

TURNPIKE DESIGN HANDBOOK (TDH)

DESIGN CRITERIA – PART 2



FLORIDA'S TURNPIKE ENTERPRISE PRODUCTION DESIGN DEPARTMENT

OCOEE, FL

January 2019

July 2019 Addendum #1

Introduction

As part of the Turnpike's continuing quality enhancement effort, the ***Turnpike Design Handbook (TDH)*** has been developed to provide consultants, reviewers and management with a single source of additional Turnpike-specific requirements that modify or add to the requirements included in the ***Florida Department of Transportation (FDOT) Design Manual (FDM)***.

The ***FDM*** and the ***TDH*** are both three-part documents:

- Development and Processes – Part 1
- Design Criteria – Part 2
- Plans Production – Part 3

The ***TDH*** also includes the [***Turnpike Guide Drawings***](#), which are available electronically on the Turnpike Design website.

For Turnpike requirements related to tolling, please see the [***General Tolling Requirements \(GTR\)***](#) which is a separate document.

The ***TDH*** table of contents for Parts 1, 2, and 3 show the ***FDM's*** chapters and sections that have been modified. If a section has been modified, the user can refer to the specific section in the ***TDH*** shown in the Table of Contents.

The ***TDH*** is updated on an annual basis, following the official revision of the ***FDM***. Interim updates to the ***TDH*** will be issued as Addenda to the annual revision.

Should you have any comments or suggestions for this ***TDH*** document, please contact the Turnpike Design Engineer.

200 Context Based Design

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

200.1 General

Add the following bullet to the design criteria list

- Aesthetics

201 Design Controls

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

201.4 Design Speed

Add the following paragraph

All Turnpike Interstate Facilities will follow **FDM, Table 201.4.1** (70 MPH minimum design speed) with the following exceptions.

1. HEFT from Milepost 0 to Milepost 27.5 has a design speed of 65 MPH in accordance to **AASHTO** design criteria, for horizontal and vertical curve length and stopping sight distance, with the exception of K-Values for crest vertical curves that must meet or exceed the more stringent FDOT 60 MPH criteria. All other design elements must conform to FDOT criteria.
2. Veteran's Expressway from milepost 1.54 to milepost 13.57 must have a design speed of 60 MPH.
3. Polk Parkway from Milepost 0 to Milepost 12.7 must have a design speed of 65 MPH.

201.4.3 RRR Projects

Add the following section

201.4.3.1 Turnpike Resurfacing Restoration and Rehabilitation (RRR) Design

Resurfacing design criteria must follow the modifications shown in **TDH 114**.

Add the following sections

201.6 Turnpike Design Controls

201.6.1 Use of "Interstate" vs. "Freeway Other" vs. "Non Interstate" Criteria

The Turnpike system must be designed to "Interstate" standards with the following exception.

1. Veteran's Expressway from Milepost 1.54 to Milepost 13.57 is classified as an Urbanized Freeway.

202 Speed Management

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

210 Arterials and Collectors

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

210.9 Superelevation

210.9.1 Superelevation Transitions

Replace paragraph 2 with the following paragraph

The standard superelevation transition places 80% of the transition on the tangent and 20% on the curve. In transition sections where the cross slope is less than 1.5%, a minimum longitudinal grade of 0.5% must be maintained for new and reconstructed alignments. For widening projects if MOT is shown to be cost prohibitive, the inside and outside edge of pavement must maintain a minimum grade of 0.3%.

210.10 Vertical Alignment

210.10.1 Grades

Table 210.10.2 Maximum Change in Grade without Vertical Curves

Add the following footnote

The minimum distance required between VPI's used to develop the profile grade line (PGL) is 3 x Design Speed.

210.10.3 Vertical Clearances

Replace the first sentence of vertical clearance requirement (6) with the following sentence

The required clearance for new overhead sign structures is 18.0 feet.

Replace the first sentence of vertical clearance requirement (7) with the following sentence

The required clearance for new walk-in Dynamic Message Sign (DMS) structures is 20.0 feet.

211 Limited Access Facilities

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

211.2 Travel Lanes and Auxiliary Lanes

211.2.2 Pavement Cross Slopes

Add the following sentence to the third paragraph

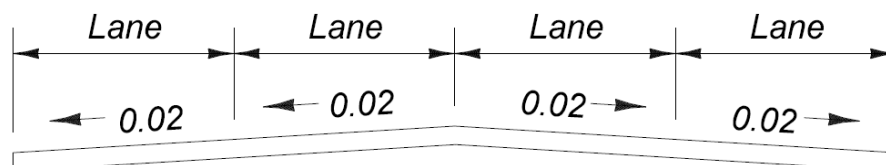
Both shoulder and travel lane transition(s) must be detailed in the roadway plans and all calculations documented in the roadway design documentation.

Add the following paragraphs

New two-lane ramps, must be designed with 0.03 cross slope for both lanes through the gore area. It is understood that **Figure 211.2.1** depicts through lanes, and that auxiliary lanes can be applied with a cross slope in the same direction as the adjacent through lane even if this causes more than three lanes to be sloped in the same direction. This approach does not require a Design Variation.

For new construction and widening projects the Turnpike's typical section with a 70 MPH design speed and eight (8) lanes is to have the two inside travel lanes sloped towards the median as shown in **Figure 211.2.1**.

Replace the 4th Typical Section with the following in Figure 211.2.1



211.2.2.1 Existing Pavement Cross Slopes

Add the following paragraph

Median through-lane widening, turn lanes, tapered or parallel single lane ramps adjacent to two through-lanes do not automatically warrant a 0.03 cross slope. Surface drainage will be reviewed and used as the deciding factor.

211.2.3 Hydroplaning Risk Analysis

Add the following paragraph

A hydroplaning analysis is required whenever any additional contributing pavement (ex: express lane buffer, paved shoulder, paved gore, auxiliary lane, etc.) is added to the standard pavement cross slope sections shown in **Figure 211.2.1**. Super-elevated sections must be analyzed for hydroplaning as outlined in **Table 211.2.4** below. For bridges with un-grooved decks that exceed the requirements outlined above, a hydroplaning analysis is required. A grooved bridge deck does not require an analysis. Hydroplaning analyses will apply to all conventional and non-conventional projects; (widening, reconstruction, and new construction projects). The hydroplaning analysis will include hydroplaning calculations and where a risk is identified, a risk evaluation will be provided in report format to include identifying mitigating strategies to reduce or eliminate the risk. The report will also include a benefit/cost analysis for the mitigating strategies. A final recommendation will be prepared and provided to the Turnpike Project Manager in conjunction with the Typical Section Package. This must be performed prior to the Phase I submittal.

Table 211.2.4: Hydroplaning Analysis Requirements in Superelevated (SE) Sections

Project Type	Number of lanes draining in one direction		
	Less than 3 lanes	3 lanes	More than 3 lanes
Capacity Improvements & New Alignments	Not required	Only when SE of lowest lane is less than 3% or when there have been 2 or more wet weather crashes* within the available 5-year crash data	Always required
RRR	Not required	Only required when there have been 2 or more wet weather crashes* within the available 5-year crash data	

* wet weather crashes attributable to hydroplaning conditions.

211.2.4 Roadway Transitions

Add the following paragraph

At bridge approach slabs, for a 150-foot length before or after the concrete approach slab, the ultimate pavement design asphalt thickness must be placed flush with the concrete at the ultimate profile grade. The initial pavement section must transition to the ultimate thickness at a maximum rate of 0.08 percent (1 inch/100 feet).

211.3 Medians

211.3.2 Median Crossovers

Add the following section

211.3.2.2 Crossovers on Turnpike Facilities

Median u-turns are used to accommodate turnarounds between interchanges for maintenance, service, and law enforcement personnel. The primary purpose of the u-

turns is to alleviate adverse travel time for emergency vehicles by providing strategic u-turn locations.

Coordination efforts between the Turnpike Roadway Design Engineer, Turnpike Traffic Operations Engineer, FHP Troop Commander, and Turnpike Maintenance Engineer helped provide the direction needed to identify and develop Turnpike specific criteria for the design and locations (sometimes relocation) of the official use u-turns on the system. Design guidelines from **AASHTO's A Policy of Highway and Streets**, along with outcome of the internal coordination efforts, were used to develop Turnpike specific criteria during the time when the state was developing standards for crossovers on Limited Access Facilities.

The following is a summary of crossover spacing criteria:

Criteria	Turnpike Requirement
Median width opening	≥ 20 feet (concrete barrier wall separated)

All crossovers within a project's limit must be evaluated for the spacing criteria and for sight distance deficiency. Findings must be documented and submitted to the Turnpike Project Manager for review and an internal decision will be made as to relocate or close the location. In the special case of managed lanes with buffers separating the managed lanes from general use lanes, crossovers will be prohibited. Evaluate alternative crossing locations.

[Emergency Crossover Design Guide Drawings](#) can be found on the Turnpike Design Website.

Additional guide drawings are available within **FDM 211**.

211.4 Shoulders

Add the following paragraphs

On ramps, the left and right shoulder widths may be reversed or adjusted if needed to provide additional sight distance on the inside of a curve. However, the sum of the right and left shoulder widths must be greater than or equal to the sum of the standard shoulder widths and in no instance will the shoulder width on the outside of the curve be less than 4 ft. Even though this is an acceptable practice for mitigating sight distance per **AASHTO Chapter 10.9.6**, a Design Variation for shoulder width will be required.

Where single lane ramps meet cross roads, additional ramp lanes are usually added for acceleration/deceleration of right or left turns. Unless these additional lanes are more than 500 feet long measured along the ramp baseline, single lane six-foot-wide ramp

shoulders must be used throughout. A similar 500 feet length would apply to ramp toll facility approaches and departures. Frequent short changes in ramp width do not warrant corresponding short changes in ramp shoulder width. The shoulder transitions may be longer than the multi-lane ramp segment.

Other shoulder requirements:

1. Four feet paved inside shoulders on one lane ramps and profiled edge lines on both sides of the travel way for all ramps must be evaluated at each ramp location within a project before implementation. The evaluation must consider horizontal and vertical geometry, sight distance, crash data, and other site-specific factors to compare safety benefits to constructability and cost considerations.
2. "Two Lane Ramp Interstate" within **FDM Table 211.4.1** must also be applied to ramps with more than two lanes, and thus have a four foot paved inside shoulder and a ten feet paved outside shoulder.
3. Though **FDM 260.1.1** only shows "two lanes" for multi-lane ramps, the shoulder configuration (six feet inside shoulder and ten feet outside shoulder) must also be applied when more than two ramp lanes occur.
4. Twelve feet inside and outside paved shoulders must be provided for mainline sections that are three lanes or more in one direction, and that have greater than 250 DDHV trucks. Additional stabilization and continuation of the shoulder cross slope beyond the twelve feet paved width are not required. This shoulder width requirement must be applied to roadway on retaining wall and bridge when the above conditions occur.
5. A minimum median paved shoulder width of twelve feet is required for express lane marker separated express lanes.
6. Shoulder requirements for 100 ft. of pavement centered on the toll gantry, are listed in the General Tolling Requirements.

211.4.2 Shoulder Cross Slopes

Add the following section

211.4.2.1 Shoulder Rocking

When a minimum 0.3% longitudinal gutter grade cannot be maintained using uniform shoulder cross slopes then shoulder rocking may be used to achieve positive drainage. The cross slope for shoulders may be varied from minimum 3% to a maximum 6% in tangent sections. The design must maintain balance between inlet spacing and flat shoulder cross slopes. A 0.24% minimum longitudinal gutter grade may be used to achieve a minimum distance of 100-feet between the low point and the high point of the shoulder rocking. Designs adjacent to a single slope barrier wall must include provisions to maintain the minimum height required by the Standard Plans. Designs adjacent to an F-Shape concrete barrier wall must include provisions to maintain the gutter profile within the 3" vertical face of the wall and maintain a minimum height required by the Standard Plans.

For outside shoulder rocking, use one of the three options below to meet minimum spread criteria. Options 1 and 2 are preferred and must be shown as not feasible, as determined by the District Roadway and District Drainage Engineers, before Option 3 can be considered.

1. Use concrete barrier wall with inlets to collect storm water. The varying shoulder cross slope must be designed to meet then the above criteria for shoulder cross slope and longitudinal gutter grade.
2. Use guardrail with shoulder gutter and inlets to collect storm water. The varying shoulder cross slope must be designed to meet the above criteria for shoulder cross slope and longitudinal gutter grade.
3. Use guardrail in conjunction with a permanent turf reinforcement mat in fill sections with a front slope steeper than 1:4 (maximum slope of 1:2) and maximum height of 10 feet. Shear stress calculations are required to be submitted for the design/selection of the permanent turf reinforcement mat. If slope and height criteria cannot be achieved then Option 3 is not feasible, use Option 1 or 2.

The top of concrete barrier wall profile must be designed in such a manner as to create a profile that follows the roadway profile grade and does not follow the 'sawtooth' shoulder design. The height of the proposed concrete barrier wall will vary (minimum height per Standard Plans) between the high and low points of the shoulder rocking profile to allow

the top of the barrier wall profile to stay relatively constant and follows the grades of the roadway profile grade avoiding undulating top of barrier wall.

211.4.4 Audible and Vibratory Treatment

211.4.4.1 Ground-in Rumble Strips

Add the following paragraph

The minimum thickness of structural asphalt on shoulders where ground-in rumble strips must be used is 1.5 inches. On existing shoulders without rumble strips that call for new rumble strips to be placed, the minimum thickness of existing structural asphalt and proposed asphalt must be no less than 1.5 inches.

211.7 Horizontal Alignment

211.7.2 Horizontal Curves

Add the following section

211.7.2.1 Express Lane Separation in Horizontal Curves

Express lanes must be either barrier separated or buffer separated with express lane markers. Minimum stopping sight distance requirements per **FDM Tables 211.10.1, 211.10.2** and **AASHTO** apply. If barrier or express lane markers impede required sightlines around horizontal curves, then a design exception or variation is required.

211.8 Superelevation

Add the following sentences

The criteria contained in **TDH 210.9** is applicable for Interstates, Freeways, and Expressways. The RRR criteria contained in **TDH 210.9.2** applies to limited access resurfacing projects.

For ramp design speeds less than 35 mph see **AASHTO Exhibit 3-30 Maximum Relative Gradient** for superelevation transition rates.

211.9 Vertical Alignment

211.9.2 Vertical Curves

Add the following paragraphs

The minimum vertical curve lengths and minimum K values found in **FDM Tables 211.9.2** and **211.9.3** require some clarifications and restrictions:

Service Interchanges Per **AASHTO**, it is intended that a "platform" about 200 feet in length be provided on the ramp in advance of the gore using the Freeway K values.

System Interchanges K values for the higher system ramp design speeds must be used except for the "platform" area.

211.11 Structures

Add the following sentences

The width of all Turnpike-owned roadways on retaining wall and bridge must equal the paved width of the approach roadway and shoulder. The unpaved width of shoulder is not included in the width. **TDH 211.4** provides criteria for design of shoulders.

211.13 Ramp Terminals

Add the following paragraph

According to **AASHTO**, parallel designs are preferred over tapered design. To optimize safety and operations within interchanges, all new construction, widening, and capacity improvement projects must provide parallel entrance and exits unless project specific circumstances warrant the need for tapered designs. The project specific circumstances must be coordinated with the Turnpike Roadway Design Engineer and the justification documented in the Design Decisions Journal.

Add the following section

211.17 Sodding

On resurfacing projects where there is more than 12 feet of travel lane pavement draining to the edge, the minimum sod dimension is 2 feet 8 inches. Where there is less than 12 feet of travel lane pavement draining to the edge, the minimum sod dimension is 1 foot 4 inches. Typically, the 2 feet 8 inches occurs on the outside shoulder and the 1 foot 4 inches on the inside shoulder.

For all slopes adjacent to new construction or widening, sodding must be used throughout the entire limits of the project.

Add the following section

211.18 Interchange Fence

On all projects involving interchanges between a Turnpike system facility and any roadway classified as “Urban”, use Type B fence along the limited access right of way within the limits of the interchange unless otherwise approved for the Turnpike Roadway Design Engineer.

Limits of Type B fence within the interchange begin at the theoretical gore point of each ramp and terminate at the end of the limited access right of way adjoining the urban roadway being crossed. Quadrants that do not contain a theoretical gore point will extend Type B fence to the point where the typical mainline right of way is resumed.

Add the following section

211.19 Roadway and Bridge Approach Slab Evaluation

RRR Projects – The ERCAR must evaluate the profile, cross slope, and rideability of all roadway and bridge approach slab locations throughout the limits of the project. When deficiencies are identified, summarize the potential underlying causes and provide a recommendation for correcting the deficiencies along with an estimated cost of construction.

Capacity Improvement Projects – Perform the same evaluation and obtain concurrence as described in the paragraph above prior to the 15% line & grade submittal. Existing bridges and approach slabs that are scheduled for complete reconstruction do not need to be evaluated for corrective measures.

Add the following section**211.20 Flexible Pavement Design**

Flexible pavement designs must be done to the following minimum standards.

