

**PERMANENT
TRAFFIC CONTROL DEVICES
LIGHTING - SIGNS - SIGNALS**

**AN OVERVIEW
OF POTENTIAL PROBLEMS
ON CONTRACT INSTALLATIONS**

February 27, 2009

4/1/2009



Agenda

- DISTRICT CONTACTS
- SPECIFICATIONS, STANDARDS, DETAILS
- FIELD CHECKS
- PRE-CONSTRUCTION CONFERENCES
- RECURRING PROBLEMS
 - LIGHTING
 - SIGNS
 - SIGNALS
- AS-BUILT PLANS

DISTRICT CONTACTS

4/1/2009

DISTRICT CONTACTS

CRAWFORDSVILLE

WILLIAM R. SMITH

Traffic & Roadway Engineering Manager

(765) 361-5631

DISTRICT CONTACTS

FORT WAYNE

Dana Plattner

Traffic Engineer
(260) 969-8233

4/1/2009

DISTRICT CONTACTS

GREENFIELD

RANDY GLESING
Traffic-Construction Liaison
Engineer

(317) 467-3421



4/1/2009

DISTRICT CONTACTS

LAPORTE

MIKE ESSLING

Maintenance & Operations Engineer

(219) 325-7542

4/1/2009

DISTRICT CONTACTS

SEYMOUR

ED COX

Maintenance & Operations Engineer

(812) 524-3762

4/1/2009

DISTRICT CONTACTS

VINCENNES

TERRY BOUGH

Traffic Operations Engineer

(812) 895-7450



4/1/2009

SPECIFICATIONS, STANDARDS, **& DETAILS**

4/1/2009

The INDIANA Manual On UNIFORM TRAFFIC CONTROL DEVICES

2008 Edition

Indiana
Manual on Uniform
Traffic Control Devices

for Streets and Highways

4/1/2009

The INDIANA Manual On UNIFORM TRAFFIC CONTROL DEVICES



U.S. Department
of Transportation
**Federal Highway
Administration**

Indiana Division

676 North Pennsylvania Street, Room 254
Indianapolis, Indiana 46204

July 1, 2008

HDA-IN

July 1, 2008

FHWA approval for
the INDIANA MUTCD

Commissioner Browning
"adopted" the IMUTCD
on the same date as the
FHWA approval.

Karl B. Browning, Commissioner
Indiana Department of Transportation
100 N. Senate Avenue, Room 755
Indianapolis, Indiana 46204

Dear Mr. Browning:

We have reviewed the 2008 Indiana Manual on Uniform Traffic Control Devices (IMUTCD) for Streets and Highways. As per 23 CFR 655.603(b) we find that it is in substantial conformance to the National Manual and approve the IMUTCD.

This letter serves as the Federal Highway Administration's, formal concurrence as prescribed in Indiana Code 9-21-2-1. Once the Indiana Department of Transportation's Commissioner adopts the IMUTCD it shall apply to all traffic control devices placed on, over or adjacent to a public street, highway, pedestrian facility or bikeway by a public agency having jurisdiction in Indiana.

If you have any further questions or comments on this action, please contact our Traffic Operations and ITS Engineer, Karen Stippich, at (317) 226-7122.

Sincerely,

Robert F. Tally, P.E.
Division Administrator

cc:
Jim Poturski, INDOT, N758
Mike Bowman, INDOT, N-901
Carl Turtle, INDOT, N-925
John Haberman, Indiana LTAP
David Unkefer, FHWA Indiana

**MOVING THE
AMERICAN
ECONOMY**



4/1/2009

The INDIANA Manual On UNIFORM TRAFFIC CONTROL DEVICES

INDOT INTERNET



Publications



Manuals



Indiana Manual on Uniform Traffic
Control Devices

Manual On Uniform Traffic Control Devices



for Streets and Highways

2003 EDITION

**Including Revision 1 dated November 2004
and Revision 2 dated December 2007**



U.S. Department of Transportation
Federal Highway
Administration

4/1/2009

SCHOOL

**The FHWA Manual On
UNIFORM TRAFFIC CONTROL DEVICES
2003 EDITION**

is available at:

<http://mutcd.fhwa.dot.gov>

DESIGN FIELD CHECKS

4/1/2009

DESIGN FIELD CHECKS

District Traffic Personnel should always be invited

- Review details of the design
- Answer questions
- Confirm with Consultant or Design Engineer the specific needs and desires of District

PRE-CONSTRUCTION CONFERENCES

4/1/2009

PRE-CONSTRUCTION CONFERENCES

The District Traffic Personnel should be invited to all Pre-Construction Conferences

- Answer Traffic Control questions
- Discuss plan problems or changes
- Review traffic signal maintenance during the contract
- Review the **SIGNAL TURN-ON** procedure
- Review the Chain-of-Command

“Chain-of-Command”

The Contractor should **NOT**
“By-Pass” the PE / PS
by directly contacting the
District Traffic Personnel

All Traffic Control questions should go through
YOU !

RECURRING PROBLEMS

4/1/2009

RECURRING PROBLEMS

LIGHTING

4/1/2009

RECURRING PROBLEMS : LIGHTING

- Locating existing underground lighting equipment for Contractors:
 - INDOT is developing a policy for this activity



4/1/2009

RECURRING PROBLEMS : LIGHTING

Communication with the District Traffic Personnel
about the **functional condition** of
Lighting Systems in your contract area:

- Some Districts have TM (Traffic Maintenance) contracts for their Lighting Systems
- District Traffic Personnel conduct scheduled inspections of lighting for maintenance

RECURRING PROBLEMS : LIGHTING

CONSTRUCTION DETAIL PROBLEMS

Waterproofing of splices in Handholes

- Done poorly with improper materials, or, not per INDOT standards and spec's

- **NOT DONE AT ALL !**



4/1/2009

RECURRING PROBLEMS

SIGNS

4/1/2009

RECURRING PROBLEMS : SIGNS

Maintaining continuously :

ALL **REGULATORY** SIGNS

(Spec. Book 104.04)



