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TRB TRANSPORTATION RESEARCH BOARD

TRB Webinar: Staged Bridge Construction Goals and Challenges

November 15, 2024

1:00 – 2:30 PM



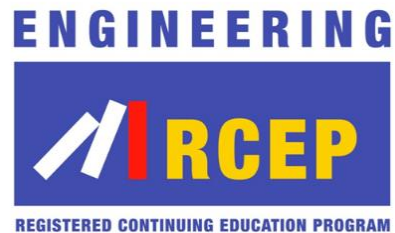
PDH Certification Information

1.5 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at TRBwebinar@nas.edu

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.



Purpose Statement

This webinar will focus on the broad and occasionally diverging objectives stakeholders may prioritize on complex, staged bridge construction projects. Presenters will identify common priorities of bridge users, owners, designers, and contractors and explore strategies to effectively coordinate these priorities.

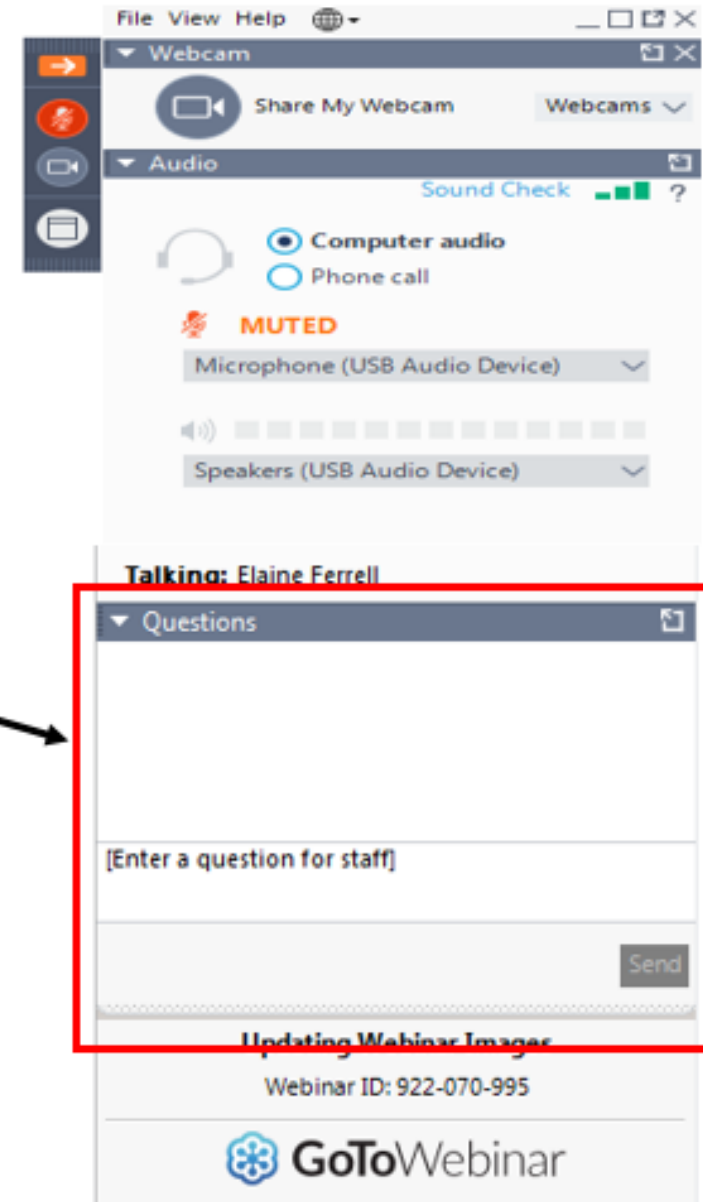
Learning Objectives

At the end of this webinar, you will be able to:

- (1) Plan complex bridge projects and be prepared to compromise
- (2) Engage all relevant parties when planning complex construction stages
- (3) Be a more prepared team player in a demanding collaborative environment

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



Today's moderator

Chiara Rosignoli

crosignoli@hardestyhanover.com



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Staged Bridge Construction

The Workshop



Workshop

Successful Staged Bridge Construction Projects are envisioned, designed and built by team players.



Speakers - Stakeholder Representatives



Owner and Community
Evan Grimm, WSDOT



Designer
Matthias Schueller, Parsons



Contractor
Walter Eggers, Kiewit

Owner & Community Perspectives

- Project Risk
- Outreach
- Coordination
- Quality, Schedule, Cost



Owner Perspective – Why Build a Bridge in Stages?

Staged Construction means that a part of a bridge is built *and opened* before it is completed or the old one entirely removed.

Bridges are built in stages when

- The existing bridge may not be closed
- Stakeholder facilities may not be interrupted
- Separation of operations (shoefly) is required for safety
- Funding isn't available immediately for the entire project

- Someone else got there first...

Owner Perspective – Building in Stages adds Risks

- Permitting
- Stakeholder acceptance
- Forward compatibility
- Certainty of funding for future stages
- Multiple contractors building various scopes and stages



Owner Perspective – Staged Construction Risk

Triage of Risk Items

- Addressed by the Owner?
- Require design input?
- Require construction input?

