# ADOT STANDARD DRAWINGS

ITS STANDARDS
EFFECTIVE APRIL 2019

| REVISION DATE | STANDARD NUMBER | SUBJECT: ITS STANDARDS |
|---|---|---|
| July-14 | FM-0.01 | SYMBOLS AND ABBREVIATIONS |
| Aug-13 | FM-1.01 | TRENCH DETAILS, FMS TRUNKLINE |
| Aug-13 | FM-1.02 | TRENCH UNDER PAVEMENT, FMS TRUNKLINE |
| Aug-13 | FM-1.03 | BURIED CONDUIT AROUND OBSTRUCTION, DIRECTIONAL DRILLING |
| Aug-13 | FM-1.04 | CONDUIT REQUIREMENTS FOR DMS, RMC TO PVC CONDUIT CONNECTION, THROUGH WALL CONDUIT |
| Aug-13 | FM-1.05 | CONDUIT MOUNTING DETAILS |
| Aug-13 | FM-1.06 | CONDUIT EXPANSION, COUPLING AND JUNCTION BOX, INSTALLATION PLAN |
| Aug-13 | FM-1.07 | FMS TRUNK LINE IN BOX GIRDER BRIDGE |
| Aug-13 | FM-1.08 | FMS TRUNKLINE IN I-BEAM OR I-GIRDER BRIDGE |
| Aug-13 | FM-2.01 | PULL BOX ADJACENT TO FMS PULL BOX |
| Aug-13 | FM-2.02 | PULL BOX NO. 9 CABINET CONDUIT INTERFACE PLANS |
| Aug-13 | FM-2.03 | PULL BOX NO. 9 DETAILS |
| Aug-13 | FM-2.04 | NO. 9 PULL BOX CONDUIT ROUTING AND CABLE RACKING DETAILS |
| Aug-13 | FM-2.05 | No. 9 PULL BOX TORSION ASSIST COVER |
| Aug-13 | FM-2.06 | PULL BOX NO. 7 TYPICAL INSTALLATION |
| Aug-13 | FM-2.07 | BURIED PULL BOX NO. 7 TYPICAL INSTALLATION |
| Aug-13 | FM-2.08 | SPLIT NO. 9 PULL BOX |
| Aug-13 | FM-3.01 | RAMP METER CABINET DETAILS (SHEET 1 of 2) |
| Aug-13 | FM-3.02 | RAMP METER CABINET DETAILS (SHEET 2 of 2) |
| Aug-13 | FM-3.03 | RAMP METER CABINET SPECIAL DETAILS |
| Aug-13 | FM-3.04 | RAMP METER CABINET ACCESSORIES |
| Aug-13 | FM-3.05 | RAMP METER FIELD PANEL DETAILS |
| Aug-13 | FM-3.06 | RAMP METER FIELD PANEL CONNECTIONS |
| Aug-13 | FM-3.07 | RAMP METER SIGNAL POWER INTERRUPT RELAY AND PIN ASSIGNMENTS |
| Aug-13 | FM-3.08 | POWER DISTRIBUTION ASSEMBLY CONNECTOR AND INSTALLATION DETAILS |
| Aug-13 | FM-3.09 | POWER DISTRIBUTION ASSEMBLY #4 (PDA4) SCHEMATIC DIAGRAM |
| Aug-13 | FM-3.10 | RAMP METER CI HARNESS CONNECTIONS |
| Aug-13 | FM-3.11 | CCTV CABINET DETAILS (SHEET 1 of 2) |
| Aug-13 | FM-3.12 | CCTV CABINET DETAILS (SHEET 2 of 2) |
| Aug-13 | FM-3.13 | CABINET NUMBER DECAL DETAIL |
| Aug-13 | FM-3.14 | TRANSFORMER CABINET, EXTERNAL POWER DISCONNECT |
| Aug-13 | FM-3.15 | TRANSFORMER, 3kVA & 7.5kVA, DRY TYPE DETAILS AND WIRING DIAGRAMS |
| Aug-13 | FM-3.16 | TRANSFORMER, 10kVA & 25kVA, DRY TYPE DETAILS AND WIRING DIAGRAMS |
| Aug-13 | FM-3.17 | CLEAR ZONES, UNPROTECTED EQUIPMENT |
| Aug-13 | FM-3.18 | TYPE II LOAD CENTER |
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| July-14 | FM-3.25 | NOT USED |
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| Oct-17 | FM-3.27 | DAKTRONICS DMS CABINET FOUNDATION DETAILS |
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| Aug-13 | FM-5.01 | DETECTION DEFINITION |
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| Aug-13 | FM-5.06 | DETECTOR LOOP TEST FORM 1 |
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| Apr-19 | FM-6.01 | RAMP METER DETAILS |
| Apr-19 | FM-6.02 | SINGLE-LANE RAMP METER |
| Apr-19 | FM-6.03 | SINGLE-LANE RAMP METER WITH FRONTAGE ROAD |
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| Apr-19 | FM-6.06 | RAMP METER WITH OBSTRUCTION INSTALLATION DETAILS |
| Apr-19 | FM-7.01 | CCTV POLE CCTV CABINET MOUNTING DETAILS AND FIELD ORIENTATION |
| Apr-19 | FM-7.02 | CCTV POLE AND MOUNTING DETAILS |
| Apr-19 | FM-7.03 | CCTV POLE MOUNTING PLATE DETAILS |

| ADOT STANDARD DRAWINGS REVISION DATES and STANDARD NO.'s REVIEW | | |
|---|---|---|
| | NAME | DATE |
| ITS STANDARD DRAWINGS | | |
| PROJECT NO. | | 1E OF |
| RECORD DRAWING DATA | FEDERAL AID NO. / REC. DWG. DATE | OF |

# SPECIAL ABBREVIATIONS

| | |
|---|---|
| ACIA | ASYNCHRONOUS COMMUNICATIONS INTERFACE ADAPTER |
| ADDR | ADDRESS |
| ADOT | ARIZONA DEPARTMENT OF TRANSPORTATION |
| APS | ARIZONA PUBLIC SERVICE |
| ASSY | ASSEMBLY |
| AWG | AMERICAN WIRE GAUGE |
| BKR | BREAKER |
| BNC | COAXIAL CONNECTOR TYPE |
| BOC | BACK OF CURB |
| BW | BARRIER WALL |
| CC | CONTROL CABLE |
| CCSDU | CCTV CONTROL SIGNAL DISTRIBUTION UNIT |
| CCTV | CLOSED CIRCUIT TELEVISION |
| C/L | CENTER LINE |
| COAX | COAXIAL CABLE |
| CONT. | CONTROL |
| CPU | CENTRAL PROCESSING UNIT |
| C XXXXXXX | CABINET - SEVEN DIGIT IDENTIFICATION CODE |
| DB-25 | 25 PIN CONNECTOR |
| DET. | DETECTOR |
| DIA | DIAMETER |
| DLC | DETECTOR LOOP CABLE |
| DMS | DNYAMIC MESSAGE SIGN |
| EEPROM | ELECTRICALLY ERASABLE PROGRAMMABLE READ ONLY MEMORY |
| EIA | ELECTRONICS INDUSTRY ASSOCIATION |
| EMT | ELECTRICAL METALLIC TUBING |
| EOP | EDGE OF PAVEMENT |
| EOTW | EDGE OF TRAVELED WAY |
| EPROM | ERASABLE PROGRAMMABLE READ ONLY MEMORY |
| EUSER | ELECTRIC UTILITY SERVICE EQUIPMENT REQUIREMENTS |
| EXST. | EXISTING |
| FDM | FREQUENCY DIVISION MULTIPLEXOR |
| FMS | FREEWAY MANAGEMENT SYSTEM |
| FODC | FIBER OPTIC DISTRIBUTION CENTER |
| G.B. | GREEN BOND |
| GND | GROUND |
| HDPE | HIGH DENSITY POLY-ETHYLENE (CONDUIT) |
| HOV | HIGH OCCUPANCY VEHICLE |
| INDCT | INNERDUCT |
| JBX | JUNCTION BOX NO. |
| kVA | KILO-VOLT-AMPERES |
| LC XXXXXXX | LOAD CENTER-SEVEN DIGIT IDENTIFICATION CODE |
| LI | LOOP LEAD-IN CABLE |
| ML | MATCH LINE |
| MU XXXXX | MAINTENANCE UNIT-FIVE DIGIT IDENTIFICATION CODE |
| N/C | NO CONNECTION |
| NC | NORMALLY CLOSED (RELAY CONTACT) |
| NEC | NATIONAL ELECTRICAL CODE |
| NEMA | NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION |
| NID | NETWORK INTERFACE DEVICE |
| NO | NORMALLY OPEN (RELAY CONTACT) |
| NTSC | NATIONAL TELEVISION STANDARDS COMMITTEE |
| N | PIPE NIPPLE |
| OD | OUTER DIAMETER |
| OTR | OPTICAL TRANSCEIVER |
| PBX(T) | PULL BOX NO. (TYPE) |
| PDA | POWER DISTRIBUTION ASSEMBLY |
| PRI | PRIMARY |
| PVC | POLYVINYL CHLORIDE (CONDUIT) |
| QTY | QUANTITY |
| RAM | RANDOM ACCESS MEMORY |
| RGB | RED GREEN BLUE |
| RM | RAMP METER |
| RMC | RIGID METAL CONDUIT |
| RS-232 | EIA REVISED STANDARD 232 |
| SCADA | SUPERVISORY CONTROL AND DATA ACQUISITION |
| SEC | SECONDARY |
| SMFO(X) | SINGLE MODE FIBER OPTIC CABLE (NUMBER OF FIBERS) |
| SRAM | STATIC RANDOM ACCESS MEMORY |
| SRP | SALT RIVER PROJECT |
| ST | FIBER OPTIC CONNECTOR TYPE |
| STD | STANDARD |
| SWPK | SWITCH PACK |
| TCS | TRAFFIC COUNT STATION |
| TDM | TIME DIVISION MULTIPLEXOR |
| TOC | TRAFFIC OPERATIONS CENTER |
| TYP | TYPICAL |
| T XXXXXXX | TRANSFORMER - SEVEN DIGIT IDENTIFICATION CODE |
| VAC | VOLTS ALTERNATING CURRENT |
| VDC | VOLTS DIRECT CURRENT |
| VDT | VIDEO DISPLAY TERMINAL |
| VOTR | VIDEO OPTICAL TRANSCEIVER |
| VSC | VIDEO SUPPORT COMPUTER |
| VTR | VIDEO TAPE RECORDER |
| XFMR | TRANSFORMER |

NOT TO SCALE

## SYMBOL LEGEND

| EXISTING | PROPOSED | DESCRIPTION |
|---|---|---|
| | | NO. 9 PULL BOX |
| | | NO. 7 FMS PULL BOX/24" DEEP |
| | | NO. 7 PULL BOX W/EXTENSION |
| | | NO. 7 PULL BOX |
| | | NO. 5 PULL BOX |
| | | CABINET |
| | | CONDUIT |
| | | CONDUIT CALLOUT |
| | | LOAD CENTER |
| | | SIGN SUPPORT STRUCTURE |
| | | DYNAMIC MESSAGE SIGN (DMS) |
| | | LOOP DETECTER (6' x 6') |
| | | FLASHER ASSEMBLY |
| | | RAMP METER ASSEMBLY |
| | | CCTV CAMERA |
| | | NODE BUILDING |
| | | TRANSFORMER |

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| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>7/14 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | SYMBOLS AND ABBREVIATIONS | DRAWING NO.<br>FM-0.01 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | Added New No. 7 FMS Pull Box Symbol | D. Bruggeman | 05/14 |
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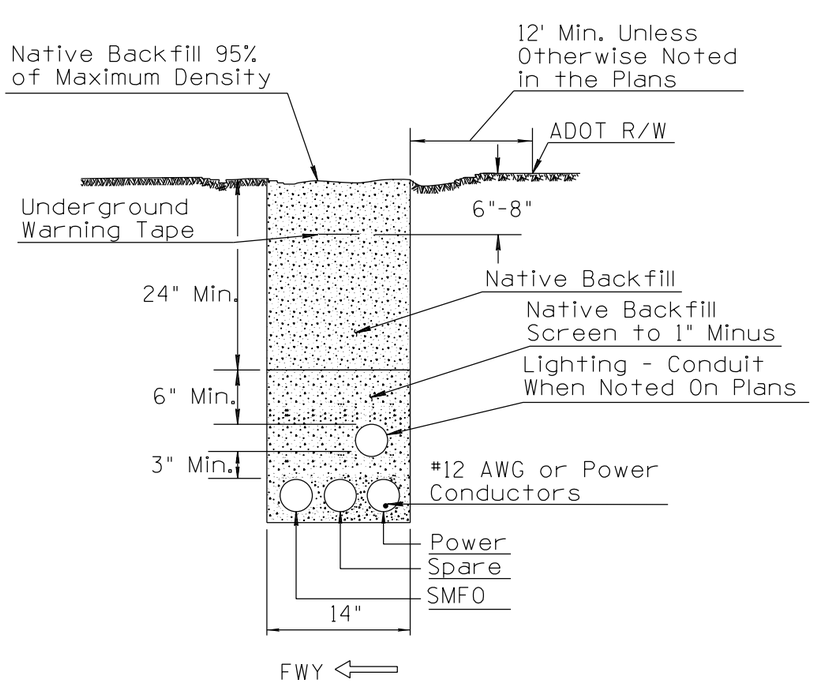
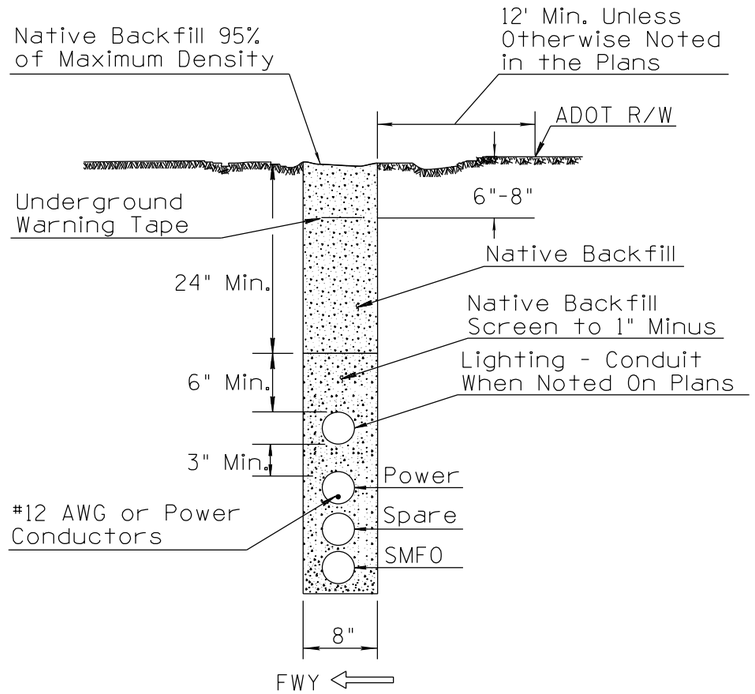
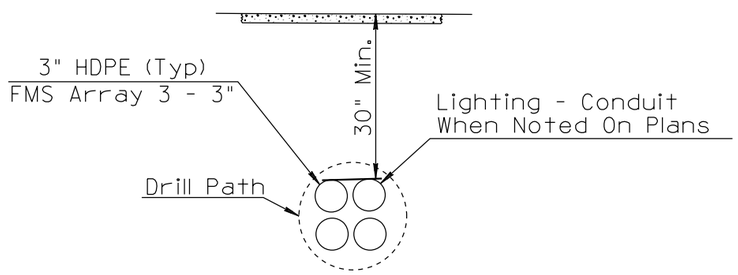



FMS TRUNKLINE - HORIZONTAL CONFIGURATION




FMS TRUNKLINE - VERTICAL CONFIGURATION




FMS TRUNKLINE - HORIZONTAL DIRECTIONAL DRILL

## NOTES:

1. Excess Spoil Materials Shall be Removed Offsite or Placed in an Approved by Engineer Embankment by the Contractor.
2. Area Shall be Returned to Existing Grade.
3. Conduit Couplings Shall be Staggered.
4. Minimum Cover to Top of Conduit is 30".
5. Trench Depth Varies Based on Potential Conflict with Utilities.
6. Conduit Shall Not Exceed 360-Degrees of Cumulative Bending Between Adjacent Pull Boxes.
7. Roadway Lighting Conduit Shall Not Enter Any FMS Pull Boxes.
8. Reference Lighting Plans for Additional Information/Requirements for Any Pull Boxes Located Adjacent to Any FMS Pull Boxes. Lighting Conduit Shall be Installed as Required by Plans.
9. Detectable 2500# Pull Tape with #22 Gauge Conductor Shall be Installed in all Unused Conduits.
10. All Non-Powered Ductbanks Shall have a #12 AWG Tracer Wire Installed.

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| APPROVED FOR DISTRIBUTION<br>ON FILE | TRENCH DETAILS,<br>FMS TRUNKLINE | DRAWING NO.<br>FM-1.01 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | DATE | MADE BY |
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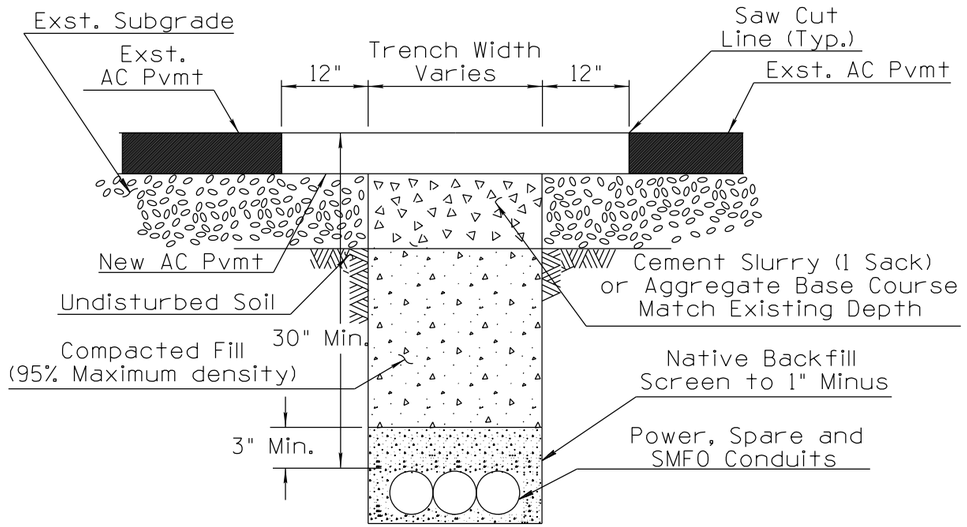
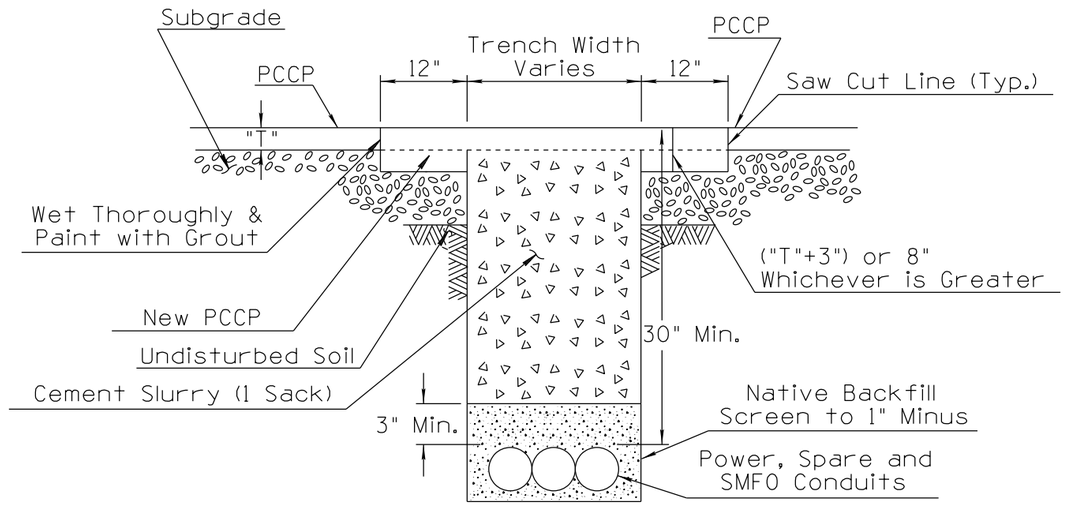



CONDUIT TRENCH UNDER
ASPHALTIC CONCRETE PAVEMENT




CONDUIT TRENCH UNDER PCCP

## NOTES:

1. Excess Spoil Materials Shall be Removed Offsite or Placed in an Approved by Engineer Embankment by the Contractor.
2. Conduit Couplings Shall be Staggered.
3. Minimum Cover to Top of Conduit is 30".
4. Trench Depth Varies Based on Potential Conflict with Utilities.
5. Conduit Shall Not Exceed 360-Degrees of Cumulative Bending Between Adjacent Pull Boxes.
6. Roadway Lighting Conduit Shall Not Enter Any FMS Pull Boxes.
7. Reference Lighting Plans for Additional Information/Requirements for Any Pull Boxes Located Adjacent to Any FMS Pull Boxes. Lighting Conduit Shall be Installed as Required by Plans.
8. Detectable 2500# Pull Tape with #22 Gauge Conductor Shall be Installed in all Unused Conduits.
9. All Non-Powered Ductbanks Shall have a #12 AWG Tracer Wire Installed.
10. Repair with Class P PCCP.
11. Trench Only Where Shown on Plans or Approved by Engineer.

TWO WORKING DAYS BEFORE YOU DIG, CALL
(602) 263-1100
BLUE STAKE
OUTSIDE MARICOPA COUNTY
1-800-STAKE-IT

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| APPROVED FOR DISTRIBUTION<br>ON FILE | TRENCH UNDER PAVEMENT<br>FMS TRUNKLINE | DRAWING NO.<br>FM-1.02 |
| | | SHEET NO. |

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
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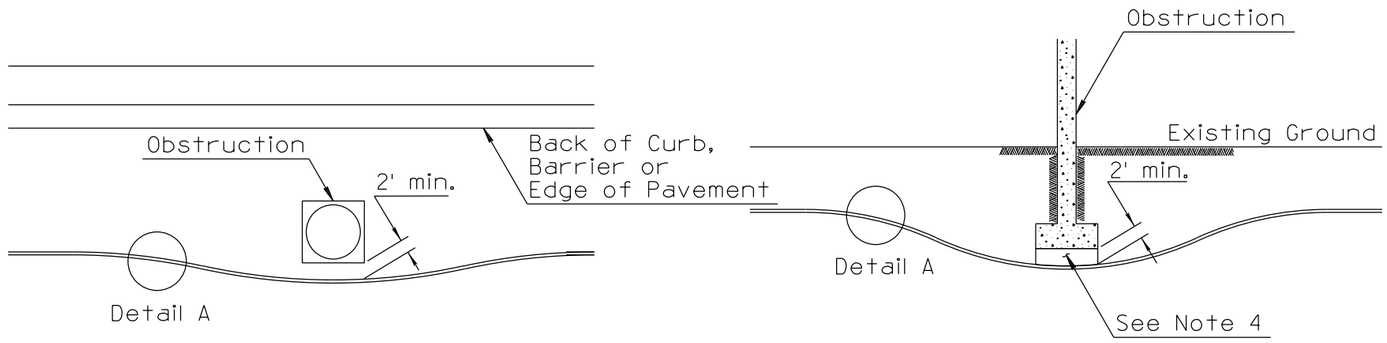
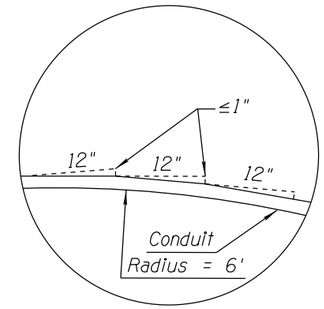



TYPICAL HORIZONTAL ROUTING OF CONDUIT AROUND AN OBSTRUCTION

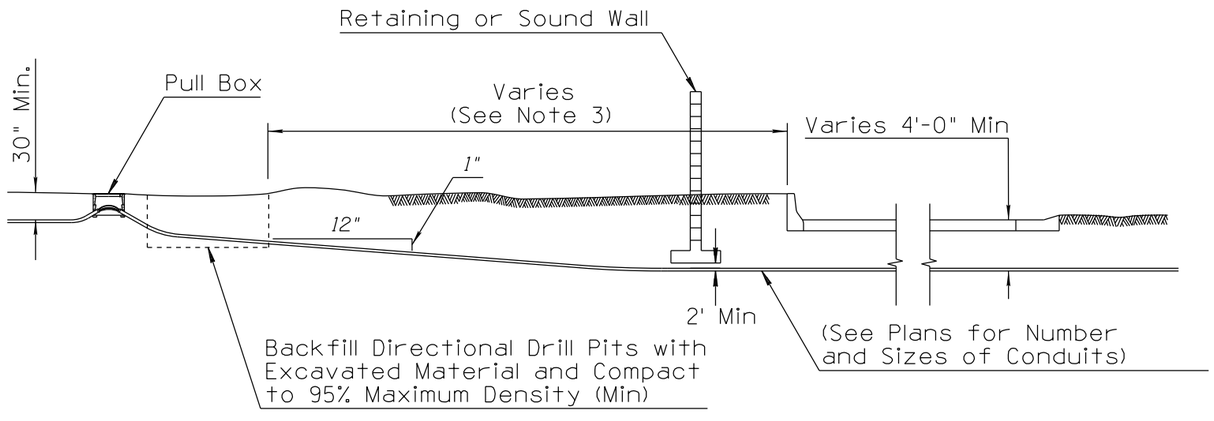
TYPICAL VERTICAL ROUTING OF CONDUIT UNDER AN OBSTRUCTION

NOTES:

1. Conduit Deflection for Conduit Containing Fiber Optic Cable Shall Not Exceed 1" Per Foot in any Direction.
2. Conduit Shall be Routed No Closer Than 2' to Any Obstruction.
3. Core Drilling Through an Obstruction May be Used as an Alternative Method. When Approved by Engineer.
4. Backfill Under Footer Shall be Cement Slurry (1500 psi)




DETAIL A




TYPICAL CONDUIT DIRECTIONAL DRILL PATH

NOTES:

1. When Drilling Under Roadways, Backfill Shall be Bentonite Slurry or other Approved Materials.
2. HDPE Conduit Installation Shall Meet All of the Dimensional Requirements Shown in this Detail.
3. Lateral Offset to Unprotected Drill Pit Shall Comply With Std. Dwg. FM-3.17 "CLEAR ZONE, UNPROTECTED EQUIPMENT".

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| APPROVED FOR DISTRIBUTION<br>ON FILE | BURIED CONDUIT<br>AROUND OBSTRUCTION &<br>DIRECTIONAL DRILLING | DRAWING NO.<br>FM-1.03 |
| | | SHEET NO. |

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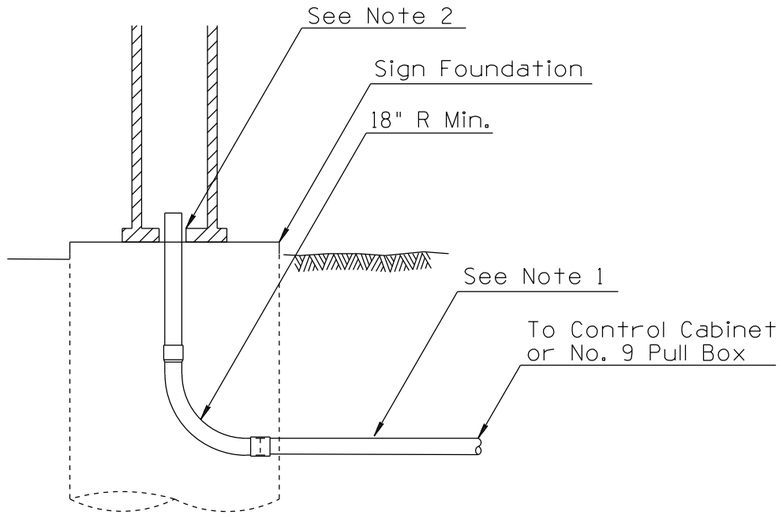
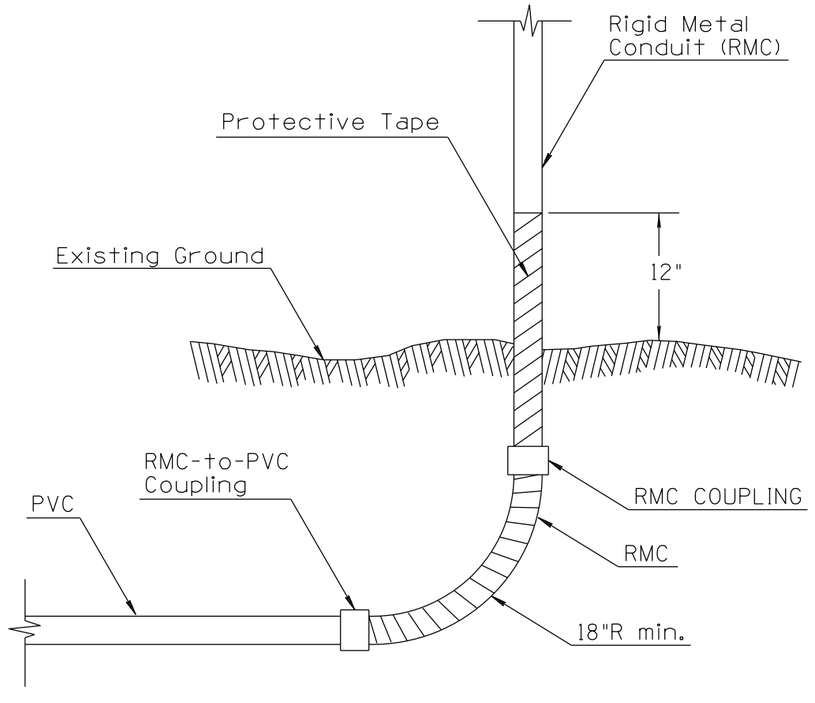



## FOUNDATION FOR TUBULAR SIGN STRUCTURE

### NOTES:

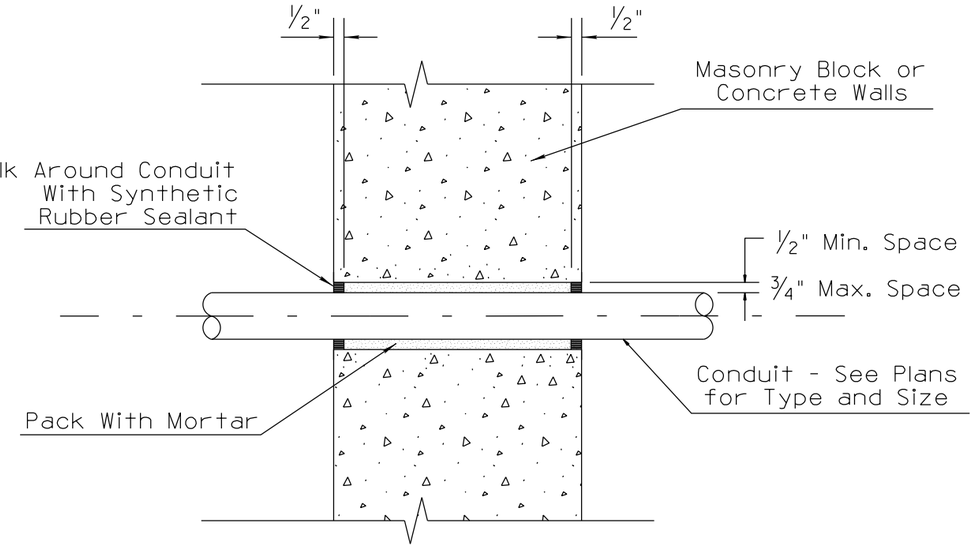
1. See Plans for Size and Number of Conduits, and Contents at Each DMS Sign Location.
2. Contractor Shall Modify Base Plate to Have an 8" Minimum Diameter Hole Centered in the Base Plate for Electrical Conduits.
3. Construct Conduits Shown in all Non-Median Foundations. Construct 2-3" Conduits in all Median Foundations Without Median Barrier. Omit Conduits Only in Median Foundations Constructed With Median Barrier.




## CONDUIT INSTALLATION
## RMC TO PVC CONDUIT CONNECTION

### NOTES:

1. See ADOT Standard Specifications Section 732-3.01 (Installation of Electrical Conduit And Pull Boxes).




## THROUGH-WALL CONDUIT INSTALLATION

### NOTE:

1. Core or Sleeve Hole Shall be Waterproofed With Mortar & Rubber Sealant or Other Approved Sealant, as Shown Above.

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| APPROVED FOR DISTRIBUTION<br>**ON FILE** | CONDUIT REQUIREMENTS FOR DMS<br>RMC TO PVC CONDUIT CONNECTION<br>THROUGH WALL CONDUIT | DRAWING NO.<br>FM-1.04<br>SHEET NO. |

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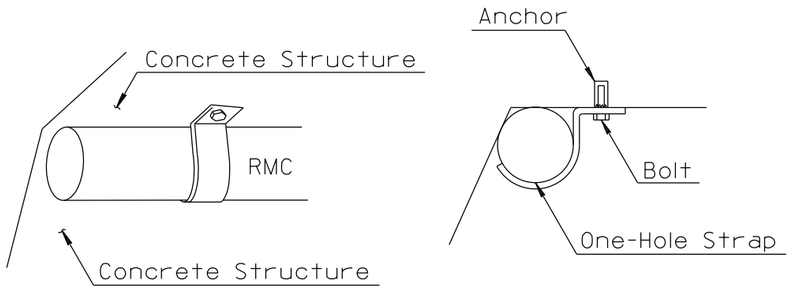
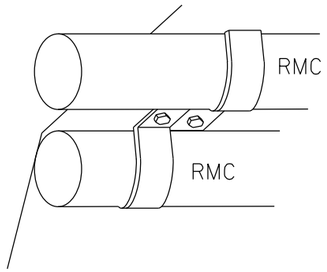
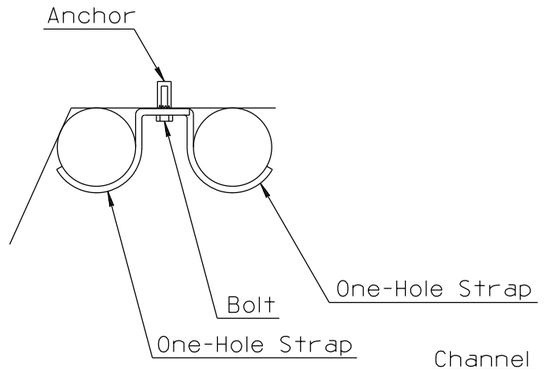
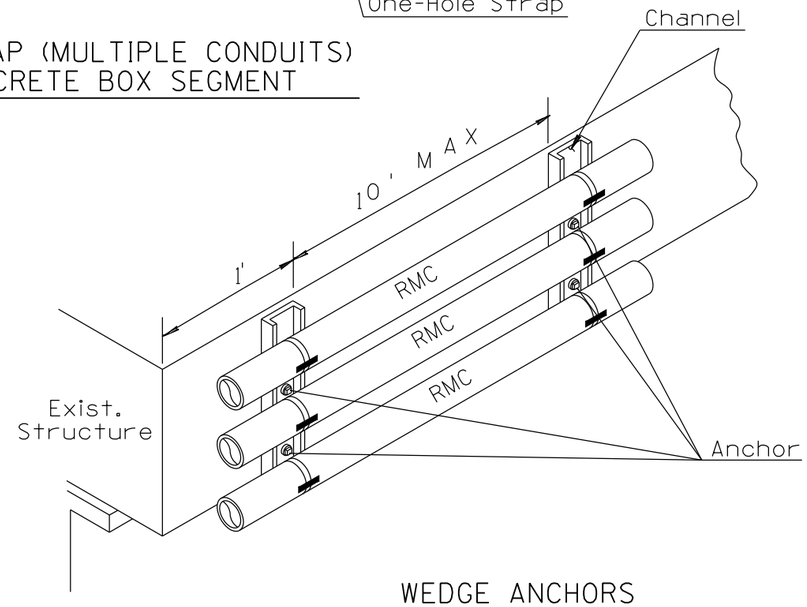



ONE-HOLE STRAP (SINGLE CONDUIT)
ALONG CONCRETE BOX SEGMENT

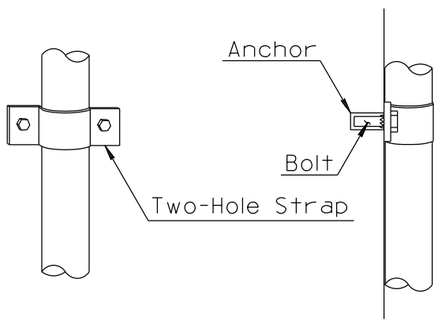


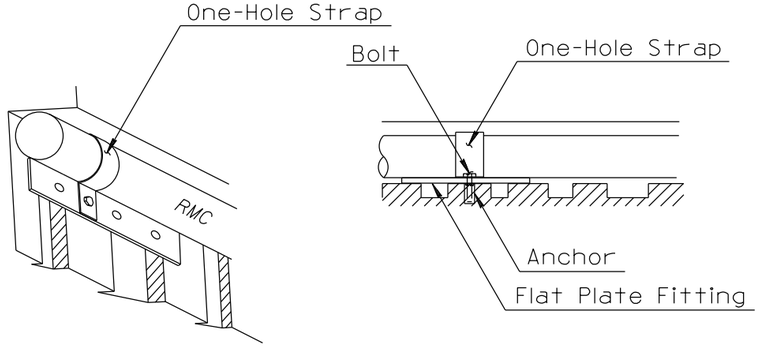

ONE-HOLE STRAP (MULTIPLE CONDUITS)
ALONG CONCRETE BOX SEGMENT




WEDGE ANCHORS
ON VERTICAL WALL MOUNT




TWO-HOLE STRAP ALONG
CONCRETE BOX SEGMENT




ONE-HOLE STRAP
ALONG RUSTICATED WALL

NOTE:

1. Maximum Strap Spacing of 10'. Place Strap 36" min. from Any Conduit Fitting, Coupling or Box.
2. See Plans for Conduit Sizes.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | CONDUIT MOUNTING DETAILS | DRAWING NO.<br>FM-1.05 |
| | | SHEET NO. |

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
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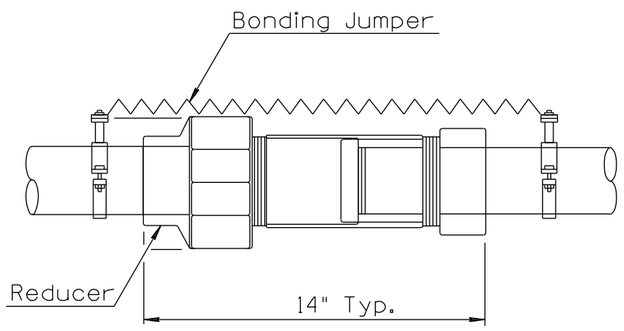
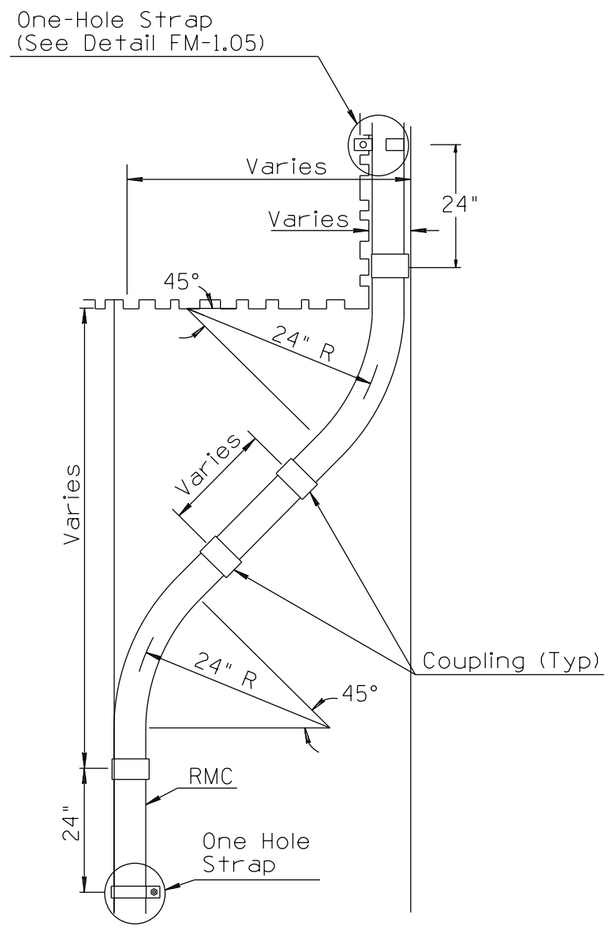



EXPANSION COUPLING DETAIL




JUNCTION BOX DETAIL




TYPICAL CONDUIT
45° BEND FITTING

NOTES:

1. Expansion Couplings Shall be Installed at all Bridge Expansion Joints.
2. Expansion Couplings Shall be Installed on Conduit Runs Greater Than 100' at a Maximum Spacing of 100', with a Minimum of one Per Run Per Conduit.
3. Expansion Couplings Shall not be Installed Underground in Dirt.

NOT TO SCALE

| | | |
|---|---|---|
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| APPROVED FOR DISTRIBUTION<br>ON FILE | CONDUIT EXPANSION COUPLING AND JUNCTION BOX INSTALLATION PLAN | DRAWING NO.<br>FM-1.06 |
| | | SHEET NO. |

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
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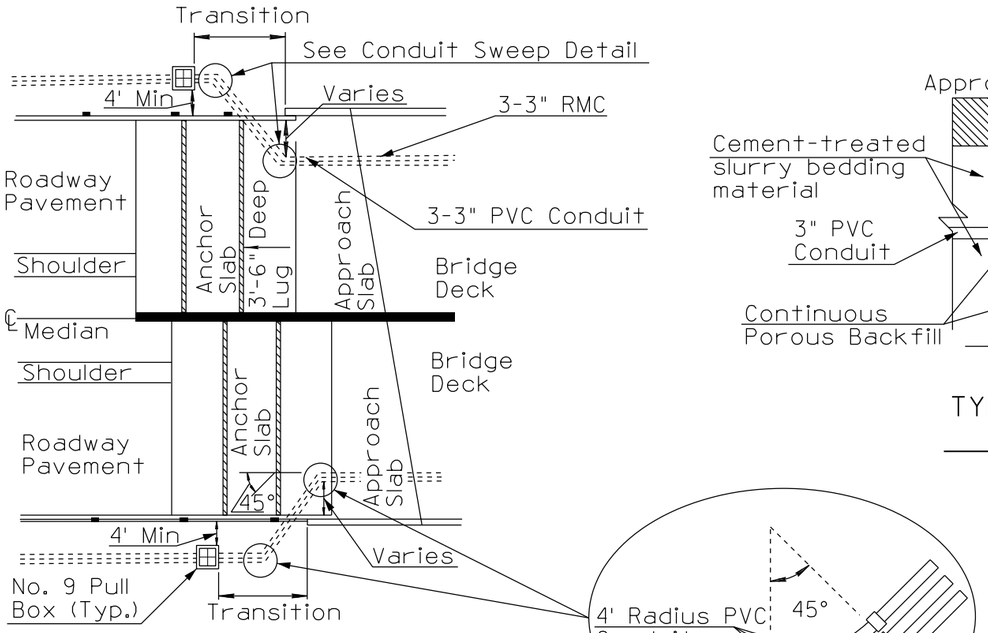
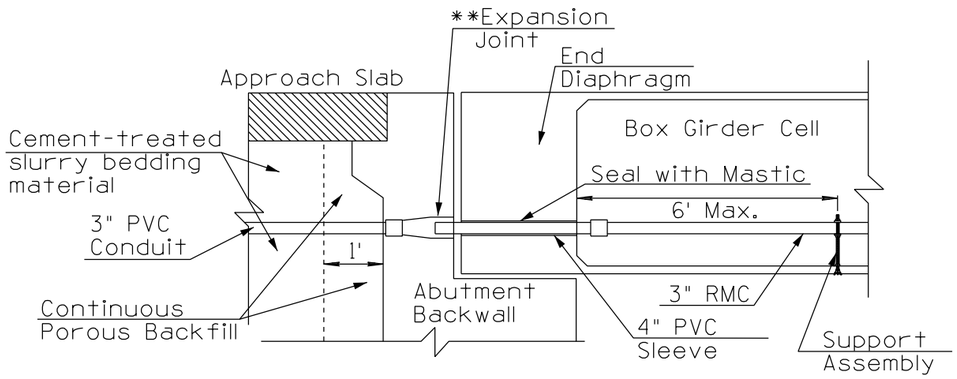


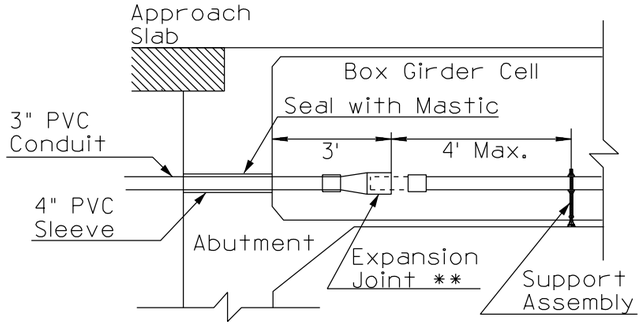

PLAN VIEW



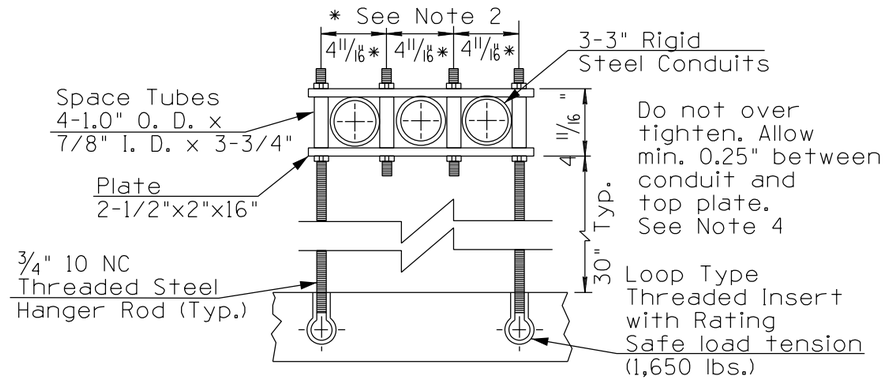

TYPICAL CONDUIT SWEEP DETAIL



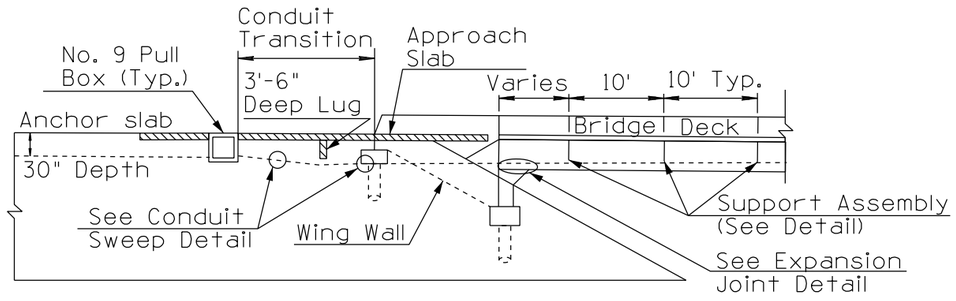

TYPICAL END DIAPHRAGM AND ABUTMENT EXPANSION JOINT DETAIL
** See Note 3



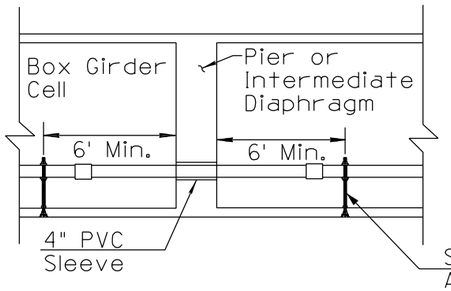

TYPICAL INTEGRAL ABUTMENT EXPANSION JOINT DETAIL
** See Note 3



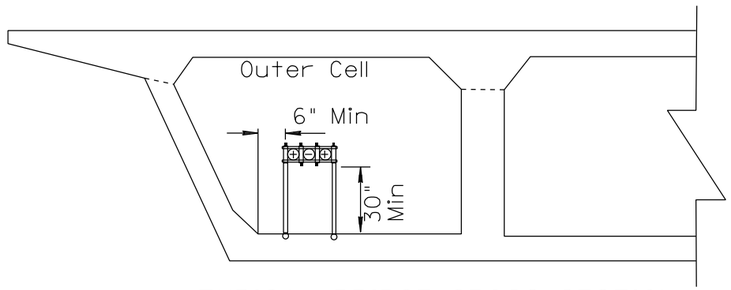

HANGER SUPPORT ASSEMBLY DETAIL




TYPICAL HALF SECTION




TYPICAL SUPPORT ASSEMBLY DETAIL AT PIER OR INTERMEDIATE DIAPHRAGMS




TYPICAL BRIDGE CROSS SECTION

NOTES:

1. Only one end of structure shown; details apply to both ends.
2. Minor deviations from design detail may be required for placement of conduit in order to provide proper clearance of conduit from anchor slab and diaphragm or abutment reinforcing steel.
3. Expansion joint shall allow for 6" (min) movement per 100' length of structure.
4. Conduit placement at support assembly shall allow for flex and free movement.

