October 28-29, 2025
Orlando, FL

TRANSPORTATION SYMPOSIUM

Plans Quality: D2 Construction and Bidability Reviews

Belqis Mujtaba Majboor, PE, ME, CPM
District Quality Engineer
District Pavement Design Engineer
District Errors & Omissions Engineer

Transportation Symposium Website
SCAN ME

1

Session Objectives:

- Share Best Practices
  - Focused Constructability Review (FCR)
  - Constructability Plans Review
  - E&O Lesson Learned

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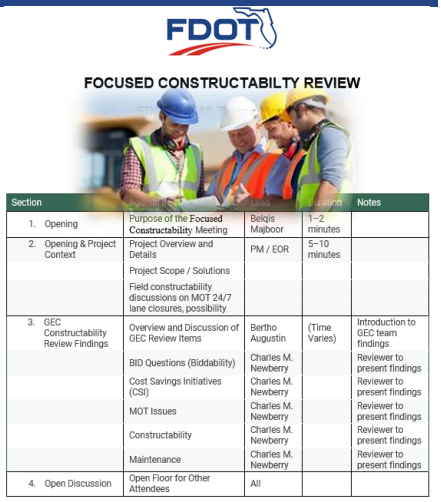
2

2

D2 Focused Constructability Review (FCR)

- The **Focused Constructability Review (FCR)** is an advanced quality assurance intervention **beyond standard checks**
- Designed to **produce** the most efficient, effective, and **Optimized** contract plans **for complex** FDOT projects.
- Drainage / Permits, Right of Way (R/W) easements, utility relocations, RR



Section	Agenda Item	Lead	Duration	Notes
1. Opening	Purpose of the Focused Constructability Meeting	Belqis Majboor	1–2 minutes	
2. Opening & Project Context	Project Overview and Details	PM / EOR	5–10 minutes	
	Project Scope / Solutions			
	Field constructability discussions on MOT 24/7 lane closures, possibility			
3. GEC Constructability Review Findings	Overview and Discussion of GEC Review Items	Bertho Augustin	(Time Varies)	Introduction to GEC team findings
	BID Questions (Biddability)	Charles M. Newberry		Reviewer to present findings
	Cost Savings Initiatives (CSI)	Charles M. Newberry		Reviewer to present findings
	MOT Issues	Charles M. Newberry		Reviewer to present findings
	Constructability	Charles M. Newberry		Reviewer to present findings
	Maintenance	Charles M. Newberry		Reviewer to present findings
4. Open Discussion	Open Floor for Other Attendees	All		

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3

3

The Mandates: Criteria, Practice, and Policy

The FCR is guided by a **commitment to the highest quality** - AASHTO and FDOT policy:

- **Biddable:** clear/comprehensive, reducing contractor risk and **bid uncertainty.**
- **Buildable (Constructible):** using standard, efficient construction methods, **minimizing field conflicts and engineering challenges.**
- **Maintainable:** can be operated and maintained in a **cost-effective/safe manner** its entire service life.

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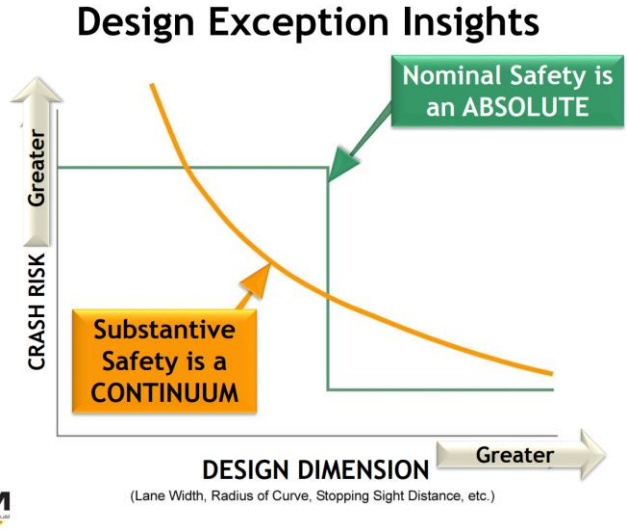
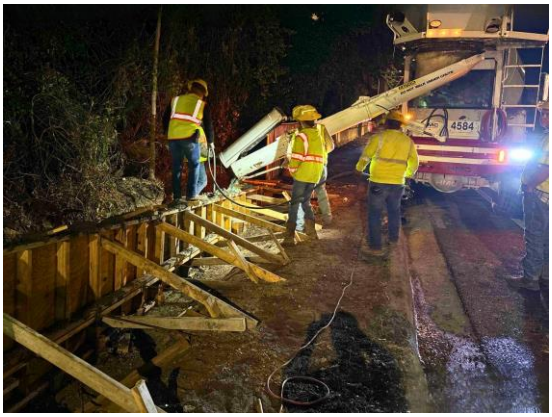
4

4

Safety Message – Ultimate Goal





HSM Highway Safety Manual

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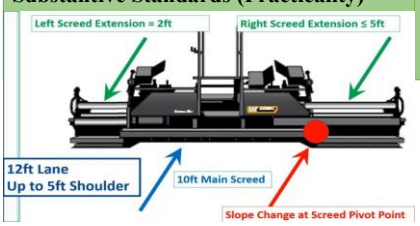
5

5

Beyond Criteria: Nominal vs. Substantive Standards (HSM)

Plans meet not just minimum criteria, but practical constructability standards as well:

Standard Type	Focus	Key Application in FCR
Nominal Standards (Criteria)	Compliance with all prescriptive legal and contractual requirements, including **FDOT Design Standards**, **FDOT Criteria**, and the **FDOT Specifications Book.**	Verifies code adherence and required dimensions.
Substantive Standards (Practicality) 	Moves beyond criteria to ensure the design is safe and practical based on real-world field experience, addressing factors like **Field Performance**, Equipment Limitations, and **Site-Specific Logistics.**	Verifies that designs are physically possible, efficient to build, and minimize crew safety hazards.

