Instructions to designer:

1. Include only applicable notes.
2. Revised April 23, 2026
3. Show date of notes on plans notes sheet.

1. CONTRACTOR RESPONSIBILTY:

1A. MAINTENANCE OF THE EXISTING SIGNAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR FROM THE BEGINNING OF THE PROJECT WHEN THE CONTRACTOR IMPACTS THE SIGNAL.

1B. At the time of inspection of the project, the contractor shall furnish the maintaining agency, City of Orlando Transportation Engineering Division, one (1) copy of equipment warranty documents, one (1) hard copy and one (1) electronic (Adobe Acrobat) copy of maintenance manuals, and three (3) complete sets of as-built plans. One set shall be left in the cabinet. In addition, the contractor shall furnish a completed traceability matrix for all ITS equipment.

1C. These plans reflect conditions known during plan development. In the event actual physical conditions prevent the application of the progression of any work specified in these plans, the contractor shall notify the project engineer and Signal Chief immediately and prior to any further activity. These changes will be in the as-built plans.

1D. No equipment, vehicles or material shall be parked or stored within 30 feet of the roadway carrying traffic during non-working hours. If the above is not possible, a storage area approved by the engineer with proper delineation and advance warning shall be used.

1E. Unless otherwise noted, all removed equipment, except concrete poles, shall be turned over to the City of Orlando Signal Section as directed by the engineer. Concrete poles shall be disposed of by the contractor in areas provided by him.

1F. Existing signalization shall remain in place to the extent possible and shall be used for the maintenance of traffic as required.

1G. Engineer of Record shall be responsible for supplying and ensuring all intersection coordination timings are included in the final plans for newly constructed or modified signalized intersections.

1H. The contractor shall notify the owner (Orange County, FDOT) of any signalized intersection adjacent to intersection being constructed or modified with the nature and schedule of the signal project.

1I. The contractor shall maintain any preemption operation and internally illuminated street name signs at all times.

1J. The contractor shall have an IMSA Level 2 certified technician on call with a maximum of two (2) hours response time. The Project Engineer of record and

Contractor shall provide a local 24-hour telephone number to the City of Orlando Signal Section prior to any construction of signalized location. Once the Engineer of record and Contractor has been notified of an emergency signal trouble call and they have not responded within the specified two (2) hours, the City has the option of responding to the call. If the City responds to an emergency signal trouble call due to lack of response by the contractor within the specified time period, the prime contractor of the project will be billed according to the City of Orlando's Policy #1267.4: Sec. G, Paragraph 8.

1K. Traffic control plans for signal installation: maintain traffic on existing roadway by use of index numbers, published in the Roadway and Traffic Design Standards booklet, and the Manual on Uniform Traffic Control Devices. Most recent publications are to be used as shown in plans. Submit traffic control plans to Traffic Control Manager, (407) 246-2372 for approval.

1L. Refer to FDOT Specifications for any item not specifically addressed.

1M. The contractor shall notify the Traffic Management Center (TMC) a minimum of 24 hours prior to disrupting the Orlando Regional Computerized Signal System (RCSS) communications, making any signal modifications or timing changes that could cause the intersection signals to go out of (or fail) it’s coordination plans at (407) 246-2020.

1N. Integrity of RCSS must be maintained throughout construction and shall be restored within 2 hours of communication disruption, unless approved in advance.

1O. Contractor shall provide City of Orlando Signal Section with a cabinet log at the time of acceptance. Cabinet log shall have all trouble calls and corrective measures at a given location.

1P. Contractor shall not be considered demobilized until final acceptance is received from City of Orlando, Transportation Engineering Division. This includes confirming communications by the City of Orlando Traffic Management Center to all Ethernet based devices.

1Q. Contractor shall be responsible for obtaining all permits necessary for the installation of all signal related equipment.

1R. The contractor shall maintain vehicle detection throughout construction. Aerial detectors are acceptable.

1S. Contractor is to notify the City of Orlando Traffic Signal Maintenance (407-246-2617) and FDOT three (3) business days prior to beginning construction.