- (1) All pavement designs on new construction must be calculated using a minimum reliability (%R) of 95%.
- (2) All pavement designs on rehabilitation projects must be calculated using a minimum reliability (%R) of 99%.
- (3) All temporary pavement designs for use during construction must be calculated using a minimum reliability (%R) of 80%.
- (4) All pavement designs, with the exception of temporary pavement, must be calculated for a 20-year design life. The minimum design life and traffic (ESAL_d) for temporary pavements must be no less than the construction period for the project.
- (5) Table 5.5 of the [*Flexible Pavement Design Manual*](#) is the required minimum thickness for new construction and resurfacing projects.
- (6) All travel lanes pavement must include PG 76-22 in the top structural lift and friction course regardless of traffic level.
- (7) Coordinate the use of friction course with the Turnpike Pavement Design Engineer for all ramps. FC-5 is preferred for high speed tangent sections of ramps. FC-12.5 is preferred for section of ramps with heavy truck traffic, turning and stopping movements. The type of friction course used must be evaluated for long term maintenance, surface drainage, existing crash patterns and pavement structural value. The pavement design report must document what the existing friction course is and compare that to the existing crash patterns in determining the friction course when resurfacing ramps. The EOR must determine the location where speeds on the ramp are expected to drop below or exceed approximately 50 mph and make a recommendation for the logical transition between FC-5 and FC-12.5.
- (8) Using a much higher traffic level mix than traffic requires can cause premature deterioration and cracking of the pavement. Therefore, do not increase the traffic level mix in the pavement design documents or plans to anticipate optimization of contractor operations. [*FDOT Standard Specification 334-3.2*](#) provides the contractor this flexibility within the realms of required criteria.
- (9) If new pavement is proposed to be joined to existing pavement such as widening, auxiliary lanes, ramps, and turn lanes, a minimum 6-inch wide shelf must be created at the longitudinal joint by milling the existing pavement structure. The minimum depth of the milling equals the thickness of the final lift of structural

course in the new pavement structure. This creates a milled offset in the longitudinal pavement joint from preceding lifts of structural asphalt. Tack coat is used in the shelf to aid in adhesion and imperviousness. A detail of the longitudinal joint must be developed and placed in the project typical section details. The traffic control plan must accommodate the space necessary for this work in the phasing sequence. Plan notes or a table of dimensions must describe the limits of the milled shelf width and depth.

- (10) All pavement designs through toll loop pavement area must meet the minimum pavement designs listed in the [GTR](#). If necessary, the pavement thickness must be increased from the [GTR](#) minimums in order to provide the required pavement structural number.

212 Intersections

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

213 Modern Roundabouts

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

214 Driveways

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

215 Roadside Safety

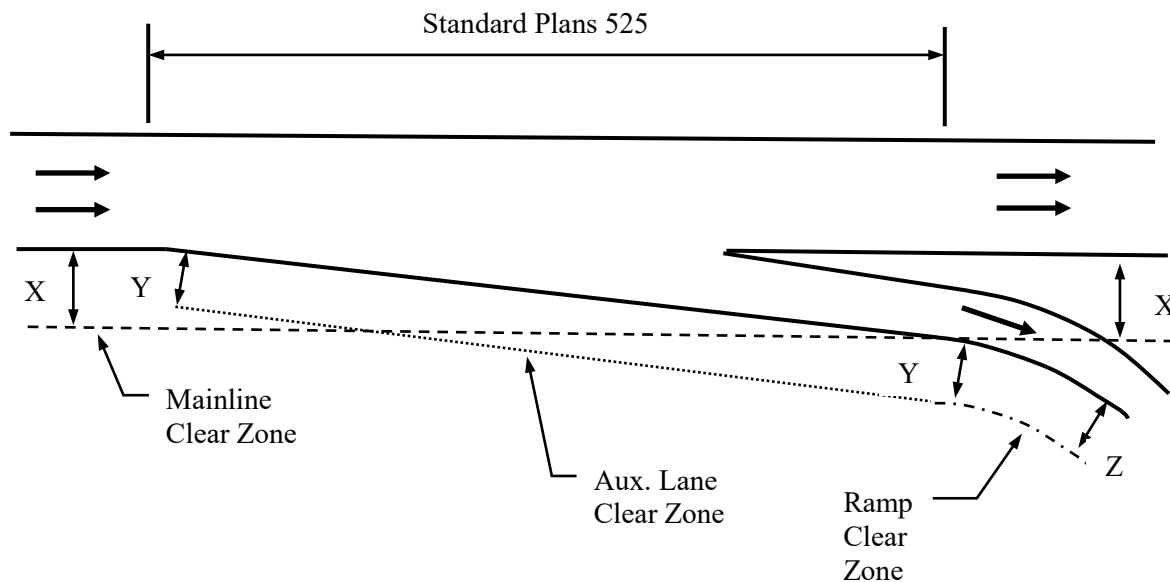
The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

215.2 Roadside Features

215.2.3 Clear Zone Criteria

Add the following figure

Figure 215.2.16 Clear Zones at a Ramp



215.2.6 Roadside Slope Criteria

Add the following paragraphs

A 1:2 front slope rate with guardrail can be applied regardless of fill height when constrained conditions exist, which requires approval from the Turnpike Roadway Design Engineer, Turnpike Drainage Design Engineer and Turnpike Maintenance Engineer.

5 feet from face of guardrail to the beginning of the 1:2 cut slope must be provided on all guardrail and 1:2 cut slope applications to allow for a 5 feet guardrail deflection. If a

concrete barrier is used instead of guardrail and shoulder gutter, then a 4 feet wide level bench must be constructed within the fill behind the barrier before proceeding with a 1:2 slope.

New permanent slopes steeper than 1:2 require approval from Turnpike Roadway Design Engineer, Turnpike Drainage Design Engineer, Turnpike Geotechnical Engineer and Turnpike Maintenance Engineer. Where the slopes are deemed too steep to perform maintenance, provide concrete pavement on slopes.

215.3 Roadside Hazards

215.3.2 Canal Hazards

Add the following paragraphs

A water body is defined as a natural or manmade feature, such as a pond, lake, ditch or canal that has a depth of water of 3 feet or more for an extended period of time (24 hours or more), as measured from the seasonal high water level or control elevation, to the water feature's bottom elevation.

Provide shielding for all water bodies within the interchange areas.

Evaluate for the need to shield all water bodies within Turnpike right of way and those that run along and may fall slightly outside of Turnpike right of way. Evaluation must include the review of traffic data, facility characteristics, 5 year crash history, and a cost estimate of recommended improvements.

Modification for Non-Conventional Projects:

Delete the above paragraph and see RFP for specific shielding requirements.

215.4 Longitudinal Barriers, Barrier Transitions, End Treatments & Crash Cushions

215.4.1 Longitudinal Barriers

215.4.1.1 Flexible Barrier

Add the following paragraphs

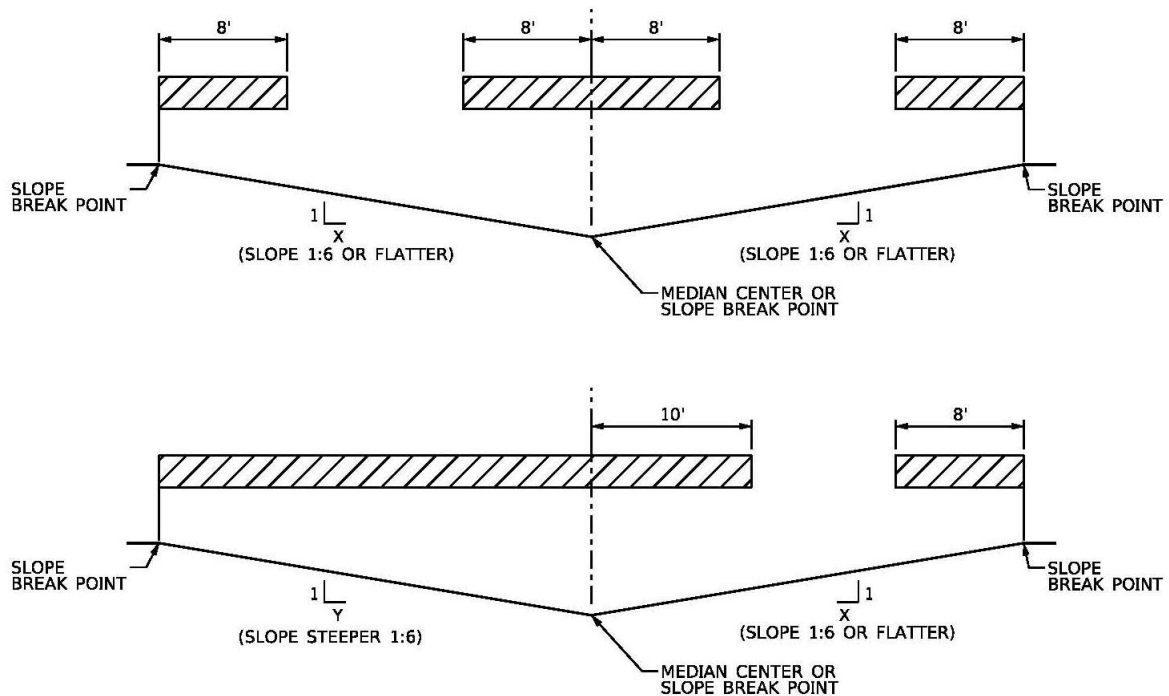
The following criteria apply to the placement of high tension cable barrier and supplement the ***Developmental Specification 540 High Tension Cable Barrier System***.

1. The preferred slope for high tension cable barrier placement is 1V:10H. The maximum allowable slope is 1V:6H.
2. Areas where high tension cable barrier must not be placed are shown in ***Figure 215.4.8*** below.
3. Post spacing must be installed such that the dynamic deflection is no more than a maximum of 8 feet.
4. End anchors must be protected from vehicle impact with rigid barrier, guardrail, or overlapping cable barrier.

For median applications retro-reflective sheeting must be specified on both sides of the posts.

Add the following figure

Figure 215.4.8 Flexible Barrier Placement



THE CROSS HATCHED AREAS IN THE FIGURE INDICATE THE LATERAL POSITIONS WHERE THE CABLE BARRIER MAY NOT BE EFFECTIVE AND SHALL NOT BE PLACED.

215.4.1.2 Semi-Rigid Barrier

Add the following paragraph

The treatment of guardrail post installed in areas with soils that exceed the standard **AASHTO** soil requirements for guardrail post must conform to the [W-Beam Guardrail Installations In Rock and In Mowing Strips Detail Guide Drawing](#) which can be found on the Turnpike Design Website.

215.4.6 Barrier Placement

215.4.6.4 Continuous Median Barriers

Add the following section

215.4.6.4.1 Median Barrier Grading Requirements

The preferred median slope is 1V:10H. This is flatter than the standard 1V:6H median typical section slopes. The slopes ahead and in front of guardrail installation are particularly critical on the older and narrow medians of 40 feet wide (see **AASHTO Roadside Design Guide**). In most cases, regrading requires the median ditch profile to be realigned horizontally and vertically. Therefore, drainage and earthwork in these areas need special attention in developing the typical sections and drainage profiles.

Add the following section

215.4.6.4.2 Access Openings

On projects that add roadside barrier to existing facilities (e.g. canal protection, spot/system wide safety improvement projects), locate maintenance and operations access points to existing facilities that are outside the clear zone and would not be accessible from the shoulder.

The maximum continuous length of a guardrail run along the outside of the roadway is 2,500 feet between end terminals. An access opening must be provided when long guardrail runs are broken up. Coordinate with the Turnpike Maintenance Engineer and Turnpike ITS Design Engineer on the final access location points to meet the needs of maintenance and operations.

The preferred typical detail for roadside guardrail access openings is depicted in the [Maintenance Access Detail Guide Drawing](#), found on the Turnpike Design Website.

215.4.7 Warrants for Roadside Barriers

Add the following sentence

Light pole foundations are not considered a hazard if built in accordance to **Standard Plans, Index 715-001**, though the roadway slope may cause a portion of the foundations to protrude more than 4" in height.

215.7 Existing Barrier Systems

Add the following paragraphs

For added capacity and reconstruction projects, existing guardrail sections that do not meet current mounting height design standards must be replaced or upgraded to meet current standards. If a run of guardrail extends beyond the project limits, then a 25 foot transition detail will be used to connect to the existing guardrail.

For resurfacing and spot or system wide safety improvement projects, existing guardrail sections that do not meet current mounting height design standards AND are impacted by project improvements must be replaced or upgraded such that the entire run of guardrail meets current standards. If the impacted length is less than 50 percent of the total length of guardrail then only the impacted length may be replaced or upgraded if a Design Memorandum is provided that includes justification for the modified replacement or upgrade. If the run of guardrail extends beyond the project limits, then a 25 foot transition detail will be used to connect to the existing guardrail. Existing guardrail not impacted by the project improvements is not required to be upgraded or replaced.

216 Earthwork

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

216.1 General

Add the following sentence to paragraph 3

Landscape work may require excavation to remove and replace soils unsuitable for plant growth and finish grading for drainage and aesthetic purposes.

216.5 Earthwork Pay Items

216.5.6 Borrow Excavation (Truck Measure)

Replace paragraph 2 with the following paragraph

Borrow material, if available, may be obtained from within the right of way of the project, upon approval from the Turnpike Design Engineer. Obtaining material from the project right of way must not create an unsafe condition or unprotected hazard. Any borrow excavation occurring within the FDOT right of way must meet the pond dimensional criteria depicted in **Figure 5-1** of the [FDOT Drainage Manual](#). The control elevation must be determined if a slope steeper than 1:4 is proposed in order to confirm compliance with **Figure 5-1** of the [FDOT Drainage Manual](#). The proposed borrow areas must be reviewed and coordinated with the Turnpike Environmental Permit Coordinator, Turnpike Drainage Design Engineer, and Turnpike Roadway Design Engineer.

216.6 Summary of Earthwork

Add the following sentence

Specify and quantify material necessary to meet the drainage design requirements, such as select material beneath swales, on fill, and ponds designed to percolate runoff.

220 Railroads

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

221 Utilities

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

221.1 General

Add the following sentence to paragraph 3

For stand-alone landscape projects, it may not be necessary or cost effective to do full utility coordination. Utilize best available information (Level D) to show utilities on landscape plans and add plan notes stating utilities will not be relocated as a result of planting. Notes will be included requiring the contractor to provide utility designates and locates for Department-owned and private utilities.

222 Pedestrian Facilities

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

223 Bicycle Facilities

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

224 Shared Use Paths

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

225 Public Transit Facilities

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

226 Patterned Pavement and Architectural Pavers

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

227 Freight

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

228 Landscape Design

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

229 Selective Clearing and Grubbing Design

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

230 Signing and Pavement Marking

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

230.1 General

Add the following paragraphs

[Traffic Guide Drawings](#) establish guidelines for traffic design and traffic engineering plan development. The Guide Drawings attempt to improve the quality of plans, provide system consistency, reduce plan development time and reduce plan review time. The Guide Drawings represent the compilation of engineering manuals, best practices and effective design experience. The Guide Drawings show layouts and details of an example condition.

Use these Guide Drawings to exercise proper engineering judgment and prepare a safe and effective design that fits the specific conditions of a project. The inappropriate use of and adherence to these Guide Drawings does not serve as exemption from the professional responsibility of developing an appropriate design. Become familiar with the information contained in the Guide Drawings and discuss specific design details with Turnpike design staff.

The [Traffic Guide Drawings](#) are available on the Turnpike Design Website

Ancillary structures must not be placed in drainage features. If project geometry or other constraints require the placement of an ancillary structure in a drainage feature, coordinate with the Turnpike Drainage Design Engineer to confirm these structures and their associated components are placed above the appropriate elevation as follows:

- Treatment Swales – Weir Elevation
- Conveyance Ditches – Normal Depth
- Stormwater Ponds – Design Storm Peak Stage
- Floodplain Compensation or Other Systems – Seasonal High Water Level
- Provide the applicable elevation in the component specific cross sections and typical cross sections.

230.1.1 Structural Supports

Add the following sentence

Refer to **TDH 261** for information regarding structural support requirements. Refer to **TDH 325** for information regarding plan requirements.

230.1.3 Vertical Clearance

Add the following sentence

Refer to **TDH 210.10.3** for vertical clearance requirements for sign structures.

230.2 Signing

230.2.1 Sign Placement

Add the following sentences to paragraph 1

The placement of signs must avoid presenting too much information, interfering with other traffic control devices, impairing the visibility of other signs and violating minimum spacing distances (see **Table 1, Minimum Spacing Distances for Signs in Florida Administrative Code 14-51.014**). The design must adhere to the sign spreading concept presented in **MUTCD 2E.11**. The minimum sign spacing between a Dynamic Message Sign (DMS) and guide signs or directional signs should be 1000 feet, when the guide sign is upstream of the DMS sign.

Add the following sentences to paragraph 2

Consider the physical placement of sign supports as well as the visibility of the sign panel. Clearing and grubbing must be included in the project to remove trees and other vegetation that blocks or diminishes the visibility of the sign panel. Refer to the [Traffic Guide Drawings](#) for guidance.

Add the following paragraphs

All advance guide signs should use the physical gore as the point of reference for distance messages. The only time this should not be done is if the physical gore and theoretical gore are separated by more than 500 feet.

Destination guide signs on ramps must include destinations that repeat advance guide sign and supplemental guide sign information and provides route guidance to the driver.

Follow Typical Off Ramp Signing Diagrams, located on Turnpike Design Website, for Advisory Speed Warning Signing at all Turnpike exit ramps.

For all post-interchange distance signs, the maximum letter height used must be 10" E or 10" EM.

For size of signs, lettering and plaques, follow the Freeway Classification in **MUTCD Tables 2B-1, 2C-2, 2E-4 and 2E-5**. The minimum sizes for regulatory and warning signs on exit or entrance ramps to/from Turnpike facilities must be Freeway Classification.

230.2.2 Overhead Signs on Limited Access Facilities

Apply the following overhead sign warrant to exit direction signs and advance guide signs

Mount advance guide signs on overhead structures when the number of travel lanes in one direction is three or more. Supplemental guide signs must remain ground mounted under sections of three or more travel lanes.

Add the following paragraphs

The express lane toll amount sign closest to an express lane ingress must be supported on a mid-or full-span structure.

Add the following sentence to paragraph 5

Align the far edge of the sign panel, furthest from the upright, flush with the end of the horizontal chord of the cantilever structure.

