TYPICAL SECTION AT LIGHT POLE PEDESTAL FOR APPROACH SLAB OR BRIDGE DECK THICKNESS AT COPING 1'-5½" OR GREATER

CROSS REFERENCE:
For Detail "A", Anchor Plate Detail and Light Pole Pedestal Notes, see Sheet 3.

NOTE: Anchor Bolt, Nuts, Washers and Anchor Plate are dashed for clarity.

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ELEVATION VIEW

PLAN VIEW

TYPICAL SECTION AT LIGHT POLE PEDESTAL FOR FLAT SLAB OR BRIDGE DECK THICKNESS AT COPING 1'-5½" OR GREATER

Traffic Railing Reinforcing (Typ.)

Traffic Railing (Type Varies, 32" Vertical Shape shown), Pedestrian/Bicycle Railing or Curb similar

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LIGHT POLE PEDESTAL FOR APPROACH SLAB OR BRIDGE DECK THICKNESS AT COPING 1'-5½" OR GREATER

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REVISION
07/01/13

INDEX NO.
21200

SHEET NO.
2 of 3

FY 2016-17
DESIGN STANDARDS
CONDUIT GENERAL NOTES:

1. Furnish and install approved Conduits and Fittings in accordance with the Specifications, this Standard, the National Electric Code (NEC) and as directed by the Engineer.

2. Furnish and install Schedule 80 PVC Conduits in accordance with Specification Section E50 and this Index. Connect Conduit and Fittings using solvent cement in accordance with the manufacturer's recommendations.

3. Furnish and install Embedded Junction Boxes (EJB) with weatherproof covers sized in accordance with NEC requirements and the maximum size limits shown. Install EJB adjacent to the Begin and End of Bridges, Begin and End of Retaining Walls, and at other required locations. Omits EJB at Begin or End of Retaining Walls adjacent to Bridges unless a precast Traffic Railing with junction slab is used. Position EJB as shown.

4. Furnish and install Expansion Fittings at locations shown in the Plans. Certify that Expansion Fittings used at a given location are rated to accommodate the anticipated movement at that location: along Bridge decks - see Structures Plans, Expansion Joint Data Table; along Retaining Walls and other unspecified locations - 2" minimum.

5. Furnish and install Expansion/Deflection Fittings at locations shown in the Plans. Certify that Expansion/Deflection Fittings used at a given location are rated to accommodate a minimum rotation of 30 degrees and the anticipated movement at that location: along Bridge decks - see Structures Plans, Expansion Joint Data Table; along Retaining Walls and other unspecified locations - 0.7" minimum.

6. For all Conduits designated for future use, install either a #12 AWG Pull Wire or a Polyethylene cord between every EJB and install a #12 AWG Pull Wire from the first and last EJB in Traffic Railing or Parapet to the capped end of the Conduit.

7. For Conduit not designated for future use, see Plans for details. For Conduit designated for future use, stub out and cap the Conduit and drive a 3'-6" long 3/4" (min.) diameter Steel Pipe to be flush with the ground line adjacent to the Conduit as shown on Sheets 2, 3 or 4. Provide the location of the stub out with Steel Pipe to the Engineer for inclusion on the As-Built Plans.

8. Shift vertical Railing reinforcement symmetrically to provide 2" clearance to EJB. Space shifted vertical reinforcement at minimum 3" centers. Cut horizontal Reinforcement to provide 2" clearance to EJB and provide supplemental reinforcement as shown. To facilitate placement of Conduit, Expansion Fittings, and Expansion/Deflection Fittings, shift reinforcing a maximum of 1" but do not cut railing reinforcing to facilitate Conduit or Fittings. Do not bundle Conduits, or Conduit and horizontal reinforcement.

