6300000 CONDUIT
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Stefanie Maxwell
414-4314

Comment: (11-29-12)

1. 630-2.4 Warning Tape: Add highlighted text (for clarification) as follows:

630-2.4 Warning Tape: *Ensure that the buried cable warning tape is flexible, elastic material 3 inches wide, 6 mil* ***(0.006 inches)*** *thick, intended for burial and use as an underground utility warning notice~~.~~*

Response: This measurement terminology (x mil) is used in other sections of the specs. We do not think adding the suggested language adds any value.
No change made.

2. 630-3.1 General: Change (highlighted) 13th paragraph as follows, as this is old language:

When backfilling trenches in existing pavement, use ~~a commercially available sand-cement (approximately 10:1 mix ratio)~~*flowable fill meeting the requirements of Section 121*.

Response: Suggested language will be added to spec.
Change made.

3. 630-3.9 Fiber Optic Cable Locate Wire: Change (highlighted) 1st paragraph as follows:

630-3.9 Fiber Optic Cable Locate Wire: *Install locate wire in the trench or bore with all underground conduits to provide end-to-end electrical continuity for electronically locating the underground conduit system. Bury locate wire along the centerline of the top outer surface of installed conduit~~, as shown in the Plans, or as directed by the Engineer. Install locate wire in the trench or bore with all underground conduits to provide end-to-end electrical continuity for electronically locating the underground conduit system.~~ Do not install locate wire in a conduit with fiber optic cable.*

Response: Suggested language will be added to spec.
Change made.

4. 630-3.10(3) Route Markers: Do we need to say this (highlighted text)?

3. Markers are placed at a 1 foot offset from the conduit system or as shown in the Plans.~~Ensure that markers are set within the right of way.1.~~

Response: Highlighted text will be deleted.
Change made.

5. 630-4.2 Furnish and Install: (see Comment 2, above) Add highlighted text as follows:

630-4.2 Furnish and Install: The Contract unit price per foot of conduit, furnished and installed, will include furnishing all hardware and materials *and all testing* as specified in ~~the~~ *this*

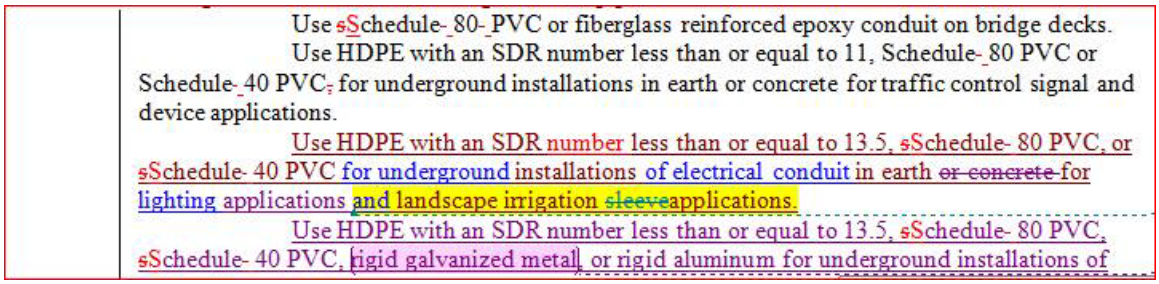
Section and the Contract Documents, and all labor, trenching, *boring,* backfilling, *flowable fill,* and restoration materials necessary for a complete and accepted installation.

Response: Suggested language will be added to the spec.
Change made.

Comment: (1-11-13)
Chester and I had a teleconference with Jeff Caster and the District Landscape Architects on 1/8/13 to discuss deleting Index 591 (Landscape Irrigation Sleeves). We discussed the following:

- Whether there were any true savings to installing a sleeve with concrete monuments and steel markers ahead of the landscape project when the landscape contractor would have to hire a subcontractor to install the rest of the irrigation on the project, which would most likely include directional boring.
- The practicality of digging out a trench at the capped location in order to populate the irrigation sleeve with the irrigation pipe.
- The potential for modifications to the landscaping which could make the location of the sleeve location infeasible.
- The potential for damage to the landscaping sleeve if installed ahead of time.

