

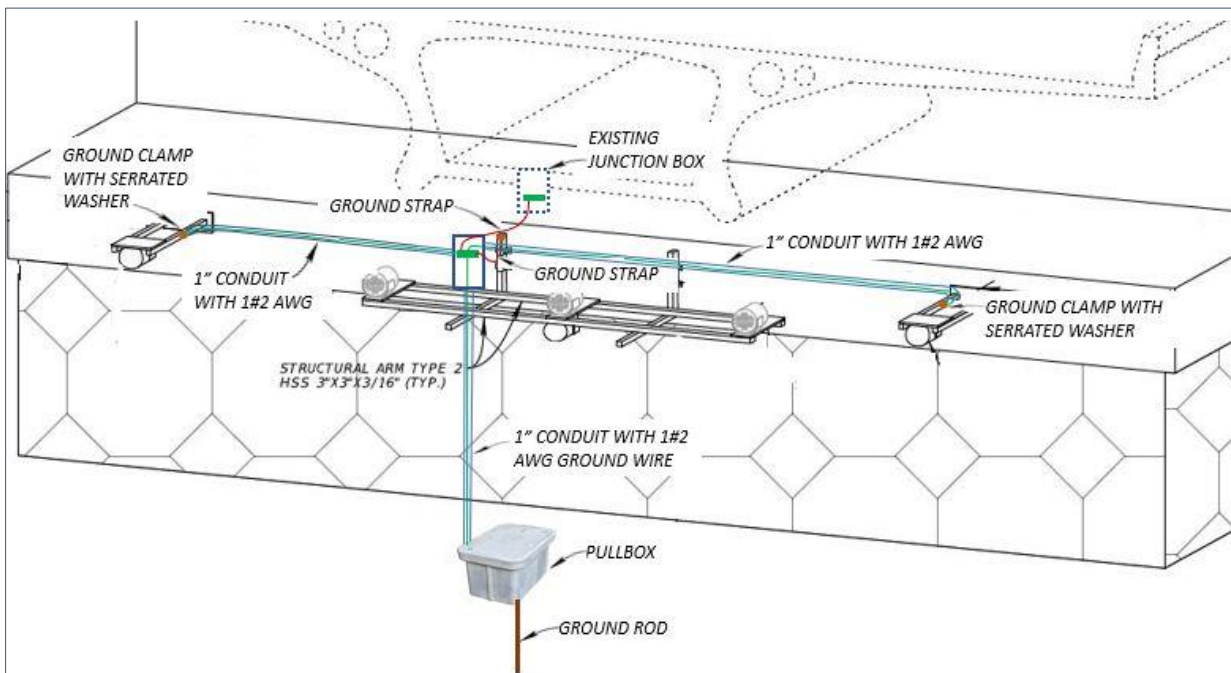
## Required ITB Amendment 1/29/24

### AMENDMENT

Add new section WORK ADJACENT TO SIDEWALKS below; Page 10 of 13:

Correction: Added new section WORK ADJACENT TO SIDEWALKS

Figure 1. ABUTMENT GROUND WIRE ROUTING



### WORK ADJACENT TO SIDEWALKS

**For piers that abut sidewalks, run conduit horizontally on the slope pavement to the pull box installed in the grass area. Do not sawcut slope pavement or sidewalk. Use Unistrut and a bracket to mount the conduit. Do not block drainage outlets. See Figures 11A through 11C.**

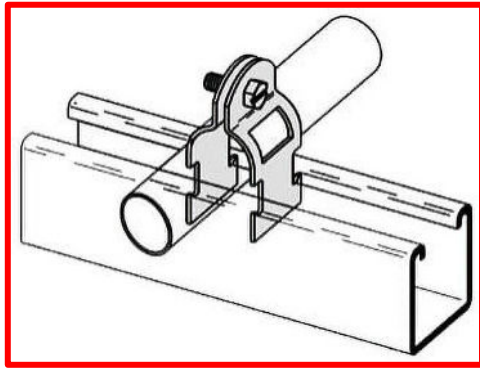
**Figure 11A. VERTICAL CONDUIT TO HORIZONTAL CONDUIT TRANSITION**



**Figure 11B. Horizontal Conduit on Slope Pavement**



*Figure 11C. Unistrut and Bracket for Conduit*



### **GROUND CLAMP, GROUND STRAP, AND SERRATED WASHER INSTALLATION**

The ground wire and ground strap shall be terminated to the bracket arms with a connection mechanism that penetrates the powder coating to create the electrical grounding desired. Ensure that a proper electrical contact is achieved between the ground clamp, ground strap connector, serrated washer, and the bracket arm. See Figures 12 and 13.

**Background:** The lighting manufacturer for the aesthetic lighting on THEA’s Reversible Expressway Lanes (REL) has performed a field investigation of the lighting system and has recommended grounding the lighting bracket arms at each of the 157 piers to mitigate transient voltage surges that are otherwise impacting the lighting system. The lighting brackets will be bonded to the aesthetic lighting ground system located in existing Junction Box Δ inside the bridge deck. The lighting brackets will also be bonded to a ground rod at the base of the pier.

In addition to the piers, the lighting brackets located on the straddle bents and abutments will be bonded to the grounding circuit. The grounding circuit will also be bonded to a ground rod at the base of the bent leg or abutment.

Firms shall inspect and test the load centers servicing each facility and reports of the testing and inspections shall be provided to the engineer.

**Scope:** The Governing Standard Plans are the Florida Department of Transportation, FY2022-23 Standard Plans for Road and Bridge Construction and applicable Interim Revisions (IRs). Standard Plans for Road Construction and associated IRs are available at the following website: <http://www.fdot.gov/design/standardplans>.

The Governing Standard Specifications are the Florida Department of Transportation, July 2022 Standard Specifications for Road and Bridge Construction at the following website: <http://www.fdot.gov/programmanagement/Implemented/SpecBooks>

The scope of work consists of grounding the lighting brackets at 157 piers. The pier numbers are listed in Table 1.

