Turnpike Extinguish the Torch – Session 2
FIN: 406151-1-52-01 & 406151-3-52-01 / E8M62
FIN: 4061512-1-52-01 & 406152-1-56-01 & 406152-3-52-01 / E8M63
FIN: 431275-1-52-01 & 431275-1-56-04 & 431275-3-52-01 / E8M60

- **Issue #1 – Veterans Expressway Inside Widening Sawcut Layout**

Issue:

For Section 1 - Roadway Plan Sheet 33 lists the sawcut offsets for the inside Southbound Expressway Widening. The Traffic Control Plan Sheet 346 shows the Phase 1 Stage 2 Southbound inside temporary barrier Type K layout. These plan sheets were in conflict, since portions of the temporary barrier wall were laid out intersecting the sawcut line limiting the necessary widening work zone.

For Section 2 - Saving existing asphalt pavements by use of sawcuts was difficult, and no profile grade lines were given. Profile grade line with elevations every 100 feet were needed to match the widening, and building median barrier wall off of existing sawcut lines elevations instead of given PGL elevations led to low and high walls and reveals. The contractor had to survey the sawcut line and then compare this to elevations for inlets in the plans. Many adjustments were required. The lack of having a profile grade line contributed to not taking remedial actions for shy thickness on the structural pavements.

Resolution:

For Section 1 - The conflict required an additional MOT sub-phase to complete the missing wedge of inside roadway widening. The operation required using a weekend long lane closure to allow for the complete milling of the existing pavement, and excavation to the design depth and pave back the asphalt base and structural course.

For Section 2 - The EORs need to survey and provide the PGL on the existing asphalt that they want saved. We found most of the existing asphalt pavement on the Veterans was substandard in structural thickness and needed to be corrected with the milling and resurfacing of lanes 2 and 3.

Lesson Learned:

For Section 1 - It is recommended the EOR ensures that Traffic Control Plan Sheet layouts of temporary barrier wall are on the proper side of the sawcut line with enough distance for the width of the barrier wall and the required 2’ sliding width in accordance with Standard Index 414 Sheet 6 FREESTANDING ROADWAY INSTALLATION. In addition, the plans should identify “center line of barrier wall” when detailing the location on the Traffic Control Plans.

For Section 2 - Recommend that enough surveying be given to the EOR budgets in Design so they can get the PGL established and also give elevations for the median barrier wall and the PGL of the existing roadway and new widening. This will have a major positive impact on the contractor's ability to build the project to given elevations. Providing elevations would eliminate guess work from the contractor and allow for better checking and verification by the CEI.

- **Issue #2 - Insufficient Ramp Closure Durations or Changes to Ramp Closure Durations in TCP Phase**

  Issue:

  For Section 1 - The Traffic Control Plans for Phase 1, Stage 3, Step 3, Plan Sheet No. 307, Note No. 2, limits the duration of ramp closures (Hillsborough Avenue Ramps A and B) to 9 days. During the 9-day period, the Contractor is expected to complete drainage, the AET gantry foundation left upright drilled shaft, the AET gantry installation and AET operational testing. The gantry structure is not fabricated until the as-built survey of the drilled shafts is submitted to the fabricator, this takes a minimum of 6 to 10 weeks. Therefore, the given time constraint for this Phase does not allow the completion of the required activities.

  For Section 2 - FTE allowed the Contractor to close the Anderson Ramps in May 2013, ahead of the specified MOT phase. The Contractor agreed to re-open the ramps in 10 months and a memorandum of understanding was executed. The new SB ramp was opened on March 8, 2015; nearly two years after it was closed. The NB ramp was finally opened on November 23, 2015, after being closed for 2.5 years. FTE lost toll revenues for over two years while these ramps were closed. The toll paying motorists were inconvenienced for over two years and routed through the Waters Avenue ramps.

  For Section 3 - Three ramp closure events were identified in the TCP but were either vague or not constructible as stipulated in the TCP. 1) Wilsky ramp closures for ramp reconstruction and AET conversion. The plan notes did not give a specific closure duration. The plan notes stated to expedite and focus on this work when started. 2) SB Veterans Entrance Ramp at Gunn Hwy. Plans required a weekend closure, which was not feasible due to the volume of work required. 3) NB Veterans Exit Ramp at

Linebaugh Ave. the plans required a weekend closure, which was not feasible due to the volume of work.