NOT TO SCALE

| | | |
|---|---|---|
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| APPROVED FOR DISTRIBUTION<br>ON FILE | FMS TRUNK LINE<br>IN BOX GIRDER BRIDGE | DRAWING NO.<br>FM-1.07 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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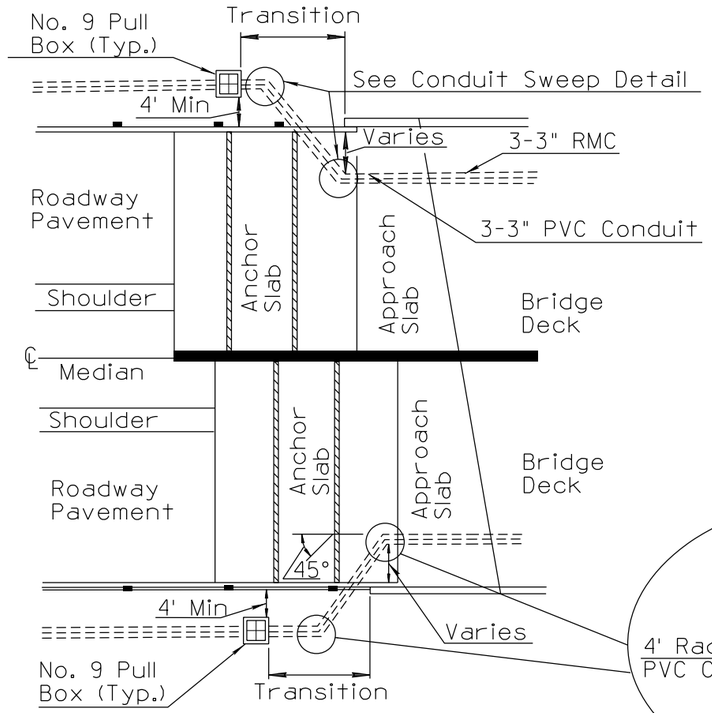
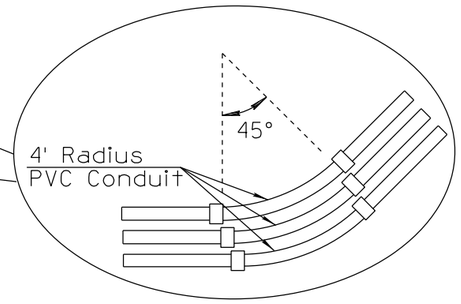
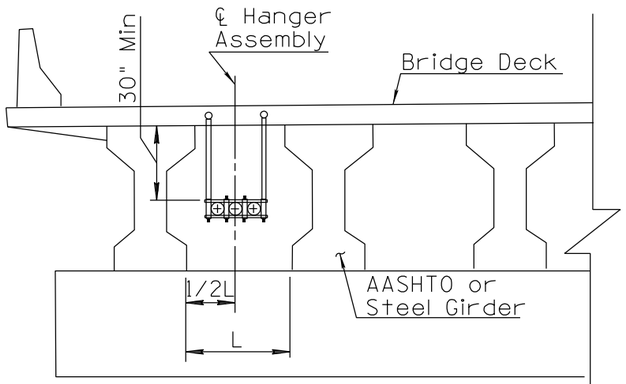


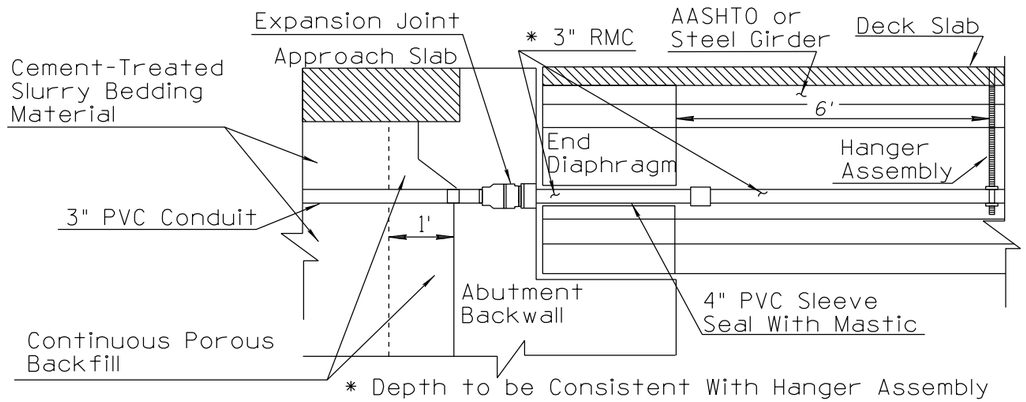

PLAN VIEW




TYPICAL CONDUIT SWEEP DETAIL

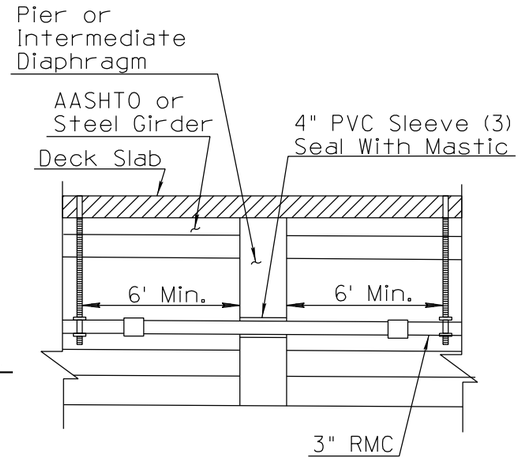



TYPICAL BRIDGE CROSS SECTION

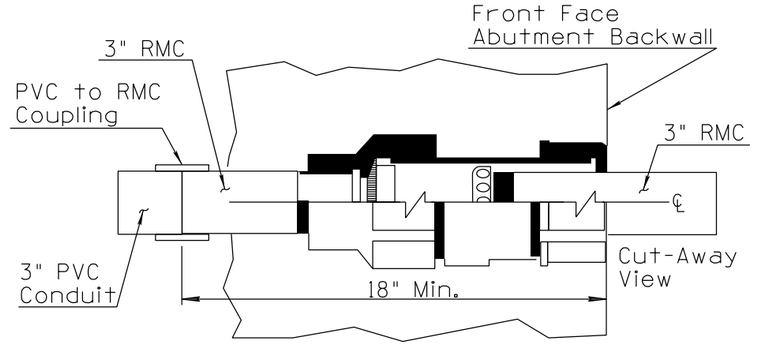



* Depth to be Consistent With Hanger Assembly

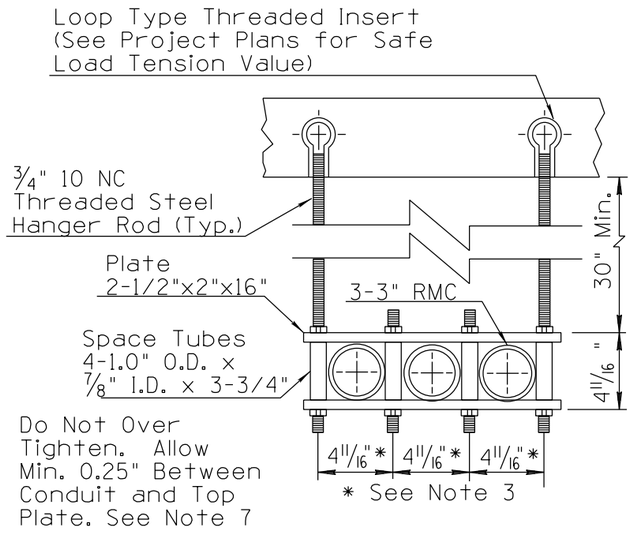
TYPICAL END DIAPHRAGM AND ABUTMENT EXPANSION JOINT DETAIL




TYPICAL PIER OR INTERMEDIATE DIAPHRAGM DETAIL



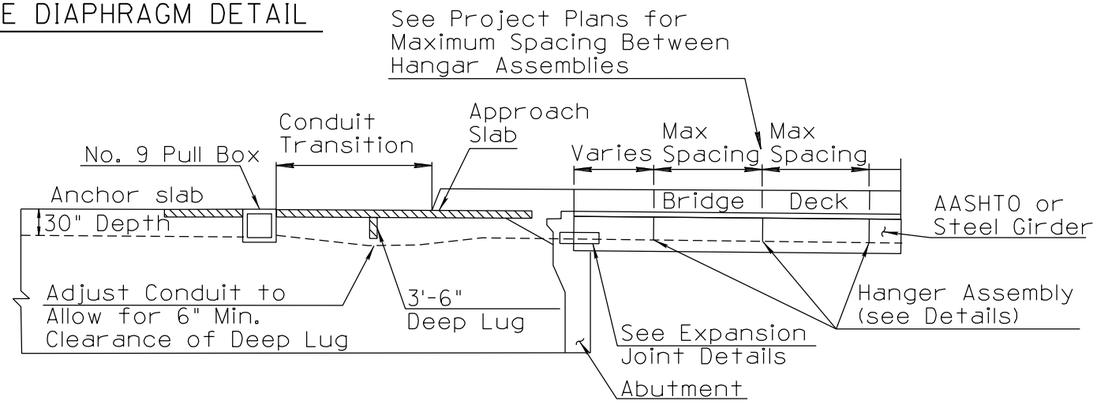

TYPICAL PVC/STEEL CONDUIT EXPANSION JOINT DETAIL




FERRULE LOOP HANGER DETAIL

NOTES:

1. Conduit Type is as Noted.
2. Only One End of Structure Shown. Details Apply to Both Ends.
3. Minor Deviations From Design Detail May be Required for Placement of Conduit in Order to Provide Proper Clearance of Conduit From Anchor Slab and Diaphragm or Abutment Reinforcing Steel.
4. AASHTO Girder is Illustrated. Details Apply to Steel Girder Structure Also.
5. Structures in Excess of 1,000' Will Require In-Line Pull Boxes as Noted on the Plans.
6. Expansion Joint Shall Allow for 6" (min) movement per 100' lenght of structure.
7. Conduit Placement at Hanger Assembly Shall Allow for Flex and Free Movement.




TYPICAL HALF SECTION

NOT TO SCALE

TWO WORKING DAYS BEFORE YOU DIG, CALL (602) 263-1100 BLUE STAKE OUTSIDE MARICOPA COUNTY 1-800-STAKE-IT

| | | |
|---|---|---|
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| APPROVED FOR DISTRIBUTION: ON FILE | FMS TRUNKLINE IN<br>I-BEAM OR I-GIRDER BRIDGE | DRAWING NO.: FM-1.08 |
| | | SHEET NO. |

| NO | DATE | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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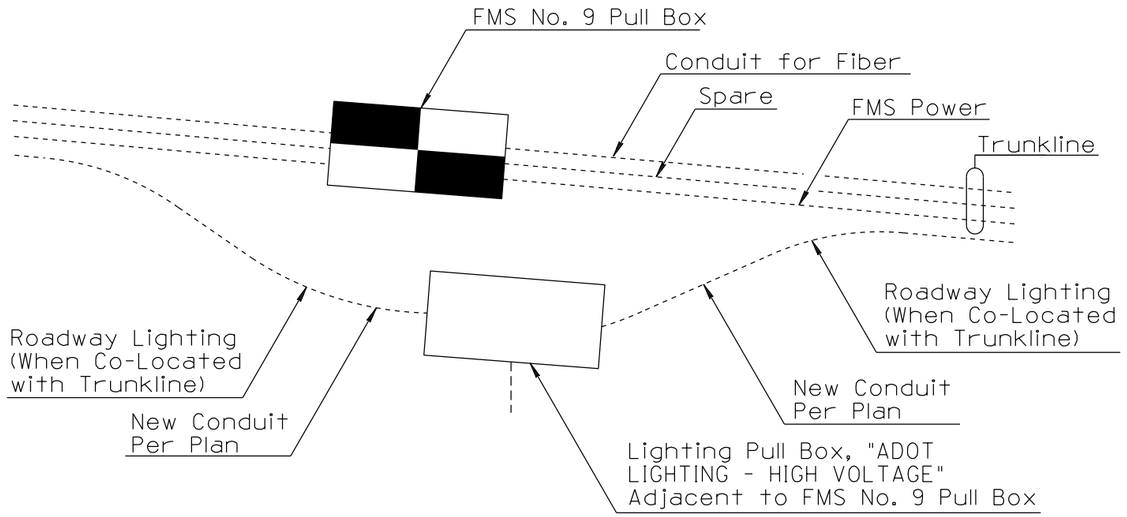
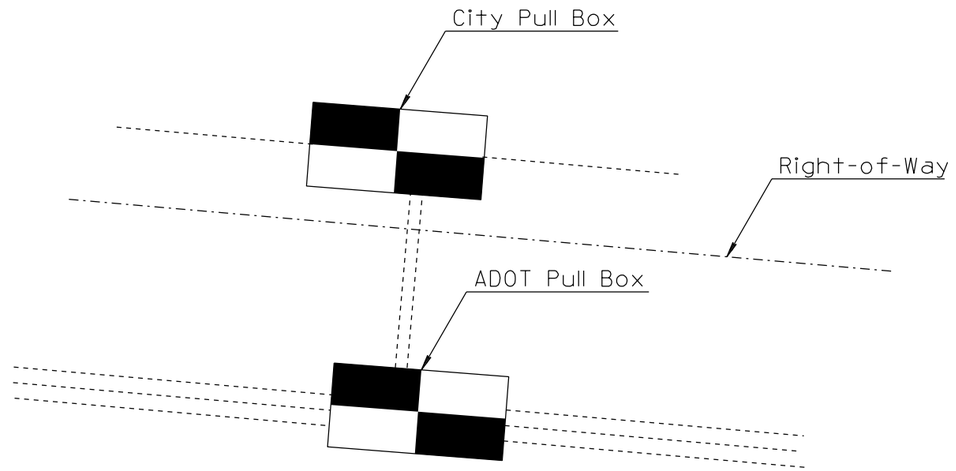
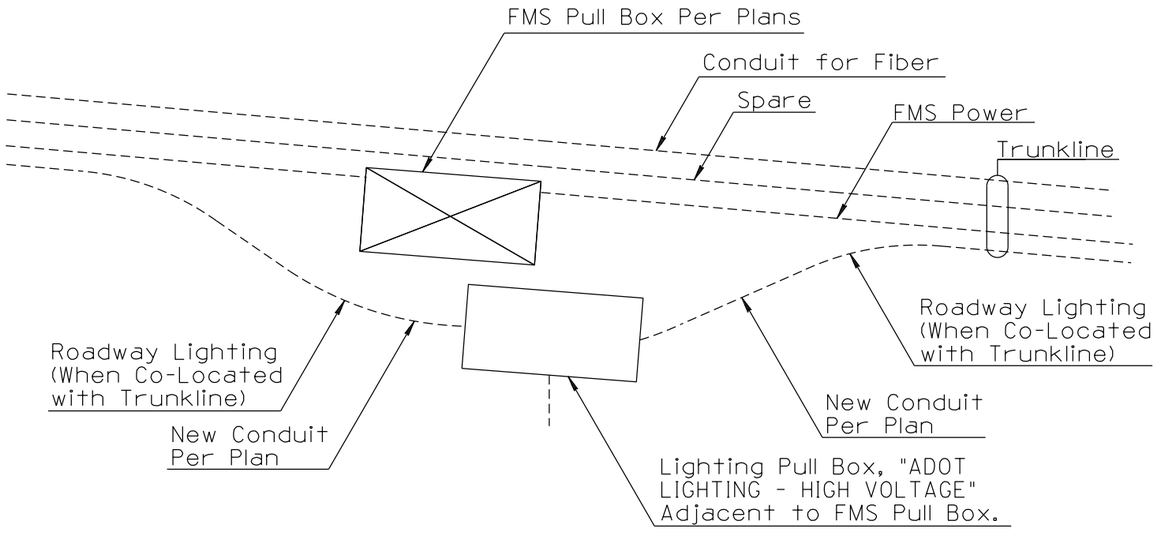



FMS No. 9 Pull Box




ADOT To City Connection




FMS Pull Box

## NOTE

1. Lighting Pull Box is Intended to be Shown on the Same Side of the Trunkline as the Roadway Lighting.

NOT TO SCALE

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| APPROVED FOR DISTRIBUTION<br>ON FILE | PULL BOX ADJACENT TO FMS PULL BOX | DRAWING NO.<br>FM-2.01 |
| | | SHEET NO. |

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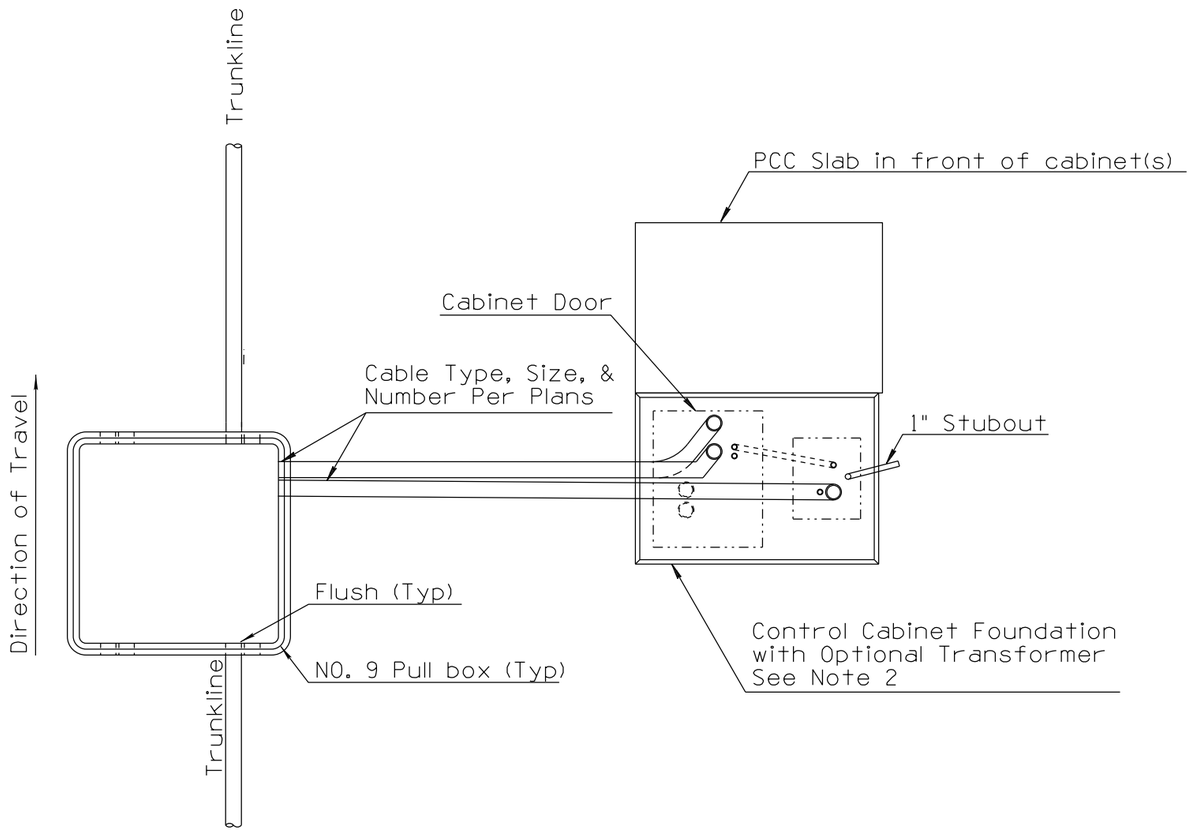
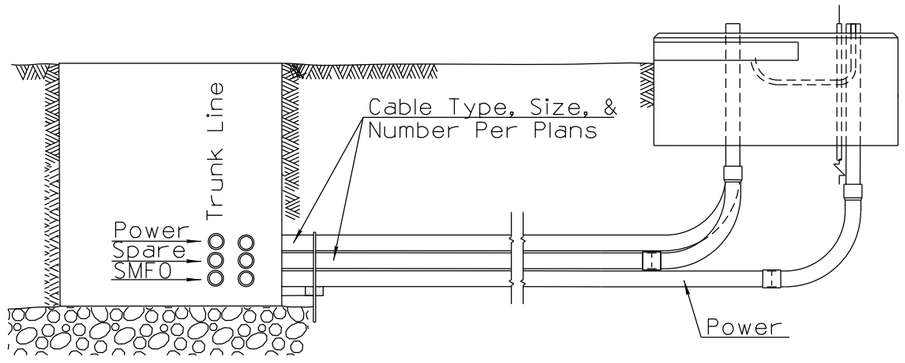



PLAN VIEW




FRONT VIEW

NOTES:

1. When a Transformer is not Used in Conjunction with a Control Cabinet, the Power Conduit Shall be Stubbed Up Into the Control Cabinet Foundation.
2. See Plans for Conduit Layout.
3. The 1" Ground Rod Stubout Shall be Field Located.

NOT TO SCALE

| | | |
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| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | PULL BOX NO. 9 CABINET<br>CONDUIT INTERFACE PLANS | DRAWING NO.<br>FM-2.02 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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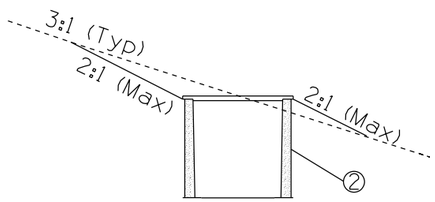
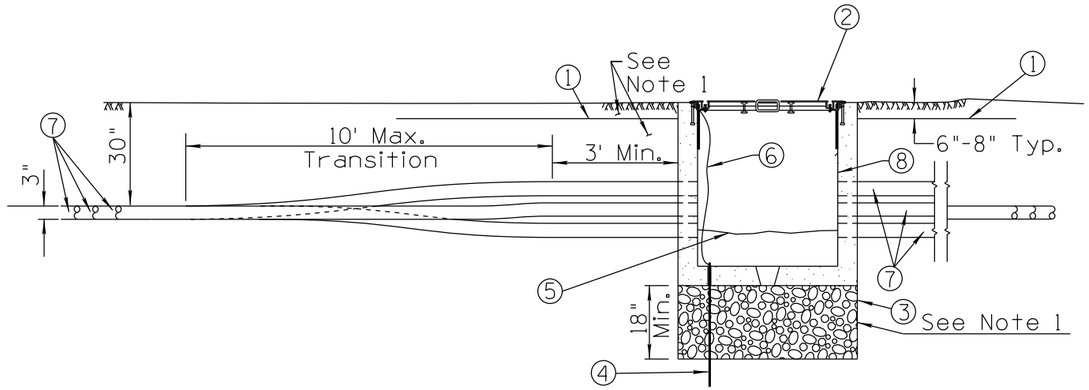
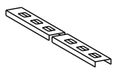


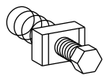

INSTALLATION IN SLOPED AREAS



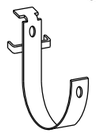

CONDUIT PLACEMENT AND COILING DETAIL SIDE VIEW



4 - 18 Hole C- Channel Rack



8 - ½" Spring Nuts and Bolts



8 - 7½" Hooks

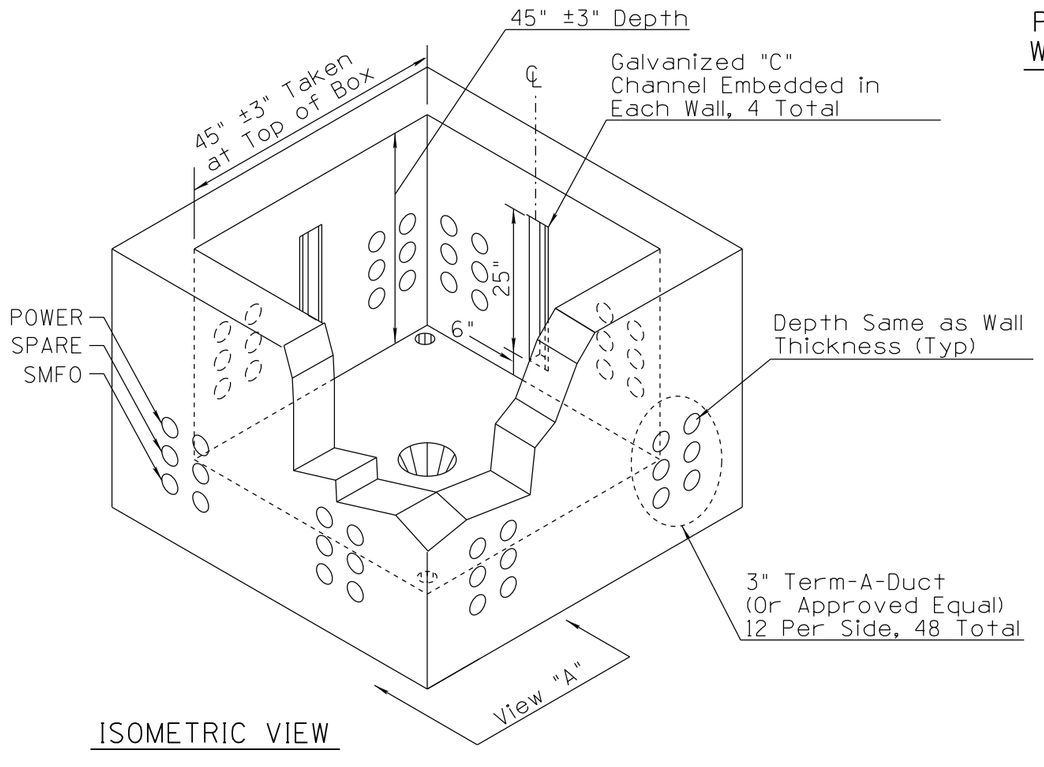
RACKING PACKAGE

| MATERIAL LIST | |
|---|---|
| ITEM | DESCRIPTION |
| ① | Warning Tape |
| ② | No. 9 Pull Box |
| ③ | Designated Size No. 57 Aggregate |
| ④ | Ground Rod |
| ⑤ | Detectable Pull Tape #2500 |
| ⑥ | #8 AWG Grounding Wire to Lid |
| ⑦ | Conduit Per Plans |
| ⑧ | Rack and Hook (Each Wall Typ) |

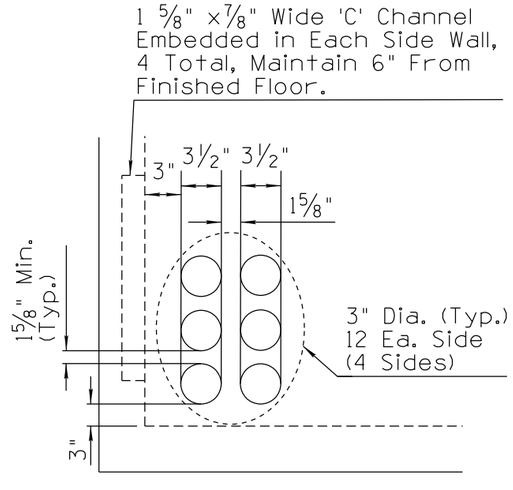
## NOTES:

1. Backfill With Designated Size No. 57 Aggregate Below Pull Box. Backfill Around Sides of Pull Box With Select Excavated Material and Compact at 95% Max. Density.
2. Conduit From the Typical Trench Section Shall Not Deflect by More Than 1 Inch Per Foot From the Alignment Preceding or Following the Pull Box.
3. Top of Conduits Shall be Located at 30" (Min.) Below Existing Ground. Conduits at Pull Boxes Shall Deflect No More Than 1 Inch Per Foot to Enter Pull Box. Conduits Shall be Flush With Inside of Pull Box.
4. The No. 9 Pull Box Shall Measure 45" ±3" for all Interior Dimensions of the Pull Box, Measured at Top of Pull Box. This Measurement Shall Also Apply to Interior Depth.
5. Numbers in Circles Refer to Items in Material List.
6. Pulling Irons Near Bottom of Pull Box.
7. All New Pull Boxes Shall be Furnished With Racks and Hooks Installed.
8. Provide Total Slack Per Plan for Each Fiber Optic Cable Coiled in all No. 9 Pull Boxes, With Splice Enclosure Centered on Slack. Slack on Branch Fiber Shall Match or Exceed Slack on Trunkline Fiber.
9. Plug Each Conduit End With Approved, Waterproof Duct Plug.
10. Pull Box and Lids Shall be Rated for HS20-44 Loading.
11. All Power and Communication Cables Shall be Tagged With Cable Identification
12. "ADOT FMS" Shall be the Title Embossed on the Lid.
13. Pull Box Height Above Finished Grade Shall Permit 2 Inches of Decomposed Granite to be Used to Match Existing Grade/Slope.
14. Locking Lip W/Seal Between Wall and Cover Assembly.

PULL BOX NO. 9 WIRING DETAILS




ISOMETRIC VIEW




ISOMETRIC VIEW "A"

NOT TO SCALE

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| APPROVED FOR DISTRIBUTION<br>ON FILE | PULL BOX NO. 9<br>DETAILS | DRAWING NO.<br>FM-2.03 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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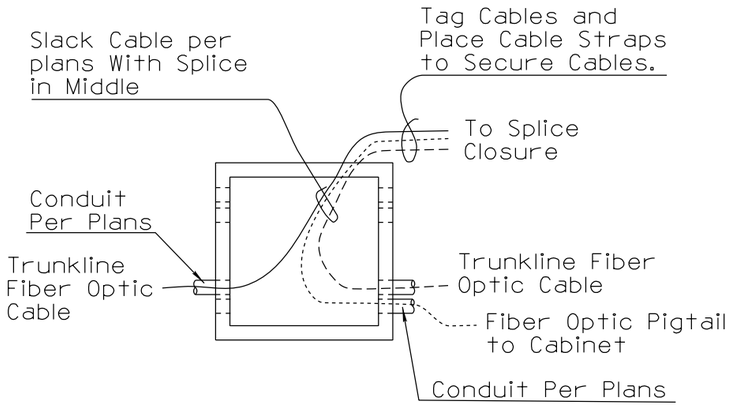
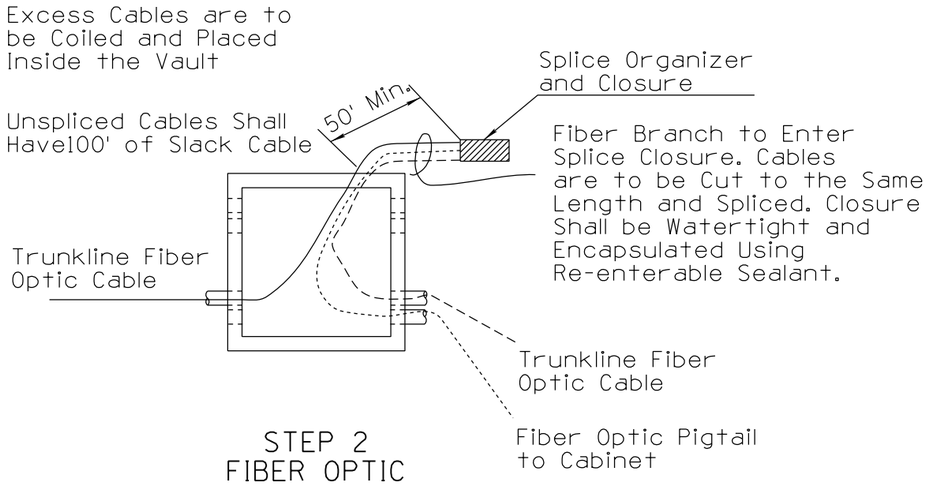
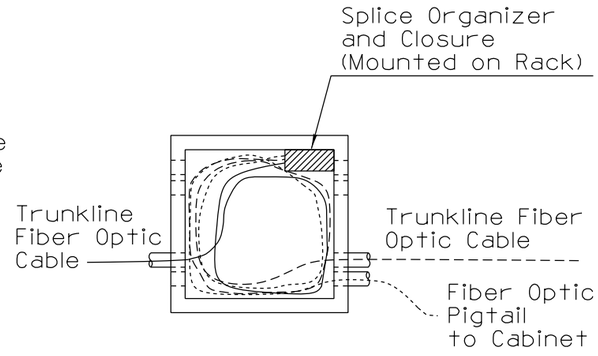


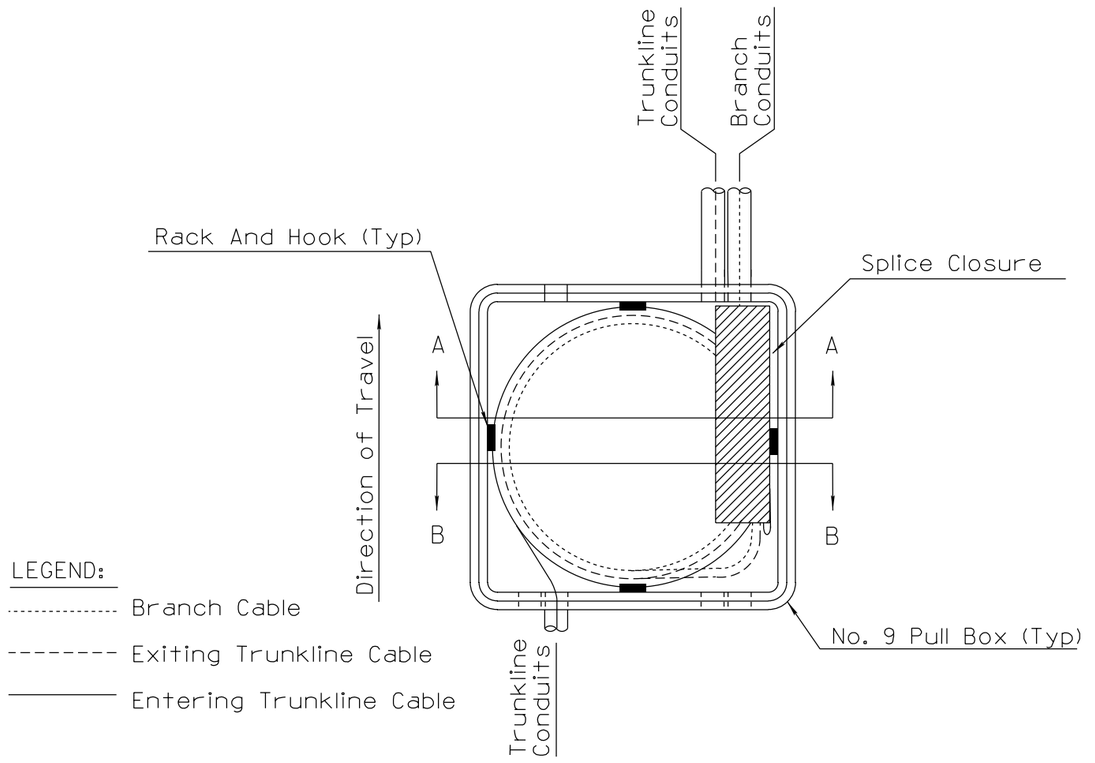

STEP 1



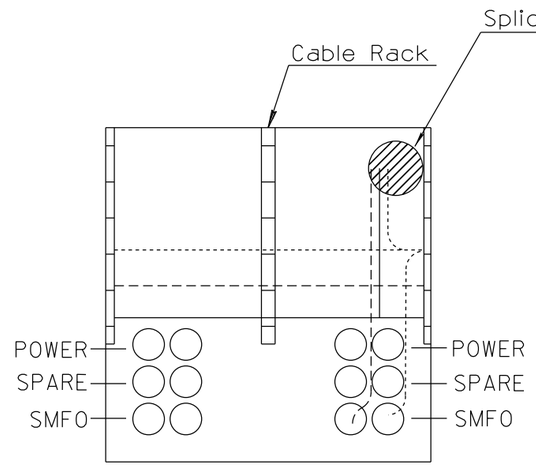

STEP 2
FIBER OPTIC
SPLICE PROCEDURE
(TOP VIEW)



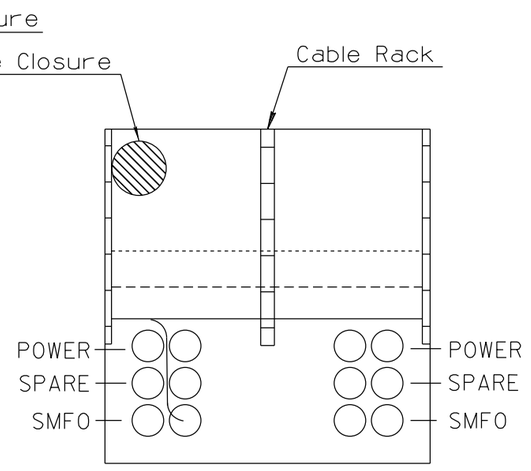

STEP 3
FIBER BRANCH TO CABINET




PLAN VIEW
CABINET DOWNSTREAM OR PERPENDICULAR TO PULLBOX




SECTION A-A




SECTION B-B

NOT TO SCALE

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| APPROVED FOR DISTRIBUTION<br>ON FILE | NO. 9 PULL BOX<br>CONDUIT ROUTING AND<br>CABLE RACKING DETAILS | DRAWING NO.<br>FM-2.04<br>SHEET NO. |

| NO | DATE | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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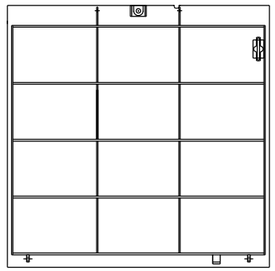
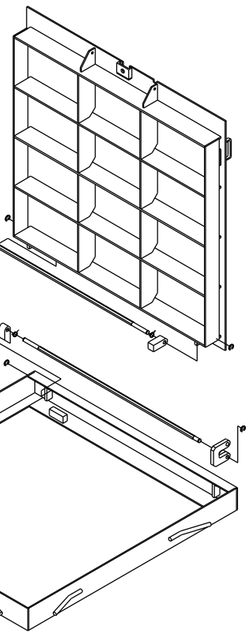


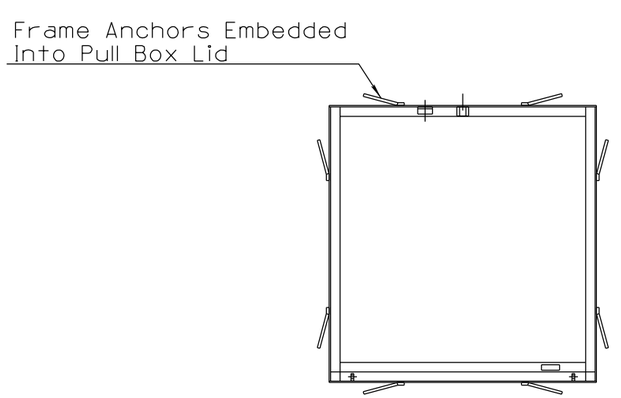
BOTTOM VIEW OF COVER

SIDE VIEW OF COVER

END VIEW OF COVER

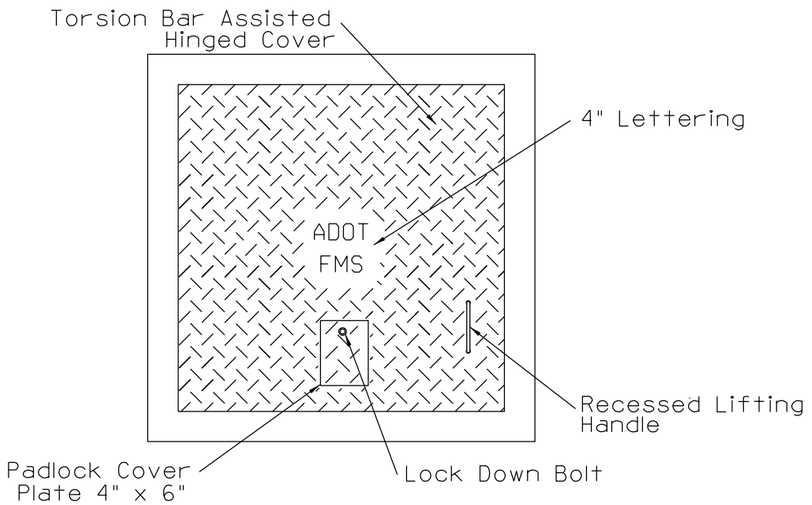


COVER AND FRAME ASSEMBLY




PLAN VIEW OF FRAME

END VIEW OF FRAME




PLAN VIEW WITH COVER

NOTES:

1. Cover Opens to 180 Degree Position.
2. Exclude All Provisions for 90-Degree Open Position.
3. Easily Opened and Closed By One Person, Maximum Force Required To Open/Close = 30 Lbs.
4. Torsion Assist with Spring Mechanism. No Hydraulic System.
5. Locking Hardware Required.
6. 4" Welded Lettering on Lid to Read "ADOT FMS"
7. Load Rated for HS 20-44
8. Weight: Steel Cover 200 Lbs. Maximum.
9. Grounding Lug to Be Attached On Frame for Cover Grounding Per NEC.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | No. 9 PULL BOX<br>TORSION ASSIST COVER | DRAWING NO.<br>FM-2.05 |
| | | SHEET NO. |

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
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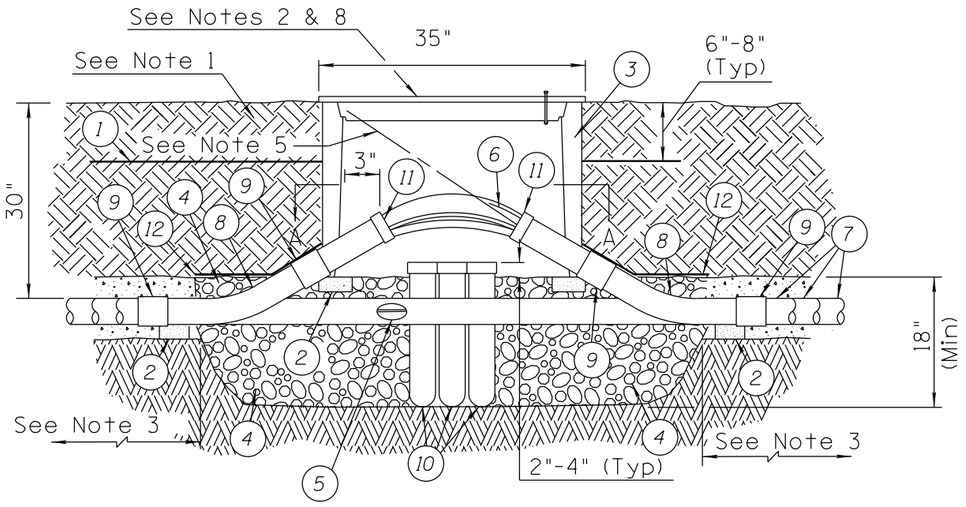
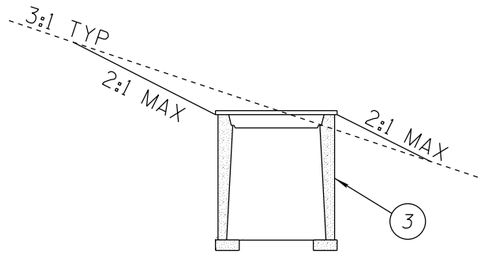
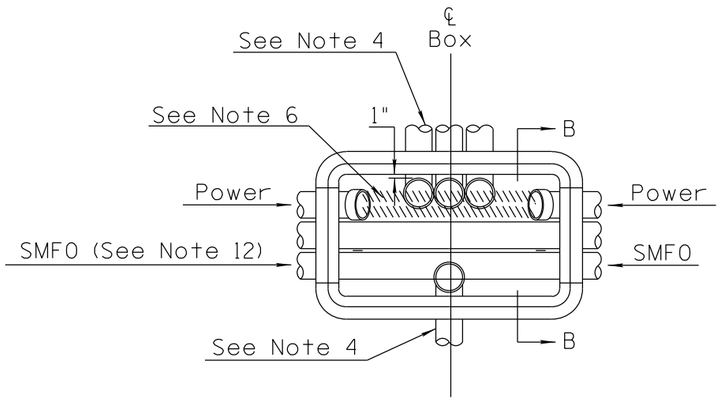
| 4 | | | |

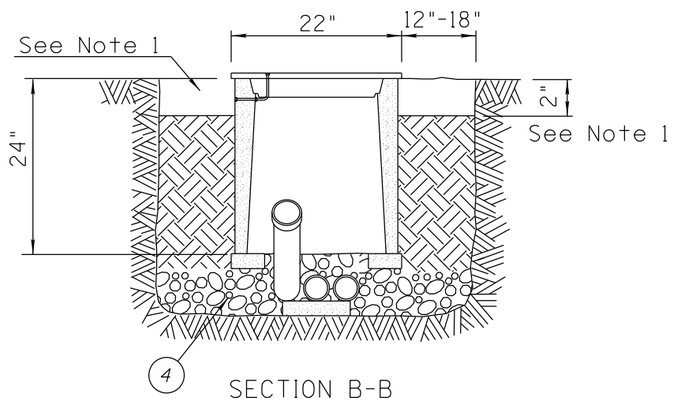



INSTALLATION IN SLOPED AREAS




SECTION A-A




SECTION B-B

| MATERIAL LIST | |
|---|---|
| ITEM | DESCRIPTION |
| ① | Warning Tape |
| ② | Concrete Building Block 2" x 4" x 8" |
| ③ | No. 7 Pull Box 24" Deep |
| ④ | Aggregate Size No. 57 |
| ⑤ | SMFO Trunkline Cable |
| ⑥ | Electrical Power Cables - See Note 6 |
| ⑦ | 3" DIA Schedule 40 PVC Conduit |
| ⑧ | 30 Degree Elbow, 18" Radius |
| ⑨ | PVC Coupling |
| ⑩ | 45 Degree PVC Elbow, 18" Radius |
| ⑪ | Bell End for PVC - See Note 9 |
| ⑫ | 30 Lb. Felt Paper |

NOTES:

1. Backfill With Designated Size No. 57 Aggregate to Bottom of the Pull Box. Backfill Around Sides of the Pull Box With Select Excavated Material and Thoroughly Compact. Set Pull Box 2 Inches Above Finished Grade to Allow for 2 Inches of Decomposed Granite to be Used to Match Slope.
2. Pull Box Lids Shall be Rated HS 20.
3. Conduit from the Typical Trench Section Shall not Deflect by More Than 1 Inch Per Foot From the Alignment Preceding or Following the Pull Box.
4. Lateral Conduits as Required.
5. Conduit C/L Shall be Aligned to Minimize Bending During Cable Pulling.
6. All Power and Communications Cable Shall be Tagged With Cable Identification.
7. Numbers in Circles Refer to Items in Material List.
8. "ADOT FMS" Shall be the Title Embossed on the Lid in Urban Projects and "ADOT ELECTRICAL HIGH VOLTAGE" on Rural Projects.
9. Use PVC to Extend into Pull Box.
10. Use Felt Paper to Block Opening Between Conduits and Around Base to Prevent Backfill Material from Entering Box.
11. Single Mode Fiber Optic Cable Conduit Shall Sweep into No. 7 Pull Boxes With Exceptions to Provide a Conduit Path for Loop Lead-In Cable from Loop Detector Locations to Controller Cabinet Locations that are Not Immediately Adjacent to the Loop Detector Location.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | PULL BOX No. 7<br>TYPICAL INSTALLATION | DRAWING NO.<br>FM-2.06<br>SHEET NO. |

DESCRIPTION OF REVISIONS | DATE | MADE BY | NO
1 2
3 4

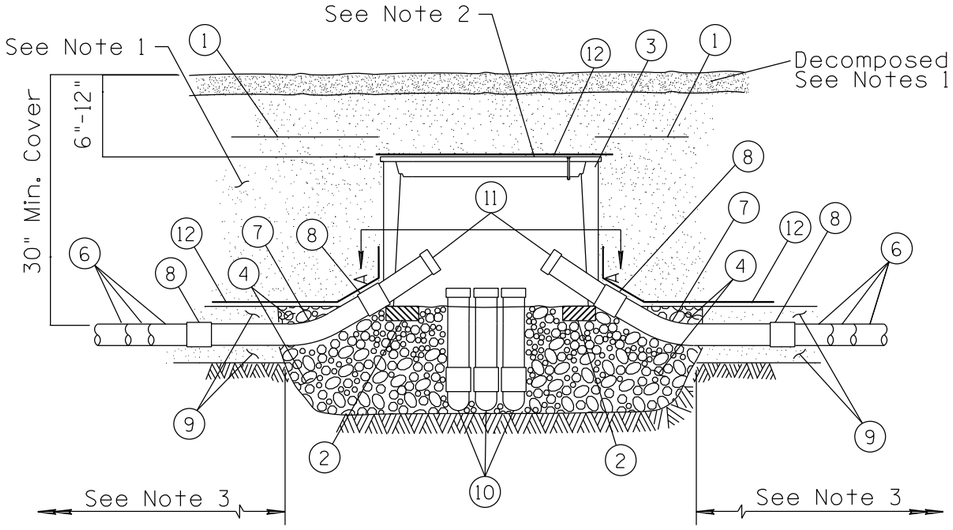
NO | DATE | MADE BY | DESCRIPTION OF REVISIONS

1 | 2 | 3 | 4

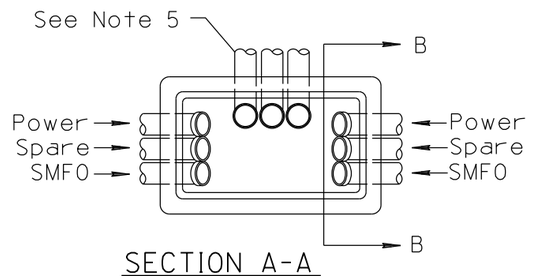
## NOTES:

1. Backfill With Designated Size No. 57 Aggregate to Bottom of the Pull Box. Backfill Around Sides of the Pull Box With Select Excavated Material and Thoroughly Compact. Allow for 2 Inches of Decomposed Granite to be Used to Match Slope.
2. Pull Box Lids Shall be Rated HS 20.
3. Conduit from the Typical Trench Section Shall not Deflect by More Than 1 Inch Per Foot From the Alignment Preceding or Following the Pull Box.
4. Lateral Conduits as Required.
5. Conduit C/L Shall be Aligned to Minimize Bending During Cable Pulling.
6. All Power and Communications Cable Shall be Tagged With Cable Identification.
7. Numbers in Circles Refer to Items in Material List.
8. "ADOT FMS" Shall be the Title Embossed on the Lid in Urban Projects and "ADOT ELECTRICAL HIGH VOLTAGE" on Rural Projects.
9. Use PVC to Extend into Pull Box.
10. Use Felt Paper to Block Opening Between Conduits and Prevent Backfill Materials From Entering Pull Box.
11. Pull Box Height 6" - 12" Below Finished Grade. Decomposed Granite to be Used to Match Existing.
12. Existing Pull Box Configurations May Vary. Locations Where No. 7 Pull Boxes Are Being Replaced Shall Be Installed As Shown On This Sheet Unless Directed Otherwise By The Project Plans.
13. Place Felt Paper Covering Entire Pull Box Before Covering With Fill.
14. Contractor Shall Note Pull Box Location By GPS Coordinates Unless Instructed Otherwise In the Plans.