The District Landscape Architects agreed to delete Index 591, but requested that we include language in Section 630 to cover conduit if an irrigation system is installed. I suggest that we add the highlighted text to the spec below:



Use ~~s~~Schedule 80 PVC or fiberglass reinforced epoxy conduit on bridge decks.

Use HDPE with an SDR number less than or equal to 11, Schedule 80 PVC or Schedule 40 PVC, for underground installations in earth or concrete for traffic control signal and device applications.

Use HDPE with an SDR number less than or equal to 13.5, ~~s~~Schedule 80 PVC, or ~~s~~Schedule 40 PVC for underground installations of electrical conduit in earth ~~or concrete~~ for lighting applications and landscape irrigation ~~sleeve~~applications.

Use HDPE with an SDR number less than or equal to 13.5, ~~s~~Schedule 80 PVC, ~~s~~Schedule 40 PVC, rigid galvanized metal, or rigid aluminum for underground installations of

Also, Developmental Spec Section 590 will need to reference Section 630 for conduit and be reviewed along with the Developmental Design Standard for any other changes that may be necessary due to this change.

Response: Agree, highlighted text will be added to 630-3.1. (Dev Spec 590 is not in the scope of this revision.)
Change made.

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Debbie Toole
414-4114

Comment: (12-5-12)
630-5 Basis of Payment, paragraph 5: Is this really necessary? We direct the Contractor in 630-3 to install in accordance with Section 555, which already states this requirement.

No payment will be made for underpavement/directional bore until a Bore Path Report has been delivered to the Engineer.

555-6 Compensation

No ~~payment~~ *compensation* will be made for directional boring until a Bore Path Report has been delivered to the Engineer

Response: Language will be deleted from spec.
Change made.

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Gordon Wheeler
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Comment: (12-7-12)
1. 630-2.1 Conduit: I suggest revising the first sentence of 630-2.1 to : "Use materials that meet the following industry standards."

Response: The language already implies this.
No changes made.

2. 630-2.1 Conduit, footnote #1: I believe the term is "solvent weld" type slip-fit instead of solvent type slip fit.

Response: Agree. Change made.

3. 630-2.2 Locate Wire: I suggest adding "or copper clad" conductor.

Response: We feel copper wire would last longer than copper clad wire.
No changes made.

4. 630-2.3 Locate Wire Grounding Unit, (# 2): I suggest changing it to read …after the unit has "been" grounded to dissipate….

Response: Agree.
Change made.

5. 630-2.4 Warning Tape, (2nd sentence): I suggest it to read: …and has "the repeating message" "CAUTION: FDOT CABLE",…

Response: Agree.
Change made.

6. 630-3.1 General (8th paragraph): change degree to degrees.

Response: Agree.
Change made.

7. 630-4.2 Furnish and Install: The second paragraph is incomplete.
Is the second paragraph of 630-4.2 needed? It looks like the next paragraph repeats the same info.

Response: This has been corrected.
Change made.

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Bob Dion
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Comment: (12-10-12)
1. Suggest you delete 'in' from the first sentence of the second paragraph of 630-4.2, changing the wording to: 'Payment for conduit placed underground will be based on the linear feet installed.'

Response: This now reads “Payment for conduit placed underground…..”.
Change made.

However; there are two methods for payment. For **underground and directional bore** it is the horizontal length between pull boxes, with no allowance for sweeps. For **bridge mounted or other aboveground mounted**, it is the actual length of conduit installed.
No changes made.

2. There seems to 2 methods of measurement for underground conduit. The second paragraph of 630-4.2 is the linear length of conduit installed; the third paragraph is based on the length of trench or bore measured between pull boxes. Can the first sentence of the third paragraph be deleted?

Response: This has been corrected.
Change made.

