



Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

January 26, 2009

Monica Gourdine
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section 785
Proposed Specification: 7850300 ITS – Infrastructure - REVISED

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

These changes were proposed by Gene Glotzbach include a statement for clarification of design requirements for poles and to clarify the requirement that devices described by these specifications be listed on the Approved Product List.

Please review and transmit your comments, if any, within four weeks. Comments should be sent via Email to ST986RP or rudy.powell@dot.state.fl.us.

If you have any questions relating to this specification change, please call Rudy Powell, State Specifications Engineer at 414-4110.

Sincerely,

Signature on File

Rudy Powell, Jr., P.E.
State Specifications Engineer

RP/ft
Attachment

cc: Gregory Jones, Chief Civil Litigation
Florida Transportation Builders' Assoc.
State Construction Engineer

INTELLIGENT TRANSPORTATION SYSTEMS INFRASTRUCTURE.
(REV 11-9-07 1-22-09) (FA 1-10-08) (7-08)

SUBARTICLE 785-2.2 (of the Supplemental Specifications) is deleted and the following substituted:

785-2.2 Materials: Provide a grounding system that meets the grounding requirements of this section and also those defined in Section 620.

Install a transient voltage surge suppressor (TVSS) both ahead of and behind (i.e., on the supply side and the load side of) the ITS device electronics.

Install TVSS on all power, data, video and any other conductive connection.

Use only equipment and components that meet the requirements of these minimum specifications, and are listed on the Department's Approved Product List (APL).

SUBARTICLE 785-3.2.1 (of the Supplemental Specifications) is deleted and the following substituted:

785-3.2.1 Pole: ~~Use a pole as shown in the plans that meets the requirements of either Section 641 for prestressed concrete poles, Section 649 for steel poles, or Department requirements for centrifugally spun concrete poles. Provide shop drawings for poles in accordance with Section 5. Depending on the structural design requirements, use Class V (Special) or VI concrete pole, meeting the requirements of 346 specifications. Obtain poles from a manufacturing plant that is currently on the Department's list of qualified Incidental Precast Concrete Plants and currently listed on the Department's QPL for concrete CCTV Poles. Construct concrete poles in accordance with Section 450 specification. Assume responsibility for performance of all quality control testing and inspections in accordance with Sections 346 and 450 specifications and Section 8.2 of the Materials Manual. The PCI personnel and plant certifications are not required. Permanently and legibly mark each pole with the pole manufacturer, pole type, length, and the date cast at the same location of the pole as shown on the shop drawings. Provide written certification and delivery tickets from the pole manufacturer, in accordance with Section 8.2 of the Materials Manual, indicating that the poles meet the requirements of Section 785, Standard Index 18113, and the approved QPL drawings. Use a concrete or steel pole in accordance with Design Standard 18111 or 18113 and listed on the Department's Qualified Products List (QPL).~~

For concrete poles, use concrete meeting the requirements of Section 346 and construct in accordance with Section 450. Obtain concrete poles from a manufacturing plant that is currently on the Department's list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet

the requirements of 105-3. Assume responsibility for performance of all quality control testing and inspection required by Sections 346 and 450; however the PCI personnel and plant certifications are not required.

Use a pole that is equipped with a handhole of sufficient size to provide access to the pole interior and for temporarily securing and operating the lowering tool. Ensure that the pole-top tenon is rotatable.

SUBARTICLE 785-3.2.2 (of the Supplemental Specifications) is deleted and the following substituted:

785-3.2.2 Lowering Device: Use a lowering device as shown in the plans.

Ensure that the lowering device provides the electrical connections between the control cabinet and the equipment installed on the lowering device without reducing the function or effectiveness of the equipment installed on the lowering device or degrading the overall system in any way.

Locate the stainless steel lowering cable inside conduit to avoid cable twisting and to ensure that only the lowering cable is in motion inside the pole when the lowering device is operated.

Ensure that all other cables remain stable and secure during lowering and raising operations.

Ensure that the lowering device includes a disconnect unit for electrically connecting the equipment installed on the lowering device's equipment connection box to the power, data, and video cables (as applicable); a divided support arm, a pole adapter for the assembly's attachment to the rotatable pole-top tenon, and a pole-top junction box, as shown in the plans.

Ensure that all of the lowering device's external components are made of corrosion-resistant materials that are powder-coated, galvanized, or otherwise protected from the environment by industry-accepted coatings that withstand exposure to a corrosive environment.

Use only lowering device equipment and components that meet the requirements of these minimum specifications, and are listed on the Department's Approved Product List (APL).