4/1/2009

RECURRING PROBLEMS : SIGNS

Relocation of existing signs

- Proper disassembly
- Proper re-assembly



4/1/2009

RECURRING PROBLEMS : SIGNS

Relocation of existing signs

- Proper storage : Vertical & Separated
- If possible : Out of the Weather



Wrong

4/1/2009

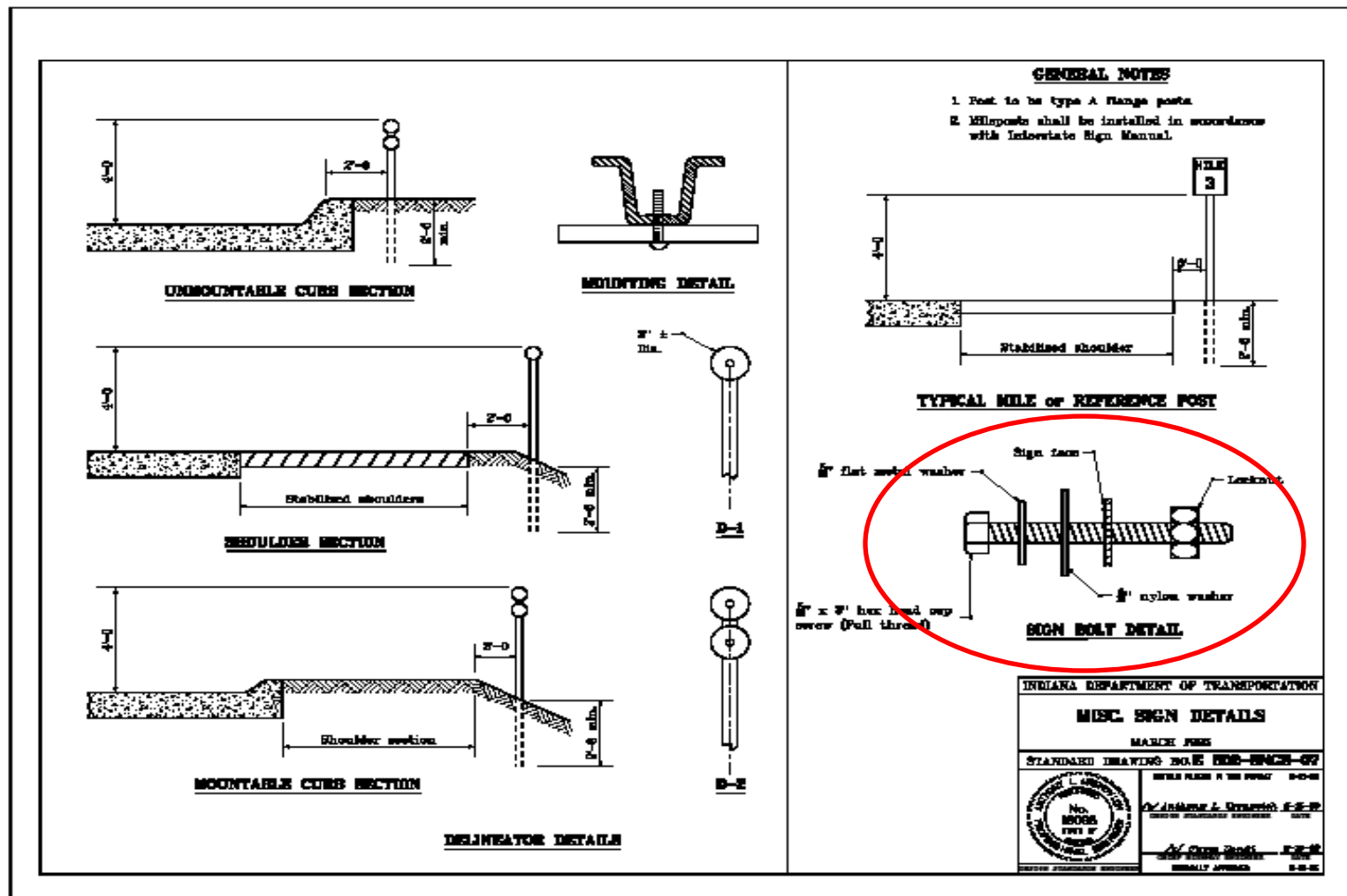


Right

RECURRING PROBLEMS : SIGNS

Proper bolt & washer installation:

- Taking care not to damage the sheeting material



RECURRING PROBLEMS : SIGNS

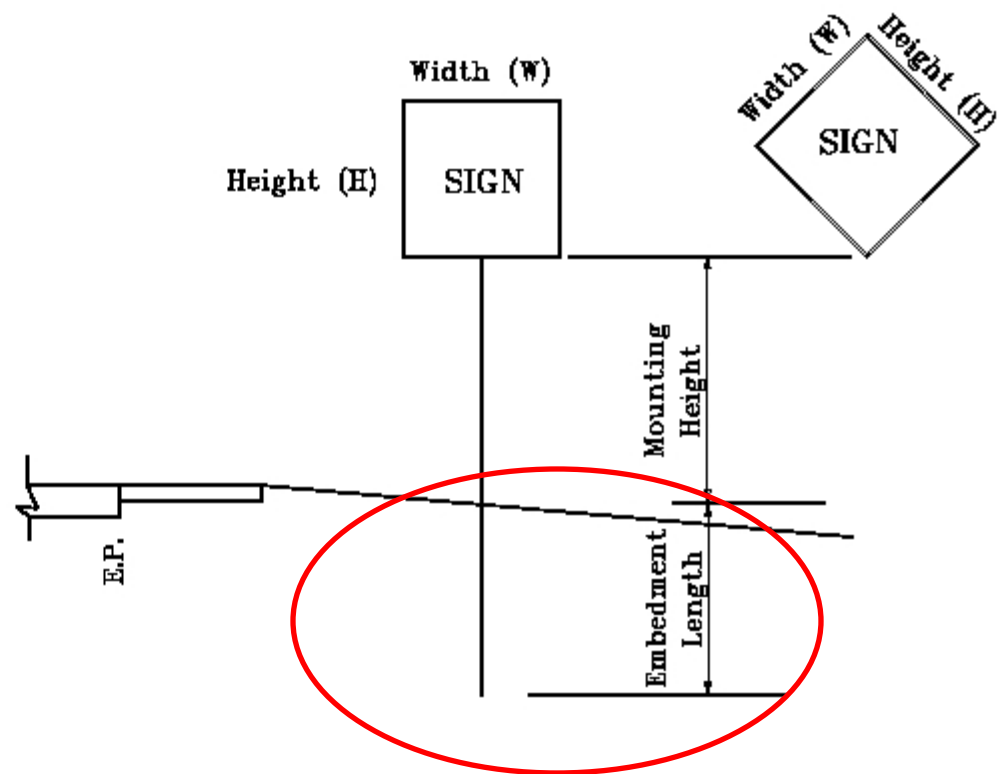
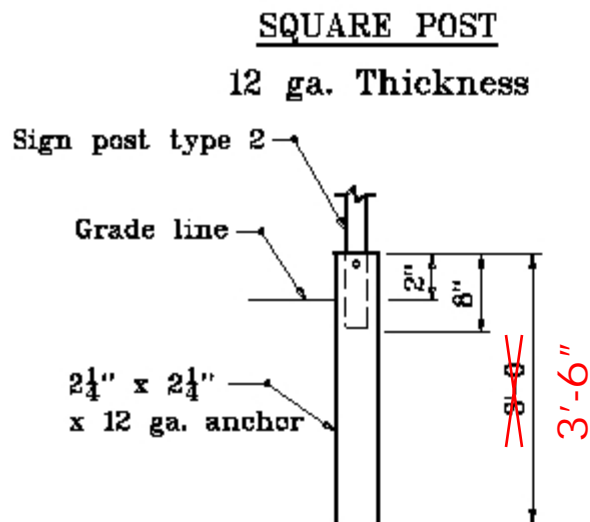
Proper driven-post depth



4/1/2009

RECURRING PROBLEMS : SIGNS

Proper driven post depth



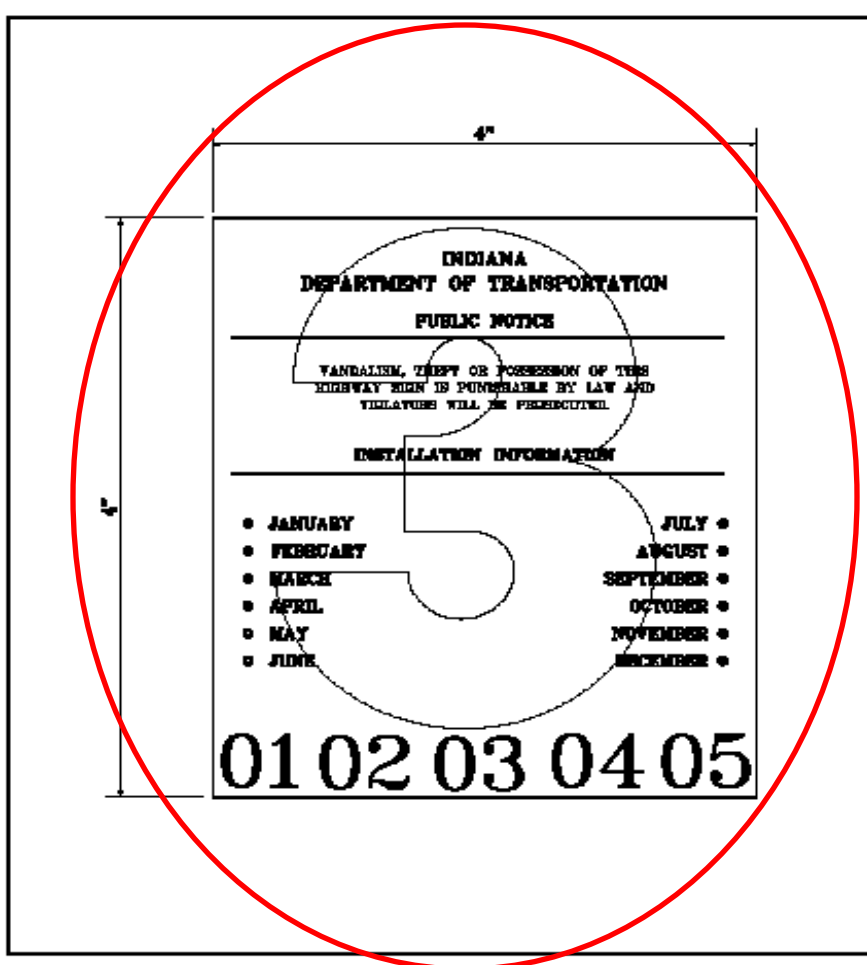
UNREINFORCED ANCHOR BASE

4/1/2009

E802-SNGS-10

RECURRING PROBLEMS : SIGNS

Identification Sticker on the back of the sign



The diagram shows a rectangular sign with a red circle highlighting the identification sticker area on the back. The sign is divided into sections for text and a large number '3'. The text includes the Indiana Department of Transportation logo, a public notice, and installation information. The large number '3' is in the center. The bottom of the sign features a sequence of numbers 01 02 03 04 05. To the right of the sign, there are notes and a table of color codes for the identification sticker.

NOTES

1. Height of lettering shall be $\frac{1}{2}$ in. to $\frac{3}{4}$ in. The height of the dates along the bottom shall be $\frac{1}{2}$ in.
2. Copy shall be black on reflectorized white background.
3. The number of dates along the bottom need not be five, and the first date need not be 01. However, the installation date shall be shown.
4. The month and year of installation shall be punched by a $\frac{1}{4}$ " minimum diameter hole.
5. The overlay number is to be of colored transparent sheeting to indicate the last digit of the year of installation.

