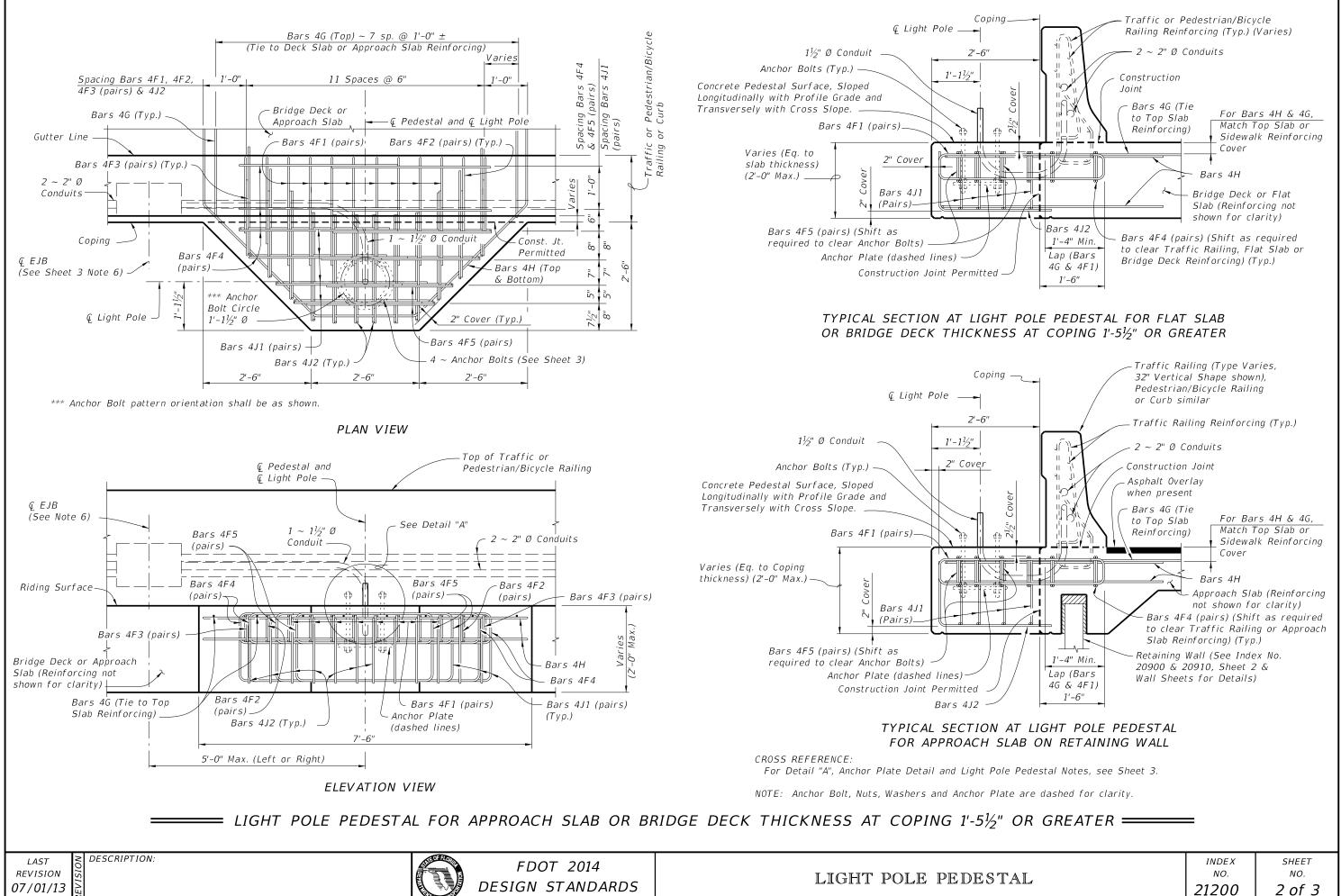
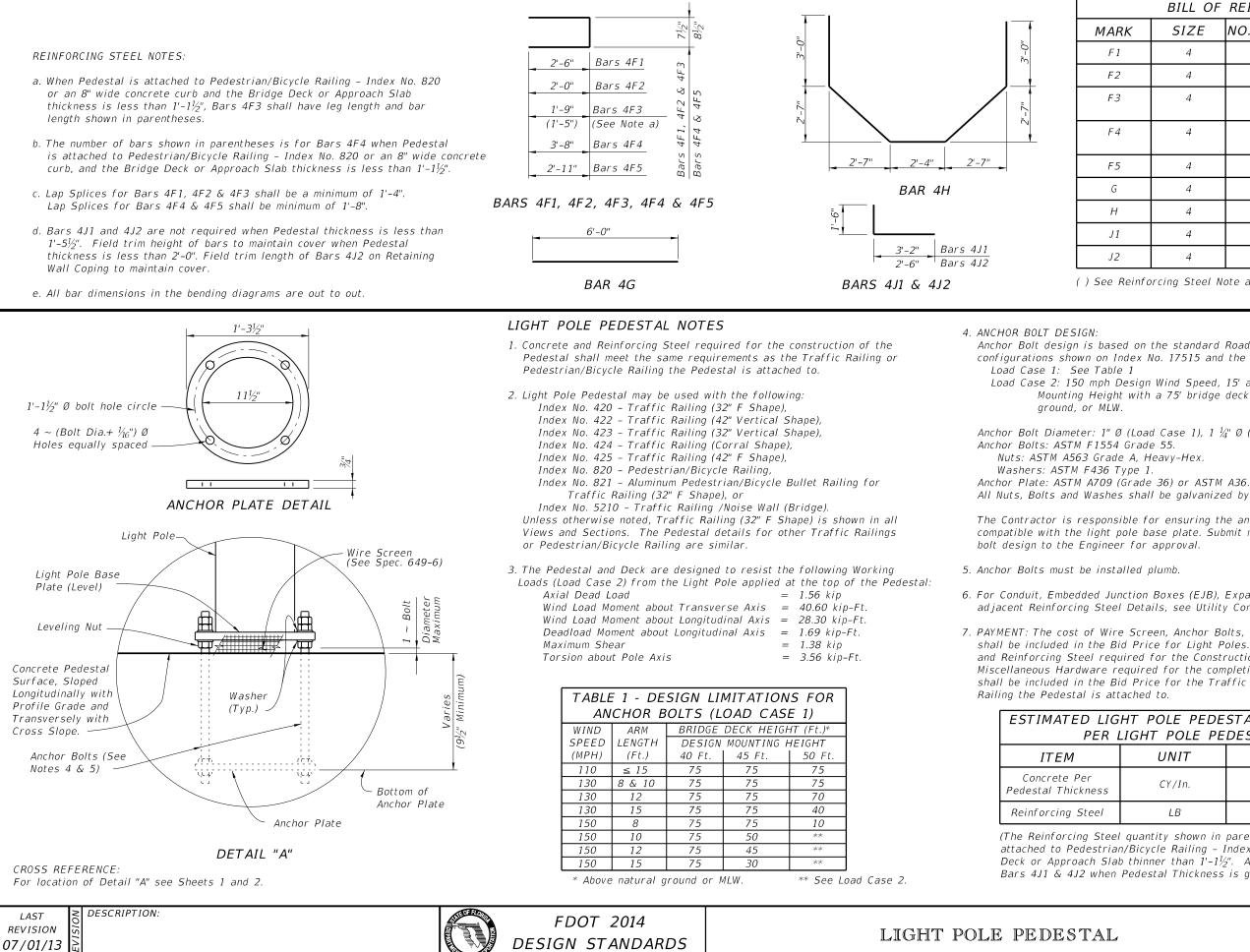