**Table 1. REL Pier Numbers**

No.	Pier Number	No.	Pier Number	No.	Pier Number
1	Pier 172	16	Pier 153	31	Pier 138
2	Pier 171	17	Pier 152	32	Pier 138A
3	Pier 170	18	Pier 151	33	Pier 137
4	Pier 169	19	Pier 150	34	Pier 136
5	Pier 168	20	Pier 149	35	Pier 135
6	Pier 167	21	Pier 148	36	Pier 134
7	Pier 166	22	Pier 147	37	Pier 133
8	Pier 161	23	Pier 146	38	Pier 132
9	Pier 160	24	Pier 145	39	Pier 131
10	Pier 159	25	Pier 144	40	Pier 130
11	Pier 158	26	Pier 143	41	Pier 129
12	Pier 157	27	Pier 142	42	Pier 128
13	Pier 156	28	Pier 141	43	Pier 127
14	Pier 155	29	Pier 140	44	Pier 126
15	Pier 154	30	Pier 139	45	Pier 125

Table 1 continued. REL Pier Numbers

No.	Pier Number	No.	Pier Number	No.	Pier Number
46	Pier 122	86	Pier 82	126	Pier 37
47	Pier 121	87	Pier 81	127	Pier 36
48	Pier 120	88	Pier 80	128	Pier 35
49	Pier 119	89	Pier 79	129	Pier 34
50	Pier 118	90	Pier 78	130	Pier 33
51	Pier 117	91	Pier 77	131	Pier 32
52	Pier 116	92	Pier 76	132	Pier 31
53	Pier 115	93	Pier 75	133	Pier 30
54	Pier 114	94	Pier 74	134	Pier 25
55	Pier 113	95	Pier 73	135	Pier 24
56	Pier 112	96	Pier 72	136	Pier 23
57	Pier 111	97	Pier 71	137	Pier 22
58	Pier 110	98	Pier 70	138	Pier 21
59	Pier 109	99	Pier 69	139	Pier 20
60	Pier 108	100	Pier 68	140	Pier 19
61	Pier 107	101	Pier 67	141	Pier 18
62	Pier 106	102	Pier 66	142	Pier 17
63	Pier 105	103	Pier 65	143	Pier 16
64	Pier 104	104	Pier 64	144	Pier 15
65	Pier 103	105	Pier 63	145	Pier 14
66	Pier 102	106	Pier 62	146	Pier 13
67	Pier 101	107	Pier 61	147	Pier 12
68	Pier 100	108	Pier 60	148	Pier 11
69	Pier 99	109	Pier 59	149	Pier 10
70	Pier 98	110	Pier 58	150	Pier 9
71	Pier 97	111	Pier 57	151	Pier 8
72	Pier 96	112	Pier 56	152	Pier 7
73	Pier 95	113	Pier 55	153	Pier 6
74	Pier 94	114	Pier 54	154	Pier 5
75	Pier 93	115	Pier 53	155	Pier 4
76	Pier 92	116	Pier 52	156	Pier 3
77	Pier 91	117	Pier 51	157	Pier 2
78	Pier 90	118	Pier 50		
79	Pier 89	119	Pier 49		
80	Pier 88	120	Pier 48		
81	Pier 87	121	Pier 47		
82	Pier 86	122	Pier 41		
83	Pier 85	123	Pier 40		
84	Pier 84	124	Pier 39		
85	Pier 83	125	Pier 38		

The scope of work includes the grounding of the lighting brackets located on the 13 straddle bents. Table 2 lists the various straddle bent numbers.

Table 2. REL Straddle Bent Numbers

No.	Straddle Bent Number	No.	Straddle Bent Number
1	165	8	43
2	164	9	42
3	163	10	29
4	162	11	28
5	46	12	27
6	45	13	26
7	44		

The scope of work includes the grounding of the lighting brackets located on the abutments. Table 3 lists the abutment number.

Table 3. REL Abutment Numbers

No.	Abutment Number
1	1

## **PIER WORK**

The pier work includes the installation of a new ground bus bar and connection to the common ground within the existing Junction Box Δ inside the bridge deck. Provide an insulated ground wire from the ground bus bar located within the existing Junction Box Δ to a new ground bus bar in a new pier mounted junction box. Figure 1 shows the location of the existing Junction Box Δ. Figure 2 shows the existing splices, proposed ground bus bar, and the ground wire in Junction Box Δ.