1T. The contractor is required to inspect the installation of the traffic signals in accordance with FDOT Specification 105-5.10. The contractor shall coordinate the final acceptance inspection in accordance with FDOT Specification 611-2.2 with the Engineer at least seven business days in advance. The intersection shall be communicating on the City's Traffic Network with any necessary coordination timings prior to any scheduled inspection. FDOT's inspector, John Lilly (386-943-5329) shall also be contacted seven business days before the inspection is to be performed so they may be present.

1U. The policy of the City of Orlando Transportation Engineering Division to issue (1) Cyber key to the contractor.

1) Request for a Cyber key or reprogramming Cyber keys are to be done during normal work hours: the contractor must notify the Orlando Traffic Signal Construction group (5) business days in advance orlando_traffic_signal_construction@orlando.gov.

1V. Contact information for the City of Orlando traffic signal construction:

1) 24-hour emergency contact number: Orlando Traffic Management Center – 4072462020

2) Routine traffic signal construction coordination: the Orlando Traffic Signal Construction mailbox <orlando_traffic_signal_construction@orlando.gov>

2. CONDUIT & PULL BOXES:

2A. Wherever possible all conduit under pavement or sidewalk shall be installed prior to the installation of the base course.

2B. Cabinet conduit requirements will be as follows:

(1) 3"conduit for signal,
(1) 2" conduit for detection (loop lead-ins, video detection, etc.) and other low voltage equipment (Opticom, CCTV, etc.),
(1) 2" spare conduit for low voltage (loop lead-ins, video detection, pedestrian detection etc.),
(1) 3” conduit for communication,
(1) 1" conduit for grounds,
(1) 3" spare conduit for signal,
(1) 3" spare conduit for communications.

Include a 3/8" nylon pull string in each unused and / or spare conduit.

The spare 3-inch conduit for signal shall be provided from the controller cabinet base to the nearest signal pull box, which shall be a minimum of 24”x 36” in size. The spare 3-inch conduit for communications shall be reserved for the RCSS communication cable and brought to the nearest RCSS box available. The spare conduits shall be capped and stubbed.

2C. Completely ring the intersection with conduit. Conduit requirements will be as follows:

(2) 2"conduit for signal,
(1) 2" conduit for detection (loop lead-ins, video detection, etc.) and other low voltage equipment (Opticom, CCTV, etc.),
(1) 2" conduit for street lighting,
(1) 1" conduit for grounds, and
(2) 2" spare conduit.

Provide separate pull boxes and conduit on each corner with separate boxes for detection, signals, communications, and street lighting.

2D. Contractor to provide the following conduit for Mast Arm installations:

1-3" conduit from Signal Pull Box to Mast Arm foundation.
1-2" conduit from Electrical Pull Box to Mast Arm foundation.
1-2" Conduit for detection (video, Opticom, pedestrian other)
1-1" conduit from Signal Pull Box to Mast Arm foundation for grounding,
1-2" spare conduit.

2E. All conduits shall be a minimum of schedule 40.

2F. Install warning tape 8" to 12" above all conduit runs placed in trenches.

2G. Do not install conduit, including innerduct, for fiber optic cable with a bend radius less the manufacturer's recommendation.

2H. Wherever pull boxes are to be installed in decorative sidewalk, the contractor shall install a 6" wide band of concrete surrounding the pull box. The band will act as transition and support and shall be color coordinated with the surrounding area. The City of Orlando may require color coordinated pull boxes as shown in plans.

2I. Lead pull box minimum size requirements will be as follows:

Communication .....24"x 36"
Signal .....24"x 36"
Detection .....13"x 24"
Street lighting .....13"x 24"

2J. No pull boxes shall be allowed in new ramps.

2K. Pull boxes shall be placed at back edge of sidewalk. If there is no curb and gutter, then pull boxes shall be placed at least 10' from the edge of pavement. The distance between pull boxes shall be 400 feet (copper wire) or 1000 feet (fiber optic cable) unless shown in plans. Pull boxes and lids shall be on the QPL. Contractor shall include shop drawings in the materials submittal.

