Engineering Industry Forum
2020/2021 Design and Expansion Projects
Will Hawthorne, P.E., Director of Engineering
Central Florida Expressway Authority
- July 9, 2020 -
## FY 2021-2025 Work Plan

### Project Cost Summary ($000's)

<table>
<thead>
<tr>
<th>Category</th>
<th>2020/21</th>
<th>2021/22</th>
<th>2022/23</th>
<th>2023/24</th>
<th>2024/25</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing System Improvements</td>
<td>136,210</td>
<td>510,001</td>
<td>499,440</td>
<td>165,309</td>
<td>31,234</td>
<td>1,342,194</td>
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<td>System Expansion Projects</td>
<td>23,134</td>
<td>81,155</td>
<td>246,823</td>
<td>337,947</td>
<td>238,739</td>
<td>927,798</td>
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<td>Interchange Projects</td>
<td>15,340</td>
<td>3,086</td>
<td>31,432</td>
<td>39,439</td>
<td>43,772</td>
<td>133,069</td>
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<td>Facilities Projects</td>
<td>6,397</td>
<td>7,323</td>
<td>6,127</td>
<td>6,508</td>
<td>4,787</td>
<td>31,142</td>
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<td>Transportation Technology Projects</td>
<td>15,136</td>
<td>6,214</td>
<td>5,634</td>
<td>698</td>
<td>2,894</td>
<td>30,576</td>
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<td>Information Technology Projects</td>
<td>29,094</td>
<td>24,294</td>
<td>11,535</td>
<td>2,260</td>
<td>2,260</td>
<td>69,443</td>
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<td>Signing and Pavement Markings</td>
<td>3,495</td>
<td>19,703</td>
<td>5,585</td>
<td>8,134</td>
<td>2,299</td>
<td>39,216</td>
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<td>Renewal and Replacement Projects</td>
<td>33,064</td>
<td>71,473</td>
<td>9,151</td>
<td>19,937</td>
<td>7,528</td>
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<td>Landscape Projects</td>
<td>769</td>
<td>787</td>
<td>1,413</td>
<td>799</td>
<td>794</td>
<td>4,562</td>
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<td>Non-System Projects</td>
<td>19</td>
<td>580</td>
<td>0</td>
<td>0</td>
<td>144</td>
<td>743</td>
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<td><strong>TOTALS</strong></td>
<td>262,658</td>
<td>724,616</td>
<td>817,140</td>
<td>581,031</td>
<td>334,451</td>
<td>2,719,896</td>
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</table>
Design Contracts / Projects
Design Team Requirements

Prime Executes 55% of the Scope

Key Local Resources

– Project Manager

– Roadway

– Drainage & Permitting
Design Team Qualifications* (SR 528)

Major Types of Work:
3.2 – Major Highway Design
3.3 – Controlled Access Highway Design

Additional Types of Work Required:
3.1 – Minor Highway Design
4.1 – Miscellaneous Structures and Minor Bridge Design
4.2 – Major Bridge Design
6.1 – Traffic Engineering Studies
6.3 – Intelligent Transportation Systems Analysis, Design and Implementation
7.1 – Signing, Pavement Marking, and Channelization
7.2 – Lighting
7.3 – Signalization
8.1 – Control Surveying
8.2 – Design, Right of Way and Construction Surveying
8.4 – Right of Way Mapping
9.1 – Soil Exploration
9.2 – Geotechnical Classification Lab Testing
9.4 – Foundation Studies

Disadvantaged / Minority / Women / Business Enterprise Participation:
20% participation objective for each Project

*Subject to Change
SR 528 Widening
Goldenrod Road to Narcoossee Road

1.8 Miles – Widening

Advertisement

– 3rd Quarter 2020

Design Fee Estimate = $1.4 M
SR 528 Widening
Goldenrod Road to Narcoossee Road

Challenges

Adjacent project coordination
- West – SR 528 (528-143)
- East – SR 528 (528-160)

Design
- Orlando International Airport
- Virgin Trains USA
Design Team Qualifications* (OPE)

Major Types of Work:
- 3.2 – Major Highway Design
- 3.3 – Controlled Access Highway Design
- 4.2.1 – Major Bridge-Concrete Design (Segment 1)