Framework for Decisions

Compromise, Engagement

- Attitudes
- Project Structure



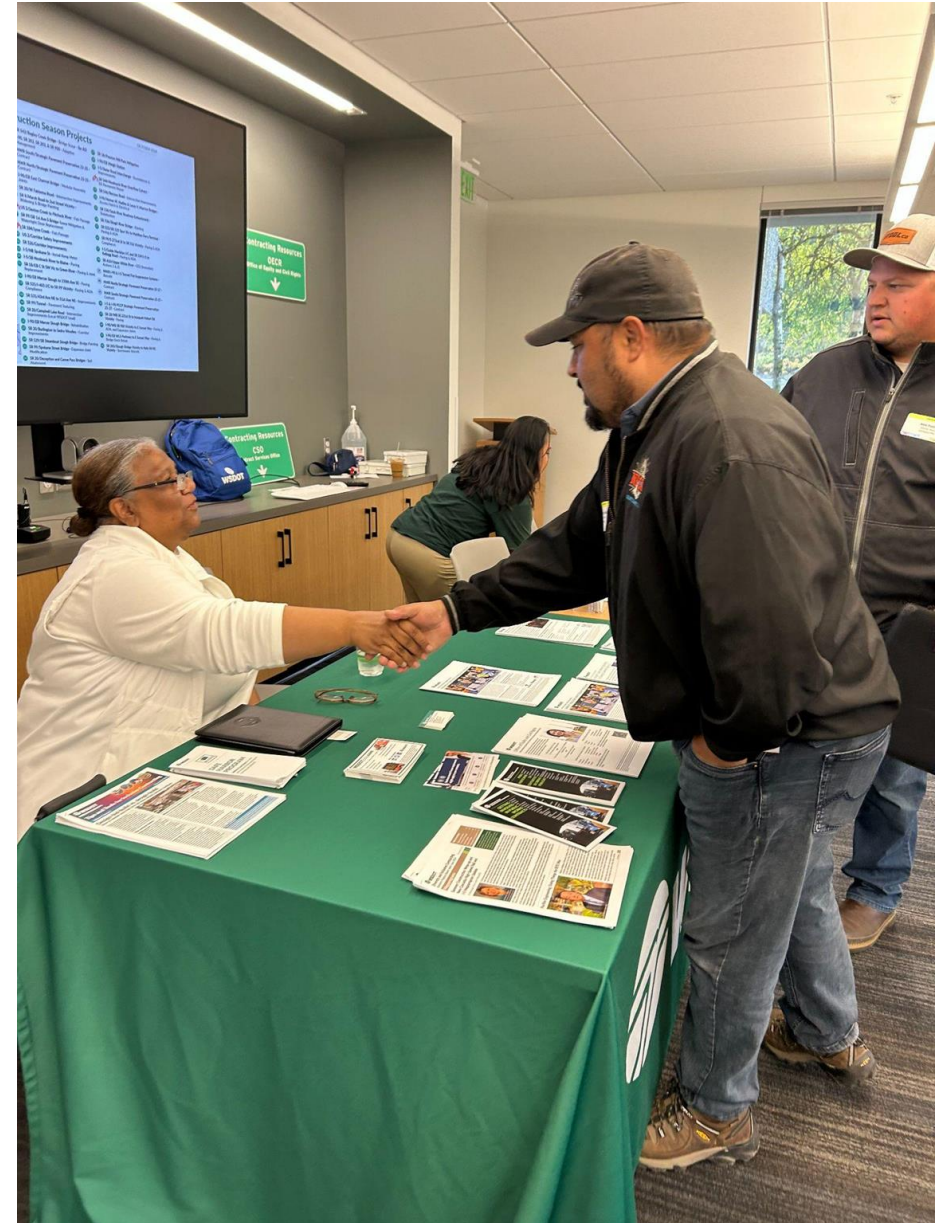
Stakeholder Perspective – Community Engagement

Stakeholder Examples

- Public, Community Groups
- Tribes, Permitting Agencies
- Businesses, Events
- Legislature/City

Owner Representation

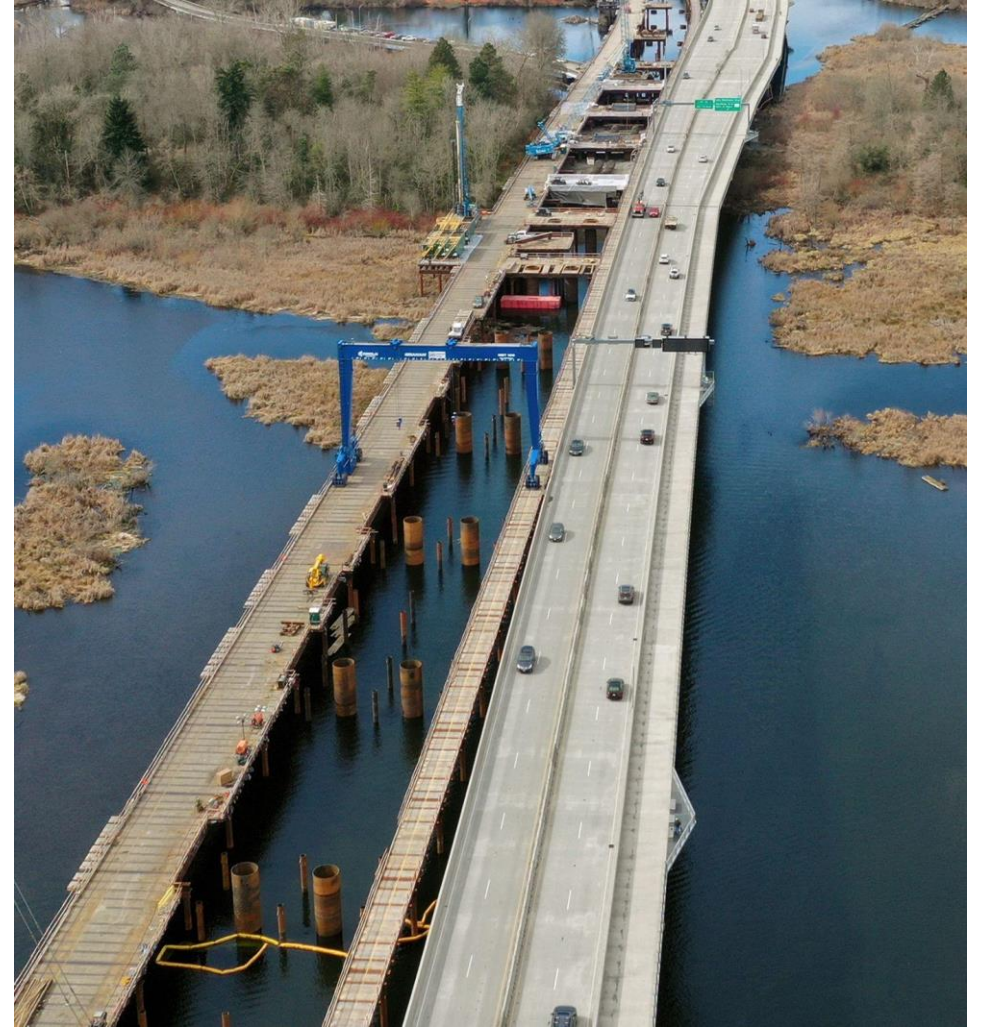
- Increase Consent
- Improve Understanding
- Information Access



Stakeholder Perspective – Construction Impacts

Drawing Board to Execution

- Complexity / Sensitivity
- Construction Windows
- Best Time to Make Decisions



Owner Perspective – Quality

- Collaborative Project Environment
- Knowledgeable, Confident Owner
- Technical Requirements in Design AND Construction



Owner Perspective – Cost, Schedule

- Simplicity vs Complexity
- Traffic Access During Construction
- Present vs Life Cycle Costs