Resolution:

For Section 1 - TCP Phase 1, Stage 3, Step 2 was revised in Plan Revision 5 with a revised temporary Ramp B layout by providing a horizontal reverse curve to shift the on-ramp in order to complete the drill shafts installation and gantry erection ahead of Phase 1. Stage 3, Step 3. This change provided Ramp B construction without any extension of the 9 day ramp closure duration.

For Section 3 – 1) The CEI negotiated a 120 day closure duration for the Wilsky ramps, since no maximum duration was identified in the TCP. Actual duration was approximately 4 months. Unfortunately, the negotiated duration was likely longer than it would have been if a maximum duration was specified in the plans. 2) Related to the Gunn Hwy entrance ramp, the TCP required full reconstruction of 2200 SY of the ramp in a single weekend. Constructing the ramp over several weekends was not viable. A longer duration, 10 day closure was negotiated which ultimately took 14 days due to weather impacts. 3) The Linebaugh Ave ramp reconstruction was similar to the Gunn Hwy ramp. The amount of work to be completed to tie-in the new ramp alignment with the mainline and Linebaugh Ave could not be completed with night time operations. The TCP did not adequately detail the scope of work to be done. A 21 day ramp closure was negotiated to complete the required construction activities.

Lesson Learned:

For Sections 1 and 3 - For ramp reconstruction with drilled shafts, AET gantry fabrication and erection, it is recommended to properly sequence the construction of the roadway, the gantry foundations and the gantry erection. Temporary diversions may be required to maintain the ramp open for periods of time between operations. Short duration ramp closures are not always feasible to accommodate the scope of work, especially on tolled ramps. Construction activities on the ramps should be clearly specific with reasonable closure durations. If conventional construction methods produce unreasonable durations, consider other options to expedite construction. Consider additional notes in the TCP phasing that require 24/7 work during tolled ramp closures.

For Section 2, the Anderson ramp extended closure issue, changes to the TCP should not be considered unless there is a constructability issue with the original design. If there is

consideration, a supplemental agreement should be written detailing scope of work and ramp closure duration. Monetary penalties, such as adding the lane rental specification to the contract, should be part of ramp closure changes.

- **Issue #3 – ITS pull boxes constructed in the mainline shoulder**

Issue*:* A corridor issue was discovered involving the precast concrete pull boxes (open bottom) for the ITS system placed in the shoulder per plan. The TCP for Section 3 required that traffic be placed on the outside shoulder temporarily, which placed these pull boxes in the wheel path. Pull box covers were dislodged and concrete boxes failed multiple times, causing several emergency repairs and a safety concern.

Resolution: Designing ITS pull boxes in the roadway shoulder is not a good practice and should be avoided. The damaged boxes and metal covers were repaired and were placed out of the wheel path as soon as possible. Ultimately, the pull boxes were encapsulated in structural concrete to prevent their settlement and new bolts and washers were installed on the metal covers.

Lesson Learned: Whenever possible, ITS (or any) pull boxes should not be placed in the shoulders. When pull boxes must be placed in the shoulders, they should have a closed concrete bottom with entry holes for the conduits. Recommend the use concrete structures or vaults in conjunction with steel manhole tops. Every consideration should be made to prevent traffic from constantly driving over the boxes during MOT phases.

- **Issue #4 – Streamline the Shop Drawing Process**

Issue: The process for initiating the shop drawing list requires the contractor to develop the list to be reviewed by the EOR and FTE. The contractors often do not have the expertise or personnel to submit an inclusive list, particularly for the Toll Equipment Buildings. Related to the actual submittals, there were challenges with the shop drawing process for the Toll Equipment Buildings (primarily Divisions 13, 23 and 26).

Resolution: The EOR and FTE Production had to provide numerous suggestions and additions to the list initially, and as the projects progressed. For the Toll Equipment

Building shop drawings, several meetings, and finally a face to face meetings with the EOR reviewers, the CEI teams, the Contractors, subcontractors, equipment suppliers and the building manufacturer were required to move the shop drawing process along.

Lesson Learned: The list of required shop drawings/submittals for the Toll Equipment Buildings should be provided by the EOR and FTE. FTE to consider a Standard Index type drawing for the precast Toll Equipment Buildings with several building dimensions.

- **Issue #5 – Separate transformer for ITS systems**

Issue*:* FTE ITS requested a standalone transformer dedicated solely for ITS systems. This was not in the Construction Plans and technical specifications. FTE had to pay extra for the additional transformer and the sidewalk pad had to be extended.

Resolution: FTE Electrical Engineers wanted a power source for the ITS system separate from the tolling power source to minimize the likelihood of both systems going out if there was a lightning strike or power surge.

