



2024 Design Guidelines

Central Florida Expressway Authority

Introduction

Central Florida Expressway Authority's (CFX) continuing quality development effort has developed these Design Guidelines to provide consultants, reviewers, and management with a single source of design preferences. The guidelines serve to modify or add to the requirements included in the Florida Department of Transportation (FDOT) Design Manual (FDM) January 2024.

Additional guidance is available in the following documents located on the CFX Website:

- CFX ITS Design Details
- CFX Lighting Design Details
- CFX PD&E Study Documentation Guidance
- CFX Property Acquisition & Disposition Manual
- CFX Signalization Design Details
- CFX Signing and Marking Details
- CFX Tolling Design Details
- Specifications

The Table of Contents lists the FDM chapters and sections modified within this document. If a section has been modified, the user should refer to the specific section in the **Design Guidelines** shown in the table of contents.

The **Design Guidelines** will be updated annually following the official revision to the FDM. Interim updates to the **Design Guidelines** will be issued as Addenda to the annual revision.

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1.0 - Development and Process

2024 Design Guidelines

1.0 DEVELOPMENT AND PROCESSES

102 - Glossary of Terms

Add the following section:

102.3 - CFX Terms

Bridge Concept Memorandum (BCM): A brief report of practical superstructure, substructure, and foundation alternatives for a bridge widening or new bridge design. Plan, Elevation, and Typical Section drawings should be included. For a new bridge, a comparison of superstructure and substructure alternatives regarding constructability, cost, and transport should be included to determine the type of bridge if not dictated by the scope. CFX utilizes a BCM instead of the Bridge Development Report (BDR). Change all references in the FDM from Bridge Development Report to Bridge Concept Memorandum.

Central Florida Expressway Authority (CFX): An agency of the State that builds and maintains a regional transportation network that connects Brevard, Lake, Orange, Osceola, and Seminole counties.

Conceptual Signing Plan (CSP): Proposed guide signs and structure locations required for a project based on preliminary geometry. Does not include standard signing (regulatory, warning, route markers, etc.) other than post interchange signing along the mainline. The CSP is intended to provide a general layout of sign panel messages, existing and proposed, and does not dictate the final disposition of existing structures where structure re-use is subject to structural analysis and final design of the sign panel layout.

Constructability Review: A supplemental and specialized review of construction plans and specifications that seeks to identify construction requirements that are impractical, unnecessarily costly, or difficult to build. Constructability reviews consider contractor access, site constraints, and relationship to other project work.

Construction Guide Signing Plan (CGSP): Existing, proposed, and temporary guide signing required during each phase of construction.

Design Deviations: CFX follows the design criteria and standards in the FDM except where noted in the Design Guidelines. When it becomes necessary to deviate from the FDM, the minimum criteria established by AASHTO will be used. CFX utilizes the term Design Deviations instead of Design Variations and Exceptions. Change all references in the FDM from Design Variations and Exceptions to Design Deviations. See Section 122.

Engineer of Record (EOR): "A Florida professional engineer who is in responsible charge for the preparation, signing, dating, sealing and issuing of any engineering document(s) for any engineering service or creative work." F.A.C. CHAPTER 61G15-30. Throughout the Design Guidelines, the terms EOR and Designer are synonymous.

Executive Director: Whenever the FDOT-incorporated documents refer to the FDOT or Florida's Turnpike (the "Department"/ "District"/"Turnpike") or any FDOT or Florida's Turnpike offices or personnel (e.g., "Engineer", "Estimates Engineer", "Project Engineer", "Inspector"), such words shall be taken to mean CFX's Executive Director, or representative specifically and duly authorized to act on behalf of the Executive Director.

General Engineering Consultant (GEC): A consulting firm that provides professional services in connection with general planning, design, engineering, management, and other services for projects related to the development, determination of feasibility, planning, design, permitting, right-of-way acquisition, bidding, construction, and maintenance of CFX's existing and future system.

Phase submittals: Throughout the FDM, Phases I, II, III, & IV are equivalent with 30%, 60%, 90%, and 100% plans.

Preliminary Design Review/Report (PDR): A document that provides a brief project overview and project-specific design issues (e.g., auxiliary lanes, geometric changes, drainage design approach, basic weave analysis, maintenance of traffic, pier protection, typical sections, ramp realignment, etc.) including:

- A brief description of the design issue, including a summary of the research performed to identify the design issue
- A description of each design alternative considered (with exhibits)
- An analysis of alternatives, including the benefits and impacts of each alternative considered
- A design recommendation
- A table for design criteria of each design element, referencing applicable publications (CFXDG, AASHTO, FDM, etc.)

Renewal and Replacement (R&R): A CFX program designed to preserve their infrastructure assets and maintain the serviceability of the system by meeting the following standards:

- Routine Maintenance: Maintain an overall Maintenance Rating Program (MRP) of at least 90.
- Resurfacing: Ensure a minimum of 85% of its lane miles in good condition (rated 7 or above)
- Bridge Repair and Replacement: Ensure 95% or more of all bridges are in good condition.

CFX utilizes the term R&R in lieu of the Resurfacing, Restoration and Rehabilitation (RRR). Change all references in the FDM from Resurfacing, Restoration, and Rehabilitation to Renewal and Replacement.

Responsible Agency: When the FDM identifies an approval or review process to be performed by either a State or District Office, they are not obligated to provide the same service for the CFX system.

Change all references in the FDM that requires State or District approval to the CFX Chief of Infrastructure.

103 - Standard Forms

Delete FDM 103.

104 - Public Involvement

104.1 - General

Insert the following sentence after the last paragraph.

CFX is supported in these efforts through a Public Information Services contract. Design and Construction firms shall coordinate all public involvement efforts through this contract.

105 - Aesthetic Design

Add the following section:

105.7 - CFX Aesthetic Guidelines

CFX has developed aesthetic treatments for multiple corridors which are applied consistently throughout the system to mitigate the visual impacts of the expressway and provide context sensitive design features characteristic of the neighborhoods and areas it traverses. The future development along the right-of-way as well as the ultimate build out the corridors will impact the existing aesthetic treatments along the corridor. To maintain the existing level of treatments and communicate the current standards, CFX has developed general guidelines to define the potential impacts and provide standards for development of aesthetic treatments for the following corridors:

- SR 408
- SR 414
- SR 417
- SR 429
- SR 453
- SR 516
- SR 528
- SR 534
- SR 538
- Wekiva Parkway

In addition to the general Aesthetic Guidelines, SR 408, SR 453, and the Wekiva Parkway have specific aesthetic requirements.

Along SR 408 between the interchanges of Kirkman Road and Chickasaw Trail, single post and multi-post sign assemblies (all posts, post attachment hardware, and back of sign panels) shall be painted black. The black paint shall be semi-gloss “thermoset powder paint finish,” Federal color #27038. The back of panel decal containing owner and fabrication information, shall be applied after the painting process is complete.

Request a sample Aesthetic Plan set from the CFX GEC..

106 - Exempt Public Documents

106.3 - Distribution of Exempt Documents

Delete all paragraphs and replace with:

The process for the distribution of documents can be found on the CFX website.

110 - Initial Engineering Design Process

110.2 - Initial Engineering Design

Delete activity (13) and replace it with the following:

- (13) Identify applicable project drainage criteria and constraints. Determine impacts to project design and schedule.

Add the following to the end of the section:

Resilience measures for critical assets are project-dependent within the CFX system of infrastructure. The consultant shall coordinate in the initial stages of project scoping to inform CFX if any existing or future climate hazards (e.g.: flood, extreme heat, tropical cyclone) may affect the proposed lifespan of critical assets to be designed. If proposed assets are vulnerable to existing or future hazards, then evaluation may move forward, at the agency’s discretion, to account for future climate conditions and minimize maintenance costs during the anticipated lifespan of such assets.

110.4.1 - Sole Sourced Products or Processes

Delete FDM 110.4.1 and replace with the following:

Sole sourcing products or processes occur when the CFX/GEC/EOR specifies a proprietary product or process within the construction contract documents which results in the exclusion of other products or processes that may perform the same or similar function. Sole sourcing should be approved by CFX and identified early in the design process.

110.5 - Support Services

In the second paragraph, replace (9) with:

- (9) Intelligent Transportation Systems GIS Documentation

In the third paragraph, replace (14), (21), and (26) with the following, respectively:

- (14) Environmental Permitting
- (21) Toll Design/ Toll Operations
- (26) Concepts

In the third paragraph, add the following functional area:

- (29) Materials (pavement)

110.5.7 - Traffic Monitoring Sites

Delete the last sentence of the first paragraph and replace with:

Inquiries about monitoring sites should be addressed to the ITS Department at CFX.

110.5.11- Resilience

Delete references to the Project Suite Enterprise Edition (PSEE) Resilience Tracker Module and coordinate with CFX suggested resilience implementations.

110.6 - Preliminary Geometry

Delete item 8 from the fourth paragraph.

111 - Final Engineering Design Process

111.2 - Final Engineering Design

Add the following item to the list of major design activities:

- (16) Toll facilities design

111.2.1 - Work Program Administration (WPA) System

Delete FDM 111.2.1.

111.4 - Standard Specifications and Special Provisions

Delete FDM 111.4. and replace with the following:

The EOR shall coordinate with the CFX PM and the CFX GEC PM for the most current CFX Technical Specifications, Special Provisions, and Technical Special Provisions on a project-by-project basis.

111.5 - Pay Items and Summaries of Quantities

Delete FDM 111.5 and replace with the following:

As the engineering plans are prepared, the quantities are calculated, tabulated, and summarized by Pay Item (of work) as stipulated by the Standard Specifications and the Basis of Estimates Manual. The summary of pay items is updated as quantities are determined and summarized.

111.6 - PS&E Package Submittal

Delete FDM 111.6.

111.7- Project Documentation

Delete all paragraphs and replace with:

The submittal of project documentation is required for all projects. This section describes the required process for delivery of project documentation, and a list of documents that are to be provided.

Create a project documentation folder structure as shown in APPENDIX A – CFX File Directory Structure.

General Requirements:

All PDF files shall be compressed prior to submittal.

111.7.1 - File Naming Convention

Delete all paragraphs and replace with:

Although the filename is limited to 240 characters, the number of characters used should not exceed 48. Filename is not to contain spaces or special characters (!@#\$\$%^&*+).

Filenames are not case sensitive; however, the use of uppercase letters to begin each word in the filename is encouraged.

The filename should be easily searchable within the folder. See APPENDIX B – CFX Document Naming for commonly used file names.

111.7.2 - Documents

Delete FDM 111.7.2.

112 - Update Engineering Design Process

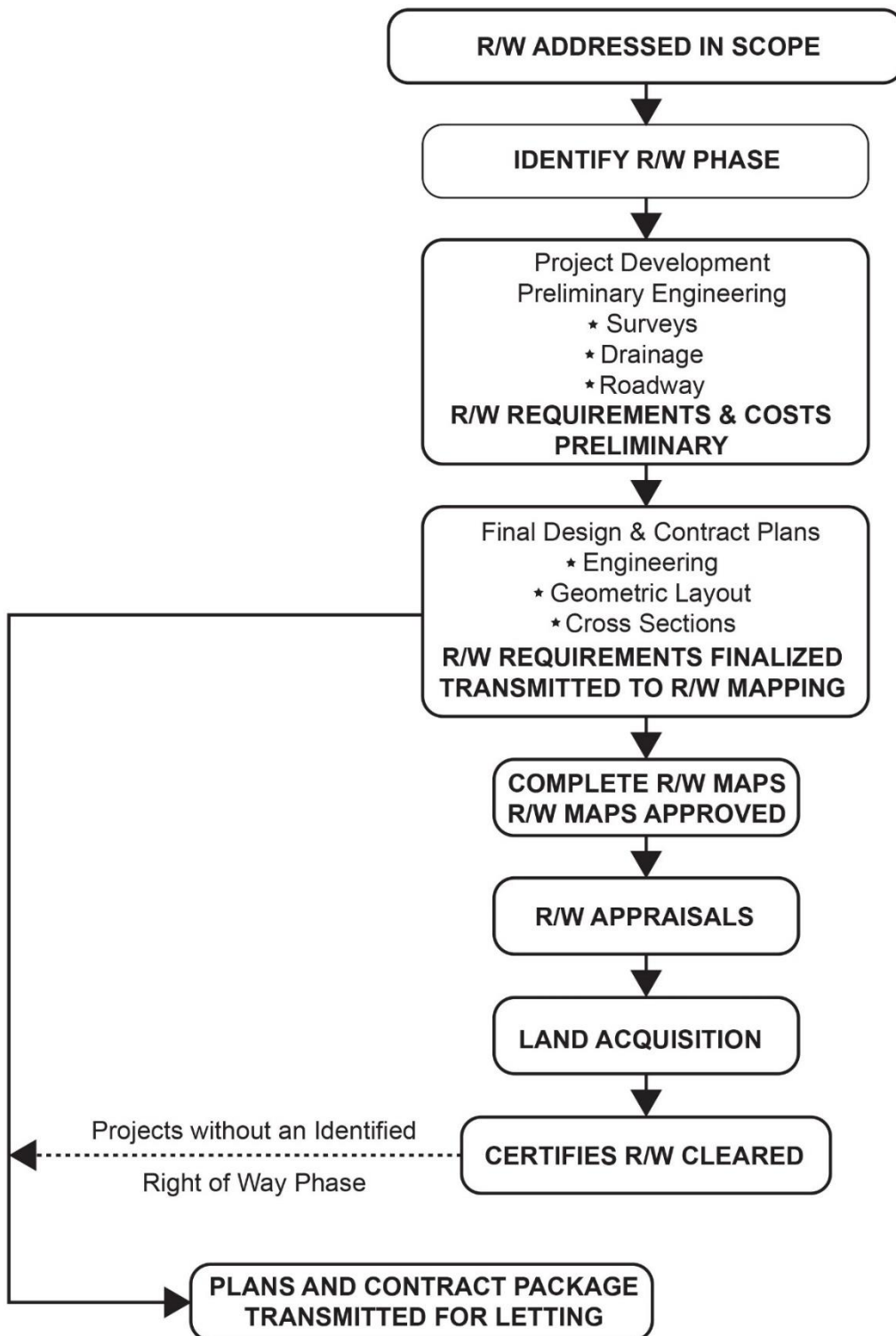
Delete FDM 112.

113 - Right of Way Requirements

Figure 113.3.1 - Right of Way Requirements Generalized Process Flow Diagram

Delete FDM Figure 113.3.1 and replace with CFX Figure 113.3.1.

CFX Figure 113.3.1



Add the following section:

113.4 - CFX Property Acquisition, Disposition, & Permitting Procedures Manual

The Central Florida Expressway Authority Property Acquisition, Disposition, and Permitting Procedures Manual (“Manual”) is intended to provide recommended procedures to CFX employees and consultants for:

- (1) Obtaining necessary rights of way, easements and other property rights for roadway improvement projects and other projects for which CFX may be authorized to acquire such property rights
- (2) Disposing of property rights deemed available for disposal by CFX.

The Manual is intended for use in all projects for which CFX is the acquiring agency, unless the project is required by law or contract to be governed by Florida Department of Transportation procedures or other procedures.

CFX Property Acquisition & Disposition Manual can be found on the CFX website.

114 - Resurfacing, Restoration and Rehabilitation (RRR)

*Revise title of Section to **Renewal & Replacement (R&R)**, replace all references of RRR to R&R, and replace the respective sections with the following:*

114.1 - General

Add the following paragraph:

Unless otherwise noted in this Chapter or unless otherwise approved by CFX or their GEC, projects not specifically designated as “R&R” are required to apply new construction criteria for all design elements.

114.1.1 - Improvements in R&R Projects

Delete the first sentence and replace with:

The following items must be included in each R&R project unless written authorization to deviate from this policy is obtained from CFX.

Add the following item to the list:

- (8) Improvements to facilitate future maintenance operations.

114.3.2.1 - Office Reviews

After the first sentence in the first paragraph add the following:

In review of historical documents, the following information shall be obtained and evaluated:

- Determine the FDOT or AASHTO criteria used for the original design,
- Determine if the “old” criteria are current, and
- Document deficiencies and provide recommendation to correct.
- “Old” criteria will not be given an automatic approval to remain in place.

114.3.2.2 - Safety Assessment

Delete all paragraphs and replace with:

Perform and document the safety assessment as part of preliminary design report and/or condition assessment memorandum.

114.3.2.3 - Field Reviews

Replace Note (1) (g) and (j) with the following:

- (g) Shoulder type, width, and condition
- (j) Drainage (including erosion, siltation problems, or deficient surface conveyance systems)

114.3.2.4 - Identified Improvements

Add the following possible improvements:

- (24) Add through lane capacity (requires use of new construction criteria).
- (25) Correct shoulder gutter or inlet top deficiencies.
- (26) Increase lengths of parallel acceleration/deceleration lanes at ramp terminals to meet current standards or to increase storage.

114.3.2.5 - Design Exceptions and Design Variations

Revise the title to Design Criteria Deviations (Modifications) and replace with the following:

R&R projects with existing features not meeting minimum criteria values require processing a Design Deviation for the feature to remain. Refer to Section 122 for the Design Deviation procedures.

114.3.4 - Drainage

Delete the second sentence and replace with:

Field reviews should inspect and evaluate the existing drainage and coordinate with GEC drainage staff.

114.3.8 - Signals, Signing, and Pavement Markings

Add the following paragraph:

The geometry (baseline, stationing, curve data, etc.) shown on the Signing and Pavement Marking Plans for milling and resurfacing projects shall match the original roadway construction plans and/or any revisions as a result of major roadway improvements, i.e., widening and adding/removing ramps, when survey is not scoped.

Add the following section:

114.3.12 - Shoulder Pavement Resurfacing

The EOR shall prepare a Technical Design Memorandum recommending needing to mill and resurface (or not to mill and resurface) existing shoulders on resurfacing projects. The Tech Memo shall evaluate the age, visual condition including noticeable deficiencies and geotechnical core evaluations. EOR shall consider construction cost, time savings and construction impacts (such as being adjacent to an aesthetic feature or sound wall). The Tech Memo, with a recommendation, shall be presented to the CFX Design and construction for inclusion or exclusion into the design.

115 - Standard Plan and Standard Specifications

115.4 - Approved Products List (APL) for Local Agency

Delete FDM 115.4.

117 - Monitor Existing Structures

117.2 - Inspection and Settlement Monitoring

Delete the second paragraph.

120 - Design Submittals

120.1 - General

Delete the first paragraph and replace with:

The design process will require various submittals to transfer technical information and decisions between the Engineer of Record (EOR) and GEC personnel. The GEC Project Manager is responsible for the adequacy of the submittals or requests and for the coordination of reviews between the GEC and the EOR. To the extent practical, the contract scope of work should list the information to be furnished by CFX functional areas and submittals (number and type) required of the EOR. **FDM Figure 120.1.1**, is a partial list of functional areas with typical submittals and requests.

The design process also requires coordination with other agencies, such as FDOT, local counties, or local cities. The EOR is responsible for the coordination during design and the GEC personnel are responsible for coordinating the reviews.

120.2 - Design Documentation Submittals

Add the following paragraph:

Draft, pre-final, and final versions of all documents requiring CFX approval or concurrence must be submitted to the GEC Project Manager for review. Upon completion of the review process, the GEC Project Manager will proceed with obtaining the necessary approvals or concurrence.

120.2.2.2 - 18 Kip Equivalent Single Axle Loads (ESAL)

Delete the first paragraph and replace with:

The GEC will provide the AADT forecasts for the year a project opens to traffic and for the design year. In addition to the AADT, together with percent trucks (24-hour period) and other factors, the GEC will provide to the EOR, the pavement loading (18kip ESAL) information to be used for the pavement design.

120.2.3 - Typical Section Package

Delete FDM 120.2.3 and replace with the following:

Typical sections are prepared during the PD&E phase, as well as the PDR phase of design.

120.2.3.1 - Approval Process

Delete FDM 120.2.3.1 and replace with the following:

When crossroads or other facilities are maintained by another agency, the EOR must provide correspondence from that agency confirming their concurrence. The design documentation shall include a copy of the local agency's standard to document design conformance. The maintaining agency will not be required to upgrade their typical sections to meet higher FDOT or CFX criteria.

In addition, typical sections of ramp and mainline bridges over the initial and ultimate local roadway shall be included to confirm clear zones, future lanes and the proposed bridge length. All under bridge typical sections are to be included in the roadway plans.

120.2.3.2 - Cover Sheet

Delete FDM 120.2.3.2.

120.2.3.3 - Typical Section Sheet

Delete the first sentence of the first paragraph.

Delete subsection Project Controls.

Delete note 3 and 4 in the Typical Section subsection.

Delete FDM Exhibits 120-1 through 120-4.

Add the following paragraph:

The projects should facilitate the ultimate widening by designing for the future lane offsets and cross slopes where possible. A separate future typical section must be provided. Future lanes on existing or proposed crossroad typical sections must be dashed and labeled "Future, By Others".

120.2.4 - Preliminary Drainage Design

Delete this section and replace with:

On projects where the drainage design is a critical element the following items should require a preliminary submittal:

- (1) Determination of water elevations affecting the roadway grade. These include base clearance water elevations, design flood elevations, and minimum ditch elevations.
- (2) Determination of design high water elevations for pond locations.
- (3) Documentation of preliminary drainage coordination with permitting agencies facilitated by the GEC staff.
- (4) Information that is essential to proper evaluation of drainage design concepts such as seasonal high ground water, soil types, existing cross drain peak design stages, historical pavement failure, floodplain elevation, present water elevations, and drainage areas.
- (5) Evaluation and documentation of hydroplaning risk associated with the proposed roadway typical and critical sections.

120.2.5 - Preliminary Geometry and Grades

Add the following section:

120.2.5.1 - Preliminary Line and Grade Submittal

Submit preliminary (15%) alignment and grade sketches depicting the proposed geometric design. The

submittal should include the following in preliminary status:

- Typical Section
- Roadway – Plan & Profile (Roll Plots)
- Interchange Layout
- Pond Locations

120.2.6 - Preliminary Traffic Control Plan

Add the following:

- (5) A preliminary traffic control plan on roll plots shall be submitted at the (30%) phase for review. If required, a comment resolution meeting with the GEC and CFX staff must be scheduled following the review.

120.2.7 - Pavement Selection and Design

*Revise the title to **Pavement Design** and replace with the following:*

The pavement selection and design shall be completed as early in the process as possible. Pavement designs must meet the following minimum standards. Variations from these standards require concurrence from the GEC prior to the final pavement design being submitted to the GEC Project Manager.

Pavement Type Selection Reports are not required.

The GEC:

- Will provide the ESAL's and traffic counts to the EOR
- Upon request will provide Rut, Ride and Crack reports to the EOR
- As directed by CFX, will provide the pavement layering for new construction to the EOR for their review and concurrence.
- As directed by CFX, will provide the pavement requirements to the EOR for toll plazas.

Design:

- A single reliability of 95% should be selected for an entire project, even if the project includes both widening and resurfacing.
- All pavement designs, except for temporary pavement, must be calculated for a 20-year design life. The minimum design life and traffic (ESALd) for temporary pavements must be no less than the construction period for the project.

- Table 5.5 of the Flexible Pavement Design Manual contains the required minimum thickness for new construction and resurfacing projects.
- All travel lanes pavement must include PG 76-22 in the top structural lift and friction course regardless of traffic level.
- Use only Dark Granite for FC (Friction Course) Aggregate
- Limerock base LBR 100 and Type B 12.5 Black Base are the only two base materials to be used on CFX projects. Local roads associated with the projects will follow local design criteria standards.
- 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 plus the FC-5 thickness of the travel lanes.
- A detail of the longitudinal joint must be shown in the plans. The traffic control plan must accommodate the space necessary for this work in the phasing sequence plan notes and/or a table of dimensions must describe the limits of the milled shelf width and depth.
- Show proposed pavement layer details for milling and resurfacing, widening and shoulders in the plan Typical Section details.

General Conditions:

- The references in the guidelines represent the minimum requirements, which must be met for flexible pavement design for new construction, pavement rehabilitation, and milling/resurfacing projects. It is the EOR's task and responsibility to evaluate and apply the sound application of acceptable engineering criteria and standards.
- The reference documentation and preferences do not apply or cover all situations, when this occurs the EOR shall bring these conditions to the GEC for discussion and resolution.
- For specific projects prepare and submit a draft coring plan to the GEC for review and comment. This submittal and approval by the GEC shall take place before any physical coring takes place.
- Submit to the GEC for review the geotechnical coring report and recommendations.
- The 30% submittal package shall include a draft of the pavement design for review and comment.
- Provide the final signed and sealed pavement design and report on or before the 60% plans submittal.
- Upon acceptance by the GEC, submit all the signed and sealed pavement design reports to the GEC.

Add the following section:

120.2.7.1 - Pavement Selection at Toll Plazas and Intersections

Longitudinal joints through the toll loop pavement area must be placed along the center of the lane line as this approach is more beneficial with the toll equipment and placement of the loops. However, if there are challenges with the construction on the placement of the longitudinal joints at specific locations, CFX will evaluate and provide recommendations.

| FC-5 and FC-12.5 Limits at Toll Plazas and Intersections | | |
|--|--|---|
| Off-Ramps | | |
| | Cash Plaza | FC-12.5 300' in advance of the Toll Plaza concrete and FC 12.5 from the Toll Plaza to the local road |
| | No Plaza | FC-12.5 500' from the local road intersection |
| | ORT | FC-5 only through toll lane and FC-12.5 500' from the local road intersection |
| On-Ramps | | |
| | Cash Plaza | FC-12.5 from the local road intersection to the Toll Plaza concrete pavement and 300' beyond the Toll Plaza concrete pavement |
| | No Plaza | FC-12.5 500' from the local road intersection |
| | ORT | FC-5 only through toll lane and FC-12.5 500' from the local road intersection |
| Mainline Cash Plazas | | |
| | Cash Plaza | FC-12.5 shall be placed 300' on either side of the Toll Plaza concrete pavement. |
| | ORT Lanes | FC-5 only |
| Exceptions: | | |
| | <ol style="list-style-type: none"> 1. Loop Ramp friction course limits shall be determined on a case-by-case basis and approved by the GEC and CFX. 2. No pavement messages shall be applied on the interface between the FC-5 and FC-12-5 friction course. The FC-12.5 and FC-5 limits shall be adjusted as necessary to support the placement of required pavement messages. | |

Note: The terms “in advance” and “beyond” refer to the respective direction of travel.

Add the following section:

120.2.9 - Roadway Design Documentation

Roadway design documentation must be provided at phase submittals. The design documentation

must include, but is not limited to, the following information as applicable:

- (1) Section 1 - Summary
 - (a) Narrative - summary of existing and proposed design
 - (b) Location Map
- (2) Section 2 - Design Documentation
 - (a) Roadway Design Criteria
 - (b) Horizontal and Vertical Alignments
 - (c) Design Calculations and Exhibits
 - Superelevation
 - Horizontal and Vertical Stopping Sight Distance
 - Vertical Clearance
 - Barrier – Length of Need
 - AutoTURN Analysis
 - Intersection Sight Distance Analysis
 - Cross Slope and Superelevation Analysis
 - (d) MOT
 - Lane Closure Analysis (Provided by GEC)
 - Pacing Analysis
 - Detour Analysis
 - Impacts to Toll Facilities
 - (e) Pavement Design Report (Final Signed and Sealed) (Include Pavement Design Calculations and Resilient Modulus Recommendations)
 - (f) Documented Design Deviations (Exclude Appendices)
 - (g) Meeting Minutes/Project Correspondence
 - (h) Comments and Responses

The design documentation must include all design notes, data, and calculations to document the design conclusions reached during the development of the contract plans.

120.4 - Plans Phase Reviews

Add the following paragraphs:

Verification at the 60% level that a field review of the proposed sign locations has occurred, and appropriate sign distances have been provided is required.

Verification whether governing agencies (other than FDOT) for roadways contained in the plans, which are not within CFX's jurisdiction, have established their own signing and pavement marking criteria. If the governing agency has its own criteria, a copy shall be provided to CFX with the 60% plans submittal.

121 - Bridge Project Development

121.1 - General

Delete the first paragraph.

Delete the third paragraph and replace with:

Structural designs for repair or rehabilitation of bridges are developed under the direction of the GEC or CFX and may not include all the submittal types discussed in this chapter.

121.2 - Organization

Delete FDM 121.2.

121.5 - Responsibility

Delete FDM 121.5.

121.7 - Bridge Project Development

Insert the following as the first paragraph:

CFX utilizes a Bridge Concept Memorandum (BCM) in lieu of the Bridge Development Report (BDR). Change all references in the FDM from Bridge Development Report to Bridge Concept Memorandum.

Delete the second paragraph and replace with:

Bridge project development normally includes five phases of development:

- The first phase of development, bridge analysis, occurs during the Project Development and Environment (PD&E) process.
- After location design approval is granted, the second phase, Bridge Concept Memorandum is initiated. After approval of the BCM, the production plans phases of work will begin.
- The third phase is the 30% Structures Plans.
 - A 60% Structures Plans phase is required for Category 2 Structures between the third and fourth phases.
- The fourth phase includes the 90% Structures Plans and specifications.
- The fifth phase includes the 100% Structures Plans and specifications. For efficiency, one engineering firm (one design team) should be responsible for the BCM and the final plans and specifications.

121.9 - Bridge Concept Memorandum / 30% Structures Plans

Delete the fifth sentence of the first paragraph.

121.9.3 - Aesthetics

Insert the following after the last paragraph:

CFX has developed aesthetic treatments for multiple corridors, see **CFX Design Guidelines Section 105.7** for additional guidance.

If an existing bridge is to be widened or modified, the consultant shall ensure the new bridge date is stacked with the original bridge date.

121.9.5 - Historical Significance Considerations

Delete FDM 121.9.5.

121.9.9 - 30% Structure Plans

In the first paragraph, second sentence, replace Bridge Development Report with 60% Roadway Design Plans.

Add the following to the second paragraph, note (4):

Provide a 4'-0" minimum wide deck closure pour between phase constructed sections of steel girder superstructures.

121.10 - Bridge Concept Memorandum Submittal Checklist

Replace the section with the following paragraphs:

Each BCM is project specific and should be developed for its individual characteristics, however the referenced BCM is to serve as a guideline/example for all that is expected for a quality report.

The BCM shall contain the following for each bridge within the project limits:

- (1) A description of the existing bridge characteristics (e.g., length, width, deck thickness, superstructure beam type, foundation, skew, cross-slope, lane configuration, etc.), as applicable.
- (2) A description of the proposed bridge design characteristics (e.g., length, width, deck thickness, superstructure type, skew, cross-slope, lane configuration, etc.), including specific components such as beam type and spacing, wall type, and foundation type.
- (3) For a new bridge, a comparison of superstructure, substructure, and foundation types (advantages and disadvantages). Configuration alternatives regarding constructability, cost, and transport should be included to determine the type of bridge if not dictated by the scope.
- (4) Proposed bridge typical sections.
- (5) Proposed bridge profiles, including documenting horizontal and vertical clearances, span lengths, and facilities underneath the bridge, including water bodies, railroads, and roadway typical sections.
- (6) Existing inspection report and existing load rating analysis, if applicable.
- (7) Railroad requirements, if applicable.

121.12 - Independent Peer Review of Bridges

Replace the 2nd, 3rd, and 4th paragraphs with the following:

For any project which includes a bridge, once the proposed bridge type and layout has been determined as part of preparation of the Bridge Concept Memo (BCM), the Project Manager (PM) shall determine if an Independent Peer Review (IPR) is required based on type of bridge. Category 1 structures, as defined by Section 121.3.1 of the FDOT Design Manual, shall be exempt from the need for a peer review except as noted below.

- (1) An IPR will always be required for the following structures:
 - a. Segmental Concrete Superstructures.

- b. Post-Tensioned Concrete U-Beam Superstructures or other post tensioned superstructure types.
 - c. Structural Steel Box Beam bridges with skew angles greater than 5 degrees at end bents.
 - d. Any substructure type which contains post-tensioned elements (straddle bents, integral bents, etc.). This may involve only a peer review of the substructure, depending on the superstructure type.
 - e. Long span (200'+) steel I-beam superstructures with skew angles greater than 20 degrees at end bents/piers.
 - f. Long span (200'+) steel box beam superstructures with skew angles greater than 20 degrees at piers or individual piers.
 - g. Structures with design concepts, components, elements, details, atypical precast structural elements, or construction techniques not typically utilized by CFX.
 - h. Any bridge with a non-redundant superstructure or foundation type (not typically used).
 - i. Any widening of the above structure types.
- (2) An IPR may be required for the following structures, which will be decided on a case-by-case basis by the PM:
- a. Structures being designed which are atypical and outside the normal work performed by the selected design firm. For a structure type to be considered typical of the type of design work performed by the firm, the firm must have:
 - i. Designed at least two similar type structures within the last 5 years.
 - ii. Have FDOT prequalification for the intended work category.
 - iii. The proposed structural EOR for the project must be one of the individuals the firm listed to obtain the appropriate FDOT prequalification.
 - iv. Any other structure type the PM determines requires a peer review.

The above requirements shall apply to D/B projects, as well as any Cost Saving Initiatives proposed by the Contractor.

121.14.3 - Summary of Phase Submittals

Table 121.14.3 – Summary of Design -Build Technical Proposal and Component Plan Submittals

Delete the last note in the table.

122 - Design Exceptions and Design Variations

Revise title of Section to **Procedure for Design Deviations**, delete FDM 122.1 through 122.4 and replace with the following:

122.1 - General

CFX follows the design criteria and standards contained in the FDM except where noted in the Design Guidelines. When it becomes necessary to deviate from the FDM for the elements listed in Sections 122.2.1 and 122.2.2, the minimum criteria established by AASHTO will be used. Documentation for all deviations shall be identified within the Preliminary Design Report (PDR) submitted to the GEC for review and approval. The PDR shall call out to the GEC and reviewers any criteria deviation from the FDM.

As the design progresses, the designer will continue to provide early notification and documentation to the GEC on any design deviations that were not included in the PDR and do not meet FDM requirements.

There are two approval procedures used by CFX and shall be used by designers.

122.2 - Procedures

Procedure One:

If the design criteria do not meet FDM criteria but meets AASHTO, the designer shall:

- Notify the GEC and document the notification and condition within the PDR and design documentation.
- The designer shall provide a complete narrative to the GEC PM, with practical solutions and recommendations that have been evaluated. Along with the AASHTO criteria that can be used or applied.
- The designer shall provide any additional information that the GEC requests, and upon review and with a full understanding of the requested FDM deviation, the GEC with CFX concurrence may approve the deviation.
- The designer shall document this approval and incorporate the approval at the next progress meeting. The meeting minutes shall provide sufficient background information, connecting the deviation to previous documentation.

Procedure Two:

If the design criteria do not meet FDM and/or AASHTO criteria, the designer shall:

- Notify the GEC in writing and document the notification and condition.
- Provide sufficient detail, explanations, practical solutions and recommendations to the GEC PM to justify approval.
- Evaluate the 10 Controlling Design Elements that are safety related. This justification may be used to defend design decisions made by the designer and approved by the GEC and CFX.
- Provide any additional information that the GEC requests, and upon review and with a full understanding of the requested FDM deviation, the GEC with CFX concurrence may approve the deviation.

122.3 - Justification for Approval

All deviations from criteria and standards must be uniquely identified, located, and justified; no blanket approvals are given. A strong case can be made if the following can be proven:

- (1) The required criteria are not applicable to the site-specific conditions.
- (2) The project can be as safe by not following the criteria and the level of safety will not be reduced due to criteria-based deficiencies.
- (3) The environmental or community needs prohibit meeting criteria.

Most often, a case is made by showing the required criteria are impractical and the proposed design wisely balances all design impacts. The impacts required for initial review, evaluation, and recommendation are:

- (1) Safety and Operational performance
- (2) Level of Service
- (3) Right of Way impacts
- (4) Community impacts
- (5) Environmental impacts
- (6) Costs
- (7) Usability by all modes of transportation
- (8) Long term and cumulative effects on adjacent sections of roadway

A case should not be made based solely on the basis that:

- (1) The CFX can save money.
- (2) The CFX can save time.
- (3) The proposed design is similar to previous designs.

The designer will provide all supporting documentation as requested by the GEC during the review and approval process and is cautioned not to proceed with the design without the approval of the design criteria deviation.

Upon review of all supporting documentation the GEC and the CFX may approve the requested design deviation from the FDM/AASHTO criteria.

122.7 Design Approval Request

Delete FDM 122.7.

123 - Engineering Design Estimate Process

123.1 - General

Delete note (5) from paragraph 1.

123.3 - Designer Interface for AASHTOWare Project Preconstruction

Delete FDM 123.3.

123.4.1 - Compiling and Reporting Quantities

*Revise title of Section to **Summary of Quantities**, delete the first sentence of the first paragraph, and replace with the following:*

All quantities for pay items are tabulated and totaled on Summary of Quantity sheets in the plans. The summary boxes should be organized in pay item sequence for the project.

123.4.2 - Breakdown of Quantities

Delete FDM 123.4.2.

126 - Lane Repurposing Projects

Delete FDM 126.

128 - Federal-Aid Project Certification

Delete FDM 128.

130 - Signing and Sealing Documents

130.2.1 - Digital Signing and Sealing

Add the following paragraph:

Digital certificates used to sign documents submitted to CFX must be acquired from one of the FDOT approved digital Certificate Authorities. The current FDOT requirement is that the digital certificate meets a National Institute of Standards and Technology (NIST) assurance level of three (3) or higher (NIST Special Publication (SP) 800-63-2 Electronic Authentication Guideline). However, NIST SP 800-63-2 was withdrawn and superseded in June 2017 (updated 12/1/2017) by SP 800-63-3 Digital Identity Guidelines (includes parts 800-63A, 800-63B and 800-63C). As part of SP 800-63-3, the definitions of assurance levels were revised from a scale of one to four to a scale of one to three. Based on NIST SP 800-63A, the required assurance level shall now be a two (2) or higher. (SP 800-63A assurance levels two and three replaced SP 800-63-2 assurance levels three and four, respectively). The list of approved Certificate Authorities can be found on the FDOT website.

130.2.1.1 - Single Digital Signature

Delete FDM 130.2.1.1 and replace with the following:

A Signature Sheet is required for all component plans that will be signed and sealed by one or more professionals. See **CFX Design Guidelines 303** for Signature Sheet requirements.

130.2.1.2 - Multiple Digital Signatures

Delete FDM 130.2.1.2 and replace with the following:

A Signature Sheet is required for all component plans that will be signed and sealed by one or more professionals. See **CFX Design Guidelines 303** for Signature Sheet requirements.

130.2.2 - Manual Signing and Sealing

Delete FDM 130.2.2.

131 - Plans Processing

*Delete FDM 131. Revise the title to **Plans, Processing, and Revisions** and replace with the following:*

131.1 - General

This section describes the critical activities required to process the contract plans, specifications and estimate for letting.

131.2 - Plans Processing

All CFX construction contracts are let utilizing CFX's Procurement Resources, located on the CFX website.

131.2.1 - Bid Plans (Prior to Advertisement for Construction)

- a. Submit bid plans with all digital signatures applied to the signature sheet(s) to CFX.
- b. The bid plans will be reviewed by CFX and CFX's GEC.

131.2.2 - Addendums (During Advertisement for Construction)

- a. Plan changes during advertisement are to be issued as addendums.
 - i. Addendum triangles, clouds, dates, and descriptions to describe the changes should be added to each revised sheet.
- b. Submit addendums in clean pdf format (not signed and sealed) to CFX.

131.2.3 - Approved for Construction (AFC) Plans (After Award)

- a. Do NOT reprint/pdf the entire plan set to create the AFC Plan set
- b. The AFC plan set shall be comprised of the original pdf sheets generated for and included in the digitally signed and sealed Bid Plans with the following exceptions:
 - i. Replace the key sheet
 1. Remove all addendum triangles, clouds, dates, and descriptions.
 2. Update the plans submittal label from "Bid Plans" to "Approved for Construction Plans" and the month and calendar year, i.e.: "October 2018", to the month and calendar year that the AFC Plans are to be submitted.
 - ii. Replace sheets modified per addendum
 1. Remove all addendum triangles, clouds, dates, and descriptions.
 - iii. Replace the signature sheet if any sheets were added or deleted as part of the addendums.

- iv. Submit the Approved for Construction Plans with all digital signatures applied to the signature sheet(s) to CFX.
 1. The AFC Plans will be reviewed by CFX and the CFX GEC to verify that the AFC Plans adhere to the process outlined above.

131.2.4 - Revisions

- a. Prepare plans revisions in accordance with FDM Section 151.2 Post-Let Revisions, as modified by CFX Design Guidelines 151.2.1.
- b. Prepare revision signature sheet in accordance with CFX Design Guidelines 303 Signature Sheet, subsection 303.8 Revisions.
- c. Sign and seal revisions in accordance with FDM Section 130.5 Signing and Sealing Revisions.
- d. Submit plans revisions with all digital signatures applied to the signature sheet(s) to CFX and the Construction Engineering and Inspection (CEI) consultant.

131.2.5 - As-Built Plans

The As-Built plan process is as follows:

- a. The project CEI will prepare and send the Final As-Built PDFs to the CFX CMC.
- b. The CFX CMC will send the As-Built plans to the CFX Engineering PM.
- c. The CFX PM coordinates with the EOR to verify the As-Built Plans are complete.
 1. The EOR will notify the CFX PM if there are any comments.

The EOR will confirm the As-Built Plans are accepted.

132 - PS&E Submittal Package Revisions

Delete FDM 132.

140 - Lump Sum Projects

Delete FDM 140.

151 - Revision Packages

151.2.1 - Post-Let Revision Package

Delete the first and fourth bullet items of paragraph three.

151.2.1.3 - Specifications

Delete FDM 151.2.1.3.

151.2.1.4 - Estimated Quantities

Delete the last sentence in the paragraph.

151.3 - Post-Stamped Revisions

Deleted the last paragraph.

152 - Shop Drawing Submittals

152.1 - Introduction

Add the following after the third paragraph:

The CEI and or the EOR that attend the preconstruction meeting will describe and detail the Shop Drawing Process. The electronic submittal of shop drawings to the CEI and the procedures and routing will be included in the presentation. The presentation will also address the requirement for submission of CFX shop drawings, tracking of the submittal, and outlining the review and approval process.

Delete the third note of the fourth paragraph and replace with:

Engineer of Record (EOR): Consultant shall review standard regulatory and warning signs with respect to the elements specific to CFX's design requirements, i.e., sheeting, color, size, thickness, etc. The Consultant shall review the fabricator's details for attachment of single post mounted panels to the horizontal brackets. The use of mechanical fasteners is limited to each end of the bracket. See VHB Special Provision. Holes shall not be "punched" at standard increments through the full width of the sign. The Consultant shall review panel and hardware fabrications for single and multi-post assemblies to ensure compliance with aesthetic criteria when applicable. The Consultant shall ensure the structure manufacturer has included the capability of future cantilever arm length adjustment(s) when required in design and that the structure manufacturer has provided for mounting mainline toll plaza approaching signs, i.e., single line DMS/static combination and adjacent static panel, on the same vertical plane.

Delete the tenth note of the fourth paragraph and replace with:

CFX Shop Drawing Review: The GEC assigned by CFX will be responsible for performing CFX shop drawing reviews for sign panels and structures, aesthetics for certain bridge and noise wall elements, and proprietary lighting items when specified as a CFX preference. The GEC will be responsible for documenting, tracking, and maintaining tracking records for the specific shop drawings as previously noted, disposition and distribution of Shop Drawings to other disciplines within the GEC organization for review as well as distribution back to the EOR.

Delete the eleventh note of the fourth paragraph and replace with:

Final Review Office: The CEI is responsible for performing the final review and final distribution of shop drawings which have been reviewed.

Replace within whole section:

It shall be understood that any references stated within the **FDM 152**, to the Department or the FDOT Shop Drawing Review Office shall be replaced with CFX or the CFX Shop Drawing Review Office.

152.2 - Shop Drawing Submittals Not Required

Delete this section and replace with:

Material certifications, welding procedures, paint procedures, and concrete mix designs are submitted by the Contractor to the Engineer (CEI) who forwards the certifications to the EOR. These items do not need to be submitted for shop drawing review and approval. For non-standard items, the Engineer (CEI) will request approval by the EOR regarding applicability. Material certification for items on the Approved Product List (APL) is submitted by the Contractor to the Engineer (CEI).

152.3 - Contractor Information Required

Replace first paragraph with the following:

A shop drawing submittal which omits any of the minimum requirements listed in FDOT Standard Specifications, Sections 5-1.4.4.1, 5-1.4.4.2, and 5-1.4.6.1 must be returned for resubmittal.

152.5 - Transmittal of Submittals

In the first paragraph delete the last sentence and add the following information:

One copy of each sign panel shop drawing submittal shall be transmitted to CFX's GEC for a concurrent oversight review. Comments will be provided by CFX's GEC to the EOR for incorporation into the shop drawing (unless the EOR notifies CFX's GEC otherwise). The EOR shall not return the shop drawing submittal to the CEI prior to receiving and incorporating CFX's GEC concurrent review comments.

Delete the first sentence in the second paragraph.

152.5.1 - Requirements for Department EOR

Delete FDM 152.5.1.

152.5.2 - Requirements for Consultant EOR (Full Services)

Delete FDM 152.5.2.

152.5.3 - Requirements for Consultant EOR (Design Services Only)

Delete FDM 152.5.3.

152.5.4 - Requirements for Architectural or Building Structures

Delete FDM 152.5.4.

152.5.7 - 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 be advised to contact the CEI or the appropriate CFX Shop Drawing Review Office personnel. Regardless of submittal type, a letter of transmittal must always accompany a shop drawing submittal.

152.6 - Disposition of Submittals

Revise title of Section to ***Disposition of Shop Drawing Submittals***:

After the first paragraph add the following:

The GEC has the responsibility to review and comment on specific shop drawings as specified in Section 152.1 or other shop drawings as directed and assigned by CFX. When assigned the GEC will proceed as follows:

- Upon receipt of the shop drawing(s) from the EOR, review and mark the shop drawings with comments, questions, or clarifications.
- Call the EOR for discussions and electronically transmit a copy of the marked-up shop drawing(s) to the EOR. The EOR will review and determine the final resolution.
- The GEC is not responsible to stamp the shop drawing for approval, disapproval, resubmit or not approved. The GEC can make a recommendation to the EOR however these actions are the responsibility of the EOR. The GEC may mark and date their copy of the shop drawing as “dated and reviewed.”
- For those cases where the GEC requests a resubmittal or recommends not approving the shop drawing, the EOR shall discuss and resolve all issues brought forth by the GEC prior to proceeding and shall not approve or approve as noted any shop drawing without the full concurrence of the GEC.

- The GEC shall maintain a historical record of all activity, from receipt to return, devoted to an individual submittal for all shop drawings that the GEC is directly assigned.

Delete the last paragraph.

152.7 - Distribution of Submittals

Delete the first three paragraphs and replace with:

CFX Figure 152-1 illustrates the submittal and distributional flow of shop drawing for reviews performed by the EORs and the GEC.

152.9 - Submittal Activity Record (Logbook)

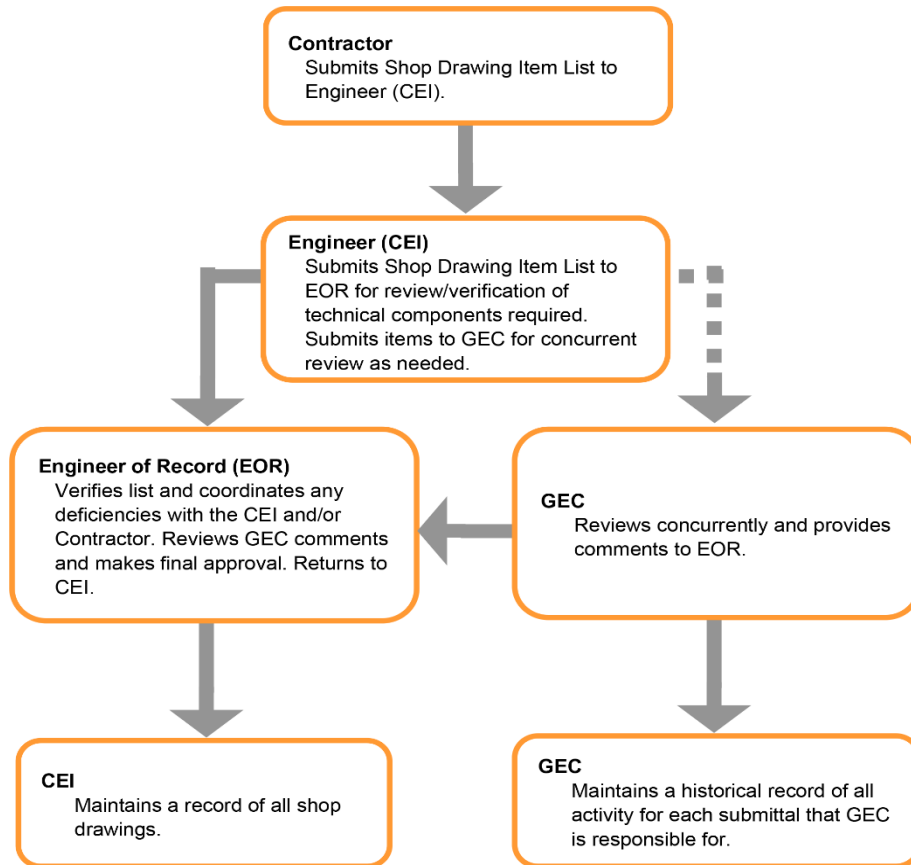
Delete note (1) and replace with:

- (1) CFX Project Number (if assigned)

152.11 - Shop Drawing Flow Diagrams

Replace Figures 152.11.1 through 152.11.4 with:

CFX Figure 152-1





2.0 - Design Criteria

2024 Design Guidelines

2.0 DESIGN CRITERIA

200 - Context Based Design

200.1 - General

Add the following sentence at the end of paragraph two:

CFX roadways use Interstate criteria unless approved by the CFX Chief of Infrastructure.

201 - Design Controls

201.5.1 - Design Speed Selection

Delete the eighth paragraph.

Table 201.5.2 Ramp Design Speeds

Delete Express Lane Direct Connections.

201.5.1.2 - Express Lanes

Delete FDM 201.5.1.2.

201.5.2 - Post-Construction Speed Study

Delete FDM 201.5.2.

201.5.3 - RRR Projects

Apply this section to CFX R&R Projects.

Delete the second, third, and fourth paragraphs.

210 - Arterials and Collectors

210.1.1 - Criteria for RRR Projects

Apply this section to CFX R&R Projects.

210.6 - Roadside Slopes

Delete all bullets in the second paragraph and replace with:

Sod must be used throughout the entire limits of CFX projects. Coordinate with the GEC for the type of sod to be used on each specific project.

210.10.3 - Vertical Clearances

Replace the second sentence in (6) with:

This clearance shall be measured from the highest point of the entire roadway width, including shoulders, for all span trusses.

Add the following:

- (9) The minimum VC for single line DMS / static panel combination used in toll plaza approach signing shall be 19'-6". For all other DMS/static sign installations vertical clearance shall be measured to the bottom controlling element.

211 - Limited Access Facilities

211.1 - General

Delete the second and third paragraph.

In the fifth paragraph beginning with "The following manuals" add:

- Standard Highway Signs and Marking Book (SHS)

Delete the eighth paragraph and replace with the following:

Specific requirements for placement of the toll site infrastructure (e.g., tolling equipment structures, equipment buildings, utilities) is provided in the General Tolling Requirements and amended per the CFX ITS Design Standards. The CFX ITS Design Standards can be located on the CFX website.

211.2.2 - Pavement Cross Slopes

Delete the first paragraph and replace with the following:

Standard pavement cross slopes are shown in **FDM Figure 211.2.1**. An analysis of the surface drainage is required when more than three lanes are sloped in one direction.

211.2.2.1 - Existing Pavement Cross Slopes

Delete the first sentence of the third paragraph and replace with the following:

When cross slope correction is necessary, work closely with the GEC PM to determine the appropriate method of correction.

211.2.3 - Hydroplaning Risk Analysis

Add the following paragraph after the first paragraph:

The analysis should be completed during the PDR phase because the typical section cross slopes and superelevation rotation points could impact the roadway geometry. Modifications to cross slopes or superelevations should be discussed with the GEC Project Manager before completing each phase submittal. Travel lanes with existing cross slopes that are found to be non-compliant must be corrected to meet standard pavement cross slopes.

211.3 - Medians

*Add note (2) to **FDM Table 211.3.1**.*

- (2) For CFX roadways (without barrier), provide a median width which will accommodate future lanes when planned. (106-ft median width for 4 lane sections planned to be future 8 lane section with special use lanes and 4-ft buffers)

211.3.2 - Median Crossovers

Delete the last sentence in the second paragraph.

Delete the fourth paragraph and replace with:

Crossover locations that do not meet the above criteria require approval by the CFX Chief of Infrastructure.

211.3.2.1 - Existing Crossovers

Delete criterion (2) and (3) and replace with:

- (2) Crossover locations that do not meet the AASHTO Green Book criteria or the additional FDOT criteria require approval by the CFX Chief of Infrastructure to remain.

211.3.3 - Managed Lanes Separation

Delete FDM 211.3.3 and Figures 211.3.1 thru 211.3.4.

211.4 - Shoulders

Add the following paragraphs:

It is CFX preference to provide a wider useable shoulder for emergency use and to accommodate stopped or disabled vehicles. For new (2-Lane) or widened facilities (3-Lane or more), provide 14 ft. wide inside and outside shoulders with a 12 ft. paved width.

Per AASHTO Chapter 10.9.6, the left and right shoulder widths may be reversed if needed to provide additional sight distance.

Delete Managed Lanes from Table 211.4.1.

Add the following to the NOTES with shoulder gutter in Table 211.4.1:

- (2) Where no guardrail, shoulders shall extend 4 ft beyond the outside of shoulder gutter with 0.06 cross slope back toward the gutter. The 4 ft backslope shall include 3 ft of misc. asphalt adjacent to shoulder gutter and 1 ft of sod.

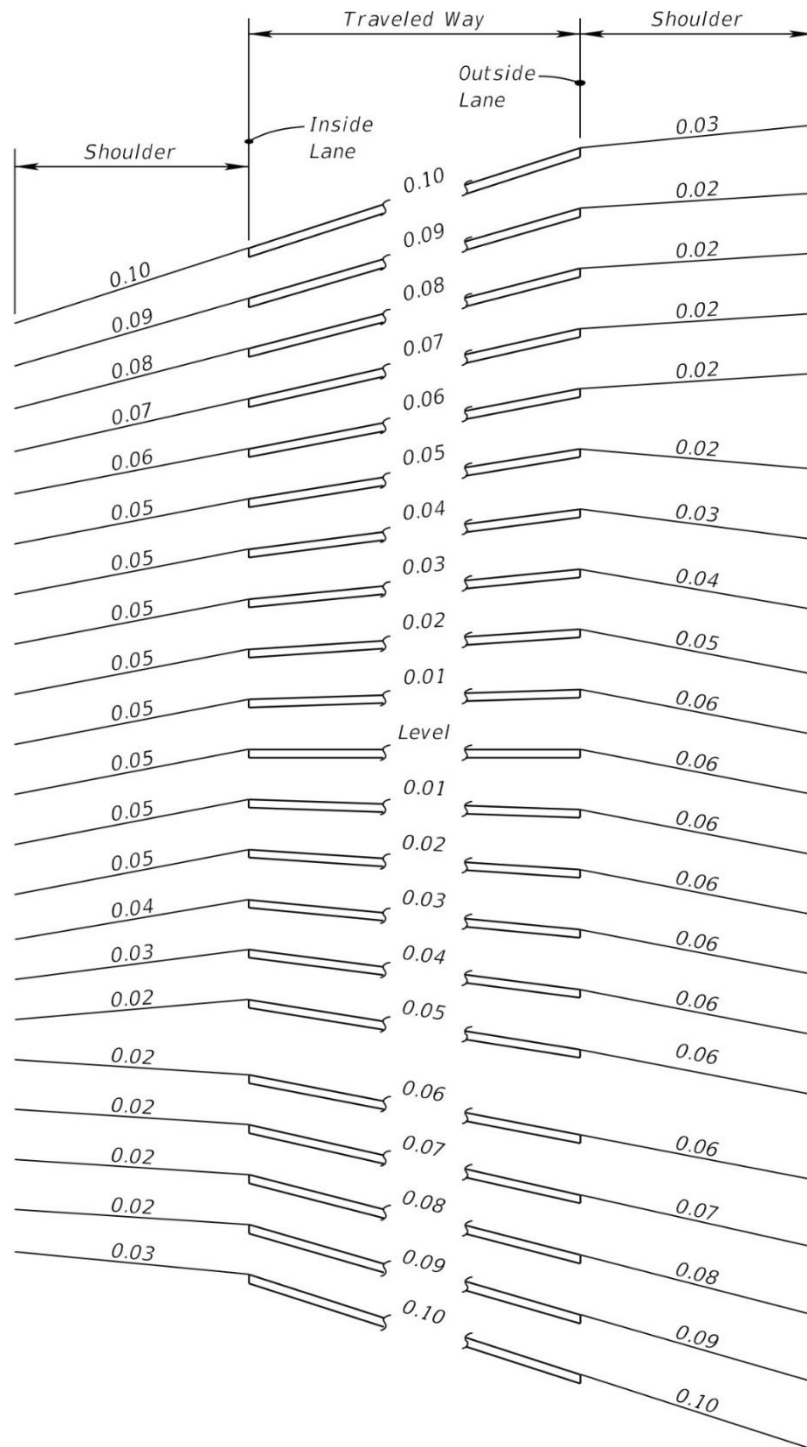
211.4.1 - Managed Lanes Shoulders

Delete FDM 211.4.1 and the rows for Managed Lanes from Table 211.4.1.

211.4.2 - Shoulder Cross Slopes

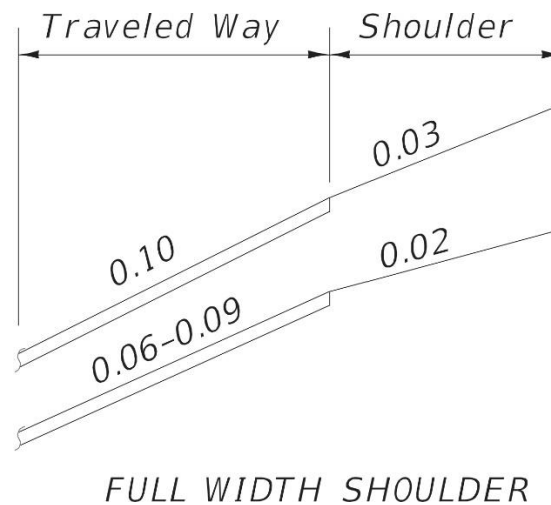
*Replace FDM Figure 211.4.1 Shoulder Superelevation with **CFX Figure 211.4.1** Shoulder Superelevation*

CFX Figure 211.4.1 Shoulder Superelevation



Replace FDM Figure 211.4.2 Special Ramp Shoulder Superelevation with **CFX Figure 211.4.2** Special Ramp Shoulder Superelevation

CFX Figure 211.4.2 Special Ramp Shoulder Superelevation



211.4.2.1 - Shoulder Rocking

Delete first paragraph and replace with the following:

CFX preference is to use trench drain in areas of substandard gutter grade. When trench drain is not feasible or cost effective, consult CFX prior to utilizing shoulder rocking. Shoulder rocking is not allowed for new alignment or new ramp locations.

Roadway shoulder may be rocked up and down to provide the minimum longitudinal slope of 0.3% along the outside of shoulder / gutter line. The Shoulder Rocking may vary from a minimum 3% cross slope to a maximum 7% cross slope in areas of tangent roadway sections. Where Shoulder Rocking occurs outside of tangent roadway sections, shoulder cross slopes may range from a minimum of matching the adjacent travel lane cross slope to a maximum cross slope of 7% break over from the travel lane. The cross-slope difference between adjacent low points and high points of Shoulder Rocking shall not exceed 4%.

Add the following after last paragraph:

Shoulder Rocking shall be depicted on the Roadway Profile Sheets and shall include a gutter line profile (station and elevation of all low points and high points, and longitudinal slopes of the gutter line) and a top of barrier wall profile. Where shoulder rocking occurs on both sides of a median barrier wall, a gutter line profile for each side of the median barrier wall and a profile for the top of barrier wall shall be required. The top of barrier shall follow the adjacent profile grade. In lieu of gutter line profiles, a table may be provided in the plans that includes, at a minimum, necessary information to construct the shoulder rocking and the longitudinal gutter grades. Shoulder cross slopes at each low point and high point of shoulder rocking shall be included in either the Shoulder Rocking table on the plans or in separate shoulder rocking calculations in the Drainage Report.

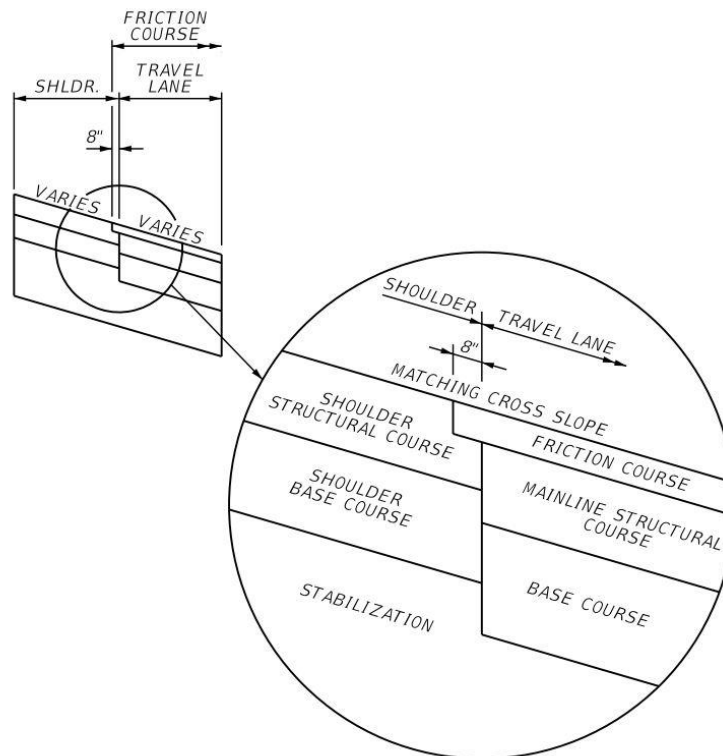
211.4.3 - Limits of Friction Course on Paved Shoulders

Delete the second paragraph and Figure 211.4.3 and replace with the following:

For all locations where the shoulder pavement width greater than 5 feet and the shoulder slopes toward the travel lane, the shoulder pavement shall be flush with the travel lane friction course that extends 8" outside the travel lane. This will address any concerns for trapping water on the shoulder as demonstrated in **CFX Figure 211.4.3**.

In areas where the shoulder pavement width is 5 feet or less and barrier is not adjacent to, the CFX Figure for the shoulder pavement being flush with the travel lane friction course does not apply.

CFX FIGURE 211.4.3



211.4.4.1 - Ground-in Rumble Strips

Add the following paragraph:

The minimum thickness of proposed structural asphalt on shoulders with ground-in rumble strips must be no less than 2.0 inches. On existing shoulders without rumble strips that call for new rumble strips to be placed, the minimum thickness of combined existing structural asphalt and proposed asphalt must be no less than 2.0 inches.

211.4.7.1 - Existing Curb

Delete the third sentence.

211.7 - Horizontal Alignment

Add the following paragraph:

Spiral curves should not be used on mainline curves equal to or less than 1.5 degrees and on ramp curves equal to or less than 3 degrees. Avoid the use of spirals on bridges and R/W lines.

211.8 - Superelevation

Add the following paragraph:

Zero percent cross slopes are to be avoided within 150 ft. of the high point or low point of crest and sag vertical curves, respectively, especially at gore areas and bridges.

211.9.1 - Grades

Add the following sentence to the last paragraph:

The minimum distance between VPIs on curbed roadways is 250 feet. The minimum distance required between VPIs on an expressway used to develop the profile grade line should be 5 x Design Speed.

Table 211.9.2

Delete Note (2).

Table 211.9.3

Add the following note to the Table:

Notes:

- (1) This table provides general guidance for minimum vertical curve lengths. If a curve meets K value, stopping sight distance, decision sight distance, and provides positive drainage control, then a reduction in vertical curve length may be approved by the CFX Chief of Infrastructure.

211.10.2 - Decision Sight Distance

Delete the last paragraph and replace with:

Do not place decision points e.g., ingress or egress within the limits of reduced sight distance.

211.11 - Structures

Add the following sentence:

The width of all CFX-owned bridges must equal the paved width of the approach roadway including the paved width of shoulders.

211.13 - Ramp Terminals

Delete the last three sentences of the first paragraph and replace with the following:

For single lane ramp terminals, it is CFX's preference to use the taper-type design for exit ramps and the parallel-type for entrance ramps. Per AASHTO, "the advantages in efficient traffic operations and low crash frequencies of long acceleration lanes provided by parallel type entrances are well recognized. A long acceleration lane provides more time for the merging vehicles to find an opening in the through-traffic stream. An acceleration lane length of at least 360 m [1,200 ft.] plus the taper is desirable wherever it is anticipated that the ramp and freeway will frequently carry traffic volumes approximately equal to the design capacity of the merging area."

A parallel type of exit ramp will be considered in locations where both the main line and ramp carry high volumes of traffic. In this case, the deceleration lane provided by the parallel-type exit provides storage for vehicles that would otherwise undesirably queue up on the through lane or shoulder. The taper portion of a parallel-type exit deceleration lane shall have a taper of 25:1. See AASHTO for additional guidance for two-lane ramp terminal designs.

211.14 - Managed Lanes Access Points and Access Types

Delete FDM 211.14.

Delete Exhibits 211-3 through 211-12

213- Modern Roundabouts

213.10 – Signing and Pavement Markings

Delete the fourth and fifth paragraphs.

Delete Figure 213.10.1.

215 - Roadside Safety

215.1.1 RRR Criteria

Apply this section to CFX R&R Projects.

215.2.6 - Roadside Slope Criteria

Add the following paragraphs:

To reduce future erosion and maintenance issues, utilizing a maximum slope of 1:3 is preferable. In constrained conditions, flattening, maintaining or shielding the existing slopes should be evaluated. Where the slopes are greater than 1:2 and maintenance is difficult to perform, consider placing concrete pavement on slopes.

In areas where guardrail is adjacent to the roadway, provide a maintenance/landscaping berm behind the guardrail. The berm should be 10 ft. wide (3 ft. minimum), measured from the back of the miscellaneous asphalt and slope towards the roadway. The back of the berm (break point) shall be maintained at an elevation equal to the outside edge of travel. This design is intended to prevent roadway runoff from bypassing treatment as well as preventing runoff from staging into the travel way in the event of a drainage structure malfunction/clog during a storm event. See **CFX Figure 215.2.16** for additional information.

CFX Figure 215.2.16 Grading Behind Guardrail

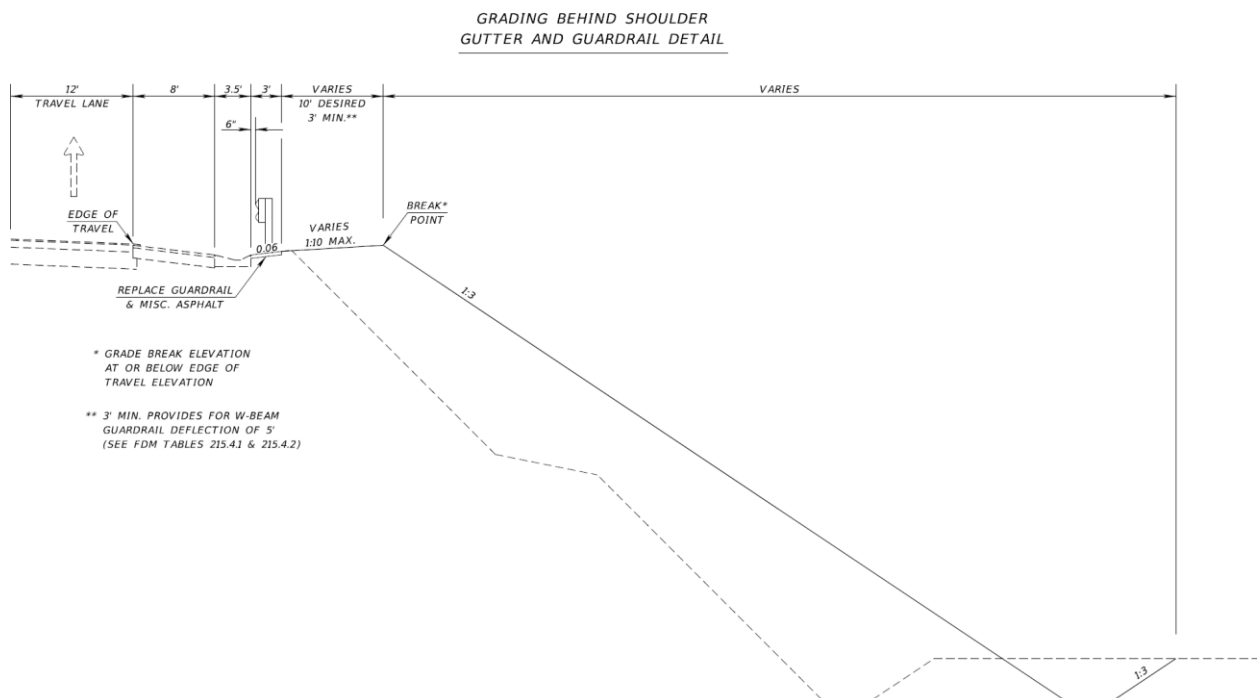


Table 215.2.3

For front slope with height greater than 20 ft., delete the rate and replace with:

1:3 with guardrail and maintenance/landscaping berm.