3. CABINET:

3A. Cabinet and controller to be City of Orlando approved equipment, RCSS compatible. The controller shall be the latest version of the Trafficware Commander ATC TS2 Type 2 controller on FDOT roadways, 980 ATC on City roadways with full Ethernet functionality unless otherwise noted in the plans. The cabinet shall be a Type VI, TS2 Type 1 cabinet with a generator disconnect and a built-in emergency generator transfer switch. The additional equipment and accessories for the fiber optic cable interconnect shall be furnished and installed as part of the controller assembly. This shall also include the RCSS communication interface panels.

3B. Placement of traffic cabinets shall be inside the limits of the right of way with no exceptions unless an appropriate easement exists (or being established) for the purpose of the traffic cabinet.

3C. The selected location for the placement of the traffic cabinet shall be away from other utility boxes/equipment, to maximize accessibility and reduce power surge interferences.

3D. Furnish a manual push button cord for all controller cabinets.

3E. Service pad and cabinet base shall be a monolithic pour.

3F. The cabinet door shall open away from the intersection.

3G. The pre-emption equipment to be used at each signal shall be the Opticom GPS kit by Global Traffic Technologies (formerly 3M) as shown in plans. Mount the antenna on the on the top center section of the cabinet top unless indicated otherwise on the plans or directed by the Engineer. Follow manufacturer installation instructions for cabinet mounted antennas and include a clear silicone sealant around the exterior perimeter of the drilled hole and antenna unit. Each Opticom kit shall be able to communicate to the Opticom Central Management System through an Ethernet connection. Include the appropriate interface panel.

3H. Clearly label all cables in cabinet.

3I. Paint the controller cabinet to match the color of the steel signal pole.

3J. Remove the cabinet before core drilling the base.

3K. Provide D-panel (as shown in the plans, if needed).

3L. Do not jumper the neutral and the chassis ground together in the signal cabinet.

3M. Wire electrically powered signs (e.g., Blank Out signs) to go dark during flashing operation. Signs will be powered from the signal buss. Relays will be powered from field terminals.

3N. Internally illuminated street name signs shall remain illuminated during flashing operation.

3O. Traffic cabinets must have a (10) port SDLC hub.

4. LOOPS:

4A. All detectors, loops or system sensors shall be cut into the asphaltic concrete structure course whenever possible. All loop lead-in cable shall be placed in conduit.

4B. The contractor shall notify the Signal Section, Orlando Traffic Signal Construction <orlando_traffic_signal_construction@cityoforlando.net> at least 48 hours in advance of loop cutting.

4C. All saw cuts for loop installation shall be cleaned of dust, dirt, and other debris by air compressor prior to installation of the loop wire or lead-in cable. Place one-quarter inch sealant in the sawcut and then take a blunt object, such as a paddle, to seat wire without damaging it. Brush dust or sand over the sealed saw cut to help cleanup.

4D. All saw cuts shall be sealed with QPL listed sealant or equivalent per materials submittal.

4E. All loop saw cuts shall have only one loop lead-in per saw cut, unless directed otherwise by Signal Chief.

4F. Type "F" loops shall be 6' x 40' and extend 5' past the stop bar, not to extend into the crosswalk.

4G. Type "F" loops for bike lanes shall be modified to 3' x 20'.

4H. Any existing loops damaged during construction shall be replaced by the contractor at no additional cost. Temporary detection will be required whenever repairs cannot be made within 48 hours.

4I. Loop lead-in windows shall be 2” and are to be installed outside the radius.

4J. Any new or existing striping cut because of loop placement shall be restriped prior to acceptance.

5. VEHICLE DETECTION

5A. Vehicle Detection System shall include all necessary equipment to operate aerial vehicle detection devices (transformer, panel, harnesses, terminals, detectors, etc.). Vehicle detection used shall be Wavetronix brand Smart Sensor Matrix or approved equal (as adopted by City of Orlando). Vehicle detection rack shall be sized appropriately to accommodate all necessary hardware. Detection equipment shall be installed per manufacturer instructions.

