

CT: 54 kip transverse force applied at 32" above FS, distributed over 10 feet at the top of wall and 1 : 1 distribution down and outward. Distribution below footing taken no less than 40'.

SEISMIC: $k_h$ = 0.2, $k_v$ = 0.0

SOIL BACKFILL: ø = 34°, γ = 120 pcf — SOIL FOR BASE FRICTION: ø = 32°, γ = 120 pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+βEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |
| Extreme II | Q = 1.00DC+1.00EV+1.00EH+0.5LS+1.0CT |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |
| CT: | Vehicular Collision Force |

NOTES:

1. For details not shown and drainage notes, see B3-5.
2. For wall stem joint details, see B0-3 3-3 and B0-3 3-4.
3. At Ⓒ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.
4. Provide #6 @ 8" Ⓒ bars in addition to tabulated Ⓒ bars over a distance of 8'-0" measured from all expansion joints, begin wall and end wall location.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 1A (CASE 1)

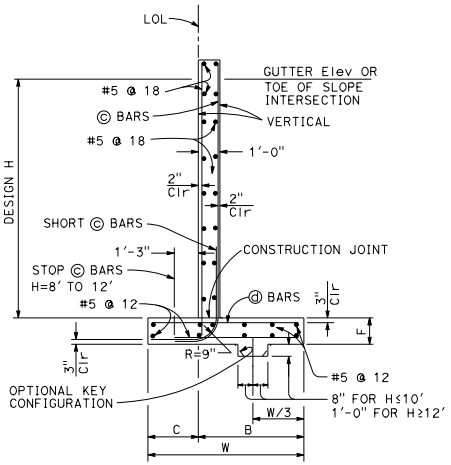
NO SCALE

B3-3A

2025 STANDARD PLAN B3-3A

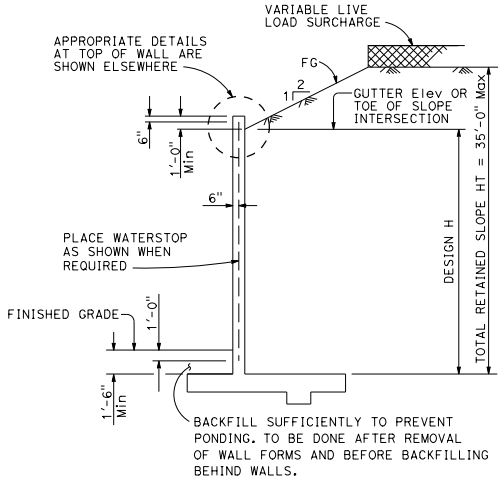
7-1-25

Return to Table of Contents

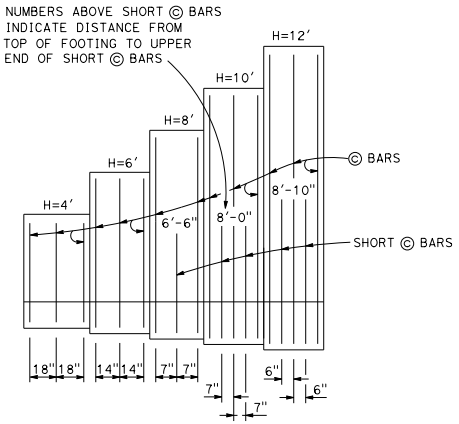



## SPREAD FOOTING SECTION

Place concrete in toe against undisturbed material, except as permitted by the Engineer.




## DESIGN SECTION




## ELEVATION

## SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
B' - effective footing width (ft)
$q'_o$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)

| TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA | | | | | |
|---|---|---|---|---|---|
| DESIGN H | 4' | 6' | 8' | 10' | 12' |
| W | 4'-3" | 5'-9" | 6'-7" | 7'-4" | 8'-3" |
| C | 1'-3" | 1'-9" | 2'-4" | 2'-4" | 2'-6" |
| B | 3'-0" | 4'-0" | 4'-3" | 5'-0" | 5'-9" |
| F | 1'-4" | 1'-7" | 1'-7" | 1'-9" | 1'-9" |
| © BARS | #5 @ 18 | #5 @ 12 | #5 @ 7 | #6 @ 7 | #7 @ 6 |
| ⓓ BARS | #5 @ 18 | #5 @ 12 | #5 @ 7 | #5 @ 7 | #6 @ 6 |
| Ser: B', $q'_o$ | 3.9, 0.7 | 5.3, 1.0 | 6.0, 1.2 | 6.2, 1.7 | 6.8, 2.0 |
| Str: B', $q_o$ | 3.8, 1.4 | 5.2, 1.8 | 5.9, 2.1 | 6.0, 2.8 | 6.6, 3.4 |
| Ext I: B', $q_o$ | 2.6, 2.6 | 3.6, 3.1 | 3.9, 3.6 | 3.7, 5.0 | 4.0, 5.9 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

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## DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

## DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019

LS: Variable live load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

SEISMIC: $k_h = 0.2$, $k_v = 0.0$

SOIL BACKFILL: $\phi = 34°$, $\gamma = 120$ pcf

SOIL FOR BASE FRICTION: $\phi = 32°$, $\gamma = 120$ pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+βEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

## NOTES:

1. For details not shown and drainage notes, see B3-5.
2. For wall stem joint details, see B0-3 3-3 and B0-3 3-4.
3. At © and short © bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 1A (CASE 2)

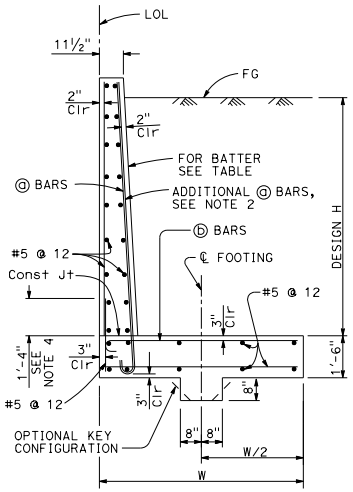
NO SCALE

**B3-3B**

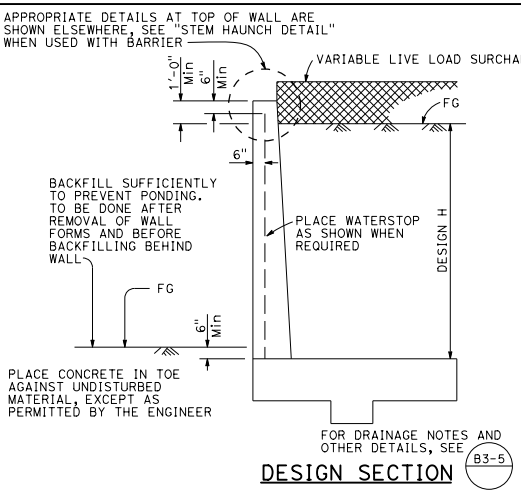
7-1-25



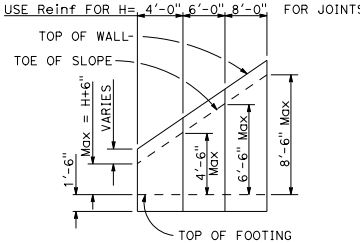
Return to Table of Contents

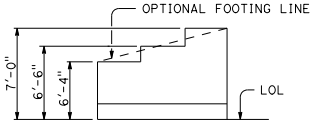



SPREAD FOOTING SECTION

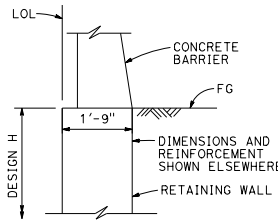



DESIGN SECTION

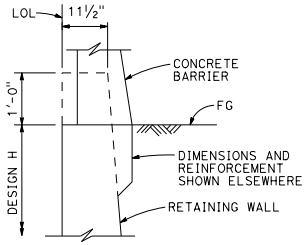


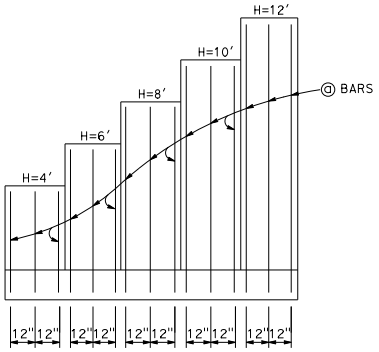

TYPICAL LAYOUT EXAMPLE




NO STEM HAUNCH ALTERNATIVE
SEE NOTE 3




STEM HAUNCH DETAIL




ELEVATION

SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
Ext II - extreme event limit state II
B' - effective footing width (ft)
$q_o'$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)

TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 4' | 6' | 8' | 10' | 12' |
|---|---|---|---|---|---|
| W | 6'-4" | 6'-6" | 7'-0" | 8'-0" | 8'-10" |
| BATTER | NONE | 1/4 : 12 | 1/4 : 12 | 3/8 : 12 | 1/2 : 12 |
| ⓐ BARS | #7 @ 12 | #7 @ 12 | #7 @ 12 | #7 @ 12 | #7 @ 12 |
| ⓑ BARS | #5 @ 6 | #5 @ 6 | #5 @ 6 | #6 @ 6 | #7 @ 6 |
| Ser: B', $q_o'$ | 5.0, 1.6 | 4.6, 2.1 | 4.6, 2.6 | 5.2, 3.0 | 5.6, 3.4 |
| Str: B', $q_o$ | 3.6, 2.4 | 2.5, 3.3 | 2.4, 4.3 | 2.9, 4.7 | 3.2, 5.3 |
| Ext I: B', $q_o$ | 3.0, 2.3 | 2.6, 3.4 | 2.5, 4.8 | 2.8, 5.5 | 3.0, 6.6 |
| Ext II: B', $q_o$ | 0.9, 7.3 | 1.3, 6.6 | 2.1, 5.6 | 3.4, 4.5 | 4.5, 4.4 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER Gary Wang No. C58298 Exp. 6-30-26 CIVIL STATE OF CALIFORNIA
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DESIGN CONDITIONS:

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DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019

LS: Variable Live Load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

CT: 54 kip transverse force applied at 32" above FG, distributed over 10 feet at the top of wall and 1 : 1 distribution down and outward. Distribution below footing taken no less than 40'.

SEISMIC: $k_h = 0.2$, $k_v = 0.0$

SOIL BACKFILL: ø = 34°, γ = 120 pcf; SOIL FOR BASE FRICTION: ø = 32°, γ = 120 pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+ØEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |
| Extreme II | Q = 1.00DC+1.00EV+1.00EH+0.50LS+1.00CT |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| ø: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |
| CT: | Vehicular Collision Force |

NOTES:

1. At ⓐ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.
2. Provide #6 @ 8" ⓐ bars in addition to tabulated ⓐ bars over a distance of 8'-0" measured from all expansion joints, begin wall and end wall locations.
3. Constant stem thickness of 1'-9" at all DESIGN H, in No Stem Haunch Alternative.
4. Non-contact lap splice length. Maximum transverse spacing of spliced rebars to be 3 inches.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 5 (CASE 1)

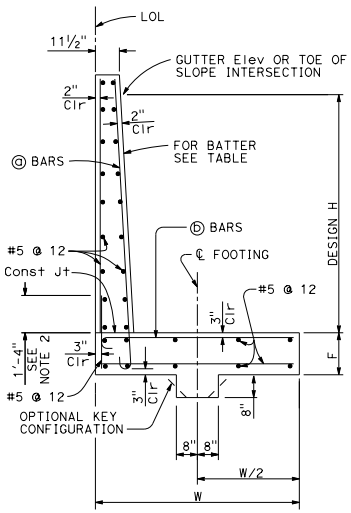
NO SCALE

B3-4A

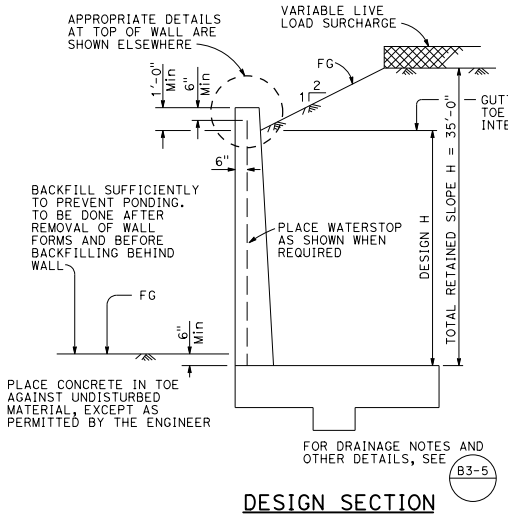
2025 STANDARD PLAN B3-4A

7-1-25

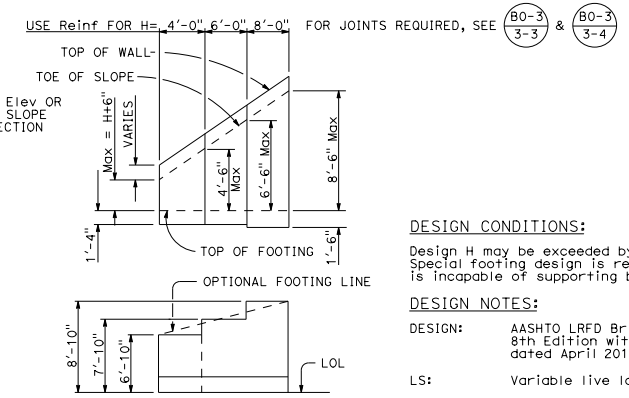
Return to Table of Contents



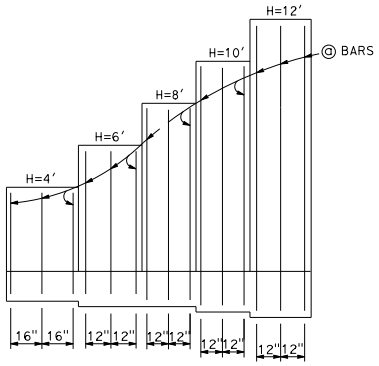

SPREAD FOOTING SECTION




DESIGN SECTION




TYPICAL LAYOUT EXAMPLE




ELEVATION

SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
B' - effective footing width (ft)
$q'_o$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)

TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 4' | 6' | 8' | 10' | 12' |
|---|---|---|---|---|---|
| W | 6'-10" | 7'-10" | 8'-10" | 9'-10" | 11'-0" |
| F SPREAD FOOTING | 1'-4" | 1'-4" | 1'-6" | 1'-6" | 1'-10" |
| BATTER | NONE | NONE | ⅜ : 12 | ½ : 12 | ⅝ : 12 |
| ⓐ BARS | #5 @ 12 | #6 @ 12 | #7 @ 12 | #8 @ 12 | #9 @ 12 |
| ⓑ BARS | #5 @ 6 | #5 @ 6 | #6 @ 6 | #7 @ 6 | #8 @ 6 |
| Ser: B', $q'_o$ | 4.1, 1.5 | 6.8, 1.5 | 7.4, 2.0 | 8.0, 2.4 | 8.7, 3.0 |
| Str: B', $q_o$ | 2.4, 2.8 | 2.7, 3.6 | 3.0, 4.6 | 3.3, 5.4 | 3.8, 6.2 |
| Ext I: B', $q_o$ | 5.3, 2.3 | 4.8, 2.9 | 4.8, 3.9 | 5.0, 4.9 | 5.2, 6.2 |

DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019.

LS: Variable live load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

SEISMIC: $k_h$ = 0.2, $k_v$ = 0.0

SOIL BACKFILL: ø = 34°, γ = 120 pcf — SOIL FOR BASE FRICTION: ø = 32°, γ = 120 pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+βEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

NOTES:

1. At ⓐ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.

2. Non-contact lap splice length. Maximum transverse spacing of spliced rebars to be 3 inches.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Gary Wang No. C58298 Exp. 6-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 5 (CASE 2)

NO SCALE

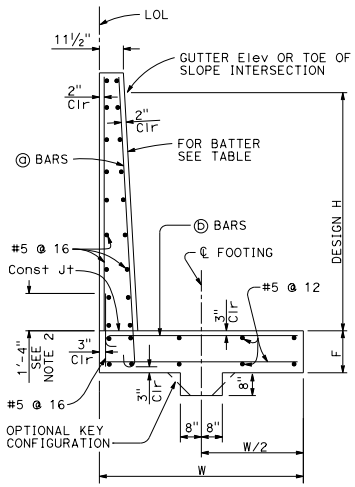
B3-4B

2025 STANDARD PLAN B3-4B

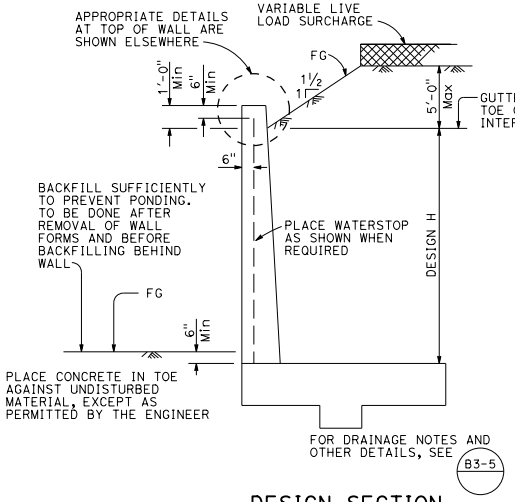


7-1-25

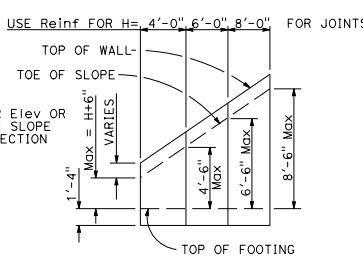
Return to Table of Contents

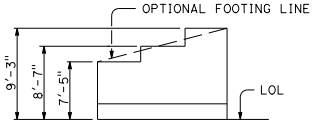



SPREAD FOOTING SECTION




DESIGN SECTION




TYPICAL LAYOUT EXAMPLE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
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REGISTERED PROFESSIONAL ENGINEER
Gary Wang
No. C58298
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019.

LS: Variable live load surcharge on level ground surface

DC: Stem Architectural Treatment of thickness up to 2" of concrete (25 psf) considered

SEISMIC: $k_h = 0.2$, $k_v = 0.0$

SOIL BACKFILL: ø = 34°, γ = 120 pcf

SOIL FOR BASE FRICTION: ø = 32°, γ = 120 pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+βEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |

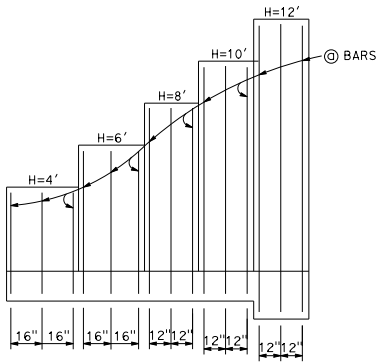
Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

NOTES:

1. At ⓐ bars:
   H ≤ 6', no splices are allowed within 1'-8" above the top of footing.
   H > 6', no splices are allowed within H/4 above the top of footing.

2. Non-contact lap splice length. Maximum transverse spacing of spliced rebars to be 3 inches.




ELEVATION

SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I - extreme event limit state I
B' - effective footing width (ft)
$q'_o$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)

TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 4' | 6' | 8' | 10' | 12' |
|---|---|---|---|---|---|
| W | 7'-5" | 8'-7" | 9'-3" | 10'-0" | 10'-9" |
| F SPREAD FOOTING | 1'-4" | 1'-4" | 1'-4" | 1'-4" | 1'-7" |
| BATTER | NONE | ⅜ : 12 | ⅜ : 12 | ⅝ : 12 | ⅝ : 12 |
| ⓐ BARS | #5 @ 12 | #5 @ 12 | #5 @ 12 | #6 @ 12 | #7 @ 12 |
| ⓑ BARS | #5 @ 6 | #6 @ 6 | #7 @ 6 | #8 @ 6 | #8 @ 6 |
| Ser: B', $q'_o$ | 4.5, 1.6 | 5.2, 2.1 | 5.7, 2.5 | 6.2, 3.0 | 6.3, 3.6 |
| Str: B', $q_o$ | 2.5, 3.1 | 3.0, 3.8 | 3.2, 4.7 | 3.5, 5.3 | 3.9, 6.0 |
| Ext I: B', $q_o$ | 4.8, 1.8 | 5.1, 2.6 | 4.9, 3.5 | 4.8, 4.5 | 4.7, 5.9 |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 5 (CASE 3)

NO SCALE

B3-4C

7-1-25

2025 STANDARD PLAN B3-4C

Return to Table of Contents

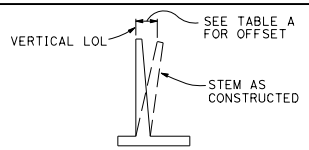
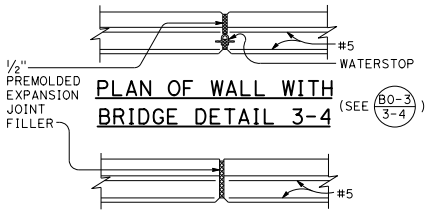



TABLE A

| H | OFFSET |
|---|---|
| 4'-12' | H/200 |
| 14'-16' | H/160 |
| 18'-20' | H/140 |
| 22'-24' | H/130 |
| 26'-36' | 2½" |

## APPROXIMATE WALL OFFSET VALUES

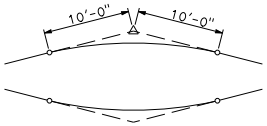
Values for offseting forms to be determined by the Engineer.




## PLAN OF WALL WITH BRIDGE DETAIL 3-4

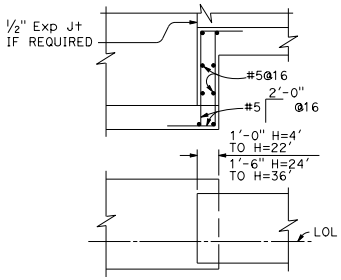
(SEE B0-3 3-4)

## PLAN OF WALL WITH EXPANSION JOINT ONLY

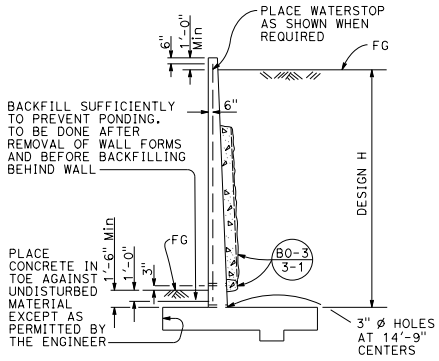



## 20'-0" VC AT TOP OF WALL SLOPE CHANGE

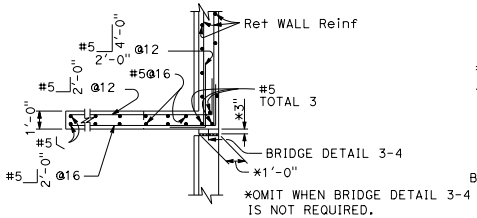
Where shown on the plans



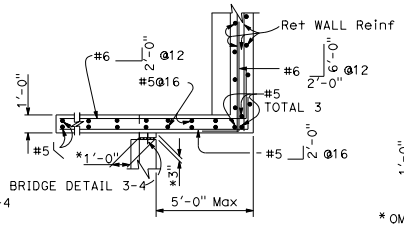

## FOOTING STEP



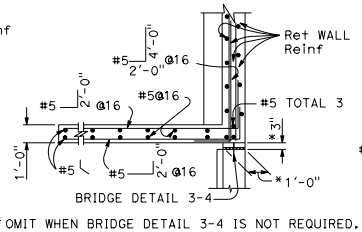

## DESIGN AND DRAINAGE



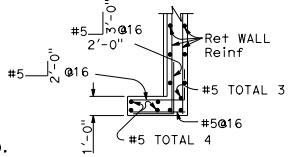

PLAN
(For return wall Type "A")



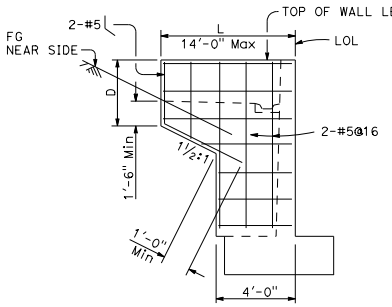

PLAN
(For return wall Type "B")



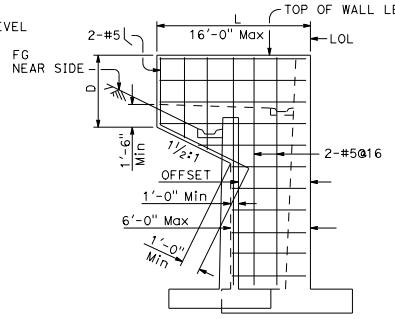

PLAN
(For return wall Type "C")



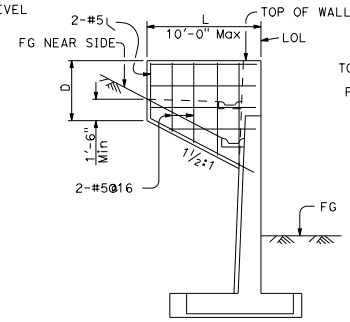

PLAN
(For return wall Type "D")



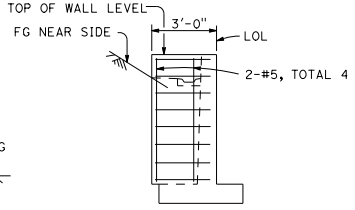

ELEVATION
## RETURN WALL TYPE "A"
Use where H=8' or less




ELEVATION
## RETURN WALL TYPE "B"
Use where H=10' or more on offset walls




ELEVATION
## RETURN WALL TYPE "C"
Use where H=10' or more on straight walls




ELEVATION
## RETURN WALL TYPE "D"
Use where H=6' or less

### DESIGN CONDITIONS:

Design "H" may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in table

Return wall not required unless shown elsewhere

### DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 4th edition with California Amendments

LIVE LOAD: Surcharge on level ground surface

SOIL: ø = 34°
γ = 120 pcf

REINFORCED CONCRETE: fy = 60,000 psi
fc' = 3,600 psi

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Gary Wang
No. C58298
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL DETAILS No. 1

NO SCALE

B3-5

7-1-25

2025 STANDARD PLAN B3-5



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

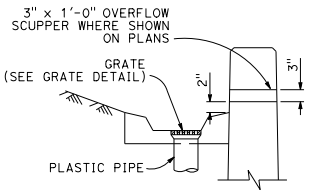
Gary Wang
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

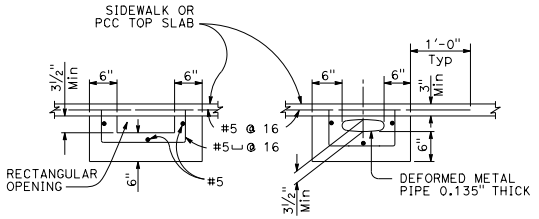
REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

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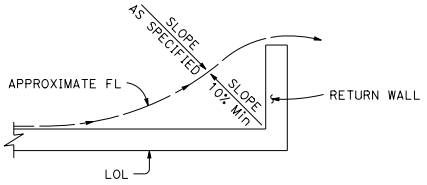

WALL DRAIN DETAIL



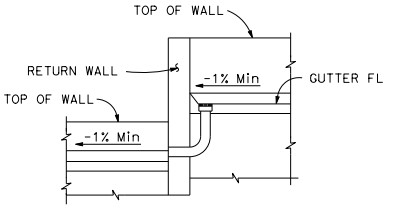

NOTES:

Area of opening to be not less than that of pipe from wall gutter. Make opening transition in wall. Edge opening in curb face to ¾" minimum radius.

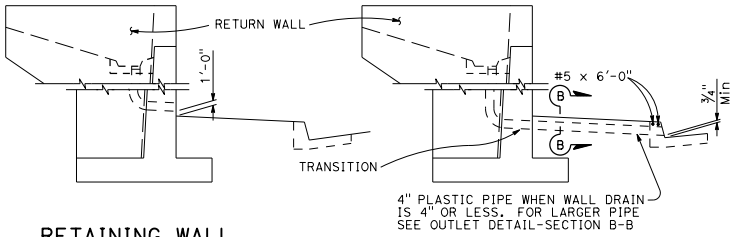
OUTLET DETAIL - SECTION B-B




WALL DRAINAGE
WHERE GUTTER NOT REQUIRED

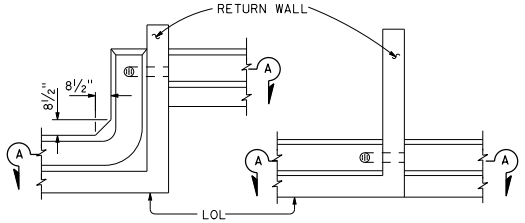



SECTION A-A



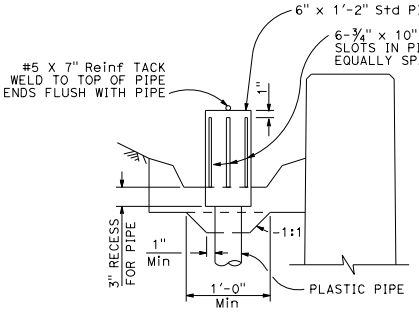

RETAINING WALL,
FACE OF WALL OUTLET

RETAINING WALL, GUTTER OUTLET

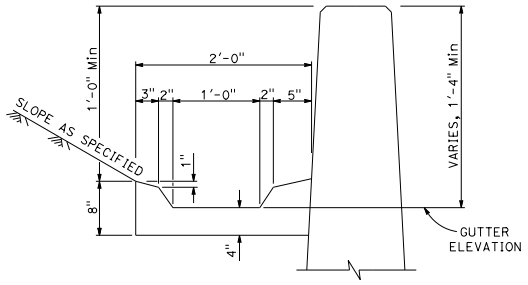



PLAN-OFFSET WALL PLAN-CONTINUOUS WALL

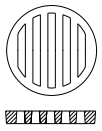
DRAIN THROUGH RETURN WALL




WALL DRAIN WITH PIPE DOME

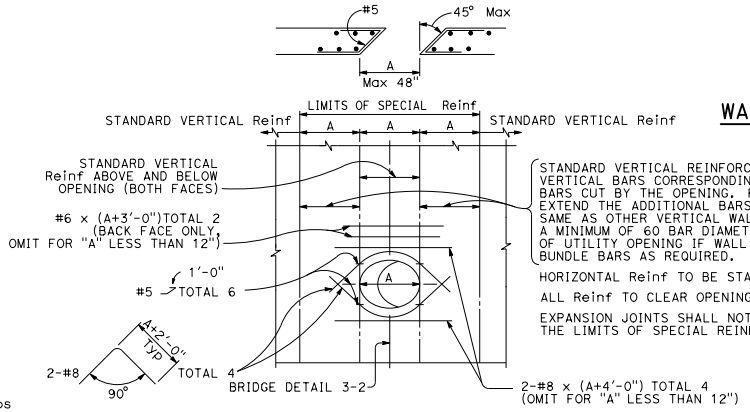



TYPICAL GUTTER DETAIL



GRATE DETAIL

Sizes to fit standard hubs




RETAINING WALL UTILITY OPENING

Max size of opening (A) = 48"

To be used in conjunction with sheet B3-5

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**RETAINING WALL DETAILS No. 2**

NO SCALE

B3-6

7-1-25

Return to Table of Contents

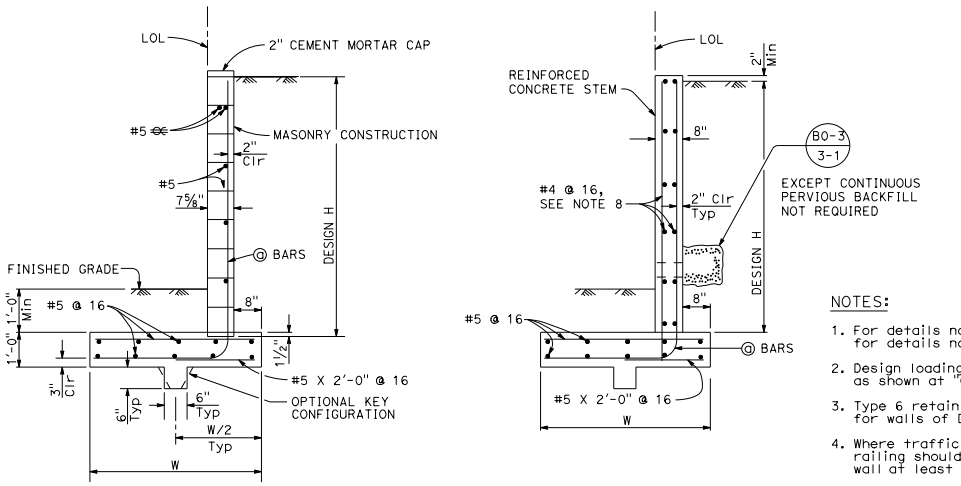
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wong
REGISTERED CIVIL ENGINEER

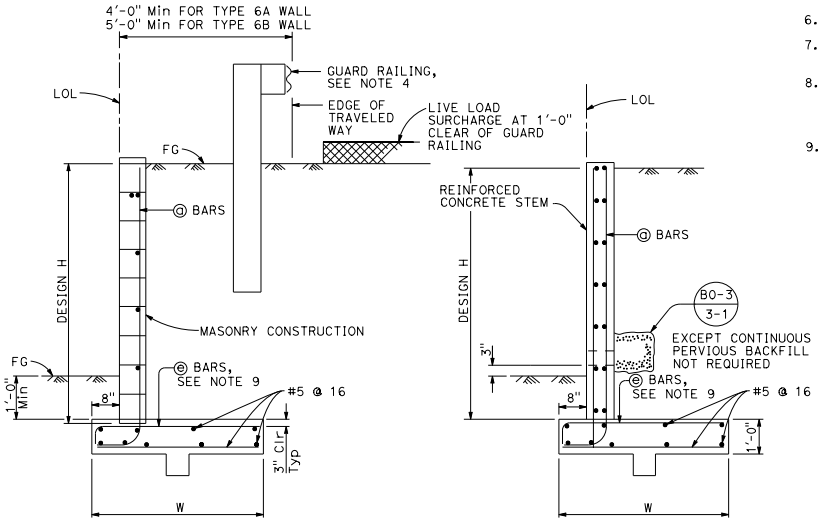
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Gary Wang — No. C58298 — Exp. 6-30-26 — CIVIL — STATE OF CALIFORNIA

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TYPE 6A WALL




TYPE 6B WALL

SYMBOLS:

Ser - service limit state I
Str - strength limit state I
Ext I- extreme event limit state I
B' - effective footing width (ft)
$q'_o$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)

NOTES:

1. For details not shown at "6B", see "6A", similarly, for details not shown at "6A", see "6B".
2. Design loading for both Type "6A" and "6B" is as shown at "6B".
3. Type 6 retaining wall shall be limited to use for walls of Design H of 6'-0" or less.
4. Where traffic is adjacent to the top of wall, guard railing should be set back from the top front face of wall at least 4'-0" or 5'-0", dependent on wall type.
5. For reinforced concrete wall stem joint details, See B0-3 3-3 and B0-3 3-4
6. No splices are allowed on @ bars.
7. See "Retaining Wall Type 6 Details" sheet for Elevation View and Footing Step Details.
8. Contractor must verify minimum spacing requirements for the horizontal stem reinforcement based on maximum aggregate size for the concrete mix being used. Horizontal stem reinforcement may be staggered by up to 2".
9. Hook of Ⓔ bar should be rotated to maintain minimum bottom clearance of 3" or replaced with a 180 degree hook.

DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019.
Building Code Requirements and Specification for Masonry Structures (TMS 402/602-16)

LS: 240 psf live load surcharge on level ground surface as limited by Guard Railing location

SEISMIC: $k_h = 0.2$, $k_v = 0.0$

SOIL BACKFILL: $\phi = 34°$, $\gamma = 120$ pcf — SOIL FOR BASE FRICTION: $\phi = 32°$, $\gamma = 120$ pcf

REINFORCED CONCRETE: $f'c = 3{,}600$ psi, $fy = 60{,}000$ psi

REINFORCED MASONRY: $fm' = 1{,}500$ psi, $fy = 60{,}000$ psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | $Q = 1.00DC+1.00EV+1.00EH+1.00LS$ |
| Strength I | $Q = \alpha DC+\beta EV+\eta EH+1.75LS$ |
| Extreme I | $Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE$ |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

TYPE 6A WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 3'-4" | 4'-0" | 4'-8" | 5'-4" | 6'-0" |
|---|---|---|---|---|---|
| W | 3'-2" | 3'-6" | 3'-10" | 4'-2" | 4'-6" |
| @ BARS | #5 @ 16 | #5 @ 16 | #5 @ 16 | #5 @ 16 | #5 @ 16 |
| Ser: B', $q'_o$ | 3.1, 0.2 | 3.4, 0.2 | 3.6, 0.3 | 3.8, 0.3 | 4.0, 0.3 |
| Str: B', $q_o$ | 3.0, 0.6 | 3.2, 0.6 | 3.4, 0.7 | 3.6, 0.7 | 3.0, 0.7 |
| Ext I: B', $q_o$ | 2.6, 0.6 | 2.8, 0.6 | 3.1, 0.7 | 3.4, 0.7 | 3.7, 0.7 |

TYPE 6B WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 3'-4" | 4'-0" | 4'-8" | 5'-4" | 6'-0" |
|---|---|---|---|---|---|
| W | 2'-8" | 3'-0" | 3'-4" | 4'-2" | 4'-6" |
| @ BARS | #5 @ 16 | #5 @ 16 | #5 @ 16 | #5 @ 16 | #5 @ 16 |
| Ⓔ BARS | #5 @ 16 | #5 @ 16 | #5 @ 16 | #5 @ 16 | #6 @ 16 |
| Ser: B', $q'_o$ | 2.2, 0.4 | 2.5, 0.5 | 2.7, 0.6 | 2.7, 0.9 | 2.9, 1.1 |
| Str: B', $q_o$ | 2.2, 0.8 | 2.4, 1.0 | 2.6, 1.1 | 1.5, 2.0 | 1.6, 2.2 |
| Ext I: B', $q_o$ | 1.5, 1.0 | 1.7, 1.2 | 1.8, 1.4 | 2.5, 1.4 | 2.6, 1.6 |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

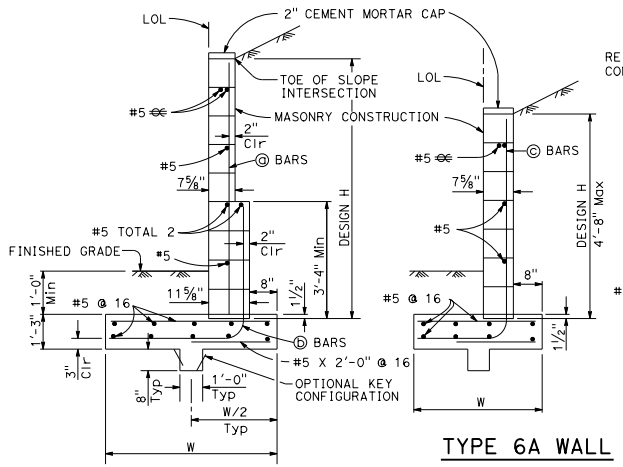
# RETAINING WALL TYPE 6 (CASE 1)

NO SCALE

B3-7A

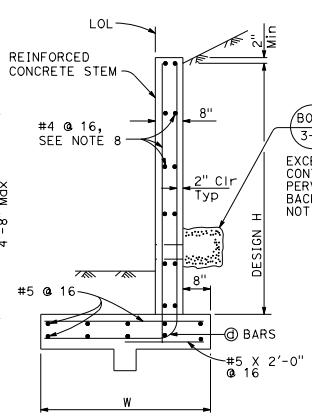
7-1-25

Return to Table of Contents

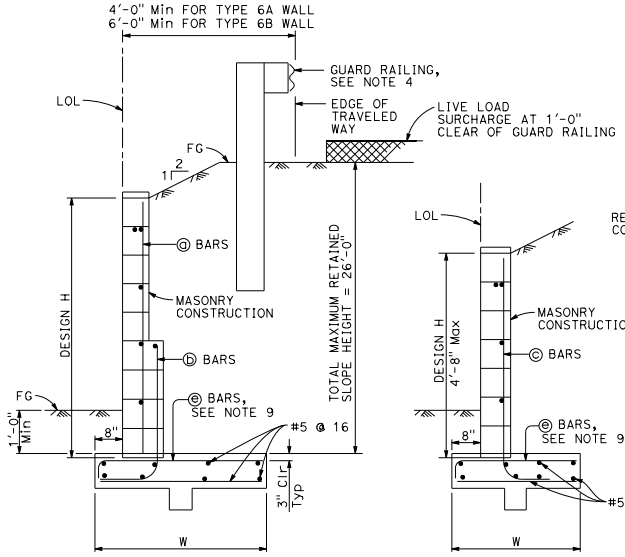


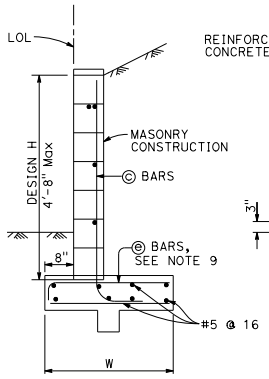


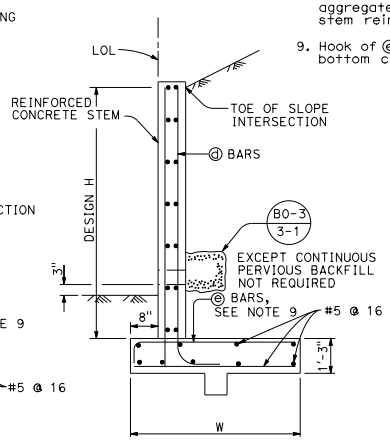





TYPE 6A WALL




TYPE 6B WALL

SYMBOLS:

Ser - service limit state 1
Str - strength limit state 1
Ext I - extreme event limit state I
B' - effective footing width (ft)
$q_o'$ - net bearing stress (ksf), OG assumed to be FG at toe
$q_o$ - gross uniform bearing stress (ksf)

NOTES:

1. For details not shown at "6B", see "6A", similarly, for details not shown at "6A", see "6B".
2. Design loading for both Type "6A" and "6B" is as shown at "6B".
3. Type 6 retaining wall shall be limited to use for walls of Design H of 6'-0" or less.
4. Where traffic is adjacent to the top of wall, guard railing should be set back from the top front face of wall at least 4'-0" or 6'-0", dependent on wall type.
5. For reinforced concrete wall stem joint details, See B0-3 3-3 and B0-3 3-4
6. No splices are allowed on ⓐ, ⓑ, ⓒ and ⓓ bars.
7. See "Retaining Wall Type 6 Details" sheet for Elevation View and Footing Step Details.
8. Contractor must verify minimum spacing requirements for the horizontal stem reinforcement based on maximum aggregate size for the concrete mix being used. Horizontal stem reinforcement may be staggered by up to 2".
9. Hook of ⓔ bar should be rotated to maintain minimum bottom clearance of 3" or replaced with a 180 degree hook.

DESIGN NOTES:

DESIGN: AASHTO LRFD Bridge Design Specifications, 8th Edition with California Amendments, Preface dated April 2019.
Building Code Requirements and Specification for Masonry Structures (TMS 402/602-16)

LS: 240 psf live load surcharge on level ground surface as limited by Guard Railing location

SEISMIC: $k_h$ = 0.2, $k_v$ = 0.0

SOIL BACKFILL: ø = 34°, γ = 120 pcf
SOIL FOR BASE FRICTION: ø = 32°, γ = 120 pcf

REINFORCED CONCRETE: f'c = 3,600 psi, fy = 60,000 psi

REINFORCED MASONRY: fm' = 1,500 psi, fy = 60,000 psi

LOAD COMBINATIONS AND LIMIT STATES:

| | |
|---|---|
| Service I | Q = 1.00DC+1.00EV+1.00EH+1.00LS |
| Strength I | Q = αDC+βEV+ηEH+1.75LS |
| Extreme I | Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE |

Where:

| | |
|---|---|
| Q: | Force Effects |
| α: | 1.25 or 0.90, Whichever Controls Design |
| β: | 1.35 or 1.00, Whichever Controls Design |
| η: | 1.50 or 0.90, Whichever Controls Design |
| DC: | Dead Load of Structure Components |
| EH: | Horizontal Earth Fill Pressure |
| EV: | Vertical Earth Pressure from Earth Fill Weight |
| LS: | Live Load Surcharge |
| EQE: | Seismic Earth Pressure |
| EQD: | Soil and Structural and Nonstructural Components Inertia |

TYPE 6A WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 3'-4" | 4'-0" | 4'-8" | 5'-4" | 6'-0" |
|---|---|---|---|---|---|
| W | 3'-2" | 3'-6" | 3'-10" | 4'-2" | 4'-6" |
| ⓐ BARS | NONE | NONE | NONE | #5 @ 16 | #5 @ 16 |
| ⓑ BARS | NONE | NONE | NONE | #5 @ 16 | #5 @ 16 |
| ⓒ BARS | #5 @ 16 | #5 @ 16 | #6 @ 16 | NONE | NONE |
| ⓓ BARS | #5 @ 16 | #5 @ 16 | #5 @ 16 | #5 @ 16 | #6 @ 16 |
| Ser: B', $q_o'$ | 3.1, 0.3 | 3.5, 0.3 | 3.8, 0.4 | 4.0, 0.4 | 4.3, 0.4 |
| Str: B', $q_o$ | 3.1, 0.8 | 3.4, 0.8 | 3.6, 0.9 | 3.9, 0.9 | 4.1, 1.0 |
| Ext I: B', $q_o$ | 2.1, 2.0 | 2.3, 2.0 | 2.5, 2.0 | 2.8, 1.9 | 3.0, 1.9 |

TYPE 6B WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA

| DESIGN H | 3'-4" | 4'-0" | 4'-8" | 5'-4" | 6'-0" |
|---|---|---|---|---|---|
| W | 3'-0" | 3'-4" | 4'-0" | 5'-6" | 5'-11" |
| ⓐ BARS | NONE | NONE | NONE | #5 @ 16 | #5 @ 16 |
| ⓑ BARS | NONE | NONE | NONE | #5 @ 8 | #5 @ 8 |
| ⓒ BARS | #5 @ 16 | #5 @ 16 | #6 @ 16 | NONE | NONE |
| ⓓ BARS | #5 @ 16 | #5 @ 16 | #6 @ 16 | #5 @ 8 | #5 @ 8 |
| ⓔ BARS | #5 @ 16 | #5 @ 16 | #5 @ 16 | #6 @ 16 | #5 @ 8 |
| Ser: B', $q_o'$ | 2.6, 0.6 | 2.8, 0.7 | 3.5, 0.8 | 3.5, 1.1 | 5.4, 1.0 |
| Str: B', $q_o$ | 2.2, 1.1 | 1.8, 1.2 | 2.9, 1.4 | 1.9, 2.5 | 2.0, 2.8 |
| Ext I: B', $q_o$ | 1.4, 3.3 | 1.5, 3.6 | 2.1, 3.2 | 3.8, 2.5 | 4.0, 2.8 |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Gary Wang
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Gary Wang No. C58298 Exp. 6-30-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 6 (CASE 2)

NO SCALE

B3-7B

7-1-25



Return to Table of Contents

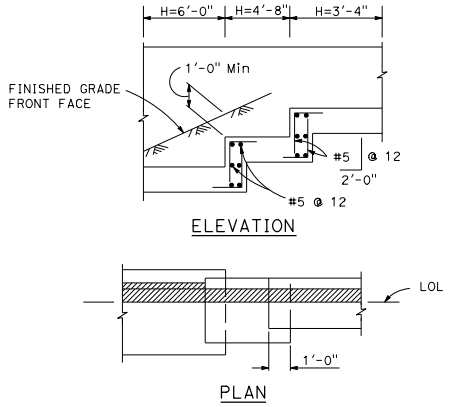
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Gary Wang
REGISTERED CIVIL ENGINEER

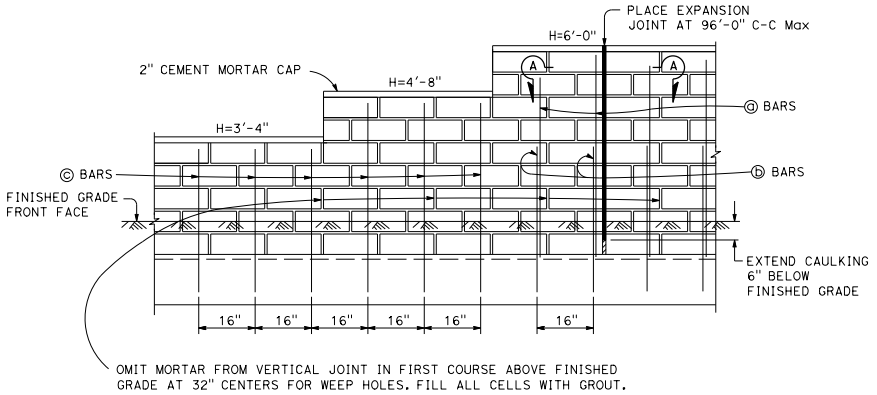
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Gary Wang
No. C58298
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

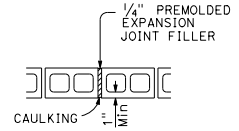
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FOOTING STEP DETAILS




ELEVATION - MASONRY CONSTRUCTION




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# RETAINING WALL TYPE 6 DETAILS

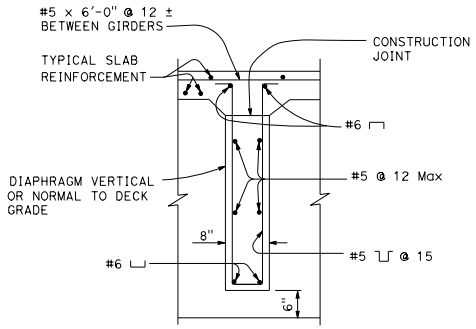
NO SCALE

B3-7C

7-1-25

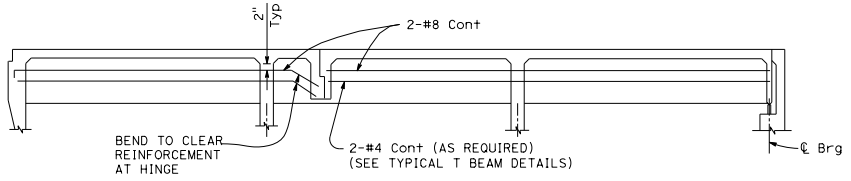


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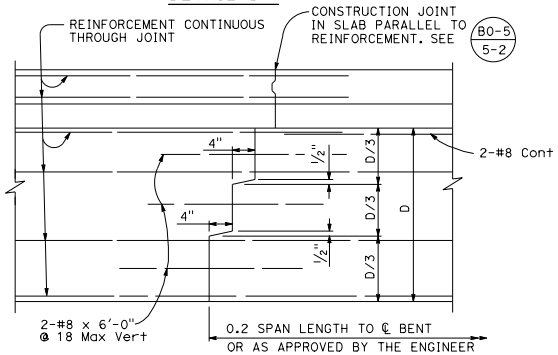

## INTERMEDIATE DIAPHRAGM SECTION

DETAIL D-1



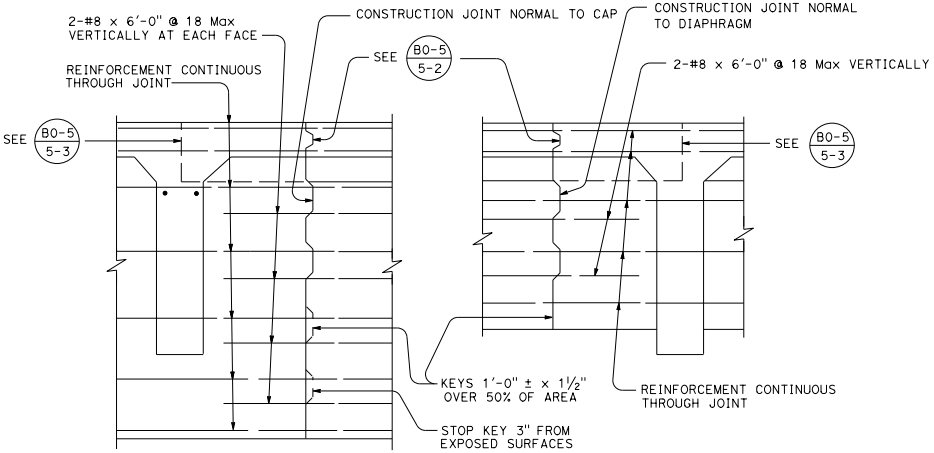

## GIRDER WEB REINFORCEMENT

DETAIL J-1



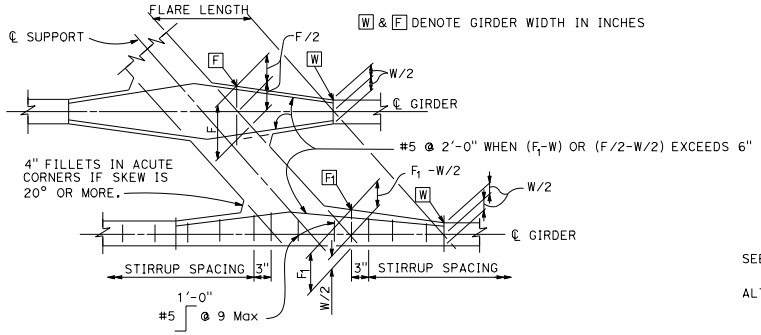

## TRANSVERSE GIRDER CONSTRUCTION JOINTS

DETAIL J-3



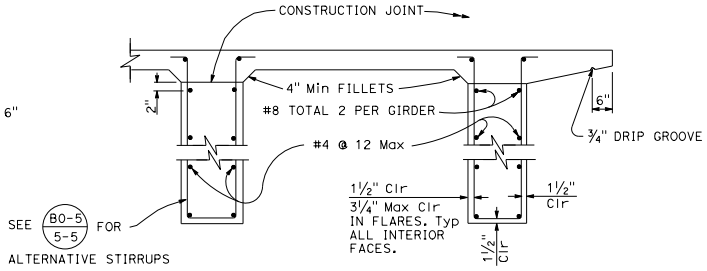

## LONGITUDINAL CONSTRUCTION JOINTS

DETAIL J-4




## TYPICAL GIRDER FLARE AND STIRRUP SPACING DIAGRAM

DETAIL S-3




## TYPICAL T BEAM DETAILS

DETAIL T-1

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Peter W. Norboe
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Peter W. Norboe
No. C57519
Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# T-BEAM DETAILS

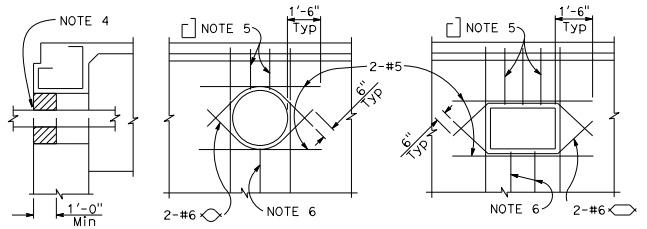
NO SCALE

B6-1

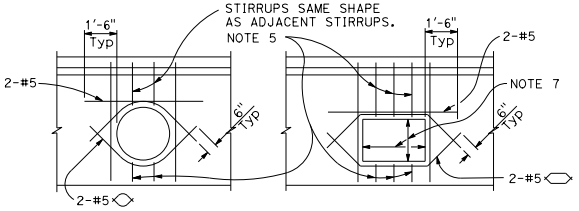
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Return to Table of Contents

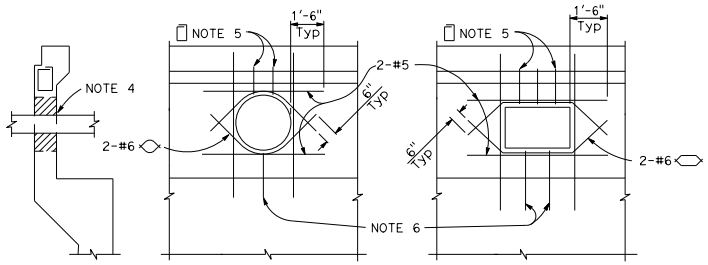



DETAIL U-11

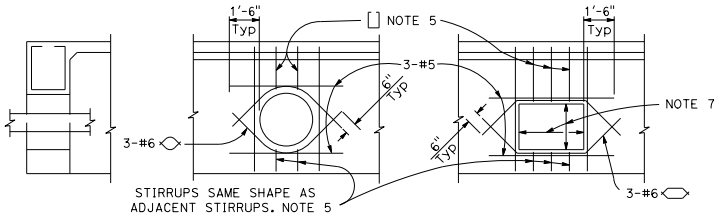



DETAIL U-15

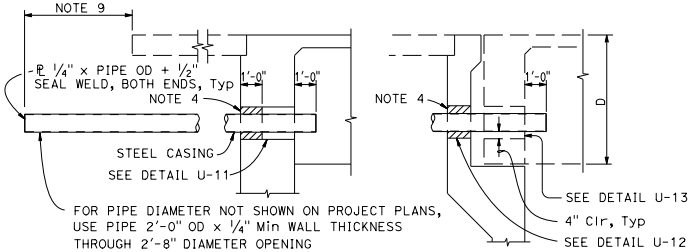
INTERMEDIATE DIAPHRAGMS




DETAIL U-12



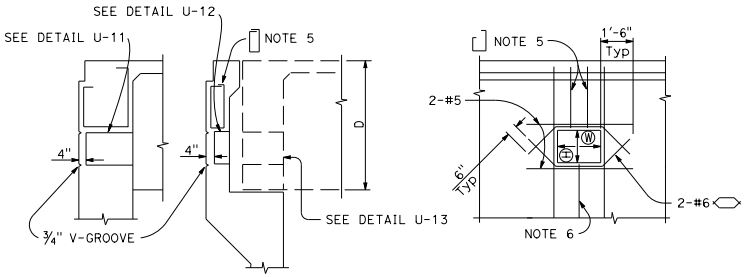

DETAIL U-13




DETAIL U-16

(For future utility provisions under approach slab)

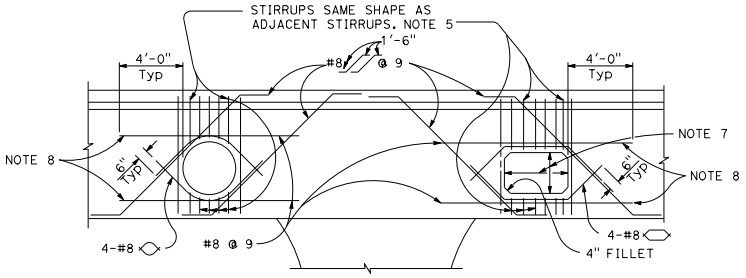
ABUTMENT DIAPHRAGMS




DETAIL U-14

(For future utility opening)

ABUTMENT DIAPHRAGMS




DETAIL U-17

BENT CAPS

Near or between columns

For future utility opening dimensions not shown on Project Plans use:

Ⓗ = 1/3 D or 1'-3" Min, whichever is greater.

Ⓦ = 1/3 D or 1'-3" Min, whichever is greater.

NOTES:

1. The exact location, elevation, size and direction of openings shall be in accordance with the Project Plans and as directed by the Engineer.
2. Girders not shown. See Project Plans.
3. All reinforcement detailed to be placed in addition to reinforcement shown on Project Plans.
4. Seal utilities at abutments with concrete or mortar, after tightly wrapping utility with 2 layers of 15 LBS building paper.
5. Reinforcement to be same bar size, and 2/3 the spacing of adjacent reinforcement shown on Project Plans.
6. Reinforcement to be same bar size and shape as adjacent reinforcement shown on Project Plans.
7. For future utility opening dimensions, see Project Plans and Detail U-14.
8. When there is insufficient space to place reinforcement as shown, hook reinforcement into exterior girder.
9. Unless otherwise shown on Project Plans, casing shall extend to the greater of 5'-0" beyond the end of the approach slab, 5'-0" beyond the end of the adjacent wingwall, or 20'-0" beyond the back of the abutment.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Peter W. Norboe
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Peter W. Norboe
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**UTILITY OPENINGS T-BEAM**

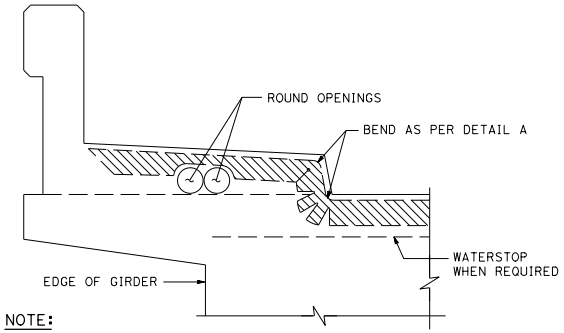
NO SCALE

**B6-10**

7-1-25

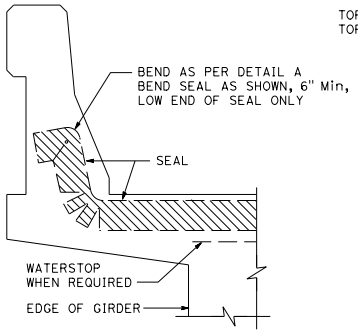


Return to Table of Contents



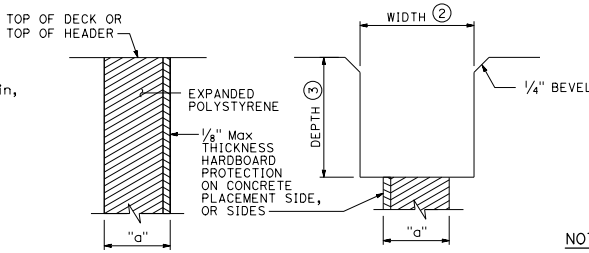

NOTE:
Type B seal shown. Type A seals to comform to the general path of seal shown, cuts for bending not required. Bend Type A seals 3" up into curb or barrier rail on only the low end of the seal.

CONCRETE BARRIER AND SIDEWALK




CONCRETE BARRIER

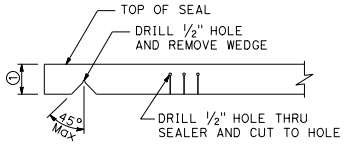
# JOINT SEALS DETAILS

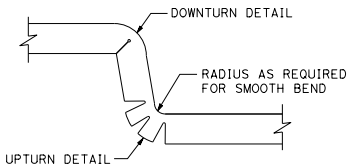



FORMING DETAIL

SAWCUT DETAIL

NOTE:
Verify all controlling field dimensions before ordering or fabricating any material.

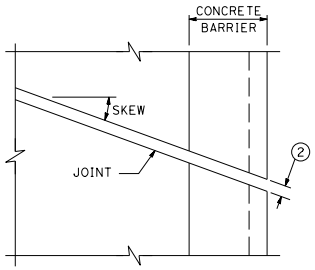


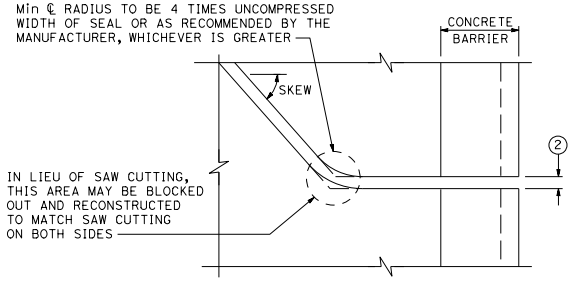

DETAIL A

NOTES:

1. Make smooth cuts from the bottom of seal to 1½" clear of top leaving at least one complete cell between the top of the cut and top of the seal. When necessary cut back of seal to clear conduit and round openings.
2. Sawcut groove widths shall be as ordered by the Engineer.
3. Depth of sawcut:
   Type A - Depth to be 2" minimum.
   Type B - Depth to be equal to or greater than the depth of seal measured along the contact surface, when compressed to minimum width position ($W_2$) plus dimensions shown.
4. MR (movement range) as shown on other plan sheets.
5. Other depths must be approved by the Engineer.
6. Cover sidewalk joint with expansion joint armor. Expansion joint armor details shown on other plan sheets.

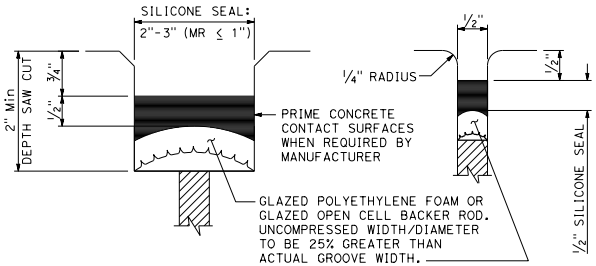



PLAN OF JOINT (SKEW ≤ 20°)



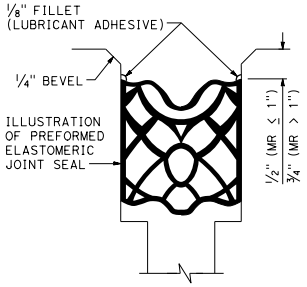

PLAN OF JOINT (SKEW > 20°)

| DIMENSIONS "a" OF JOINT REQUIRED | | | | |
|---|---|---|---|---|
| MOVEMENT RANGE (MR) (4) | BRIDGE TYPE | "a" DIMENSION | | |
| | | DECK CONCRETE PLACED | | |
| | | WINTER | FALL-SPRING | SUMMER |
| 2" | ALL EXCEPT CIP/PS | 1½" | 1¼" | ¾" |
| | CIP/PS | 1¼" | 1" | ½" |
| 1½" | ALL EXCEPT CIP/PS | 1¼" | 1" | ½" |
| | CIP/PS | 1" | ¾" | ½" |
| 1" | ALL EXCEPT CIP/PS | 1" | ¾" | ½" |
| | CIP/PS | ¾" | ½" | ½" |
| ½" | ALL EXCEPT CIP/PS | ¾" | ¾" | ½" |
| | CIP/PS | ½" | ½" | ½" |

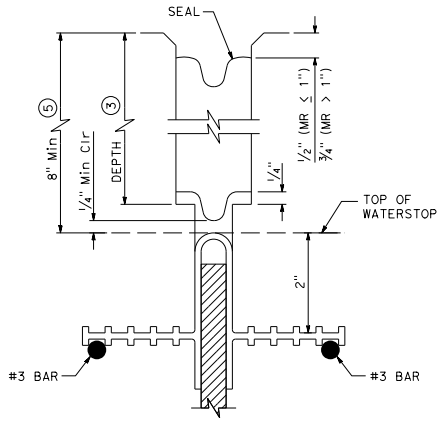



TYPE A SEAL
Movement range: Silicone = 1" Max

TYPE AL SEAL
Longitudinal joints only




TYPE B SEAL
Movement range ≤ 2"




TYPE B JOINT SEAL
IN MINIMUM WIDTH POSITION ($W_2$)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**JOINT SEALS (MAXIMUM MOVEMENT RANGE = 2")**

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Don Nguyen-Tan
No. C57510
Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

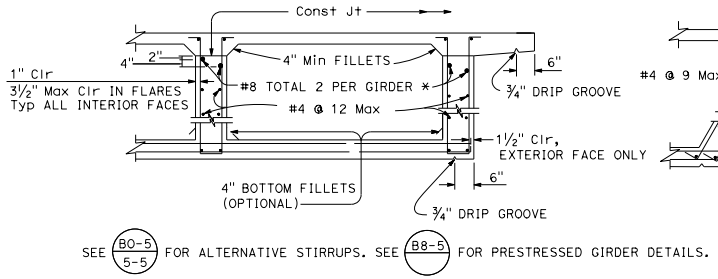
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B6-21

7-1-25



Return to Table of Contents




SEE BO-5 / 5-5 FOR ALTERNATIVE STIRRUPS. SEE B8-5 FOR PRESTRESSED GIRDER DETAILS.

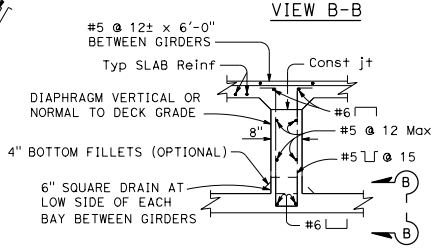
## TYPICAL BOX GIRDER DETAILS

DETAIL B-1

* At all web construction joints

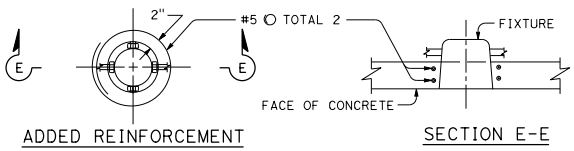



VIEW B-B




## INTERMEDIATE DIAPHRAGM SECTION

DETAIL D-1

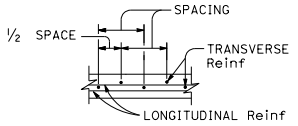



ADDED REINFORCEMENT

SECTION E-E

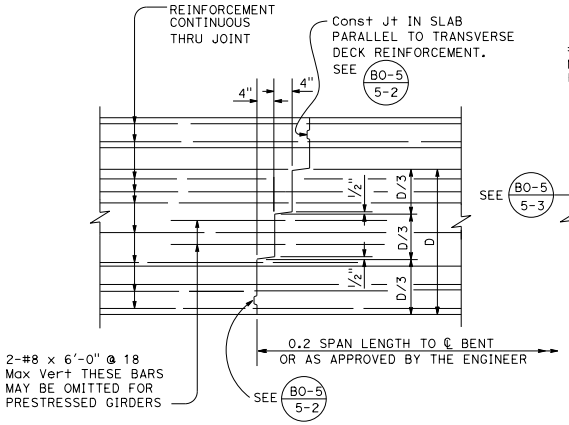
## RECESSED SOFFIT LIGHT

DETAIL F-1



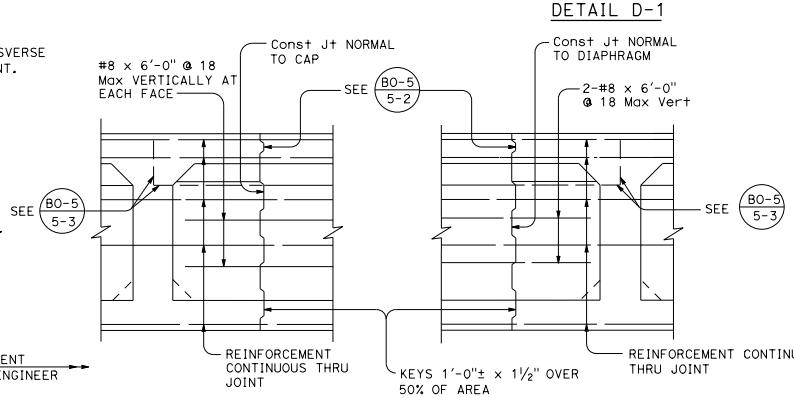

DETAIL S-2

## BOTTOM SLAB TRANSVERSE REINFORCEMENT SPACING DIAGRAM




## TRANSVERSE GIRDER CONSTRUCTION JOINTS

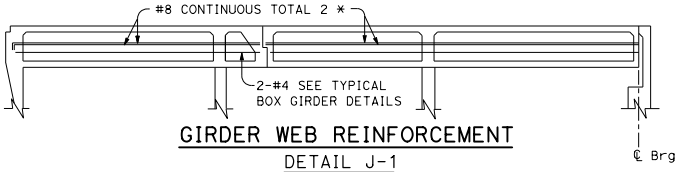
DETAIL J-3




BENT CAP DIAPHRAGMS

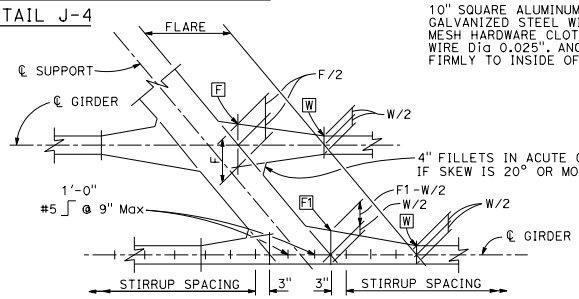
## LONGITUDINAL CONSTRUCTION JOINTS

DETAIL J-4




## GIRDER WEB REINFORCEMENT

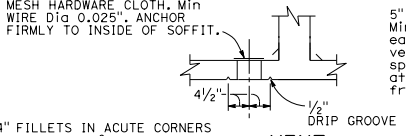
DETAIL J-1




## TYPICAL GIRDER FLARE AND STIRRUP SPACING DIAGRAM

DETAIL S-3

W and F denote girder width in inches.

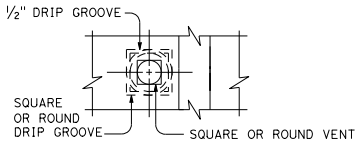



## VENT

DETAIL V-1

**NOTE:**

5" ø or ⌀ vent in lower slab. Minimum of two vents per span in each bay between girders. One vent to be located at low point of span and other vent to be located at opposite end of span @ 1'-6" from face of abutment or bent.




| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Peter W. Norboe
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Peter W. Norboe
No. C57519
Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# BOX GIRDER DETAILS

NO SCALE

B7-1

7-1-25



Return to Table of Contents

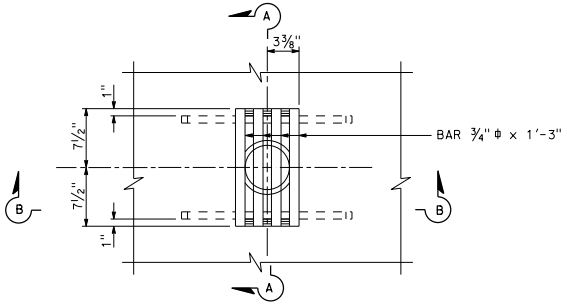
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REGISTERED CIVIL ENGINEER

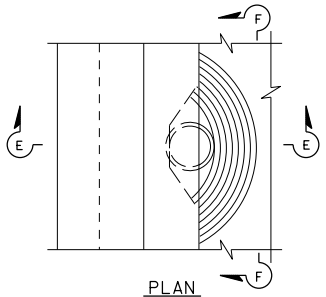
September 19, 2025
PLANS APPROVAL DATE

Don Nguyen-Tan
No. C57510
Exp. 12-31-25
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

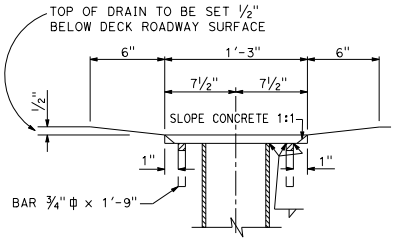
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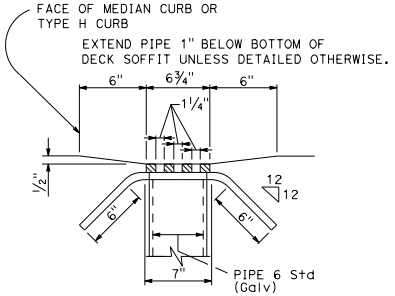

PLAN




PLAN

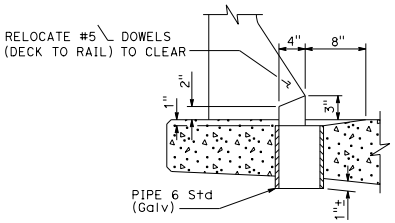



SECTION A-A

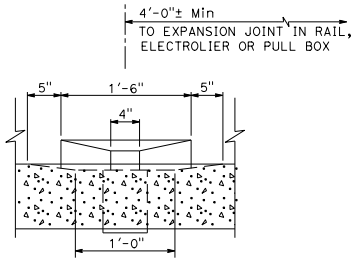



SECTION B-B

## DRAIN - TYPE "A" DETAIL 7-1



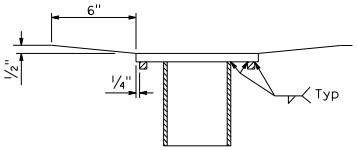

SECTION E-E



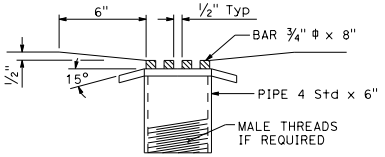

SECTION F-F

## DRAIN - TYPE "B" DETAIL 7-3

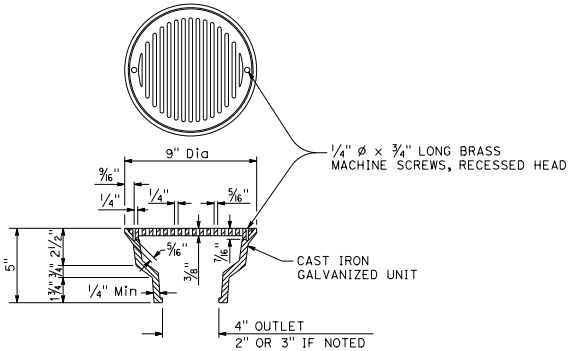
For Type 25 barrier railing



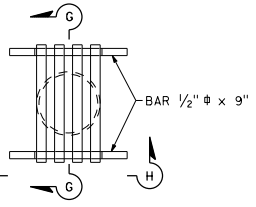

SECTION G-G




SECTION H-H

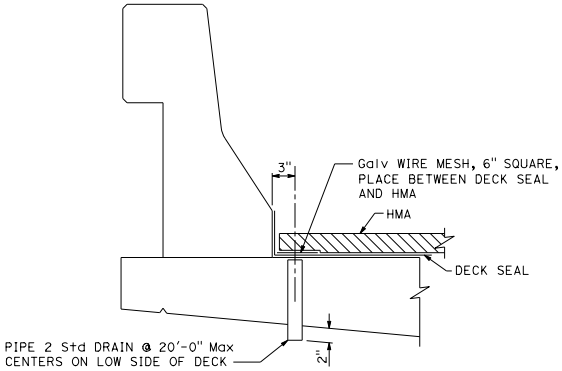



AREA DRAIN DETAIL 7-4




PLAN

PEDESTRIAN STRUCTURE DRAIN DETAIL 7-5




## DECK BLEEDER DRAIN DETAIL 7-6

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

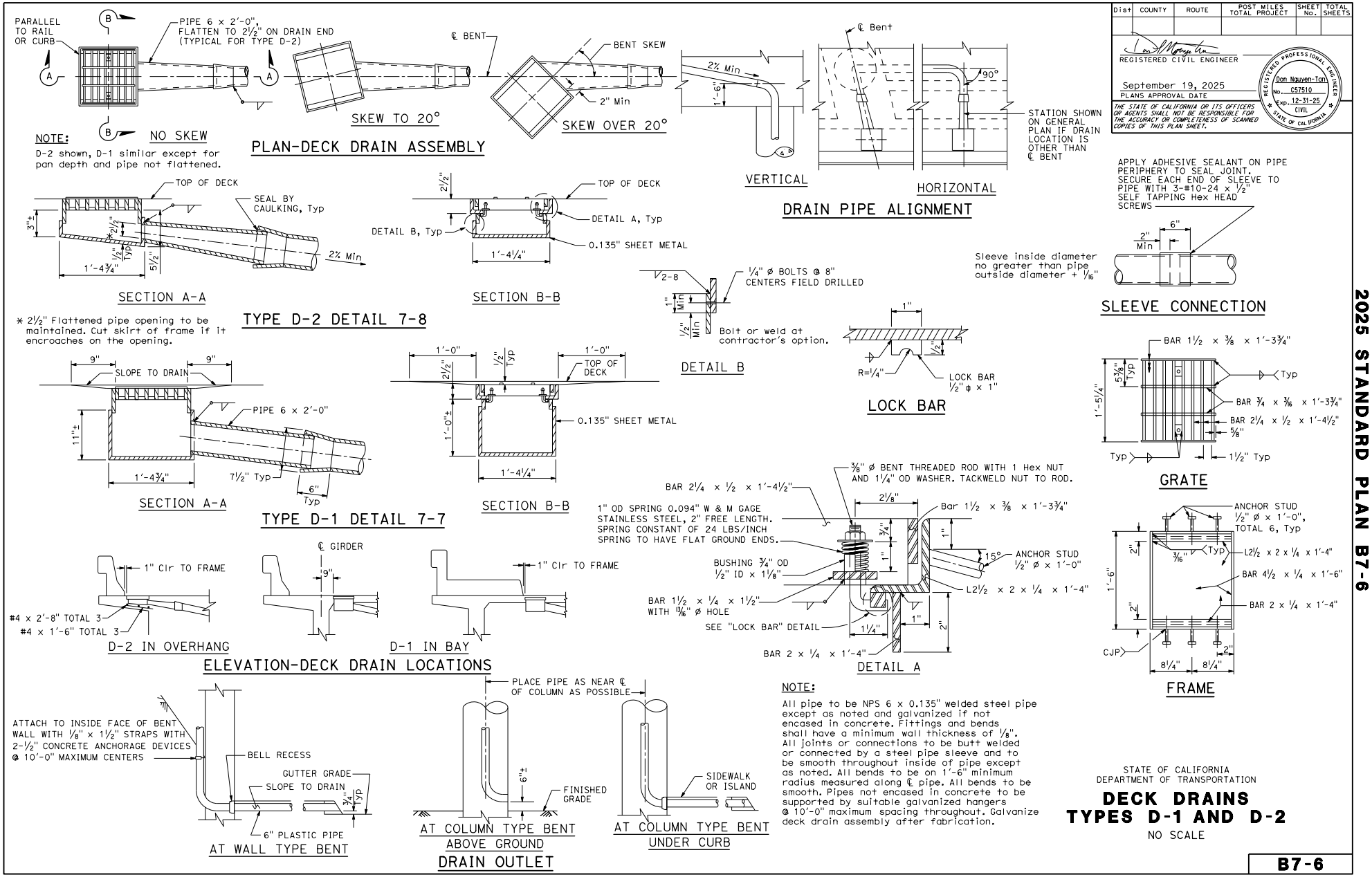
# DECK DRAINS

NO SCALE

B7-5

7-1-25

Return to Table of Contents








Return to Table of Contents

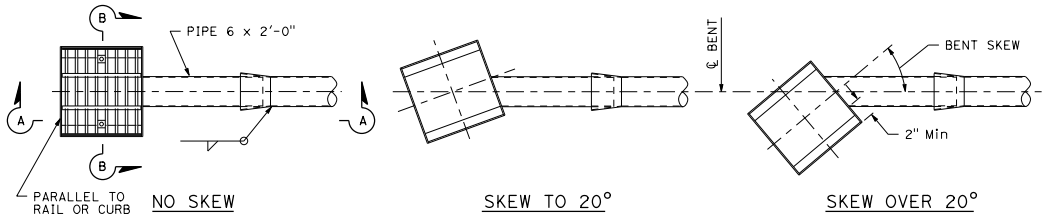
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

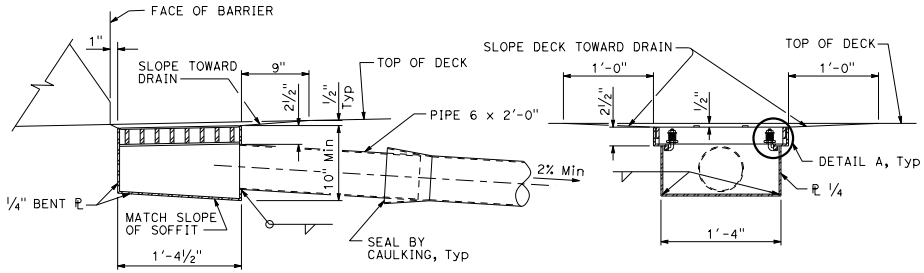
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Don Nguyen-Tan
No. C57510
Exp. 12-31-25
CIVIL
STATE OF CALIFORNIA

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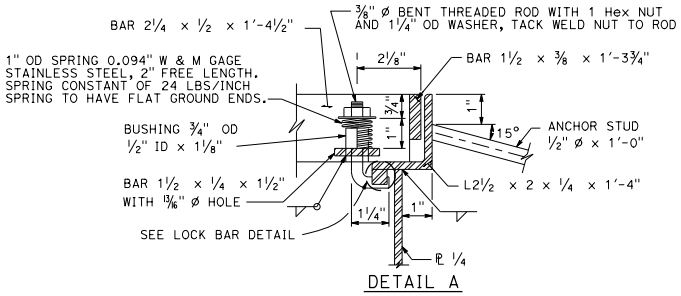



## PLAN-DECK DRAIN ASSEMBLY

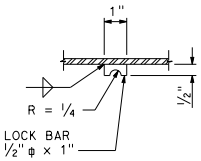



SECTION A-A SECTION B-B

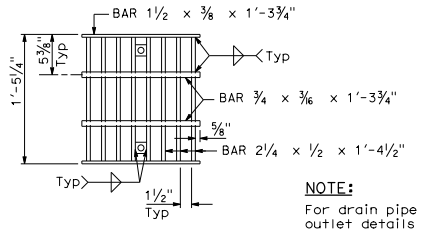
## DECK DRAIN ASSEMBLY DETAIL




DETAIL A

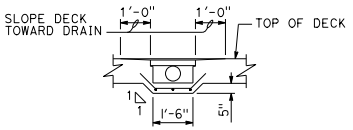



LOCK BAR

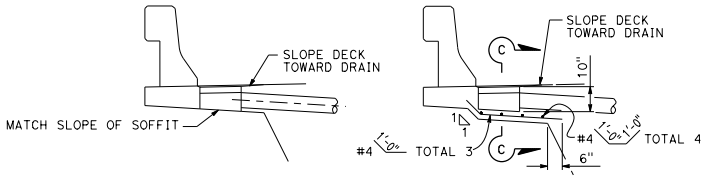



GRATE

**NOTE:**
For drain pipe alignment, sleeve connection, drain outlet details and notes, see Standard Plan B7-6.



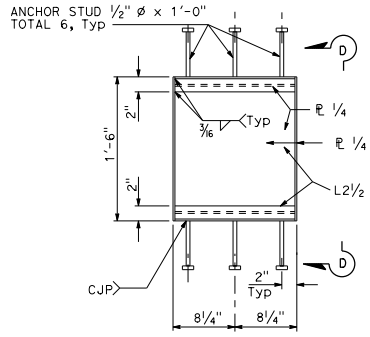

SECTION C-C



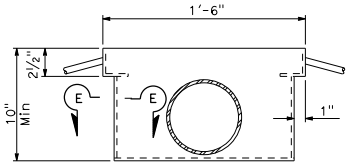

DETAIL 7-9
DRAIN FLUSH WITH OVERHANG

DETAIL 7-10
DRAIN WITH HAUNCHED OVERHANG

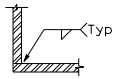
## ELEVATION-DECK DRAIN LOCATIONS




FRAME




VIEW D-D




SECTION E-E

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

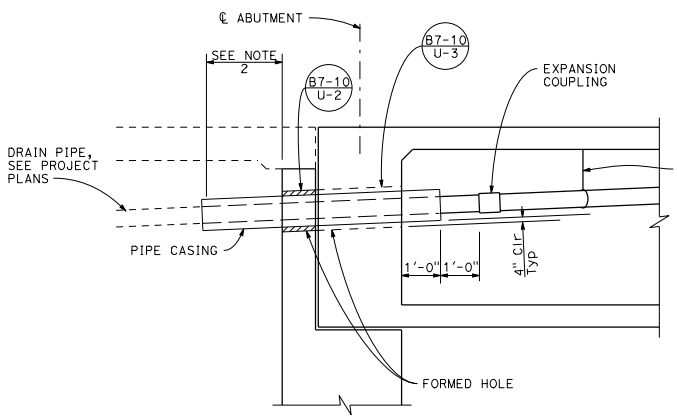
# DECK DRAIN TYPE D-3

NO SCALE

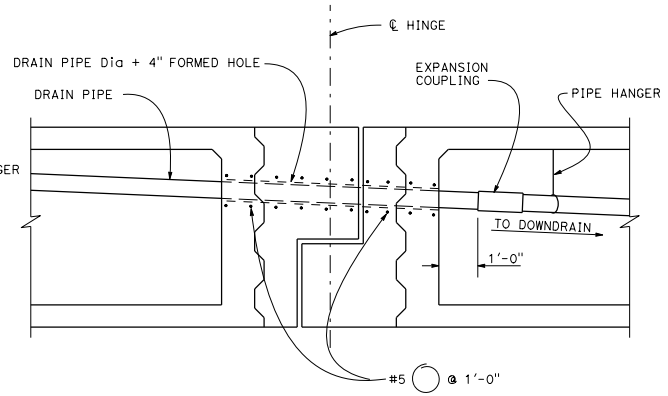
B7-7

7-1-25

Return to Table of Contents




ABUTMENT

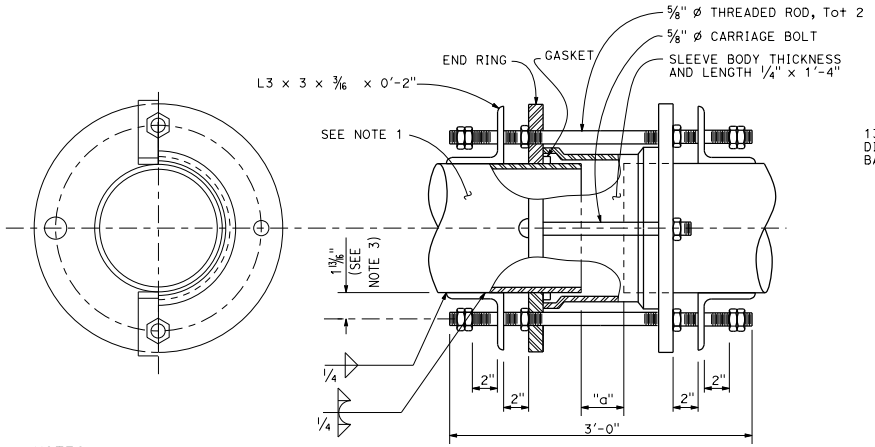



HINGE

# DECK DRAIN PIPE DETAIL

NOTES:

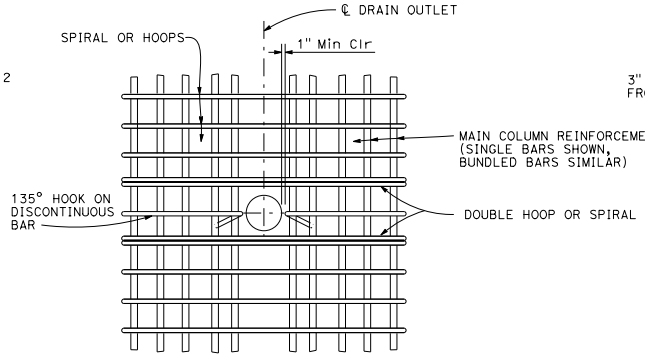
1. Pipe casing OD = Drain pipe Dia + 4" (¼" Min wall thickness).
2. Unless otherwise shown on Project Plans, casing shall extend to the greater of 5'-0" beyond the end of approach slab or 20'-0" beyond the back of abutment.




NOTES:

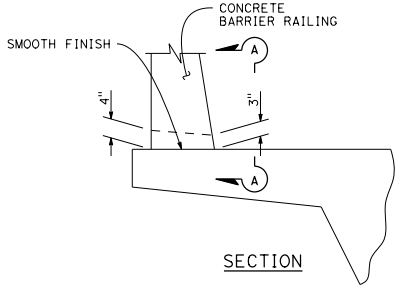
1. For "a" dimension and pipe diameter, see Project Plans.
2. Expansion coupling with 4 bolts shown. Coupling with a greater number of bolts allowed.
3. Adjust dimension to suit coupler end ring bolt circle.

## EXPANSION COUPLING

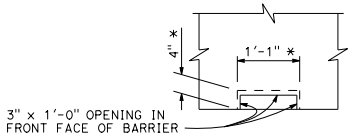



NOTE:
Adjust spacing of main column reinforcement to clear drain outlet.

## COLUMN REINFORCEMENT AT DRAIN OUTLET




SECTION




ELEVATION A-A

## SCUPPER DETAIL

* At exterior face of barrier

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Don Nguyen-Tan — No. C57510 — Exp. 12-31-25 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# DECK DRAINAGE DETAILS

NO SCALE

B7-8

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

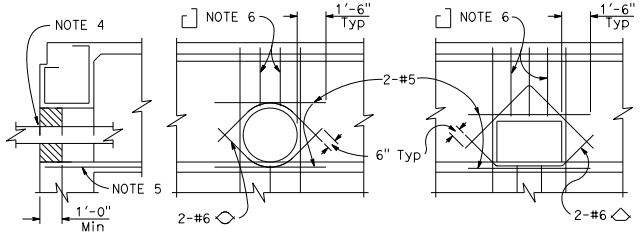
Peter W. Norboe
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

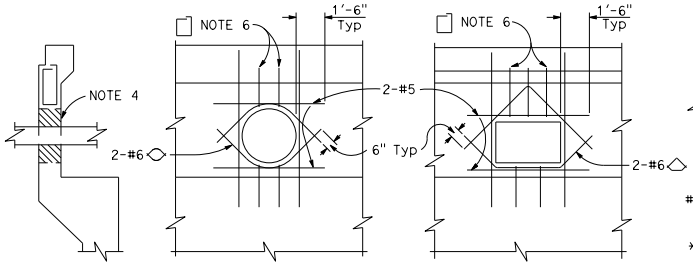
REGISTERED PROFESSIONAL ENGINEER — Peter W. Norboe — No. C57519 — Exp. 12-31-25 — CIVIL — STATE OF CALIFORNIA

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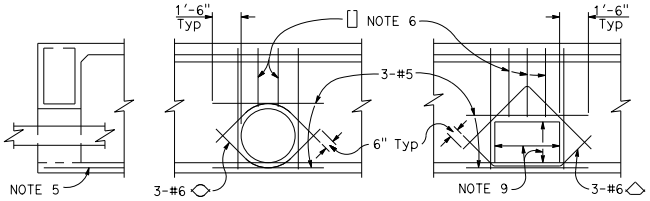
## ABUTMENT DIAPHRAGMS



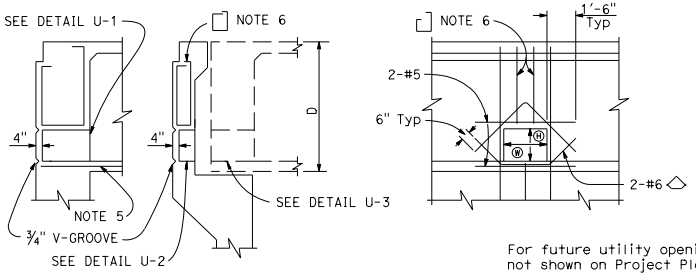

DETAIL U-1




DETAIL U-2

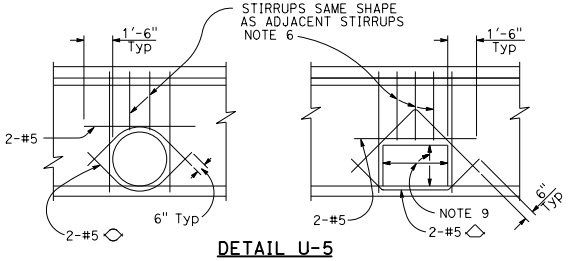



DETAIL U-3

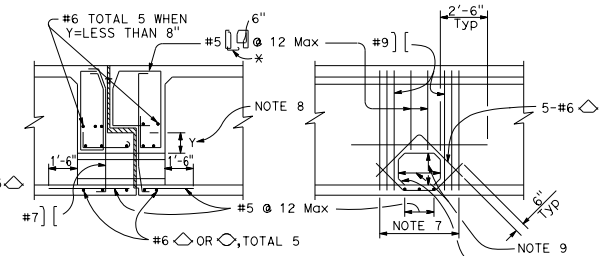



DETAIL U-4
(FOR FUTURE UTILITY OPENING)

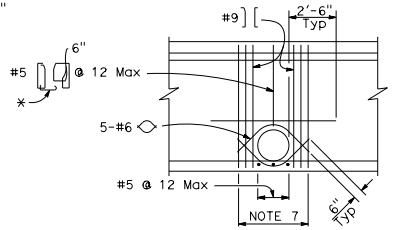
## INTERMEDIATE DIAPHRAGMS AND HINGES



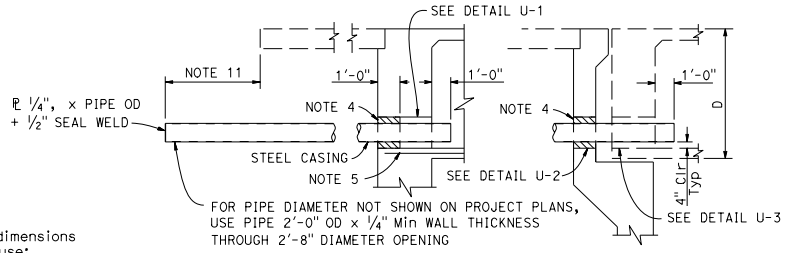

DETAIL U-5
AT INTERMEDIATE DIAPHRAGM




* Omit #5 ⌙ when Y=less than 8"



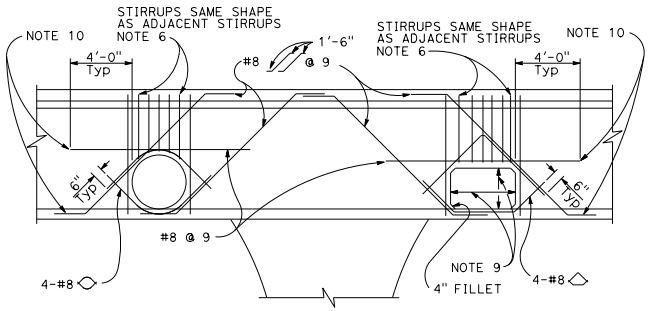

DETAIL U-6
AT HINGE




DETAIL U-8
(FOR FUTURE UTILITY PROVISIONS UNDER APPROACH SLAB)

For future utility opening dimensions not shown on Project Plans use:
Ⓗ = ⅓ D or 1'-6" minimum, whichever is greater.
Ⓦ = ⅓ D or 2'-0" minimum, whichever is greater.

## BENT CAPS




DETAIL U-7
NEAR OR BETWEEN COLUMNS

NOTES:

1. The exact location, elevation, size, and direction of openings shall be in accordance with the Project Plans and as directed by the Engineer.
2. Girders not shown. See Project Plans.
3. All reinforcement detailed to be placed in addition to reinforcement shown on Project Plans.
4. Seal utilities at abutments with concrete or mortar, after tightly wrapping utility with 2 layers of 15 LBS building paper. If structure is prestressed, seal to be placed after stressing is completed.
5. Main reinforcement to clear opening.
6. Reinforcement to be same bar size and ⅔ the spacing of adjacent reinforcement shown on Project Plans.
7. Replace each set of 2-#9 bars cut off by opening. Place ½ on each side of opening.
8. When "Y" is less than 8", extend top of opening to bottom of bearing seat elevation.
9. For future utility opening dimensions, see Project Plans and Detail U-4.
10. When there is insufficient space to place reinforcement as shown, hook reinforcement into exterior girder.
11. Unless otherwise shown on Project Plans, casing shall extend to the greater of 5'-0" beyond the end of the approach slab, 5'-0" beyond the end of the adjacent wingwall, 20'-0" beyond the back of the abutment, or to the State right-of-way limit.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# UTILITY OPENING BOX GIRDER

NO SCALE

B7-10

7-1-25



Return to Table of Contents

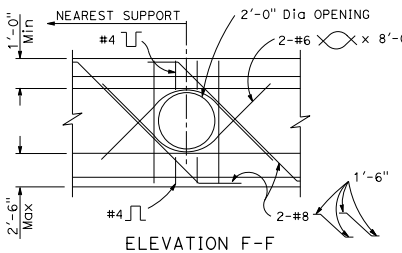
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Peter W. Norboe
REGISTERED CIVIL ENGINEER

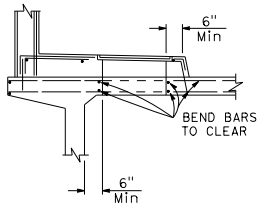
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Peter W. Norboe — No. C57519 — Exp. 12-31-25 — CIVIL — STATE OF CALIFORNIA

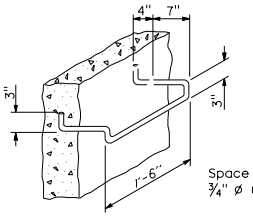
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ELEVATION F-F

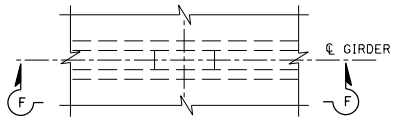



SECTION C-C

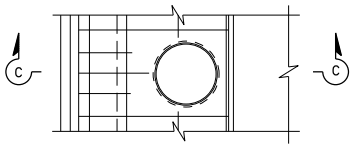



Space ladder rung @ 12
¾" Ø Galvanize after fabrication

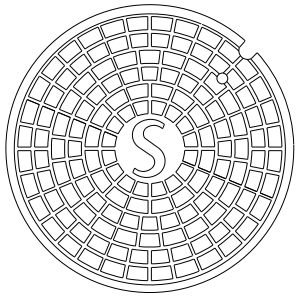
BAR STEP
LADDER RUNG DETAILS
DETAIL U44



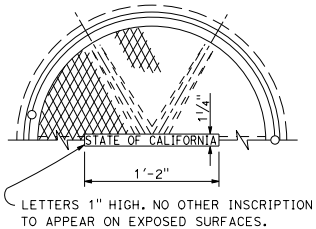

PART PLAN
GIRDER STEM ACCESS OPENING
DETAIL U41




PART PLAN
SIDEWALK ACCESS OPENING
DETAIL U42




TOP OF MANHOLE COVER

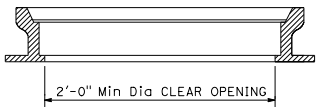



LETTERS 1" HIGH. NO OTHER INSCRIPTION TO APPEAR ON EXPOSED SURFACES.

TOP OF MANHOLE FRAME & COVER

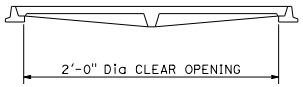
NOTES:

1. For exact location of openings see other sheets.
2. Location and size of manholes may be modified as directed by the Engineer, provided minimum dimensions are maintained.
3. All reinforcement detailed to be placed in addition to reinforcement shown on other sheets.




SECTION THROUGH FRAME

NON-ROCKING MANHOLE FRAME & COVER FOR DECKS
DETAIL U45




SECTION THROUGH FRAME & COVER

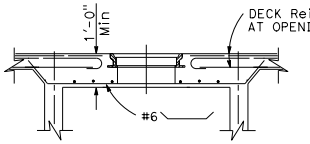
MANHOLE FRAME & COVER FOR SIDEWALKS
DETAIL U46

NOTES:

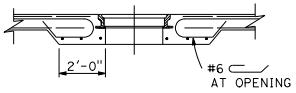
1. Step inserts may be substituted for the standard step detail. Step inserts shall comply with State Industrial Safety requirements.
2. Covers for use on sewer structures shall bear the letter "S"; on storm drain structures the letter "D"; on openings for utilities the letter "U".

NOTES:

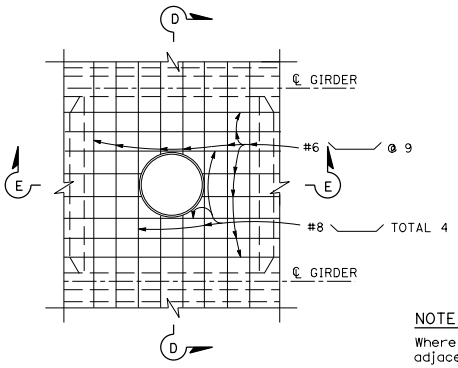
1. Frame and cover shall be cast iron.
2. Cover shall be supplied with bolt down or locking devices.




SECTION D-D

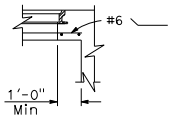



SECTION E-E




PART PLAN

NOTE:
Where manhole is located adjacent to a diaphragm or abut, substitute half Section E-E on one side of Section E-E.




HALF SECTION E-E

DECK ACCESS OPENING
DETAIL U43

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DEPARTMENT OF TRANSPORTATION

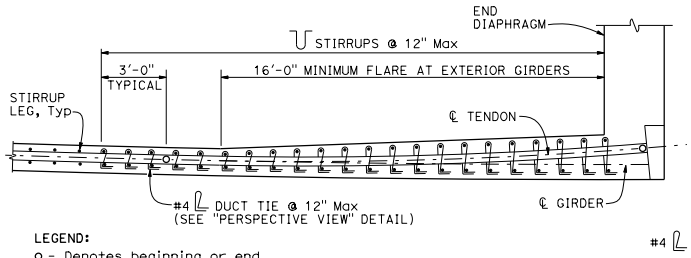
**UTILITY DETAILS**

NO SCALE

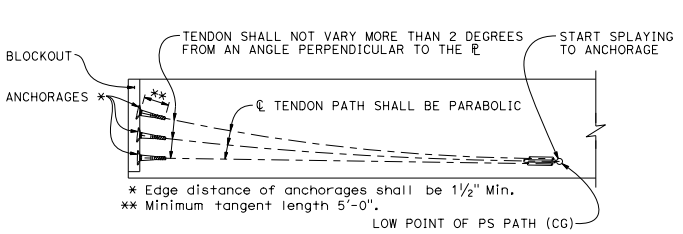
B7-11

7-1-25

Return to Table of Contents




## DUCT TIES AT TENDON HORIZONTAL ANGLE CHANGES
## DETAIL 5-1




## ELEVATION - ANCHORAGES AND PRESTRESSING PATH
## DETAIL 5-2

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

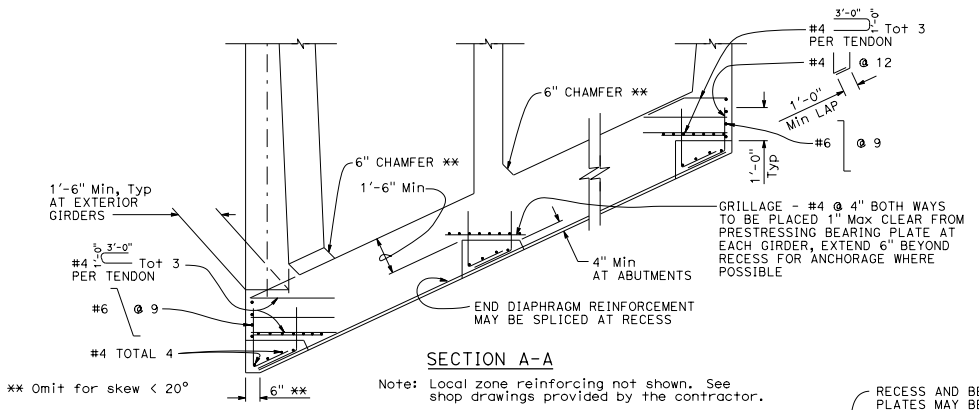
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Marc Friedheim
No. C57968
Exp. 6-30-26
CIVIL
STATE OF CALIFORNIA

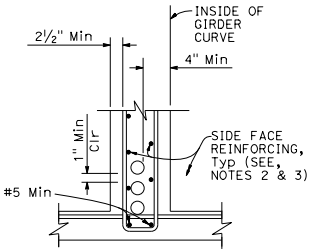
### NOTES FOR DETAIL 5-1

1. Tendon horizontal angle change at end diaphragm shown. Duct tie placement similar for other locations where tendon horizontal angle changes occur. For curved girders place duct ties at tendon angle changes where ℄ tendon radius is smaller than ℄ girder radius.
2. Adjacent duct ties may be staggered vertically to facilitate placement if stirrup spacing is 6 inches or less.
3. Place closed end of duct ties toward inside of tendon curve.
4. Wrap duct ties around both stirrup legs.
5. Individual duct ties may only be used to anchor one duct.

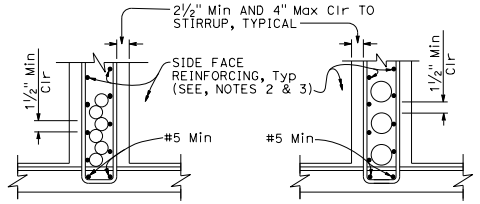



SECTION A-A

Note: Local zone reinforcing not shown. See shop drawings provided by the contractor.

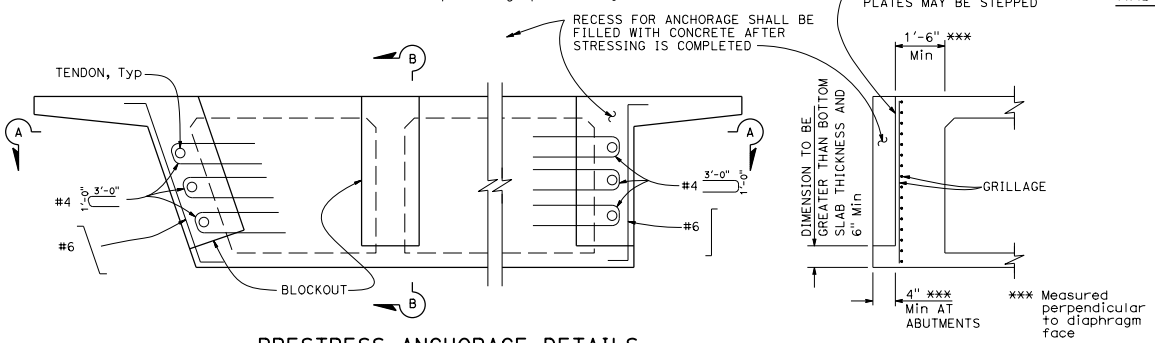



DUCTS 4½" OD AND LESS FOR HORIZONTAL CURVE RADIUS ≤ 2000'




DUCTS 4½" OD AND LESS

DUCTS OVER 4½" OD




## PRESTRESS ANCHORAGE DETAILS AT END DIAPHRAGMS
## DETAIL 5-3

SECTION B-B

## CLEARANCE REQUIREMENTS FOR DUCTS
## DETAIL 5-4

### NOTES FOR DETAIL 5-4:

1. ⊔ Stirrups may also be used.
2. For additional details, see Standard Plan B7-1, and Project Plans.
3. Bar reinforcing which interferes with prestressing ducts may be adjusted as approved by the Engineer.
4. The detail for "DUCTS OVER 4½" OD" shall be used on tangent and horizontally curved alignments.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CAST-IN-PLACE POST-TENSIONED GIRDER DETAILS

NO SCALE

B8-5

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

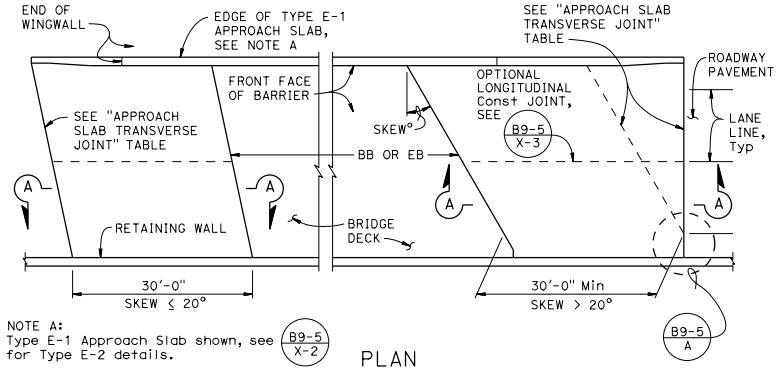
REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

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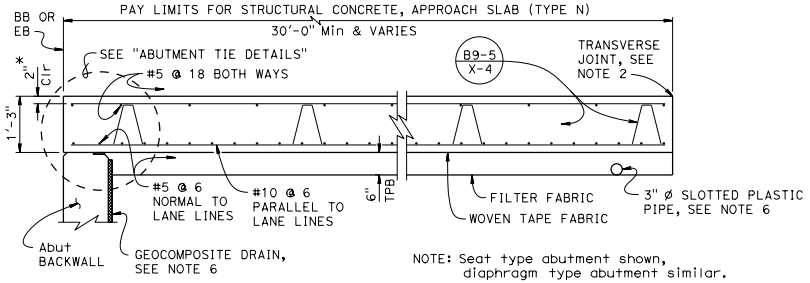
REGISTERED PROFESSIONAL ENGINEER — Daniel Sessions — No. C77723 — Exp. 6-30-27 — CIVIL — STATE OF CALIFORNIA




NOTE A:
Type E-1 Approach Slab shown, see B9-5 X-2 for Type E-2 details.

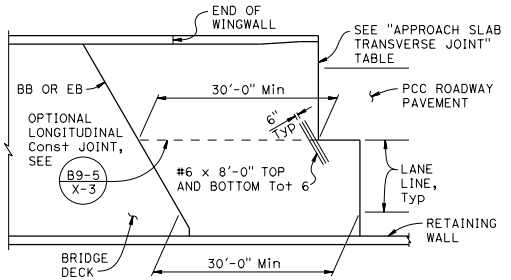
PLAN

| APPROACH SLAB TRANSVERSE JOINT | | |
|---|---|---|
| APPROACH SKEW, x | WITH HMA ROADWAY PAVEMENT | WITH PCC ROADWAY PAVEMENT |
| x < 20° | PARALLEL TO BB OR EB | PARALLEL TO BB OR EB |
| 20° < x < 45° | PARALLEL TO BB OR EB (B9-5 A) | STAGGER AT LANE LINES 24' TO 36' APART, SEE "END STAGGER DETAIL" |
| x > 45° | PARALLEL TO BB OR EB (B9-5 A) | STAGGER AT EACH LANE LINE, SEE "END STAGGER DETAIL" |

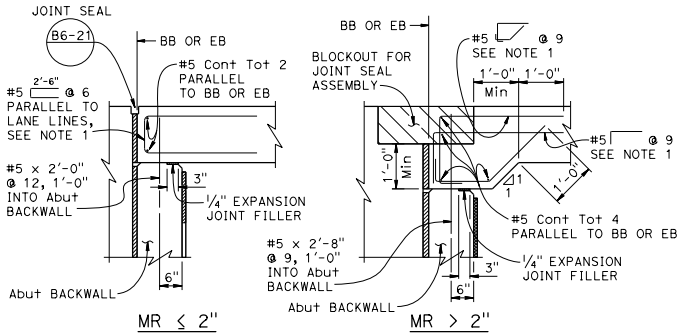



NOTE: Seat type abutment shown, diaphragm type abutment similar.

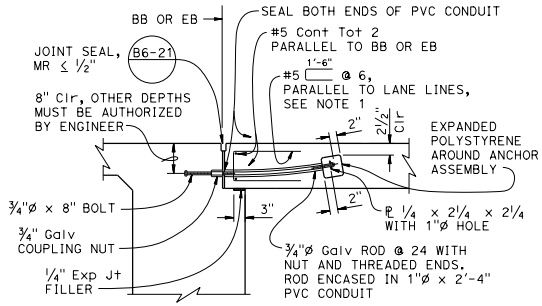
SECTION A-A




END STAGGER DETAIL




SEAT TYPE ABUTMENT (B9-5 C)




DIAPHRAGM TYPE ABUTMENT

ABUTMENT TIE DETAILS

LEGEND:

* - All approach slab reinforcement shall be epoxy coated and minimum top mat cover 2½" in Freeze-Thaw Area.

NOTES:

1. For MR ≤ 2", adjust reinforcement to clear sawcut for sealed joint. For MR > 2", reinforcement must be normal to BB or EB and spaced to avoid joint seal assembly anchorage.
2. Transverse Joint must be a minimum of 5'-0" from an existing or constructed weakened plane joint in approach PCC roadway pavement.
3. Place dowels into the adjacent PCC pavement along the Transverse Joint, refer to Standard Plans P10 and P30.
4. At the Contractor's option, approach slab transverse reinforcement may be placed parallel to BB or EB. Spacing of transverse reinforcement is measured along ℄ roadway.
5. For details not shown, refer to Standard Plan B9-5.
6. For structure approach drainage details, refer to Standard Plan B9-6.

STATE OF CALIFORNIA
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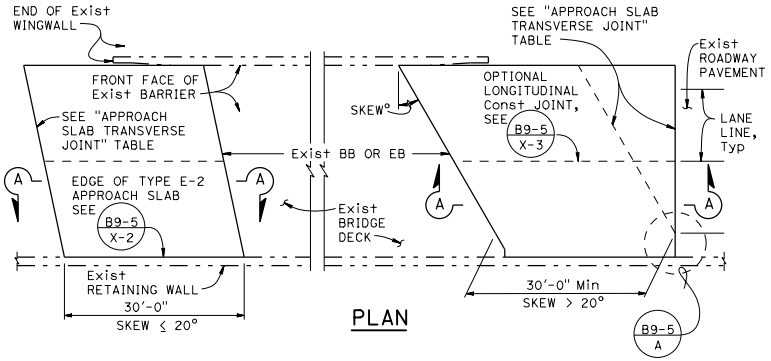
# STRUCTURE APPROACH TYPE N (30)

NO SCALE

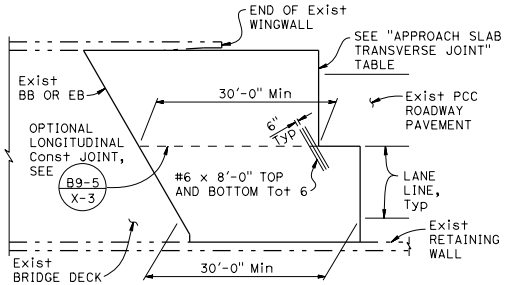
B9-1

7-1-25

Return to Table of Contents




PLAN




END STAGGER DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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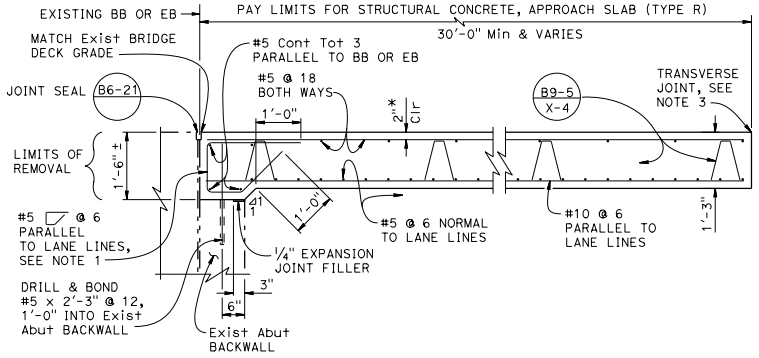
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

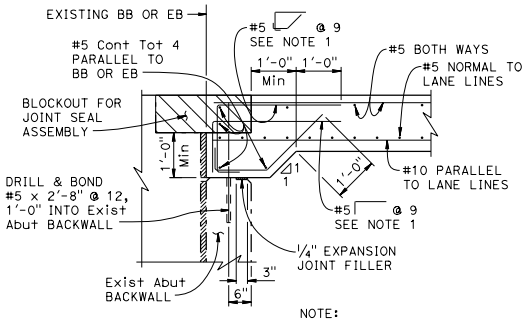
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| APPROACH SLAB TRANSVERSE JOINT | | |
|---|---|---|
| APPROACH SKEW, x | WITH HMA ROADWAY PAVEMENT | WITH PCC ROADWAY PAVEMENT |
| x < 20° | PARALLEL TO BB OR EB | PARALLEL TO BB OR EB |
| 20° < x < 45° | PARALLEL TO BB OR EB (B9-5 A) | STAGGER AT LANE LINES 24' TO 36' APART, SEE "END STAGGER DETAIL" |
| x > 45° | PARALLEL TO BB OR EB (B9-5 A) | STAGGER AT EACH LANE LINE, SEE "END STAGGER DETAIL" |

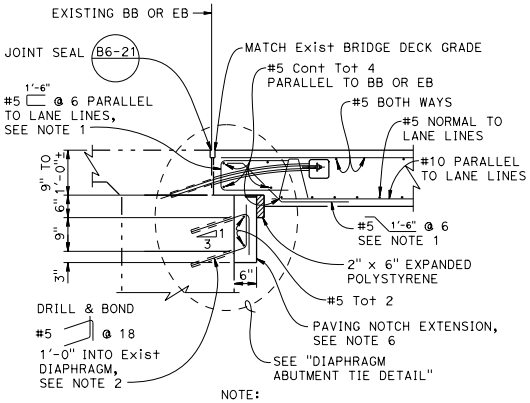



SEALED JOINT




NOTE:
For additional details not shown, see "SEALED JOINT"

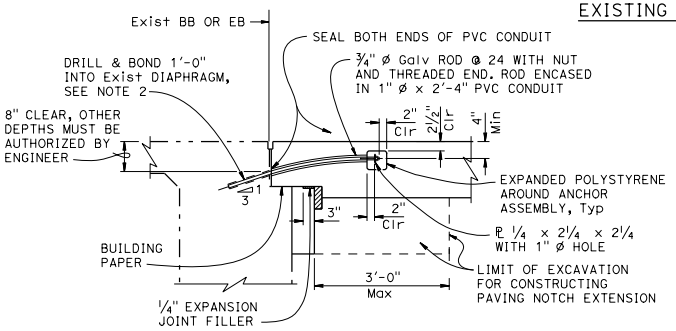
JOINT SEAL ASSEMBLY




NOTE:
For additional details not shown, see "EXISTING SEAT ABUTMENT".

EXISTING DIAPHRAGM ABUTMENT

EXISTING SEAT ABUTMENT




DIAPHRAGM ABUTMENT TIE DETAIL

SECTION A-A

NOTES:

1. For MR ≤ 2", adjust reinforcement to clear sawcut for sealed joint. For MR > 2", reinforcement must be normal to BB or EB and spaced to avoid joint seal assembly anchorage.
2. Space reinforcement and abutment ties to avoid existing prestressing anchorages and other reinforcement in abutment, as needed.
3. Transverse Joint must be a minimum of 5'-0" from an existing or constructed weakened plane joint in approach PCC roadway pavement.
4. Place dowels into the adjacent PCC pavement along the Transverse Joint, refer to Standard Plans P10 and P30.
5. At the Contractor's option, approach slab transverse reinforcement may be placed parallel to BB or EB. Spacing of transverse reinforcement is measured along ℄ roadway.
6. Paving notch extension is required if existing diaphragm paving notch is < 6".
7. For details not shown, refer to Standard Plan B9-5.

LEGEND:

— - - — Indicates Existing Structure

* - All approach slab reinforcement shall be epoxy coated and top mat cover 2½" clear in Freeze-Thaw Area.

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# STRUCTURE APPROACH TYPE R (30)

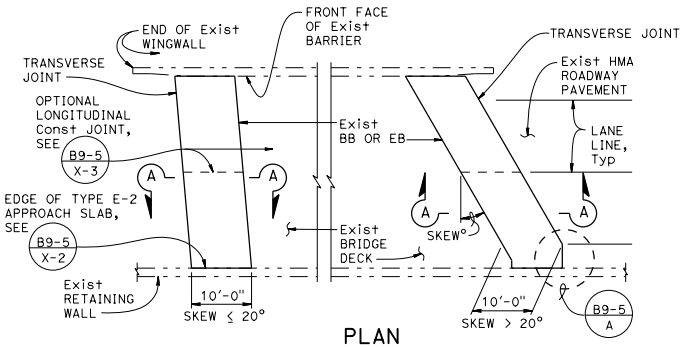
NO SCALE

B9-2

7-1-25

2025 STANDARD PLAN B9-2

Return to Table of Contents




PLAN

LEGEND:

— - - — Indicates Existing Structure

* - All approach slab reinforcement shall be epoxy coated and top mat cover 2½" clear in Freeze-Thaw Area.

NOTES:

1. For MR ≤ 2", adjust reinforcement to clear sawcut for sealed joint. For MR > 2", reinforcement must be normal to BB or EB and spaced to avoid joint seal assembly anchorage.
2. Space reinforcement and abutment ties to avoid existing prestressing anchorages and other reinforcement in abutment, as needed.
3. Place dowels into the adjacent PCC pavement along the Transverse Joint, refer to Standard Plans P10 and P30.
4. At the Contractor's option, approach slab transverse reinforcement may be placed parallel to BB or EB. Spacing of transverse reinforcement is measured along ℄ roadway.
5. Paving notch extension is required if existing diaphragm paving notch is < 6".
6. For details not shown, refer to Standard Plan B9-5.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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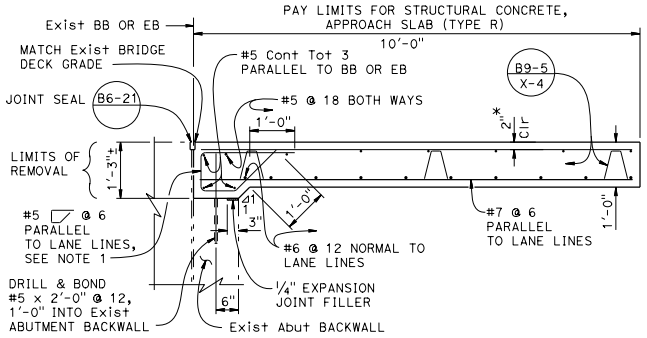
REGISTERED CIVIL ENGINEER

September 19, 2025

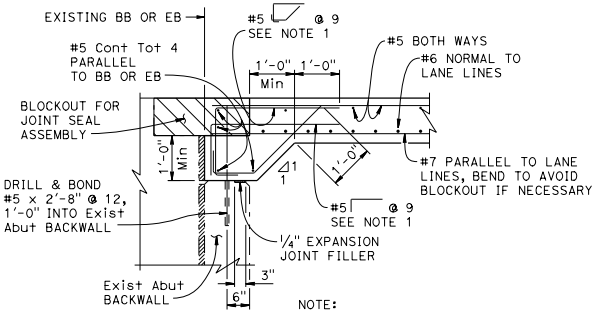
PLANS APPROVAL DATE

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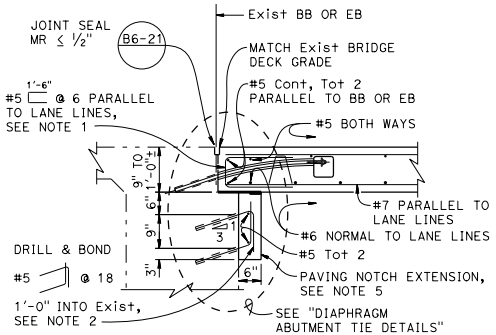



SEALED JOINT




NOTE:
For additional details not shown, see "SEALED JOINT"

JOINT SEAL ASSEMBLY

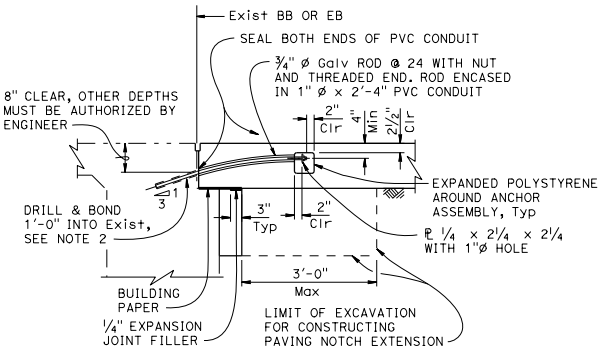



NOTE:
For additional details not shown, see "EXISTING SEAT ABUTMENT"

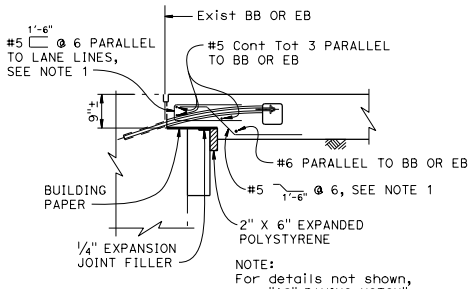
EXISTING DIAPHRAGM ABUTMENT

EXISTING SEAT ABUTMENT

SECTION A-A




12" PAVING NOTCH




NOTE:
For details not shown, see "12" PAVING NOTCH"

9" PAVING NOTCH

DIAPHRAGM ABUTMENT TIE DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**STRUCTURE APPROACH TYPE R (10)**

NO SCALE

**B9-3**

7-1-25



Return to Table of Contents

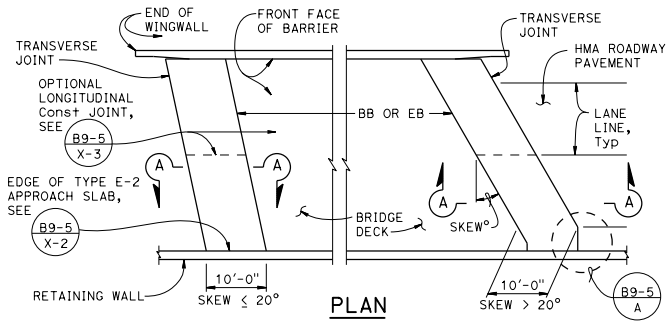
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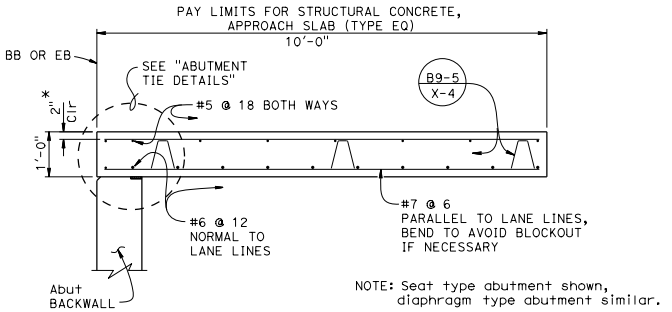
September 19, 2025
PLANS APPROVAL DATE

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Daniel Sessions
No. C77723
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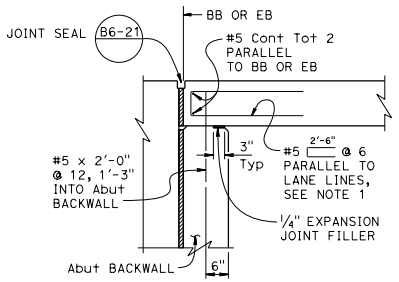



PLAN

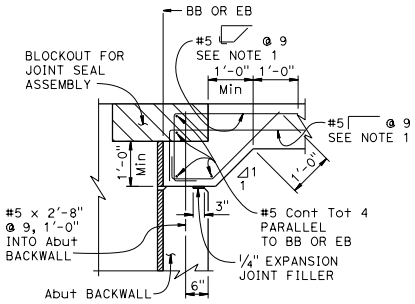



NOTE: Seat type abutment shown, diaphragm type abutment similar.

SECTION A-A

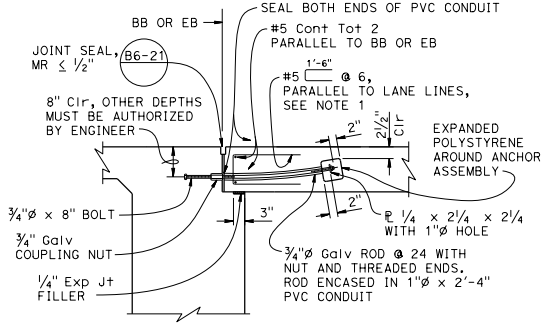



MR ≤ 2"




MR > 2"

SEAT TYPE ABUTMENT B9-5 C




DIAPHRAGM TYPE ABUTMENT

ABUTMENT TIE DETAILS

LEGEND:

* - All approach slab reinforcement shall be epoxy coated and minimum top mat cover 2½" in Freeze-Thaw Area.

NOTES:

1. For MR ≤ 2", adjust reinforcement to clear sawcut for sealed joint. For MR > 2", reinforcement must be normal to BB or EB and spaced to avoid joint seal assembly anchorage.
2. Place dowels into the adjacent PCC pavement along the Transverse Joint, refer to Standard Plans P10 and P30.
3. At the Contractor's option, approach slab transverse reinforcement may be placed parallel to BB or EB. Spacing of transverse reinforcement is measured along ℄ roadway.
4. For details not shown, refer to Standard Plan B9-5.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# STRUCTURE APPROACH TYPE EQ (10)

NO SCALE

B9-4



7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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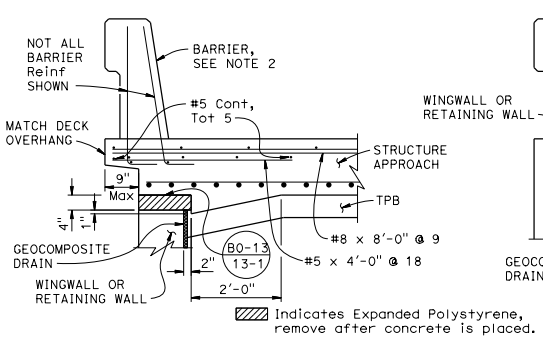
REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

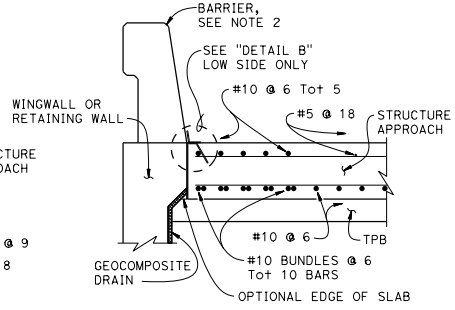
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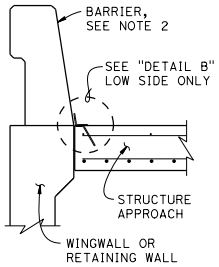

DETAIL X-1

TYPE E-1




DETAIL X-2

TYPE E-2




DETAIL X-2

TYPE R (10) AND EQ

## DESIGN NOTES

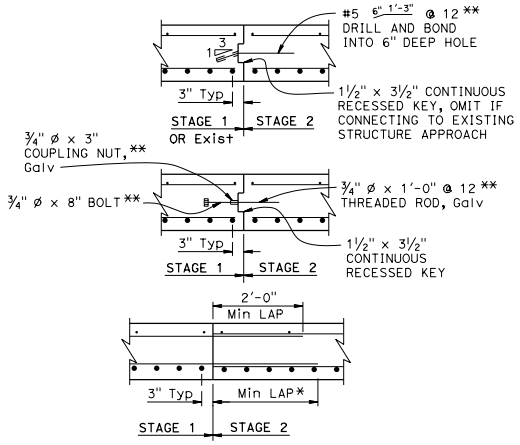
DESIGN: AASHTO LRFD Bridge Design Specifications, 2012 Edition with Caltrans Amendments, preface dated January 2014

LIMIT STATES: Service I, Strength I & II, Extreme II and Fatigue I ($\gamma_{FAT}$ = 1.0)

DEAD LOAD: Includes 35 psf for future wearing surface

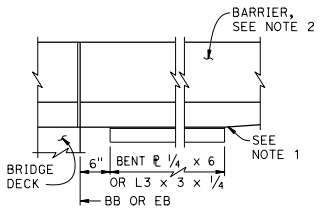
LIVE LOAD: HL93 and permit design load
Equivalent strip width method: $W_1$ = 12 ft
Slab span: $L_1$ = 24.5 ft (30 ft Approach Slab)
Slab span: $L_1$ = 7.83 ft (10 ft Approach Slab)

REINFORCED CONCRETE:
$f_y$ = 60 ksi
$f'_c$ = 3.6 ksi
n = 8

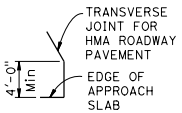



DETAIL X-3

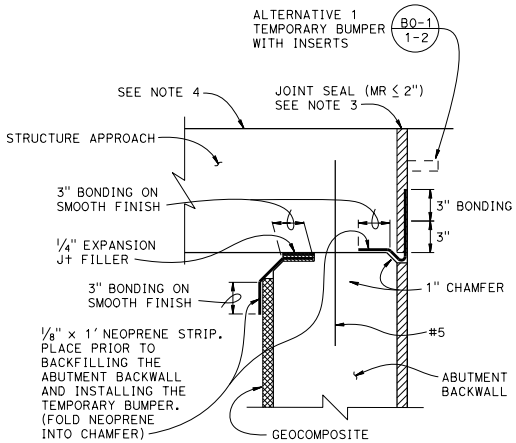
LONGITUDINAL CONSTRUCTION JOINT ALTERNATIVES



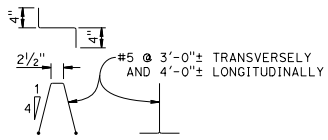

EDGE ANGLE PLAN




DETAIL A

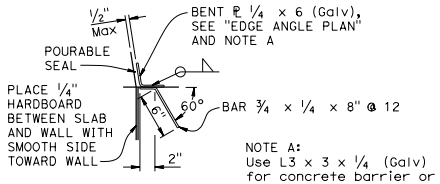



DETAIL C




DETAIL X-4

BAR CHAIR DETAIL




DETAIL B

NOTE A:
Use L3 x 3 x ¼ (Galv) for concrete barrier or curb with vertical face.

LEGEND:

* Min lap splice for bottom Reinf in Freeze-Thaw Area shall be 3'-6".

** Threaded Rods and Dowels in Freeze-Thaw Area shall be stainless steel or epoxy-coated prefabricated 9" Drill and Bond dowels into a 9" deep hole.

NOTES:

1. End the plate or edge angle at beginning of barrier transition, end of wingwall or end of structure approach as applicable.
2. Solid concrete barrier shown, details similar for all concrete and standard post-beam barriers.
3. Joint protection details shown for MR ≤ 2". Details similar when joint seal assembly is required.
4. Polyester concrete shall be placed across approach slab to match bridge deck protection in Freeze-Thaw Area.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# STRUCTURE APPROACH SLAB DETAILS

NO SCALE

B9-5

7-1-25

Return to Table of Contents

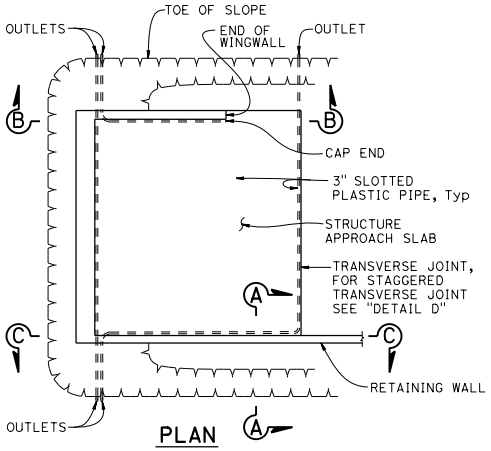
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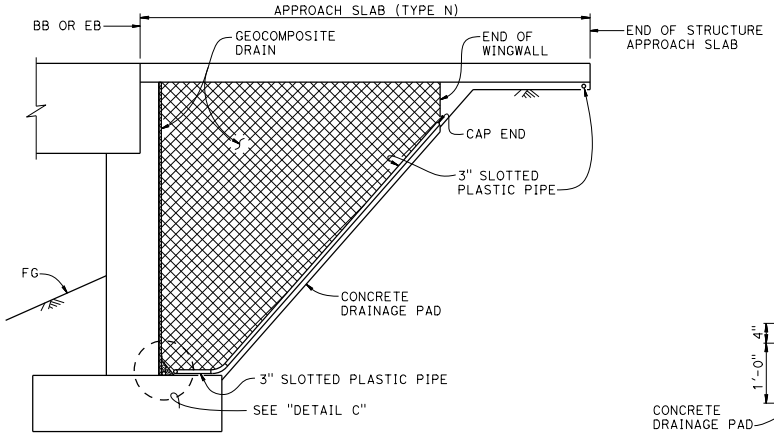
September 19, 2025
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Daniel Sessions
No. C77723
Exp. 6-30-27
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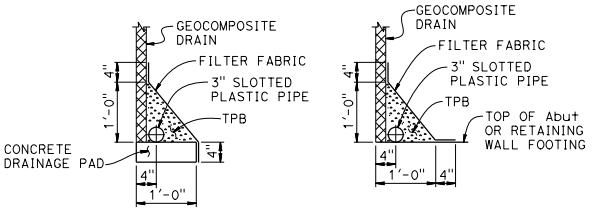
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PLAN

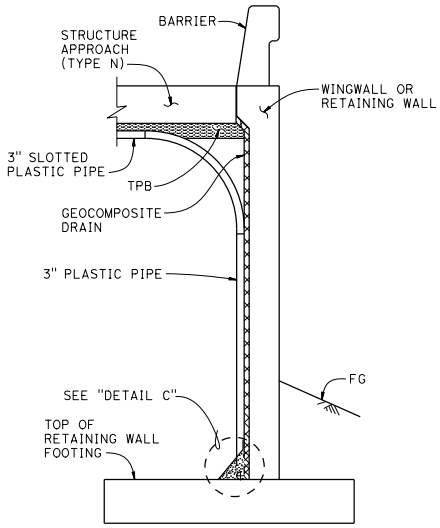



SECTION B-B

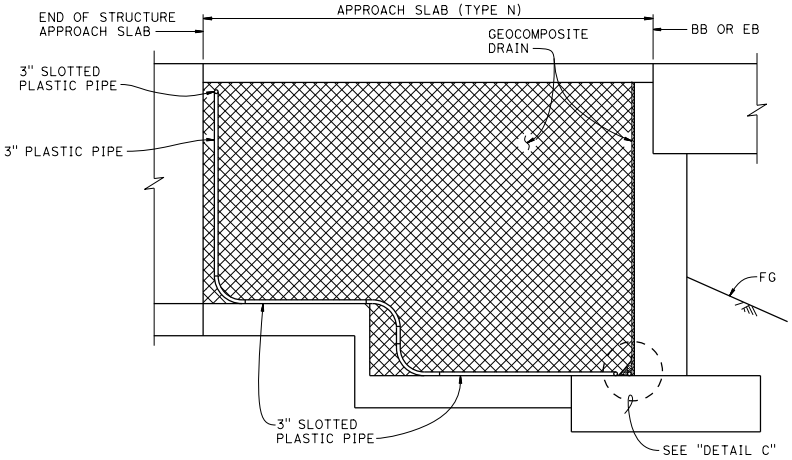



DRAINAGE PAD FOOTING

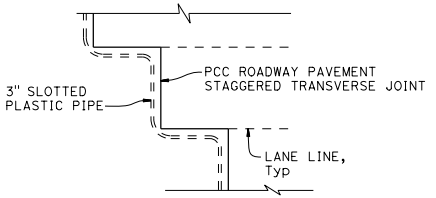
DETAIL C




SECTION A-A




SECTION C-C




DETAIL D

NOTES:

1. All bends in plastic pipe must have 3'-0" minimum radius. Plastic pipe used for bends is not required to be slotted.
2. For Approach Slab (Type N) details, refer to Standard Plan B9-1.

STATE OF CALIFORNIA
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# STRUCTURE APPROACH DRAINAGE DETAILS

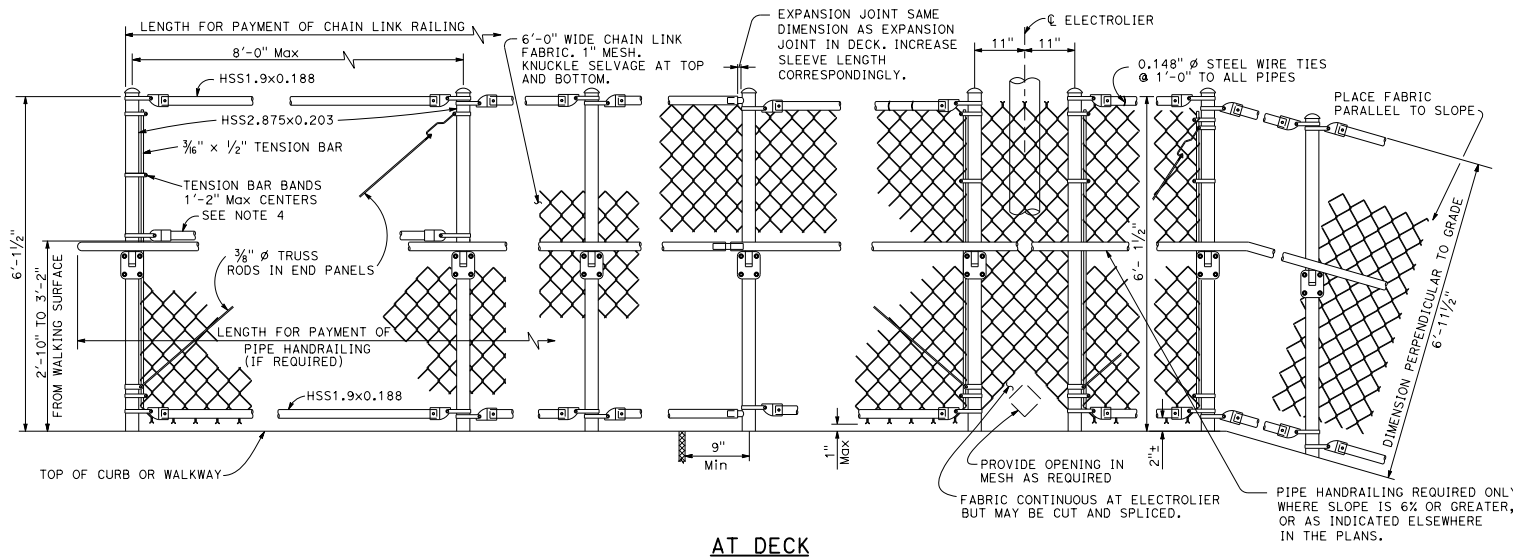
NO SCALE

B9-6

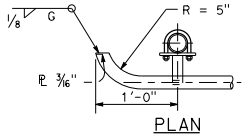
7-1-25

2025 STANDARD PLAN B9-6

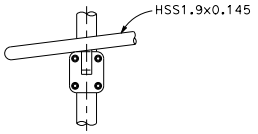
Return to Table of Contents




END POST | INTERMEDIATE POSTS | AT DECK EXPANSION JOINTS | AT ELECTROLIER | ON SLOPES




PLAN

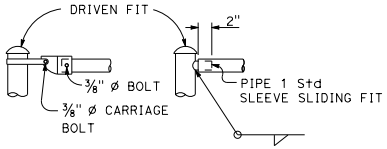



ELEVATION

## PIPE HANDRAILING AT END



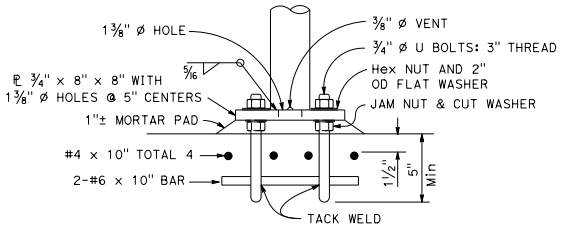
## ALTERNATIVE DETAILS



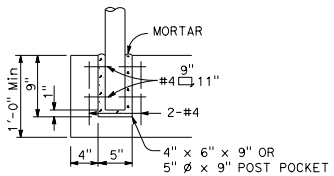

## TYPICAL CONNECTION DETAILS

NOTES:

1. Peen all bolt threads.
2. Railing shall conform to horizontal and vertical alignment. Posts shall be vertical. Top and bottom pipes shall be bent if radius is 148'-0" or less; may be on 8'-0" chords if radius is over 148'-0".
3. When railing is on slope, 6'-0" chain link fabric shall be placed parallel to slope.
4. Additional HSS 1.9 x 0.188 required when radius is less than 150'-0".




## ANCHORAGE DETAIL




## ALTERNATIVE ANCHORAGE DETAIL

May be used when thickness of concrete is 1'-0" or more.

## DESIGN NOTES

**DESIGN:**

AASHTO LRFD Bridge Design Specifications 8th Edition 2017 with California Amendments April 2019

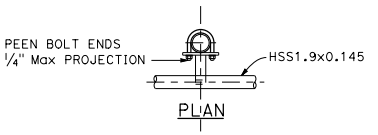
**CONCRETE:**

$f_y$ = 60 ksi

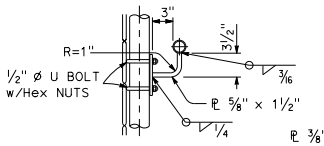
$f'_c$ = 3.6 ksi

**STRUCTURAL STEEL**

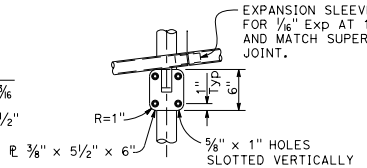
HSS: $f_y$ = 50 ksi




PLAN




SIDE VIEW




ELEVATION

## PIPE HANDRAILING BRACKET

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CHAIN LINK RAILING

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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**B11-7**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

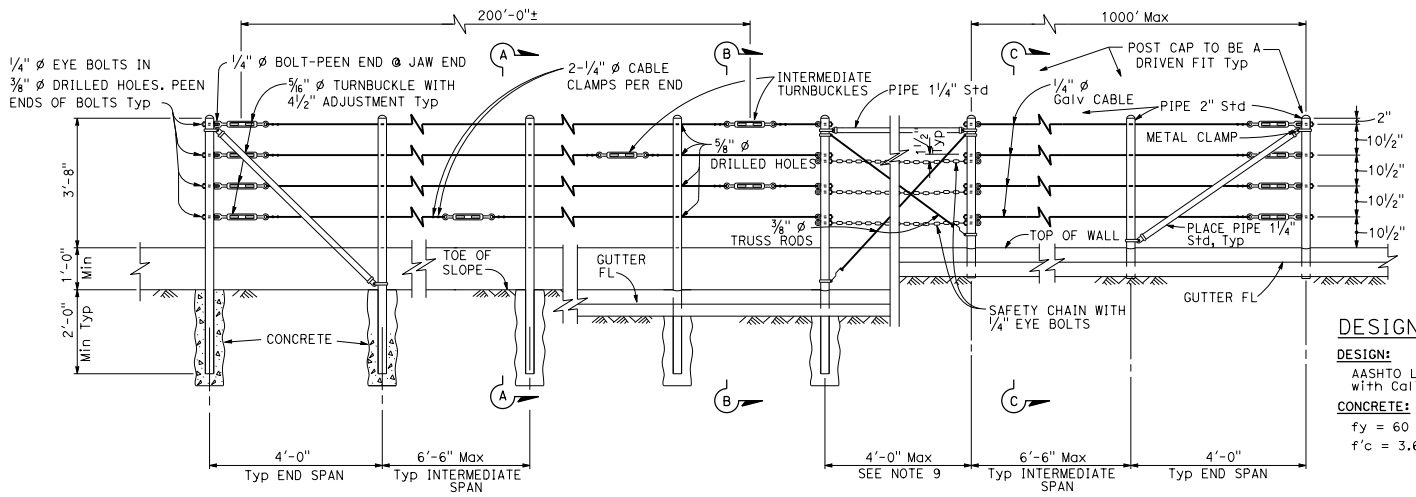
REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Aiman Malak No. C73369 Exp. 12-31-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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EXISTING WALL (WITHOUT GUTTER) — Existing

RETAINING WALL (WITH GUTTER) — Existing

RETAINING WALL (WITH GUTTER) — New construction

## ELEVATION

## DESIGN NOTES

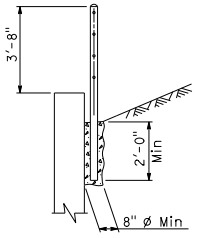
**DESIGN:**

AASHTO LRFD Bridge Design Specifications 8th Edition 2017 with California Amendments April 2019

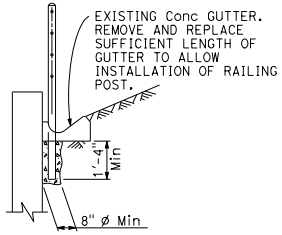
**CONCRETE:**

fy = 60 ksi

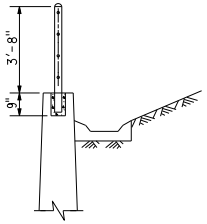
f'c = 3.6 ksi



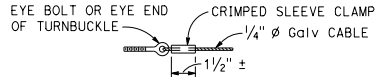

SECTION A-A — Existing



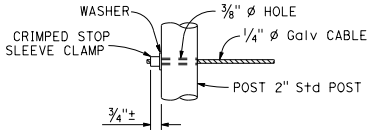

SECTION B-B — Existing



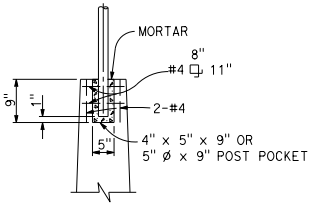

SECTION C-C — New construction




ALTERNATIVE CABLE CONNECTION




ALTERNATIVE DEAD END ANCHORAGE




POST POCKET

**NOTES:**

1. Maximum distance between turnbuckles shall be 200'-0"±.
2. Intermediate turnbuckles to be placed in adjacent spans.
3. Cable shall not be spliced between intermediate turnbuckles and end posts.
4. Posts to be vertical.
5. Alignment of holes in posts may vary to conform to slope of top of retaining wall.
6. The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.
7. Line posts shall be braced horizontally and trussed diagonally in both directions at intervals not to exceed 1000'.
8. Post pockets to be centered in top of wall.
9. Typical end spans, braced in both directions, shall be constructed at changes in line where the angle of deflection is 15° or more.
10. Shall not be used for pedestrian walkways.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CABLE RAILING

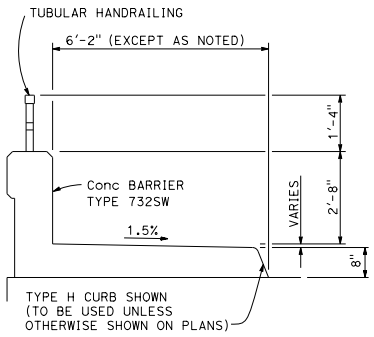
NO SCALE

**B11-47**

7-1-25



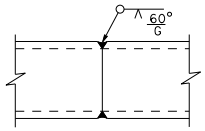
Return to Table of Contents



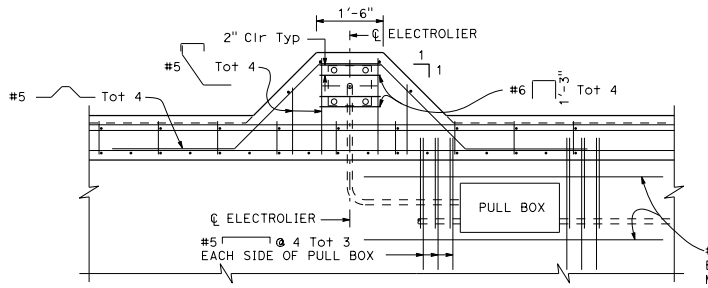

TYPICAL SECTION



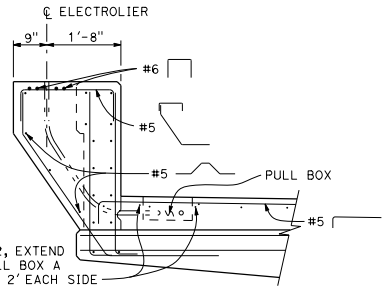

RAIL CAP
HSS3x2x3/16 similar




TUBE-WELDED SPLICE

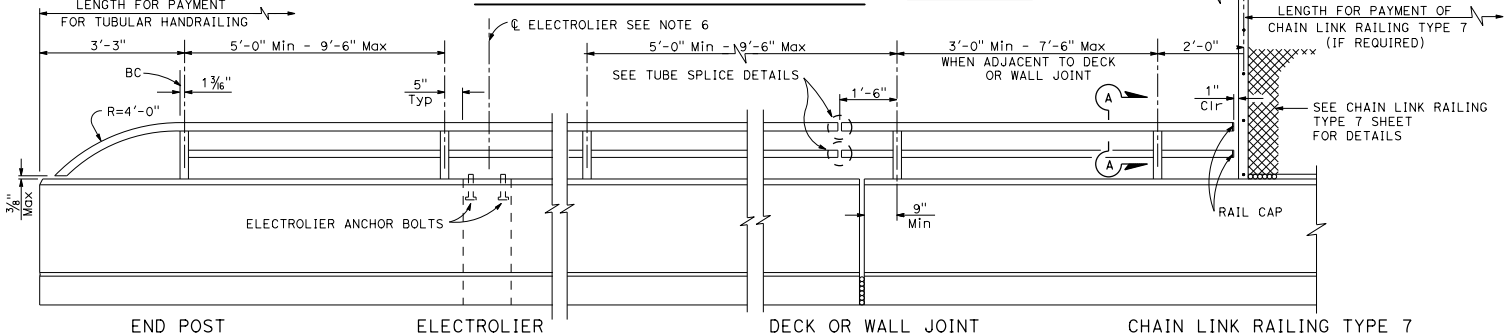



PLAN



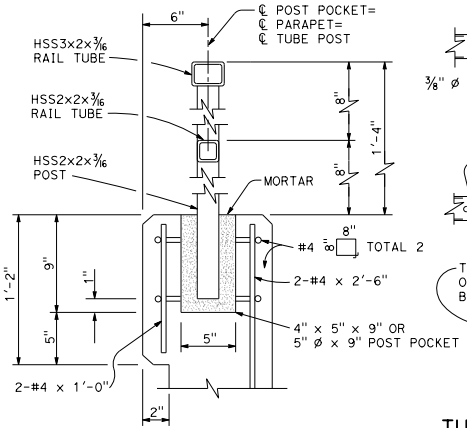

ELECTROLIER PEDESTAL DETAILS

SECTION B-B

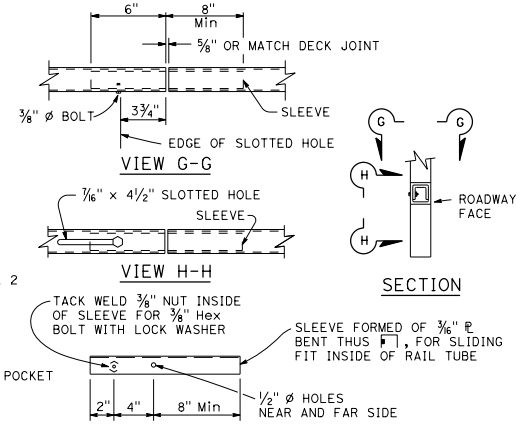



END POST | ELECTROLIER | DECK OR WALL JOINT | CHAIN LINK RAILING TYPE 7

ELEVATION




POST ANCHORAGE DETAILS

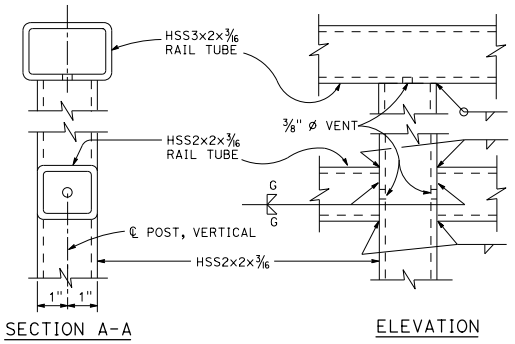



TUBE SPLICE DETAILS
HSS3x2x3/16 similar




SECTION

NOTE:
3/8" Nut tack welded to sleeve
may be replaced by drilled and
tapped hole in sleeve.




SECTION A-A | ELEVATION

RAIL CONNECTION DETAILS

DESIGN NOTE:
AASHTO LRFD Bridge Design Specifications 8th Edition 2017
with California Amendments April 2019

NOTES:

1. Post shall be normal to railing.
2. Rail tubes shall be shop bent or fabricated to fit horizontal curve when radius is less than 950'.
3. Tube splices shall be located in the tubes spanning deck or wall joints. Increase joint width in tubes to match expansion joint width and increase sleeve length correspondingly.
4. Top rail tube shall be continuous over not less than two posts except a short post spacing is permitted near deck or wall joints, electroliers, or other rail discontinuities as noted.
5. For details and reinforcement not shown, see Standard Plan B11-58.
6. For electrolier mounting details, see Standard Plan ES-6A and ES-6B.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Aiman Malak No. C73369 Exp. 12-31-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TUBULAR HANDRAILING

NO SCALE

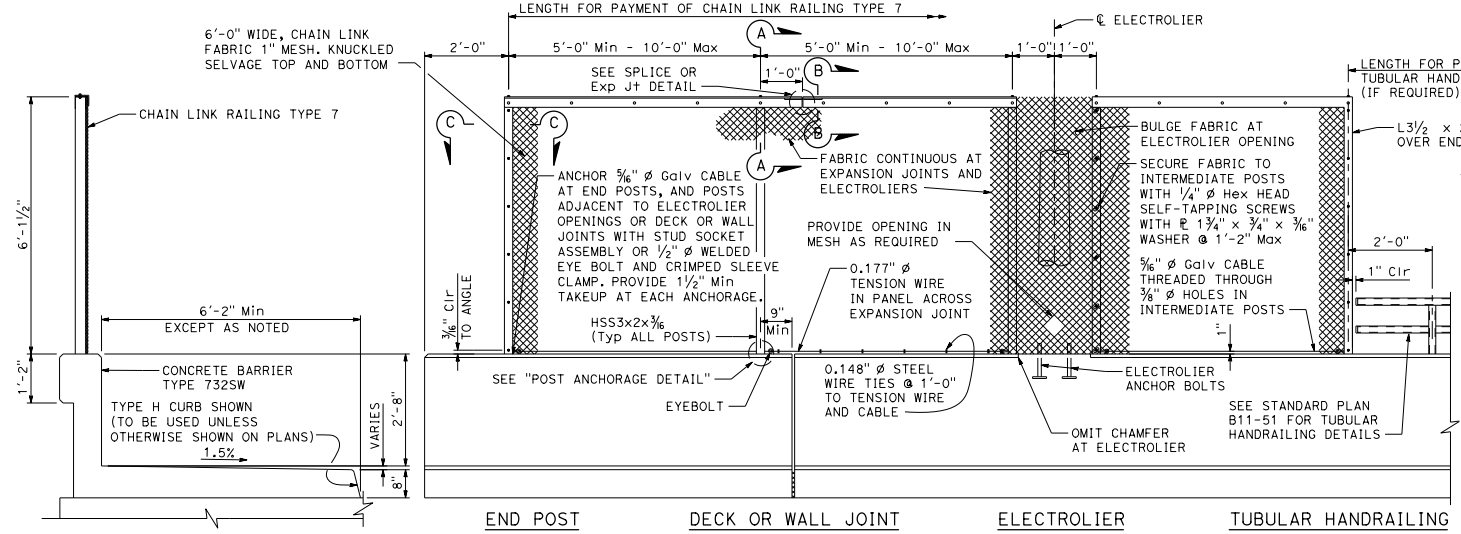
B11-51

7-1-25

2025 STANDARD PLAN B11-51

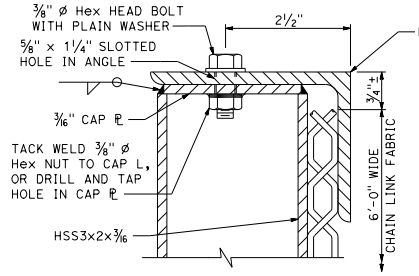


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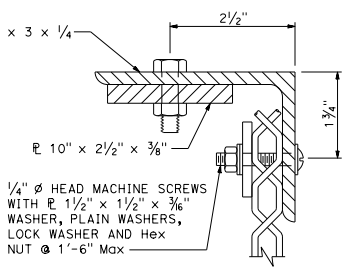



## TYPICAL SECTION

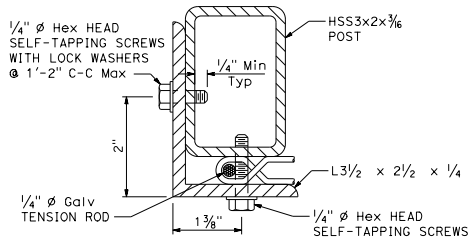
## ELEVATION



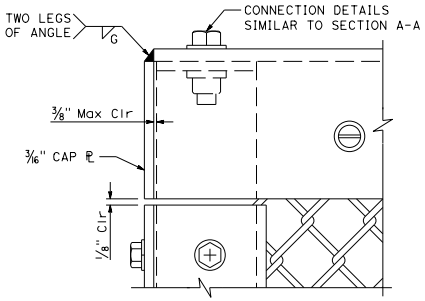

## SECTION A-A



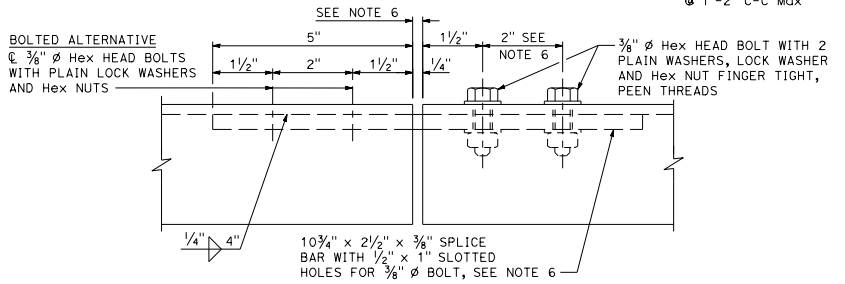

## SECTION B-B




## SECTION C-C




## END POST ELEVATION




## SPLICE OR EXPANSION JOINT DETAIL

### NOTES:

1. Posts shall be vertical.
2. Railing shall conform to horizontal and vertical alignment. When railing is placed on a curved horizontal alignment with radius of 148'-0" or less, thread the 5/16" ø cable through ⅜" ø welded eye rods embedded 4" into the top of the concrete parapet and equally spaced to limit the midordinate distance between the 5/16" ø cable and the curve to 1" maximum. Horizontal angle shall be bent to conform to horizontal alignment if radius is 148'-0" or less and may be on 10'-0" chords if radius is over 148'-0".
3. Horizontal angle shall be continuous over not less than two intermediate posts, except that a shorter length is permitted at expansion joints, electroliers and other rail discontinuities.
4. When rail is on slope, place fabric parallel to slope.
5. For details and reinforcement not shown see Standard Plans B11-58 to B11-59A.
6. Expansion joint same dimension as expansion joint in deck or wall. Increase slotted hole length and splice bar length correspondingly.
7. Design valid for bridges with the top of Chain Link Railing Type 7 equal to or less than 150' height above surrounding ground surfaces.