215.2.8 - Aboveground Utilities

Delete the last sentence in the first paragraph.

215.3.2 - Canal Hazards

Delete FDM 215.3.2 (FDM Figures 215.3.1 and 215.3.2 to remain), rename the section to **Water Body/ Canal Hazards** and replace with the following:

Water body is defined as a natural or manmade feature, such as a pond, lake, ditch, canal, river, wetland, etc. that has a depth of water 3 feet or more for an extended period of time (24 hours or longer) as measured from the bottom elevation of the water body.

Minimal lateral offsets for water body hazards exceed standard clear zone width criteria. Water body hazard lateral offsets are measured from the edge of travel lane, auxiliary lane or ramp to the top of the water body side slope nearest the road. Minimum required distances are illustrated in **FDM Figures 215.3.1** and **215.3.2** and summarized as follows:

- Not less than 60' for flush shoulder and curbed roadways with design speeds of 50 mph or greater.
- Not less than 50' for flush shoulder roadways with design speeds of 45 mph or less.
- Not less than 40' for curbed roadways with design speeds of 45 mph or less.

When new water body or roadway alignment is required, provide distances greater than those above to accommodate future widening of the roadway.

On fill sections, provide a flat berm (1:10 or flatter slope) no less than 20' in width between the toe of the roadway front slope and the top of the water body side slope nearest the roadway.

When the slope between the roadway and the "extended period of time" water surface is 1:6 or flatter, the minimum distance can be measured from the edge of the travel lane, auxiliary lane, or ramp to the "extended period of time" water surface and a berm is not required.

In sections with ditch cuts, provide a minimum of 20' between the toe of the front slope and the top of the water body side slope nearest the roadway.

If the minimum lateral offset can be met, additional water body protection criteria may still apply and are summarized as follows:

- No crashes within a 5-year period in which a vehicle departs from the roadway towards the waterbody.
- There shall be no non-traversable slopes (rough terrain, obstructed, or slopes steeper than 1:3) between the roadway and the water body.
- If design speeds of 45 mph or less on roadway adjacent to water body, the distance between where a vehicle leaves the roadway along the outside of a horizontal curve and the edge of

waterbody shall not be less than runout path length of 435 ft (based on a 50-mph stopping distance).

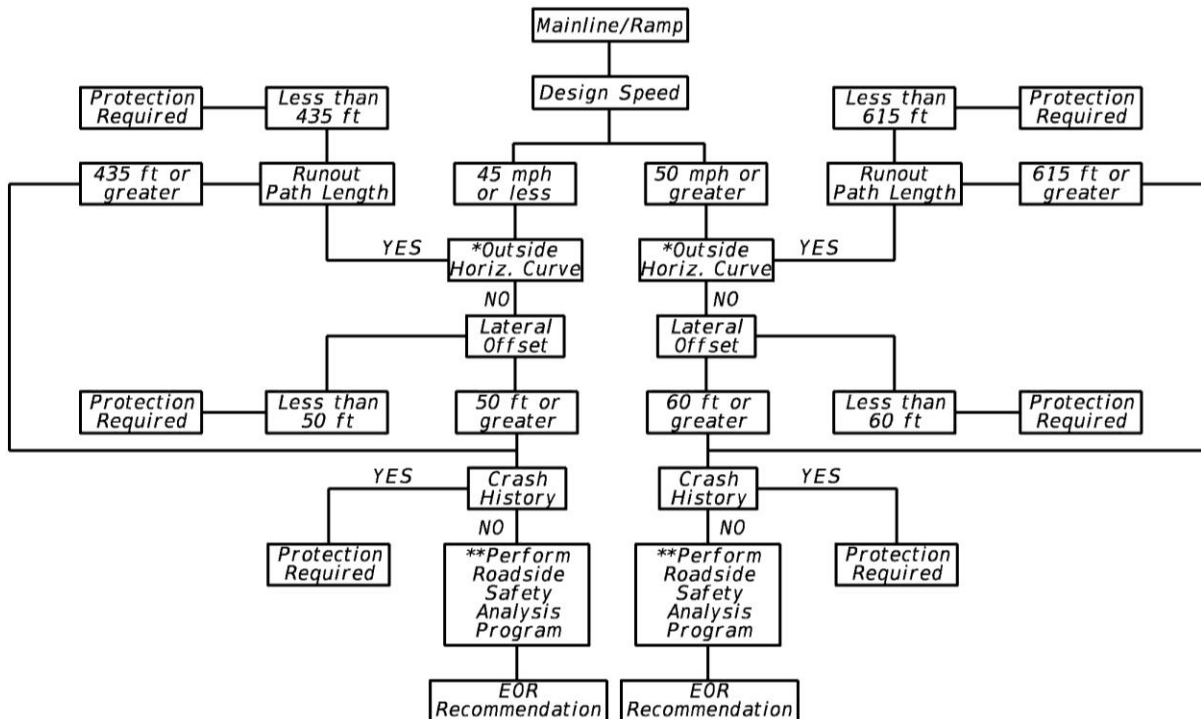
- If design speeds of 50 mph or greater on roadway adjacent to water body, the distance between where a vehicle leaves the roadway along the outside of a horizontal curve and the edge of waterbody shall not be less than the runout path length of 615 ft (based on a 70-mph stopping distance).

Shield the water body hazard with an approved roadside barrier when the required minimum lateral offset cannot be met, or the water body protection criteria above cannot be met. Use the following criteria for water body hazard protection:

- Locate the barrier as far from the traveled way as practical and outside of the clear zone where possible.
- Locate guardrail no closer than 6 feet from the water body front slope.
- Locate High Tension Cable Barrier no closer than 15 feet from the water body front slope.

If the above offset criteria would locate the barrier within the clear zone, follow the offset requirements of **FDM 215.4.6.1**.

CFX Figure 215.3.4 Waterbody Protection Requirement Flowchart



***Outside Horizontal Curve** – Waterbody is located along the outside of a horizontal curve where an errant vehicle may encroach.

****Roadside Safety Analysis Program (RSAP)** – Cost effective analysis for evaluation of roadside safety improvements. The encroachment-based approach uses a series of conditionally independent probabilities

representing vehicle roadside encroachment events, the conditional probability of a crash given a roadside encroachment has occurred, the probable severity of crashes that are likely to occur and the expected benefit cost ratios of various roadside design alternatives. EOR to provide recommendation from results and present to CFX GEC for approval.

215.4.1.1 - Flexible Barrier

Add the following paragraph:

Use of High-Tension Cable Barrier (HTCB) must be approved by CFX during the scoping process. If approved, HTCB installations utilize a 3-wire system and must be submitted with the 60% plans, to include the necessary geotechnical investigations and foundation designs. The type of barrier will be a special provision, supplied by CFX.

215.4.2.1 - Guardrail End Treatments

Delete the third sentence of the first note of the first paragraph and replace with:

Approach terminals are classified by a Test Level (TL-2 for Design Speeds \leq 45 mph or TL-3, which is acceptable for all design speeds). All guardrail and end treatments on CFX's System shall be TL-3.

Add the following note 4 to the end of the first paragraph:

- (4) On projects that call for the replacement of an existing continuous run of guardrail located between two fixed points (i.e., median guardrail between adjacent bridges), the post spacing and panel layout may not equal an even number of panels. These areas are to be identified in the plans, and the non-standard guardrail detail, **CFX Design Guidelines Exhibit 215.1**.

215.4.3.2 - Temporary Crash Cushions

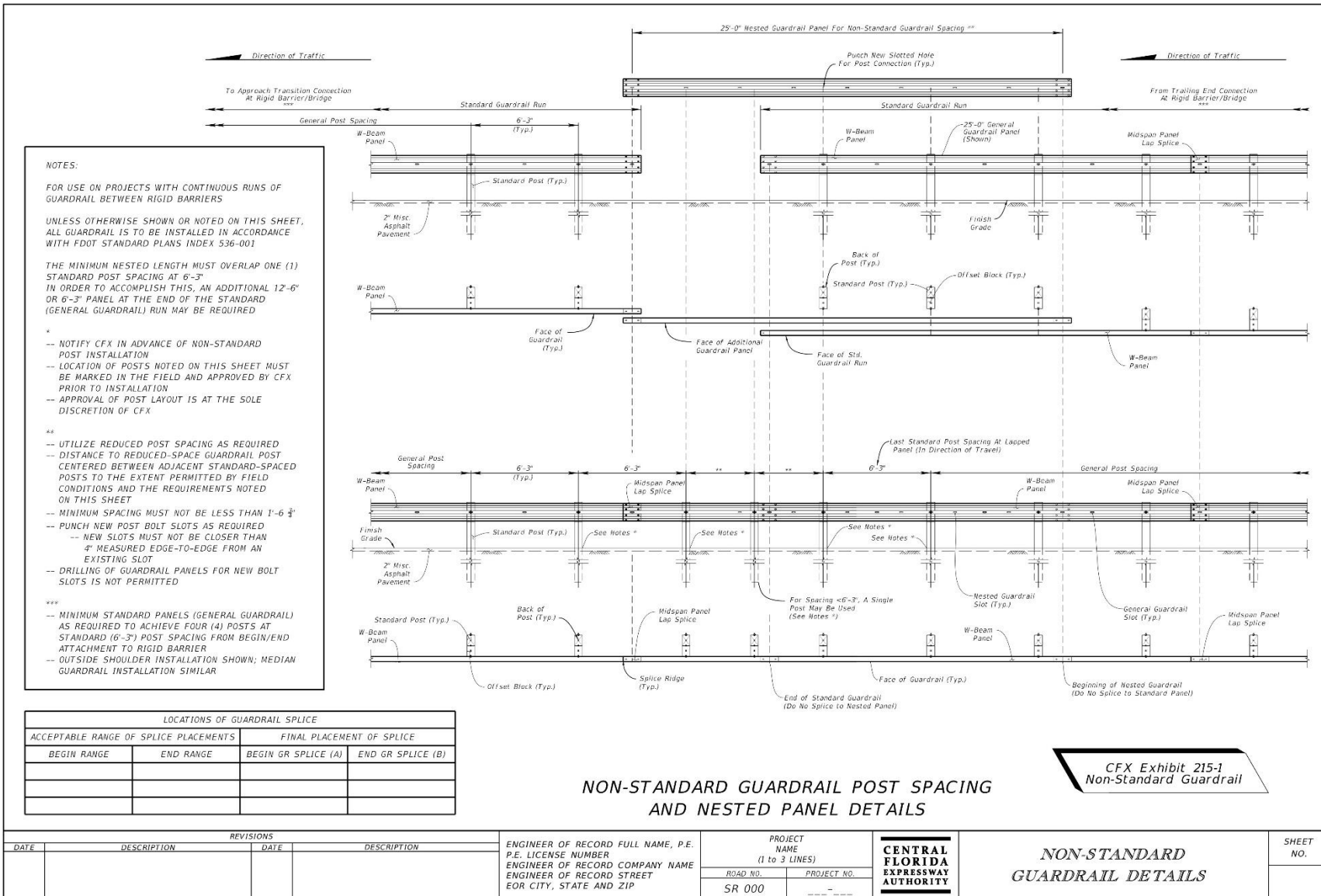
Delete the first paragraph and replace with:

Only redirective non-gating crash cushions are permitted for use as temporary crash cushions on CFX roadways unless otherwise approved.

Delete the third paragraph.

215.4.6.1 - Barrier Offset

Delete "shoulder gutter segments" from the third sentence in the third paragraph. Delete the last sentence of the third paragraph.



216 - Earthwork

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 Quantities

Delete all paragraphs and replace with:

Earthwork quantities are calculated by the method of average end areas:

$$\text{CUBIC YARDS} = \frac{\text{EA1} + \text{EA2} \times \text{LENGTH}}{2}$$

Each set of end areas for the different types of earthwork (subsoil excavation, regular excavation and embankment) are calculated separately and shown in the appropriate column on the cross-section sheets, as indicated in **CFX Design Guidelines 319**.

221 - Utilities

221.1 - General

Add the following to the last paragraph:

Guidance for accommodating utilities within CFX R/W can be found in CFX's Property Acquisition and Disposition Procedures Manual.

230 - Signing and Pavement Marking

230.1 - General

Delete the last sentence of paragraph two and replace with:

Signs and Pavement Markings not included in the CFX Signing and Marking Details, the FDM, or the FDOT Standard Plans are to be detailed in the plans.

Add the following paragraphs:

CFX recognizes Comm (community) as an approved abbreviation. The MUTCD approved abbreviation Intl (International) is restricted to signing for International Airports.

Sign R5-10b shall be placed on all entrance ramps near the cross street.

Regulatory sign R3-8 shall not be used on the mainline in advance of a lane drop at a two lane exit with optional lane without prior approval from CFX.

If Lane Ends (W9-1 and W4-2) signs are used, the corresponding merge arrow and message pavement markings should be used.

Signs of different shapes or sizes shall not be mounted back-to-back.

Trailblazer sign assemblies shall:

- Be placed 1 mile or less from the CFX facility, in an urban area
- Be placed 2 miles or less from the CFX facility, outside an urban area
- Be placed such that the motorist will make no more than one turn to reach the facility
- Be placed at strategic locations which make it easy for a motorist to find a new facility or new alignment
- Not be placed at intersections that would direct traffic through neighborhoods

Signs are to match the ***CFX Aesthetic Guidelines Section 105.7***.

230.2.2 - Overhead Signs on Limited Access Facilities

Delete all paragraphs and replace with:

All exit direction signs shall be mounted overhead.

All advanced guide signs shall be mounted overhead. Multi-post advanced guide signs shall not be permitted.

Alternatives to sign placement shall have written justification approved by CFX and include the following:

- Right edge of sign panel aligned with the outside edge of travel
- Left edge of sign panel aligned with the skip stripe for the outside lane.

Crossroad signing shall be overhead to extent possible.

Span mounted panels shall be centered over the entire width of the roadway.

Cantilever mounted panels shall be centered over the entire width of the roadway.

Panels containing NEXT RIGHT or NEXT LEFT are considered lane specific signs and shall be centered over the applicable lane. Panels less than ½ mile from the exit direction assembly are to read “NEXT RIGHT” or “NEXT LEFT”.

“Overhead” category in MUTCD applies to all signing along the mainline. Interstate, U.S., and State Route Shields shall be reduced from the “overhead” criteria to the next smallest size for Interchange Sequence Signs.

Multiple panels on an overhead structure shall be designed having the same overall height if panels face the same direction of travel and after using standard design criteria, the difference in panel heights is 24 inches or less.

The overall panel width shall be equal to or greater than the overall height unless otherwise directed by CFX.

Hyphens shall only be used if the destination and/or street name is hyphenated with the governing agency.

Temporary panels must be fully designed and detailed in the plans.

230.2.3 - Local Street Names on Guide Signs

Delete the last sentence and replace with:

The decision to use a local name should be coordinated with CFX.

230.2.4 - External Lighting of Overhead Signs

Delete all paragraphs and replace with:

Provide external lighting for all CFX overhead signs. LED type lighting shall be used for overhead signs.

Luminaires shall not be mounted to the top of sign panels, unless otherwise approved by CFX for airport glide paths. Luminaires shall be grey or silver. Refer to **FDM 231, Table 231.2.1** and **CFX Design Guidelines 231** for information related to sign lighting criteria.

230.2.5 - Signs on Barriers and Traffic Railings

Add the following to the first paragraph:

Crossroad street name signs shall be mounted flush to traffic railing barrier on roadway bridges crossing over the mainline. The CFX logo signs shall be mounted flush to the traffic railing on mainline bridges crossing over surface roadways.

Delete the second paragraph and replace with:

Utilize **FDOT Standard Plans, Index 700-013** when attaching permanent sign supports to a median traffic railing.

Delete the first sentence in the third paragraph and add the following:

Utilize the Barrier Mounted Sign Details as shown in the CFX Signing and Marking Details Appendix for all outside traffic railing sign installations.

230.2.7 - Object Markers and Delineators

Delete the second paragraph and replace with:

The CFX Signing and Marking Details illustrate the use of delineators along the edge of limited access traffic lanes and interchange ramps.

Do not place delineators behind guardrail.

Add new section:

230.2.7.1 - Linear Delineation

3M Linear Delineation System, Series 340 is to be specified on barrier walls and guardrail into and along the high side of loop / partial loop ramp curves and other locations as determined by CFX. Panels are to be thirty-four (34) inches long and six (6) inches wide on barrier walls and guardrail. Panels are typically spaced eighteen (18) inches apart on barrier walls and centered at 2 feet above the gutter line elevation. However, spacing may require adjustment depending on the total length of each wall such that all panels are 34" long. Sheeting color shall match adjacent edge line.

230.2.10 - Internally Illuminated Street Name Signs

Delete the first paragraph and replace with:

Do not exceed ten feet in width for any internally illuminated street name sign installed on CFX-maintained signals. On mast arm supports, the sign shall be free swinging from the arm. If the sign cannot be free swinging from the arm, it shall be placed on an arm below the signal mast arm. The sign is never to be placed above the mast arm.

Delete the first sentence in the second paragraph and replace with:

Unless directed otherwise by the local agency responsible for the cross street at an interchange, design the street name sign in accordance with the **TEM Section 2.2**.

Add the following section:

230.2.10.1 - Traffic Signal Mounted Signing

Submit a written recommendation addressing all traffic signal related signing including, but not limited to, street name signs (internally illuminated or static), turn prohibition, etc. Signal related signing shall include proposed overhead panels (span wire, mast arm, pole, etc.) as well as single post ground mounted assemblies.

230.2.11 - Tourist-Oriented Directional Signs

Delete FDM 230.2.11.

Add the following sections:

230.2.13 - ClearView Font

ClearView Font is the standard font for use in guide sign design and fabrication. Traditional Series shall be used for negative contrast copy. Traditional Series and CV shall not be used on the same panel for positive contrast.

“TRANSOFT GuidSIGN” is the only software currently approved by CFX. However, the Consultant may use an alternative program or format provided examples have been submitted and approved prior to 60% plans submittal.

For mainline and ramp guide signs, CV standard upper-case heights will match the MUTCD table, but the lower-case heights may not. Do not adjust the lower-case letters to match the MUTCD. Only the upper-case letter height is to be shown on the guide sign worksheets.

230.2.13.1 - Letter Spacing for Panel Design

Interword spacing (the horizontal space between words) shall be 1.25 times the UC letter height (rounded to the nearest tenth of an inch) when the destination contains two words, (i.e. Goldenrod Rd) and 1.0 times the UC letter height when the destination contains three or more words, (Winter Garden Vineland Rd). When two- and three-word destinations are on the same panel, use 1.0 times the UC letter height for all lines of destination copy.

Interline spacing (the vertical space between lines of copy) should be 0.75 times the average of the UC letter heights in the adjacent lines of copy. For example, using 16” UC in one line and 12” UC in the adjacent line, the interline space would be 10.5” or $(0.75 * (16 + 12) / 2)$.

Spacing may be slightly adjusted to achieve a total panel height in an even 6” increment.

230.2.14 - Crossroad Street Name Signs

Crossroad street name signs for roadways that do not have an interchange with a CFX facility shall be provided. If design constraints require two lines of text, CFX approval is required. Locations for these signs shall be as follows:

- Crossroad over toll road: Mount panels on the bridge girder for view by toll road traffic.
- Toll road over crossroad: Install multi-post assemblies in the median behind bridge approach guardrail depending on existing or proposed landscaping. If median installation is prevented by landscaping or other design related elements, install the multi-post assembly along the outside travel lane. Roadside mounted assemblies shall be located as close to the bridge as practical.

230.2.15 - Partial Overlay Designs

Partial overlays shall completely cover all existing copy to be revised by the overlay, match positive contrast copy style, i.e., CV or Traditional, which is to remain visible when overlay is positive contrast, and provide sufficient information such that the Contractor can correctly align the proposed copy (not the overall overlay) with the existing copy which is to remain visible.

230.3 - Pavement Markings

Delete the first sentence in the first paragraph and replace with:

Pavement marking design are to comply with the CFX Signing and Marking Details, Standard Specifications, Standard Plans, TEM, MUTS, and the MUTCD.

230.3.1 - Selection of Pavement Marking Material

Add the following paragraph to the beginning of the section:

For local roadways impacted by construction or maintenance of a CFX facility use the **FDM Section 230.3.1** and **FDM Table 230.3.1** as a tool to assist in determining the appropriate pavement marking material.

230.3.1.1 - Longitudinal Solid Lines

230.3.1.2 - Skip/ Dotted Lines

230.3.1.3 - Transverse Markings

230.3.1.4 - Messages and Symbols

Delete 230.3.1.1 through 230.3.1.4 and replace with:

3M Company Standard Preformed Patterned Retroreflective Pavement Marking Tape (PPRT), Series 380AW is to be specified for all solid lane lines, edge lines, skip striping, Do Not Stop pavement messages and gore markings on asphalt and concrete pavement on facilities within CFX's jurisdiction.

At ramp terminal return radii, where the radius is smaller than manufacturer's recommend radius for PPRT installations, Consultant may request to utilize thermoplastic marking materials in lieu of PPRT.

Stop bars, crosswalks, messages, directional arrows, and option arrows will be preformed thermoplastic.

For lane lines leading to a ramp terminal, determine if existing markings show a significant amount of crossover from the vehicles. If so, use thermoplastic for the lane lines, otherwise use PPRT. Coordinate decision with CFX GEC.

9" Contrast (PPRT, black/white) shall be specified for all solid lane lines, 10'- 30' skip striping, and white edge of pavement lines within CFX's jurisdiction.

230.3.2 - Pavement Marking Maintenance

Delete FDM 230.3.2.

230.3.2.1 - Refurbishment Thermoplastic

Delete FDM 230.3.2.1

230.3.2.2 - Hot Spray Thermoplastic

Delete FDM 230.3.2.1

230.3.4 - Work Zone Pavement Markings

Delete the second paragraph and replace with:

Use Removable Tape for all temporary pavement markings on final asphalt or concrete surfaces. Removable Tape shall be 3M Brand Scotch-Lane Removable Tape Series 710, 711, and 715 or CFX Approved Equal.

230.3.5 - Raised Pavement Markers (RPMs)

Add the following to the last paragraph:

... and the CFX Signing and Marking Details. All RPMs installed within CFX's jurisdiction shall be 3M Company Series 290 or CFX's approved equal.

230.4 - Wrong Way Signs and Pavement Markings

Replace the third sentence of the first paragraph with the following:

Include red retroreflective strips on Do Not Enter (R5-1) and Wrong Way (R5-1a) signs, in accordance with the CFX ITS Design Details.

230.4.1 - Exit Ramp Intersections

Add the following to note (3):

- (3) ...for any static wrong way panels. Otherwise, Wrong Way Signing shall be coordinated with the ITS Consultant and/or CFX's General System Consultant to include the Wrong Way Detection System as directed by CFX.

Delete the first sentence in note (7) and replace with:

- (7) Include a straight arrow and "RAMP" pavement message in left-turn lanes extending from the far-side ramp intersection through the near-side ramp intersection to prevent premature left turns.

Delete note (9).

230.5 - Signing and Pavement Marking Coordination

Delete the second and fourth paragraphs.

Add the following paragraphs:

Unless constrained by other roadway design elements, signs shall be placed in advance of the nearest light pole to provide optimum visibility (as viewed in the direction facing the sign). The Consultants for signing and pavement marking and lighting are responsible for adjusting one or both plan components if proposed signing or lighting changes during plan development.

Multi-post assemblies shall be placed in advance of the nearest light pole when both are behind guardrail or wall.

ITS EOR shall provide locations for Dynamic Message Signs to ensure locations do not conflict. ITS EOR shall coordinate the placement of the Wrong Way signage and Wrong Way detection.

230.6.8 - Toll Route Markers

Delete paragraph one and replace with:

Typical signing and pavement markings for CFX Facilities can be found in the CFX SPM Details, located on the CFX Website.

Delete paragraph three.

Delete Exhibits 230-16a to 230-16c and replace with CFX SPM Details.

231 - Lighting

231.1 - General

Add the following paragraphs:

LED fixtures shall be used for new installation and the retrofit of existing lighting systems.

231.1.4 - Voltage Drop Criteria

Delete the FDM 231.1.4 and replace with the following:

When determining conductor sizes for lighting circuits, the maximum allowable voltage drop from the service point on any circuit shall not exceed 5% on combination of service, feeder, and branch circuit.

The voltage drop calculations for design of lighted signs shall be based on the worst-case scenario.

231.1.5 - Grounding

Delete note (3).

231.2 - Design Criteria

Delete information in the “**Color Temperature**” section and replace with:

Use 4000K LED luminaires on all CFX facilities.

231.3.6 - Underdeck Bridge Lighting

Add to the end of the first paragraph:

CFX approval is required to use Pendant Hung Underdeck Lighting.

Add the following sections:

231.3.8 - Luminaires

- All luminaires shall be produced by the same manufacturer.
- The models currently accepted by CFX for new installation and the retrofit of existing facilities are:
 - **Underdeck Wall Mount:** Visionaire BSX series including: 4000k CCT - 7 pin

receptacle – 20kv surge protection – Adjustable wall mount bracket – Dali 2/4i Driver – Surface Conduit Box - Universal Shielding. Finish, Distribution, Diode Array and output to be determined by EOR to meet the criteria for the individual project.

- **Underdeck Pendant Mount:** Visionaire PGA series including: 4000k CCT – Remote driver enclosure with 20kv surge protection and 7 pin receptacle – Dali 2/4i Driver. Finish, Distribution, Diode Array, Output and Pendant length to be determined by EOR to meet criteria for the individual project.
- **Roadway:** Signify/Lumec RoadFocus series including: 4000k CCT – Dali 2/4i – Driver – 20KV surge protection – 7 pin receptacle – Zhaga door frame socket. Finish, Distribution, Diode Array and output to be determined by EOR to meet the criteria for the individual project.
- **Sign Lighting:** Visionaire VSX Series including: 4000k CCT – Remote driver enclosure with 20kv surge protection and 7 pin receptacle - Dali 2/4i Driver – Knuckle Mount. Finish, Distribution, Diode Array and output to be determined by EOR to meet the criteria for the individual project.

231.3.9 - Remote LED Driver Cabinets

All fixtures must be able to accommodate a smart driver that will allow remote performance of diagnostics, adjustment of lighting levels and control with intelligent systems.

231.3.9.1 - Remote LED Driver Cabinets for Underdeck Lighting

If pendant hung underdeck lighting is approved, remote mounted LED driver cabinets shall be utilized for all Pendant hung underdeck luminaires providing illumination over mainline and ramp toll roads and non-toll facilities like crossroads with design speed of more than 45 MPH within limited access R/W. No remote LED driver cabinets required for wall-mounted underdeck luminaires and those pendants hung luminaires illumination non-toll facilities like crossroads with design speed equal or less than 45 MPH.

231.3.9.2 - Remote LED Driver Cabinets for Sign Lighting

Remote mounted LED driver cabinets shall be utilized for all overhead sign luminaires installed over mainline and ramp toll roads including bridge-mounted signs over both mainline and non-toll facilities like crossroads with design speed of more 45 MPH. No remote LED driver cabinets required for bridge-mounted overhead signs installed over non-toll facilities like crossroads with design Speed equal or less than 45 MPH.

231.7 - Lighting Design Analysis Report

Delete the section and replace with:

The design of all electrical systems for lighting 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.

Prepare a Lighting Design Analysis Report (LDAR) that provides horizontal illumination photometric analysis, using AGI32 Lighting Software, for the mainline section, ramp section, interchange, signalized intersections including vertical illumination, overhead signs, structure with underdeck lighting, and veiling luminance for typical sections.

Provide load analysis, voltage drop calculations for combination of service feeder and branch circuits, short circuit current analysis and device coordination, and arc flash hazard analysis.

The LDAR should include an evaluation of various lighting design alternatives which consider factors such as pole configurations, pole heights, arm lengths, luminaire wattages, and optics. A single alternative should be implemented on the project. The evaluation should be based on safety, constructability, maintainability, economics, and consistency with the adjacent projects. In addition, the LDAR should include all correspondence with the local power company, coordination with other authorities having jurisdiction, meeting minutes, documentation on all gathered field data, FAA coordination, and any other related information.

232 - Signalization

232.1 - General

Add the following paragraphs:

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, conduit routing, specific equipment, signal timing methods, etc. Meet with the maintaining agency to ascertain their preferences and obtain all other pertinent information. Submit to the GEC for review and final approval. All documentation of preferences and correspondence with the local agencies shall be included in the signalization design documentation.

Refer to CFX Signalization Details located on the CFX website.

232.2 - Lane Configuration

Delete the last three sentences of the second paragraph and replace with:

Consultant is responsible for obtaining current turning movement counts.

232.5 - Vehicle Detection

Delete the last two sentences of first paragraph and replace with:

Video shall be the preferred detection type.

232.8.1 - Mast Arm Policy

Delete all paragraphs and replace with:

Mast arms shall be installed for all new or reconstructed signals.

232.9 - Span Wire Assemblies

Delete this section.

232.10 - Traffic Signal Project Coordination

Delete the third paragraph and replace with:

Utilities - The Utility Coordinator provides the coordination between the designer and the various utilities that may be involved in the project. The Utility Coordinator may assist in identifying or verifying conflicts with overhead and underground utilities. The designer should coordinate with the utility company providing power for the preferred location for the electrical service.

Delete the sixth paragraph.

233 - Intelligent Transportation Systems (ITS)

233.1 - General

Delete the first paragraph and replace with the following:

The CFX ITS Design Details establishes guidelines for the preparation of ITS Plans for CFX facilities.

Delete the fifth bullet from the second paragraph. Add the following to the list:

- CFX Design Guidelines
- CFX Signing and Marking Details
- CFX Lighting Details

Add the following after the last paragraph:

Change all references of the District ITS/TSM&O Engineer to CFX Manager of Traffic Operations.

233.1.3 - ITS Device Approval and Compatibility

Delete the last bullet point and replace with:

- Reference the CFX ITS Specifications that apply to each device to provide a uniform and

compatible system.

233.3.8 - Grounding and Lightning Protection

Add the following paragraph.

The CFX ITS Design Details establishes guidelines for the grounding and lighting protection for ITS devices.

233.3.9.1 - Generator Design Requirements

Delete the last sentence of the fifth paragraph and replace with the following:

Coordinate with the CFX Manager of Traffic Operations to determine if remote monitoring is required.

233.5.1 - Fiber Optic Cable

Delete 233.5.1 and replace with the following:

Refer to CFX ITS Design Details for Fiber Optic Cable.

233.8.4 - Wireless Communication System

Delete the last paragraph.

233.10 - Closed Circuit Television Systems

Delete the tenth bullet in the third paragraph and replace with the following:

Identify locations for vegetation removal in the plans or propose closer spacing upon approval from the CFX Traffic Operations Manager and the CFX Landscape Architect representative.

233.11.1.1 - Express Lanes DMS

Delete FDM 233.11.1.1.

233.11.2 - Highway Advisory Radio (HAR)

Delete FDM 233.11.2.

240 - Transportation Management Plan

240.1 - General

Delete FDM 240.1.

240.1.2 - TMP Components

Delete the second sentence of the first paragraph.

240.2 - Temporary Traffic Control Plan

Add the following paragraphs:

Project specific conditions associated with milling and resurfacing require development of project specific notes for the plans. These notes are part of the TTCP. Stormwater ponding conditions during milling and resurfacing is prohibited. The Temporary 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 the prevention of ponding requirement and drop off restrictions.

A TTCP is comprised of, but not limited to, specific plan sheets, typical sections and phasing notes, critical cross sections, detour and pacing details, temporary pavement details, and references to FDOT Standard Plans layouts describing how traffic will be controlled through a work zone.

TTCP plan sheets detail the proper delineation of traffic through the work zone during all construction phases. The complexity of the TTCP varies with the complexity of the project.

A TTCP provides the following information:

- (1) The location of all advance warning signs
- (2) Temporary pavement markings, (including raised pavement markers (RPMs))
- (3) Location of temporary barriers and end treatments
- (4) Temporary drainage design
- (5) Channelizing devices at special locations
- (6) Locations for special devices such as portable changeable message signs (PCMS), arrow panels, radar speed display units (RSDU), portable regulatory signs (PRS), and temporary signals
- (7) PCMS messages for each phase
- (8) Signal timing for each phase, including temporary actuation, to maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract (Check with Traffic Operations Engineer)
- (9) Location and geometry for transitions, detours, and diversions
- (10) Typical sections for each phase of work with notes describing the general intent of work to be performed in each phase
- (11) The proposed regulatory speed(s) for each phase

- (12) References to specific *MUTCD Typical Applications* or *Standard Plans Index* sheets
- (13) Appropriate pay item notes
- (14) Provisions for the elimination of any conflicts between existing, permanent, and temporary (work zone) signing and pavement markings
- (15) CFX Standard TTC General notes
- (16) Project Specific Notes
- (17) Work area access plan

240.2.1.1 - Emergency Shoulder Use

Delete FDM 240.2.1.1.

240.2.1.2 - Work Zone Speed

Replace paragraphs two and three with the following:

Work zone speed should be the existing posted speed. The existing posted speed is defined as the posted speed prior to the start of any work zone activity. A reduction from the existing posted speed should only be made when all other temporary design alternatives have been exhausted. Include the justification for reduction in existing posted speed in the project documentation. The TTCP and the project documentation will suffice as a traffic and engineering investigation.

All proposed reductions in work zone speed must be approved by CFX prior to the 90% Plans submittal. Work zone speed reductions are limited to 10 MPH (max) below the existing posted speed, except as directed by CFX.

240.2.1.3 - Tapers

Delete the last paragraph and replace with the following:

Except where temporary barrier wall is installed along the inside of a mainline/ramp horizontal curve at an offset to the travel lane of four (4) feet or less, refer to **FDM 211** for required sight distance using the work zone speed.

240.2.1.5 - Lane Widths

Add the following paragraph:

The standard lane width for work zone travel lanes on CFX facilities is 12 feet for all mainline lanes. Prior to the 60% submittal, if the EOR finds or determines that the 12-foot lane width requirement cannot be met, the EOR shall evaluate the traffic control typical section and make a request to the GEC and CFX with a recommendation to reduce lane widths. The EOR is cautioned not to proceed with the design without approval from CFX.

240.2.1.6 - Lane Closure Analysis

Delete this section and replace with the following paragraph:

Upon request, the GEC will analyze the traffic and provide the hours of closure to the designer. This request can also be made for traffic pacing design hours.

240.2.1.7 - Traffic Pacing

Delete the second sentence of the first paragraph and replace with the following:

CFX prefers the use of road closures and detours but will approve the use of traffic pacing on a limited basis.

Delete the third and fourth paragraphs.

240.2.1.9 - Bicycle, Pedestrian, and Transit Accommodation

Add the following to the beginning of the first sentence:

For temporary traffic control along local (non-CFX) facilities, ...

Location of Temporary Routes for Pedestrians and Bicyclists

Delete 2(a), 2(b), 3(b)iii, 3(b)iv, and 3(b)v.

240.2.1.15 - Bridge Construction

Delete the paragraph and replace with:

To facilitate the development of an optimal design minimizing traffic disruption and construction costs, the roadway engineer and structures engineer must collaborate with each other prior to completion of the Bridge Concept Memorandum (BCM). For very complex urban projects, this collaboration should begin as early as the PD&E

Add the following sections:

240.2.1.17 - Temporary Drainage

Design all 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 a lane. All temporary drainage items must be shown in the plans.

240.2.1.18 - Standard MOT General Notes

See *CFX Exhibits 321-1 and 321-2* for Temporary Traffic Control Standard General Notes.

240.2.1.19 - 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.

240.2.1.20 - Overhead Structures Used in Multiple Phases

Sign structures used in multiple phases of a project shall be designed to accommodate the worst-case scenario. Temporary panels must be fully designed and detailed in the plans.

240.2.2.1 - Signs

Add the following to the third paragraph:

...and a "Speeding Fines Doubled" sign.

Add the following paragraphs:

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.

Include the special design "TCP-1" (Your EPASS Tolls At Work) sign and sign details on all projects that include widening, mainline reconstruction, interchange modifications, or as directed by CFX. Placement of the TCP-1 sign shall be shown on the Advance Signing Detail or appropriate TTC Plan Sheet in advance of the work zone.

240.2.2.2 - Work Zone Pavement Markings

Add the following sentences to the first paragraph:

Resurfacing is the preferred method for obliterating existing pavement markings on asphalt. Water blasting and grinding will not be permitted for the removal of gore or lane transition pavement markings. Temporary markings on concrete pavement e.g., bridge decks and toll plazas, shall be 3M brand Scotch-Lane Removable Tape Series 710, 711, and 715 or CFX approved equal.

240.2.2.7 - Portable Changeable Message Signs

Add the following paragraph:

For planned lane closures and detours, a PCMS must be placed and display an advanced notification message one week prior to a travel lane or ramp closure or detour. Time may be extended if deemed

necessary but should not extend to more than 14 calendar days.

For all ramp closures on the CFX system, provide two (2) PCMS in advance of the exit to be closed. Spacing of the PCMS should be 1000' and 500' in advance of the closed exit.

240.2.2.9 - Type III Barricades

Add the following paragraph:

An R11-2 (Road Closed) sign panel shall be provided on a minimum of one (1) of the Type III barricades at each closure location.

240.2.2.11 - Law Enforcement Officers

Delete second sentence and bullets of the first paragraph.

Speed and Law Enforcement Officers

Delete this section.

Traffic Control Officer

Add the following sentence to the first paragraph:

A Traffic Control Officer is required for each CFX lane closure and each CFX ramp closure on CFX facilities.

240.2.2.15 - Temporary Highway Lighting

Replace the first three sentences of the first paragraph with the following:

Existing highway lighting is to remain in service during all phases of construction or until new lighting is installed and placed in service. Temporary highway lighting is not required where it is necessary to remove existing lighting before new lighting is placed in service, i.e. replacement of light fixtures on an existing pole or replacement of light poles at the same location as existing.

240.2.2.18 - Temporary ACROW Bridge

Delete FDM 240.2.2.18.

240.3 - Transportation Operations Plan

Delete FDM 240.3

240.4 - Public Information Plan

Delete the first two paragraphs and replace with the following:

Public information during construction is coordinated by CFX through the Authority's public relations consultant.

250 - Hydraulic Data and Agency Permits

250.1 - General

Add the following paragraph:

15% (roll plot) 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 Runoff Control Concept

*Revise title of Section to **Stormwater Pollution Prevention Plan (SWPPP) Development** and replace the section with the following:*

251.1 - General

A Stormwater Pollution Prevention Plan (SWPPP) must be developed and implemented for each CFX construction project that disturbs one or more acres of total land area or as directed by the GEC and discharges to waters of the United States. The State of Florida Department of Environmental Protection Generic Permit for Stormwater Discharges from Large and Small Construction Activities, herein referred to as the DEP Generic Permit, applies to projects where multiple, separate, and distinct construction activities may be taking place at different times and at different schedules under one contract plan. In these situations, the DEP Generic Permit will apply.

The site specific SWPPP is a requirement of the DEP Generic Permit. In order to use this permit:

- The Contractor must prepare a plan that assures compliance with the terms and conditions of the DEP Generic Permit and any other State or Federal permits.
- The Contractor must file a Notice of Intent (NOI) and submit payment of permit fee to the DEP.

Distribution of the NOI, SWPPP, and signed certification statements will be in accordance with the requirements of the DEP Generic Permit.

The objectives of the SWPPP are to:

- (1) Prevent erosion where construction activities are occurring
- (2) Prevent pollutants from mixing with stormwater
- (3) Prevent pollutants from being discharged by trapping them on-site, before they can

affect the receiving waters

For the purpose of preparing a SWPPP, a pollutant is anything that could cause or contribute to a violation of state water quality standards.

A complete SWPPP includes:

- (1) Signed and sealed SWPPP sheets,
- (2) Other plan sheets and documents referenced in the SWPPP sheets,
- (3) Contractor's approved Erosion Control Plan in accordance with Standard Specifications, Section 104,
- (4) Inspection reports, and
- (5) Documentation of field changes that were made to better address the objectives.

Preparing and implementing a SWPPP involves evaluating the site, selecting and describing control measures to address the objectives, and implementing, installing, inspecting, and maintaining the controls.

The EOR will evaluate the site and describe the basic controls during the design phase which will be documented in the SWPPP sheets. The SWPPP sheets should be prepared in consultation with the GEC. The SWPPP sheets must be placed in the Roadway Plans, or other lead component. Refer to the CFX Guidelines, specifically Section 320, for assistance in preparing the SWPPP sheets.

Implementing, installing, inspecting, and maintaining the controls are the responsibility of the Contractor. The Contractor is also responsible for adjusting the SWPPP Plan to match the actual site conditions.

Add the following section:

252 - Drainage Design Documentation

252.1 - Introduction

This outline is not all-inclusive, and the designer should anticipate that there may be circumstances when information is not included in this outline that should be prepared to provide adequate explanations/documentation for project specific issues. Unless specified by the scope or directed by CFX, the report shall include the following components.

252.2 - General Information

- (1) Project Location
 - Overall project location (county, city, section/township/range, etc.).
 - Datum used for this project. Provide datum conversion.

- (2) Purpose.
 - Brief description of the intent of the report and purpose of the project.
- (3) Existing Drainage Patterns.
 - General drainage patterns in the vicinity of the project, on a regional basis.
 - Address offsite areas draining toward the CFX right-of-way.
 - Review KMZ file containing Drainage Connection Permits for projects that discharge to the project's right-of-way.
 - Describe if project is in open and/or closed basins.
 - Brief description of receiving water bodies and their classification (Outstanding Florida Water, etc.).
 - Brief description of proximity to potable well fields and well field protection zones.
 - Describe whether the project discharges to an impaired water body and what TMDL's are associated with it.
- (4) Tailwater
 - Discuss tailwater elevations used in the design for all cases such as ponds, storm sewers, ditches, underdrain, etc. Include pertinent information such as, previous studies from state or local agencies, etc. References should be made to the appropriate Appendix and/or Document for calculations and information related to tailwater determinations.
 - Refer to the FDOT Drainage Manual and CFX Supplement to the FDOT Drainage Manual for tailwater requirements.
- (5) Floodplain Impacts and Mitigation/Floodway Involvement
 - Describe whether the project impacts adjacent floodplain areas. If so, describe how it is being mitigated.
 - Describe whether the project will have any floodway involvement and if a no-rise certification is needed.
- (6) Rules & Regulations/Regulatory Agency Coordination
 - Describe all stormwater and right of way occupancy permits needed to construct this project.
 - Summarize drainage criteria specific to this project.

- a. Describe water quality and quantity criteria applicable to this project.
 - b. Describe all stormwater recovery requirements applicable to this project.
- Describe any Special Basin Criteria that may apply to the project such as Outstanding Florida Waters or Wellfield Protection Zones.

All maps and figures should be included in Appendix A. These include the Project Location Maps, USGS Quadrangle Maps, Soils Maps, FEMA Maps, WMD Basin Maps and Wellfield Protection Zone Maps

252.3 - Pre-Development Analysis

The intent of this section is to provide a brief narrative describing the existing condition of the project site as it relates to stormwater management. The narrative should include information on the number of drainage basins with their respective outfalls, as well as the type of existing stormwater management systems currently in use. Tables summarizing pre-development analysis should be included in this section. All supporting calculations, documentation, and the pre-development drainage map, for the pre-development analysis, should be presented in Appendix B.

Refer to the FDOT Drainage Manual and the FDOT Drainage Design Guides Chapter 9 for guidance.

For each basin, the documentation should include the following:

- Basin name.
- Begin and end station limits.
- Existing drainage patterns (i.e., time of concentration flow paths).
- Land uses (i.e., curve numbers).
- Describe soils and hydrologic grouping.
- Ultimate outfall location for discharge comparison (open or closed basin?).
- Document/justify tailwater (provide source of information).
- Identify hazardous materials, utilities, archeological, historical, and environmental information affecting the design of the stormwater facility.
- Identify offsite areas draining towards the road and how offsite runoff is currently conveyed through the project.
- Existing permitted stormwater management system, if applicable.
- Previously permitted/required water quality, if applicable (is there surplus volume and/or

discharge available).

252.4 - Post-Development Analysis

The intent of this section is to provide a brief narrative describing the proposed condition of the project site as it relates to stormwater management. The narrative should include information on the number of drainage basins with their respective outfalls, as well as the type of recommended stormwater management systems to be used for the basin. Tables summarizing post-development analysis should be included in this section. Discharge rates may be compared at the ultimate outfall locations if more than one basin shares the same downstream outfall. All supporting calculations and documentation, including the post-development drainage map, for the post-development analysis should be presented in Appendix C.

Refer to the FDOT Drainage Manual and the FDOT Drainage Design Guides Chapter 9 for guidance.

For each basin include the following:

- Basin name.
- Begin and end station limits.
- Proposed drainage patterns (flow paths in ditches and swales for example, time of concentration, etc.).
- Land uses (i.e., curve numbers).
- Discuss direct discharge to Outstanding Florida Waters, TMDLs or facilities within a Wellfield Protection Zones, if any.
- Describe soils and summarize results from the geotechnical investigation.
- Ultimate outfall point.
- Discuss any Special Basin Criteria that may apply to the project basin.
- Document/justify tailwater, seasonal high-water table, control, and weir elevations.
- Identify offsite areas draining towards the road and describe how it is to be conveyed through the project.
- Recommended stormwater management system.
- Total required and provided water quality (includes previously permitted, if applicable, as well as anything new) meet criteria.
- Treatment volume recovery meets criteria.

- Permanent pool volume meets criteria, if applicable.
- If compensating or over treatment to be used, provide detailed description of area of new impervious not being treated, area of existing pavement to be treated, etc.
- Retention system(s) infiltration rates certified by a Geotechnical Engineer.
- Post-development discharge rates compared to the pre-development discharge rates (meets critical duration criteria, as stated in Chapter 14-86, F.A.C.).
- Post-development stages provide for freeboard as stated in the FDOT Drainage Manual.

252.5 - Floodplain Analysis

The intent of this section is to provide a brief narrative describing the floodplain conditions at the project site and should include the following information. Tables summarizing floodplain impacts, locations, and compensation should be included in this section. All supporting calculations and documentation for the floodplain analysis should be presented in Appendix D.

- Brief narrative. Floodway involvement? No-rise certification required?
- Statement describing impacts have been avoided or minimized.
- Describe limits of impacts and final cut/fill quantities, if applicable.
- Describe where compensation is to occur, if applicable.

252.6 - Base Clearance Analysis

The intent of this section is to provide a brief narrative describing site specific base clearance issues as well as issues involved in determining the base clearance water elevation. Tables summarizing the calculated base clearances should be included in this section. All supporting calculations and documentation for the base clearance analysis should be presented in Appendix E.

Refer to the **FDM 210.10.3** and the Flexible Pavement Design Manual for base clearance water elevation guidance.

- Describe how the base clearance water elevation was established.
- Describe limits of project which do not meet FDM base clearance requirements.
- Describe how sections that do not meet base clearance are to be handled.

252.7 - Cross Drain Analysis

The intent of this section is to provide a brief narrative discussing existing cross drains along the project alignment, how these structures will be impacted by the proposed design and discuss the need for any new cross drain structures along the project alignment. A table summarizing the pre-vs- post condition flows and stages should be included in this section. All supporting calculations and documentation for the cross-drain analysis should be presented in Appendix F.

Refer to the FDOT Drainage Manual and the FDOT Drainage Design Guides Chapter 4 for guidance.

For each cross drain, include the following:

- Brief narrative.
- Cross drain name, size, shape, material.
- Location (include stationing).
- Describe the contributing drainage area for the cross drain.
- Describe the condition of the cross drain, including, but not limited to, age, erosion issues, maintenance issues, structural deficiencies and if an extension or replacement is proposed.
- Document/justify tailwater used in the design and provide source of tailwater information.
- Document the pre-development and post-development flows and stages.
- Provide a statement verifying that stages on off-site properties are not increased in the proposed condition and that the allowable high-water conditions are met.

252.8 - On-Site Conveyance Analysis

The intent of this section is to provide a brief narrative discussing the proposed methods of conveyance for drainage from the project. All supporting calculations and documentation for the on- site conveyance analysis should be presented in Appendix G.

Refer to the FDOT Drainage Manual and Chapter 6 of the Drainage Design Guide for guidance.

- Brief narrative describing methods of conveyance for proposed drainage basins within the project (ditch flow, storm sewer, side drains, etc.) Include existing conveyance systems being utilized.
- Document/justify tailwater used in the design and provide source of tailwater information.
- Describe critical ditch sections (such as sign post obstructions, narrow sections, steep slopes) and lining requirements, if applicable.

- Discuss areas of superelevation transitions, bridge end-treatments, sag inlets, etc.
- Discuss design frequencies used for the analysis of each method of conveyance. Reference the software used.
- Include verification of wall zones for Wall Zone Pipes as outlined in the FDOT Drainage Manual Section 3.11 and Appendix D and follow the requirements set forth in section 430-4.1 of FDOT Standard Specifications.

252.9 - MOT Drainage

The intent of this section is to provide a brief narrative discussing the proposed methods of conveyance for project drainage for the temporary condition (during construction). All supporting calculations and documentation for MOT drainage should be presented in Appendix H and coordinated with the Traffic Control and Roadway EORs. Refer to the FDOT Drainage Manual for design frequencies and the FDOT Drainage Design Guides Chapter 10 for design guidance.

252.10 - Hydroplaning analysis

The intent of this section is to evaluate and document the hydroplaning risk associated with the proposed roadway typical and critical sections, particularly key areas where there can be potentially problematic cross slopes such as sections with additional auxiliary and /or ramp lanes that are in superelevation. All supporting calculations and documentation associated with this analysis should be presented in Appendix I. Refer to **FDM 211.2.3** and **FDOT Drainage Manual Chapter 3.9.4** for guidance.

Where a ramp tying into the mainline is revised or added, include a hydroplaning analysis for both the widest part of the gore (with ramp speeds 5 mph less than mainline) and where gore width becomes zero (with speed of ramp lane adjacent to mainline the same as mainline speed).

252.11 - Structure Analysis for Loaded Pipes

The intent of this section is to provide a structural pipe analysis anytime reinforced concrete pipe or ADS Class 2 Polypropylene pipe (HP Storm) is designed and installed under deep fill embankments more than 14' of cover, special loading conditions or wall zones. All supporting calculations and documentation associated with this analysis should be presented in Appendix J. Refer to the FDOT Drainage Design Guides Chapter 8 for guidance.

252.12 - References

At a minimum, the reference information should contain the pertinent information to the design and analysis of the systems located in the project.

- Survey information used to determine Tailwater (example: Photos showing stain lines)

- Geotechnical Information
- Existing Permit(s) and Calculations

252.13 - Appendices

Appendix A – Figures

- Project Location Maps
- USGS Quadrangle Maps
- Soils Maps
- FEMA Floodplain Maps
- WMD Basin Maps
- Maps
- Other

Appendix B – Pre-Development Calculations and Documentation including:

- Pre-development drainage map with aerial background. (Do not include storm sewer – only cross drains, ponds, and outfalls).
- If the stormwater management facility (SMF) is existing and permitted to accommodate the proposed improvements without modification, provide the relevant permit excerpts. Otherwise provide the information below:
 - (a) Supporting pre-development stormwater facility calculations; T_c , CN, Areas, etc.
 - (b) Pre-development ICPR Input and Output Data
 - (c) Pre-development nodal diagram. Reference specific structure numbers and pond names as shown in the construction plans.

Appendix C – Post-Development Calculations and Documentation including:

- Post-development drainage map with aerial background. (Do not include storm sewer – only cross drains, ponds, and outfalls).
- If the SMF is existing and permitted to accommodate the proposed improvements without modification, provide the relevant permit excerpts. Otherwise provide the

information below:

- Supporting post-development stormwater facility calculations; Tc, CN, Areas, etc.
 - (a) Post-development ICPR Input and Output Data
 - (b) Post-development nodal diagram. Reference specific structure numbers and pond names as shown in the construction plans.
 - (c) Post-Development recovery analysis

Appendix D – Floodplain Encroachment/Compensation Calculations and Documentation

Appendix E – Base Clearance Calculations and Documentation

Appendix F – Cross Drain Calculations and Documentation

Appendix G – On-site Conveyance Calculations and Documentation:

- Ditch calculations – Document tailwater used in design. Describe critical ditch sections (narrow sections, steep slopes, etc.) and lining requirements. Include hydraulic worksheet with ditch flow lines and check freeboard.
- Storm sewer tabulations – Document tailwater used in design and check HGL clearance and outfall erosion protection needs.
- Spread calculations – Include spread worksheet. Make note of areas of superelevation transition, bridge end treatment, sag inlets, auxiliary lanes etc.
- Shoulder capacity calculations – Include shoulder gutter conveyance worksheet.
- Noise Wall drainage analysis

Appendix H – MOT Drainage Calculations and Documentation

- Spread calculations; verify sufficient shoulder width in MOT plans.
- Shoulder gutter capacity calculations
- Storm tabs
- Ditch calculations
- Maintenance of flow, if needed, such as canal relocation or cross drain extension

Appendix I – Hydroplaning Calculations

- See **CFX Exhibits 252-1 thru 252-4** for sample Hydroplaning Risk Analysis spreadsheets.

Appendix J – Structural Analysis Calculations and Documentation

- Run FDOT Culvert Service Life Estimator software (use latest version available).
- Include copy of geotechnical table of soil chemistry.
- Check CSLE results against Drainage Manual Appendix C for maximum and minimum fill heights and material availability (max cover check now included in the CSLE program).

Appendix K – Correspondence, Excerpts from Previous Permits and Studies

CFX Exhibit 252-1
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

| | | | |
|--------------|--------------------------------------|------------------------|---|
| FPID | <input type="text"/> | Roadway Section Number | <input type="text"/> |
| District No. | <input type="text" value="CFX"/> | Station | <input type="text" value="Mainline+Gore+Ramp"/> |
| County | <input type="text" value="Osceola"/> | Direction | <input type="text" value="EB"/> |

Analysis Options

Select Analysis Option : Show intermediate outputs?
(e.g., Drainage Path Length)

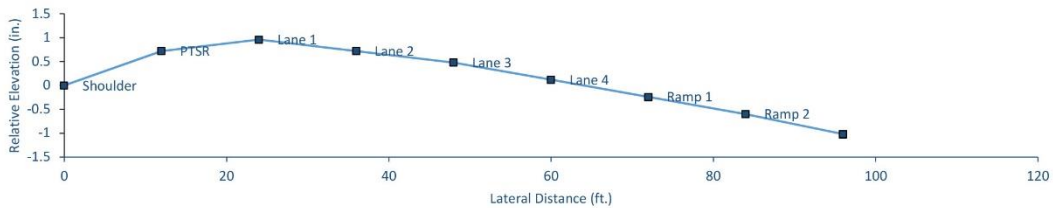
Risk Analysis?
(Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

| | | | |
|------------------------|--|---|------------------------------------|
| Longitudinal Grade (%) | <input type="text" value="0.3"/> | Pavement Texture (Please Select MTD or MPD below) | <input type="text"/> |
| Surface Type | <input type="text" value="Open Graded Friction Course"/> | Mean Texture Depth (in.) | <input type="text" value="0.067"/> |
| Permeability (in/hr) | <input type="text" value="0"/> | | |

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|------|--------|--------|--------|--------|---|--------|--------|----|----|----|
| Description | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | | Ramp 1 | Ramp 2 | | | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 70 | | 70 | 65 | | | |
| Cross Slope (%) | -6 | -2 | 2 | 2 | 3 | 3 | 2 | 3 | 3.5 | | | |
| Width (ft.) | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | | | |



Risk Analysis Results

(Based on Gallaway WFT and PAVDRN HPS Models)

| | | Predicted Driver Speed (mph) | | | | | | | | | | | |
|-------------------|----------|------------------------------|--------|--------|--------|--------|---|--------|--------|---|----|----|----|
| Plane Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | | Ramp 1 | Ramp 2 | | | | |
| 0.1 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 70.0 | 65.0 | | | | |
| 0.25 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 70.0 | 65.0 | | | | |
| 0.5 | | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | | 64.0 | 59.0 | | | | |
| 1 | | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | | 62.0 | 57.0 | | | | |
| 2 | | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | | 58.0 | 53.0 | | | | |
| 3 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | | |
| 4 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | | |

| | | Predicted Hydroplaning Speed (mph) | | | | | | | | | | | |
|-------------------|----------|------------------------------------|--------|--------|--------|--------|---|--------|--------|------------|----|----|----|
| Plane Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | | Ramp 1 | Ramp 2 | | | | |
| 0.1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | | |
| 0.25 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | | |
| 0.5 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | | |
| 1 | | 999.0 | 999.0 | 999.0 | 999.0 | 107.5 | | 80.3 | 75.9 | | | | |
| 2 | | 74.0 | 99.0 | 73.8 | 68.7 | 60.7 | | 56.3 | 55.0 | Acceptable | | | |
| 3 | | 60.2 | 92.6 | 60.1 | 57.6 | 52.9 | | 49.9 | 49.0 | | | | |
| 4 | | 54.4 | 71.2 | 54.3 | 52.5 | 48.8 | | 53.5 | 53.3 | | | | |

CFX Exhibit 252-1
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

FPID _____ Roadway Section Number CFX 6-Lane Typical
 District No. CFX Milepost Mainline + Ramp
 County Osceola (Please Select Milepost or Station above)
 Direction EB

Analysis Options

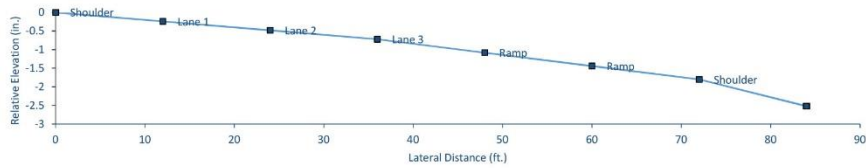
Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
 (e.g., Drainage Path Length)
 Risk Analysis? Yes
 (Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

Longitudinal Grade (%) 0.3 Pavement Texture (Please Select MTD or MPD below)
 Surface Type Open Graded Friction Course Mean Texture Depth (in.) 0.067
 Permeability (in/hr) 0

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|--------|--------|--------|------|------|----------|---|---|----|----|----|
| Description | Shoulder | Lane 1 | Lane 2 | Lane 3 | Ramp | Ramp | Shoulder | | | | | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 65 | | | | | | |
| Cross Slope (%) | 2 | 2 | 2 | 3 | 3 | 3 | 6 | | | | | |
| Width (ft.) | 12 | 12 | 12 | 12 | 12 | 12 | 12 | | | | | |



Risk Analysis Results

(Based on Gallaway WFT and PAVDRN HPS Models)

| | | Predicted Water Film Thickness (in.) | | | | | | | | | | |
|-------------------|----------|--------------------------------------|--------|--------|--------|--------|----------|---|---|----|----|----|
| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | Lane 1 | Lane 2 | Lane 3 | Ramp | Ramp | Shoulder | | | | | |
| 0.1 | | -0.051 | -0.048 | -0.047 | -0.045 | -0.043 | | | | | | |
| 0.25 | | -0.041 | -0.034 | -0.034 | -0.030 | -0.027 | | | | | | |
| 0.5 | | -0.028 | -0.019 | -0.019 | -0.013 | -0.007 | | | | | | |
| 1 | | -0.009 | 0.004 | 0.004 | 0.013 | 0.021 | | | | | | |
| 2 | | 0.018 | 0.038 | 0.038 | 0.051 | 0.063 | | | | | | |
| 3 | | 0.040 | 0.065 | 0.065 | 0.081 | 0.096 | | | | | | |
| 4 | | 0.058 | 0.088 | 0.088 | 0.107 | 0.125 | | | | | | |

| | | Predicted Driver Speed (mph) | | | | | | | | | | |
|-------------------|----------|------------------------------|--------|--------|------|------|----------|---|---|----|----|----|
| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | Lane 1 | Lane 2 | Lane 3 | Ramp | Ramp | Shoulder | | | | | |
| 0.1 | | 70.0 | 70.0 | 70.0 | 70.0 | 65.0 | | | | | | |
| 0.25 | | 70.0 | 70.0 | 70.0 | 70.0 | 65.0 | | | | | | |
| 0.5 | | 64.0 | 64.0 | 64.0 | 64.0 | 59.0 | | | | | | |
| 1 | | 62.0 | 62.0 | 62.0 | 62.0 | 57.0 | | | | | | |
| 2 | | 58.0 | 58.0 | 58.0 | 58.0 | 53.0 | | | | | | |
| 3 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | | | | | |
| 4 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | | | | | |

| | | Predicted Hydroplaning Speed (mph) | | | | | | | | | | |
|-------------------|----------|------------------------------------|--------|--------|-------|-------|----------|---|---|----|----|----|
| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | Lane 1 | Lane 2 | Lane 3 | Ramp | Ramp | Shoulder | | | | | |
| 0.1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | | | | | |
| 0.25 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | | | | | |
| 0.5 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | | | | | |
| 1 | | 999.0 | 108.7 | 107.1 | 80.3 | 70.9 | | | | | | |
| 2 | | 73.8 | 60.8 | 60.7 | 56.3 | 53.3 | | | | | | |
| 3 | | 60.1 | 52.9 | 52.8 | 49.9 | 54.0 | | | | | | |
| 4 | | 54.3 | 48.9 | 48.8 | 53.5 | 52.9 | | | | | | |

Within 3mph is acceptable only if no other options; Possibly revise cross slope to 3.5% or slope inside shoulder to the inside

CFX Exhibit 252-2
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

| | | | |
|--------------|---------|------------------------|--------------------|
| FPID | _____ | Roadway Section Number | CFX Typical |
| District No. | CFX | Station | Mainline+Gore+Ramp |
| County | Osceola | Direction | EB |

Analysis Options

Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
(e.g., Drainage Path Length)

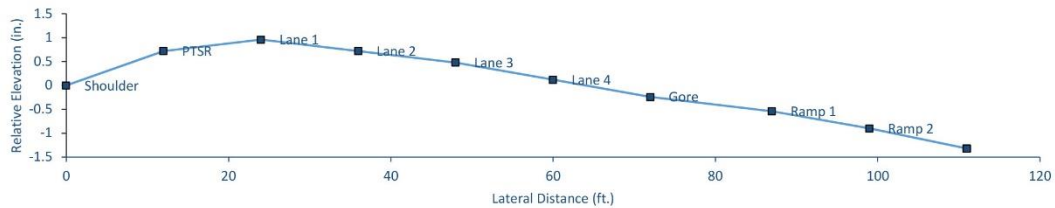
Risk Analysis? Yes
(Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

| | | | |
|------------------------|-----------------------------|---|-------|
| Longitudinal Grade (%) | 0.3 | Pavement Texture (Please Select MTD or MPD below) | |
| Surface Type | Open Graded Friction Course | Mean Texture Depth (in.) | 0.067 |
| Permeability (in/hr) | 0 | | |

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|------|--------|--------|--------|--------|------|--------|--------|----|----|----|
| Description | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp 1 | Ramp 2 | | | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 70 | | 65 | 65 | | | |
| Cross Slope (%) | -6 | -2 | 2 | 2 | 3 | 3 | 2 | 3 | 3.5 | | | |
| Width (ft.) | 12 | 12 | 12 | 12 | 12 | 12 | 15 | 12 | 12 | | | |



Risk Analysis Results

(Based on Gallaway WFT and PAVDRN HPS Models)

| | | Predicted Driver Speed (mph) | | | | | | | | | | | |
|--------------|-------------------|------------------------------|------|--------|--------|--------|--------|------|--------|--------|----|----|----|
| Plane Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Intensity (in/hr) | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp 1 | Ramp 2 | | | |
| | 0.1 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | | |
| | 0.25 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | | |
| | 0.5 | | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | | 59.0 | 59.0 | | | |
| | 1 | | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | | 57.0 | 57.0 | | | |
| | 2 | | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | | 53.0 | 53.0 | | | |
| | 3 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | |
| | 4 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | |

| | | Predicted Hydroplaning Speed (mph) | | | | | | | | | | | |
|--------------|-------------------|------------------------------------|-------|--------|--------|--------|--------|------|--------|--------|------------|----|----|
| Plane Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Intensity (in/hr) | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp 1 | Ramp 2 | | | |
| | 0.1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| | 0.25 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| | 0.5 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| | 1 | | 999.0 | 999.0 | 999.0 | 999.0 | 107.5 | | 69.4 | 67.9 | | | |
| | 2 | | 74.0 | 99.0 | 73.8 | 68.7 | 60.7 | | 52.8 | 52.2 | Acceptable | | |
| | 3 | | 60.2 | 92.6 | 60.1 | 57.6 | 52.9 | | 53.8 | 53.7 | | | |
| | 4 | | 54.4 | 71.2 | 54.3 | 52.5 | 48.8 | | 52.8 | 52.6 | | | |

CFX Exhibit 252-2
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

FPID _____
 District No. CFX Roadway Section Number CFX 6-Lane Typical
 County Orange / Osceola Milepost _____
 (Please Select Milepost or Station above)
 Direction EB

Analysis Options

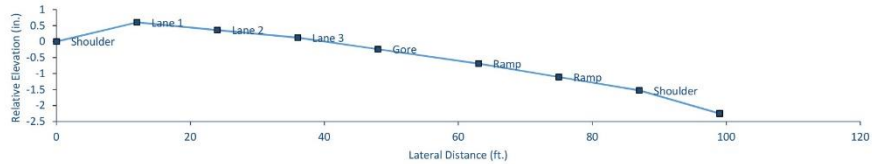
Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
 (e.g., Drainage Path Length)
 Risk Analysis? Yes
 (Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

Longitudinal Grade (%) 0.3 Pavement Texture (Please Select MTD or MPD below)
 Surface Type Open Graded Friction Course Mean Texture Depth (in.) 0.067
 Permeability (in/hr) 0

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|--------|--------|--------|------|------|------|----------|---|----|----|----|
| Description | Shoulder | Lane 1 | Lane 2 | Lane 3 | Gore | Ramp | Ramp | Shoulder | | | | |
| Design Speed (mph) | | 70 | 70 | 70 | | 65 | 65 | | | | | |
| Cross Slope (%) | -5 | 2 | 2 | 3 | 3 | 3.5 | 3.5 | 6 | | | | |
| Width (ft.) | 12 | 12 | 12 | 12 | 15 | 12 | 12 | 12 | | | | |



Risk Analysis Results

(Based on Galloway WFT and PAVDRN HPS Models)

Predicted Water Film Thickness (in.)