07/01/13

DESIGN STANDARDS



## CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



BILL OF REINFORCING STEEL				
MARK	SIZE	NO. REQD.	LENGTH	NOTES
F 1	4	16	5'-8"	С
F2	4	4	4'-8"	С
F3	4	4	4'-2'' (3'-6'')	а, с
F4	4	8 (6)	8'-3''	b, c
F5	4	4	6'-7"	С
G	4	8	6'-0"	-
Н	4	2	15'-8"	-
J 1	4	8	4'-8"	d
J2	4	12	4'-0''	d
See Reinfo	orcing Steel N	ote a & b.		
on Index M Table 1 ph Design eight with MLW. 1" Ø (Load 554 Grade Tade A, H 36 Type 1	No. 17515 and Wind Speed, a 75' bridge d Case 1), 1 ½ e 55. 'eavy-Hex.	Roadway Alum the following 15' arm length deck height al 4'' Ø (Load Case	design limitat n, 50' Design pove natural	

All Nuts, Bolts and Washes shall be galvanized by ASTM F2329.

The Contractor is responsible for ensuring the anchor bolt configuation is compatible with the light pole base plate. Submit modifications of the anchor

6. For Conduit, Embedded Junction Boxes (EJB), Expansion/Deflection Fitting and adjacent Reinforcing Steel Details, see Utility Conduit Detail Sheets.

7. PAYMENT: The cost of Wire Screen, Anchor Bolts, Nuts, Washers and Anchor Plates shall be included in the Bid Price for Light Poles. The cost of all Labor, Concrete and Reinforcing Steel required for the Construction of the Pedestals, EJB, and Miscellaneous Hardware required for the completion of the Electrical System, shall be included in the Bid Price for the Traffic Railing or Pedestrian/Bicycle

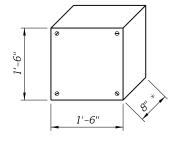
## ESTIMATED LIGHT POLE PEDESTAL QUANTITIES PER LIGHT POLE PEDESTAL

	UNIT	QUANTITY		
55	CY/In.	0.040		
e/	LB	195 (182)		

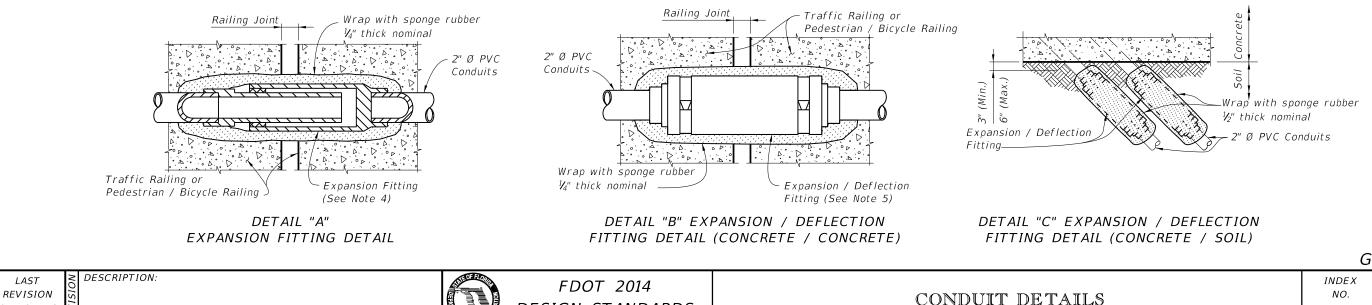
(The Reinforcing Steel quantity shown in parenthesis is for a Pedestal attached to Pedestrian/Bicycle Railing - Index No. 820 with Bridge Deck or Approach Slab thinner than  $1'-1\frac{1}{2}''$ . Add 59 Lbs. for Bars 4J1 & 4J2 when Pedestal Thickness is greater than 1'-5")