Figure 1. JUNCTION BOX INSIDE THE BRIDGE DECK

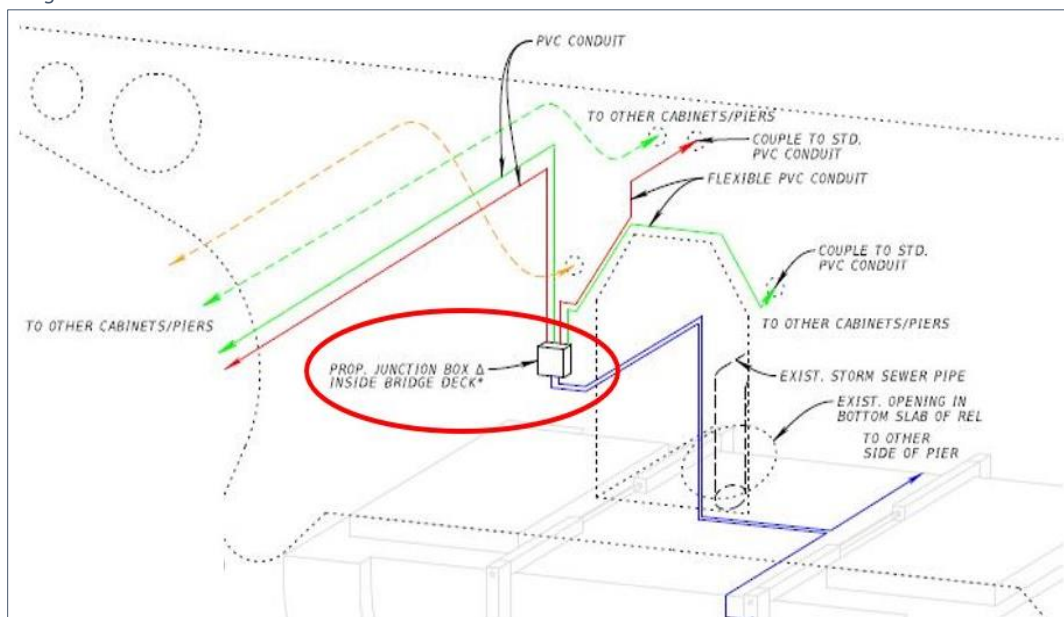
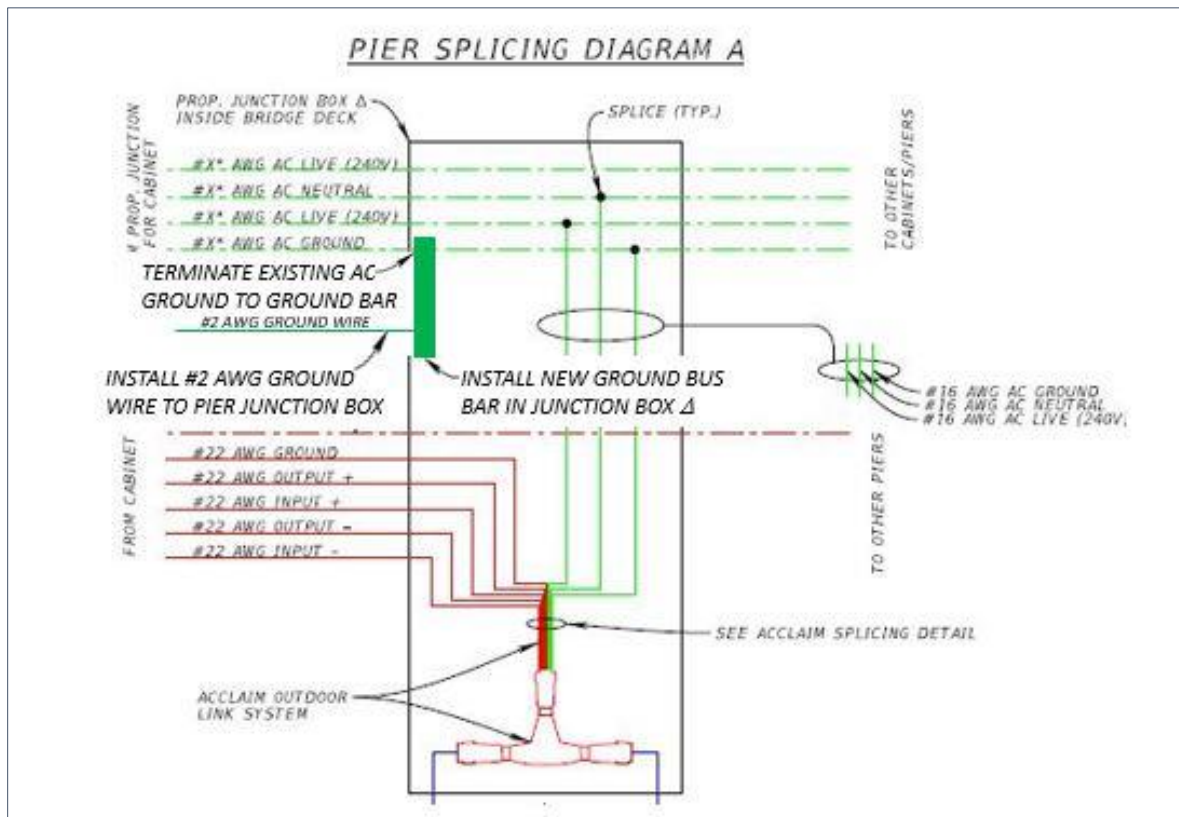


Figure 2. EXISTING SPLICES INSIDE THE JUNCTION BOX



At each pier, install ground straps from each bracket arm to the ground bus bar in the new junction box. In addition, install a 1" conduit with a #2 AWG ground wire from the ground bus bar in the new junction box to the new pull box and new ground rod at the base of the pier. See Figures 3 through 6.

All proposed exposed conduits (flexible and rigid) as shown in Figures 2, 3, 5 and 6 shall be supported with two-hole conduit straps attached to surfaces with wall anchors and screws. Supporting of proposed exposed conduits shall be in accordance with The National Electric Code (NEC) and Florida Department of Transportation, July 2022 Standard Specifications for Road and Bridge Construction, Section 630.