Additional Types of Work Required:
- 3.1 – Minor Highway Design
- 4.1 – Miscellaneous Structures and Minor Bridge Design
- 4.2.1 – Major Bridge-Concrete Design (Segments 2 & 3)
- 6.1 – Traffic Engineering Studies
- 6.3 – Intelligent Transportation Systems Analysis, Design and Implementation
- 7.1 – Signing, Pavement Marking, and Channelization
- 7.2 – Lighting
- 7.3 – Signalization
- 8.1 – Control Surveying
- 8.2 – Design, Right of Way and Construction Surveying
- 8.4 – Right of Way Mapping
- 9.1 – Soil Exploration
- 9.2 – Geotechnical Classification Lab Testing
- 9.4 – Foundation Studies

Disadvantaged / Minority / Women / Business Enterprise Participation:
- 20% participation objective for each Project

*Subject to Change
Osceola Parkway Extension
SR 417 to Sunbridge Parkway

330' Right-of-Way
Osceola Parkway Extension – Segment 1
SR 417 to Laureate Boulevard

New Systems Interchange

Advertisement

– 1st Quarter 2021

Design Fee Estimate =

$19.0 M
Challenges

Adjacent project coordination

- West – SR 417 (417-149 & 417-151)
- East – OPE Segment 2

Design

- Systems Interchange at SR 417
- Rail Coordination
- Lake Nona – Medical City Drive
Osceola Parkway Extension – Segment 2
Laureate Boulevard to Narcoossee Road

4.0 Miles – New Expressway

Advertisement

– 1st Quarter 2021

Design Fee Estimate = $12.4 M
Challenges

Adjacent project coordination
- West – OPE Segment 1
- East – OPE Segment 3

Design
- Lake Nona – Laureate Blvd. Ramps
- Orange/Osceola Counties
- Simpson Road Interchange, Narcoossee Road & Clapp-Simms Duda Road

Osceola Parkway Extension – Segment 2
Laureate Boulevard to Narcoossee Road
Osceola Parkway Extension – Segment 3
_Narcoossee Road to Sunbridge Parkway_

4.9 Miles – New Expressway

Advertisement

– 1st Quarter 2021

Design Fee Estimate = $10.3 M
Osceola Parkway Extension – Segment 3
*Narcoossee Road to Sunbridge Parkway*

**Challenges**

Adjacent project coordination
- West – OPE Segment 2
- East – Sunbridge Parkway

**Design**
- Split Oak Forest
- Bridges over Narcoossee Road
- Orange/Osceola Counties – Cyrils Drive, Sunbridge Parkway
# 2021 Look Ahead

<table>
<thead>
<tr>
<th>Description</th>
<th>Work Plan Design Estimate</th>
<th>Anticipated Advertisement*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 528 Widening Goldenrod Road to Narcoossee Road</td>
<td>$1.4 Million</td>
<td>3rd Quarter 2020</td>
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<tr>
<td>Osceola Parkway Extension Segment 1</td>
<td>$19.0 Million</td>
<td>1st Quarter 2021</td>
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<tr>
<td>Osceola Parkway Extension Segment 2</td>
<td>$12.4 Million</td>
<td>1st Quarter 2021</td>
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<tr>
<td>Osceola Parkway Extension Segment 3</td>
<td>$10.3 Million</td>
<td>1st Quarter 2021</td>
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*Quarters are Calendar Year, dates Subject to Change.
Questions?

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Engineering Industry Forum
2020/2021 Construction Oversight

Jack Burch, P.E., Resident Engineer/Construction Manager
Central Florida Expressway Authority

- July 9, 2020 -
Agenda

• Construction Costs
• CEI Qualifications
• Status of Widening Projects
• 1-Year Look Ahead Summary
Construction Costs
Actual and Estimated
CEI Qualifications

• Major Types of Work:
  • 10.1 – Roadway Construction
  • 10.3 – Construction Materials Inspection (through subconsultant)
  • 10.4 – Minor Bridge and Miscellaneous Structures
  • 10.5 – Major Bridge (depending on project scope)
Status of Widening Projects

- CEI Advertisement (upcoming)
- CEI Selected
SR 538 Widening
Ronald Reagan Parkway to Cypress Parkway

- Project (538-165)

- Advertisement:
  - August 2020 - CEI

- Design-Build Project (538-165)
  - Bids open August 2020
  - 180 day LNTP, 900 day Construction Duration

- $113M Construction cost estimate

- Concept Plan
  - Widen 2-lane expressway to 4-lane divided
    - Constructing eastbound lanes, new ramps, and noise walls
SR 538 Widening
*Ronald Reagan Parkway to Cypress Parkway*