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6

6

Strategic Focus: Quality Before Costly Correction

The FCR is strategically timed **(60% to 90% completion)** to apply construction expertise when design decisions have the **highest cost influence** but are still **flexible enough** to change.

FCR Focus Area	Optimized Plan Objective	Resulting Benefit
Risk Elimination	**Proactive Conflict Resolution:** Identify and resolve critical design conflicts, especially related to utilities, deep foundations, temporary works (MOT), and clearances, on design paper, not in the field.	Substantially **Reduced Change Orders** and Contract Claims, Errors & Omissions (The highest source of project delays and cost overruns).
Logistical Feasibility	**Validate Construction Access and Phasing:** Ensure site logistics (crane radii, material delivery, laydown areas) and sequence of operations are practical and optimized for maximum productivity.	**Minimized Public Inconvenience** and Guaranteed Project Schedule adherence.
Contract Clarity	**Optimized Specifications & Quantities:** Rigorously verify that all pay items, quantities, and special provisions are accurate, consistent, and unambiguous across all plan sets.	**Zero Requests for Information (RFIs)** related to design clarity, which often burden staff and slow construction start-up.

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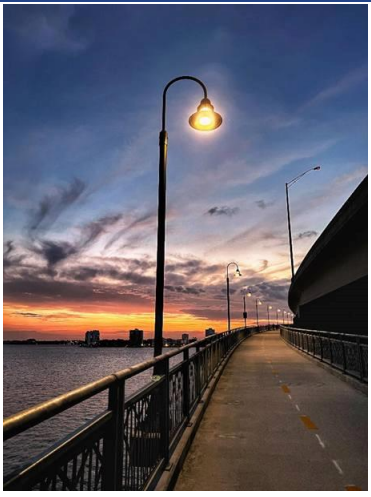
7

7

FCR as a Value-Added Tool

- The FCR is not a critique; it's a **collaborative value-engineering** exercise:
  - **Drives Innovation:** incorporating **Cost Saving Initiatives (CSIs)** and construction technology into the design, rather than as a post-award proposal.
  - **Enhances Teamwork:** promoting the **'Team Concept & Learning'** advocated by AASHTO and FDOT.
  - **Elevates FDOT's Reputation:** leading to more competitive bidding and ultimately, better results for Florida.



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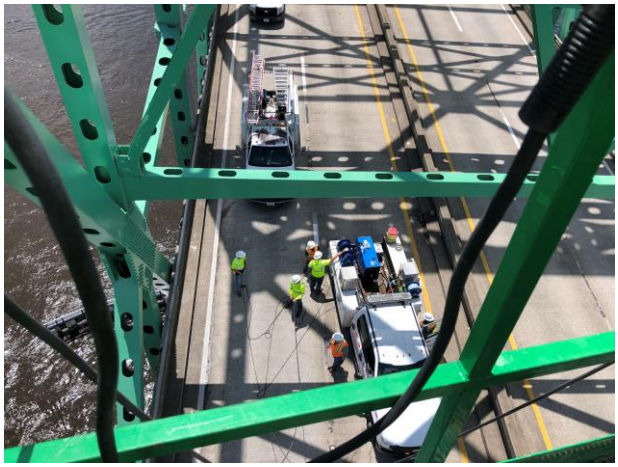
8

8

FCR Process Parameters

- To ensure this high-value review is implemented efficiently:
  - **Review Timing:** to hold a **single Focused Constructability Review** at the most advantageous time between **60% and 90%**
  - **Documentation: will not be recorded** on Teams. Meeting notes serve as the action items.



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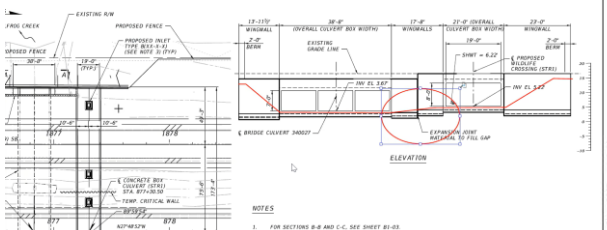
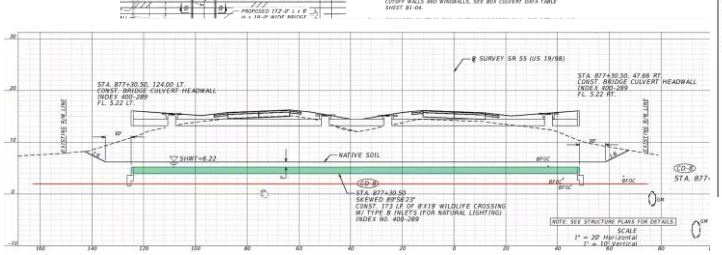
9

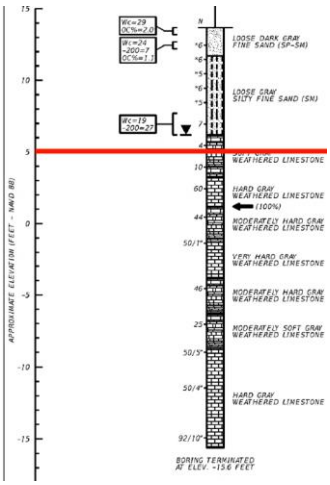
9

FCR Examples:

- Bullfrog Creek Wildlife Crossing Box Culvert
- High blow counts for
- Sheet pile
- Extra Embankment
- Load/stability