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- CONDUIT GENERAL NOTES:
- 1. Furnish and install approved Conduits and Fittings in accordance with the Specifications, this Standard, and the National Electric Code (NEC) and as directed by the Engineer.
- 2. Furnish Schedule 80 PVC Rigid Nonmetallic Conduits in accordance with NEMA TC-2 and UL Standard 651. Furnish Fittings in accordance with NEMA TC-3 and UL Standard 514b. Conduit and Fittings must have UL labels: Conduit - on each 10-foot length; Fittings - stamped or molded on each Fitting. Connect Conduit and Fittings using solvent cement in accordance with the manufacturer's recommendations.
- 3. Furnish and install Embedded Junction Boxes (EJB) 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. Omit 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 Conduit designated for future use, install in accordance with Specification Section 630, either: #12 AWG Pull Wire or Polypropylene cord between every EJB and install #12 AWG Pull Wire from the first and last EJB in Traffic Railing or Parapet to in-ground Junction Box or capped end of Conduit.
- 7. For all Conduit designated for future use, stub out and cap the Conduit; drive a steel pipe at the End of the Conduit as shown on Sheet 2 unless the plans require an in-ground Junction Box. Show location of stub out with Steel Pipe or in-ground Junction Box on 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 Railing reinforcement to provide 2" clearance to EJB and provide supplemental reinforcement as shown. Shift reinforcing a maximum of 1" but do not cut Railing reinforcement to facilitate placement of Conduit, Expansion Fittings, and Expansion/Deflection Fittings. Do not bundle Conduits, or Conduits 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.



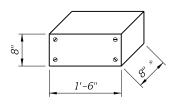
EJB "A" Double Conduit (Maximum Dimensions)



DESIGN STANDARDS

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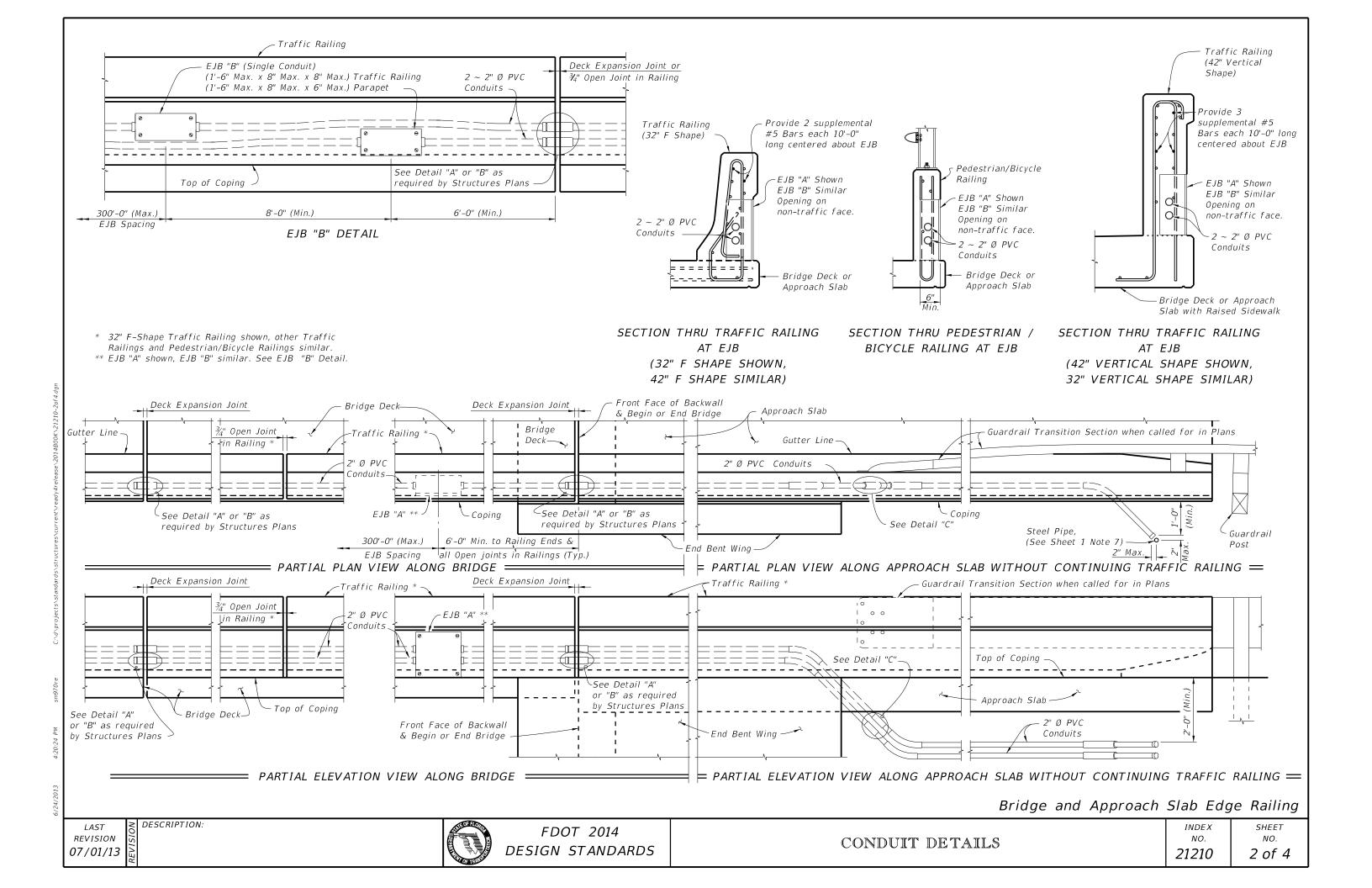
\* Reduce to 6" maximum when installed in Pedestrian/ Bicycle Railings.