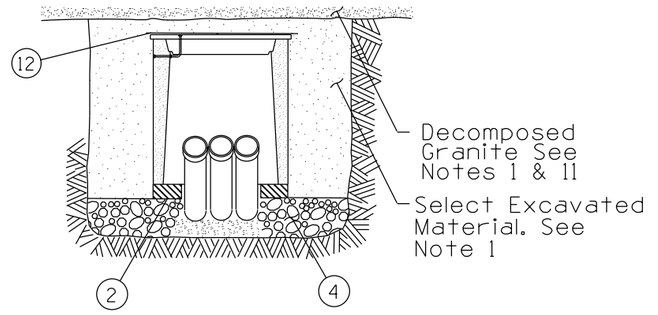
| MATERIAL LIST | |
|---|---|
| ITEM | DESCRIPTION |
| ① | Warning Tape |
| ② | Concrete Building Block 2" X 4" X 8" |
| ③ | No. 7 Pull Box 24" Deep |
| ④ | Aggregate Designated Size No. 57 |
| ⑤ | SMFO Trunkline Cable |
| ⑥ | 3" Dia. Schedule 40 PVC OR HDPE Conduits |
| ⑦ | 30 Degree Elbow, 18" Radius |
| ⑧ | PVC Coupling |
| ⑨ | Select Excavated Backfill |
| ⑩ | 45 Degree Elbow, 18" Radius |
| ⑪ | Bell End For PVC - See Note 9 |
| ⑫ | 30 Lb. Felt Paper |



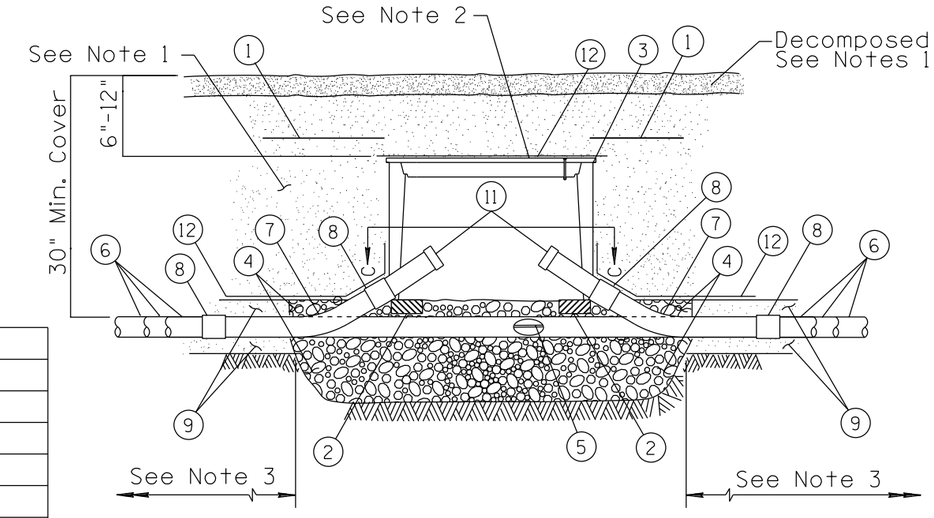

INSTALLATION FOR NO. 7 PULL BOX WITH THREE CONDUITS SWEEPING INTO PULL BOX



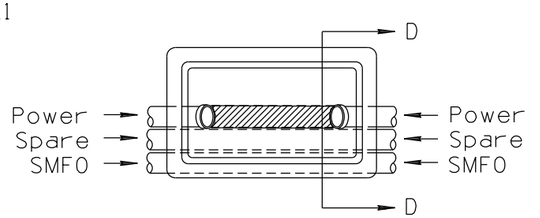

SECTION A-A



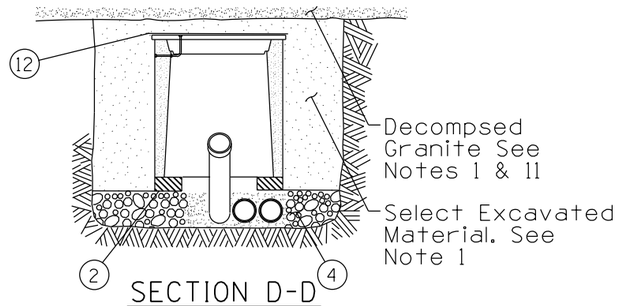

SECTION B-B




INSTALLATION FOR NO. 7 PULL BOX WITH ONE CONDUIT SWEEPING INTO PULL BOX



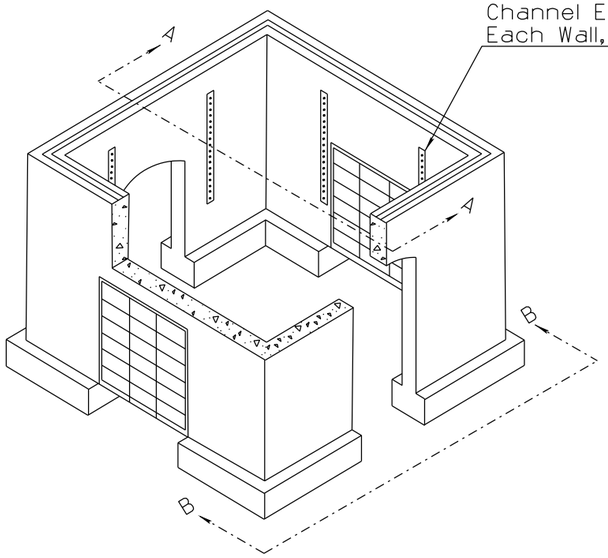

SECTION C-C

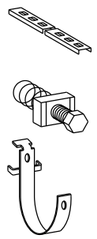



SECTION D-D

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | TYPICAL BURIED INSTALLATION<br>NO. 7 PULL BOX | DRAWING NO.<br>FM-2.07<br>SHEET NO. |



8 - 18 Hole C- Channel Rack

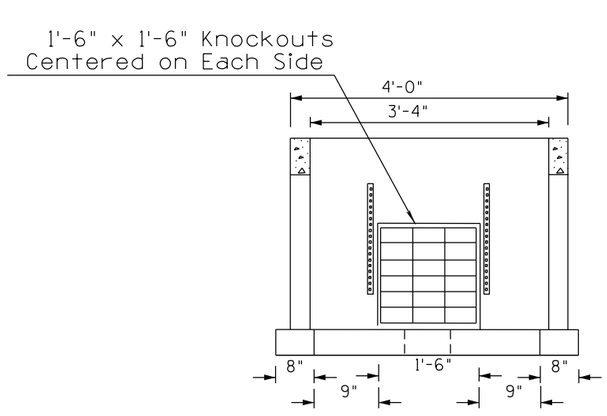
16 - ½" Spring Nuts and Bolts

8 - 7½" Hooks

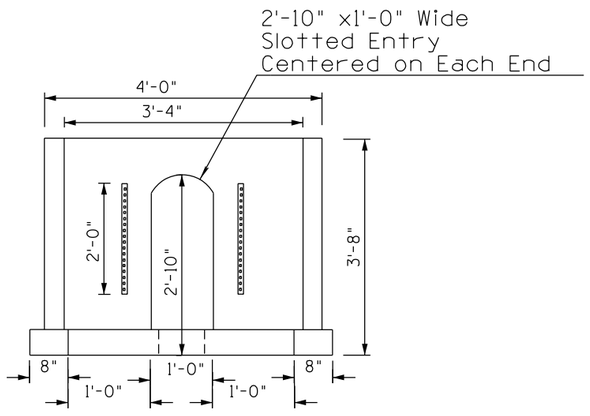
RACKING PACKAGE

## NOTES:

1. Backfill With Designated Size No. 57 Aggregate Below Pull Box. Backfill Around Sides of Pull Box With Select Excavated Material and Compact at 95% Max. Density.
2. Conduit From the Typical Trench Section Shall Not Deflect by More Than 1 Inch Per Foot From the Alignment Preceding or Following the Pull Box.
3. The Contractor Shall Pour the Floor with Drain, After the Pull Box Installation.
4. The Contractor Shall Grout the Knockout Areas. Around the Conduits, with a Smooth Concrete Finish After the Pull Box Installation.
5. All New Pull Boxes Shall be Furnished With Racks and Hooks Installed.
6. Provide Total Slack Per Plan for Each Fiber Optic Cable Coiled in all No. 9 Pull Boxes, With Splice Enclosure Centered on Slack. Slack on Branch Fiber Shall Match or Exceed Slack on Trunkline Fiber.
7. Plug Each Conduit End With Approved, Waterproof Duct Plug.
8. Pull Box and Lids Shall be Rated for HS20-44 Loading.
9. All Power and Communication Cables Shall be Tagged With Cable Identification
10. Pull Box Height Above Finished Grade Shall Permit 2 Inches of Decomposed Granite to be Used to Match Existing Grade/Slope.
11. Locking Lip W/Seal Between Wall and Cover Assembly.
12. No. 9 Split Pull Box May be Altered Based on the Availbility of Model from Various Manufacturers. Shop Drawings Shall be Approved by the Engineer Prior to The Ordering of Materials.




Section A-A




Section B-B

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | SPLIT NO. 9<br>PULL BOX DETAILS | DRAWING NO.<br>FM-2.08 |
| | | SHEET NO. |

| NO | DATE | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|---|
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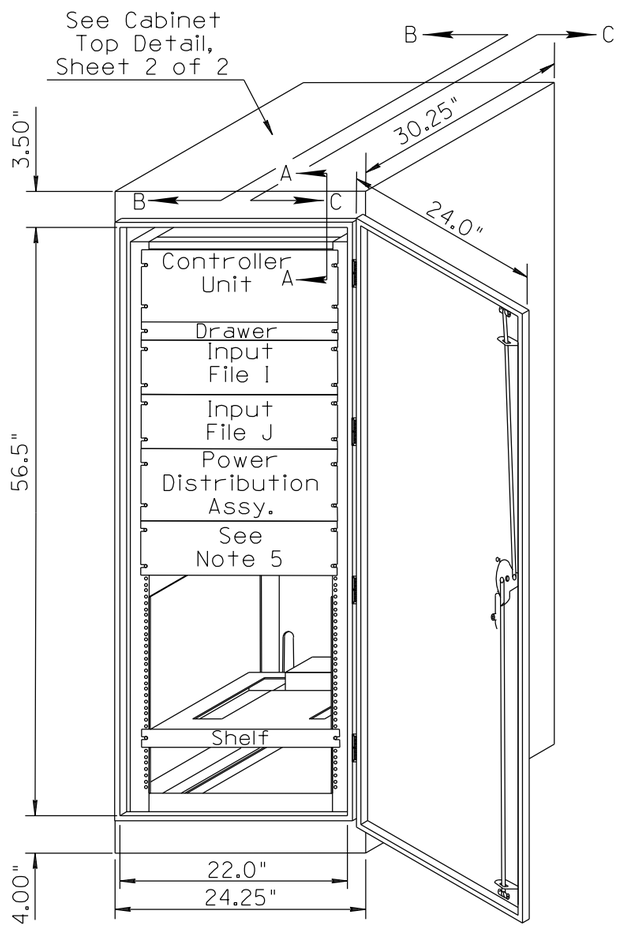
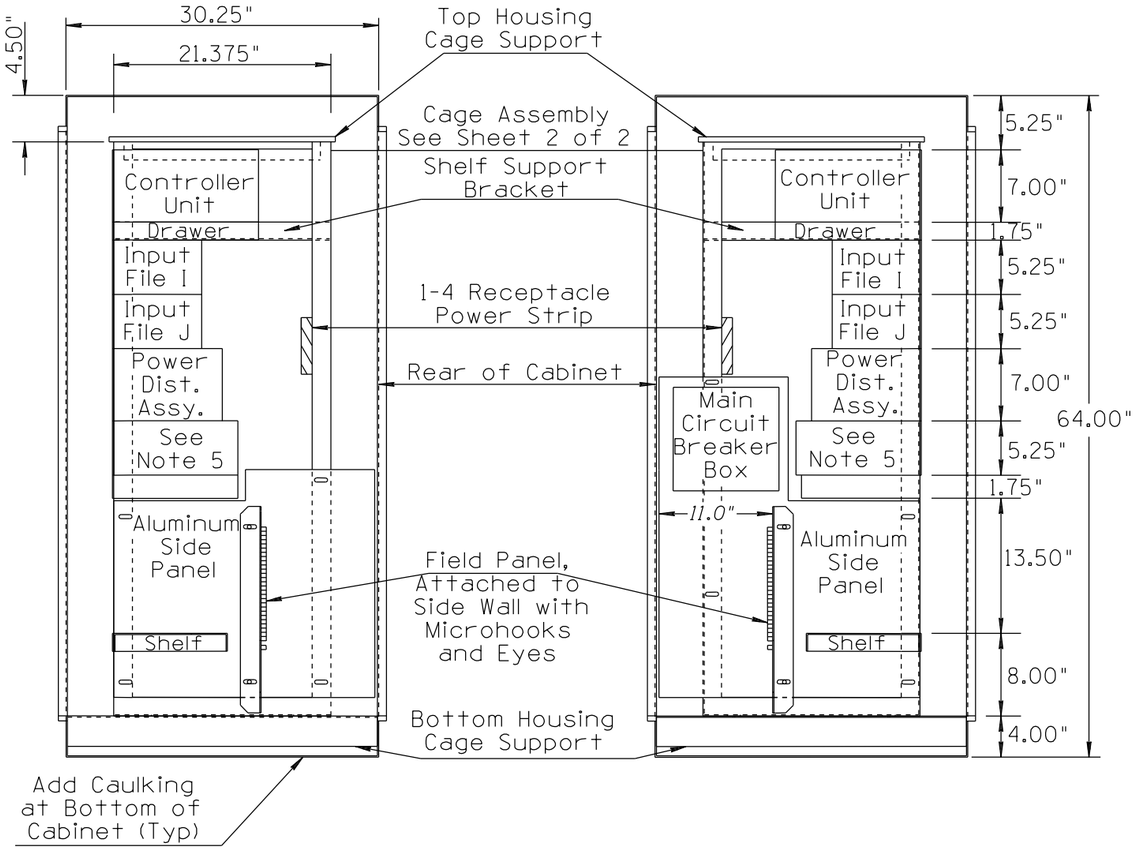
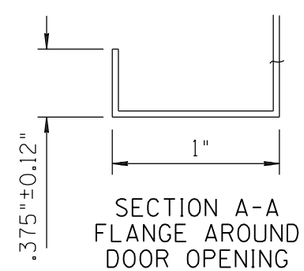
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |




SECTION B-B

SECTION C-C




SECTION A-A
FLANGE AROUND DOOR OPENING

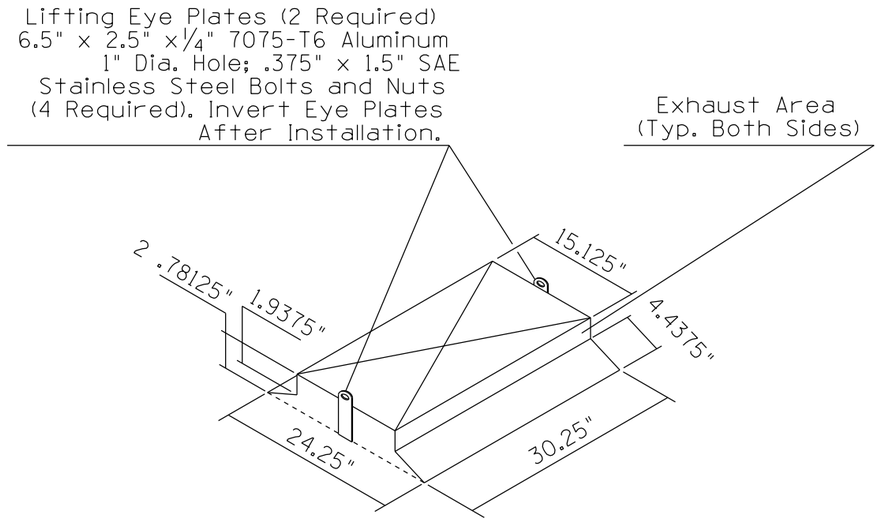
## NOTES:

1. Except Where Otherwise Noted, all Dimensions Shall Have a ±0.0625" Tolerance.
2. Ventilation Louvers With Filter/Shell Assembly Shall be Provided on Rear Door of Cabinet.
3. Hinges for the Rear Cabinet Door Shall be Located on the Left Side When Facing the Rear of the Cabinet.
4. See Plan Sheets for Seven Digit Cabinet Numbers. Numbers Shall be Placed in Such a Manner That Entire Seven Digit Cabinet Number is Centered Horizontally on the Cabinets Front Door. See FM-3.13.
5. For Future Use.
6. Cabinets Shall be to Earth Ground Per the NEC.
7. Caulking is required along interior bottom edges of cabinet.

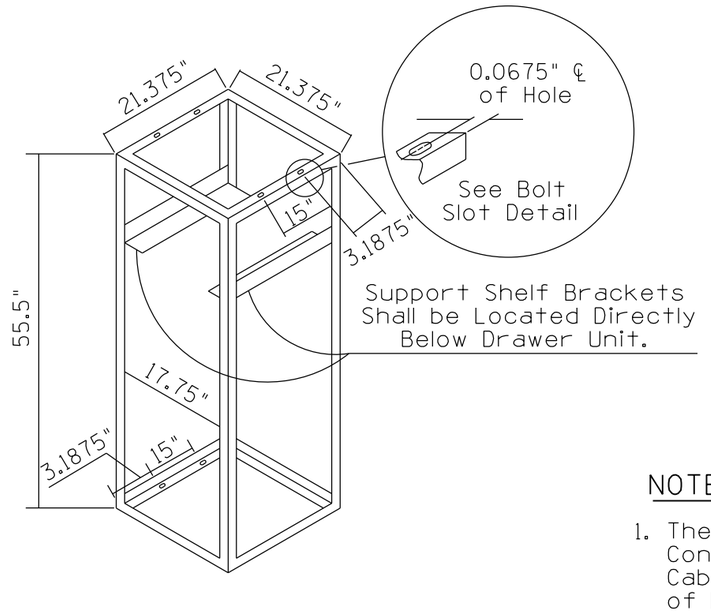
NOT TO SCALE

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 3 | | | |
| 2 | | | |
| 1 | | | |

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION 8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | RAMP METER CABINET DETAILS<br>(SHEET 1 of 2) | DRAWING NO. FM-3.01<br>SHEET NO. |



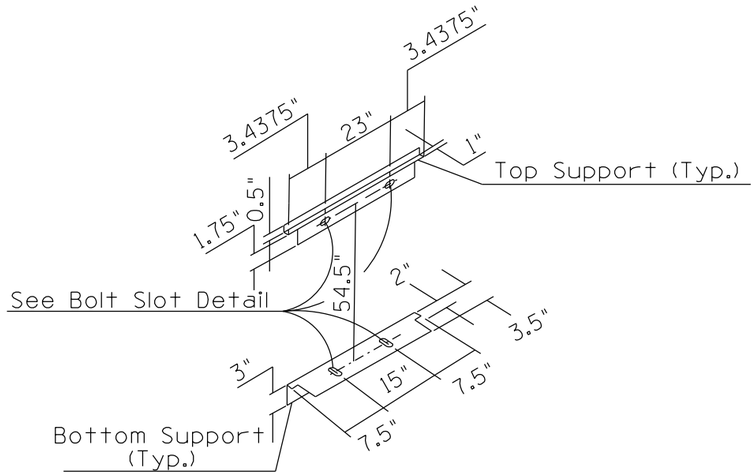

CABINET TOP DETAIL



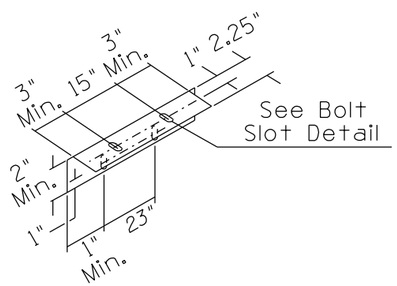

CAGE ASSEMBLY DETAIL

## NOTES:

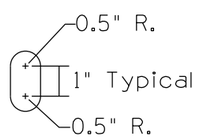
1. The Bottom Cabinet Cage Supports Shall be Continuously Welded Along the Sides Of The Cabinet and Extended to the Inside Corner of Door Openings. The Top Cabinet Cage Supports Shall be Continuously Welded Along The Sides of the Cabinet.
2. Cage Support Hole Slot Dimensions Shall be Common for Top and Bottom.




CABINET CAGE
SUPPORT DETAIL




CAGE SPACER
BRACKET DETAIL

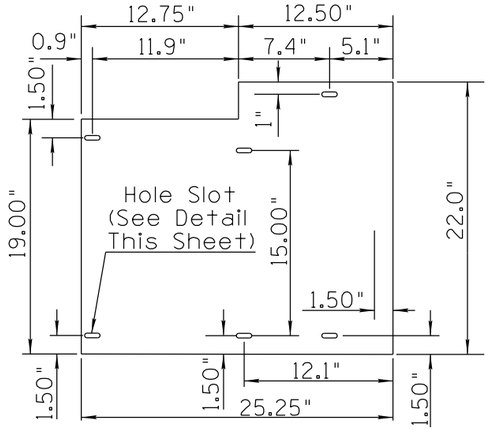



BOLT SLOT
DETAIL

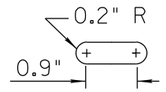
NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| | | DRAWING NO.<br>FM-3.02 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | RAMP METER CABINET DETAILS<br>(SHEET 2 of 2) | SHEET NO. |

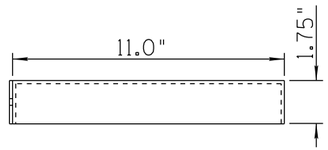
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 3 | | | |
| 2 | | | |
| 1 | | | |



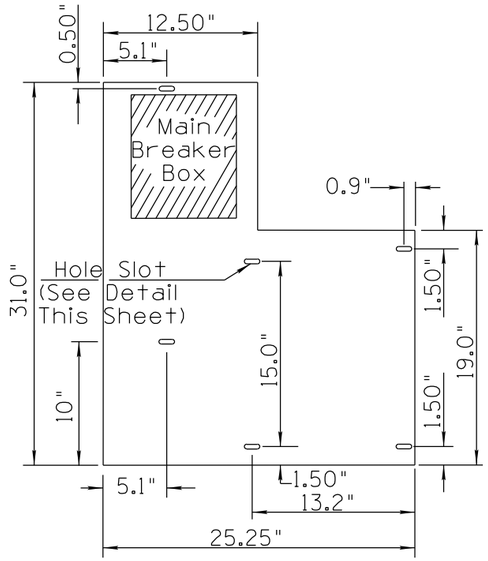

LEFT SIDE PANEL



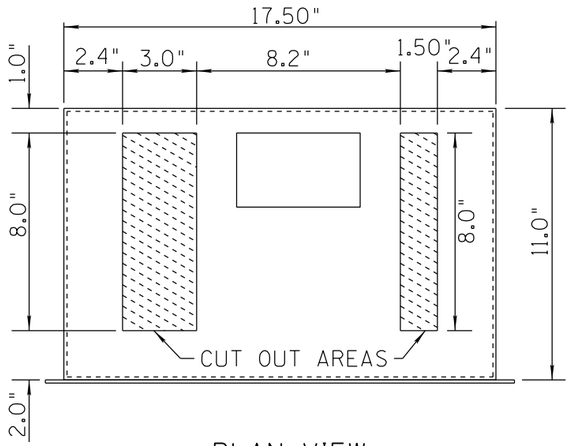

TYPICAL
HOLE SLOT DETAIL




SIDE VIEW SECTION




RIGHT SIDE PANEL




PLAN VIEW


FRONT VIEW
SHELF

## NOTES:

1. The Panels Shall be Fabricated From Single Sheets of 0.125" Iridited Aluminum. The Aluminum Shall be Bent to Form the Flaps as Shown on the Drawing.
2. Terminal Numbers and Labels Shall be Silk Screened on Panels.
3. The Panels Shall Not be Painted.
4. The Panels Shall be Free of Burrs and Sharp Edges.
5. Spacers Shall be Used Between Cage and Side Panels.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | RAMP METER<br>CABINET SPECIAL DETAILS | DRAWING NO.<br>FM-3.03 |
| | | SHEET NO. |

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

| NO | DATE | DESCRIPTION OF REVISIONS | MADE BY |
|---|---|---|---|
| 3 | | | |
| 2 | | | |
| 1 | | | |

# CONNECTION OF SWITCH PACKS IN POWER DISTRIBUTION ASSEMBLY #4 (PDA4)

NOTE: SEE CONNECTOR DETAIL SHEET FM-3.10

## SWITCH PACK #1 SOCKET ASSIGNMENTS FOR RAMP METER CABINETS ONLY

| SWITCH PACK PIN | FUNCTION | CONNECT TO |
|---|---|---|
| 1 | AC+ | T2-4 |
| 2 | EQUIP. GROUND | T2-1 |
| 3 | LEFT LANE RED OUTPUT | T4-1 |
| 4 | NA | |
| 5 | BEACON OUTPUT | FL-11, T4-12 |
| 6 | LEFT LANE RED INPUT | C7-1 |
| 7 | LEFT LANE GREEN OUTPUT | T4-2 |
| 8 | BEACON INPUT | C7-5 |
| 9 | +24 VDC | PSS-7,T3-1,2 |
| 10 | LEFT LANE GREEN INPUT | C7-2 |
| 11 | AC- | T2-2 |
| 12 | NA | |

## SWITCH PACK #2 SOCKET ASSIGNMENTS

| SWITCH PACK PIN | FUNCTION | CONNECT TO |
|---|---|---|
| 1 | AC+ | T2-4 |
| 2 | EQUIP. GROUND | T2-1 |
| 3 | RIGHT LANE RED OUTPUT | T4-3 |
| 4 | NA | |
| 5 | NA | |
| 6 | RIGHT LANE RED INPUT | C7-3 |
| 7 | RIGHT LANE GREEN OUTPUT | T4-4 |
| 8 | NA | |
| 9 | +24 VDC | PSS-7 |
| 10 | RIGHT LANE GREEN INPUT | C7-4 |
| 11 | AC- | T2-2 |
| 12 | NA | |

## SWITCH PACK #3 SOCKET ASSIGNMENTS

| SWITCH PACK PIN | FUNCTION | CONNECT TO |
|---|---|---|
| 1 | AC+ | T2-4 |
| 2 | EQUIP. GROUND | T2-1 |
| 3 | GATE DOWN OUTPUT | T4-8 |
| 4 | NA | |
| 5 | SIGN OUTPUT | T4-6 |
| 6 | GATE DOWN INPUT | C7-8 |
| 7 | GATE UP OUTPUT | T4-7 |
| 8 | SIGN INPUT | C7-6 |
| 9 | +24 VDC | PSS-7 |
| 10 | GATE UP INPUT | C7-7 |
| 11 | AC- | T2-2 |
| 12 | NA | |

## SWITCH PACK #4 SOCKET ASSIGNMENTS

| SWITCH PACK PIN | FUNCTION | CONNECT TO |
|---|---|---|
| 1 | AC+ | T2-4 |
| 2 | EQUIP. GROUND | T2-1 |
| 3 | SPECIAL FUNCTION 1 OUTPUT | T4-9 |
| 4 | NA | |
| 5 | FUTURE OUTPUT | T4-11 |
| 6 | SPECIAL FUNCTION 1 INPUT | C7-9 |
| 7 | SPECIAL FUNCTION 2 OUTPUT | T4-10 |
| 8 | FUTURE INPUT | |
| 9 | +24 VDC | PSS-7 |
| 10 | SPECIAL FUNCTION 2 INPUT | C7-10 |
| 11 | AC- | T2-2 |
| 12 | NA | |

## MODEL 204 FLASHER UNIT (FU) SOCKET WIRING DETAIL FOR TYPE RAMP METER CABINETS ONLY

| FLASHER PIN | FUNCTION | CONNECT TO |
|---|---|---|
| 7 | LOAD CIRCUIT #1-BEACON OUTPUT | T4-5 |
| 8 | LOAD CIRCUIT #2 | NOT USED |
| 9 | EQUIPMENT GROUND | T2-1 |
| 10 | AC- | T2-2 |
| 11 | AC+ | SWPK #1 PIN 5 |
| 12 | NA | |

## PDA4 TERMINAL BLOCK T2 TERMINAL ASSIGNMENTS CONNECTIONS

| PIN | FUNCTION | PDA4 INTERNAL DEVICE | TERM. |
|---|---|---|---|
| 1 | EQUIPMENT GROUND | MODEL 204 | 9 |
| | | MODEL 206 | 9 |
| | | SWPK-1 | 2 |
| | | SWPK-2 | 2 |
| | | SWPK-3 | 2 |
| | | SWPK-4 | 2 |
| | | REC 1 | 3 |
| | | REC 2 | 3 |
| | | REC 3A | 3 |
| | | REC 3B | 3 |
| 2 | AC- | MODEL 204 | 10 |
| | | SWPK-1 | 11 |
| | | SWPK-2 | 11 |
| | | SWPK-3 | 11 |
| | | SWPK-4 | 11 |
| | | REC 1 | 2 |
| | | REC 2 | 2 |
| 3 | AC+ SOURCE | CB-1 | 1 |
| | | CB-2 | 1 |
| | | CB-3 | 1 |
| | | CB-4 | 1 |
| 4 | AC+ CONTROLLED | SWPK-1 | 1 |
| | | SWPK-2 | 1 |
| | | SWPK-3 | 1 |
| | | SWPK-4 | 1 |
| 5 | (NOT USED) | | |
| 6 | SIGNAL POWER INTERRUPT RELAY CONTROL OUT | MODEL 208 | 2 |
| 7 | (NOT USED) | NONE | |
| 8 | AC- | | |
| 9 | AC+ FILTERED | CB-1 | 1 |
| | | CB-3 | 1 |
| 10 | AC- FILTERED | REC 3A | 2 |
| | | REC 36 | 2 |
| | | PSS | 11 |
| | | MODEL 208 | 15 |

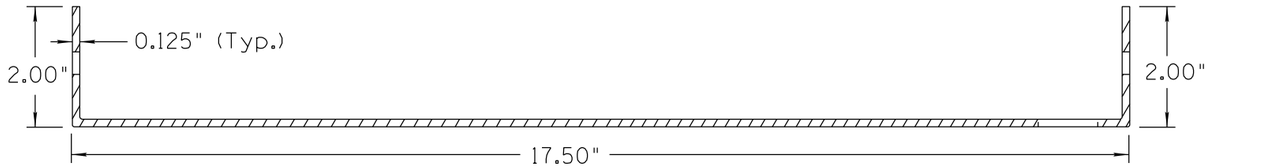
| PIN | FUNCTION | PDA4 INTERNAL SOCKET ASSIGNMENTS DEVICE | TERM. |
|---|---|---|---|
| 1 | SWPK-1 CIRCUIT 1 OUT | SWPK-1 | 3 |
| 2 | SWPK-1 CIRCUIT 3 OUT | SWPK-1 | 7 |
| 3 | SWPK-2 CIRCUIT 1 OUT | SWPK-2 | 3 |
| 4 | SWPK-2 CIRCUIT 3 OUT | SWPK-2 | 7 |
| 5 | FLASHER OUT | MODEL 204 | 7 |
| 6 | SWPK-3 CIRCUIT 2 OUT | SWPK-3 | 5 |
| 7 | SWPK-3 CIRCUIT 3 OUT | SWPK-3 | 7 |
| 8 | SWPK-3 CIRCUIT 1 OUT | SWPK-3 | 3 |
| 9 | SWPK-4 CIRCUIT 1 OUT | SWPK-4 | 3 |
| 10 | SWPK-4 CIRCUIT 3 OUT | SWPK-4 | 7 |
| 11 | SWPK-4 CIRCUIT 2 OUT | SWPK-4 | 5 |
| 12 | BEACON POWER | MODEL 204 | 11 |
| | | MODEL 204 | 13 |

## PDA4 TERMINAL BLOCK T4 TERMINAL ASSIGNMENTS

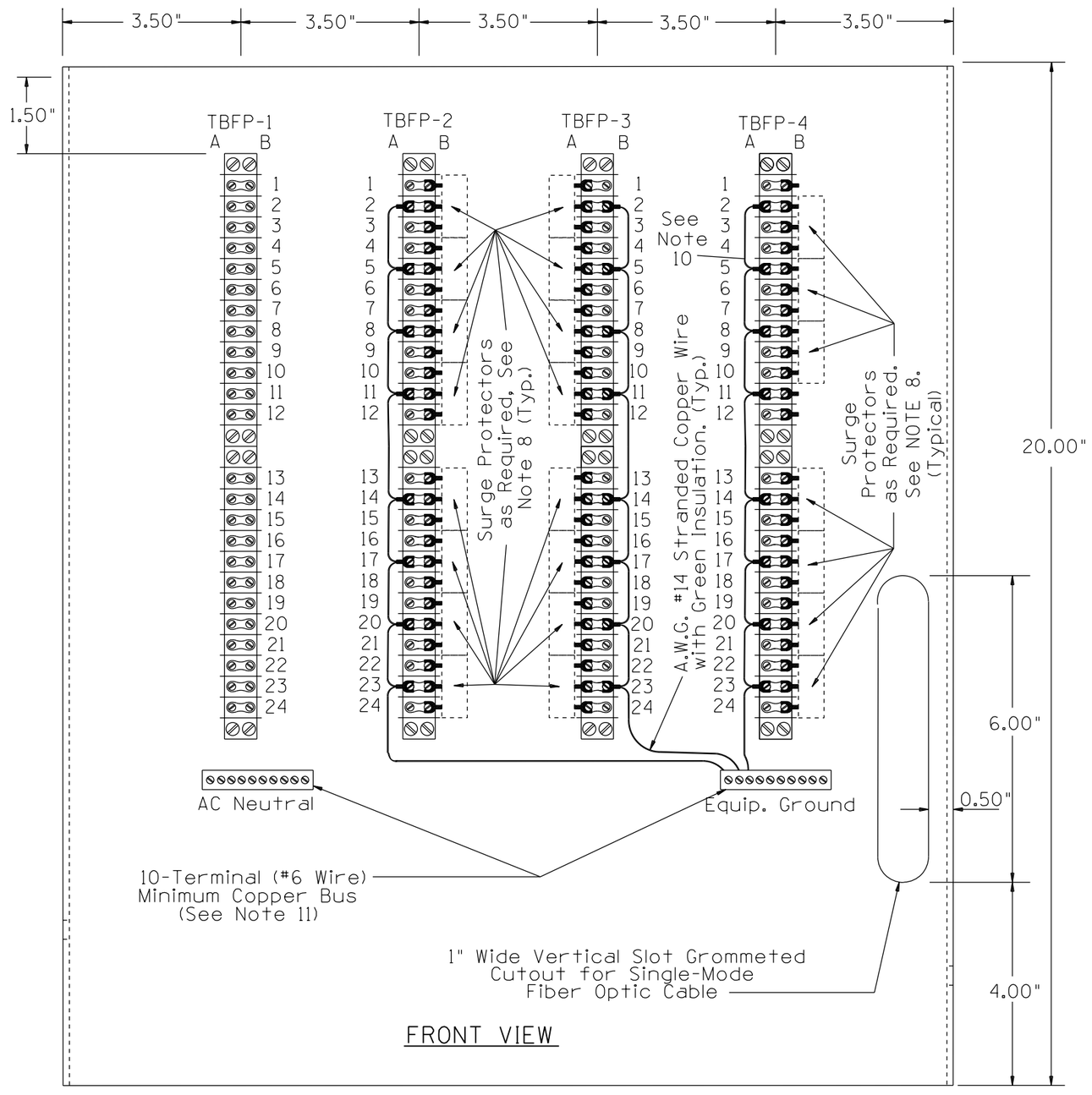
| PIN | FUNCTION | PDA4 INTERNAL SOCKET ASSIGNMENTS DEVICE | TERM. |
|---|---|---|---|
| 13 | SIGNAL/GATE POWER | CB-2 | 2 |
| 14 | SIGNAL/GATE POWER | CB-2 | 2 |
| 15 | SIGNAL/GATE POWER | CB-2 | 2 |
| 16 | NOT USED | | |
| 17 | NOT USED | | |
| 18 | NOT USED | | |
| 19 | NOT USED | | |
| 20 | NOT USED | | |

NOT TO SCALE

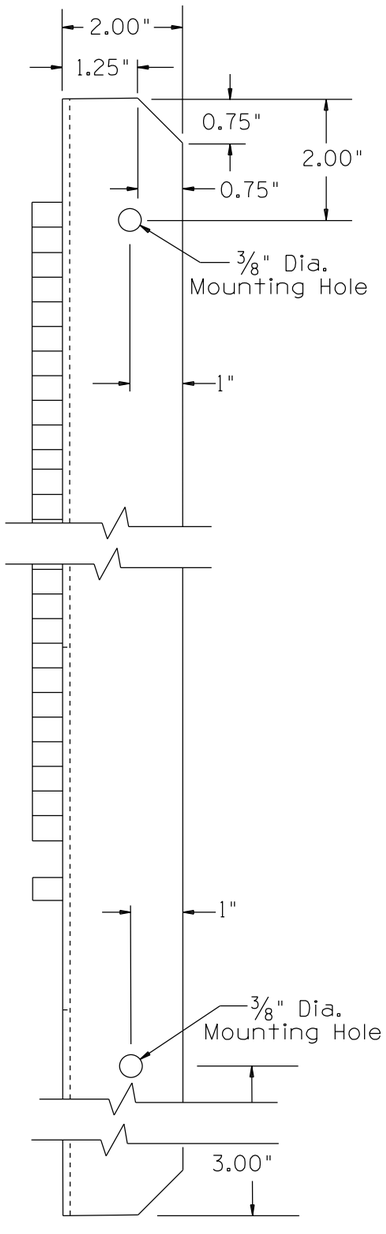
| | | |
|---|---|---|
| DESIGN APPROVED SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS ITS STANDARD DRAWINGS | REVISION 8/13 |
| APPROVED FOR DISTRIBUTION ON FILE | RAMP METER CABINET ACCESSORIES | DRAWING NO. FM-3.04 |
| | | SHEET NO. |




TOP VIEW




FRONT VIEW




SIDE VIEW

NOT TO SCALE

## NOTES:

1. The Panel Shall be Fabricated From a Single Sheet of 0.125" Iridized Aluminum. The Aluminum Shall be Bent to Form the Flaps as Shown on the Drawing.
2. Terminal Block and Neutral Bus Mountings Shall be Via Screws Threaded Into Holes in The Aluminum Panel. Screws Shall Not Protrude Beyond Back Face of Panel. The AC Neutral Bus Shall be Electrically Isolated From the Field Panel.
3. All Terminal Blocks Shall Have (7/16" Terminal Spacing) as Shown.
4. Terminal Numbers and Labels Shall be Silk Screened on Panels.
5. The Panel Shall Not ae Painted. Furnish and Install Crimped Solderless Spade Lugs on All Conductors. Each Conductor End Shall Have its Own Spade Lug.
6. The Panel Shall be Free of Burrs and Sharp Edges.
7. The Panel Shall be Attached by Bolting the Side Flaps (as Shown on Drawing) to the Side Panels on Cage.
8. An Approved Surge Protector Shall be Furnished and Installed as Part of Each Detector Loop Connected in the Cabinet.
9. When Adjacent Terminals Must be Connected Together, Prefabricated Shorting Strips May be Used in Lieu of Wire Jumpers. Surge Protectors May Use Individual Leads with Spade Lugs Attached in the Same Manner for Attaching Lugs to Loop Lead-In Wires.
10. All AC Neutral Circuits in Cabinet Shall be Connected to the Cabinet AC Neutral Bus. That Same Neutral Bus Shall be Connected To PDA4 T2-2.
11. The Surge Protector Ground and the Main Circuit Breaker Box Equipment Ground Stud Shall be Connected to the Cabinet Ground Rod Via a Single Bare #8 AWG Soft Drawn Solid Copper Wire From The Equipment Ground Bus. Cabinet Shall be Connected to Earth Ground Per NEC.
12. Appropriately Sized Locking Star Washers Shall be Used on All Terminals.

| NO | DATE | DESCRIPTION OF REVISIONS | MADE BY |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
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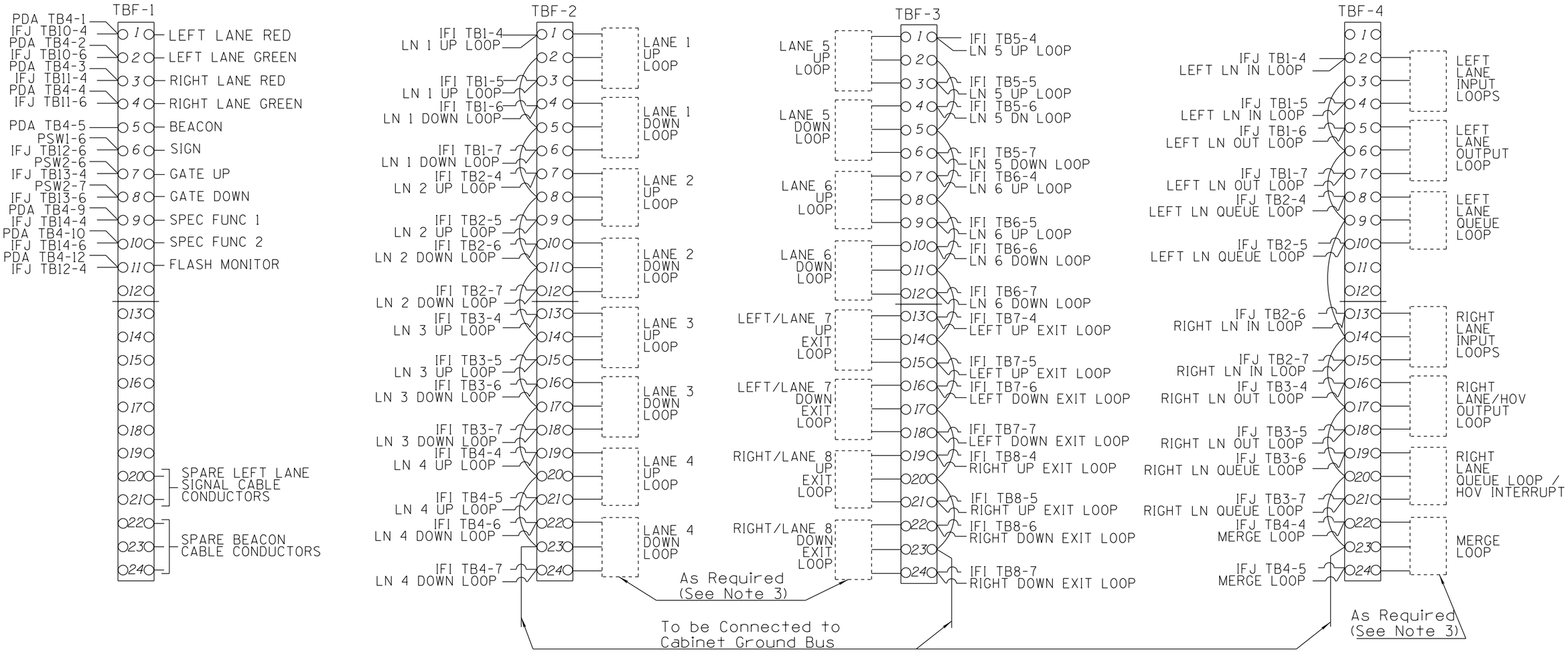
| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | RAMP METER<br>FIELD PANEL DETAILS | DRAWING NO.<br>FM-3.05 |
| | | SHEET NO. |

# RAMP METER
# FIELD PANEL CONNECTIONS (REAR VIEW)




## LEGEND:

| | |
|---|---|
| IFI | INPUT FILE "I" |
| IFJ | INPUT FILE "J" |
| PDA | POWER DISTRIBUTION ASSEMBLY |
| PSWX-Y | POLICE PANEL SWITCH NO "X", POSITION "Y" |
| TBW-Y | TERMINAL BOARD "X", POSITION "Y" |

## NOTES:

1. All Field Cables Connected to TBF-1, Terminals 1 To 10, Shall be Grounded To Appropriate Ground Bus.
2. "Up" and "Down" Signify "Upstream" and "Downstream", Respectively. See Drawing (Loop Detector Definition) For Loop Placement.
3. A Surge Protector (Arrestor) Shall Be Installed for Each Loop System Connected to the Panel.