- R/W Varies (110' Min.*
- Median Varies (50' - 64')
- 12' 24' 24' 12'

* Reedy Creek Bridge 88'
SR 538 Widening
Ronald Reagan Parkway to Cypress Parkway

• Adjacent project coordination
  – North – SR 538 Extension (538-234)
  – South – Cypress Parkway Alignment Study & Design (Polk County)

• Construction
  – 3 New Bridges & Mainline Toll Gantry Structures
  – Approx. 6,000 LF bridge through Reedy Creek Mitigation Bank
  – TWA JPA – Utility Relocations
Widening Typical Section

SR 429 & SR 417
SR 429 Widening

*Tilden Road to Florida’s Turnpike*

- Project (429-154)
- Advertisements:
  - LOI’s Due Today! - CEI
  - 4th Quarter 2020 - Construction
SR 429 Widening
Florida’s Turnpike to West Road

- Project (429-152)

- Advertisements:
  - 3rd Quarter 2020 – CEI
  - 1st Quarter 2021 - Construction

- $142M Construction cost estimate
  - Inside & Outside Widening to 10 lanes:
    - 6 General Use
    - 2 Part-Time Shoulder Use
    - 2 Auxiliary
SR 429 Widening
*Florida’s Turnpike to West Road*

• **Adjacent project coordination:**
  - South – Project 429-154
  - North – Project 429-153

• **Construction:**
  - Coordination with Florida’s Turnpike & Central Florida Railroad
  - Ocoee / Winter Garden / FDOT owned Plant Street / SR 438
  - 11 Sets of Bridge Widenings (Inside & Outside)
  - Ramp Reconstruction at Plant Street including Tolling Structures
SR 429 Widening
West Road to SR 414

- Project (429-153)
- Advertisements:
  - 4th Quarter 2020 - CEI
  - 1st Quarter 2021 - Construction
- $72M Construction cost estimate
  - Inside Widening to 8 lanes:
    - 2 Part-Time Shoulder Use
    - 6 General Use
SR 429 Widening
West Road to SR 414

• Adjacent project coordination
  – South – Project 429-152

• Construction
  – 4 Sets of Bridge Widenings
  – 1 Set of Bridge Replacements (CR 437A)
  – Temporary Utility Relocation
  – Toll Plaza Coordination
SR 417 Widening
*Boggy Creek Road to Narcoossee Road*

- Project (417-151)

- Advertisements:
  - 4th Quarter 2020 - CEI
  - 1st Quarter 2021 - Construction

- $75M Construction cost estimate
  - Inside Widening to 8 lanes:
    - 2 Part-Time Shoulder Use
    - 6 General Use
SR 417 Widening
Boggy Creek Road to Narcoossee Road

• Adjacent project coordination
  – West – Project 417-149
  – East – Project 417-150
  – North – Narcoossee Road Project
    (City of Orlando)

• Construction
  – 1 Set of Bridge Widenings
  – Adjacent to railroad and overhead power facilities
SR 408 Tampa Avenue Interchange
Tampa Avenue to Orange Blossom Trail

• Project (408-315)

• Advertisement:
  – 3rd Quarter 2021 – CEI

• $45M Construction cost estimate
  – Multiple new / widened bridges
  – New and reconstructed ramps
  – 2 new ramp tolling locations
  – Local road improvements including: roundabouts, pavement widening / reconstruction / resurfacing, lighting, landscaping, drainage and sidewalks
SR 408 Tampa Avenue Interchange
Tampa Avenue to Orange Blossom Trail

• Adjacent project coordination
  – East – I-4 Ultimate Project (FDOT)

• Construction
  – Camping World Stadium events
  – City of Orlando – JPA for local streets
    • Tampa Avenue, Long Street, Carter Street, Rio Grande Avenue, Orange Blossom Trail (FDOT)
  – Existing drainage systems and utilities
Systemwide CEI

ITS, Lighting, and Tolling

- Advertisement:
  - August 2020

- 3 year contract with (2) – 1 year renewals

- Projects:
  - DMS Replacement
  - WWD Installation
  - LED Lighting Conversion
  - Supplemental DCS and CCTV Deployment

- Key positions:
  - Senior Project Engineer
  - Technical Project Administrator
  - Senior ITS Inspector
# 1-Year Look Ahead Summary