230.2.4 External Lighting of Overhead Signs

Add the following paragraph

If a sign panel on an existing structure is being replaced, all sign panels on the structure should be consistent. For example, if a structure has three existing signs with lights, one panel is being replaced, the plans should call for either A) lights on the new panel or B) the other two panels replaced with Type XI sheeting and removal of the lights.

Add the following paragraph

Top mounted luminaires are prohibited on mainline or ramps.

230.2.5 Signs on Barriers and Traffic Railings***Add to list of permanent signs permitted on median traffic railing***

Do Not Stop (TPK-7)

Add the following section**230.2.11 Toll Route Markers**

The Turnpike mainline must use the Turnpike route marker sign panel shown in the most current [Traffic Guide Drawings](#).

On side streets, leading to the Turnpike Mainline, use the Toll Auxiliary Sign (M4-15) in combination with the Turnpike route marker. On numbered routes, use the Toll Route Shield (FTP-79-06, FTP-80-06, or FTP-81-06) without the additional Toll Auxiliary Sign.

The width of the attached cardinal direction sign, directional arrow auxiliary sign, or other auxiliary sign must match the width of the parent route marker sign.

Add the following section**230.2.12 Truck Lane Restrictions**

Include truck lane restriction signs on corridors that have three or more lanes in each direction of travel.

Sample panel designs for the restriction are included in the Guide Drawings. Locate the signs similar to a post-interchange sign so that drivers entering the system are informed at each entry point. If installation of the truck lane restriction sign is not possible on the mainline due to sign clutter, the truck lane restriction sign can be located on the entrance ramp after the toll facility, when necessary, to maintain proper sign spacing.

230.3 Pavement Markings

Add the following reference

TDH [Traffic Guide Drawings](#)

231 Lighting

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

231.1 General

Add the following paragraphs

Lighting Guide Drawings establish guidelines for lighting design and plan development. The Lighting Guide Drawings are available on the Turnpike Design website

Projects that include lighting design must comply with applicable standards. In addition to the FDOT Standard Specifications, the following standards should be consulted:

Roadway Lighting Design Guide, AASHTO - This is the basic guide for highway lighting. It includes information on warranting conditions and design criteria.

FDOT Standard Plans - These indices are composed of standard drawings or indexes which address specific situations that occur on a large majority of construction projects.

Recommended Practice for Roadway Lighting IES RP-8-00 (R2005), ANSI/IESNA.

American National Standard Practice for Tunnel Lighting IES RP-22-11, ANSI/IESNA.

The IESNA Lighting Handbook Reference & Application, IESNA.

Federal Aviation Regulation, Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, USDOT/FAA. This regulation sets the requirements to follow on projects near airports.

Federal Aviation Administration Advisory Circular AC 70/7460-1, Obstruction Marking and Lighting, FAA. This advisory circular defines the requirements identify objects that require special lighting near airports.

Federal Aviation Administration Advisory Circular AC 150/5345-43, Specification for Obstruction Lighting Equipment, FAA. This advisory circular contains the FAA specification for obstruction lighting equipment.

Manual on Uniform Traffic Studies (January 2000) Chapter 15 Highway Lighting Justification Procedure, FDOT.

231.1.3 Voltage Drop Criteria

Replace all with the following paragraph

The maximum allowable voltage drop for determining the conductor sizes for light branch circuits is 6 percent. It must include a combination of both feeder and branch circuit runs from the power company service point to the last luminaire within a circuit.

231.1.5 Underdeck Bridge Lighting

Add the following sentence

In addition to piers and pier caps, underdeck lighting can also be mounted to other substructure elements such as end bents and wall copings.

Add the following section

231.1.5.1 Nighttime Underdeck Lighting

Where there is continuous roadway lighting during the night, roadways under bridge structures must be lighted to the same level (or criteria) of the adjacent roadway. If the adjacent roadway is not lighted, lighting under bridge structures is still required where frequent nighttime pedestrian traffic exists, or where unusual/critical roadway geometry occurs adjacent to or underneath the bridge structure.

Add the following section

231.1.5.2 Daytime Supplemental Underdeck Lighting

Tunnel or daytime lighting may be required when the bridge structure limits natural sunlight penetration and limits a driver's visibility under the structure. Evaluation of existing/proposed roadway design regarding the need for tunnel or daytime lighting must be included in the LDAR. Tunnel or daytime supplemental lighting must be provided as warranted by evaluation or as required by the Turnpike Electrical Design Engineer or Turnpike Maintenance Engineer. These requirements include not only Turnpike facilities, but any roadway crossing under a Turnpike facility.

Methodology from the **ANSI/IES RP-22-11 Tunnel Lighting Guide** must be used to determine the need for daytime supplemental lighting for underpasses. **ANSI/IES RP-22-11** provides **Table 2** and **Table 3** for determining the need for daytime lighting of

tunnels/underpasses and for preliminary determination of the target luminance value for threshold zone lighting.

When the adjustment factor per **ANSI/IES RP-22-11 Table 2** is zero, no daytime lighting is recommended.

No daytime lighting is recommended for underpasses of 80' or less.

No daytime lighting is recommended for underpasses between 80' and 250' long with traffic volume below 15000 AADT, if there is good daylight penetration and good wall reflectance. However, where skewed roadway geometry, pedestrian/bike facilities, or local jurisdictional request(s) are present, a daylight study (per Turnpike procedure and with consideration of these factors) must be performed to verify the need for daytime lighting.

- (1) Consider several factors when determining the proper adjustment factor from **ANSI/IES RP-22-11 Table 2**:
 - (a) Exit Visibility- Where the exit is completely visible from the site safe stopping distance, the silhouette of objects beneath the underpass against the bright aperture at the exit may provide better detection by contrast for a driver. Make an assessment to determine if the roadway beneath the underpass is straight and allows contrast detection from the driver's viewpoint at the site safe stopping distance. This is considered "good" exit visibility. Otherwise, for example where curved roadways (horizontal curve with radii of 880 ft. or less in rural areas, 2500 ft. or less in urban areas) are present beneath the underpass, the exit must not be considered visible.
 - (b) Daylight penetration- The overall luminance level is assisted by natural light entering the underpass. Assess daylighting through openings such as entrance/exit portal, columns, wall embankments beneath the underpass, and median separations (10 ft. or greater) between the bridges. 3-D modeling lighting simulation software with daylighting features (i.e. AGi32) is the recommended method for determining daylight penetration for proposed/existing conditions. For existing bridge daylighting retrofits, results from software simulation may be field verified using photometric meters at the site prior to completion of design.
 - (c) Reflectance of Underpass Walls- For narrow underpasses, retaining walls help to improve the luminance on the pavement due to the amount of light that will be reflected. For wide underpasses with three or more lanes and those with embankments, the reflectance has much less effect due to the inter-reflection between the bridge deck and embankment surfaces. Assess the reflectance based upon the material reflectivity (i.e. concrete

reflectivity varies between 20-30%, see recommended reflectivity in **Table 231.1.1**) of the underpass' surfaces.

- (d) Traffic volume and pedestrian/cyclist traffic- Underpasses in urban areas are likely to have high traffic volume and pedestrian/cyclist traffic, therefore daytime lighting is required for underpasses exceeding 80 ft. as warranted per **ANSI/IES RP-22-11, Table 2**.
- (2) Determine the pavement luminance value from **ANSI/IES RP-22-11, Table 3** and apply the adjustment factor from Table 2.
- (3) Perform a daylight study using lighting simulation software capable of 3-D modeling of proposed underpasses and with features required to account for contribution of sunlight per weather station data. The Study must be performed at 9am, 12 noon, & 3pm at proposed underpass locations.

The average luminance value in the threshold zone of the underpass must be determined per **Tables 2** and **3** of the **ANSI/IES RP-22-11** guide.

A daylight study (to be included in the LDAR) must be performed by software simulation and field investigation to account for sunlight that may contribute to achieving the overall luminance value at the roadway beneath the underpass. See recommended surface material reflectivity percentages for use in software modules following the recommended procedure below.

The Procedure for Design of Photometrics for Daytime Lighting is as follows (**ANSI/IES RP-22-11** and **AGi32** or equivalent software will be needed to implement this procedure):

- (1) Determine the **AASHTO** SSSD per **ANSI/IES RP-22-11 Table 1**. Typical underpass will likely be evaluated for threshold zone only lighting. Calculations must be performed to confirm this assumption.
- (2) Determine threshold zone luminance value.
 - (a) Per **ANSI/IES RP-22-11 Table 2**, evaluate table parameters to determine adjustment factor.
 - (b) Evaluate proposed roadway "scene" and select scene per **ANSI/IES RP-22-11 Figure 3**.
 - (c) Evaluate and determine the "Suggested Maintained Average Pavement Luminance Levels in the Threshold Zone of Vehicular Tunnels", per **ANSI/IES RP-22-11 Table 3**.
 - (d) Apply adjustment factor from 2a.

- (3) Perform daylight study for proposed underpass. **AGi 32** lighting software is recommended. Other equivalent software/field methods may also be used. Considerations include, but may not be limited to: luminance contributions from the sun, material reflectance, underpass orientation, etc. per **ANSI/IES RP-22-11**.
- (a) Create a proposed underpass model. The model must include, but not be limited to: all surfaces that reflect light, any openings, roadway layout below underpass, bridge structures beneath underpass, as well as other contributors.
 - (b) Apply surface reflectivity characteristics. The recommended material reflectivity characteristics may be obtained from **Table 231.1.1**.
 - (c) Create calculation zones for the roadway(s) beneath the proposed underpass. Data points near the edges of the underpass may artificially inflate the luminance average. It is recommended that those data points not be considered in the overall average luminance. points within the first 23 ft. of the entrance and exit portals must not be included in the overall average.
 - (d) Run daylighting module and calculate average luminance values within calculation zones established in 3c. Site location coordinates are required for weather station data (if available, the Perez All Weather module). Luminance value determined in previous step 2 must be used. As a worst-case scenario, daylight module study must be run assuming the orientation of the sun at 9am, 3pm, and 12 noon.
 - (e) If average luminance value cannot be met using daylight, then layout supplemental wall mount luminaires beneath underpass as needed to meet the calculated average luminance value. Use of nighttime luminaires in conjunction with the daytime supplemental luminaires may be required. The goal should be to meet the average luminance value using the least amount of fixtures.
 - (f) Adjust and re-run daylight module and re-calculate as needed to meet the average luminance value as determined in Step 2 above.

Deliverables from the daylighting study must include, but not be limited to:

- Snapshots of all 3-D views of underpass models
- Summary of luminance value achieved with point to point photometrics layout that shows the calculation zones
- All designer's assumptions/judgements made to support the study

Coordination with the Turnpike Structures Design Engineer, power utility service provider, and electrical design sub-consultant (if separate from lighting designer) may be required.

Modification for Non-Conventional Project:

Average pavement luminance value for daytime lighting must be implemented as directed in the RFP.

Add the following table

Table 231.1.1 Material Reflectivity

Material (Surface)	Recommended Reflectivity
Concrete	0.25
Steel	0.20
Asphalt	0.38

231.2 Design Criteria

Add the following paragraphs

All design considerations must be documented in the Lighting Design Analysis Report (LDAR). Design variations and exceptions from Department criteria must be identified separately in the table of contents and fully clarified under the “Design Methodology” section of the LDAR. See Lighting Design Analysis Report template, available from the FTE Design website, for additional information. Correspondence regarding deviations/exceptions should be included as an appendix to the report and referenced as needed for clarification. A summary of deviations/variations/exceptions described in the design methodology shall be documented in the “Conclusions” section of the LDAR. Coordinate with maintaining agencies, as well as other Department stakeholders as applicable, to ascertain their preferences and obtain all other pertinent information required to provide an acceptable design.

Lighting pole layout and design must employ practices, where possible, to reduce the risk of light poles in high crash and high risk locations. Some of these design considerations are, but not limited to: lane drop and intersection locations, sections of roadway where the paved shoulder narrows, and curve/vehicle departure directions.

Conventional lighting must be used. Conventional lighting must be mounted within the right of way beyond the outside shoulders of the roadway along the mainline. For ramps and auxiliary lanes separated from the mainline, outside shoulder mounting is preferred.

Conventional roadway lighting luminaires must be pole top style, for FTE-owned roadways.

Modification for Non-Conventional Projects:

Conventional lighting must be used unless directed otherwise in the RFP.

Shoulder mounted poles must be used unless directed otherwise in the RFP.

Projects with conventional lighting must be designed for an average initial illumination as indicated in **Table 231.2.1**. Rest areas and service plazas must also be designed for an average initial illumination as indicated in **Table 231.2.1**. This includes the ramps to and from the service plazas.

The lighting design must include mainline transition lighting to allow a reasonable reduction in lighting levels from a lighted roadway to an unlighted road. The mainline transition lighting must extend beyond the project lighting limits by approximately four-to six- pole spacing. The mainline transition illumination levels must be 1.0 foot candles average initial intensity (horizontal foot candles) with the same uniformity ratios specified in **Table 231.2.1**.

Evaluation of the use of luminaire shielding will be required for all areas of the roadway adjacent to residential, highly urbanized, or environmentally sensitive locations where potential light pollution may be perceived. Photometric analysis using luminaires with the manufacturer's shield option must be included in the Lighting Design Analysis Report. Coordination with other disciplines for review of areas of concern is required.

If the length of the mainline between any two lighted areas (roadway sections, interchanges, service plazas, and/ or tolls facility) is 0.5 mile or less, then that section of the mainline must be lighted.

All widening and resurfacing projects must be reviewed for compliance with current lighting criteria. Project begin and end limits must define project lighting scope to be considered, regardless of the limits of resurfacing unless otherwise noted.

Projects with open road tolling gantries are not required to have roadside lighting unless required by another section of the **TDH** and/or a Lighting Justification Report. Where roadside lighting exists, the roadway lighting must be reviewed for compliance with current lighting criteria and **GTR**. All deficiencies within the project scope must be identified and corrected. The Turnpike Electrical Design Engineer and the Turnpike Project Manager must be notified regarding all lighting deficiencies found outside the project limits.

Where new poles and luminaires are being proposed, all poles, luminaires, foundations, and infrastructure within the project scope must be new.

Modification for Non-Conventional Projects:

All poles, luminaries, foundations and infrastructure must be new unless directed otherwise in the RFP.

Table 231.2.1 Lighting Initial Values

Replace the following items

Roadway Classification	Illumination Level Average Initial Foot Candle		Illumination Uniformity Ratios		Veiling Luminance Ratio
Or Project Type	Horizontal (H.F.C.)	Vertical (V.F.C.)	Avg./Min.	Max./Min.	L _{V(MAX)} /L _{AVG}
Conventional Roadway Lighting and Signalized Intersections					
Limited Access Facilities, Major Arterials & Highway Speed Tolling Gantries	1.7	N/A	4:1 or Less	10:1 or Less	0.3:1 or Less
All Other Roadways	1.0				
Pedestrian Ways and Bicycle Lanes*	2.5				
High Mast Roadway Lighting					
Limited Access Facilities, Major Arterials & Highway Speed Tolling Gantries	1.0	N/A	3:1 or Less	10:1 or Less	N/A
All Other Roadways					
Sign Lighting					
Low Ambient Luminance**	5.0 to 10.0	N/A	N/A	6:1	N/A

Medium Ambient Luminance**	10.0 to 20.0				
High Ambient Luminance**	20.0 to 40.0				
Rest Area Lighting					
Entrance and Exit	1.7	N/A	4:1 or Less	10:1 or Less	N/A
Interior Roadways	1.5				
Parking Areas	1.5				

*This assumes a separate facility. Facilities adjacent to a vehicular roadway should use the levels for that roadway.

** Ambient luminance classifications are defined in Section 10.3 of the **AASHTO Roadway Lighting Design Guide** (2005). Refer to the [Traffic Guide Drawings](#) for information on sign panel sheeting.

Add the following notes to Table 231.2.1

Notes:

- *For conventional lighting:* These average illumination values should be considered standard, but should be increased, if necessary, to maintain a uniform ratio. The maximum illumination level average initial horizontal foot-candle value must be 2.25 FC for interstate, expressway, freeway, major arterials, and highway speed tolling gantries. The maximum illumination level average initial horizontal foot-candle values must be one and one-half values for all other roadways, pedestrian ways, and bicycle lanes.
- *For highmast lighting:* These average illumination values should be considered standard, but should be increased, if necessary, to maintain a uniform ratio. The maximum illumination level average initial horizontal foot-candle values must be one and one-half values for interstate, expressway, freeway, major arterials, highway speed tolling gantries, and all other roadways.
- *For rest area and service plaza lighting:* These average illumination values should be considered standard, but should be increased if necessary to maintain a uniform ratio. The maximum illumination level average initial horizontal foot-candle values must be one and one-half values.

Add the following section

231.2.1 Box Girder Maintenance Lighting and Power

Welding or burning of the structure is not allowed. The electrical work associated with the box girders involves working in confined space areas. All precautions and rules according to "confined spaces" of the ***Code of Federal Regulations, 29 CFR 1910.146*** apply. Emergency lighting must be provided within each box girder per ***NFPA 101***.

The minimum conductor size must be No. 10 AWG. A green insulated conductor must be installed in each conduit run. The minimum conduit size must be 1 inch.

The six-hour timers must control the lighting contactors. Timers must be provided at each hatch entrance and mid span.

The light fixtures must be connected to branch circuit breakers separate from the receptacle branch circuit breakers.

The service voltage for the box girders must be 240/480 volts, single-phase, three-wires and then step down to the 120/240 volts through the mini power centers. A main disconnect switch must be provided immediately adjacent to the hatch door of each girder. The 240/480 volt-feeder must terminate in a distribution panelboard. The distribution panelboard must provide 480 volt power to each mini power center.

The number of mini power centers within each box girder must be determined based on the number of lights and receptacles. The maximum number of lights and receptacles within a mini power center must be as indicated on ***Standard Plans, Index 715-240***.