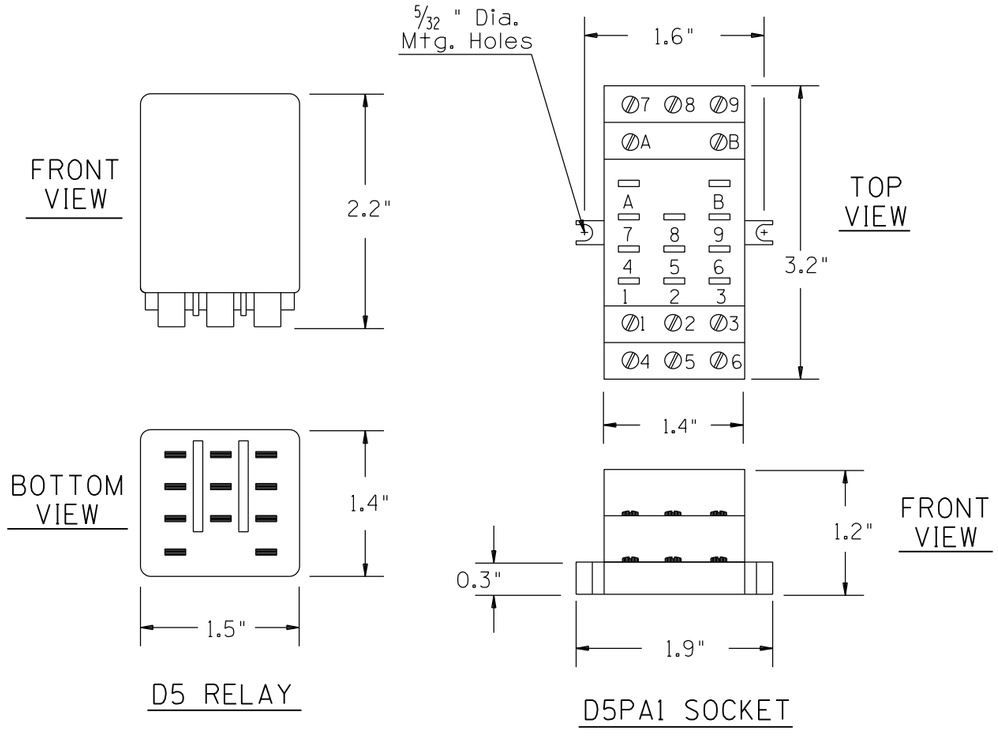
NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | RAMP METER<br>FIELD PANEL CONNECTIONS | DRAWING NO.<br>FM-3.06 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

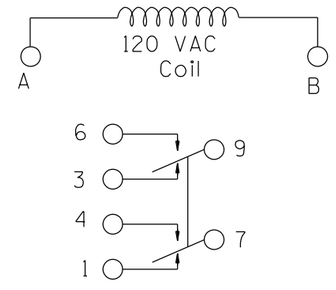
## SIGNAL POWER INTERRUPT RELAY (SPIR) (IN MAIN CIRCUIT BREAKER BOX RAMP METER CABINETS ONLY)




NOTES:

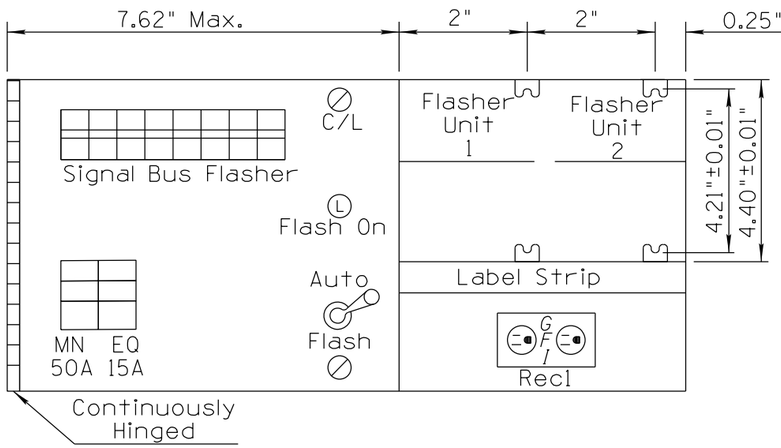
1. Signal Power Interrupt Relay to be D5 Relay with 120 VAC Coil and Contacts for 120 Vac, 10 Amperes. Socket to be D5PA1.
2. Relay Contacts Shown with Coil De-Energized.

## SIGNAL POWER INTERRUPT RELAY PIN ASSIGNMENTS

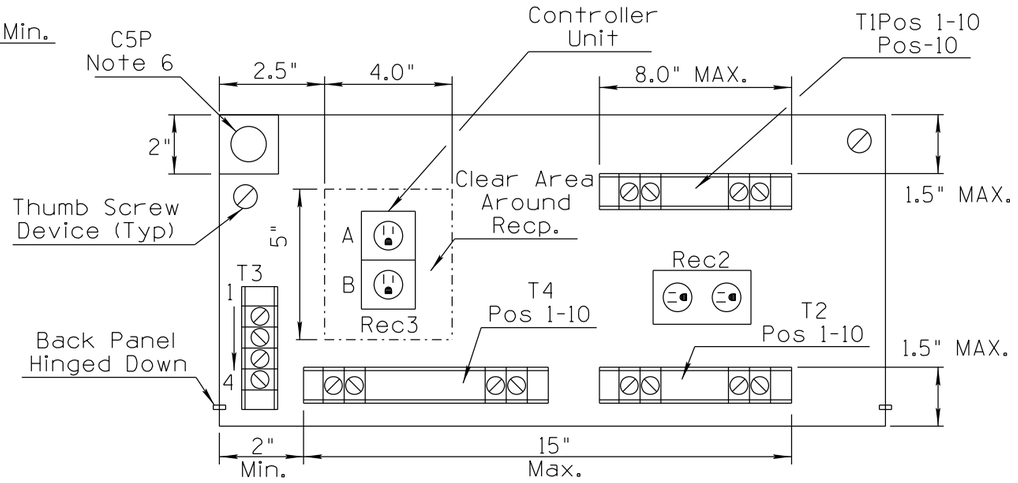



NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | RAMP METER<br>SIGNAL POWER INTERRUPT RELAY AND PIN ASSIGNMENTS | DRAWING NO.<br>FM-3.07<br>SHEET NO. |




FRONT VIEW

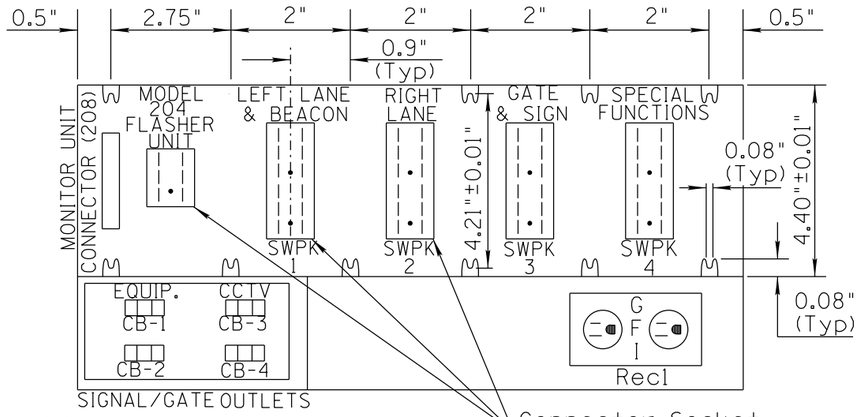



REAR VIEW

## NOTES:

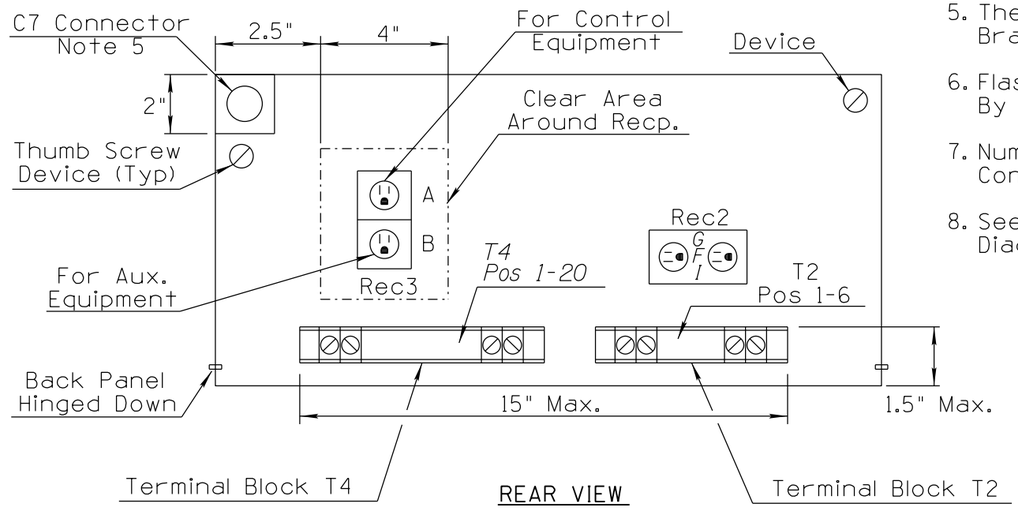
1. Slack Shall Be Provided In The Wiring For The Circuit Breakers and Receptacles To Allow For Removal and Repair. Excess Bends and Stress On The Wiring Shall Be Minimized.
2. Wiring Shall Be Routed (With Extra Length) To Minimize Movement When Front Panel Door Is Opened. The Wiring Going To The Front Panel Shall Be Routed Such That It Does Not Cause Undue Twisting Or Bending Of The Wires.
3. No Ventilation Hole Shall Be Larger Than 0.375".
4. The C7 Connector and Support Bracket Shall Be Installed In PDA4.
5. The C5P Connector and Support Bracket Shall Be Installed In PDA2.
6. Flasher To Be Installed As Required By Plans.
7. Number Of Load Switch Packs To Conform To Requirements Of Plans.
8. See FM-3.09 For PDA4 Schematic Diagram.

## POWER DISTRIBUTION ASSEMBLY #2 (PDA2)



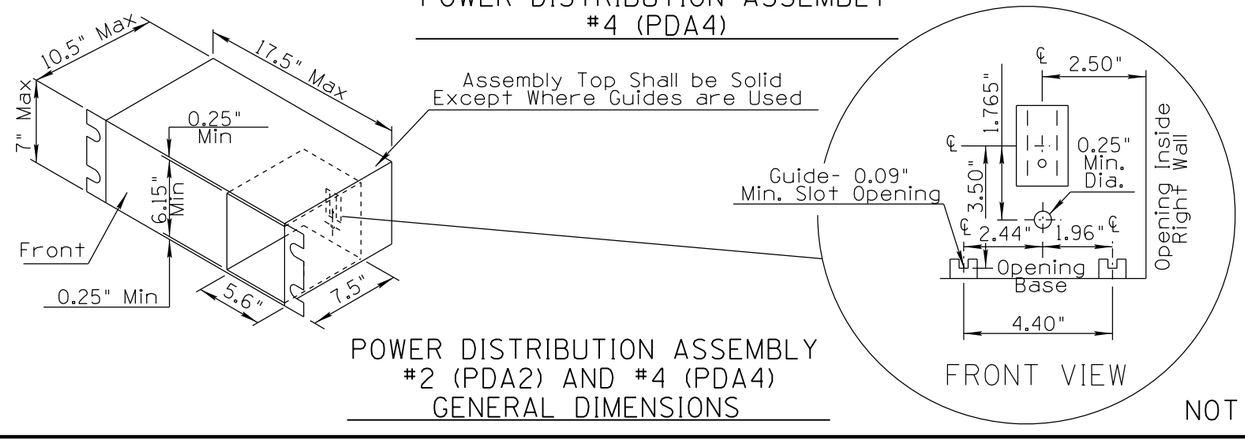

NOTE:
All Circuit Breakers Shall be 15 AMP.

FRONT VIEW




REAR VIEW

## POWER DISTRIBUTION ASSEMBLY #4 (PDA4)



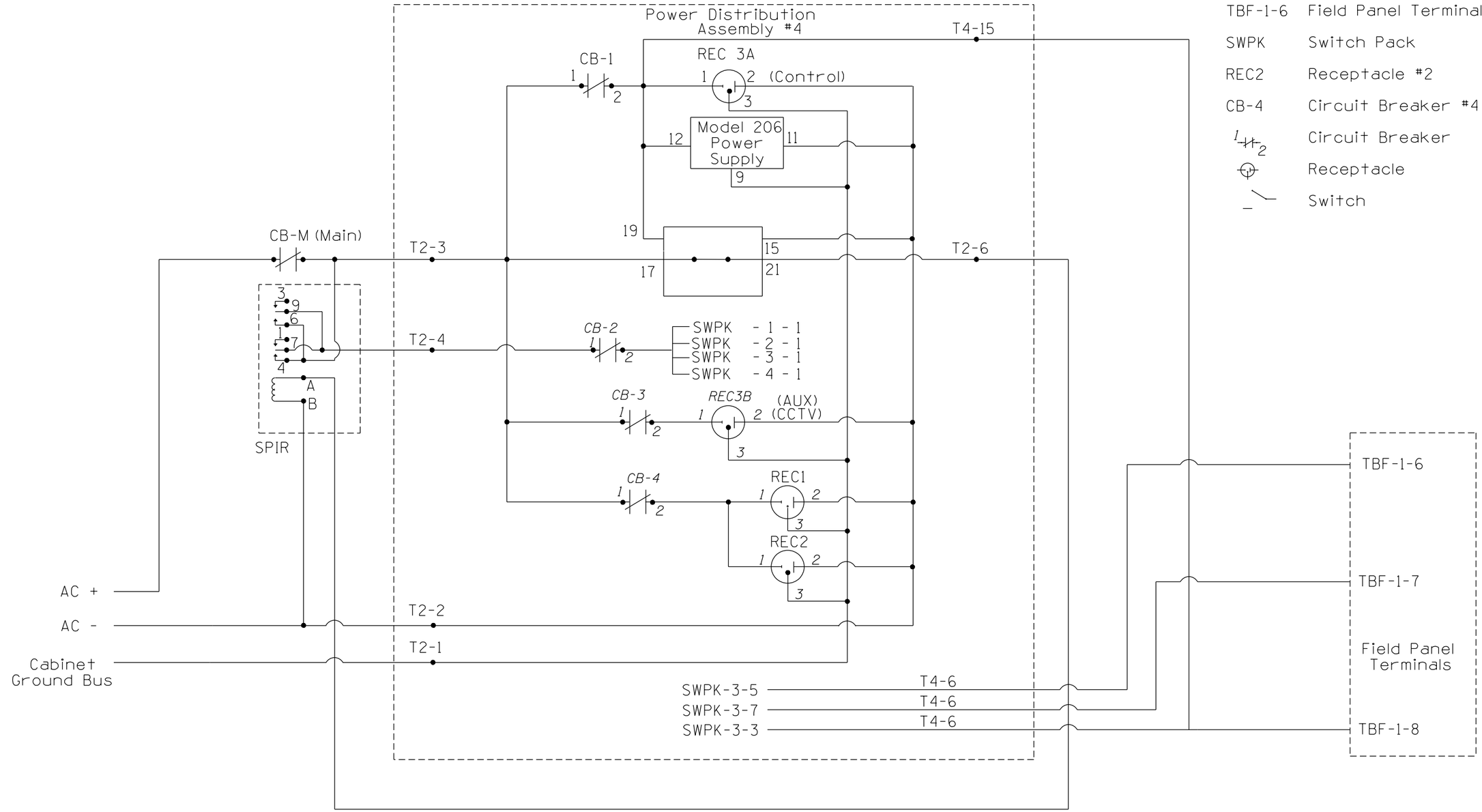

## POWER DISTRIBUTION ASSEMBLY #2 (PDA2) AND #4 (PDA4) GENERAL DIMENSIONS

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | POWER DISTRIBUTION ASSEMBLY CONNECTOR AND INSTALLATION DETAILS | DRAWING NO.<br>FM-3.08 |
| | | SHEET NO. |

DESCRIPTION OF REVISIONS | NO | DATE | MADE BY
1 | 2
3 | 4

# POWER DISTRIBUTION ASSEMBLY #4 AC POWER CONNECTIONS IN RAMP METER CABINET (INTERNAL AND EXTERNAL)




LEGEND:

| | |
|---|---|
| SPIR | Signal Power Interrupt Relay |
| T | Terminal Block |
| TBF-1-6 | Field Panel Terminal Block 1, Terminal 6 |
| SWPK | Switch Pack |
| REC2 | Receptacle #2 |
| CB-4 | Circuit Breaker #4 |
| 1 2 | Circuit Breaker |
| | Receptacle |
| | Switch |

NOTE:

Surge Protector and Radio Interference Filter In Main Circuit Breaker Box Not Shown.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED: SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION: 8/13 |
| APPROVED FOR DISTRIBUTION: ON FILE | POWER DISTRIBUTION ASSEMBLY #4 (PDA4) SCHEMATIC DIAGRAM | DRAWING NO.: FM-3.09 |
| | | SHEET NO. |

DESCRIPTION OF REVISIONS | MADE BY | DATE

NO 1 2 | NO 3 4

| RELATION TO CONTROLLER | FUNCTION | C1 CONNECTOR PIN | C1 HARNESS BRANCH | OTHER END CONNECTOR | OTHER END CONNECTOR PIN | OTHER END DEVICE | OTHER END DEVICE TERMINAL |
|---|---|---|---|---|---|---|---|
| GRND | DC GROUND BUS | 1 | D | --- | --- | CABINET | DC GROUND BUS |
| OUTPUT | LEFT LANE RED CONTROL | 2 | A | C7 | 1 | PDA SWPK 1 | 6 |
| OUTPUT | LEFT LANE GREEN CONTROL | 3 | A | C7 | 2 | PDA SWPK 1 | 10 |
| OUTPUT | RIGHT LANE RED CONTROL | 4 | A | C7 | 3 | PDA SWPK 2 | 6 |
| OUTPUT | RIGHT LANE GREEN CONTROL | 5 | A | C7 | 4 | PDA SWPK 2 | 10 |
| OUTPUT | BEACON CONTROL | 6 | A | C7 | 5 | PDA SWPK 1 | 8 |
| OUTPUT | SIGN CONTROL | 7 | A | C7 | 6 | PDA SWPK 3 | 8 |
| OUTPUT | GATE UP CONTROL | 8 | A | C7 | 7 | PDA SWPK 3 | 10 |
| OUTPUT | GATE DOWN CONTROL | 9 | A | C7 | 8 | PDA SWPK 3 | 6 |
| OUTPUT | SPECIAL FUNCTION 1 CONTROL | 10 | A | C7 | 9 | PDA SWPK 4 | 6 |
| OUTPUT | SPECIAL FUNCTION 2 CONTROL | 11 | A | C7 | 10 | PDA SWPK 4 | 10 |
| OUTPUT | OUT TO WATCH DOG TIMER | 12 | A | C7 | 11 | PDA, MODEL 208 | 18 |
| GRND | DC GROUND, INPUT FILE I | 14 | B | --- | --- | INPUT FILE I | TB15-4 |
| OUTPUT | COUNT DETECTOR RESET (INPUT FILE I) | 20 | B | --- | --- | INPUT FILE I | TB15-3 |
| OUTPUT | METER DETECTOR RESET (INPUT FILE J) | 21 | C | --- | --- | INPUT FILE J | TB15-3 |
| INPUT | LANE 1 UPSTREAM DETECTOR | 40 | B | --- | --- | INPUT FILE I | TB1-2 |
| INPUT | LANE 1 DOWNSTREAM DETECTOR | 41 | B | --- | --- | INPUT FILE I | TB1-3 |
| INPUT | LANE 2 UPSTREAM DETECTOR | 42 | B | --- | --- | INPUT FILE I | TB2-2 |
| INPUT | LANE 2 DOWNSTREAM DETECTOR | 43 | B | --- | --- | INPUT FILE I | TB2-3 |
| INPUT | LANE 3 UPSTREAM DETECTOR | 44 | B | --- | --- | INPUT FILE I | TB3-2 |
| INPUT | LANE 3 DOWNSTREAM DETECTOR | 45 | B | --- | --- | INPUT FILE I | TB3-3 |
| INPUT | LANE 4 UPSTREAM DETECTOR | 46 | B | --- | --- | INPUT FILE I | TB4-2 |
| INPUT | LANE 4 DOWNSTREAM DETECTOR | 47 | B | --- | --- | INPUT FILE I | TB4-3 |
| INPUT | LANE 5 UPSTREAM DETECTOR | 48 | B | --- | --- | INPUT FILE I | TB5-2 |
| INPUT | LANE 5 DOWNSTREAM DETECTOR | 49 | B | --- | --- | INPUT FILE I | TB5-3 |
| INPUT | LANE 6 UPSTREAM DETECTOR | 50 | B | --- | --- | INPUT FILE I | TB6-2 |
| INPUT | LANE 6 DOWNSTREAM DETECTOR | 51 | B | --- | --- | INPUT FILE I | TB6-3 |
| INPUT | LANE 7 UPSTREAM DETECTOR | 52 | B | --- | --- | INPUT FILE I | TB7-2 |
| INPUT | LANE 7 DOWNSTREAM DETECTOR | 53 | B | --- | --- | INPUT FILE I | TB7-3 |
| INPUT | LANE 8 UPSTREAM DETECTOR | 54 | B | --- | --- | INPUT FILE I | TB8-2 |
| INPUT | LANE 8 DOWNSTREAM DETECTOR | 55 | B | --- | --- | INPUT FILE I | TB8-3 |
| INPUT | LEFT LANE INPUT DETECTOR | 56 | C | --- | --- | INPUT FILE J | TB1-2 |
| INPUT | LEFT LANE OUTPUT DETECTOR | 57 | C | --- | --- | INPUT FILE J | TB1-3 |
| INPUT | LEFT LANE QUEUE DETECTOR | 58 | C | --- | --- | INPUT FILE J | TB2-2 |
| INPUT | RIGHT LANE INPUT DETECTOR | 59 | C | --- | --- | INPUT FILE J | TB2-3 |
| INPUT | RIGHT LANE/HOV OUTPUT DETECTOR | 60 | C | --- | --- | INPUT FILE J | TB3-2 |
| INPUT | RIGHT LANE QUEUE DETECTOR/HOV INTERRUPT | 61 | C | --- | --- | INPUT FILE J | TB3-3 |
| INPUT | MERGE DETECTOR | 62 | C | --- | --- | INPUT FILE J | TB4-2 |
| INPUT | LEFT LANE RED IN | 63 | C | --- | --- | INPUT FILE J | TB10-2 |
| INPUT | LEFT LANE GREEN IN | 64 | C | --- | --- | INPUT FILE J | TB10-3 |
| INPUT | RIGHT LANE RED IN | 65 | C | --- | --- | INPUT FILE J | TB11-2 |
| INPUT | RIGHT LANE GREEN IN | 66 | C | --- | --- | INPUT FILE J | TB11-3 |
| INPUT | BEACON IN | 67 | C | --- | --- | INPUT FILE J | TB12-2 |
| INPUT | SIGN IN | 68 | C | --- | --- | INPUT FILE J | TB12-3 |
| INPUT | GATE UP IN | 69 | C | --- | --- | INPUT FILE J | TB13-2 |
| INPUT | GATE DOWN IN | 70 | C | --- | --- | INPUT FILE J | TB13-3 |
| INPUT | SPECIAL FUNCTION 1 IN | 71 | C | --- | --- | INPUT FILE J | TB14-2 |
| INPUT | SPECIAL FUNCTION 2 IN | 72 | C | --- | --- | INPUT FILE J | TB14-3 |
| GRND | DC GROUND BUS | 92 | D | --- | --- | CABINET | DC GROUND BUS |
| GRND | DC GROUND, INPUT FILE J | 104 | C | --- | --- | INPUT FILE J | TB15-4 |

NOTE:

C1 Harness has 4 Branches as Follows:

| BRANCH | TO |
|---|---|
| A | Connector C7 on PDA4 |
| B | Input File I |
| C | Input File J |
| D | Cabinet DC Ground Bus |

NOT TO SCALE

DESIGN APPROVED
SIGNATURE

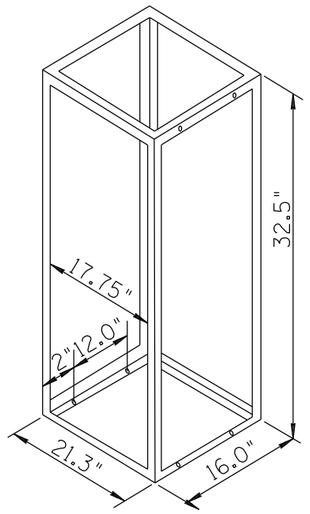
APPROVED FOR DISTRIBUTION
ON FILE

ARIZONA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS
ITS STANDARD DRAWINGS

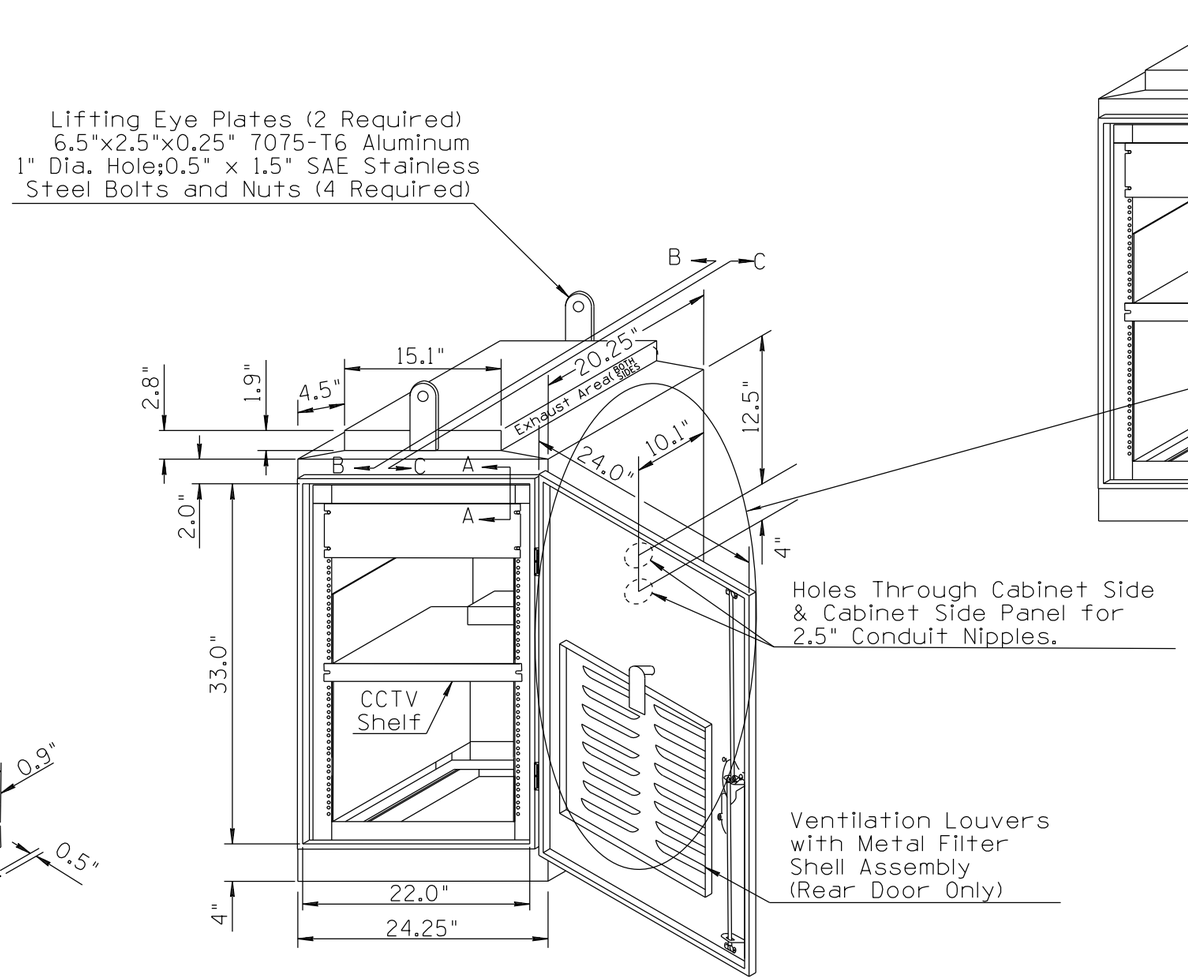
RAMP METER
CI HARNESS CONNECTIONS

REVISION 8/13
DRAWING NO. FM-3.10
SHEET NO.

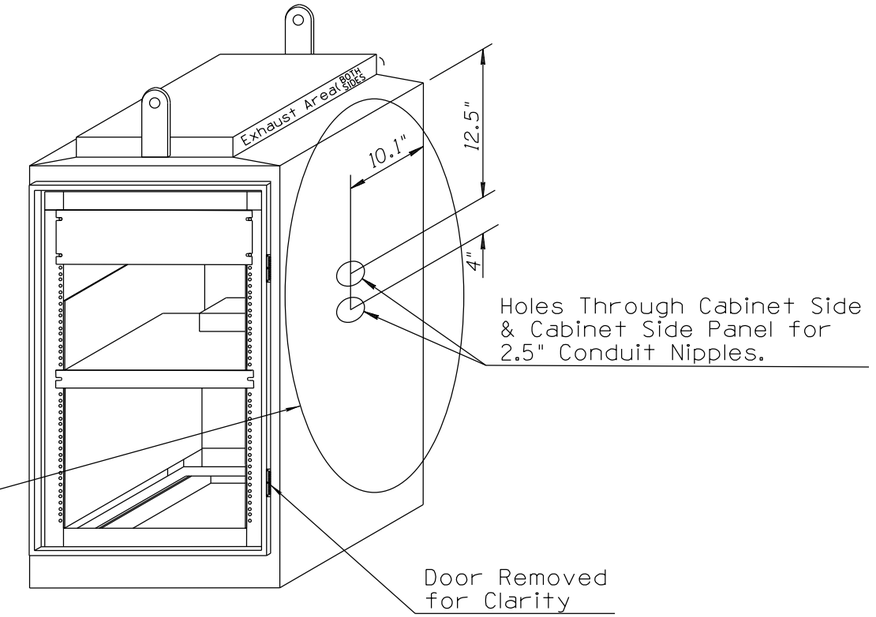
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

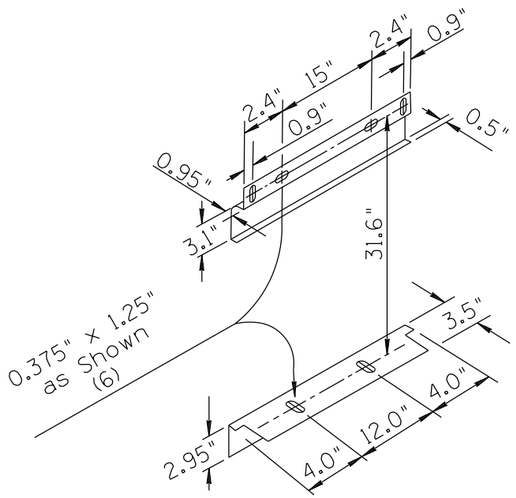



CAGE ASSEMBLY DETAIL

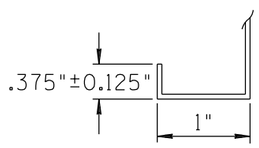



SCHEMATIC LAYOUT

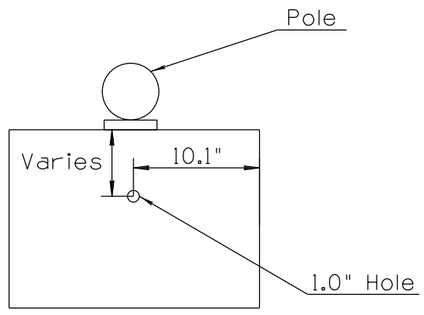



CAGE SUPPORT DETAIL




SECTION A-A
FLANGE AROUND DOOR OPENING




BOTTOM LAYOUT

NOTES:

1. The Bottom Cabinet Cage Supports Shall be Continuously Welded Along the Sides of the Cabinet and Extended to the Inside Corner of Door Openings. The Top Cabinet Cage Supports Shall be Continuously Welded Along the Sides of the Cabinet. The Top Cabinet Cage Supports Shall be a Minimum of 21.75" Apart.
2. The 16" Dimension Side of the Mounting Cage Shall be Bolted to the Cabinet Cage Supports.
3. Except Where Otherwise Specifically Noted all Dimensions Shall Have a 0.0625" Tolerance.
4. See Sheet FM-3.12 for Sections "B-B" and "C-C".
5. See Plan Sheets for Seven-Digit Cabinet Identification Code. Numbers Shall be Placed in Such a Manner that Entire Seven-Digit Cabinet Identification Code is Centered Horizontally on the Side of the Cabinet Facing Traffic.
6. See Sheet FM-7.01 for Mounting Details.
7. Fiber Branch Cable Shall be Secored to Rack.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | CCTV CABINET DETAILS<br>(SHEET 1 of 2) | DRAWING NO.<br>FM-3.11 |
| | | SHEET NO. |

DESCRIPTION OF REVISIONS | MADE BY | DATE

NO 1 2 3 4

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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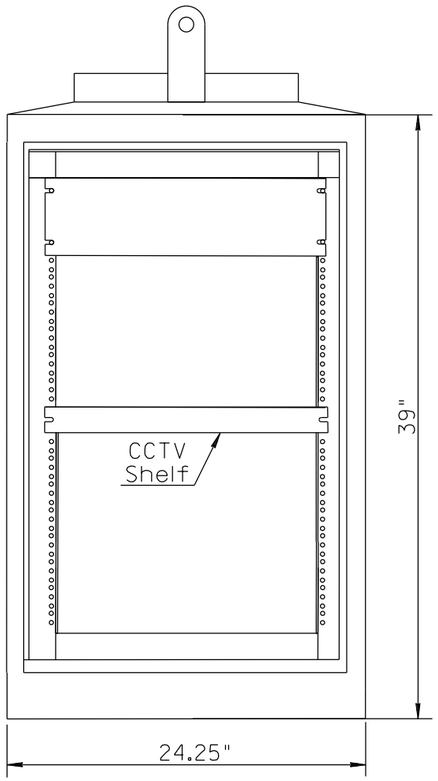
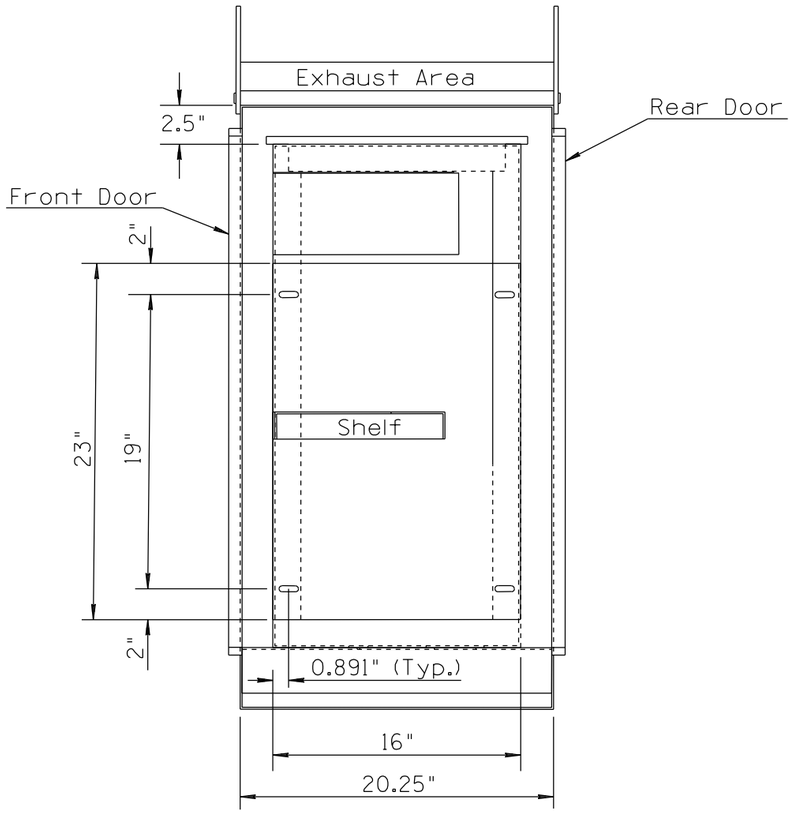
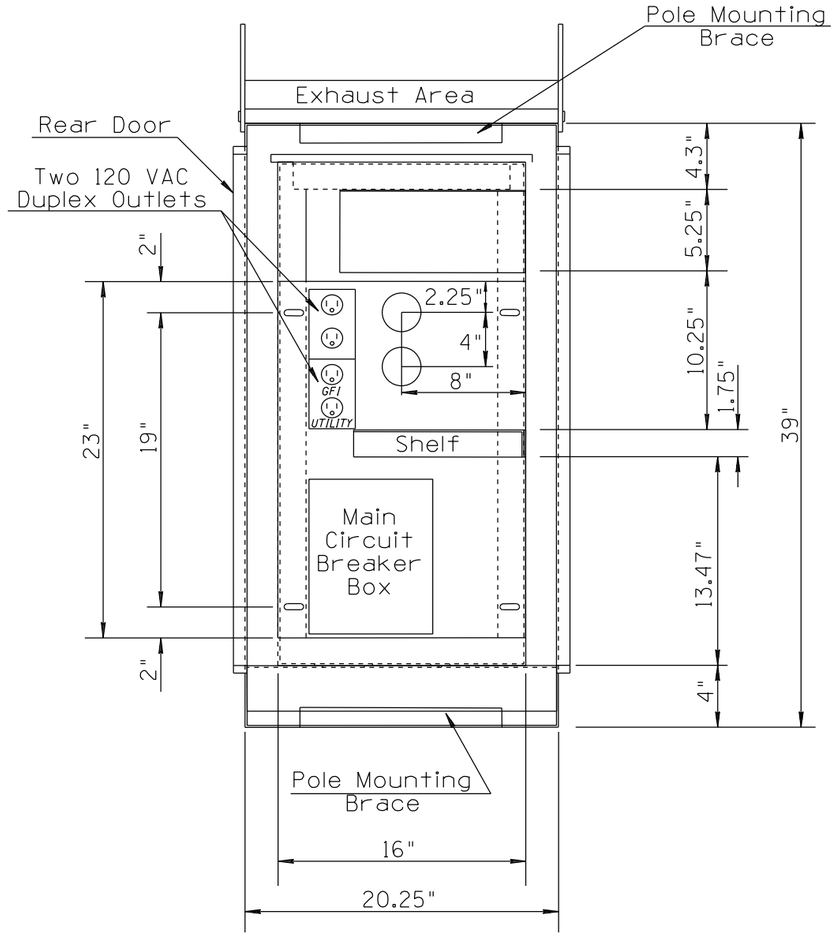



FRONT VIEW




SECTION B-B




SECTION C-C

NOT TO SCALE

| | | |
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| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| | | DRAWING NO.<br>FM-3.12 |
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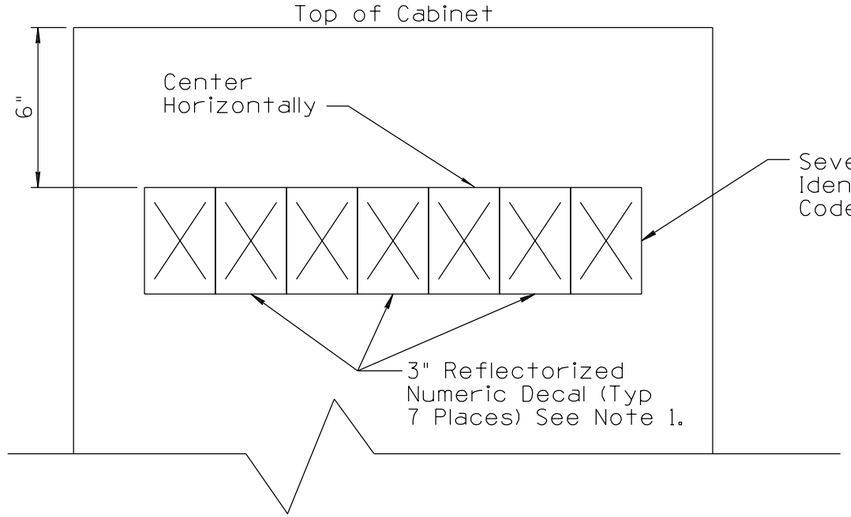
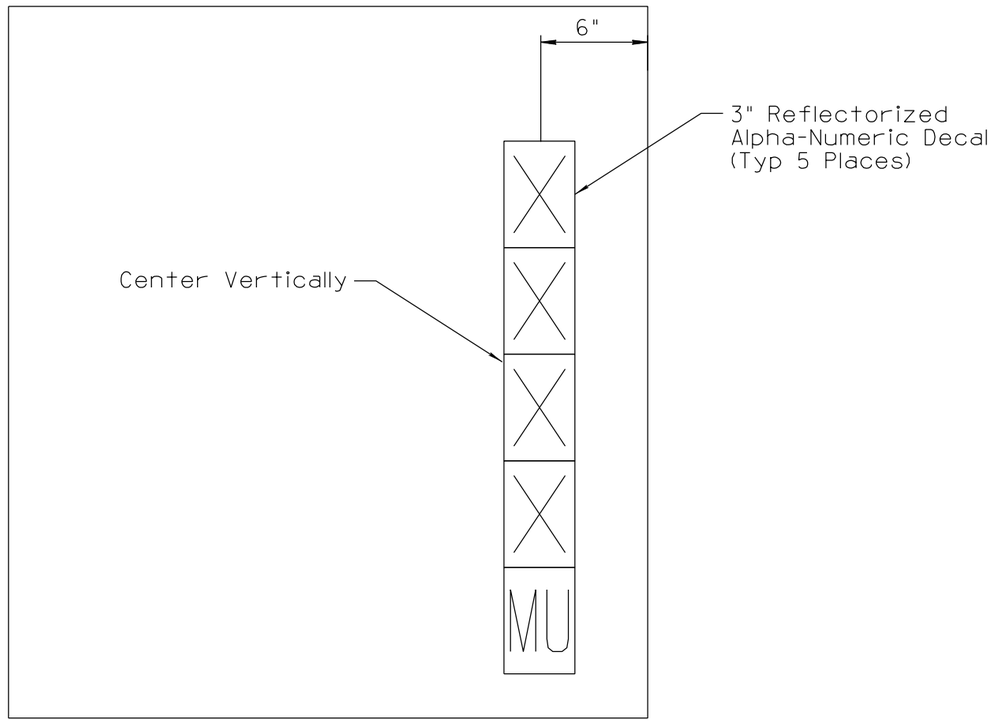



CABINET NUMBER
DECAL DETAIL




MAINTENANCE UNIT NUMBER
DECAL DETAIL

## CABINET NUMBER NOTES:

1. See Plan Sheets for Seven-Digit Cabinet Identification Code. Numbers Shall be Placed in Such a Manner that Entire Seven-Digit Identification Code is Centered Horizontally on the Side of the Cabinet Facing Traffic.

2. Cabinet Identification Code.

A B C

   A. The First Digit Represents the Assigned Route Number. Routes are Numbered, as Follows.
      1 - Interstate 10
      2 - Interstate 17
      3 - US Route 60
      4 - SR 143
      5 - SR 51
      6 - Loop 202
      7 - Loop 101
      8 - Interstate 19
      9 - Loop 303
      0 - Other

   B. The Second Digit Represents the Direction of the Mile Post with Respect to the Direction of Travel, as Follows.
      0 - Mile Post Numbering Decreases with the Direction of Travel.
      1 - Mile Post Numbering Increases with the Direction of Travel.

   C. The Last Five Digits Represent the Mile Post Recorded to the Nearest Hundredth. (The Last Two Digits Represent Tenths & Hundredths).

3. Submit Numbering Detail to the Engineer with Supporting Documentation for Approval 10 Working Days Prior to Numbering.

## MAINTENANCE UNIT (MU) NUMBER NOTES:

1. MU # Will be Assigned by ADOT.

2. MU # Shall be Visible Facing The Roadway.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | CABINET NUMBER<br>DECAL DETAIL | DRAWING NO.<br>FM-3.13 |
| | | SHEET NO. |

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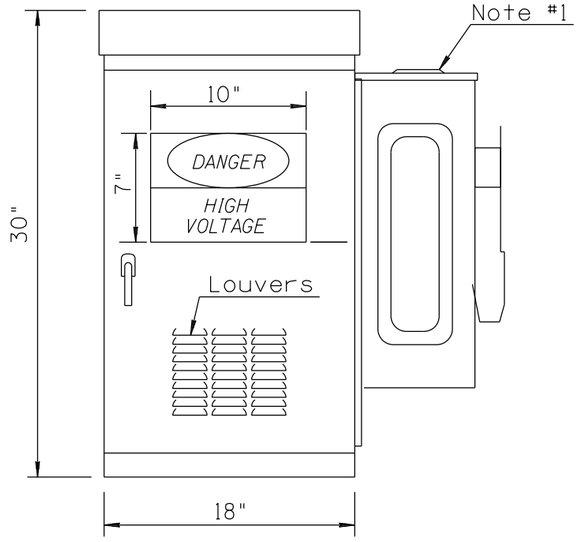
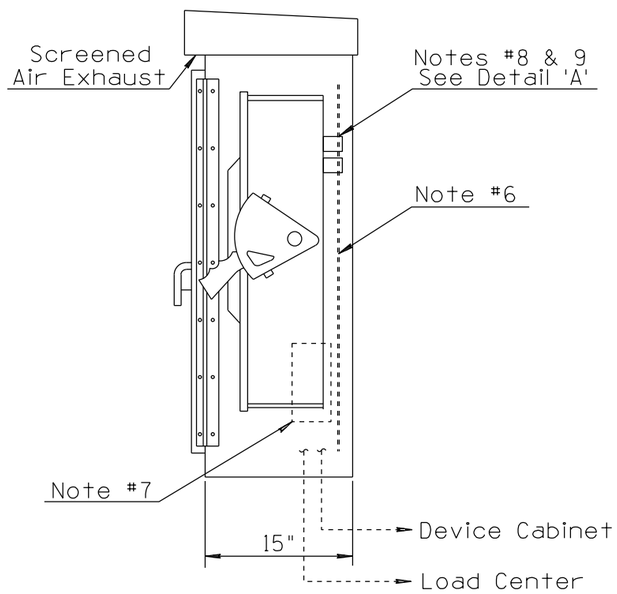
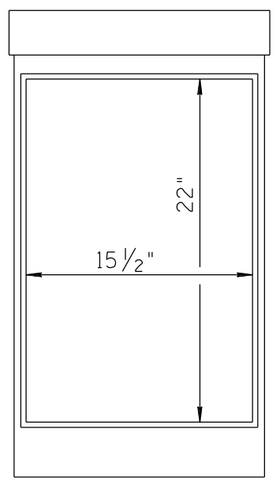



FRONT VIEW



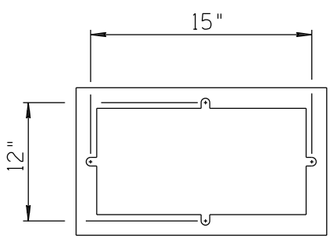

SIDE VIEW



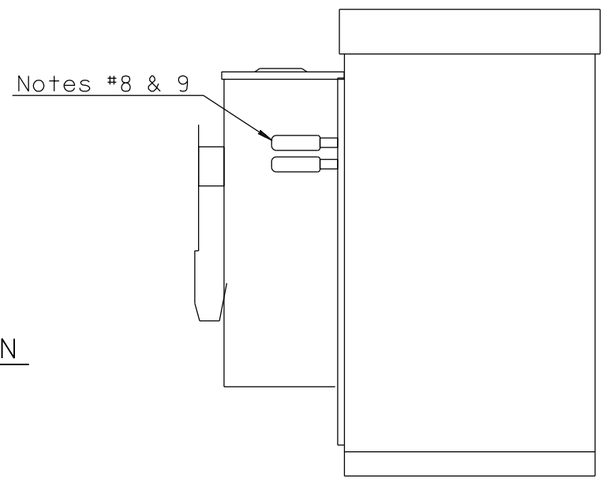

OPENING

## NOTES:

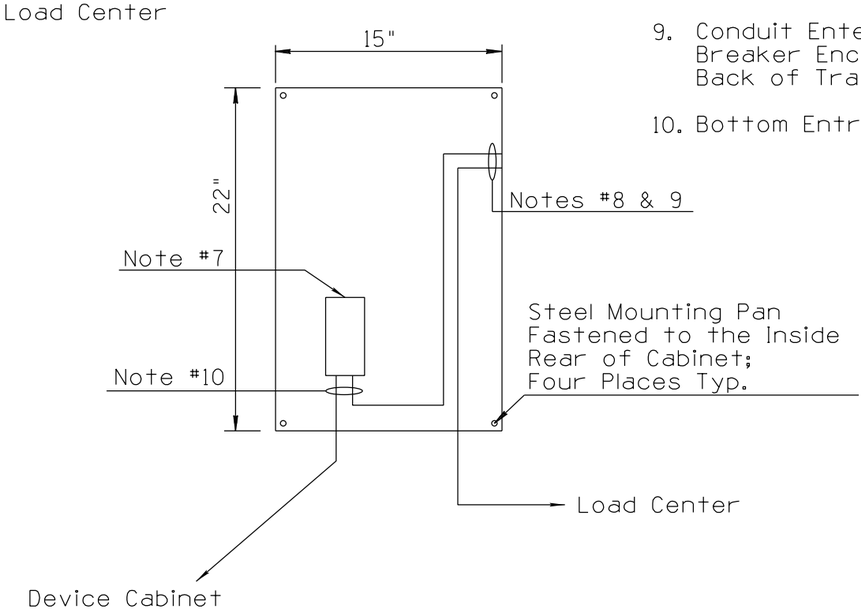
1. 20 Amp 2-Pole Circuit Breaker (480V) in NEMA 3 Enclosure with External Operating Handle (Lockable). Enclosure to be Mounted to Side of Cabinet.
2. Use Grout or Mastic to Seal Gap Between Cabinet and Foundation.
3. For Number and Size of Conductors Between Transformer Cabinet and Control Cabinet, See Plan Sheets.
4. See Sheet FM-3.23 for Transformer Cabinet Foundation Details.
5. The Danger High Voltage Sign Shall be Made of Reflective Vinyl with Pressure-Sensitive Adhesive Backing.
6. Mounting Pan.
7. Transformer Mounted to Mounting Pan.
8. Conduit LB and Close Nipple Into Rear of Circuit Breaker Enclosure. LB Shall Be Sized for Conductors
9. Conduit Enters and Exits Circuit Breaker Enclosure from Back of Transformer Cabinet.
10. Bottom Entry/Exit for Conduit.