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----------|--------|--------|--------|------|--------|--------|----------|---|----|----|----|
| Intensity (in/hr) | Shoulder | Lane 1 | Lane 2 | Lane 3 | Gore | Ramp | Ramp | Shoulder | | | | |
| 0.1 | | -0.056 | -0.051 | -0.050 | | -0.046 | -0.044 | | | | | |
| 0.25 | | -0.049 | -0.041 | -0.039 | | -0.031 | -0.028 | | | | | |
| 0.5 | | -0.040 | -0.028 | -0.025 | | -0.015 | -0.010 | | | | | |
| 1 | | -0.027 | -0.009 | -0.006 | | 0.011 | 0.018 | | | | | |
| 2 | | -0.008 | 0.018 | 0.024 | | 0.047 | 0.058 | | | | | |
| 3 | | 0.007 | 0.040 | 0.047 | | 0.077 | 0.090 | | | | | |
| 4 | | 0.021 | 0.058 | 0.067 | | 0.102 | 0.118 | | | | | |

Predicted Driver Speed (mph)

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----------|--------|--------|--------|------|------|------|----------|---|----|----|----|
| Intensity (in/hr) | Shoulder | Lane 1 | Lane 2 | Lane 3 | Gore | Ramp | Ramp | Shoulder | | | | |
| 0.1 | | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | | | | |
| 0.25 | | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | | | | |
| 0.5 | | 64.0 | 64.0 | 64.0 | | 59.0 | 59.0 | | | | | |
| 1 | | 62.0 | 62.0 | 62.0 | | 57.0 | 57.0 | | | | | |
| 2 | | 58.0 | 58.0 | 58.0 | | 53.0 | 53.0 | | | | | |
| 3 | | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | | | |
| 4 | | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | | | |

Predicted Hydroplaning Speed (mph)

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----------|--------|--------|--------|------|-------|-------|----------|---|----|----|----|
| Intensity (in/hr) | Shoulder | Lane 1 | Lane 2 | Lane 3 | Gore | Ramp | Ramp | Shoulder | | | | |
| 0.1 | | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | | | |
| 0.25 | | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | | | |
| 0.5 | | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | | | |
| 1 | | 999.0 | 999.0 | 999.0 | | 84.7 | 73.9 | | | | | |
| 2 | | 999.0 | 73.8 | 68.7 | | 57.4 | 54.4 | | | | | |
| 3 | | 92.6 | 60.1 | 57.6 | | 50.6 | 48.5 | | | | | |
| 4 | | 71.2 | 54.3 | 52.5 | | 53.7 | 53.1 | | | | | |

CFX Exhibit 252-3
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

FPID _____ Roadway Section Number _____ CFX Typical _____
 District No. CFX Station _____ **Mainline+Gore+Ramp**
 County Osceola Direction _____ EB

Analysis Options

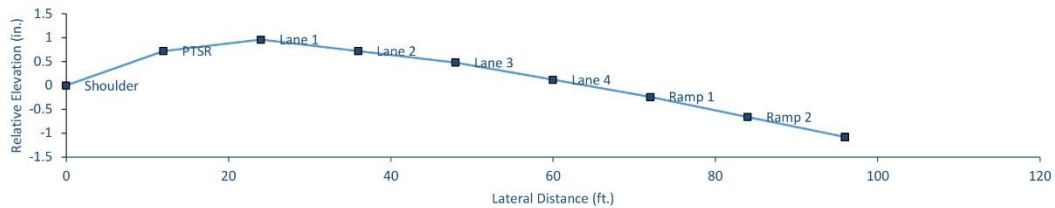
Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
 (e.g., Drainage Path Length)
 Risk Analysis? Yes
 (Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

Longitudinal Grade (%) 3 Pavement Texture (Please Select MTD or MPD below)
 Surface Type Open Graded Friction Course Mean Texture Depth (in.) 0.067
 Permeability (in/hr) 0

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|------|--------|--------|--------|--------|---|--------|--------|----|----|----|
| Description | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | | Ramp 1 | Ramp 2 | | | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 70 | | 70 | 65 | | | |
| Cross Slope (%) | -6 | -2 | 2 | 2 | 3 | 3 | 2 | 3.5 | 3.5 | | | |
| Width (ft.) | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 12 | 12 | | | |



Risk Analysis Results

(Based on Gallaway WFT and PAVDRN HPS Models)

| Plane Number | Predicted Driver Speed (mph) | | | | | | | | | | | |
|-------------------|------------------------------|------|--------|--------|--------|--------|---|--------|--------|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | | Ramp 1 | Ramp 2 | | | |
| 0.1 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 70.0 | 65.0 | | | |
| 0.25 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 70.0 | 65.0 | | | |
| 0.5 | | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | | 64.0 | 59.0 | | | |
| 1 | | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | | 62.0 | 57.0 | | | |
| 2 | | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | | 58.0 | 53.0 | | | |
| 3 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | |
| 4 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | |

| Plane Number | Predicted Hydroplaning Speed (mph) | | | | | | | | | | | |
|-------------------|------------------------------------|-------|--------|--------|--------|--------|---|--------|--------|----|----|----------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | | Ramp 1 | Ramp 2 | | | |
| 0.1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| 0.25 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| 0.5 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| 1 | | 999.0 | 999.0 | 999.0 | 113.2 | 80.0 | | 73.1 | 67.1 | | | |
| 2 | | 75.6 | 99.0 | 67.1 | 61.2 | 56.2 | | 54.1 | 51.8 | | | Not Acceptable |
| 3 | | 60.9 | 78.0 | 56.7 | 53.2 | 49.8 | | 48.3 | 53.6 | | | |
| 4 | | 54.9 | 65.3 | 51.8 | 49.1 | 53.5 | | 53.1 | 52.5 | | | |

→ Increase cross slope
→ Acceptable

CFX Exhibit 252-3
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

FPID _____ Roadway Section Number CFX Ultimate Typical
 District No. CFX Milepost Flex + Mainline + Ramp
 County Orange / Osceola Direction EB
(Please Select Milepost or Station above)

Analysis Options

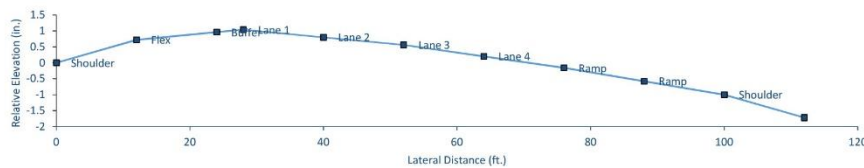
Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
(e.g., Drainage Path Length)
 Risk Analysis? Yes
(Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

Longitudinal Grade (%) 1 Pavement Texture (Please Select MTD or MPD below)
 Surface Type Open Graded Friction Course Mean Texture Depth (in.) 0.067
 Permeability (in/hr) 0

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|------|--------|--------|--------|--------|--------|------|------|----------|----|----|
| Description | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Ramp | Ramp | Shoulder | | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 65 | | | |
| Cross Slope (%) | -6 | -2 | -2 | 2 | 2 | 3 | 3 | 3.5 | 3.5 | 6 | | |
| Width (ft.) | 12 | 12 | 4 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | | |



Risk Analysis Results

(Based on Galloway WFT and PAVDRN HPS Models)

| Plane Number | Predicted Water Film Thickness (in.) | | | | | | | | | | | |
|-------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|----------|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Ramp | Ramp | Shoulder | | |
| 0.1 | | -0.054 | -0.061 | -0.056 | -0.051 | -0.050 | -0.047 | -0.046 | -0.044 | | | |
| 0.25 | | -0.045 | -0.056 | -0.048 | -0.040 | -0.038 | -0.034 | -0.032 | -0.028 | | | |
| 0.5 | | -0.035 | -0.051 | -0.039 | -0.027 | -0.024 | -0.018 | -0.015 | -0.010 | | | |
| 1 | | -0.020 | -0.044 | -0.026 | -0.009 | -0.004 | 0.006 | 0.010 | 0.018 | | | |
| 2 | | 0.003 | -0.033 | -0.007 | 0.019 | 0.026 | 0.040 | 0.047 | 0.058 | | | |
| 3 | | 0.021 | -0.024 | 0.009 | 0.041 | 0.050 | 0.068 | 0.076 | 0.090 | | | |
| 4 | | 0.036 | -0.017 | 0.022 | 0.060 | 0.070 | 0.092 | 0.101 | 0.117 | | | |

| Plane Number | Predicted Driver Speed (mph) | | | | | | | | | | | |
|-------------------|------------------------------|------|--------|--------|--------|--------|--------|------|------|----------|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Ramp | Ramp | Shoulder | | |
| 0.1 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 65.0 | | | |
| 0.25 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 65.0 | | | |
| 0.5 | | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | 59.0 | | | |
| 1 | | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 57.0 | | | |
| 2 | | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | 53.0 | | | |
| 3 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | | |
| 4 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | | |

| Plane Number | Predicted Hydroplaning Speed (mph) | | | | | | | | | | | |
|-------------------|------------------------------------|-------|--------|--------|--------|--------|--------|-------|-------|----------|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Ramp | Ramp | Shoulder | | |
| 0.1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | | |
| 0.25 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | | |
| 0.5 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | | |
| 1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 99.2 | 85.3 | 74.1 | | | |
| 2 | | 118.1 | 999.0 | 999.0 | 72.4 | 67.1 | 59.8 | 57.5 | 54.4 | | | |
| 3 | | 71.0 | 999.0 | 89.2 | 59.4 | 56.7 | 52.3 | 50.7 | 48.6 | | | |
| 4 | | 61.5 | 999.0 | 70.1 | 53.9 | 51.8 | 48.4 | 53.8 | 53.1 | | | |

Within 3mph is acceptable only if no other options

CFX Exhibit 252-4
Hydroplaning Example



Hydroplaning Analysis Tool

General Inputs

| | | | |
|--------------|---------|------------------------|--------------------|
| FPID | _____ | Roadway Section Number | CFX Typical |
| District No. | CFX | Station | Mainline+Gore+Ramp |
| County | Osceola | Direction | EB |

Analysis Options

Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
(e.g., Drainage Path Length)

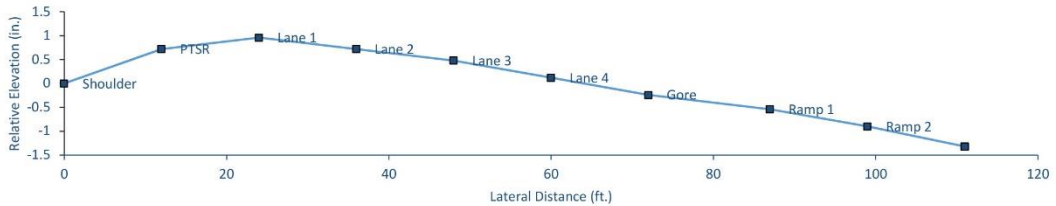
Risk Analysis? Yes
(Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

| | | | |
|------------------------|-----------------------------|---|-------|
| Longitudinal Grade (%) | 3 | Pavement Texture (Please Select MTD or MPD below) | |
| Surface Type | Open Graded Friction Course | Mean Texture Depth (in.) | 0.067 |
| Permeability (in/hr) | 0 | | |

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|------|--------|--------|--------|--------|------|--------|--------|----|----|----|
| Description | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp 1 | Ramp 2 | | | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 70 | | 65 | 65 | | | |
| Cross Slope (%) | -6 | -2 | 2 | 2 | 3 | 3 | 2 | 3 | 3.5 | | | |
| Width (ft.) | 12 | 12 | 12 | 12 | 12 | 12 | 15 | 12 | 12 | | | |



Risk Analysis Results

(Based on Gallaway WFT and PAVDRN HPS Models)

| | | Predicted Driver Speed (mph) | | | | | | | | | | | |
|-------------------|--|------------------------------|------|--------|--------|--------|--------|------|--------|--------|----|----|----|
| Plane Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp 1 | Ramp 2 | | | |
| 0.1 | | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | | |
| 0.25 | | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | | |
| 0.5 | | | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | | 59.0 | 59.0 | | | |
| 1 | | | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | | 57.0 | 57.0 | | | |
| 2 | | | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | | 53.0 | 53.0 | | | |
| 3 | | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | |
| 4 | | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | | |

| | | Predicted Hydroplaning Speed (mph) | | | | | | | | | | | |
|-------------------|--|------------------------------------|-------|--------|--------|--------|--------|------|--------|--------|----|----|----|
| Plane Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Intensity (in/hr) | | Shoulder | PTSR | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp 1 | Ramp 2 | | | |
| 0.1 | | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| 0.25 | | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | | |
| 0.5 | | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 138.3 | 108.4 | | | |
| 1 | | | 999.0 | 999.0 | 999.0 | 113.2 | 80.0 | | 62.4 | 60.9 | | | |
| 2 | | | 75.6 | 99.0 | 67.1 | 61.2 | 56.2 | | 49.7 | 48.9 | | | |
| 3 | | | 60.9 | 78.0 | 56.7 | 53.2 | 49.8 | | 53.0 | 52.8 | | | |
| 4 | | | 54.9 | 65.3 | 51.8 | 49.1 | 53.5 | | 52.0 | 51.8 | | | |

Increase cross slopes

Not acceptable

Acceptable



CFX Exhibit 252-4
Hydroplaning Example

Hydroplaning Analysis Tool

General Inputs

FPID _____ Roadway Section Number CFX Ultimate Typical
 District No. CFX Milepost Flex + Mainline + Gore + Ramp
 County Orange / Osceola Direction EB
 (Please Select Milepost or Station above)

Analysis Options

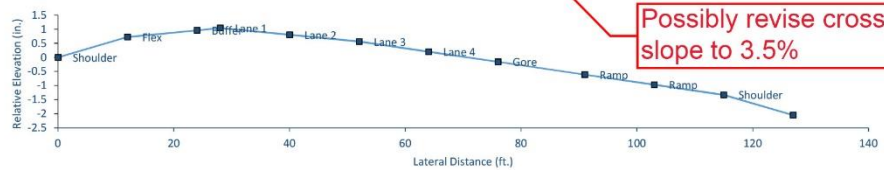
Select Analysis Option Deterministic (Default) : Show intermediate outputs? Yes
 (e.g., Drainage Path Length)
 Risk Analysis? Yes
 (Per FDOT's Design Guidance)

Pavement Inputs

Deterministic Analysis

Longitudinal Grade (%) 2 Pavement Texture (Please Select MTD or MPD below)
 Surface Type Open Graded Friction Course Mean Texture Depth (in.) 0.067
 Permeability (in/hr) 0

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|----------|------|--------|--------|--------|--------|--------|------|------|------|----------|----|
| Description | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp | Ramp | Shoulder | |
| Design Speed (mph) | | 70 | 70 | 70 | 70 | 70 | 70 | | 65 | 65 | | |
| Cross Slope (%) | -6 | -2 | -2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 6 | |
| Width (ft.) | 12 | 12 | 4 | 12 | 12 | 12 | 12 | 15 | 12 | 12 | 12 | |



Risk Analysis Results

(Based on Gallaway WFT and PAVDRN HPS Models)

Predicted Water Film Thickness (in.)

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----------|--------|--------|--------|--------|--------|--------|------|--------|--------|----------|----|
| Intensity (in/hr) | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp | Ramp | Shoulder | |
| 0.1 | | -0.054 | -0.060 | -0.055 | -0.050 | -0.049 | -0.046 | | -0.041 | -0.039 | | |
| 0.25 | | -0.044 | -0.056 | -0.048 | -0.039 | -0.036 | -0.032 | | -0.024 | -0.020 | | |
| 0.5 | | -0.034 | -0.051 | -0.038 | -0.026 | -0.022 | -0.015 | | -0.003 | 0.002 | | |
| 1 | | -0.018 | -0.043 | -0.025 | -0.006 | 0.000 | 0.009 | | 0.028 | 0.035 | | |
| 2 | | 0.006 | -0.032 | -0.005 | 0.022 | 0.031 | 0.046 | | 0.073 | 0.084 | | |
| 3 | | 0.024 | -0.023 | 0.011 | 0.045 | 0.057 | 0.075 | | 0.109 | 0.122 | | |
| 4 | | 0.040 | -0.015 | 0.025 | 0.065 | 0.078 | 0.099 | | 0.140 | 0.155 | | |

Predicted Driver Speed (mph)

| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----------|------|--------|--------|--------|--------|--------|------|------|------|----------|----|
| Intensity (in/hr) | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp | Ramp | Shoulder | |
| 0.1 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | |
| 0.25 | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | | 65.0 | 65.0 | | |
| 0.5 | | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | | 59.0 | 59.0 | | |
| 1 | | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | | 57.0 | 57.0 | | |
| 2 | | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | 58.0 | | 53.0 | 53.0 | | |
| 3 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | |
| 4 | | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | | 45.0 | 45.0 | | |

Predicted Hydroplaning Speed (mph)

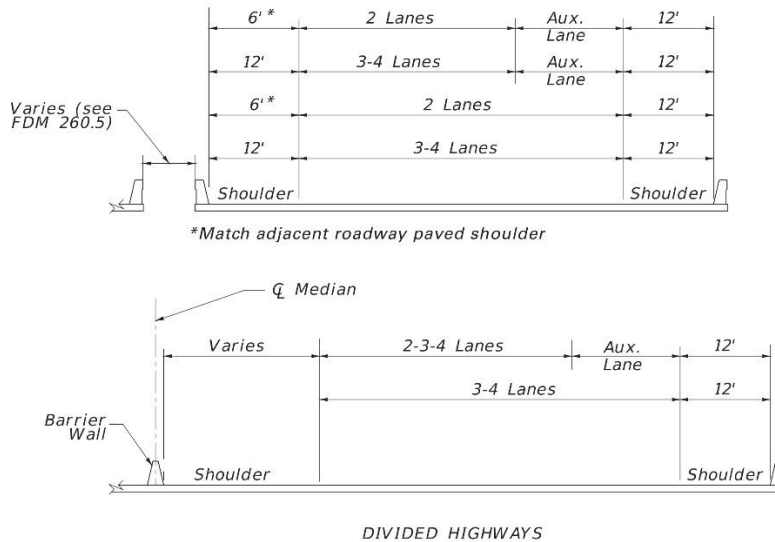
| Plane Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----------|-------|--------|--------|--------|--------|--------|------|-------|-------|----------|----|
| Intensity (in/hr) | Shoulder | Flex | Buffer | Lane 1 | Lane 2 | Lane 3 | Lane 4 | Gore | Ramp | Ramp | Shoulder | |
| 0.1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | |
| 0.25 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 999.0 | | |
| 0.5 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | | 999.0 | 128.9 | | |
| 1 | | 999.0 | 999.0 | 999.0 | 999.0 | 999.0 | 87.3 | | 65.9 | 62.1 | | |
| 2 | | 100.2 | 999.0 | 999.0 | 69.6 | 63.8 | 57.9 | | 51.3 | 49.5 | | |
| 3 | | 68.4 | 999.0 | 82.9 | 58.0 | 54.8 | 51.0 | | 53.5 | 53.0 | | |
| 4 | | 59.9 | 999.0 | 67.6 | 52.8 | 50.4 | 53.8 | | 52.4 | 52.0 | | |

Possibly add trench drain in the gore

260 - Bridge Structures

260.1.1 - Partial Bridge Sections

Revise **FDM Figure 260.1.1** with the following:



260.6 - Vertical Clearance

Add the following paragraph:

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

Table 260.6.1

Change Note 2 to the following:

Contact CFX or the GEC Structures Lead for further guidance when vertical clearance of an existing bridge is less than 14.5 feet.

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

261.1 - General

Delete the second bullet in the third paragraph.

Change the third bullet in the third paragraph to the following:

- Cantilever and Span Sign Structure Truss Depth: 9.5 feet

261.2 - Sign Support Structures

Note the following:

The main panels on overhead structures are to be designed with an overall height sufficient to completely cover the structural cross member as viewed in the direction of travel. The overall height shall also be sufficient to completely cover the hanger extensions necessary for installation (3" top and bottom, 6" total), i.e., no portion of the cross member or hangers shall be visible above or below the main panel.

Increase sign panel depth by 20% to accommodate future modifications.

All support columns for overhead sign assemblies shall be painted, after installation, in accordance with CFX Special Provisions.

Add the following paragraphs:

- (1) Tri-chords shall be used for all structures unless special conditions dictate the need for a box truss. All designs shall utilize single tubular uprights.
- (2) Box truss designs shall only be allowed for toll plaza related static/single line DMS combination panels that are facing both directions of travel and are co-located on the same structure; or multi-line DMS (walk-in) boxes that are facing both directions of travel and are co-located on the same structure.
- (3) Cantilever arms shall be designed and detailed in plans such that future arm lengths are accommodated by adding or removing a portion of the arm. Additions or removals of arm sections shall not impact the integrity of the structure.
- (4) Span structures with panels in one direction shall be designed to accommodate a future panel, including exit number, in the opposite direction. Refer to CFX Signing and Marking Details for dimensions of future panel.

261.6 - Tolling Support Structures

Delete this section and replace with:

Refer to the CFX Tolling Design Details for the design of the tolling support structures. Confirm with CFX Tolling and CFX Engineering for the type of structure, prior to beginning any design.

261.8.2.1 - Determination of Need for Detailed Structural Analysis

Delete the Span and Cantilever Overhead Sign Structure bullet and replace with the following:

Span, Cantilever, and Bridge Mounted Overhead Sign Structures

Sign panels, sizes, and/or locations may be modified on existing overhead sign structures that were designed to CFX's overdesign criteria in effect at time of the original design.

- Existing structures may be utilized subject to the following:
 - The sign structure shall be less than 35 years old.
 - If the new panel configuration is equal to or smaller than the originally upsized sign panel (20% overage)
 - It is the Consultant's responsibility to document the original and proposed sign modification and certify the proposed sign panels do not exceed the original upsized sign panel.
 - A detailed analytical evaluation is not required.
- Existing structures recommended for re-use shall be in good condition per the latest inspection records and site observation. CFX will review and approve based on the merits of each case.
- It is the Consultant's responsibility to request the approved shop drawings for existing sign structures.
- When possible, existing mainline toll plaza approach structures containing tolling DMS/static panel combinations with an adjacent static panel are to be adjusted such that all static signs are mounted on the same vertical plane with the front of the DMS.
- Existing structures (with additional loading) may be utilized subject to:
 - If the new panel configuration is greater than the originally upsized sign panel or if the approved shop drawings for the existing structure are unavailable, provide a detailed analytical evaluation of the existing structure with the proposed additional loading and new structure criteria in accordance with the Structures Manual Volume 3, Section 18.3. The analysis including calculations of the Demand/Capacity (D/C) ratios, Combined Stress Ratios (CSRs), and the EOR's recommendations shall be submitted to CFX's GEC for review.
 - CFX's approval will be based on the analysis, the EOR's recommendation, and CFX's GEC review results.
 - CFX will review and approve based on the merits of each case.
- Bridge mounted sign panels shall be evaluated on a case-by-case basis and adhere to the following:
 - Existing bridge mounted sign replaced with same size panel: sign is at least 1'-6" from the face of the traffic railing at the nearest point.
 - Existing bridge mounted sign replaced with larger panel or new bridge mounted sign:
 - Bridge is oriented over the lower roadway such that the proposed sign is

- skewed away from the bridge and that the midpoint of that sign is at least 5' from the face of the traffic railing.
- Sign is at least 1'-6" from the face of the traffic railing at the nearest point.
- Sign panel does not cantilever above the mounting beams by more than 5 feet.
- Sign does not unduly add additional wind loading to the bridge.
- For sign panel replacements, sign panel does not extend vertically over the traffic railing more than the existing panel.
- Once these evaluations have been completed and reviewed by CFX and GEC, then the sign can be approved by CFX as warranted. If a sign cannot meet this approval, then it shall be placed on a separate structure, as appropriate.
- Sign structures supporting single direction multi-line (walk-in) or single line DMS panels shall be designed such that the DMS is installed on the front vertical plane of the truss tri-chord. The Consultant shall verify the design dead load weight for each type of DMS with the CFX GEC or GSC prior to beginning design.
 - The cross sections showing DMS signs shall have a note indicating the weight and eccentricity of the DMS used in structural design.
 - Consultant must coordinate the location of the DMS vertical supports and the truss diagonal locations with DMS manufacturer. The connection between truss and DMS must be such as to allow for easy installation.

262 - Retaining Walls

262.1 - General

Add the following to the first paragraph:

Design retaining walls 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, an analysis must be submitted for review with the 90% Plans. Internal and external wall stability analyses must use the lowest soil friction angle, as determined by direct shear tests in accordance with FM 3-D3080 to model existing MSE wall backfill.

263 - Geosynthetic Design

263.1 - General

Add the following to the second paragraph:

Prior to selecting Reinforced Soil Slopes, coordinate with CFX to assure that geosynthetic reinforcement is compatible with beautification goals and planned landscape projects.

264 - Noise Walls and Perimeter Walls

264.2.2.2 - Reasonableness

Add the following to Note (2) of paragraph 4:

Walls taller than 8' require CFX approval.

Add the following paragraph:

Maintenance access points must be provided for noise walls constructed along the CFX 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 CFX Maintenance Department.

275 - Tree and Palm Relocation

275.1- General

Replace paragraph two with the following:

Relocation of trees and palms require the approval of the CFX Landscape Architect.



3.0 - Plans Production

2024 Design Guidelines

3.0 PLANS PRODUCTION

300 - Production of Plans

Note: CFX utilizes Chapter 300 Production of Plans and does not adopt Chapter 900 Production of NexGen Plans.

300.1 - General

The requirements provided in the Plans Production section of the **CFX Design Guidelines** (the 300 Series) and the FDOT CADD Manual form the basis for contract plans format and assembly.

Many chapters contain “generic” exhibits that provide examples of the plan sheets covered by that chapter. These exhibits were developed using the CFX’s criteria, FDOT’s 2022 criteria and standards in force at the time of their creation. These exhibits are not to be used as a source for criteria unless specified as such within the respective chapter.

Abbreviations may be used to save space. A list of standard abbreviations is given in the Standard Plans Cover and CFX Design Guidelines. Additional deviations from these standard abbreviations are allowed, provided that the abbreviation used is clear and easily understood.

Standard symbols for Roadway Design are shown in the FDOT Symbol Cell Library, and in other CADD sources.

Placing the Consultant’s business logo on any plan sheet contained in the Contract Plans is prohibited.

300.1.1 - Converting from Metric to English

When converting metric values related to surveys, R/W, and other geometric alignment use the U.S. Survey Foot taken to a minimum of 8 decimal places:

$$1 \text{ foot} = 0.30480061 \text{ meters}$$

For other direct mathematical conversions use the SI definition to 4 decimal places:

$$1 \text{ foot} = 0.3048 \text{ meters}$$

Display direct mathematical (soft) converted values to 2 decimal places.

On resurfacing projects where the original construction was done in metric, hard convert typical section dimensions (e.g., lane widths, shoulder widths) where existing conditions permit.

Use direct mathematical (soft) conversion for existing pavement widths in curbed sections, existing R/W widths, and existing median widths.

300.2 - Displaying Information and Data

Text and plan details should be readable from either the bottom or right edge of the sheet. Orientation of text is as follows:

- (1) Horizontal Line: Read left to right
- (2) Vertical Line: Read bottom to top
- (3) Diagonals: Read left to right

Apply the following rules for displaying information and data:

- (1) Dimensioning Requirements:
 - (a) Typical Section Elements, including lane widths and shoulder widths – in feet, typically as a whole number.
 - (b) Horizontal control points on plans, including survey centerline, baseline, intersections, and alignment - in feet to 2 decimal places.
 - (c) Vertical alignment control points, (e.g., PVC, PVI, PVT) and profile grade elevations - in feet to 2 decimal places.
 - (d) Profile Grade - in percent to 3 decimal places.
 - (e) Proposed flow lines - in feet to 2 decimal places.
 - (f) Manhole tops and grate elevations - in feet to 2 decimal places.
 - (g) Ditch elevations - in feet to 1 decimal place (to nearest 0.05 when controlled by percent of grade).
 - (h) Box or Three-sided Culvert Spans and Heights - Show inside dimensions using “span by height” format (10 x 6 means the span is 10 feet and the height is 6 feet). In feet as a whole number for new construction; in feet to 2 decimal places for extensions of existing box culverts.
- (2) Display alignment bearings, degree of curve and delta angles for curve data in degrees, minutes, and seconds, rounded to the nearest second.
- (3) Express slope ratios in vertical to horizontal (V:H) format, e.g., 1:6, 1:4.

300.3 - Base Sheet Format

All plan sheet formats are contained in the FDOT CADD Software and amended by CFX’s Sheet Cell Library (to be provided by the GEC). Sheet borders include a project information block to place the CFX Project Name, state road designation, CFX’s Project Number, and CFX’s logo as shown below:

| | | | |
|---|--------------------------------|--------------------------|--|
| ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY |
| | ROAD NO. SR 000 | PROJECT NO. --- - --- | |

The title block immediately left of the project information block is to contain information for the Professional of Record that Signs and Seals the sheet, as discussed in **FDM 130** and **CFX Design**

Guidelines 130.

PDFs of contract plans must be to scale at size B (11" X 17"). These PDF files are to be generated from CADD design files in accordance with the CADD Manual. Sheets that feature grids (e.g., cross sections, plan-profile) may be created with minor grid lines turned off or on. The minor grids are to be half-toned when shown. The FDOT CADD Software provides plot example configuration files for this task.

Plans sheets may use photography (aerial or other) when approved by the GEC. Using photography for Drainage Maps or SWPPP supplemental site maps does not require approval.

301 - Sequence of Plans Preparation

301.1 - General

The set of plans depicting in detail all the desired construction work is known as the "Contract Plans Set". This set is assembled as component plans that are associated with a primary work type. See **CFX Design Guidelines 302.5** for information on contract plans components. The contract plans set should be prepared systematically, undergoing phases of review and updates to ensure technically correct and clear plans. Additional information can be found in the **FDM** and **CFX Design Guidelines 110, 111, and 120**. These chapters contain a comprehensive discussion of design processes and activities from initial to final engineering.

301.2 - Phase Submittals

See **FDM** and **CFX Design Guidelines 120** for design submittal requirements and guidance in preparing submittals for review by the CFX. For bridge submittal requirements see **FDM** and **CFX Design Guidelines 121**.

Standard submittal phases are: 15%, 30%, 60%, 90%, 100%, Pre-Bid, Bid, and Approved for Construction (AFC).

General descriptions of the required levels of completion that are noted in **Table 301.2.1** are as follows:

- (1) Preliminary (P): Basic shapes, geometry, and information are shown to adequately convey the concept.
- (2) Complete but Subject to Change (C): The design, drawings and details are complete. Only reviewer-initiated changes should be expected at this level.
- (3) Final (F): All drawings and designs are complete. No changes are expected at this level. Plans are ready to be signed and sealed by the EOR.

Table 301.2.1 - Summary of Phase Submittals

| ITEM | 15% | 30% | 60%* | 90% | 100% |
|--|-----|-----|------|-----|------|
| Key Sheet | | P | P | C | F |
| Signature Sheet | | | P | C | F |
| Summary of Pay Items | | | P | C | F |
| Drainage Map | | P | C | C | F |
| Interchange Drainage Map | | P | C | C | F |
| Typical Section | P | P | C | C | F |
| Summary of Drainage Structures | | | P | C | F |
| Project Layout | | P | C | C | F |
| Project Control | | P | C | C | F |
| Curve and Coordinate | | P | C | C | F |
| Roadway Plan-Profile | P** | P | P | C | F |
| Traffic Monitoring Site | | | P | C | F |
| Special Profile | | P | P | C | F |
| Interchange Layout | P** | P | P | C | F |
| Ramp Terminal Details | | | P | C | F |
| Intersection Layout/Detail | | P | P | C | F |
| Drainage Structures | | | P | C | F |
| Lateral Ditch Plan-Profile | | | P | C | F |
| Lateral Ditch Cross Section | | | P | C | F |
| Retention/Detention Ponds | P** | P | C | C | F |
| Cross Section Pattern | | | P | C | F |
| Roadway Soil Survey | | | P | C | F |
| Cross Sections | | P | P | C | F |
| Stormwater Pollution Prevention Plan | | | C | C | F |
| Temporary Traffic Control Plans | | P** | P** | C | F |
| Utility Adjustments | | | P | C | F |
| Selective Clearing and Grubbing | | | P | C | F |
| Developmental Standard Plans | | | C | C | F |
| Mitigation Plans | | | C | C | F |
| Miscellaneous Structures Plans | | | P | C | F |
| Signing and Pavement Marking Plans | | P** | P** | C | F |
| Signalization Plans | | | P | C | F |
| Intelligent Transportation System (ITS) Plans | | | P | C | F |
| Lighting Plans | | | P | C | F |
| Landscape Plans | | | P | C | F |
| Utility Work by Highway Contractor Agreement Plans | | | | C | F |
| Summary of Quantities | | | | C | F |
| 3D Model Files | | P | P | C | F |
| KMZ Files | | | P | C | F |
| Toll Facility Plans | | | P | C | F |

Status Key: P - Preliminary C - Complete but subject to change F - Final

* Projects with structures plans component must submit the 30% set with the 60% roadway submittal.

** Submittal will include a roll plot at an appropriate scale for the entire project.

A "Notes for Reviewers" sheet may be placed behind the Key Sheet to call attention to conditions, issues and features unique to the project design. Do not use this sheet beyond 100% submittal.

301.2.1 - 15% Submittal Preliminary Line and Grade

Unless otherwise directed by CFX, the following elements are required for a 15% submittal:

TYPICAL SECTIONS

- Mainline and crossroad typical sections
- R/W lines

PLAN VIEW (ROLL PLOT)

- North arrow and scale
- Baseline of survey, equations
- Curve data (including superelevation)
- Existing topography
- Preliminary horizontal geometrics/dimensions
- Existing & proposed R/W lines (if available)
- Centerline of construction (if different from the baseline of survey)
- Begin and end stations for the project, bridges, bridge culverts and exceptions
- General locations of proposed retention/detention ponds

PROFILE VIEW (ROLL PLOT)

- Scale
- Preliminary profile grade line
- Equations
- Existing ground line with elevations at each end of sheet
- Begin and End Stations for the Project, bridges, bridge culverts and exceptions

INTERCHANGE DETAIL (ROLL PLOT)

- Schematic of traffic flow
- Preliminary configuration and geometrics
- Quadrant Identification
- Ramp Labels

DRAINAGE DESIGN DOCUMENTATION

- Preliminary Hydroplaning Analysis
- Preliminary Base Clearance Calculations

301.2.2 - 30% Submittal

Unless otherwise directed by CFX, the following elements are required for a 30% Submittal set of plans:

KEY SHEET

- Location Map with location of project on map
- All applicable Project Numbers/ Financial Project IDs
- (Federal Funds) notation, if applicable
- Exceptions & Equations
- County Name
- State Road Number
- North arrow
- Approval signature lines
- Railroad crossing (if applicable)
- Revision box
- Governing Standards & Specifications dates
- CFX Project Manager's Name
- Begin & end project station, begin mile post
- Begin & end bridge stations
- Consultant's name, address, contract number, and vendor number (if applicable)

DRAINAGE MAP - PLAN VIEW

- North arrow and scale
- Drainage basin divides and ground
- Elevations (Inlet basin divides not required)
- Drainage areas and flow direction arrows
- High water information as required
- Preliminary horizontal alignment
- Section, township, range lines
- Street names
- Begin & end stations of project, construction, bridge, bridge culverts & exceptions
- Existing structures & pipes with relevant information
- State, Federal, county highway numbers (as appropriate)

DRAINAGE MAP - PROFILE VIEW (IF INCLUDED)

- Preliminary profile grade & existing ground line
- Horizontal & vertical scale
- Begin & end stations of project, bridges, bridge culverts & exceptions

INTERCHANGE DRAINAGE MAP

- North arrow and scale
- Stationing along baselines
- Ramp baselines with nomenclature
- Begin and end bridge stationing
- Preliminary interchange configuration
- R/W lines
- Preliminary interchange drainage with drainage areas and flow direction arrows

TYPICAL SECTIONS

- Mainline and crossroad typical sections
- R/W lines
- Special details (e.g., bifurcated sections, high fills)
- Traffic data

PROJECT LAYOUT

- Plan-profile sheet sequence (mainline and crossroads)

PROJECT CONTROL

- Benchmarks
- Reference points
- Control points

PLAN AND PROFILE - PLAN VIEW

- North arrow and scale
- Baseline of survey, equations

- Curve data (including superelevation)
- Existing topography including utilities
- Preliminary horizontal geometrics/dimensions
- Existing & proposed R/W lines (if available)
- Centerline of construction (if different from the baseline of survey)
- Begin and end stations for the project, bridges, bridge culverts and exceptions

PLAN AND PROFILE - PROFILE VIEW

- Scale
- Appropriate existing utilities
- Benchmark information
- Preliminary profile grade line
- Equations
- Existing ground line with elevations at each end of sheet
- Begin and End Stations for the Project, bridges, bridge culverts and exceptions.

SPECIAL PROFILE

- Scale
- Ramp profile worksheet including nose sections
- Existing ground line of intersections
- Preliminary grade line of intersections
- Preliminary curb return profiles, if applicable

BACK - OF - SIDEWALK PROFILE (Worksheet)

- Scale
- Begin and end project stations
- Begin and end sidewalk stations
- Cross street locations and elevations
- Drainage flow direction arrows
- Mainline equations
- Existing driveway locations and details
- Superelevation details
- Back of sidewalk profile grades and vertical curve information
- Building floor elevations with offset distance left and right
- Grade line notation: Specifically, the numeric difference relative to roadway profile grade line

INTERCHANGE DETAIL

- North arrow and scale
- Schematic of traffic flow and volumes
- Proposed bridge limits
- R/W lines
- Preliminary configuration and geometrics
- Quadrant Identification
- Ramp Labels

INTERSECTION LAYOUT

- North arrow and scale
- Existing topography (if applicable)
- Proposed R/W limits
- Length of turn lanes
- Taper lengths
- Existing Utilities
- Geometric dimensions (radii, offsets, widths)

RETENTION POND DETAILS

- North arrow and scale
- R/W lines
- Existing topography, drainage structures, utilities
- Limits of wetlands
- Berm location
- Pond Typical Section
- Soil Boring information

CROSS SECTIONS*(May require accompanying cross section pattern sheet)*

- Scale
- Existing ground line
- Existing survey baseline elevations
- Station numbers
- Baseline of survey labeled
- Existing utilities
- Proposed template with profile grade elevations along mainline and cross-streets

TEMPORARY TRAFFIC CONTROL PLANS

- Project specific
- Other worksheets as necessary to convey concept and scope

TREE DISPOSITION PLAN (IF REQUESTED)

- North Arrow and Scale
- Drainage divides and ground elevations (if available)
- Drainage areas and flow direction arrows
- Street names
- Baseline of Survey or Project Centerline
- Begin & end stations of project, construction and exceptions
- Existing to remain or proposed roadway improvements, structures and drainage facilities with relevant information
- Existing off-site features and conditions that affect or are affected by the project
- Edge of pavement and traffic lanes
- Curbs or curb and gutter
- Guardrails
- R/W or limited access fence line and gate locations
- Sidewalks or other planned or existing structures
- Lighting, signs, signal poles, and ITS facilities
- Existing and proposed overhead or underground utilities
- Transit facilities
- Details for vegetation removal and pruning
- Vegetation Relocation Plan
- Notes

DRAINAGE DESIGN DOCUMENTATION

- Existing Conditions Analysis with Recommendations
- Pre-Development Treatment Computations
- Pre-Development Bridge and Cross Drain Analysis
- Hydroplaning Analysis, based on available information
- Reference Material

PRELIMINARY SIGNING AND PAVEMENT MARKING

- Project Roll Plot
 - To be scoped at the discretion of CFX based on the project complexity and/or CFX-provided CSP
- Preliminary Overhead and Multi-post sign panels and structure locations
- Preliminary Pavement Marking or Lane Line layout

301.2.3 - 60% Submittal

Typically, the work to be done during this phase is the following:

- (1) Address 30% Submittal comments.
 - a. Submit preliminary responses to 30% comments within fifteen (15) business days of receipt following the 30% submittal for CFX review and acceptance
 - b. Submit final responses to all 30% comments with the 60% submittal. Any changes from the preliminary responses or follow-up comments must be clearly noted on the comment forms
- (2) Provide a Summary of Pay Items sheet with the lead plan set
 - a. Include all pay items from all applicable component sets included with the 60% submittal
- (3) Provide the complete 60% CADD directory upon request
- (4) Identify any potential project specific Special Provisions that may be required.
- (5) Develop 60% Plans to include the following:

KEY SHEET

- Index of sheets
- Contract plans and component plans list

SIGNATURE SHEET

- Sections for each Professional of Record
- Index of sheets for each Professional of Record
- Image of the seal(s)
- Appearance of the Digital Signature only to be applied in Phase IV
- (Note: Digital Signatures are not to be applied in this Phase)

DRAINAGE MAP - PLAN VIEW

- Proposed structures with structure numbers
- Proposed storm drainpipes
- Flow arrows along proposed ditches
- Retention/Detention ponds, pond number and area size
- Cross drains with pipe sizes and structure numbers
- Bridges/bridge culverts with begin and end stations
- Flood data (if applicable)

DRAINAGE MAP - PROFILE VIEW (IF INCLUDED)

- Final Roadway profile grade line
- Mainline storm drainpipes
- Mainline structures with structure numbers and pipes
- Bridge, Bridge Culvert
- Cross drains with pipe sizes, structure numbers and flow line elevation

PROJECT LAYOUT

- Complete

PROJECT CONTROL

- Complete

PLAN AND PROFILE - PLAN VIEW

- Curb return numbers, station ties and elevations
- Proposed drainage structures with structure number
- Proposed R/W lines
- Existing utilities
- Proposed side drainpipe requirements (including size) for access and intersections
- Final geometrics and dimensions including radii, station pluses, offsets, widths, taper/transition lengths, curve data
- General Notes (if General Notes Sheet not included)
- Flood data if not shown elsewhere
- Limits of wetlands

PLAN AND PROFILE - PROFILE VIEW

- Final profile grades and vertical curve data
- Mainline storm drainpipes
- Proposed special ditches
- Ditch gradients with DPI station and elevation
- Nonstandard superelevation transition details
- High water elevations
- Existing utilities
- Mainline drainage structures with structure numbers
- Cross drains with structure number, size and flow line elevations
- Overhead sign structures with structure number labeled

INTERCHANGE DRAINAGE MAP

- Final geometrics including PC and PT
- Proposed structures with structure numbers
- Proposed storm drainpipes
- Special ditches with DPI and elevation

TYPICAL SECTIONS

- Pavement Design

SPECIAL PROFILE

- Final intersection profile grades
- Final curb return profiles (if applicable)
- Superelevation diagrams as required
- Final ramp profile grades including nose sections
- Preliminary access and frontage road profiles (may contain one or more types of special profiles.)

BACK OF SIDEWALK PROFILE

- Complete

INTERCHANGE LAYOUT

- Curve data including superelevation and design speed
- Coordinate data, stationing and ties
- Access and frontage roads with dimensions and R/W
- Fence location
- Ramp identification

RAMP TERMINAL DETAILS

- Preliminary geometrics
- Radii, transition/taper lengths
- Ramp identification

INTERSECTION LAYOUT

- Limits of proposed construction on side roads
- Applicable notes
- Cross drains with structure numbers and pipe sizes
- Storm drainpipes including sizes
- Final geometrics including dimensions, radii, offsets, station pluses and taper/transition lengths

DRAINAGE STRUCTURES

- Vertical and horizontal scale
- Roadway template with profile grade elevation
- Underground utilities
- Special sections at conflict points
- R/W lines (at critical locations)
- Storm drain construction notes
- Flow arrows
- Applicable notes
- Structure numbers and location station along right side of sheet
- Drainage structures with number, type, size, location, and flowline elevations

OUTFALL / LATERAL DITCH - PLAN VIEW

- North arrow and scale
- Roadway centerline
- Existing or survey ditch centerline
- Proposed ditch centerline with stationing
- Begin and end ditch stations
- Equations
- Ditch centerline intersection stations
- R/W lines
- Bearings of ditch and mainline centerlines
- Proposed storm drainpipes
- Ditch PI stations with deflection angle left or right
- Proposed drainage structures with structure numbers
- Existing topography, drainage structures, utilities
- Limits of wetlands

OUTFALL / LATERAL DITCH - PROFILE VIEW

- Benchmark information
- Scale
- Existing ground line
- Proposed ditch profile with grades
- Begin and end ditch stations
- High water elevations
- Proposed storm drainpipes with size
- Existing Utilities
- Overland flow or overtopping elevations
- Proposed drainage structures with structure numbers
- Typical section can be placed in either plan or profile

LATERAL DITCH CROSS SECTIONS

- Horizontal and vertical scale
- Existing ground line
- Station numbers
- Survey centerline and elevation
- R/W
- Begin and end ditch stations
- Begin and end excavation stations
- Existing utilities
- Proposed template with ditch bottom elevation

RETENTION/DETENTION POND DETAILS

- North arrow and scale
- Roadway centerline ties
- Proposed pond centerline with stationing
- Begin and end pond stations
- Side slopes, dimensions, and elevations
- R/W lines
- Berm, fence and gate locations
- Soil boring information
- Proposed pond drainage structures with structure numbers
- Existing topography, drainage structures, utilities
- Pond sections (2 perpendicular to each other)
- Pond Typical Section
- Limits of wetlands

RETENTION/DETENTION POND CROSS SECTIONS

- Horizontal and vertical scale
- Existing ground line
- Station numbers
- Begin and end pond stationing
- Pond centerline and elevations
- R/W
- Soil borings
- Water table
- Extent of unsuitable material
- Existing utilities
- Proposed template with bottom elevation

CROSS SECTION PATTERN

- North arrow and scale
- Interchange layout
- Access and frontage roads
- Mainline and ramp stationing
- Begin and end bridge stations
- Cross section location lines
- Ramp baselines with nomenclature and stationing

ROADWAY SOIL SURVEY

- Soil data
- Project specific

CROSS SECTIONS

- R/W
- Special ditch bottom elevations
- Equivalent stations for ramps and mainline
- Mainline equation stations
- Soil borings
- Water table
- Extent of unsuitable material
- Proposed template with profile grade elevation
- Earthwork Columns
- Begin and end stationing for project, construction and earthwork, bridge, and bridge culvert
- Existing utilities affected by the template and where unsuitable materials are present

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

- Narrative Description (with supplemental topographic maps, when used)

TEMPORARY TRAFFIC CONTROL PLANS

- Preliminary traffic control plan
- Detour plan
- Phasing plan
- R/W - existing and additional if required
- Existing Utilities

SELECTIVE CLEARING AND GRUBBING

- Existing vegetation to be protected, relocated, or removed
- Notes
- Details
- Project Specific

UTILITY ADJUSTMENTS

- All existing utilities highlighted

MITIGATION PLANS

- Project Specific
- Retaining walls (Cast in place, proprietary, temporary) if required

SIGNING AND PAVEMENT MARKING PLANS - KEY SHEET

- CFX Project Number
- (Federal Funds) notation, if applicable
- State Road Number
- County Name
- CFX Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

SIGNING AND PAVEMENT MARKING PLANS - PLAN SHEETS

- North arrow and scale
- Begin/End Stations and Exceptions
- Station equations
- Permanent walls by type, including height of sound walls
- All roadway light poles
- Conflicting utilities, lighting/ITS conduit, or drainage pipes/structures
- Pavement markings
- Sign locations
- Applicable pay items

SIGNING AND PAVEMENT MARKING PLANS - SIGN DETAIL SHEETS, GUIDE SIGN WORK SHEETS AND GUIDE SIGN CROSS SECTIONS

- Project Specific

SIGNALIZATION PLANS - KEY SHEET

- CFX Project Number
- (Federal Funds) notation, if applicable
- State Road Number
- County Name
- CFX Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

SIGNALIZATION PLANS - PLAN SHEET

- North arrow and scale
- Basic Roadway Geometrics
- Begin/End Stations and Exceptions
- Station Equations
- Conflicting utilities, lighting or drainage
- Signal Pole Location
- Type and location of loops/detection assignments
- Type and location of signal heads
- Pedestrian Signals including stations and offsets
- Location of Stop Bars

- Location of Pedestrian Crosswalks
- Sheet Title
- Applicable pay items
- Controller Timing Chart
- Standard Operating Plan (SOP)

SIGNALIZATION PLANS - POLE SCHEDULE

- Pole location, number, type
- Pole dimensions
- Pay item number
- Joint use pole details, if applicable
- Foundation design

SIGNALIZATION PLANS - INTERCONNECT/ COMMUNICATION CABLE PLAN

- Placement of interconnect/communication cable
- Conflicting utilities, lighting or drainage
- Other project specific details

ITS PLANS - KEY SHEET

- CFX Project number
- (Federal Funds) notation, if applicable
- State Road Number
- County Name
- CFX Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

ITS PLANS - PLAN SHEETS

- North arrow and scale
- Basic Roadway Geometrics
- Begin/End Stations and Exceptions
- Station equations
- Conflicting utilities, lighting, or drainage
- Applicable pay items

ITS PLANS - DETAIL SHEETS

- Project Specific

LIGHTING PLANS - KEY SHEET

- CFX Project Number
- (Federal Funds) notation, if applicable
- State Road Number
- County Name
- CFX Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

LIGHTING PLANS - POLE DATA AND LEGEND SHEET

- Each pole by number with location, arm length, mounting height and luminaire wattage noted.
- Design value for light intensities and uniformity ratios shown.
- Legend and sheet title

LIGHTING PLANS - PLAN SHEETS

- North arrow and scale
- Basic Roadway Geometrics
- Begin/End Stations and Equations
- Station Equations
- Conflicting utilities, drainage, signal poles, etc.
- Sheet title
- Applicable pay items

- Pole symbols shown at correct station location and approximate offset

LANDSCAPE PLANS - KEY SHEET

- CFX Project Number
- (Federal Funds) notation, if applicable
- Fiscal year and sheet number
- State Road Number
- County Name
- CFX Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Landscape Architect of Record name and registration number
- Consultant's name, address, and contract number, if applicable
- Index of landscape plans

LANDSCAPE PLANS - PLANT SCHEDULE

- Project Specific

LANDSCAPE PLANS - SCHEDULE FOR IRRIGATION AND SITE AMENITIES

- Project Specific

LANDSCAPE PLANS – PLANTING PLAN SHEETS

- Project centerline
- Edge of pavement (edge of traffic lanes)
- Curbs or curb and gutter
- Drainage systems
- Guardrails
- Right of way and/or limited access fence line
- Sidewalks or other planned or existing structures
- Lighting, signs, and signal poles
- Intersections and driveways which are noted in the plans
- Existing and proposed overhead and underground utility locations
- Clear Zone/Lateral offset (should be plotted or safety setback distances noted frequently on each plan sheet)
- View zones for permitted outdoor advertising signs
- Canopy limits
- Existing vegetation (to remain or be removed)
- Existing off-site features and conditions that affect or are affected by the project
- Fence and gate locations
- Setbacks from structural elements or drainage system
- Limits of clear sight
- Transit facilities
- Proposed Planting Plan (Plant symbols)
- Noise walls and architectural elements

LANDSCAPE PLANS - IRRIGATION PLAN SHEETS (if applicable)

- Type of system
- Location and size of mainlines and lateral lines
- Type and location of spray heads and rotors
- Type and location of valves, sleeves, controllers, water sources/point of connection, backflow preventers, and isolation valves

LANDSCAPE PLANS – DETAILS SHEET

- Applicable landscape details
- Irrigation symbology with associative descriptions (if applicable)

DRAINAGE DESIGN DOCUMENTATION

- All items outlined as part of **CFX Design Guidelines 252** as relevant to the project.
- Bridge Hydraulic Recommendation

LIGHTING DESIGN DOCUMENTATION

- Initial LDAR (Lighting Design Analysis Report) Write-Up
- Illumination photometrics
- Luminaire catalog cut sheets

TOLL FACILITY PLANS

- Site/Civil
- Architectural
- Structural
- Electrical
- Mechanical
- Plumbing
- Communications
- Systems

301.2.4 - 90% Submittal

Typically, the work to be done during this phase is the following:

- (1) Address 60% Submittal comments.
 - a. Submit preliminary responses to 60% comments within fifteen (15) business days of receipt following the 60% submittal for CFX review and acceptance.
 - b. Submit final responses to **all** 60% comments with the 90% submittal. Any changes from the preliminary responses or follow-up comments must be clearly noted on the comment forms.
- (2) Complete all remaining Plan Sheets.
- (3) Provide roadway summary of pay items, roadway summary of quantities, and component tabulation of quantity sheets.
- (4) Submit Technical Special Provisions or Special Provisions for technical and legal review(s).
- (5) Estimate the Construction Time and provide the preliminary Contract Time Memo.
- (6) Provide the complete 90% CADD directory upon request.
- (7) Obtain Toll Equipment Contractor Equipment Layout sheets to verify no conflicts exist.

Utility Work by Highway Contractor (UWHC) Agreement Plans, if applicable, are also to be included in the 90% submittal.

DRAINAGE DESIGN DOCUMENTATION

- All items outlined as part of **CFX Design Guidelines 252** as relevant to the project.

LIGHTING DESIGN DOCUMENTATION

- Complete LDAR (Lighting Design Analysis Report) Write-Up
 - Illumination Photometrics
 - Luminaire Catalog Cut Sheets
 - FAA Coordination (if required)
- PDAR (Power Design Analysis Report) Write-Up
 - Voltage Drop Calculations
 - Load Analysis
 - Short Circuit Current Analysis
 - Device Coordination (Time-Current Curves)
 - ARC Flash Hazard Analysis
- Power Company Correspondence

STRUCTURAL DESIGN DOCUMENTATION (i.e. calculations)

TOLL FACILITY PLANS

- | | |
|-----------------|------------------|
| • Site/Civil | • Mechanical |
| • Architectural | • Plumbing |
| • Structural | • Communications |
| • Electrical | • Systems |

301.2.5 - 100% Submittal

Typically, the work to be done during this phase is the following:

- (1) Address 90% Submittal
- (2) Provide complete 100% CADD directory upon request
- (3) Provide an Engineer of Record's construction cost estimate to the Department Project Manager (when requested).

After corrections noted during the 100% submittal review are completed and verified, prepare the Pre-Bid plans.

301.2.6 - Pre-Bid and Bid Submittals

After changes to the 100% Plans and Specifications Package have been completed and verified, deliver the Pre-Bid and Bid Submittals consisting of the following:

- (1) Signed and Sealed Plans
- (2) Clean set of Plans – Not signed and sealed
- (3) Bid Form

- (4) Construction Time Estimate
- (5) CADD Files

301.2.7 - Approved for Construction (AFC) Submittal

Once the bid phase is complete, incorporate all revisions and addendum into the bid set and provide the revised sheets. Replace the revised sheets from the original Bid Submittal to create the Approved for Construction Submittal.

301.3 - Design-Build Phase Submittals

CFX Design Guidelines 301.3 applies exclusively to Design-Build projects. Requirements relating to the design process for various submittals are given in **FDM 120**. Refer to that chapter for additional guidance in preparing submittals for review by the CFX. For bridge submittal requirements see **FDM 121**. For Design-Build projects, the standard submittal phases are:

- (1) Technical Proposal
- (2) 90% Component Plans
- (3) Final Component Plans

Table 301.3.1 summarizes the plans sheet status required for each submittal.

An additional sheet titled "Notes for Reviewers" may be placed as the second sheet in the submittal package to call attention to conditions, issues and features unique to the project design. The sheet is to be used only in the review process and is not included in the final plans.

301.3.1 - Direction to All Discipline Phase Reviewers on Non-Conventional Projects

Discipline phase reviewers should primarily review Design-Build and Public-Private- Partnership project plan submittals for compliance with contract requirements. However, non-contractual comments submitted "for information only" can also provide valuable feedback to the Design-Build Firm or Concessionaire. The purpose of this section is to allow a formal process for submitting both types of comments on Non-Conventional Projects.

Discipline phase reviewers must separate component plan review comments into the following two categories:

- **Response Required Comment:** these refer to direct violations of the Contract
- **FYI Comment:** these do not refer to direct violations of the Contract

The discipline phase reviewer should enter comments in the Electronic Review Comments (ERC) system in the boxes labeled "Response Required Comment" or "FYI Comment" as appropriate. The

ERC system will automatically add a statement at the end of each comment indicating “A written response is required.” or “This comment is for information only. A written response is NOT required.”

301.3.1.1 - Response Required Comment

Response Required Comments refer to direct violations of the Contract. These comments require a written response by the Design-Build Firm or Concessionaire. Where possible, the reviewer is expected to include the specific contract reference or requirement that is being violated. Examples may include, but are not limited to:

- An AASHTO provision that is being violated.
- A Governing Regulation (e.g., CFX Design Guidelines, FDM, Structures Design Guidelines) requirement that is being violated.
- A Technical Proposal commitment that is not being met.
- A Request for Proposal (RFP) requirement that is being omitted or violated;
- Omission in the plans or calculations.
- Inconsistencies between the plans and calculations.
- Obvious errors in math or basic engineering principles.
- An environmental commitment or permit commitment that is not being met.

301.3.1.2 - FYI Comment

FYI Comments are those that do not refer to direct violations of the Contract. These comments do not require a written response by the Design-Build Firm or Concessionaire. At the end of each comment state that the comment is for information only and a written response is not required.

Table 301.3.1 - Summary of Design Build Phase Submittals

| ITEM | Tech Proposal | 90% | Final Plans |
|--------------------------|---------------|-----|-------------|
| Key Sheet | | P | F |
| Signature Sheet | | P | F |
| Drainage Map | P | C | F |
| Interchange Drainage Map | P | C | F |
| Typical Section | P | C | F |
| Project Layout | | C | F |
| Project Control | P | C | F |
| Roadway Plan-Profile | P | C | F |
| Traffic Monitoring Site | P | C | F |

| ITEM | Tech Proposal | 90% | Final Plans |
|--|---------------|-----|-------------|
| Special Profile | | C | F |
| Back of Sidewalk Profile | | C | |
| Interchange Layout | P | C | F |
| Intersection Layout/Detail | P | C | F |
| Drainage Structures | | C | F |
| Lateral Ditch Plan-Profile | | C | F |
| Lateral Ditch Cross Section | | C | F |
| Retention/Detention Ponds | | C | F |
| Roadway Soil Survey | | C | F |
| Cross Sections | | C | F |
| Temporary Traffic Control Plans | P | C | F |
| Utility Adjustments | | C | |
| Selective Clearing and Grubbing | | C | |
| Developmental Standard Plans | | C | F |
| Mitigation Plans | | C | F |
| Miscellaneous Structures Plans | | C | F |
| Signing and Pavement Marking Plans | P | C | F |
| Signalization Plans | | C | F |
| Intelligent Transportation System (ITS) Plans | | C | F |
| Lighting Plans | | C | F |
| Landscape Plans | | C | F |
| Tree Disposition Plan | | C | |
| Utility Work by Highway Contractor Agreement Plans | | C | F |
| Summary of Quantities | | C | F |
| Toll Facility Plans | | | |
| Site/Civil | P | P | F |
| Architectural | P | P | F |
| Structural | P | P | F |
| Electrical | | P | F |
| Mechanical | | P | F |
| Plumbing | | P | F |
| Communications | | P | F |
| System | | P | F |

301.3.2 - Technical Proposal Submittal Requirements

If required as part of the RFP, submit a complete set of 11" X 17" plan sheets for the Technical Proposal Submittal. As a supplement to the plan set, select plan sheets, no larger than 24" X 36" or roll plot(s) no larger than 24" X 96", may be submitted. Supplemental plan sheets or roll plots are desirable for such roadway features that cannot be presented adequately on 11" X 17" sheets, e.g., complex interchanges, Maintenance of Traffic phases, large complex intersections. Unless otherwise directed by CFX, the following elements are required for a Technical Proposal Submittal:

DRAINAGE MAP - PLAN VIEW

- Drainage basin divides and flow direction arrows (Inlet basin divides not required)
- High water information as required
- Preliminary horizontal alignment with stationing
- State, Federal, County highway numbers (as appropriate)
- Proposed storm drain trunk line and outfall locations
- Proposed Retention/Detention Pond Location

INTERCHANGE DRAINAGE MAP - PLAN VIEW

- Preliminary interchange drainage with drainage areas and flow direction arrows

TYPICAL SECTIONS

- Mainline and crossroad typical sections
- R/W lines
- Traffic data
- Pavement Design

PROJECT CONTROL

- Benchmarks
- Reference Points
- Control Points

PLAN AND PROFILE - PLAN VIEW

- North arrow and scale
- Baseline of survey, equations
- Curve data (including superelevation)
- Existing topography including utilities
- Preliminary horizontal geometrics/dimensions
- Existing & proposed R/W lines (if available)
- Centerline of construction (if different from the baseline of survey)
- Begin and end stations for the project and stations of equations and exceptions
- Existing utilities
- Guide sign locations
- Limits of wetlands

PLAN AND PROFILE - PROFILE VIEW

- North arrow and scale
- Appropriate existing utilities
- Preliminary profile grade line
- Existing ground line with elevations at each end of sheet
- Begin and end stations for the project and stations of equations and exceptions
- Final profile grades and vertical curve data
- High water elevations

INTERCHANGE LAYOUT

- Curve data including superelevation and design speed
- Stationing and ties
- Access or frontage roads with dimensions and R/W
- Ramp identification

INTERSECTION LAYOUT

- North arrow and scale
- Existing topography (if applicable)
- Proposed R/W limits
- Length of turn lanes
- Geometric dimensions (radii, offsets, widths)
- Limits of proposed construction alongside roads

TEMPORARY TRAFFIC CONTROL PLANS

- Project specific
- Other worksheets as necessary to convey concept and scope
- Preliminary traffic control plan
- Detour plan
- Phasing plan
- R/W – existing and additional if required

SIGNING AND PAVEMENT MARKING PLANS - SIGN DETAIL SHEETS

- Preliminary layout of multi-column and overhead guide sign worksheets

TOLL FACILITY PLANS

- Site/Civil
- Architectural
- Structural

301.3.3 - 90% Plans Component Submittal Requirements

CFX may provide review comments and mark-ups to the EOR for incorporation into the plan set. CFX may allow the EOR to include sketches of details or revised plan sheets along with their written responses to some review comments, in lieu of resubmitting a component plan set. The EOR will upload these sketches or revised plan sheets into the ERC system.

Unless otherwise directed by CFX, the following elements are required for a 90% Plans Component Submittal:

KEY SHEET

- Location Map with location of project on map
- All applicable CFX Project IDs
- Federal Funds notation, if applicable
- Exceptions & Equations
- County Name
- State Road Number
- North arrow and scale
- Approval signature lines
- Railroad crossing (if applicable)
- Revision box
- Governing Standards & Specifications dates
- CFX 's Project Manager's Name
- Begin & end project station and begin mile post
- Begin & end bridge stations
- Consultant's name, address, contract number, and vendor number (if applicable)
- Index of sheets
- Contract plans and component plans list

SIGNATURE SHEET

- Sections for each Professional of Record
- Index of sheets for each Professional of Record
- Image of the seal(s)
- (Note: Digital Signatures are not to be applied in this Phase)

DRAINAGE MAP - PLAN VIEW

- North arrow and scale
- Drainage basin divides and ground elevations (Inlet basin divides not required)
- Drainage areas and flow direction arrows
- Equations
- High water information as required
- Preliminary horizontal alignment
- Section, township, range lines

- Street names
- Begin & end stations of project, bridge, bridge culverts & exceptions
- Existing structures & pipes with relevant information
- Proposed structures with structure numbers
- Proposed storm drainpipes
- Flow arrows along proposed ditches
- Retention/Detention ponds, pond number and area size
- Cross drains with pipe sizes and structure numbers
- Bridges/bridge culverts with begin and end stations
- Flood data (if applicable)
- State, Federal, county highway numbers (as appropriate)

DRAINAGE MAP - PROFILE VIEW

- Horizontal & vertical scale
- Begin & end stations of project, bridges, bridge culverts & exceptions
- Equations
- Ditch gradients including DPIs
- Final roadway profile grade line
- Mainline storm drainpipes
- Mainline flow line elevations
- Mainline structures with structure numbers and pipes
- Bridge, Bridge Culvert
- Cross drains with pipe sizes, structure numbers and flow line elevation

INTERCHANGE DRAINAGE MAP

- North arrow and scale
- Stationing along baselines
- Ramp baselines with nomenclature
- Begin and end bridge stationing
- Final interchange configuration
- R/W lines
- Final Interchange drainage with drainage areas and flow direction arrows
- Final geometrics including PC and PT
- Proposed structures with structure numbers
- Proposed storm drainpipes
- Special ditches with DPI and elevation

TYPICAL SECTIONS

- Mainline and crossroad typical sections
- R/W lines
- Special details (e.g., bifurcated sections, high fills)
- Traffic data
- Pavement Design

PROJECT LAYOUT

- Plan-profile sheet sequence (mainline and crossroads)

PROJECT CONTROL

- Complete

ROADWAY PLAN PROFILE - PLAN VIEW

- North arrow and scale
- Baseline of survey, equations
- Curve data (including superelevation)
- Existing topography including utilities
- Preliminary horizontal geometrics/dimensions
- Existing & proposed R/W lines (if available)
- Centerline of construction (if different from the baseline of survey)

- Begin and end stations for the project, bridges, bridge culverts and exceptions
- Reference points (if project survey control sheet not included in plans set)
- Curb return numbers, station ties and elevations
- Proposed drainage structures with structure numbers
- Proposed R/W lines
- Existing utilities
- Limits of wetlands
- Flood data if not shown elsewhere
- Proposed side drainpipe requirements (including size) for access and intersections
- Final geometrics and dimensions including radii, station pluses, offsets, widths, taper/transition lengths, curve data
- General notes (if project layout sheet not included)

ROADWAY PLAN PROFILE - PROFILE VIEW

- Begin and end stations for the project and stations of equations and exceptions
- Existing ground line with elevations at each end of sheet
- Final profile grades and vertical curve data
- High water elevations
- Appropriate existing utilities
- Mainline storm drainpipes
- Proposed special ditches
- Ditch gradients with DPI station and elevation
- Non-standard superelevation transition details
- High water elevations
- Mainline drainage structures with structure numbers
- Cross drains with structure number, size and flow line elevations

TRAFFIC MONITORING SITE

- Project Specific

SPECIAL PROFILE

- Scale
- Existing ground line of intersections
- Final intersection profile grades
- Final curb return profiles (if applicable)
- Superelevation diagrams as required
- Final ramp profile grades including nose sections
- Final access and frontage road profiles (may contain one or more types of special profiles.)

BACK-OF-SIDEWALK PROFILE

- Scale
- Begin and end project stations
- Begin and end sidewalk stations
- Cross-street locations and elevations
- Drainage flow direction arrows
- Mainline equations
- Existing driveway locations and details
- Superelevation details
- Back-of-sidewalk profile grades and vertical curve information
- Building floor elevations with offset distance left and right
- Grade line notation: Specifically, the numeric difference relative to roadway profile grade line

INTERCHANGE LAYOUT

- North arrow and scale
- Quadrant Identification
- Ramp Labels
- Schematic of traffic flow and volumes
- Proposed bridge limits
- R/W lines

- Final configuration and geometrics
- Curve data including superelevation and design speed
- Coordinate data, stationing and ties
- Access and frontage roads with dimensions and R/W
- Fence location

RAMP TERMINAL DETAILS

- Ramp identification
- Final geometrics
- Radii, transition/taper lengths

INTERSECTION LAYOUT

- North arrow and scale
- Existing topography (if applicable)
- Proposed R/W limits
- Length of turn lanes
- Taper lengths
- Existing Utilities
- Geometric dimensions (radii, offsets, widths)
- Limits of proposed construction on side roads
- Applicable notes
- Cross drains with structure numbers and pipe sizes
- Storm drainpipes including sizes
- Final geometrics including dimensions, radii, offsets, station pluses and taper/transition lengths

DRAINAGE STRUCTURES

- Vertical and horizontal scale
- Roadway template with profile grade elevation
- Underground utilities
- Special sections at conflict points
- R/W lines (at critical locations)
- Storm drain construction notes
- Flow arrows
- Applicable notes
- Structure numbers and location station along right side of sheet
- Drainage structures with numbers in numerical order, type, size, location and flow
- line elevations

OUTFALL / LATERAL DITCH - PLAN VIEW

- North arrow and scale
- Roadway centerline
- Existing and survey ditch centerline
- Proposed ditch centerline with stationing
- Begin and end ditch stations
- Equations
- Ditch centerline intersection stations
- R/W lines
- Bearings of ditch and mainline centerlines
- Proposed storm drainpipes
- Ditch PI stations with deflection angle left or right
- Proposed drainage structures with structure numbers
- Existing topography, drainage structures, utilities
- Limits of wetlands

OUTFALL / LATERAL DITCH - PROFILE VIEW

- Benchmark information
- Scale
- Existing ground line
- Proposed ditch profile with grades
- Begin and end ditch stations
- High water elevations
- Proposed storm drainpipes with size
- Existing Utilities

- Overland flow or overtopping elevations
- Proposed drainage structures with structure numbers
- Typical section can be placed in either plan or profile

LATERAL DITCH CROSS SECTIONS

- Horizontal and vertical scale
- Existing ground line
- Station numbers
- Survey centerline and elevation
- R/W
- Begin and end ditch stations
- Begin and end excavation stations
- Existing utilities
- Proposed template with ditch bottom elevation

RETENTION/DETENTION POND DETAILS

- North arrow and scale
- Roadway centerline ties
- Proposed pond centerline with stationing
- Begin and end pond stations
- Side slopes, dimensions, and elevations
- R/W lines
- Berm, fence and gate locations
- Soil boring information
- Proposed pond drainage structures with structure numbers
- Existing topography, drainage structures, utilities
- Pond sections (2 perpendicular to each other)
- Pond Typical Section
- Limits of wetlands

RETENTION/DETENTION POND CROSS SECTIONS

- Horizontal and vertical scale
- Existing ground line
- Station numbers
- Begin and end pond stationing
- Pond centerline and elevations
- R/W
- Soil borings
- Water table
- Extent of unsuitable material
- Existing utilities
- Proposed template with bottom elevation

ROADWAY SOIL SURVEY

- Soil data
- Project specific

CROSS SECTIONS

- Scale
- Existing ground line
- Existing survey baseline elevations
- Station numbers
- Baseline of survey labeled
- Existing utilities
- Proposed template with profile grade elevations along mainline and cross-streets as necessary

TEMPORARY TRAFFIC CONTROL PLANS

- Project specific
- Other worksheets as necessary to convey concept and scope.
- Final traffic control plan
- Detour plan
- Phasing plan
- R/W - existing and additional if required
- Existing Utilities

UTILITY ADJUSTMENTS

- All existing utilities highlighted

SELECTIVE CLEARING AND GRUBBING

- Limits of construction by station and type of selective clearing and grubbing.