Lesson Learned: A separate transformer should be specified for the ITS system and the tolling system at the Gantry Equipment Building. EOR and FTE need to provide this detail in the plans and make sure the wiring back to the power source is in parallel.

- **Issue #6 – Simplify the O&M Manuals and Warranties Submittals for Gantry Equipment Building**

Issue*:* There is an inconsistency in the TSP specifications as to how many O&M sheets are needed for each device in the Gantry building. For example, the AC units, UPS system, Automatic Transfer Switch, Generators, Fuel Tanks, and SCADA system all had differing requirements. The date that maintenance takes over responsibility should be clarified and consistent.

Resolution: The EOR should be consistent in same number of O&M manuals per device. Also submittal dates for the manuals should be based on Functional Building Acceptance. For example, the spec should say to provide manuals within 10 days after FBA.

Lesson Learned: Tolls Maintenance Operations required a complete O&M manual in the buildings, plus one at the nearest maintenance facility that services the gantry and gantry building (Anclote Plaza). A few other FTE staff also required a copy of the O&M manual. Indicate due dates for the manuals in the plans notes (require within 10 days after Functional Building Acceptance).

- **Issue #7 – Under pavement conduit detailed across the mainline**

Issue:
The EOR for roadway lighting and ITS show under pavement conduit being installed between the outside and median throughout the project (Section 3). This is not feasible unless detours are used. Directional bores should have been indicated in the plans.

Resolution:
The CEI directed the contractor to install directional bores. The directional bore pay item was overrun and the under pavement pay item was underrun.

Lesson Learned:
Do not use under pavement for conduit runs across the mainline on widening projects. Directional bores are needed, similar to jack and bores for drainage pipe

- **Issue #8 – Details needed in the plans for removal/demolition items to be bid**

Issue:
The contractor stated that removal of existing gravity wall and median barrier wall (pier protection) was not clearly depicted in the contract documents. The EOR stated that is was inherent that the items were to be removed since the area was full reconstruction and a completely new barrier wall (pier protection) was shown to be constructed in the same location.

Resolution:
The contractor submitted an NOI for the existing pier protection for the bridge over Linebaugh Ave. The CEI disagreed since there was a callout that referred to existing barrier wall, and cited the requirement for site visit prior to bidding per Article 2-4 and specific Structural Plan notes. The CEI stated that this was to be removed and paid for

under clearing and grubbing. The NOI was eventually retracted. The CEI agreed that the other location (existing SB gravity wall between Linebaugh and Wilsky, 400 LF) was not clear and consistent. There was no callout for this gravity wall to be removed, although the EOR stated it was shown in the topo in the plan and cross section sheets. It was not consistent since an existing gravity and sheet pile wall at the southern project limits (Station 2384+00) was clearly called out to be removed in the structural (wall) plans. The CEI directed the contractor to remove only a 12 foot section of wall that was in conflict with drainage. The remaining portion was left in place since it was 2 feet or more below the proposed roadway base.

Lesson Learned:
Clearly call out existing structures to be removed. Do not assume that full reconstruction or topo layer(s) clearly identify the structure to be removed under clearing and grubbing.

- **Issue #9 – Temporary Asphalt for MOT not considered for final pavement**

Issue:
The EOR intended to provide a temporary overlay on newly constructed outside shoulders. After the phase requiring the temporary overlay was complete, the shoulder was to be milled and resurfaced to its final configuration. The plans did not provide separate details for the temporary overlay and restoration to final configuration. Further, this was not quantified in the computation book or 102-1 pay item.

Resolution:
Temporary overlay on permanent shoulders was only provided where the grade break was noticeable. Areas that receive this overlay will require an overrun of existing pay items to mill and resurface to final configuration.

Lesson Learned:
Determine if the temporary overlay on new shoulders is absolutely necessary. If so, make sure that the details are separate from any temporary pavement on existing shoulders. EOR should provide quantity, phasing required and how payment is made (LS MOT). Include detail for removal of temp pavement. Make sure that it is clear to put the temporary overlay on the new shoulder while paving the structural course. In other

words, don't allow a separate operation to provide the temporary overlay since it would require the pavement to go down to 0" at the shoulder break.

- **Issue #10 – Traffic placed in the shoulder over an existing bridge drainage structure during MOT phasing**

  Issue:
  For Section 3, SB traffic was shifted to the inside during Phase 1 Stage 2 to construct the outside widening. There was an existing bridge drainage inlet on the inside shoulder of the SB Veterans bridge over Linebaugh Avenue. This inlet likely did not see much vehicular traffic until the temporary shift of traffic. Within a year of having traffic run over the existing inlet, the bolts/nuts on the frame of the inlet through the deck came loose, and the grate came out of the structure.