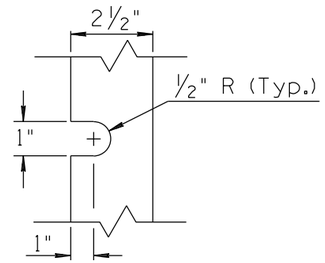

PAD MOUNTING PATTERN




DETAIL A
BACK VIEW




MOUNTING PAN




BOLT SLOT DETAIL

NOT TO SCALE

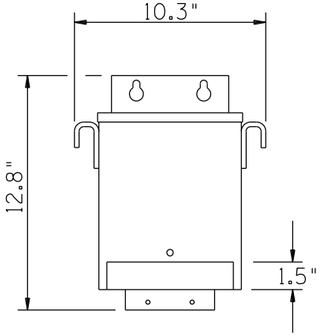
| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | TRANSFORMER CABINET<br>EXTERNAL POWER DISCONNECT | DRAWING NO.<br>FM-3.14<br>SHEET NO. |

DESCRIPTION OF REVISIONS | MADE BY | DATE

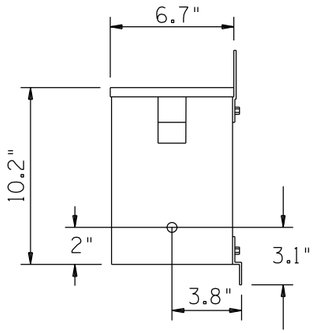
NO 1 2 | NO 3 4 | DATE | MADE BY | DESCRIPTION OF REVISIONS

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 3 | | | |
| 4 | | | |
| 1 | | | |
| 2 | | | |

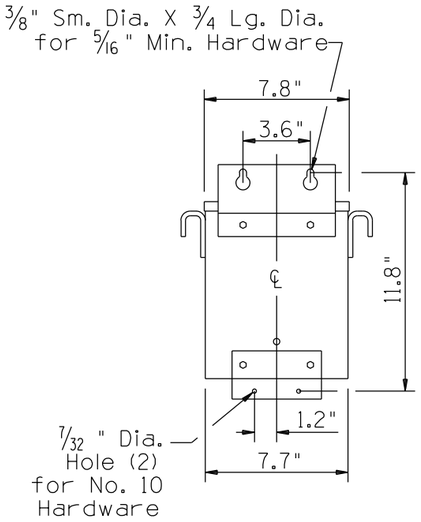
## DETAIL "A"
## TYPICAL 3 KVA DRY TYPE TRANSFORMER



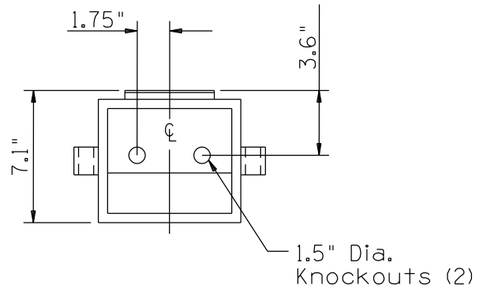

FRONT




SIDE




BACK

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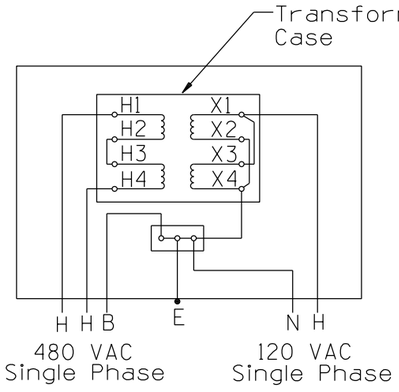
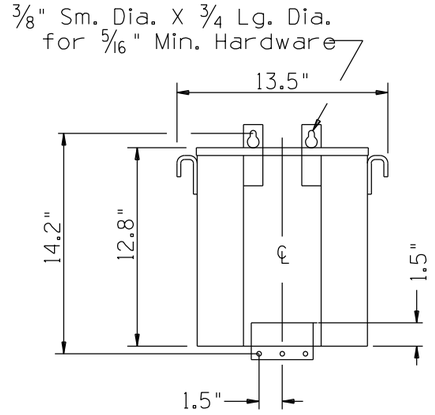
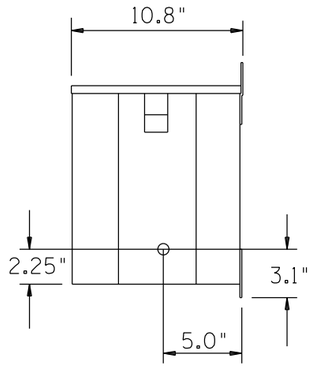



WIRING DIAGRAM

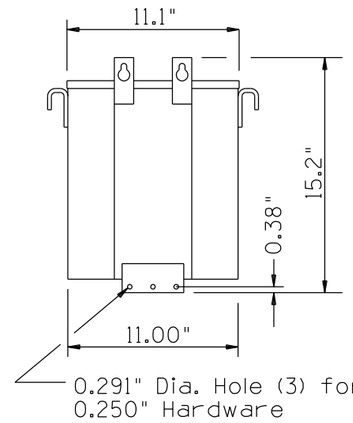
## DETAIL "B"
## TYPICAL 7.5 KVA DRY TYPE TRANSFORMER




FRONT




SIDE

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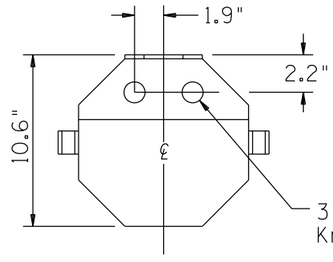
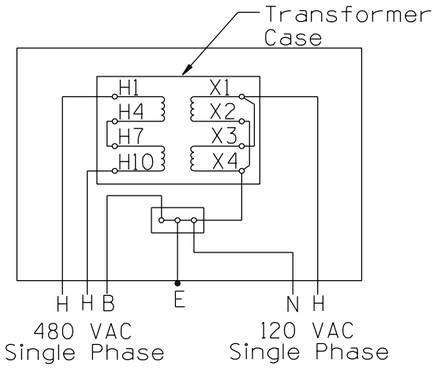



BOTTOM




WIRING DIAGRAM

### LEGEND:

H - Hot Lead
B - Green Bond Wire
E - Equipment Ground
N - AC Neutral

### NOTES:

1. Install Rubber Grommets in Knockouts.
2. Totally Enclosed, Encapsulated Distribution Transformer with Front Access.
3. Transformer Shall be Single-Phase.
4. The Transformer Case Shall be Grounded to Equipment Through Mounting Screws.
5. Dimensions are Typical

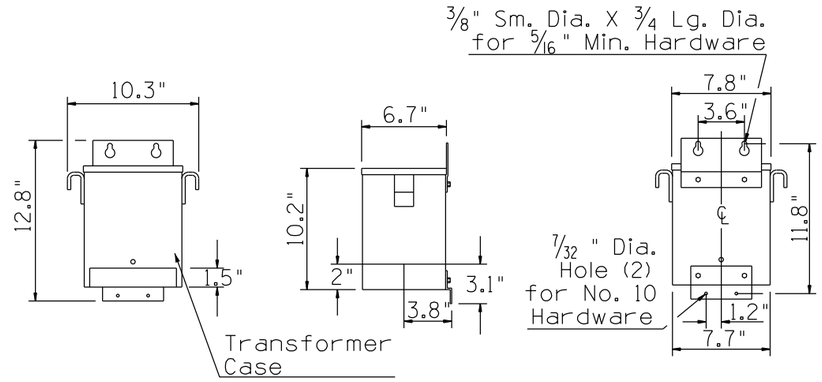
NOT TO SCALE

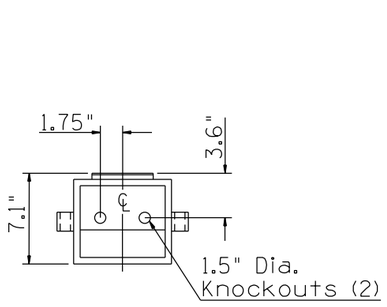
| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | TRANSFORMER, 3kVA & 7.5kVA,<br>DRY TYPE DETAILS<br>AND WIRING DIAGRAMS | DRAWING NO.<br>FM-3.15 |
| | | SHEET NO. |

DESCRIPTION OF REVISIONS | MADE BY | DATE

NO | DESCRIPTION OF REVISIONS | MADE BY | DATE | NO

## DETAIL "A"
## TYPICAL 10 KVA DRY TYPE TRANSFORMER

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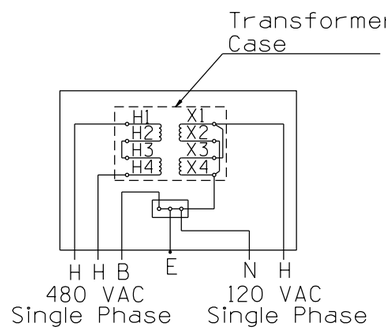
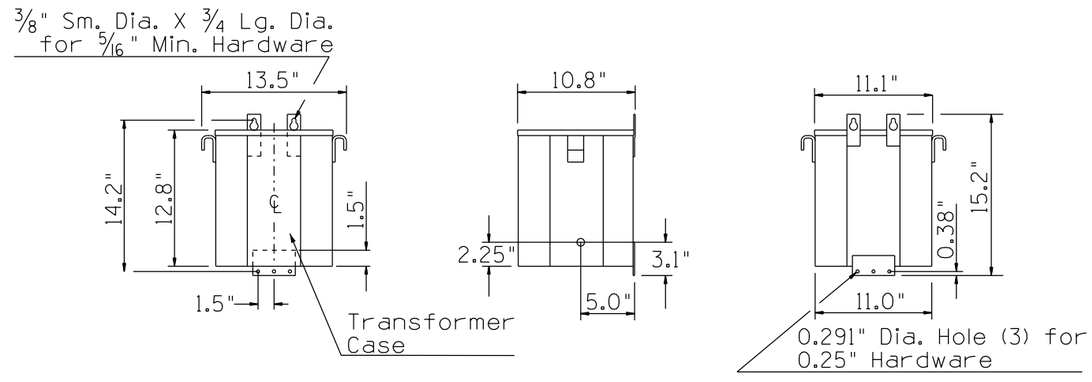
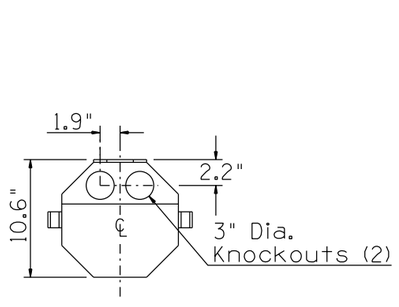


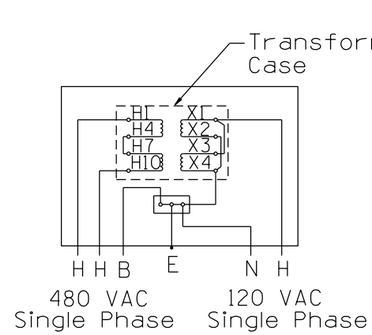

WIRING DIAGRAM

## DETAIL "B"
## TYPICAL 25 KVA DRY TYPE TRANSFORMER




BOTTOM




WIRING DIAGRAM

### LEGEND:

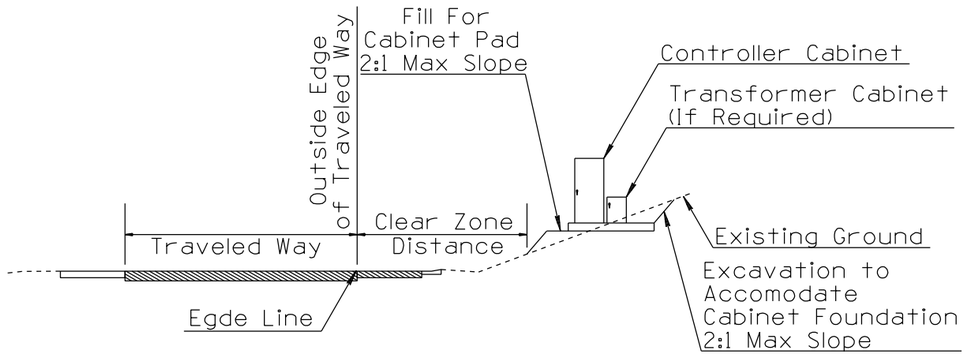
H - Hot Lead
B - Green Bond Wire
E - Equipment Ground
N - AC Neutral

### NOTES:

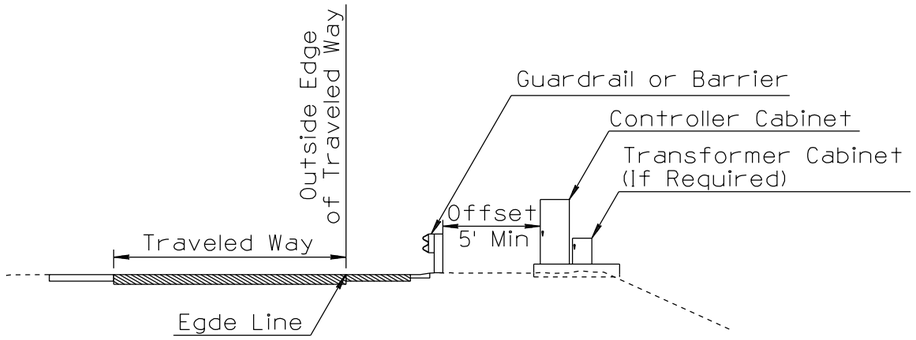
1. Install Rubber Grommets in Knockouts.
2. Totally Enclosed, Encapsulated Distribution Transformer with Front Access.
3. Transformer Shall be Single-Phase.
4. The Transformer Case Shall be Grounded to Equipment Through Mounting Screws.
5. Dimensions are Typical

NOT TO SCALE

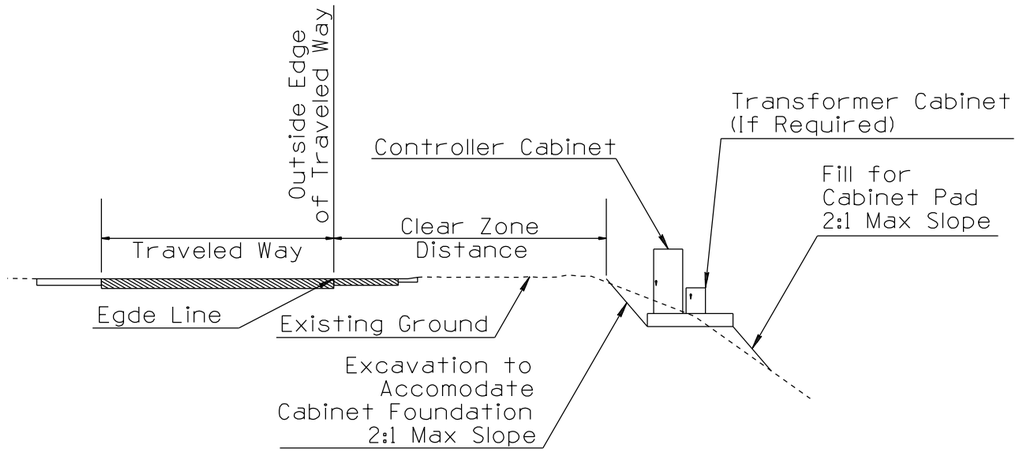
| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | TRANSFORMER, 10kVA & 25kVA, DRY TYPE DETAILS AND WIRING DIAGRAMS | DRAWING NO.<br>FM-3.16 |
| | | SHEET NO. |




CABINET FOUNDATION INSTALLATION
ON CUT SLOPES




CLEARANCE FOR EQUIPMENT PROTECTED
BY GUARDRAIL OR TRAFFIC BARRIER




CABINET FOUNDATION INSTALLATION
ON FILL SLOPES

NOTES:

1. All Field Equipment Locations Shall be Staked By The Contractor and Approved By The Engineer Prior to Installation.
2. Refer to AASHTO Roadside Design Guide For Clear Zone Requirements.
3. If 2:1 Can Not be Met, Other Means Shall be as Approved by Engineer.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | CLEAR ZONES,<br>UNPROTECTED EQUIPMENT | DRAWING NO.<br>FM-3.17 |
| | | SHEET NO. |

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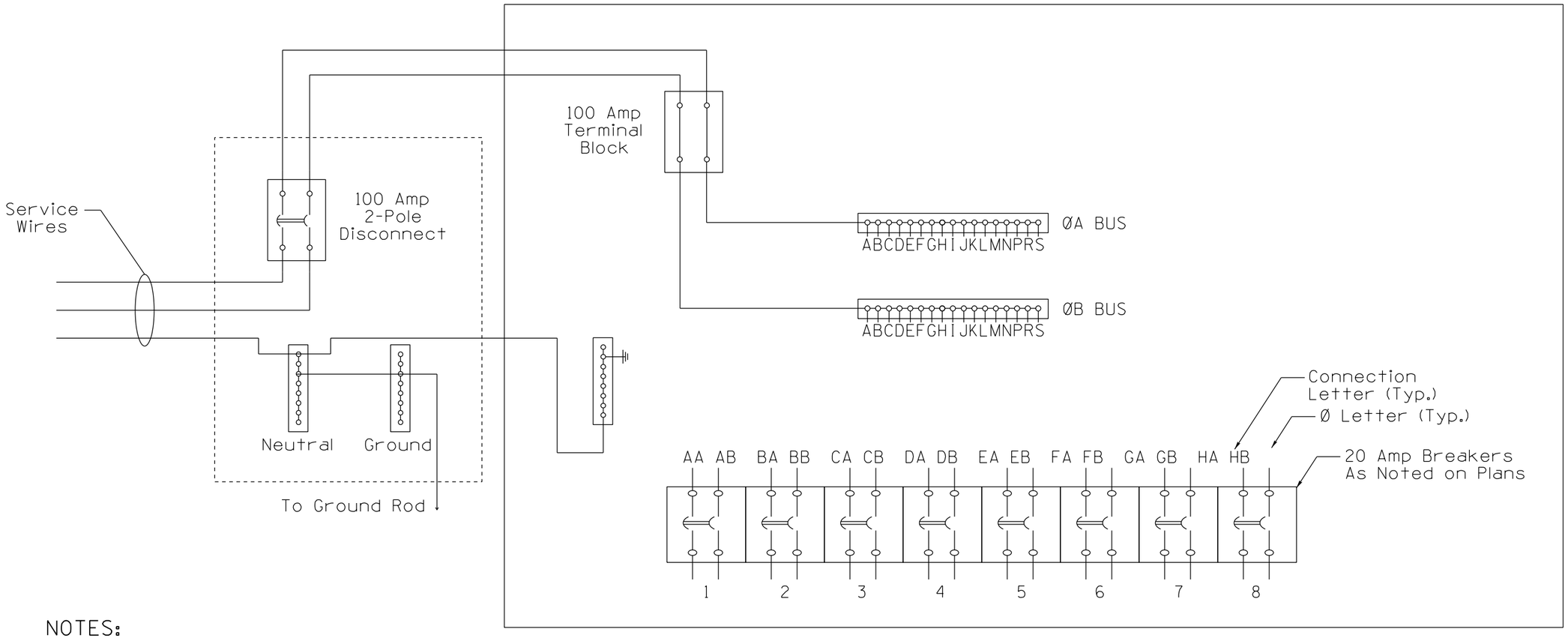


## NOTES:

1. All Service Conductors and Service Switches Shall have an 100 Amp Capacity.
2. All Components on 120/240 Volt Circuits Shall be Rated for 600 Volt Operation. All Other Components Shall be Rated for 250 Volt Operation.
3. Typical Component Installations are Shown, Leave Space for Future Component Installation.
4. All Components Shall be Interior Mounted.
5. All Live Electrical Components Shall be Protected by a Dead-Front Panel Which Conforms to the NEC.

# TYPE II LOAD CENTER WIRING DIAGRAM

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | TYPE II LOAD CENTER | DRAWING NO.<br>FM-3.18 |
| | | SHEET NO. |

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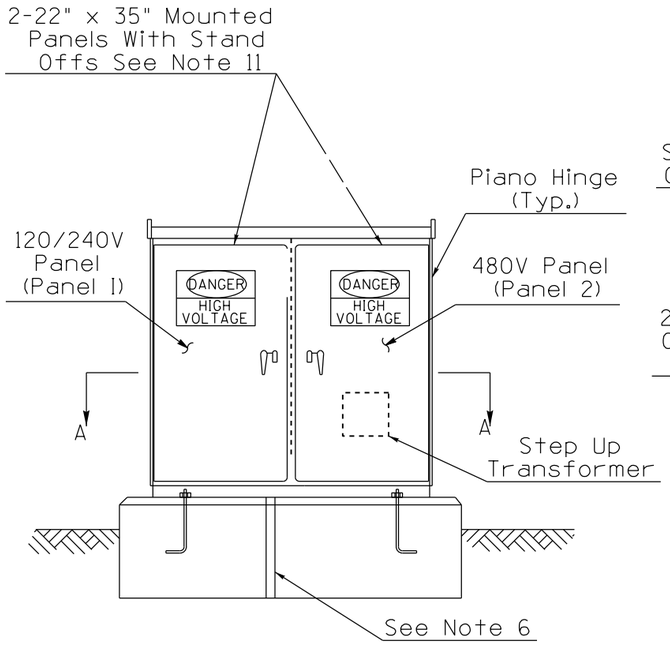
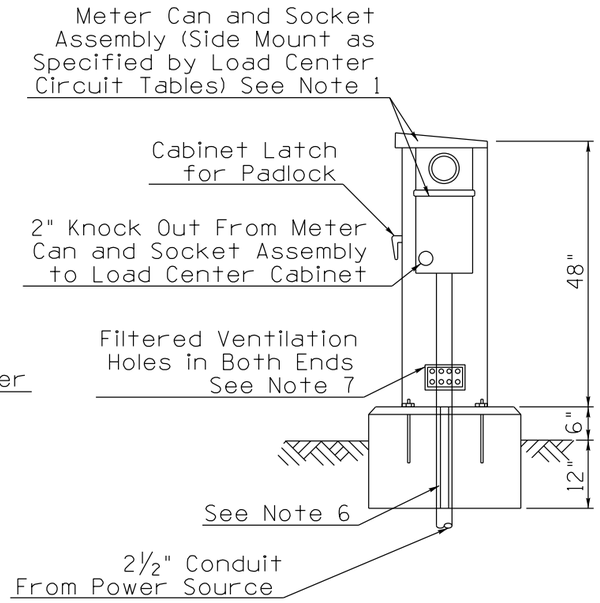
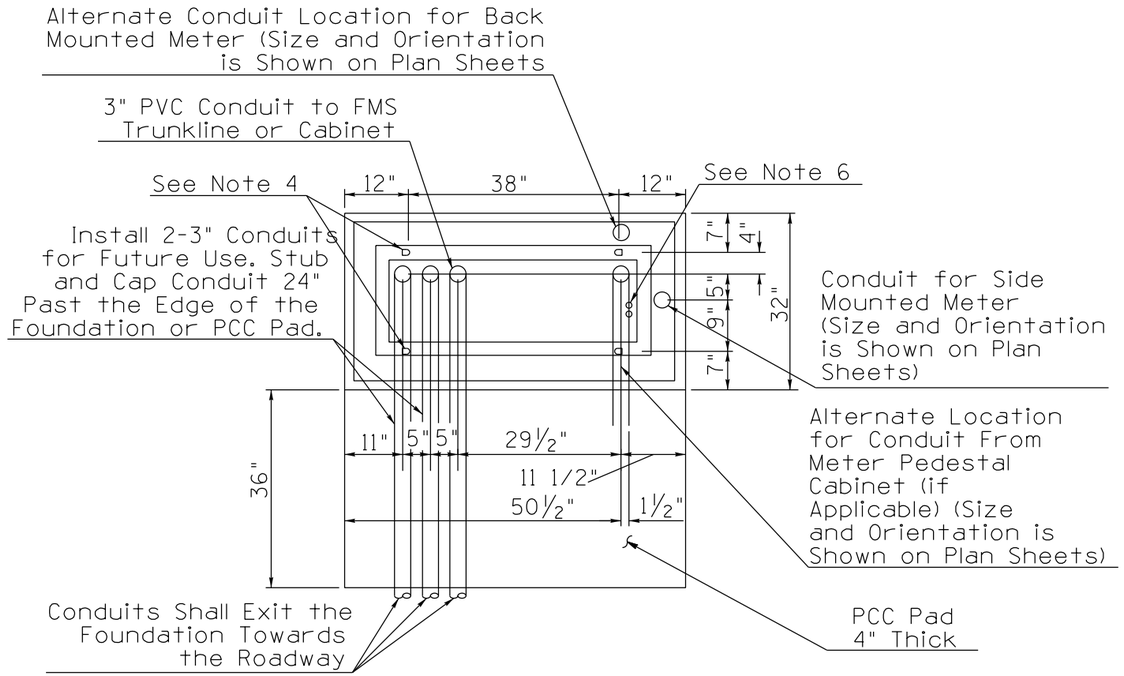



FRONT VIEW



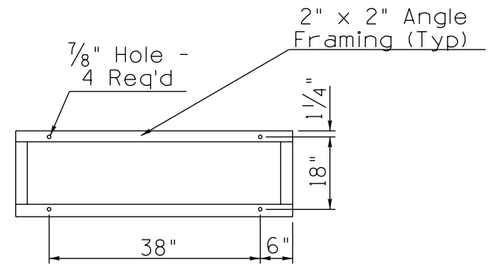

SIDE VIEW




FOUNDATION PLAN

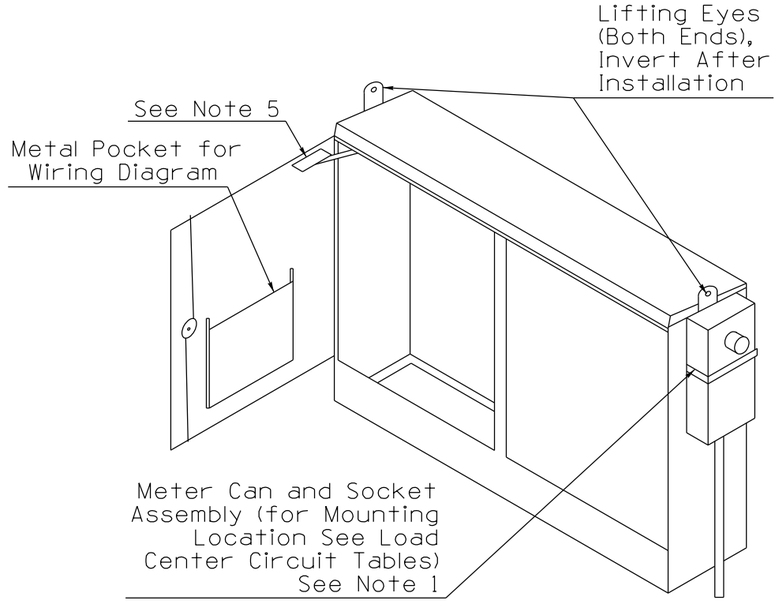
## NOTES:

1. The Meter Can Shall be NEMA 3 Rated and Shall Meet All Requirements of the Electrical Utility Service Provider.
2. Cabinet and Cabinet Base Shall be Constructed of Aluminum.
3. The Doors Shall be Rainproof and Dustproof.
4. Anchor Bolts Shall be Galvanized ½" x 12" x 4" and Shall be Furnished With the Cabinet by the Contractor Supplier. Anchor Bolts Shall Project a Min. 1½" and a Max. 2" Above Foundation.
5. See T.S. 3-9 for 2-Position Door Stop Details. One Door Stop Required for Each Door Per Cabinet.
6. 2 - 1" Sleeves (for Ground Rod) Shall be Inserted When Foundation is Poured.
7. For Filtered Ventilation Hole Pattern Only See T.S. 3-2.
8. Ground Rod Shall be ⅝" Dia. by 10' and Project Above the Foundation Approximately 3".
9. A Raised PCC PAD 36" x 4" x Width of Foundation Shall be Placed in Front of the Cabinet. The PAD Shall be Set 2" Below the Foundation Elevation. Slope PAD Away From Cabinet. See PAD Detail on T.S. 2-2.




SECTION A-A

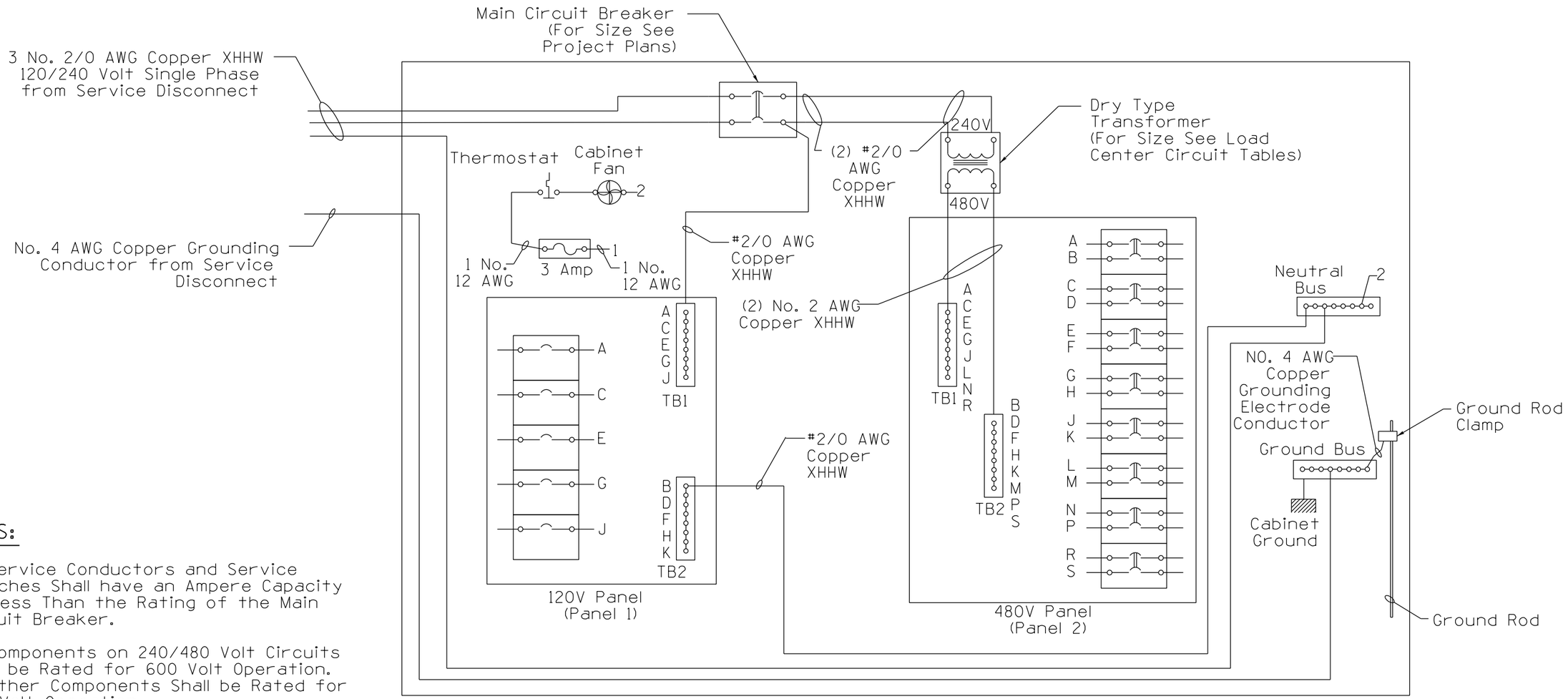
10. Use Grout or Mastic to Seal Gap Between Cabinet and Foundation.
11. Stand Offs Shall be Short Enough to Allow the Step Up Transformer to be Mounted Onto the Front of the 480 VAC Panel.
12. The Orientation of Conduits in the Foundation May Vary. See Plan Sheets for Correct Orientation.
13. Conduit Shall Project a Minimum of 2" and a Maximum of 4" Above the Foundation.
14. Contractor Shall Verify Quantity, No. of Poles and Rating of Breakers.




NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | TYPE IV LOAD CENTER<br>FOUNDATION AND CABINET DETAIL | DRAWING NO.<br>FM-3.19<br>SHEET NO. |

NO | DATE | MADE BY | DESCRIPTION OF REVISIONS
1 | 2
3 | 4




## NOTES:

1. All Service Conductors and Service Switches Shall have an Ampere Capacity No Less Than the Rating of the Main Circuit Breaker.
2. All Components on 240/480 Volt Circuits Shall be Rated for 600 Volt Operation. All Other Components Shall be Rated for 250 Volt Operation.
3. All Circuit Breakers Shall be Furnished and Installed as Required by Load Center Circuit Tables.
4. See Type IV Load Center Cabinet and Foundation Detail.
5. All Components Shall be Interior Mounted.
6. All Live Electrical Components Shall be Protected by a Dead-Front Panel Which Conforms to the NEC.
7. The Contractor Shall be Responsible for Providing Suitable Adapters, Where Required, to Connect the Field Wires to the Appropriate Circuit Breakers.

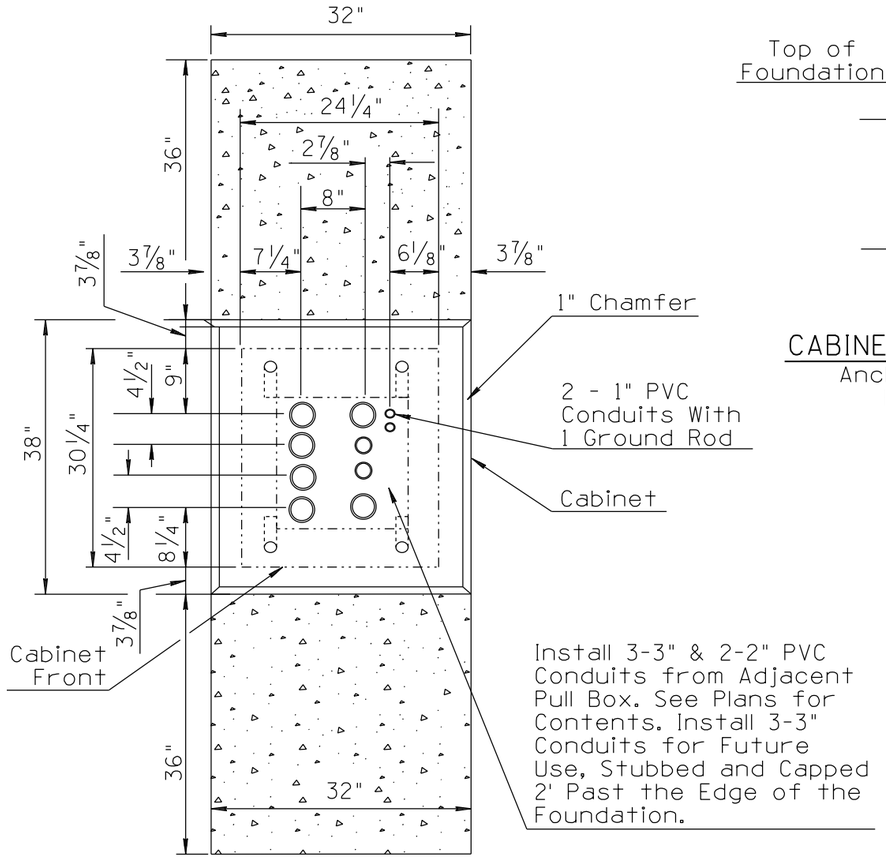
## TYPE IV LOAD CENTER (MODIFIED) WIRING DIAGRAM

NOT TO SCALE

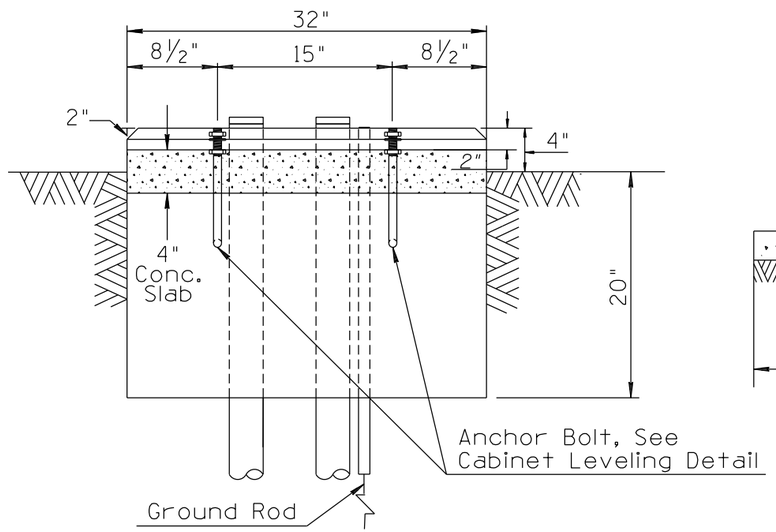
| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | TYPE IV MODIFIED<br>LOAD CENTER | DRAWING NO.<br>FM-3.20 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

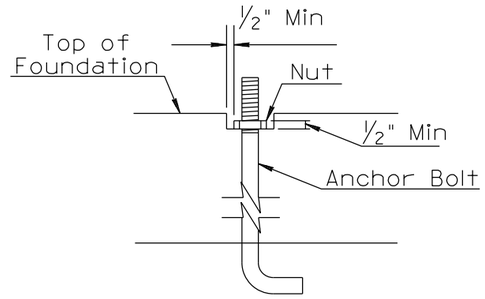
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | Removed foundation rebar & Dooley sump. Revised ground rod note & callouts. | D. Bruggeman | 7/31/14 |
| 2 | | | |
| 3 | | | |
| 4 | | | |



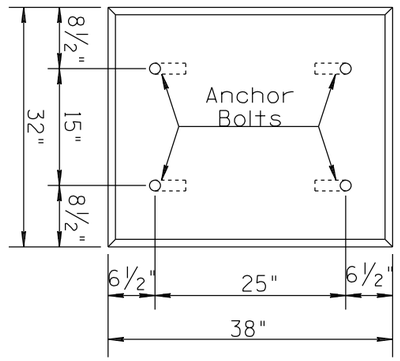

CONTROLLER CABINET FOUNDATION
TOP VIEW



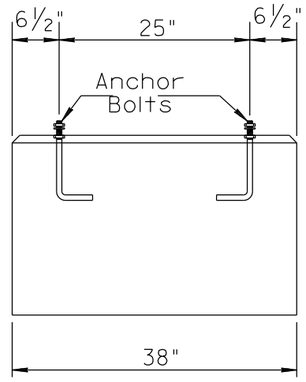

CONTROLLER CABINET FOUNDATION
FRONT VIEW



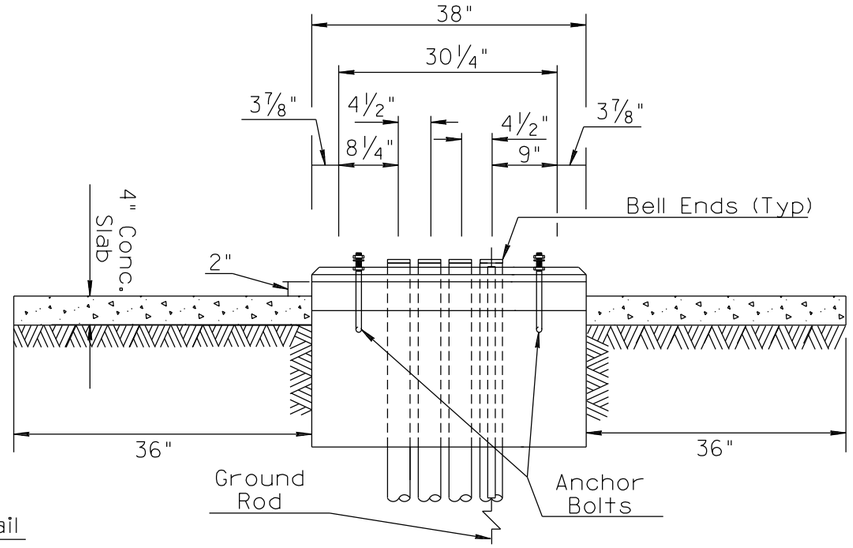

CABINET LEVELING DETAIL
Anchor Bolt Leveling
Recess Detail




CONTROLLER CABINET
FOUNDATION ANCHOR BOLTS
TOP VIEW




CONTROLLER CABINET
FOUNDATION ANCHOR BOLTS
SIDE VIEW



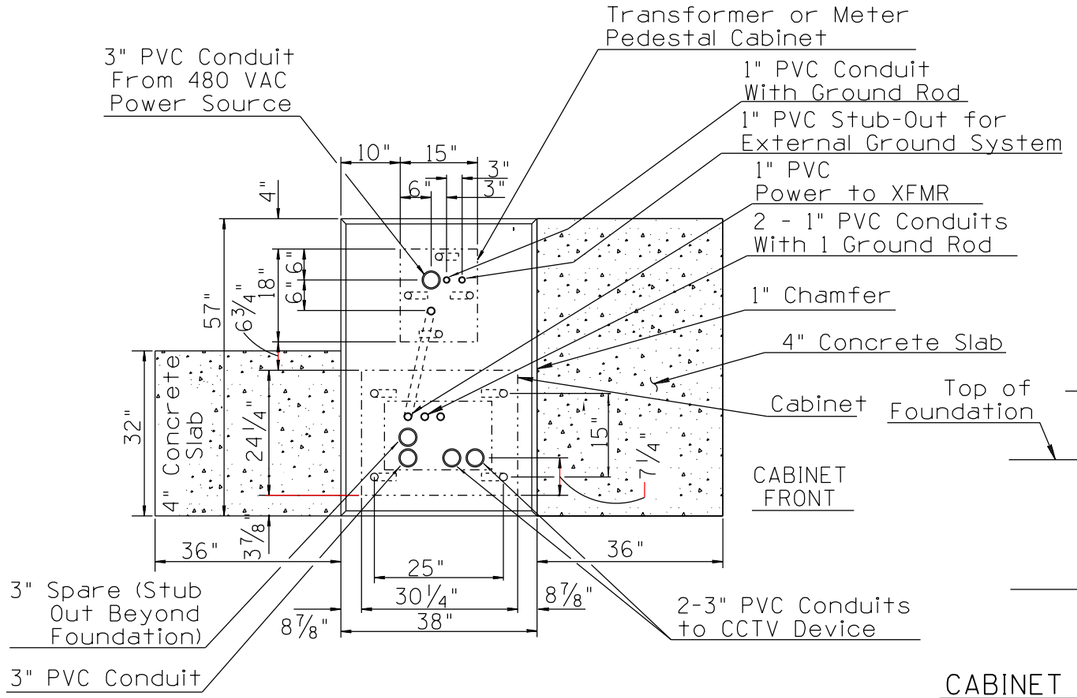

CONTROLLER CABINET
FOUNDATION SIDE VIEW

NOTES:

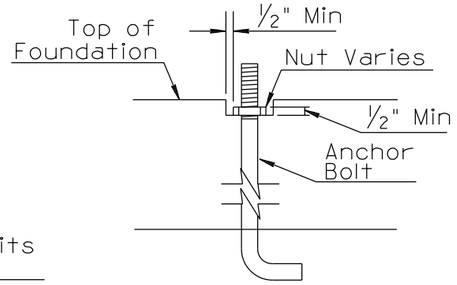
1. Foundations Shall Be Class S (f'c=3000 PSI) Concrete.
2. All Conduits Shown Shall Be Furnished and Installed in Foundation. See Individual Plan Sheets for Stub-Out Direction.
3. Ground Rod Shall be ⅝" Dia. by 10' and Project Above the Foundation 2" to 3".
4. The Contractor Shall Note that the Conduit Layout Dimensions are Extremely Critical and Shall be Adhered to.
5. Anchor Bolts Shall be Galvanized Steel, ¾"x11"x 5", Complete with Nuts & Washers.
6. Anchor Bolts Shall Extend a Minimum of 2" and a Maximum of 2.5" Above Foundation.
7. Contractor Shall Furnish and Install Anchor Bolts for the Foundation.

NOT TO SCALE

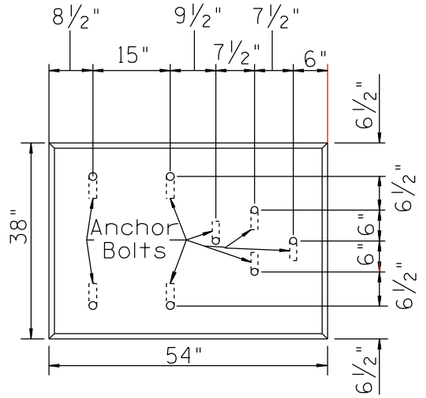
| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>7/14 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | RAMP METER CABINET<br>FOUNDATION W/O TRANSFORMER | DRAWING NO.<br>FM-3.21 |
| | | SHEET NO. |



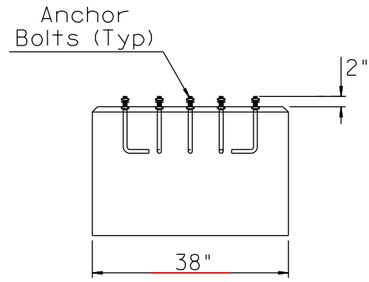

CONDUIT ORIENTATION
TOP VIEW




CABINET LEVELING DETAIL
Anchor Bolt Leveling
Recess Detail



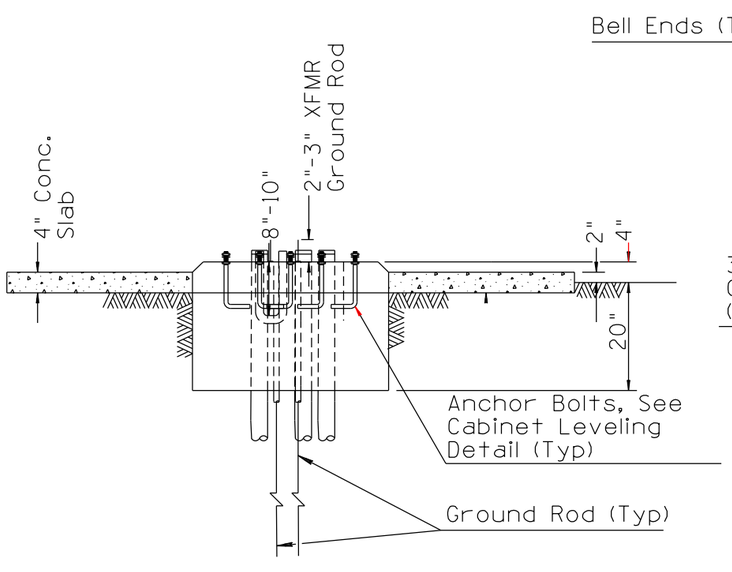

CONTROLLER CABINET WITH
TRANSFORMER FOUNDATION
ANCHOR BOLTS
TOP VIEW



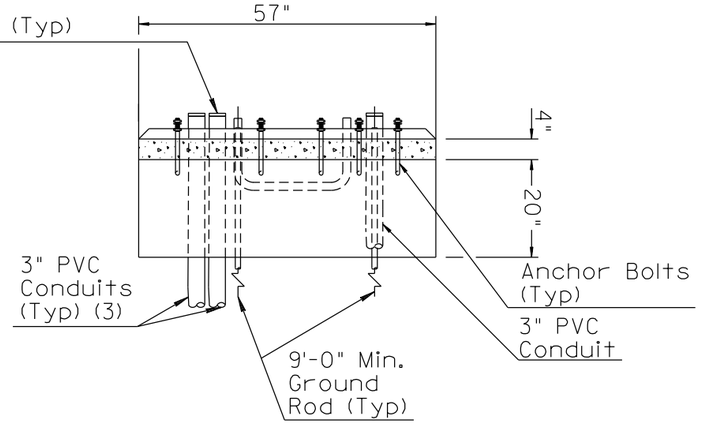

CONTROLLER CABINET WITH
TRANSFORMER FOUNDATION
ANCHOR BOLTS
SIDE VIEW

## NOTES:

1. Foundations Shall Be Class S (f'c=3,000 PSI) Concrete.
2. All Conduits Shown Shall Be Furnished And Installed In Foundation. See Individual Plan Sheets For Stub Out Direction.
3. Foundations shall include 2-5/8" dia. by 10' ground rods, and they shall project 2" to 3" above the foundation.
4. The Contractors Shall Furnish And Install 2 #8 AWG Conductors From Transformer To Control Cabinet Main Circuit Breaker In Indicated Conduit. 1 #8 AWG Green Bond Shall Be Connected Between The Ground Rods In The Transformer Cabinet And The Control Cabinet And Shall Be Included In Control Cabinet Installation.
5. The Contractor Shall Note That The Conduit Layout Dimensions Are Extremely Critical And Shall Be Adhered To.
6. Anchor Bolts Shall Be Galvanized Steel, ¾" x 11" x 5", Complete With Nuts & Washers.
7. Anchor Bolts Shall Project A Minimum Of 2" And A Maximum Of 2½" Above Foundation.
8. Transformer Cabinet May Need To Be Located On Opposite Side Of Controller Cabinet If Required.
9. Contractor Shall Furnish And Install Anchor Bolts For The Foundation.