9. Unless otherwise shown in the plans, include the cost of furnishing and installing Conduit, Pull Cords and Wires, EJB, Expansion and Expansion/Deflection Fittings and all associated hardware required to complete the installation in the cost of the Traffic Railing or Pedestrian Railing (Parapet) that the Conduit is installed in.
PARTIAL PLAN VIEW ALONG APPROACH SLAB
WITH CONTINUING TRAFFIC RAILING

PARTIAL PLAN VIEW ALONG RETAINING WALL

PARTIAL ELEVATION VIEW ALONG APPROACH
SLAB WITH CONTINUING TRAFFIC RAILING
(Retaining Wall Mounted Traffic Railing shown, Roadway Concrete Barrier similar)

PARTIAL ELEVATION VIEW ALONG RETAINING WALL

* 32" F Shape Traffic Railing shown, other Traffic Railings and Pedestrian / Bicycle Railing similar. (See Sheet 2)

** EJB 'A' shown EJB 'B' similar. See EJB 'B' Detail on Sheet 2.
**NAVIGATION LIGHT NOTES:**

1. Provide Navigation Light System in compliance with Specifications Section 510.

**NAVIGATION LIGHT SYSTEM SCHEMATIC**

**FOR SINGLE BRIDGE WITH FENDERS**

**FOR DUAL BRIDGES WITH FENDERS**

**FOR SINGLE BRIDGE WITHOUT FENDERS**

**FOR DUAL BRIDGES WITHOUT FENDERS**

*Use RFL when Pier is at Channel Edge and see CFR, Title 33, part 118 for Mounting Height restrictions. Use RCL otherwise.***

**NAVIGATION LIGHT SYSTEM DETAILS (FIXED BRIDGES)**

**LEGEND**

- **LC**: Lighting Contactor
- **PC**: Photocell Control
- **Xmer**: Transformer (If Required)
- **RFL**: Red Pier/Fender Light (180° visibility)
- **RCL**: Red Channel Margin Light (180° visibility)
- **GCL**: Green Center Channel Light (360° visibility)
- **CGL**: Clearance Gauge Light
- **CM**: Channel Margin or Pier inner surface whichever defines Channel Edge.

**TYPICAL ELECTRICAL SCHEMATIC DIAGRAM**

**POWER CONDUCTORS**

<table>
<thead>
<tr>
<th>DISTANCE (feet)</th>
<th>VOLS</th>
<th>CONDUCTOR</th>
<th>TRANSFORMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 75</td>
<td>120</td>
<td>#12 AWG</td>
<td>N/A</td>
</tr>
<tr>
<td>75 - 500</td>
<td>120 or 240</td>
<td>#10 AWG</td>
<td>N/A</td>
</tr>
<tr>
<td>500 - 1000</td>
<td>240</td>
<td>#10 AWG</td>
<td>2 KVA</td>
</tr>
<tr>
<td>1000 - 2000</td>
<td>480</td>
<td>#4 AWG</td>
<td>2 KVA</td>
</tr>
<tr>
<td>2000 - 5000</td>
<td>480</td>
<td>#6 AWG</td>
<td>2 KVA</td>
</tr>
<tr>
<td>5000 - 10000</td>
<td>480</td>
<td>#6 AWG</td>
<td>2 KVA</td>
</tr>
<tr>
<td>Over 10000</td>
<td>480</td>
<td>#4 AWG</td>
<td>2 KVA</td>
</tr>
</tbody>
</table>

**NOTE:**

Size conduit and conductors per NEC requirements. Do not use conduit smaller than Ø.
CROSS REFERENCES:
1. For Navigation Light System notes and legend, see Sheet 1.
2. See Utility Conduit Detail sheets for Embedded Junction Box (EJB) dimensions & locations.

GCL OR RCL MOUNTING DETAILS (SCHEMATIC)
VIEW A-A
(Traffic Railing - 32" F Shape shown, other railings similar)
* Supplied by Light Fixture Manufacturer

GCL OR RCL MOUNTING DETAILS (SCHEMATIC)
ELEVATION VIEW
(Traffic Railing (32" F Shape) shown, other railings similar)

Install Light Fixture so as to ensure visibility from an approaching vessel.

