

TM400 Series: Signals

- TM450 – Mast Arm Pole Details
- TM452 – Temporary Wood Strain Pole Details
- TM453 – Temporary Pedestrian Wood Post, Guy Wire/Anchor, & Luminaire Arm Details
- TM454 – Temporary Controller Cabinet, Service Cabinet, Meter Base, & Terminal Cabinet
- TM456 – Temporary Spanwire Mounting Details For Vehicle Signals, Signs & Fire Preemption
- TM457 – Pedestal Foundation and Traffic Signal Assembly
- TM460 – Vehicle Signal Details
- TM462 – Vehicle Signal Bracket & Sign Bracket (Type B) Details
- TM466 – Radar Mounting Details
- TM467 – Pedestrian Signal Mount and Pedestrian Pushbutton Details
- TM470 – Wire & Cable Installation
- TM471 – Trenching & Conduit Installation
- TM472 – Junction Boxes/Hand Holes
- TM482 – Controller Cabinet & Service Cabinet Foundation Details
- TM485 – Service Cabinet Wiring Details
- TM492 – Ramp Meter Assemblies
- TM493 – Rectangular Rapid Flashing Beacon (RRFB) Assemblies

TM600 Series: Sign, Illumination, and Signal Support Structures

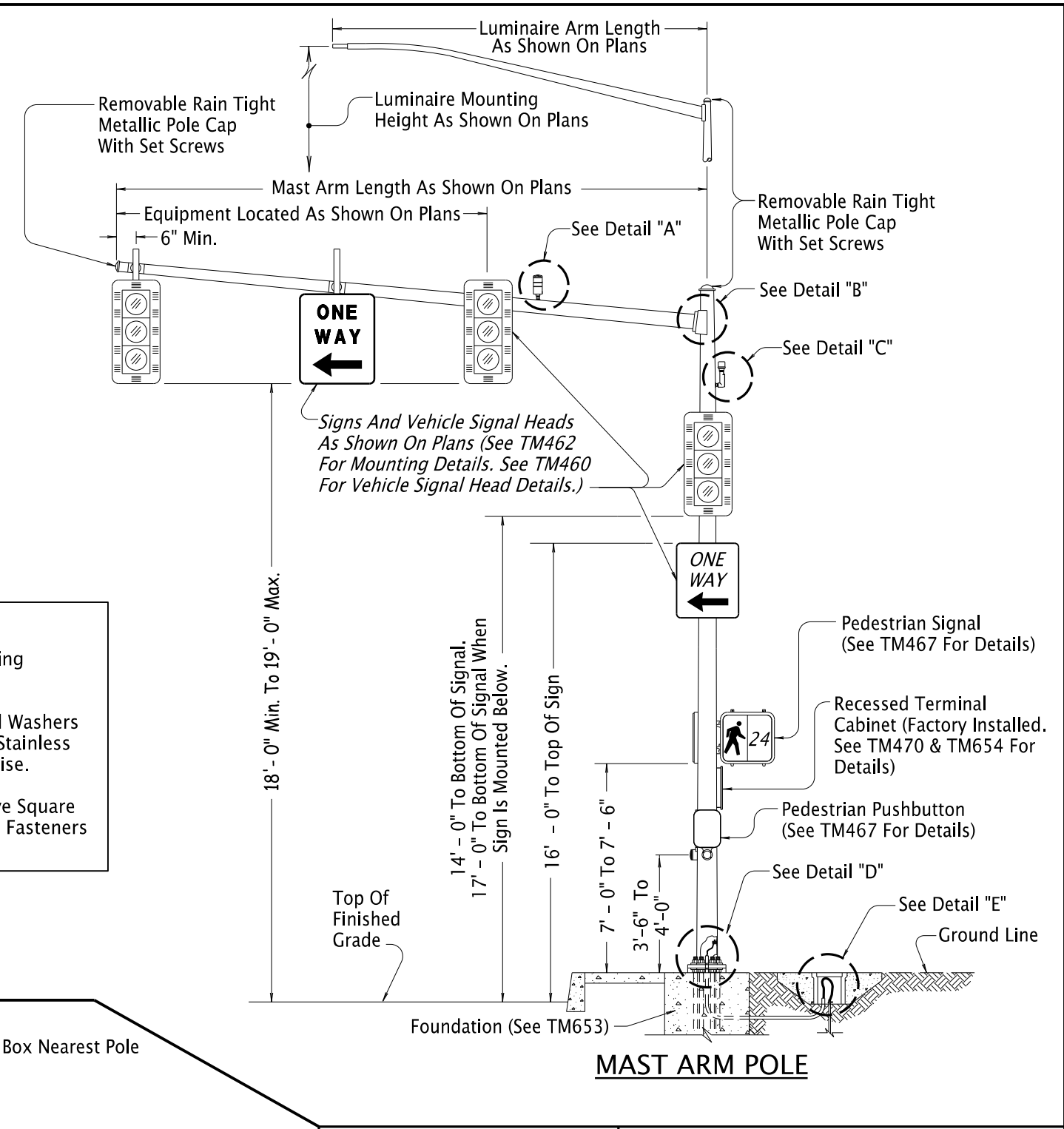
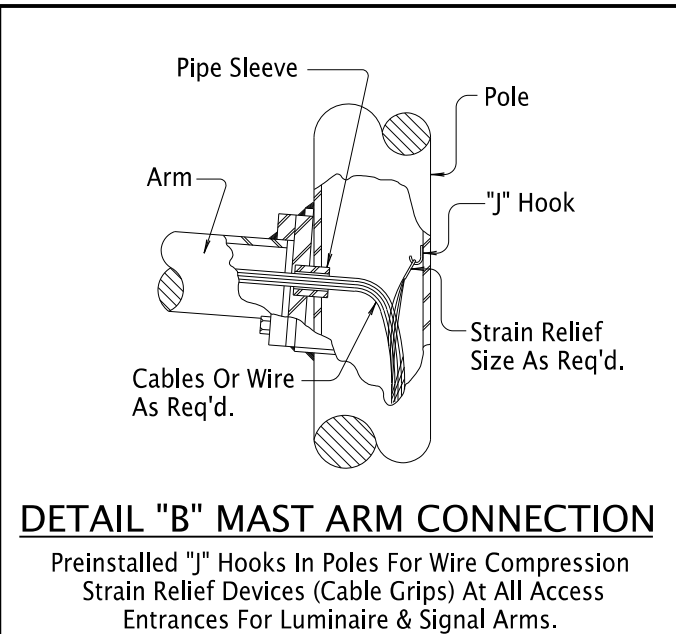
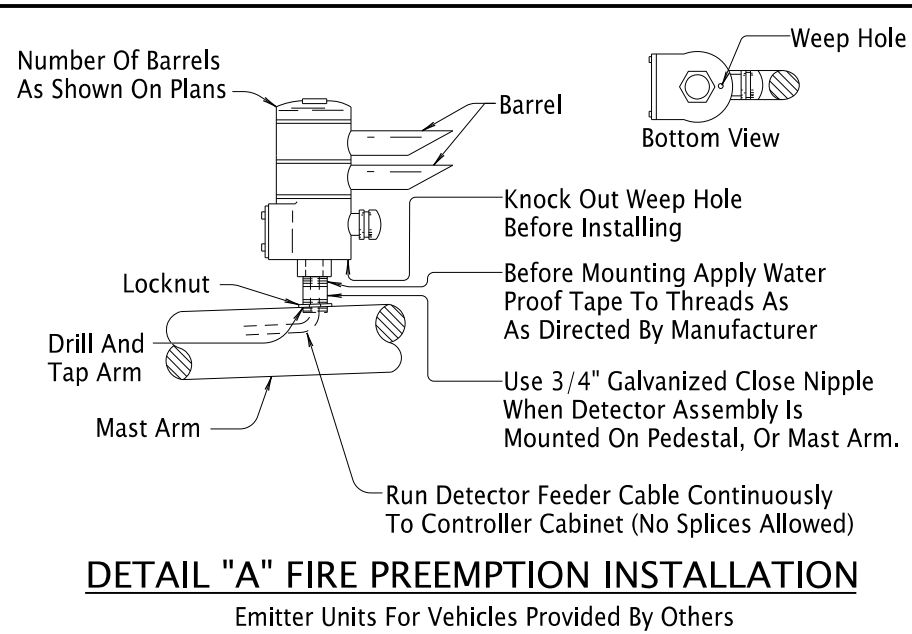
- TM650 – Traffic Signal Supports General Details & Design Criteria
- TM651 – Traffic Signal Supports Notes and Reactions
- TM652 – Traffic Signal Supports Steel Details
- TM653 – Traffic Signal Supports Foundation Requirements
- TM654 – Traffic Signal Pole Recessed Terminal Cabinet
- TM655 – Traffic Signal 60' through 75' Mast Arm Supports General Details & Design Criteria
- TM656 – Traffic Signal 60' through 75' Mast Arm Supports Notes
- TM657 – Traffic Signal 60' through 75' Mast Arm Supports Steel Details (SH. 1)
- TM658 – Traffic Signal 60' through 75' Mast Arm Supports Steel Details (SH. 2)
- TM628 – Std. Monotube Sign/VMS Support Drilled Shaft Details (only used for 60' through 70' mast arms supports)

RD700 Series: Curbs, Islands, Sidewalks, and Driveways

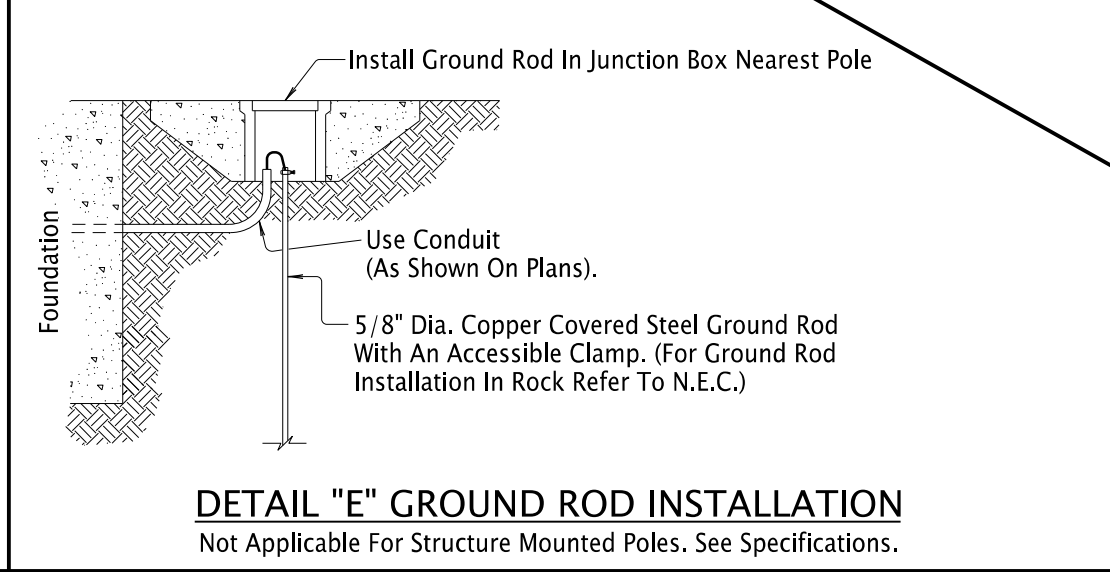
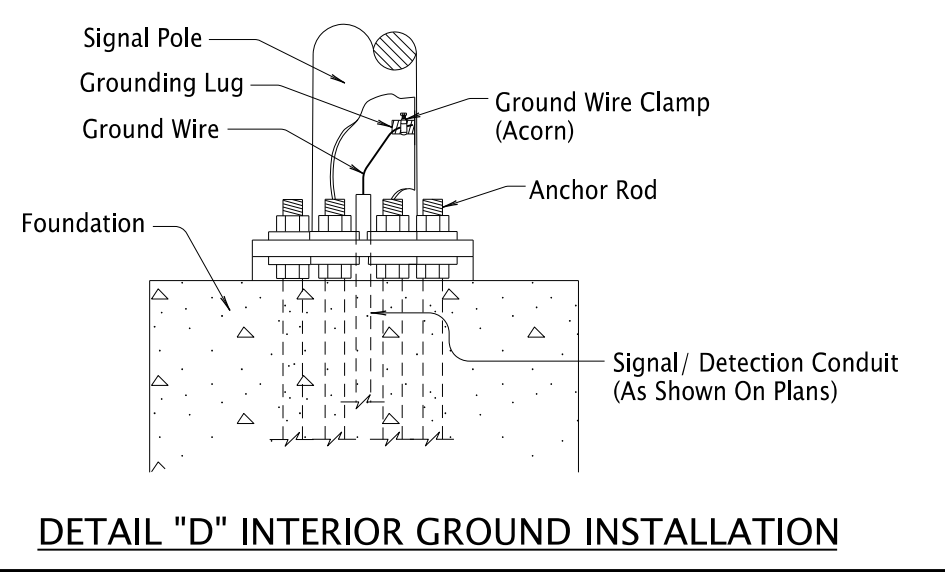
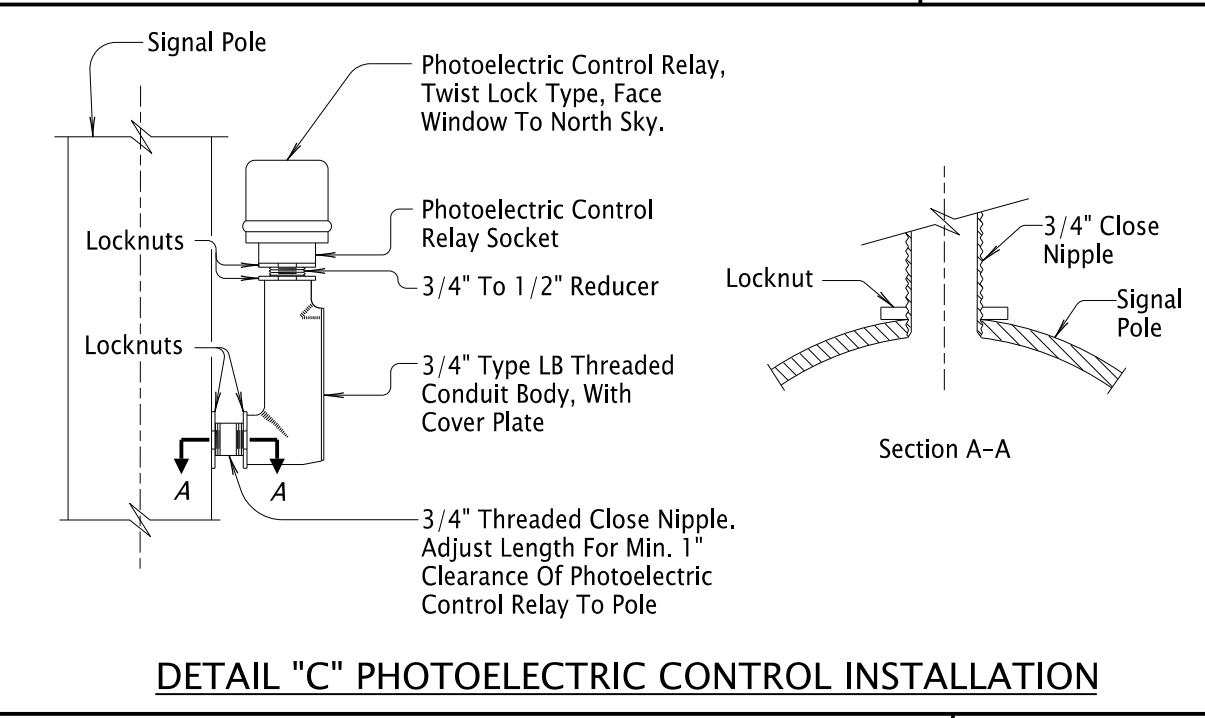
- RD720 – Curb Line Sidewalks

14-JUL-2023

TM450.dgn



- General Notes:**
1. All Pole Entrances Containing Wiring Shall Be Smooth.
 2. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
 3. Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.



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All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

MAST ARM POLE DETAILS

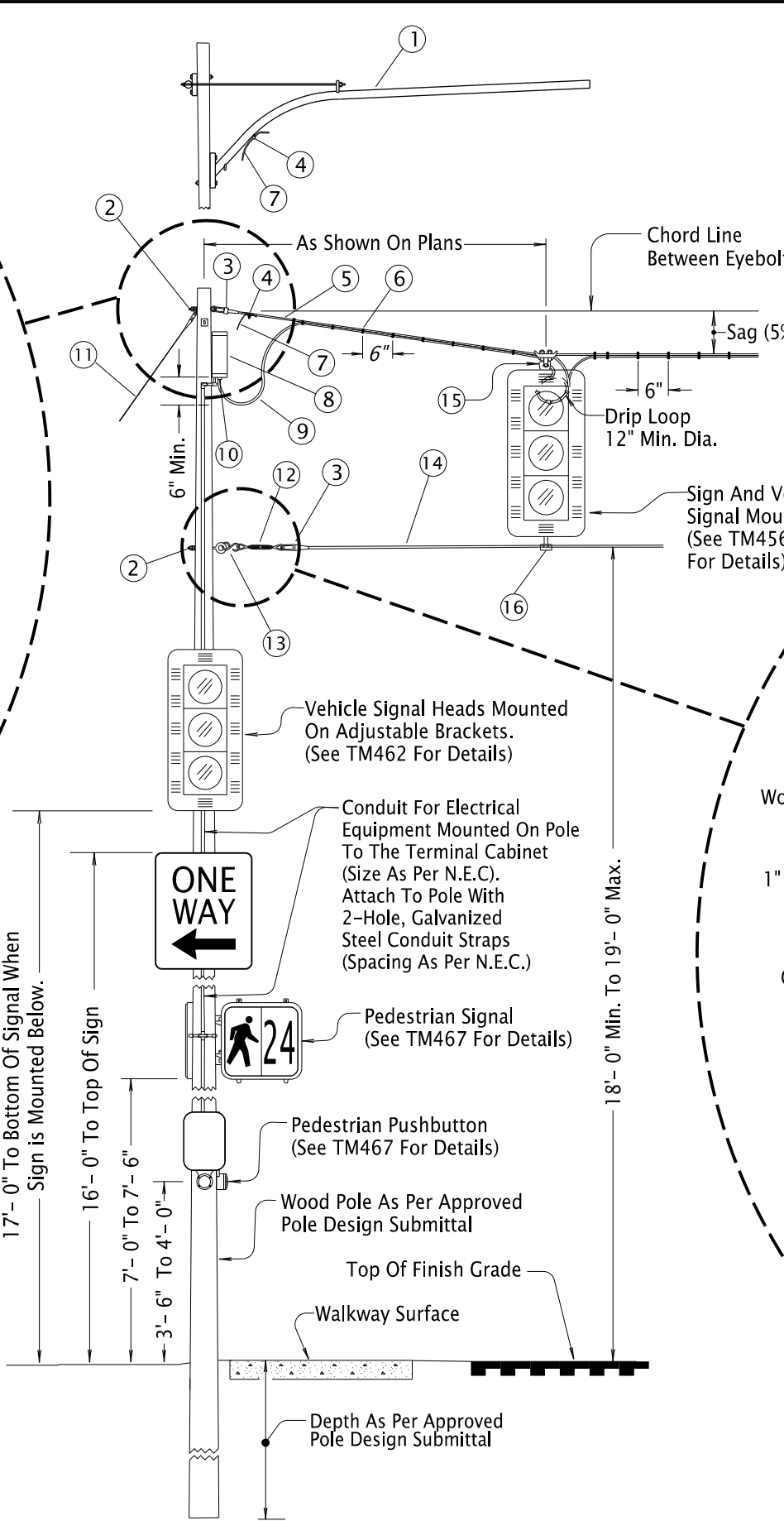
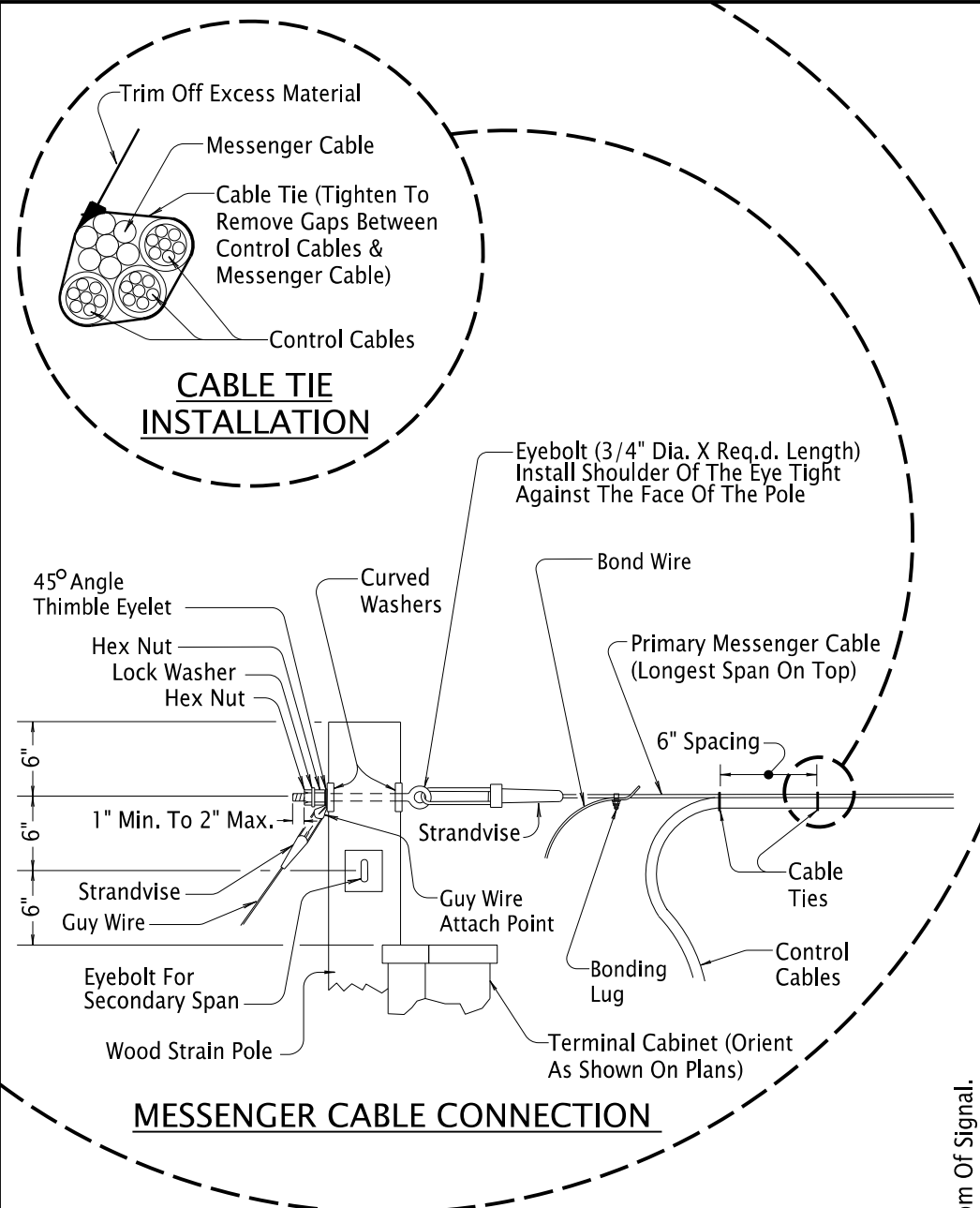
2024

DATE	REVISION DESCRIPTION
01-2021	CORRECTED STD. DWG. REFERENCE
07-2023	ADDED STD. DWG. REFERENCE

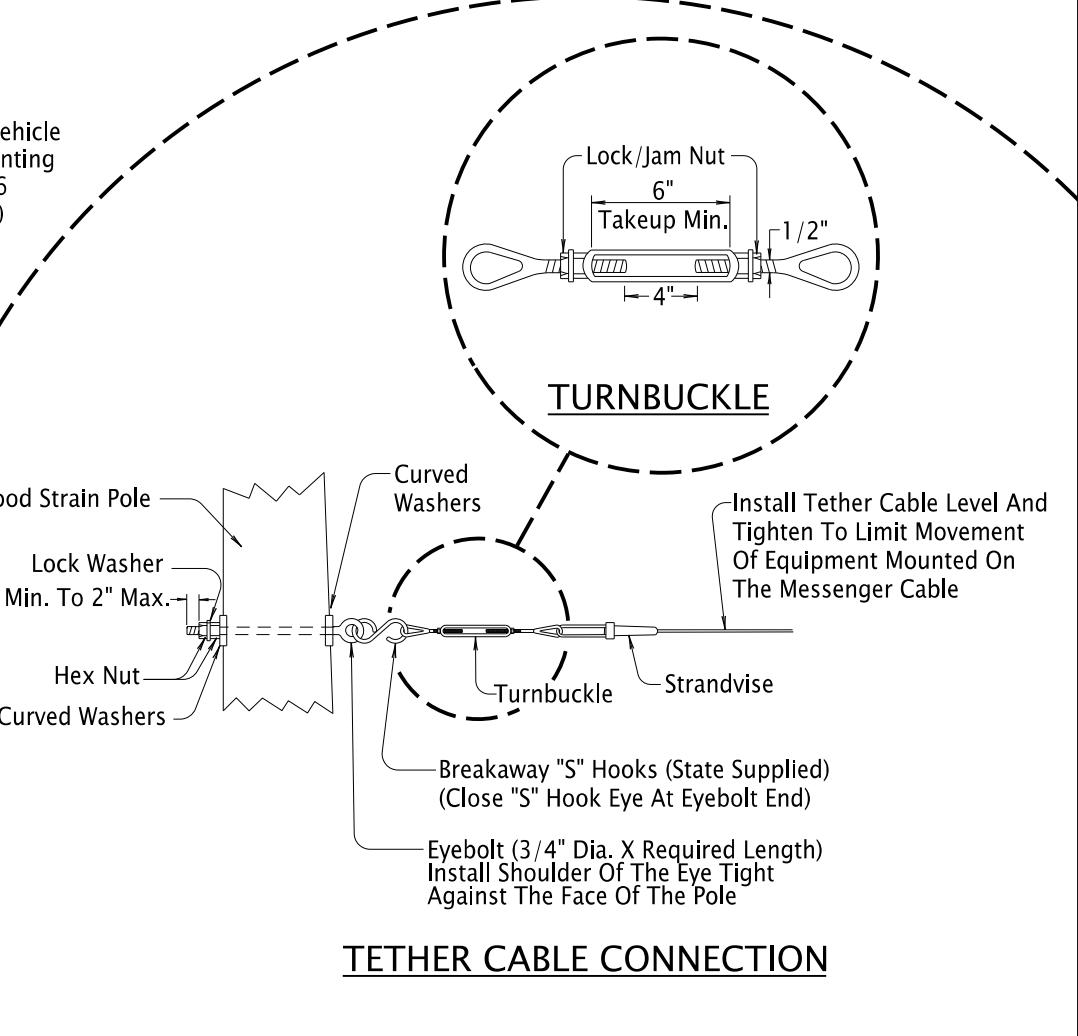
CALC. BOOK NO. ---	N/A ---	SDR DATE- 14-JUL-2023	TM450
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14-JUL-2023

TM452.dgn



- General Notes:**
1. The Bottom Of Signal Heads Shall Be At The Same Vertical Elevation Above The Roadway. Eyebolts For Span Need Not Be At The Same Elevation.
 2. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Or Galvanized Unless Noted Otherwise.
 3. Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
 4. Conduit Mounted On Wood Poles/Posts May Be Liquid Tight Flex Conduit.



LEGEND

- ① Luminaire Arm (See TM453 For Details)
- ② Eyebolt
- ③ Strandwise
- ④ Bonding Lug (See TM454 For Details)
- ⑤ Messenger cable
- ⑥ Cable Ties
- ⑦ Bond Wire (See TM454 For Details)
- ⑧ Terminal Cabinet (See TM454 For Details)
- ⑨ Control Cable
- ⑩ Watertight Compression Entrance Fitting
- ⑪ Guy Wire (See TM453 For Details)
- ⑫ Turnbuckle
- ⑬ "S" Hook (State Supplied)
- ⑭ Tether Cable
- ⑮ Spanwire Hanger (See TM456 For Details)
- ⑯ Tether Clamp (See TM456 For Details)

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OREGON STANDARD DRAWINGS

TEMPORARY WOOD STRAIN POLE DETAILS

2024

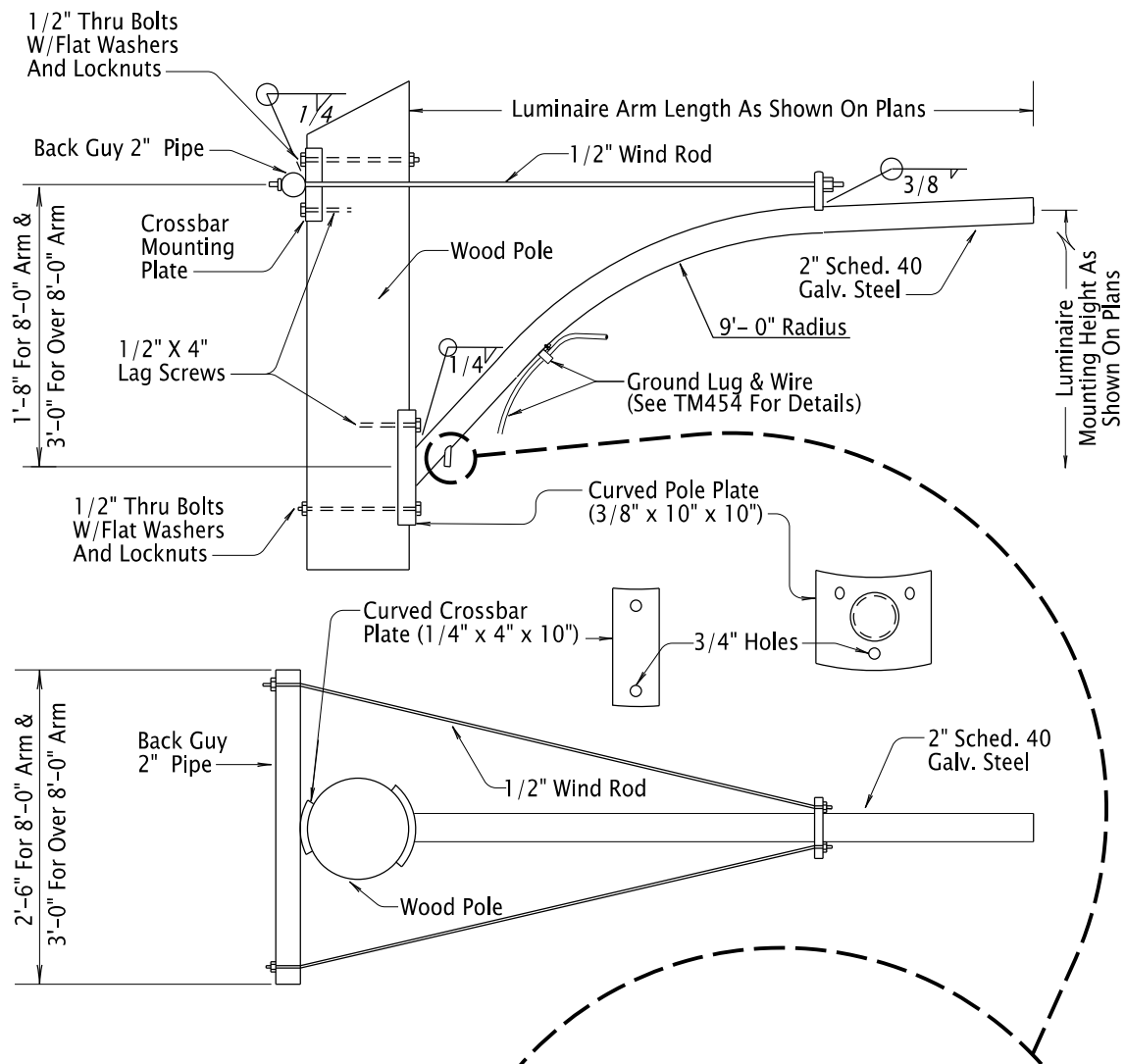
DATE	REVISION	DESCRIPTION
07-2023	ADDED POLE DESIGN SUBMITTAL INFO. CHANGED NOTE 2. DRAFTING CLEAN-UP.	

CALC. BOOK NO. ---	N/A ---	SDR DATE: 14-JUL-2023	TM452
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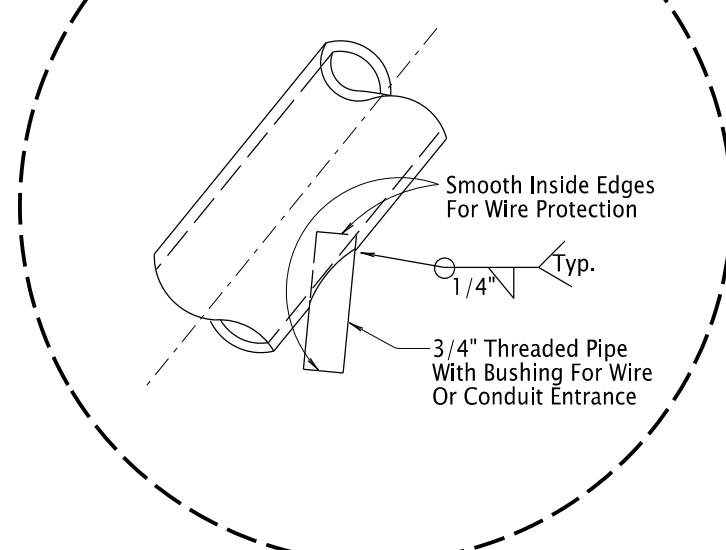
14-JUL-2023

TM453.dgn

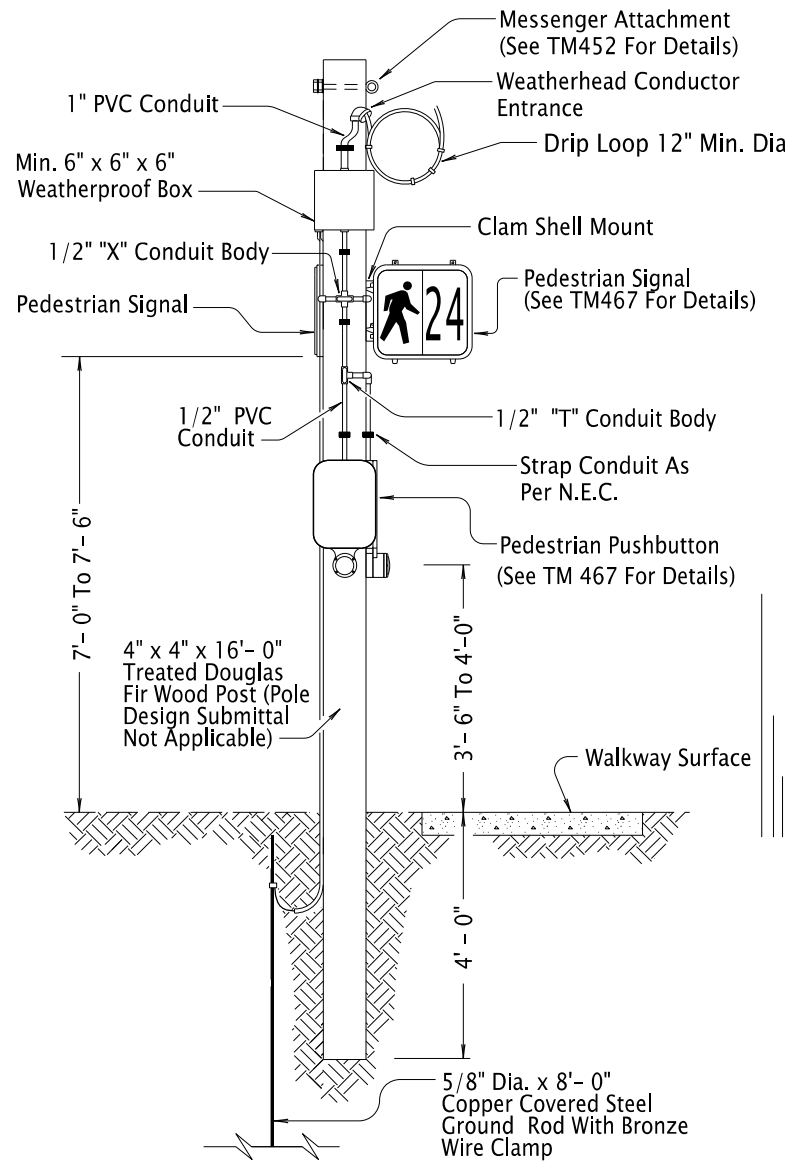
ARM LENGTH	LUM. MAX. WT.	MAX. PROJ. AREA
8'-0" thru 20'-0"	65 lbs.	2 sq. ft.



- NOTES:**
1. Bolts Shall Conform To ASTM Specification A307
 2. Steel Sheet And Plate Shall Be Merchant Quality
 3. All Structural Steel, Including Washers And Nuts, Shall Be Hot Dip Galvanized After Fabrication

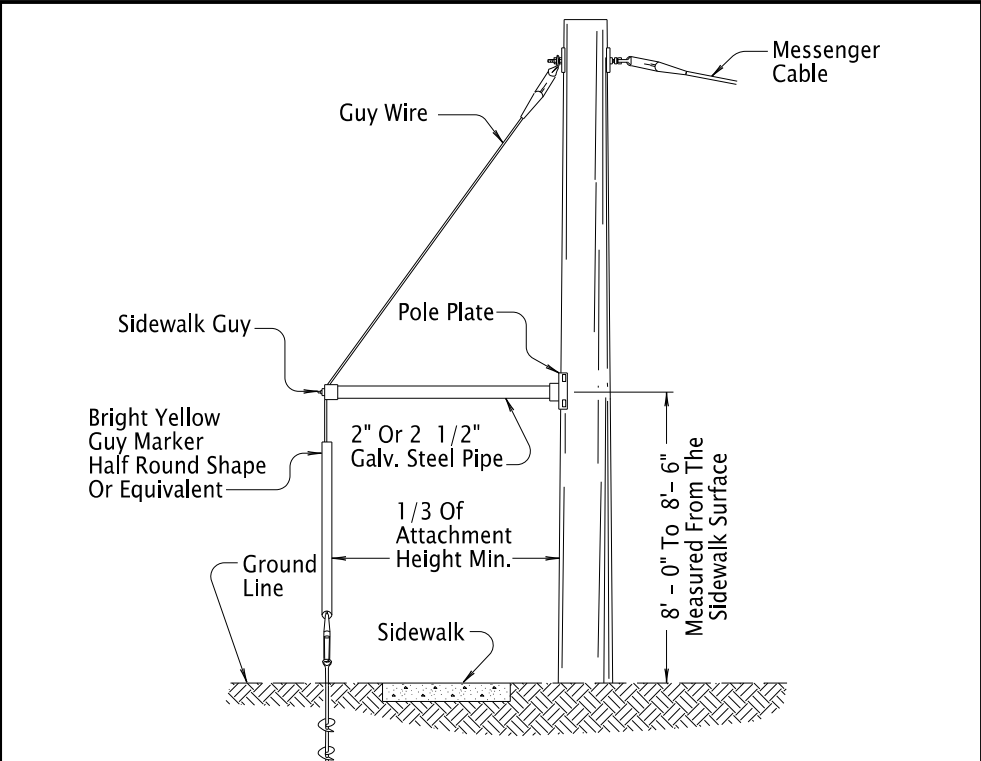


LUMINAIRE ARM INSTALLATION ON WOOD POLE

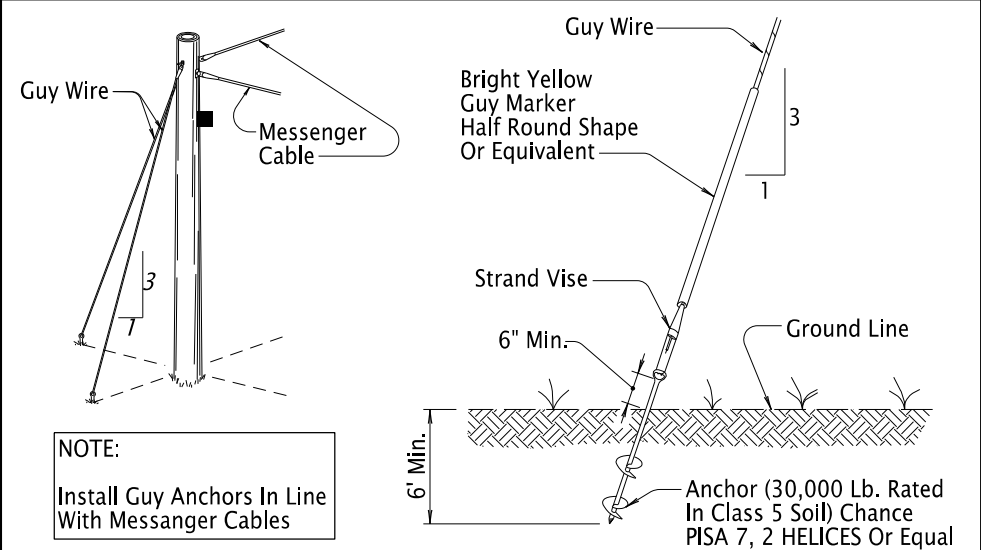


PEDESTRIAN WOOD POST INSTALLATION OVERHEAD CONDUCTORS

- GENERAL NOTES:**
1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 or 316 Stainless Steel Or Galvanized Unless Noted Otherwise.
 2. Bolts And Screws Shall Have Hex Or Square Heads. Allen Head Fasteners Not Allowed.
 3. Conduit Mounted On Wood Poles/Posts May Be Liquid Tight Flex Conduit.



TYPICAL SIDEWALK GUY ANCHOR ASSEMBLY
Install As Per Approved Pole Design Submittal



TYPICAL GUY ANCHOR ASSEMBLY
Install As Per Approved Pole Design Submittal

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All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS
TEMPORARY
PEDESTRIAN WOOD POST, GUY WIRE/ANCHOR, & LUMINAIRE ARM DETAILS
2024

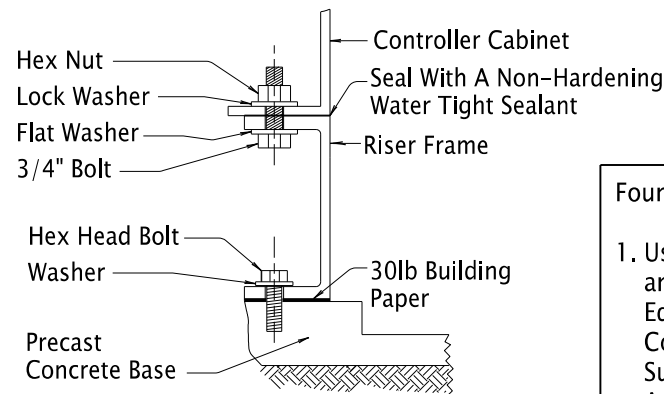
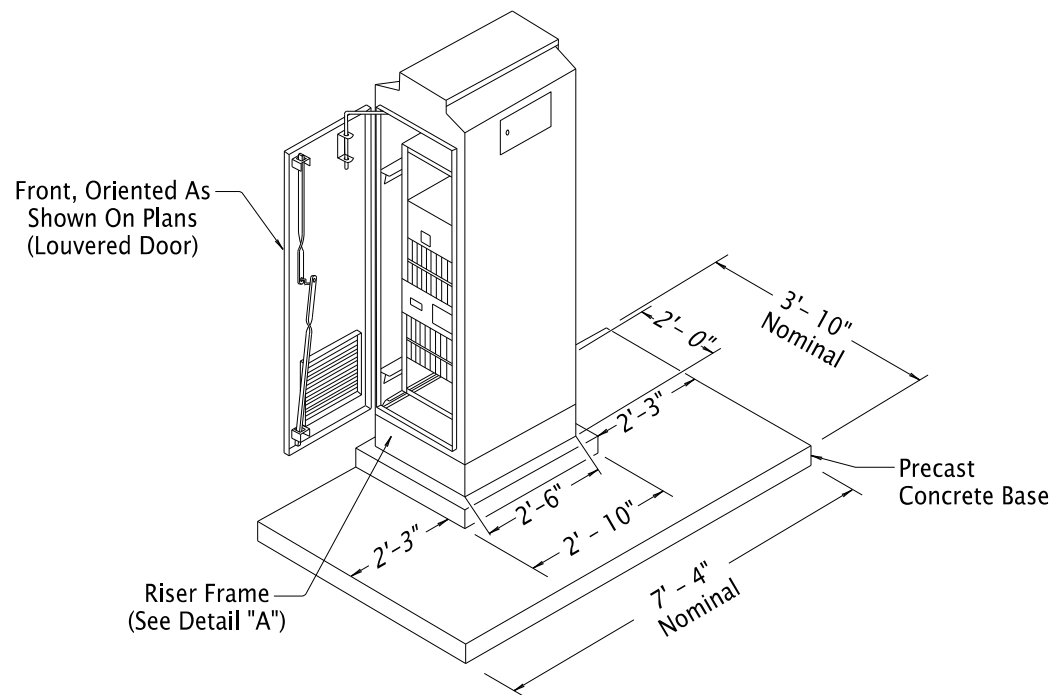
DATE	REVISION	DESCRIPTION
07-2023	ADDED POLE DESIGN SUBMITTAL INFO. ADDED POST INFO. CHANGED NOTE 1.	