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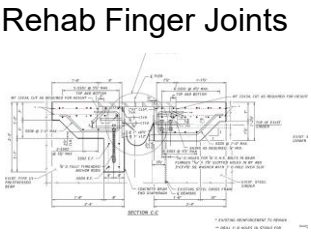
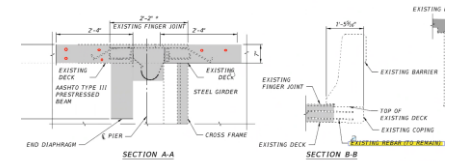
10

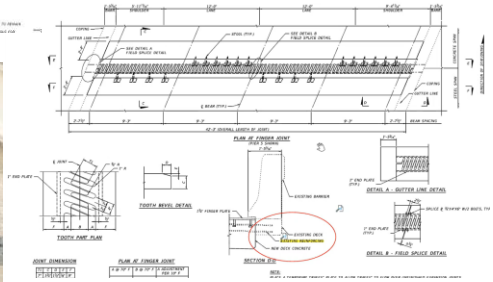
10

FCR Examples:

- I-10 at Suwannee River Bridges - Rehab Finger Joints
- Discussed barrier reinforcement
- Discussed 24-hour detour







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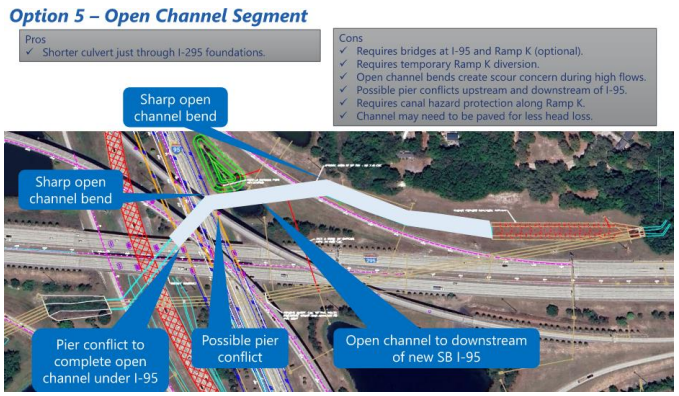
11

11

Constructability Example – District Const

- **I-95/I-295 Sweetwater Creek box culvert – in PDE phase –**
  - discussed alternatives which would reduce constructability challenges and
  - possibly reduce long-term maintenance;
    - discussed re-routing,
    - constructability challenges with installing sheet pile under the existing clearance.



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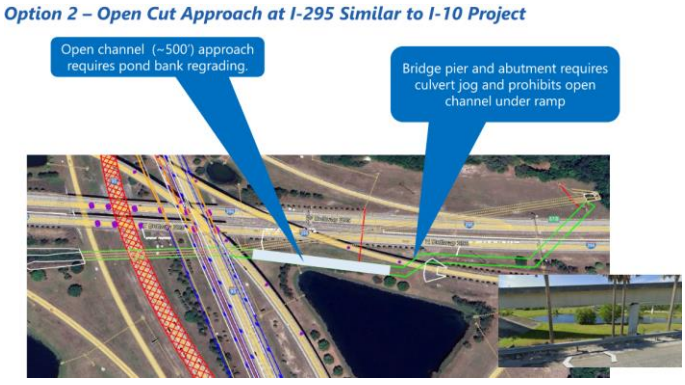
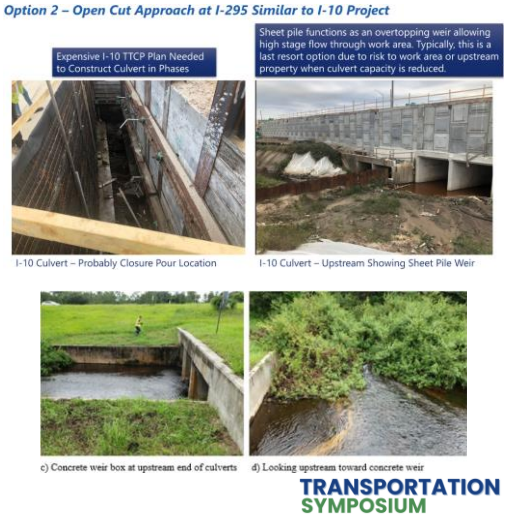
12

12

Constructability Example – District Const

- **I-95/I-295 Sweetwater Creek box culvert**





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13

13

Constructability Example – District Const

- **I-95/I-295 Sweetwater Creek box culvert**

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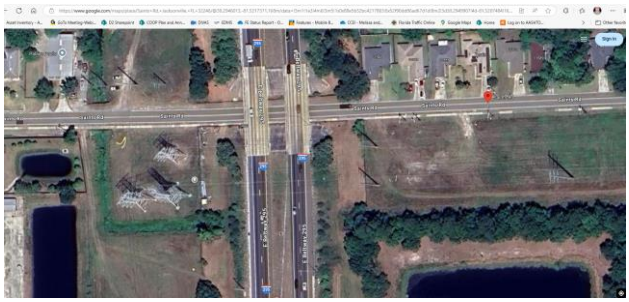
14

14

Constructability Example – District Const

- **I-295 over Saints Rd box culvert** –
  - Proposed lengthening the bridge as part of the scope,
  - realign the path, and
  - convert to open channel instead of a box culvert



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15

15

Constructability Example – District Const

- **SR 211 at Willow Branch – in PDE phase:**
- discussed concerns for local road capability to handle two-way traffic for detours and concern for the tree canopy on the detour route;
- questioned why not use the ACROW?
- Could the permanent bridge be built in the location of the proposed ACROW and keep traffic on the existing structure?