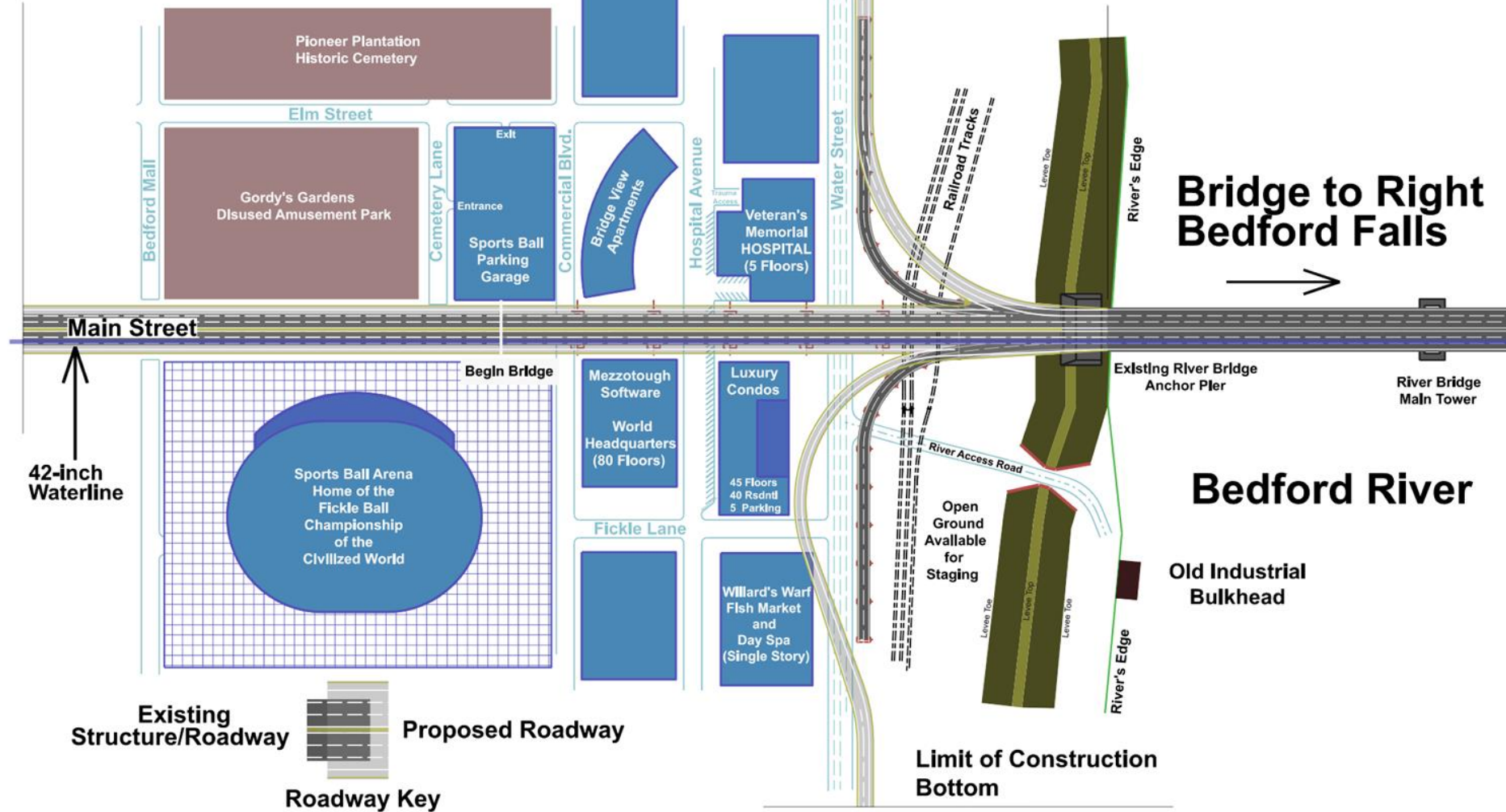
Owner Perspective – Jan 2024 Workshop Example

Town of Left Bedford Falls Proposed Main Street Modifications - Plan

Limit of Construction - Left

Limit of Construction
Top

Limit of Construction - Right



Owner Perspective – Workshop Outcomes

"No work on Commercial Blvd during sporting events."

"Project Risk --> Stagger bridge construction to maintain ramp traffic."

"Mitigate noise --> drilled shafts instead of driven piles."

"Constant impacts of equipment mitigated by using gantry for demolition."

"MOT: Construct westbound lanes first, allows relocation of water main."

"Local Considerations: Close only one street at a time during demolition and during bridge construction."

Designer Perspectives

- What Matters?
- How to Get There?
- What Are the Benefits?



Designer Perspective – What Matters?

Quality of Design

- Owner's Preferences (Consultation)
- Design Standards (Interpretation)
- Stakeholder Concerns (Mitigation)
- Weather and Site Location (Anticipation)



Designer Perspective – What Matters?

Schedule Considerations

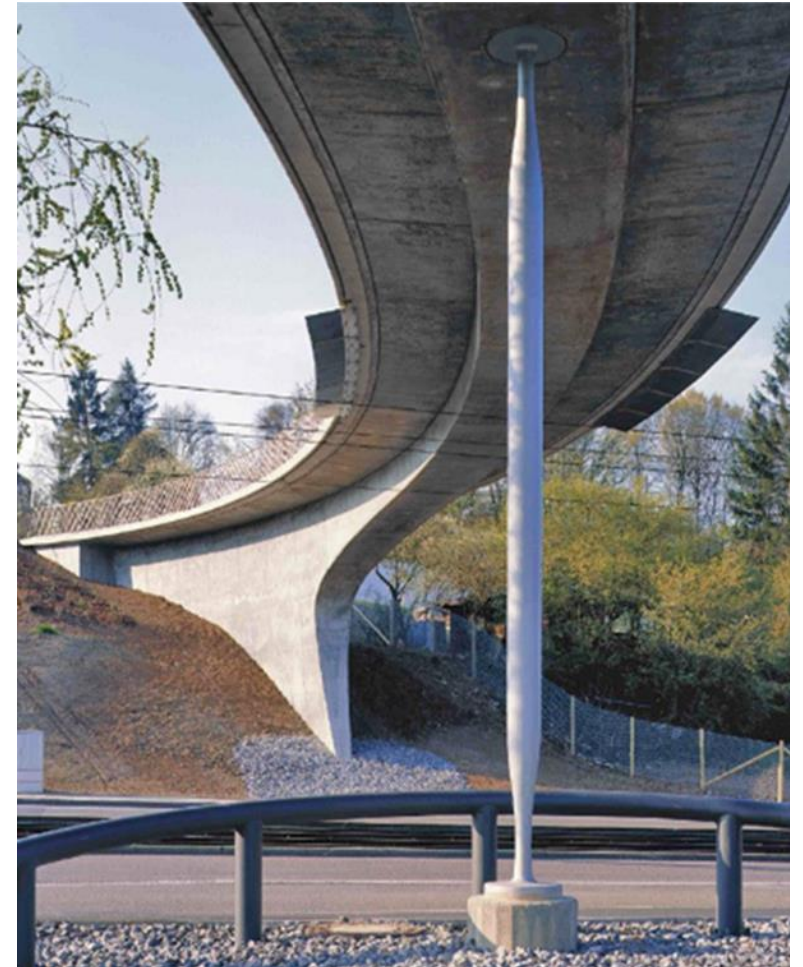
- Constructability (Collaboration w/ Fabricators and Contractors)
- Implemented Staged Bridge Construction (Erection Engineering)
- Traffic Management (Increasing Safety while Reducing Disruptions)
- Back-up Plans (Design Alternatives/Redundancy)



Designer Perspective – What Matters?