CALC. BOOK NO. ---	N/A ---	SDR DATE- 14-JUL-2023	TM453
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Effective Date: December 1, 2023 – May 31, 2024

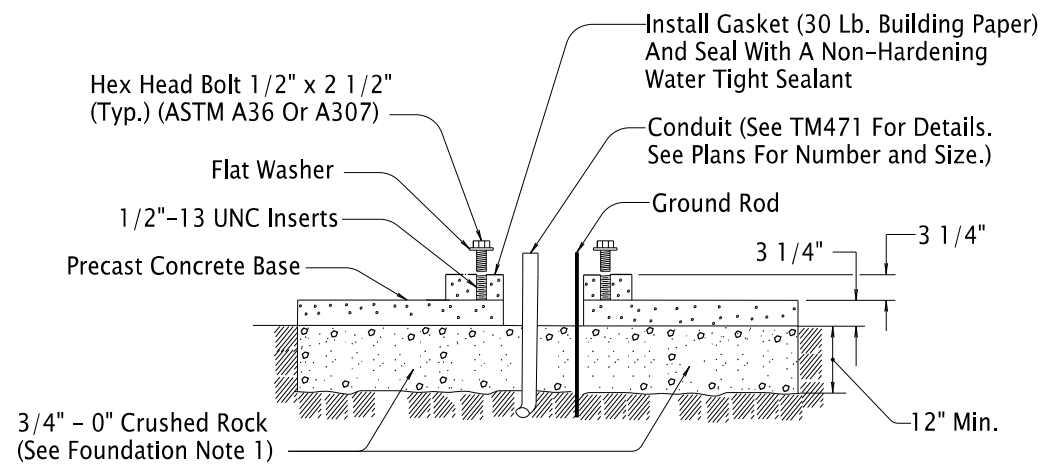
14-JUL-2023

TM454.dgn

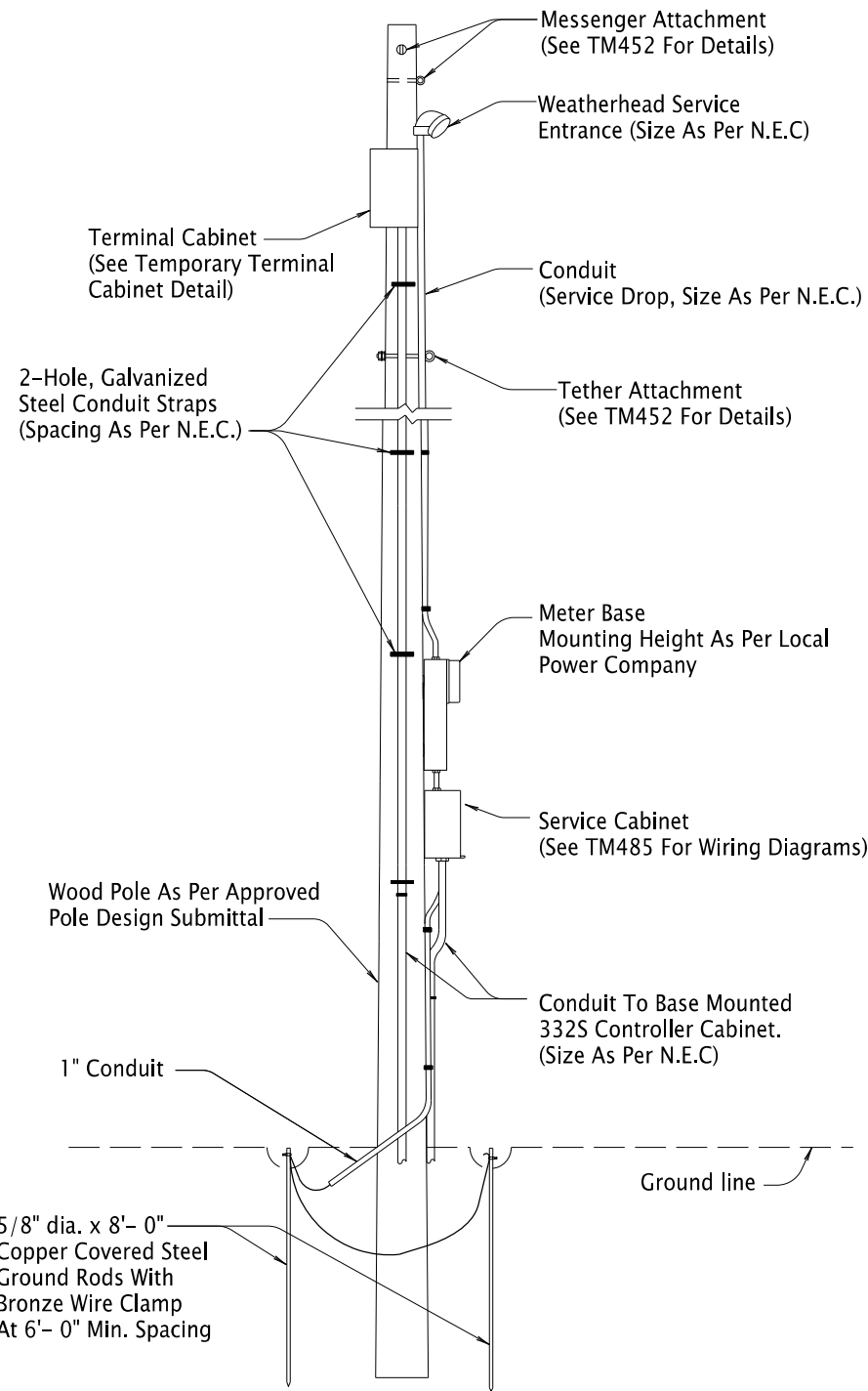


**DETAIL "A"
RISER FRAME CONNECTION**

Foundation Note:
1. Use Materials According To 00640.10 and 00640.16. Use Compaction Equipment Suitable For Area And Compact Each Six Inch Layer With Sufficient Coverages To Produce A Firm Unyielding Surface.



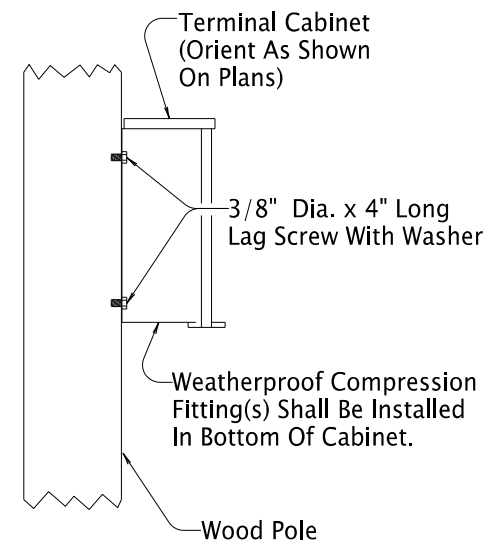
**TEMPORARY CONTROLLER CABINET FOUNDATION
(Model 332, 334, And 340 Cabinets)**



TEMPORARY SERVICE CABINET AND METER BASE

General Notes:

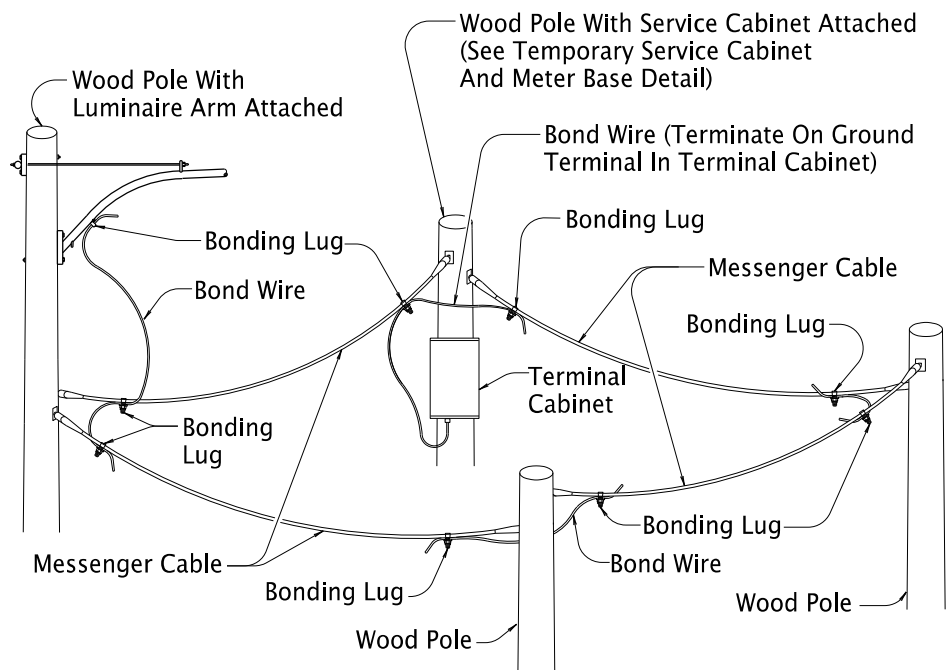
1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Or Galvanized Unless Noted Otherwise.
2. Bolts And Screws Shall Have Hex Or Square Heads. Allen Head Fasteners Not Allowed.
3. Conduit Mounted On Wood Poles/Posts May Be Liquid Tight Flex Conduit.



TEMPORARY TERMINAL CABINET

Terminal Cabinet General Notes:

1. Install The Number Of Terminal Blocks Needed For The Circuits. Evenly Distribute All The Terminal Blocks Among The Mounting Brackets.
2. Terminate Only One Wire In Each Termination Point. Use Additional Terminals With A Factory Jumper Between The Terminals If Additional Taps Are Necessary.
3. Label The Marking Strip In The Terminal Cabinet With The Wire Number And/OR Letter As Coded In The Controller Cabinet Terminal Block. Use Only Mechanically Printed Labels.



TEMPORARY GROUNDING/BONDING

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All materials shall be in accordance with the current Oregon Standard Specifications.

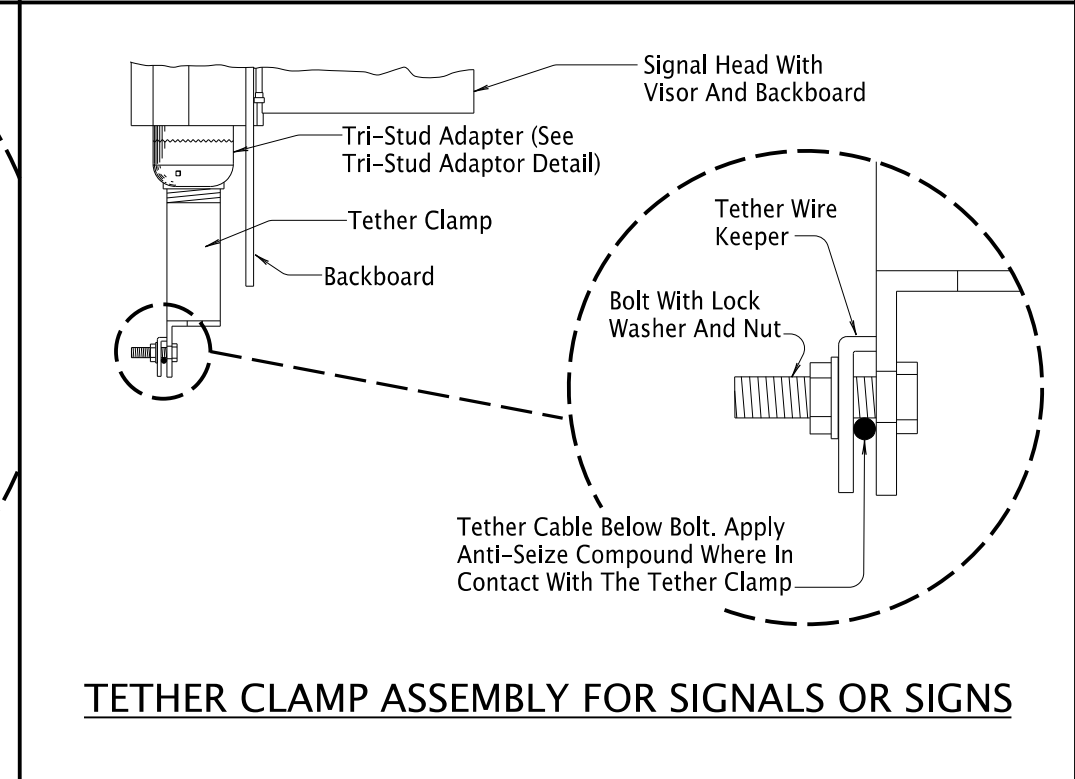
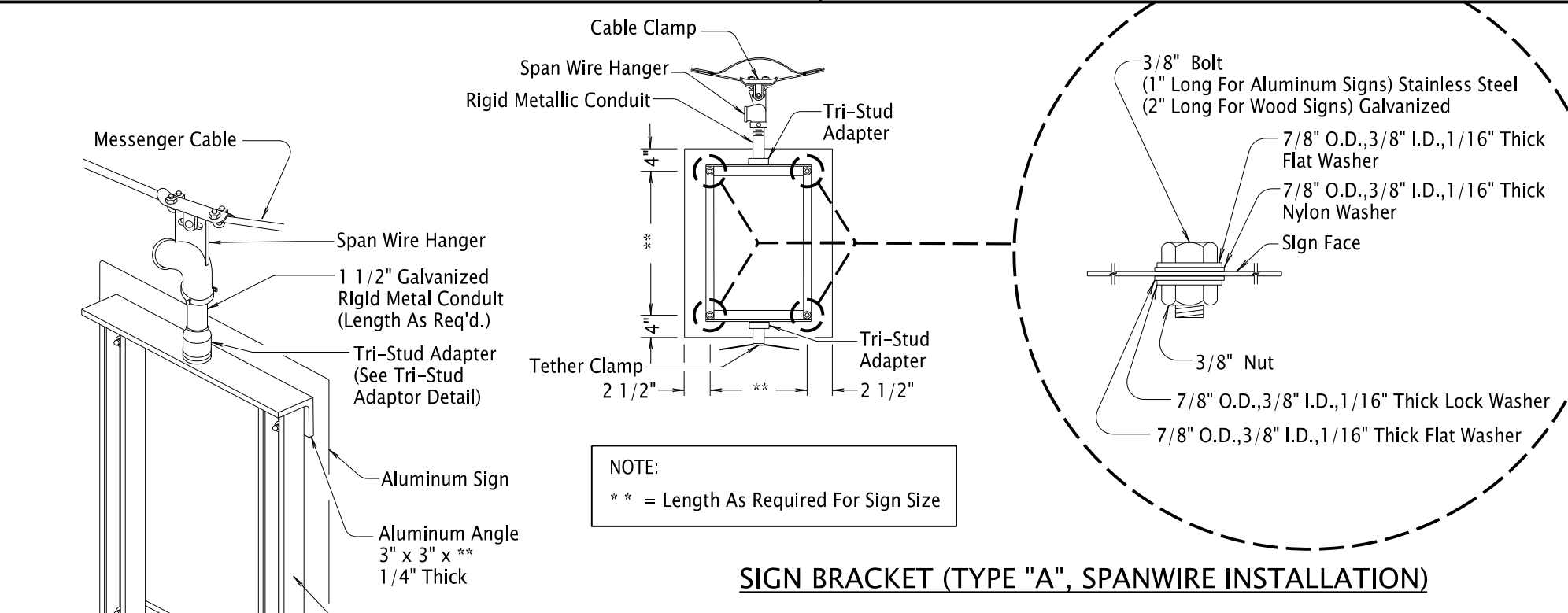
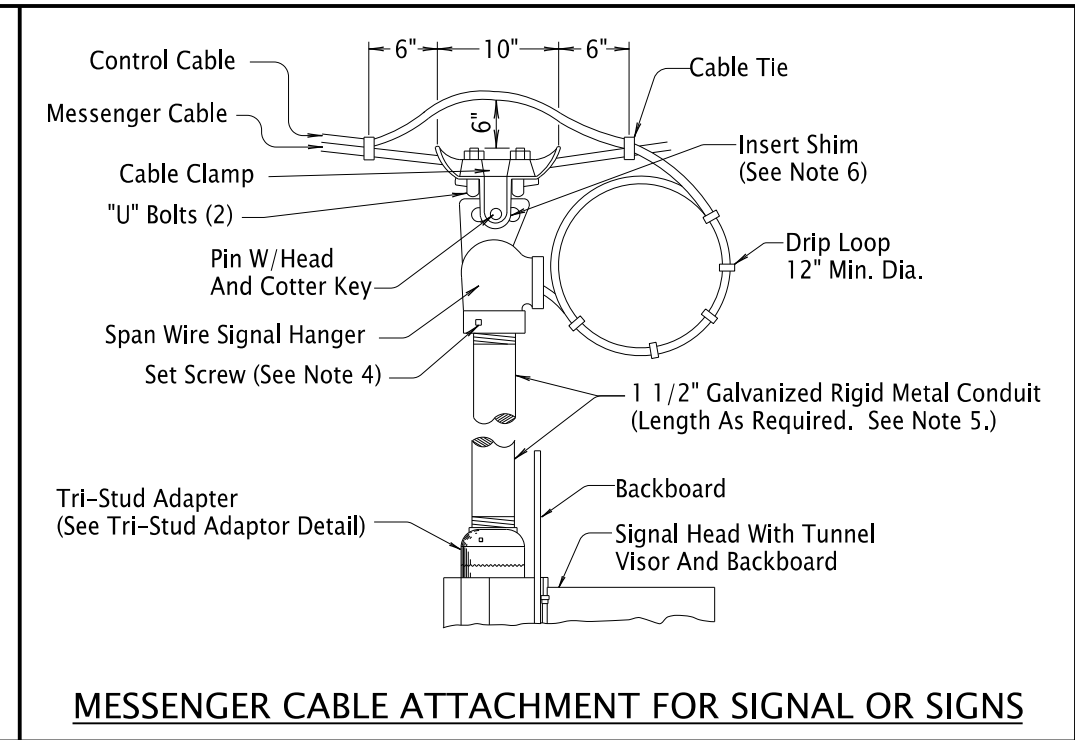
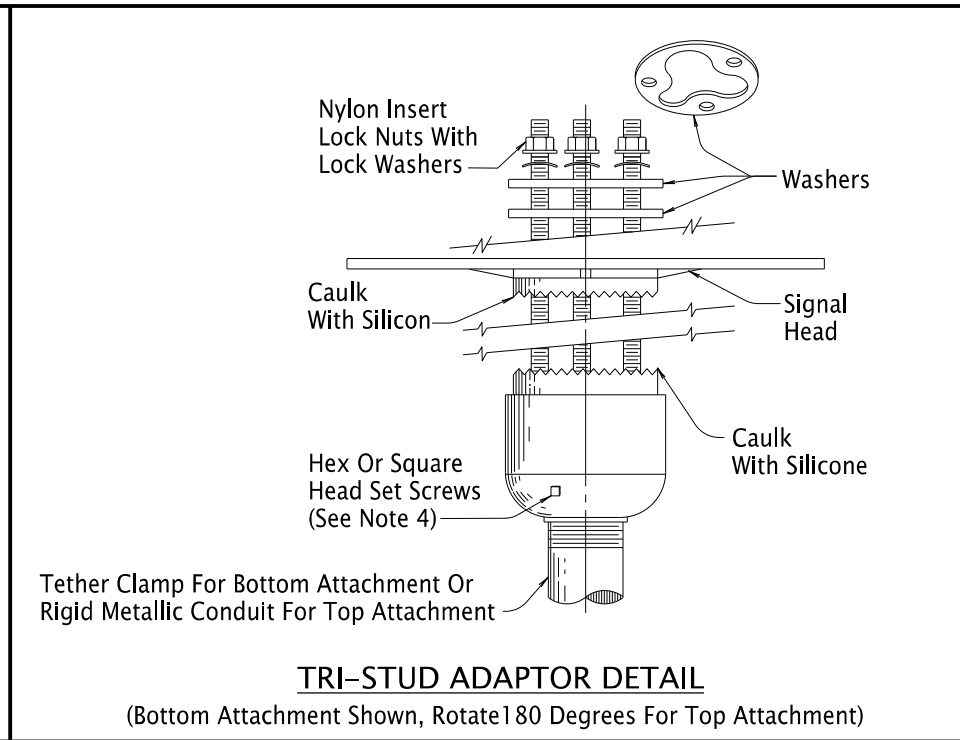
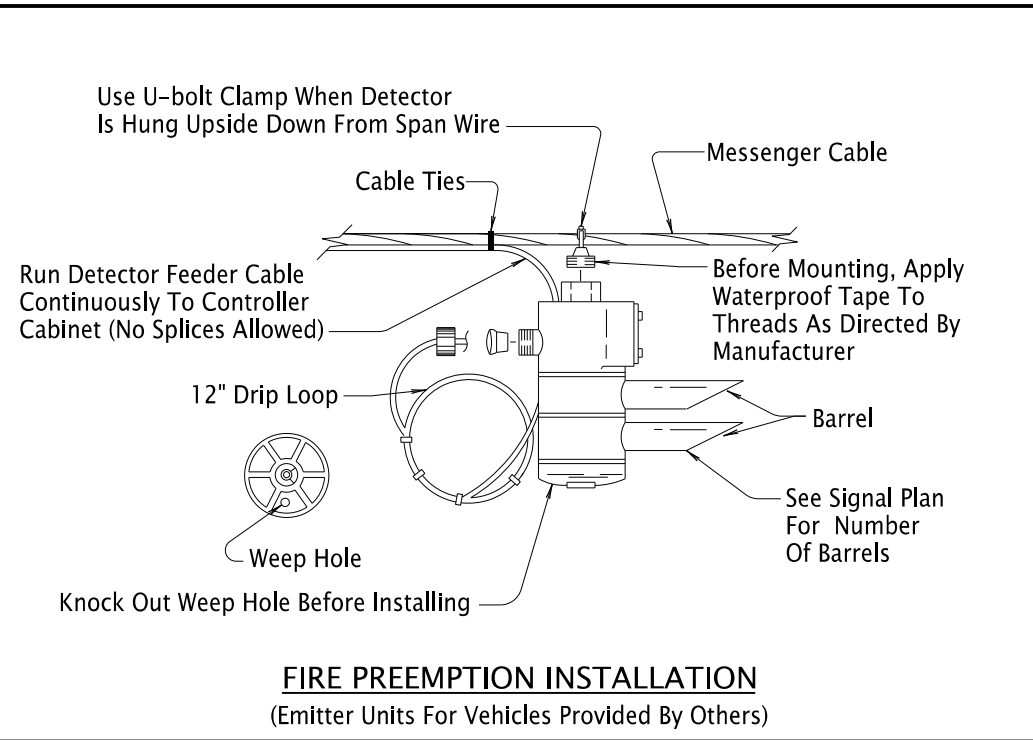
**OREGON STANDARD DRAWINGS
TEMPORARY
CONTROLLER CABINET,
SERVICE CABINET, METER BASE, &
TERMINAL CABINET
2024**

DATE	REVISION	DESCRIPTION
07-2023	ADDED POLE DESIGN SUBMITTAL INFO.	DRAFTING REVISIONS, CHANGED NOTE 1.

CALC. BOOK NO. - - -	N/A - - -	SDR DATE - 14-JUL-2023 -	TM454
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14-JUL-2023

TM456.dgn



- GENERAL NOTES:**
- Galvanize All Steel Parts After Fabrication.
 - All Screws, Bolts, "U" Bolts, Pins, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Or Galvanized Unless Noted Otherwise.
 - Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
 - All Set Screws Shall Be Drilled And Tapped Through The First Wall Of Conduit/Tether Clamp. Set Screw Shall Not Extend More Than 5/8" Inside Conduit And Be Installed With Anti-Seize Compound.
 - Threaded End Of Conduit Shall Extend A Minimum Of 5/8" Into Span Wire Signal Hanger.
 - Install Shim Between Cable Clamp And Span Wire Hanger To Eliminate Excess Movement Yet Allow For Moderate Sway.

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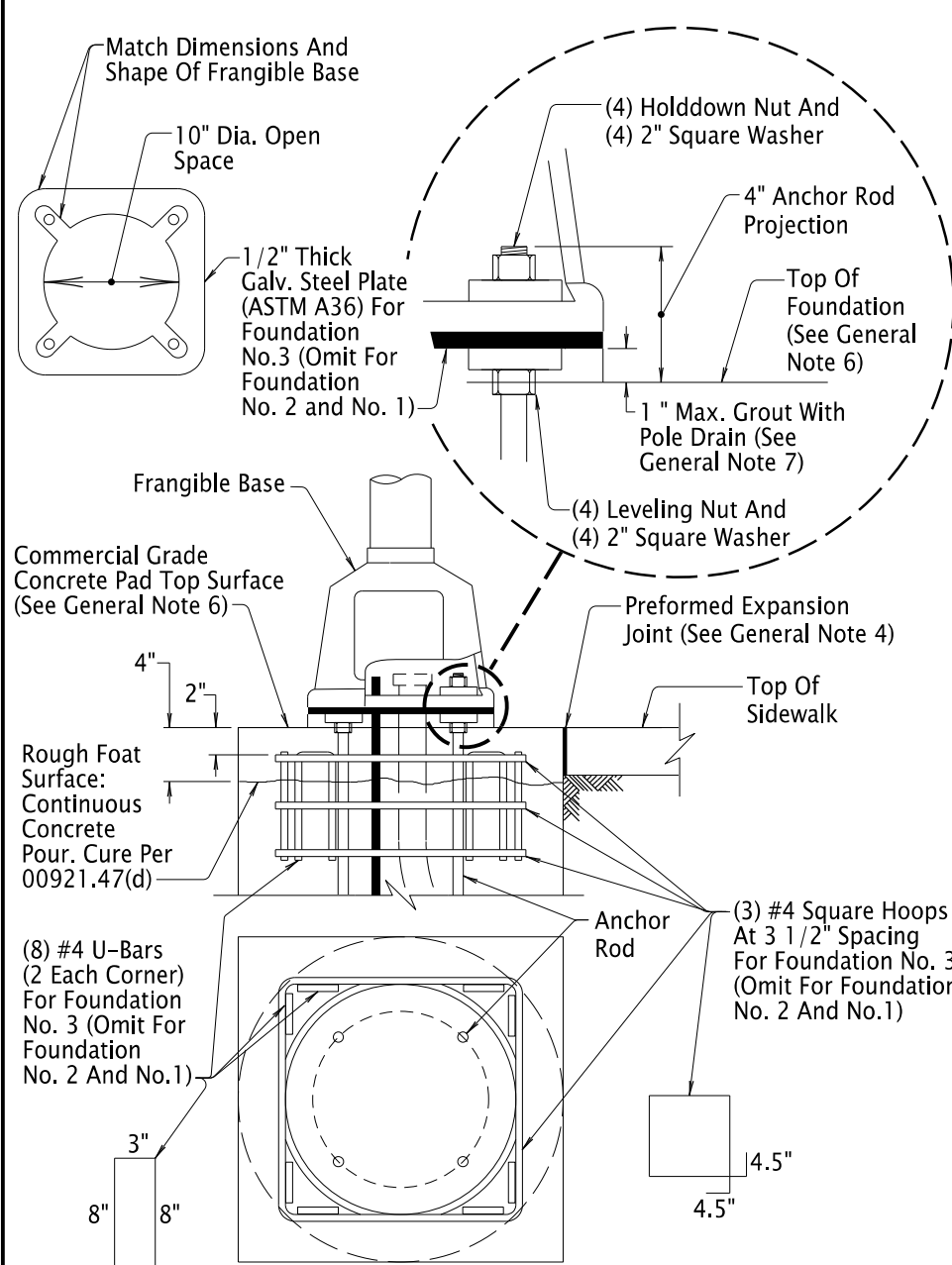
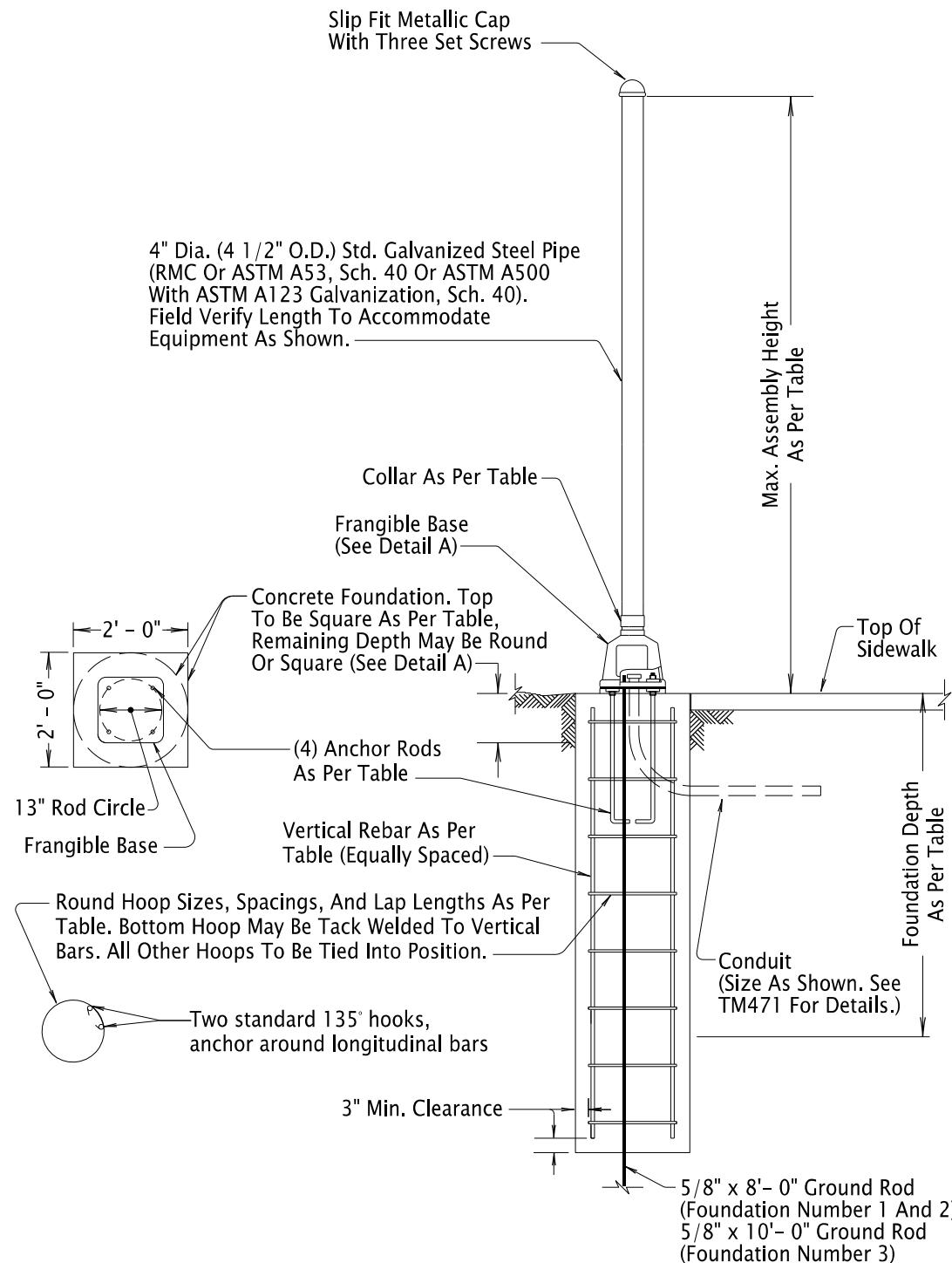
OREGON STANDARD DRAWINGS
TEMPORARY
SPANWIRE MOUNTING DETAILS FOR
VEHICLE SIGNALS, SIGNS, &
FIRE PREEMPTION
2024

DATE	REVISION	DESCRIPTION
07-2023	CHANGED TO ANTI-SEIZE COMPOUND FOR TETHER CLAMP. CHANGED NOTE 2.	

CALC. BOOK NO. ---	N/A ---	SDR DATE- 14-JUL-2023	TM456
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14-JUL-2023

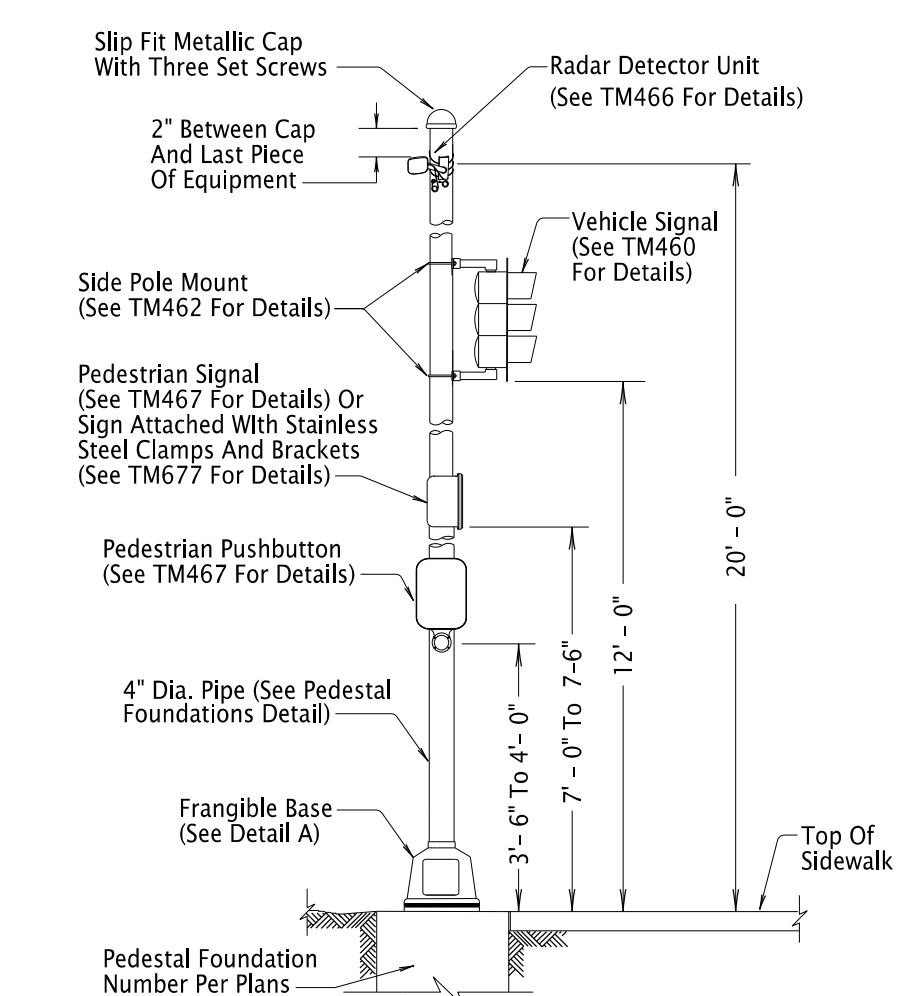
TM457.dgn



DETAIL A - FRANGIBLE BASE

General Notes:

- All Bolts, Nuts And Washers To Conform To 02560.20 And Be Galvanized Steel According To 02560.40 Unless Noted Otherwise.
- All Anchor Rods To Be Galvanized Steel Conforming To 02560.30.
- All Pole Entrances Containing Wiring To Be Smooth.
- Install 1/4" Thick Preformed Expansion Joint Filler Around Footing In Sidewalk Areas.
- The Entire Foundation To Be Located On A Single Plane With Less Than 2% Slope. The Flat Edge(s) Of The Foundation May Be Adjacent To The Turn Space, Back Of Walk, Or A Curb Ramp Grade Break Line.
- Install Commercial Grade Concrete Pad Above Rough Float Surface With Top Surface Matching Sidewalk Grade And Less Than 1/4" Vertical Exposure From Adjacent Grade. Clean Rough Float Surface Prior To Placing Fresh Concrete By Removing All Scum, Laitance, Loose Gravel, And Sediment. Pour During Sidewalk Installation After Installing Pipe And Appurtenances.
- Non-Shrink High Early Strength Grout (Non-Ferrous) with 3/4" Diameter Pole Drain And A Minimum Strength of 5000 psi. Do Not Use Footing Concrete.



Notes:

- Equipment Shown In The Assembly Detail Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
- See TM492 For Ramp Meter Pedestal Mounting Details.
- See TM493 For RRFB Pedestal Mounting Details.

TRAFFIC SIGNAL PEDESTAL ASSEMBLY

Pedestal Foundation Number	Max. Assembly Height	Foundation Depth	Depth of Square Foundation	Anchor Rods (ASTM F 1554 Grade 36)	Reinforcing Steel			Collar
					Vertical Rebar	Hoop Size & Spacing	Hoop Lap Length	
1	6' - 0"	2' - 0"	4"	3/4" x 18" x 4" (6" Thread)	N/A	N/A	N/A	N/A
2	10' - 0"	3' - 0"	4"	1" x 36" x 4" (6" Thread)	8-#6	#4-12"	6" with 2 hooks	Req'd
3	20' - 6"	8' - 0"	12"	1" x 36" x 4" (6" Thread)	8-#6	#4-12"	6" with 2 hooks	Req'd

PEDESTAL FOUNDATIONS

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

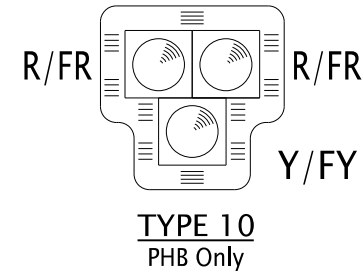
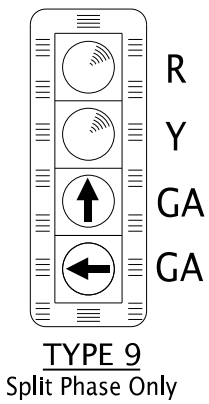
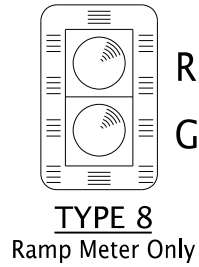
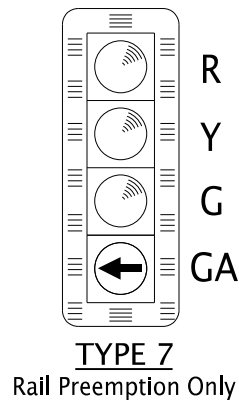
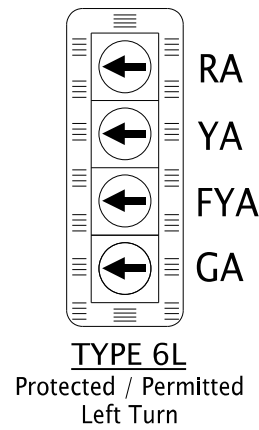
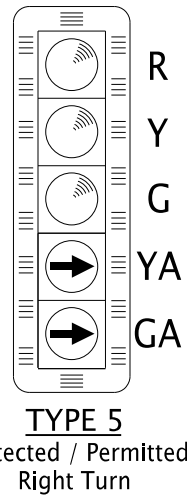
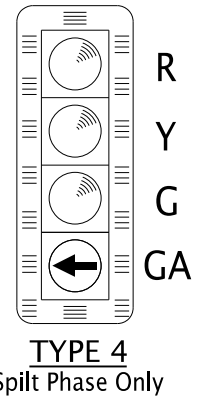
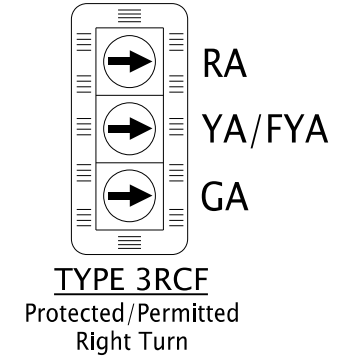
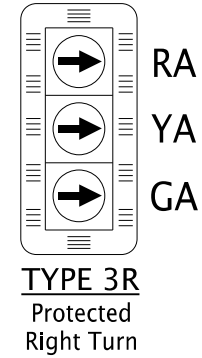
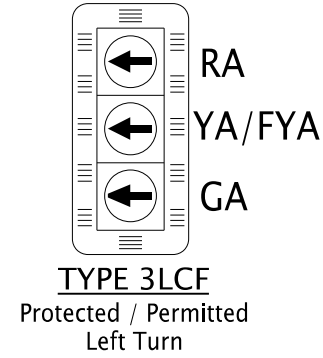
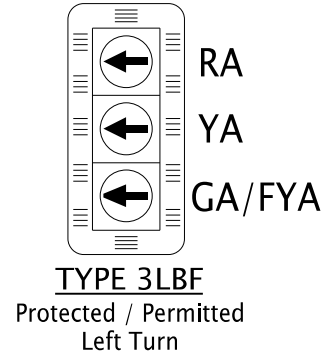
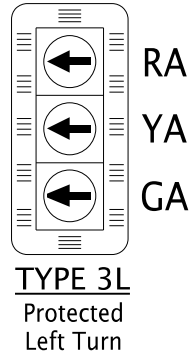
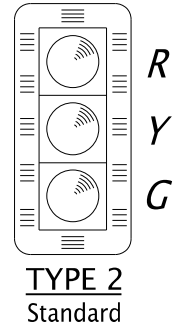
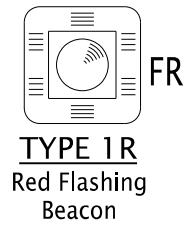
PEDESTAL FOUNDATION AND TRAFFIC SIGNAL ASSEMBLY

2024

DATE	REVISION	DESCRIPTION
01-2021		UPDATED ALL ANCHOR ROD DETAILS. CORRECTED STD. DWG. REFERENCE
07-2022		COMPLETE REDESIGN OF FOUNDATION AND INSTALLATION PROCEDURE
07-2023		NOTE 5 - CHANGED TO 2% SLOPE. ADDED RMC AS PIPE OPTION. MINOR TEXT CHANGES FOR CLARITY.