CONTROLLER CABINET WITH
TRANSFORMER FOUNDATION
FRONT VIEW

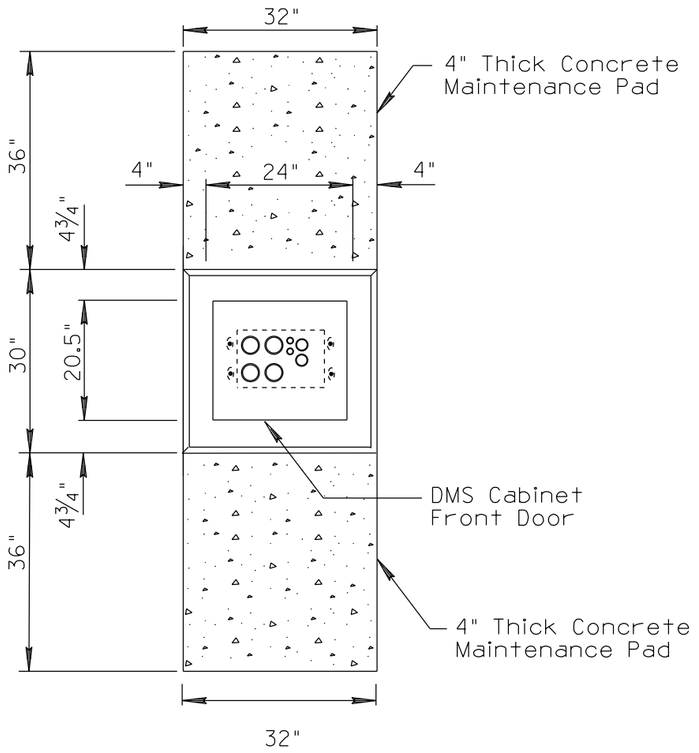



CONDUIT ORIENTATION
SIDE VIEW

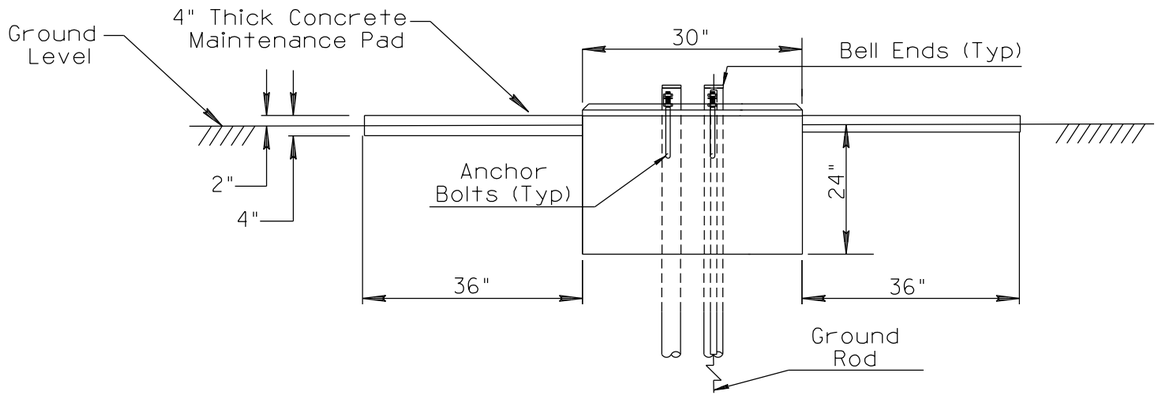
NOT TO SCALE

| NO | DESCRIPTION OF REVISIONS | DATE | MADE BY |
|---|---|---|---|
| 1 | Removed foundation rebar & Dooley sump. Revised ground rod note & callouts. | 7/31/14 | D. Bruggeman |
| 2 | | | |
| 3 | | | |
| 4 | | | |

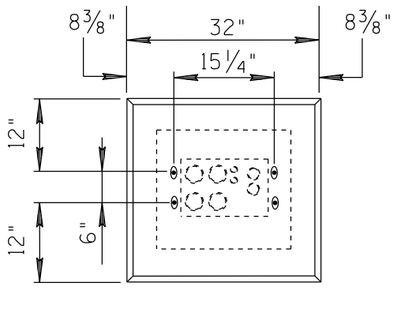
| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>7/14 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | RAMP METER CABINET<br>WITH TRANSFORMER, FOUNDATION | DRAWING NO.<br>FM-3.22<br>SHEET NO. |



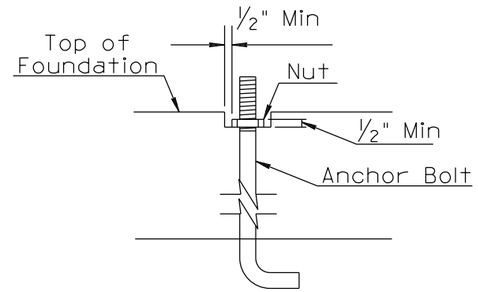

TOP VIEW




SIDE VIEW

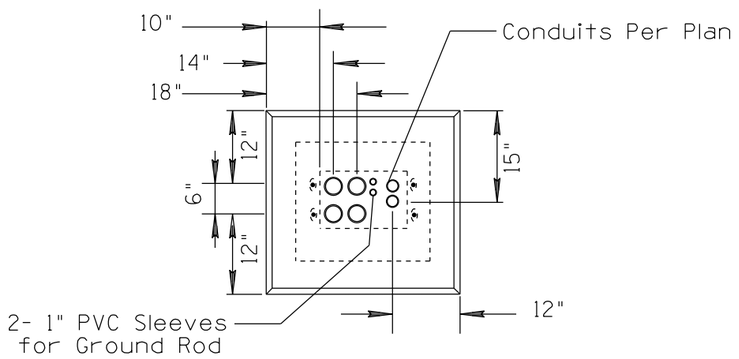



ANCHOR BOLT LAYOUT




CABINET LEVELING DETAIL

Anchor Bolt Leveling Recess Detail




CONDUIT LAYOUT

NOTES:

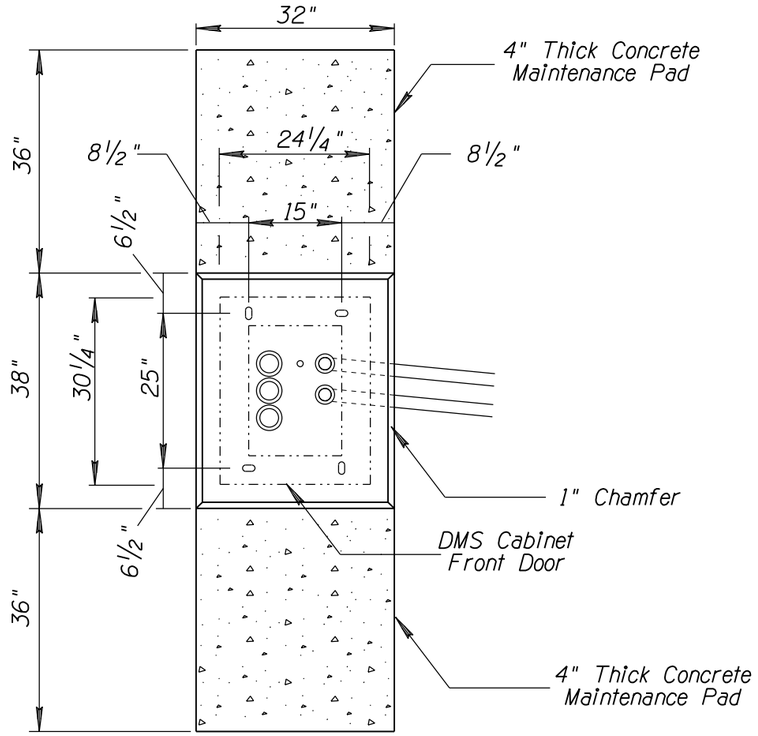
1. This foundation shall be used only for the Skyline 336S series cabinet, when shown on plans.
2. Foundations Shall be Class S (F'c=3,000 PSI) Concrete.
3. Foundation Shall Include a 5/8" X 10' Ground Rod, Leaving a Projection Above the Foundation of 2" to 3".
4. Anchor Bolts Shall be Galvanized Steel, ¾" X 11" X 5", Complete with Nuts and Washers.
5. Anchor Bolts Shall Project a Minimum of 2", and a Maximum of 2 1/2 " Above Foundation.

NOT TO SCALE

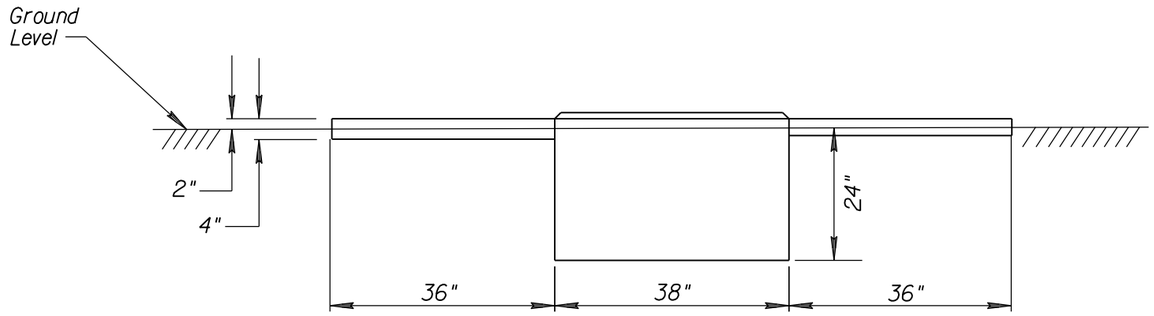
TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE. OUTSIDE MARICOPA COUNTY 1-800-STAKE-IT

| | | |
|---|---|---|
| DESIGN APPROVED: SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION: 7/14 |
| APPROVED FOR DISTRIBUTION: ON FILE | SKYLINE 336S DMS CABINET FOUNDATION DETAILS | DRAWING NO.: FM-3.23 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | Removed Dooley sump, revised ground rod note & callouts, revised detail name. | D. Bruggeman | 7/31/14 |
| 2 | | | |
| 3 | | | |
| 4 | | | |



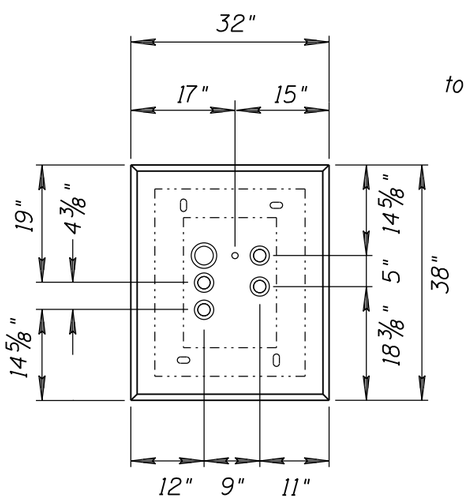

TOP VIEW

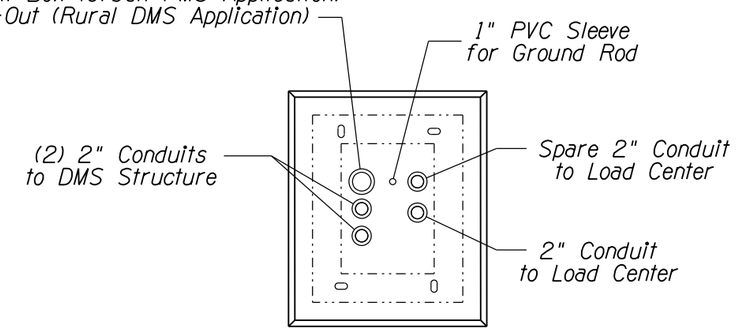



SIDE VIEW

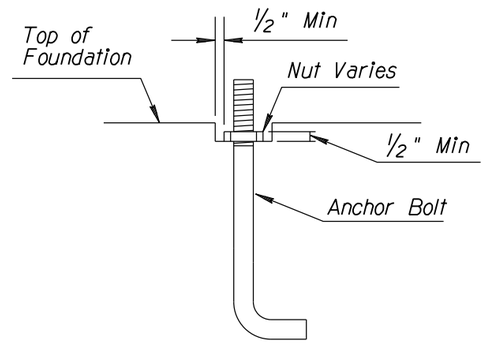
NOTES:

1. This foundation shall be used only for the Skyline 332 series cabinet, unless otherwise noted on the plans.
2. Foundations shall be class S (f'c=3000 psi) concrete.
3. All conduits shown shall be furnished and installed in foundation. See individual site plans for conduit orientations and stub-out direction, and as directed by the Engineer. Stub-out conduits shall extend 12" past edge of foundation, and be securely capped. All conduits, except 1" ground rod sleeve, shall have end bell fittings. Cut 1" sleeve flush with foundation top.
4. Foundation shall include a 5/8 inch x 10 foot ground rod, driven vertically into the earth to leaving a projection above the foundation of 2" to 3".
5. Contractor-furnished anchor bolts shall be galvanized steel, 3/4 inch x 11 inch x 5 inch, complete with nuts and washers.
6. Anchor bolts shall project a minimum of 2 inches, and a maximum of 2 1/2 inches above foundation. Cabinet leveling capability shall be provided, as shown in detail.




CONDUIT LAYOUT



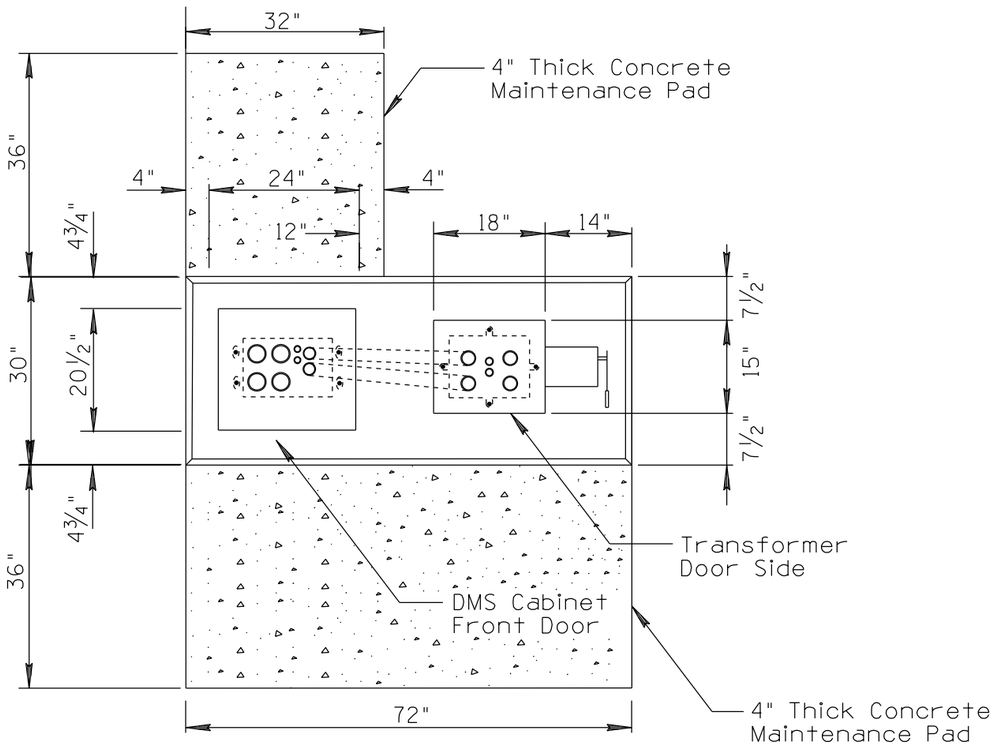

CABINET LEVELING DETAIL

NOT TO SCALE

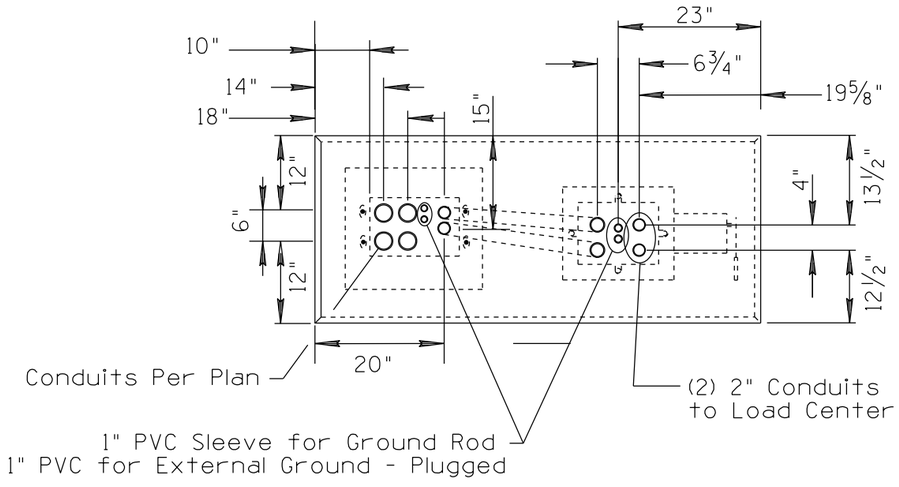
TWO WORKING DAYS BEFORE YOU DIG. CALL
263-1100
BLUE STAKE
OUTSIDE MARICOPA COUNTY
1-800-STAKE-IT

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>7/14 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | SKYLINE 332 DMS<br>CABINET FOUNDATION DETAILS | DRAWING NO.<br>FM-3.23A<br>SHEET NO. |

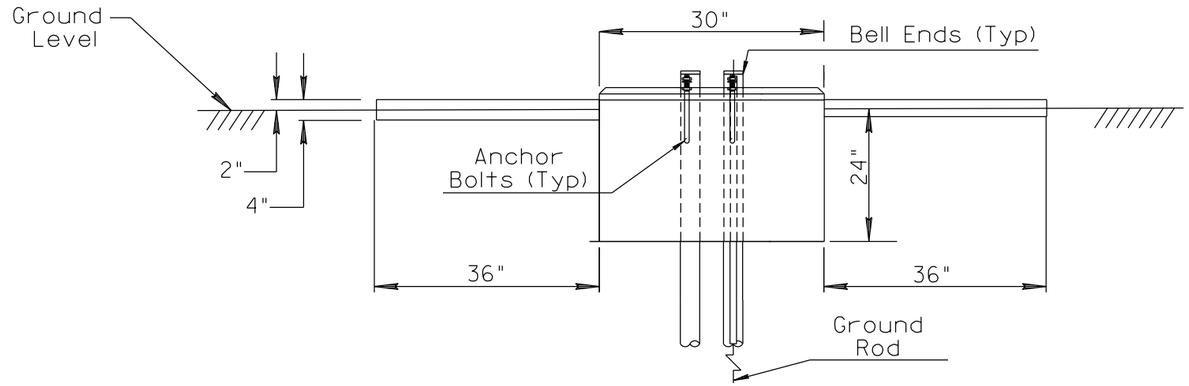
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | Added spare 2" conduit to load center, revised 3" conduits to 2" to DMS. | D. Bruggeman | 7/31/14 |
| 2 | | | |
| 3 | | | |
| 4 | | | |



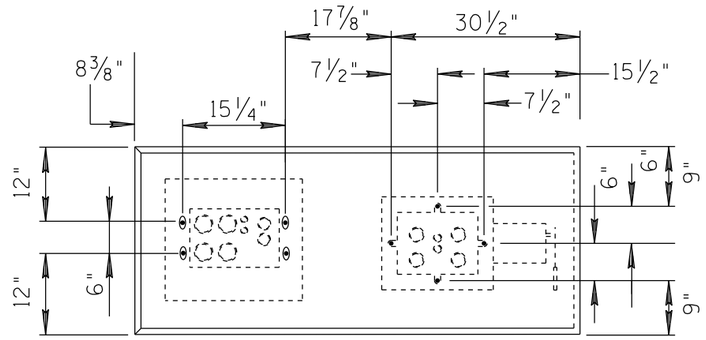

TOP VIEW




CONDUIT LAYOUT




SIDE VIEW




ANCHOR BOLT LAYOUT

NOTES:

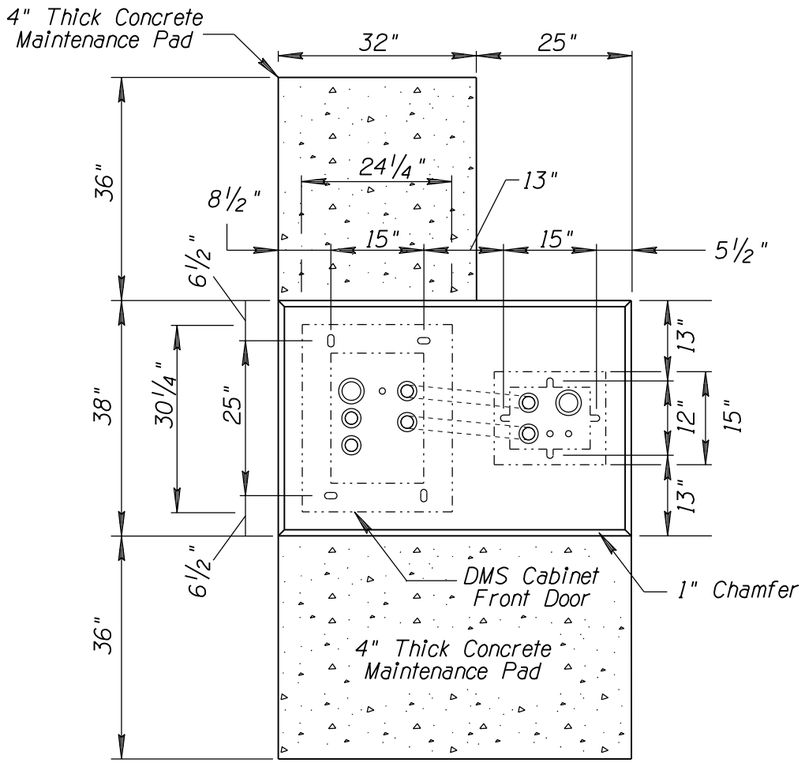
1. This foundation shall be used only for the Skyline 336S series cabinet, when shown on plans.
2. Foundations Shall be Class S (F'c=3,000 PSI) Concrete.
3. Foundation Shall Include a 5/8" X 10' Ground Rod, Leaving a Projection Above the Foundation of 2" to 3".
4. Contractor Shall Furnish & Install 2 #8 AWG Conductors from Transformer to Control Cabinet Main Circuit Breaker. 1 #8 AWG Green Bond Conductor Shall be Furnished & Installed and Connected Between the Transformer Cabinet and Control Cabinet, All Included in The Foundation Item.
5. Anchor Bolts Shall be Galvanized Steel, 3/4" X 11" X 5", Complete with Nuts and Washers.
6. Anchor Bolts Shall Project a Minimum of 2", and a Maximum of 2 1/2 " Above Foundation

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE OUTSIDE MARICOPA COUNTY 1-800-STAKE-IT

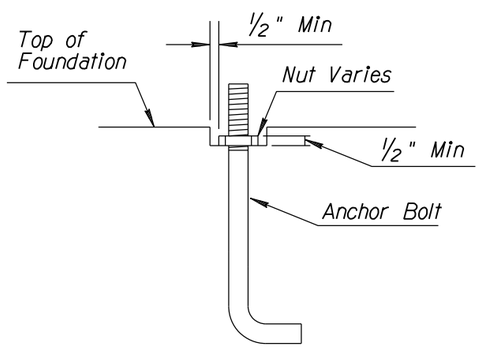
NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED: SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION: 7/14 |
| APPROVED FOR DISTRIBUTION: ON FILE | SKYLINE 336S DMS & TRANSFORMER CABINET FOUNDATION DETAILS | DRAWING NO.: FM-3.24<br>SHEET NO. |

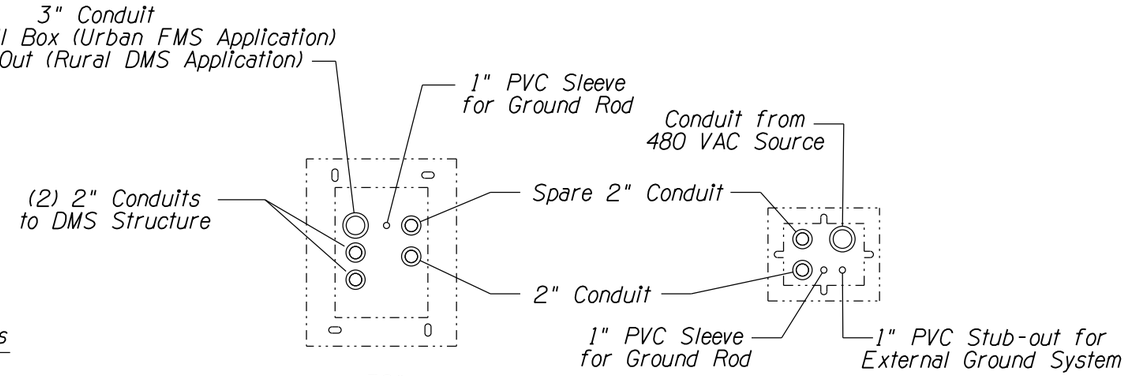
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | Removed Dooley sump, revised ground rod note & callouts, revised detail name. | D. Bruggeman | 7/31/14 |
| 2 | | | |
| 3 | | | |
| 4 | | | |

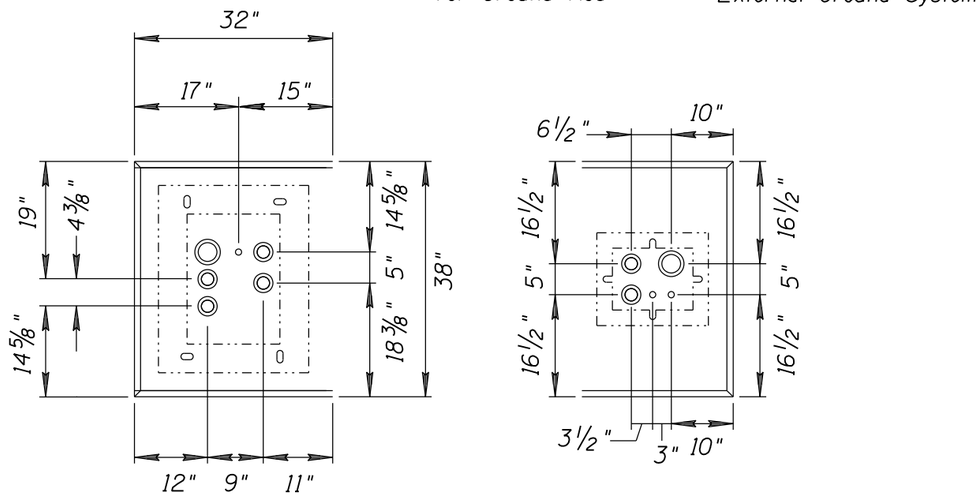



TOP VIEW

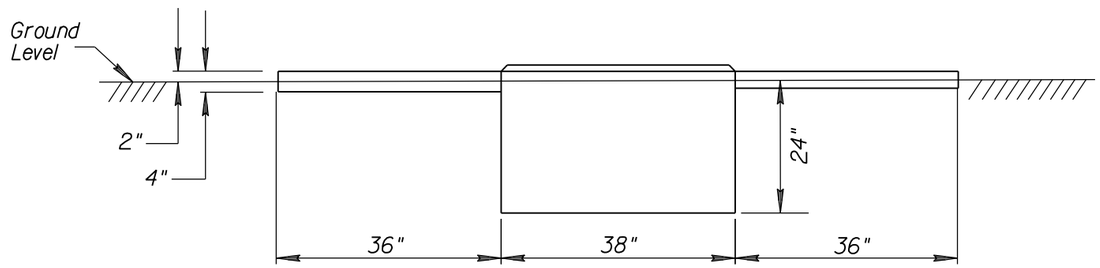



CABINET LEVELING DETAIL




CONDUIT LAYOUT




SIDE VIEW

## NOTES:

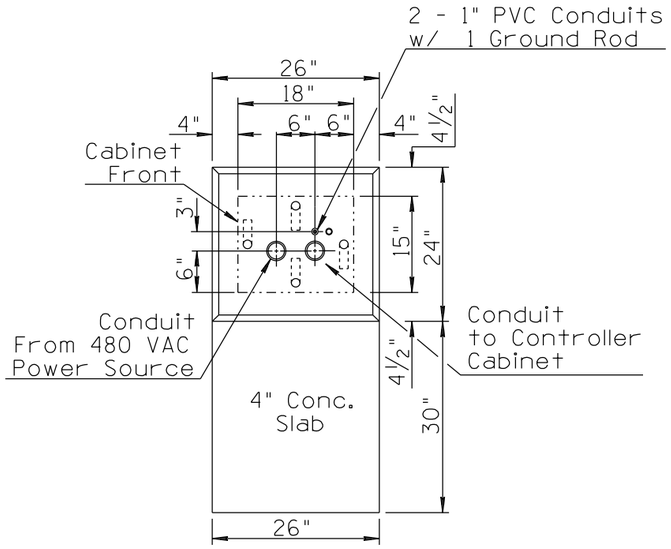
1. This foundation shall be used only for the Skyline 332 series cabinet, unless otherwise noted on the plans. Contractor shall confirm with Engineer on which side of the DMS cabinet the transformer cabinet will be located.
2. Foundations shall be class S (f'c=3000 psi) concrete.
3. All conduits shown shall be furnished and installed in foundation. See individual site plans for conduit orientations and stub-out direction, and as directed by the Engineer. Stub-out conduits shall extend 12" past edge of foundation, and be securely capped. All conduits, except 1" ground rod sleeve, shall have end bell fittings. Cut 1" sleeve flush with foundation top.
4. Foundation shall include a 5/8 inch x 10 foot ground rod, driven vertically into the earth to leaving a projection above the foundation of 2" to 3".
5. Contractor-furnished anchor bolts shall be galvanized steel, 3/4 inch x 11 inch x 5 inch, complete with nuts and washers.
6. Contractor shall furnish and install 2 #8 AWG conductors from transformer to control cabinet main breaker. 1 #8 AWG stranded green bond wire shall be connected between the ground rods in the transformer cabinet and DMS control cabinet.
7. Anchor bolts shall project a minimum of 2 inches, and a maximum of 2 1/2 inches above foundation. Cabinet leveling capability shall be provided, as shown in detail.



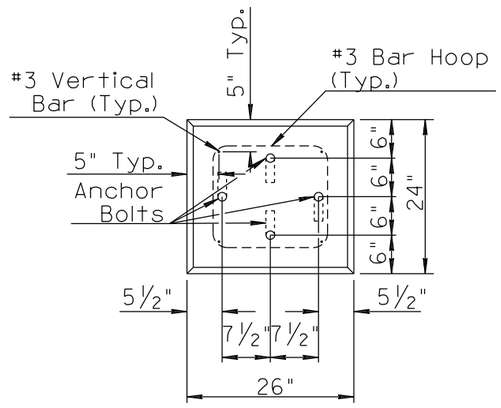
NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>7/14 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | SKYLINE 332 DMS & TRANSFORMER CABINET FOUNDATION DETAILS | DRAWING NO.<br>FM-3.24A |
| | | SHEET NO. |

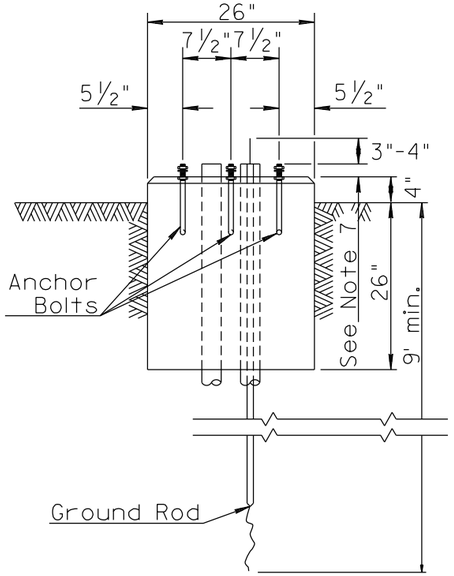
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | Added spare 2" conduit to load center, revised 3" conduits to 2" conduits to DMS | Bruggeman | 7/31/14 |
| 2 | | | |
| 3 | | | |
| 4 | | | |



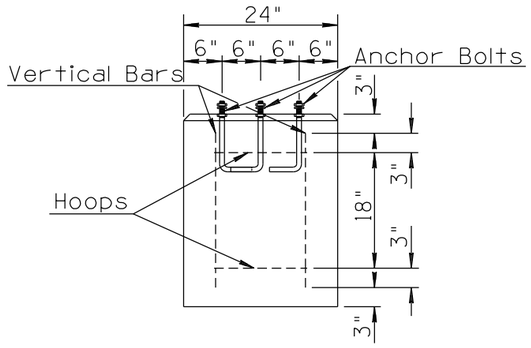

TRANSFORMER CABINET FOUNDATION
TOP VIEW




TRANSFORMER CABINET FOUNDATION
REINFORCING & ANCHOR BOLTS
TOP VIEW




TRANSFORMER CABINET FOUNDATION
FRONT VIEW




TRANSFORMER CABINET FOUNDATION
REINFORCING & ANCHOR BOLTS
SIDE VIEW

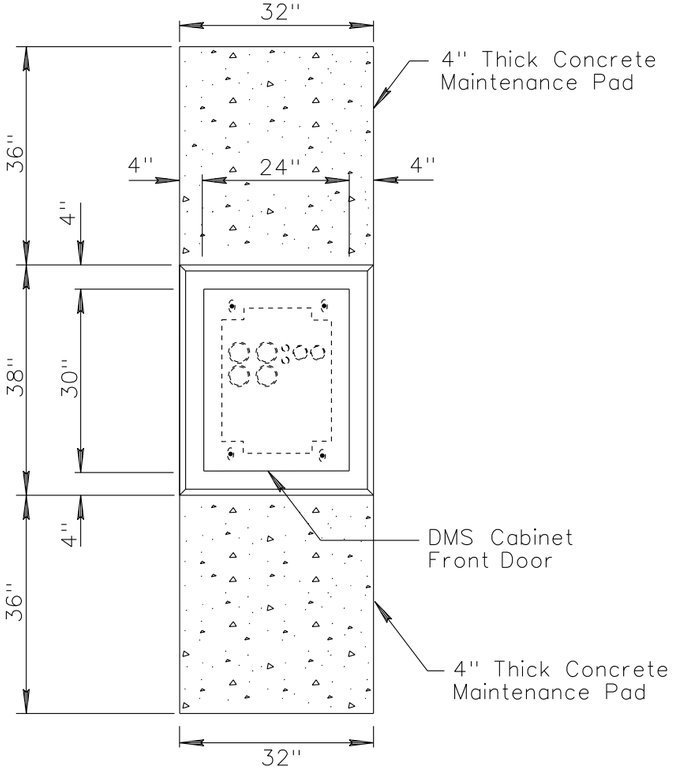
NOT TO SCALE

## NOTES:

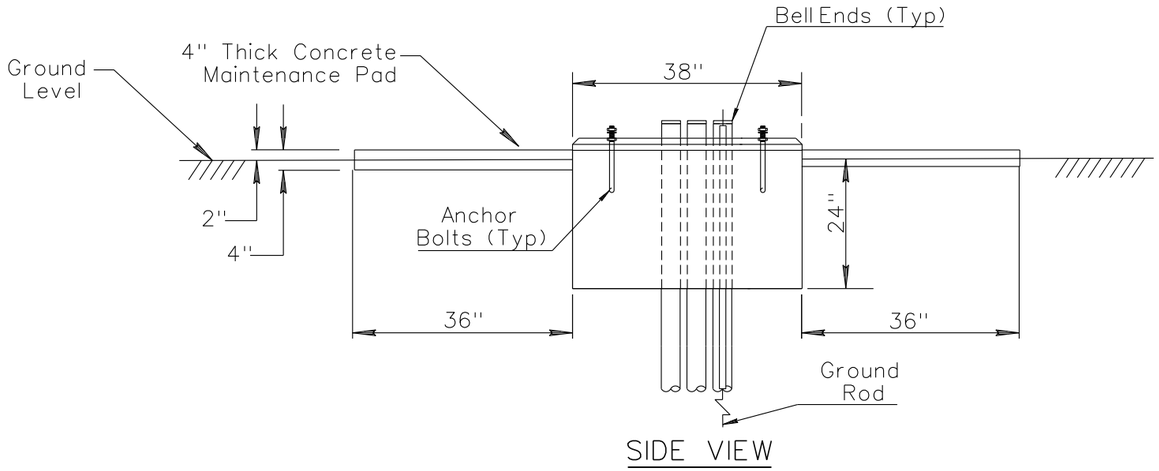
1. Foundations Shall be Class S (f'c=3,000 PSI) Concrete.
2. Foundations Shall Include a ⅝" Ground Rod Which Shall be Driven Vertically into the Earth to a Minimum of 9' Below the Ground Surface.
3. All Reinforcing Bars and Hoops Shall be ⅜" Diameter Reinforcing Steel. Hoops Shall be Secured to Vertical Bars.
4. 1#4 AWG Green Bond Shall be Connected Between the Ground Rod in the Transformer Cabinet and the Ground Rod for the Associated Cabinet or Pole. Payment for this Conductor Shall be Included in Control Cabinet Installation.
5. The Contractor Shall Furnish and Install 2#8 AWG Conductors from Transformer to Control Cabinet Main Circuit Breaker in Indicated Conduit. 1#4 AWG Green Bond Shall be Connected Between Rods in the Transformer Cabinet and the Control Cabinet. Payment for these Conductors Shall be Included in Control Cabinet Installation.
6. Anchor Bolts Shall be Galvanized Steel, ¾"x 11"x 5", Complete with Nuts & Washers.
7. Anchor Bolts Shall Project a Minimum of 2" and a Maximum of 2½" Above Foundation.

| DESIGN APPROVED | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
|---|---|---|
| SIGNATURE | | DRAWING NO.<br>FM-3.26 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | TRANSFORMER CABINET FOUNDATION | SHEET NO. |

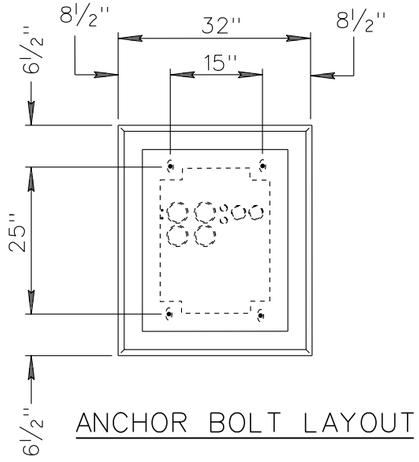
| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 3 | | | |
| 4 | | | |
| 1 | | | |
| 2 | | | |



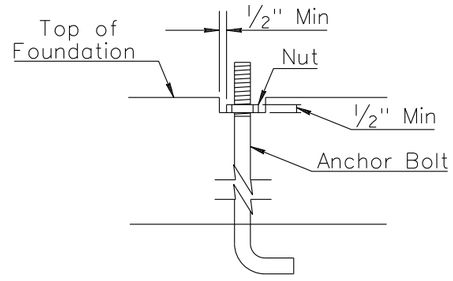

TOP VIEW




SIDE VIEW

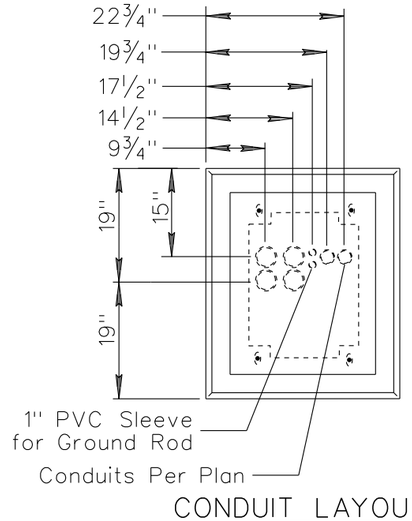



ANCHOR BOLT LAYOUT




CABINET LEVELING DETAIL

Anchor Bolt Leveling
Recess Detail




CONDUIT LAYOUT

NOTES:

1. Foundations Shall be Class S (F'c=3,000 PSI) Concrete.
2. Foundation Shall Include a 5/8" X 10' Ground Rod, Leaving a Projection Above the Foundation of 2" to 3".
3. Anchor Bolts Shall be Galvanized Steel, ¾" X 11" X 5", Complete with Nuts and Washers.
4. Anchor Bolts Shall Project a Minimum of 2", and a Maximum of 2 1/2 " Above Foundation.

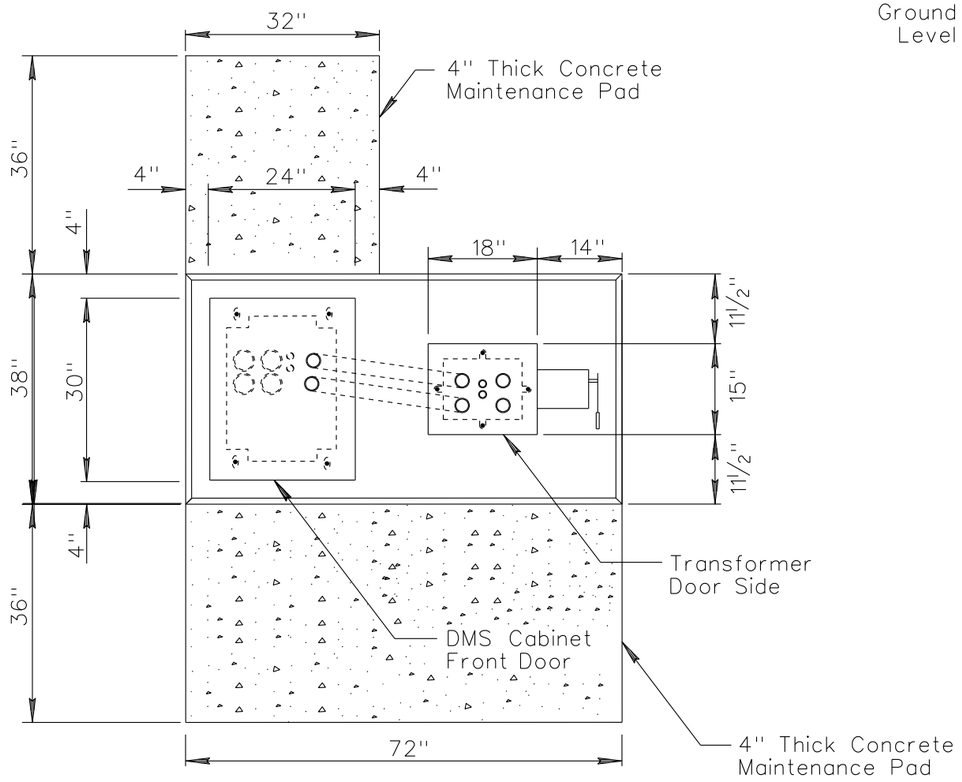
TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE OUTSIDE MARICOPA COUNTY 1-800-STAKE-IT

NOT TO SCALE

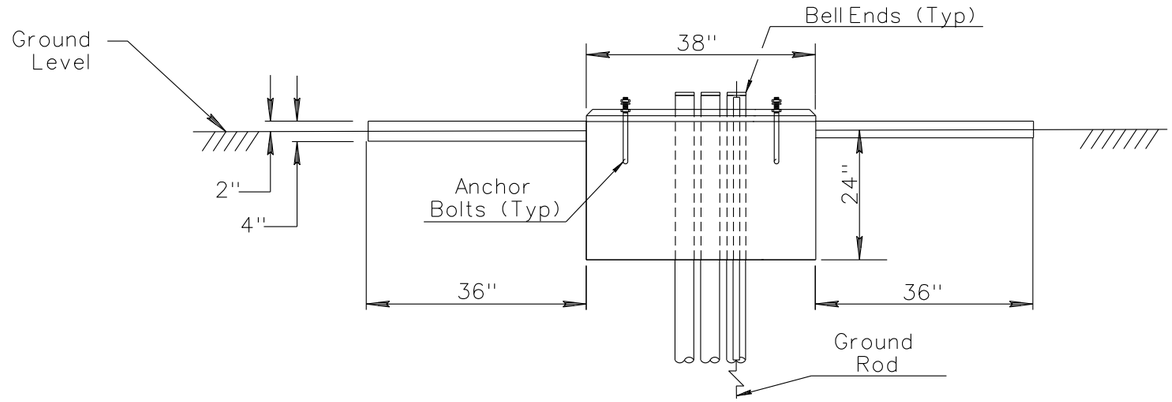
| | |
|---|---|
| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWING |
| GROUP MANAGER<br>S. E. ANDERSON<br>APPROVED | DAKTRONICS DMS CABINET FOUNDATION DETAILS |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 10/17 DATE | DRAWING NO.<br>FM-3.27 |

PRIOR DISTRIBUTION DATE 07/14

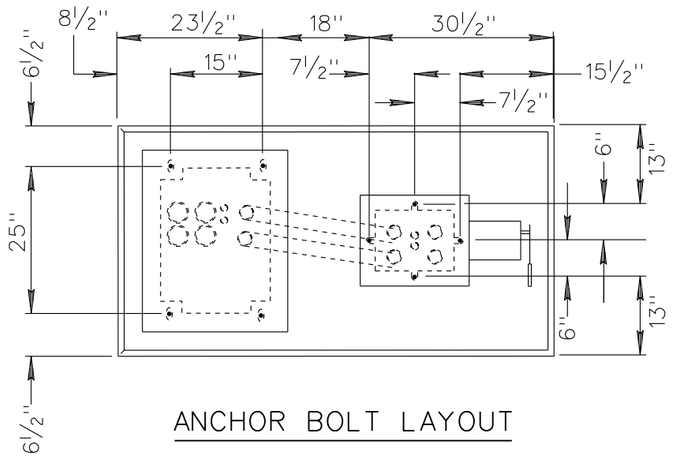
Note to Designer:
The information presented in this Standard Drawing has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.



