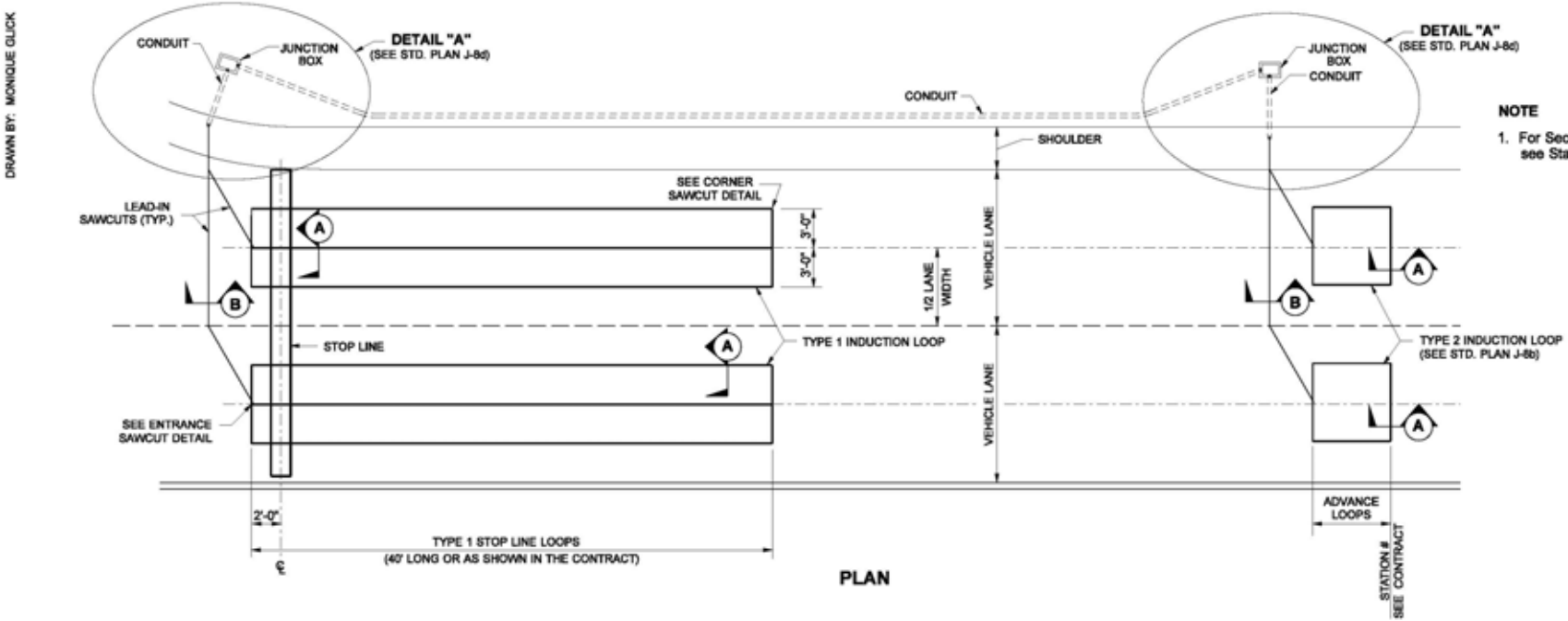
Signal Detection

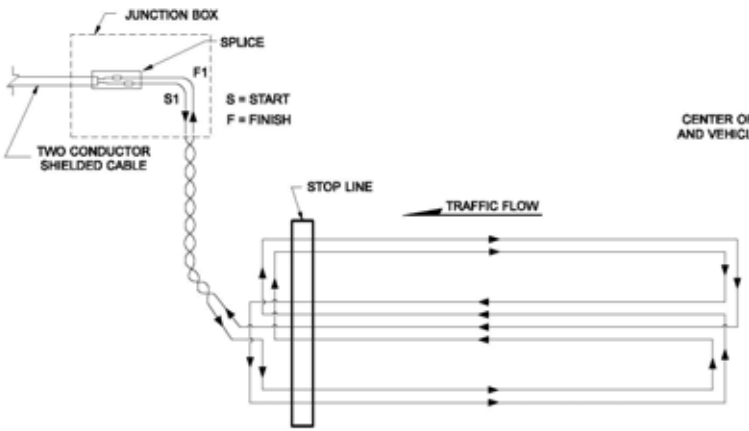
- 8-20.3(14)c
- Induction loop Vehicle Detectors
- Video detection
- Pre-form loops
- Magnetometers
- 9-29.18 Vehicle Detectors

Loop Details
J-8a through J-8d

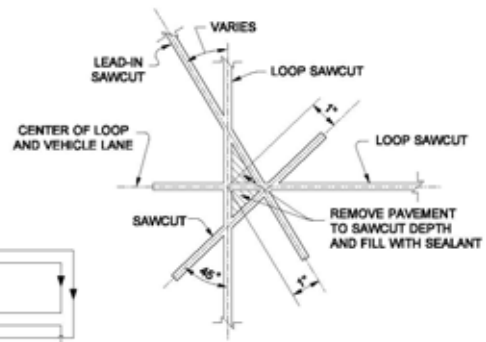
Skip J-8 drawings
Go to Circle Saw

Standard Plan J-8a

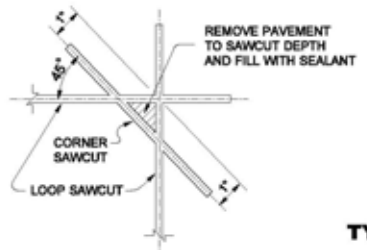




TYPE 1 STOP LINE LOOP WIRING DIAGRAM



ENTRANCE SAWCUT DETAIL



CORNER SAWCUT DETAIL

EXPIRES MAY 5, 2005

TYPE 1 INDUCTION LOOP

STANDARD PLAN J-8a

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso 05-20-04

STATE DESIGN ENGINEER DATE

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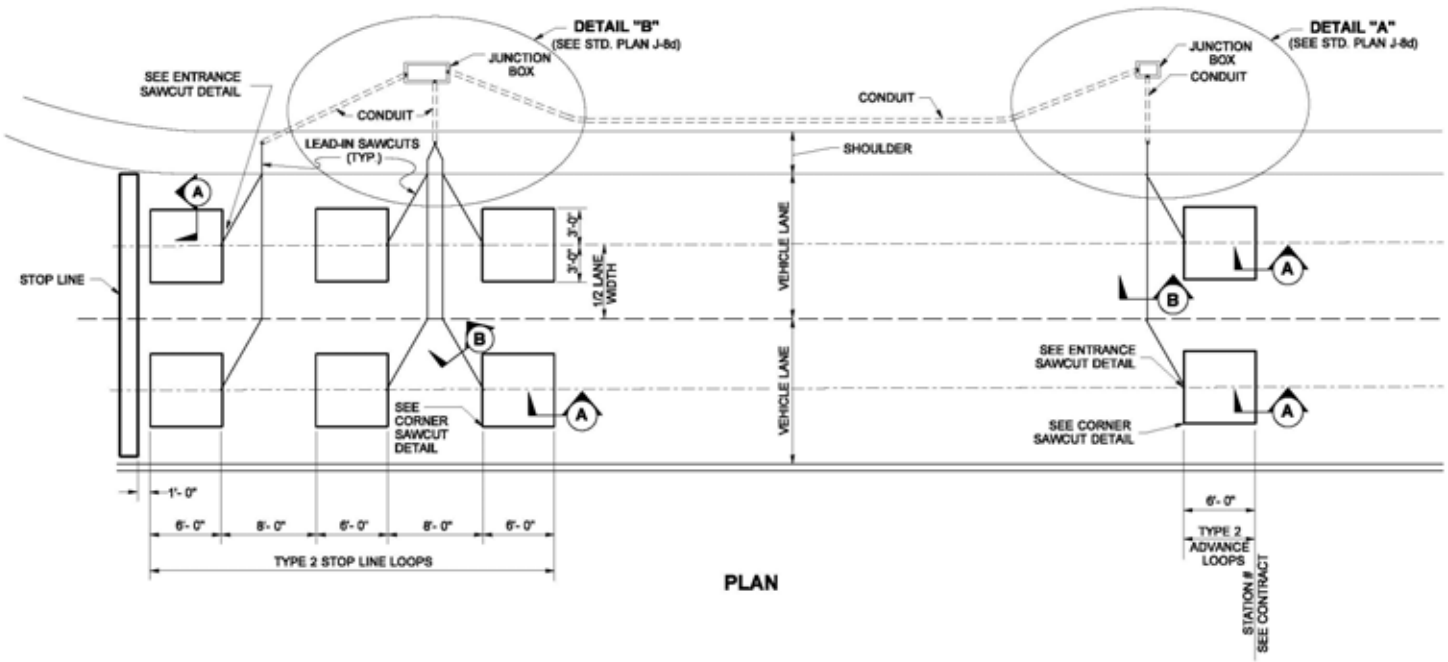
Standard Plan J-8b 1 of 2

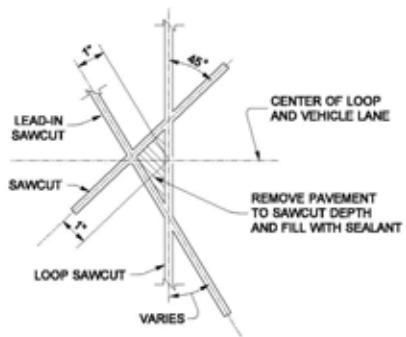
DRAWN BY: MONIQUE GLICK



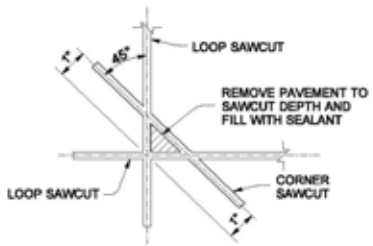
PLAN

NOTE

1. For Sections A and B, see Standard Plan J-8d.



ENTRANCE SAWCUT DETAIL



CORNER SAWCUT DETAIL

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TYPE 2 INDUCTION LOOP

STANDARD PLAN J-8b

SHEET 1 OF 2 SHEETS

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Standard Plan J-8b 2 of 2

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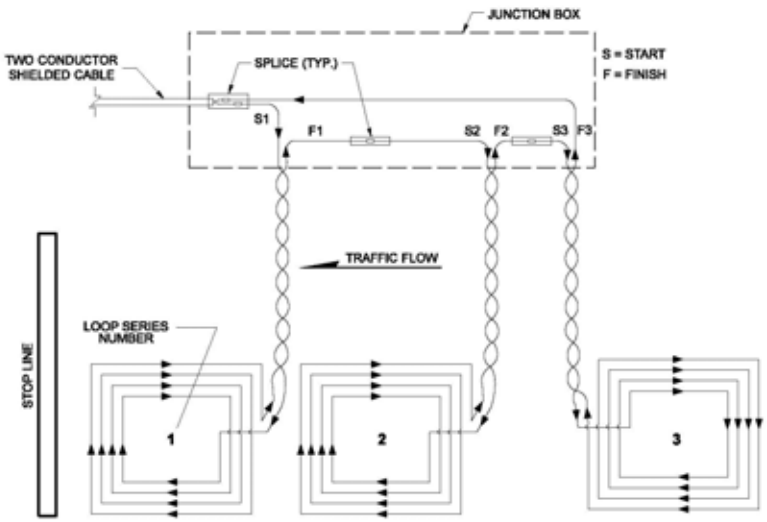
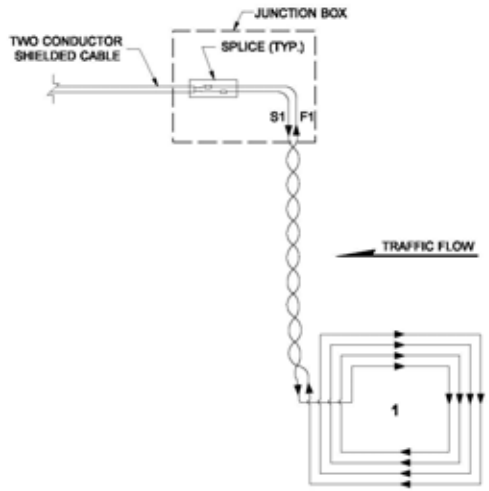


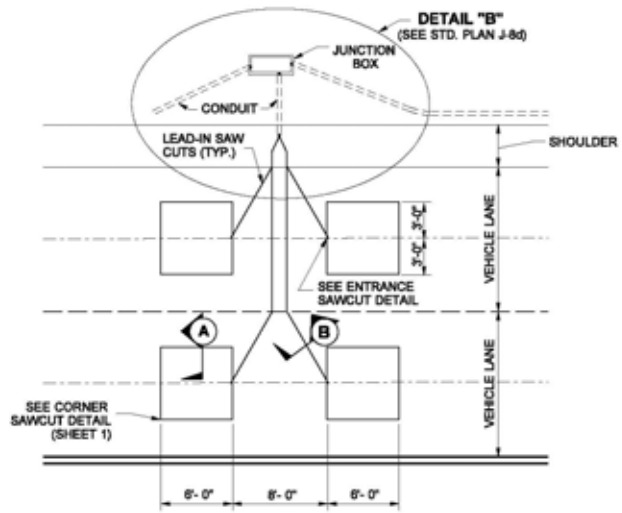
TYPE 2 STOP LINE LOOP WIRING DIAGRAM
(SERIES SPLICE SHOWN)