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Chris Sweitzer
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Comment: (12-18-12)
630-1: Suggest changing "Plans" at the end to "Contract Documents" as some conduit is not shown in the plans but is detailed in the Design Standards (such as vertical conduit on sign structures and power services), and may be referred to in a TSP or MSP.

Response: Agree. “Plans” will be changed to “Contract Documents”.
Change made.

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Jennifer Williams
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Comments: (12-26-12)
Add the requirement for Contractors to provide Global Positioning System (GPS) coordinates of underground or other infrastructure. Due to current and future advancements to the satellite based GPS and procedures of other Federal and State entities the requirement for GPS and Geographic Information System (GIS) should be required by State Specification for all future projects. An exception could be defined requiring the FDOT Project Manager to authorize total or partial exemption from the guidance.
Several machine manufactures offer GPS as an integrated, on board tool to increase work accuracy. GPS could provide a mechanism to allow quick locates after events such as hurricanes

and other weather or natural events (fires, etc.) where markers or other identification is damaged or destroyed (including mower strikes on markers). GPS would enhance plan sets and aid other contractors when additional projects are being advertised, construction phase begins, etc. Central Office is building a database for ITS and other FDOT infrastructure (fiber, electrical, etc.) that includes GPS locations. Our District Survey and Mapping group also has the ability and has provided GPS based interactive maps when the data is available.

Response: At this time, we are only doing this for special projects. (A team comprised of members from CO Construction, Roadway Design, Traffic Operations, Specifications, and Survey and Mapping has been investigating potential improvements to as-built requirements in 611-2.3.1, including use of GPS and statewide repositories for such information. Your comment has been noted for consideration as part of that activity.)
No change made.

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Rudy Hoyos
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Comment: (12-28-12)
1. 630-3.1: HDPE and PVC should also be options for underground power service installations. If run to power pole needs to be bored it will be HDPE.

Response: The spec already allows this.
No change made.

2. 630-5: Add the highlighted text.

No additional payment will be made for multiple conduits in the same trench when bored.

Response: Disagree. This also applies to trenched conduits.
No change made.

3.630-5 Basis of Payment: DO NOT CHANGE THE PAY ITEM TO 630-2. LEAVE AS 630-1. This should be stressed.

Payment will be made under:

Item No. 630- *2*~~1~~- Conduit - ~~per foot~~*LF*.

Response: When we change the method of measurement/basis of payment for an item, we always use a new pay item. This is done to prevent miscalculation of cost history in current estimating systems.
In this case, the old specification paid for multiple conduits in the same trench; new paragraph 4 of 630-5 does not reimburse the Contractor for the additional conduit material.
No change made.

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D4 Construction

Comment: (1-2-13)
1. 630-2.1: Hot dipped galvanizing coating text; how is the actual vs specified coating thickness/weight to be determined, i.e. is the contractor or manufacturer supposed to conduct tests and or certify?

[3]Use conduit that is hot-dipped galvanized *with a minimum coating of 1.24 o~~z~~unces~~/~~ per ~~ft~~[2] square foot on both the inside and outside of the conduit.* ~~, with both ends reamed and threaded~~*The weight of the zinc coating shall be determined using ASTM* ~~-~~ *A90*.

Response: This requirement is 630-2 Materials, which is directed to both the manufacturer and the Contractor. Therefore, the manufacturer must certify that the conduit conforms to the spec requirements and the Contractor must ensure that the conduit that he (Contractor) installs on the project has been certified by the manufacturer as conforming to the spec requirements.
No change made.

2. 630-2.5: Second paragraph, last sentence; suggest deleting the text and the sentence after the word "deteriorate".

Ensure that each SRM is labeled and identified as an FDOT fiber optic cable marker unless otherwise shown in the ~~p~~Plans. ~~Ensure that~~ The labels must include the Department's logo, contact information for the local FDOT District, and a telephone number to call prior to any excavation in the area. Ensure that the identification information is permanently imprinted on the top fitting, and will not peel, fade, or deteriorate ~~with prolonged exposure to the typical roadside environmental hazards. Ensure that all route markers used on the project are new and consistent in appearance.~~

Response: Agree. Change made.