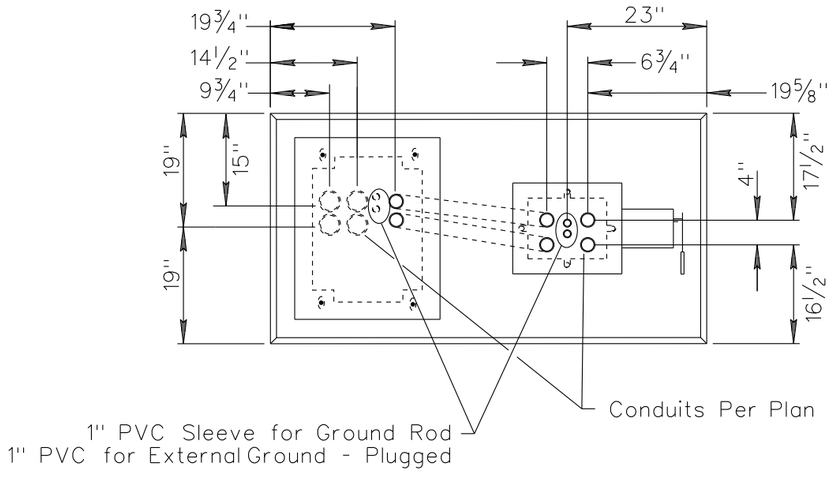

TOP VIEW




SIDE VIEW




ANCHOR BOLT LAYOUT




CONDUIT LAYOUT

NOTES:

1. Foundations Shall be Class S (F'c=3,000 PSI) Concrete.
2. Foundation Shall Include a 5/8'' X 10' Ground Rod, Leaving a Projection Above the Foundation of 2'' to 3''.
3. Contractor Shall Furnish & Install 2 #8 AWG Conductors from Transformer to Control Cabinet Main Circuit Breaker. 1 #8 AWG Green Bond Conductor Shall be Furnished & Installed and Connected Between the Transformer Cabinet and Control Cabinet, All Included in The Foundation Item.
4. Anchor Bolts Shall be Galvanized Steel, 3/4'' X 11'' X 5'', Complete with Nuts and Washers.
5. Anchor Bolts Shall Project a Minimum of 2'', and a Maximum of 2 1/2 '' Above Foundation

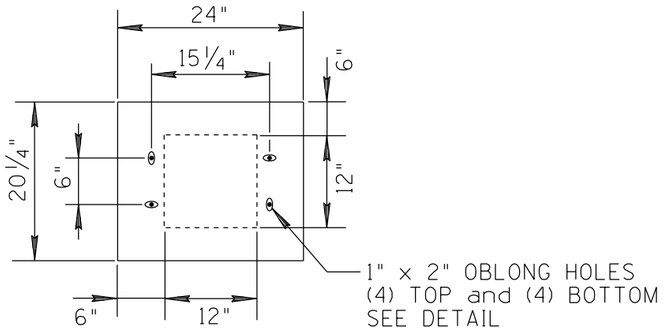
TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE OUTSIDE MARICOPA COUNTY 1-800-STAKE-IT

NOT TO SCALE

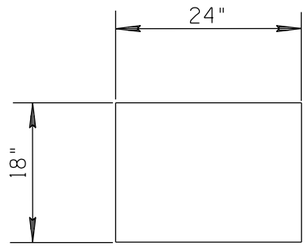
| | |
|---|---|
| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWING |
| GROUP MANAGER<br>S. E. ANDERSON<br>APPROVED | DAKTRONICS DMS & TRANSFORMER CABINET FOUNDATION DETAILS |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 10/17 DATE | DRAWING NO. FM-3.28 |

PRIOR DISTRIBUTION DATE 07/14

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

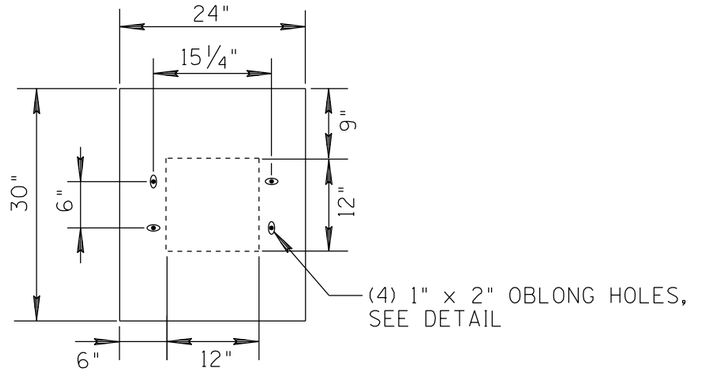



TOP AND BOTTOM VIEW

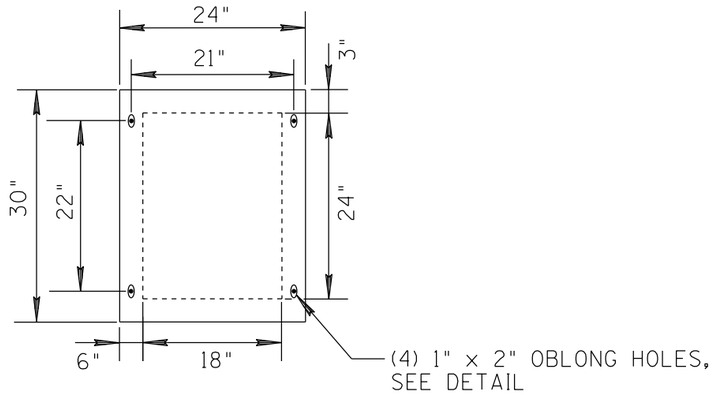



SIDE VIEW

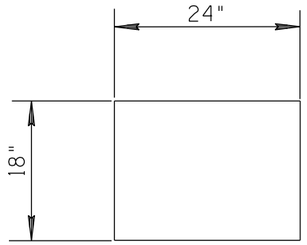
SKYLINE DMS CABINET
ELEVATOR BASE




TOP VIEW

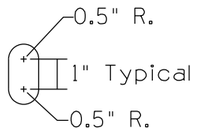



BOTTOM VIEW




SIDE VIEW

SKYLINE CABINET TO DAKTRONICS
FOUNDATION ELEVATOR BASE




BOLT SLOT
DETAIL

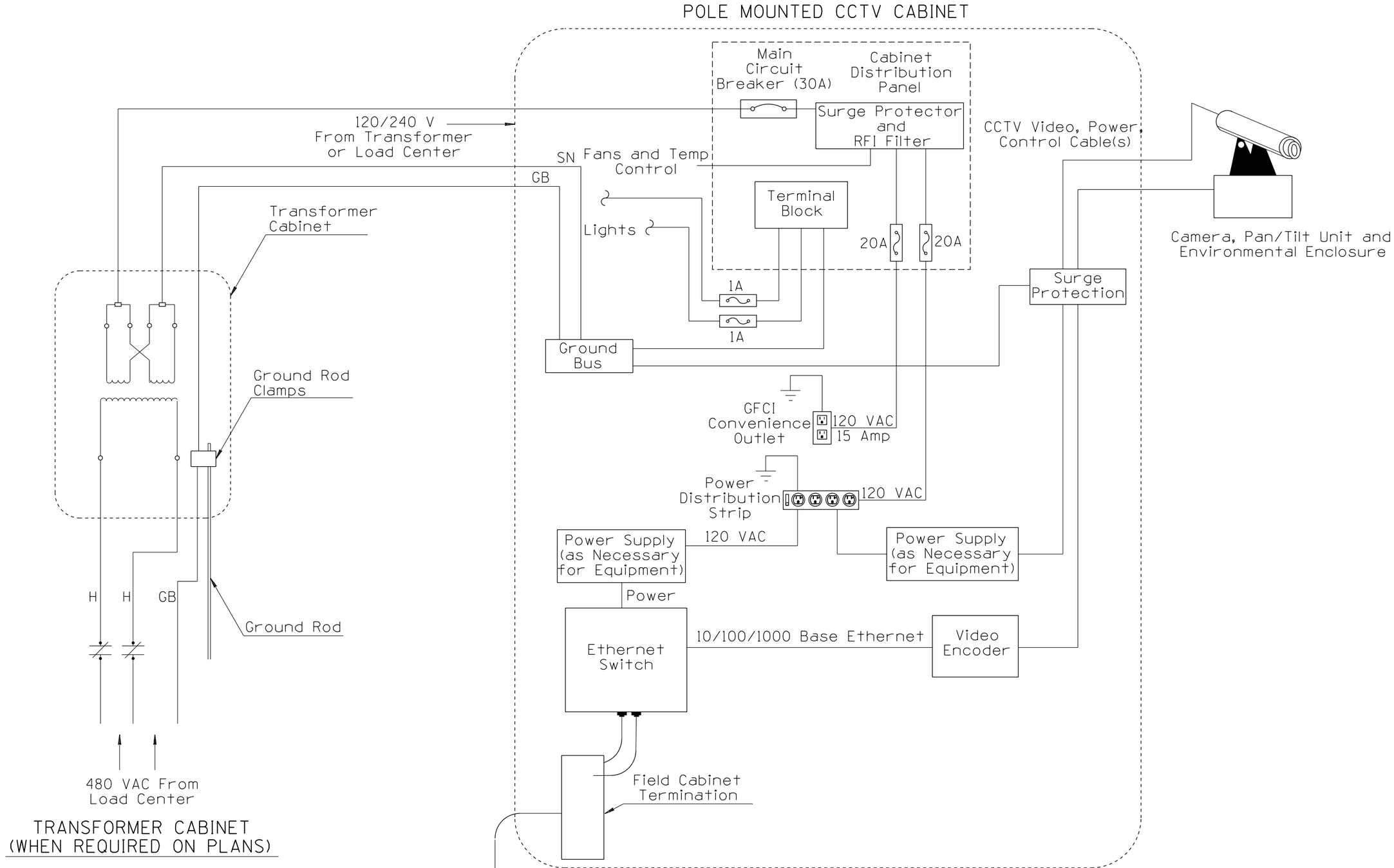
## NOTES:

1. Cabinet Mounting Bolts Shall be Stainless Steel, ¾"x 2", Complete with Nuts & Washers.
2. The Elevator Base Shall be Constructed of Sheet Alluminum (0.125" Min).
3. The Elevator Base Shall be Continuously Welded Along All the Mated Seems Of The Base.
4. BaseMounting Hole Slot Dimensions Shall be Common for Top and Bottom.

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | DMS CABINET ADAPTER AND ELEVATOR BASE DETAILS | DRAWING NO.<br>FM-3.29 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 3 | | | |
| 2 | | | |
| 1 | | | |



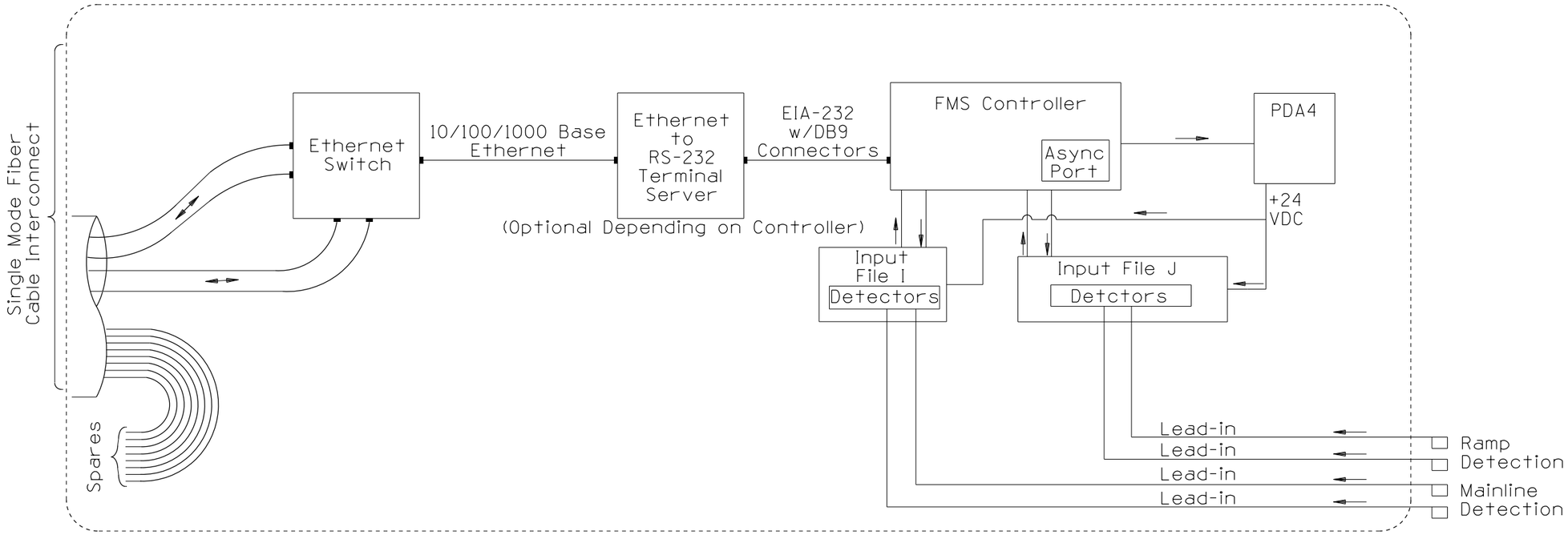

CCTV CABINET BLOCK DIAGRAM

NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | CCTV CABINET ETHERNET BLOCK DIAGRAM | DRAWING NO.<br>FM-4.01 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 3 | | | |
| 4 | | | |

CONTROLLER CABINET
(FMS CONTROLLER)
(RAMP METER)




TYPICAL TRAFFIC CABINET
BLOCK ETHERNET DIAGRAM

NOTES:

1. Refer to Plans for Cable Routing To/From Cabinets.
2. All Ethernet Switch, are Single Mode, Operating at 1310 nm, Unless Otherwise Specified.
3. Ethernet Switch and Terminal Servers Shall Include Power Adapters Converting 120 VAC to Appropriate Operating Voltages, Interconnect to Power Not Shown.

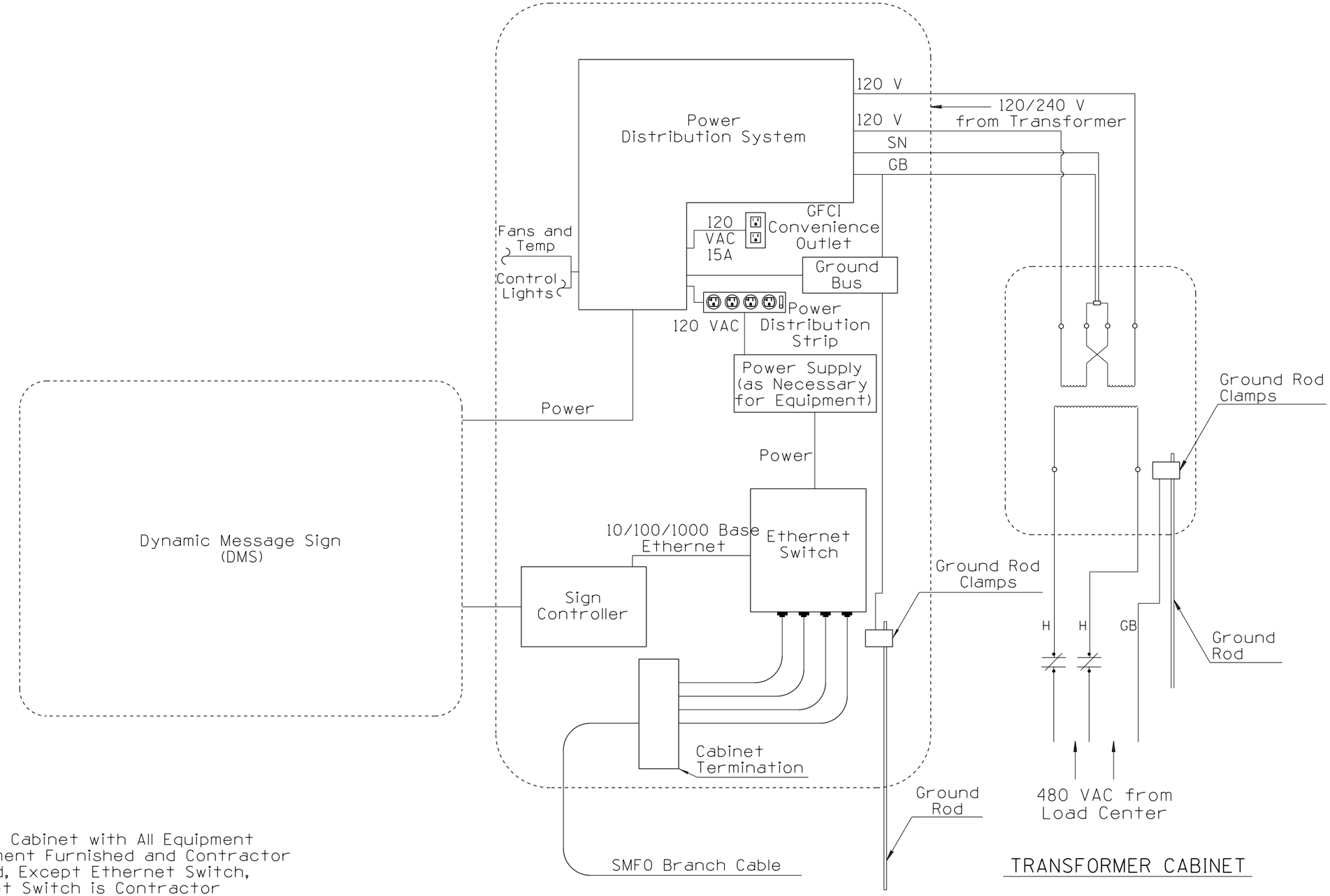
NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | FREEWAY MANAGEMENT SYSTEM<br>CABINET BLOCK<br>ETHERNET DIAGRAM | DRAWING NO.<br>FM-4.02 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

TYPICAL CABINET DEPARTMENT FURNISHED



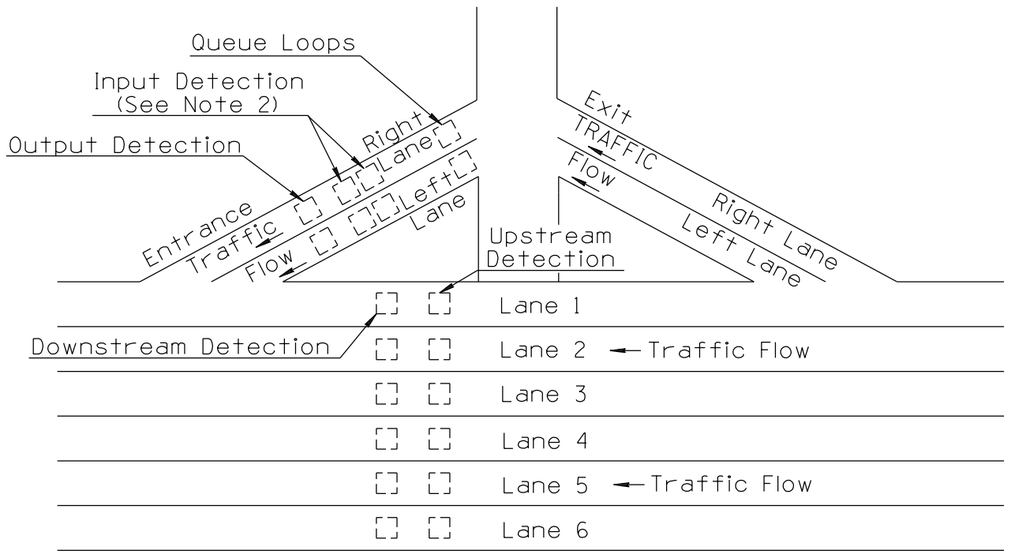

NOTE:

DMS and Cabinet with All Equipment Department Furnished and Contractor Installed, Except Ethernet Switch, Ethernet Switch is Contractor Supplied, Installed and Tested.

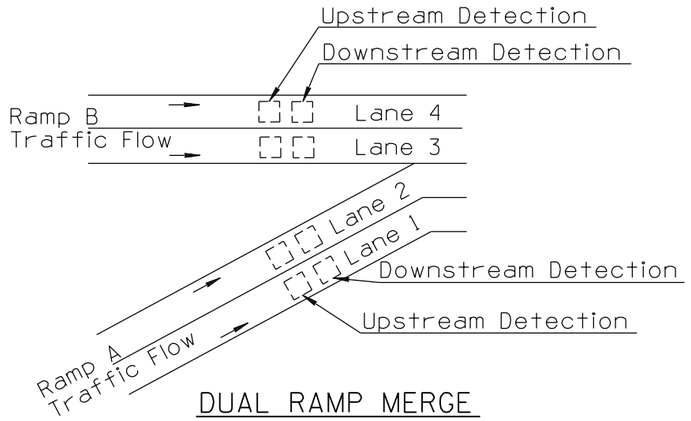
DMS CABINET ETHERNET BLOCK DIAGRAM

NOT TO SCALE

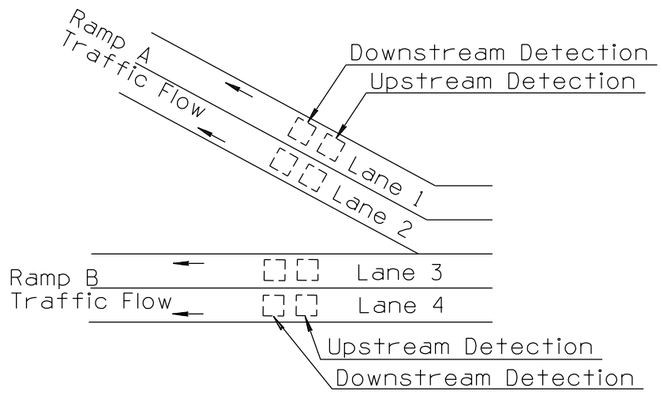
| | | |
|---|---|---|
| DESIGN APPROVED<br>**SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>**ON FILE** | DMS CABINET ETHERNET BLOCK DIAGRAM | DRAWING NO.<br>FM-4.03 |
| | | SHEET NO. |




## LOOP DETECTOR DEFINITION (UP TO 6 LANE CONFIGURATION)




## DUAL RAMP MERGE




## DUAL RAMP DIVERGE

| MAINLINE OR RAMP MERGE/DIVERGE | | |
|---|---|---|
| LANE | UPSTREAM | DOWNSTREAM |
| 1 | 1U | 1D |
| 2 | 2U | 2D |
| 3 | 3U | 3D |
| 4 | 4U | 4D |
| 5 | 5U | 5D |
| 6 | 6U | 6D |
| 7 | 7U | 7D |
| 8 | 8U | 8D |

| ENTRANCE RAMPS (E) | | | | |
|---|---|---|---|---|
| LANE | MERGE | OUTPUT | INPUT | QUEUE |
| LEFT | ELM | ELO | ELI | ELQ |
| RIGHT | --- | ERO | ERI | ERQ |

## TABLE OF DETECTION LABELS

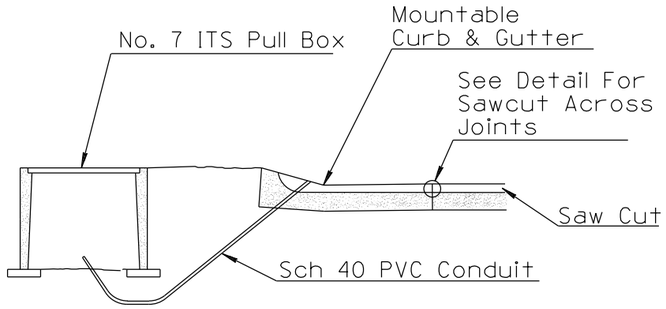
### NOTES:

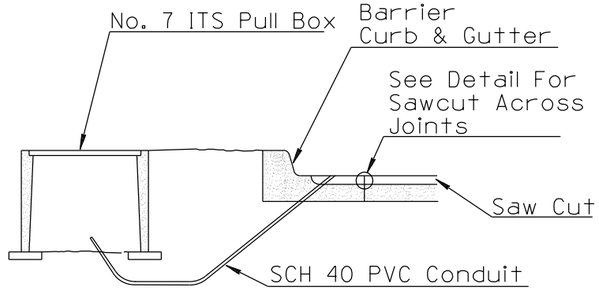
1. Not All Cabinet Locations Will Have All Detection for Mainline Lanes as Shown.
2. Input Detection for Each Entrance Lane Shall be Connected in Series in the Nearest Roadside Pull Box.
3. All New & Existing Detection Shall be Tagged With Pre-Printed Labels as Shown in the Table on this Sheet. On Existing Detection, the Contractor Shall Identity and Label the Upstream and Downstream Detection in Each Lane.

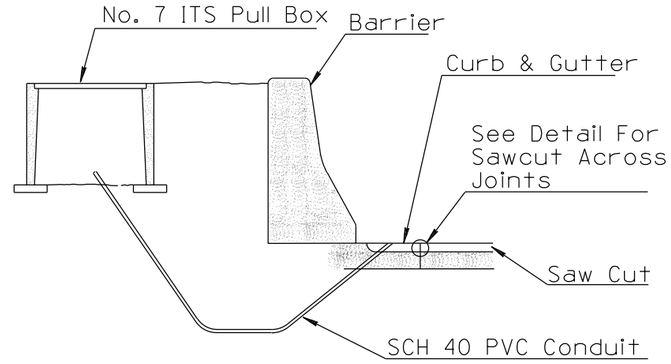
NOT TO SCALE

| | | |
|---|---|---|
| DESIGN APPROVED **SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION 8/13 |
| APPROVED FOR DISTRIBUTION **ON FILE** | DETECTION DEFINITION | DRAWING NO. FM-5.01 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |



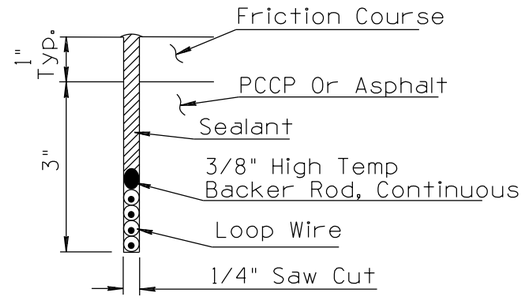



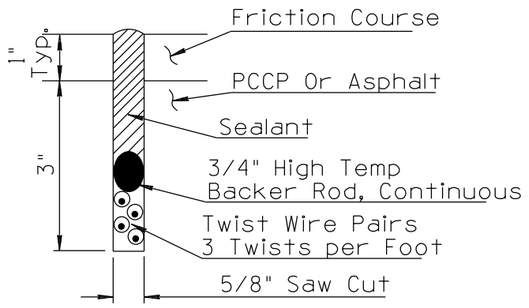

NOTES:

1. AB Slurry Required to Fill Void Under Curb and Gutter.

## HOME RUN CONDUIT




LOOP DETECTOR

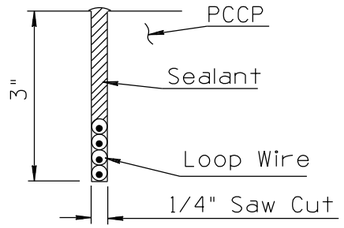



HOME RUN

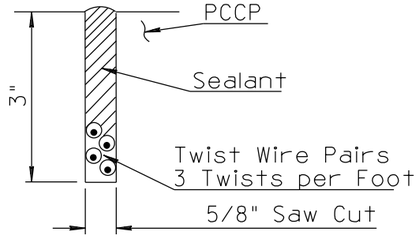
## CROSS SECTIONS IN PCCP WITH FRICTION COURSE OR ASPHALT

NOTES:

1. High Temperature Backer Rod Shall Be Continuous and Completely Shield Loop Wire From Slot Sealant.
2. Coil backer rod in hole of cored corners to provide complete barrier between slot sealant and loop wires.
3. Adjust Saw Cut Depth For Friction Course Thicknesses Other Than Shown.
4. Sawcut Depth Shall Be Reduced 1/2" in PCCP Less Than 9" Thick.




LOOP DETECTOR

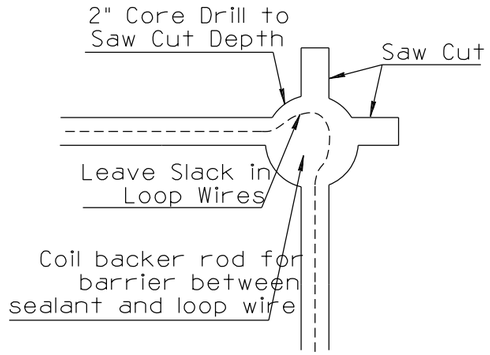



HOME RUN

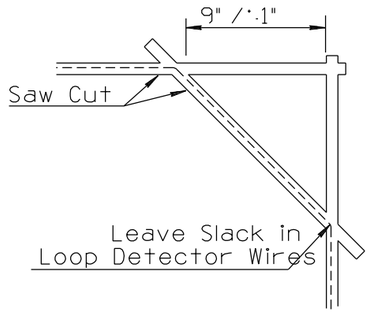
## CROSS SECTIONS IN PCCP WITHOUT FRICTION COURSE

NOTES:

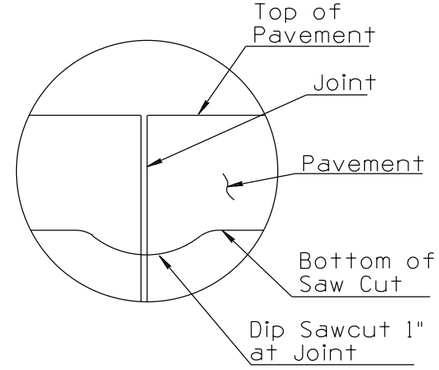
1. Use Short Sections of Backer Rod As Needed to Hold Loop Wire in Place.
2. Sawcut Depth Shall Be Reduced 1/2" in PCCP Less Than 9" Thick.




## CORED CORNERS




## SAW CUT CORNERS




## SAWCUT ACROSS JOINTS

NOT TO SCALE

| | |
|---|---|
| DESIGN APPROVED: SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS |
| APPROVED FOR DISTRIBUTION: ON FILE | TYPICAL LOOP DETECTOR INSTALLATION DETAILS |

REVISION 6/16
DRAWING NO. FM-5.02
SHEET NO.

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
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| 3 | | | |
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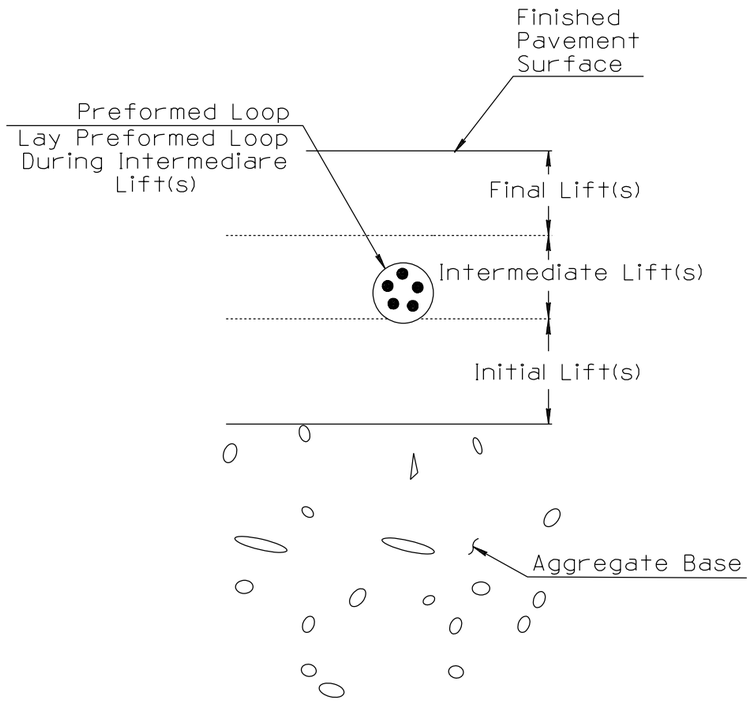
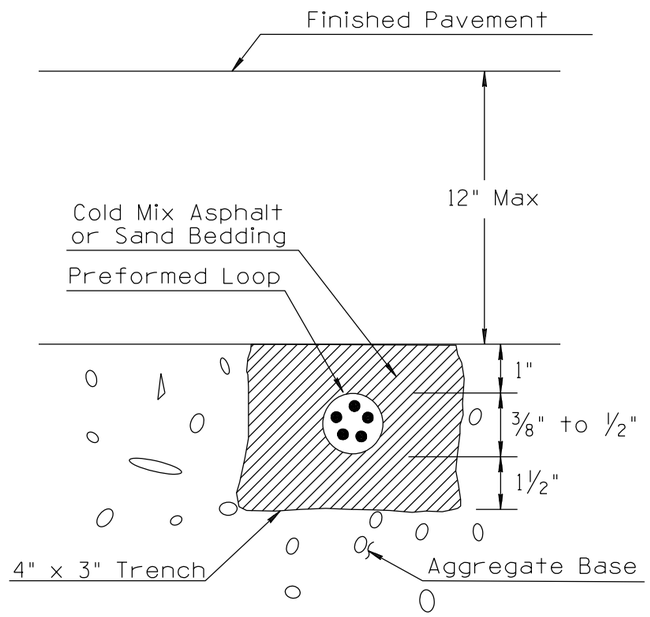
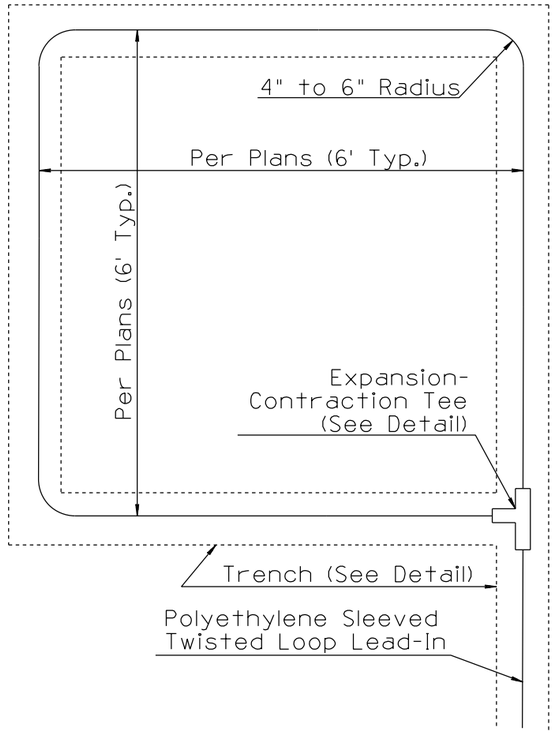


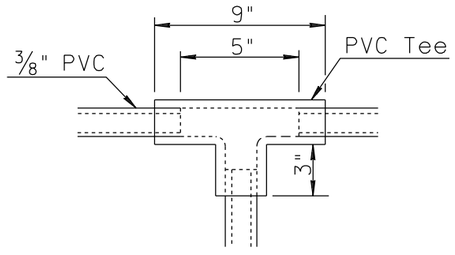

A.C. PAVEMENT




P.C.C. PAVEMENT




TYPICAL PREFORMED LOOP




EXPANSION-CONTRACTION TEE

NOTES:

1. Factory Formed Preformed Loops Shall be 3/8" to 1/2" PVC Schedule 40 PVC or Polypropylene (250 PSI Minimum).
2. The 90 Degree Corner Shall be 4" to 6" Radius. The Bends Shall be Integral to the Conduit. Seperate 90's Shall Not be Used.
3. All Preformed Loops and Sleeved Lead-In Wire Shall be Filled With Loop Sealant. Lead-in shall be unspliced to pull box.
4. Loop and Lead-In Wire Shall be Stranded No. 16 AWG Copper and Rated at 600 Volts With TFFN Insulation.
5. The Tee Fitting Shall be Constructed of PVC and Shall Have "Skirted Glue on" Covers. Tees Shall Not be Glued to PVC.
6. Loop Shall be Strapped Down to AB or Intermediate AC Surface at Corners and at a 2' Spacing on Each 6' Leg to Secure Loop to Prevent Movement During Paving. The Loop Shall be Placed Parallel to Finished Surface.
7. Loops Shall Have Five (5) Turns. Pairs of Loops in Same Lane Shall be Wound in Opposite Directions. Polarity Shall be Tagged. There Shall be 18' From Front Edge to Front Edge of the Loops in the Same Lane.

NOT TO SCALE

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| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | TYPICAL PREFORMED DETECTOR LOOP INSTALLATION DETAILS | DRAWING NO.<br>FM-5.03 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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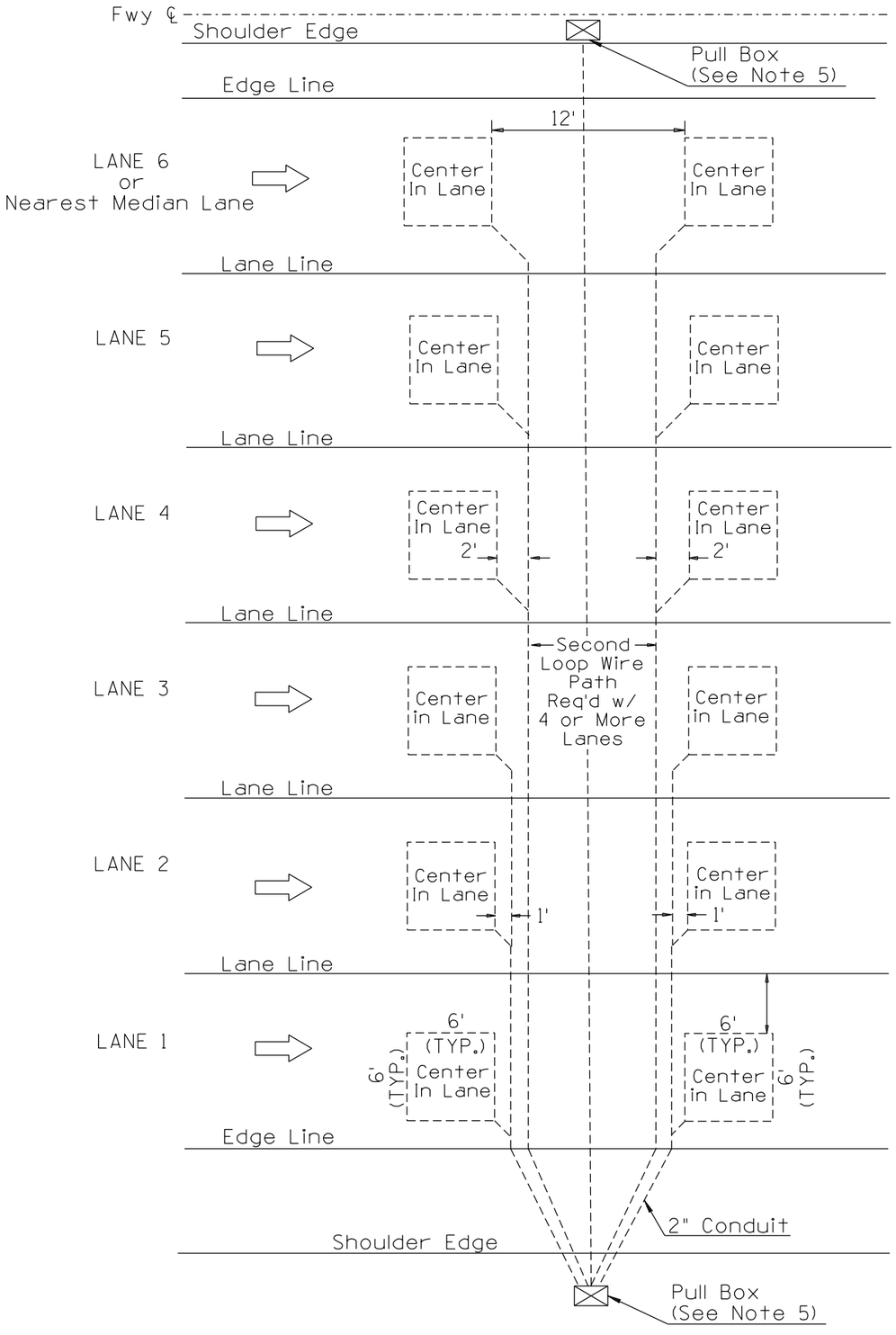


NOTES:

1. Pre Formed Loops Shall Have 5 Turns Unless Otherwise Noted. Saw-Cut Loops Shall Have 4 Turns Unless Otherwise Noted.
2. Loops Shall Be Centered in Lane Unless Otherwise Noted.
3. See FM-5.05 for Detector Loops in PCCP Pavement.
4. See FM-5.02 for Saw Cut Details
5. See Project Plans for Pull Box Size and Number.
6. Lane Numbering as per Detection Definition Std Dwg FM-5.01.

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| APPROVED FOR DISTRIBUTION<br>ON FILE | DETECTOR LOOP IN AC PAVEMENT INSTALLATION LAYOUT | DRAWING NO.<br>FM-5.04 |
| | | SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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| 1 | | | |
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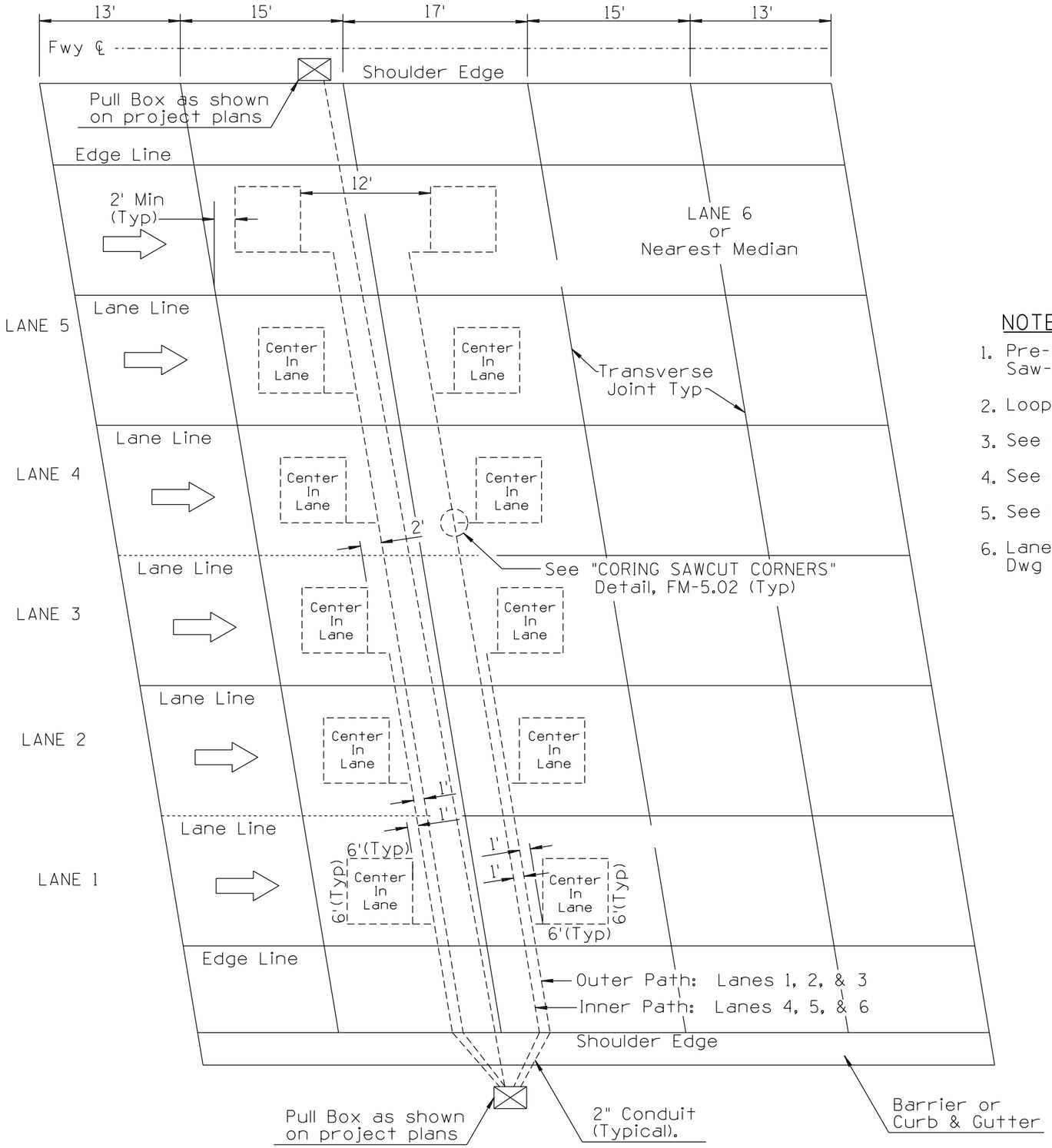


NOTES:

1. Pre-Formed Loops Shall Have 5 Turns Unless Otherwise Noted. Saw-Cut Loops Shall Have 4 Turns Unless Otherwise Noted.
2. Loops Shall Be Centered in Lane Unless Otherwise Noted.
3. See FM-5.04 for Detector Loops in AC Pavement.
4. See FM-5.02 for Saw Cut Details.
5. See Project Plans for Pull Box Number and Size.
6. Lane Numbering as per Detection Definition Std Dwg FM-5.01.