MITIGATION PLANS

- Project Specific

MISCELLANEOUS STRUCTURES PLANS

- Retaining walls (Cast in place, proprietary, temporary) if required

SIGNING AND PAVEMENT MARKING PLANS - KEY SHEET

- CFX Project Number
- Federal Funds notation, if applicable
- State Road Number
- County Name
- CFX 's Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

SIGNING AND PAVEMENT MARKING PLANS - PLAN SHEETS

- Begin/End Stations and Exceptions
- Station equations
- Permanent walls by type, including height of sound walls
- All roadway light poles
- Conflicting utilities, lighting/ITS conduit, or drainage pipes/structures
- Pavement markings

GUIDE SIGN WORK SHEETS, SIGNING DETAILS, AND GUIDE SIGN CROSS SECTIONS

- Project Specific

SIGNALIZATION PLANS - KEY SHEET

- CFX Project Number
- Federal Funds notation, if applicable
- State Road Number
- County Name
- CFX 's Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

SIGNALIZATION PLANS - PLAN SHEET

- North arrow and scale
- Basic Roadway Geometrics
- Begin/End Stations and Exceptions
- Station Equations
- Conflicting utilities, lighting or drainage
- Signal Pole Location
- Type and location of loops
- Type and location of signal heads
- Pedestrian Signals including stations and offsets
- Location of Stop Bars
- Location of Pedestrian Crosswalks
- Sheet Title
- Controller Timing Chart
- Standard Operating Plan (SOP)

SIGNALIZATION PLANS - POLE SCHEDULE

- Pole location, number, type
- Pole dimensions
- Joint use pole details, if applicable
- Foundation design

SIGNALIZATION PLANS - INTERCONNECT/ COMMUNICATION CABLE PLAN

- Placement of interconnect/communication cable
- Conflicting utilities, lighting or drainage
- Other project specific details

ITS PLANS - KEY SHEET

- CFX Project Number
- Federal Funds notation, if applicable
- State Road Number
- County Name
- CFX 's Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if Applicable

ITS PLANS - PLAN SHEETS

- North arrow and scale
- Basic Roadway Geometrics
- Begin/End Stations and Exceptions
- Station equations
- Conflicting utilities, lighting or drainage

ITS PLANS - DETAIL SHEETS

- Project Specific

LIGHTING PLANS - KEY SHEET

- CFX Project Number
- Federal Funds notation, if applicable
- State Road Number
- County Name
- CFX 's Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Engineer of Record
- Consultants name & address, if applicable

LIGHTING PLANS - POLE DATA AND LEGEND SHEET

- Each pole by number with location, arm length, mounting height and luminaire wattage
- Design value for light intensities and uniformity ratios shown
- Legend and sheet title

LIGHTING PLANS - PLAN SHEETS

- North arrow and scale
- Basic Roadway Geometrics
- Begin/End Stations and Equations
- Station Equations
- Conflicting utilities, drainage, signal poles
- Sheet title
- Pole symbols shown at correct station location and approximate offset

LANDSCAPE PLANS – KEY SHEET

- CFX Project Number
- Federal Funds notation, if applicable
- Fiscal year and sheet number
- State Road Number
- County Name
- CFX 's Project Manager's Name
- Begin/end stations & exceptions
- Station Equations (if location map is shown)
- Landscape Architect of Record name and registration number
- Consultants name, address, and contract number, if applicable
- Index of landscape plans

TREE DISPOSITION PLAN

- North Arrow and Scale

- Drainage divides and ground elevations (if available)
- Drainage areas and flow direction arrows
- Street names
- Baseline of Survey or Project Centerline
- Begin & end stations of project, construction and exceptions
- Existing to remain or proposed roadway improvements, structures and drainage facilities
- with relevant information
- Existing off-site features and conditions that affect or are affected by the project
- Edge of pavement and traffic lanes
- Edge of pavement (edge of traffic lanes)
- Curbs or curb and gutter
- Guardrails
- Right of way and/or limited access fence line and gate locations
- Sidewalks or other planned or existing structures
- Lighting, signs, signal poles and ITS facilities
- Existing and proposed overhead or underground utilities
- Transit facilities
- Details for vegetation removal and pruning
- Vegetation Relocation Plan
- Notes

LANDSCAPE PLANS – PLANTING PLAN SHEETS

- Project centerline
- Edge of pavement (edge of traffic lanes)
- Curbs or curb and gutter
- Drainage systems
- Guardrails
- R/W or limited access fence line
- Sidewalks or other planned or existing structures
- Lighting, signs, and signal poles
- Intersections and driveways which are noted in the plans
- Existing and proposed overhead and underground utility locations
- Clear Zone/Lateral offset (should be plotted or safety setback distances noted frequently on
- each plan sheet)
- View zones for permitted outdoor advertising signs
- Canopy limits
- Existing vegetation (to remain or be removed)
- Existing off-site features and conditions that affect or are affected by the project
- Fence and gate locations
- Setbacks from structural elements or drainage system
- Limits of clear sight
- Transit facilities
- Proposed Planting Plan
- Noise walls and architectural elements

LANDSCAPE PLANS - IRRIGATION PLAN SHEETS

(if applicable)

- Type of system
- Location and size of mainlines and lateral lines
- Type and location of spray heads and rotors
- Type and location of valves, sleeves, controllers, water sources/point of connection,
- backflow preventers, and isolation valves

LANDSCAPE PLANS – DETAILS SHEET

- Applicable landscape details
- Irrigation symbology with associative descriptions (if applicable)

TOLL FACILITY PLANS

- Site/Civil
- Architectural
- Structural
- Electrical
- Mechanical
- Plumbing
- Communications
- Systems

301.3.4 - Final Plans Submittal

Ordinarily, the remaining work to be done will be to:

- (1) Comply with comments received as a result of the 90% review,
- (2) Update all plan sheets and the Financial Management (FM) system, and
- (3) Provide Utility Work by Highway Contractor (UWHC) Agreement Plans, consisting of a key sheet, and mainline plan-profile showing proposed utility horizontal and vertical locations.
- (4) Obtain Toll Equipment Contractor Equipment Layout sheets to verify no conflicts exist. Provide written documentation no conflicts exist with the Equipment Layout sheets.

The CFX may provide review comments and mark-ups to the EOR for incorporation into the plan set. The CFX may allow the EOR to include sketches of details or revised plan sheets along with their written responses to some review comments, in lieu of resubmitting a component plan set. The EOR will upload these sketches or revised plan sheets into the ERC system. When the review comments have been resolved and documented by the designer, the plans are ready to proceed to completion.

301.3.5 - Released for Construction Plans

After corrections noted in the Final Plans submittal have been satisfactorily resolved as determined by the CFX, the CFX's Project Manager will initial, date, and stamp each submittal as "Released for Construction". Only signed and sealed plans stamped "Released for Construction" by the CFX's Project Manager are valid.

302 - Key Sheet

302.1 - General

The Key Sheet is the first sheet of the contract plans. This sheet describes the project and the contents of the plans.

The Key Sheet cell can be found in the CFX cell library (provided by the GEC).

See **CFX Exhibit 302-1** for an example of a lead Key Sheet. See **CFX Exhibit 302-2** for an example of a component Key Sheet. See **CFX Exhibit 302-3** for an example of the structures and geotechnical sheet border.

302.2 - CFX Project Number, Project Name, and State Road Number

Place the Project Name immediately under the heading "CONTRACT PLANS" in the top center of the sheet. A description of the project limits shall be placed next, e.g., "Falk Avenue to Plant Street". This shall be followed by the state road number. The CFX Project Number is the main number identifying each individual project within CFX. Place the CFX Project Number below the state road number.

302.3 - Fiscal Year and Sheet Number

Show the fiscal year for which the letting is scheduled in the "Fiscal Year" box, i.e., enter "22" in the box for a project that has a Letting date during the July 1, 2021 to June 30, 2022 fiscal year. Show the sheet number in the lower right corner. The sheet number shall always be shown as a three-digit number, i.e., "001".

302.4 - Project Location Map and North Arrow

Place the project location map in the center of the key sheet with a north arrow on the right side of the map. Orient the map so that the north arrow points toward the top of the sheet. If the north arrow cannot be oriented toward the top of the sheet, then orient the map so that the north arrow points to the right.

The map consists of a reproduced portion of one or more county maps showing the project location. County maps in Portable Document Format (PDF) can be downloaded from the County General Highway Maps web page.

A utility to download the county map and clip out the project location area is provided in the FDOT CADD Software.

The intent of the project location map is to provide enough information so that the project location is easily understood. Show Section, Township, and Range lines and numbers to provide clarity and scale to the project location map. Show county, city, and urban limits where applicable.

Designate roads by name and State Road number or U.S. Highway number. Show the name of the next incorporated city at the edge of the map to which these roads lead. Use standard symbols as shown in the FDOT CADD Software.

Indicate project location using a heavy solid line of substantial width. It is sometimes advantageous to show station numbers at regular intervals, particularly with city street projects. Flag and station the following:

- (1) Begin and end project limits. Provide milepost, correct to three decimals, under the project stations.
- (2) Begin and end limits of bridges and bridge culverts. When an existing structure is being replaced, indicate the proposed structure and not the existing.
- (3) Station equations

- (4) Project exception limits (i.e., mileposts excluded from project)
- (5) Rail crossings within the limits of construction, including name of railroad, DOT/AAR crossing number, and railroad milepost.

Calculate the end milepost by adding the distance in miles between begin and end project to the begin milepost. Plans are to be prepared using stationing in linear feet. A project may be prepared using mileposts when linear foot stationing is unavailable.

When several projects are covered by the same set of plans, flag and station begin and end project limits for each CFX Project Number.

The project location map is typically located on the lead component Key Sheet.

Show a small-scale inset of counties under CFX's purview in the upper right portion of the lead component Key Sheet and indicate the location of the project thereon. Under the Engineer of Record's contact information add the name of the designated CFX Project Manager. The counties map shall also be shown on the component Key Sheets.

302.5 - Contract Plans Set Components

The Contract Plans Set is typically assembled as component plans that are associated with a primary work type. Roadway plans are typically the lead component of the contract plans. Provide a list of all component plans included in the contract plans in the upper left corner of the lead component Key Sheet in the following order:

- (1) Roadway
- (2) Signing and Pavement Marking
- (3) Signalization
- (4) Intelligent Transportation Systems (ITS)
- (5) Lighting
- (6) Landscape
- (7) Architectural
- (8) Structures
- (9) Toll Facilities

Another component (e.g., structures, signals, landscaping), may become the lead component when there are no roadway plans. Any sheets incidental to the project typically found within the roadway plans may be included in the lead component plans and numbered consecutively. Sheet number

prefixing is not required for the lead component plan, i.e., “IT-#” is not required for ITS Plans when they are the lead component.

See the Structures Manual, Volume 2 – Structures Detailing Manual when Structures plans become the lead component.

302.6 - Index of Roadway Plans

Place an index of roadway sheets on the left side of the Key Sheet. Each component Key Sheet will have an index of sheets contained in that component. Assemble roadway plans in the following order:

- (1) Key Sheet
- (2) Signature Sheet
- (3) Drainage Map
- (4) Interchange Drainage Map
- (5) Typical Section
- (6) Optional Materials Tabulation Project Layout
- (7) Project Control
- (8) General Notes
- (9) Roadway Plan and Profiles
- (10) Traffic Monitoring Site
- (11) Special Profiles
- (12) Back-of-Sidewalk Profiles
- (13) Interchange Layout
- (14) Ramp Terminal Details
- (15) Intersection Layout/Detail
- (16) Drainage Structures
- (17) Outfall/Lateral Ditch Plan and Profiles
- (18) Outfall/Lateral Ditch Cross Sections
- (19) Special Details
- (20) Cross Section Pattern
- (21) Roadway Soil Survey
- (22) Cross Sections
- (23) Stormwater Pollution Prevention Plans (SWPPP)
- (24) Temporary Traffic Control Plans
- (25) Utility Adjustments

- (26) Selective Clearing and Grubbing
- (27) Tree Disposition Plan
- (28) Developmental Standard Plans
- (29) Signing and Pavement Marking Plans
- (30) Signalization Plans
- (31) ITS Plans
- (32) Lighting Plans
- (33) Landscape Plans
- (34) Mitigation Plans
- (35) Miscellaneous Structures Plans
- (36) Toll Facilities

Note: Do not place Box Culvert plan sheets in the Roadway component plans. These sheets are to be placed in a Structure component, even when there are no bridge plans.

Each sheet in the plan set must have a unique sheet number. Do not duplicate sheet numbers within the plan set.

No plan sheets other than those listed above are to be separated from the component plans.

302.7 - Professional Responsibility

An Engineer of Record (EOR) is the lead Florida licensed professional engineer in charge of the preparation of the component plans. Place in the lower right corner the name and license number of the EOR. Also show the name, address, and phone number of the engineering business or agency where the EOR is employed. Include the consultant contract number and vendor number when plans are prepared by an engineering business.

For non-engineering professionals that are in charge of the preparation of the component plans, change title to “Licensed Professional of Record”. Include similar information that applies to their profession.

Place the name of CFX’s Project Manager below the EOR information.

302.8 - Governing Standard Plans and Standard Specifications

Show the governing Standard Plans and Standard Specifications on the lead component Key Sheet as shown on **CFX Exhibit 302-1**. Do not show this reference on other component Key Sheets. For requirements of the Structures General Notes and inclusion of the relevant bridge related Standard Plans in the structures component plan set, see the Structures Detailing Manual. For additional information on the Standard Plans and Standard Specifications, see **FDM 115**.

When Standard Plans Interim Revisions (IRs) are released, the engineer must determine if any IRs apply to the project and reference those applicable IRs as shown on **CFX Exhibit 302-1**.

302.9 - Developmental Standard Plans

Insert Developmental Standard Plans at the end of each applicable component plan set as applicable. When included in structure component plans, insert Developmental Standard Plans before existing bridge plans. List Developmental Standard Plans below the “Index of Sheets” for the plans component in which they are included, as shown on **CFX Exhibit 302-1**.

302.10 - Revisions

Show a complete record of all contract plans revisions on the lead component Key Sheet under the “REVISIONS” header located below the project location map. Include the component (such as roadway, structures, signing, and pavement marking), the sheet number, and the date for each plan sheet that was revised. Show the unique numbered symbol that corresponds to the Revision Number on the Revision Memo and modified sheets as well.

Show revisions to the Key Sheet in the Key Sheet Revisions block placed below the project location map, and to the right of the “REVISIONS” header. List the revision date and a brief description of the revision. The Key Sheet Revisions block is only used to record changes to the Key Sheet other than recorded revisions under the “REVISIONS” header. A new lead component Key Sheet is required when any sheet within the contract plans is revised.

CONTRACT PLANS COMPONENTS

- ROADWAY PLANS
- SIGNING AND PAVEMENT MARKING PLANS
- SIGNALIZATION PLANS
- INTELLIGENT TRANSPORTATION SYSTEMS PLANS
- LIGHTING PLANS
- ARCHITECTURAL PLANS
- STRUCTURE PLANS
- TOLL FACILITIES PLANS

INDEX OF ROADWAY PLANS

| SHEET NO. | SHEET DESCRIPTION |
|--------------|---------------------------------|
| 1 | KEY SHEET |
| 2 | SIGNATURE SHEET |
| 3 | SUMMARY OF PAY ITEMS |
| 4 | TYPICAL SECTIONS |
| 5 | TYPICAL SECTION NOTES |
| 6-7 | GENERAL NOTES |
| 8-15 | ROADWAY PLANS |
| 16-40 | ROADWAY CROSS SECTIONS |
| 41-50 | TEMPORARY TRAFFIC CONTROL PLANS |
| 50-1 - 50-20 | SUMMARY OF QUANTITIES |

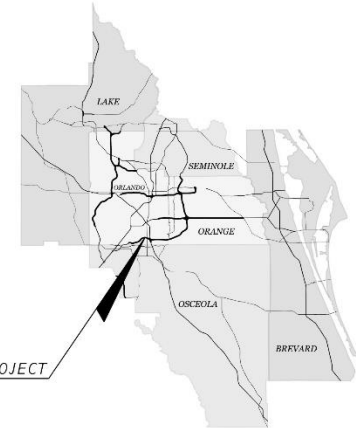
CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CONTRACT PLANS

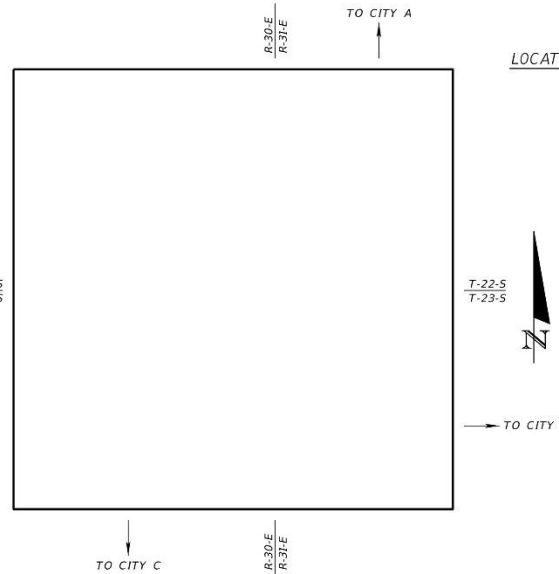
PROJECT NAME

STATE ROAD NO. 000

CFX PROJECT NUMBER: 000-000



LOCATION OF PROJECT



CENTRAL FLORIDA EXPRESSWAY AUTHORITY GOVERNING BOARD

- | | |
|--------------------|--|
| JERRY DEMINGS | CHAIRMAN, ORANGE COUNTY MAYOR |
| BRANDON ABRINGTON | VICE CHAIRMAN, OSCEOLA COUNTY REPRESENTATIVE |
| CHRISTOPHER MAIER | TREASURER, GOVERNOR'S APPOINTEE |
| BUDDY DYER | CITY OF ORLANDO MAYOR |
| JAY MADARA | GOVERNOR'S APPOINTEE |
| RAFAEL E. MARTINEZ | GOVERNOR'S APPOINTEE |
| CHRISTINE MOORE | ORANGE COUNTY REPRESENTATIVE |
| TOM GOODSON | BREVARD COUNTY REPRESENTATIVE |
| SEAN PARKS | LAKE COUNTY REPRESENTATIVE |
| ANDRIA HERR | SEMINOLE COUNTY REPRESENTATIVE |

ROADWAY PLANS ENGINEER OF RECORD:

ENGINEER OF RECORD FULL NAME, P.E.
 P.E. NO.: 00000
 ENGINEER OF RECORD COMPANY NAME
 ENGINEER OF RECORD COMPANY STREET
 ENGINEER OF RECORD CITY, STATE AND ZIP
 CONTRACT NO.: 00000
 VENDOR NO.: 0000000000000

CFX PROJECT MANAGER:
 CFX PROJECT MANAGER NAME, P.E.

GOVERNING STANDARD PLANS:

Florida Department of Transportation, FY 2022-23 Standard Plans for Road and Bridge Construction and applicable Interim Revisions (IRs).

Standard Plans for Road Construction and associated IRs are available at the following website: <http://www.fdot.gov/design/standardplans>

APPLICABLE IRs: IR ___-___-___

Standard Plans for Bridge Construction are included in the Structures Plans Component

GOVERNING STANDARD SPECIFICATIONS:

Florida Department of Transportation, JULY 20XX Standard Specifications for Road and Bridge Construction at the following website: <http://www.fdot.gov/programmanagement/implemented/SpecBooks>

REVISIONS:

CFX Exhibit 302-1
 Lead Key Sheet

___% PLANS
 MONTH 20__

| FISCAL YEAR | SHEET NO. |
|-------------|-----------|
| 23 | 001 |

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CONTRACT PLANS COMPONENTS

- ROADWAY PLANS
- SIGNING AND PAVEMENT MARKING PLANS
- SIGNALIZATION PLANS
- INTELLIGENT TRANSPORTATION SYSTEMS PLANS
- LIGHTING PLANS
- ARCHITECTURAL PLANS
- STRUCTURE PLANS
- TOLL FACILITIES PLANS

INDEX OF ROADWAY PLANS

| SHEET NO. | SHEET DESCRIPTION |
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| 1 | KEY SHEET |
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| 4 | TYPICAL SECTIONS |
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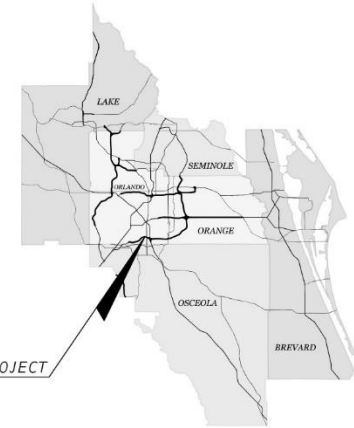
CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CONTRACT PLANS

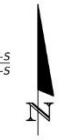
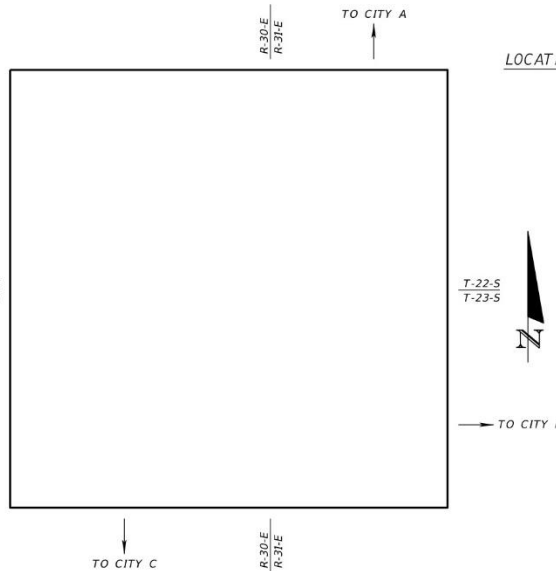
PROJECT NAME

STATE ROAD NO. 000

CFX PROJECT NUMBER: 000-000



LOCATION OF PROJECT



CENTRAL FLORIDA EXPRESSWAY AUTHORITY GOVERNING BOARD

- CHAIRMAN, ORANGE COUNTY MAYOR
- VICE CHAIRMAN, OSCEOLA COUNTY REPRESENTATIVE
- TREASURER, GOVERNOR'S APPOINTEE
- CITY OF ORLANDO MAYOR
- BREVARD COUNTY REPRESENTATIVE
- SEMINOLE COUNTY REPRESENTATIVE
- GOVERNOR'S APPOINTEE
- GOVERNOR'S APPOINTEE
- ORANGE COUNTY REPRESENTATIVE
- LAKE COUNTY REPRESENTATIVE

ROADWAY PLANS

ENGINEER OF RECORD:

ENGINEER OF RECORD FULL NAME, P.E.
 P.E. NO.: 00000
 ENGINEER OF RECORD COMPANY NAME
 ENGINEER OF RECORD COMPANY STREET
 ENGINEER OF RECORD CITY, STATE AND ZIP
 CONTRACT NO.: 00000
 VENDOR NO.: 0000000000000

CFX PROJECT MANAGER:

CFX PROJECT MANAGER NAME, P.E.

GOVERNING STANDARD PLANS:

Florida Department of Transportation, FY 202-2_ Standard Plans for Road and Bridge Construction and applicable Interim Revisions (IRs).

Standard Plans for Road Construction and associated IRs are available at the following website: <http://www.fdot.gov/design/standardplans>

APPLICABLE IRs: IR____-____

Standard Plans for Bridge Construction are included in the Structures Plans Component

GOVERNING STANDARD SPECIFICATIONS:

Florida Department of Transportation, FY 202-2_ Standard Specifications for Road and Bridge Construction at the following website: <http://www.fdot.gov/programmanagement/Implemented/SpecBooks>

REVISIONS:

CFX Exhibit 302-1
Lead Key Sheet

__% PLANS
MONTH 20__

| FISCAL YEAR | SHEET NO. |
|-------------|-----------|
| 2_ | 001 |

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SIZES
STYLES
SIZES

INDEX OF SIGNING AND PAVEMENT MARKING PLANS

| SHEET NO. | SHEET DESCRIPTION |
|-----------|--------------------------|
| 1 | KEY SHEET |
| 2 | SIGNATURE SHEET |
| 3 | TABULATION OF QUANTITIES |
| 4-6 | GENERAL NOTES |
| 7-20 | PLAN SHEETS |
| 21-25 | GUIDE SIGN WORKSHEETS |

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

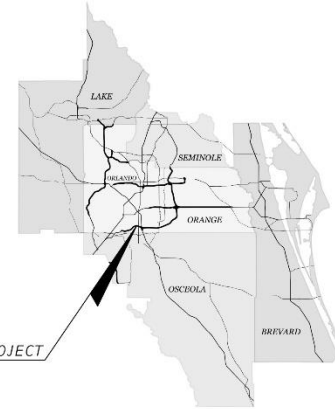
CONTRACT PLANS

PROJECT NAME

STATE ROAD NO. 000

CFX PROJECT NUMBER: 000-000

SIGNING AND PAVEMENT MARKING PLANS



LOCATION OF PROJECT

__% PLANS
MONTH 20__

SIGNING AND PAVEMENT MARKING PLANS
ENGINEER OF RECORD:

ENGINEER OF RECORD FULL NAME, P.E.
P.E. NO.: 00000
ENGINEER OF RECORD COMPANY NAME
ENGINEER OF RECORD COMPANY STREET
ENGINEER OF RECORD CITY, STATE AND ZIP
CONTRACT NO.: 00000
VENDOR NO.: 0000000000000

CFX PROJECT MANAGER:
CFX PROJECT MANAGER NAME, P.E.

REVISIONS:

CFX Exhibit 302-2
Component Key Sheet

| FISCAL YEAR | SHEET NO. |
|-------------|-----------|
| 23 | S-1 |

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DESIGNS
NOTES
STIPES
UTILS

**CENTRAL FLORIDA
EXPRESSWAY AUTHORITY**

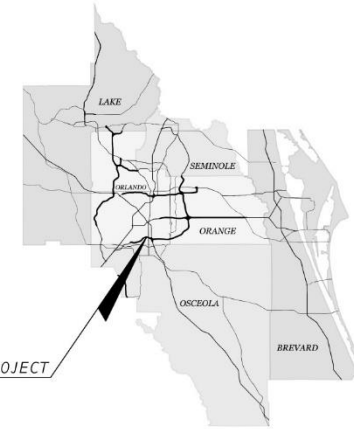
CONTRACT PLANS

PROJECT NAME

STATE ROAD NO. 000

CFX PROJECT NUMBER: 000-000

SIGNING AND PAVEMENT MARKING PLANS



LOCATION OF PROJECT

**INDEX OF SIGNING AND
PAVEMENT MARKING PLANS**

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**__% PLANS
MONTH 20__**

**SIGNING AND PAVEMENT
MARKING PLANS
ENGINEER OF RECORD:**

ENGINEER OF RECORD FULL NAME, P.E.
P.E. NO.: 00000
ENGINEER OF RECORD COMPANY NAME
ENGINEER OF RECORD COMPANY STREET
ENGINEER OF RECORD CITY, STATE AND ZIP
CONTRACT NO.: 00000
VENDOR NO.: 000000000000

**CFX PROJECT MANAGER:
CFX PROJECT MANAGER NAME, P.E.**

REVISIONS:

CFX Exhibit 302-2
Component Key Sheet

| FISCAL YEAR | SHEET NO. |
|-------------|-----------|
| 2_ | 5-1 |

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

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CFX Exhibit 302-3
Structures and
Geotech Border

| REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | SHEET TITLE: | REF DWG NO. |
|-----------|-------------|---|-----------------------------------|-------------|--------------|---------------|
| DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | PROJECT NAME: |
| | | | SR 000 | - | | |

3/16/2024 11:38:33 AM W:\068888\PROJECTS\Design\Criteria\CGD - Structures\Source Files\CGD - Update 03-01-24\Subarea01.DWG

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

303 - Signature Sheet

303.1 - General

The Signature Sheet is the second sheet of the contract plans. This sheet defines a professional's area of responsibility for those portions of the document being digitally signed. The Signature Sheet shows the Digital Signature Appearance of the Professional(s) of Record.

See *CFX Exhibit 303-1* for an example of a Signature Sheet.

Projects are to be delivered as individual Signed and Sealed components of the contract plans, e.g., Roadway Plans, Signing and Pavement Marking Plans, Structure Plans. A Signature Sheet is required for component plans that are to be Signed and Sealed by one or more licensed professionals.

303.2 - Title Block

The Signature Sheet title block is to contain the information for the licensed professional that is responsible for the creation and content of the sheet. Do not place the Official Record note along the right edge of this sheet. See *FDM 130* for digital Signing and Sealing requirements.

303.3 - Digital Signature Placement

By placing a digital signature on the Signature Sheet of a multi-sheet plans set, the licensed professional associates their professional signature with the entire plans set. The Signature Sheet provides a Statement of Responsibility delineating the extent of the professional's responsibility and identifies the specific sheets for which the professional is accepting responsibility.

303.4 - Digital Signature Appearance

A Digital Signature Appearance is the visual representation of a Digital Signature applied to a document. The Digital Signature Appearance is composed of combinations of informational fields, e.g., dates or text, and other information. The Digital Signature Appearance must include the professional's name, and the date and time of signing stamp.

303.5 - Seal

The professional will include a representation of their Seal next to the Digital Signature Appearance. Seal representations are provided with the FDOT CADD Software. Each respective Board of Professional Regulation has enacted in their section of the Florida Administrative Code the requirements for the size and representation of a Seal.

303.6 - Statement of Responsibility

The Statement of Responsibility is used to define the licensed professional's limits of responsibility and any exculpatory language. Place this statement below the Seal and Digital Signature Appearance and

above the sheet index. The Statement of Responsibility must indicate the applicable Rule of the Florida Administrative Code (F.A.C.).

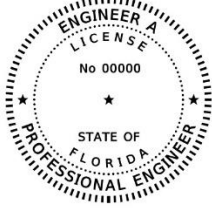
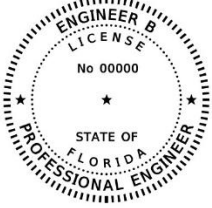


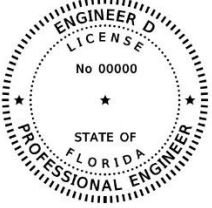

Exculpatory language may be included in cases where professionals share responsibility for content on any given sheet. In those cases, additional text must include the limitations of their responsibility.

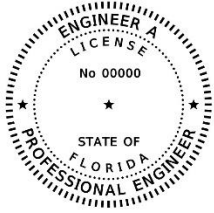
303.7 - Index

The Index is a list of sheets that the licensed professional is responsible for signing and sealing. Place the Index below the Statement of Responsibility for each licensed professional. There may be sheets common to more than one licensed professional, and in such case, exculpatory language should be used to differentiate each area of responsibility.

303.8 - Revisions

A revision Signature Sheet is created when more than one licensed professional is required to Sign and Seal a revision package. The revision Signature Sheet is numbered using an alphabetic suffix, e.g., 2A, 2B. Only the licensed professionals required to Sign and Seal the revision are to be included on the revision Signature Sheet. See **CFX Exhibit 303-2** for an example of a revision Signature Sheet.

|  <p style="font-size: small;">THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY</p> <p style="font-size: x-small;">ON THE DATE ADJACENT TO THE SEAL</p> <p style="font-size: x-small;">PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.</p> <p style="font-size: x-small;">ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP ENGINEER OF RECORD FULL NAME, P.E. NO. 00000</p> <p style="font-size: x-small;">THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.</p> <p style="font-size: x-small;"><u>ROADWAY PLANS</u></p> <table style="font-size: x-small; width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>SHEET NO.</u></th> <th style="text-align: left;"><u>SHEET DESCRIPTION</u></th> </tr> </thead> <tbody> <tr><td>1</td><td>KEY SHEET</td></tr> <tr><td>2</td><td>SIGNATURE SHEET</td></tr> <tr><td>3-5</td><td>SUMMARY OF PAY ITEMS</td></tr> <tr><td>17-25</td><td>TYPICAL SECTIONS</td></tr> <tr><td>26</td><td>TYPICAL SECTION NOTES</td></tr> <tr><td>27-28</td><td>PAY ITEM NOTES</td></tr> <tr><td>45</td><td>PROJECT LAYOUT</td></tr> <tr><td>46</td><td>GENERAL NOTES</td></tr> <tr><td>47-74</td><td>ROADWAY PLANS</td></tr> <tr><td>75-112</td><td>ROADWAY PROFILES</td></tr> <tr><td>113-117</td><td>RAMP TERMINAL DETAILS</td></tr> <tr><td>202</td><td>CROSS SECTION PATTERN</td></tr> <tr><td>203-343</td><td>CROSS SECTIONS</td></tr> <tr><td>493-524</td><td>UTILITY ADJUSTMENT SHEETS</td></tr> <tr><td>SO-1 - SO-37</td><td>SUMMARY OF QUANTITIES</td></tr> </tbody> </table> | <u>SHEET NO.</u> | <u>SHEET DESCRIPTION</u> | 1 | KEY SHEET | 2 | SIGNATURE SHEET | 3-5 | SUMMARY OF PAY ITEMS | 17-25 | TYPICAL SECTIONS | 26 | TYPICAL SECTION NOTES | 27-28 | PAY ITEM NOTES | 45 | PROJECT LAYOUT | 46 | GENERAL NOTES | 47-74 | ROADWAY PLANS | 75-112 | ROADWAY PROFILES | 113-117 | RAMP TERMINAL DETAILS | 202 | CROSS SECTION PATTERN | 203-343 | CROSS SECTIONS | 493-524 | UTILITY ADJUSTMENT SHEETS | SO-1 - SO-37 | SUMMARY OF QUANTITIES |  <p style="font-size: small;">THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY</p> <p style="font-size: x-small;">ON THE DATE ADJACENT TO THE SEAL</p> <p style="font-size: x-small;">PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.</p> <p style="font-size: x-small;">ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP ENGINEER OF RECORD FULL NAME, P.E. 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| 201 | ROADWAY SOIL SURVEY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ENGINEER OF RECORD COMPANY NAME | ROAD NO. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ENGINEER OF RECORD COMPANY STREET | PROJECT NO. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ENGINEER OF RECORD CITY, STATE AND ZIP | SR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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ENGINEER OF RECORD COMPANY NAME
ENGINEER OF RECORD COMPANY STREET
ENGINEER OF RECORD CITY, STATE AND ZIP
ENGINEER OF RECORD FULL NAME, P.E. NO. 00000

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE
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ROADWAY PLANS

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| 1-1A | KEY SHEET |
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| 113-117 | RAMP TERMINAL DETAILS |
| 202 | CROSS SECTION PATTERN |
| 203-343 | CROSS SECTIONS |
| 493-524 | UTILITY ADJUSTMENT SHEETS |
| 50-1 - SQ-37 | SUMMARY OF QUANTITIES |

CFX Exhibit 303-2
Revision Signature Sheet

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 3/11/2023
 REVISED

| REVISIONS | | PROJECT NAME | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | SIGNATURE SHEET | SHEET NO. 002 |
|-----------|----------------|---|-------------|---|-----------------|-------------------------|
| DATE | DESCRIPTION | (1 to 3 LINES) | | | | |
| DATE | DESCRIPTION | ROAD NO. | PROJECT NO. | | | |
| 3/11/23 | ADDED SHEET 1A | | | SR --- | --- | |
| | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | | | | |

304 - Summary of Pay Items

304.1 - Summary of Pay Items Sheet

The summary of pay items sheet(s) lists all pay items and quantities for all components for the project, or projects, in a contract. Place the summary of pay items sheets directly behind the lead signature sheet.

A summary of pay items sheet without quantities is required at the 60% submittal, and a complete summary of pay items sheet with quantities is required at the 90%, 100%, and Bid submittals.

Pay item numbers shall be displayed in a 4-3-3 format. Both hyphens (-) and preceding zeros are to be included. For example, the pay item number format for Maintenance of Traffic, 102-1, shall be formatted as 0102-001-000.

Quantities are to be displayed to three (3) decimal places. For example, a quantity of 35.1 TN will be displayed as 35.100 TN. This requirement is intended mitigate rounding errors in quantities often hidden in spreadsheets. Precision and rounding of quantities as defined in chapter 2 of the FDOT Basis of Estimates (BOE) Manual remain unchanged. Quantities shall also be right justified and columns for plan and final quantities are to be included.

Please add in parenthesis after pay item for Optional Base Group # the type of base (specify Limerock or Type B-12.5).

Pay items are to be placed in numerical order and not be separated by component. If two component sets share a common pay item (e.g.: pull boxes, conductors, etc.), total all quantities under a single line item. See **CFX Exhibit 304-1** below.

CFX Exhibit 304-1

| SUMMARY OF PAY ITEMS | | | | |
|----------------------|---|------|----------|-------|
| PAY ITEM NO. | PAY ITEM DESCRIPTION | UNIT | QUANTITY | |
| | | | PLAN | FINAL |
| 0101-001-000 | MOBILIZATION | LS | 1.000 | |
| 0102-001-000 | MAINTENANCE OF TRAFFIC | LS | 1.000 | |
| 0102-001-BRC | MAINTENANCE OF TRAFFIC FOR ROADWAY REPAIR CONTINGENCY | ED | 5.000 | |
| 0102-99C-000 | PORTABLE CHANGEABLE MESSAGE SIGN, TEMPORARY (CONTINGENCY) | ED | 110.000 | |
| 0104-020-000 | EROSION CONTROL | LS | 1.000 | |
| 0110-001-001 | CLEARING & GRUBBING | LS | 1.000 | |
| 0120-001-000 | REGULAR EXCAVATION | CY | 1010.600 | |
| 0334-001-BRC | ROADWAY REPAIR, EMERGENCY BASE REPAIR CONTINGENCY | TN | 500.000 | |
| 0430-004-008 | VIDEO EXISTING STORM DRAIN PIPES | LF | 225.000 | |
| 0560-003-000 | EXISTING OVERHEAD SIGN STRUCTURE UPRIGHT PAINTING | EA | 2.000 | |
| 0570-001-002 | PERFORMANCE TURF, SOD | SY | 2534.000 | |
| 0713-101-536 | PAVEMENT MARKING - PREFORMED TAPE, CONTRAST, SKIP, 9" | GM | 16.321 | |
| 0999-001-000 | ALLOWANCE FOR DISPUTES REVIEW BOARD | N/A | N/A | |
| 0999-002-000 | WORK ORDER ALLOWANCE | N/A | N/A | |

305 - Drainage Map and Bridge Hydraulic Recommendation Sheet

305.1 - Drainage Map

Drainage maps are required for all projects that add mainline capacity or changes to the drainage hydraulics. Drainage maps must be developed using an aerial base map and must be included in the construction plans.

Preformatted drainage map sheet cells are located in the FDOT CADD Software. The upper (grid) portion of each sheet is used for plotting the project profile. The standard grid pattern for the profile portion of the sheet is five lines per inch, both in the horizontal and vertical. This will accommodate most scales. An optional grid with four lines per inch is available. This optional grid may be used if appropriate for scale.

Locate the topography of the project area in the remaining portion of the sheet. Utilize a horizontal and vertical scale of the profile so that the stations and elevations can be read directly from the grid without the use of a scale. Use the same horizontal scale for both the plan and profile views. Recommended scales for facility types are as follows:

| Location | Horizontal Scale | Vertical Scale |
|------------------------|------------------|-----------------|
| Inside Urban Boundary | 1" = 200'/500' | 1" = 5'/1"=10' |
| Outside Urban Boundary | 1"=1000'/2000' | 1" = 10'/1"=20' |

305.1.1 - Plan View

The plan view must comply with the following requirements:

- (1) Show stationing every 500 feet for scales of 1" = 100'/200', every 1000 feet for a scale of 1" = 500' and every 5000 feet for scales of 1" = 1000'/2000'. For additional information, see **CFX Design Guidelines 311**.

Show horizontal alignment station equations and exceptions. Also show begin and end stations of project, construction, bridge, and bridge culverts.

- (2) Clearly label existing physical land features affecting drainage, such as lakes, streams, and swamps, by name and direction of flow. Show past high-water elevations with date of occurrence, if available, and present water elevations with date of reading.

Where applicable, show drainage divides and other information (such as pop-off elevations and spot elevations) to indicate the overland flow of water. Show drainage areas on maps in acres.

Use inserts to show areas that are of such magnitude that the boundaries cannot be plotted at the selected scale.

- (3) Label existing road numbers and street names, drainage structures with type, size, flow line elevations, flow arrows and any other pertinent data. Refer to the FDOT CADD

Software for correct symbols for existing drainage facilities. In a situation of limited space, all data relating to existing drainage structures and pipes may be compiled in a table format and shown in either the plan or profile portion of the sheet. Should the space limitations be such that a table will not fit within the plan or profile view, a supplemental drainage data sheet is acceptable.

- (4) Show proposed drainage structures, cross drains, storm drainpipes, outfall structures and retention/detention pond locations. Label cross drains by pipe size and structure number. Label structures by structure number, storm drainpipes by pipe size, and ponds by pond number and area size. Show arrows to indicate direction of flow along proposed ditches. Show and label (in acres) pond drainage basins on maps and include pond basin names.
- (5) Label Section, Township, Range, and county lines for rural and urban projects when occurring within the project limits.
- (6) Include a north arrow and scale, typically in the upper right corner of the plan view.
- (7) If the drainage map is to be included in the contract plans set, include the following note:

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.
- (8) General location of landfills or contamination sites must be indicated on the plan view of the drainage maps.
- (9) Wellfield Protection areas, if any, must be shown on the plan view. Include the wellfield name and associated regulatory agency.
- (10) FDEP impaired water body basin boundaries, if any, must be shown on the plan view. Include the impaired water body name.
- (11) Place the datum conversion from NAVD to NGVD on the drainage map. For example, NAVD 88 EL. 1.00 = NGVD 29 EL. 2.50.
- (12) Section, Township, and Range lines labeled with their respective directions.
- (13) Show the drainage area boundaries using a very heavy, broken line, with the area (in acres or square miles) shown within the boundary. The proposed structure location should be shown. Existing structures over the same water body and those structures that affect the hydraulics of the proposed structure should be located and numbered and corresponding existing structure information listed in the appropriate columns.
- (14) Depressional areas (if closed basin)

305.1.2 - Profile View

The profile view, if shown, must comply with the following requirements:

- (1) The recommended vertical scale for rural and urban projects is 1" = 5' in level terrain and 1" = 10' in rolling terrain. A scale of 1" = 20' may sometimes be used for rural projects through rough terrain to avoid numerous profile breaks. The profile can be broken for rolling terrain in urban areas; however, a scale of 1" = 20' should never be used at locations of proposed storm drain systems.
- (2) Station numbers are to be shown along the bottom edge of the profile view.
- (3) Show elevation datum at each side of the sheet. In cases where the profile block is insufficient and excess space is available on the plan portion of the sheet, the profile block may be expanded.
- (4) Plot and label the profile of the existing natural ground, and note the existing elevation at each end, just above the station numbers.
- (5) Plot the proposed profile grade line. Percent of grade need not be shown. Plot the PC, PI, and PT of vertical curves using their respective standard symbols; however, no data (station, elevation, length of curve) needs be noted. Label begin and end project, construction, bridge and bridge culvert stations, station equations, and exceptions. Show profile grade line elevations at begin and end project stations and at the beginning and end of each additional drainage sheet.
- (6) Plot proposed cross drains and identify by structure number. Do not show skew or pipe slope in plotting, but plot to elevation and location at point of crossing the construction centerline.
- (7) For projects with storm drain systems, show only the mainline structure and pipes. Laterals need not be shown. Label each structure with its appropriate structure number, and flow line elevations noted for the incoming and outgoing pipes.
- (8) Show high water elevations affecting base clearance or roadway grades.
- (9) Seasonal high-water information within roadway limits as determined from the geotechnical report.

305.1.3 - Flood Data Summary Box

The Project Drainage Engineer must provide the information required to complete the Flood Data Summary box.

Place the Flood Data Summary box on the drainage map, either in the plan or in the profile portion. Place the Flood Data Summary box on the General Notes sheet when the drainage map is not included in the plans.

Design, base and overtopping or greatest flood discharge and stage values are required for all cross structures (culverts and bridges), regardless of size, under the following conditions:

- (1) New cross structures
- (2) Existing cross structures that are being modified, where modifications affect the existing hydraulic calculations.
- (3) Existing cross structures that have a history of flooding or other hydraulic problems, even if the structure is not to be modified; or
- (4) Existing cross structures that are not being modified but are being impacted by a modification to another cross structure within the same drainage basin.

Place the following under the Summary of Flood Data table to avoid misuse and responsibility for changes in the flood information values over which the Department has no control:

Note: This hydraulic data is a summary of design calculations and is provided for informational purposes only. The user is cautioned against the assumption of precision for the discharge rates and water surface elevations. The units are in cubic feet per second (cfs) and the design stages are in feet, **[Insert datum reference here]**.

Definitions:

Design Flood: Utilized to assure a standard level of hydraulic performance.

Base Flood: Has a 1% chance of being exceeded in any year (100 yr. frequency).

Overtopping Flood: Causes flow over the highway, over a watershed divide or through emergency relief structures.

Greatest Flood: The most severe that can be predicted where overtopping is not practicable.

A preformatted summary box with disclaimer and definitions is in the FDOT CADD Software.

305.1.4 - Interchange Drainage Map

If projects include interchanges or rest areas, include a drainage map on a 1" = 200' or 1" = 500' scale. The purpose of this detail is to show the small areas needed to calculate pipe sizes for the tabulation of drainage structures within these special areas. Should major drains pass through one of these areas, include a cross reference note indicating the proper sheet which reflects the drainage area for that through-structure.

305.2 - Bridge Hydraulic Recommendation Sheet

When a Bridge Hydraulic Recommendation Sheet (BHRS) is required (see Drainage Design Guide, Section 5.7.4), it must be prepared on a preformatted sheet. The cell for this sheet is in the FDOT CADD Software. Place the BHRS in the structures plans.

Parallel (dual) bridges may be shown on one sheet; however, it typically requires a second sheet to clearly convey the fit of the bridge to the stream bank. When two sheets are used, only the plan and profile information is required on the second sheet.

The preformatted BHRS is divided into the four regions listed below. The required information for each region is described in the following sections:

- (1) Plan View
- (2) Profile View
- (3) Location Map and Drainage Area
- (4) Existing Structures, Hydraulic Design Data and Hydraulic Recommendations

A completed BHRS is shown as **CFX Exhibit 305-1**.

305.2.1 - Plan View

The plan view is to include the following:

- (1) Stationing, scale, and north arrow. Include the channel baseline if one was created.
- (2) Existing topography including existing bridge(s) and contours to show elevations. Show sufficient detail in the vicinity of the proposed bridge to depict how the structure will tie to natural ground.
- (3) Label the name of the water body (e.g., St. Johns River).
- (4) Arrows showing the direction of the flow.
- (5) Proposed bridge begin and end station.
- (6) Limits of riprap.
- (7) R/W lines

305.2.2 Profile View

The profile view is to include the following:

- (1) Stationing and scale.
- (2) One cross section which most represents the section at the proposed crossing.
- (3) Road profile for the proposed structure (i.e., stationing and elevation).
- (4) Proposed bridge with begin and end station, low member, and pier locations.
- (5) Abutment locations (e.g., toe of slope) and abutment protection.

- (6) Flood elevations. For non-tidal crossings, show the Normal High Water (NHW) and Design Flood elevations. For tidal crossings, show the Mean High Water (MHW) and Design Flood Stage elevations.
- (7) Present water elevation with month, day and year of survey.
- (8) Bridge Number (for the proposed structure).

305.2.3 - Existing Structures Data, Hydraulic Design Data, and Hydraulic Recommendations

The Drainage Design Guide, Chapter 5 provides additional guidance for this section.

The following information is required for this section:

Existing Structures: Column contains information pertaining to the existing structures. Structure 1 refers to the structure being replaced or modified. Structures 2, 3 & 4 refer to relief structures, immediate upstream and downstream structures and those structures that affect the hydraulics of the proposed structure.

Proposed Structure: Column contains information pertaining to the proposed structure.

Foundation: Provide information describing the type of foundation (e.g., timber piles, concrete piles).

Overall Length (ft): Provide the total length of the structure in feet. The length is measured from the top of the abutments. Use the total length shown in the final plans for the proposed structure.

Span Length (ft): Provide the span length of the structure in feet (i.e., the length of the main span).

Type Construction: Describe the material(s) used for construction of the structure (e.g., steel, concrete, steel and concrete).

Area of Opening (ft²) @ D.F.: Provide the area of opening in square feet below the design flood elevation at the bridge section. Subtract the assumed pile area if pile area is significant.

Bridge Width (ft): Provide the distance from outside rail to outside rail in feet.

Elev. Low Member (ft): Provide the elevation in feet of the lowest point along the low member of the structure.

Water Surface Elevations (ft): Provide elevation in feet of the following water surfaces at the bridge section, when applicable:

- Normal High Water (N.H.W.): This applies only to non-tidal areas.
- Control: Water surface elevation controlled by the operation of pump stations, dams, or other hydraulic structures. This applies only to non-tidal areas.
- Mean High Water (M.H.W.): This applies only to tidal areas.
- Mean Low Water (M.L.W.): This applies only to tidal areas.

Max. Event of Record: Column contains information related to the maximum event recorded based on historical information, when available.

Design Flood: Column contains information related to the design flood.

Base Flood: Column contains information related to the base flood.

Overtopping Flood/Greatest Flood: Column contains information related to the overtopping or greatest flood event. If the overtopping flood has a lower return period than the greatest flood, then the block indicating overtopping flood is checked and the information related to the overtopping flood is shown. Otherwise, the block indicating greatest flood is checked and the information related to the greatest flood is shown.

Stage Elevation (ft): Provide stage elevation in feet (NAVD 88 or NGVD 29) for the Maximum Event of Record, Design Flood, Base Flood and Overtopping or Greatest Flood. Use data from hydraulic model for freshwater flow. Use maximum elevation during the flood or ebb storm surge tidal flow.

Discharge (cfs): Provide total discharge in cubic feet per second. Use data from hydraulic model for freshwater flow. Use maximum discharge during the flood or ebb storm surge tidal flow.

Average Velocity (fps): Provide average velocity in feet per second. Use data from hydraulic model for freshwater flow. Use maximum velocity during the flood or ebb storm surge tidal flow.

Exceedance Prob. (%): Provide the probability that the conditions will be exceeded. Probability is determined as 100% times unity over the return interval (e.g., $100\% \times (1/100) = 1\%$).

Frequency (yr.): Provide the return period of the conditions in years of the worst-case scour condition up through the design return period flow conditions.

Pier Information: Provide the following pier information for the proposed structure:

- Pier Numbers: Pier number(s) which correspond to the pier size and type and the scour elevations.
- Pier Size and Type: Pier size and type which produces the greatest scour. If necessary, for clarity, place a reference to the appropriate details of the bridge plans. If the space provided is not adequate, place the information in the plan or profile view.

Scour Elevations (ft): Provide the following scour information for the proposed structure:

- Long-Term Scour: Applicable only to structures required to meet extreme event vessel collision load. Place "N/A" when not applicable.
- Total Scour Elevation (< 100-year): The predicted total scour elevation in feet for the worst-case scour condition up through the scour design flood frequency. This includes aggradation or degradation, channel migration, local scour (pier and abutment) and contraction scour.
- Total Scour Elevation (< 500-year): The predicted total scour elevation in feet for the worst-case scour condition up through the scour design check flood frequency. This includes aggradation or degradation, channel migration, local scour (pier and abutment) and contraction scour.

Begin Bridge Station: Provide the station for the beginning of the bridge.

End Bridge Station: Provide the station for the end of the bridge.

Skew Angle (degrees): Provide the angle in degrees at which the centerline of the structure is skewed from the centerline of construction.

Clearance Provided (ft): Provide the following navigational and drift clearance information for the proposed structure:

- Navigation Horizontal: The horizontal distance provided between fenders or piers.
- Navigation Vertical: The vertical distance between low beam member and design flood water elevation.
- Navigation Above Elevation: The Design flood water elevation in feet (NAVD 88 or NGVD 29) used to determine Navigation Vertical clearance. Use normal high water (NHW) elevation or control elevation for freshwater flow. Use mean high water (MHW) for tidal flow.
- Drift Horizontal: The actual minimum horizontal clearance provided.
- Drift Vertical: The actual minimum vertical clearance in feet provided above the design flood water elevation.
- Drift Above Elevation: The Design flood water elevation in feet (NAVD 88 or NGVD 29) used to determine Drift Vertical clearance. Use normal high water (NHW) elevation or control elevation for freshwater flow. In many cases, it is reasonable to use the elevation at the Approach Section, realizing that this will be slightly higher than actual elevation at the bridge. For tidal flow, use the maximum stage associated with an average velocity of 3.3 feet per second through the bridge section during the flood or ebb for the storm surge for the design flood. If the maximum velocity due to the storm surge is less than 3.3 fps, use the stage associated with the maximum velocity through the bridge section.

If either of these stages causes the profile to be higher than the profile of the bridge approaches, consider other alternatives such as:

- Discuss with personnel in the Structures Design Office, the potential of having less drift clearance and designing the structure for debris loads.
- Do a more rigorous and site-specific analysis to set the stage above which to provide the standard drift clearance. Investigate and address these situations on a site-specific basis.

Minimum Clearance (ft): Provide the following minimum navigational and drift clearances in feet. Vertical and horizontal clearances will also be subject to the requirements of the Coast Guard, Corps of Engineers, Water Management District, and any other regulatory agency having appropriate statutory jurisdiction or authority. Such regulatory agency requirements may exceed Department requirements.

- Navigation Horizontal: Crossings subject to small boat traffic, must provide a minimum 10-foot horizontal navigation clearance. Other agencies may have minimum clearance requirements.
- Navigation Vertical: See **FDM 260.8.1** for information on vertical clearances over water.
- Drift Horizontal and Vertical: Consistent with debris conveyance needs and structure economy where no boat traffic is anticipated.

Rubble Grade: Provide the type of rubble to be constructed at the begin and end bridge abutments, e.g., Riprap (Bank & Shore). References can be made to details sheets if non-standard riprap is employed.

Slope: Provide the slope of the abutments at the begin and end bridge, e.g., 1H:2V.

Non-buried or Buried Horizontal Toe: Indicate whether the toe of the abutment will be non-buried or buried when extended horizontally from the bridge. The horizontal and vertical extents should be determined using the design guidelines contained in HEC-23.

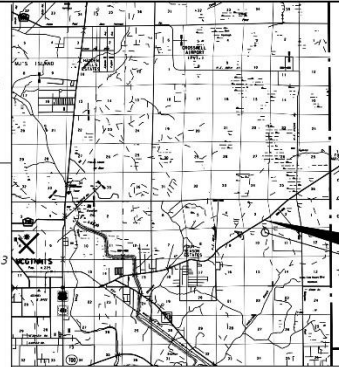
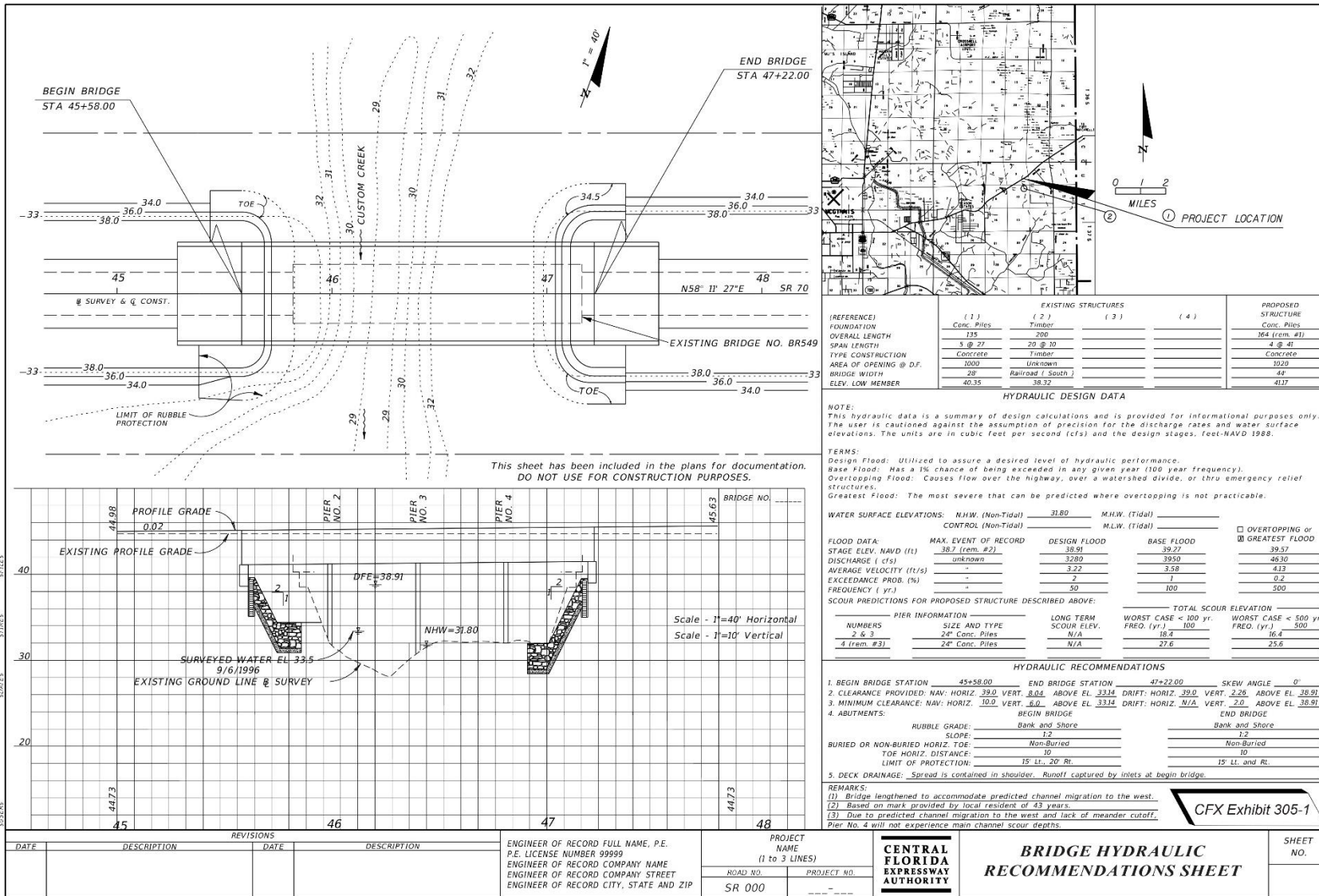
Toe Horizontal Distance (ft): Provide the horizontal extent in feet of the rubble protection measured from the toe of the abutment. The horizontal and vertical extents should be determined using the design guidelines contained in HEC-23.

Limit of Protection (ft): Provide the limits of protection, measured parallel to the stationing, from the edge of the rubble protection to the bridge begin/end station. If the distance is different on each side, indicate both distances with their corresponding sides.

Deck Drainage: Describe how the rainfall runoff is collected and conveyed from the proposed structure deck, e.g., scuppers, storm drain system.

Remarks: Provide any pertinent remarks.

- Wave Crest Elevation (ft) (when applicable): Provide the 100-year design wave crest elevation including the storm surge elevation and wind setup. The vertical clearance of the superstructure must be a minimum of 1-foot above the wave crest elevation.



| [REFERENCE] | EXISTING STRUCTURES | | | PROPOSED STRUCTURE |
|------------------------|---------------------|------------------|-----|--------------------|
| | (1) | (2) | (3) | (4) |
| FOUNDATION | Conc. Piles | Timber | | Conc. Piles |
| OVERALL LENGTH | 735 | 200 | | 164 (rem. #1) |
| SPAN LENGTH | 5 @ 27' | 20 @ 10' | | 4 @ 41' |
| TYPE CONSTRUCTION | Concrete | Timber | | Concrete |
| AREA OF OPENING @ D.F. | 1000 | Unknown | | 1020 |
| BRIDGE WIDTH | 28 | Railroad (South) | | 44 |
| ELEV. LOW MEMBER | 40.35 | 38.32 | | 41.17 |

HYDRAULIC DESIGN DATA

NOTES:
This hydraulic data is a summary of design calculations and is provided for informational purposes only. The user is cautioned against the assumption of precision for the discharge rates and water surface elevations. The units are in cubic feet per second (cfs) and the design stages, feet-NAVD 1988.

TERMS:
Design Flood: Utilized to assure a desired level of hydraulic performance.
Base Flood: Has a 1% chance of being exceeded in any given year (100 year frequency).
Overtopping Flood: Causes flow over the highway, over a watershed divide, or thru emergency relief structures.
Greatest Flood: The most severe that can be predicted where overtopping is not practicable.

| WATER SURFACE ELEVATIONS: | N.H.W. (Non-Tidal) | | M.H.W. (Tidal) | | <input type="checkbox"/> OVERTOPPING or <input type="checkbox"/> GREATEST FLOOD |
|---------------------------|----------------------|--------------|-----------------|-------|--|
| | CONTROL (Non-Tidal) | 31.80 | CONTROL (Tidal) | | |
| FLOOD DATA: | MAX. EVENT OF RECORD | DESIGN FLOOD | BASE FLOOD | | |
| STAGE ELEV. NAVD (ft) | 38.7 (rem. #2) | 38.91 | 39.27 | 39.57 | |
| DISCHARGE (cfs) | unknown | 3200 | 3950 | 4630 | |
| AVERAGE VELOCITY (ft/s) | | 3.22 | 3.58 | 4.13 | |
| EXCEEDANCE PROB. (%) | | 2 | 1 | 0.2 | |
| FREQUENCY (yr.) | | 50 | 100 | 500 | |

SCOUR PREDICTIONS FOR PROPOSED STRUCTURE DESCRIBED ABOVE:

| PIER INFORMATION | | LONG TERM SCOUR ELEV. | | TOTAL SCOUR ELEVATION | |
|------------------|-----------------|-----------------------|-------------|-----------------------|-------------|
| NUMBERS | SIZE AND TYPE | SCOUR ELEV. | FREQ. (yr.) | SCOUR ELEV. | FREQ. (yr.) |
| 2 & 3 | 24" Conc. Piles | N/A | 18.6 | 27.6 | 16.4 |
| 4 (rem. #3) | | N/A | | | 25.6 |

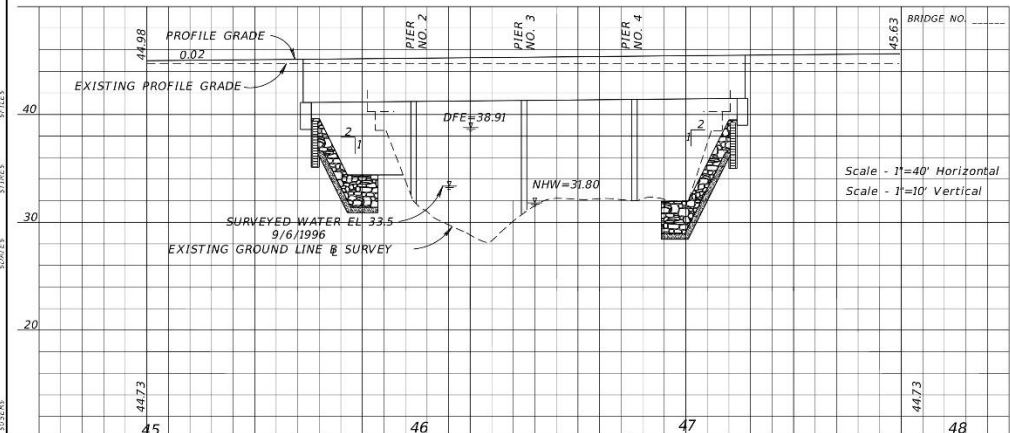
HYDRAULIC RECOMMENDATIONS

- BEGIN BRIDGE STATION 45+58.00 END BRIDGE STATION 47+22.00 SKEW ANGLE 0°
- CLEARANCE PROVIDED: NAV: HORIZ. 39.0 VERT. 8.04 ABOVE EL. 33.14 DRIFT: HORIZ. 39.0 VERT. 2.26 ABOVE EL. 38.91
- MINIMUM CLEARANCE: NAV: HORIZ. 10.0 VERT. 6.0 ABOVE EL. 33.14 DRIFT: HORIZ. N/A VERT. 2.0 ABOVE EL. 38.91
- ABUTMENTS:

| | |
|---|-----------------|
| BEGIN BRIDGE | END BRIDGE |
| RUBBLE GRADE: Bank and Shore | Bank and Shore |
| SLOPE: 1:2 | 1:2 |
| BURIED OR NON-BURIED HORIZ. TOE: Non-Buried | Non-Buried |
| TOE HORIZ. DISTANCE: 10 | 10 |
| LIMIT OF PROTECTION: 15' Lt., 20' Rt. | 15' Lt. and Rt. |

REMARKS:
 (1) Bridge lengthened to accommodate predicted channel migration to the west.
 (2) Based on mark provided by local resident of 43 years.
 (3) Due to predicted channel migration to the west and lack of meander cutoff, Pier No. 4 will not experience main channel scour depths.

This sheet has been included in the plans for documentation. DO NOT USE FOR CONSTRUCTION PURPOSES.



| DATE | DESCRIPTION | DATE | DESCRIPTION |
|------|-------------|------|-------------|
| | | | |

ENGINEER OF RECORD FULL NAME, P.E.
 P.E. LICENSE NUMBER 99999
 ENGINEER OF RECORD COMPANY NAME
 ENGINEER OF RECORD COMPANY STREET
 ENGINEER OF RECORD CITY, STATE AND ZIP

PROJECT NAME
 (1 to 3 LINES)
 ROAD NO. PROJECT NO.
 SR 000

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

BRIDGE HYDRAULIC RECOMMENDATIONS SHEET

SHEET NO.

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULES 61E01-220.004, F.A.C.

306 - Typical Sections

306.1 - General

Typical Section sheets provide detailed cross section depictions of the principal roadway elements that are standard between certain station or milepost limits. These sections are the basis for construction details and information shown on the plan sheets.

306.2 - Typical Section Sheet

Typical sections should only show typical conditions that are found within the limits applicable to that section. Non-standard conditions that prevail for short distances should not be shown. Typical sections are to show existing elements that are to be incorporated into the final roadway section, along with the proposed elements.

Show the station limits or milepost of each section below the typical section title. Typical section stationing must cover the entire project. Include transitions from one typical to another in the stationing of one or the other typical section. Sheets that feature more than one typical section should read from the top down, with the sections in the order in which they occur within the project.

Place Typical Section sheets in the plans in the following order:

- (1) Project mainline
- (2) Ramps and service roads (for projects which include an interchange)
- (3) Crossing side roads
- (4) Minor side streets

The FDOT CADD Software contains several typical sections that can be used and adjusted to suit the conditions of a particular project. Usually, typical sections are not created to scale, but the horizontal dimensions should be proportionate.

See *CFX Exhibits 306-1 through 306-5* for illustrations of various typical sections.

306.2.1 - Half Sections and Details

Half sections and details supplement or support typical sections. They should be placed on the same sheet as the typical section to which they apply. If this is not possible, additional sheets for details should be placed behind the typical section sheet(s).

Half sections are necessary when changes occur that affect several typical section elements (e.g., number of lanes, border width, ditch, or drainage features, clearing and grubbing, R/W width).

Details and partial sections are necessary for the clarification of construction techniques or sequence and to show alternates (e.g., the placement of shoulder gutter in high fill areas, changes in sidewalk

location). Judgment is necessary in making decisions about when and where details should be shown.

306.3 - Typical Section Information

Include the following information on the typical sections:

- (1) Cross Slopes
 - (a) Express cross slopes of roadway pavement, shoulder surfaces, sidewalks, and bridge decks as a decimal part of a foot vertical per foot horizontal. These cross slopes should be rounded to two decimal places, i.e., 0.02, 0.06. Three decimal places may be used when required.
 - (b) Show median and outer slopes by ratio, vertical to horizontal, i.e., 1:4, 1:2.
 - (c) Include either feathering details or notes (or both) when resurfacing without milling in urban curb and gutter sections is specified or when milling depth is less than the overlay thickness.
 - (d) When cross slope correction is necessary, include special milling and layering details showing the method of correction in the plans.
- (2) Location of profile grade point.
- (3) Depict pavement construction in a clear, precise manner by indicating the LBR requirement and the thickness of the subgrade stabilization, subbase, or base, as well as thickness for structural course, friction course and shoulder pavement. Use 4 inches for both base extension on rural sections and for stabilization extension on curbed sections.
- (4) Limits of grassing.
- (5) Sidewalk location and width.
- (6) Curb and gutter location and type (show Type E or F, not the dimension).
 - (a) On new construction curb and gutter projects which include Asphalt Base, Type B-12.5 only, indicate the asphalt curb pad on the typical section and provide a detail.
- (7) Limits of standard clearing and grubbing unless selective clearing and grubbing is present.
- (8) R/W line and limits of construction.
- (9) Pavement dimensions.
- (10) For widening projects, provide a dimension for total pavement width (existing and proposed). Show the pavement widening width with an asterisk. Show Note 3, of **CFX Design Guidelines 306.5**, as near to this noted asterisk as possible.