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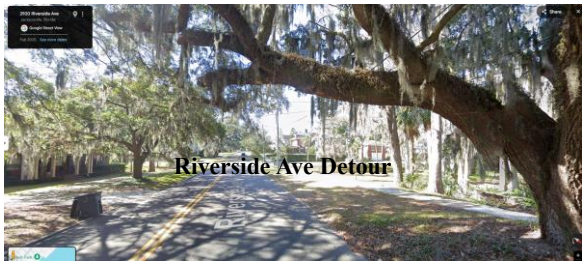
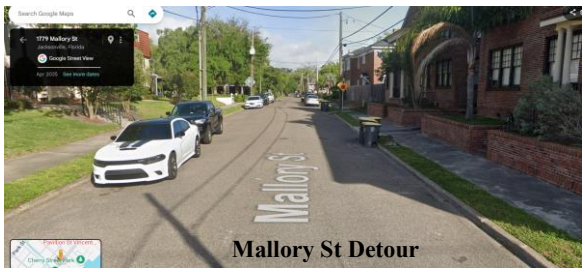
16

16

Constructability Example – District Const





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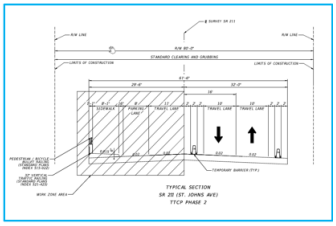
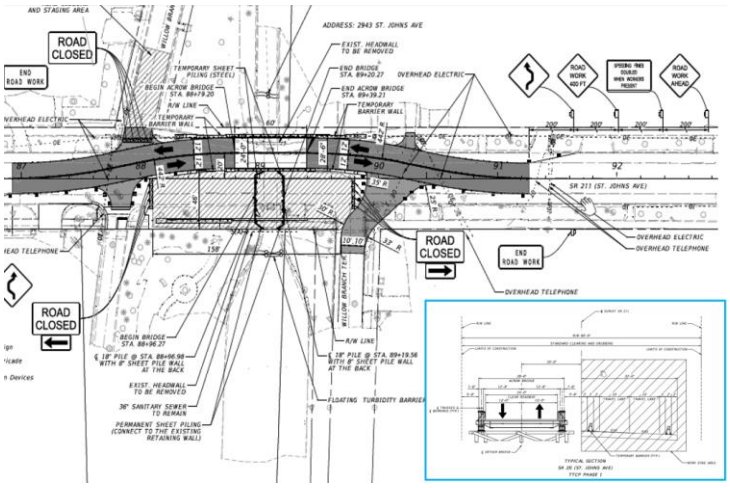
17

17

Constructability Example – District Const

- SR 211
- ACROW Bridge
  - 80' R/W
  - Park South side
  - 36" Gravity Sewer
  - Overhead Transmission Pole
  - 12" WM center





Bridge Typical Section – PHASED/ACROW

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18

18

Plans Review Process: Gainesville Residency

- Follows CPAM Section 1 2025 Checklist

- Table – Printed Plans for Review / markups
- Table – Digital Plans Review – One Drive

- CPM – Lead Reviewer comments in ERC
- Field Review with CPM & review prior to meeting

- Contract Time Construction Project Manager (CPM)
  - Pay items & Quantities reviewed again
- Future ideas – leverage AI in sorting comments

CPAM Section 1 2025

Topic No. 700-000-000
Construction Project Administration Manual
Pre-Letting Activities

Effective: July 1, 2002
Revised Date: March 7, 2025

8. SIGNALIZATION

Item No.	Feature to be Checked	Ok	Not Ok	N/A
8-1.	Pole locations and their conflict with utilities and drainage structures.			
8-2.	Controller, signal heads, pull boxes, pedestrian pole locations.			
8-3.	Vertical conduit.			
8-4.	Verification of conduit street crossing to become overhead.			
8-5.	Existing controller compatible to added items.			
8-6.	Fiberglass insulators needed for span wire due to power overhead lines and adequate provisions.			
8-7.	Number of detectors is right.			
8-8.	Any signs attached to the overhead span wire for the traffic signal.			
8-9.	Disposition of existing signal poles and other equipment if they are removed.			
8-10.	Signal arms far enough to provide sidewalk access.			
8-11.	Pole embedment conforms to proper depth criteria.			

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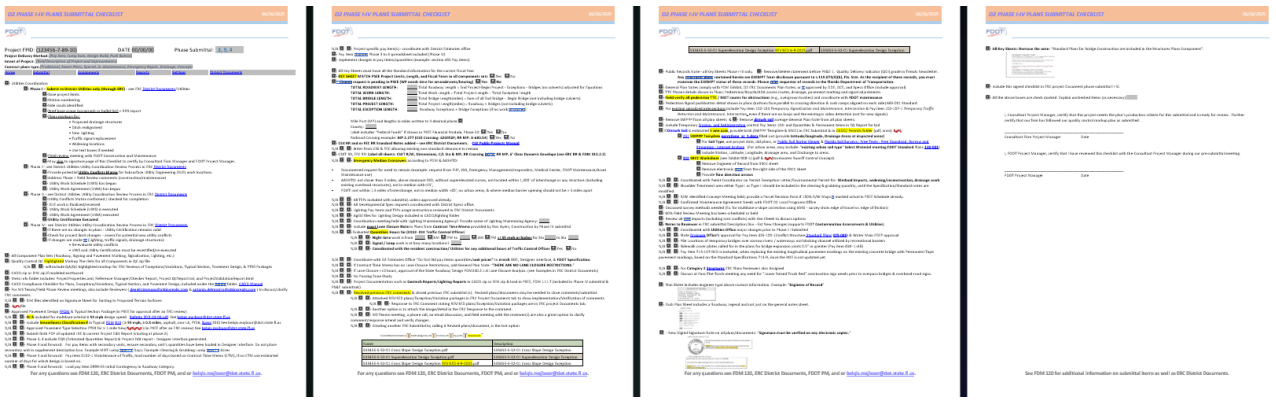
Plans Review Process: Phase Submittal