EJB
Flexible Conduit
2" Ø Conduits
Access Fitting 3/4" Ø Min.
Bottom of Bridge Deck

RCL or GCL
2" nominal
Bottom of Girder

Service Chain

Traffic Railing or Parapet
BOX GIRDER MAINTENANCE LIGHTING NOTES:

1. Submit shop drawings to the Engineer detailing the layout of the maintenance lighting system for the entire structure. The shop drawings must include, but not be limited to, the following items:
   a. Conduit layout and installation details through diaphragms, around post-tensioning (PT) ducts, lateral bracing and cross frames as necessary.
   b. Conduct access through box girder end diaphragms with minimum 1" clearance in all directions.
   c. Conduit expansion fitting details.
   d. Fastener details for the interior electrical system.
   e. Single line diagram showing mini power centers, switches, circuit breakers, etc.
   f. Mini power center details including circuit breaker details.
   g. Mini power center mounting details if required.
   h. Feeder schedule.

2. Ensure installation meets all requirements of the latest edition of the National Electrical Code (NEC) and local ordinances. Install grounding in accordance with NEC Article 250. Maintain separation between 480V and 120V Conductors / Conduits throughout.

3. Furnish all labor, equipment, materials, and incidentals required for a complete and functional installation.

4. Use only new, unused and Underwriters Laboratories (UL) listed equipment and materials for outdoor use.

5. Furnish and install polyvinyl chloride (PVC) conduit in conformance with UL Section 651, NEC Section 347 and NEMA TC-2. Use-resistant and schedule 80. Blend conduits as necessary to connect to loads.

6. Provide PVC sleeve 2" larger in diameter than conduit to accommodate construction tolerances.

7. Install a UL labeled expansion fitting for specified PVC conduit at all structure expansion joints. Provide certification that the expansion fitting meets the following minimum requirements: Compatibility with the connected conduits, waterproof, UV protected and allows longitudinal movement equal to that of the Expansion Joint.

8. Use only Alloy 316 stainless steel supporting hardware. Provide minimum #8 fasteners. For concrete or SIP form mounting, provide anchor bolts (expansion, drop-in or adhesive) suitable for dynamic loading (due to vibration caused by traffic). Install fasteners to avoid conflicts with reinforcing steel and PT ducts. For structural steel mounting, do not attach fasteners to main members, i.e. webs and flanges.

9. Furnish power distribution at 480V AC, 1 phase, with step down transformers at regular intervals. Furnish 7.5 KVA mini power center with eight 20A breakers as the step down transformer, feeding a maximum of 20 lamps and 20 receptacles. Each mini power center will provide power to no more than 1000' of bridge, preferably 500' on each side of the mini power center, 480V top feed, 120V bottom feed to maintain separation.

10. Furnish and install lighting contactors to switch the 480V AC feeding the mini power centers.

11. Furnish and install copper conductors, Type XHHW. Do not use any conductor larger than #4 AWG.

12. Provide enough slack in all interior cable terminations to allow for minor shifting of the structure.

13. Furnish and install National Electric Manufacturers Association (NEMA) Type 4X (non-metallic) surface mounted boxes sized in conformance with the NEC.

14. Furnish and install 120V duplex receptacles (GFI, NEMA Type 5-20R) in non-metallic outlet boxes at 50' maximum on centers. Provide each receptacle with a gasketed weather-protective outdoor plate. Maximum wire size to connect to receptacles is #12 AWG.

15. Furnish and install surface mounted, fully enclosed, incandescent light fixtures with gasketed clear globes and wire guards at 50' maximum on centers. Provide 100 watt, 130 volt, vibration resistant and brass base incandescent lamps.