- (11) Shoulder dimensions; paved and total width
- (12) Label shoulder treatment on R&R projects (See **FDM 210.4.4**)

306.4 - Required Data

Include the following data for each typical section:

- (1) Traffic data (as identified in **FDM 120.2.2**) consistent with the data used for pavement design.
 - (a) Current Year and AADT
 - (b) Estimated Opening Year and AADT
 - (c) Estimated Design Year and AADT
 - (d) K, D, T (24 hour) and T (Design Hour) factors.
 - (e) Design Speed: The estimated opening and design year traffic data is not required for skid hazard projects.
- (2) Approved pavement designs described in the order of construction:
 - (a) For new construction start with Option Base Group (specify Limerock or Type B-12.5) and end with friction course.
 - (b) For resurfacing projects start with milling depth, then list the structural courses and end with friction course.
- (3) Standard notes. Refer to **CFX Design Guidelines 306.5** for standard notes for typical sections.
- (4) Template dimensions:

For widening projects, show the existing pavement width as a \pm dimension, and show the base widening width with an asterisk. Show Note 3, of **CFX Design Guidelines 306.5**, as near to this noted asterisk as possible.

NOTE: For typical sections with varying dimensions, clearly indicate the dimensions on the plan-profile sheets.
- (5) Identify shoulder treatment where applicable on RRR projects (See **FDM 210.4.4**)

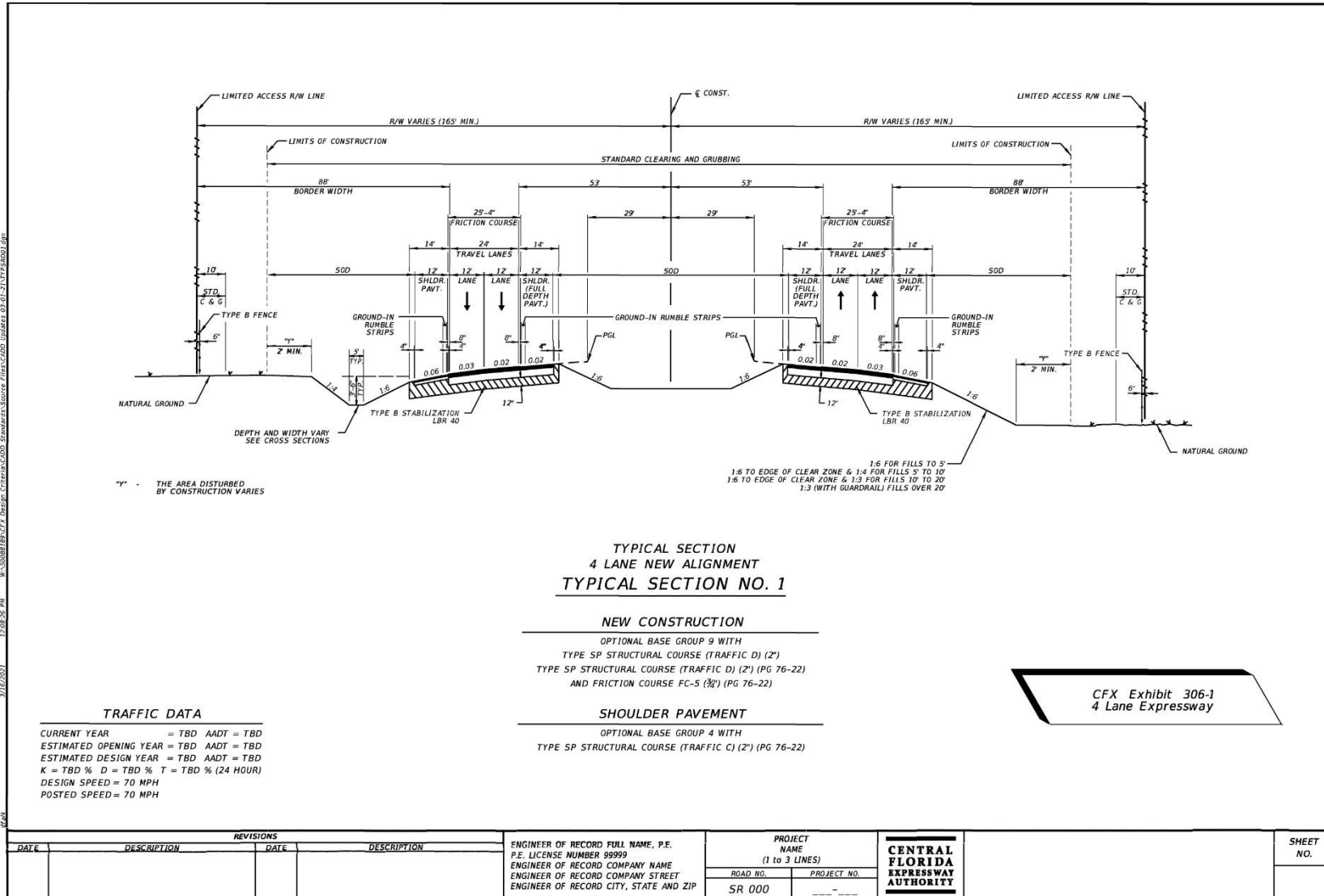
306.5 - Standard Notes for Typical Section Sheets

Show the following standard notes on typical section sheets as applicable:

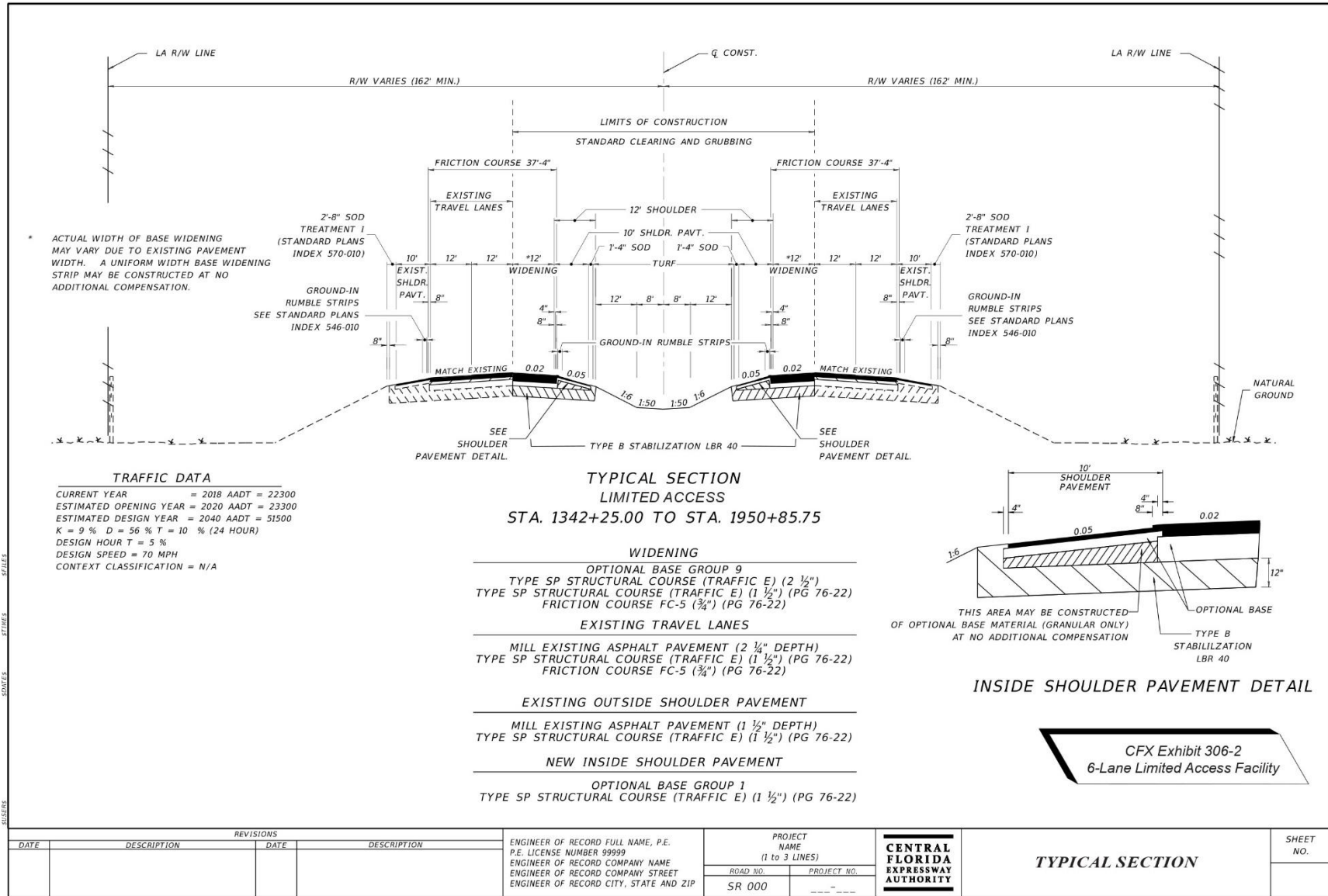
- (1) For details and limits of selective clearing and grubbing, see sheet XX.
- (2) (Under paved shoulders):

This area may be constructed of base material at no additional compensation.

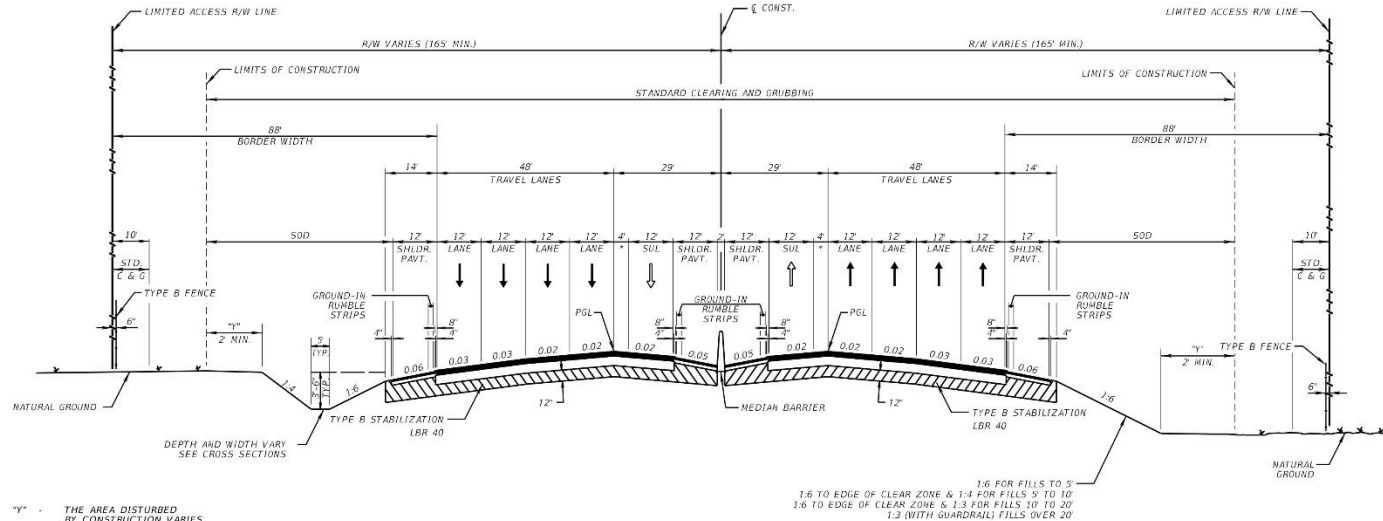
- (3) (On widening projects):
Actual width of base widening may vary due to actual existing pavement width. A uniform width base widening strip may be constructed at no additional compensation.
- (4) All base material shall be Limerock, unless otherwise noted.
- (5) Embankment slope requirements are as follows:
- 1:6 for fill to 5'
 - 1:6 to edge of clear zone & 1:4 for fills 5' to 10'
 - 1:6 to edge of clear zone & 1:3 for fills 10' to 20'
 - 1:3 with guardrail for fills over 20' and must include shoulder gutter
 - Shoulder gutter is required in areas of guardrail where embankment slopes are steeper than 1:4 and any pavement is sloped toward the embankment



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7' - THE AREA DISTURBED BY CONSTRUCTION VARIES
 SUL - SPECIAL USE LANE
 * - BUFFER

1:6 TO EDGE OF CLEAR ZONE & 1:4 FOR FILLS 5 TO 10
 1:6 TO EDGE OF CLEAR ZONE & 1:3 FOR FILLS 10 TO 20
 1:3 (WITH GUARDRAIL) FILLS OVER 20

**TYPICAL SECTION
 8 LANE NEW ALIGNMENT
 TYPICAL SECTION NO. 2**

NEW CONSTRUCTION

OPTIONAL BASE GROUP 9 WITH
 TYPE SP STRUCTURAL COURSE (TRAFFIC D) (2")
 TYPE SP STRUCTURAL COURSE (TRAFFIC D) (2") (PG 76-22)
 AND FRICTION COURSE FC-5 (3/4") (PG 76-22)

SHOULDER PAVEMENT

OPTIONAL BASE GROUP 4 WITH
 TYPE SP STRUCTURAL COURSE (TRAFFIC C) (2") (PG 76-22)

NOTES TO DESIGNERS:
 HYDROPLANING ANALYSIS MUST BE PERFORMED BY THE DESIGNER ON THEIR RESPECTIVE ROADWAY SECTIONS UTILIZING THE FDOT HYDROPLANING TOOL.
 SAMPLE HYDROPLANING ANALYSIS FOR THIS TYPICAL SECTION (0.3% AND 3% PROFILE GRADE AND A 70 MPH MAINLINE DESIGN SPEED) CAN BE FOUND ON CFX EXHIBITS 252-1 THRU 252-4.

**CFX Exhibit 306-2
 8 Lane Expressway
 + 2 Special Use Lanes w/ Buffer**

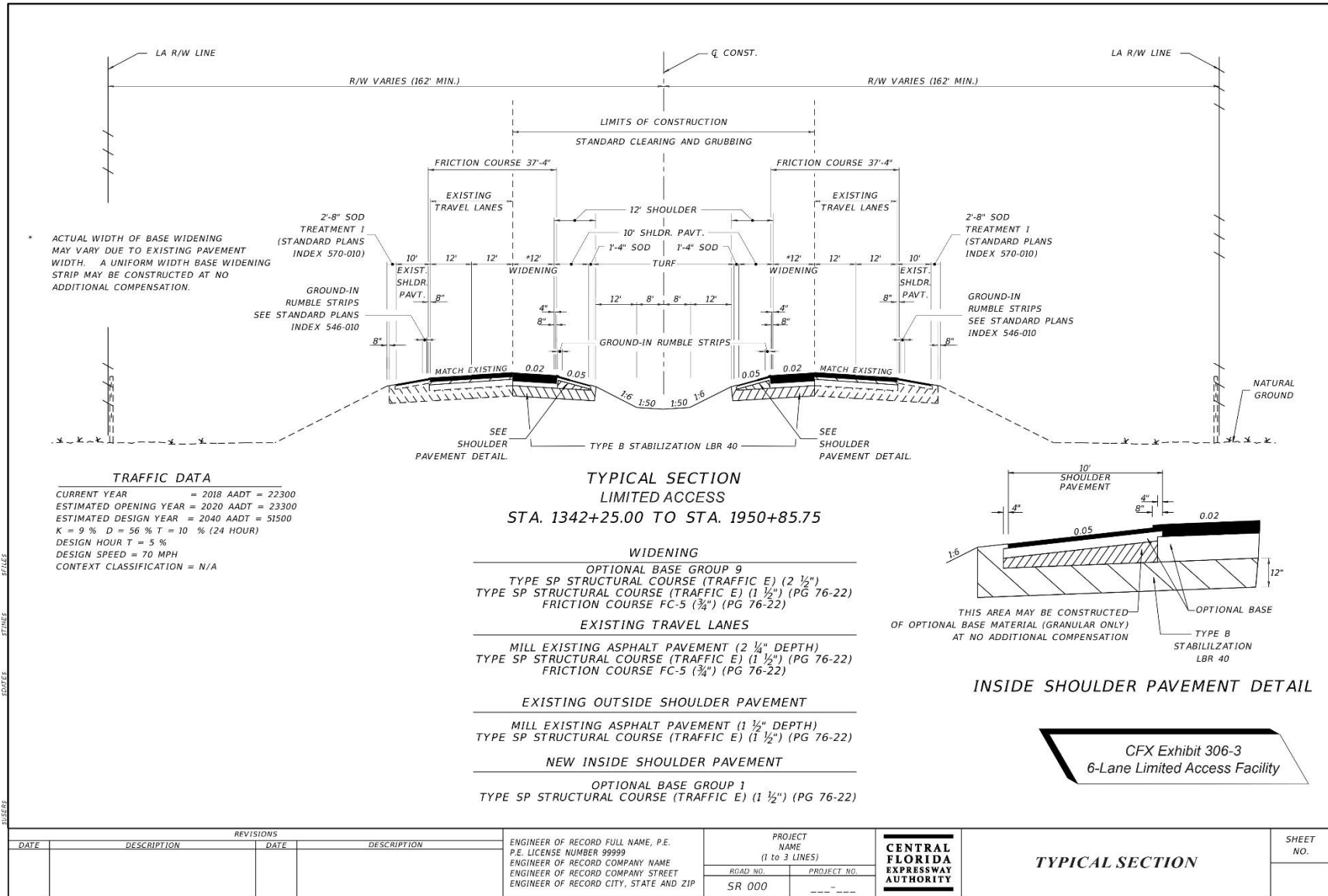
TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
 ESTIMATED OPENING YEAR = TBD AADT = TBD
 ESTIMATED DESIGN YEAR = TBD AADT = TBD
 K = TBD % D = TBD % T = TBD % (24 HOUR)
 DESIGN SPEED = 70 MPH
 POSTED SPEED = 70 MPH

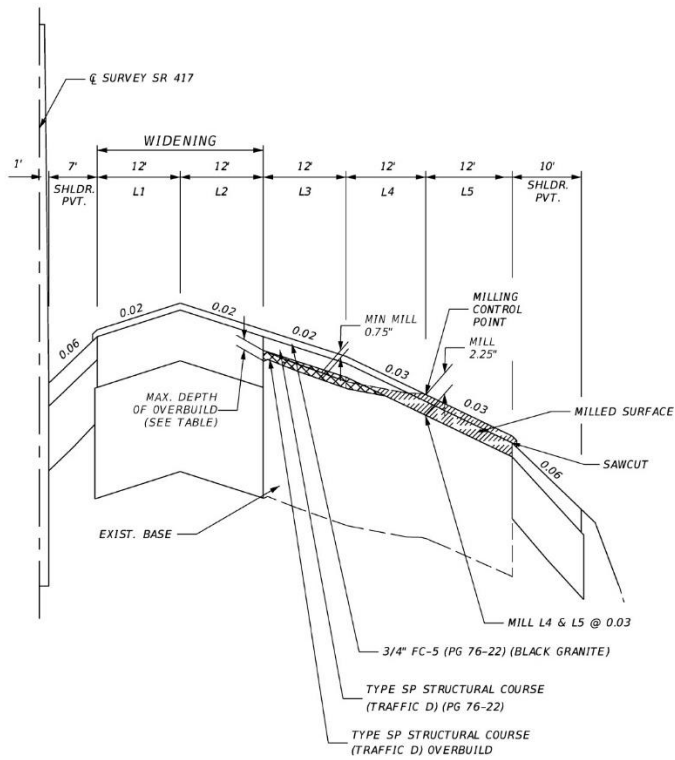
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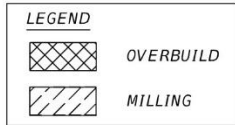
| REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 TO 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | SHEET NO. |
|-----------|-------------|---|--------------------------------|-------------|---|-----------|
| DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | |
| | | | SR 000 | --- | | |



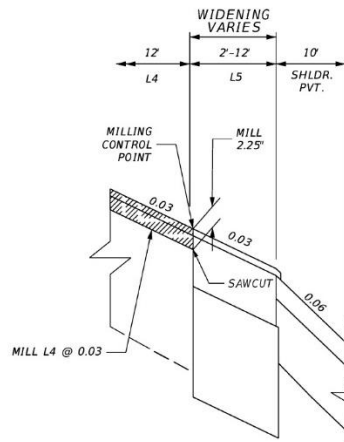
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NB OVERBUILD DETAIL STA 1250+00 TO STA 1259+55.06



| OVERBUILD DETAILS | | | | | | | |
|-------------------|-----------------|------------------|--------------------|------------------------------|--------------------------|-------------------------------|-----------------------------|
| LOCATION | | EXIST. SLOPE (%) | PROPOSED SLOPE (%) | MAX DEPTH OF OVERBUILD (IN.) | WIDTH OF OVERBUILD (FT.) | AVG. DEPTH OF OVERBUILD (IN.) | AREA OF OVERBUILD (SQ. FT.) |
| STATION | LANE | | | | | | |
| 1251+00 | NORTHBOUND - L3 | (-) 0.8% | (-) 2.0% | 0.87 | 6.6 | 0.44 | 0.24 |
| 1252+00 | NORTHBOUND - L3 | (-) 0.2% | (-) 2.0% | 1.11 | 4.7 | 0.56 | 0.22 |
| 1253+00 | NORTHBOUND - L3 | (-) 0.3% | (-) 2.0% | 1.68 | 7.9 | 0.84 | 0.55 |
| 1254+00 | NORTHBOUND - L3 | (-) 0.9% | (-) 2.0% | 1.41 | 9.5 | 0.71 | 0.56 |
| 1255+00 | NORTHBOUND - L3 | (-) 0.9% | (-) 2.0% | 1.77 | 12.0 | 0.95 | 0.95 |
| 1255+00 | NORTHBOUND - L4 | (-) 1.8% | (-) 3.0% | 0.12 | 1.0 | 0.06 | 0.01 |
| 1256+00 | NORTHBOUND - L3 | (-) 1.1% | (-) 2.0% | 1.29 | 10.9 | 0.65 | 0.59 |
| 1257+00 | NORTHBOUND - L3 | (-) 2.3% | (-) 2.0% | 1.23 | 12.0 | 1.22 | 1.22 |
| 1257+00 | NORTHBOUND - L4 | (-) 1.0% | (-) 3.0% | 1.23 | 5.7 | 0.62 | 0.29 |
| 1258+00 | NORTHBOUND - L3 | (-) 1.4% | (-) 2.0% | 0.90 | 4.4 | 0.45 | 0.17 |
| 1259+00 | NORTHBOUND - L3 | (-) 2.0% | (-) 2.0% | 0.39 | 12.0 | 0.24 | 0.24 |
| 1259+00 | NORTHBOUND - L4 | (-) 1.8% | (-) 3.0% | 0.09 | 1.0 | 0.05 | 0.00 |
| 1260+00 | NORTHBOUND - L3 | (-) 0.9% | (-) 2.0% | 1.92 | 12.0 | 1.11 | 1.11 |
| 1260+00 | NORTHBOUND - L4 | (-) 1.7% | (-) 3.0% | 0.30 | 2.4 | 0.15 | 0.03 |
| 1261+00 | NORTHBOUND - L3 | (-) 1.3% | (-) 2.0% | 1.77 | 12.0 | 1.17 | 1.17 |
| 1261+00 | NORTHBOUND - L4 | (-) 1.5% | (-) 3.0% | 0.57 | 1.0 | 0.29 | 0.02 |



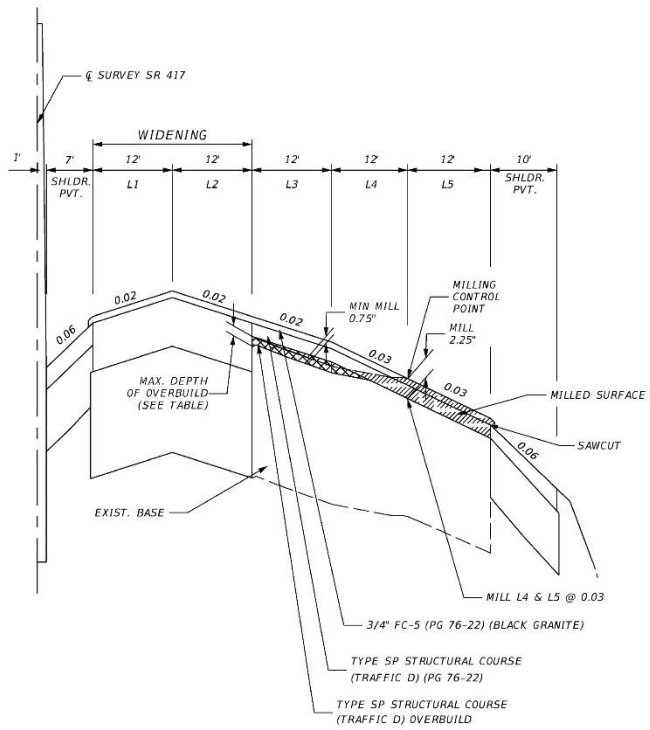
NB DETAIL STA 1259+55.06 TO STA 1262+00

Include the subtotals in the Summary of Pavement sheet as a line item named Summary of Overbuild". Do not include contingency quantities associated with overbuild.

CFX Exhibit 306-3 Overbuild Details

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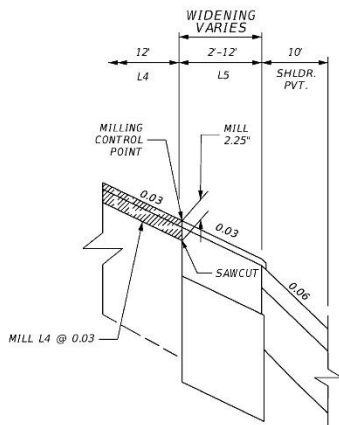
| REVISIONS | | REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) ROAD NO. PROJECT NO. SR 000 | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | TYPICAL SECTION | SHEET NO. |
|-----------|-------------|-----------|-------------|---|--|--------------------------------------|-----------------|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | | | | |
| | | | | | | | | |



NB OVERBUILD DETAIL STA 1250+00 TO STA 1259+55.06

| LEGEND | |
|--------|-----------|
| | OVERBUILD |
| | MILLING |

| OVERBUILD DETAILS | | | | | | | |
|-------------------|-----------------|------------------|--------------------|------------------------------|--------------------------|-------------------------------|-----------------------------|
| LOCATION | | EXIST. SLOPE (%) | PROPOSED SLOPE (%) | MAX DEPTH OF OVERBUILD (IN.) | WIDTH OF OVERBUILD (FT.) | AVG. DEPTH OF OVERBUILD (IN.) | AREA OF OVERBUILD (SQ. FT.) |
| STATION | LANE | | | | | | |
| 1251+00 | NORTHBOUND - L3 | (-) 0.8% | (-) 2.0% | 0.87 | 6.6 | 0.44 | 0.24 |
| 1252+00 | NORTHBOUND - L3 | (-) 0.2% | (-) 2.0% | 1.11 | 4.7 | 0.56 | 0.22 |
| 1253+00 | NORTHBOUND - L3 | (-) 0.3% | (-) 2.0% | 1.68 | 7.9 | 0.84 | 0.55 |
| 1254+00 | NORTHBOUND - L3 | (-) 0.9% | (-) 2.0% | 1.41 | 9.5 | 0.71 | 0.56 |
| 1255+00 | NORTHBOUND - L3 | (-) 0.9% | (-) 2.0% | 1.77 | 12.0 | 0.95 | 0.95 |
| 1255+00 | NORTHBOUND - L4 | (-) 1.8% | (-) 3.0% | 0.12 | 1.0 | 0.06 | 0.01 |
| 1256+00 | NORTHBOUND - L3 | (-) 1.1% | (-) 2.0% | 1.29 | 10.9 | 0.65 | 0.59 |
| 1257+00 | NORTHBOUND - L3 | (-) 2.3% | (-) 2.0% | 1.23 | 12.0 | 1.22 | 1.22 |
| 1257+00 | NORTHBOUND - L4 | (-) 1.0% | (-) 3.0% | 1.23 | 5.7 | 0.62 | 0.29 |
| 1258+00 | NORTHBOUND - L3 | (-) 1.4% | (-) 2.0% | 0.90 | 4.4 | 0.45 | 0.17 |
| 1259+00 | NORTHBOUND - L3 | (-) 2.0% | (-) 2.0% | 0.39 | 12.0 | 0.24 | 0.24 |
| 1259+00 | NORTHBOUND - L4 | (-) 1.8% | (-) 3.0% | 0.09 | 1.0 | 0.05 | 0.00 |
| 1260+00 | NORTHBOUND - L3 | (-) 0.9% | (-) 2.0% | 1.92 | 12.0 | 1.11 | 1.11 |
| 1260+00 | NORTHBOUND - L4 | (-) 1.7% | (-) 3.0% | 0.30 | 2.4 | 0.15 | 0.03 |
| 1261+00 | NORTHBOUND - L3 | (-) 1.3% | (-) 2.0% | 1.77 | 12.0 | 1.17 | 1.17 |
| 1261+00 | NORTHBOUND - L4 | (-) 1.5% | (-) 3.0% | 0.57 | 1.0 | 0.29 | 0.02 |



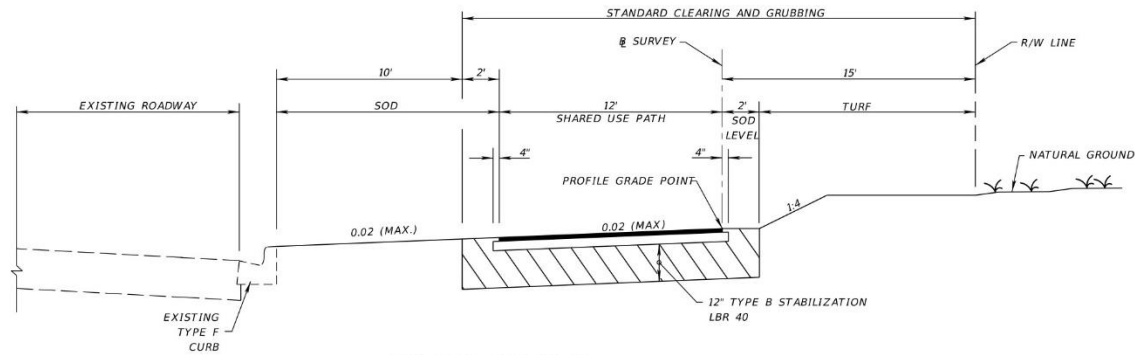
NB DETAIL STA 1259+55.06 TO STA 1262+00

Include the subtotals in the Summary of Pavement sheet as a line item named "Summary of Overbuild". Do not include contingency quantities associated with overbuild.

CFX Exhibit 306-4 Overbuild Details

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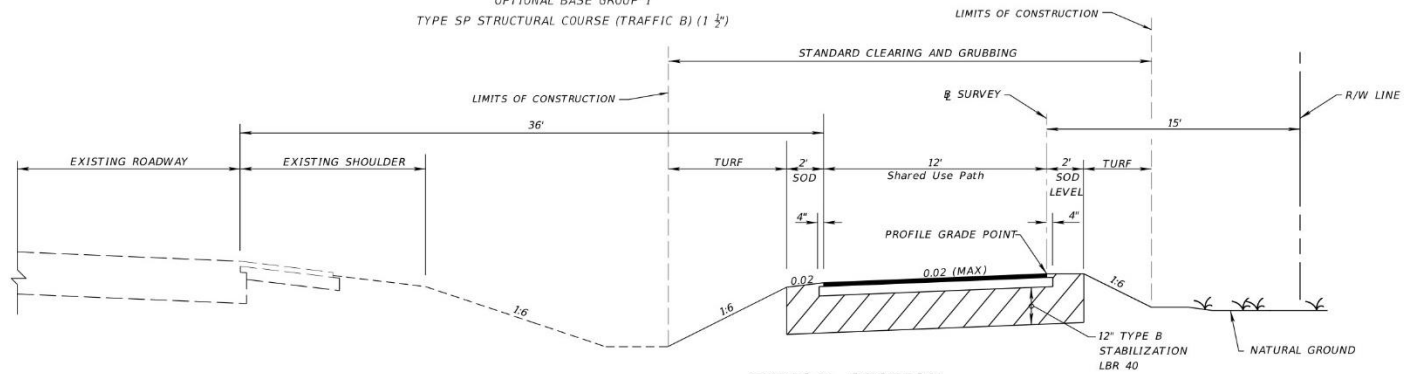
| DATE | | REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | TYPICAL SECTION | SHEET NO. |
|------|-------------|-----------|-------------|---|--------------------------------|-------------|---|-----------------|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | | | SR 000 | | | | |



TYPICAL SECTION

STA. 122+00.000 TO STA. 210+65.00

SHARED USE PATH
 OPTIONAL BASE GROUP 1
 TYPE SP STRUCTURAL COURSE (TRAFFIC B) (1 1/2")



TYPICAL SECTION

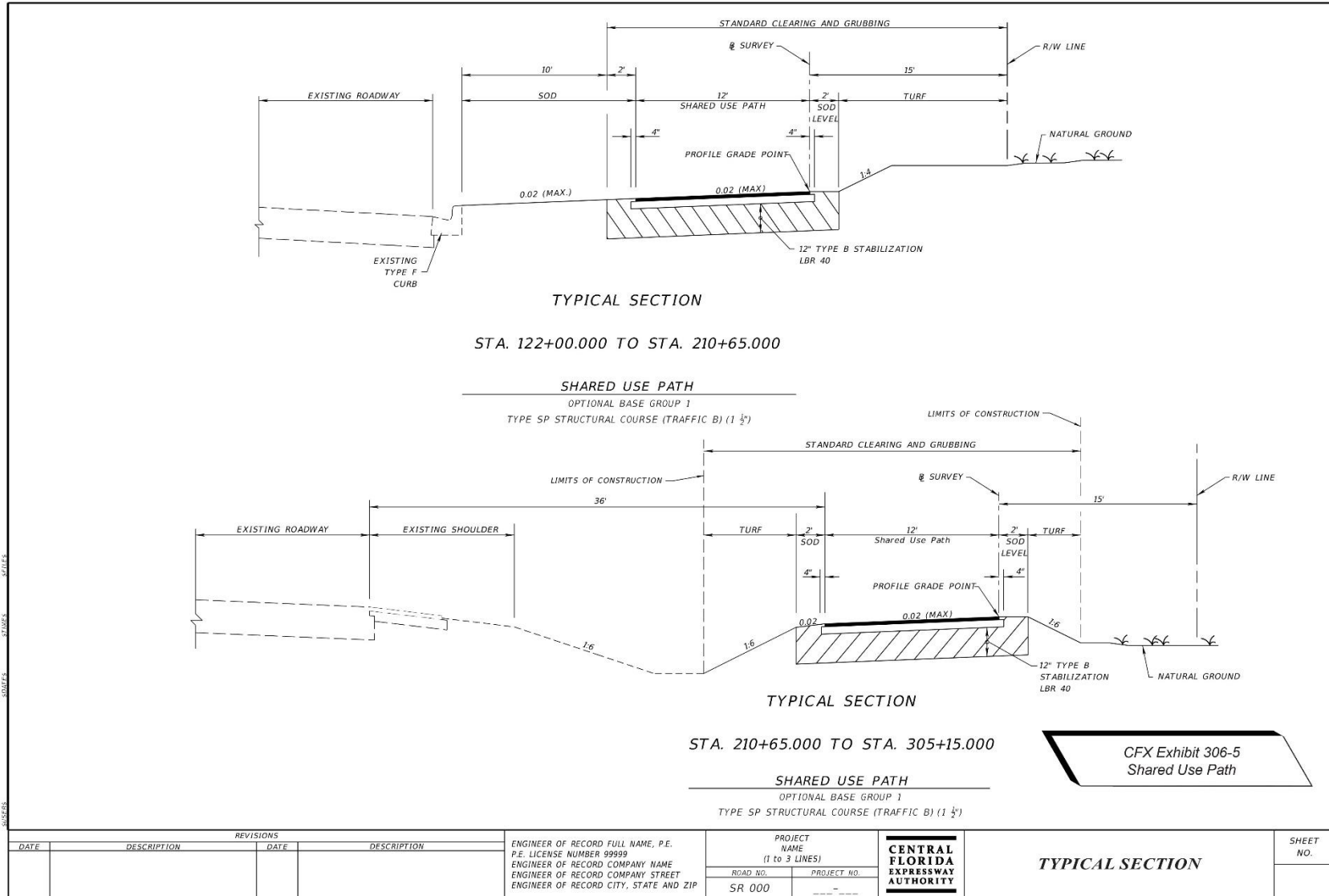
STA. 210+65.000 TO STA. 305+15.00

SHARED USE PATH
 OPTIONAL BASE GROUP 1
 TYPE SP STRUCTURAL COURSE (TRAFFIC B) (1 1/2")

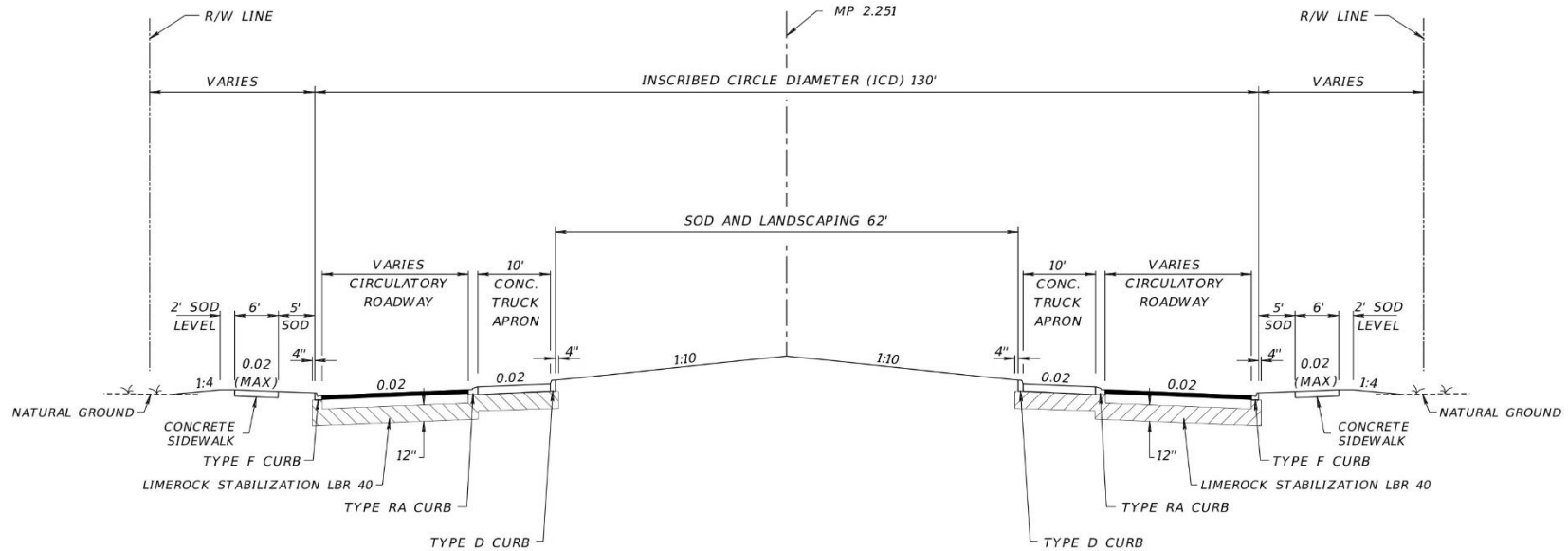
CFX Exhibit 306-4
 Shared Use Path

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|-----------|-------------|------|-------------|---|--------------------------------|-------------|---|-----------------|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | | | SR 000 | | | | |



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TYPICAL SECTION
MP 2.251

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
 ESTIMATED OPENING YEAR = 2020 AADT = 25800
 ESTIMATED DESIGN YEAR = 2040 AADT = 30600
 K = 6% D = 55% T = 2% (24 HOUR)
 DESIGN HOUR T = 1%
 CONTEXT CLASSIFICATION = N/A

CIRCULATORY ROADWAY

OPTIONAL BASE GROUP 9
 TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1")
 FRICTION COURSE FC-9.5 (TRAFFIC C) (2")

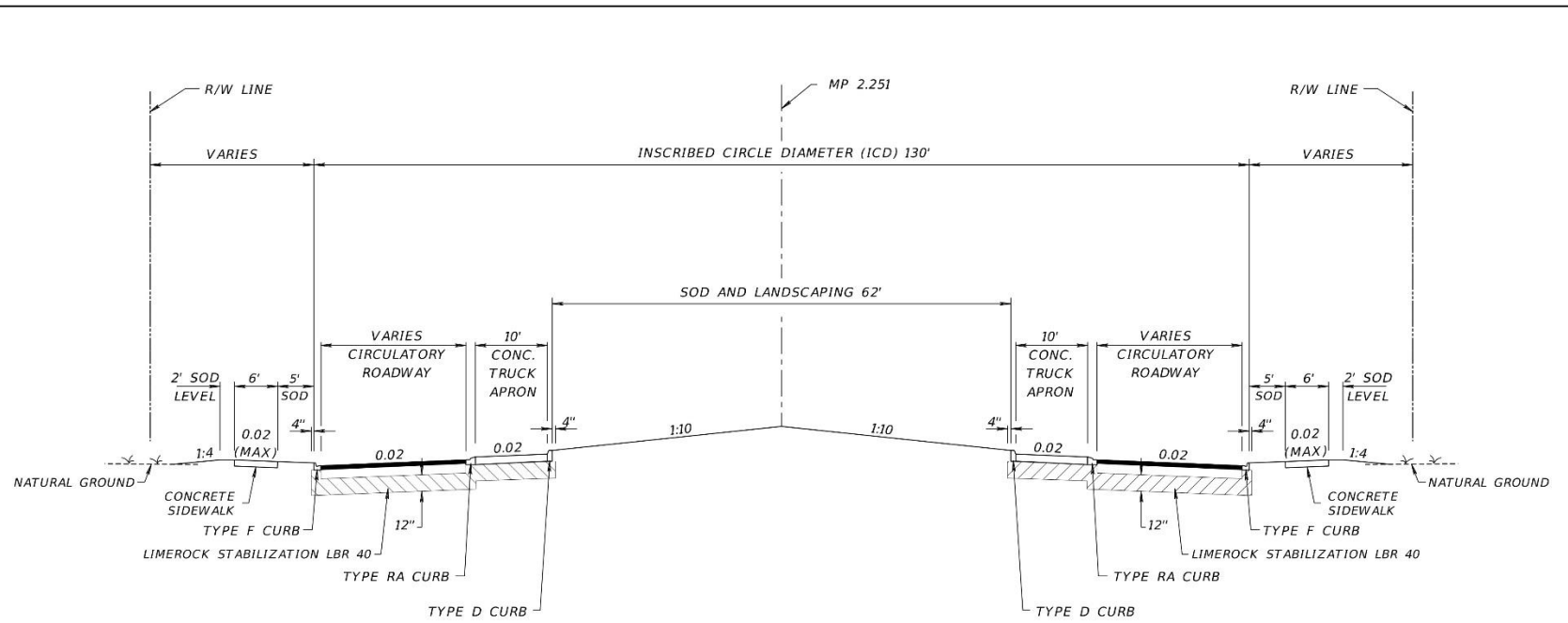
CFX Exhibit 306-5
Roundabout

NOT TO SCALE

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SIZES
STIPES
NOTES
USERS

| REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | SHEET NO. |
|-----------|-------------|---|--------------------------------|-------------|---|--------------|
| DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | |
| | | | SR 000 | | TYPICAL SECTION | |



TYPICAL SECTION
MP 2.251

TRAFFIC DATA

CURRENT YEAR = 2018 AADT = 22800
 ESTIMATED OPENING YEAR = 2020 AADT = 25800
 ESTIMATED DESIGN YEAR = 2040 AADT = 30600
 K = 6% D = 55% T = 2% (24 HOUR)
 DESIGN HOUR T = 1%
 CONTEXT CLASSIFICATION = N/A

CIRCULATORY ROADWAY

OPTIONAL BASE GROUP 9
 TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1")
 FRICTION COURSE FC-9.5 (TRAFFIC C) (2")

CFX Exhibit 306-6
Roundabout

NOT TO SCALE

SUSERS ROUTE STILES

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|-----------|-------------|---|--------------------------------|-------------|---|-----------|
| DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | |
| | | | SR 000 | | TYPICAL SECTION | |

307 - Summary of Quantities

307.1 - General

The Summary of Quantities sheets contain plan summary boxes for all work to be performed on the project except for work provided for on the Summary of Drainage Structure sheet(s). Document the quantities by location in the plan summary boxes. The Summary of Quantities sheets is the only location where quantities are to be documented. Do not place plan summary boxes in any other location in the plan set.

The Summary of Quantities sheets are to be placed after the numbered Plan Sheets. Number the Summary of Quantities sheets prefixed by the letter "SQ;" e.g., SQ-1, SQ-2, SQ-3.

Include with phase submittals the electronic shape file (QTDSRD.dgn) and other documentation (i.e., calculations, sketches, or spreadsheets) that support the quantities shown in the summary boxes, beginning with Phase III.

307.1.1 - Tabulation of Quantities Sheets

When signing and pavement marking, lighting, signal, ITS, or landscape improvements are shown in the roadway plan set, in lieu of a component plan set, place the Tabulation of Quantities sheet for those improvements behind roadway Summary of Quantities sheets. Number the Tabulation of Quantities sheet in sequence with the Summary of Quantities sheets using the prefix "SQ".

307.2 - Plan Summary Boxes and Format

The plan summary boxes are provided in the FDOT CADD Software. Boxes should be placed on the sheets in order of pay item numbers. A continuation of a box onto subsequent plan sheets may be necessary. On contracts with multiple Financial Project ID numbers or federal aid and non-federal aid quantities, make provisions to tabulate and summarize their respective quantities.

307.2.1 - Standard Notes

Place the following standard note below the Summary of Earthwork box:

Earthwork has been calculated using the _____ base option.

Place the following standard note below the Summary of Monitor Existing Structures box:

This list includes existing structures (as determined by CFX) located outside the limits specified in Article 108-2 of the FDOT Specifications that are required to be monitored. This list should not be considered all-inclusive and does not contain existing structures to be monitored that are located within the distances specified in Article 108-2.

307.2.2 - Pay Item Notes

Delete all paragraphs and replace with:

Place the following applicable pay item notes on the first Summary of Quantities Sheet:

- (1) 102-1
THE LUMP SUM PAYMENT INCLUDES ALL COSTS ASSOCIATED WITH WORK, PERSONNEL, MATERIALS, AND EQUIPMENT NECESSARY TO MAINTAIN TRAFFIC WITHIN THE CONSTRUCTION LIMITS OF THE PROJECT AS SPECIFIED UNDER SECTION 102 OF THE CFX TECHNICAL SPECIFICATIONS. LITTER REMOVAL SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM.
- (2) 102-99C
A CONTINGENCY ITEM, TO BE INCLUDED AS DIRECTED BY THE ENGINEER.
- (3) 285-7XX
ALL BASE MATERIAL SHALL BE LIMEROCK, UNLESS OTHERWISE NOTED.
- (4) 327-70-XX
INCLUDES RETAINMENT OF 500 TONS OF MILLINGS, OWNED BY CFX. MATERIAL IS TO BE STORED AT THE CONTRACTOR'S FACILITIES FOR TWO YEARS FOLLOWING FINAL ACCEPTANCE OF THE PROJECT. WHEN NEEDED BY CFX, THE CONTRACTOR SHALL LOAD THE MATERIALS INTO CFX TRUCKS AT NO ADDITIONAL COST
- (6) 436-1-1
MDH 12-12" ID TRENCH FORMER SYSTEM WITH E-COATED FRAME AND UNCOATED GRATE (HI-INTAKE) OR APPROVED EQUAL. INCLUDES ALL ITEMS NEEDED TO FURNISH AND INSTALL TRENCH DRAIN AS SHOWN IN THE PLANS. INCLUDES BUT NOT LIMITED TO, CONCRETE TRENCH DRAIN, 12" PIPE, GRATE, CONCRETE JACKETS, SPECIAL DESIGN CONCRETE SHOULDER GUTTER AND CONCRETE SHOULDER GUTTER TRANSITION SEGMENTS.
- (7) 570-1-2
SOD QUANTITIES INCLUDE THE AREAS IDENTIFIED TO RECEIVE PINE BARK NUGGET MULCH. ALL COSTS ASSOCIATED WITH THE PINE BARK NUGGET MULCH SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM.

307.3 - Box Culvert

The structural design of any size concrete box culvert may be performed utilizing computer programs as described in **FDM 265.13**. The LRFD Box Culvert Program complements the details shown on **Standard Plans, Index 400-289**.

Complete the Box Culvert Data Table (cell is included in the Structures workspace of the FDOT CADD Software) and the Reinforcing Bar List. Place the table and list on plan sheets in the Structures Component Plan Set.

For box culverts without FDOT assigned bridge numbers (typically \leq 20-foot spans measured along the centerline of the roadway from face-face (inside) of the extreme abutments or sidewalls), place quantity totals in a Summary of Box Culverts box on a “BQ-” numbered plan sheet in the Structures Component Plan Set. Do not include the quantities in the Summary of Structure Quantities table. Load these planned quantities into AASHTOWare Project™ Preconstruction or Designer Interface in the Roadway Category.

For box culverts with FDOT assigned bridge numbers (bridge culverts), place quantity totals in the Box Culvert section of the Summary of Structure Quantities in the Structures Component Plan Set. Load these planned quantities into AASHTOWare Project™ Preconstruction or Designer Interface in the Structures Category under the assigned bridge number.

307.4 - Litter Removal and Mowing

All elements of CFX’s transportation system enjoy a high maintenance standard that provides a safe, efficient, and effective facility for its customers. Litter removal shall occur once per week and in advance of each mowing cycle. As such, litter removal shall be incidental to the Maintenance of Traffic pay item.

307.5 - Monitor Existing Structures

Monitor Existing Structures includes settlement, vibration, and groundwater monitoring of existing structures during construction as described in Section 108 of the Standard Specifications. Structures requiring consideration for monitoring typically include buildings, bridges, and retaining walls which are adjacent to construction activities. When there is a concern regarding vibration, structures to be monitored may also include historic features and buildings in which sensitive business operations are conducted, e.g., eye surgery, medical treatments, rehabilitation operations, recording and broadcasting operations, places of worship, antique shops, or museums.

When appropriate, include a note on the General Notes sheet that:

- (1) Restricts hours of construction operations.
- (2) Restricts the type of construction equipment to be used.

Pay item 108-1 is to be used to mitigate the risk for damage occurring to an existing structure due to settlement.

Pay item 108-2 is to be used to mitigate the risk for interfering with the intended use of an existing structure. This pay item is not typically used for residential properties.

Pay item 108-3 is to be used only when recommended by a geotechnical firm and concurred with by

the District Geotechnical Engineer. The use of this pay item is not common.

307.5.1.1 - Miscellaneous Structures

Activities that may cause harm to existing structures include the construction of foundations for mast arm signal poles, strain poles, cantilever signs, overhead truss signs, high mast light poles and ITS.

Based on visual field observations, the EOR will identify existing structures that are recommended to be monitored during these activities. CFX will make the final determination of the existing structures to be monitored.

307.5.1.2 - Structures other than Miscellaneous Structures

Activities that may cause harm to existing structures include the construction of retaining walls, noise walls, sheet pile walls, deep excavations and foundations for bridges and other structures.

- (1) If any existing structure is within the distances specified in Section 108-2 of the Standard Specifications, include pay item 108-1 in the Summary of Monitor Existing Structures summary box. Use 250 feet as the limit for pile driving. Do not list or identify these structures in the Contract Plans.
- (2) Based on visual field observations, the EOR may recommend monitoring existing structures located beyond the distances specified in Section 108-2 during these activities. CFX will make the final determination of the existing structures to be monitored.

307.5.1.3 - Roadway Compaction Operations

Activities that may cause harm to existing structures include embankment and asphalt vibratory compaction.

- (1) If an existing structure is within the distances specified in Section 108-2 of the Standard Specifications, include pay item 108-1 in the Summary of Monitor Existing Structures summary box. Do not list or identify these structures in the Contract Plans.
- (2) Based on visual field observations, the EOR may recommend monitoring existing structures located beyond the distances specified in Section 108-2 during these activities. CFX will make the final determination of the existing structures to be monitored.

307.5.2 - Vibration Monitoring

Activities that may cause harm to existing structures include pile driving, sheet pile and casing installation, and embankment and asphalt vibratory compaction. Based on visual field observations, the EOR will identify existing structures that are recommended to be monitored during these activities. CFX

will make the final determination of the existing structures to be monitored.

307.5.3 - Groundwater Monitoring

Based on visual field observations, the EOR will identify existing structures that are recommended to be monitored during anticipated dewatering operations. CFX will make the final determination of the existing structures to be monitored.

308 - Summary of Drainage Structures and Optional Materials Tabulation

308.1 - General

The Summary of Drainage Structures sheet shows the location, size, length, number and type of drainage structures used in a project. The sheet format is available in the FDOT CADD Software. Specific levels and fonts are in the CADD Manual Archives.

308.2 - Summary of Drainage Structures

Prepare and include a summary of drainage structures in the plans. List the structures in numerical order of structure number. Identify the location of each structure by station along the centerline of construction.

Tabulate storm and cross drains in the summary of drainage structures by structure number, providing the station, size, length and incidental quantities appropriate for the material detailed in the plans. When the number of columns exceeds one page, the additional sheet is to be numbered using a suffix (e.g., 3 and 3A, 4 and 4a). Information for the drainage elements in the columns is obtained from drainage structure sheets and plan-profile sheets. The order in which the elements are listed should be as follows:

- | | |
|----------------------------|---------------------------|
| (1) Pipe Sizes for | (6) Gutter Inlets |
| (a) Storm and Cross Drains | (7) Flared End Sections |
| (b) Gutter Drain | (8) Mitered End Sections |
| (2) Curb Inlets | (9) Performance Turf, Sod |
| (3) Manholes | (10) Class of Concrete |
| (4) Junction Boxes | (11) Reinforcing Steel |
| (5) Ditch Bottom Inlets | (12) Riprap |

Use the "Description" column to specify the type of structure, the outgoing pipe and the end treatment of that pipe, if applicable.

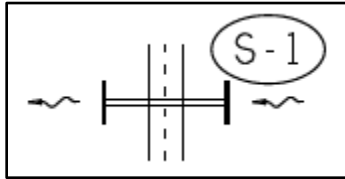
The remarks column contains special notes pertaining to the structure. The "Final Quantity" line is for construction to use and must be left blank.

It is recommended that structure numbers be established using the convention shown in **Figures 308.1**

and 308.2, and described as follows:

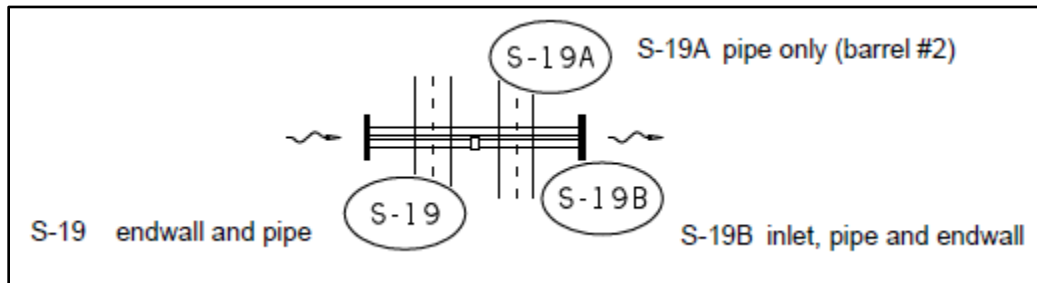
- (1) For simple cross drains, one structure number is appropriate for the inlet, pipe, and outlet treatments.

Figure 308.1: Cross Drain without Median Inlet



- (2) For complex cross drains, it is suggested that the first and all intermediate structure numbers identify the hydraulically upper end treatment and pipe. The last structure number should identify the hydraulically upper end treatment, pipe and hydraulically lower end treatment.

Figure 308.2: Double Pipe Cross Drain and Median Inlet



308.3 - Optional Materials Tabulation

Unless otherwise approved, it is CFX preference to utilize reinforced concrete pipe (RCP) or ADS Class 2 Polypropylene pipe (HP Storm) for all storm sewer pipes. ADS single wall HDPE meeting AASHTO M294 standards and bituminous coated corrugated metal pipe (BCCCMP) are approved for gutter drains. Culvert extensions are to match the existing culvert material. HP Storm is required to be installed with an RCP end section. For the case of wall zone pipes, HP Storm should be utilized. In areas where conditions warrant, steel pipe may be used in lieu of HP Storm for wall zone applications. Pipes to be installed via jack and bore shall utilize the steel casing as the carrier pipe. The steel casing should extend from structure to structure, where reasonable. All drainage pipe must be produced from an FDOT approved production facility.

309 - Project Layout

309.1 - General

The project layout sheet is an optional sheet that the district may choose to include in the plans set.

This sheet shows the horizontal alignment and plan or plan-profile sheet sequence and numbering for the project. The project layout sheet provides clarity and detailed information on complex projects involving interchanges with many connecting routes. If included in the plans set, this sheet should also show all survey reference points.

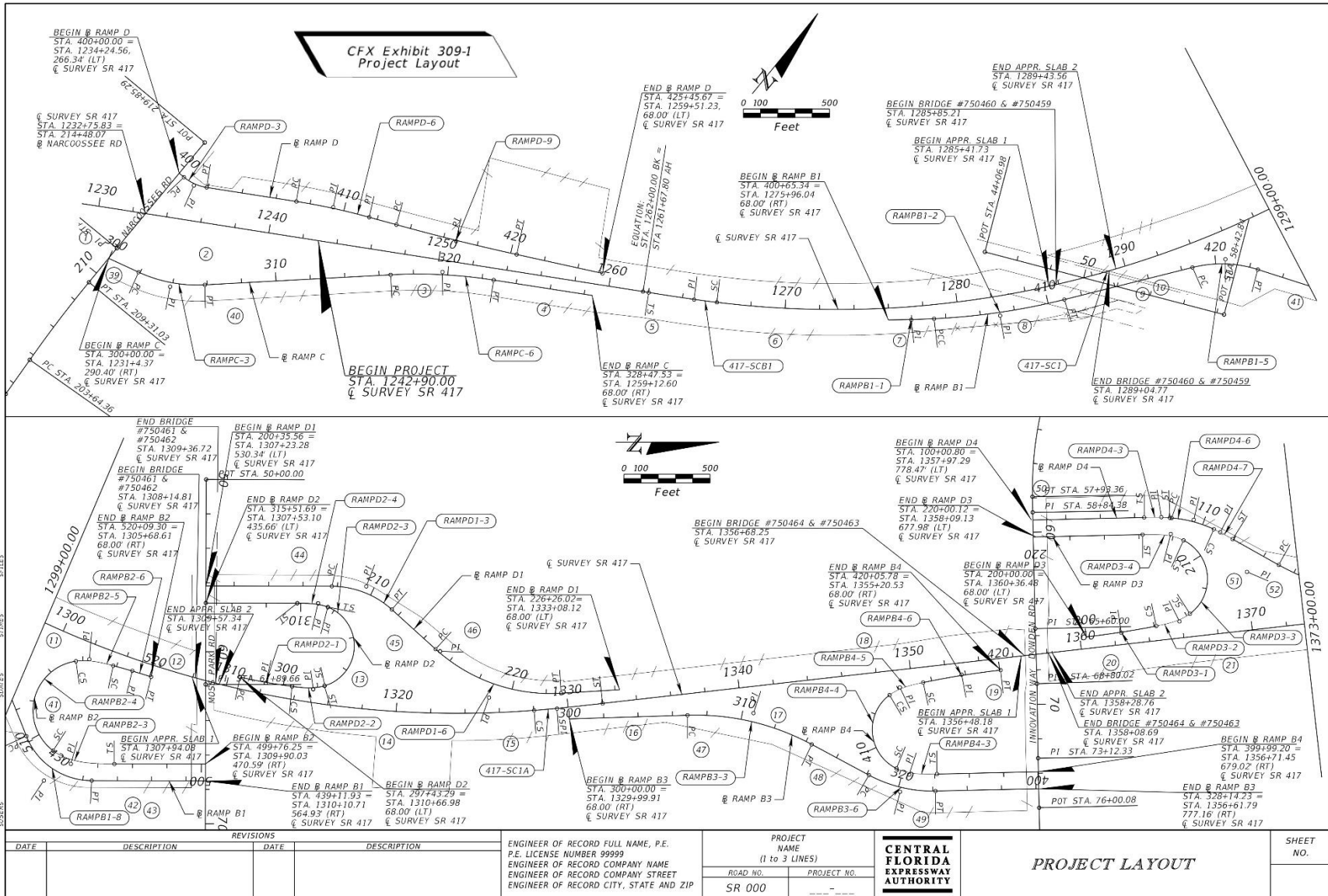
Use the standard plan format sheet provided in the FDOT CADD Software to prepare the project layout sheet. Use a scale that provides clarity and legibility. Place a north arrow and scale in a conspicuous location, typically in the upper right portion of the sheet. For large or complicated projects, more than one sheet may be required to clearly depict all required information. Use match lines when multiple project layout sheets are needed.

309.2 - Alignment Sheet Sequence

Show complete project alignment with baseline of survey and/or centerline of construction. Show edge of pavements if scale permits. Superimpose on the alignment the outlines of the plan, or plan-profile sheets to depict the sheet sequence with relation to the alignment stationing. Include the appropriate plan sheet number on each sheet outline. Plan or plan-profile sheet numbering must be in the following order:

- (1) Mainline (for widely separated roadways, the right roadway in the direction of stationing takes precedence)
- (2) Crossroads
- (3) Ramps
- (4) Frontage roads
- (5) Access roads

Flag and label beginning and ending stations for project, construction, and ramps, including equations and/or exceptions.



THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

| REVISIONS | | REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) SR 000 | PROJECT NO. --- | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | PROJECT LAYOUT | SHEET NO. |
|-----------|-------------|-----------|-------------|---|---|--------------------|---|----------------|--------------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | | | | | |
| | | | | | | | | | |

310 - Project Control

310.1 - General

The Project Control sheet provides a summary of horizontal and vertical datum (i.e., reference points, benchmarks, and control points). The datum shown on this sheet must provide clear and sufficient information to establish horizontal and vertical control during the construction of the project. The data shown can be extracted from the project network control survey and historical control data or reflect assumed datum. The Engineer of Record will create the Project Control sheet from data extracted from the project survey and sign and seal the Project Control sheet.

These sheets are to be placed in the component plans in accordance with ***CFX Design Guidelines 302.6***.

310.2 - Sheet Setup

Use the standard plan format sheet provided in the FDOT CADD Software to prepare the sheet. Use standard symbols contained in the CADD Manual.

Provide a note on the Project Control sheet that identifies horizontal and vertical datum that the survey is based on.

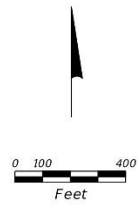
310.3 - Reference Points

Reference points are prominent, easily located points in the terrain used to define a location of another point that is located on the baseline of survey. The purpose of reference points is to provide horizontal location to re-establish primary control points along the baseline of survey. Reference points should not be located on the baseline. Detailed descriptions of each reference point are illustrated with a sketch.

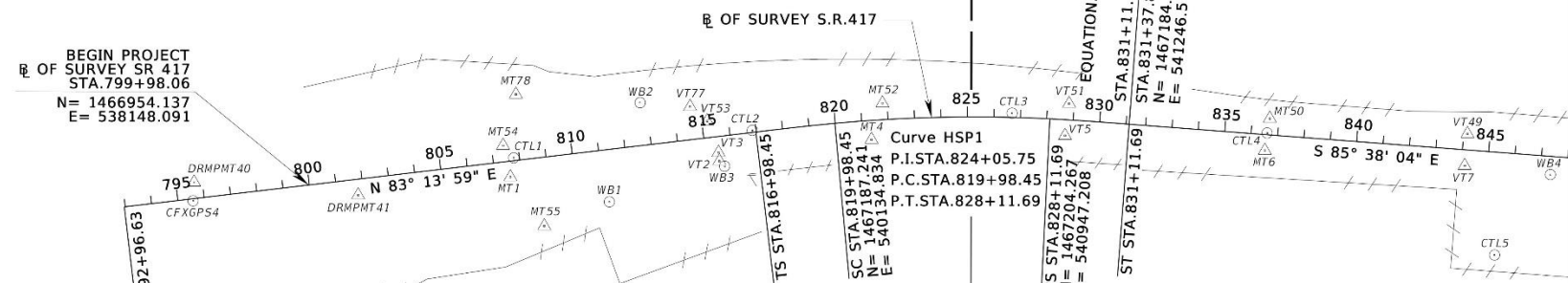
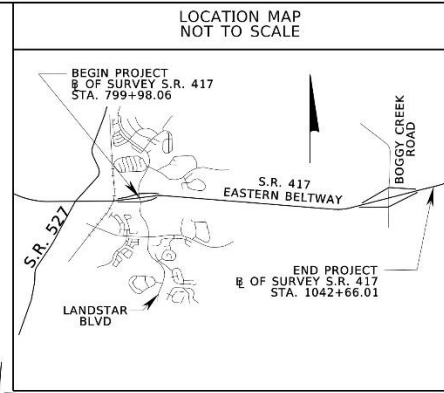
Place survey reference points on the Project Control sheet along the top of the sheet or where other space allows. Clearly indicate the baseline of survey and reference points, including all ties. Complete length of survey baseline between two consecutive reference points need not be shown. Clearly label each reference point, beginning at the first reference point within the limits of the project, and progressing in the direction of stationing. Reference points need not be drawn to any scale, but distances and angles shown must be proportionate.

GENERAL NOTES:

1. BEARINGS AND COORDINATES ARE BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM (NAD) OF 1983, ADJUSTMENT OF 2011.
2. HORIZONTAL CONTROL FOR THIS PROJECT IS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NORTH AMERICAN DATUM OF 1983 (NAD83), AND 2011 ADJUSTMENT.
3. ALL ELEVATIONS ARE RELATIVE TO NORTH AMERICAN VERTICAL DATUM (N.A.V.D.) OF 1988 AND BASED ON CONTROL POINTS "CFXGPS4", "DRMPMT40", "DRMPMT41" AS PUBLISHED BY DRMP, INC AND "1091" AS PROVIDED BY SEMA CONSTRUCTION, PROJECT No. 417-301C. VERTICAL VALUES WERE ESTABLISHED FROM A 3-WIRE CLOSED LEVEL LOOP.
5. ALL HORIZONTAL AND VERTICAL INFORMATION IS U.S. SURVEY FEET.
6. THE BASELINES AND RIGHT OF WAY LINES SHOWN HERE ON BASED ON ORLANDO-ORANGE COUNTY EXPRESSWAY AUTHORITY RIGHT OF WAY MAP SECTION NO. 75301-6445-453 AND 454 OF S.R. 417 EASTERN BELTWAY PROVIDED TO THIS SURVEYOR AND CONFIRMED BY FIELD MONUMENTATION CHECK.
7. STATIONS AND OFFSETS ARE RELATIVE TO THE BASELINE OF SURVEY, UNLESS OTHERWISE INDICATED.
8. THE BASELINES SHOWN WERE NOT PHYSICALLY STAKED IN THE FIELD.
9. THE OFFICIAL RECORD OF THIS PROJECT NETWORK CONTROL IS THE SURVEY REPORT. SEE SAID SURVEY REPORT FOR CERTIFICATION.