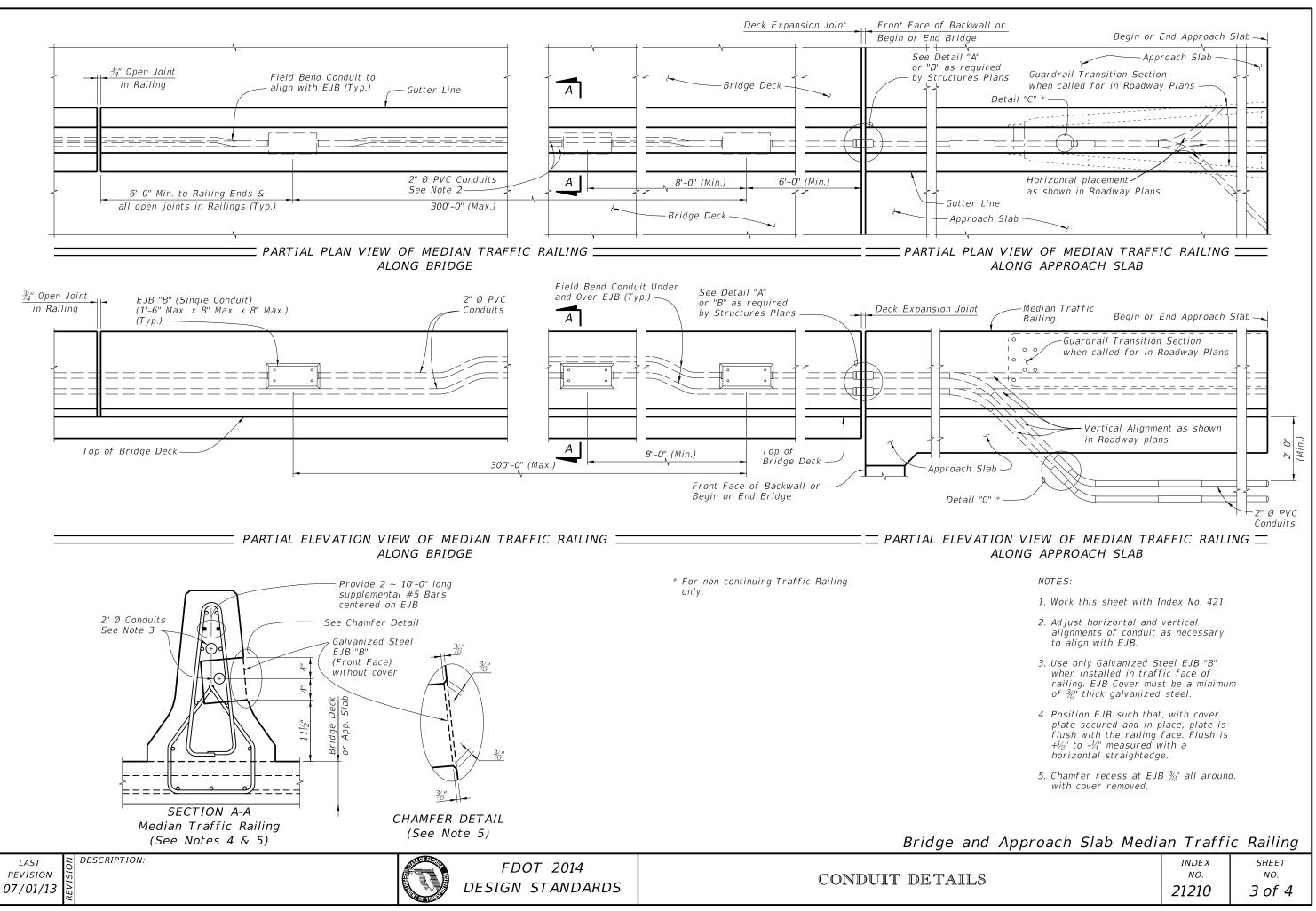


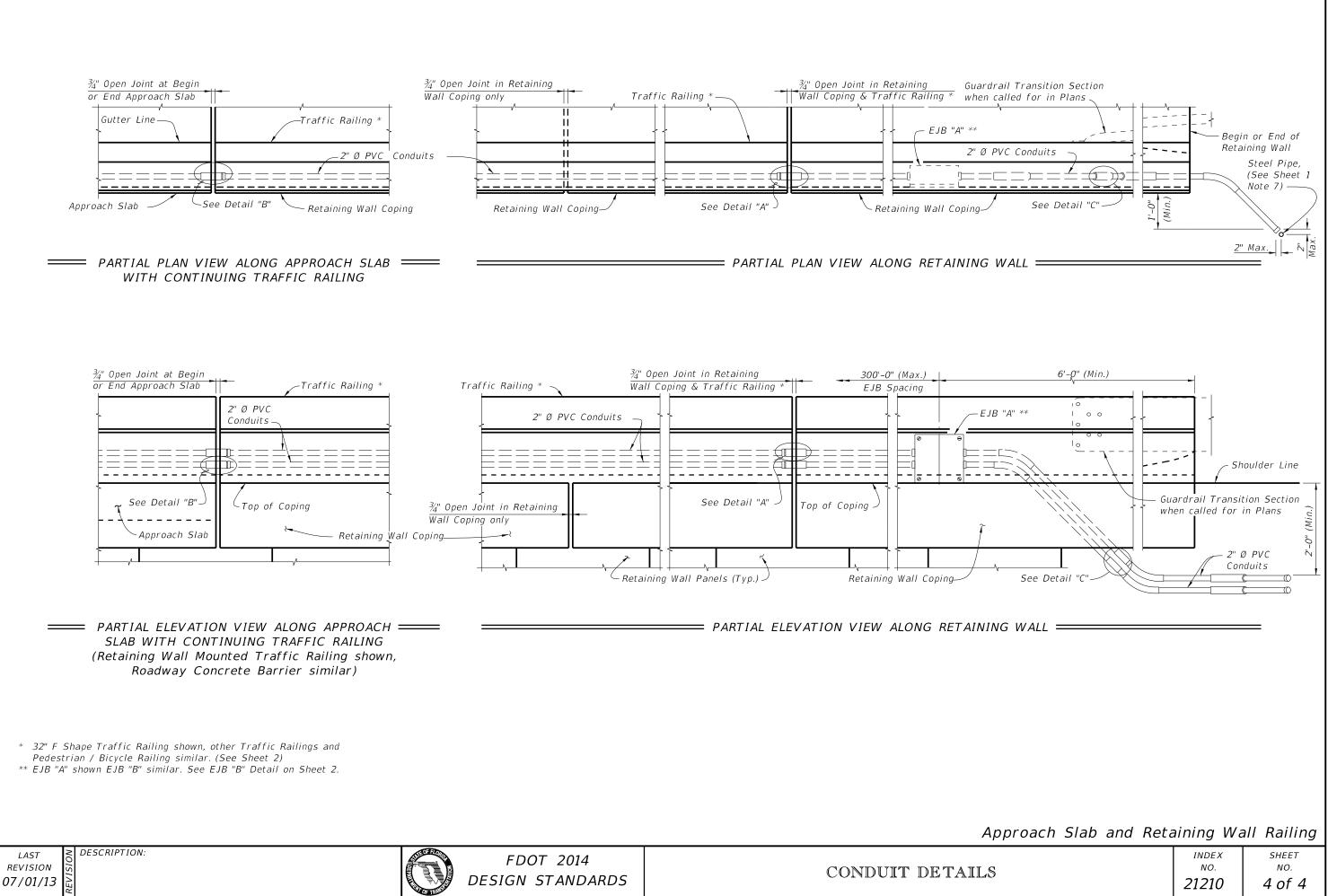
EJB "B" Single Conduit (Maximum Dimensions)