Cost Implications

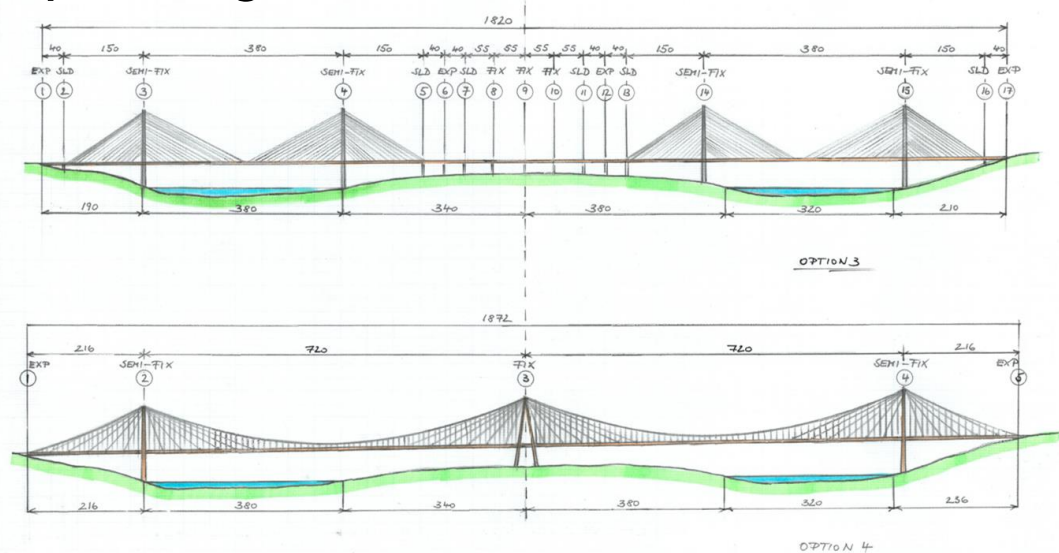
- Architecture & Choice of Material (Availability, Cost, and Construction Impact)
- Design Reliability (Cost Control)
- Durability (Long-term Performance)
- Adaptability (Sustainability)



Designer Perspective – How To Get There?

Technical Leadership

- Knowledge and Experience
- Building Trust and Establishing Values
- Ability to Communicate, Empower, and Support
- Learning Agility and being Open-Minded
- Visionary and Strategic Thinking
- Setting Priorities and Being Transparent
- Explaining Motivations and Decisions



Designer Perspective – How To Get There?

Collaboration

- Respect and Trust
- Listening and Understanding
- Ability to Compromise
- Accountability
- Willingness to put Mutual Goals over Personal Goals



Designer Perspective – What Are The Benefits?

Big Picture

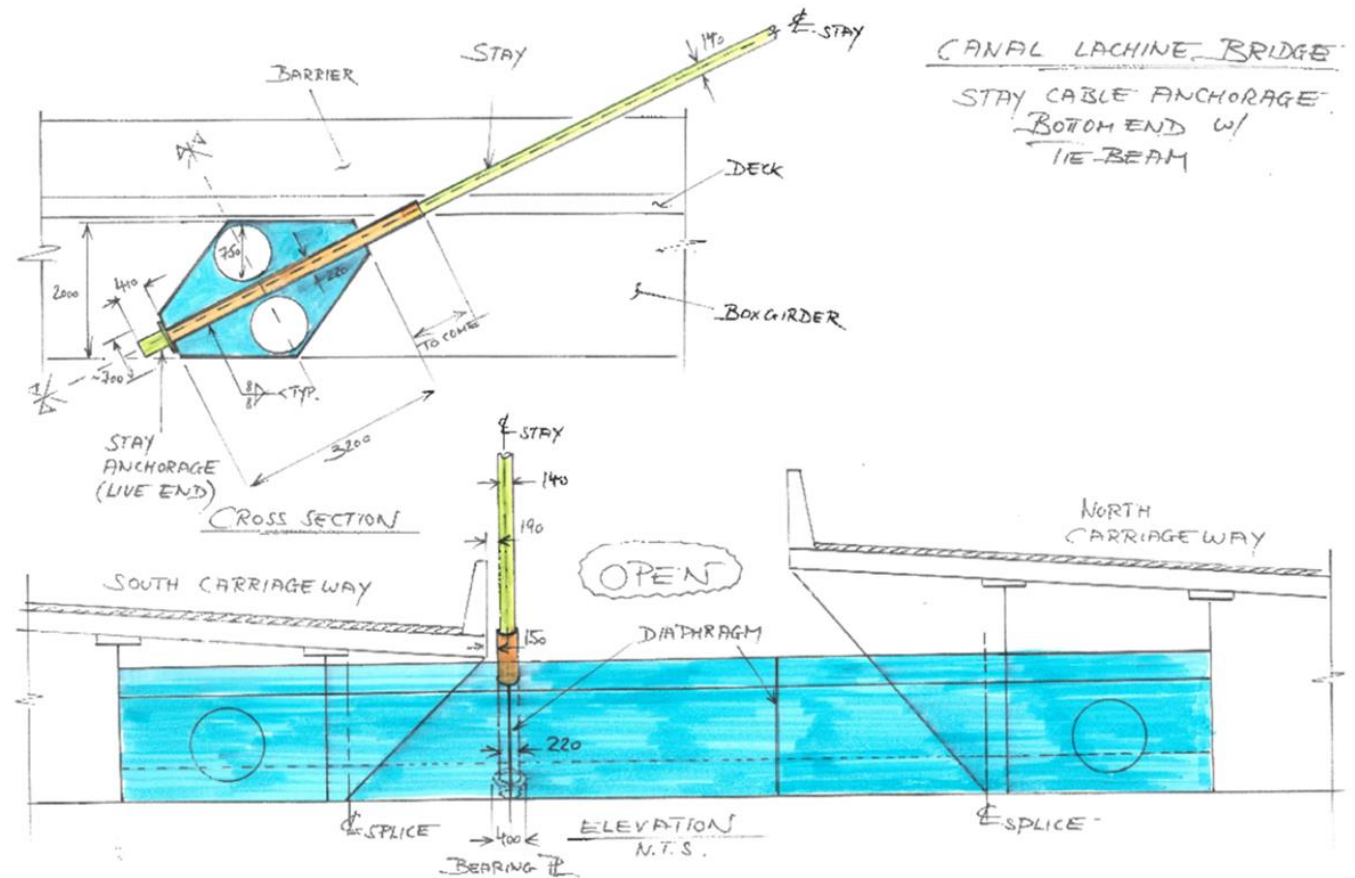
- Understanding of What Matters
- Seeing Different Perspectives
- Realizing the Potential
- Mobilizing Synergy Effects
- Achieving Sustainability



Designer Perspective – What Are The Benefits?