CFX Exhibit 310-1
Project Control Sheet



CURVE HSP1

| | |
|---------------|-----------------|
| TOTAL TANGENT | 706.76 |
| TOTAL LENGTH | 1413.24 |
| TOTAL DELTA | 11 07' 56" (RT) |
| BACK TANGENT | N 83° 13' 59" E |
| AHEAD TANGENT | S 85° 38' 04" E |

SPIRAL ELEMENTS

| | |
|--------|-----------------|
| Angle | 1° 30' 00" (RT) |
| LS | 300.00 |
| R | 5,729.58 |
| YS | 2.62 |
| XS | 299.98 |
| P | 0.65 |
| K | 150.00 |
| LT | 200.01 |
| ST | 100.01 |
| LC | 299.99 |
| DEFL | 0° 30' 00" |
| BRG BK | N 83° 13' 59" E |
| BRG AH | N 84° 43' 59" E |
| TS | 816+98.45 |
| SC | 819+98.45 |

CURVE DATA

| | |
|-----------|-----------------|
| PI STA. | 824+05.75 |
| Δ | 8° 07' 56" (RT) |
| D | 1° 00' 00" |
| T | 407.30 |
| L | 813.24 |
| R | 5,729.58 |
| P.C. STA. | 819+98.45 |
| P.T. STA. | 828+11.69 |

SPIRAL ELEMENTS

| | |
|--------|-----------------|
| Angle | 1° 30' 00" (RT) |
| LS | 300.00 |
| R | 5,729.58 |
| YS | 2.62 |
| XS | 299.98 |
| P | 0.65 |
| K | 150.00 |
| LT | 200.01 |
| ST | 100.01 |
| LC | 299.99 |
| DEFL | 0° 30' 00" |
| BRG BK | S 87° 08' 04" E |
| BRG AH | S 85° 38' 04" E |
| CS | 828+11.69 |
| ST | 831+11.69 |

SPIRAL LEGEND

- BRG = BEARING
- CS = CURVE TO SPIRAL
- DEFL = DEFLECTION ANGLE
- LC = LONG CHORD
- LS = LENGTH OF SPIRAL
- LT = LONG TANGENT
- K = FORMULA DEFINITION
- P = OFFSET FROM THE INITIAL TANGENT
- SC = SPIRAL TO CURVE
- ST = SPIRAL TO TANGENT
- TS = TANGENT TO SPIRAL
- XS = TANGENT DISTANCE AT THE SC
- YS = TANGENT OFFSET AT THE SC

- LEGEND**
- Δ = BASELINE
 - Δ = DELTA (CENTRAL ANGLE)
 - D = DEGREE OF CURVE
 - CMON = PRECAST CONCRETE MONUMENT
 - CS = CURVE TO SPIRAL
 - E = EASTING
 - FND = FOUND OR RECOVERED
 - FPRN = FLORIDA PERMANENT REFERENCE NETWORK
 - GPS = GLOBAL POSITIONING SYSTEM
 - ID = IDENTIFICATION
 - IRC = IRON ROD AND CAP
 - L = LENGTH
 - L.A. = LIMITED ACCESS
 - LT = LEFT
 - MP = MILE POST
 - MT = MOBILE LIDAR TARGET NUMBER
 - N. = NOTHING
 - PC = POINT OF CURVATURE
 - PI = POINT OF INTERSECTION
 - PMON = POURED IN PLACE MONUMENT
 - PNC = PROJECT NETWORK CONTROL NUMBER
 - POT = POINT ON TANGENT
 - PT = POINT OF TANGENCY
 - R = RADIUS
 - RT = RIGHT
 - R/W = RIGHT OF WAY
 - SC = SPIRAL TO CURVE
 - S.R. = SPIRAL TO TANGENT
 - ST = STATE ROAD
 - STA. = STATION
 - T = TANGENT
 - TS = TANGENT TO SPIRAL

TOWNSHIP 24 SOUTH

RANGE 29 EAST
RANGE 30 EAST

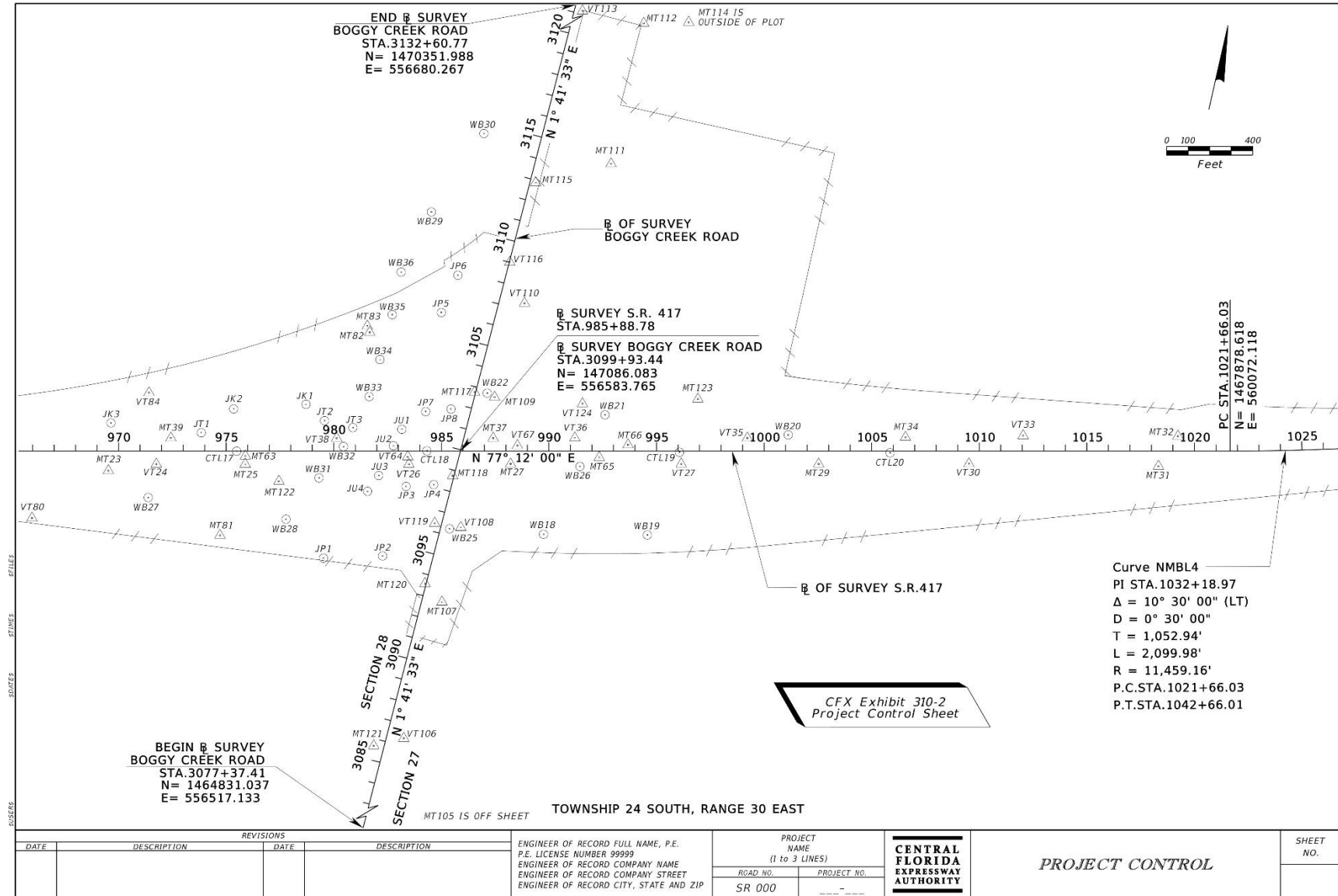
SECTION 25.
SECTION 30

EQUATION:
STA. 831+11.69 BK =
STA. 831+37.83 AH
N = 1467184.044
E = 541246.517

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SOURCE: STIPLES

| <table border="1"> <thead> <tr><th colspan="2">REVISIONS</th></tr> <tr><th>DATE</th><th>DESCRIPTION</th></tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> | | | | REVISIONS | | DATE | DESCRIPTION | | | | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | | PROJECT NAME (1 to 3 LINES) SR 000 | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | | SHEET NO. | |
|--|-------------|--|--|-----------|--|-------------|-------------|-----------|--|--|--|---|--|--|--|--------------------------------------|--|-----------|--|
| REVISIONS | | | | | | | | | | | | | | | | | | | |
| DATE | DESCRIPTION | | | | | | | | | | | | | | | | | | |
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| PROJECT CONTROL | | | | SR 000 | | PROJECT NO. | | SHEET NO. | | | | | | | | | | | |



HORIZONTAL AND VERTICAL CONTROL

CFX Exhibit 310-3
Project Control Sheet

| POINT | STATION | OFFSET | LATITUDE | LONGITUDE | NORTHING | EASTING | ELEV. | S.F. | DESCRIPTION |
|-------|-----------|--------------|-----------------|-----------------|-------------|------------|---------|------------|--------------------|
| VT42 | 949+60.24 | 93.22' LT | 28°22'02.88539" | 82°19'14.60859" | 1466440.992 | 553024.984 | 83.790 | 0.99995337 | FND MAG NAIL NO ID |
| VT43 | 936+21.82 | 83.65' LT | 28°22'02.71300" | 82°19'29.40009" | 1466427.119 | 551703.598 | 106.079 | 0.99995368 | FND MAG NAIL NO ID |
| VT44 | 919+66.36 | 72.11' LT | 28°22'03.89788" | 82°19'47.88379" | 1466551.269 | 550052.758 | 85.976 | 0.99995408 | FND MAG NAIL NO ID |
| MT45 | 880+66.07 | 70.04' LT | 28°22'06.93453" | 82°20'31.40988" | 1466868.790 | 546165.408 | 83.865 | 0.99995505 | FND MAG NAIL NO ID |
| VT46 | 873+38.97 | 61.05' LT | 28°22'07.41531" | 82°20'39.53179" | 1466919.411 | 545440.015 | 93.379 | 0.99995523 | FND MAG NAIL NO ID |
| VT47 | 858+28.90 | 61.05' LT | 28°22'08.56869" | 82°20'56.4216" | 1467040.231 | 543932.429 | 104.660 | 0.99995566 | FND MAG NAIL NO ID |
| MT48 | 850+43.78 | 61.37' LT | 28°22'09.13958" | 82°21'05.15489" | 1467100.157 | 543151.610 | 91.395 | 0.99995582 | FND MAG NAIL NO ID |
| VT49 | 844+14.29 | 61.15' LT | 28°22'09.59373" | 82°21'12.18301" | 1467147.859 | 542523.926 | 87.506 | 0.99995598 | FND MAG NAIL NO ID |
| MT50 | 836+66.20 | 61.74' LT | 28°22'10.14160" | 82°21'20.53447" | 1467205.384 | 541778.056 | 89.951 | 0.99995617 | FND MAG NAIL NO ID |
| VT51 | 828+80.62 | 61.16' LT | 28°22'10.67483" | 82°21'29.02520" | 1467261.482 | 541019.744 | 94.359 | 0.99995637 | FND MAG NAIL NO ID |
| MT52 | 821+82.64 | 62.05' LT | 28°22'10.67044" | 82°21'36.91698" | 1467263.139 | 540314.776 | 95.040 | 0.99995656 | FND MAG NAIL NO ID |
| VT53 | 815+20.86 | 62.45' LT | 28°22'09.98195" | 82°21'44.32375" | 1467195.587 | 539652.925 | 91.170 | 0.99995674 | FND MAG NAIL NO ID |
| MT54 | 807+44.48 | 61.58' LT | 28°22'09.04456" | 82°21'52.95005" | 1467103.239 | 538882.055 | 102.279 | 0.99995694 | FND MAG NAIL NO ID |
| MT55 | 808+62.88 | 258.76' RT | 28°22'06.03767" | 82°21'51.20108" | 1466799.085 | 539037.372 | 98.009 | 0.99995690 | FND MAG NAIL NO ID |
| VT56 | 858+27.67 | 25.85' RT | 28°22'07.70999" | 82°20'56.47472" | 1466953.523 | 543926.589 | 105.014 | 0.99995562 | FND MAG NAIL NO ID |
| MT57 | 880+65.33 | 28.03' RT | 28°22'05.96716" | 82°20'31.50499" | 1466771.114 | 546156.635 | 84.656 | 0.99995505 | FND MAG NAIL NO ID |
| VT58 | 888+47.52 | 27.89' RT | 28°22'05.35571" | 82°20'22.77615" | 1466707.157 | 546936.211 | 82.266 | 0.99995485 | FND MAG NAIL NO ID |
| MT59 | 895+92.36 | 20.52' RT | 28°22'04.84477" | 82°20'14.45784" | 1466653.468 | 547679.145 | 88.177 | 0.99995467 | FND MAG NAIL NO ID |
| VT60 | 903+43.39 | 19.57' RT | 28°22'04.26557" | 82°20'06.07611" | 1466592.885 | 548427.727 | 92.483 | 0.99995448 | FND MAG NAIL NO ID |
| MT61 | 926+44.17 | 28.01' RT | 28°22'02.37803" | 82°19'46.05888" | 1466936.047 | 550720.088 | 100.762 | 0.99995392 | FND MAG NAIL NO ID |
| MT62 | 940+57.37 | 26.08' RT | 28°22'01.40051" | 82°19'24.61342" | 1466293.415 | 548130.840 | 104.760 | 0.99995388 | FND MAG NAIL NO ID |
| MT63 | 975+89.21 | 22.78' RT | 28°22'06.92733" | 82°18'45.63721" | 1466842.411 | 555614.082 | 88.014 | 0.99995277 | FND MAG NAIL NO ID |
| VT64 | 983+43.84 | 26.12' RT | 28°22'08.56934" | 82°18'37.39599" | 1467006.344 | 556350.698 | 96.711 | 0.99995260 | FND MAG NAIL NO ID |
| MT65 | 992+33.90 | 29.34' RT | 28°22'10.51284" | 82°18'27.67741" | 1467200.401 | 557219.354 | 93.960 | 0.99995240 | FND MAG NAIL NO ID |
| MT66 | 993+67.82 | 28.99' LT | 28°22'11.37270" | 82°18'26.36267" | 1467286.944 | 557337.021 | 92.392 | 0.99995237 | FND MAG NAIL NO ID |
| VT67 | 988+53.89 | 25.60' LT | 28°22'10.19999" | 82°18'31.96111" | 1467169.783 | 556836.614 | 96.315 | 0.99995249 | FND MAG NAIL NO ID |
| MT68 | 943+82.47 | 26.55' LT | 28°22'01.91699" | 82°18'40.97276" | 1466344.069 | 552566.217 | 97.475 | 0.99995350 | FND MAG NAIL NO ID |
| VT69 | 936+24.48 | 27.58' LT | 28°22'06.31619" | 82°19'29.65284" | 1466971.459 | 548186.735 | 101.729 | 0.99995355 | FND MAG NAIL NO ID |
| MT70 | 929+02.09 | 25.09' LT | 28°22'02.69975" | 82°19'37.48360" | 1466427.732 | 550981.486 | 104.413 | 0.99995386 | FND MAG NAIL NO ID |
| MT71 | 911+15.24 | 22.91' LT | 28°22'04.07972" | 82°19'57.42522" | 1466571.975 | 549200.465 | 87.346 | 0.99995429 | FND MAG NAIL NO ID |
| VT72 | 903+31.58 | 19.48' LT | 28°22'04.66026" | 82°20'06.17321" | 1466632.770 | 548419.164 | 92.384 | 0.99995448 | FND MAG NAIL NO ID |
| MT73 | 896+66.56 | 20.39' LT | 28°22'05.19044" | 82°20'13.59357" | 1466688.163 | 547756.448 | 89.100 | 0.99995465 | FND MAG NAIL NO ID |
| VT74 | 888+95.14 | 28.52' LT | 28°22'05.87524" | 82°20'22.19474" | 1466759.480 | 546988.296 | 82.284 | 0.99995484 | FND MAG NAIL NO ID |
| MT75 | 880+62.83 | 28.92' LT | 28°22'06.53123" | 82°20'31.48236" | 1466828.076 | 546158.817 | 84.710 | 0.99995505 | FND MAG NAIL NO ID |
| VT76 | 867+43.48 | 26.55' LT | 28°22'07.56199" | 82°20'46.65482" | 1466936.047 | 544803.058 | 104.760 | 0.99995526 | FND MAG NAIL NO ID |
| MT77 | 814+62.94 | 124.18' LT | 28°22'10.51937" | 82°21'45.05086" | 1467250.060 | 539588.135 | 90.216 | 0.99995675 | FND MAG NAIL NO ID |
| MT78 | 808+14.84 | 247.63' LT | 28°22'10.95740" | 82°21'52.41979" | 1467296.283 | 538930.007 | 90.703 | 0.99995693 | FND MAG NAIL NO ID |
| MT79 | 956+14.69 | 184.49' RT | 28°22'01.04963" | 82°19'06.88713" | 1466253.763 | 553714.259 | 88.114 | 0.99995321 | FND MAG NAIL NO ID |
| VT80 | 965+97.13 | 311.43' RT | 28°22'01.94077" | 82°18'55.73637" | 1466341.144 | 554710.607 | 92.008 | 0.99995297 | FND MAG NAIL NO ID |
| MT81 | 974+71.08 | 391.50' RT | 28°22'03.10720" | 82°18'46.00109" | 1466456.682 | 555580.576 | 100.475 | 0.99995277 | FND MAG NAIL NO ID |
| MT82 | 981+66.83 | 551.93' LT | 28°22'13.75473" | 82°18'40.77700" | 1467530.820 | 556050.025 | 120.865 | 0.99995267 | FND MAG NAIL NO ID |
| MT83 | 981+55.63 | 580.71' LT | 28°22'14.00750" | 82°18'40.97145" | 1467556.393 | 556032.721 | 120.136 | 0.99995266 | FND MAG NAIL NO ID |
| VT84 | 971+41.42 | 270.94' LT | 28°22'08.76815" | 82°18'51.25929" | 1467029.629 | 555112.347 | 93.276 | 0.99995288 | FND MAG NAIL NO ID |
| MT85 | 964+70.59 | 159.81' LT | 28°22'06.20733" | 82°18'58.29909" | 1466772.644 | 554482.806 | 79.179 | 0.99995303 | FND MAG NAIL NO ID |
| VT86 | 960+86.23 | 96.76' LT | 28°22'04.74593" | 82°19'02.33414" | 1466625.997 | 554121.966 | 79.879 | 0.99995311 | FND MAG NAIL NO ID |
| MT87 | 954+23.26 | 104.48' LT | 28°22'03.55493" | 82°19'09.54798" | 1466507.413 | 553477.232 | 80.159 | 0.99995326 | FND MAG NAIL NO ID |
| MT88 | 911+22.86 | 98.90' LT | 28°22'04.82377" | 82°19'57.27277" | 1466647.083 | 549214.291 | 85.226 | 0.99995429 | FND MAG NAIL NO ID |
| VT89 | 905+14.86 | 72.58' LT | 28°22'05.04072" | 82°20'04.08092" | 1466670.676 | 548606.176 | 89.380 | 0.99995444 | FND MAG NAIL NO ID |
| MT90 | 904+39.72 | 164.53' LT | 28°22'06.00714" | 82°20'04.83790" | 1466768.470 | 548538.825 | 88.939 | 0.99995445 | FND MAG NAIL NO ID |
| VT91 | 900+34.40 | 163.18' LT | 28°22'06.31160" | 82°20'09.36224" | 1466800.339 | 548134.750 | 89.622 | 0.99995455 | FND MAG NAIL NO ID |
| MT92 | 893+97.14 | 92.58' LT | 28°22'06.11416" | 82°20'16.53609" | 1466782.190 | 547493.852 | 83.500 | 0.99995471 | FND MAG NAIL NO ID |
| MT93 | 861+91.53 | 388.34' RT | 28°22'03.86662" | 82°20'52.70967" | 1466564.390 | 544621.801 | 82.880 | 0.99995523 | FND MAG NAIL NO ID |
| VT94 | 862+93.59 | 100.11' LT | 28°22'08.61598" | 82°20'51.16980" | 1467043.655 | 544400.741 | 82.637 | 0.99995549 | FND MAG NAIL NO ID |
| MT95 | 864+27.03 | 473.14' LT | 28°22'12.19682" | 82°20'49.34365" | 1467404.833 | 544564.911 | 82.574 | 0.99995545 | FND MAG NAIL NO ID |
| MT96 | 864+02.18 | 507.01' LT | 28°22'12.55062" | 82°20'49.59102" | 1467440.628 | 544542.917 | 82.674 | 0.99995546 | FND MAG NAIL NO ID |
| VT97 | 862+21.58 | 79.28' RT | 28°22'06.89670" | 82°20'52.12081" | 1466870.261 | 544315.287 | 83.248 | 0.99995552 | FND MAG NAIL NO ID |
| MT98 | 861+45.84 | 383.30' RT | 28°22'03.94953" | 82°20'53.21571" | 1466572.893 | 544216.620 | 83.006 | 0.99995554 | FND MAG NAIL NO ID |
| MT99 | 935+32.68 | 618.33' RT | 28°21'55.85425" | 82°19'31.01765" | 1465736.810 | 55155.341 | 83.500 | 0.99995572 | FND MAG NAIL NO ID |
| VT100 | 934+62.36 | 166.21' LT | 28°22'03.65309" | 82°19'31.10635" | 1466522.474 | 551551.432 | 83.078 | 0.99995372 | FND MAG NAIL NO ID |
| MT101 | 934+11.25 | 1,179.44' LT | 28°22'13.69412" | 82°19'30.77774" | 1467536.488 | 551583.522 | 83.621 | 0.99995371 | FND MAG NAIL NO ID |
| MT102 | 933+52.32 | 1,174.69' LT | 28°22'13.69344" | 82°19'31.43964" | 1467536.579 | 551524.395 | 83.450 | 0.99995373 | FND MAG NAIL NO ID |
| VT103 | 934+03.28 | 167.78' RT | 28°22'00.40286" | 82°19'32.06192" | 1466194.448 | 551465.184 | 83.181 | 0.99995374 | FND MAG NAIL NO ID |
| MT104 | 934+54.32 | 645.34' RT | 28°21'55.64916" | 82°19'31.91599" | 1465714.313 | 551476.924 | 81.731 | 0.99995374 | FND MAG NAIL NO ID |
| MT105 | 980+62.68 | 2,048.73' RT | 28°22'48.42789" | 82°18'55.39040" | 1464971.712 | 556524.629 | 76.174 | 0.99995256 | FND MAG NAIL NO ID |
| VT106 | 983+25.36 | 1,334.19' RT | 28°21'55.90580" | 82°18'34.31672" | 1465726.685 | 556622.484 | 76.622 | 0.99995253 | FND MAG NAIL NO ID |
| MT107 | 985+02.77 | 701.35' RT | 28°22'02.40613" | 82°18'33.96848" | 1466383.104 | 556655.278 | 74.771 | 0.99995253 | FND MAG NAIL NO ID |
| VT108 | 985+90.48 | 354.53' RT | 28°22'05.94750" | 82°18'33.88144" | 1466740.744 | 556663.971 | 73.561 | 0.99995252 | FND MAG NAIL NO ID |
| MT109 | 987+47.33 | 250.24' LT | 28°22'12.13127" | 82°18'33.68711" | 1467365.229 | 556682.932 | 72.897 | 0.99995252 | FND MAG NAIL NO ID |
| VT110 | 988+86.38 | 686.66' LT | 28°22'16.65114" | 82°18'33.26460" | 1467821.615 | 556721.846 | 73.059 | 0.99995251 | FND MAG NAIL NO ID |
| MT111 | 992+88.72 | 1,334.46' LT | 28°22'23.79475" | 82°18'30.49986" | 1468542.450 | 556970.660 | 75.112 | 0.99995245 | FND MAG NAIL NO ID |
| MT112 | 994+40.39 | 1,987.51' LT | 28°22'30.43302" | 82°18'30.48296" | 1469212.878 | 556973.885 | 75.412 | 0.99995245 | FND MAG NAIL NO ID |

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

SIZES: 8" X 11" (SHEET)

| | | | | | | |
|---|-------------|--|-------------|---|------------------------|-----------|
| ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | | PROJECT NAME (1 to 3 LINES) ROAD NO. PROJECT NO. SR 000 - - - - - | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | PROJECT CONTROL | SHEET NO. |
| DATE | DESCRIPTION | DATE | DESCRIPTION | | | |

310.4 - Benchmarks

Benchmarks provide a known elevation that is used as the basis for measuring the elevation of other topographical points. When benchmarks are not used to provide horizontal control, they may be placed on the Project Control sheet along the bottom of the sheet or where other space allows. At a minimum, benchmarks are to include:

- (1) Identifying name (e.g., BM No. 9)
- (2) Description (e.g., nail in tree, concrete monument)
- (3) Station and offset
- (4) Elevation (in feet to two decimal places)

310.5 - Control Points (Horizontal and Vertical Datum)

Control points provide information for the location and elevation of established monuments. Control points that provide vertical datum are also known as benchmarks.

Place the following information for the control points in a table titled Horizontal and Vertical Control:

- (1) Point Name – Often identified on the stamped disk placed on the established monument.
- (2) Northing and Easting – Show to three decimal places. If control point serves only as a Benchmark show Northing and Easting to the nearest foot.
- (3) Scale Factor – Show to eight decimal places.
- (4) Latitude and Longitude – Show seconds to five decimal places. If control point serves only as a Benchmark show Latitude and Longitude to the nearest second.
- (5) Baseline Station and Offset – Show to two decimal places.
- (6) Elevation – if control point only serves as horizontal control show elevation as “N/A”.
- (7) Description – indicate the size, type, if the monument is “found” or “set” and include the monument ID number.

When this table is the sole means to convey horizontal and vertical datum, include a project sketch on the Project Control sheet that provides a visual reference for the location of the control points. The sketch does not need to be any scale but must provide clarity and legibility. Include the following information on the sketch:

- (1) Show the baseline of survey with stationing.
- (2) Flag and label beginning and ending stations for project.
- (3) Show bearings for all tangent sections, in the direction of stationing.
- (4) Label PC and PT points and show horizontal curve data.

- (5) Indicate graphically the location of intersecting roadways and railroads.
- (6) Indicate Township, Range and Sections that the survey traverses. Show the location where section lines cross the baseline of survey.
- (7) Place a north arrow and scale in a conspicuous location, typically in the upper right portion of the sheet.

311 - General Notes

311.1 - General

General notes provide information and direction to the contractor by clarifying design details or construction practices. General notes are project-specific and must not restate, broaden, or curtail requirements in the Standard Specifications or Standard Plans.

General notes are not a substitute for specifications; refer to the Specifications Handbook for guidance. Contact the District Specifications Office for assistance with Modified Special Provisions, Technical Special Provisions, or other specification needs.

Place general notes on a standard plan sheet available in the FDOT CADD Software. Place the General Notes sheet before the first roadway plan-profile sheet in the plans set.

311.2 - Writing General Notes

It is important to choose words carefully when writing general notes, i.e., be precise and concise. Use terminology and abbreviations commonly used in the Standard Specifications and Standard Plans.

When a general note requires an action by the contractor, the note is written as a command. Do not include "Contractor must," "by the Contractor," or similar phrases in general notes.

311.2.1 - Required General Notes

See *CFX Exhibit 311-1* for required standard general notes and *CFX Exhibit 311-2* for project specific general notes.

311.2.2 - Bridge Clearance

For projects affecting an existing bridge (e.g., bridge widenings or resurfacing) that propose a minimum design vertical clearance between 16'-0" and 16'-2" or if a Design Variation or Design Exception is required, place the following general note in the plans:

"When construction is complete, submit a certified survey confirming the as-built minimum vertical clearance is equal to or greater than the minimum design vertical clearance called for in the plans."

STANDARD ROADWAY GENERAL NOTES

1. BENCHMARK ELEVATIONS SHOWN ON THE PLANS ARE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29) OR THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88) (EOR to specify). ALL SURVEY INFORMATION WAS OBTAINED FROM A LICENSED FLORIDA PROFESSIONAL SURVEYOR AND MAPPER AND UTILIZED AS SUPPORTING DATA IN THE PRODUCTION OF DESIGN PLANS AND FOR CONSTRUCTION ON SUBJECT PROJECT. THE PROFESSIONAL SURVEYOR AND MAPPER OF RECORD IS:

 SURVEYOR NAME, P.S.M.
 P.S.M. NO.: 00000
 COMPANY NAME
 STREET ADDRESS
 CITY, FL 00000
2. THE LOCATION(S) OF THE UTILITIES SHOWN IN THE PLANS (INCLUDING THOSE DESIGNATED Vv, Vh, AND Vvh) ARE BASED ON LIMITED INVESTIGATION TECHNIQUES AND SHOULD BE CONSIDERED APPROXIMATE ONLY. THE VERIFIED LOCATIONS/ELEVATIONS APPLY ONLY AT THE POINTS SHOWN. INTERPOLATIONS BETWEEN THESE POINTS HAVE NOT BEEN VERIFIED.
3. UTILITY/AGENCY OWNERS:

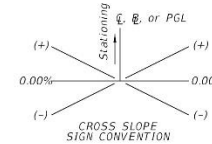
| COMPANY | CONTACT | TELEPHONE NUMBER |
|----------------------|--------------|------------------|
| SPRINT/FLORIDA, INC. | JON BAKER | (850) 555 - 1234 |
| CFX ITS/FIBER | PAT COLLINS | (407) 690 - 5056 |
| CFX LIGHTING | BRYCE RAINEY | (407) 690 - 5335 |
4. SPECIAL EVENT DAYS FOR THIS PROJECT INCLUDE:

 (List applicable special event days e.g., UCF HOME SPORTING EVENTS)
5. ANY NGVD 29 OR NAVD 88 MONUMENT WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF IN DANGER OF DAMAGE, NOTIFY:

 BUREAU OF SURVEYING & MAPPING
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 COMMONWEALTH BOULEVARD, MP 105
 TALLAHASSEE, FL 32399-3000
 TELEPHONE (850) 245-2606
6. MAINTAIN THE INTEGRITY OF THE LIMITED ACCESS FENCING AT ALL TIMES.
7. DO NOT BRING ANY HAZARDOUS MATERIALS ONTO THE PROJECT. SHOULD SUCH MATERIALS BE REQUIRED FOR PERFORMING THE CONTRACTED WORK, SUBMIT A WRITTEN REQUEST TO THE ENGINEER FOR APPROVAL. PROVIDE THE ENGINEER WITH A COPY OF THE MATERIAL SAFETY DATA SHEET (SDS) FOR EACH HAZARDOUS MATERIAL PROPOSED FOR USE. BECAUSE STATE LAW DOES NOT TREAT PETROLEUM PRODUCTS THAT ARE PROPERLY CONTAINERIZED AND INTENDED FOR EQUIPMENT USE AS A HAZARDOUS MATERIAL, SUCH PRODUCTS DO NOT NEED A SDS SUBMITTAL. ANY KNOWN OR SUSPECTED HAZARDOUS MATERIAL FOUND ON THE PROJECT SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, WHO SHALL DIRECT THE CONTRACTOR TO PROTECT THE AREA OF KNOWN OR SUSPECTED CONTAMINATION FROM FURTHER ACCESS. THE ENGINEER IS TO NOTIFY CFX OF THE DISCOVERY. CFX WILL ARRANGE FOR INVESTIGATION, IDENTIFICATION, AND REMEDIATION OF THE HAZARDOUS MATERIAL. DO NOT RETURN TO THE AREA OF CONTAMINATION UNTIL APPROVAL IS PROVIDED BY THE ENGINEER.
8. NOTIFY ALL CONCERNED UTILITY COMPANIES 48 HOURS IN ADVANCE OF WORKING NEAR THEIR EXISTING FACILITIES. NO UNDERGROUND EXCAVATION SHALL COMMENCE UNTIL EXISTING UTILITIES HAVE BEEN PROPERLY MARKED.
9. A CFX REPRESENTATIVE SHALL BE PRESENT DURING CONSTRUCTION IN THE VICINITY OF CFX ITS FACILITIES.
10. OUT OF SERVICE BURIED UTILITIES WITHIN THE LIMITS OF ROADWAY EXCAVATION SHALL BE REMOVED.
11. LIMITS OF CONSTRUCTION AS SHOWN ON THE TYPICAL SECTIONS REPRESENT THE LIMITS OF STANDARD CLEARING AND GRUBBING. ADDITIONAL AREAS ARE SHOWN ON THE APPLICABLE PLAN AND POND SHEETS.

STANDARD ROADWAY GENERAL NOTES

12. ALL WASTE MATERIALS SHALL BE REMOVED FROM CFX'S RIGHT OF WAY AND PROPERLY DISPOSED OF IN AREAS PROVIDED BY THE CONTRACTOR.
13. DISPOSE OF MILLED MATERIAL AWAY FROM THE PROJECT SITE AT A LOCATION PROVIDED BY THE CONTRACTOR. NO MILLED MATERIAL SHALL BE STOCKPILED WITHIN THE PROJECT RIGHT OF WAY. THIS SHALL INCLUDE MATERIAL REMOVED BY THE CONSTRUCTION OF THE GROUND IN RUMBLE STRIPS. DO NOT SWEEP MILLED ASPHALT ONTO UNPAVED SHOULDERS.
14. DURING MILLING OPERATIONS, ENCROACHMENT INTO THE LIMEROCK BASE IS ANTICIPATED IN SOME OF THE MILLING SCHEMES. REMOVE ANY LOOSE ASPHALT REMNANTS AND ROLL THE EXPOSED LIMEROCK BASE COURSE WITH A MINIMUM OF TWO PASSES OF A 5 TO 12 TON RUBBER TIRE ROLLER. AN APPLICATION OF PRIME OR TACK COAT AND A MINIMUM OF ONE LIFT OF ASPHALT IS REQUIRED BEFORE OPENING THE LANE TO TRAFFIC.
15. CONSTRUCT RETENTION/DETENTION PONDS AND OUTFALL STRUCTURES PRIOR TO ROADWAY CONSTRUCTION.
16. EXISTING DRAINAGE STRUCTURES WITHIN THE CONSTRUCTION LIMITS SHALL REMAIN/BE REMOVED UNLESS OTHERWISE NOTED.
17. ALL TYPE S INLETS (INDEX 425-040) ARE TO BE PROVIDED WITH PARALLEL BAR TYPE GRATES.
18. ALL STORM SEWER CULVERTS AND PIPES SHALL BE CLASS I/II/III/IV/V (EOR to specify) REINFORCED CONCRETE PIPE OR CLASS II POLYPROPYLENE PIPE UNLESS OTHERWISE NOTED. ALL GUTTER DRAIN PIPES SHALL BE BITUMINOUS COATED CORRUGATED METAL PIPE OR CORRUGATED HDPE (EOR to specify) BCCMP OR HDPE UNLESS OTHERWISE NOTED. ALL WALL ZONE PIPES SHALL BE POLYPROPYLENE PIPE UNLESS STEEL PIPE IS SPECIFIED IN THE PLANS.
19. WHERE A CONCRETE COLLAR/JACKET IS IDENTIFIED IN THE PLANS TO JOIN A NEW PIPE TO AN EXISTING PIPE, THE EXISTING PIPE MUST BE REMOVED TO THE NEAREST JOINT TO BEGIN THE PLACEMENT OF THE NEW PIPE, UNLESS IT WOULD REQUIRE ENCROACHMENT INTO THE ADJACENT TRAVEL LANE. THE CONCRETE MUST BE CURED AND INSPECTED TO CONFIRM THE INTEGRITY OF THE COLLAR PRIOR TO PLACEMENT OF FILL MATERIAL.
20. THE CROSS SLOPES AND SUPERELEVATIONS SHALL ADHERE TO THE FOLLOWING SIGN CONVENTION:



21. VIBRATORY AND OSCILLATORY ROLLING OF PAVEMENT SHALL NOT BE PERMITTED.
22. EXISTING LIMEROCK BASE THAT IS REMOVED SHALL NOT BE USED IN THE CONSTRUCTION OF THE NEW LIMEROCK BASE. EXISTING LIMEROCK THAT IS REMOVED MAY BE INCORPORATED INTO THE STABILIZED PORTION OF THE SUBGRADE OR DISPOSED OF PROPERLY OFF THE PROJECT SITE.
23. BITUMINOUS PRIME COAT SHALL BE APPLIED TO ALL LIMEROCK BASES ON WHICH PAVEMENT IS TO BE PLACED AT A RATE NOT LESS THAN 0.15 GALLONS PER SQ. YD., OR AS DIRECTED BY THE ENGINEER.
24. THE CONSTRUCTION JOINT BETWEEN LANES FOR SP LIFTS SHALL BE OFFSET 6" MIN. FROM THE LIFT BENEATH.
25. PROVIDE A SMOOTH TRANSITION BETWEEN THE ROADWAY AND THE BRIDGES. SURVEY AND PLOT THE PROFILE SHOWING THE TRANSITION OF THE BRIDGE, THE BRIDGE APPROACH/DEPARTURE SLAB, AND STRUCTURAL COURSE. SUBMIT THE PROFILE TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT OF FRICTION COURSE.
26. WHEN MEASURING FOR SURFACE IRREGULARITIES, STRAIGHT EDGE ASPHALT, APPROACH SLABS, AND BRIDGE DECKS (15' ONTO BRIDGE DECK).

CFX Exhibit 311-1
General Notes

SOURCE: SPFILES

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| REVISIONS | | | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | STANDARD NOTES FOR ROADWAY PROJECTS | SHEET NO. |
|-----------|-------------|------|-------------|---|--------------------------------|-------------|---|--|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | | | SR 000 | --- | | | |

STANDARD ROADWAY GENERAL NOTES

- 27. THE FRICTION COURSE ON CFX ROADS SHALL BE MADE WITH DARK GRANITE AGGREGATE ONLY.
- 28. THE FRICTION COURSE OVERLAP SHALL BE INSTALLED TO THE DIMENSION PROVIDED ON THE TYPICAL SECTIONS WITHIN A 1/2" TOLERANCE.
- 29. TAPE PAVEMENT MARKINGS SHALL NOT BE PLACED OVER LONGITUDINAL FRICTION COURSE JOINTS.
- 30. ALL DISTURBED AREAS WITHIN THE LIMITS OF CONSTRUCTION SHALL BE GRADED AND SODDED, UNLESS OTHERWISE NOTED.
- 31. ALL PERMANENT GRASS AREAS, EXCEPT POND BOTTOMS, SHALL RECEIVE A 6" FINISH SOIL LAYER MEETING THE REQUIREMENTS OF CFX TECHNICAL SPECIFICATION SECTION 162.
- 32. ALL A-B MATERIAL MAY BE STOCKPILED ON-SITE AND USED AS EMBANKMENT MATERIAL AND/OR FINISH SOIL LAYER IN ACCORDANCE WITH INDEX NO 120-001, 120-002, AND THE STANDARD SPECIFICATIONS. ANY UNSUITABLE MATERIAL REMOVED FROM THE SITE BECOMES THE PROPERTY OF THE CONTRACTOR TO BE DISPOSED OF PROPERLY.
- 33. ALL PERMANENT AND TEMPORARY CRASH CUSHIONS ON CFX'S SYSTEM SHALL BE REDIRECTIVE AND NON-GATING. ALL TEMPORARY CRASH CUSHIONS USED ON CFX'S SYSTEM SHALL BE DESIGNED AT THE ORIGINAL POSTED SPEED NOT AT THE REDUCED TCP SPEED.
- 34. (New alignment) THE STATION/OFFSETS AT RIGHT OF WAY BREAKPOINTS AND CORNERS REFER TO THE R/W LINE AND NOT THE FENCE LOCATION AND ARE BASED UPON CENTERLINE CONSTRUCTION STATIONING.
- 35. (New alignment) PERMANENT TURNOUTS AND DRIVEWAY CONNECTIONS TO PRIVATE PROPERTY THAT LIE OUTSIDE THE LIMITS OF LIMITED ACCESS RIGHT OF WAY AND WHERE ACCESS RIGHTS HAVE NOT BEEN ACQUIRED SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TURNOUT DETAILS AND STATE STANDARD SPECIFICATIONS REFERENCED ON THE KEY SHEET OF THESE PLANS. DO NOT ISOLATE ADJACENT AND/OR THE REMAINDER OF THE PROPERTY UNLESS ACCESS RIGHTS ARE ACQUIRED. ACCESS SHALL BE PROVIDED TO SUCH PROPERTY WHENEVER THE CONSTRUCTION INTERFERES WITH THE EXISTING MEANS OF ACCESS.

PROJECT SPECIFIC GENERAL NOTES

- 1. ENGINEER OF RECORD TO DETERMINE ADDITIONAL NOTES AS REQUIRED.

NOTES TO DESIGNERS:

STANDARD NOTES AS SHOWN ARE APPLICABLE TO THE MAJORITY OF PROJECTS ALONG THE CFX SYSTEM

WHERE A NOTE DOES NOT APPLY, IT SHALL BE REVISED TO "NOT USED" SUCH THAT THE NUMBERING OF STANDARD NOTES DOES NOT CHANGE

ADDITIONAL NOTES MAY BE ADDED UNDER "PROJECT SPECIFIC GENERAL NOTES" AS DETERMINED BY THE SECTION ENGINEER

DELETE THIS BOX AND ALL "NOTES TO DESIGNERS" PRIOR TO SUBMITTAL OF PLANS FOR REVIEW

CFX Exhibit 311-2
Project Specific
General Notes

3/21/2023 1:33:27 PM #:\0268183\CFX Design Criteria\CFX Standards\Source Files\CODE Updates\02-21-23\UMITR001_V2.dgn

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| REVISIONS | | | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | STANDARD NOTES FOR ROADWAY PROJECTS | SHEET NO. |
|-----------|-------------|------|-------------|---|--------------------------------|-------------|---|--|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | | | SR 000 | --- | | | |

312 - Roadway Plan-Profile

312.1 - General

The Roadway Plan-Profile sheet provides the complete horizontal and vertical alignments for the project. Various roadway elements such as pavement width, medians, paved shoulders, curbs, drainage elements, tapers, turn provisions, and intersecting roadways, are shown on this sheet. Prepare the Roadway Plan-Profile sheet according to the standard formatted sheets that are contained in the FDOT CADD Software. The scale is 1"=50'.

When appropriate, the plan-profile sheet may be divided into separate plan sheets and profile sheets.

312.2 - Roadway Plan Portion

312.2.1 - Centerline

Place the baseline of survey or centerline of construction in the center of the plan portion of the sheet, with stationing increasing from left to right. For resurfacing projects, simple projects, or sections of a project without a profile view, "stacking" multiple plans on one sheet is optional if clarity and legibility are maintained. When multiple plan views are shown on a plan sheet, they must be stacked from top to bottom. When the alignment includes horizontal curves, lay the centerline on the sheet in such a manner to avoid breaks or match lines (except at the beginning or end of the sheet).

Place "tick" marks on the upper side of the centerline at every station as shown in Figure 312.2.1. Place intermediate ticks between the station ticks. Intermediate ticks should be half the length of station ticks.

Place station numbers close to station ticks for scales up to and including 1" = 50'.

Show bearings for tangent sections (in the direction of stationing) below the baseline and centerline. Where appropriate, tie intersecting roads or streets by station and angle/bearings to the baseline or centerline. Section lines or city limits must be tied by station and angle/bearings to the baseline or centerline.

In cases where the construction centerline does not coincide with the survey baseline, the construction centerline must be identified with complete alignment data and tied to the survey baseline; however, the construction centerline need not be shown when it is uniformly offset from the survey baseline for the entire length of the project and is shown on the typical section. Show all station equations occurring on the survey baseline and those equating the survey baseline and construction centerline.

Place a north arrow and scale at a point of maximum visibility, typically in the upper right portion of the plan view.

312.2.2 - Horizontal Curves

Designate PC and PT points of horizontal curves by small circles with short radial lines from these points. Designate PI points by a small triangle with a short section of tangent on either side.

Properly orient the horizontal curves within the plan view when clipping plan sheets. Repeat the curve data on each sheet when a curve extends over more than one plan sheet. Show horizontal curve data using the following format:

CURVE DATA

| | |
|----------|------------------------------|
| PI | (Station) |
| Δ | (Delta Angle with Direction) |
| D | (Degree of Curve) |
| T | (Tangent Length) |
| L | (Length of Curve) |
| R | (Radius Length) |
| PC | (Station) |
| PT | (Station) |
| e | (Superelevation Rate) |

Horizontal curve information must also be shown on its own individual sheet(s) known as “Curve and Coordinate Data” and must contain all horizontal curve information as identified in the FDM as well providing the “Northing/Easting” information for the PC, PI, PT, and CC of the curves.

The Design Speed (DS) of the curve shall also be identified.

312.2.3 - Existing Topography

Show and label all existing topography, including roads, streets, drives, buildings, underground and overhead utilities, walls, curbs, pavements, fences, railroads, bridges, drainage structures and similar items. Also show streams, ponds, lakes, wooded areas, ditches, and other physical features. Existing gasoline storage tanks within limits of topographical survey must be shown.

Show and label all existing utilities. If the type of utility is unknown it should be labeled as such. Indicate the line voltage for all overhead electrical power lines. Use standard symbols contained in the FDOT CADD Software.

312.2.4 - Construction and Project Limits

Flag and station the following limits:

- (1) Begin project and end project. Project limits should be at the beginning and the end of the full typical sections. Begin construction and end construction where construction limits are other than project limits. Transitions for maintenance of traffic and other construction work such as feathering, friction course, guardrail, drainage work, signing and marking work, and sidewalk may fall outside of the project limits but must be included within the construction limits. If plans include more than one project, identify the

limits for each by Financial Project ID. The Engineer of Record is responsible for determining project and construction limits.

- (2) The limits of project breakdown necessary for separation of length and quantities for federal aid and non-federal aid projects.
- (3) The limits of each type of construction classification where more than one type is involved, such as, new construction, resurfacing, bridge work, widening, and milling.
- (4) The begin and end limits of project exceptions (excluded areas).
- (5) Station equations

312.2.5 - Drainage Structures and Bridges

Show proposed cross drainpipes, box culverts and three-sided culverts by using a symbol and a drainage structure number. Label cross drainpipe sizes and lengths on plan-profile sheet. Show box and three-sided culvert lengths on drainage structure sheet.

Bridge-sized culverts (a.k.a., bridge culverts) are defined in **FDM 265.1**. Flag and station the begin station and end station for the bridge culvert (outside wall to outside wall). Provide a bridge number and a drainage structure number for all bridge culverts.

Show proposed bridges and approach slabs by simple outline. Flag and station the begin station and end station for the bridge and for the approach slabs. Also provide a bridge number. Show the existing vertical clearance for any construction affecting existing bridges.

When appropriate, show a short section of lateral ditch/outfall centerline on the Roadway Plan-Profile sheet, and include a note referring to lateral ditch/outfall sheets for details.

Show the proposed drainage system by depicting storm drainpipes with a single line, and the outline of inlets, manholes and junction boxes. The outline of structure bottoms may be shown. Label the pipe size and length between structures. Provide structure numbers for inlets, manholes, junction boxes and special structures.

312.2.6 - Plan Sheet Layout

Provide the following dimensions or labeling:

- (1) Show R/W lines. Dimension the R/W line only if the applicable typical section shows a varying dimension from the baseline or centerline. Dimensions of the R/W line must be from the centerline or baseline if survey and construction lines are parallel; otherwise dimension the R/W line from the construction centerline.
- (2) Avoid showing detailed information regarding median openings or intersections when specific details can be grouped on a separate sheet. When this is the case, identify median openings and intersections by station location.

- (3) Label locations along the alignment where traveled way dimensions change, or begin to change, including the station and dimensions of the traveled way.
- (4) Show curb, curb and gutter, traffic separators, sidewalks, curb ramps, retaining walls, and driveways.
- (5) Show stations of return points in tabular form or include on the plan, unless shown on an intersection detail sheet. Also, show offsets, if not governed by a typical.
- (6) Show station of radius points of traffic separator or median curb at median openings on the plan. Elevation of these points must also be shown if not shown in the intersection details sheet.
- (7) Indicate control radii for traffic turns when setting median nose locations, unless shown on the intersection detail sheet.
- (8) Include the station of end of curb and gutter at side street intersections (when end is not at a return point) with proposed gutter grade elevation.
- (9) Include label for begin/end guardrail.
- (10) Include station offset for begin/end differing paved shoulder widths.
- (11) Indicate the limits of pavement and grading at side street intersections.
- (12) When incidental construction extends beyond the R/W lines, construction easements or license agreements may be required and should be shown on the plan sheets.
- (13) Show the limits of wetlands based on permit or regulatory requirements.
- (14) Show all utilities. Label field verified utilities (see Quality Level "A" locates, **FDM 221**.) in accordance with the following symbol:

Vvh = Verified Vertical Elevation and Horizontal Location

Projects with minor utility work or impacts may include these features on the Roadway Plan-Profile sheet.

- (15) Plot the locations of roadway soil borings in the roadway plan view using a target symbol and boring number label.

In addition to the dimensions and labeling on plan sheets, the following should be shown on a plan sheet. See **CFX Exhibit 312-1**.

- Shade M&R including shoulders
- Concrete pattern (appropriate scale) for concrete
- Hatch special areas (e.g., isolated areas of base repair, or deeper milling), if more than one area, crosshatch second area

- No shading or hatching of new construction, widening, or new shoulder pavement (aside from paved shoulder hatching)
- Do not show pavement markings or lane direction arrows
- Include overhead sign structures, without callouts (this is to avoid conflicts with foundation locations)
- Dimension to limits of widening (i.e., dimension each edge of widening from the BL or CL)

312.3 - Roadway Profile Portion

312.3.1 - General Data

Preformatted plan-profile sheets are in the FDOT CADD Software. The grid portion of each sheet is used for plotting the project profile. The standard grid pattern for the profile portion of the sheet is five lines per inch, both in the horizontal and vertical. This will accommodate most scales. An optional grid with four lines per inch is available. This sheet may be used if approved by the district.

The horizontal scale for the profile portion of the sheet must be the same as that used for the plan portion. Station limits of the profile must correspond to those of the plan portion of each sheet. Station numbers must be placed across the bottom of the sheet just above the title block. Intervals for profile stations must be the same as those in the plan view.

Select the vertical elevation datum such that the profile will not crowd either the upper or lower limits of the profile format. As a general guideline the vertical scale should be 10% of the horizontal grid. Show the elevation datum on both the left and right sides of the sheet in the space provided adjacent to the grid.

Label the existing ground line profile and show the existing ground line elevations vertically, just above the station numbers at each end of the sheet only. Show and label all high-water elevations affecting base clearance or roadway grades. Refer to Exhibit 312-2 for correct format.

Show station equations and exceptions. Begin and end stations of project, construction, bridge, and bridge culverts must also be shown.

312.3.2 - Vertical Alignment

Show and label the proposed profile grade. Vertical curve PCs and PTs must be indicated by small circles and PIs by a small triangle with short sections of tangent shown on each side. Show percent grade to three significant decimal places on the tangent line (trailing zeros need not be shown). Extend vertical lines from the PC and PT points and place a dimension line indicating the length of the vertical curve. The PC and PT stations and elevations must be labeled on the vertical lines.

For vertical curves, show the profile grade elevations on even stations and at appropriate intervals. Place the elevations between the dimension line and the grade line. Also, place the curve length, dimension lines and the profile grade elevations above the grade line for sag vertical curves and below the grade line for crest vertical curves. The dimensions and elevations must be placed near the grade line whenever possible. The PI station and elevation must be noted, lettered vertically above the PI symbol for crest curves and below for sag curves.

Show the profile grade elevation of the beginning and ending station of each sheet vertically just above the grade line, except when the beginning or ending station is on a vertical curve.

312.3.3 - Grades

Label percent grade to three decimal places for each tangent section on every sheet (trailing zeros need not be shown). When two tangent grades intersect and no vertical curve is required, label the PI station and elevation vertically, using the same criteria as for vertical curves.

312.3.4 - Superelevation and Special Profiles

For standard superelevated sections, superelevation transitions shall be plotted above the roadway profiles, with stationing labels indicating the beginning and ending points of the superelevation transitions as well as the location of zero cross slope. For non-standard superelevated sections of the project, the beginning and ending superelevation stations should be indicated on the profile with a note: "For Superelevation details see Special Profiles Sheet"

Other special profiles that cannot be clearly shown on the plan-profile sheets must be referenced in a similar manner to non-standard superelevated sections. For additional information regarding special profiles see **CFX Design Guidelines 313**.

312.3.5 - Other Profile Features

For flush shoulder roadways, show and label special ditches in the profile. Show percent ditch grade and a beginning or ending ditch PI with elevation and station plus. For multilane divided projects, three special ditch grades (right and left roadway ditches and median ditches) sometimes occur at the same location. In such cases, it may be advantageous to show the median ditch at a convenient location on the sheet with a separate elevation datum.

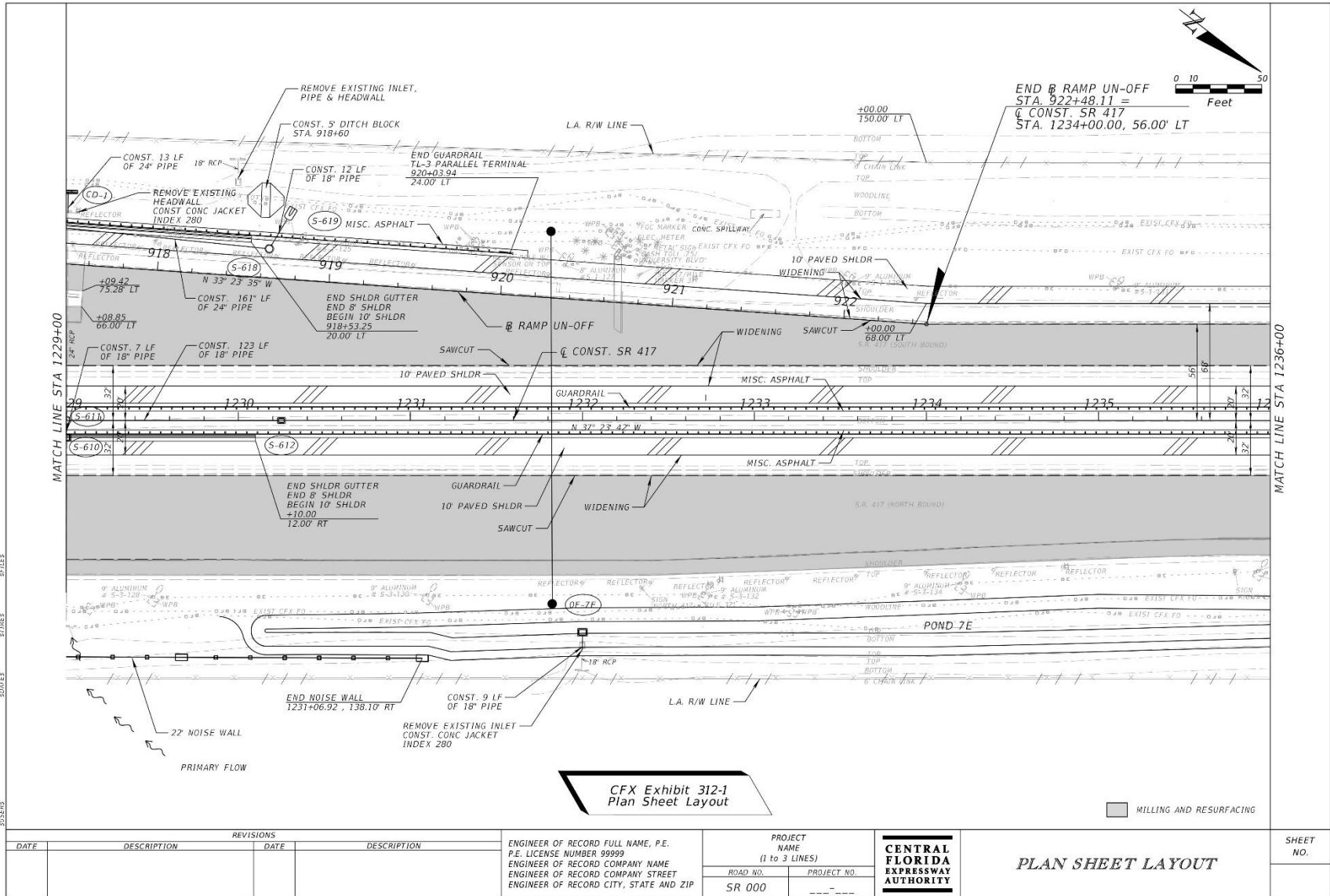
Depict uniform ditches of non-standard depth by a dimension line in the lower portion of the grid and label as a special ditch with location and depth or show them by flagging the DPIs at each end with station elevation and side. Standard depth ditches are not labeled.

Show special gutter grades in profile for cases where the gutter grades are not controlled by the typical section and no "special profiles" are included in the plans set. Prolongations of gutter profile grades across street intersections must be included on plan-profile sheets if an inlet is not provided before the intersection.

Show storm drainpipes, inlets and manholes along the main line. Pipes must be noted by size. Proposed structures may be shown by structure number only. Show flow line elevations for all pipes entering and leaving the structure.

Plot proposed cross drainpipes and culverts at the correct location and elevation of the proposed structure crossing the centerline of construction. Identify cross drains by structure number only.

Where the project overpasses a road or railroad, the cross-section template of the road/railroad under the bridge must be shown at the appropriate location in profile. Except for transverse utilities, do not show underground utilities in profile.



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| REVISIONS | | | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | SHEET NO. |
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| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | |
| | | | | | SR 000 | | PLAN SHEET LAYOUT | |
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313 - Special Profile and Back-of-Sidewalk Profile

313.1 - General

Special Profile sheets show profiles of pavement edges or gutter flow lines at street intersections, ramp termini, curb returns, railroad crossings and roadway or bridge sections requiring special superelevation details. Vertical transitions between roadways and bridges may also require special profiling.

Back-of-Sidewalk Profile sheets are used to establish the profile grade of sidewalk that is separated or independent from the roadway. Profiles help ensure the constructability of the project within the R/W without excessive disturbance or rework of adjoining properties. Back-of-sidewalk profiles are also used for checking of stormwater trapped behind the sidewalks and as a major input for establishing centerline grade profiles.

313.2 - Special Profile Sheet

Prepare Special Profile sheet as outlined in the following sections.

313.2.1 - Intersections

In addition to normal profile grade lines, supplemental profiles and sections at intersections may be necessary to define edge of pavement profiles. Include sections showing pavement surface elevations for nose points and other critical locations. It is important to develop accurate profiles and sections at locations of curbed channelization to ensure proper drainage.

When plan-profile format is used for intersection details, the profile's horizontal scale must be the same as that for the plan portion. A vertical scale of 1" = 2' for the profile portion is recommended as it enables intermediate elevations to be determined from the profile with reasonable accuracy. The existing ground line and curb line must be as called for in the CADD Manual.

For intersections detailed on a plan only format, show the profile and sections on a separate grid sheet. The standard cross section sheet, available in the FDOT CADD Software, should be used. This sheet features a standard grid of five lines per inch, both in the vertical and horizontal. The vertical scale can be altered to ten lines per inch by utilizing a toggle feature in the FDOT CADD Software.

For street intersections of municipal projects, a scale of 1" = 20' horizontally and 1" = 2' vertically, or 1" = 50' horizontally and 1" = 5' vertically is recommended.

313.2.2 -Curb Returns

Curb return profiles show the profiles of the gutter flow line from the PC to the PT point of the return at an intersection.

Show curb return profiles on a grid format. They must be included in the plans set if the required information cannot clearly be shown on the plan-profile sheet or intersection detail sheet, or if extreme grades are involved.

Standard scale used should be 1" = 20' horizontally and 1" = 2' vertically. Other scales may be used provided all construction details are clearly and legibly shown. Identify each return profile and its PC

and PT stations shown. Elevations should be shown at appropriate intervals and low and high spots must be identified by location and elevation.

313.2.3 - Ramps

Develop ramp profile grades along the baseline of each ramp. A profile of the edge of the pavement opposite the baseline must also be shown. Show these profiles on a grid format. Data required to be shown is similar to that required in **CFX Design Guidelines 312** for roadway profile.

Recommended scales for ramp profiles are: 1" = 20' horizontally and 1" = 2' vertically, or 1" = 40' or 50' horizontally and 1" = 4' or 5' vertically.

Sections at nose points are required. They may be shown using a scale of 1" = 20' horizontally and 1" = 2' vertically.

313.2.4 - Spline Grade

Intersections of ramp pavement with mainline pavement and other sections of pavement within special superelevated zones need special attention, not only during the design phase of the project, but also during construction. Construction details pertaining to these areas should be clearly and accurately shown in the plans.

Spline grades are often used to show the interconnection and interrelation of the edges of pavement with the mainline edge of pavement. This profile proves to be especially helpful if the mainline pavement is superelevated or within the superelevation transition zone.

A spline grade must show the elevations at intervals of 20 to 100 feet, depending on the scale. Show elevations for the outer edge of mainline pavement and inner and outer edges of the ramp pavement at the nose areas.

Show grades of the three pavement edges on a grid format. Recommended scales are 1"=20' horizontally, 1"=2' vertically, or 1"= 40' or 50' horizontally and 1"= 4' or 5' vertically.

Join the grades of each pavement edge by smooth splines or simple curves. The three grade profiles must be clearly labeled, and all equality stations indicated. Flag and label nose stations. Place the scale in proximity of the profile and ensure that it is clearly visible.

313.2.5 - Superelevation

Standard superelevation details shown in **Standard Plans, Indexes 000-510 and 000- 511** may be used for projects with simple curves. Show a superelevation diagram in the plans for:

- Reverse curves
- Compound curves
- Other conditions requiring special superelevation not covered in the standards

Special profile details may be used to design superelevation on multilane facilities when a simple diagram will not be sufficient.

Show complete profile grade line and edges of pavement (right and left) within the superelevation zone on the grid format. A scale of 1" = 20' horizontally and 1" = 2' vertically is recommended for clarity. Label the begin and end superelevation stations with a solid vertical line at the appropriate station. Use a horizontal dimension line to indicate a section in full superelevation.

313.2.6 - At-Grade Railroad Crossings

In addition to normal profile grade lines, supplemental profiles for at-grade railroad crossings may be necessary to define lane lines, edges of pavement, and gutter flow lines. Develop profiles that ensure proper drainage.

For at-grade railroad crossings that cannot be adequately detailed on the plan-profile sheets, show the profiles on a separate grid format. A horizontal scale of 1" = 20' and a vertical scale of 1" = 2' are recommended.

313.3 - Back-of-Sidewalk Profile Sheet

Sidewalk grades shown on this sheet are at the back of the proposed sidewalk. The location of the profile grade line (PGL) is denoted on the typical section.

Prepare Back-of-Sidewalk Profile sheet using standard cross section format. For simple projects which do not involve many cross streets or driveways, the sheet may be divided horizontally to maximize usage. Stationing must progress from left to right and multiple profile views must be stacked from top to bottom. Match lines must be stationed. Care should be taken to preserve clarity and legibility.

Work sheets may be required with phase reviews. The inclusion of the back-of-sidewalk profiles in the plans set is optional, at the discretion of the CFX, for local road connections only.

313.3.1 - Required Information

Show existing ground profile, proposed back-of-sidewalk profile, and the profile grade line in accordance with the CADD Manual.

The standard scales are 1" = 100' horizontally and 1" = 5' vertically. This combination works well for projects having few locations where back-of-sidewalk grades would be critical. A vertical scale of 1" = 2' and a horizontal scale of 1" = 50' may be used for projects located in business and commercial areas, or where greater clarity is required. Show elevation datum on both sides of the sheet, with station numbers below the profile.

Limits of existing pavement (e.g., parking areas, driveways) must be identified on the back-of-sidewalk profile. Existing pavement and proposed sidewalk should match elevation as closely as possible. Indicate the centerline for each intersecting street and driveway with a vertical line at the proper station and the street name and station noted. Intersecting streets and driveways on the right must be shown below the profile and those on the left above the profile.

At each station, as well as locations of significant drainage, draw arrows to indicate the slope of ground at the outer edges of the sidewalk.

Place drainage arrows below the profile line for the right profile and above the profile line for the left profile. Arrows pointing outwards from the profile indicate drainage away from the project, while arrows pointing inwards indicate drainage to the project.

Indicate floor elevations for buildings with a horizontal line drawn at the floor elevation between the building limits. Show the numeric elevation, as well as the offset (distance and side) from centerline of project to the face of the building. Entrances to buildings, elevations of top of existing major utilities (see **FDM 221**), and water table elevation may be shown when appropriate.

Once the proposed back-of-sidewalk profile has been developed, show percent of grade, PI stations, and elevations. Vertical curves, if any, must be dimensioned. Elevations along vertical curves are not required. Flag and label stations for begin and end project, exceptions, back-of-sidewalk special profiles, and mainline station equations within the limits of the sidewalk profile.

Note the difference in elevation between the profile grade line and back-of-sidewalk profile grade on the sheet. Superelevation notes, if applicable, must also be included on the sheet.

313.4 - Treatment/Attenuation Swales

Identify treatment swales in the profile view of the plans and include the following:

Begin Treatment/Attenuation Swale @ Sta. XXX LT (or RT) Construct Ditch Block; Sta. XXX LT (or RT); Top Elevation xx.xx

End Treatment/Attenuation Berm Sta. XXX LT (or RT); Top Elevation, if required DHW and SHWT elevations

For plan sets that do not have a profile view, the stations and elevations above must be summarized in a table that uses the same naming convention.

Note that treatment/attenuation berm locations need to be specified only if a special longitudinal berm is constructed above natural ground to increase storage in the swale. If the outside boundary of the treatment/attenuation swale is the intersection between the backslope and natural ground confirm that the design high-water does not exceed 0.5 feet below the elevation of the intersection point and that no special berm information is necessary in the plans.

314 - Intersection and Interchange Layout and Details

314.1 - General

These sheets provide layouts and details for intersections and interchanges, with consideration for turning and weaving movements of vehicular traffic. For a safe and efficient roadway system (including provisions for bicycles and pedestrians), these areas must be designed with special attention to channelization, turning movements, signalization, drainage, and vertical alignment.

Intersection and interchange layout sheets must show details of geometric controls and access management features including:

- Channelization
- Tapers
- Turn lanes
- Special drainage
- Grading

Prepare the sheets on a standard plan format using a scale large enough to show details clearly and legibly.

314.2 - Intersections

These sheets are to be titled:

- (1) Intersection Layout, or
- (2) Intersection Details.

Show intersection details on a separate plan sheet if they cannot be shown clearly on the plan-profile sheet.

In cases of simple, non-signalized intersections covering small areas, a regular plan-profile sheet may be used. Use an appropriate scale to place the intersection layout in the plan portion and the profile grades in the profile portion.

For larger, more complicated intersections involving channelization, signalization, or tapered connections, place the layout on a standard plan sheet. Match lines should be used when more than one sheet is required.

Place the profiles separately on a grid format. Existing topography need not be shown on these details if it is shown elsewhere in the plans. Refer to **CFX Design Guidelines 313** for additional information on displaying profiles on grid format.

Information in the plan and profile portions of these sheets typically includes:

- Pavement edges
- R/W lines
- Curb and gutter
- Channelizing and median curbs
- Driveways
- Sidewalks
- Drainage structures
- Pavement dimensions
- Radii
- Appropriate notes

Intersection layouts must be dimensioned, stationed, and include pertinent construction notes and alignment data. Provide design speed data when appropriate. Check widths of turning lanes and turning paths for encroachments or conflicts.

Include a north arrow and scale at a point of maximum visibility on the plan sheet. Use a scale that is sufficient to cover all necessary details, preferably 1" = 40'. Do not use a scale smaller than 1" = 50'.

314.3 - Interchanges

These sheets are to be titled:

- (1) Interchange Layout,
- (2) Interchange Drainage Map,
- (3) Interchange Topographic Map,
- (4) Interchange Cross Section Pattern,
- (5) Ramp Terminal Details, or
- (6) Ramp Cross Sections.

314.3.1 - Geometric Layout

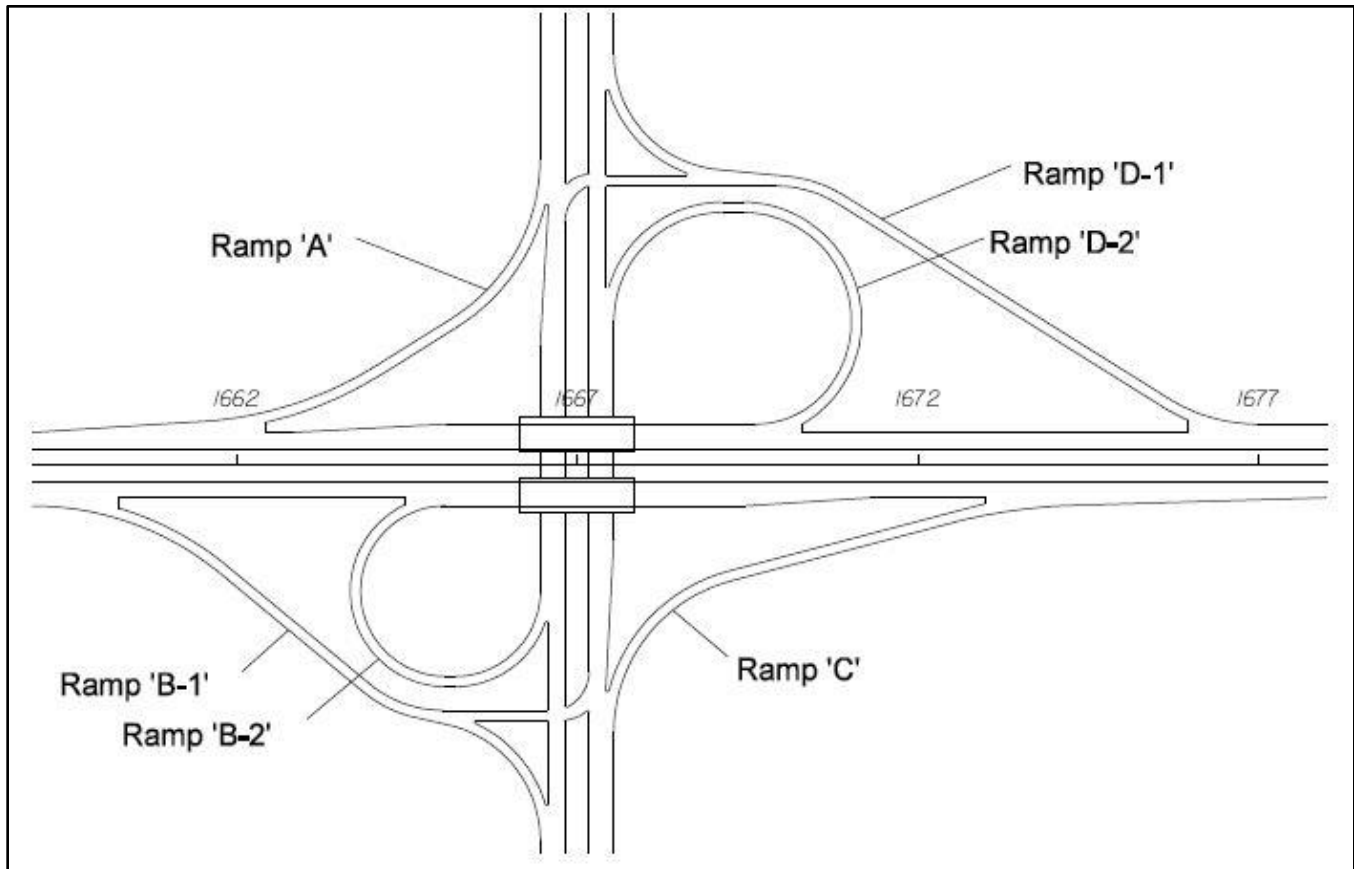
Prepare the Interchange Layout sheet on a standard plan sheet. Place the entire interchange on one sheet when possible, using a scale no smaller than 1" = 400'. In cases of large cloverleaf or directional interchanges, more than one sheet may be required. Show appropriate match lines.