The decade of installation shall be indicated by color of transparent sheeting :

2000 - 2009	Blue
2010 - 2019	Red
2020 - 2029	Brown
2030 - 2039	Orange

INDIANA DEPARTMENT OF TRANSPORTATION
SIGN IDENTIFICATION MARKING
MARCH 2008
STANDARD DRAWING NO. E 800-2008-11

INDIANA DEPARTMENT OF TRANSPORTATION
No. 18292
DATE OF ISSUE 03/08
BY: [Signature]
CHECKED: [Signature]
DATE: 03/08

RECURRING PROBLEMS

TRAFFIC SIGNALS

4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

Skilled, Knowledgeable, and Experienced Signal Technicians are sometimes hard to find on the job.

Spec. 805.03 requires that

- Electrical wiring terminations and splices
- Controller and cabinet set-up
- Testing, review and turn-on of all operational apparatus

Be done by, or under the charge of, a

LEVEL II TRAFFIC SIGNAL ELECTRICIAN

CHECK CREDENTIALS !

RECURRING PROBLEMS : TRAFFIC SIGNALS

Documentation of work done by the contractor's technician:

Signing the CABINET CARD

[illegible]

RECURRING PROBLEMS : TRAFFIC SIGNALS

Documentation of work done by the contractor's technician:

Submitting the LOOP TEST REPORT

[illegible]

RECURRING PROBLEMS : TRAFFIC SIGNALS

Contractor may request a **PUNCHLIST** inspection
or, a signal **TURN-ON**
before the work is completed.

Before District Traffic is called
YOU NEED TO DETERMINE:

- **IS THE POWER INSTALLED ?**
- **IS THE DETECTION INSTALLED & FUNCTIONING ?**
- **IS INTERCONNECT INSTALLED & FUNCTIONING ?**

RECURRING PROBLEMS : TRAFFIC SIGNALS

YOU

SHOULD

CONDUCT A FIELD INSPECTION

TO CONFIRM THAT ALL THE WORK IS
FINISHED AND THE PROJECT IS INDEED
READY FOR A

SIGNAL PUNCHLIST

or

SIGNAL TURN-ON

RECURRING PROBLEMS : TRAFFIC SIGNALS

Salvaged Material Delivery :

Sometimes, a Contractor delivers salvaged signal materials without prior notification to the District Traffic Section

Sometimes,
Contractors deliver
salvaged signal
materials without a
SALVAGED MATERIAL
REPORT

[illegible]

These practices are NOT acceptable!

4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

The procedure for
SIGNAL TURN-ON

Should always be discussed in detail
at the
PRE-CONSTRUCTION CONFERENCE

RECURRING PROBLEMS : TRAFFIC SIGNALS

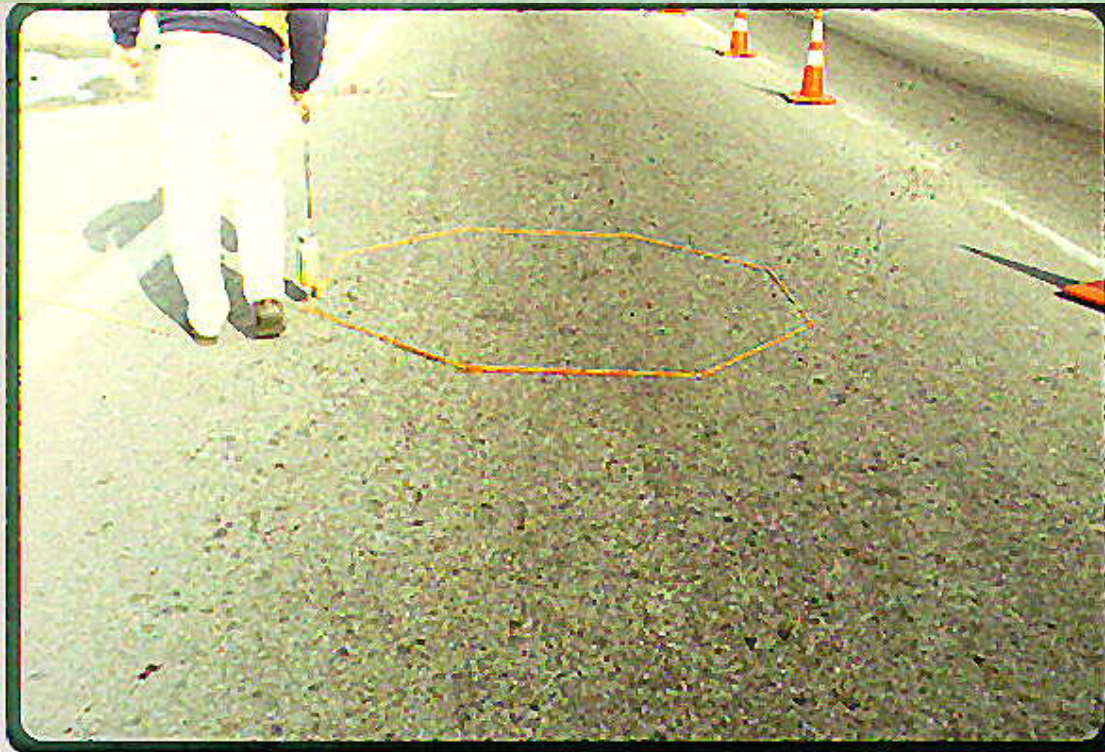
SIGNAL DETECTION LOOP INSTALLATIONS

4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP LAYOUT

It is usually a good practice to have a representative of the **DISTRICT TRAFFIC SECTION** present when loop locations are laid out, i.e., prior to cutting the loops.



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RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP SPLICING

- Poor Workmanship by some contractors
- Don't follow INDOT standards

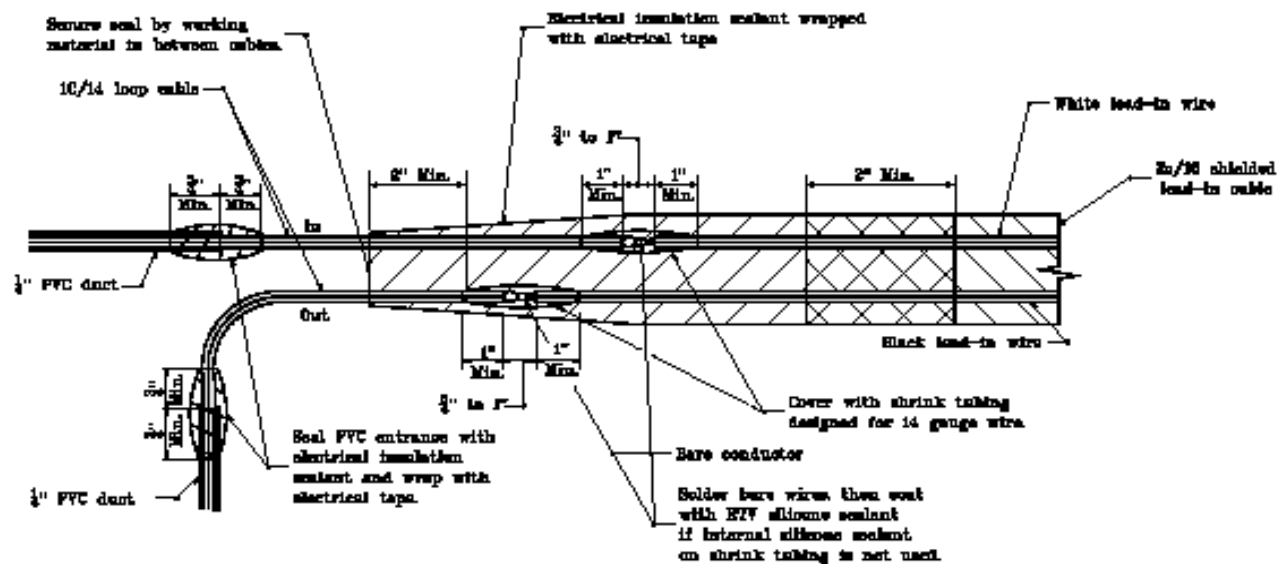
RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP SPLICING


Some Districts may have their own desired variations on the INDOT standard.

Check with Traffic Personnel to confirm their preferences for loop splice installation details.