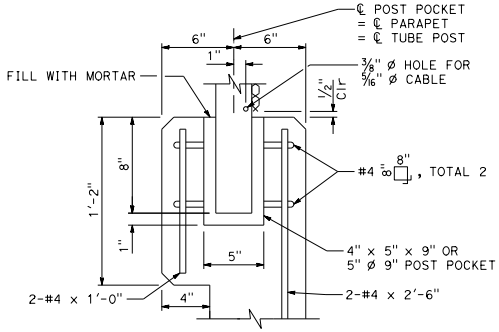
### DESIGN NOTES:

**DESIGN:**

AASHTO LRFD Bridge Design Specifications 8th Edition 2017 with California Amendments April 2019

**CONCRETE:**

fy = 60 ksi
f'c = 3.6 ksi




## POST ANCHORAGE DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CHAIN LINK RAILING TYPE 7

NO SCALE

**B11-52**

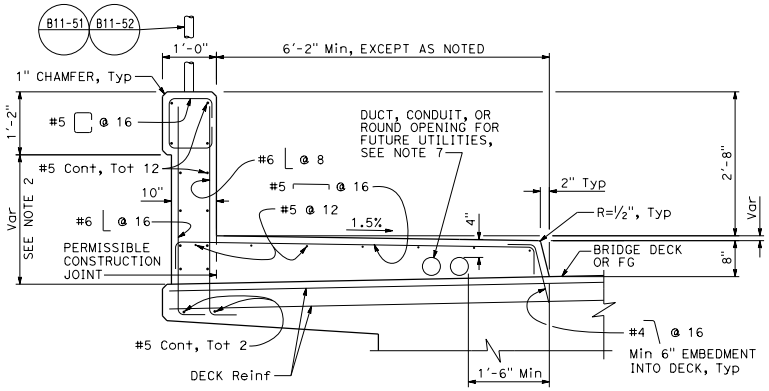
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Aiman Malak No. C73369 Exp. 12-31-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
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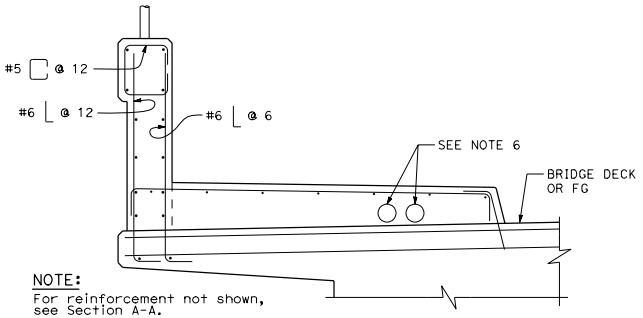
7-1-25

Return to Table of Contents




SECTION A-A

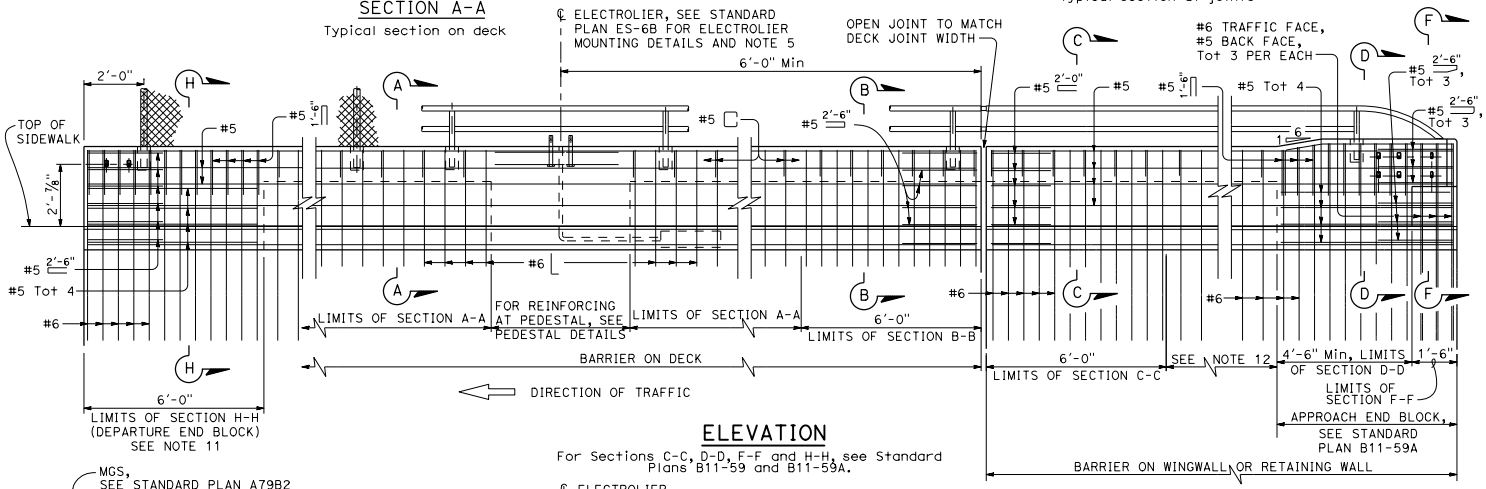
Typical section on deck




NOTE:
For reinforcement not shown, see Section A-A.

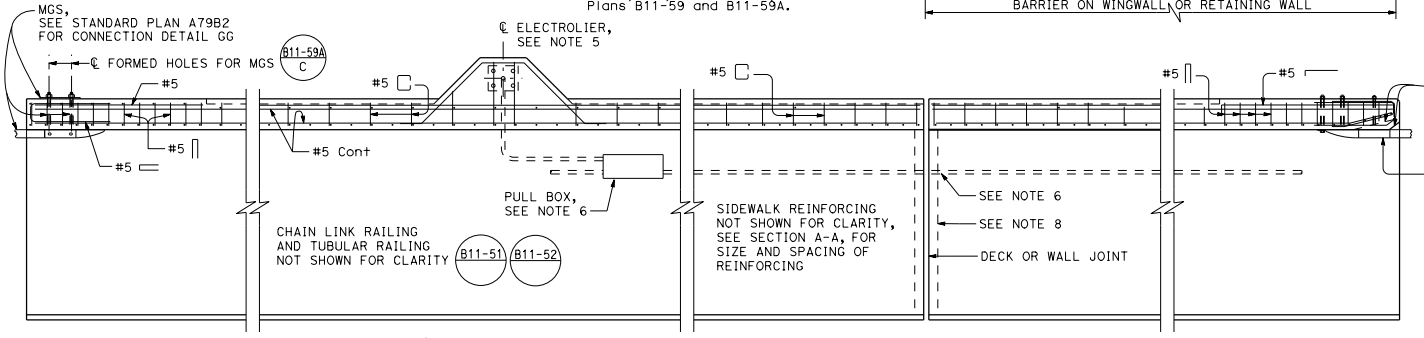
SECTION B-B

Typical section at joints




ELEVATION

For Sections C-C, D-D, F-F and H-H, see Standard Plans B11-59 and B11-59A.




PLAN

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. This barrier is to be used only for posted speeds of 45 MPH or less. For speeds greater than 45 MPH, pedestrians must be protected by a separation traffic barrier.
2. Dimensions will vary with cross slope and if applicable, overlay thickness.
3. Walls must be backfilled before curb and parapet is placed.
4. Clearance to reinforcing steel in curb and railing is 2" except as noted. Longitudinal reinforcement to stop at all expansion joints.
5. See roadway plans for electrolier locations and pull box type.
6. For electrical details, see Standard Plans ES-9A, ES-9B, ES-9C, ES-9D, and ES-9E. For utility duct expansion fitting/coupling details, see Standard Plans ES-9B and B14-3.
7. A minimum of two - 4" round openings for future utilities. A maximum six - 4" round openings for a 6'-2" sidewalk. One - 4" round opening can be added for each additional 1'-0" of sidewalk width. Utility opening must be a minimum of 6" from face of barrier parapet. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. For exact number and placement of utility openings, see Project Plans. Minimum 2" clear between round openings, ducts, or conduits.
8. See Project Plans for Joint Armor For Pedestrian Walkways details.
9. Tubular hand railing and chain link railing continuous at pedestal.
10. For details and reinforcement not shown, see Standard Plans B11-59 and B11-59A.
11. If departure end block is within the Clear Recovery Zone (CRZ, 30 feet for expressways and freeways, or 20 feet for conventional highways) of opposing traffic, then use the approach end block at departure end.
12. Reinforcement is similar to Section C-C, except spacing between vertical reinforcement is 8" at traffic face and 16" at back face of barrier.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 732SW DETAILS No. 1

NO SCALE

**B11-58**

7-1-25

2025 STANDARD PLAN B11-58

Return to Table of Contents

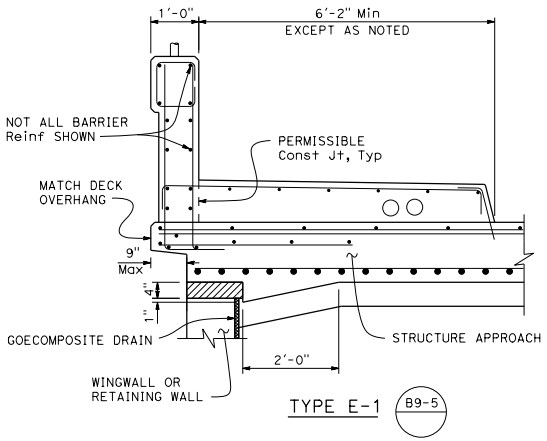
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|---|---|---|---|---|---|
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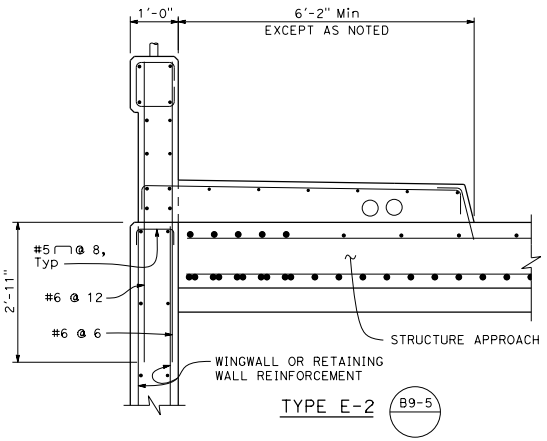
REGISTERED CIVIL ENGINEER

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No. C73369
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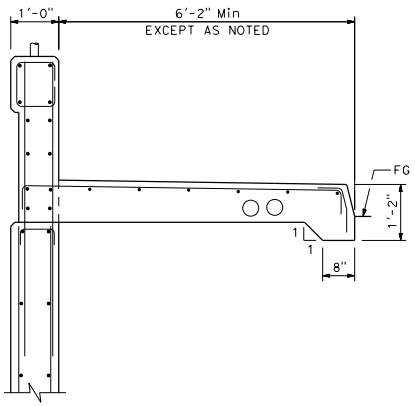



SECTION C-C

## WITH STRUCTURE APPROACH

NOTE: For details not shown, see Section B-B on Standard Plan B11-58.




SECTION C-C

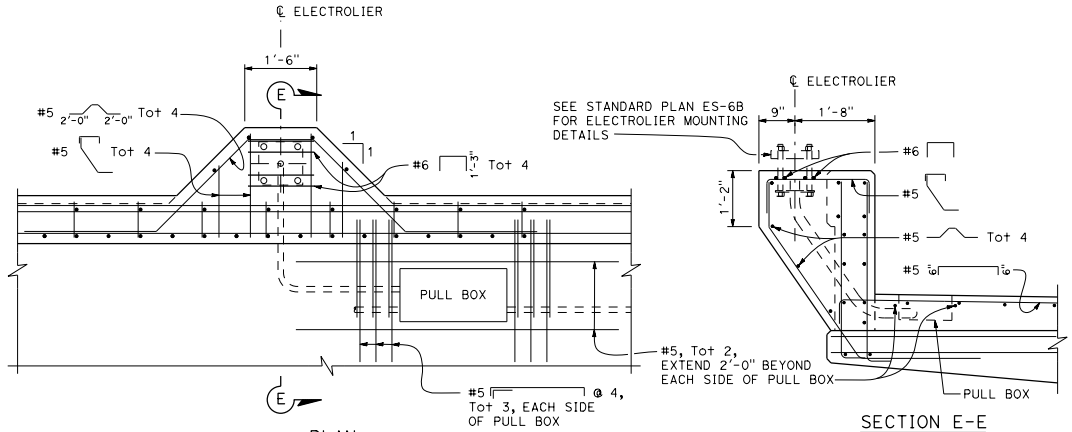
## WITHOUT STRUCTURE APPROACH

**NOTES:**

1. For details not shown, see Standard Plan B11-58.
2. For location of Section C-C, Section D-D, and Section H-H, see Standard Plan B11-58.

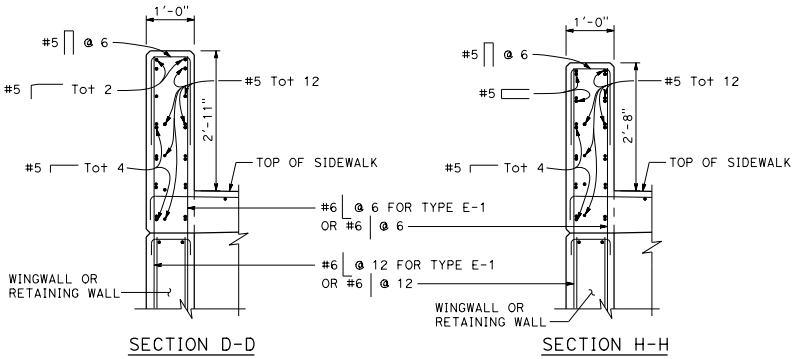
**LEGEND:**

Expanded Polystyrene, remove after concrete is placed




NOTE:
For reinforcement not shown, see Section A-A on Standard Plan B11-58.

## PEDESTAL DETAILS




NOTE: For sidewalk, structure approach, wingwall or retaining wall, see Section C-C.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 732SW DETAILS No. 2

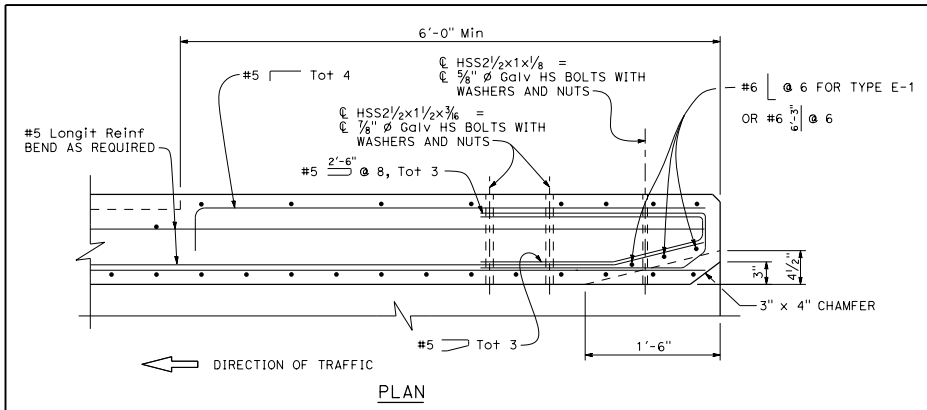
NO SCALE

**B11-59**

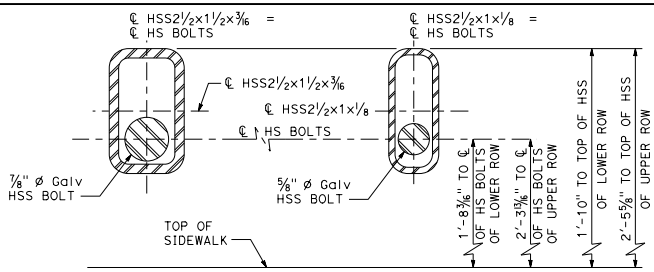
7-1-25

2025 STANDARD PLAN B11-59

Return to Table of Contents

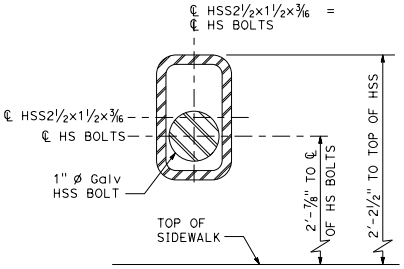



PLAN




DETAIL A DETAIL B

APPROACH END BLOCK FORMED HOLES

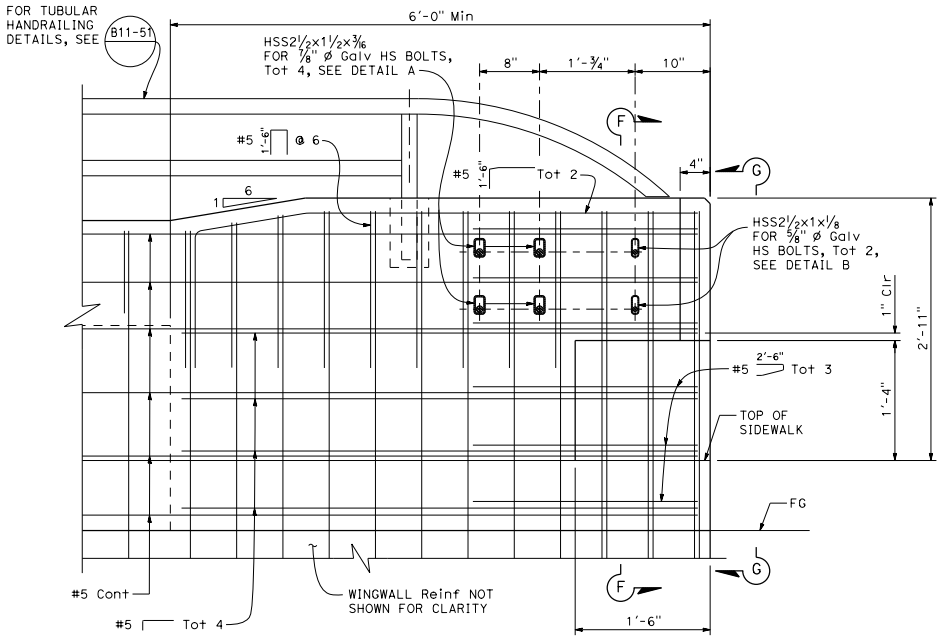



DETAIL C

DEPARTURE END BLOCK FORMED HOLES

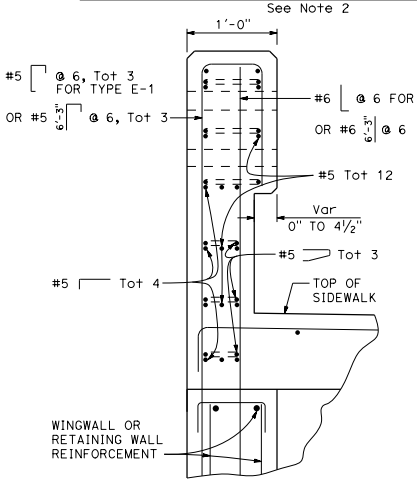
NOTES:

1. Adjust reinforcement as needed to clear HSS sections by at least 1".
2. For departure end block details, see Standard Plan B11-58 and Section H-H on Standard Plan B11-59.



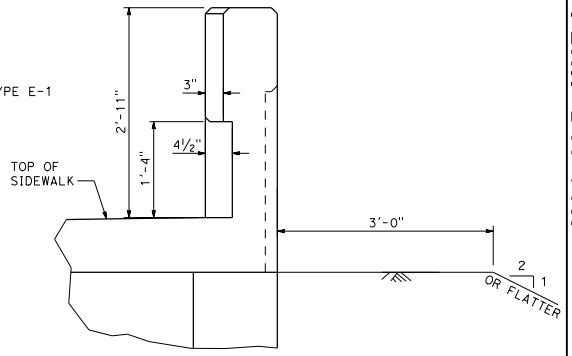

ELEVATION

APPROACH END BLOCK DETAILS




SECTION F-F

NOTE: For reinforcement not shown, see Section D-D on Standard Plan B11-59.




VIEW G-G

Handrailing not shown

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER TYPE 732SW DETAILS No. 3**

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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B11-59A

7-1-25



Return to Table of Contents

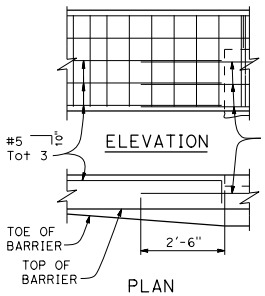
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

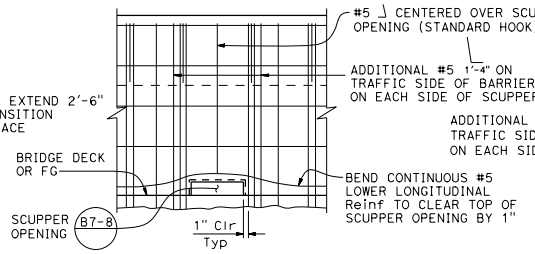
REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



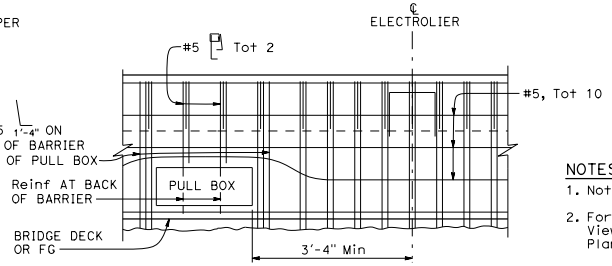

## DETAIL A

Approach end block similar.




## SCUPPER REINFORCEMENT DETAILS

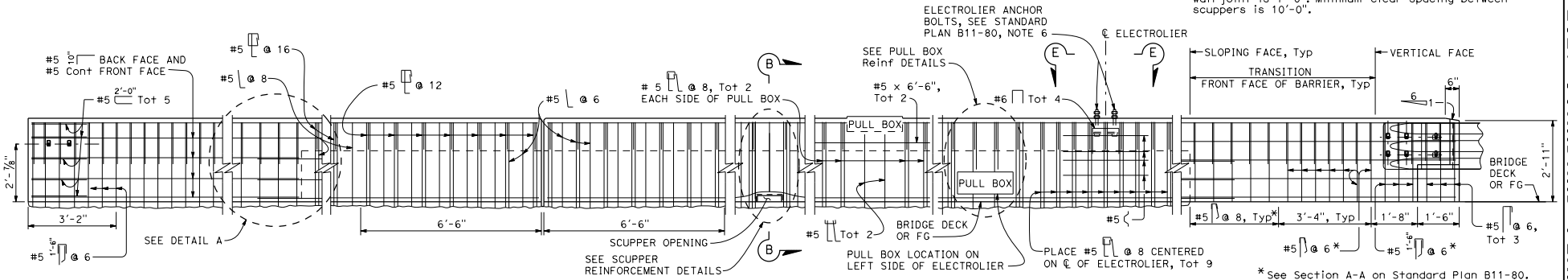
If scupper is permitted on bridge




## PULL BOX REINFORCEMENT DETAILS

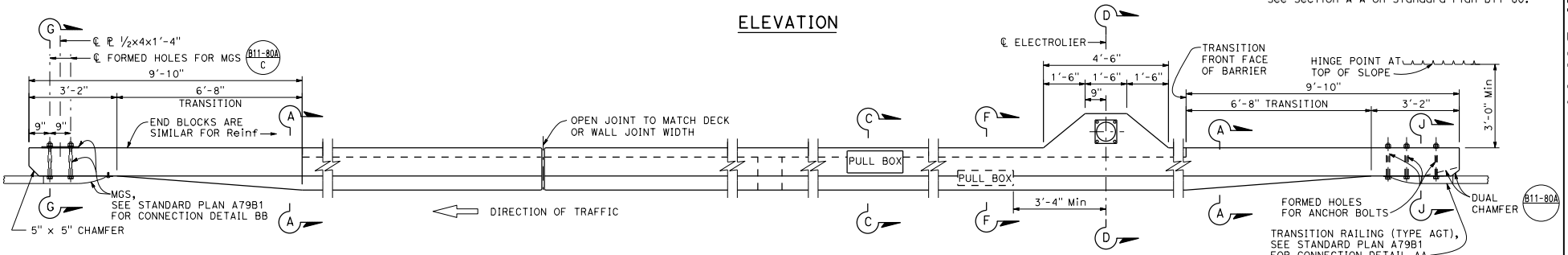
**NOTES:**

1. Not all reinforcement shown for clarity.
2. For Section A-A, Section B-B, Section C-C, Section D-D, View E-E, Section F-F and Section G-G, see Standard Plan B11-80. For Section J-J, see Standard Plan B11-80A.
3. If departure end block is within the Clear Recovery Zone (CRZ, 30 feet for expressways and freeways and 20 feet for conventional highways) of opposing traffic, then use the approach end block at departure end.
4. Minimum clear spacing between scupper and deck or wall joint is 7'-0". Minimum clear spacing between scuppers is 10'-0".




* See Section A-A on Standard Plan B11-80.

## ELEVATION




## DEPARTURE END BLOCK

Rail element not shown for clarity

## DECK OR WALL JOINT

## SCUPPER DETAIL

## PLAN

## ELECTROLIER

See Note 5 on Standard Plan B11-80 for electrical details.

## APPROACH END BLOCK

See Standard Plan B11-80A for additional Approach End Block Details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

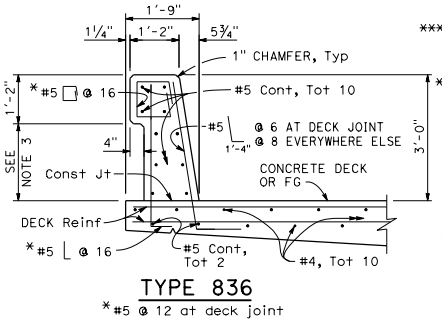
# CONCRETE BARRIER TYPE 836 DETAILS No. 1

NO SCALE

**B11-79**

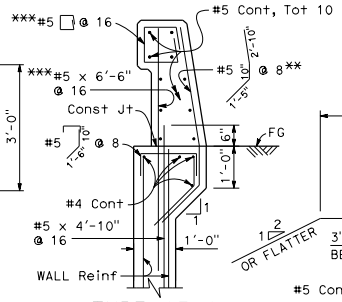
7-1-25

Return to Table of Contents




TYPE 836

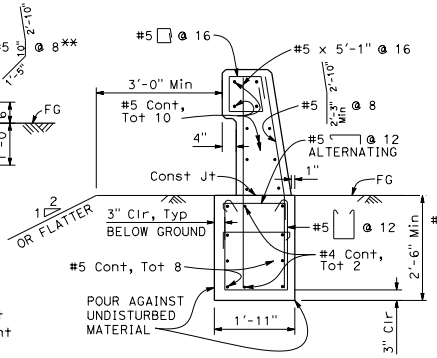
*#5 @ 12 at deck joint



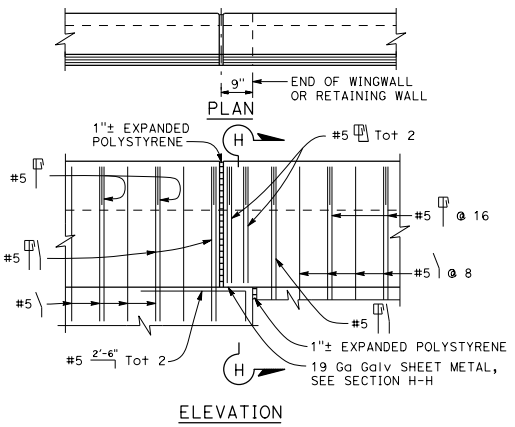

TYPE 836A

**#5 @ 6 at wall joint

***#5 @ 12 at wall joint



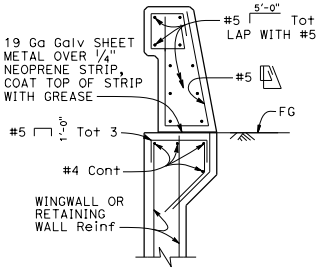

TYPE 836B



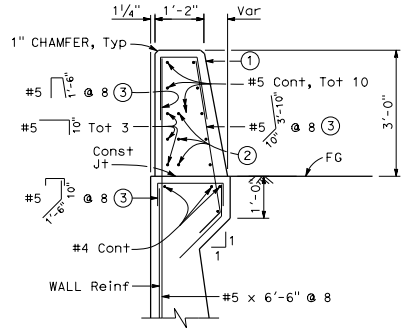

ELEVATION

TYPE 836A TYPE 836B

NOTE:
Type 836A and Type 836B are similar to Type 836 except as noted.




SECTION H-H

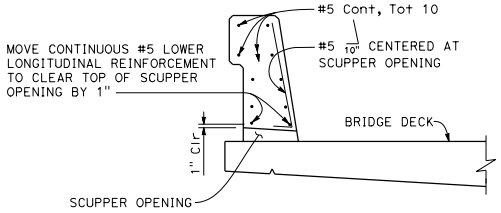



SECTION A-A

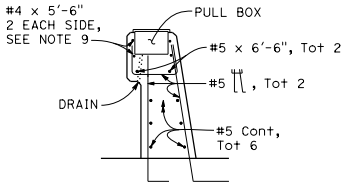
① Transition sloping face to vertical face.

② Extend lower reinforcement, total 3 at back face 2'-6" into transition. See Detail A on Standard Plan B11-79.

③ Spacing is 6" for 6'-6" of each barrier end.




SECTION B-B

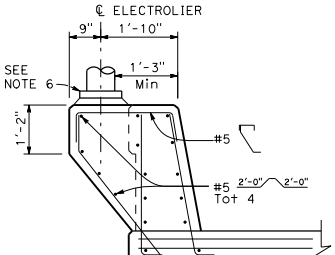



SECTION C-C

See Note 9

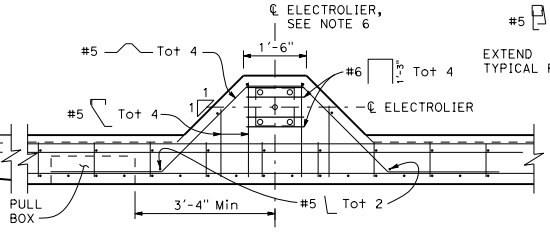
NOTES:

1. Walls shall be backfilled before barrier is placed.
2. Clearance to reinforcing steel in barrier shall be 2", except as noted. Longitudinal reinforcement to stop at all expansion joints.
3. Dimension from top of bridge deck to bottom of bridge rail haunch on backside of bridge rail may vary with roadway cross slope and with certain thicknesses of deck overlay if placed on the same contract, see bridge/roadway plans.
4. For typical metal railing connection details not shown, see Standard Plan A79B1.
5. See Standard Plans ES-9A, ES-9B, ES-9C, ES-9D, and ES-9E for electrical details. The maximum number of conduits in the barrier is limited to two 2" Ø conduits along with one 3" Ø conduit. When a 3" Ø conduit is used, it is restricted to the base of the barrier.
6. For electrolier mounting details, see Standard Plans ES-6A and ES-6B.
7. Minimum concrete edge distance to the reinforcement shown shall be maintained. Edge distance may be adjusted to accommodate increase in concrete cover for architectural treatment on backside of bridge rail.
8. Minimum length of Concrete Barrier Type 836B is 40'-0".
9. In front and back of pull box (Section C-C), the #4 x 5'-6" bars must be centered on pull box. As an alternative 4 x 4 - W12 x W12 welded wire fabric extending minimum 8" beyond ends of pull box may be substituted.

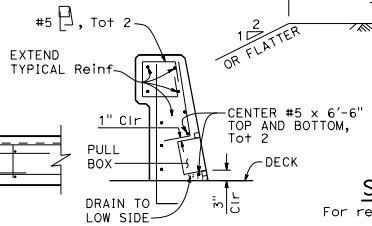



PEDESTAL ELEVATION

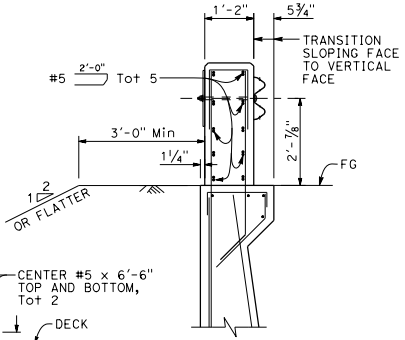
SECTION D-D




VIEW E-E




SECTION F-F




SECTION G-G

For reinforcement not shown, see Section A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 836 DETAILS No. 2

NO SCALE

B11-80

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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2025 STANDARD PLAN B11-80



7-1-25

Return to Table of Contents

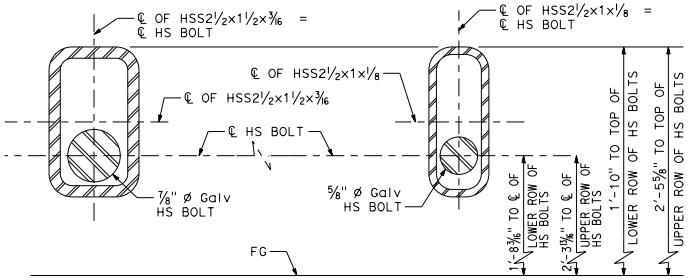
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

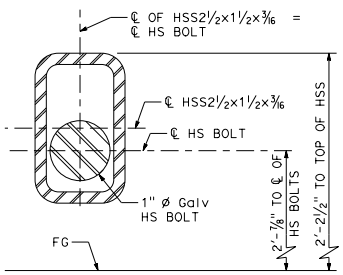
REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.




DETAIL A DETAIL B

## APPROACH END BLOCK FORMED HOLES

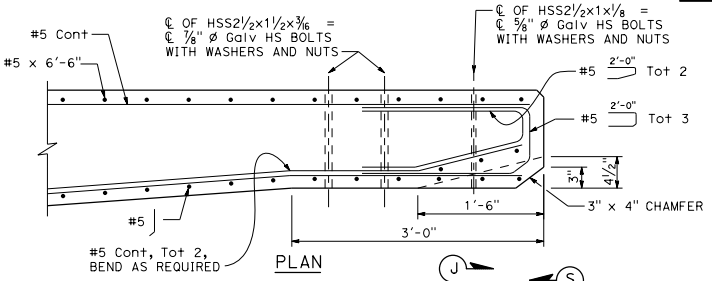



DETAIL C
See Note 2

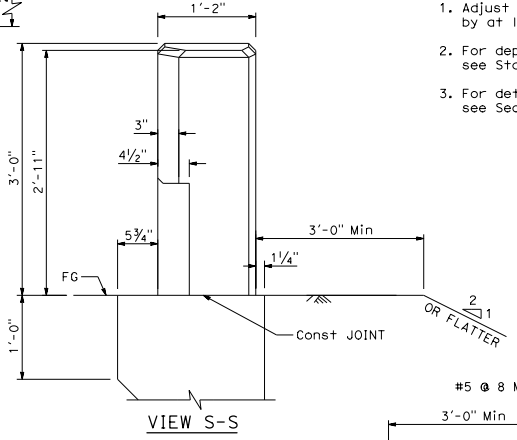
## DEPARTURE END BLOCK FORMED HOLE

NOTES:

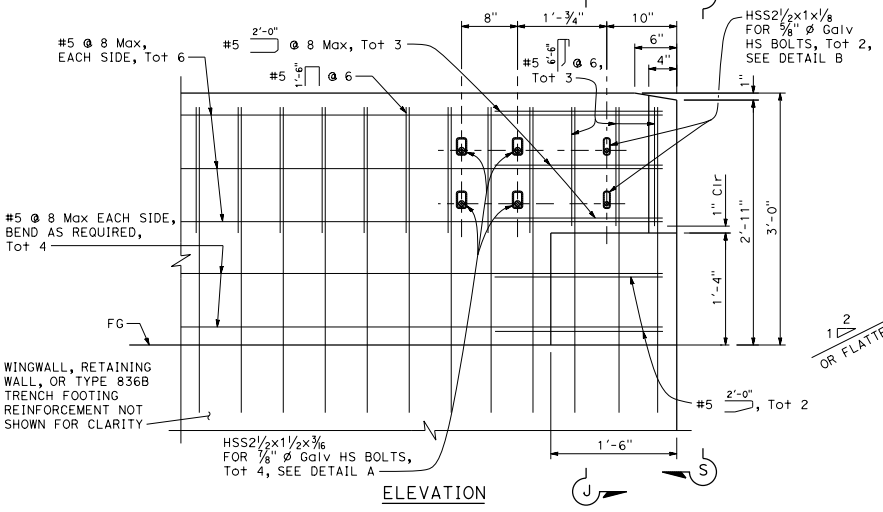
1. Adjust reinforcement to clear HSS sections by at least 1".
2. For departure end block details, see Standard Plan B11-79.
3. For details and dimensions not shown, see Section A-A on Standard Plan B11-80.




PLAN

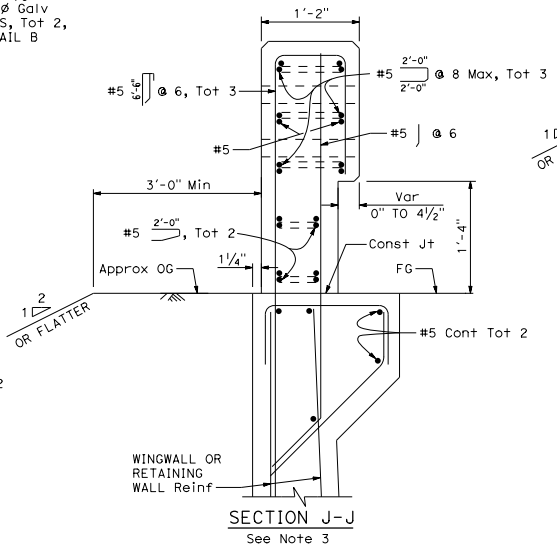



VIEW S-S

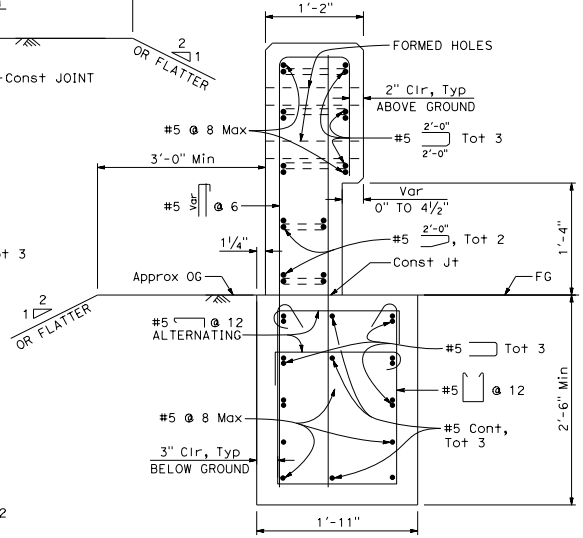



ELEVATION

## APPROACH END BLOCK DETAIL




SECTION J-J
See Note 3




SECTION J-J
For Concrete Barrier Type 836B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 836 DETAILS No. 3

NO SCALE

**B11-80A**

7-1-25

Return to Table of Contents

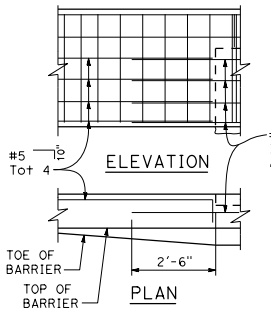
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

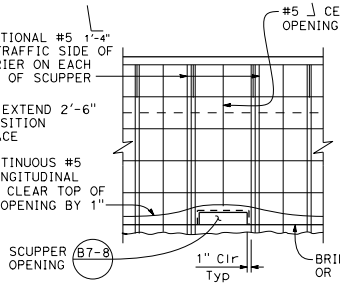
REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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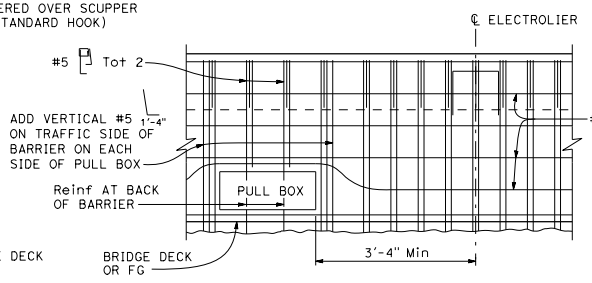

## DETAIL A

Approach end block similar.




## SCUPPER REINFORCEMENT DETAILS

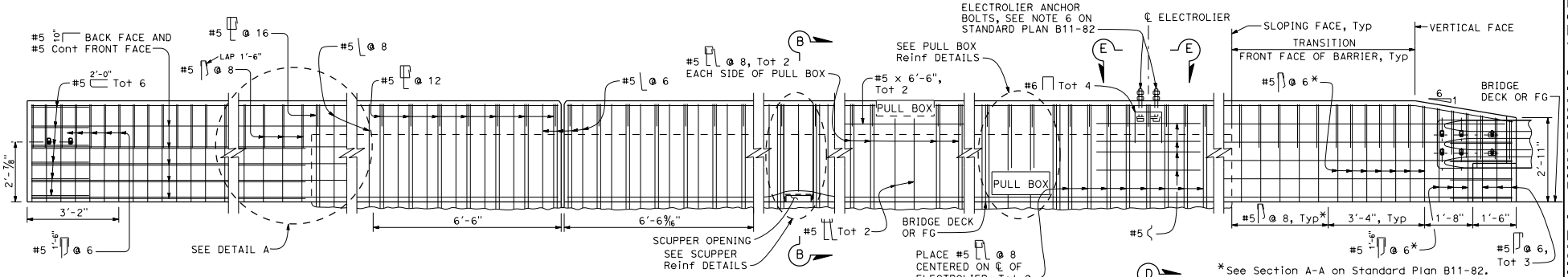
If scupper is permitted on bridge



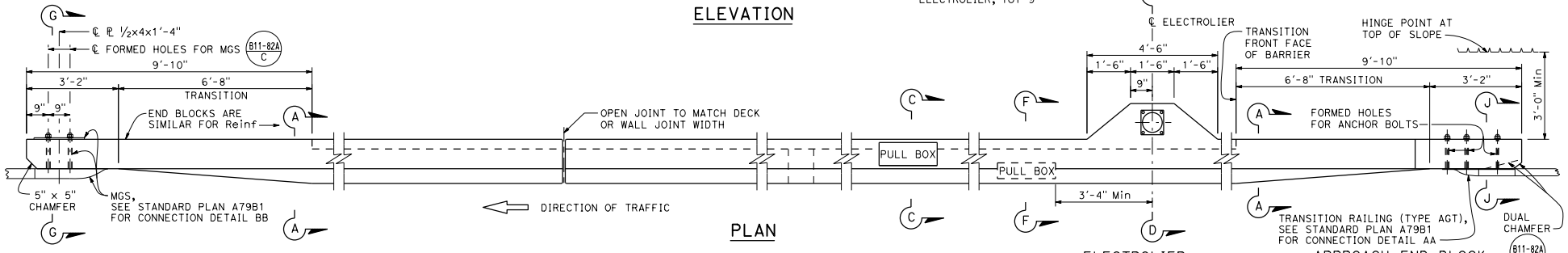

## PULL BOX REINFORCEMENT DETAILS

**NOTES:**

1. Not all reinforcement shown for clarity.
2. For Section A-A, Section B-B, Section C-C, Section D-D, View E-E, Section F-F and Section G-G, see Standard Plan B11-82. For Section J-J, see Standard Plan B11-82A.
3. If departure end block is within the Clear Recovery Zone (CRZ, 30 feet for expressways and freeways and 20 feet for conventional highways) of opposing traffic, then use the approach end block at departure end.
4. Minimum clear spacing between scupper and deck or wall joint is 7'-0". Minimum clear spacing between scuppers is 10'-0".




## ELEVATION




## DEPARTURE END BLOCK

Rail element not shown for clarity

## DECK OR WALL JOINT

## PLAN

## SCUPPER DETAIL

## ELECTROLIER

See Note 5 on Standard Plan B11-82 for electrical details.

## APPROACH END BLOCK

See Standard Plan B11-82A for additional Approach End Block Details.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

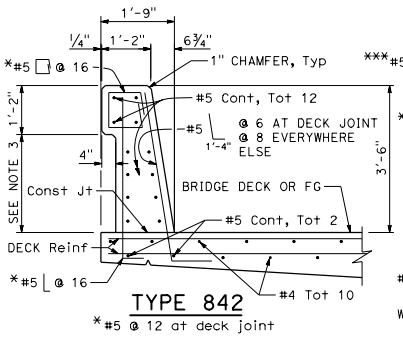
# CONCRETE BARRIER TYPE 842 DETAILS No. 1

NO SCALE

**B11-81**

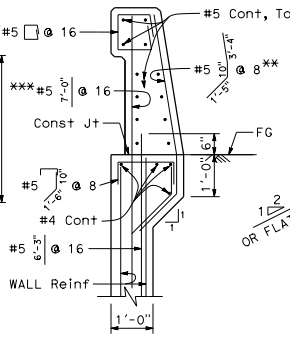
7-1-25

Return to Table of Contents



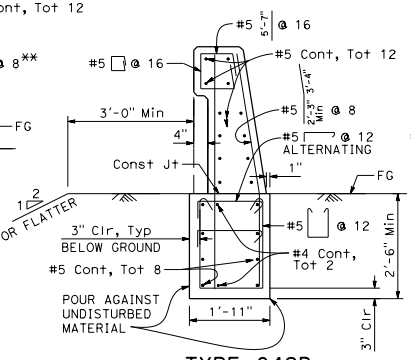

TYPE 842

*#5 @ 12 at deck joint

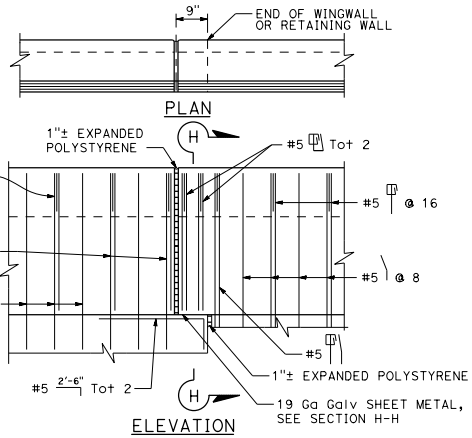



TYPE 842A

**#5 @ 6 at wall joint
***#5 @ 12 at wall joint



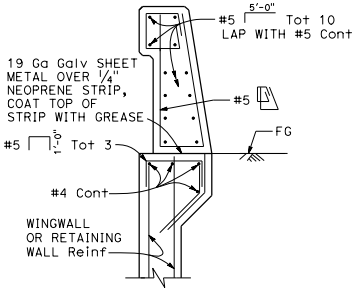

TYPE 842B



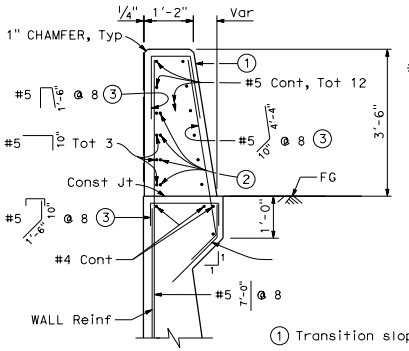

ELEVATION

TYPE 842A TYPE 842B

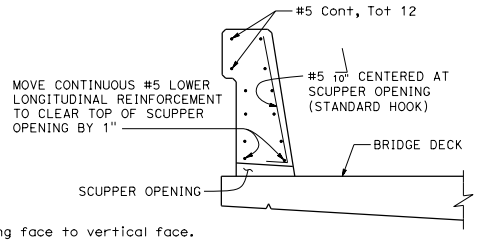
NOTE:
Type 842A and Type 842B are similar to Type 842 except as noted.



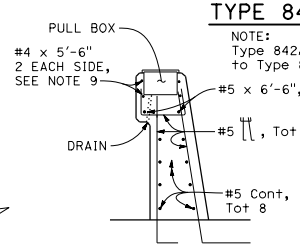

SECTION H-H




SECTION A-A




SECTION B-B




SECTION C-C

See Note 9

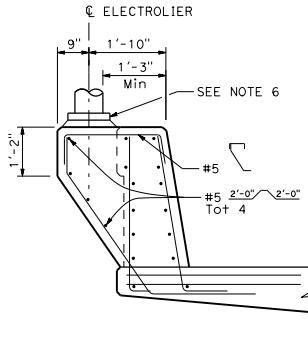
① Transition sloping face to vertical face.

② Extend lower reinforcement, total 4 at back face 2'-6" into transition. See Detail A on Standard Plan B11-81.

③ Spacing is 6" for 6'-6" of each barrier end.

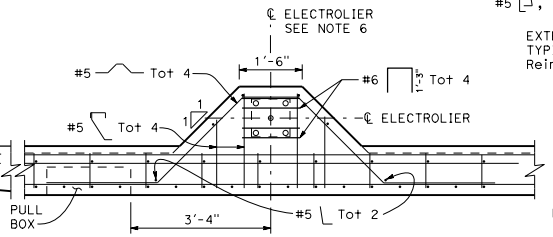
NOTES:

1. Walls shall be backfilled before barrier is placed.
2. Clearance to reinforcing steel in barrier shall be 2", except as noted. Longitudinal reinforcement to stop at all expansion joints.
3. Dimension from top of bridge deck to bottom of bridge rail haunch on backside of bridge rail may vary with roadway cross slope and with certain thicknesses of deck overlay if placed on the same contract, see bridge/roadway plans.
4. For typical metal railing connection details not shown, see Standard Plan A79B1.
5. See Standard Plans ES-9A, ES-9B, ES-9C, ES-9D, and ES-9E for electrical details. The maximum number of conduits in the barrier is limited to two 2" Ø conduits along with one 3" Ø conduit. When a 3" Ø conduit is used, it is restricted to the base of the barrier.
6. For electrolier mounting details, see Standard Plans ES-6A and ES-6B.
7. Minimum concrete edge distance to the reinforcement shown shall be maintained. Edge distance may be adjusted to accommodate increase in concrete cover for architectural treatment on backside of bridge rail.
8. Minimum length of Concrete Barrier Type 842B is 40'-0".
9. In front and back of pull box (Section C-C), the #4 x 5'-6" bars must be centered on pull box. As an alternative 4 x 4 - W12 x W12 welded wire fabric extending minimum 8" beyond ends of pull box may be substituted.

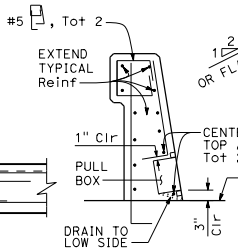



PEDESTAL ELEVATION

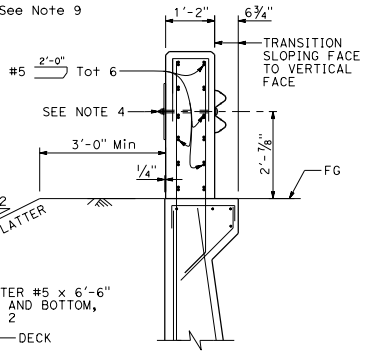
SECTION D-D




VIEW E-E




SECTION F-F




SECTION G-G

For reinforcement not shown, see Section A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 842 DETAILS No. 2

NO SCALE

B11-82

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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September 19, 2025
PLANS APPROVAL DATE

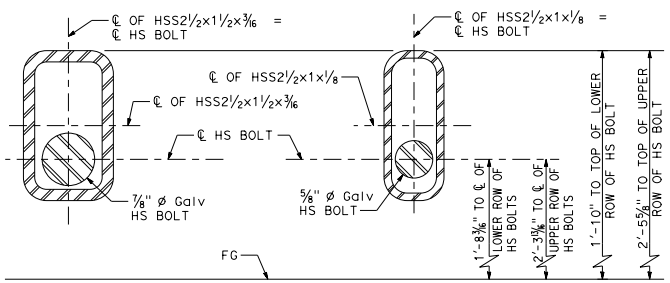
REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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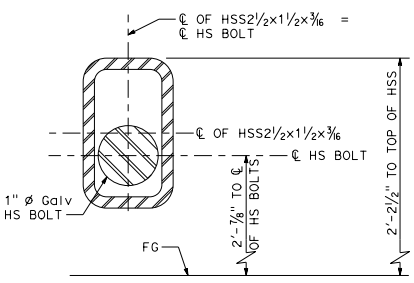
2025 STANDARD PLAN B11-82

7-1-25

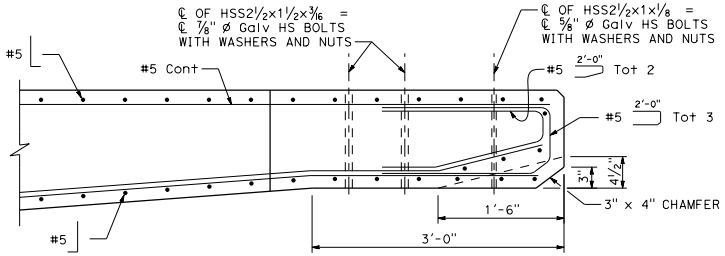
Return to Table of Contents

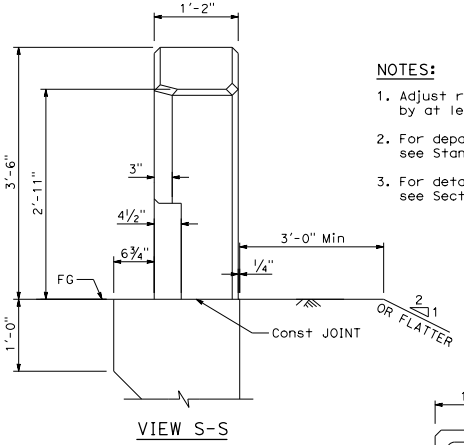



## APPROACH END BLOCK FORMED HOLES



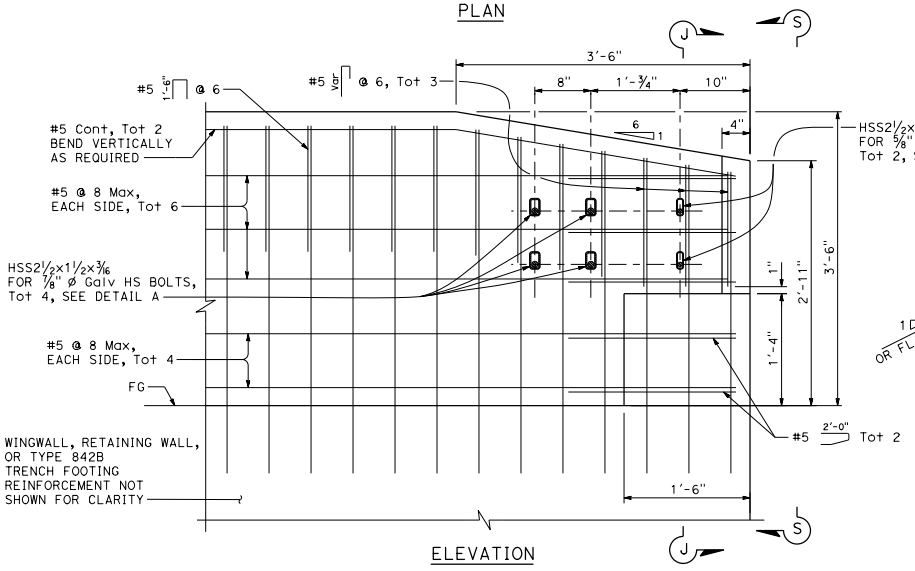

## DEPARTURE END BLOCK FORMED HOLE



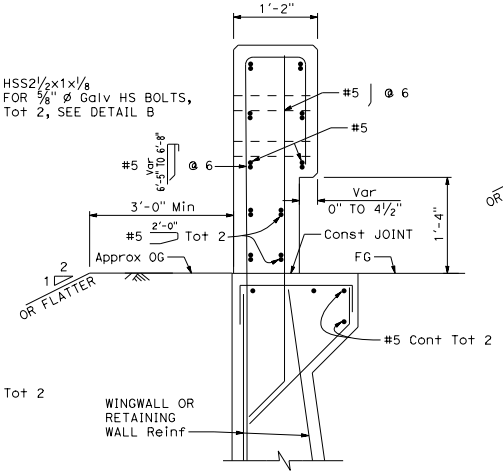




NOTES:

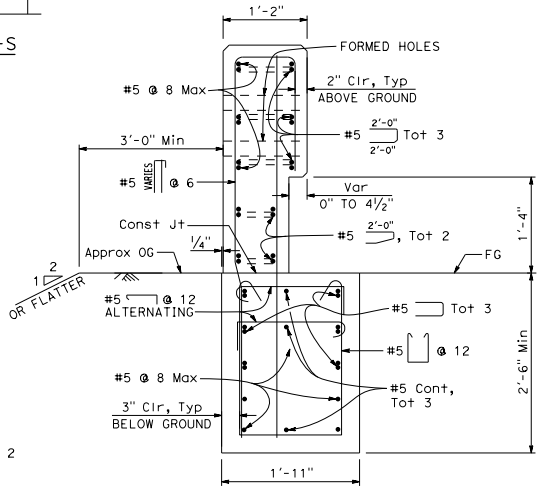
1. Adjust reinforcement to clear HSS sections by at least 1".
2. For departure end block details, see Standard Plan B11-81.
3. For details and dimensions not shown, see Section A-A on Standard Plan B11-82.




## APPROACH END BLOCK DETAILS




For reinforcement not shown, see Section A-A on Standard Plan B11-82.




For Concrete Barrier Type 842B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 842 DETAILS No. 3

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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September 19, 2025
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B11-82A

7-1-25



Return to Table of Contents

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| | | | | | |

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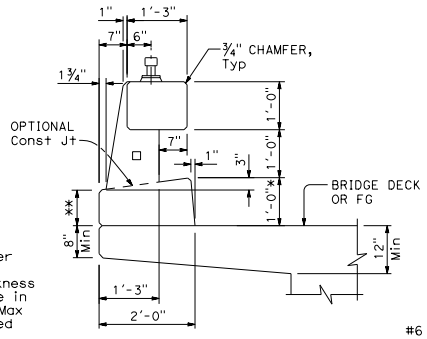
September 19, 2025
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STATE OF CALIFORNIA

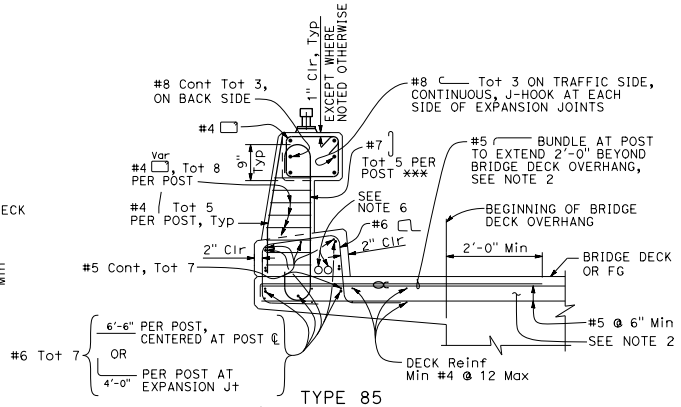
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* Dimension must be 1'-0" above top of Bridge Deck or FG (including overlay). Increase lower beam (curb) height by 2" Max to match overlay depth.

** Dimension from top of bridge deck to top of backside of lower beam (curb) is determined by bridge cross slope and by thickness of deck overlay due to increase in lower beam (curb) height by 2" Max to match overlay depth if placed on the same contract.

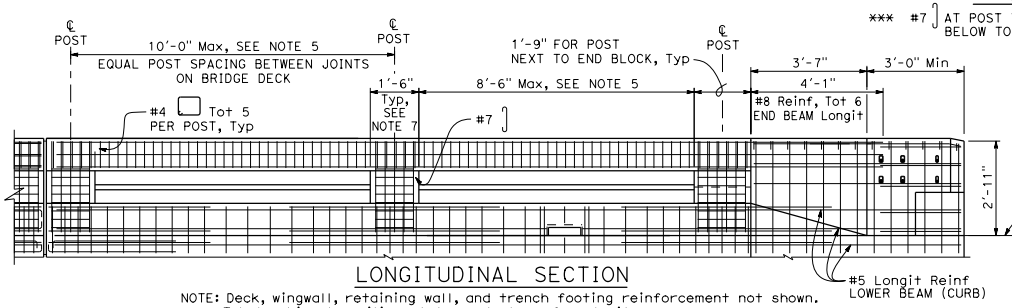



TYPICAL SECTION



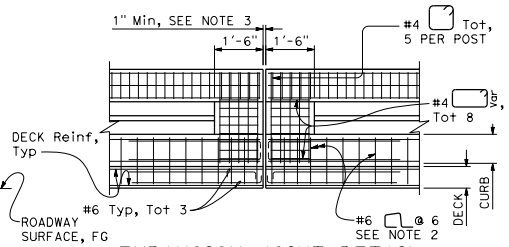

TYPE 85

*** #7 AT POST TO EXTEND 6" Min BELOW TOP OF BRIDGE DECK



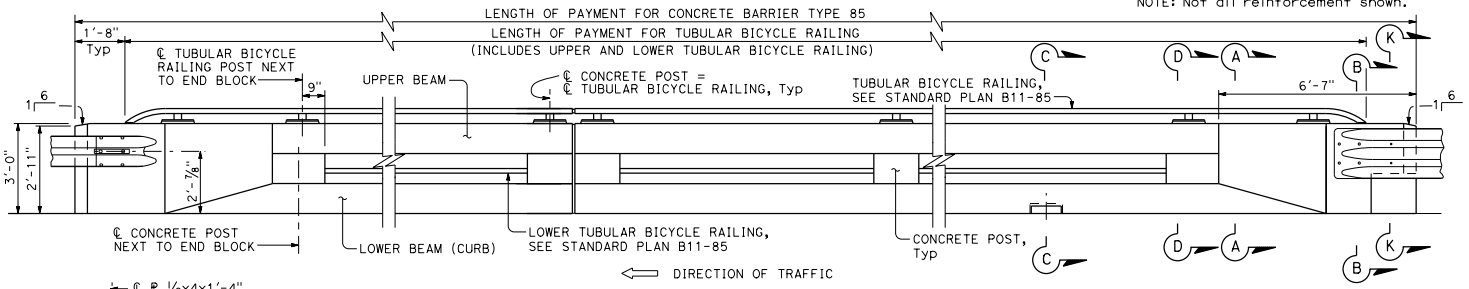

LONGITUDINAL SECTION

NOTE: Deck, wingwall, retaining wall, and trench footing reinforcement not shown. Tubular bicycle railing at top not shown for clarity.



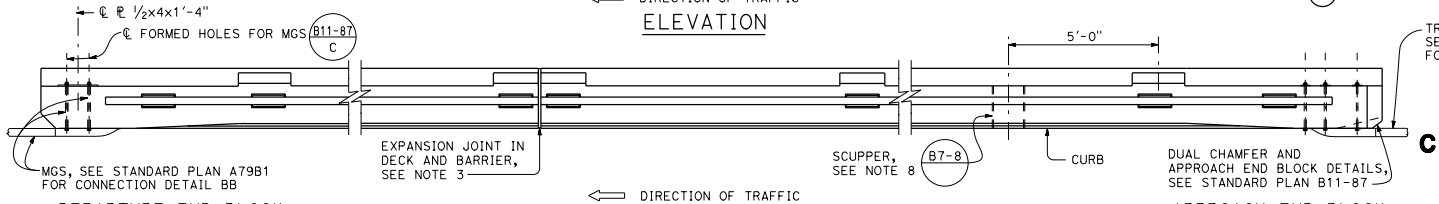

EXPANSION JOINT DETAIL

NOTE: Not all reinforcement shown.




DIRECTION OF TRAFFIC

ELEVATION




DEPARTURE END BLOCK
See Note 1

DIRECTION OF TRAFFIC

PLAN

APPROACH END BLOCK

NOTES:

1. If departure end block is within the Clear Recovery Zone (CRZ) of opposing traffic (30 feet for expressways and freeways, and 20 feet for conventional highways), use the approach end block detail for the departure end.
2. For additional reinforcement details, see Standard Plan B11-84.
3. Barrier expansion joint to match deck joint, 1" minimum.
4. Splicing in longitudinal rail reinforcing must be staggered. Lap splices must be completely outside the limits of concrete post. Butt welds are an acceptable alternative to lap splicing #8 bars.
5. Maximize post spacing, not to exceed 10'-0", while spacing posts equally between bridge joints.
6. The maximum number of conduits is limited to two 1½" ø and must be placed in front half of the lower beam (curb). See also Conduit in Bridge Railing detail on Standard Plan B14-3.
7. Width of concrete post supporting electrolier pedestal is 1'-8", see Standard Plan B11-86 for additional details.
8. Scupper and pull box can only be placed at mid-points between concrete posts. Scupper and pull box cannot both be located between the same two concrete posts. Neither scupper nor pull box can be located between concrete posts where one of those posts is adjacent to an expansion joint. Bend conduits around scupper, for scupper details, see Section C-C on Standard Plan B11-84.
9. For Section A-A, Section B-B, and Section D-D, see Standard Plan B11-83A. For Section C-C, see Standard Plan B11-84. For Section K-K, see Standard Plan B11-87.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 85 DETAILS No. 1

NO SCALE

**B11-83**

7-1-25



Return to Table of Contents

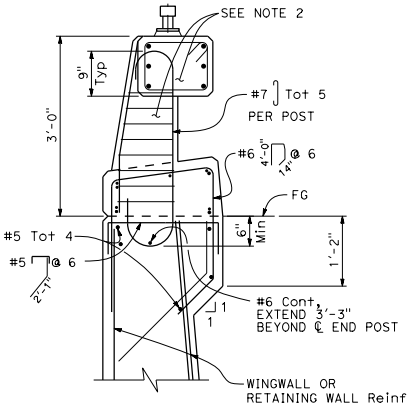
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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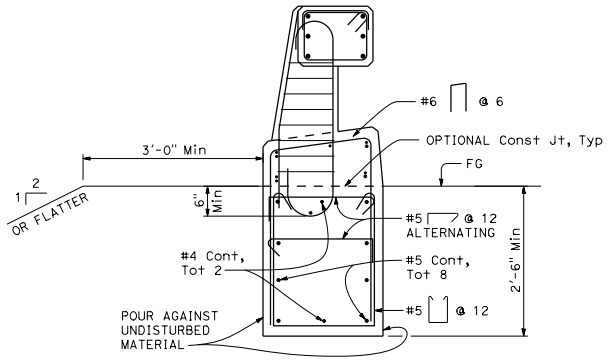
September 19, 2025
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No. C73369
Exp. 12-31-26
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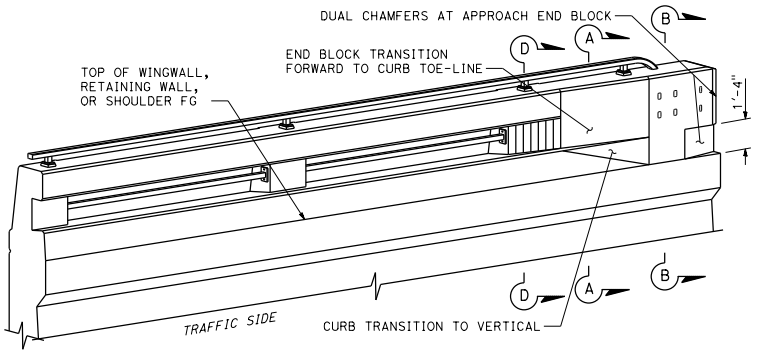

TYPE 85A



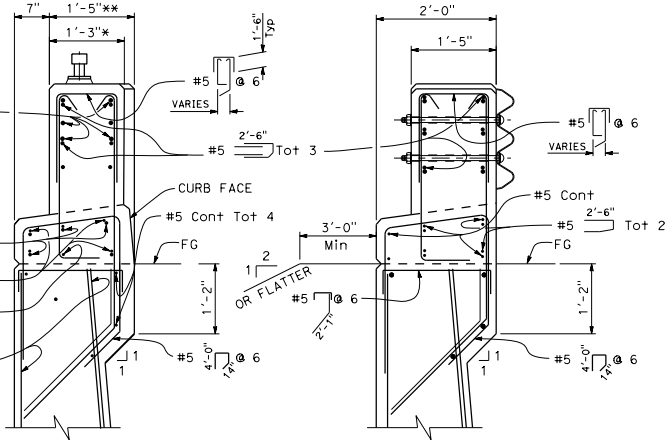

TYPE 85B
See Note 1

NOTES:

1. 40'-0" minimum length for Type 85B.
2. For details not shown, see Standard Plans B11-83 and B11-84.
3. Section D-D is 1'-9" long as shown, only the reinforcement for post transition is shown.
4. For additional approach end block details, see Standard Plan B11-87.



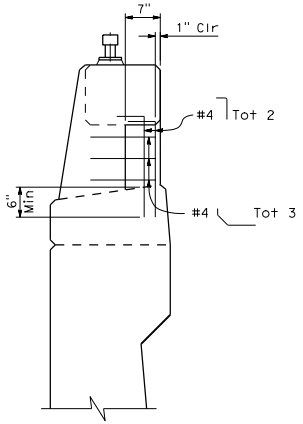

ISOMETRIC VIEW OF POST FACE TRANSITION TO END BLOCK AND DUAL END BLOCK CHAMFER




SECTION A-A

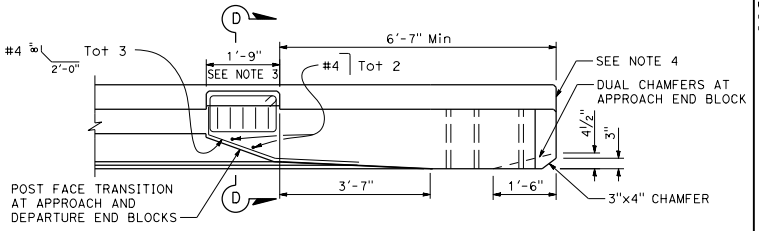



SECTION B-B




SECTION D-D

* BEGIN BARRIER TRANSITION
** END BARRIER TRANSITION




END BLOCK AND ADJACENT POST TRANSITION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 85 DETAILS No. 2

NO SCALE

**B11-83A**

2025 STANDARD PLAN B11-83A

7-1-25

Return to Table of Contents

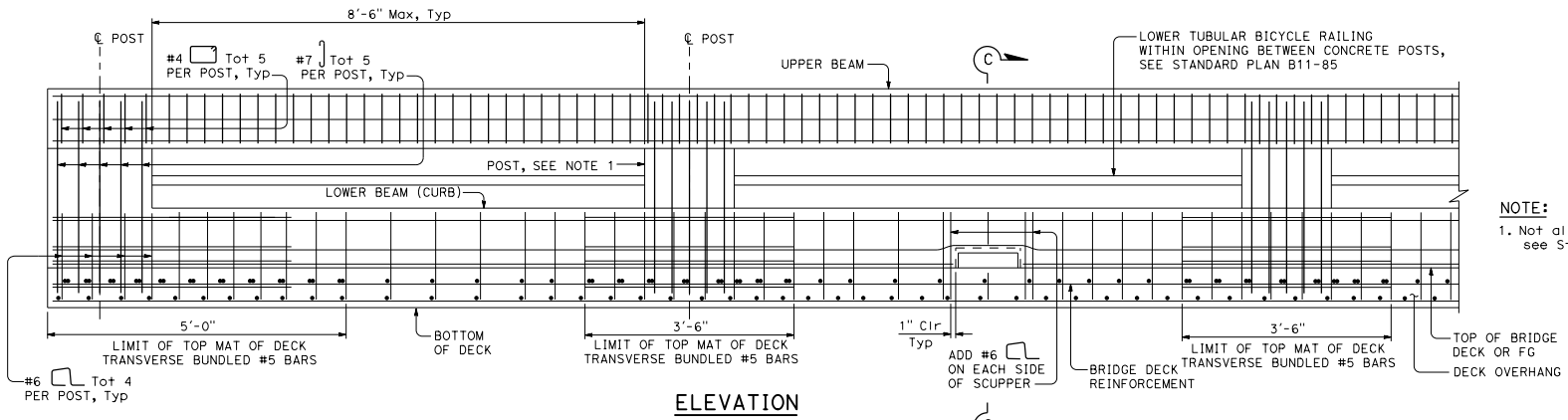
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
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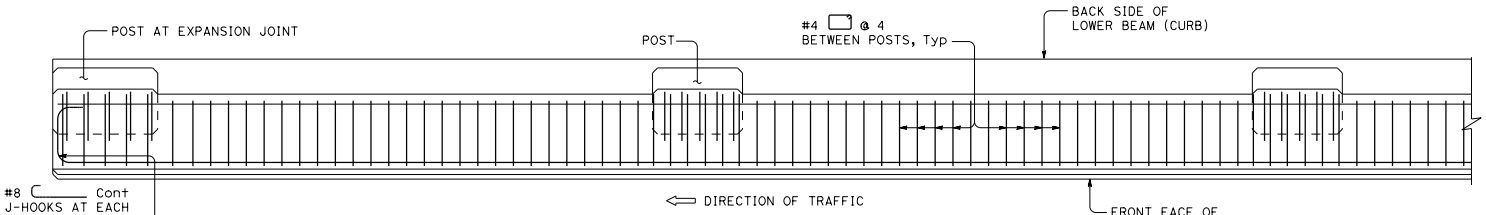



## ELEVATION

NOTE: Upper tubular bicycle railing not shown for clarity.

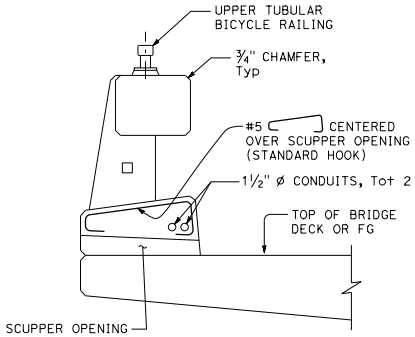
NOTE:

1. Not all post reinforcement is shown for clarity, see Standard Plan B11-83 for additional details.

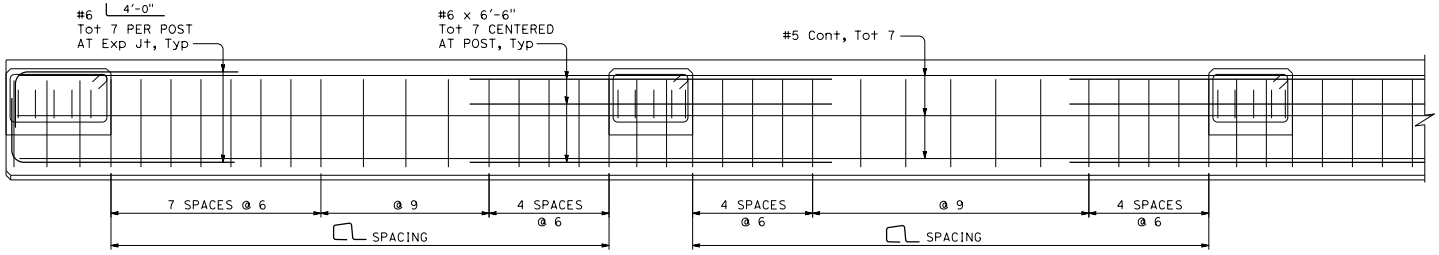



## PLAN AT UPPER BEAM

NOTE: Upper tubular bicycle railing not shown for clarity.




## SECTION C-C




## PLAN AT LOWER BEAM (CURB)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 85 DETAILS No. 3

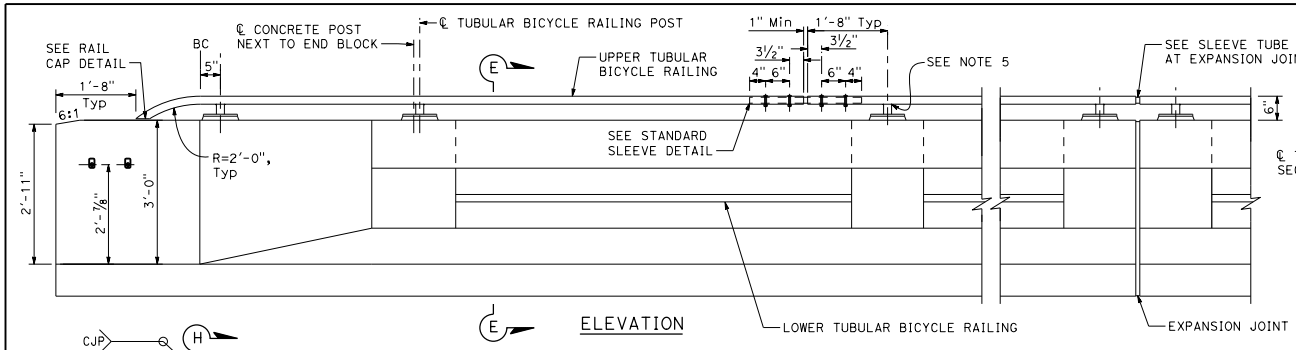
NO SCALE

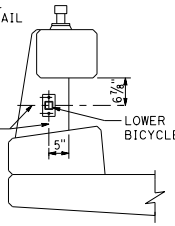
**B11-84**

7-1-25

2025 STANDARD PLAN B11-84

Return to Table of Contents




| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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September 19, 2025
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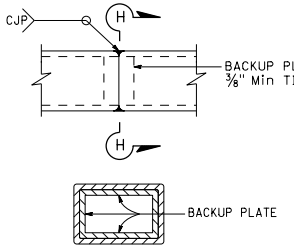
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NOTES:

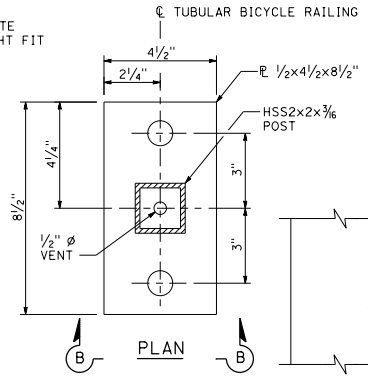
1. Adjust mortar pad thickness so that the base plate is level in the transverse cross sectional view, and is parallel to the top of the upper beam (parallel to profile grade) in the longitudinal direction.
2. Tube splices shall be located in the tubes spanning deck or wall joints. Increase joint width in tubes to match expansion joint width and increase sleeve length accordingly.
3. Upper tubular bicycle railing shall be continuous over not less than two posts.
4. Use HS bolt ½" ø x 3⅝" with nut and washers, snug tightened, with thread locking mechanism.
5. Welded connection details between tubular bicycle railing and HSS2x2x3/16 post is shown. For bolted connection details, see Railing Connection Details on Standard Plan B11-220.

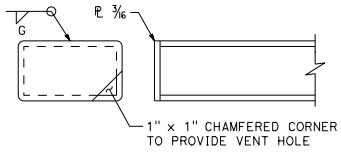



SECTION H-H

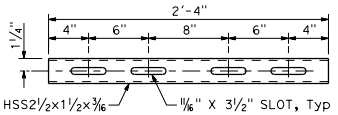
## ALTERNATIVE TUBE WELDED STANDARD SPLICE

NOTE: For splices not at expansion joints.

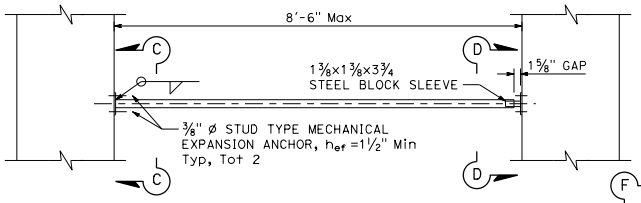


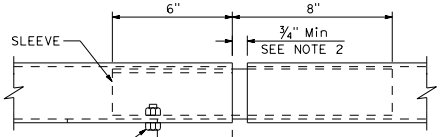

RAIL CAP DETAIL



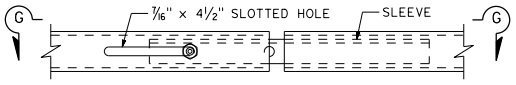

STANDARD SLEEVE DETAIL
See Note 4



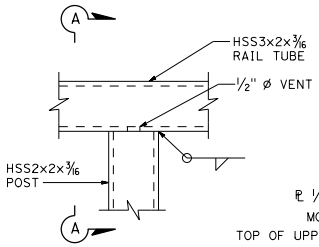

LOWER TUBULAR BICYCLE RAILING DETAIL
$h_{ef}$ = Effective Embedment Depth



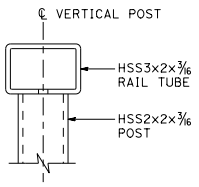

VIEW G-G



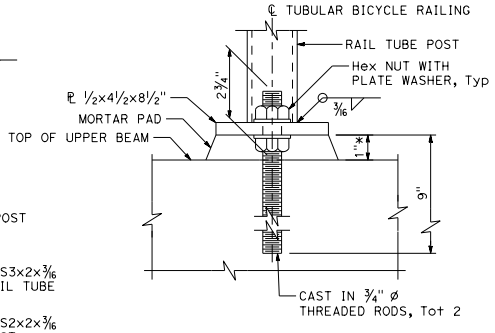

VIEW F-F



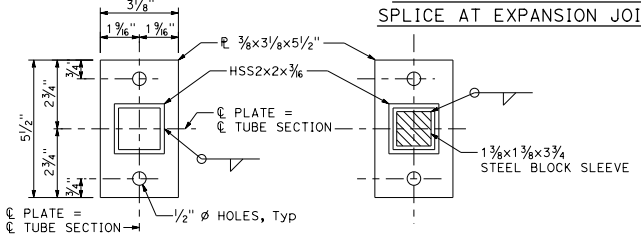

ELEVATION
See Note 5




SECTION A-A

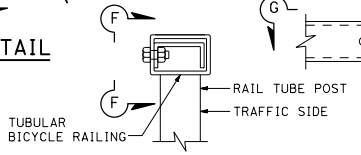



SECTION B-B
* See Note 1

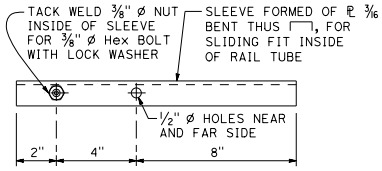



SECTION C-C

SECTION D-D
See Section C-C for details not shown.




SECTION AT SLEEVE TUBE SPLICE AT EXPANSION JOINT




SLEEVE TUBE SPLICE AT EXPANSION JOINT DETAIL

## TUBULAR BICYCLE RAILING DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 85 DETAILS No. 4

NO SCALE

B11-85

7-1-25

2025 STANDARD PLAN B11-85

Return to Table of Contents

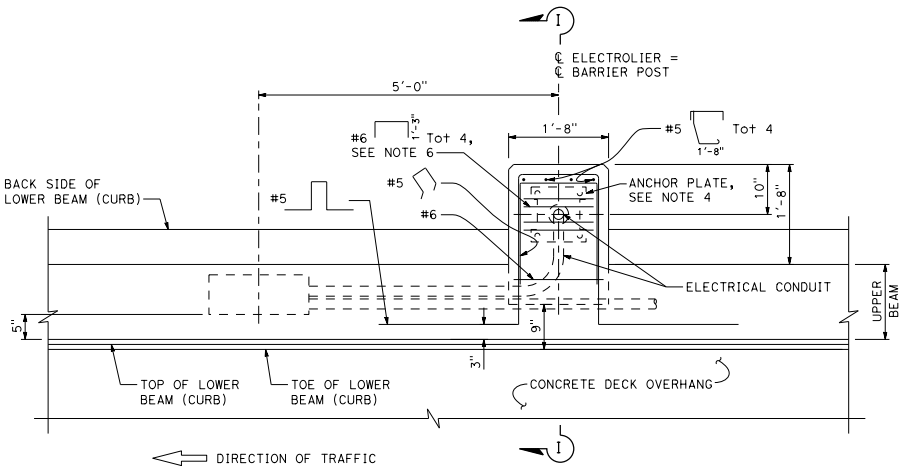
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

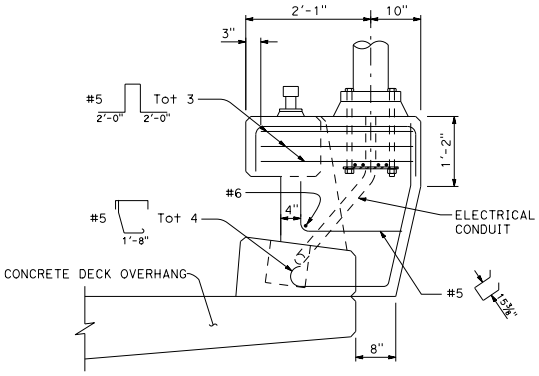
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



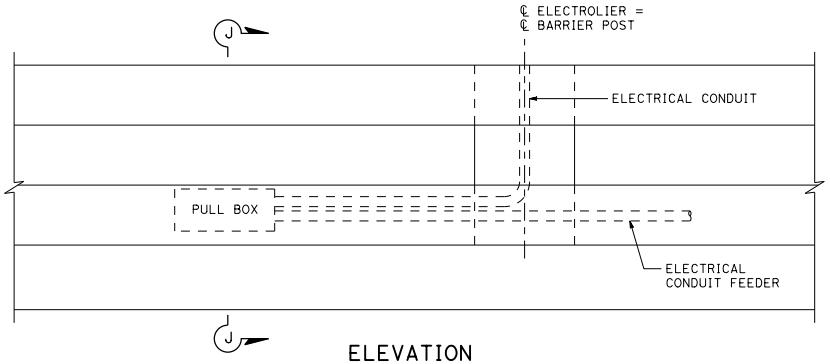

PLAN
See Note 1



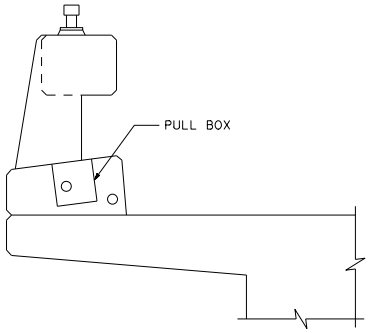

SECTION I-I
See Note 4

NOTES:

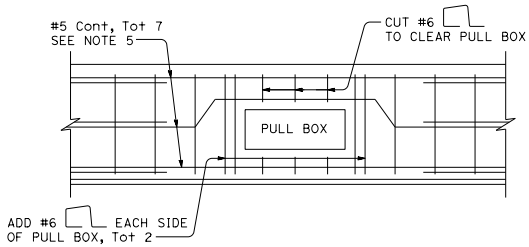
1. See Project Plans for electrolier and pull box locations.
2. For electrical details, see Standard Plans ES-9A, ES-9B, ES-9C, ES-9D, and ES-9E.
3. Only the additional reinforcing for the electrolier pedestal is shown. For other typical reinforcing for Type 85 Barrier, see Standard Plans B11-83, B11-83A, and B11-84.
4. For electrolier mounting details, see Standards Plans ES-6A and ES-6B.
5. Bend #5 reinforcement in curb as required to clear pull box.
6. Place #6 reinforcement to clear conduit and anchor bolts.




ELEVATION




SECTION J-J
At pull box if required




PULL BOX REINFORCEMENT DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 85 DETAILS No. 5

NO SCALE

B11-86

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

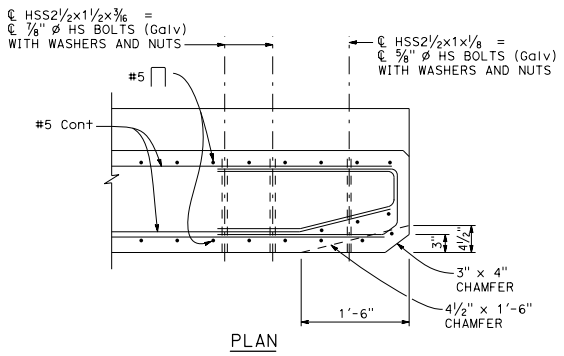
September 19, 2025
PLANS APPROVAL DATE

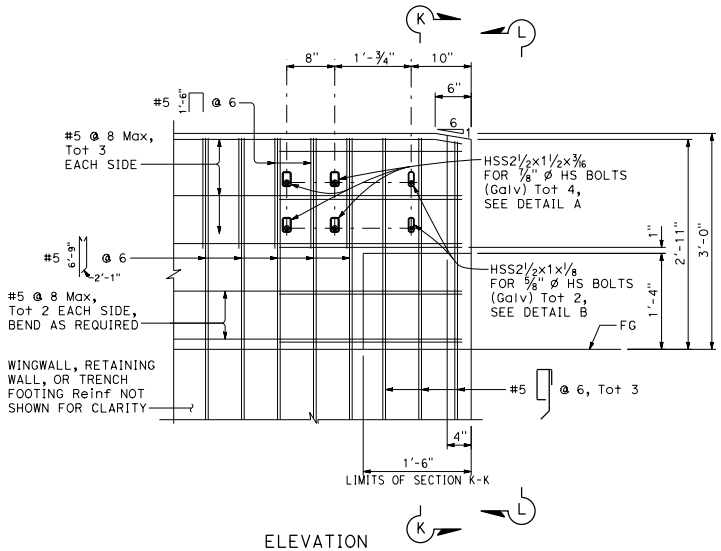
REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

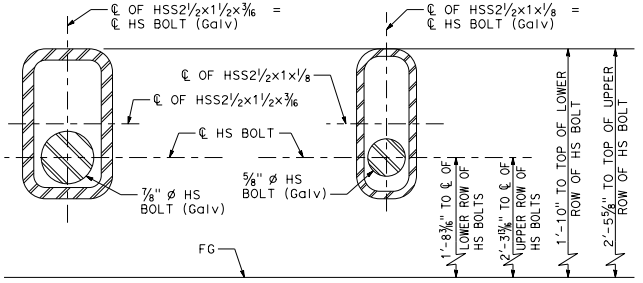
NOTES:

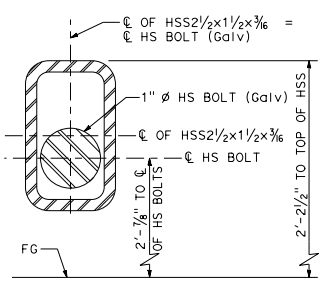
1. Adjust reinforcement as needed to clear HSS section by 1" minimum.
2. For typical connection for departure end block to MGS details, see Standard Plan A79B1 and Detail C on this sheet.



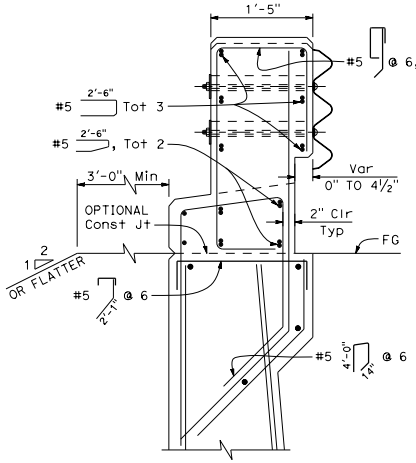

APPROACH END BLOCK DETAILS

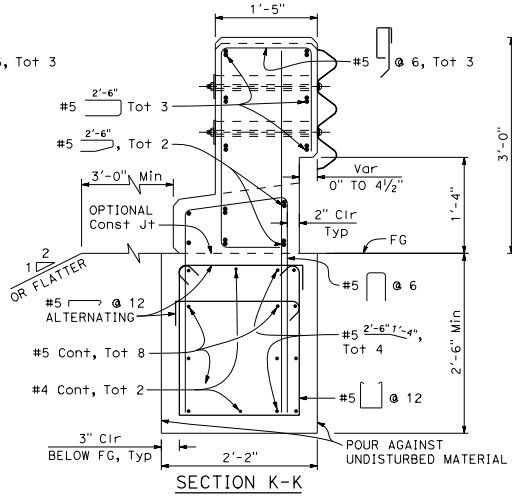


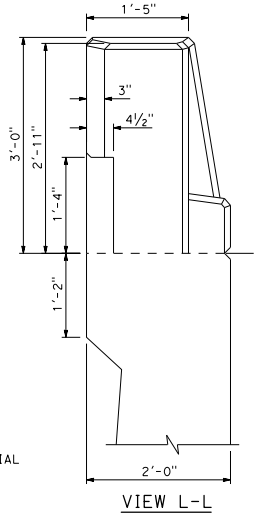




APPROACH END BLOCK FORMED HOLES

DEPARTURE END BLOCK FORMED HOLE




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CONCRETE BARRIER TYPE 85 DETAILS No. 6

NO SCALE

B11-87

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

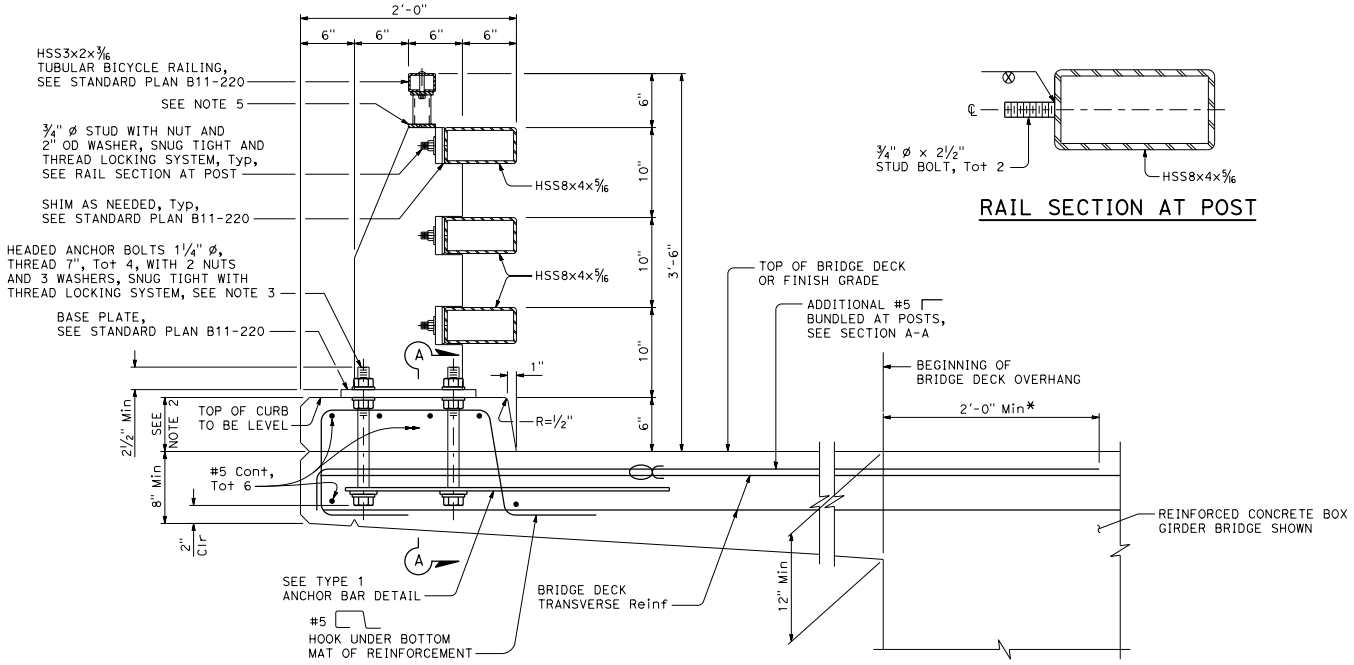
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LEGEND:
Bundled reinforcement




## TYPICAL SECTION

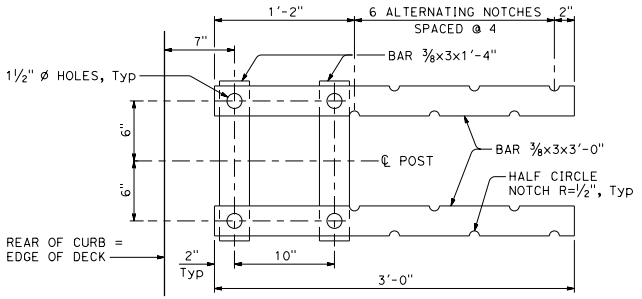
* #5 ⌐ Bundled at posts to extend 2'-0" Min beyond beginning of bridge deck overhang.
Bridge deck longitudinal reinforcement not shown for clarity.



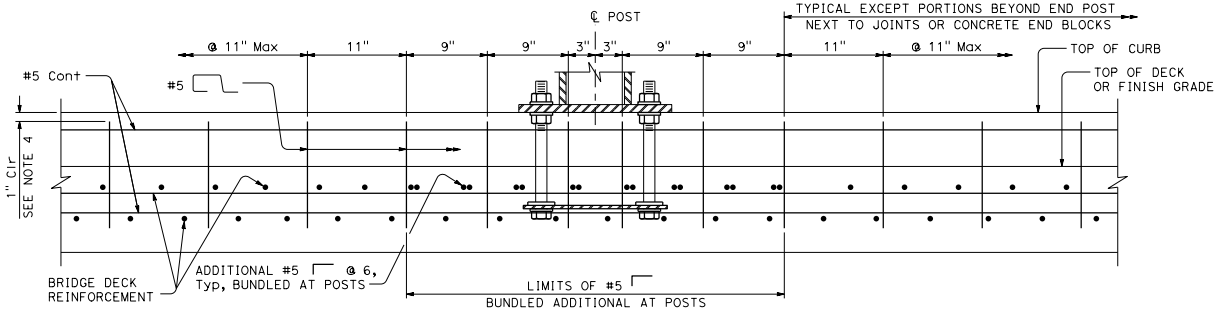

## RAIL SECTION AT POST

NOTES:

1. Heads of headed anchor bolts may be tack welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
2. Curb dimension at back side of rail will vary with bridge deck cross slope, and if overlay is placed on the bridge deck. For the same reasons, the anchor bolt lengths will vary.
3. Use extra thick washers for anchor bolts, with a minimum thickness of 0.305" and a maximum thickness of 0.375".
4. Clearance to reinforcement in concrete curb is 2" at traffic face and back face, and 1" on the top.
5. For access controlled freeways and expressways where bicycle traffic is prohibited by signage on the on-ramps, the bicycle railing (includes bar 3/8x3x8" and above) may be omitted.
6. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.




## TYPE 1 ANCHOR BAR DETAIL




## SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-75 BRIDGE RAIL DETAILS No. 1

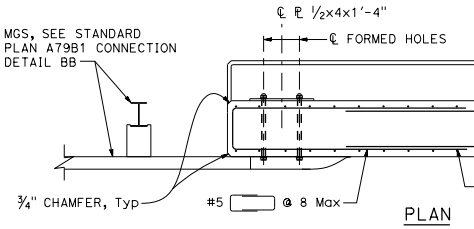
NO SCALE

**B11-200**

7-1-25

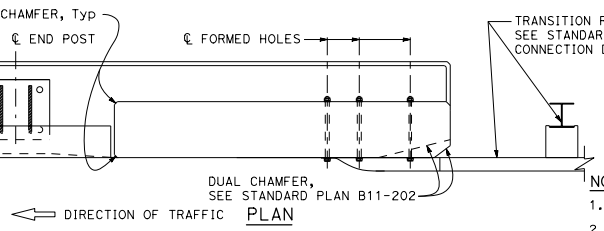


Return to Table of Contents



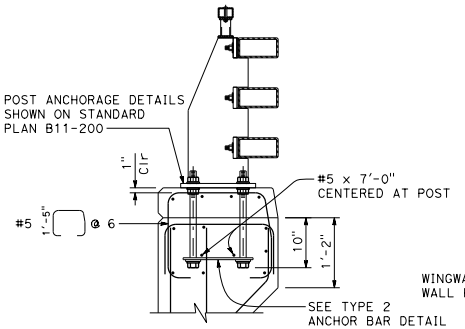

## DEPARTURE END BLOCK DETAIL

Tubular bicycle railing not shown for clarity.



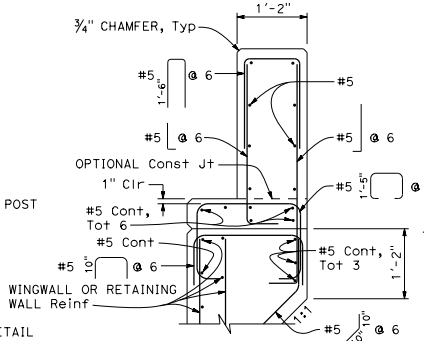

## APPROACH END BLOCK DETAIL

Tubular bicycle railing not shown for clarity.

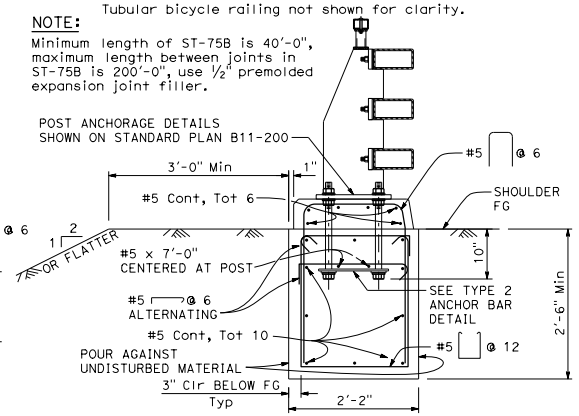



## SECTION B-B

For details not shown, see Section C-C.

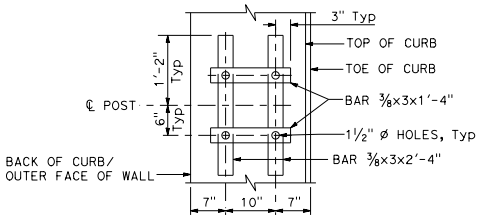



## SECTION C-C

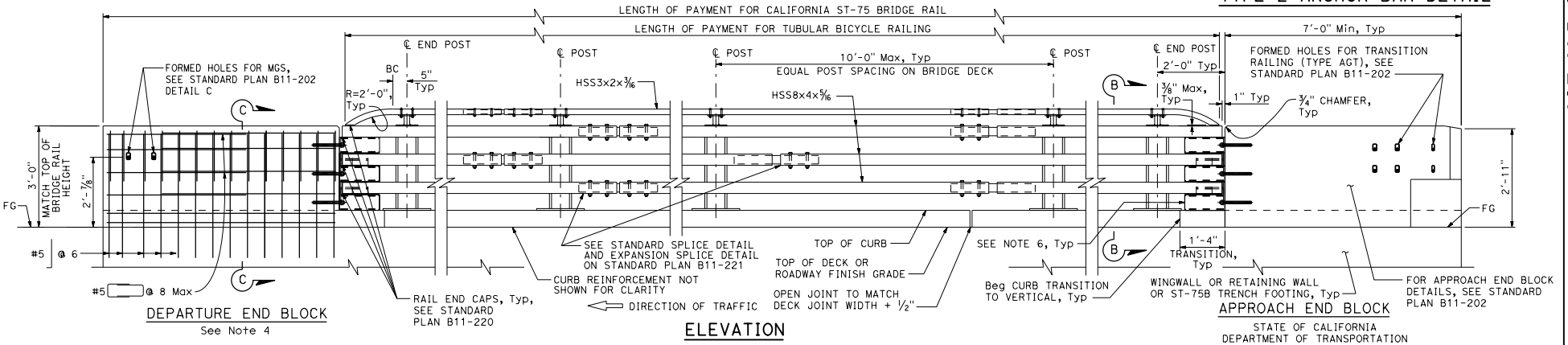



## ST-75B

NOTE:
Minimum length of ST-75B is 40'-0", maximum length between joints in ST-75B is 200'-0", use ½" premolded expansion joint filler.




## TYPE 2 ANCHOR BAR DETAIL




## DEPARTURE END BLOCK

See Note 4

## ELEVATION

Tubular bicycle railing to extend to where level bench elevation along exterior face of wingwall is within 1'-0" of roadway shoulder FG.

## APPROACH END BLOCK

NOTE: Not all reinforcement shown for clarity.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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NOTES:

1. All HSS tubes to be parallel to longitudinal profile grade.
2. Posts are normal to profile grade of structure.
3. Posts are plumb in the transverse cross-section to profile grade.
4. If departure end block is within the Clear Recovery Zone (CRZ) of opposing traffic (30 feet for expressways and freeways, and 20 feet for conventional highways), use the Approach End Block detail for the departure end.
5. Heads of headed anchor bolts may be tack welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
6. For parapet shoe details, see Standard Plan B11-222.
7. For additional approach end block details, see Standard Plan B11-202.
8. For post and rail, and rail splice details, see Standard Plans B11-220 and B11-221.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-75 BRIDGE RAIL DETAILS No. 2

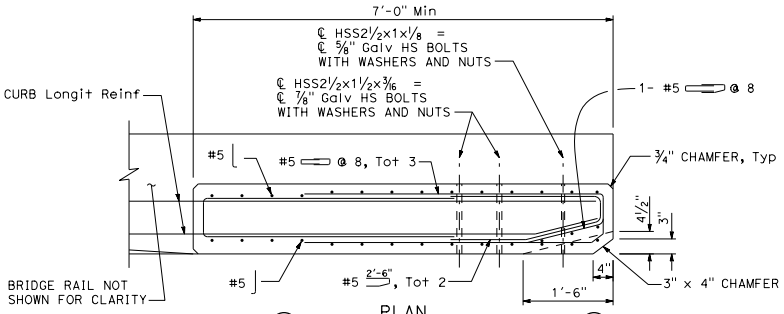
NO SCALE

**B11-201**

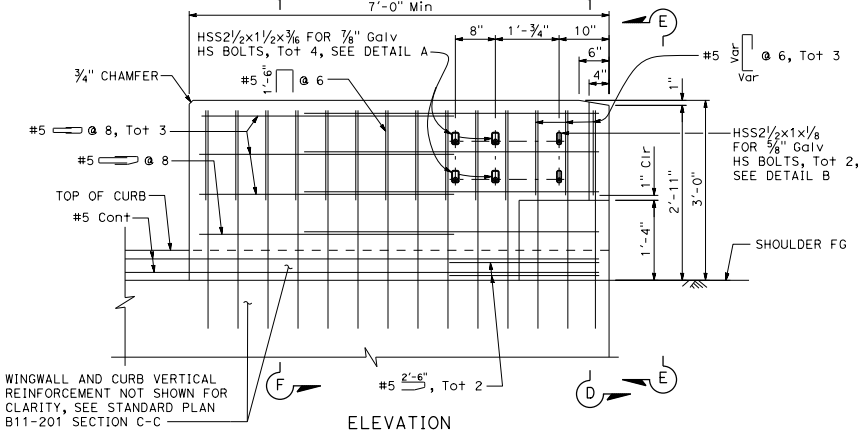
2025 STANDARD PLAN B11-201

7-1-25

Return to Table of Contents



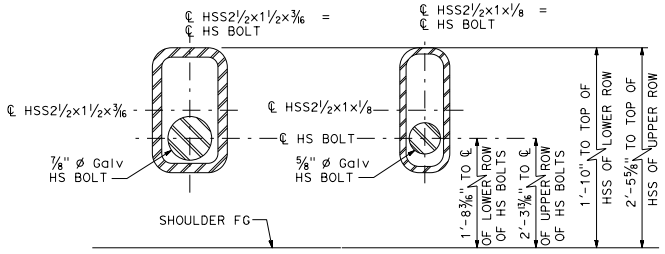

PLAN




ELEVATION

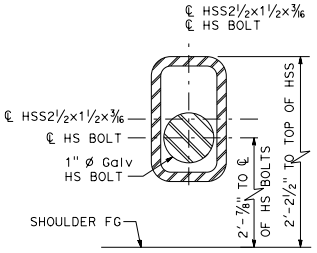
## APPROACH END BLOCK DETAILS

Not all reinforcement shown for clarity.




DETAIL A DETAIL B

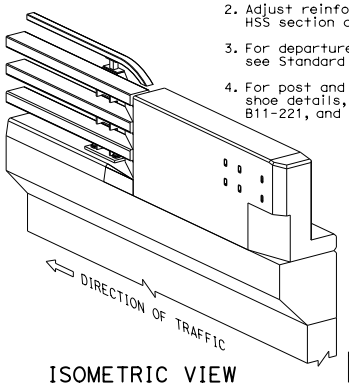
## APPROACH END BLOCK FORMED HOLES




DETAIL C

## DEPARTURE END BLOCK FORMED HOLES

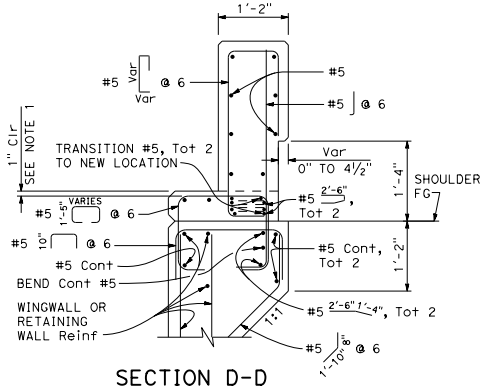
See Note 3



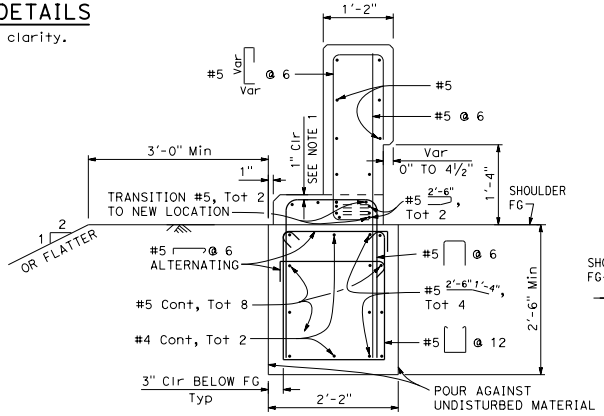

ISOMETRIC VIEW

NOTES:

1. 1" clearance at top of concrete curb, 2" clearance typical in end blocks, front and back face of concrete curb.
2. Adjust reinforcement as needed to clear HSS section at least 1".
3. For departure end block details, see Standard Plan B11-201.
4. For post and rail, rail spilce, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.

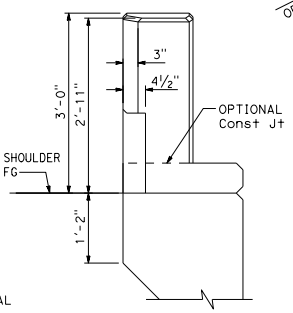



SECTION D-D

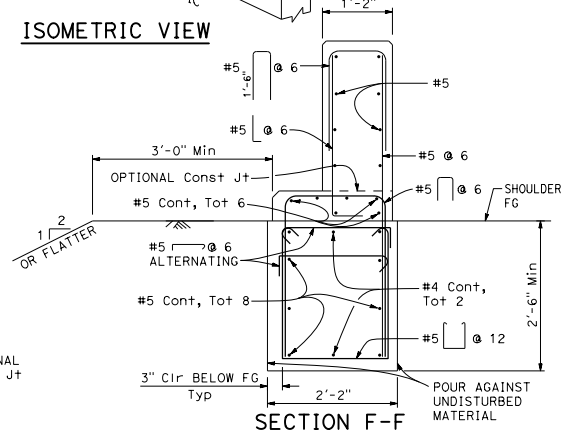



SECTION D-D

For ST-75B on trench footing




VIEW E-E




SECTION F-F

For ST-75B on trench footing

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-75 BRIDGE RAIL DETAILS No. 3

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 CIVIL — STATE OF CALIFORNIA

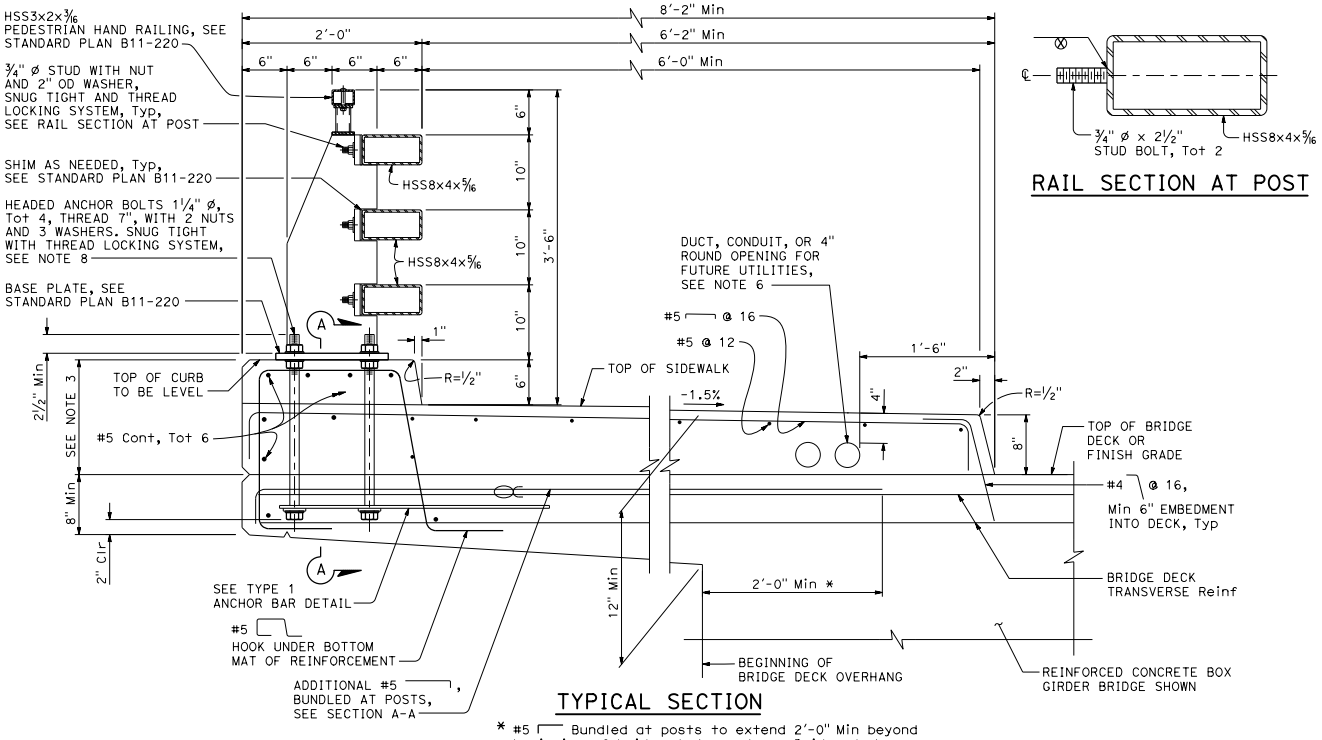
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B11-202

7-1-25

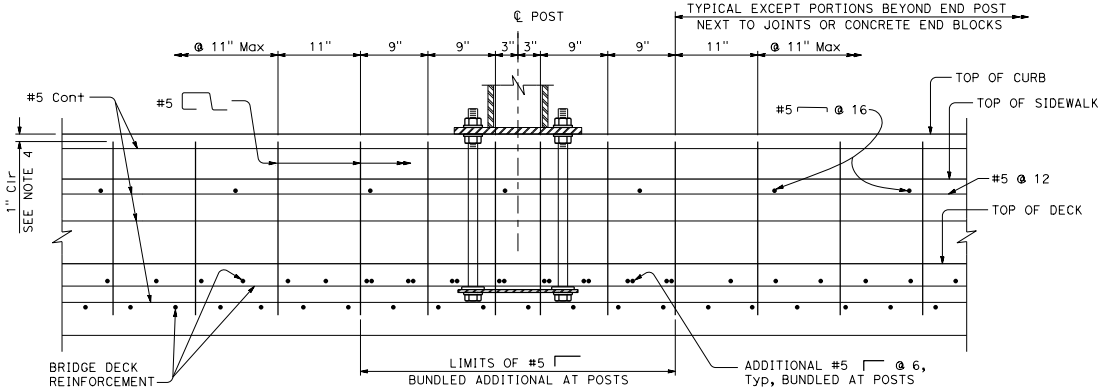


Return to Table of Contents

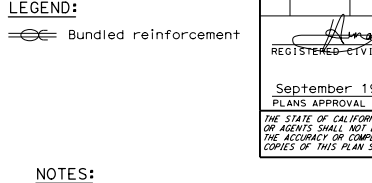



## TYPICAL SECTION

* #5 ⌐ Bundled at posts to extend 2'-0" Min beyond beginning of bridge deck overhang. Bridge deck longitudinal reinforcement not shown for clarity.




## SECTION A-A




## RAIL SECTION AT POST

LEGEND:

Bundled reinforcement

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

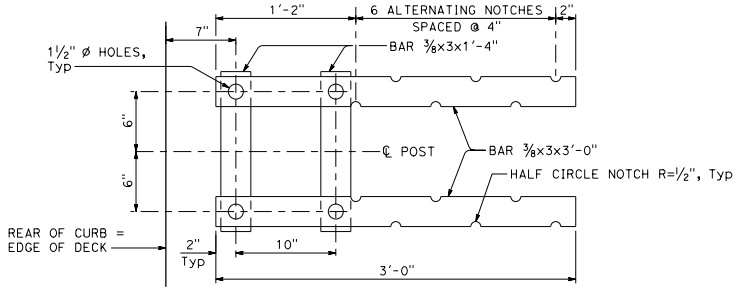
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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NOTES:

1. This barrier is to be used only for posted speeds of 45 MPH or less. For speeds greater than 45 MPH, pedestrians must be protected by a separation traffic barrier.
2. Heads of headed anchor bolts may be welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
3. Dimensions will vary with cross slope of sidewalk and bridge deck, and sidewalk width, and if overlay is placed on deck. For the same reasons, anchor bolt lengths will vary.
4. Clearance to reinforcing steel in curb, sidewalk, and end blocks is 2" except as noted. Longitudinal reinforcement to stop at all expansion joints.
5. See Project Plans for Joint Armor for Pedestrian Walkways details.
6. A minimum of two 4" round openings for future utilities and a maximum of six 4" round openings for a 6'-2" sidewalk. One 4" round opening can be added for each additional 1'-0" of sidewalk width. Utility opening must be a minimum of 6" from face of barrier parapet. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. For exact number and placement of utility openings, see Project Plans. Minimum 2" clearance between round openings, ducts, or conduits.
7. See Project Plans for pull box location and type.
8. Use extra thick washers for anchor bolts with a minimum thickness of 0.305" and a maximum thickness of 0.375".
9. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.




## TYPE 1 ANCHOR BAR DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-75SW BRIDGE RAIL DETAILS No. 1

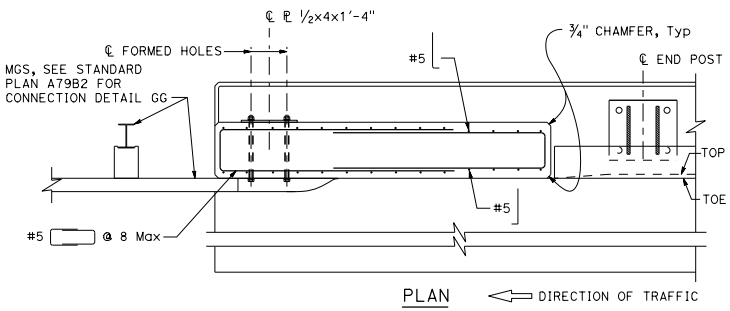
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**B11-205**

2025 STANDARD PLAN B11-205

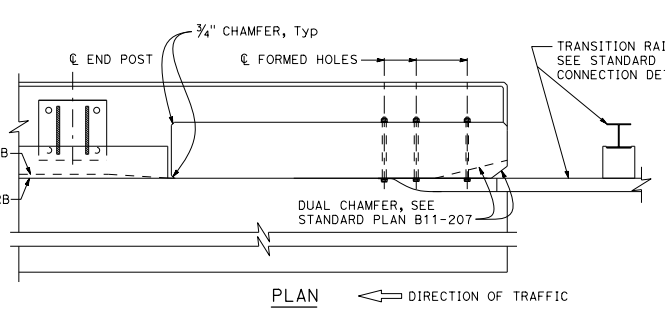
7-1-25

Return to Table of Contents




## DEPARTURE END BLOCK DETAIL

Pedestrian hand railing not shown for clarity.




## APPROACH END BLOCK DETAIL

Pedestrian hand railing not shown for clarity.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

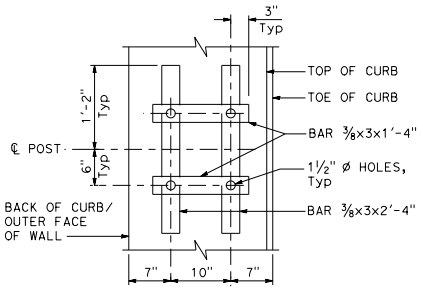
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 CIVIL — STATE OF CALIFORNIA

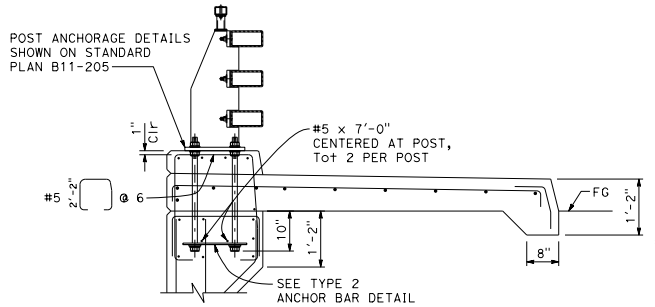
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**NOTES:**

1. All HSS tubes to be parallel to longitudinal profile grade.
2. Posts are normal to profile grade of structure.
3. Posts are plumb in the transverse cross-section to profile grade.
4. If departure end block is within the Clear Recovery Zone (CRZ) of opposing traffic (30 feet for expressways and freeways, and 20 feet for conventional highways), use the Approach End Block detail for the departure end.
5. Heads of headed anchor bolts may be tack welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
6. For parapet shoe details, see Standard Plan B11-222.
7. For sidewalk reinforcement, see Standard Plan B11-205.
8. For post and rail, and rail splice details, see Standard Plans B11-220 and B11-221.

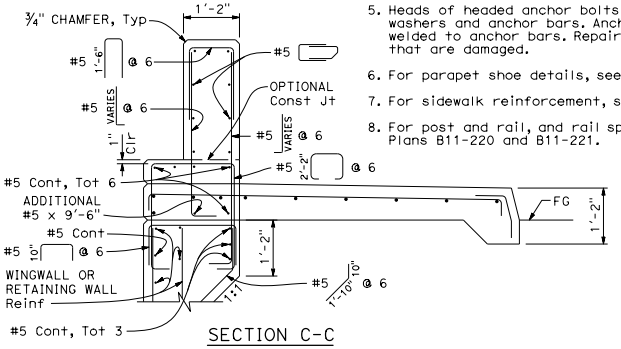



## TYPE 2 ANCHOR BAR DETAIL

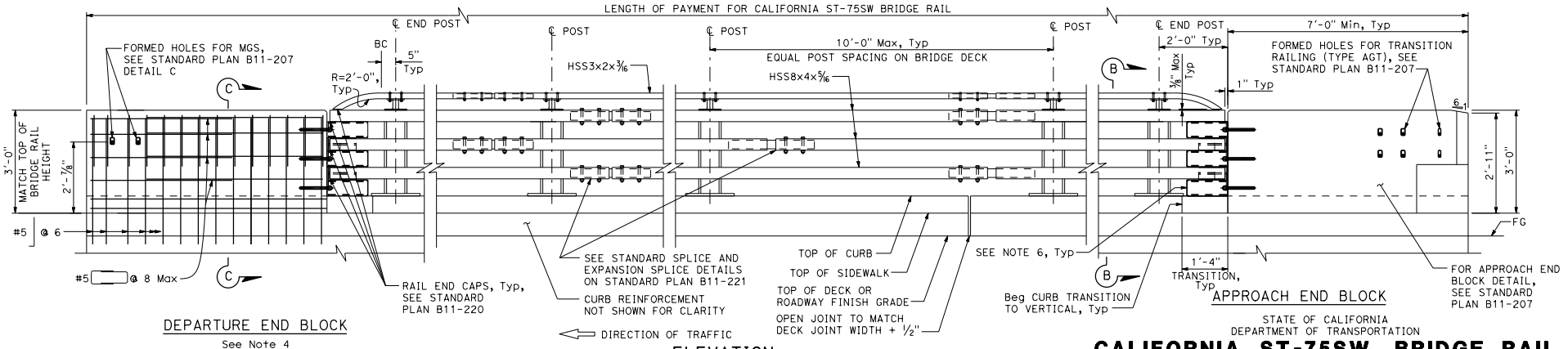



## SECTION B-B

For details not shown, see Section C-C.




## SECTION C-C




## DEPARTURE END BLOCK

See Note 4

## APPROACH END BLOCK

## ELEVATION

Pedestrian hand railing to extend to where level bench elevation along exterior face of wingwall is within 1'-0" of roadway shoulder FG.

NOTE: Not all reinforcement shown for clarity.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-75SW BRIDGE RAIL DETAILS No. 2

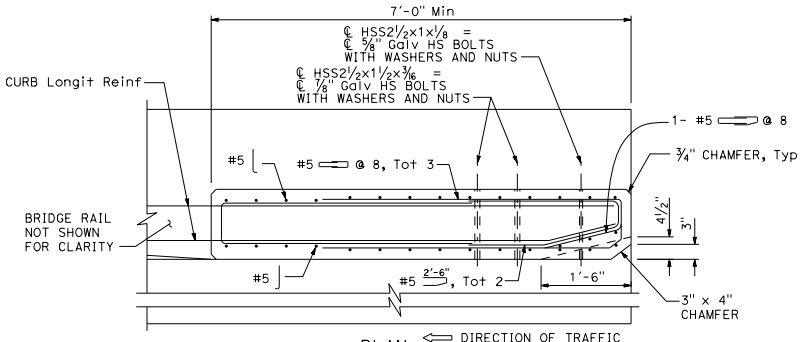
NO SCALE

**B11-206**

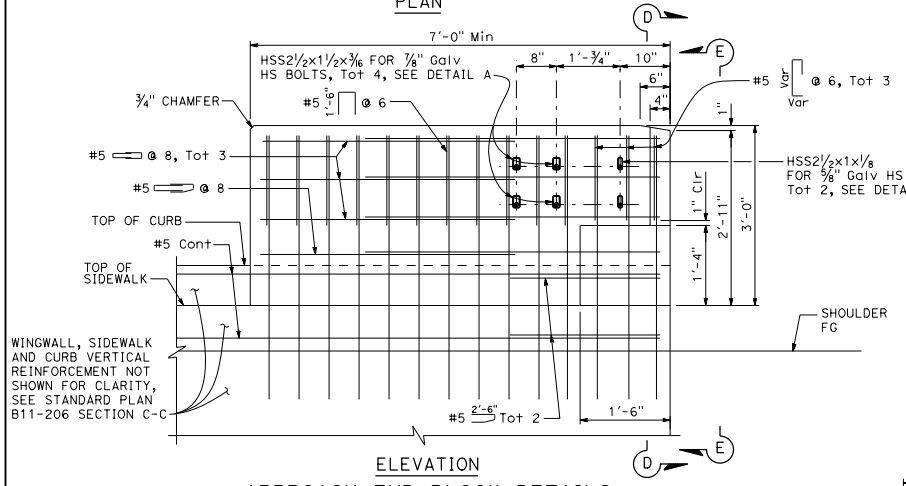
7-1-25



Return to Table of Contents



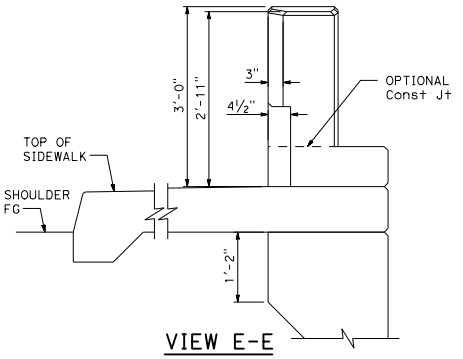

PLAN ⇦ DIRECTION OF TRAFFIC



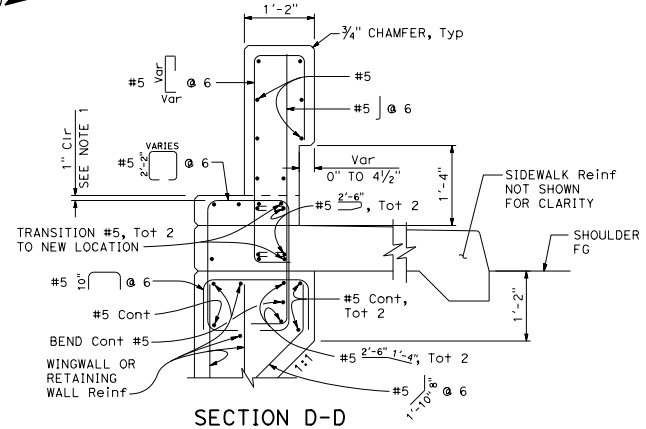

ELEVATION

## APPROACH END BLOCK DETAILS

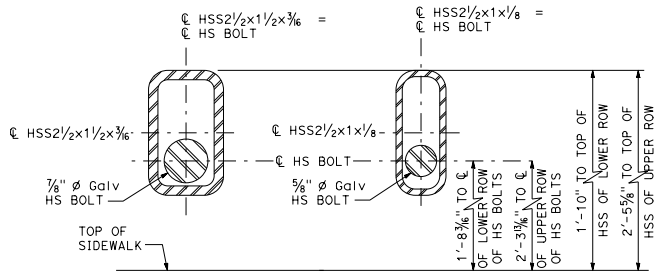
Not all reinforcement shown for clarity.




VIEW E-E

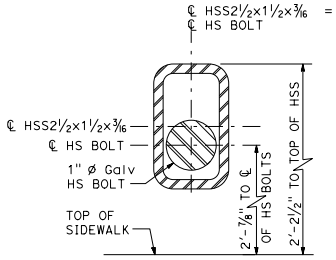



SECTION D-D




DETAIL A DETAIL B

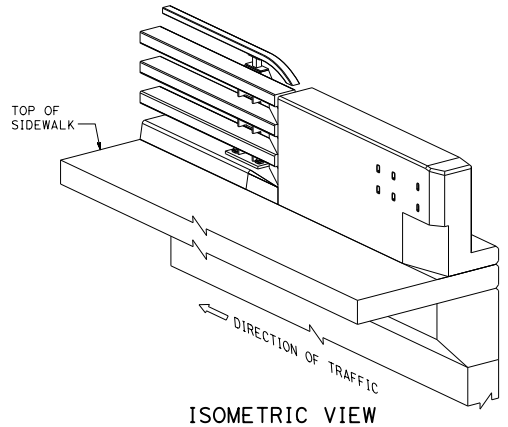
## APPROACH END BLOCK FORMED HOLES




DETAIL C

## DEPARTURE END BLOCK FORMED HOLES

See Note 3




ISOMETRIC VIEW

NOTES:

1. 1" clearance at top of concrete curb, 2" clearance typical in end blocks, front and back face of concrete curb.
2. Adjust reinforcement as needed to clear HSS section by at least 1".
3. For departure end block details, see Standard Plan B11-206.
4. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Aiman Malak No. C73369 Exp. 12-31-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-75SW BRIDGE RAIL DETAILS No. 3

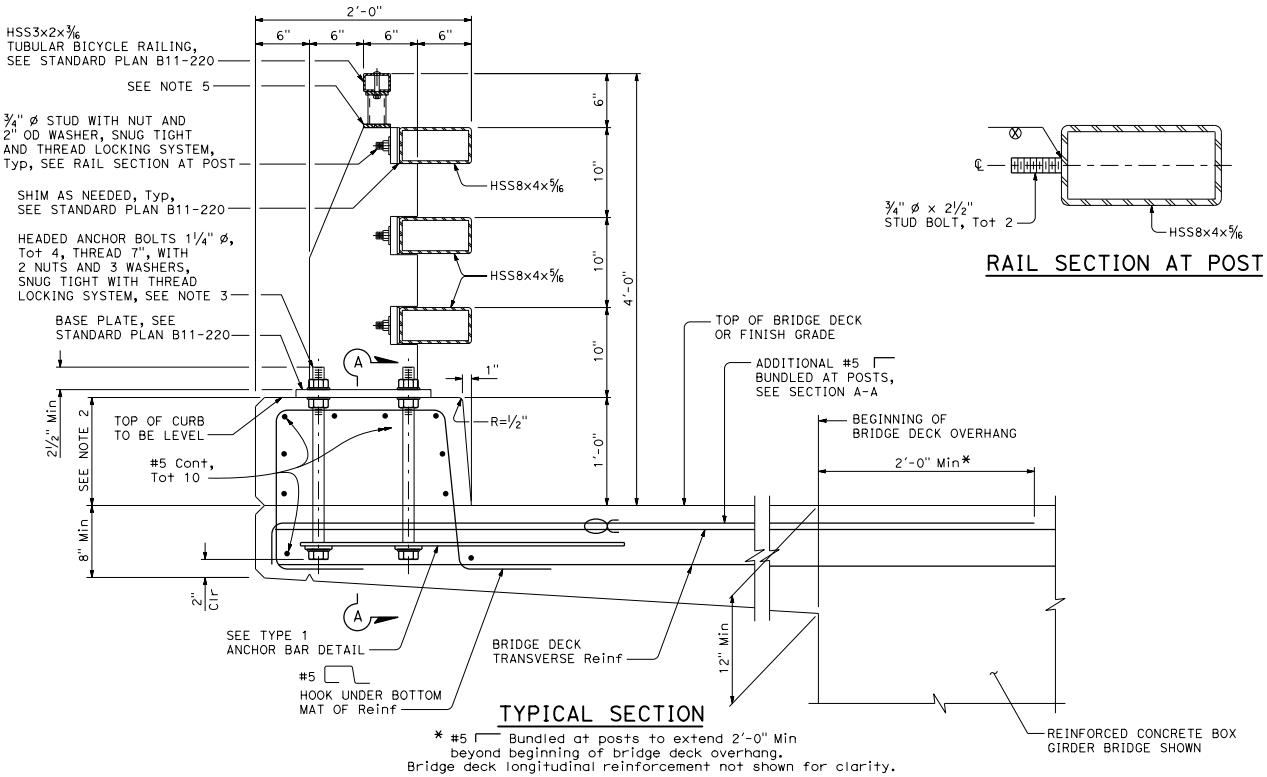
NO SCALE

**B11-207**

7-1-25



Return to Table of Contents

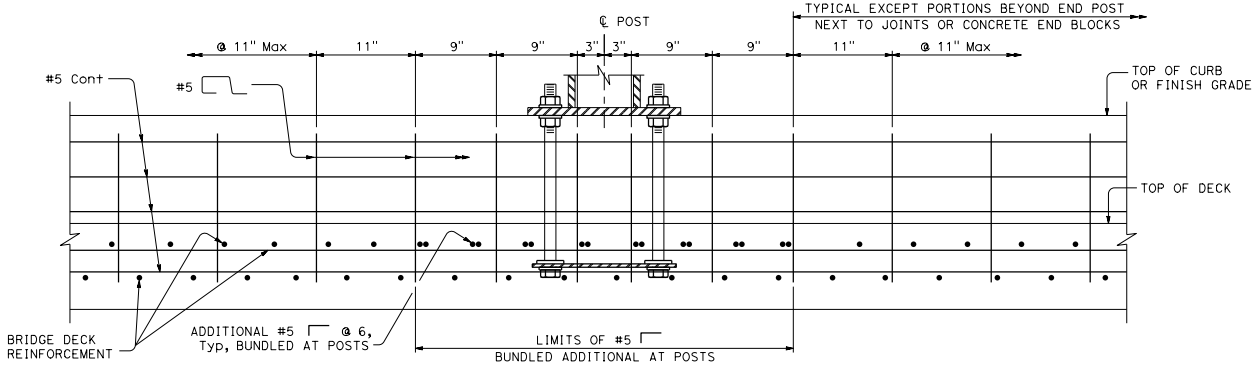



## TYPICAL SECTION

* #5 ⌐ Bundled at posts to extend 2'-0" Min beyond beginning of bridge deck overhang.
Bridge deck longitudinal reinforcement not shown for clarity.




## RAIL SECTION AT POST




## SECTION A-A

LEGEND:

Bundled reinforcement

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

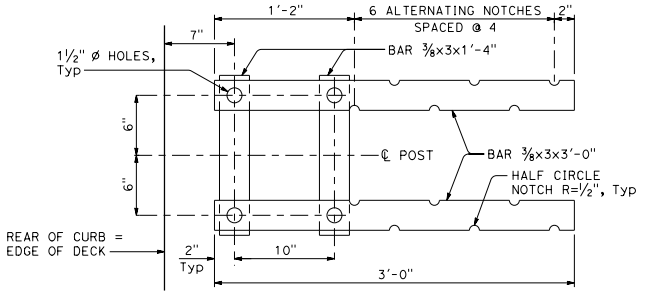
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. Heads of headed anchor bolts may be tack welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
2. Curb dimension at back side of rail will vary with bridge deck cross slope, and if overlay is placed on the bridge deck. For the same reasons, the anchor bolt lengths will vary.
3. Use extra thick washers for anchor bolts, with a minimum thickness of 0.305" and a maximum thickness of 0.375".
4. Clearance to reinforcing steel in curb and end blocks is 2". Longitudinal reinforcement to stop at all expansion joints.
5. For access controlled freeways and expressways where bicycle traffic is prohibited by signage on the on-ramps, the bicycle railing (includes bar 3/8x3x8" and above) may be omitted.
6. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.




## TYPE 1 ANCHOR BAR DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-76 BRIDGE RAIL DETAILS No. 1

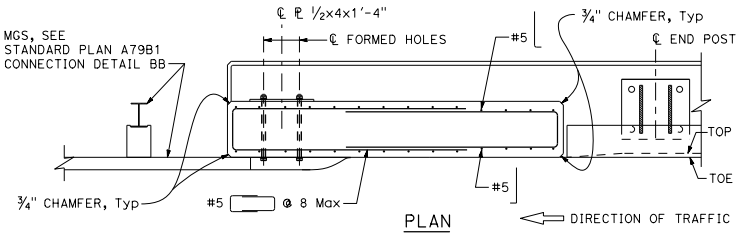
NO SCALE

B11-210

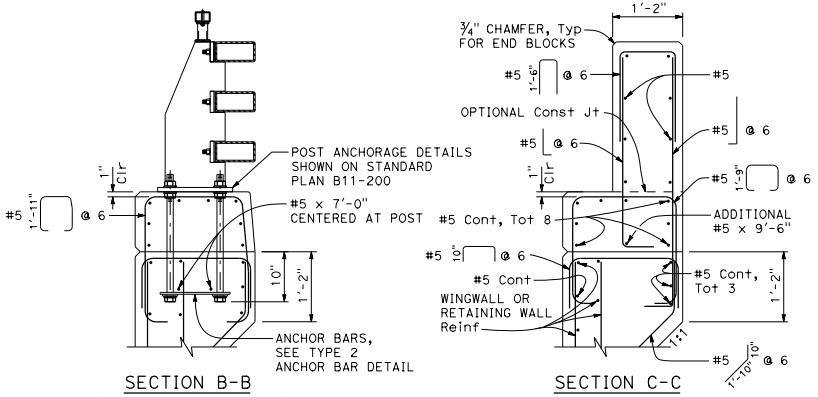
7-1-25

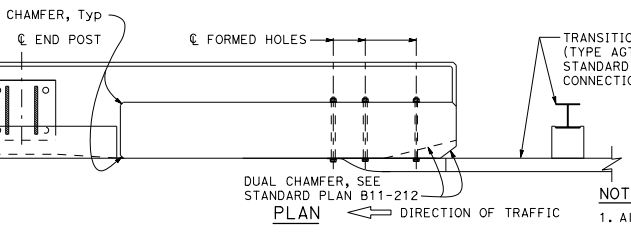
2025 STANDARD PLAN B11-210

Return to Table of Contents



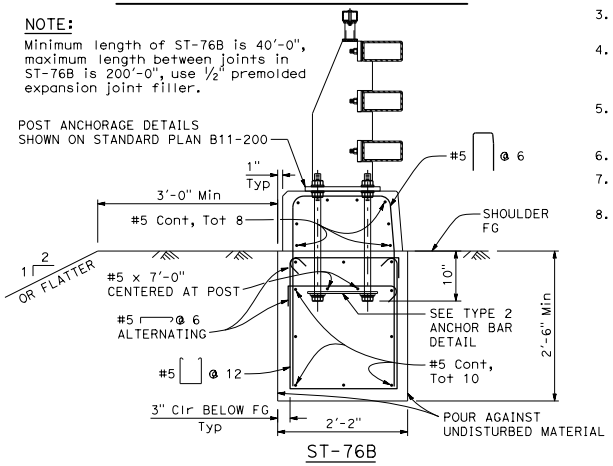

## DEPARTURE END BLOCK DETAIL



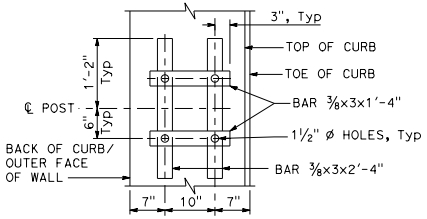

## APPROACH END BLOCK DETAIL

NOTE:
Minimum length of ST-76B is 40'-0", maximum length between joints in ST-76B is 200'-0", use ½" premolded expansion joint filler.

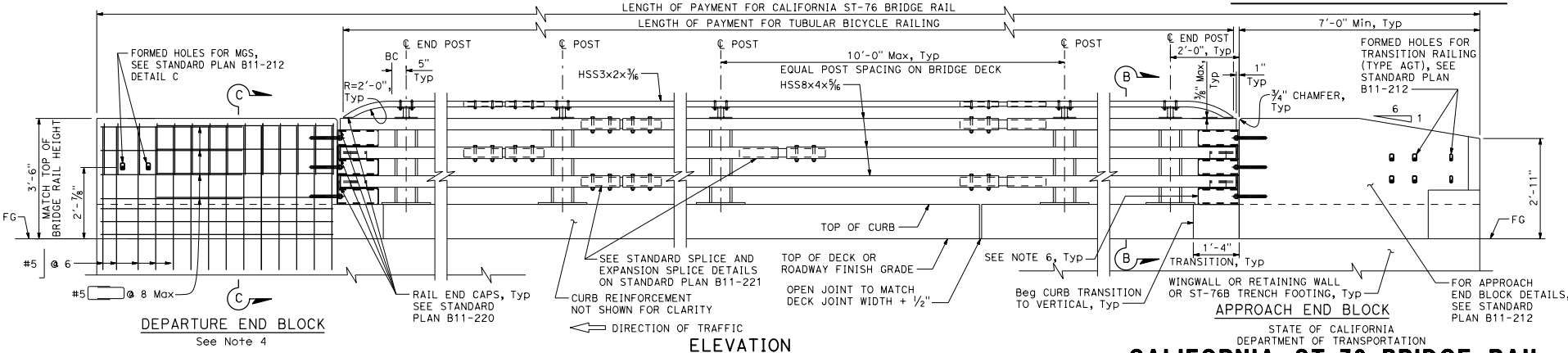



NOTES:

1. All HSS tubes to be parallel to longitudinal profile grade.
2. Posts are normal to profile grade of structure.
3. Posts are plumb in the transverse cross-section to profile grade.
4. If departure end block is within the Clear Recovery Zone (CRZ, 30 feet for expressways and freeways and 20 feet for conventional highways) of opposing traffic, then use the approach end Block at the departure end.
5. Heads of headed anchor bolts may be tack welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
6. For parapet shoe details, see Standard Plan B11-222.
7. For additional approach end block details, see Standard Plan B11-212.
8. For post and rail, and rail splice details, see Standard Plans B11-220 and B11-221.




## TYPE 2 ANCHOR BAR DETAIL




Tubular bicycle railing to extend to where level bench elevation along exterior face of wingwall is within 1'-0" of roadway shoulder FG.

NOTE: Not all reinforcement shown for clarity.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-76 BRIDGE RAIL DETAILS No. 2

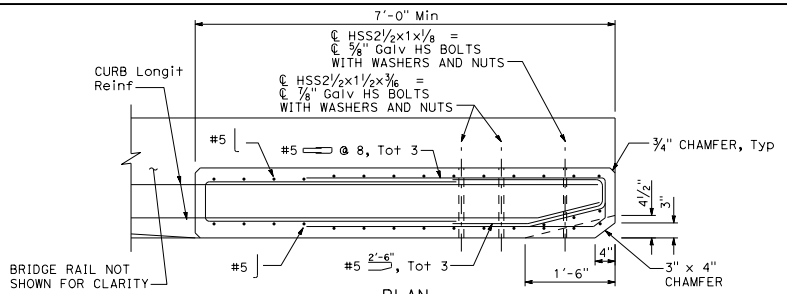
NO SCALE

**B11-211**

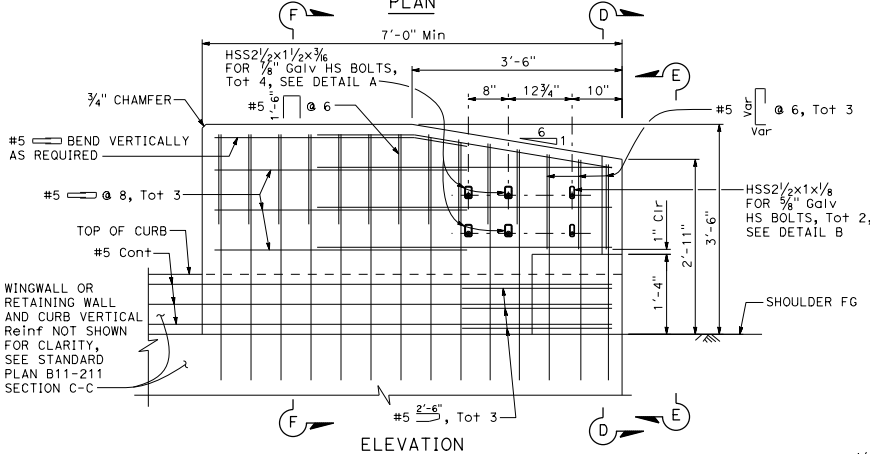


7-1-25

Return to Table of Contents



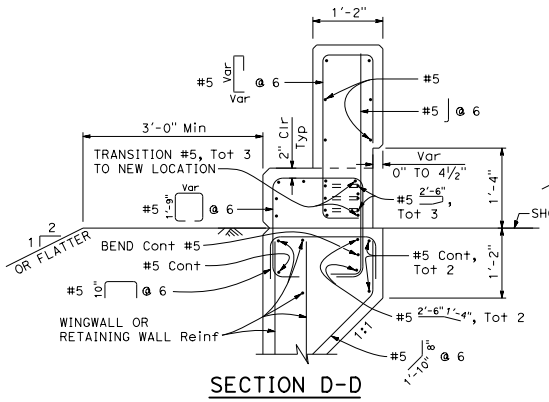

PLAN



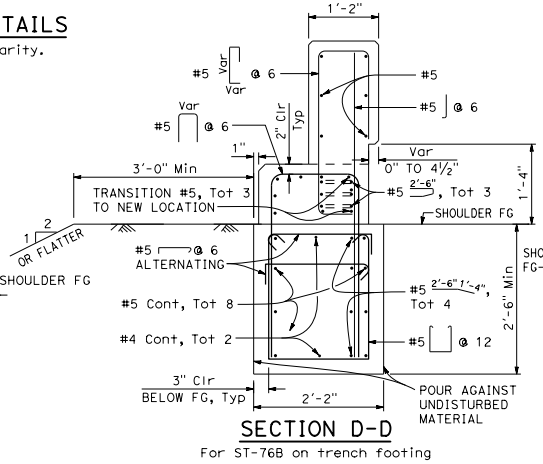

ELEVATION

## APPROACH END BLOCK DETAILS

Not all reinforcement shown for clarity.

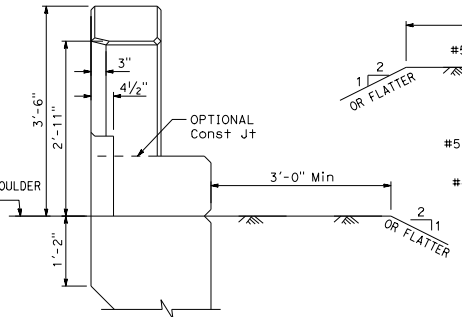



SECTION D-D



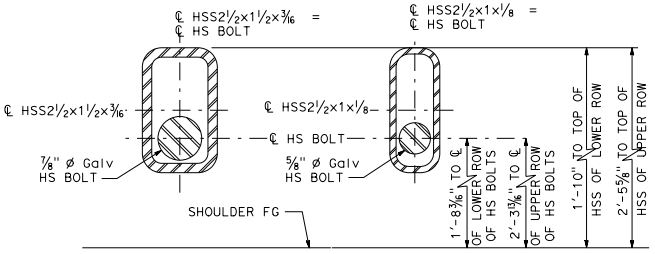

SECTION D-D

For ST-76B on trench footing



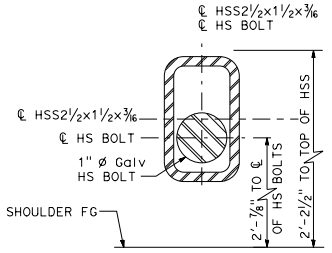

VIEW E-E

APPROACH TRANSITION END BLOCK DETAILS




DETAIL A DETAIL B

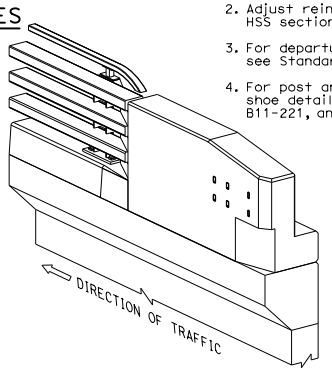
## APPROACH END BLOCK FORMED HOLES




DETAIL C

## DEPARTURE END BLOCK FORMED HOLES

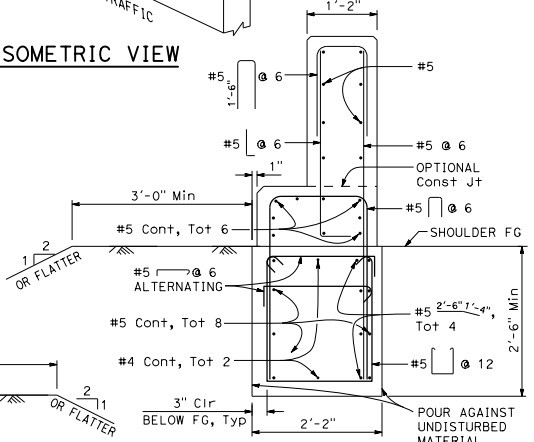
See Note 3




ISOMETRIC VIEW

NOTES:

1. 1" clearance at top of concrete curb, 2" clearance typical in end blocks, front and back face of concrete curb.
2. Adjust reinforcement as needed to clear HSS section by at least 1".
3. For departure end block details, see Standard Plan B11-221.
4. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.




SECTION F-F

For ST-76B on trench footing

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-76 BRIDGE RAIL DETAILS No. 3

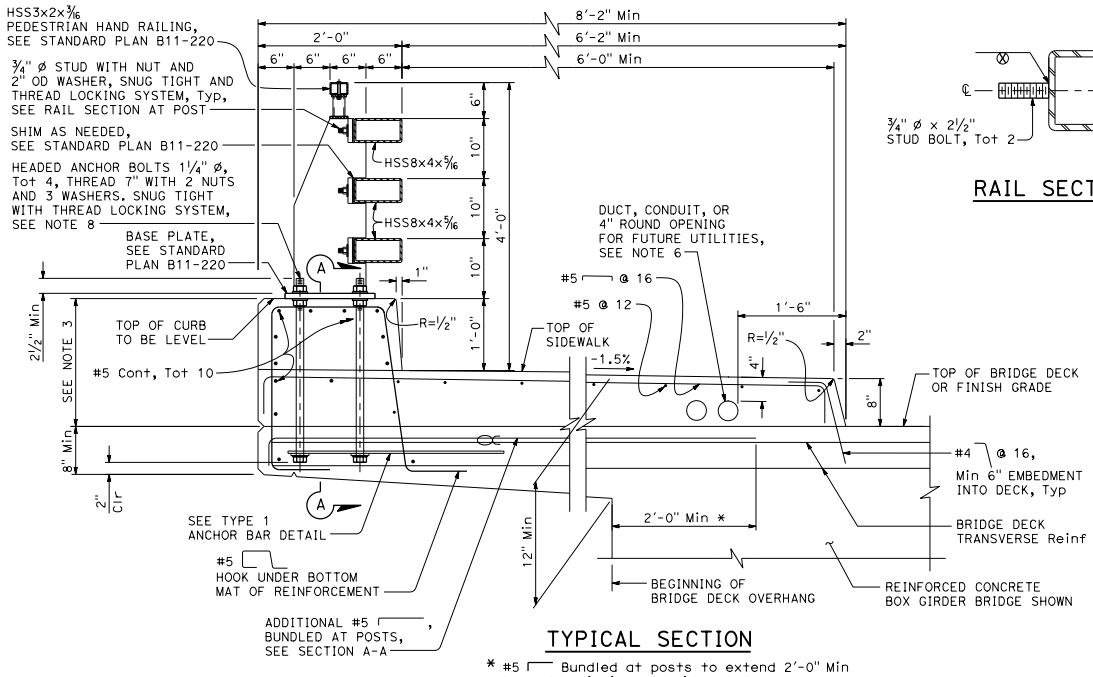
NO SCALE

B11-212

7-1-25

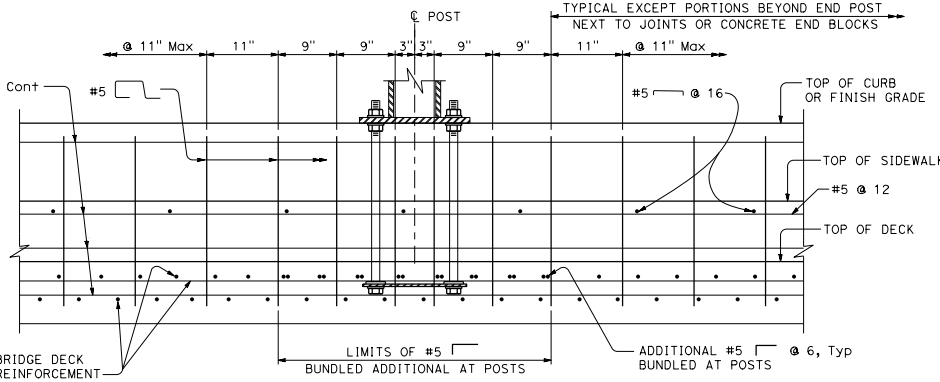
2025 STANDARD PLAN B11-212

Return to Table of Contents

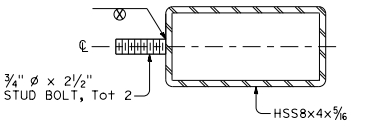



## TYPICAL SECTION

* #5 Bundled at posts to extend 2'-0" Min beyond beginning of bridge deck overhang.
Bridge deck longitudinal reinforcement not shown for clarity.




## SECTION A-A




## RAIL SECTION AT POST

LEGEND:

Bundled reinforcement

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

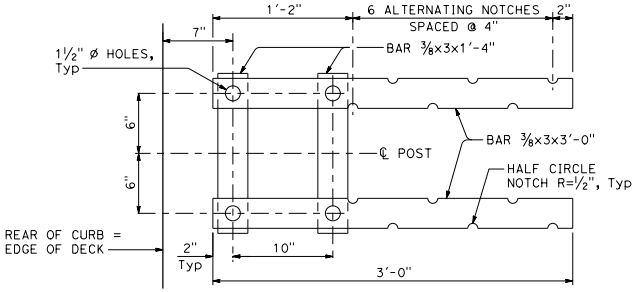
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. This barrier is to be used only for posted speeds of 45 MPH or less. For speeds greater than 45 MPH, pedestrians must be protected by a separation traffic barrier.
2. Heads of headed anchor bolts may be welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
3. Dimensions will vary with cross slope of sidewalk and bridge deck, and sidewalk width, and if overlay is placed on deck. For the same reasons, anchor bolt lengths will vary.
4. Clearance to reinforcing steel in curb, sidewalk, and end blocks is 2" except as noted. Longitudinal reinforcement to stop at all expansion joints.
5. See Project Plans for Joint Armor for Pedestrian Walkways details.
6. A minimum of two 4" round openings for future utilities and a maximum of six 4" round openings for a 6'-2" sidewalk. One 4" round opening can be added for each additional 1'-0" of sidewalk width. Utility opening must be a minimum of 6" from face of barrier parapet. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. For exact number and placement of utility openings, see Project Plans. Minimum 2" clearance between round openings, ducts, or conduits.
7. See Project Plans for pull box location and type.
8. Use extra thick washers for anchor bolts with a minimum thickness of 0.305" and a maximum thickness of 0.375".
9. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.




## TYPE 1 ANCHOR BAR DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-76SW BRIDGE RAIL DETAILS No. 1

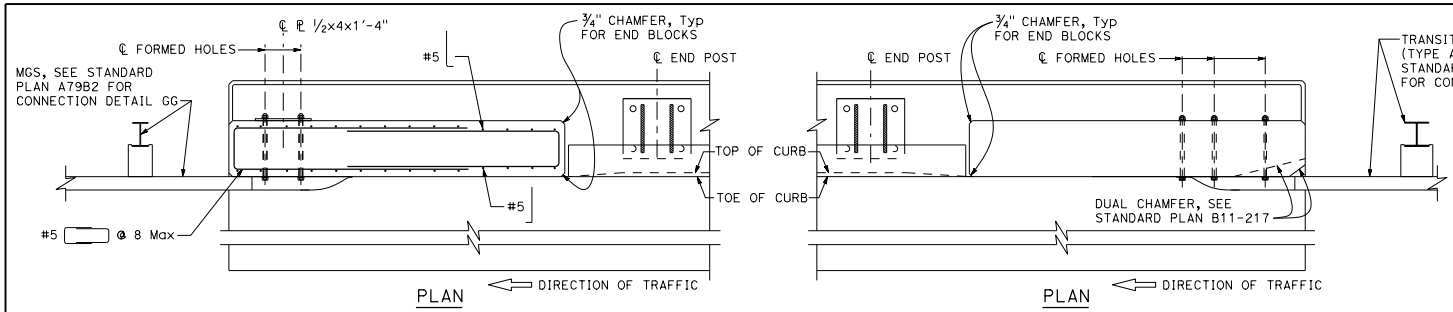
NO SCALE

**B11-215**

7-1-25

2025 STANDARD PLAN B11-215

Return to Table of Contents




PLAN

## DEPARTURE END BLOCK DETAIL




PLAN

## APPROACH END BLOCK DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

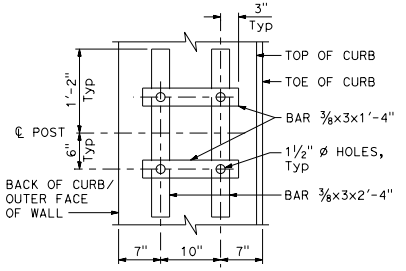
September 19, 2025
PLANS APPROVAL DATE

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No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

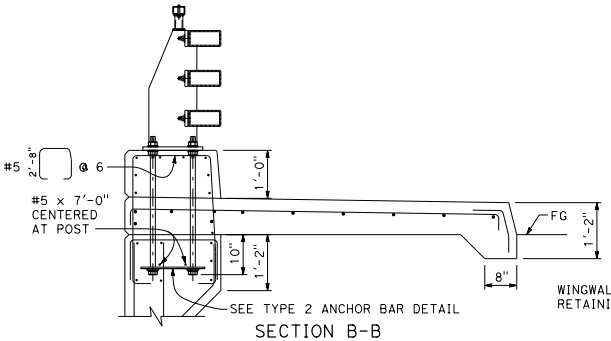
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**NOTES:**

1. All HSS tubes to be parallel to longitudinal profile grade.
2. Posts are normal to profile grade of structure.
3. Posts are plumb in the transverse cross-section to profile grade.
4. If departure end block is within the Clear Recovery Zone (CRZ) of opposing traffic (30 feet for expressways and freeways, and 20 feet for conventional highways), use the Approach End Block detail for the departure end.
5. Heads of headed anchor bolts may be tack welded to washers and anchor bars. Anchor bars may be tack welded to anchor bars. Repair galvanized surfaces that are damaged.
6. For parapet shoe details, see Standard Plan B11-222.
7. For sidewalk reinforcement, see Standard Plan B11-217.
8. For post and rail, and rail splice details, see Standard Plans B11-220 and B11-221.