Acceptance

- Elimination of Show Stoppers
- Active Mitigation of Risks
- Finding Stakeholder Support
- Project Identification
- Budget and Schedule Reliability



Contractor Perspective

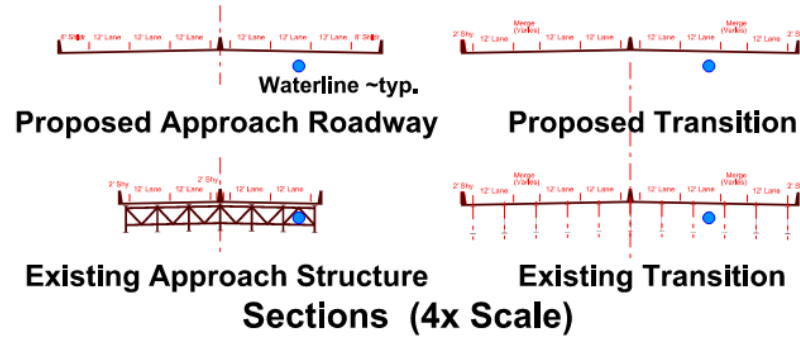
- Preconstruction
- Risk
- Planning
- Execution



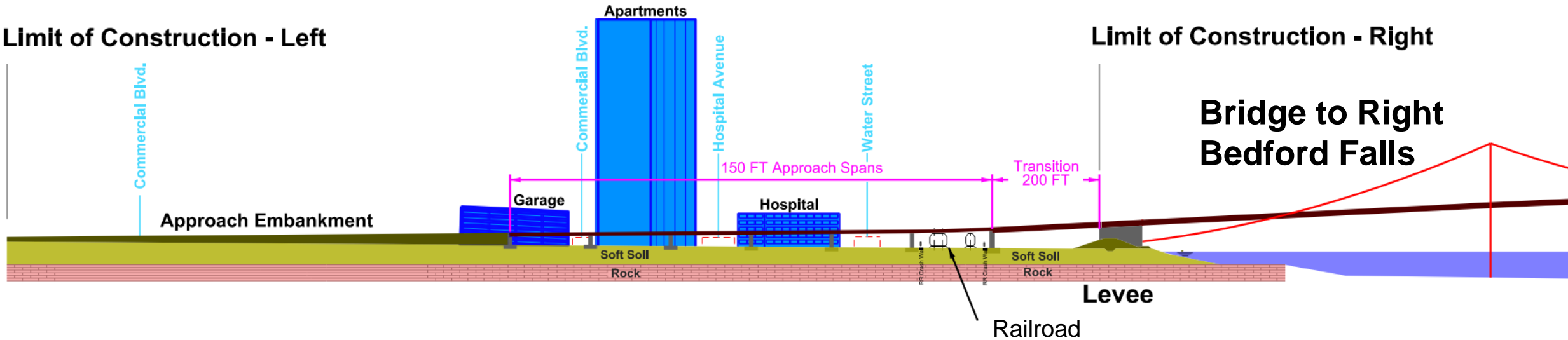
Contractor Perspective – Preconstruction

Town of Left Bedford Falls

Proposed Main Street Modifications - Elevation



Limit of Construction - Left



Contractor Perspective – Staged Construction Risks

- Safety, with traffic through construction site
- Challenging access
- Complexity – build, switch, build, tie-in, ..., open
- Inflexible operations schedule – completion date certainty
- Reduced productivity
- Long construction periods – price escalation, changes in labor availability
- Greater coordination (Owner/subs/stakeholders)
- Condition of existing infrastructure

Contractors don't take risks – they price them.

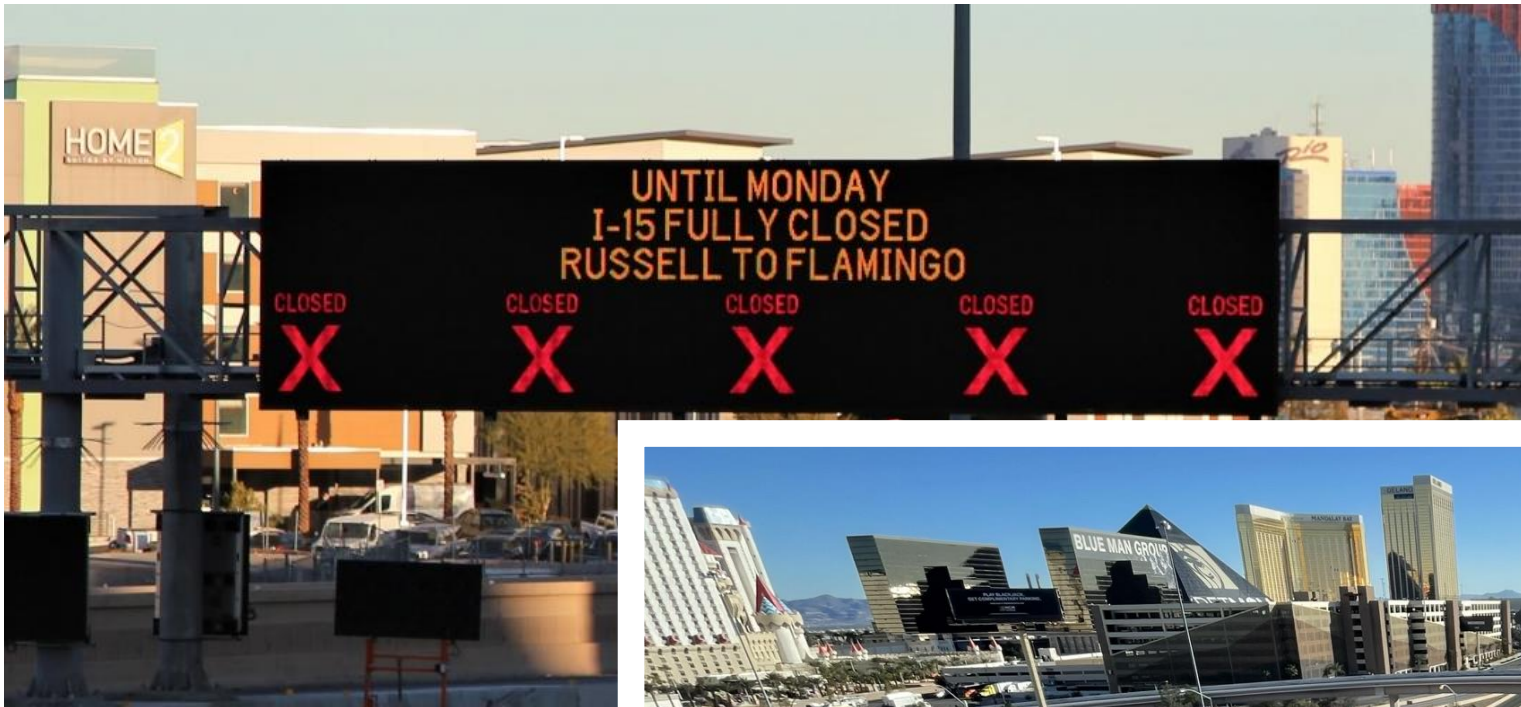
Contractor Perspective – Project Plan

All the activities must fit together in a holistic project plan

- Maintenance of traffic (MoT)
- Material delivery
- Labor access
- Material staging
- Prefabrication/piece size
- Equipment placement
- Utility relocation
- Selection of construction processes
- Third party coordination