GENERAL
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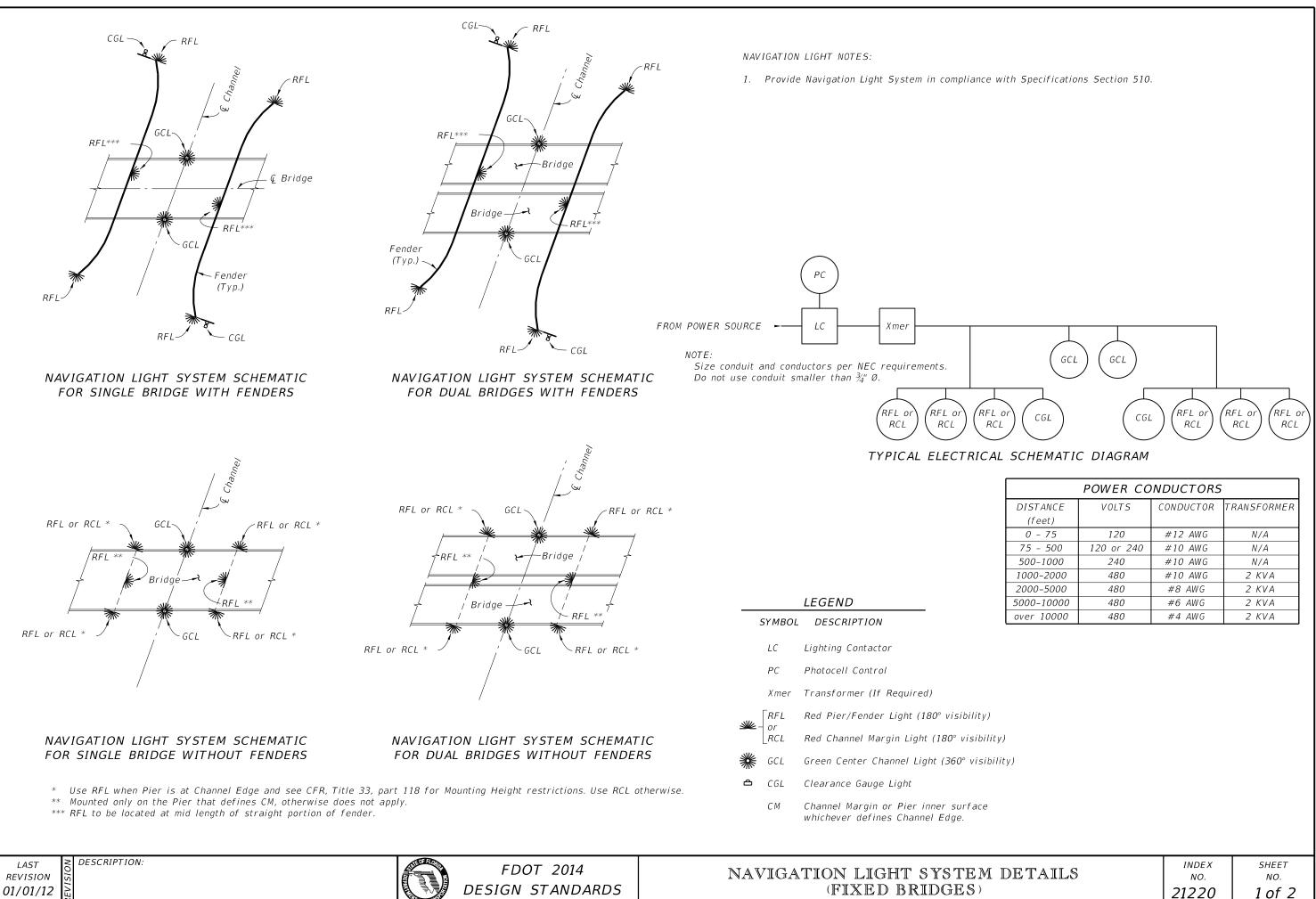
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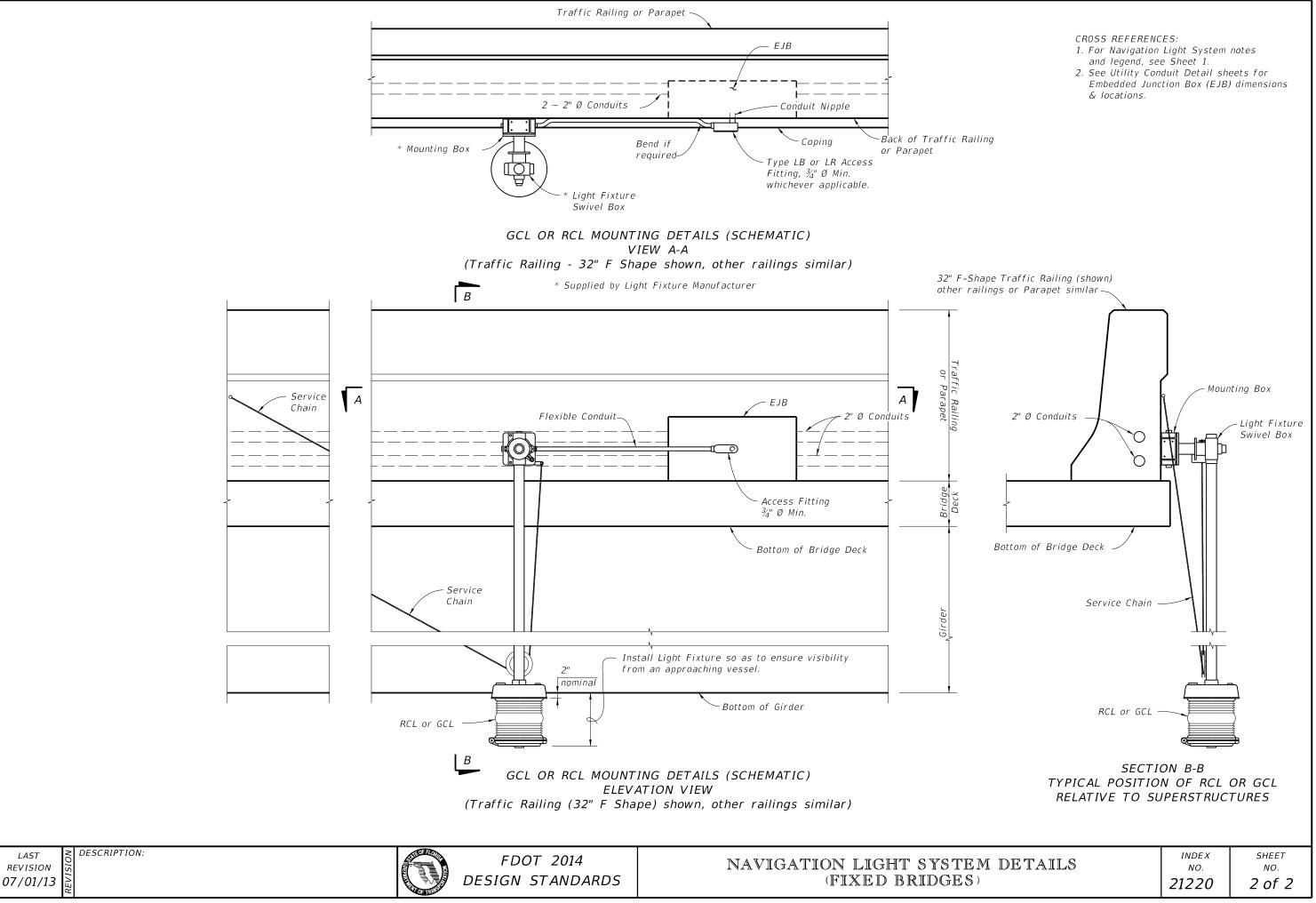








(FIXED BRIDGES)



LAST REVISION

## 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. Conduit 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, contactors, timers, 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, UV-resistant and schedule 80. Bend conduits as necessary to connect to loads.
- 6. Provide PVC sleeve 2" bigger in diameter than conduit to accommodate construction tolerance.
- 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  $\frac{3}{6}$  Ø 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. Locate switches at each end of each span and at every access door.
- 17. Provide six hour reset timers for each circuit to turn off the lighting system automatically.
- 18. Include the cost of the box maintenance lighting system in the pay item for Lighting Inside Box Girder (LS).