  Resolution:
  Ultimately, the existing inlet was removed and concrete put in its place.

  Lesson Learned:
  Avoid placing traffic on older existing bridge inlets. If not avoidable, closely monitor the performance of the existing inlet to ensure the bolts/nuts and surrounding deck concrete are holding up. Require the contractor to remove existing bridge deck inlets and replace with concrete prior to placing traffic on it. We inserted a 4" PVC pipe flush to the gutter line during the concrete placement to ensure it would continue to drain at this location.

- **Issue #11 – Using too many pavement sections within a single ramp**

  Issue:
  The Wilsky ramps on the Veterans had varying pavement sections including black base, non-polymer and polymer top structural courses, and a gantry pavement section that is different altogether. This made for a lot of joints and inefficient work.

  Lesson Learned:
  Suggest making the pavement sections more uniform, specifically with regards to the structural courses. This will allow for a better product since it can be done in a single

operation with minimal joints. It is also more efficient, especially when it is critical to re-open a ramp.

- **Issue #12 – Work adjacent to CSXT**

  Issue: Just prior to construction completion, CSXT would not accept the Department's pond H-25 outfall discharge into their ROW. The pond's weir elevation was designed/constructed at the same elevation as the pond bottom.

  Resolution: FTE would not alter its previously approved design to meet the late demands of CSXT. CSXT eventually shut down the contractor, which resulted in unfinished work for the SR
  589 project within CSXT ROW.

  Lesson Learned: Production should not design for discharge to CSXT ROW if possible. If unavoidable, CSXT will require that FTE prove that the CSXT drainage basin will be able to handle a 100-yr storm, including FTE's discharge. Production must make sure that any discharge is clearly documented and included in a project specific Railroad Reimbursement Agreement Grade Separation.

- **Issue #13 – Selection of the project limits**

  Issue: Project Limits selected between Veterans Section 2 and 3 were not ideal, and made access extremely difficult for the southern limits of Section 3. Specifically, the southern limits were bounded by CSXT, private property, existing box culvert not traversable (due to length), wetlands, and the adjacent construction project. Also, the TCP phasing did not align at the project limits, further complicating the situation. For example, the adjacent project showed this area to be constructed in TCP Phase 1 Stage 2, and was on their critical path; this project did not begin widening work in this area until Phase 1 Stage 6.

  Resolution: This area was elevated, designed with MSE walls, but also drainage/pond improvements at grade alongside the NB MSE wall. Project Limits were extended in the SB direction by Supplemental Agreement in order to facilitate access. In the NB

direction, a section of the southernmost traffic railing was left unconstructed to facilitate a ramp down into the work zone alongside the newly constructed MSE wall.

Lesson Learned: When designing for adjacent projects that will be in construction concurrently, make sure project limits are designed such that either contractor will have adequate access to each respective work zone.

- **Issue #14 – Open flume construction on steep slopes**

  Issue: Open flume constructed on 1:2 slope had design flaw, but also undermined after design flaw addressed.

  Resolution: Flume did not have curb details, which allowed water to flow over the ditch pavement and erode the 1:2 slope. Due to erosion issues, flume and 1:2 slope was reconstructed via work order. After work order work, flume continue to exhibit undermining, which required flowable fill and joint sealant. After Final Acceptance, flume continues to exhibit undermining.

  Lesson Learned: Design for a shoulder (gutter) inlet and gutter/cross drain rather than an open flume.

- **Issue #15 – Design of dry ponds**

  Issue: All ponds were designed to be dry (on-line) retention ponds, and required to be dry within 72 hours by permit. A few ponds required a 1.5' - 3.0' A3 soil layer (< 5% passing #200) at the pond bottom per design. Several ponds did not perform (recover within 72 hours) as required by permit.

  Resolution: This is an open issue and continues to be researched.

  Lesson Learned: Many factors play a role in the performance of the dry ponds. Existing soil conditions (e.g. percolation), seasonal high water table, adjacent MSE walls, etc. Recommend being very conservative with respect to these design variables. This may require underdrain systems, deeper layers of A-3 soil layers, or ultimately wet pond construction if 72-hr recovery period is not attainable.