RECURRING PROBLEMS : TRAFFIC SIGNALS



SPLICE DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION	
TRAFFIC SIGNAL LOOP SPLICE	
MARCH 1988	
STANDARD DRAWING NO. E 808-BLL-04	
	DETAILS PLAIN IN THE NOTES DATE: 8-8-88
	BY: <u>ANDREW L. STANFORD</u> E-8-88 CHECKED: <u>UNDESIGNED</u> DATE:
	BY: <u>CHUCK BOWEN</u> E-8-88 CHECKED: <u>UNDESIGNED</u> DATE:
	DESIGNED BY: <u>UNDESIGNED</u> DATE:



4/1/2009

Proper Installation Procedures

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP TESTING

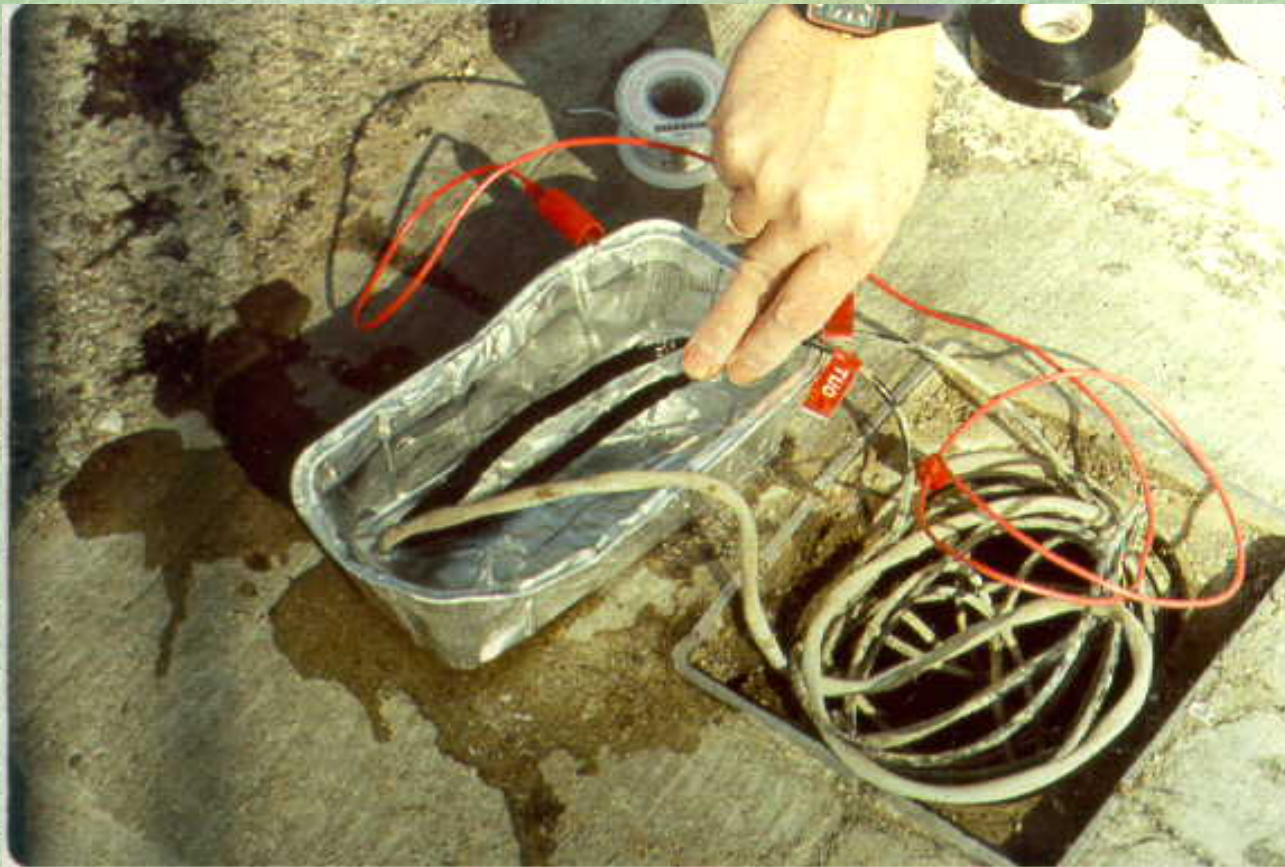
Spec 805.09 REQUIRES the contractor to perform FOUR tests on newly installed detection loops:

- Megohm Test before the Splice is made at the Detector Housing (for the loop)
- Megohm Test before the Splice is made at the Detector Housing (for the lead-in cable)
- Megohm Test after the Splice at the Detector Housing is completed (WET TEST)
- Vehicle Simulator Test

**These tests are important
to insure the long-term serviceability
of new loops !**

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP TESTING



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP TESTING

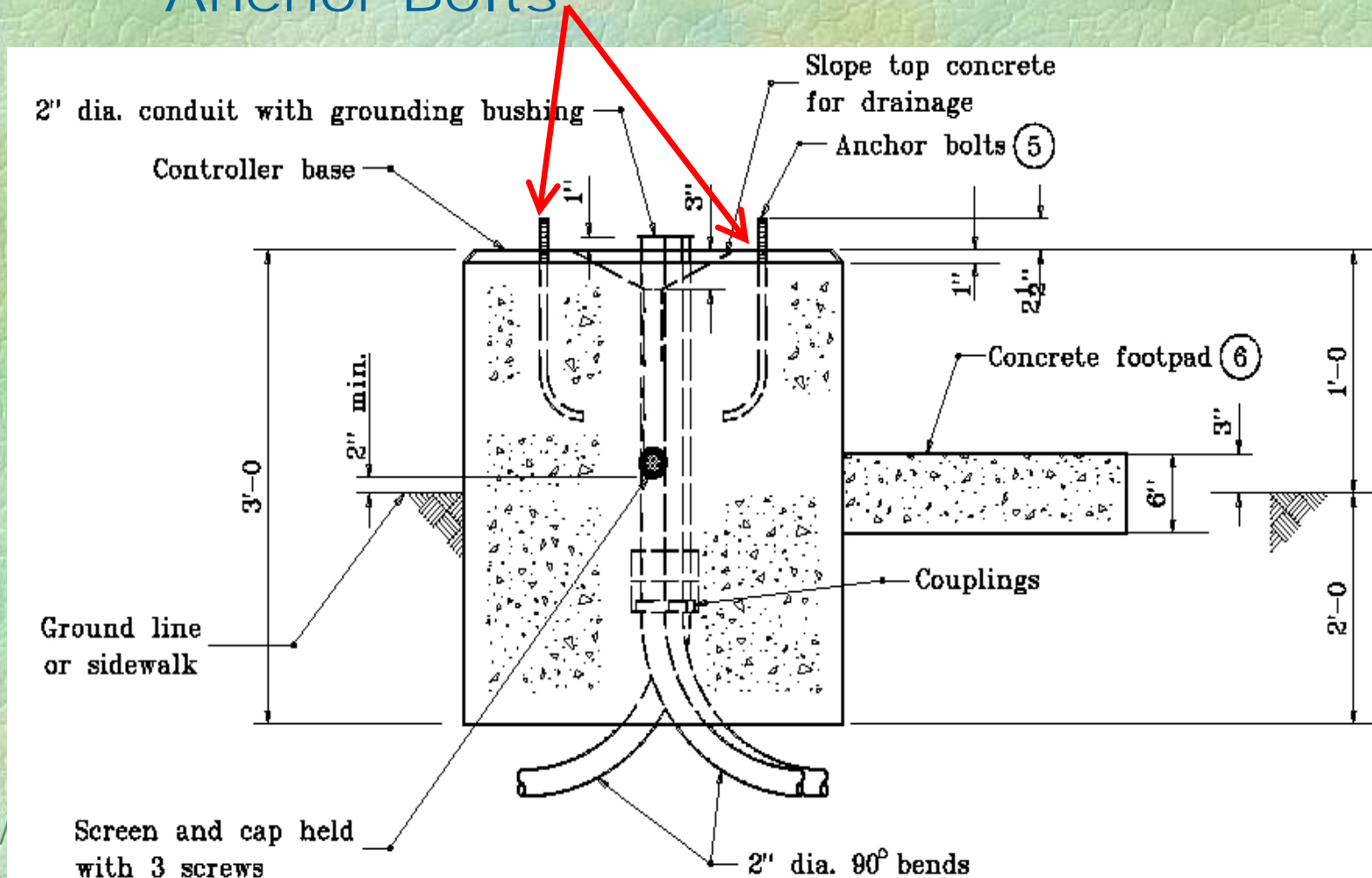
- Some Contractors don't perform the **WET SPLICE** test
- Some Contractors don't perform the **VEHICLE SIMULATOR** test

These tests are important
to insure the long-term serviceability
of new loops !