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Cheryl Hudson
414-5332

Comment: (1-2-13)
1. 630-3.1 General, paragraph 4 states: "Use Schedule 80 PVC or fiberglass reinforced epoxy conduit on bridge decks." Suggest the sentence/paragraph be replaced with: "*Use Schedule 80 PVC conduit in structural elements in or on bridges.*"

Index 21210 requires Schedule 80 PVC in bridge decks and traffic railings. The fiberglass reinforced epoxy conduit has a history of UV degradation; therefore we do not recommend it be used on or in any structure. Additionally, we are not familiar with any conduit placed "on" bridge decks. Galvanized steel may be used when attached to the bridge (if required by the utility and approved by the EOR or Bridge Maintenance).

Response: Agree. Change made.

2. 630-3.1: "Use HDPE with an SDR number less than or equal to 13.5, Schedule 80 PVC, Schedule 40 PVC, rigid galvanized metal, or **rigid aluminum** for underground installations of electrical conduit **in concrete** for lighting applications." Suggest "**or rigid aluminum**" be deleted. Aluminum should not be installed in direct contact with concrete due to corrosion. For more information contact State Materials Office (SMO).

Response: Agree. Change made.

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Bert Woerner
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Comment: (1-7-13)
Basis of payment section of 630: Should 555-6 and 556-6 be referenced for the bore path reports requirements.

Response: No; Sections 555 and 556 are referenced in 630-3.1, General Installation Requirements.
No change made.

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Jeff Kipfinger
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Comment: (12-7-13)
1. This section is labeled CONDUIT; however, there are many other types of electrical raceways installed on, under, and over Florida's roads, bridges, tunnels, and railways. Recommend expanding this section to cover the other types of raceways or insert a statement such as: "Acceptable raceways are described herein and all other types of raceways are not acceptable."

Response: We understand that conduit is a raceway. However, all FDOT specifications for signals, ITS, lighting and irrigation refers to conduit, not raceways. Additionally, the primary focus of this revision was to consolidate requirements/materials for conduit from other sections to one section.
No change made.

2. Recommend adding specifications on raceway accessories such as conduit bodies, LB's, RB's, device boxes, outlet boxes, cutout boxes, handholes, fittings, wireways, wire troughs, cable trays, busways, gutters, cabinets, meter socket enclosures, etc.

Response: Necessary accessories, not included in Section 630, are covered in other portions of signalization, ITS and lighting specifications. For instance the lighting materials are in Section 992.
No change made.

3. Recommend adding specifications for raceway mounting hardware and raceway structural supports such as unistrut, kindorf, threaded rods, beam clamps, straps, nuts, bolts, etc.

Response: Please see response to your comment #1.
No change made.

4. Recommend inserting the statement: "Plastic or nylon cable ties and tie wraps shall not be installed outdoors."

Response: UV stabilized cable ties and tie wraps have been successfully used in a number of FDOT outdoor applications.
No change made.

5. Paragraph 630-1: The types electrical and communications systems installed on Florida's roads, bridges, tunnels, and railways are too numerous to list, therefore the reviewer suggests removing the list of systems such as traffic control signals and highway lighting.

Response: FDOT Standard Specifications for Road and Bridge Construction are written primarily for the types of work to be performed on Department road and bridge construction projects.
No change made.

6. Paragraph 630-1: Consider removing the reference to “Plans”. The FDOT specifications book is used by many contractors performing maintenance, repairs, upgrades, equipment replacements, and many times there are no “Plans”.

Response: Reference to “Plans” has been changed to “Contract Documents”, as the plans is a component of the Contract Documents. FDOT Standard Specifications for Road and Bridge Construction are written primarily for Department road and bridge construction projects. The specifications direct the method and manner of the performing the work, including labor and material quantity and quality to be furnish. The Plans show the locations, character, dimensions and details of the work.
Change made.