SUBARTICLE 785-3.3 (of the Supplemental Specifications) is deleted and the following substituted:

785-3.3 Installation Requirements: Ensure that the divided support arm and receiver brackets self-align the contact unit with the pole centerline during installation, and that the contact unit cannot twist when subjected to the design wind speeds defined in the FDOT Plans Preparation Manual, Vol. I, Chapter 29, Table 29.1 *Structures Manual, Volume 9*. Supply internal conduit in the pole for the power and video cabling if required by the Engineer.

Ensure all pulleys installed for the lowering device and portable lowering tool have sealed, self-lubricated bearings, oil-tight bronze bearings, or sintered bronze bushings.

Provide 1.25-inch-diameter PVC conduit in the pole for the lowering cable. Verify that a conduit mount adapter is furnished for the interface between the conduit and the internal back side of the lowering device.

~~Ensure that the poles and their foundations conform to the requirements of the PPM and Indexes 17723 and 17725 of the Design Standards, and with the AASHTO LTS 4 standard with current addenda. Use Vol. 1, Chapter 29, Table 29.1, Design Wind Speeds, of the PPM to compute the wind loads. Provide shop drawings that specify the overturning moment or ground line moment detail for the pole structure and all necessary design features.~~

~~**785-3.3.1 Concrete Poles:** Provide footings 4 feet in diameter and of the depth specified in the plans. Provide footings for all other pole applications as specified in the plans. Construct the footings with Class I concrete as specified in Section 347. For the excavation and backfill of the footing, meet the requirements specified in 125-4 and 125-8.2 with the exception of the backfill density. In lieu of the requirements for obtaining the specified density, the Contractor may hand tamp the backfill in 4 inch maximum layers or machine tamp the backfill in 6 inch maximum layers. When performing such operations, ensure that the material is neither dry nor saturated. The Contractor may backfill with concrete.~~

~~Use forms, when required, meeting the requirements of 700-7.3. If the footing is cast in an oversize hole, place the concrete in the top 6 inches in a form. Trowel all exposed surfaces to a smooth finish. **Install foundation and pole in accordance with 641-4.2, except footing dimensions shall be in accordance with Design Standard 18113.**~~

~~**785-3.3.2 Steel Poles:** Install foundation and pole in accordance with 649-5 and 649-6.~~

SUBARTICLE 785-4.1 (of the Supplemental Specifications) is deleted and the following substituted:

785-4.1 Description: Furnish and install an ITS field cabinet for housing ITS equipment and network devices including, but not limited to, managed field Ethernet switches, hub switches, device servers, digital video encoders, fiber optic cable patch panels, and equipment

racks for non-intrusive vehicle detection systems. *Use only equipment and components that meet the requirements of these minimum specifications, and are listed on the Department's Approved Product List (APL).*

SUBARTICLE 785-4.2.9.6 (of the Supplemental Specifications) is deleted and the following substituted:

785-4.2.9.6 Generator and Auxiliary Power Connection: If shown on the plans, furnish an ITS field cabinet that has provisions for the connection of an external power source, such as a portable generator, through a weatherproof, water-resistant, secure interface. This feature should allow authorized personnel to access, connect, and secure an external power source to the cabinet in order to restore power within 5 minutes of arrival at the ITS field cabinet. *Provide the field cabinet with a transfer switch rated equal to or higher than the design load of the cabinet's main breaker and the generator input twist-lock connector rating. Ensure that the transfer switch provides a means of switching between normal utility power and auxiliary backup generator power. Ensure that the switching time between sources is no longer than 250 milliseconds. Ensure that the transfer switch meets UL Standard 1008. Ensure that the transfer switch does not allow simultaneous active power from two sources and does not allow generator backflow into normal utility AC circuits. Provide the field cabinet with a transfer switch rated for the design load of the cabinet's main breaker to provide an alternate power source using a generator. Use a transfer switch that can be permanently mounted inside the cabinet. Ensure that the transfer switch meets UL Standard 1008. Ensure that the transfer switch does not allow simultaneous active power from two sources.*

785-4.2.9.6.1 Manual Transfer Switch: *Ensure the manual transfer switch is a two-position switch. Label the switch positions as "Generator Power" and "Utility Power".*

Equip the transfer switch with a "Utility-on" indicator, which will illuminate when normal utility power service is available and the switch is in the "Generator Power" position. The indicator must turn off when the transfer switch is moved to the "Utility Power" position. Ensure that the Utility-on indicator is clearly visible outside the cabinet and that the indicator's on/off state can be visually determined from a distance of 30 feet.

785-4.2.9.6.2 Automatic Transfer Switch: *To provide for automatic transition from generator power back to normal utility service after utility power is restored, an automatic transfer switch may be used instead of a manual transfer switch. Ensure that the automatic transfer switch has indicators that display the status of connected power sources and indicate which power source is actively energizing the cabinet.*

If a relay circuit is used to provide switching, the normally closed circuits must be connected to normal utility power. The relay shall be energized only by the generator, not by the electric utility service. When energized, the relay must break the connection to normal utility power and make connection to the generator power input. Any automatic transfer switch or relay operated switch must

include a bypass switch that permits the automatic switching function to be disabled and permits manual selection of the power sources connected to the cabinet.