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Plans Review Process: Atkins / FDOT

AtkinsRéalis - Design Exception / Variation Review Checklist

Updated on 09/26/2025

- ☐ Ensure compliance with all required documentation listed in FDOT Design Manual FDM Chapter 122 (Forms Chapter 103).
- ☐ Design Exceptions/Variations **Format:**
  - Use **Memo Format (Form 122-B)** for simple Design Variations.
  - Use **Formal Design Variation (FDM 122.4)** for elements listed in **FDM 122.2.2**.
  - **Central Office Submission (PSEE):** Upload as two separate files:
    - **(Form 122-A)** (Signatures Only) and
    - Engineering Report (Signed & Sealed).
- ☐ Railroad Vertical Clearance Exception/Variation must include **Railroad correspondence** (letter or email) acknowledging/concurring with allowing the existing clearance condition to remain, with no proposed change. Coordinate with District Rail Coordinator (FDM 220).
- ☐ **Verify crash analysis and supporting crash history for accuracy and completeness.**
  - The latest **five-year crash history** must be used, including data up to the current date (data prior to approximately 70 days ago).
    - **Update the crash data prior to submittal into PSEE for approvals.**
    - Mentions **long-form crash** analysis and if the requested Design Exception item attributed or contributed to the crash (personal information must be redacted in Appendix).
    - **B/C analysis** with actual construction costs to validate the conclusions reached in the submittal. B/C is zero if no related crashes are attributed to the Exception/ Variation element. For the Benefit-Cost Analysis a 20-year design period should be used. Show documentation of the cost calculations in an Appendix.
  - FYI:
    - Signal 4's **default "current" date is ~70 days prior to today's date** (this includes the 10-day officer submittal window).
    - **FDOT Employee** Access to Signal 4 is by default which includes access to DATA from Long and Short Form crash reports. Additional authorization through AARF is needed for access to the actual crash report DOCUMENTS (add a note in the request for anything specific needed).
    - **Staff Augmentation:** FDOT Project Manager must use AARF to request access.

- **Project Consultant** (Non-Augmentation): FDOT Project Manager must use the Signal 4 Request New Account form directly in Signal 4.

- ☐ Verify that the appropriate approval authority has been requested for signature.
- ☐ Reasons, justification, and **mitigation** explanation should be provided in the report.
  - Document **EXISTING** and **IMPROVED** corridor features as active mitigation (documentation is **NOT dependent on crash data**). *Do NOT commit to new mitigation not currently in contract plans, Example: stating adding advanced warning or speed advisory signs in the plans but not included in contract plans.*
  - **Ability to Stay in Lane (FDM 122.5.5.3):** Include improved **Skid-resistance** (from resurfacing/new pavement), **New Markings**, and **Corridor Lighting**.
  - **Ability to Recover:** Include the benefit of the **Full Paved Shoulder Width**.
  - **Audible/Vibratory Treatments:** Provide a documented evaluation/rationale for their use or non-use (FDM 210 arterials and FDM 211 Limited Access).
- ☐ Both **FDM** and **AASHTO** criteria must be discussed in the report and presented preferably in a Table format.
- ☐ For Vertical Clearance, the report should mention coordination with the **local Maintenance Office** regarding any accidents not reported.
- ☐ For **Cross Slope / Superelevation** exceptions, show a **Table cross slope** data at 100-foot intervals. Use shading or highlighting to identify deficient cross slopes both in and out of compliance.
  - Cross slopes must match typical section cross slopes.
  - Provide the complete cross slope and superelevation data for the whole project.
  - For Superelevation, cross slope data must be shown along the superelevation.
  - Show curve data - existing superelevation e-rates, criteria e-rates, & side frictions.
  - Ensure the calculations for side friction factors are correct and verify the correct design speed was used in the calculations.
  - Evaluate the hydroplaning analysis at 1in/hour.
  - If deficient tangent cross slope sections are 1000 feet or longer, correction should be considered.
  - If correction is proposed, it should be noted within the report, along with the rationale of why some locations were selected for correction while others were not.
  - Paved/unpaved shoulder cross slopes in clear zone must be addressed.
  - Source of data such as DTM, MPSV, and field verifications mentioned in the report.

- ☐ Median Crossover / Spacing Exception Limited Access (FDM 211):
  - Justify ALL criteria violations (e.g., bridge/interchange distance, proximity to Overhead Structures).
  - Address Overhead Structures and provide necessary FHWA justification.
  - Operational Need: Secure written support from FHP, Emergency Management, and Maintenance (Asset Management) to prove operational purpose.
- ☐ For Lateral Offset, provide tabulation of stations (or mileposts) and lateral offsets for aboveground fixed objects.
- ☐ Upload in ERC Revised package, extend ERC due date, for a quick review (crash data must be kept "current" **for Central Office** prior to PSEE uploads for approval).
- ☐ CO Comments on Exceptions/Variations:
  - elaborate on the substandard horizontal offset details of Curve #_.
  - evaluate the cross slopes using the RRR criteria in FDM Table 210.2.3 (allowable range is 1.5% to 3.0%, regardless of design or posted speed).
  - Limit Access FDM 211 & Arterials / Collectors FDM 210
  - provide the FDM and AASHTO criteria for Curve _. This is necessary to document that existing values meet criteria.
  - For Central Office Resubmittals, mark cover letter: **re-submittal** & **reference #** Example: Ref: 3411-0-0
  - Check report over note: "**Signature must be verified on any electronic copies.**"

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Plans Review Process: Atkins GEC

Constructability Checklist Spreadsheet:

	TTC	OK	Not OK	NA	Comments	heet Refere	Component
1	Does TTC geometry meet criteria in Index 102-100 series?			x	Barrier wall not needed for this project based on approach to traffic control.		
2	How could TTC Plan be made safer?				It could be made safer with the use of barrier walls and if drainage system replacement work was specifically identified in the maintenance of traffic		
3	Does traffic phasing address pedestrians and bicycles through the workzone?	x					
4	Are all proposed elements accounted for within a work zone?	x					
5	Has all earthwork, including subsoil excavation been accounted for in TTCP?			x			
6	Are drop-offs adequately protected?	x					
7	Are any proposed elements outside of RW or easements?	x					
8	Are detours reasonable in length and time?	x			Pedestrian detours.		
9	Would a detour be a better solution for any TTCP phases?			x			
10	Are there any driveways not being maintained throughout all phases of construction?	x					
11	Are barriers accounted for correctly with F&I and relocation pay items?			x			
12	Has temporary drainage been accounted in every phase necessary?	x					
13	Does temporary diversion leave room to construct proposed drainage features?			x			
14	Note deep drainage construction (>8' deep) that cannot be built using standard trench boxes. Does the trench opening affect any other TTCP or design elements or RW?	x					
15	If project has new signal or lane changes, has temporary signalization been accounted for adequately?			x			
16	Verify signal loops, conduit and other signal items are included in TTCP phasing.	x			Signal loops are included in the plans as usual. Work does not seem significant enough to reference in the TTCP.		
17	Identify any fences, mailboxes, irrigation, business signage, landscaping or other property owner items that may need a special note or protection or relocation.			x			
18	Verify if Critical Walls are needed for any construction phasing.			x			

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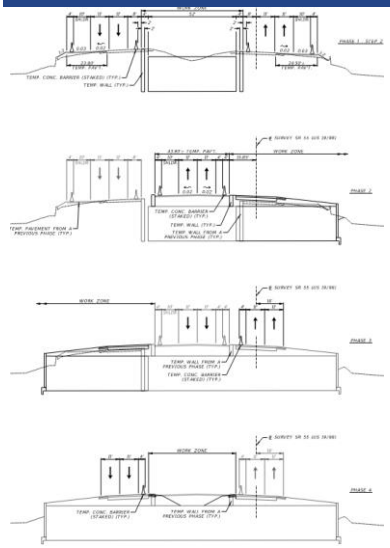
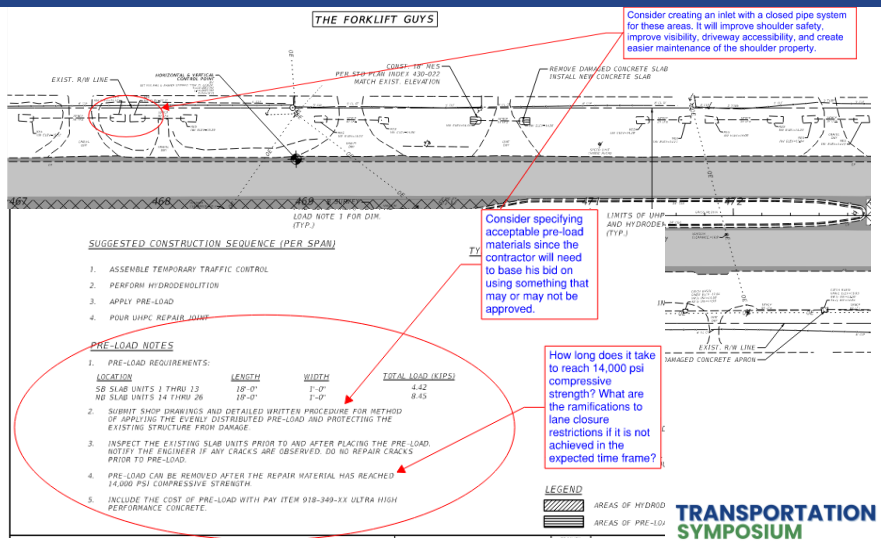
Plans Review Process: Atkins GEC





Plans Review Process: Goal

- **BlueBeam Studio Session**
  - **Several reviewers review at same time**
  - Speeding up overall review process.
  - Host can add or remove reviewers
  - Host needs a BlueBeam Revu account
  - Reviewers just need a free Bluebeam Studio account (BBID) to join in the review process

- AI Technology use

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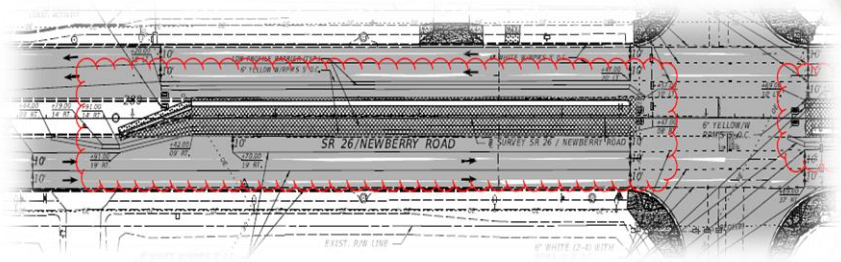
Errors & Omissions: Best Practices

- **Turn Lanes traffic detoured**
  - Low profile barrier wall not used
    - Met school schedule
    - Cost savings,
    - efficient completion, and
    - improved safety for commuters