Figure 3. GROUND WIRE ROUTING UPPER PIER

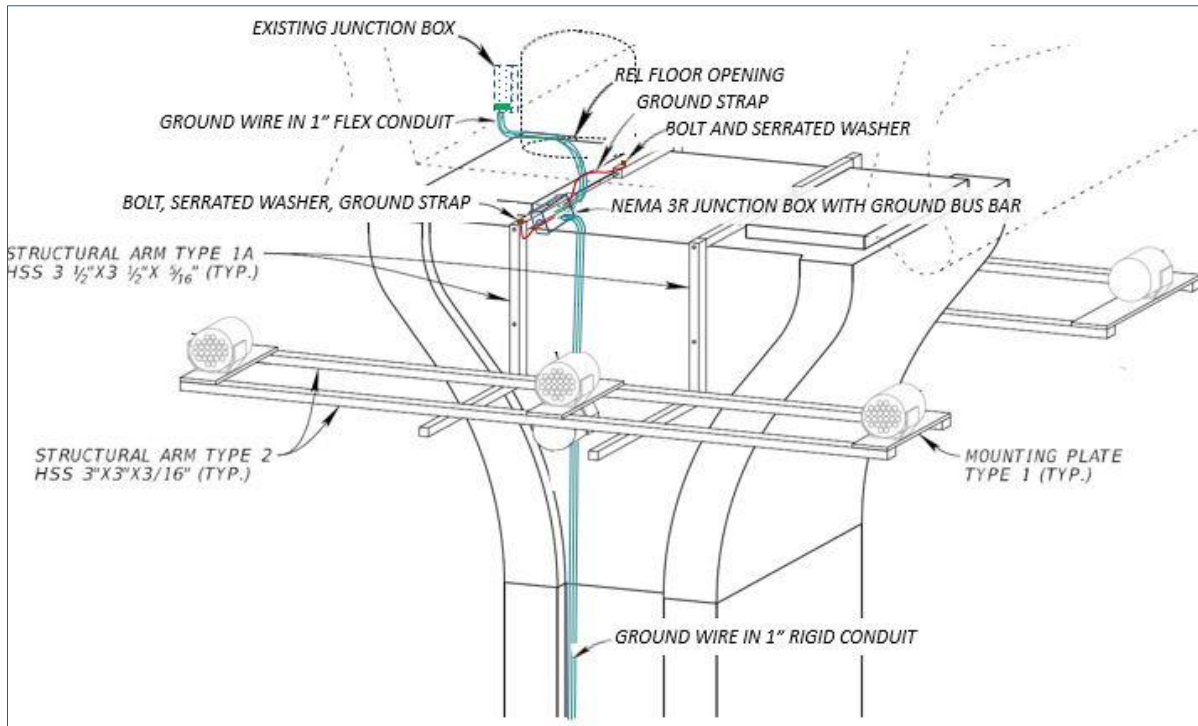


Figure 4. GROUND WIRE ROUTING LOWER PIER

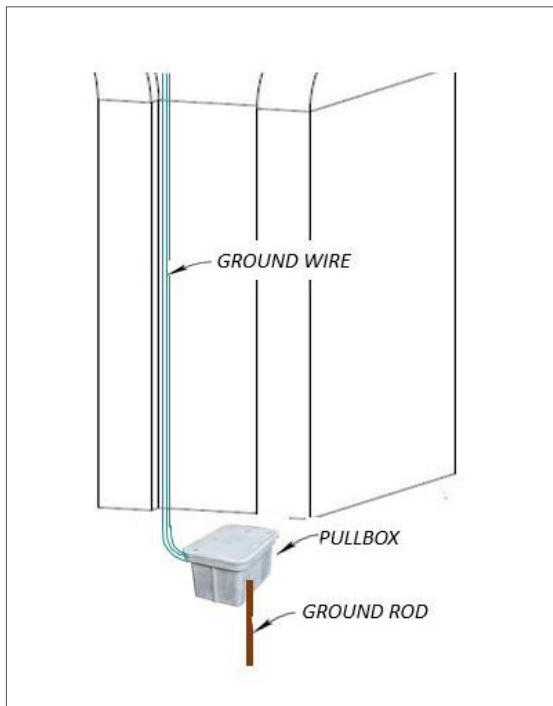