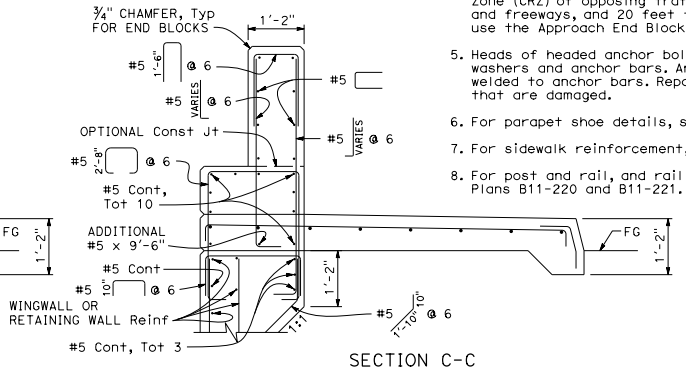



## TYPE 2 ANCHOR BAR DETAIL

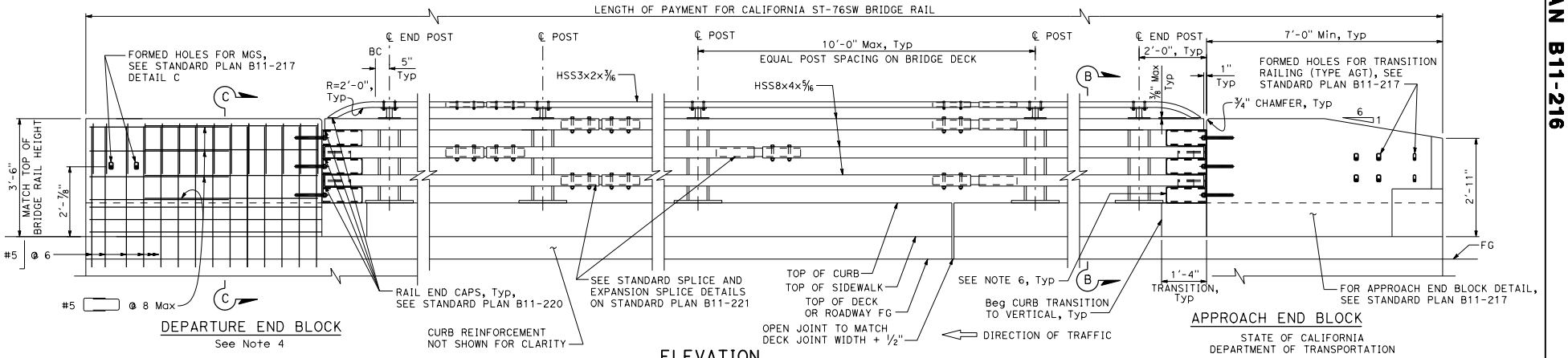



## SECTION B-B

For details not shown, see Section C-C




## SECTION C-C




DEPARTURE END BLOCK
See Note 4

## ELEVATION

APPROACH END BLOCK

Pedestrian hand railing to extend to where level bench elevation along exterior face of wingwall is within 1'-0" of roadway shoulder FG.

NOTE: Not all reinforcement shown for clarity.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA ST-76SW BRIDGE RAIL DETAILS No. 2

NO SCALE

**B11-216**

7-1-25

2025 STANDARD PLAN B11-216

Return to Table of Contents

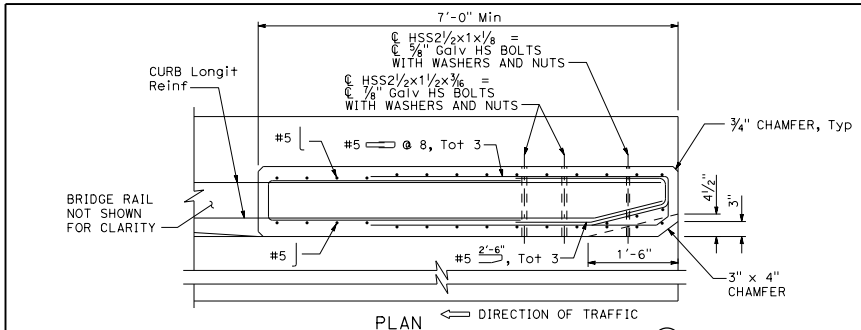
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

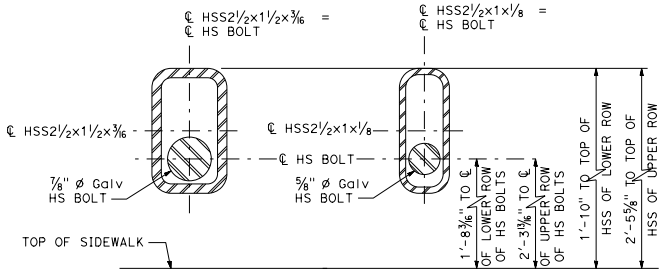
September 19, 2025
PLANS APPROVAL DATE

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Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
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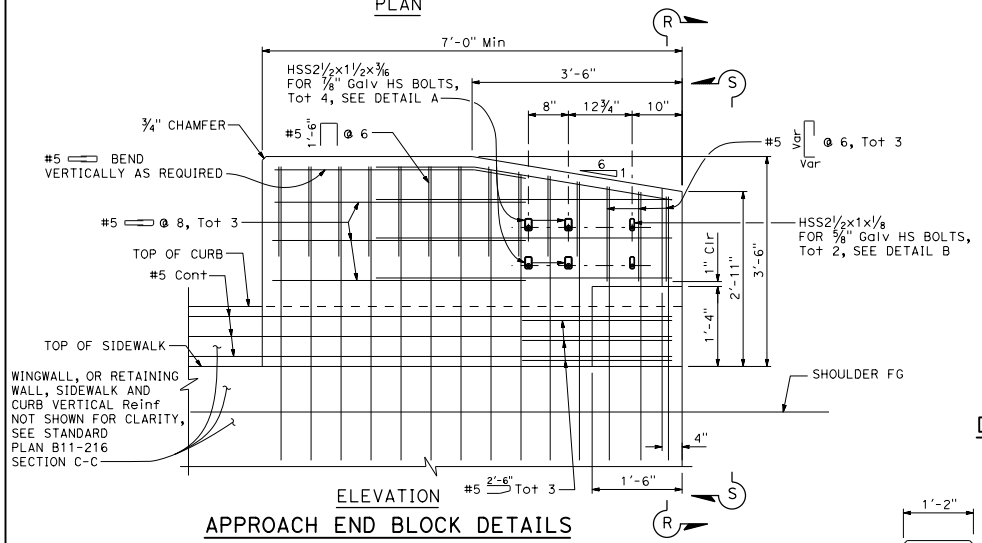



PLAN




DETAIL A DETAIL B

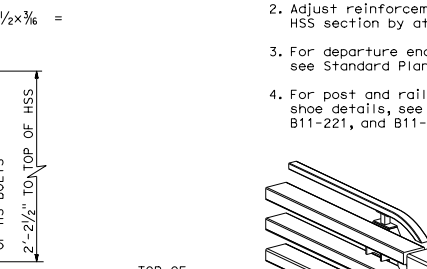
APPROACH END BLOCK FORMED HOLES




ELEVATION

APPROACH END BLOCK DETAILS

Not all reinforcement shown for clarity.



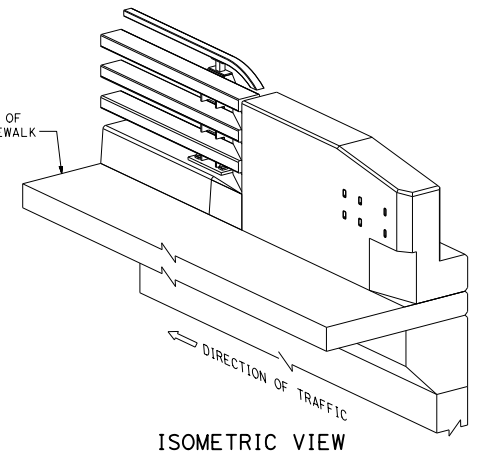

DETAIL C

DEPARTURE END BLOCK FORMED HOLES

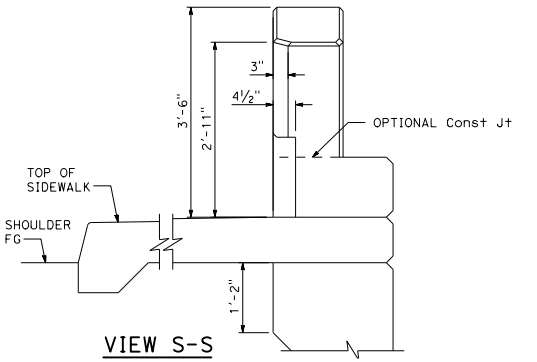
See Note 3

NOTES:

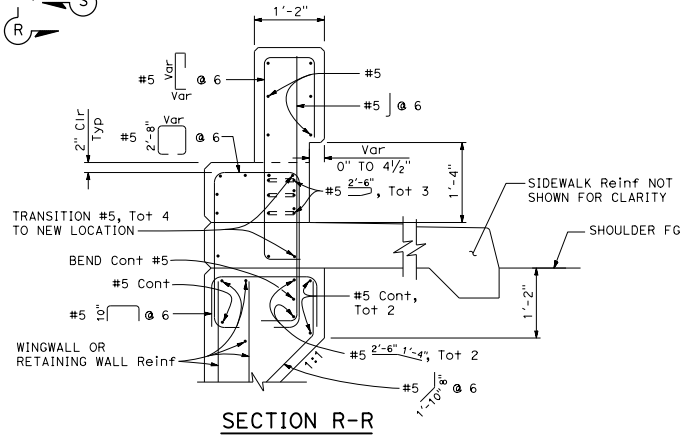
1. 1" clearance at top of concrete curb, 2" clearance typical in end blocks, front and back face of concrete curb.
2. Adjust reinforcement as needed to clear HSS section by at least 1".
3. For departure end block details, see Standard Plan B11-216.
4. For post and rail, rail splice, and parapet shoe details, see Standard Plans B11-220, B11-221, and B11-222.




ISOMETRIC VIEW




VIEW S-S




SECTION R-R

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

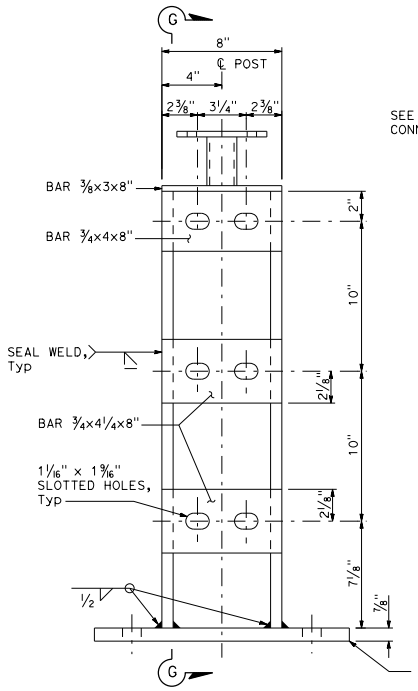
# CALIFORNIA ST-76SW BRIDGE RAIL DETAILS No. 3

NO SCALE

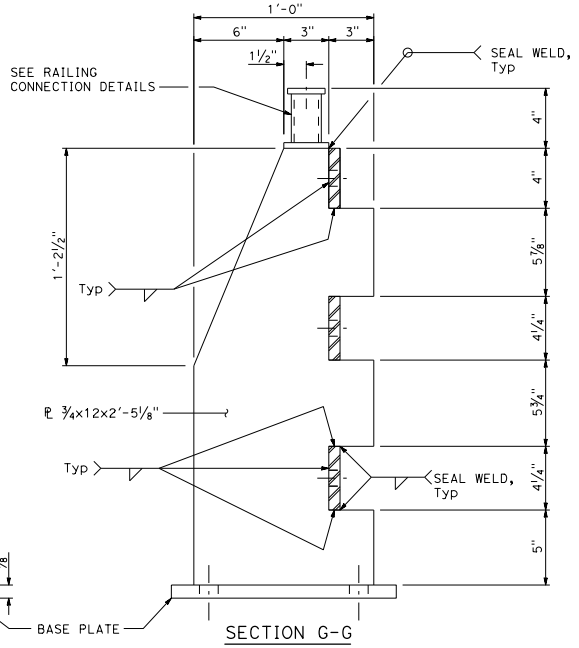
B11-217

7-1-25

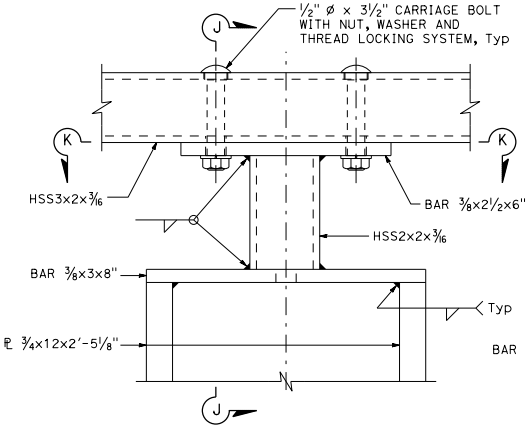
Return to Table of Contents




POST DETAIL




SECTION G-G

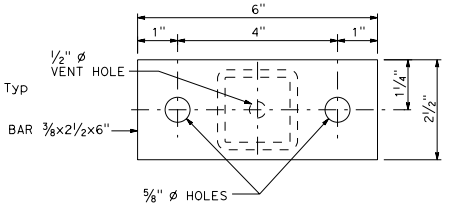



ELEVATION

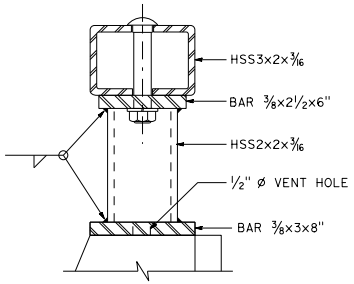
Bar ¾x4x8" omitted for clarity.

NOTE:

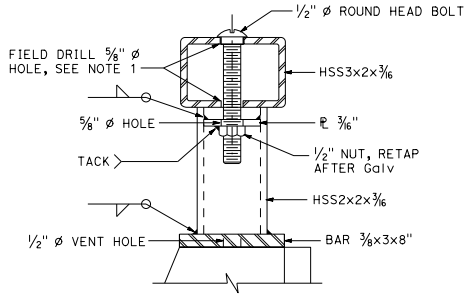
1. Repair galvanized surfaces that are damaged.




VIEW K-K

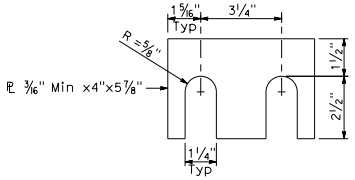



SECTION J-J



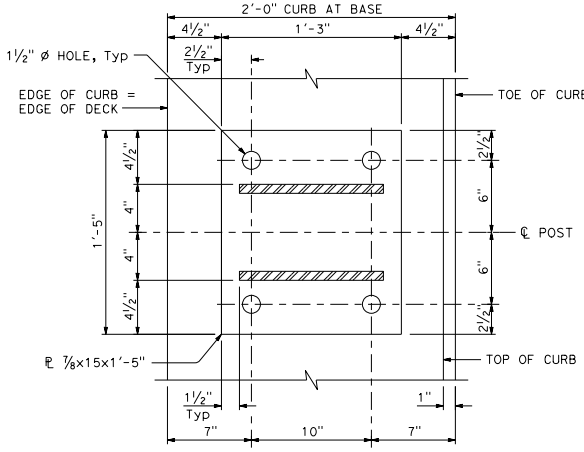

ALTERNATIVE SECTION J-J

RAILING CONNECTION DETAILS

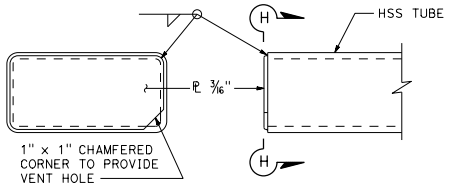



SHIM DETAIL

Shim as needed to get full bearing between posts and HSS rail tubes.




BASE PLATE DETAIL




VIEW H-H ELEVATION

RAIL END CAP

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA BRIDGE RAIL
# ST-75, ST-75SW, ST-76, AND ST-76SW
# POST AND RAIL DETAILS

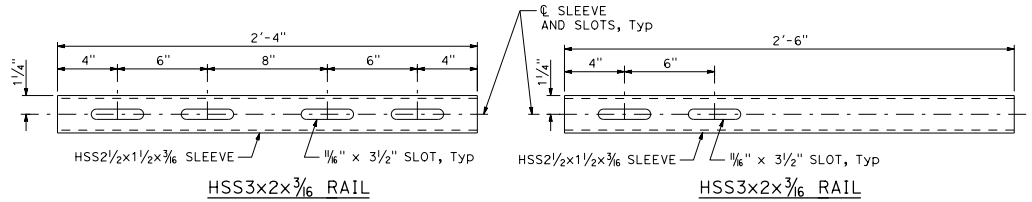
NO SCALE

**B11-220**

7-1-25

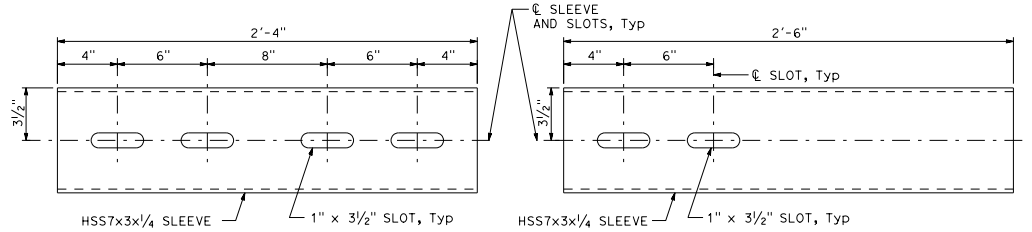
2025 STANDARD PLAN B11-220

Return to Table of Contents



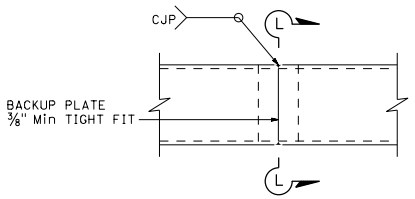

HSS3x2x3/16 RAIL

HSS3x2x3/16 RAIL




HSS8x4x5/16 RAIL

HSS8x4x5/16 RAIL




SECTION L-L

ALTERNATE TUBE WELDED STANDARD SPLICE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

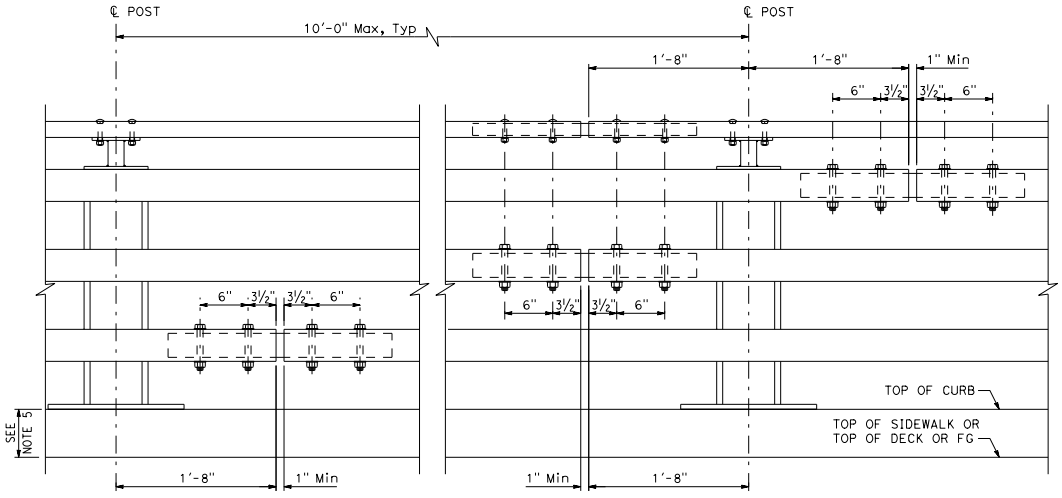
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NOTES:

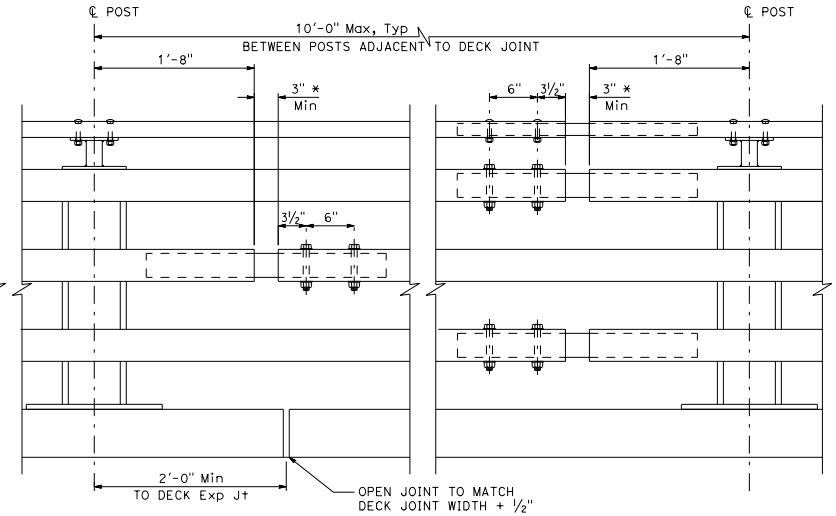
1. HS bolts with nut and washers, snug tightened, and thread locking system.
2. Use ½" ø x 3 5/16" BOLTS for HSS3x2x3/16.
   Use ¾" ø x 5 5/16" BOLTS for HSS8x4x5/16.
3. Each rail length must be continuous over a minimum of two posts.
4. Except for expansion splices, not more than one splice for HSS8x4x5/16 is permitted per same side of post.
5. Bridge rail curb height is 6" for ST-75 and ST-75SW, and is 12" for ST-76 and ST-76SW.

STANDARD SLEEVE DETAILS

EXPANSION SLEEVE DETAILS




STANDARD SPLICE
See Notes 3 and 4




EXPANSION SPLICE
* Match deck or wall joint.
See Notes 3 and 4

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA BRIDGE RAIL
# ST-75, ST-75SW, ST-76, AND ST-76SW
# RAIL SPLICE DETAILS

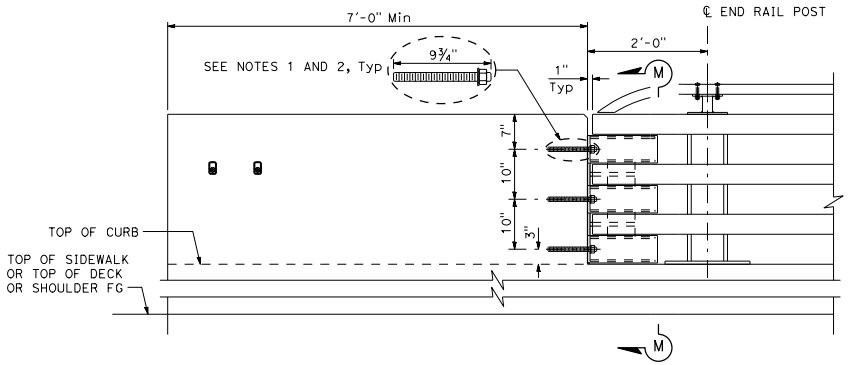
NO SCALE

B11-221

7-1-25

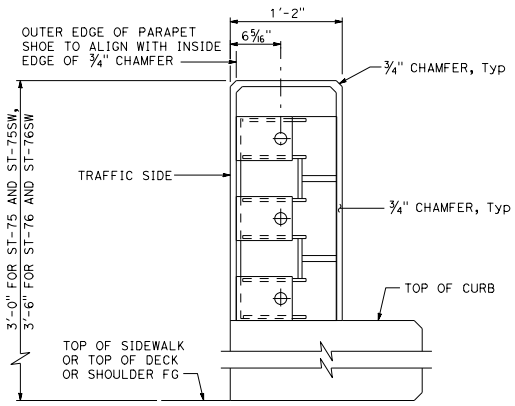
2025 STANDARD PLAN B11-221

Return to Table of Contents




## PARAPET SHOE AT DEPARTURE END BLOCK

Parapet shoe connection to approach end block is similar.




## SECTION M-M

Bridge railing not shown for clarity.


| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

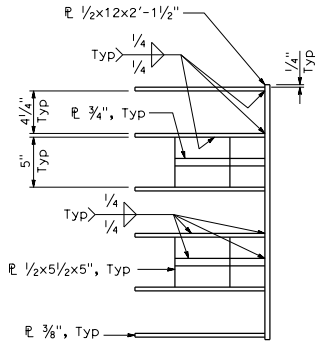
September 19, 2025
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Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

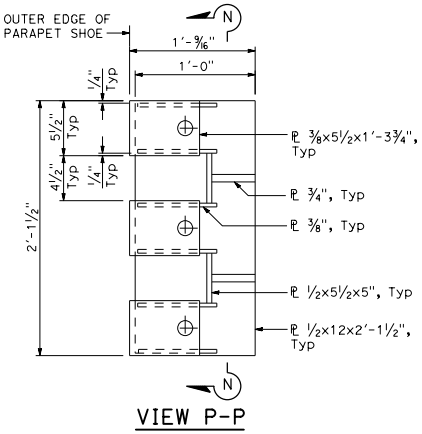
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### NOTES:

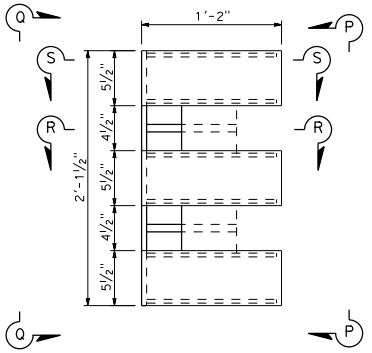
1. Anchor bolts must be ⅞" Dia and ASTM F1554 Grade 105 fully threaded rods with heavy hex nut and one hardened washer (1¾" OD) each. Embed threaded rods 8" into concrete anchor block with Drill and Bond (Chemical Adhesive) anchorage system.
2. Drill and Bond (Chemical Adhesive) anchorages are subjected to approval of Engineer. Installation procedure must comply with manufacturer's instructions.



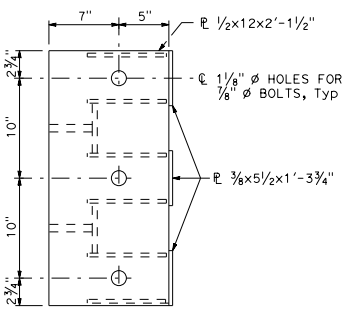

## SECTION N-N



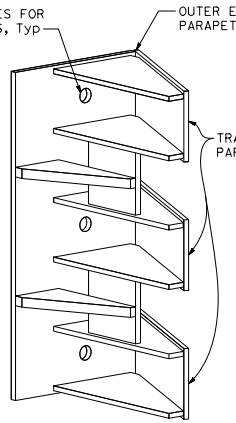

## VIEW P-P




## PARAPET SHOE ELEVATION

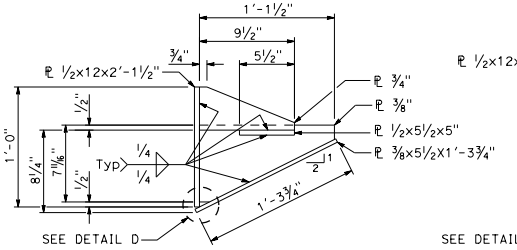



## VIEW Q-Q

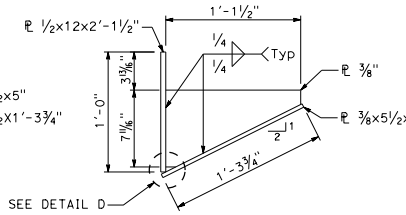



## ISOMETRIC VIEW

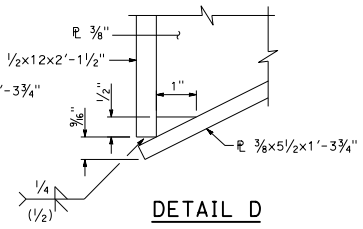
Isometric rear view
mirrored to show more details.




## SECTION R-R




## SECTION S-S




## DETAIL D

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# CALIFORNIA BRIDGE RAIL
# ST-75, ST-75SW, ST-76, AND ST-76SW
# PARAPET SHOE DETAILS

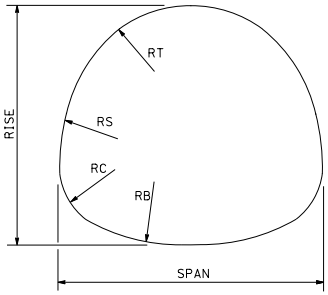
NO SCALE

**B11-222**

7-1-25



Return to Table of Contents




## DESIGN NOTES:

Design: AASHTO LRFD Bridge Design Specifications, 4th edition with California Amendments.

Soil: $\gamma$ = 140 pcf

Reinforced Concrete: $f_y$ = 60 ksi, n = 8, $f'_c$ = 3.6 ksi

Structural Steel Plate: 6" x 2" Annular Corrugations, $f_y$ = 33 ksi, Specified thickness includes galvanization

## NOTES:

1. For strutting requirements of structural steel plate vehicular undercrossing during construction, see Standard Plan D88A.
2. Minimum cover from crown to shoulder hinge point = 5'-0".
3. Backfill shall be brought up uniformly on both sides of the structure.
4. Minimum cover for construction loading, see Standard Plan D88.

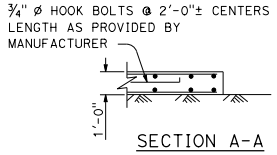
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REGISTERED CIVIL ENGINEER

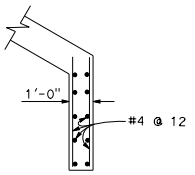
September 19, 2025
PLANS APPROVAL DATE

Carl M. Duan
No. C59976
Exp. 6-30-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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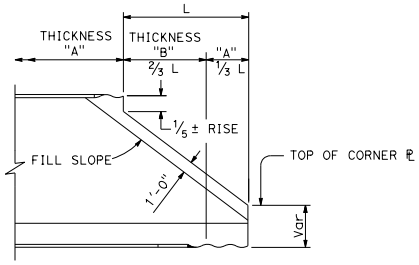



SECTION A-A




DETAIL B

**NOTE:**
Reinforce both faces of concrete collar with #4 @ 12 both ways. Maximum skew is 35°.

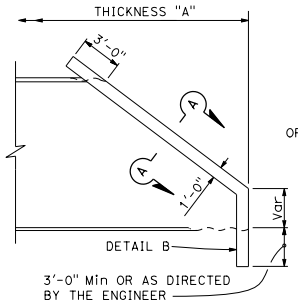



SIDE ELEVATION

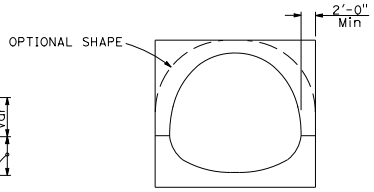
**NOTE:**
Thickness "B" two thicknesses greater than thickness "A" except for 0.249" and 0.280" thicknesses.

Skew-bevels not permitted with Alternative 1. Cutoff dimensions are approximate only and may be varied by fabricator to suit plate layout.

ALTERNATIVE 1




SIDE ELEVATION




END ELEVATION

ALTERNATIVE 2

END BEVELS

| MAXIMUM HEIGHT OF FILL | | | | | | | | | | LAYOUT DATA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GAGE | | 12 | 10 | 12 | 10 | 8 | 5 | 3 | 1 | | | | |
| THICKNESS | | 0.110" | 0.140" | 0.110" | 0.140" | 0.170" | 0.218" | 0.249" | 0.280" | | | | |
| SPAN | RISE | SOIL PRESSURE 6.0 ksf | | FOR SOIL PRESSURES SEE TABLE A | | | | | | RT | RS | RC | RB |
| 12'-2" | 11'-0" | 14.0' | 14.0' | 14.0' | 25.0' | 31.0' | 44.0' | 53.0' | 58.0' | 5'-8" | 7'-9" | 3'-2" | 11'-2" |
| 12'-11" | 11'-3" | 13.0' | 13.0' | 13.0' | 24.0' | 29.0' | 42.0' | 49.0' | 55.0' | 6'-1" | 7'-11" | 3'-2" | 12'-0" |
| 13'-2" | 11'-11" | 13.0' | 13.0' | 13.0' | 23.0' | 28.0' | 41.0' | 48.0' | 54.0' | 6'-1" | 8'-7" | 3'-2" | 13'-3" |
| 13'-10" | 12'-3" | 12.0' | 12.0' | 12.0' | 22.0' | 27.0' | 39.0' | 46.0' | 51.0' | 6'-5" | 9'-0" | 3'-2" | 13'-8" |
| 14'-1" | 12'-10" | 12.0' | 12.0' | 12.0' | 21.0' | 26.0' | 38.0' | 45.0' | 50.0' | 6'-5" | 9'-7" | 3'-2" | 15'-2" |
| 14'-6" | 13'-6" | 11.0' | 11.0' | 11.0' | 20.0' | 25.0' | 37.0' | 44.0' | 48.0' | 6'-6" | 10'-11" | 3'-2" | 14'-6" |
| 14'-10" | 14'-0" | 11.0' | 11.0' | 11.0' | 20.0' | 24.0' | 36.0' | 42.0' | 47.0' | 6'-7" | 11'-4" | 3'-2" | 16'-0" |
| 15'-6" | 14'-4" | 10.0' | 10.0' | 10.0' | 19.0' | 23.0' | 34.0' | 40.0' | 45.0' | 7'-0" | 11'-6" | 3'-2" | 16'-9" |
| 15'-9" | 15'-1" | 10.0' | 10.0' | 10.0' | 18.0' | 22.0' | 33.0' | 40.0' | 44.0' | 6'-11" | 12'-6" | 3'-2" | 17'-8" |
| 16'-4" | 15'-5" | 9.0' | 9.0' | 9.0' | 18.0' | 22.0' | 32.0' | 38.0' | 42.0' | 7'-2" | 13'-1" | 3'-2" | 17'-11" |
| 16'-5" | 16'-1" | 8.0' | 8.0' | 8.0' | 17.0' | 21.0' | 31.0' | 37.0' | 41.0' | 7'-4" | 13'-2" | 3'-2" | 22'-7" |
| 16'-9" | 16'-3" | 8.0' | 8.0' | 9.0' | 17.0' | 20.0' | 30.0' | 36.0' | 40.0' | 7'-5" | 13'-11" | 3'-2" | 20'-7" |
| 17'-3" | 17'-0" | 11.0' | 11.0' | 8.0' | 16.0' | 20.0' | 29.0' | 36.0' | 39.0' | 7'-6" | 14'-6" | 3'-11" | 17'-11" |
| 18'-4" | 16'-11" | 10.0' | 10.0' | 6.0' | 15.0' | 19.0' | 28.0' | 33.0' | 37.0' | 8'-3" | 13'-1" | 3'-11" | 20'-9" |
| 19'-2" | 17'-2" | | 9.0' | | 14.0' | 18.0' | 26.0' | 32.0' | 35.0' | 8'-9" | 13'-0" | 3'-11" | 22'-0" |
| 19'-6" | 17'-7" | * | 9.0' | * | 14.0' | 17.0' | 25.0' | 31.0' | 34.0' | 8'-11" | 13'-2" | 3'-11" | 24'-9" |
| 20'-4" | 17'-10" | | 9.0' | | 13.0' | 16.0' | 24.0' | 29.0' | 32.0' | 9'-5" | 13'-0" | 3'-11" | 26'-2" |

* - Strutting required. See Note 1.

| TABLE A | | | | | | |
|---|---|---|---|---|---|---|
| GAGE | 12 | 10 | 8 | 5 | 3 | 1 |
| THICKNESS | 0.110" | 0.140" | 0.170" | 0.218" | 0.249" | 0.280" |
| SPANS | STRENGTH I SOIL PRESSURE (ksf) | | | | | |
| 12'-2" TO 16'-9" | 6.0 | 10.0 | 12.0 | 17.0 | 20.0 | 22.0 |
| 17'-3" TO 20'-4" | 4.9 | 8.1 | 9.7 | 13.7 | 16.2 | 17.8 |

STATE OF CALIFORNIA
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# STRUCTURAL STEEL PLATE VEHICULAR UNDERCROSSING

NO SCALE

**B14-1**

7-1-25



Return to Table of Contents

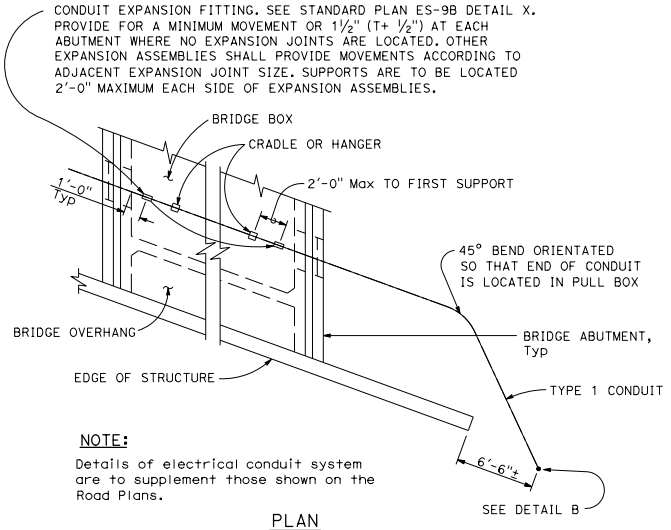
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M. Kassimi
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September 19, 2025
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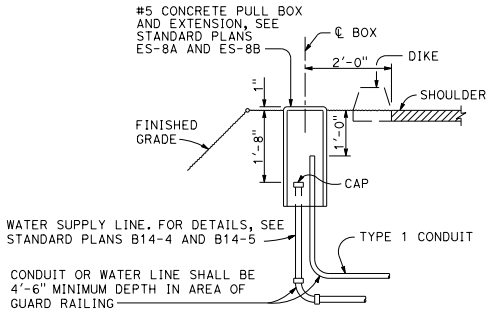
Majid Hosseini
No. E21503
Exp. 6-30-26
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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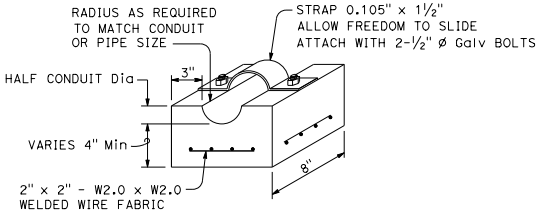



NOTE:
Details of electrical conduit system are to supplement those shown on the Road Plans.

PLAN
## COMMUNICATION OR SPRINKLER CONTROL CONDUITS

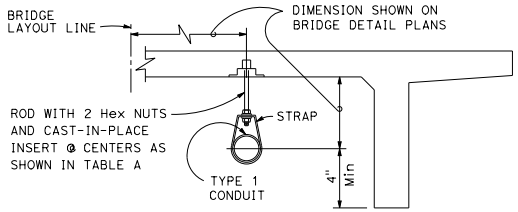



DETAIL B

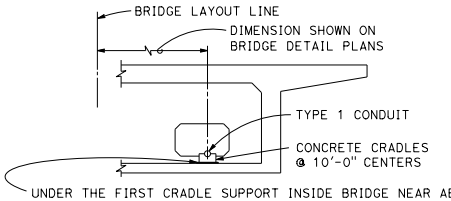



NOTES:
1. Cradles to be precast concrete.
2. Secure all cradles to bottom slab of bridge with epoxy adhesive, except as provided below.

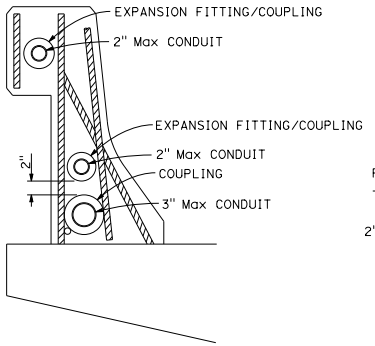
## CONCRETE CRADLE




OTHER THAN BOX GIRDER
## CONDUIT HANGER SUPPORT DETAILS

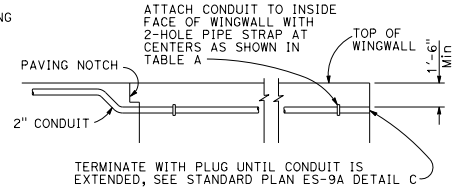



BOX GIRDER
## CONDUIT SUPPORT DETAILS

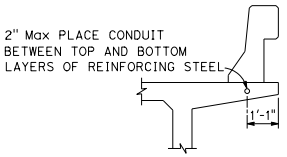



## CONDUIT IN BRIDGE RAILING

NOTES:
1. The maximum conduit sizes shown are for a straight run across the bridge without pull boxes.
2. In a bridge railing with lighting standards or pull boxes, reduce size of affected conduits as needed.




CONDUIT IN OVERHANG-WINGWALL DETAIL




CONDUIT IN OVERHANG

## CONDUIT LOCATIONS

(For 2" conduit only except as noted)
For location see Bridge Detail plans.

TABLE A

| CONDUIT | 2½" OR LESS | 3" | 3½" |
|---|---|---|---|
| ROD | ⅜" ø | ½" ø | ⅝" ø |
| STRAP | 0.090" x 1" | 0.090" x 1" | 0.105" x 1½" |
| SUPPORT SPACING | 10'-0" | 10'-0" | 10'-0" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# COMMUNICATION AND SPRINKLER CONTROL CONDUITS (CONDUIT LESS THAN 4")

NO SCALE

B14-3

7-1-25



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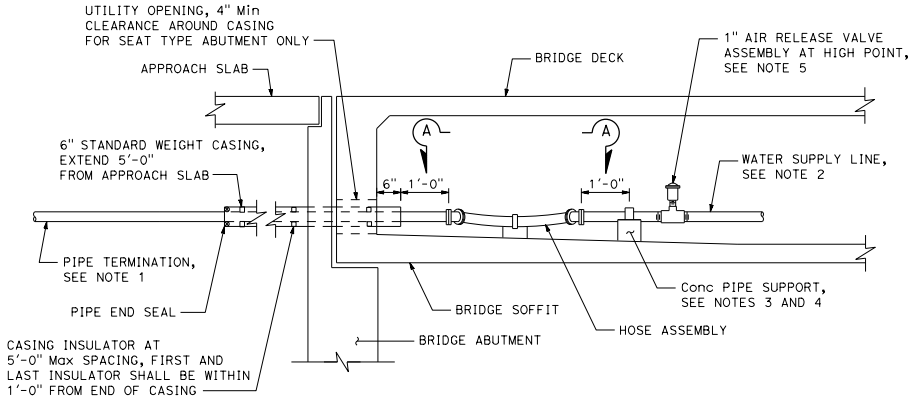
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Ali A Moradi
REGISTERED CIVIL ENGINEER

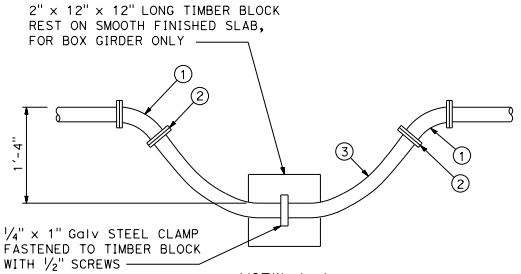
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER — Ali A. Moradi — No. C45273 — Exp. 9-30-26 — CIVIL — STATE OF CALIFORNIA

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## BOX GIRDER INSTALLATION

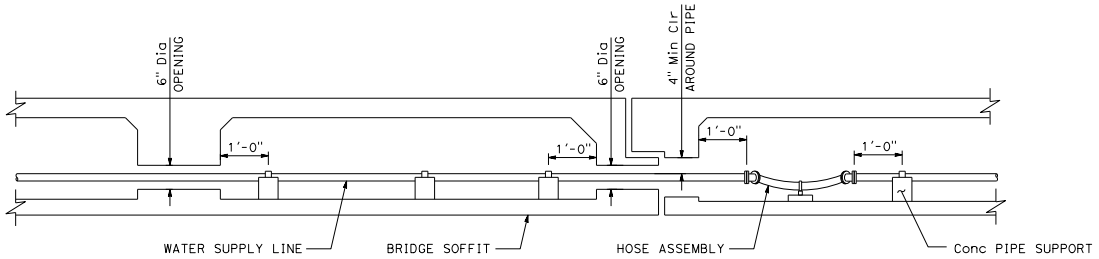



VIEW A-A

## HOSE ASSEMBLY

NUMBERED ITEM

1. 45° flanged elbow with insulated flange connection
2. Flanged hose fitting
3. Hose 6'-6" in length (size shall be same as pipe)

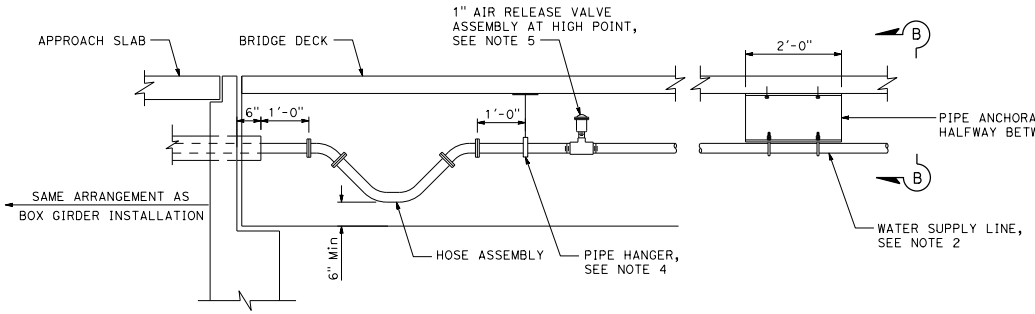



## PIPE INSTALLATION AT HINGE

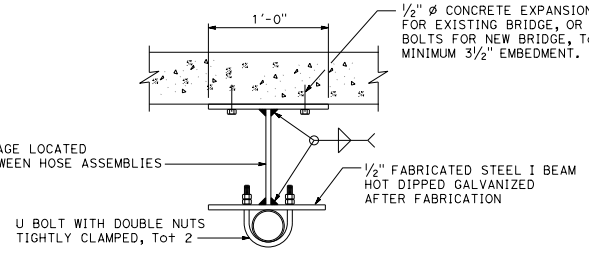
Same for hanger type installation

NOTES:

1. Extend pipe 5'-0"+ beyond the edge of shoulder or as shown on bridge plans. Terminate in a pull box as shown on Standard Plan B14-3, Detail B.
2. Water supply line shall be installed parallel to bridge soffit or deck.
3. For concrete pipe support, pipe shall be tightly clamped at the pipe support located halfway between hose assemblies. At all other supports, pipe clamp shall be shimmed with steel washer plate to provide 1/4" clearance between pipe and clamp.
4. Maximum spacing between pipe hangers or supports shall be 10'-0" unless otherwise detailed on the plans.
5. Install air release valve using threaded tee or pipe saddle.
6. Openings through diaphragm and bent caps shall be 6" diameter unless otherwise detailed on the plans.
7. For details of pipe hanger and concrete pipe support, see Standard Plan B14-5.
8. These details are not designed for seismic and wind loads.




## INSTALLATION FOR OTHER STRUCTURE TYPES




VIEW B-B

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DEPARTMENT OF TRANSPORTATION

# WATER SUPPLY LINE (BRIDGE) (PIPE SIZES LESS THAN 4")

NO SCALE

B14-4

7-1-25



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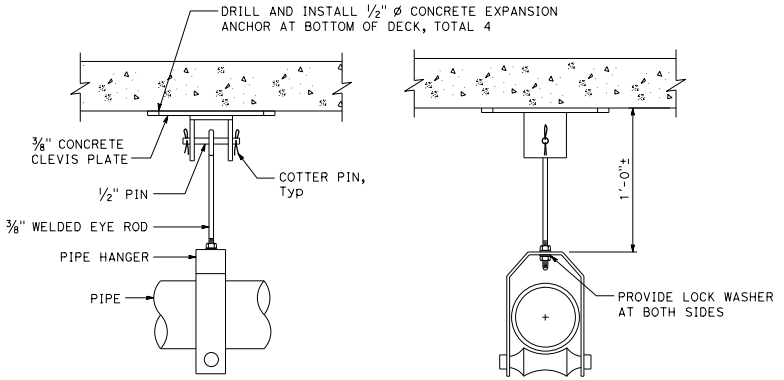
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Ali A Moradi
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

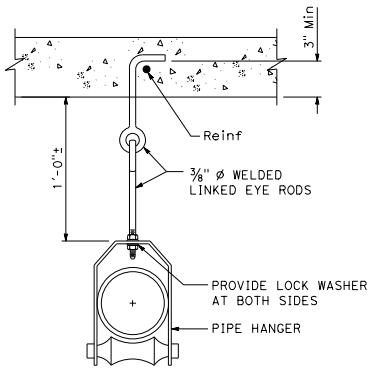
REGISTERED PROFESSIONAL ENGINEER
Ali A. Moradi
No. C45273
Exp. 9-30-26
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FRONT VIEW SIDE VIEW

FOR EXISTING BRIDGE

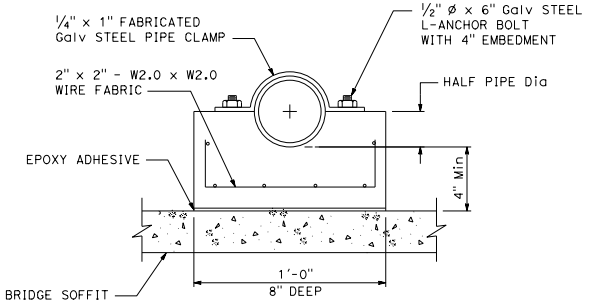



FOR NEW BRIDGE

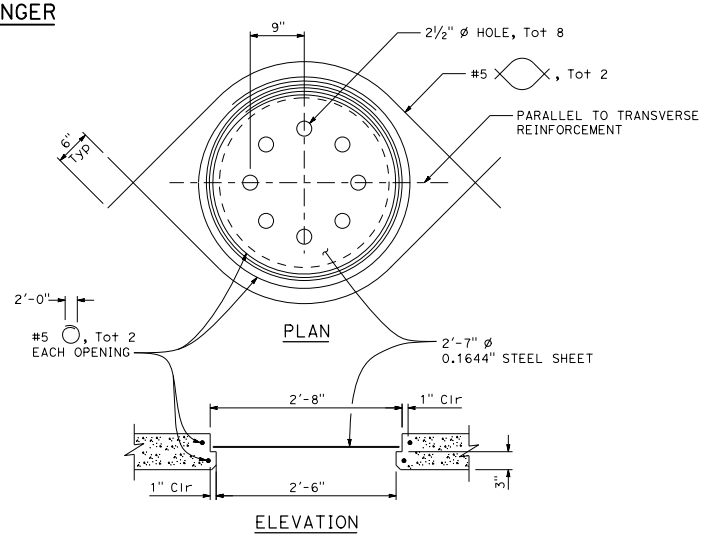
NOTE:

1. These details are not designed for seismic and wind loads.

## PIPE HANGER




CONCRETE PIPE SUPPORT




ELEVATION

Locate where called for on bridge plans.
Adjust reinforcement to clear opening.
Plate must be installed before top deck is placed.

SOFFIT ACCESS OPENING

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# WATER SUPPLY LINE (DETAILS) (PIPE SIZES LESS THAN 4")

NO SCALE

B14-5

7-1-25

Return to Table of Contents

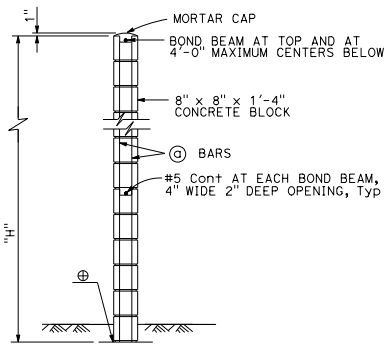
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

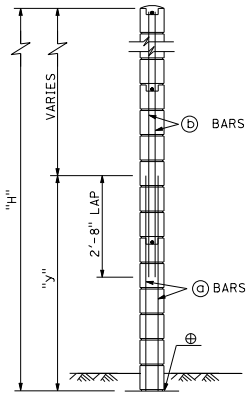
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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H=6'-0" THRU H=10'-0"

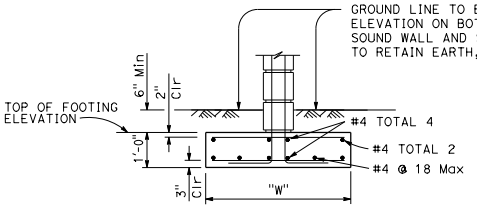



H=12'-0" THRU H=16'-0"

For details not shown, see H=6'-0" thru H=10'-0".

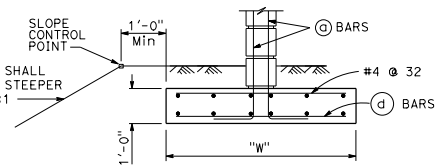
## TYPICAL SECTION

⊕ Full mortar bed at bottom of wall




CASE 1

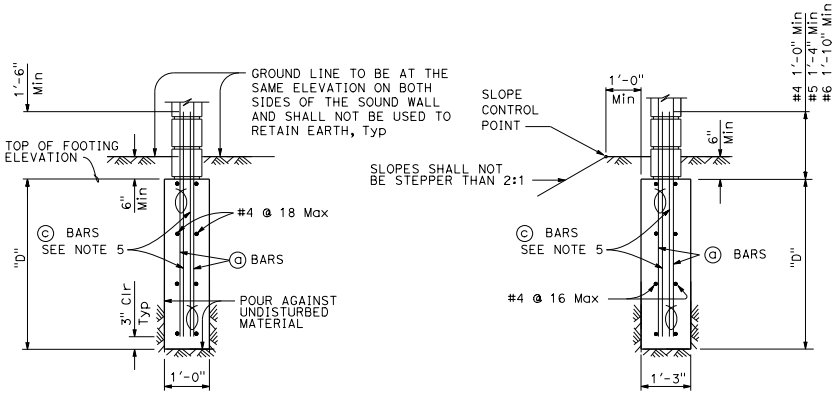
For details not shown, see Case 2. Level ground (±10%) on both sides of the sound wall.




CASE 2

For details not shown, see Case 1. Level ground (±10%) on the traffic side of the sound wall and sloping ground on the opposite side.

## SPREAD FOOTING SECTION




CASE 1

For details not shown, see Case 2. Level ground (±10%) on both sides of the sound wall.

CASE 2

For details not shown, see Case 1. Level ground (±10%) on one side of the sound wall and sloping ground on the opposite side.

## TRENCH FOOTING SECTION

### TRENCH FOOTING

| MAXIMUM H | CASE 1 | | | CASE 2 | | ⓒ BARS @ 1'-4" Max |
|---|---|---|---|---|---|---|
| | Ø = 25 Min | Ø = 30 Min | Ø = 35 Min | Ø = 30 Min | Ø = 35 Min | |
| | D | D | D | D | D | |
| 6'-0" | 5'-3" | 4'-3" | 3'-9" | 7'-9" | 5'-0" | ——— |
| 8'-0" | 6'-0" | 5'-0" | 4'-6" | 8'-9" | 6'-0" | #4 |
| 10'-0" | 6'-9" | 5'-9" | 5'-0" | 10'-0" | 6'-9" | #4 |
| 12'-0" | 7'-9" | 6'-6" | 5'-6" | 11'-0" | 7'-9" | #5 |
| 14'-0" | 8'-6" | 7'-3" | 6'-0" | 11'-9" | 8'-6" | #5 |
| 16'-0" | 9'-3" | 7'-9" | 6'-6" | 12'-9" | 9'-3" | #6 |

Case 1 - Level ground (±10%) on both sides of the sound wall.
Case 2 - Level ground (±10%) on one side of the sound wall and sloping ground on opposite side.

LEGEND:

Bundled reinforcement

### SPREAD FOOTING

| MAXIMUM H | W | ⓓ BARS |
|---|---|---|
| 6'-0" | 3'-3" | #5 @ 16 |
| 8'-0" | 4'-0" | #5 @ 16 |
| 10'-0" | 5'-0" | #5 @ 16 |
| 12'-0" | 5'-9" | #5 @ 16 |
| 14'-0" | 6'-6" | #4 @ 8 |
| 16'-0" | 7'-6" | #4 @ 8 |

### SOUND WALL REINFORCEMENT TABLE

| MAXIMUM H | ⓐ BARS @ 1'-4" Max | ⓑ BARS @ 1'-4" Max | "y" |
|---|---|---|---|
| 6'-0" | #4 | ——— | ——— |
| 8'-0" | #4 | ——— | ——— |
| 10'-0" | #4 | ——— | ——— |
| 12'-0" | #5 | #4 | 6'-0" |
| 14'-0" | #6 | #4 | 8'-0" |
| 16'-0" | #6 | #4 | 10'-0" |

NOTES:

1. For type of block and joint finish, see other sheets.
2. When blocks are laid in stacked bond, ladder type, galvanized joint reinforcement shall be provided. A minimum of 2-9 gauge wires continuous at 4'-0" maximum to be used. Locate reinforcement in joints that are at the approximate midpoint between bond beams.
3. Horizontal joints shall be tooled concave or weathered. vertical joints shall be tooled concave or raked.
4. For intermediate wall heights that are between the "H's" given, use the tabular information for the next higher "H".
5. Bundle additional ⓒ bars with typical ⓐ bars.
6. If wall is placed behind traffic barriers, clear distance from face of barrier to face of wall shall exceed 4'-0". Wall is not designed for impact loading.
7. Ultimate spread footing factored bearing pressure demand, $q_a$ = 1.25 ksf, B' = W/3 Where B' is the effective footing width (ft).

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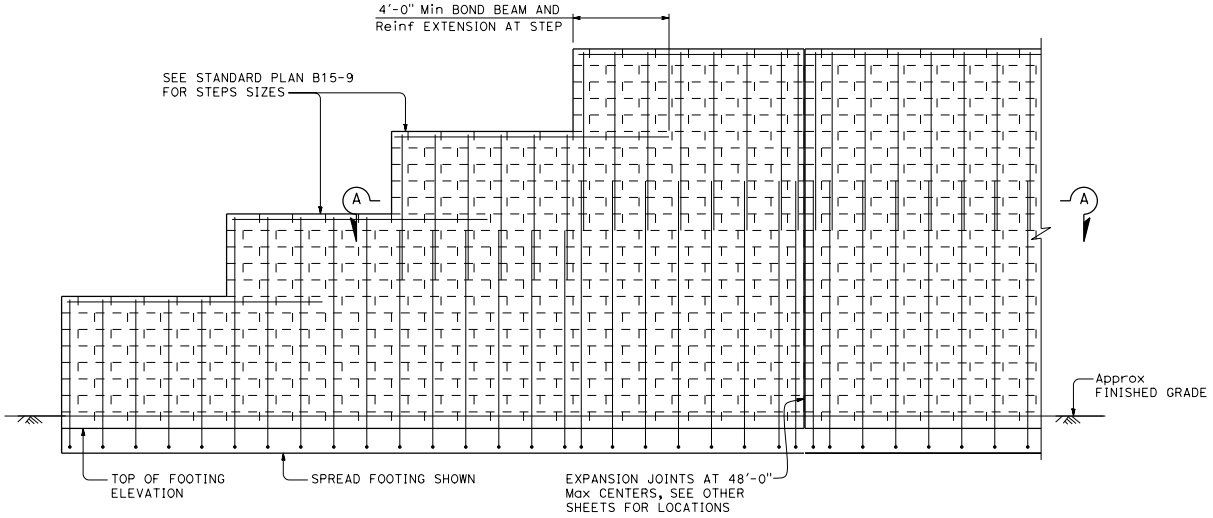
# SOUND WALL MASONRY BLOCK ON FOOTING DETAILS (1)

NO SCALE

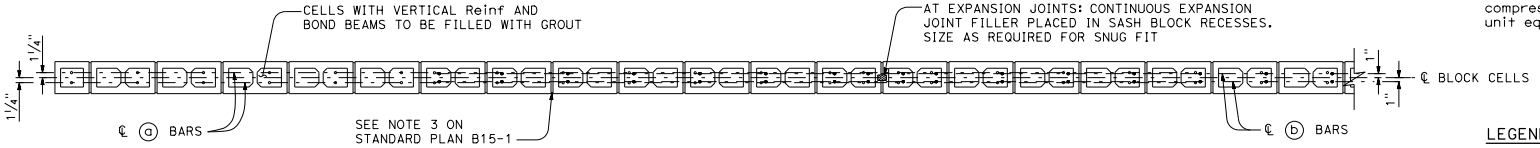
B15-1

7-1-25

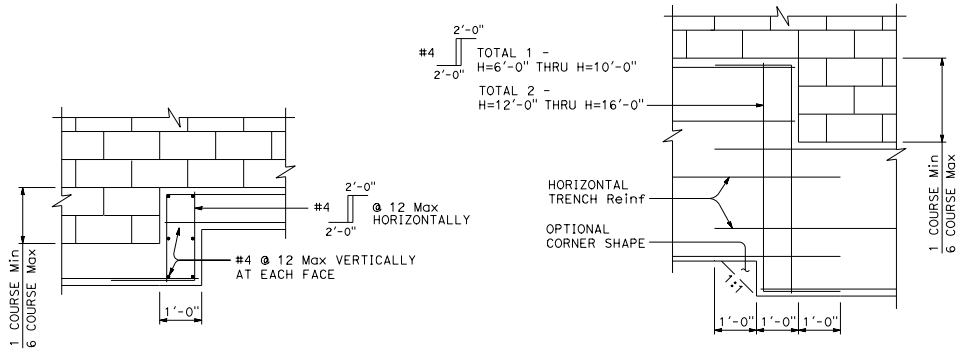
Return to Table of Contents




ELEVATION




SECTION A-A




SPREAD FOOTING

TRENCH FOOTING

FOOTING STEP DETAILS

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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**NOTE:**

1. For details not shown, see Standard Plan B15-1.

**DESIGN NOTES:**

**DESIGN:**

AASHTO LRFD Bridge Design Specifications,
8th Edition 2017 with California Amendment,
Preface date April 2019
TMS 402-16
2019 California Building Code

**DESIGN WIND LOAD:**

36.5 psf

**DESIGN SEISMIC LOAD:**

0.57 Dead Load

**REINFORCED CONCRETE AND CONCRETE MASONRY:**

$f_y$ = 60 ksi
$f'_c$ = 3.6 ksi
$f'_m$ = 2,000 psi *

* Provide materials to achieve the net compressive strength of concrete masonry unit equal or greater than the specified $f'_m$.

**LEGEND:**

- ⓐ BARS
- ⓑ BARS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK ON FOOTING
# DETAILS (2)

NO SCALE

**B15-2**

7-1-25

2025 STANDARD PLAN B15-2

Return to Table of Contents

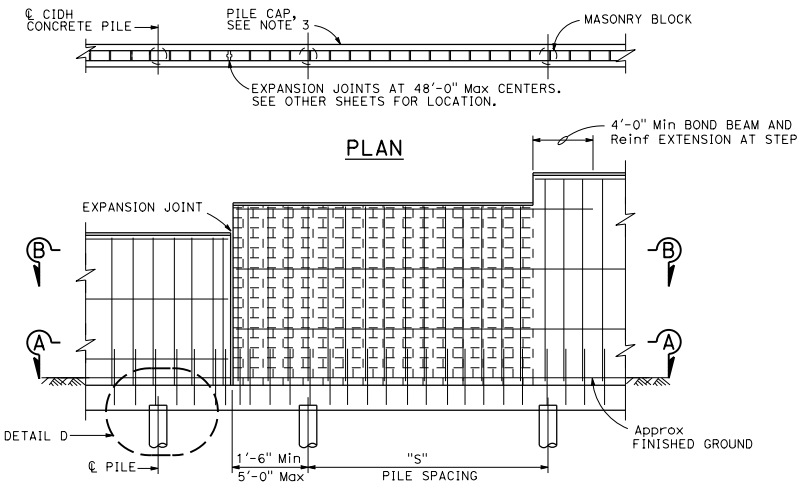
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

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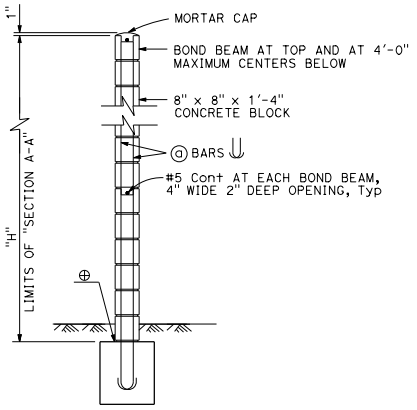



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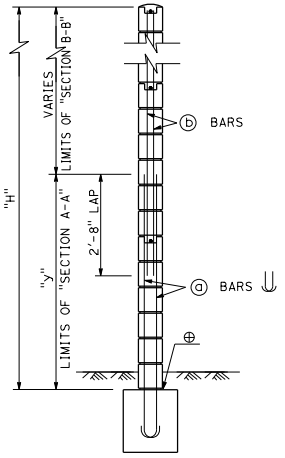
1. For Detail D, see Standard Plan B15-5.
2. For sections and details not shown, see Standard Plans B15-4 and B15-5.
3. See Standard Plan B15-9 for other details.

## SOUND WALL REINFORCEMENT TABLE

| MAXIMUM H | ⓐ BARS @ 1'-4" Max | ⓑ BARS @ 1'-4" Max | "y" |
|---|---|---|---|
| 6'-0" | #4 | | |
| 8'-0" | #4 | | |
| 10'-0" | #4 | | |
| 12'-0" | #5 | #4 | 6'-0" |
| 14'-0" | #6 | #4 | 8'-0" |
| 16'-0" | #6 | #4 | 10'-0" |



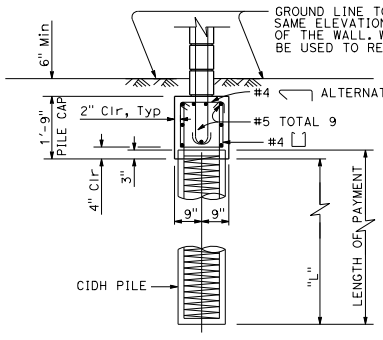

H=6'-0" THRU H=10'-0"




H=12'-0" THRU H=16'-0"
For details not shown, see H=6'-0" thru H=10'-0".

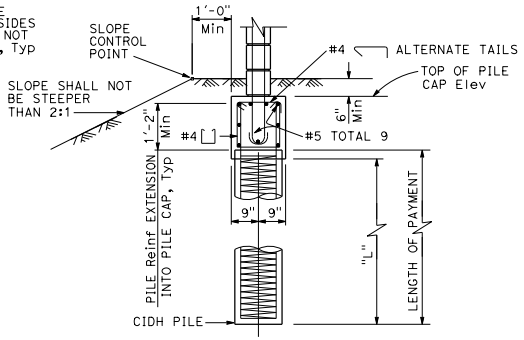
## TYPICAL SECTION

⊕ Full mortar bed at bottom of wall.




CASE 1

For details not shown, see Case 2.
Level ground (±10%) on both sides of the sound wall.




CASE 2

For details not shown, see Case 1.
Level ground (±10%) on one side of the sound wall and sloping ground on the opposite side.

## PILE CAP SECTION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON PILE CAP DETAILS (1)

NO SCALE

B15-3

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

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STATE OF CALIFORNIA

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## GENERAL NOTES:

1. For type of block and joint finish, see other sheets.
2. When blocks are laid in stacked bond, ladder type, galvanized joint reinforcement shall be provided. A minimum of 2-9 gauge wires continuous at 4'-0" maximum to be used. Locate reinforcement in joints that are at the approximate midpoint between bond beams.
3. Horizontal joints shall be tooled concave or weathered. Vertical joints shall be tooled concave or raked.
4. For intermediate wall heights that are between the "H's" given, use the tabular information for the next higher "H".
5. If wall is placed behind traffic barriers, clear distance from face of barrier to face of wall shall exceed 4'-0". Wall is not designed for impact loading.

## DESIGN NOTES

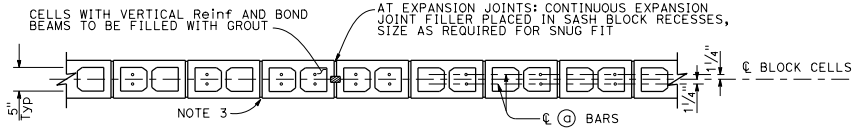
DESIGN:
AASHTO LRFD Bridge Design Specifications,
8th Edition 2017 with California Amendment,
Preface date April 2019
TMS 402-16
2019 California Building Code

DESIGN WIND LOAD:
36.5 psf

DESIGN SEISMIC LOAD:
0.57 Dead Load

REINFORCED CONCRETE AND CONCRETE MASONRY:
$f_y$ = 60 ksi
$f'_c$ = 3.6 ksi
$f'_m$ = 2000 psi *

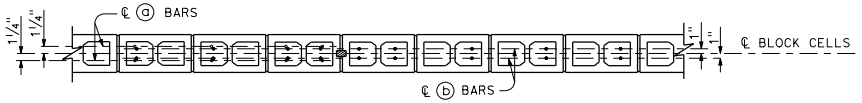
* Provide materials to achieve the net compressive strength of concrete masonry unit equal or greater than the specified $f'_m$.




**SECTION A-A**

For details not shown, see other sections.

**H=6'-0" THRU H=10'-0"**




**SECTION A-A** **SECTION B-B**

For details not shown, see other sections.

**H=12'-0" THRU H=16'-0"**

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK ON PILE CAP
# DETAILS (2)

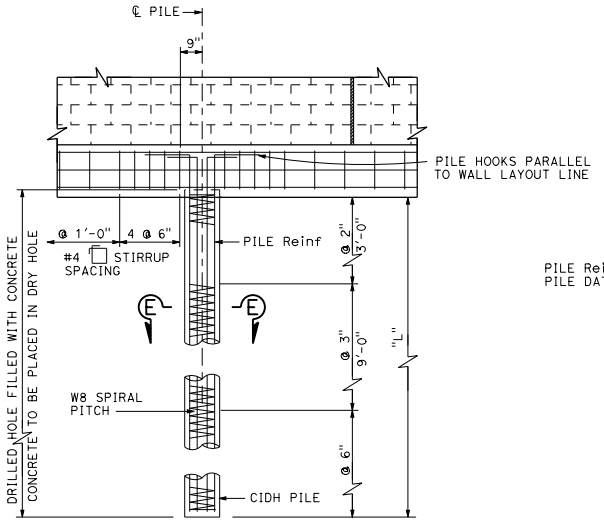
NO SCALE

B15-4

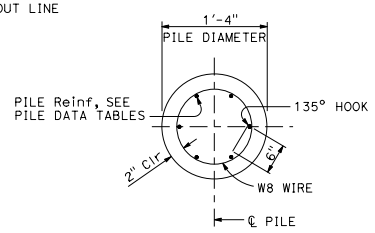
7-1-25



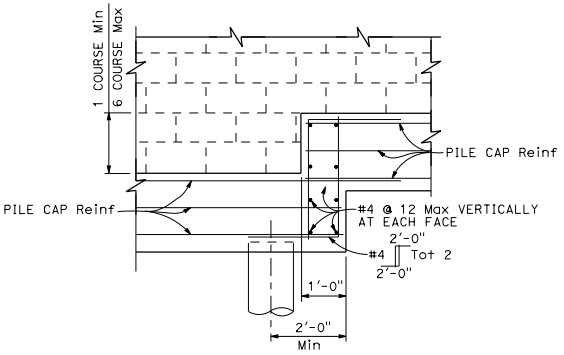
Return to Table of Contents




DETAIL D




SECTION E-E




PILE CAP STEP DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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NOTE:

1. For details not shown, see Standard Plans B15-3 and B15-4.

CASE 1 : PILE DATA TABLE

| MAXIMUM H | ø = 25 Min | | | ø = 30 Min | | | ø = 35 Min | | | MAXIMUM H |
|---|---|---|---|---|---|---|---|---|---|---|
| | S | L | PILE Reinf | S | L | PILE Reinf | S | L | PILE Reinf | |
| 6'-0" | 16'-0" | 9'-6" | #6 Tot 6 | 16'-0" | 7'-6" | #6 Tot 6 | 16'-0" | 6'-0" | #6 Tot 6 | 6'-0" |
| 8'-0" | 16'-0" | 10'-6" | #6 Tot 7 | 16'-0" | 8'-6" | #6 Tot 7 | 16'-0" | 7'-0" | #6 Tot 7 | 8'-0" |
| 10'-0" | 16'-0" | 11'-6" | #7 Tot 6 | 16'-0" | 9'-6" | #7 Tot 6 | 16'-0" | 8'-0" | #7 Tot 6 | 10'-0" |
| 12'-0" | 15'-0" | 12'-6" | #8 Tot 7 | 16'-0" | 10'-6" | #8 Tot 7 | 16'-0" | 8'-6" | #8 Tot 7 | 12'-0" |
| 14'-0" | 13'-0" | 13'-0" | #8 Tot 7 | 14'-0" | 11'-0" | #8 Tot 7 | 14'-0" | 9'-0" | #8 Tot 7 | 14'-0" |
| 16'-0" | 12'-0" | 13'-6" | #8 Tot 7 | 13'-0" | 11'-6" | #8 Tot 7 | 13'-0" | 9'-6" | #8 Tot 7 | 16'-0" |

Case 1 - Level ground (±10%) on both sides of the sound wall.

CASE 2 : PILE DATA TABLE

| MAXIMUM H | ø = 30 Min | | | ø = 35 Min | | | MAXIMUM H |
|---|---|---|---|---|---|---|---|
| | S | L | PILE Reinf | S | L | PILE Reinf | |
| 6'-0" | 16'-0" | 13'-0" | #8 Tot 7 | 16'-0" | 9'-6" | #6 Tot 7 | 6'-0" |
| 8'-0" | 16'-0" | 15'-0" | #8 Tot 7 | 16'-0" | 10'-6" | #7 Tot 6 | 8'-0" |
| 10'-0" | 15'-0" | 16'-0" | #8 Tot 7 | 16'-0" | 12'-0" | #7 Tot 7 | 10'-0" |
| 12'-0" | 12'-0" | 16'-0" | #8 Tot 7 | 15'-0" | 13'-6" | #8 Tot 7 | 12'-0" |
| 14'-0" | 10'-0" | 16'-0" | #8 Tot 7 | 12'-0" | 13'-6" | #8 Tot 7 | 14'-0" |
| 16'-0" | 8'-0" | 16'-0" | #8 Tot 7 | 11'-0" | 14'-0" | #8 Tot 7 | 16'-0" |

Case 2 - Level ground (±10%) on traffic side of the sound wall and sloping ground on opposite side.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK ON PILE CAP
# DETAILS (3)

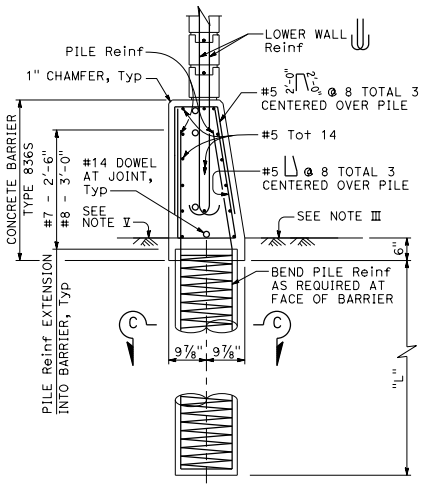
NO SCALE

B15-5



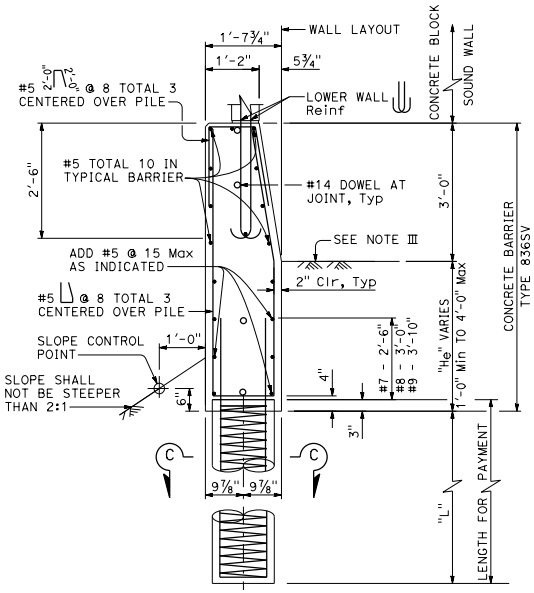
7-1-25

Return to Table of Contents




CASE 1

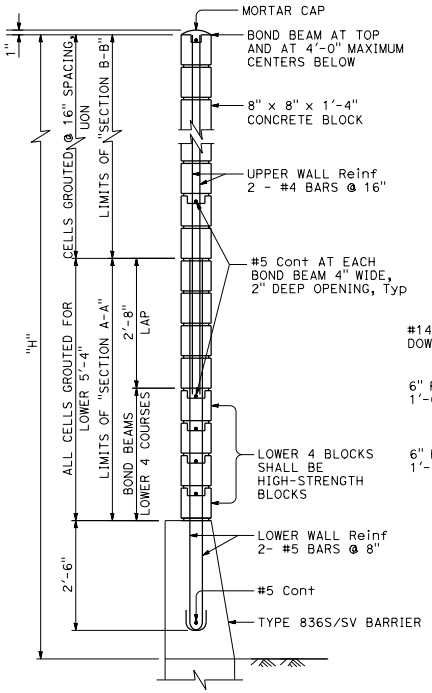
For details not shown, See Case 2.
Level ground ±10% on both sides of barrier.




CASE 2

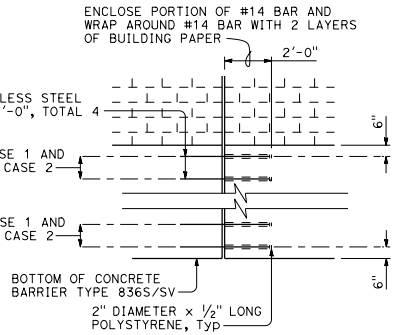
For details not shown, See Case 1.
Level ground ±10% at the traffic side of barrier and sloping ground on the opposite side.

## BARRIER SECTIONS

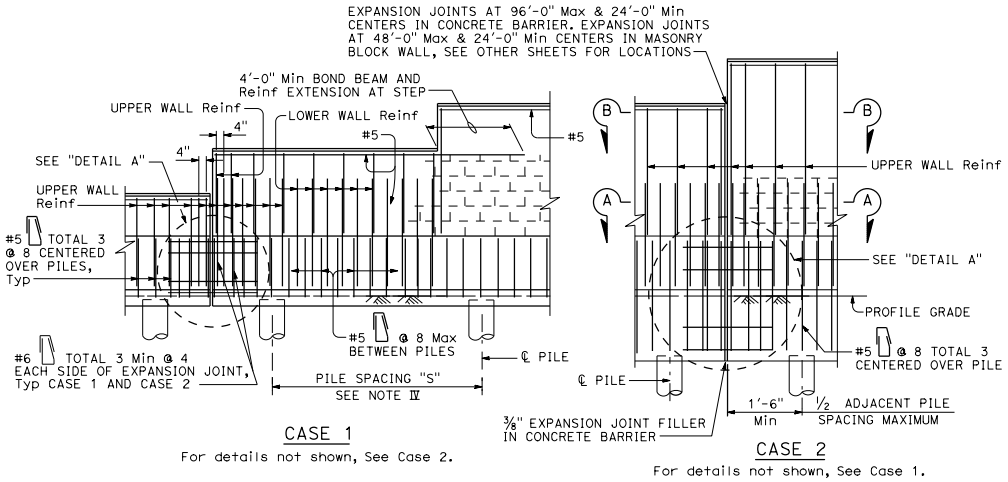



TYPICAL SECTION

See Standard Plan B15-8 for pile details.




DETAIL A




CASE 1

For details not shown, See Case 2.

CASE 2

For details not shown, See Case 1.

## PARTIAL ELEVATIONS

### NOTES I THROUGH VI:

I. Details shown are primarily to conform design of sound walls to Type 836S and Type 836SV Concrete Barriers.

II. For details and sections not shown, see Standard Plans B15-7 and B15-8.

III. Slope ground at traffic side of barrier to drain. Maximum slope ±10%. See Note 3 on Standard Plan B11-80.

IV. Pile spacing may be varied, but shall not exceed the tabular values. See Standard Plan B15-8.

V. For Case 1 - ground line to be at the same elevation on both sides of the barrier. Barrier shall not be used to retain earth.

VI. See Standard Plan B15-9 for other details.

### NOTES A THROUGH G:

A. For type of block, type of block bond, and joint finish, see other sheets.

B. When blocks are laid in stacked bond, ladder type, galvanized joint reinforcement shall be provided. A minimum of 2-9 gauge wires continuous at 4'-0" maximum to be used. Locate reinforcement in joints that are at the approximate midpoint between bond beams.

C. Horizontal joints shall be tooled concave or weathered. Vertical joints shall be tooled concave or raked.

D. For intermediate wall heights (H), or barrier depths ($H_e$), that are between the values given, use the tabular information for the next higher (H) or ($H_e$).

E. Refer to Standard Plan B15-7 for masonry strength.

F. For wall heights = 7'-8", the upper wall reinforcement may be omitted.

G. Minimum wall height shall be 7'-8". Maximum wall height shall be 16'-4".

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER DETAILS (1)

NO SCALE

B15-6

7-1-25



Return to Table of Contents

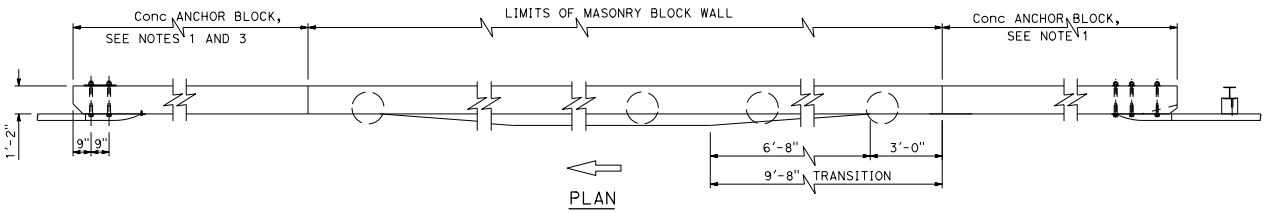
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

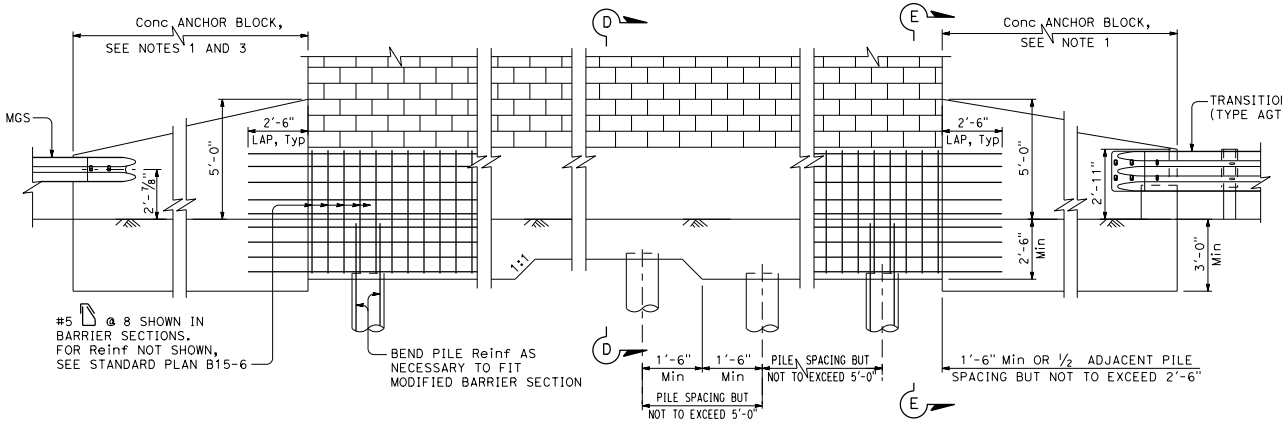
September 19, 2025
PLANS APPROVAL DATE

Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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PLAN



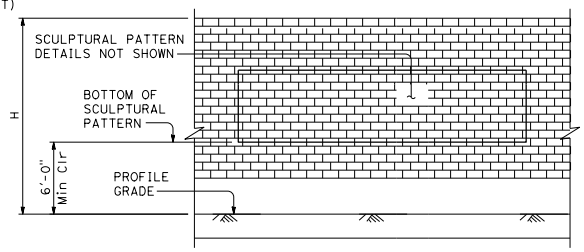

ELEVATION

## MIDWEST GUARDRAIL SYSTEM ANCHORAGE

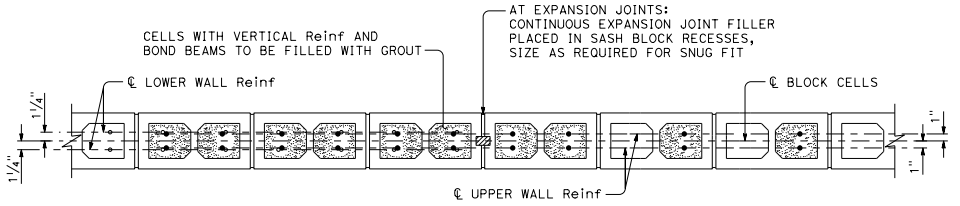
For details not shown, see Standard Plans B11-79, B11-80 and B11-80A.

**NOTES:**

1. For Concrete Anchor Block and connection details, see Standard Plan A79C1.
2. At this location, pile reinforcement shall be taken from Standard Plan B15-8.
3. If departure end block is within the Clear Recovery Zone (CRZ, 30 feet for expressways and freeways, or 20 feet for conventional highways) of opposing traffic, then use the approach end block at the departure end.




CLEARANCE DETAIL




SECTION A-A SECTION B-B

For location of Section A-A and Section B-B, see Standard Plan B15-6.

**DESIGN NOTES:**

**DESIGN:**

AASHTO LRFD Bridge Design Specifications, 8th Edition 2017 with California Amendment, Preface date April 2019
TMS 402-16
2019 California Building Code

**DESIGN WIND LOAD:**

36.5 psf

**DESIGN SEISMIC LOAD:**

0.57 Dead Load

**DESIGN IMPACT LOAD:**

TL-3

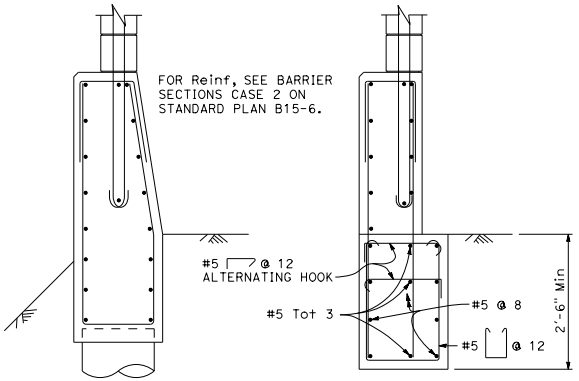
**DESIGN LIVE LOAD SURCHARGE:**

240 psf surcharge on level ground surface

**REINFORCED CONCRETE AND CONCRETE MASONRY:**

$f_y$ = 60 ksi
$f'_c$ = 3.6 ksi
$f'_m$ = 2000 psi *
$f'_m$ = 2500 psi for high-strength blocks only *

* Provide materials to achieve the net compressive strength of concrete masonry unit equal or greater than the specified $f'_m$.




SECTION D-D SECTION E-E

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER DETAILS (2)

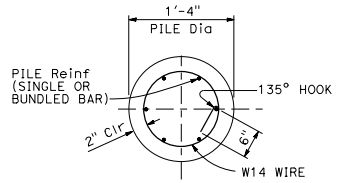
NO SCALE

**B15-7**

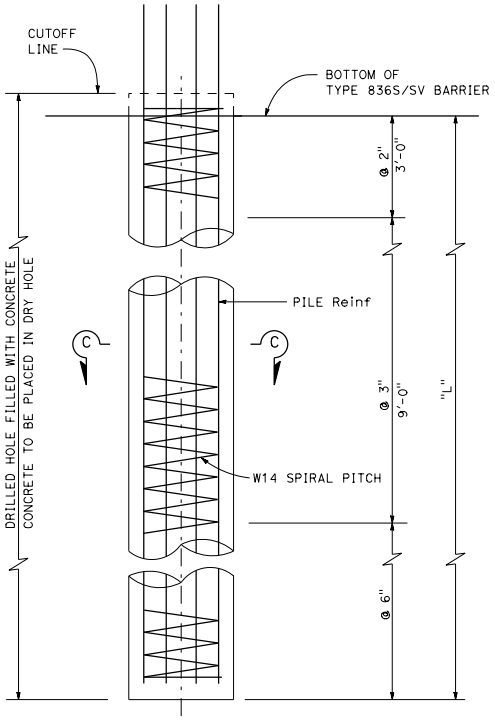
2025 STANDARD PLAN B15-7

7-1-25

Return to Table of Contents




SECTION C-C




ELEVATION

**CASE 1: PILE DATA TABLE**

| MAXIMUM H | ø = 25 Min | | | ø = 30 Min | | | ø = 35 Min | | |
|---|---|---|---|---|---|---|---|---|---|
| | S | L | PILE Reinf | S | L | PILE Reinf | S | L | PILE Reinf |
| 8'-4" | 10'-0" | 16'-0" | #7 Tot 7 | 10'-0" | 10'-0" | #7 Tot 7 | 10'-0" | 8'-0" | #8 Tot 6 |
| 10'-4" | 10'-0" | 16'-0" | #7 Tot 7 | 10'-0" | 10'-0" | #7 Tot 7 | 10'-0" | 8'-0" | #8 Tot 6 |
| 12'-4" | 10'-0" | 16'-0" | #7 Tot 7 | 10'-0" | 10'-0" | #7 Tot 7 | 10'-0" | 8'-6" | #8 Tot 6 |
| 14'-4" | 10'-0" | 16'-0" | #7 Tot 7 | 10'-0" | 10'-6" | #7 Tot 7 | 10'-0" | 9'-0" | #8 Tot 6 |
| 16'-4" | 10'-0" | 16'-0" | #8 Tot 7 | 10'-0" | 11'-6" | #8 Tot 7 | 10'-0" | 9'-6" | #8 Tot 6 |

**CASE 2: PILE DATA TABLE**

| $H_e$ | MAXIMUM H | ø = 30 Min | | | ø = 35 Min | | |
|---|---|---|---|---|---|---|---|
| | | S | L | PILE Reinf | S | L | PILE Reinf |
| 1'-0" | 8'-4" | 10'-0" | 16'-0' | #7 Tot 7 | 10'-0" | 11'-6" | #7 Tot 7 |
| | 10'-4" | 9'-7" | 16'-0" | #7 Tot 7 | 10'-0" | 12'-6" | #7 Tot 7 |
| | 12'-4" | 8'-4" | 16'-0" | #7 Tot 7 | 10'-0" | 13'-0" | #8 Tot 7 |
| | 14'-4" | 7'-1" | 16'-0" | #7 Tot 7 | 10'-0" | 14'-0' | #8 Tot 7 |
| | 16'-4" | 6'-3" | 16'-0" | #7 Tot 7 | 10'-0" | 14'-6" | #8 Tot 7 |
| 2'-0" | 8'-4" | 8'-4" | 16'-0" | #7 Tot 7 | 10'-0" | 13'-0" | #7 Tot 7 |
| | 10'-4" | 7'-6" | 16'-0" | #7 Tot 7 | 10'-0" | 13'-6' | #8 Tot 7 |
| | 12'-4" | 6'-3" | 16'-0" | #7 Tot 7 | 10'-0" | 14'-6" | #8 Tot 7 |
| | 14'-4" | 5'-10" | 16'-0" | #7 Tot 7 | 10'-0" | 15'-0" | **#8 Tot 10 |
| | 16'-4" | 5'-0" | 16'-0" | #7 Tot 7 | 9'-7" | 15'-6" | **#8 Tot 10 |
| 3'-0" | 8'-4" | 6'-3" | 16'-0" | #7 Tot 7 | 10'-0" | 14'-6" | #8 Tot 7 |
| | 10'-4" | 5'-5" | 16'-0" | #7 Tot 7 | 10'-0" | 15'-0" | **#8 Tot 10 |
| | 12'-4" | 5'-0" | 16'-0" | #7 Tot 7 | 10'-0" | 15'-6" | **#8 Tot 10 |
| | 14'-4" | 4'-7' | 16'-0" | #7 Tot 7 | 9'-7" | 16'-0" | **#8 Tot 10 |
| | 16'-4" | 4'-2" | 16'-0" | #7 Tot 7 | 8'-4" | 16'-0" | **#8 Tot 10 |
| 4'-0" | 8'-4" | 4'-7" | 16'-0" | #7 Tot 7 | 10'-0" | 16'-0" | #9 Tot 6 |
| | 10'-4" | 4'-2" | 16'-0" | #7 Tot 7 | 9'-2" | 16'-0" | **#8 Tot 10 |
| | 12'-4" | 3'-9" | 16'-0" | #7 Tot 7 | 8'-4" | 16'-0" | **#8 Tot 10 |
| | 14'-4" | 3'-4" | 16'-3" | #7 Tot 7 | 7'-11" | 16'-0" | **#8 Tot 10 |
| | 16'-4" | 3'-4" | 16'-6" | #7 Tot 7 | 7'-1" | 16'-0" | **#8 Tot 10 |

** Indicates bundled bars (bundle of two bars)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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NOTE:

1. For details not shown, see Standard Plans B15-6 and B15-7.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER DETAILS (3)

NO SCALE

B15-8

7-1-25

2025 STANDARD PLAN B15-8

Return to Table of Contents

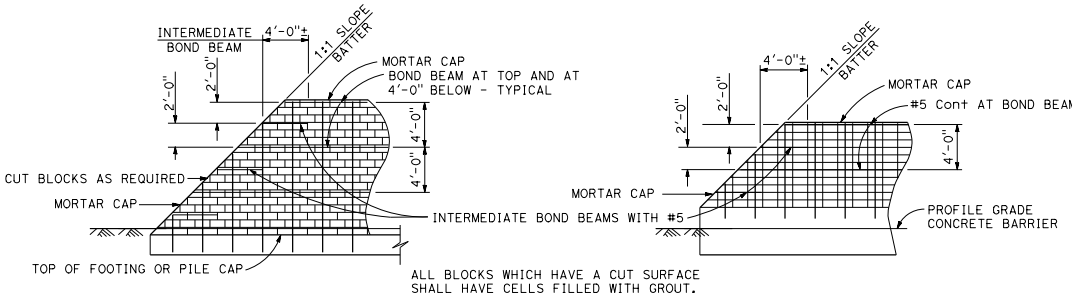
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
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No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

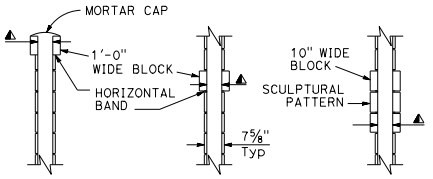
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TYPE I

Slope batter shall not be flatter than 1:1.



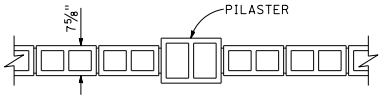




ARCHITECTURAL ALTERNATIVES

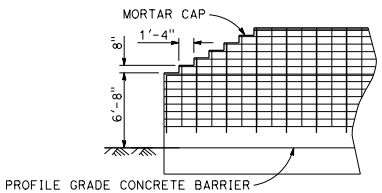
▲ Cell width to match 8" block.

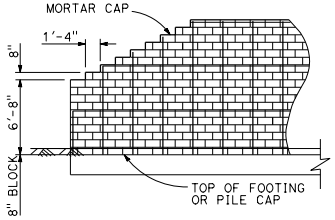
NOTES:

1. 1'-0" wide block not allowed within 6'-0" of profile grade.
2. For structural details, see other sheets.
3. Type Ⅲ not permitted for sound walls with "H" less than 10'-0".
4. The end of the wall details may be used with any of the standard supporting foundations for masonry block. The foundations shown for the different types are for the purpose of illustration only.

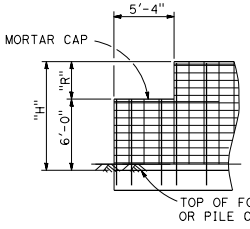



1'-0" WIDE PROJECTING BLOCK

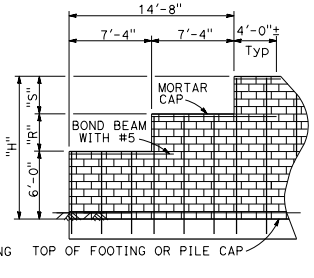


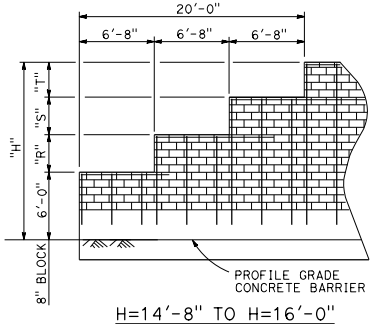

TYPE Ⅱ




H=10'-0"
SINGLE STEP

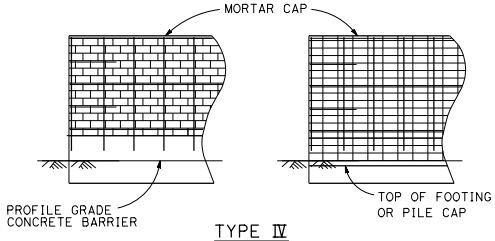



H=10'-8" TO H=14'-0"
2 STEPS




H=14'-8" TO H=16'-0"
3 STEPS

TYPE Ⅲ




TYPE Ⅳ

END OF WALL DETAILS

8" x 8" x 16" BLOCK

| H | R | S | T |
|---|---|---|---|
| 10'-0" | 4'-0" | — | — |
| 10'-8" | 2'-8" | 2'-0" | — |
| 11'-4" | 2'-8" | 2'-8" | — |
| 12'-0" | 3'-4" | 2'-8" | — |
| 12'-8" | 3'-4" | 3'-4" | — |
| 13'-4" | 4'-0" | 3'-4" | — |
| 14'-0" | 4'-0" | 4'-0" | — |
| 14'-8" | 3'-4" | 2'-8" | 2'-8" |
| 15'-4" | 3'-4" | 3'-4" | 2'-8" |
| 16'-0" | 3'-4" | 3'-4" | 3'-4" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK
# MISCELLANEOUS DETAILS

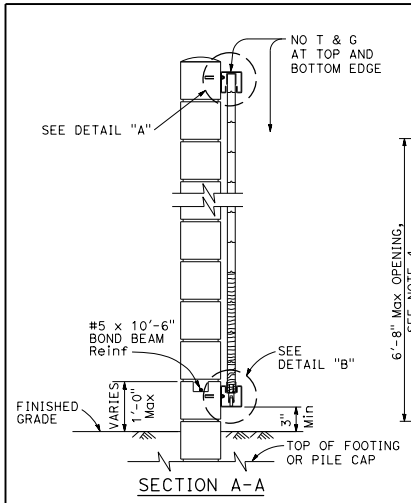
NO SCALE

B15-9

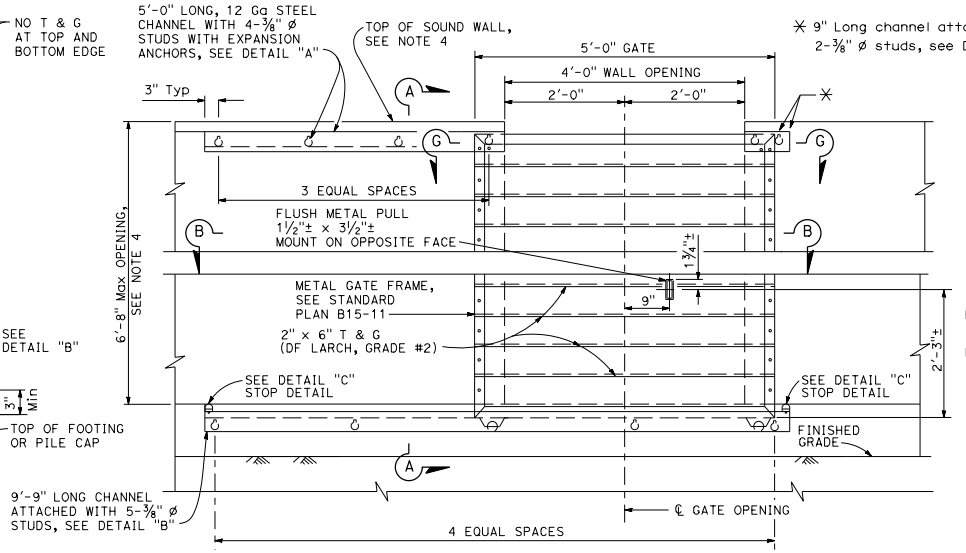
7-1-25

2025 STANDARD PLAN B15-9

Return to Table of Contents



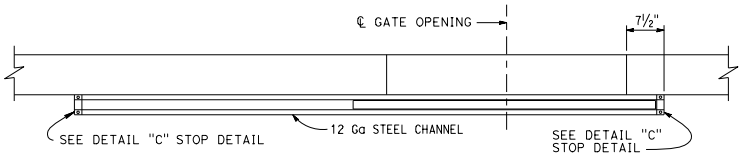

SECTION A-A



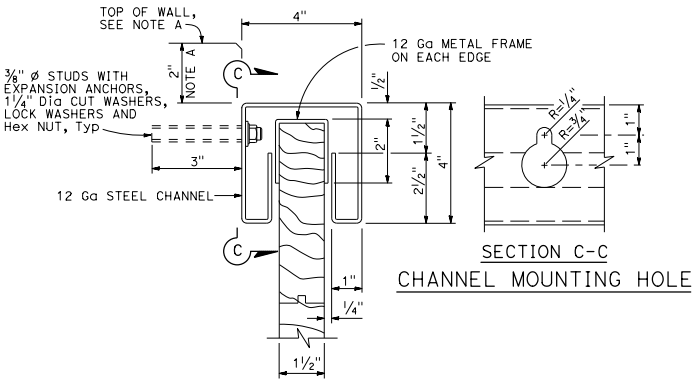

GATE ELEVATION - BACK

NOTES:

1. Gate mounted on sloping grade shall be oriented to be in closed position when at lower grade point.
2. Two masonry cells adjacent to each side of gate to be reinforced and grouted.
3. Those blocks upon which the supporting steel channels are mounted shall be smooth faced on the mounting side.
4. When sound wall as measured from the bottom of the gate opening exceeds 6'-8", see Standard Plan B15-11.

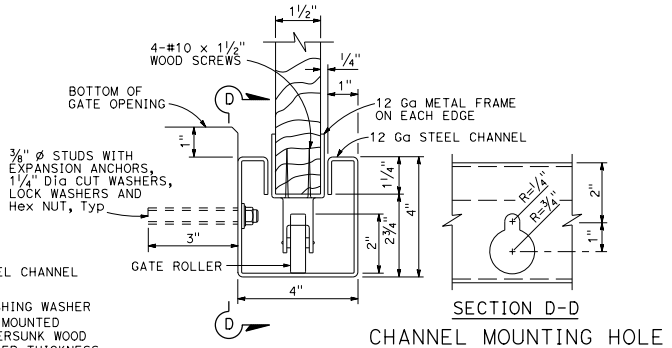



SECTION B-B



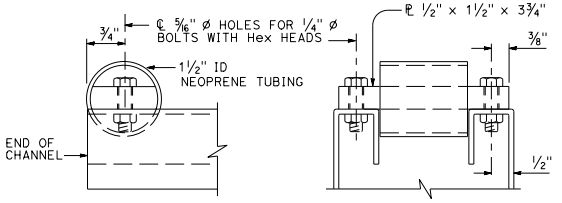

SECTION C-C
CHANNEL MOUNTING HOLE

DETAIL "A"



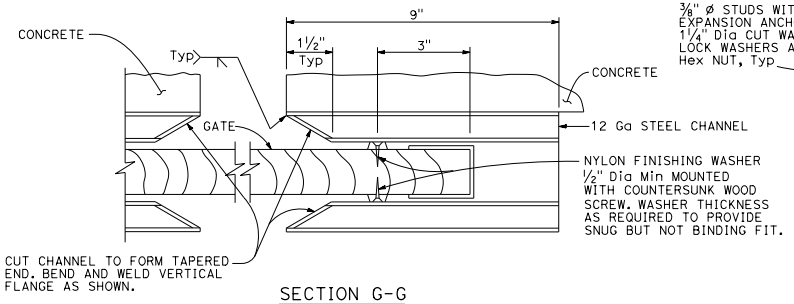

SECTION D-D
CHANNEL MOUNTING HOLE

DETAIL "B"




SIDE VIEW END VIEW

DETAIL "C" STOP DETAIL




SECTION G-G

For location of nylon finishing washers, see Standard Plan B15-11.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON FOOTING OR PILE CAP 5'-0" ACCESS GATE DETAILS (1)

NO SCALE

B15-10

2025 STANDARD PLAN B15-10

7-1-25

Return to Table of Contents

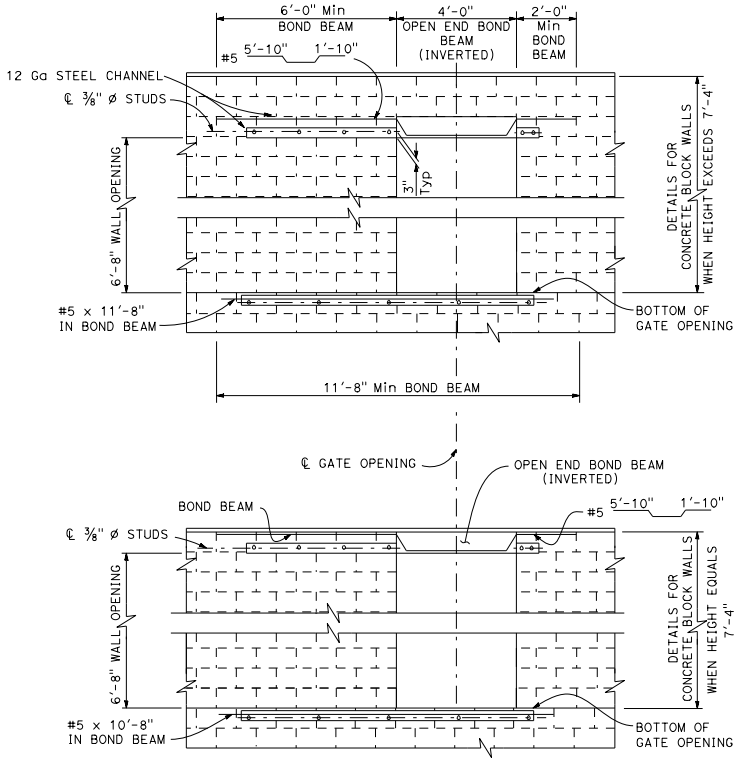
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

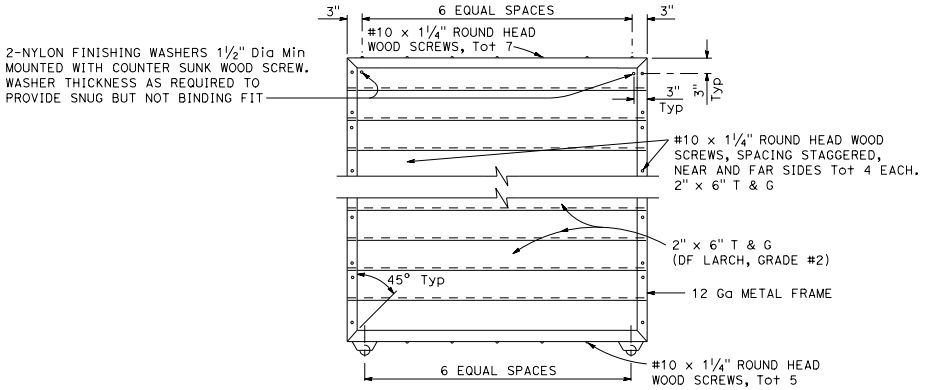
REGISTERED PROFESSIONAL ENGINEER
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No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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PARTIAL ELEVATION (BACK)

For details not shown, see above.




ELEVATION - METAL FRAME

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON FOOTING OR PILE CAP 5'-0" ACCESS GATE DETAILS (2)

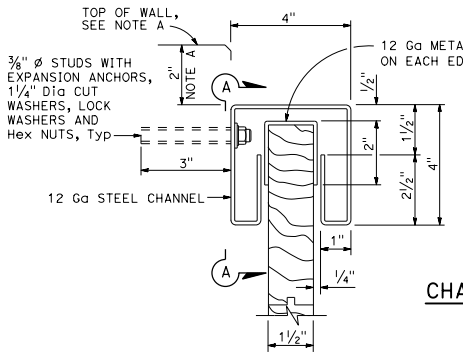
NO SCALE

B15-11

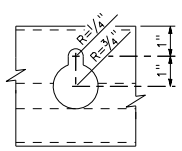
7-1-25

2025 STANDARD PLAN B15-11

Return to Table of Contents

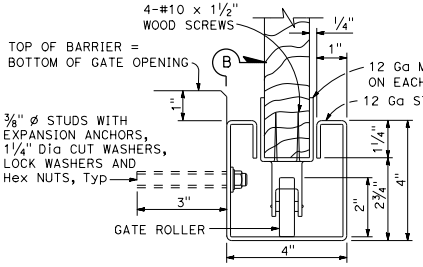



DETAIL "A"




SECTION A-A

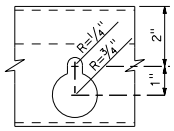
CHANNEL MOUNTING HOLE




DETAIL "B"

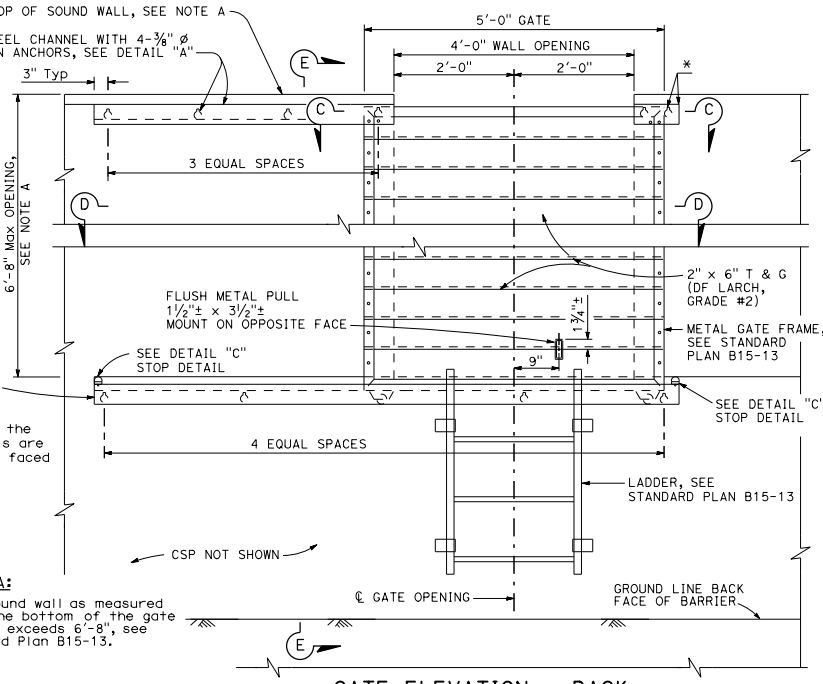
9'-9" LONG CHANNEL ATTACHED WITH 5-3/8" Ø STUDS, SEE DETAIL "B"

**NOTE:**
Those blocks upon which the supporting steel channels are mounted shall be smooth faced on the mounted side.




SECTION B-B

CHANNEL MOUNTING HOLE

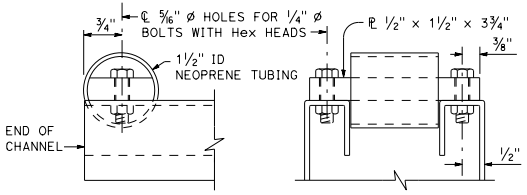



**NOTE A:**
When sound wall as measured from the bottom of the gate opening exceeds 6'-8", see Standard Plan B15-13.

GATE ELEVATION - BACK

* 9" long channel attached with 2-3/8" Ø studs, see DETAIL "A".

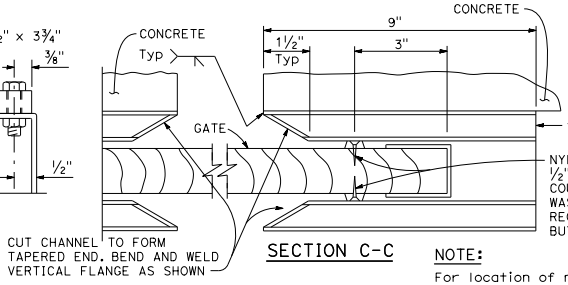
**NOTE:**
1. Gate mounted on sloping grade shall be oriented to be in closed position when at lower grade point.




SIDE VIEW

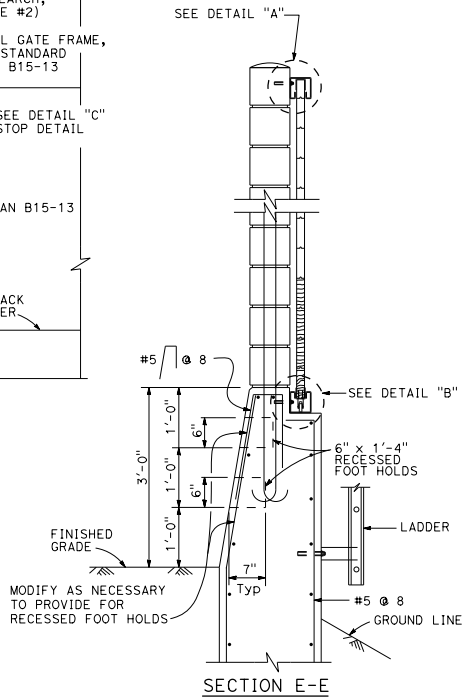
END VIEW

DETAIL "C" STOP DETAIL



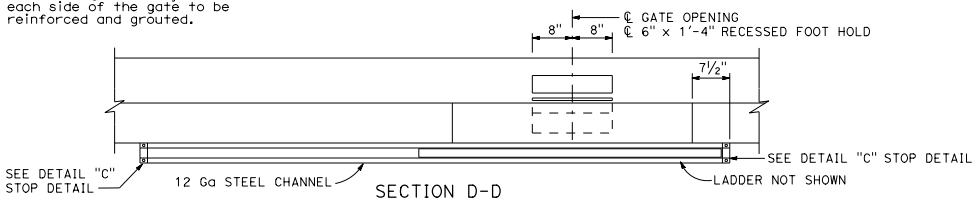

SECTION C-C

**NOTE:**
For location of nylon finishing washers, see Standard Plan B15-13.




SECTION E-E

**NOTE:**
Two masonry cells adjacent to each side of the gate to be reinforced and grouted.




SECTION D-D

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK ON BARRIER
# 5'-0" ACCESS GATE
# DETAILS (1)

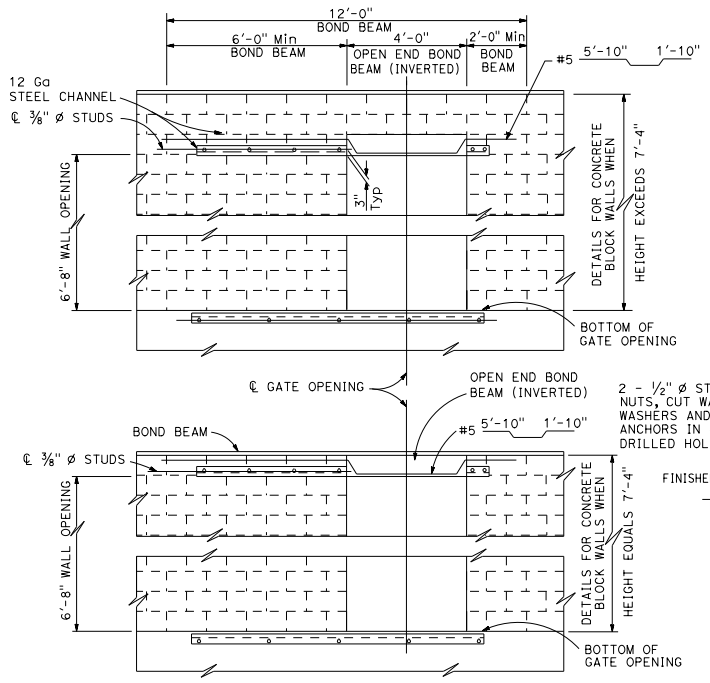
NO SCALE

**B15-12**

7-1-25

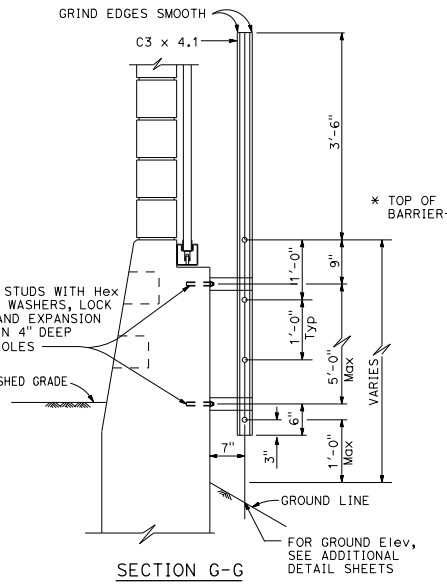
2025 STANDARD PLAN B15-12

Return to Table of Contents

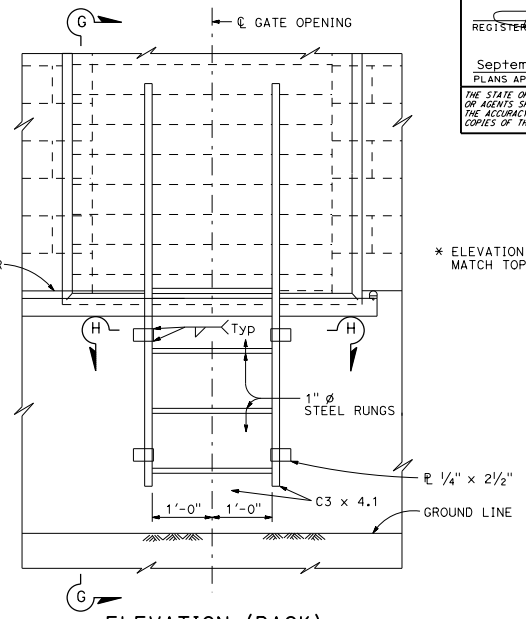



## PART ELEVATION (BACK)

For details not shown, see above.

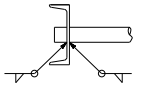



## SECTION G-G

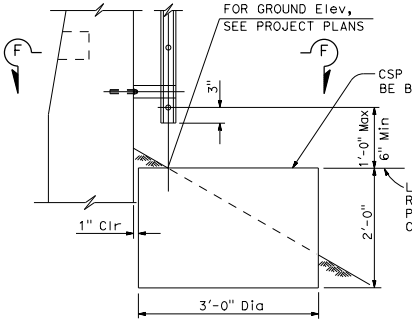



## ELEVATION (BACK)

* ELEVATION OF CENTERLINE OF TOP RUNG TO MATCH TOP OF CONCRETE BARRIER ELEVATION.

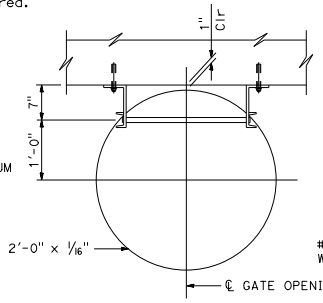


## DETAIL "A"

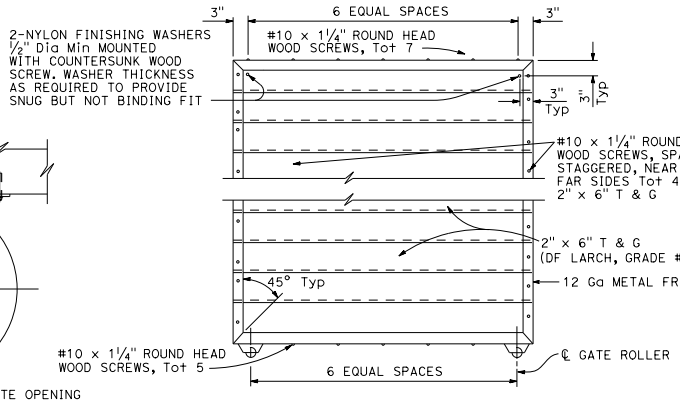



**NOTE:**
CSP landing required when slope of ground behind barrier is steeper than 8:1. See additional detail sheets for location where required.

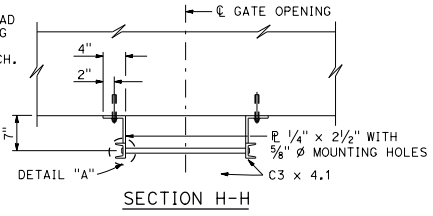
## CORRUGATED STEEL PIPE LANDING DETAILS




## SECTION F-F




## ELEVATION - METAL FRAME




## SECTION H-H

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK ON BARRIER
# 5'-0" ACCESS GATE
# DETAILS (2)

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Aiman Malak No. C73369 Exp. 12-31-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER * STATE OF CALIFORNIA *
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**B15-13**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

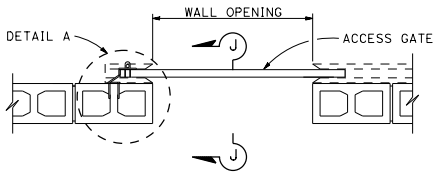
REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

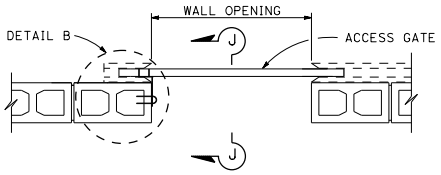
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REGISTERED PROFESSIONAL ENGINEER — Aiman Malak — No. C73369 — Exp. 12-31-26 — CIVIL — STATE OF CALIFORNIA



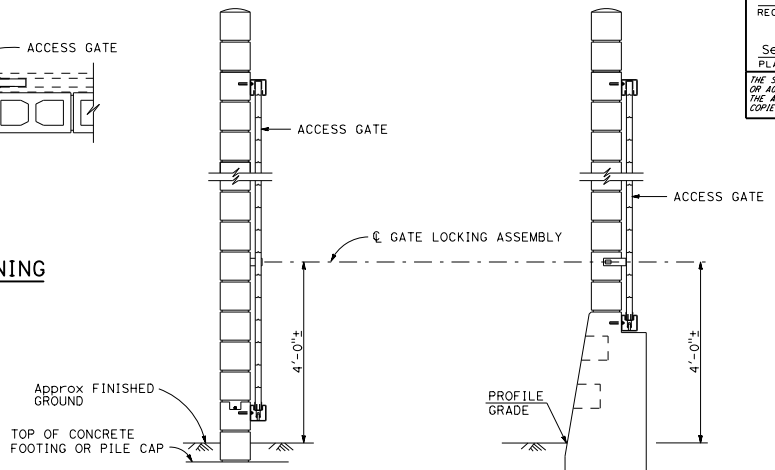

PLAN

LOCK ON
GATE SIDE OF WALL




PLAN

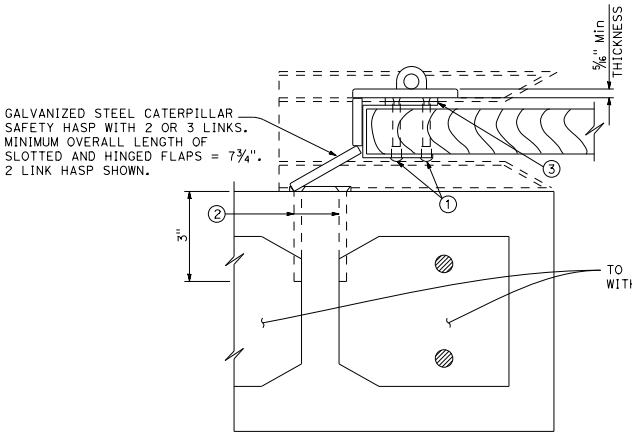
LOCK ON
INSIDE OF WALL OPENING



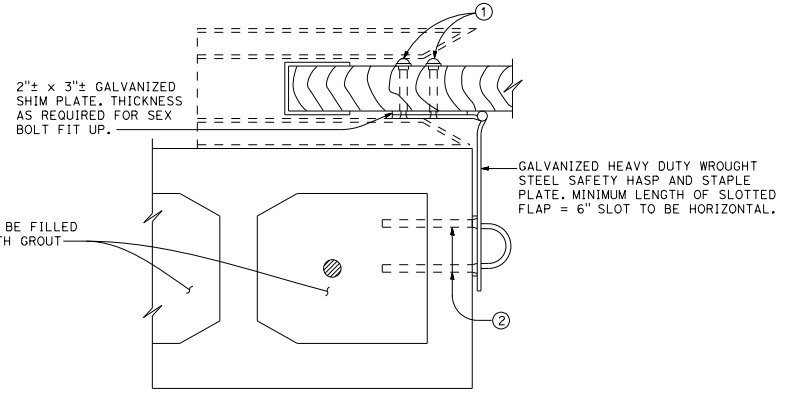

MASONRY ON FOOTING
OR PILE CAP

MASONRY ON BARRIER

SECTION J-J




DETAIL A




DETAIL B

NOTES:

1. Masonry anchors to be installed after the grout in the block cells has attained specified strength.
2. The Contractor may submit alternative gate locking assemblies for approval by the Engineer.
3. See other sheets for gate details.

① 4 - SEX BOLTS WITH ¼" - 20 FLAT HEAD CORROSION RESISTANT MACHINE SCREWS.

② 4 - ¼" ø x 3" LONG FLAT HEAD SLEEVE TYPE CORROSION RESISTANT MASONRY ANCHORS.

③ GALVANIZED SHIM PLATE. SIZE AS REQUIRED TO MATCH HASP STAPLE PLATE. THICKNESS AS REQUIRED FOR SEX BOLT FIT UP.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL
# MASONRY BLOCK
# ACCESS GATE LOCKING DETAILS

NO SCALE

B15-14

7-1-25

Return to Table of Contents

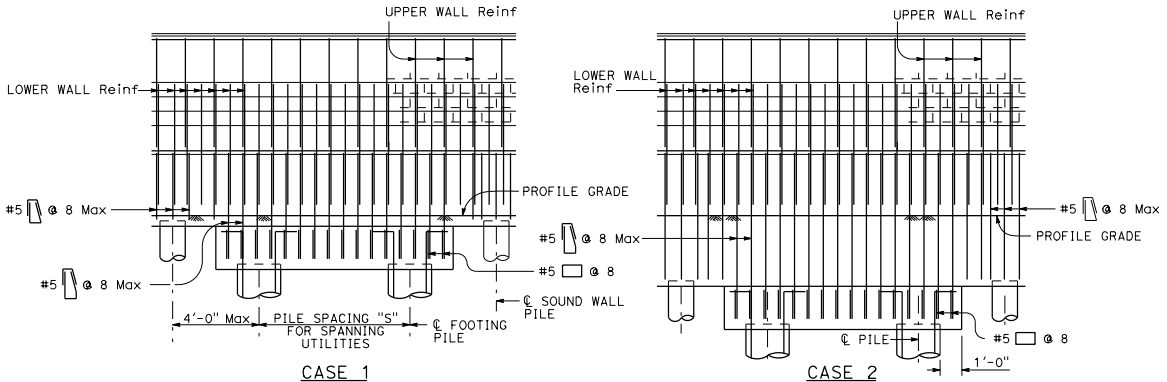
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Aiman Malak
No. C73369
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

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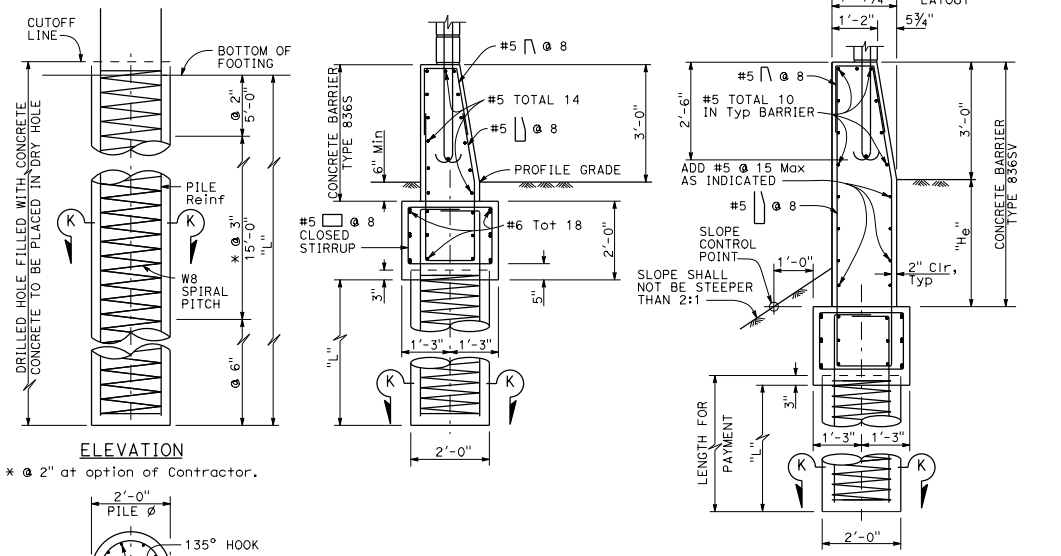

CASE 1

For details not shown, see Case 2.
See Note 1

CASE 2

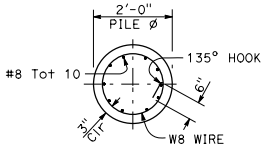
For details not shown, see Case 1.
See Note 1

## PART ELEVATIONS




ELEVATION

* @ 2" at option of Contractor.




SECTION K-K

CASE 1

Level ground ±10% on both sides of barrier.
For details not shown, see Case 2.

CASE 2

Level ground ±10% at the traffic side of barrier and sloping ground on the opposite side.
For details not shown, see Case 1.

## BARRIER SECTIONS

## DESIGN NOTES:

**DESIGN**

AASHTO LRFD Bridge Design Specifications,
8th Edition 2017 with California Amendment,
Preface date April 2019
TMS 402-16
2019 California Building Code

| DESIGN WIND LOAD | DESIGN SEISMIC LOAD | DESIGN IMPACT LOAD |
|---|---|---|
| 36.5 psf | 0.57 Dead load | TL-3 |

**DESIGN LIVE LOAD SURCHARGE**

240 psf surcharge on level ground surface

**REINFORCED CONCRETE AND CONCRETE MASONRY**

$f'_c$ = 3.6 ksi
$f_y$ = 60 ksi
$f'_m$ = 2000 psi *
$f'_m$ = 2500 psi for high-strength blocks only *

* Provide materials to achieve the net compressive strength of concrete masonry unit equal or greater than the specified $f'_m$.

**CASE 1 : PILE DATA TABLE**

| MAXIMUM H | ø = 25 | | ø = 30 | | ø = 35 | | MAXIMUM H |
|---|---|---|---|---|---|---|---|
| | S | L | S | L | S | L | |
| 8'-4" | 16'-0" | 13'-6" | 16'-0" | 10'-0" | 16'-0" | 8'-0" | 8'-4" |
| 10'-4" | 16'-0" | 14'-0" | 16'-0" | 10'-6" | 16'-0" | 8'-6" | 10'-4" |
| 12'-4" | 16'-0" | 14'-6" | 16'-0" | 11'-0" | 16'-0" | 8'-6" | 12'-4" |
| 14'-4" | 16'-0" | 15'-0" | 16'-0" | 11'-6" | 16'-0" | 9'-0" | 14'-4" |
| 16'-4" | 16'-0" | 15'-6" | 16'-0" | 12'-0" | 16'-0" | 9'-6" | 16'-4" |

**CASE 2 : PILE DATA TABLE**

| $H_e$ | H | ø = 30 Min | | ø = 35 Min | | H |
|---|---|---|---|---|---|---|
| | | S | L | S | L | |
| 1'-0" | 8'-4" | 16'-0" | 18'-0" | 16'-0" | 13'-6" | 8'-4" |
| | 10'-4" | 16'-0" | 19'-0" | 16'-0" | 14'-6" | 10'-4" |
| | 12'-4" | 16'-0" | 19'-6" | 16'-0" | 15'-6" | 12'-4" |
| | 14'-4" | 16'-0" | 20'-6" | 16'-0" | 16'-6" | 14'-4" |
| | 16'-4" | 16'-0" | 21'-6" | 16'-0" | 17'-6" | 16'-4" |
| 2'-0" | 8'-4" | 16'-0" | 20'-0" | 16'-0" | 15'-0" | 8'-4" |
| | 10'-4" | 16'-0" | 20'-6" | 16'-0" | 16'-0" | 10'-4" |
| | 12'-4" | 16'-0" | 21'-6" | 16'-0" | 17'-0" | 12'-4" |
| | 14'-4" | 16'-0" | 22'-6" | 16'-0" | 18'-0" | 14'-4" |
| | 16'-4" | 14'-6" | 22'-6" | 16'-0" | 18'-6" | 16'-4" |
| 3'-0" | 8'-4" | 16'-0" | 22'-0" | 16'-0" | 16'-6" | 8'-4" |
| | 10'-4" | 15'-6" | 22'-6" | 16'-0" | 17'-6" | 10'-4" |
| | 12'-4" | 14'-0" | 22'-6" | 16'-0" | 18'-6" | 12'-4" |
| | 14'-4" | 13'-0" | 22'-6" | 15'-6" | 19'-0" | 14'-4" |
| | 16'-4" | 12'-0" | 22'-6" | 14'-0" | 19'-0" | 16'-4" |
| 4'-0" | 8'-4" | 12'-3" | 22'-6" | 15'-3" | 18'-0" | 8'-4" |
| | 10'-4" | 11'-6" | 22'-6" | 14'-3" | 18'-6" | 10'-4" |
| | 12'-4" | 10'-9" | 22'-6" | 13'-3" | 18'-6" | 12'-4" |
| | 14'-4" | 10'-0" | 22'-6" | 12'-3" | 18'-6" | 14'-4" |
| | 16'-4" | 9'-6" | 22'-6" | 11'-3" | 19'-0" | 16'-4" |

**NOTE:**

1. For wall reinforcement details, see Standard Plan B15-6.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SOUND WALL MASONRY BLOCK ON TYPE 836S/SV BARRIER ON PILE FOOTING FOR SPANNING UTILITIES

NO SCALE

**B15-15**

7-1-25

Return to Table of Contents

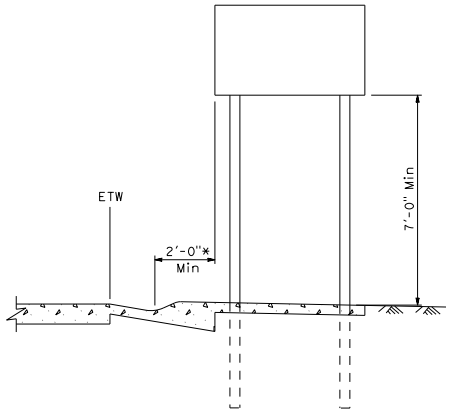
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

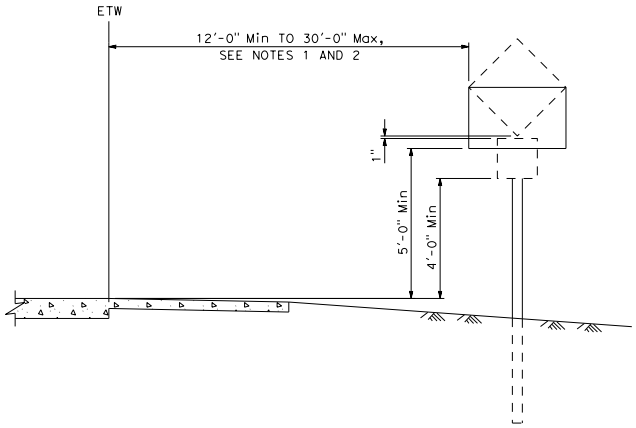
REGISTERED PROFESSIONAL ENGINEER — Mario Lozano-Cisneros — No. C94626 — Exp. 3-31-27 CIVIL — STATE OF CALIFORNIA

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URBAN LOCATIONS

* 1'-0" Min where lateral clearance limited




RURAL LOCATIONS

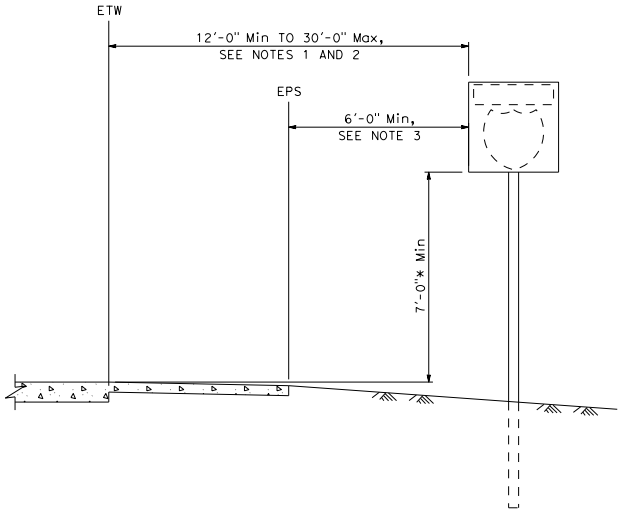
## CONVENTIONAL HIGHWAYS AND INTERCHANGE AREAS

NOTES:

1. When clear roadside recovery areas are provided, signs shall be placed as far from the edge of traveled way as possible, up to a maximum of 30'-0". When possible, they shall be placed in protected locations.
2. Signs in medians shall be placed at midpoint of median up to a maximum distance of 30'-0" from edge of traveled way. When appropriate, signs for opposing directions shall be placed back to back.
3. Does not apply at locations where minimum horizontal distance is not reasonable due to terrain characteristics, steep slopes, roadway features, or when signs are installed on structures or signal or lighting standards.

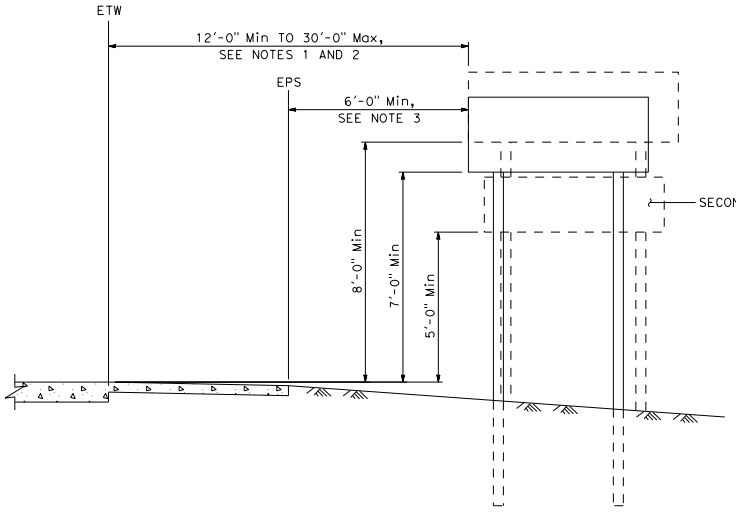
ABBREVIATION:

EPS - Edge of Paved Shoulder




REGULATORY AND WARNING SIGNS AND ROUTE SHIELDS

* 5'-0" Min at 30'-0" from ETW




GUIDE SIGNS

## FREEWAY AND EXPRESSWAY LOCATIONS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE SIGNS TYPICAL INSTALLATION DETAILS No. 1

NO SCALE

RS1

7-1-25

2025 STANDARD PLAN RS1

Return to Table of Contents

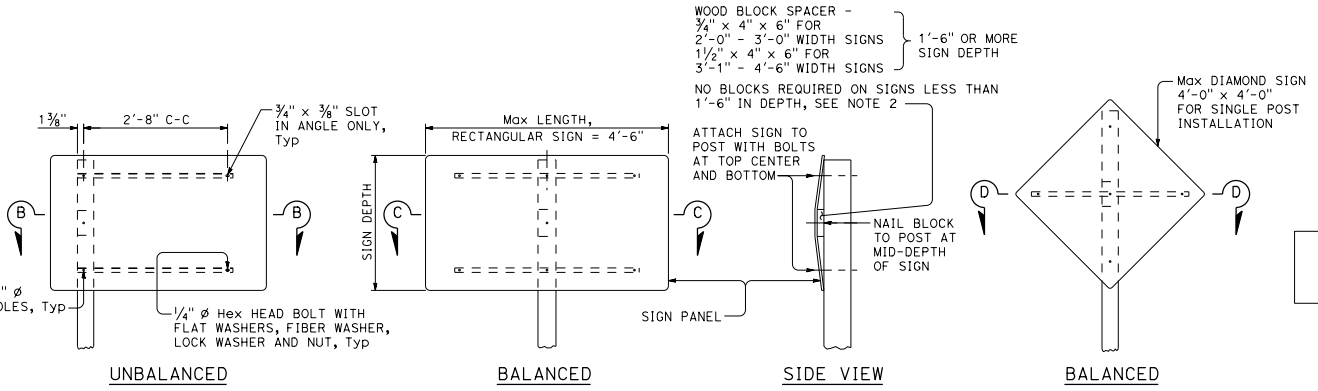
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

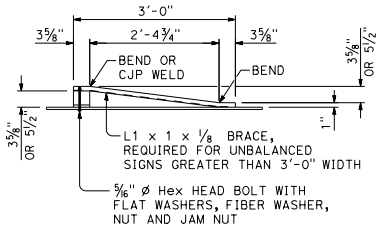
REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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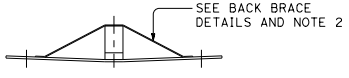



## SINGLE POST INSTALLATION

See Note 5 regarding breakaway feature for single post installations.

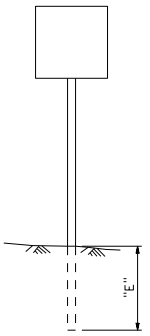



SECTION B-B




SECTION C-C

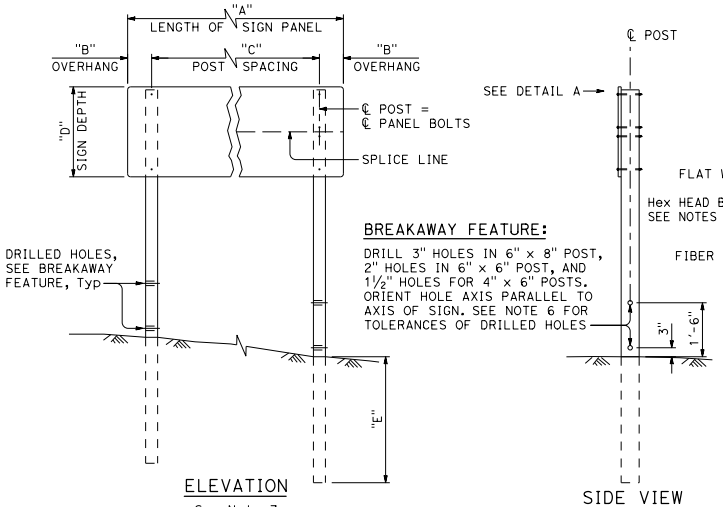
SECTION D-D




POST EMBEDMENT

| POST EMBEDMENT | |
|---|---|
| POST SIZE | "E" |
| 4" x 4" | 3'-6" |
| 4" x 6" | 4'-6" |
| 6" x 6" | 5'-0" |
| 6" x 8" | 6'-0" |

| POST SPACING TABLE | | |
|---|---|---|
| SIGN PANEL LENGTH "A" | SIGN PANEL OVERHANG "B" | POST SPACING "C" |
| 4'-6" | 6" | 3'-6" |
| 4'-8" TO 5'-6" | 7" TO 1'-0" | 3'-6" |
| 6'-0" & 6'-6" | 1'-0" & 1'-3" | 4'-0" |
| 7'-0" & 7'-6" | 1'-3" & 1'-6" | 4'-6" |
| 8'-0" | 1'-6" | 5'-0" |
| 8'-6" | 1'-8" | 5'-2" |
| 9'-0" | 1'-10" | 5'-4" |
| 9'-6" | 1'-11" | 5'-8" |
| 10'-0" | 2'-0" | 6'-0" |
| 10'-6" | 2'-0" | 6'-6" |
| 11'-0",11'-6",12'-0" | 2'-0", 2'-3", 2'-6" | 7'-0" |
| 12'-6" | 2'-6" | 7'-6" |
| 13'-0" | 2'-6" | 8'-0" |
| 13'-6", 14'-6" | 2'-6", 3'-0" | 8'-6" |
| 14'-0", 15'-0" | 2'-6", 3'-0" | 9'-0" |
| 15'-6", 16'-0" | 3'-0", 3'-3" | 9'-6" |
| 16'-6" | 3'-3" | 10'-0" |
| 17'-0", 17'-6" | 3'-3", 3'-6" | 10'-6" |
| 18'-0", 18'-6" | 3'-6", 3'-9" | 11'-0" |
| 19'-0" | 3'-9" | 11'-6" |
| 19'-6", 20'-0" | 3'-9", 4'-0" | 12'-0" |
| 20'-6", 21'-0" | 4'-0", 4'-3" | 12'-6" |
| 21'-6" | 4'-3" | 13'-0" |
| 22'-0", 22'-6" | 4'-3", 4'-6" | 13'-6" |
| 23'-0" | 4'-6" | 14'-0" |
| 23'-6", 24'-0" | 4'-6", 4'-9" | 14'-6" |



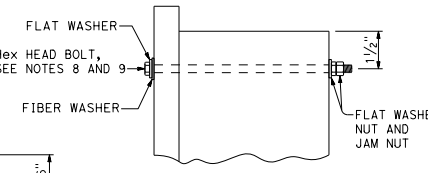

ELEVATION
See Note 7

SIDE VIEW

TWO POST INSTALLATION

**BREAKAWAY FEATURE:**

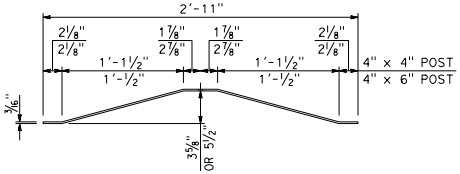
DRILL 3" HOLES IN 6" x 8" POST, 2" HOLES IN 6" x 6" POST, AND 1 1/2" HOLES FOR 4" x 6" POSTS. ORIENT HOLE AXIS PARALLEL TO AXIS OF SIGN. SEE NOTE 6 FOR TOLERANCES OF DRILLED HOLES



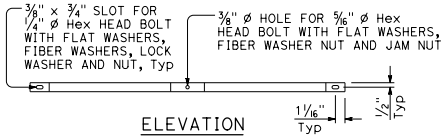

DETAIL A

**NOTES:**

1. Place long dimension of post cross section normal to sign axis, see Section C-C.
2. Balanced single post installations of unframed single sheet aluminum panel signs shall have block spacers if 1'-6" or more in depth and a combination of block spacers and back braces if 1'-6" or more in depth and 2'-10" or more in width. Sign panels less than 1'-6" in depth and 2'-10" or more in width shall have back braces only.
3. For post size see sign layout, format or quantity sheets.
4. Balanced single post installations of Laminated Panel and Framed single sheet panel signs require back braces when 2'-10" or more in length.
5. Breakaway feature for single post installation shall be the same as the breakaway feature shown for the two post installation.
6. Tolerance for diameter of drilled holes in breakaway feature is ±1/8".
7. Bolt hole layout is dependent on type of panel. Drill holes in post to match panel.
8. 5/16" ø for single sheet aluminum panel signs.
9. 3/8" ø for laminated panel signs or framed single sheet aluminum panel signs.




PLAN




ELEVATION

## BACK BRACE DETAILS

See Note 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE SIGNS WOOD POST TYPICAL INSTALLATION DETAILS No. 2

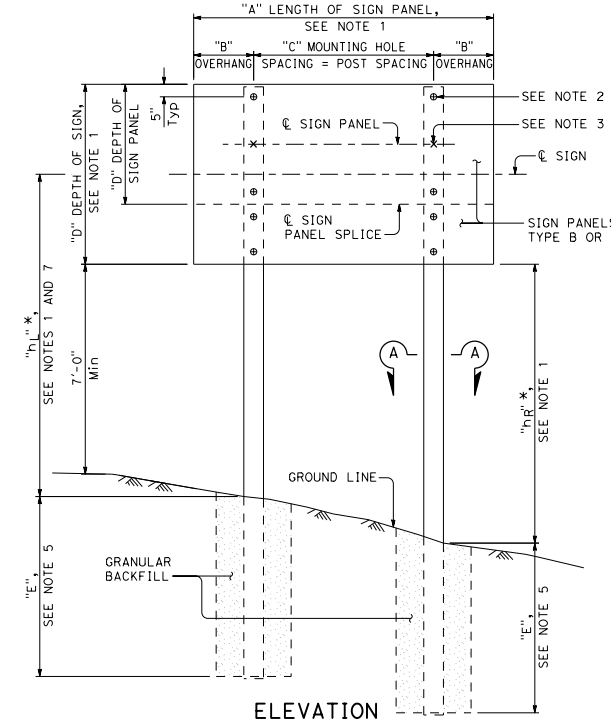
NO SCALE

**RS2**

2025 STANDARD PLAN RS2

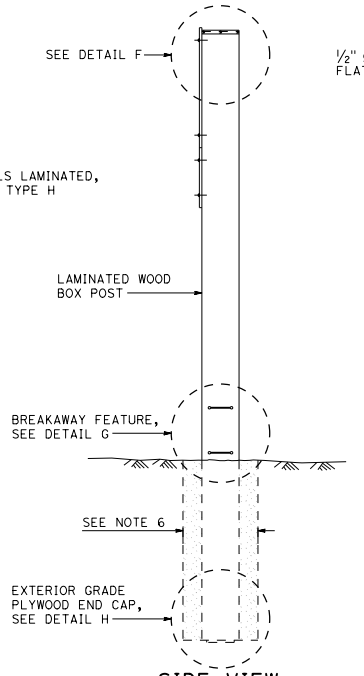
7-1-25

Return to Table of Contents

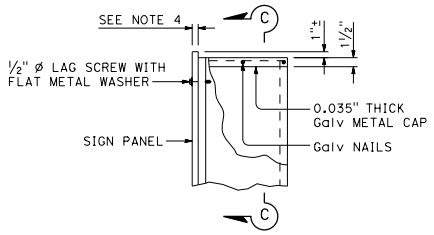



ELEVATION

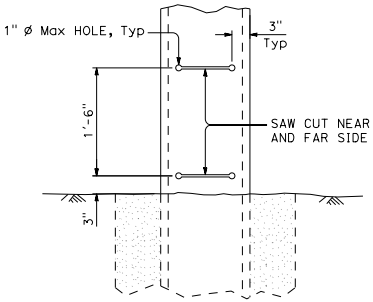
See Table 1 for post spacing "C" and overhang "B".



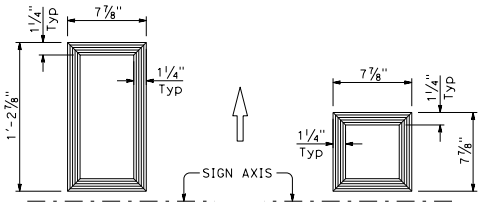

SIDE VIEW




DETAIL F

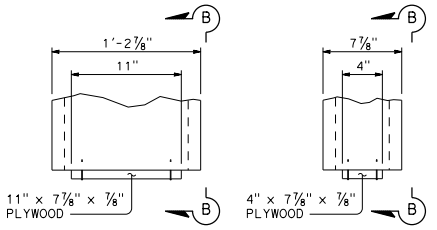



DETAIL G

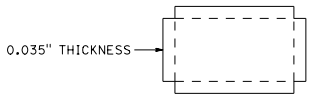



TYPE L POST TYPE M POST

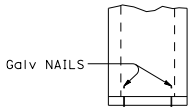
SECTION A-A



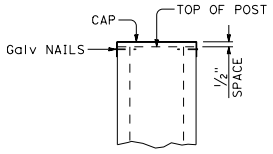

TYPE L POST TYPE M POST




Galv METAL CAP




SECTION B-B




SECTION C-C

DETAIL H

| TABLE 1 | | |
|---|---|---|
| SIGN PANEL LENGTH (SEE NOTE 1) "A" | SIGN PANEL OVERHANG "B" | MOUNTING HOLE SPACING "C" |
| 8'-0" | 1'-6" | 5'-0" |
| 9'-0" | 1'-10" | 5'-4" |
| 10'-0" | 2'-0" | 6'-0" |
| 11'-0" | 2'-0" | 7'-0" |
| 12'-0" | 2'-6" | 7'-0" |
| 13'-0" | 2'-6" | 8'-0" |
| 14'-0" | 2'-6" | 9'-0" |
| 15'-0" | 3'-0" | 9'-0" |
| 16'-0" | 3'-3" | 9'-6" |
| 17'-0" | 3'-3" | 10'-6" |
| 18'-0" | 3'-6" | 11'-0" |
| 19'-0" | 3'-9" | 11'-6" |
| 20'-0" | 4'-0" | 12'-0" |
| 21'-0" | 4'-3" | 12'-6" |
| 22'-0" | 4'-3" | 13'-6" |
| 23'-0" | 4'-6" | 14'-0" |
| 24'-0" | 4'-9" | 14'-6" |

NOTES:

1. See Project Plans for:
   a. Location of each sign.
   b. Length of sign panel "A".
   c. Depth of sign "D".
   d. Height "$h_L$" and "$h_R$" of centerline of sign above ground line at each post.
   e. Type of post, L and M.

   See Standard Plan RS1 for other details.
2. "⊕" Indicates location of ½" lag screws and existing holes in panels. Lag screws are to be embedded at least 1" into post using ⅝" diameter pilot holes.
3. "x" Indicates location of additional ½" lag screws required when the depth of sign panel (d) and the length of sign panel (A) are as follows:

| A | d |
|---|---|
| 17'-0" to 24'-0" | 5'-0" |
| 19'-0" to 24'-0" | 4'-6" |
| 21'-0" to 24'-0" | 4'-0" |
| 24'-0" | 3'-6" |

4. Type B laminated sign panels are 1" nominal thick for sign lengths of 15'-0" and less. Panels over 15'-0" in length and Type H laminated sign panels are 2½" nominal thick.
5. Embedment "E" for Type L post shall conform to the requirements in Table 2. Embedment for Type M posts shall be 6'-0" minimum.
6. Diameter of post holes for Type L posts shall be at least 2'-6". Diameter of post holes for Type M posts shall be at least 2'-0".
7. Dimensions shown on project plans are for fabrication. During installation adjust these dimensions to provide A level sign appoximately 7'-0" above roadway shoulder.
8. Minimum post embedment "E" for Type L post.

**TABLE 2** (SEE NOTE 8)

| "hL" OR "hR" | TOTAL SIGN AREA SQFT | | | | |
|---|---|---|---|---|---|
| | 40 TO 90 | 90+ TO 140 | 140+ TO 190 | 190+ TO 240 | 240+ TO 290 |
| 9'-0" TO 13'-0" | 6' | 6.5' | 7.5' | 8.5' | 9' |
| 13'-0"+ TO 17'-0" | 6' | 7' | 8' | 9' | 10' |
| 17'-0"+ TO 21'-0" | 6' | 7.5' | 9' | 9' | |
| 21'-0"+ TO 26'-0" | 7' | 8' | 9' | | |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

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September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE SIGNS
# LAMINATED WOOD BOX POST
# TYPICAL INSTALLATION
# DETAILS No. 3

NO SCALE

RS3

2025 STANDARD PLAN RS3

7-1-25

Return to Table of Contents

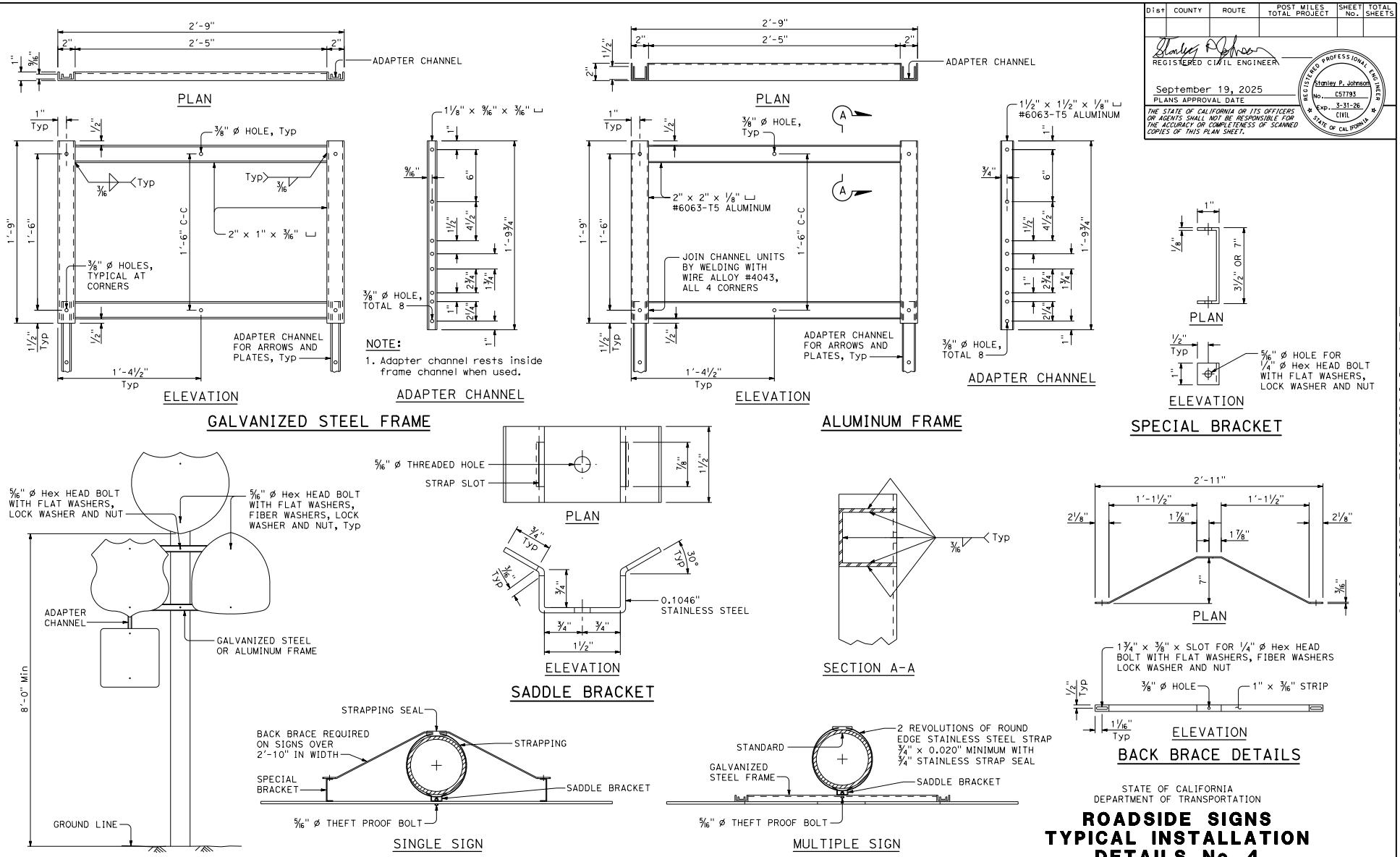
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DEPARTMENT OF TRANSPORTATION

# ROADSIDE SIGNS TYPICAL INSTALLATION DETAILS No. 4

NO SCALE

**RS4**

7-1-25

Return to Table of Contents

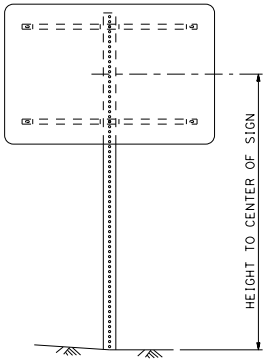
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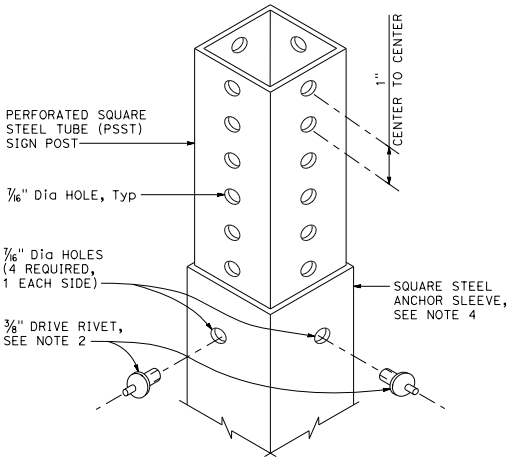
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SINGLE POST INSTALLATION

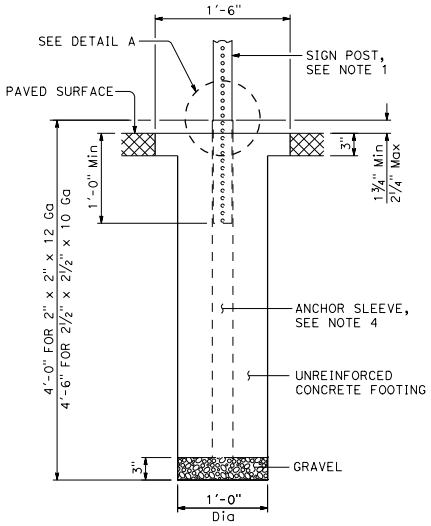
| POST SIZE | Max AREA (SQUARE FEET) OF SIGN | | | | | | | SLEEVE SIZE |
|---|---|---|---|---|---|---|---|---|
| 2" x 2" x 12 Ga | 10.8 | 8.9 | 7.6 | 6.6 | 5.9 | 5.3 | 4.8 | 2½" x 2½" x 7 Ga |
| 2½" x 2½" x 10 Ga | 20 | 18 | 16 | 14 | 12 | 11 | 10 | 3" x 3" x 7 Ga |
| HEIGHT TO CENTER OF SIGN SINGLE POST GROUND SIGNS 100 MPH WIND SPEED | 5'-0" | 6'-0" | 7'-0" | 8'-0" | 9'-0" | 10'-0" | 11'-0" | - |



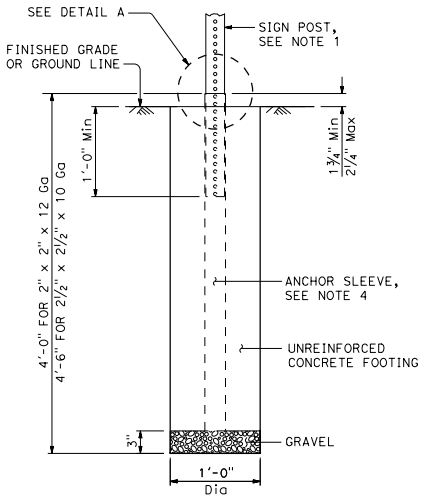

DETAIL A

NOTES:

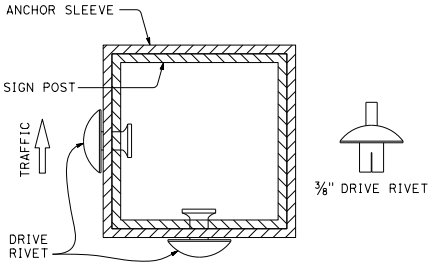
1. The sign post shall have 7/16" diameter perforations 1" on center on all four sides for the full length.
2. Use two drive rivets to fasten assembled sign and sign post into anchor sleeve. Install drive rivets or fastener alternative into the sides facing traffic.
3. All steel sign posts and anchor sleeves shall be galvanized.
4. All anchor sleeves shall be embedded in PCC.
5. For details not shown, see Standard Plans RS1 and RS2.
6. Steel post: fy = 60 ksi.



