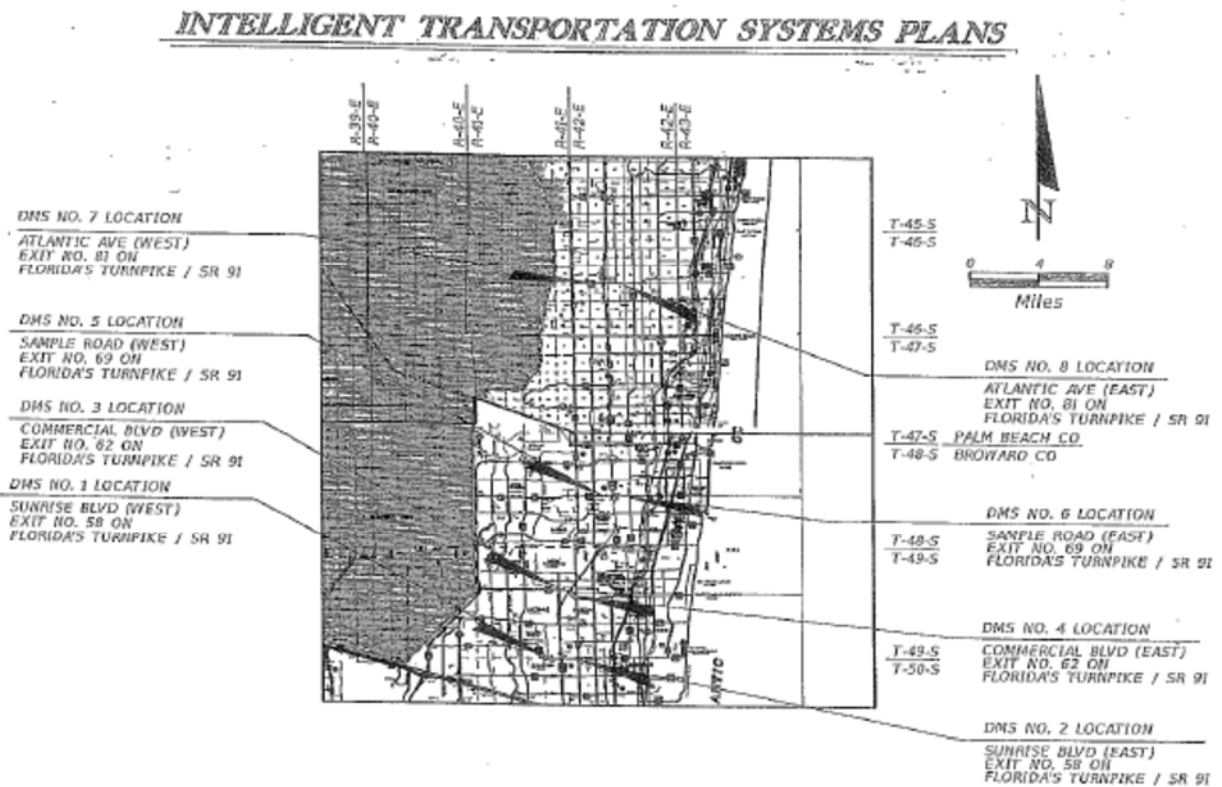


ADMS Installation MP 58-86

Financial Project Number: 435617-1-52-01

Extinguish the Torch Summary Report

CEI: RS&H, Inc.
Turnpike CPM: Jaime Gomez
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1. CEI TEAM

Senior PE/Project Admin/CSS: Jason Trujillo, PE (RS&H)
Senior Inspector: Kristina Widup (RS&H)
Inspector: Philip Lyon (RS&H)

2. PROJECT DESCRIPTION & PERFORMANCE MEASURES

Project Location: SR 91 (Turnpike Expressway) Arterials MP 58-86.
Construction Start Date: November 18, 2015
Final Acceptance Date: May 24, 2016
Original Contract Time: 140 CD
Original Contract Amount: \$ 1,736,149.10 *
Days Added (Weather/Holiday): 45 CD
Days Added (SA): 4 CD
Final Contract Time: 185 CD
Final Contract Amount: \$ 1,651,059.83

The improvements under this contract includes all labor , materials, equipment and incidentals necessary for installation of eight (8) Arterial Dynamic Message Signs (DMS) within Broward and Palm Beach Counties.

LESSONS LEARNED

Topic 1: Conduit Colors for ITS

Turnpike ITS noted that the correct color conduit was not being installed. Midasco LLC was installing the conduit per plan. No color for conduit was specified in the contract plans.

Lesson Learned

Turnpike ITS has developed a standard color scheme for conduit installation. This should be communicated with the designers and confirmed during plans review.

Topic 2: Route Markers for Electric

During semi-final inspections, Turnpike ITS requested, the use Tubular route markers, to identify the installation path of electric wires powering the devices. The Specifications are silent on the matter of route markers for electrical paths. They are only required for communications installation paths. Due to the custom label, product lead times did not allow us to add this to the scope without impacting time goals on the contract.