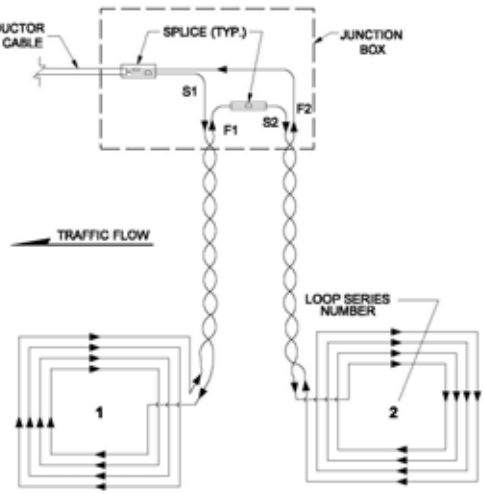
TYPE 2 ADVANCE LOOP WIRING DIAGRAM

NOTES

1. All of the loop lead-in wires shall return to the Junction Box.
2. For Splice Detail, see Standard Plan J-8d.



TYPE 2 SAMPLING LOOPS



TYPE 2 SAMPLING LOOP WIRING DIAGRAM
(SERIES SPLICE SHOWN)

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TYPE 2 INDUCTION LOOP

STANDARD PLAN J-8b

SHEET 2 OF 2 SHEETS

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Standard Plan J-8c 1 of 3

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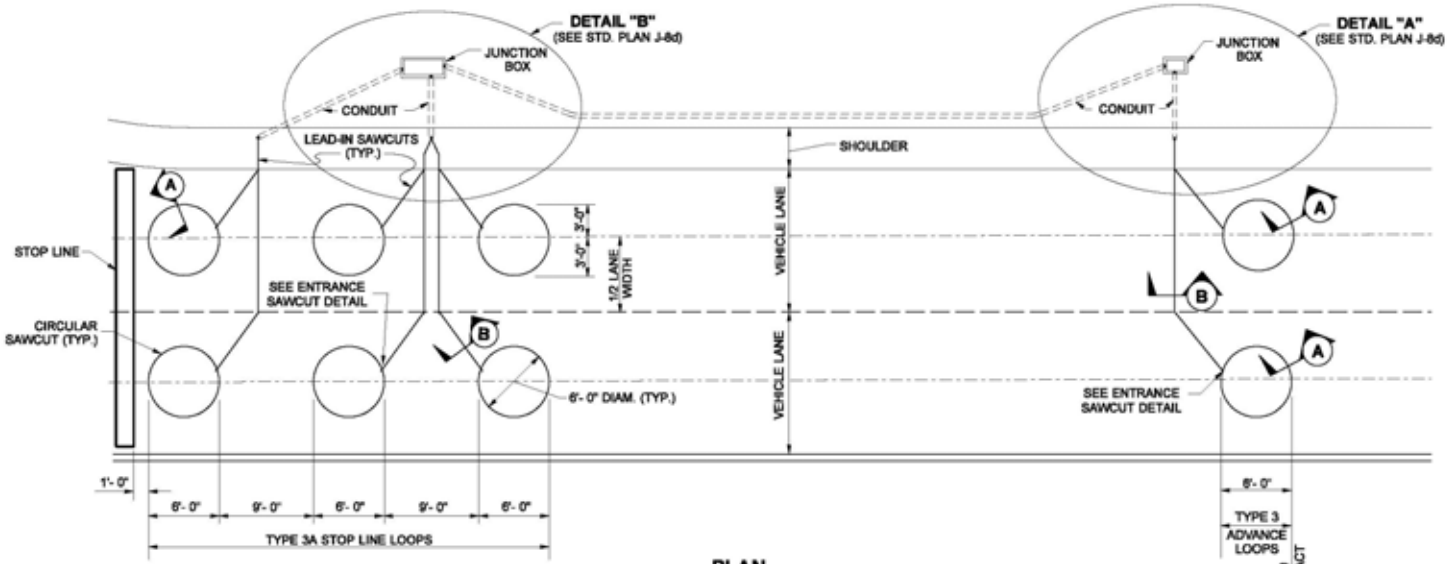
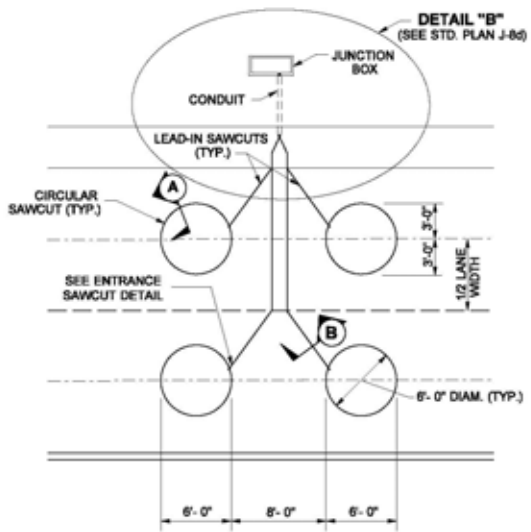


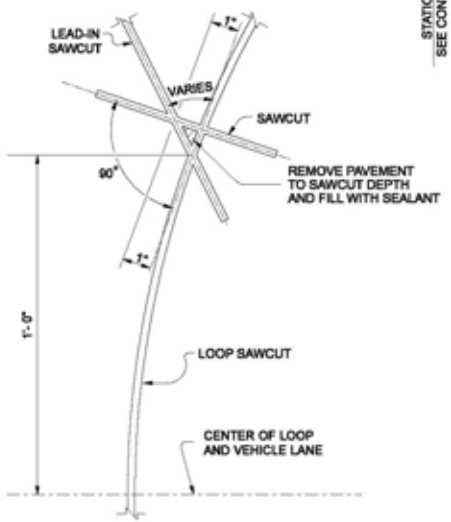
PLAN

NOTE

1. For Sections A and B, see Standard Plan J-8d.



TYPE 3 SAMPLING LOOPS



ENTRANCE SAWCUT DETAIL

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TYPE 3 INDUCTION LOOP

STANDARD PLAN J-8c

SHEET 1 OF 3 SHEETS

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Standard Plan J-8c 2 of 3

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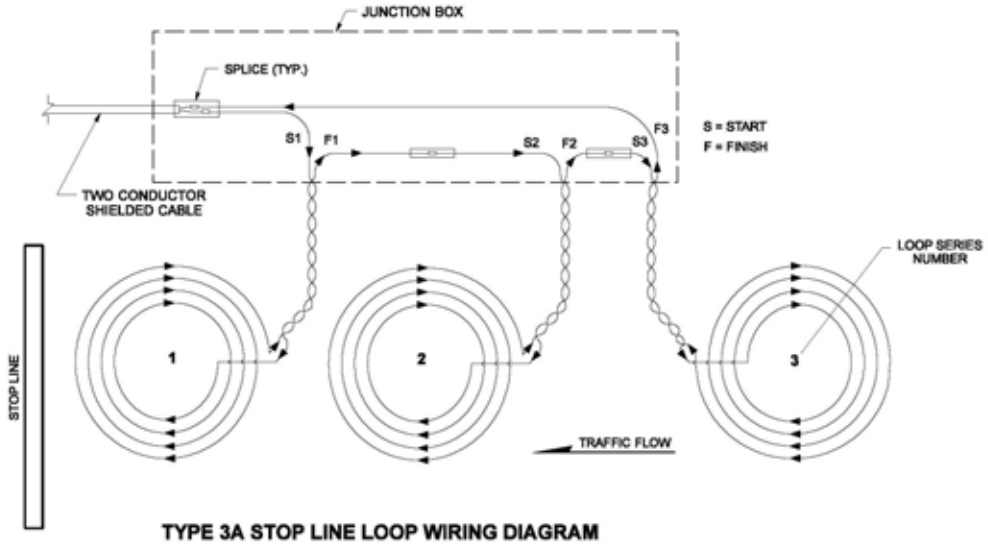
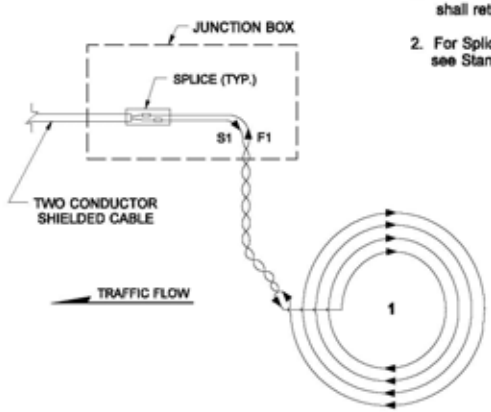


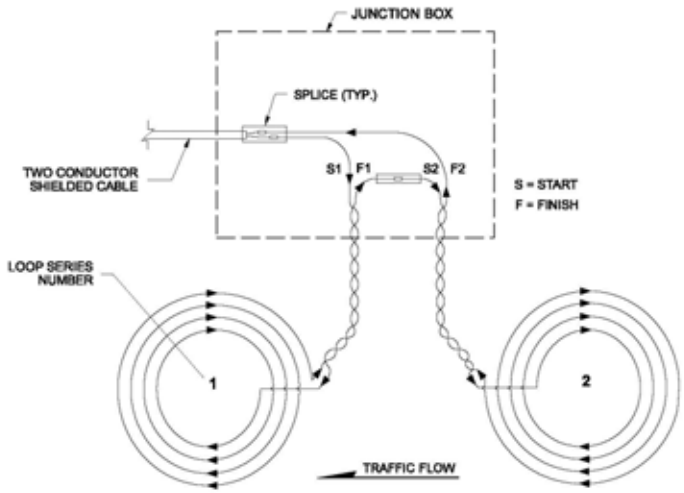
TYPE 3A STOP LINE LOOP WIRING DIAGRAM
(SERIES SPLICE SHOWN)

NOTES

1. All of the loop lead-in wires shall return to the Junction Box.
2. For Splice Detail, see Standard Plan J-8d.



TYPE 3 ADVANCE LOOP WIRING DIAGRAM



TYPE 3 SAMPLING LOOP WIRING DIAGRAM
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TYPE 3 INDUCTION LOOP

STANDARD PLAN J-8c

SHEET 2 OF 3 SHEETS

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Standard Plan J-8c 3 of 3

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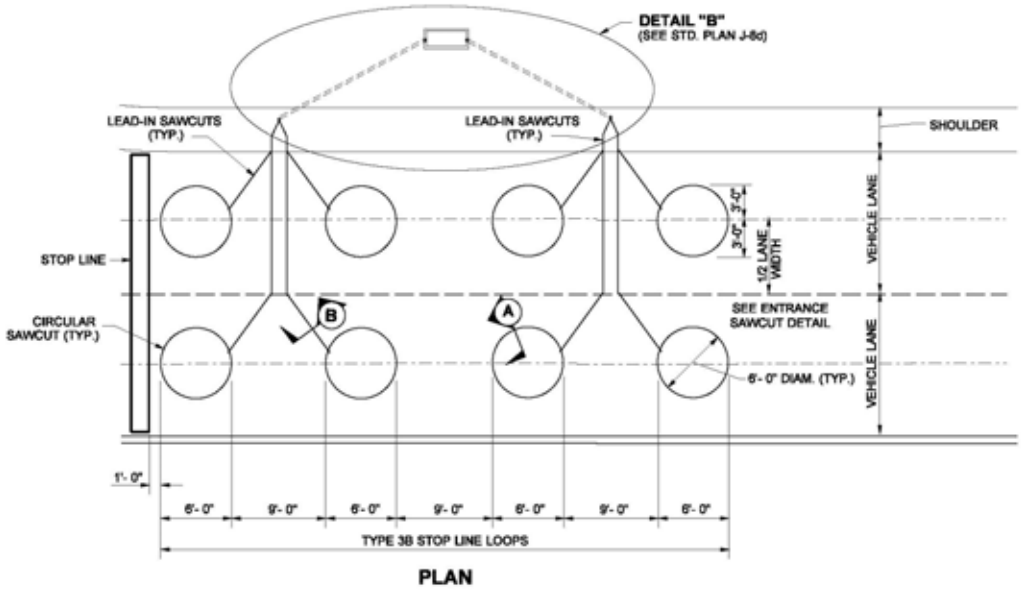
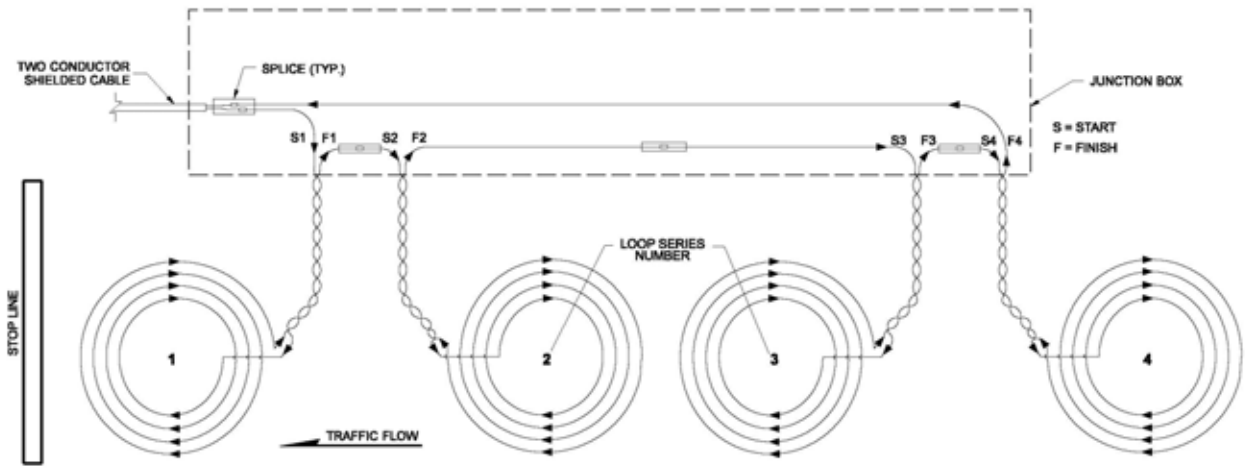