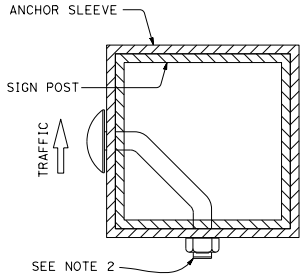

ANCHOR SLEEVE IN PAVED SURFACE




ANCHOR SLEEVE IN UNPAVED SURFACE




FASTENER




FASTENER ALTERNATIVE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE SIGN
# PSST POST
# TYPICAL INSTALLATION
# DETAILS No. 1

NO SCALE

RS5

7-1-25



Return to Table of Contents

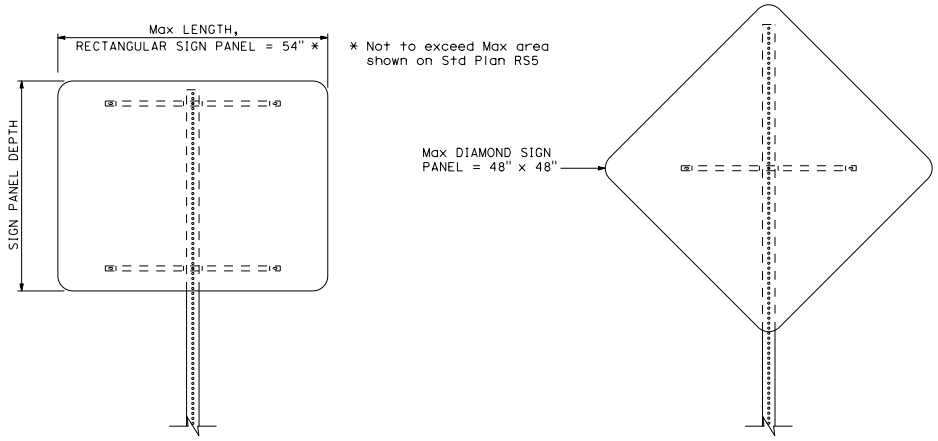
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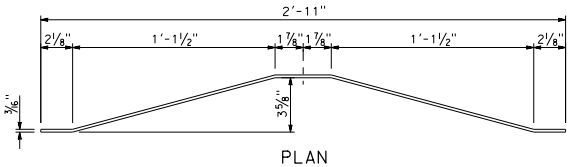

BALANCED
See Note 3

BALANCED
See Note 4

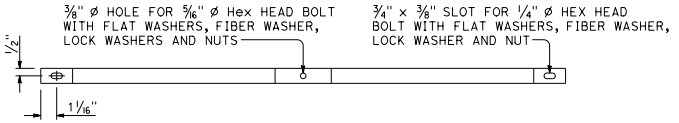
## SINGLE POST INSTALLATION

NOTES:

1. Balanced single post installations of single sheet aluminum panel signs require back braces when 2'-10" or more in length.
2. Wood block spacers are not required for signs mounted on metal posts.
3. Attach rectangular sign panel to sign post with bolts at the top and bottom. Center may be attached with either bolt or ⅜" drive rivets.
4. Attach diamond sign panel to sign post with bolt at center. Top and bottom may be attached with either bolts or ⅜" drive rivets.
5. For details not shown, see Standard Plans RS1 and RS2.



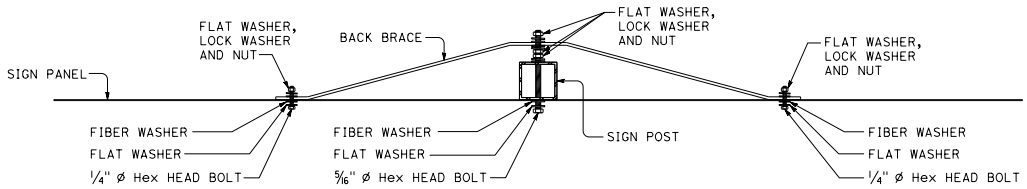

PLAN




ELEVATION

## BACK BRACE DETAIL

See note 1




## BACK BRACE MOUNTING DETAIL

See Note 1

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE SIGN PSST POST TYPICAL INSTALLATION DETAILS No. 2

NO SCALE

**RS6**

7-1-25

2025 STANDARD PLAN RS6

Return to Table of Contents

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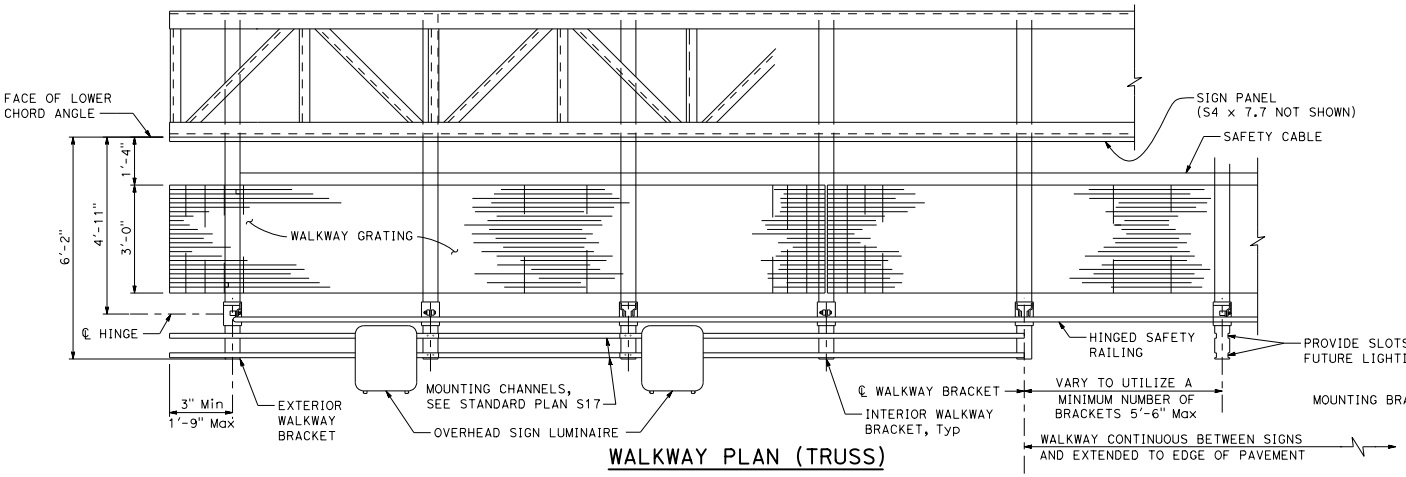
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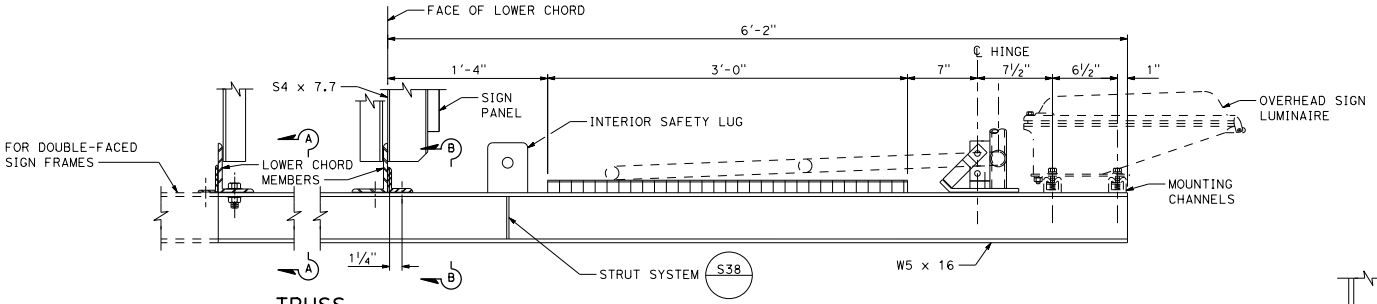
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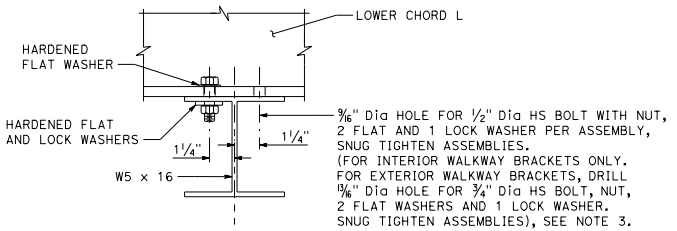



## WALKWAY PLAN (TRUSS)

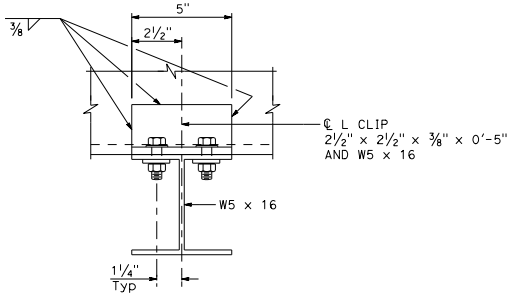



## TRUSS

## TYPICAL WALKWAY SECTION



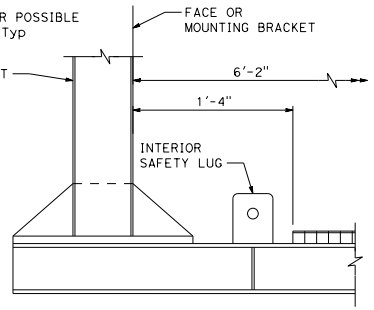

## SECTION A-A



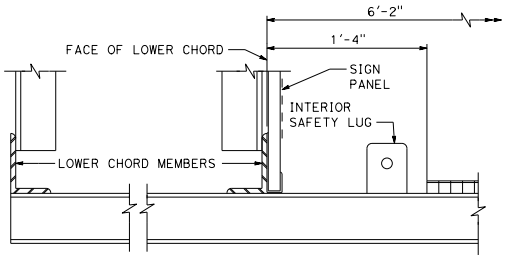

## SECTION B-B

NOTES:

1. For spacing of overhead sign luminaire, see Standard Plan ES-15A.
2. For safety lug details, see Standard Plan S17.
3. For double faced sign frames with double walkways, use a total 8 bolt assemblies per bracket.
4. This sheet applies to truss, tubular, and bridge mounted, but not versatile truss.




## TUBULAR AND BRIDGE MOUNTED




## BOX BEAM CLOSED TRUSS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS
# WALKWAY DETAILS No. 1

NO SCALE

**S16**

7-1-25

Return to Table of Contents

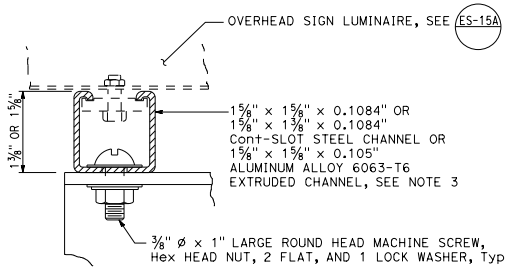
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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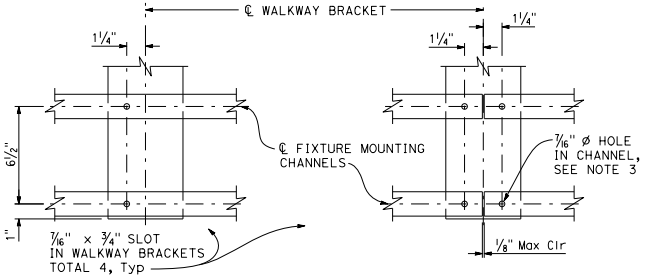
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## OVERHEAD SIGN LUMINAIRE MOUNTING CHANNEL DETAILS 1



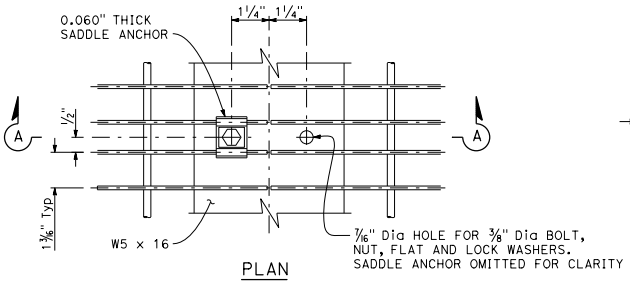

TYPICAL CONNECTION

CONNECTION AT SPLICE

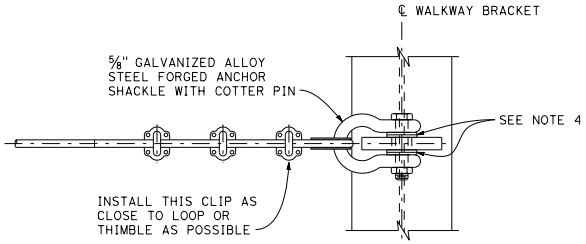
## OVERHEAD SIGN LUMINAIRE MOUNTING CHANNEL DETAILS 2

NOTES:

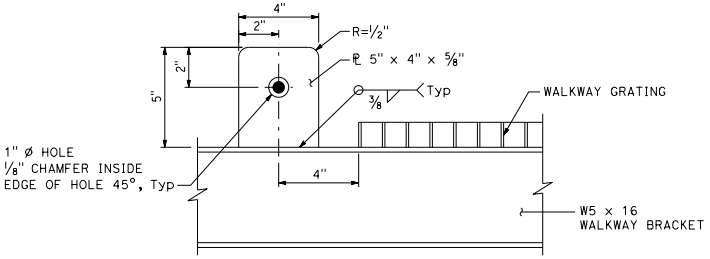
1. Welded type grating shall have 1¼" x ⅛" bearing bars at 1 3/16" centers with ¼" diameter (or equal) cross bars at 4" centers. If mechanical lock grating is used, it shall be equal in strength to the welded type. Alternate hold-down clips may be submitted for approval.
2. Walkway grating and light fixture mounting channels to be continuous (no splices) over as many walkway brackets as practical and consistent with fabrication, ease of handling and assembly.
3. Contractor may substitute 1⅝" x 1⅝" x 0.1084" cont-slot steel channel with pre-punched slots not larger than 9/16" x 3". Slots shall be at bottom of channel and shall be parallel to channel. Slots shall be spaced not closer than 4" center to center.
4. Place an equal amount of washers on each side to align cable with end lug without restricting shakle bolt rotation or contacting cable.
5. This sheet applies to truss, tubular, and bridge mounted, but not versatile truss.




PLAN

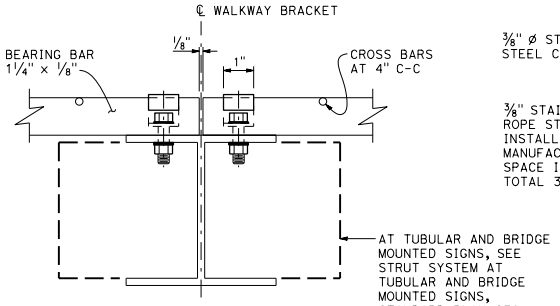



PLAN




## INTERIOR SAFETY LUG DETAIL

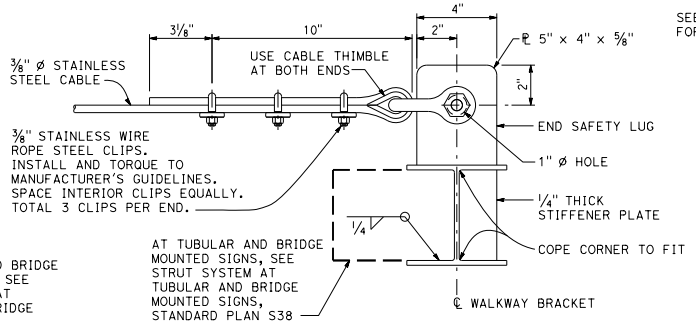
At every walkway bracket between exterior walkway brackets




SECTION A-A

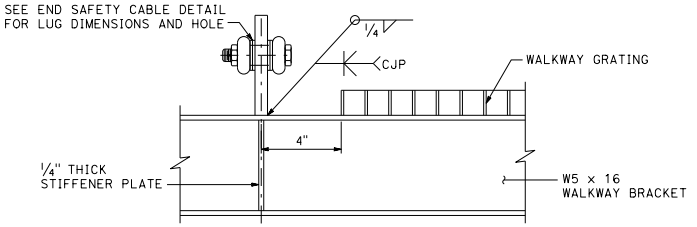
## WALKWAY GRATING DETAILS

Shown at splice




ELEVATION

## END SAFETY CABLE DETAIL




## END SAFETY LUG DETAIL

At exterior walkway brackets

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

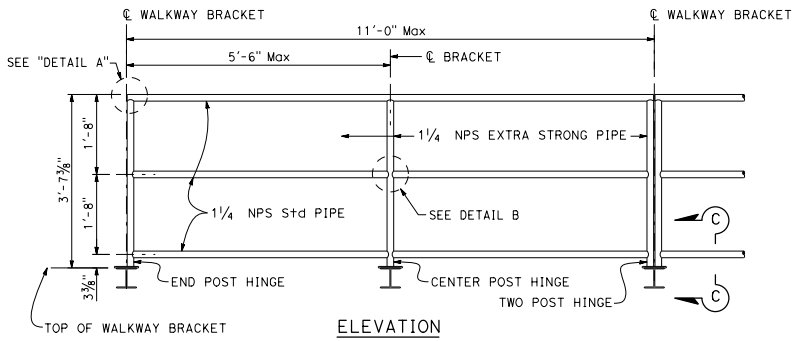
# OVERHEAD SIGNS
# WALKWAY DETAILS No. 2

NO SCALE

**S17**

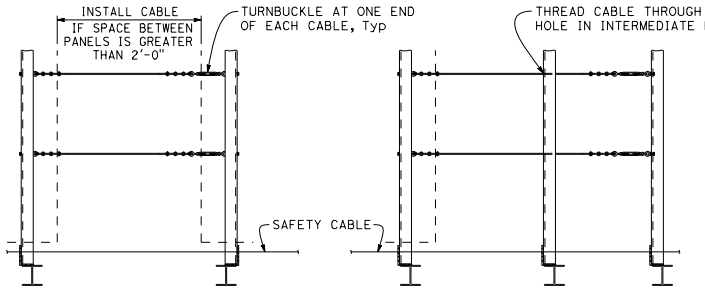
7-1-25

Return to Table of Contents




ELEVATION

## SAFETY RAILING




BETWEEN PANELS

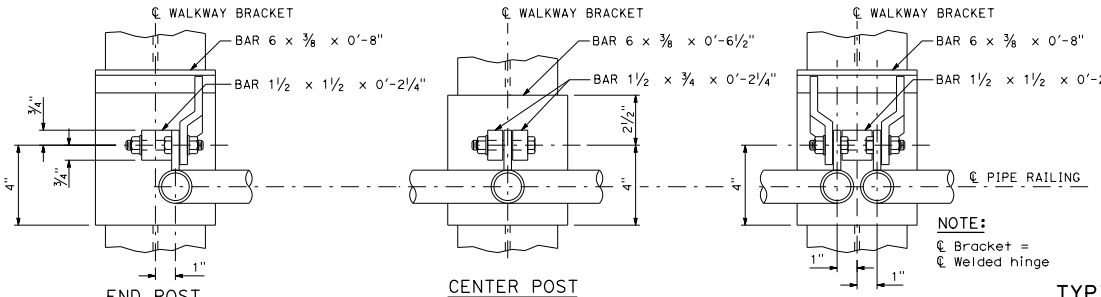
BEYOND PANELS

## UPPER SAFETY CABLE ELEVATION

For tubular structures

**NOTE:**

1. This sheet applies to truss, tubular, and bridge mounted, but not verstile truss.




END POST

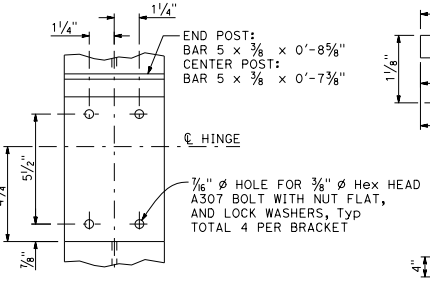
CENTER POST

PLAN

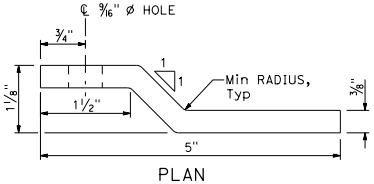
TWO POST

**NOTE:**
℄ Bracket =
℄ Welded hinge

## WELDED HINGE

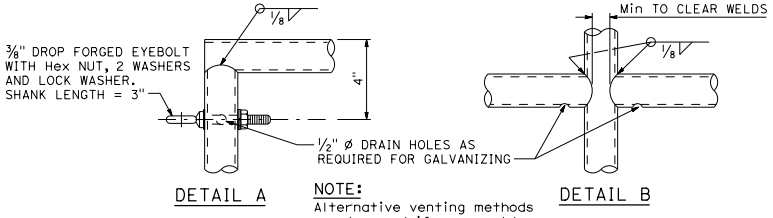



## TYPICAL BOLTED (ALTERNATIVE) HINGED CONNECTION




PLAN

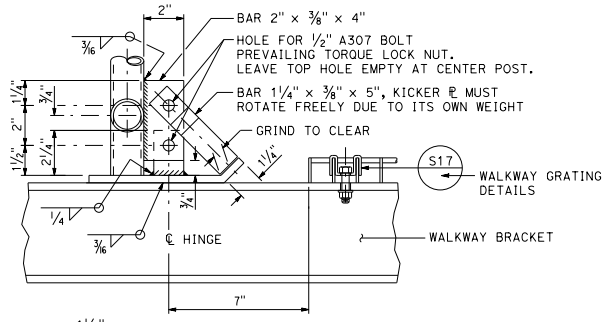
## KICKER BAR



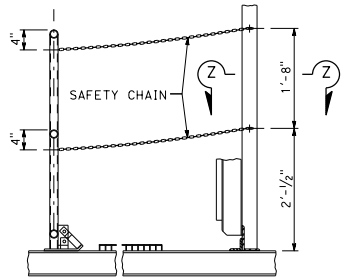

DETAIL A

DETAIL B

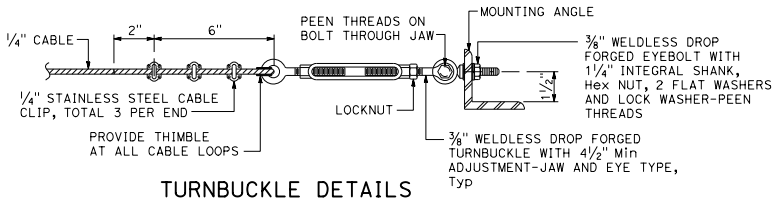
**NOTE:**
Alternative venting methods may be used if approved by the Engineer.



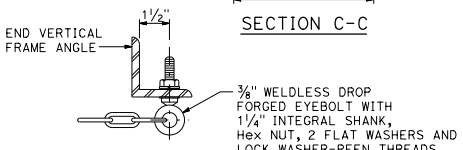

SECTION C-C




## CHAIN ASSEMBLY




## TURNBUCKLE DETAILS




SECTION Z-Z

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS WALKWAY SAFETY RAILING DETAILS

NO SCALE

**S18**

7-1-25



Return to Table of Contents

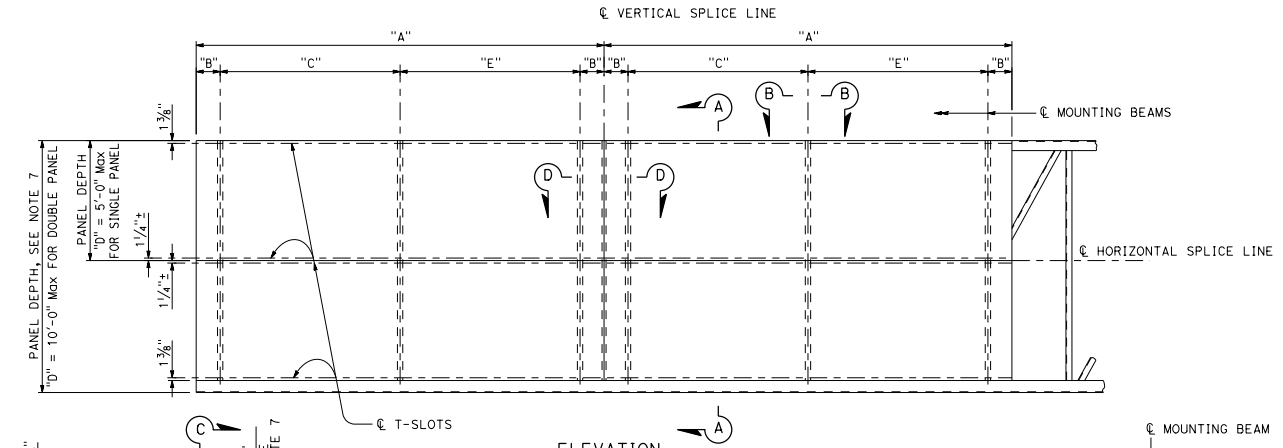
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

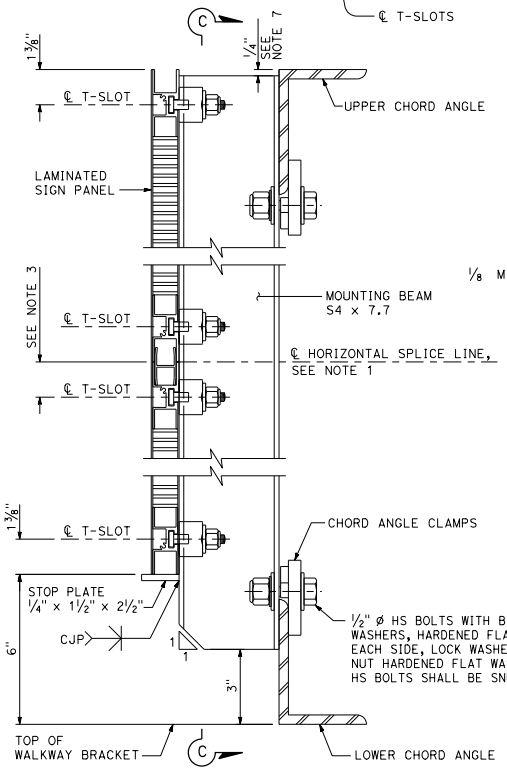
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

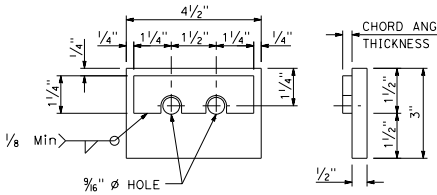
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ELEVATION
SIGN PANEL

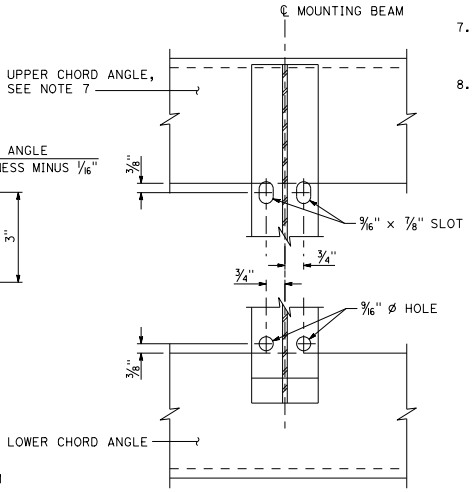



SECTION A-A

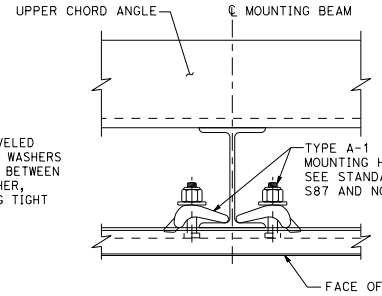



CHORD ANGLE CLAMP

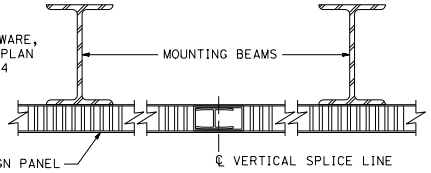
NOTE: May use machined single piece instead of two welded pieces.




SECTION C-C




SECTION B-B




SECTION D-D

NOTES:

1. The location of the horizontal splice line is dependent on the Contractor for signs greater than 60" in depth.
2. Mounting bolts and clamps are required on each side of the horizontal splice lines at each support beam.
3. Dimension varies from panel to panel. Average value approximate 1¼".
4. Torque stainless steel sign panel mounting bolts to 100 inch-pounds.
5. Chord angle clamp to be galvanized after fabrication.
6. The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.
7. 9'-2" and 10'-0" sign panel along with the mounting beams will project above the top chord truss member 10" and 1'-8" respectively. Attachment details shall be the same.
8. This sheet applies to truss, tubular, and bridge mounted, but not versatile truss.

**MOUNTING BEAM SPACING TABLE**

| SIGN PANEL LENGTH * | NUMBER MOUNTING BEAMS | SIGN PANEL OVERHANG | MOUNTING BEAM SPACING | |
|---|---|---|---|---|
| "A" | | "B" | "C" | "E" |
| 5'-0" | 2 | 0'-9" | 3'-6" | |
| 6'-0" | 2 | 1'-0" | 4'-0" | |
| 7'-0" | 2 | 1'-3" | 4'-6" | |
| 8'-0" | 2 | 1'-6" | 5'-0" | |
| 9'-0" | 2 | 1'-10" | 5'-6" | |
| 10'-0" | 2 | 2'-0" | 6'-0" | |
| 11'-0" | 2 | 2'-0" | 7'-0" | |
| 12'-0" | 2 | 2'-6" | 7'-0" | |
| 13'-0" | 2 | 2'-6" | 8'-0" | |
| 14'-0" | 2 | 2'-6" | 9'-0" | |
| 15'-0" | 2 | 3'-0" | 9'-0" | |
| 16'-0" | 3 | 0'-6" | 7'-6" | 7'-6" |
| 17'-0" | 3 | 1'-0" | 7'-6" | 7'-6" |
| 18'-0" | 3 | 1'-0" | 8'-0" | 8'-0" |
| 19'-0" | 3 | 1'-0" | 8'-6" | 8'-6" |
| 20'-0" | 3 | 1'-6" | 8'-6" | 8'-6" |
| 21'-0" | 3 | 1'-6" | 9'-0" | 9'-0" |
| 22'-0" | 3 | 2'-0" | 9'-0" | 9'-0" |
| 23'-0" | 3 | 2'-6" | 9'-0" | 9'-0" |
| 24'-0" | 3 | 3'-0" | 9'-0" | 9'-0" |

* Signs longer than 24'-0" are fabricated and mounted as adjoining single panels. The location of the vertical splice line will be determined by the Engineer.

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DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TRUSS SIGN MOUNTING DETAILS LAMINATED PANEL - TYPE A

NO SCALE

S19

7-1-25

Return to Table of Contents

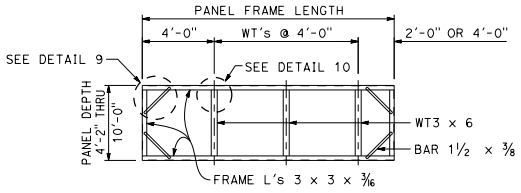
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

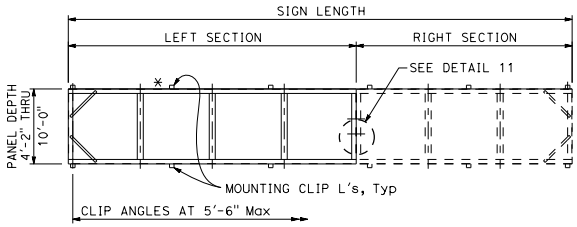
REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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## TYPICAL REMOVABLE FRAME

(4'-0" thru 20'-0")




## REMOVABLE FRAME GREATER THAN 20'-0"

* 9'-2" and 10'-0" sign panel frames will project above the top chord of the truss. In these cases the top clips shall be bolted to vertical frame members. See Standard Plan S22 for details.

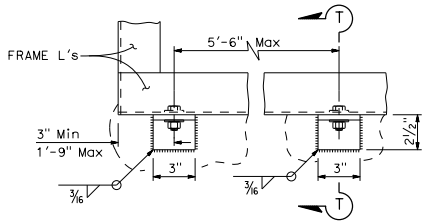
| SIGN LENGTH | LEFT SECTION | RIGHT SECTION |
|---|---|---|
| 22'-0" | 12'-0" | 10'-0" |
| 24'-0" | 12'-0" | 12'-0" |
| 26'-0" | 12'-0" | 14'-0" |
| 28'-0" | 16'-0" | 12'-0" |
| 30'-0" | 16'-0" | 14'-0" |
| 32'-0" | 16'-0" | 16'-0" |
| 34'-0" | 16'-0" | 18'-0" |
| 36'-0" | 20'-0" | 16'-0" |
| 38'-0" | 20'-0" | 18'-0" |
| 40'-0" | 20'-0" | 20'-0" |

NOTES:

Frames for signs greater than 20'-0" in length shall be fabricated in two sections with left section a multiple of 4'-0" in length. See table above.

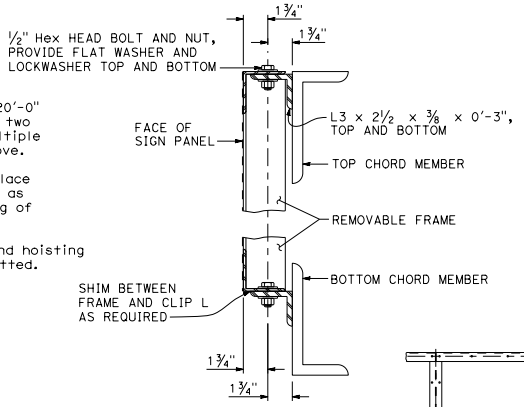
Sections shall be hoisted into place individually and bolted together as per Detail 11 prior to tightening of mounting clip bolts.

Bolting two sections together and hoisting simultaneously will not be permitted.




## FRAME MOUNTING DETAILS

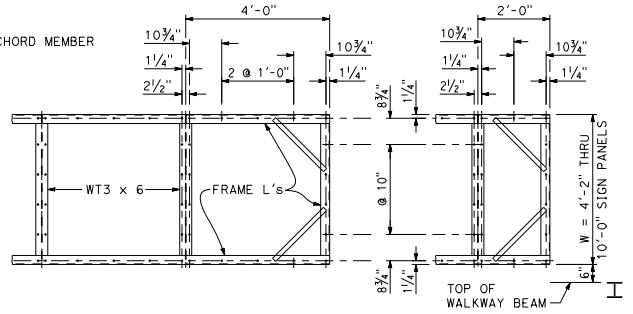
Details shown apply for sign panel frames ≤ 8'-4" deep. Mounting details for deeper panels shown on Standard Plan S22.




## SECTION T-T

NOTES:

1. Frames shall be all-welded construction.
2. Panel mounting holes shall be drilled by template. Sign panel may be considered as a template.
3. Drilled and tapped holes ¼" may be used where interference due to welds or structural members is encountered.
4. WT3 x 6 shall be flush with faces of frame angles.
5. Mounting clip angles shall be located such as to allow the top and bottom frame angles of the removable sign panel to lie on a straight horizontal line.
6. Holes for mounting removable sign panel frame may be slotted 1" maximum parallel to the axis of the sign.
7. WT3 x 6 may be crimped at ends to join frame angles. Fillet weld all around.
8. This sheet applies to truss, tubular, and bridge mounted, but not versatile truss.

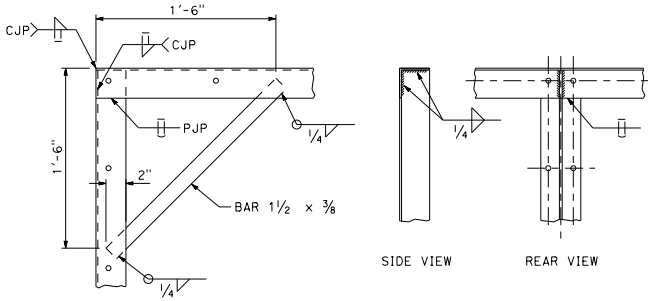



TYPICAL 4'-0" PANEL  TYPICAL 2'-0" PANEL

All holes ½" diameter maximum.

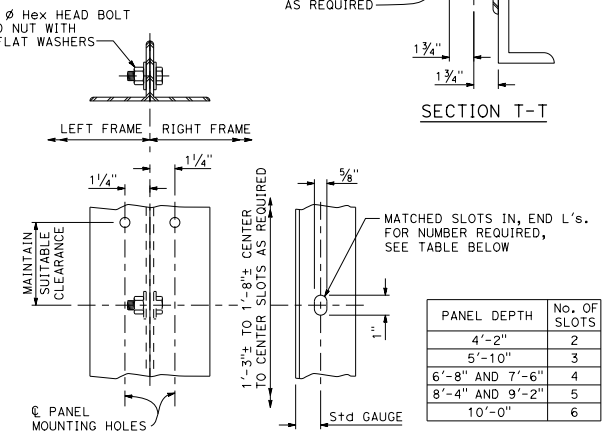
## MOUNTING HOLE SPACING SIGN PANEL AND FRAME

Hole spacing is for single sheet sign panels. For Overhead Formed Panels, see Standard S21.




DETAIL 9  DETAIL 10

## TYPICAL FRAME JOINT DETAILS




DETAIL 11

## FRAME TO FRAME CONNECTION DETAILS

| PANEL DEPTH | No. OF SLOTS |
|---|---|
| 4'-2" | 2 |
| 5'-10" | 3 |
| 6'-8" AND 7'-6" | 4 |
| 8'-4" AND 9'-2" | 5 |
| 10'-0" | 6 |

NOTE:

Panel mounting holes not shown. Panel lengths available in 2'-0" increments.

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DEPARTMENT OF TRANSPORTATION

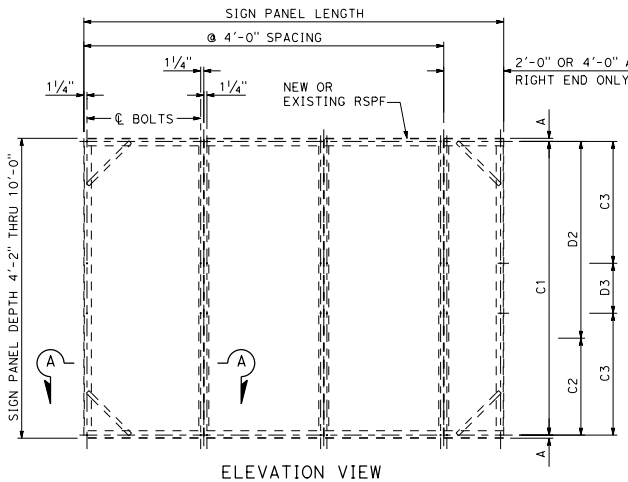
# OVERHEAD SIGNS
# STEEL FRAMES
# REMOVABLE SIGN PANEL FRAME

NO SCALE

**S20**

7-1-25

Return to Table of Contents




ELEVATION VIEW

## NEW OR EXISTING REMOVABLE SIGN PANEL FRAME MOUNTING HOLE SPACING

NOTE:

Sign panel mounting holes ½" ø maximum for ⅜" ø bolts.

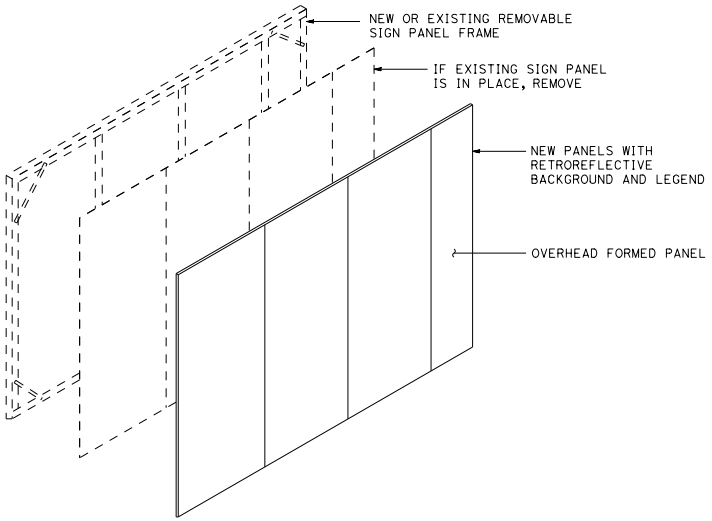
**TABLE 1**

MOUNTING BOLT SPACING

| PANEL DEPTH | A | 1 SPACE | 2 SPACES | | 3 SPACES | | |
|---|---|---|---|---|---|---|---|
| | | C1 | C2 | D2 | C3 | D3 | C3 |
| 50" | 1¼" | 3'-11½" | | | | | |
| 60" | 1¼" | | 2'-4¾" | 2'-4¾" | | | |
| 70" | 1¼" | | 1'-6¾" | 4'-¾" | | | |
| 80" | 1¼" | | 3'-2¾" | 3'-2¾" | | | |
| 90" | 1¼" | | 3'-2¾" | 4'-¾" | | | |
| 100" | 1¼" | | 4'-¾" | 4'-¾" | | | |
| 110" | 1¼" | | | | 3'-2¾" | 2'-6" | 3'-2¾" |
| 120" | 1¼" | | | | 4'-¾" | 1'-8" | 4'-¾" |

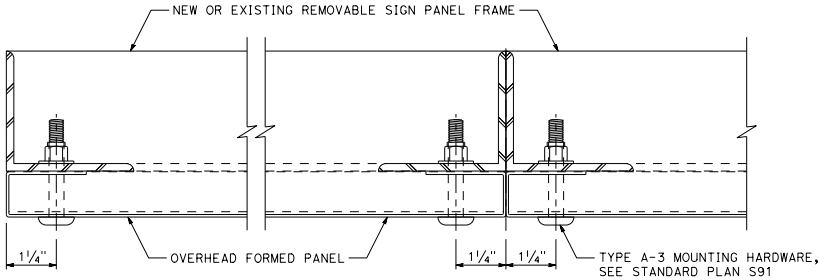
NOTES:

1. When constructing a new frame, refer to:
   a. Standard Plan S20 for structural details.
   b. Sign panels shall be considered as a template for drilling holes for mounting bolts.
2. This sheet applies to truss, tubular, and bridge mounted, but not versatile truss.




NOTE:

The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.




CORNER DETAIL

PANEL CONNECTION

SECTION A-A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS
# REMOVABLE SIGN PANEL FRAMES
# MOUNTING DETAILS

NO SCALE

**S21**

7-1-25



Return to Table of Contents

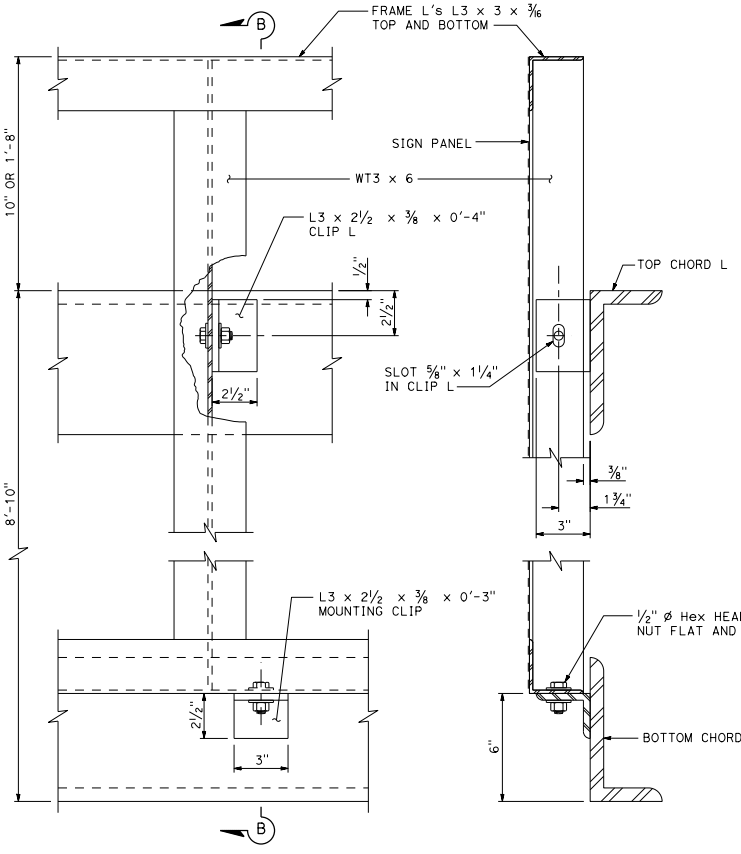
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

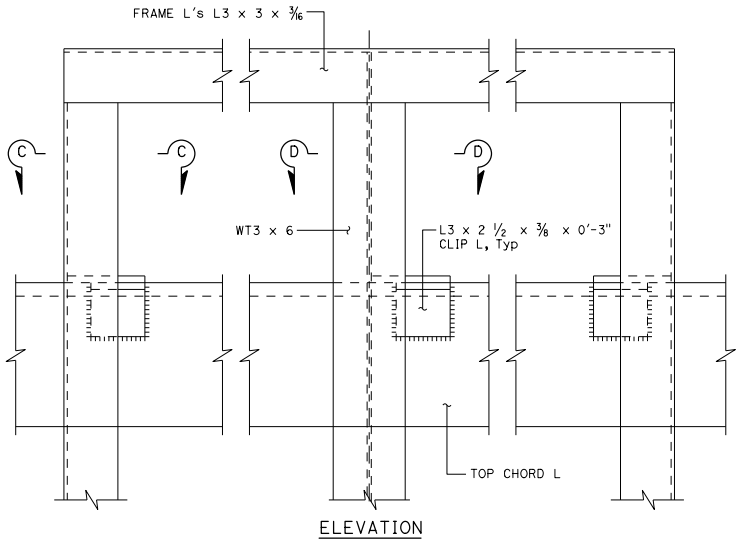
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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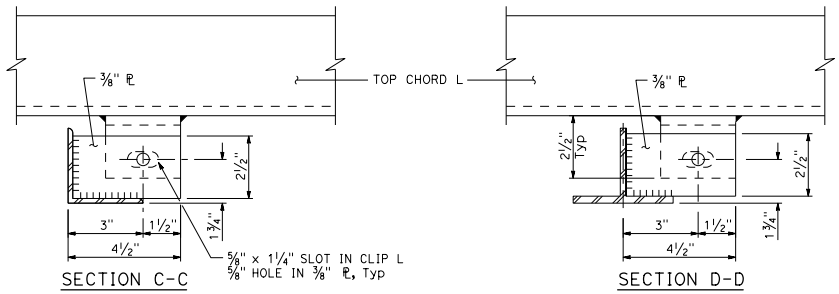



STEEL REMOVABLE SIGN PANEL FRAME

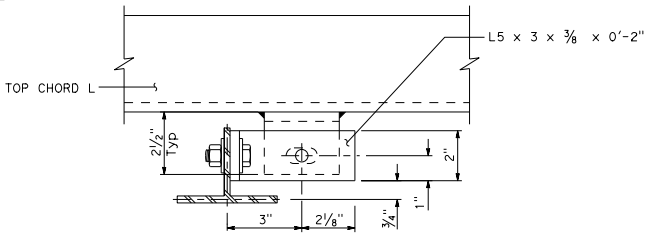



NOTES:

1. For Steel Removable Sign Panel Frame details, see Standard Plan S20.
2. Minimum fillet weld is 1/4" for clip angles welded to chord member of truss.
3. Maximum spacing of bottom clip angle is 5'-6".
4. Top clips required for each vertical member of Removable Sign Panel Frame.
5. This sheet applies to truss, tubular, and bridge mounted, but not versatile truss.




ALTERNATIVE CONNECTIONS AT TOP CHORD




BOLTED ALTERNATIVE CONNECTION AT TOP CHORD

For details not shown, see Sections C-C and D-D.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TRUSS REMOVABLE SIGN PANEL FRAMES 110" AND 120" SIGN PANELS

NO SCALE

S22

7-1-25

2025 STANDARD PLAN S22

Return to Table of Contents

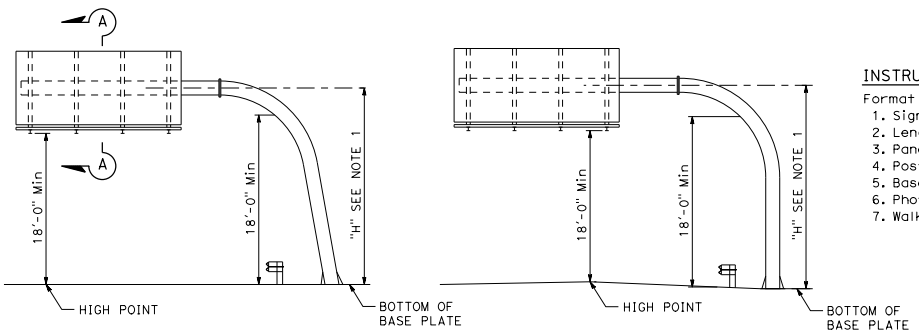
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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SLANTED SINGLE POST TYPE

VERTICAL SINGLE POST TYPE

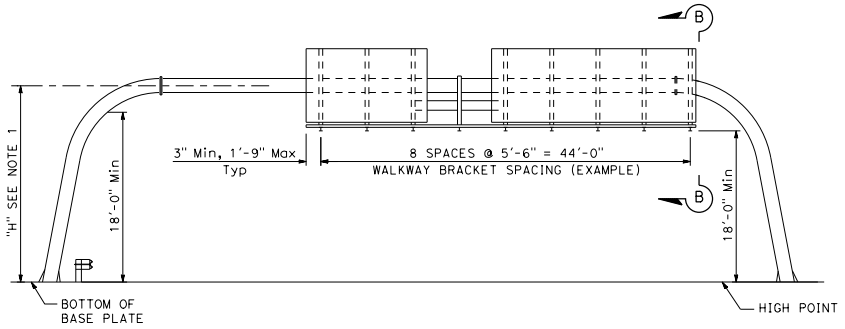
## INSTRUCTIONS TO FABRICATOR

Format sheet shows:

1. Sign structure location.
2. Length of structure span.
3. Panel size and location on structure.
4. Post height to bottom of panel or mast arm elevation.
5. Base plate elevation.
6. Photoelectric unit location if required.
7. Walkway location.

## NOTES:

1. Maximum post height = 24'-0" + sign panel depth/2.
2. For walkway details, see Standard Plan S16.
3. For safety railing and cable details, see Standard Plans S17 and S18.




SLANTED TWO POST TYPE

## WALKWAY BRACKETS:

Maintain uniform spacing where possible. Maximum spacing shall not exceed 5'-6". Minimum clear to field splice = 1'-0"±.

## WALKWAY AND SAFETY RAILING:

Walkway to extend full length of sign area and be continuous between signs. Extend walkway to edge of pavement if required. Safety railing to protect entire walkway.

## PHOTOELECTRIC UNIT:

Place behind sign panel nearest right shoulder unless otherwise shown on format sheet.

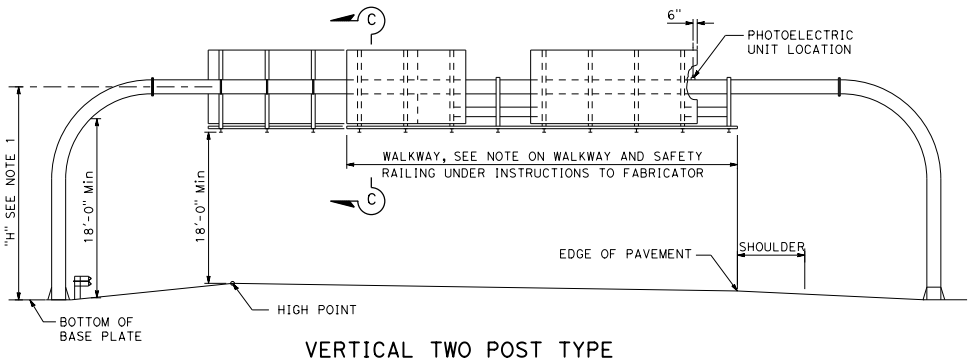
## GENERAL NOTES:

LOADING:
  WIND LOADING:
    Normal to face of sign: 40.3 psf on 100% panel coverage.
    Transverse to face of sign: 20% of normal force.
  WALKWAY LOADING:
    Dead load 500 LBS concentrated live load.

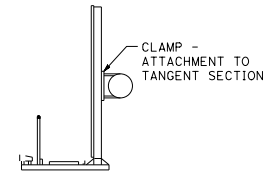
UNIT STRESSES:
  STRUCTURAL STEEL: fy = 36,000 psi
  REINFORCED CONCRETE: fy = 60,000 psi
  f'c = 3600 psi
  FOOTING SOIL PRESSURE: 2.5 ksf (spread footing)

MINIMUM CLEARANCE
  Vertical roadway clearance 18'-0" above roadway and shoulders.

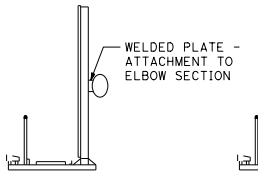
WELDING:
  All welding continuous unless otherwise noted on the plans.



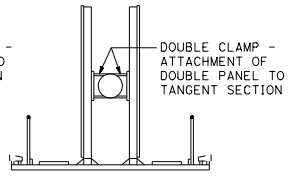

VERTICAL TWO POST TYPE




SECTION A-A




SECTION B-B




SECTION C-C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR INSTRUCTIONS AND EXAMPLES

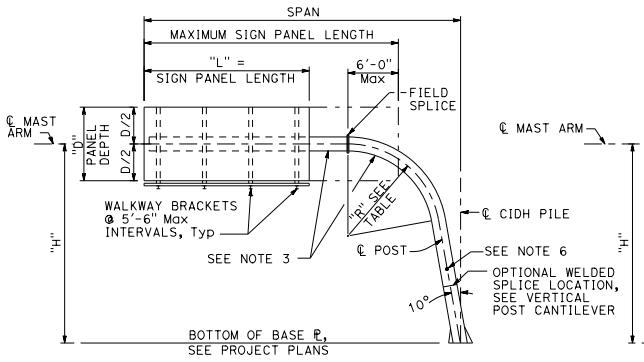
NO SCALE

S30

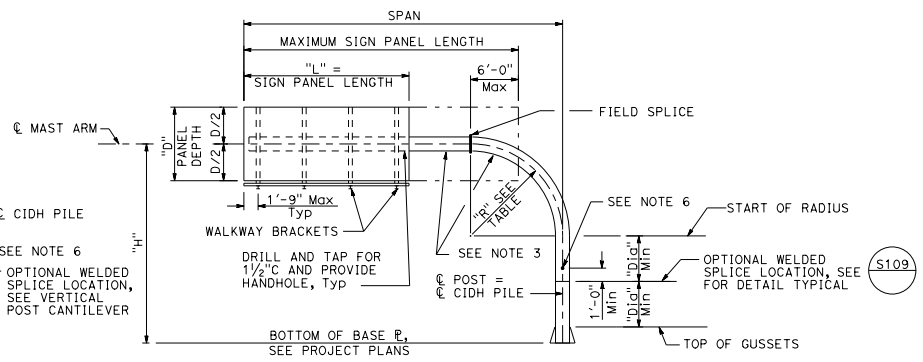
7-1-25



Return to Table of Contents




SLANTED POST CANTILEVER




VERTICAL POST CANTILEVER

| "D" PANEL DEPTH | "H" POST HEIGHT | POST TYPE No. FOR SPANS OF CANTILEVER | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 38'-0" SPAN Col # | 37'-0" SPAN Col # | 36'-0" SPAN Col # | 35'-0" SPAN Col # | 34'-0" SPAN Col # | 33'-0" SPAN Col # | 32'-0" SPAN Col # | 31'-0" SPAN Col # | 30'-0" SPAN Col # | 29'-0" SPAN Col # | 28'-0" SPAN Col # | 27'-0" SPAN Col # | 26'-0" SPAN Col # | 25'-0" SPAN Col # | 24'-0" SPAN Col # | 23'-0" SPAN Col # | 22'-0" SPAN Col # | 21'-0" SPAN Col # | 20'-0" SPAN Col # |
| 120" | 29'-0" | VI | V | V | V | V | V | V | V | IV | IV | IV | IV | IV | III | III | III | III | II | II |
| | 27'-0" | V | V | V | V | V | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II |
| | 25'-0" | V | V | V | V | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II |
| | 23'-0" | V | V | V | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II |
| | 21'-0" | V | V | IV | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II |
| 110" | 29'-0" | V | V | V | V | V | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II |
| | 27'-0" | V | V | V | IV | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II |
| | 25'-0" | V | V | IV | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II |
| | 23'-0" | V | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II |
| | 21'-0" | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I |
| 100" | 29'-0" | V | V | V | V | V | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II |
| | 27'-0" | V | V | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II |
| | 25'-0" | IV | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II |
| | 23'-0" | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I |
| | 21'-0" | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I |
| 90" | 29'-0" | V | V | V | V | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II |
| | 27'-0" | IV | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II |
| | 25'-0" | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I |
| | 23'-0" | IV | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I |
| | 21'-0" | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I |
| 80" | 29'-0" | IV | IV | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II | I |
| | 27'-0" | IV | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II | I | I |
| | 25'-0" | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II | I | I | I |
| | 23'-0" | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II | II | I | I | I |
| | 21'-0" | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I |
| 70" | 29'-0" | IV | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II | II | I | I |
| | 27'-0" | IV | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I |
| | 25'-0" | IV | IV | IV | IV | III | III | III | III | III | II | II | II | II | II | II | I | I | I | I |
| | 23'-0" | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I |
| | 21'-0" | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I |
| 60" | 29'-0" | IV | IV | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I |
| | 27'-0" | IV | IV | IV | IV | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I |
| | 25'-0" | IV | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I |
| | 23'-0" | IV | III | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I |
| | 21'-0" | III | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I | I |
| 50" | 29'-0" | IV | III | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I |
| | 27'-0" | IV | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I | I |
| | 25'-0" | III | III | III | III | III | II | II | II | II | II | II | II | I | I | I | I | I | I | I |
| | 23'-0" | III | III | III | II | II | II | II | II | II | II | II | I | I | I | I | I | I | I | I |
| | 21'-0" | III | III | II | II | II | II | II | II | II | II | I | I | I | I | I | I | I | I | I |

NOTES:

1. The maximum sign panel overlap onto the post elbow shall not exceed 6'-0" from the field splice.
2. When several sign panels are to be installed with a space between the panels, the space shall be as small as possible and 2'-0" maximum.
3. All posts between base plate and field splice shall be as scheduled in table. All mast arms are standard pipe.
4. During sign erection the post shall be raked as necessary with the use of leveling nuts to level the sign panel.
5. At final position of post all top and bottom anchor bolt nuts shall be snug tighten against base plate.
6. Drill and tap for 1½"C chase nipple and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. See Standard Plan ES-15C.

ABBREVIATION:

"Dia" = POST OUTSIDE DIAMETER

| POST TYPE No. | PIPE | | "R" RADIUS |
|---|---|---|---|
| | NPS | THICKNESS | |
| I | 20 | ½" | 12'-0" |
| II | 24 | ½" | 12'-0" |
| III | 24 | ⅝" | 12'-0" |
| IV | 30 | ½" | 12'-0" |
| V | 30 | ⅝" | 12'-0" |
| VI | 30 | ¾" | 12'-0" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR SINGLE POST TYPE LAYOUT AND PIPE SELECTION

NO SCALE

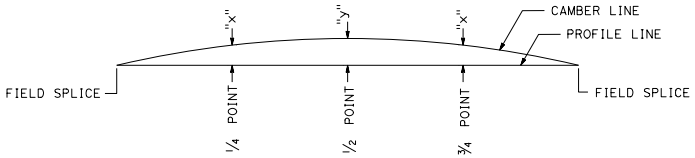
S31

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2025 STANDARD PLAN S31



Return to Table of Contents




CAMBER DIAGRAM

ABBREVIATION:

R = Radius of 90° elbow

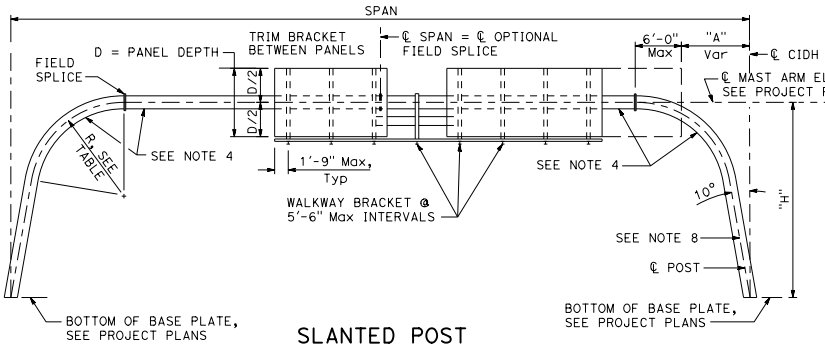
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

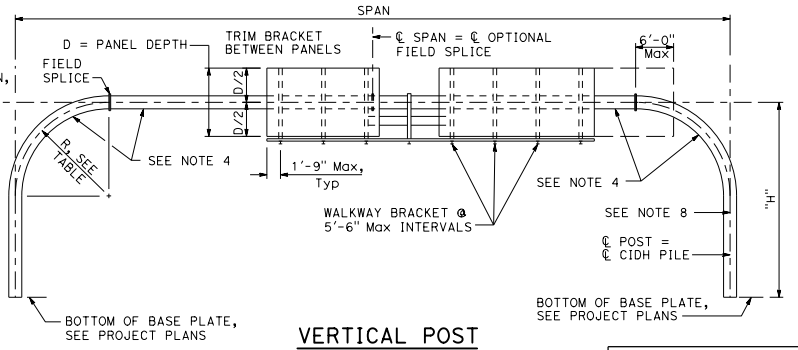
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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SLANTED POST




VERTICAL POST

**TABLE A**

| "D" PANEL DEPTH | "H" POST HEIGHT | POST TYPE No. FOR SPAN LENGTH BELOW | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 140'-0" TO 145'-0" | 130'-0" TO 139'-0" | 120'-0" TO 129'-0" | 110'-0" TO 119'-0" | 100'-0" TO 109'-0" | 90'-0" TO 99'-0" | 80'-0" TO 89'-0" | 70'-0" TO 79'-0" | 60'-0" TO 69'-0" | 50'-0" TO 59'-0" |
| 120" | 29'-0" | VI | VI | VI | VI | V | V | IV | III | III | II |
| | 27'-0" | VI | VI | VI | V | V | IV | IV | III | II | II |
| | 25'-0" | VI | VI | V | V | IV | IV | III | III | II | II |
| | 23'-0" | VI | V | V | IV | IV | IV | III | II | II | I |
| | 21'-0" | V | V | IV | IV | IV | III | III | II | II | I |
| 110" | 29'-0" | VI | VI | VI | V | V | IV | IV | III | II | II |
| | 27'-0" | VI | VI | V | V | IV | IV | III | III | II | II |
| | 25'-0" | V | V | V | IV | IV | IV | III | II | II | I |
| | 23'-0" | V | V | IV | IV | IV | III | III | II | II | I |
| | 21'-0" | V | V | IV | IV | III | III | II | II | II | I |
| 100" | 29'-0" | VI | V | V | V | IV | IV | III | III | II | II |
| | 27'-0" | V | V | V | IV | IV | IV | III | II | II | I |
| | 25'-0" | V | V | IV | IV | IV | III | III | II | II | I |
| | 23'-0" | V | IV | IV | IV | III | III | II | II | II | I |
| | 21'-0" | V | IV | IV | III | III | II | II | II | I | I |
| 90" | 29'-0" | V | V | V | IV | IV | III | III | II | II | I |
| | 27'-0" | V | V | IV | IV | IV | III | II | II | II | I |
| | 25'-0" | IV | IV | IV | IV | III | III | II | II | I | I |
| | 23'-0" | IV | IV | IV | III | III | II | II | II | I | I |
| | 21'-0" | IV | IV | III | III | II | II | II | I | I | I |
| 80" | 29'-0" | V | IV | IV | IV | III | III | II | II | II | I |
| | 27'-0" | IV | IV | IV | III | III | II | II | II | I | I |
| | 25'-0" | IV | IV | III | III | II | II | II | II | I | I |
| | 23'-0" | IV | IV | III | III | II | II | II | I | I | I |
| | 21'-0" | IV | III | III | II | II | II | I | I | I | I |
| 70" | 29'-0" | IV | IV | IV | III | III | II | II | II | I | I |
| | 27'-0" | IV | IV | III | III | II | II | II | I | I | I |
| | 25'-0" | III | III | III | II | II | II | II | I | I | I |
| | 23'-0" | III | III | II | II | II | II | I | I | I | I |
| | 21'-0" | III | III | II | II | II | I | I | I | I | I |

NOTES:

1. The maximum sign panel overlap onto elbow shall not exceed 6'-0" from the field splice.
2. When several sign panels are to be installed with spaces between panels, the total sign panel length is the sum of individual sign panel lengths only.
3. For spans ranging from 50'-0" to 145'-0", maximum sign panel coverage is as follows:
   a) For slanted post type: Span - "A" on both sides from ℄ of CIDH Pile.
   b) For vertical post type: Span - 6'-0" on both sides from ℄ of CIDH Pile.
4. All posts between base plate and field plate splice shall be as scheduled in table. All mast arms are standard pipe.
5. Before any portion of sign frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame, with no load condition, is within ±½" of field measured span length between foundations.
6. If sign frames are erected as one unit, they shall be adequately suspended to avoid distortions or changes in span lengths between base plates.
7. At final position of post, all top and bottom anchor bolt nuts shall be snug tighten against base plate.
8. Drill and tap for 1½"C chase nipple and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. See Standard Plan ES-15C.
9. Maximum difference between post heights on an individual frame = 5'-0".
10. For standard pipe members (mast arms) with lengths greater than 78'-9", an optional field splice will be permitted at the centerline of span to facilitate hauling operations.
11. For location of optional welded splice in post, see Standard Plan S31.

**TABLE B**

| POST TYPE No. | PIPE | | R RADIUS |
|---|---|---|---|
| | NPS | THICKNESS | |
| I | 20 | ½" | 12'-0" |
| II | 24 | ½" | 12'-0" |
| III | 24 | ⅝" | 12'-0" |
| IV | 30 | ½" | 12'-0" |
| V | 30 | ⅝" | 12'-0" |
| VI | 30 | ¾" | 12'-0" |

**TABLE C**

CAMBER

| POST TYPE No. | SPAN LENGTH | X | Y |
|---|---|---|---|
| II | 50'-0" TO 119'-0" | 2¼" | 3½" |
| II | 120'-0" TO 145'-0" | 3¾" | 5" |
| III | 50'-0" TO 119'-0" | 2¼" | 3½" |
| III | 120'-0" TO 145'-0" | 3¾" | 5" |
| IV | 50'-0" TO 119'-0" | 2¼" | 3½" |
| IV | 120'-0" TO 145'-0" | 3¾" | 5" |
| V | 50'-0" TO 119'-0" | 2¼" | 3½" |
| V | 120'-0" TO 145'-0" | 3¾" | 5" |
| VI | 50'-0" TO 119'-0" | 2¼" | 3½" |
| VI | 120'-0" TO 145'-0" | 3¾" | 5" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR TWO POST TYPE LAYOUT AND PIPE SELECTION

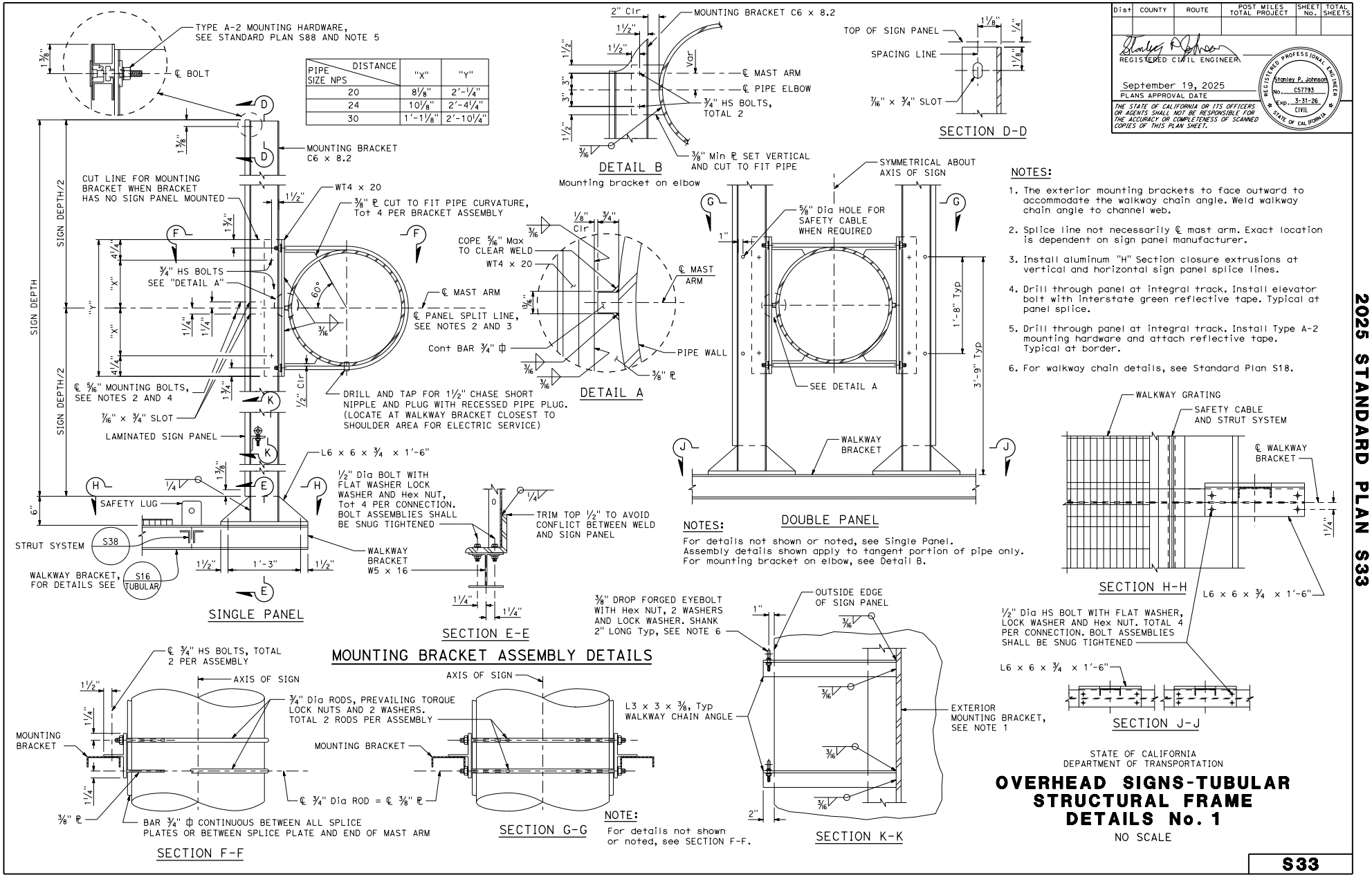
NO SCALE

S32

7-1-25



Return to Table of Contents




| DISTANCE / PIPE SIZE NPS | "X" | "Y" |
|---|---|---|
| 20 | 8⅛" | 2'-¼" |
| 24 | 10⅛" | 2'-4¼" |
| 30 | 1'-1⅛" | 2'-10¼" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR STRUCTURAL FRAME DETAILS No. 1

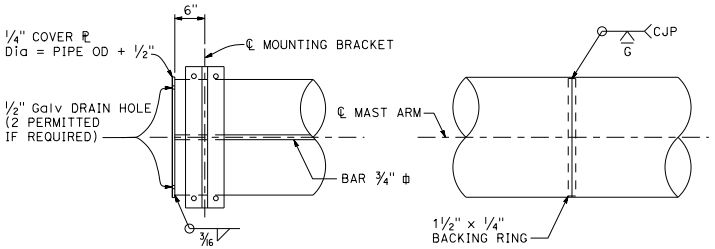
NO SCALE

S33

7-1-25



Return to Table of Contents

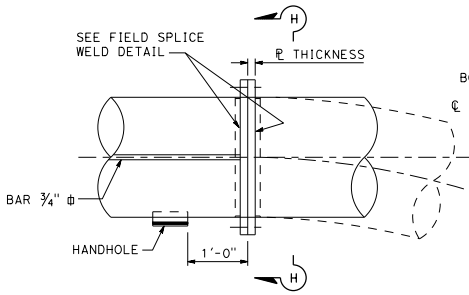



## MAST ARM END DETAIL

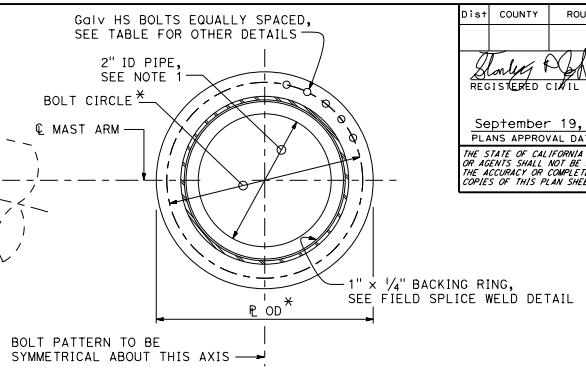
For Single Post Type only.



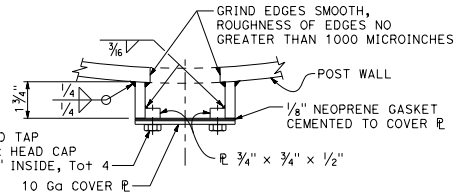

## SHOP SPLICE



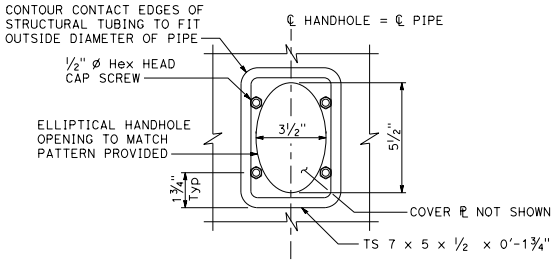

## FIELD SPLICE




## SECTION H-H

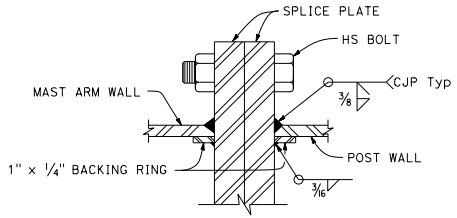



## PLAN

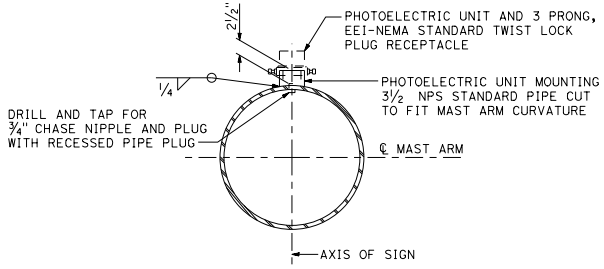



## ELEVATION

## DETAILS OF LOWER HANDHOLE AND COVER

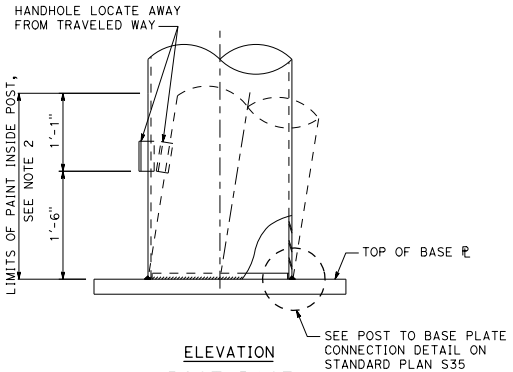



## FIELD SPLICE WELD DETAIL




## PHOTOELECTRIC UNIT DETAILS

See Layout sheet for location when required.




## ELEVATION

## POST BASE

For base ℄ details, see Standard Plan S35.

**NOTES:**

1. Place single thin bead of silicone caulking compound around hole before bolting. Caulking not to interfere with friction between plates in bolted area.
2. Prime and paint post interior from base ℄ to 6" above lower handhole unless post is galvanized.
3. Field splice diameters marked "*" may be increased 2" to facilitate bolting.

**ABBREVIATION:**

ID - Inside Diameter of Post Pipe

| FIELD SPLICE TABLE | | | | |
|---|---|---|---|---|
| PIPE SIZE (NPS) | ℄ OD * | ℄ THICKNESS | BOLT CIRCLE Dia * | No. OF HS BOLTS AND BOLT Dia |
| 20 | 2'-3" | 1⅜" | 2'-0" | 22 - 1" |
| 24 | 2'-7" | 1½" | 2'-4" | 26 - 1" |
| 30 | 3'-1" | 1⅝" | 2'-10" | 34 - 1" |

**NOTE:**

Design based on capacity of standard pipe.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR STRUCTURAL FRAME DETAILS No. 2

NO SCALE

S34

7-1-25





Return to Table of Contents

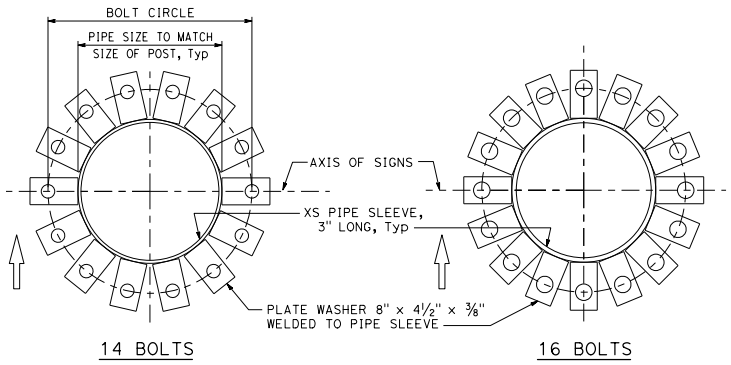
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

September 19, 2025
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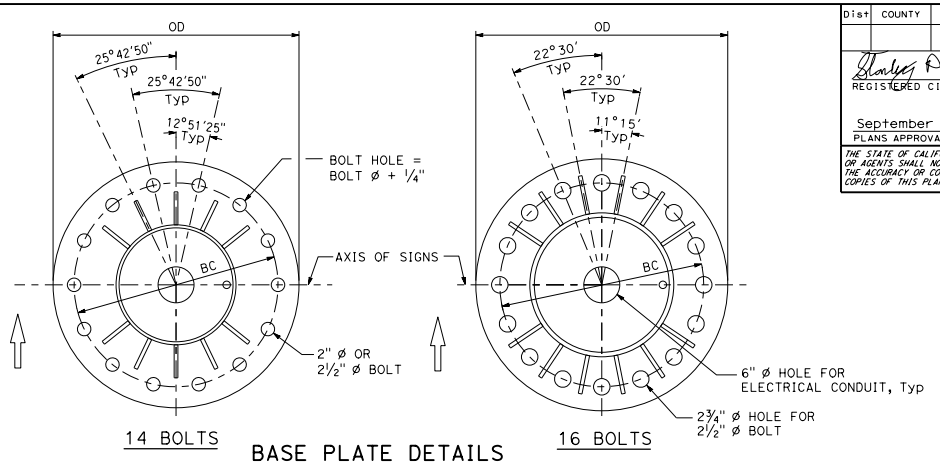
Stanley P. Johnson
No. C57793
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STATE OF CALIFORNIA

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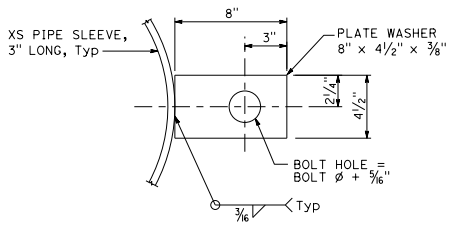



## ANCHOR BOLT TEMPLATE

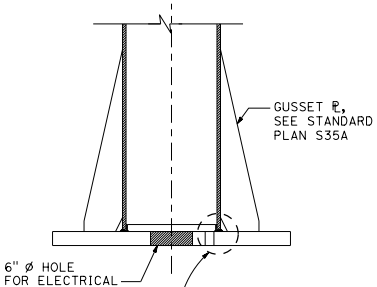
Template to match base plate anchor bolt pattern (Option: Template similar to ring plate type can be used in lieu of plate washer type).

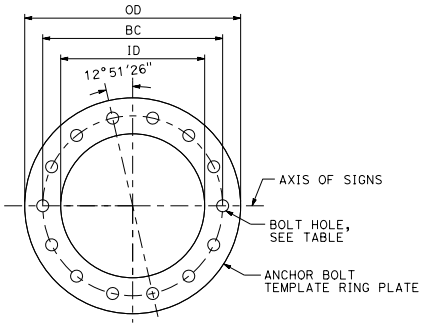



## BASE PLATE DETAILS SINGLE AND TWO POST TYPE



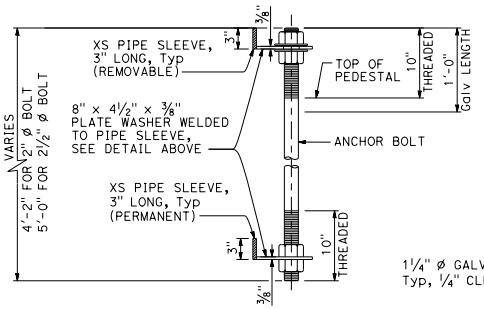

## PLATE WASHER DETAIL FOR 14 AND 16 BOLT TEMPLATE PATTERN



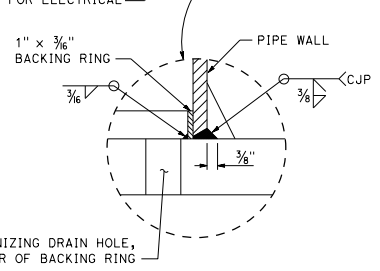

14 BOLT
Type I shown

| SINGLE POST AND TWO POST TUBULAR | | | | | |
|---|---|---|---|---|---|
| POST TYPE | PIPE | | BASE PL OD AND THICKNESS | ANCHOR BOLTS | |
| | NPS | THICKNESS | | BOLT CIRCLE Dia | BOLT TOTALS AND BOLT Dia |
| I | 20 | ½" | 3'-1" x 2½" | 2'-6" | 14 - 2" |
| II | 24 | ½" | 3'-6" x 2½" | 2'-10" | 14 - 2½" |
| III | 24 | ⅝" | 3'-6" x 2½" | 2'-10" | 14 - 2½" |
| IV | 30 | ½" | 4'-0" x 2½" | 3'-4" | 16 - 2½" |
| V | 30 | ⅝" | 4'-0" x 2½" | 3'-4" | 16 - 2½" |
| VI | 30 | ¾" | 4'-0" x 3" | 3'-4" | 16 - 2½" |

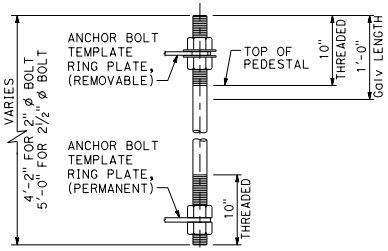



## ANCHOR BOLT TEMPLATE ASSEMBLY PLATE WASHER TYPE

NOTE:
One bolt shown only. Other bolts same configuration around pipe sleeve.




## POST TO BASE PLATE CONNECTION DETAIL




## ANCHOR BOLT TEMPLATE RING PLATE TYPE

NOTE:
One bolt shown only. Other bolts same configuration around ring plate.

| RING DIMENSIONS | | | |
|---|---|---|---|
| TYPE DIMENSIONS | POST TYPE No. | | |
| | I | II TO III | IV TO VI |
| OD | 2'-9" | 3'-2" | 3'-10" |
| ID | 2'-3" | 2'-6" | 2'-10" |
| BC | 2'-6" | 2'-10" | 3'-4" |
| HOLE Dia | 2⅛" Max | 2⅝" Max | 2⅝" Max |
| PERMANENT TEMPLATE THICKNESS | ⅝" | ¾" | ¾" |
| TEMPORARY TEMPLATE THICKNESS | ½" | ½" | 1½" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR SINGLE POST AND TWO POST TYPE BASE PLATE AND ANCHORAGE DETAILS

NO SCALE

S35

7-1-25

Return to Table of Contents

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|---|---|---|---|---|---|
| | | | | | |

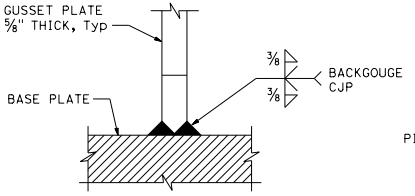
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

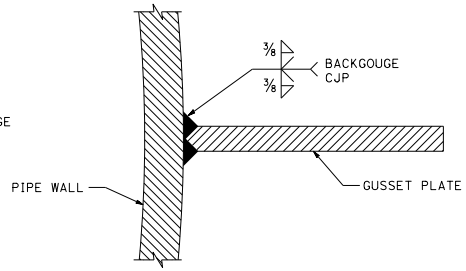
REGISTERED PROFESSIONAL ENGINEER
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No. C57793
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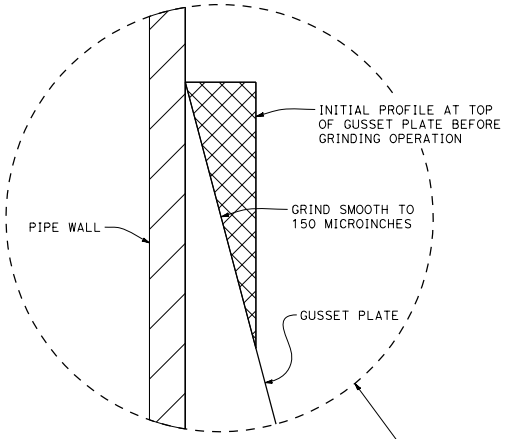





SECTION A-A



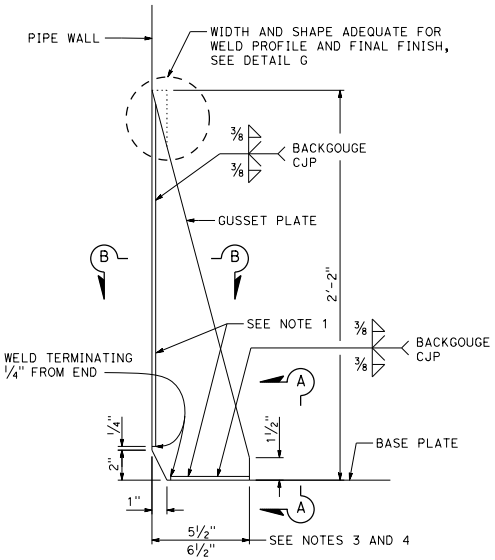

SECTION B-B



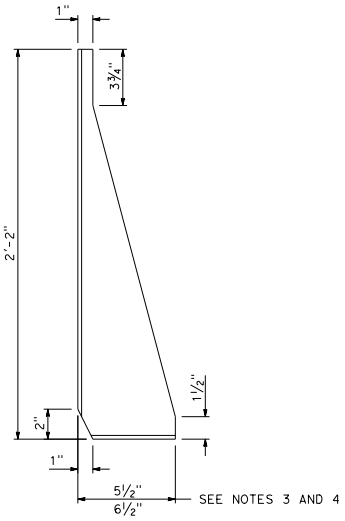

DETAIL G

NOTES:

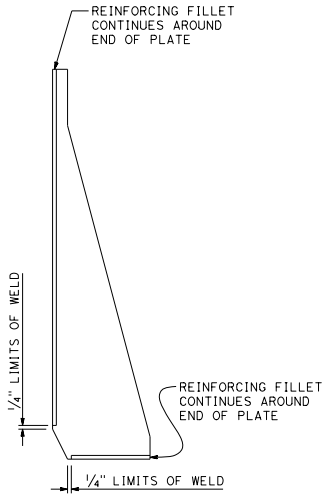
1. All gussets to be same height.
2. Provide a smooth transition from gusset plate to tube.
3. 5½" for post Types I-S through V-S.
4. 6½" for post Types VI-S and VII-S, single post trusses and tubular.



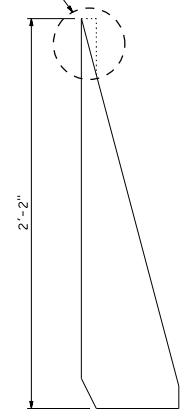

WELD DETAILS




GUSSET PLATE
Initial Shape




GUSSET PLATE WELDING
See Weld Details




GUSSET PLATE GRINDING
See Detail G

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DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR GUSSET PLATE DETAILS

NO SCALE

S35A

7-1-25

Return to Table of Contents

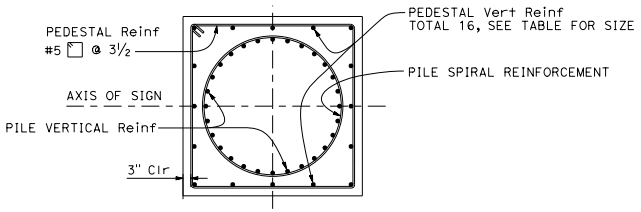
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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REGISTERED CIVIL ENGINEER

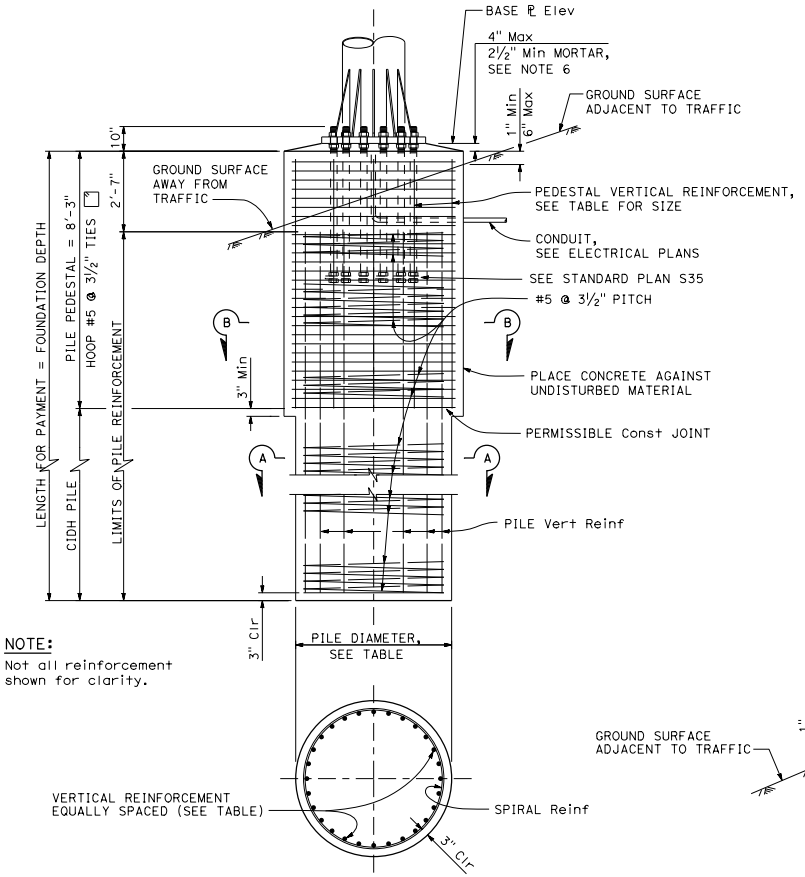
September 19, 2025
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CIVIL
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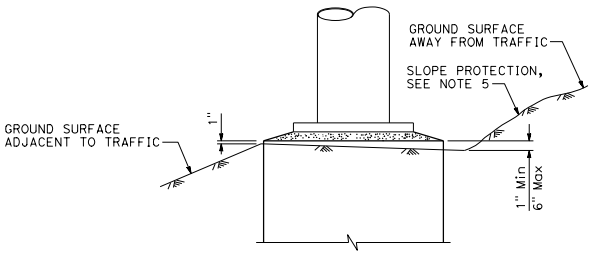



SECTION B-B




SECTION A-A

**NOTE:**
Not all reinforcement shown for clarity.




DETAIL C

**NOTES:**

1. For anchor bolt layout, see Standard Plan S35.
2. For Base ℄ elevation, see Project Plans.
3. Before erection of the post, backfill which is equivalent to the surrounding material, shall be in place.
4. Pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.
5. Slope protection required when indicated on the Project Plans.
6. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.

| POST TYPE No. | ANCHOR BOLTS | | | SQUARE PILE PEDESTAL | | | | | | CIDH PILE | | | | | FOUNDATION DEPTH * * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BOLT CIRCLE Dia | BOLT TOTAL AND Dia | TOTAL LENGTH | PEDESTAL SQUARE ONE SIDE | VERTICAL REINFORCING | | | HOOP | | PILE Dia | VERTICAL REINFORCING | | SPIRAL | | |
| | | | | | BAR SIZE | No. OF BARS EACH FACE | TOTAL | BAR SIZE | SPACING | | BAR SIZE | TOTAL | BAR SIZE | PITCH | |
| I | 2'-6" | 14-2" | 4'-2" | 5'-6" | #11 | 5 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 25'-0" |
| II | 2'-10" | 14-2½" | 5'-0" | 5'-6" | #11 | 5 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 25'-0" |
| III | 2'-10" | 14-2½" | 5'-0" | 5'-6" | #11 | 5 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 25'-0" |
| IV | 3'-4" | 16-2½" | 5'-0" | 5'-6" | #11 | 5 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 33'-0" |
| V | 3'-4" | 16-2½" | 5'-0" | 5'-6" | #11 | 5 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 33'-0" |
| VI | 3'-4" | 16-2½" | 5'-0" | 5'-6" | #11 | 5 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 33'-0" |

* * Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

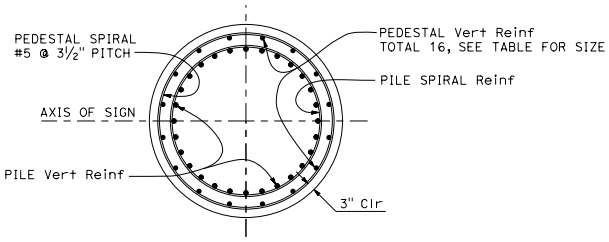
# OVERHEAD SIGNS-TUBULAR SINGLE POST AND TWO POST TYPE SQUARE PEDESTAL PILE FOUNDATION

NO SCALE

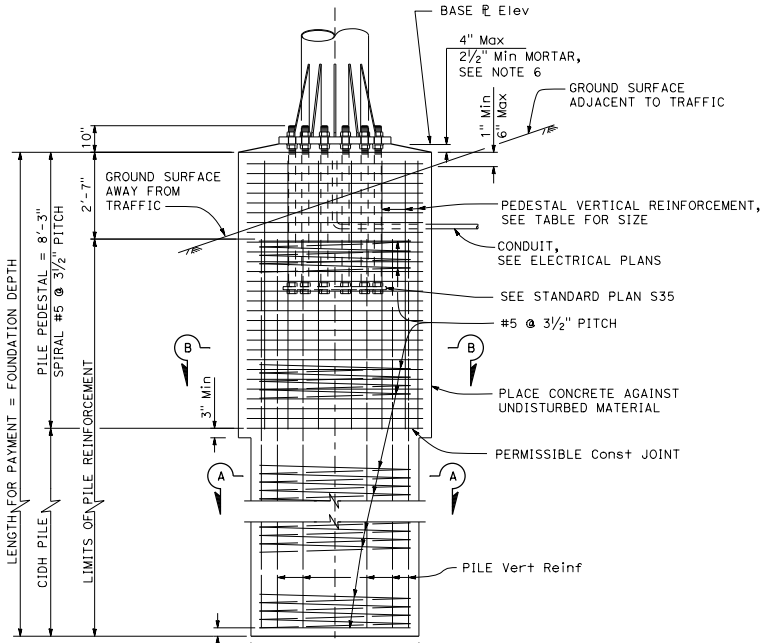
S36

7-1-25

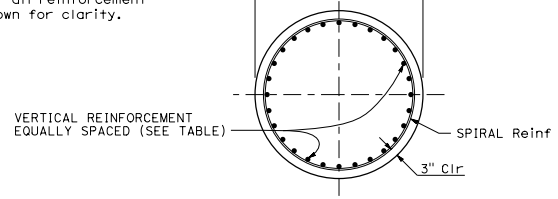
Return to Table of Contents



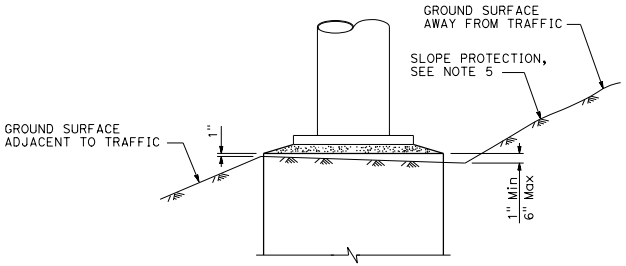

SECTION B-B




NOTE:
Not all reinforcement shown for clarity.




SECTION A-A




DETAIL C

NOTES:

1. For anchor bolt layout, see Standard Plan S35.
2. For Base ℄ elevation, see Project Plans.
3. Before erection of the post, backfill which is equivalent to the surrounding material, shall be in place.
4. Pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.
5. Slope protection required when indicated on the Project Plans.
6. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.

| POST TYPE No. | ANCHOR BOLTS | | | ROUND PILE PEDESTAL | | | | | CIDH PILE | | | | | FOUNDATION DEPTH * * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BOLT CIRCLE Dia | BOLT TOTAL AND Dia | TOTAL LENGTH | Dia | VERTICAL REINFORCING BAR SIZE | VERTICAL REINFORCING TOTAL | SPIRAL BAR SIZE | SPIRAL PITCH | PILE Dia | VERTICAL REINFORCING BAR SIZE | VERTICAL REINFORCING TOTAL | SPIRAL BAR SIZE | SPIRAL PITCH | |
| I | 2'-6" | 14-2" | 4'-2" | 5'-6" | #11 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 25'-0" |
| II | 2'-10" | 14-2½" | 5'-0" | 5'-6" | #11 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 25'-0" |
| III | 2'-10" | 14-2½" | 5'-0" | 5'-6" | #11 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 25'-0" |
| IV | 3'-4" | 16-2½" | 5'-0" | 5'-6" | #11 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 33'-0" |
| V | 3'-4" | 16-2½" | 5'-0" | 5'-6" | #11 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 33'-0" |
| VI | 3'-4" | 16-2½" | 5'-0" | 5'-6" | #11 | 16 | #5 | 3½" | 5'-0" | #11 | 28 | #5 | 3½" | 33'-0" |

* * Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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# OVERHEAD SIGNS-TUBULAR SINGLE POST AND TWO POST TYPE ROUND PEDESTAL PILE FOUNDATION

NO SCALE

S37

7-1-25



Return to Table of Contents

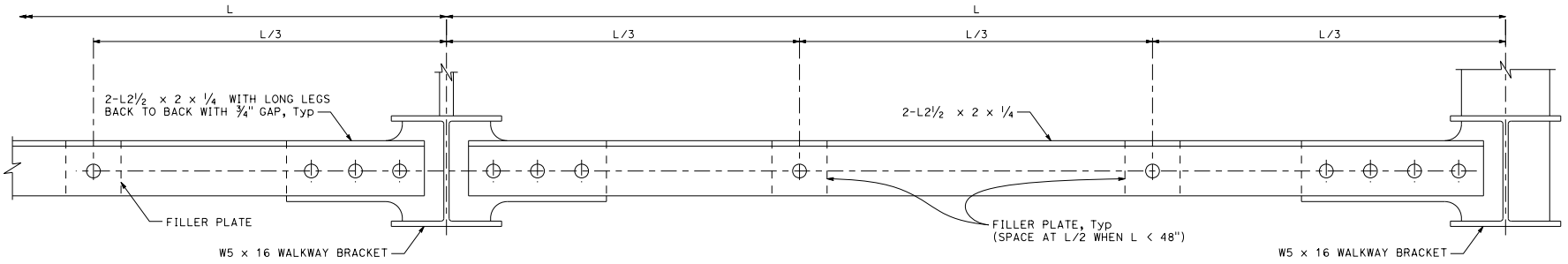
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

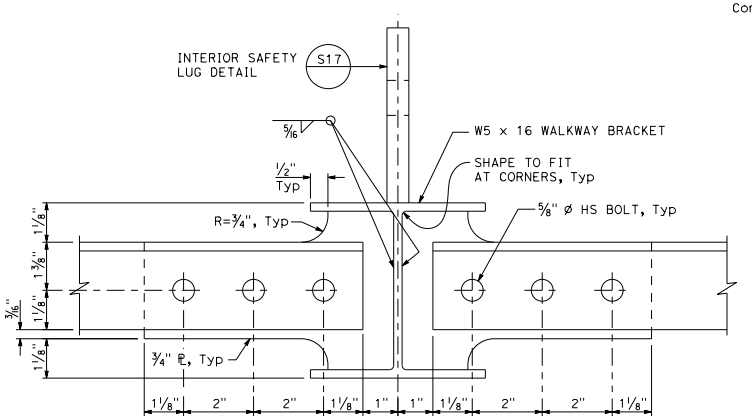
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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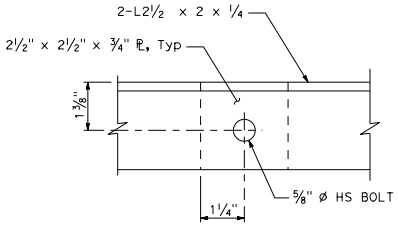



## STRUT SYSTEM AT TUBULAR AND BRIDGE MOUNTED SIGNS

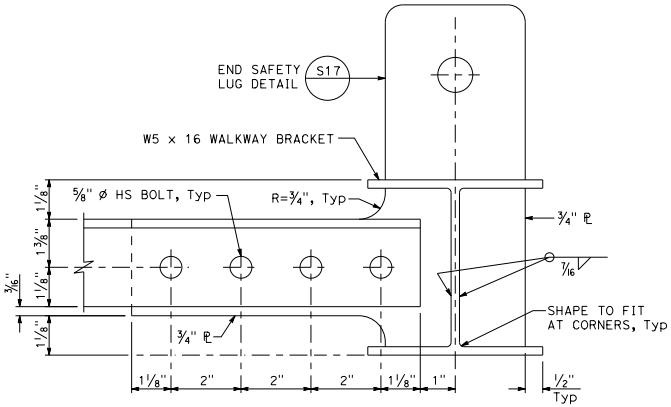
Continuous between end safety lug locations.




## INTERIOR SAFETY LUG LOCATION




## FILLER PLATE




## END SAFETY LUG LOCATION

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-TUBULAR COMPRESSION STRUT DETAILS AT WALKWAY

NO SCALE

**S38**

7-1-25



Return to Table of Contents

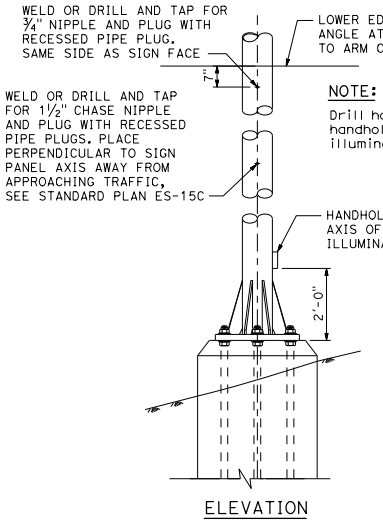
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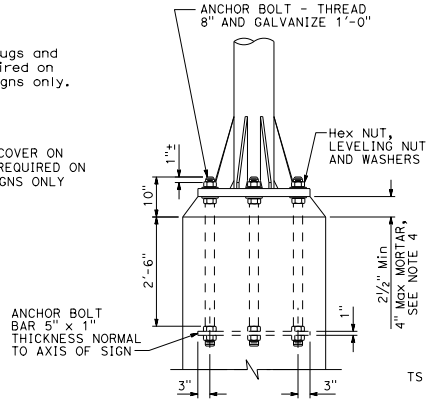
September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

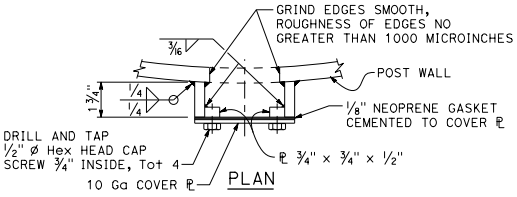
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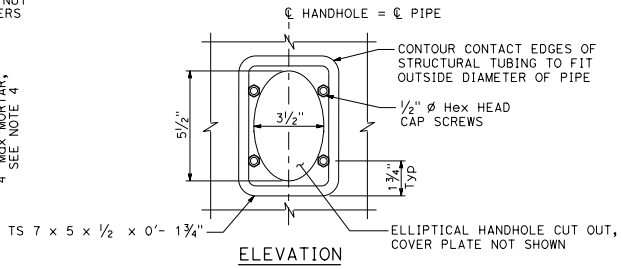

ELEVATION




ANCHORAGE BOLT




PLAN




ELEVATION

TYPICAL DETAILS OF HANDHOLE AND COVER

## GENERAL NOTES:

DESIGN: 70 mph (fastest mile)

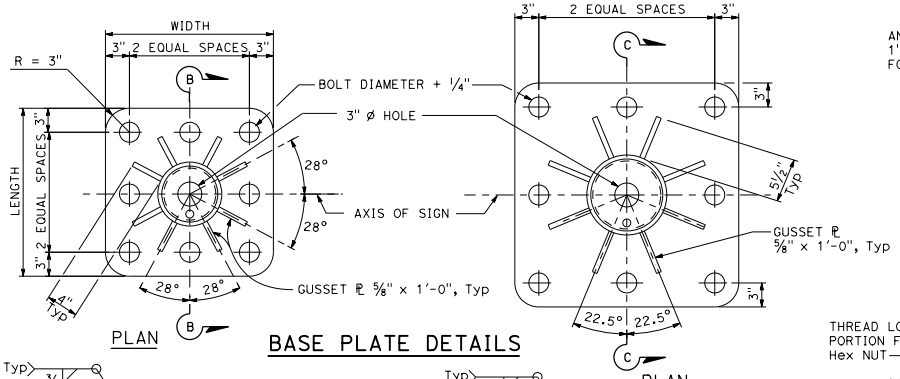
WELDING: All welding continuous unless otherwise noted on the plans. All welding to be done in accordance with the Standard Specifications.

## NOTES:

1. Footing shall be placed with long dimensions normal to axis of sign.
2. On single post signs the post shall be raked out of plumb with the use of leveling nuts to make the bottom of the sign panel level.
3. 2½" ø anchor bolts may be substituted for 2¼" ø bolts.
4. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.

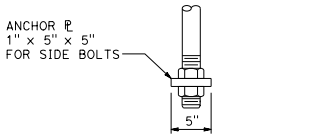
| POST | | BASE PLATE | ANCHOR BOLTS |
|---|---|---|---|
| NPS | "t" | | BOLT TOTALS AND Dia OF BOLT |
| 6 | 5/32" | 2" x 1'-9" x 1'-9" | 8 - 2" |
| 6 | 7/16" | 2" x 1'-9" x 1'-9" | 8 - 2" |
| 8 | 5/16" | 2" x 1'-9" x 1'-9" | 8 - 2" |
| 8 | ½" | 2" x 1'-9" x 1'-9" | 8 - 2" |
| 10 | ½" | 2" x 2'-4" x 2'-4" | 8 - 2¼" |
| 12 | ½" | 2" x 2'-4" x 2'-4" | 8 - 2¼" |
| 14 | ½" | 2" x 2'-4" x 2'-4" | 8 - 2¼" |
| 14 | ¾" | 2" x 2'-4" x 2'-4" | 8 - 2¼" |

"t" = Wall Thickness

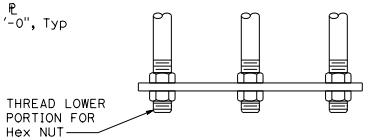



PLAN

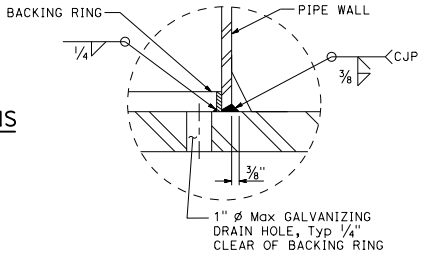
BASE PLATE DETAILS



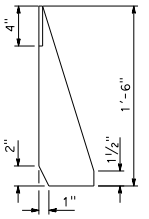

ANCHORAGE SIDE BOLT
Axis of Sign



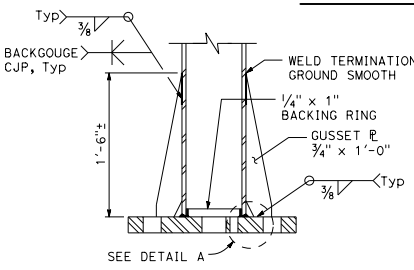

ANCHOR BOLT BAR CONNECTIONS



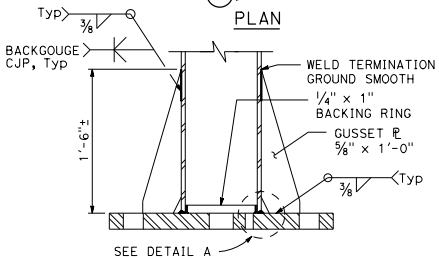

DETAIL A




GUSSET PLATE

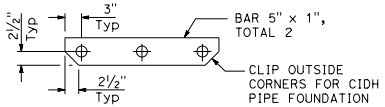



SECTION B-B
6 NPS THRU 8 NPS POSTS




SECTION C-C
10 NPS THRU 14 NPS POSTS

POST TO BASE PLATE CONNECTION DETAILS




PLAN

ANCHOR BOLT BAR DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-LIGHTWEIGHT POST DETAILS

NO SCALE

S48

7-1-25

Return to Table of Contents

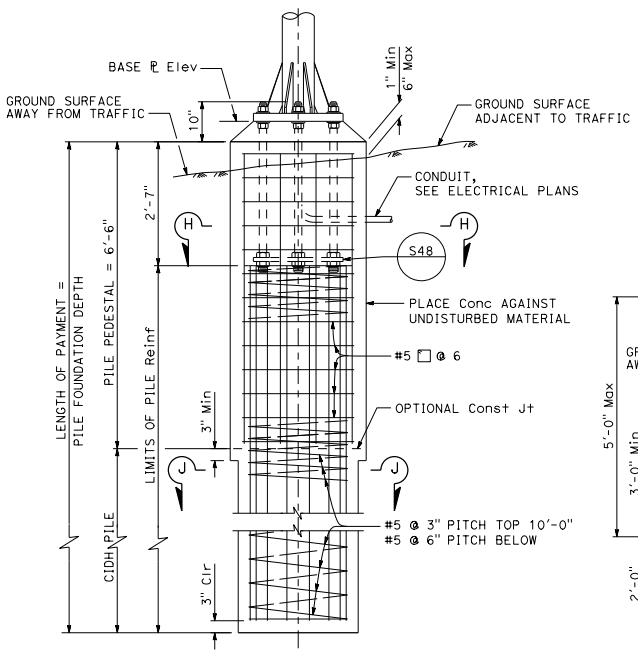
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REGISTERED CIVIL ENGINEER

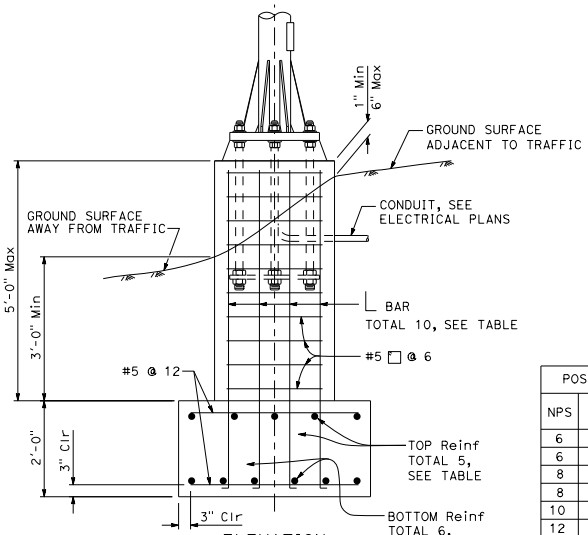
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

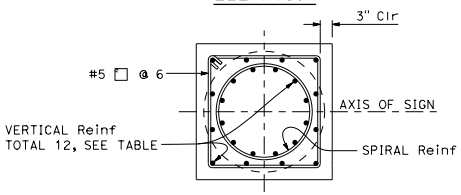
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ELEVATION

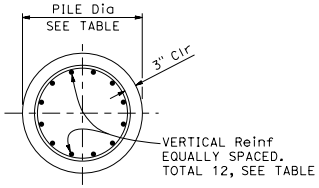



ELEVATION



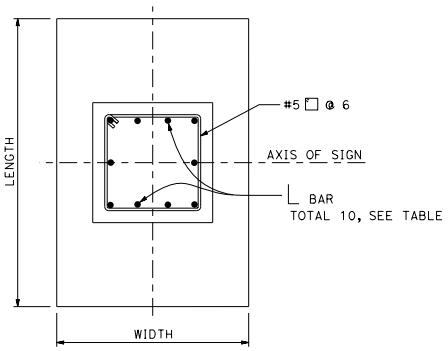

SECTION H-H

NOTE:
Not all reinforcement shown for clarity.




SECTION J-J

PILE FOUNDATION
6 NPS THRU 14 NPS POSTS




PLAN
SPREAD FOOTING

NOTES:
1. Backfill shall be in place before erection of post.
2. Slope protection required when indicated on the plans.
3. Pile pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.

| POST | | PILE FOUNDATION | | | | SPREAD FOOTING | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | "t" | PEDESTAL | PILE Dia | PILE DEPTH | VERTICAL Reinf | PEDESTAL | FOOTING WIDTH x LENGTH | REINFORCEMENT TOP | REINFORCEMENT BOTTOM | REINFORCEMENT L BAR |
| 6 | 9/32" | 2'-10" x 2'-10" | 30" | 10'-0" | #6 | 2'-6" x 2'-6" | 4'-0" x 6'-0" | #5 | #5 | #5 |
| 6 | 7/16" | 2'-10" x 2'-10" | 30" | 10'-0" | #6 | 2'-6" x 2'-6" | 4'-0" x 7'-0" | #5 | #5 | #5 |
| 8 | 5/16" | 2'-10" x 2'-10" | 30" | 10'-0" | #6 | 2'-6" x 2'-6" | 5'-0" x 8'-0" | #5 | #5 | #5 |
| 8 | 1/2" | 2'-10" x 2'-10" | 30" | 11'-0" | #7 | 2'-6" x 2'-6" | 6'-0" x 9'-0" | #5 | #5 | #5 |
| 10 | 1/2" | 3'-4" x 3'-4" | 36" | 13'-0" | #8 | 3'-0" x 3'-0" | 7'-0" x 10'-0" | #5 | #8 | #8 |
| 12 | 1/2" | 3'-4" x 3'-4" | 36" | 15'-0" | #10 | 3'-0" x 3'-0" | 7'-0" x 12'-0" | #6 | #8 | #8 |
| 14 | 1/2" | 3'-4" x 3'-4" | 36" | 15'-0" | #10 | 3'-0" x 3'-0" | 7'-0" x 13'-0" | #8 | #9 | #8 |
| 14 | 3/4" | 3'-4" x 3'-4" | 36" | 16'-0" | #10 | 3'-0" x 3'-0" | 8'-0" x 14'-0" | #8 | #9 | #8 |

"t" = WALL THICKNESS

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DEPARTMENT OF TRANSPORTATION

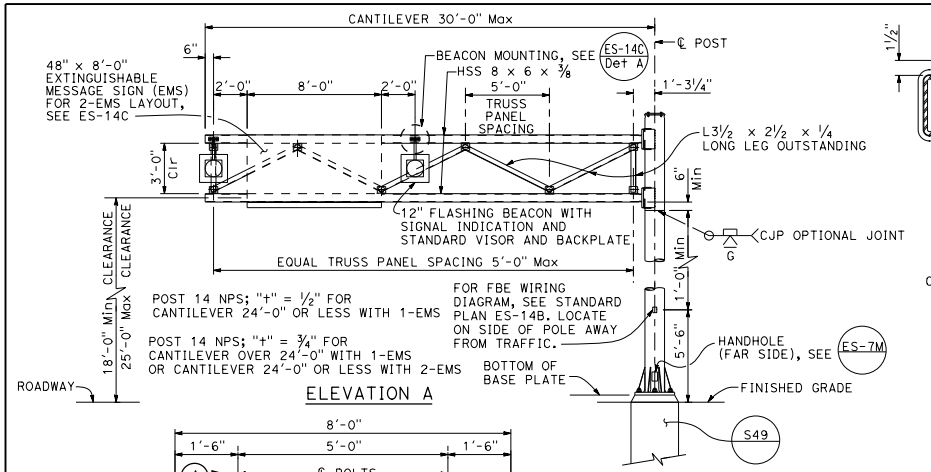
# OVERHEAD SIGNS-LIGHTWEIGHT FOUNDATION DETAILS

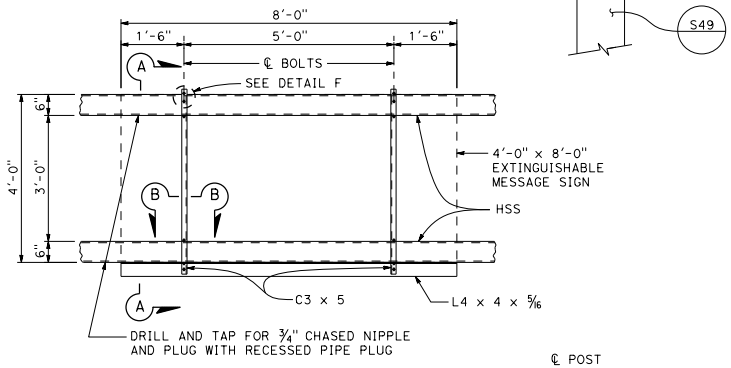
NO SCALE

S49

7-1-25

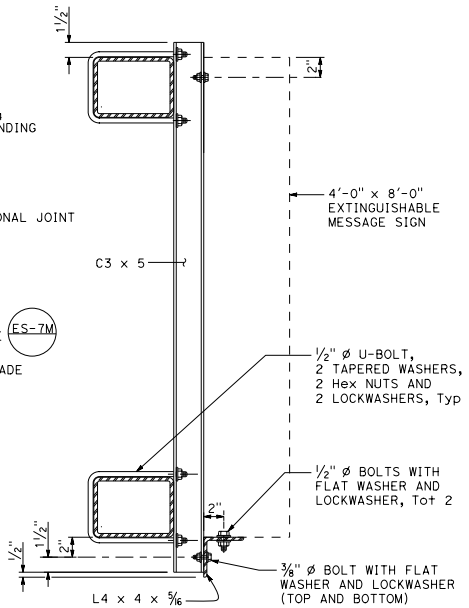
Return to Table of Contents



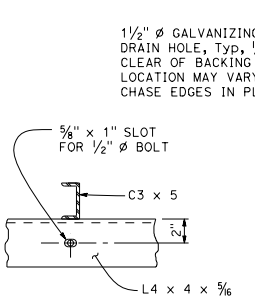




SIGN MOUNTING

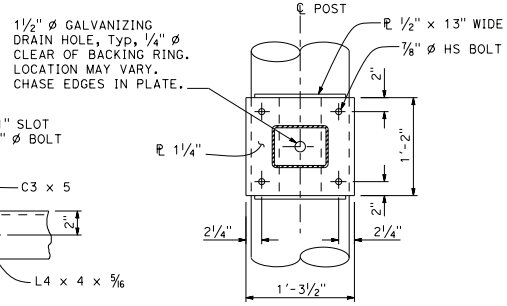
DETAIL H



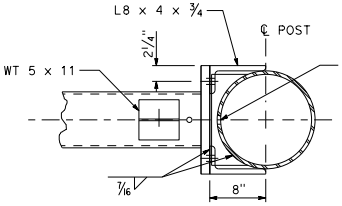

SECTION A-A




SECTION B-B

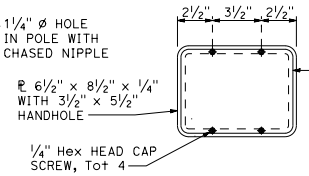



SECTION C-C



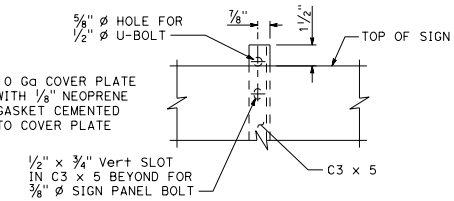

SECTION D-D

Other steel not shown for clarity

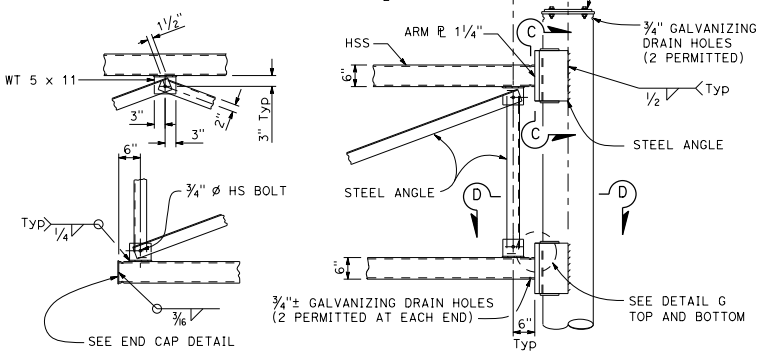



DETAIL D

END CAP

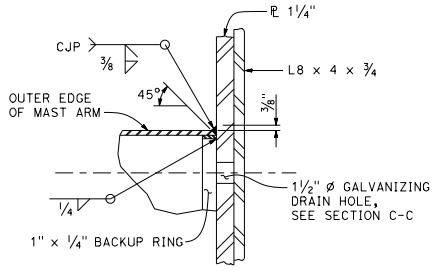



DETAIL F




TRUSS FRAME CONNECTION

DETAIL I




DETAIL G

NOTES:

1. For sign structure dimensions, see Project Plans.
2. For bolt-access hole details, see Standard Plan S113.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-LIGHTWEIGHT EXTINGUISHABLE MESSAGE SIGN AND FLASHING BEACONS

NO SCALE

S50

7-1-25



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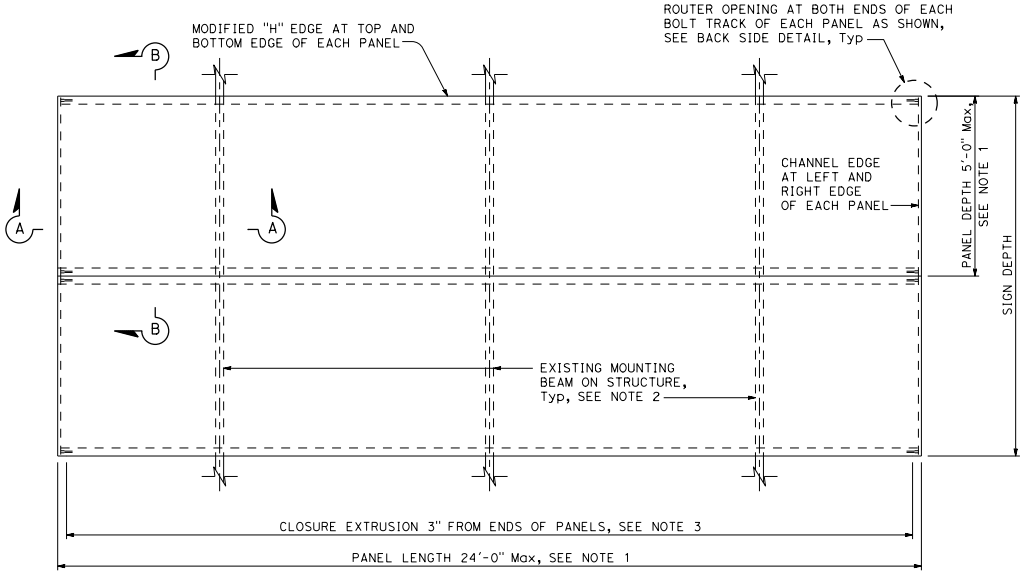
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Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

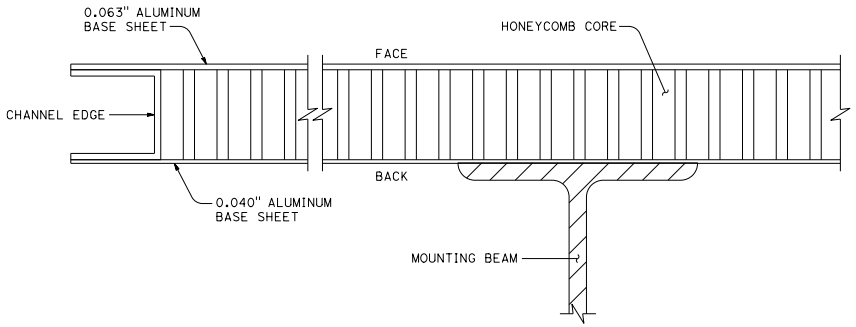
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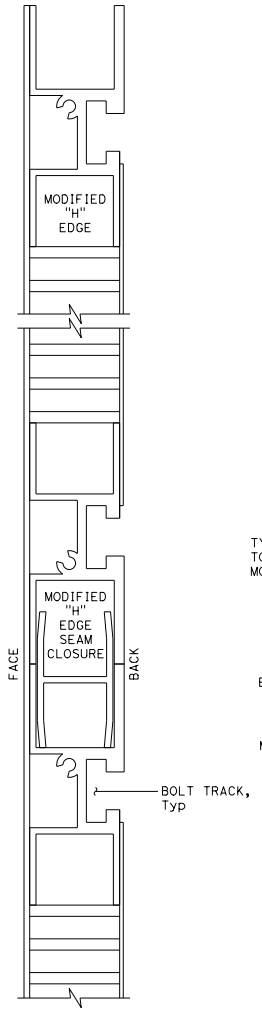



## FACE VIEW OF LAMINATED PANEL

Two panels shown, see Note 7



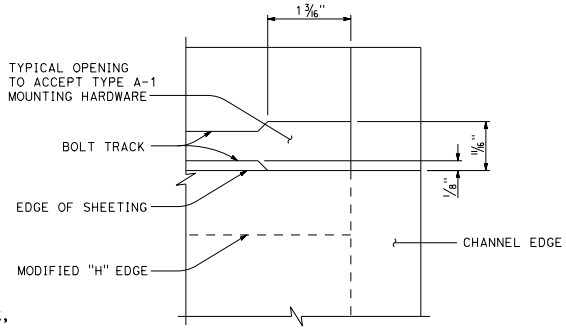

## SECTION A-A




## SECTION B-B

NOTES:

1. Panel length shall be graduated in increments of 1'-0". Panel depth shall be 1'-8" to 5'-0", graduated in increments of 10".
2. Unless otherwise shown on the plans, refer to applicable Standard Plan for location of structure supports and mounting details.
3. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
4. See Standard Plan S86 for extrusion details.
5. See Standard Plan S87 for Type A-1 mounting hardware and Standard Plan S88 for Type A-2 mounting hardware.
6. All horizontal extrusions shall be continuous.
7. Place three 1/8" Ø weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.




## BACK SIDE DETAIL (TYPICAL)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD LAMINATED SIGN SINGLE OR MULTIPLE PANEL (TYPE A, 1" THICK)

NO SCALE

**S81**

2025 STANDARD PLAN S81

7-1-25

Return to Table of Contents

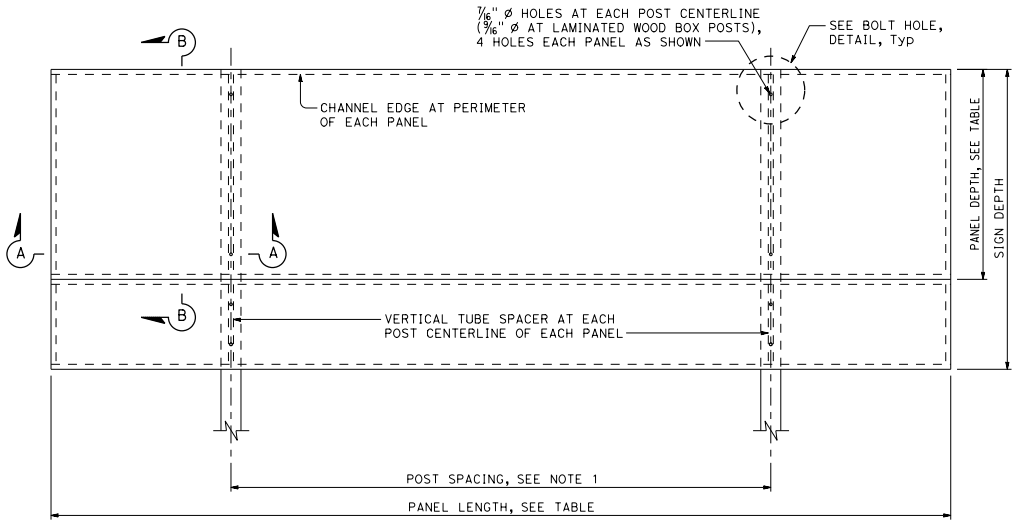
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

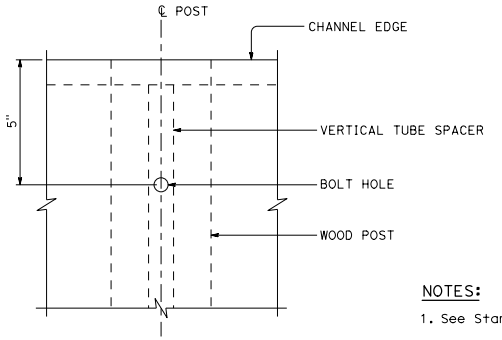
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## FACE VIEW OF LAMINATED PANEL

Two panels shown, see Note 6



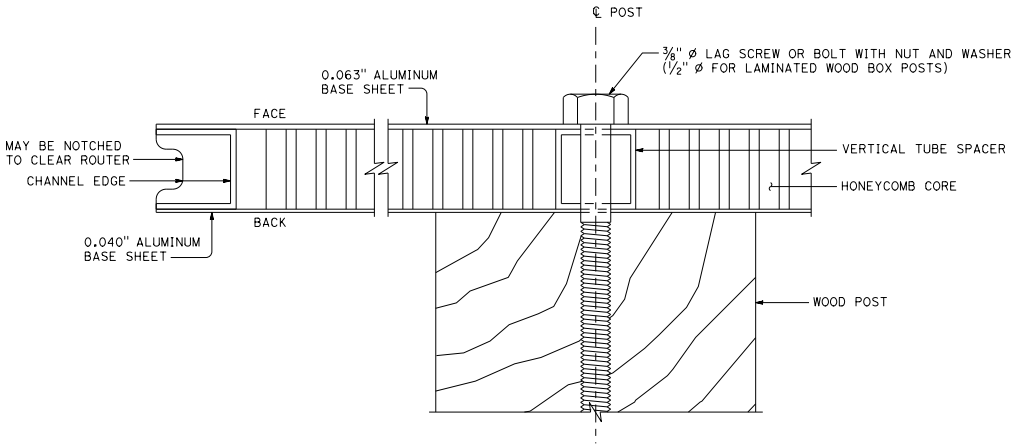

## BOLT HOLE DETAIL

NOTES:

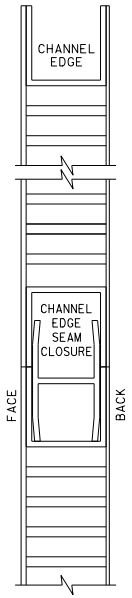
1. See Standard Plan S85 for post spacing table.
2. See Standard Plan S86 for extrusion details.
3. All horizontal extrusions shall be continuous.
4. Depth and length of panel shall be graduated in increments of 6".
5. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
6. Place three 1/8" Ø weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

| TABLE | |
|---|---|
| TYPE B PANEL 1" THICK | |
| PANEL DEPTH | PANEL LENGTH |
| 5'-0" | 4'-6" TO 15'-0" |
| 4'-6" | 4'-6" TO 15'-0" |
| 4'-0" | 4'-6" TO 15'-0" |
| 3'-6" | 4'-6" TO 15'-0" |
| 3'-0" | 4'-6" TO 15'-0" |
| 2'-6" | 4'-6" TO 15'-0" |
| 2'-0" | 4'-6" TO 15'-0" |
| 1'-6" | 4'-6" TO 15'-0" |

See Note 4




## SECTION A-A




## SECTION B-B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE LAMINATED SIGN SINGLE OR MULTIPLE PANEL (TYPE B, 1" THICK)

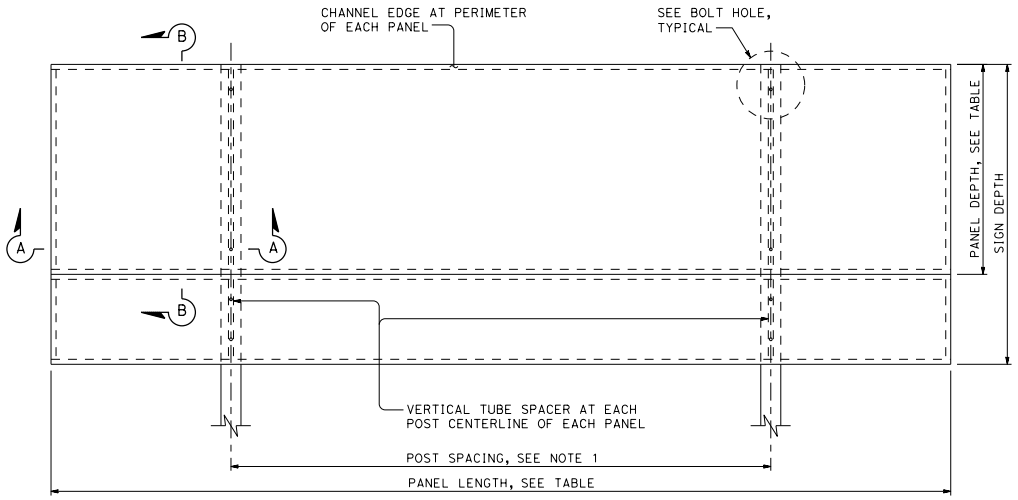
NO SCALE

S82

7-1-25

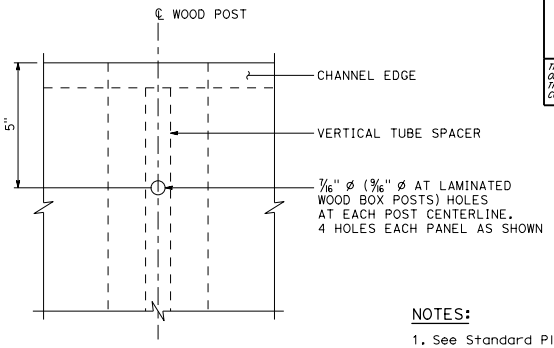
2025 STANDARD PLAN S82

Return to Table of Contents

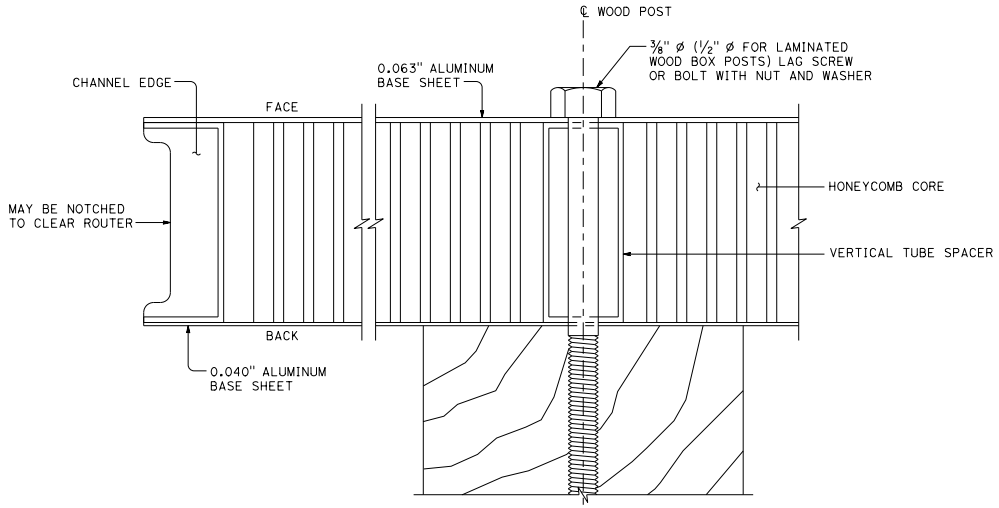



## FACE VIEW OF LAMINATED PANEL

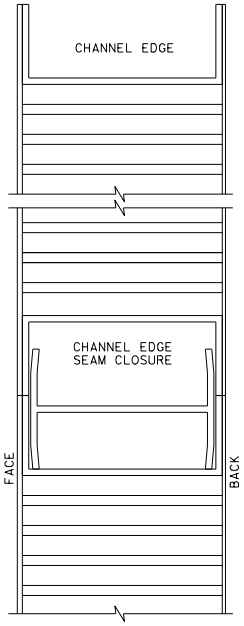
Two panels shown, see Note 6




## BOLT HOLE (TYPICAL)




## SECTION A-A




## SECTION B-B

NOTES:

1. See Standard Plan S85 for post spacing table.
2. See Standard Plan S86 for extrusion details.
3. All horizontal extrusions shall be continuous.
4. Depth and length of panel shall be graduated in increments of 6".
5. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
6. Place three 1/8" ø weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

TABLE

| TYPE B PANEL 2½" THICK | |
|---|---|
| PANEL DEPTH | PANEL LENGTH |
| 5'-0" | 15'-6" TO 16'-6" |
| 4'-6" | 15'-6" TO 18'-6" |
| 4'-0" | 15'-6" TO 20'-6" |
| 3'-6" | 15'-6" TO 23'-6" |
| 3'-0" | 15'-6" TO 24'-0" |
| 2'-6" | 15'-6" TO 24'-0" |
| 2'-0" | 15'-6" TO 24'-0" |
| 1'-6" | 15'-6" TO 24'-0" |

See Note 4

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Mario Lozano-Cisneros — No. C94626 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE LAMINATED SIGN SINGLE OR MULTIPLE PANEL (TYPE B, 2½" THICK)

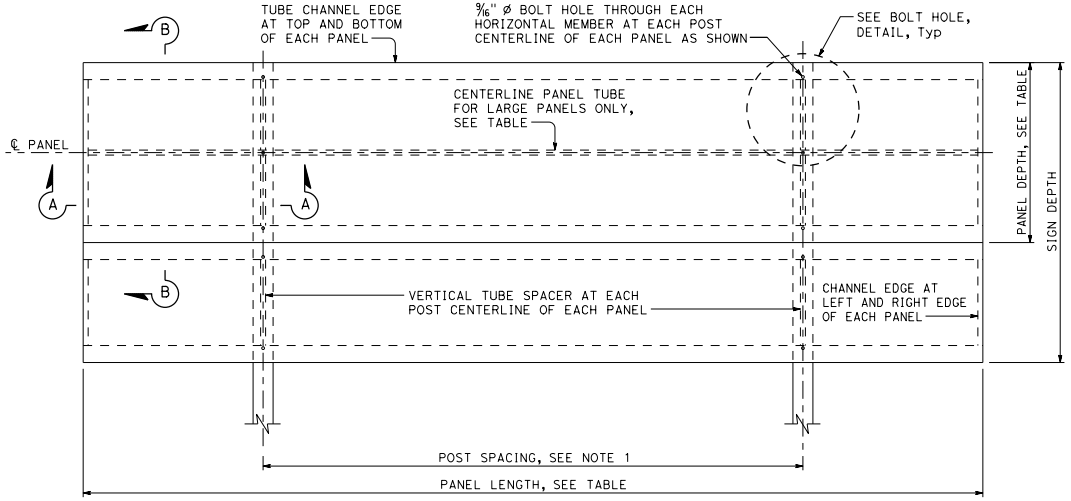
NO SCALE

S83

7-1-25

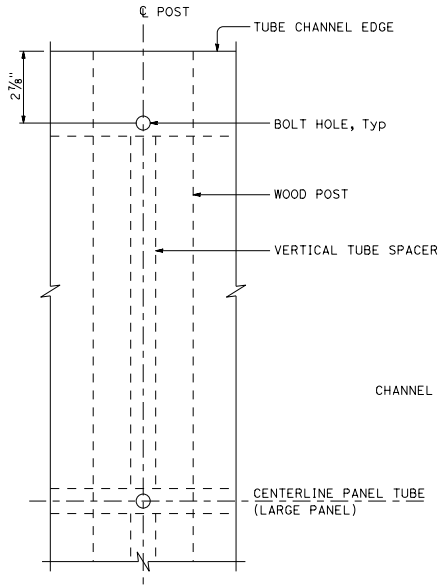
2025 STANDARD PLAN S83

Return to Table of Contents



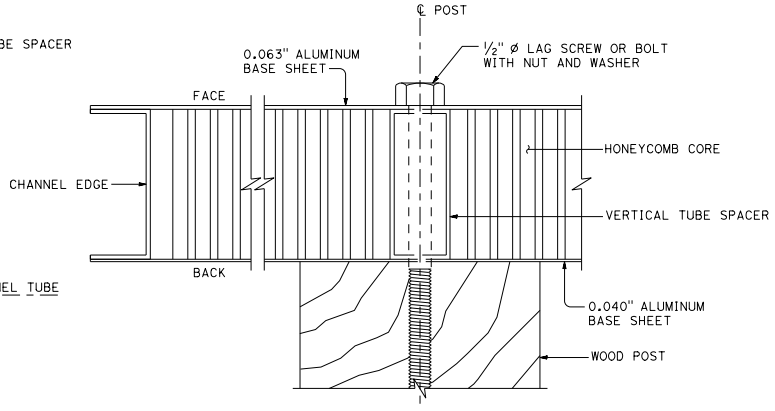

## FACE VIEW OF LAMINATED PANEL

Two panels shown, see Note 7

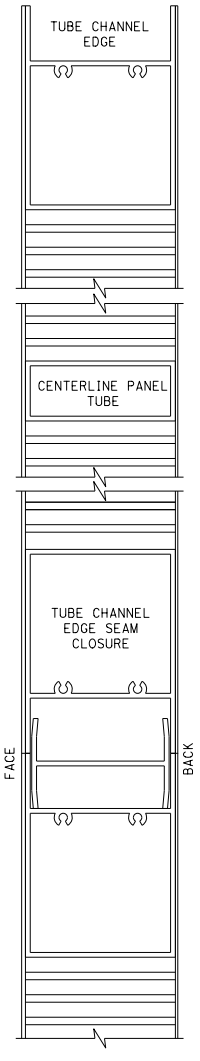



## BOLT HOLE DETAIL

Large panel shown




## SECTION A-A




## SECTION B-B

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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NOTES:

1. See Standard Plan S85 for post spacing table.
2. See Standard Plan S86 for extrusion details.
3. All horizontal extrusions shall be continuous.
4. Depth and length of panel shall be graduated in increments of 6".
5. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
6. Panels with the dimensions shown in Table A are designated as large panels.
7. Place three 1/8" Ø weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

**TABLE A**

| PANEL DEPTH | PANEL LENGTH |
|---|---|
| 5'-0" | 17'-0" TO 24'-0" |
| 4'-6" | 19'-0" TO 24'-0" |
| 4'-0" | 21'-0" TO 24'-0" |
| 3'-6" | 24'-0" |

See Notes 4 and 6

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE LAMINATED SIGN SINGLE OR MULTIPLE PANEL (TYPE H, 2½" THICK)

NO SCALE

S84

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

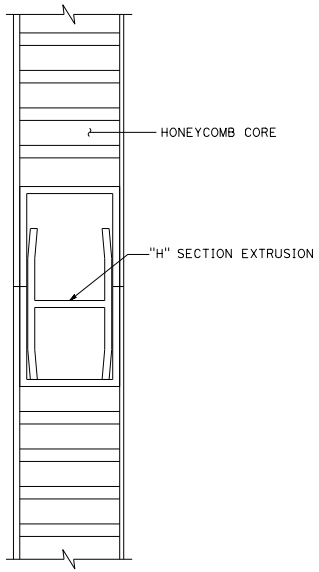
Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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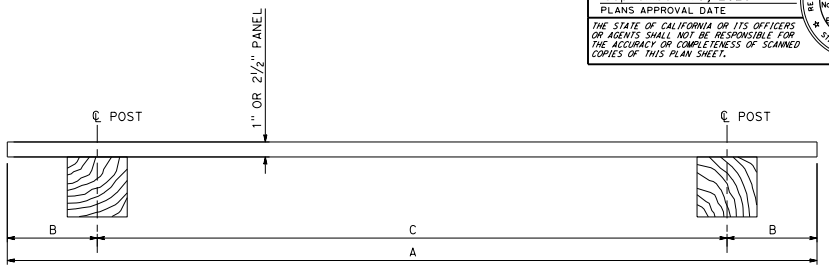



TYPICAL SEAM CLOSURE DETAIL

| PANEL LENGTH | CLOSURE LENGTH | NUMBER OF PIECES AND LENGTH REQUIRED |
|---|---|---|
| 3'-6" 4'-0" | 3'-0" 3'-6" | ONE 3'-0" ONE 3'-6" |
| 4'-6" 5'-0" | 4'-0" 4'-6" | ONE 4'-0" ONE 4'-6" |
| 5'-6" 6'-0" | 5'-0" 5'-6" | ONE 5'-0" ONE 5'-6" |
| 6'-6" 7'-0" | 6'-0" 6'-6" | TWO 3'-0" ONE 3'-0", ONE 3'-6" |
| 7'-6" 8'-0" | 7'-0" 7'-6" | TWO 3'-6" ONE 3'-6", ONE 4'-0" |
| 8'-6" 9'-0" | 8'-0" 8'-6" | TWO 4'-0" ONE 4'-0", ONE 4'-6" |
| 9'-6" 10'-0" | 9'-0" 9'-6" | TWO 4'-6" ONE 4'-6", ONE 5'-0" |
| 10'-6" 11'-0" | 10'-0" 10'-6" | TWO 5'-0" ONE 5'-0", ONE 5'-6" |
| 11'-6" 12'-0" | 11'-0" 11'-6" | TWO 5'-6" TWO 4'-0", ONE 3'-6" |
| 12'-6" 13'-0" | 12'-0" 12'-6" | THREE 4'-0" TWO 4'-0", ONE 4'-6" |
| 13'-6" 14'-0" | 13'-0" 13'-6" | TWO 4'-6" THREE 4'-6", ONE 4'-0" |
| 14'-6" 15'-0" | 14'-0" 14'-6" | TWO 4'-6", ONE 5'-0" TWO 5'-0", ONE 4'-6" |
| 15'-6" 16'-0" | 15'-0" 15'-6" | THREE 5'-0" TWO 5'-6", ONE 4'-6" |
| 16'-6" 17'-0" | 16'-0" 16'-6" | TWO 5'-6" THREE 5'-6", ONE 5'-0" |
| 18'-6" 18'-0" | 17'-0" 17'-6" | THREE 4'-0", ONE 5'-0" THREE 4'-6", ONE 4'-0" |
| 18'-6" 19'-0" | 18'-0" 18'-6" | FOUR 4'-6" THREE 4'-6", ONE 5'-0" |
| 19'-6" 20'-0" | 19'-0" 19'-6" | THREE 5'-0", ONE 4'-0" THREE 5'-0", ONE 4'-6" |
| 20'-6" 21'-0" | 20'-0" 20'-6" | FOUR 5'-0" THREE 5'-6", ONE 4'-0" |
| 21'-6" 22'-0" | 21'-0" 21'-6" | THREE 5'-6", ONE 4'-6" THREE 5'-6", ONE 5'-0" |
| 22'-6" 23'-0" | 22'-0" 22'-6" | FOUR 5'-6" FIVE 4'-6" |
| 23'-6" 24'-0" | 23'-0" 23'-6" | FOUR 4'-6", ONE 5'-0" THREE 4'-6", TWO 5'-0" |

"H" sections will be set in 3" from edge of panels to allow for rivet clearance in borders. Standard length in stock: 3'-0", 3'-6", 4'-0", 4'-6", 5'-0" and 5'-6".

SEAM CLOSURE
"H" SECTION EXTRUSION




PLAN VIEW

| 1" PANEL | | | |
|---|---|---|---|
| LENGTH OF SIGN A | NUMBER OF POSTS | OVERHANG B | POST SPACING C |
| 4'-6" | 2 | 6" | 3'-6" |
| 5'-0" | 2 | 9" | 3'-6" |
| 5'-6" | 2 | 1'-0" | 3'-6" |
| 6'-0" | 2 | 1'-0" | 4'-0" |
| 6'-6" | 2 | 1'-3" | 4'-0" |
| 7'-0" | 2 | 1'-3" | 4'-6" |
| 7'-6" | 2 | 1'-6" | 4'-6" |
| 8'-0" | 2 | 1'-6" | 5'-0" |
| 8'-6" | 2 | 1'-8" | 5'-2" |
| 9'-0" | 2 | 1'-10" | 5'-4" |
| 9'-6" | 2 | 1'-11" | 5'-8" |
| 10'-0" | 2 | 2'-0" | 6'-0" |
| 10'-6" | 2 | 2'-0" | 6'-6" |
| 11'-0" | 2 | 2'-0" | 7'-0" |
| 11'-6" | 2 | 2'-3" | 7'-0" |
| 12'-0" | 2 | 2'-6" | 7'-0" |
| 12'-6" | 2 | 2'-6" | 7'-6" |
| 13'-0" | 2 | 2'-6" | 8'-0" |
| 13'-6" | 2 | 2'-6" | 8'-6" |
| 14'-0" | 2 | 2'-6" | 9'-0" |
| 14'-6" | 2 | 3'-0" | 8'-6" |
| 15'-0" | 2 | 3'-0" | 9'-0" |

| 2½" PANEL | | | |
|---|---|---|---|
| LENGTH OF SIGN A | NUMBER OF POSTS | OVERHANG B | POST SPACING C |
| 15'-6" | 2 | 3'-0" | 9'-6" |
| 16'-0" | 2 | 3'-3" | 9'-6" |
| 16'-6" | 2 | 3'-3" | 10'-0" |
| 17'-0" | 2 | 3'-3" | 10'-6" |
| 17'-6" | 2 | 3'-6" | 10'-6" |
| 18'-0" | 2 | 3'-6" | 11'-0" |
| 18'-6" | 2 | 3'-9" | 11'-0" |
| 19'-0" | 2 | 3'-9" | 11'-6" |
| 19'-6" | 2 | 3'-9" | 12'-0" |
| 20'-0" | 2 | 4'-0" | 12'-0" |
| 20'-6" | 2 | 4'-0" | 12'-6" |
| 21'-0" | 2 | 4'-3" | 12'-6" |
| 21'-6" | 2 | 4'-3" | 13'-0" |
| 22'-0" | 2 | 4'-3" | 13'-6" |
| 22'-6" | 2 | 4'-6" | 13'-6" |
| 23'-0" | 2 | 4'-6" | 14'-0" |
| 23'-6" | 2 | 4'-6" | 14'-6" |
| 24'-0" | 2 | 4'-9" | 14'-6" |

STANDARD POST SPACING

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# SEAM CLOSURE, "H" SECTION EXTRUSION AND POST SPACING TABLES (MULTI-HORIZONTAL LAMINATED PANEL ALUMINUM SIGNS)

NO SCALE

S85

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

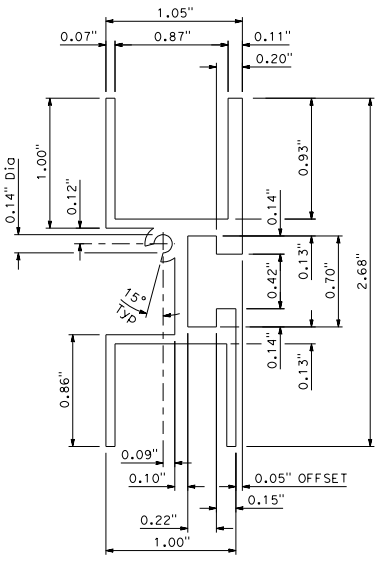
REGISTERED PROFESSIONAL ENGINEER — Mario Lozano-Cisneros — No. C94626 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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**TABLE**

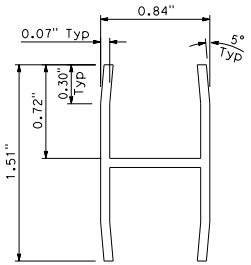
| EXTRUSION TYPE | 1" THICK PANEL | | 2½" THICK PANEL | |
|---|---|---|---|---|
| | TYPE A PANEL | TYPE B PANEL | TYPE B PANEL | TYPE H PANEL |
| CHANNEL EDGE | DETAIL No. 4 | DETAIL No. 4 | DETAIL No. 9 | DETAIL No. 9 |
| TUBE-CHANNEL EDGE | N/A | N/A | N/A | DETAIL No. 6 |
| MODIFIED "H" EDGE | DETAIL No. 1 | N/A | N/A | N/A |
| VERTICAL TUBE SPACER | N/A | DETAIL No. 3 | DETAIL No. 8 | N/A |
| VERTICAL TUBE SPACER (LARGE PANEL) | N/A | N/A | N/A | DETAIL No. 7 |
| ℄ PANEL TUBE (LARGE PANEL) | N/A | N/A | N/A | DETAIL No. 7 |
| SEAM CLOSURE "H" SECTION | DETAIL No. 2 | DETAIL No. 2 | DETAIL No. 5 | DETAIL No. 5 |

Note: All extrusions shall be aluminum alloy 6063-T6.

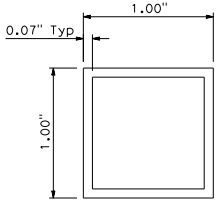



DETAIL No. 1

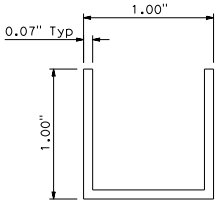
Unless noted, wall thickness is 0.07".



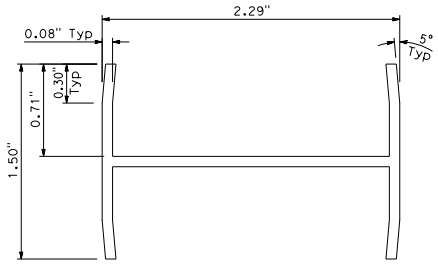

DETAIL No. 2



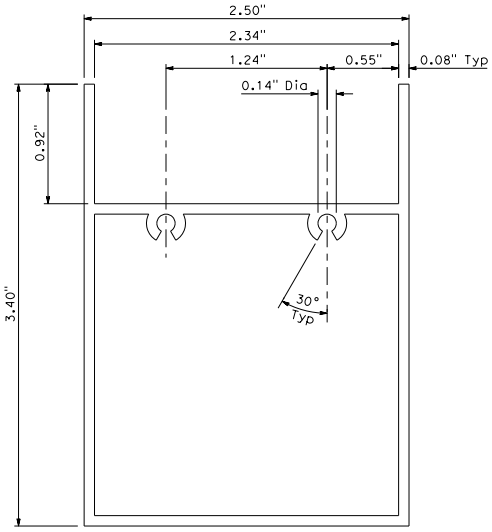

DETAIL No. 3



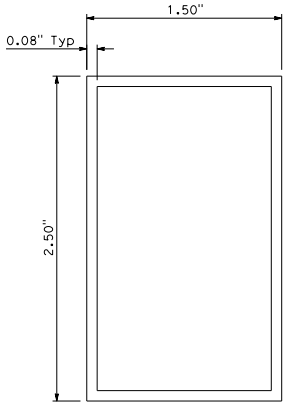

DETAIL No. 4



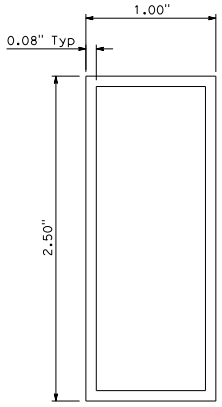

DETAIL No. 5



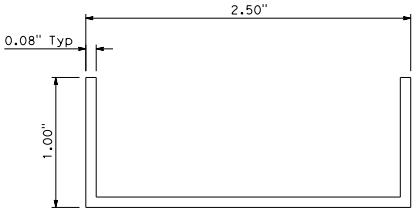

DETAIL No. 6




DETAIL No. 7




DETAIL No. 8




DETAIL No. 9

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# LAMINATED PANEL DETAILS (EXTRUSION FOR TYPES A, B, AND H PANELS)

NO SCALE

S86

7-1-25

2025 STANDARD PLAN S86

Return to Table of Contents

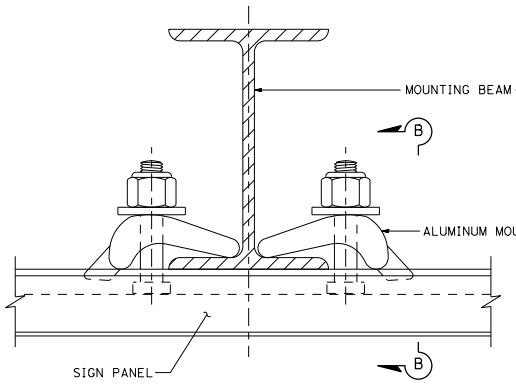
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

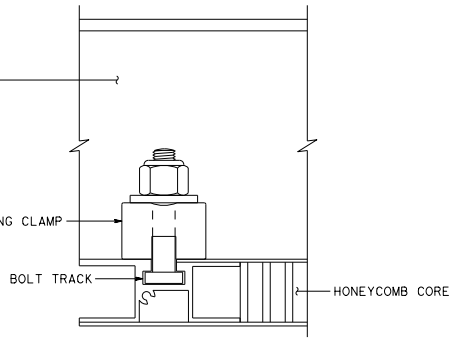
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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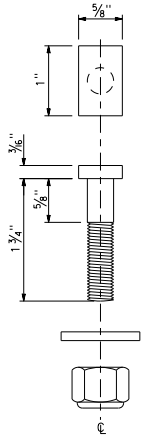



TYPICAL ALUMINUM CLAMP MOUNTING




SECTION B-B

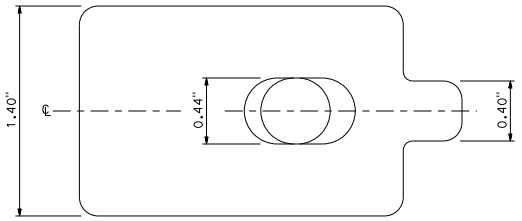
TYPICAL BOLTED CONNECTION TO STRUCTURE SUPPORT



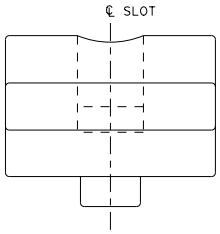

STAINLESS STEEL BOLT, WASHER AND NUT

NOTES:

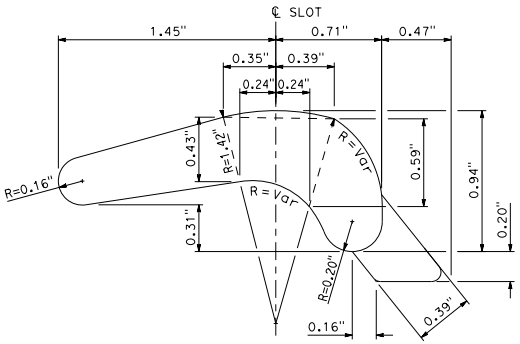
1. Refer to applicable Standard Plan for additional mounting details.
2. Rectangular head bolt, hexagon stop nut, and flat washer shall be 3/8" diameter (18-8) stainless steel.
3. One unit of Type A-1 hardware shall consist of two sets of these components: clamp, bolt, nut and washer.
4. Signs 9'-2" and 10'-0" in depth may be fabricated in three panel sections to avoid legend from being placed on a horizontal seam. Increase number of units of mounting hardware accordingly.




TOP VIEW




FRONT VIEW




SIDE VIEW

**TYPE A-1 HARDWARE QUANTITY TABLE**

| SIGN LENGTH | SIGN DEPTH SEE NOTE 4 | UNITS REQUIRED SEE NOTE 3 |
|---|---|---|
| 15'-0" OR LESS | 4'-2" TO 5'-0" | 4 |
| 16'-0" TO 24'-0" | 4'-2" TO 5'-0" | 6 |
| 15'-0" OR LESS | 5'-10" TO 10'-0" | 8 |
| 16'-0" TO 24'-0" | 5'-10" TO 10'-0" | 12 |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TYPE A-1 MOUNTING HARDWARE FOR OVERHEAD LAMINATED TYPE A PANEL (TRUSS AND LIGHTWEIGHT SIGN STRUCTURES)

NO SCALE

S87

7-1-25



Return to Table of Contents

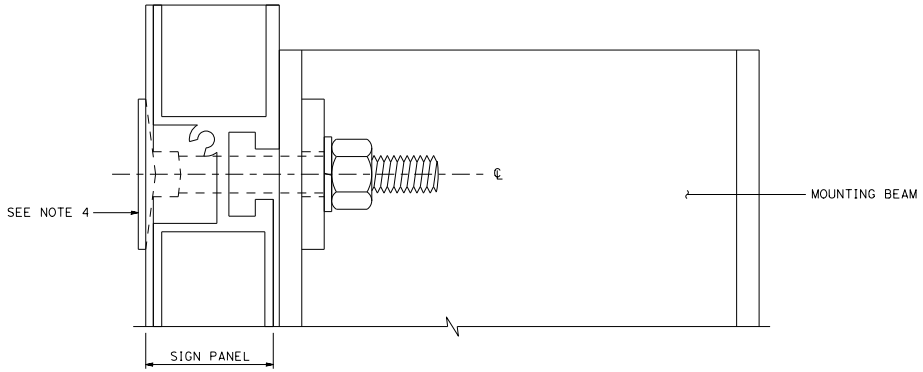
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

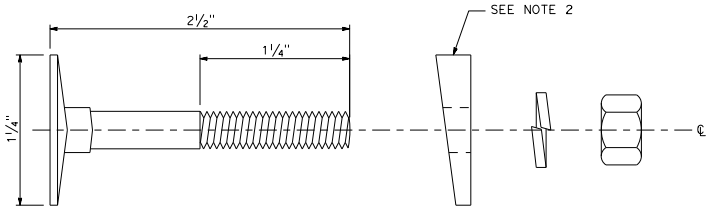
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Mario Lozano-Cisneros — No. C94626 — Exp. 3-31-27 — CIVIL — STATE OF CALIFORNIA

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SIDE VIEW




MOUNTING HARDWARE

NOTES:

1. Refer to applicable Standard Plan for additional mounting details.
2. Beveled washer for tapered flange only.
3. Elevator head bolt, hexagon nut, and lock washer shall be ⅝" diameter (18-8) stainless steel.
4. Furnish retroflective stick-ons for bolt head in same color as sign. Apply during installation.
5. One unit of Type A-2 hardware shall consist of one each; bolt, nut, lock washer and beveled washer. Quantity listed includes 1 spare unit.
6. Signs 9'-2" and 10'-0" in depth may be fabricated in three panel sections to avoid legend from being placed on a horizontal seam. Increase number of units of mounting hardware accordingly.