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**
- Anchor Bolts



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**
- Anchor Bolts

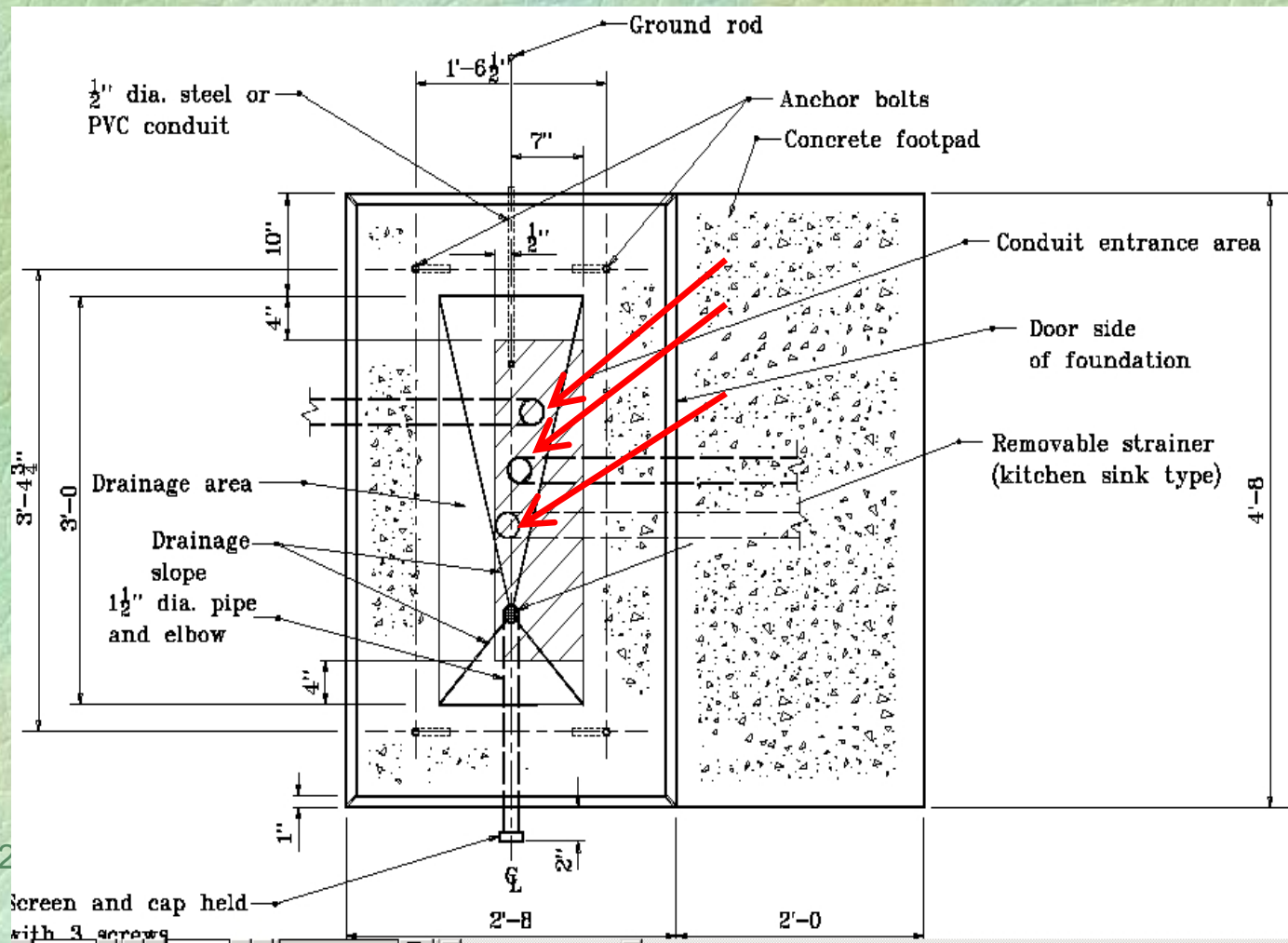


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

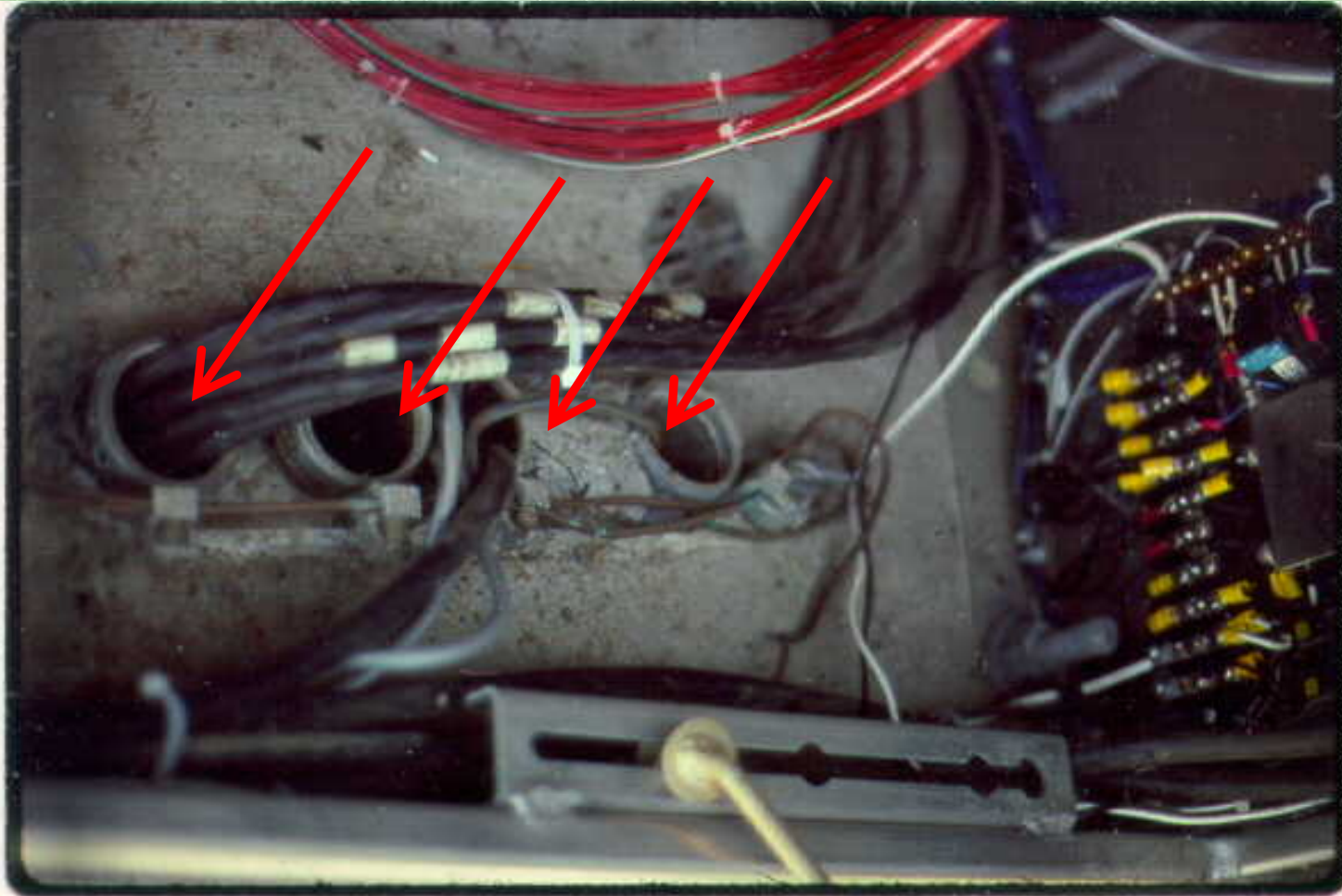
- **Conduit Placements**



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**
- Conduit Placements



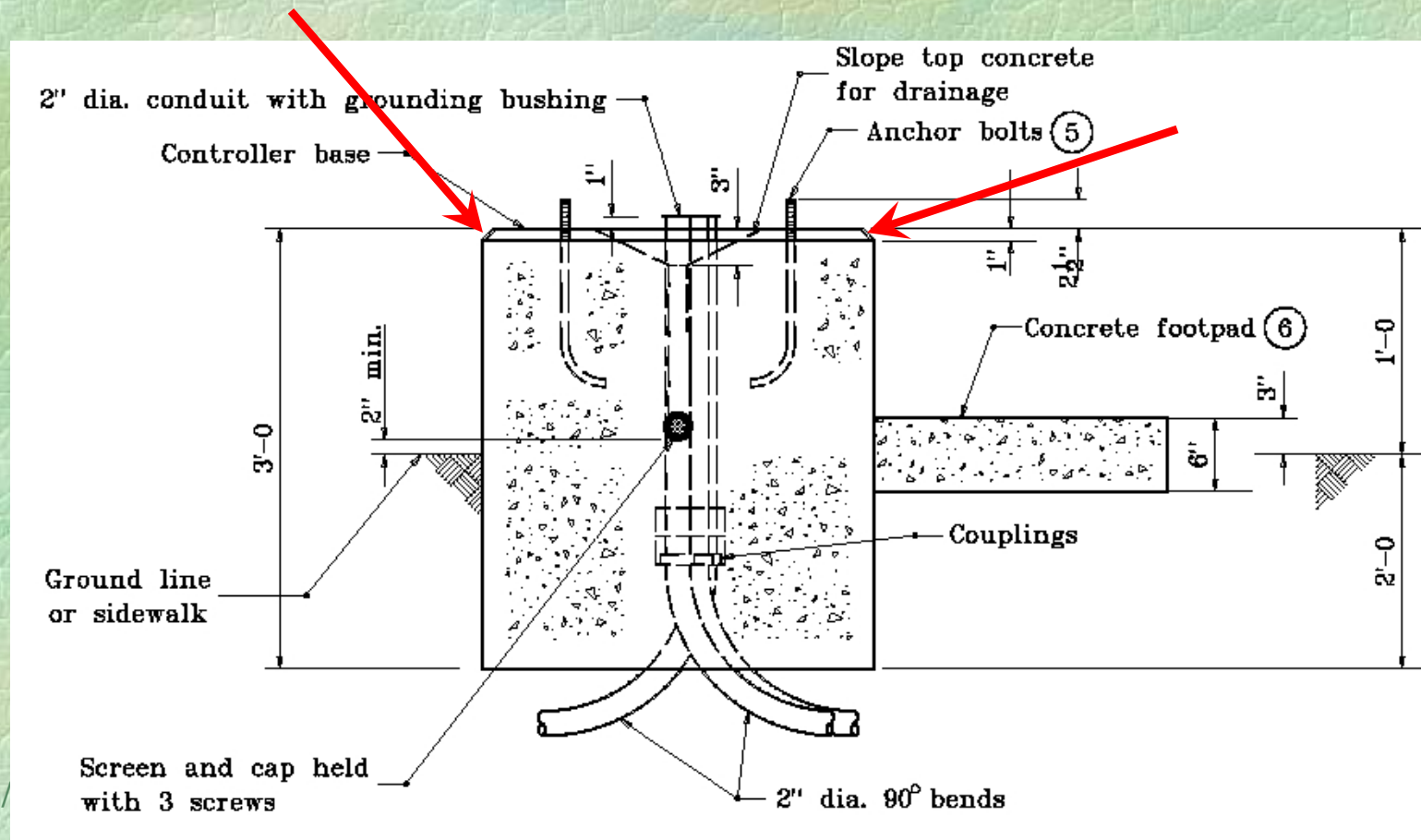
4/1/20

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

- Chamfered Edges



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**