Figure 5. GROUND WIRE ROUTING SECTION VIEW

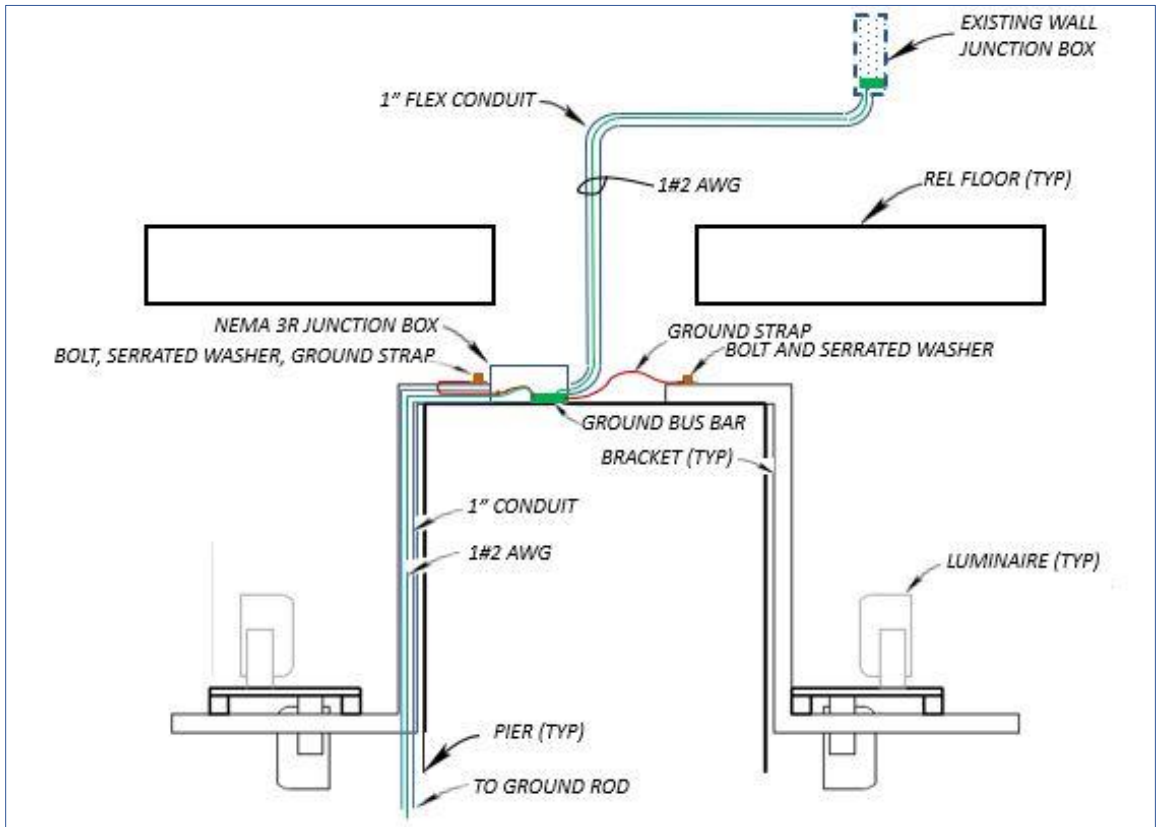
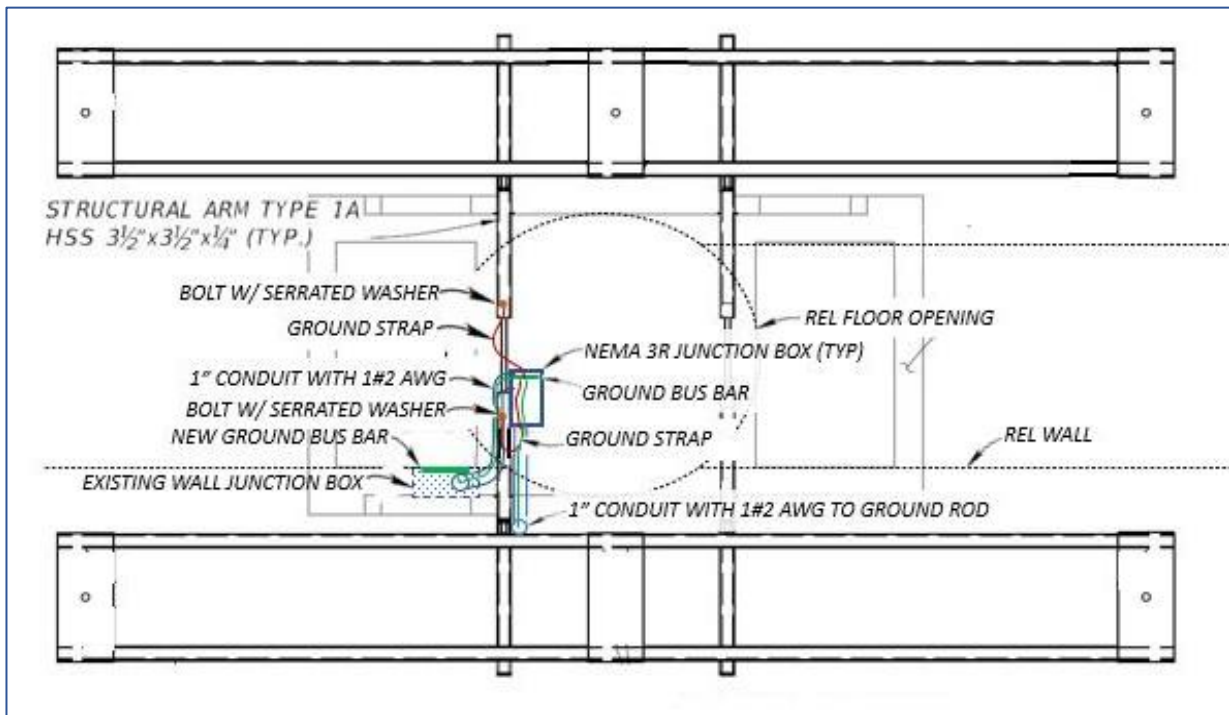


