



Signal Inspections: Lessons Learned

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Signals

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Agenda

- NoVA Signal Inspection Check List
- Areas Needing Attention during Construction
- Electrical Service
- Junction Boxes
- Questions & Answers

Signal Inspection Check List

- Critical elements of construction to verify
- Eleven primary areas
- Check these in advance of VDOT inspectors for faster acceptance
- Ask us for a copy!



TRAFFIC SIGNAL INSPECTION CHECK LIST

- 1] **Need an Approved Stamped Signal Plan.**
- 2] **Need Approved Signal pole shop drawings, signal pole calculations, foundation and soil boring logs.**
- 3] **Signal Poles and Foundations**
 - A] Check foundation to proper grade
 - B] Check signal pole and arm length
 - C] Check tightness of anchor nuts and flange bolts
 - D] Check ID tag
- 4] **Signal Heads**
 - A] Check alignment, and height
 - B] Check distance from Stop Bar
 - C] Check wiring in signal head
- 5] **Signs**
 - A] Check all overhead signs [Regulatory and Street]
 - B] Check any ground mounted signs associated with the traffic signal
- 6] **Junction Boxes**
 - A] Check junction box and collar for proper grade
 - B] Check junction box for proper amount of gravel, and grounding electrode
 - C] Check junction box for "J" Hook and conduit lengths and depths
 - D] Check to see if loop detector cables are marked in junction box
- 7] **Electrical**
 - A] Make sure all signal equipment is properly grounded
 - B] Check service disconnect for proper wiring
- 8] **Pedestrian Equipment**
 - A] Check all pedestrian push buttons for proper operation
 - B] Check push button accessibly from side walk
 - C] Check for proper alignment with crosswalk
- 9] **Pavement Markings**
 - A] Make sure all pavement markings match the Approved Signal Plan
- 10] **Traffic Signal Controller and Cabinet**
 - A] Check cabinet foundation for proper grade
 - B] Check cabinet for proper wiring and tagging of cables
 - C] All conduits in cabinet need to be sealed
 - D] Test all loop detectors for meg readings
 - E] Confirm loop detector inputs to proper phases
 - F] Check timings and data in controller
 - G] Test conflict monitor
- 11] **General**
 - A] All signal facilities need to be properly graded around, seeded and straw as needed
 - B] Any old existing signal equipment that is not being used needs to be removed