Add the following section

231.2.2 Lighting Load Center and Wiring Criteria

The standard service voltage for the roadway lighting load centers must be 240/480 volts, single-phase, three-wires.

Roadway lighting load centers must be coordinated with utility service provider prior to Phase III Plan Submittal. Utility service transformers must be coordinated for connected and spare loads. Consideration must be given for utility standard transformer sizes and limitations. Where a lighting load exceeds typical utility service transformer sizes, the lighting load must be split and multiple load centers provided to serve the load.

[FDOT Standard Plans, Index 639-001](#) (Service Point Details) and **[Lighting Guide Drawings](#)** must be coordinated with the utility service provider's requirements for

electrical service (or electrical service standards). The electrical service point must be designed to meet all utility service provider's requirements.

The load center location and surrounding area must have a minimum of 1'-0" between the load center and the design high water elevation.

Load center enclosure minimum dimensions must be as shown in the Turnpike Lighting Guide Drawings.

Where a load center is being replaced and existing poles, equipment, etc. are being re-fed, all equipment and identification labels must be replaced to include the new load center designation and circuit. Coordinate with the Turnpike Maintenance Engineer to properly update identification of equipment.

The voltage for the roadway luminaires must be 480 volts, single-phase, two-wires.

Roadway lighting circuit conductors must not be larger than #1 AWG. Circuits requiring conductors larger than #1 AWG must be coordinated with the Turnpike Electrical Design Engineer and Turnpike Maintenance Engineer.

Where existing conductors within a circuit are being replaced, the size of the new conductors must not be smaller than the existing conductors.

Dedicated circuits must be provided for daytime supplemental underdeck lighting. Daytime dedicated circuits must be in separate conduits from roadway lighting circuits. Where conduits are run in the same trench with roadway lighting conduits, the conduits must be separated in the pull boxes. Dedicated daytime lighting circuit conduits must be wrapped with electrical hazard tape in the pull boxes. Dedicated daytime lighting circuit conductors must be identified with an additional tag that states the conductors are live 24 hours a day, seven days a week.

Underdeck light fixture mounting details must be provided. Light fixtures/associated conduit may be field routed. Attachment of lighting equipment/associated conduit to MSE wall panels is not allowed. Attachment of lighting equipment/associated conduit to MSE copings is acceptable. Attachment to other bridge elements must conform to the Structures Design Guidelines Appendix 1A.

Roadway lighting must be connected to alternate circuits to prevent a total blackout of any section of the highway in the event a circuit is out of service. Minor replacements must be evaluated on a case by case basis.

Modification for Non-Conventional Projects:

Roadway lighting must be connected to alternate circuits unless directed otherwise in the RFP.

The maximum distance between pull boxes and/or splice boxes in long conduit runs is 300 feet.

A special power distribution design is required when new poles and luminaires are being proposed behind noise walls. Conduit, junction boxes, and pull boxes must be installed in front of noise walls on the roadside.

There must be no more than three circuits in a single conduit. Provide multiple conduits as needed in the plans.

All roadway crossings must be provided with a spare conduit and a dedicated pull box at each end of the crossing road. Use of light pole pull boxes is not allowed, where space is sufficient for providing dedicated pull boxes.

Add the following section

231.2.3 Temporary Lighting Criteria

The design of temporary lighting must meet the criteria shown in **TDH 231.2**. Temporary lighting design may require review from Central Office for the purposes of opening a project specific pay item. Photometrics, details, quantities, and layout in the roadway temporary traffic control plan for specific construction phases will be required.

Add the following section

231.2.4 Pole Design Criteria

Bridge mounted light poles (bridges and approach slabs) are not desirable and should be avoided where possible. This can be done by adjusting the pole spacing before and after bridge approaches. If bridge mounted light poles are unavoidable, their location must be coordinated with the Engineer of Record for Structures Design (see Standard Plan Instructions for Index 521-660). Bridge-mounted poles must have pull box as specified in [**FDOT Standard Plans**](#), **Index 630-010**.

Nominal mounting heights for conventional poles must be 40 and 50 feet as specified in [**FDOT Standard Plans, Index 715-002**](#). Nominal mounting heights for highmast poles must be between 80 and 120 feet as specified in [**FDOT Standard Plans, Index 715-010**](#). Technical special provisions (TSP) and details must be provided in those cases where special designs are required. TSPs must be signed and sealed by a Professional Engineer, licensed in the State of Florida.

Conventional roadway light poles must be aluminum and must not be painted. High mast light poles must be galvanized steel only.

A concrete slab is not required in those instances when the poles are located behind sidewalks. The pull box must be located flush with the sidewalk in front of the light pole. Plan details will be required for light poles located behind sidewalks to show layout of pull box, conduits, pole foundation, etc., especially for sites where limited Department-owned right of way exists.

A combination pole and pull box concrete slab is not required where the grade is 1:2 or greater and protected by guardrail.

All foundations and pull boxes must be coordinated with current and future grading to ensure that the top of the foundations and the pull boxes are not below grade. In addition, foundations, boxes (pull, splice, junction or similar), and lighting equipment must not be located within the limits of any drainage systems or other locations where water may intrude or debris may accumulate.

All components of the pole cable distribution system must be listed by a nationally recognized testing laboratory.

The pole cable distribution system must be installed in the pull box adjacent to each light pole.

For poles with two luminaires, a single TC cable must be run from the adjacent pull box to the pole's handhole. From the pole's handhole, a pole cable distribution system is required for each luminaire.

231.3 Design Methodology

Add the following list item

- (3) For Roadway Segments beneath Bridge Underdecks: 5 feet longitudinally and 5 feet transversely along the roadway, including pedestrian travel ways.

Add the following paragraphs

A point-by-point, computerized photometric analysis must be performed for all roadway areas being illuminated throughout the project. Photometric data points must be legible. A copy of the results of this analysis must be included in the LDAR. The photometric analysis must identify and evaluate each roadway classification and area of illumination, as defined by the **FDM 231.3.1**, within the project scope. Each analysis zone must be identified for all distinct area/sections of roadway within the project scope. Some of these distinct areas may include: mainline, ramps, and roadway directions. Results must indicate foot-candle values displayed on plan view on 11" x 17" pages with 1/100th accuracy (0.XX foot-candles). Where solid objects, such as bridges, block light fixture contributions, a 3D graphic representation must be included to ascertain that solids were accounted for. Typical section photometric analyses are not considered a complete or thorough photometric analysis.

A point-by-point, computerized photometric analysis must be performed for all signs being illuminated throughout the project. A 1 foot by 1 foot maximum point spacing must be used for the point by point photometric for the entire area of the sign panel(s). A copy of the results of this analysis must be included in the LDAR. Results must indicate foot-candle values displayed on each sign panel with 1/100th accuracy (0.XX) foot-candles).

A photometric analysis is required for projects where the relocation of light poles is included in the scope of work.

Provide an angle convention detail, if any tilting is required, to clearly depict fixture tilt orientation. A detail is required for each type of fixture being used (fixture on pole, sign luminaire, etc.). The detail(s) must be provided in the LDAR and the plan sheets.

231.3.1 Analysis Zones

Replace the last paragraphs with the following paragraphs

Limited Access Facilities:

Establish independent analysis zones for the mainline roadway segments, ramp segments, underdeck segments, and crossroad segments at interchanges.

The termini for each mainline roadway segment will be the lighting project limits. Logical termini for the other segments will be determined by the designer. The boundary of each segment is described as follows:

- (1) Analyze divided mainline roadway with grassed median using two analysis zones, one for each direction of travel; i.e., one zone for each direction of travel. Each zone will be bounded by the outside and median shoulder breaks.
- (2) Analyze barrier separated mainline roadway as one analysis zone bounded by the outside shoulder breaks of each direction of travel.
- (3) Analyze each ramp segment as one analysis zone bounded by the shoulder breaks. For interchange lighting where there is no continuous mainline roadway lighting, the average illuminance criteria must be maintained to the end of the ramp tapers.
- (4) Analyze underdeck divided roadway segments using two analysis zones, one for each direction of travel. Include pedestrian travel ways (i.e. bike lanes and sidewalks). Each zone will be bounded by the back edge of the pedestrian travel ways or travel lane (where no pedestrian travel ways are provided).
- (5) Analyze crossroad segments based on the criteria given above for flush shoulder or curbed roadways.

231.6 Lighting Coordination

Replace the last paragraph with the following paragraphs

Per **FDM 110.5.1**, all projects must be reviewed and coordinated with the FDOT State Aviation and Spaceports Office to determine if notification and/or permitting are required by the Federal Aviation Administration (FAA), (FDOT), and any local jurisdictions.

The preferred method of determining FAA notification requirements must be the **FAA's Online Notice Criteria Tool**.

The designer must provide copies of all lighting related notifications and permits for review in the LDAR. If none are required, written notification must be given to that effect in the LDAR. For FAA accounts, designate the “Sponsor” as Florida’s Turnpike Enterprise (FTE) with the Turnpike Production Project Manager identified as the “Attention of.”

Coordination with the manager of any affected airport and/or heliport may be required to fully address the airspace aspects of the project.

Add the following paragraph

Turnpike ITS and Tolls – Once the light pole locations are established, they should be checked with the ITS layout and the toll equipment layouts for any conflicts with the light poles, the light pole pull boxes, and the roadway lighting circuits.

Modification for Non-Conventional Projects:

The Roadway Lighting Engineer of Record is responsible for all necessary coordination of lighting facilities.

Add the following sections

231.7 Electrical Systems Design and Analysis

The design of all electrical systems (Lighting, Traffic Signals, ITS, etc.) must comply with ***FAC 61G15-33, Responsibility Rules of Professional Engineers Concerning the Design of Electrical Systems***. These responsibilities are applicable for all new projects and any major modifications or renovations.

The following analyses are required, yet not limited to: voltage drop calculations, load analysis and calculations, arc flash hazard analysis, and short circuit analysis and device coordination. These designs and analyses must be prepared, reviewed, signed and sealed by a Professional Engineer licensed in the State of Florida. The Professional Engineer must be competent in electrical engineering through training and/or experience. The design analyses must be submitted with each plan submittal as part of the LDAR for lighting projects and the Power Design Analysis Report (PDAR) for ITS projects.

Electrical system design analysis should be completed using accepted industry power system analysis software (i.e. ETAP, SKM, etc.). If calculations by hand are used, engineering judgment, assumptions and methods must be clearly explained in the report. All supplemental information used or referenced in the power design analysis must also be provided in the report.

231.7.1 Voltage Drop

Voltage drop calculations must be submitted for all branch circuits and service feeders. Voltage drop calculations must be limited to the percentages shown in the **TDH** and/or [Guide Drawings](#). If no criteria exist within the **TDH** and/or [Guide Drawings](#), the standards set forth in the **FDM**, [FDOT Standard Plans](#), and [FDOT Standard Specifications](#) must be used. If no Turnpike or FDOT criteria exist, use the guidelines set forth in the **NEC**. Voltage drop calculations must be performed when additional loads are added to existing infrastructure to ensure the proposed conductors are sized appropriately for the total voltage drop resulting from the addition of new loads further from the existing circuits. Formulas, description of variables, and any other supplemental information required to evaluate design results must be included in the report.

231.7.2 Load Analysis

A complete load analysis must be submitted. This analysis must include, but is not limited to: calculation of cabinet loads, circuit loads, and total loads for each service to determine and evaluate the appropriate capacity and rating for all components of the electrical system.

For any major modifications or renovations, calculations must consist of providing the existing load (prior to modification), the load being removed, the load being added, and new total load. A load analysis must be provided any time electrical load is added to existing infrastructure. All existing loads must be field verified by metering or calculated based on existing conditions.

New service points and load centers must be provided with a minimum of 20-percent spare capacity.

Manufacturer's product data cut sheets containing equipment power requirements must be provided in the report. Generator sizing calculations, UPS sizing calculations, and any other calculations affected by power loads for the project must be provided in the report.

231.7.3 Arc Flash Hazard Analysis

Provide an arc flash hazard analysis for new electrical distribution equipment (panelboards, transformers, load centers, disconnects, etc.), per the latest version of the **Standard for Electrical Safety in the Workplace, NFPA 70E**. An arc flash hazard analysis must determine the arc flash protection boundary and the personal protective equipment (PPE) that personnel within the arc flash boundary must use. The arc flash hazard analysis must be updated when a major modification or renovation takes place.

arc flash and shock warning labels must be field installed on each piece of new electrical distribution equipment. The labels must indicate the flash hazard boundary, the flash hazard at 18 inches, the PPE level requirements, and the approach restrictions. All labels proposed for use on electrical equipment must be provided (in .pdf format) as part of the report and in the plans.

231.7.4 Short Circuit Analysis and Device Coordination

A short circuit analysis must determine maximum fault current on each piece of new electrical distribution equipment and proper fault current interrupting capacity. Provide documentation from the utility provider on the maximum available fault current at the utility transformer. This value must be used in the short circuit analysis. Software programs or hand methods used must be capable of calculating the maximum short circuits at all electrical equipment locations to ensure equipment ratings are adequate. The short circuit analysis must be updated when a major modification or renovation takes place or if electrical load is added to existing infrastructure. The AIC ratings for all equipment must be provided as part of the contract documents to meet or exceed the short circuit analysis results.

Electrical distribution equipment must be designed as fully rated and selectively coordinated systems. The protective features of the electrical distribution system must automatically and selectively isolate a faulted or overloaded circuit from the remainder of the electrical system. Only the closest protective device to the fault must operate to isolate the fault without affecting other parts of the system.

232 Signalization

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

232.1 General

Add the following paragraph

Make every reasonable effort to incorporate the design preferences of the local maintaining agency. These preferences may include but are not limited to pole types, detector loop strategies, conduit routing, specific equipment, signal timing methods, etc. Meet with the maintaining agency to ascertain their preferences and obtain all other pertinent information. Report all findings to the Turnpike Project Manager before proceeding with design.

232.1.1 Structural Supports

Add the following sentence

Refer to **TDH 261** for information regarding structural support requirements. Refer to **TDH 325** for information regarding plan requirements.

232.1.3 Certification and Specialty Items

Add the following paragraph

The design of traffic signals compatible with local signal systems may require the use of materials for which there are no approved Standard Specifications or Supplemental Specifications. In those cases, Develop project specific TSPs for inclusion in the contract document.

232.10 Traffic Signal Project Coordination

Add the following paragraphs

Verify that documentation exists that the signal is warranted. If documentation does not exist, contact the Turnpike Traffic Operations Office.

In general, the Turnpike will actively work with the local maintaining agencies and the geographic District Traffic Operations office for coordination of design and maintenance issues.

Signal Systems - At the request of the local maintaining agency any signals designed by the Turnpike will include features and equipment typically used for their signals and signal systems. This will include time base, closed loop, UTCS or other technologies. The communications medium must match those already in place.

Legal Authorization and Maintenance Agreements - New traffic signal locations must be discussed with the Turnpike Traffic Operations Engineer so the new traffic signals can be included in the existing agreement. Maintenance agreements exist between the geographic district and local agency. The Turnpike Traffic Operations Office is responsible for communicating and coordinating directly with each District Traffic Operations Office (District Traffic Operations Engineer and Traffic Signals Engineer (or equivalent)) on new or modified traffic signals, signal systems and/or intersection beacons. Refer to the Traffic Signal Maintenance and Compensation Agreement (TSMCA) Procedure for details.

Add the following note to the Signal General Notes sheet:

Coordination must be made with the Turnpike Traffic Operations Engineer and Assistant Traffic Operations Engineer to prepare a traffic regulation for a warranted signal a minimum of 30 days prior to the signal going active.

Add the following section

232.11 Electrical Systems Design and Analysis

Refer to ***TDH 231.7***.

233 Intelligent Transportation Systems (ITS)

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

233.1 General

Add the following paragraph

Refer to **FDM 228** and Standard Scope of Services for information regarding Landscaping and Landscape Design. Coordinate with the DLA to avoid potential conflicts with existing or proposed landscape improvements.

233.1.3 ITS Device Approval and Compatibility

Add the following paragraph

Equipment requirements must be coordinated at time of final RFP or specification development with the Turnpike Traffic Operations Engineer to ensure the most appropriate manufacturers and models at the time.

233.3 ITS Power Design

Add the following paragraph

Refer to **TDH 231.7** for electrical design requirements for ITS.

600V step-up electrical systems are prohibited.

Include Power Distribution Unit (PDU) within each device cabinet. The PDUs provide maintenance technicians the capability to instantly reboot, start, and stop equipment remotely. Coordinate with FTE Traffic Operations Engineer for requirements.

233.3.2 Local Backup and Alternative Power Sources

Add the following paragraph

If any DMS (walk-in, Lane Status and TADMS) has secondary backup power through a permanent generator, then the corresponding UPS for the sign must be able to operate on battery power and display messages for a minimum of 15 minutes.

233.3.5 Power Load Requirements

Add the following paragraph

Design for 100% of load for all ITS device types. Include 20% spare load capacity in every cabinet (excluding DMS loads) and in addition, include a 15A receptacle load at the end of every circuit.

233.3.6 Voltage Drop

Add the following paragraph

The total voltage drop from the service point or separately derived system to the furthest ITS equipment shall be as recommended by NEC. See 233.3.7 for additional information.

For the calculation of the voltage drop and the size of conductors from the ITS cabinet UPS to the ITS devices (and for DMS DC circuits), use the allowable voltage drop recommended by the manufacturer of the ITS equipment.

233.3.7 Installation of Power Cable

Add the following paragraph

Maximum conductor size for ITS power circuits shall be #1/0 AWG. Larger Conductor sizes may be permitted from the utility service transformer to the service disconnect and from the service disconnect to the main distribution panel (load center, if applicable) to accommodate the total demand load calculated for all of the circuits. Coordinate with the utility company to provide service transformers at suitable locations to meet the maximum conductor size requirements.

Provide requirement to use gel-cap splices to splice electrical wires. No wire nut or electrical tape splicing is acceptable.