785-4.2.9.6.3 Generator Access Panel: *Include a generator connection panel consisting of, at a minimum, the manual transfer switch and three-prong, 30-amp twist-lock connector with recessed male contacts for generator hookup. Locate and label the transfer switch and twist lock connector on a panel easily accessible behind a lockable exterior door. Ensure that this access door is labeled as “Generator Access Door”, equipped with a tamper-resistant hinge, and that the door assembly is weatherproof and dustproof. The access door shall be provided with a #2 lock unless otherwise specified in the plans. Provide the access door with a weatherproof opening for the generator cable. The generator hookup compartment itself shall be recessed into the cabinet and be deep enough to allow closing and locking of the access door when the generator cable is connected. Limit the generator hookup compartment and access panel’s intrusion into the cabinet interior to no more than 6 inches. Avoid blocking access to any other equipment in the cabinet. Locate this generator panel as close as possible to the main AC circuit breaker. Ensure that the bottom of the access panel is no less than 24 inches above the bottom of the cabinet. Never locate the generator access panel on the main cabinet door or back door.*

Connect wiring from the Cabinet AC+ Input Terminal to the transfer switch. Connect the alternate power source’s wiring on the transfer switch to a receptacle that can accept a 120 VAC generator cord. Install a power service wire between the transfer switch and the existing power distribution panel in the cabinet.

~~Include a generator connection panel consisting of, at a minimum, the manual transfer switch and twist lock connector for generator hookup. Locate and label the transfer switch knob and twist lock connector on a panel easily accessible behind a lockable exterior door. Ensure that this access door is equipped with a tamper-resistant hinge, and that the door assembly is weatherproof and dustproof. Provide the access door with a weatherproof opening for the generator cable. Locate this generator panel as close as possible to the main AC circuit breaker. Never locate the generator access panel on the main cabinet door or back door.~~

~~Connect the power service wiring entering the cabinet to the transfer switch. Connect the alternate power source’s wiring on the transfer switch to a receptacle that can accept a 120 V_{AC} generator cord. Install a power service wire between the transfer switch and the existing power service panel in the cabinet.~~

INTELLIGENT TRANSPORTATION SYSTEMS INFRASTRUCTURE.
(REV 1-22-09)

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Install a transient voltage surge suppressor (TVSS) both ahead of and behind (i.e., on the supply side and the load side of) the ITS device electronics.

Install TVSS on all power, data, video and any other conductive connection. Use only equipment and components that meet the requirements of these minimum specifications, and are listed on the Department's Approved Product List (APL).

SUBARTICLE 785-3.2.1 (of the Supplemental Specifications) is deleted and the following substituted:

785-3.2.1 Pole: Use a concrete or steel pole in accordance with Design Standard 18111 or 18113 and listed on the Department's Qualified Products List (QPL).

For concrete poles, use concrete meeting the requirements of Section 346 and construct in accordance with Section 450. Obtain concrete poles from a manufacturing plant that is currently on the Department's list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3. Assume responsibility for performance of all quality control testing and inspection required by Sections 346 and 450; however the PCI personnel and plant certifications are not required.

Use a pole that is equipped with a handhole of sufficient size to provide access to the pole interior and for temporarily securing and operating the lowering tool. Ensure that the pole-top tenon is rotatable.

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785-3.2.2 Lowering Device: Use a lowering device as shown in the plans. Ensure that the lowering device provides the electrical connections between the control cabinet and the equipment installed on the lowering device without reducing the function or effectiveness of the equipment installed on the lowering device or degrading the overall system in any way. Locate the stainless steel lowering cable inside conduit to avoid cable twisting and to ensure that only the lowering cable is in motion inside the pole when the lowering device is operated. Ensure that all other cables remain stable and secure during lowering and raising operations.

Ensure that the lowering device includes a disconnect unit for electrically connecting the equipment installed on the lowering device's equipment

connection box to the power, data, and video cables (as applicable); a divided support arm, a pole adapter for the assembly's attachment to the rotatable pole-top tenon, and a pole-top junction box, as shown in the plans.

Ensure that all of the lowering device's external components are made of corrosion-resistant materials that are powder-coated, galvanized, or otherwise protected from the environment by industry-accepted coatings that withstand exposure to a corrosive environment.

Use only lowering device equipment and components that meet the requirements of these minimum specifications, and are listed on the Department's Approved Product List (APL).