Turnpike Extinguish the Torch – Session 2
FIN: 406151-1-52-01 & 406151-3-52-01 / E8M62
FIN: 4061512-1-52-01 & 406152-1-56-01 & 406152-3-52-01 / E8M63
FIN: 431275-1-52-01 & 431275-1-56-04 & 431275-3-52-01 / E8M60

- **Issue #16 – ITS changes by FTE after project letting**

  Issue: Changes to ITS devices requested by FTE ITS Department after project letting. FTE ITS was concerned that devices per the contract were already outdated, and would not have provided any additional performance value to the existing ITS devices. Devices/pay items involved were CCTV Camera, Managed Ethernet Field Switch, Device Server, Digital Video Encoder (not needed to due CCTV upgrade), Ethernet Hub Switch, Steel Pole with Lowering Device, Field Cabinets, and MVDSs.

  Resolution: FTE ITS provided a list of preferred equipment changes. A Supplemental Agreement was executed to modify the unit price of the existing pay items. Total SA = $21,636.74.

  Lesson Learned: This was a relatively minor change that was requested early into the project. Nevertheless, FTE ITS should be more proactive in reviewing the plans prior to letting to ensure they are receiving the appropriate equipment. If the available APL products are "outdated" and FTE ITS desires more current devices, a Technical Special Provision would need to be included in the Specifications Package.

- **Issue #17 - Vibration Requirements for Adjacent Business Southern Manufacturing Technologies (SMT)**

  Issue:

  Southern Manufacturing Technologies (SMT) located at 5910 Johns Road (SE Corner), manufacturers high precision components for aircraft for the Department of Defense (DOD). SMT is in close proximity to the Johns Road Bridges and any construction activities with vibration impact their operation. SMT operations 24 hours a day, 7 days a week. The contract documents did not have special provisions to accommodate the low threshold of acceptable vibration required by SMT's Manufacturing Process.

  Resolution:

  The Contractor had to accommodate Southern Manufacturing Technologies (SMT) holiday schedule shut down timeframe to install the pile driving. Also the Contractor's means and methods had to be modified to accommodate the low threshold, such as pre auger prior to sheet pile installation, and augering grouting H piles for soldier pile and lagging walls. Also modify the compaction required for limerock base and asphalt

pavement placement. Finally the building vibration monitoring equipment was installed inside and outside SMT's building during all pile driving and steel sheet pile and H pile installations.

Lesson Learned:

1) Get with the property owner early in the process to see what their concerns are. Adequately survey the adjacent properties to determine if special provisions will be needed.
2) Discuss the property owner concerns with the District Geotechnical Engineer to see if any changes to determine alternate foundation types or temporary shoring systems to lessen vibration levels
3) Incorporate Special Provisions restricting work hours based on property owner needs
4) Since the project did not incorporate Special Provisions to address SMT's manufacturing process low vibration threshold, the Contractor had to be compensated for extra work and inefficiencies. SA 20 $57,000.00 - Premium Holiday Pile Driving Labor, SA 45 $64,159.34 Auger and Lagging TW-113, SA 55 $60,000.00 Augering and Precast holes TW-228 – **TOTAL: $181,159.34**

- **Issue #18 – Back Slope Protection Mainline Outside Shoulder Areas During Major rain Fall Events**

Issue:

By placing temporary asphalt in the existing shoulder gutter as per Plan Sheet 322 the drainage runoff coefficient changed in the shoulder gutter reducing the storm water holding capacity. The high side and low side of the temporary shoulder paving details show placing temporary asphalt in the existing shoulder gutter along SR 589 Mainline outside shoulder areas. The Contractor constructed the temporary asphalt as per TCPs. The temporary asphalt placed over the existing gutter as per plans reduced the holding capacity of storm water in the existing gutter, building the flow up laterally and overflowing the miscellaneous asphalt under the guardrail during heavy rain events and causing numerous washouts along SR 589 Mainline outside shoulder areas.

Resolution:

Turnpike Extinguish the Torch – Session 2
FIN: 406151-1-52-01 & 406151-3-52-01 / E8M62
FIN: 4061512-1-52-01 & 406152-1-56-01 & 406152-3-52-01 / E8M63
FIN: 431275-1-52-01 & 431275-1-56-04 & 431275-3-52-01 / E8M60

The Contractor had to repair washouts along the SR 589 Mainline outside shoulder at various locations after storm events. The Contractor was directed to install an asphalt curb at the low points behind the guardrail where the erosion occurred, on the miscellaneous asphalt at the low points to channelize the water into the next gutter inlet. The slopes behind the guardrail were addressed.

Lesson Learned:

The EOR needs to address the slope behind the guardrail when similar temporary drainage conditions are depicted in the TCP. Use of temporary flumes or asphalt curb at the low points to channelize the water into the gutter inlet.