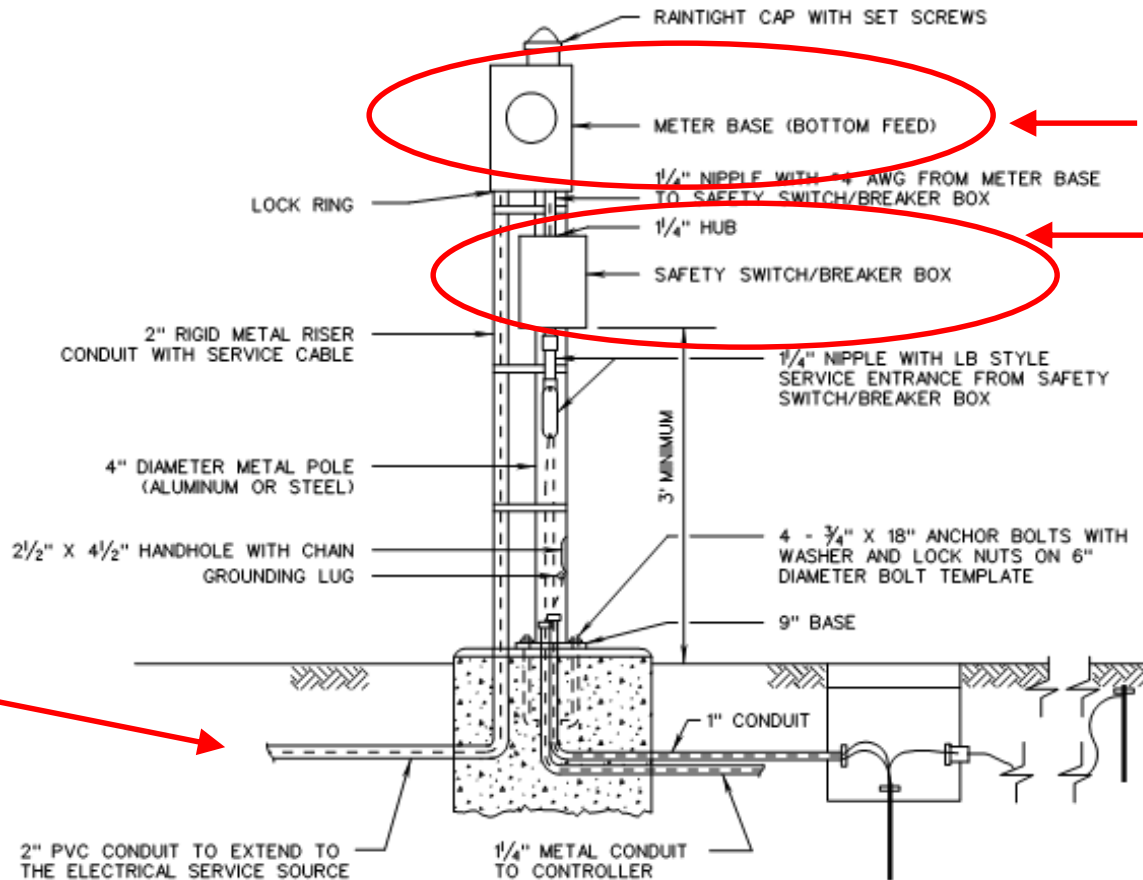
Key Problem Areas

- Frequent punch list items
- The smaller equipment items can hold up signal acceptance
- Areas needing more attention during construction:
 - Electrical service
 - Junction boxes

NRO-Specific SE-5 Configuration

Areas for improvement:

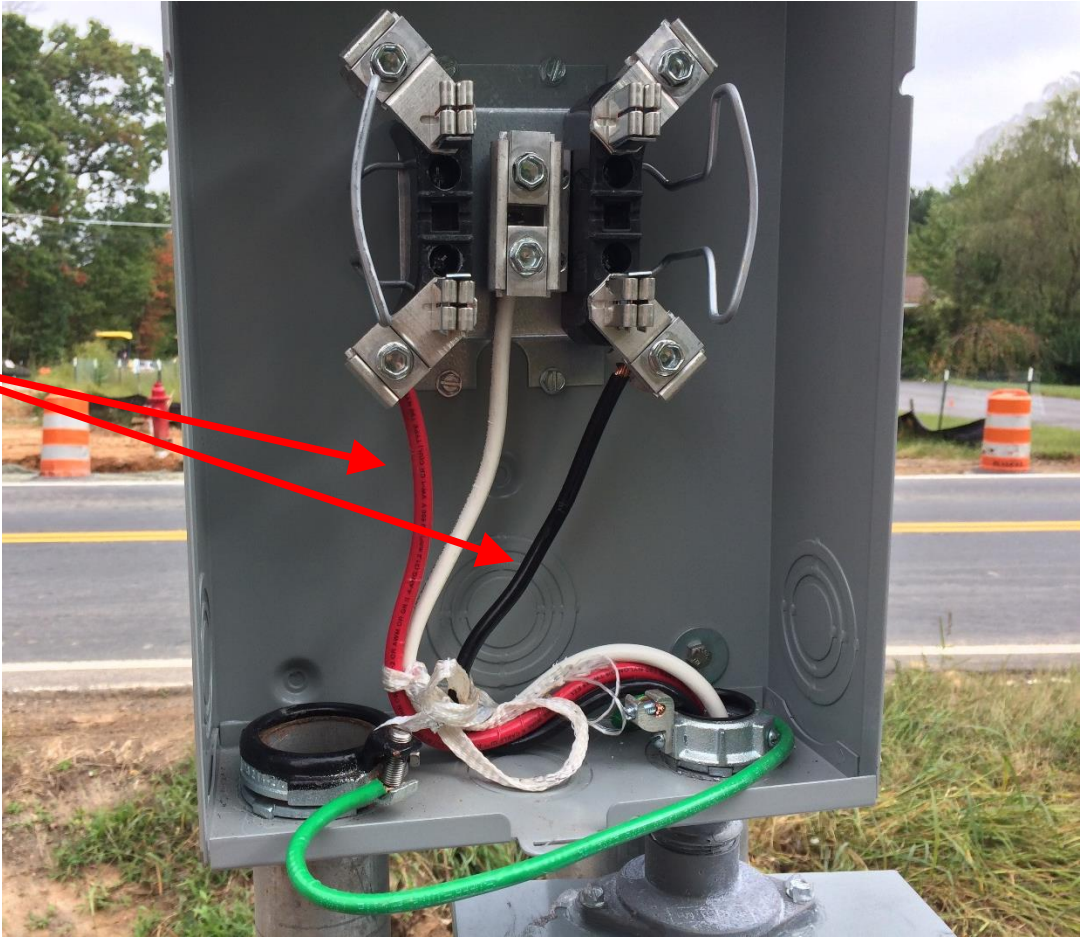
- Meter base
- Switch/breaker box



No JB for source cable per Dominion & NOVEC

Meter Base - Frequent Construction Problems

Red and black are on the wrong sides

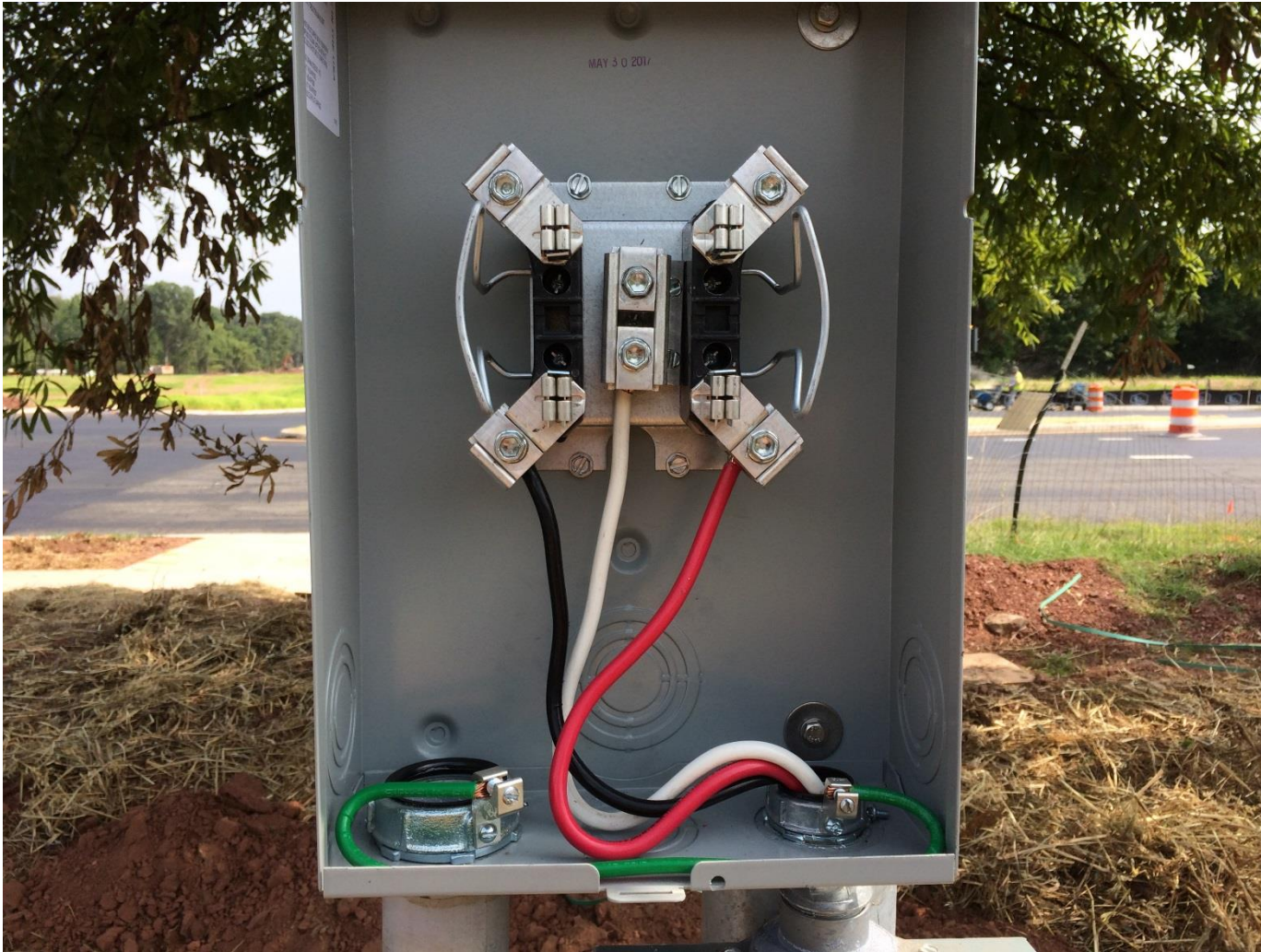


Meter Base - Frequent Construction Problems

Excess
cable



Meter Base – Example of Correct Wiring



Switch/Breaker Box

- Single-pole 60-amp breaker
- One main & one spare
- Main breaker in the control cabinet is 50 amps
- With 60, have more amps than needed to run the signal



Switch/Breaker Box – Common Problems

- Improper phase coloring
- A Phase – Black
 - Should be on the left
- B Phase – Red
 - Should be on the right