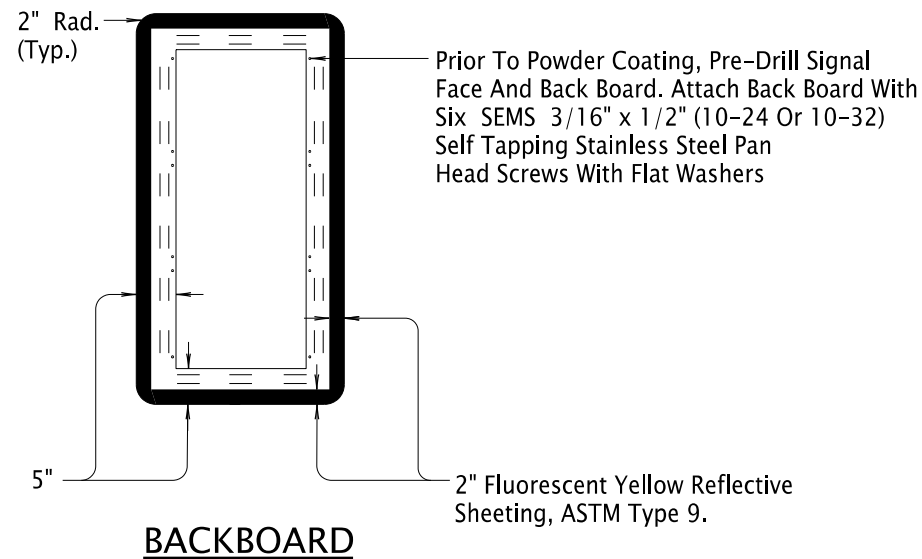
CALC. BOOK NO. --- N/A --- SDR DATE: 14-JUL-2023 **TM457**

Effective Date: December 1, 2023 - May 31, 2024

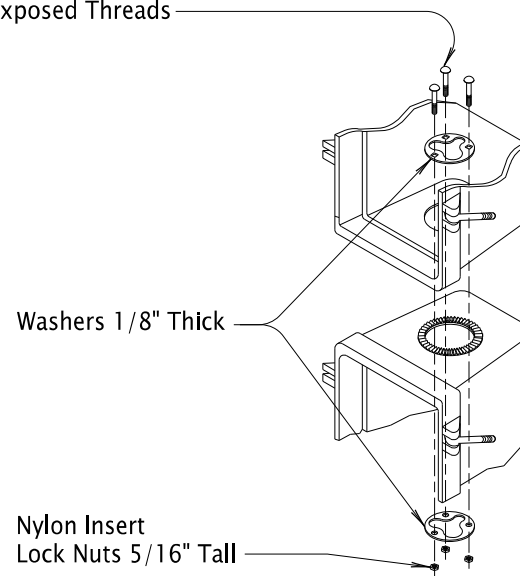


Color Indications. All Indications Are 12" Diameter.	
R	Red Circular Ball
Y	Yellow Circular Ball
G	Green Circular Ball
RA	Red Arrow
YA	Yellow Arrow
GA	Green Arrow
FYA	Flashing Yellow Arrow
FR	Flashing Red Circular Ball
FY	Flashing Yellow Circular Ball

VEHICLE SIGNAL HEAD DESIGNATIONS AND LENS ARRANGEMENT



(3) - Carriage Bolts
1/4" x Length As Req'd. For Three Fully Exposed Threads



VEHICLE HEAD ASSEMBLY

General Notes:

- All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
- Bolts And Screws Shall Have Square Or Hex Heads Unless Otherwise Noted. Allen Head Fasteners Not Allowed.
- Assemble The Heavy Duty Polycarbonate Vehicle Signal, Visor, And Backboard With Bolted Connections, Stainless Steel Reinforcing Strips And Stainless Steel Plates.

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OREGON STANDARD DRAWINGS

VEHICLE SIGNAL DETAILS

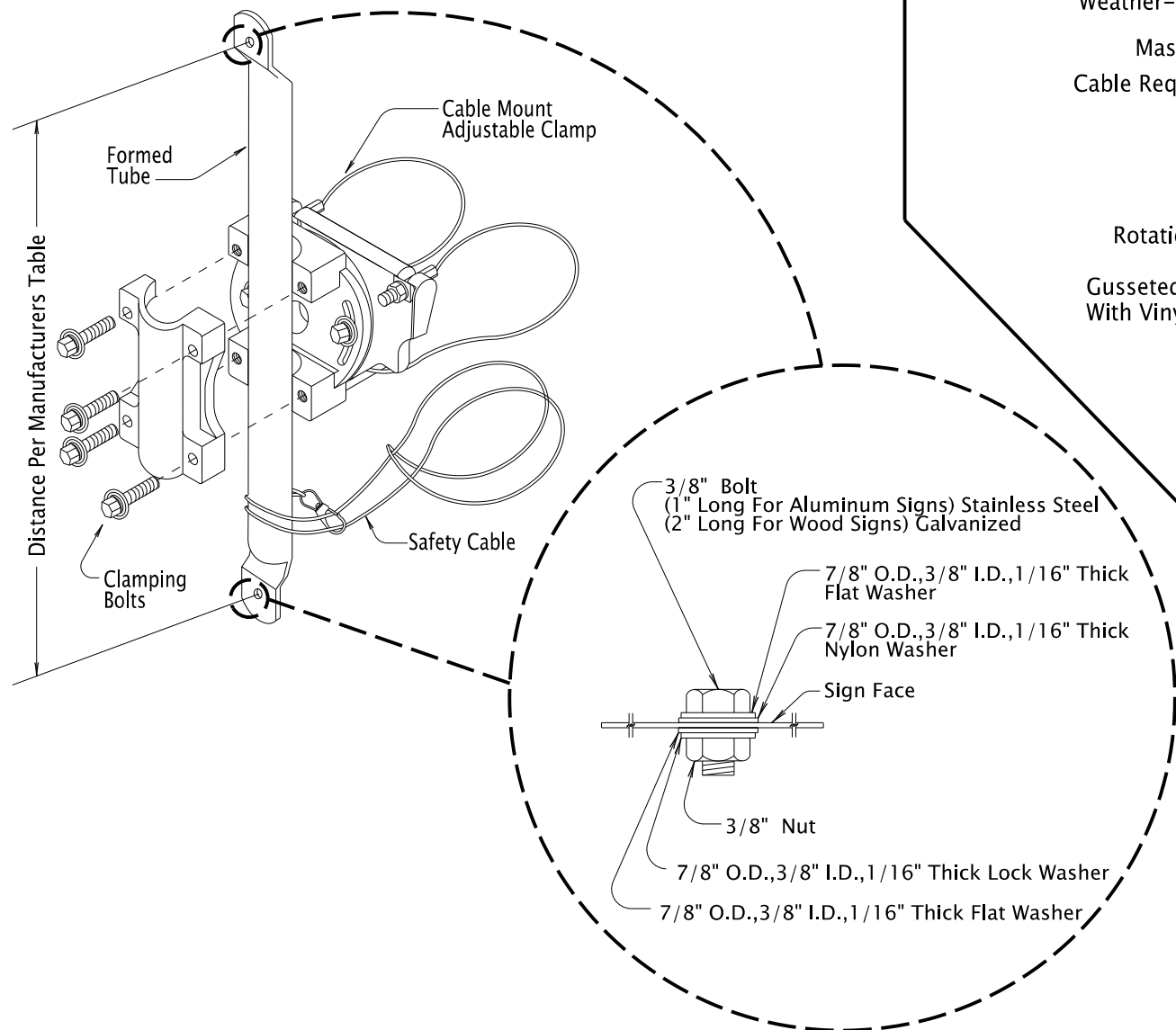
2024

DATE	REVISION	DESCRIPTION

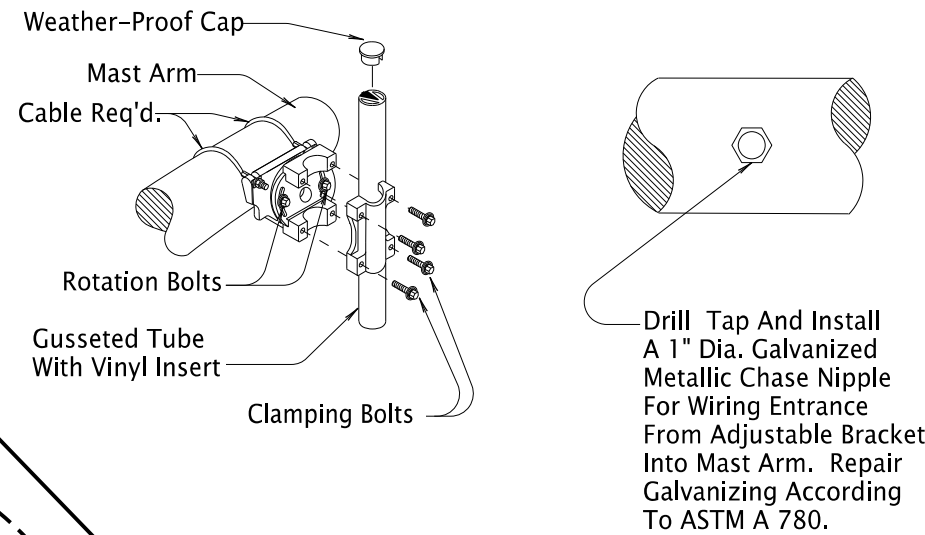
CALC. BOOK NO. - - - -	N/A - - - -	SDR DATE - 02-JUL-2018	TM460
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02-JUL-2020

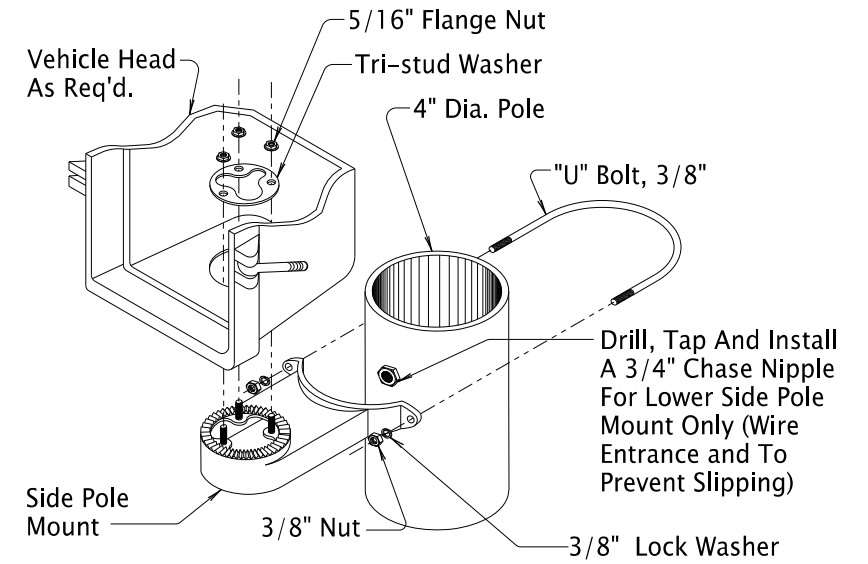
TM462.dgn



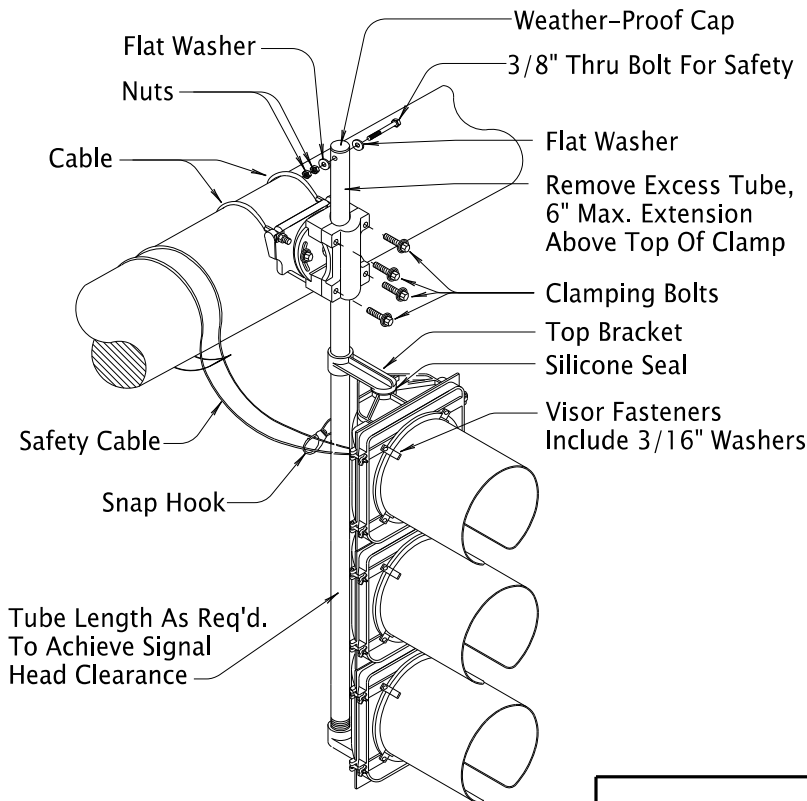
SIGN BRACKET (TYPE "B", MAST ARM/POLE INSTALLATION)



VEHICLE SIGNAL MAST ARM INSTALLATION

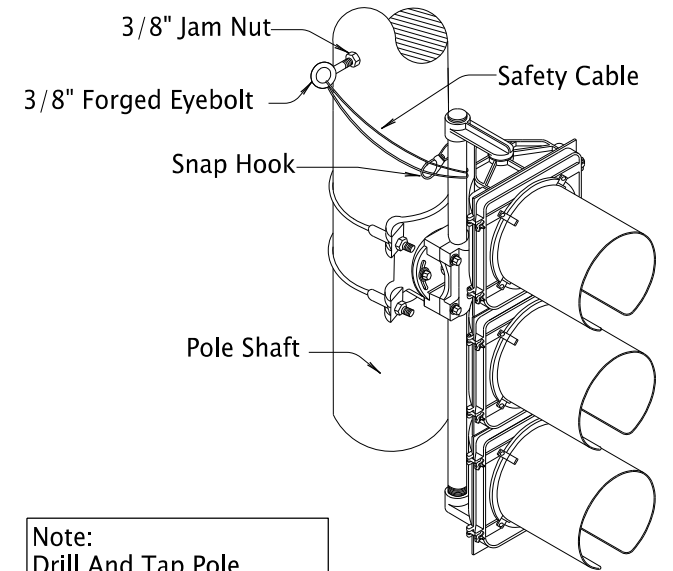


4" SIDE POLE MOUNT INSTALLATION
(For Mounting Signal Heads to Vehicle Pedestals)

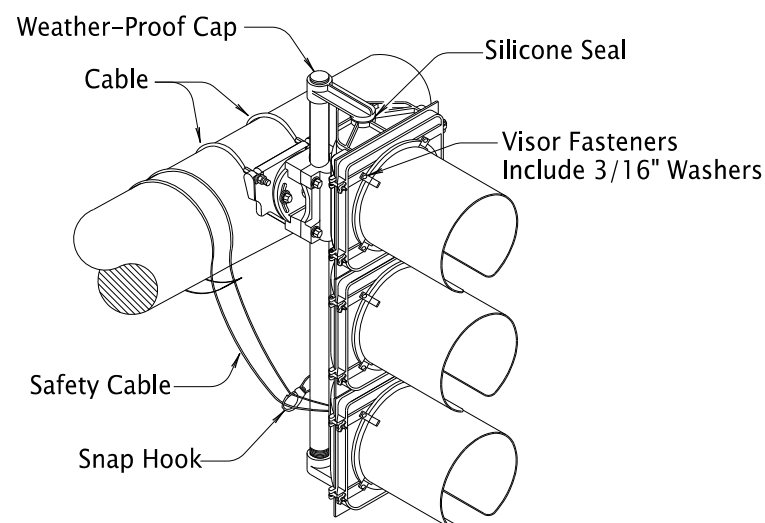


NOTE:
This Detail Can Be Applied To Any Signal Head Configuration. If The Extension Between The Center Line Of The Mast Arm And The Top Bracket Exceeds 18" Consult Engineer For Guidance.

MOUNTING VEHICLE SIGNAL ABOVE BRACKET ARMS



POLE SHAFT INSTALLATION



MOUNTING VEHICLE SIGNAL BETWEEN BRACKET ARMS

General Notes:

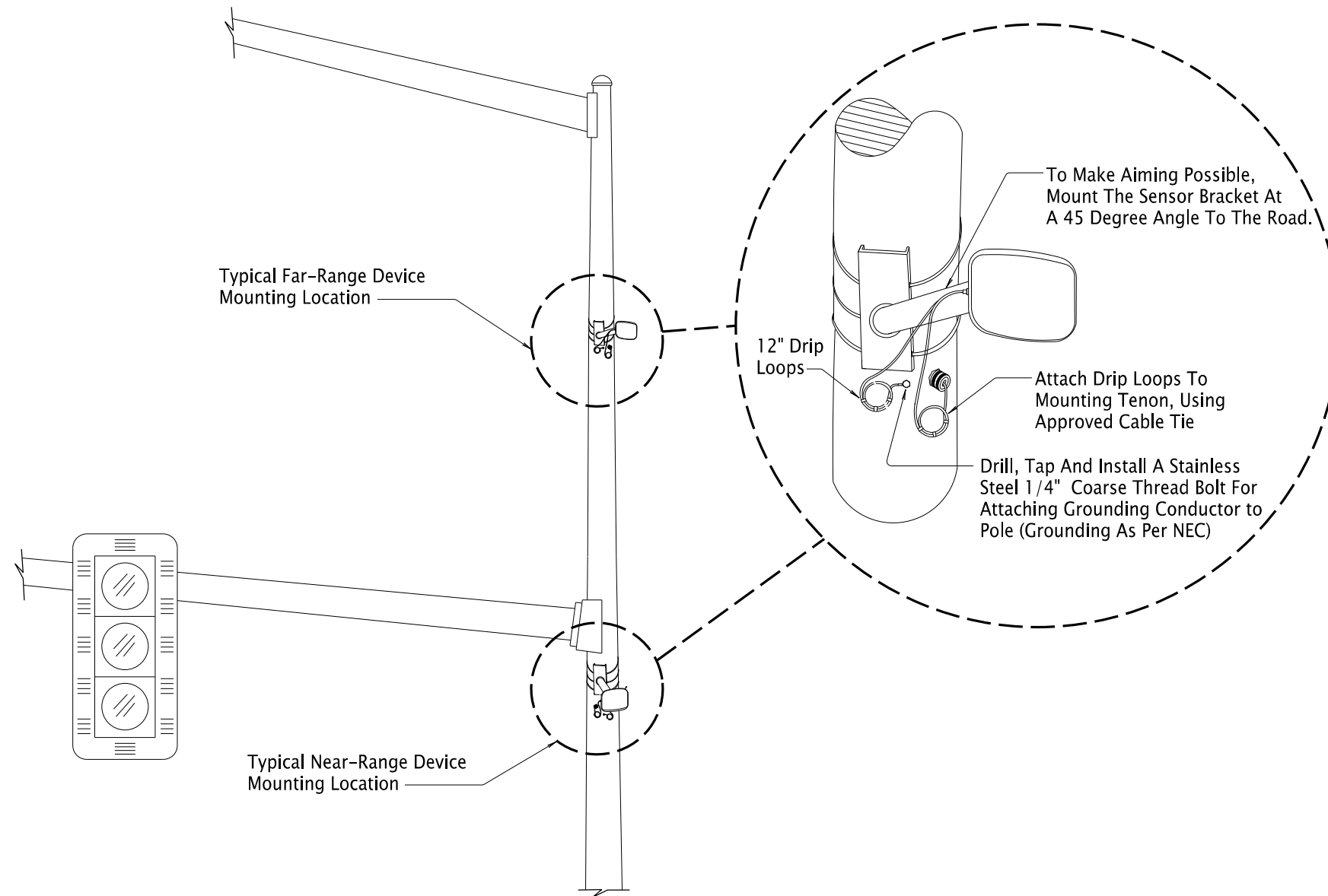
1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
3. Follow Manufacturers Recommendations For Installation.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

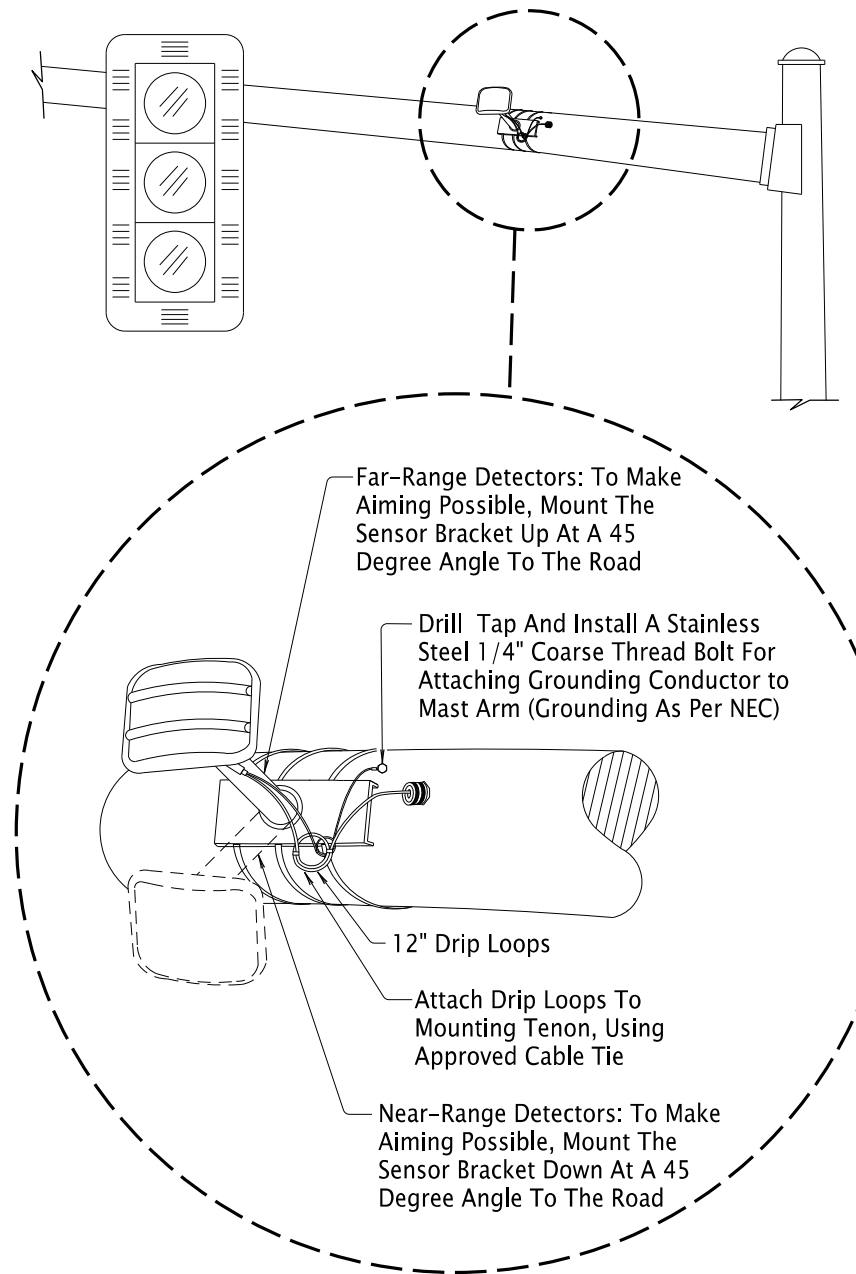
All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
VEHICLE SIGNAL BRACKET & SIGN BRACKET (TYPE B) DETAILS			
2024			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	02-JUL-2020
			TM462

20-JAN-2023

TM466.dgn



VERTICAL SIGNAL POLE MOUNT

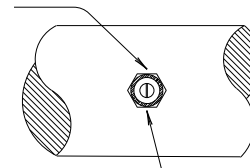


HORIZONTAL MAST ARM MOUNT

GENERAL NOTES:

1. All Bolts, Nuts And Washers Shall Be 304, Or 316 Stainless Steel Unless Noted Otherwise.
2. Mount Radar Detector Assembly As Per Manufacturers Recommendations.

Drill, Tap And Install A Galvanized Metallic Strain Relief For Wiring Entrance From Radar Detector Into Mast Arm, Or Pole



Repair Galvanizing According To ASTM A 780

CABLE GRIP

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

RADAR MOUNTING DETAILS

2024

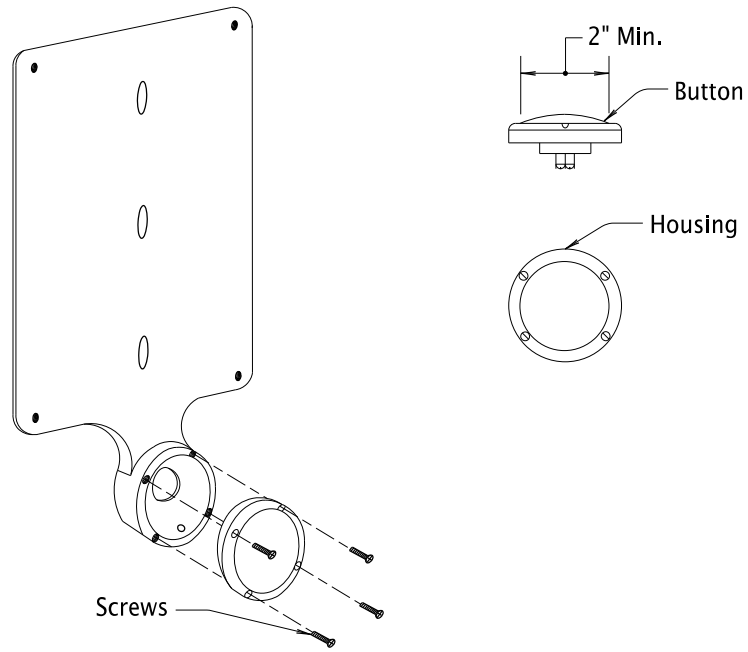
DATE	REVISION	DESCRIPTION
01-2023	ADDED NEAR RANGE DETECTOR INFORMATION	

CALC. BOOK NO.	N/A	SDR DATE_ 20-JAN-2023 _	TM466
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Effective Date: December 1, 2023 – May 31, 2024

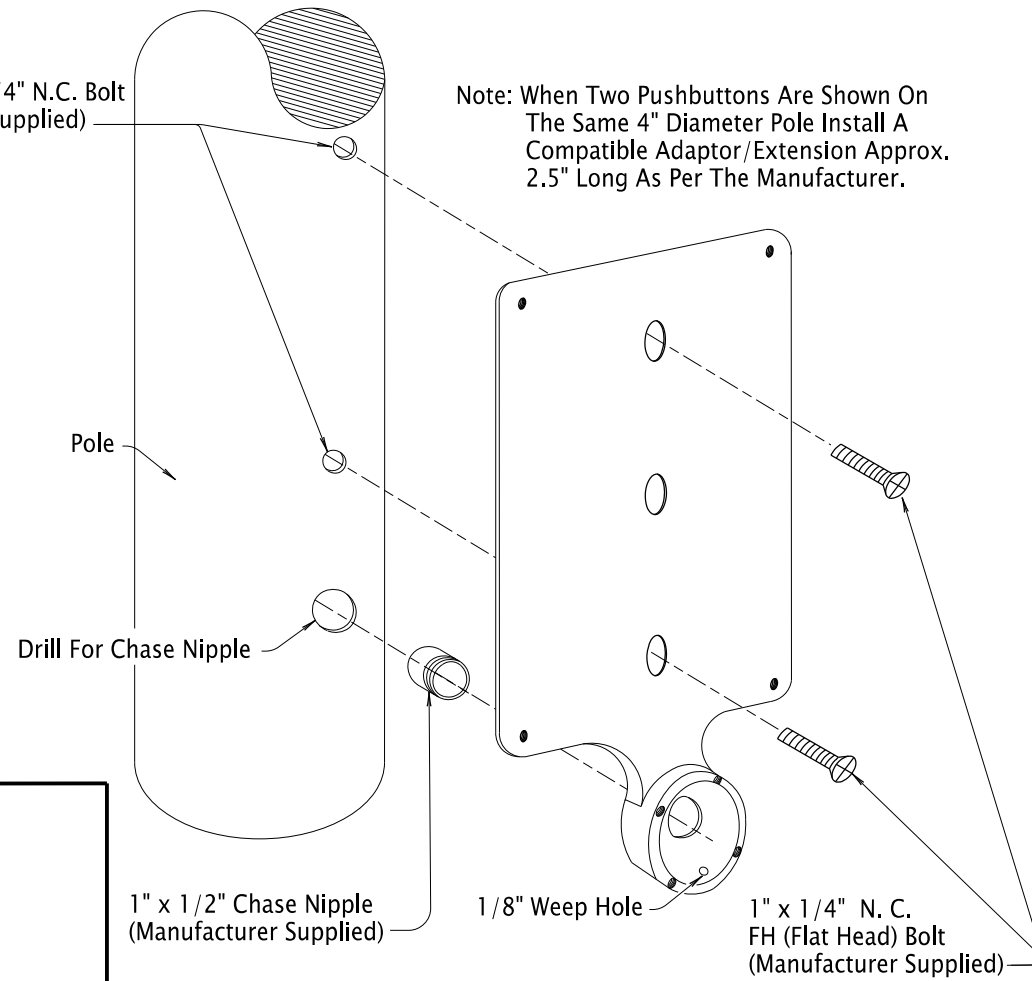
08-JUL-2022

TM467.dgn

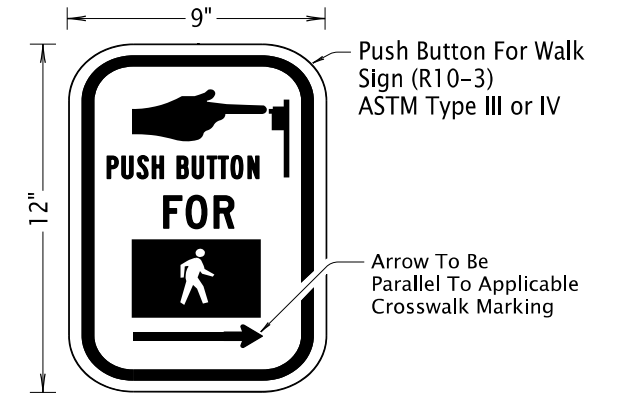


STANDARD PUSHBUTTON

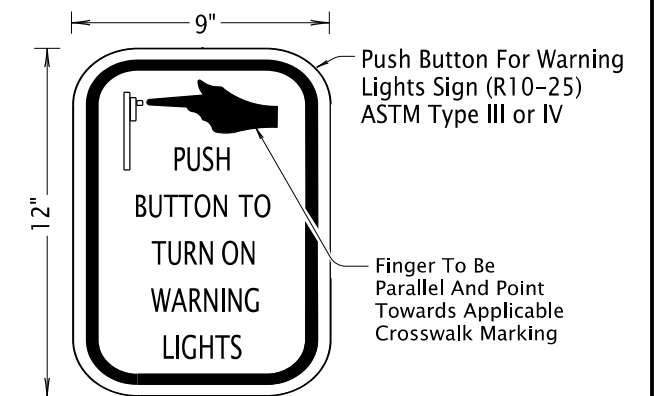
Drill, Tap For 1/4" N.C. Bolt
(Manufacturer Supplied)



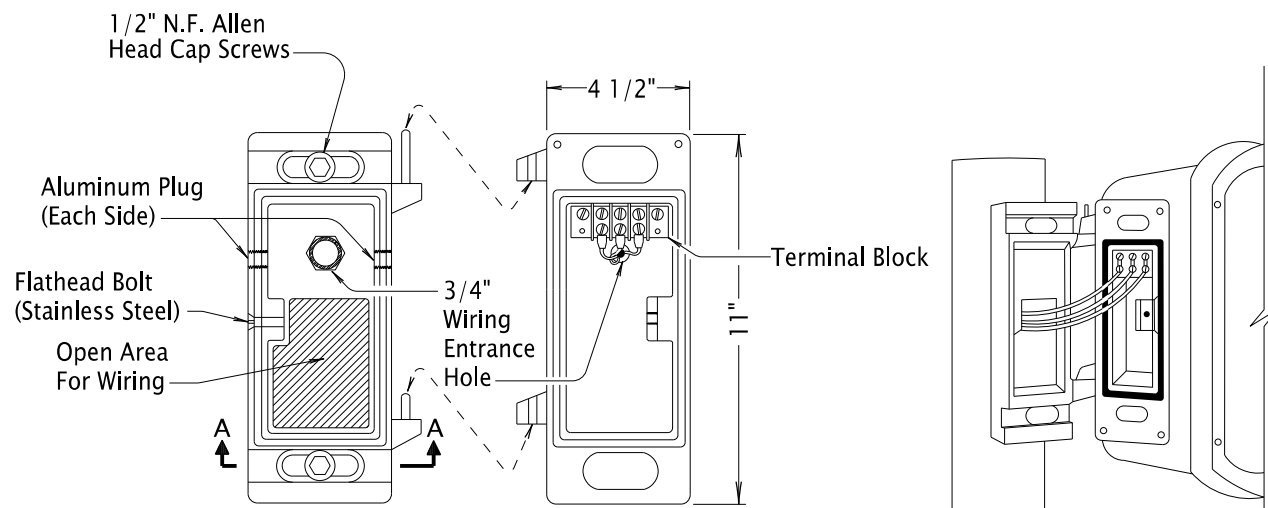
**STANDARD PUSHBUTTON STATION
AND INSTRUCTION SIGN**



SIGN FOR PEDESTRIAN SIGNALS



SIGN FOR WARNING BEACON ASSEMBLY



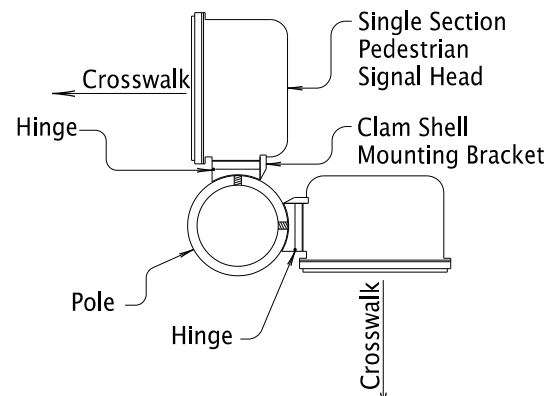
PEDESTRIAN SIGNAL MOUNT (CLAM SHELL)

General Notes:

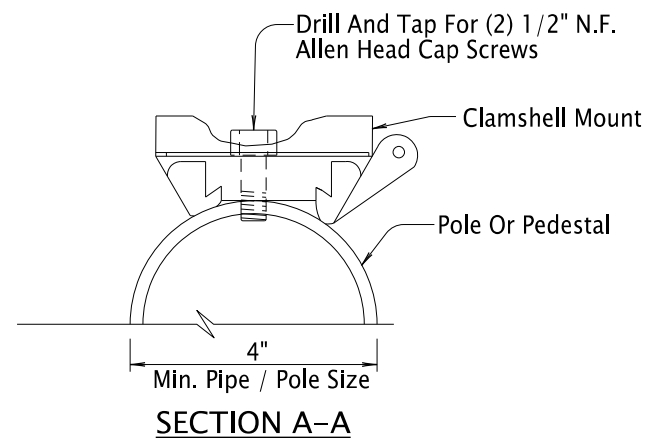
1. All Screws, Bolts, Nuts And Washers To Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws To Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
3. Drill And Tap Pole As Per Orientation Shown On Plans.
4. Horizontal Reach To The Pushbutton To Be 10 Inches Maximum. See Plans Or Consult Engineer To Ensure Compliance.

NOTES:

1. Where Two Heads Are Side Mounted On 4" Conduit, Proper Clearance To Be Maintained To Allow Legend To Be Fully Visible.
2. Clam Shells To Be Orientated So That The Heads Can Be Opened For Maintenance. (Verify Hinge Placement Of Clamshell).



TOP VIEW

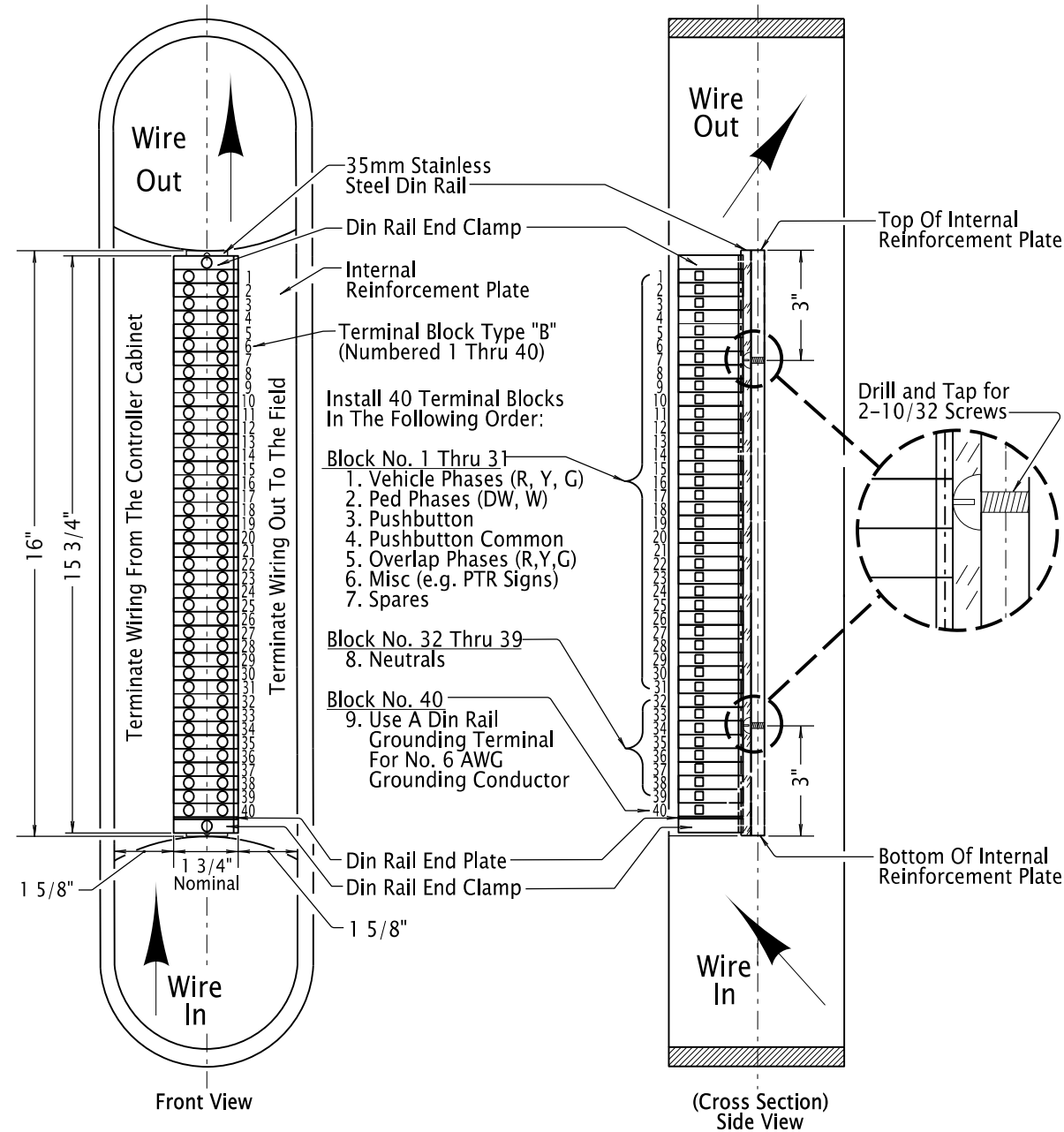


CLAM SHELL ORIENTATION

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS PEDESTRIAN SIGNAL MOUNT AND PEDESTRIAN PUSHBUTTON DETAILS 2024			
DATE	REVISION	DESCRIPTION	
07-2022	ADDED R10-25 SIGN. ADDED EXTENSION MOUNTING NOTE FOR 2 PUSHBUTTONS ON SAME 4" DIA. POLE.		
CALC. BOOK NO.	N/A	SDR DATE	08-JUL-2022
			TM467

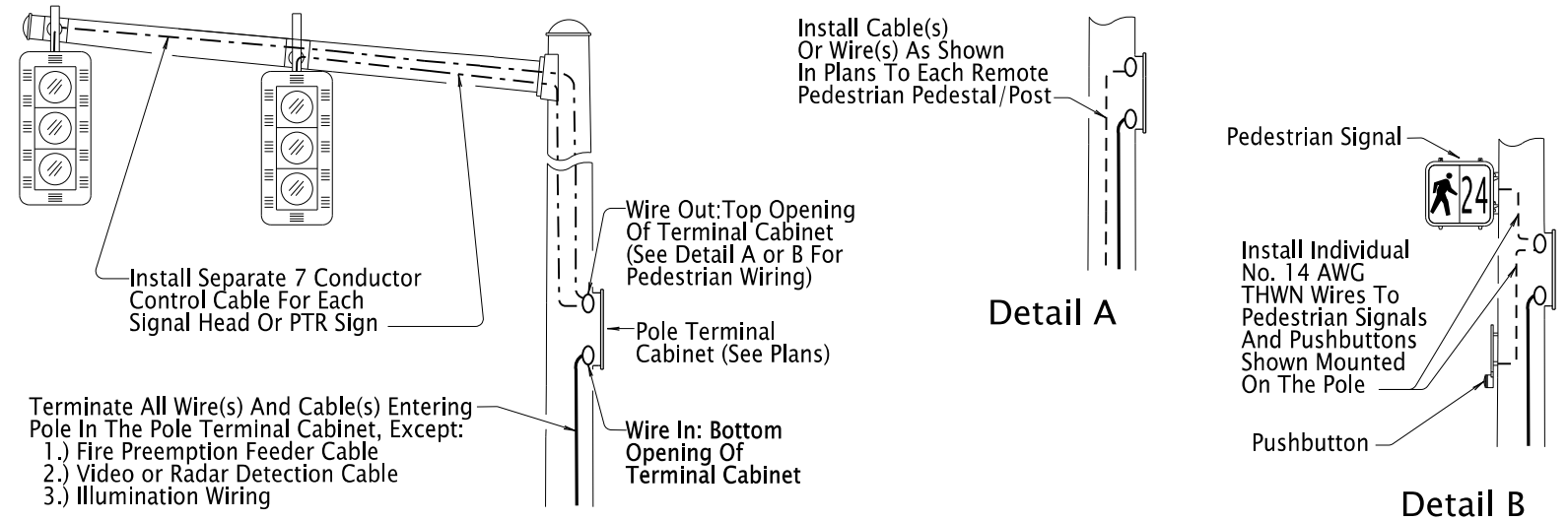
Effective Date: December 1, 2023 – May 31, 2024



DIN RAIL, TERMINAL BLOCKS, & WIRING IN POLE RECESSED TERMINAL CABINET

7 CONDUCTOR CONTROL CABLE			PEDESTRIAN PHASES	VEHICLE PHASES	SIGNAL HEAD TYPES			
CONDUCTOR NUMBER	BASE COLOR	FIRST TRACER	1 Pedestrian Phase	1 Vehicle Phase	6L, 3LBF	5 or 7	1R, 1Y, 2, 3L, 3LCF, 3R, 4 or 9	10
1	WHITE	—	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL
2	BLACK	—	WALK	YELLOW	YELLOW	YELLOW	YELLOW	YELLOW
3	RED	—	DONT WALK	RED	RED	RED	RED	RED 1
4	ORANGE	—	P.B. COMMON	SPARE	FLASHING YELLOW	TURN YELLOW	SPARE	RED 2
5	GREEN	—	PUSHBUTTON	GREEN	GREEN	GREEN	GREEN	SPARE
6	BLUE	—	SPARE	SPARE	SPARE	TURN GREEN	SPARE	SPARE
7	WHITE	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

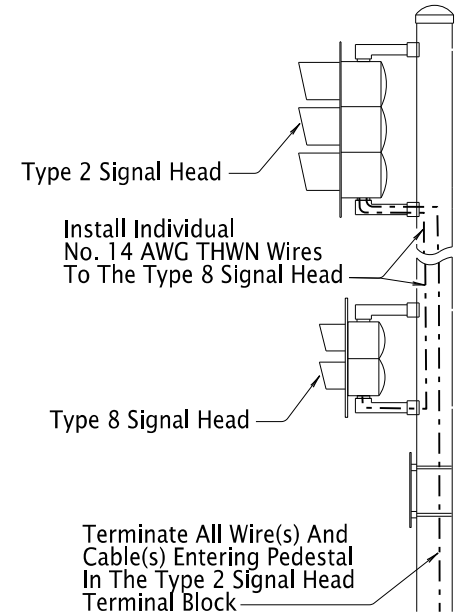
COLOR CODE CHART CONTROL CABLE



WIRE & CABLE IN POLES

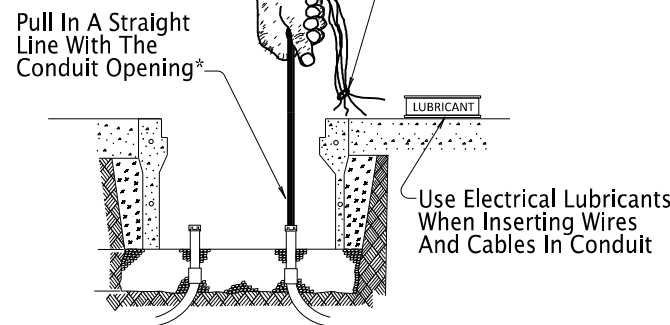
General Notes:

1. Install All Wire And Cable Between Terminal Blocks Without Splicing.
2. Mark Phase Number/Identification On All Cable In Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets With Permanent Tags. Use Handheld Labeler (Brady IDXPRT With XC-1500-580-WT-BK Tags Or Approved Equal). Wiring For Overlaps Shall Be Labeled (OLA,OLB,OLC,OLD).
3. Install No. 16 AWG TFFN Orange Base With Blue Tracertone Wire In All Conduits As A Locate Wire. Leave Slack As Required In General Note 5 And Install A Wire Nut. Do Not Join Multiple Locate Wires Under A Common Wire Nut Unless Otherwise Shown.
4. Tape The Ends Of Unsued Conductors With Insulated Vinyl Plastic Tape.
5. Leave Slack In Each Wire And Cable As Follows:
 A.) 2 Feet In Junction Boxes And Poles
 B.) 6 Feet In The First Junction Box Nearest The Controller Cabinet
 C.) 6 Feet In Controller Cabinet And Service Cabinet
6. Install Polyethylene Pull Line In All Conduits Noted On The Plans For Future Use (No Wires/Cables In Conduit). Leave 6 Feet Of Slack Pull Line.
7. At Existing Installations The Contractor Is Responsible For the Re-wiring And Re-numbering Of New And Existing Control Cables, In All Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets.