5B. The Contractor shall notify the Signal Section at Orlando Traffic Signal Construction <orlando_traffic_signal_construction@cityoforlando.net> at least 24 hours in advance of installing video detection so the City may observe their installation.

5C. Mounting height as recommended by the manufacturer and approved by the Engineer. Prior to installation, camera placement shall be approved by manufacturer.

5D. GridSmart units, where called for in plans for FDOT roadways, will include the Data Module and Communication Module to enable live video feeds. These units are not to be used for intersection detection.

5E. Systems shall only require one IP address. All units shall have their own #6 ground attached to the span/mast arm ground rod.

6. SIGNAL:

6A. The contractor shall verify color codes for signal cable, interconnect cable and service cable with Signal Chief at the City of Orlando Traffic Signal Maintenance Section before ordering. Wiring diagrams shall be approved by the City of Orlando Traffic Signal Maintenance Section.

6B. Wherever applicable, during traffic signal flashing operation, the red arrow indication of all 3 section left turn heads shall be the flashing indication displayed.

6C. All signal assemblies shall be 12" black cast aluminum with tunnel visors and retroreflective backplates.

6D. Separate cables to be installed for each signal movement.

6E. All signal displays shall be L.E.D. Red, Yellow, Green, and Arrows.

6F. Signal cable splicing is only allowed in steel poles with oversized hand holes with fixed splice blocks on FDOT roadways only.

6G. Provide blue LED confirmation lights for all signalized movements. *[Note to designers: may delete this note if the plans show confirmation lights.]*

7. ELECTRICAL SERVICE REQUIREMENTS:

7A. All electrical service connections shall not be spliced.

7B. Grounding electrode ground readings shall be 25 ohms or less and follow FDOT Ground readings log to be provided as part of as-built plans. All grounding shall be installed per FDOT standards.

7C. Grounding electrode readings for ITS and Detection equipment shall be 5 ohms or less. Provide grounding readings as part of as-built plans.

7D. The city's preference is Square "D" electric service disconnect/Load centers, equipment and hardware.

7E. Do not install meter bases on electrical services if OUC is utility power provider.

7F. Color code service cable as follows (No marking/phase tape will be accepted):

- White: AC neutral
- Black: AC positive
- Green: Ground

7G. The service disconnect/load center shall be located on a concrete pole adjacent to the controller cabinet as shown in plans, unless approved by the City. A second service disconnect/Load center is required at power source if power source is greater than 250 feet from the controller cabinet. Four spare breaker slots must be maintained at all times for any service disconnect/Load center installed.

7H. Ground wires shall be bonded around the intersection to form a grounding array. The cabinet ground rod shall be in a separate pull box and not incorporated into the cabinet base. Intersection grounding array is NOT to be pulled into the traffic signal cabinet and the signal cabinet grounding is NOT to be included in the intersection grounding array.

7I. All grounding requirements for solar powered equipment installations must match A/C powered grounding requirements (i.e. grounding rod, grounding wire, pull box, etc) to accommodate future conversion.

8. INTERNALLY ILLUMINATED STREET NAME SIGNS:

8A. The contractor shall install and test in place the internally illuminated street name signs to City of Orlando staff's approval and are required to "burn-in" for 60 days before final acceptance. This burn-in will begin with intersection burn-in.

8B. Internally illuminated street name signs shall meet the City of Orlando specifications and references to text shall be upper and lower case.

8C. All internally illuminated street name signs shall be controlled by one photocell per intersection, mounted on the service disconnect.

8D. The internally illuminated street name signs shall have a separate breaker installed in the service disconnect.

8E. All internally illuminated street name signs shall be double sided, unless shown in plans.

8F. Internally illuminated street name signs will be free-swinging under the signal arm unless the arm is not perpendicular to the travel lane, or the arm is too low. Mount the sign to a separate arm in those cases.

8G. Use internal LED light engines to light the sign.

9. PEDESTRIAN SIGNAL:

9A. Push buttons to be listed on the FDOT APL.

9B. Pedestrian push button signs are to be included within unit price for pay item 665-11.