- **Issue #19 – Toll Gantry Upright Concrete**

Issue:
Possible blockage in the 1" PVC or 1" PVC drain pipe not being flush with concrete prevents the water from draining and cause a build up of water and condensation to occur inside the gantry column, thus creating potential corrosion to occur.

Issue (section 2)*:* The hole in the column is too small to pump concrete into efficiently. The hole should be enlarged.

Resolution:
Place concrete is placed inside the column to distance 2 feet below the top of the column. The 1 inch PVC drain pipe should be extended well above this elevation during concrete placement; then after placement the Contractor shall cut-off the 1 inch PVC drain pipe flush with the top of the concrete to allow for proper drainage.

Resolution (section 2): The benefit is constructability for the contractor to do his work.

Lesson Learned:
Right upright base for Hillsborough Avenue Entrance Gantry required concrete to be filled to a height of 12 feet above bottom of upright with 1" PVC drain pipe through full depth of concrete fill and termination of 1" PVC pipe outside the drill shaft cap foundation cap draining downward. Since more than half of the upright is left empty without concrete, it would lead to water ponding inside the upright, in case of the drain pipe blockage, it would not be accessible and would result in condensation and potential corrosion.

Lesson Learned (section 2): Design a larger hole in the columns. Also covering the anchor bolts leveling nuts with concrete that later cracks and spalls is poor practice and should be designed so the contractor does not have to form up outside the anchor bolt pattern. Bottom of the column should have been designed to hold the concrete in the column (not having to form up outside the anchor bolts)

- **Issue #20 – Humidity Inside Gantry Equipment Building (GEB)**

Issue:

Excessive Humidity in the range of 70 to 93% were detected inside Gantry Equipment Buildings. The TSPs did not include Gantry Equipment Building humidity range requirements.

Resolution:

Based on the trial and error steps taken on the recommendation from EOR following between the EOR, CEI and the Mechanical Subcontractor the following seems to work:

1) Increase the thermostat dead band range to 5 degrees from 70 to 75 F (the specified dead band range in 2 degrees from 73 to 75 F). This will increase the run time of AC unit which will in turn help in reducing the excess humidity.
2) Turning off the fan within 90 seconds after the compressor shuts off, as it was observed when the fan is in continuous running mode, it is raising the humidity inside the building by blowing hot air inside GEB, from the heat generated by electrical components of the compressor
3) Dehumidifier unit as a means to dry out, reduce excess and maintain acceptable humidity levels inside the GEB, however remedial action has extra costs associated plus maintenance and condensate drain considerations that FTE needs to re3view and evaluate.

Lesson Learned:

AC units on the Veterans corridor where oversized for the GEB and the amount of heat generated by the equipment inside, not enough heat for the AC unit to stay on for sufficient time, to maintain acceptable humidity range which is between 50 to 60 %. The AC units need to be cycle more frequently to efficiently reduce the humidity levels. The AC units on the project are 3.5 ton HVAC units and appear to be 1 ton oversized. The recommended unit should be a miniature split system in lieu of the wall mounted system as per Jeff Kipfinger.

Turnpike Extinguish the Torch – Session 2
FIN: 406151-1-52-01 & 406151-3-52-01 / E8M62
FIN: 4061512-1-52-01 & 406152-1-56-01 & 406152-3-52-01 / E8M63
FIN: 431275-1-52-01 & 431275-1-56-04 & 431275-3-52-01 / E8M60

- **Issue #21 – Differential Temp. Readings (Cornstat 4 vs SCADA Thermostats) Inside the Gantry Equipment Building**

  Issue:
  There is up to 7 degree temperature difference in reading between the Marv-Air AC thermostat and the SCADA thermostat. The SCADA thermostats transmit the data to FTE Sunwatch and generate alarms if the temperature inside exceeds 75F dry bulb. The Temperature differential between SCADA thermostat and Marv-Air thermostat needs to be minimal in order to provide3 accurate data to FTE Sunwatch and prevent any unnecessary alarms. It was observed by the CEI and the Contractor that the difference in sensitivity between the two thermostats in causing the differential readings. The Marv-Air thermostat is found to be more sensitive when the AC is not running.

  Resolution:
  Base on the recommendation from EOR following meetings between the EOR, CEI and Contractor, moving the Marv-Air Cornstat 4 thermostat temperature sensor closer, within 6 inches, to the SCADA thermostat tremendously reduced the temperature differential from average 5 degrees to average 2.5 degrees, thus eliminating the SCADA alarms.