**A-2 HARDWARE QUANTITY TABLE (STANDARD TUBULAR)**

| SIGN LENGTH | SIGN DEPTH SEE NOTE 6 | UNITS REQUIRED SEE NOTE 5 |
|---|---|---|
| 14'-0" OR LESS | 4'-2" TO 5'-0" | 9 |
| 15'-0" TO 20'-0" | 4'-2" TO 5'-0" | 13 |
| 21'-0" TO 24'-0" | 4'-2" TO 5'-0" | 17 |
| 14'-0" OR LESS | 5'-10" TO 10'-0" | 17 |
| 15'-0" TO 20'-0" | 5'-10" TO 10'-0" | 25 |
| 21'-0" TO 24'-0" | 5'-10" TO 10'-0" | 33 |

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DEPARTMENT OF TRANSPORTATION

# TYPE A-2 MOUNTING HARDWARE FOR OVERHEAD LAMINATED TYPE A PANEL (BRIDGE MOUNTED AND TUBULAR SIGN STRUCTURES)

NO SCALE

S88

7-1-25



Return to Table of Contents

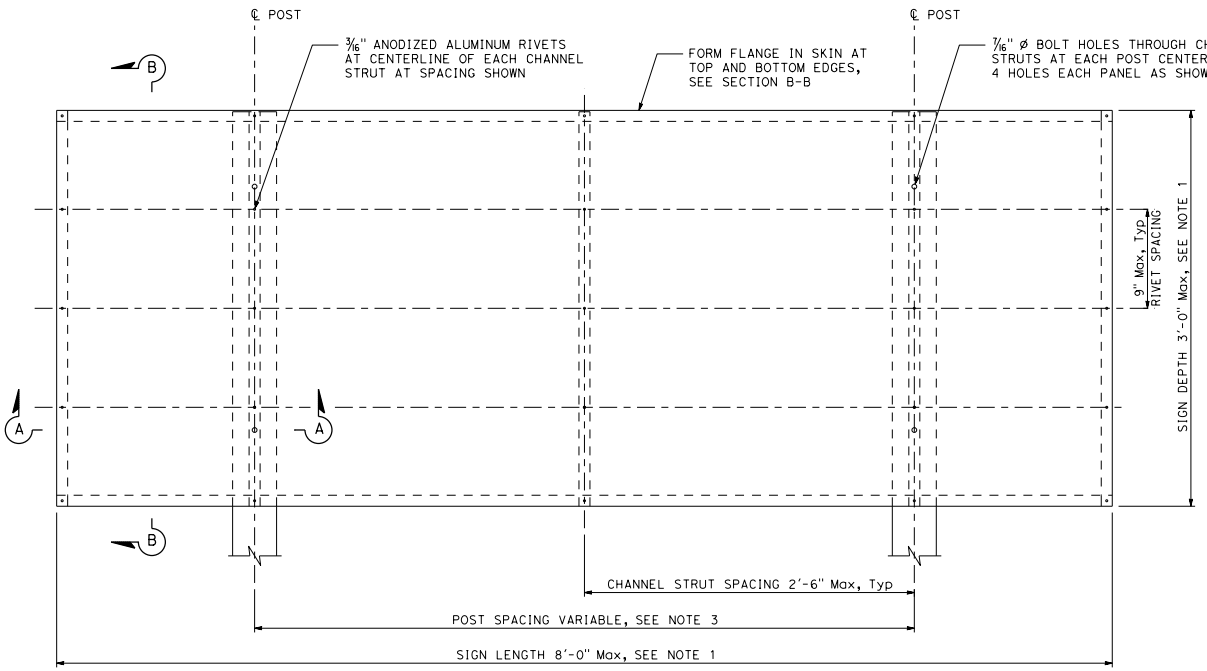
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

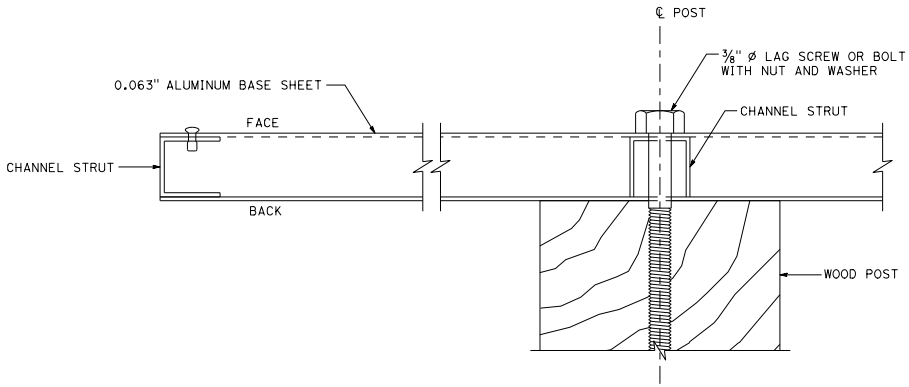
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

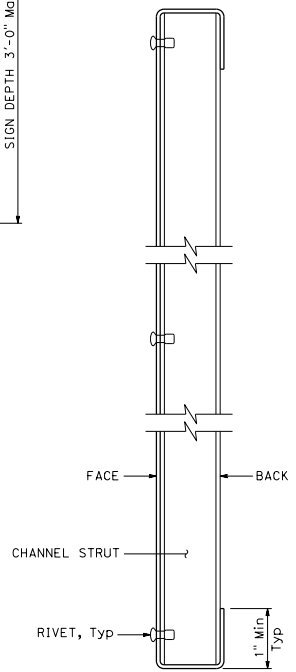
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FACE VIEW OF FORMED PANEL




SECTION A-A




SECTION B-B

NOTES:

1. Sign size to be graduated in 6" increments, both vertically and horizontally. Area of sign not to exceed 20 square feet.
2. Channel strut extrusions shall be 1" x 1" x 1/16" aluminum alloy 6063-T6.
3. See Standard Plan RS2 for post spacing and mounting details.

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# ROADSIDE SIGN FORMED SINGLE SHEET ALUMINUM PANEL

NO SCALE

S89

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

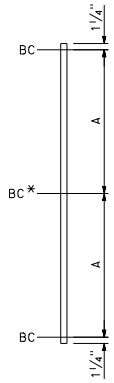
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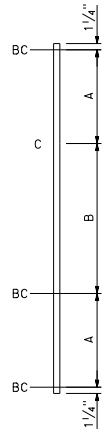
| PANEL DEPTH | DIMENSION A | DIMENSION B | DIMENSION D | TOTAL No. OF CHANNELS PER PANEL |
|---|---|---|---|---|
| 4′-2" | 1′-11¾" | | | 3 |
| 5′-0" | 2′-4¾" | | | 3 |
| 5′-10" | 1′-6¾" | 2′-6" | | 4 |
| 6′-8" | 1′-6¾" | 1′-8" | | 5 |
| 7′-6" | 1′-6¾" | 2′-6" | 1′-8" | 5 |
| 8′-4" | 1′-6¾" | 2′-6" | | 5 |
| 9′-2" | 1′-6¾" | 1′-8" | 2′-6" | 6 |
| 10′-0" | 1′-6¾" | 2′-6" | 1′-8" | 6 |

LEGEND:

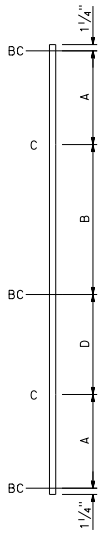
C - INDICATES LOCATION OF CHANNEL
BC - INDICATED LOCATION OF BOLT AND CHANNEL
* - THIS BOLT MAY BE OMITTED WHEN DEPTH IS 4′-2"



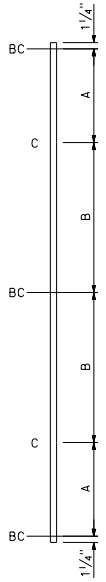

3 CHANNELS FOR
4′-2" AND 5′-0" DEPTH



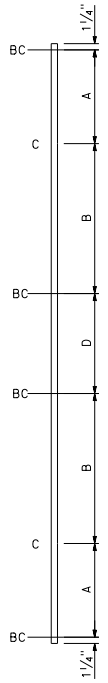

4 CHANNELS FOR
5′-10" DEPTH




5 CHANNELS FOR
7′-6" DEPTH




5 CHANNELS FOR
6′-8" AND 8′-4" DEPTH




6 CHANNELS FOR
9′-2" AND 10′-0" DEPTH

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# CHANNEL AND BOLT HOLE LOCATION FOR OVERHEAD FORMED SIGN PANEL

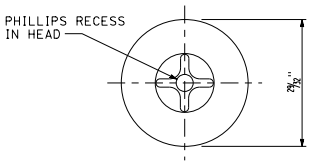
NO SCALE

S90

7-1-25

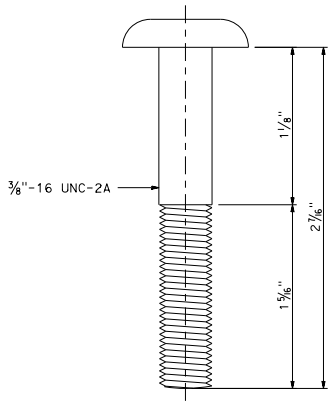


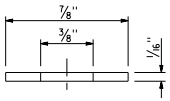
Return to Table of Contents




## TRUSS HEAD BOLT

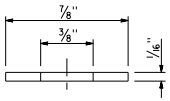
2024 Aluminum alloy per QQ-A-430 or ASTM B316
Anodize interstate green per MIL-A-8625



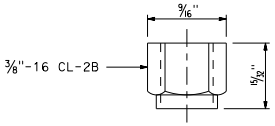

## WASHER

Fiber/Nylon




## WASHER

2024 Aluminum alloy
Clear anodize per MIL-A-8625




## LOCKNUT WITH NYLON INSERT

6061-T6 or 2011-T3 Aluminum alloy or equivalent
Anodize per MIL-A-8625
Maximum torque - 60 in-lbs

**MOUNTING HARDWARE QUANTITY CHART**

| SIGN LENGTH | SIGN DEPTH | NUMBER OF UNITS REQUIRED |
|---|---|---|
| 8'-0" | 4'-2" | 8 |
| 10'-0" TO 12'-0" | 4'-2" | 12 |
| 14'-0" TO 16'-0" | 4'-2" | 16 |
| 18'-0" TO 20'-0" | 4'-2" | 20 |
| 22'-0" TO 24'-0" | 4'-2" | 24 |
| 26'-0" TO 28'-0" | 4'-2" | 28 |
| 30'-0" TO 32'-0" | 4'-2" | 32 |
| 34'-0" TO 36'-0" | 4'-2" | 36 |
| 38'-0" TO 40'-0" | 4'-2" | 40 |
| 42'-0" TO 44'-0" | 4'-2" | 44 |
| 46'-0" TO 48'-0" | 4'-2" | 48 |
| 8'-0" | 5'-0" TO 8'-4" | 12 |
| 10'-0" TO 12'-0" | 5'-0" TO 8'-4" | 18 |
| 14'-0" TO 16'-0" | 5'-0" TO 8'-4" | 24 |
| 18'-0" TO 20'-0" | 5'-0" TO 8'-4" | 30 |
| 22'-0" TO 24'-0" | 5'-0" TO 8'-4" | 36 |
| 26'-0" TO 28'-0" | 5'-0" TO 8'-4" | 42 |
| 30'-0" TO 32'-0" | 5'-0" TO 8'-4" | 48 |
| 34'-0" TO 36'-0" | 5'-0" TO 8'-4" | 54 |
| 38'-0" TO 40'-0" | 5'-0" TO 8'-4" | 60 |
| 42'-0" TO 44'-0" | 5'-0" TO 8'-4" | 66 |
| 46'-0" TO 48'-0" | 5'-0" TO 8'-4" | 72 |
| 8'-0" | 9'-2" TO 10'-0" | 16 |
| 10'-0" TO 12'-0" | 9'-2" TO 10'-0" | 24 |
| 14'-0" TO 16'-0" | 9'-2" TO 10'-0" | 32 |
| 18'-0" TO 20'-0" | 9'-2" TO 10'-0" | 40 |
| 22'-0" TO 24'-0" | 9'-2" TO 10'-0" | 48 |
| 26'-0" TO 28'-0" | 9'-2" TO 10'-0" | 56 |
| 30'-0" TO 32'-0" | 9'-2" TO 10'-0" | 64 |
| 34'-0" TO 36'-0" | 9'-2" TO 10'-0" | 72 |
| 38'-0" TO 40'-0" | 9'-2" TO 10'-0" | 80 |
| 42'-0" TO 44'-0" | 9'-2" TO 10'-0" | 88 |
| 46'-0" TO 48'-0" | 9'-2" TO 10'-0" | 96 |

Unit - 1 Truss head bolt, 1 Nylon insert locknut,
1 washer (Fiber/Nylon), 1 washer (Aluminum)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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# OVERHEAD SIGN
# FORMED SIGN PANEL
# TYPE A-3 MOUNTING HARDWARE

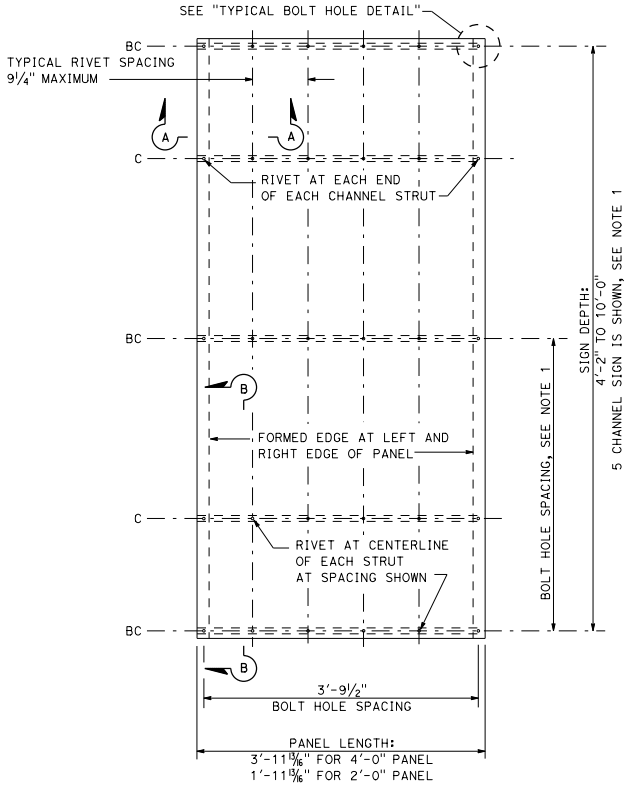
NO SCALE

S91

7-1-25

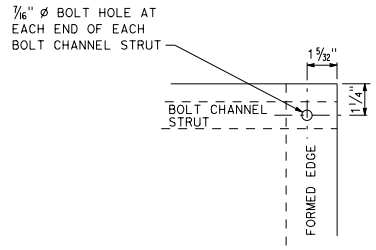


Return to Table of Contents




FACE VIEW OF FORMED PANEL

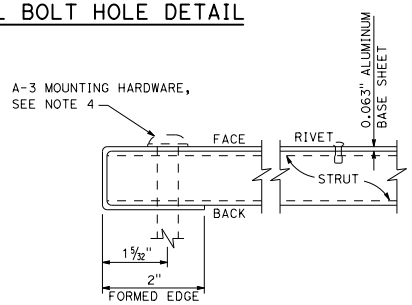
Single panel shown



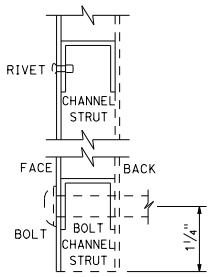

TYPICAL BOLT HOLE DETAIL

ABBREVIATIONS:

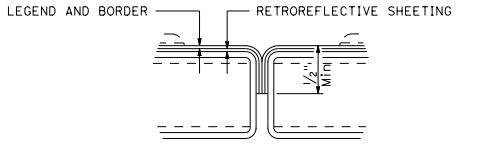
BC = Centerline of Bolt Channel Strut
C = Centerline of Channel Strut




SECTION A-A




SECTION B-B




RETROREFLECTIVE SHEETING OVERLAP
ON INTERIOR EDGES

Two panels shown

NOTES:

1. See Standard Plan S90 for location and configuration of struts.
2. Bolt channel and channel extrusions shall be 1" x 1" x 1/16" aluminum alloy 6063-T6.
3. See Standard Plan S21 for mounting details.
4. See Standard Plan S91 for A-3 mounting hardware.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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# OVERHEAD SIGN
# FORMED SIGN PANEL

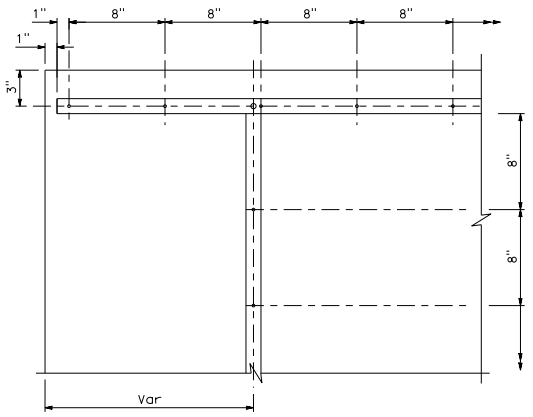
NO SCALE

S92

7-1-25

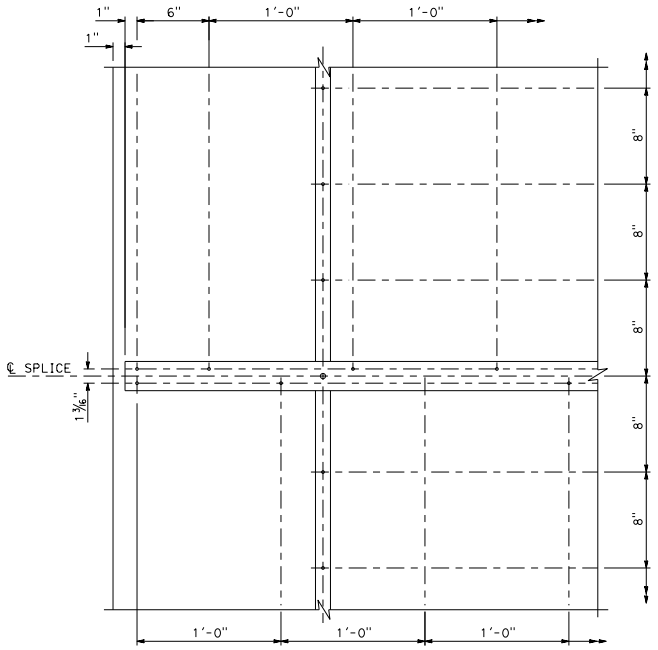
2025 STANDARD PLAN S92

Return to Table of Contents




TYPICAL RIVET

DETAIL A

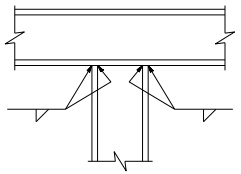



RIVET AT SPLICE

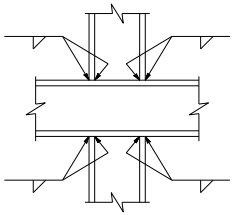
DETAIL B

## CHANNEL SIZES

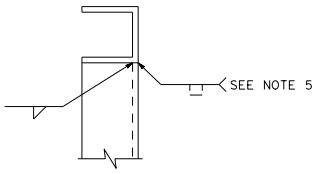
| SIGN LENGTH | SIGN DEPTH | PANEL THICKNESS | No. OF HORIZONTAL MEMBERS | No. OF VERTICAL MEMBERS | Horiz MEMBER TYPE | Vert MEMBER TYPE |
|---|---|---|---|---|---|---|
| UP TO 3'-11" | | 0.063" | NO FRAME REQUIRED | | | |
| 4'-0" TO 4'-7" | | 0.080" | NO FRAME REQUIRED | | | |
| 4'-8" TO 5'-10" | 1'-0" TO 2'-0" | 0.063" | 2 | | A | |
| | 2'-1" TO 3'-0" | 0.063" | 2 | 2 | A | A |
| | 3'-1" TO 4'-0" | 0.063" | 2 | 3 | A | A |
| | 4'-1" TO 8'-0" | 0.063" | 3 | 3 | B | A |
| 6'-0" TO 6'-6" | 1'-0" TO 2'-0" | 0.063" | 2 | | A | |
| | 2'-1" TO 3'-0" | 0.063" | 2 | 2 | A | A |
| | 3'-1" TO 4'-0" | 0.063" | 2 | 3 | A | A |
| | 4'-1" TO 6'-0" | 0.063" | 3 | 3 | B | B |
| | 6'-1" TO 8'-0" | 0.063" | 3 | 3 | C | C |
| 6'-8" TO 7'-6" | 1'-6" TO 4'-0" | 0.080" | 2 | 3 | B | B |
| | 4'-1" TO 6'-0" | 0.080" | 3 | 3 | B | B |
| | 6'-1" TO 8'-0" | 0.080" | 3 | 3 | C | C |
| 7'-8" TO 8'-6" | 1'-6" TO 4'-0" | 0.080" | 2 | 3 | B | B |
| | 4'-1" TO 8'-0" | 0.080" | 3 | 3 | C | C |
| 8'-8" TO 9'-6" | 1'-6" TO 4'-0" | 0.080" | 2 | 3 | B | B |
| | 4'-1" TO 8'-0" | 0.080" | 3 | 3 | C | C |
| 9'-8" TO 11'-0" | 1'-6" TO 4'-0" | 0.080" | 2 | 3 | C | C |
| | 4'-1" TO 8'-0" | 0.080" | 3 | 3 | C | C |
| | 8'-1" TO 11'-0" | 0.080" | 4 | 3 | C | C |



TOP VIEW

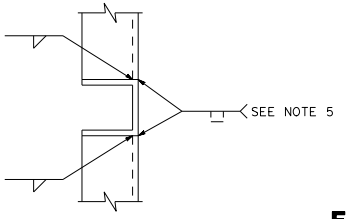


TOP VIEW




SIDE VIEW

WELD DETAIL No. 1




SIDE VIEW

WELD DETAIL No. 2

TYPICAL WELD DETAILS

NOTES:

1. Type A - 1¼" x 1¼" x ⅛" channel to be aluminum alloy 6063-T5.
2. Type B - 2⅜" x 1¼" x 3/16" channel to be aluminum alloy 6063-T6.
3. Type C - 2" x 2" x ¼" channel to be aluminum alloy 6063-T6.
4. 1¾" x 1½" x ⅛" rectangular tubing aluminum alloy 6063-T6 may be substituted for Types B and C, but more than one type of framing material used on one sign is unacceptable.
5. For rectangular tubing, weld all around and grind beads flush where weld contacts sign panel.

## POST SPACING

| SIGN LENGTH | CENTERLINE SPACING |
|---|---|
| 4'-8" TO 5'-8" | 3'-6" |
| 5'-10" TO 6'-8" | 4'-0" |
| 6'-10" TO 7'-8" | 4'-6" |
| 7'-10" TO 8'-2" | 5'-0" |
| 8'-4" TO 8'-8" | 5'-2" |
| 8'-10" TO 9'-2" | 5'-4" |
| 9'-4" TO 9'-8" | 5'-8" |
| 9'-10" TO 10'-2" | 6'-0" |
| 10'-4" TO 10'-10" | 6'-6" |
| 10'-11" TO 11'-0" | 7'-0" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# FRAMING DETAILS FOR FRAMED SINGLE SHEET ALUMINUM SIGNS, RECTANGULAR SHAPE

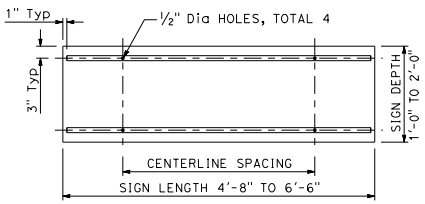
NO SCALE

S93

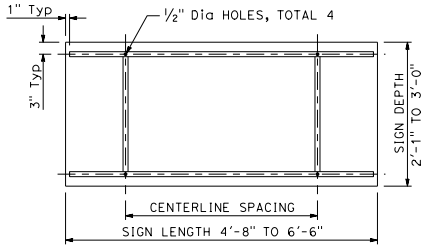
7-1-25



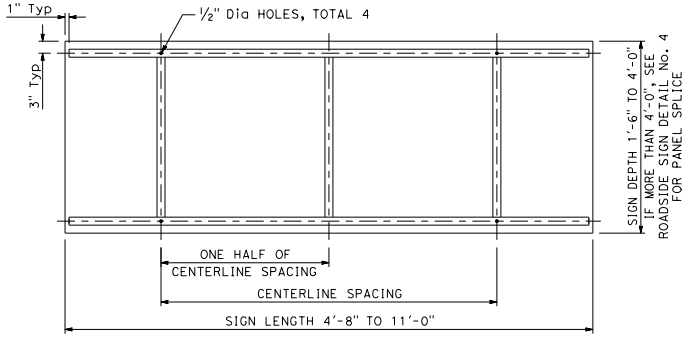
Return to Table of Contents




ROADSIDE SIGN DETAIL No. 1



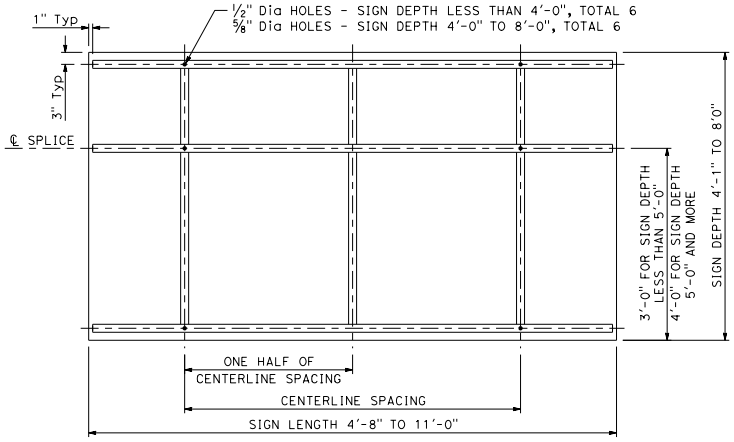

ROADSIDE SIGN DETAIL No. 2



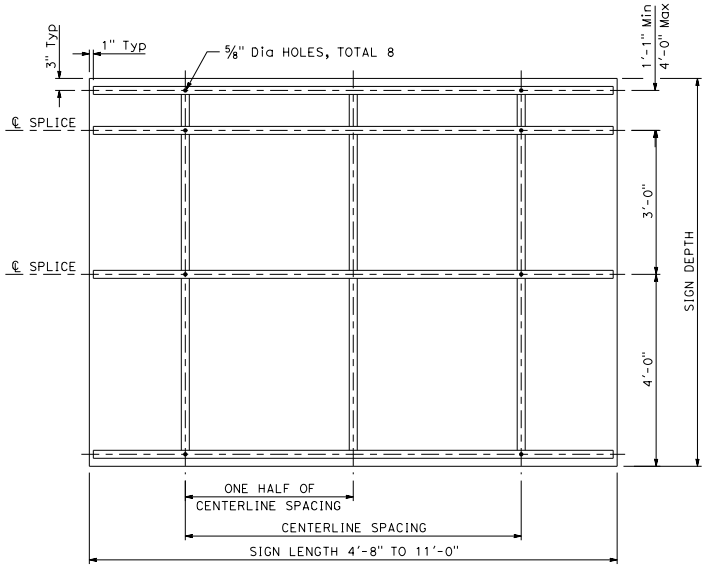

ROADSIDE SIGN DETAIL No. 3

NOTES:

1. See Standard Plan S93 for framing details.
2. All members welded at joints as shown on Standard Plan S93.




ROADSIDE SIGN DETAIL No. 4




ROADSIDE SIGN DETAIL No. 5

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Mario Lozano-Cisneros
No. C94626
Exp. 3-31-27
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE FRAMED SINGLE SHEET ALUMINUM SIGNS, RECTANGULAR SHAPE

NO SCALE

S94

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Mario Lozano
REGISTERED CIVIL ENGINEER

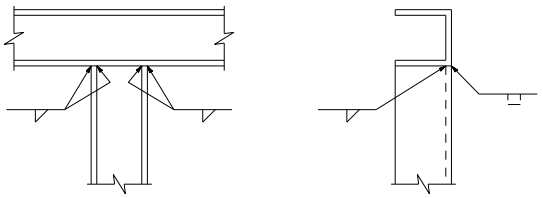
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Mario Lozano-Cisneros — No. C94626 — Exp. 3-31-27 CIVIL — STATE OF CALIFORNIA

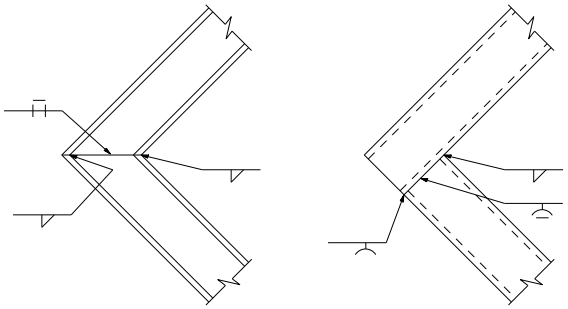
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**CHANNEL SIZES**

| SIGN SIZE | PANEL THICKNESS | FRAME TYPE |
|---|---|---|
| 4'-0" x 4'-0" | 0.063" | NO FRAME REQUIRED |
| 4'-0" x 4'-0" | 0.080" | NO FRAME REQUIRED |
| 5'-0" x 5'-0" | 0.080" | SEE ROADSIDE SIGN DETAIL No. 6 |
| 6'-0" x 6'-0" | 0.080" | SEE ROADSIDE SIGN DETAIL No. 7 |
| 8'-0" x 8'-0" | 0.080" | SEE ROADSIDE SIGN DETAIL No. 8 |

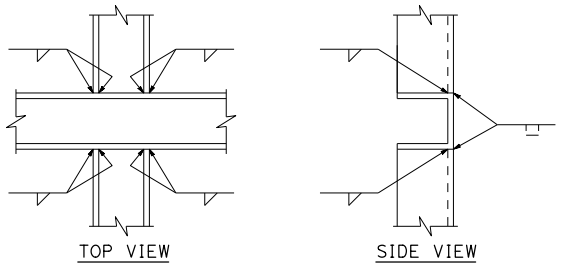



WELD DETAIL No. 3



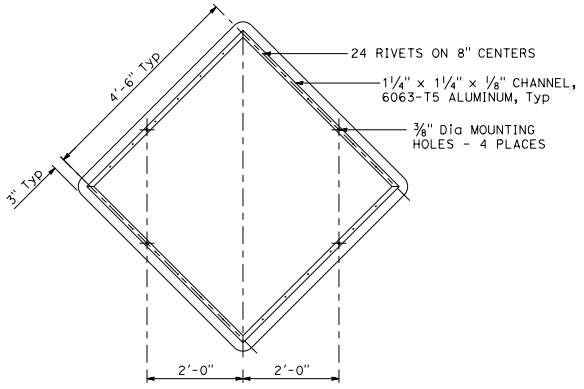

WELD DETAIL No. 4

ALTERNATE WELD DETAIL No. 4A
Weld all around outside

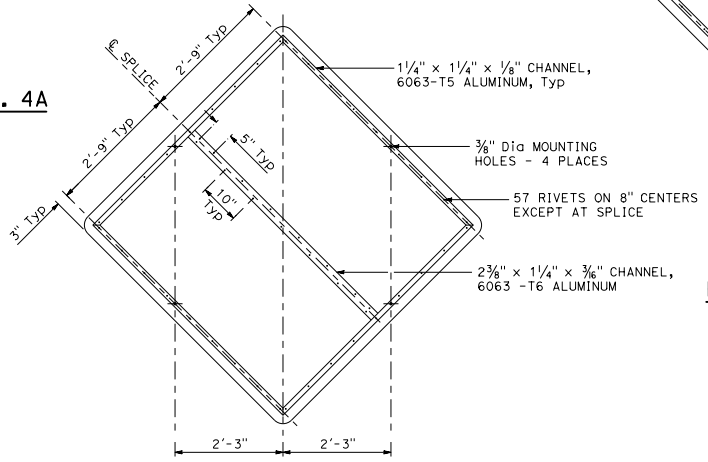



WELD DETAIL No. 5

TYPICAL WELD DETAILS

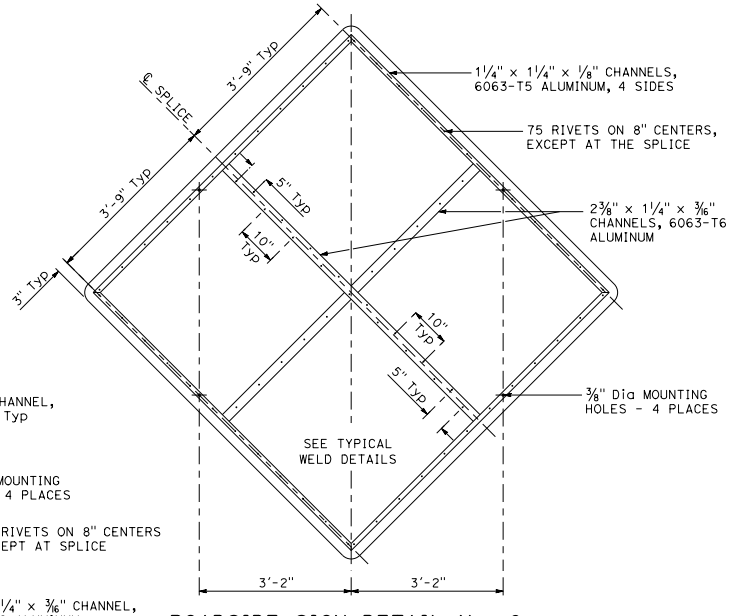



ROADSIDE SIGN DETAIL No. 6
Framing detail for 5'-0" x 5'-0" diamond.




ROADSIDE SIGN DETAIL No. 7
Framing detail for 6'-0" x 6'-0" diamond.
Made from 2 - 3'-0" x 6'-0" panels,
spliced and braced by channels as shown.

NOTE:
1. All channel members welded at joints as shown on this plan.




ROADSIDE SIGN DETAIL No. 8
Framing detail for 8'-0" x 8'-0" diamond.
Made from 2 - 4'-0" x 8'-0" panels,
spliced and braced by channels as shown.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ROADSIDE SINGLE SHEET ALUMINUM SIGNS, DIAMOND SHAPE

NO SCALE

S95

7-1-25

502

2025 STANDARD PLAN S95

Return to Table of Contents

## INSTRUCTIONS TO FABRICATOR

PROJECT PLANS SHOW:

1. Sign structure location.
2. Length of structure frame.
3. Panel size and locations on structure.
4. Walkway length for two post signs.
5. Post type and height to bottom of frame.
6. Base plate elevation.
7. Pedestal height and shape, if applicable.
8. Location of pile foundation.
9. Photoelectric unit location if required.

REFER TO THE FOLLOWING STANDARD PLANS FOR DETAILS NOT SHOWN ON PROJECT PLANS:

SHEET No. SHEET NAME

S100 Overhead Signs-Versatile Truss, One and Two Post Type

ONE POST TYPE SHEETS

S101 Overhead Signs-Versatile Truss, One Post Type, Truss Layout
S102 Overhead Signs-Versatile Truss, One Post Type, Steel Post Type and Truss Member Table
S103 Overhead Signs-Versatile Truss, One Post Type, Steel Post Base Plate and Anchorage Details
S104 Overhead Signs-Versatile Truss, One Post Type, CIDH Pile Foundation Details
S105 Overhead Signs-Versatile Truss, One Post Type, Concrete Pedestal with CIDH Pile Foundation Details

TWO POST TYPE SHEETS

S106 Overhead Signs-Versatile Truss, Two Post Type, Truss Layout
S107 Overhead Signs-Versatile Truss, Two Post Type, Steel Post Type and Truss Member Table
S108 Overhead Signs-Versatile Truss, Two Post Type, Steel Post Base Plate and Anchorage Details
S109 Overhead Signs-Versatile Truss, Two Post Type, CIDH Pile Foundation Details
S110 Overhead Signs-Versatile Truss, Two Post Type, Concrete Pedestal with CIDH Pile Foundation Details

COMMOM ELEMENTS SHEETS

S111 Overhead Signs-Versatile Truss, Truss Connection Details
S112 Overhead Signs-Versatile Truss, Chord Splice Details
S113 Overhead Signs-Versatile Truss, Truss To Steel Post Connection Details
S114 Overhead Signs-Versatile Truss, CIDH Pile Foundation with Inspection Pipes
S115 Overhead Signs-Versatile Truss, Walkway Details No. 1
S116 Overhead Signs-Versatile Truss, Walkway Details No. 2
S117 Overhead Signs-Versatile Truss, Walkway Details No. 3
S118 Overhead Signs-Versatile Truss, Walkway Safety Railing Details
S119 Overhead Signs-Versatile Truss, Sign Mounting Details Laminated Panel-Type A
S120 Overhead Signs-Versatile Truss, Removable Sign Panel Frames Details No. 1
S121 Overhead Signs-Versatile Truss, Removable Sign Panel Frames Details No. 2
S122 Overhead Signs-Versatile Truss, Exit Plaque Mounting Details
S123 Overhead Signs-Versatile Truss, CMS Mounting Details
S123B Overhead Signs-Versatile Truss, Additional Details for CMS
S124 Overhead Signs-Versatile Truss, EMS and Flashing Beacon Details

## DESIGN NOTES:

WIND LOADING:
Wind loading per AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition, 2013 with 2015 interim revisions.

Design wind speed (V) = 100 mph
Importance factor (Ir) = 1.0
Velocity conversion factor (Cv) = 1.0
Height and exposure factor (Kz) = 1.18
Gust effect factor (G) = 1.14

WALKWAY LOADING:
Dead load plus 500 lb concentrated live load.

CMS LOADING:

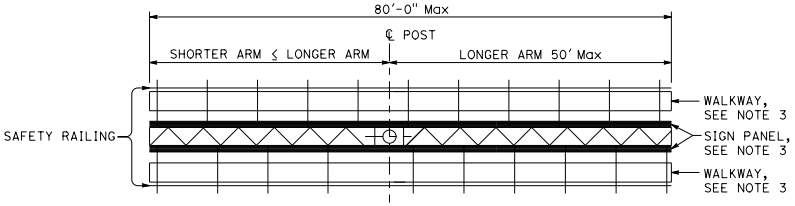
| CMS Load Case | Max Size (W x H x D) | Max Weight (lb) | Max Ave Weight Per Unit Length |
|---|---|---|---|
| Case 1 | 310" x 90" x 18" | 2400 | 100 lb/ft |
| Case 2 | 175" x 60" x 16" | 2000 | 140 lb/ft |

MATERIALS & UNIT STRESSES:

| | |
|---|---|
| Structural Steel: | fy = 50 ksi |
| Steel Posts: | Dia ≤ 24" fy = 35 ksi |
| | Dia > 24" fy = 50 ksi |
| Base Plates: | fy = 50 ksi |
| Anchor Bolts: | fy = 55 ksi |
| Reinforced Concrete: | fy = 60 ksi |
| | f'c = 4 ksi |

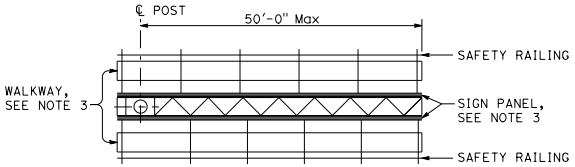
SOIL PARAMETERS FOR CIDH FOUNDATION:
Minimum Soil Shear Strength: 1.5 ksf (cohesive soils)
Minimum Soil Friction Angle: 30° (non-cohesive soils)
Minimum Unit weight of soil: 120 pcf (non-cohesive soils)

MINIMUM CLEARANCE:
Vertical roadway clearance 18'-6" (bottom of frame/sign/CMS/walkway)



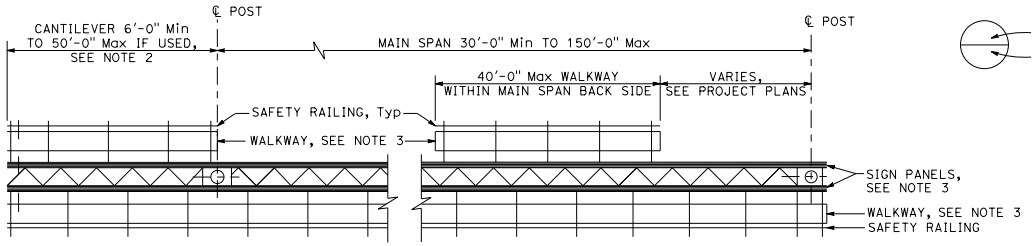

PLAN

### UNBALANCED ONE POST TYPE MAXIMUM COVERAGE




PLAN

### CANTILEVER ONE POST TYPE MAXIMUM COVERAGE




PLAN

### TWO POST TYPE WITH CANTILEVER MAXIMUM COVERAGE

NOTES:

1. Signs are shown and dimensioned looking in the direction of traffic. Double faced signs are shown and dimensioned looking ahead along stationing.
2. For Two Post Type, maximum cantilever length ≤ main span length/3.
3. For cantilever lengths ≤ 40'-0", sign panels and walkways may be placed on both sides of truss. For cantilever lengths > 40'-0" and ≤ 50'-0", sign panels and walkways may only be placed on one side of truss.
4. A single Changeable Message Sign (CMS) may be placed anywhere on the truss. CMS and static sign panels may be placed on the same truss.
5. Refer to Standard Plan S123 for CMS mounting details.
6. Place walkway and safety railing on truss only when called out on the project plans. When required, walkway to be continuous for entire length of frame for one post signs. For two post signs, see Project Plans. Safety railing to run the entire length of walkway.
7. Thread locking nuts or locking washers shall be used for all connections, unless noted otherwise.
8. All high strength (HS) bolts are to be snug tightened unless otherwise noted on the plans.
9. All welds are continuous unless otherwise noted on the plans.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS ONE AND TWO POST TYPE

NO SCALE

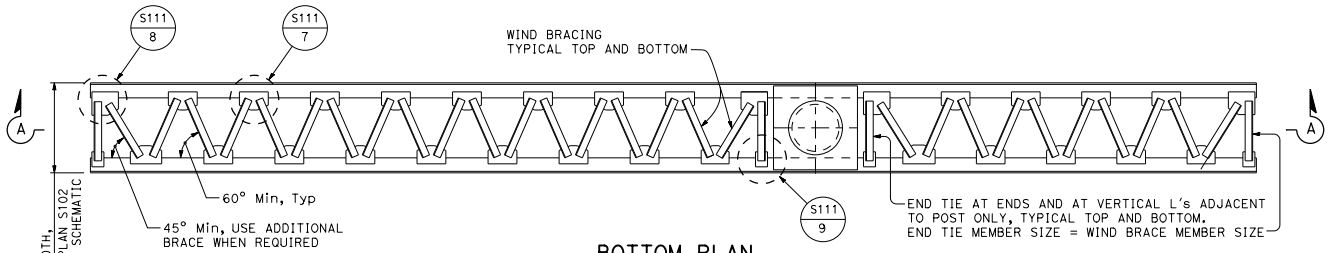
**S100**

2025 STANDARD PLAN S100



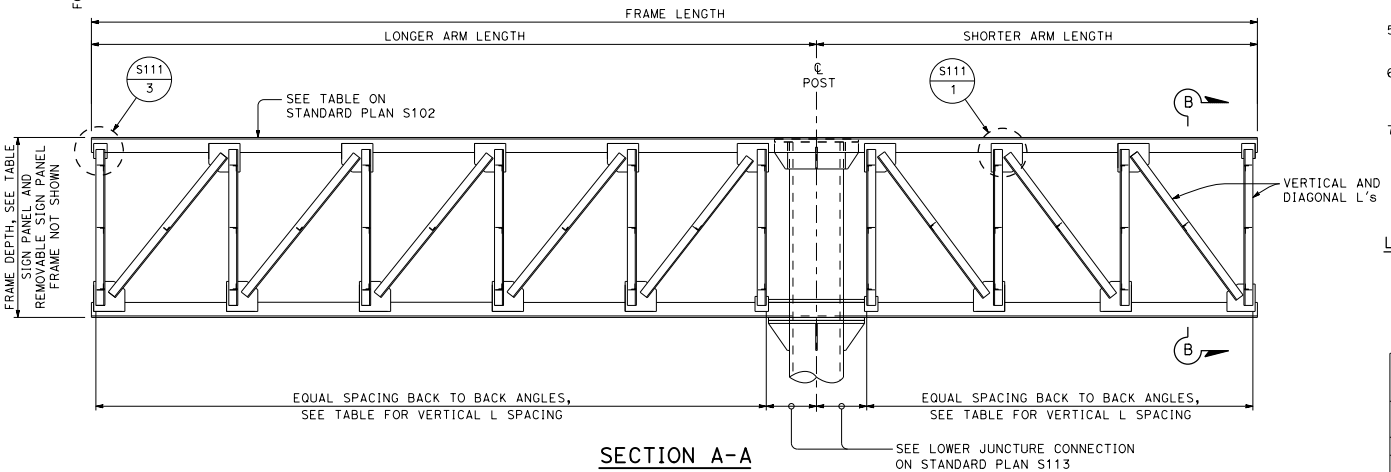
7-1-25

Return to Table of Contents



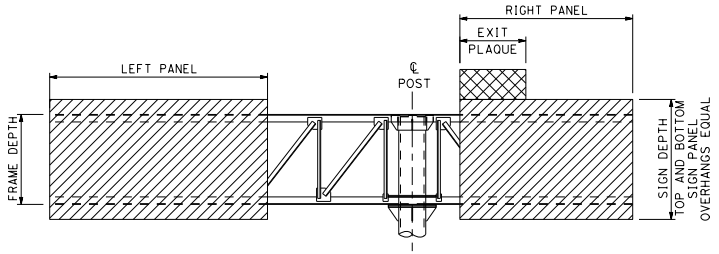

## BOTTOM PLAN

Vertical, diagonal and interior L members not shown.
Walkway not shown.




## SECTION A-A

Walkway and wind bracing not shown




## SIGN AND EXIT PLAQUE PLACEMENT

NOTE:
Equal sign panel overhangs apply to sign panels only. The exit plaque is mounted above sign panels and the walkway is mounted below the sign panels, when used.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

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NOTES:

1. For connection of frame to post, see Standard Plan S113.
2. For walkway details, see Standard Plans S115, S116, and S117.
3. For walkway length, see Standard Plan S100.
4. Minimum length of frame varies by frame depth, see Standard Plan S102.
5. For interior members, refer to Typical Section B-B on Standard Plan S111.
6. A single exit plaque may be placed above the sign, at any location on the truss. Maximum exit plaque length = 16'-0". Maximum exit plaque depth = 5'-0".
7. See Standard Plan S122 for Exit Plaque Mounting Details.

LEGEND:

SIGN PANEL

EXIT PLAQUE

**TRUSS FRAME DEPTH AND VERTICAL ANGLE SPACING TABLE**

| MAXIMUM SIGN PANEL DEPTH | FRAME DEPTH | MAXIMUM VERTICAL L SPACING |
|---|---|---|
| 80" | 60" | 45" |
| 180" | 72" | 54" |
| 240" | 120" | 90" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS ONE POST TYPE TRUSS LAYOUT

NO SCALE

**S101**



7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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## TRUSS MEMBER TABLE

SIGN PANEL DEPTH ≤ 80"

| LONGER ARM LENGTH L | FRAME DEPTH | ANGLE MEMBER SIZE AND MINIMUM OVERLAP LENGTH TO GUSSET PLATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CHORD | VERTICAL | $L_V$ | DIAGONAL | $L_d$ | WIND BRACE | $L_W$ | INTERIOR | $L_i$ |
| 10'-0" ≤ L ≤ 20'-0" | 60" | L4 x 4 x 3/8 | L3 x 2 x 3/8 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 20'-0" < L ≤ 30'-0" | 60" | L5 x 5 x 1/2 | L3 x 2 x 1/2 | 3 | L3 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 30'-0" < L ≤ 40'-0" | 60" | L5 x 5 x 1/2 | L5 x 3 1/2 x 1/2 | 3 | L4 x 4 x 1/2 | 4 | L2 1/2 x 2 1/2 x 1/4 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 40'-0" < L ≤ 50'-0" | 60" | L5 x 5 x 1/2 | L5 x 5 x 1/2 | 4 | L5 x 5 x 1/2 | 4 | L3 x 3 x 5/16 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |

80" < SIGN PANEL DEPTH ≤ 180"

| LONGER ARM LENGTH L | FRAME DEPTH | ANGLE MEMBER SIZE AND MINIMUM OVERLAP LENGTH TO GUSSET PLATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CHORD | VERTICAL | $L_V$ | DIAGONAL | $L_d$ | WIND BRACE | $L_W$ | INTERIOR | $L_i$ |
| 15'-0" ≤ L ≤ 20'-0" | 72" | L5 x 5 x 1/2 | L3 x 2 x 3/8 | 4 | L3 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 20'-0" < L ≤ 30'-0" | 72" | L5 x 5 x 1/2 | L3 x 3 x 3/8 | 3 | L4 x 4 x 1/2 | 4 | L2 1/2 x 2 1/2 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 30'-0" < L ≤ 40'-0" | 72" | L6 x 6 x 5/8 | L5 x 3 x 1/2 | 3 | L4 x 4 x 1/2 | 5 | L3 x 3 x 3/8 | 5 | L3 x 3 x 5/16 | 3 |
| 40'-0" < L ≤ 50'-0" | 72" | L6 x 6 x 3/4 | L5 x 3 1/2 x 3/4 | 3 | L5 x 5 x 1/2 | 5 | L4 x 3 x 3/8 | 5 | L3 x 3 x 5/16 | 3 |

180" < SIGN PANEL DEPTH ≤ 240"

| LONGER ARM LENGTH L | FRAME DEPTH | ANGLE MEMBER SIZE AND MINIMUM OVERLAP LENGTH TO GUSSET PLATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CHORD | VERTICAL | $L_V$ | DIAGONAL | $L_d$ | WIND BRACE | $L_W$ | INTERIOR | $L_i$ |
| 20'-0" | 120" | L6 x 6 x 5/8 | L3 x 3 x 3/8 | 4 | L5 x 5 x 1/2 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 20'-0" < L ≤ 30'-0" | 120" | L6 x 6 x 5/8 | L4 x 4 x 3/8 | 4 | L5 x 5 x 1/2 | 4 | L3 x 3 x 3/8 | 5 | L3 x 3 x 5/16 | 3 |
| 30'-0" < L ≤ 40'-0" | 120" | L6 x 6 x 1 | L5 x 3 x 1/2 | 3 | L5 x 5 x 1/2 | 4 | L3 x 3 x 3/8 | 5 | L3 x 3 x 5/16 | 3 |
| 40'-0" < L ≤ 50'-0" | 120" | L6 x 6 x 1 | L5 x 3 x 1/2 | 3 | L5 x 5 x 1/2 | 5 | L4 x 3 x 3/8 | 5 | L3 x 3 x 5/16 | 3 |

NOTE: All table dimensions are given in inches, unless otherwise noted.

## POST SELECTION TABLE

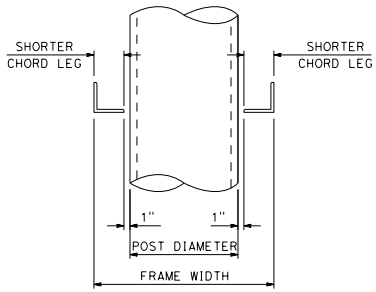
| SIGN PANEL DEPTH D | LONGER ARM LENGTH L | POST TYPE BY POST CLEAR HEIGHT | | | |
|---|---|---|---|---|---|
| | | ≤ 16 ft | ≤ 20 ft | ≤ 24 ft | ≤ 28 ft |
| D ≤ 80" | 20'-0" | 1A | 1A | 1A | 1B |
| | 20'-0" < L ≤ 30'-0" | 1B | 1B | 1D | 1D |
| | 30'-0" < L ≤ 40'-0" | 1C | 1D | 1D | 1F |
| | 40'-0" < L ≤ 50'-0" | 1F | 1F | 1F | 1F |
| 80" < D ≤ 100" | 20'-0" | 1A | 1A | 1B | 1C |
| | 20'-0" < L ≤ 30'-0" | 1B | 1D | 1D | 1E |
| | 30'-0" < L ≤ 40'-0" | 1D | 1D | 1F | 1F |
| | 40'-0" < L ≤ 50'-0" | 1F | 1F | 1F | 1F |
| 100" < D ≤ 120" | 20'-0" | 1A | 1B | 1C | 1C |
| | 20'-0" < L ≤ 30'-0" | 1C | 1D | 1E | 1F |
| | 30'-0" < L ≤ 40'-0" | 1D | 1F | 1F | 1F |
| | 40'-0" < L ≤ 50'-0" | 1F | 1F | 1F | 1F |
| 120" < D ≤ 150" | 20'-0" | 1B | 1C | 1D | 1D |
| | 20'-0" < L ≤ 30'-0" | 1D | 1E | 1F | 1F |
| | 30'-0" < L ≤ 40'-0" | 1F | 1F | 1F | 1G |
| | 40'-0" < L ≤ 50'-0" | 1F | 1F | 1G | 1G |
| 150" < D ≤ 180" | 20'-0" | 1B | 1C | 1D | 1D |
| | 20'-0" < L ≤ 30'-0" | 1E | 1F | 1F | 1F |
| | 30'-0" < L ≤ 40'-0" | 1F | 1G | 1G | 1G |
| | 40'-0" < L ≤ 50'-0" | 1F | 1G | 1G | 1G |
| 180" < D ≤ 210" | 20'-0" | 1D | 1D | 1E | 1F |
| | 20'-0" < L ≤ 30'-0" | 1F | 1F | 1G | 1G |
| | 30'-0" < L ≤ 40'-0" | 1G | 1G | 1G | 1G |
| | 40'-0" < L ≤ 50'-0" | 1G | 1G | 1G | 1H |
| 210" < D ≤ 240" | 20'-0" | 1D | 1E | 1F | 1F |
| | 20'-0" < L ≤ 30'-0" | 1F | 1G | 1G | 1G |
| | 30'-0" < L ≤ 40'-0" | 1G | 1G | 1G | 1H |
| | 40'-0" < L ≤ 50'-0" | 1H | 1H | 1H | 1H |

## POST TYPE TABLE

| POST TYPE | DIAMETER | Min NOMINAL THICKNESS |
|---|---|---|
| 1A | 16" | 1.218" |
| 1B | 18" | 1.156" |
| 1C | 20" | 1.031" |
| 1D | 22" | 1.125" |
| 1E | 24" | 0.969" |
| 1F | 30" | 0.625" |
| 1G | 30" | 1" |
| 1H | 36" | 1" |

NOTES:

1. Shorter arm member sizes shall match the member sizes selected for the longer arm.
2. Post clear height is measured to underside of bottom truss chord.
3. Refer to Standard Plan S111 for connection details.
4. Minimum overlap lengths to gusset plates ($L_V$, $L_d$, $L_W$, and $L_i$) are in inches.




FRAME WIDTH SCHEMATIC

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS ONE POST TYPE STEEL POST TYPE AND TRUSS MEMBER TABLE

NO SCALE

S102

2025 STANDARD PLAN S102

505

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

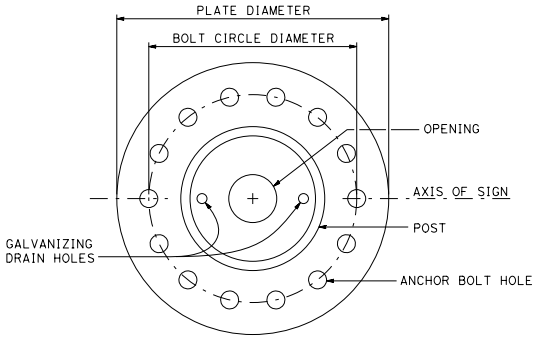
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

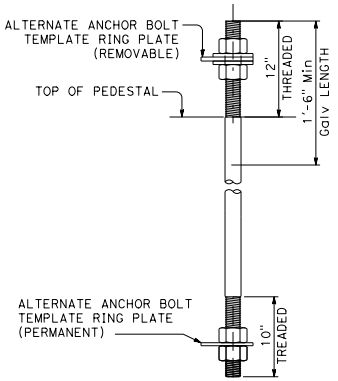
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## BASE PLATE AND ANCHOR BOLT DIMENSIONS

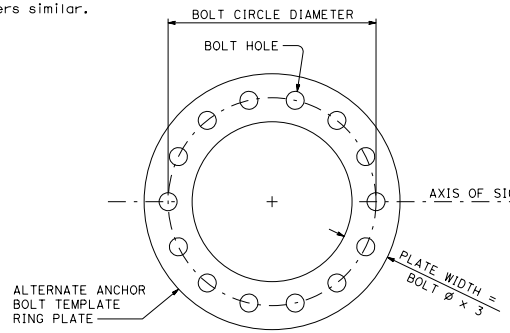
| POST TYPE | BASE PLATE | | | ANCHOR BOLTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | PLATE THICKNESS | PLATE DIAMETER | OPENING DIAMETER | NUMBER OF BOLTS | BOLT DIAMETER | BOLT LENGTH | BOLT HOLE DIAMETER | BOLT CIRCLE DIAMETER |
| 1A | 3½" | 2'-7" | 5" | 14 | 1¾" | 5'-0" | 2" | 2'-0" |
| 1B | 3½" | 2'-10" | 6" | 14 | 2" | 5'-0" | 2¼" | 2'-2" |
| 1C | 3" | 3'-0" | 6" | 16 | 2" | 5'-0" | 2¼" | 2'-4" |
| 1D | 3½" | 3'-2" | 7" | 16 | 2" | 5'-0" | 2¼" | 2'-6" |
| 1E | 3" | 3'-6" | 7½" | 18 | 2" | 5'-0" | 2¼" | 2'-10" |
| 1F | 3" | 4'-0" | 9" | 20 | 2" | 5'-0" | 2¼" | 3'-4" |
| 1G | 3½" | 4'-2" | 9" | 20 | 2½" | 5'-0" | 2¾" | 3'-4" |
| 1H | 3½" | 4'-8" | 11" | 24 | 2½" | 5'-0" | 2¾" | 3'-10" |



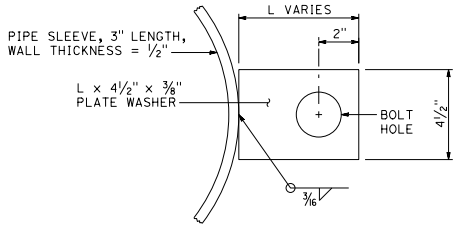

### BASE PLATE DETAILS
### SINGLE POST TYPE
14 bolt base plate depicted, others similar.



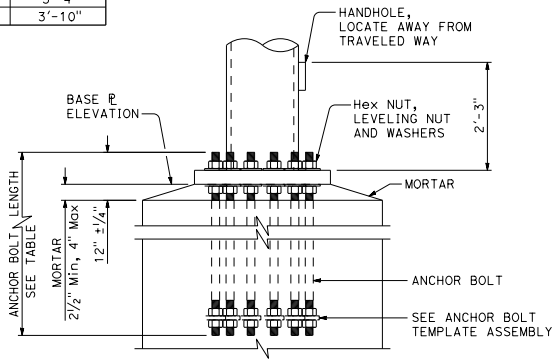

### ALTERNATE ANCHOR BOLT TEMPLATE ASSEMBLY
NOTE: One bolt shown only. Other bolts same configuration around ring plate.



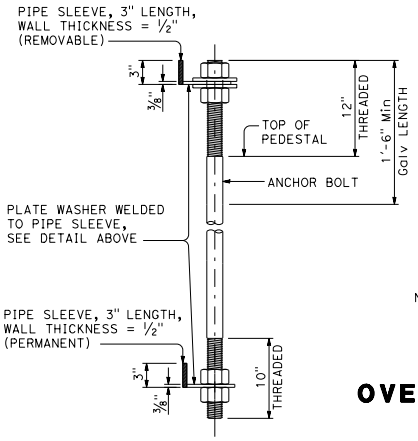

### ALTERNATE ANCHOR BOLT TEMPLATE
14 bolt template depicted. Others similar.
NOTE: Permanent plate thickness = ¾", Removable plate thickness = ½"



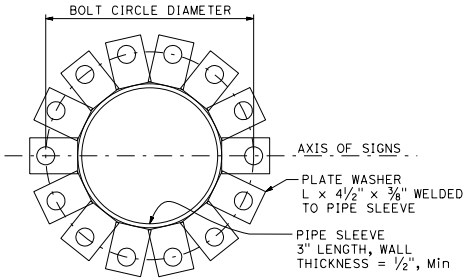

### PLATE WASHER DETAIL



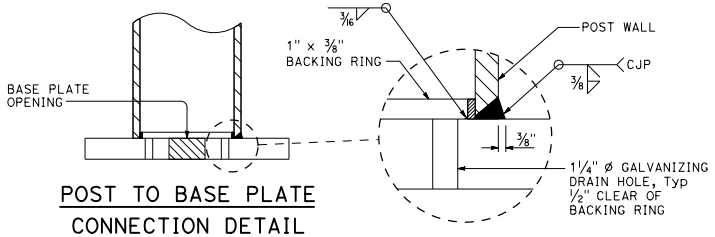

### POST AND ANCHORAGE DETAIL




### ANCHOR BOLT TEMPLATE ASSEMBLY
NOTE: One bolt shown only. Other bolts same configuration around pipe sleeve.




### ANCHOR BOLT TEMPLATE
14 bolt template depicted, others similar.
NOTE: Template to match base plate anchor bolt pattern. Pipe sleeve diameter same as post type diameter.




### POST TO BASE PLATE CONNECTION DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS ONE POST TYPE STEEL POST BASE PLATE AND ANCHORAGE DETAILS

NO SCALE

**S103**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

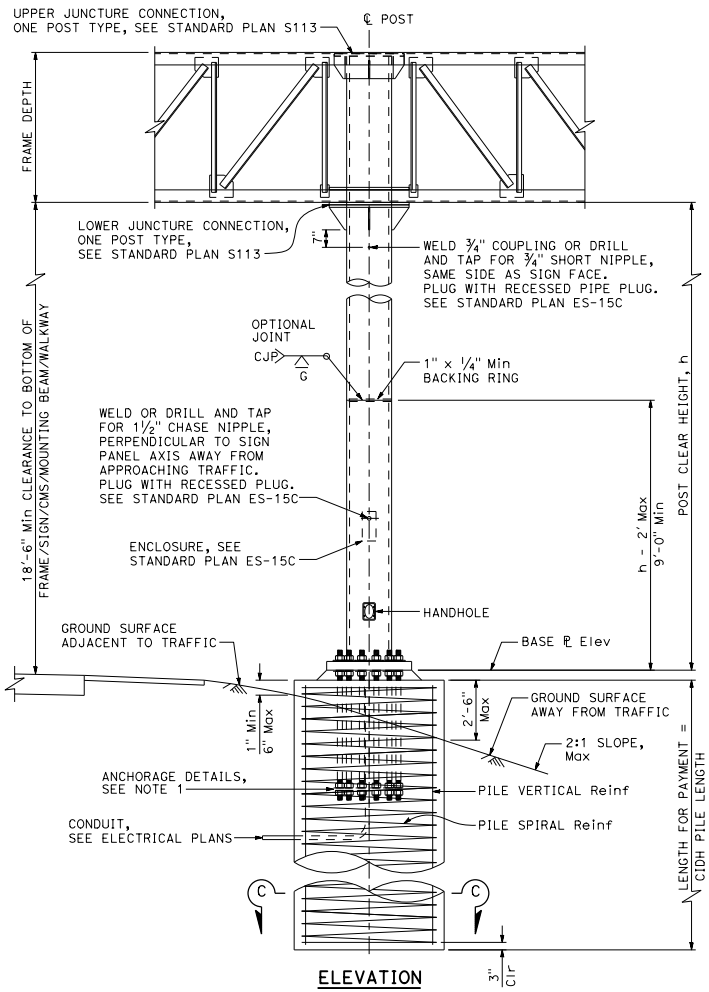
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

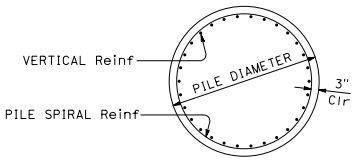
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ELEVATION

CIDH in fill-slope depicted

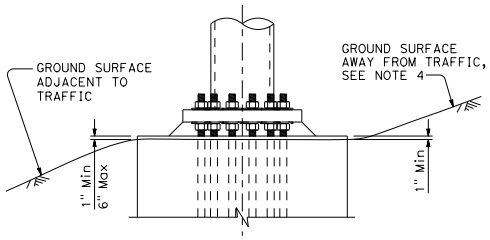



SECTION C-C

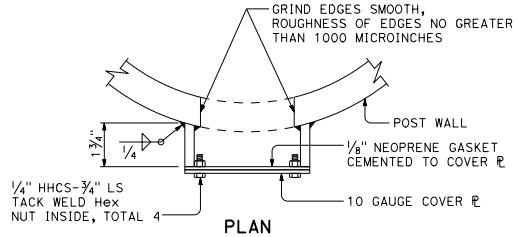
See Note 10

## CIDH CONCRETE PILE TABLE

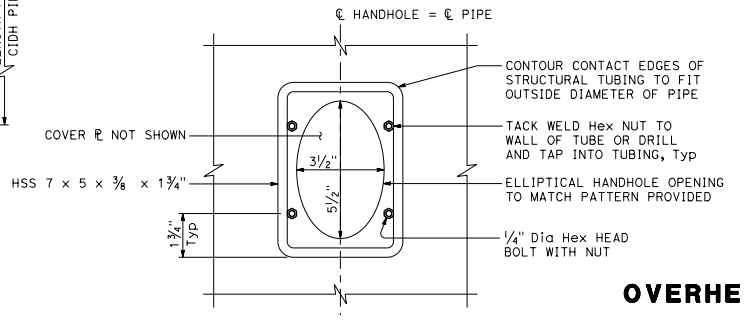
| POST TYPE | DIAMETER | VERTICAL BAR SIZE | TOTAL NUMBER OF BARS | SPIRAL BAR SIZE | SPIRAL PITCH | MINIMUM CIDH PILE LENGTH |
|---|---|---|---|---|---|---|
| 1A | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 1B | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 1C | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 1D | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 1E | 5'-0" | #10 | 32 | #6 | 5" | 24'-0" |
| 1F | 5'-0" | #10 | 36 | #6 | 5" | 27'-0" |
| 1G | 5'-0" | #10 | 36 | #6 | 4" | 30'-0" |
| 1H | 5'-6" | #10 | 40 | #6 | 4" | 32'-0" |




CIDH IN CUT-SLOPE




PLAN




ELEVATION

TYPICAL DETAILS OF HANDHOLE AND COVER

NOTES:

1. For anchorage details, see Standard Plan S103.
2. For base ℄ elevation, see Project Plans.
3. Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place.
4. Slope stabilization required when indicated on the Project Plans.
5. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.
6. Refer to Standard Plan S102 for post type table.
7. Use pedestal with CIDH pile foundation when shown on the Project Plans. See Standard Plan S105.
8. On single post sign structures, the post shall be raked out of plumb, with the use of the leveling nuts to make the bottom of the sign frame level.
9. At final position of post all top and bottom nuts shall be tightened against base plate.
10. For CIDH pile foundation with inspection pipes, see Standard Plan S114.
11. Maximum electrical conduit diameter is 3".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

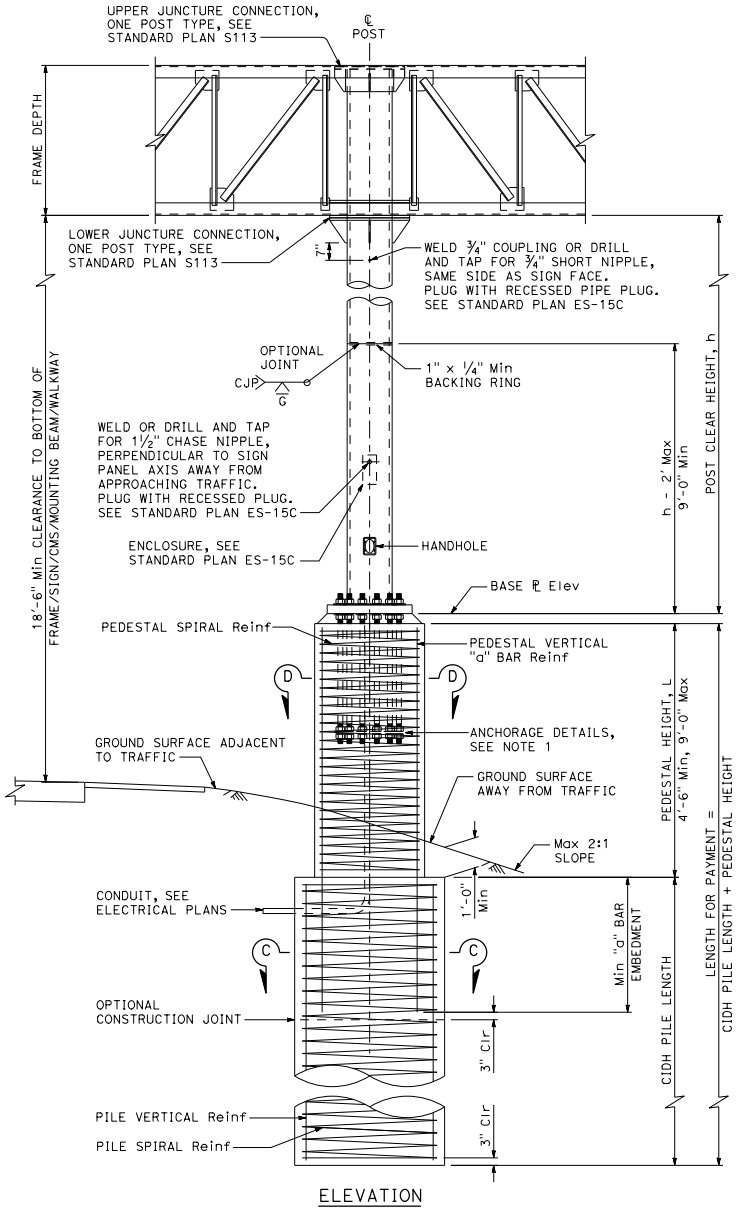
# OVERHEAD SIGNS-VERSATILE TRUSS ONE POST TYPE CIDH PILE FOUNDATION DETAILS

NO SCALE

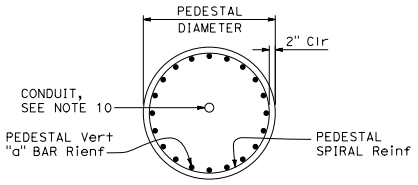
**S104**

7-1-25

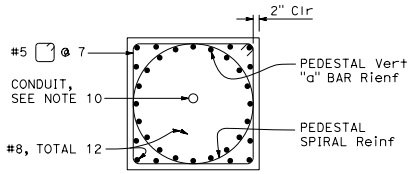
Return to Table of Contents



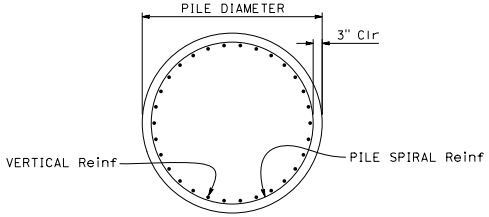

ELEVATION




SECTION D-D
ROUND PEDESTAL




SECTION D-D
SQUARE PEDESTAL




SECTION C-C
See Note 9

NOTES:

1. For anchorage details, see Standard Plan S103.
2. For base ℄ elevation, see Project Plans.
3. Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place.
4. For pedestal height and pedestal shape, see Project Plans.
5. Refer to Standard Plan S104 for CIDH pile foundation details when a pedestal is not indicated in the Project Plans.
6. Refer to Standard Plan S104 for additional details and notes not shown on this sheet.
7. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.
8. Refer to Standard Plan S102 for post type table.
9. For CIDH pile foundation with inspection pipes, see Standard Plan S114.
10. Maximum electrical conduit diameter is 3".

**CONCRETE PEDESTAL AND CIDH CONCRETE PILE TABLE**

| POST TYPE | CONCRETE PEDESTAL | | | | | | | CIDH CONCRETE PILE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROUND PEDESTAL DIAMETER | SQUARE PEDESTAL SIDES LENGTH | VERTICAL "a" BAR SIZE | NUMBER OF VERTICAL "a" BARS | SPIRAL BAR SIZE | SPIRAL PITCH | Min "a" BAR EMBEDMENT | DIAMETER | VERTICAL BAR SIZE | TOTAL NUMBER OF VERTICAL BARS | SPIRAL BAR SIZE | SPIRAL PITCH | MINIMUM CIDH PILE LENGTH |
| 1A | 3'-6" | 3'-6" | #8 | 18 | #5 | 3½" | 54" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 1B | 3'-8" | 3'-8" | #8 | 20 | #5 | 3½" | 54" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 1C | 3'-10" | 3'-10" | #9 | 18 | #5 | 3½" | 72" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 1D | 4'-0" | 4'-0" | #9 | 22 | #5 | 3½" | 72" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 1E | 4'-4" | 4'-4" | #9 | 24 | #5 | 3½" | 72" | 5'-0" | #10 | 32 | #6 | 5" | 22'-0" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS ONE POST TYPE CONCRETE PEDESTAL WITH CIDH PILE FOUNDATION DETAILS

NO SCALE

**S105**



7-1-25

Return to Table of Contents

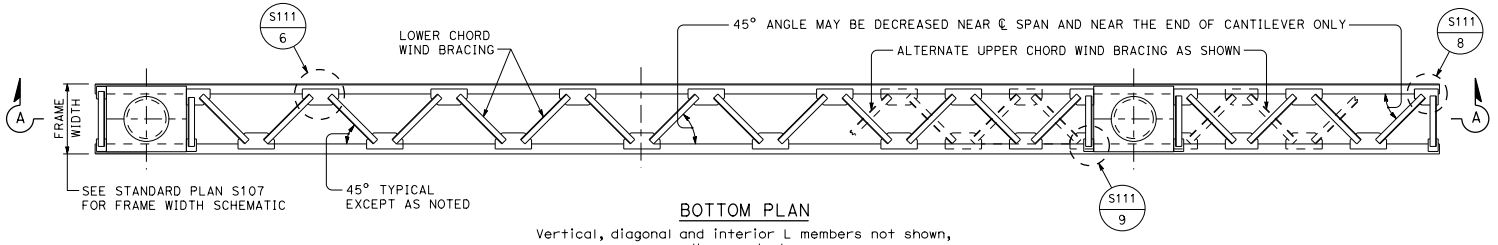
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

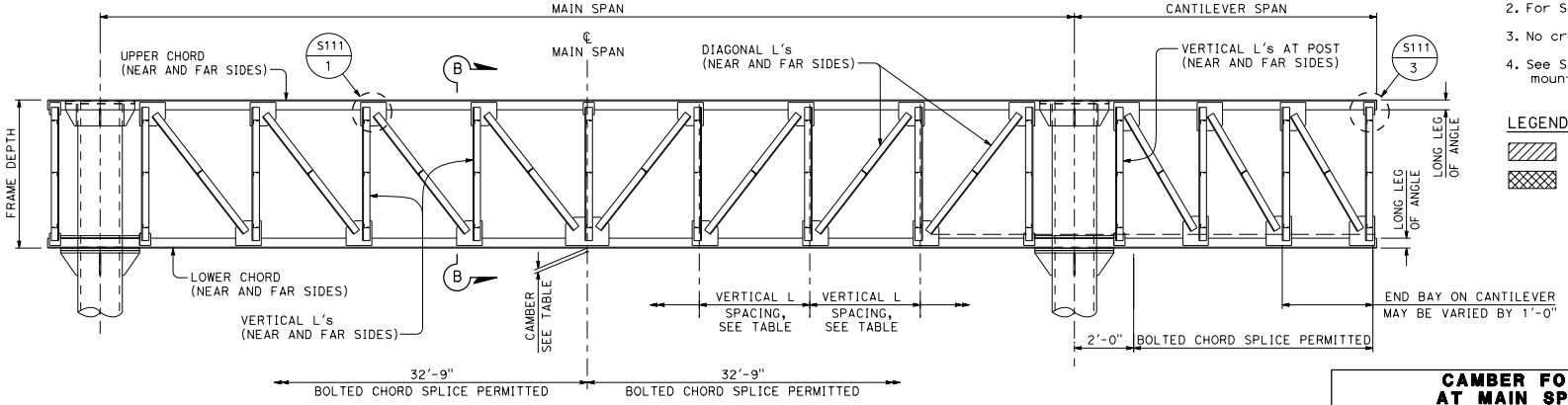
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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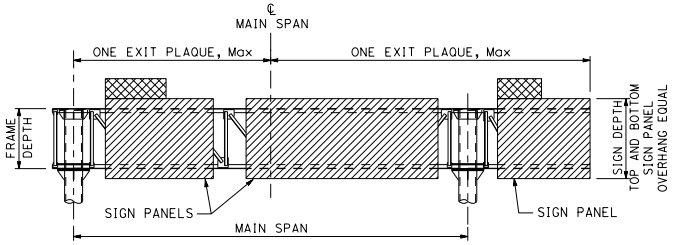

## BOTTOM PLAN

Vertical, diagonal and interior L members not shown, walkway not shown




## SECTION A-A

Walkway and wind bracing not shown




Right cantilever shown.
Cantilever may be left or right.

## SIGN AND EXIT PLAQUE PLACEMENT

NOTE:
Equal sign panel overhangs apply to sign panels only. The exit plaque is mounted above the sign panels and the walkway is mounted below the sign panels, when used.

NOTES:

1. Frame widths shown are nominal. These widths may be varied by 1/4" to standardize fabrication methods.
2. For Section B-B, see Standard Plan S111.
3. No crossties on diagonals.
4. See Standard Plan S122 for exit plaque mounting details.

LEGEND:

SIGN PANEL

EXIT PLAQUE

**CAMBER FOR FABRICATION AT MAIN SPAN CENTERLINE**

| SPAN | FRAME DEPTH | CAMBER | FRAME DEPTH | CAMBER | FRAME DEPTH | CAMBER |
|---|---|---|---|---|---|---|
| 30'-0" TO 60'-0" | 60" | 1½" | 72" | 1¼" | 120" | 1" |
| 61'-0" TO 105'-0" | 60" | 3½" | 72" | 3" | 120" | 2" |
| 106'-0" TO 150'-0" | 60" | 8" | 72" | 6¼" | 120" | 3½" |

Camber to approximate parabola.
Camber of cantilever arm = ½" for arms greater than 10'-0".

**TRUSS FRAME DEPTH AND VERTICAL ANGLE SPACING TABLE**

| MAXIMUM SIGN PANEL DEPTH | FRAME DEPTH | MAXIMUM VERTICAL L SPACING |
|---|---|---|
| 80" | 60" | 45" |
| 180" | 72" | 54" |
| 240" | 120" | 90" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TWO POST TYPE TRUSS LAYOUT

NO SCALE

**S106**

7-1-25

2025 STANDARD PLAN S106

Return to Table of Contents

## POST SELECTION TABLE

| SIGN PANEL DEPTH D | MAIN SPAN LENGTH L | POST TYPE BY POST CLEAR HEIGHT ≤ 16 ft | ≤ 20 ft | ≤ 24 ft | ≤ 28 ft |
|---|---|---|---|---|---|
| D ≤ 80" | 30'-0" | 2A | 2A | 2A | 2B |
| | 30'-0" < L ≤ 45'-0" | 2A | 2B | 2C | 2D |
| | 45'-0" < L ≤ 60'-0" | 2C | 2C | 2E | 2E |
| | 60'-0" < L ≤ 75'-0" | 2D | 2E | 2E | 2E |
| | 75'-0" < L ≤ 90'-0" | 2E | 2E | 2E | 2E |
| | 90'-0" < L ≤ 105'-0" | 2E | 2E | 2E | 2F |
| | 105'-0" < L ≤ 120'-0" | 2E | 2E | 2F | 2F |
| | 120'-0" < L ≤ 135'-0" | 2E | 2F | 2F | 2G |
| | 135'-0" < L ≤ 150'-0" | 2F | 2F | 2G | 2G |
| 80" < D ≤ 100" | 30'-0" | 2A | 2A | 2B | 2C |
| | 30'-0" < L ≤ 45'-0" | 2B | 2C | 2D | 2E |
| | 45'-0" < L ≤ 60'-0" | 2C | 2E | 2E | 2E |
| | 60'-0" < L ≤ 75'-0" | 2E | 2E | 2E | 2E |
| | 75'-0" < L ≤ 90'-0" | 2E | 2E | 2F | 2F |
| | 90'-0" < L ≤ 105'-0" | 2E | 2F | 2F | 2G |
| | 105'-0" < L ≤ 120'-0" | 2E | 2F | 2G | 2G |
| | 120'-0" < L ≤ 135'-0" | 2F | 2F | 2G | 2G |
| | 135'-0" < L ≤ 150'-0" | 2F | 2G | 2G | 2H |
| 100" < D ≤ 120" | 30'-0" | 2A | 2B | 2C | 2D |
| | 30'-0" < L ≤ 45'-0" | 2C | 2D | 2E | 2E |
| | 45'-0" < L ≤ 60'-0" | 2E | 2E | 2E | 2E |
| | 60'-0" < L ≤ 75'-0" | 2E | 2E | 2E | 2F |
| | 75'-0" < L ≤ 90'-0" | 2E | 2E | 2F | 2F |
| | 90'-0" < L ≤ 105'-0" | 2E | 2F | 2G | 2G |
| | 105'-0" < L ≤ 120'-0" | 2F | 2F | 2G | 2G |
| | 120'-0" < L ≤ 135'-0" | 2F | 2G | 2G | 2H |
| | 135'-0" < L ≤ 150'-0" | 2G | 2G | 2H | 2H |
| 120" < D ≤ 150" | 30'-0" | 2B | 2C | 2D | 2E |
| | 30'-0" < L ≤ 45'-0" | 2D | 2E | 2E | 2E |
| | 45'-0" < L ≤ 60'-0" | 2E | 2E | 2E | 2F |
| | 60'-0" < L ≤ 75'-0" | 2E | 2F | 2F | 2G |
| | 75'-0" < L ≤ 90'-0" | 2F | 2F | 2G | 2G |
| | 90'-0" < L ≤ 105'-0" | 2F | 2G | 2G | 2H |
| | 105'-0" < L ≤ 120'-0" | 2F | 2G | 2H | 2H |
| | 120'-0" < L ≤ 135'-0" | 2G | 2H | 2H | 2H |
| | 135'-0" < L ≤ 150'-0" | 2G | 2H | 2H | 2H |
| 150" < D ≤ 180" | 30'-0" | 2C | 2D | 2E | 2E |
| | 30'-0" < L ≤ 45'-0" | 2E | 2E | 2E | 2E |
| | 45'-0" < L ≤ 60'-0" | 2E | 2E | 2F | 2F |
| | 60'-0" < L ≤ 75'-0" | 2E | 2F | 2G | 2G |
| | 75'-0" < L ≤ 90'-0" | 2F | 2G | 2G | 2H |
| | 90'-0" < L ≤ 105'-0" | 2G | 2G | 2H | 2H |
| | 105'-0" < L ≤ 120'-0" | 2G | 2H | 2H | 2H |
| | 120'-0" < L ≤ 135'-0" | 2H | 2H | 2H | 2H |
| | 135'-0" < L ≤ 150'-0" | 2H | 2H | 2H | 2H |
| 180" < D ≤ 210" | 30'-0" | 2D | 2E | 2E | 2E |
| | 30'-0" < L ≤ 45'-0" | 2E | 2E | 2F | 2F |
| | 45'-0" < L ≤ 60'-0" | 2F | 2F | 2G | 2G |
| | 60'-0" < L ≤ 75'-0" | 2F | 2G | 2G | 2H |
| | 75'-0" < L ≤ 90'-0" | 2G | 2G | 2H | 2H |
| | 90'-0" < L ≤ 105'-0" | 2H | 2H | 2H | 2H |
| | 105'-0" < L ≤ 120'-0" | 2H | 2H | 2H | 2H |
| | 120'-0" < L ≤ 135'-0" | 2H | 2H | 2H | 2H |
| | 135'-0" < L ≤ 150'-0" | 2H | 2H | 2H | 2H |
| 210" < D ≤ 240" | 30'-0" | 2E | 2E | 2E | 2E |
| | 30'-0" < L ≤ 45'-0" | 2E | 2F | 2F | 2G |
| | 45'-0" < L ≤ 60'-0" | 2F | 2F | 2G | 2G |
| | 60'-0" < L ≤ 75'-0" | 2G | 2G | 2H | 2H |
| | 75'-0" < L ≤ 90'-0" | 2G | 2H | 2H | 2H |
| | 90'-0" < L ≤ 105'-0" | 2H | 2H | 2H | 2H |
| | 105'-0" < L ≤ 120'-0" | 2H | 2H | 2H | 2H |
| | 120'-0" < L ≤ 135'-0" | 2H | 2H | 2H | 2H |
| | 135'-0" < L ≤ 150'-0" | 2H | 2H | 2H | - |

## TRUSS MEMBER TABLE

SIGN PANEL DEPTH ≤ 80"

| MAIN SPAN LENGTH L | FRAME DEPTH | ANGLE MEMBER SIZE AND MINIMUM OVERLAP LENGTH TO GUSSET PLATE CHORD | VERTICAL | $L_V$ | DIAGONAL | $L_d$ | WIND BRACE | $L_W$ | INTERIOR | $L_i$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 30'-0" | 60" | L4 x 4 x 3/8 | L3 x 3 x 3/8 | 3 | L3 x 3 x 5/16 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 30'-0" < L ≤ 45'-0" | 60" | L4 x 4 x 3/8 | L3 x 3 x 3/8 | 3 | L3 x 3 x 5/16 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 45'-0" < L ≤ 60'-0" | 60" | L4 x 4 x 1/2 | L3 x 2 x 3/8 | 3 | L3 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 60'-0" < L ≤ 75'-0" | 60" | L4 x 4 x 1/2 | L3 x 2 x 3/8 | 3 | L4 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 75'-0" < L ≤ 90'-0" | 60" | L5 x 5 x 1/2 | L4 x 4 x 1/2 | 3 | L4 x 4 x 1/2 | 4 | L3 x 3 x 5/16 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 90'-0" < L ≤ 105'-0" | 60" | L5 x 5 x 5/8 | L5 x 3 x 1/2 | 3 | L5 x 3 x 1/2 | 4 | L3 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 105'-0" < L ≤ 120'-0" | 60" | L6 x 6 x 5/8 | L5 x 3 1/2 x 1/2 | 3 | L5 x 3 x 1/2 | 4 | L3 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 120'-0" < L ≤ 135'-0" | 60" | L6 x 6 x 3/4 | L5 x 3 1/2 x 3/4 | 3 | L5 x 5 x 1/2 | 5 | L3 x 3 x 3/8 | 4 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 135'-0" < L ≤ 150'-0" | 60" | L8 x 6 x 7/8 | L5 x 5 x 5/8 | 4 | L5 x 5 x 1/2 | 6 | L3 1/2 x 3 1/2 x 3/8 | 5 | L2 1/2 x 2 1/2 x 1/4 | 3 |

80" < SIGN PANEL DEPTH ≤ 180"

| MAIN SPAN LENGTH L | FRAME DEPTH | ANGLE MEMBER SIZE AND MINIMUM OVERLAP LENGTH TO GUSSET PLATE CHORD | VERTICAL | $L_V$ | DIAGONAL | $L_d$ | WIND BRACE | $L_W$ | INTERIOR | $L_i$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 30'-0" | 72" | L4 x 4 x 3/4 | L3 x 3 x 5/16 | 3 | L3 x 3 x 5/16 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 30'-0" < L ≤ 45'-0" | 72" | L4 x 4 x 3/4 | L3 x 3 x 3/8 | 3 | L4 x 4 x 3/8 | 4 | L2 1/2 x 2 1/2 x 3/8 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 45'-0" < L ≤ 60'-0" | 72" | L5 x 5 x 5/8 | L3 x 3 x 3/8 | 3 | L4 x 4 x 3/8 | 4 | L3 x 3 x 5/16 | 5 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 60'-0" < L ≤ 75'-0" | 72" | L5 x 5 x 3/4 | L3 x 3 x 3/8 | 3 | L4 x 4 x 3/8 | 5 | L3 x 2 1/2 x 3/8 | 5 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 75'-0" < L ≤ 90'-0" | 72" | L6 x 6 x 5/8 | L4 x 4 x 1/2 | 3 | L4 x 4 x 1/2 | 5 | L4 x 3 x 3/8 | 5 | L2 1/2 x 2 1/2 x 1/4 | 3 |
| 90'-0" < L ≤ 105'-0" | 72" | L6 x 6 x 3/4 | L5 x 3 x 1/2 | 3 | L5 x 5 x 1/2 | 5 | L4 x 4 x 3/8 | 6 | L3 x 3 x 5/16 | 3 |
| 105'-0" < L ≤ 120'-0" | 72" | L6 x 6 x 1 | L5 x 3 x 1/2 | 3 | L5 x 5 x 1/2 | 5 | L4 x 4 x 3/8 | 6 | L3 x 3 x 5/16 | 3 |
| 120'-0" < L ≤ 135'-0" | 72" | L8 x 6 x 1 | L6 x 6 x 5/8 | 4 | L5 x 5 x 5/8 | 5 | L4 x 4 x 1/2 | 6 | L3 x 3 x 5/16 | 3 |
| 135'-0" < L ≤ 150'-0" | 72" | L8 x 8 x 1 | L6 x 6 x 5/8 | 4 | L6 x 6 x 5/8 | 5 | L4 x 4 x 1/2 | 6 | L3 x 3 x 5/16 | 3 |

180" < SIGN PANEL DEPTH ≤ 240"

| MAIN SPAN LENGTH L | FRAME DEPTH | ANGLE MEMBER SIZE AND MINIMUM OVERLAP LENGTH TO GUSSET PLATE CHORD | VERTICAL | $L_V$ | DIAGONAL | $L_d$ | WIND BRACE | $L_W$ | INTERIOR | $L_i$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 30'-0" | 120" | L5 x 5 x 5/8 | L3 x 3 x 3/8 | 3 | L5 x 5 x 1/2 | 3 | L2 1/2 x 2 1/2 x 1/4 | 3 | L3 x 3 x 5/16 | 3 |
| 30'-0" < L ≤ 45'-0" | 120" | L6 x 6 x 5/8 | L3 x 3 x 3/8 | 3 | L5 x 5 x 1/2 | 3 | L2 1/2 x 2 1/2 x 3/8 | 3 | L3 x 3 x 5/16 | 3 |
| 45'-0" < L ≤ 60'-0" | 120" | L6 x 6 x 5/8 | L3 x 3 x 3/8 | 3 | L5 x 5 x 1/2 | 3 | L3 x 2 1/2 x 3/8 | 4 | L3 x 3 x 5/16 | 3 |
| 60'-0" < L ≤ 75'-0" | 120" | L6 x 6 x 5/8 | L3 x 3 x 3/8 | 3 | L5 x 5 x 1/2 | 4 | L3 x 3 x 1/2 | 4 | L3 x 3 x 5/16 | 3 |
| 75'-0" < L ≤ 90'-0" | 120" | L6 x 6 x 5/8 | L4 x 4 x 1/2 | 3 | L5 x 5 x 1/2 | 5 | L4 x 4 x 3/8 | 6 | L3 x 3 x 5/16 | 3 |
| 90'-0" < L ≤ 105'-0" | 120" | L6 x 6 x 1 | L5 x 3 x 1/2 | 3 | L5 x 5 x 1/2 | 5 | L4 x 4 x 1/2 | 6 | L3 x 3 x 5/16 | 3 |
| 105'-0" < L ≤ 120'-0" | 120" | L6 x 6 x 1 | L5 x 3 x 1/2 | 3 | L5 x 5 x 1/2 | 5 | L4 x 4 x 1/2 | 6 | L3 x 3 x 5/16 | 3 |
| 120'-0" < L ≤ 135'-0" | 120" | L8 x 8 x 3/4 | L5 x 3 x 1/2 | 3 | L5 x 5 x 5/8 | 5 | L5 x 5 x 1/2 | 6 | L3 x 3 x 5/16 | 3 |
| 135'-0" < L ≤ 150'-0" | 120" | L8 x 8 x 7/8 | L5 x 3 1/2 x 3/4 | 3 | L5 x 5 x 5/8 | 5 | L5 x 5 x 1/2 | 6 | L3 x 3 x 5/16 | 3 |

## POST TYPE TABLE

| POST TYPE | DIAMETER | Min NOMINAL THICKNESS | SPLIT |
|---|---|---|---|
| 2A | 16" | 1.218" | N/A |
| 2B | 18" | 1.156" | N/A |
| 2C | 20" | 1.031" | N/A |
| 2D | 22" | 1.125" | N/A |
| 2E | 24" | 0.969" | N/A |
| 2F | 30" | 0.625" | 12" |
| 2G | 30" | 1" | 12" |
| 2H | 36" | 1" | 12" |

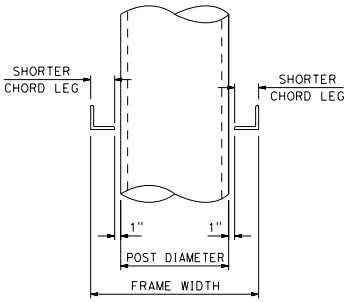
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.




FRAME WIDTH SCHEMATIC

NOTES:

1. If a cantilever span is added, the same member sizes and weld lengths shall be used on the main and cantilever spans. Refer to Standard Plan S100 for rules on span lengths.
2. Post clear height is measured to underside of bottom truss chord.
3. Refer to Standard Plan S111 for connection details.
4. Minimum overlap lengths to Gusset Plates (Lv, Ld, Lw, and Li) are in inches.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TWO POST TYPE STEEL POST TYPE AND TRUSS MEMBER TABLE

NO SCALE

**S107**

7-1-25

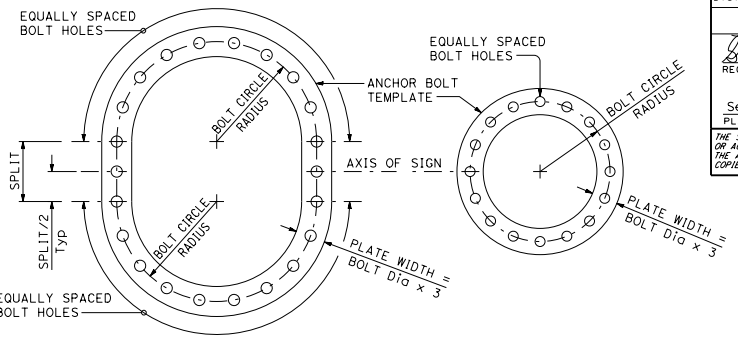


Return to Table of Contents

## BASE PLATE AND ANCHOR BOLT DIMENSIONS

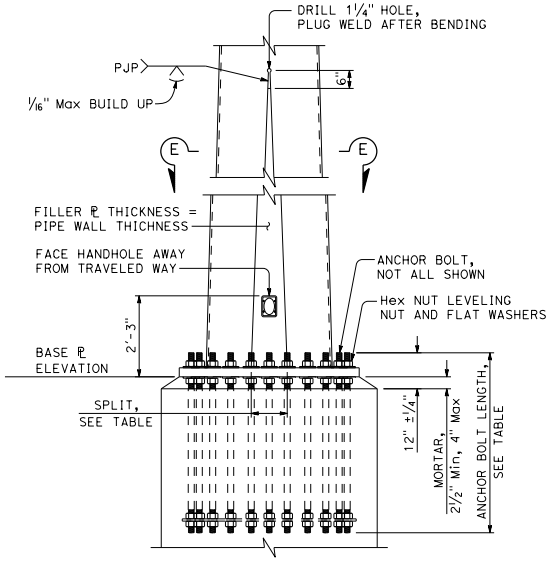
| POST TYPE | BASE PLATE | | | | ANCHOR BOLTS | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | PLATE THICKNESS | PLATE RADIUS | SPLIT | OPENING RADIUS | NUMBER OF BOLTS | BOLT DIAMETER | BOLT LENGTH | BOLT HOLE DIAMETER | BOLT CIRCLE RADIUS |
| 2A | 3½" | 1'-3" | N/A | 2½" | 14 | 1½" | 5'-0" | 1¾" | 1'-0" |
| 2B | 3½" | 1'-4½" | N/A | 3" | 14 | 1¾" | 5'-0" | 2" | 1'-1" |
| 2C | 3" | 1'-5½" | N/A | 3" | 16 | 1¾" | 5'-0" | 2" | 1'-2" |
| 2D | 3½" | 1'-6½" | N/A | 3½" | 16 | 1¾" | 5'-0" | 2" | 1'-3" |
| 2E | 3" | 1'-9" | N/A | 3¾" | 18 | 2" | 5'-0" | 2¼" | 1'-5" |
| 2F | 3" | 2'-0" | 12" | 4½" | 22 | 2" | 5'-0" | 2¼" | 1'-8" |
| 2G | 3½" | 2'-0" | 12" | 4½" | 22 | 2" | 5'-0" | 2¼" | 1'-8" |
| 2H | 3½" | 2'-4" | 12" | 5½" | 24 | 2½" | 5'-0" | 2¾" | 1'-11" |

NOTE:
Thread locking nuts not required for anchor bolts.

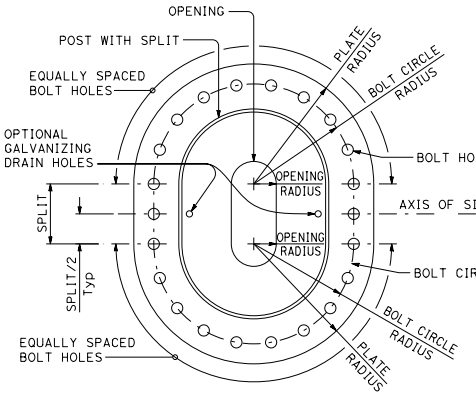



TEMPLATE WITH SPLIT
22 Bolt base plate depicted, others similar

TEMPLATE WITHOUT SPLIT
16 Bolt base plate depicted, others similar

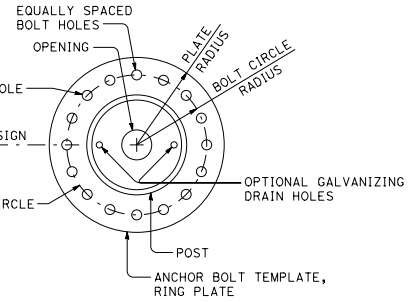



POST AND ANCHORAGE DETAIL



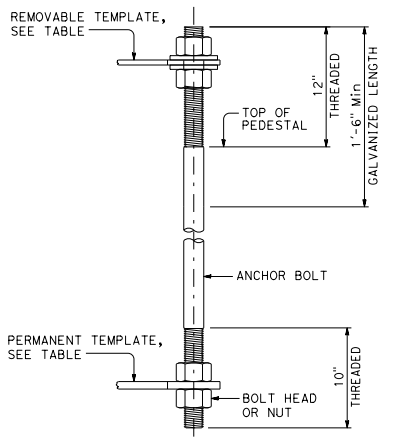

BASE PLATE WITH SPLIT
22 Bolt base plate depicted, others similar

ANCHOR BOLT TEMPLATE
Note: Permanent plate thickness = ¾", Removable plate thickness = ½"



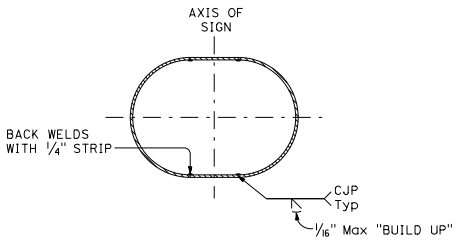

BASE PLATE WITHOUT SPLIT
16 Bolt base plate depicted, others similar

BASE PLATE DETAILS

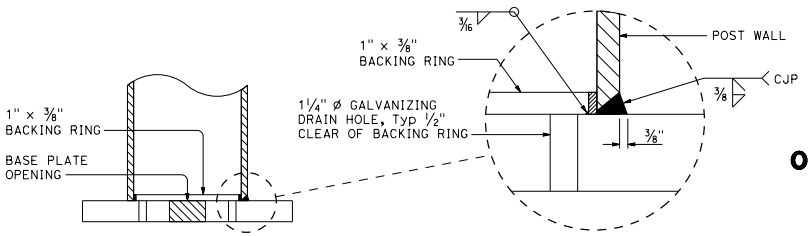



ANCHOR BOLT TEMPLATE ASSEMBLY

NOTE:
One bolt shown only. Other bolts same configuration around pipe sleeve. Template to match base plate anchor bolt pattern.




SECTION E-E




POST TO BASE PLATE CONNECTION DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TWO POST TYPE STEEL POST BASE PLATE AND ANCHORAGE DETAILS

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
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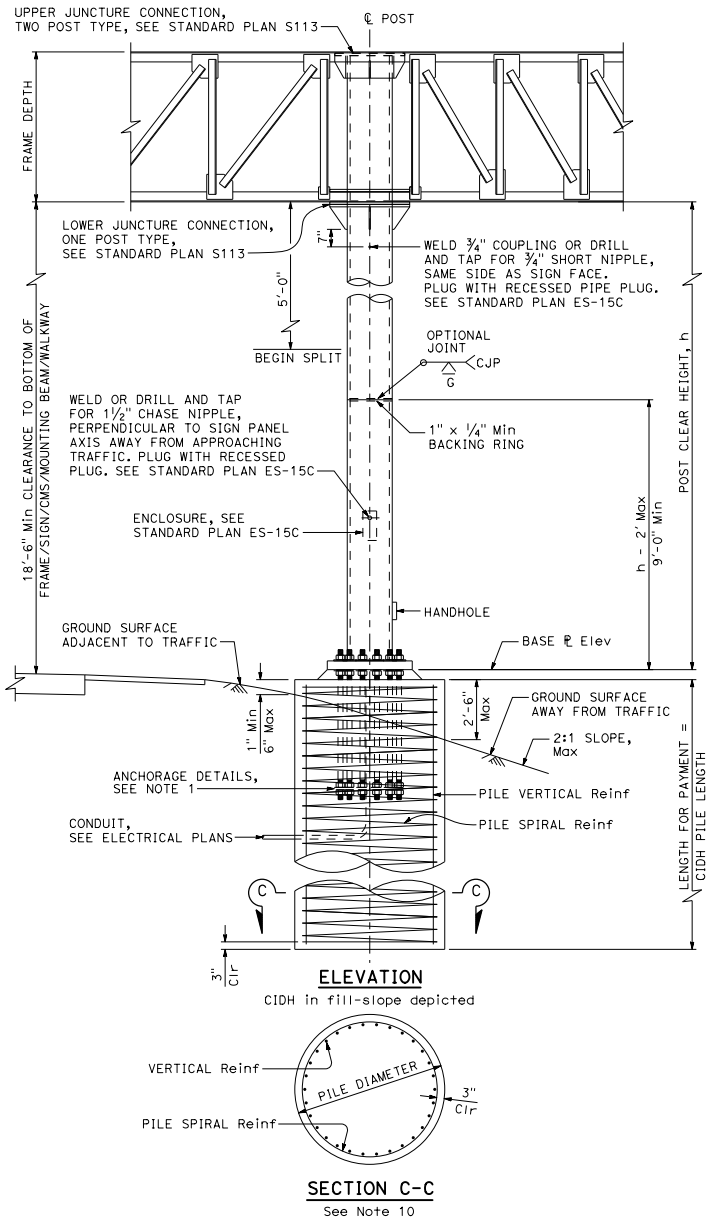
S108





7-1-25

Return to Table of Contents




ELEVATION

CIDH in fill-slope depicted

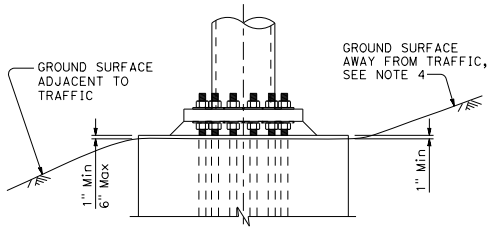



SECTION C-C

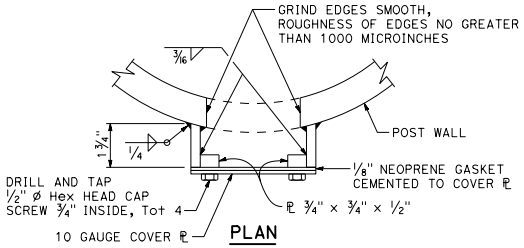
See Note 10

**CIDH CONCRETE PILE TABLE**

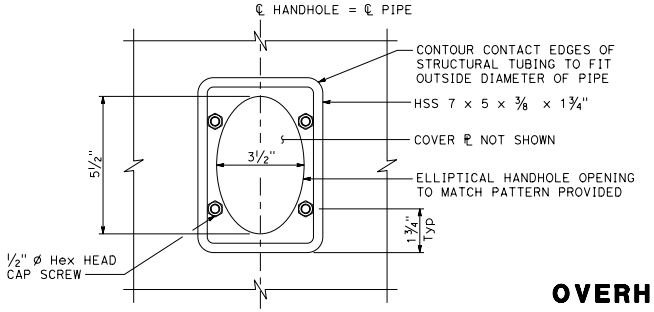
| POST TYPE | DIAMETER | VERTICAL BAR SIZE | TOTAL NUMBER OF BARS | SPIRAL BAR SIZE | SPIRAL PITCH | MINIMUM CIDH PILE LENGTH |
|---|---|---|---|---|---|---|
| 2A | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 2B | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 2C | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 2D | 5'-0" | #10 | 30 | #6 | 5" | 22'-0" |
| 2E | 5'-0" | #10 | 32 | #6 | 5" | 24'-0" |
| 2F | 6'-0" | #10 | 36 | #6 | 5" | 25'-0" |
| 2G | 6'-0" | #10 | 36 | #6 | 4" | 29'-0" |
| 2H | 6'-6" | #10 | 40 | #6 | 4" | 36'-0" |




CIDH IN CUT-SLOPE




PLAN




ELEVATION

TYPICAL DETAILS OF HANDHOLE AND COVER

NOTES:

1. For anchorage details, see Standard Plan S108.
2. For base ℄ elevation, see Project Plans.
3. Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place.
4. Slope stabilization required when indicated on the Project Plans.
5. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.
6. Refer to Standard Plan S107 for post type table.
7. Use pedestal with CIDH pile foundation when shown on the Project Plans. See Standard Plan S110.
8. On single post sign structures, the post shall be raked out of plumb, with the use of the leveling nuts to make the bottom of the sign frame level.
9. At final position of post all top and bottom nuts shall be tightened against base plate.
10. For CIDH pile foundation with inspection pipes, see Standard Plan S114.
11. Maximum electrical conduit diameter is 3".

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

Sebtember 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TWO POST TYPE CIDH PILE FOUNDATION DETAILS

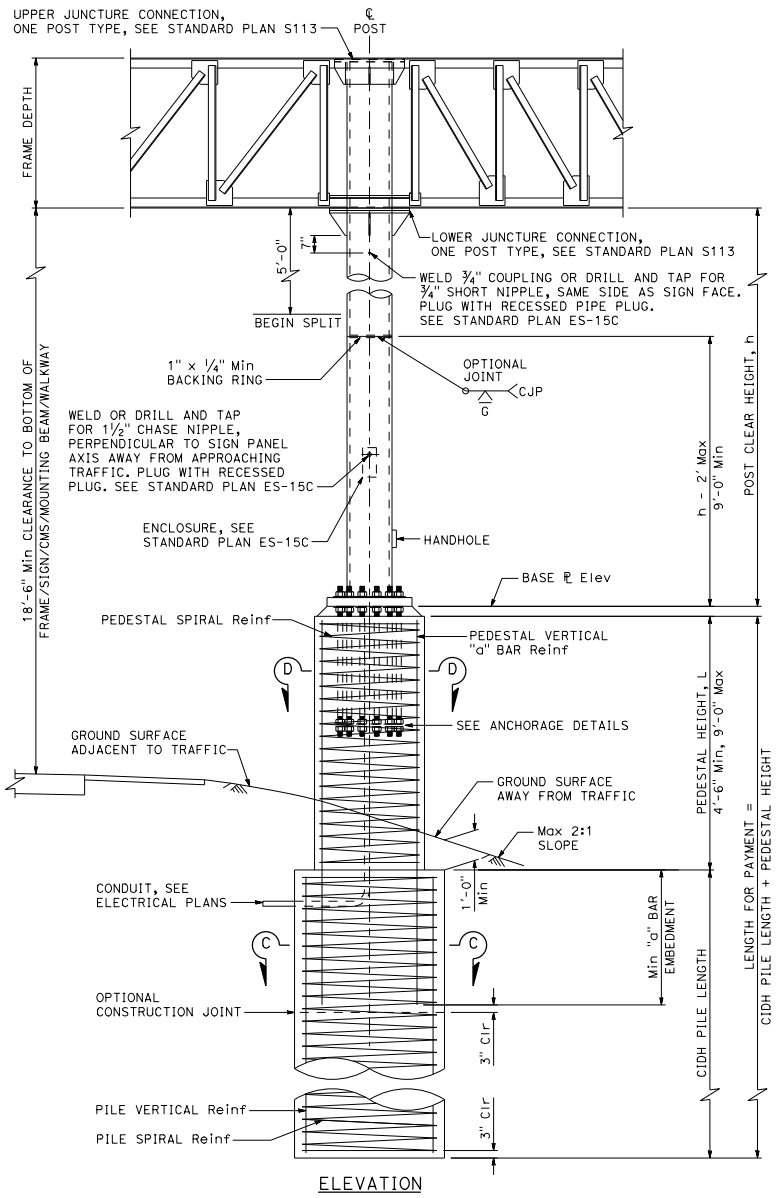
NO SCALE

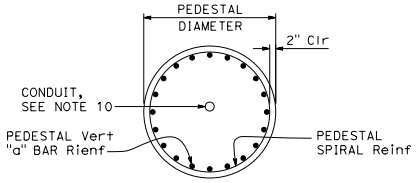
S109



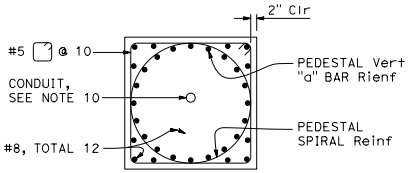
7-1-25

Return to Table of Contents

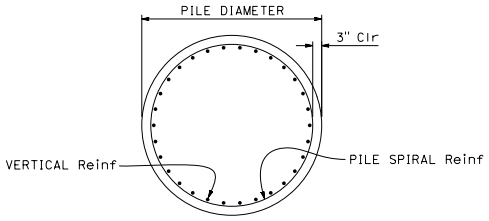



SECTION D-D
ROUND PEDESTAL




SECTION D-D
SQUARE PEDESTAL




SECTION C-C
See Note 9

NOTES:

1. For anchorage details, see Standard Plan S108.
2. For base ℄ elevation, see Project Plans.
3. Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place.
4. For pedestal height and pedestal shape, see Project Plans.
5. Refer to Standard Plan S109 for CIDH pile foundation details when a pedestal is not indicated in the Project Plans.
6. Refer to Standard Plan S109 for additional details and notes not shown on this sheet.
7. For drain holes and central void in mortar, see Standard Plan ES-6B Detail N.
8. Refer to Standard Plan S107 for post type table.
9. For CIDH pile foundation with inspection pipes, see Standard Plan S114.
10. Maximum electrical conduit diameter is 3".

**CONCRETE PEDESTAL AND CIDH CONCRETE PILE TABLE**

| POST TYPE | CONCRETE PEDESTAL | | | | | | | CIDH CONCRETE PILE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ROUND PEDESTAL DIAMETER | SQUARE PEDESTAL SIDES LENGTH | VERTICAL "a" BAR SIZE | NUMBER OF VERTICAL "a" BARS | SPIRAL BAR SIZE | SPIRAL PITCH | Min "a" BAR EMBEDMENT | DIAMETER | VERTICAL BAR SIZE | TOTAL NUMBER OF VERTICAL BARS | SPIRAL BAR SIZE | SPIRAL PITCH | MINIMUM CIDH PILE LENGTH |
| 2A | 3'-6" | 3'-6" | #8 | 18 | #5 | 5" | 54" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 2B | 3'-8" | 3'-8" | #8 | 20 | #5 | 5" | 54" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 2C | 3'-10" | 3'-10" | #9 | 22 | #5 | 5" | 72" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 2D | 4'-0" | 4'-0" | #9 | 24 | #5 | 5" | 72" | 5'-0" | #10 | 30 | #6 | 5" | 20'-0" |
| 2E | 4'-4" | 4'-4" | #9 | 22 | #5 | 5" | 72" | 5'-0" | #10 | 32 | #6 | 5" | 22'-0" |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

Sebtember 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TWO POST TYPE CONCRETE PEDESTAL WITH CIDH PILE FOUNDATION DETAILS

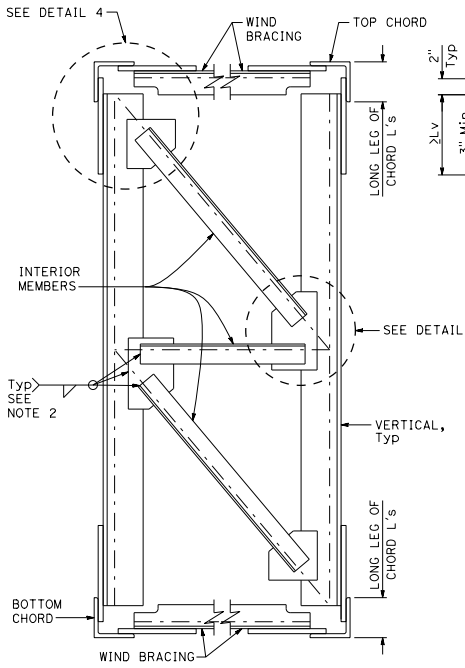
NO SCALE

**S110**



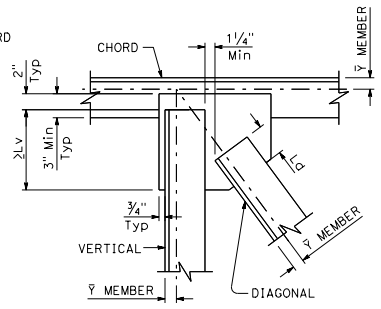
7-1-25

Return to Table of Contents

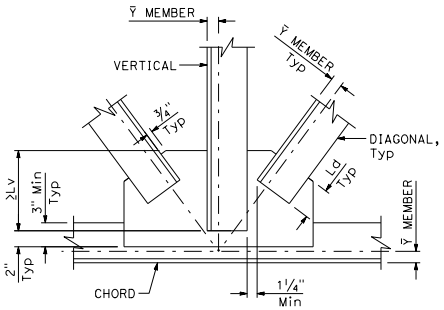



## TYPICAL SECTION B-B

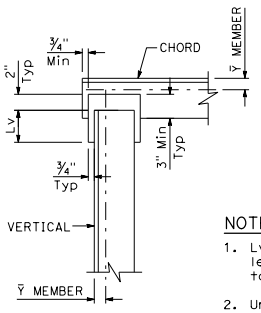
Diagonal members not shown, see Standard Plans S101 and S106



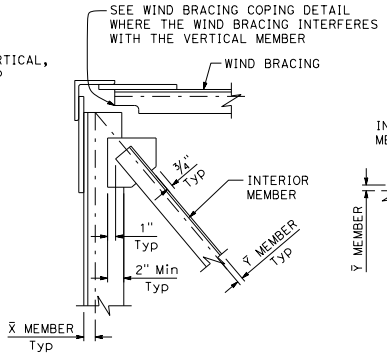

## DETAIL 1



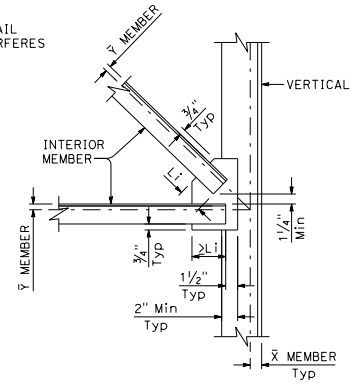

## DETAIL 2



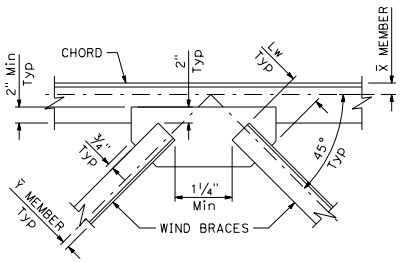

## DETAIL 3



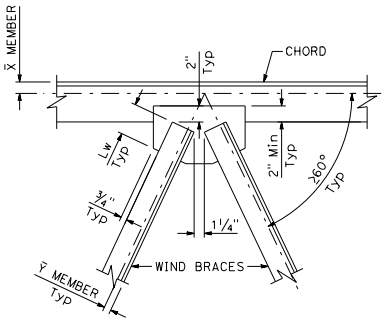

## DETAIL 4



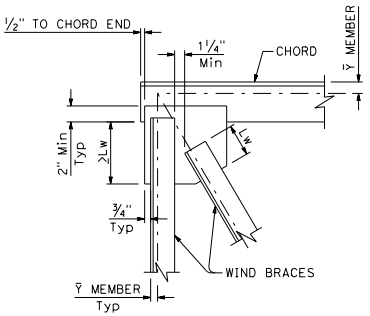

## DETAIL 5



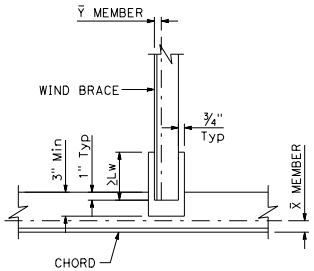

## DETAIL 6




## DETAIL 7




## DETAIL 8




## DETAIL 9

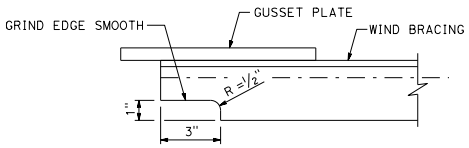
### NOTES:

1. Lv, Ld, Lw and Li indicate minimum overlap lengths for member to gusset plates. Refer to Standard Plans S102 and S107 for values.
2. Unless otherwise noted, connections between members and gusset plates are fillet welds around all edges. See "Weld Table" for fillet weld size.
3. Gusset plate thickness = ⅝".
4. Gusset plate dimensions vary based on connecting member sizes and the orientation of their centroids.
5. All connection details are typical and may be mirrored depending on the connection location.

### ABBREVIATIONS:

X̄ = Distance to centroid of L along the short leg.
Ȳ = Distance to centroid of L along the long leg.

| WELD TABLE | |
|---|---|
| THICKNESS OF ANGLE | WELD SIZE |
| ¼" | 3/16" |
| 5/16" | 3/16" |
| 3/8" | ¼" |
| ½" | 3/8" |
| 5/8" | ½" |
| ≥ ¾" | 9/16" |




## WIND BRACING COPING DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TRUSS CONNECTION DETAILS

NO SCALE

**S111**

2025 STANDARD PLAN S111

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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**TABLE 1**
**BOLTED CHORD SPLICE**

| CHORD THICKNESS | NOMINAL BOLT DIAMETER | "a" Pref | "a" Min | "b" Min |
|---|---|---|---|---|
| 3/8" | 3/4" | 2 1/4" | 2" | 1" |
| 1/2" | 7/8" | 2 5/8" | 2 3/8" | 1 1/8" |
| 5/8" | 1" | 3" | 2 11/16" | 1 1/4" |
| 3/4" | 1 1/4" | 3 3/4" | 3 3/8" | 1 5/8" |
| 7/8" | 1 1/2" | 4 1/2" | 4" | 1 7/8" |
| 1" | 1 1/2" | 4 1/2" | 4" | 1 7/8" |

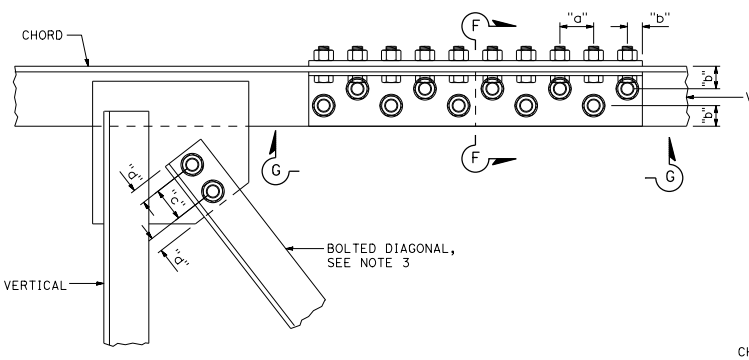
Use Pref values of "a", unless lack of room requires use of Min values.

**TABLE 2**
**BOLTED WIND BRACE AT CHORD SPLICE**

| CHORD THICKNESS | BOLTED WIND BRACE | |
|---|---|---|
| | BOLTED LEG Min WIDTH | Min THICKNESS |
| 3/8" | 2 1/2" | 5/16" |
| 1/2" | 3" | 5/16" |
| 5/8" | 3" | 3/8" |
| 3/4" | 3" | 1/2" |
| 7/8" | 3 1/2" | 1/2" |
| 1" | 3 1/2" | 1/2" |

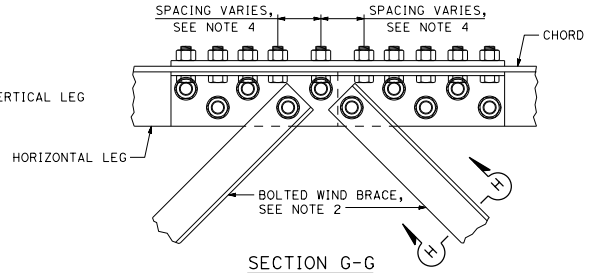
**TABLE 3**
**BOLTED MEMBER TO GUSSET PLATE**

| MEMBER THICKNESS | NOMINAL BOLT DIAMETER | "c" Min | "d" Min |
|---|---|---|---|
| 5/16" | 5/8" | 1 7/8" | 7/8" |
| 3/8" | 3/4" | 2 1/4" | 1" |
| 1/2" | 7/8" | 2 5/8" | 1 1/8" |
| 5/8" | 1" | 3" | 1 1/4" |
| 3/4" | 1 1/4" | 3 3/4" | 1 5/8" |



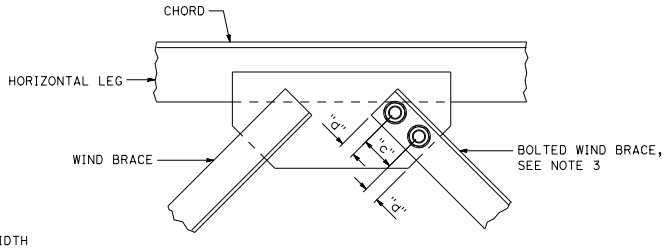

BOLTED CHORD SPLICE

Wind bracing not shown

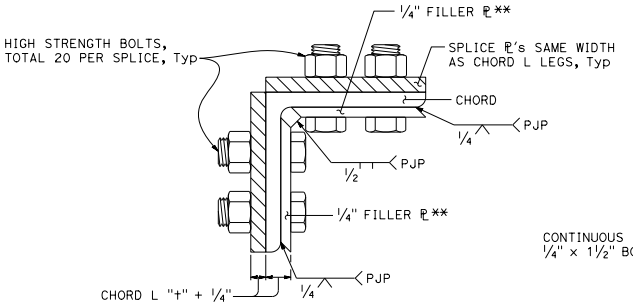



SECTION G-G

BOLTED WIND BRACE AT BOLTED CHORD SPLICE

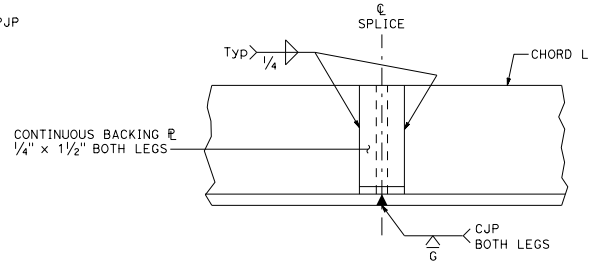



BOLTED WIND BRACE AT GUSSET PLATES

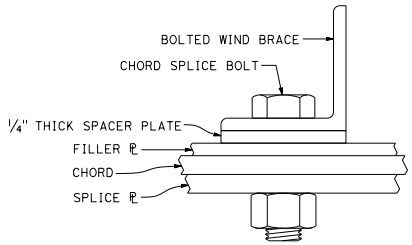



SECTION F-F

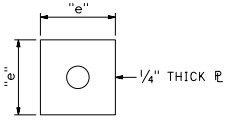
** 5/16" Filler ℄ at 3/4" thick chord angle
** 3/8" Filler ℄ at 7/8" and 1" thick chord angle




WELDED CHORD SPLICE




SECTION H-H




SPACER PLATE

"e" = WIND BRACE LEG WIDTH

NOTES:

1. All bolted connections for the chord splice and gusset plate connections are fully tensioned.
2. See "Truss Member Table" on Standard Plans S102 and S107 for the size of bolted wind brace angle. The bolted wind brace leg width and thickness shall be increased if necessary in order to meet the minimum dimensions on Table 2.
3. See Table 3 for nominal bolt diameter and spacing for bolted members to gusset plate.
4. The bolt spacing for the bolted chord splice may be increased up to 1" in order to accomodate the bolted wind brace. The unbolted leg of the wind brace may be trimmed in order to avoid conflicts with the chord splice bolts, see Wind Bracing Coping Detail on Standard Plan S111.
5. See Standard Plan S111 for details not shown.

SPLICE NOTES:

Location of Splices:
The splice shall be located so as not to interfere with the gusset plate connections for the vertical and diagonal L's. For two post type, see also Standard Plan S106.

Filler ℄:
The filler plates welded to the angle legs on the inside shall be welded before drilling the bolt holes. The filler plates shall be the same length as the splice plates. The filler plates are not necessary on the single post signs if the splice is located over 1/3 of the cantilever length from the post. Alternative splice details may be used if approved by the Engineer.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS CHORD SPLICE DETAILS

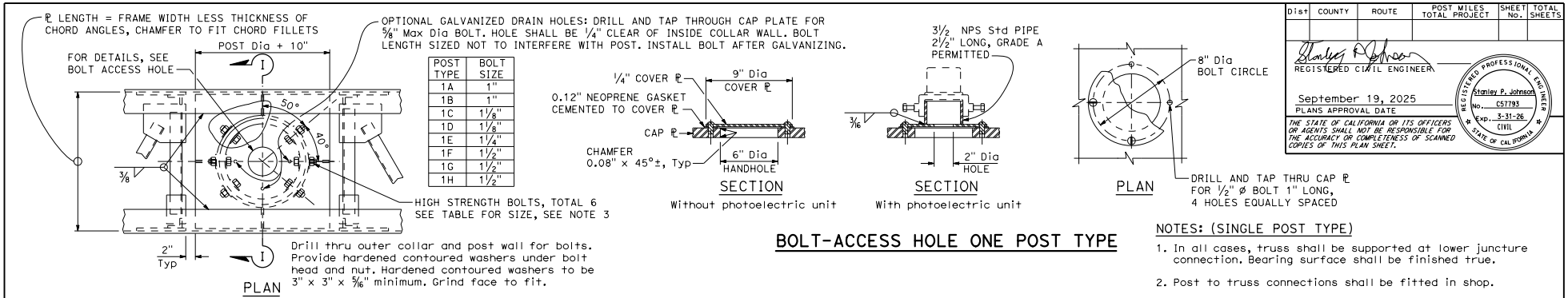
NO SCALE

**S112**

7-1-25



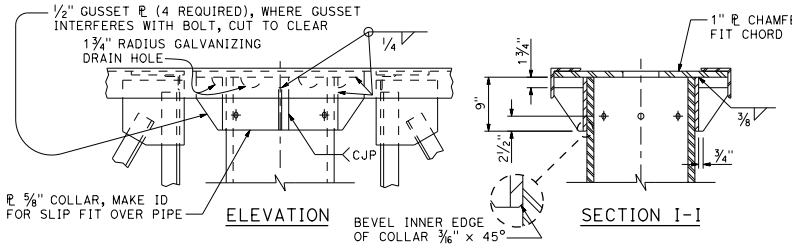
Return to Table of Contents



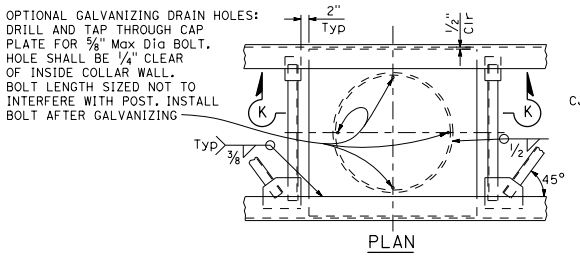

## BOLT-ACCESS HOLE ONE POST TYPE

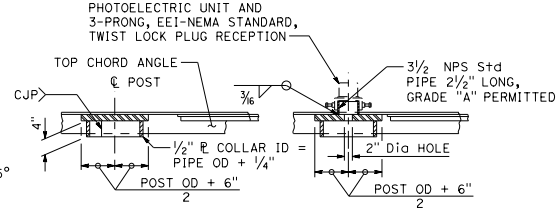
NOTES: (SINGLE POST TYPE)

1. In all cases, truss shall be supported at lower juncture connection. Bearing surface shall be finished true.
2. Post to truss connections shall be fitted in shop.
3. High strength bolts shall be snug tighten. Torque requirments are waived.

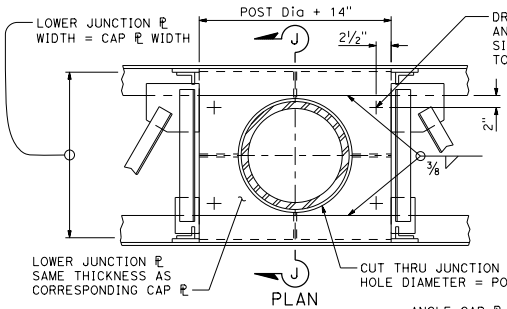


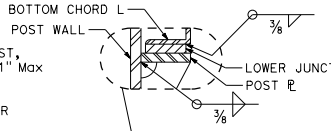

## UPPER JUNCTURE CONNECTION ONE POST TYPE

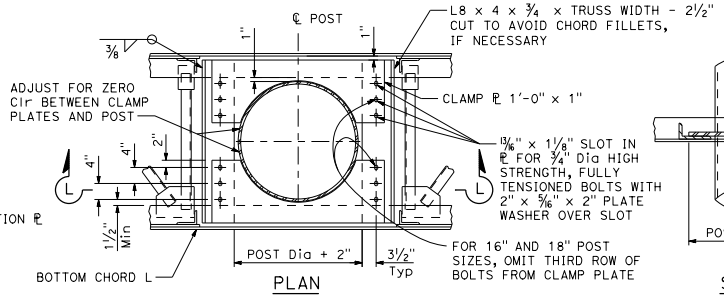


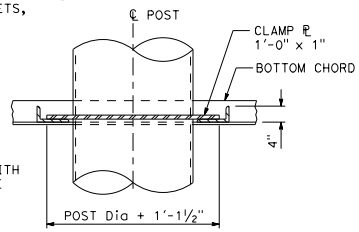




## UPPER JUNCTURE CONNECTION TWO POST TYPE

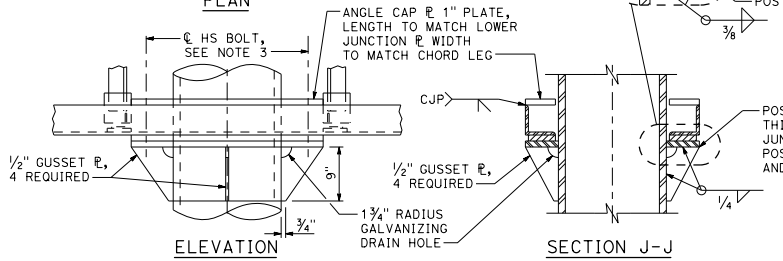



## LOWER JUNCTURE CONNECTION TWO POST TYPE




## LOWER JUNCTURE CONNECTION ONE POST TYPE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS TRUSS TO STEEL POST CONNECTION DETAILS

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

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S113

7-1-25



Return to Table of Contents

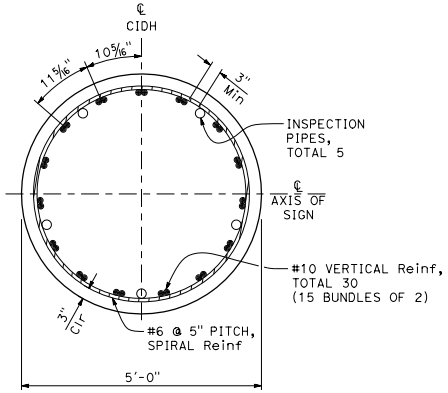
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

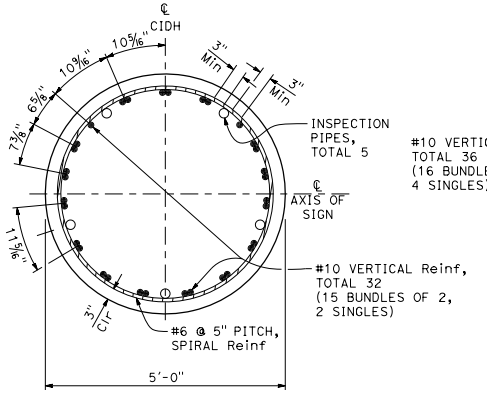
September 19, 2025
PLANS APPROVAL DATE

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STATE OF CALIFORNIA

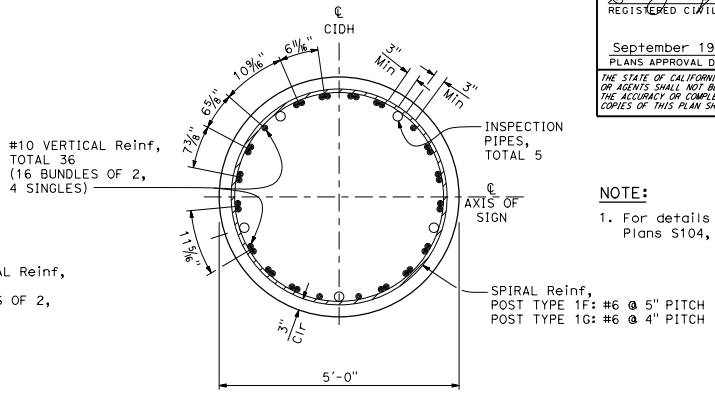
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POST TYPES 1A, 1B, 1C, 1D, 2A, 2B, 2C AND 2D



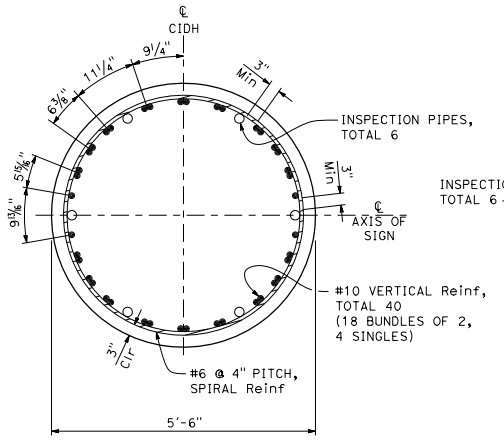

POST TYPES 1E AND 2E



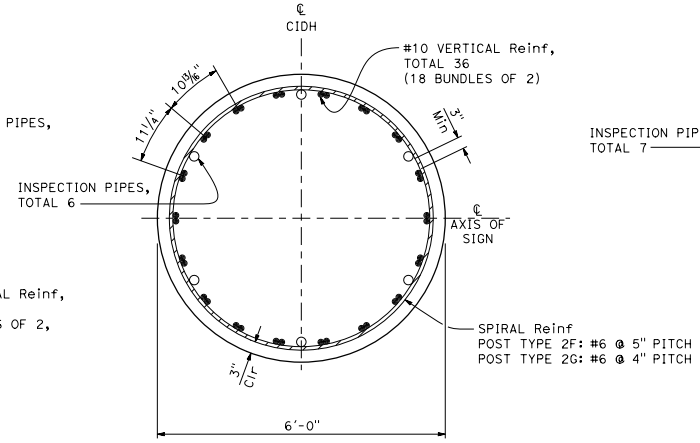

POST TYPES 1F AND 1G

NOTE:

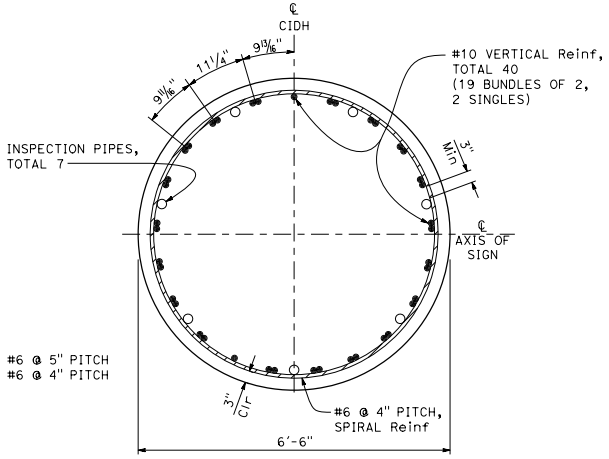
1. For details not shown, see Standard Plans S104, S105, S109 and S110.




POST TYPE 1H




POST TYPES 2F AND 2G




POST TYPE 2H

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS CIDH PILE FOUNDATION WITH INSPECTION PIPES

NO SCALE

S114

7-1-25

Return to Table of Contents

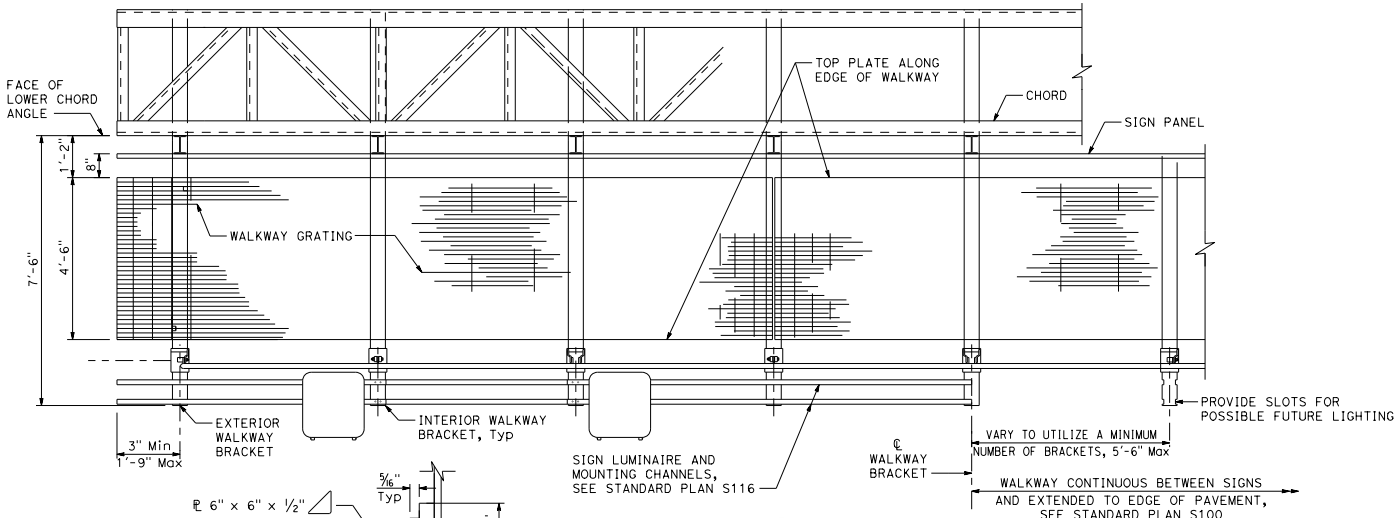
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

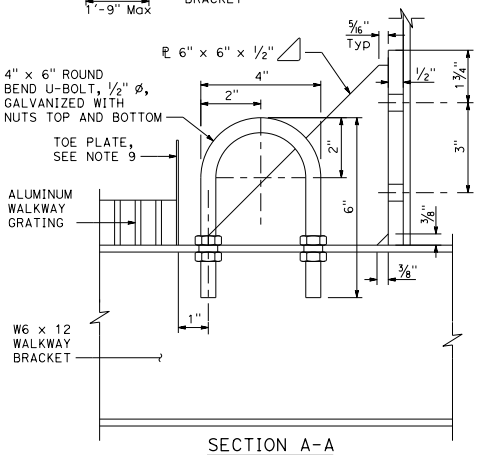
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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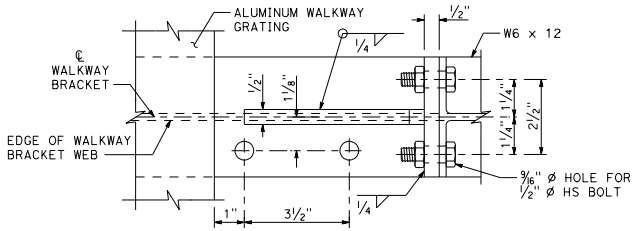



WALKWAY PLAN



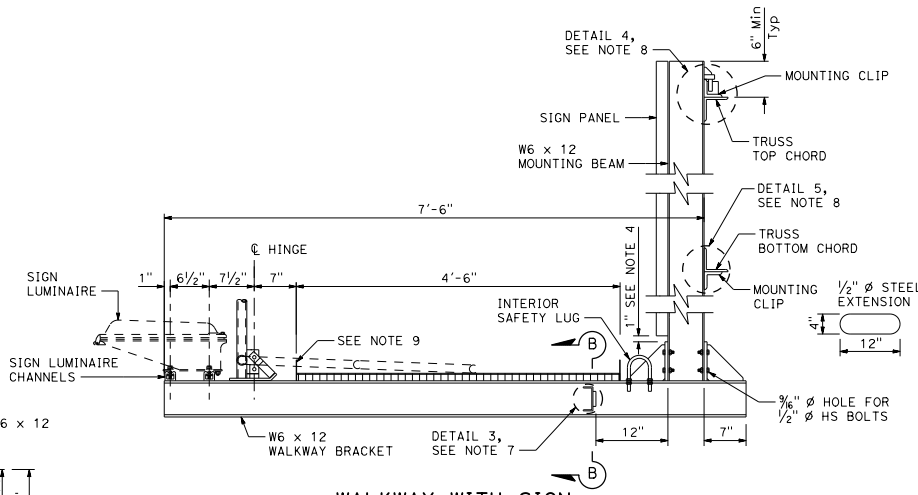

SECTION A-A

(At every walkway bracket)
NOTE: ½" ø Steel Ring not shown

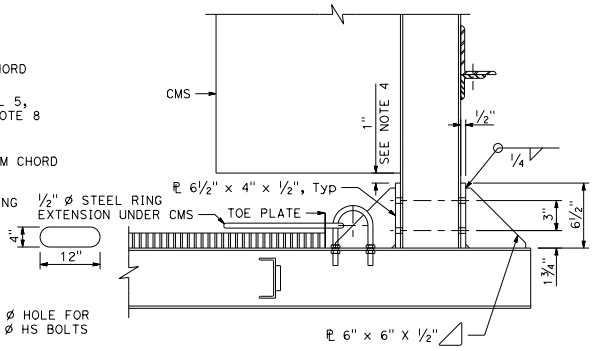



INTERIOR SAFETY LUG DETAIL

U-Bolt not shown




WALKWAY WITH SIGN




WALKWAY WITH CMS

NOTES:

1. Mounting beam spacing to be determined by sign requirements. Refer to Standard Plans S119 to S124 for details.
2. For signs without walkways, mounting beam to be cut short at bottom. Refer to Standard Plans S119 to S122 and S124 for details.
3. Walkway brackets shall be bolted to mounting beams when walkways are provided. Maximum spacing = 5'-6".
4. For sign panels and CMS that don't project below the truss, maintain 1" clearance between the mounting clip and walkway bracket gusset plate assembly.
5. For sign luminaire mounting channel details, see Standard Plan S116.
6. For aluminum walkway grating details, see Standard Plan S116.
7. For Section B-B and Detail 3, see Standard Plan S116.
8. For Detail 4 and Detail 5, see Standard Plan S117.
9. For Toe Plate Cut-Out Detail and Cover Plate Detail, see Standard Plan S117.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS WALKWAY DETAILS No. 1

NO SCALE

**S115**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

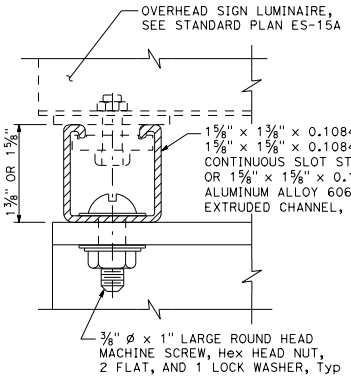
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

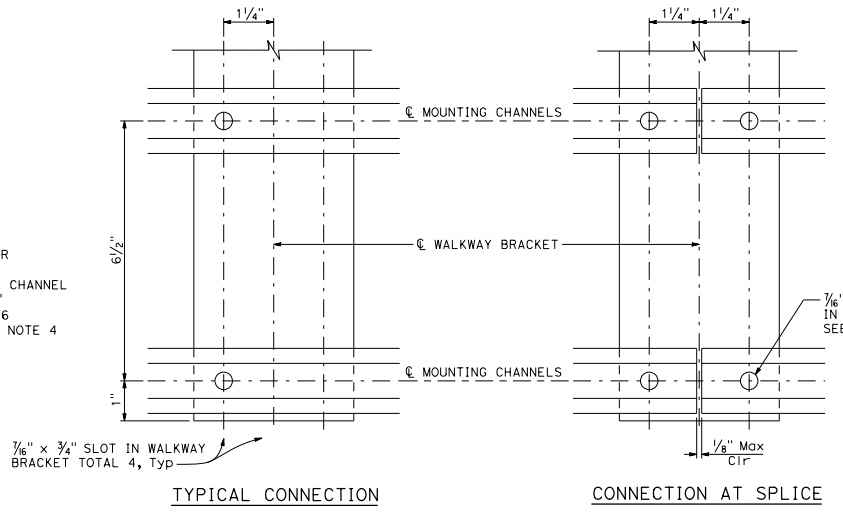
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
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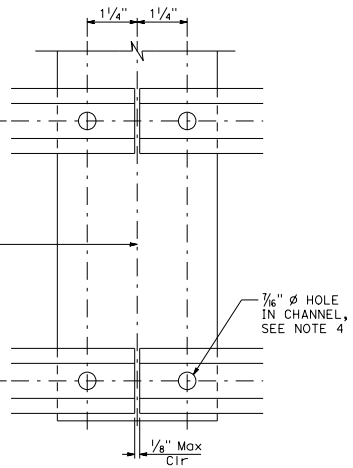





DETAIL 1




TYPICAL CONNECTION



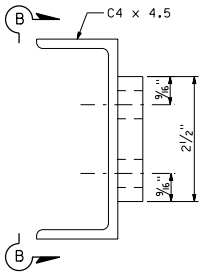

CONNECTION AT SPLICE

DETAIL 2

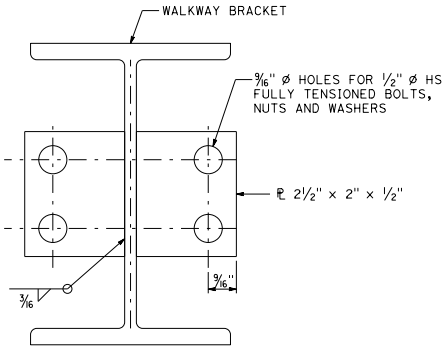
## SIGN LUMINAIRE MOUNTING CHANNEL

NOTES:

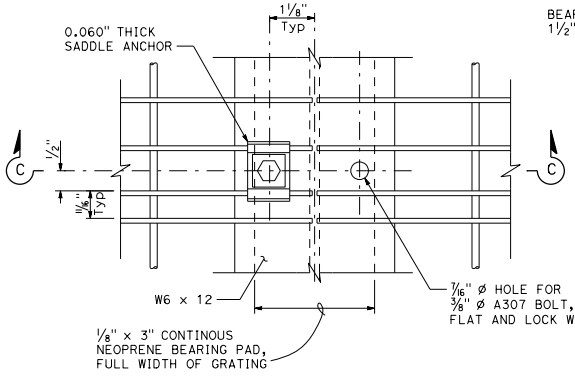
1. Aluminum bar grating with bearing bars at 11/16" spacing shall be used, with cross bars at 4" maximum spacing. Maximum unsupported span shall be 5'-6". Bearing bar minimum height shall be 1½", maximum height shall be 2½", and bearing bar thickness shall be ⅜". Grating shall be capable of carrying a 500 lb concentrated load and a 40 psf uniform load, applied non-concurrently. Maximum allowable deflection under 40 psf uniform load shall be 1.75". The maximum allowable grating self-weight shall be 9.0 psf.
2. Aluminum walkway grating and light fixture mounting channels to be continuous (no splices) over as many walkway brackets as practical and consistent with fabrication, ease of handling, and assembly.
3. Hold down saddle anchors shall be installed at every walkway bracket (not just spliced locations). At non-splice locations, saddle anchors may be installed on one side of girder web only. All hold-down hardware shall be galvanized, the hold-down saddle clip shall be aluminum, and a nylon washer shall be installed on the underside of the nut.
4. Contractor may substitute 1⅝" x 1⅝" x 0.1084" continuous slot steel channel with pre-punched slots not larger than 11/32" x 3" slots shall be at bottom of channel and shall be parallel to channel. Slots shall be spaced not closer than 4" center to center.



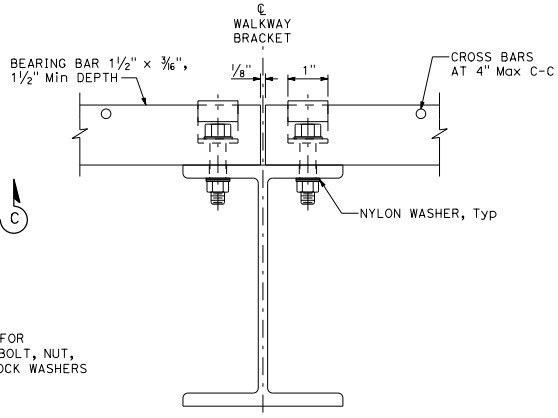

DETAIL 3




SECTION B-B
Walkway and C-shape not shown




PLAN




SECTION C-C

## ALUMINUM WALKWAY GRATING DETAILS

Shown at splice

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS WALKWAY DETAILS No.2

NO SCALE

**S116**

7-1-25

Return to Table of Contents

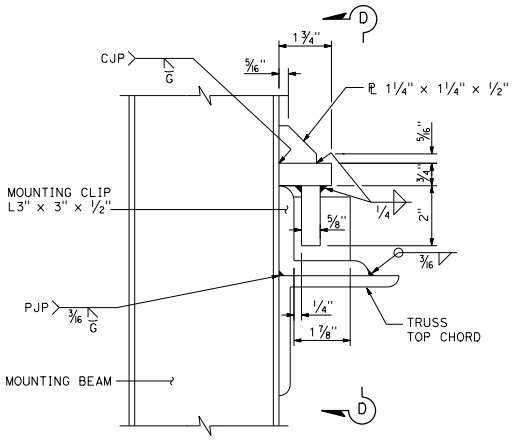
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

September 19, 2025
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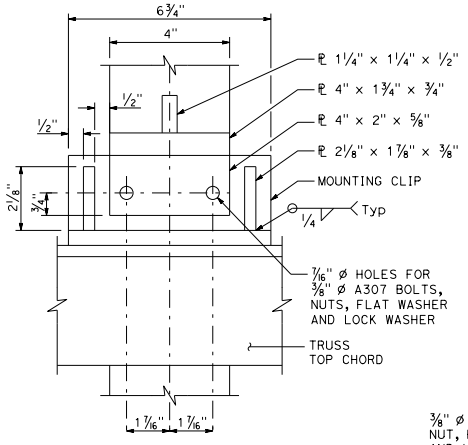
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
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DETAIL 4

Bolt holes not shown



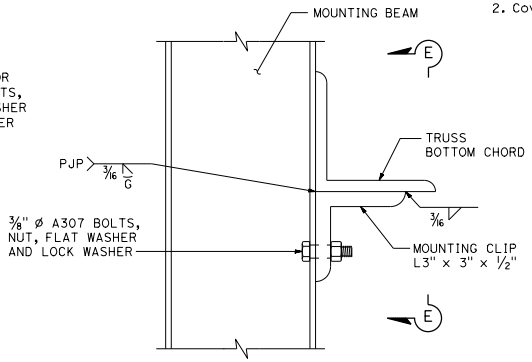

SECTION D-D

NOTE:

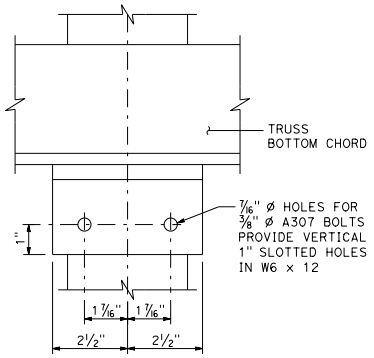
L3" x 3" x 1/2" mounting beam supports may be installed over full length of truss if greater sign placement flexibility is desired.

NOTES:

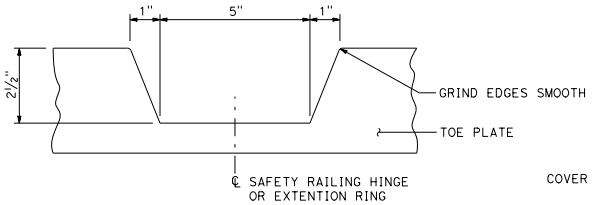
1. Cover plates placed on the walkway grating side of toe plate.
2. Cover plate is 1/16" thick aluminum sheet 5052-H-32.



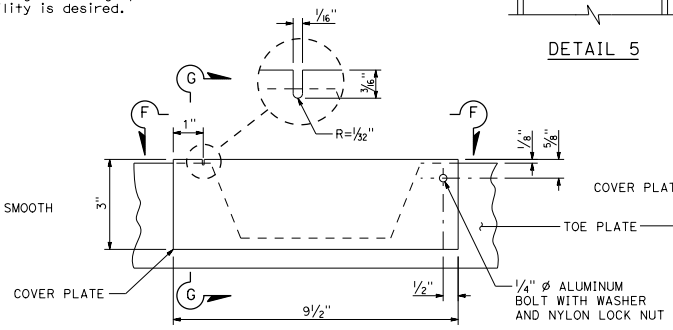

DETAIL 5



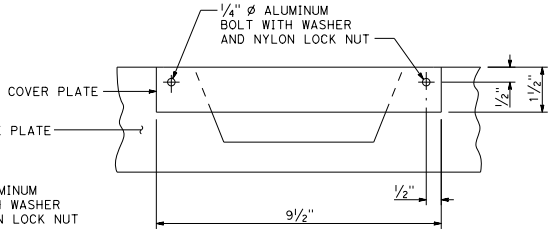

SECTION E-E




TOE PLATE CUT-OUT DETAIL



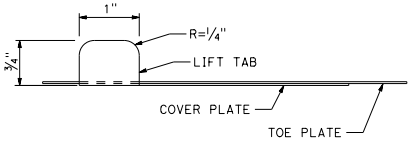

AT SAFETY RAILING HINGE



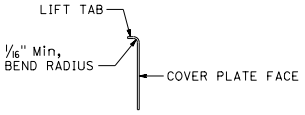

AT RING EXTENTION UNDER CMS

## COVER PLATE DETAIL

See Notes 1 and 2




SECTION F-F




SECTION G-G

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS WALKWAY DETAILS No. 3

NO SCALE

S117

7-1-25



Return to Table of Contents

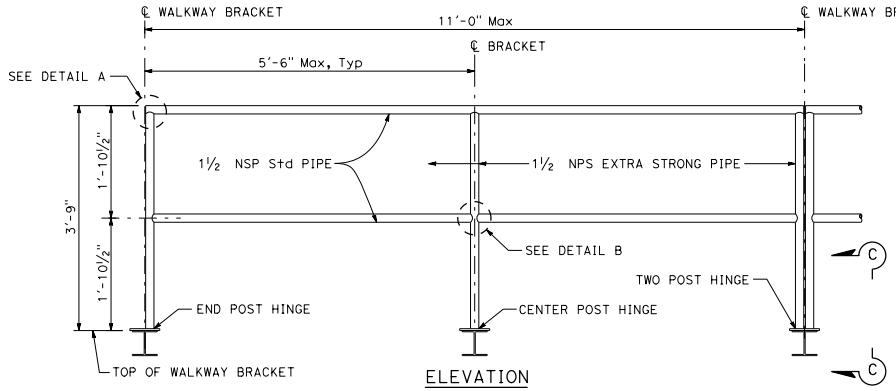
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
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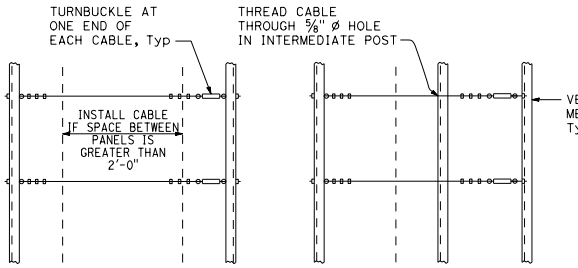
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Stanley P. Johnson
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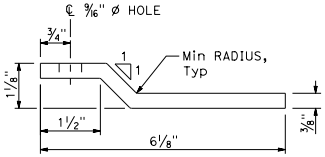

ELEVATION

## SAFETY RAILING



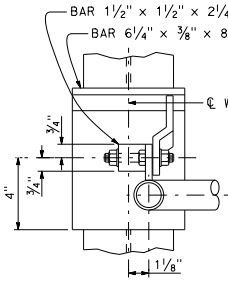

## UPPER SAFETY CABLE ELEVATION

NOTE: Thread cable through ⅝" ø hole in diagonal members, diagonal members not shown.

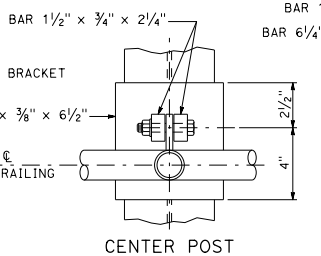



PLAN

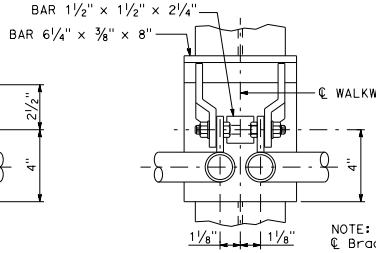
## KICKER BAR




END POST



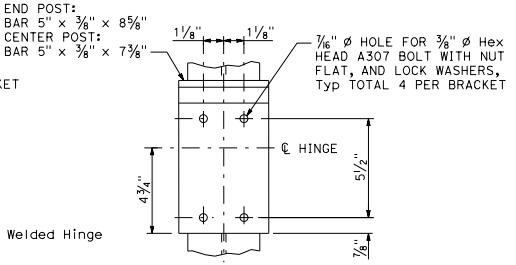

CENTER POST PLAN



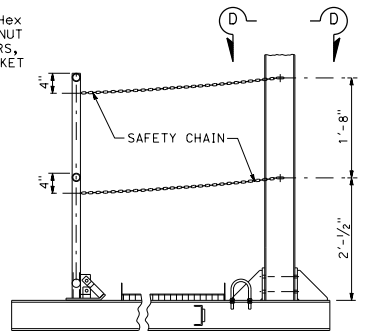

TWO POST

NOTE:
℄ Bracket = ℄ Welded Hinge

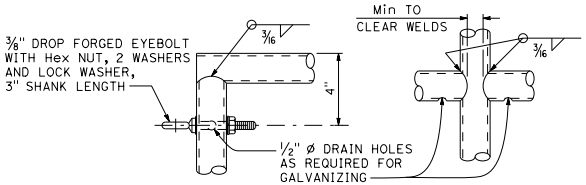
## WELDED HINGE




## TYPICAL BOLTED (ALTERNATIVE) HINGED CONNECTION

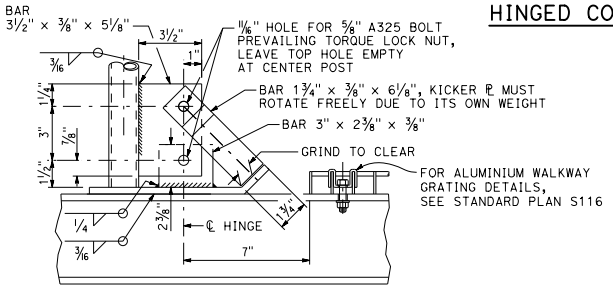



## CHAIN ASSEMBLY

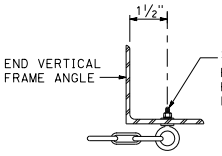



DETAIL A DETAIL B

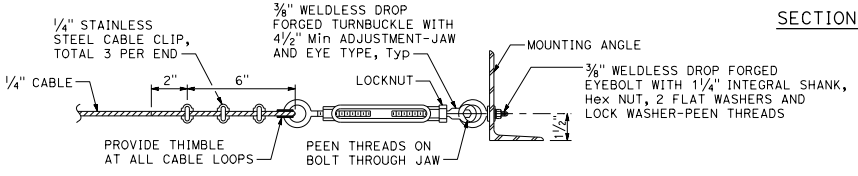
NOTE: Alternative venting methods may be used if approved by the Engineer.