PLAN



TYPE 3B STOP LINE LOOP WIRING DIAGRAM

(SERIES SPLICE SHOWN)

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TYPE 3 INDUCTION LOOP

STANDARD PLAN J-8c

SHEET 3 OF 3 SHEETS

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Standard Plan J-8d 1 of 2

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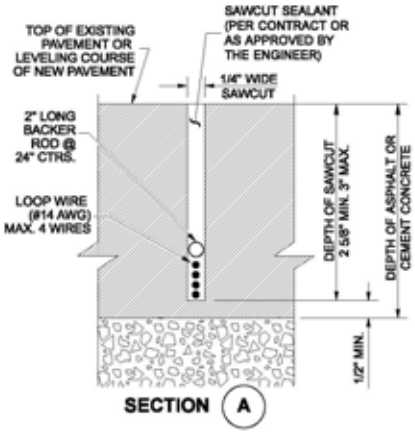
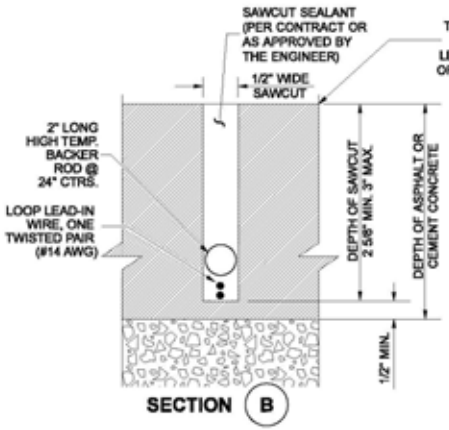
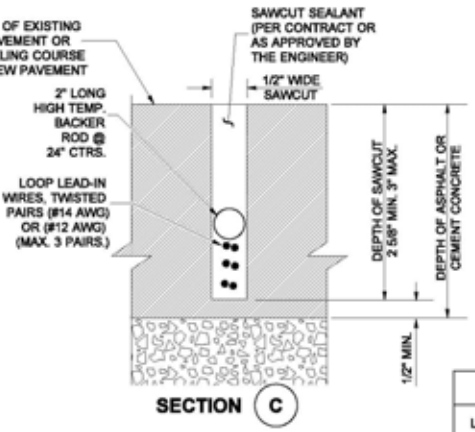




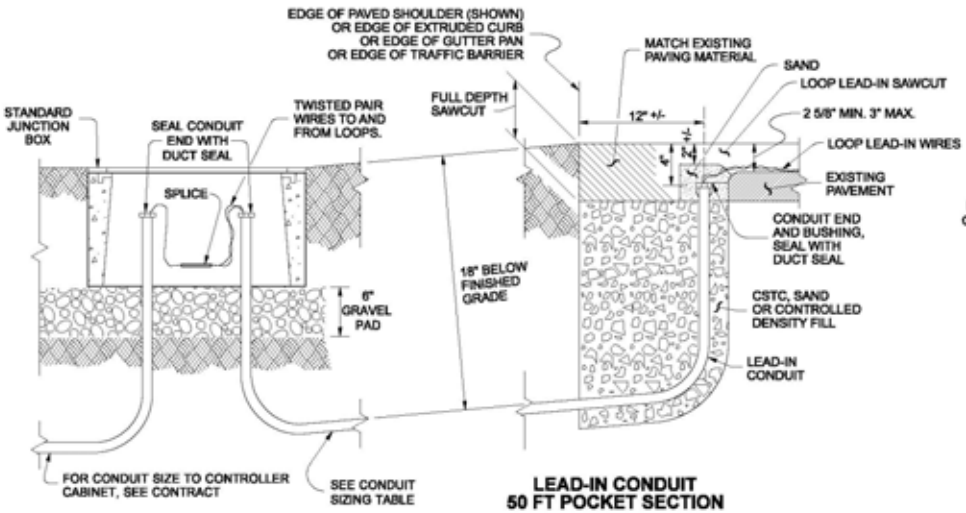


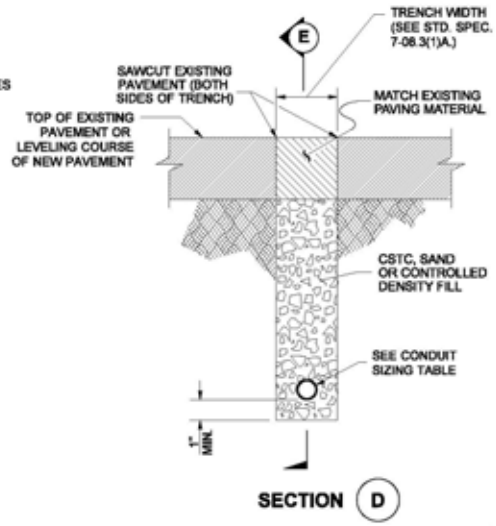
NOTES

1. Fill the conduit trench to the top of the existing or new surfacing with CSTC, sand or controlled density fill. See "Standard Specifications" Section 2-09.3(1)E.
2. Minor Regional variation is allowed in the soft pocket closure. Consult with the Engineer or see the Contract for additional requirements.
3. Conductors shall be snug to the bottom of the sawcut. High temperature backer rod shall be snug to the conductors.

CONDUIT SIZING TABLE

LOOP LEAD PAIRS	1-2	3	4-5	6-8	9-12
CONDUIT SIZE (MIN)	1"	1 1/4"	1 1/2"	2"	3"





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INDUCTION LOOP DETAILS

STANDARD PLAN J-8d

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Standard Plan J-8d 2 of 2

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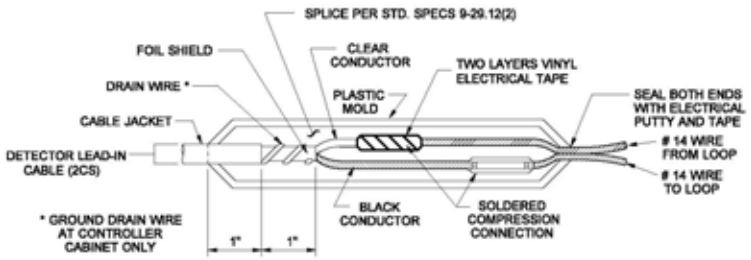
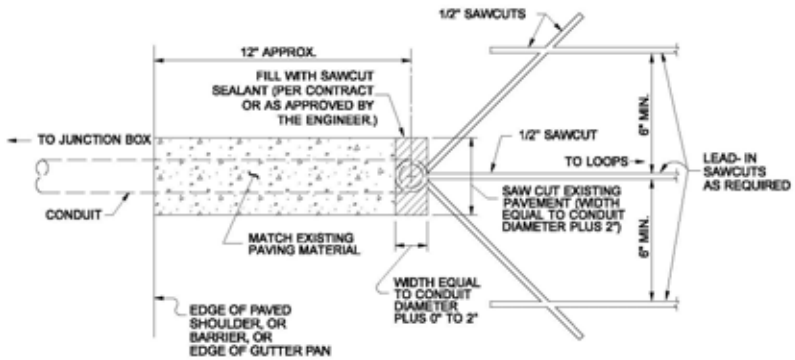
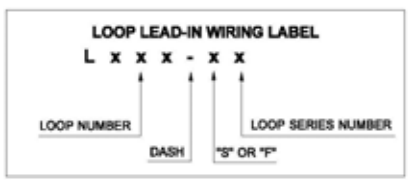
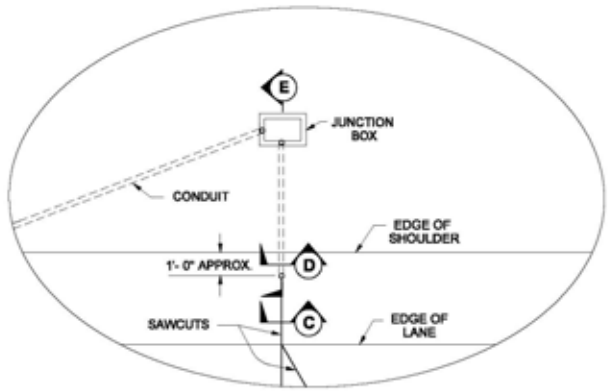


SPLICE DETAIL

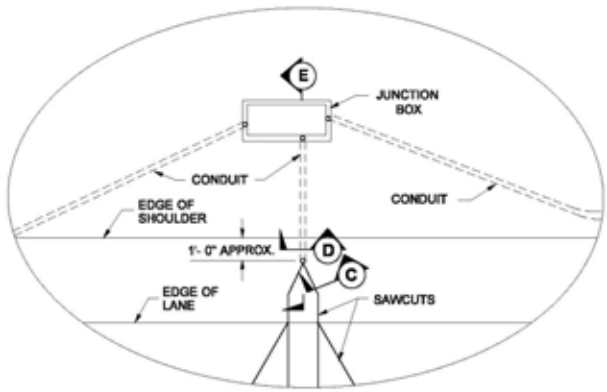


SAWCUT AND CONDUIT CONNECTION PLAN





DETAIL "A"



DETAIL "B"

LOOP INSTALLATION NOTES

1. Install the Junction Box and the lead-in conduit.
2. Sawcut the loop slots and the lead-in slots.
3. Lay out the loop wire starting at the Junction Box, allowing 5' minimum slack.
4. Install the wire in the loop slot as shown.
5. Finish laying out the wire at the Junction Box and identify the leads with the loop number, the "S" for start and the "F" for the finish, and the loop series number.
6. Twist each pair of the lead wires two times per foot from the loop to the Junction Box. Reverse the direction of the twist for each successive pair installed.
7. Construct a supplemental splice containing any series loop connections required in the plans. Supplemental splices are subject to the same requirements shown for the loop lead and the shielded cable splice.
8. Splice the loop leads of supplemental splice leads to the shielded cable as noted in the Contract.
9. Complete installation and test loop circuits or combination loop circuits. See Standard Specifications 8-20.3(14)D.
10. Conduit for the loop stubout shall be as required in the Contract.

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STATE OF WASHINGTON
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INDUCTION LOOP DETAILS

STANDARD PLAN J-8d

SHEET 2 OF 2 SHEETS

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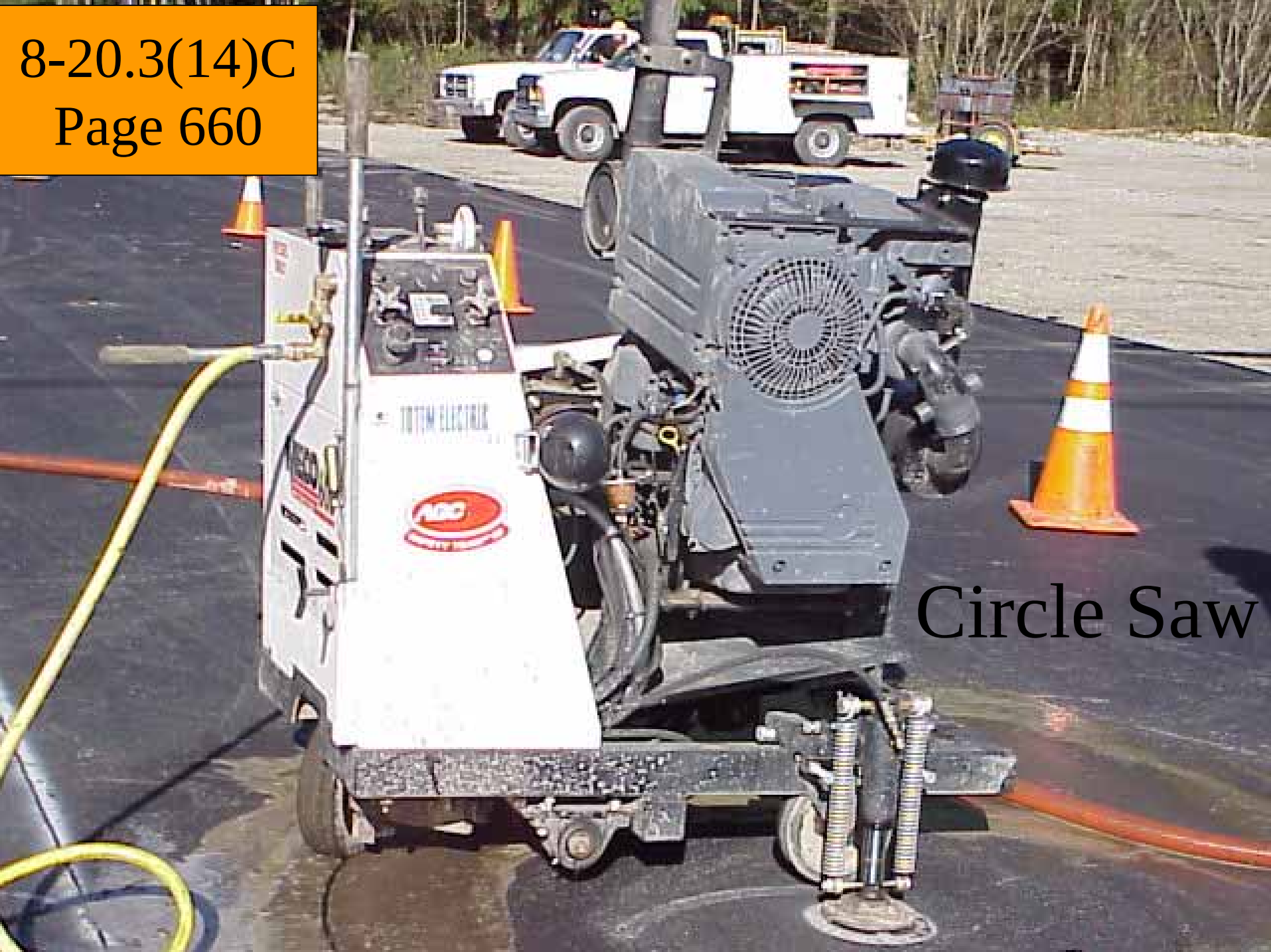
8-20.3(14)C
Page 660