- Chamfered Edges

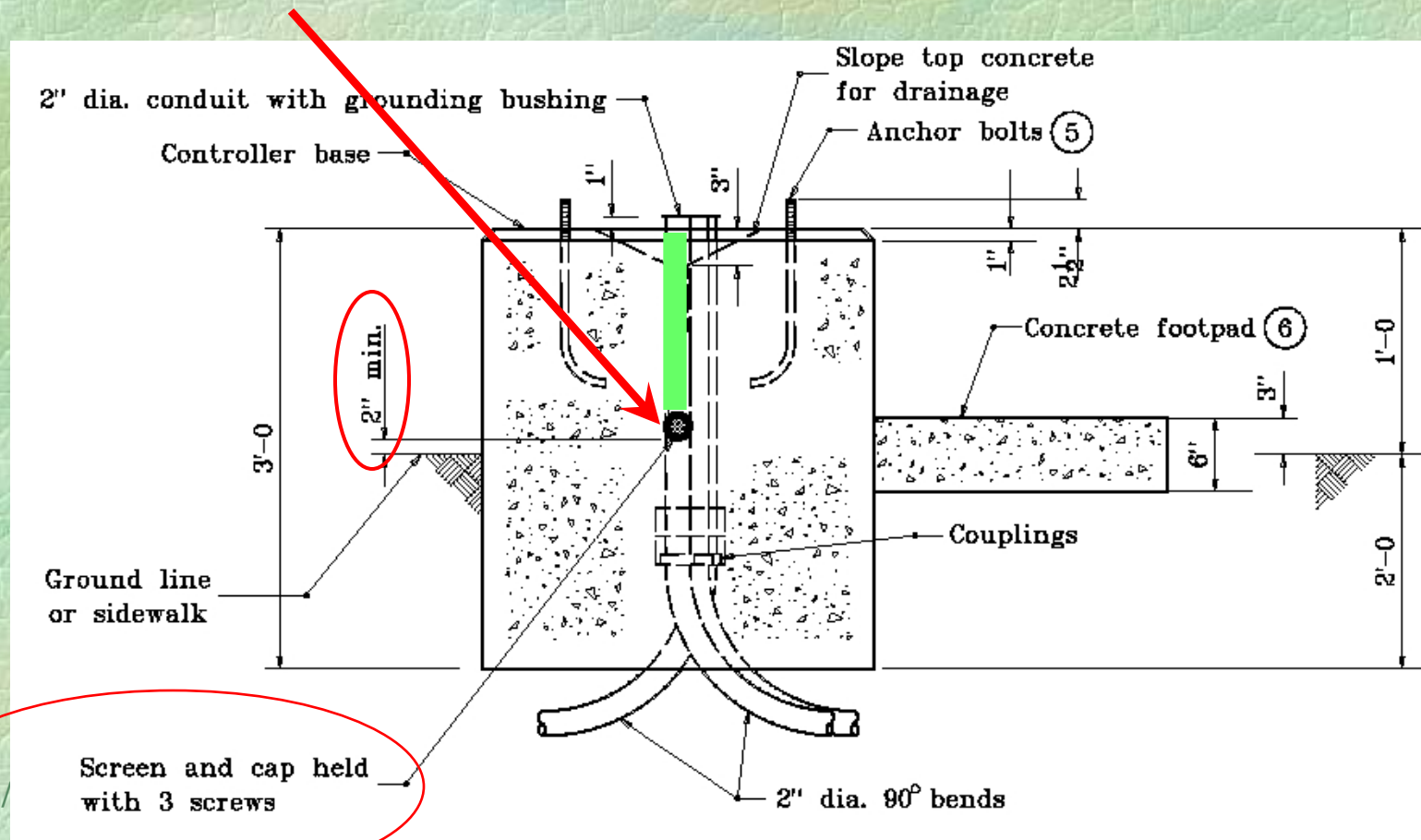


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

- **Functioning Drain**



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

- Drainage
 - Top Surface Slope
 - Drain Access/Location
 - Drain Plugged



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

- **SIGNAL SUPPORT POLES**

- Raked, before spans are installed
- Plumb, after spans are installed



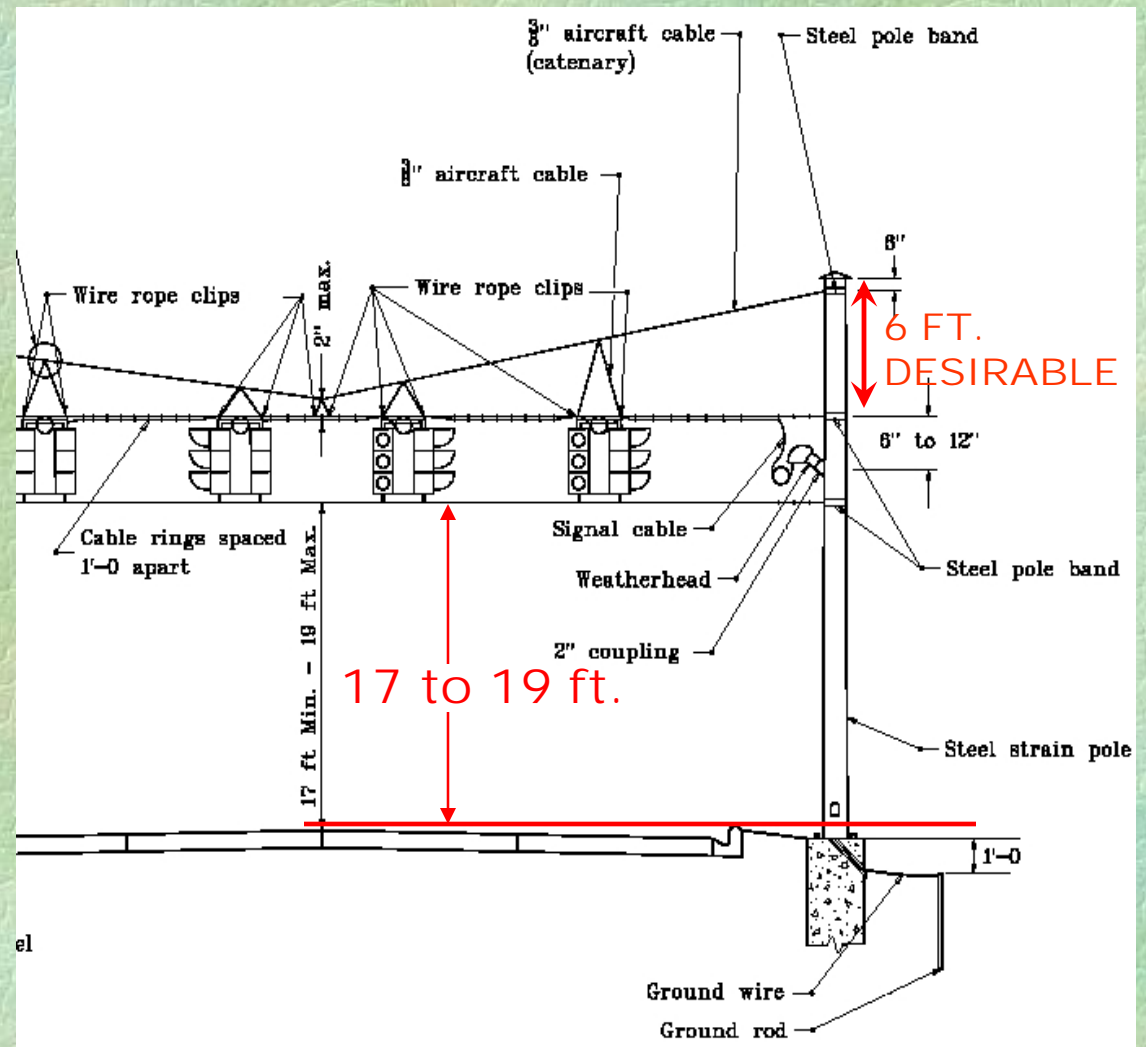
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RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