SECTION C-C




VIEW D-D




## TURNBUCKLE DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

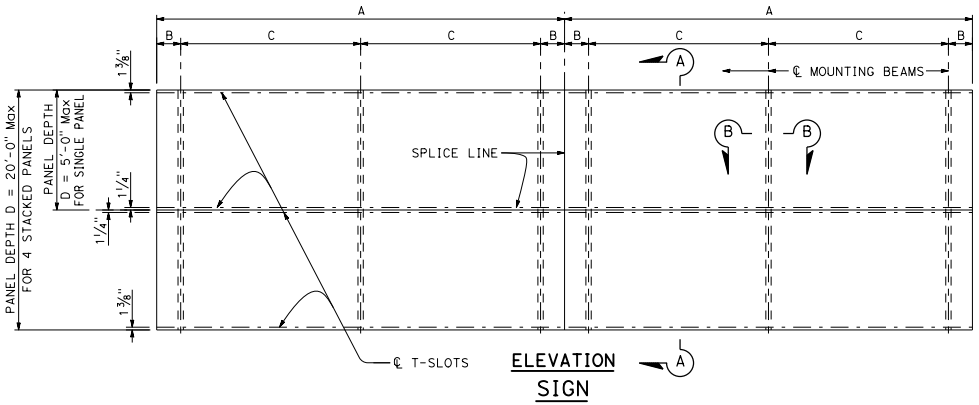
# OVERHEAD SIGNS-VERSATILE TRUSS WALKWAY SAFETY RAILING DETAILS

NO SCALE

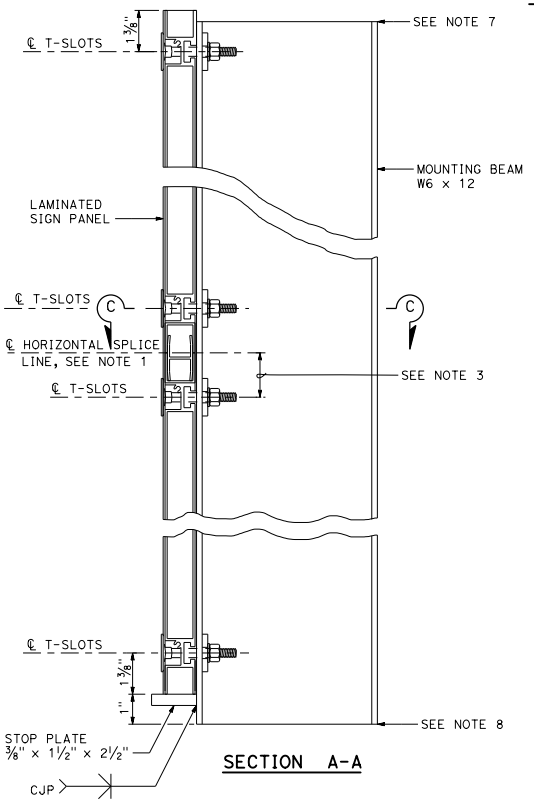
**S118**

7-1-25

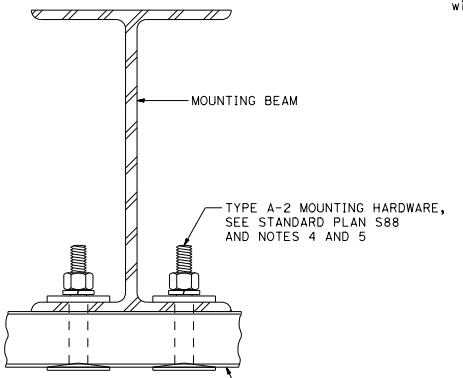
Return to Table of Contents



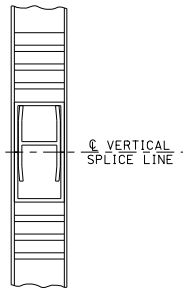

ELEVATION
SIGN




SECTION A-A




SECTION B-B




SECTION C-C
Mounting beam not shown

**MOUNTING BEAM SPACING TABLE**

| SIGN PANEL LENGTH * | NUMBER MOUNTING BEAMS | SIGN PANEL OVERHANG | MOUNTING BEAM SPACING |
|---|---|---|---|
| A | | B | C |
| 5'-0" | 2 | 9" | 3'-6" |
| 6'-0" | 2 | 1'-0" | 4'-0" |
| 7'-0" | 2 | 1'-3" | 4'-6" |
| 8'-0" | 2 | 1'-6" | 5'-0" |
| 9'-0" | 2 | 1'-10" | 5'-6" |
| 10'-0" | 2 | 2'-0" | 6'-0" |
| 11'-0" | 2 | 2'-0" | 7'-0" |
| 12'-0" | 2 | 2'-6" | 7'-0" |
| 13'-0" | 2 | 2'-6" | 8'-0" |
| 14'-0" | 3 | 1'-0" | 6'-0" |
| 15'-0" | 3 | 1'-0" | 6'-6" |
| 16'-0" | 3 | 6" | 7'-6" |
| 17'-0" | 3 | 1'-0" | 7'-6" |
| 18'-0" | 3 | 1'-0" | 8'-0" |
| 19'-0" | 3 | 1'-6" | 8'-0" |
| 20'-0" | 3 | 2'-0" | 8'-0" |
| 21'-0" | 4 | 1'-6" | 6'-0" |
| 22'-0" | 4 | 2'-0" | 6'-0" |
| 23'-0" | 4 | 1'-0" | 7'-0" |
| 24'-0" | 4 | 1'-6" | 7'-0" |

* Signs longer than 24'-0" are fabricated and mounted as adjoining single panels. The location of the vertical splice line will be determined by the Engineer.

NOTES:

1. The location of the horizontal splice line is dependent on the Contractor for signs greater than 60" in depth.
2. Mounting bolts and clamps are required on each side of the horizontal splice lines at each support beam.
3. Dimension varies from panel to panel. Average value approximate 1".
4. Torque stainless steel sign panel mounting bolts to 100 inch-pounds.
5. Drill through panel at integral track. Install Type A-2 mounting hardware and attach reflective tape.
6. Refer to Standard Plan S115 for mounting beam to truss connection details.
7. For sign panel depths of 70" or less the top of the mounting beam extends beyond the limits of the sign panel. Refer to Standard Plan S115.
8. For sign panel depths of 60" or less, or where a walkway is installed, the bottom of the mounting beam extends further than 1" from the bottom of the sign panel. Refer to Standard Plan S115.
9. The Contractor must verify all dependent dimensions in the field before ordering or fabricating any material.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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Stanley P. Johnson
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STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS SIGN MOUNTING DETAILS LAMINATE PANEL - TYPE A

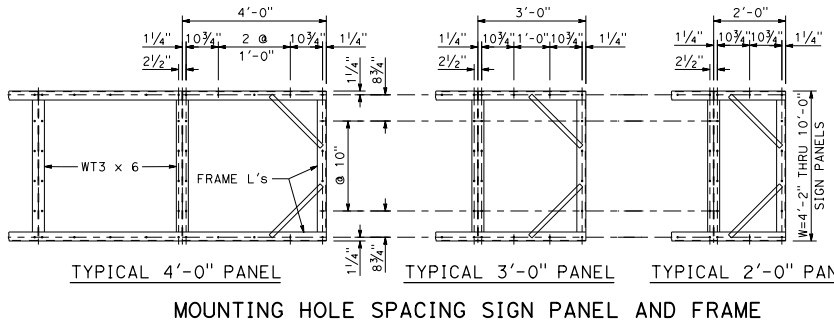
NO SCALE

S119

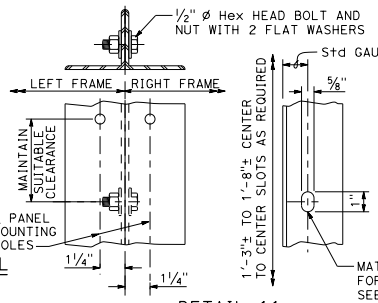
7-1-25



Return to Table of Contents




MOUNTING HOLE SPACING SIGN PANEL AND FRAME




DETAIL 11

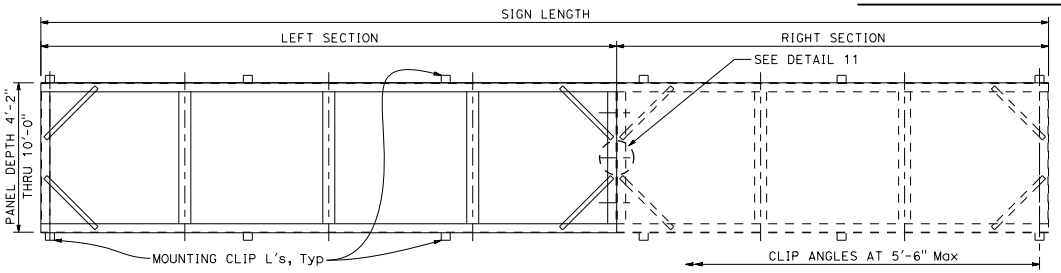
FRAME TO FRAME CONNECTION DETAILS

| SLOT TABLE | |
|---|---|
| PANEL DEPTH | No. OF SLOTS |
| 4'-2" | 2 |
| 5'-0" | 3 |
| 5'-10" | 3 |
| 6'-8" AND 7'-6" | 4 |
| 8'-4" AND 9'-2" | 5 |
| 10'-0" | 6 |

NOTE:
Panel mounting holes not shown. Panel lengths available in 2'-0" increments.

NOTES:

1. Frames shall be all-welded construction.
2. Panel mounting holes shall be drilled by template. Sign panel may be considered as a template.
3. Drilled and tapped holes ¼" may be used where interference due to welds or structural members is encountered.
4. WT3 x 6 shall be flush with faces of frame angles.
5. Mounting clip angles shall be located such as to allow the top and bottom frame angles of the removable sign panel to lie on a straight horizontal line.
6. Hole for mounting removable sign panel frame may be slotted 1" maximum parallel to the axis of the sign.
7. WT3 x 6 may be crimped at ends to join frame angles. Fillet weld all around.
8. For Table 2, see Standard Plan S121.
9. For sign panel depth of 70" or less the top of the mounting beam extends beyond the limits of the sign panel. Refer to Standard Plan S115.
10. For sign panel depth of 60" or less, or where a walkway is installed, the bottom of the mounting beam extends further than 1" below the clip L.

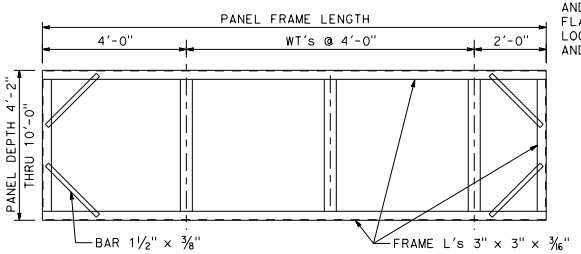



REMOVABLE FRAME GREATER THAN 20'-0"

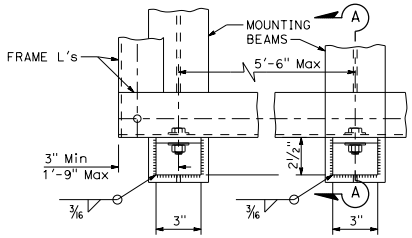
NOTES:
Frames for signs greater than 20'-0" in length shall be fabricated in two sections with left section a multiple of 4'-0" in length. See Section Length Table.

Sections shall be hoisted into place individually and bolted together as per detail 11 prior to tightening of mounting clip bolts. Bolting two sections together and hoisting simultaneously will not be permitted. For signs up to 20'-0" in height, 2 panels shall be stacked verically. Refer to Section T-T for connection details.

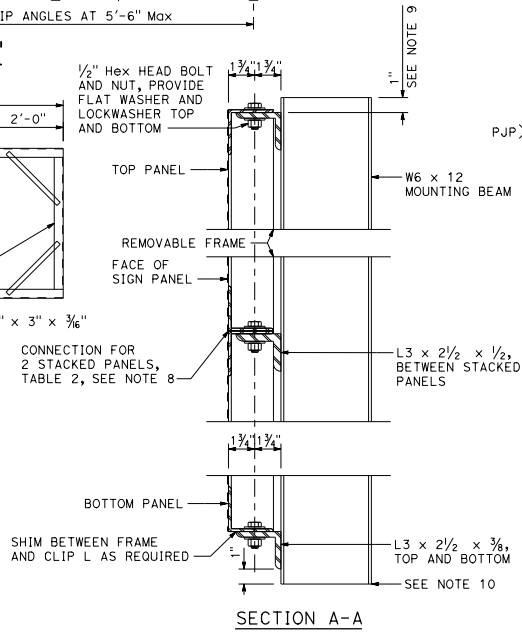
| SECTION LENGTH TABLE | | |
|---|---|---|
| SIGN LENGTH | LEFT SECTION | RIGHT SECTION |
| 22'-0" | 12'-0" | 10'-0" |
| 23'-0" | 12'-0" | 11'-0" |
| 24'-0" | 12'-0" | 12'-0" |
| 25'-0" | 12'-0" | 13'-0" |
| 26'-0" | 12'-0" | 14'-0" |
| 27'-0" | 12'-0" | 15'-0" |
| 28'-0" | 16'-0" | 12'-0" |
| 29'-0" | 16'-0" | 13'-0" |
| 30'-0" | 16'-0" | 14'-0" |
| 31'-0" | 16'-0" | 15'-0" |
| 32'-0" | 16'-0" | 16'-0" |
| 33'-0" | 16'-0" | 17'-0" |
| 34'-0" | 16'-0" | 18'-0" |
| 35'-0" | 16'-0" | 19'-0" |
| 36'-0" | 20'-0" | 16'-0" |
| 37'-0" | 20'-0" | 17'-0" |
| 38'-0" | 20'-0" | 18'-0" |
| 39'-0" | 20'-0" | 19'-0" |
| 40'-0" | 20'-0" | 20'-0" |



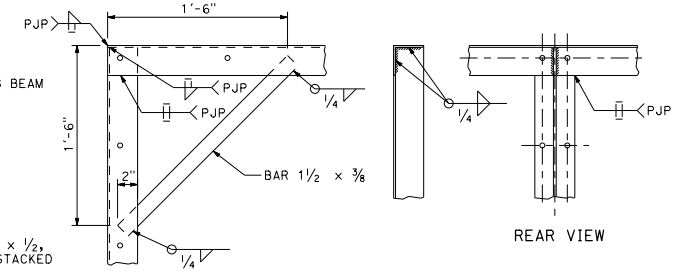

TYPICAL REMOVABLE FRAME
(4'-0" thru 20'-0")




FRAME MOUNTING DETAILS




SECTION A-A




DETAIL 9 DETAIL 10

TYPICAL FRAME JOINT DETAILS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS REMOVABLE SIGN PANEL FRAMES DETAILS No.1

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

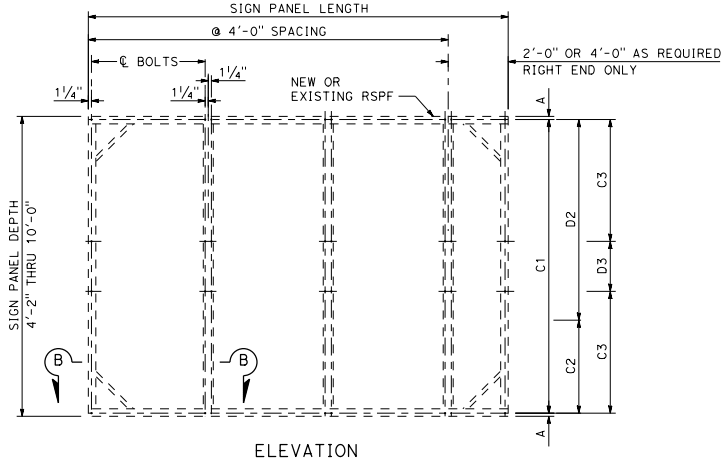
REGISTERED CIVIL ENGINEER
Sebtember 19, 2025
PLANS APPROVAL DATE
Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
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S120

7-1-25

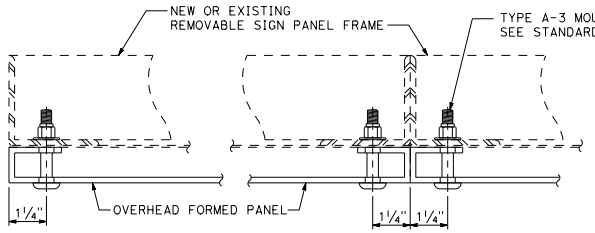
2025 STANDARD PLAN S120

Return to Table of Contents




ELEVATION

## NEW OR EXISTING REMOVABLE SIGN PANEL FRAME MOUNTING HOLE SPACING




CORNER DETAIL PANEL CONNECTION

SECTION B-B

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

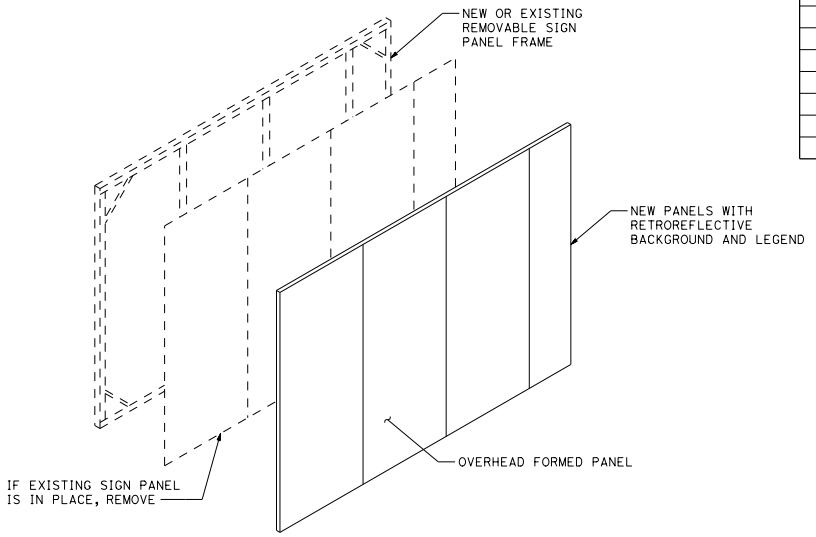
1. When constructing a new frame:
   a. Refer to Standard Plan S120 for structural details.
   b. Sign panels shall be considered as a template for drilling holes for mounting bolts.
2. Sign panel mounting holes ½" ø maximum for ⅜" ø bolts.
3. The Contractor shall verify all dependent dimensions in the field before ordering or fabriacting any material.

**TABLE 1**
**MOUNTING BOLT SPACING**

| PANEL DEPTH | A | 1 SPACE | 2 SPACES | | 3 SPACES | | |
|---|---|---|---|---|---|---|---|
| | | C1 | C2 | D2 | C3 | D3 | C3 |
| 50" | 1¼" | 3'-11½" | | | | | |
| 60" | 1¼" | | 2'-4¾" | 2'-4¾" | | | |
| 70" | 1¼" | | 1'-6¾" | 4'-¾" | | | |
| 80" | 1¼" | | 3'-2¾" | 3'-2¾" | | | |
| 90" | 1¼" | | 3'-2¾" | 4'-¾" | | | |
| 100" | 1¼" | | 4'-¾" | 4'-¾" | | | |
| 110" | 1¼" | | | | 3'-2¾" | 2'-6" | 3'-2¾" |
| 120" | 1¼" | | | | 4'-¾" | 1'-8" | 4'-¾" |

**TABLE 2**
**PANEL DEPTH GREATER THAN 120"**

| TOTAL PANEL DEPTH | TOP PANEL | BOTTOM PANEL |
|---|---|---|
| 130" | 70" | 60" |
| 140" | 70" | 70" |
| 150" | 80" | 70" |
| 160" | 80" | 80" |
| 170" | 90" | 80" |
| 180" | 90" | 90" |
| 190" | 100" | 90" |
| 200" | 100" | 100" |
| 210" | 110" | 100" |
| 220" | 110" | 110" |
| 230" | 120" | 110" |
| 240" | 120" | 120" |




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS REMOVABLE SIGN PANEL FRAMES DETAILS No. 2

NO SCALE

**S121**

7-1-25



Return to Table of Contents

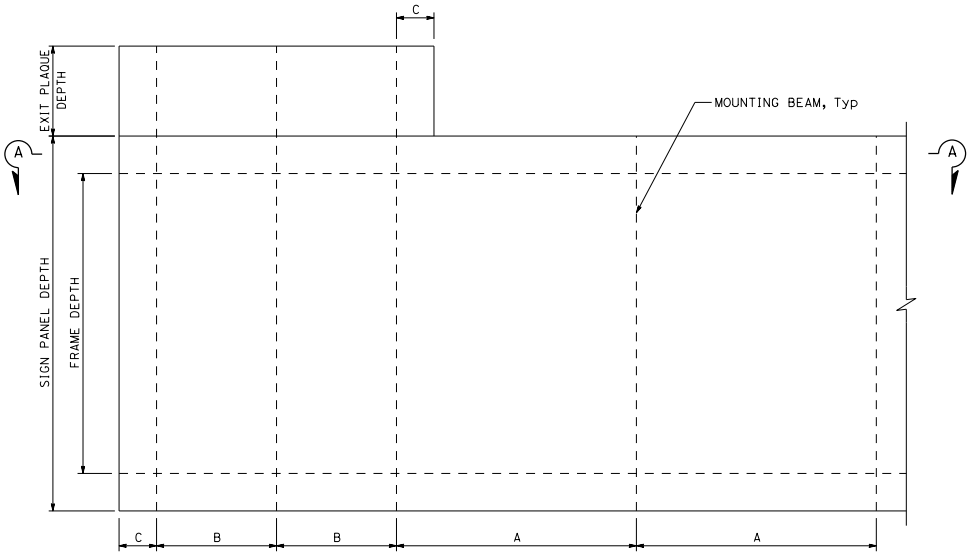
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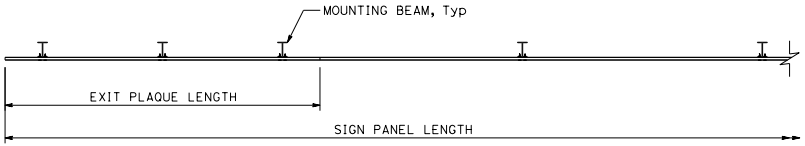
September 19, 2025
PLANS APPROVAL DATE

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Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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SIGN PANEL ELEVATION




SECTION A-A

MOUNTING BEAM SPACING NOTES AND ABBREVIATIONS:

A: Maximum mounting beam spacing for sign support = 8'-0".

B: Maximum mounting beam spacing for exit plaque support. A minimum of 2 mounting beams are required per exit plaque. Refer to "EXIT PLAQUE MOUNTING BEAM TABLE" for "B" values.

C: Maximum sign panel/exit plaque overhang length. Refer to Standard Plans S119 and S120 for permissible overhang values.

NOTES: Additional mounting beams will be required when walkways are installed. Maximum mounting beam spacing at walkways = 5'-6". Refer to Standard Plan S115 for walkway mounting beam details. When mounting beams are added for walkway or exit plaque support, they are not required to be attached to the sign panels.

**EXIT PLAQUE MOUNTING BEAM TABLE**

| SIGN PANEL DEPTH D | B |
|---|---|
| D ≤ 80" | 8'-0" |
| 80" < D ≤ 100" | 8'-0" |
| 100" < D ≤ 120" | 8'-0" |
| 120" < D ≤ 150" | 7'-0" |
| 150" < D ≤ 180" | 6'-0" |
| 180" < D ≤ 210" | 7'-0" |
| 210" < D ≤ 240" | 4'-0" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS EXIT PLAQUE MOUNTING DETAILS

NO SCALE

S122

7-1-25



Return to Table of Contents

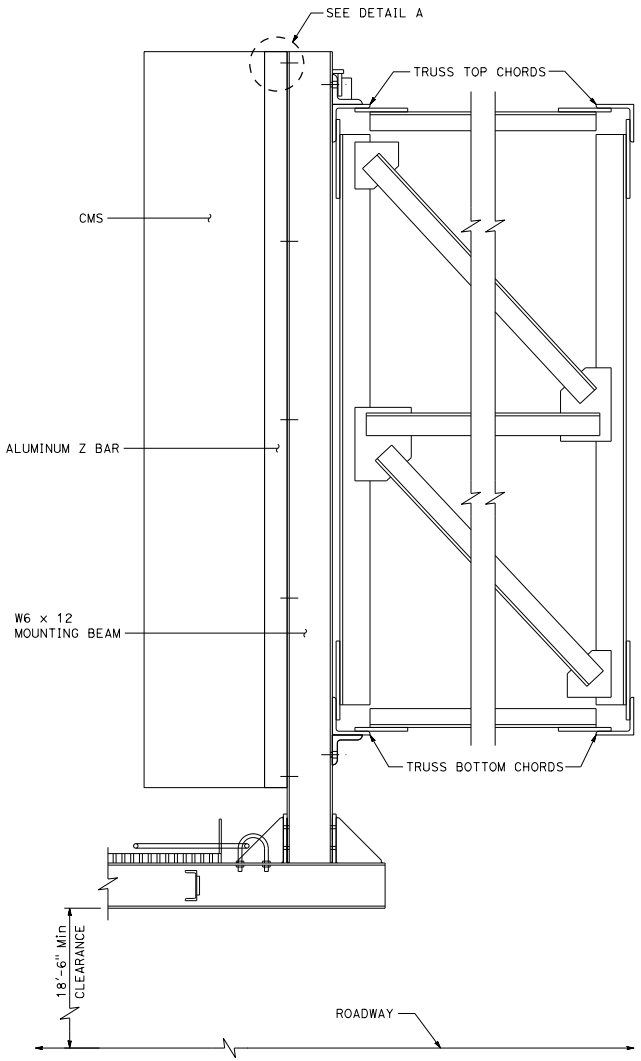
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September 19, 2025
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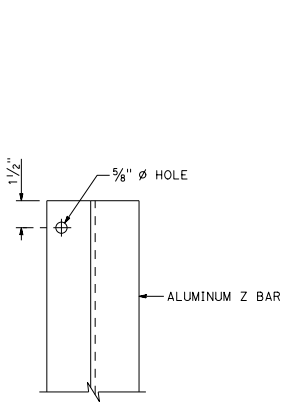
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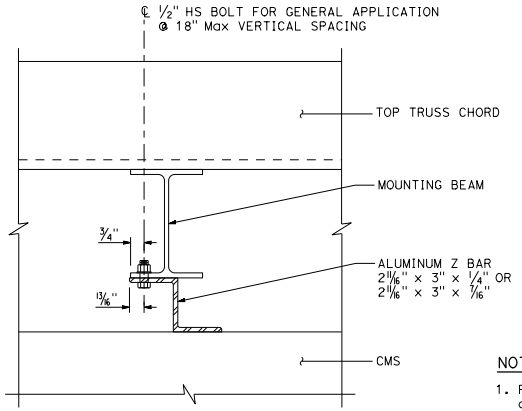



ELEVATION

(Diagonal and wind brace members not shown)



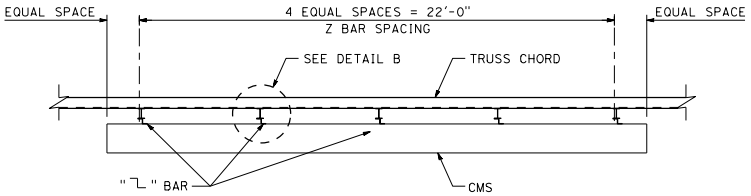

DETAIL A



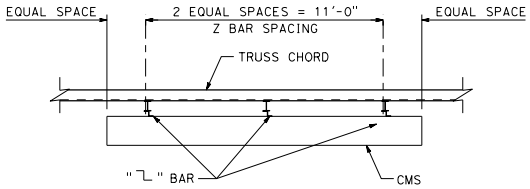

DETAIL B

NOTES:

1. For mounting beam to truss chord connection details, see Standard Plan S115.
2. For horizontal and vertical position of CMS, see Project Plans.
3. Contractor shall verify Z bar spacing prior to drilling holes in mounting channels.
4. If walkway is required per Project Plans, refer to Standard Plan S115 for details. Minimum vertical clearance shall be measured to underside of walkway.




ALUMINUM Z BAR SPACING CMS LOAD CASE 1




ALUMINUM Z BAR SPACING CMS LOAD CASE 2

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS CMS MOUNTING DETAILS

NO SCALE

**S123**

7-1-25



Return to Table of Contents

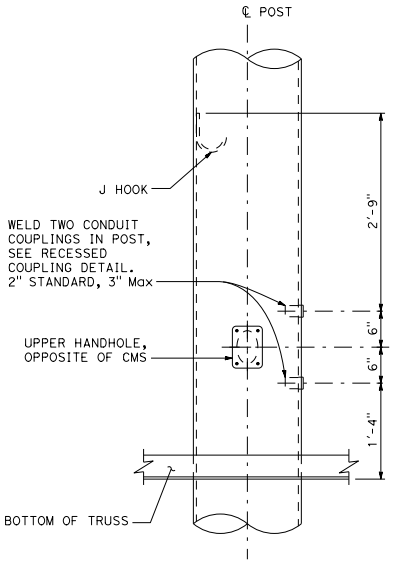
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REGISTERED CIVIL ENGINEER

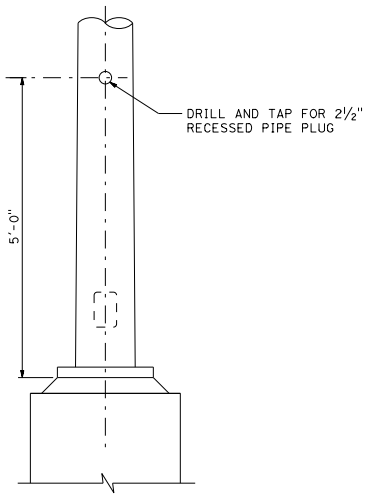
Sebtember 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

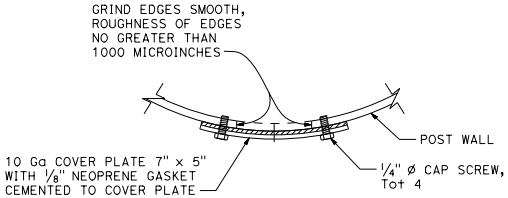
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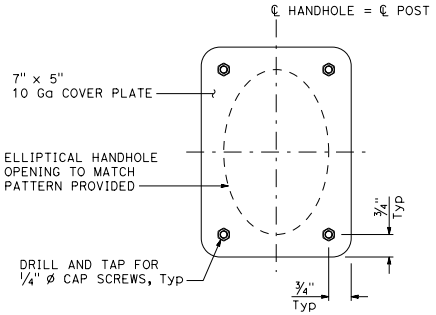

ELEVATION AT POST



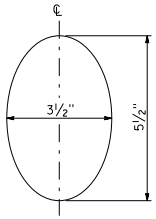

PIPE PLUG DETAIL




PLAN

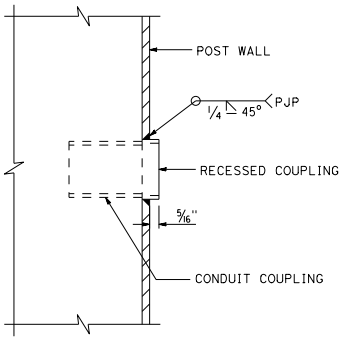



ELEVATION

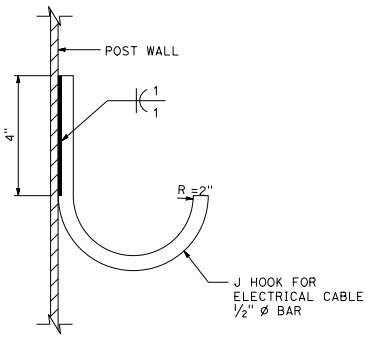



PATTERN OF ELLIPTICAL HANDHOLE CUT OUT

UPPER HANDHOLE AND COVER DETAILS




RECESSED COUPLING DETAIL




J HOOK DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS ADDITIONAL DETAILS FOR CMS

NO SCALE

**S123B**

2025 STANDARD PLAN S123B

7-1-25

Return to Table of Contents

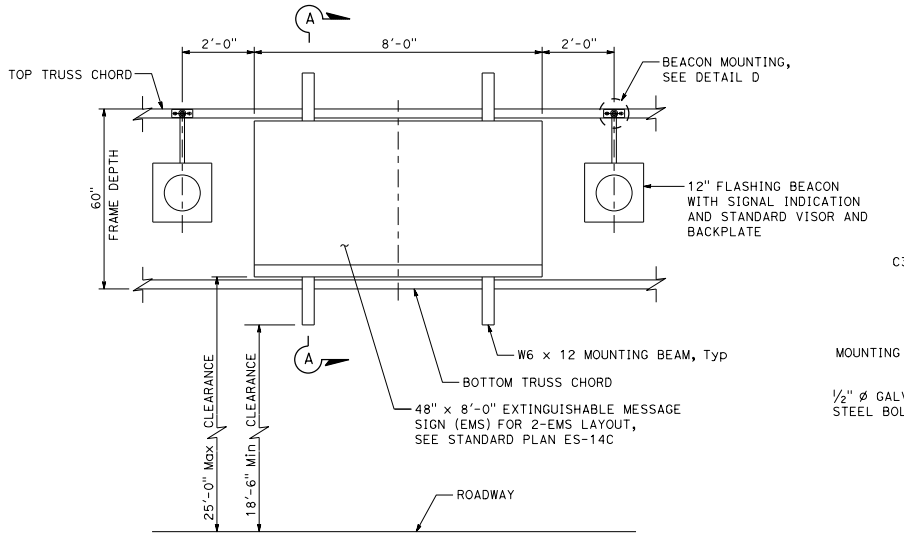
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

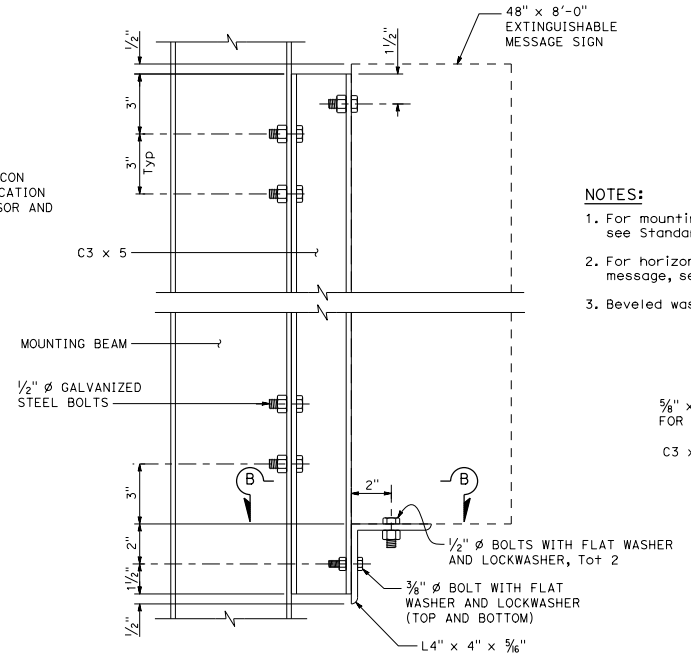
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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## ELEVATION

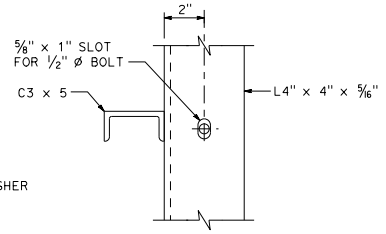
Vertical and diagonal truss members not shown



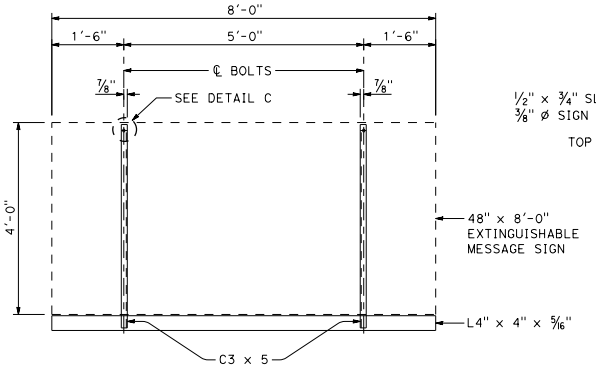

## SECTION A-A

**NOTES:**

1. For mounting beam to truss chord connection details, see Standard Plan S115.
2. For horizontal and vertical position of extinguishable message, see Project Plans.
3. Beveled washers must be used at the channel member flanges.

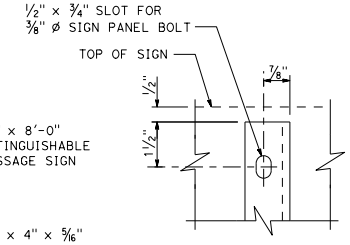



## SECTION B-B

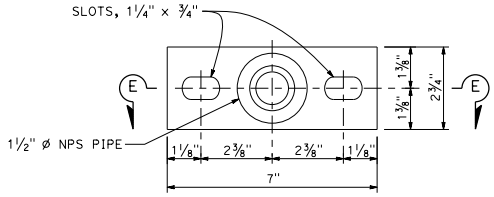



## DETAIL H

## SIGN MOUNTING

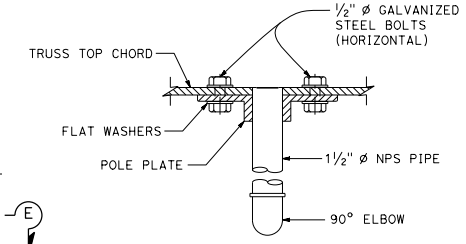



## DETAIL C




## DETAIL D

Top truss chord not shown




## SECTION E-E

Refer to Standard Plan ES-14C for additional details

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# OVERHEAD SIGNS-VERSATILE TRUSS EMS AND FLASHING BEACON DETAILS

NO SCALE

**S124**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED ELECTRICAL ENGINEER

Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

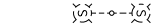
September 19, 2025
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## ANNOTATION

| SYMBOL | DESCRIPTION |
|---|---|
| AB | ABANDON. IF APPLIED TO CONDUIT, REMOVE CONDUCTORS |
| BC | INSTALL PULL BOX IN EXISTING CONDUIT RUN |
| BP | PEDESTRIAN BARRICADE, TYPE AS INDICATED ON PLAN |
| CB | INSTALL CONDUIT INTO EXISTING PULL BOX |
| CC | CONNECT NEW AND EXISTING CONDUIT. REMOVE EXISTING CONDUCTORS AND INSTALL CONDUCTORS AS INDICATED |
| CF | CONDUIT TO REMAIN FOR FUTURE USE. REMOVE CONDUCTORS. INSTALL PULL TAPE |
| DH | DETECTOR HANDHOLE |
| FA | FOUNDATION TO BE ABANDONED |
| IS | INSTALL SIGN ON SIGNAL MAST ARM |
| NS | NO SLIP BASE ON STANDARD |
| PEC | PHOTOELECTRIC CONTROL |
| PEU | PHOTOELECTRIC UNIT |
| RC | EQUIPMENT OR MATERIAL TO BE REMOVED AND BECOME THE PROPERTY OF THE CONTRACTOR |
| RL | RELOCATE EQUIPMENT |
| RR | REMOVE AND REUSE EQUIPMENT |
| RS | REMOVE AND SALVAGE EQUIPMENT |
| SC | SPLICE NEW TO EXISTING CONDUCTORS |
| SD | SERVICE DISCONNECT |
| TSP | TELEPHONE SERVICE POINT |

## STANDARD

| NEW | EXISTING | TYPE |
|---|---|---|
|  |  | 15 |
|  |  | 15D |
|  |  | 15 STRUCTURE |
|  |  | 15D STRUCTURE |
|  |  | 21 |
|  |  | 21D |
|  |  | 21 STRUCTURE |
|  |  | 21D STRUCTURE |
|  |  | 30 |
|  |  | 31 |
|  |  | 32 |

## SOFFIT AND WALL-MOUNTED LUMINAIRES

| SYMBOL | DESCRIPTION |
|---|---|
|  | PENDANT SOFFIT LUMINAIRE |
|  | FLUSH-MOUNTED SOFFIT LUMINAIRE |
|  | WALL-MOUNTED LUMINAIRE |
|  | EXISTING SOFFIT OR WALL-MOUNTED LUMINAIRE TO REMAIN UNMODIFIED |
|  | EXISTING SOFFIT OR WALL-MOUNTED LUMINAIRE TO BE MODIFIED AS SPECIFIED |

NOTE:
Arrow indicates "street side" of luminaire.

## MISCELLANEOUS ELECTROLIERS

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
|  |  | LUMINAIRE ON WOOD POLE |
|  |  | NON-STANDARD ELECTROLIER (SEE PROJECT LEGEND) |
|  |  | CITY ELECTROLIER |
|  |  | ELECTROLIER FOUNDATION (FUTURE INSTALLATION) |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LEGEND)

NO SCALE

ES-1A

2025 STANDARD PLAN ES-1A



7-1-25

Return to Table of Contents

## CONDUIT

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| C | c | COMMUNICATION CONDUIT |
| | | CONDUIT TERMINATION |
| FO | fo | FIBER OPTIC CONDUIT |
| F | f | FIRE ALARM CONDUIT |
| | | LIGHTING CONDUIT, UNLESS OTHERWISE INDICATED OR NOTED |
| T | t | TELEPHONE CONDUIT |
| | | TRAFFIC SIGNAL CONDUIT |
| R | r | CONDUIT RISER ATTACHED TO THE STRUCTURE OR SERVICE POLE |

## SERVICE EQUIPMENT

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| OH | oh | OVERHEAD LINES |
| | | POLE GUY WITH ANCHOR |
| III | III | SERVICE EQUIPMENT ENCLOSURE TYPE. DOOR INDICATES FRONT OF ENCLOSURE |
| T | T | TELEPHONE DEMARCATION CABINET |
| | | UTILITY TRANSFORMER - GROUND MOUNTED |
| U | U | WOOD POLE, "U" INDICATES UTILITY OWNED |

## POLE-MOUNTED SERVICE DESIGNATION

| SYMBOL | DESCRIPTION |
|---|---|
| TYPE H SERVICE, 28'-10" | TYPE OF INSTALLATION AND POLE HEIGHT ABOVE GRADE |

## FLASHING BEACON

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| R | R | FLASHING BEACON (ONE VEHICLE SIGNAL HEAD WITH BACKPLATE AND VISOR)<br>"R" INDICATES RED INDICATION<br>"Y" INDICATES YELLOW INDICATION |
| Y<br>Y | Y<br>Y | FLASHING BEACON WITH TYPE 15-FBS STANDARD AND A SIGN. |
| R R | R R | FLASHING BEACON WITH TYPES 9, 9A OR 9B SIGN UNLESS OTHERWISE SPECIFIED OR INDICATED |

## SIGNAL EQUIPMENT

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| | | CONTROLLER ASSEMBLY, DOOR INDICATES FRONT OF CABINET |
| | | GUARD POST |
| PV | PV | MODIFICATIONS OF BASIC SYMBOL:<br>"L" INDICATES ALL NON-ARROW SECTIONS LOUVERED<br>"LG" INDICATES LOUVERED GREEN SECTION ONLY<br>"PV" INDICATES ALL 12" SECTIONS PROGRAMMED VISIBILITY<br>"8" INDICATES ALL 8" SECTIONS (ONLY WHEN SPECIFIED)<br>"PHBF" INDICATES PEDESTRIAN HYBRID BEACON FACE |
| | | OPTICAL DETECTOR FOR THE EMERGENCY VEHICLE DETECTION |
| | | PEDESTRIAN BARRICADE |
| | | PEDESTRIAN SIGNAL HEAD |
| | | POST WITH PUSH BUTTON |
| | | STANDARD WITH A SIGNAL MAST ARM, ATTACHED VEHICLE SIGNAL HEADS AND STREET NAME SIGN |
| | | STANDARD WITH LUMINAIRE AND SIGNAL MAST ARMS AND ATTACHED VEHICLE SIGNAL HEADS |
| | | TYPE 1 STANDARD WITH ATTACHED VEHICLE SIGNAL HEADS |
| | | TYPE 15TS STANDARD WITH VEHICLE SIGNAL HEAD, PEDESTRIAN SIGNAL HEAD, AND LUMINAIRE |
| | | TYPE 21TS STANDARD WITH VEHICLE SIGNAL HEAD, PEDESTRIAN SIGNAL HEAD, AND LUMINAIRE |
| | | VEHICLE SIGNAL HEAD CONSISTING OF RED, YELLOW, AND GREEN SECTIONS |
| | | VEHICLE SIGNAL HEAD CONSISTING OF RED, YELLOW, AND GREEN LEFT ARROW SECTIONS (TYPICAL) |
| | | VEHICLE SIGNAL HEAD CONSISTING OF RED AND YELLOW SECTIONS WITH AN UP GREEN ARROW SECTION |
| | | VEHICLE SIGNAL HEAD (5 SECTION) CONSISTING OF RED, YELLOW, AND GREEN SECTIONS WITH YELLOW AND GREEN RIGHT ARROW SECTIONS |
| | | VEHICLE SIGNAL HEAD WITH ANGLE VISOR |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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NOTES:

1. All signal sections shall be 12" unless shown otherwise.
2. Signal heads shall be provided with backplates unless shown otherwise.

## OVERHEAD SIGN

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| | | DOUBLE POST, SINGLE SIGN |
| | | DOUBLE POST, SINGLE SIGN WITH ELECTROLIER |
| | | SINGLE POST, DOUBLE SIGN, BALANCED BUTTERFLY |
| | | SINGLE POST, SINGLE SIGN, BALANCED BUTTERFLY |
| | | SINGLE POST, SINGLE SIGN, FULL CANTILEVER |
| | | SINGLE POST, SINGLE SIGN, FULL CANTILEVER WITH ELECTROLIER |
| | | SINGLE SIGN MOUNTED ON STRUCTURE |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LEGEND)

NO SCALE

ES-1B

7-1-25

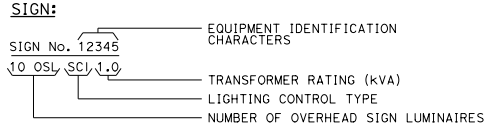
2025 STANDARD PLAN ES-1B

530

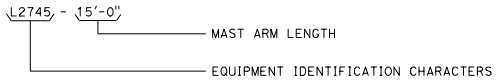
Return to Table of Contents

## EQUIPMENT DESIGNATION

### SIGN:




### LIGHTING STANDARD, SIGNAL AND LIGHTING STANDARD:




### SOFFIT:



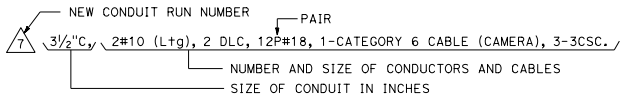

**NOTE:**
EXISTING EQUIPMENT IDENTIFICATION CHARACTERS ARE SHOWN IN PARENTHESIS

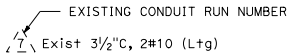
| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| (B) | (b) | POLE, POST OR STANDARD DESIGNATION |

## MISCELLANEOUS EQUIPMENT

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| CMS | cms | CHANGEABLE MESSAGE SIGN |
| | | CAMERA |
| | | HIGHWAY ADVISORY RADIO POLE AND ANTENNA |
| EMS | ems | EXTINGUISHABLE MESSAGE SIGN |
| M V | m v | DETECTION DEVICE<br>M = MICROWAVE SENSOR<br>V = VIDEO DETECTION SENSOR |
| | | RADAR SPEED FEEDBACK SIGN |

## CONDUIT AND CONDUCTORS



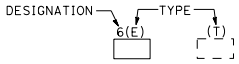




## WIRING COMPONENTS

| SYMBOL | DESCRIPTION |
|---|---|
| | EXTERNAL CONDUCTOR |
| | CONDUCTOR OR BUS |
| | TIE POINT |
| | CONTACTOR COIL |
| | CONTACTOR, NO CONTACT |
| | TERMINAL BLOCKS |
| | CONTACTOR, NC CONTACT |
| | ENCLOSURE BOND |
| | GROUNDING ELECTRODE |
| | CIRCUIT BREAKER |
| | RECEPTACLE |

## HANDHOLES, PULL BOXES, AND VAULTS

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| DH | dh | DETECTOR HANDHOLE |
| | | PULL BOX, No. 5 UNLESS OTHERWISE INDICATED |
| V | v | VAULT |



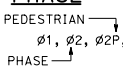

**DESIGNATIONS:**
3 No. 3½ PULL BOX
5 No. 5 PULL BOX
6 No. 6 PULL BOX
7 No. 7 PULL BOX (CEILING)
8 No. 8 PULL BOX
9 No. 9 PULL BOX (STRUCTURE)
9A No. 9A PULL BOX (STRUCTURE)

**TYPE:**
(E) EXTENDED PULL BOX
(T) TRAFFIC PULL BOX
(TR) TAMPER-RESISTANT PULL BOX

## DETAILS




## PHASE




TRAFFIC PHASE IDENTIFICATION FOR SIGNALS, DETECTORS, AND PHASE DIAGRAMS

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

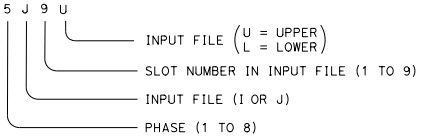
Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
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## VEHICLE DETECTOR DESIGNATION




## DETECTORS

| NEW | EXISTING | DESCRIPTION |
|---|---|---|
| | | TYPE A LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | TYPE B LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | TYPE C LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | TYPE D LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | TYPE E LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | TYPE F LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | TYPE Q LOOP DETECTOR.<br>OUTLINE OF SAW CUT SHOWN |
| | | MICROWAVE OR VIDEO DETECTION ZONE |
| | | ROADWAY SENSOR, PIEZOELECTRIC AXLE SENSOR UNLESS OTHERWISE INDICATED |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LEGEND)

NO SCALE

**ES-1C**

7-1-25



Return to Table of Contents

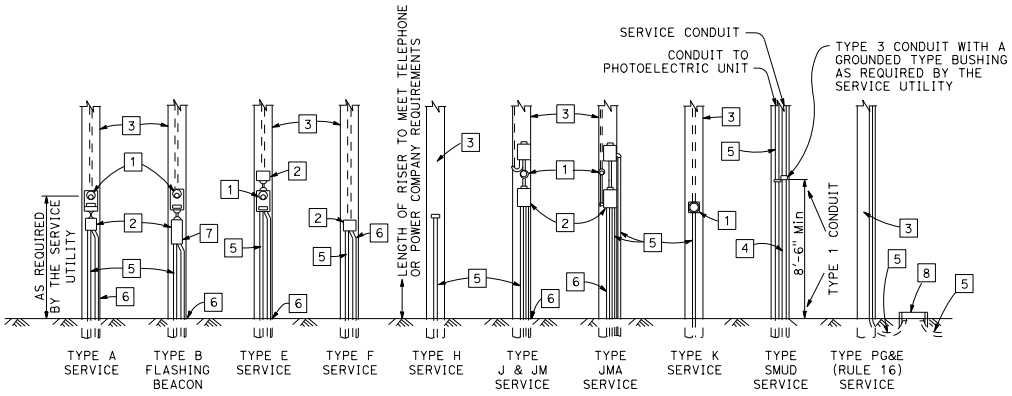
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|---|---|---|---|---|---|
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Bhanupriya
REGISTERED ELECTRICAL ENGINEER

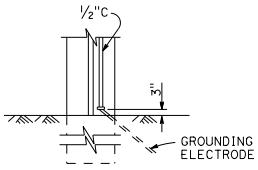
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Registered Professional Engineer
Bhanupriya Sharma
No. E23752
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ELECTRICAL
State of California

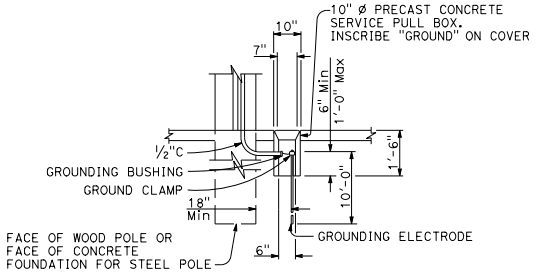
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## POLE MOUNTED SERVICE INSTALLATIONS




TYPE A
See Note 1




TYPE B
See Note 2

## SERVICE GROUNDING

LEGEND:

1. METER SOCKET.
2. SERVICE ENCLOSURE WITH A MINIMUM 60 A RATED MAIN CIRCUIT BREAKER, UNLESS OTHERWISE SHOWN.
3. A. UTILITY OWNED POLE. THE SERVICE UTILITY WILL FURNISH AND INSTALL REQUIRED SERVICE RISER, PEU WITH CONDUCTORS AND OTHER EQUIPMENT AS NEEDED.
   B. STATE OWNED POLE. THE CONTRACTOR SHALL FURNISH AND INSTALL REQUIRED SERVICE RISER AND EQUIPMENT.
4. 2"C, SERVICE CONDUIT MUST HAVE A GROUNDED TYPE BUSHING INSTALLED AT UPPER END OF THE METALLIC POLE RISER CONDUIT. A GROUNDING CONDUCTOR MUST BE ATTACHED TO THE BUSHING, CARRIED THROUGH THE CONDUIT RUN AND ATTACHED TO THE SERVICE EQUIPMENT ENCLOSURE'S GROUNDING ELECTRODE.
5. CONDUIT, LENGTH AND SIZE AS REQUIRED.
6. ½"C, 1#6. SEE SERVICE GROUNDING.
7. FLASHING BEACON ENCLOSURE.
8. SERVICE PULL BOX, No. 5 UNLESS OTHERWISE NOTED, FURNISHED AND INSTALLED BY THE CONTRACTOR. SERVICE UTILITY SHALL DETERMINE THE EXACT LOCATION.

NOTES:

1. Ground clamp and required fittings must be accessible. Conduit must extend to protect grounding electrode conductor from mechanical damage.
2. Use where service utility requires 18" clearance between grounding electrode and the pole or service equipment enclosure. Installation shown is for sidewalk or paved areas. In unpaved areas, omit special service pull box and locate ground clamp above ground or locate ground clamp in nearest pull box.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SERVICE EQUIPMENT)

NO SCALE

**ES-2A**

7-1-25



Return to Table of Contents

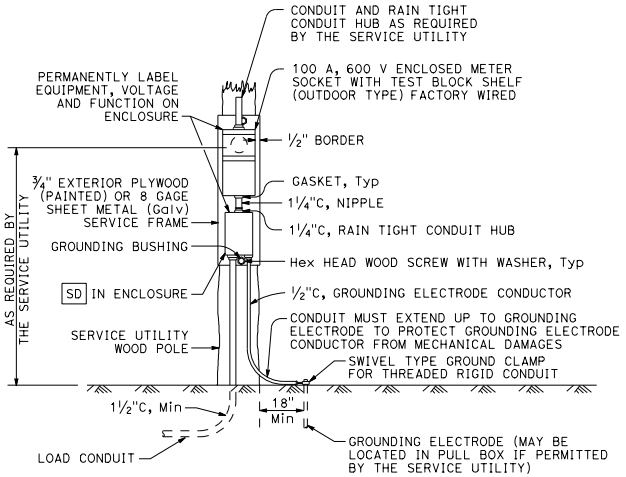
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|---|---|---|---|---|---|
| | | | | | |

Bhanupriya
REGISTERED ELECTRICAL ENGINEER

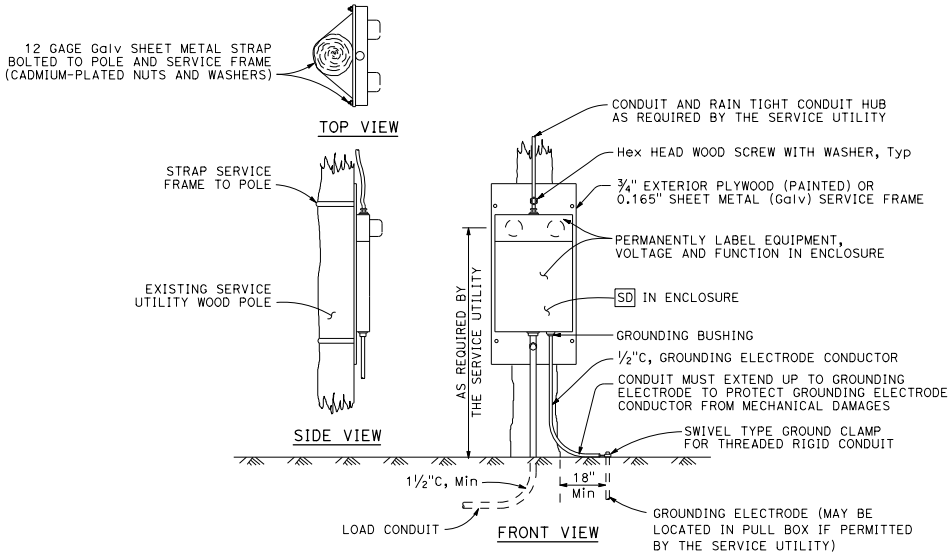
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TYPE SCE-1
DETAIL A




TYPE SCE-2
DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SERVICE EQUIPMENT)

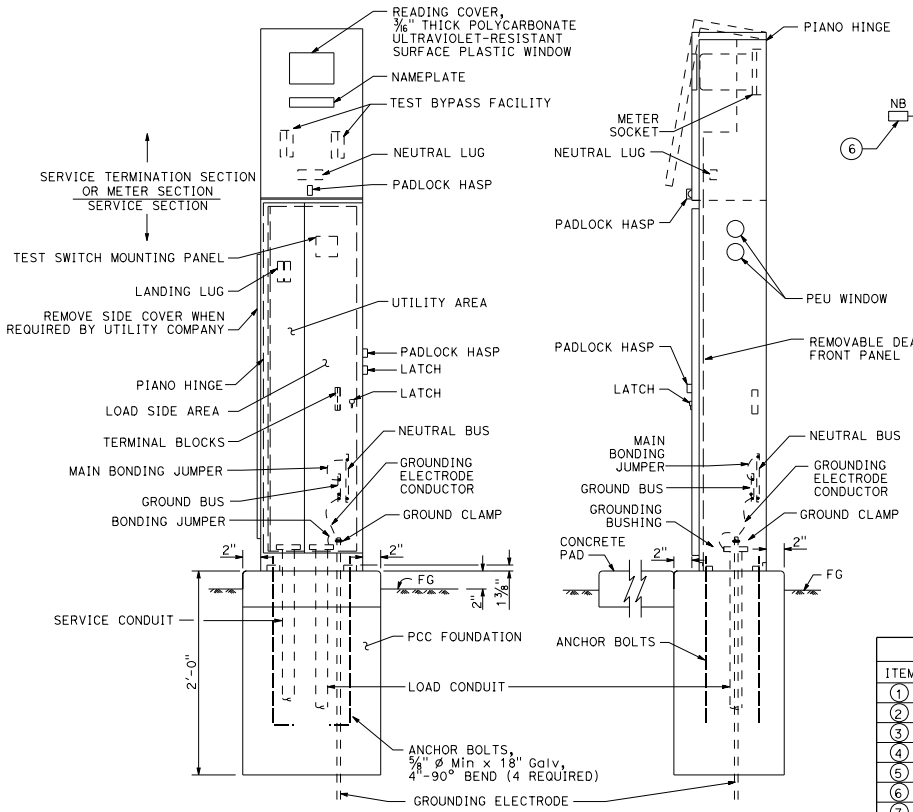
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ES-2B

7-1-25

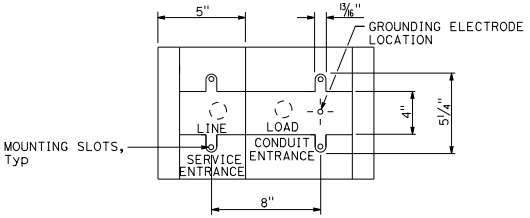


Return to Table of Contents



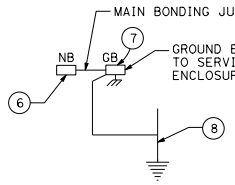

## TYPE III-AF SERVICE EQUIPMENT ENCLOSURE (TYPICAL)

DETAIL A

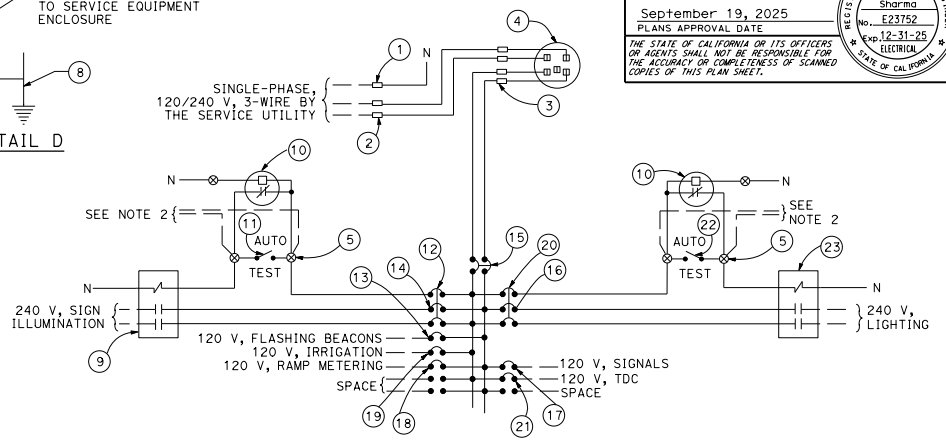



## BASE FOR TYPE III-A SERVICE EQUIPMENT ENCLOSURE

DETAIL B




DETAIL D




## 120/240 V SERVICE WIRING DIAGRAM (TYPICAL)

DETAIL C

TYPE III-A SERVICE EQUIPMENT ENCLOSURE LEGEND (120/240 V)

| ITEM | COMPONENT | NAMEPLATE DESCRIPTION | ITEM | COMPONENT | NAMEPLATE DESCRIPTION |
|---|---|---|---|---|---|
| (1) | NEUTRAL LUG | | (13) | 15 A, 120 V, 1P, CB | FLASHING BEACON |
| (2) | LANDING LUG | | (14) | 30 A, 240 V, 2P, CB | SIGN ILLUMINATION |
| (3) | TEST BYPASS FACILITY | | (15) | 100 A, 240 V, 2P, CB | MAIN BREAKER |
| (4) | METER SOCKET AND SUPPORT | | (16) | 30 A, 240 V, 2P, CB | LIGHTING |
| (5) | TERMINAL BLOCKS | | (17) | 50 A, 120 V, 1P, CB | SIGNALS |
| (6) | NEUTRAL BUS | | (18) | 30 A, 120 V, 1P, CB | RAMP METERING |
| (7) | GROUND BUS | | (19) | 20 A, 120 V, 1P, CB | IRRIGATION |
| (8) | GROUNDING ELECTRODE | | (20) | 15 A, 120 V, 1P, CB | LIGHTING CONTROL |
| (9) | 30 A, 2P, NO CONTACTOR | SIGN ILLUMINATION | (21) | 20 A, 120 V, 1P, CB | TELEPHONE DEMARCATION CABINET |
| (10) | PHOTOELECTRIC UNIT (NOTE 4) | PEU | (22) | 15 A, 1P, TEST SWITCH | LIGHTING TEST SWITCH |
| (11) | 15 A, 1P, TEST SWITCH | SIGN ILLUMINATION TEST SWITCH | (23) | 60 A, 2P, NO CONTACTOR | LIGHTING |
| (12) | 15 A, 120 V, 1P, CB | SIGN ILLUMINATION CONTROL | | | |

NOTES:

1. Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
2. Connect to remote test switch mounted on lighting standards, sign post, or structure when required.
3. Items (1) and (6) shall be isolated from the service equipment enclosure.
4. Type V photoelectric control shall be used unless otherwise indicated on the plans.
5. Item (12) and (20) shall be ganged operated CB.
6. The plan shows the approximate location of devices within the enclosure. Components may be rearranged, however, the "working" clearances within the service equipment enclosure shall be maintained.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III-A SERIES)

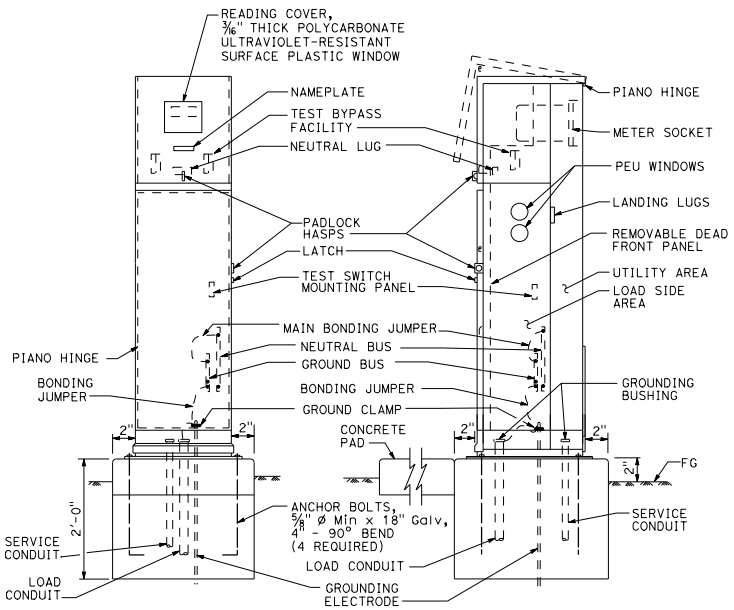
NO SCALE

ES-2D



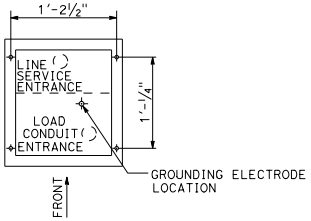
7-1-25

Return to Table of Contents



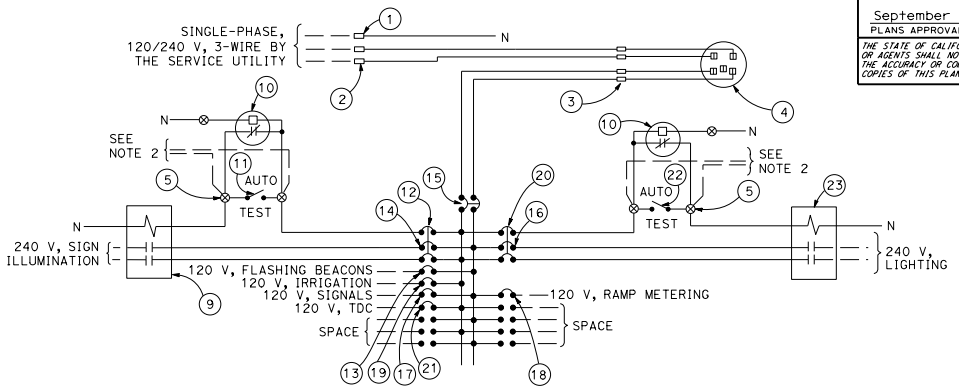

## TYPE III-BF SERVICE EQUIPMENT ENCLOSURE (TYPICAL)

DETAIL A



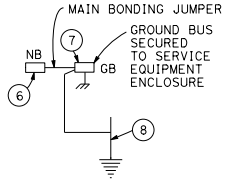

## BASE FOR TYPE III-B SERVICE EQUIPMENT ENCLOSURE

DETAIL B




## 120/240 V SERVICE WIRING DIAGRAM (TYPICAL)

DETAIL C




DETAIL D

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Bhanupriya Sharma — No. E23752 — Exp. 12-31-25 — ELECTRICAL — STATE OF CALIFORNIA

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### TYPE III-B SERVICE EQUIPMENT ENCLOSURE LEGEND (120/240 V)

| ITEM | COMPONENT | NAMEPLATE DESCRIPTION | ITEM | COMPONENT | NAMEPLATE DESCRIPTION |
|---|---|---|---|---|---|
| (1) | NEUTRAL LUG | | (13) | 15 A, 120 V, 1P, CB | FLASHING BEACON |
| (2) | LANDING LUG | | (14) | 30 A, 240 V, 2P, CB | SIGN ILLUMINATION |
| (3) | TEST BYPASS FACILITY | | (15) | 100 A, 240 V, 2P, CB | MAIN BREAKER |
| (4) | METER SOCKET AND SUPPORT | | (16) | 30 A, 240 V, 2P, CB | LIGHTING |
| (5) | TERMINAL BLOCKS | | (17) | 50 A, 120 V, 1P, CB | SIGNALS |
| (6) | NEUTRAL BUS | | (18) | 30 A, 120 V, 1P, CB | RAMP METERING |
| (7) | GROUND BUS | | (19) | 20 A, 120 V, 1P, CB | IRRIGATION |
| (8) | GROUNDING ELECTRODE | | (20) | 15 A, 120 V, 1P, CB | LIGHTING CONTROL |
| (9) | 30 A, 2P, NO CONTACTOR | SIGN ILLUMINATION | (21) | 20 A, 120 V, IP, CB | TELEPHONE DEMARCATION CABINET |
| (10) | PHOTOELECTRIC UNIT (NOTE 4) | PEU | (22) | 15 A, 1P, TEST SWITCH | LIGHTING TEST SWITCH |
| (11) | 15 A, 1P, TEST SWITCH | SIGN ILLUMINATION TEST SWITCH | (23) | 60 A, 2P, NO CONTACTOR | LIGHTING |
| (12) | 15 A, 120 V, 1P, CB | SIGN ILLUMINATION CONTROL | | | |

NOTES:

1. Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
2. Connect to remote test switch mounted on lighting standards, sign post, or structure when required.
3. Items (1) and (6) shall be isolated from the service equipment enclosure.
4. Type V photoelectric control shall be used unless otherwise indicated on the plans.
5. Item (12) and (20) shall be ganged operated CB.
6. The plan shows the approximate location of devices within the enclosure. Components may be rearranged, however, the "working" clearances within the service equipment enclosure shall be maintained.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III-B SERIES)

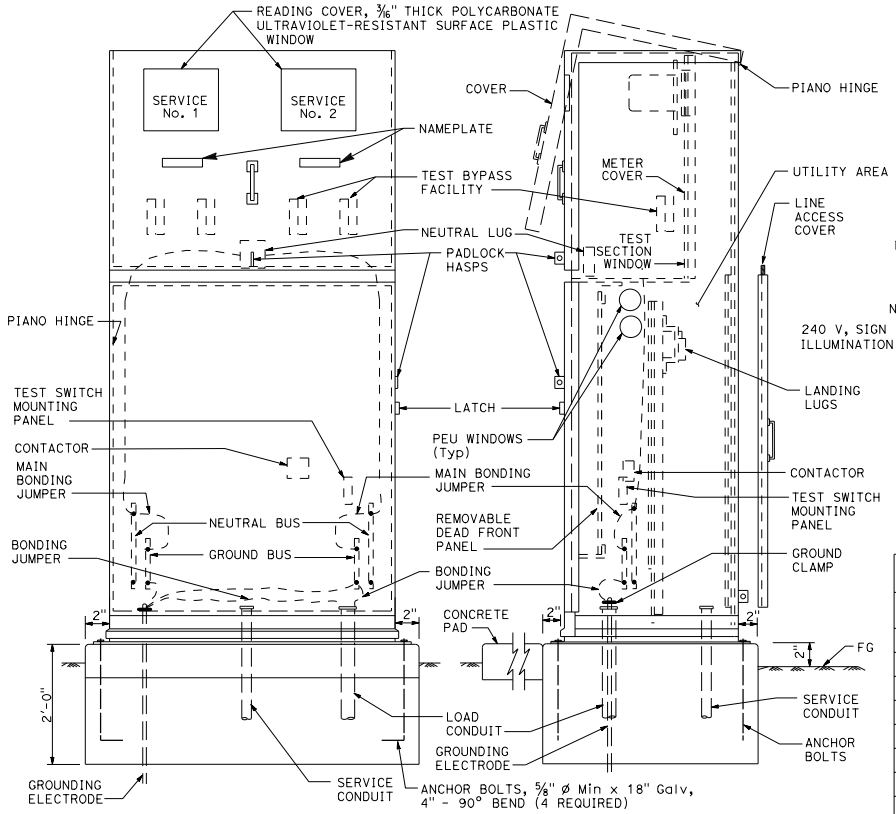
NO SCALE

**ES-2E**



7-1-25

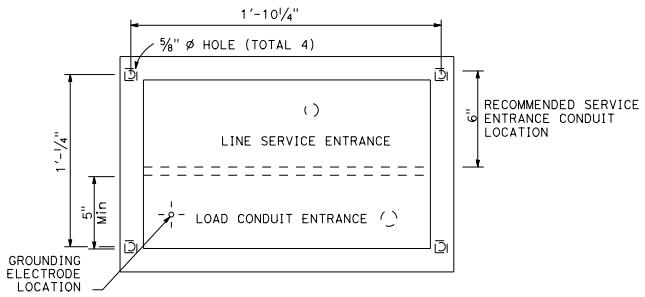
Return to Table of Contents




FRONT VIEW SIDE VIEW

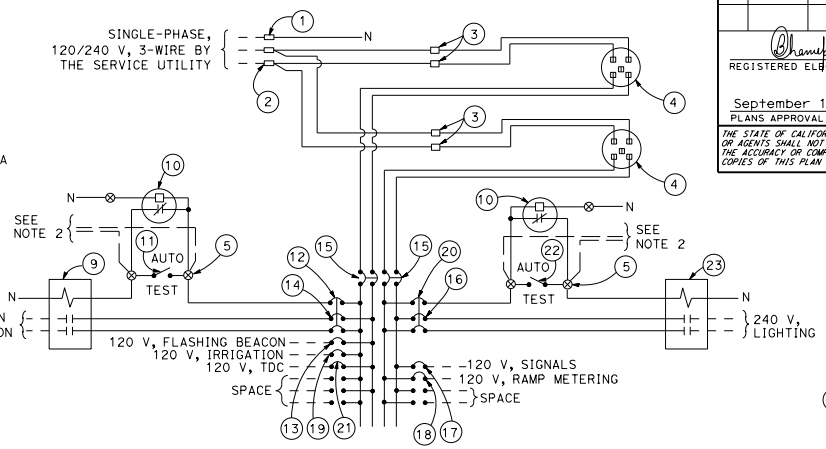
## TYPE III-CF SERVICE EQUIPMENT ENCLOSURE (TYPICAL)

DETAIL A



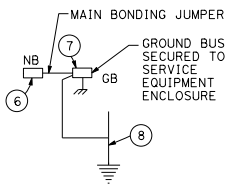

## BASE FOR TYPE III-C SERVICE EQUIPMENT ENCLOSURE

DETAIL B




## 120/240 V SERVICE WIRING DIAGRAM (TYPICAL)

DETAIL C




DETAIL D

### TYPE III-C SERVICE EQUIPMENT ENCLOSURE LEGEND (120/240 V)

| ITEM | COMPONENT | NAMEPLATE DESCRIPTION | ITEM | COMPONENT | NAMEPLATE DESCRIPTION |
|---|---|---|---|---|---|
| 1 | NEUTRAL LUG | | 13 | 15 A, 120 V, 1P, CB | FLASHING BEACON |
| 2 | LANDING LUG | | 14 | 30 A, 240 V, 2P, CB | SIGN ILLUMINATION |
| 3 | TEST BYPASS FACILITY | | 15 | 100 A, 240 V, 2P, CB | MAIN BREAKER |
| 4 | METER SOCKET AND SUPPORT | | 16 | 30 A, 240 V, 2P, CB | LIGHTING |
| 5 | TERMINAL BLOCKS | | 17 | 50 A, 120 V, 1P, CB | SIGNALS |
| 6 | NEUTRAL BUS | | 18 | 30 A, 120 V, 1P, CB | RAMP METERING |
| 7 | GROUND BUS | | 19 | 20 A, 120 V, 1P, CB | IRRIGATION |
| 8 | GROUNDING ELECTRODE | | 20 | 15 A, 120 V, 1P, CB | LIGHTING CONTROL |
| 9 | 30 A, 2P, NO CONTACTOR | SIGN ILLUMINATION | 21 | 20 A, 120 V, 1P, CB | TELEPHONE DEMARCATION CABINET |
| 10 | PHOTOELECTRIC UNIT (NOTE 4) | PEU | 22 | 15 A, 1P, TEST SWITCH | LIGHTING TEST SWITCH |
| 11 | 15 A, 1P, TEST SWITCH | SIGN ILLUMINATION TEST SWITCH | 23 | 60 A, 2P, NO CONTACTOR | LIGHTING |
| 12 | 15 A, 120 V, 1P, CB | SIGN ILLUMINATION CONTROL | | | |

NOTES:

1. Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
2. Connect to remote test switch mounted on lighting standards, sign post, or structure when required.
3. Items (1) and (6) shall be isolated from the service equipment enclosure.
4. Type V photoelectric control shall be used unless otherwise indicated on the plans.
5. Item (12) and (20) shall be ganged operated CB.
6. The plan shows the approximate location of devices within the enclosure. Components may be rearranged, however, the "working" clearances within the service equipment enclosure shall be maintained.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III-C SERIES)

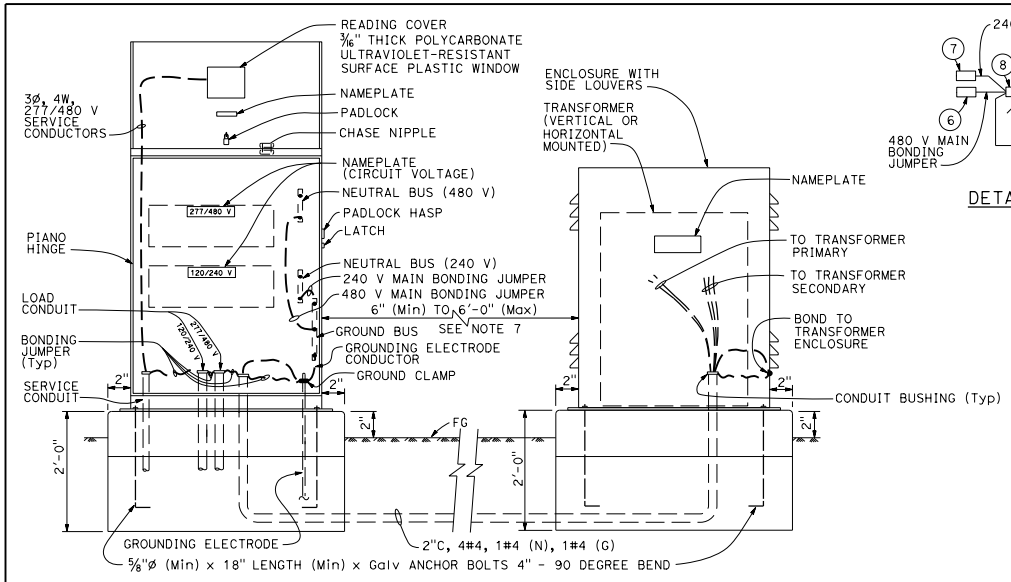
NO SCALE

ES-2F

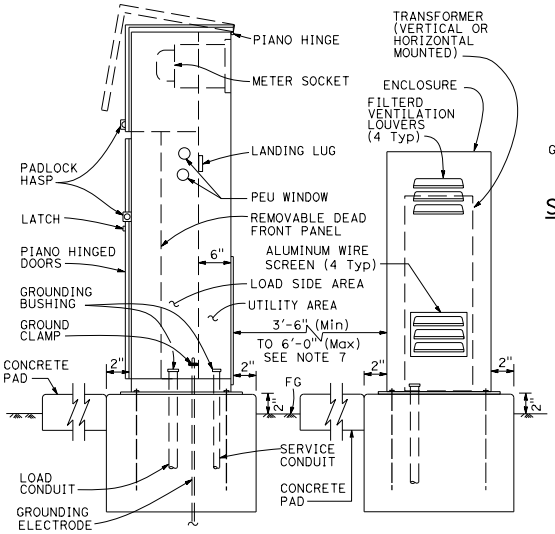
7-1-25



Return to Table of Contents

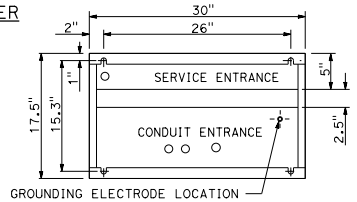



SIDE INSTALLATION OF TRANSFORMER




REAR INSTALLATION OF TRANSFORMER

TYPE III-DF SERVICE EQUIPMENT ENCLOSURE TYPICAL

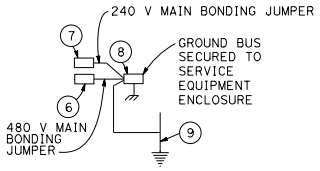



BASE FOR TYPE III-D SERVICE EQUIPMENT ENCLOSURE

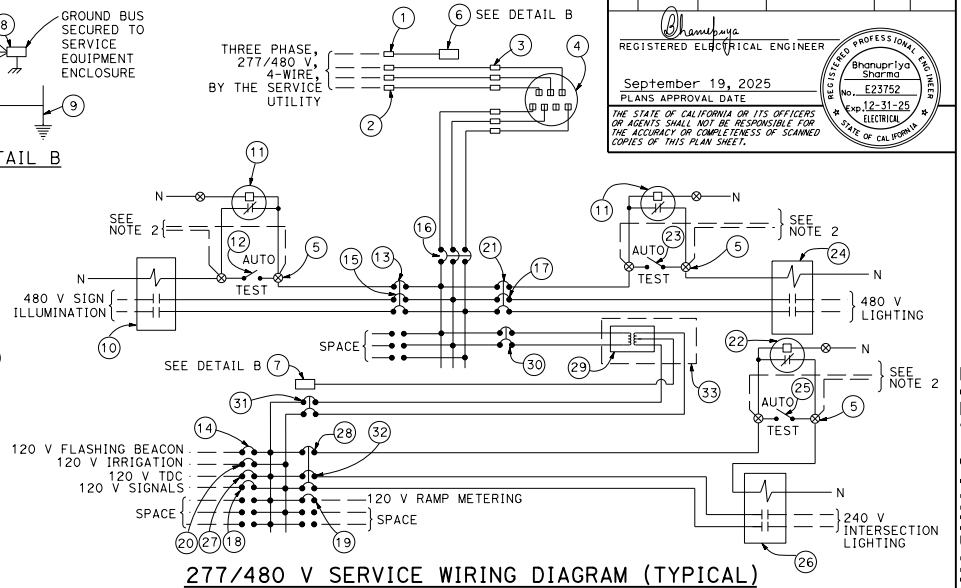
DETAIL A

NOTES:

1. Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
2. Connect to remote test switch mounted on lighting standards, sign post, or structure when required.
3. Items No. (1), (6), and (7) shall be isolated from the service equipment enclosure.
4. Type V photoelectric control shall be used unless otherwise indicated on the plans.
5. Color of insulation of the neutral shall be gray for the 277/480 V system and shall be white for the 120/240 V system.
6. Items (13), (21), and (28) shall be ganged operated CB.
7. The enclosure shall be located to the side of the service equipment enclosure unless otherwise indicated on the plans.
8. The base dimension for the enclosure for the transformer shall be as per manufacturer's design.
9. The plan shows the approximate location of devices within the enclosure. Components may be rearranged, however, the "working" clearances within the service equipment enclosure shall be maintained.




DETAIL B




277/480 V SERVICE WIRING DIAGRAM (TYPICAL)

DETAIL C

TYPE III-D SERVICE (277/480 V) EQUIPMENT LEGEND

| ITEM | COMPONENT | NAMEPLATE DESCRIPTION | ITEM | COMPONENT | NAMEPLATE DESCRIPTION |
|---|---|---|---|---|---|
| (1) | NEUTRAL LUG | | (18) | 50 A, 120 V, 1P, CB | SIGNAL (120 V) |
| (2) | LANDING LUG | | (19) | 30 A, 120 V, 1P, CB | RAMP METERING (120 V) |
| (3) | TEST BYPASS FACILITY | | (20) | 20 A, 120 V, 1P, CB | IRRIGATION (120 V) |
| (4) | METER SOCKET AND SUPPORT | | (21) | 10 A, 277 V, 1P, CB | LIGHTING CONTROL (277 V) |
| (5) | TERMINAL BLOCKS | | (22) | PHOTOELECTRIC UNIT (NOTE 4) | PEU (120/240 V) |
| (6) | NEUTRAL BUS | NEUTRAL BUS (480 V) | (23) | 15 A, 1P, TEST SWITCH | LIGHTING TEST SWITCH (277 V) |
| (7) | NEUTRAL BUS | NEUTRAL BUS (240 V) | (24) | 30 A, 2P, NO CONTACTOR | LIGHTING (480 V) |
| (8) | GROUND BUS | | (25) | 15 A, 1P, TEST SWITCH | INTERSECTION LIGHTING TEST SWITCH (120 V) |
| (9) | GROUNDING ELECTRODE | | (26) | 30 A, 2P, NO CONTACTOR | INTERSECTION LIGHTING (120 V) |
| (10) | 30 A, 2P, NO CONTACTOR | SIGN ILLUMINATION (480 V) | (27) | 20 A, 120 V, 1P, CB | TELEPHONE DEMARCATION CABINET (120 V) |
| (11) | PHOTOELECTRIC UNIT (NOTE 4) | PEU (277/480 V PEU) | (28) | 10 A, 120 V, 1P, CB | INTERSECTION LIGHTING CONTROL (120 V) |
| (12) | 15 A, 1P, TEST SWITCH | SIGN ILLUMINATION TEST SWITCH (277 V) | (29) | 15 kVA, 480-120/240 V TRANSFORMER | TRANSFORMER, 15 kVA, 480-240 V |
| (13) | 10 A, 277 V, 1P, CB | SIGN ILLUMINATION CONTROL (277 V) | (30) | 40 A, 480 V, 2P, CB | TRANSFORMER PRIMARY (480 V) |
| (14) | 15 A, 120 V, 1P, CB | FLASHING BEACON (120 V) | (31) | 80 A, 240 V, 2P, CB | TRANSFORMER SECONDARY (240 V) |
| (15) | 15 A, 480 V, 2P, CB | SIGN ILLUMINATION (480 V) | (32) | 30 A, 240 V, 2P, CB | INTERSECTION LIGHTING (240 V) |
| (16) | 100 A, 480 V, 3P, CB | MAIN BREAKER (480 V) | (33) | ENCLOSURE | TRANSFORMER, 15 kVA, 480-240 V |
| (17) | 15 A, 480 V, 2P, CB | LIGHTING (480 V) | | | |

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Bhanupriya Sharma, No. E23752, Exp. 12-31-25, ELECTRICAL, REGISTERED PROFESSIONAL ENGINEER, STATE OF CALIFORNIA
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SERVICE EQUIPMENT ENCLOSURE AND TYPICAL WIRING DIAGRAM, TYPE III-D SERIES)

NO SCALE

ES-2G

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED ELECTRICAL ENGINEER

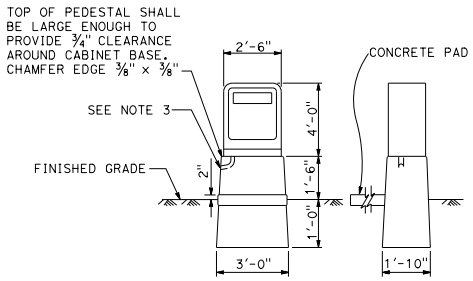
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

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NOTES:

1. Cabinet shall be installed with the back toward the nearest lane of traffic.
2. In unpaved areas, a raised portland cement concrete pad shall be constructed in front of each controller cabinet. The pad shall be 3'-0" x 4" thick x width of foundation.
3. A 1" drain shall be provided through the foundation of a cabinet. Drain pipe shall be screened.
4. Cabinet shelves shall be adjustable for vertical spacing and shall be removable.
5. Controller units, plug-mounted equipment, shelf-mounted equipment and wall-mounted equipment shall be located to permit safe and easy removal or replacement without removing any other piece of equipment.
6. Where telephone interconnect is required, a minimum of 5" clear vertical space shall be provided inside the cabinet for the equipment.
7. Telephone interconnect conductors shall be enclosed in a ¾"C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in cabinets or pedestals.
8. Anchor bolts for cabinet shall be ¾" ø x 1'-6" with a 2" - 90° bend.




FRONT VIEW SIDE VIEW

## PEDESTAL FOUNDATION FOR MODEL 336LS CABINET

DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CONTROLLER CABINET ADAPTER, FOUNDATIONS, AND PAD DETAILS)

NO SCALE

**ES-3B**

7-1-25

2025 STANDARD PLAN ES-3B



Return to Table of Contents

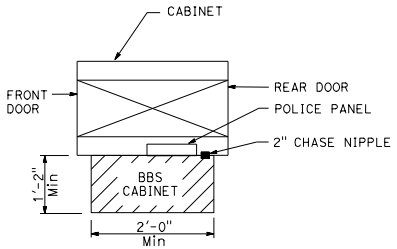
NOTES:

1. Where telephone interconnect is required, a minimum of 5" clear vertical space shall be provided inside the cabinet for the equipment.
2. Telephone interconnect conductors shall be enclosed in a ¾"C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in cabinets.

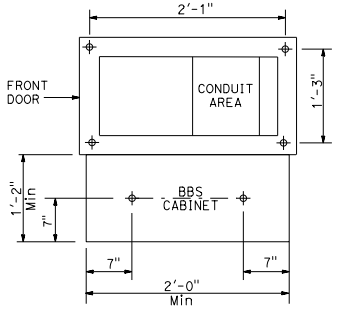
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

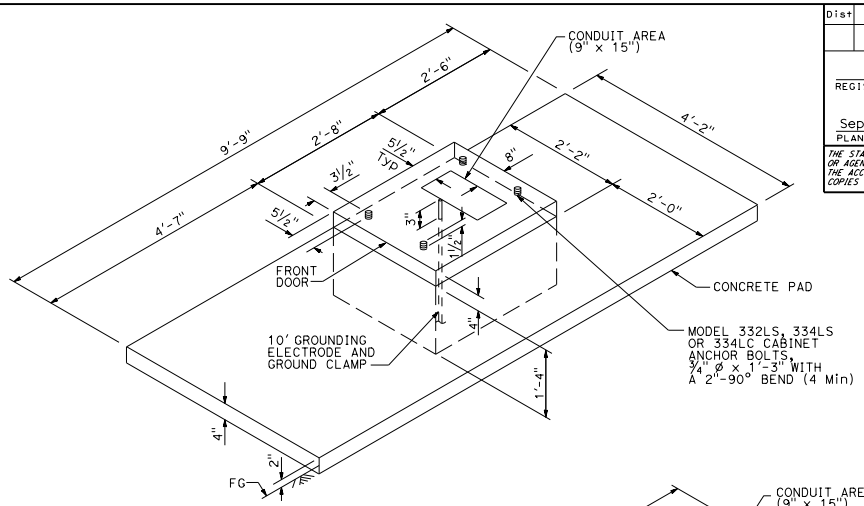



TOP VIEW



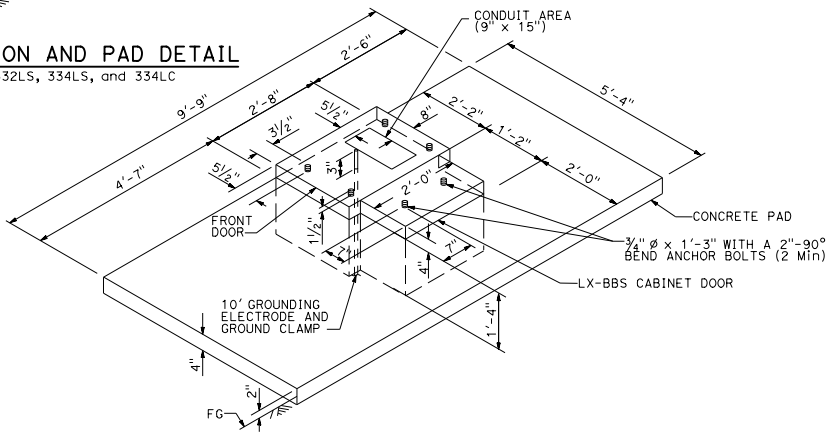

## BASE PLAN FOR LX-BBS CABINET MOUNTED TO THE MODEL 332LS CABINET

(FOR DIMENSIONS AND DETAILS NOT SHOWN, SEE CABINET HOUSING DETAILS OF THE TRANSPORTATION ELECTRICAL EQUIPMENT SPECIFICATION (TEES))



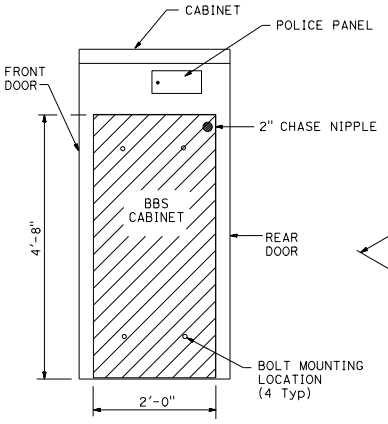

## FOUNDATION AND PAD DETAIL

Model 332LS, 334LS, and 334LC



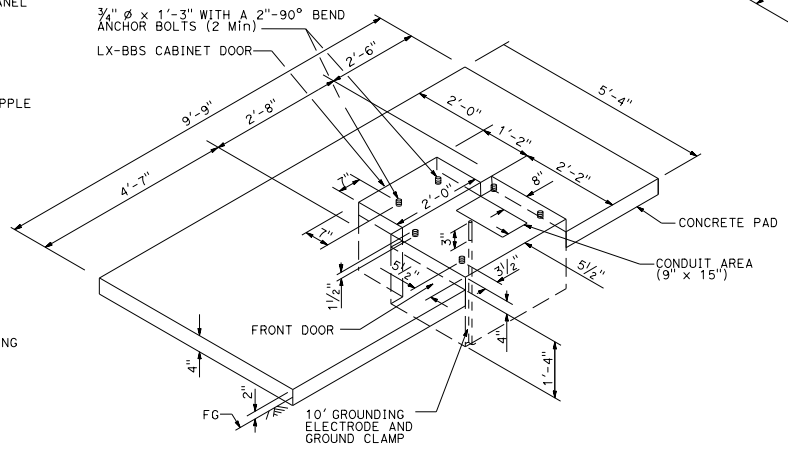

## RIGHT SIDE INSTALLATION

DETAIL B




SIDE VIEW

## LX-BBS CABINET MOUNTED TO THE MODEL 332LS CABINET




## LEFT SIDE INSTALLATION

DETAIL A

## MODEL 332LS CABINET FOUNDATION DETAIL WITH LX-BATTERY BACKUP SYSTEM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CONTROLLER CABINET FOUNDATION AND PAD DETAILS)

NO SCALE

ES-3C

7-1-25

2025 STANDARD PLAN ES-3C

Return to Table of Contents

NOTES:

1. Where telephone interconnect is required, a minimum of 5" clear vertical space shall be provided inside the cabinet for the equipment.
2. Telephone interconnect conductors shall be enclosed in a ¾"C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in cabinets.
3. Dimensions are nominal.
4. For Model 342LX, 344LX, and 346LX cabinets details, see "Transportation Electrical Equipment Specifications".
5. Grounding electrode shall be placed 3 inches in front of the service conduit area.
6. Conduit area, to 120 V Service.
7. Conduit area for the controller side of cabinet.

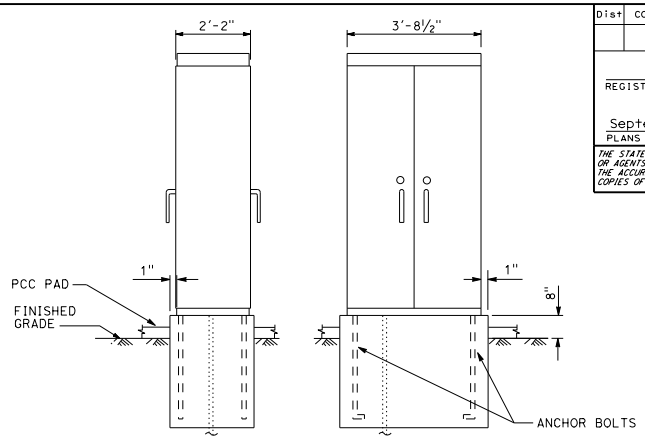
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

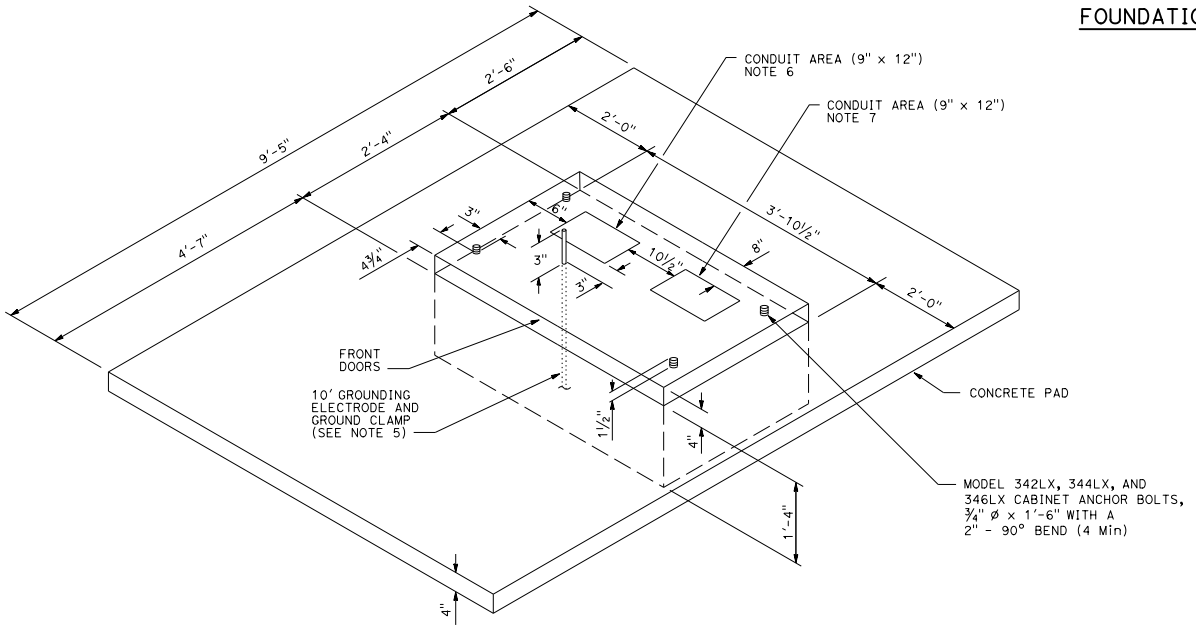
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Bhanupriya Sharma — No. E23752 — Exp. 12-31-25 — ELECTRICAL — STATE OF CALIFORNIA

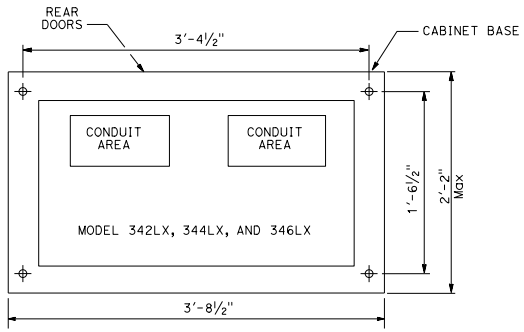
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FOUNDATION FOR TYPE LX CABINET
DETAIL A




FOUNDATION AND PAD DETAIL
Model 342LX, 344LX, and 346LX
DETAIL B




BASE PLAN FOR THE MODEL
342LX, 344LX, AND 346LX CABINET

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CONTROLLER CABINET FOUNDATION AND PAD DETAILS)

NO SCALE

ES-3C1

7-1-25

2025 STANDARD PLAN ES-3C1



Return to Table of Contents

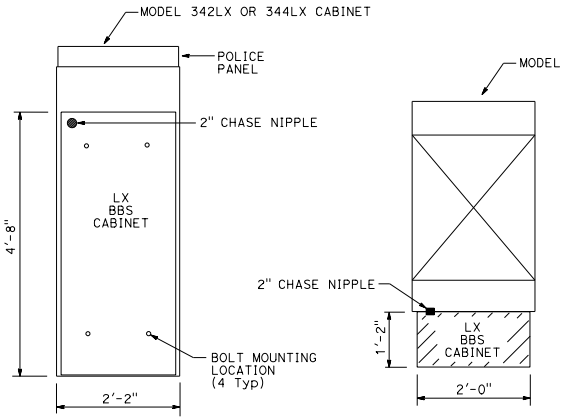
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

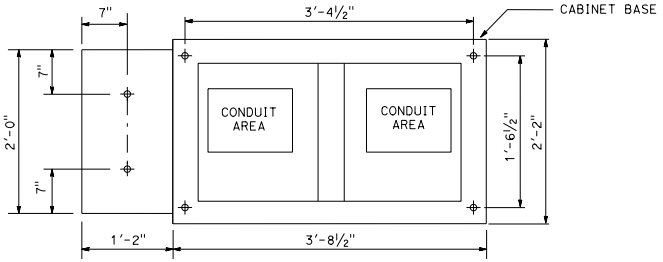
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PLANS APPROVAL DATE

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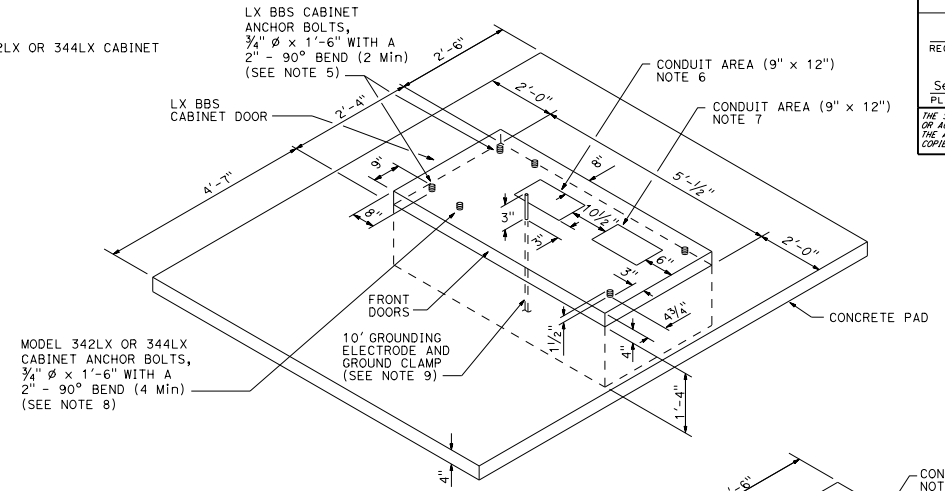
REGISTERED PROFESSIONAL ENGINEER — Bhanupriya Sharma — No. E23752 — Exp. 12-31-25 — ELECTRICAL — STATE OF CALIFORNIA



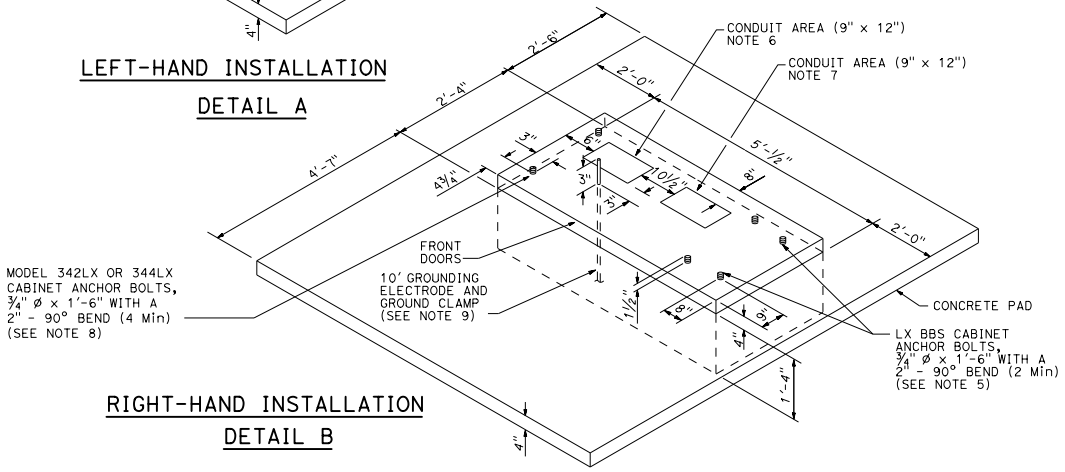

## LX BBS CABINET MOUNTED TO THE MODEL 342LX OR 344LX CABINETS




## BASE PLAN FOR MODEL 342LX OR 344LX CABINETS




## LEFT-HAND INSTALLATION DETAIL A




## RIGHT-HAND INSTALLATION DETAIL B

NOTES:

1. Where telephone interconnect is required, a minimum of 5" clear vertical space shall be provided inside the cabinet for the equipment.
2. Telephone interconnect conductors shall be enclosed in a ¾"C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in cabinets.
3. The LX BBS cabinet shall be mounted to the Model 342LX or 344LX cabinet with four 18-8 stainless steel hex head, fully-threaded, ⅜"-16 x 1" bolts; two washers per bolt, designed for ⅜" bolts and are 18-8 stainless steel, 1" outside diameter, round, and flat; and one K-Lock nut per bolt that is 18-8 stainless steel and a hex-nut.
4. All dimensions are nominal.
5. The dimensions of the BBS cabinet shall be verified prior to constructing the foundation of the Model 342LX or 344LX cabinet foundation.
6. Conduit area, to 120 V Service.
7. Conduit area for the controller side of cabinet.
8. For Type LX cabinets details, see "Transportation Electrical Equipment Specifications".
9. Grounding electrode shall be placed 3 inches in front of the service conduit area.

## MODEL 342LX OR 344LX CABINET FOUNDATION DETAIL WITH BATTERY BACKUP SYSTEM

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

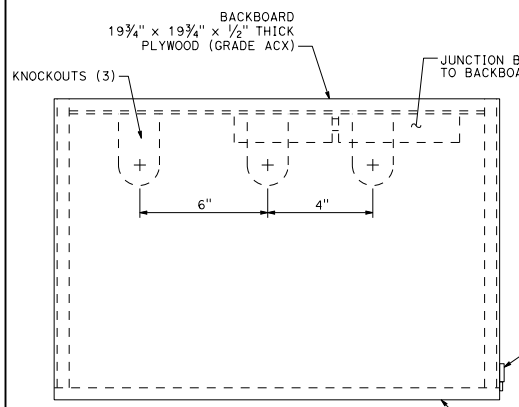
# ELECTRICAL SYSTEMS (CONTROLLER CABINET FOUNDATION DETAILS)

NO SCALE

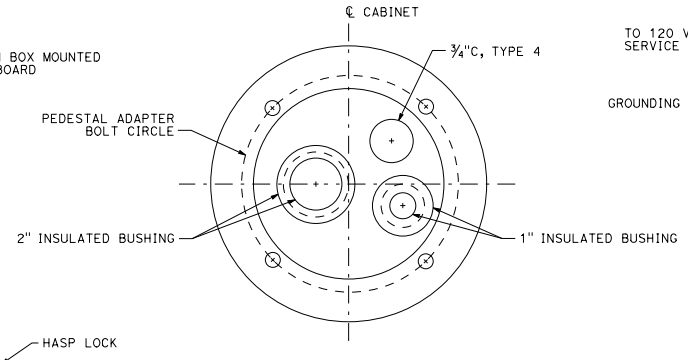
**ES-3C2**

7-1-25

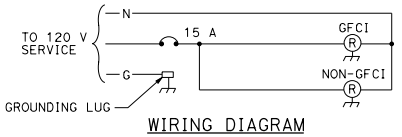
Return to Table of Contents




TOP
DETAIL C




SECTION A-A




WIRING DIAGRAM
DETAIL D

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

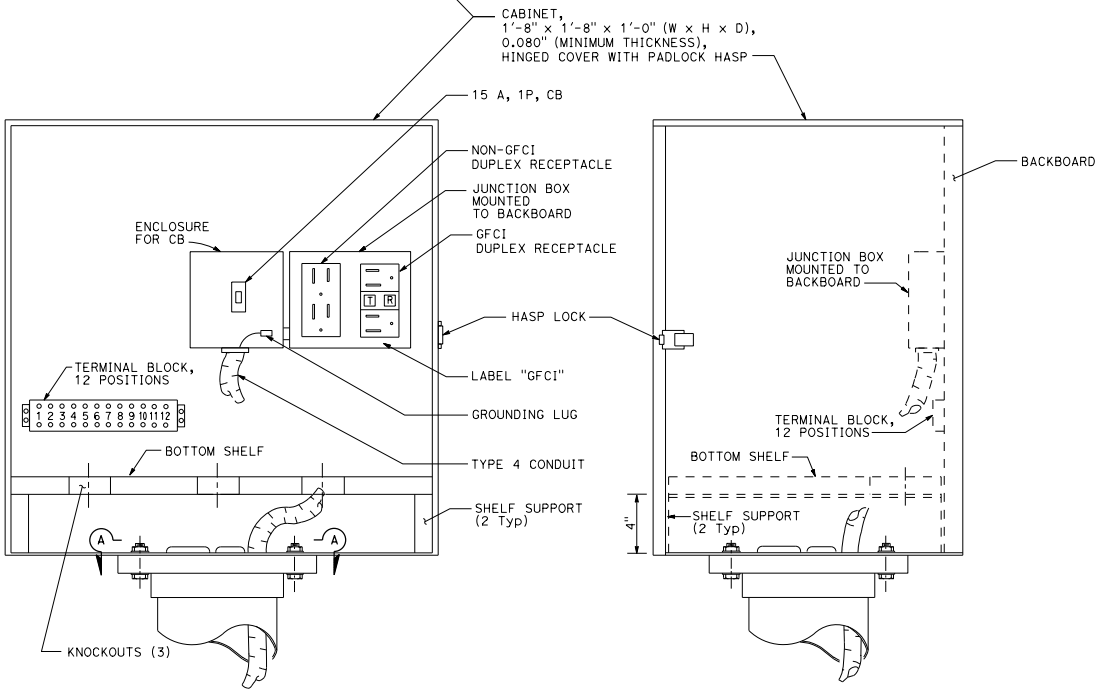
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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**NOTES:**

1. Dimensions are nominal.
2. The steel pedestal, base plate, and bolt circle for the telephone demarcation cabinet shall be the same as that shown for a Type 1-C Standard. The steel pedestal shall be 2'-1" to 2'-6" in length. Anchor bolts shall be ¾" Ø x 1'-6" with a 2" - 90° bend. Four bolts required per cabinet.
3. Telephone interconnect conductors shall be enclosed in a ¾"C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in the cabinet and pedestal.
4. Mount cabinet on Type G cabinet pedestal and foundation, see Standard Plan ES-3B.




FRONT
DETAIL A




RIGHT SIDE
DETAIL B

FASTENER SCHEDULE

| | |
|---|---|
| BACKBOARD | 4 - ¾" (LENGTH) WOOD SCREWS |
| 2 SHELF SUPPORTS | 4 - ¾" (LENGTH) WOOD SCREWS |
| JUNCTION BOX | 4 - ½" (LENGTH) WOOD SCREWS |
| TERMINAL BLOCK | 4 - ¾" (LENGTH) WOOD SCREWS |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE A)

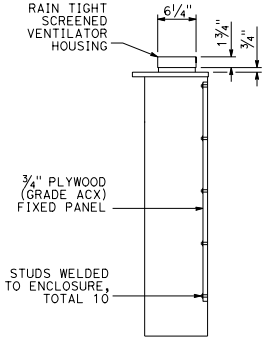
NO SCALE

ES-3D

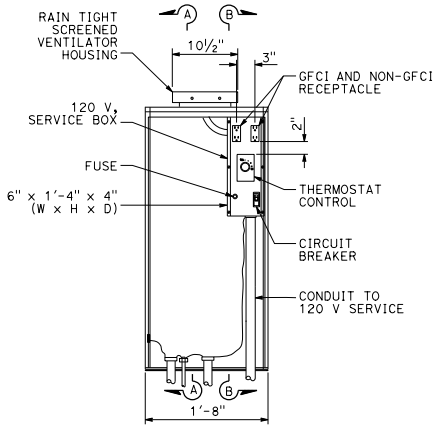
7-1-25



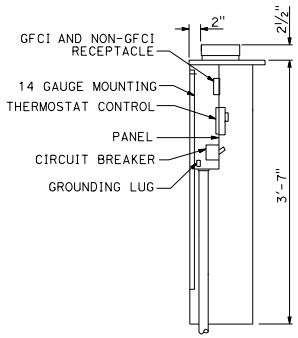
Return to Table of Contents




SECTION A-A




FRONT VIEW

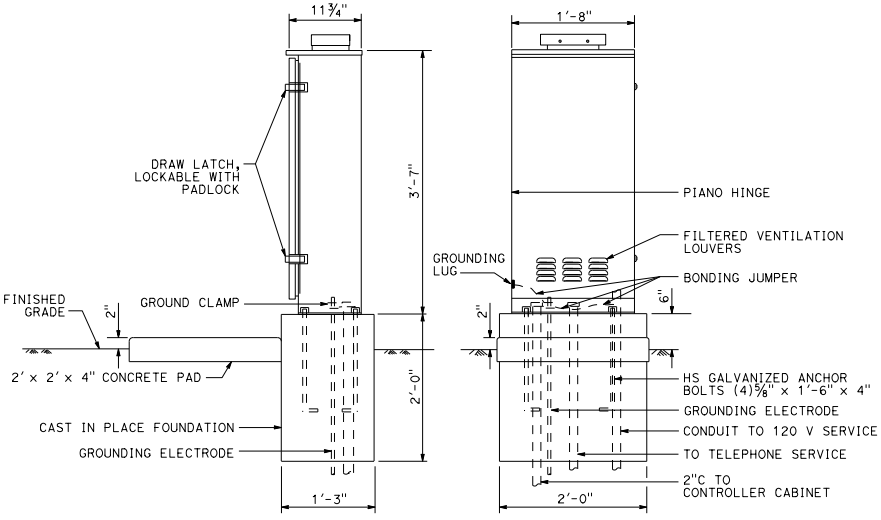



SECTION B-B

INTERIOR
DETAIL A

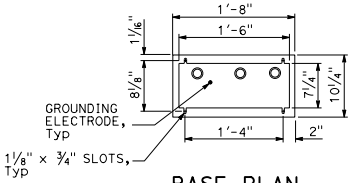
NOTE:

1. Dimensions are nominal.

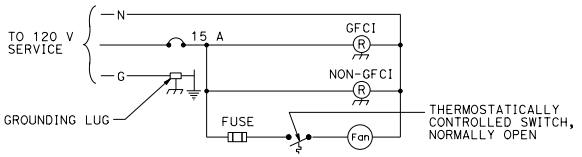



SIDE VIEW FRONT VIEW

EXTERIOR
DETAIL B




BASE PLAN
DETAIL C




WIRING DIAGRAM
DETAIL D

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE B)

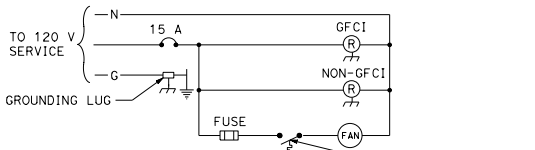
NO SCALE

ES-3E

7-1-25

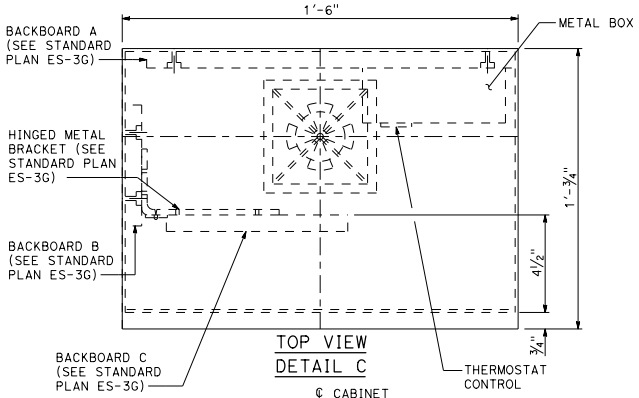
2025 STANDARD PLAN ES-3E

Return to Table of Contents



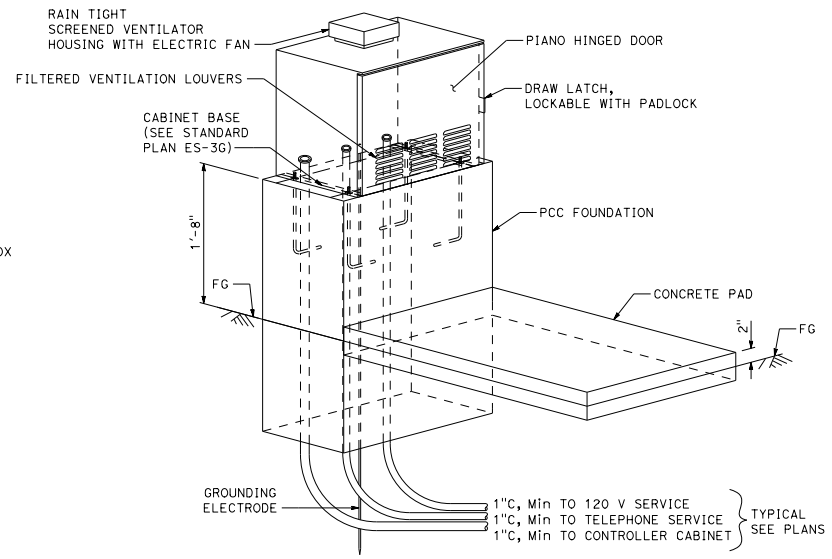

WIRING DIAGRAM

DETAIL F

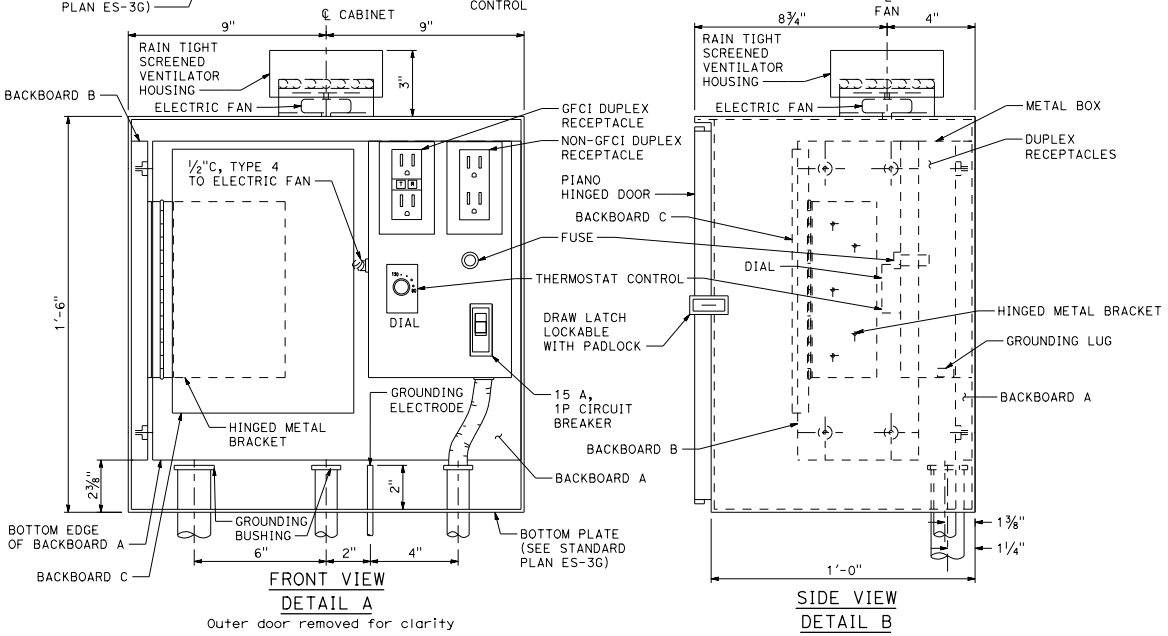



TOP VIEW

DETAIL C




DETAIL D




FRONT VIEW

DETAIL A

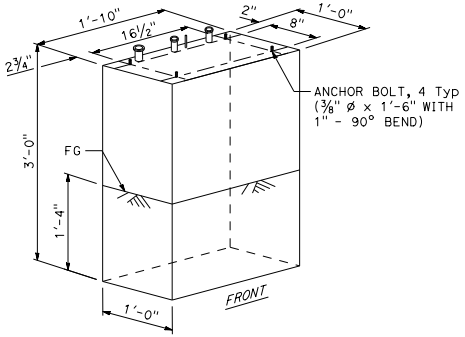
Outer door removed for clarity

SIDE VIEW

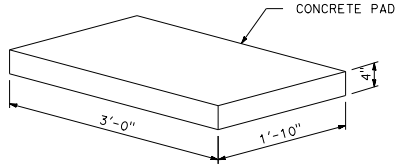
DETAIL B

NOTES:

1. Dimensions are nominal.
2. Hardware for fastening of mounting boards:
   a. Fasten backboard A and backboard B to telephone demarcation cabinet with 3/16" Ø x ¾" stainless steel carriage bolts (8 required).
   b. Fasten hinged metal bracket to backboard B and backboard C to hinged metal bracket with No. 10 x ¾" wood screws (9 required).




FOUNDATION




CONCRETE PAD

FOUNDATION AND PAD DETAILS

DETAIL E

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE C)**

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
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Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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ES-3F

7-1-25

2025 STANDARD PLAN ES-3F

Return to Table of Contents

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|---|---|---|---|---|---|
| | | | | | |

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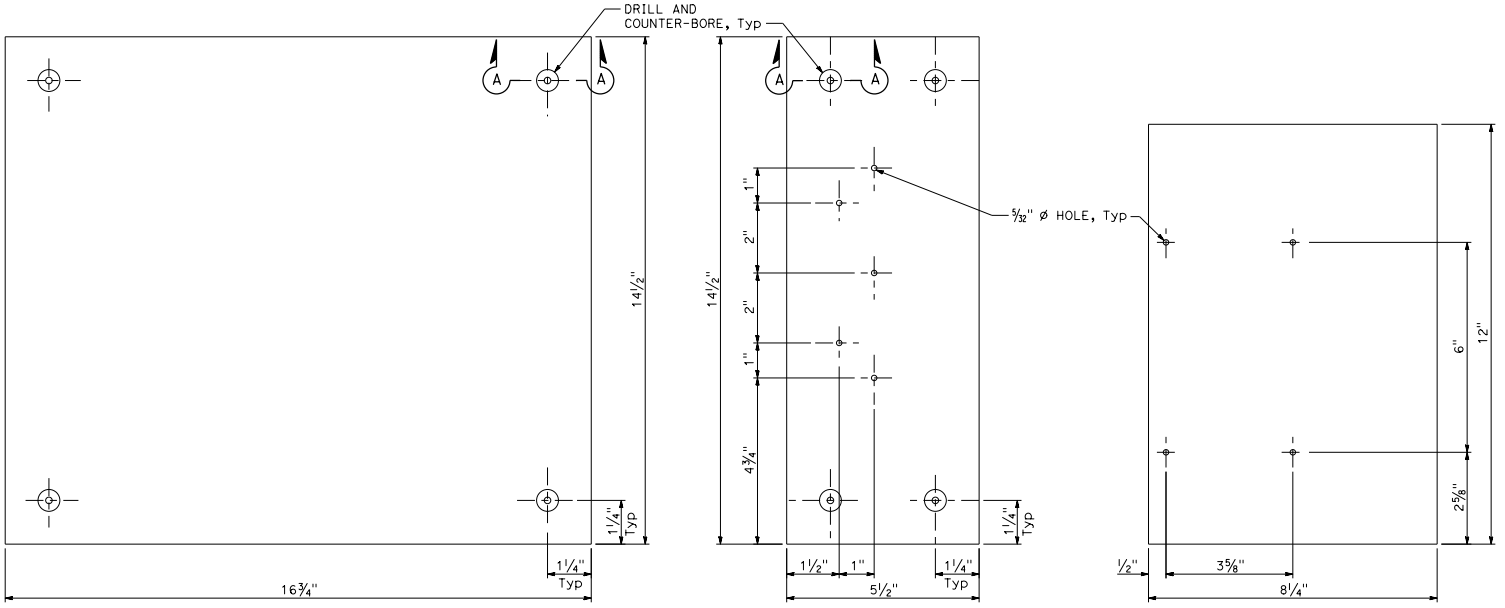
September 19, 2025
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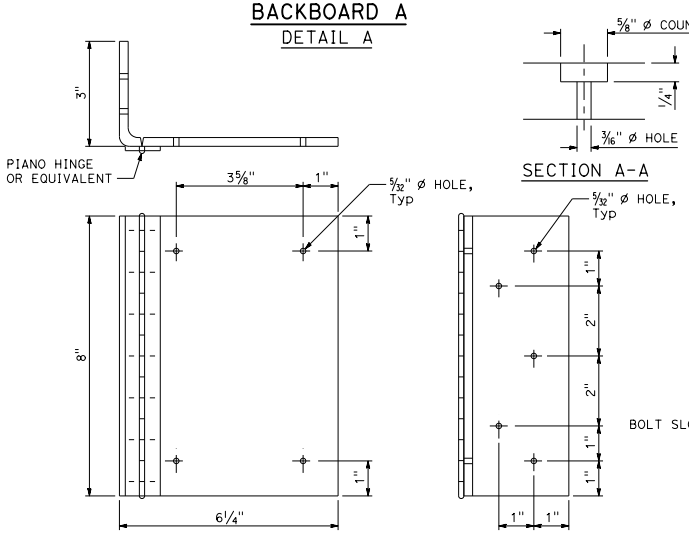
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Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

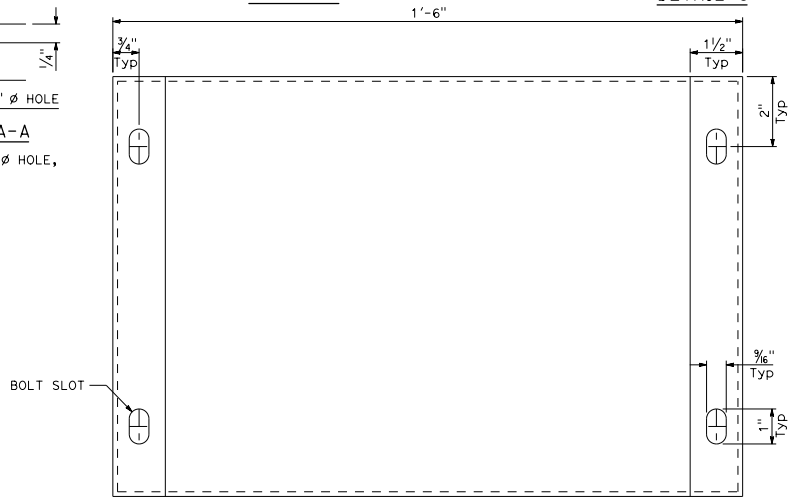
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NOTE:

1. Base mounting frame shall be constructed with 0.134" galvanized steel.




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DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (TELEPHONE DEMARCATION CABINET, TYPE C DETAILS)

NO SCALE

ES-3G

7-1-25

Return to Table of Contents

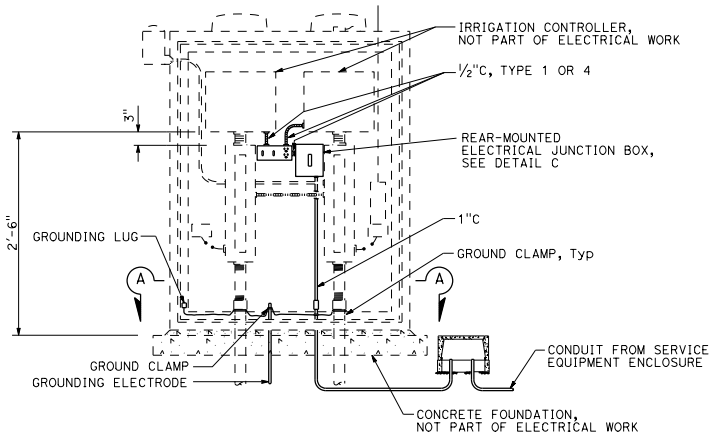
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REGISTERED ELECTRICAL ENGINEER

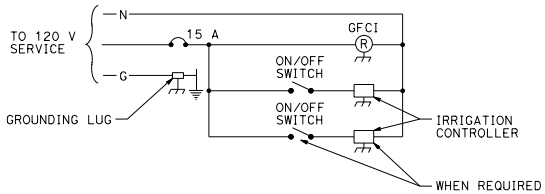
September 19, 2025
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ELECTRICAL
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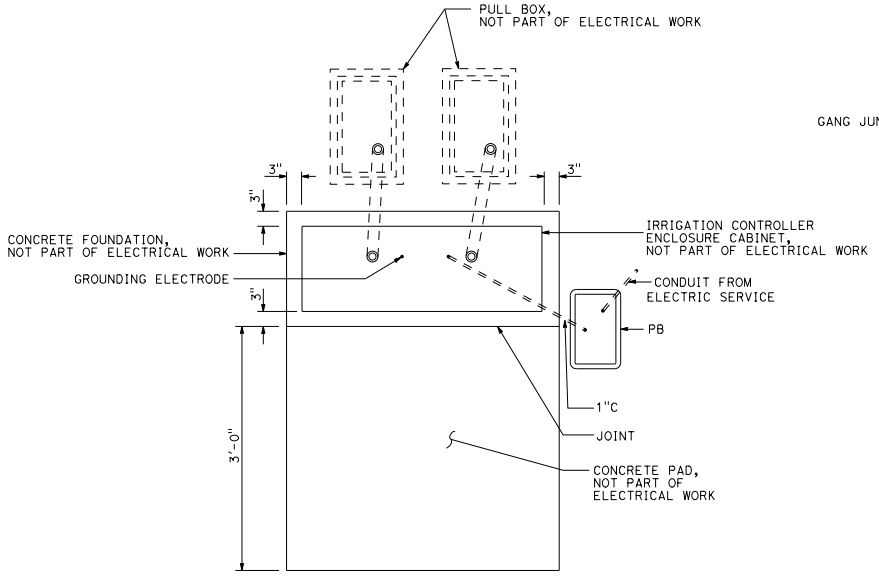

ELEVATION
DETAIL A



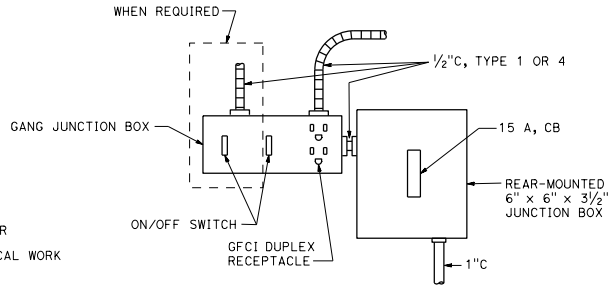

IRRIGATION CONTROLLER ENCLOSURE CABINET WIRING DIAGRAM, Typ
DETAIL B

NOTES:

1. See Standard Plan H10 for other details.
2. Underground electrical work done prior to foundation installation.




SECTION A-A




ELECTRICAL JUNCTION BOX LAYOUT
DETAIL C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (IRRIGATION CONTROLLER ENCLOSURE CABINET)

NO SCALE

**ES-3H**

7-1-25

2025 STANDARD PLAN ES-3H

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED ELECTRICAL ENGINEER

Bhanupriya Sharma
No. E23752
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ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
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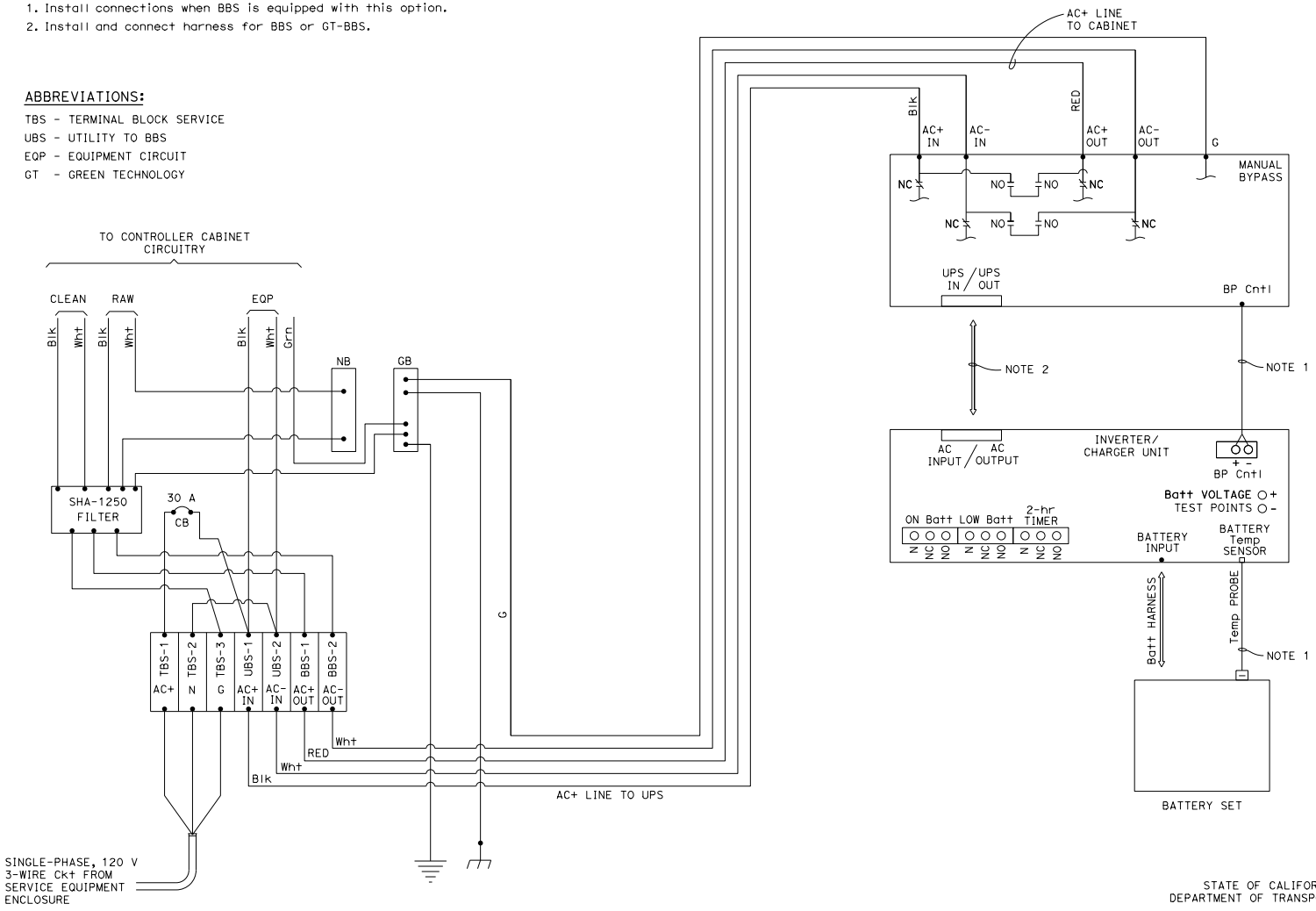
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**NOTES:**

1. Install connections when BBS is equipped with this option.
2. Install and connect harness for BBS or GT-BBS.

**ABBREVIATIONS:**

TBS - TERMINAL BLOCK SERVICE
UBS - UTILITY TO BBS
EQP - EQUIPMENT CIRCUIT
GT - GREEN TECHNOLOGY




STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (ELECTRONICS ASSEMBLY CONNECTION DIAGRAM) (BATTERY BACKUP SYSTEM)

NO SCALE

**ES-3K**

7-1-25

2025 STANDARD PLAN ES-3K

Return to Table of Contents

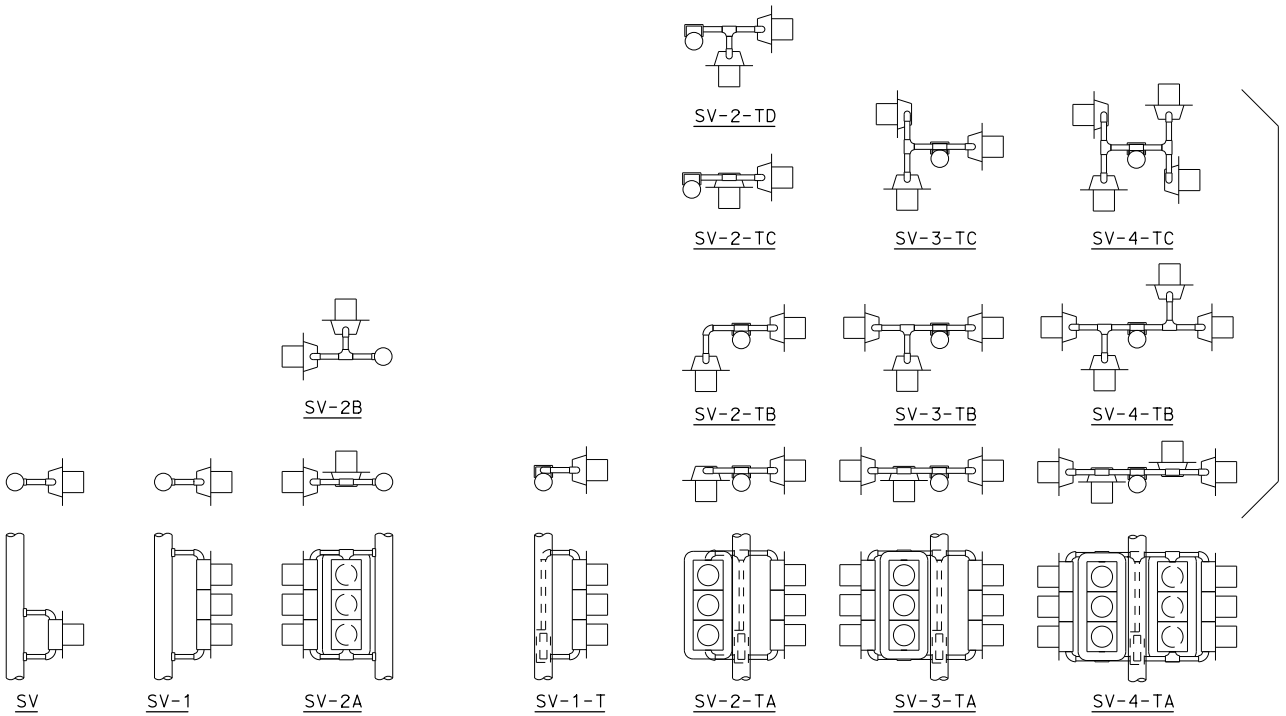
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|---|---|---|---|---|---|
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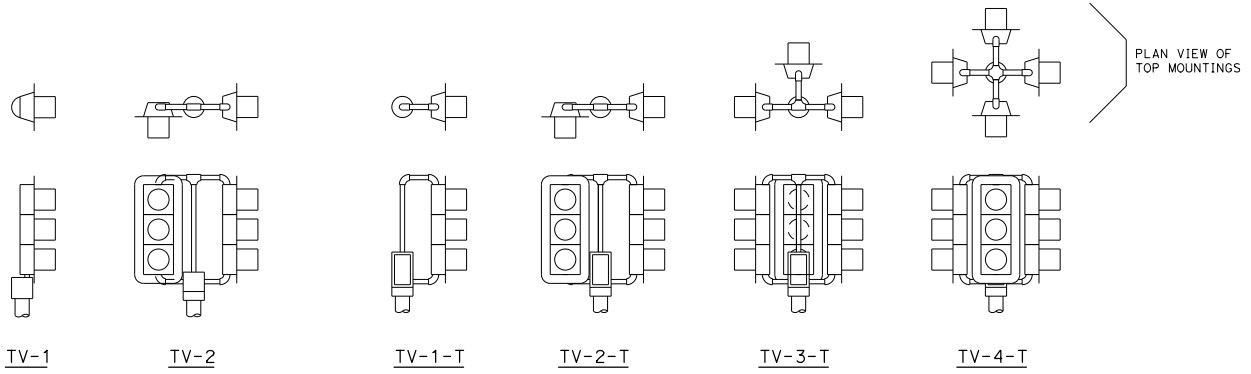
Bhanupriya
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
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Bhanupriya Sharma
No. E23752
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ELECTRICAL
STATE OF CALIFORNIA

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NOTES:

1. Mountings shall be oriented to provide maximum horizontal clearance to adjacent roadway.
2. See Standard Plans ES-4D and ES-4E for attachment fitting details.

ABBREVIATIONS:

| | |
|---|---|
| SV | - SIDE MOUNTED SIGNAL HEADS |
| T | - TERMINAL COMPARTMENT |
| TV | - TOP MOUNTED SIGNAL HEADS |
| 1, 2, 3, 4 | - NUMBER OF SIGNAL FACES |
| A, B, C, D | - CONFIGURATION OF SIGNALS |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL HEAD MOUNTING)

NO SCALE

**ES-4A**

7-1-25

Return to Table of Contents

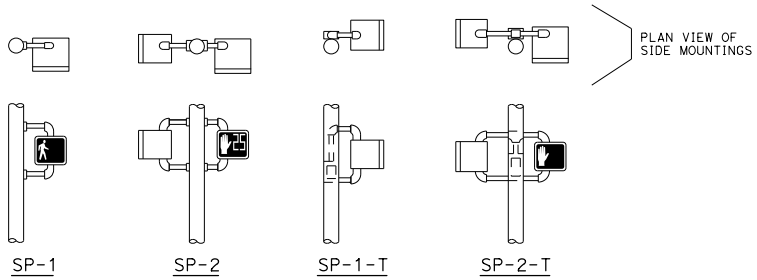
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

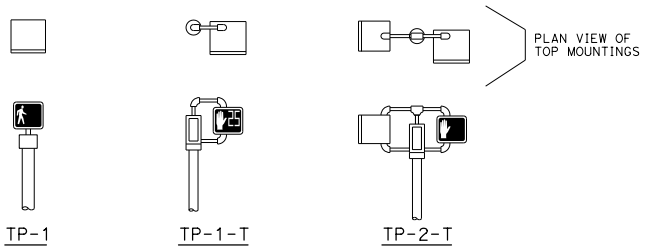
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Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA




SIDE MOUNTINGS




TOP MOUNTINGS

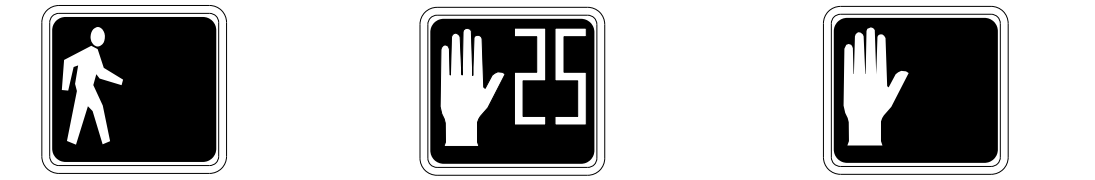
## PEDESTRIAN SIGNAL HEAD MOUNTINGS
DETAIL A

NOTES:

1. Mounting shall be oriented to provide maximum horizontal clearance to adjacent roadway.
2. See Standard Plan ES-4D for attachment fittings details.

ABBREVIATIONS:

1, 2 - NUMBER OF SIGNAL FACES
SP - SIDE MOUNTED PEDESTRIAN SIGNAL
T - TERMINAL COMPARTMENT
TP - TOP MOUNTED PEDESTRIAN SIGNAL




PERSON WALKING INTERVAL | FLASHING UPRAISED HAND INTERVAL | STEADY UPRAISED HAND INTERVAL

## LED COUNTDOWN PEDESTRIAN SIGNAL FACE MODULE
DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (PEDESTRIAN SIGNAL HEADS)

NO SCALE

**ES-4B**

7-1-25

2025 STANDARD PLAN ES-4B

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

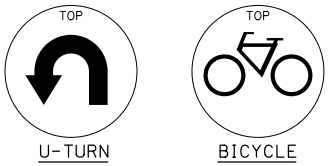
September 19, 2025
PLANS APPROVAL DATE

Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

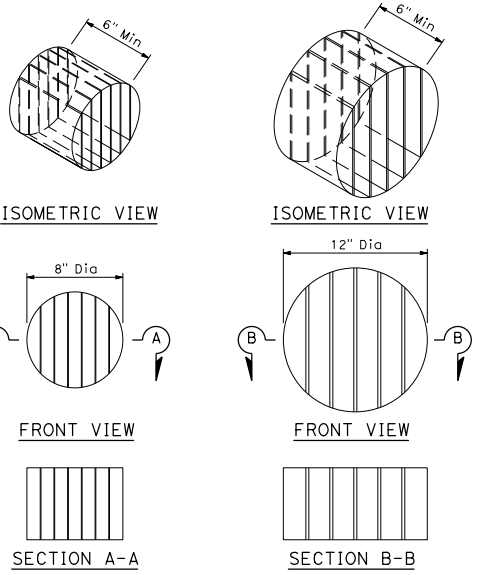
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## VISORS




## SIGNAL FACES

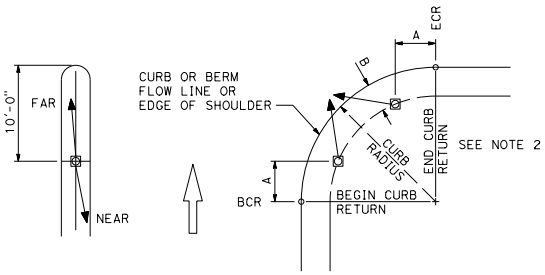



## DIRECTIONAL LOUVERS

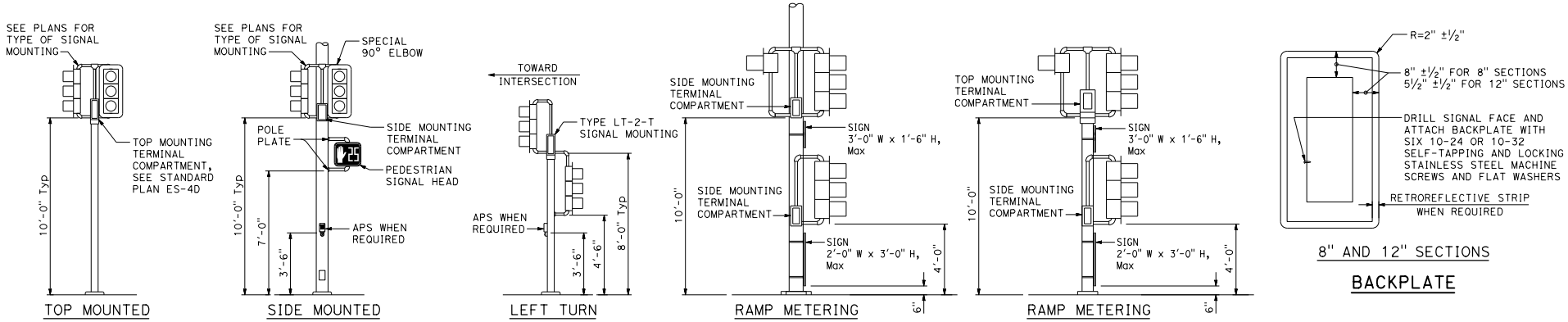
Directional louvers shall be oriented and secured in place with one plated brass machine screw and nut.

NOTES:

1. Typical signal pole placement unless dimensioned on the plans.
2. For A and B dimensions, see Pole Schedule.




## SIGNAL STANDARD PLACEMENT DIMENSIONS AND EQUIPMENT LOCATIONS




TOP MOUNTED SIGNALS (TV)
Type 1-A, 1-B, 1-C and 1-D standard as indicated on the plans.

SIDE MOUNTED SIGNALS (SV AND SP)
Normally used on standards with luminaire or signal mast arm.

LEFT TURN LANE SIGNAL
Type 1-A, 1-B, 1-C and 1-D standard as indicated on the plans.

RAMP METERING TYPE TS STANDARD
Normally used on standards with luminaire or signal mast arm.

RAMP METERING TYPE 1 STANDARD
Type 1-A, 1-B, 1-C and 1-D standard as indicated on the plans.

## TYPICAL SIGNAL HEAD INSTALLATIONS




8" AND 12" SECTIONS BACKPLATE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL HEADS AND MOUNTINGS)

NO SCALE

**ES-4C**

7-1-25

2025 STANDARD PLAN ES-4C

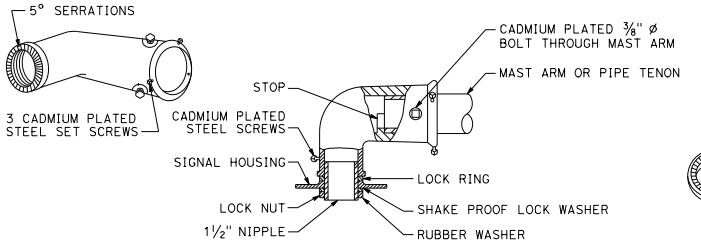
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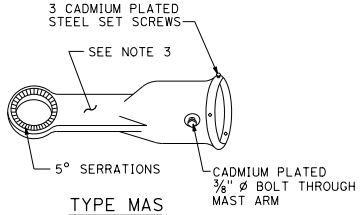
Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
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REGISTERED PROFESSIONAL ENGINEER — Bhanupriya Sharma — No. E23752 — Exp. 12-31-25 — ELECTRICAL — STATE OF CALIFORNIA

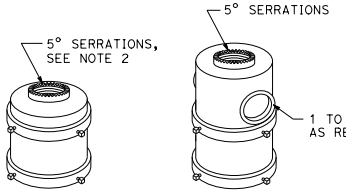





TYPE MAT
MAST ARM MOUNTING
For 2 NPS pipe, see Note 1.




TYPE MAS
MAST ARM MOUNTING
For 2 NPS pipe, see Note 1.

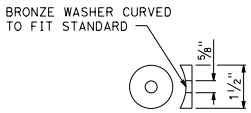



TOP MOUNTINGS
For 4 NPS pipe, see Note 2.

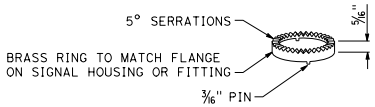
## SIGNAL SLIP FITTERS

NOTES:

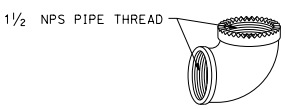
1. After mast arm signal has been plumbed and secured, drill 7/16" hole through mast arm tenon in line with slip fitter hole. Place a cadmium plated ⅜" ø galvanized bolt with washer under bolt head through hole and secure with washer, nut, and locknut. Seal openings between mast arm mountings and mast arm with mastic.
2. Threaded top mounted slip fitter openings shall be 1½ NPS. Serrations in fittings shall match those on bottom of signal heads or in lock ring. Top opening shall be offset when backplate is used.
3. Wireway shall have a cross section area of 0.95 square inch minimum. Minimum width of ½".




DETAIL C

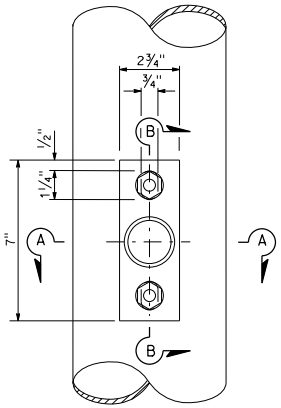



LOCK RING
Use where locking ring is not integral With signal housing or fitting.

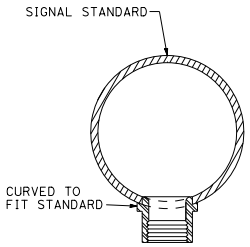



SPECIAL 90° ELBOW
One for each signal head, except those With special slip fitter mounting

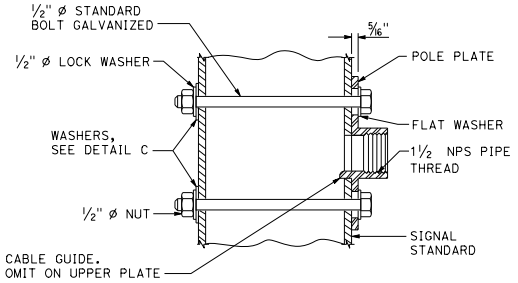
## MISCELLANEOUS MOUNTING HARDWARE




TOP VIEW

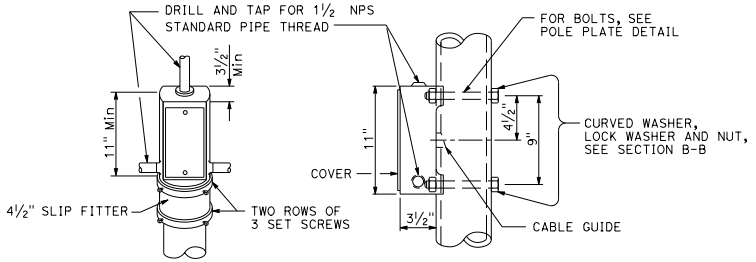



SECTION A-A




SECTION B-B

POLE PLATE FOR SIDE MOUNTED SIGNAL HEAD
WITHOUT TERMINAL COMPARTMENT




TOP MOUNTING SIDE MOUNTING

TERMINAL COMPARTMENT

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

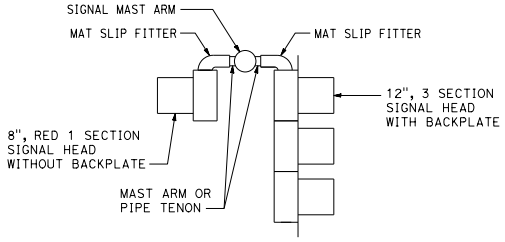
# ELECTRICAL SYSTEMS (SIGNAL HEAD MOUNTING)

NO SCALE

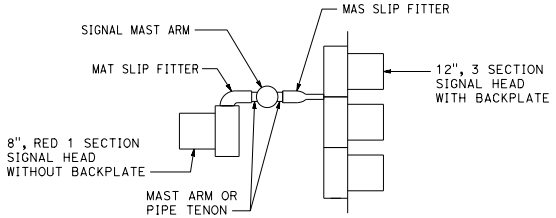
ES-4D

7-1-25

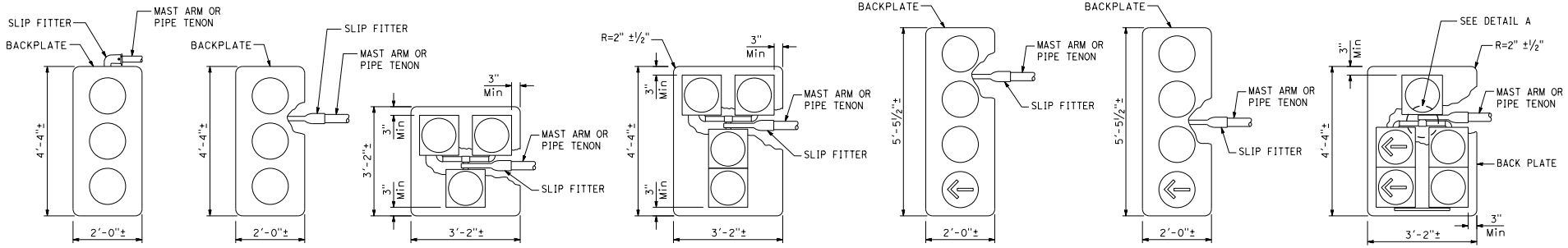
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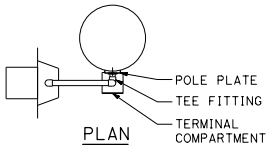

TYPE MAT-RM



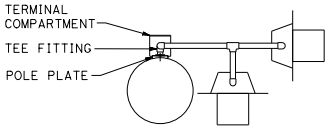

TYPE MAS-RM



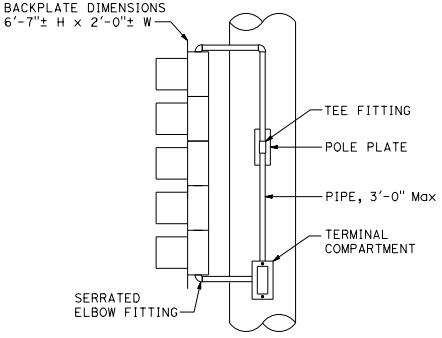

## MAST ARM MOUNTINGS




PLAN

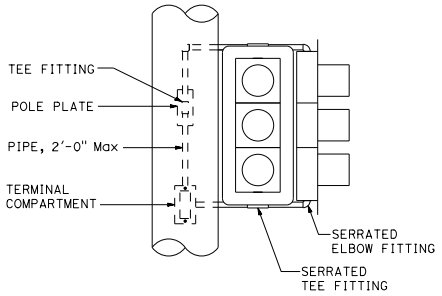



PLAN



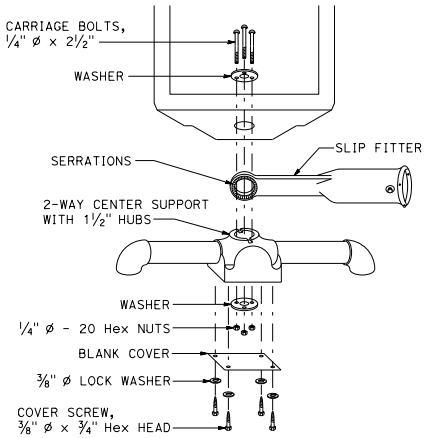

SIDE VIEW

SV-1-T WITH 5 SIGNAL SECTIONS




SIDE VIEW

SV-2-TD




DETAIL A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEM (SIGNAL HEADS)

NO SCALE

ES-4E

7-1-25



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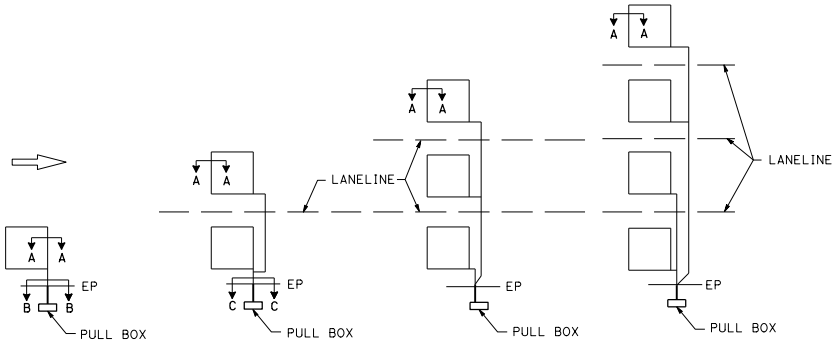
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Bhanupriya
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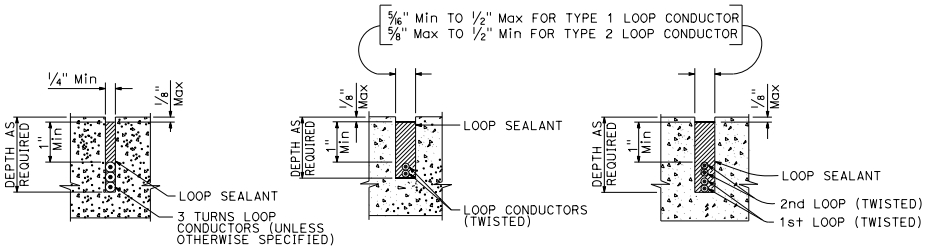
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STATE OF CALIFORNIA



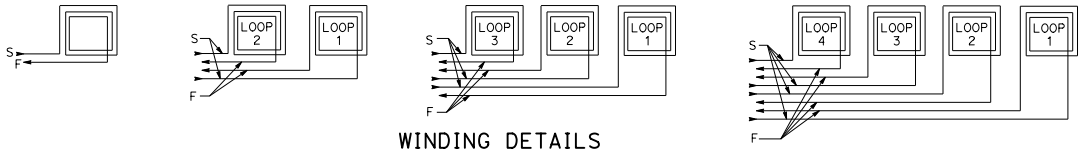

## SAW CUT DETAILS

Type A loop detector configurations illustrated




SECTION A-A SECTION B-B SECTION C-C

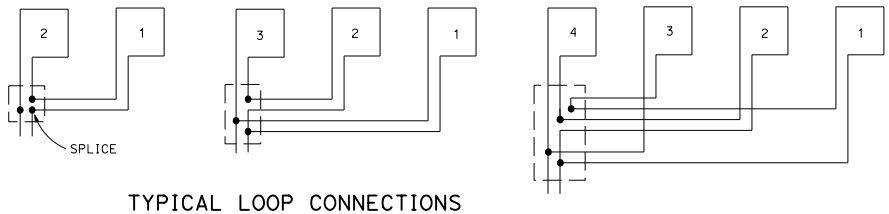
## SLOT DETAILS - TYPE 1 AND TYPE 2 LOOP CONDUCTOR




## WINDING DETAILS

ABBREVIATIONS:

S - START
F - FINISH




## TYPICAL LOOP CONNECTIONS

Dashed lines represent the pull box

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LOOP DETECTORS)

NO SCALE

**ES-5A**

7-1-25

2025 STANDARD PLAN ES-5A

Return to Table of Contents

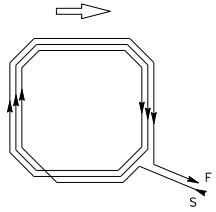
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REGISTERED ELECTRICAL ENGINEER

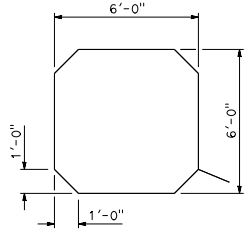
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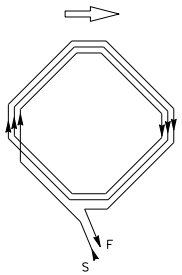



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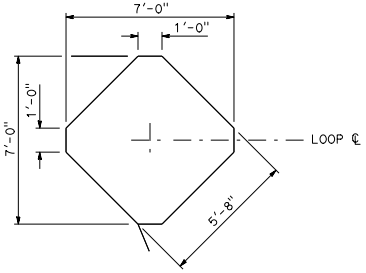



SAW CUT DETAIL

TYPE A LOOP DETECTOR CONFIGURATION




WINDING DETAIL

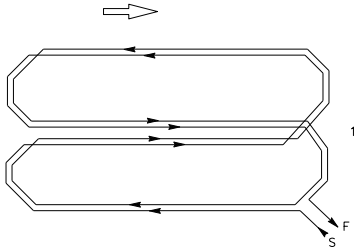



SAW CUT DETAIL

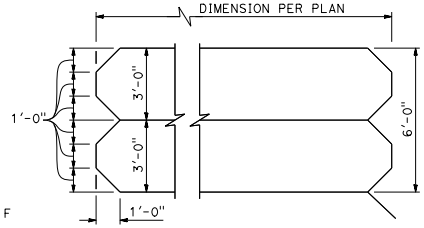
TYPE B LOOP DETECTOR CONFIGURATION

NOTES:

1. Round corners of acute angle saw cuts to prevent damage to conductors.
2. Typical distance separating loops from edge to edge is 10' for Type A, B, D, E, and F installation in single lane.
3. Use Type D and F loops for limit line detection and bicycle lanes.