7. Paragraph 630-2.2: Since this section covers CONDUIT, the reviewer recommends removing specifications on Locate Wires, and Wire Grounding Units. Wires, Cable, and WGU’s should be specified in a separate section. This section could possibly contain a statement such as: “Install a buried “locate wire” above underground non-metallic conduits that contain non-metallic cables.”

Response: When installing conduit, locate wires, wire grounding units, WGU’s, etc., are included in the Contract unit price of the conduit, there is no separate payment for these items. Also, please see response to your comment #1.

8. Standard Index drawing 18204 shows the locate wire connected to driven ground rods in each handhole or pull box. Since the locate wires are connected directly to earth in many places, what is the purpose of the WGU? The WGU does not seem necessary.

Response: Design Standard, Index No. 18204 has been incorporated into Index No. 17700. The WGU is a product that is designed to shunt trace wire connections to ground only in the event of an overvoltage condition (so that signals transmitted on the trace wire are not impeded by connection of the wire to ground). The purpose of the WGU is to protect against shock hazard in the event that voltage is induced on the trace wire while personnel or equipment may be in contact with the trace wire.
No change made.

9. Paragraph 630-2.4: Since this section covers CONDUIT, the reviewer recommends removing specifications for Buried Cable Warning Tape from this section. This section could possibly contain a statement such as: “Install buried cable warning tape above the entire length of underground conduits.”

Response: Please see response to your comment #1.
No change made.

10. Paragraph 630-2.5: Since this section covers CONDUIT, the reviewer recommends removing specifications for Route Markers. Underground Cable Markers should have their own specification section.

Response: Please see response to your comment #1.
No change made.

11. Paragraph 630-3.1: There are many different standard index details that show buried conduits and many that show conduits installed on sign structures, CCTV poles, ITS poles, light poles, signal poles, etc., the reviewer recommends removing the reference to Index No. 17721 and No. 21210 and simply stating "FDOT Standard Index".

Response: The language will be revised as follows:

> **630-3.1 General:** Install the conduit in accordance with NEC or National Electrical Safety Code (NESC) requirements *and the Design Standards*. ……

Change made.

12. Paragraph 630-3.1: Recommend specifying HOT DIPPED GALVANIZED Intermediate Metal Conduit.

Response: Footnote #3 in 630-2.1 requires that intermediate metal conduit be hot dipped galvanized.
No change made.

13. Paragraph 630-3.1: Please define "electric power service installation". Does this mean all above ground conduits for the whole electrical power distribution system? Where does the electric power "service" begin and end?

Response: A service assembly which is supplied electrical power service from either an overhead or underground power company source. Please see Section 639 and Design Standards, Index No. 17502 for more information.
No change necessary.

14. Paragraph 630-3.1: The reviewer recommends including SCH 80 Rigid PVC Conduit as acceptable for underground electric utility service lateral installations. The reviewer does not recommend installing Galvanized Rigid Metal Conduit below grade unless it is bituminous coated or PVC coated.

Response: Disagree. We are only referring to the main service point in this sentence. Electrical service beyond the service point is addressed in 630-3.1, paragraph 6.
No change made.

15. Paragraph 630-3.1: Limiting all underground conduit installations to a maximum of 270 degrees of bends between pulling points may be too restrictive. There are many different power distribution systems installed along the roadways. Suggest listing each power distribution system that this 270 degree rule will apply to.

Response: Disagree. No change made.

16. Paragraph 630-3.2. Specifying minimum 2 inch conduit size may be too restrictive. Many systems use smaller conduits such as ITS cabinets, CCTV systems, power to sign lights, power to DMS signs, power to highway advisory radio systems, power to sewage pumps, etc.

Response: The first sentence of 630-3.2 includes the caveat "unless otherwise shown in the Contract Documents". This would apply to the situations you refer to.

No change made.

17. Paragraph 630-3.9. Recommend providing min/max acceptable parameters for the continuity test and insulation resistance tests on locate wires.

Response: This is outside the scope of this revision. If this becomes a problem, we will address it at that time.
No change made.

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