SUBARTICLE 785-3.3 (of the Supplemental Specifications) is deleted and the following substituted:

785-3.3 Installation Requirements: Ensure that the divided support arm and receiver brackets self-align the contact unit with the pole centerline during installation, and that the contact unit cannot twist when subjected to the design wind speeds defined in the FDOT Structures Manual, Volume 9. Supply internal conduit in the pole for the power and video cabling if required by the Engineer.

Ensure all pulleys installed for the lowering device and portable lowering tool have sealed, self-lubricated bearings, oil-tight bronze bearings, or sintered bronze bushings.

Provide 1.25-inch-diameter PVC conduit in the pole for the lowering cable. Verify that a conduit mount adapter is furnished for the interface between the conduit and the internal back side of the lowering device.

785-3.3.1 Concrete Poles: Install foundation and pole in accordance with 641-4.2, except footing dimensions shall be in accordance with Design Standard 18113.

785-3.3.2 Steel Poles: Install foundation and pole in accordance with 649-5 and 649-6.

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785-4.1 Description: Furnish and install an ITS field cabinet for housing ITS equipment and network devices including, but not limited to, managed field Ethernet switches, hub switches, device servers, digital video encoders, fiber optic cable patch panels, and equipment racks for non-intrusive vehicle detection systems. Use only equipment and components that meet the requirements of these minimum specifications, and are listed on the Department's Approved Product List (APL).

SUBARTICLE 785-4.2.9.6 (of the Supplemental Specifications) is deleted and the following substituted:

785-4.2.9.6 Generator and Auxiliary Power Connection: If shown on the plans, furnish an ITS field cabinet that has provisions for the connection of an external power source, such as a portable generator, through a weatherproof, water-resistant, secure interface. This feature should allow authorized personnel to access, connect, and secure an external power source to the cabinet in order to restore power within 5 minutes of arrival at the ITS field cabinet. Provide the field cabinet with a transfer switch rated equal to or higher than the design load of the cabinet's main breaker and the generator input twist-lock connector rating. Ensure that the transfer switch provides a means of switching between normal utility power and auxiliary backup generator power. Ensure that the switching time between sources is no longer than 250 milliseconds. Ensure that the transfer switch meets UL Standard 1008. Ensure that the transfer switch does not allow simultaneous active power from two sources and does not allow generator backflow into normal utility AC circuits. .

785-4.2.9.6.1 Manual Transfer Switch: Ensure the manual transfer switch is a two-position switch. Label the switch positions as "Generator Power" and "Utility Power".

Equip the transfer switch with a "Utility-on" indicator, which will illuminate when normal utility power service is available and the switch is in the "Generator Power" position. The indicator must turn off when the transfer switch is moved to the "Utility Power" position. Ensure that the Utility-on indicator is clearly visible outside the cabinet and that the indicator's on/off state can be visually determined from a distance of 30 feet.

785-4.2.9.6.2 Automatic Transfer Switch: To provide for automatic transition from generator power back to normal utility service after utility power is restored, an automatic transfer switch may be used instead of a manual transfer switch. Ensure that the automatic transfer switch has indicators that display the status of connected power sources and indicate which power source is actively energizing the cabinet.

If a relay circuit is used to provide switching, the normally closed circuits must be connected to normal utility power. The relay shall be energized only by the generator, not by the electric utility service. When energized, the relay must break the connection to normal utility power and make connection to the generator power input. Any automatic transfer switch or relay operated switch must include a bypass switch that permits the automatic switching function to be disabled and permits manual selection of the power sources connected to the cabinet.

785-4.2.9.6.3 Generator Access Panel: Include a generator connection panel consisting of, at a minimum, the manual transfer switch and three-prong, 30-amp twist-lock connector with recessed male contacts for generator hookup. Locate and label the transfer switch and twist lock connector on a panel easily accessible behind a lockable exterior door. Ensure that this access door is labeled as "Generator Access Door", equipped with a tamper-resistant hinge, and that the door assembly is weatherproof and dustproof. The access door shall be provided with a #2 lock unless otherwise specified in the plans. Provide the access door with a weatherproof opening for the generator cable. The generator hookup compartment itself shall be

recessed into the cabinet and be deep enough to allow closing and locking of the access door when the generator cable is connected. Limit the generator hookup compartment and access panel's intrusion into the cabinet interior to no more than 6 inches. Avoid blocking access to any other equipment in the cabinet. Locate this generator panel as close as possible to the main AC circuit breaker. Ensure that the bottom of the access panel is no less than 24 inches above the bottom of the cabinet. Never locate the generator access panel on the main cabinet door or back door.

Connect wiring from the Cabinet AC+ Input Terminal to the transfer switch. Connect the alternate power source's wiring on the transfer switch to a receptacle that can accept a 120 VAC generator cord. Install a power service wire between the transfer switch and the existing power distribution panel in the cabinet.