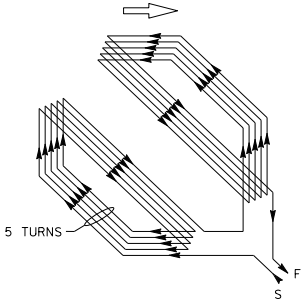



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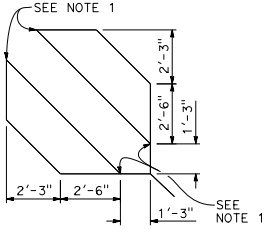



SAW CUT DETAIL

TYPE C LOOP DETECTOR CONFIGURATION

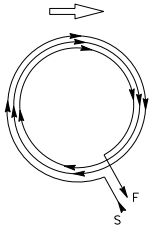



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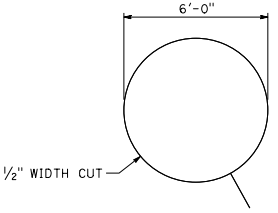



SAW CUT DETAIL

TYPE D LOOP DETECTOR CONFIGURATION

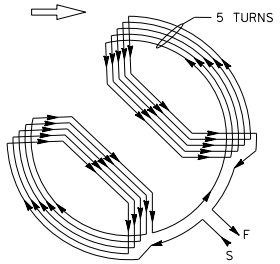



WINDING DETAIL

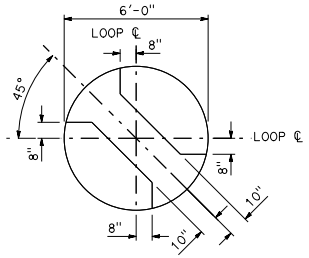



SAW CUT DETAIL

TYPE E LOOP DETECTOR CONFIGURATION

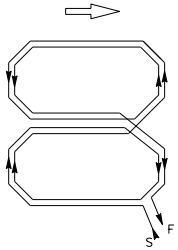



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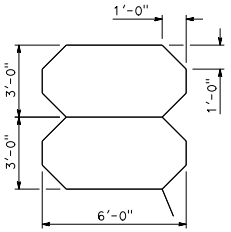



SAW CUT DETAIL

TYPE F LOOP DETECTOR CONFIGURATION

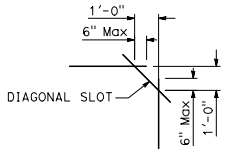



WINDING DETAIL




SAW CUT DETAIL

TYPE Q LOOP DETECTOR CONFIGURATION




PLAN VIEW OF DIAGONAL SLOT AT CORNERS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (DETECTORS)

NO SCALE

ES-5B

7-1-25

Return to Table of Contents

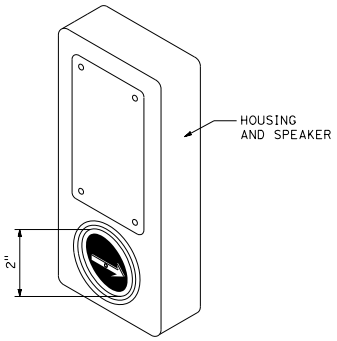
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| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

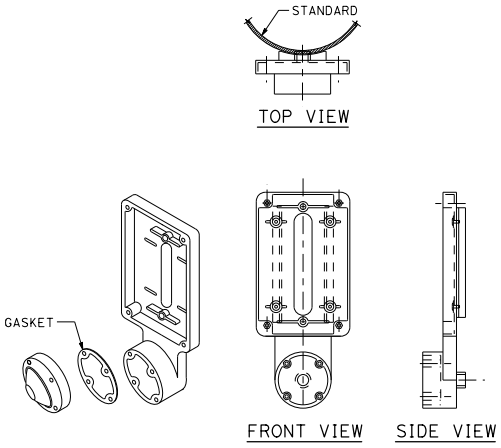
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

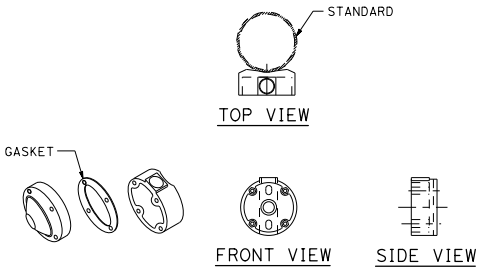
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ACCESSIBLE PEDESTRIAN SIGNAL
DETAIL A




TYPE B PUSH BUTTON ASSEMBLY
DETAIL B




TYPE C PUSH BUTTON ASSEMBLY
DETAIL C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (ACCESSIBLE PEDESTRIAN SIGNAL AND PUSH BUTTON ASSEMBLIES)

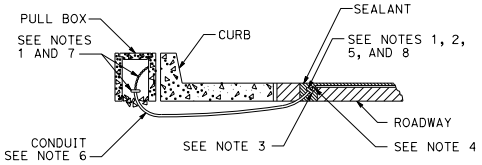
NO SCALE

ES-5C

7-1-25

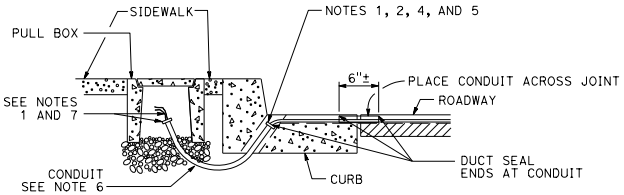
2025 STANDARD PLAN ES-5C

Return to Table of Contents

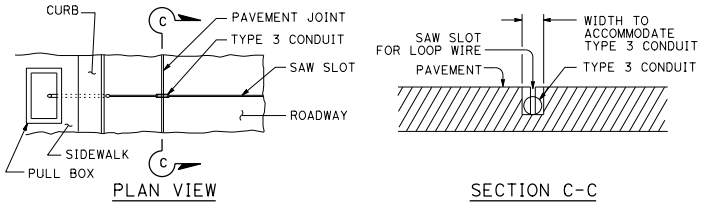



TYPE A

## CURB TERMINATION DETAIL




CROSS SECTION

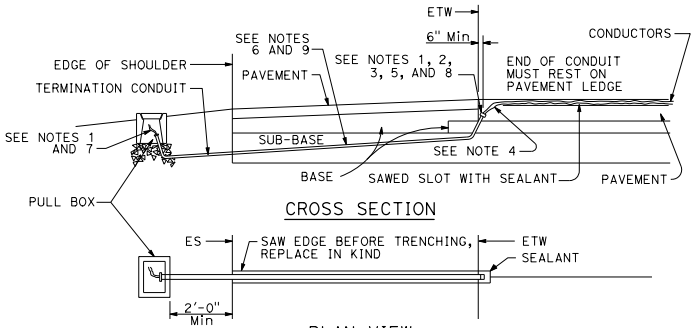



PLAN VIEW

SECTION C-C

TYPE B

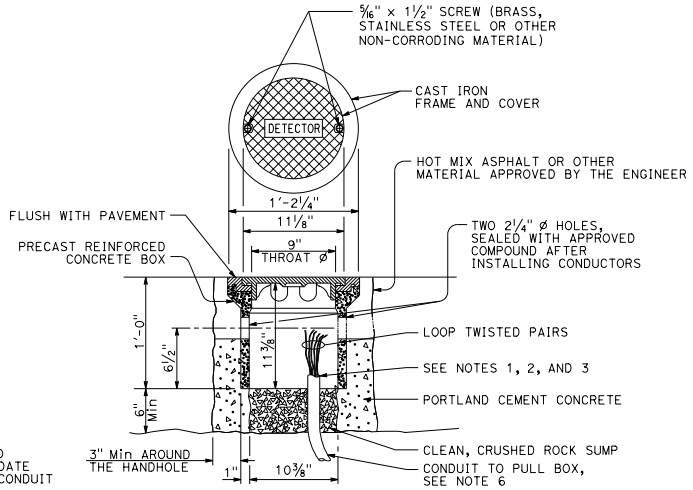
## CURB TERMINATION DETAIL



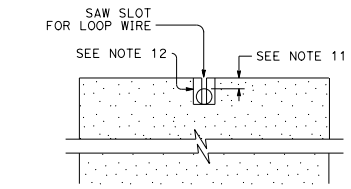

CROSS SECTION

PLAN VIEW

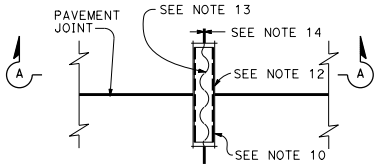
## SHOULDER TERMINATION DETAILS




## DETECTOR HANDHOLE DETAIL

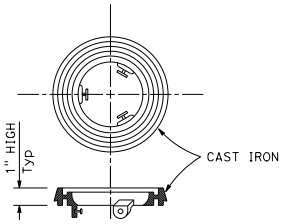



SECTION A-A




PLAN VIEW

## TYPICAL LOOP LEAD-IN DETAIL AT PAVEMENT JOINT




## LOCKING GRADE RING

NOTES:

1. Bushing shall be used at end of conduit.
2. Tape detector conductors 3" each side of bushings.
3. Install duct seal compound to each end of termination conduit before installing sealant.
4. Round all sharp edges where detector conductors have to pass.
5. End of conduit shall be 3/8" below roadway surface.
6. 

| Conduit size | Loop conductors |
|---|---|
| 1"C minimum | 1 to 2 pairs |
| 1 1/2"C minimum | 3 to 4 pairs |
| 2"C minimum | 5 or more pairs |

7. Splice detector conductors to detector lead-in-cable.
8. Location of detector handhole when shown on plans.
9. When the shoulder and traveled way are paved with the same material and there is no joint between them, the conduit shall extend only 2'-0" into the shoulder pavement.
10. 3/4"C, Type 3 conduit 6" long minimum, plug both ends with duct compound to keep out sealant.
11. 1/2" Minimum between top of conduit and pavement surface.
12. Sawcut shall not exceed 1" in width and 1/8" longer than conduit to be installed.
13. Conductors with 1/2" minimum slack inside conduit.
14. Inductive loop detector saw slot.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CURB AND SHOULDER TERMINATION, TRENCH, AND HANDHOLE DETAILS)

NO SCALE

ES-5D

7-1-25



Return to Table of Contents

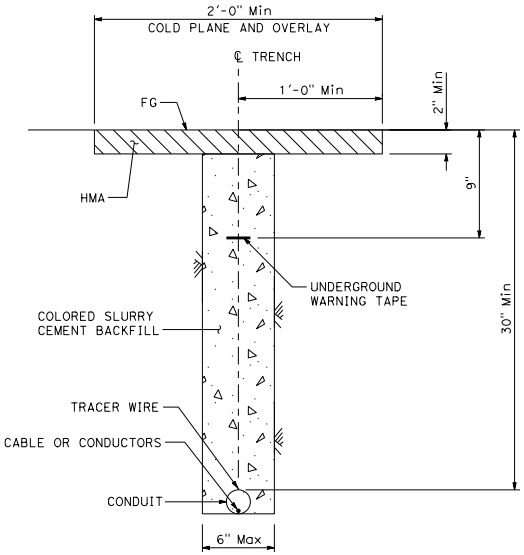
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Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

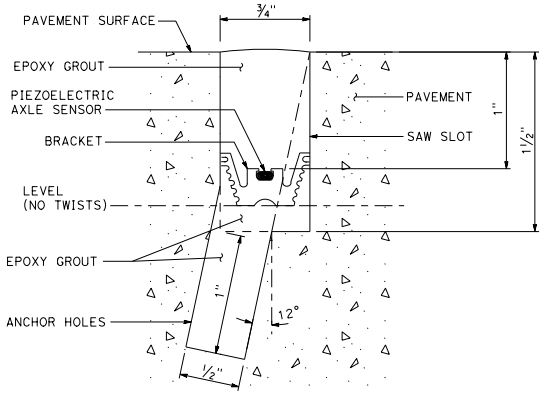
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

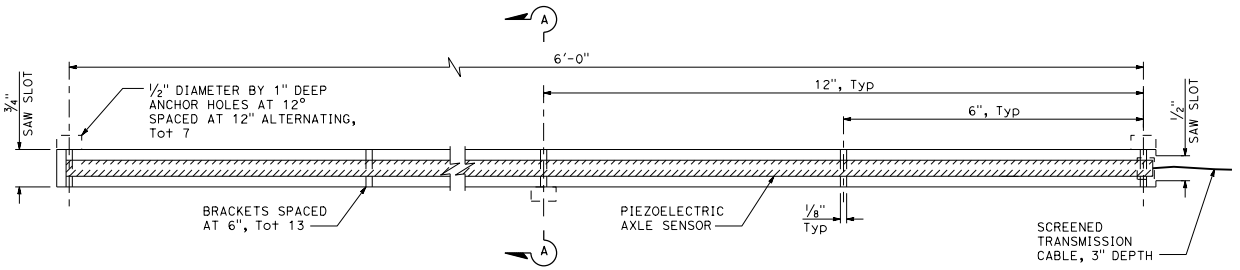
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TRENCH IN PAVEMENT




SECTION A-A




PLAN

PIEZOELECTRIC AXLE SENSOR

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (TRENCH IN PAVEMENT AND PIEZOELECTRIC AXLE SENSOR DETAILS)

NO SCALE

**ES-5E**

7-1-25



Return to Table of Contents

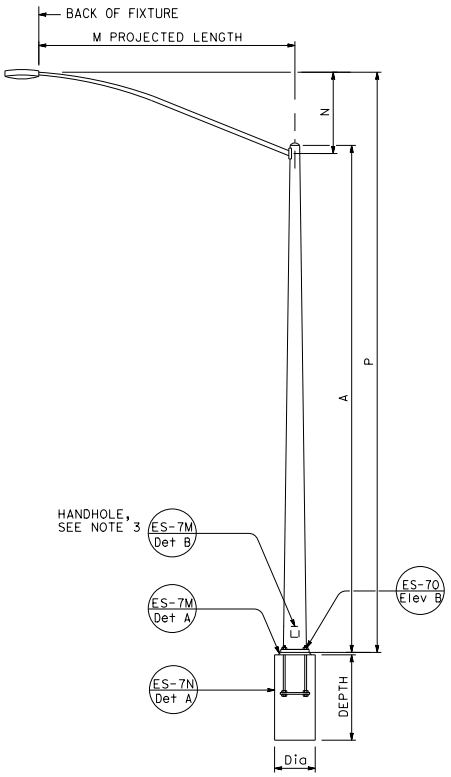
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

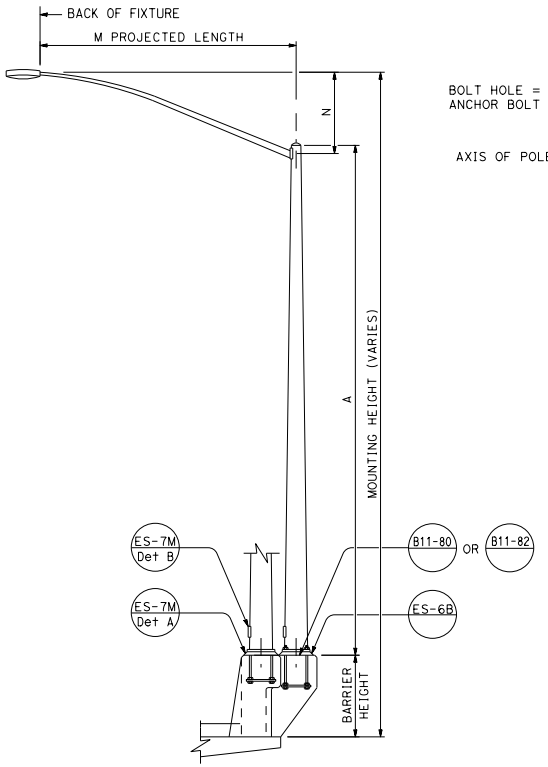
REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
EXP. 3-31-26
CIVIL
STATE OF CALIFORNIA

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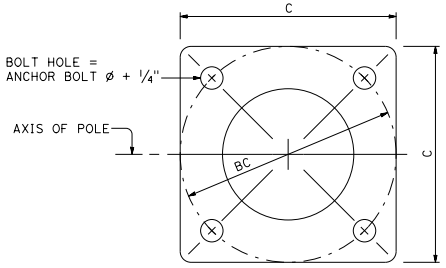

TYPE 15 AND TYPE 21

ELEVATION A




TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED

ELEVATION B

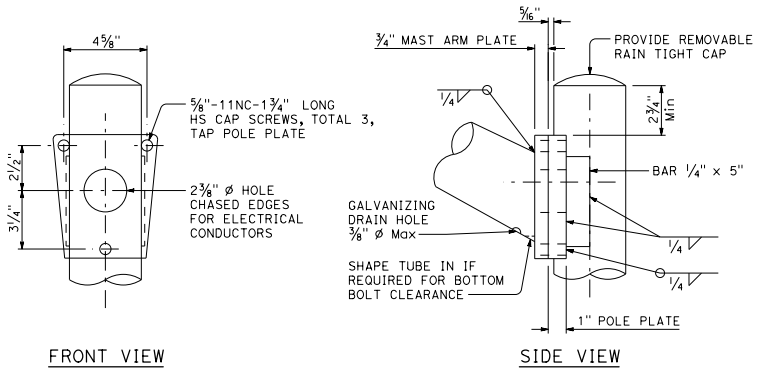



BASE PLATE

DETAIL A

NOTES:

1. ☐ Indicates mast arm length to be used unless otherwise noted on the plans.
2. For Type 15-SB, use Type 15 Standard with Type 30 slip base plate details, see Standard Plan ES-6F.
3. Handhole shall be located on the downstream side of traffic.
4. For additional notes and details, see Standard Plans ES-7M and ES-7N.




LUMINAIRE MAST ARM CONNECTION

DETAIL R

| LUMINAIRE MAST ARM DATA | | | | | |
|---|---|---|---|---|---|
| M PROJECTED LENGTH | N RISE | Min OD AT POLE | NOMINAL THICKNESS | P | |
| | | | | TYPE 15 | TYPE 21 |
| 6'-0" | 2'-0"± | 3 1/4" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3 1/2" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3 7/8" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4 1/4" | | 34'-3"± | 39'-3"± |

| POLE DATA | | | | | BASE PLATE DATA | | | | CIDH PILE FOUNDATION | |
|---|---|---|---|---|---|---|---|---|---|---|
| POLE TYPE | A HEIGHT | Min OD | | WALL THICKNESS | C | BC | THICKNESS | ANCHOR BOLT SIZE | Dia | DEPTH |
| | | BASE | TOP | | | | | | | |
| 15 | 30'-0" | 8" | 3 11/16" | 0.1196" | 1'-0" | 1'-0" | 1 1/2" | 1" ø x 36" * | 2'-6" | 6'-0" |
| 21 | 35'-0" | 8 5/8" | 3 9/16" | 0.1793" | | | 2" | 1 1/4" ø x 36" * | | 7'-0" |

* FOR BARRIER RAIL BOLTS, SEE STANDARD PLAN ES-6B.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 15 AND 21)

NO SCALE

ES-6A

7-1-25

Return to Table of Contents

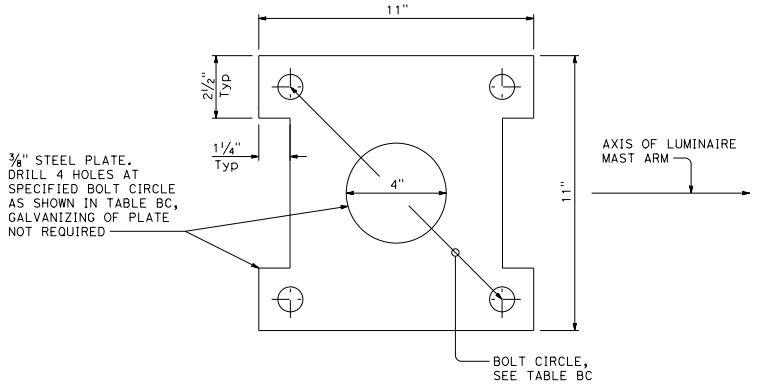
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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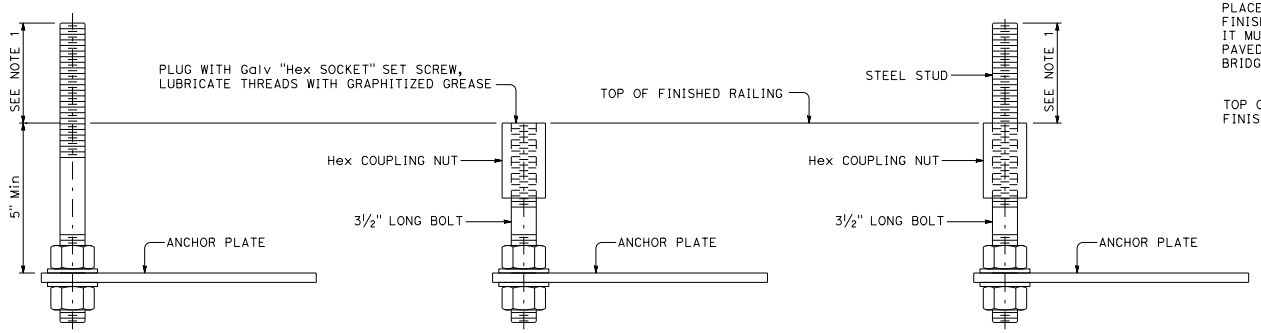

ANCHOR PLATE
DETAIL A

**TABLE BC**

| TYPE | BC = BOLT CIRCLE | ANCHOR BOLT DIAMETER | COUPLING NUT BASIC LENGTH | SET SCREW LENGTH DETAIL B-2 |
|---|---|---|---|---|
| 15 | 1'-0" | 1" | 3" | 1½" |
| 21 | | 1¼" | 3¾" | 1⅞" |

NOTES:

1. Anchor bolt or stud length shall be such that thread extends ½" maximum above nut on level base plate after grouting, see Detail N.
2. Electrolier anchor bolts shall be held in position for pouring by means of anchor plates and suitable templates. Deviation from the true position, vertical and height shall not exceed 1/16".
3. See railing sheets for reinforcement and structural details at electroliers and pull boxes.

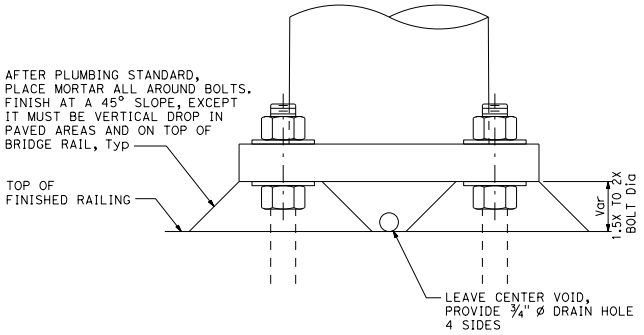



FOR IMMEDIATE INSTALLATION
DETAIL B-1

FOR FUTURE INSTALLATION WITH PLUG
DETAIL B-2

FOR INSTALLATION ON FUTURE ANCHORAGE WITH STUD
DETAIL B-3

ELECTROLIER ANCHORAGES
DETAIL B




GROUTING AT ELECTROLIER
DETAIL N

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (ELECTROLIER ANCHORAGE AND GROUTING FOR TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED)

NO SCALE

ES-6B

7-1-25

2025 STANDARD PLAN ES-6B

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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| | | | | | |

REGISTERED CIVIL ENGINEER

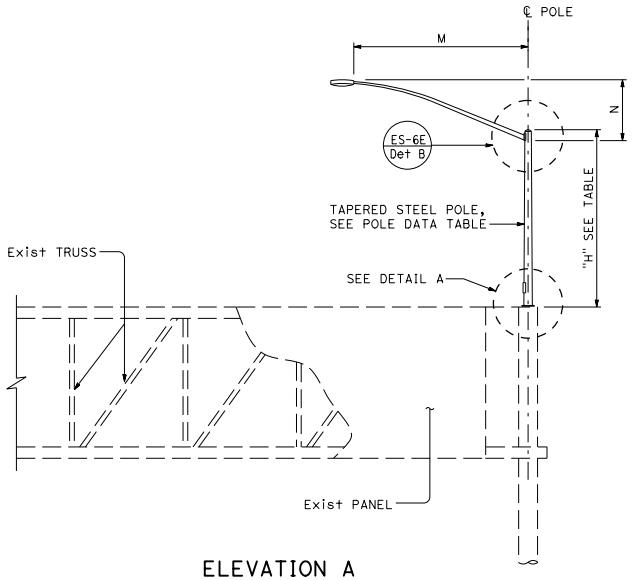
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

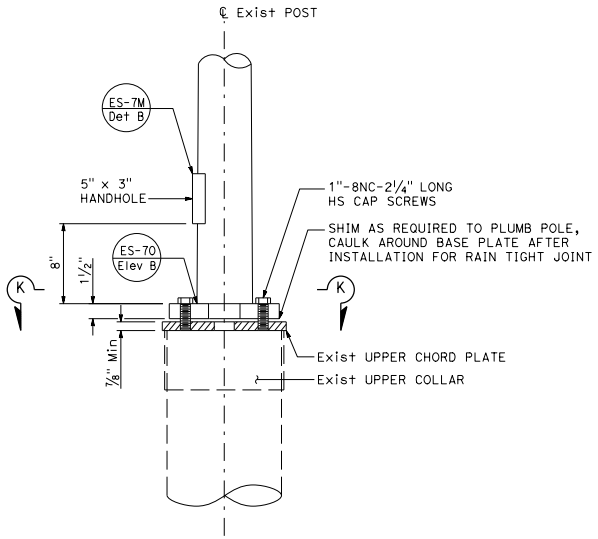
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| LUMINAIRE MAST ARM DATA | | | |
|---|---|---|---|
| M PROJECTED LENGTH | N RISE | Min OD AT POLE | NOMINAL THICKNESS |
| 15'-0" | 4'-9"± | 4½" | 0.1196" |
| 20'-0" | 2'-6"± | 5" | 0.1793" |

| POLE DATA | | | | |
|---|---|---|---|---|
| POLE EXTENSION TYPE | HEIGHT "H" | Min OD | | THICKNESS |
| | | BASE | TOP | |
| 5 | 5'-0" | 6½" | 5 11/16" | 0.1793" |
| 10 | 10'-0" | 7¼" | | |



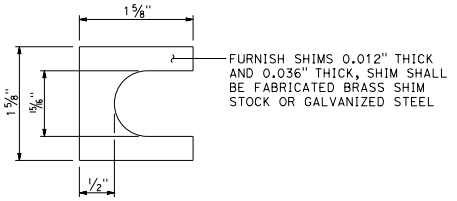

ELEVATION A




DETAIL A

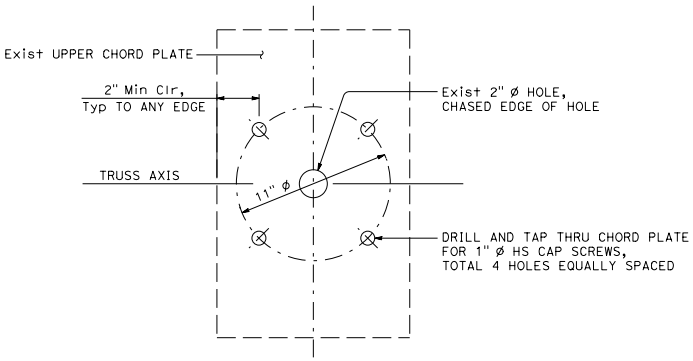
NOTES:

1. The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.
2. Bolt hole locations may vary at the discretion of the Engineer.
3. For Wind Loading, see Standard Plan ES-7M.
4. See Standard Plan S113 for Versatile Truss (similar for Overhead Truss).
5. Materials (Structural Steel):
   a. fy = 55,000 psi tapered steel tube (pole)
   b. fy = 50,000 psi unless otherwise noted




SHIM DETAIL

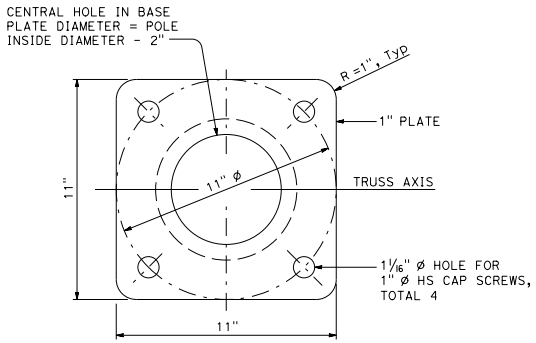
DETAIL B




UPPER CHORD PLATE

DETAIL C

See Note 4




SECTION K-K

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 5 AND 10, OVERHEAD SIGN MOUNTED)

NO SCALE

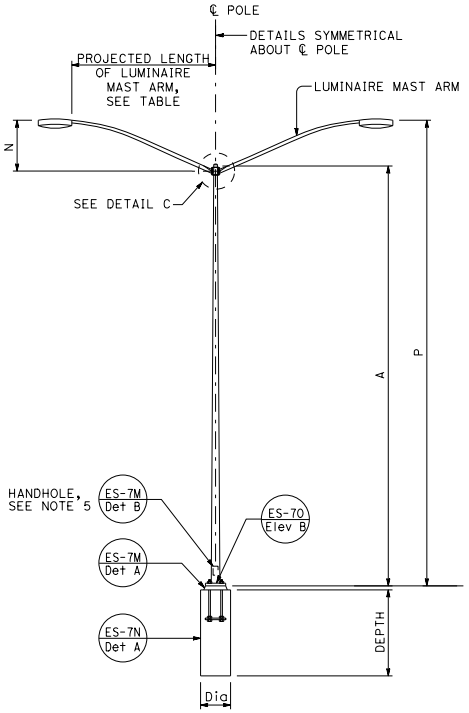
ES-6C

7-1-25

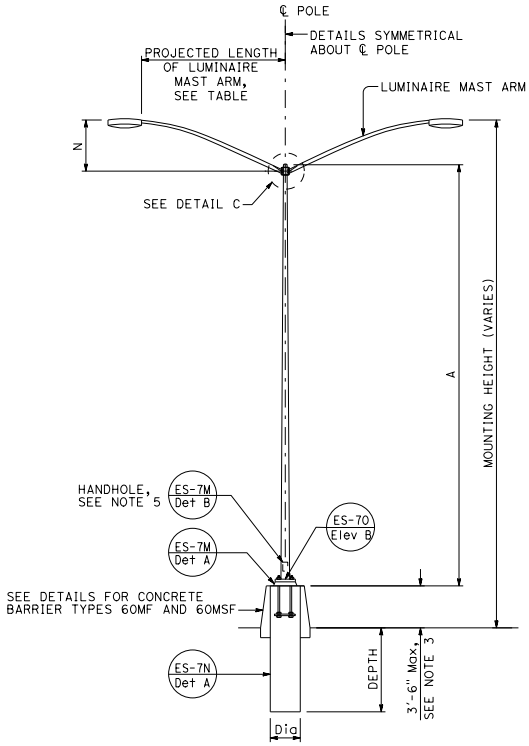
2025 STANDARD PLAN ES-6C

560

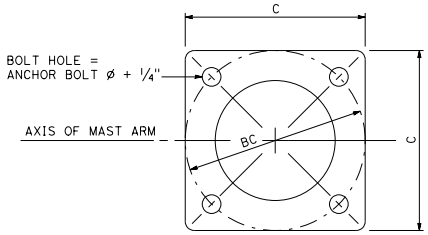
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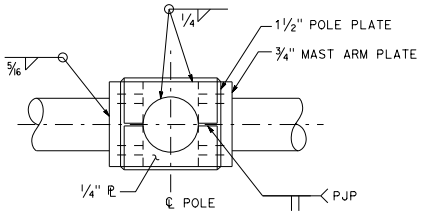

TYPE 15D AND TYPE 21D
ELEVATION A




TYPE 15D AND TYPE 21D
MEDIAN BARRIER MOUNTED
ELEVATION B




BASE PLATE
DETAIL B



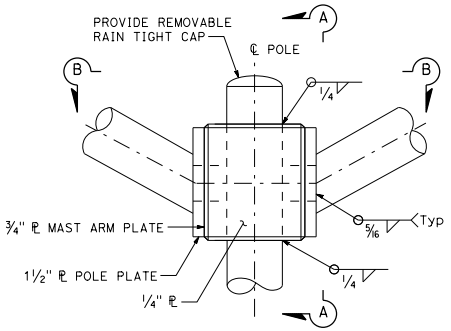

SECTION B-B

| LUMINAIRE MAST ARM DATA | | | | | |
|---|---|---|---|---|---|
| PROJECTED LENGTH | N RISE | Min OD AT POLE | NOMINAL THICKNESS | P | |
| | | | | TYPE 15D | TYPE 21D |
| 6'-0" | 2'-0"± | 3 1/4" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3 1/2" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3 7/8" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |

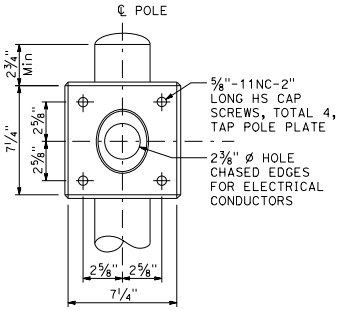
| POLE DATA | | | | | BASE PLATE DATA | | | | CIDH PILE FOUNDATION | |
|---|---|---|---|---|---|---|---|---|---|---|
| POLE TYPE | A HEIGHT | Min OD | | Min THICKNESS | C | BC | THICKNESS | ANCHOR BOLT SIZE | Dia | DEPTH |
| | | BASE | TOP | | | | | | | |
| 15D | 30'-0" | 8" | 3 11/16" | 0.1793" | 1'-0" | 1'-0" | 1 1/2" | 1 1/4" Ø x 42" | 2'-6" | 7'-0" |
| 21D | 35'-0" | 8 5/8" | | | | | | | | |

NOTES:

1. ☐ Indicates mast arm length to be used unless otherwise noted on the plans.
2. For additional notes and details, see Standard Plans ES-7M and ES-7N.
3. CIDH footing shown. For trench footing at barrier, see Standard Plans A76BM, A76BN, A76BO, A76BP, A76BQ, and A76BR.
4. For locations with one arm, plug unused cap screw holes and chased outlet with galvanized cap screws and knockout plug.
5. Handhole shall be located perpendicular to the luminaire mast arm and as directed by the Engineer.




DETAIL C




SECTION A-A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 15D AND 21D, DOUBLE LUMINAIRE MAST ARM)

NO SCALE

ES-6D

7-1-25

2025 STANDARD PLAN ES-6D

Return to Table of Contents

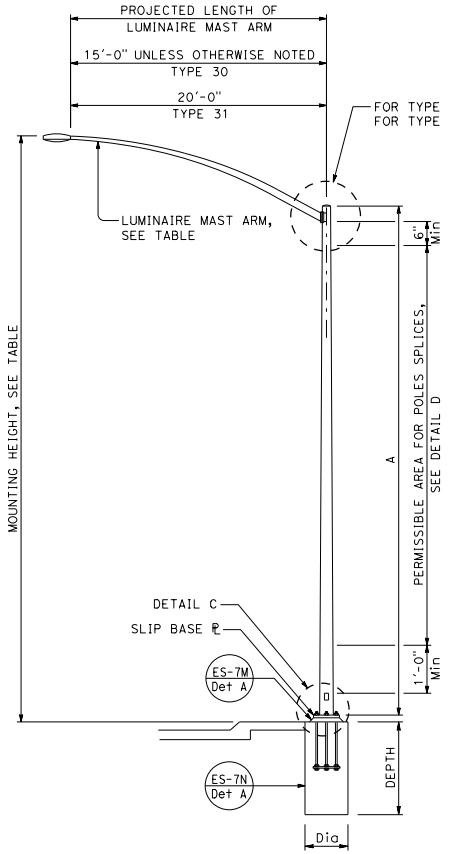
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

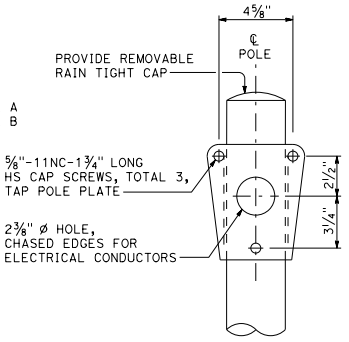
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

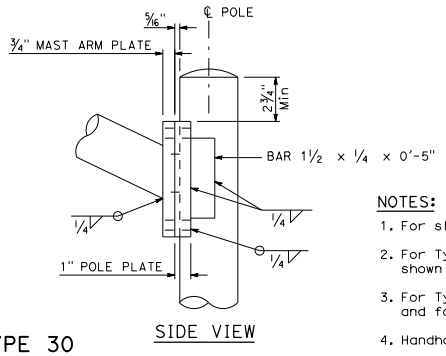
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ELEVATION A




FRONT VIEW

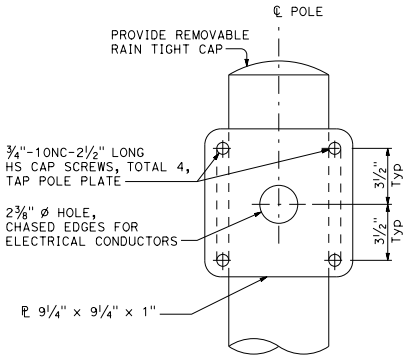



SIDE VIEW

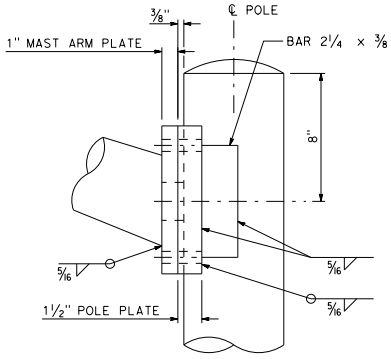
TYPE 30
DETAIL A

NOTES:

1. For slip base plate details, see Standard Plan ES-6F.
2. For Type 30 fixed base, use Type 15 base plate and foundation shown on Standard Plan ES-6A. Use 1¼" ø x 3'-6" anchor bolts.
3. For Type 31 fixed base, use Type 32 base plate, anchor bolts and foundation on Standard Plan ES-6G.
4. Handhole shall be located on the downstream side of traffic.
5. For additional notes and details, see Standard Plans ES-7M and ES-7N.

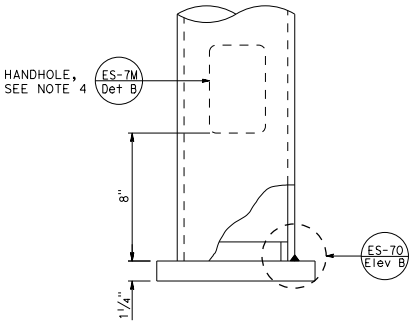



FRONT VIEW

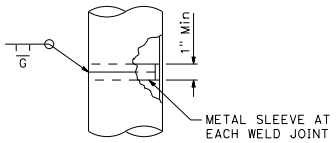



SIDE VIEW

TYPE 31
DETAIL B




DETAIL C




POLE SPLICE
DETAIL D

| LUMINAIRE MAST ARM DATA | | | |
|---|---|---|---|
| PROJECTED LENGTH | THICKNESS | MINIMUM OD AT POLE | MOUNTING HEIGHT |
| * 6'-0" | 0.1196" | 3¼" | 36'-9"± |
| * 8'-0" | | 3½" | 37'-3"± |
| * 10'-0" | | 3⅜" | 38'-0"± |
| * 12'-0" | | | 39'-0"± |
| * 15'-0" | | 4¼" | 39'-6"± |
| ** 20'-0" | 0.1793" | 5" | 37'-0"± |

* TYPE 30
** TYPE 31

| POLE DATA | | | | | CIDH PILE FOUNDATION | |
|---|---|---|---|---|---|---|
| POLE TYPE | A HEIGHT | Min OD BASE | Min OD TOP | Min THICKNESS | Dia | DEPTH |
| 30 | 35'-0" | 8¾" | 3 11/16" | 0.1196" | 2'-6" | 7'-0" |
| 31 | | 10¾" | 5 11/16" | 0.1793" | 3'-0" | 8'-0" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPES 30 AND 31)

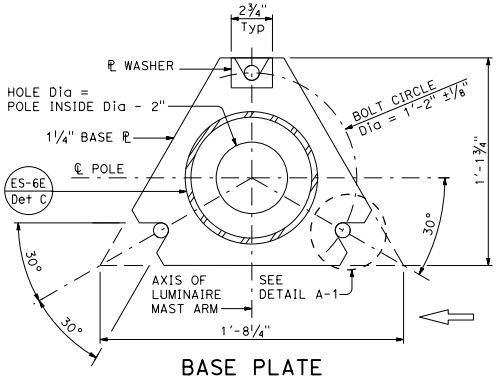
NO SCALE

ES-6E

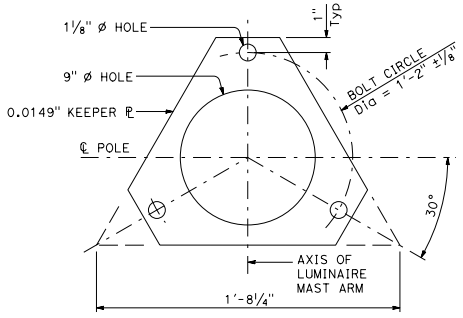
2025 STANDARD PLAN ES-6E

7-1-25

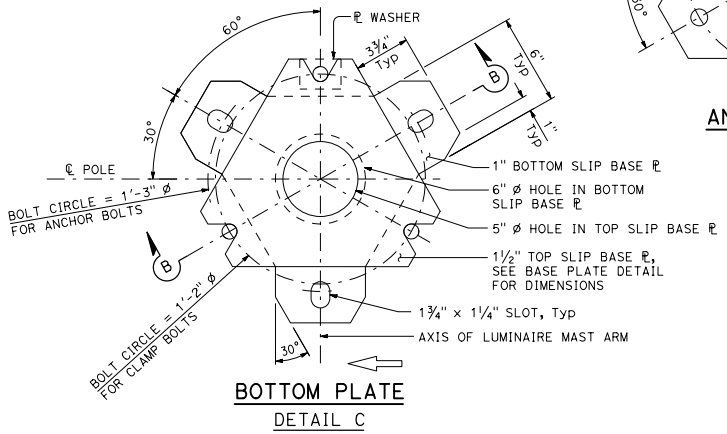
Return to Table of Contents



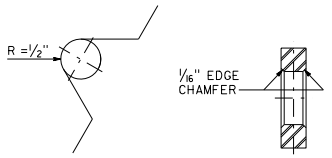

BASE PLATE
DETAIL A




KEEPER PLATE
DETAIL B




BOTTOM PLATE
DETAIL C




DETAIL A-1




SECTION A-A

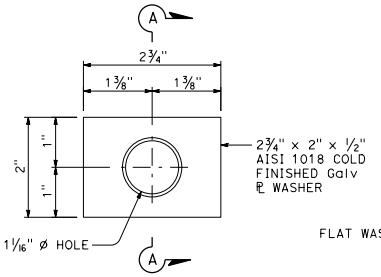
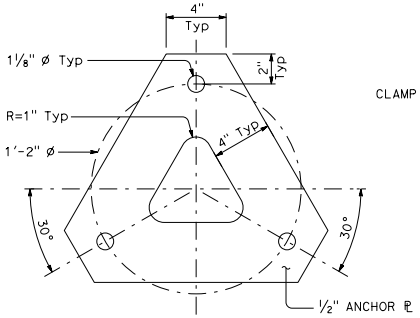
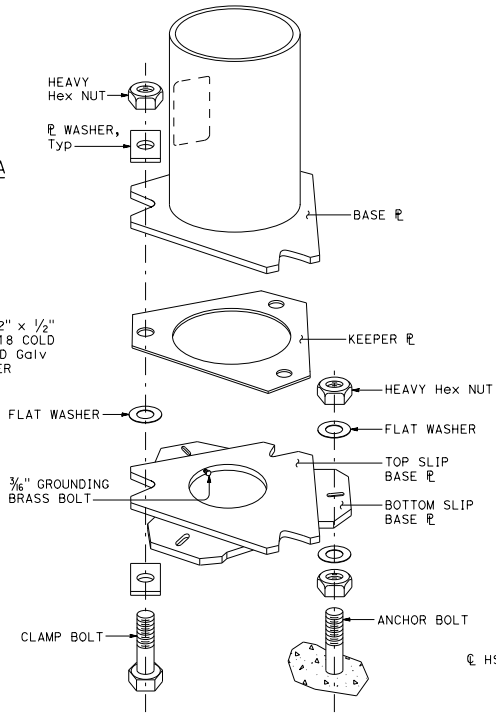



PLATE WASHER
DETAIL D



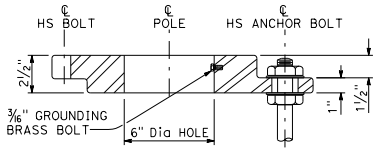

ANCHOR PLATE
DETAIL E



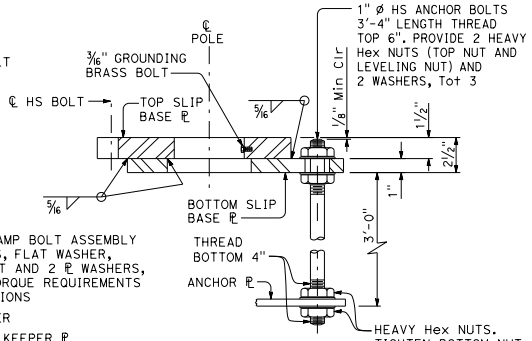

SLIP BASE DETAIL
DETAIL F

NOTES:

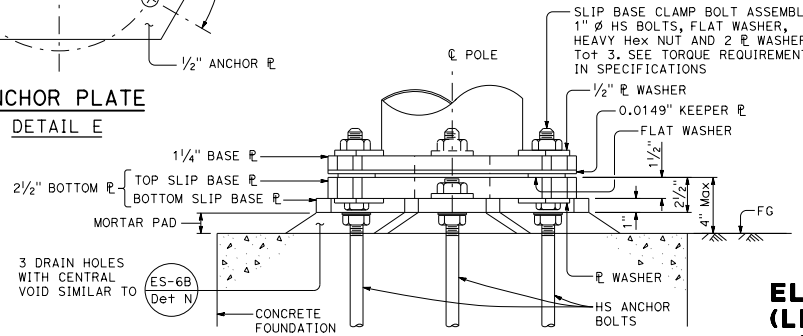
1. 1" ø HS anchor bolts. For clamp bolts, see specifications.
2. Conduit shall not protrude more than 2" above top of foundation.
3. Handhole shall be located on the downstream side of traffic.
4. For Type 30 and Type 31 fixed base, see Notes 2 and 3 on Standard Plan ES-6E.




CAST OPTION




WELDED OPTION
SECTION B-B




SLIP BASE ELEVATION A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING STANDARD, SLIP BASE PLATE)

NO SCALE

ES-6F

2025 STANDARD PLAN ES-6F

7-1-25

Return to Table of Contents

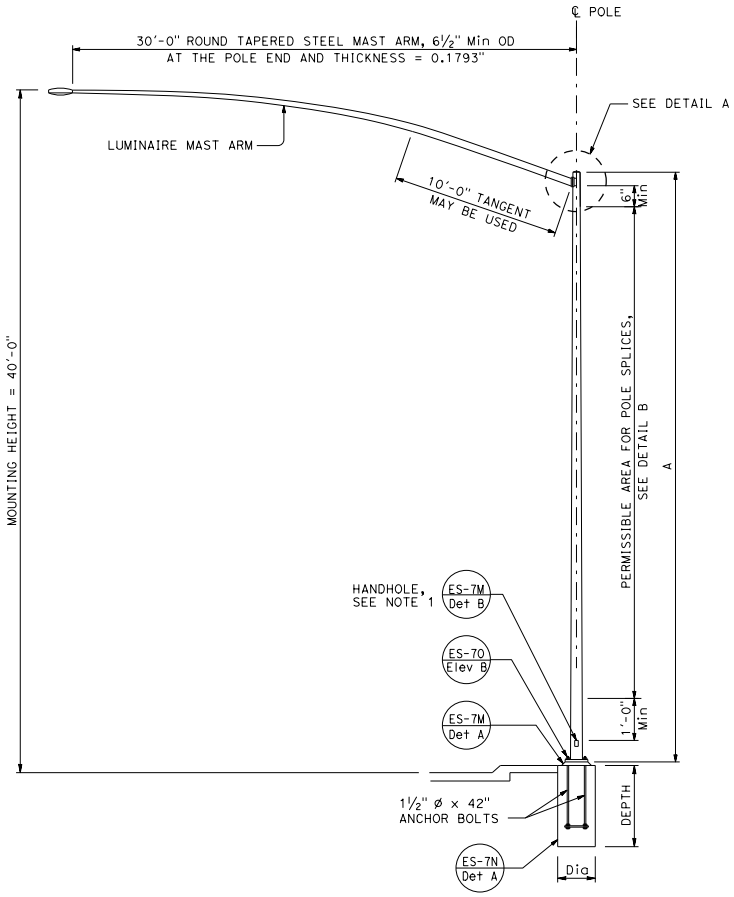
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|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

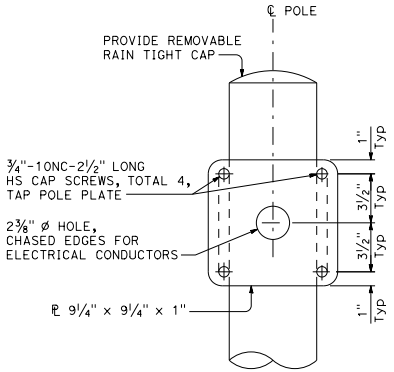
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

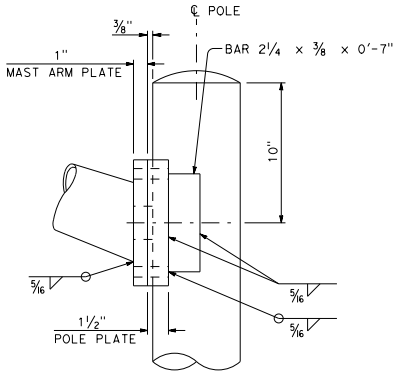
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ELEVATION A




FRONT VIEW

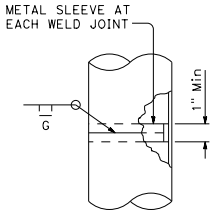



SIDE VIEW

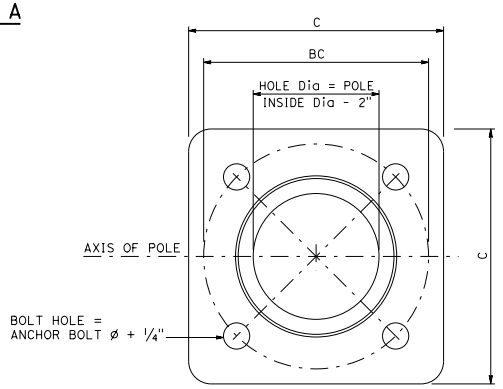
DETAIL A

NOTES:

1. Handhole shall be located on the downstream side of traffic.
2. For additional notes and details, see Standard Plans ES-7M and ES-7N.




POLE SPLICE
DETAIL B




BASE PLATE DETAIL
DETAIL C

| POLE DATA | | | | | BASE PLATE DATA | | | | CIDH PILE FOUNDATION | |
|---|---|---|---|---|---|---|---|---|---|---|
| POLE TYPE | A HEIGHT | Min OD BASE | Min OD TOP | Min THICKNESS | C | BC | THICKNESS | ANCHOR BOLT SIZE | Dia | DEPTH |
| 32 | 35'-0" | 10¾" | 5¹¹⁄₁₆" | 0.1793" | 1'-5" | 1'-3" | 2" | 1½" ø x 42" | 3'-0" | 8'-0" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING STANDARD, TYPE 32)

NO SCALE

ES-6G

7-1-25

Return to Table of Contents

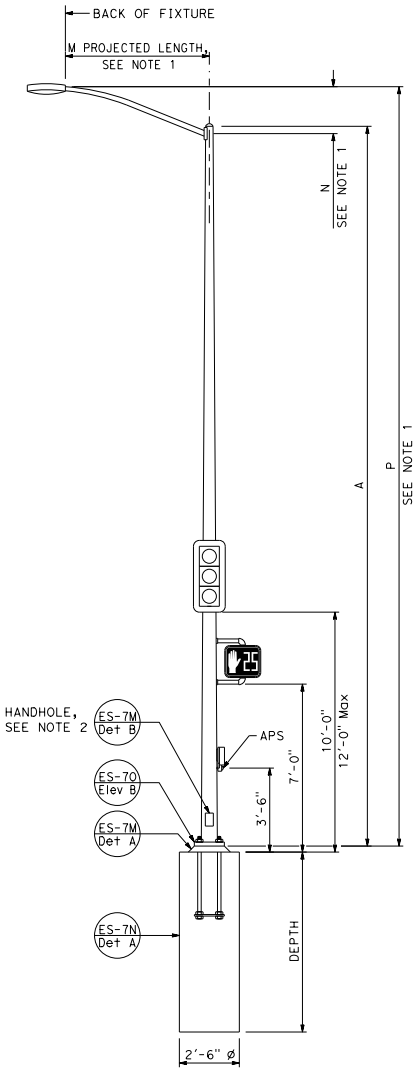
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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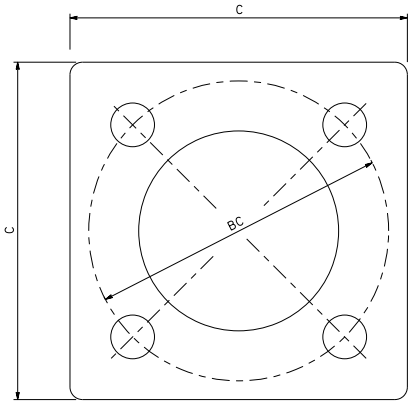



ELEVATION A

TYPES 15TS AND 21TS STANDARD

See Note 1

| POLE DATA | | | | | BASE PLATE DATA | | | | CIDH |
|---|---|---|---|---|---|---|---|---|---|
| POLE TYPE | A HEIGHT | Min OD BASE | Min OD TOP | WALL THICKNESS | C | BC | THICKNESS | ANCHOR BOLT SIZE | DEPTH |
| 15TS | 30'-0" | 8" | 3 11/16" | 0.1793" | 1'-1 1/2" | 1'-0" | 2" | 1 1/2" ø x 42" | 7'-6" |
| 21TS | 35'-0" | 9 3/8" | 4 5/16" | | 1'-3" | 1'-2" | | | 8'-6" |



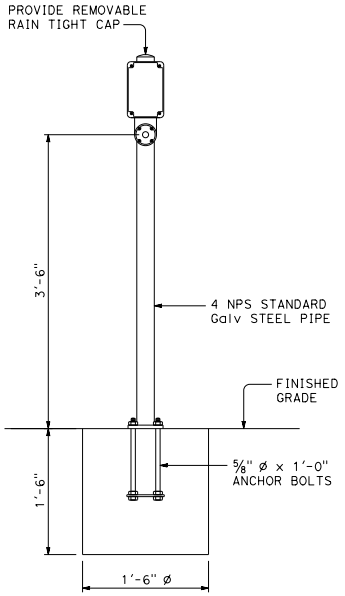

BASE PLATE

TYPE 15TS AND 21TS

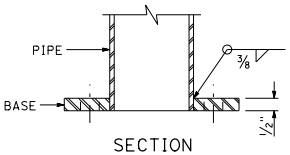
DETAIL A

NOTES:

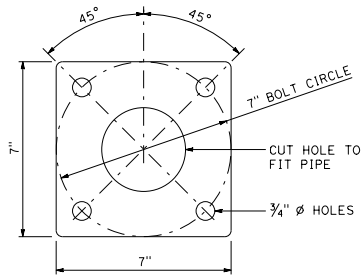
1. For additional notes, details and data for Types 15TS and 21TS Standards, see Standard Plan ES-6A.
2. Handhole shall be located on the downstream side of traffic.




ELEVATION




SECTION




BASE PLATE

TYPE 2 POST

DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, TYPE TS, AND TYPE 2 POST)

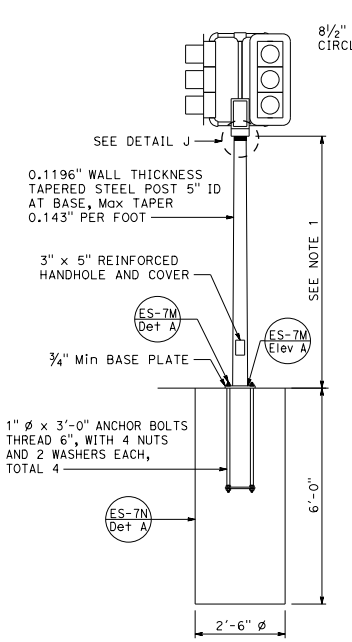
NO SCALE

ES-7A

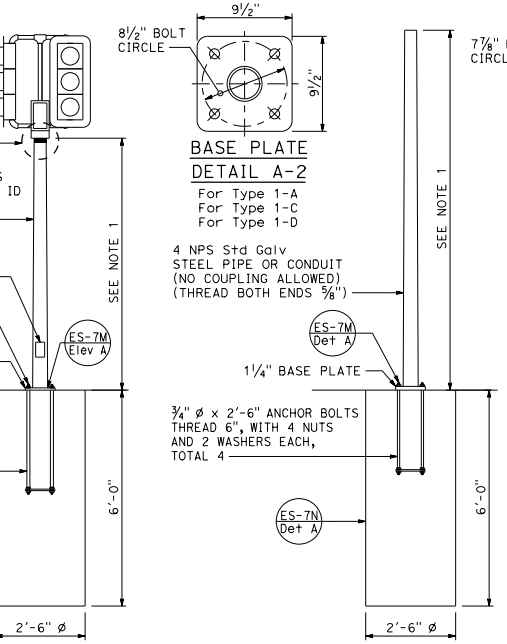
7-1-25

2025 STANDARD PLAN ES-7A

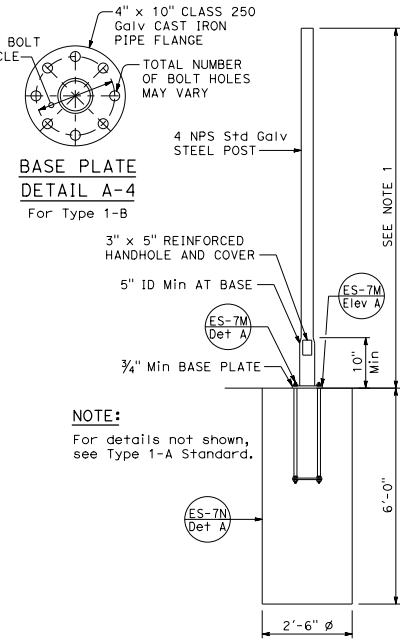
Return to Table of Contents




TYPE 1-A STANDARD
DETAIL A-1

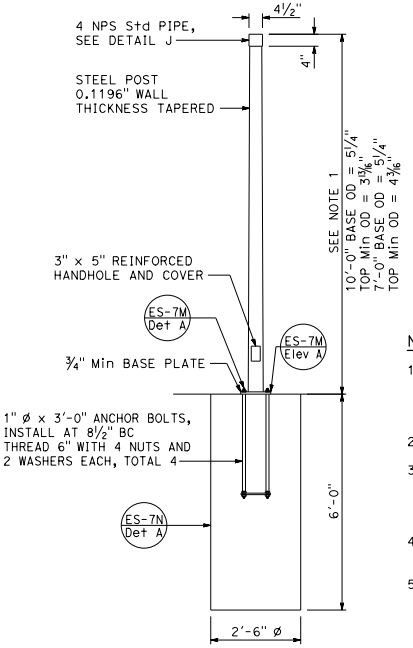



TYPE 1-B STANDARD
DETAIL A-3




NOTE:
For details not shown, see Type 1-A Standard.

TYPE 1-C STANDARD
DETAIL A-5

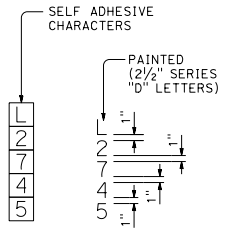



TYPE 1-D STANDARD
DETAIL A-6

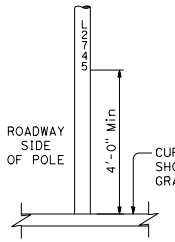
TYPE 1 SIGNAL STANDARDS
DETAIL A

NOTES:

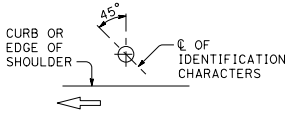
1. Standards shall be 12'-0" ±2" for flashing beacons, 10'-0" ±2" for vehicle signals, and 7'-0" ±2" for pedestrian signals unless shorter pole is noted on project plans.
2. Top of standards shall be 4½" OD.
3. Conduits shall extend 2" maximum above finished surface of foundation and for Types 1-A, 1-C, and 1-D shall be sloped toward handhole.
4. Coupling nuts to be used only when shown or specified on project plans.
5. Handholes shall be located on the downstream side of traffic.




IDENTIFICATION CHARACTER DETAIL
DETAIL B-1

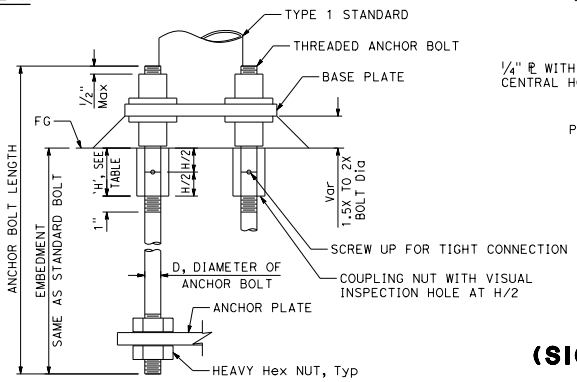



TYPICAL IDENTIFICATION CHARACTER FORMAT
DETAIL B-2

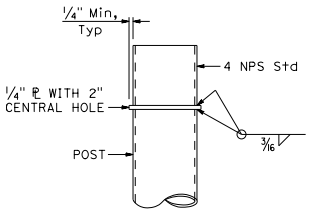



DETAIL B-3

LOCATION OF EQUIPMENT IDENTIFICATION CHARACTERS ON STANDARDS AND POSTS
DETAIL B




ANCHOR BOLTS WITH COUPLING NUTS
DETAIL C
See Note 4




DETAIL J

| COUPLING NUT TABLE | |
|---|---|
| BOLT DIAMETER | NUT TABLE THICKNESS 'H' |
| ¾" | 2¼" |
| 1" | 3" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, TYPE 1 AND EQUIPMENT IDENTIFICATION CHARACTERS)

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

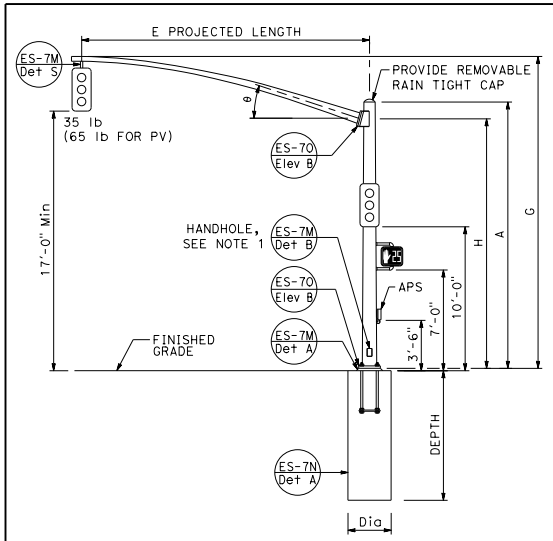
REGISTERED CIVIL ENGINEER
Stanley P. Johnson
September 19, 2025
PLANS APPROVAL DATE
REGISTERED PROFESSIONAL ENGINEER Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL STATE OF CALIFORNIA
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

ES-7B

7-1-25

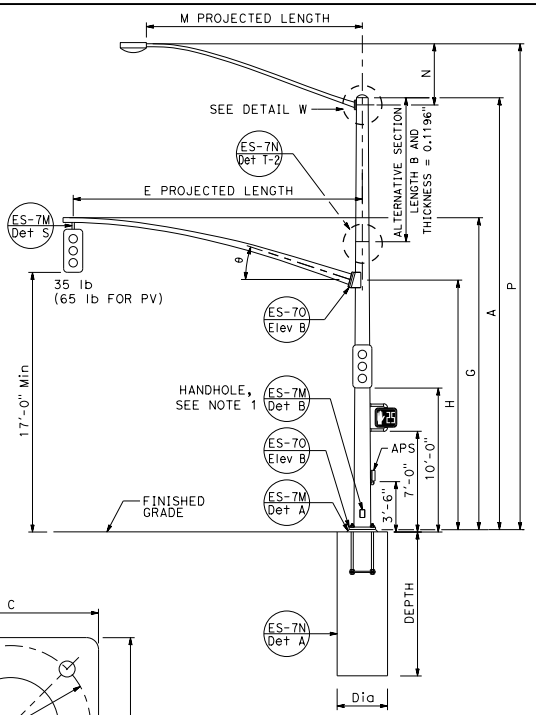
2025 STANDARD PLAN ES-7B

Return to Table of Contents



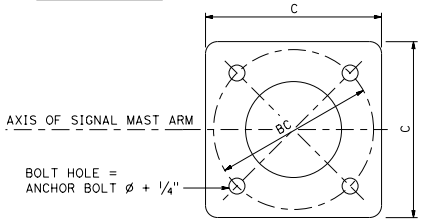

TYPE 16-1-100, 18-1-100

ELEVATION A




TYPE 19-1-100, 19A-1-100

ELEVATION B

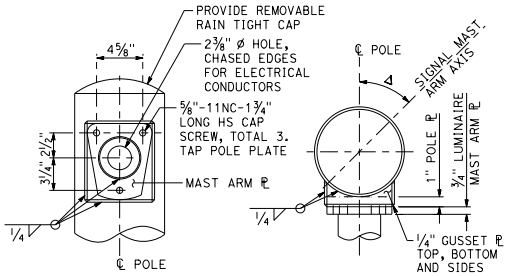



BASE PLATE

DETAIL D

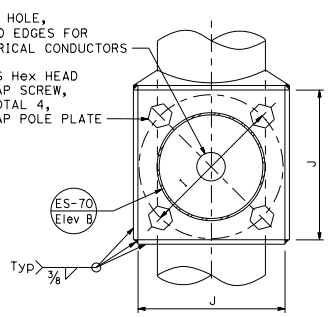
NOTES:

1. Handhole shall be located on the downstream side of traffic.
2. Δ = Luminaire mast arm skew -90° or +90°, default 0°.

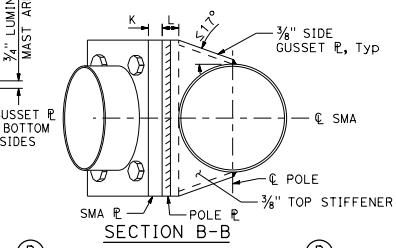



LUMINAIRE MAST ARM CONNECTION

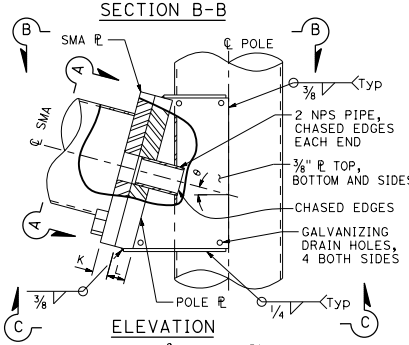
DETAIL W



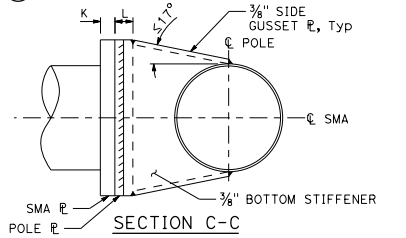

SECTION A-A




SECTION B-B




ELEVATION




SECTION C-C

SIGNAL MAST ARM CONNECTION

DETAIL A

| SIGNAL MAST ARM DATA | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| E PROJECTED LENGTH | G MOUNTING HEIGHT | H | Min OD AT POLE | THICKNESS | I BOLT CIRCLE | HS CAP SCREWS | J PLATE SIZE | K MAST ARM ℄ THICKNESS | L POLE ℄ THICKNESS | θ |
| 15'-0" | 21'-8"± | 17'-6" | 7 3/8" | 0.1793" | 12" | 1 1/4"-7NC-3" | 1'-0" | 1 1/4" | 1 1/2" | 23° |
| 20'-0" | | | 8" | | | | 1'-1" | | | |
| 25'-0" | 22'-8"± | 16'-0" | 9" | | | | | | | |
| 30'-0" | 23'-0"± | | 10" | | | | | | | |

| LUMINAIRE MAST ARM DATA | | | | | |
|---|---|---|---|---|---|
| M PROJECTED LENGTH | N RISE | Min OD AT POLE | THICKNESS | P MOUNTING HEIGHT 30'-0" POLE | P MOUNTING HEIGHT 35'-0" POLE |
| 6'-0" | 2'-0"± | 3 1/4" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3 1/2" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3 7/8" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4 1/4" | | 34'-3"± | 39'-3"± |

| POLE TYPE | LOAD CASE | WIND VELOCITY (mph) | POLE DATA A HEIGHT | Min OD BASE | Min OD TOP | THICKNESS | ALTERNATIVE SECTION B LENGTH | ALTERNATIVE SECTION BOTTOM | ALTERNATIVE SECTION TOP | BASE PLATE DATA C | BC | THICKNESS | ANCHOR BOLT SIZE | LUMINAIRE MAST ARM | SIGNAL MAST ARM | CIDH PILE FOUNDATION Dia | CIDH PILE FOUNDATION DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16-1-100 | 1 | 100 | 18'-6" | 12" | 9 3/8" | 0.2391" OR 0.25" | None | | | 1'-6" | 1'-4" | 2" | 1 3/4"ø x 42" | NONE | 15'-0", [20'-0"] | 3'-0" | 9'-0" |
| 18-1-100 | | | 17'-0" | | | | None | | | | | | | NONE | | | |
| 19-1-100 | | | 30'-0" | 14" | 9 3/4" | | 10'-0" | 11 7/8" | 9 3/4" | 1'-10" | 1'-8" | 2 1/2" | 2"ø x 42" | 6'-15' [12'-0"] | 25'-0", [30'-0"] | 3'-6" | 10'-0" |
| 19A-1-100 | | | 35'-0" | | 9" | | 15'-0" | | 9" | | | | | 6'-15' [15'-0"] | | | |

[ ] INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 1 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 30')

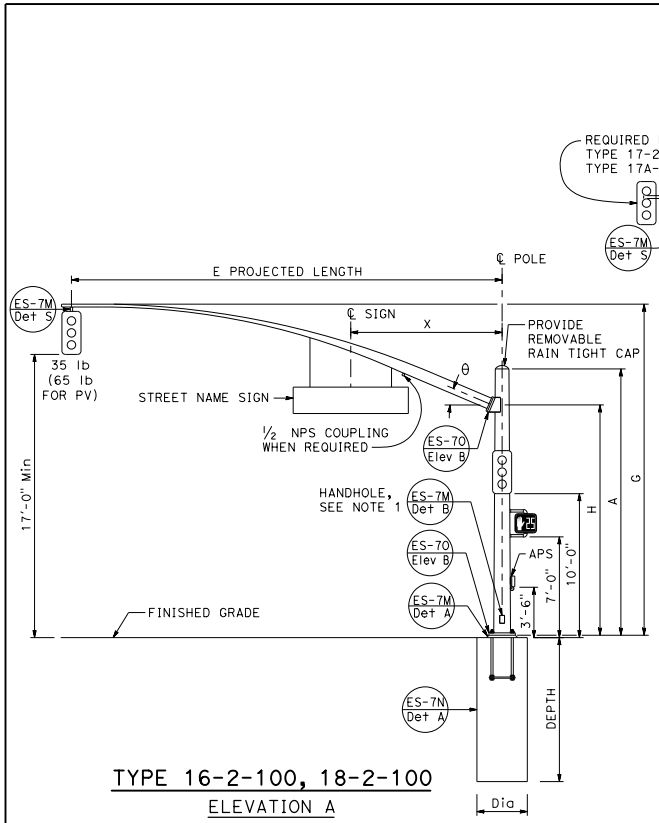
NO SCALE

ES-7C

2025 STANDARD PLAN ES-7C

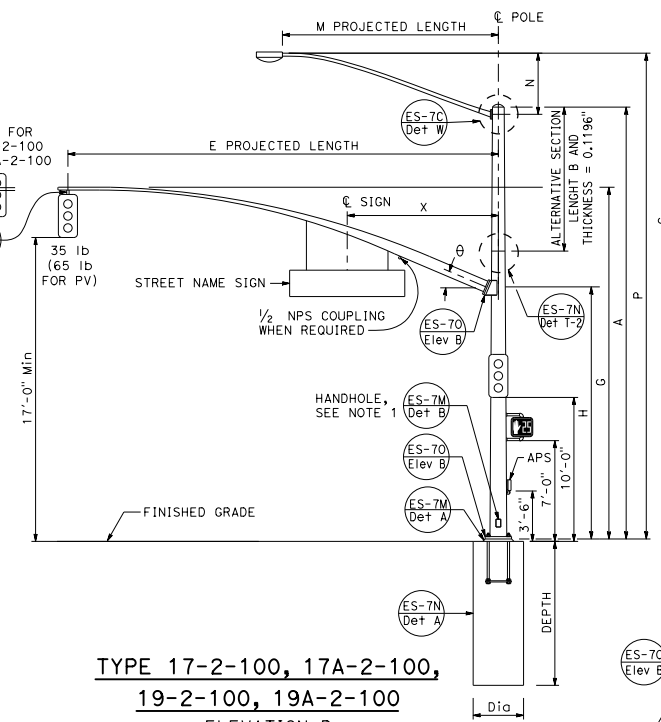
7-1-25

Return to Table of Contents




TYPE 16-2-100, 18-2-100

ELEVATION A

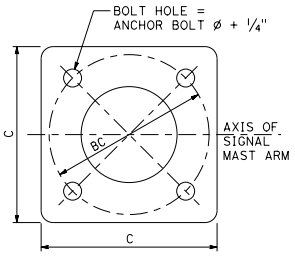



TYPE 17-2-100, 17A-2-100,
19-2-100, 19A-2-100

ELEVATION B

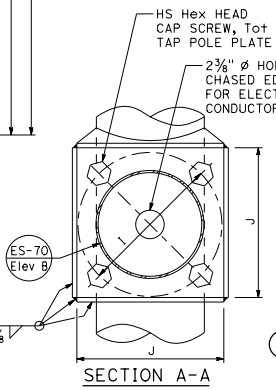
NOTE:

1. Handhole shall be located on the downstream side of traffic.

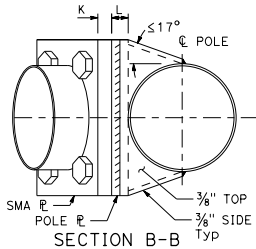



BASE PLATE

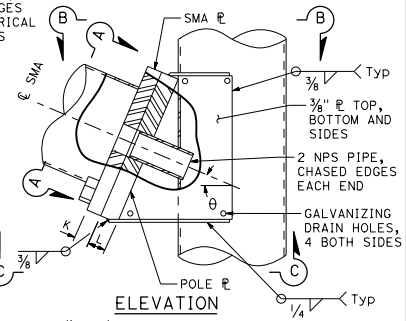
DETAIL B



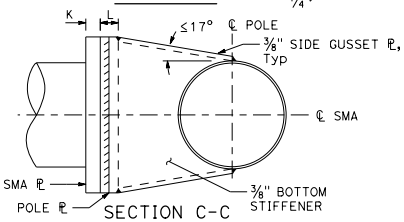

SECTION A-A




SECTION B-B




ELEVATION




SECTION C-C

SIGNAL MAST ARM CONNECTION

DETAIL A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**SIGNAL MAST ARM DATA**

| E PROJECTED LENGTH | G MOUNTING HEIGHT | H | Min OD AT POLE | THICKNESS | I BOLT CIRCLE | HS CAP SCREWS | J PLATE SIZE | K MAST ARM ℄ THICKNESS | L POLE ℄ THICKNESS | θ | X Max |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15'-0" | 21'-8"± | 17'-6" | 7⅜" | 0.1793" | 12" | 1¼"-7NC-3" | 1'-1" | 1¼" | 1½" | 23° | 10'-6" |
| 20'-0" | | | 8" | | | | | | | | |
| 25'-0" | 22'-8"± | 16'-0" | 9" | 0.2391" | | | 1'-3" | | | | |
| 30'-0" | 23'-0"± | | 10" | | | | | | | | |

**LUMINAIRE MAST ARM DATA**

| M PROJECTED LENGTH | N RISE | Min OD AT POLE | THICKNESS | P MOUNTING HEIGHT 30'-0" POLE | P MOUNTING HEIGHT 35'-0" POLE |
|---|---|---|---|---|---|
| 6'-0" | 2'-0"± | 3¼" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3½" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3⅞" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4¼" | | 34'-3"± | 39'-3"± |

| POLE TYPE | LOAD CASE | WIND VELOCITY (mph) | POLE DATA A HEIGHT | Min OD BASE | Min OD TOP | THICKNESS | ALTERNATIVE SECTION B LENGTH | ALTERNATIVE SECTION BOTTOM | ALTERNATIVE SECTION TOP | BASE PLATE DATA C | BC | THICKNESS | ANCHOR BOLT SIZE | LUMINAIRE MAST ARM | SIGNAL MAST ARM | CIDH PILE FOUNDATION Dia | CIDH PILE FOUNDATION DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16-2-100 | 2 | 100 | 18'-6" | 14" | 11⅜" | 0.2391" OR 0.25" | | | | 1'-10" | 1'-8" | 2½" | 2" ø x 42" | NONE | 15'-0", [20'-0"] | 3'-6" | 10'-0" |
| 17-2-100 | | | 30'-0" | | 9¾" | | 10'-0" | 11⅛" | 9¾" | | | | | 6'-15' [12'-0"] | | | |
| 17A-2-100 | | | 35'-0" | | 9" | | 15'-0" | | 9" | | | | | 6'-15' [15'-0"] | | | |
| 18-2-100 | | | 17'-0" | | 11⅝" | | | | | | | | | NONE | | | |
| 19-2-100 | | | 30'-0" | | 9¾" | | 10'-0" | 11⅛" | 9¾" | | | | | 6'-15' [12'-0"] | 25'-0", [30'-0"] | | |
| 19A-2-100 | | | 35'-0" | 16" | 11" | | 15'-0" | 13⅛" | 11" | 1'-11" | 1'-9" | 3" | 2¼" ø x 42" | 6'-15' [15'-0"] | | | 12'-0" |

[ ] INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 2 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 30')

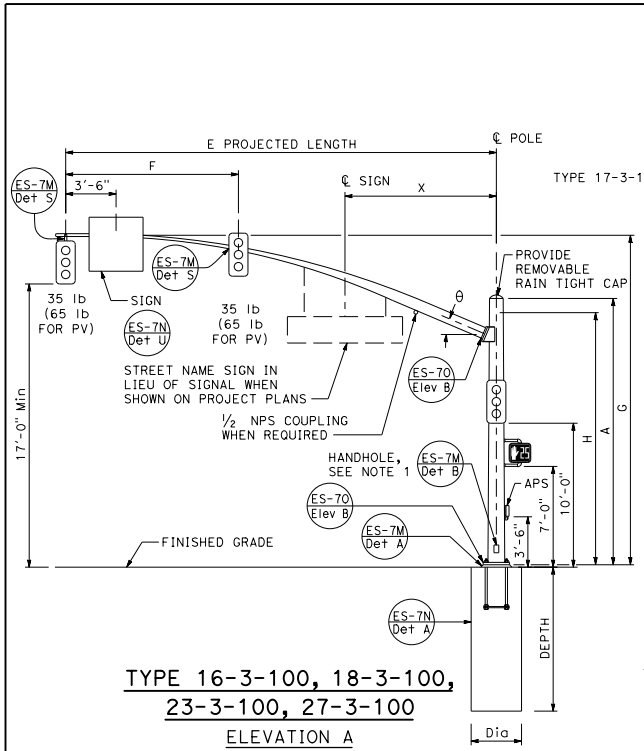
NO SCALE

ES-7D

2025 STANDARD PLAN ES-7D

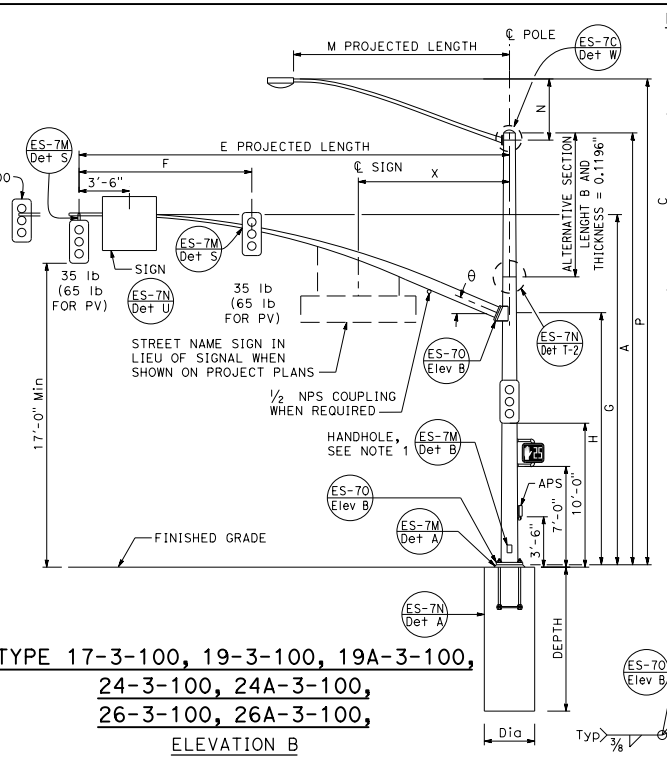
7-1-25

Return to Table of Contents




TYPE 16-3-100, 18-3-100, 23-3-100, 27-3-100

ELEVATION A

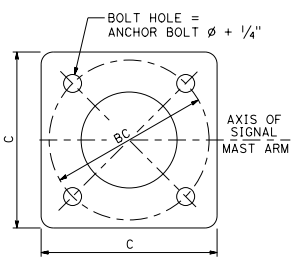



TYPE 17-3-100, 19-3-100, 19A-3-100, 24-3-100, 24A-3-100, 26-3-100, 26A-3-100,

ELEVATION B

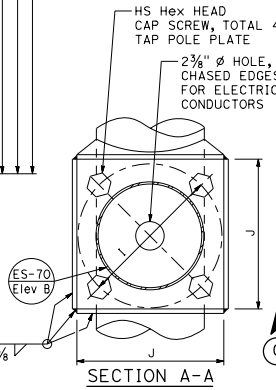
NOTE:

1. Handhole shall be located on the downstream side of traffic.

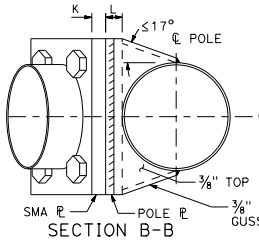



BASE PLATE

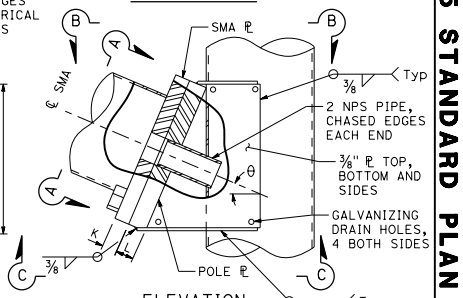
DETAIL B



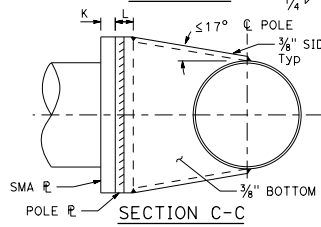

SECTION A-A




SECTION B-B




ELEVATION




SECTION C-C

SIGNAL MAST ARM CONNECTION

DETAIL A

**SIGNAL MAST ARM DATA**

| E PROJECTED LENGTH | F Min SPACING | G MOUNTING HEIGHT | H | Min OD AT POLE | THICKNESS | I BOLT CIRCLE | HS CAP SCREWS | J PLATE SIZE | K MAST ARM ℄ THICKNESS | L POLE ℄ THICKNESS | θ | X Max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15'-0" | 8'-0" | 21'-8"± | 17'-6" | 7⅜" | 0.1793" | 12" | 1¼"-7NC-3" | 1'-3" | 1¼" | 1½" | 23° | - |
| 20'-0" | | 21'-8"± | | 7⅜" | | | | | | | | 10'-6" |
| 25'-0" | 12'-0" | 22'-8"± | | 7⅜" | | | | | | | | |
| 30'-0" | | | | 8" | | | | | | | | |
| 35'-0" | 14'-0" | 23'-0"± | 16'-0" | 8¾" | 0.2391" | 13" | | | 1½" | 1¾" | 21° | 13'-0" |
| 40'-0" | 15'-0" | | | 9⅜" | | | | | | | 15° | |
| 45'-0" | | 23'-8"± | | 10 1/16" | | | | 1'-5" | | | | |

**LUMINAIRE MAST ARM DATA**

| M PROJECTED LENGTH | N RISE | Min OD AT POLE | THICKNESS | P MOUNTING HEIGHT 30'-0" POLE | P MOUNTING HEIGHT 35'-0" POLE |
|---|---|---|---|---|---|
| 6'-0" | 2'-0"± | 3¼" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3½" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3⅞" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4¼" | | 34'-3"± | 39'-3"± |

**POLE DATA / BASE PLATE DATA / CIDH PILE FOUNDATION**

| POLE TYPE | LOAD CASE | WIND VELOCITY (mph) | A HEIGHT | Min OD BASE | Min OD TOP | THICKNESS | ALTERNATIVE SECTION B LENGTH | ALTERNATIVE SECTION BOTTOM | ALTERNATIVE SECTION TOP | C | BC | THICKNESS | ANCHOR BOLT SIZE | LUMINAIRE MAST ARM | SIGNAL MAST ARM | CIDH PILE FOUNDATION Dia | CIDH PILE FOUNDATION DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16-3-100 | 3 | 100 | 18'-6" | 16" | 13⅜" | 0.2391" OR 0.25" | | | | 1'-11" | 1'-9" | 3" | 2¼" ø x 42" | NONE | 15'-0", [20'-0"] | 3'-6" | 12'-0" |
| 17-3-100 | | | 30'-0" | | 11¾" | | 10'-0" | 13⅛" | 11¾" | | | | | 6'-15' [12'-0"] | | | |
| 18-3-100 | | | 17'-0" | | 13⅝" | | | | | | | | | NONE | 25'-0", [30'-0"] | | |
| 19-3-100 | | | 30'-0" | | 11¾" | | 10'-0" | 13⅛" | 11¾" | | | | | 6'-15' [12'-0"] | | | |
| 19A-3-100 | | | 35'-0" | | 11" | 0.3125" | 15'-0" | | 11" | | | | | 6'-15' [15'-0"] | | | |
| 23-3-100 | | | 17'-0" | | 13⅝" | 0.2391" OR 0.25" | | | | | | | | NONE | 35'-0" | | |
| 24-3-100 | | | 30'-0" | | 11¾" | | 10'-0" | 13⅛" | 11¾" | | | | | 6'-15' [12'-0"] | | | |
| 24A-3-100 | | | 35'-0" | | 11" | | 15'-0" | | 11" | | | | | 6'-15' [15'-0"] | | | |
| 26-3-100 | | | 30'-0" | 18" | 13¾" | 0.3125" | 10'-0" | 15⅛" | 13¾" | 2'-1" | 1'-11" | | | 6'-15' [12'-0"] | 40'-0", [45'-0"] | | 13'-0" |
| 26A-3-100 | | | 35'-0" | | 13" | | 15'-0" | | 13" | | | | | 6'-15' [15'-0"] | | | |
| 27-3-100 | | | 17'-0" | | 15⅝" | | | | | | | | | NONE | | | |

[ ] INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 3 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 45')

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

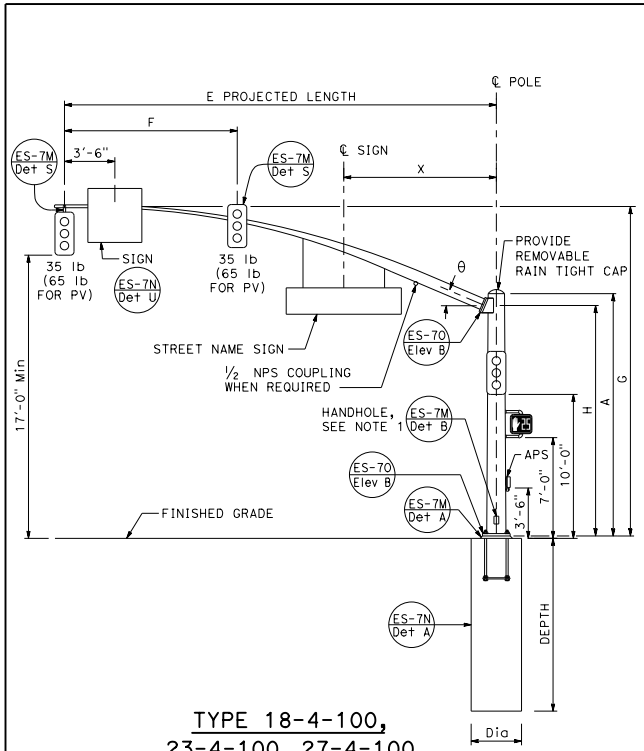
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2025 STANDARD PLAN ES-7E

ES-7E

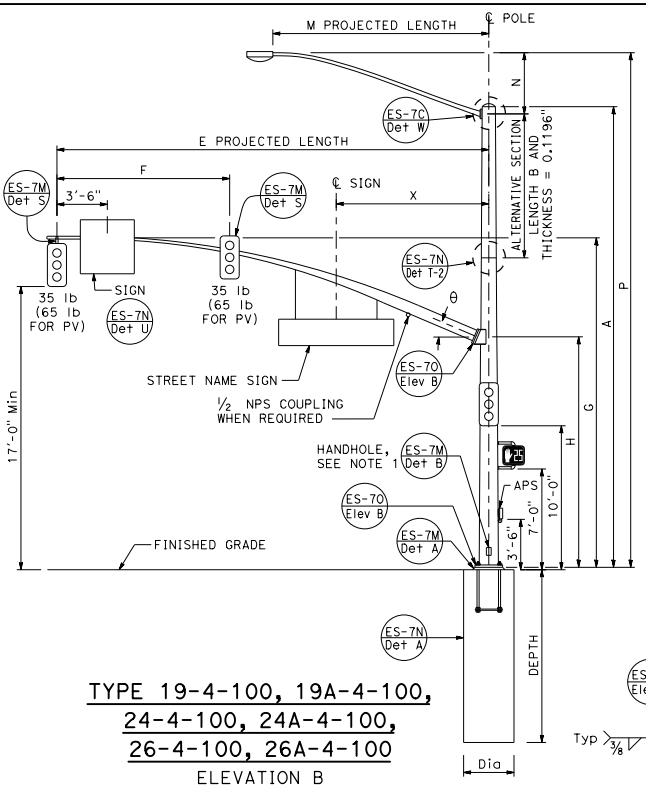
7-1-25

Return to Table of Contents




TYPE 18-4-100, 23-4-100, 27-4-100

ELEVATION A

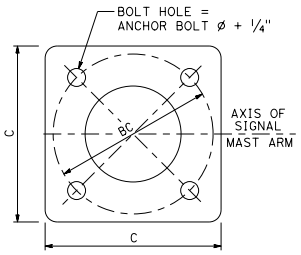



TYPE 19-4-100, 19A-4-100, 24-4-100, 24A-4-100, 26-4-100, 26A-4-100

ELEVATION B

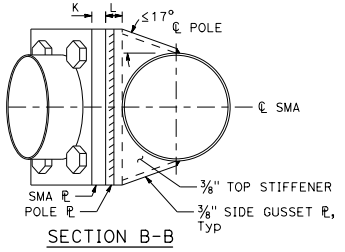
NOTE:

1. Handhole shall be located on the downstream side of traffic.

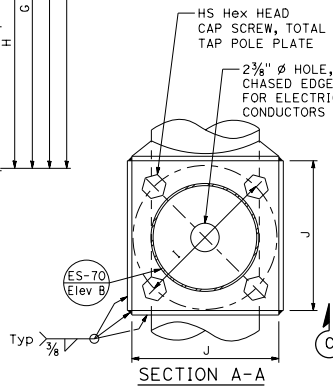



BASE PLATE

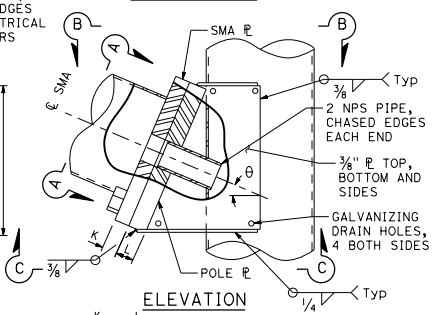
DETAIL B



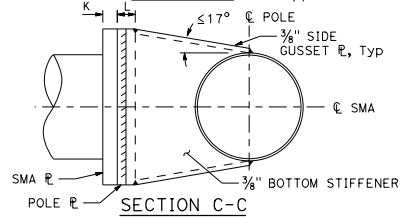

SECTION B-B




SECTION A-A




ELEVATION




SECTION C-C

SIGNAL MAST ARM CONNECTION

DETAIL A

**SIGNAL MAST ARM DATA**

| E PROJECTED LENGTH | F Min SPACING | G MOUNTING HEIGHT | H | Min OD AT POLE | THICKNESS | I BOLT CIRCLE | HS CAP SCREWS | J PLATE SIZE | K MAST ARM ℄ THICKNESS | L POLE ℄ THICKNESS | θ | X Max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25'-0" | 10'-0" | 22'-8"± | 16'-0" | 7⅜" | 0.2391" | 12" | 1¼"-7NC-3" | 1'-3" | 1¼" | 1½" | 23° | 10'-6" |
| 30'-0" | 12'-0" | 23'-0"± | | 8" | | 13½" | | | 1½" | 1¾" | 21° | 13'-0" |
| 35'-0" | 14'-0" | | | 8⅛" | | | | | | | | |
| 40'-0" | 15'-0" | | | 9⅜" | | | | 1'-5" | | | 15° | |
| 45'-0" | | 23'-8"± | | 10¼" | | | | | | | | |

**LUMINAIRE MAST ARM DATA**

| M PROJECTED LENGTH | N RISE | Min OD AT POLE | THICKNESS | P MOUNTING HEIGHT 30'-0" POLE | P MOUNTING HEIGHT 35'-0" POLE |
|---|---|---|---|---|---|
| 6'-0" | 2'-0"± | 3¼" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3½" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3⅞" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4¼" | | 34'-3"± | 39'-3"± |

| POLE TYPE | LOAD CASE | WIND VELOCITY (mph) | POLE DATA A HEIGHT | POLE DATA Min OD BASE | POLE DATA Min OD TOP | POLE DATA THICKNESS | POLE DATA ALTERNATIVE SECTION B LENGTH | POLE DATA ALTERNATIVE SECTION BOTTOM | POLE DATA ALTERNATIVE SECTION TOP | BASE PLATE DATA C | BASE PLATE DATA BC | BASE PLATE DATA THICKNESS | BASE PLATE DATA ANCHOR BOLT SIZE | LUMINAIRE MAST ARM | SIGNAL MAST ARM | CIDH PILE FOUNDATION Dia | CIDH PILE FOUNDATION DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18-4-100 | 4 | 100 | 17'-0" | 16" | 13⅝" | 0.2391" OR 0.25" | | | | 1'-11" | 1'-9" | 3" | 2¼" ø x 42" | NONE | 25'-0", [30'-0"] | 3'-6" | 12'-0" |
| 19-4-100 | | | 30'-0" | | 11¼" | | 10'-0" | 13⅛" | 11¼" | | | | | 6'-15' [12'-0"] | | | |
| 19A-4-100 | | | 35'-0" | | 11" | | 15'-0' | 13⅛" | 11" | | | | | 6'-15' [15'-0"] | | | |
| 23-4-100 | | | 17'-0" | | 13⅝" | 0.3125" | | | | | | | | NONE | 35'-0" | | |
| 24-4-100 | | | 30'-0" | | 11¾" | | 10'-0" | 15⅛" | 13¾" | | | | | 6'-15' [12'-0"] | | | |
| 24A-4-100 | | | 35'-0" | | 11" | | 15'-0" | 13⅛" | 11" | | | | | 6'-15' [15'-0"] | | | |
| 26-4-100 | | | 30'-0" | 18" | 13¾" | | 10'-0" | 15⅛" | 13¾" | 2'-1" | 1'-11" | | | 6'-15' [12'-0"] | 40'-0", [45'-0"] | | 13'-0" |
| 26A-4-100 | | | 35'-0" | | 13" | | 15'-0" | 15⅛" | 13" | | | | | 6'-15' [15'-0"] | | | |
| 27-4-100 | | | 17'-0" | | 15⅝" | | | | | | | | | NONE | | | |

[ ] INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

September 19, 2025

PLANS APPROVAL DATE

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 4 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 25' TO 45')

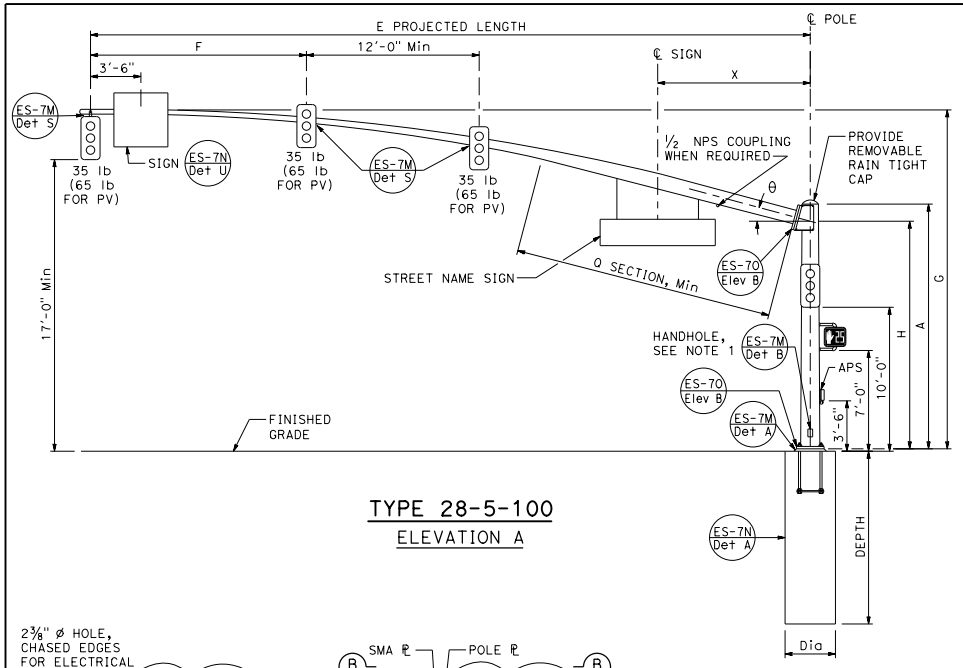
NO SCALE

**ES-7F**

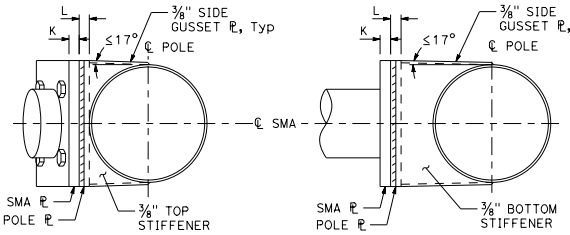
7-1-25



Return to Table of Contents



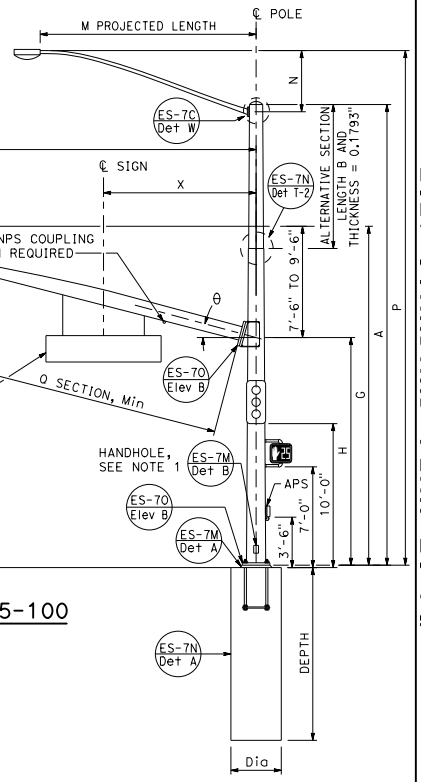

TYPE 28-5-100
ELEVATION A



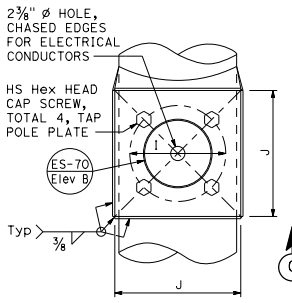

SECTION B-B

SECTION C-C

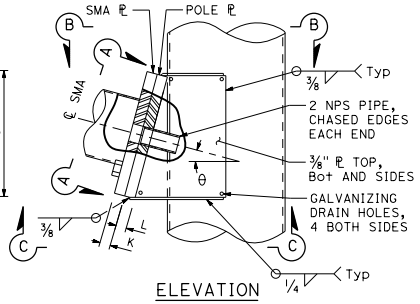
NOTE:
1. Handhole shall be located on the downstream side of traffic.




TYPE 29-5-100, 29A-5-100
ELEVATION B

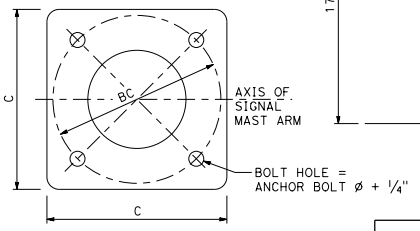



SECTION A-A




ELEVATION

SIGNAL MAST ARM CONNECTION
DETAIL A




BASE PLATE
DETAIL B

**LUMINAIRE MAST ARM DATA**

| M PROJECTED LENGTH | N RISE | Min OD AT POLE | THICKNESS | P MOUNTING HEIGHT | |
|---|---|---|---|---|---|
| | | | | 30'-0" POLE | 35'-0" POLE |
| 6'-0" | 2'-0"± | 3¼" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3½" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3⅞" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4¼" | | 34'-3"± | 39'-3"± |

**SIGNAL MAST ARM DATA**

| E PROJECTED LENGTH | F Min SPACING | G MOUNTING HEIGHT | H | Min OD AT POLE | THICKNESS | I BOLT CIRCLE | HS CAP SCREWS | J PLATE SIZE | K MAST ARM ℙ THICKNESS | L POLE ℙ THICKNESS | θ | Q SECTION | | X Max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | LENGTH | THICKNESS | |
| 50'-0" | 15'-0" | 23'-7"± TO 25'-7"± | 16'-0" | 11 7/16" | 0.1793" | 16" | 1½"-6NC-3¼" | 1'-9" | 1¾" | 1¾" | 15° | 18'-0" | 0.2391" | 14'-0" |
| 55'-0" | | | | 1'-1¼" | | | | | | | | 23'-0" | | |

**POLE DATA**

| POLE TYPE | LOAD CASE | WIND VELOCITY (mph) | A HEIGHT | Min OD BASE | Min OD TOP | THICKNESS | ALTERNATIVE SECTION B LENGTH | ALTERNATIVE SECTION BOTTOM | ALTERNATIVE SECTION TOP |
|---|---|---|---|---|---|---|---|---|---|
| 28-5-100 | 5 | 100 | 17'-0" | 22" | 19 5/8" | 0.375" | 10'-0" | 19⅛" | 17¾" |
| 29-5-100 | | | 30'-0" | | 17¾" | | | | |
| 29A-5-100 | | | 35'-0" | | 17" | | 15'-0" | | 17" |

**BASE PLATE DATA**

| C | BC | THICKNESS | ANCHOR BOLT SIZE |
|---|---|---|---|
| 2'-6" | 2'-4" | 3" | 2¼" ø x 42" |

| LUMINAIRE MAST ARM | SIGNAL MAST ARM |
|---|---|
| NONE | 50'-0", [55'-0"] |
| 6'-15' [15'-0"] | |

**CIDH PILE FOUNDATION**

| Dia | DEPTH |
|---|---|
| 4'-0" | 14'-0" |

[ ] INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 5 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 50' TO 55')

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

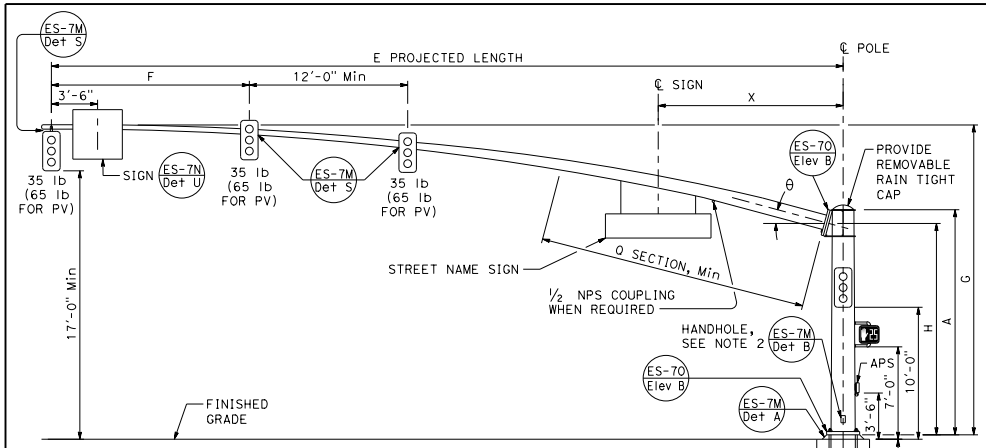
REGISTERED CIVIL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.
REGISTERED PROFESSIONAL ENGINEER Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL STATE OF CALIFORNIA

ES-7G

7-1-25

2025 STANDARD PLAN ES-7G

Return to Table of Contents

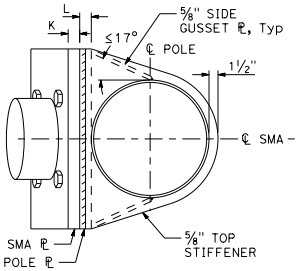



TYPE 60-5-100

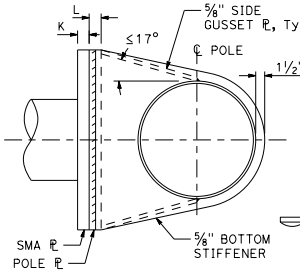
ELEVATION A

NOTES:

1. The radial separation between the face of the pole and the adjacent insides of the top and bottom gusset plates shall not exceed 3/16". Fillet weld size to be increased by amount of gap.
2. Handhole shall be located on the downstream side of traffic.




SECTION D-D




SECTION E-E




SECTION F-F

ELEVATION

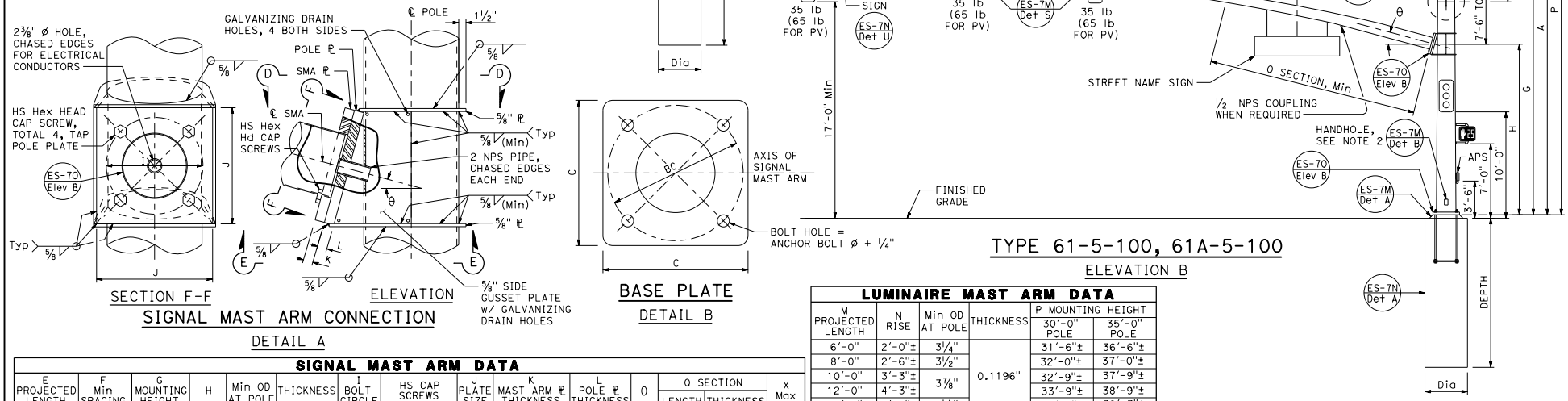
SIGNAL MAST ARM CONNECTION

DETAIL A



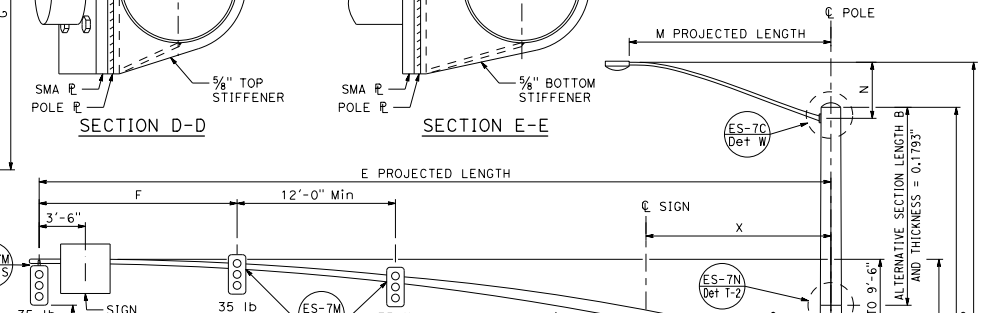

BASE PLATE

DETAIL B




TYPE 61-5-100, 61A-5-100

ELEVATION B




**LUMINAIRE MAST ARM DATA**

| M PROJECTED LENGTH | N RISE | Min OD AT POLE | THICKNESS | P MOUNTING HEIGHT 30'-0" POLE | P MOUNTING HEIGHT 35'-0" POLE |
|---|---|---|---|---|---|
| 6'-0" | 2'-0"± | 3¼" | 0.1196" | 31'-6"± | 36'-6"± |
| 8'-0" | 2'-6"± | 3½" | | 32'-0"± | 37'-0"± |
| 10'-0" | 3'-3"± | 3⅞" | | 32'-9"± | 37'-9"± |
| 12'-0" | 4'-3"± | | | 33'-9"± | 38'-9"± |
| 15'-0" | 4'-9"± | 4¼" | | 34'-3"± | 39'-3"± |

**SIGNAL MAST ARM DATA**

| E PROJECTED LENGTH | F Min SPACING | G MOUNTING HEIGHT | H | Min OD AT POLE | THICKNESS | I BOLT CIRCLE | HS CAP SCREWS | J PLATE SIZE | K MAST ARM ℙ THICKNESS | L POLE ℙ THICKNESS | θ | Q SECTION LENGTH | Q SECTION THICKNESS | X Max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60'-0" | 15'-0" | 23'-7" TO 25'-7" | 16'-0" | 1'-1½" | 0.1793" | 20" | 1½"-6NC-4" | 2'-0" | 2" | 2" | 15° | 24'-0" | 0.2391" | 14'-0" |
| 65'-0" | | | | | 0.2391" | | | | | | | 29'-0" | 0.3125" | |

| POLE TYPE | LOAD CASE | WIND VELOCITY (mph) | POLE DATA A HEIGHT | Min OD BASE | Min OD TOP | THICKNESS | ALTERNATIVE SECTION B LENGTH | ALTERNATIVE SECTION BOTTOM | ALTERNATIVE SECTION TOP | BASE PLATE DATA C | BC | THICKNESS | ANCHOR BOLT SIZE | LUMINAIRE MAST ARM | SIGNAL MAST ARM | CIDH PILE FOUNDATION Dia | CIDH PILE FOUNDATION DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60-5-100 | 5 | 100 | 17'-0" | 22" | 19⅝" | 0.375" | | | | 2'-6" | 2'-4" | 3" | 2¼" ø x 42" | NONE | 60'-0", [65'-0"] | 4'-0" | 14'-0" |
| 61-5-100 | | | 30'-0" | 25" | 20¾" | | 10'-0" | 22⅛" | 20¾" | 2'-11" | 2'-9" | | 3" ø x 60" | 6'-15' [15'-0"] | | 4'-6" | 15'-0" |
| 61A-5-100 | | | 35'-0" | | 20" | | 15'-0" | | 20" | | | | | | | | |

[ ] INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025

PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 5 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 60' TO 65')

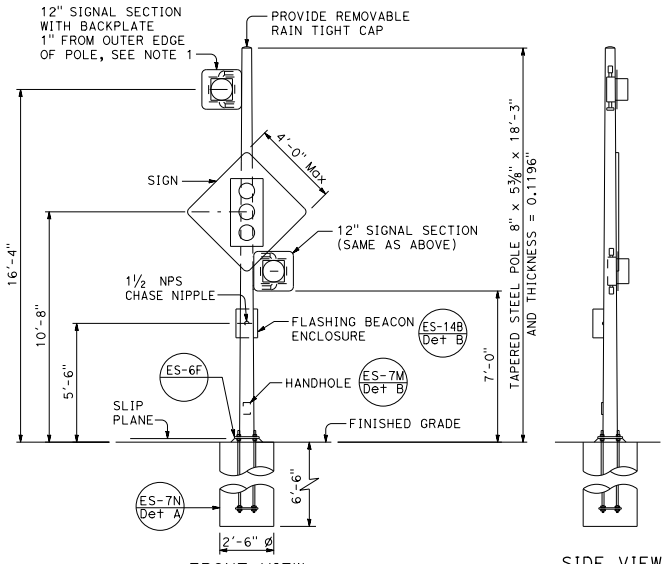
NO SCALE

ES-7H

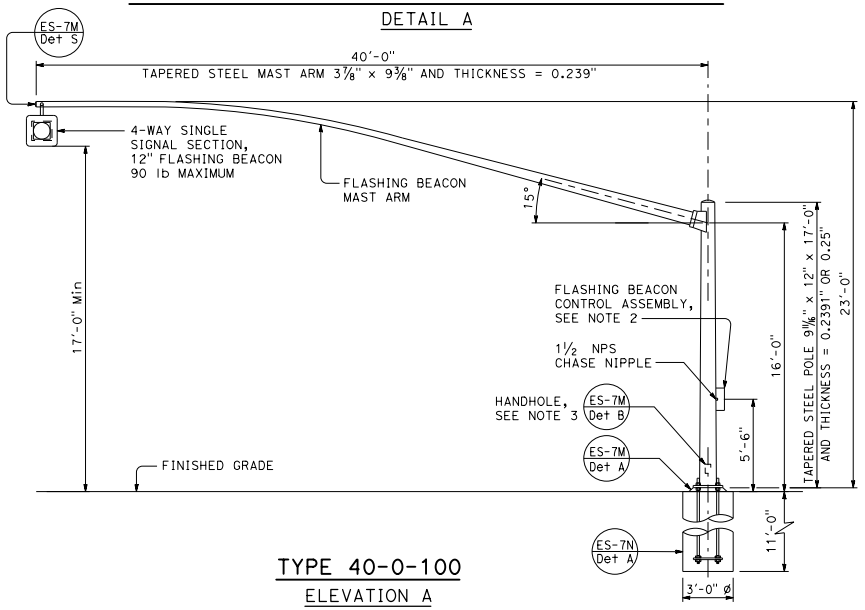
2025 STANDARD PLAN ES-7H

7-1-25

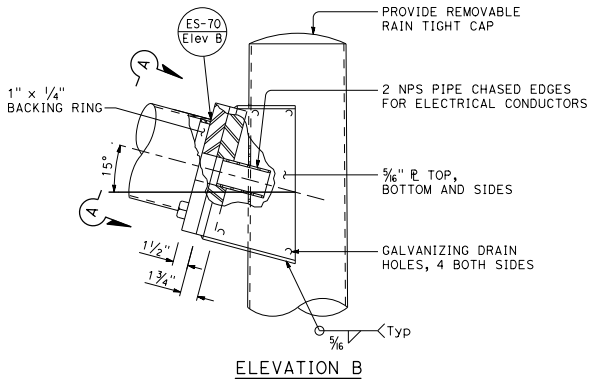
Return to Table of Contents



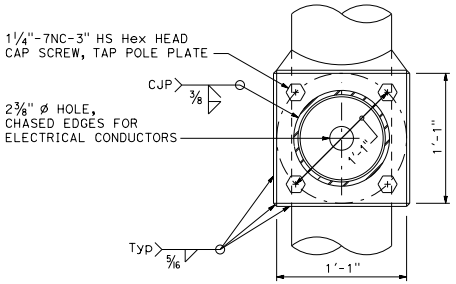

## TYPE 15-FBS
## FLASHING BEACON WITH SLIP BASE INSTALLATION
DETAIL A




## TYPE 40-0-100
ELEVATION A

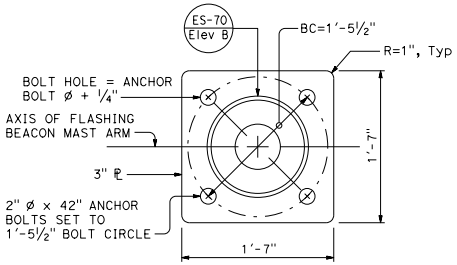



ELEVATION B




VIEW A-A

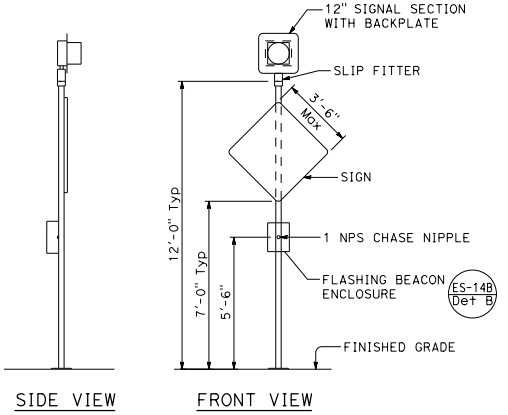
## FLASHING BEACON MAST ARM CONNECTION DETAIL
DETAIL B




## BASE PLATE
DETAIL C

NOTES:

1. See Standard Plans ES-4A and ES-4D for attachment fitting details.
2. For Type 15-FBS fixed base, use Type 15 base plate and foundation shown on Standard Plan ES-6A.
3. Handholes shall be located on the downstream side of traffic.




## TYPE 1
## FLASHING BEACON INSTALLATION
DETAIL D

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (FLASHING BEACON ON A TYPE 1, TYPE 15-FBS, AND TYPE 40 STANDARD)

NO SCALE

ES-7J

7-1-25

2025 STANDARD PLAN ES-7J

Return to Table of Contents

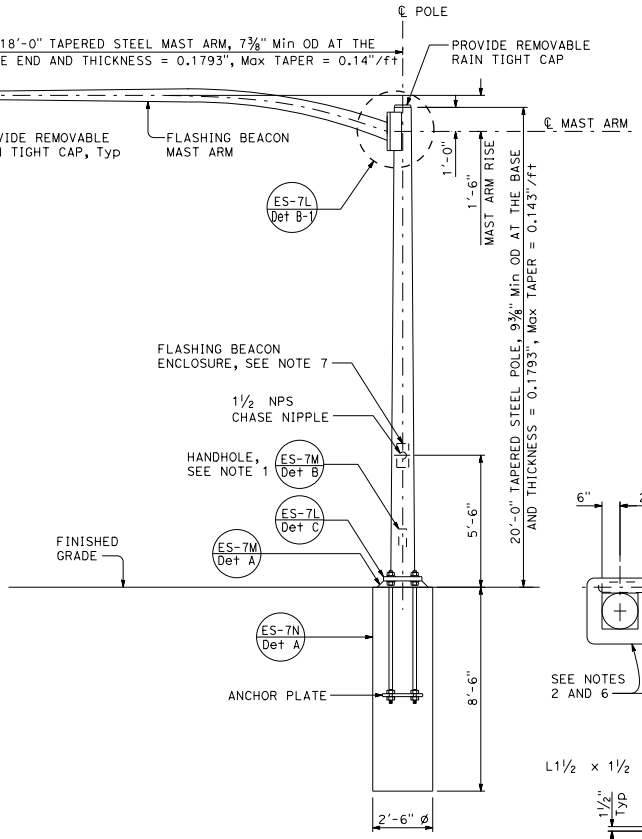
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

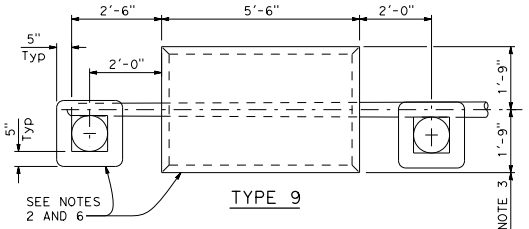
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

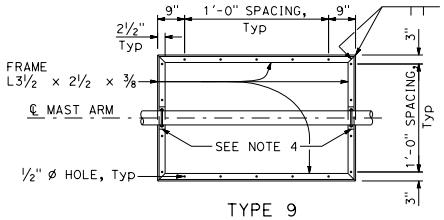
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ELEVATION A



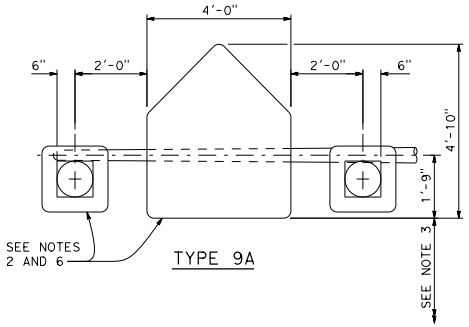

TYPE 9



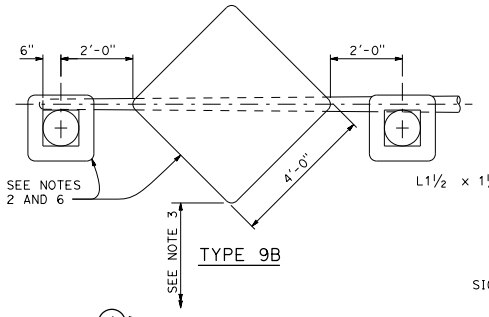

TYPE 9

NOTES:

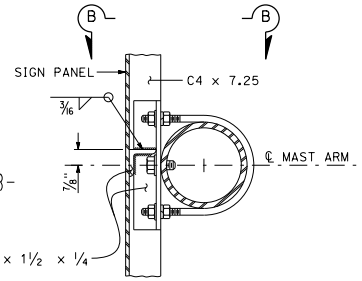
1. Handhole shall be located on the downstream side of traffic.
2. Install flashing beacons and sign frame. Flashing beacons shall be MAT mounted on pipe tenon, see Standard Plan ES-7M, Detail S.
3. Vertical clearance shall be 17'-0" minimum between roadway and bottom of signal panel.
4. See Standard Plan ES-7L, Detail B, for sign frame mounting details.
5. For additional notes and details, see Standard Plan ES-7L, Detail B-3.
6. 12" flashing beacon with signal indication, standard visor and 5" x 5" backplate, total 2.
7. Locate flashing beacon enclosure on the side of the pole away from traffic. For wiring diagram, see Standard Plan ES-14B.



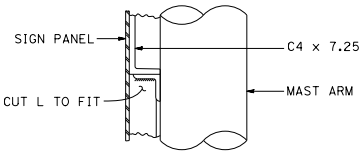

TYPE 9A




TYPE 9B

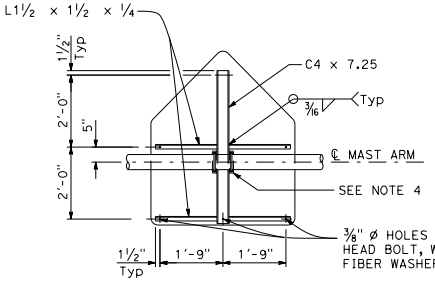



SECTION A-A

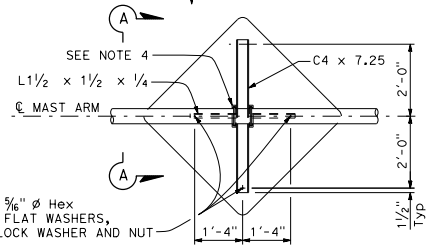



SECTION B-B

TYPE 9B
DETAIL B




TYPE 9A




TYPE 9B

FRAME DETAILS
DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (FLASHING BEACON WITH TYPE 9, 9A, AND 9B SIGN)

NO SCALE

ES-7K

7-1-25

Return to Table of Contents

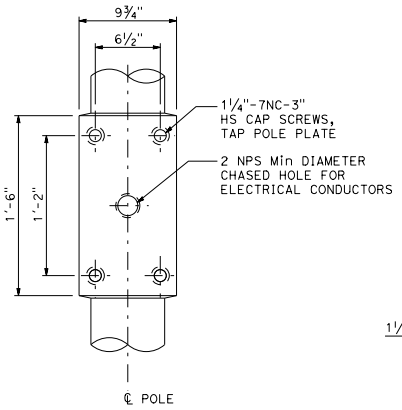
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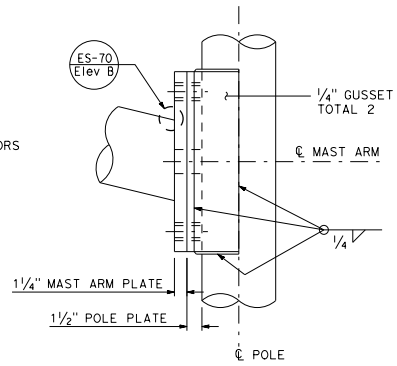
REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

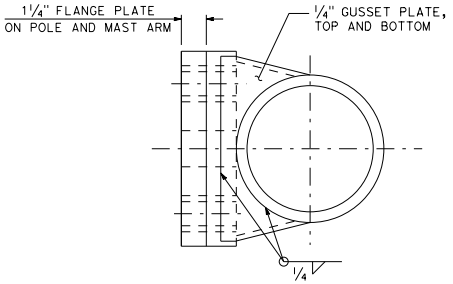
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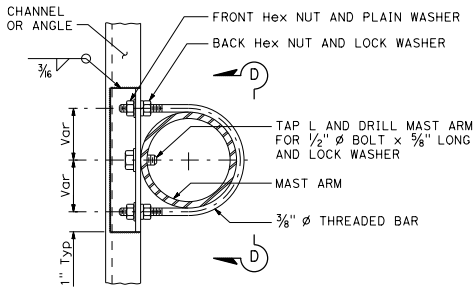




## FLASHING BEACON MAST ARM CONNECTION DETAILS

DETAIL B-1




DETAIL B-2



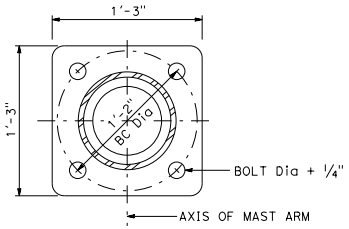

DETAIL B-3

NOTE:
Tighten front Hex nuts first, then tighten back Hex nuts.

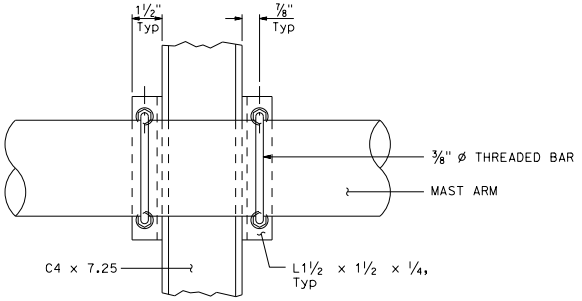
## SIGN FRAME MOUNTING DETAILS

All types

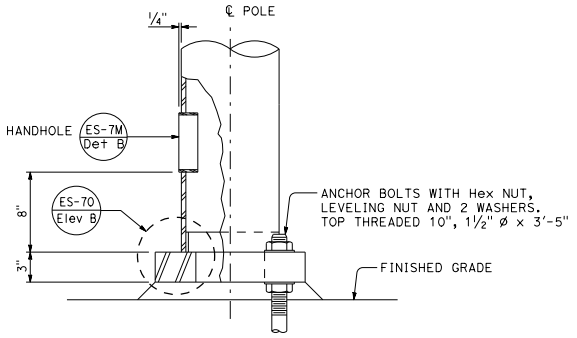
DETAIL B




PLAN




VIEW D-D




ELEVATION

## BASE PLATE AND ANCHORAGE DETAIL

DETAIL C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (FLASHING BEACON WITH TYPE 9, 9A, AND 9B SIGN)

NO SCALE

**ES-7L**

7-1-25

2025 STANDARD PLAN ES-7L

Return to Table of Contents

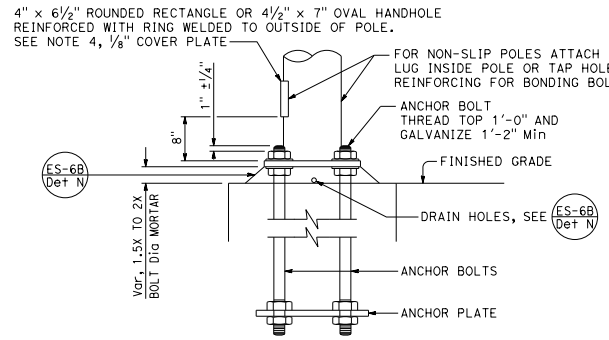
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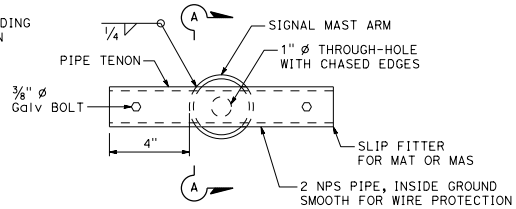
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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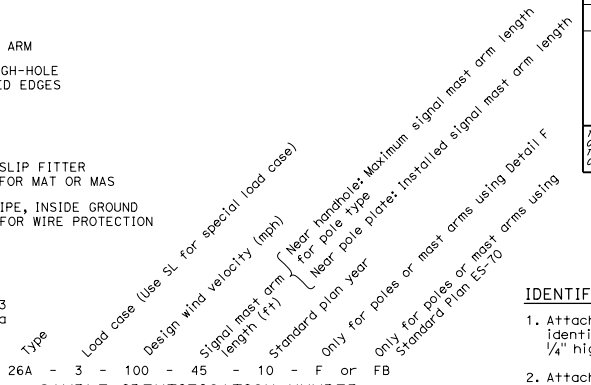



## HANDHOLE AND ANCHORAGE
DETAIL A




## DOUBLE SIDE TENON
DETAIL S-2

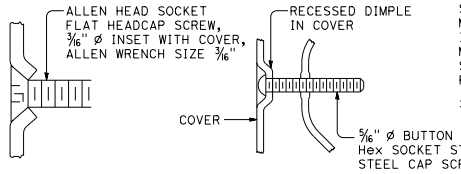
Second side limited to 15 lb and 1.3 square feet effective pressure area




## SAMPLE IDENTIFICATION NUMBER

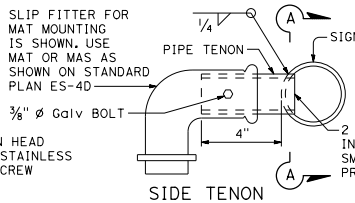
### IDENTIFICATION NUMBER

1. Attach a stamped metal tag with pole's identification number above the handhole. ¼" high number, minimum.
2. Attach a stamped metal tag with mast arm's identification number to the bottom of the signal mast arm near the pole plate. ¼" high number, minimum.

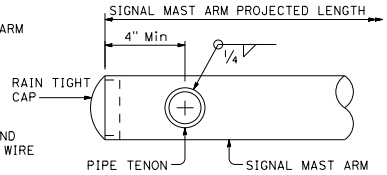



TYPICAL DETAIL
DETAIL B-1

ALTERNATIVE DETAIL
DETAIL B-2




SIDE TENON
DETAIL S-1

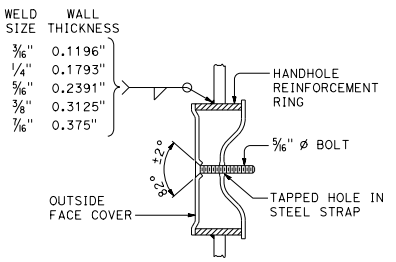



SECTION A-A

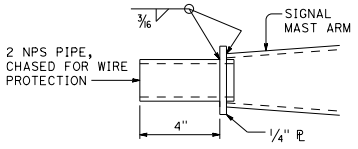
## PIPE TENONS
DETAIL S

### NOTES:

1. Provide a Hex nut, leveling nut and 2 washers for each bolt.
2. Luminaire mast arms shall be round, tapered steel tubes, taper of 0.1375" to 0.143 inch per foot with an end section 2⅜" OD for mounting hardware. Extensions of 2 NPS Standard pipe and 7" long may be used at the option of the manufacturer. When low pressure sodium luminaires are required, the extension shall be 1'-3".
3. Signal mast arms shall be round, tapered steel tubes, maximum taper 0.143 inch per foot.
4. Handhole reinforcement ring shall be ¼" x 2" for 0.1196" to 0.2391" thick poles, ⅜" x 2" for 0.3125" to 0.375" thick poles.
5. Detail F, fatigue resistant weld, is required at socket welded signal mast arm plate and pole base plate.
6. Cap screws shall be tightened by the turn-of-nut method ⅓ turn from a snug tight condition. No washer will be required.
7. Outside diameter, wall thickness, and corresponding section properties of poles and mast arms as shown in the Standard Plans are minimums. Unless otherwise specified, alternative sections shall require approval by the Engineer.
8. Design: AASHTO Standard Specifications for Structural Support for Highway Signs, Luminaires, and Traffic Signals, 6th Edition. Basic Wind Speed = 100 mph (3 seconds gust). Yearly Mean Wind Velocity = 15.6 mph.
9. Materials (Structural steel):
   fy = 55,000 psi (tapered steel tube and anchor bolts)
   fy = 50,000 psi (unless otherwise noted)
10. Materials (Reinforced concrete):
   f'c = 3,625 psi
   fy = 60,000 psi
11. End of luminaire arm may be swaged down to 2⅜" outside diameter.

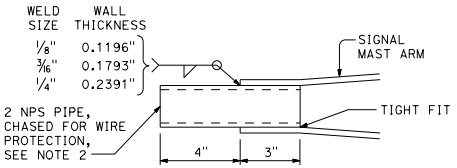



## TAMPER RESISTANT HANDHOLE COVER
DETAIL B

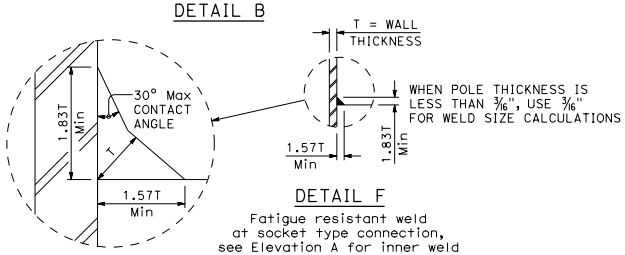



TIP TENON
DETAIL TL

This detail supersedes Detail S when so designated

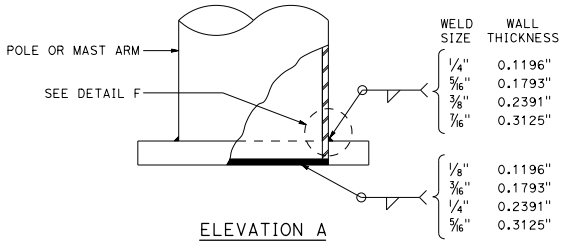



TIP TENON
DETAIL TS




DETAIL F

Fatigue resistant weld at socket type connection, see Elevation A for inner weld




ELEVATION A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, DETAILS No. 1)

NO SCALE

**ES-7M**

7-1-25

Return to Table of Contents

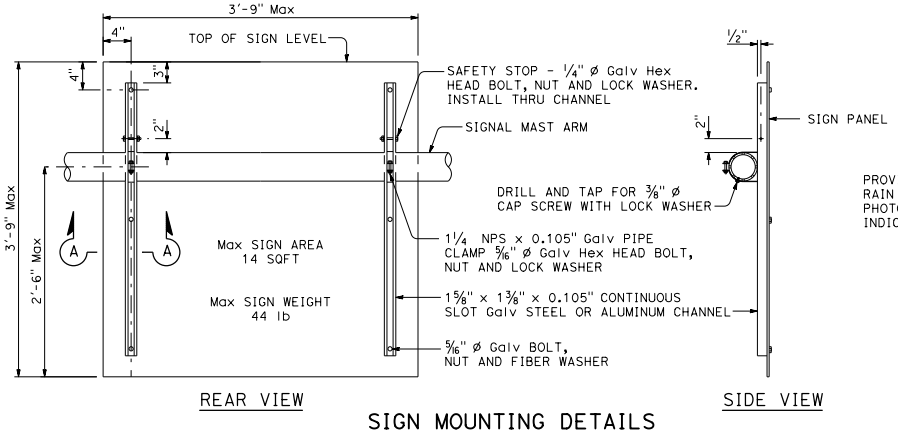
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REGISTERED CIVIL ENGINEER

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

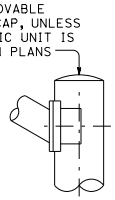
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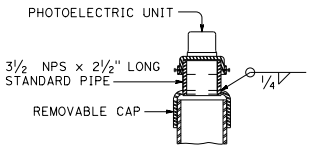

REAR VIEW

SIDE VIEW

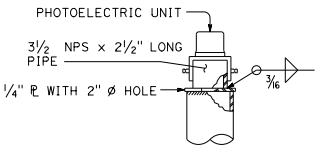
## SIGN MOUNTING DETAILS
DETAIL U



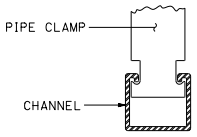

STANDARD TOP
DETAIL B-1



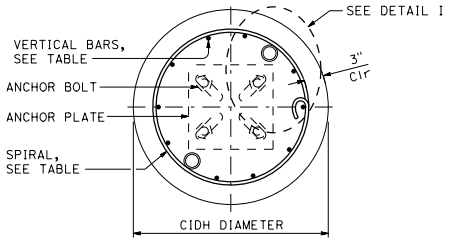

MOUNTING ADAPTER FOR PHOTOELECTRIC UNIT
DETAIL B-2




ALTERNATIVE MOUNTING ADAPTER
DETAIL B-3

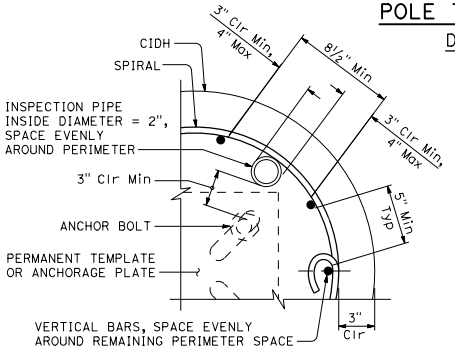



SECTION A-A

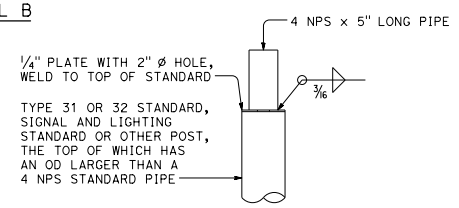



SECTION B-B

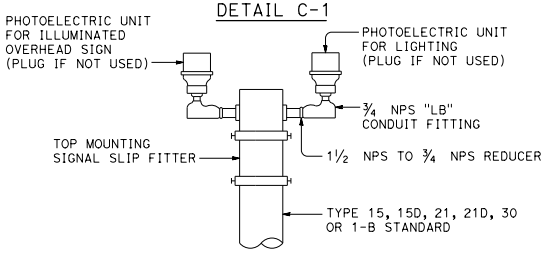
## POLE TOP DETAILS
DETAIL B




INSPECTION PIPE PLACEMENT
DETAIL I

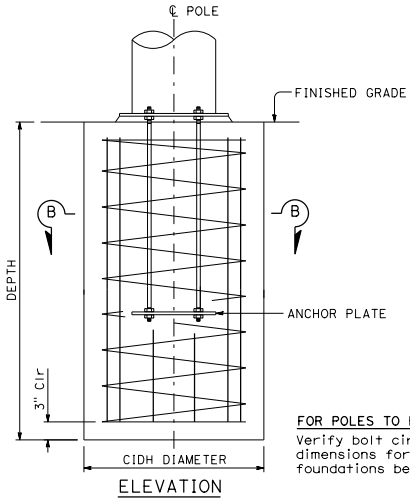



DETAIL C-1




DETAIL C-2

## DUAL PHOTOELECTRIC UNIT MOUNTING DETAIL
DETAIL C




ELEVATION

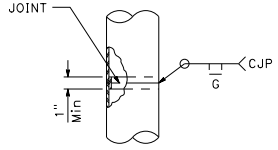
**CIDH REINFORCING AND INSPECTION PIPE SCHEDULE**

| CIDH DIAMETER | VERTICAL BARS | SPIRAL | INSPECTION PIPE |
|---|---|---|---|
| 2'-0" | 8-#5 | #4 @ 6" | 2 |
| 2'-6" | 10-#6 | #4 @ 6" | 4 * |
| 3'-0" | 12-#7 | #5 @ 6" | 4 * |
| 3'-6" | 14-#8 | #5 @ 6" | 4 |
| 4'-0" | 18-#9 | 2-#4 @ 7" | 5 |
| 4'-6" | 18-#9 | 2-#5 @ 7" | 5 |
| 5'-0" | 22-#10 | 2-#5 @ 7" | 6 |
| 6'-0" | 26-#11 | 2-#6 @ 7" | 7 |

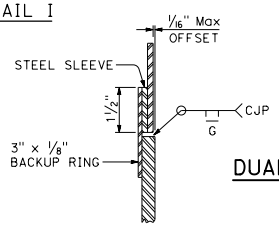
* FOR SLIP BASE VERSIONS WITH 3 ANCHOR BOLTS, USE 3 INSPECTION PIPES.

FOR POLES TO BE INSTALLED ON EXISTING FOUNDATION:
Verify bolt circles, anchor bolt sizes and dependent dimensions for poles to be installed on existing foundations before fabricating the poles.

## CAST-IN-DRILLED-HOLE PILE FOUNDATION, REINFORCED PILE
DETAIL A




FOR UNIFORM PIPE THICKNESS
DETAIL T-1




AT PIPE THICKNESS CHANGE
DETAIL T-2

## POLE SPLICES
DETAIL T

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, DETAIL No. 2)

NO SCALE

ES-7N

7-1-25

Return to Table of Contents

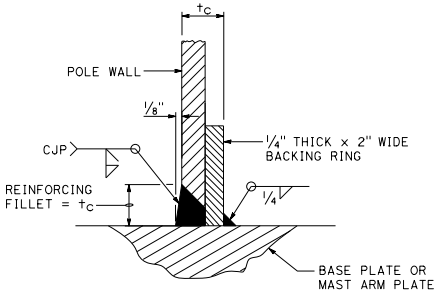
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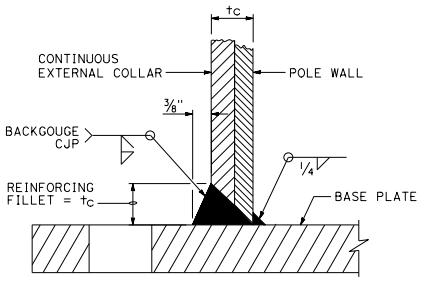
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CIVIL
STATE OF CALIFORNIA

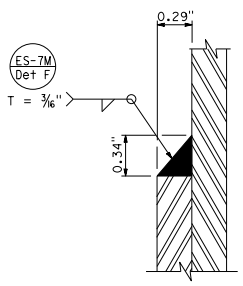
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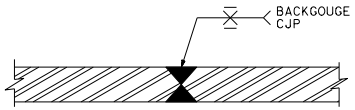

DETAIL B



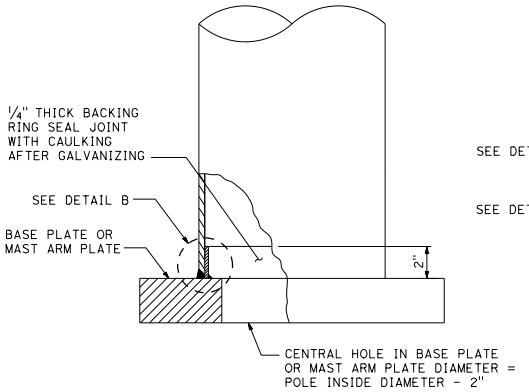

DETAIL C1



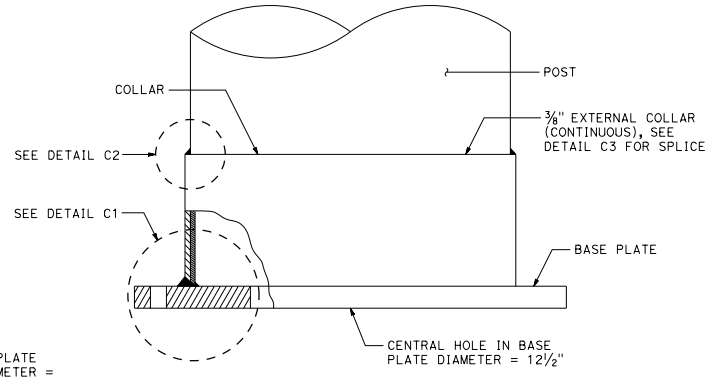

DETAIL C2




DETAIL C3

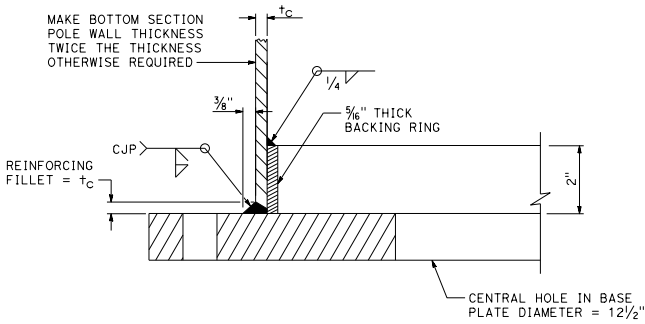



ELEVATION B




ELEVATION C

For alternative base, see Detail C4.




DETAIL C4

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, DETAIL No. 3)

NO SCALE

**ES-70**

7-1-25

2025 STANDARD PLAN ES-70



Return to Table of Contents

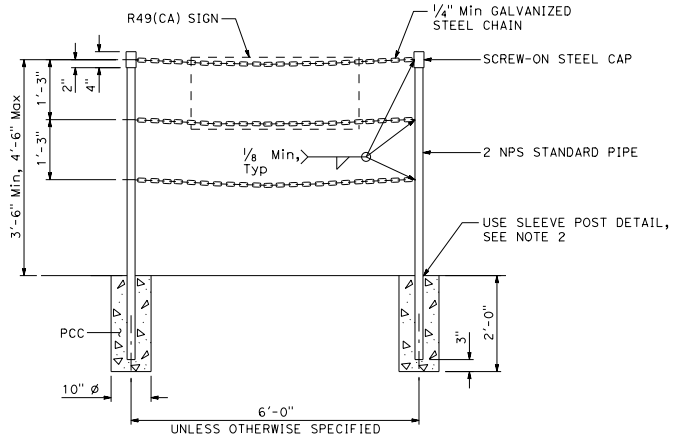
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REGISTERED CIVIL ENGINEER

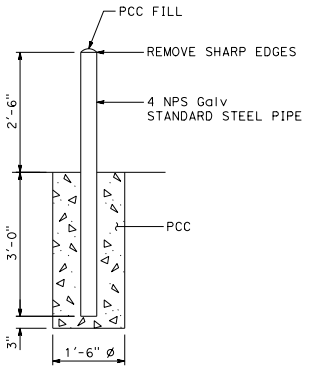
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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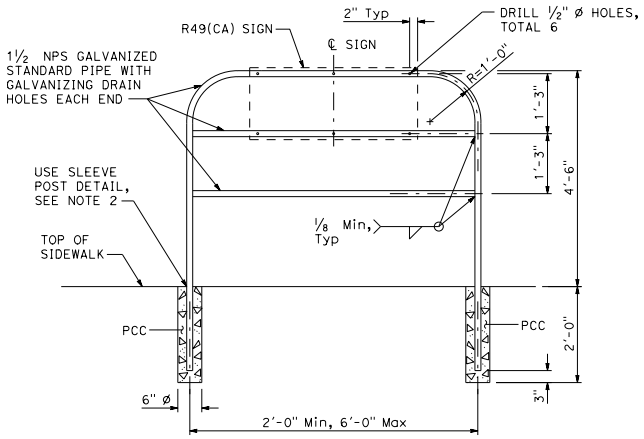

TYPE II
DETAIL A



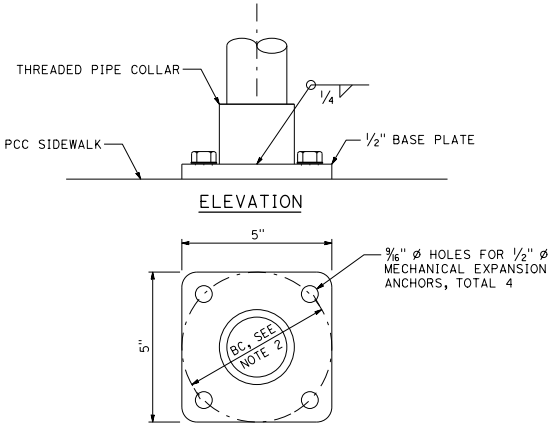

GUARD POST
DETAIL B

NOTES:

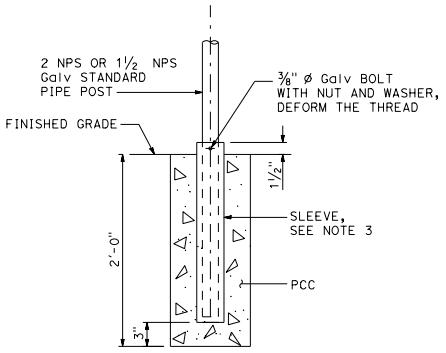
1. Pipe post to be set 1'-6" back from face of curb unless otherwise specified.
2. Where barricade posts are installed in existing concrete sidewalk, the post may be anchored to the sidewalk as shown in the Post Anchorage Detail. Bolt circle diameter shall be 4" minimum for Type I barricade and 5" minimum for Type II barricade.
3. Steel sleeve shall be constructed with an inside diameter 1/10" larger than the post's outside diameter. Wall thickness of sleeve shall be same as post or larger.
4. Alternative details may be submitted for approval by the Engineer.