16. Provide six hour reset timers for each circuit to turn off the lighting system automatically.

CROSS REFERENCES:

1. For Maintenance Light Details, see Sheet 2.
2. For actual bridge section, see Structures Plans.
Front face of End Bent Backwall

Girder End Diaphragm

Expansion Fitting

PVC Sleeve cast thru End Diaphragm, (see Note 6)

Grout and seal to prevent seepage after installation of conduit

PVC Conduit (480V)

Approach Slab

Bridge Deck

Conduit (480V) (if required)

Incandescent Light fixture (see Note 15)

Mini Power Center where required (see Note 9)

Conduit (120V)

Grout after installation

PVC Sleeve cast thru Backwall, (see Note 6)

Grout and seal to prevent seepage after installation of conduit

PVC Conduit (480V)

Approach Slab

Bridge Deck

Conduit (480V)

Incandescent Light fixture (see Note 15)

Mini Power Center where required (see Note 9)

Conduit (120V)

To load

Channel

Girder End Diaphragm

PVC Sleeve cast thru End Diaphragm, (see Note 6)

Grout and seal to prevent seepage after installation of conduit

PVC Conduit (480V)

Approach Slab

Bridge Deck

Conduit (480V)

Incandescent Light fixture (see Note 15)

Mini Power Center where required (see Note 9)

Conduit (120V)

To load

Channel

Girder End Diaphragm

PVC Sleeve cast thru Backwall, (see Note 6)

Grout and seal to prevent seepage after installation of conduit

PVC Conduit (480V)

Approach Slab

Bridge Deck

Conduit (480V)

Incandescent Light fixture (see Note 15)

Mini Power Center where required (see Note 9)

Conduit (120V)

To load

Channel

Girder End Diaphragm

PVC Sleeve cast thru Backwall, (see Note 6)

Grout and seal to prevent seepage after installation of conduit

PVC Conduit (480V)
STOP ANGLE

HATCH LOCK BAR DETAIL

DETAIL SEE HINGE

VIEW A-A

VIEW B-B

HATCH LOCK BAR DETAIL

BOX LOCK BAR DETAIL

HINGE BAR DETAIL

HATCH DETAIL

ACCESS HATCH ASSEMBLY FOR STEEL BOX SECTIONS

ACCESS HATCH ASSEMBLY

PLAN VIEW OF ACCESS HATCH ASSEMBLY

SECTION THRU ACCESS OPENING

NOTES:

1. All Structural Steel material in Access Hatch Assemblies shall conform to ASTM A500 Grade 36.
2. 3½ Ø Pipe Grab Rail shall be in accordance with ASTM A 53 Grade B for standard weight pipe (Schedule 40).
3. ¼ Ø Hinge Handle Bar, Hatch Pin and 1" Ø Ladder Brace shall be in accordance with ASTM A36.
4. All bolts shall conform to ASTM A307 or A449. All nuts shall conform to ASTM A563 and all washers shall conform to ASTM F-436.
5. All exposed edges of plates and openings shall be ground smooth.
6. Place Ladder Brace near the End Bents exclusively and only when the height is reasonable for access by a Ladder.
7. See Framing Plan sheets for locations of Access Hatch Openings.
8. Coat structural steel in accordance with Specification Section 560.
9. Include the cost of the Access Hatch Assembly and incidental items in the cost of the Steel Box Grinders. No separate payment will be made for coating structural steel.
1. Orient the Access Hatch so that the hinges are located down-grade.

HINCE NOTE:

SECTION THRU ACCESS OPENING

NOTEs:

1. All Structural Steel material in Access Hatch Assemblies shall conform to ASTM A709 Grade 36.
2. 1½ Ø Pipe Grab Rail shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40).
3. 1½ Ø Hatch Handle Bar and Hitch Pin shall be in accordance with ASTM A36.
4. All bolts shall conform to ASTM A307 or A449. All nuts shall conform to ASTM A563 and all washers shall conform to ASTM F-436.
5. All exposed edges of plates and openings shall be ground smooth.
6. See Framing Plan sheets for locations of Access Hatch Openings.
7. Coat structural steel in accordance with Specification Section 560.
8. Include the cost of the Access Hatch Assembly and incidental items in the cost of the Concrete Box Section.