Figure 6. GROUND WIRE ROUTING PLAN VIEW



## **STRADDLE BENT WORK**

The straddle bent work includes the connection of ground straps from bracket arms to the common ground located in the existing junction box. Install a new junction box with a ground bus bar at one of the legs of the straddle bent. Install a 1" conduit with a #2 AWG ground wire from the junction box to the pull box and ground rod at the base of the straddle bent leg. Install a 1" conduit with a #2 AWG ground wire from the luminaire on the opposite leg to the new junction box ground bus bar. Install a 1" conduit with a #2 AWG ground wire from the straddle bent arm bracket to the new junction box ground bus bar. Install a ground strap from the near side luminaire to the junction box. See Figures 7 through 10.

All proposed exposed conduits (flexible and rigid) as shown in Figures 7 through 11 shall be supported with two-hole conduit straps attached to surfaces with wall anchors and screws. Supporting of proposed exposed conduits shall be in accordance with The National Electric Code (NEC) and Florida Department of Transportation, July 2022 Standard Specifications for Road and Bridge Construction, Section 630.

Figure 7. STRADDLE BENT GROUND WIRE ROUTING

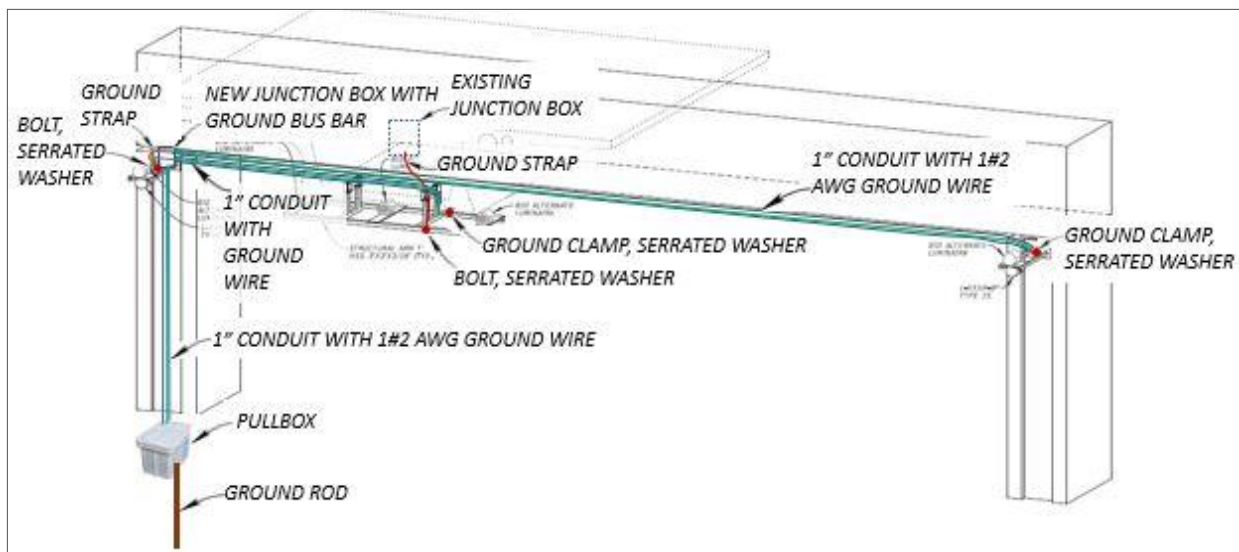


Figure 8. STRADDLE BENT ARM BRACKET GROUND WIRE ROUTING

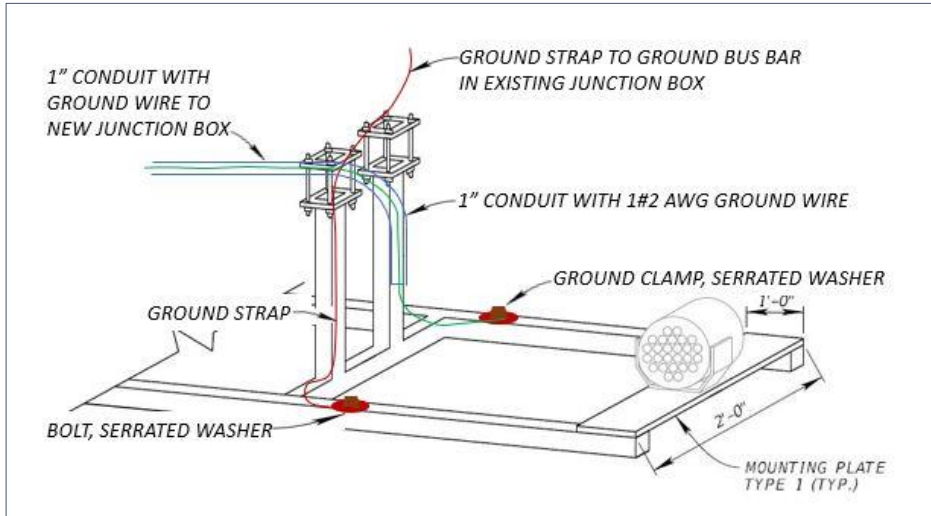


Figure 9. STRADDLE BENT ARM GROUND WIRE ROUTING

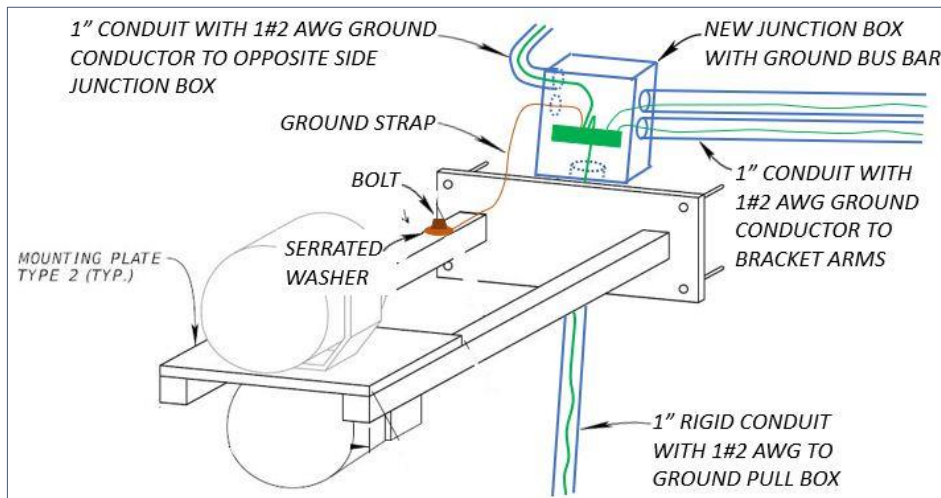
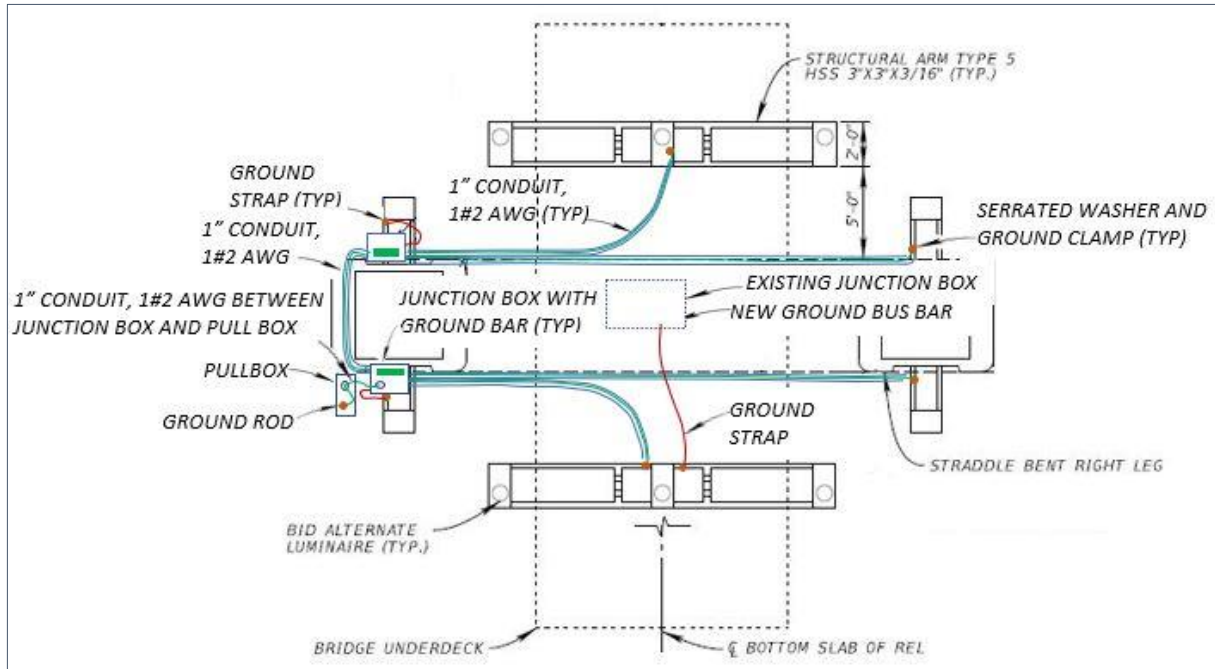