Power conduits must be sized adequately, as determined by the overall cable diameter and recommended percentage of fill of conduit area, per requirements in the latest ***National Electric Code (NEC)*** and [***FDOT Standard Specifications***](#), or a minimum of two inches (2") conduits, whichever is larger.

233.3.9 Emergency Generator Power Systems (Generators)

233.3.9.1 Generator Design Requirements

Replace the second paragraph with the following paragraph.

Use Diesel as the fuel type for permanent generator designs. The fuel tank shall be sized to provide 48 hours of run time at full (rated) load.

Add the following paragraphs

Permanent generators must be included on every express lanes project. These generators must include Automatic Transfer Switch (ATS), Communications cabinet, fuel tank, and support SCADA module. Coordinate with FTE ITS for requirements. Refer to the [***ITS Permanent Generator Installation Guide Drawings***](#) for guidance.

Provide Generator pad with a minimum clearance of 30" around the generator and fuel tank. Include pad design details with adequate information such as reinforcing, concrete class type/strength and installation notes.

233.4 ITS Support Infrastructure

Add the following paragraphs

All foundations, cabinets and pull boxes must be coordinated with current and future grading to ensure that the top of the foundations, cabinets and the pull boxes are not below grade.

Provide callouts/notes in the plans to indicate that existing infrastructure including but not limited to concrete poles, support structures, pull and splice boxes, foundations, conduit, fiber and wiring that are no longer used as part of the permanent ITS system must be removed and legally disposed.

233.4.1 Conduit Infrastructure

Add the following paragraphs

The fiber optic conduit system must consist of a minimum of four (4) 1-1/4" conduits. One (1) of the conduits must contain the fiber optic cable (FOC) backbone. One (1) of the conduits must contain tone wire and the other two (2) remaining conduits are spares. The conduits must utilize the colors as described below. In addition, for conduits that require stripes, include three (3) equally spaced longitudinal stripes of sufficient width and color intensity to be easily distinguished:

- Orange without stripes (fiber optic cable backbone);
- Orange with white stripes (tone wire);
- Orange with green stripes (spare); and
- Orange with black stripes (spare).

The electrical conduit system must consist of a minimum of one (1) 2" conduit, and must utilize Red colored (without stripes) conduit.

Lateral fiber conduit requirements for ITS must include two (2), 1.25-inch conduits, one of which one is a spare. The lateral conduits must utilize the following colors:

- Orange without stripes (lateral); and
- Orange with white stripe (spare).

Neither bridge-mount conduit nor barrier wall embedded fiber/electrical service wires will be allowed; if they are required, provide a memorandum including justification for consideration and approval by the Turnpike Traffic Operations Engineer.

Each conduit shall include only one fiber cable; no collocation of fiber cables inside the same conduit is permitted.

233.4.2 Pull, Splice, and Junction Boxes

Add the following paragraphs

Provide requirements for splice vault wire management such as non-metallic cable supports to allow the slack cable to be positioned without resting on the ground. The railing system must provide at least 3 inches of separation from the cabling to the bottom

of vault. Provide concrete apron as indicated in the standard index, ensuring appropriate compaction to reduce the possibility of washouts.

The top of pull, splice and junction boxes should be placed at a minimum of 2' above the appropriate drainage feature elevation described in **TDH 230.1**.

All splice boxes must be H-20 or HS-20 load rated with a minimum dimensions of 54"(L)x54"(W)x48"(D).

Any pull box proposed on shoulders or roadways must be H-20 or HS-20 load rated and include a solid bottom with provisions for weep holes and conduit entry. Pull boxes that are proposed outside shoulder/roadway must be Tier 22 load rated.

Pull boxes and splice boxes for fiber optic cable must be labeled and include the words "TPK FIBER OPTIC" permanently cast into their top surface.

Locate fiber pull/splice boxes such that the spacing between two consecutive fiber boxes (between pull box & pull box or pull box & splice box) does not exceed 1760 feet. Electrical pull boxes must be spaced at a maximum distance of 500 feet for the entire length of new projects.

Electrical pull box covers and Locate pull box covers for ITS must include the words "TPK ITS Electric" and "TPK ITS Locate" permanently cast into their top surface.

Pull boxes with low voltage (50V or less) ITS cables must include the words "TPK ITS Composite" permanently cast into their top surface.

233.4.3 Fiber Optic Cable Designating System

Add the following paragraphs

In addition to the Sunshine One Call number (800-432-4770) provided on each route marker, the following contact information must be shown:

Florida's Turnpike Enterprise, Traffic Management Center 954-934-1400

The labeling on the Fiber Route Marker must be:

BEFORE DIGGING IN THIS AREA CALL

Florida's Turnpike Enterprise

954-934-1400

AND

SUNSHINE ONE CALL

1-800-432-4770

For general coordination, provide the following contact information:

General ITS Coordination: 954-934-1400.

233.5 Fiber Optics and Network Design

233.5.1 Fiber Optic Cable

Add the following paragraphs

For new systems, the FOC backbone should utilize 144 single-mode fibers as a minimum (Minimum FOC 144 fibers mainline).

Lateral connections for ITS drops to the backbone must utilize 24 fibers as a minimum.

The wording on the warning tape shall include "CAUTION: TURNPIKE FIBER OPTIC CABLE BURIED BELOW".

Ensure labeling on splice enclosures, exiting conduits, and FOC entering the boot with weatherproof laser printed tags (no sharpie or marker). Ensure labeling on patch panels inside of building installations. Use a permanent laser printed tag, waterproof labels, with a printout indicating the department, number of strands, stations upstream and downstream to the next hub. For example:

Department: TP-ITS Strands: 144
Install Date: 07/07/2013 Project: 420735-1-A
Current MP: 152.6
Upstream MP: 153.4
Downstream MP: 151.9

233.5.1.1 Splices, Terminations, and Connection Hardware

Add the following paragraphs

For local hubs, use pre-terminated patch panels with factory terminated pig tail assemblies and connector panel(s). Use SC Type connectors.

Terminate all fibers that enter a structure inside the rack.

Bring the entire backbone fiber and terminate all fibers inside a hub building. Do not bring any laterals into the hub building.

Do not use multimode fiber or copper in any underground backbone or lateral locations.

When the project work necessitates a break in the fiber cable, include provisions regarding allowable downtime. Provide any temporary splice drawings required during construction.

Permanent fiber optic cable must include replacement of the entire cable from the nearest existing termination point (butt end splice) to the next existing termination point (butt end splice) removing all temporary splices.

Add the following section

233.5.1.2 Fiber Optic Cable Assignment and Allocation Scheme

Assign the backbone fiber optic cable buffers based on the following functionalities:

- Blue and Green buffers → ITS Layer 3 Communications
- Orange buffer → ITS Distribution
- Red and Black buffers → Tolls
- Rest of the buffers → Reserved for other functionalities

Allocate Orange buffer fibers to respective ITS device(s) based on the following:

ITS DEVICE FIBER ALLOCATION			
ORANGE BUFFER FIBERS		ITS DEVICE TYPE	FIBER ALLOCATION REPETITION/SPACING
1	2	CCTV AND COLLOCATED DEVICES →	Stagger between fiber pairs for each adjacent CCTV
3	4		
5	6	DMS AND COLLOCATED DEVICES →	Stagger between fiber pairs for each adjacent DMS
7	8		
9	10	MVDS GENERATOR BLUETOOTH AVI WRONG WAY DETECTION	ALTERNATE BETWEEN FIBER PAIR
11	12		

Coordinate with the Turnpike Network Administrator prior to Phase III submittal.

233.6 ITS Poles and Structures

233.6.1 Camera Lowering Device

Add the following sentence to paragraph 1

The CCTV camera must be mounted at a minimum of 45 feet above the highest crown elevation of the mainline roadway, and in some cases may need to be higher to maintain 100% coverage of the roadway.

Provide CCTV Poles in accordance with [FDOT Standard Plans](#).

All new CCTV deployments must utilize a camera lowering device to facilitate maintenance for locations that are difficult to access or where pole heights greater than 45 feet.

233.7 ITS Enclosures

233.7.3 Equipment Shelter

Add the following paragraph

The design layout must include necessary master hub locations to minimize network traffic with an optimum spacing. However, it must be supported by a network layout and analysis with appropriate design loss calculations to meet the intent and requirements of this section and all applicable Turnpike and FDOT standards.

Add the following section

233.7.4 Maintenance Service Pads

Maintenance pads are required at each new ITS component support pole location. These pads must provide adequate clear space for maintenance access and protected from erosion and silt.

Provide a concrete service pad at all new and existing, cabinet locations to allow a technician to stand on comfortably while working on equipment inside the cabinet. Service pad must allow access to cabinet equipment from each door.

At DMS locations with separate generators (separate from the overall express lanes generator installations) a leveled concrete pad of minimum eight feet (8') by ten feet (10') and six-inch (6") thickness must be installed to support the DMS controller cabinet and generator.

233.8 Communication and Networking Devices

Add the following paragraph

Coordinate with the Turnpike Traffic Operations Engineer to ensure the most appropriate ITS device and equipment manufactures and models are included in the plans.

233.9 Vehicle Detection Systems

233.9.3 Microwave Vehicle Detection Systems (MVDS)

Add the following paragraphs

In rural areas, MVDS devices must be spaced at 1 mile intervals and co-located with other ITS equipment, like CCTV. For urban areas, the MVDS devices must be spaced at ½ mile intervals.

For projects with Express Lanes, MVDS detectors must be located in both directions of travel with a maximum spacing of 1/3rd mile along each direction. Each MVDS detector may detect both General Toll and Express Lanes, however detectors located on a side of roadway must only detect General Toll and/or Express Lane(s) on the same side.

The MVDS should be installed at CCTV Camera locations to minimize costs, and where conflicts between the MVDS and CCTV lowering device can be avoided. The use of roadway lighting poles or sign structures for the installation of CCTV cameras and MVDS sites is not allowed.

233.9.5 Automatic Vehicle Identification (AVI) Systems

Add the following paragraphs

For travel time data collection, provide VDS-AVI equipment based on Bluetooth technology. VDS-AVI equipment must be installed at each walk-in DMS and every interchange, with a maximum spacing of approximately 3 to 5 miles, and in accordance with the manufacturer's requirements.

Provide a travel time origin-destination and link development submittal. This submittal must be coordinated with the Turnpike Traffic Operations Engineer, ensuring adequate link and site design / selection to provide adequate read and matches to provide a reliable travel time. This submittal must clearly identify each VDS-AVI location, message origin and destination, segment length, and anticipated DMS travel time message. In addition, this submittal must identify the links and messages for the FL 511 designation, which will be provided for critical segments from interchange to interchange.

233.10 Closed-Circuit Television Systems

Add the following paragraphs

Provide IP-addressable CCTV cameras with, Power over Ethernet (PoE) and built-in encoder utilizing H.264 video compression standard. Provide camera capable of providing 1080p resolution.

Provide 100% video coverage of the project corridor General Toll Lanes, and Express Lanes (as applicable) including shoulders, entrance/exit ramps, Master Hubs, ITS Cabinets, generators and walk-in DMS.

Provide a dedicated verification CCTV for every Toll Amount DMS (TADMS) and every Lane Status DMS (LSDMS). Mount the verification CCTV at a minimum height of ten (10) feet above the bottom elevation of the corresponding LSDMS or TADMS, and at a minimum offset of 250 feet upstream of the DMS face. These CCTVs must not count towards the 100% video coverage requirement of the corridor. The verification CCTVs may not require Camera Lowering Device unless CCTV is mounted at 45 feet or above the ground level and/or required for safety and maintenance purposes. Show cone of vision guide lines to ensure the verification CCTVs can view corresponding DMS clearly.

Add the following section

233.10.1 Video Display Systems

Video wall requirements must be coordinated at time of final RFP or specification development with the Turnpike Traffic Operations Engineer to ensure the most appropriate manufactures and models.

233.11 Motorist Information Systems

233.11.1 Dynamic Message Sign (DMS)

Add the following paragraphs

When general purpose mainline DMS is proposed, a travel time sensor compatible with the existing Vehicle Detection System – Automatic Vehicle Identification (VDS-AVI) System, formerly known as travel time system (TTS), must be installed at the site. Placement of mainline and arterial DMS must be in accordance with the **FDM**.

Any walk-in DMS proposed on structures collocated with static signage in the same direction must require a formal approval from the Turnpike Traffic Operations Engineer. Submit justification as to why **FDM 233.11.1** 8th bullet and 3rd sub-bullet cannot be achieved.

New walk-in DMS installed on the mainline must be capable of displaying 18” characters, 21 characters per line, three lines, full color, full matrix messages with 20mm pixel pitch (resolution). Center walk-in DMS over intended lanes.

Arterial DMS (also known as “ADMS” or “Front Access DMS”) must be capable of displaying 15 characters per line, three lines, full color and full matrix messages with 20mm pixel pitch (resolution). The minimum character height must be per **FDM 233.11.1**.

Toll Facility Approach DMS (TDMS) must be full-color with 20mm pixel pitch (resolution). TDMS must be located 1-mile to 2-miles from the toll facility being considered, and must be located to provide adequate perception-reaction distance for the approaching motorists.

Toll Amount DMS (TADMS). Each individual toll rate brick on a TADMS panel must be controlled by one controller, located in ground accessible cabinet. For instance, a

standard 3-destination TADMS requires three controllers installed in ground accessible cabinet.

For all types of DMS, provide a ground accessible cabinet to install UPS head units and associated battery equipment to meet backup power requirements. Transfer switch, auxiliary power and generator connection must be installed. Coordinate with the Turnpike Traffic Operations Engineer to see if a separate generator is required.

233.11.2 Highway Advisory Radio (HAR)

Add the following paragraphs

Existing HAR Transmitter (HART) and HAR Beacon (HARB) locations impacted by project work must be relocated to maintain system effectiveness, in accordance with FCC licensing requirements.

A typical HAR deployment consists of one (1) HART and two (2) HARB signs. One HARB is installed in each direction approaching the HART. A frequency study should be performed to determine a location for the HARB and HART. Ideal locations provide adequate signal strength and minimal potential interference of the radio signal between HARB and HART locations. A practical spacing of 3 miles is recommended between the HART and HARB location to ensure adequate signal strength at the beacon locations.

Coordinate HAR relocations with FDOT State Traffic Engineering and Operations, who maintains FCC licensing information for each HART. The Radio Frequency (RF) output is power adjustable up to the FCC maximum of 10 watts. The maximum power level must be in accordance with the requirements of the FCC License.

The existing and desired radio frequency is established at 1640 AM (1640 KHz), as licensed by the FCC.

240 Transportation Management Plan

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

240.1 General

Add the following item to the list of entities

- Florida Highway Patrol and Emergency Responders

Add the following item to the list of documents

- (9) FDOT, Drainage Manual

240.4 TTC Plan

Add the following items to item (6) of the TTC plan information list

- (6) “.... roadway CCTVs, and video detection sites.”

Add the following sentence to item (9) of the TTC plan information list

- (9) Consideration must take into account all affected lanes, i.e., mainline, auxiliary lanes, acceleration/deceleration lanes, ramps, etc.

Add the following items to the TTC plan information list

- (22) Emergency responder access to maintained travel lanes within work zone and to work area.
- (23) Communication plan to coordinate with Turnpike Traffic Management Center (TMC) for real-time work zone and lane closure activities.
- (24) Address Emergency Stopping Sites (ESS)/Accident Investigation Sites (AIS) for motorists and responders within the work zone.

Add the following paragraphs

Project specific conditions associated with milling and resurfacing require development of project specific notes for the plans. Generally, these notes are part of the TCP.

Ponding conditions during milling and resurfacing is prohibited. The Traffic Control Plan may require alternate stages/notes within a milling and resurfacing phase to meet this requirement.

The plan may require the contractor to alternate stages or pave multiple lifts during the same work period to comply with ponding avoidance and drop off restrictions.

Evaluate plans and to incorporate notes or phasing such that the contractor clearly understands the conditions associated with milling and resurfacing.

240.4.1 TTC Plan Development

Add the following items to Step #2

- (10) Maintaining drainage conveyance and spread.
- (11) Maintaining traffic at interchange locations, i.e. need for auxiliary lane(s), lengths of acceleration and deceleration lane(s).
- (12) Maintaining traffic on paved surfaces.

Add the following bullets to Step #6, Item (11)

- Staged wreckers or tow vehicles
- Emergency Stopping Sites (ESS) or Accident Investigation Sites (AIS)

Add the following items to Step #6

- (13) Turnpike TMC communication and coordination for real-time activities.
- (14) Detail temporary drainage and maintenance of offsite drainage plans.

240.4.2 TTC Plan Details

Add the following condition

- (11) Temporary pavement and drainage maintenance details.

240.4.2.5 Superelevation

Add the following paragraphs

The transition from existing to temporary pavements is a critical area. These areas are prone to flooding since all of the permanent construction features do not exist. These incomplete features include final pavement elevations and drainage facilities. Frequently, these temporary pavement transitions are superelevated with almost flat profiles. Elevations and grades with all superelevation data are required to be shown to ensure the intended design is constructed.

Diversions with construction speeds of 50 mph or greater are considered high speed facilities. Curvature and superelevation criteria for open highway conditions apply and must meet superelevation criteria described in the **FDM 210.9** and **211.8**.

240.4.2.6 Lane Widths

Add the following condition

The minimum lane width for work zone travel lanes is 11 feet on Interstate and freeway facilities, except at least one 12 ft. lane located on the outside in each direction must be provided. Auxiliary, turning, acceleration or deceleration lanes are not to be considered as the outside lane.

Add the following paragraphs

The lane width for work zone travel lanes on single lane ramps shall be no less than 12 feet minimum. For single lane ramps the lane width provided for turning movements must accommodate WB-62FL trucks entirely within the pavement markings of the travel lane. Truck turning templates and AutoTurn Analysis must be provided in the TTCP design documentation.