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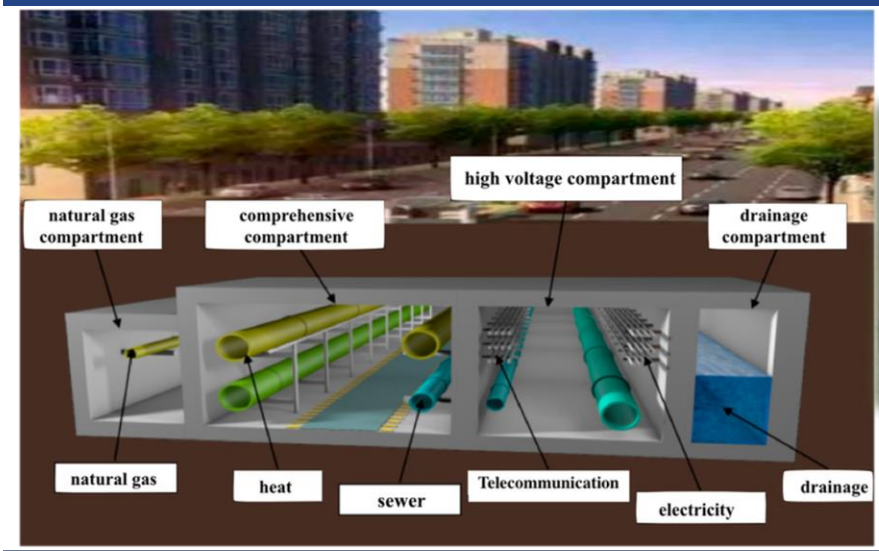
25

25

Drainage & Utility Conflicts



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26

26

Mast Arm Foundation & Pipe Sizing

- Guardrail posts conflict – utilities
- Utility Work Schedule
  - relocated conduit avoided drainage
  - But conflict w/ Mast Arm foundation
- Incorrect pipe size / sign size
- Signal cabinet small – fit equipment
- New Signal over Existing signal

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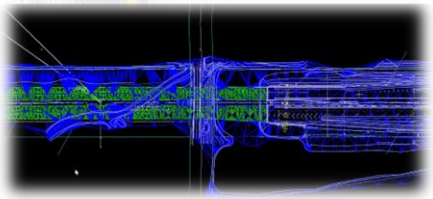
27

27

Plans & Design Survey

- Survey accuracy multilane x-slope
  - shots at edge travel vs. edge of friction
- Signal box-span Vertical Clearance? Contractor believed
- Water ponding pavement- temporary / permanent
- Interpretation - Standards, Specs, & Criteria
- Was it in the design scope of work?



TRANSPORTATION SYMPOSIUM

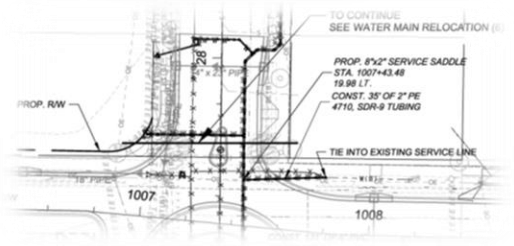
28

28

Missing Items

- Missing:
  - temporary drainage structures
  - temporary pavement
  - Temporary pedestrian MOT Plan

  - pay items:
    - Pavement Marking
    - Temp Barrier Wall
    - Concrete Traffic Railing
    - Temporary signal
    - Temporary traffic detection and maint.
    - Temp Traffic Control Officer



TRANSPORTATION SYMPOSIUM

29

Discovery MH

- Survey did not show MH - turn lane
  - Utility company had paved over it
  - Emergency WM repair
- As-builts not available to EOR

TRANSPORTATION SYMPOSIUM

30

Discovery MH

TRANSPORTATION SYMPOSIUM

Communicate with EOR Before Action

- Contact EOR prior to:
  - Relocating Pedestrian Push Button
  - Relocating Signal Pole
- EOR – conducts design load analysis

TRANSPORTATION SYMPOSIUM

Avoiding Rework by Asking Questions

- EOR Shop Drawing not matching Original Plans
  - Ask why & ask for a plan revision
    - Changed plan had conflict
    - Original Plan worked
  - Premium cost:
    - Rework / remobilization

TRANSPORTATION SYMPOSIUM

33

33

Plan Error: Identify & Report

- **Plan Error = Delay = Premium Cost**
  - Idle equipment, labor, material waste, rework, remobilize
- **Timeline of actions: Contractor, CEI, EOR**
  - FDOT Standard Specifications Section 5-4:
    - Do not "take advantage of any apparent error or omission" and must "immediately notify the Engineer in writing of such discovery."
    - Responsible for reviewing plans for discrepancies and notifying the Engineer before proceeding with any work.

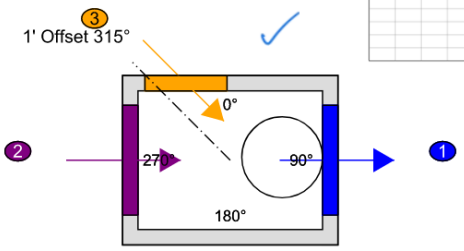
TRANSPORTATION SYMPOSIUM

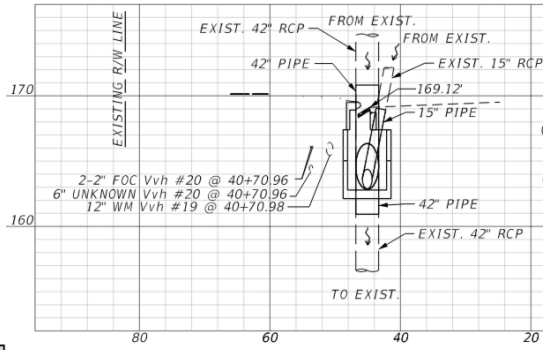
34

34

Solving Plan Discrepancies Quickly

- Plans Clarification - Call EOR
- Work Closely with Contractor
- Calculate best outcome & proceed
- As-built plan is not signed by EOR





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35

35

Contract Documents per the Specs – EQR? T/F

Contract Documents.