WIRE & CABLE IN RAMP METER PEDESTALS

Pull All Wires And Cables By Hand Only
 Temporarily Bundling Cables Or Wire (Tapes, Straps, Ties, Or Other Binding Material) Allowed Only At The Terminating End Points For Pulling Only



* Use A Pulley Device To Achieve A Straight Line If Pulls Are Made With Poles Or Controller Cabinets In Place

WIRE & CABLE IN CONDUITS

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

WIRE & CABLE INSTALLATION

2024

DATE	REVISION DESCRIPTION

CALC. BOOK NO. ---	N/A ---	SDR DATE: 02-JUL-2020	TM470
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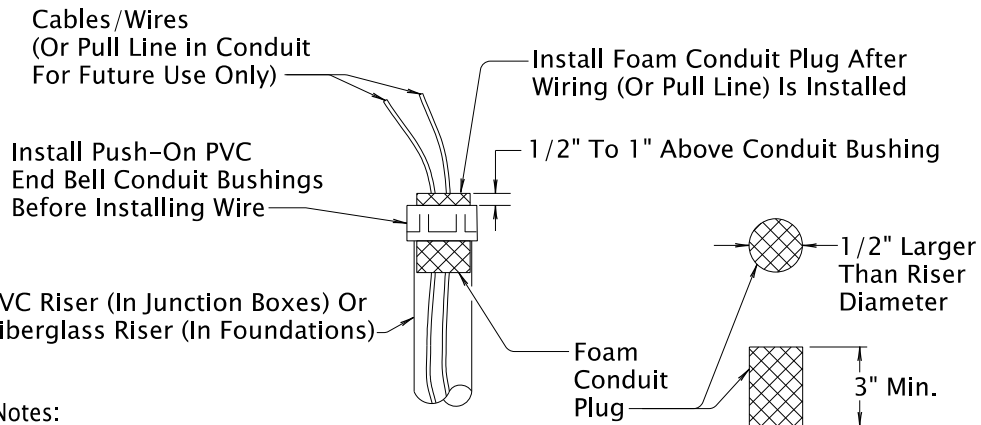
04-JAN-2021

TM471.dgn

Type Of Conduit	Minimum Cover From Top of Finished Surface (Use Permit Depth If Greater Than These)	
	Roadway & Shoulders	Other Areas
Metallic	24"	18"
Non-Metallic	30"	18"

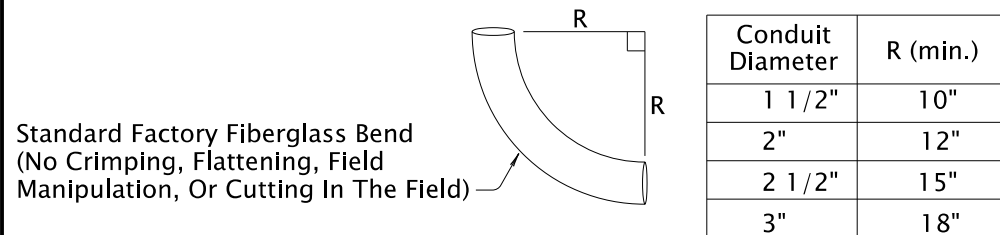
Note:
1.) Additional Cover Depth May Be Necessary Near Foundations And Junction Boxes To Accommodate The Minimum Radius ("R") Of The Conduit Elbow. See "Conduit Elbow", "Conduit Installation In Foundations" And "Conduit Installation In Junction Boxes" Details For More Information.

MINIMUM COVER FROM FINISHED SURFACE

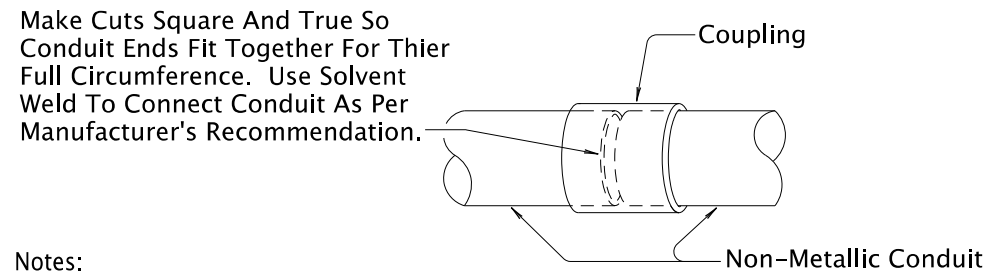


Notes:
1.) Ream Conduit Ends To Remove Rough Edges And Burrs
2.) Temporarily Plug Or Cap Conduit Ends At All Times To Keep Debris Out

CONDUIT ENDS AND BUSHINGS

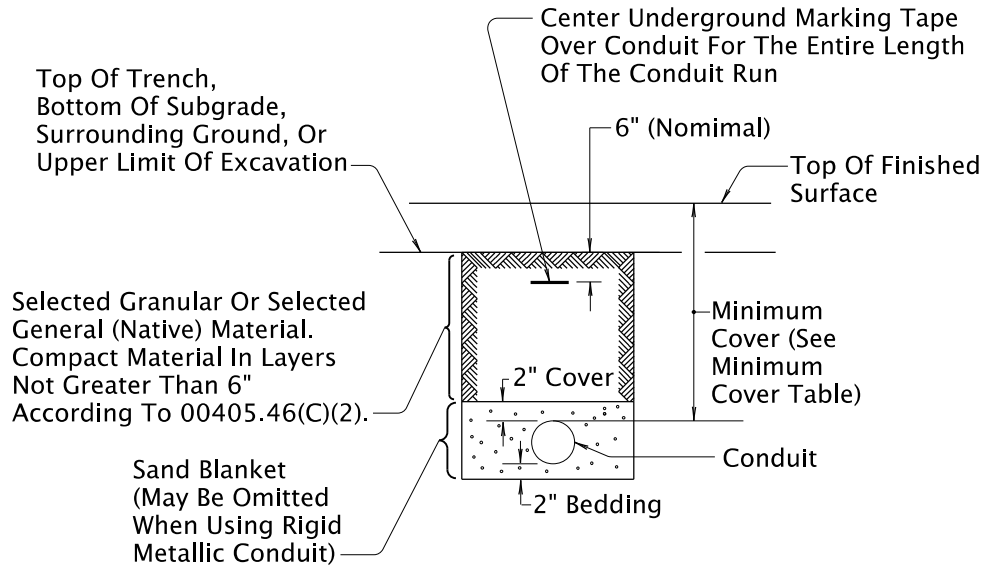


CONDUIT ELBOWS

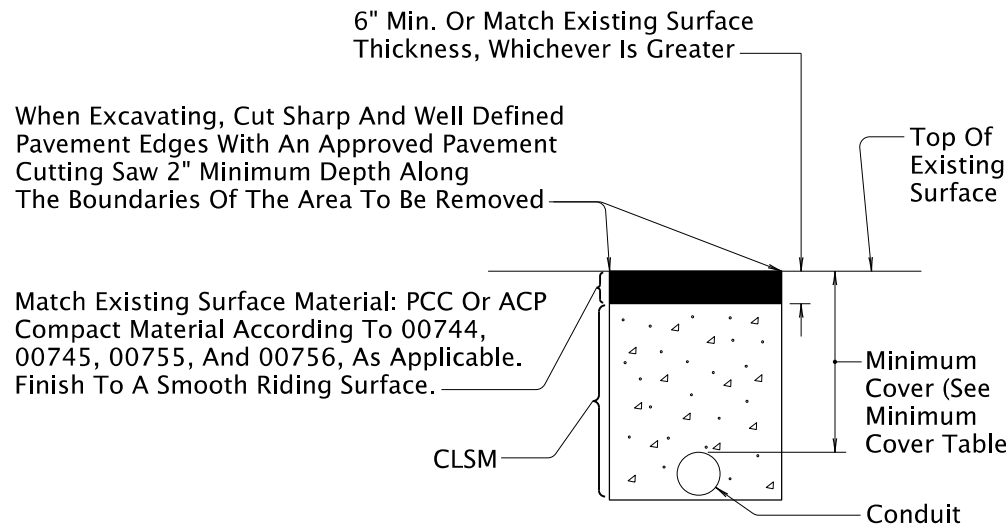


Notes:
1.) Slip Joints, Running Threads Or Reducing Couplings Not Allowed. Use The Same Size Conduit For The Entire Length, Outlet To Outlet.

CONDUIT COUPLINGS



UNSURFACED AREAS
(new roadway prior to paving, shoulders, under sidewalk, landscaped areas, etc.)

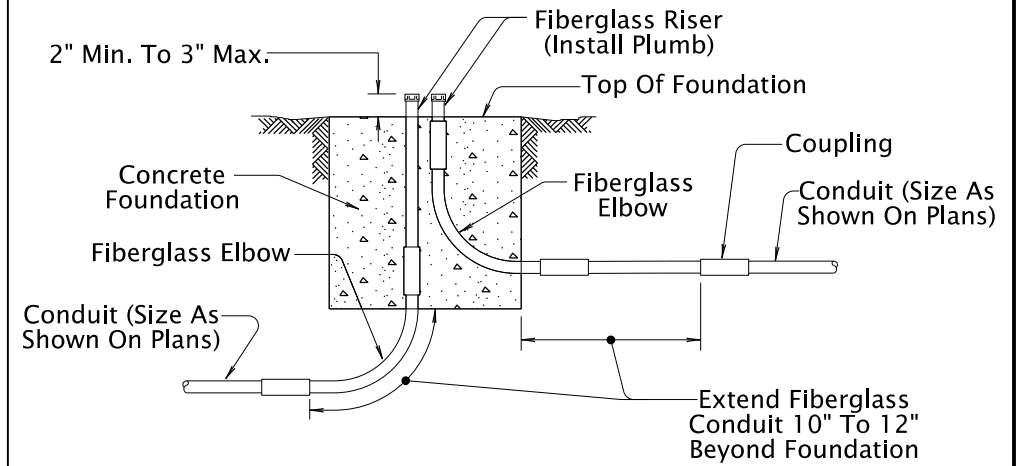


EXISTING PAVED AREAS

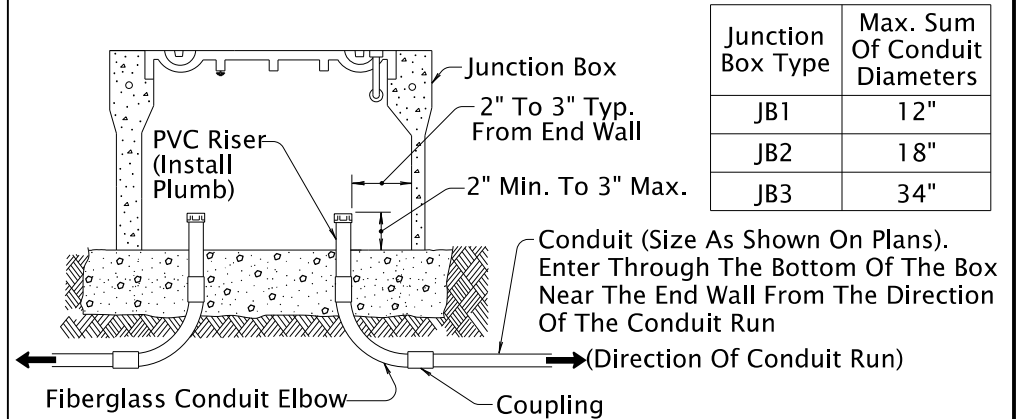
Trenching & Backfill Notes:

1. Excavate According To 00960.40. In Areas To Be Paved Or Landscaped, Place All Conduit Before Paving Or Landscaping.
2. Hold Trench Width To A Practical Minimum
3. Do Not Backfill Trenches Until Inspected By The Engineer
4. Furnish Backfill Materials According To 00960.10

CONDUIT OPEN TRENCH EXCAVATION & BACKFILL



CONDUIT INSTALLATIONS IN FOUNDATIONS
(Applicable for Pole, Pedestal, Post, Service Cabinet and Controller Cabinet Foundations)



Junction Box Type	Max. Sum Of Conduit Diameters
JB1	12"
JB2	18"
JB3	34"

CONDUIT INSTALLATION IN JUNCTION BOXES

General Notes:

1. Install Non-Metallic Conduit Unless Otherwise Shown. Conduit Runs Shall Be Continuous Between Any Pole, Junction Box, Or Cabinet.
2. Install Conduit By Open Trench Method, Horizontal Directional Drilling, Or As Shown
3. Conduit Runs Shown On Plans Are For Bidding Purposes Only. Locations May Be Changed To Avoid Obstructions.
4. Larger Conduit Than Specified May Be Used At The Option And Cost Of The Contractor If Max. Sum Of Conduit Diameters In Junction Box Is Not Exceeded.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS
TRENCHING & CONDUIT INSTALLATION

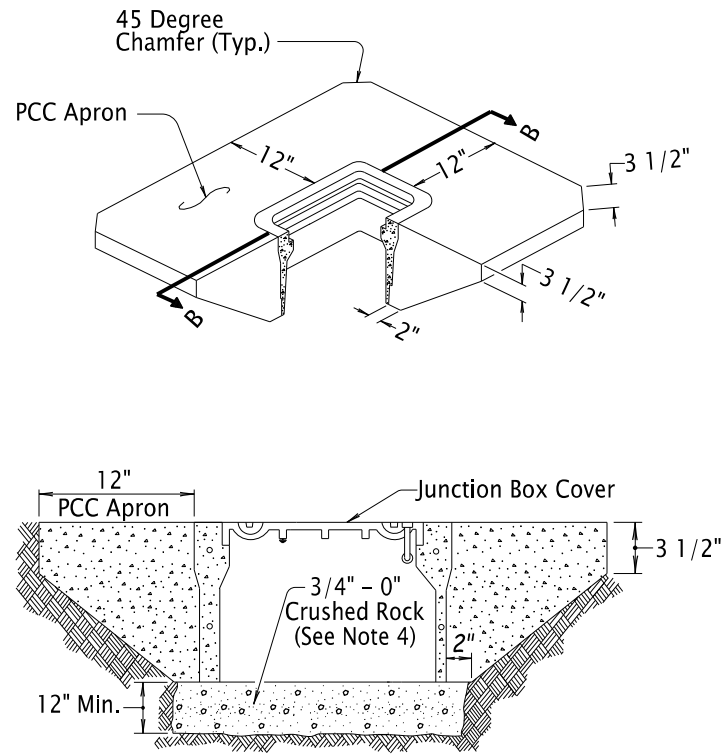
2024

DATE	REVISION	DESCRIPTION
01-2021	ADDED NOTE 1 TO "MINIMUM COVER FROM FINISHED SURFACE" DETAIL	

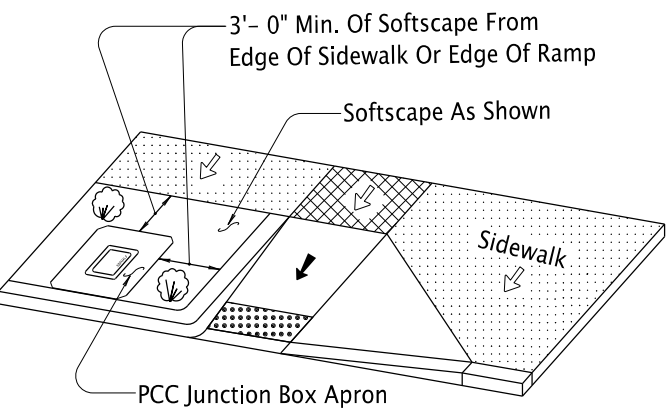
CALC. BOOK NO. --- N/A --- SDR DATE: 04-JAN-2021 **TM471**

08-JUL-2022

TM472.dgn

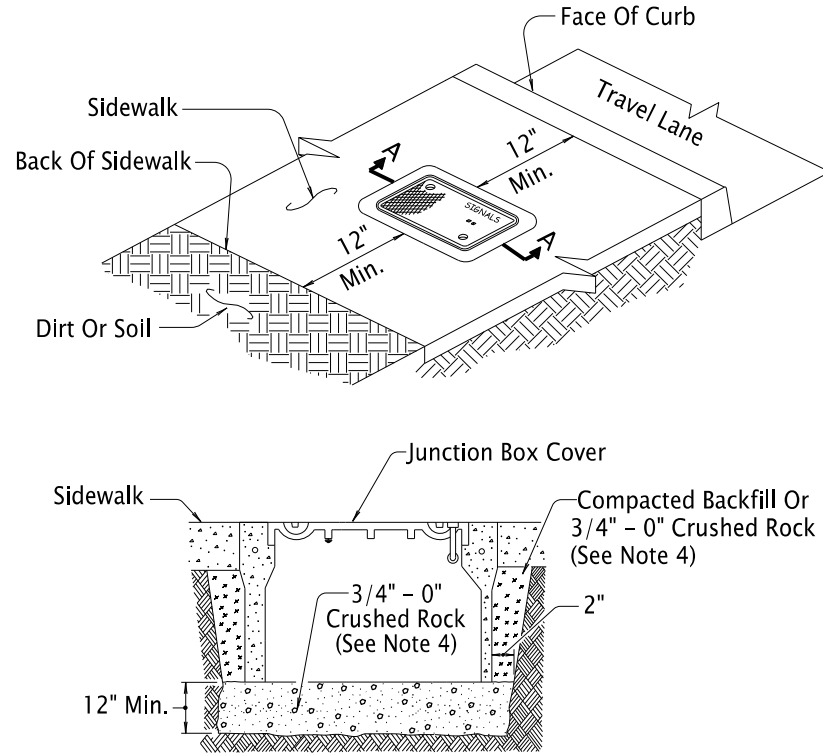


SECTION B-B



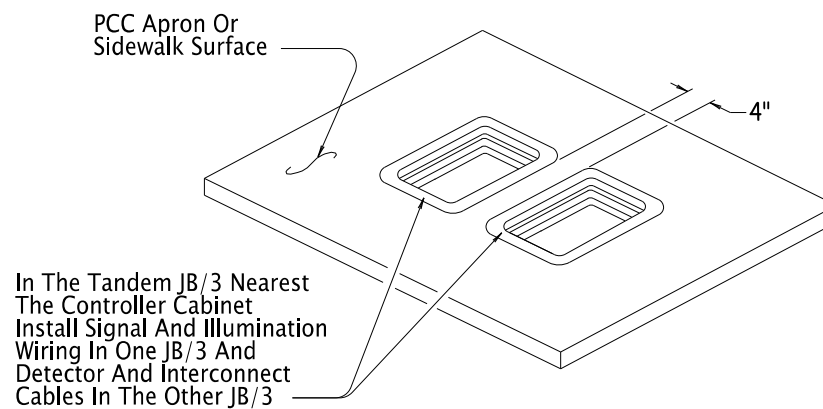
JUNCTION BOX INSTALLATION IN UNSURFACED AREA

(This Detail Only Applicable for Junction Boxes Located In Incidental Travel Areas; Gravel Shoulders, Behind Guardrail, Etc. Do Not Install In Travel Lanes, Paved Shoulders, Or Other Areas Exposed To Traffic.)

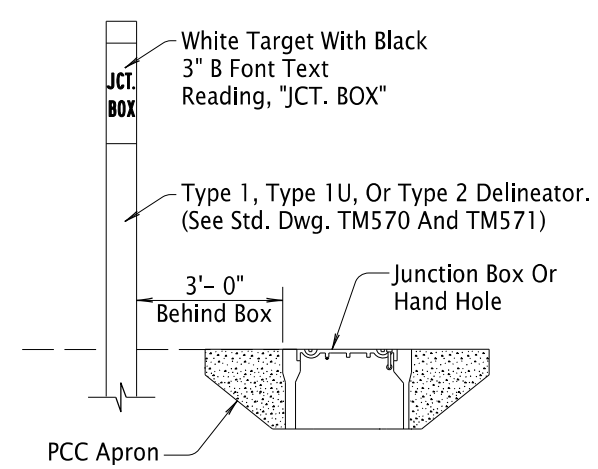


SECTION A-A

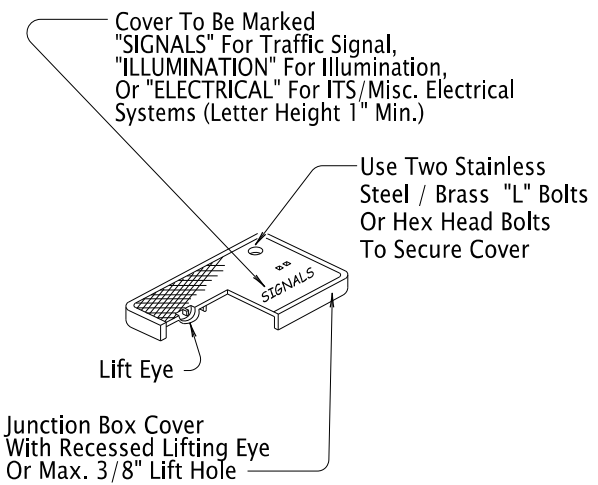
JUNCTION BOX INSTALLATION IN PCC SIDEWALK
(This Detail Only Applicable for Junction Boxes Located In Flat Areas Of Sidewalks. Do Not Install In Slopes Of Ramps Or Driveways)



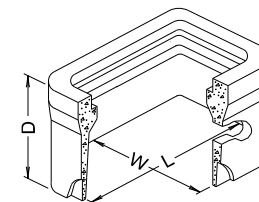
TANDEM JB/3A JUNCTION BOX DETAILS



DELINEATION OF JUNCTION BOX & HAND HOLE IN UNSURFACED AREA



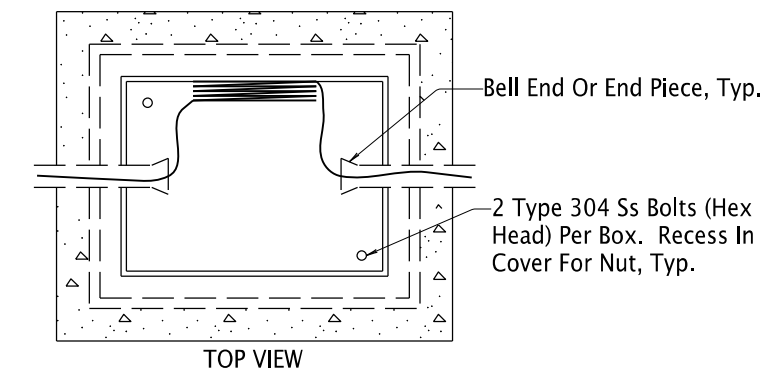
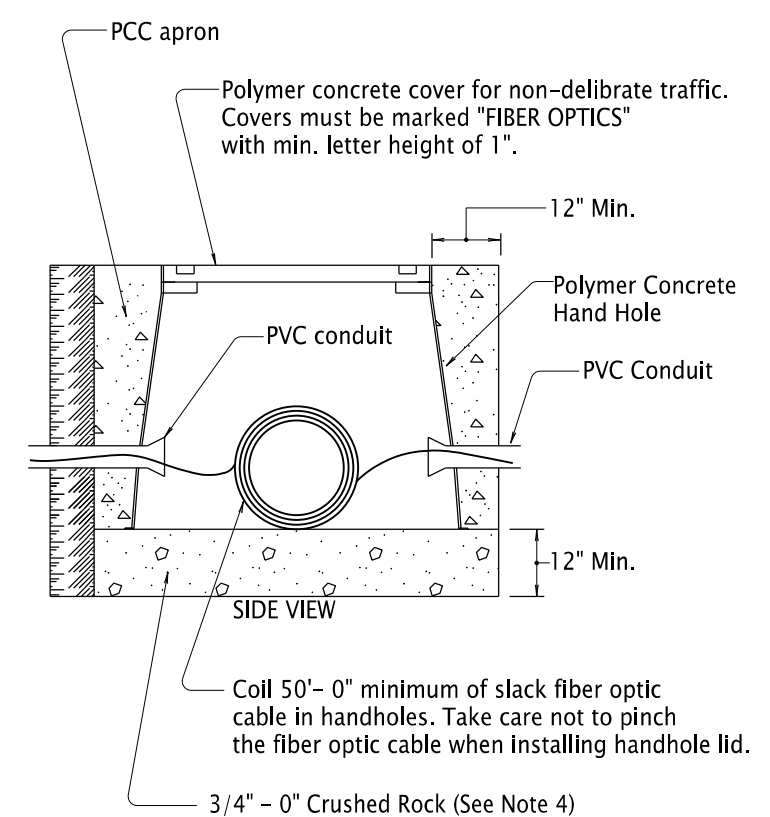
JUNCTION BOX COVER DETAILS



Type*	L	W	D
JB1	17"	10"	12"
JB2	22"	12"	12"
JB3	30"	17"	12"
HH-1	24"	30"	24"
HH-2	30"	48"	24"
HH-3	30"	48"	36"

*Junction Box Or Handhole Type As Shown On Plans

DIMENSION TABLE



FIBER OPTIC CABLE HAND HOLE INSTALLATION

GENERAL NOTES:

1. Install Top of Junction Box And Hand Hole Flush With The Sidewalk, Surrounding Grade, Or Top Of Curb. For Hand Holes Installed In The Roadway Or Shoulder, Leave The Top Of The Hand Hole 1/2" Below The Pavement Surface.
2. Install Junction Boxes And Hand Holes At The Approximate Locations Shown, Or If Not Shown, No More Than 300 Feet Apart For Junction Boxes And No More Than 1000 Feet Apart For Hand Holes.
3. More Junction Boxes And Hand Holes Than Specified May Be Installed To Facilitate The Work At The Option And Cost Of The Contractor
4. Use Materials According To 00640.10 and 00640.16. Use Compaction Equipment Suitable For Area And Compact Each Six Inch Layer With Sufficient Coverages To Produce A Firm Unyielding Surface. Do Not Install Conductors Until Surface Has Been Constructed.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

JUNCTION BOXES/HAND HOLES

2024

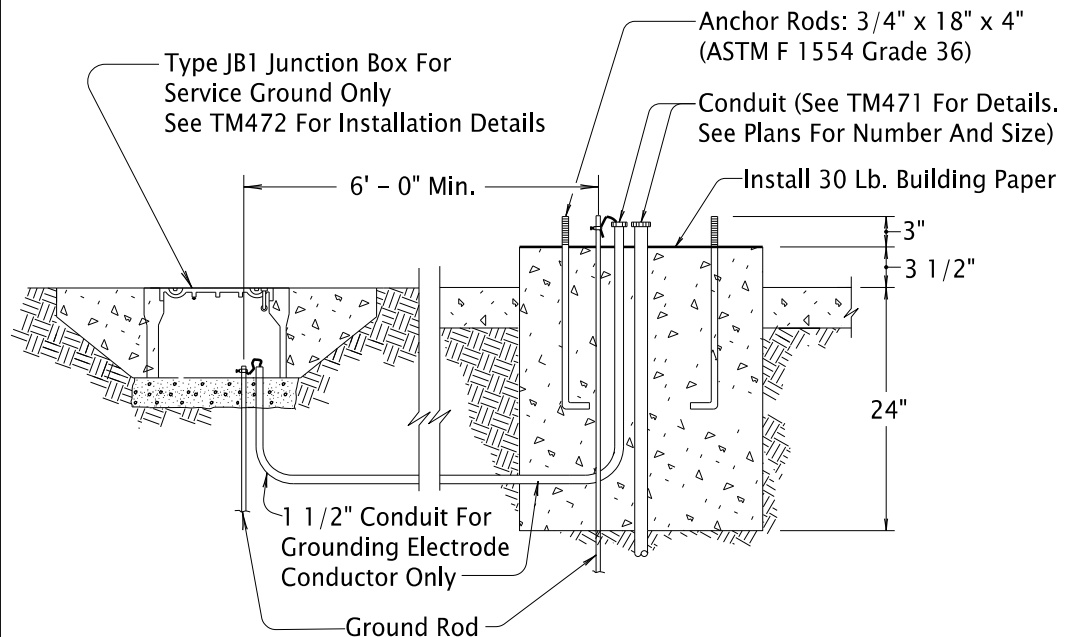
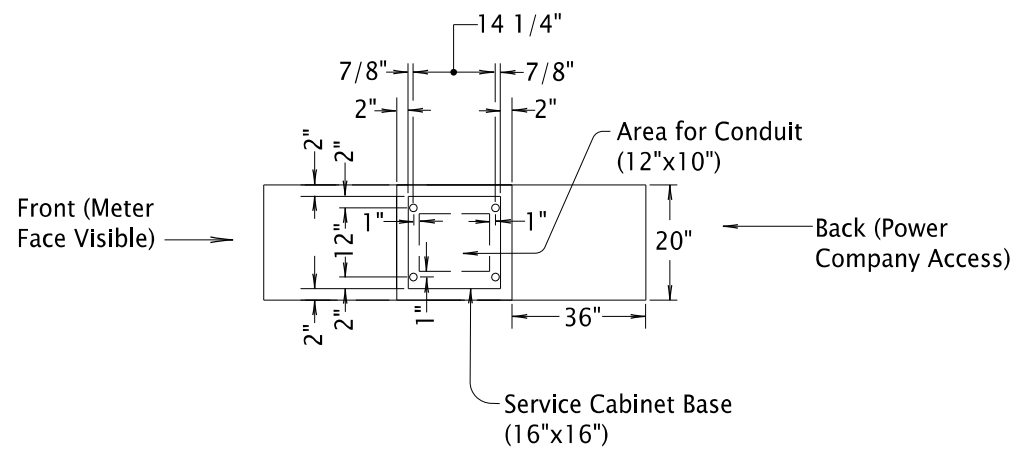
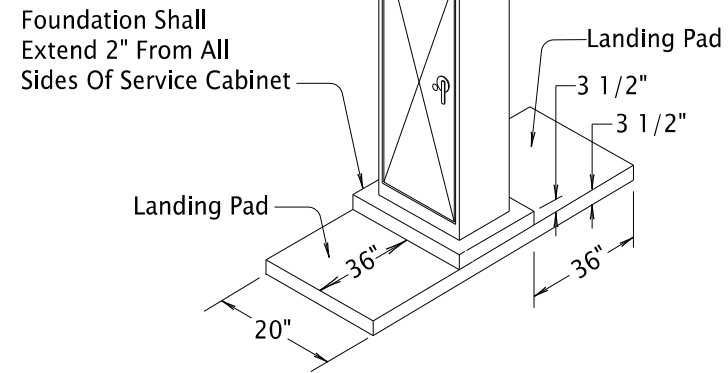
DATE	REVISION	DESCRIPTION
07-2022	ADDED NEW MARKING (ILLUMINATION & ELECTRICAL) FOR JB COVER	

CALC. BOOK NO.	N/A	SDR DATE	08-JUL-2022	TM472
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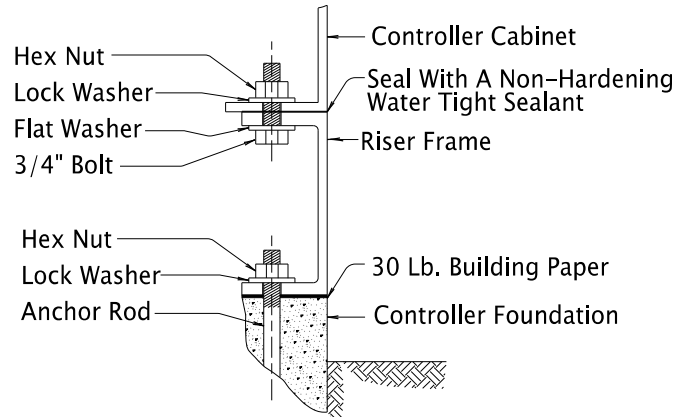
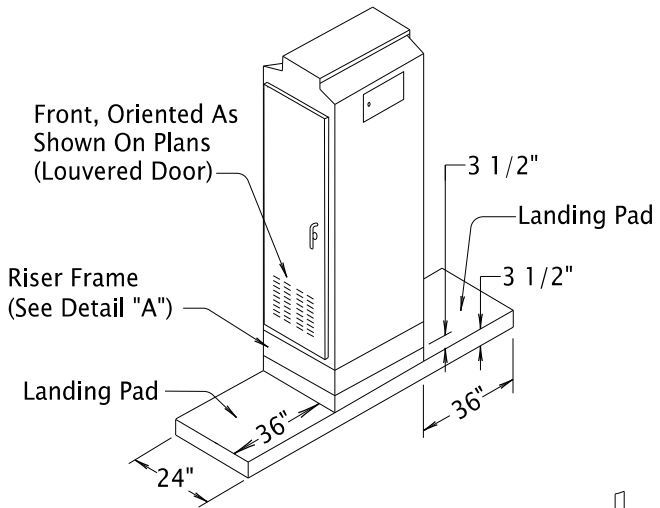
Effective Date: December 1, 2023 – May 31, 2024

04-JAN-2021

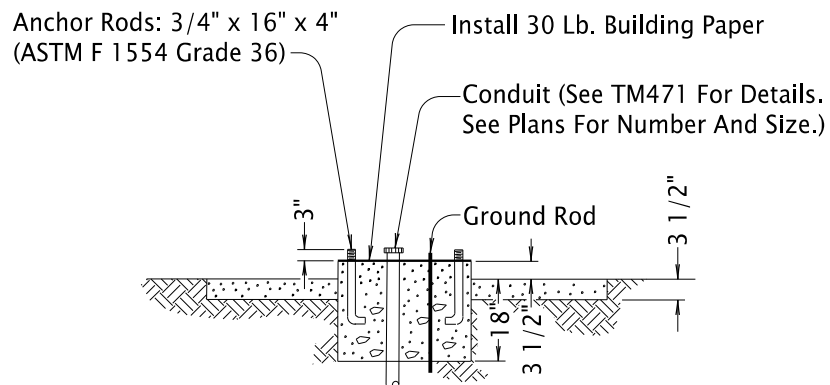
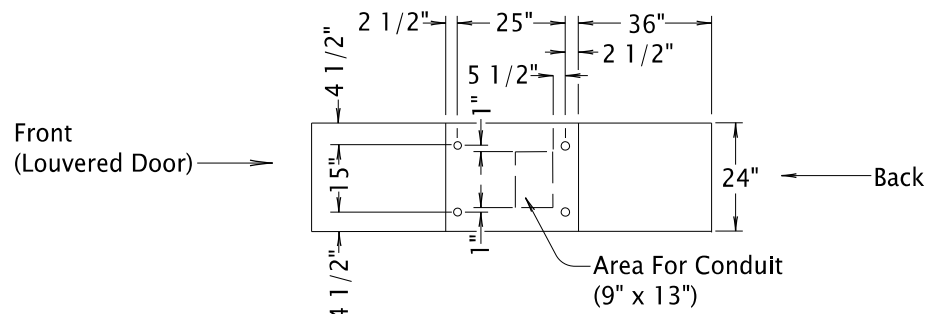
TM482.dgn



BASE MOUNTED SERVICE CABINET FOUNDATION



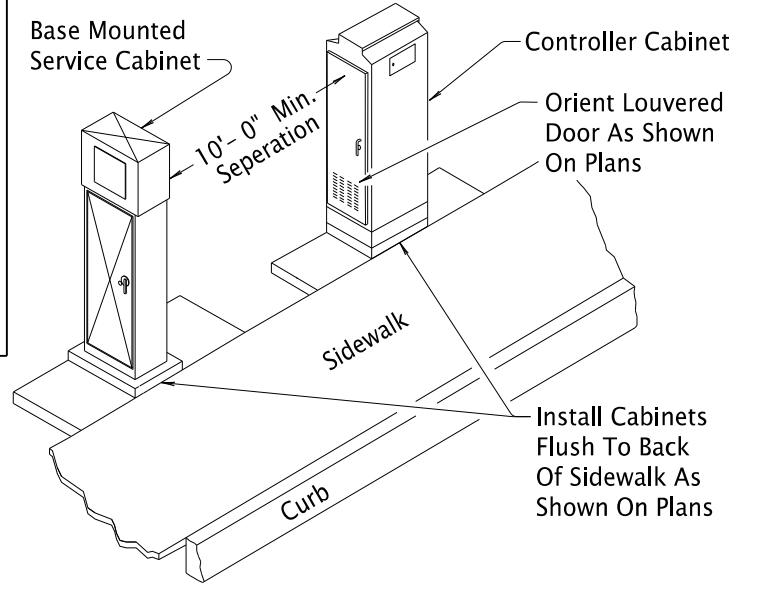
**DETAIL "A"
RISER FRAME CONNECTION**



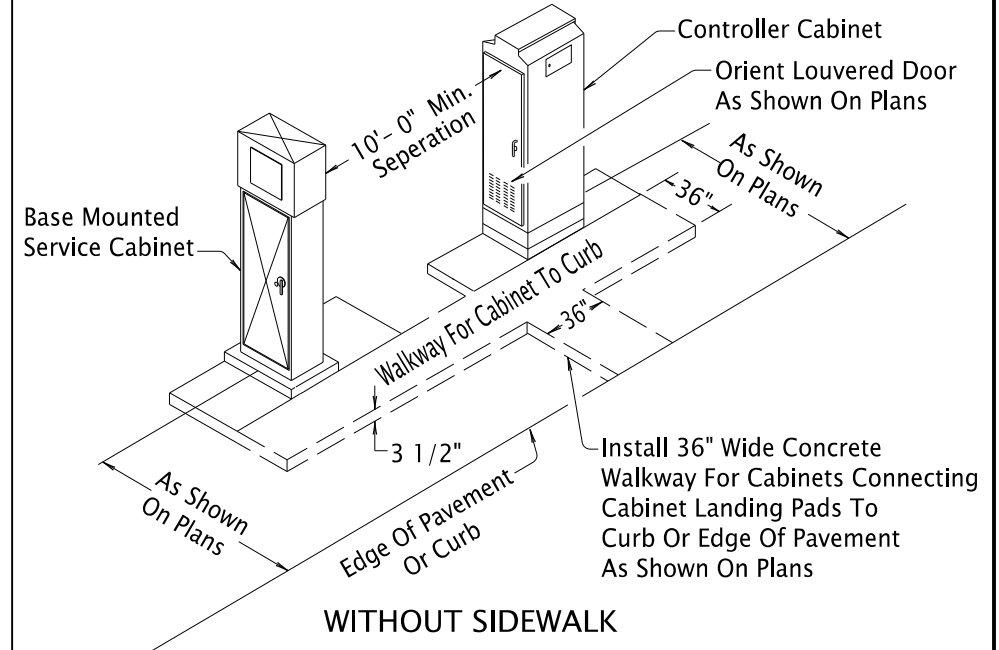
CONTROLLER CABINET FOUNDATION DETAILS
(Model 332S, 332, 334, And 340 Cabinets)

General Notes:

1. All Screws, Bolts, Nuts And Washers Shall Be Galvanized Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads. Allen Fasteners Not Allowed.
3. Type 304 Or 316 Stainless Steel Or Galvanized Steel May Be Used For Mounting Cabinet To Riser Frame.
4. Provide A 3/4" Chamfer On All Exposed Concrete Edges.