Contractor Perspective – Plan the Work

Maintenance of Traffic



(or Not...)

Contractor Perspective – Plan the Work

Design the Construction Scheme

- MoT plan
- Bridge type
- Equipment
- Prefabrication
- Transportation
- Collaboration!



Contractor Perspective – Plan the Work

Prefabrication: It's a Matter of Size

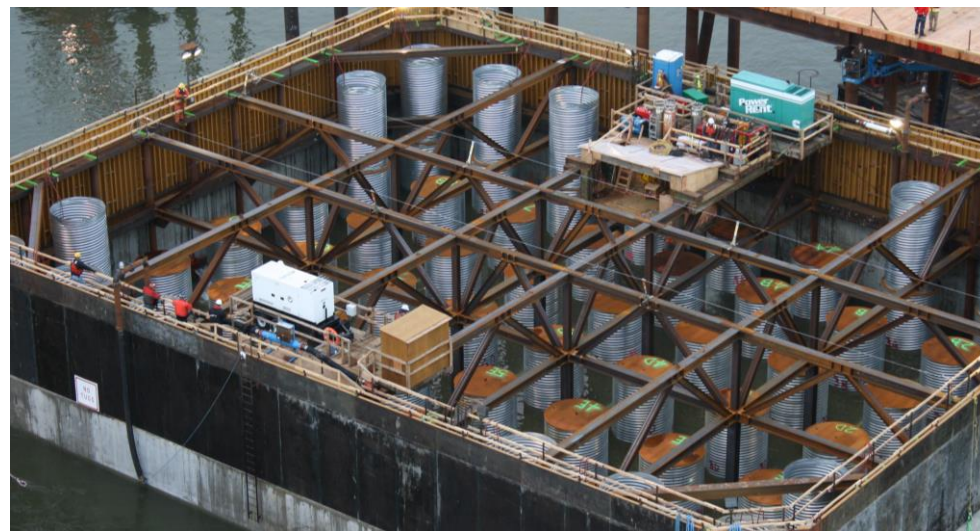


- MoT Plan
- Transport
- Site access
- Equipment
- Closures

The Never-Ending Need for Speed



4 ksi – in 4 hours!



Slide



Launch



Contractor Perspective – Plan the Work

What's Up with the Bridge that's Coming Down?



Contractor Perspective – Work the Plan

SAFETY



NATIONAL
**WORKZONE
SAFETY**
INFORMATION CLEARINGHOUSE

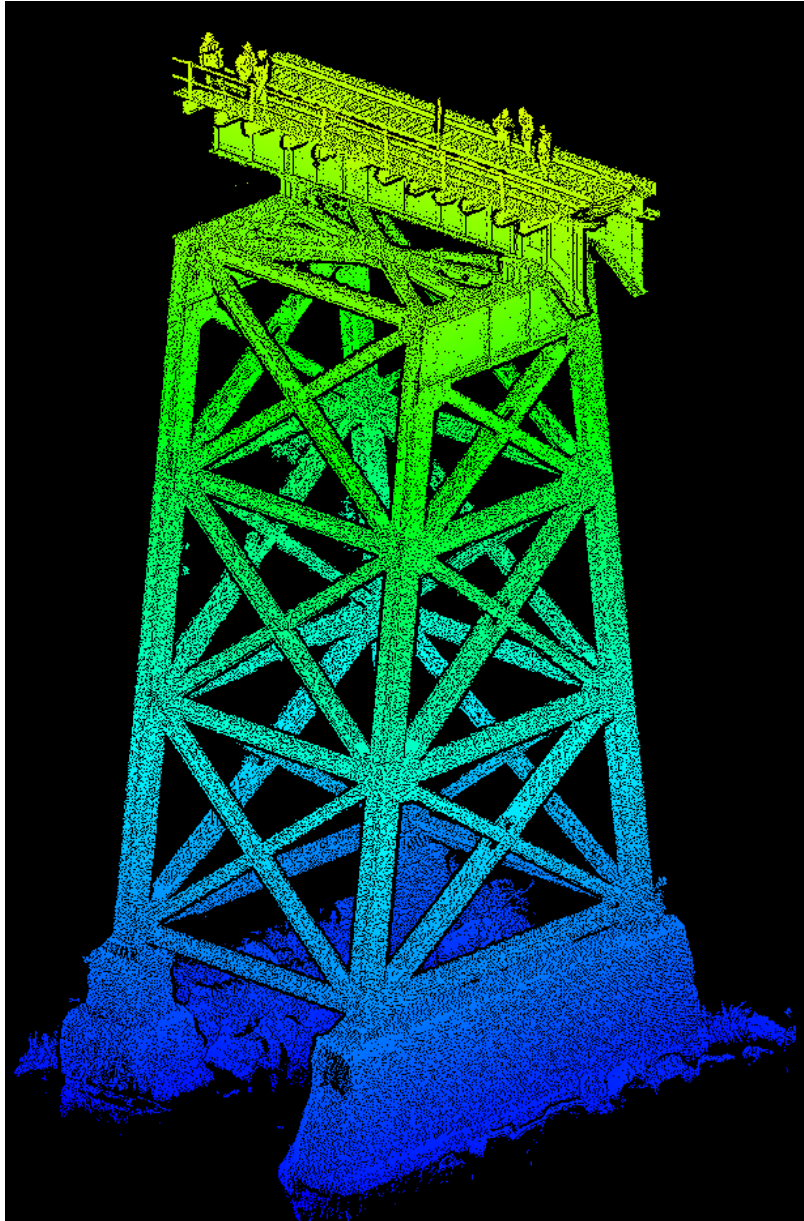
Work Zones are **temporary**.
Actions behind the wheel can last **forever**.