  Lessons Learned:
  Recommend the plans locate the Marv-Air Cornstat 4 thermostat temperature sensor and SCADA thermostat closer together, within 6 inches if possible.

- **Issue #22 – Ditch Bottom Inlet at East Eisenhower Blvd Offset Conflict with Guardrail (Correction for Height out of Tolerance)**

  Issue:
  A newly installed ditch bottom inlet using an existing cross drain pipe located under the newly installed guardrail too close to the adjacent secondary road, the guardrail posts need to straddle the sides of the box. The ditch bottom inlet caused the warping of the shoulder pavement under the guardrail element to allow for proper drainage increasing the height from top of pavement to center of guardrail element greater than the FDOT standards.

Resolution:
The over height guardrail was brought into compliance utilizing Standard Index 400, Sheet 1 Note 4, with the use of localized rubrail element.

Lesson Learned:
It is recommended to ensure adequate offset distance between the edge of shoulder pavement and the ditch bottom inlet to avoid this condition.

- **Issue #23 – Pilaster Mounted Local IT Hubs Behind Noise Walls**

Issue:
Pilaster Mounted Local ITS Hubs: On Expressway Widenings with limited Right-of-Way, local ITS hubs for CCTV, MVDS, ITS and cabinet installations are set on Pilaster Mounted overhang concrete slabs with aluminum railings set on MSE Walls. Maintenance access is from the outside shoulder where the maintenance technician would need to climb over 2'-8" parapet. On the projects with 8' noise walls access from the outside shoulder is problematic. Access from outside walls would require a maintenance berm from a local road, with the use of bucket truck or a ladder. The installation of a permanent exterior wall ladder to the ground surface is not recommended to deter trespassers from accessing the local hub.

Resolution:
A platform and permanent ladder detail was developed by the EOR for the outside face of the noise wall to allow for the climbing down the outside face of the noise wall to the concrete overhang slab, once access from the shoulder over the wall has to be obtained via a bucket truck to get over the wall. However, the proposed resolution was not implemented due to contract time restriction.

Lesson Learned:
If possible located the local hubs at gaps in the noise wall for access from the mainline shoulder or provide a maintenance berm to allow local road access via a bucket truck from underneath.

Turnpike Extinguish the Torch – Session 2
FIN: 406151-1-52-01 & 406151-3-52-01 / E8M62
FIN: 4061512-1-52-01 & 406152-1-56-01 & 406152-3-52-01 / E8M63
FIN: 431275-1-52-01 & 431275-1-56-04 & 431275-3-52-01 / E8M60

- **Issue #24 - ITS Master Hub Foundation, Stairs and Security Fence**

  Issue:

  The contract plans did not provide a detail for the foundation, stairs, or security fence for the ITS Equipment Shelter.

  Per Special Provision Article 785-5.2.2 Shelter Floor and Foundation; The size of the foundation is dependent on the size of the ITS Equipment Shelter. Minimum dimensions of the shelter were provided in the pay item note on sheet IT-8. The shelter's concrete foundation size was to be determined to accommodate the offsets specified on the Master HUB Details (sheet IT-70). The foundation is required to have a minimum embedment of 8" in addition to being a minimum of 2' above the final grade by Specification.

  Resolution:

  In response to RFI #: E8M62-0142 a drawing labeled Master HUB Details (sheet IT-70A) was provided which was incorporated by Supplemental Agreement # 59. The drawing detailed the foundation size, provided for stairs, stair landing area, aluminum hand rail, sidewalk, Security Type "B" fence, and sliding gate.

  Lesson Learned:

  A standard ITS Master Hub Details drawing will be incorporated in all project contract documents which require an ITS Master Hub prefabricated shelter.

- **Issue #25 – Extra temporary AET signage for implementation**

  Issue: We had to pay extra to put up new AET signage in temporary locations because the permanent locations were not available in the phase of work that FTE wanted the signs erected. This resulted in extra cost to the FTE to have the permanent signs put up in temporary locations on skids and barrier walls. Also once the permanent signs were put up they were vulnerable to contruction damages and many were damaged. FTE had to pay for replacements because the contractor would have waited to the end of the project to erect permanent signs.

  Resolution or Benefit: Plan the work better or determine to use temporary AET signs.

Lesson Learned: Let AET contracts prior to the roadway and bridge contracts or design the MOT plans to show temporary AET signage to be placed by the contractor at the time of AET implementation. Put up the permanent AET signs near the project end.