Circle Saw

Circle Saw Blade

Cutting Circle Loop

1-07.5(3)
Page 106

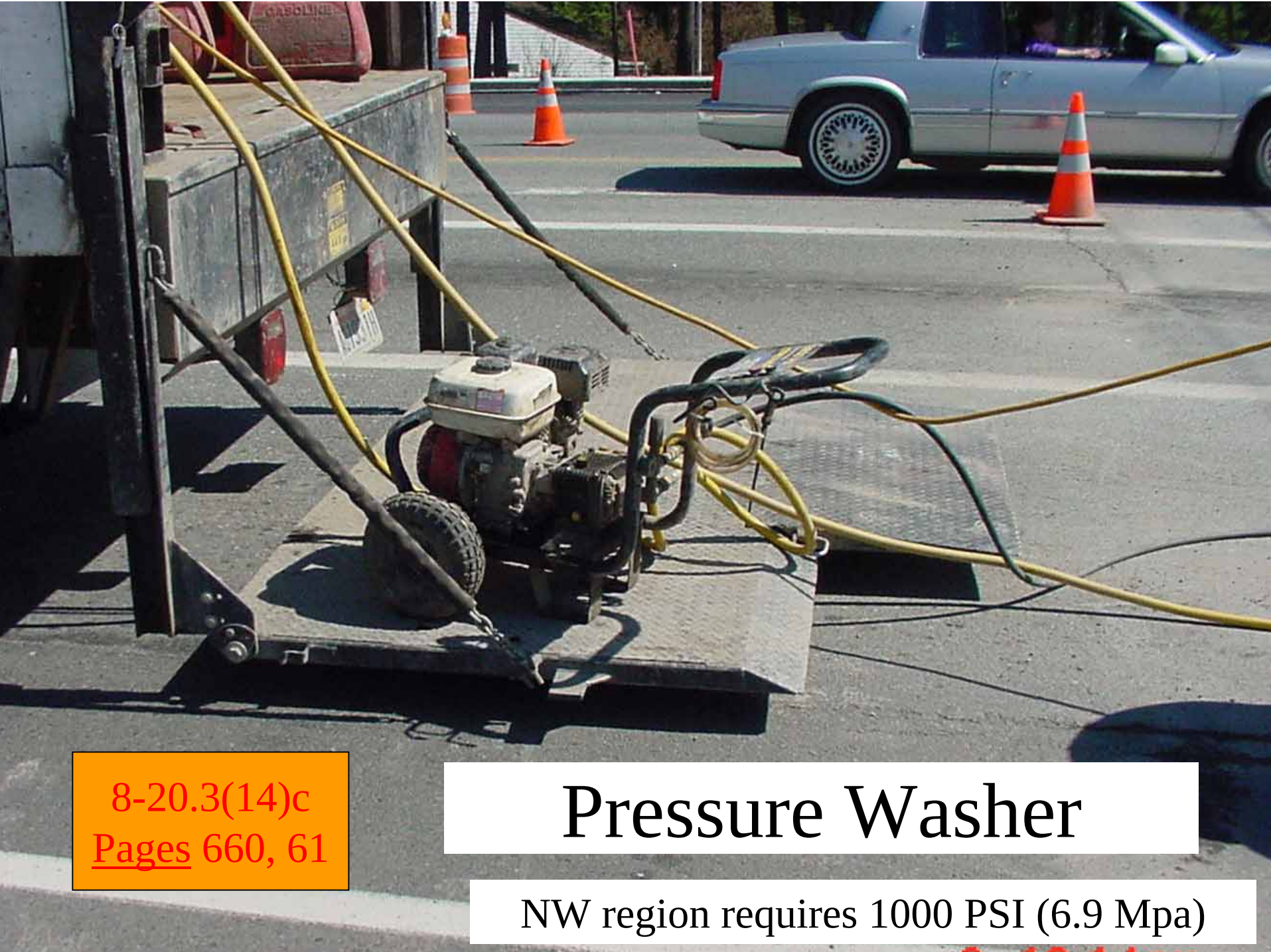
Vacuum

Vacuum Slurry

Sand Bags Help Control Slurry

Home Runs Cut With Flat Saw

Home Run Cuts
at 45 Degree
Angles



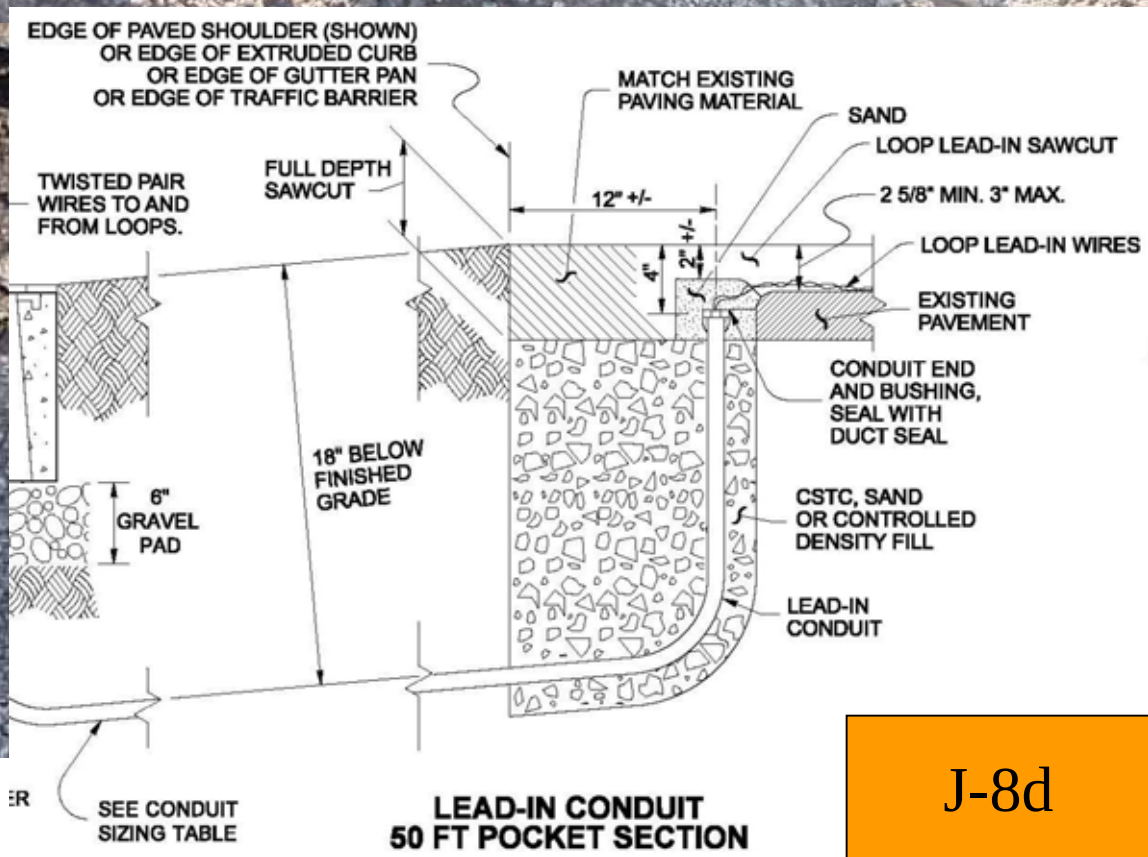
8-20.3(14)c
Pages 660, 61

Pressure Washer

NW region requires 1000 PSI (6.9 Mpa)