Show dimensions, station layouts, and include alignment data and construction notes. Assign each curve a number and present curve data in a tabular form. The tabular curve and coordinate data should be placed on the same sheet as the interchange layout.

Identify interchange ramps using letters or a combination of letters and numbers. The recommended practice for assigning ramp names is as follows:

- (1) Ramps in the first left quadrant along mainline stationing should be assigned first. Name assignments progress in a counterclockwise direction around the interchange (see **CFX Figure 314.3.1**). For projects with two or more interchanges, continue name assignments with the next letter and in same counterclockwise direction noted above.
- (2) Ramp baselines are typically located on the right edge of the pavement with respect to the direction of traffic and must be clearly indicated. Stationing of ramps should be in the same direction as the project.

CFX Figure 314.3.1 Interchange Layout



A topographic worksheet for all interchanges is required and will be considered as the preliminary layout of the interchange. Prepare this worksheet on a standard plan sheet using a scale no smaller than 1" = 400'. Include the following information on the worksheet:

- (1) All topography, such as existing roads, property lines, utilities, buildings, driveways.
- (2) Preliminary interchange geometrics and proposed R/W limits.
- (3) Drainage R/W and easements.
- (4) Proposed reconstruction of the crossroad, and access roads and frontage roads within the interchange.
- (5) Frontage roads should be assigned a unique alpha or numeric designation to avoid confusion with ramp nomenclature.
- (6) Contours, unless the terrain is flat.
- (7) Traffic diagram with AADT, DHV, K, D and T values.
- (8) The length of speed change lanes.
- (9) Design speed for ramps and crossroads.

- (10) Proposed bridge limits.
- (11) Pavement transitions.
- (12) Limits of construction along the crossroad.

314.3.2 - Ramp Terminal Details

Show details of ramp terminals with mainline and crossroads on separate plan sheets. Do not use a scale smaller than 1" = 50'. A scale of 1" = 40' is preferred. Show the following details of the terminal:

- (1) Curve data.
- (2) Station equality and horizontal tie to mainline or crossroad at critical ramp locations.
- (3) Turning radii, taper/transition lengths, curb/curb and gutter (if any).
- (4) Channelization (if any).
- (5) Ramp and crossroad intersection station and angle.
- (6) Median nose data (if any).
- (7) Limits of construction.
- (8) R/W.
- (9) Limited Access R/W and fence location.
- (10) Drainage structures.
- (11) Spot elevations (as needed).
- (12) Roadway dimensions.
- (13) Station pluses and offsets
- (14) A combined Plan and Profile Sheet is preferred
- (15) Use 1" = 2', 1" = 4' or 1" = 5' for the vertical scale.
- (16) At a minimum, the Plan/Profile sheet should provide coverage for 100 ft. in advance of the ramp EOP flare to 100 ft. beyond the 17 or 19 ft. physical gore.
- (17) Show elevations at 25 ft. incremental stations (i.e., 1+25, 1+50, 1+75, 2+00, etc.), in profile only, at all roadway edges, plus break lines.
- (18) Provide a section through the physical gore.

314.3.3 - Cross Section Pattern Sheet

The Cross Section Pattern sheet shows the entire interchange layout (including frontage and access roads, if any) with location and extent of proposed cross sections. Include the following information on the Cross Section Pattern sheet:

- (1) North arrow and scale.
- (2) Interchange layout.
- (3) Access and frontage roads (if any).
- (4) Centerline construction and baseline survey.
- (5) Ramp base lines.
- (6) Stationing along mainline, crossroads, ramps, access, and frontage roads.
- (7) PC and PT points by symbol.
- (8) Bridge outline.
- (9) Cross section pattern.

Prepare the Cross Section Pattern sheet on a standard plan sheet. Use a scale such that the complete interchange is clearly and legibly shown on one plan sheet. A scale of 1" = 400' is preferred. Place the north arrow and scale at a point of maximum visibility.

315 - Drainage Structures

315.1 - General

Drainage Structure sheets show the following information:

- Drainage structures and their location
- Cross section
- Flow line elevations
- Top of grates
- Culverts and top of manhole elevations
- Vertical relationships of the entire drainage system

All projects require the plotting of drainage structures. When only cross drains are to be constructed or modified, drainage structures may be plotted on the cross-section sheets. Otherwise, drainage structures should be plotted on separate drainage structure sheets, utilizing the cross-section sheet cell available in the FDOT CADD Software. See **CFX Design Guidelines 324** for additional requirements for box and three-sided culverts utilized as drainage structures. Examples of Drainage Structures sheets are included in **CFX Exhibits 315-1 through 315-4**.

315.2 - Required Information

For flush shoulder projects, show the existing ground line at the location of the structure, with the existing elevation placed immediately below the ground line at the survey baseline. Do not show existing structures, except those to be incorporated into the proposed drainage system or otherwise

modified. Note the flow line elevations of the drainage structures shown in the plans. Where storm drains run laterally or diagonally across the project, the drawing should show the pipe cover.

Show the roadway template and proposed structures, with the proposed profile grade elevation, placed above the grade point. Locate the structure by station and offset from the centerline of construction. Provide flow line information at each structure and at each culvert end. Plot drainage structure details according to the applicable index of the Standard Plans Index, e.g., show walls, grates, tops, pipes. Include the size and length of each proposed structure on the cross-drain sections. Show box and three-sided culvert lengths on the drainage structure sheet.

Depict sections for skewed cross drains along the centerline of the structure. Clear zone distances are to be measured at right angles to the traffic lane for all structures.

Determine where the construction of a drainage structure may have potential impact on existing R/W.

Note the following information for each drainage structure:

- Size
- End treatment
- Flow line elevations
- Structure number
- Standard Plan
- Station number
- Flow direction arrows

Place the note as close to the structure as possible. Provide elevations for manhole tops and ditch bottom inlet grates and slots. Show grate elevations for gutter inlets and edge of pavement elevations for curb and gutter inlets.

Include special grate treatment requirements in the inlet note. Include additional details, e.g., special bedding, 36" manhole rings.

Include soil boring and SHWT elevation at the nearest station to the soil boring. For Cross Drains, include HW and tailwater elevations for the design storm as calculated per **CFX Design Guidelines 252.7**. For Outfall structures shown on the plans, include tailwater elevations used in the storm sewer calculations.

If existing structures are to be filled and plugged and are to remain in place, show them in the plans with an appropriate note.

Include the following notes on the first drainage structure sheet as applicable:

- (1) Special attention is directed to the fact that portions of some drainage structures extend into the stabilized portion of the roadbed and extreme caution will be necessary in stabilization operations at these locations.

- (2) All drainage pipes have optional materials. The Optional Materials Tabulation Sheet(s) shows all materials allowed and indicates which material is plotted in the plans and used as the basis for pay quantities.

315.3 Utility Conflicts

Identify and resolve drainage structure conflicts with existing or proposed utilities as early in the design process as possible. Plot utilities, as defined in **FDM 221**, in conjunction with the structures to identify potential conflicts.

Plot a section for each location that a longitudinal pipe crosses a major underground utility line.

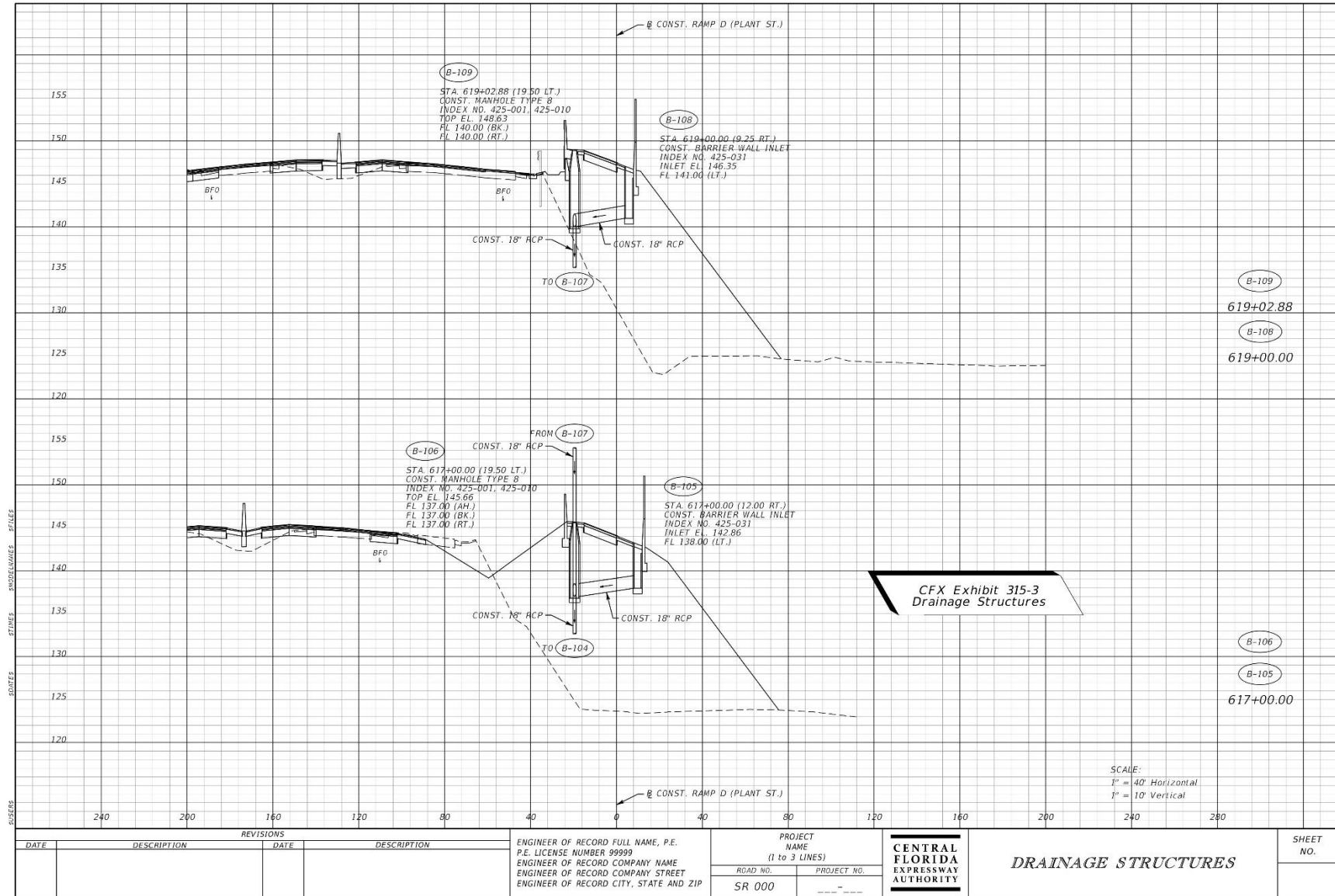
Note and plot (to scale) the utilities that have been verified (Quality Level "A" locate) in the appropriate locations on the Drainage Structure Sheets, Cross Section Sheets and bridge foundation plans. These utilities should be labeled with the following symbol:

Vvh1 = Verified Vertical Elevation and Horizontal Location and pipe ID number

315.4 Sheet Setup

Plot drainage structures as sections along the centerline of the structure and show on a standard cross section sheet. Space the sections sufficiently to avoid overlapping of structures or notes. Label the station and offsets from the appropriate baseline or centerline, as indicated in the Standard Plans. Beginning at the bottom of the sheet, show the sections successively by stations and number them sequentially, from the beginning to the end of the project. Show the structure number and location station near the right border of the sheet.

If a structure must be shown out of order, place a note in the correct sequence, referring to the sheet where the structure is shown. Use the same scale that is used for roadway cross sections, with the centerline of construction placed near the center of the sheet.



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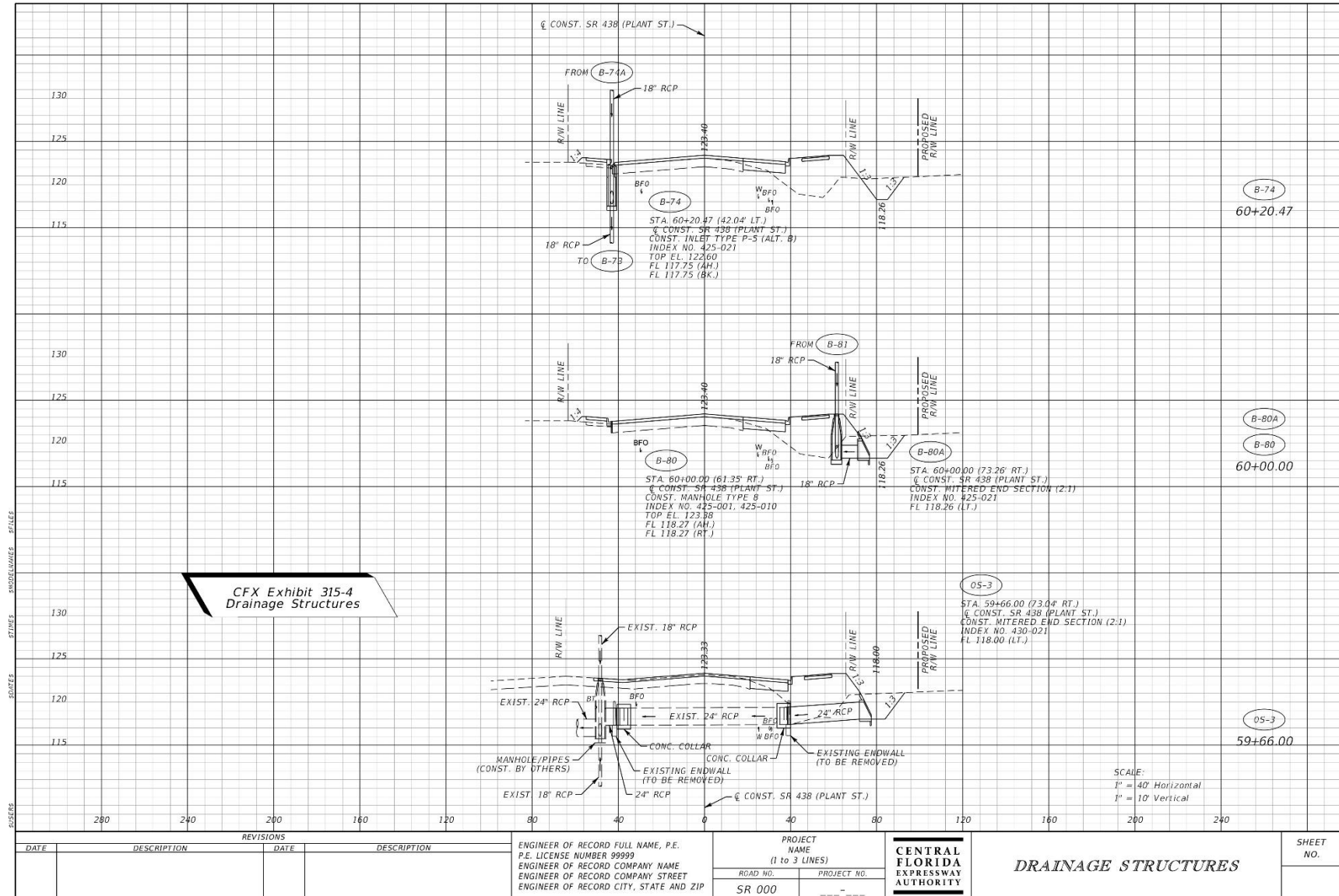
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 ENGINEER OF RECORD COMPANY NAME
 ENGINEER OF RECORD COMPANY STREET
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 ROAD NO. PROJECT NO.
 SR 000 - - - - -



DRAINAGE STRUCTURES

SHEET NO.



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316 - Stormwater Facilities

316.1 - General

This chapter discusses the content and requirements for plan sheets relating to stormwater facilities, including the following systems:

- lateral ditches
- outfalls
- retention areas
- detention areas
- mitigation areas

These systems typically require additional R/W or easements. Mitigation areas are not usually a component of the highway drainage system. However, they may include drainage components. Drainage components adjacent to the roadway may be shown on the roadway plan-profile sheets as long as they are clear and legible. Drainage components not adjacent to the roadway may require separate plan view sheets. In either case, profile views and cross sections may also be needed.

Plans for drainage components are typically grouped into three categories:

- (1) Lateral ditches and outfalls
- (2) Retention or detention areas
- (3) Mitigation areas

316.2 - Lateral Ditches and Outfalls

Prepare lateral ditch plans and profiles on a standard plan-profile sheet using a horizontal scale of 1" = 100'. However, if storm drain construction is proposed for a portion of the ditch, a scale of 1" = 40' or 1" = 50' may be used.

316.2.1 - Plan Portion

Orient data in the plan portion so that the lateral ditch or outfall centerline is parallel to the long side of the sheet. Show information in a manner similar to that described in **CFX Design Guidelines 312**.

Show R/W (or easement) alignment data and topography in the plan portion. Tie the alignment of the lateral ditch or outfall to the centerline of construction. Place the north arrow and scale at a point of maximum visibility, typically in the upper right portion of the plan view.

316.2.2 - Profile Portion

Prepare the profile portion in the same manner as described in **CFX Design Guidelines 312**. Show the following information:

- Existing ground line profiles
- High water elevations
- Underground utilities
- Benchmark information
- Elevation datum

Where the lateral ditch and outfall survey baselines do not follow the flow line of the existing ditch or channel, the existing ditch or channel profile must be shown with a broken line and identified.

If storm drain construction is proposed along a lateral ditch or at an outfall, plot the proposed structures on the drainage structures sheets, or in the lateral ditch and outfall profile. Include the following information for the structures shown in the profile:

- Flow line
- Structure numbers
- Pipe or culvert sizes
- Utilities (if applicable)
- Label the normal water elevation of the receiving system.

316.2.3 - Typical Section

Include a typical section showing the following:

- Limits of clearing and grubbing
- R/W
- Ditch bottom width
- Side slopes

The typical section does not need to be to scale but must be dimensionally proportionate. If the width of proposed clearing and grubbing is variable, note the various widths and their respective station limits below the typical section.

316.2.4 - Ditch Cross Sections

Lateral ditch cross section sheets are included in the plans. These sheets include the following:

- R/W
- Limits of clearing and grubbing
- Earthwork

Prepare lateral ditch cross sections in the same manner as described in **CFX Design Guidelines 319**. A horizontal scale of 1" = 10' is preferred. Use a vertical scale of 1" = 10'.

Two or more columns of ditch cross sections may be placed on one sheet. Cross section stationing must progress from the bottom to the top of the sheet and multiple columns must be placed from the

left to right.

Soil surveys are typically performed along the lateral ditch only when a large amount of material is expected to be excavated.

316.3 - Retention or Detention Areas

316.3.1 - Pond Detail Sheet

The retention or detention pond, including the outlet structure, is usually the end point of the drainage system for a particular project. The retention or detention pond detail sheet shows the pond in plan view and includes station and offset ties to the project centerline of construction. The plan view also includes the following:

- (1) Locations of pond sections
- (2) Side slopes and base dimensions
- (3) Bottom and top elevations
- (4) Location of maintenance berm
- (5) Fence and gate locations
- (6) R/W
- (7) Pond drainage structures with structure numbers
- (8) Soil boring locations
- (9) Any other necessary data pertaining to the pond

Include a minimum of two sections, taken in directions perpendicular to each other. These pond sections include the following:

- Bottom width and elevation
- Side slopes
- Normal water depth (if applicable)
- Soil borings

316.3.2 - Typical Section

A typical section is required when the pond sections do not represent the typical design features of the pond. The following is a list of appropriate information to be shown on the typical section:

- Limits of clearing and grubbing
- Side slopes
- Bottom and top elevations
- Details of maintenance berm

- Fence location
- R/W
- Water level information
- Vegetation requirements

The typical section does not need to be to scale but must be dimensionally proportionate. It should be shown on the pond detail sheet, if room allows, or on a separate sheet when necessary.

316.3.3 - Pond Cross Sections

Prepare pond cross sections in the same manner as described in *CFX Design Guidelines 319*. A horizontal scale of 1" = 10' is preferred. Use a vertical scale of 1" = 10'.

If material is to be excavated from the pond, plot the soil borings on the cross sections.

316.4 - Mitigation Areas

If construction details for mitigation areas are included in the plans, follow the requirements for retention or detention areas.

317 - Special Details

317.1 - General

Special Details sheets are included in the plans set when additional details, information or clarification to specific construction elements is necessary. These sheets are typically included when Roadway Plan sheets do not provide the scale necessary to clearly depict the work that is required. Special Details Sheets are also used to show construction details that are not provided in the Standard Plans.

These sheets are to be placed in the component plans in accordance with *CFX Design Guidelines 302.6*.

317.2 - Sheet Setup

Use the standard plan format sheet provided in the FDOT CADD Software to prepare the sheet. Use standard symbols contained in the FDOT CADD Manual.

Any convenient scale may be used, provided the information shown is clear and legible. Provide adequate cross-referencing to appropriate sheets in the plans set.

318 - Soil Survey

318.1 - General

The Soil Survey sheet (essentially a soil test analysis sheet) depicts the various types of soils encountered within the limits of the project. This sheet also shows the classification, mechanical properties and recommended usage of those soils. A preformatted CADD sheet can be found in the FDOT CADD Software.

Assign soils having identical characteristics to the same stratum and group for identification and recommendation purposes. The responsible Engineer must sign the test analysis sheet.

318.2 - Roadway Soil Survey Compilation and Presentation

Upon completion of the proposed typical section, and after placing alignment, proposed grades and existing utilities on the plan-profile sheets and preliminary sections, prints of these sheets must be utilized for determining the location and depth of borings for the sampling of soils for testing and classifications. These classification and test results, including pH, resistivity, sulfides, and chlorides must be shown on the test analysis sheet. Show date and weather conditions at the time of sampling.

After completion of soils testing, show the boring data on cross sections by columns 1/4-inch-wide below the ground line at test sample locations. Show stratum limits and numbers inside the column. Transmit this information to the appropriate responsible materials engineer for verification. Retain one hard copy of the soils information, including cross sections with soils information, in the Soils Engineer's Record.

318.3 - Other Soil Surveys

Soil surveys other than those for roadway plans are required for various plans components. Included in these are soil surveys/borings for retention/detention ponds, overhead sign structures, high mast poles and traffic signal mast arms.

Soil Survey sheets generated for such components are located in the plans set with the other details and information for each component. Requirements for the Soil Survey sheets are similar to those prepared for the roadway soil survey, showing such things as the location of test holes, various strata encountered, soil properties, classification, and recommended usage.

319 - Cross Sections

319.1 - General

Cross sections depict the existing ground conditions, including all manmade features, as sections perpendicular to the respective stations along a survey baseline or construction centerline. The proposed cross-sectional outline of the new facility with all its functional elements is also shown on cross sections.

Use standard cross section sheets for showing roadway cross sections. The preformatted sheet cell is in the FDOT CADD Software. The recommended vertical scale is 1" = 10'. The recommended horizontal scale is 1" = 40'. If the entire R/W cannot be shown on one sheet, more sheets may be

utilized, and appropriate match lines shown with referenced sheet numbers. Show the scale at the bottom right corner of the sheet above the title box.

319.2 - Required Information

Show existing ground lines and note the existing elevation at the centerline just below the ground line at the centerline. Indicate the station number of the section below the ground line on the right side of the sheet. Label the baseline of survey along the top and bottom of the sheet. Lines parallel to the baseline of survey should show station equivalencies to the baseline of survey.

Show the surface, as well as the below ground portions of existing features such as pavements, curbs, and sidewalks.

Existing parallel underground utilities which lie within the horizontal limits of the project must be shown along with verification notation for those locations which have been verified. Utilities that have been verified should be labeled as shown in **CFX Design Guidelines 315**. Small distribution or service lines need not be drafted.

Show the soil data and the groundwater table elevation from soil borings on cross sections as described in **CFX Design Guidelines 318**. If it is determined that an organic or plastic material must be removed below the finished grade template, show the lower limits (undercut line) of the removal on the cross section to determine the area and volume of subsoil excavation. Refer to **FDM 216** and **Standard Plans, Index 120-002** for the requirements of subsoil excavation, i.e., removal of unsuitable organic or plastic soils.

Show the proposed roadway template. The proposed profile grade elevation must be placed vertically or at an angle to the horizontal, just above the profile grade line. Special ditch elevations must also be shown.

Show station equations, even though a cross section may not be plotted at that point. Show equivalent mainline stations for ramp cross sections. The R/W limits must be symbolically shown for each cross section.

The begin and end stations for project, construction, exceptions, bridge/bridge culvert, and the toe of slope under the bridge must be shown on the right edge of the sheets near the earthwork columns. Show the beginning and ending earthwork stations.

The order of assembling the cross sections in the plans set must be:

- (1) Mainline
- (2) Side streets
- (3) Ramps

319.3 - Sheet Set Up

Show cross sections on a standard preformatted cross section sheet (available in the FDOT CADD Software) with stations increasing from the bottom to the top of the sheet. Typically, only one column of sections is placed on a sheet.

The interval selected for showing sections on the cross-section sheet will vary according to project specific factors. For new construction and reconstruction, the normal interval for cross sections is 100' for flush shoulder roadways and 50' for curbed roadways. These intervals may also be appropriate on RRR projects, depending on the variability of earthwork along the project. Other factors that may influence the frequency of cross sections include the presence of intersections, extent of driveway and turnout construction or reconstruction, ADA related work, and drainage improvements.

Center sections on the sheet with the survey baseline or the construction centerline placed vertically in the center. In cases where additional lanes are to be constructed adjacent to existing lanes, centering the sections will depend upon the location of the survey line and the side on which the new construction is to be placed. Orient sections such that the complete ultimate section will be centered on the sheet. When the centerlines of construction and survey are not parallel, the distance between the two at each cross section must be shown.

Place as many sections as possible on a sheet with sections being spaced to avoid overlapping. The soil profile should be checked for possible unsuitable material below existing ground which may cause overlapping of sections.

When R/W is narrow enough and a horizontal scale of 1" = 20' is used, two columns of cross sections may be placed on a sheet. Cross section stationing must progress from the bottom to the top of the sheet and multiple columns must be placed from the left to the right. Set up the sheet to provide earthwork columns for each column of sections.

See **CFX Design Guidelines 216** for additional information on showing earthwork data on Cross Sections sheets.

320 - Stormwater Pollution Prevention Plan (SWPPP)

320.1 - General

The Stormwater Pollution Prevention Plan (SWPPP) sheets document the designer's site evaluation and selection of control measures and other items to comply with the terms and conditions of the State of Florida Department of Environmental Protection (DEP) Generic Permit for Stormwater Discharges from Large and Small Construction Activities (DEP Generic Permit) discussed in **FDM 251**.

For an example of SWPPP sheets on construction projects, see **CFX Exhibits 320-1 and 320-2**. Additional guidance for developing a SWPPP may be found in the DEP SWPPP template, found on the DEP web page.

320.2 - Narrative Description

The SWPPP sheets include a narrative that refers to other documents such as but not limited to the Standard Specifications or the Standard Plans as necessary. Use the following outline to prepare the narrative:

- (1) Site Description
 - (a) A Description of the Construction Activity
 - (b) Sequence of Major Soil Disturbing Activities
 - (c) Area Estimates (The total project area and the area expected to be disturbed.)
 - (d) Runoff Data consisting of:
 - i. Rational runoff coefficient before, during, and after construction,
 - ii. The size of the drainage area for each outfall,
 - iii. The location of each outfall, in terms of latitude and longitude (to the nearest 15 seconds),
 - iv. Existing data describing the soil or the quality of discharge from the site
 - (e) Site Map (Include a narrative as described in **CFX Design Guidelines 320.3**)
 - (f) Receiving Waters (The name of the receiving waters for each outfall and the wetland area on the site.)
- (2) Controls
 - (a) Erosion and Sediment Controls
 - i. Stabilization Practices
 - ii. Structural Practices
 - (b) Stormwater Management
 - (c) Other Controls
 - i. Waste Disposal
 - ii. Off-Site Vehicle Tracking & Generation of Dust
 - iii. State or Local Regulations
 - iv. Application of Fertilizers and Pesticides
 - v. Toxic Substances
 - (d) State and Local Plans

- (3) Maintenance
- (4) Inspection
- (5) Non-Stormwater Discharges

The sheets may also include supplemental design details and plan views of the location of the controls. Additional information for preparing the SWPPP sheets can be found in the ***State of Florida Erosion and Sediment Control Designer and Reviewer Manual***.

320.3 - Site Map

Show the following information on a site map:

- (1) Drainage patterns
- (2) Approximate slopes
- (3) Areas of soil disturbance
- (4) Areas that are not to be disturbed
- (5) Locations of controls identified in the plan
- (6) Areas that are to be stabilized against erosion
- (7) Surface waters (including wetlands)
- (8) Locations where stormwater is discharged to a surface water

The above information is typically shown on other sheets within a set of construction plans. Prepare a narrative description of the site map which identifies the construction plan sheets where the site map information required by the DEP Generic Permit can be found.

The locations of the temporary controls may be shown on SWPPP sheets, Erosion Control sheets, Plan-Profile sheets, or Temporary Traffic Control (TTC) Plan sheets. For projects where plan view sheets are not available, summarize the locations of the controls in a tabular format.

If an optional Drainage Map is included in the construction plans, then the drainage patterns will be shown on it. If the Drainage Map is not included, prepare a topographic map (for example, a USGS quadrangle map) showing contour lines. This map will supplement the construction plan sheets that show the other site map requirements. The supplemental site map may use photography (aerial or other). Include this supplemental map in the SWPPP sheets.

320.4 - Controls

The SWPPP must include a description of the controls that will be implemented at the construction site. For each of the major activities identified in the narrative, describe the timing of the implementation of control measures during the construction process. Also describe the stormwater management measures that will be installed during construction to control pollutants in the stormwater discharges

that will occur after construction.

Details should be prepared for all controls that are not detailed in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual. The details should show the work intended, where and how the control is to be placed, and any other special design details. Any Technical Special Provisions required by the erosion control items of work should be prepared for the specification package.

320.5 - Maintenance, Inspection and Non-Stormwater Discharges

Include a narrative describing any additional maintenance and inspection requirements that are not stated in the standard specifications or amended by CFX. Include the inspection requirements, which will be either requirements of the DEP or the applicable requirements of another regulatory agency. If special procedures have been developed to minimize turbidity associated with normal construction dewatering, the designer will include a description of those procedures.

Special monitoring requirements described in the DEP Generic Permit may apply where the project discharges to waters listed in Section 303(d) of the Clean Water Act. Consult with the GEC environmental permitting staff to determine if the monitoring requirements are applicable. If applicable and at the direction of the GEC, the EOR will describe the special monitoring requirements in the inspection section of the narrative.

THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IS PROVIDED TO ASSIST THE CONTRACTOR IN DEVELOPING THE REQUIRED SITE SPECIFIC EROSION CONTROL PLAN AND OTHER ITEMS NECESSARY TO OBTAIN COVERAGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) CONSTRUCTION GENERIC PERMIT (CGP). REFER TO THE STATE OF FLORIDA EROSION AND SEDIMENT CONTROL DESIGNER AND REVIEWER MANUAL FOR ADDITIONAL REQUIREMENTS.

1.0 SITE DESCRIPTION:

(1.A.) NATURE OF CONSTRUCTION ACTIVITY:

THE PROJECT IS THE _____ [TYPE OF CONSTRUCTION ACTIVITY] _____ OF _____ [ROADWAY] _____ IN _____ [COUNTY] _____. THIS INVOLVES _____ [LIST MAJOR ACTIVITIES SUCH AS CONSTRUCTING ROADWAY SURFACE, CURB AND GUTTER, SIDEWALK, STORMWATER MANAGEMENT FACILITIES, ETC.] _____. THE PROJECT EXTENDS A DISTANCE OF _____ MILES.

(1.B.) INTENDED SEQUENCE OF MAJOR SOIL DISTURBING ACTIVITIES:

IN THE CONTRACTOR'S SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN, PREPARE A DETAILED CONSTRUCTION SCHEDULE TO INDICATE DATES OF MAJOR GRADING ACTIVITIES AND SEQUENCES OF TEMPORARY AND PERMANENT SOIL DISTURBING ACTIVITIES ON ALL PORTIONS OF THE PROJECT. FOR ADDITIONAL INFORMATION, REFER TO SECTION 4.7 OF THE NPDES CGP.

LIST OF INTENDED ACTIVITIES:

(1.B.1.) FOR EACH CONSTRUCTION PHASE, INSTALL PERIMETER CONTROLS PRIOR TO CLEARING AND GRUBBING OR ANY OTHER CONSTRUCTION ACTIVITIES. REMOVE PERIMETER CONTROLS ONLY AFTER ALL UPSTREAM AREAS ARE STABILIZED AND PERMANENT VEGETATION IS ESTABLISHED.

(1.B.2.) TIME CONSTRUCTION ACTIVITIES TO LIMIT IMPACT FROM SEASONAL CHANGES OR WEATHER EVENTS.

(1.B.3.) THE CONTRACTOR WILL PROVIDE POLLUTION CONTROL BY IMPLEMENTING DUST CONTROL DURING ALL PHASES OF CONSTRUCTION.

(1.B.4.) OFFSITE RUNOFF SHOULD BE DIVERTED AWAY OR THROUGH THE CONSTRUCTION AREA, IF POSSIBLE. THIS ADDITIONAL FLOW, IF NOT DIVERTED, CAN ADD VOLUME AND SIZE TO STRUCTURAL PRACTICES, REQUIRING MORE FREQUENT MAINTENANCE AND LIMITING EFFECTIVENESS OF EROSION AND SEDIMENT CONTROLS.

(1.C.) PROJECT AREA ESTIMATES:

TOTAL SITE AREA: _____ ACRES.

TOTAL AREA TO BE DISTURBED: _____ ACRES.

(1.D.) RUNOFF DATA:

RUNOFF COEFFICIENTS BEFORE Cw (B), DURING Cw (D) AND AFTER Cw (A) CONSTRUCTION.

RUNOFF COEFFICIENTS FOR:

GRASSED SHOULDERS ADJACENT TO ROADWAY: C=0.35

IMPERVIOUS ROADWAYS AND PAVED SHOULDER: C=0.95

DISTURBED AREAS, EXPOSED SOIL, ETC., DURING CONSTRUCTION: C=0.40

WEIGHTED RUN-OFF COEFFICIENT:

BEFORE: Cw (B) = _____ DURING: Cw (D) = _____ AFTER: Cw (A) = _____

THE RUN-OFF COEFFICIENT Cw (D), IS CALCULATED ASSUMING THAT THE MAXIMUM ALLOWABLE AREA OF SOIL IS DISTURBED DURING CONSTRUCTION AND THE REMAINING AMOUNT IS THE EXISTING IMPERVIOUS AND GRASSED SHOULDER AREAS.

SOIL DATA:

[DELETE IF NO SURVEY IS INCLUDED] _____. THE RESULTS OF THE SOIL BORINGS ALONG THE ROADWAY ARE SHOWN IN THE ROADWAY SOIL SURVEY SHEET(S). THE RESULTS OF SOIL BORINGS DONE IN THE PONDS ARE SHOWN ON THE POND DETAIL SHEETS. THE SHEET NUMBERS FOR THESE ARE IDENTIFIED ON THE KEY SHEET OF THESE CONSTRUCTION PLANS.

IN GENERAL, THE SOILS ARE:

| SOIL TYPE | HYDROLOGIC GROUP | DEPTH TO SHWE |
|-------------------|------------------|---------------|
| 9 - ASTATULA SAND | A | 5.0' - 12.0' |

REFERENCE: USDA SOIL SURVEY OF _____ COUNTY FLORIDA

OUTFALL INFORMATION:

THERE ARE _____ OUTFALL(S).

THE OUTFALLS DISCHARGE INTO THE FOLLOWING BASINS:

| BASIN | WBID | PARAMETER(S) OF CONCERN FOR 303(d) LISTING |
|-------------------|------|--|
| HARNEY POND CANAL | 3204 | CHOLRAPHYLL-A, MACROPHYTES, NUTRIENTS |

OUTFALL LOCATIONS: (TEMPORARY AND PERMANENT)

| DESCRIPTION | DRAINAGE AREA | LATITUDE | LONGITUDE | RECEIVING WATERBODY |
|----------------------|---------------|---------------------------|---------------------------|---------------------|
| (a) 1 - " _____ AC | _____ AC | _____ ° _____ ' _____ " N | _____ ° _____ ' _____ " W | _____ |
| (b) _____ " _____ AC | _____ AC | _____ ° _____ ' _____ " N | _____ ° _____ ' _____ " W | _____ |

THIS FACILITY [DOES/DOES NOT] _____ DISCHARGE TO WATERS LISTED ON THE ADOPTED FDP VERIFIED LIST OR ADOPTED TMDL FOR IMPAIRMENT DUE TO TOTAL SUSPENDED SOLID, TURBIDITY, NUTRIENTS, DISSOLVED OXYGEN, OR FECAL COLIFORM.

WETLAND AND/OR SURFACE WATER IMPACTS SHALL BE LIMITED TO THE AREAS DESCRIBED IN THE APPROVED PERMITS FOR THE PROJECT.

(1.E.) SITE MAP:

THE SITE MAP SHALL BE COMPRISED OF THE CONSTRUCTION PLANS AND THE CONTRACTOR'S SITE-SPECIFIC EROSION AND SEDIMENT CONTROL PLAN.

(1.F.) STORMWATER MANAGEMENT (EXISTING/PROPOSED)

(1.F.1.) EXISTING DRAINAGE FLOWS ARE TYPICALLY _____ [PROJECT SPECIFIC, I.E. FROM SOUTH TO NORTH TOWARDS THE ST JOHNS RIVER] _____. THE CROSS SECTION SHEETS AND PLAN-PROFILE SHEETS PROVIDE THE APPROXIMATE SLOPE, AREAS OF SOIL DISTURBANCE AND AREAS TO BE STABILIZED, UNLESS OTHERWISE APPROVED BY THE PERMITS, THE CONSTRUCTION ACTIVITIES SHALL NOT MODIFY OR AFFECT THE EXISTING OFFSITE FLOW PATTERNS.

(1.F.2.) THE PROPOSED SEDIMENT BASINS, CONTAINMENT SYSTEMS AND/OR STORMWATER MANAGEMENT FACILITIES SHALL BE CONSTRUCTED DURING THE INITIAL PHASE OF CONSTRUCTION AND USED DURING CONSTRUCTION OF THE ROADWAY. THE OUTFALL STRUCTURES ARE TO BE PROTECTED WHEN TEMPORARY SEDIMENT BASINS, CONTAINMENT SYSTEMS OR PERMANENT STORMWATER MANAGEMENT FACILITIES ARE USED FOR EROSION AND SEDIMENT CONTROL TO PREVENT DOWNSTREAM SEDIMENTATION.

2. CONTROLS:

(2.A.) SEDIMENT AND EROSION CONTROLS

(2.A.1.) PER SECTION 5.4 OF THE NPDES CGP, STABILIZATION SHALL TAKE PLACE AS SOON AS PRACTICAL IN PORTIONS OF THE PROJECT WHERE CONSTRUCTION ACTIVITIES HAVE CEASED, BUT NO LATER THAN 7 DAYS AFTER ANY CONSTRUCTION ACTIVITY CEASES EITHER TEMPORARILY OR PERMANENTLY.

(2.A.2.) SEDIMENT BARRIERS SHALL BE USED AROUND THE PERIMETER OF STOCKPILE AREAS.

CFX Exhibit 320-1
SWPPP Sheets

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THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

| REVISIONS | | | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | STORMWATER POLLUTION PREVENTION PLAN | SHEET NO. |
|-----------|-------------|------|-------------|---|--------------------------------|-------------|---|---|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | | | SR 000 | | | | |

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(2.A.3.)STRUCTURAL PRACTICES

IN THE CONTRACTOR'S SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN, DESCRIBE THE PROPOSED STRUCTURAL PRACTICES TO CONTROL OR TRAP SEDIMENT AND OTHERWISE PREVENT THE DISCHARGE OF POLLUTANTS FROM EXPOSED AREAS OF THE SITE. SEDIMENT CONTROLS SHALL BE IN PLACE BEFORE DISTURBING SOIL UPSTREAM OF THE CONTROL. STRUCTURAL PRACTICE EXAMPLES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING, AS APPROVED BY THE CONSTRUCTION ENGINEERING INSPECTOR (CEI):

TEMPORARY DEVICES:

- * SILT FENCE
- * STAKED TURBIDITY BARRIERS
- * SOIL TRACKING PREVENTION DEVICES AT CONSTRUCTION ENTRANCES/EXITS
- * FLOATING TURBIDITY BARRIERS
- * INLET PROTECTION SYSTEMS INCLUDING SYNTHETIC BALES AND SANDBAGS
- * SEDIMENT BASIN/CONTAINMENT SYSTEMS
- * CHEMICAL TREATMENTS SUCH AS POLYACRYLAMIDES AND ALUM

PERMANENT:

- * STORMWATER PONDS
- * SOD (MAY ALSO BE USED FOR TEMPORARY CONTROLS)
- * VELOCITY DISSIPATION DEVICES SUCH AS RIPRAP OR OTHERS

(2.B.) WATER QUALITY MONITORING

(2.B.1.) WATER QUALITY MONITORING SHALL BE CONDUCTED IN ACCORDANCE WITH THE SPECIAL CONDITIONS OF ANY ENVIRONMENTAL PERMIT, OR BY THE CONTRACTOR UPON THE OBSERVATION THAT WATER QUALITY STANDARDS MAY BE VIOLATED BY THE CONTRACTOR'S ACTIVITIES. MONITORING LOCATIONS MAY BE SPECIFIED IN THE ENVIRONMENTAL PERMIT OR MAY BE DESIGNATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

(2.B.2.) THE ENGINEER WILL BE RESPONSIBLE FOR MONITORING ANY ACTIVITIES FOR VIOLATION OF WATER QUALITY STANDARDS AS THEY RELATE TO TURBIDITY (NO GREATER THAN 29 NEPHELOMETRIC TURBIDITY UNITS (NTUs) ABOVE BACKGROUND OR GREATER THAN 0 NTUs ABOVE BACKGROUND FOR DIRECT DISCHARGES TO OUTSTANDING FLORIDA WATERS (OFWS)).

(2.B.3.) IF WATER QUALITY STANDARDS ARE VIOLATED, CONSTRUCTION SHALL BE STOPPED IMMEDIATELY. THE ENVIRONMENTAL PERMIT CONDITIONS FOLLOWED AND EROSION AND SEDIMENT CONTROL DEVICES REEVALUATED AND APPROVED BY THE ENGINEER PRIOR TO ANY CONTINUATION OF ACTIVITY. MONITORING ACTIVITIES AND TURBIDITY READINGS SHALL BE RECORDED ON THE CONSTRUCTION INSPECTION REPORT AND CONTINUED UNTIL TURBIDITY READINGS FALL BELOW AN ACCEPTABLE LEVEL (LESS THAN 29 NTUs ABOVE BACKGROUND OR LESS THAN 0 NTUs ABOVE BACKGROUND FOR DIRECT DISCHARGES TO OFWS).

(2.B.4.) WATER QUALITY MONITORING MAY BE CONDUCTED DURING ANY PHASE OF CONSTRUCTION AS DIRECTED BY THE ENGINEER.

(2.C.) DEWATERING CONTROLS

THE SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN SHALL INCLUDE A DESCRIPTION OF THE BMPs THAT WILL BE USED TO ENSURE THAT DISCHARGES OF NONCONTAMINATED GROUND WATER FROM DEWATERING OPERATIONS DO NOT CAUSE OR CONTRIBUTE TO VIOLATIONS OF STATE WATER QUALITY STANDARDS.

(2.D.) OTHER CONTROLS

(2.D.1.) THE SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN SHALL IDENTIFY CHEMICAL AND FUEL STORAGE AREAS, MEANS OF MINIMIZING EXPOSURE TO STORMWATER, AND SPILL PREVENTION.

(2.D.2.) OFFSITE VEHICLE TRACKING & GENERATION OF DUST

IN THE SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN, DESCRIBE THE PROPOSED METHODS FOR MINIMIZING OFFSITE VEHICLE TRACKING OF SEDIMENTS AND GENERATING DUST. THE PROPOSED METHODS SHALL INCLUDE AT LEAST THE FOLLOWING, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

- (2.D.2.a.) LOADED HAUL TRUCKS ARE TO BE COVERED BY A TARPULIN.
- (2.D.2.b.) REMOVING EXCESS DIRT FROM ROADS DAILY.
- (2.D.2.c.) USING WATER TRUCKS DURING DUST-GENERATING ACTIVITIES.
- (2.D.2.d.) SEDIMENT CONTROL MAY BE ACCOMPLISHED BY USING STREET OR VACUUM SWEEPERS.

3. MAINTENANCE

MAINTAIN AND REPAIR ALL EROSION AND SEDIMENT CONTROL DEVICES AND REMOVE EROSION AND SEDIMENT CONTROL DEVICES WHEN NOTICE OF TERMINATION IS MAILED. REMOVE AND PROPERLY DISPOSE OF SEDIMENT BUILDUP THROUGH THE LIFE OF THE INSTALLED EROSION AND SEDIMENT CONTROL DEVICES.

- (3.A.) NECESSARY REPAIRS SHALL BE INITIATED WITHIN 24 HOURS OF NOTICE FROM THE CEI.
- (3.B.) SEDIMENT BARRIERS SHALL BE REPLACED WHEN IT IS NO LONGER EFFECTIVE OR AS DIRECTED BY THE ENGINEER.
- (3.C.) STABILIZED CONSTRUCTION ENTRANCES SHALL BE MAINTAINED TO PREVENT CLOGGING OF ROCK BEDDING WHICH MAY IMPEDE THE USEFULNESS OF THE STRUCTURE.
- (3.D.) REMOVE SEDIMENT FROM SEDIMENT BASINS WHEN IT BECOMES MORE THAN HALF THE AVAILABLE VOLUME.

4. INSPECTION, TRACKING, AND REPORTING

INSTALL AND MAINTAIN RAIN GAUGES ON THE PROJECT SITE AND RECORD RAINFALL.


- (4.A.) SUBMIT A WEEKLY REPORT TO THE CONSTRUCTION ENGINEERING INSPECTOR DOCUMENTING THE DAILY INSPECTIONS AND MAINTENANCE OR REPAIRS TO THE EROSION AND SEDIMENT CONTROL DEVICES. MAINTAIN ALL REQUIRED REPORTS AND COMPLETE ALL SWPPP INSPECTION FORMS.
- (4.B.) PREPARATION OF ALL THE CONTRACTOR'S REPORTS OF INSPECTION, MAINTENANCE AND REPAIRS REQUIRED FOR THE CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION, SHALL BE INCLUDED IN THE INDIVIDUAL COSTS OF THE EROSION AND SEDIMENT CONTROL DEVICES.

5. NON-STORMWATER DISCHARGES

THE SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN SHALL IDENTIFY ALL ANTICIPATED NON-STORMWATER DISCHARGES AND DESCRIBE THE PROPOSED MEASURES TO PREVENT POLLUTION. THE PLAN SHALL INCLUDE PROCEDURES FOR SPILL CONTAINMENT, REPORTING AND RESPONSES. THE PLAN SHALL SPECIFY WHAT MANAGEMENT PRACTICES AND CONTAINMENT METHODS WILL BE USED TO PREVENT POTENTIAL POLLUTANTS (FUEL, LUBRICANTS, HERBICIDES, ETC.) FROM SPILLING ONTO THE SOIL OR INTO THE SURFACE WATERS. IF A SPILL DOES OCCUR OR IF CONTAMINATED SOIL OR GROUNDWATER IS ENCOUNTERED, CONTACT THE CONSTRUCTION ENGINEERING INSPECTOR IMMEDIATELY. IF A RELEASE CONTAINING HAZARDOUS SUBSTANCES OCCURS, THE CONTRACTOR SHALL ADHERE TO SECTION 9.2 OF THE NPDES CGP.

CFX Exhibit 320-2
SWPPP Sheets Cont.

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| REVISIONS | | REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | |  | STORMWATER POLLUTION PREVENTION PLAN | SHEET NO. |
|-----------|-------------|-----------|-------------|---|--------------------------------|-------------|---|---|-----------|
| DATE | DESCRIPTION | DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | | | SR 000 | | | | |

321 - Temporary Traffic Control Plan

321.1 - General

A project-specific Temporary Traffic Control Plan (TTCP) is required for all projects. The TTCP is used to describe the actions to be taken by the Contractor to minimize traffic impacts while conveying traffic through a work zone. The TTCP may include the following:

- General Notes
- Phasing Notes
- Phasing Typical Sections
- Phasing Plan-Profile Sheets
- Signalization Plans
- Special Details
- Temporary Cross Sections
- Temporary Highway Lighting Plans

321.2 - TTCP Submittals

TTCP submittals typically include the following:

- (1) 30%: a typical section for each phase as well as a description of the phasing sequence and work involved.
- (2) 60%: a majority of the TTCP completed (75-90%) and a list of the pay items needed.
- (3) 90%: a final TTCP, including all notes, pay items and preliminary quantities.
- (4) 100%: Finalize all plans and resolve/incorporate all previous comments.

321.3 - Required Information

The information provided in the TTCP may be simple or may be elaborate (e.g., detailed individual phase layouts using profile sheets, interchange, and intersection layout sheets).

Provide the following information in the TTCP:

- Work zone speed
- Lane widths and shoulder widths
- Lane closure restrictions
- Traffic pacing restrictions
- PCMS message for each phase
- Temporary geometry for all road users (e.g., all necessary special details or phasing plans to provide a pedestrian detour or temporary pedestrian way)
- Locations or notes describing locations of temporary traffic control devices
- Temporary pavement marking and RPM callouts

- Temporary signing, including warning and regulatory signs shown on each applicable TTC Plan Sheet
- Temporary drainage design or permanent drainage design phasing
- Signal timing for each phase, including temporary actuation, to maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract
- Work, by location, to be accomplished during each phase of construction
- Project-specific requirements (e.g., school zones, railroads, waterborne vessels)

See **CFX Exhibits 321-1 and 321-2** for Temporary Traffic Control Standard General Notes.

When a system-to-system or complicated interchange will be partially open to traffic during construction, the Consultant shall provide a fully developed construction guide signing plan (CGSP) for each phase of construction.

The CGSP shall clearly identify the construction phase in which:

- A proposed structure is required for temporary and/or permanent signing.
- An existing structure is needed for temporary signing.
- An existing structure could be relocated for temporary use (CFX approval required prior to including in plans).
- A temporary ground mount guide sign is to be installed.
- Relevant VMS are to be used and proposed text.

321.4 - Levels of Complexity

The following guidelines have been developed to assist in determining the level of detail and complexity that may be required for a project.

321.4.1 - Level I

Project Type: Simple construction projects

Examples: R&R, Minor Widening

Components of the TTCP:

- (1) General Notes
- (2) Phase Typical Section(s)
- (3) Minimal Special Details
- (4) Pedestrian Special Details or Phasing Plans

321.4.2 - Level II

Project Type: Complex construction projects

Examples: Widening Projects, Projects with Diversions

Components of the TTCP:

- (1) General Notes
- (2) Phase Notes
- (3) Phase Typical Section(s)
- (4) Detailed Plan Sheets
- (5) Cross Sections, as necessary (e.g., diversions, temporary drainage, temporary bridge structure)
- (6) Temporary Signalization Plans, as necessary
- (7) Special Details, as necessary; e.g., temporary drainage, slope requirements due to diversions, temporary signalization, railroad work; intersection details, construction guide sign plan and worksheets, overhead sign structure cross section sheets for different phases
- (8) Pedestrian Special Details or Phasing Plans

321.4.3 - Level III

Project Type: Complex projects.

Components of the TTC Plan:

- (1) General Notes
- (2) Phase Notes (including any references to the applicable Standard Plans Index)
- (3) Phase Typical Section(s)
- (4) Detailed Plan Sheets
- (5) Cross Sections
- (6) Temporary Signalization Plans (if required)
- (7) Special Details, as necessary; e.g., temporary drainage, slope requirements due to diversions, temporary signalization, railroad work; intersection details, construction guide sign plan and worksheets, overhead sign structure cross section sheets for different phases

321.5 - Format

Prepare TTCP on a standard plan sheet. The scale should match the roadway plan sheet scale. Use

levels, fonts, and line weights in accordance with the CADD Manual .

Tools are available in FDOT CADD Software to assist in the development of TTCPs.

STANDARD TTC GENERAL NOTES

STANDARD TTC GENERAL NOTES

1. ALL TRAFFIC CONTROL PROCEDURES AND DEVICES SHALL CONFORM TO THE REQUIREMENTS SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD, 2009 EDITION), THE FDOT STANDARD PLANS (INDEX 102-600-SERIES), AND THE FOLLOWING NOTES AND DETAILS INCLUDED THIS PLAN.
2. DURING OPERATIONS, NO LANE SHALL BE CLOSED FOR MORE THAN 3 MILES. A LANE SHALL NOT BE CLOSED OVERNIGHT EXCEPT AT AN ACTIVE WORK ZONE. IN THE EVENT OF AN ANTICIPATED EXTENDED STOPPAGE OF WORK EXCEEDING 24 HOURS, ELEVATION DIFFERENCE OF ADJACENT LANES SHALL NOT EXCEED 1-1/2 INCHES.
3. LANE CLOSURES OR OTHER TRAFFIC CONTROL NECESSARY FOR THE PLACEMENT, RELOCATION, OR REMOVAL OF BARRICADES, BARRIER WALL OR OTHER TRAFFIC CONTROL DEVICES SHALL BE EXECUTED IN ACCORDANCE WITH FDOT STANDARD PLANS INDEX 102-600-SERIES.
4. TEMPORARY PAVEMENT SHALL BE AT A MINIMUM, 2" OF TYPE S ASPHALT ON 6" OF LIMEROCK BASE. TYPE SP ASPHALT MAY BE SUBSTITUTED FOR THE TYPE S ASPHALT FOR NO ADDITIONAL COMPENSATION.
5. MAINTAIN ADEQUATE DRAINAGE AND HISTORICAL DRAINAGE PATTERNS TO PREVENT FLOODING OR DRAINAGE TO FLOW TO ROADWAY OR ROADSIDE AREAS EXISTING, UNDER CONSTRUCTION, OR COMPLETED. PROVIDE ANY TEMPORARY DRAINAGE MEASURES AS REQUIRED TO ADEQUATELY DRAIN THE PROJECT AND TEMPORARY TRAVELED ROADWAYS. ANY ADDITIONAL COSTS ASSOCIATED WITH DRAINAGE (TEMPORARY PIPES, TEMPORARY DRAINAGE STRUCTURES, TEMPORARY DITCHES AND THE REMOVAL OF THE SAME) SHALL BE CONSIDERED INCIDENTAL TO PAY ITEM NO. 102-1 MAINTENANCE OF TRAFFIC.
6. SUBMIT A DRAINAGE CONTROL PLAN PRIOR TO CONSTRUCTION.
7. ALL DRAINAGE INLETS THAT ARE CONSTRUCTED PRIOR TO FINAL SURROUNDING GRADE BEING ACHIEVED WILL REQUIRE TEMPORARY COVERING THAT WILL ALLOW DRAINAGE FLOW AND PROTECT THE INLET DURING TCP PHASES AND SHALL BE CONSIDERED INCIDENTAL TO PAY ITEM NUMBER 102-1.
8. REGULATORY SPEED FOR SR ___ DURING CONSTRUCTION SHALL BE MAINTAINED AT ___ MPH UNLESS OTHERWISE NOTED IN THE PLANS.
9. METHODS TO MAINTAIN NOISE LEVELS WITHIN ACCEPTABLE LIMITS SHALL INCLUDE BUT NOT BE LIMITED TO TEMPORARY NOISE BARRIERS, ENCLOSURES FOR EQUIPMENT, MUFFLERS, ETC.
10. HEAVY TRAFFIC CONDITIONS, ACCIDENTS, AND ANY UNFORESEEN EMERGENCIES MAY REQUIRE RESTRICTION OR REMOVAL OF ANY LANE CLOSURE. MAKE THE NECESSARY ADJUSTMENTS WITHOUT DELAY AT THE DIRECTION OF THE CFX CONSTRUCTION ENGINEER.
11. A TRAFFIC CONTROL OFFICER IS REQUIRED FOR EACH LANE AND EACH RAMP CLOSURE AND SHALL BE CONSIDERED INCIDENTAL TO PAY ITEM NO. 102-1 MAINTENANCE OF TRAFFIC.
12. REQUEST PERMISSION FOR ANY RAMP OR FULL ROAD CLOSURE AT LEAST 14 DAYS PRIOR TO THE CLOSURE FROM THE CFX CONSTRUCTION ENGINEER OR REPRESENTATIVE. COORDINATE DETOURS WITH ALL ADJACENT CONSTRUCTION PROJECTS INCLUDING PROJECTS AT ADJOINING INTERCHANGES.
13. LANE CLOSURES ON THE CFX SYSTEM ARE PERMITTED FROM SUNDAY NIGHT THROUGH FRIDAY MORNING DURING THE HOURS SPECIFIED IN TTC GENERAL NOTES. THE CONTRACTOR MAY REQUEST WEEKEND LANE CLOSURES, DEFINED AS FRIDAY NIGHT THROUGH SUNDAY MORNING, ON AN AS-NEEDED BASIS. APPROVAL OF ANY WEEKEND LANE CLOSURES WILL BE AT THE SOLE DISCRETION OF CFX.
14. COORDINATE ALL LANE CLOSURES, DIVERSIONS, OR OTHER MAINTENANCE OF TRAFFIC ACTIVITIES WITH CFX TOLL OPERATIONS (TOLLCLOSURES@CFXWAY.COM) AT LEAST 72 HOURS PRIOR TO THE ACTIVITY.
15. SINGLE LANE CLOSURES ARE LIMITED TO THE HOURS OF:
SR ___: ___ PM TO ___ AM
RAMP: ___ PM TO ___ AM
SIDE STREET: ___ PM TO ___ AM
16. MULTI-LANE CLOSURES ARE LIMITED TO THE HOURS OF:
SR ___: ___ PM TO ___ AM, ___ DAY THROUGH ___ DAY ONLY
17. TRAFFIC PACING PROCEDURES PER STANDARD PLANS INDEX 102-655 ARE LIMITED TO THE HOURS OF:
___ AM TO ___ AM, ___ DAY THROUGH ___ DAY ONLY
18. MAINLINE ROADWAY CLOSURES WITH OFF-SITE DETOURS ARE LIMITED TO THE HOURS OF:
___ AM TO ___ AM, ___ DAY THROUGH ___ DAY ONLY.
REFER TO THE DETOUR DETAILS FOR ADDITIONAL INFORMATION.

19. RAMP CLOSURES WITH OFF-SITE DETOURS ARE LIMITED TO THE HOURS OF:
___ AM TO ___ AM, ___ DAY THROUGH ___ DAY ONLY.
REFER TO THE DETOUR DETAILS FOR ADDITIONAL INFORMATION.
20. DO NOT DRIVE OR TRANSPORT CONSTRUCTION EQUIPMENT ON OPEN TRAVEL LANES UNLESS IN COMPLIANCE WITH FDOT STANDARD PLANS INDEX 102-600 AND 102-607. USE OF INDEX 102-607 MUST COMPLY WITH THE LANE CLOSURE RESTRICTIONS LISTED ON THIS SHEET. MAINTAIN CLEAR ZONE REQUIREMENTS FOR EQUIPMENT AND MATERIALS WHEN NOT IN USE.
21. ALTERNATE TRAFFIC CONTROL PLANS AND/OR CHANGES MADE TO THE TRAFFIC CONTROL PLAN SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF FLORIDA AND BE APPROVED BY CFX.
22. A CERTIFIED TRAFFIC CONTROL SUPERVISOR (TCS) SHALL BE ON SITE WHEN CONTRACTOR IS WORKING AND SHALL BE ON CALL FOR EMERGENCIES. PROVIDE THE ENGINEER WITH A 24 HOUR ON-CALL NUMBER.
23. ARROWS (→) SHOWN IN THESE PLANS DENOTE NUMBER OF LANES AND DIRECTION OF TRAFFIC ONLY AND DO NOT INDICATE PAVEMENT MARKINGS.
24. MAKE PROVISIONS FOR CONSTRUCTION INGRESS/EGRESS, INCLUDING MATERIALS DELIVERY, IN ACCORDANCE WITH THE PROVISIONS OF FDOT INDEX 102-655. FOR MEDIAN INGRESS/EGRESS, PROVIDE A SIGNED AND SEALED TTC PLAN FOR REVIEW AND APPROVAL. APPROVAL OF MEDIAN INGRESS/EGRESS IS AT THE SOLE DISCRETION OF CFX.
25. TRAFFIC SHALL NOT BE MAINTAINED ON A MILLED/GROOVED SURFACE. DURING MILLING AND RESURFACING OPERATIONS, ALL MILLED LANES SHALL BE RESURFACED AND BROUGHT TO WITHIN 1-1/2" OF THE ADJACENT TRAVEL LANE IN ACCORDANCE WITH STANDARD PLANS INDEX 102-600. MILLING AND RESURFACING OPERATIONS MUST BE PHASED TO PREVENT STANDING/TRAPPED WATER IN THE TRAVEL LANES.
26. MILLING, RESURFACING, AND OVERBUILD OPERATIONS ARE TO BE PHASED SUCH THAT ALL DROP-OFFS COMPLY WITH STANDARD PLANS INDEX 102-600. ANY TRAVEL LANE TREATMENTS OR ADDITIONAL TEMPORARY PAVEMENT NECESSARY TO REMOVE DROP-OFF HAZARDS SHALL BE CONSIDERED INCIDENTAL TO PAY ITEM NO. 102-1.
27. EXISTING GORE STRIPING WHICH IS TO BE REMOVED AND RE-STRIPED AS PART OF THE TRAFFIC CONTROL PLANS SHALL BE MILLED AND RESURFACED PRIOR TO PLACING THE TEMPORARY MARKINGS. WATER BLASTING, AS A MEANS OF MARKING REMOVAL, WILL NOT BE PERMITTED WITHIN THE GORE AREAS.
28. ALL TEMPORARY BARRIER WALL TRANSITIONS SHALL COMPLY WITH STANDARD PLANS INDEX 102-100; IMPACT ATTENUATORS SHALL BE INSTALLED PER STANDARD PLANS INDEX 102-100 AND AS SHOWN IN THE PLANS. UNLESS OTHERWISE SHOWN IN THE PLANS, ALL ATTENUATORS MUST BE PLACED 4' TO 8' FROM THE NORMAL TEMPORARY BARRIER WALL OFFSET AND A 1:20 TRANSITION PROVIDED.
29. MAINTAIN EXISTING ROADWAY LIGHTING LEVELS DURING ALL PHASES OF TRAFFIC CONTROL.
30. MAINTAIN EXISTING WARNING AND REGULATORY SIGNAGE DURING ALL PHASES OF TRAFFIC CONTROL AS APPLICABLE.
31. REMOVE ALL UNUSED TRAFFIC CONTROL DEVICES AND WORK ZONE SIGNS UPON COMPLETION OF THEIR USE. POST-MOUNTED SIGNS MAY BE COVERED OR TURNED TO FACE AWAY FROM TRAFFIC.
32. UNLESS OTHERWISE DIRECTED BY CFX, ALL CHANNELIZING DEVICES USED SHALL BE DRUMS.
33. THE TEMPORARY TRAFFIC CONTROL PLAN MUST BE MAINTAINED THROUGHOUT THE LIFE OF THE PROJECT. EXCLUDING FRICTION COURSE AND FINAL PAVEMENT MARKINGS, WORK ACTIVITIES NOT SHOWN WITHIN THE CURRENT PHASE MAY BE CONSTRUCTED PROVIDED ALL WORK IS OUTSIDE OF THE CLEAR ZONE AND DOES NOT AFFECT THE TRAFFIC PATTERN SHOWN IN THE CURRENT PHASE.
34. OBTAIN PERMITS FROM THE LOCAL MAINTAINING AGENCY PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN THE LOCAL MAINTAINING AGENCY'S ROAD RIGHT-OF-WAY.

CFX Exhibit 321-1
TTC General Notes

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| REVISIONS | | ENGINEER OF RECORD FULL NAME, P.E. P.E. LICENSE NUMBER 99999 ENGINEER OF RECORD COMPANY NAME ENGINEER OF RECORD COMPANY STREET ENGINEER OF RECORD CITY, STATE AND ZIP | PROJECT NAME (1 to 3 LINES) | | CENTRAL FLORIDA EXPRESSWAY AUTHORITY | STANDARD NOTES FOR TTC PLANS | SHEET NO. |
|-----------|-------------|---|-----------------------------------|-------------|---|---------------------------------|--------------|
| DATE | DESCRIPTION | | ROAD NO. | PROJECT NO. | | | |
| | | | SR 000 | --- | | | |

PROJECT SPECIFIC TTC GENERAL NOTES

1. SECTION ENGINEER TO DETERMINE ADDITIONAL NOTES AS REQUIRED

NOTES TO DESIGNERS:

STANDARD NOTES AS SHOWN ARE APPLICABLE TO THE MAJORITY OF PROJECTS ALONG THE CFX SYSTEM

WHERE A GENERAL OR PAY ITEM NOTE DOES NOT APPLY, IT SHALL BE REVISED TO "NOT USED" SUCH THAT THE NUMBERING OF STANDARD NOTES DOES NOT CHANGE

ADDITIONAL NOTES MAY BE ADDED UNDER "PROJECT SPECIFIC TTC GENERAL NOTES" AS DETERMINED BY THE SECTION ENGINEER

DELETE THIS BOX AND ALL "NOTES TO DESIGNERS" PRIOR TO SUBMITTAL OF PLANS FOR REVIEW

TTC PAY ITEM NOTES

1. PAYMENT FOR TRAFFIC CONTROL WILL BE PER PAY ITEM NO. 102-1, MAINTENANCE OF TRAFFIC (LUMP SUM.)
2. THE FOLLOWING LIST IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND IS NOT INTENDED TO BE THE SOLE BASIS OF THE CONTRACTOR'S BID. THE FOLLOWING ITEMS ARE CONSIDERED INCIDENTAL TO PAY ITEM NO. 102-1:
 - a. ALL LANE CLOSURES ALONG SR ___ ARE TO UTILIZE THE MOTORIST AWARENESS SYSTEM (M.A.S.) PER STANDARD PLANS INDEX 102-613.
 - b. ALL TEMPORARY PAVEMENT AND ALL CLEARING, GRUBBING, AND EARTHWORK NECESSARY FOR PLACEMENT OF TEMPORARY PAVEMENT.
 - PHASE ___: ---- SY TEMPORARY PAVEMENT
 - PHASE ___: ---- SY TEMPORARY PAVEMENT
 - PHASE ___: ---- SY TEMPORARY PAVEMENT
 - PHASE ___: ---- SY TEMPORARY PAVEMENT
 - c. CROSS STREET AND SIDE STREET TEMPORARY TRAFFIC CONTROL FOR INCIDENTAL CONSTRUCTION NOT SHOWN ON THE TTC PLANS.
 - d. MAINTENANCE OF GUIDE SIGNING IN ACCORDANCE WITH TTC PLANS.
 - e. ALL SIGNAGE AND TRAFFIC CONTROL DEVICES FOR ROAD CLOSURES AND DETOURS.
 - f. MAINTENANCE OF EXISTING ROADWAY LIGHTING AND/OR TEMPORARY LIGHTING IS REQUIRED AS NECESSARY TO MAINTAIN EXISTING ROADWAY LIGHTING LEVELS UNTIL THE PROPOSED ROADWAY LIGHTING IS IN PLACE AND OPERATIONAL.
 - g. TRAFFIC CONTROL OFFICERS ARE REQUIRED FOR ALL LANE CLOSURES ALONG SR ___ PER CFX SPECIFICATIONS.
 - h. TRAFFIC CONTROL OFFICERS ARE REQUIRED FOR ALL RAMP CLOSURES AT THE INTERCHANGES.
 - i. ALL TEMPORARY DRAINAGE INCLUDING ANY TEMPORARY PIPES, STRUCTURES, TEMPORARY SWALES OR DITCHES, PARTIAL CONSTRUCTION OF PERMANENT STRUCTURES, ETC.
 - j. REMOVAL OF TEMPORARY ATTENUATORS AS SOON AS POSSIBLE WHEN THEY ARE NO LONGER REQUIRED BY THE PLANS. ONLY THE QUANTITY OF TEMPORARY ATTENUATORS SHOWN IN THE PLANS WILL BE PAID FOR BOTH THEIR INSTALLATION AND ANY REPAIRS AS NECESSARY.
 - k. ALL FHP TROOPERS AND PCMS BOARDS REQUIRED FOR TRAFFIC PACING PROCEDURES PER STANDARD PLANS INDEX 102-655 DURING OVERHEAD SIGN REMOVALS AND INSTALLATIONS.
 - l. ALL COORDINATION AND/OR PERMITS REQUIRED FOR WORK WITHIN THE MAINTAINING AGENCY'S RIGHT-OF-WAY.
 - m. MAINTENANCE OF ALL EXISTING LA R/W FENCING DURING CONSTRUCTION ACTIVITIES. IF EXISTING FENCING IS IN CONFLICT WITH CONSTRUCTION ACTIVITIES, PROVIDE TEMPORARY FENCING AT A LOCATION DESIGNATED BY THE ENGINEER AND CFX. RESTORE THE EXISTING LA R/W FENCE IN LOCATIONS WHICH ARE TO REMAIN THAT WERE REMOVED OR RELOCATED TO ACCOMMODATE CONSTRUCTION ACTIVITIES.
 - n. MAINTAINING EXISTING WARNING, REGULATORY, AND EXIT (E5-1A) SIGNS AT ALL TIMES UNLESS OTHERWISE SHOWN IN THE PLANS. COVER, RELOCATE OR REMOVE CONFLICTING OR MISLEADING SIGNS DURING THE APPLICABLE TCP PHASES UNLESS OTHERWISE SHOWN IN THE PLANS.
 - o. EXTENSIVE COORDINATION WITH CFX, THE ENGINEER, AND THE TOLL EQUIPMENT CONTRACTOR REQUIRED DURING THE INSTALLATION, MODIFICATION, REMOVAL, PARTIAL DEMOLITION, AND/OR CONSTRUCTION OF TOLL FACILITIES AND EQUIPMENT.
 - p. TEMPORARY MARKINGS ON CONCRETE PAVEMENT (BRIDGE DECKS AND TOLL PLAZAS) SHALL BE 3M BRAND SCOTCH-LANE REMOVABLE TAPE SERIES 710, 711, AND 715 OR CFX APPROVED EQUAL.