<table>
<thead>
<tr>
<th>Project #</th>
<th>Description</th>
<th>Construction Cost Estimate</th>
<th>Anticipated CEI Advertisement*</th>
<th>Anticipated Construction Advertisement*</th>
</tr>
</thead>
<tbody>
<tr>
<td>538-165</td>
<td>SR 538 (Poinciana Parkway) Widening Design Build</td>
<td>$113 Million</td>
<td>August 2020</td>
<td>Bids due August 2020</td>
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<tr>
<td>429-154</td>
<td>SR 429 Widening Tilden Rd to Florida’s Turnpike</td>
<td>$66 Million</td>
<td>Currently Advertised</td>
<td>4th Quarter 2020</td>
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<tr>
<td>429-152</td>
<td>SR 429 Widening Florida’s Turnpike to West Rd</td>
<td>$142 Million</td>
<td>3rd Quarter 2020</td>
<td>1st Quarter 2021</td>
</tr>
<tr>
<td>429-153</td>
<td>SR 429 Widening West Rd to SR 414</td>
<td>$72 Million</td>
<td>4th Quarter 2020</td>
<td>1st Quarter 2021</td>
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<tr>
<td>417-151</td>
<td>SR 417 Widening Boggy Creek to Narcoossee Rd</td>
<td>$75 Million</td>
<td>4th Quarter 2020</td>
<td>1st Quarter 2021</td>
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<tr>
<td>408-315</td>
<td>SR 408 Tampa Avenue Interchange</td>
<td>$45 Million</td>
<td>3rd Quarter 2021</td>
<td>-</td>
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<tr>
<td>-</td>
<td>Systemwide CEI – ITS, Lighting, and Tolling</td>
<td>-</td>
<td>August 2020</td>
<td>-</td>
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Engineering Industry Forum
2020/2021 Engineering Design
Jamison Edwards, P.E., Engineering Project Manager
Central Florida Expressway Authority
- July 9, 2020 -
CFX Design Guidelines

- Adopt 2019 FDOT Design Manual (FDM)
- Add/Delete/Revise Sections
- 1st Edition – March 2020
- Updated Annually
- [https://www.cfxway.com/cfx-design-standards/](https://www.cfxway.com/cfx-design-standards/)
CFX Design Guidelines

Intent:

- Continue CFX’s quality development effort
- Provide a single source of design standards and preferences
- Gain uniformity and document processes
- Offer guidance for typical situations
CFX Design Guidelines

FDOT Design Manual (FDM) Sections:

1) Development and Processes
2) Design Criteria
3) Plans Production
Development and Processes

Part I
Development and Processes

- 102.3 – CFX Terms (New)
  - Bridge Concept Memorandum (BCM)
  - Design Deviations
  - Preliminary Design Review/Report (PDR)
  - Renewal and Replacement (R&R)
Development and Processes

• 105.7 – CFX Aesthetic Guidelines (New)
  – Treatments Developed for Multiple Corridors
Development and Processes

• 111 – Final Engineering Design Process
  - Preferences and processes vary from FDOT (Submittals, specs, etc.)
  - 111.7 – Project Documentation
    • CFX File Directory Structure (Appendix A)
    • CFX Document Naming (Appendix B)
Development and Processes

• 113.4 – Right of Way Requirements
  – 113.4 – CFX Property Acquisition, Disposition, & Permitting Procedures Manual (New)

• 114 – Renewal & Replacement (R&R)
  – Replaces FDOT’s 3R

• 120.2.7 – Pavement Design (New)
  – 120.2.7.1 – Pavement Selection at Toll Plazas and Intersections
Development and Processes

• 121.7 – Bridge Project Development
  – Bridge Concept Memorandum (BCM) utilized in lieu of the Bridge Development Report (BDR)

• 122 – Procedure for Design Deviations (New)
  – Design Deviations replace Design Exceptions and Design Variations
Development and Processes

• 130 – Signing and Sealing Documents
  – A signature sheet is required for **all component plans** that will be signed and sealed by **one or more** professionals.