- **Issue #26 – Asphalt cracking at junction slabs**

  Issue*:* Cracking Asphalt at the interface with concrete junction slabs. Refer to Standard Index 6110

  Resolution or Benefit: CEI recommendation is for the Design firms to design a crack prevention geotextile layer such as a woven fabric material to be placed over the moment slabs and under the asphalt or perhaps between the first and second layer of asphalt to prevent the uneven settlement of material. We want to stop the transfer cracking up through the asphalt at the interface of the moment slab. Also CEI learned that the joint expansion material (roofing felt) must be cut back to below the concrete level in the moment slab to prevent the asphalt from developing a crack at these joints caused by joint material sticking up into the asphalt and a weak area.

  Lesson Learned: Designer should have a crack prevention layer as a standard feature at the interface of pavement to moment slab. This problem occurs often where there are moment slabs under asphalt shoulders. Contractors must cut back the joint roofing felt material to concrete level in the junction slabs prior to placing asphalt.

- **Issue #27 – Shoulder Wall 32**

  Issue*:* On the Waters Avenue north bound on ramp to SR-589 Shoulder Wall-32 is a rigid retaining shoulder concrete barrier wall built per Standard Index 410 sheet 7. Plans show it holding soil at a 2:1 slope above the top of the wall with a gutter drain on top. This is a 1480 LF cast in place wall that has significant permeable landscaped area behind it. No weep holes were provided at the bottom of the wall. Water pressures in the soil must have been great and the wall showed fissures of leaking water which were dirty and stained the wall face. Construction and CEI consider that this wall should have had weep holes at the bottom to relieve the hydrostatic pressure in the soil behind the wall. As result this wall had water seeping and ugly soil stains through most of the joints and cracks and even small fissures in the concrete. Nothing was wrong with the concrete or reinforcing bars. The concrete averaged over 8000psi. FTE Materials Office investigated the wall and found adequate cover over the reinforcing bars. The design was from the

Standard index 410 and is used all over the state but our belief is that weep holes at the bottom of the wall with a type II underdrain system should have been designed. Also waterproofing material such as bentonite should have been designed on the back side of the wall as is done for tunnels and culverts.

Resolution or Benefit: FTE had to pay a $109,623.44 Supplemental Agreement to have the wall excavated and a waterproofing backing applied and an underdrain installed by a specialty water proofing subcontractor (Suncoast Waterproofing) to reduce the hydrostatic pressure and to keep the water and soil from seeping through the cracks, joints and fissures in the wall.

Lesson Learned: Designer AECOM should have used MSE wall in this location or designed a different wall and ensured that weep holes with underdrain was included.

- **Issue #28 – V Groove in traffic rail**

Issue: Cracking of the traffic rails sitting on top of MSE walls. Index 6110 requires ½" V Groove maximum spacing of 30 feet. Typical precast coping sections purchased from a supplier and installed by the contractor are 10 feet in length. Where there are joints in the precast coping every 10 feet we find hairline cracks in the traffic rails above.

Resolution or Benefit: When precast copings are used; require that the contractor place a ½" V Groove installed at the coping joints; this will control the cracking.

Lesson Learned: Though the cracking over the coping joints are not causing structural defects of the wall the uncontrolled directions of the cracks is unsightly.

- **Issue #29 – ITS conduit in shoulder**

Issue*:* ITS conduits should be placed near the ROW in the ground not in the roadway shoulder. There are 4 ITS fiber optic and 1 electrical conduits to be installed in the roadway shoulders going into and out of pull boxes and splice vaults for power and fiber lines, which are also located in the shoulders. The Veterans corridor was almost entirely MSE walls with moment slabs. The ITS conduits had to be placed just beyond the 5 ft. moment slab and slightly below it. The location of the conduits made it difficult to keep them out of the way of the mixing roadway stabilized subgrade layer, which uses a mixing machine and limerock base which requires a significant compactive effort. Often the

conduits were hit and/or crushed and had to be dug out and repaired with new conduit and couplings. The conduits were placed in the bridge decks and there were problems at the approach slabs with the weight of the concrete causing the rubber couplings at the bends in the conduit to collapse or be crushed and have to be jackhammered out and repaired.

Resolution or Benefit: Installation of the ITS and power conduits along the ROW fence line provides better access and minimizes exposure to damage during construction activities, in addition to providing safer maintenance access. If the only option available is installing the conduits in the roadway shoulder they should be installed inside an HDPE duct that provides additional protection from damage during construction activities. Another option is to encase the conduits in a concrete trench for protection.

Lesson Learned: Bury the 4 ITS Fiber optic conduits in the embankment in a duct bank near the ROW fences away from roadway shoulders concrete asphalt pavements.