Lesson Learned

Turnpike ITS should consider developing a standard plans notes and requirements checklist to the design section until such requirements are either standardized statewide or they choose another standard.

Topic 3: Standardizing a DMS Site

3.1: Verification Cameras for DMS

Turnpike ITS questioned why we had not installed any DMS message, verification cameras. They had not been included in the scope of work. These cameras enable operators to detect maintenance problems with the DMS as well as verify whether messages were correctly posted to the sign or cleared.

Lesson Learned

Verification cameras should be considered a BMP and implemented on all DMS projects.

3.2: Cabinet Location & Height

The current cabinet location places you at the base of the DMS. The DMS requires its foundation, a drilled shaft, to rise 2' above grade. Installing the cabinet on the structure will place the access to the cabinet uncomfortably high and requires the use of a ladder. Additionally, assessing the immediate area surrounding the pole should have given pause about the location adjacent to the canal slope as it is not nearly level enough to place or work off of a ladder. Lastly, placing the cabinet this close to the cabinet requires either a technician to continually walk upstream of the DMS to verify any test/troubleshooting message posted or a second technician on-site situated upstream of the DMS to verify any messages posted to the sign by the first technician.



Figure 1; Cabinet Height at DMS 1

Lesson Learned

Special consideration to cabinet height should be given when installing them on the steel uprights of the DMS support structure due to the practice of installing the drilled shaft 2' above grade. The EOR should specify a maximum height the cabinet is to be installed above grade. This was done for the cabinets installed on the concrete wireless poles but omitted for the DMS cabinet detail.

3.3: Cabinet Door Orientation

A plans note states that a technician's back should never be exposed to traffic. Unfortunately, with cabinets having two doors, a technician's back will always be either parallel or perpendicular to traffic. This matter is further complicated at intersections

Lesson Learned

While a standard approach is good to have, there are several site specific considerations that must be accounted for during design and plans reviews. The cabinets should be installed as depicted in the plans if this coordination and review is considered during design.

Topic 4: TSPs for Equipment Compatibility

Turnpike ITS questioned who had approved the wireless components and Managed Field Ethernet Switches (MFES) installed on this contract because they were not 100% compatible with the existing components they used. These plans provided no TSPs for the contractor and reviewers to meet for the wireless components. The MFES were approved based on the standard specifications

Lesson Learned

Turnpike ITS & Maintenance should be providing minimum requirements to the EOR for all the equipment installed on their network to ensure 100% compatibility with existing components and inventory.

Topic 5: Missing UPS at the Wireless Poles

The specifications don't address UPS requirements for anything other than DMS. No UPS Pay Item was included in the plans for the wireless poles. A work order to pay for 4 UPS at the wireless poles was processed by CEI.

Lesson Learned

If there are other sites critical to the transportation communications network, they should be installed with a UPS to allow continued operations of the devices during periods of intermittent/unreliable electric availability. In addition, the UPS can prolong device service life by providing stable electric power.

Topic 6: Keyed Access

Turnpike ITS has a standard key for each device site. For example, DMS cabinets are apparently keyed as #4 keys and non-DMS cabinets are keyed Common #2. Our plans made no mention of what key types any particular cabinets should receive; therefore, a common #2 was provided.

Lesson Learned

This is something that could be identified in the plans with a plans note or during the shop drawing review process. As always, it's riskier to identify during a submittals review due to an increase in cost – regardless how negligible.

Topic 7: FPL Changed Service Location and Misidentified Available Voltage for Service

The dynamic of the state's relationship with FPL is such that FPL is held harmless when identifying service locations and ensuring the voltages provided are as the plans require. It is common to have FPL identify a location for service significantly different than the ones identified in the plans due to the elapsed time when design coordination occurred and construction operations commence. The contractor had to install a step-down transformer in order to provide 120/240V at the Sample Wireless pole. FPL identified this condition as they were going to tap for service - after design coordination, after field meetings, after their design, and after they installed the riser on the pole.

Lesson Learned

As is customary with ITS projects, early and continuous communication and coordination with FPL is necessary in order to minimize delays and adverse impacts.

3. RECOMMENDATIONS

This section is more geared towards recommendations that would ensure a more reliable system based on my personal ITS experience.

Topic 1: System/Device Failure Identification

The Standard Specification does not define the failure of a device very well, especially when it comes to pausing the system test. The Turnpike has a Network Management System (NMS) in place that can identify failure rates for each device type and could be a very useful tool in documenting the reliability of the newly installed system/components. Language should be developed and included as a plans note defining what successful completion of the testing period entails.

Topic 2: Training for New Device Types and/or Models

Turnpike ITS Operations and Maintenance personnel should be provided training on new device types and use cases by the manufacturer. A note should be placed that a certain number of hours of operations training and maintenance training should be provided for each new/updated device type.

Topic 3: Use of Tech Pads

Wherever there is a cabinet installed, there should be a flat, level stable surface for the technician to work on. This also allows for a stable and level surface to place a ladder should one be necessary.