The term "Contract Documents" includes: Advertisement for Proposal, Proposal, Certification as to Publication and Notice of Advertisement for Proposal, Appointment of Agent by Nonresident Contractors, Noncollusion Affidavit, Warranty Concerning Solicitation of the Contract by Others, Resolution of Award of Contract, Executed Form of Contract, Performance Bond and Payment Bond, Specifications, Plans (including revisions thereto issued during construction), Estimated Quantities Report, Standard Plans, Addenda, or other information mailed or otherwise transmitted to the prospective bidders prior to the receipt of bids, work orders and supplemental agreements, all of which are to be treated as one instrument whether or not set forth at length in the form of contract.

Note: As used in Sections 2 and 3 only, Contract Documents do not include work orders, and supplementary agreements. As used in Section 2 only, Contract Documents also do not include Resolution of Award of Contract, Executed Form of Contract, and Performance and Payment Bond.

TRANSPORTATION SYMPOSIUM

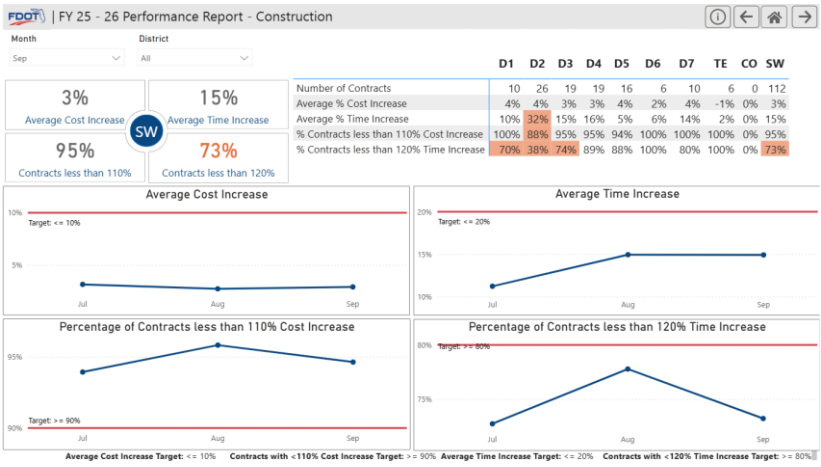
36

36

Cost / Time

NHI: Managing Highway Contract Claims: Analysis and Avoidance

- Entitlement,
- Impacts,
- Costs,
- Evaluation,
- Avoidance



TRANSPORTATION SYMPOSIUM

Contact

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District Quality Engineer
District Pavement Design Engineer
District Errors & Omissions Engineer

belqis.majboor@dot.state.fl.us

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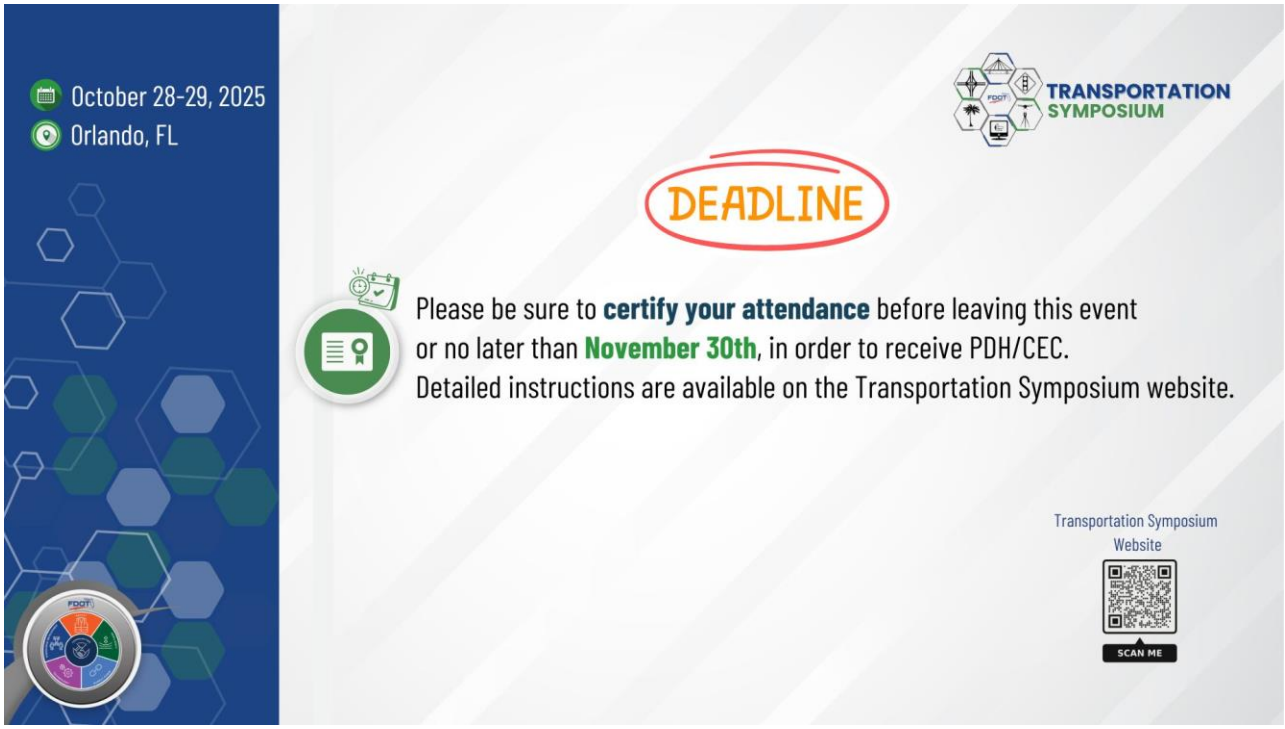
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39