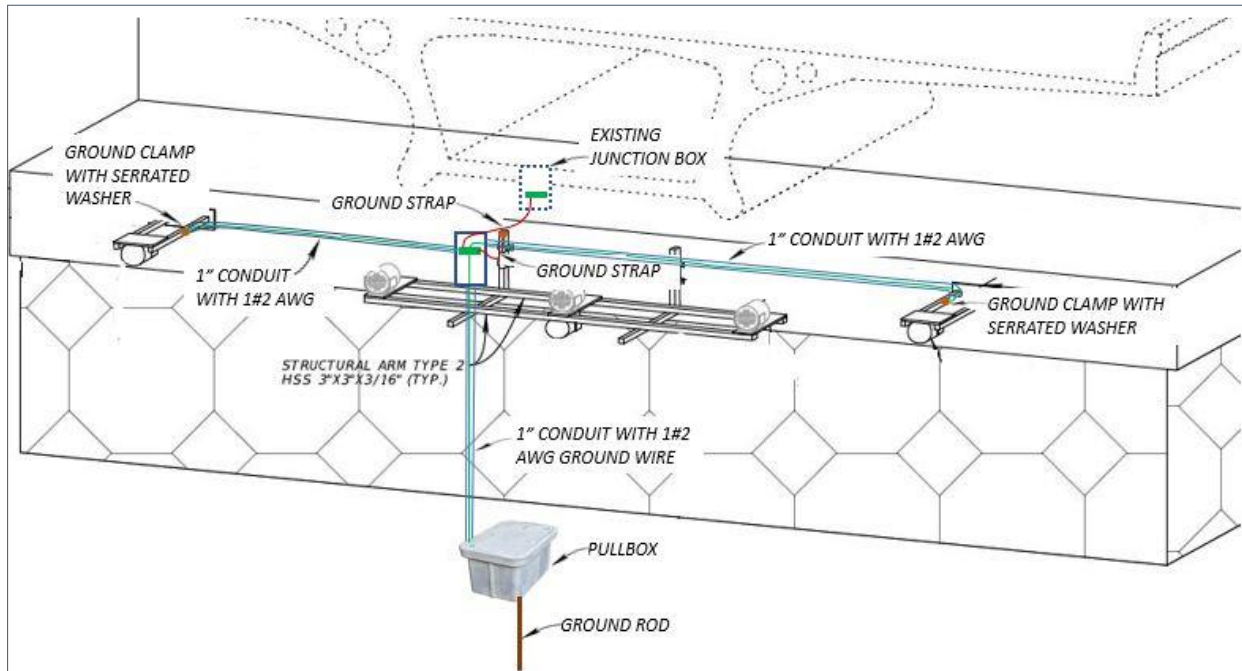
Figure 10. STRADDLE BENT GROUND WIRE ROUTING PLAN VIEW



**ABUTMENT WORK**

The abutment work includes the installation of a new junction box containing a ground bus bar. Install a new ground bus bar in the existing junction box and connect the existing AC ground circuit. Connect both ground bus bars with a ground strap. Install a 1” conduit and insulated ground wire from the bracket arms to the ground bus bar in the new junction box. Install a 1” rigid conduit and a #2 AWG ground wire from the new junction box to the pull box and ground rod at the base of the abutment. See Figure 11.