Wash Them and Dry Them

Loop Stub

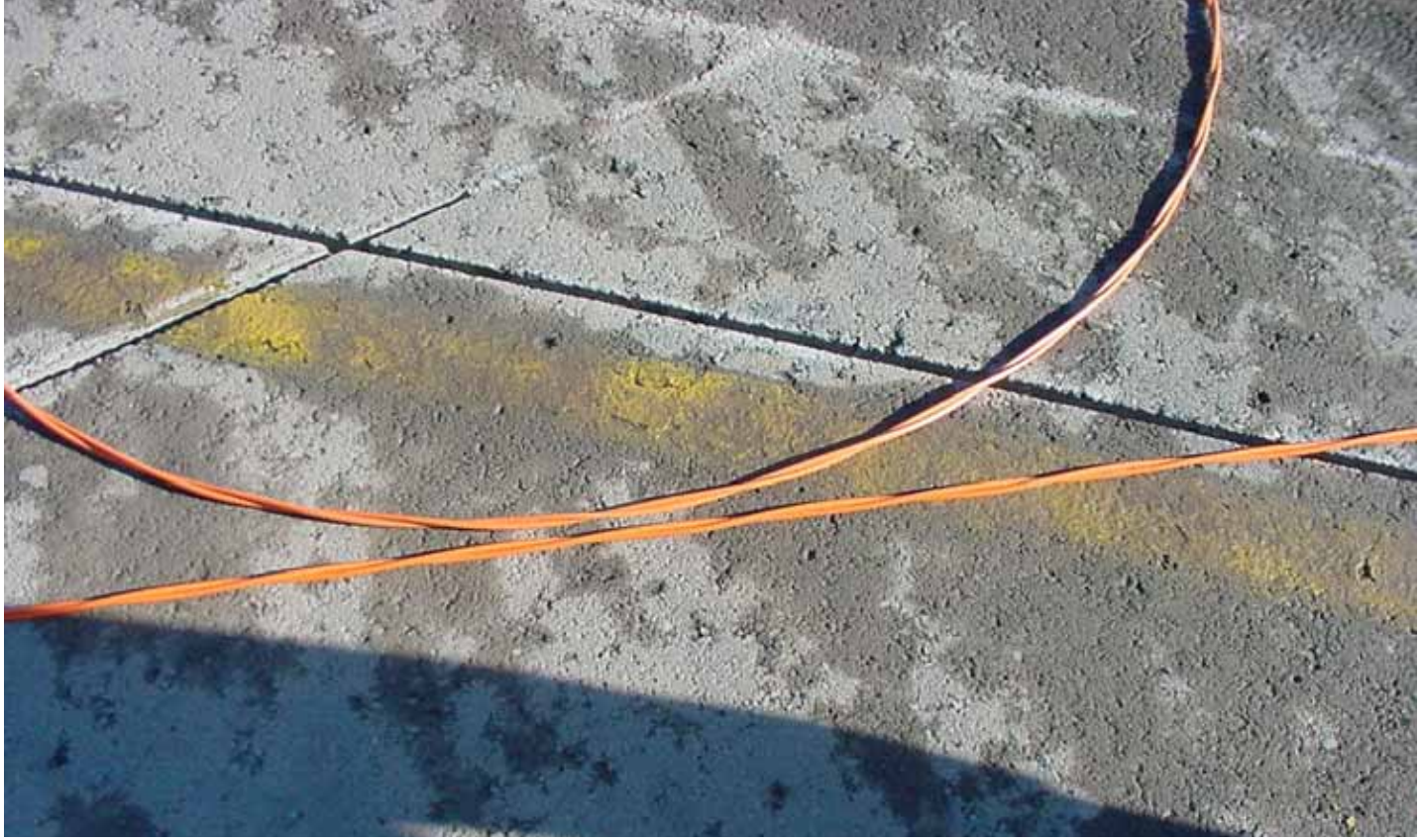


J-8d

Install Wire

Use a Wood Tool to Install So Wire Is Not Damaged

8-20.3(14)c
Pages 660, 61

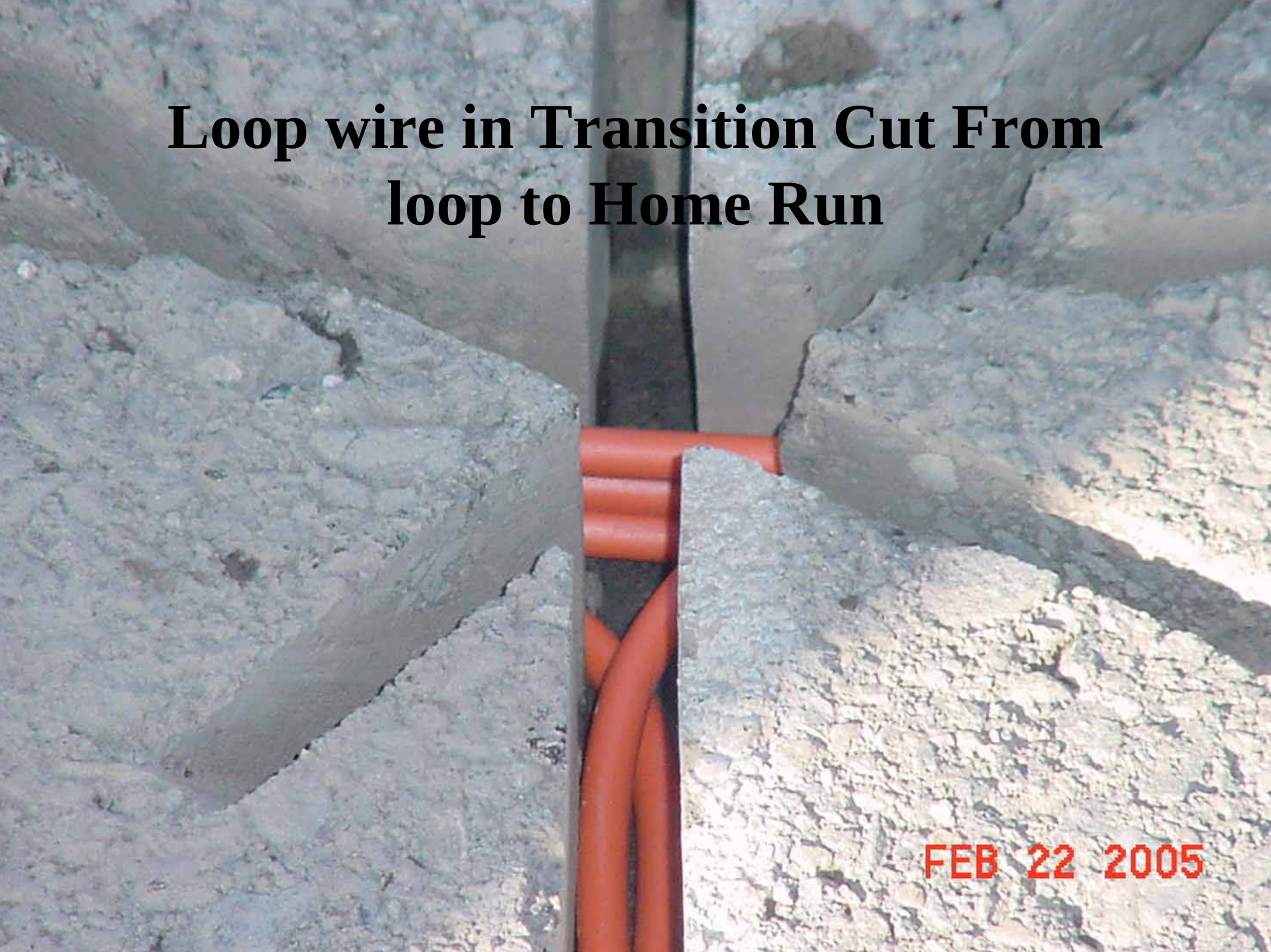


Twist Each Pair of Loop Lead Wires 2 Times per Foot. Reverse Direction of Twist for each Successive Pair Installed. **J-8d sheet 2 Loop Installation Note 6**

51-7 Wire
CLIFFORD/QP IMSA 51-5 600V 2001
JAN 5 2005

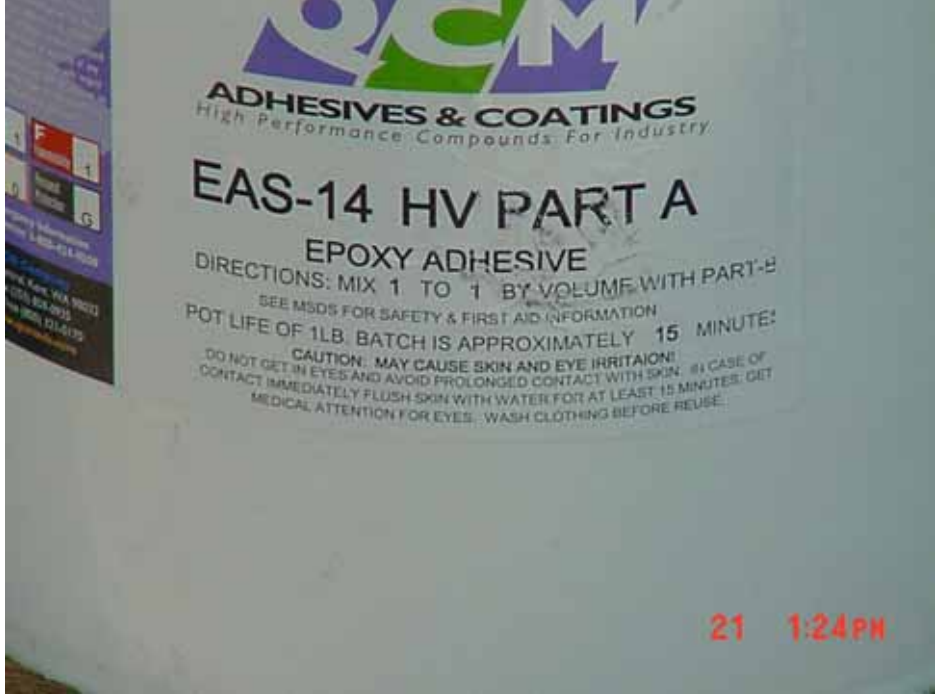
Orange 51-7 Wire

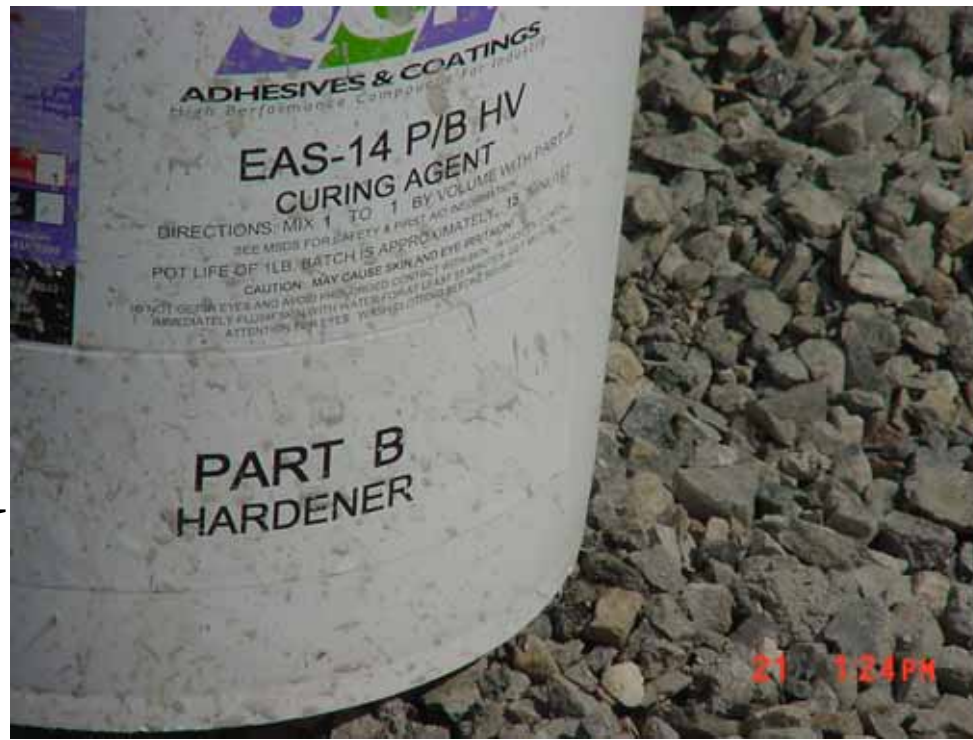
Loop wire in Transition Cut From loop to Home Run



Test Loop
Before Sealing
15 8:07AM

Sealing Loops With 3M 5000





QCM 2 Part Epoxy Loop Sealant

Mixing QCM Epoxy

Install QCM
Loop Sealant

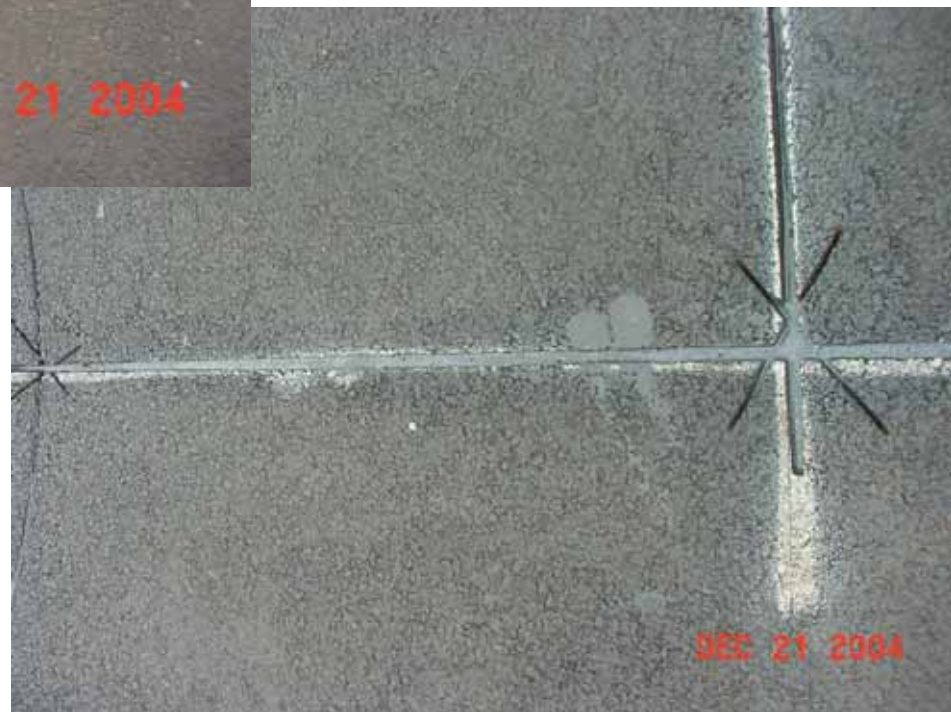
QCM Can Be Messy

Injection Pump in 5 Gallon Bucket

Cold Application Loop Sealants

- NW Region Sealants for ACP
  - RAI Pro-Seal 6006EX
  - QCM EAS-14
  - 3m Black 5000
- NW Region Sealants for PCC
  - QCM EAS-14
  - 3m Black 5000
  - Gold Label Flex 1P