WITH SIDEWALK



WITHOUT SIDEWALK

CABINET FOUNDATION LOCATIONS

Note: Verify Base Mounted Service Cabinet Location And Meter Placement Is Acceptable To Local Power Company

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

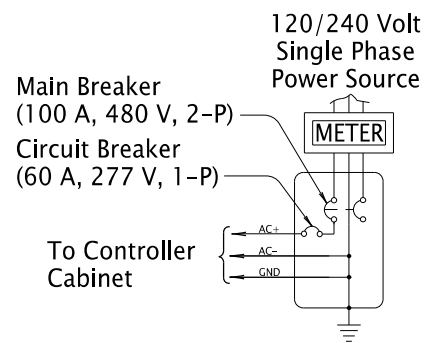
**OREGON STANDARD DRAWINGS
CONTROLLER CABINET &
SERVICE CABINET
FOUNDATION DETAILS**

2024

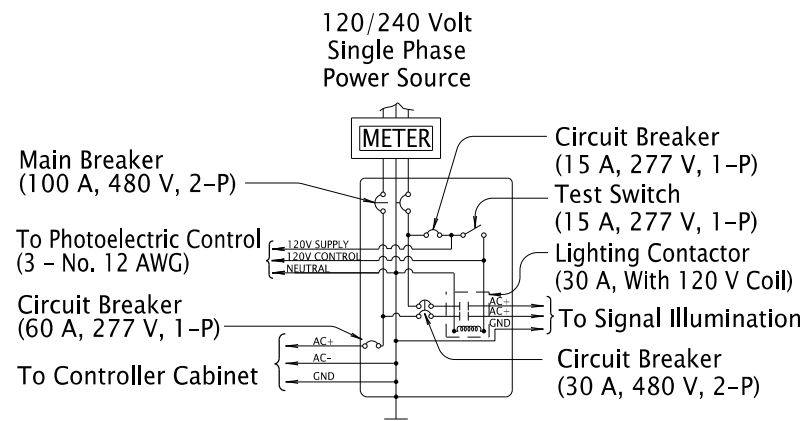
DATE	REVISION	DESCRIPTION
01-2021	UPDATED ALL ANCHOR ROD DETAILS	

CALC. BOOK NO. ---	N/A ---	SDR DATE: 04-JAN-2021	TM482
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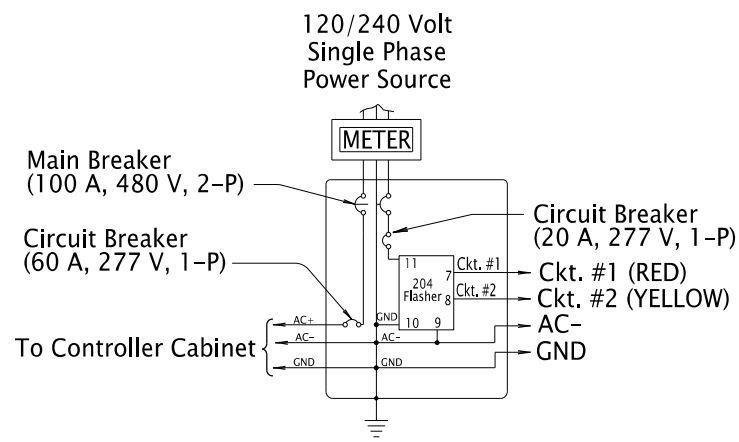
Effective Date: December 1, 2023 - May 31, 2024



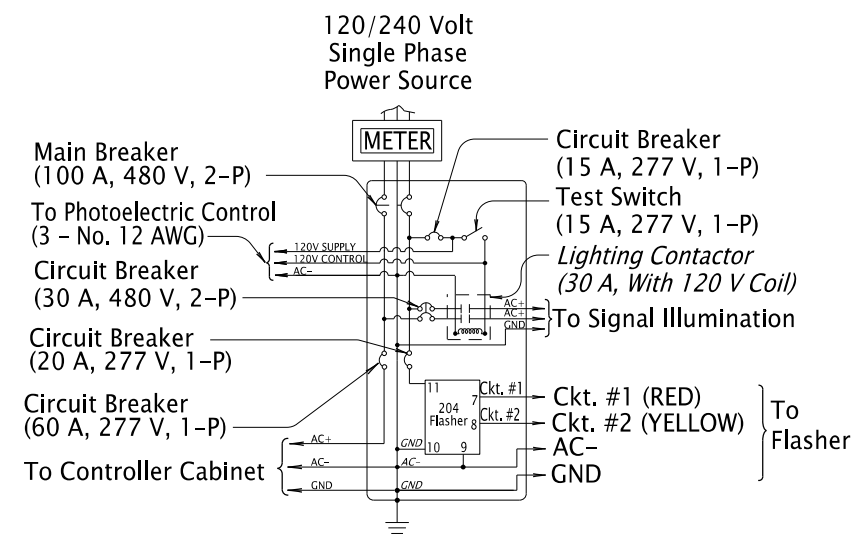
SERVICE CABINET WIRING: (BMC) (SC)
(Signal System)



SERVICE CABINET WIRING: (BMCL) (SCL)
(Signal + Illumination System)

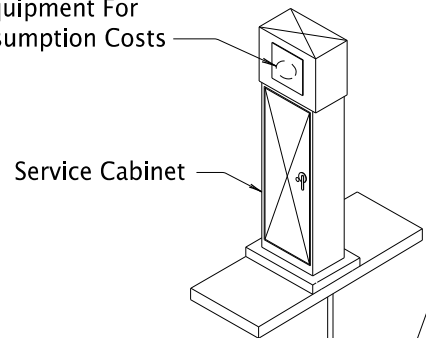


SERVICE CABINET WIRING: (BMCF)
(Signal + Flashing Beacon System)



SERVICE CABINET WIRING: (BMC FL)
(Signal + Flashing Beacon + Illumination System)

Utility Provider To Supply And Install Meter Or Required Equipment For Flat-Rate Power Consumption Costs



Install Utility Conduit As Per The Size, Material, Depth, And Mounting Requirements Of The Utility Provider. Utility Provider To Install Wiring.

To Commercial Power Source. Service Point Shown On Plans Is Approximate Only. Exact Location Shall Be Verified In The Field.

UTILITY PROVIDER DETAILS

General Notes:

1. Notify Utility Before Making Any Connections To Utility Poles.
2. Service Cabinet Shall Have A Solid Copper Neutral Bus And The Number And Size Of Switches Or Circuit Breakers As Shown. Service Cabinet Can Accommodate A Maximum Of 10 Circuit Breakers.
3. Wiring Connections To The Terminal Screws On The Circuit Breakers And Contactors Shall Make Full Contact Under The Screw Head.
4. Circuit Breakers Shall Be UL489 Listed, Unenclosed, Molded Case Bolt-On Type With End Conductor Terminals Suitable For Surface Mounting In The Cabinet On A False Back Or Bracket.
5. Label Circuit Breakers And Equipment With An Engraved Permanent Label On The Dead Front Panel To Indicate The Circuit Controlled.
6. Fill Out Manufacturer Provided Arc Flash Stickers Using A Permanent Handheld Labeler (Brady IDXPRT with XC-1500-580-WT-BK Tags Or Approved Equal).

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

SERVICE CABINET WIRING DETAILS

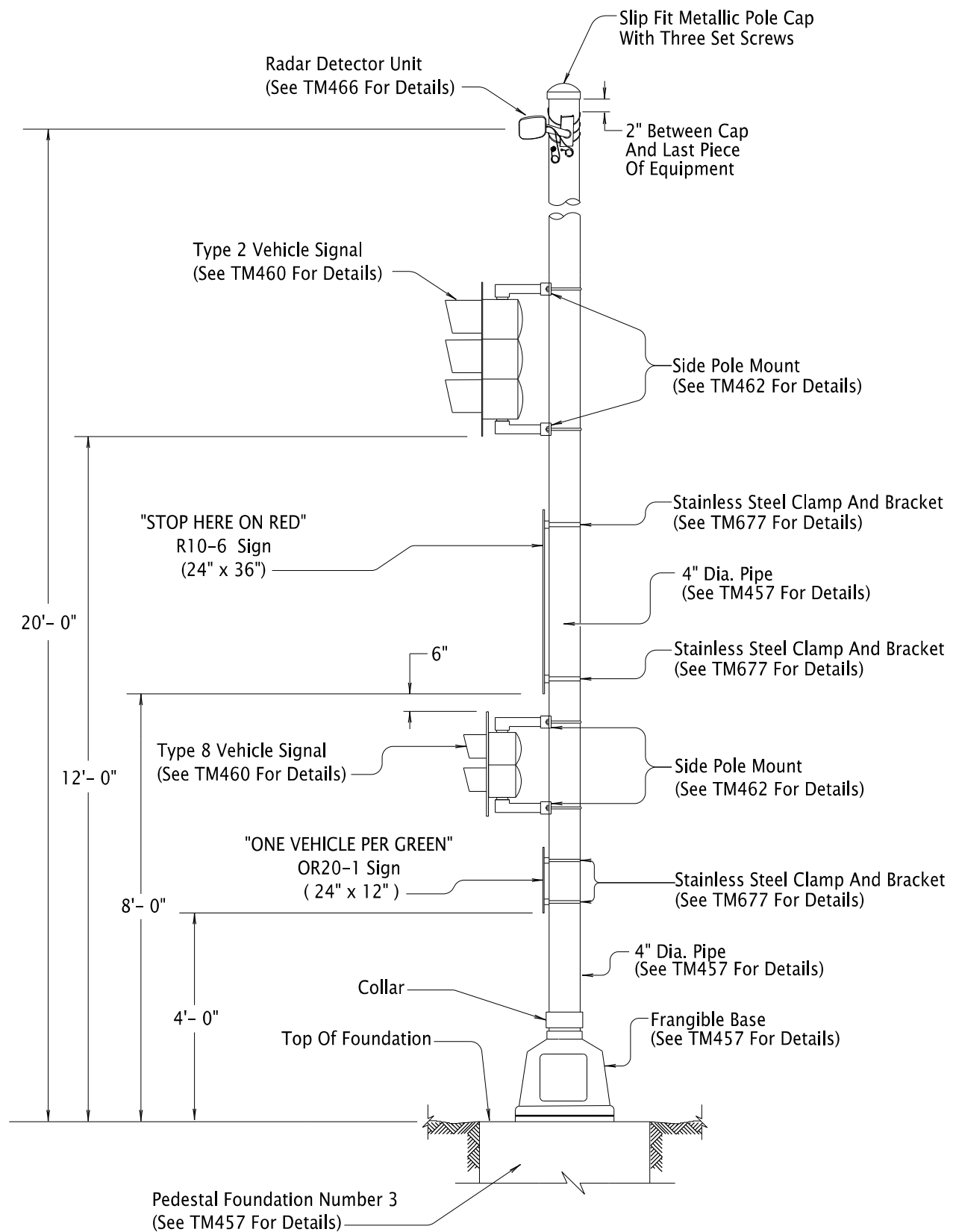
2024

DATE	REVISION	DESCRIPTION
07-2023	REVISED SERVICE CABINET WIRING TITLES. ADDED NOTE 6.	

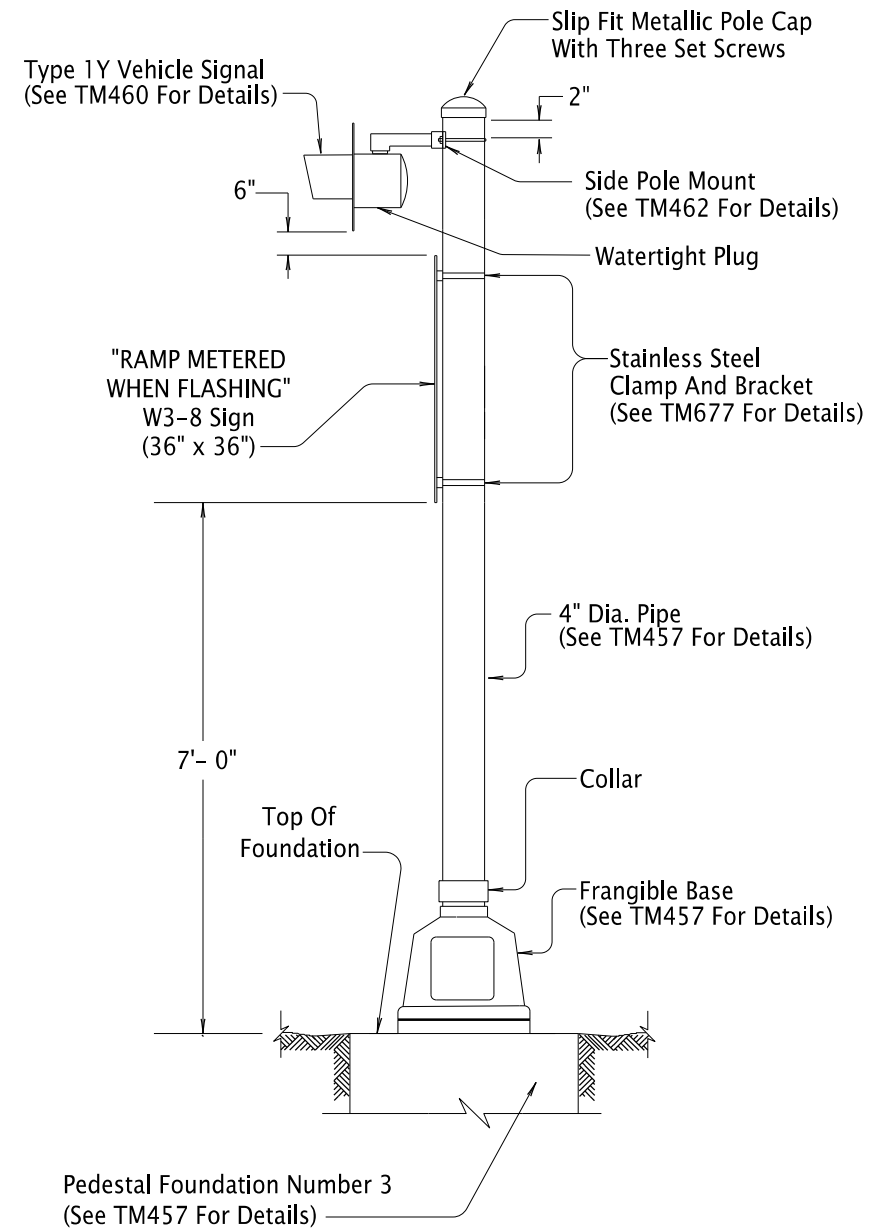
CALC. BOOK NO. --- N/A --- SDR DATE: 14-JUL-2023 **TM485**

14-JUL-2023

TM492.dgn



RAMP METER SIGNAL ASSEMBLY



RAMP METER ADVANCE WARNING SIGN ASSEMBLY

General Notes:

1. Equipment Shown In the Assembly Details Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
2. Do NOT Install Assemblies Within Paved Gore Area.
3. Locate Ramp Meter Signal Assembly 25'- 0" Beyond Stop Line Or As Shown.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

RAMP METER ASSEMBLIES

2024

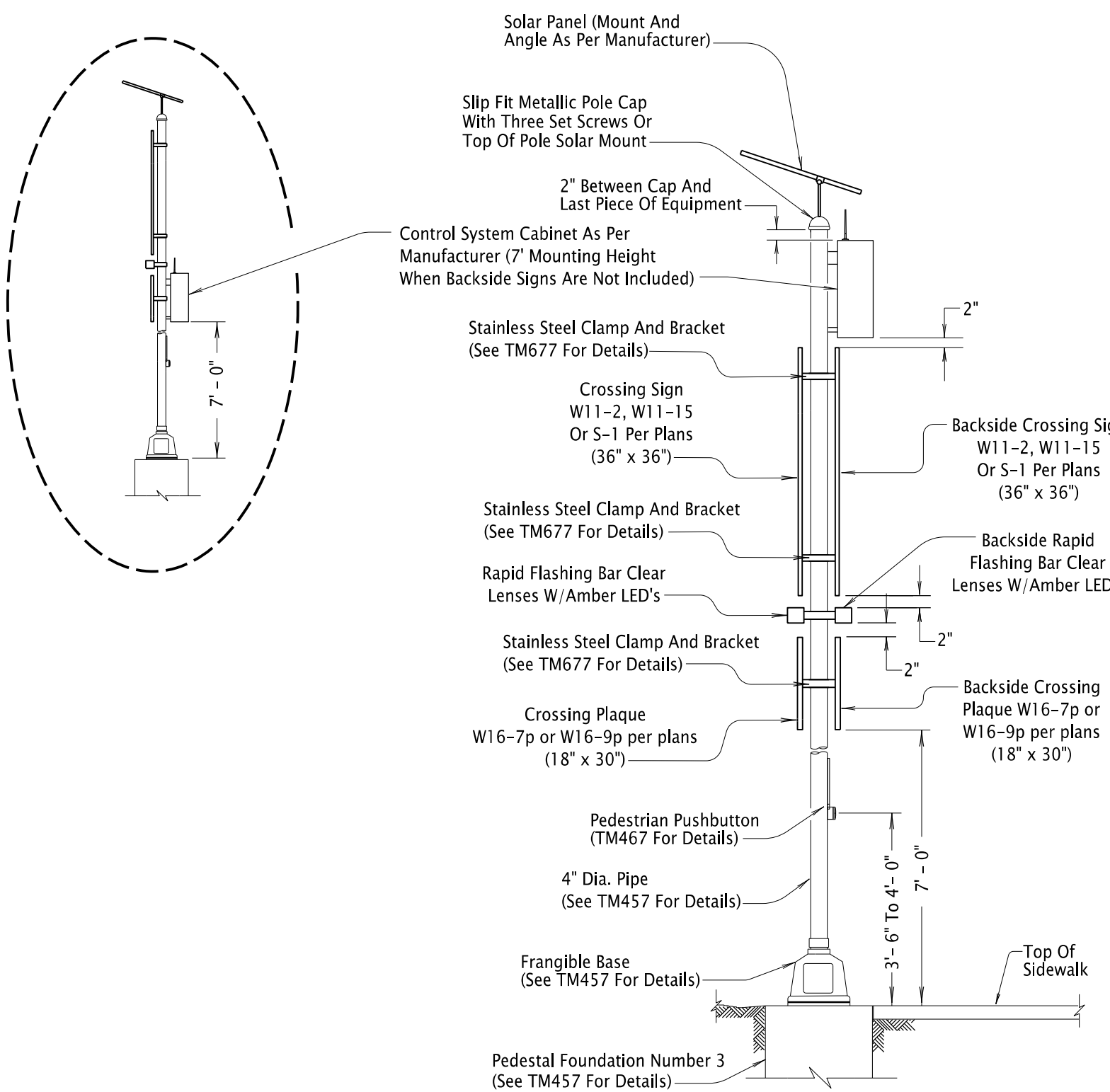
DATE	REVISION	DESCRIPTION
01-2021	REVISED DRAFTING, ADDED RADAR MOUNT REFERENCE, ADDED SLOPED	
		GROUND DETAILS, CHANGED NOTE 2 FROM 10 TO 25 FEET.
01-2022	REFERENCED TM457 FOR ALL PIPE INFO	
07-2022	REVISED TO MATCH TM457 REVISIONS/FORMAT	
07-2023	MINOR TEXT CHANGES FOR CLARITY	

CALC. BOOK NO. --- N/A --- SDR DATE-- 14-JUL-2023 -- **TM492**

Effective Date: December 1, 2023 – May 31, 2024

14-JUL-2023

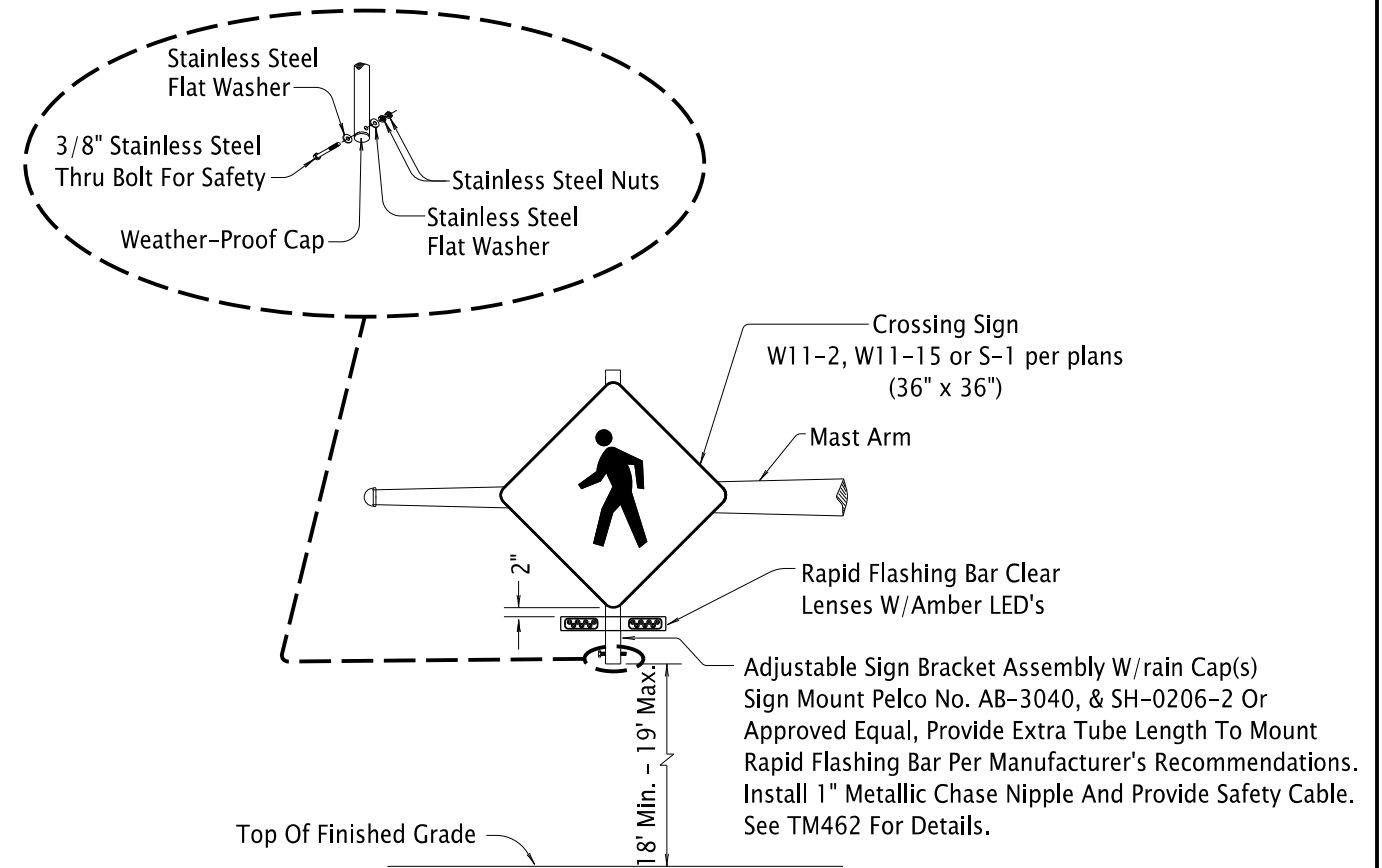
TM493.dgn



Note:

1. Equipment Shown In The Assembly Detail Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
2. Equipment Mounting Details Shown Are Also Applicable When Mounting Equipment To A Large Signal Pole.

RECTANGULAR RAPID FLASHING BEACON PEDESTAL ASSEMBLY
 (Use Green Sheet Listed Items Only)



RECTANGULAR RAPID FLASHING BEACON MAST ARM ASSEMBLY
 (Use Green Sheet Listed Items Only)

<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.</i></p>		<p>All materials shall be in accordance with the current Oregon Standard Specifications.</p>	
		<p>OREGON STANDARD DRAWINGS</p>	
		<p>RECTANGULAR RAPID FLASHING BEACON (RRFB) ASSEMBLIES</p>	
		<p>2024</p>	
DATE	REVISION	DESCRIPTION	
07-2022	NEW DRAWING		
07-2023	MINOR TEXT CHANGES FOR CLARITY		
CALC. BOOK NO.	N/A	SDR DATE	14-JUL-2023
			TM493

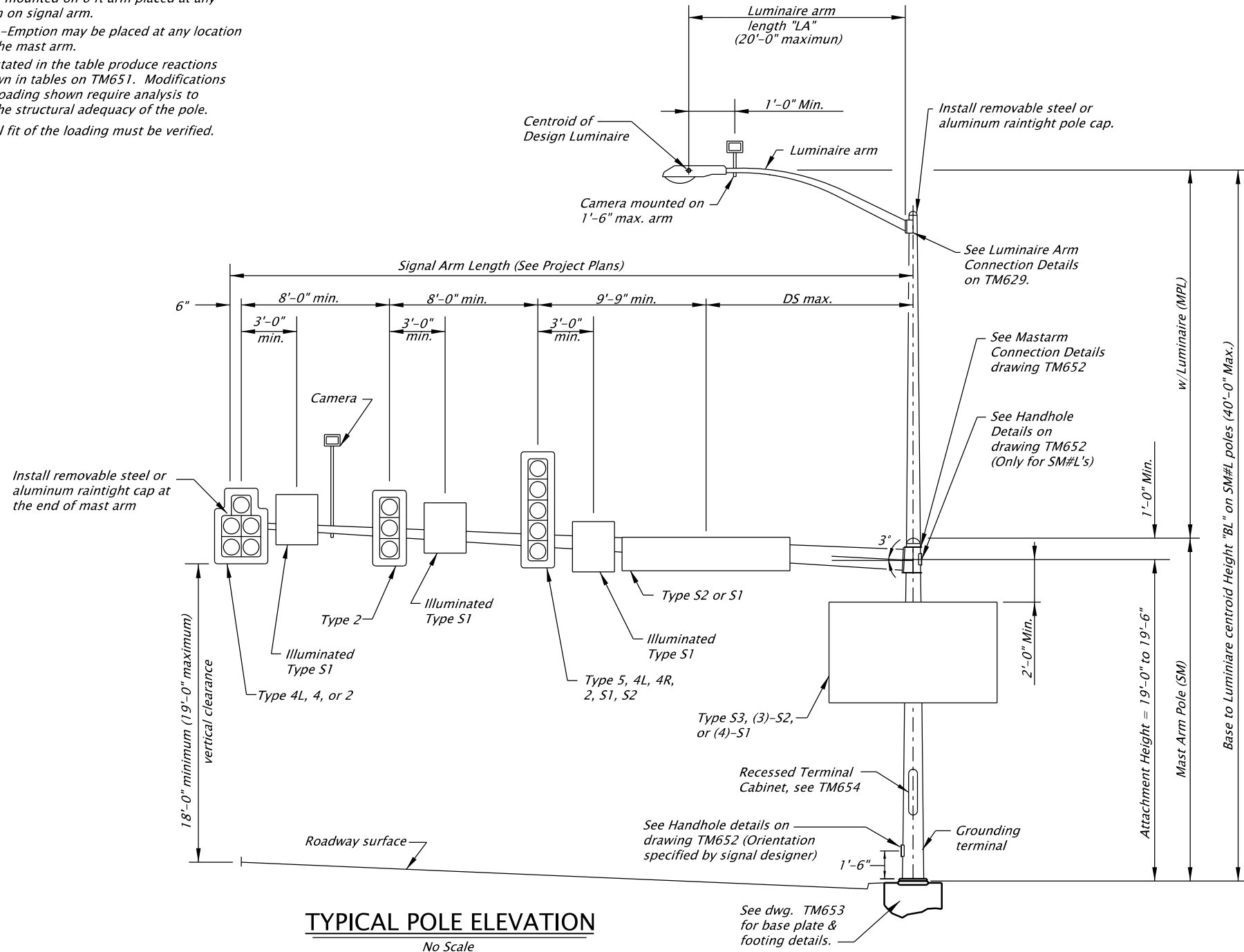
Effective Date: December 1, 2023 – May 31, 2024

STANDARD SIGNAL ARM LOADS							
Signal Pole Type	Signal Arm Length	Signals			Sign		DS Max. for S2
		4L Qty.	2 Qty.	5 *	S1 Qty.	S2 *	
SM1 or SM1L	15'	1	0	1	2	0	N/A
SM2 or SM2L	20'	1	1	1	3	0	N/A
	25'	1	1	1	3	0	
SM3 or SM3L	30'	1	1	1	3	1	9'-1"
	35'	1	1	1	3	1	
SM4 or SM4L	40'	1	2	1	4	1	11'-1"
	45'	1	2	1	4	1	
SM5 or SM5L	50'	1	2	1	4	1	21'-1"
	55'	1	2	1	4	1	

SIGNAL ARMS DEFLECTION		
Signal Arm Length "SA"	Allowable Dead Load Deflection	Allowable Total Load Deflection
15' or less	0.01"SA	0.05"SA
20'	2 1/2"	12"
25'	3 1/2"	15"
30'	5"	21"
35'	7"	29"
40'	9 1/2"	38"
45'	1'-1/2"	48"
50'	1'-4"	60"
55'	1'-8"	74"

* - Load location is the closest sign or signal of that type to the vertical post.

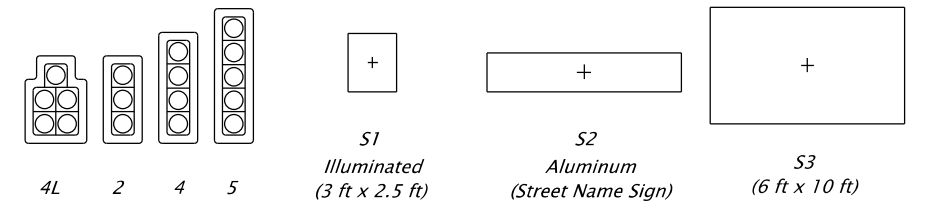
1. Camera mounted on 6 ft arm placed at any location on signal arm.
2. Fire Pre-Emption may be placed at any location along the mast arm.
3. Loads stated in the table produce reactions as shown in tables on TM651. Modifications to the loading shown require analysis to verify the structural adequacy of the pole.
4. Physical fit of the loading must be verified.



TYPICAL POLE ELEVATION
No Scale

VERTICAL POST LOADS								
Description	Maximum Centerline Elevation	Height (Each)	Width (Each)	Depth (Each)	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
2-Ped. Push Buttons	3'-6"	7 3/4"	5"	3 3/8"	0.27	0.18	0.12	3.0
Controller Cabinet	5'-9"	46"	24"	22"	7.67	7.03	3.67	300
2-Pedestrian Signals	8'-3 1/2"	18 3/4"	19"	19"	2.47	2.47	2.51	25.0
Terminal Cabinet	10'-9"	18 1/8"	6 3/4"	8 3/8"	0.85	1.05	0.39	25.0
Guide Sign (S3)	15'-0"	72"	120"	8 3/8"	60.0	1.00	1.67	395
Photoelectric Cell	38'-4"	2 1/4"	3 1/4"	3 1/4"	0.05	0.05	0.07	5.0

1. Physical fit of the loading must be verified.



SIGNAL POLE APPURTENANCE TYPES

APPURTENANCE LOADS				
Type	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
4L	12.4	6.61	3.64	145
2	8.67	6.61	1.95	85.0
4	11.0	8.49	1.95	97.0
5	13.3	10.36	1.95	142
S1	7.50	2.38	1.72	71.0
S2	21.0	0.00	1.67	105

Accompanied by dwgs. TM651, TM652, TM653, TM654, TM679

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS
TRAFFIC SIGNAL SUPPORT
GENERAL DETAILS & DESIGN CRITERIA
2024

DATE	REVISION	DESCRIPTION
07-2020	REPLACED HUB WITH RECESSED TERMINAL CABINET AND ADDED	
	ACCOMPANIED BY DRAWING TM654	

CALC. BOOK NO. 5301	SDR DATE 10-JUL-2020	TM650
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06-JAN-2023
TM651.dgn

GENERAL NOTES

1. Signal supports shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 4th edition, 2001, 2002, and 2003 interim revisions.
2. All traffic signal supports shall conform to the design criteria and details shown on these drawings except as approved by the Engineer.
3. The design basic wind speed (3 second gust) shall be 110 mph, gust factor $G = 1.14$, $I_r = 1.0$ (50 year recurrence interval), Fatigue Category II, no galloping, and truck speed = 55 mph.
4. Signal poles from this standard are not allowed over highways I-5, I-84, I-205, I-405, US 26 (Sunset Hwy.) between milepoints 64.3 - 73.0, I-105, and I-82. Signal poles on these highways require a Fatigue Category I.
5. Pole and arm shafts may be either round, hexdecagonal, dodecagonal, or octagonal but shapes shall not be mixed on a project. Dimensional tolerances of ASTM A595 shall apply to all tapered steel tubing members. Additionally, the diameter of round tapered steel tubing members or the dimensions across the flats of octagonal tapered steel tubing members shall not vary more than 2 percent from specified dimension. Two ply and fluted poles or arms are not permitted.
6. Pole taper shall be equal to .0117 in/in.
7. Anchor rods shall conform to ASTM Specification F1554 Gr. 55, Supplementary Requirement "S2" that include grade and manufacturer's identification.
8. High strength bolts shall conform to ASTM F3125 Grade A325 Type 1.
9. Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".
10. Hardened steel washers shall conform to ASTM F436 Type 1.
11. Direct Tension Indicators (DTI) shall be the compressible washer type, mechanically galvanized, conforming to ASTM F959.
12. Steel sheet for poles and arm shall conform ASTM A595, Grades A or B, ASTM A572 Gr. 50, or approved equal. All other steel sheet and plate shall conform to AASHTO specification M223 (ASTM A572), or approved equal. Supplement S18 of ASTM A6 regarding maximum tensile strength shall apply.
13. All structural steel including fasteners shall be hot-dip galvanized after fabrication unless otherwise noted.
14. Galvanize-Control Silicon, typical. Silicon content of the base metal shall be in the range of 0 to 0.04 percent or 0.15 to 0.25 percent.
15. Footing concrete shall be Commercial Grade Concrete ($f_c=3000$ psi) per Specification Section 440. Grout in grout pad shall be non-shrink high early strength grout (non-ferrous) with a minimum strength of 5000 psi.
16. Reinforcing steel shall conform to AASHTO M31, Grade 60 (ASTM A615 or A706). A minimum lap splice length of 32 bar diameters shall be used unless shown otherwise.

17. Computed deflection of these poles at full design loading shall be limited to 5 percent of the pole length. Computed dead load deflection of the poles shall be limited to 1 percent of the pole length. Pole shall be raked to offset the computed dead load deflection. Computed deflection (ignoring pole bending and/or rotation) of signal arms shall not exceed that listed in the Signal Arm Deflection Table on TM650. Additionally, the amplitude (maximum up to maximum down as measured at the tip of the arm) of wind induced vertical oscillations shall not exceed 1.5 percent of the signal arm length. Luminaire arms and pole extensions to support luminaire arms shall meet requirements of standard drawing TM629.
18. Hubs for cabinets and/or other appurtenances shall be welded into the pole prior to galvanizing. Poles may be tapped for up to 1" galvanized bolts after pole has been galvanized.
19. Longitudinal seam welds within 6 inches of a circumferential weld shall be complete penetration welds. Weld inspection shall be in accordance with AWS D1.1 and the special provisions. Inspect seam welds using cyclically loaded criteria. Hubs shall be 3000# threaded forged carbon steel flat weld hubs by Anvil Products Inc., Phoenix Forging Co., Bonney Forge & Tool Works or approved equal.
20. Grounding terminal shall be 1/2" UNC x 1 1/2" Type 308, 309 or 310 threaded stainless steel weld studs.
21. Assemble support, tighten anchor bolts, tighten HS thru bolts and tighten HS bolts in tapped holes according to 00962.46(j)(2).
22. Round and smooth all edges along electrical way.
23. The minimum arm flange thickness shall be equal to the value where prying action is not included in the bolt calculation.

Standard Maximum Base Reactions (Unfactored)								
Signal Pole Type	Signal Arm Lengths	Wind Load Case II				Controlling Fatigue		
		Axial (Kips)	Shear (Kips)	Moment (Kip-ft)	Torque (Kip-ft)	Shear (Kips)	Moment (Kip-ft)	Torque (Kip-ft)
SM1	15'	2.10	5.15	80.39	16.95	0.68	10.39	2.13
SM2	20', 25'	2.66	6.23	105.41	42.54	0.82	13.35	5.37
SM3	30', 35'	3.49	7.77	138.43	82.87	1.00	17.10	10.31
SM4	40', 45'	4.51	9.00	173.46	132.72	1.16	20.54	16.50
SM5	50', 55'	5.69	9.23	190.91	181.60	1.18	21.62	22.55
SM1L	15'	2.96	6.09	113.28	23.22	0.79	14.08	2.84
SM2L	20', 25'	3.69	7.23	139.41	48.81	0.94	17.17	6.08
SM3L	30', 35'	4.39	8.80	176.51	87.88	1.14	21.43	11.02
SM4L	40', 45'	5.94	10.14	215.11	136.97	1.31	25.27	17.21
SM5L	50', 55'	7.34	10.56	241.17	187.96	1.34	26.49	23.26

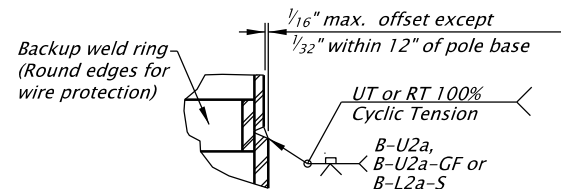
Standard Maximum Mast Arm Reactions						
Signal Pole Type	Signal Arm Lengths	Wind Load Case II			Controlling Fatigue	
		Axial (Kips)	Shear (Kips)	Moment (Kip-ft)	Shear (Kips)	Moment (Kip-ft)
SM1, SM1L	15'	0.06	1.98	18.44	0.23	2.18
SM2, SM2L	20', 25'	0.10	3.14	46.20	0.37	5.48
SM3, SM3L	30', 35'	0.15	4.51	89.42	0.53	10.51
SM4, SM4L	40', 45'	0.23	5.91	146.67	0.67	16.82
SM5, SM5L	50', 55'	0.34	6.78	211.94	0.70	22.99

Luminaire Arm Reactions					
Arm Lengths	Wind Load Case II			Controlling Fatigue	
	Axial (Kips)	Shear (Kips)	Moment (Kip-ft)	Shear (Kips)	Moment (Kip-ft)
6'	0.03	0.31	1.49	0.03	0.15
10'	0.06	0.38	2.85	0.04	0.29
15'	0.08	0.47	4.96	0.05	0.51
20'	0.05	0.55	7.24	0.06	0.74

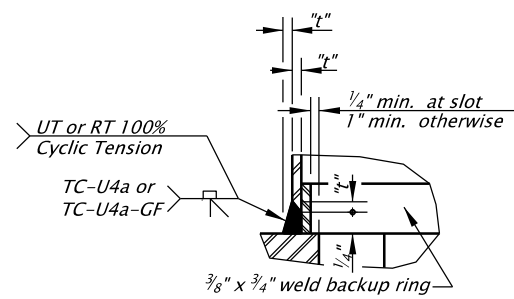
Accompanied by drawings TM650, TM652, TM653, TM654

<p>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.</p>	All materials shall be in accordance with the current Oregon Standard Specifications.		
	OREGON STANDARD DRAWINGS		
	TRAFFIC SIGNAL SUPPORTS NOTES AND REACTIONS		
	2024		
	DATE	REVISION	DESCRIPTION
07-2020	ADDED	ACCOMPANIED BY STANDARD DRAWING TM654	
07-2021	ADDED	"(UNFACTORED)" TO THE TABLE HEADING	
01-2023	CHANGED	HIGH STRENGTH BOLT TIGHTENING TO 00962.46(j)(2)	
CALC. BOOK NO. -- 5301 --	SDR DATE -- 06-JAN-2023 --	TM651	

Effective Date: December 1, 2023 - May 31, 2024

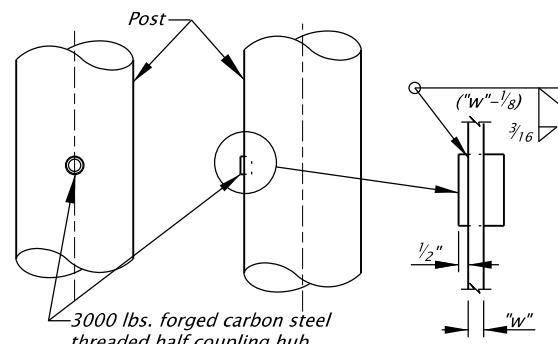


POLE AND ARM SPLICE WELD DETAILS
No Scale

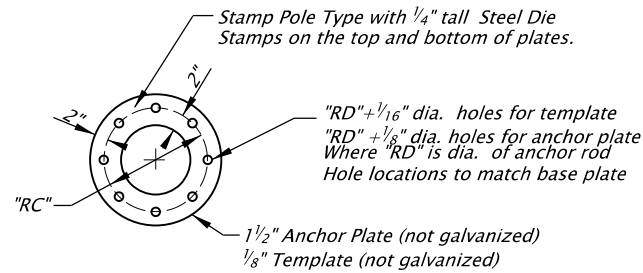


TC-U4a WELD DETAIL
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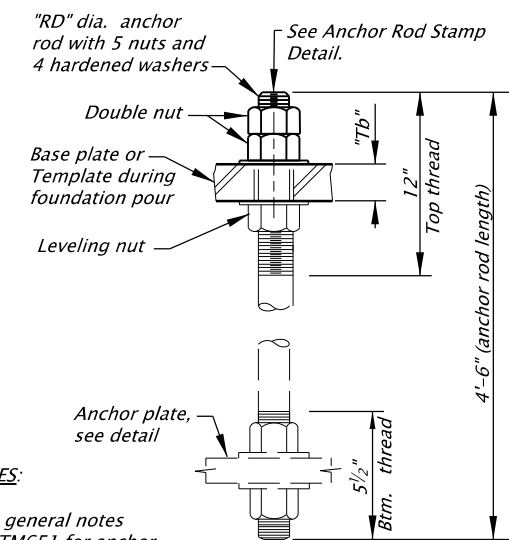
Mast arm Connection				
Signal Arm Lengths	N Number	D Bolt Diam.	BC Bolt Circle	V Bolt Spacing
15'	4	1"	9 1/2"	—
20', 25'	4	1 1/4"	14"	—
30', 35'	4	1 1/2"	15 1/2"	—
40', 45'	8	1"	—	5"
50', 55'	8	1 1/4"	—	6"



HUB WELD DETAIL
No Scale



ANCHOR PLATE AND TEMPLATE DETAIL
No Scale

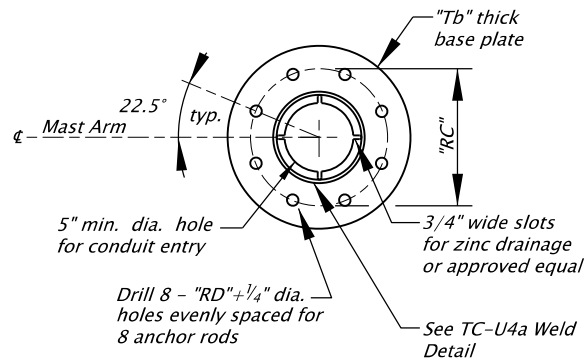


NOTES:

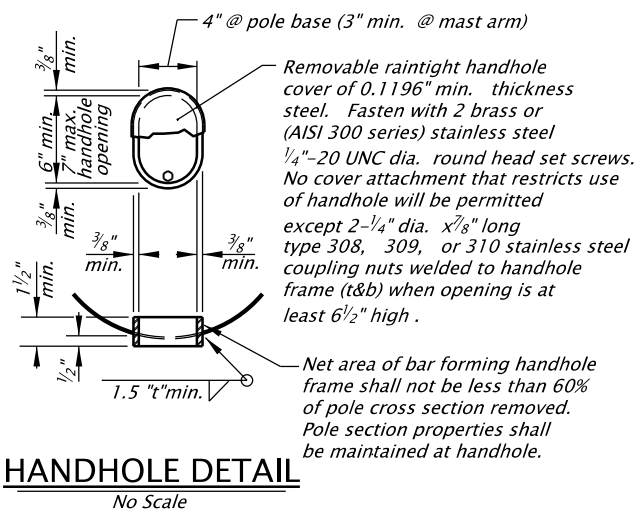
- See general notes on TM651 for anchor rod tightening.
- "Tb" determined by manufacturer.