Shoulder widths associated with the travel lanes must be designed to achieve a minimum of two feet in width (paved). Spread must be checked to verify that the provided shoulder width complies with the criteria in **Chapter 3.9.1** of the [FDOT Drainage Manual](#).

Milling and resurfacing must utilize a minimum offset of four feet from Turnpike traffic and the milling operation or the resurfacing operation.

Consideration should also be given to maintain the maximum shoulder width up to 12-feet whenever possible to benefit motorists and for use by law enforcement and emergency responders for incident management.

240.4.2.7 Lane Closure Analysis

Add the following after paragraph 3

When the lane closure analysis requires periods less than eight hours the signed and sealed documents must be concurred by the Turnpike Traffic Operations Engineer and approval obtained from the State Roadway Design Engineer before the Phase II plans can be submitted for review. The Phase II plans will not be accepted for review until approval is obtained from the State Roadway Design Engineer.

Add the following paragraphs

Closing a traffic lane on interstate or limited access facilities can have a significant operational impact in terms of reduced capacity and delay. Operational impact can occur when lane closure(s) of any of the following occur; mainline, interchange ramp(s), auxiliary lane(s), acceleration or deceleration lane(s). There will be no daytime lane closures allowed unless it is approved in writing by the Turnpike Director of Transportation Operations or designee, even though the lane closure analysis may support a daytime closure, approval must be obtained. See [Turnpike Lane Closure Policy](#) for more information. The Lane Closure Policy can be found on the Turnpike Design website.

The Turnpike System is a major intrastate facility that is vital in the case of evacuations due to weather and other disasters. The Turnpike also serves as a diversion route for various Interstates, including I-95 and I-4. All construction zones must be able to reopen all lanes in the event of evacuation. The development of a traffic control plan must not include prolonged lane reductions on mainline, ramps, auxiliary lanes, etc. The staging of a particular construction project must permit the roadway to be restored to its original number of lanes within 24 hours. If necessary the use of temporary bridges must be included in the traffic control plans to avoid prolonged lane closures due to work on the bridge.

Lane closure traffic data must be obtained from Turnpike Traffic and Planning Office including a growth rate factor and peak seasonal factor for all production design projects. See [Turnpike Lane Closure Guidelines](#) for additional information and guidance. The Lane Closure Guidelines can be found on the Turnpike Design website.

Develop analysis for both the begin construction year and the end construction year for projects twenty-four months and longer. Lane closure analyses are to be submitted for review in electronic format and include traffic data as attachment for reference. If a detour and/or a prolonged closure is proposed on a project, the lane closure analysis must also include traffic analysis of the affected ramps. In terms of prolonged closure, include analysis and effect of closure(s) on the capacity and operations at the interchange. Once

reviewed and approval is provided, a signed and sealed Lane Closure Analysis will be requested by the Turnpike Project Manager for filing in the project folder.

Daytime closures will be considered/allowed if a recommendation is made to the Turnpike Project Manager that a closure is more beneficial to the Turnpike, its customers and adjacent property owners. For example, driving guardrail posts at night adjacent to homes is not as desirable as daytime closures which would support the work during the day and minimize the noise pollution and complaints from the adjacent property owners. Provide all supporting documentation including, but not limited to, lane closure analysis and the specific reasons why the request is being made. On certain projects, daytime lane closures may not be applicable throughout the entire project. This aspect must be considered for the design when making a recommendation. Evaluate adjacent project closure hours and include analysis and recommendation.

In addition to daytime lane closures, lane closures from sunup Friday until sundown Sunday (weekend) are prohibited. Weekend lane closures will also be considered/allowed if a recommendation is made to the Turnpike Project Manager that a closure is more beneficial to the Turnpike, its customers and adjacent property owners. A weekend lane closure request must follow the same process as a daytime lane closure request.

Add the following section

240.4.2.7.1 Requesting Deviations from the Lane Closure Policy

Deviations from the [Turnpike Lane Closure Policy](#) are highly discouraged and should only be considered when all other alternatives are deemed impossible, impractical, or unsafe. Deviations must be requested with the necessary justification in accordance with the [Turnpike Lane Closure Policy](#). A Technical Memorandum must be prepared and approved by the Turnpike Director of Transportation Operations or designee(s) as soon as possible in the design and no later than Phase III. The Technical Memorandum must contain at a minimum:

- 1.) Project Description
- 2.) Design Criteria
- 3.) Proposed Criteria
- 4.) Justification
 - a. Summarize Lane Closure Analysis
 - b. Evaluate 5-Year Crash Data (Including Time of Day Analysis)

c. Alternatives Considered

- i. Explain why these alternatives are impractical, impossible, or unsafe.
- ii. Include rough cost, impacts to right of way, environment, community, operations, etc.

5.) Summary Conclusions

6.) Appendices

- a. All necessary supporting documentation

A coordination meeting with Turnpike Traffic Operations Engineer, Turnpike Roadway, Design Engineer and Turnpike Construction Engineer is required prior to requesting the deviation which is done as part of the 45% MOT meeting and no later than Phase II.

Add the following section

240.4.2.7.2 Exit Ramp Opening

Work in the vicinity of an exit ramp must follow the latest MUTCD requirements with the following modification:

- (12) Minimum Ramp Opening of 200 feet.

240.4.2.8 Traffic Pacing Design

Add the following paragraphs

The Florida Highway Patrol troop who will assist in the operation, and communicate and coordinate with the Turnpike TMC for pre-notice and real-time implementation. Coordination with Turnpike TMC will allow real-time traveler information use of dynamic message signs, highway advisory radios and citizen band advisory system and statewide Florida 511 system.

FDOT Standard Plans, **Index 102-655** also includes a design table applicable to most work times of 20 minutes or less. The table is based on a pacing speed of 20 mph. Slower pacing speeds are not recommended but can be selected when necessary to shorten the pacing distance. See **Turnpike Lane Closure Policy** for additional guidelines on Traffic Pacing. The Lane Closure Policy can be found on the Turnpike Design website.

Site specific conditions will dictate whether a pacing operation can be implemented; therefore, coordination is required at the time the Traffic Control Plan is being developed. The type of work will determine the construction equipment and required staging areas the contractor will need, particularly for placing bridge beams. Review of these issues will determine if lane closures will need to be used along with the pacing operation, or if the traffic will have to be detoured instead of paced. If it is determined that a pacing operation will be used, concurrence must be obtained from the FHP Troop Commander who will assist in the operation.

Refer to **TDH 242.7** for Traffic Pacing Restrictions.

240.4.2.9 Detours, Diversions, and Lane Shifts

Replace the 1st bullet under the header Special Detour with the following

- Cross sections (which only show geometric information) and a table showing temporary asphalt thickness will be included in the TTC Plan for detours.

Add the following items to the list of requirements

- (6) Cross-slope break overs must be located on stripe lines except when the lane is actively transitioning.
- (7) Lane cross slopes are required to be per **FDM 211.2.2**.
- (8) TTCP will provide provisions that pavement drop offs must be on lane lines.

240.4.2.12 Narrow Bridges and Roadways

Add the following paragraph

In the development of the detailed traffic control plan, any existing guardrail and barrier wall end treatments must be compared with standards to ensure the current standards are met. If the traffic control plan impacts these end treatments, then protective device upgrades will be necessary.

240.4.2.13 Highway Lighting

Replace paragraph 1 with the following paragraph

Temporary lighting systems are required for all roadways where existing lighting is being replaced or new lighting is being constructed. Prepare a specification that completely describes what is to be done during all phases of construction. Give detailed information

on poles, conduit, and/or conductors that would have to be installed. A field survey must be conducted to establish the condition of any existing system(s) and what responsibility the contractor will have in bringing the existing lighting system(s) back to an acceptable condition.

Add the following section

240.4.2.17 Emergency Pull Off Area

All capacity improvement (widening, reconstruction, etc.) or interchange projects that are greater than one mile in length along the mainline, and reduce the outside mainline shoulder width less than eight feet wide, must include provisions for an emergency pull off area. The emergency pull off area must be located to the right of the outside travel lane for use by patrons and emergency management personnel. The emergency pull off area must be a minimum of twelve feet wide and 500 feet long located every one-half to one mile and no closer than one-half mile from an interchange. The emergency pull off area must maintain the adjacent lane or paved shoulder cross slope and be paved with chevron pavement markings at 60 foot spacing. The emergency pull off area must not be designated as an ingress/egress location for the contractor.

Add the following section

240.4.2.18 Temporary Drainage

Design the temporary drainage facilities necessary during all construction phases. This includes but is not limited to designing temporary ditches, the size and length of pipes, placement of inlets and where necessary, calculating inlet hydraulics and spread where water may pool along temporary barrier wall or curbing adjacent to an inside lane. All temporary drainage items must be shown in the plans and quantified.

Add the following section

240.4.2.19 Friction Course on Temporary Pavement

New structural asphalt has similar friction factors as friction course. The use of friction course asphalt on temporary pavement during construction will be used on a case by case basis and consider the duration of the construction phase, drainage, cross slope, operating speed and horizontal curvature.

Add the following section

240.4.2.20 Standard MOT General Notes

See the [Roadway Guide Drawings](#) for standard MOT General Notes that must be shown on traffic control plans as applicable. [Roadway Guide Drawings](#) are located on the Turnpike Design website.

Add the following section

240.4.2.21 Paving Milled Surfaces Prior to Opening to Traffic

The temporary traffic control plan must ensure that all milled surfaces are paved prior to opening to traffic. Incorporate [FDOT Developmental Specification DEV327SDP](#) into the project specification package. Provide justification as to why same-day paving is required and coordinate approval request through the Turnpike Specifications and Estimates Manager.

240.5 Transportation Operations

Table 240.5.1 Transportation Operation Strategies

Add the following boxes

Safety Management and Enforcement
Specialty tow or flatbed wreckers, incident response trucks (IRT)
Emergency Access, Emergency Stopping Sites, Glare Screens

240.5.1 Regulatory Speeds

Add the following paragraph

All transitions and tapers for work zones must be based upon the preconstruction speed limits. For any locations incorporating speed reductions, speed limit signs must be installed departing the work zone to "restore" the speed limit to its preconstruction limit.

During non-construction periods the speed limits must be restored to preconstruction limits.

240.7 Coordination

Add the following paragraphs

Refer to **TDH 120.2.6.1**, for specific coordination and preliminary traffic control plan requirements.

TTC plans must also include requirements for real-time communication and coordination with Turnpike TMC for active work zone and lane closure activities.

240.9 TTC Devices

Replace TTC device item (8) with the following item

(8) Motorist Awareness System (MAS) and Turnpike TMC real-time coordination

240.9.1 Signs

Add the following paragraph

Prepare details for nonstandard TTC signs that do not have a standard MUTCD or FTP number. Provide the details on guide sign worksheets in the plans.

240.9.1.3 Project Information

Add the following paragraph

Project Information Signs and Toll Dollars at Work Signs are required for all projects with more than 90 days of contract time. Placement of the Project Information Sign and Toll Dollars At Work Sign must be in advance of the first advance warning sign or as close to the beginning of the project as practice on each mainline approach. Ensure proper sign spacing criteria is maintained as described in **TDH 230.2.1**. The Project Information Sign must precede the Toll Dollars at Work Sign. See the [**FDOT Standard Plans**](#) and the [**Traffic Guide Drawings**](#) for sign layout details.

240.9.2 Lighted Units

240.9.2.2 Portable Changeable Message Signs

Add the following paragraphs

Use of remotely programmable portable changeable message signs (PCMS) should be considered as needed. These PCMS could be activated and changed in real-time by Turnpike TMC for better work zone management.

For planned lane closures and detours, a PCMS must be placed and must display an advanced notification message one week prior to lane closure or detour. Time may be extended if deemed necessary, but should not extend 14 calendar days. The message must include the month and day(s) of the implementation of the closure or detour. Prior to closure, the message must read location "TO CLOSE" with the date. During the closure the message must read the location is "CLOSED".

240.9.4 Work Zone Markings

Add the following paragraphs

All proposed, temporary, or pavement markings to be removed must be detailed completely in the plans for a proper layout. This includes either dimensions to physical features or stations and offsets.

Overlays or milling with overlays is the only acceptable method(s) to achieve a positive means for the obliteration of existing pavement markings in areas such as long term crossovers, diversions and in some cases tangent sections that provide a rough riding pavement.

High pressure water blasting is the only acceptable method for the removal of conflicting pavement markings in those areas not mentioned above. When removing pavement messages via water blasting, the entire area within the pavement message, including the interior of the message that is not painted or have thermoplastic, must be water blasted so that the message outline is completely obliterated and drivers are not able to read or see the scar outlining the former message.

240.9.4.1 Raised (Retroreflective) Pavement Markers

Add the following paragraph

Reflective Pavement Markers (RPM) used to delineate traffic control lane lines must be installed in conjunction with lane stripes. The use of RPMs independent of pavement stripes must be approved by the Turnpike Design Engineer.

240.9.6 Law Enforcement

240.9.6.2 Traffic Control Officer

Add the following paragraphs

All lane and ramp closures require the use of traffic control officers for the duration of the closure. Coordinate the use of additional traffic control officers with the Turnpike Construction Engineer at the preliminary TCP submittal, or at a minimum, prior to the Phase II submittal. This must be an item of discussion at the 45% Traffic Control Meeting.

The locations and/or need for additional traffic control, must be outside of the conditions called out in the [*FDOT Standard Specifications, 102-7*](#) and must be documented by memo identifying the additional locations and the corresponding considerations of a safety issue to the motorist and workers.

A matrix indicating the estimated hours for traffic control must be developed and provided to the Turnpike Construction Engineer during coordination with law enforcement personnel. Coordination with the Turnpike Construction Engineer must include discussion on placement of the matrix within the plans and/or the Computation Book.

FHP TRAFFIC CONTROL OFFICER ESTIMATE				
Direction/Phase	Number Work Periods	Hours/Work Period	No. Troopers Required	Total FHP Hours
NB Phase I	2	8	1	16
NB Phase II	2	8	1	16
SB Phase I	2	8	1	16
SB Phase II	2	8	1	16
Total FHP				64

This matrix is an example and must be modified as required for each project.

Upon concurrence with the recommendation for the use of additional traffic control officers on the project, review the [MOT General Notes](#) and incorporate in plans the applicable traffic control officer notes and regional contact information. The [MOT General Notes](#) can be found on the Turnpike Design website.

240.9.7 Motorist Awareness System

Add the following paragraphs

Required real-time communication and coordination with Turnpike TMC for traveler information device usage should be utilized. Dynamic message signs and other traveler information devices can be used by Turnpike TMC for motorist information.

All lane and ramp closures require the use of [FDOT Standard Plans](#), **Index 102-670 Motorist Awareness System**.

241 Lane Closure Analysis

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

242 Traffic Pacing Design

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

242.1 General

Add the following paragraph

FDM 242.5 and **242.6** are not applicable. See [Turnpike Lane Closure Policy](#) for allowable hours of Traffic Pacing. The Lane Closure Policy can be found on the Turnpike Design website.

Add the following section

242.7 Traffic Pacing Restrictions

The construction of span sign structures or span toll gantry structures shall be performed utilizing detours where practical. Project specific needs may warrant the use of traffic pacing for these activities. If traffic pacing is determined to be necessary, provide sufficient justification and obtain concurrence from the Turnpike Traffic Operations Engineer prior to designing traffic pacing for these construction activities.

The number of allowable detours, durations, and restrictions must be defined in the plans.

Modification for Non-Conventional Projects:
Delete TDH 242.7 and refer to the RFP for Traffic Pacing Restrictions.

243 Portable Changeable Message Signs

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

250 Hydraulic Data and Agency Permits

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

250.1 General

Add the following paragraph

15% submittals for projects with bridges over water bodies should depict the existing and proposed bridge pile alignments (substructures) to indicate any impact or change to the hydraulics.

251 Stormwater Pollution Prevention Plan (SWPPP) Development

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

260 Bridge Structures

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

Add the following additional note to Table 260.6.1

Existing bridge vertical clearances between 16 feet and 16.5 feet must be maintained or increased.

261 Structural Supports for Signs, Signals, Lighting, and ITS

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

261.1 General

Add the following sentence to the end of the first paragraph

Use of a custom design sign structure requires written (email) approval of the Turnpike Structures Design Engineer.

Add the following bullet item to the sign and signal structure span length limitations

- ***[FDOT Standard Plans](#), Indexes 700-040 and 700-041***, Cantilever and Span Sign Structure: avoid truss depths greater than 8 feet due to inspection issues.

Add the following paragraph

Ancillary structures (signs, signals lighting, ITS) must use a galvanized coating per the ***[FDOT Standard Plans](#)***. Do not paint or otherwise coat these structures without consent of the Turnpike Structures Design Engineer.

261.2 Sign Support Structures

Add the following sentence to the last paragraph

Coordinate with the Turnpike Maintenance Engineer to request structure identification numbers for overhead sign structures. See ***TDH 325.9*** for more information.

261.5 ITS Support Structures

Add the following paragraph

Every effort should be made to use ITS support structures from the ***[FDOT Standard Plans](#)***. Confirm that the ***[FDOT Standard Plans](#)*** are applicable by comparing project-specific attachments and site conditions versus the assumptions in the Standard Plans Instructions (SPI). Provide design and details based on the proposed attachments to ITS poles. Symmetrically placed prestressing should be considered where applicable.

261.7 Evaluating Existing Sign, Signal, Lighting and ITS Support Structures

261.7.2 Category 2 Analytical Evaluation

Add the following sentence to the end of the second paragraph

Design Exceptions typically will not be approved.

262 Retaining Walls

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

262.1 General

Add the following sentence to the 1st paragraph

Design retaining walls in accordance with **FDM 105**.

Add the following sentence to the 5th paragraph

Retaining walls must be designed in accordance with **FDM 105**.