NOT TO SCALE

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| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION<br>8/13 |
| APPROVED FOR DISTRIBUTION<br>ON FILE | DETECTOR LOOP IN PCCP PAVEMENT INSTALLATION LAYOUT | DRAWING NO.<br>FM-5.05 |
| | | SHEET NO. |

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
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# LOOP DETECTOR ACCURACY VERIFICATION FORM

**CABINET #** _____ **DATE** _____ **LOCATION** _____

**TESTERS** _____ / _____

**Test Procedure:**

1. Each loop in each lane must be tested individually.
2. From the base display press "**2**" to enter the "**STATUS**" menu.
3. Press "**9**" to enter the "**Volume and Occupancy**" menu.
4. Press "**4**" to view the count data for "**Mainline 1-12**".
5. With both people in position watch for the countdown timer on the controller to reset to "**0**" and ask the person performing the manual counting of vehicles to begin counting.
6. An additional worksheet is included to record the "20 second" count data that the 2070 controller provides. Those figures will then automatically be transferred to this sheet.
7. At the end of each 1 minute period ask the manual counter to to provide his total count and record it in the additional worksheet. Those figures will then automatically be transferred to this sheet.
8. After 15 minutes or 100 vehicles, cease counting.
9. Detector accuracy is computed using the following formula:

$$\frac{\text{Manual Count - (Manual Count - 2070 Count)}}{\text{Manual Count}} \times 100 = \%\ \text{Accuracy}$$

Passing is greater than or equal to 95% accuracy or less than or equal to 105% accuracy

| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man |
| 1U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Zone | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | Zone | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Left In | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Left Out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Que | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Right In | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Right Out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | Percentage | (Pass/Fail) |
|---|---|---|
| Lane 1 U: | | |
| Lane 2 U: | | |
| Lane 3 U: | | |
| Lane 4 U: | | |
| Lane 5 U: | | |
| Lane 6 U: | | |
| Left Lane In: | | |
| Left Lane Out: | | |
| Right Lane In: | | |
| Right Lane Out: | | |

| | Percentage | (Pass/Fail) |
|---|---|---|
| Lane 1 D: | | |
| Lane 2 D: | | |
| Lane 3 D: | | |
| Lane 4 D: | | |
| Lane 5 D: | | |
| Lane 6 D: | | |
| L Que: | | |
| R Que: | | |

Contractor: _____

Inspector: _____

NOT TO SCALE

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| DESIGN APPROVED **SIGNATURE** | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS | REVISION 8/13 |
| APPROVED FOR DISTRIBUTION **ON FILE** | DETECTOR LOOP<br>TEST FORM 1 | DRAWING NO. FM-5.06<br>SHEET NO. |

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
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Location _____

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1U | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1D | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2U | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2D | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3U | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3D | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4U | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4D | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5U | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

NOT TO SCALE

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| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS |
| APPROVED FOR DISTRIBUTION<br>ON FILE | DETECTOR LOOP<br>TEST FORM 2 PART A |

REVISION 8/13
DRAWING NO. FM-5.07
SHEET NO.

| NO | DATE | MADE BY | DESCRIPTION OF REVISIONS |
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| 3 | | | |
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Location _____

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5D | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6U | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6D | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Left Lane In | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Left Lane Out | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L Que Loop | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Right Lane In | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Right Lane Out | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| | Time Period | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | Total | | % Accuracy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | 2070 | Man | |
| Zone | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R Que Loop | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | |
| | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

NOT TO SCALE

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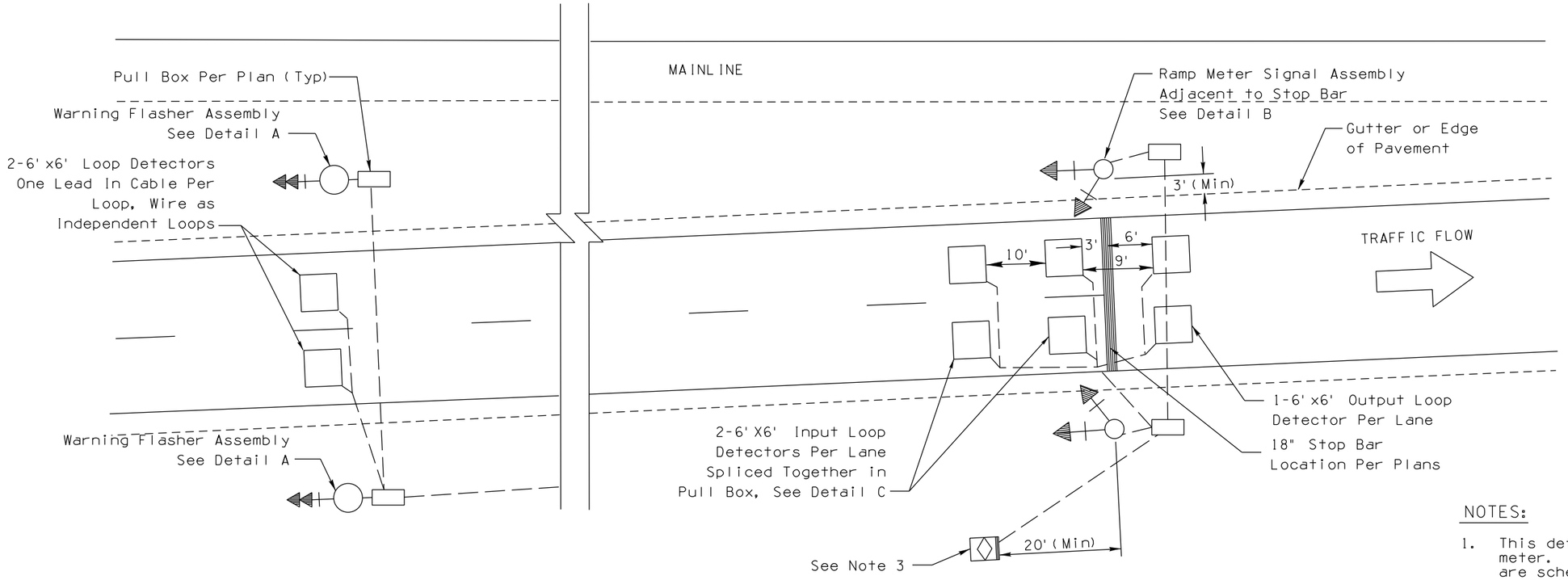
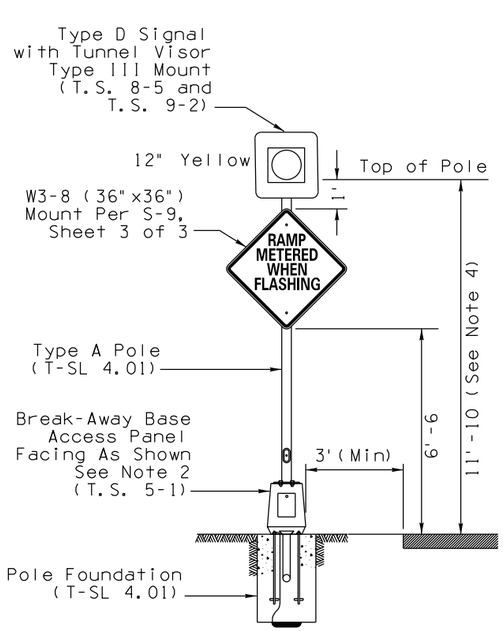
| DESIGN APPROVED<br>SIGNATURE | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>ITS STANDARD DRAWINGS |
| APPROVED FOR DISTRIBUTION<br>ON FILE | DETECTOR LOOP<br>TEST FORM 2 PART B |

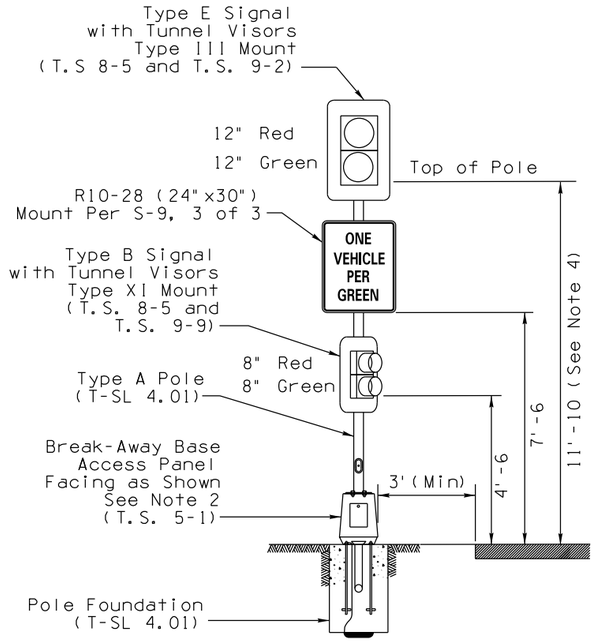
REVISION 8/13
DRAWING NO. FM-5.08
SHEET NO.

| NO | DESCRIPTION OF REVISIONS | MADE BY | DATE |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

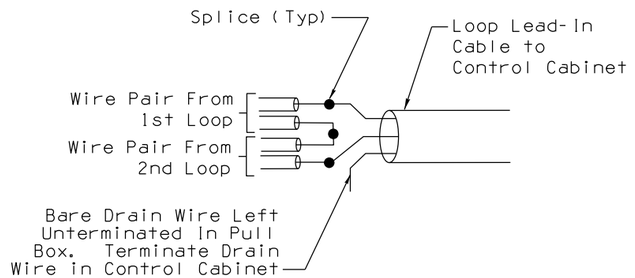



DETAIL A




DETAIL B



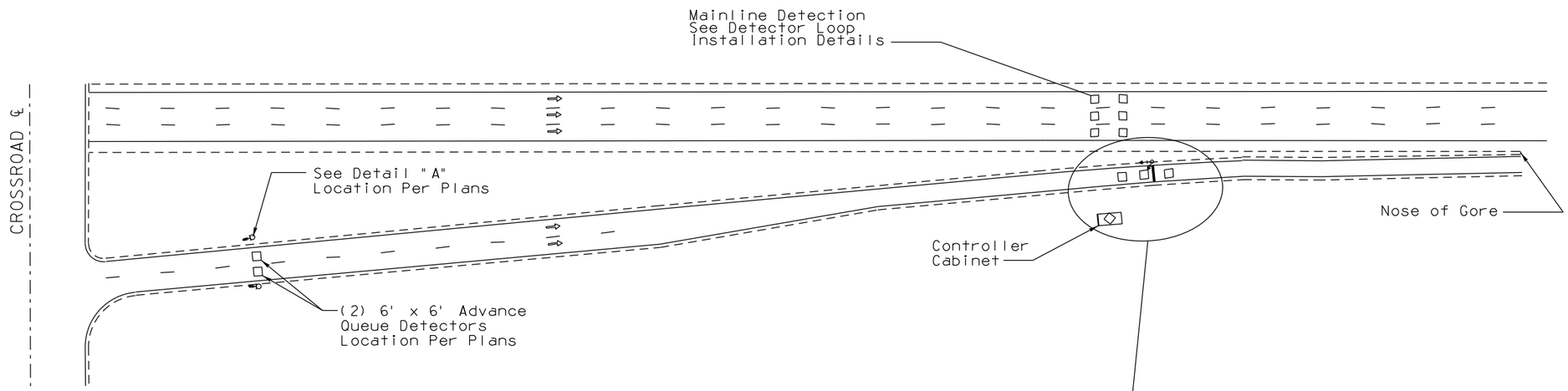

DETAIL C

NOTES:

1. This detail depicts a typical 2-lane ramp meter. Conduit and pull box locations are schematic. See plans for locations and details of equipment.
2. Breakaway bases shall be used on poles unless outside clear zone or protected behind guardrail or barrier.
3. Cabinets not protected by barrier shall be located outside of the clear zone (see FM-3.17). Ramp meter signal indications facing traffic shall be visible from the cabinet. Exact cabinet location to be determined by the contractor, with the approval of the engineer. The contractor shall mark proposed cabinet location at least 48 hours prior to foundation excavation.
4. Measurement shall be taken from the highest point on the ramp pavement adjacent to the poles so that signals installed on both sides of ramp are equal height. Povide pole lenghts as necessary to meet this measurement within 6 inches.
5. Saw cut loop detectors shall have 4 turns per loop and be centered in the lane.
6. The contractor shall mark proposed stop bar location at least 48 hours prior to loop detector installation or pole foundation excavation. The engineer will field review the proposed location prior to starting construction.

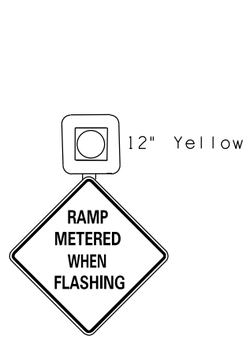
| | |
|---|---|
| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>**ITS STANDARD DRAWINGS** |
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | RAMP METER DETAILS — DRAWING NO. FM 6.01 |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | |

| PRIOR DISTRIBUTION DATE | 08/13 |
|---|---|



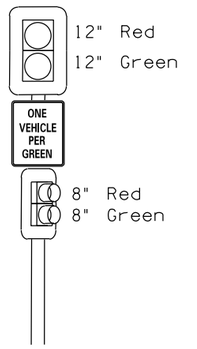

NOTES:

1. For Conduit and Pull Box Layout, See Plan Sheets.
2. If Poles Can Not be Located Outside the Clear Zone for the Freeway, Breakaway Bases Shall be Used.
3. Minimum Clear Zones Shall be Determined from the AASHTO Roadside Design Guide.
4. Permanently Mark Into Shoulder/ Curb the Downstream Edge of Downstream Input Loop for Proper Stop Bar Location.



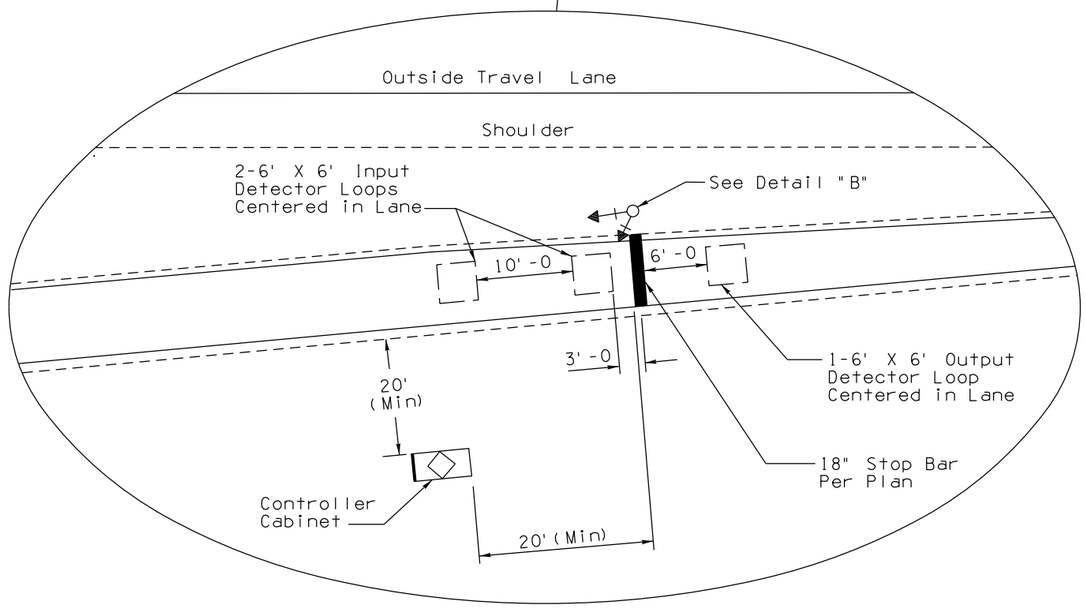

W3-8

Detail "A"




R10-28

Detail "B"




Note to Designer:
The information presented in this Standard Drawing has been prepared in accordance with recognized engineering principles and is for general use. Users of specific applications should obtain competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

| PRIOR DISTRIBUTION DATE | 08/13 |
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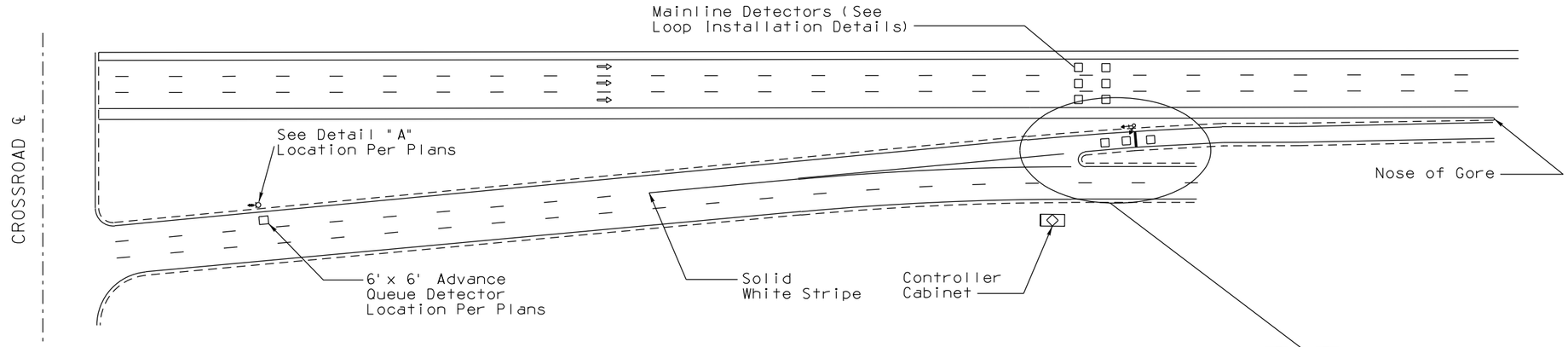
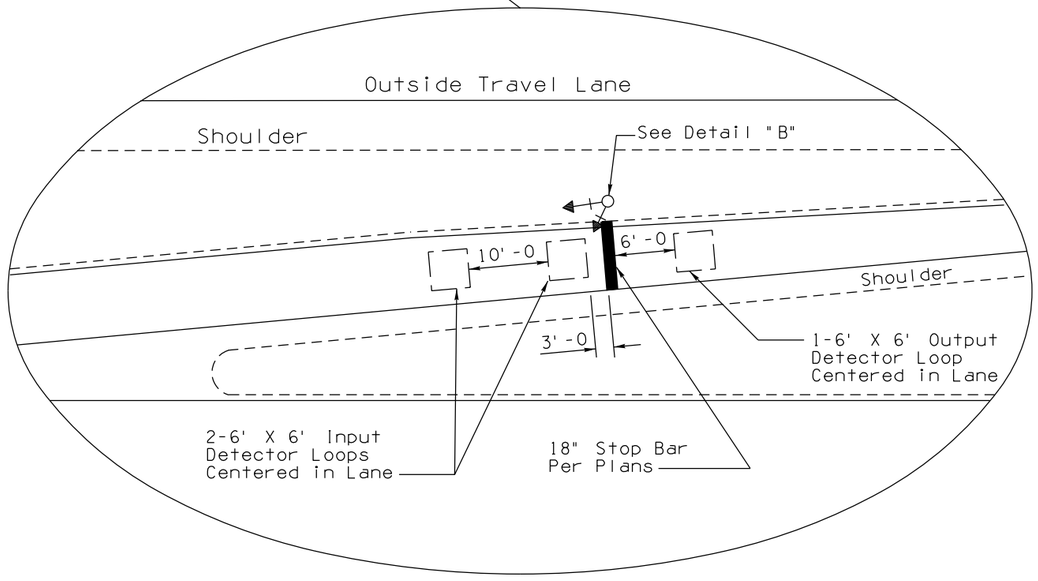
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | SINGLE-LANE RAMP METER — DRAWING NO. FM 6.02 |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | |



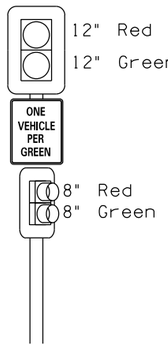




NOTES:

1. For Conduit and Pull Box Layout, See Plan Sheets.
2. If Poles Can Not be Located Outside the Clear Zone for the Freeway, Breakaway Bases Shall be Used.
3. Minimum Clear Zones Shall be Determined from the AASHTO Roadside Design Guide.
4. Permanently Mark Into Shoulder/ Curb the Downstream Edge of Downstream Input Loop for Proper Stop Bar Location.


W3-8

Detail "A"




R10-28

Detail "B"

Note to Designer:
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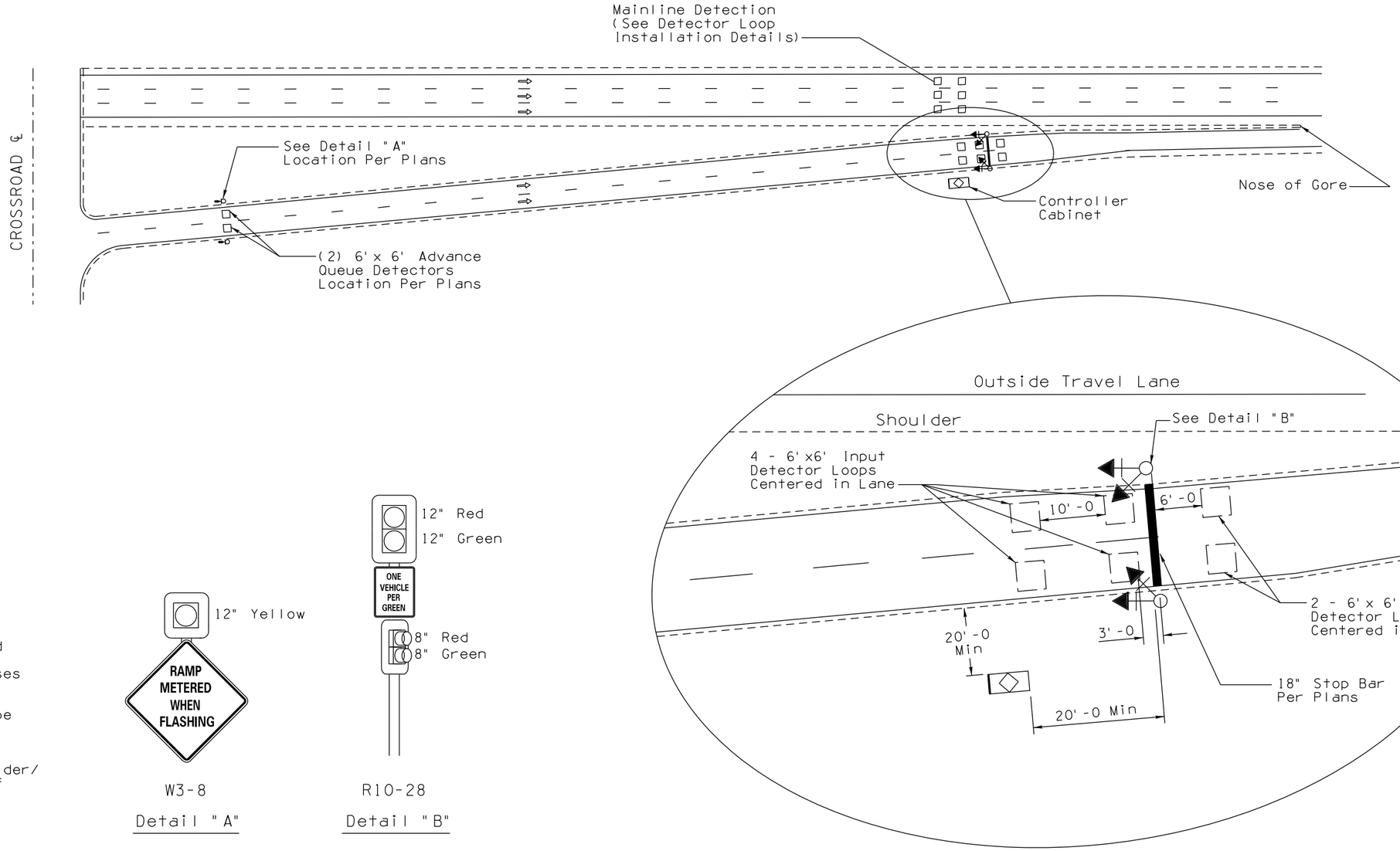
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | SINGLE-LANE RAMP METER WITH FRONTAGE ROAD |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | DRAWING NO.<br>FM 6.03 |




NOTES:

1. For Conduit and Pull Box Layout, See Plan Sheets.
2. If Poles Can Not be Located Outside the Clear Zone for the Freeway, Breakaway Bases Shall be Used.
3. Minimum Clear Zones Shall be Determined from the AASHTO Roadside Design Guide.
4. Permanently Mark Into Shoulder/ Curb the Downstream Edge of Downstream Input Loop for Proper Stop Bar Location.




W3-8

Detail "A"




R10-28

Detail "B"



| PRIOR DISTRIBUTION DATE | 08/13 |
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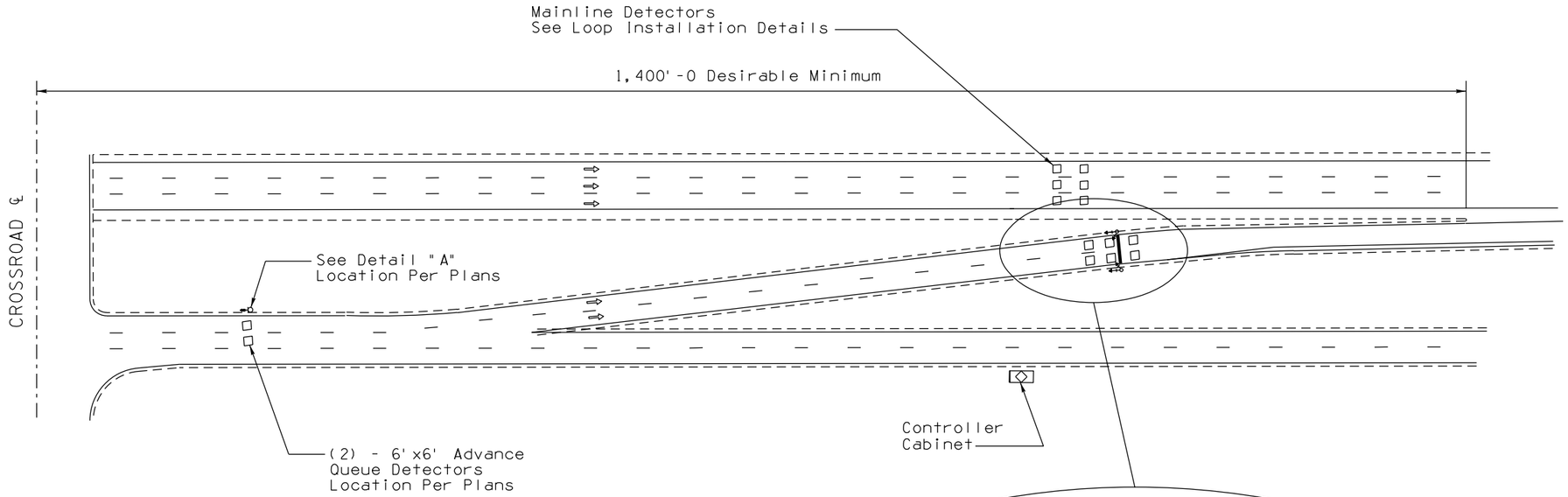
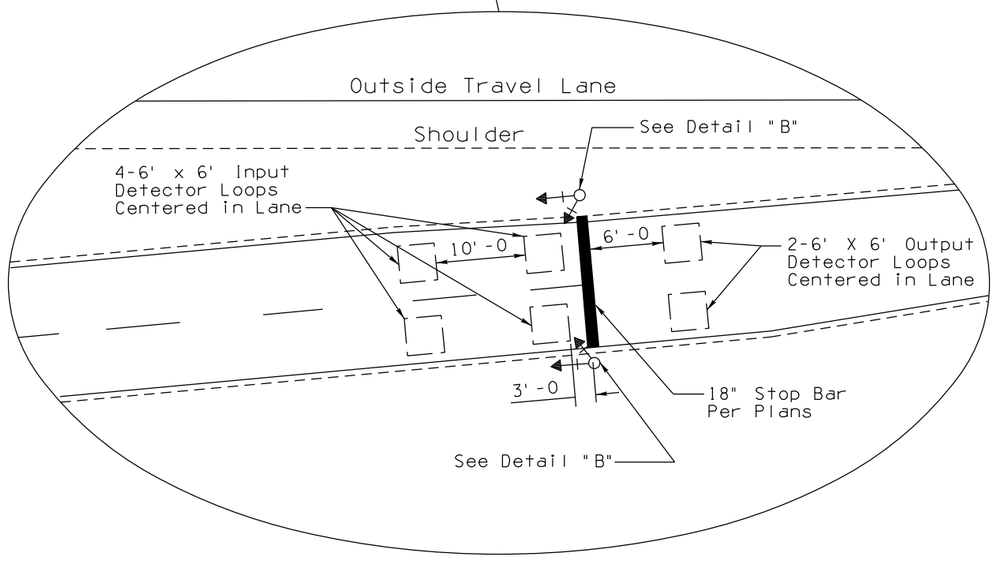
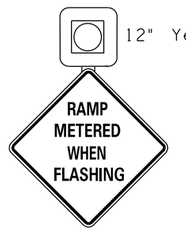
| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>**ITS STANDARD DRAWINGS** |
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | TWO-LANE RAMP METER — DRAWING NO. FM 6.04 |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | |



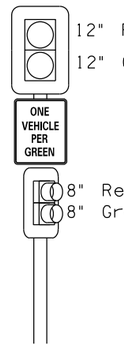

NOTES:

1. For Conduit and Pull Box Layout, See Plan Sheets.
2. If Poles Can Not be Located Outside the Clear Zone for the Freeway, Breakaway Bases Shall be Used.
3. Minimum Clear Zones Shall be Determined from the AASHTO Roadside Design Guide.
4. Permanently Mark Into Shoulder/ Curb the Downstream Edge of Downstream Input Loop for Proper Stop Bar Location.




W3-8

Detail "A"




R10-28

Detail "B"

Note to Designer:
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| PRIOR DISTRIBUTION DATE | 08/13 |
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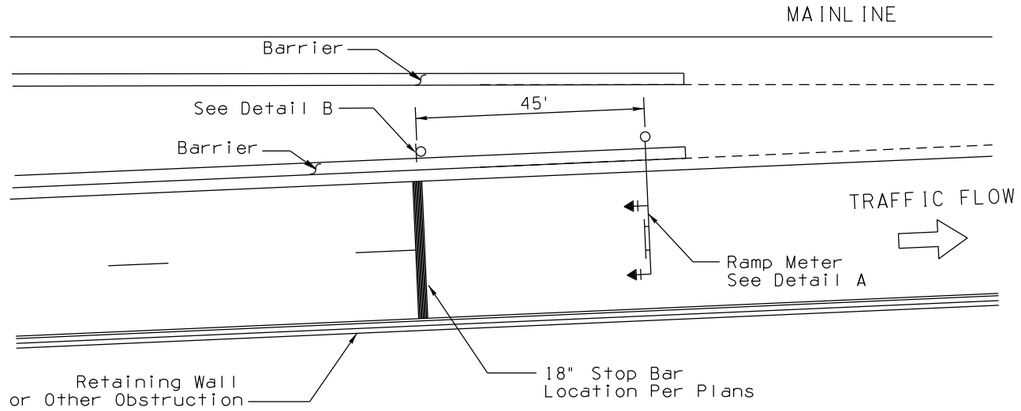
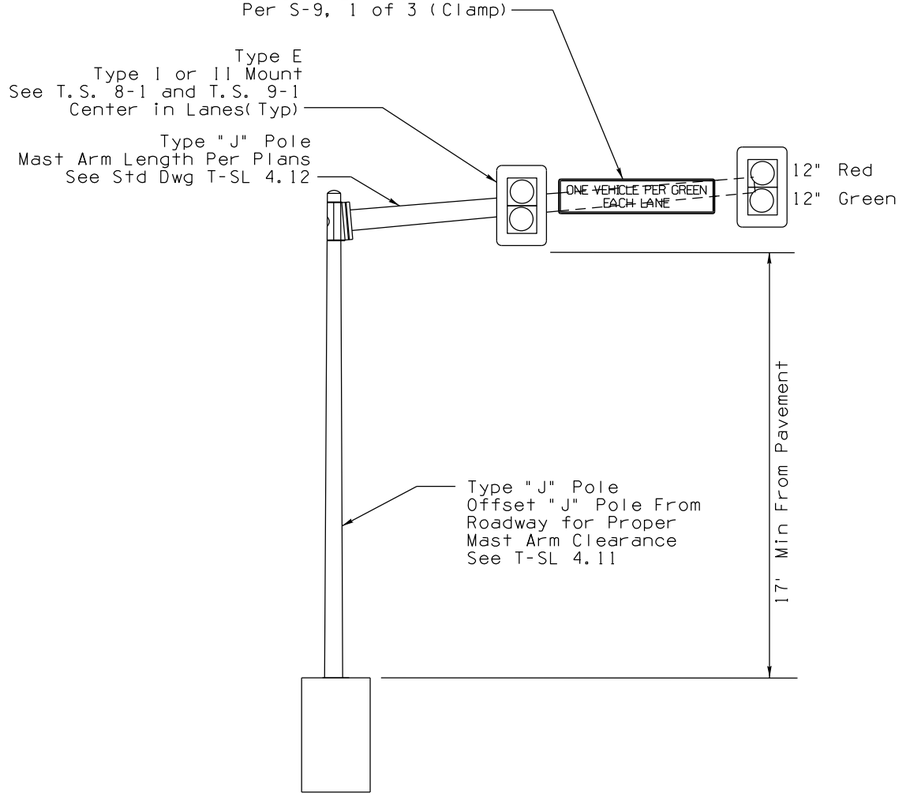
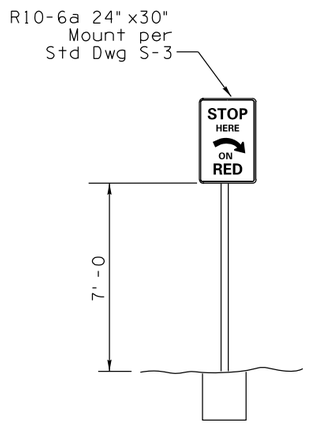
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | TWO-LANE RAMP METER<br>WITH FRONTAGE ROAD — DRAWING NO. FM 6.05 |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | |




DETAIL A




DETAIL B

NOTES:

1. This detail applies to a typical 2-lane ramp meter where side-mounting the ramp meter is not possible, conditions may vary, see plans for details of each location
2. See FM 6.01 for other ramp meter details not shown.
3. Cabinet not protected by guardrail or barrier shall be located outside of the clear zone (see FM-3.17). Ramp meter signal indications facing traffic shall be visible from the cabinet. Exact cabinet location to be determined by the contractor, with the approval of the engineer. The contractor shall mark proposed cabinet location at least 48 hours prior to foundation excavation.
4. The contractor shall mark proposed stop bar location at least 48 hours prior to loop detector installation or pole foundation excavation. The engineer will field review the proposed location prior to starting construction.



| PRIOR DISTRIBUTION DATE | 08/13 |
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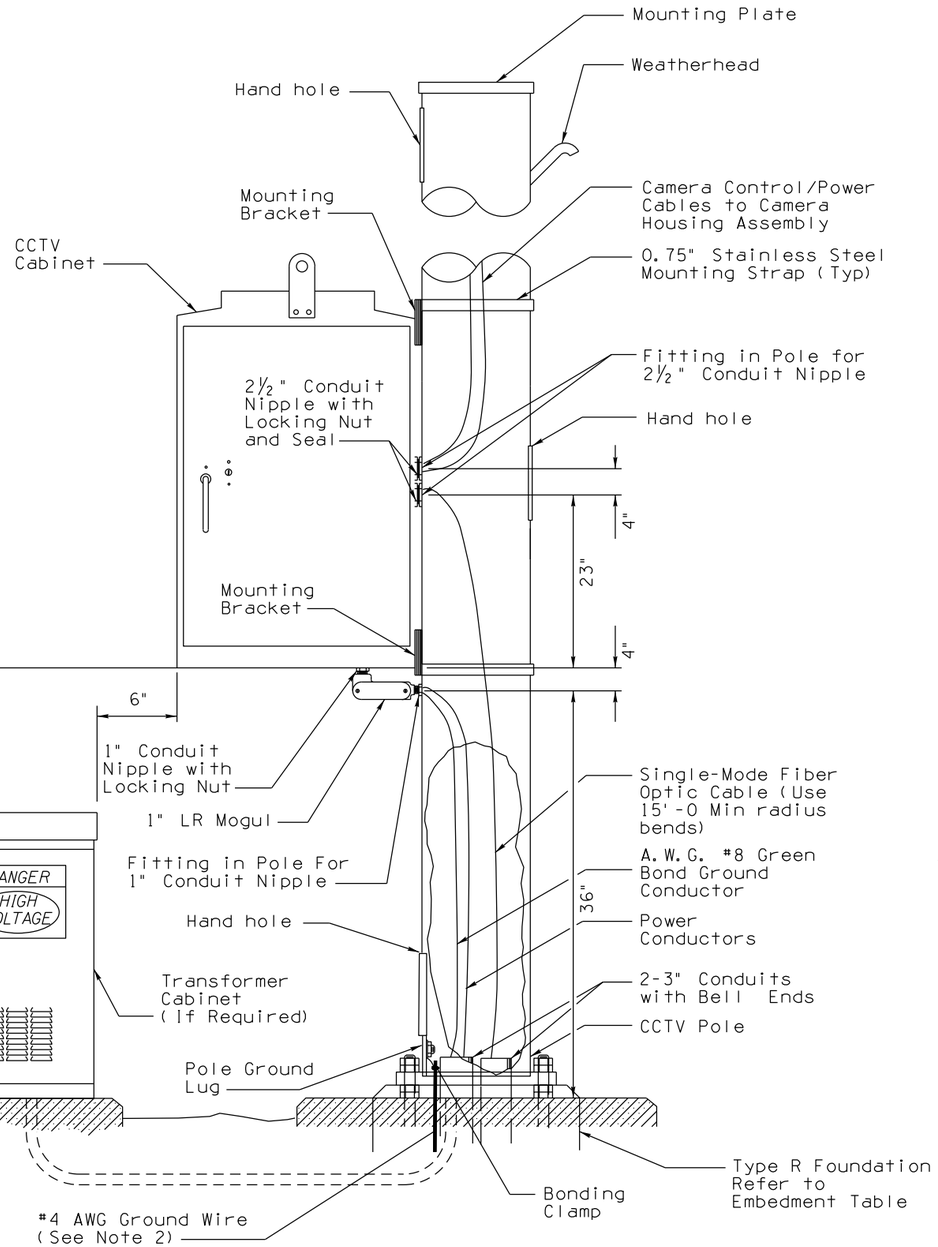
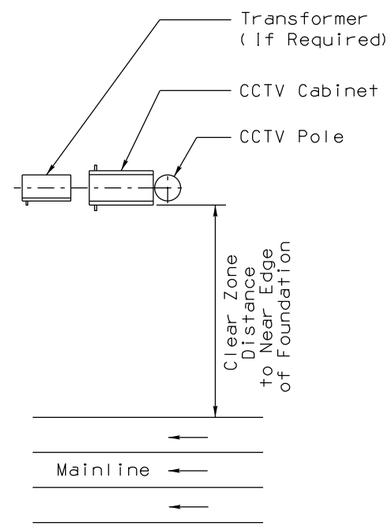
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | RAMP METER WITH OBSTRUCTION INSTALLATION DETAILS |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | DRAWING NO.<br>FM 6.06 |




TYPE 343 MOUNTING DETAILS
AND FIELD ORIENTATION




ORIENTATION - PLAN VIEW

NOTES:

1. Anchor bolts shall project 3" above the foundation.
2. A 25 foot Coil of No. 4 AWG bare Copper conductor shall be installed before concrete is poured, and connected to pole grounding screw in hand hole.
3. Unstable soil may require deeper foundation.
4. Conduit holes in cabinet may be field drilled or factory drilled.
5. Top of drilled shaft foundation shall be within 6 Inches of the finished grade.
6. The Contractor shall furnish and install all mounting hardware.
7. Pipe nipples shall be installed on poles requiring Type 343 pole mounted cabinets. Threaded pipe nipples shall not extend more than 0.25 of an inch inside pole wall.

POLE DESIGN NOTE:

Pole and Associated Mounting Hardware shall be designed to support a 100 lbs. camera unit assembly with a 4 Square Feet projected wind area 2 Feet above the top of the Pole.

Pole shall be designed such that the deflection of the CCTV camera does not exceed 1 inch, in 30 mph winds or less.

Pole and associated hardware shall be designed for Ultimate Wind Loading of 90 MPH plus 30% Gust Factor.

Pole is similar to an ADOT T Pole (Std. TS-L 4.03), with top of pole modified per detail FM 7.03

| DRILLED SHAFT EMBEDMENT TABLE | |
|---|---|
| Level to 3:1 | 10'-0 |
| 2:1 | 12'-0 |
| 1:1 | 14'-0 |
| * See Note 5 | |

Note to Designer:
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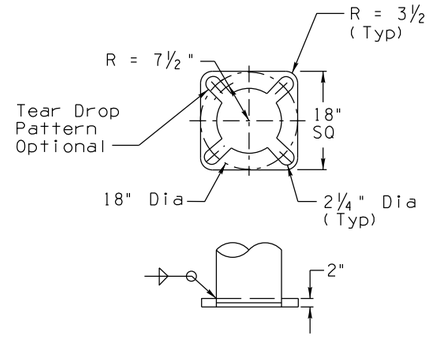
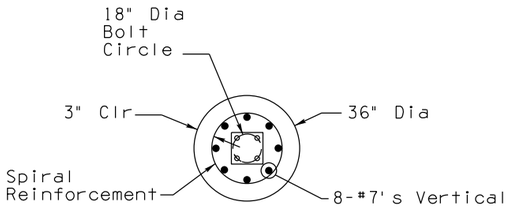
| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>**ITS STANDARD DRAWINGS** |
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | CCTV POLE<br>CCTV CABINET MOUNTING DETAILS<br>AND FIELD ORIENTATION |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | DRAWING NO.<br>FM 7.01 |



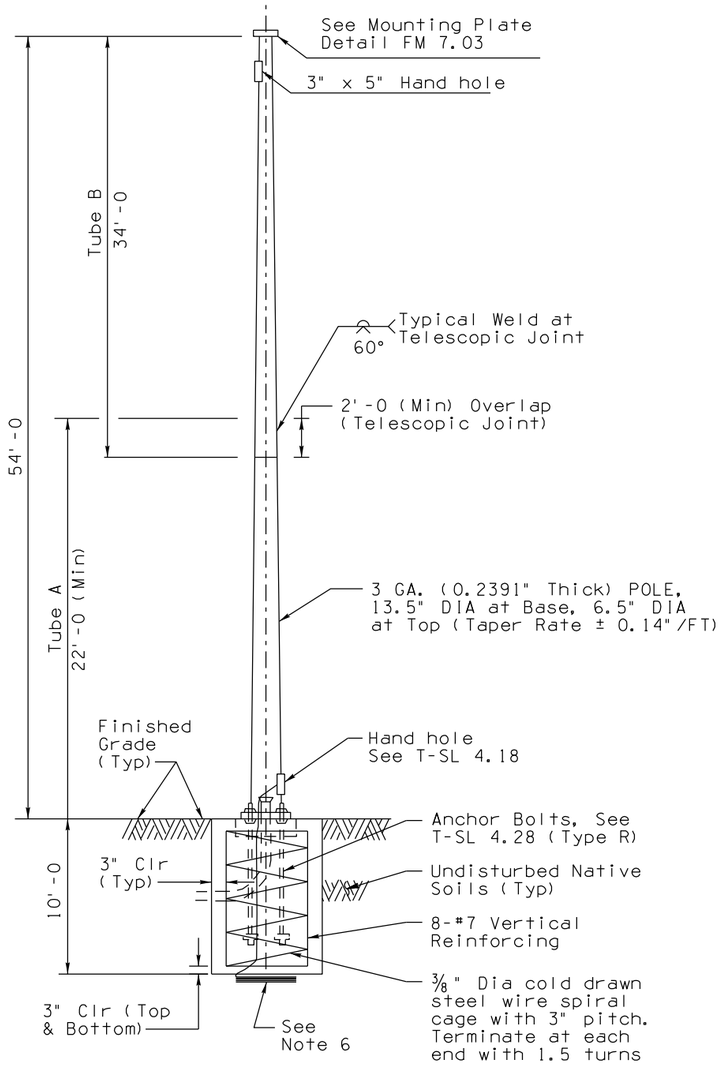

POLE BASE



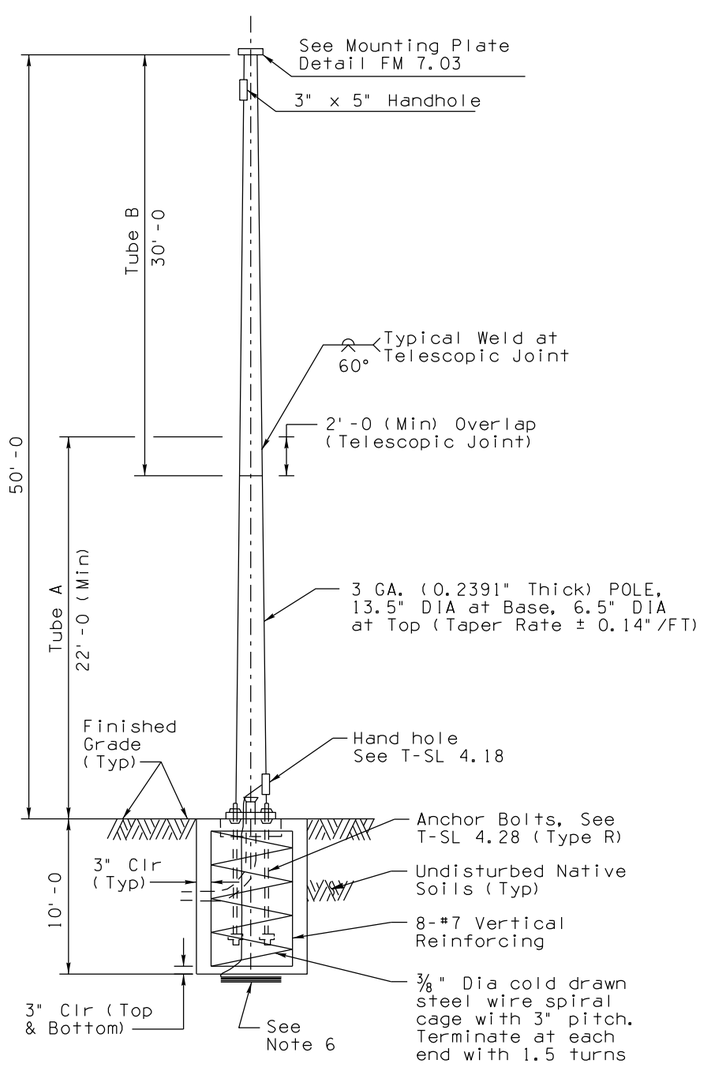

FOUNDATION SECTION

NOTES:

1. All Materials and Construction shall conform to the requirements of the Standard Specifications. Contractor shall provide shop drawings for poles, and all appurtenances to the Engineer for review.
2. Anchor Bolts shall project 3" above the foundation.
3. Conduit shall project a minimum of 2" above the foundation. Maximum projection shall be 4".
4. Block out for leveling nuts. See Standard Specifications for grout requirements.
5. Pole shall be installed with Hand hole on roadway side.
6. A 25 foot coil of No. 4 AWG Bare Copper Conductor shall be installed before the concrete is poured and connected to pole grounding screw in the hand hole.
7. The Foundation hole shall be augured and Class "S" (3,500 psi) concrete poured against undisturbed native soil. Reinforcing steel shall be ASTM A615, Grade 60, and the spiral reinforcing shall conform to AASHTO M336, Minimum Tensile Strength = 60 Ksi.
8. Pole shall comply with the Loading Requirements of the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) with 2015 Interim Revisions. Pole is designed for maximum area of 2 SF for CCTV & Assembly shown. Pole is designed for 1 inch maximum deflection at the top for 30 mph Non-Gust wind.
9. All dimensions are nominal.




54' CCTV CAMERA POLE AND FOUNDATION




50' CCTV CAMERA POLE AND FOUNDATION

Note to Designer:
The information presented in this Standard Drawing has been prepared in accordance with recognized engineering principles and is intended for use by competent professional engineers for specific application without further professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

| PRIOR DISTRIBUTION DATE | 08/13 |
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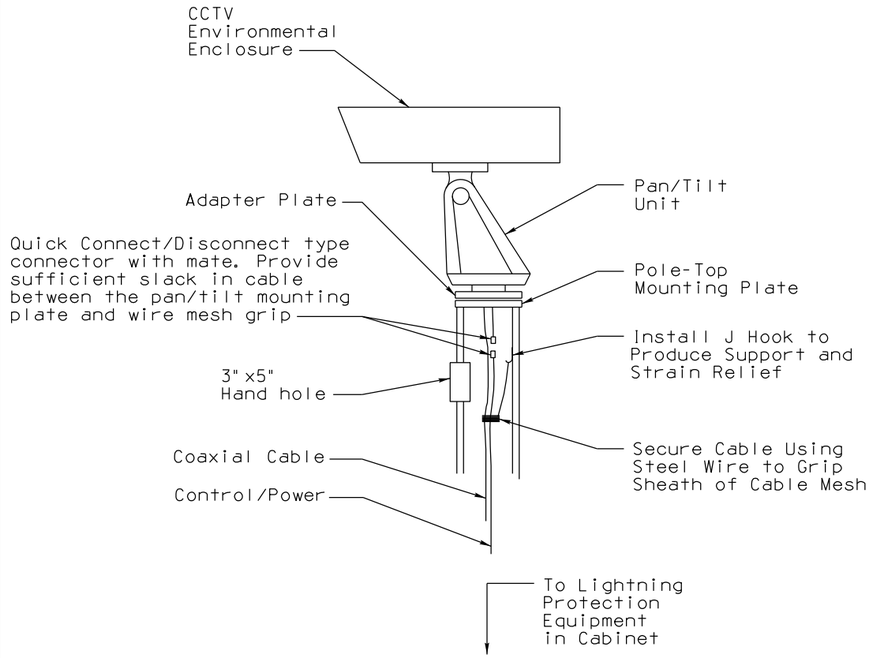
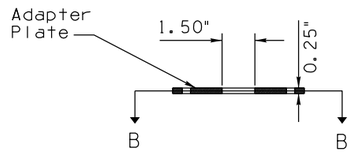
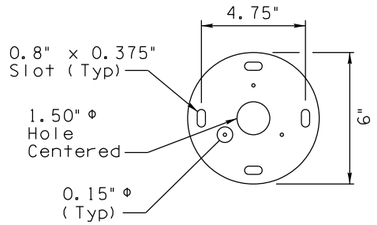
| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>**ITS STANDARD DRAWINGS** |
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | CCTV POLE AND MOUNTING DETAILS |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 DATE | DRAWING NO.<br>FM 7.02 |



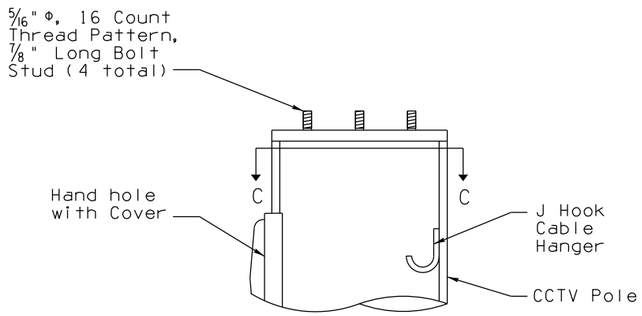

CCTV CAMERA AND
TILT/PAN UNIT MOUNTING



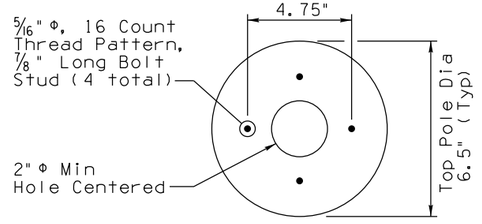

ADAPTER PLATE DETAIL



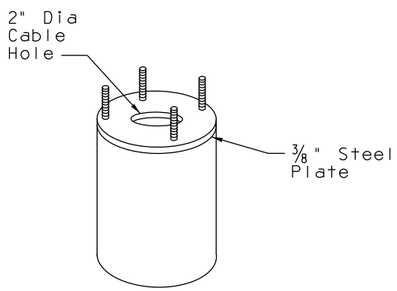

SECTION B-B




POLE-TOP
MOUNTING PLATE DETAIL




SECTION C-C




POLE-TOP
MOUNTING PLATE

NOTE:
Adapter Plate is contractor furnished to match CCTV bolt pattern

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| STANDARDS ENGINEER<br>D. RILEY<br>RECOMMENDED FOR APPROVAL | ARIZONA DEPARTMENT OF TRANSPORTATION<br>TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS<br>**ITS STANDARD DRAWINGS** |
| GROUP MANAGER<br>S. ANDERSON<br>APPROVED | CCTV POLE MOUNTING<br>PLATE DETAILS — DRAWING NO. FM 7.03 |
| STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/19 (DATE) | |