ANCHOR ROD DETAIL
No Scale

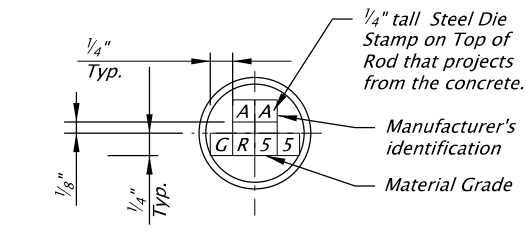
Anchor Rods and Base Plate Data			
Mastarm Pole Type	Strain Pole Type	RD Rod Diam.	RC Rod Circle
SM1	----	1 1/4"	16 1/2"
SM2, SM1L	----	1 1/2"	17"
SM3, SM2L	STP1, STP1L, STP2, STP2L	1 1/2"	20"
SM4, SM3L	STP3, STP3L, STP4, STP4L	1 3/4"	22"
SM5, SM4L	----	1 3/4"	23"
SM5L	STP5, STP5L, STP6, STP6L, STP7, STP7L	2"	23 1/2"



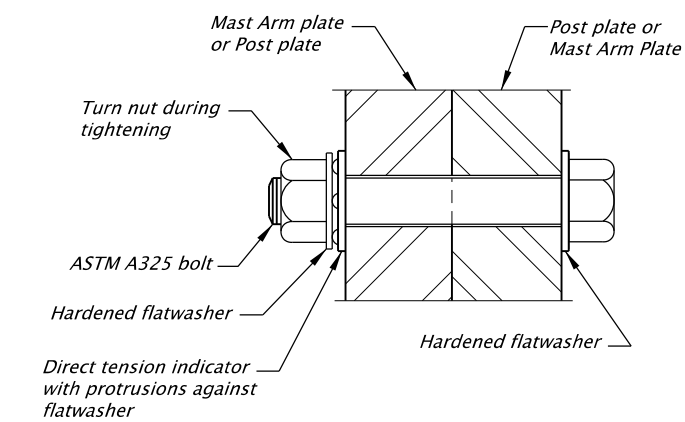
PLAN - BASE PLATE
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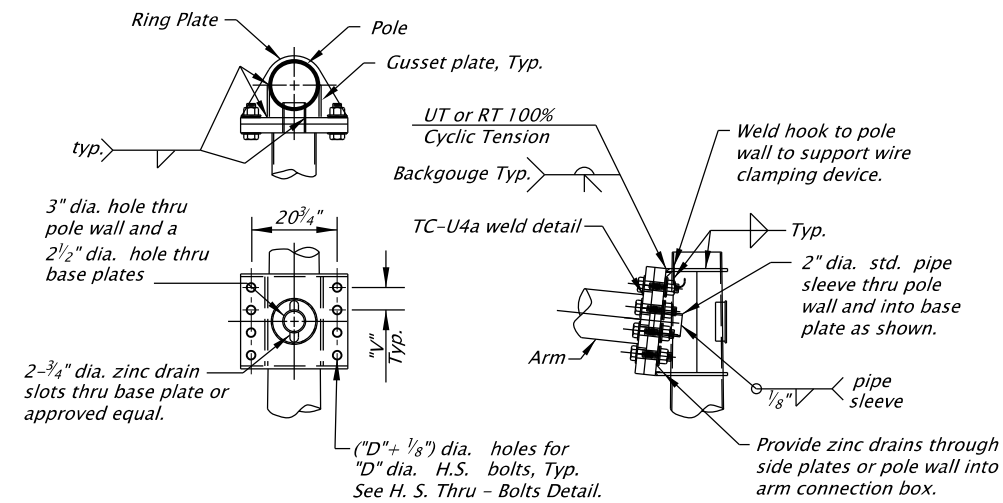
HANDHOLE DETAIL
No Scale



ANCHOR ROD STAMP DETAIL
No Scale



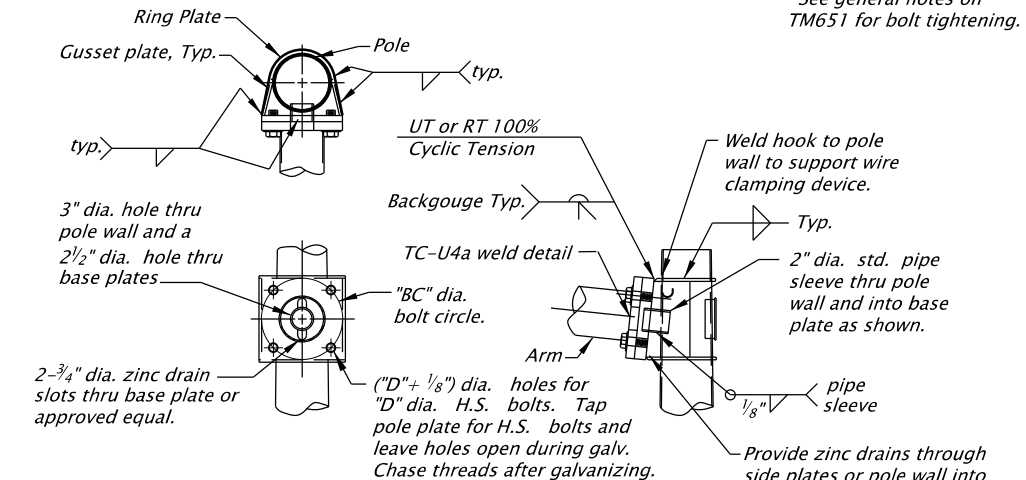
H.S. THRU - BOLTS
No Scale



8 BOLT ARM CONNECTION DETAILS
No Scale

ARM CONNECTION NOTES:

- Gusset plates are 1/4" min. thickness.
- Ring plates are 3/8" min. thickness.
- See general notes on TM651 for bolt tightening.



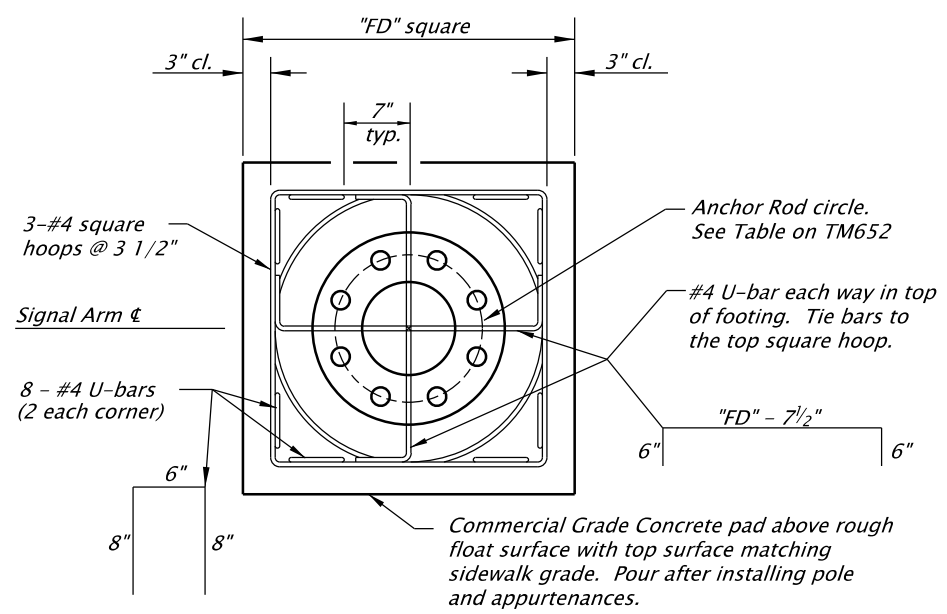
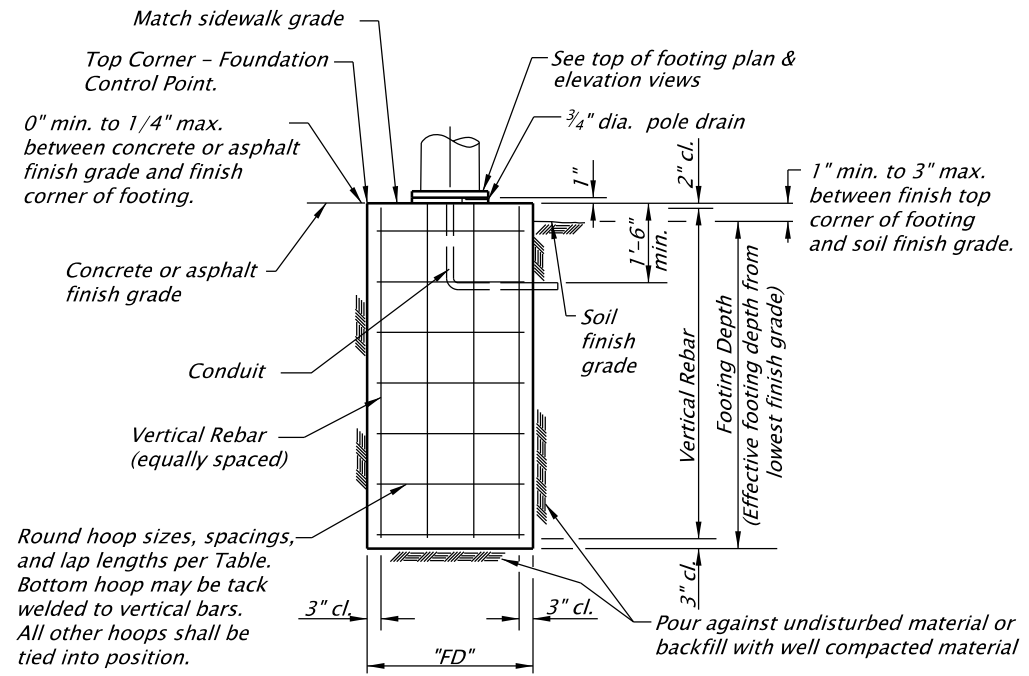
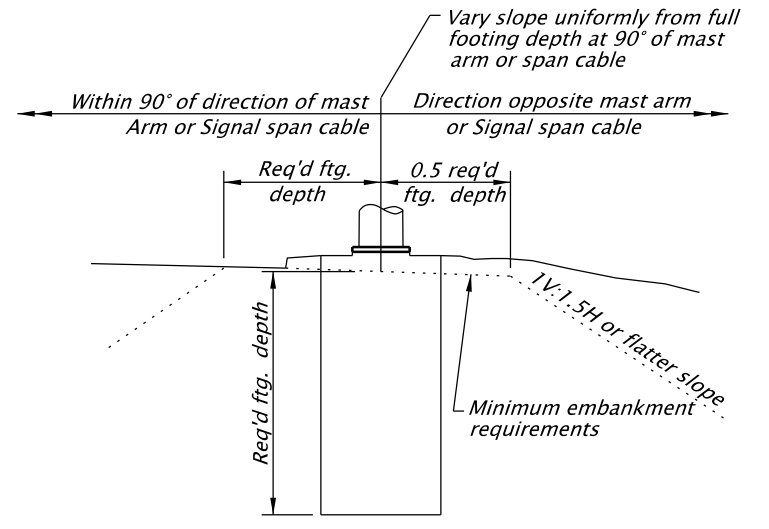
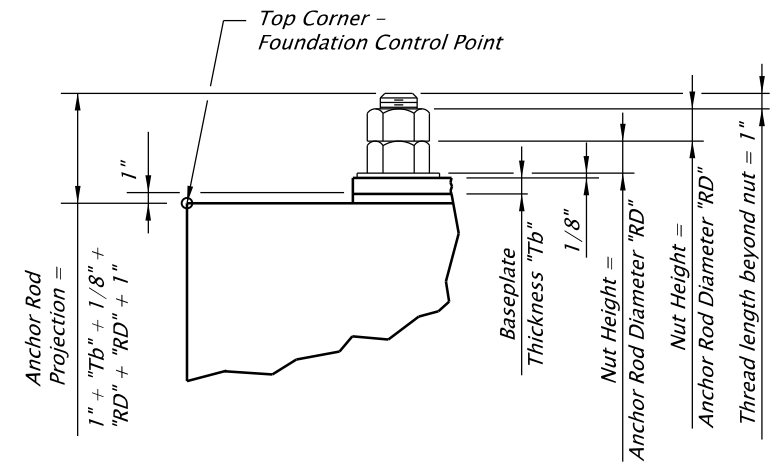
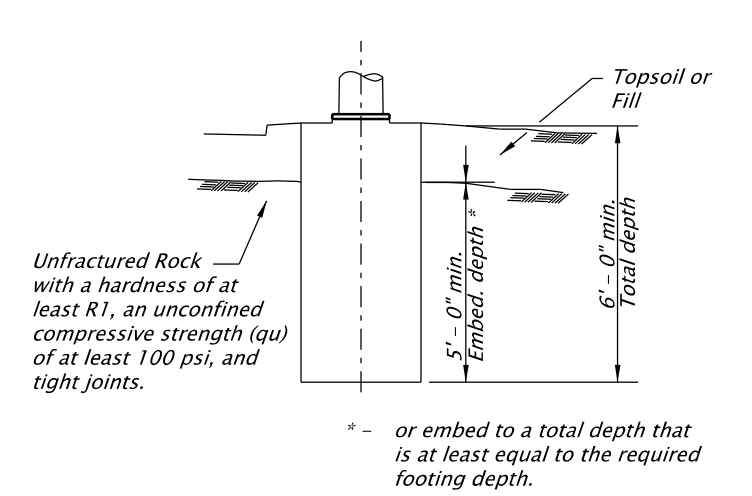
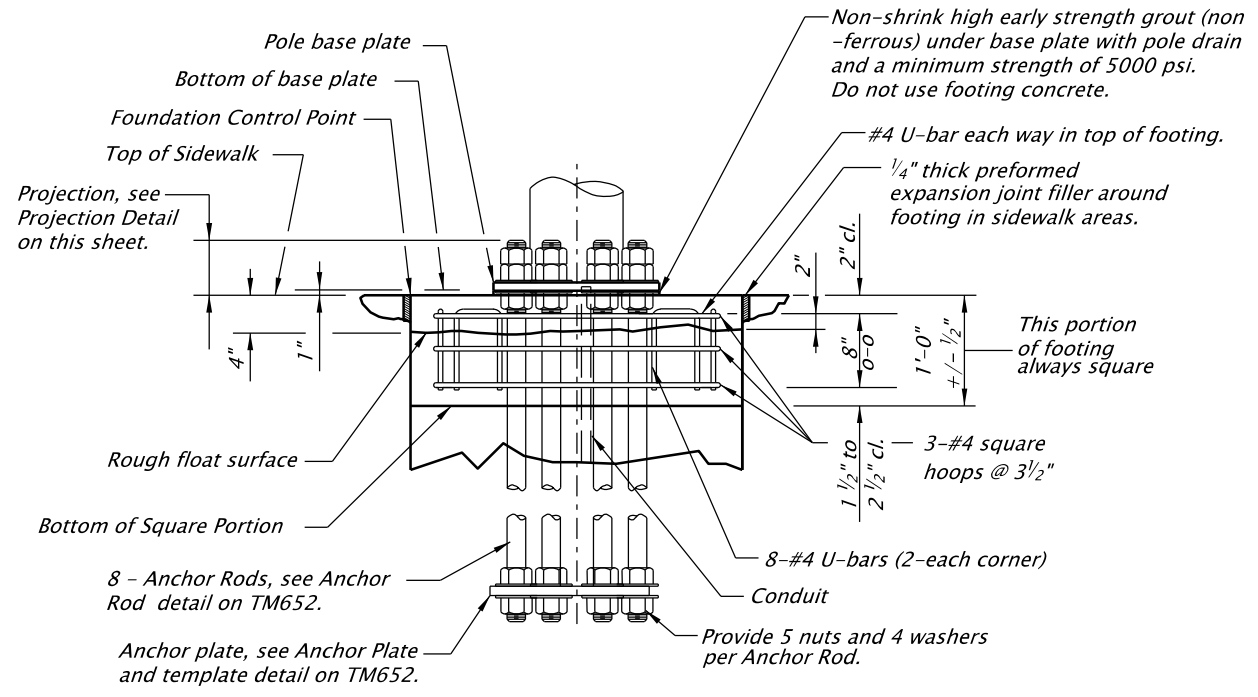
4 BOLT ARM CONNECTION DETAILS
No Scale

Accompanied by dwgs. TM650, TM651, TM653, TM654

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

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OREGON STANDARD DRAWINGS			
TRAFFIC SIGNAL SUPPORTS			
STEEL DETAILS			
2024			
DATE	REVISION DESCRIPTION		
07-2020	ADDED ACCOMPANIED BY DRAWING TM654		
CALC. BOOK NO.	5301	SDR DATE	10-JUL-2020
			TM652

Standard Foundations					
Foundation Number	Mastarm Pole Types	"FD" Diameter Min.	Vertical Rebar	Hoop Size and Spacing	Hoop Lap Length
1	SM1	36"	8-#8	#4 at 6"	18"
2	SM2, SM1L	36"	8-#8	#4 at 6"	18"
3	SM3, SM2L	36"	8-#8	#4 at 6"	18"
4	SM4, SM3L	42"	10-#8	#5 at 6"	21"
5	SM5, SM4L	42"	10-#9	#5 at 6"	21"
6	SM5L	42"	10-#9	#5 at 6"	21"



NOTES:
See TM651 for general notes.
The pier torsional forces have been designed according to the ACI 318.

Accompanied by dwgs. TM650, TM651, TM652, TM654

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

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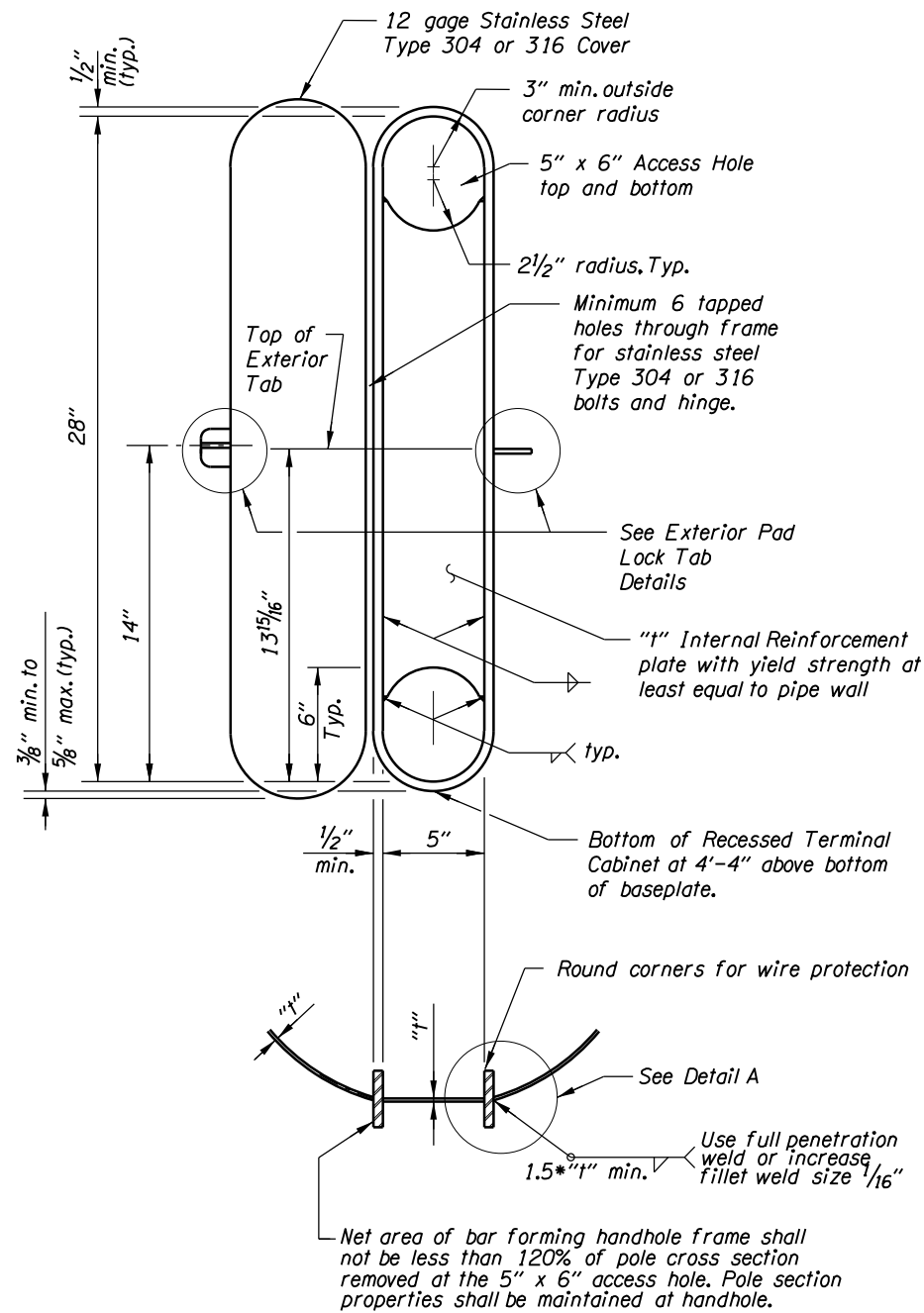
OREGON STANDARD DRAWINGS

TRAFFIC SIGNAL SUPPORTS FOUNDATION REQUIREMENTS

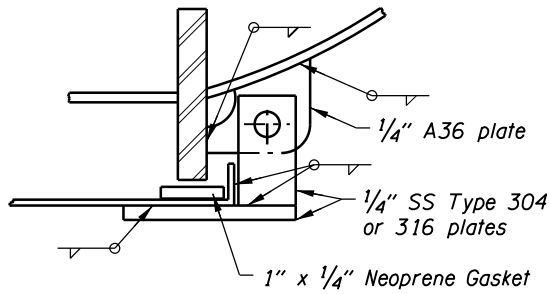
2024

DATE	REVISION	DESCRIPTION
07-2020	ADDED	ACCOMPANIED BY DRAWING TM654

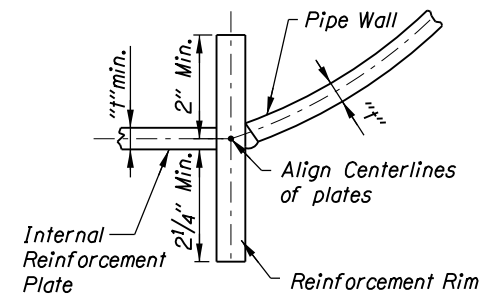
CALC. BOOK NO. 5323	SDR DATE 10-JUL-2020	TM653
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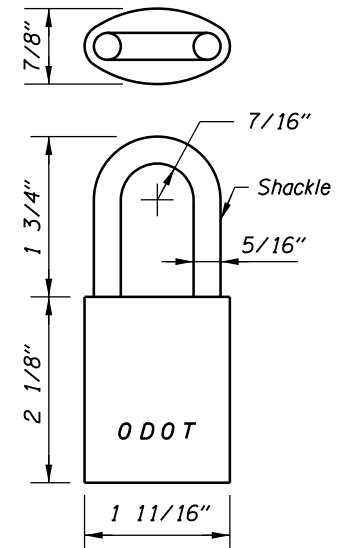
RECESSED TERMINAL CABINET DETAIL
No scale



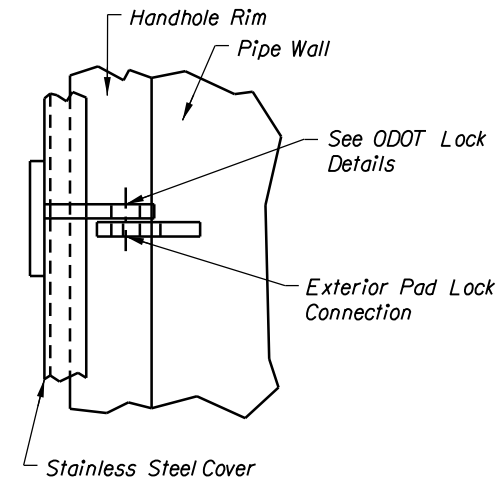
SECTION A-A
No scale



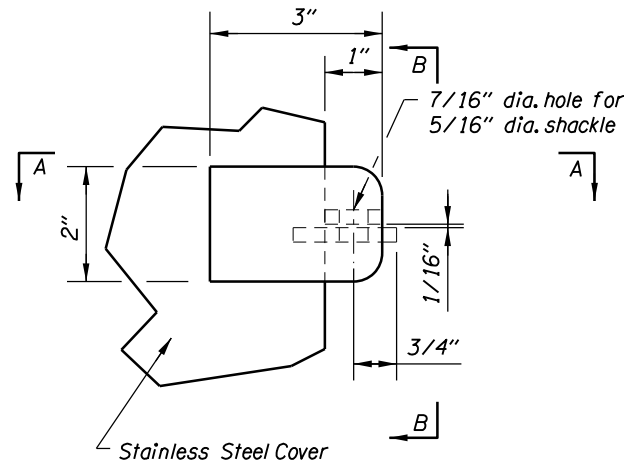
DETAIL A
No scale



ODOT LOCK DETAILS
No scale
(ODOT Supplied Post Construction)



SECTION B-B
No scale



EXTERIOR PAD LOCK DETAILS
No scale

Accompanied by dwgs. TM650, TM651, TM652, TM653, TM655, TM656, TM657, TM658, TM679

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

TRAFFIC SIGNAL POLE RECESSED TERMINAL CABINET

2024

DATE	REVISION	DESCRIPTION
07-2020	DRAWING CREATED	

CALC. BOOK NO. 5301 SDR DATE 10-JUL-2020 **TM654**

08-JUL-2022

TM655.dgn

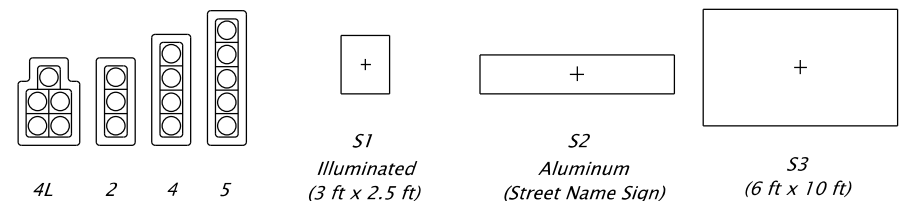
STANDARD SIGNAL ARM LOADS								DEFLECTIONS	
Signal Pole Type	Signal Arm Length	Signals			Sign			DS Max. * for S2	Estimated "defl" End of Arm
		4L Qty.	2 Qty.	5 *	S1 Qty.	S2 *	Horz. Blank		
SM6L	60', 65'	1	2	1	4	1	58'-0"	21'-1"	2'-9"
SM7L	70', 75'	1	2	1	4	1	68'-0"	21'-1"	3'-9"

* - Load location is the closest sign or signal of that type to the vertical post.

1. Camera mounted on 6 ft arm placed at any location on signal arm.
2. Fire Pre-Emption may be placed at any location along the mast arm.
3. Modifications to the loading shown require analysis to verify the structural adequacy of the pole.
4. Physical fit of the loading must be verified.
5. 60' and 70' mast arm lengths use the same design as the longer 65' and 75' lengths with the end 5' removed.

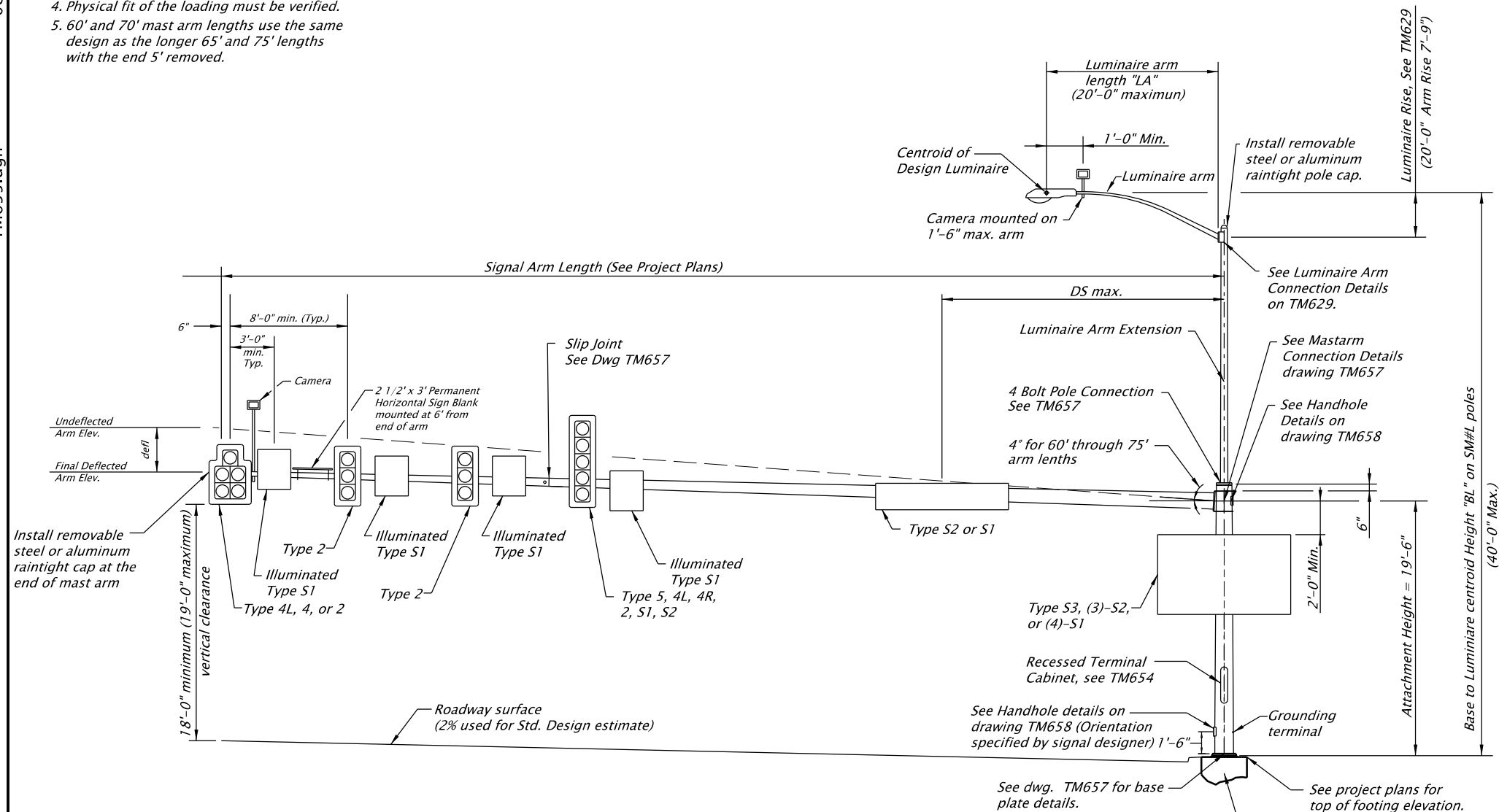
VERTICAL POST LOADS								
Description	Maximum Centerline Elevation	Height (Each)	Width (Each)	Depth (Each)	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
2-Ped. Push Buttons	3'-6"	7 ³ / ₄ "	5"	3 ³ / ₈ "	0.27	0.18	0.12	3.0
Controller Cabinet	5'-9"	46"	24"	22"	7.67	7.03	3.67	300
2-Pedestrian Signals	8'-3 ¹ / ₂ "	18 ³ / ₄ "	19"	19"	2.47	2.47	2.51	25.0
Terminal Cabinet	10'-9"	18 ¹ / ₈ "	6 ³ / ₄ "	8 ³ / ₈ "	0.85	1.05	0.39	25.0
Guide Sign (S3)	15'-0"	72"	120"	8 ³ / ₈ "	60.0	1.00	1.67	395
Photoelectric Cell	38'-4"	2 ¹ / ₄ "	3 ¹ / ₄ "	3 ¹ / ₄ "	0.05	0.05	0.07	5.0

1. Physical fit of the loading must be verified.



SIGNAL POLE APPURTENANCE TYPES

APPURTENANCE LOADS				
Type	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
4L	12.4	6.61	3.64	145
2	8.67	6.61	1.95	85.0
4	11.0	8.49	1.95	97.0
5	13.3	10.36	1.95	142
S1	7.50	2.38	1.72	71.0
S2	21.0	0.00	1.67	105
Horz. Blank	1.72	2.38	7.50	45.0
Signal Camera	1.64	2.55	0	60
Lum. Camera	0.65	1.42	0	25



TYPICAL POLE ELEVATION

No Scale

Accompanied by dwgs. TM654, TM656, TM657, TM658, TM628

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.	
OREGON STANDARD DRAWINGS TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS GENERAL DETAILS & DESIGN CRITERIA 2024	
DATE	REVISION DESCRIPTION
07-2020	REPLACED HUB WITH RECESSED TERMINAL CABINET, ADDED ACCOMPANIED BY DRAWING TM654, AND CHANGED SIGN 7' DISTANCE TO 6'
07-2022	ADDED DRAWING TM656 BASE REACTIONS AND CLARIFIED DRAWING TM628 TABLE DETAIL REQUIREMENTS
CALC. BOOK NO. 7088	SDR DATE 08-JUL-2022
TM655	

Effective Date: December 1, 2023 - May 31, 2024

06-JAN-2023
TM656.dgn

GENERAL NOTES

1. Signal supports shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals LRFD 1st edition with 2017 and 2018 interim revisions.
2. All traffic signal supports shall conform to the design criteria and details shown on these drawings except as approved by the Engineer.
3. The design basic wind speed (3 second gust) shall be 145 mph, gust factor $G = 1.14$, 50 year recurrence, Fatigue Category I, no galloping, and truck speed = 65 mph.
4. The design service basic wind speed (3 second gust) shall be 91 mph.
5. Signal poles from this standard are not allowed over highways I-5, I-84, I-205, I-405, US 26 (Sunset Hwy) between milepoints 64.3 - 73.0, I-105, and I-82.
6. Pole and arm shafts must be round. Dimensional tolerances of ASTM A595 shall apply to all tapered steel tubing members. Additionally, the diameter of round tapered steel tubing members shall not vary more than 2 percent from specified dimension. Two ply and fluted poles or arms are not permitted.
7. Pole taper shall be equal to .0117 in/in.
8. Anchor rods shall conform to ASTM Specification F1554 Gr. 55, Supplementary Requirement "S2" that include grade and manufacturer's identification.
9. High strength bolts shall conform to ASTM F3125 Grade A325 Type 1.
10. Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".
11. Hardened steel washers shall conform to ASTM F436 Type 1.
12. Direct Tension Indicators (DTI) shall be the compressible-washer type, mechanically galvanized, conforming to ASTM F959.
13. Steel sheet for poles and arm shall conform ASTM A595, Grades A or B, ASTM A572 Gr. 50, or approved equal. All other steel sheet and plate shall conform to AASHTO specification M223 (ASTM A572), or approved equal. Supplement S18 of ASTM A6 regarding maximum tensile strength shall apply.
14. All structural steel including fasteners shall be hot-dip galvanized after fabrication unless otherwise noted.
15. Galvanize-Control Silicon, typical. Silicon content of the base metal shall be in the range of 0 to 0.06 percent or 0.13 percent to 0.25 percent.
16. Footing concrete shall be according to TM628.
17. Reinforcing steel shall conform to AASHTO M31, Grade 60 (ASTM A615 or A706). A minimum lap splice length of 32 bar diameters shall be used unless shown otherwise.
18. Computed deflection of these poles at full design loading shall be limited to 5 percent of the pole length. Computed dead load deflection of the poles shall be limited to 1 percent of the pole length. Rake pole, apply mast arm and appurtenance loads, and verify final pole position is plumb.
19. Luminaire arms and pole extensions to support luminaire arms shall meet requirements of drawing TM629.
20. Hubs for cabinets and/or other appurtenances shall be welded into the pole prior to galvanizing. Poles may be tapped for up to 1" galvanized bolts after pole has been galvanized.
21. Longitudinal seam welds within 6 inches of a circumferential weld shall be complete penetration welds. Weld inspection shall be in accordance with AWS D1.1 and the special provisions. Inspect seam welds using cyclically loaded criteria. Hubs shall be 3000# threaded forged carbon steel flat weld hubs by Anvil Products Inc., Phoenix Forging Co., Bonney Forge & Tool Works or approved equal.
22. Grounding terminal shall be 1/2" UNC x 1 1/2" Type 308, 309 or 310 threaded stainless steel weld studs.
23. Assemble support, tighten anchor bolts, tighten HS thru bolts, and tighten HS bolts in tapped holes according to 00962.46(j)(2).
24. Round and smooth all edges along electrical way.

Signal Pole Type	Reaction At Base Plate (Factored)				Reaction At Base Plate (Service)			
	Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)	Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)
SM6L	7,430	13,000	301,000	322,000	6,520	5,200	163,000	127,000
SM7L	8,860	13,100	349,000	385,500	8,080	5,190	212,720	153,000

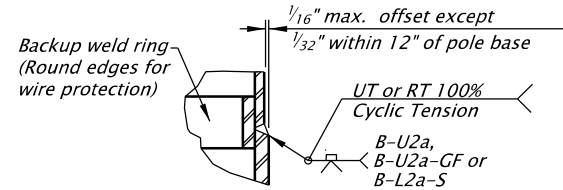
Note:

The base plate reactions shown in the table are worst case Extreme I and Service I loads. Engineer of Record to specify shaft depth and confirm shaft design for local soil conditions based on a site specific geotechnical study and loads shown in table. If shaft size or reinforcement shown in the table on TM628 for the required design number are not adequate for local soil conditions, Engineer of Record must adjust the shaft design accordingly.

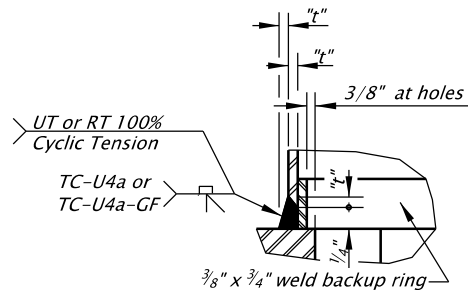
Accompanied by drawings TM628, TM654, TM655, TM657, TM658

<p>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.</p>	All materials shall be in accordance with the current Oregon Standard Specifications.	
	OREGON STANDARD DRAWINGS	
	TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS	
	NOTES AND REACTIONS	
	2024	
DATE	REVISION	DESCRIPTION
07-2020		ADDED ACCOMPANIED BY STANDARD DRAWING TM654
07-2022		ADDED REACTIONS TO TITLE AND ADDED REACTIONS TABLE
01/2023		CHANGED HIGH STRENGTH BOLT TIGHTENING TO 00962.46(j)(2)
CALC. BOOK NO.	7088	SDR DATE
		06-JAN-2023
		TM656

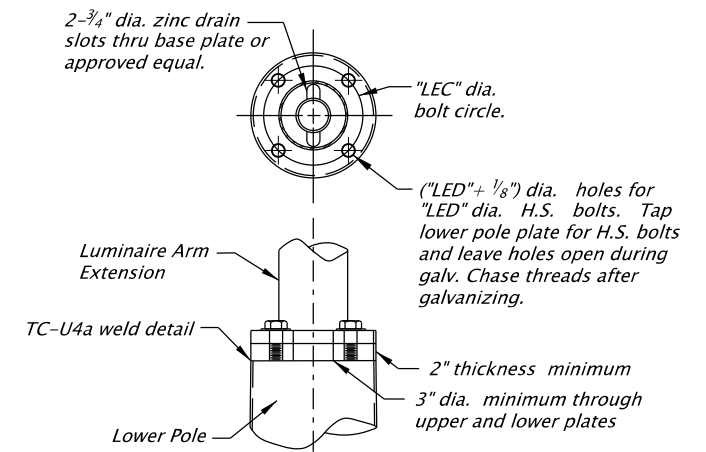
Effective Date: December 1, 2023 - May 31, 2024



POLE AND ARM SPLICE WELD DETAILS
No Scale

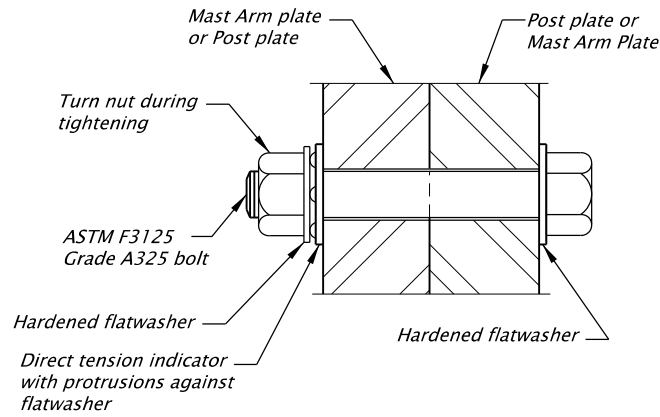


TC-U4a WELD DETAIL
No Scale

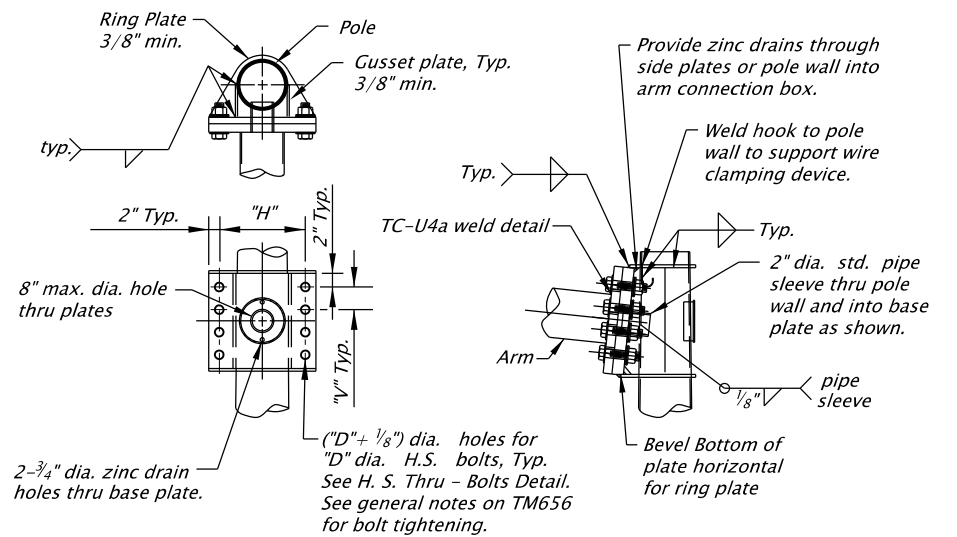


4 BOLT POLE CONNECTION DETAILS
No Scale

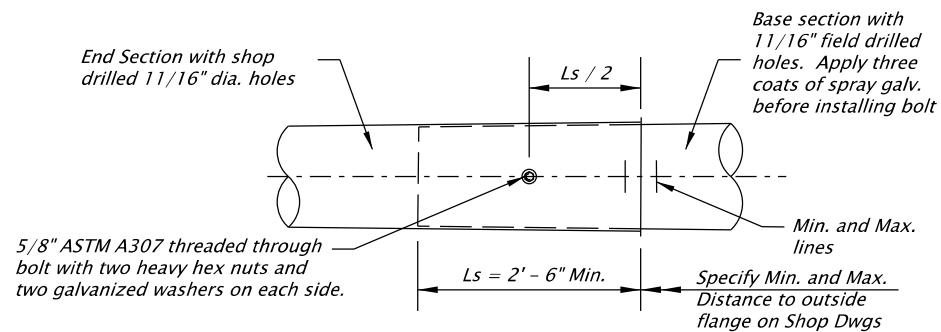
Mastarm Pole Type	Anchor Rod			Arm Connection			Luminaire Arm Extension Connection	
	RD Rod Diam.	RC Rod Circle	"PR"	"D"	"H"	"V"	LED Bolt Diam.	LEC Bolt Circle
SM6L	2"	28"	9"	1 1/2"	24"	8"	1"	12"
SM7L	2"	30"	9"	1 1/2"	27"	9"	1"	12"