• SIGNAL SUPPORT POLES

- Proper Foundation elevation
- Span / Catenary separation
- Proper Tether Mounting Height



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

- **SIGNAL SUPPORT POLES**

- Span / Catenary separation



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RECURRING PROBLEMS : TRAFFIC SIGNALS

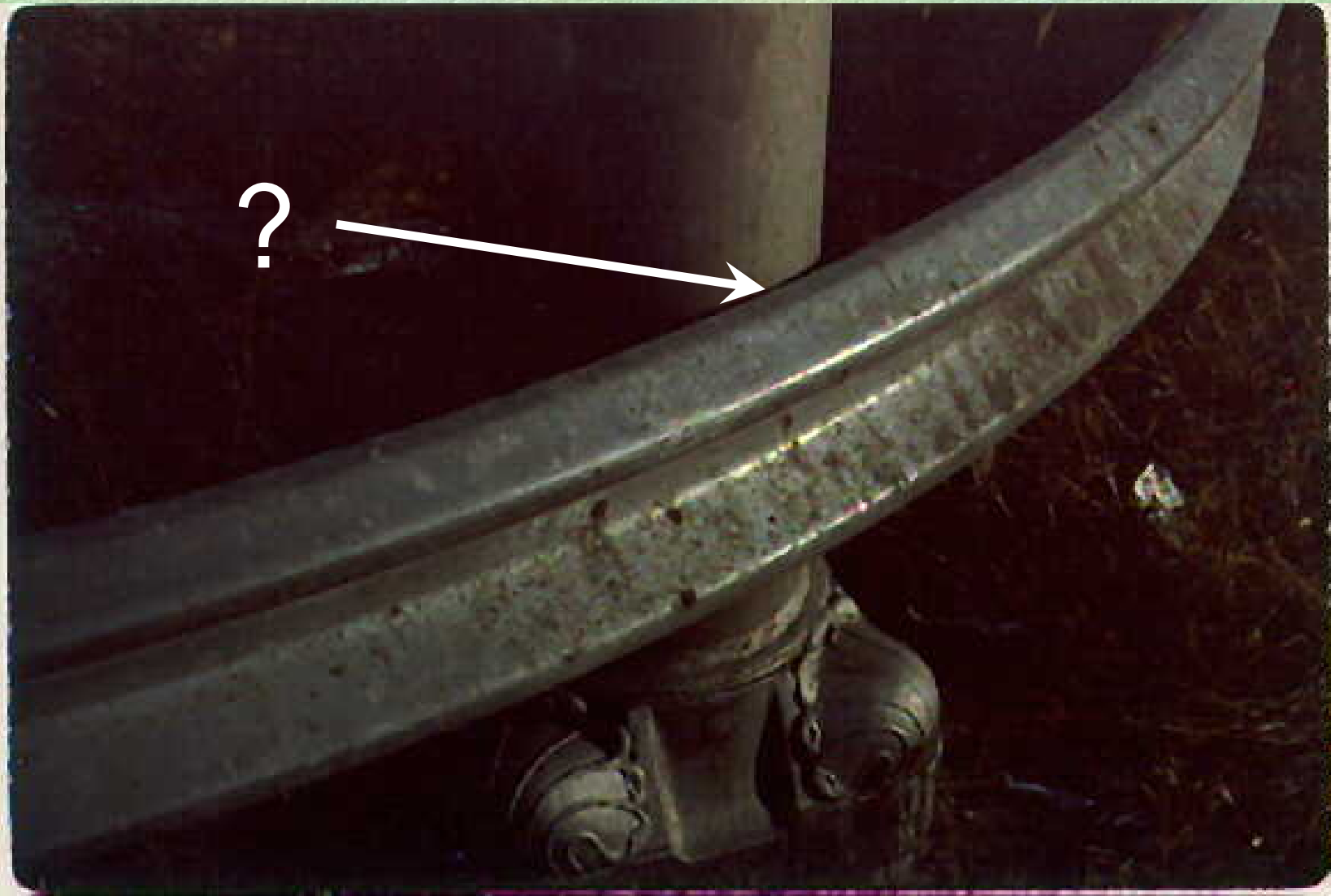
SIGNAL STRUCTURES

- **LOCATED AS PER PLANS**
(or as directed by YOU)

- Any significant location changes should be discussed with the District Traffic Personnel

- Some Contractors may want to relocate structures or conduit runs, but

BEWARE : The Contractor's primary concern may be for his own convenience or savings



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

Avoid installation of
controller cabinets and
handholes in ditches



4/1/2009

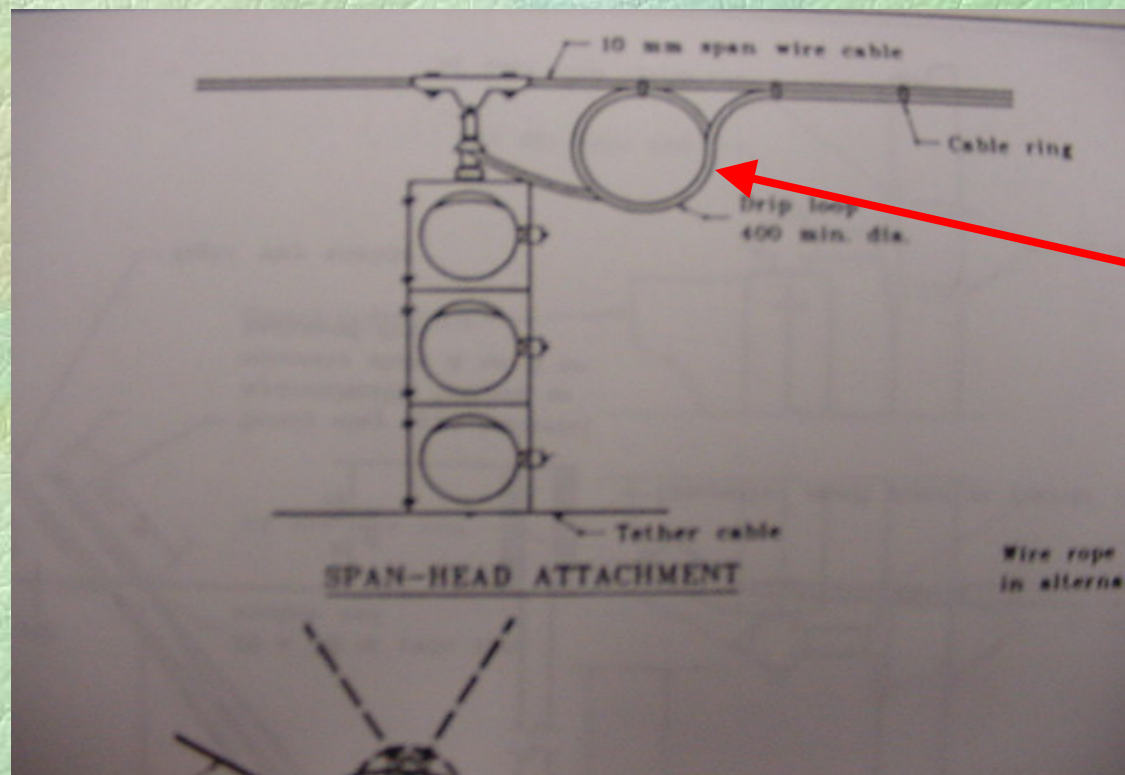
WRONG !