262.2 Retaining Wall Plans Submittal Procedures

Add the following paragraph

If any wall system is proposed to be connected to an existing MSE wall, and the existing soil reinforcement provides resistance for the new wall, the design life of the existing wall system must be analyzed to confirm that it has the same design life as the new wall. This analysis must be submitted for review with the Phase III submittal (or 90% Plans). Internal and external wall stability analyses must use the lowest soil friction angle, as determined by direct shear tests following FM 3-D3080 to model existing MSE wall backfill.

263 Geosynthetic Design

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

263.1 General

Add the following sentences to the 2nd paragraph

The use of Reinforced Soil Slopes will most likely preclude the installation of large plant material and relegate the use of sod which necessitates expensive and dangerous mowing operations. Prior to deciding to use Reinforced Soil Slopes, coordinate with the Turnpike Landscape Architect to assure that geosynthetic reinforcement is compatible with beautification goals and programmed or planned landscape projects.

264 Noise Walls and Perimeter Walls

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

264.2 Noise Walls

264.2.2 Noise Abatement Criteria

264.2.2.2 Reasonableness

Add the following paragraphs

Maintenance access points must be provided for noise walls constructed along the Turnpike system. The spacing between openings or the ends of the noise wall must be no greater than one-half mile. Coordinate all maintenance openings with the Turnpike Project Manager and the Turnpike Maintenance Department. Refer to the Noise Wall Maintenance Access Detail included as part of the Turnpike [Structures Guide Drawings](#), which can be found on the Turnpike Design web site, for acceptable access opening types and example details of maintenance doors. Prepare the final Control Drawings and all details required for the proposed openings.

If a Design Phase Noise Study Report proposes a traffic railing/noise wall without addressing the tapers and attenuators, the wall station limits must be extended to account for any tapers or attenuators required during final design by [FDOT Standard Plans](#). This also applies to overlapping noise wall installations. These changes may require reanalysis due to site specific geometry, and must be approved by the Turnpike Environmental Management Office Noise Specialist and Environmental Administrator.

Show the location and limits (stations and offsets), including any tapers, for the traffic railing/noise walls in the Post and Panel Plans. Provide dimensions “D” and “L” depicted in the Noise Wall Maintenance Access Guide Drawings for any proposed access points.

265 Reinforced Concrete Box and Three-Sided Culverts

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

No changes to this section

266 Bicycle and Pedestrian Bridges

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

266.2 Design Criteria

Add the following paragraph to item (4)(b)

Use full screening on pedestrian bridges crossing Turnpike right of way. When fencing is required, the limits of fencing is from the beginning of the approach slab at Begin Bridge to the end of the approach slab at End Bridge.

267 Shop Drawing Submittals

The following are changes, additions or deletions to the January 2019 FDOT Design Manual (FDM), Topic #625-000-002, for use on Turnpike projects only.

267.1 Introduction

Add the following paragraphs after paragraph 3

Submit shop drawings electronically using Turnpike's website, ProjectSolve.

Typically, the Turnpike's Shop Drawing Review Office provides the Shop Drawing Procedures and Routing Charts (reference **Figures 267.11.1** and **267.11.2**) at the preconstruction conference. The information addresses the need for the submission of Turnpike shop drawings, and outlines the review and approval process. It also summarizes the use of ProjectSolve for shop drawing submissions.

Add the following as last sentence to paragraph 4 (2)

Also referred to as the Construction Engineering Inspection (CEI) firm.

Replace within whole section

Any references outlined within the **FDM 267**, to the Engineer of Record, shall be replaced with Architect of Record or Engineer of Record (AOR or EOR).

Any references outlined within the **FDM 267**, to the Department, shall be replaced with Turnpike.

267.2 Shop Drawing Submittals Not Required

Replace with the following

Material certifications, welding procedures, paint procedures and concrete mix designs are typically submitted by the Contractor to the Resident Engineer (CEI), who forwards the certifications to the State Materials Engineer in Gainesville. These items do not require review by the Consultant nor Turnpike's Shop Drawing Review Office. Material certifications for items on the Approved Product List (APL), are typically submitted by the Contractor to the Resident Engineer (CEI). For non-standard items, the Resident Engineer (CEI) will typically request approval by the Consultant regarding applicability.

As the Consultant, ensure these components are identified as “Submittals” in the shop drawing-submittal list, to be reviewed by the Resident Engineer (CEI).

267.3 Contractor Information Required

Replace this whole section with the following

A shop drawing submittal which omits any of the minimum requirements listed in [FDOT Standard Specifications, Sections 5-1.4.](#) through 5-1.4.7.3 and as outlined within this chapter, will be returned for resubmittal.

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

267.3 Contractor Information Required

The Design Build Firm is responsible for the preparation and approval of all shop drawings and calculations. Once the shop drawings have been reviewed and approved by both the Contractor and AOR or EOR, send the shop drawings and calculations to the Turnpike Shop Drawing Review Office for review using ProjectSolve.

The Contractor must stamp and initial each sheet, indicating the shop drawing review and approval is in conformance with the design concept of the project, information provided in the Contract Plans and the Specifications (including Supplemental Specifications and Special Provisions).

A shop drawing submittal which omits any of the minimum requirements listed in the [FDOT Standard Specifications, Sections 5-1.4 through 5-1.4.73](#) and RFP documents will be returned for resubmittal.

Only shop drawings stamped “APPROVED” or “APPROVED AS NOTED” will be forwarded to the Turnpike for review. Shop drawings submitted without electronic stamps from the Design Build Firms, will be returned for resubmittal. When the Turnpike requires a resubmittal, the drawings must be modified by the Contractor, resubmitted to the AOR or EOR for approval, and sent to the Turnpike for review.

If the AOR or EOR generates the shop drawings for the project, another Engineer within their firm, not involved in the production of the shop drawing, must review and stamp the drawings per the requirements outlined herein.

Once the shop drawings and calculations have been reviewed and approved by both the Contractor and the AOR or EOR, the Contractor submits shop drawings to the Turnpike Shop Drawing Review Office, or as directed at the preconstruction meeting. (Reference **TDH 267.4**)

The date on the shop drawing stamp must supersede the date of when the contract documents were stamped "Released for Construction".

The Contractor is required to submit a Shop Drawing Item List to the Resident Engineer (CEI) within 60 days of the start of construction operations, and prior to the submission of any shop drawings.

Submit the list using the required excel spreadsheet format, which is provided by the Resident Engineer (CEI), to the Contractor.

For each planned shop drawing submission and when developing the shop drawing item list, define the following; description of item, structure identification number, bridge number, location, specification number and/or roadway division number.

If the project consists of Express Lanes Tolling components, identify these components by each site location, (i.e. building, gantry identification number, etc.) along with the respective specification section number. Combining shop drawings for multiple sites is not acceptable.

For ITS, Roadway Lighting and Traffic components, which all share the same roadway division number, indicate specifically what the component applies to in the Shop Drawing-Submittal Item List. This ensures shop drawings are distributed to the proper discipline reviewer for the Consultant and Turnpike's Reviewer.

Reference **Figure 267.11.1** which depicts the review coordination of the Shop Drawing-Submittal Item List.

Submit shop drawings in Portable Data Format (pdf), using 300 dpi resolution. When the Contractor submits a shop drawing using ProjectSolve, the Consultant is notified by a system generated email.

Other documents such as trade literature, catalogue information, calculations and manuals must be submitted electronically.

Any comments or markings provided by the Contractor or their Subcontractor must be indicated in blue or black. If there is no place to incorporate electronic stamping on the front page, and considering stamping by others (Consultant and Turnpike), insert blank pages and indicate back side of page, and page number (i.e., back of page 1 of 6). Do not stamp over literature, dimensions, or details.

At the time of each submission, the Contractor must provide specific written notice, along with an itemized list of all deviations/variations from the Contract Plans and Specifications, in a transmittal letter with the shop drawing submission. The drawings must have a specific notation which explicitly and prominently calls out any deviations. Approval of shop drawings will not constitute nor be considered grounds for approval of a variation in which the project requirements are affected, unless indicated as such and noted on the submission by the AOR or EOR, or the Turnpike's approval comments as returned with the shop drawing to the Contractor.

Contractor to submit samples, as outlined in the shop drawing item list. It is acceptable for the data to be submitted electronically using ProjectSolve. Electronic data must include the following: Manufacturer, Product Name and Product Number. These pages must be electronically stamped by the Contractor. It will be at the discretion of the Consultant, if submissions of original samples are required.

If original samples are required, the Contractor must submit three (3) samples for proper processing, in addition to the number of samples needed by the Contractor. The Contractor is required to stamp the samples, include the FPID and their shop drawing submittal number. Initiate the shop drawing review process using ProjectSolve by uploading the transmittal letter and indicate the samples have been provided to the Consultant via overnight courier service. Once samples have been reviewed by the Consultant and the Turnpike, the Shop Drawing Review Office will distribute the allotted number of samples to the Resident Engineer (CEI). Any remaining samples will be provided to the Contractor.

267.4 Submittals Requiring a Specialty Engineer or Contractor's Engineer of Record

Replace title with the following

267.4 Shop Drawings Requiring a Specialty Engineer or Contractor's Engineer of Record

1st paragraph, replace 2nd sentence with the following

The Turnpike keeps the digital signed and sealed shop drawings along with the electronic copy used for the shop drawing review as the official record shop drawing.

Add the following as the last paragraph of this section

Prior to the submission of the shop drawings using ProjectSolve, the Contractor must confirm the Specialty Engineers' seal is acquired from one of the FDOT approved digital certificate authorities (Reference **TDH 130**). If the digital seal does not comply, it will constitute the submission as incomplete. The shop drawing will be returned to Contractor as "Not Reviewed", and a resubmittal will be required. It is acceptable for the Contractor and Consultant to stamp the cover page of the calculations only. Each sheet of the shop drawings must be electronically stamped.

So as not to invalidate the Specialty Engineers' digital seal, when submitting the shop drawing include the original along with a saved copy of the original submission with a new name, in .pdf format, as outlined under **TDH 267.3**. The processed shop drawing will include both the Specialty Engineers' original digital signed and sealed submission and the copy to be used for the shop drawing review.

267.5 Transmittal of Submittals

Replace last sentence in paragraph 1 with the following

The Turnpike Shop Drawing Review Office encourages subcontractors and fabricators to contact the Office for guidance.

Replace paragraph 2 with the following

Figures 267.11.1 using **267.11.4** shown in **TDH 267.11** illustrate the flow of shop drawing submissions during the review process. Use electronic delivery, using ProjectSolve to send shop drawing submissions between parties.

Replace with the following

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

Figure 267.11.3 shows the flow of shop drawing submissions during the review process. Use electronic delivery, using ProjectSolve to send shop drawing submissions between parties.

267.5.1 Requirements for Department EOR

Replace title with the following

267.5.1 Requirements for Department AOR or EOR

On projects where the AOR or EOR is the Turnpike in-house staff, the Contractor submits the shop drawings to the Turnpike Shop Drawing Review Office or as directed at the preconstruction conference. The Turnpike Shop Drawing Review Office is the principal contact group and clearinghouse for all construction shop drawings, reference **Figure 267.11.4**.

267.5.2 Requirements for Consultant EOR (Full Services)

Replace title with the following

267.5.2 Requirements for Consultant AOR or EOR (Full Services)

Add the following paragraphs

On projects where the AOR or EOR is the Consultant to the Turnpike and has been retained by the Turnpike to review construction items without follow-up review by the Turnpike, the Consultant will assume the responsibility of the owner's agent. The

reviewing Consultant is encouraged to communicate with fabricators, contractors, Specialty Engineers, and the Turnpike Reviewers to clarify any concerns before returning the shop drawing submittal back to the Turnpike Shop Drawing Review Office, via ProjectSolve, for final processing. The reviewing Consultant must also contact the Turnpike Lead Discipline Review Office if unsure of the Turnpike's position on certain issues during the review.

The Contractor provides a shop drawing item list. The Consultant reviews the list to ensure verification for its technical components per the Design Plans (Reference **Figure 267.11.1**).

The Contractor sends the shop drawing directly to the Consultant using ProjectSolve. Upon receipt, verify the shop drawing has been submitted in complete format as required within this chapter. If not, the Consultant must coordinate directly with the Contractor or the Resident Engineer (CEI) to determine if a resubmittal is required. If resubmittal is determined, the Consultant will coordinate with the Turnpike Shop Drawing Review Office, to process the shop drawing using ProjectSolve and request a resubmission.

Upon receipt of the shop drawing, the Consultant reviews the shop drawing, electronically notes any comments on the sheets in red. Indicate their disposition by electronically stamping every sheet of the shop drawing.

The Consultant must verify if a submission requires samples, as outlined in the Contractor's shop drawing item list. If samples are submitted in electronic format, the Consultant must electronically stamp these pages.

If original samples are submitted, the Consultant must confirm within ProjectSolve, they are in receipt of the samples. After the Consultant's review, they will keep a copy for their records. Any remaining original samples are returned to the Turnpike Shop Drawing Review Office (via overnight courier).

The Consultant, must indicate if color should match existing, or select the appropriate color. Indicate the review disposition stamp on either the electronic or original samples.

The reviewed shop drawing is submitted using ProjectSolve to the Turnpike's Shop Drawing Review Office for review and distribution to the responsible Turnpike lead reviewer for final processing (Reference **Figure 267.11.2**).

The Consultant must notify the Turnpike Project Manager if shop drawing submissions deviate from contract requirements.

267.5.2.1 Review by Engineer of Record Only

Replace title with the following

267.5.2.1 Review by Architect of Record or Engineer of Record Only

Replace this section with the following

Reference **TDH 267.5.2** for Consultant's general requirements. If the Consultant is retained by the Turnpike to review construction items without follow-up review by the Turnpike, the Consultant will assume the responsibility of the owner's agent.

267.5.2.2 Review by Engineer of Record and the Department

Replace title with the following

267.5.2.2 Review by Architect of Record or Engineer of Record and the Department

Replace this section with the following

On projects where the AOR or EOR is the Consultant to the Turnpike and has been retained by the Turnpike to review construction items, shop drawings (unless otherwise noted below) must be sent by the Contractor directly to the Consultant using ProjectSolve. Upon receipt of the shop drawing, the Consultant performs the review, electronically notes any comments on the sheets, indicates the disposition by electronically stamping the sheets and routes to the Turnpike Shop Drawing Review Office using ProjectSolve, as outlined in **TDH 267.5.2**.

The Turnpike will review those shop drawings which are deemed "Critical" (ADA, Life Safety, ITS and Tolling components). Turnpike will identify "Critical" items from the Contractor's shop drawing item list. Upon completion of review, the Turnpike's reviewer will indicate electronically, any comments in green, include the disposition on every sheet, and include full name, department and date (Reference **Figure 267.11.2**).

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

The Turnpike will review all shop drawings. Upon completion of review, the Turnpike's reviewer will indicate electronically, any comments in green, the disposition on every sheet and include full name, department and date (Reference **Figure 267.11.3**).

267.5.3 Requirements for Consultant EOR (Design Services Only)

Replace this title with the following

267.5.3 Requirements for Consultant AOR or EOR (Design Services Only)

Replace with the following

On projects where the AOR or EOR is the Consultant to the Turnpike, but has not been retained by the Turnpike to review construction items, the Contractor will route shop drawings using ProjectSolve directly to the Turnpike Shop Drawing Review Office or as directed at the project's preconstruction conference.

267.5.4 Requirements for Architectural or Building Structures

Replace with the following

Shop drawings related to architectural or building structures must follow the standard Turnpike Shop Drawing Review Process as outlined within this chapter.

267.5.5 Requirements for Roadway Submittal Items

Replace title with the following

267.5.5 Requirements for Roadway Shop Drawing Submittal Items**267.5.6 Requirements for Overhead Sign Structures and Nonstandard Miscellaneous Structures**

Replace with the following

Submit shop drawings for overhead sign structures and non-standard miscellaneous structures as previously described in this chapter.

267.5.7 Miscellaneous Requirements and Assistance

Replace this section with the following

For items not specified above or for which questions may arise as to shop drawing requirements, the Contractor should contact the Resident Engineer (CEI) or the appropriate Turnpike Shop Drawing Review Office personnel. Regardless of submittal type, a letter of transmittal must always accompany a shop drawing submittal.

267.6 Disposition of Submittals

Replace title with the following

267.6 Disposition of Shop Drawing Submittals

Replace paragraph 1 with the following

The approval or disapproval of shop drawings by the Consultant must indicate one of the following designations: "APPROVED" (no further action required), "APPROVED AS NOTED" (make corrections noted, no further submission is required), "RESUBMIT" (make corrections noted and resubmit for approval), or "NOT APPROVED" (rejected, do not resubmit the concept or component as submitted). Any additional comments may be added where they apply, under the stamp or in an attached memorandum. Shop drawings should not be stamped "RESUBMIT" if "APPROVED AS NOTED" suffices.

Replace with the following

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

The approval or disapproval of shop drawings by the AOR or EOR is indicated by one of the following designations: "APPROVED" (no further action required), "APPROVED AS NOTED" (make corrections noted, no further submission is required), "RESUBMIT" (make corrections and resubmit for approval), or "NOT APPROVED" (rejected, do not resubmit the concept or component as submitted). Any additional comments may be added where they apply, under the stamp or in an attached memorandum. Only shop drawings which have been "APPROVED" or "APPROVED AS NOTED" are sent to the Turnpike for review.

Upon completion of the Turnpike's review, the Turnpike sends the shop drawing to the CEI, using ProjectSolve, electronically stamps the drawings, "RELEASE FOR CONSTRUCTION", "RELEASE FOR CONSTRUCTION AS NOTED". For drawings, or calculations stamped with the following dispositions, "Revise/Resubmit", "Rejected", "Rejected/Submit Specific Item", "Not Reviewed"/Submit Specific Item", the Resident Engineer (CEI) is not required to stamp. These individual drawings, must be resubmitted by the Design Build Firm.