ACCESS HATCH ASSEMBLY
FOR CONCRETE BOX SECTIONS

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**ACCESS DOOR NOTES:**

**STRUCTURAL STEEL:**
Fabricate Door Assemblies using structural steel in accordance with Specification 962, any grade. Grind all exposed edges and burrs smooth. Non-destructive testing of welds is not required. See Plans for details of Diaphragm, Stiffeners and Top and Bottom Plates.

**EXPANDED METAL MESH:**
Expanded metal mesh shall be 1/2" No. 16 expanded carbon steel mesh in accordance with ASTM F 1267, Type I or II, Class 2, Grade A.

**BOLTS, NUTS AND STEEL WASHERS:**
Bolts shall be stainless steel hex head bolts meeting the requirements of ASTM F 593, Type 316. Nuts shall be ASTM F 594, Type 316. Steel washers shall be stainless steel compatible with the bolts and nuts.

**PTFE WASHERS:**
P'TFE washers shall be 1/8" or 1/16" (nominal), 1/16" or 1/18" thick, sized for use with 1/4" or 1/8" diameter bolts as shown.

**COATING:**
Coat Access Door Assemblies after complete fabrication, including the expanded metal mesh, using an Interior Box Girder Coating System in accordance with Specification 973. Weld expanded metal mesh to the door frame after the door frame has been abrasive blast cleaned and prior to coating. Install Bolts and PTFE Washers after coating. Touch-up tack weld on Latch Bolt after welding.

**DOOR HINGE LOCATION:**
Place door hinges on the transverse downward side of the access opening.

**PADLOCKS:**
Provide a suitable keyed commercial grade, weather resistant padlock with a 2" shackle for each Access Door Assembly located at Bridge Approaches. Key all padlocks for Access Door Assemblies and Access Opening Hinges (if present) on an individual bridge alike.

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**ELEVATION VIEW OF ACCESS DOOR ASSEMBLY**

(At Access Opening in End Internal Diaphragm as seen from inside the Box Girder. Right Hand Door shown; Left Hand Door opposite hand)

**SECTION A-A**

- Elevation View of Access Door Assembly
- Exterior Face of Diaphragm at End of Span or Continuous Unit
- Diaphragm
- Top & Bottom Plates
- Expanded Metal Mesh
- L 3' x 3' x 1/2 Door Frame

**SECTION B-B**

- Expanded Metal Mesh
- Door Hinge Bar (See Detail)
- 1 1/8" Ø Hinge Bolt, Nut & Washers
- 1 1/8" Ø Stop Pin tack weld to Stiffener
- L 3' x 3' x 1/2 Door Frame

**SECTION C-C**

- Door Hinge Bar (See Detail)
- Bearing or Jacking Stiffener
- L 3' x 3' x 1/2 Door Frame
- 1 1/8" Ø Latch Bolt & Nut
- Edge Adjacent to Stiffener

**SECTION D-D**

- Door Hinge Bar (See Detail)
- Bearing or Jacking Stiffener
- L 3' x 3' x 1/2 Door Frame
- 1 1/8" Ø Latch Bolt, Nut & Washer
- Edge Adjacent to Door Frame
- 3 1/2" Ø Hole for Padlock

**SECTION E-E**

- Latch Bar (See Detail)
- Bearing or Jacking Stiffener
- L 3' x 3' x 1/2 Door Frame
- 1 1/8" Ø Latch Bolt, Nut & Washer
- Edge Adjacent to Latch Bolt
- 1 1/8" Ø Hole for Latch Bolt

**SECTION F-F**

- Latch Bar (See Detail)
- Bearing or Jacking Stiffener
- L 3' x 3' x 1/2 Door Frame
- 1 1/8" Ø Latch Bolt, Nut & Washer
- Edge Adjacent to Door Frame
- 1 1/8" Ø Hole for Padlock

**VIEW D-D**

- Door Hinge Bar (See Detail)
- Bearing or Jacking Stiffener
- L 3' x 3' x 1/2 Door Frame
- 1 1/8" Ø Latch Bolt, Nut & Washer
- Edge Adjacent to Stiffener
- 3 1/2" Ø Hole for Padlock