RECURRING PROBLEMS : TRAFFIC SIGNALS

DRIP LOOPS

- **PROPER DIAMETER**

- Standards say 16"
- Some Districts prefer smaller - 8" in Greenfield



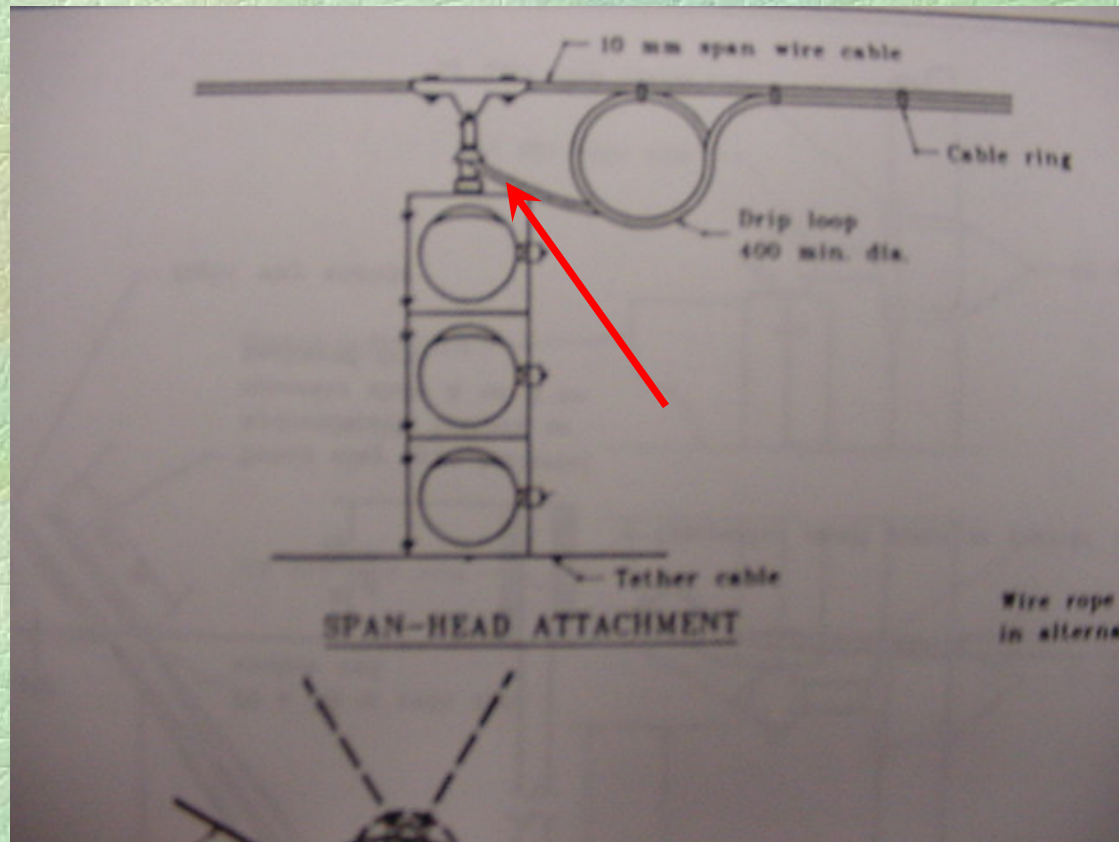
4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

DRIP LOOPS

- **ORIENTATION**

- Wire should enter the head from below



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

DRIP LOOPS

- ORIENTATION

NOT FROM ABOVE



4/1/200

RECURRING PROBLEMS : TRAFFIC SIGNALS

ELECTRICAL GROUNDING

- LOOSE CONNECTIONS IN A FOUNDATION OR THE BASE OF A POLE
- GROUNDING ROD MISSING

YOU

**may encounter these, or many other,
problems during the installation of
TRAFFIC CONTROL DEVICES**

DO NOT HESITATE TO SEEK
THE ADVICE OF
DISTRICT TRAFFIC PERSONNEL

AS-BUILT PLANS

4/1/2009

AS-BUILT PLANS

Are needed by the

DISTRICT TRAFFIC SECTION

in order to insure that the

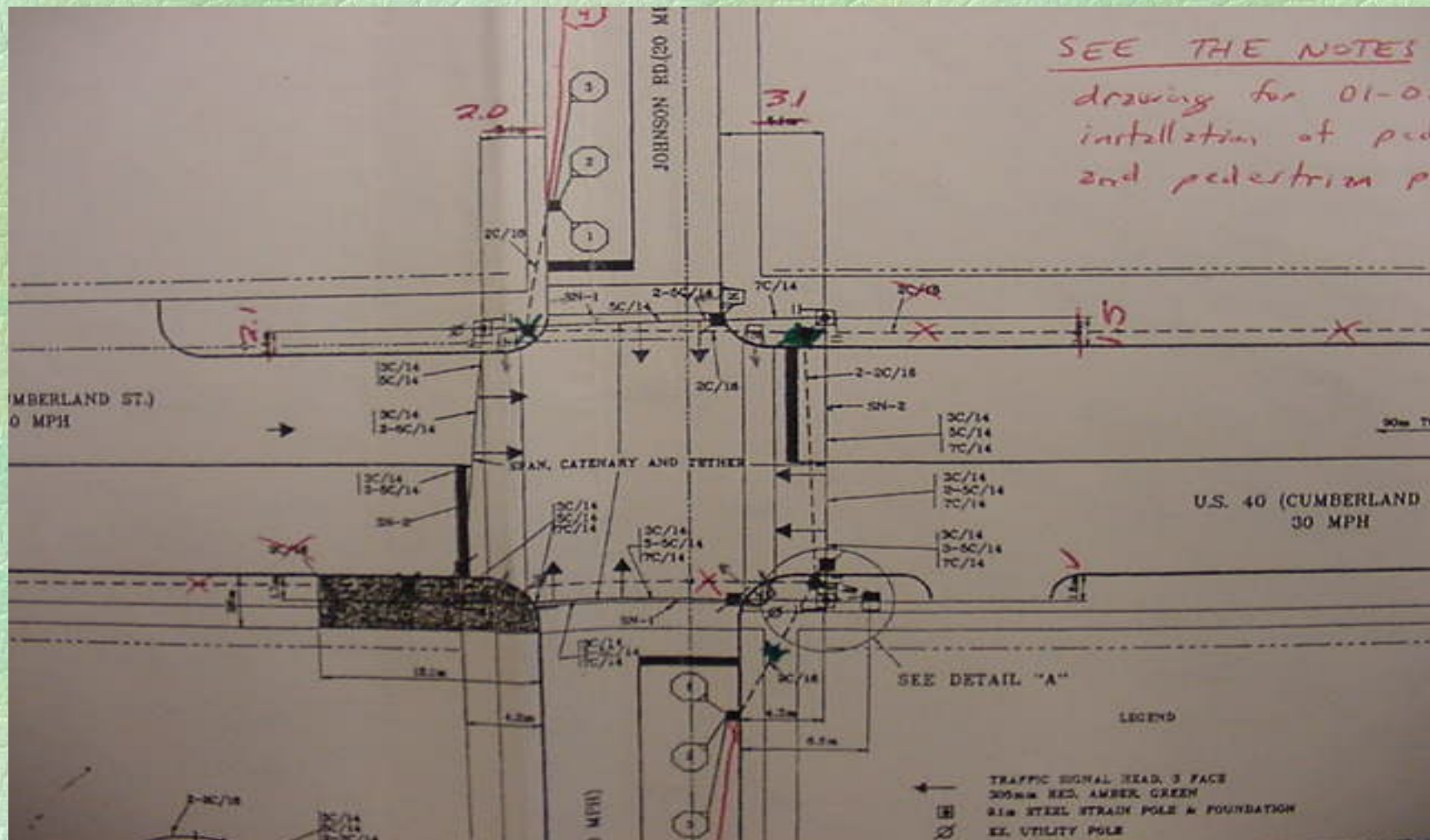
LONG-TERM MAINTENANCE

of INDOT's Traffic Control Devices

can be accomplished
with a minimum of difficulty

AS-BUILT PLANS

- Clearly marked with installation details



AS-BUILT PLANS

- The District Traffic Section may want to receive the **As-Built Plans** BEFORE the contract is accepted
- Some Contracts **REQUIRE** (per a Special Provision) that the **As-Built Plans** be submitted before the Contract is accepted

ANY
QUESTIONS?

4/1/2009

4/1/2009