Add the following after paragraph 1

The approval or disapproval of shop drawings by the Turnpike must be indicated by one of the following designations: "REVIEWED" (approved, no further action required), "FURNISH AS NOTED" (approved as noted, make corrections noted, no further submission is required), "FURNISH AS NOTED/SUBMIT SPECIFIC ITEM" (approved as noted, approval is contingent upon submission of additional information for review and approval), "REJECTED" (not approved, do not resubmit the concept or component as submitted), "REJECTED/SUBMIT SPECIFIC ITEM" (not approved, submit additional information for review and approval), "REVISE/RESUBMIT" (resubmit with corrections), "NOT REVIEWED" (no review required), "SUBMIT SPECIFIC ITEM" (submit additional information for review and approval), "NOT REVIEWED/SUBMIT SPECIFIC ITEM" (not reviewed, submit additional information for proper review and approval).

Replace paragraph 2 with the following

Indicate the disposition designation on each and every drawing sheet, or on the cover sheet of calculations, by the use of an electronic red-colored stamp. The electronic stamp size must not exceed 3" high by 3" wide, but 1-1/2" high by 3" wide stamp is preferred. Stamps must identify the approving groups, such as the AOR or EOR Consultant the Department's Verification Inspection Consultant and Department personnel. Electronic stamp to include firm name, full name, Department, and the date. All notations or corrections made on the approval prints must be consistently marked on all drawings.

Replace paragraph 3 with the following

All Consultants reviewing shop drawings must use red ink stamp, as noted above with the firm's appropriate stamp. When the AOR or EOR is a Consultant, and when a Sub-consultant is retained to assist in the shop drawing review, the Sub-consultant must signify disposition of the shop drawing as noted above. The AOR or EOR to verify firm's appropriate stamp prior to distribution to the Turnpike. The shop drawing must include one disposition review stamp on each page, multiple dispositions on the same sheet is prohibited. Additional comments may be added where they apply, under the stamp or in an attached Memorandum.

Replace paragraph 4 with the following

When the AOR or EOR receives a shop drawing submission which is not in accordance with requirements outlined in this chapter, the Contractor will be advised to resubmit with the corrections or additions necessary.

Add the following paragraph

When a shop drawing consists of deviations from the Contract Plans and Specifications, the Consultant must contact the Turnpike Project Manager, who coordinates with the Construction Project Manager, and decides if a Supplemental Agreement or Cost Savings Initiative Proposal (CSIP) is required. If either procedure is needed, the shop drawing will not be reviewed until a decision is finalized.

Replace paragraph 7 with the following

On projects when the AOR or EOR is a Consultant to the Turnpike, and where the Turnpike will also be reviewing shop drawings, the Turnpike will perform a second confirmation review of the shop drawing submittal. Upon receipt of the Consultant's reviewed submittal, the Turnpike will stamp the shop drawing submittal using the

appropriate disposition. The primary purpose for the Turnpike's review includes: conformance with FDOT policy and standards; uniformity of disposition and similar shop drawing submissions; accuracy and completeness of the Consultant's review; and attention to specific details or areas of work which have experienced recurring problems during fabrication or construction.

Replace paragraph 8 with the following

Figure 267.11.2 shows the distributional flow of a shop drawing. When the Turnpike concurs with the Consultant's review and disposition, the Turnpike electronically stamps, and the shop drawing is processed back to Contractor using ProjectSolve. The Consultant receives a system generated email notification. If the Turnpike's review or disposition of the shop drawing differs from the Consultant, the final disposition is resolved by coordination between the Consultant and the Turnpike Reviewer. The final disposition on the shop drawing is reflected by the Turnpike's disposition stamp.

Replace the following after paragraph 13

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

Figure 267.11.3 shows the distributional flow of a shop drawing. When the Turnpike concurs with the Design-Build Firm's AOR or EOR review and disposition, the Turnpike will electronically stamp and the shop drawing is processed back to the Contractor using ProjectSolve. Should the Turnpike's review or disposition differ from the Design-Build Firm's AOR or EOR, the final disposition on the shop drawing is reflected by the Turnpike's disposition stamp.

267.7 Distribution of Submittals

Replace paragraph 1 with the following

Figure 267.11.2 shown in **TDH 267.11** illustrates the shop drawing submission distributional flow for reviews performed by the Consultant with or without Turnpike review. In the case of reviews performed solely by the Consultant, the Consultant must send the shop drawing to the Turnpike Shop Drawing Review Office using ProjectSolve.

Modification for Non-Conventional Projects:

Delete **TDH 267.7** and replace with the following:

Figure 267.11.3 shows the shop drawing flow diagram for design-build projects.

When precast or prestressed concrete components are involved, copies of the shop drawings are submitted to the Department's District Prestress Engineer and the State Materials Office (Gainesville). When structural steel components are involved, copies of the shop drawings are submitted to the Department's Verifications Inspection Consultant.

267.9 Submittal Activity Record (Logbook)

Replace the above title with the following

267.9 Shop Drawing Activity Record (Logbook) and ProjectSolve

Replace this section with the following

The Turnpike's Shop Drawing Review Office is the Final Review Office and keeps the Shop Drawing Activity Record (Logbook), using ProjectSolve. An activity log of submitted shop drawings can be generated for each project on a daily basis.

The following data is entered and generated within the ProjectSolve System.

- (1) Financial Project ID
- (2) Contract Number
- (3) Roadway Division or Specification Section
- (4) Turnpike Shop Drawing Number
- (5) Description of Shop Drawing Entry
- (6) AOR or EOR Submittal Number (if applicable)
- (7) Contractor Submittal Number (if applicable)
- (8) Date Submitted by Contractor to the AOR or EOR
- (9) Date Submitted by AOR or EOR to the Turnpike's Shop Drawing Review Office
- (10) Date Distributed by the Final Review Office to the Contractor
- (11) AOR or EOR Disposition
- (12) Turnpike Disposition

ProjectSolve gives a historical record of individual shop drawing reviews. It can serve as verification of review time, to respond to inquiries of regarding a shop drawing's status and as a record of manpower effort to aid in estimating and allocating future workload. It is also used as inventory for Turnpike Statewide components for future maintenance.

267.11 Shop Drawing Flow Diagrams

Replace Figures 267.11.1 through 267.11.4 with the following

Figure 267.11.1
Turnpike Shop Drawing Review Office
Flow Chart for Shop Drawing Item List, Reviewer Coordination for Items Deemed
“Critical”-Design Bid Build (Conventional) Projects

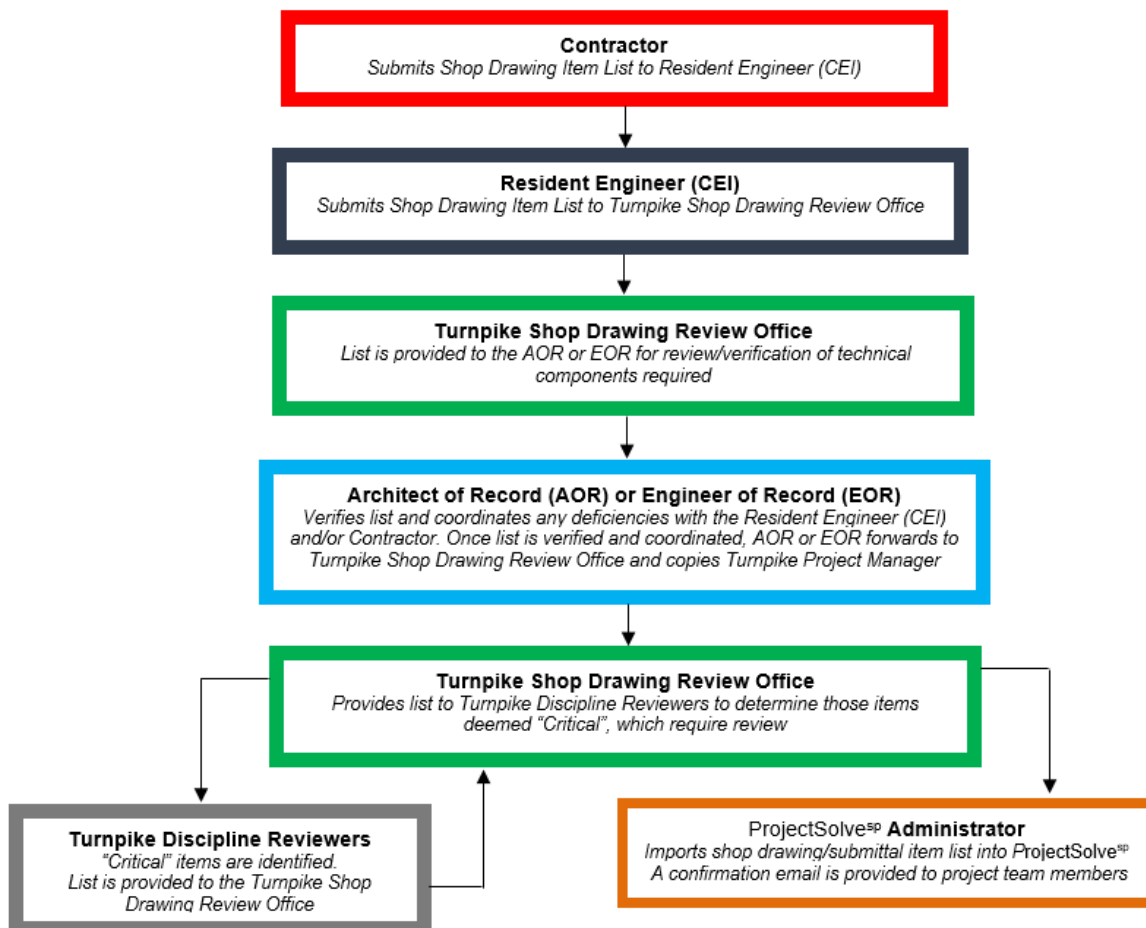


Figure 267.11.2
Turnpike Shop Drawing Review Office
Routing Chart for Design Bid Build (Conventional) Projects

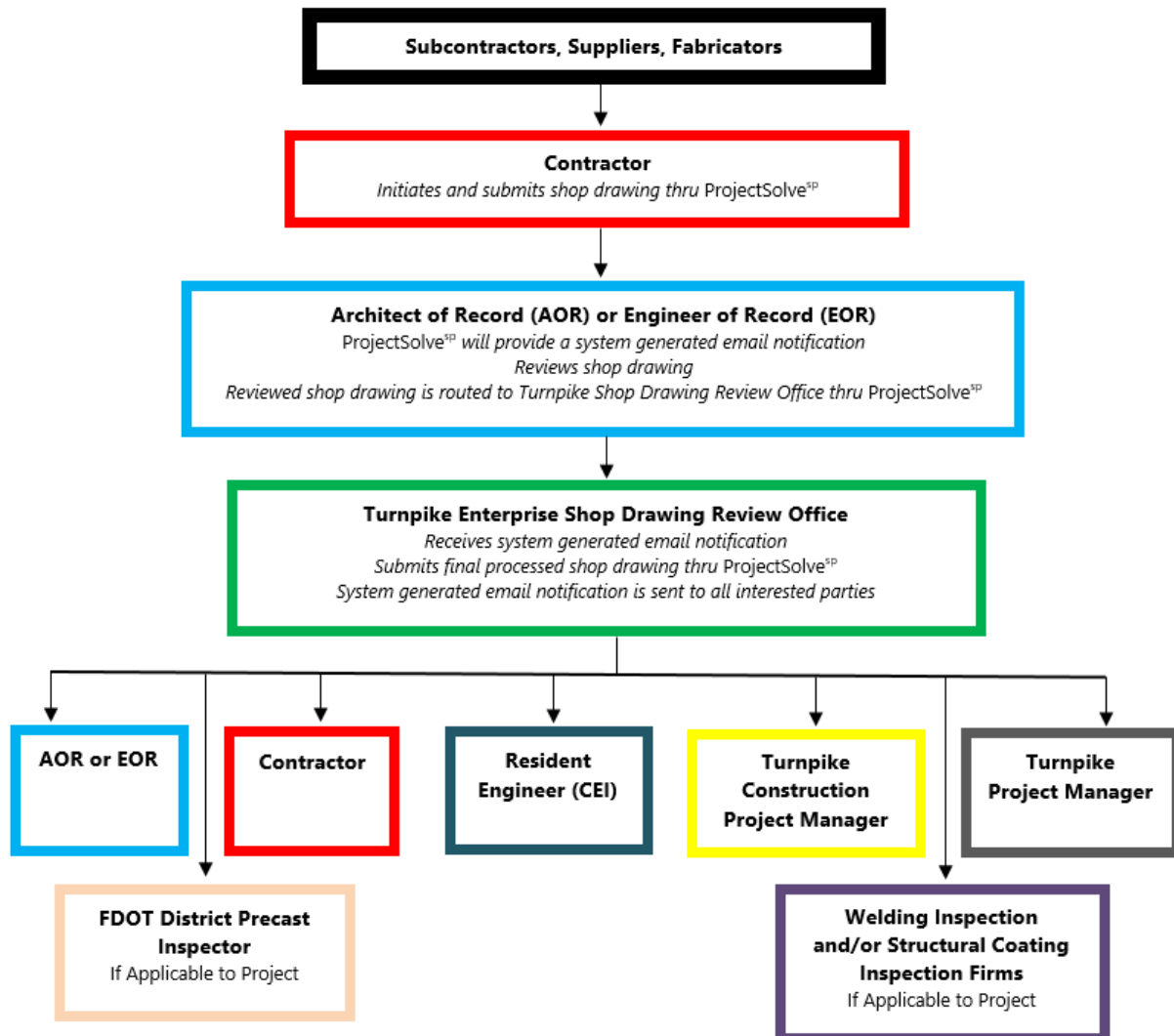


Figure 267.11.3
Turnpike Shop Drawing Review Office
Routing Chart for Design Build (Non-Conventional) Projects

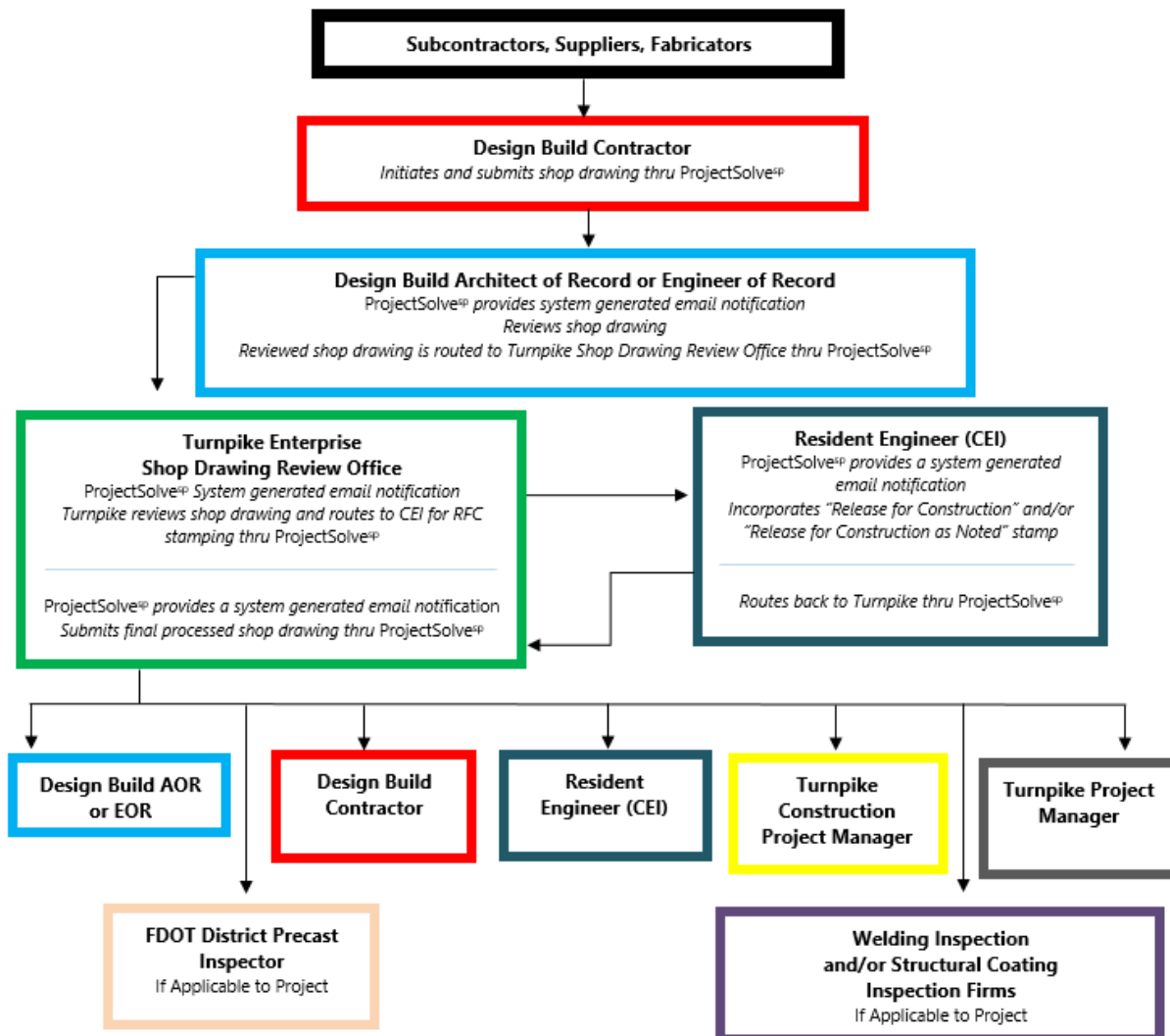


Figure 267.11.4
Turnpike Shop Drawing Review Office
Internal Distribution Chart