• 131 – Plans Processing and Revisions (New)
  – Bid Plans, Addendums, AFC Plans
  – Revisions, As-Built Plans, Record Drawings
Design Criteria

Part II
Design Criteria

• 211.2.3 – Hydroplaning Risk Analysis
  – Example Documentation Exhibits
Design Criteria

• 211.4 – Shoulders
  – Provide wider (12 ft paved) useable shoulders for emergency use and stopped or disabled vehicles

• 211.4.2 – Shoulder Cross Slopes
  – Shoulder Superelevation Figures (New), removing “house-tops” in shoulder
  – Special Ramp Shoulder Superelevation (at right)

• 211.4.4.1 – Ground-in Rumble Strips
  – Minimum 2-inches of structural course
Design Criteria

• 211.11 – Structures
  – CFX-owned bridges
    • Bridge Width = Paved Width of Approaching Roadway
    • Paved width includes paved shoulder width

• 211.13 – Ramp Terminals
  – Preference:
    • Taper-type for exits
    • Parallel-type for entrances (accel length 1200 ft per AASHTO, desired)
  – Consideration:
    • Parallel-type considered for exits where both mainline and ramp traffic volumes are high
Design Criteria

- **215.2.6 – Roadside Slope Criteria**
  - Maximum slope of 1:3 preferred
  - To reduce erosion and maintenance issues
  - New Figure 215.2.16

**Grading Behind Guardrail**
- Provides maintenance / landscape berm
- 10-ft desired (3-ft minimum)
Design Criteria

• 215.4.2.1 – Guardrail End Treatments
  – CFX System
    • All guardrail and end treatments shall be TL-3

• 215.4.3.2 – Temporary Crash Cushions
  – CFX System
    • Only redirective non-gating permitted, unless otherwise approved

• 221 – Utilities (New)
  – Guidance for Utility Accommodations within CFX right of way
Design Criteria

• 230 – Signing and Pavement Marking
  – CFX Standards for Preparation of Signing and Pavement Marking Plans
    • Establishes preparation guidelines
    • Separate document, to be combined with 2021 CFX Design Guidelines release

• 230.2.2 – Overhead Signs on Limited Access Facilities
  – Overhead signing required

• 230.2.4 – External Lighting of Overhead Signs
  – Required for all CFX overhead signs
Design Criteria

• 231.1.6 – CFX Lighting Preferences (New)
  – Fixtures
    • LED required
    • Be able to accommodate a smart driver for remote operations
    • See product list

• 231.7 – Lighting Design Analysis Report (New)
Design Criteria

- 232 – Signalization
  - 232.8.1 – Mast Arm Policy
    - Mast arms shall be used at all signalized intersections

- 233 – Intelligent Transportation Systems (ITS)
  - See CFX ITS Standards for plans preparation guidance
Design Criteria

• 240 – Transportation Management Plan
  – Temporary Traffic Control
    • Lane Widths = 12 ft
    • Consider emergency pull off areas, where mainline shoulders <8 ft
    • Design temporary drainage and include in plans
    • TTC Standard General Notes
    • Project Information Signs not used
    • Resurfacing preferred for pavement marking removal

• 252 – Drainage Design Documentation (New)
  – Report Preparation Guidance
Design Criteria

• 260.1.1 – Partial Bridge Sections
  – Replace Figure

• 260.6 – Vertical Clearance
  – Existing bridge vertical clearances between 16 ft and 16.5 ft must be maintained
Design Criteria

• 261.7.2 – Category 2 Analytical Evaluation
  – Existing sign structures may be utilized
    • New sign panels do not exceed original upsized design

• 262.2 – Retaining Wall Plans Submittal Procedures
  – Proposed connection to an existing MSE wall
    • Provide an analysis for review with the 90% Plans
Design Criteria

• 267 – Shop Drawing Submittals
  – CFX Shop Drawing Review:
    • GEC performs concurrent reviews of:
      – Sign panels and structures
      – Aesthetics for certain bridge items
      – Noise wall elements
      – Proprietary lighting items
Plans Production

Part III
Plans Production

• Standard Sheets and Details
  – Lead Component Key Sheet
  – Component Key Sheets
  – Structures/Geotech Sheet Border
  – Signature Sheet
  – Pay Item Notes
  – General Notes
  – SWPPP Sheets
  – TTC General Notes
  – SPM General Notes
306 – Typical Sections

- Exhibits (New)
• 306 – Typical Sections
  – Exhibits (New)
• 312.3.4 – Superelevation and Special Profiles
  – Plot superelevation transitions above the roadway profiles

• 314.3.2 – Ramp Terminal Details
  – A combined Plan and Profile Sheet is preferred
  – Provide sufficient coverage beyond the physical gore and gore tip
  – Show elevations at 25 ft incremental stations in profile only, at all roadway edges and break lines
  – Provide a section through the physical gore
Questions?

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