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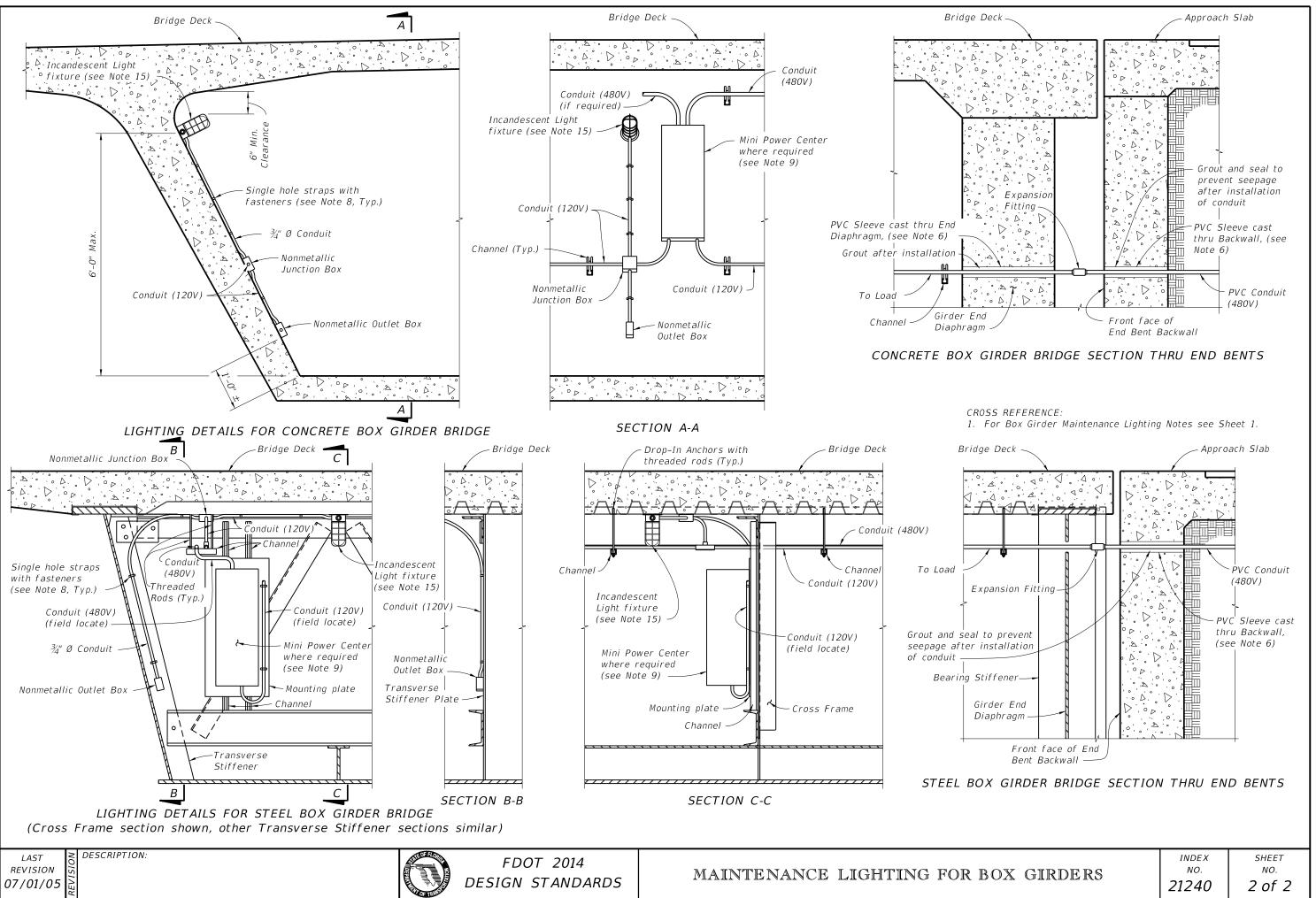
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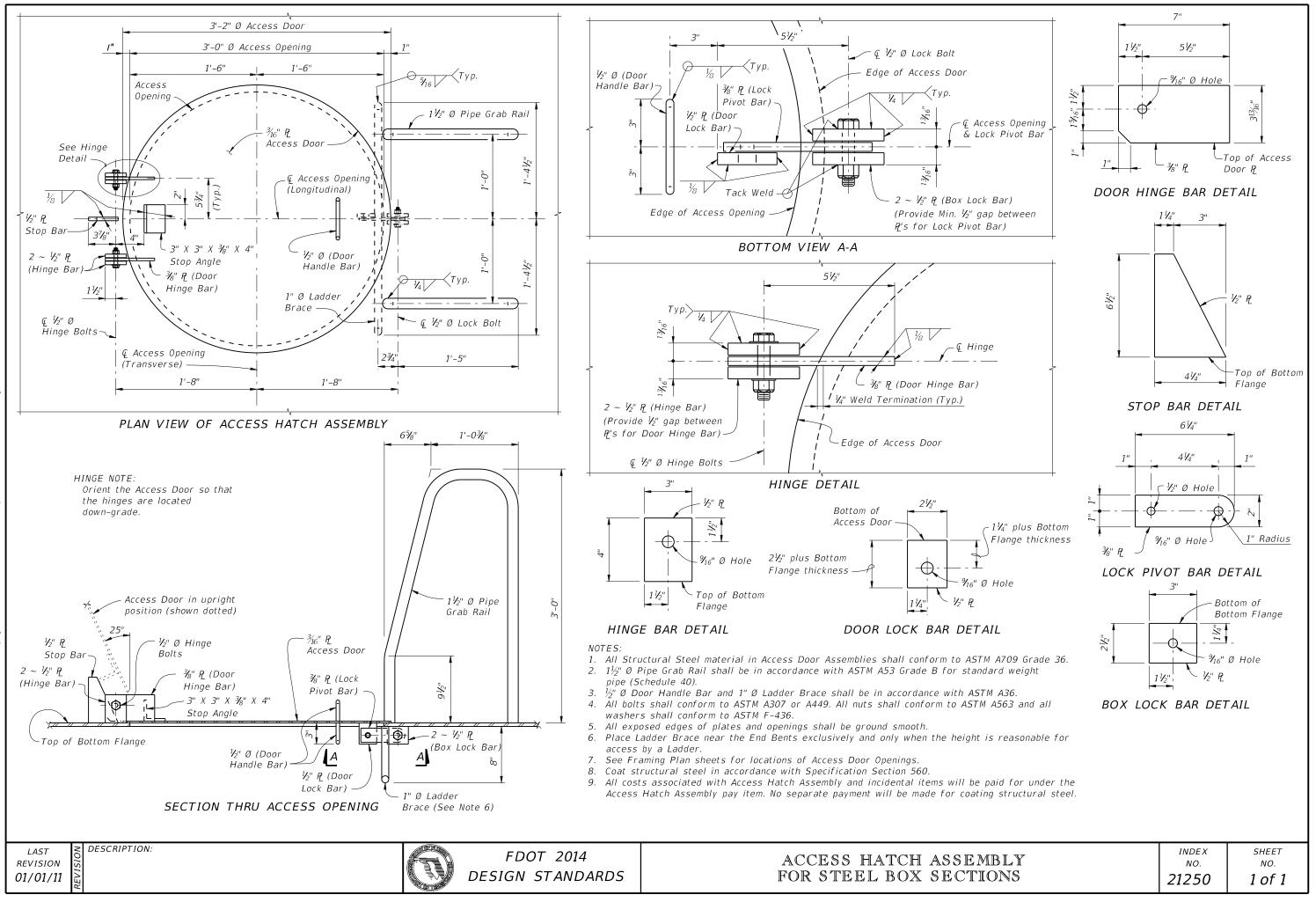