Switch/Breaker Box – Correct Configuration

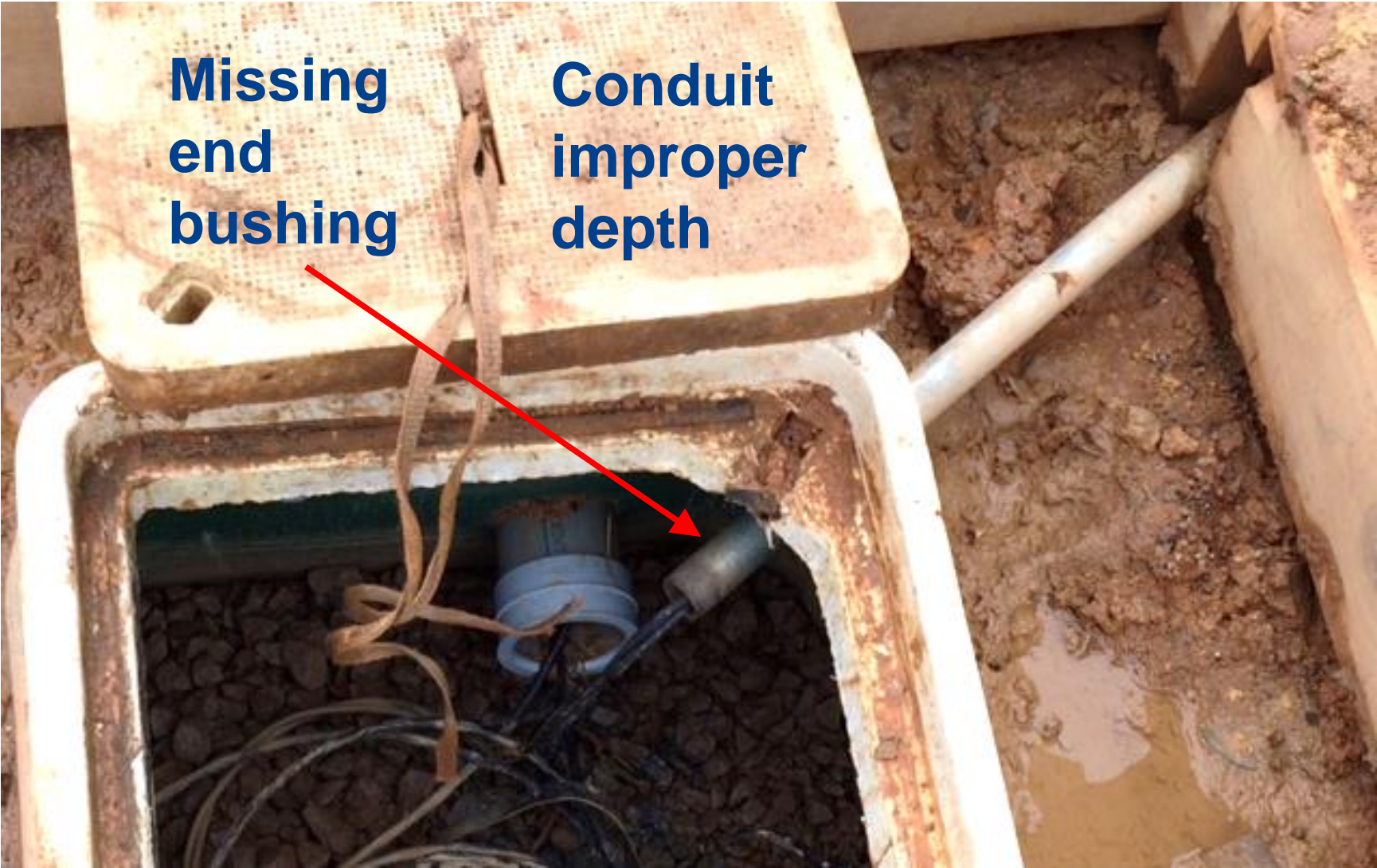


Junction Boxes – Common Problems



Missing
silicone
caulk at
entry
points

Junction Boxes – Common Problems



Junction Boxes – Common Problems



Improper
box
grade

Junction Boxes – Common Problems



Side of box has lost original form

Junction Boxes – Correct Installation

- Apply common sense with grade
- Follow the specifications & standards



Junction Boxes – Correct Installation

- Seal entry points
- Splice kit on the J-hook
- Maintain integrity of structure
- Follow the specifications & standards



Junction Boxes – Use of Existing Boxes



For the designer:
before you decide to re-use an existing box, open and check the condition

Designers – Look Beyond the Intersection



With new signal installation, Innovation Avenue is no longer the NEXT SIGNAL

Summary

- Perform your own review of inspection checklist items
- Pay attention to details in the specifications and standards – *the answers are in there!*
- Apply common sense with junction boxes
- Designers need to consider existing equipment and traffic control devices.

Upcoming maintenance enhancement:

- VDOT investigating physical and cyber security for cabinet access in the future