Don’t Over Fill Cuts

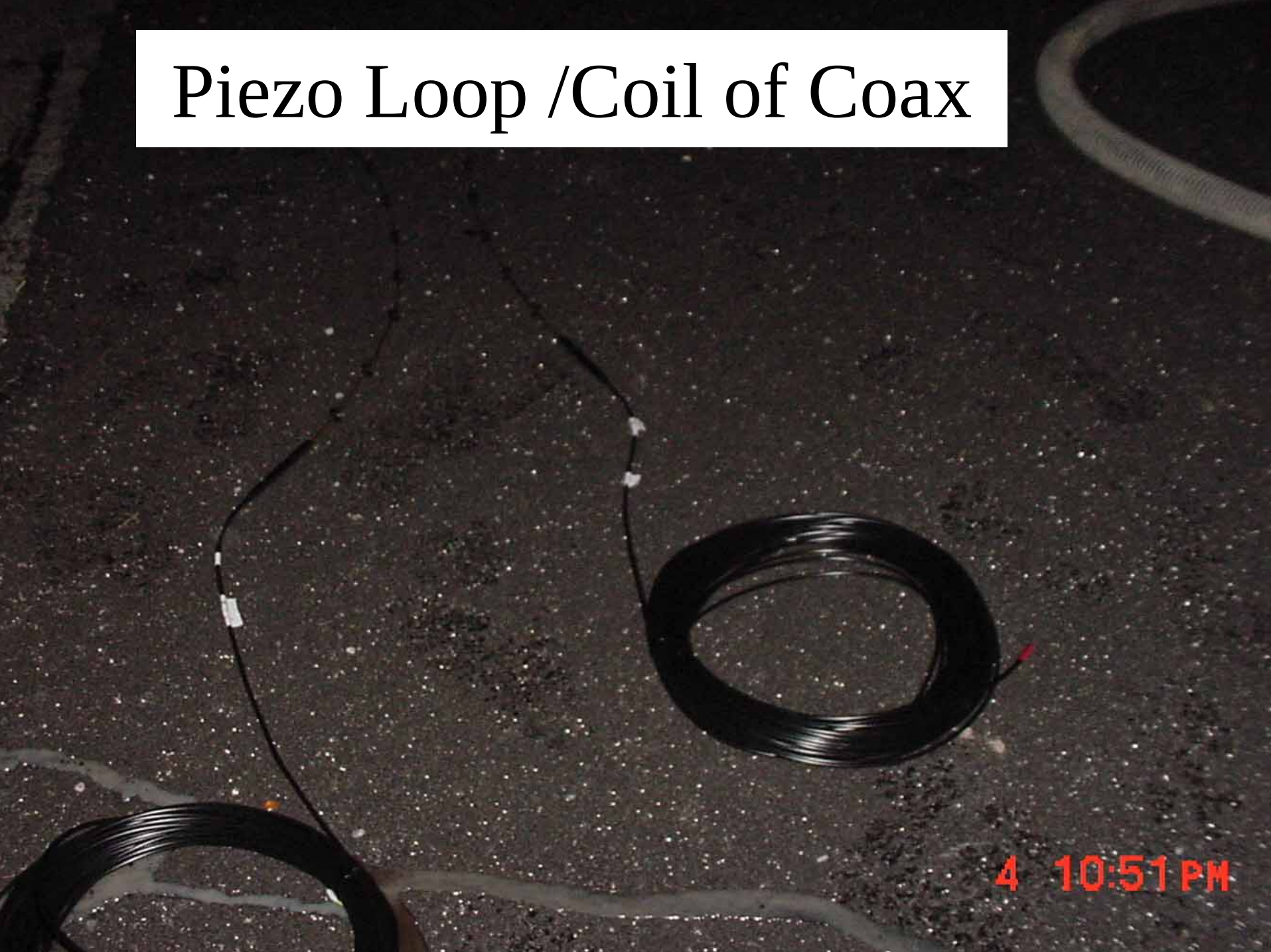


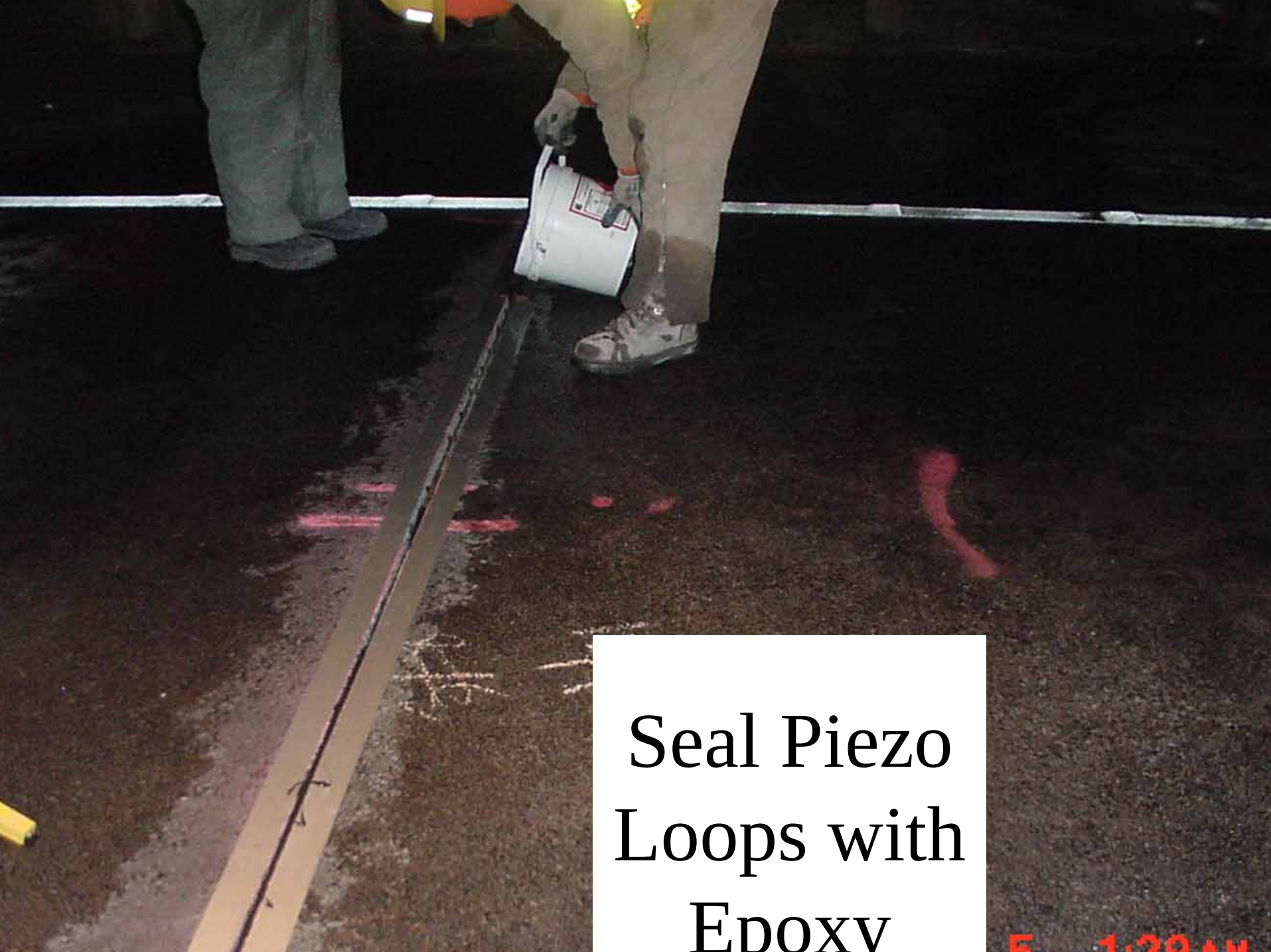
These Look Good

Finished Product Poor Location

Piezo Loop With Clips installed

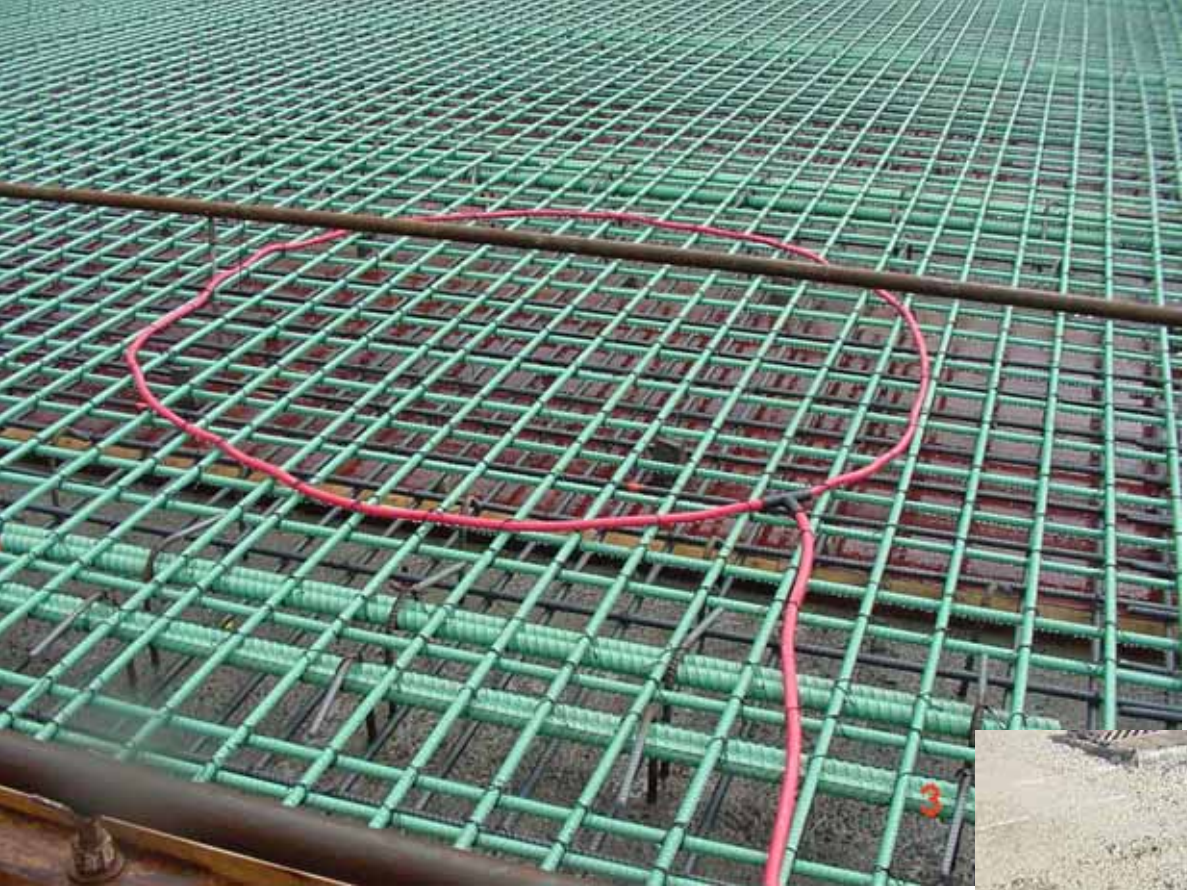
Piezo Loop /Coil of Coax




Seal Piezo
Loops with
Epoxy

Seal Coax
With 3M 5000

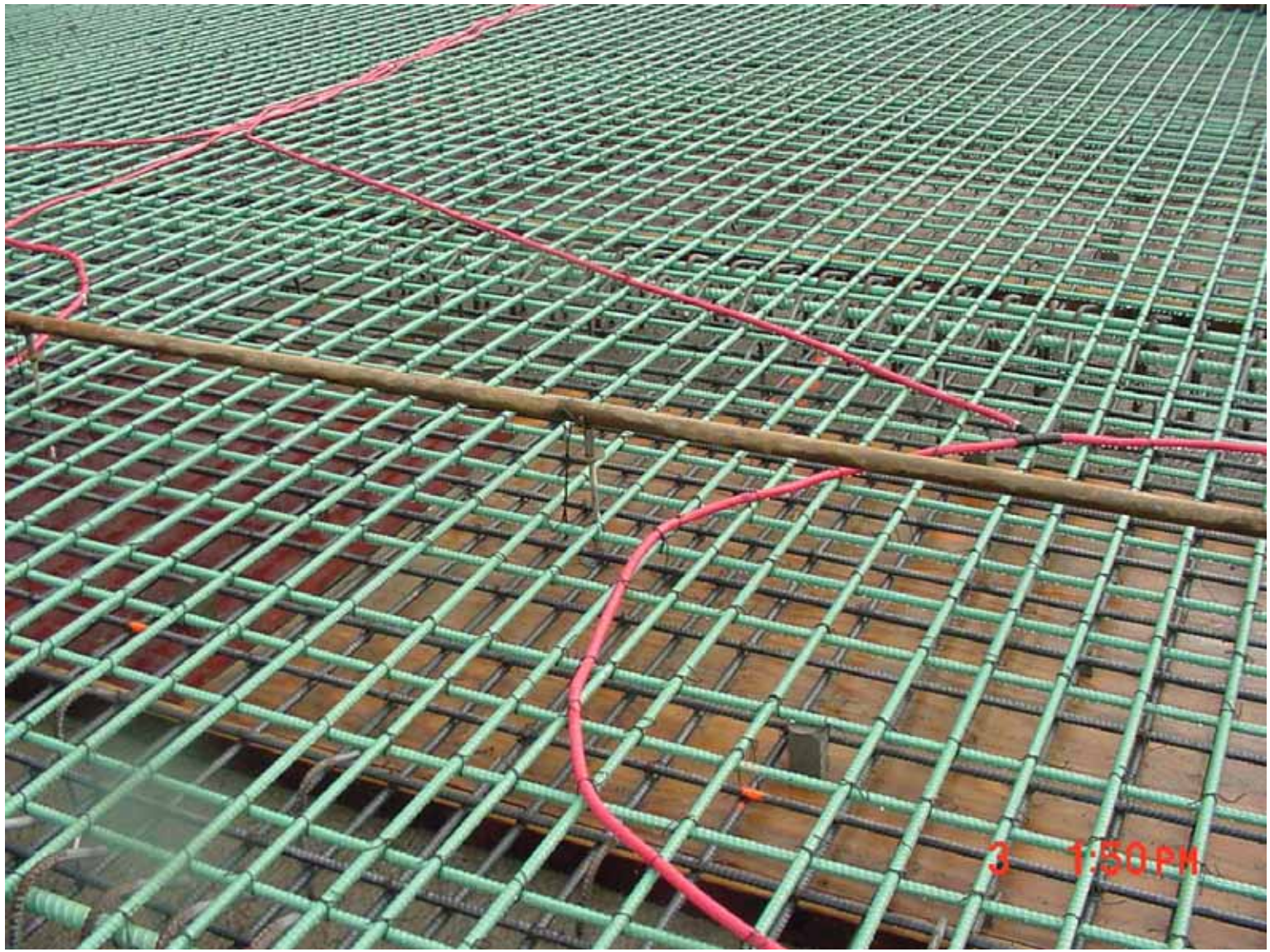
Pre-form Loops



Pre-form Loop Homerun

Spare Loop Stub for Future
with PVC Sleeve

Pre-form Header Loops



Loop Splicing

Solder and Tape

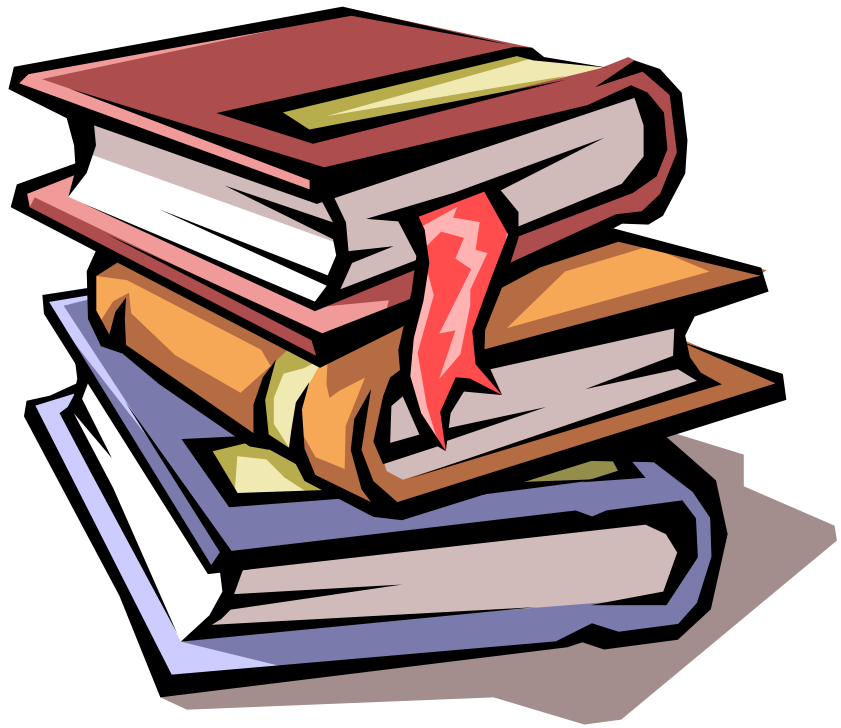
J-8d Sheet 2
Splice Detail

Video Detection Cameras

Video Detection Monitor Target

Test for Induction Loops and Lead-in Cables

- 8-20.3(14)d



Loop Analyzer

Record Loop Test Data

Form in Check Lists

Loop Test 8-20.3(14)D **Date;** _____

Location: _____ **Contract Number:** _____

Taken By:

Loop Number	Loop Type R1,R2,R3	**Test A** Ohms. <= 5	**Test B** Meg. Test Shield/Gr. >= 100	**Test C** Meg. Test Loop/Gr. >= 100	**Test D** M. Henry R1 >= 75 R3 >= 150

Test "A" for long ITS loops should not exceed the values calculated using the formula below:

Resistance per 1000 ft of #14 AWG, R = 3.16 ohms / 1000 ft

$$R = \frac{3.16 \times \text{distance of lead-in cable (ft)}}{1000 \text{ ft}}$$

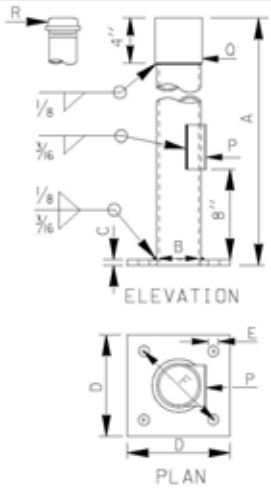
Signal Standards

- 8-20.3(14)e
- 9-29.6 light and signal standards
- 9-29.6(1) steel light and signal standards
- 9-29.6(3) timber strain poles

Standard Plan J-7a

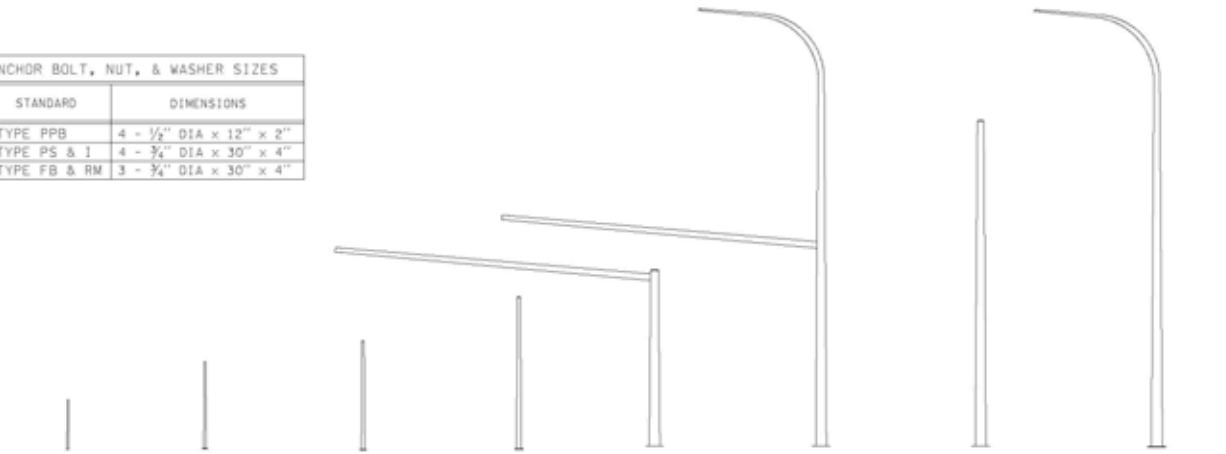
On Line Standard Plans

TYPE PPB, PS, & I STANDARD DETAILS



ANCHOR BOLT, NUT, & WASHER SIZES		
MARK	STANDARD	DIMENSIONS
S	TYPE PPB	4 - ½" DIA x 12" x 2"
S	TYPE PS & I	4 - ¾" DIA x 30" x 4"
S	TYPE FB & RM	3 - ¾" DIA x 30" x 4"

SIGNAL STANDARD TYPE DESIGNATIONS



TYPE PPB PED. PUSH BUTTON POST

TYPE PS PED. HEAD STANDARD

TYPE I & RM VEHICLE HEAD AND RAMP METER STANDARD

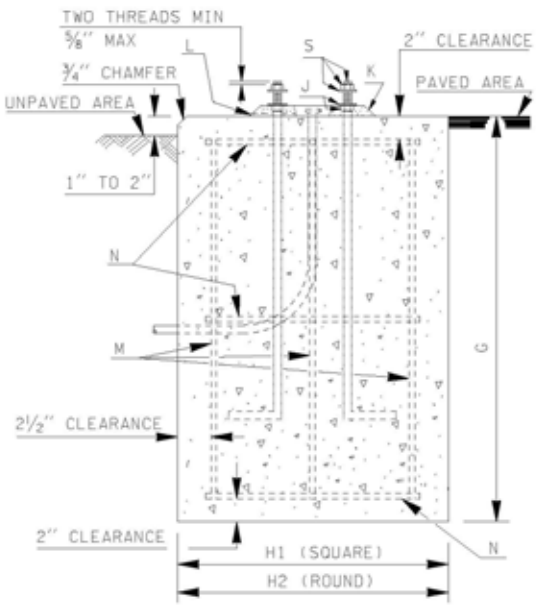
TYPE FB FLASHING BEACON STANDARD

TYPE II MAST ARM STANDARD

TYPE III LIGHTING AND MAST ARM STANDARD

TYPE IV STRAIN POLE STANDARD

TYPE V LIGHTING AND STRAIN POLE STANDARD



FOUNDATION DETAILS

TYPE PPB, PS, I, RM & FB STANDARD DIMENSION CHART						
MARK	ITEM	TYPE PPB	TYPE PS	TYPE I	TYPE RM	TYPE FB
A	HEIGHT	4'-6"	8'-0"	10'-0"	SEE SHEET 2	SEE SHEET 2
B	POLE BASE DIA	2½"	*	*	*	*
C	PLATE THICKNESS	½"	½"	½"	SEE SHEET 2	SEE SHEET 2
D	PLATE WIDTH	5"	9"	9"	SEE SHEET 2	SEE SHEET 2
E	HOLE DIA	⅝"	1"	1"	SEE SHEET 2	SEE SHEET 2
F	BOLT CIRCLE	4½"	8½"	8½"	SEE SHEET 2	SEE SHEET 2
G	FOUNDATION DEPTH	1'-6"	3'-0"	3'-0"	3'-0"	3'-0"
H1	FOUNDATION WIDTH	1'-6"	2'-0"	2'-0"	2'-0"	2'-0"
H2	FOUNDATION DIA	2'-0"	2'-3"	2'-3"	2'-3"	2'-3"
J	NUT & WASHER	Four ½"	¾"	¾"	¾"	¾"
K	GROUT PAD THICKNESS	NONE	**	**	SEE SHEET 2	SEE SHEET 2
L	PLASTIC DRAIN TUBE DIA	NONE	⅜"	⅜"	⅜"	⅜"
M	VERTICAL RE-BAR	NONE	Eight #4	Eight #4	Eight #4	Eight #4
N	HORIZ. RE-BAR HOOP	NONE	Three #4	Three #4	Three #4	Three #4
P	HANDHOLE SIZE	NONE	3½" x 4"	3½" x 4"	3½" x 4"	3½" x 4"
Q	SLIPFITTER DIA (I.D.)	NONE	4"	4"	4"	4"
R	CAP DIA	2½"	NONE	NONE	NONE	NONE

* TAPERED ROUND OR OCTAGONAL SHAFT, 11 GAGE, 4" OD AT SLIPFITTER WELD. TAPER = 0.14 INCHES/FT.

** LEVELING NUT HEIGHT 1" MAXIMUM.
LEVELING NUTS NOT REQUIRED FOR TYPE PPB STANDARD

TOBY D. RICKMAN — STATE OF WASHINGTON — 24655 — REGISTERED PROFESSIONAL ENGINEER

EXPIRES OCTOBER 26, 2002

SIGNAL STANDARD TYPE DESIGNATIONS AND TYPE PPB, PS, I, RM, & FB DETAILS

STANDARD PLAN J-7a

SHEET 1 OF 2 SHEETS

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

APPROVED FOR PUBLICATION

Harold J. Peterfeso — STATE DESIGN ENGINEER — *09-12-01* — DATE

Washington State Department of Transportation

DATE	REVISION	BY
7/01	WELDING SYMBOL SIZES	MHG

Mast Arm Pole

J-7a

Mast Arm Mount
12 8:35AM

Anchor Bolt Nuts Tightening

8-20.3(4) All anchor bolt nuts must be tightened by the turn of the nut method. Minimum ¼ Max 1/3 turn past snug tight. Permanent marks shall be set on the base plate and the nuts.

Grout

- 8-20.3(15)

Grout Pad Signal Pole Base

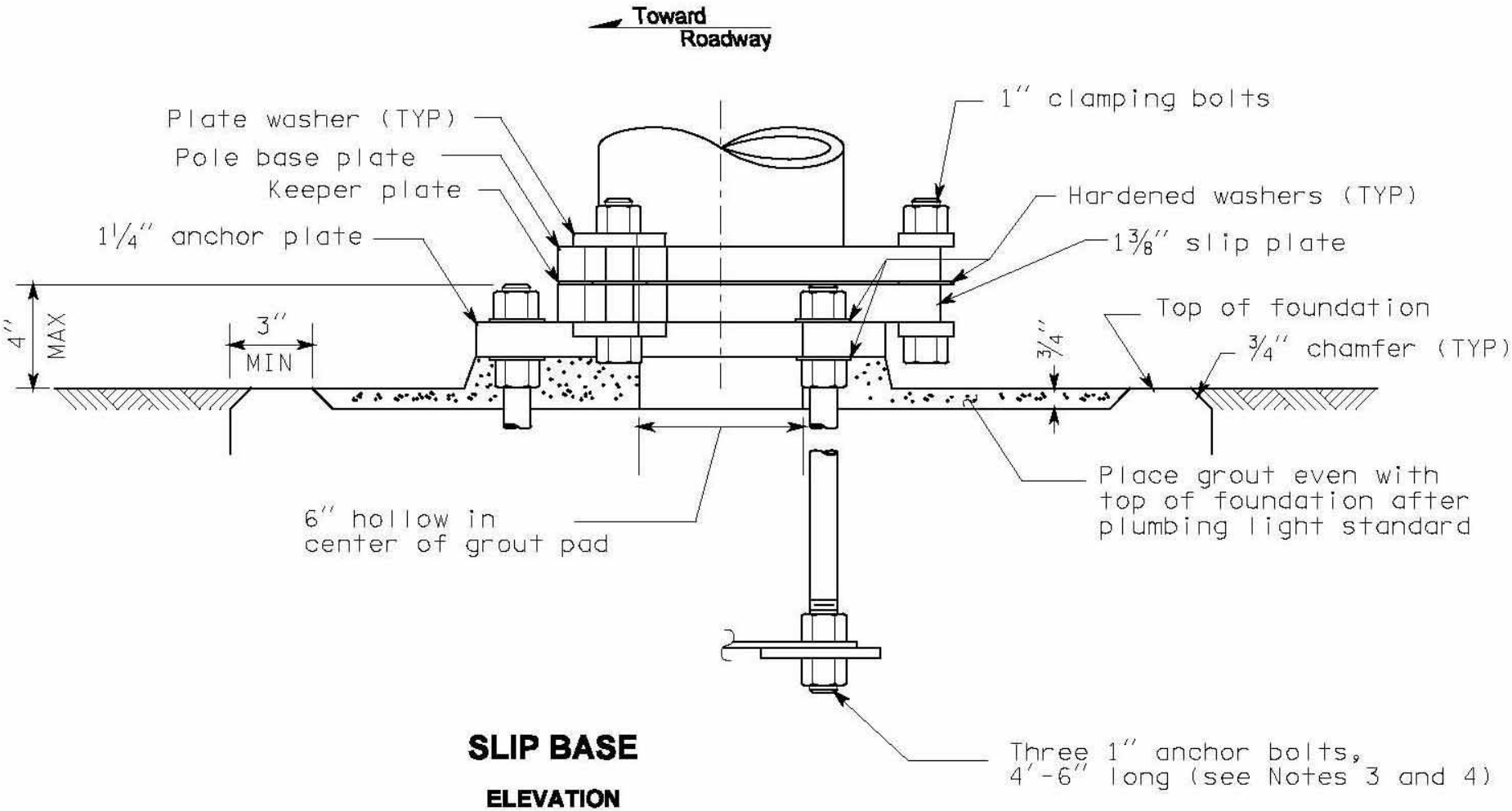
Grout Pad Luminaire Base

Too Much Grout

Good Looking Grout Pad

From J-1b

J-1b


Toward
Roadway
Plate washer (TYP)
Pole base plate
Keeper plate
1¼" anchor plate
1" clamping bolts
Hardened washers (TYP)
1⅜" slip plate
Top of foundation
¾" chamfer (TYP)
4" MAX
3" MIN
¾"
6" hollow in
center of grout pad
Place grout even with
top of foundation after
plumbing light standard
Three 1" anchor bolts,
4'-6" long (see Notes 3 and 4)
SLIP BASE
ELEVATION

Rat Screen
20 11:19AM

Traffic Signal Turn-on Checklist,

Signal Turn-on Process Flow

& Loop Installation Checklist

- Provided in Note book
- Contact Keith Calais at 360-705-6986 or
- CalaisK@wsdot.wa.gov to obtain a copy of this information.