9C. Pedestrian signals are to be Countdown LED (filled, not outline), low-profile, universal symbols with egg crate visors. (semi-gloss Black cast aluminum).

9D. Contractor shall provide a separate cable to each pedestrian movement per corner from the signal cabinet. Daisy chaining of pedestrian signal cables are NOT allowed.

9E. Mount pedestrian detector and sign perpendicular to the pedestrian’s path along the crosswalk so that the arrow on an audible pedestrian detector points pedestrians to the crosswalk. (APS)

9F. Program audible pedestrian signals accordingly:

Where push buttons are at least 10 ft apart:

- Push button locator tone during flashing and steady DON'T WALK followed by rapid tick walk indication during WALK.

Where push buttons are less than 10 ft apart or their locations would cause concern:

- Push button locator tone during flashing and steady DON'T WALK followed by speech walk indication during WALK. Speech walk indication

would be "<name of street to be crossed> <pause> walk sign is on to cross <name of street to be crossed>."

All locations:

- Extended push button during flashing and steady DON'T WALK indicates the name of the street to be crossed: "wait <pause> to cross <name of street to be crossed> <pause> wait."

Beaconing is not appropriate at locations with free right turns or split phases.

9G. Mount pedestrian pedestals on transformer bases. Do not use bases with slip fittings.

9H. Include directional arrow with R10-3i (signalized pedestrian crossing sign). *[Note to designers: may delete this note if the plans show R10-3i.]*

10. POLES:

10A. The contractor shall notify the appropriate utility provider at least 48 hours in advance of pole setting operations where a conflict with overhead electrical conductors is expected and, in all cases, where joint use poles are used.

10B. The standard mast arm details are for informational purposes only, the contractor is responsible to provide all structural and foundation design for non-QPL poles. Contractor shall provide shop drawings to the City.

10C. All mast installations shall include Cooper Lighting Solutions shoebox type fixture (model number USSL-C029-D-U-T3-SA-X-4N7) with a twist-lock long life photo control (all luminaires). Install a shorting cap (DTL #D-SHORT-VBK J50) and provide photocell to the Signal Shop in cases where the lighting circuit is centrally controlled. Fixture shall be the same color as the signal support structure. The contractor must obtain approval from City of Orlando Transportation Engineering Division and Orlando Utilities Commission for any substitution. The standard for Luminaires shall be installed at 90 degrees to the mast arm. Cost of the mast arm assembly includes wiring to base of pole. (LED)

10D. Separate service shall be provided when required for luminaires. Contact electrical power provider to identify luminaire service location and type of electrical connection.

10E. New service for streetlights must be working prior to inspection.

10F. Mast arm lengths and mounting height must be confirmed when base locations are confirmed. This must be done before ordering mast arm assemblies.

10G. The signal cable shall pass out of the mast with proper drip loop then enter the arm for clamp on the arms. Holes shall have rubber grommets.

10H. The mast arm assembly, steel strain poles, or metal pedestrian pedestals (when installed at intersections with steel or mast arm poles only) shall be finished with a semi-gloss black powder coat (Federal Standard color #27038 from the 595B Color Deck).

11. FIBER OPTIC CABLES:

11A. Fiber Optic Cables:

1) Trunk cables: minimum 72 Single-mode fibers, unless called for in the plans to match existing.
2) Drop cables: minimum 36 Single-mode fibers, unless called for in the plans to match existing.
3) No new multi-mode fiber allowed.

11B. Testing for the Fiber Optic Cable: All test results shall be supplied to the City of Orlando, hard copy as well as on disk. Test results shall be presented to the City of Orlando's Traffic Signal Inspector at time of preliminary inspection. Acceptable test results shall be determined by using the manufacturer's supplied specification sheets, which the contractor will provide with material submittals. *[Note to designers: delete references to multimode fiber if not used in project]*

Test 1: End to End Attenuation

- Dual wavelength insertion loss bi-directional
- Single-mode: 1310 and 1550 nm
- Multi-mode: 850 and 1350 nm
- Equipment Required: Optical Source(s), 2 test jumpers and Adapter.