CFX Exhibit 321-2
TTC General Notes Cont.

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| | | | | | SR 000 | --- | | | |

322 - Utility Adjustments

322.1 - General

The Utility Adjustments sheets provide coordination between the contractor and the affected utility companies. These sheets show the approximate locations of existing, proposed and relocated utilities, which helps to identify potential conflicts or damage to utilities. Projects with minor utility work or impacts may include these features on the roadway plan or plan-profile sheets or appropriate component plan sheets.

322.2 - Required Information

Show locations of existing and proposed utilities within the project limits.

Clearly show and label all proposed and relocated utilities on the plans using lines and standard utility symbols (see the CADD Manual). Clearly indicate the disposition of existing utilities that are not to remain in place and in service (e.g., "To Be Removed", "To Be Adjusted", "To Be Relocated"). Clearly label existing utilities that are to remain in place and in service with the Utility Agency Owner (UAO), Type, Size, and Material.

Show the line voltage for all overhead electrical power lines.

Place the following notes in the General Notes (see **CFX Exhibit 311-1**):

- (1) The location(s) of the utilities shown in the plans (including those designated Vv, Vh and Vvh) are based on limited investigation techniques and should be considered approximate only. The verified locations/elevations apply only at the points shown. Interpolations between these points have not been verified.
- (2) Utility/Agency Owners:
Company Contact Telephone Number

The provided company names and phone numbers are for emergency utility contacts. Also include the contact information for persons responsible for the maintenance of FDOT utility infrastructure such as traffic counters, lighting, signal components, and ITS.

While not utilities, the CFX-owned subsurface communication lines must be clearly shown and labeled on the plans.

322.3 - Sheet Format

Prepare the utility adjustment sheets from CADD files generated for the plan or plan profile sheets, and only the plan portion should be shown. Use levels, fonts and line weights in accordance with the CADD Manual.

Information and graphic data that is not necessary for utility adjustment sheets may be removed by

turning off the appropriate level(s) on which the data is stored. This will help ensure that information pertinent to utility adjustments is more easily seen. Show the following information on the utility adjustment sheets as a minimum:

- (1) Baseline and/or centerline of survey.
- (2) Curb and gutter or edge of pavement.
- (3) Drainage structures (existing and proposed).
- (4) Right of way lines.
- (5) Station numbers.
- (6) Street names.
- (7) Location of existing utilities. Label all major utilities that have been field verified (see Quality Level "A" locates, **FDM 221**) in accordance with the following symbol:

Vvh = Verified Vertical Elevation and Horizontal Location
- (8) Disposition of existing utilities that are not to remain in place and in service.
- (9) Location of new or relocated utilities.

323 - Selective Clearing and Grubbing Plans

323.1 - General

Selective Clearing and Grubbing Plan sheets are developed when existing vegetation, trees, and palms are to be protected, relocated, pruned, or removed as an alternative to Standard Clearing and Grubbing. **FDM 229** contains design criteria to determine the type and the limits of selective clearing and grubbing.

Place Selective Clearing and Grubbing Plan sheets in accordance with **CFX Design Guidelines 302**.

323.2 - Selective Clearing and Grubbing Plan Sheet

Selective Clearing and Grubbing Plan sheets include the following information, as applicable:

- Extent and type of type of clearing operation required within the project R/W limits
- Root pruning and branch pruning
- Plant preservation areas
- Tree protection barriers

323.2.1 - Sheet Set Up

Use the standard plan format sheet provided in the FDOT CADD Software to prepare Selective Clearing and Grubbing Plan sheets. Refer to the CADD Manual for CADD standards associated with selective clearing and grubbing.

Show existing topography and the centerline of construction with stationing, proposed edge of roadway pavement, R/W lines, limits of construction, canopy of existing trees, limits of vegetation to remain, tree protection barrier, and trees to be relocated. Include a legend on each sheet depicting the type of selective clearing and grubbing operation to be performed.

Place a north arrow and scale in a conspicuous location, typically in the upper right portion of the sheet. Use a scale that provides clarity and legibility. Use appropriate match lines when necessary.

When tree canopies overlap, the entire outline of the tree canopies can be shown as one mass. Show tree protection barrier on the plans. Branch and root pruning locations. When existing trees to remain are to be root pruned, the trees are assigned a label which should also be summarized, (per tree), in a summary box and shown as pruned on the Tree Disposition Charts. These items may also be labeled on the plans when needed for clarity or called out in the Selective Clearing & Grubbing Worktable but must be quantified per tree. Each tree does not need to be labeled when a group of trees are to be branch pruned, but the quantity of trees to be pruned must be provided. The disposition of trees to be relocated is shown on Tree Disposition sheets.

Where clarification is needed, trees to be removed may be noted on the plan.

Generally, the line between where standard clearing and grubbing occurs and where trees to be protected, relocated, or selectively removed demarcates a selective clearing and grubbing area. Selective clearing and grubbing areas are not always demarcated by a means of vegetation treatment or protection (tree protection barrier). Areas of tree protection, plant preservation, or selective clearing and grubbing may be delineated with tree protection barriers. When a tree protection area is adjacent to a R/W fence to remain, a sediment barrier, or similar permanent barrier, the tree protection barrier that is parallel to the permanent barrier may be omitted.

323.3 - Selective Clearing and Grubbing Detail Sheet

The notes required for selective clearing and grubbing vary depending on the project. It may be desirable to provide a separate Selective Clearing and Grubbing Detail Sheet to display the notes, symbols, and details that are applicable to the project.

323.3.1 - Work Table

Selective clearing and grubbing areas are defined and labeled by location. Location numbers can be based on roadway stationing numbers, quadrants, or sheet numbers.

Provide a Selective Clearing and Grubbing Work Table when the project includes selective removal of vegetation. As a minimum, the table includes:

- (1) Abbreviated name of primary species to preserve
- (2) Abbreviated name of primary species targeted for removal
- (3) Work Description

Other information that may be included in the table:

- (1) Florida Exotic Pest Plant Council Category I species to be removed
- (2) Estimated percent of Category I vegetative cover for each area
- (3) Additional species to target for removal or preservation
- (4) Root and branch pruning and intent (structural, aesthetic, safety, etc.)
- (5) Tree stumps to be removed or to remain
- (6) Additional Information

323.3.2 - Species Legend and Work Table Notes

Include a species legend with the Selective Clearing and Grubbing Work Table. The legend is to show all plant species noted in the table. Plant species are typically abbreviated by the first letter of the genus and the first letter of the species of the botanical name; e.g., show Live Oak, *Quercus virginiana* as QV.

Category 1 plants (as listed by the Florida Exotic Pest Plant Council) are undesirable, and in most cases should be listed to be removed. The designer may call out Category 1 plants that are to remain in the Work Table Notes or in the Selective Clearing and Grubbing Work Table, in cases where it may not be practical or feasible to remove them. Undesirable native species to be targeted for removal can also be listed.

Provide the following note on the Selective Clearing and Grubbing Detail sheet:

“Primary” species to target (remove) or preserve are those that were determined to be most prevalent in that area and are not intended to be the only species that occur.”

Provide a note describing follow up treatment needed to prevent recurrence of removed plants.

323.4 - Tree Disposition Sheets

Tree Disposition Sheets are used when there are trees to be relocated or an inventory of existing trees is necessary. An inventory may be necessary in order to document the species and size, in the case of damage or removal during construction. The inventory will provide a record of what existed, prior to the damage or removal, if mitigation or replacement is warranted.

Tree Disposition Sheets may be omitted if required information and tree relocations can be clearly and legibly shown on Selective Clearing and Grubbing or Landscape Plan sheets. If a tree or vegetation survey is available, utilize either Selective Clearing and Grubbing, Landscape or Tree Disposition sheets, showing all information on one sheet type on the Tree Disposition Chart. If there is no tree or vegetation survey, utilize only Selective Clearing and Grubbing or Landscape Sheets to show all information.

Note the following in the plans:

- Proper root pruning methods and time schedule for each species of plant to be

- relocated. See **CFX Design Guidelines 323.6** for more information.
- Contractor is responsible for coordination with an arborist for the care of vegetation during construction and during root and branch pruning

Tree bracing that is not covered by **Standard Plans, Index 580-001** is to be detailed in the plans. Refer to **CFX Design Guidelines 329.7** to determine when **Standard Plans, Index 580-001** applies. Provide recommended root pruning procedures and time schedule. Provide the above information as plan notes or details to the sheet.

Tree Disposition Sheets show the condition of each tree, and whether each tree is to remain, to be removed, or to be relocated. Tree Disposition Sheets and Tree Disposition Charts (see **CFX Design Guidelines 323.5**) list the trees on a site, and the tree numbers which must correspond to the tag ID numbers. Groups of trees to remain may be shown as a single cluster and assigned one representative tree number. Include the representative tree number on the Tree Disposition Chart and noted as 'Group of Trees' in the notes column.

Show limits of clear sight and horizontal offset on the Tree Disposition Sheet for the location of relocated material. Only show this information on the Tree Disposition Sheet if it is not shown elsewhere in the plan set, such as on the Landscape Plan.

Tree Disposition Sheets are typically prepared as part of the Selective Clearing and Grubbing Plan Sheets in the Roadway Plans set. When prepared as part of a Landscape plan set, place the sheets prior to the Landscape Plan sheets.

323.5 - Tree Disposition Chart

A plan sheet titled "Tree Disposition Chart" should accompany the Tree Disposition Sheets, and include the following in table format:

- Sheet number
- The identification number of each tree
- Botanical and common name of each tree
- Diameter at breast height (DBH) of each tree
- Condition of the tree including health, structure, and damage. Use the following (simplified) version of the International Society of Arboriculture (ISA) tree rating system. (Excellent, Good, Fair, Poor, Dead)
- Label the disposition of each tree as "To Remain," "To Be Removed," or "To Be Relocated." The location for relocation may be added.
- If a tree or palm is removed following the Vegetation Survey, note 'Tree/Palm does not exist'.

Note: Collecting and providing information on the height and spread of trees may not be cost effective, relevant, or feasible, depending on the scale of the project.

A note must be added to the Tree Disposition Charts when all trees are not shown from the Tree Survey.

Determine if the following is useful information, and provide if required:

- Approximate Tree height (feet)
- Approximate Canopy spread (feet)
- Location of the tree. Location can be based on roadway stationing numbers, quadrants, or sheet numbers.

Site-specific requirements may be included under the “Notes” column. Site-specific requirements may include:

- Watering schedule
- Fertilizer mix
- Fertilizer schedule
- Backfill or soil amendments.
- Root or Branch pruning and intent (structural, aesthetic, safety, etc.)

323.6 - Root and Branch Pruning

Root and/or Branch pruning can be shown in a plant schedule in either the Selective Clearing and Grubbing, Landscape, or Tree Disposition Plans. Do not duplicate information on separate plan sets. Use the sequence of construction to determine where to show root or branch pruning. If root or branch pruning will need to be accomplished early in the construction process, show on the Selective Clearing and Grubbing Plans. If pruning needs to be accomplished late in the construction process, show pruning on the Tree Disposition or Landscape Plans. Always specify the pruning objectives, whether for structural purposes, aesthetics, safety, clearance, etc. Ensure there is enough information provided so this work can be accurately bid by the Contractor and inspected for compliance by the Engineer.

324 - Miscellaneous Structures Plans

324.1 - General

Miscellaneous structures not included in the bridge plans must be included in the appropriate component plans. This includes high mast lighting supports, traffic mast arm supports, signal strain poles, overhead sign supports, rest area structures or buildings, barrier walls (traffic or sound), retaining walls and toll facilities.

For guidelines on structural detailing, refer to the Structures Detailing Manual.

324.2 - Approach Slabs

Custom approach slab sheets for non-standard designs and supplemental approach slab detail sheets called for by **Standard Plans, Indexes 400-090 and 400-091** are included in the structures plans. However, some roadway elements may need to be carried onto the approach slab. In these cases, clarify in the plans which elements are to be included as part of the roadway.

Elements that are part of the roadway approaches to the bridge and interface with the approach slabs areas (e.g., stabilization, guardrail, earthwork, sidewalks, approach slab surfacing) are to be included and paid for in the roadway quantities.

324.3 - Retaining Walls

Non-proprietary retaining walls require complete design and construction details in the contract plans. Proprietary walls require a set of control plan details to be included in the contract plans.

See **FDM 262** for retaining wall plans submittal procedures. See also the Structures Manual for plan content requirements.

On projects with bridges, include the control plan details in the bridge plans. When there are no bridge plans, include the control plan details in the appropriate component plans. Examples of control plan details are included in the Structures Detailing Manual.

Vendor Drawings for proprietary wall systems listed on the APL are provided on the Program Management Office website.

324.4 - Concrete Box Culverts

Place these sheets in a Structures Component, even when there are no bridge plans. Some of these sheets were previously shown in the Roadway Component Plan, but all of them are now to be shown in the Structures Component Plan regardless if the box culvert is categorized as a bridge or not.

Concrete box culverts require complete design and construction details to be included in the contract plans. Include the following minimum design details:

- (1) Plan and Elevation Sheets:
 - (a) Plan view showing: Grid north arrow; scale bar; existing highway boundaries including existing R/W monuments; new R/W line(s) including proposed R/W monuments; culvert or bridge identification number; culvert and highway alignment; survey baseline; profile grade line; direction of stationing; stream channel alignment; stream flow direction; skew angle of the culvert relative to the centerline of roadway; stationing along the profile grade line including begin and end station of culvert (outside face of sidewalls); length of culvert; subsurface exploration locations (e.g., boring locations); culvert end treatment (e.g., headwall and wing wall orientation); scour protection; slope protection; limit of stream work; utilities; traffic railing and pedestrian/bicycle railing type.
 - (b) Elevation view showing: Elevation vertical scale; profile grade line and vertical data; existing stream bottom and ground line (along PGL); utilities.
- (2) A longitudinal section along the culvert centerline showing: Culvert or bridge identification number; invert elevations; existing stream bottom or original ground; culvert stationing at centerline; typical highway section (including rail treatment); design earth cover height (measured from the top of the top slab to the top of pavement); limits of scour protection (including any keyways or geotextile fabric lining); channel work; culvert end treatments; utility (either attached to the fascia, or in the embankment, traffic railing or sidewalk); wing walls; headwalls; cutoff walls; reference to the appropriate Standard Plans.
- (3) Data Sheets: Box Culvert Data Table and Reinforcing Bar List.
- (4) Miscellaneous details showing: Construction phasing information (affects lengths of precast segments and potential need for skewed segments) including appropriate

- excavation support and protection systems (e.g., critical temporary walls); traffic railing details including connection details; slope and/or stream bank protection; channel section detail; culvert-end safety grate, guardrail or fencing details when applicable; removal of existing culvert(s); cofferdams or water diversion.
- (5) Notes indicating: Live loading requirements (HL-93 or HS-25); hydraulic data (show 100-year design flow or the design flow used and the minimum hydraulic area perpendicular to flow below the Design High Water); environmental classification for durability; minimum concrete class and reinforcing steel grade; assumed soil weight, angle of internal friction and nominal bearing capacity; differential soil settlement height and effective length (when significant); precast culvert limitations; any special joint waterproofing requirements; erosion and sediment control and stormwater pollution prevention plan requirements; restrictions for work in streams; estimated quantities.
 - (6) A Load Rating Summary sheet is required for box culverts classified as bridge culverts (per **FDM 265.1**).

In accordance with the **Basis of Estimates**, load pay items and quantities in the structures category.

324.5 - Three-Sided Concrete Culverts

These sheets are to be placed in a structure component, even when there are no bridge plans.

Complete footing, wingwall and channel lining designs and construction details are required for three-sided culverts. However only conceptual culvert barrel and headwall design details need to be provided. Include the following minimum design details in the plans:

- (1) Plan view showing the orientation of the ends of the structure. The two most typical options for culverts on a skew are ends parallel to the centerline of the roadway (skewed ends) or ends perpendicular to the centerline of the structure (square ends). The end treatment depends upon the skew, whether it is in a fill section or at grade, the location within the R/W, conflicts with utilities, phased construction details, the alignment of the feature crossed, and other site limitations.
- (2) Elevation view showing the configuration of the most appropriate type unit; e.g., frame or arch. Show any limitations on using a larger span (some manufacturers only fabricate units at fixed increments of span length, therefore showing the limitations will allow the manufacturers to bid using special units or the next larger span length of their standard units). Show other acceptable structure types in separate partial elevation views. Show limiting spans and heights for all alternatives.
- (3) No precast manufacturer should be eliminated from consideration for a given project. However, specific project requirements that may exclude some manufacturers must be identified (such as fabrication on a skew or a desired arched appearance).
- (4) Complete details for a cast-in-place footing design, including design loads and assumptions for the spread footings.
- (5) Complete details for cast-in-place wingwalls, including geometry and reinforcement details.
- (6) Include the applicable details in **CFX Design Guidelines 324.4**.
- (7) Place the following notes adjacent to the plan or elevation views, as applicable:

- (a) The assumed foundation vertical reaction is ____ kips/ft. The assumed foundation horizontal reaction is ____ kips/ft. The Contractor must submit a revised foundation design to the Engineer if the actual loads of the supplied structure exceed these assumed values. Any revised foundation design must be included in the shop drawings and submitted for approval at the same time as the design calculations for the three-sided structure.
- (b) In cases where squaring of the unit ends would create a geometric conflict with right of way, utilities, phase construction or site geometry, include the following note:
- (c) Due to site restrictions, only skewed end units are acceptable.
- (d) If site constraints do not eliminate the squaring of the ends, include the following note:
- (e) Squared end units may be substituted for skewed end units with no change in the payment limits and no additional cost to the Department.
- (f) When traffic railings are attached to skewed headwalls and site constraints do not eliminate the squaring of the ends, include the following note:

If the Contractor proposes to substitute square ends, details of the traffic railing attachment must be provided in the shop drawings and approved by the Engineer.

325 - Signing and Pavement Marking Plans

325.1 - General

Signing and Pavement Marking (S&PM) Plans are usually a component set of plans. Component plans are assembled as a separate plan set complete with a Key Sheet and all other required signing and pavement marking sheets. Number the component plans with the sheet numbers prefixed by the letter "S"; e.g., S-1, S-2, S-3. Projects with minimal signing and pavement marking improvements may show these features on signing and pavement marking sheets in the roadway plan set (lead component) or detailed on the Roadway Plan sheets. Do not use the prefix letter "S" when including signing and pavement marking sheets in the roadway plan set. Comply with the requirements in the **CFX Design Guidelines 230** in the selection of permanent pavement marking materials to be used.

325.1.1- Signs Mounted on Signal Installations

Show, detail, and tabulate signs mounted on signal span wires or mast arms in the Signalization plans. When Signalization Plans are not included in the project and signal-mounted signing modifications are proposed see the **CFX Signal Details** for direction.

325.2 - Key Sheet

The Key Sheet is the first sheet in the component plans set. The location map and Contract Plans Components list are not required on this sheet. Show the Index of S&PM Plans on the left side of the sheet. Assemble S&PM plans in the following order:

- (1) Key Sheet

- (2) Signature Sheet (if required)
- (3) General Notes (if required)
- (4) Project Layout
- (5) S&PM Plan
- (6) Guide Sign Worksheet (if required)
- (7) CFX Details (if required)
- (8) Special Details (if required)
- (9) Overhead Sign Cross Section (if required)
- (10) Overhead Sign Support Design (if required)
- (11) Foundation Details (if required)
- (12) Boring Data (if required)

Signing and pavement marking plans may require insertion of sheets that were prepared early, or prior to the design process; i.e. early works. See **CFX Design Guidelines 302.6.1** for instructions on including early works sheets.

See **CFX Design Guidelines 302** for other Key Sheet requirements and **CFX Exhibit 302-2** as an example Component Key Sheet.

325.3 - Signature Sheet

See **CFX Design Guidelines 303** for Signature Sheet requirements.

325.4 - Tabulation of Quantities and Pay Item Notes

Prepare the Tabulation of Quantities sheet using the standard plan format showing quantities, standard sign numbers, pay item numbers (except for pavement markings pay items) and size of sign for all pay items. The sign size and standard sign number is not required if shown in the plan sheets. List pay items in numerical order and tabulate quantities per sheet or by station. When the number of pay item numbers exceed one page, the additional sheet is to be labeled using an alphabetic suffix; e.g., S-3 and S-3A, S-4 and S-4A. When an alphabetic suffix is utilized, all signing pay items shall be shown on the first sheet, followed by all RPMs and pavement marking items on the "A" sheet. Provisions must be made to show the original and final quantities.

On contracts with multiple Financial Project ID numbers, or Federal Aid and non-Federal Aid quantities, provisions must be made to tabulate and summarize their respective quantities.

Pay item numbers and quantities for painted pavement markings shall not be shown.

When there is not a roadway component, see **CFX Design Guidelines 307.1** for placing Summary of Quantities sheets in the Signing and Pavement Marking plan set.

325.4.1 - Pay Item Numbers

The pay item number for the Option Lane Directional Arrow shall be counted as two arrows, Option Lane Arrow and Directional Lane Arrow.

0700-001-0AB: Single post signs mounted to either bridge railing or outside barrier walls, use A=2 or 3 (dependent on location). Revise description to read "Barrier Wall Mount- Special Design" or "Bridge Mount- Special Design"

0700-003-ABB: Supplemental Panels attached to a main panel shall be coded using the appropriate non-lighted range and associated number for BB and add the special design sign number to the description.

0700-003-ABB: Crossroad street name signs and CFX Logo 2 that are mounted to overpassing bridges that do not require steel support structures shall use A=2, BB= applicable SF range, and revise the description to read Sign Panel (F&I) (Bridge) (Flush Mount).

0700-004-ABC: Use the correct linear feet range, disregard "span only" and add the unique structure number to the description.

0705-011-1AA shall be used for surface mounted roadside delineators and the description shall read Surface Mounted Delineator (Flat Flexible) (Flexstake).

0705-11B-000 (LF): 3M Linear Delineation System description shall read 3M Linear Delineation System (Barrier Wall) or (Guardrail).

0713-1AA-BCD Preformed Tape:

713-1AA-BCD Preformed Tape

AA - Class

01 = Pavement Marking (Furnish & Install)

07 = Pavement Marking (Removal of Non-conflicting Markings) (SF), BCD=Blank

B - Color

1 = White

2 = Yellow

5 = White w/ Black Contrast

C - Type of Marking

0 = Solid, Longitudinal Lines (GM), D = 1, 2, 3

2 = Solid, Transverse Lines (LF), D = 2, 3, 4, 5

3 = Skip/Dotted 10'-30' OR 3'-9', Longitudinal Lines (GM), D = 1, 3, 6

4 = 2'-4' Dotted Guidelines / 6'-10' Gap Extension (GM), D = 1, 2, 3, 6

D - Width

1 = (6") Solid Longitudinal Lines, 10'-30' Skip, 3'-9' Skip, 2'-4' Dotted Guideline/ Extension Line, 6'-10' Gap Extension

2 = (8") Solid Longitudinal Lines, Channelizing Line

3 = (12") Solid Transverse Lines, 3'-9' Skip for Lane Drop, 3'-12' Skip for Lane Drop

4 = (18")

5 = (24") Not Used
6 = (9") For Use with Contrast Markings, B = 5

325.5 - General Notes Sheet

Show general notes on a separate General Notes sheet. See **CFX Signing and Marking Details** for Signing and Pavement Marking Standard General Notes.

All general notes shall be shown in the project plan set. For general notes not applicable to the project, the Consultant shall revise the note to read "Not Used". For notes needing modification, the Consultant shall modify the note to meet project-specific requirements. The consultant shall add project-specific notes as needed. The Consultant may add or delete pay item notes as applicable to the project.

325.6 - S&PM Plan Sheets

Prepare S&PM Plan sheets on a standard plan format utilizing 1"=50' scale. The use of other scales is at the sole discretion of CFX and may be considered on a per-project basis. See the requirements of **CFX Design Guidelines 312.1** as a guide.

For simple projects, or for narrow sections of a project, it may be possible to "stack" two plans on one sheet, one below the other. Stationing is to progress from left to right and be stacked from top to bottom. Use of "stacked" plan sheets is at the sole discretion of CFX and may be considered on a per-project basis.

325.6.1 - Required Information

The basic information pertaining to roadway geometrics and project limits required on the signing and pavement marking plan sheets is the same as that required on the plan portion of the plan-profile sheets. Topography and construction details need not be shown. Show underground and overhead utilities, lighting structures, signal structures and ITS structures that may cause construction conflicts with sign components. Check utilities, drainage, landscape features, sidewalks, and driveways for conflicts. Identify those that may cause conflicts in the plans.

Provide the following on the S&PM Plan sheet:

- (1) Flag and station the begin and end of the signing and pavement marking limits.
- (2) Place a north arrow and scale at a point of maximum visibility on the sheet. If two plans are "stacked" on one sheet, then show a north arrow and scale on each plan portion.
- (3) Show regulatory, warning, and directional signs at the proper locations. Show each sign face in close proximity to its respective sign with a leader line connecting the sign location and sign face. Orient each sign face on the plan sheet to be read as viewed from the direction of travel along the roadway. Indicate the location of all signs by station or milepost.
- (4) Provide sign placement (offset) when installation may be in conflict with utilities, drainage, lighting, sidewalks, driveways, and landscape feature.

- (5) Indicate the pay item number, sign size, standard designation, or assigned number (if nonstandard) for each sign.
- (6) Show and label permanent pavement markings specifying width, color and spacing. Indicate begin and end pavement marking stations including offsets or begin pavement marking station including offset and the total length of roadway pavement marking.
- (7) Identify Audible and Vibratory Treatments by specifying type (ground-in rumble strips or profiled thermoplastic), begin and end limits, and rumble strips configuration (Type A, B, or C). Ground-in rumble strips should be labeled with the permanent pavement marking callout labels. It is not necessary to call out the array type (skip or continuous) for Arterials and Collectors.
- (8) Indicate location of raised pavement markers and delineators by specifying the type, color, spacing, and limits of application by stations. RPM callouts shall be included with the associated pavement marking where applicable.
- (9) Indicate location of tubular markers by specifying color. If applicable, specify the spacing and limits of application by stations.
- (10) Walls shall be shown and labeled per type, i.e., sound wall, barrier wall, MSE wall, etc. Sound wall callouts must have the wall height included.
- (11) Plans sheets shall have a key map if the project contains an interchange with an intersecting roadway, a system-to-system interchange, or an interchange with loop/partial loop ramps.
- (12) Mainline and ramp toll plaza stations and begin/end of concrete deck plaza.
- (13) The centerline of each toll plaza with stations.
- (14) CFX Fiber Optic Network
- (15) Special design sign panels shall be assigned a unique sign number.
- (16) Radii labels for all dotted lines used as turning guidelines.
- (17) Station ties at the following locations:
 - Each point where a lane line is changed from one striping pattern or material to another
 - All lane and edge line begin and end taper points.
 - All stop bars
 - All crosswalks
 - Merge arrow and pavement message sets
 - First and last set of “Arrow/Only/Arrow” markings for parallel exit ramps and auxiliary lanes
- (18) Spacing for 18" white and yellow diagonal striping and painted gore areas

325.6.2 - Typical Pavement Marking Sheet

For simple projects, or sections of a project, it may be possible to show signing and pavement marking plan details schematically using straight-line format with station limits and typical markings. Show and identify all signs at their graphic location on the straight-line diagram. Show and label pavement markings on a typical marking plan. Include all necessary details for special areas, e.g., median crossovers, turn lanes.

325.7 - Guide Sign Worksheet

Show the sign face, with the complete message layout with legend spacing (vertical and horizontal), margins, all font types, border widths, corner radii and additional details listed below on the guide sign worksheet:

- All required CFX-specific notes as shown on the CFX Signing and Pavement Marking Details
- Overall sign dimensions displayed as XX'-X" (YYY")
- Callouts and dimensions of all horizontal and vertical dividers
- Callouts and dimensions for additional background and border colors
 - i.e. black on yellow exit-only portions of sign panel
- Label vertical dimensions from each sign element to any horizontal dividers
- Show vertical dividers in the copy/space table
- Show all symbols and arrows in the copy/space table
- Include special design details as required
- Include the "A" and "B" dimensions for all Exit Gore Signs

Cross sections are not required for typical multi-post signs, however, all data for each sign must be tabulated on the Multi-post Detail Sheet and included with the 60% submittal. Design of steel post section and average length may be deferred until the 90% submittal. Cross sections may be required for "non-typical" multi-post signs including those located behind sound walls or where the potential for utility conflicts exist.

This sheet should be prepared on the standard plan sheet format to any convenient scale that will preserve clarity and legibility. The number of signs that may be shown on a single sheet depends on the sign size and complexity. The format of the sheet is flexible as long as the information listed above is shown. Output from the Transoft GuidSign Program, or a similar format may be used.

All dimensions shall be shown to the nearest tenth of an inch. Word lengths shall be shown as the total for each word. The individual space between each whole element in a line of copy shall be shown. Guide Sign Worksheet sheet number shall be referenced on the plan sheets for the respective sign panel.

Guide sign worksheets shall show the maximum number of panels possible. The following note shall

appear on each sheet: “Width - horizontal spacing dimensions are in inches. End dimensions include border width and margin.”

325.8 - Multi-Post Sign Supports

Standard foundations for multi-post signs are provided in the Standard Plans. These foundations are based on the sign support size; however, the post size and length are not included in the Standard Plans and must be included as a part of the design and shown in the plans.

Multi-post support calculations shall be included in the Misc. Structures Report, or similar document, and signed and sealed by a Professional Engineer licensed in the state of Florida.

A single unique structure number shall be assigned to each multi-post sign assembly. Use the format GM-XX.

325.9 - Overhead Sign Cross Sections and Support Structure

The Sign Cross Section sheet shows the location of overhead sign(s) in cross section. A standard profile format should be utilized. Show and fully dimension the cross section of the roadway at the sign location.

The scale for the cross section is 1" = 20' horizontally and 1" = 10' vertically.

The design of the support truss, columns, and foundations, along with the boring data information, must be included in the signing and pavement marking plans. The “Cantilever Sign Structures Data Table” and the “Span Sign Structures Data Table” work in conjunction with of the **Standard Plans, Indexes 700-040 and 700-041**. These tables include the information noted above and should be completed by the Structures Engineer of Record (EOR) and inserted as a sheet in the plans.

A computer program for the design of overhead cantilever sign structures and a program for the design of overhead span sign structures are available. The programs were developed by the Structures Design Office and may be downloaded from the Structures Design web site.

The design of the attachment system for signs mounted on bridge structures is the responsibility of the Structures EOR. Include the design of the attachment system in the structures plans if bridge work is included in the project. If bridge work is not in the project, place the design details in the signing and pavement marking plans.

For widening projects with a roadway component, cross sections are required when existing sign structures have proposed panels that are lane specific or when relocating existing lane specific signs along the truss. For projects where Signing is the main component, consultants shall use “Panel Locations on Existing Structures” in the CFX SPM Details, unless specific sign cross sections are provided.

The Consultant shall identify on the sign structure cross section what panel sizes the structure must ultimately accommodate, as well as the panels required at interim installations.

Overhead sign support calculations shall be signed and sealed by a Professional Engineer licensed in the state of Florida.

A single unique structure number shall be assigned to each overhead assembly. Use the following format:

- OT-XX for overhead truss (half or full span).
- OT-EX for existing overhead truss (half or full span)
- OC-XX for overhead cantilever.
- OC-EX for existing overhead cantilever
- BM-XX for bridge mount

Cross section sheets shall be ordered such that OT-XX sheets are before OC-XX sheets.

Cross Sections sheets shall include the information shown on the CFX Signing and Pavement Marking Details and as noted below:

- Graphic of the sign panel shown on the sign structure for all signs with arrows
 - Including existing structures with new sign panels
- Callouts for C/L Arrow and C/L Lane for all arrows included on the sign panel
- Callouts for C/L Sign Panel and C/L Lane(s) for all other signs without arrows
- Lane Lines
- C/L top and bottom truss chords for all sign panels less than 8'-0" in height

326 - Lighting Plans

326.1 - General

Lighting plans include construction details, electrical circuits, pole data, conduits, service points, luminaires, foundations, boring details, and other data relevant to lighting projects.

Lighting plans are usually a component set of plans. Component plans are assembled as a separate plan set complete with a Key Sheet and all other required lighting sheets. Number the component plans with the sheet numbers prefixed by the letter "L"; e.g., L-1, L-2, L-3. Projects with minimal lighting improvements may show these features on lighting sheets included in the roadway plan set (lead component) or detailed on the Roadway Plan sheets. Do not use the prefix letter "L" when including lighting sheets in the roadway plan set.

326.2 - Key Sheet

The Key Sheet is the first sheet in the component plans set. The location map and Contract Plans Components list are not required on this sheet. Show the Index of Lighting Plans on the left side of the sheet. Assemble lighting plans in the following order:

- (1) Key Sheet
- (2) Signature Sheet (If required)
- (3) Tabulation of Quantities
- (4) General and Pay Item Notes
- (5) Maintenance Pay Items and Quantity Percentages (if required)
- (6) Temporary Lighting Notes and Details (if required)
- (7) Legend
- (8) Pole Data (Roadway Lighting)
- (9) Luminaire Data (Sign and Underdeck Lighting)
- (10) Project Layout
- (11) Lighting Plan
- (12) Underdeck Lighting Plan
- (13) Foundation Details (if required)
- (14) Maintenance Lighting (If required)
- (15) Underdeck Lighting Mounting Details
- (16) Remote LED Driver Cabinet Details
- (17) Sign Lighting Details
- (18) Service Point Details
- (19) Lighting Cabinet Details
- (20) Panelboard Schedules
- (21) Arc Flash Warning Label and Notes

Note: Refer to current CFX lighting details for additional information.

326.3 - Signature Sheet

See *CFX Design Guidelines 303* for Signature Sheet requirements.

326.4 - Tabulation of Quantities

The Tabulation of Quantities sheet lists the item numbers, description and quantity of materials.

List pay items in numerical order. Provisions must be made to show the original and final quantities per sheet or by station. When the number of pay item numbers exceed one page, the additional sheet is to be numbered using an alphabetic suffix; e.g., L-3 and L-3A, L-4 and L-4A.

When there is not a roadway component, see *CFX Design Guidelines 307.1* for placing Summary of Quantities sheets in the Lighting plan set.

See current CFX lighting details for standard lighting notes.

326.5 - General and Pay Item Notes Sheet

Refer to current CFX lighting details for additional information related to general notes, pay item notes, and maintenance related pay items, notes, and quantity percentages used for new and retrofitting lighting projects.

For notes not applicable to the project, the Consultant shall revise the note to read “Not Used”. For notes needing modification, the Consultant shall modify the note to meet project specific requirements. The consultant shall add project specific notes as needed.

326.6 - Legend Sheet

Prepare the Legend sheet on a standard plan format and include symbols, descriptions, and design criteria.

326.7 - Pole Data Table

Prepare the pole data table on a standard plan format and include all items shown on the table in the CFX Lighting Design Details.

326.8 - Underdeck Luminaire Data Table

Prepare the underdeck luminaire data table on a standard plan format and include all items shown on the table in the CFX Lighting Design Details.

326.9 - Sign Luminaire Data Table

Prepare the sign luminaire data table on a standard plan format and include all items shown on the

table in the CFX Lighting Design Details.

326.10 - Load Center Data Table

Prepare the load center data table on a standard plan format and include all items shown on the table in the CFX Lighting Design Details.

326.11 - Lighting Plan Sheets

Prepare Lighting Plan sheets on a standard plan format. The scale must be such that all details are clear and legible; however, the scale must be 1" = 50'.

Use symbols in accordance with the requirements of the FDOT CADD Software.

326.11.1 - Required Information

The basic information pertaining to roadway geometrics and project limits required on the lighting plan sheets is the same as that required on the plan portion of the roadway plan-profile sheets. Topography and construction details need not be shown. Show underground and overhead utilities, signing structures, signal structures, and ITS structures that may cause construction conflicts with lighting components. Check utilities, drainage, signal structures, sign structures, landscape features, sidewalks, and driveways for conflicts. Identify those that may cause conflicts in the plans.

Provide the following on the Lighting Plan sheet:

- (1) Show existing light poles and label as existing poles.
- (2) Show the lighting layout on the plan format using symbols which represent poles, conduits, and service points.
- (3) Flag and station the begin and end of the lighting limits.
- (4) Place a north arrow and scale at a point of maximum visibility on the sheet.
- (5) Note conduit runs providing conduit size, number, and conductor sizes.
- (6) Flag poles providing pole number, baseline or centerline station, circuit number, and offset from baseline or centerline. Show the symbols for poles at the correct baseline or centerline station and note the approximate offset from the roadway.
- (7) Flag and station service point locations as determined through utility negotiations. **Standard Plans, Index 639-001** provides details for the service point. Provide the following service point description on the Lighting Plan sheet:
 - (a) Service Point Location
 - (b) Power Service-Entrance Location Stationing and Offset
 - (c) Voltage and Phases (e.g. 240/480 Volt, Single Phase)

326.12 - LED Sign Lighting Detail Sheets

The LED Sign Lighting Detail Sheets include the side view installation of the LED Remote driver cabinet on the upright of the sign structure, the back view of overhead sign luminaire installation, sign light wiring details, sign luminaire on structure (profile), and notes.

326.13 - Underdeck Lighting Mounting Detail Sheet

The underdeck lighting mounting detail sheet includes remote LED driver cabinet installation on P-2 type poles, exposed or embedded conduit routing and junction boxes, and necessary notes.

326.14 - Remote LED Driver Cabinet Detail Sheets

The remote LED driver cabinet detail sheets include cabinets of various sizes (project dependent), the front view, right view, interior component layout, and notes.

326.15 - Conduit Routing Detail for LED Driver Cabinet Sheet

The conduit routing detail sheet includes the wiring and conduit details for sign lighting, pendant hung (when used) underdeck lighting, and notes.

326.16 - Maintenance Lighting for Box Girder Sheet

The maintenance lighting for box girder sheet includes mini power centers, LED light fixtures, conduit and junction boxes, and notes.

326.17 - Service Point Detail Sheet

The service point detail sheets include a riser diagram, electrical service assembly wiring diagram, electrical service assembly loading diagram, load center wiring diagram, cabinet installation details, panelboard schedules and notes, and ARC flash warning label and notes.

325.18 - Foundation Details Sheet

The foundation design for standard conventional poles is shown in the ***Standard Plans, Index 715-002***. These foundations do not need to be shown in the plans.

Provide design details in the plans for non-standard foundations for any of the following conditions:

- Soil conditions weaker than those shown in the Standard Plans
- Other site restrictions (e.g., limited R/W, utility conflicts)

326.19 - Boring Data Sheet

Boring Data sheets provide the boring data for non-standard foundation details.

326.20 - Temporary Highway Lighting

Temporary Highway Lighting, if required, is provided for different phases of construction as part of the TTC plans. See **FDM 240** for guidance. If used, provide “Temporary Highway Lighting Plans,” and include all applicable lighting plans components as described above. Required plans content will depend on complexity of Temporary Highway Lighting placement. At a minimum, provide plans components with following:

- (1) Lighting Data Table, listed by TTC phase and stationing range, including:
 - (a) Pay Item quantity
 - (b) light pole type (referenced standard or other)
 - (c) light pole offset (meeting minimum offset requirements)
 - (d) light pole spacing
 - (e) foundation type (referenced standard, barrier-mounted, or other)Note: Multiple TTC phases may be listed per row
- (2) Plan sheets showing light pole locations for complex projects (not required for simple layouts)
- (3) Engineering drawings and notes as required to show applicable requirements of **FDM 240** (e.g., barrier bracket mount details, Type K Temporary Barrier anchorage details or reference, 1'-6" pole setback, etc.)

327 - Signalization Plans

327.1 - General

Signalization plans include construction details, electrical circuits, signal phasing, and other data relevant to signalization projects.

Signalization plans are usually a component set of plans. Component plans are assembled as a separate plan set complete with a Key Sheet and all other required signalization sheets. Number the component plans with sheet numbers prefixed by the letter “T”; e.g., T-1, T-2, T-3.

Projects with minimal signalization improvements may show these features on signalization sheets included in the roadway plan set (lead component) or detailed on the Roadway Plan sheets. Do not use the prefix letter “T” when including signal sheets in the roadway plan set.

327.1.1 - Signs Mounted on Signal Installations

Show, detail and tabulate the signs mounted on signal span wires or mast arms in the Signalization Plans.

327.1.2 - Rectangular Rapid Flashing Beacons (RRFBs)

Show, detail, and tabulate RRFBs mounted overhead or as a standalone assembly in the Signalization Plans.

327.2 - Key Sheet

The Key Sheet is the first sheet in the component plans set. The location map and Contract Plans Components list are not required on this sheet. Show the Index of Signalization Plans on the left side of the sheet. Assemble signalization plans in the following order:

- (1) Key Sheet
- (2) Signature Sheet (if required)
- (3) Summary of Quantities
- (4) Tabulation of Quantities
- (5) General Notes
- (6) Signalization Plan
- (7) Interconnect/Communication Plan
- (8) Mast Arm Details
- (9) Foundation Details - Mast Arms
- (10) Boring Data Sheets- Mast Arms
- (11) Internally Illuminated Street Name Signs Detail(s) (if required)
- (12) Electrical Power Service Detail (if required)

See **CFX Design Guidelines 302** for other Key Sheet requirements and **CFX Exhibit 302-2** as an example Component Key Sheet.

327.3 - Signature Sheet

See **CFX Design Guidelines 303** for Signature Sheet requirements.

327.4 - Tabulation of Quantities and Standard Notes

The Tabulation of Quantities sheet lists the item numbers, description and quantity of materials. List pay item numbers in numerical order. Provisions must be made to show the original and final quantities per sheet or by station.

When there is not a roadway component, see **CFX Design Guidelines 307.1** for placing Summary of Quantities sheets in the Signalization plan set.

On contracts with multiple Financial Project ID numbers, or federal aid and non-Federal Aid quantities,

provisions must be made to tabulate and summarize their respective quantities.

327.5 - General Notes Sheet

Show general notes on a separate General Notes sheet.

Include on the General Notes sheet special signal design information such as controller operations, loop installations, signal heads, interconnect cable, and computer interface that is generally not covered in the Standard Specifications, or Supplement and Special Provisions.

Coordinate with the maintaining agency of the traffic signal and include the appropriate notes that comply with maintaining agency requirements. Review the agency notes with CFX to verify there is no contradictions.

For notes not applicable to the project, the Consultant shall revise the note to read "Not Used". For notes needing modification, the Consultant shall modify the note to meet project specific requirements. The consultant shall add project specific notes as needed.

327.6 - Signalization Plan Sheet

Prepare Signalization Plan sheets on standard plan format at a scale large enough to show all details clearly and legibly. The recommended scale is 1" = 40' or 1" = 50'. The complete intersection is typically shown on one plan sheet; however, for large intersections more sheets may be used with appropriate match lines.

Use symbols in accordance with the requirements of the FDOT CADD Software. Prepare a separate Plan Sheet for each signalized intersection included in the construction project.

327.6.1 - Required Information

The basic information requirements include roadway geometrics, street names, construction stationing or milepost, curb and gutter, drainage inlets, sidewalks and R/W lines as similarly required on the plan portion of the Roadway Plan-Profile sheets. Show underground and overhead utilities, signing structures, and lighting structures that may cause construction conflicts with signal components. Check utilities, signing and pavement marking features, drainage, landscape features, sidewalks, and driveways for conflicts. Identify those that may cause conflicts in the plans.

Provide the following on the Signalization Plan sheet:

- (1) North arrow and scale at a point of maximum visibility on the sheet.
- (2) Signal head locations with orientation arrows and movements (movements 2 and 6 must be the major streets).
- (3) Details of signal heads in tabular form with pay item numbers.
- (4) Phasing diagram/signal operating plan. If the SOP conforms to the **Standard Plans**,

Index 671-001, then a reference to the index is all that is required. For all other operating plans, the plan must be shown.

- (5) Signal controller timing chart.
- (6) Loop detectors.
- (7) Electrical service location and proposed electrical service routing.
- (8) Location of signal poles and span wires include ground and roadway crown elevations.
- (9) Signal wire signs.
- (10) Pedestrian signals including station and offsets. See Standard Plans Instructions for Index 665-001 (SPI-665-001) for additional information on pedestrian detector location and orientation.
- (11) Turning radii.
- (12) Median nose locations.
- (13) Location of "stop bars" and pedestrian crosswalks.
- (14) Coordination unit-timing chart.
- (15) Lane lines with orientation arrows.
- (16) Location of conduits.

Label all equipment shown with their respective pay item numbers.

327.7 - Interconnect/Communication Plan Sheet

The Interconnect/Communication (I/C) Plan sheet is required when signal equipment is being coordinated with other signal installations or with a computerized system. The I/C Plan sheet shows pictorially the placement of I/C cable, either underground or aerial, pull boxes or aerial junction boxes, and tabulates all related interconnect quantities. The I/C Plan sheet must indicate signal poles, service poles, and joint-use poles to which I/C cable will be attached.

Prepare the I/C Plan sheet on standard plan format. Use a scale 1" = 100' for underground cable, and 1" = 200' for aerial cable. For simple projects, or sections of a project, "stacking" two plans on one sheet is generally permitted if clarity and legibility are maintained. Stationing must progress from left to right and multiple plan views be stacked from top to bottom.

Place a north arrow and scale at a point of maximum visibility on the sheet. If two plans are "stacked" on one sheet, include a north arrow and scale in each plan portion.

The basic plan information requirements include roadway schematic, showing cross streets and driveways, cable information, pole location, pole number, utility pole identification number and pay item number.

327.8 - Mast Arm Details Sheet

See **Standard Plans, Index 649-030** (Standard Mast Arm Assemblies) or **Index 649-031** (Special Mast Arm Assemblies) and the associated Standard Plans Instructions (SPIs).

327.9 - Foundation Details Sheet

Foundations for non-standard mast arm poles and foundations in soil conditions weaker than those shown in the Standard Plans must be designed by the responsible structures design engineer of record. The construction details for the non-standard design are shown on the Foundation Details sheet.

The foundation design for standard mast arm poles is shown in the **Standard Plans, Indexes 649-030, and 649-031**. These foundations do not need to be shown in the signalization plans.

327.10 - Boring Data Sheet

Boring Data sheets provide the boring data for mast arm poles and non-standard foundation details.

328 - Intelligent Transportation Systems Plans

328.1 - General

The CFX ITS Design Details establishes guidelines for the preparation of ITS Plans that can be found on the CFX website.

Intelligent transportation systems (ITS) plans include construction details, electrical circuits, and other data relevant to ITS projects.

ITS plans are usually a component set of plans. Component plans are assembled as a separate plan set complete with a Key Sheet and all other required ITS sheets. Number the component plans with sheet numbers prefixed by the letter "IT"; e.g., IT-1, IT-2, IT-3.

When buried CFX fiber optic cable exists within the project limits, coordinate with the CFX Traffic Operations group office and include the Fiber Optic Cable Locator pay item in the Tabulation of Quantities.

328.2 - Key Sheet

The Key Sheet is the first sheet in the component plans set. The location map and Contract Plans Components list are not required on this sheet. Show the Index of ITS Plans on the left side of the sheet. Assemble ITS plans in the following order:

- (1) Key Sheet
- (2) Signature Sheet
- (3) General Notes
- (4) ITS Plan Sheets or "letter type" plan sets

(5) Detail Sheets

See **CFX Design Guidelines 302** for other Key Sheet requirements and **CFX Exhibit 302-2** as an example Component Key Sheet.

328.3 - Signature Sheet

See **CFX Design Guidelines 303** for Signature Sheet requirements.

328.4 - Tabulation of Quantities

The Tabulation of Quantities sheet lists the pay item numbers, description and quantity of materials. List pay items in numerical order. Provisions must be made to show the original and final quantities per sheet. When the number of pay item columns exceed one page, the additional sheet is to be numbered in sequential order.

328.5 - General Notes

Show general notes on a separate General Notes sheet.

Refer to current CFX ITS Design Details for additional information related to general notes, pay item notes, and maintenance related pay items, notes.

For notes not applicable to the project, the Consultant shall revise the note to read “Not Used”. For notes needing modification, the Consultant shall modify the note to meet project specific requirements. The consultant shall add project specific notes as needed.

328.6 - ITS Plan Sheets

Prepare ITS Plan sheets on standard plan format. The scale must be such that all details are clear and legible. See the requirements of **CFX Design Guidelines 312** as a guide. Place a north arrow and scale at a point of maximum visibility on the sheet.

328.6.1 - Required Information

The basic information requirements include roadway geometrics, project limits, street names, construction stationing or milepost, curb and gutter, drainage inlets, sidewalks and right of way lines as similarly required on the plan portion of the roadway plan-profile sheets. Show underground and overhead utilities, signing structures, and lighting structures that may cause construction conflicts with ITS components. Check utilities, drainage, landscape features, sidewalks, and driveways for conflicts. Identify those that may cause conflicts in the plans.

Where details normally shown on roadway plans would obscure ITS features, the details may be screened so long as the details remain plainly legible.

Clearly label all equipment shown on the plan with their respective pay item numbers and follow the CFX approved ITS naming convention. In addition, the following plan elements should be shown:

- (1) Cabling, fiber optic splicing, and interconnects.
- (2) System communication devices.
- (3) Electrical power service equipment and interconnects.
- (4) Grounding and transient voltage protection details.
- (5) Structure-mounted or ground-mounted field cabinets for system electronics, maintenance service points, and interconnect.

328.6.1.1 - Dynamic Message Sign

Plans for a Dynamic Message Sign (DMS) installation should illustrate the location, placement, and typical details of the following components:

- (1) DMS Housing, including details and notes that identify type of display (monochrome, full-color, or tricolor), size of display matrix (height, width, number of lines, and number of characters per line), and type of mechanical construction (walk-in, front access, or embedded).
- (2) DMS controller.
- (3) DMS Uninterruptible Power Supply (UPS) system.
- (4) DMS support structures, including external walkways, safety railings, and ladders.
- (5) DMS mounting brackets and hardware.
- (6) A ground-level cabinet for a DMS controller and associated electronic equipment.
- (7) Telemetry equipment details for remote sensing and control

328.6.1.2 - Network Devices

Plans including network devices should illustrate the following system attributes:

- (1) System diagrams illustrating network and device interconnect.
- (2) General network topology.
- (3) Notes regarding any special configurations or options for specific devices that are required to achieve a specific system function.

328.6.1.3 - Fiber Optic Cable and Interconnect

The plans for fiber optic cable systems should illustrate the location, placement, and typical details of the following components:

- (1) Fiber optic conduits.
- (2) Fiber optic cables.
- (3) Fiber optic splices and terminations.
- (4) Fiber optic cable designating system.
- (5) Fiber optic cable access points.

328.6.1.4 - Vehicle Detection and Data Collection

The plans for traffic data and vehicle detection systems should illustrate the location, placement, and typical details of the following components:

- (1) Diagrams illustrating detection system interconnect.
- (2) General network topology.
- (3) Notes regarding any special configurations or options for specific devices that are required to achieve a specific system function.

329 - Landscape Plans

329.1 - General

Landscape refers to any vegetation, mulches, and irrigation systems. Designs may include hardscape features (e.g., street furniture, specialty paving, tree grates, walls, planters, fountains, fences, landscape lighting). Hardscape-only projects are not landscape projects. Landscape may be constructed as a standalone project or as a component of a roadway project.

Landscape Plans are prepared as a standalone Landscape plan set. Landscape Plans are assembled as a complete set with a Key Sheet and all other required landscape sheets. The sheets are numbered with the prefix "LD"; e.g., LD-1, LD-2, LD-3.

329.2 - Key Sheet

The key sheet is the first sheet in the Landscape plan set. Show the index of Landscape Plans on the left side of the sheet. Assemble the Landscape Plans in the following order:

- (1) Key Sheet
- (2) Signature Sheet (if required)
- (3) General Notes
- (4) Plant Schedule
- (5) Project Layout
- (6) Landscape Plan
- (7) Landscape Details
- (8) Irrigation Plan (if applicable)
- (9) Irrigation Details (if applicable)
- (10) Stormwater Pollution Prevention Plan (if applicable)

See *CFX Design Guidelines 302* for other Key Sheet requirements.

329.3 - Signature Sheet (if applicable)

See *CFX Design Guidelines 303* for Signature Sheet requirements.

329.4 - Tabulation of Quantities and Plant Schedule

The Tabulation of Quantities and Plant Schedule sheet tabulates the planting materials, landscape soil work, and other materials required for the installation of plant materials. Prepare this sheet using the standard tabulation of quantities sheet as illustrated in **CFX Exhibit 329-1**. If irrigation elements are included, a separate Tabulation of Quantities is required. If hardscape elements are included, use the appropriate summary boxes for each element, and include on Summary of Quantities sheets.

On contracts with multiple Financial Project ID numbers or Federal-Aid and non-Federal Aid quantities, provisions must be made to tabulate and summarize their respective quantities.

Pay Size categorized as small plants include:

- All ground covers
- Shrubs, trees, and cycads less than 7 gallons
- Clustering palms, up to 6-foot height

Pay Size categorized as large plants include:

- Shrubs, trees, and cycads, 7 gallons or greater
- Single-trunk palms
- Clustering palms, 6-foot height or greater

329.5 - General Notes

Show general notes on a separate General Notes sheet. See **CFX Design Guidelines 311** for instructions in creating a General Notes sheet. General Notes can be used to describe site-specific requirements, such as:

- Watering schedule
- Fertilizer mix
- Fertilizer schedule
- Backfill or soil amendments
- Utility providers list
- Sight line and/or design speed criteria
- Maintaining authority contact information

329.6 - Landscape Plan Sheets

Prepare Landscape Plan sheets on a standard plan format. The scale should be such that all details are clear and legible. See the requirements of **CFX Design Guidelines 312.1** as a guide. For simple projects, or narrow sections of a project, it may be possible to "stack" two plans on one sheet, one below the other. Stationing must progress from left to right and be stacked from top to bottom. Irrigation plan sheets may be prepared at a larger scale than the planting plan sheets. Clarity and legibility must be preserved in all cases.

Place a north arrow and scale in a conspicuous location, typically in the upper right portion of the sheet. If two plans are "stacked" on one sheet, include a north arrow and scale in each plan portion.

329.6.1 - Required Information

The basic information required is as follows:

- (1) Project centerline
- (2) Edge of pavement (edge of traffic lanes)
- (3) Curbs
- (4) Drainage systems
- (5) Guardrail
- (6) R/W or limited access fence line
- (7) Sidewalks or other planned or existing structures
- (8) Lighting, signs, and signal poles
- (9) Intersections and driveways which are noted in the plans
- (10) Existing and proposed overhead and underground utility locations
- (11) Clear Zone/Lateral offset (should be plotted or distances noted frequently on each plan sheet)
- (12) View zones for permitted outdoor advertising signs
- (13) Canopy limits
- (14) Existing vegetation (to remain or be removed)
- (15) Existing off-site features and conditions that affect or are affected by the project
- (16) Fence and gate locations
- (17) Setbacks from structural elements or drainage system
- (18) Limits of clear sight (see **FDM 212.11**)
- (19) Transit Facilities
- (20) Noise walls and architectural elements

Where necessary, required sheet elements may be “screened” to provide legibility for the landscape plans, so long as the required elements remain apparent.

Planting plan sheets must also provide at a minimum the plant symbols and initials of the type of plant.

Include the following on the planting plan sheets:

- Hardscape and site amenities; e.g., street furniture, specialty paving, tree grates, walls, planters, fountains, fences, and lighting (excluding public utility street and area lighting).
- Location and depth to improve soil structure (a.k.a., soil scarification), amend existing soil, or replace existing soil with Landscape Soil
- Soil scarification and amendment requirements may be described in the Technical Special Provisions. Detailed requirements (e.g., those that vary for specific areas) should be described separately for each amendment type. Each type of soil scarification, amendment, or replacement should be defined (e.g., Type ‘A’), specified, and quantified on the Plant Schedule.

Prepare irrigation plan sheets using the planting plan sheets (devoid of unnecessary text and labeling) and include information pertaining to the irrigation system. Information on the sheet must include the approximate location of spray heads and rotors, valves, mainlines, lateral lines, sleeves (noting the diameter sizes), controllers, water sources and points of connection, backflow preventers, and isolation valves.

The Details Sheet must include a legend clearly depicting the symbiology used in the irrigation plan sheets and an associative description for each entry. Additional information such as the nozzle and component schedule, irrigation zone, or lateral schedule can be included on these sheets.

329.7 - Landscape Details Sheet

Request an example of a Landscape Detail Sheet from the CFX GEC.

330 - Utility Work by Highway Contractor Agreement Plans

330.1 - General

Most utility adjustment work is performed by the utility owners or their contractor. In some cases, it is advantageous to the Department and Utility to include the utility work as part of the roadway contract. In such cases the Department will enter into an agreement with a Utility for this purpose. These agreements are called Utility Work by Highway Contractor (UWHC) Agreements. The highway contractor is required to construct or relocate the specified utilities in accordance with the plans and special provisions developed by the Utility and incorporated as part of the bid package.

Typically, utility projects are included as strung projects. There are times when a utility company may reject the bid amount for their project. As a separate set of plans, the quantities and cost can be readily extracted from the contract.

Occasionally utility work may extend outside the normal construction limits of the project. When this is the case the limits of the utility work must be shown or noted on the plans.

For UWHC Agreements, prepare the utility plans in the same basic format as Department plans and as a separate plan set. Assemble the plans as follows:

- (1) Key Sheet
- (2) Signature Sheet (if required)
- (3) Plan-Profile Sheets
- (4) Cross Sections (as required)
- (5) Detail Sheets (as required)

Reflect any special technical or relocation agreement provisions in the plans. In some cases, it may not be practical or reasonable to develop separate plans sets for incidental construction under a UWHC Agreement. The EOR should consult with the District Utility Engineer to determine the requirements in these cases. For further financial guidance, contact the Department's Office of Comptroller, General Accounting Office.

330.2 - Key Sheet

The key sheet is the first sheet in the component plan set and must be prepared as described in **CFX Design Guidelines 302**. The location map and contract plan set information are not required if shown on the lead key sheet. Show the index of plan on the left side of the sheet. Other data, including name, consultant contract number, and vendor number of the firm (when plans are prepared by a consultant), must be shown as described in **CFX Design Guidelines 302**.

330.3 - Signature Sheet

See **CFX Design Guidelines 303** for Signature Sheet requirements.

330.4 - Tabulation of Quantities

The Tabulation of Quantities sheet lists the pay item numbers, description and quantity of materials.

List pay items in numerical order. Provisions must be made to show the original and final quantities per sheet. When the number of pay item columns exceed one page, the additional sheet is to be numbered in sequential order.

330.5 - Plan Sheets

Utility plans must show full construction details for all utilities to be relocated or constructed by the contractor as covered by the UWHC Agreement. A plan-profile sheet format should be utilized where appropriate. Show all underground utilities in the plan portion, and those which equal or exceed 4" must also be shown in the profile portion. Show all above ground Utilities in the plan portion (inclusive of underground connections).

When the construction limits are restricted such as when a power line is above and near a sanitary or water facility, either the facility (overhead lines) must be identified and shown in profile, or the minimum available vertical clearances, along with the type facility, stated on the plans. Show applicable project information similar to that described in **CFX Design Guidelines 312**. Show utilities to be relocated or constructed in plan and profile and in accordance with the FDOT CADD Software. The scale used should be the same as that used for the roadway plan-profile sheets.

The disposition and final ownership of any utility infrastructure that is to be removed by the contractor and salvaged must be identified in the plans. Include the address of the Utility/Agency Owner receiving the salvaged utility infrastructure in the UWHC Agreement plans.

331 - Tolling Plans

331.1 - General

The CFX Tolling Design Details establishes guidelines for the preparation of Tolling Plans that can be found on the CFX website.

Tolling plans include construction details, electrical circuits, and other data relevant to Tolling projects.

Tolling plans are usually a component set of plans. Component plans are assembled as a separate plan set complete with a Key Sheet and all other required Tolling sheets. Number the component plans with sheet numbers prefixed by the letter "TP"; e.g., TP-1, TP-2, TP-3.

When buried CFX fiber optic cable exists within the project limits, coordinate with the CFX Traffic Operations group office.

331.2 - Key Sheet

The Key Sheet is the first sheet in the component plans set. The location map and Contract Plans Components list are not required on this sheet if the plans are a component set. Show the Index of Tolling Plans on the left side of the sheet. Assemble Tolling plans in the following order:

- (1) Key Sheet

- (2) Signature Sheet
- (3) General Notes
- (4) Legend and Utility Contacts
- (5) Tolling Plan Sheets or “letter type” plan sets
- (6) Detail Sheets

See **CFX Design Guidelines 302** for other Key Sheet requirements and **CFX Exhibit 302-2** as an example Component Key Sheet.

331.3 - Signature Sheet

See **CFX Design Guidelines 303** for Signature Sheet requirements.

331.4 - General Notes

Show general notes on a separate General Notes sheet.

Refer to current CFX Tolling Design Details for additional information related to general notes.

For notes not applicable to the project, the Consultant shall revise the note to read “Not Used”.

For notes needing modification, the Consultant shall modify the note to meet project specific requirements. These changes must be reflected during the plan submittal process as a strikethrough of the existing note, and the proposed verbiage.

The consultant shall add project specific notes as needed.

331.5 - Tolling Plan Sheets

Prepare Tolling Plan sheets on standard plan format. The scale must be such that all details are clear and legible. See the requirements of **CFX Design Guidelines 312** as a guide. Place a north arrow and scale at a point of maximum visibility on the sheet.

331.5.1 - Required Information

The basic information requirements include roadway geometrics, project limits, street names, construction stationing or milepost, curb and gutter, drainage inlets, sidewalks and right of way lines as similarly required on the plan portion of the roadway plan-profile sheets. Show underground and overhead utilities, signing structures, and lighting structures that may cause construction conflicts with Tolling components. Check utilities, drainage, landscape features, sidewalks, and driveways for conflicts. Identify those that may cause conflicts in the plans.

Where details normally shown on roadway plans would obscure Tolling features, the details may be screened so long as the details remain plainly legible.

Clearly label all equipment shown on the plan and follow the CFX approved Tolling naming convention. In addition, the following plan elements should be shown:

- (1) Cabling and interconnects.
- (2) System communication devices.
- (3) Electrical power service equipment and interconnects.
- (4) Grounding and transient voltage protection details.
- (5) Structure-mounted or ground-mounted field cabinets for system electronics, maintenance service points, and interconnect.



Appendix A - CFX File Directory Structure

2024 Design Guidelines

CFX File Directory Structure

ProjectNumber

- 1_Administration
- 2_CADD
- 3_Submittals
- 4_Bidding
- 5_Construction
- 6_Permanent_Records

CFX File Directory Structure (Expanded)

ProjectNumber

1_Administration

1.1_Board_Memos

1.2_Contract

1.2.1_Consultant_Contract

1.2.2_Supplemental_Agreements

1.2.3_Scope_of_Services

1.2.4_Project_Schedule

1.2.5_Invoices

1.3_Coordination

1.3.1_Correspondence

1.3.2_Progress_Meetings

1.3.3_Meetings

/Agenda

/Meeting_Minutes

1.3.4_InterAgency_Coordination

1.3.5_Stakeholder_Coordination

1.3.6_Utility_Coordination

1.3.7_Design

1.4_Existing_Data

1.4.1_Traffic_Data

1.4.2_Crash_Data

1.4.3_ESAL

1.4.4_Lane_Closure

1.5.5_Bridge_Inspection

1.4_Permits

1.5.X_(Permit_Agency)

2_CADD

(FDOT File Structure and Naming Convention)

3_Submittals

3.1_Concepts

3.1.1_Preliminary_Design_Report

3.1.2_Concept_Exhibits

3.1.3_Supporting_Documentation

3.2_30%

3.2.1_Plans

3.2.2_Reports

3.2.3_QC

3.2.4_Review_Comments

3.3_60%

3.3.1_Plans

3.3.2_Reports

3.3.3_QC

3.3.4_Review_Comments

3.4_90%

3.4.1_Plans

3.4.2_Reports

3.4.3_QC

3.4.4_Review_Comments

3.4.5_CADD

3.5_100%

3.5.1_Plans

3.5.2_Reports

3.5.3_QC

3.5.4_Review_Comments

3.5.5_CADD

3.6_Pre-Bid

3.6.1_Plans

3.6.2_Reports

3.6.3_QC

3.6.4_Review_Comments

3.6.5_CADD

3.7_Bid

3.7.1_Plans

3.7.2_Reports

3.7.3_QC

3.7.4_Review_Comments

3.7.5_CADD

4_Bidding

4.1_Special_Provisions

4.2_Technical_Specifications

4.3_Technical_Special_Provisions

4.4_Addenda

4.5_Bid_Form

4.6_Schedule

4.7_Permits

4.8_Utility_Work_Schedules

4.9_Bid_Review

5_Construction

5.1_AFC

5.2_Revisions

5.3_RFIs

5.4_Shop_Drawings

5.5_Correspondence

6_Permanent_Records

6.1_AFC_Revisions

6.2_As-Builts

6.3_Record_Drawings

6.4_Final_Reports_Memos

6.5_Final_Permits

6.5.1_Environmental

6.5.2_Uilities

6.6_Agreements

6.7_Final_CADD



Appendix B - CFX Document Naming

2024 Design Guidelines

CFX Document File Naming

Plans Component PDF Files

ProjectNumber-PLANS-XX-COMPONENT-Submittal.pdf

XXX-XXXXA-

PLANS-01-ROADWAY

PLANS-02-SIGNINGMARKING

PLANS-03-SIGNALIZATION

PLANS-04-ITS

PLANS-05-LIGHTING

PLANS-06-LANDSCAPE

PLANS-07-ARCHITECTURAL

PLANS-08-STRUCTURES

PLANS-09-TOLLFACILITIES

PLANS-10-UTILITYWORK

-Submittal

30, 60, 90, 100, PREBID, BID, AFC, REV#

EXAMPLE: *100% Submittal of Signing and Pavement Markings Plans for Contract 417-134:*

417-134-PLANS-02-SIGNINGMARKING-100.pdf

Technical Reports and Memos PDF Files

ProjectNumber-REPORT_NAME-Submittal-Date.pdf

PrelimDesignReport

RoadwayDesignNotebook

CrossSlopeEvaluation

BridgeConceptMemo

PavementDesignReport

BridgeHydraulicsReport

DrainageReport

StructuralDesignCalcs

MiscStructureDesignCalcs

BridgeLoadRatingMemo

RoadwayGeotechReport

StructuresGeotechReport

SignStructuresGeotechReport

LightingDesignAnalysis

TrafficAnalysisReport

NoiseStudyReport

-Submittal (DRAFT or FINAL)

-Date (mo.da.yr)

EXAMPLE: *Final Submittal of Preliminary Design Report for Contract 417-134:*

417-134-PrelimDesignReport-FINAL-08.22.18.pdf