ITS Controller Cabinet

Cabinet Labeling As Required by NW Region ITS

Sign Structures

- 8-21

Sign Structure On Bridge With Sign Lighter

Sign Lighter

Sign Lighter Open

187

Cantilever Sign Structure
With Two Sign Lighters

VMS (Variable Message Sign)

- Inside VMS

Sign Bridge

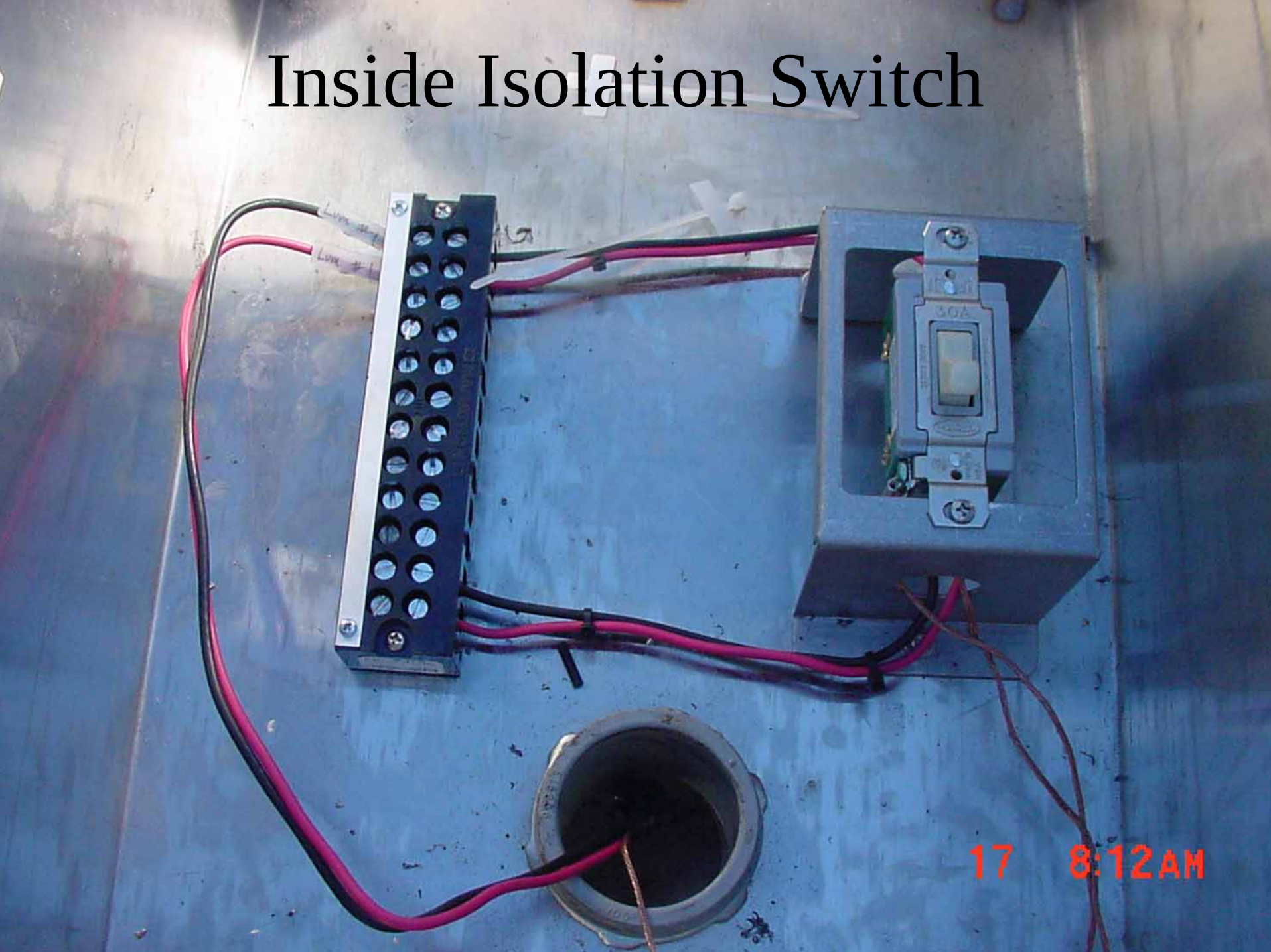
TRAFFIC ADVISORY
TUNE 530 AM
WHEN FLASHING
405
Everett
Renton
1 MILE
3 1:58PM

Putting Sign Bridge Together

Vibration Damper

Isolation Switch
3 2:01 PM

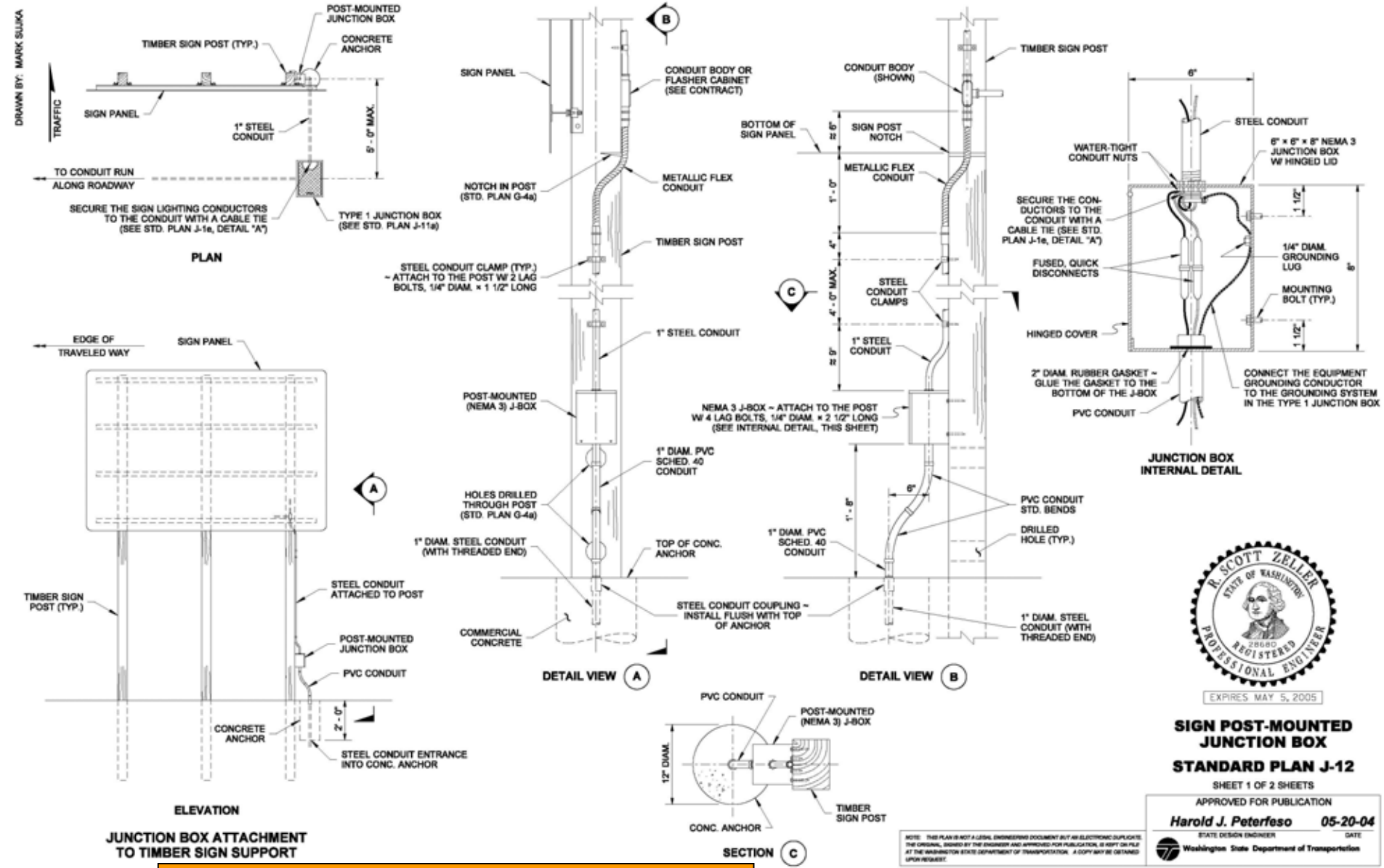
Inside Isolation Switch



Post Mounted Sign With Light and Flasher

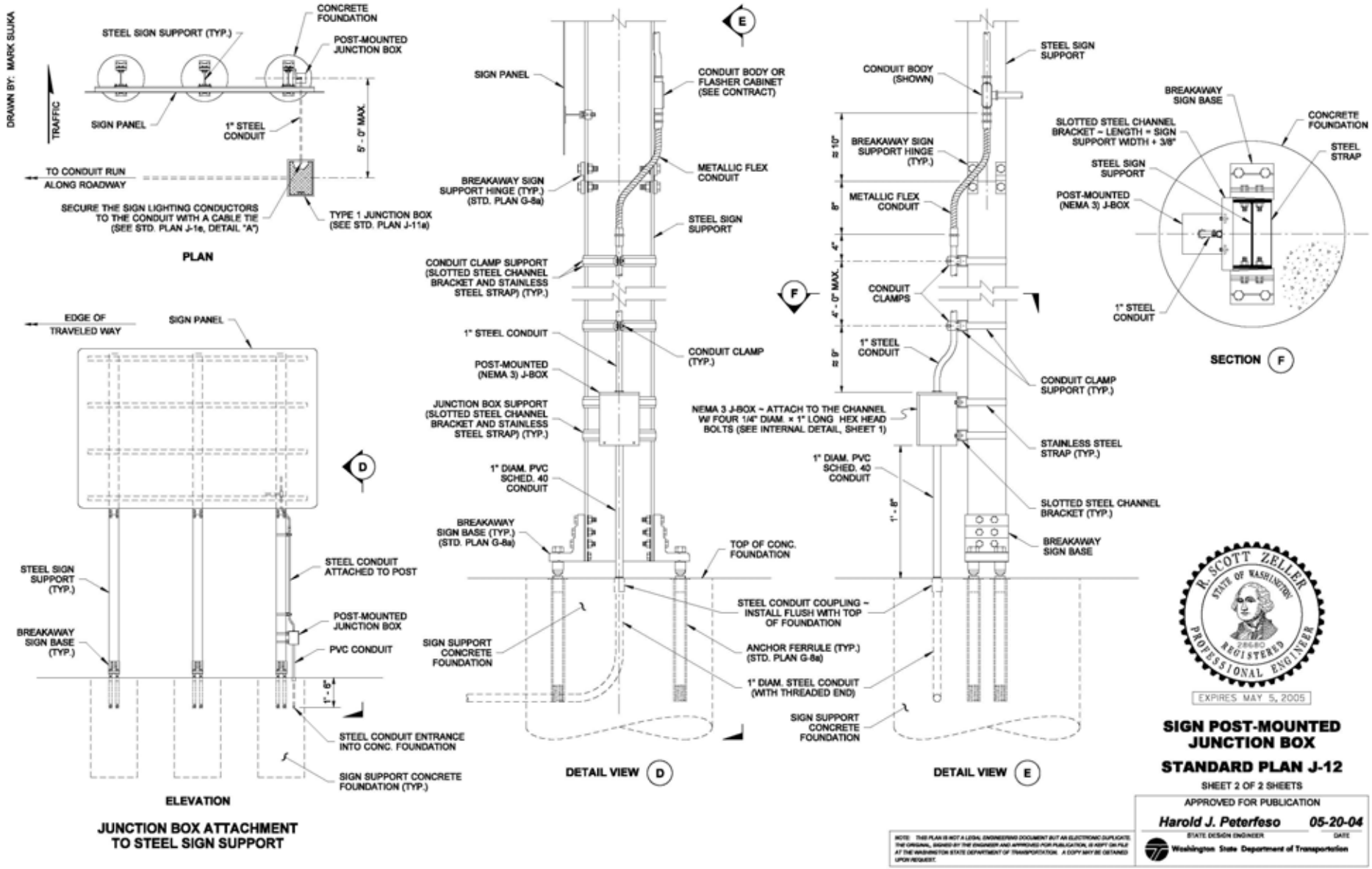
Flashing Signal Heads on Sign

Post Mounted Conduit Break-away



Standard Plan J-12 sheet 1 of 2

Post Mounted Conduit Break-away



Standard Plan J-12 sheet 2 of 2