Test 2: OTDR Test

- Bi-directional and dual wavelength OTDR testing is required.
- Wavelength shall be as follows:
- Single-mode: 1310 and 1550 nm
- Multi-mode: 850 and 1350 nm
- Signature trace documentation by computer file and print out for each fiber and all interconnections.
- Equipment Required: OTDR and Test Fiber Box (Launch Cable).

Test 3: Connector and Splice Loss.

- OTDR measurement of each field-terminated connector and each splice at dual wavelengths.
- Single-mode: 1310 and 1550 nm
- Multi-mode: 850 and 1350 nm
- Equipment Required: OTDR and Test Fiber Box (Launch Cable).

Test 4: Bandwidth/Dispersion

- Save and present to the City of Orlando Traffic Inspector at time of preliminary inspection the manufacturer's specification sheet documenting the specified fiber bandwidth and dispersion for the cable used.
- Equipment Required: None

11C. The Fiber Optic Cable shall have a 14-gauge copper, single conductor locate wire installed according to FDOT Specification 630. **** check the latest FDOT fiber optic specification for locator wires.*

11D. All splicing details and connectorization plans shall be submitted prior to installation. All splicing details and connectorization plans shall be included in the as-built plans.

11E. Label all fiber optic cable outer jacket in each pull box and aerial attachment point. Label patch panels, patch cables and buffer tubes.

11F. All fiber optic patch panels shall use ST bulkheads. All fiber optic patch cables shall be ST to ST or ST to LC connectors. Adaptors are NOT allowed.

11G. All ST connectors shall be spliced onto pre-terminated SM "pigtails".

11H. All fiber optic links shall be a 1Gig SM links unless a 10Gig SM link is shown in plans.

11I. All network programming shall be submitted and approved by the City before installing and/or modifying existing equipment.

11J. Do not install fiber optic cable at less than the manufacturer's recommended minimum bend radius.

11K. IP addresses shall be provided by contacting the Traffic Management Center at 407-246-2020.

12. UTILITIES CONTACTS:

12A. Contractor is responsible for identifying and resolving utility conflicts.

12B. All contractors shall participate in the "Sunshine State One-Call of Florida, Inc." Phone 1-800-423-3770 for all utility locates.

12C. For coordination of electrical power contact:

O.U.C., Juan Diaz, at 407-434-4143
Duke Energy, Sharon Dear, at 407-942-9421

13. TRAFFIC SURVELIANCE (CCTV) CAMERAS

13A. CCTV cameras must be color dome cameras capable of sending video streams (both unicast and multicast) in H.264 format over a TCP/IP network. The Bosch 7000-series high definition (HD) is preferred. However, if alternative CCTV is to be installed it must be equal and compatible with existing City and FDOT monitoring software. They must also be capable of being controlled and managed via a standard internet browser client and support Simple Network Management Protocol (SNMP).

13B. Contractor will provide recommended final camera location(s) for the City's review to ensure proper views in all directions.

14. DYNAMIC MESSAGE SIGNS (DMS)

14A. DMS must have a color full matrix LED display.

14B. DMS controller must communicate over the City's IP-based Ethernet network.

14C. The DMS controller must be fully NTCIP compliant and be compatible with the City's Cameleon ITS, FDOT's SunGuide and Vanguard software.

15. Managed Field Ethernet Switch

15A. All layer 2 network switches shall be "DIN" mounted.

15B. All switches shall have a minimum of (4) removable 1GB SFP ports and (12) 1GB wired ports,

15C. All switches must also support SSH, HTTPS, RADIUS, TACACS+, SCP and SFTP with Optical monitoring and mapping capabilities.

16. Cyber Locks and Keys.

16A. Each new cabinet install requires (1) Cyber lock and (1) Cyber key that must be compatible with Cyber Link software.

17. Uninterruptible Power Supply (UPS)

17A. UPS and batteries shall be installed in a stand-alone cabinet, and not mounted to the traffic signal cabinet.

17B. The UPS shall have the ability of double voltage conversion. (Buck and Boost)