TYPE I
DETAIL C




POST ANCHORAGE DETAIL
DETAIL D




SLEEVE POST DETAIL
Use unless otherwise specified or shown on plans
DETAIL E

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (PEDESTRIAN BARRICADES)

NO SCALE

ES-7Q

7-1-25

2025 STANDARD PLAN ES-7Q

Return to Table of Contents

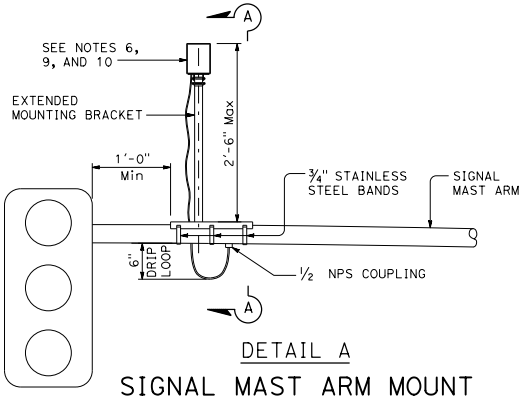
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REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

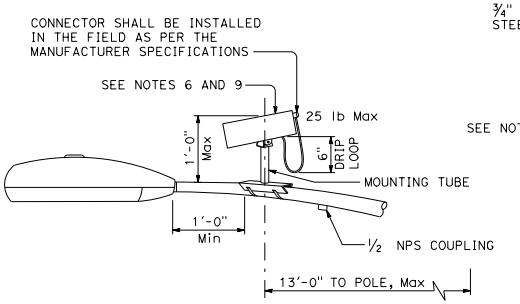
REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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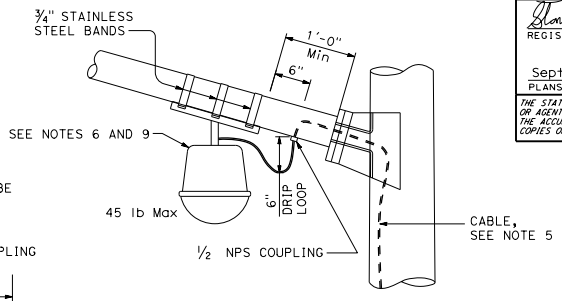

DETAIL A

## SIGNAL MAST ARM MOUNT



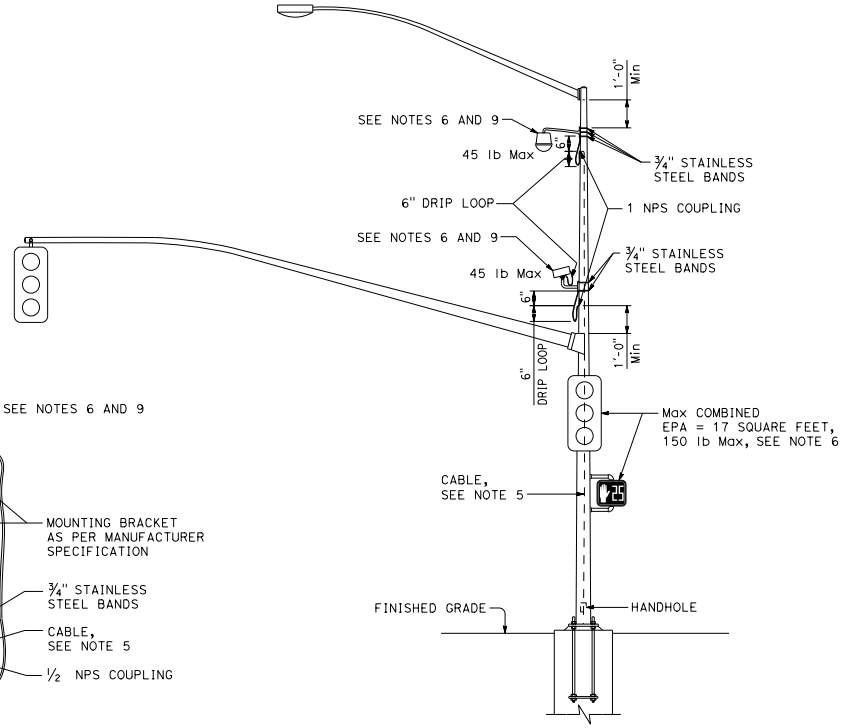

DETAIL B

## LUMINAIRE MAST ARM MOUNT



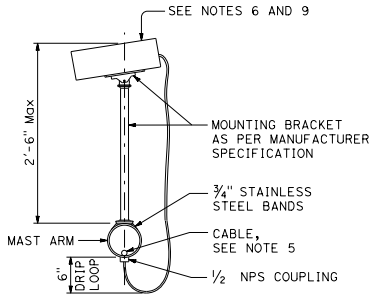

DETAIL C

## LUMINAIRE MAST ARM MOUNT




DETAIL D

## SIGNAL POLE MOUNT




SECTION A-A

NOTES:

1. Exact mounting location of attachment and bracket shall be approved by the Engineer per manufacturer's recommendation.
2. Location of cable entrances on signal pole shall be a minimum of 1'-0" from any flange or base plate.
3. Cable entrances on signal pole shall be drilled for weathertight coupling as required.
4. Cable shall have a drip loop at the entrance into signal pole, luminaire mast arm and signal mast arm.
5. A single cable shall run continuous and shall not be twisted from the attachment to the controller cabinet. No splices shall be allowed.
6. Use the manufacturer's Effective Projected Area (EPA) for attachment. The maximum EPA for each attachment shall be 1.6 square feet. The maximum weight for all attachments is shown.
7. Maximum of two attachments per traffic signal standard.
8. Maximum of one attachment per mast arm.
9. Attachment shall be mounted using clamping devices.
10. Up to 45 lb allow on standards built to Standard Plans or Revised Standard Plans dated January 20, 2017 or later. Otherwise, 25 lb maximum.
11. This sheet for use with standards built to Standard Plans dated May 20, 2011 or later.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING ATTACHMENTS)

NO SCALE

**ES-7R**

7-1-25



Return to Table of Contents

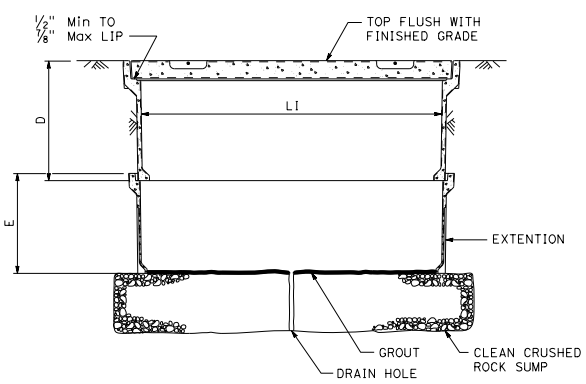
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Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

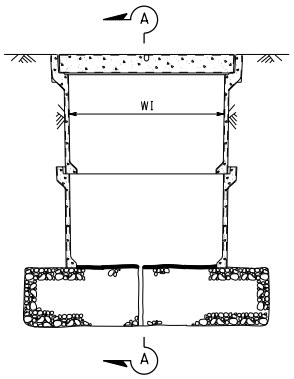
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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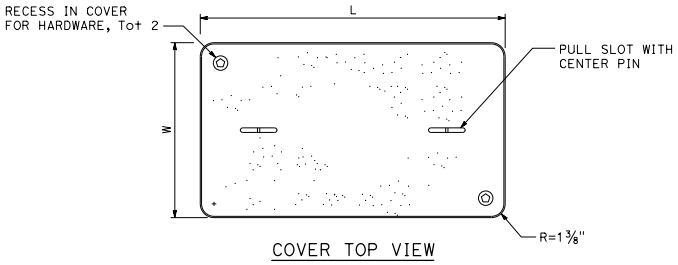

SECTION A-A



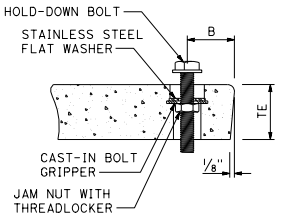

SIDE VIEW

## NON-TRAFFIC PULL BOX

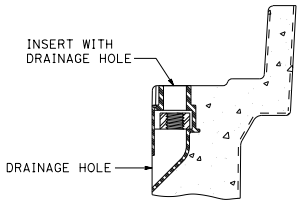
### DETAIL A




COVER TOP VIEW




TYPICAL COVER CAPTIVE BOLT
OR SIMILAR




TYPICAL THREADED INSERT
OR SIMILAR

**NOMINAL DIMENSIONS TABLE**

| PULL BOX | | | | | | COVER | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PULL BOX TYPE | MINIMUM DEPTH BOX (D) | MINIMUM DEPTH EXTENSION (E) | MAXIMUM WEIGHT | LI Min | WI Min | TE | B | L | W | MAXIMUM WEIGHT |
| No. 3½ | 12" | N/A | 40 lb | 1'-2⅜" | 9" | 1⅝"-1¾" | 1¾" | 1'-3¼" - 1'-3⅜" | 10" - 10⅛" | 30 lb |
| No. 5 | 12" | 10" | 65 lb | 1'- 8" | 11" | 2" | 1¾" | 1'-11¼" | 1'-1¾" | 60 lb |
| No. 6 | 12" | 10" | 70 lb | 2'- 4¼" | 1'- 3¼" | 2" | 2" | 2'-6½" | 1'-5½" | 95 lb |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (NON-TRAFFIC PULL BOX)

NO SCALE

**ES-8A**

7-1-25

Return to Table of Contents

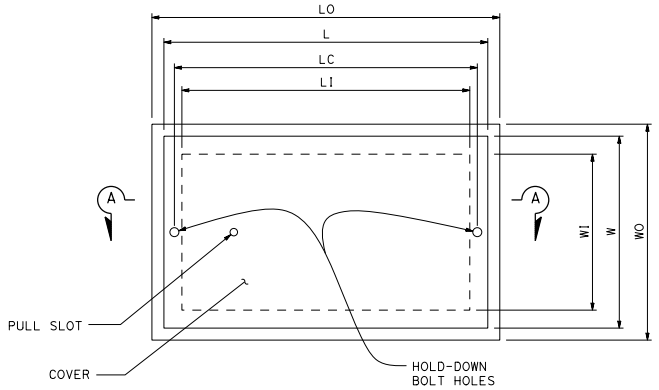
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Bhanupriya
REGISTERED ELECTRICAL ENGINEER

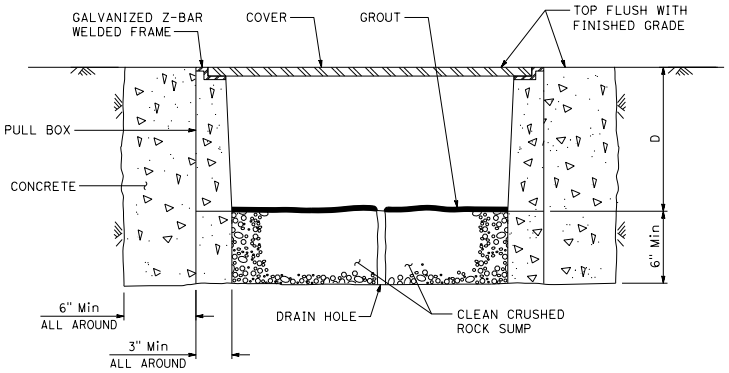
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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TOP VIEW




SECTION A-A

## No. 3½(T), No. 5(T), AND No. 6(T) TRAFFIC PULL BOX

**NOMINAL DIMENSIONS TABLE**

| | | | PULL BOX | | | | | COVER | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PULL BOX TYPE | MINIMUM THICKNESS | MINIMUM DEPTH BOX D | LO | LI | WO | WI | L | W | LC |
| No. 3½(T) | 1½" | 1'-0" | 1'-10" - 1'-11" | 1'-5" - 1'-6½" | 1'-3" - 1'-4" | 10" - 1'-0" | 1'-8" - 1'-8½" | 1'-1" - 1'-2" | - |
| No. 5(T) | 1¾" | 1'-0" | 2'-5" - 2'-6" | 2'-0" - 2'-1" | 1'-6" - 1'-7" | 1'-1" - 1'-2" | 2'-3" - 2'-3½" | 1'-4" - 1'-4½" | 2'-1¼" |
| No. 6(T) | 2" | 1'-0" | 2'-11" - 3'-1" | 2'-6" - 2'-7" | 1'-10" - 2'-0" | 1'-5" - 1'-6" | 2'-9" - 2'-9½" | 1'-8" - 1'-8½" | 2'-7¼" |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (TRAFFIC PULL BOX)

NO SCALE

**ES-8B**

7-1-25

Return to Table of Contents

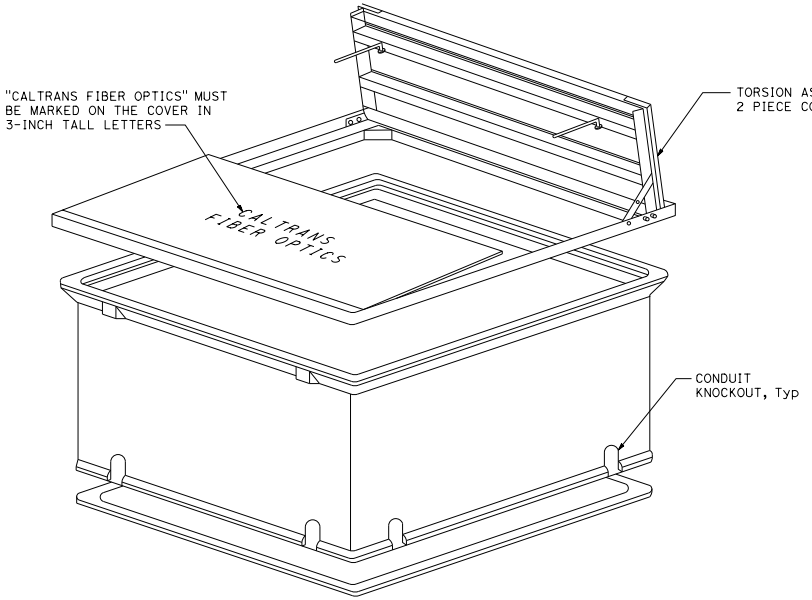
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REGISTERED ELECTRICAL ENGINEER

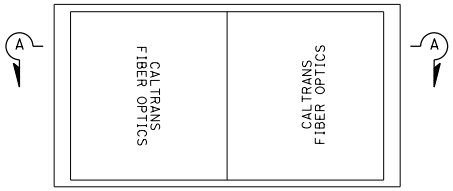
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

September 19, 2025
PLANS APPROVAL DATE

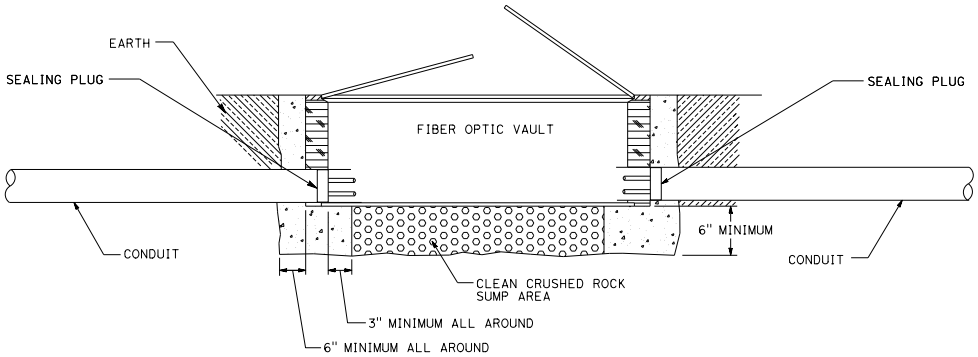
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VAULT-ISOMETRIC VIEW




TOP VIEW




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (VAULTS)

NO SCALE

ES-8C

7-1-25





Return to Table of Contents

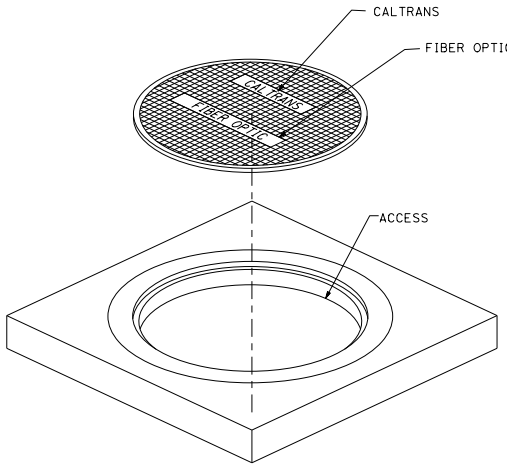
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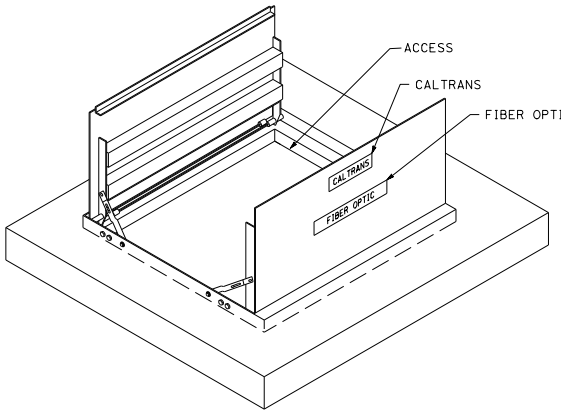
Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

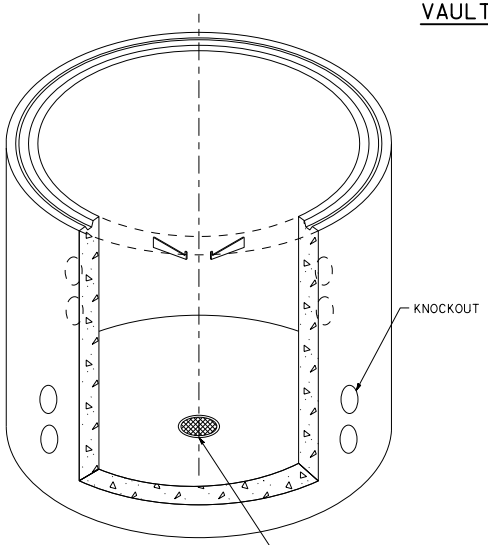
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Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

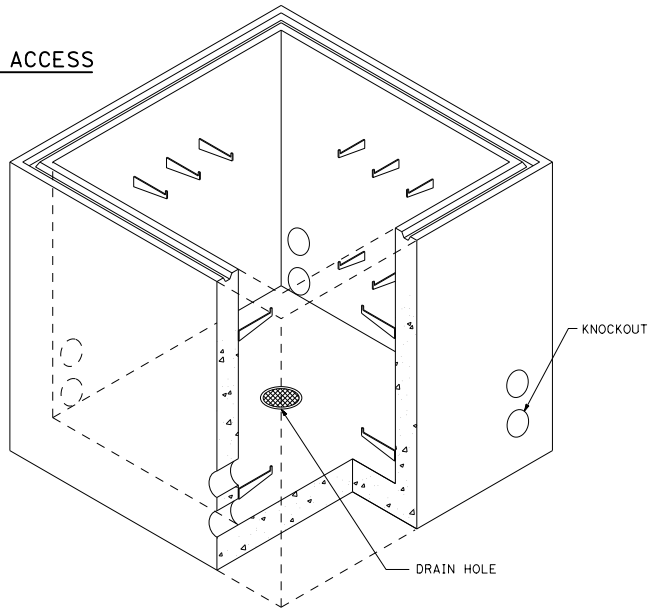



VAULT COVER AND ACCESS




ROUND VAULT




BOX VAULT

VAULT BODY

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (VAULTS)

NO SCALE

ES-8D

7-1-25

2025 STANDARD PLAN ES-8D

Return to Table of Contents

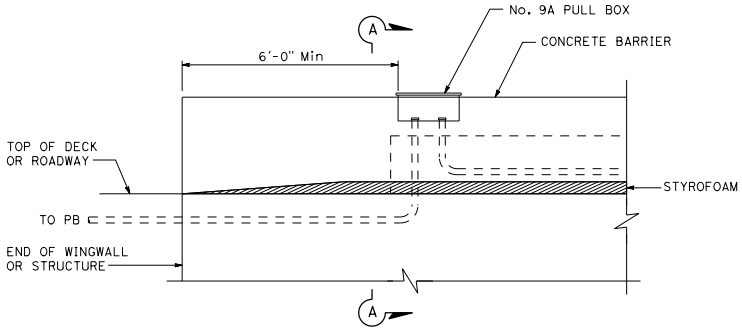
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Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

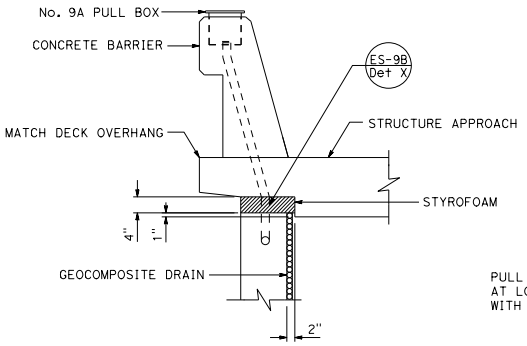
September 19, 2025
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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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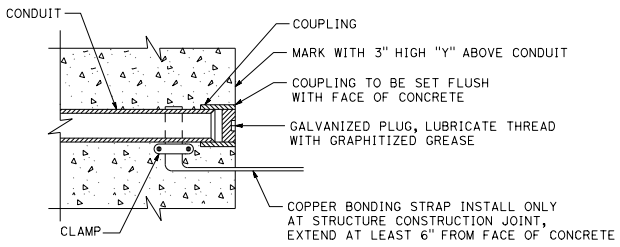

SIDE VIEW




SECTION A-A

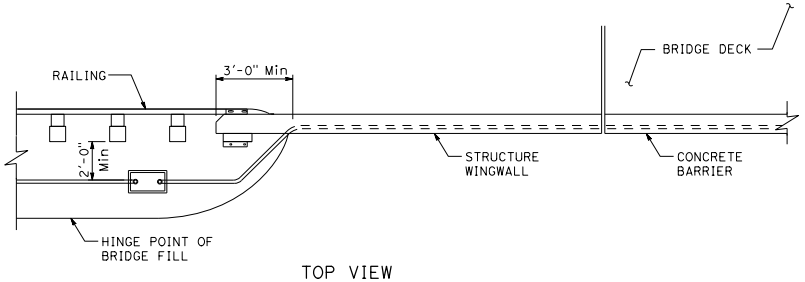
CONDUIT TERMINATION

DETAIL A

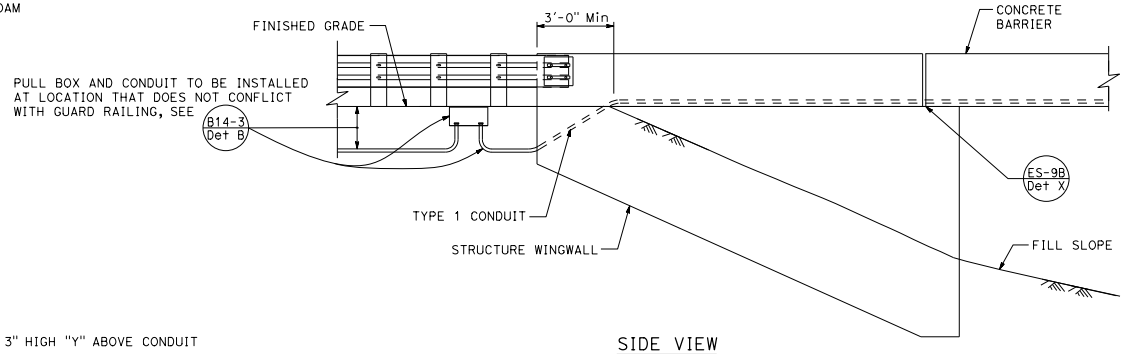



CONDUIT TERMINATION

DETAIL C




TOP VIEW




SIDE VIEW

CONDUIT TERMINATION

DETAIL I

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (STRUCTURE PULL BOX INSTALLATIONS)

NO SCALE

ES-9A

7-1-25



Return to Table of Contents

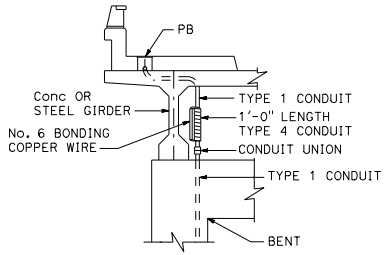
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M. Kassimi
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

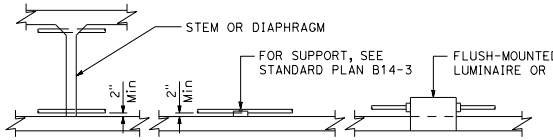
REGISTERED PROFESSIONAL ENGINEER
Majid Hosseini
No. E21503
Exp. 6-30-26
ELECTRICAL
STATE OF CALIFORNIA

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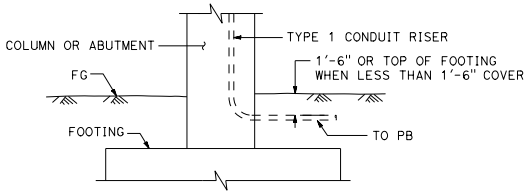

CONDUIT RISER CONNECTION

DETAIL R



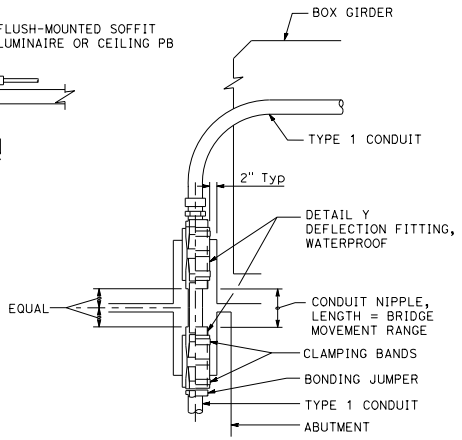

CONDUIT INSTALLATION WITHIN BOX GIRDER SECTIONS

DETAIL S



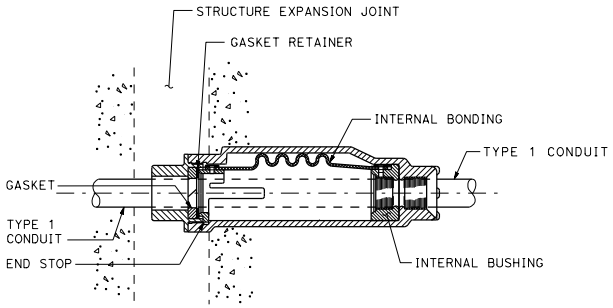

LOWER END OF CONDUIT RISER AT COLUMN OR ABUTMENT

DETAIL T



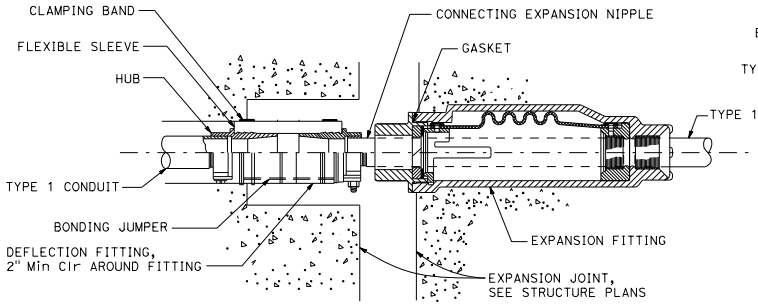

CONDUIT RISER CONNECTION AT COLUMN, ABUTMENT OR STRUCTURE WING WALL

DETAIL U



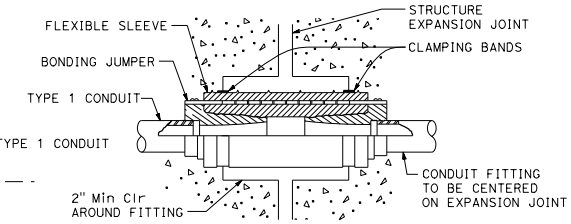

CONDUIT EXPANSION FITTING

DETAIL X




COMBINATION EXPANSION-DEFLECTION FITTINGS METALLIC CONDUIT INSTALLATION

DETAIL XY




CONDUIT DEFLECTION FITTING

DETAIL Y

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CONDUIT RISER EXPANSION AND DEFLECTION FITTINGS, STRUCTURE INSTALLATIONS)

NO SCALE

**ES-9B**

7-1-25

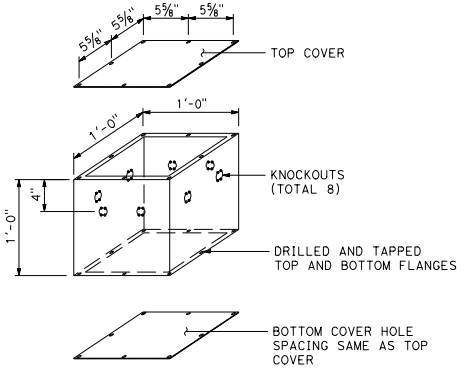


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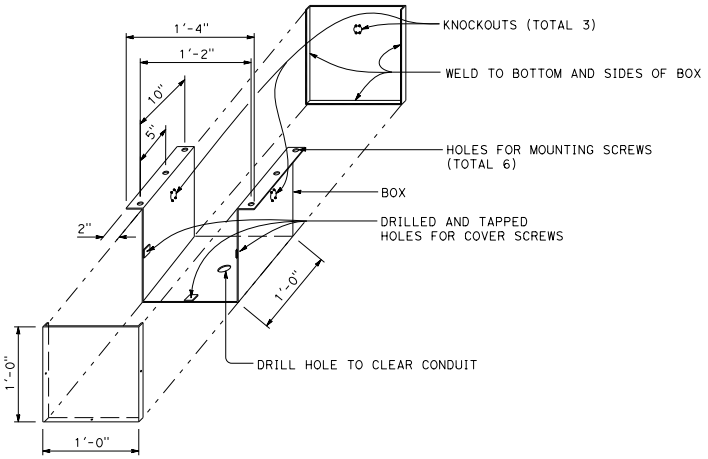
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
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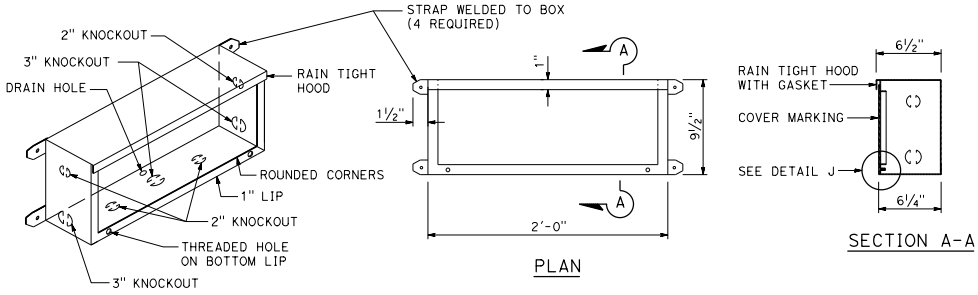
REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA



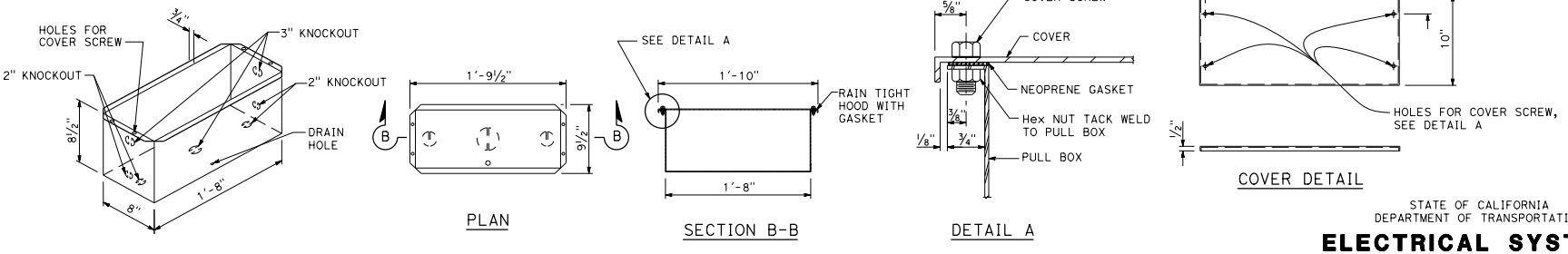

No. 7 PULL BOX




No. 8 PULL BOX




No. 9 PULL BOX




No. 9A PULL BOX

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (STRUCTURE PULL BOX)

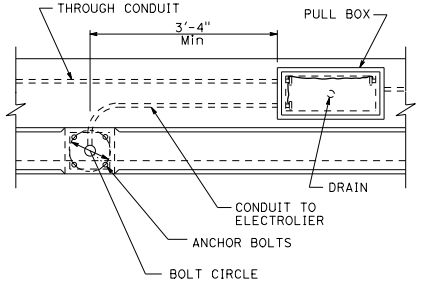
NO SCALE

ES-9C

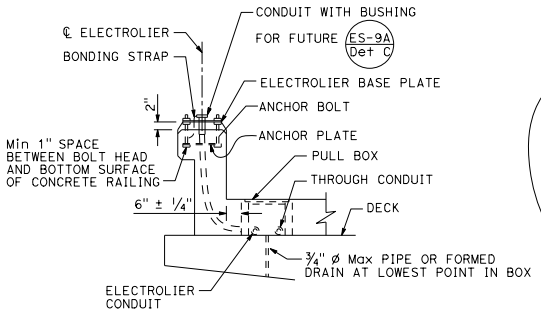
7-1-25

2025 STANDARD PLAN ES-9C

Return to Table of Contents



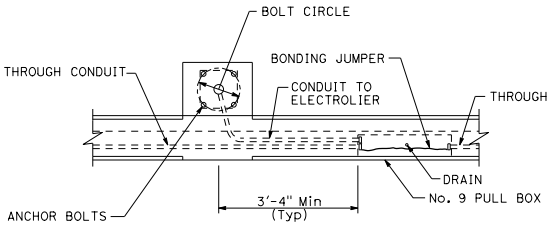

TOP VIEW



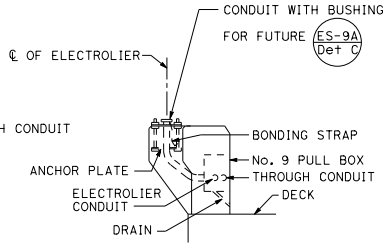

END VIEW

## No. 3½, 5, OR 6 PULL BOX INSTALLATION

DETAIL A



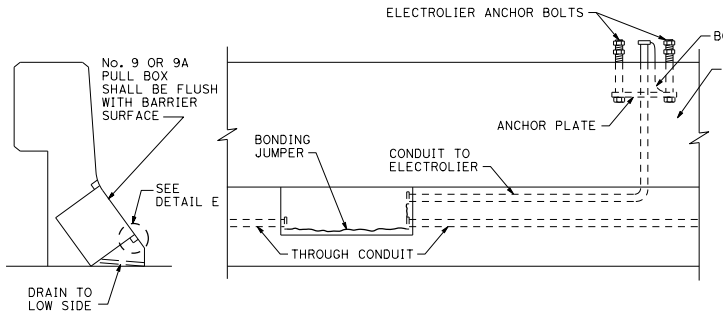

TOP VIEW




END VIEW

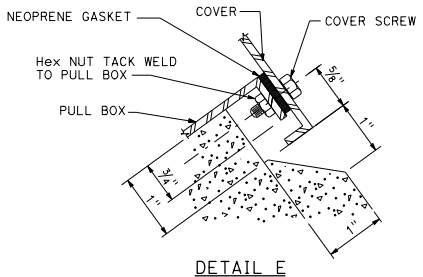
## No. 9 PULL BOX INSTALLATION

DETAIL B

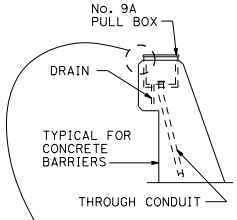



## INSTALLATION IN SLOPING PARAPETS

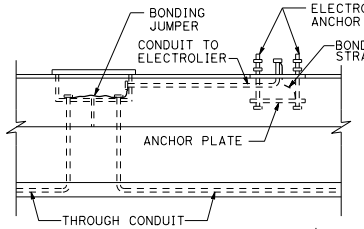
DETAIL D



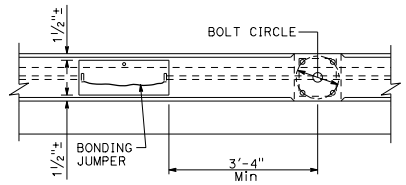

DETAIL E



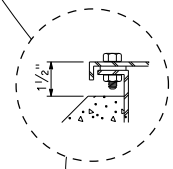

END VIEW

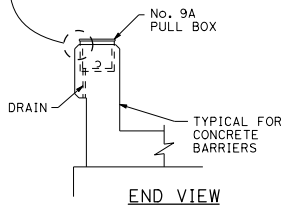



SIDE VIEW

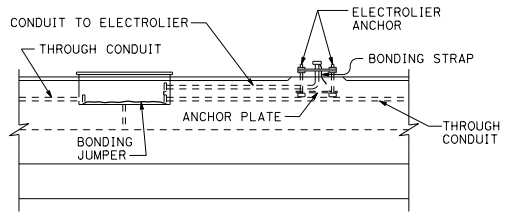



TOP VIEW




END VIEW




SIDE VIEW

## No. 9A PULL BOX INSTALLATION

DETAIL C

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (STRUCTURE PULL BOX INSTALLATIONS)

NO SCALE

**ES-9D**

7-1-25



Return to Table of Contents

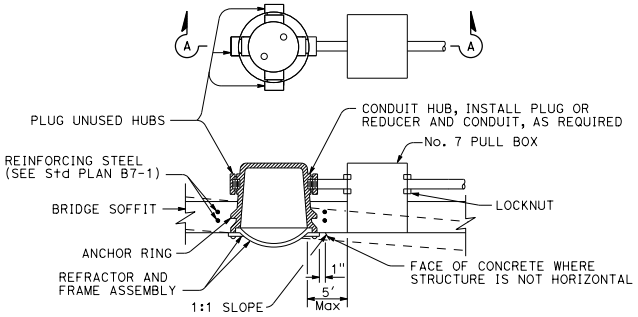
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

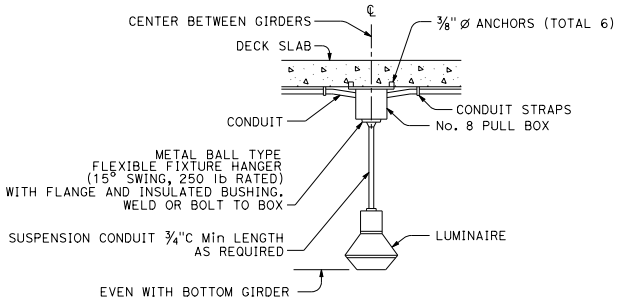
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SECTION A-A

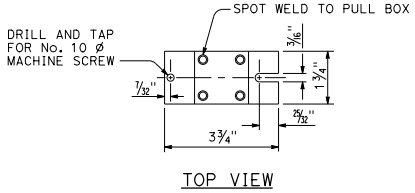
## FLUSH-MOUNTED SOFFIT LUMINAIRE INSTALLATION

DETAIL F

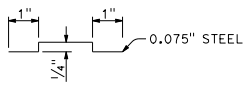



## PENDANT SOFFIT LUMINAIRE INSTALLATION

DETAIL P



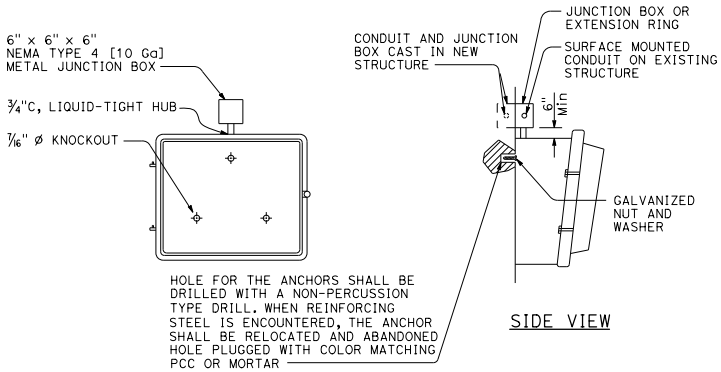

TOP VIEW




SIDE VIEW

## TERMINAL BLOCK MOUNTING BRACKET

DETAIL T




SIDE VIEW

## WALL-MOUNTED LUMINAIRE INSTALLATION

DETAIL W

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (FLUSH-MOUNTED SOFFIT, PENDANT SOFFIT AND WALL-MOUNTED LUMINAIRE STRUCTURE INSTALLATIONS)

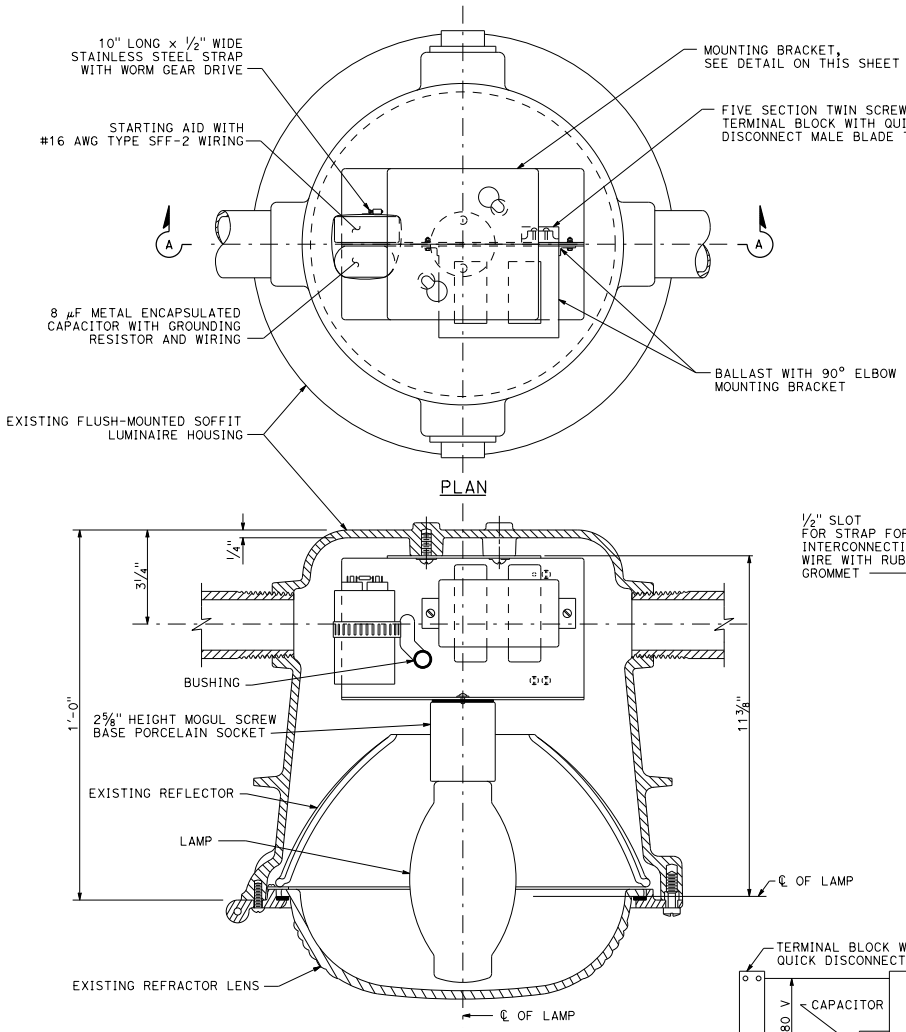
NO SCALE

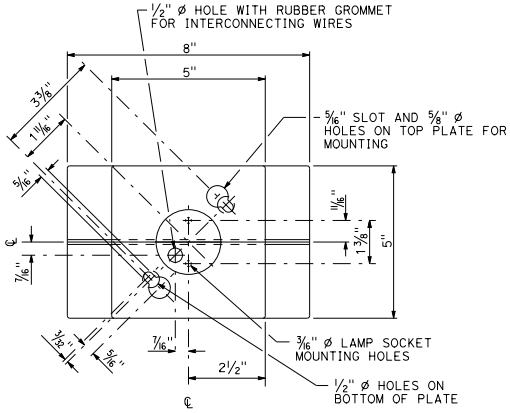
ES-9E

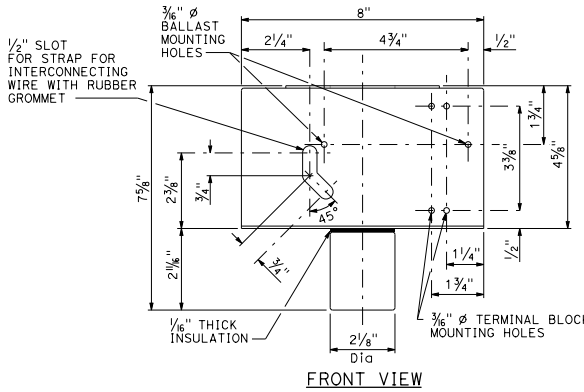
7-1-25

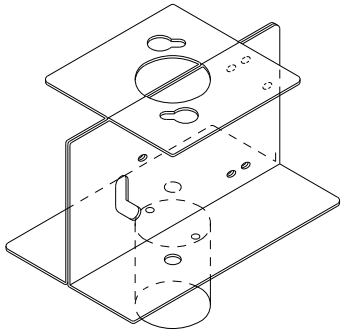
2025 STANDARD PLAN ES-9E

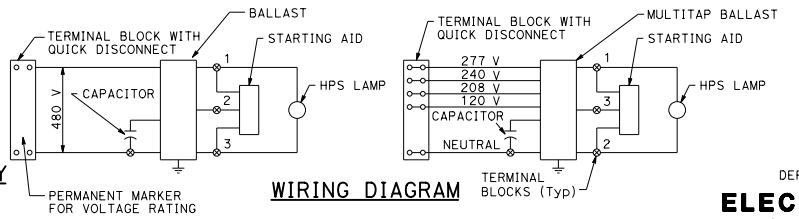
Return to Table of Contents




NOTE:
1. Use No. 8 ø machine screws, lockwashers and nuts for mounting ballast and terminal strips.

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER
September 19, 2025
PLANS APPROVAL DATE
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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp.12-31-25
ELECTRICAL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (FLUSH-MOUNTED SOFFIT LUMINAIRE DETAILS)

NO SCALE

ES-9F

7-1-25



Return to Table of Contents

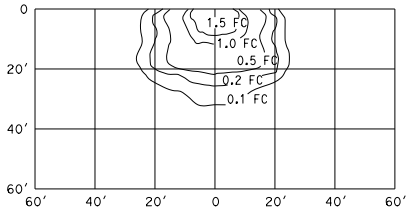
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Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

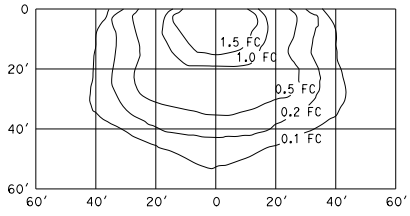
September 19, 2025
PLANS APPROVAL DATE

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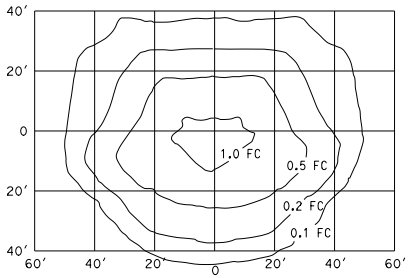
REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA




WALL-MOUNTED
15′ Mounting Height
ANSI Designation S62
Lamp operated at 5,800 lm
70 W (Max)

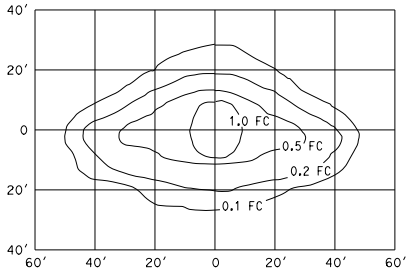



WALL-MOUNTED
15′ Mounting Height
ANSI Designation S54
Lamp operated at 9,500 lm
100 W (Max)

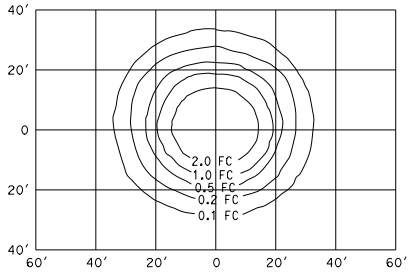



FLUSH-MOUNTED SOFFIT
17′ Mounting Height
ANSI Designation S62
Lamp operated at 5,800 lm
70 W (Max)

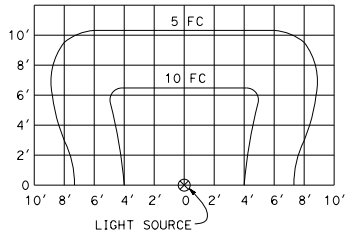
NOTE:
Curves represent the minimum maintained illuminance (FC).




PENDANT SOFFIT
TYPE III SHORT
17′ Mounting Height
ANSI Designation S62
Lamp operated at 5,800 lm
70 W (Max)




PENDANT SOFFIT
17′ Mounting Height
ANSI Designation S62
Lamp operated at 5,800 lm
70 W (Max)




OVERHEAD SIGN LUMINAIRE
60 W (Max)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (ISOFOOTCANDLE CURVES)

NO SCALE

**ES-10B**

7-1-25

2025 STANDARD PLAN ES-10B

Return to Table of Contents

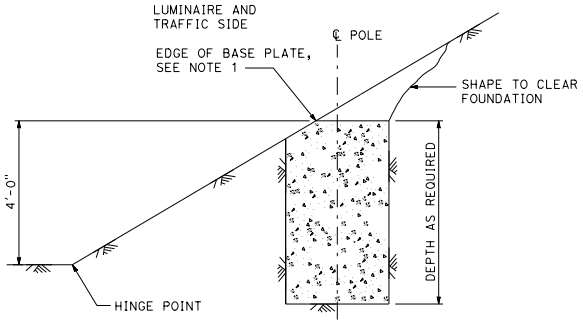
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REGISTERED CIVIL ENGINEER

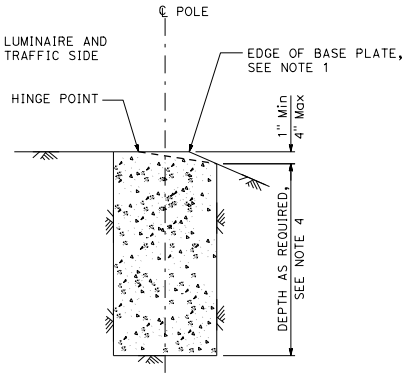
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

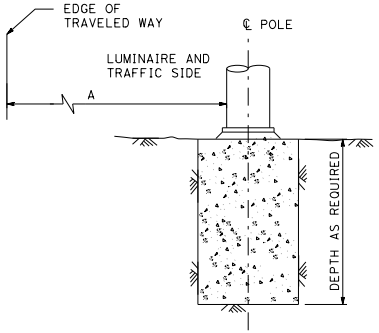
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CUT SLOPES
STEEPER THAN 4:1, LESS THAN 2:1
DETAIL A-1
See Notes 2 and 3




FILL SLOPES
STEEPER THAN 4:1, LESS THAN 2:1
DETAIL A-2
See Notes 2 and 3



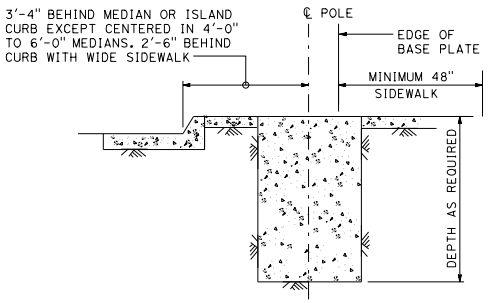

FLAT SECTIONS
CUT OR FILL SLOPES 4:1 OR FLATTER
DETAIL A-3
See Note 2

NOTES:

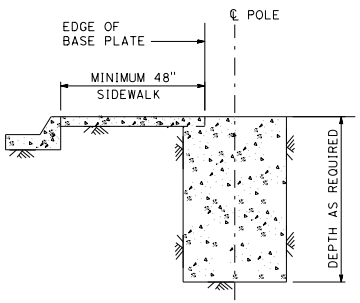
1. Where a portion of the foundation is above grade, the top edges shall have a 1" chamfer.
2. Slopes shall be horizontal to vertical ratio (Horizontal:Vertical).
3. Horizontal setbacks on cut and fill slopes steeper than 4:1 shall not exceed the distance shown for flat sections.
4. CIDH embedment depth shall be increased beyond standard depths by the diameter of the CIDH.

## FOUNDATIONS ADJACENT TO ALL ROADWAYS EXCEPT IN SIDEWALK, MEDIAN AND ISLAND AREAS

DETAIL A




MEDIAN, ISLAND OR FRONT OF SIDEWALK
DETAIL B-1




BACK OF SIDEWALK
DETAIL B-2

## FOUNDATIONS IN SIDEWALK, MEDIAN AND ISLAND AREAS

DETAIL B

| STANDARD TYPE | SETBACK (DIMENSION A) |
|---|---|
| 32 | 30'-0" (Min) |
| 31 | 20'-0" (Min) |
| 15, 15D, 15-SB, 21, 21D, 30 | ARM LENGTH (Min) |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (FOUNDATION INSTALLATIONS)

NO SCALE

ES-11

7-1-25



Return to Table of Contents

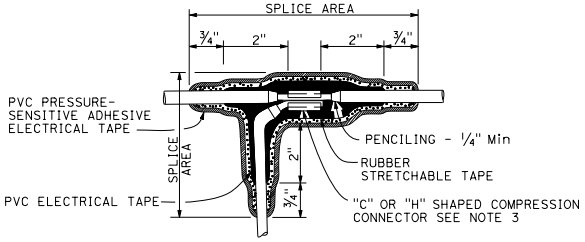
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

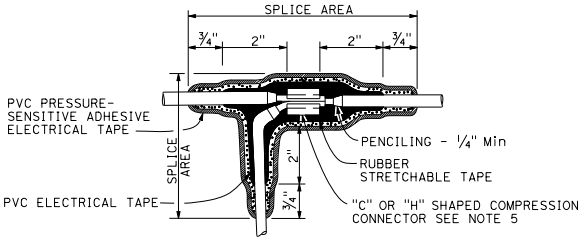
Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

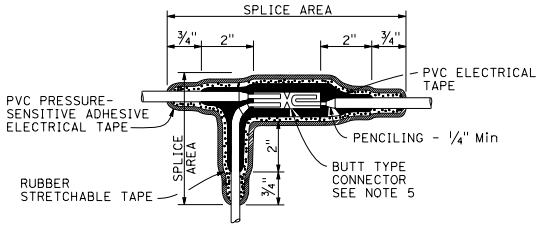
September 19, 2025
PLANS APPROVAL DATE

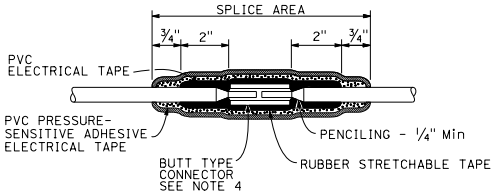
REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



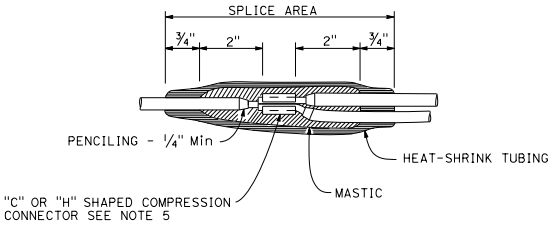



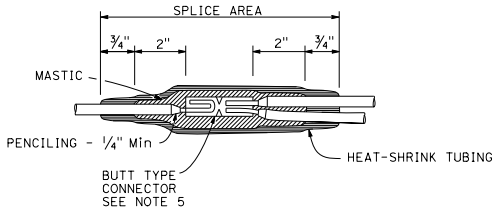



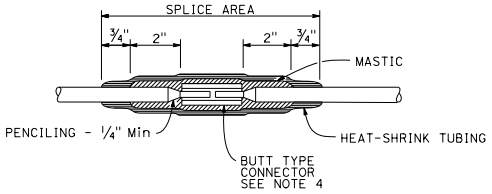

NOTES:

1. Dimensions are minimum.
2. Rubber tapes shall be rolled after application.
3. Between 1 free-end and 1 through conductor.
4. Between 2 free-end conductors.
5. Between 3 free-end conductors.

## TYPICAL SPLICE INSULATION METHOD B




## TYPICAL SPLICE INSULATION HEAT-SHRINK TUBING

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELCTRICAL SYSTEMS (SPLICE INSULATION METHODS DETAILS)

NO SCALE

**ES-13A**

7-1-25



Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

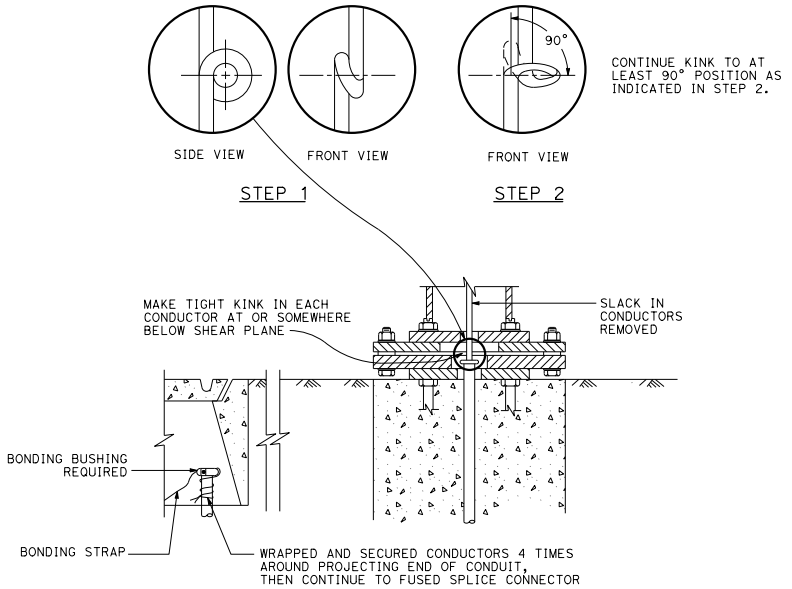
Bhanupriya
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

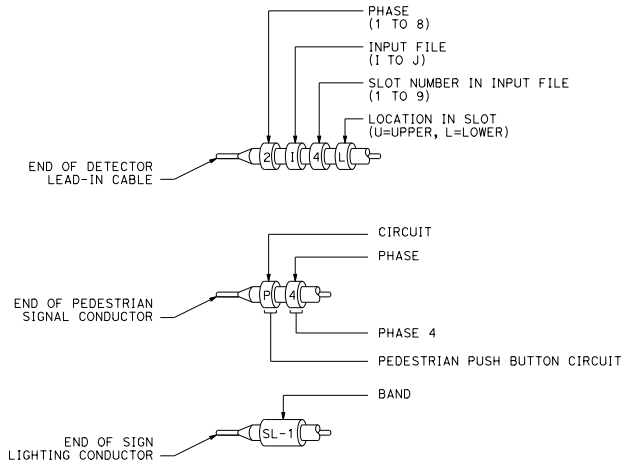
REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp.12-31-25
ELECTRICAL
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.






KINKING DETAIL FOR
SLIP BASE STANDARDS
DETAIL A




TYPICAL BANDING DETAILS
DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

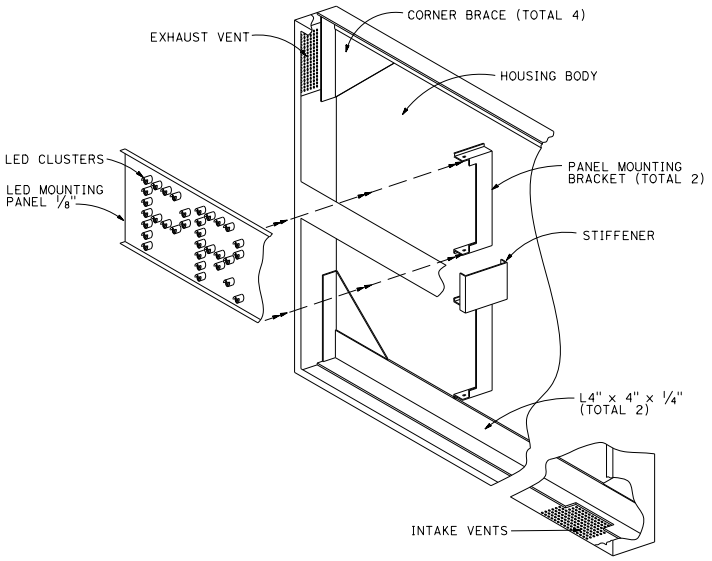
# ELECTRICAL SYSTEMS (KINKING AND BANDING DETAIL)

NO SCALE

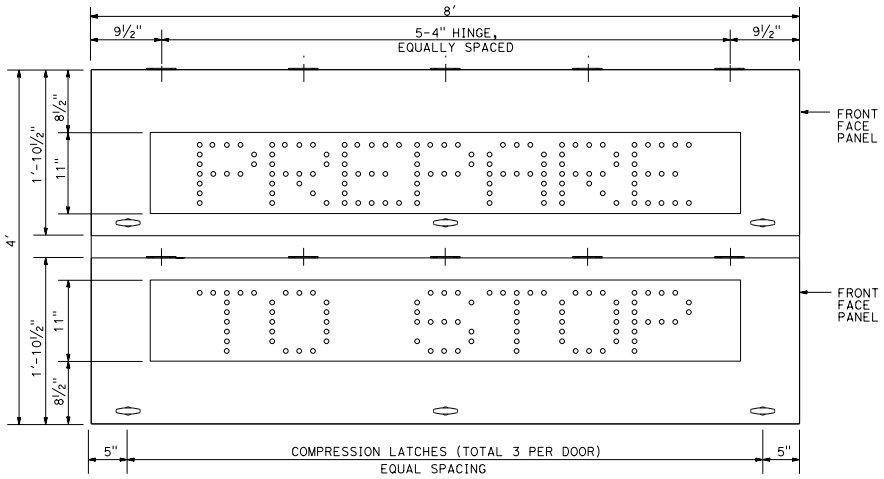
ES-13B

7-1-25

Return to Table of Contents



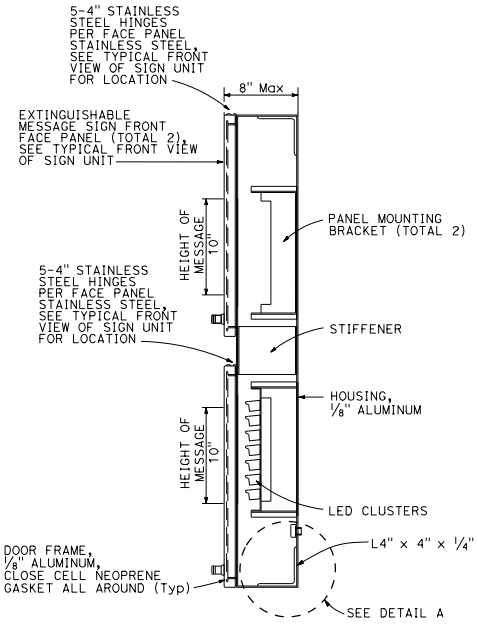

ISOMETRIC VIEW



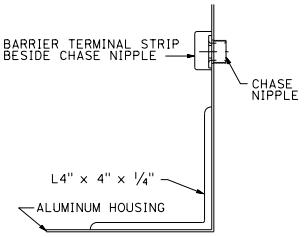

TYPICAL FRONT VIEW OF SIGN UNIT

NOTES:

1. Sheet metal shall be 1/8".
2. Welds shall be continuous.
3. Powder coat all internal and external surfaces black.
4. The door frame shall utilize two gas spring lift arms and two latching devices to maintain an open position.
5. See Wiring Notes and Symbols on Standard Plan ES-14B, Detail A.




CROSS-SECTION OF SIGN




DETAIL A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (EXTINGUISHABLE MESSAGE SIGN 10" LETTERS)

NO SCALE

**ES-14A**

7-1-25

2025 STANDARD PLAN ES-14A

Return to Table of Contents

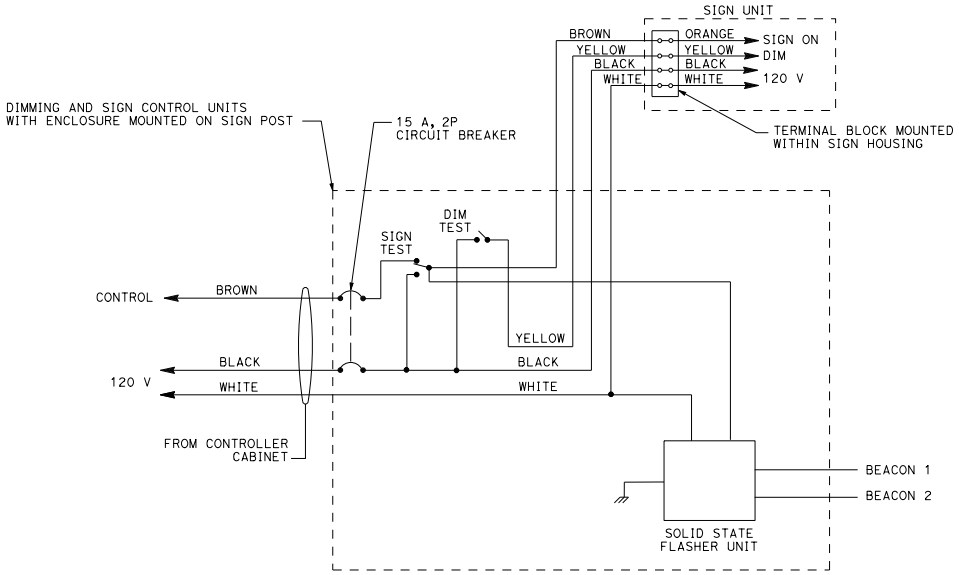
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

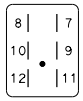
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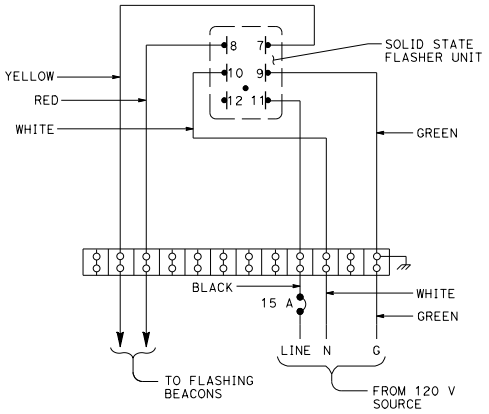

## WIRING DIAGRAM
## EXTINGUISHABLE MESSAGE SIGN
DETAIL A

THE FLASHER SHALL MATE WITH A CINCH-JONES SOCKET S-406-SB OR EQUAL AND CONNECTED AS FOLLOWS:

| PIN | CIRCUIT | PIN | CIRCUIT |
|---|---|---|---|
| 7 | LOAD | 10 | NEUTRAL |
| 8 | LOAD | 11 | LINE |
| 9 | CHASSIS GROUND | 12 | NOT USED |




## CONNECTOR SOCKET
## SOLID STATE FLASHER UNIT




## WIRING DIAGRAM
## FLASHING BEACON ENCLOSURE
DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS
# (EMS AND FBE WIRING DIAGRAMS)

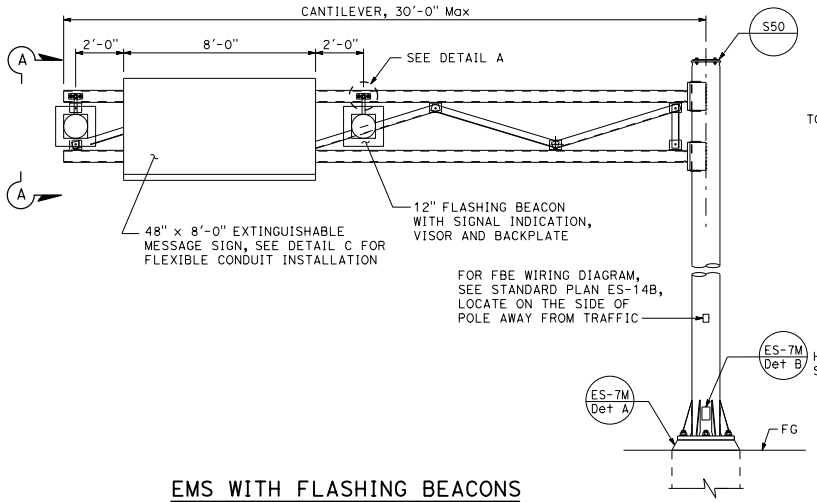
NO SCALE

**ES-14B**

7-1-25

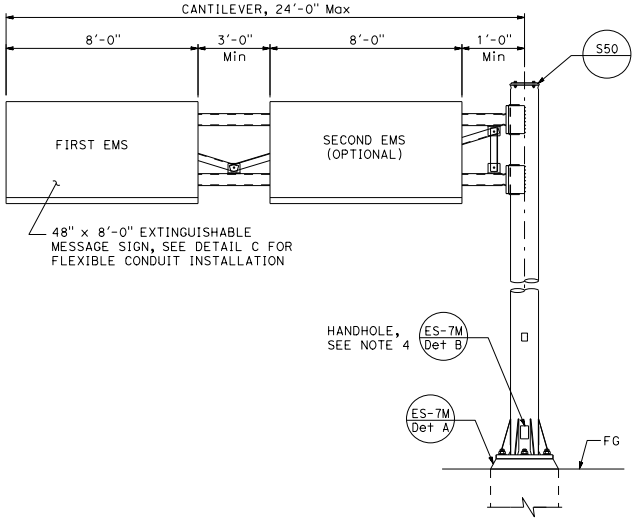


Return to Table of Contents



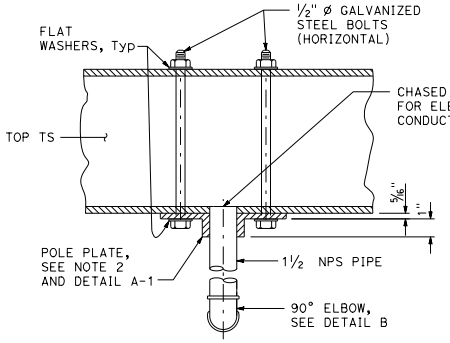

## EMS WITH FLASHING BEACONS

ELEVATION A

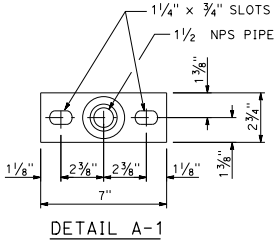



## EMS WITHOUT FLASHING BEACONS

ELEVATION B



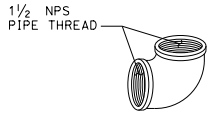

TOP VIEW
SECTION B-B




DETAIL A-1

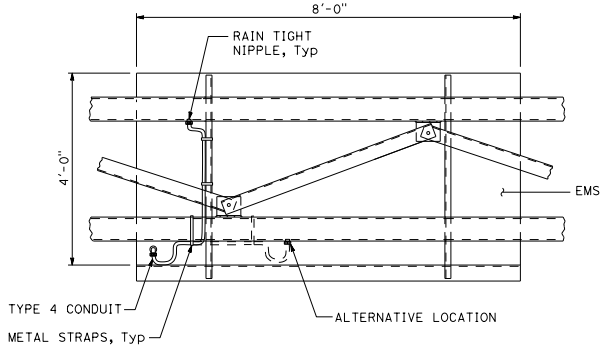
## POLE PLATE

DETAIL A




## 90° ELBOW

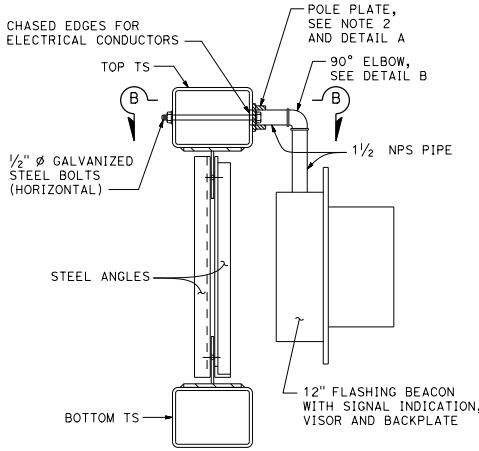
DETAIL B




## FLEXIBLE CONDUIT INSTALLATION

DETAIL C

Back view of sign




SECTION A-A

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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NOTES:

1. Pole plate shall be bronze or galvanized ductile iron.
2. For structure information, see Standard Plan S50.
3. Wind loading (3-second gust): 100 mph.
4. Handhole shall be located on the downstream side of traffic.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (EXTINGUISHABLE MESSAGE SIGN ON A FULL CANTILEVER)

NO SCALE

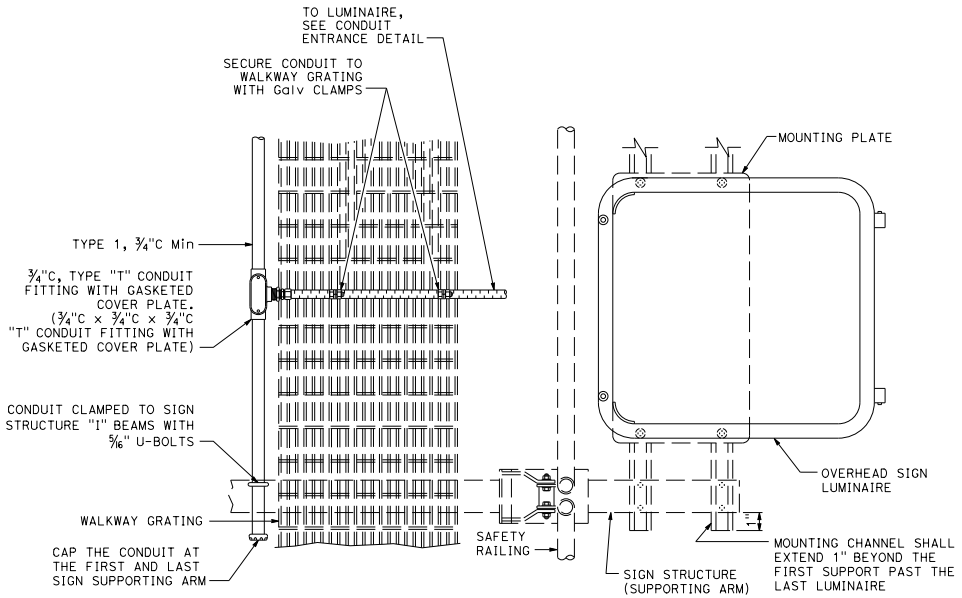
**ES-14C**

2025 STANDARD PLAN ES-14C

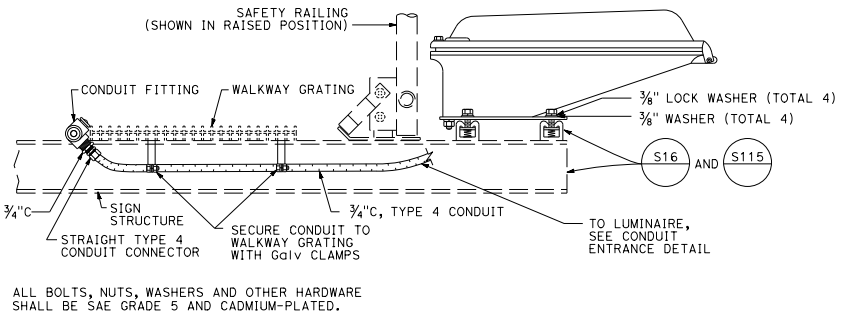
7-1-25

Return to Table of Contents

| LENGTH OF SIGN PANEL | NUMBER OF OVERHEAD SIGN LUMINAIRE (EACH) | OVERHEAD SIGN LUMINAIRE SPACING SEE NOTES |
|---|---|---|
| 5'-0" | 1 | 2'-6" |
| 6'-0" | | 3'-0" |
| 7'-0" | | 3'-6" |
| 8'-0" | | 4'-0" |
| 9'-0" | | 4'-6" |
| 10'-0" | | 5'-0" |
| 11'-0" | | 5'-6" |
| 12'-0" | | 6'-0" |
| 13'-0" | | 6'-6" |
| 14'-0" | | 7'-0" |
| 15'-0" | | 7'-6" |
| 16'-0" | | 8'-0" |
| 17'-0" | 2 | 4'-3":8'-6" |
| 18'-0" | | 4'-6":9'-0" |
| 19'-0" | | 4'-9':9'-6" |
| 20'-0" | | 5'-0":10'-0" |
| 21'-0" | | 5'-3":10'-6" |
| 22'-0" | | 5'-6":11'-0" |
| 23'-0" | | 5'-9':11'-6" |
| 24'-0" | | 6'-0":12'-0" |
| 25'-0" | | 6'-3":12'-6" |
| 26'-0" | | 6'-6":13'-0" |
| 27'-0" | | 6'-9':13'-6" |
| 28'-0" | | 7'-0":14'-0" |
| 29'-0" | | 7'-3":14'-6" |
| 30'-0" | | 7'-6":15'-0" |
| 31'-0" | | 7'-9":15'-6" |
| 32'-0" | | 8'-0":16'-0" |
| 33'-0" | 3 | 5'-6":11'-0" |
| 34'-0" | | 5'-8":11'-4" |
| 35'-0" | | 5'-10":11'-8" |
| 36'-0" | | 6'-0":12"-0" |
| 37'-0" | | 6'-2":12'-4" |
| 38'-0" | | 6'-4":12'-8" |
| 39'-0" | | 6'-6":13'-0" |
| 40'-0" | | 6'-8":13'-4" |
| 41'-0" | | 6'-10":13'-8" |
| 42'-0" | | 7'-0":14'-0" |
| 43'-0" | | 7'-2":14'-4" |
| 44'-0" | | 7'-4":14'-8" |
| 45'-0" | | 7'-6":15'-0" |
| 46'-0" | | 7'-8":15'-4" |
| 47'-0" | | 7'-10":15'-8" |
| 48'-0" | | 8'-0"-16'-0" |
| 49'-0" | 4 | 6'-1½":12'-3" |
| 50'-0" | | 6'-3":12'-6" |
| 51'-0" | | 6'-4½":12'-9" |
| 52'-0" | | 6'-6":13'-0" |
| 53'-0" | | 6'-7½":13'-3" |
| 54'-0" | | 6'-9":13'-6" |
| 55'-0" | | 6'-10½":13'-9" |
| 56'-0" | | 7'-0":14'-0" |
| 57'-0" | | 7'-1½":14'-3" |
| 58'-0" | | 7'-3":14'-6" |
| 59'-0" | | 7'-4½":14'-9" |
| 60'-0" | | 7'-6":15'-0" |
| 61'-0" | | 7'-7½":15'-3" |
| 62'-0" | | 7'-9":15'-6" |
| 63'-0" | | 7'-10½":15'-9" |
| 64'-0" | | 8'-0":16'-0" |




TOP VIEW



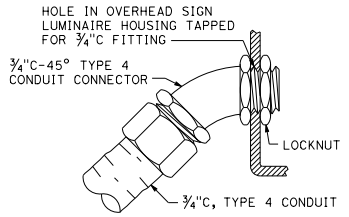

ALL BOLTS, NUTS, WASHERS AND OTHER HARDWARE SHALL BE SAE GRADE 5 AND CADMIUM-PLATED.

SIDE VIEW

## OVERHEAD SIGN LUMINAIRE MOUNTING DETAIL (TYPICAL)

NOTES:

1. The first number listed is the dimension from the edge of the sign panel to the center of the end-most sign luminaire. The second number listed is the dimension between centers of successive sign luminaire.
2. Where adjacent sign panels are spaced 1'-0" or less the combination of these panels (and spaces) shall be considered a single panel.
3. Physical configuration and mounting details may vary from what is shown.




## CONDUIT ENTRANCE DETAIL

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Bhanupriya Sharma — No. E23752 — Exp. 12-31-25 — ELECTRICAL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGN ILLUMINATION EQUIPMENT)

NO SCALE

**ES-15A**

7-1-25

2025 STANDARD PLAN ES-15A



Return to Table of Contents

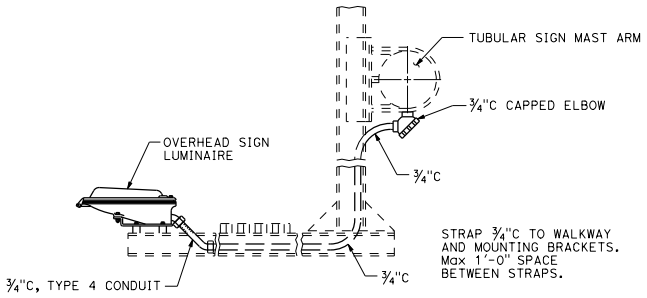
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

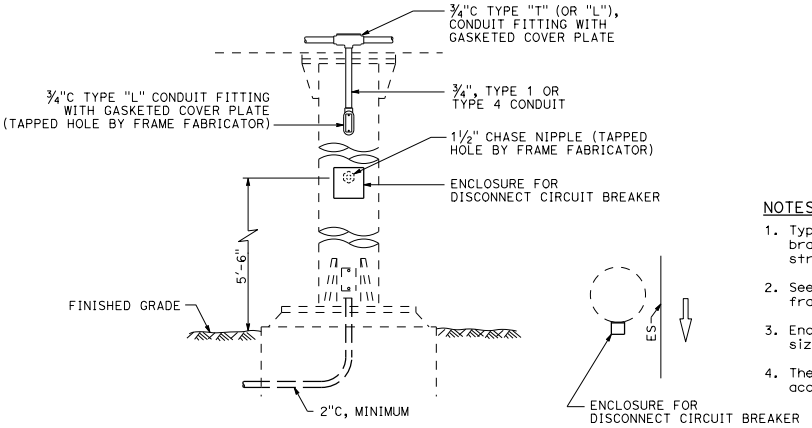
REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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## TYPICAL SIGN ILLUMINATION EQUIPMENT INSTALLATION FOR OVERHEAD SIGNS TUBULAR

DETAIL A

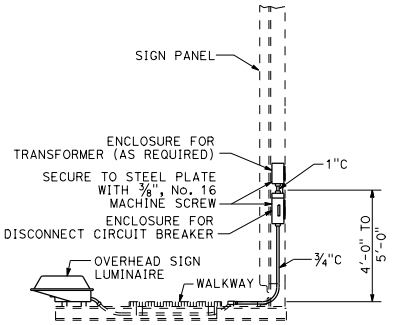



## TYPICAL SIGN ILLUMINATION EQUIPMENT INSTALLATION FOR OVERHEAD SIGNS ROUND POST

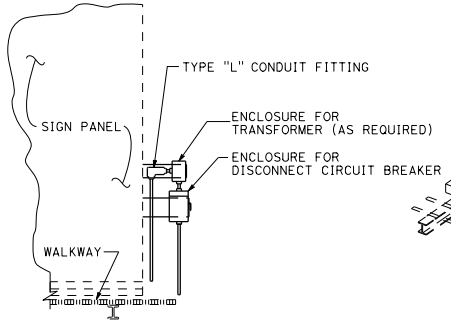
DETAIL B

NOTES:

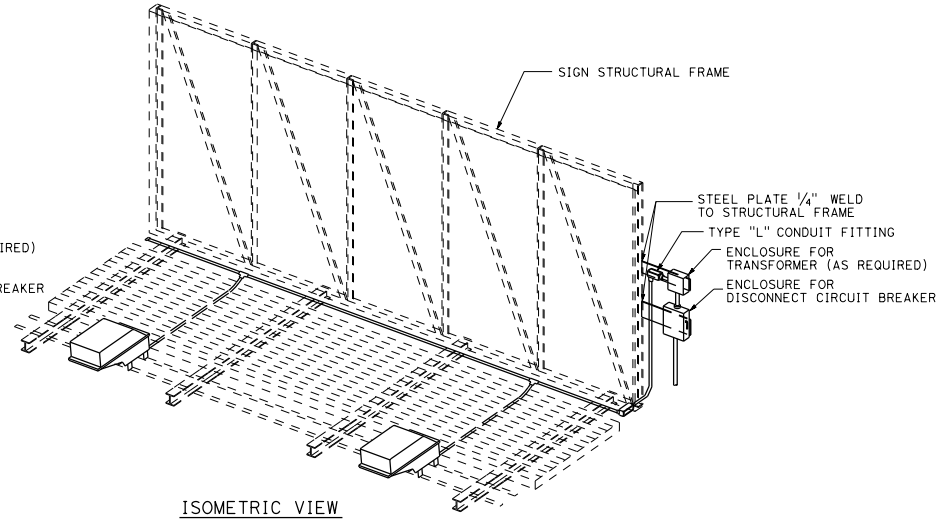
1. Type 4 conduit shall be secured to the nearest walkway bracket using one-hole galvanized malleable iron or steel straps and brass machine screws tapped into the bracket.
2. See Overhead Signs Standard Plans for overhead signs and frame juncture details for photoelectric unit installation.
3. Enclosures and straps shall be secured by ⅜" maximum size screws.
4. The contactor and test switch enclosures shall be readily accessible from the sign walkway.




SIDE VIEW




FRONT VIEW




ISOMETRIC VIEW

## TYPICAL SIGN ILLUMINATION EQUIPMENT INSTALLATION FOR OVERHEAD SIGNS BRIDGE MOUNTED

DETAIL C
See Note 4

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (SIGN ILLUMINATION EQUIPMENT)

NO SCALE

**ES-15C**

7-1-25

2025 STANDARD PLAN ES-15C

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

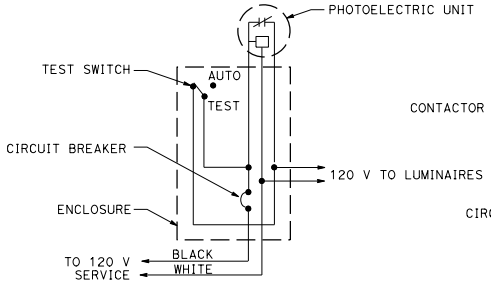
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

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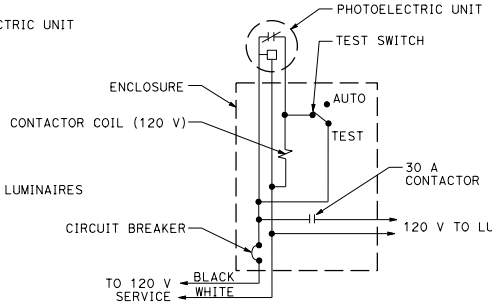
NOTE:

1. Type SC1A, SC2A, SC3A controls are similar to Types SC1, SC2 and SC controls respectively except test switch and wiring are not required.



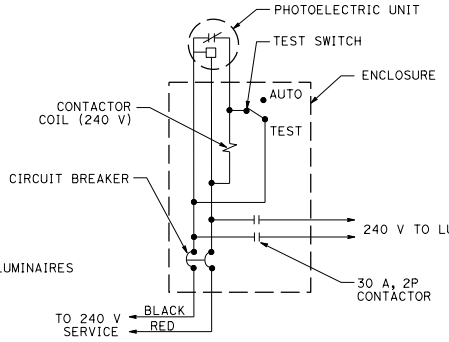

## TYPE LC1 CONTROL

For 120 V unswitched circuit with no more than 1000 W load.



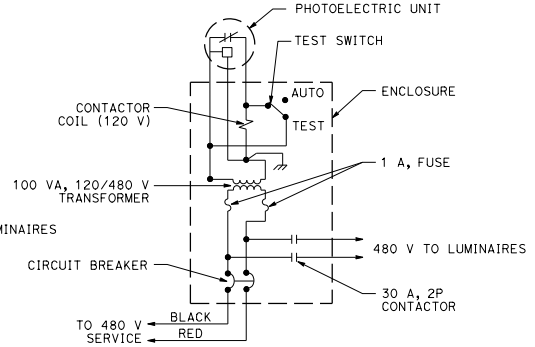

## TYPE LC2 CONTROL

For 120 V unswitched circuit



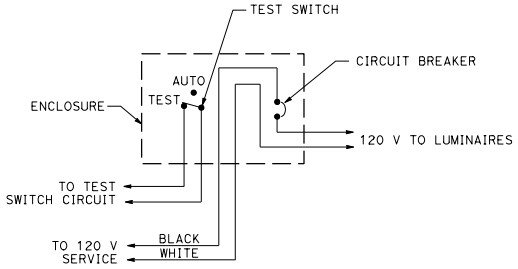

## TYPE LC3 CONTROL

For 240 V unswitched circuits



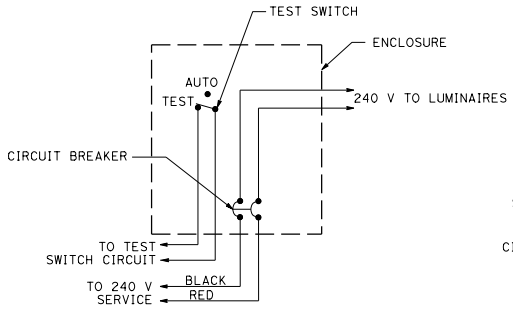

## TYPE LC4 CONTROL

For 480 V unswitched circuits



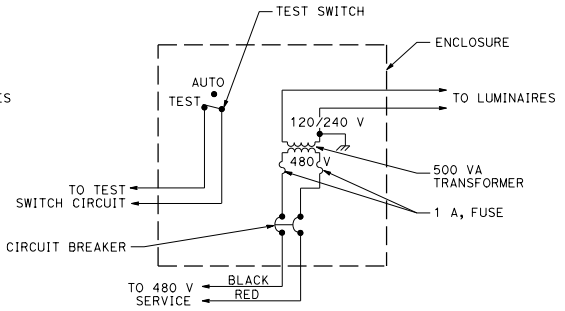

## TYPE SC1 CONTROL

For 120 V switched circuit, see Note 1 for Type SC1A




## TYPE SC2 CONTROL

For 240 V switched circuit, see Note 1 for Type SC2A




## TYPE SC3 CONTROL

For 480 V switched sign circuit, see Note 1 for Type SC3A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (LIGHTING AND SIGN ILLUMINATION CONTROL)

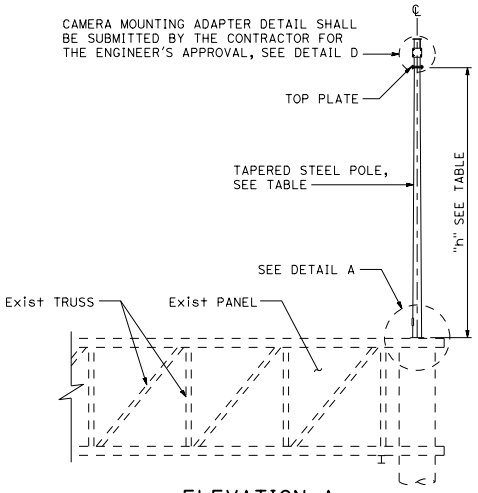
NO SCALE

**ES-15D**

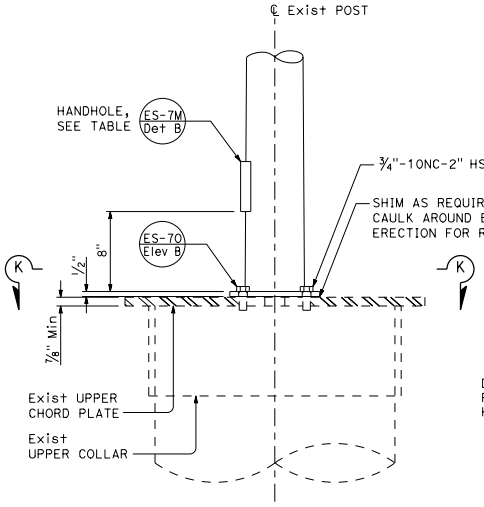
7-1-25

2025 STANDARD PLAN ES-15D

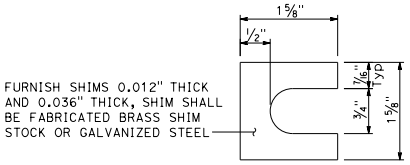
Return to Table of Contents




ELEVATION A

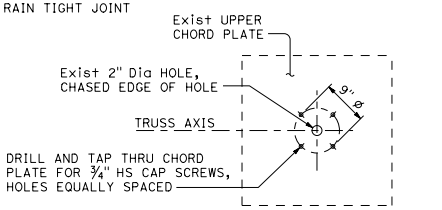



DETAIL A




SHIM

DETAIL B




UPPER CHORD PLATE

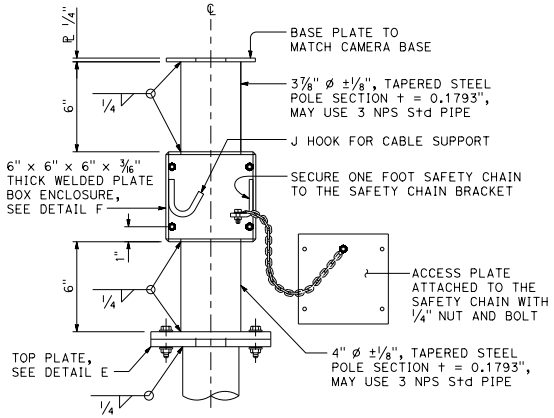
DETAIL C

See Note 3

NOTES:

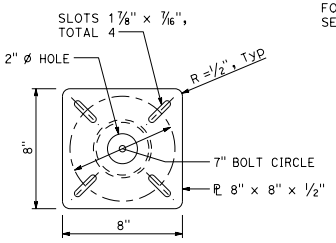
1. Verify controlling field dimensions before ordering or fabricating any material.
2. Bolt hole locations may vary at the discretion of the Engineer.
3. For additional information, see Standard Plan S113.
4. For wind loading, see Standard Plan ES-7M.
5. Materials (Structural Steel):
   a. fy = 55,000 psi (tapered steel tube)
   b. fy = 50,000 psi (unless otherwise noted)

| POLE EXTENSION TYPE | POLE DATA | | | | HANDHOLE SIZE |
|---|---|---|---|---|---|
| | HEIGHT "h" | Min OD | | THICKNESS | |
| | | BASE | TOP | | |
| CAMERA POLE 5 | 5′ | 4⅜" | 3¾" | 0.1793" | 3" x 5" |
| CAMERA POLE 10 | 10′ | 5¼" | | | |
| CAMERA POLE 15 | 15′ | 5⅝" | | | |



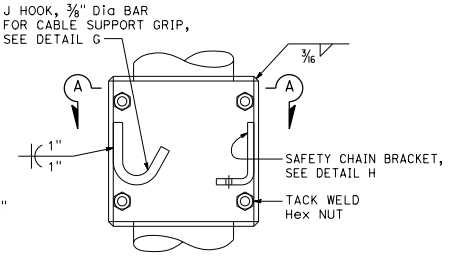

CAMERA MOUNTING ADAPTER

DETAIL D



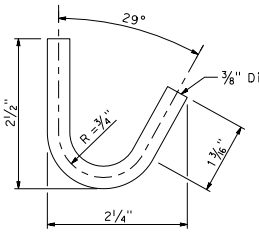

TOP PLATE

DETAIL E



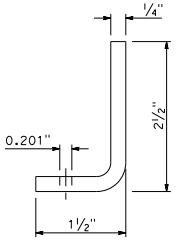

BOX ENCLOSURE

DETAIL F



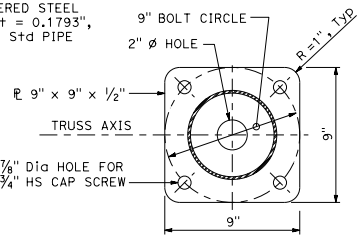

J HOOK

DETAIL G

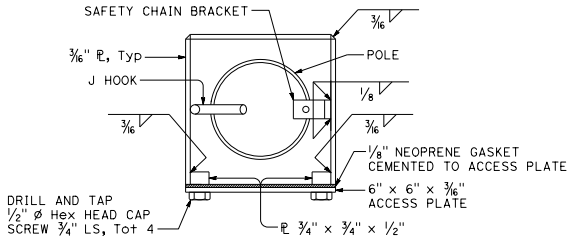



SAFETY CHAIN BRACKET

DETAIL H




SECTION K-K




SECTION A-A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CAMERA POLE 5' TO 15' OVERHEAD SIGN MOUNTED)

NO SCALE

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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ES-16A

7-1-25

2025 STANDARD PLAN ES-16A

Return to Table of Contents

| POLE TYPE | POLE DATA | | | | BASE PLATE DATA | | | | CIDH | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HEIGHT "h" | Min OD | | THICKNESS | "C" | THICKNESS | ANCHOR BOLT SIZE | BC | Dia | "d" |
| | | BASE | TOP | | | | | | | |
| CAMERA POLE 25 | 25′ | 7⅜" | 3¾" | 0.1793" | 1′-1" | 1" | 1½" ø x 36" | 11½" | 2′-6" | 7′-0" |
| CAMERA POLE 30 | 30′ | 8" | | | 1′-1½" | | | 1′-0" | | 7′-6" |
| CAMERA POLE 35 | 35′ | 8⅝" | | | 1′-2" | | | 1′-1" | | 8′-0" |
| CAMERA POLE 40 | 40′ | 9⅜" | | | 1′-3" | | | 1′-1½" | | 8′-6" |
| CAMERA POLE 45 | 45′ | 10" | | | | | | 1′-2" | | |

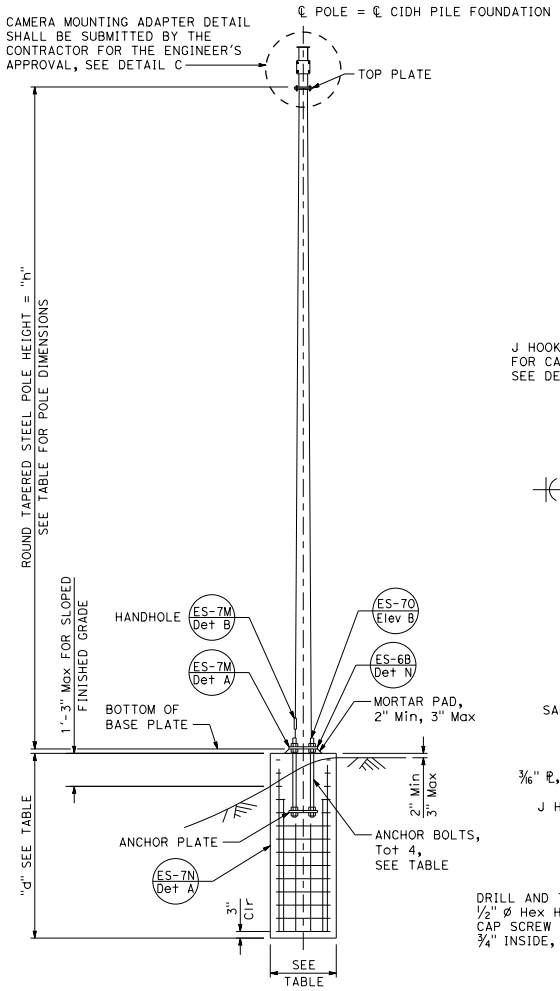
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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| | | | | | |

REGISTERED CIVIL ENGINEER

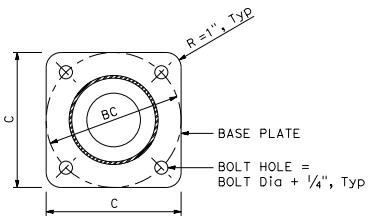
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

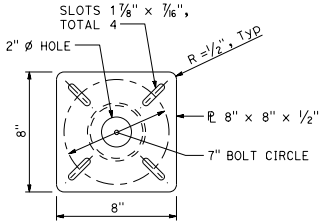
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ELEVATION A



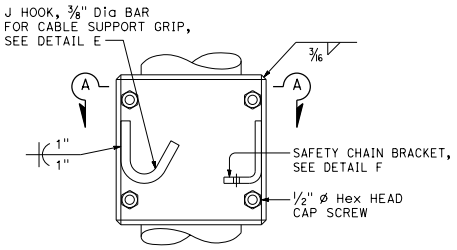

BASE PLATE
DETAIL A



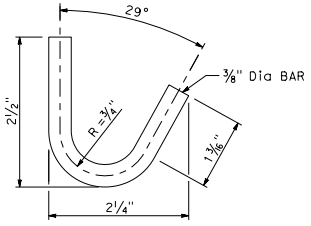

TOP PLATE
DETAIL B

NOTES:

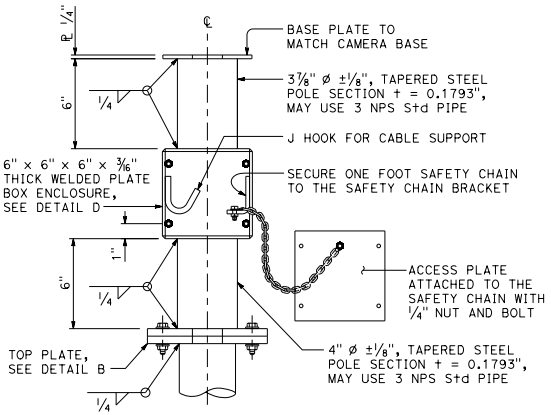
1. Verify controlling field dimensions before ordering or fabricating any material.
2. During pole installation, the post shall be raked as necessary with the use of leveling nuts to provide a plumb pole axis.
3. For wind loading, see Standard Plan ES-7M.
4. Materials (Structural Steel):
   a. fy = 55,000 psi (tapered steel tube and anchor bolts)
   b. fy = 50,000 psi (unless otherwise noted)
5. Materials (Reinforced Concrete):
   a. f'c = 3,625 psi
   b. fy = 60,000 psi



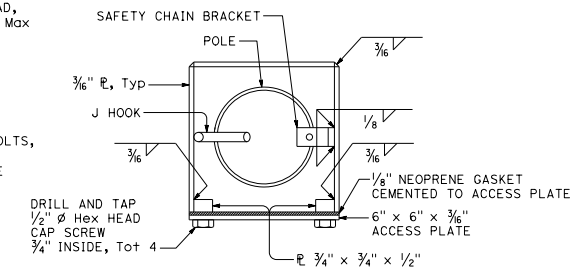

BOX ENCLOSURE
DETAIL D



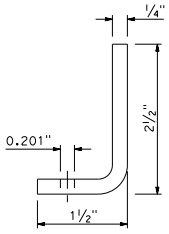

J HOOK
DETAIL E




DETAIL C
CAMERA MOUNTING ADAPTER




SECTION A-A




DETAIL F
SAFETY CHAIN BRACKET

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (CAMERA POLE 25' TO 45')

NO SCALE

ES-16B

7-1-25

2025 STANDARD PLAN ES-16B

602

Return to Table of Contents

| POLE TYPE | POLE DATA | | | | | BASE PLATE DATA | | | | | CIDH PILE DATA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HEIGHT "h" | Min OD | | THICKNESS BOTTOM SEGMENT (Min 25' LONG) | Min THICKNESS UPPER SEGMENT(S) | Dia | THICKNESS | ANCHOR BOLT SIZE | | BC | "D" | "L" |
| | | BASE | TOP | | | | | TOTAL | "d" | | | |
| HM CAMERA POLE 50 | 50' | 18" | 10⅞" | 0.3125" | 0.1875" | 32" | 2" | 12 | 2¼" | 25" | 3'-6" | 13'-0" |
| HM CAMERA POLE 60 | 60' | | 9½" | | | | | | | | | |
| HM CAMERA POLE 70 | 70' | 22" | 12" | | | 36" | 3" | | | 29" | 4'-0" | 14'-0" |
| HM CAMERA POLE 80 | 80' | 22" | 11⅝" | 0.375" | 0.25" | 39" | | | 3" | 30" | 4'-6" | |
| HM CAMERA POLE 90 | 90' | 25" | 17⅛" | | | 46" | | | | 37" | 6'-0" | 15'-0" |

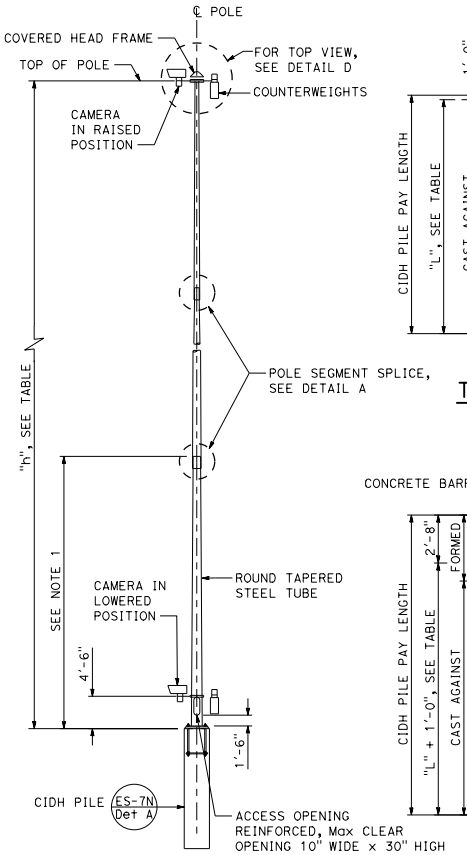
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

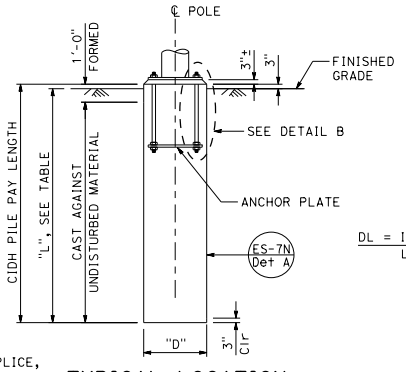
September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

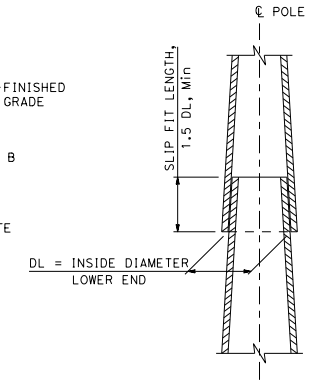
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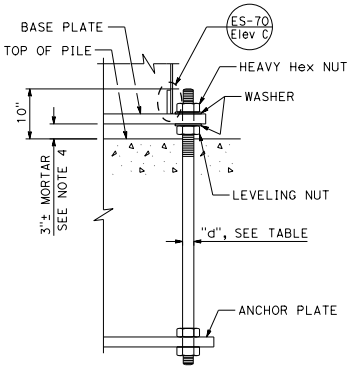

POLE
ELEVATION A




TYPICAL LOCATION
ELEVATION B



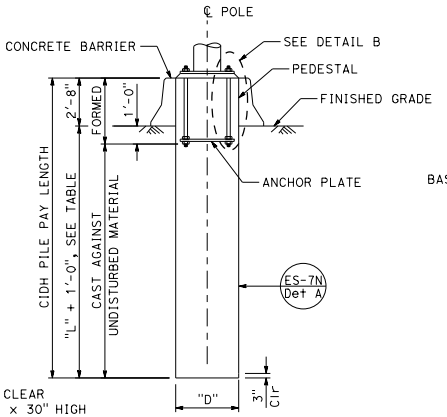

POLE SPLICE SEGMENT
DETAIL A



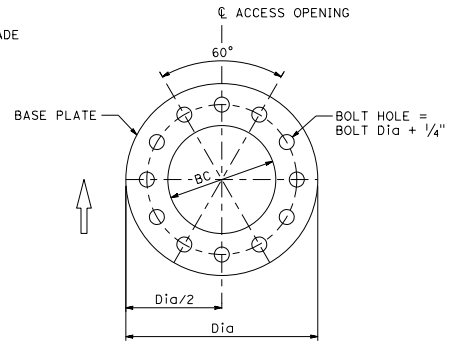

ANCHOR BOLT
DETAIL B

NOTES:

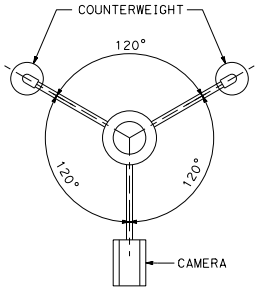
1. Pole details shall suit the lowering device and this foundation plan. Pole details shall be submitted to the Engineer for approval.
2. Access opening shall be located on the downstream side of traffic unless otherwise determined by the Engineer.
3. Foundation design is based on a 3-second wind gust of 100 mph.
4. For central void and drain holes in mortar, see Standard Plan ES-6B Detail N.
5. For wind loading, see Standard Plan ES-7M.
6. Materials (Structural Steel):
   fy = 55,000 psi (tapered steel tube)
   fy = 50,000 psi (unless otherwise noted)




MEDIAN LOCATION
ELEVATION C




BASE PLATE
DETAIL C




TOP VIEW
DETAIL D

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (HIGH MAST CAMERA POLE 50' TO 90')

NO SCALE

ES-16C

2025 STANDARD PLAN ES-16C

603

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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**TABLE A**

| POLE TYPE | POLE DATA | | | | BASE PLATE DATA | | | | CIDH PILE DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | HEIGHT H | Min OD | | THICKNESS | C | THICKNESS | ANCHOR BOLTS SIZE | BC = BOLT CIRCLE | D | L | |
| | | BASE | TOP | | | | | | | LEVEL GROUND | UP TO 2:1 |
| VDS 30 | 30′ | 8" | 3⅞" | 0.1793" | 1′-1½" | 1½" | 1½" ø x 3′-0" | 1′-0" | 2′-6" | 6′-0" | 8′-0" |
| VDS 35 | 35′ | 8¾" | 3 11/16" | | 1′-1½" | 2" | | 1′-0" | 2′-6" | 7′-0" | 9′-0" |
| VDS 40 | 40′ | 12" | 5⅝" | | 1′-6" | 2" | | 1′-4" | 3′-0" | 9′-0" | 11′-0" |

**TABLE B**

| POLE TYPE | COUPLING | |
|---|---|---|
| | E1 (Max) | E2 (Max) |
| VDS 30 | 3′-6" | 4′-9" |
| VDS 35 | | |
| VDS 40 | | |

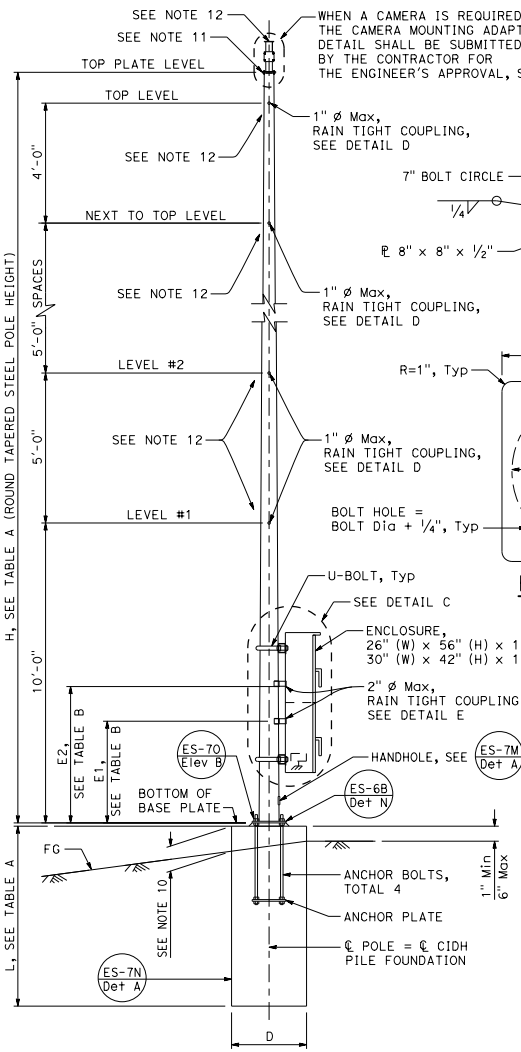
**TABLE C**

| SPREAD FOOTING | | |
|---|---|---|
| GROUND | FOOTING SIZE (LENGTH x WIDTH x DEPTH) | REINFORCEMENT TOP AND BOTTOM |
| LEVEL | 8′-6" x 8′-6" x 2′-0" | 12 - #5 EW |
| UP TO 2:1 | 10′-0" x 10′-0" x 2′-0" | 15 - #5 EW |

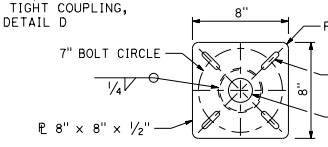
**TABLE D - LIMITATION ON ATTACHMENTS ***

| LOCATION | MAXIMUM TOTAL EPA PER LEVEL (SQUARE FEET) | MAXIMUM TOTAL WEIGHT (lb) |
|---|---|---|
| LEVEL #1 | 14 | 200 |
| LEVEL #2 | 14 | |
| LEVEL #3 | 10 *** | |
| LEVEL #4 (VDS 35 AND VDS 40 ONLY) | 2.5 | 50 |
| LEVEL #5 (VDS 40 ONLY) | | |
| NEXT TO TOP LEVEL | | |
| TOP LEVEL | | |
| ON TOP PLATE LEVEL ** | | |

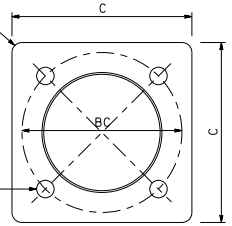
* Maximum horizontal extent beyond pole face is 4′-0".
** Maximum extent above top plate is 3′-0".
*** 14 if level #1 is zero.



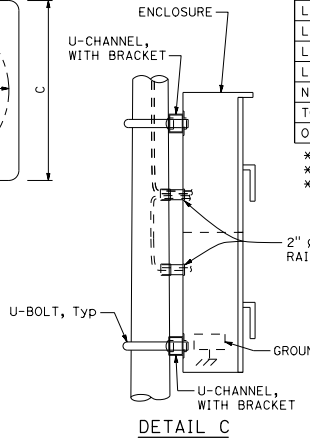

ELEVATION A



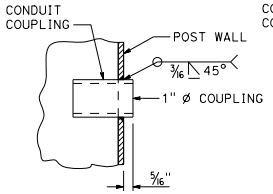

TOP PLATE
DETAIL A



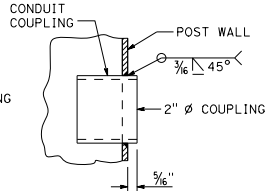

BASE PLATE
DETAIL B



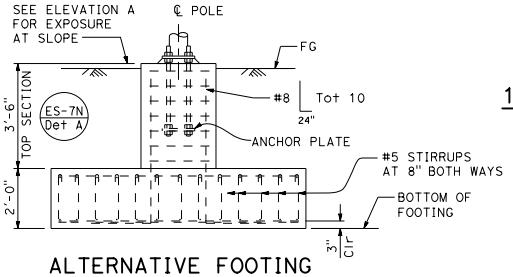

DETAIL C




1" ø COUPLING
DETAIL D




2" ø COUPLING
DETAIL E




ALTERNATIVE FOOTING
ELEVATION B

NOTES:

1. All steel shall be galvanized after fabrication.
2. The foundation shall be treated as level ground condition if the slope inclination is flatter than 4:1 (Horizontal:Vertical).
3. For devices mounted and mounting heights, see Table B.
4. For wind loading, see Standard Plan ES-7M.
5. Materials (Structural Steel):
   a. fy = 55,000 psi (tapered steel tube)
   b. fy = 50,000 psi (unless otherwise noted)
6. Anchor bolts: fy = 55,000 psi
7. Materials (Reinforced Concrete):
   a. f′c = 3,600 psi
   b. fy = 60,000 psi
8. Verify all controlling field dimension before ordering of fabricating any material.
9. When no barriers are used, the enclosure shall be located on the downstream side and perpendicular to the roadway.
10. 1′-3" maximum for sloped finished grade.
11. Top plate.
    Install a blank flange on the top plate when camera is not used.
12. Use the manufacturer's Effective Projected Area (EPA) for attachments. Assign attachments to nearest level and sum each level, see Table D for limitations.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS (VEHICLE DETECTION SYSTEM, POLE 30' TO 40')

NO SCALE

**ES-16D**

7-1-25

2025 STANDARD PLAN ES-16D

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

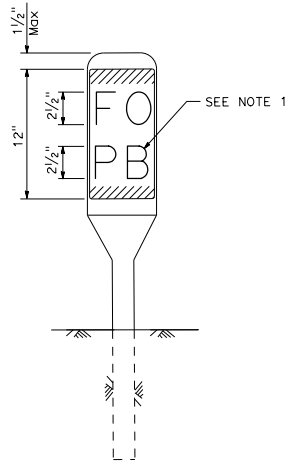
Bhanupriya Sharma
REGISTERED ELECTRICAL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

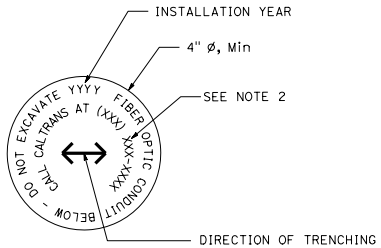
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REGISTERED PROFESSIONAL ENGINEER
Bhanupriya Sharma
No. E23752
Exp. 12-31-25
ELECTRICAL
STATE OF CALIFORNIA

NOTES:
1. "PB" for Pull Box or "VT" for Vault.
2. Telephone number as specified.
3. 1" black text.
4. ½" black text.

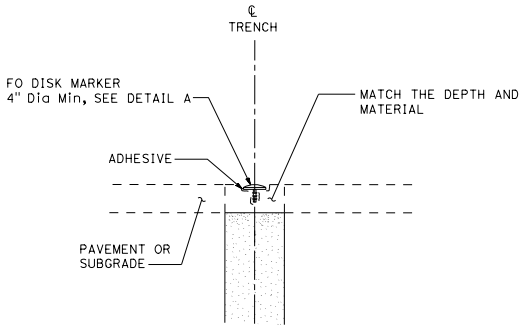



FIBER OPTIC MARKER
FOR VAULTS AND PULL BOXES

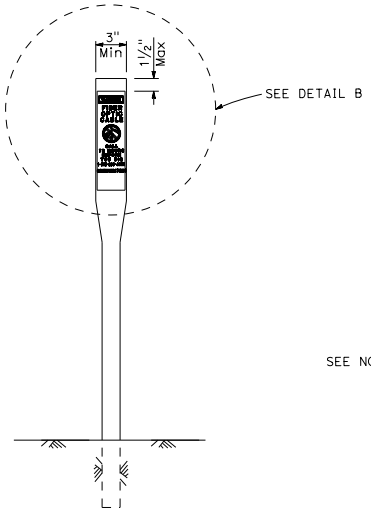



DISK MARKER ETCHING

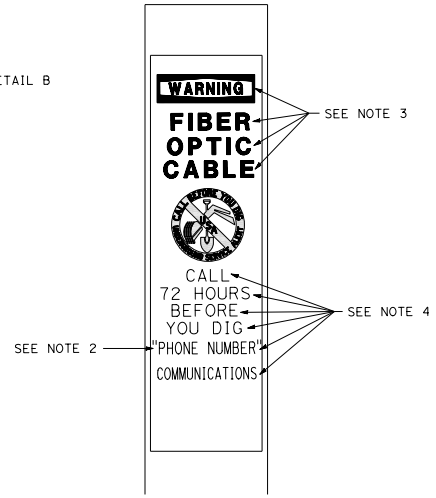
DETAIL A




FIBER OPTIC MARKER
FOR PAVED AREAS




FIBER OPTIC MARKER
FOR UNPAVED AREAS




DETAIL B

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# ELECTRICAL SYSTEMS
# (FIBER OPTIC MARKER DETAILS)

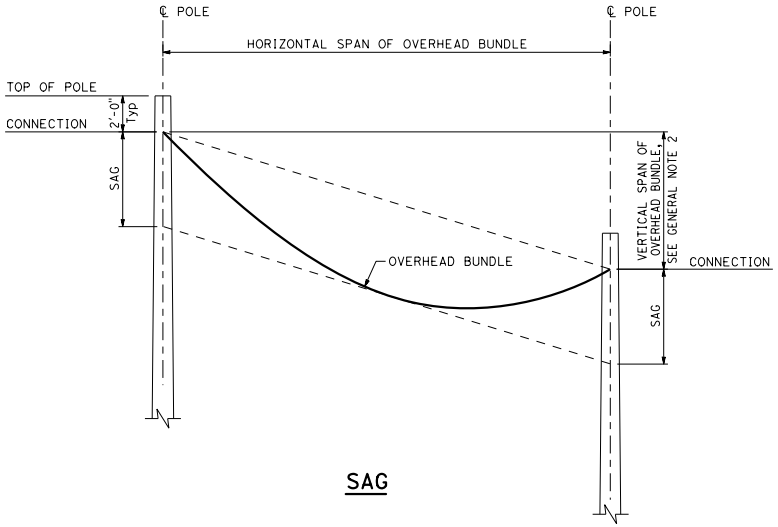
NO SCALE

**ES-17A**

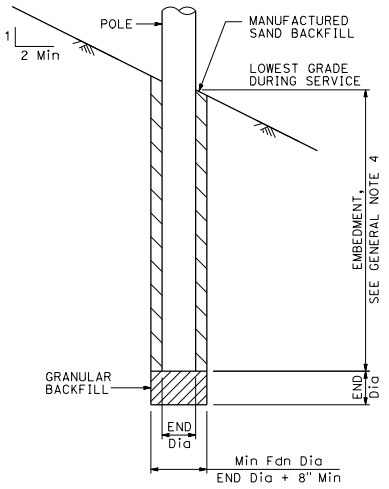
7-1-25

2025 STANDARD PLAN ES-17A

Return to Table of Contents




## SAG




## POLE FOUNDATION

Design: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Fifth Edition (LTS-5).

GROUP LOAD COMBINATIONS:

I Dead Load
II Dead Load + Wind Load
III Dead Load + 0.5 (Wind Load) + Ice Load
IV Fatigue: Not used

LOADING:

Wind Loading: 100 mph (3-second gust)
Wind Recurrence Interval: 10 years
Combined height, exposure, and elevated terrain factor = 1.05 (Exposure C, structure is not located on or over the top half of a ridge, hill, or escarpment)
Ice Loading: 3.0 psf on surfaces, 0.60 in radial thickness of ice at a unit weight of 60 pcf on overhead bundles

BASIC DESIGN VALUES:

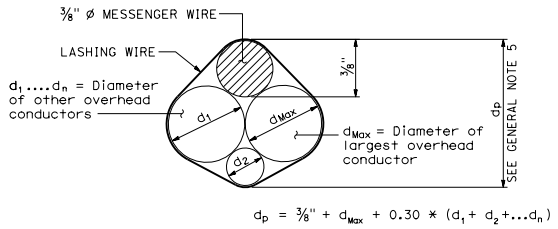
Timber Poles: Fb = 1850 psi
Fv = 110 psi
Fcp = 230 psi
Fc = 950 psi
E = 1500 x $10^3$ psi

DESIGN WIRE BREAKING STRENGTHS:

ASTM A475, Utilities Grade, 7 strand modified by termination efficiency factor of 0.8

FOUNDATION DESIGN NOTES:

1. Pole embedment depth design is based on Broms' approximate procedure as described in Article 13.6 of AASHTO LTS-5.
2. Embedment depth is calculated based on following soil parameters,
   Cohesive Soil:
   Shear strength of soil c = 1500 psf.
   Cohesionless Soil:
   ø = 30 deg, γ = 120 pcf.
   Soil assumed to be unsaturated.
3. An overload factor of 2.0 and an undercapacity factor of 0.7 were used for safety factor of 2.86.
4. Allowable vertical bearing pressure at the end bearing of poles is 3000 psf at 6 feet or more embedment.
5. Guy wire anchor minimum allowable tension capacity, "Qa" = 8,900 lbs.




$d_p = ⅜" + d_{Max} + 0.30 * (d_1 + d_2 + ... d_n)$

## PROJECTED DEPTH OF OVERHEAD BUNDLE, (dp)

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

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## GENERAL NOTES:

1. The messenger wire and any combination of overhead conductors must not exceed either a self weight of 3.0 lb/ft or the maximum d in the pole selection tables.
2. The maximum vertical span is 10% of the horizontal span.
3. For poles with adjacent unbalanced horizontal spans, the shortest horizontal span must be at least 50% of the largest horizontal span.
4. Add 2'-0" for slopes above 1V:4H.
5. For a pole supporting multiple spans, calculate dp for each span and use the largest value.
6. Do not exceed the attachments shown.

**DIAMETERS AND SELF WEIGHT OF OVERHEAD CONDUCTORS**

| CONDUCTOR OR CABLE TYPE | DIAMETER d (in) | WEIGHT w (plf) |
|---|---|---|
| 3 CONDUCTOR SIGNAL CABLE (3CSC) | 0.400 | 0.0980 |
| 5 CONDUCTOR SIGNAL CABLE (5CSC) | 0.500 | 0.1560 |
| 9 CONDUCTOR SIGNAL CABLE (9CSC) | 0.650 | 0.2760 |
| 12 CONDUCTOR SIGNAL CABLE (12CSC) | 0.800 | 0.3970 |
| 1-#14 | 0.166 | 0.0235 |
| 1-#12 | 0.185 | 0.0330 |
| 1-#10 | 0.210 | 0.0476 |
| 1-#8 | 0.271 | 0.0774 |
| 1-#6 | 0.310 | 0.1130 |
| 1-#4 | 0.359 | 0.1690 |
| 1-#3 | 0.388 | 0.2080 |
| 1-#2 | 0.420 | 0.2560 |
| 1-#1 | 0.498 | 0.3340 |
| 6-CONDUCTOR SIGNAL INTERCONNECT CABLE (SIC) | 0.350 | 0.0860 |
| 12-CONDUCTOR SIGNAL INTERCONNECT CABLE (SIC) | 0.500 | 0.1440 |
| DETECTOR LEAD-IN CABLE (DLC) | 0.310 | 0.0440 |
| 12 to 48-STRAND FIBER OPTIC CABLE (48FOC) | 0.424 | 0.0600 |
| 72-STRAND FIBER OPTIC CABLE (72FOC) | 0.484 | 0.0770 |
| 96-STRAND FIBER OPTIC CABLE (96FOC) | 0.535 | 0.1050 |
| 144-STRAND FIBER OPTIC CABLE (144FOC) | 0.670 | 0.1890 |
| ⅜" ø MESSENGER WIRE | 0.375 | 0.2730 |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES GENERAL NOTES

NO SCALE

**ES-18A**

7-1-25



Return to Table of Contents

LEGEND:

- Wood Pole No Attachments
- A — Wood Pole with Attachments
- —OH— Overhead Bundle

## POLE SELECTION TABLE

| OVERHEAD BUNDLE HORIZONTAL SPAN (Max) | | CASE 1N | | | | CASE 2N | | | | CASE 3N | | | | CASE 4N | | | | CASE 5N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MAXIMUM $d_p$ | 1.0" | 1.5" | 2.0" | 2.5" | 1.0" | 1.5" | 2.0" | 2.5" | 1.0" | 1.5" | 2.0" | 2.5" | 1.0" | 1.5" | 2.0" | 2.5" | N/A |
| 50′ | MINIMUM POLE CLASS | H-1 | H-2 | H-2 | H-2 | 4 | 3 | 2 | 1 | H-2 | H-2 | H-3 | H-3 | H-4 | H-4 | H-4 | H-5 | CLASS 1 E = 10′ |
| | POLE EMBEDMENT (E) | 11′ | | | | 10′ | | | | 11′ | | | | 12′ | | | | |
| 100′ | MINIMUM POLE CLASS | H-2 | H-3 | H-4 | H-5 | 1 | H-1 | H-2 | H-3 | H-4 | H-5 | H-5 | H-6 | H-5 | H-5 | H-6 | | |
| | POLE EMBEDMENT (E) | 12′ | | | | 11′ | | | | 12′ | | | | 12′ | | | | |
| 150′ | MINIMUM POLE CLASS | H-4 | H-5 | H-6 | | H-1 | H-2 | H-3 | H-5 | H-6 | | | | H-6 | | | | |
| | POLE EMBEDMENT (E) | 12′ | | | | 12′ | | | | 12′ | | | | 12′ | | | | |
| 200′ | MINIMUM POLE CLASS | H-5 | H-6 | | | H-2 | H-3 | H-5 | | | | | | | | | | |
| | POLE EMBEDMENT (E) | 12′ | | | | 12′ | | | | | | | | | | | | |

## LEGEND

1. Camera or vehicle detection system
2. Overhead bundle consisting of a ⅜" Ø messenger wire, overhead conductors, and lashing wire
3. Luminaire with mast arm
4. Pedestrian push button or accessible push button
5. Signal face with 3 indications or single sheet sign panel (10 SQFT Max)
6. Riser with weather head as required
7. Pull box as required
8. Grounding as required
9. Single flashing beacon or single sheet sign panel (4 SQFT Max)
10. Single sheet sign panel (4′ x 4′ Max) or signal face with 3 indications
11. Flashing beacon enclosure
12. Enclosure, 26"(W) x 56"(H) x 12"(D) Max dimensions. Max weight including batteries, 450 lbs
13. 25 SQFT Max total photovoltaic panels mounted as shown as required
14. 2-12" flashing beacons

## NOTES:

1. In addition to other restrictions on maximum horizontal span, this horizontal span must not exceed 100′.
2. Cases 1N, 3N, and 4N may substitute the attachments shown in Case 5N if the photovoltaic panel is not included.
3. For Case 1N without an overhead bundle (item 2), use minimum pole class H-1 with E=11′.

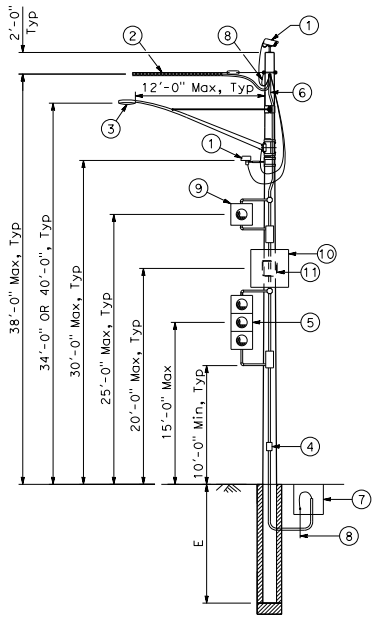
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

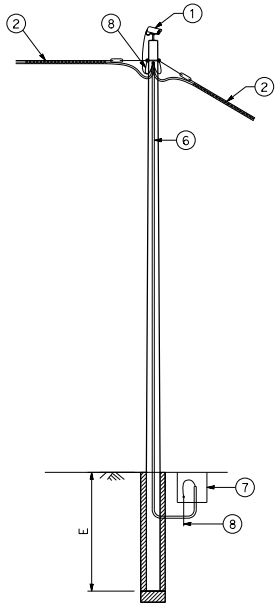
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CASE 1N

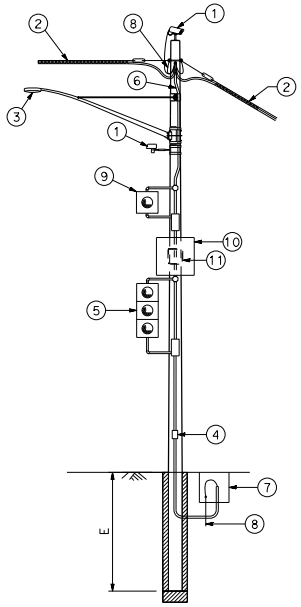
POLE AT DEAD END WITH ATTACHMENTS

See Note 2




CASE 2N

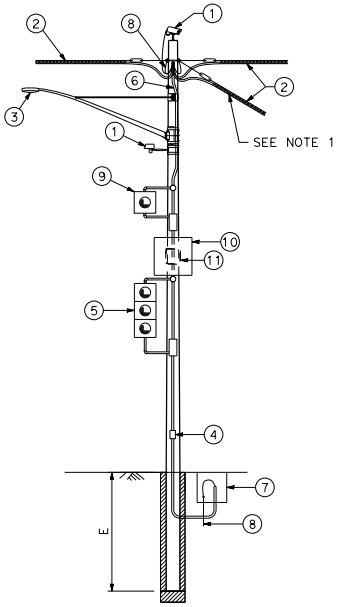
POLE AT TANGENT WITHOUT ATTACHMENTS




CASE 3N

POLE AT TANGENT OR CORNER WITH ATTACHMENTS

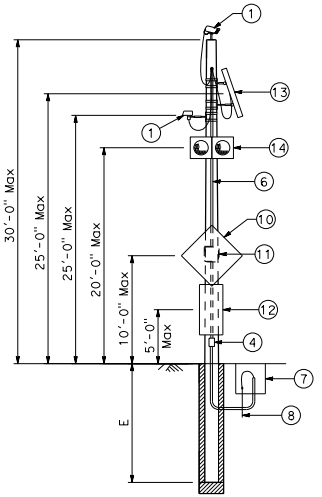
See Note 2




CASE 4N

POLE AT JUNCTION WITH ATTACHMENTS

See Note 2




CASE 5N

POLE WITHOUT OVERHEAD BUNDLE WITH ATTACHMENTS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES NON-GUYED NO SIGNALS ON SPANS

NO SCALE

**ES-18B**

7-1-25

2025 STANDARD PLAN ES-18B

607

Return to Table of Contents

LEGEND:

- A — Wood Pole with Attachments
- —OH— Overhead Bundle
- —— Guy Anchor

## POLE SELECTION TABLE

| OVERHEAD BUNDLE HORIZONTAL SPAN (Max) | | | CASE 1G | | | | CASE 2G | | | | CASE 3G | | | | CASE 4G | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MAXIMUM $d_p$ | 1.0" | 1.5" | 2.0" | 2.5" | 1.0" | 1.5" | 2.0" | 2.5" | 1.0" | 1.5" | 2.0" | 2.5" | 1.0" | 1.5" | 2.0" | 2.5" |
| | 50′ | MINIMUM POLE CLASS | H-1 | H-1 | H-2 | H-2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | H-1 | H-2 | H-2 | H-3 | H-3 |
| | | POLE EMBEDMENT (E) | 10′ | | | | 9′ | | | | 9′ | | | | 11′ | | | |
| | 100′ | MINIMUM POLE CLASS | H-2 | H-2 | H-3 | H-4 | 1 | H-1 | H-1 | H-1 | 1 | H-1 | H-2 | H-2 | H-3 | H-3 | H-4 | H-4 |
| | | POLE EMBEDMENT (E) | 11′ | | | | 9′ | | | | 9′ | | | | 12′ | | | |
| | 150′ | MINIMUM POLE CLASS | H-3 | H-3 | H-4 | H-5 | H-1 | H-1 | H-2 | H-2 | H-2 | H-3 | H-3 | H-3 | H-4 | H-5 | H-5 | H-6 |
| | | POLE EMBEDMENT (E) | 11′ | | | | 9′ | | | | 9′ | | | | 12′ | | | |
| | 200′ | MINIMUM POLE CLASS | H-4 | H-4 | H-5 | H-6 | H-1 | H-2 | H-3 | H-3 | H-3 | H-3 | H-4 | H-4 | H-5 | H-6 | | |
| | | POLE EMBEDMENT (E) | 11′ | | | | 9′ | | | | 9′ | | | | 12′ | | | |

LEGEND

1. Camera or vehicle detection system
2. Overhead bundle consisting of a ⅜" ø messenger wire, overhead conductors, and lashing wire
3. Luminaire with mast arm
4. Pedestrian push button or accessible push button
5. Signal face with 3 indications or single sheet sign panel (10 SQFT Max)
6. Riser with weather head as required
7. Pull box as required
8. Grounding as required
9. Single flashing beacon or single sheet sign panel (4 SQFT Max)
10. Single sheet sign panel (4′ x 4′ Max) or signal face with 3 indications
11. Flashing beacon enclosure
12. ½" ø guy wire with white guy marker and strain insulator (for anchorage, see Standard Plan ES-19B)

NOTES:

1. In addition to other restrictions on maximum horizontal span, this horizontal span must not exceed 100′.
2. Guy wire in line with opposing span ±5°.

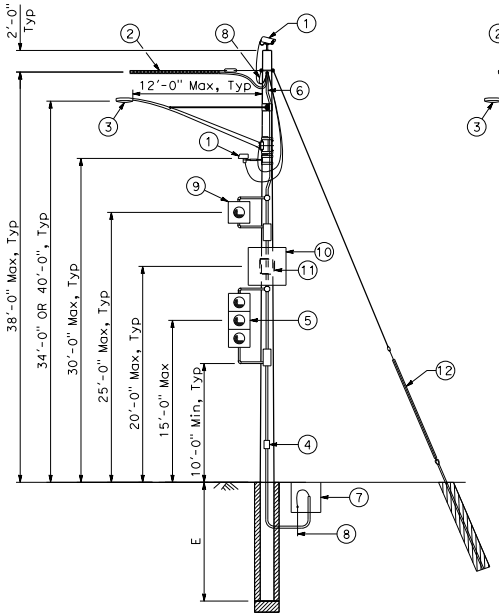
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

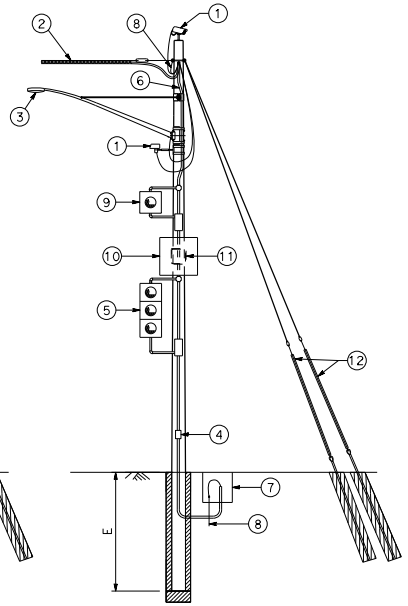
September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson No. C57793 Exp. 3-31-26 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

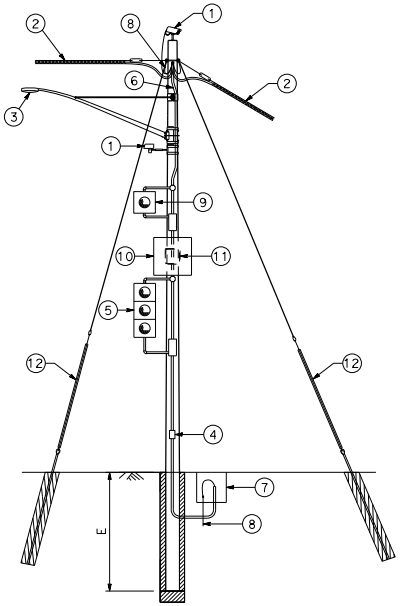
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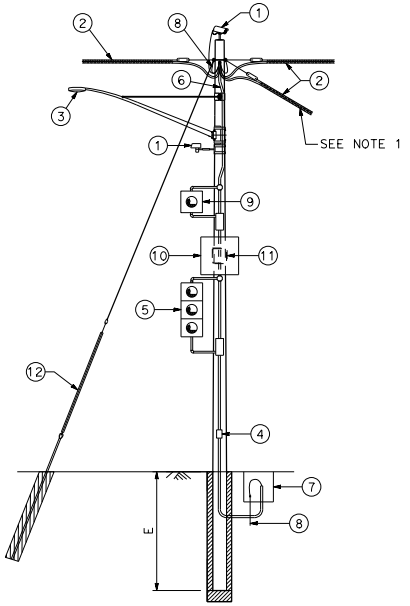

CASE 1G
POLE AT DEAD END WITH ATTACHMENTS




CASE 2G
POLE AT DEAD END WITH ATTACHMENTS




CASE 3G
POLE AT CORNER WITH ATTACHMENTS




CASE 4G
POLE AT JUNCTION WITH ATTACHMENTS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES GUYED NO SIGNALS ON SPANS

NO SCALE

ES-18C

7-1-25

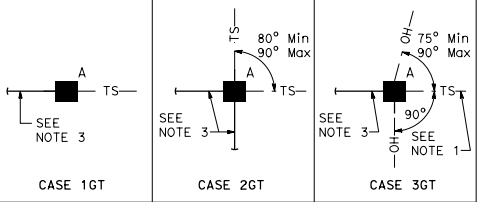
2025 STANDARD PLAN ES-18C

Return to Table of Contents

LEGEND:

- A — Wood Pole with Attachments
- TS — Overhead Bundle with Signal Faces, See Note 2
- OH — Overhead Bundle
- Guy Anchor

## POLE SELECTION TABLE




CASE 1GT | CASE 2GT | CASE 3GT

| OVERHEAD BUNDLE HORIZONTAL SPAN Max | | MAXIMUM $d_p$ | 1.0" | 1.5" | 2.0" | 1.0" | 1.5" | 2.0" | 1.0" | 1.5" | 2.0" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50′ | | MINIMUM POLE CLASS | H-2 | H-3 | H-3 | H-2 | H-2 | H-2 | H-3 | H-4 | H-4 |
| | | POLE EMBEDMENT (E) | 10′ | | | 10′ | | | 11′ | | |
| 100′ | | MINIMUM POLE CLASS | H-3 | H-3 | H-4 | H-2 | H-3 | H-3 | H-4 | H-4 | H-5 |
| | | POLE EMBEDMENT (E) | 11′ | | | 10′ | | | 11′ | | |
| 150′ | | MINIMUM POLE CLASS | H-3 | H-4 | H-4 | H-2 | H-3 | H-4 | H-4 | H-5 | H-5 |
| | | POLE EMBEDMENT (E) | 11′ | | | 10′ | | | 11′ | | |

LEGEND

1. Camera or vehicle detection system
2. Overhead bundle consisting of ⅜" ø messenger wire and overhead conductors and lashing wire
3. Luminaire with mast arm
4. Pedestrian push button or accessible push button
5. Signal face with 3 indications or single sheet sign panel (10 SQFT Max)
6. Riser with weather head as required
7. Pull box as required
8. Grounding as required
9. ⅜" ø tether wire
10. ½" ø guy wire with white guy marker and strain insulator. For anchorage, see Standard Plan ES-19B
11. Pedestrian signal head

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

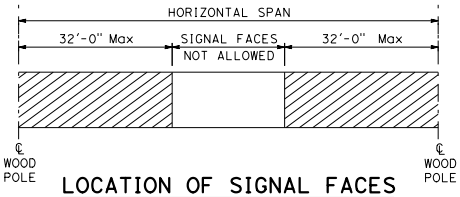
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

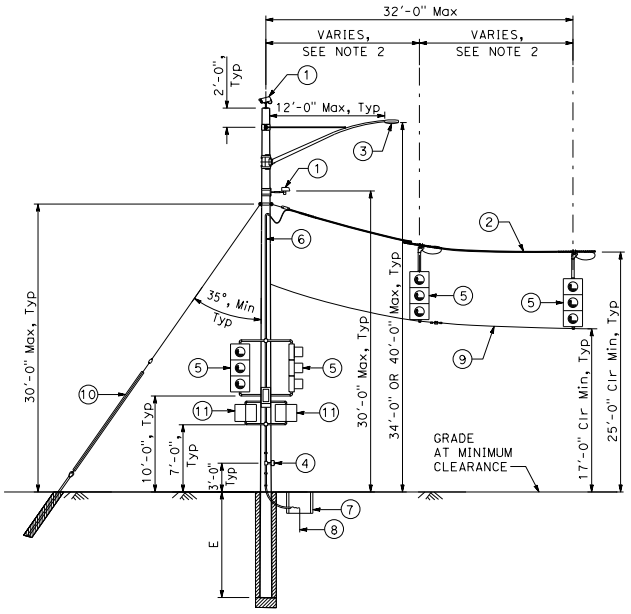
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NOTES:

1. In addition to other restrictions on maximum horizontal span, this horizontal span must not exceed 100′.
2. Maximum of 2 signal faces per span within the hatched regions indicated by "LOCATION OF SIGNAL FACES".
3. Guy wire in line with opposing span ±5°.

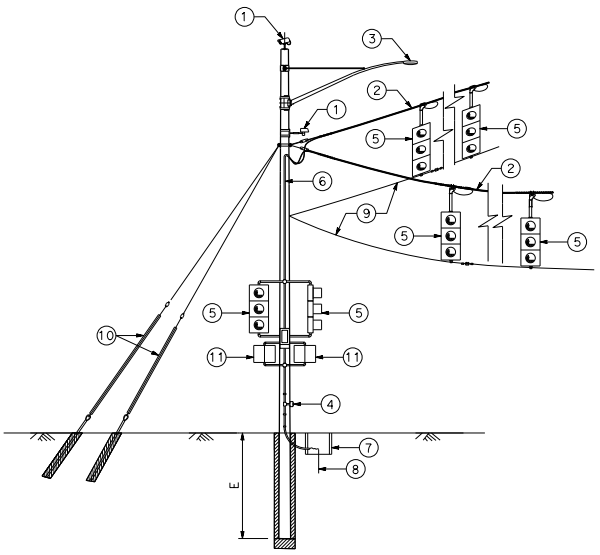



LOCATION OF SIGNAL FACES



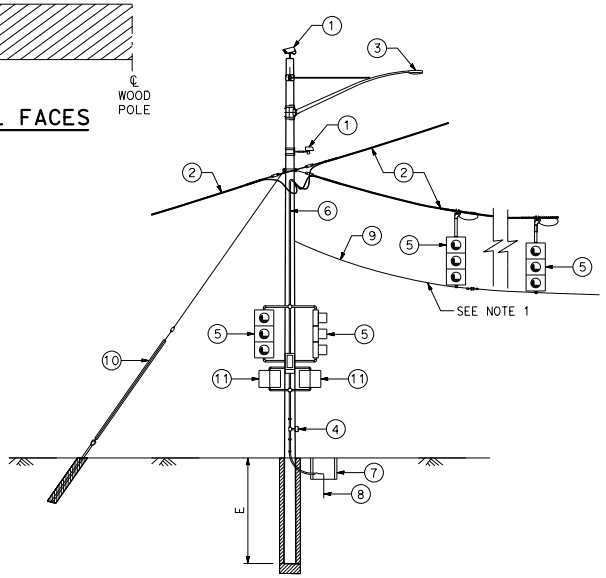

CASE 1GT

POLE AT DEAD END WITH ATTACHMENTS




CASE 2GT

POLE AT CORNER WITH ATTACHMENTS




CASE 3GT

POLE AT JUNCTION WITH ATTACHMENTS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES GUYED WITH SIGNAL FACES ON SPANS

NO SCALE

**ES-18D**

7-1-25

2025 STANDARD PLAN ES-18D

609

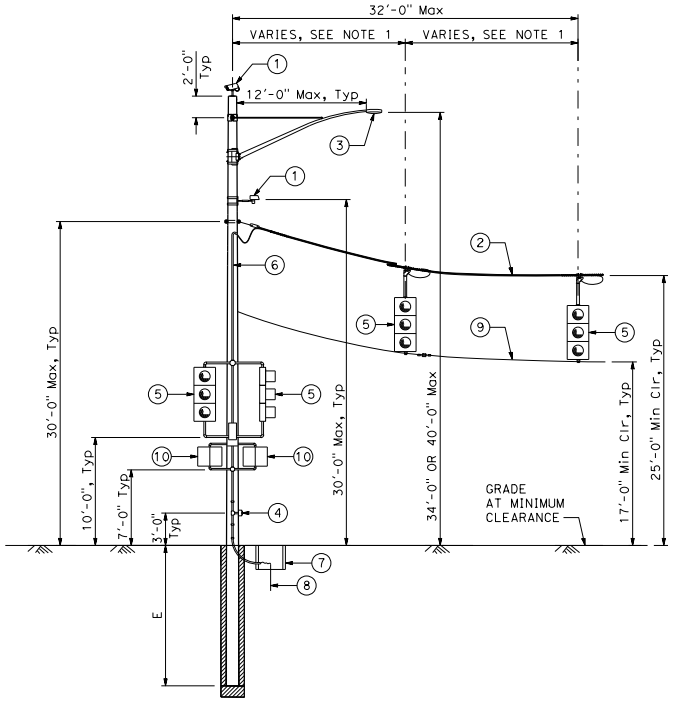
Return to Table of Contents

LEGEND:

A — Wood Pole with attachments

—TS— — Overhead Bundle with Signal Faces, see Note 1

| | | POLE SELECTION TABLE | | |
|---|---|---|---|---|
| | | A —TS— CASE 1NT | | |
| OVERHEAD BUNDLE HORIZONTAL SPAN (Max) | MAXIMUM $d_p$ | 1.0" | 1.5" | 2.0" |
| 75' | MINIMUM POLE CLASS | H-5 | H-6 | H-6 |
| | POLE EMBEDMENT (E) | 13' | | |




CASE 1NT

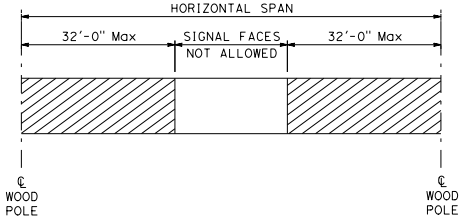
POLE AT DEAD END WITH ATTACHMENTS

NOTE:

1. Maximum of 2 signal faces per span within the hatched regions indicated by "LOCATION OF SIGNAL FACES".

LEGEND

1. Camera or vehicle detection system
2. Overhead bundle consisting of a 3/8" Ø messenger wire and overhead conductors and lashing wire
3. Luminaire with mast arm
4. Pedestrian push button or accessible push button
5. Signal face with 3 indications or single sheet sign panel (10 SQFT Max)
6. Riser with weather head as required
7. Pull box as required
8. Grounding as required
9. 3/8" Ø tether wire
10. Pedestrian signal head




LOCATION OF SIGNAL FACES

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Stanley P. Johnson — No. C57793 — Exp. 3-31-26 — CIVIL — STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES NON-GUYED WITH SIGNAL FACES ON SPAN

NO SCALE

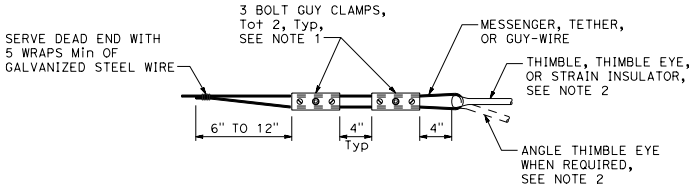
ES-18E

2025 STANDARD PLAN ES-18E

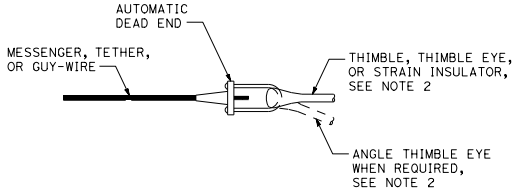
610

7-1-25

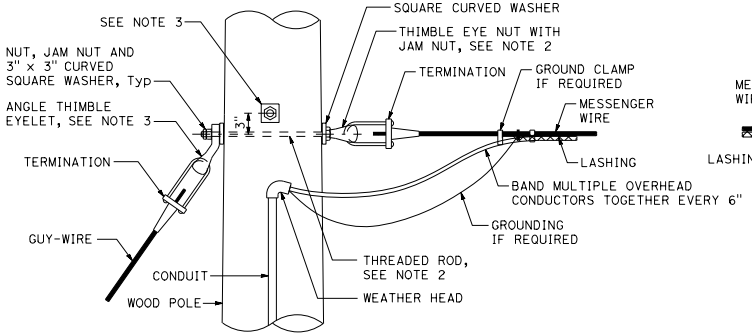
Return to Table of Contents



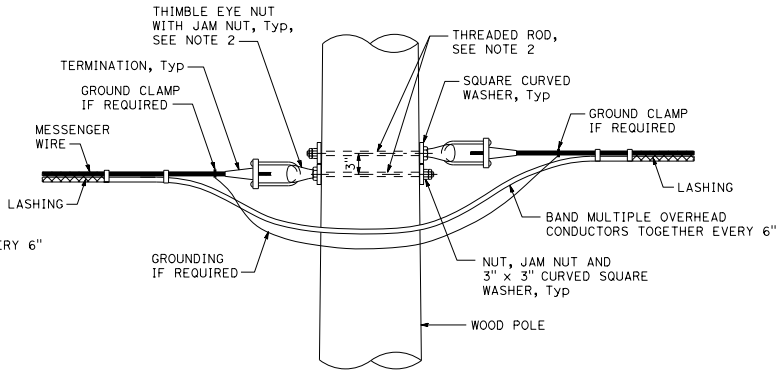

## ALTERNATIVE TERMINATION OF MESSENGER WIRES USING GUY CLAMPS




## TERMINATION OF WIRES USING AUTOMATIC DEAD END



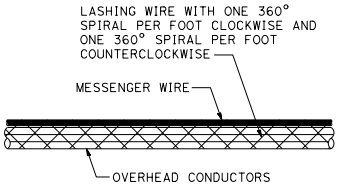

## POLE AT DEAD END WITH GUY-WIRE CONNECTION




## POLE AT TANGENT OR CORNER CONNECTION

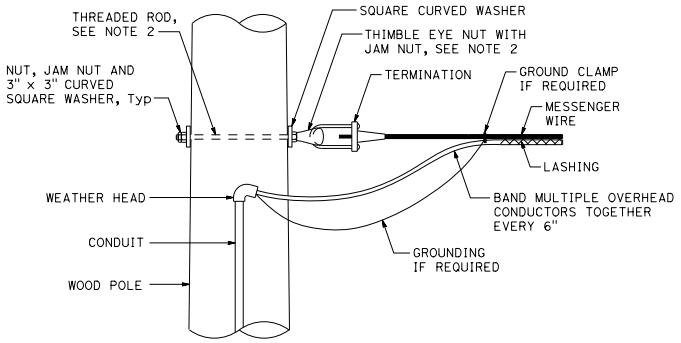
NOTES:

1. For guy wires, use 3 clamps.
2. Use $\frac{5}{8}$" ø except $\frac{3}{4}$" ø at guyed wires.
3. Install additional angle thimble eyelet at poles with two guy wires.

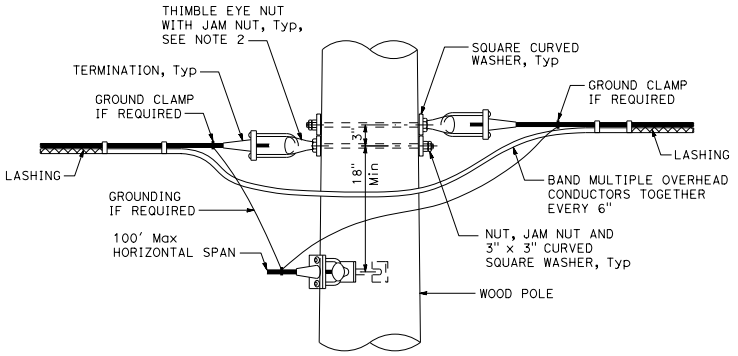



## DOUBLE LASHING DETAIL

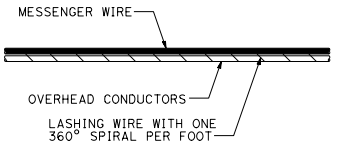
Use if $d_p$ is greater than $1\frac{1}{2}$"




## POLE AT DEAD END CONNECTION




## POLE AT JUNCTION CONNECTION




## TYPICAL LASHING DETAIL

Use if $d_p$ is $1\frac{1}{2}$" or less

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES DETAILS No. 1

NO SCALE

**ES-19A**

7-1-25

2025 STANDARD PLAN ES-19A

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
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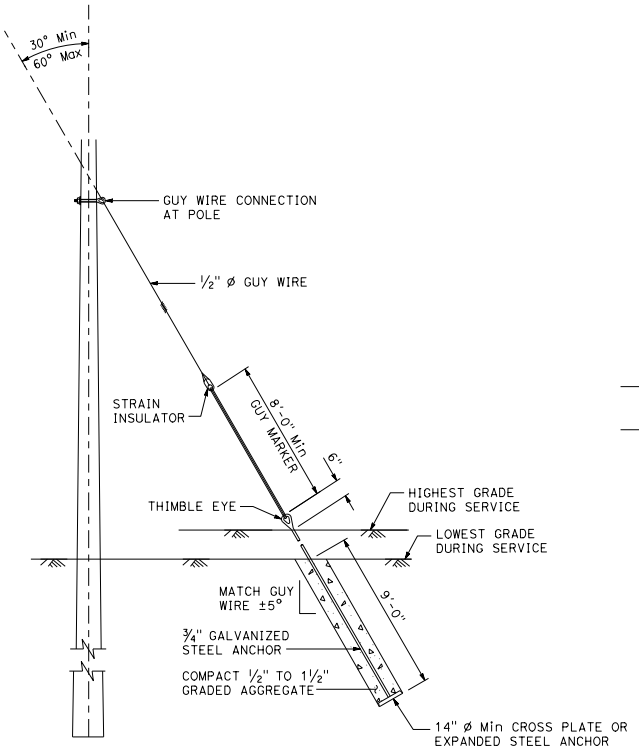
REGISTERED CIVIL ENGINEER

September 19, 2025
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Stanley P. Johnson
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CIVIL
STATE OF CALIFORNIA

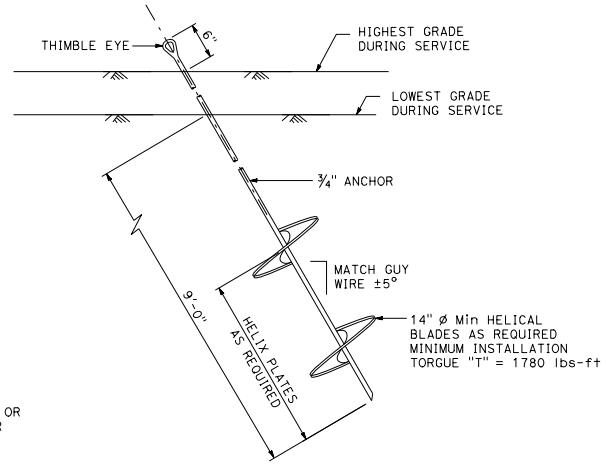
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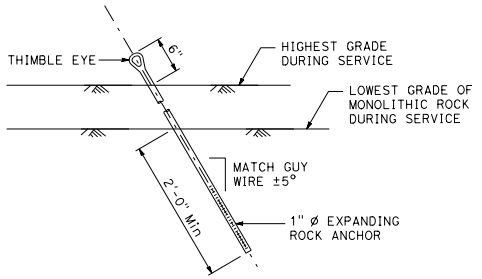

NOTE:
Helical anchor detail may be used in place of expanded steel anchors.

## EXPANDED STEEL ANCHOR DETAIL




## HELICAL ANCHOR DETAIL

NOTE:
1. For minimum allowable tension capacity of anchors, see Standard Plan ES-18A.




## EXPANDING ROCK ANCHOR DETAIL

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES DETAILS No. 2

NO SCALE

**ES-19B**

7-1-25

Return to Table of Contents

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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| | | | | | |

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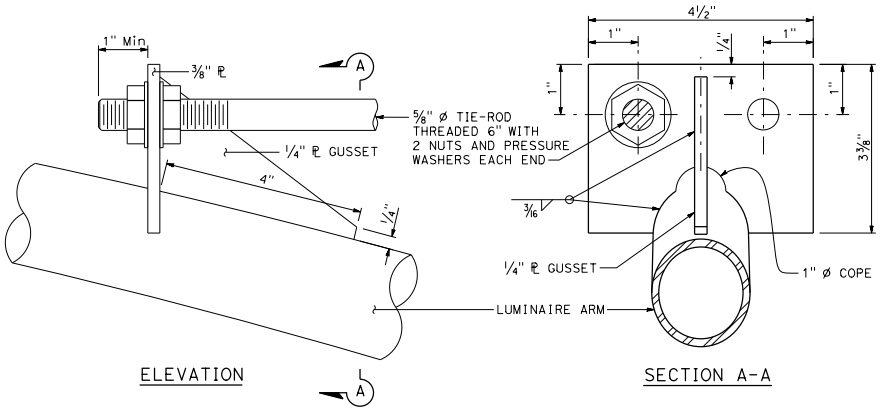
September 19, 2025
PLANS APPROVAL DATE

Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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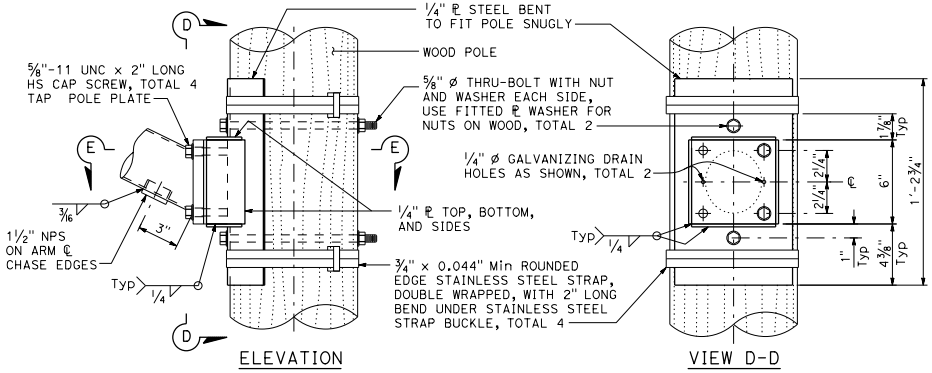
**NOTES:**

1. Luminaire mast arms must be in compliance with Standard Plan ES-6D with noted modifications.
2. Verify pole dimensions at tie-rod attachment height. Fabricate 9" flat bar with "L" Dimension to maintain an open gap between flanges in finished installation.
3. Not all screw heads and bolt heads are shown for clarity.
4. Mast arm not shown for clarity.



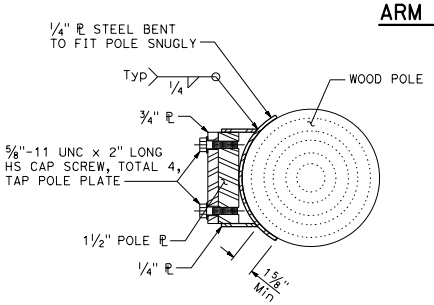

## TIE-ROD AT LUMINAIRE ARM

DETAIL A

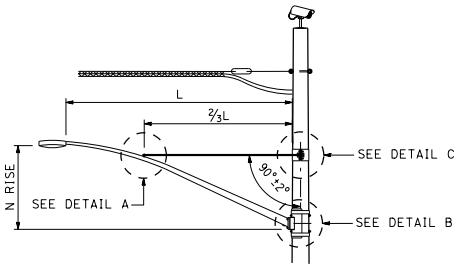



## ARM CONNECTION DETAILS

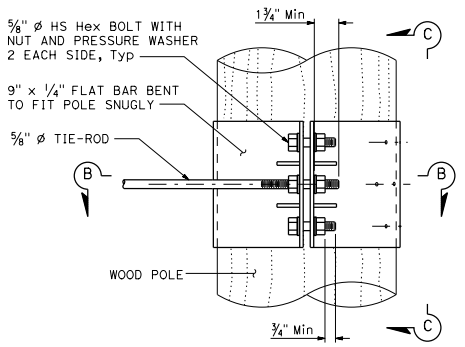
DETAIL B

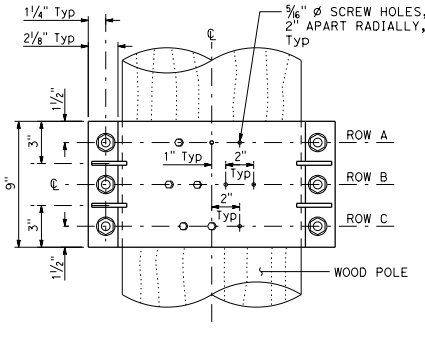


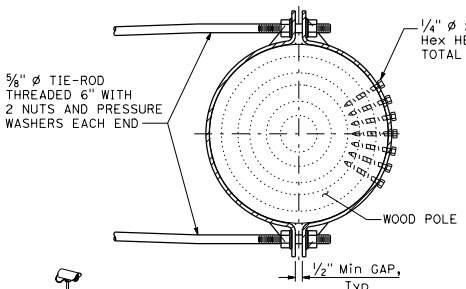

| LUMINAIRE MAST ARM DATA | | | |
|---|---|---|---|
| PROJECTED LENGTH | N RISE | Min OD AT POLE | NOMINAL THICKNESS |
| 6'-0" | 2'-0"± | 3¼" | 0.1196" |
| 8'-0" | 2'-6"± | 3½" | |
| 10'-0" | 3'-3"± | 3⅜" | |
| 12'-0" | 4'-3"± | | |

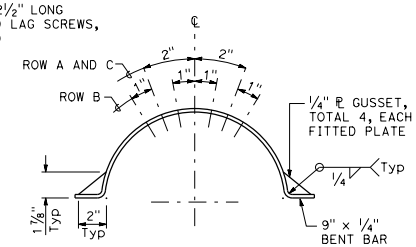



LUMINAIRE MAST ARM




## TIE-ROD AT POLE

DETAIL C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES DETAILS No. 3

NO SCALE

**ES-19C**

7-1-25

Return to Table of Contents

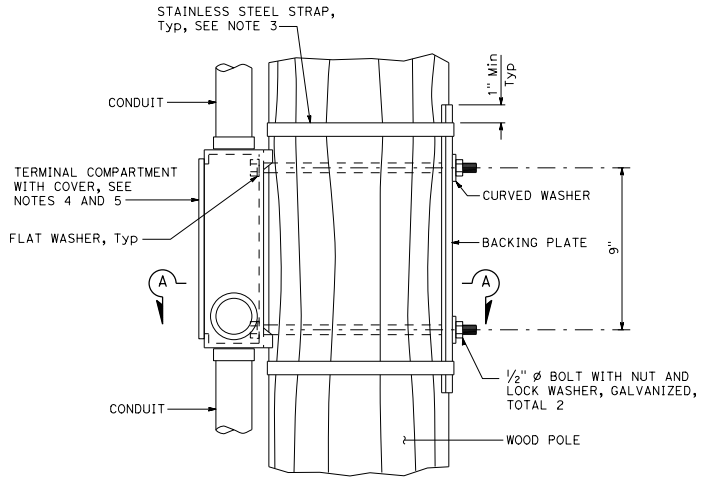
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
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REGISTERED CIVIL ENGINEER

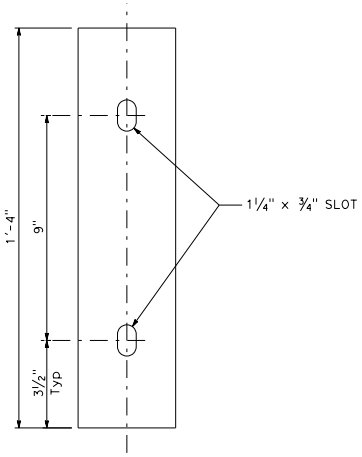
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Stanley P. Johnson
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CIVIL
STATE OF CALIFORNIA

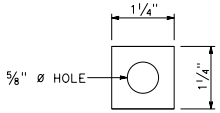
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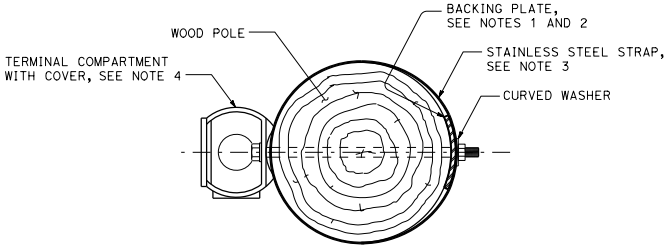

ELEVATION




ELEVATION

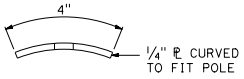



ELEVATION



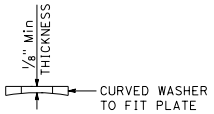

SECTION A-A

SIDE MOUNTING TERMINAL COMPARTMENT




PLAN

BACKING PLATE DETAIL




PLAN

CURVED WASHER DETAIL

NOTES:

1. Verify pole dimensions at terminal compartment for fabrication of backing plate and curved washer.
2. Backing plate to be galvanized after fabrication.
3. ¾" x 0.044" minimum, rounded edge stainless steel straps, double wrapped with 2" long bend under stainless steel strap buckle.
4. For miscellaneous details for signal mounting not shown, see Standard Plan ES-4D.
5. If the terminal compartment has a cable entry guide on the rear face, remove the cable entry guide to a level that will not interfere with the wood post. Close any unused cable entry locations with raintight cap.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES DETAILS No. 4

NO SCALE

ES-19D

2025 STANDARD PLAN ES-19D

7-1-25

Return to Table of Contents

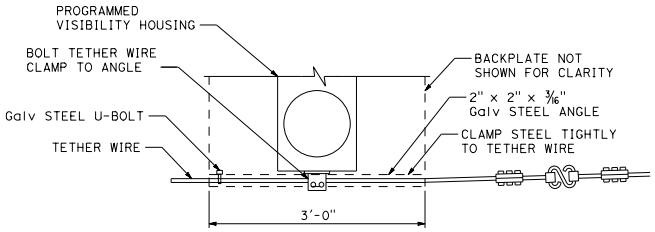
| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|---|---|---|---|---|
| | | | | | |

REGISTERED CIVIL ENGINEER

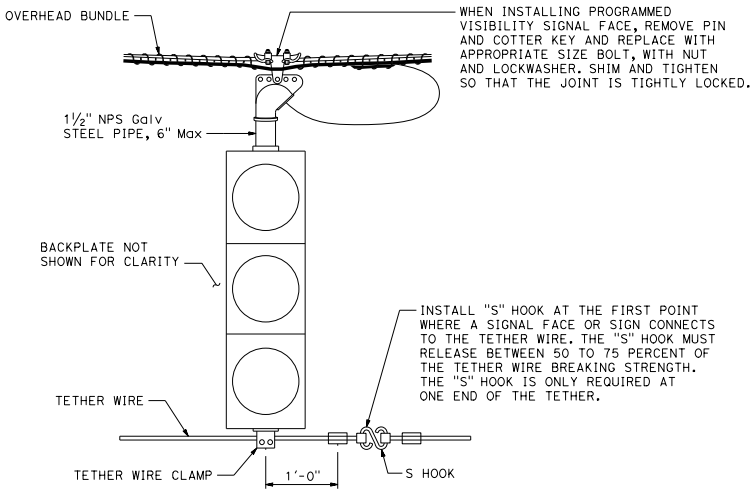
September 19, 2025
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Stanley P. Johnson
No. C57793
Exp. 3-31-26
CIVIL
STATE OF CALIFORNIA

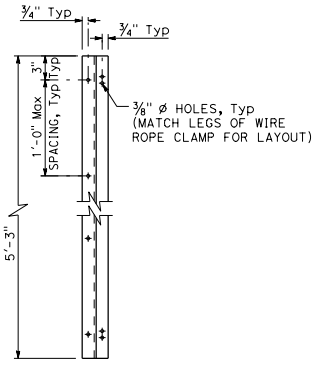
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.




## TETHER WIRE ATTACHMENT FOR PROGRAMMED VISIBILITY SIGNAL FACE

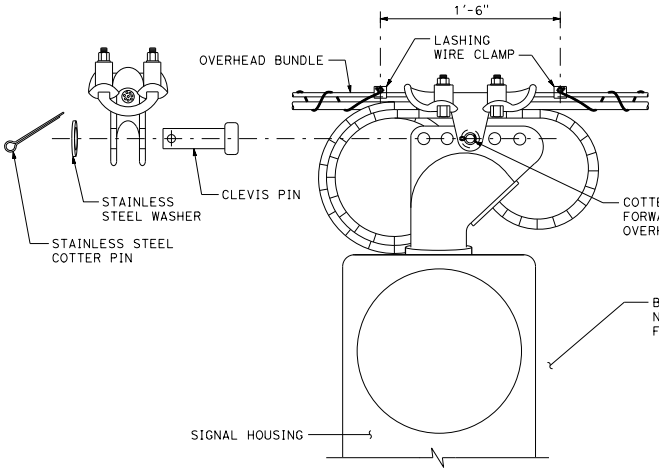



## SIGNAL FACE SUPPORT

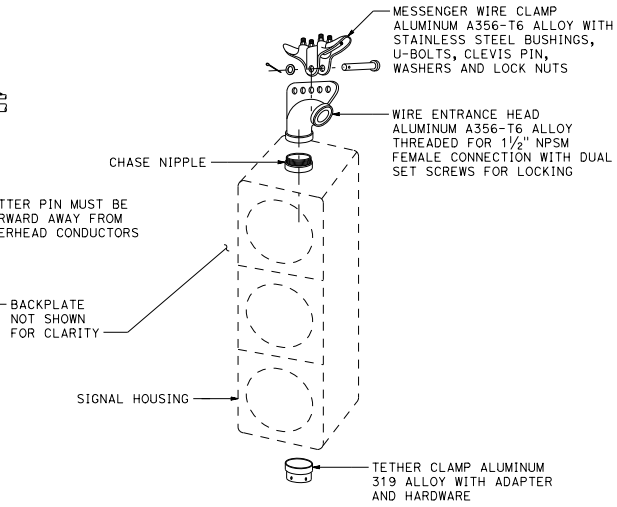



ELEVATION

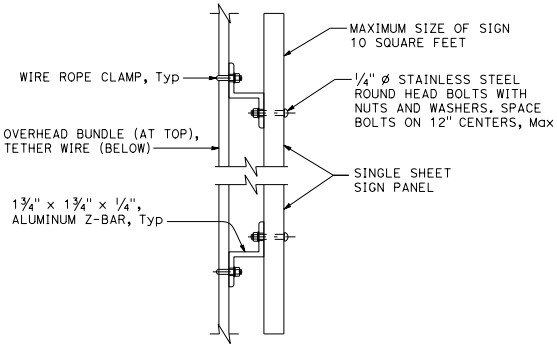
## ALUMINUM Z-BAR




## MESSENGER WIRE CLAMP COTTER PIN DETAIL




## SIGNAL FACE SUPPORT EXPLODED VIEW




## SIGN MOUNTING DETAIL

The overlapped connection of adjustable hangers must use a minimum of 2 bolts with a minimum spacing between bolts of 2".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# TEMPORARY WOOD POLES DETAILS No. 5

NO SCALE

**ES-19E**

7-1-25

2025 STANDARD PLAN ES-19E

Return to Table of Contents