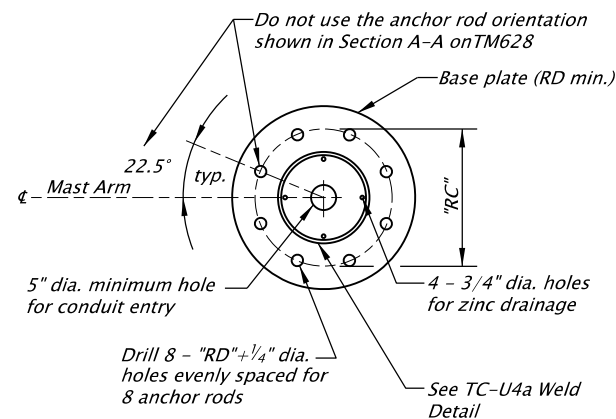
H.S. THRU - BOLTS
No Scale



8 BOLT ARM CONNECTION DETAILS
No Scale



MAST ARM SLIP-JOINT SPLICE DETAILS
No Scale

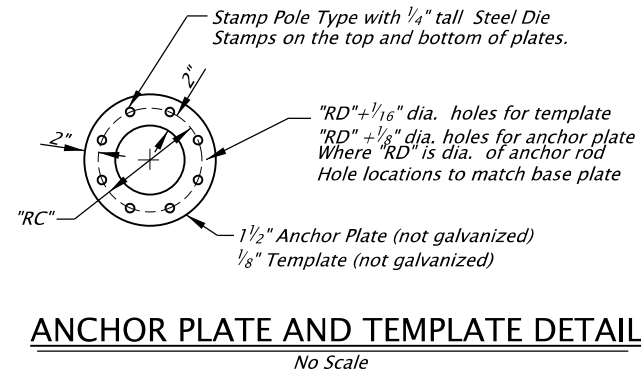
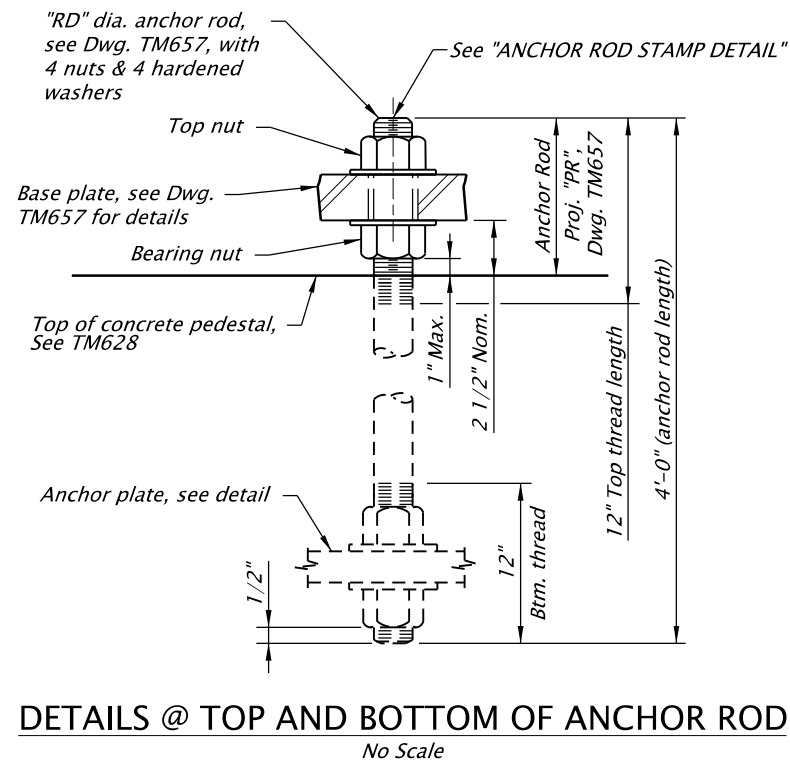
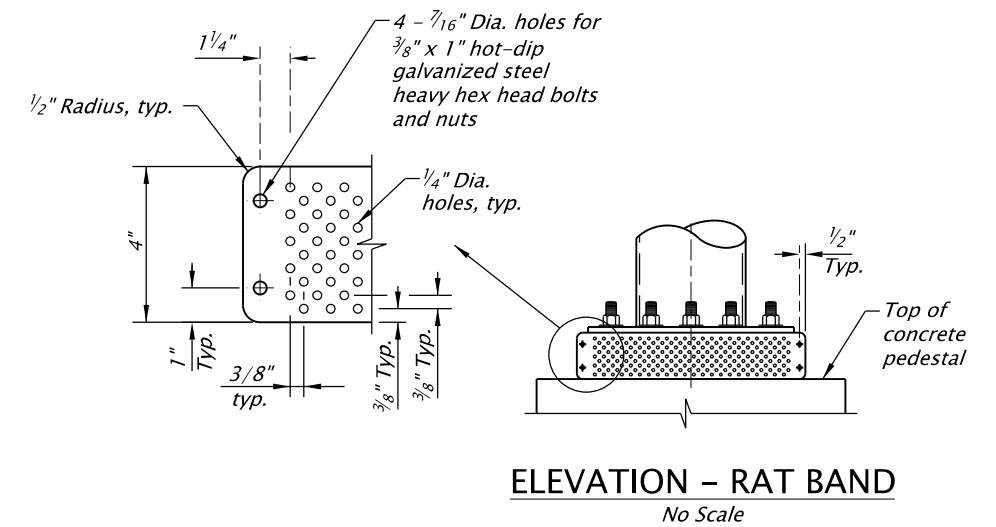
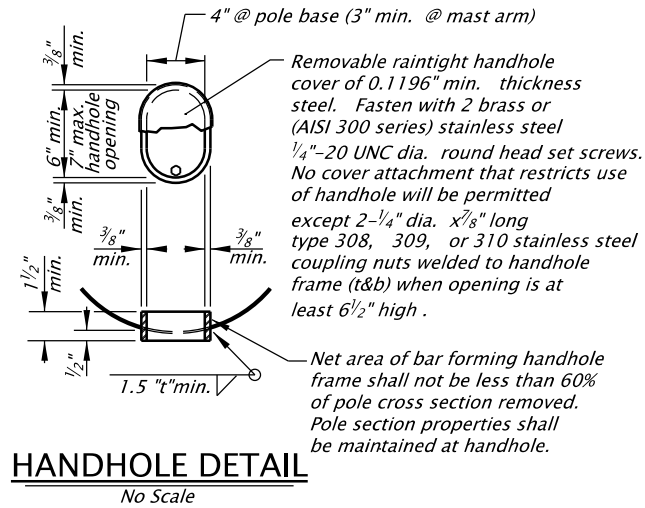
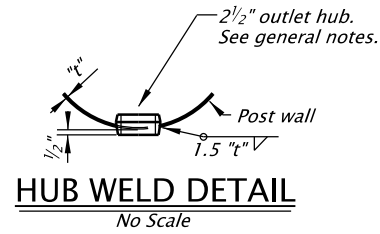


PLAN - BASE PLATE
No Scale

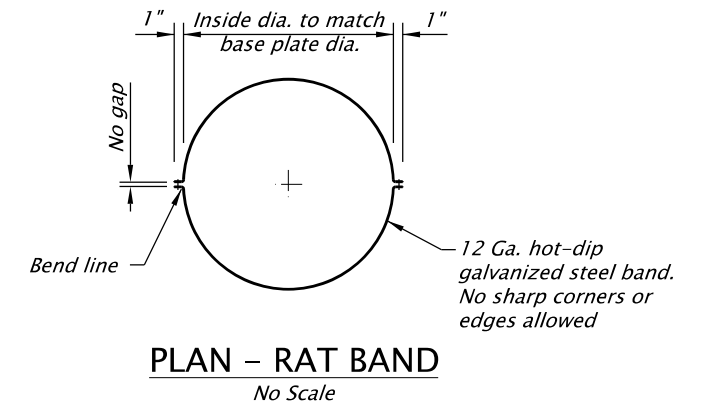
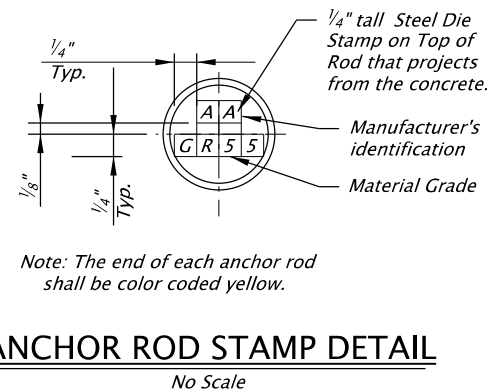
Accompanied by dwgs. TM654, TM655, TM656, TM658, TM628

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.		
OREGON STANDARD DRAWINGS		
TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS STEEL DETAILS (SH. 1)		
2024		
DATE	REVISION DESCRIPTION	
07-2020	ADDED ACCOMPANIED BY DRAWING TM654	
CALC. BOOK NO.	7088	SDR DATE
		10-JUL-2020
		TM657



Anchor Rod Note: See TM657 for "RC" and "RD" values.

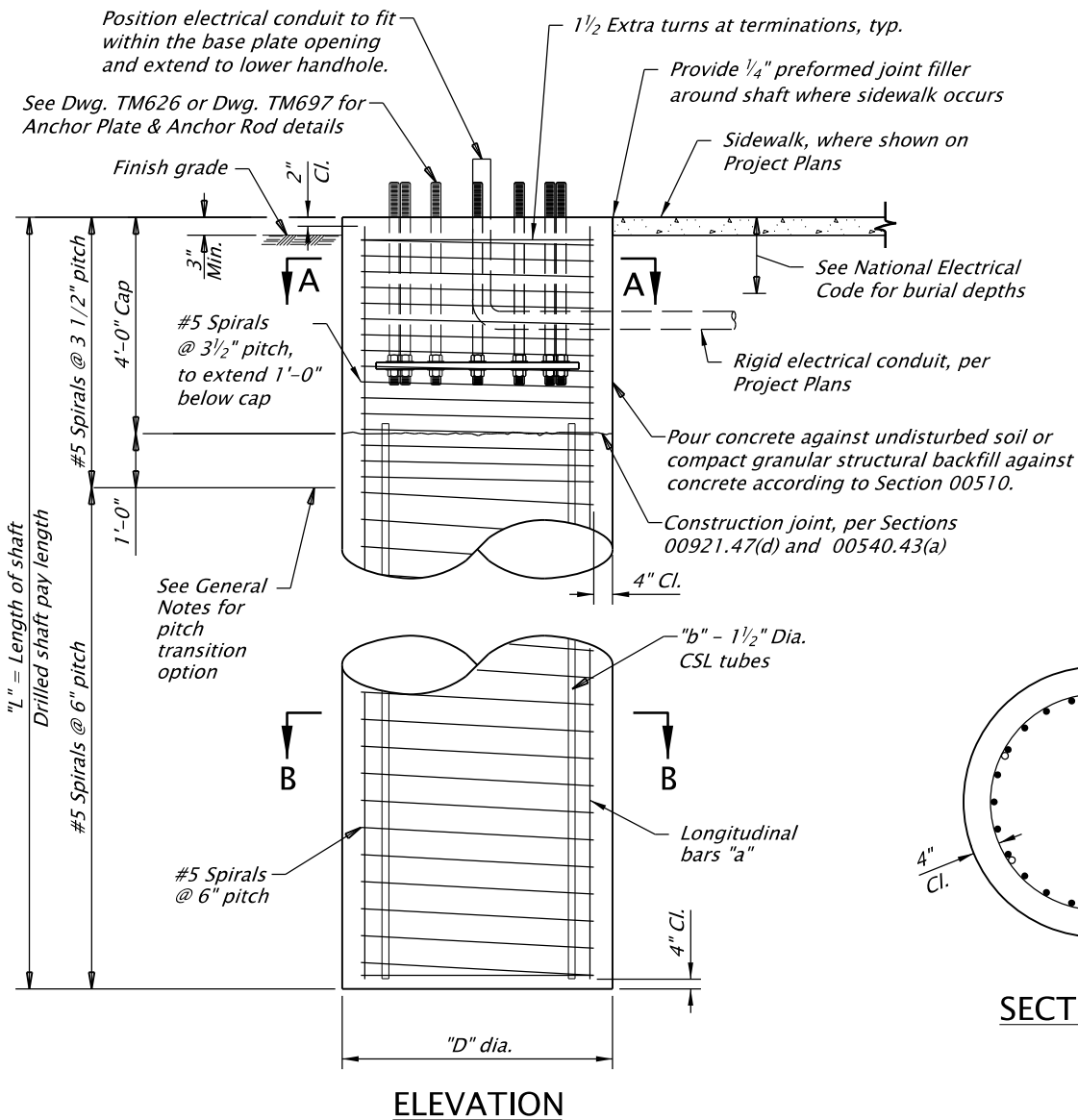


Accompanied by dwgs. TM654, TM655, TM656, TM657, TM628

<p>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.</p>		<p>All materials shall be in accordance with the current Oregon Standard Specifications.</p>	
		<p>OREGON STANDARD DRAWINGS</p> <p>TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS STEEL DETAILS (SH. 2)</p> <p>2024</p>	
DATE	REVISION	DESCRIPTION	
07-2020	ADDED	ACCOMPANIED BY DRAWING TM654	
CALC. BOOK NO.	7088	SDR DATE	10-JUL-2020
			TM658

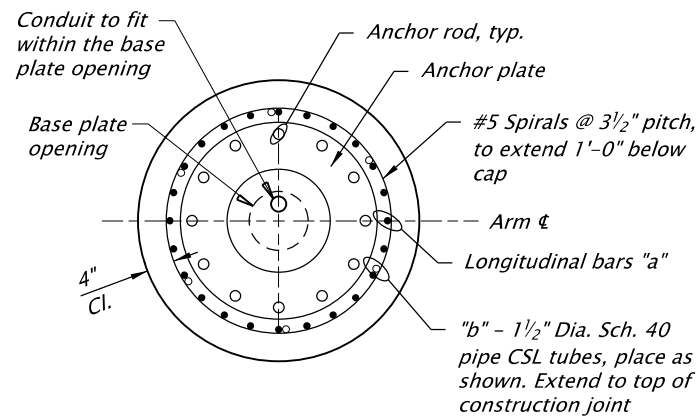
Effective Date: December 1, 2023 - May 31, 2024

08-JUL-2022
TM628.dgn

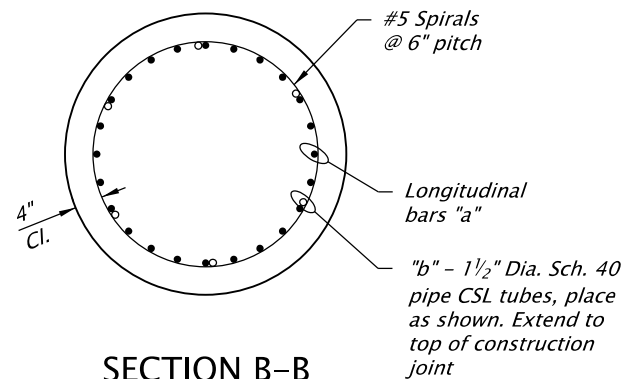


ELEVATION

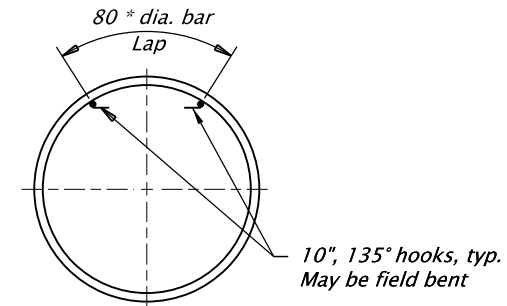
DRILLED SHAFT DETAILS
No Scale



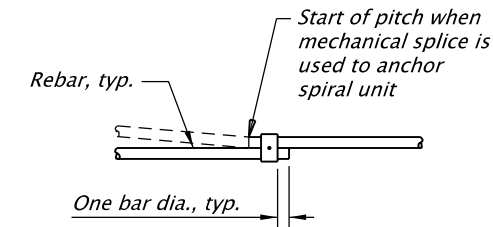
SECTION A-A



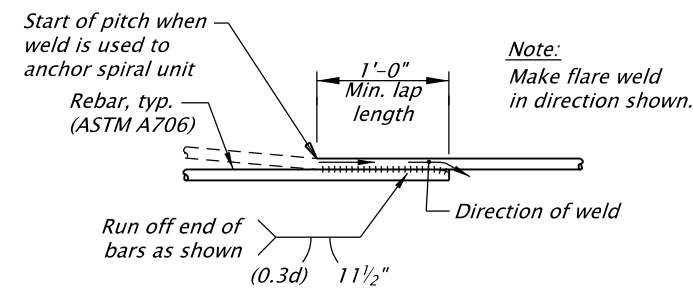
SECTION B-B



LAPPED SPLICE



MECHANICAL SPLICE
(Not allowed for ASTM A82 spirals)



WELDED SPLICE

SPIRAL SPLICE DETAIL
No Scale

GENERAL NOTES:

Use ASTM A706 for all welded splices, except ASTM A615 Grade 60, ASTM A82 or ASTM A496 may be used if copies of the chemical composition analysis are submitted and approved as weldable by the Engineer.

Anchor spirals at each end or discontinuity with one extra turn and a splice to itself as shown. Where permitted on plans, provide closed hoops conforming to the requirements of this detail.

Securely tie CSL tubes to reinforcement.

Use temporary casing as required. Permanent casing not permitted.

Cap concrete shall be Class 3600 - 3/4" commercial grade, classified as a structural item. Remainder of shaft shall be Class 4000 - 3/8" without air entrainment and with 8 1/2" ± 1 1/2" slump.

Contractor shall field verify elevations prior to installation.

The transition between the 3 1/2" to 6" pitches may use two separate spiral cages with 1 1/2" horizontal turns at the start and end of each cage and the lapped splice details between the cages.

Note:
The base plate reactions shown in the table are worst case Extreme I and Service I loads. Engineer of Record to specify shaft depth and confirm shaft design for local soil conditions based on a site specific geotechnical study and loads shown in table. If shaft size or reinforcement shown in table are not adequate for local soil conditions, Engineer of Record must adjust the shaft design accordingly.

The shafts designs shown in table were based on an analysis to encompass worst case soil conditions by applying Extreme I loads to the top of shaft and analyzing below ground shaft forces using Brom's method for two different soil types. The assumed cohesive soil minimum undrained shear strength, *c*, is 600 psf. The assumed non-cohesive soil friction angle is 25 degrees and bulk weight is 100 pcf.

Monotube Cantilever Design No.	Monotube VMS/Sign Bridge Design No.	Reinf. Steel "a"	Shaft Dia. "D"	No. of CSL Tubes "b"	Reaction At Base Plate (Factored)				Reaction At Base Plate (Service)			
					Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)	Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)
1	-	30 - #9	5'-0"	6	22,600	26,200	839,000	672,000	20,500	10,100	384,000	259,000
2	-	30 - #9	5'-0"	6	28,100	20,000	784,200	707,000	25,500	8,500	501,200	279,000
3	-	30 - #9	5'-0"	6	18,400	19,600	622,000	517,000	16,700	7,700	293,000	204,000
4	-	30 - #9	5'-0"	6	21,800	13,200	500,800	430,000	19,800	5,200	339,200	169,000
5	-	30 - #9	5'-0"	6	16,900	13,400	431,600	357,000	15,300	5,300	222,000	140,000
6	-	24 - #9	4'-6"	5	12,800	12,300	381,000	240,000	11,600	4,900	171,000	94,000
7	-	24 - #9	4'-6"	5	13,000	7,200	268,000	222,000	11,800	2,800	181,000	87,000
8	-	20 - #9	4'-0"	5	7,800	5,600	170,000	110,000	7,100	2,200	86,000	44,000
9	-	30 - #9	5'-0"	6	26,900	26,500	884,000	745,000	24,400	10,500	498,000	294,000
-	1	30 - #9	5'-0"	6	36,800	40,700	952,600	396,000	33,400	27,000	449,600	156,000
-	2	30 - #9	5'-0"	6	28,500	30,300	754,700	252,000	25,900	17,900	343,500	99,500
-	3	30 - #9	5'-0"	6	23,200	22,900	592,300	128,700	21,100	12,100	261,700	51,000

Accompanied by dwgs. TM621, TM622, TM623, TM624, TM625, TM626, TM627

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

STD. MONOTUBE SIGN/VMS SUPPORT DRILLED SHAFT DETAILS

2024

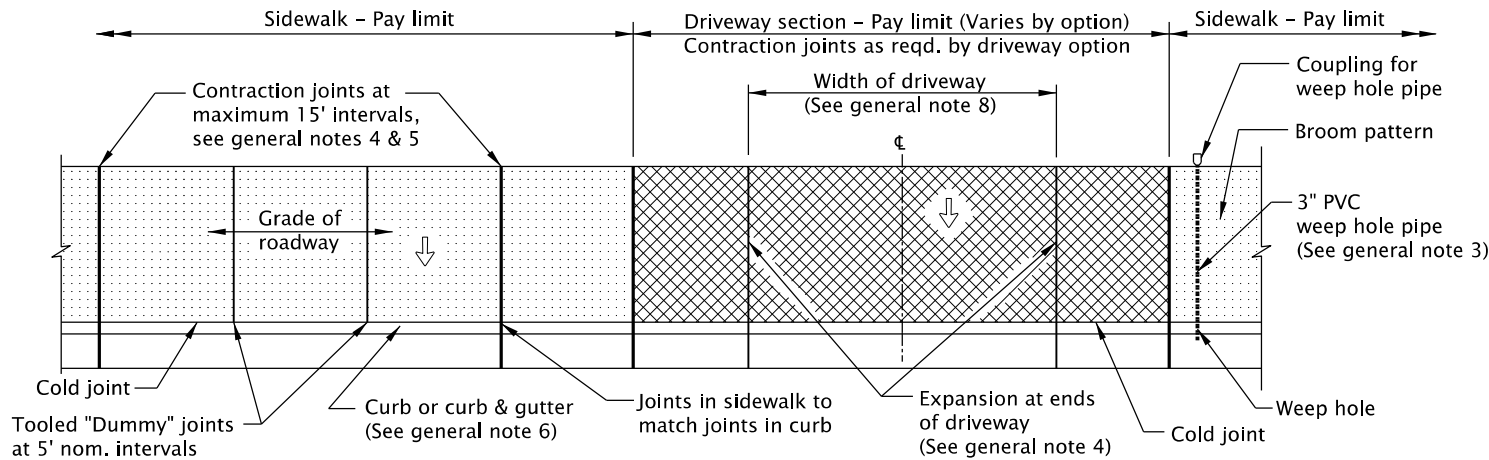
DATE	REVISION	DESCRIPTION
07-2020	ADDED "MONOTUBE" TO THE DESIGN NUMBER COLUMNS	
01-2021	CHANGED CONDUIT NOTE	
01-2022	SLUMP WAS 8" +/- 1/2"	
07-2022	ADDED SPIRAL TIE NOTES AND CONDUIT BASE PLATE NOTE	

CALC. BOOK NO. 6921-6930, 6969-6972, 6974	SDR DATE 08-JUL-2022	TM628
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Effective Date: December 1, 2023 - May 31, 2024

20-JUL-2020

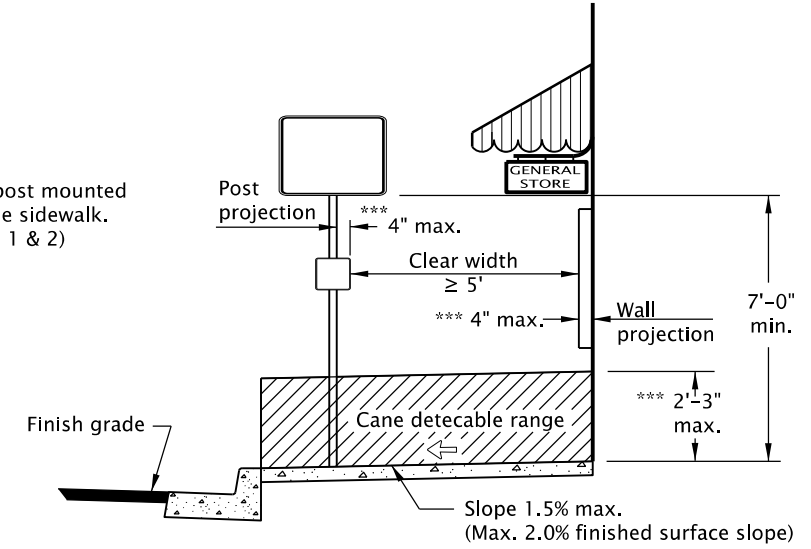
RD720.dgn



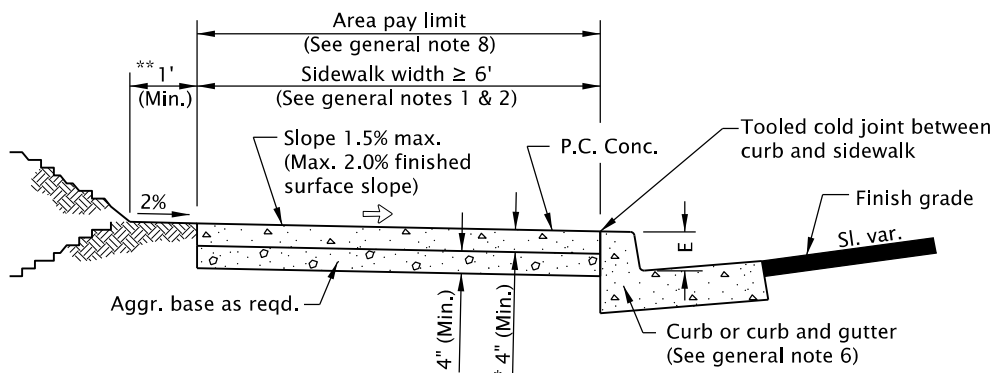
TYPICAL PLAN VIEW - CURB LINE SIDEWALK

*** Objects with base below 2'-3" may protrude any distance as long as the 5' circulation path is maintained. When an object with a base higher than 2'-3" protrudes further than 4" provide a detection below protrusion to delineate edge.

Building, wall, or post mounted obstruction outside sidewalk. (See general notes 1 & 2)



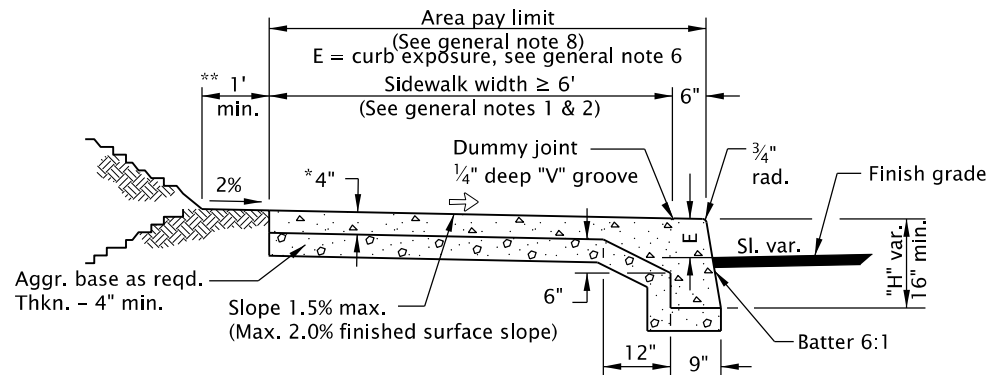
CLEAR CIRCULATION PATH



TYPICAL CURB SIDEWALK CROSS SECTION

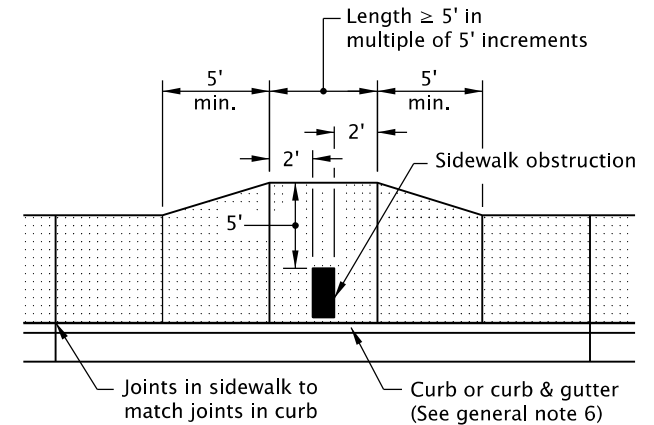
* Min. 4" or as specified in plans. A thickness $\geq 6"$ if sidewalk is intended as portion of a driveway or mountable curb is used.

** Provide compacted backfill adjacent to curb and sidewalk



TYPICAL MONOLITHIC CURB & SIDEWALK CROSS SECTION

E = curb exposure, see general note 6



REQUIRED SIDEWALK WIDENING AROUND OBSTRUCTIONS

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Include additional paved or unpaved 2' shy distance to vertical faces higher than 5' such as retaining walls, sound walls, fences and buildings.
2. Curb type and sidewalk width as shown on plans or as directed. On sidewalks 8' and wider, provide a longitudinal joint at the midpoint.
3. Install 3" pvc weep hole pipes in sidewalks where shown on plans, and allowed by jurisdiction. Place contraction joint over top of pipe. See Std. Dwg. RD700 for weep hole details.
4. Provide expansion joints around poles, posts, boxes, at ends of each driveway, and other fixtures which protrude through or against the structures. For sidewalk, monolithic curb & sidewalk, const. expansion joints at 45' maximum spacing. See Std. Dwg. RD722 for expansion joints details.
5. Const. contraction joints at 15' maximum spacing, and at ends of each curb ramp. See Std. Dwg. RD722 for contraction joints details.
6. For curb details, see Std. Dwgs. RD700 & RD701. ODOT standard E=7".

7. Sidewalk details are based on applicable ODOT standards.
8. Fully lowered sidewalk shown; see project plans for the driveway design specified. For driveway details not shown, see Std. Dwgs. RD725, RD730, RD735, RD740, RD745 & RD750.
9. See project plans for details not shown.

LEGEND

- Sidewalk pay limit.
- Driveway pay limit, varies by option, (See general note 8).
- Cross slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

CURB LINE SIDEWALKS

2024

DATE	REVISION	DESCRIPTION
CALC. BOOK NO. ---	N/A ---	SDR DATE: 21-JUN-2019


RD720

Effective Date: December 1, 2023 – May 31, 2024


EXAMPLE 1


L E G E N D


C O N T R O L L E R S

 Install model ATC controller. (Agency furnished)

C A B I N E T S


 Install a model 332S cabinet & control equipment with riser frame, orient louvered door as shown

 Install base mounted service cabinet, 120/240 volt metered, for signal and signal pole mounted illumination systems


 Install recessed terminal cabinet


P O L E S

 Install (T=type) standard traffic signal mast arm pole (See, "Pole Entrance Chart")


 Install (L=length) foot traffic signal mast arm


 Install pedestal with frangible base on (N=number) foundation. See TM457 for details.

 Install (L=length) foot luminaire arm


 Retain and protect existing power pole (Power source)


S I G N A L S


 Install phase (Ph=phase) vehicle signal

 Install phase (Ph=phase) pedestrian signal with clamshell mount and pushbutton with mount


S I G N S


 Install aluminum (30"x36") left and through arrow sign (R3-6L), ASTM type IX sheeting


 Install aluminum (30"x36") right arrow "ONLY" sign (R3-5R), ASTM type IX sheeting

 Install street name sign (See signing plans for details on sign and attachment type)


J U N C T I O N B O X E S


 Install 22"x12"x12" (min. dimension) precast concrete junction box


 Install tandem 30"x17"x12" (min. dimension) precast concrete junction boxes (See TM472 for details)

 Junction box (See Detector Plan)

W I R E S


 Install (N=number) No. (G=AWG wire size) type THWN wires


 Install (N=number) No. (G=AWG wire size) type XHHW wires

 Install (X=number of cables) control cable(s) with (N=number) (G= AWG wire size) AWG conductors


L E G E N D C O N T I N U E D

C O N D U I T S


 Install (S=size) inch electrical conduit


 Install 2" conduit stub (For future use-cap ends)

 Detector conduit (See Detector Plan)


 Install conduit and wire as required by power company


L U M I N A I R E S

 Install light emitting diode luminaire, (See special provisions). Bond luminaire to pole grounding terminal


 Install photocontrol electronic relay on pole, as per Std. Drg. No. TM450

F I R E P R E E M P T I O N

 Install channel (Ch=channel), (N=number) barrel fire preemption detector unit

 Install channel (Ch=channel) fire preemption detector feeder cable

M I S C E L L A N E O U S

 Install removable bollard

 Detection Camera, See Detection Plans.

S I G N A L H E A D T Y P E S

2 = R:Y:G

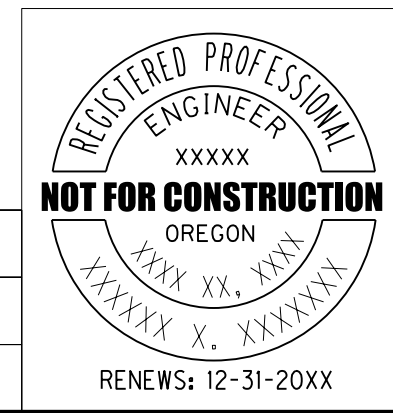
3LCF = RA:YA/FYA:GA


LEGEND
PACIFIC HWY EAST AT YOUNG ST.
OR99E, M.P. 32.87
WOODBURN

NOTE:
See T.R.S. Dwg. 18251 for Signal Plan

Traffic Section Approval

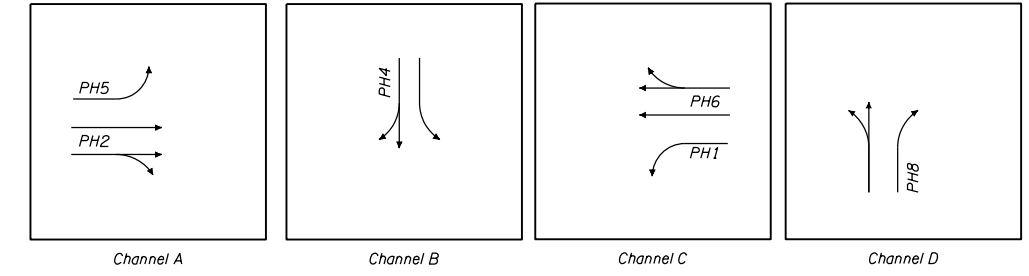
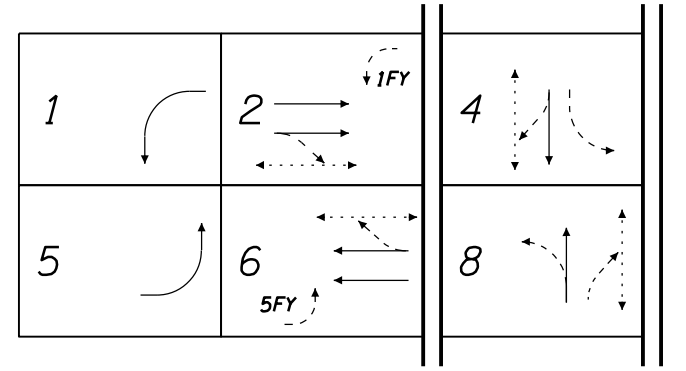
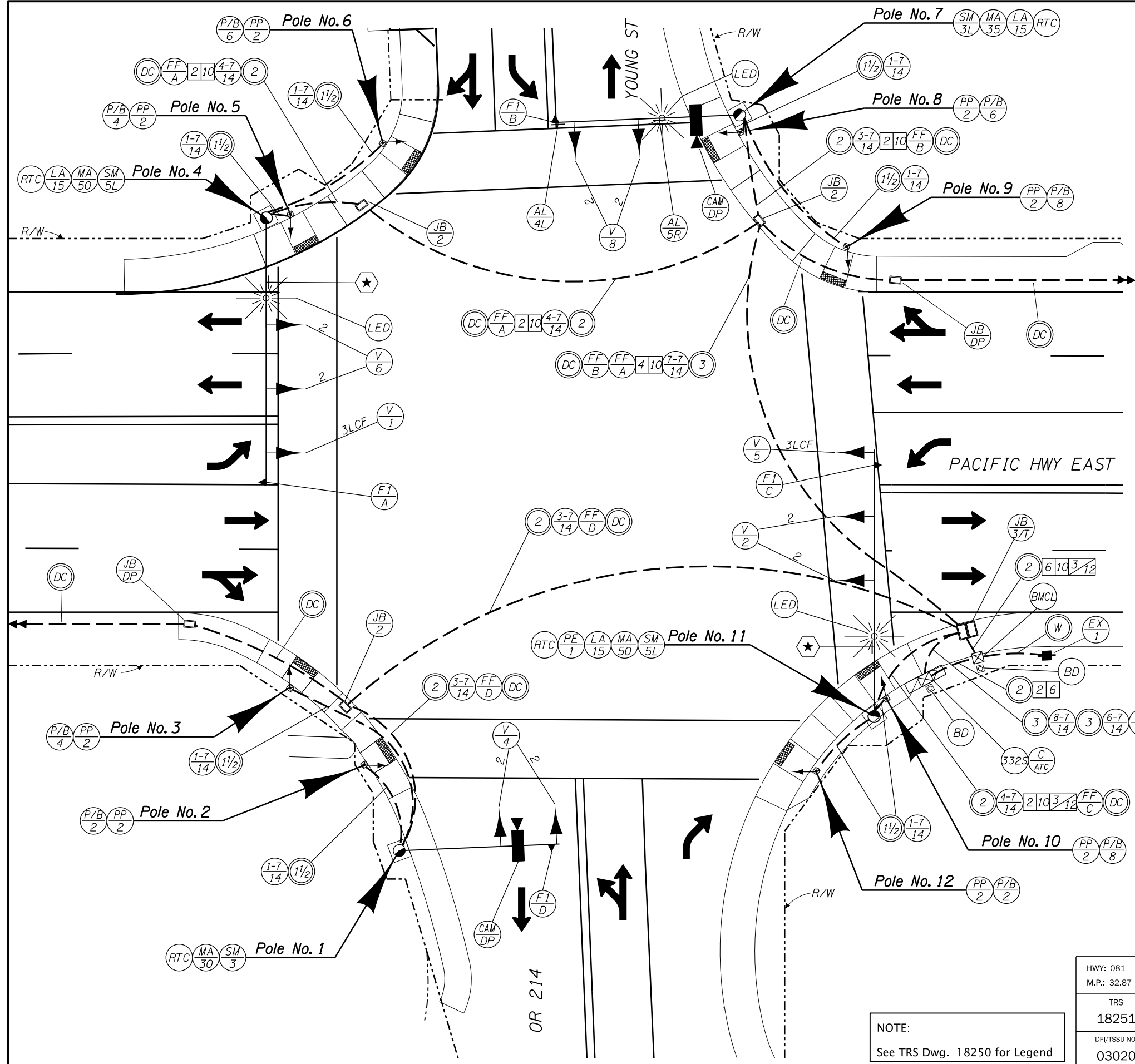
ACCOMPANIED BY DWGS.: TM450, TM457, TM460, TM462, TM467, TM470, TM471, TM472, TM482, TM485, TM650, TM651, TM652, TM653, TM654, RD130 and TRS Dwg. 18251 - 18254	HWY: 081 M.P.: 32.87
	TRS 18250
	DFI/TSSU NO. 03020



OREGON DEPARTMENT OF TRANSPORTATION		
OR99E: YOUNG ST. SAFETY (WOODBURN) SEC. PACIFIC HIGHWAY EAST MARION COUNTY		
Designer: ARLO BONES	Review: VERN GEORGE	SHEET NO. M-01
Drafter: ARLO BONES	Checker: N/A	
LEGEND		

SIGNAL PLAN
 PACIFIC HWY EAST AT YOUNG ST.
 OR99E, M.P. 32.87
 WOODBURN

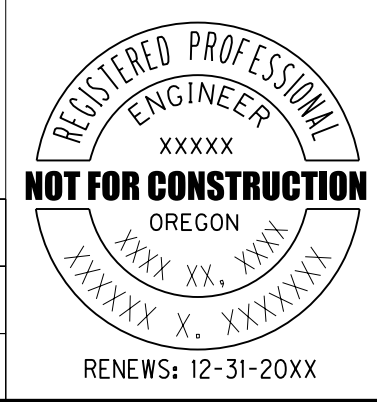
SCALE 0 10 20 30 40 FEET



NOTE:
 Ground/Bond Wire and Tracer/Locate Wire Not
 Shown on Plan Sheets. See Specifications
 and Standard Drawings for installation information.

NOTE:
 Field Verify Measurements Before Construction

"UTILITIES NOT SHOWN"
 Contractor to contact utility
 companies for field locations.



HWY: 081
 M.P.: 32.87
 TRS
 18251
 DFI/TSSU NO.
 03020

NOTE:
 See TRS Dwg. 18250 for Legend

OREGON DEPARTMENT OF TRANSPORTATION

OR99E: YOUNG ST. SAFETY (WOODBURN) SEC.
 PACIFIC HIGHWAY EAST
 MARION COUNTY

Designer: ARLO BONES Review: VERN GEORGE
 Drafter: ARLO BONES Checker: N/A

SIGNAL PLAN

SHEET NO.
 M-02

POLE ENTRANCE CHART

SIGNAL PLAN DETAILS
 PACIFIC HWY EAST AT YOUNG ST.
 0R99E, M.P. 32.87
 WOODBURN

See TM650 thru TM653			EQUIPMENT ON POLE					EQUIPMENT ON MAST ARM (Length in Feet and Equipment Type)								FOUNDATION INFORMATION (See Std. Drg. TM653)		LUMINAIRES				VIDEO DETECTION EQUIPMENT	
POLE NO.	DWG. NO.	TYPE	PED. SIGNAL & PUSHBUTTON DEG.	TERM. CABINET DEG.	SIGN DEG.	TRAFFIC SIGNAL DEG.	PHOTO ELECTRIC CELL	ARM LENGTH	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	FOUNDATION NUMBER	REQUIRED FOUNDATION DEPTH	ARM LENGTH	ARM DEG.	MOUNTING HEIGHT	TYPE	LUMINAIRE ARM MOUNT
1	18251	SM-3		180				30	0.5 V2	1.5 F	7.0 CAM	11.0 V2					3	18' - 0"					
2	18251	PP-2	180																				
3	18251	PP-2	270																				
4	18251	SM-5L		180				50	0.5 F	6.0 V3LCF	18.0 V2	30.0 V2	38.0 SNS				6	20' - 0"	15.0	0	35.0	LED	
5	18251	PP-2	90																				
6	18251	PP-2	180																				
7	18251	SM-3L		180				35	0.5 F	1.0 SA	4.0 V2	16.0 V2	20.0 SA				4	18' - 0"	15.0	0	35.0	LED	CAM
8	18251	PP-2	180																				
9	18251	PP-2	270																				
10	18251	PP-2	90																				
11	18251	SM-5L		180			180	50	0.5 V3LCF	3.0 F	12.5 V2	24.0 V2	37.0 SNS				6	20' - 0"	15.0	0	35.0	LED	
12	18251	PP-2	0																				

NOTE

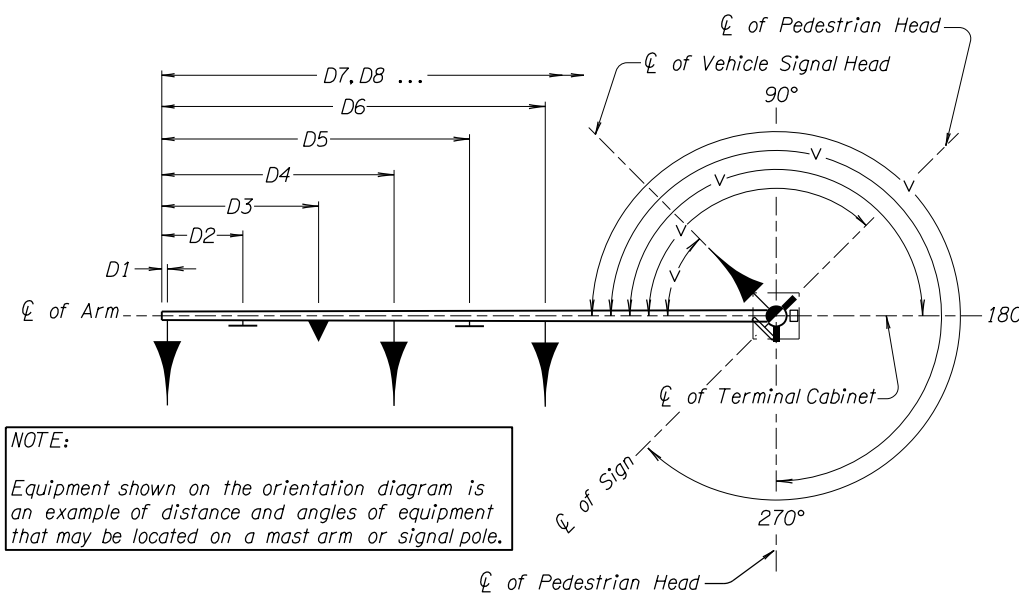
Refer To Geotechnical Memo Dated August 5, 20XX For Subsurface Information

BRACKET MOUNT

V2 = Traffic Signal Type 2, Vehicle Signal Bracket Mount
 V3LCF = Traffic Signal Type 3LCF, Vehicle Signal Bracket Mount
 SA = Sign, 30" x 36" Aluminum w/Sign Bracket Mount

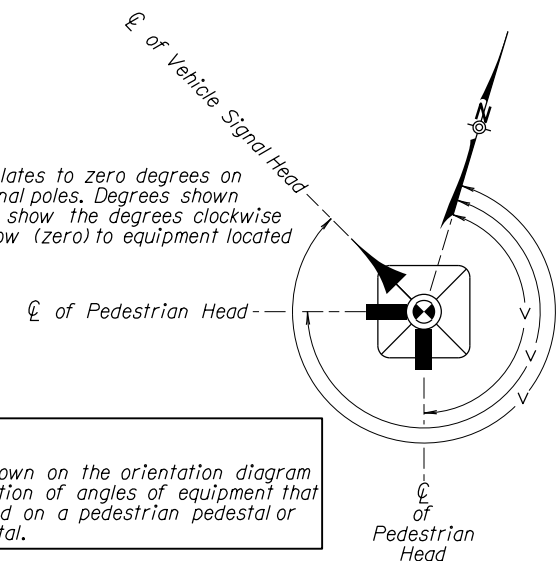
MISC. ITEMS

F = Fire Preemption
 CAM = Thermal Detection Camera
 SNS = Street Name Sign



MAST ARM POLE ORIENTATION DIAGRAM

The north arrow shown relates to zero degrees on Pedestrian and Vehicle signal poles. Degrees shown in the pole entrance chart show the degrees clockwise from plan sheet north arrow (zero) to equipment located on the pole.