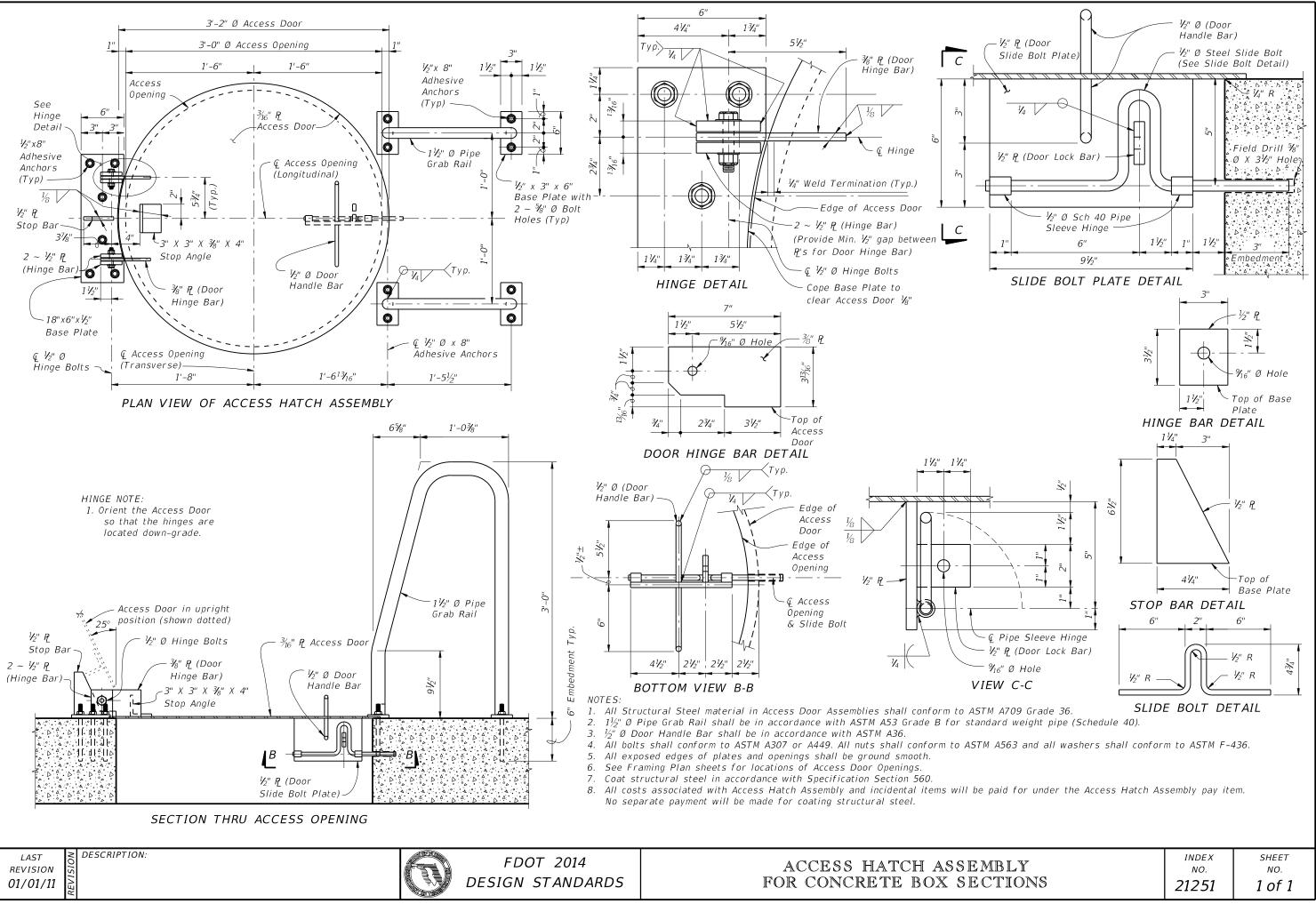
1. For Maintenance Light Details, see Sheet 2. 2. For actual bridge section, see Structures Plans.

CROSS REFERENCES:

OX GIRDERS	index NO. <b>21240</b>	<sup>SHEET</sup> NO. <b>1 of 2</b>







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