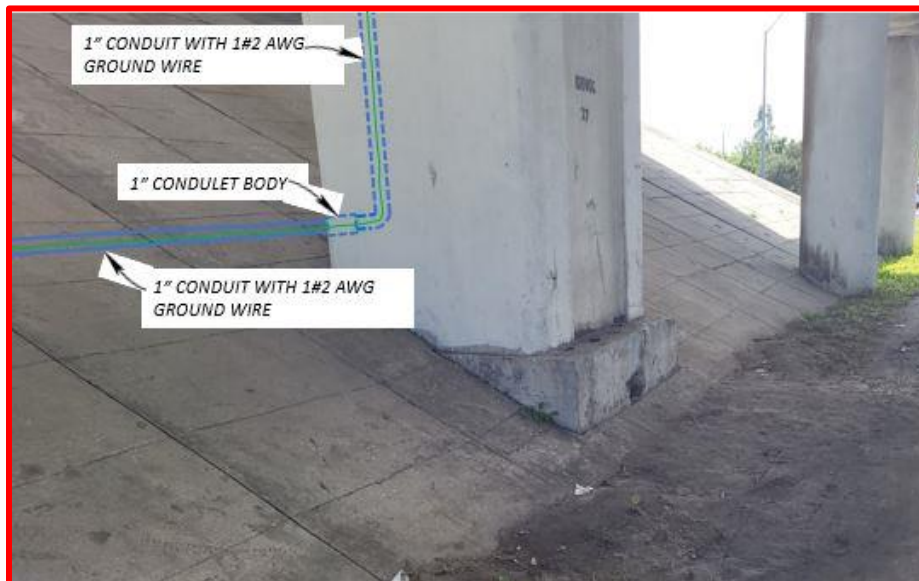
Figure 11. ABUTMENT GROUND WIRE ROUTING



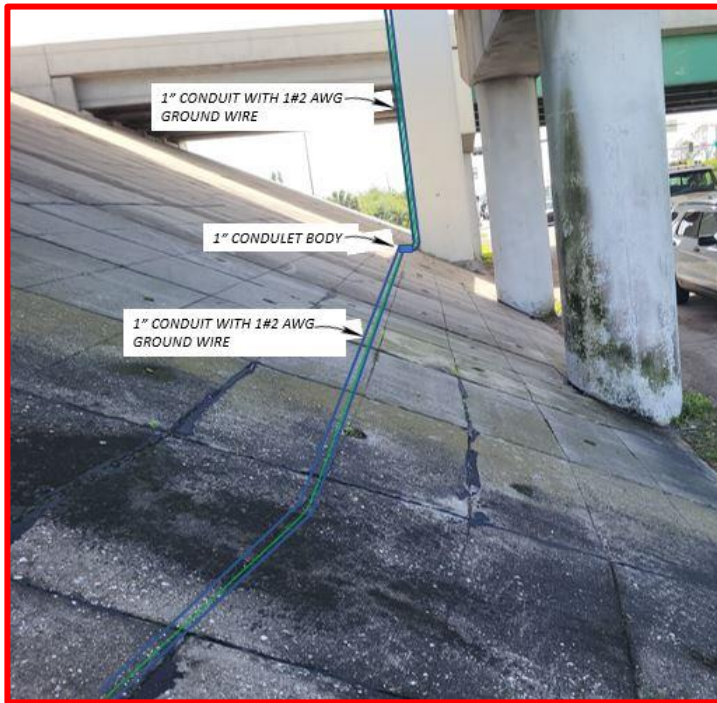
### WORK ADJACENT TO SIDEWALKS

For piers that abut sidewalks, run conduit horizontally on the slope pavement to the pull box installed in the grass area. Do not sawcut slope pavement or sidewalk. Use Unistrut and a bracket to mount the conduit. Do not block drainage outlets. See Figures 11A through 11C.

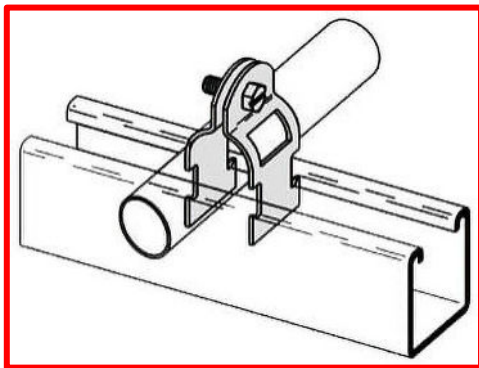
Figure 11A. VERTICAL CONDUIT TO HORIZONTAL CONDUIT TRANSITION



**Figure 11B. Horizontal Conduit on Slope Pavement**



**Figure 11C. Unistrut and Bracket for Conduit**



**GROUND CLAMP, GROUND STRAP, AND SERRATED WASHER INSTALLATION**

The ground wire and ground strap shall be terminated to the bracket arms with a connection mechanism that penetrates the powder coating to create the electrical grounding desired. Ensure that a proper electrical contact is achieved between the ground clamp, ground strap connector, serrated washer, and the bracket arm. See Figures 12 and 13.

Figure 12. GROUND CLAMP WITH SERRATED WASHER

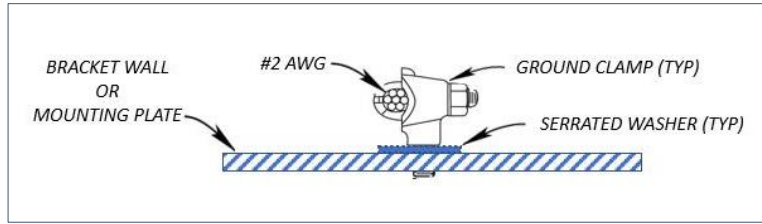
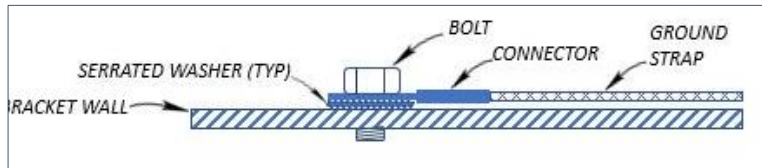


Figure 13. GROUND STRAP WITH SERRATED WASHER



At each ground clamp and ground strap, measure the resistance of the connection mechanism once grounding has been achieved and provide a reading at each termination point for each pier, straddle bent, and abutment. The resistance of the connection shall be 0.1 ohms or less. Submit the results of testing to the Engineer for approval. The following testing procedure is being suggested:

- Scratch off a 1/8” x 1/8” area of paint from the bracket arm near the threaded rod opening or at the top of the mounting plate.
- Use an ohmmeter to measure the resistance between the ground clamp and the bare area of the bracket arm or mounting plate.
- Repair the scratch using an approved powder coating repair procedure.

The Contractor may propose a less invasive method of resistance testing.

**GROUND ROD INSTALLATION, INSPECTION, AND ADJUSTMENT**

Install a ground rod pull box at the base of each pier, straddle bent leg, or abutment, as described in Indexes 641-020 and 649-020. Install grounding in accordance with Section 715. Obtain a minimum resistance as required in 620-3.2.1. Conduct fall-of-potential testing in accordance with 620-4.1. Submit the test results and documentation to the Engineer for approval.

At the 11 load center locations, inspect and test, using the clamp-on ground resistance method, the existing ground system in accordance with 620-4.1. Submit the test results and documentation to the engineer.

Table 4. Load Center Name and Location

No.	Load Center Name	Location	Destination
1	AA	120+41.36	Pier 166
2	BB	141+98.65	Pier 151
3	CC	168+76.17	Pier 131

4	DD	209+43.47	Abutment 123
5	EE	218+76.06	Pier 121
6	FF	239+90.73	Pier 107
7	GG	266+27.25	Pier 88
8	HH	292+25.17	Pier 69
9	II	320+21.81	Pier 49
10	JJ	345+97.30	Pier 30
11	KK	373+98.67	Pier 10

### **AS-BUILT DOCUMENTATION**

Take photos of the termination point at the bracket arms, mounting plates, and of the termination inside the junction box and pull box. Additionally, take photos of the pull box and ground rod installation at the piers, straddle bents, abutment, and the load centers.

Provide As-Built drawings of the installation.