PEDESTRIAN PEDESTAL / VEHICLE PEDESTAL ORIENTATION DIAGRAM

Traffic Section Approval

REGISTERED PROFESSIONAL ENGINEER
 OREGON
 RENEWS: 12-31-20XX

HWY: 081
 M.P.: 32.87
 TRS
 18252
 DFI/TSSU NO.
 03020

OREGON DEPARTMENT OF TRANSPORTATION

OR99E: YOUNG ST. SAFETY (WOODBURN) SEC.
 PACIFIC HIGHWAY EAST
 MARION COUNTY

Designer: ARLO BONES
 Drafter: ARLO BONES
 Review: VERN GEORGE
 Checker: N/A

DETAILS

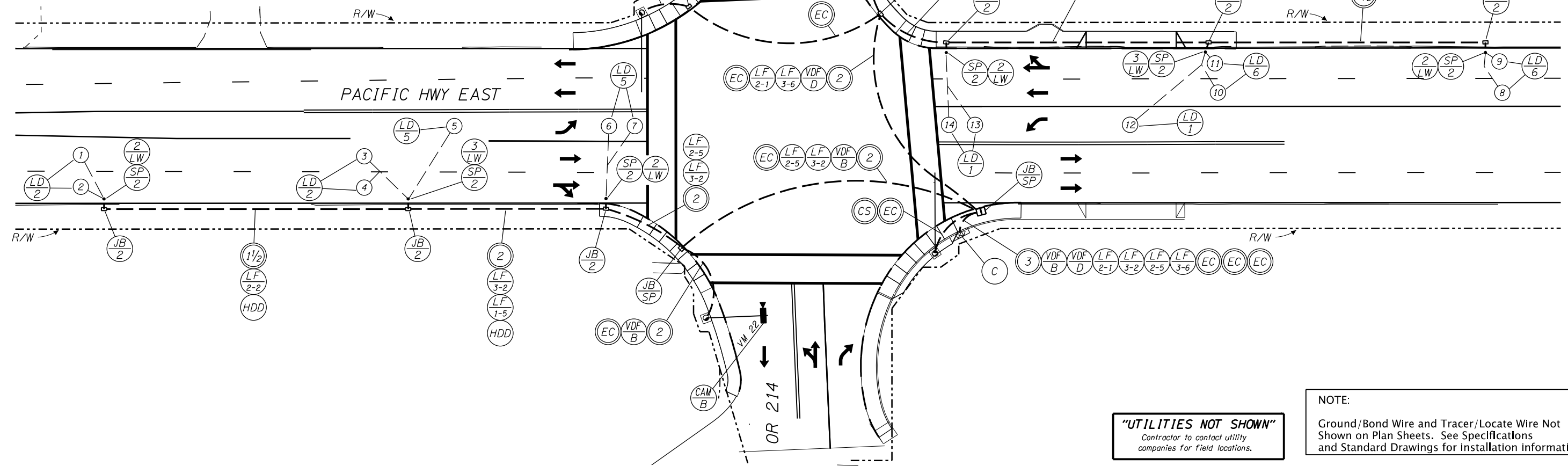
SHEET NO.
 M-03

DETECTOR PLAN
 PACIFIC HWY EAST AT YOUNG ST.
 OR99E, M.P. 32.87
 WOODBURN

SCALE 0 20 40 60 80 FEET

Loop Number	Distance Feet	Phase	Slot	MaxTime
1	220	2	I3U	2
2	220	2	I3L	3
3	110	2	I4U	4
4	110		I4L	3
5	75	5	J1U	15
6	15	5	J1L	27
7	5		J2L	27
8	220	6	J3U	16
9	220	6	J3L	17
10	110	6	J4U	18
11	110		J4L	18
12	75	1	I1U	1
13	15	1	I1L	13
14	5		I2L	13

LOOP DETECTOR WIRING DIAGRAM
 "Distance" is from Stop Line to center of loop in feet



"UTILITIES NOT SHOWN"
 Contractor to contact utility companies for field locations.

NOTE:
 Ground/Bond Wire and Tracer/Locate Wire Not Shown on Plan Sheets. See Specifications and Standard Drawings for installation information.

NOTE:
 Field Verify Measurements Before Construction

LEGEND

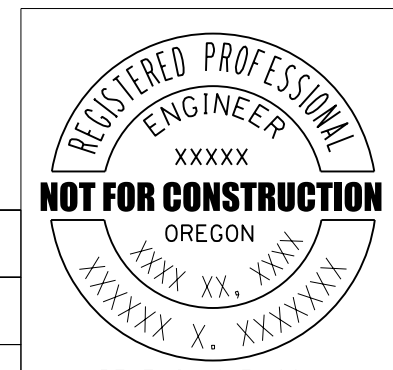
- (C) Install Controller cabinet (See Signal Plan)
- (CAM/T) Install video detector camera (T=Camera)
- (VDF/T) Install video detection coaxial and power cable for camera (T=Camera)
- (S) Install (S=size) inch conduit
- (CS) Install 2" conduit stub (For future use, cap ends)
- (EC) Electrical conduit (See Signal Plan)
- (HDD) Install conduit by horizontal directional drilling, open trench not allowed
- (JB/2) Install 22"x12"x12" (min. dimension) precast concrete junction box
- (JB/SP) Junction box (See Signal Plan)
- (LD/Ph) Install phase (Ph=phase) 6' round or 4' diamond vehicle detector loop
- (SP/S) Install 6" max. sand pocket block-out with (S=size) inch conduit to junction box
- (LF/X-Ph) Install (X=number of cables) phase (Ph=phase) loop feeder cables
- (N/LW) Install (N=number) pair of loop wires

CAMERA OPTIONS

VL = Video detection camera bracket, cable mount, 1-piece with 23" tube (Pelco part no. AS-0175 or approved equal) Mount camera on luminaire arm. Mount camera on flat part of luminaire arm or as directed by engineer.

VM = Video detection camera bracket, cable mount, 1-piece with 74" tube (Pelco part no. AS-0175 or approved equal) Mount camera on mast arm.

22 = Thermal imaging detector camera



HWY: 081
 M.P.: 32.87
 TRS
18253
 DFI/TSSU NO.
 03020

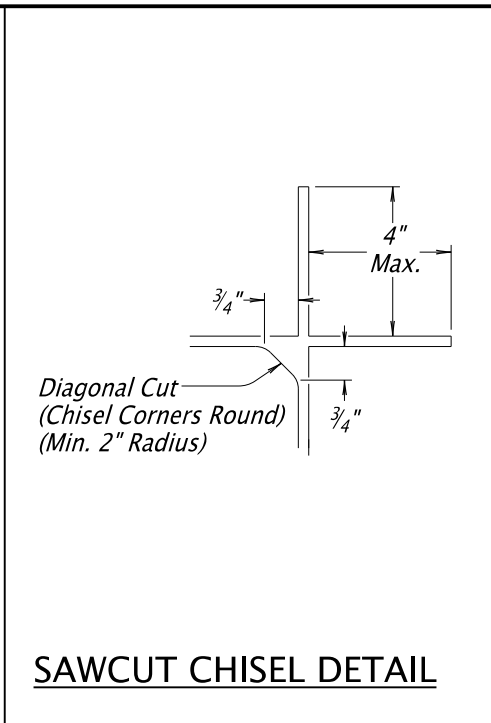
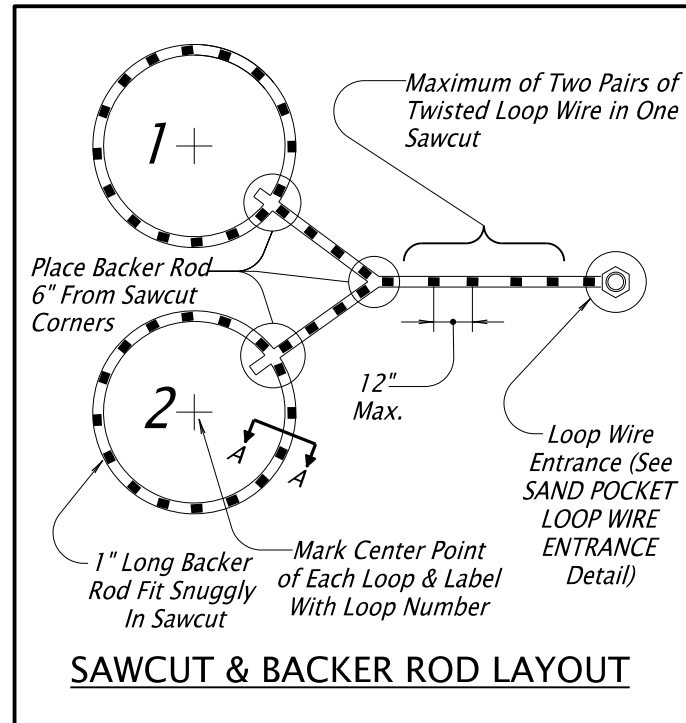
RENEWS: 12-31-20XX

OREGON DEPARTMENT OF TRANSPORTATION

OR99E: YOUNG ST. SAFETY (WOODBURN) SEC.
 PACIFIC HIGHWAY EAST
 MARION COUNTY

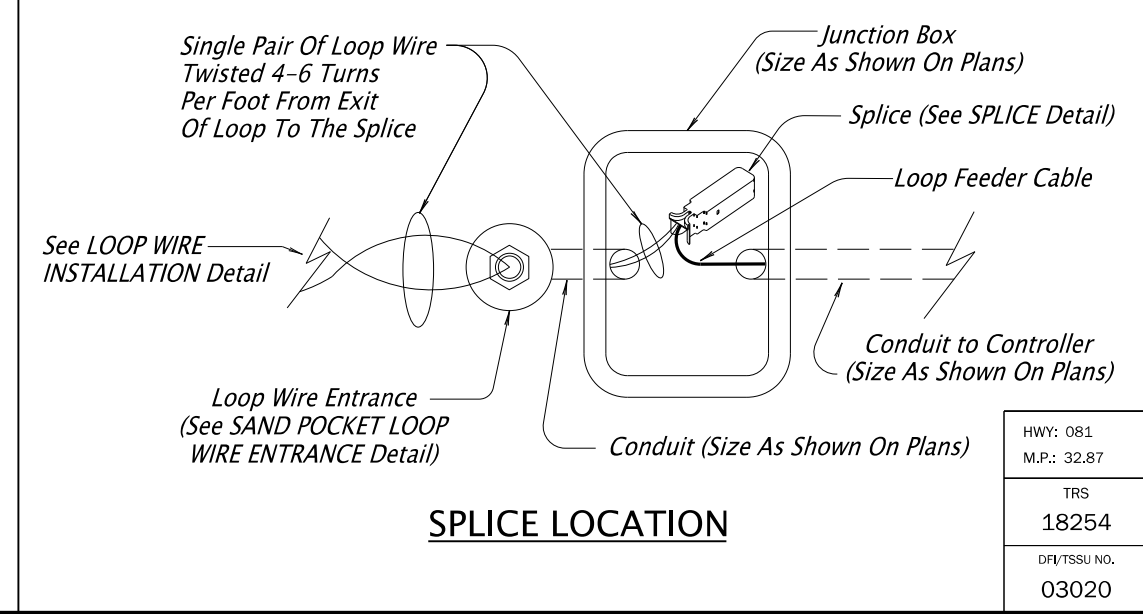
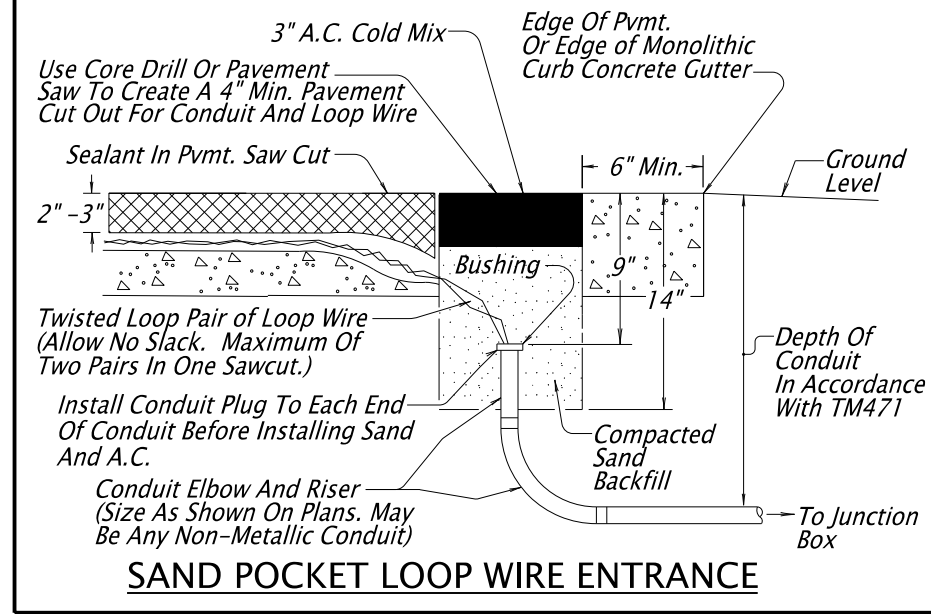
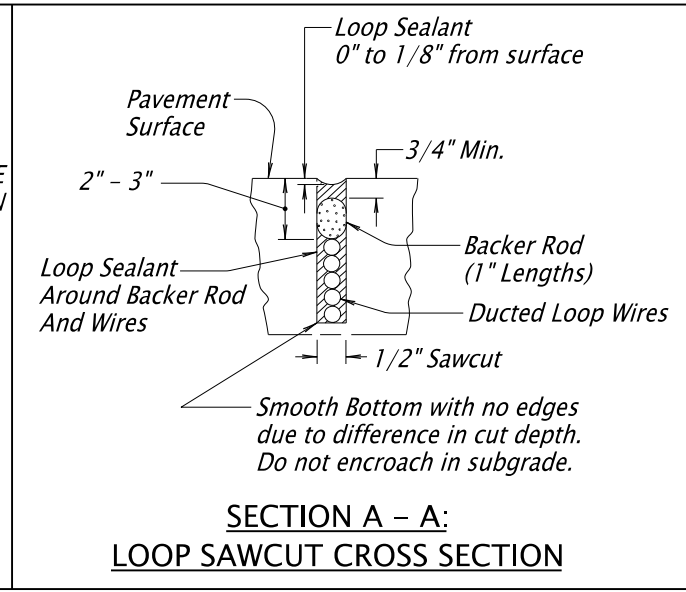
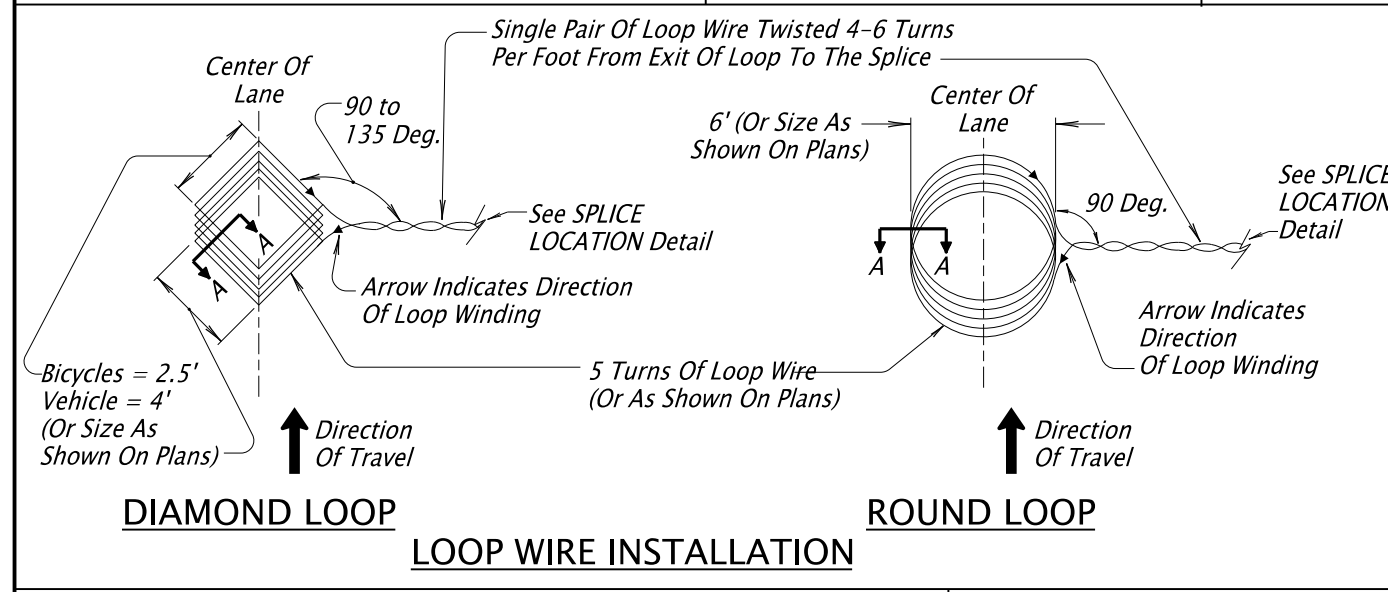
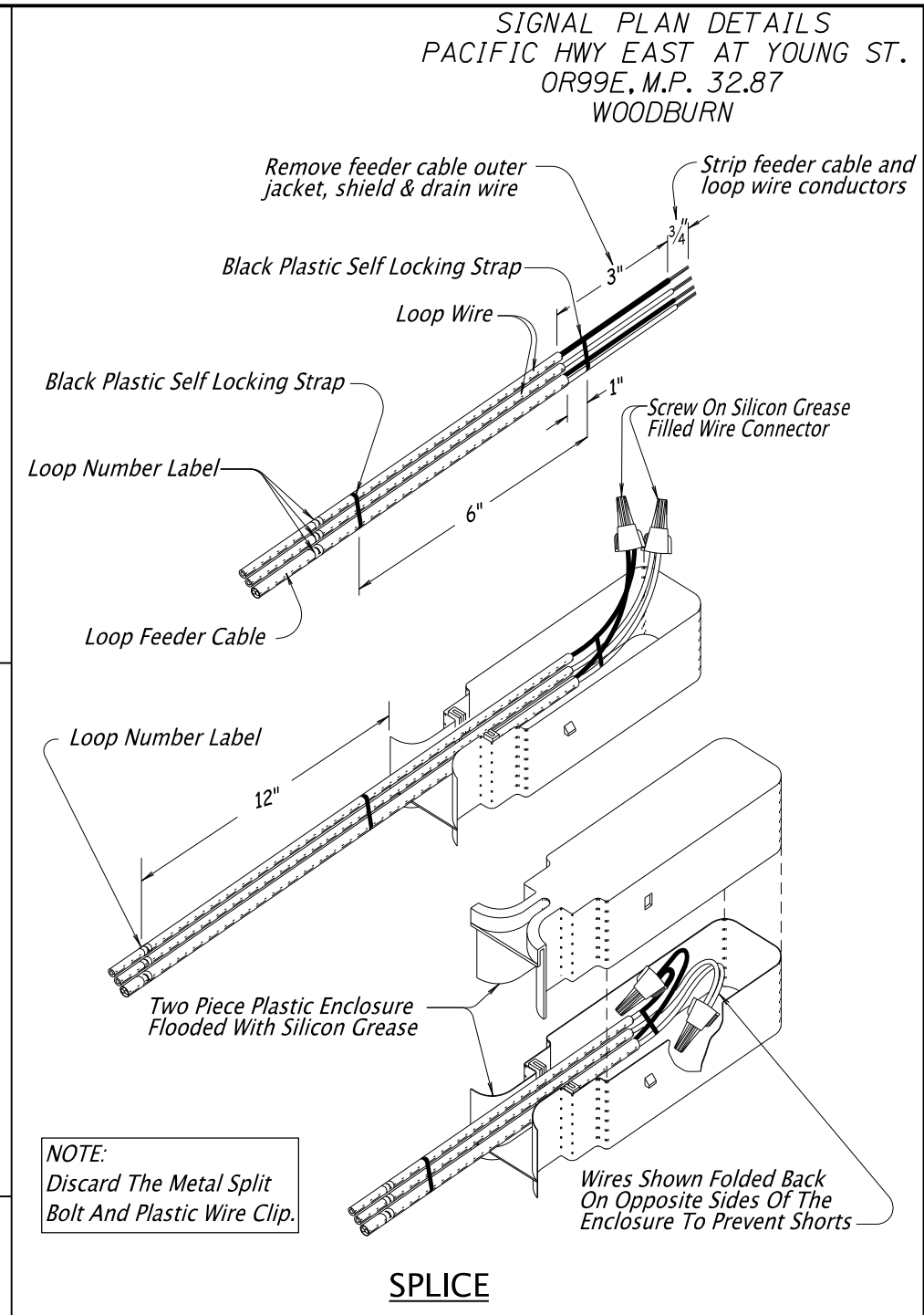
Designer: ARLO BONES Review: VERN GEORGE
 Drafter: ARLO BONES Checker: N/A

DETECTOR PLAN SHEET NO. M-04



General Notes:

1. Install Round Or Diamond Loops As Shown On The Plans
2. Limit Angle Of All Sawcuts With Loop Wire To 90 Degrees Minimum And Use Sawcut Chisel Detail To Avoid Kinking The Wire.
3. Sawcuts Shall Not Create Islands Of Pavement Less Than 2.5 Ft² In Area.
4. Mark Loop Number On All Exposed Locations Of Loop Wire And Loop Feeder Cable With Permanent Tags. Use Hand-Held Labeler (Brady Idxpert With XC-1500-580-WT-BK Tags, Or Approved Equal).
5. At Existing Installations, Re-Wire And Re-Number New And Existing Detector Loops And Loop Feeders Cables, In Junction Boxes And Cabinet, To Match Wiring Diagram. Remove Any Existing Labels That Do Not Match The Wiring Diagram.



REGISTERED PROFESSIONAL ENGINEER
XXXXX
NOT FOR CONSTRUCTION
OREGON
XXXXX XX, XXXX
XXXXXX X. XXXXXXXX

RENEWS: 12-31-20XX

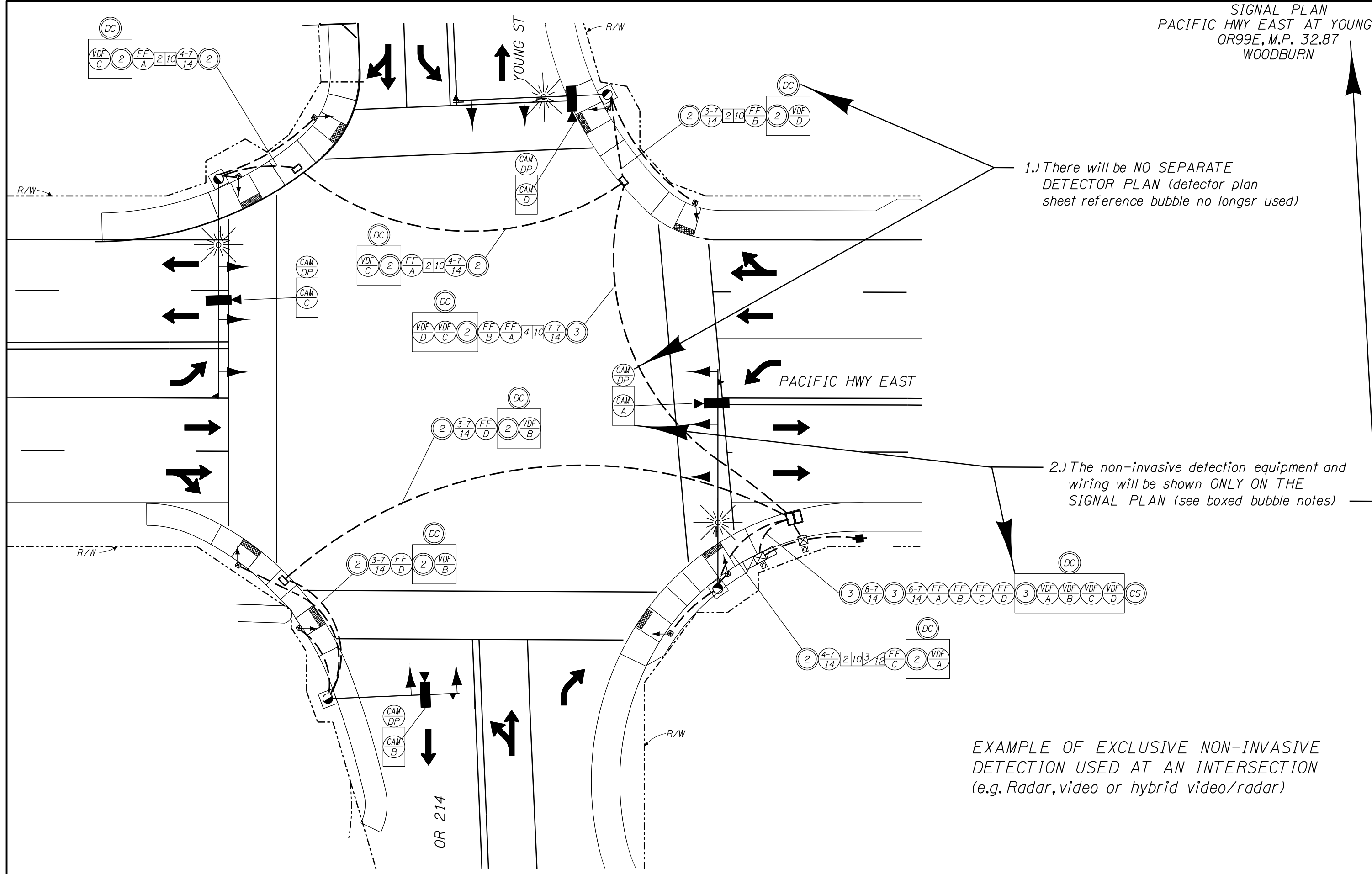
OREGON DEPARTMENT OF TRANSPORTATION

OR99E: YOUNG ST. SAFETY (WOODBURN) SEC.
PACIFIC HIGHWAY EAST
MARION COUNTY

Designer: ARLO BONES Review: VERN GEORGE
Drafter: ARLO BONES Checker: N/A

DETAILS SHEET NO. M-05

SIGNAL PLAN
 PACIFIC HWY EAST AT YOUNG ST.
 OR99E, M.P. 32.87
 WOODBURN

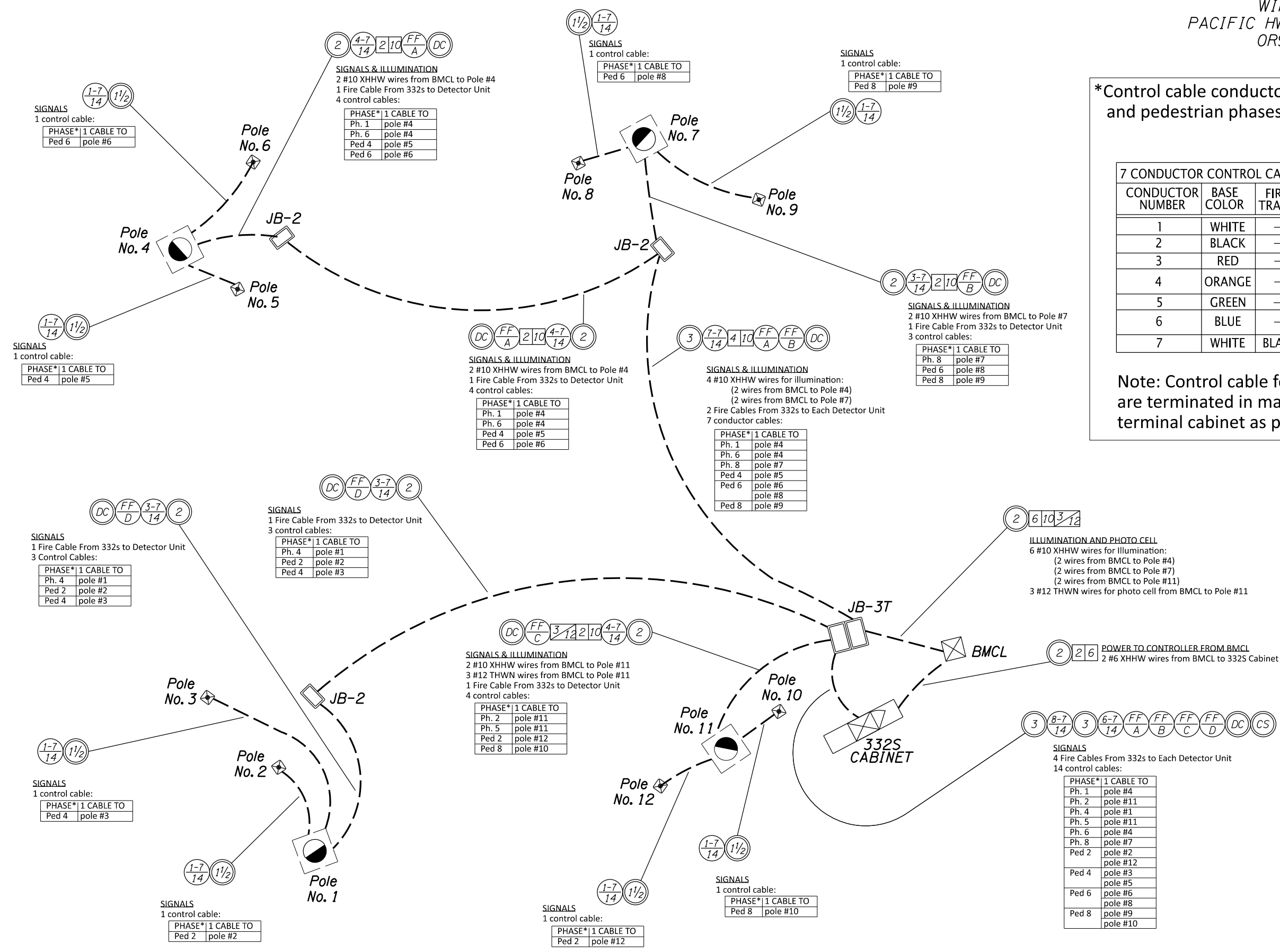


1.) There will be NO SEPARATE DETECTOR PLAN (detector plan sheet reference bubble no longer used)

2.) The non-invasive detection equipment and wiring will be shown ONLY ON THE SIGNAL PLAN (see boxed bubble notes)

EXAMPLE OF EXCLUSIVE NON-INVASIVE DETECTION USED AT AN INTERSECTION (e.g. Radar, video or hybrid video/radar)

WIRING DETAILS
 PACIFIC HWY EAST AT YOUNG ST.
 OR99E, M.P. 32.87
 WOODBURN



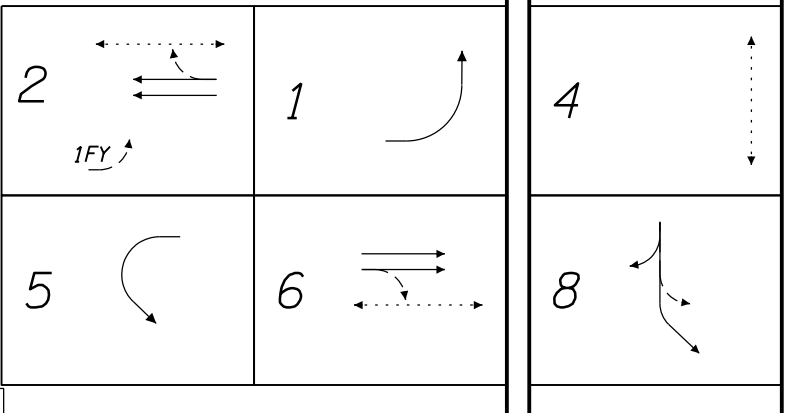
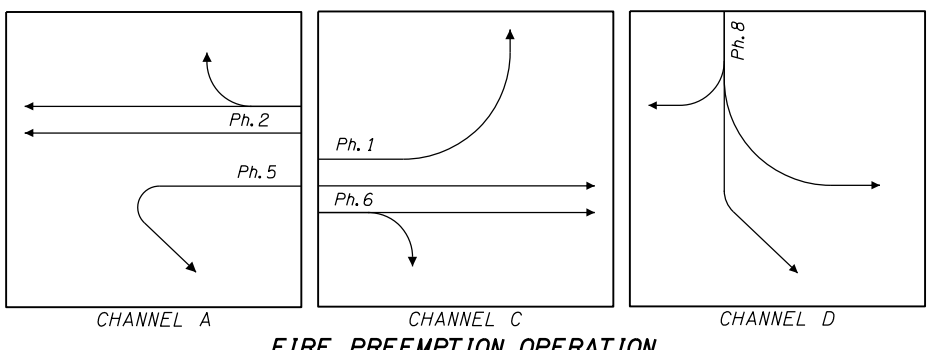
*Control cable conductor use for vehicle phases and pedestrian phases as per TM470

7 CONDUCTOR CONTROL CABLE			PEDESTRIAN PHASES	VEHICLE PHASES
CONDUCTOR NUMBER	BASE COLOR	FIRST TRACER	1 Pedestrian Phase	1 Vehicle Phase
1	WHITE	—	NEUTRAL	NEUTRAL
2	BLACK	—	WALK	YELLOW
3	RED	—	DONT WALK	RED
4	ORANGE	—	P.B. COMMON	SPARE
5	GREEN	—	PUSHBUTTON	GREEN
6	BLUE	—	SPARE	SPARE
7	WHITE	BLACK	SPARE	SPARE

Note: Control cable for pedestrian phases are terminated in mast arm pole terminal cabinet as per TM470

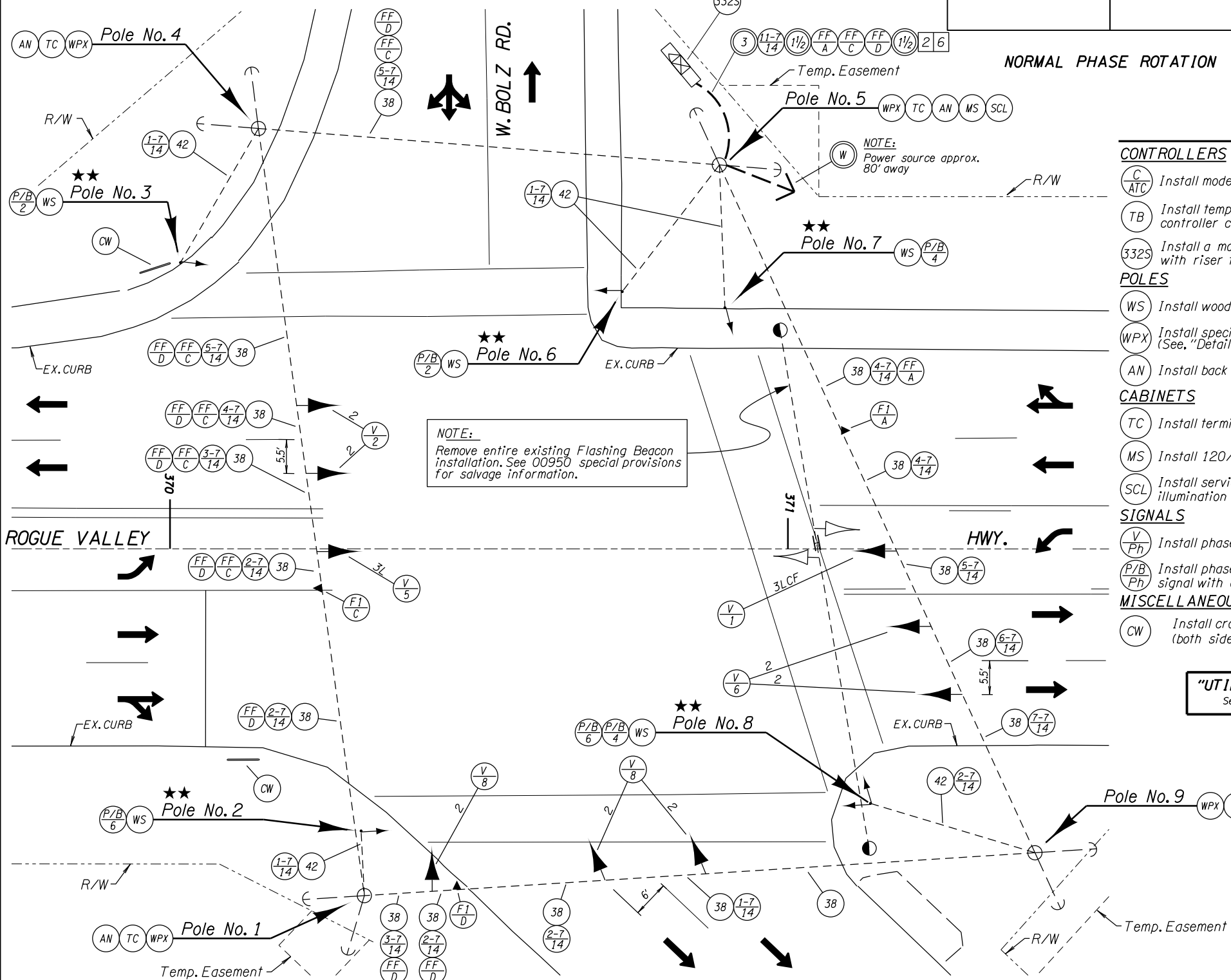
EXAMPLE 2

**(TRAFFIC CONTROL STAGE 3)
TEMPORARY SIGNAL PLAN
ROGUE VALLEY HWY. AT BOLZ RD.
OR99, M.P. 11.25
(PHOENIX)**



Note:
★ = Install wood pedestrian post as needed for construction.
Payment to relocate is incidental to temporary traffic signal installation.

Note:
Leave slack in Temporary signal head wiring to accommodate for moving heads as needed to accommodate for various staging layouts.
Engineer to verify proposed staging layouts, other than the ones shown.



NOTE:
Remove entire existing Flashing Beacon installation. See 00950 special provisions for salvage information.

LEGEND

CONTROLLERS

- (C/ATC) Install model ATC controller. (Agency furnished)
- (TB) Install temporary pre-cast (332S) traffic signal controller cabinet base
- (332S) Install a model 332S cabinet & control equipment with riser frame. Orient louvered door as shown

POLES

- (WS) Install wood pedestrian pushbutton post
- (WPX) Install special (X = non-standard) treated wood pole (See, "Details" sheet and "Pole Entrance Chart")
- (AN) Install back guy and anchor(s)

CABINETS

- (TC) Install terminal cabinet
- (MS) Install 120/240 volt meter base
- (SCL) Install service cabinet, 120/240 volt, for both signal and illumination circuits

SIGNALS

- (V/Ph) Install phase (Ph=phase) polycarbonate vehicle signal
- (P/B/Ph) Install phase (Ph=phase) polycarbonate pedestrian signal with clamshell mount and pushbutton with mount

MISCELLANEOUS NOTES

- (CW) Install crosswalk closure support with signs (both sides of support as per TM240)

FIRE PREEMPTION

- (FN/Ch) Install (N=number) direction, channel (Ch=channel) fire preemption detector unit
- (FF/Ch) Install channel (Ch=channel) fire preemption detector feeder cable

WIRES

- (38) Install galv. steel 3/8" messenger and 1/4" tether cables
- (42) Install galv. steel 1/4" messenger cable

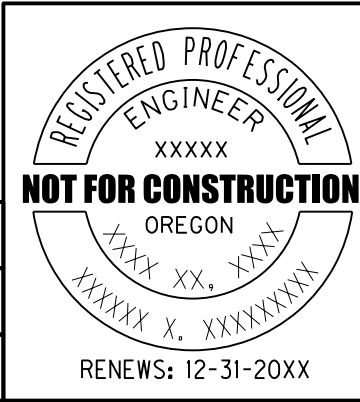
CONDUITS

- (W/G) Install (N=number) No. (G=AWG wire size) type THWN wires
- (N/G) Install (N=number) No. (G=AWG wire size) XHHW wires
- (X-N/G) Install (X=number of cables) control cables with (N=number) No. (G=AWG wire size) conductors

SIGNAL HEAD TYPES

- 2 = R:Y:G
- 3L = RA:YA:GA
- 3LCF = RA:YA:FYA:GA

"UTILITIES NOT SHOWN"
See existing utilities sheet

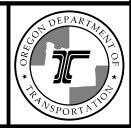


HWY: 63
M.P.: 11.25
TRS
19000
DFV/TSSU NO.
08160

RENEWS: 12-31-20XX

FINAL ELECTRONIC DOCUMENT
AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION



FFO-I-5: FERN VALLEY INTERCHANGE, UNIT 2
PACIFIC HIGHWAY
JACKSON COUNTY

Designer: ARLO BONES
Reviewer: VERN GEORGE
Drafter: ARLO BONES
Checker: N/A

TEMPORARY SIGNAL PLAN (STAGE 3)

SHEET/DWG. NO.
M-10

(TRAFFIC CONTROL STAGE 3)
 WIRING DETAILS
 ROGUE VALLEY HWY. AT BOLZ RD.
 OR99, M.P. 11.25
 (PHOENIX)