A photograph taken from the driver's perspective inside a car. The driver's hands are visible, one on the steering wheel and the other holding a smartphone. The phone screen shows a text message conversation. The speedometer shows a speed of 75. In the background, there is a construction work zone with orange traffic barrels and a yellow truck. A worker in a safety vest is visible near the truck.

STAY ALERT AND SLOW DOWN

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION Taking you places!
ARIBA American Road & Transportation Builders Association
AGC of America
NHTSA
alliance
VDOT Virginia Department of Transportation
ATSSA Safer Roads Save Lives
NWLAW National Work Zone Awareness Week
d. District Department of Transportation
AASHTO
U.S. Department of Transportation Federal Motor Carrier Safety Administration
U.S. Department of Transportation Federal Highway Administration
WORKZONE SAFETY

Contractor Perspective – Work the Plan



Survey!



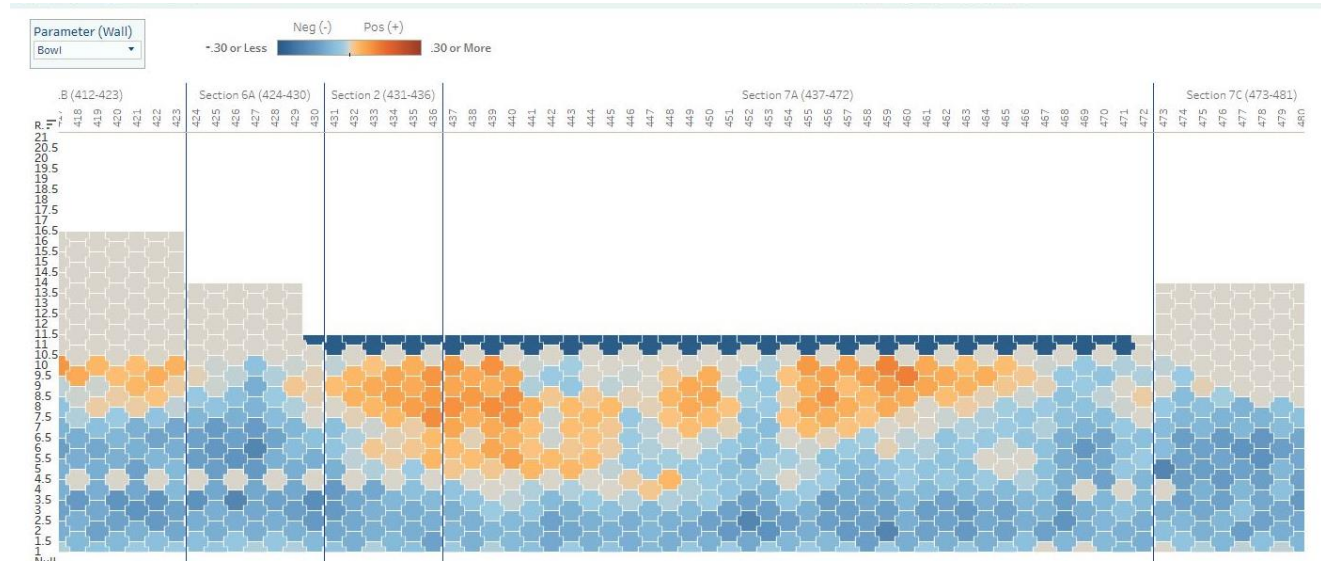
Ye Olde Notice:

*May matter how oft I did cleave it,
yet 'twas was still too short...*

Contractor Perspective – Work the Plan

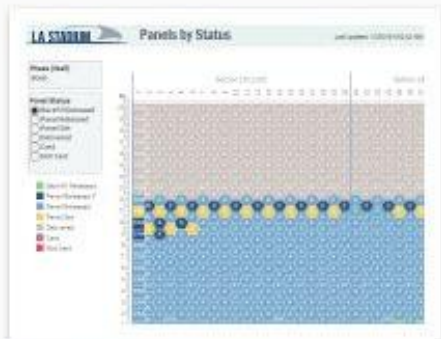
Monitor and Document Progress

Mechanically Stabilized Embankment
→ Tracking Precast Fascia Panels



Views 5 Data Sources 4 Refresh Schedules 1 Subscriptions 25 Details

▼ 0 selected



Panel Status Summary

2,439 views ☆ 2



Panel Status for Printing

71 views ☆ 0



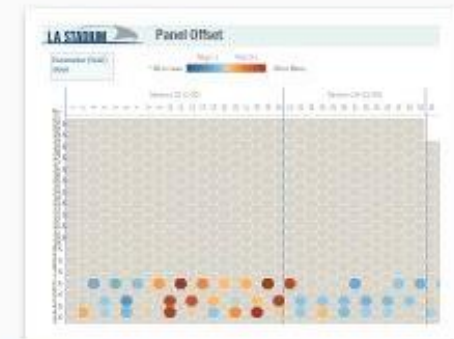
Panel Status: N Canyon/Bin

16 views ☆ 0



Management Summary

350 views ☆ 0

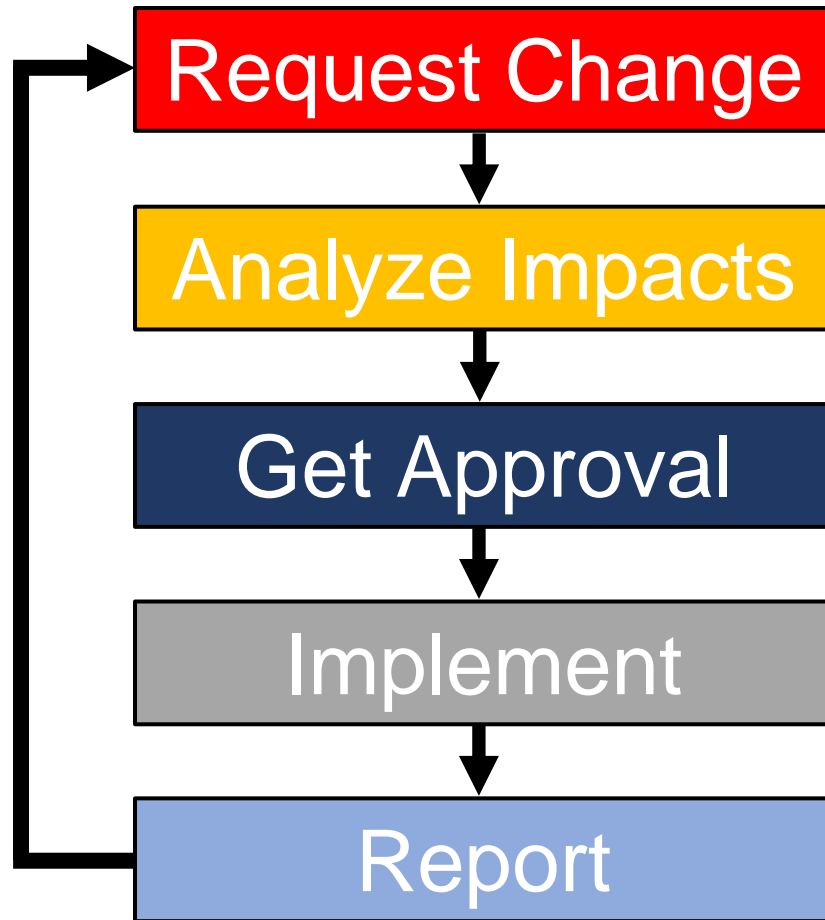


Panel Offset

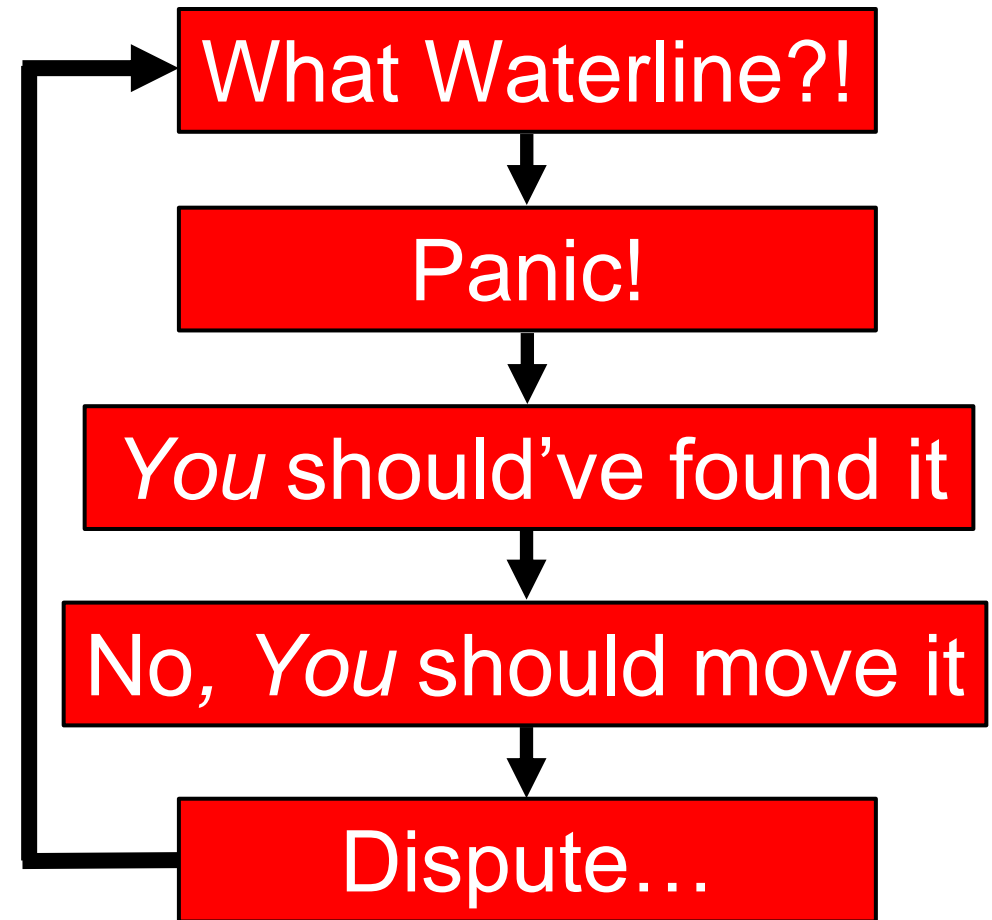
53 views ☆ 0

Contractor Perspective – Work the Plan

Roll with the Changes



Change Management –Theory



Reality?

Staged Bridge Construction – Conclusions

- Most bridge projects require some level of staging
- Decisions will not be left to the Owner and Design Team
- It's vital to identify all interested parties and include them
- Compromise and collaboration will get you to the finish line sooner

Construction Staging is getting
more common – not less
We need to get good at it!

Presenters



Owner and Community
Evan Grimm, WSDOT



Designer
Matthias Schueller, Parsons



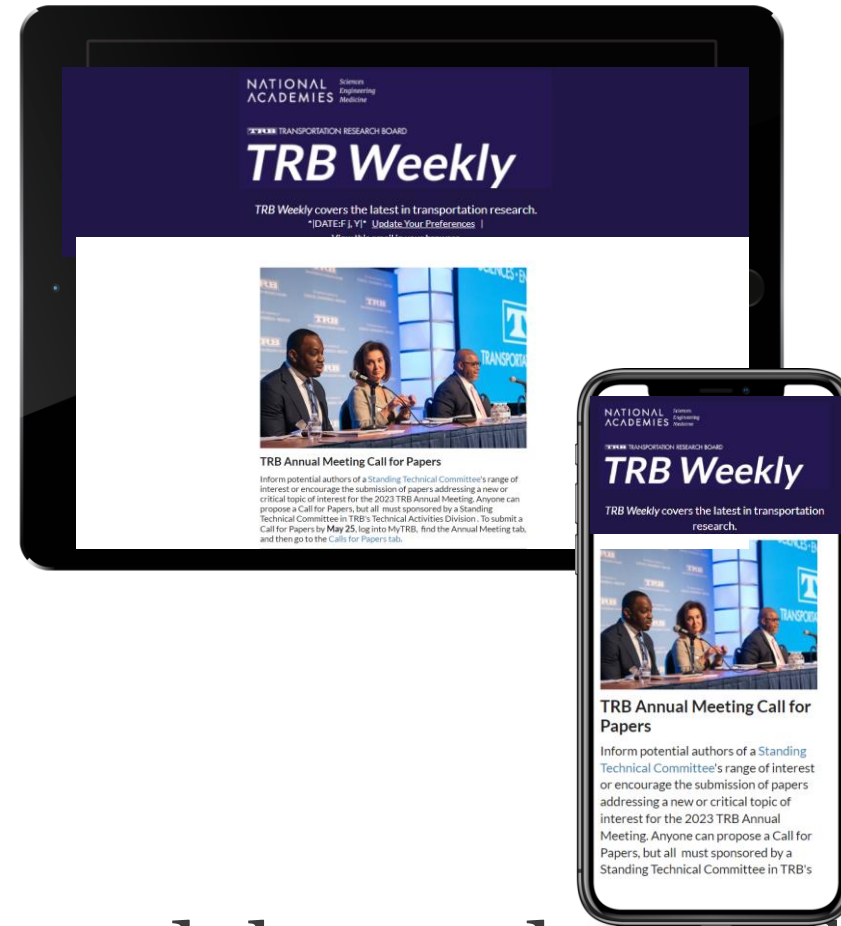
Contractor
Walter Eggers, Kiewit

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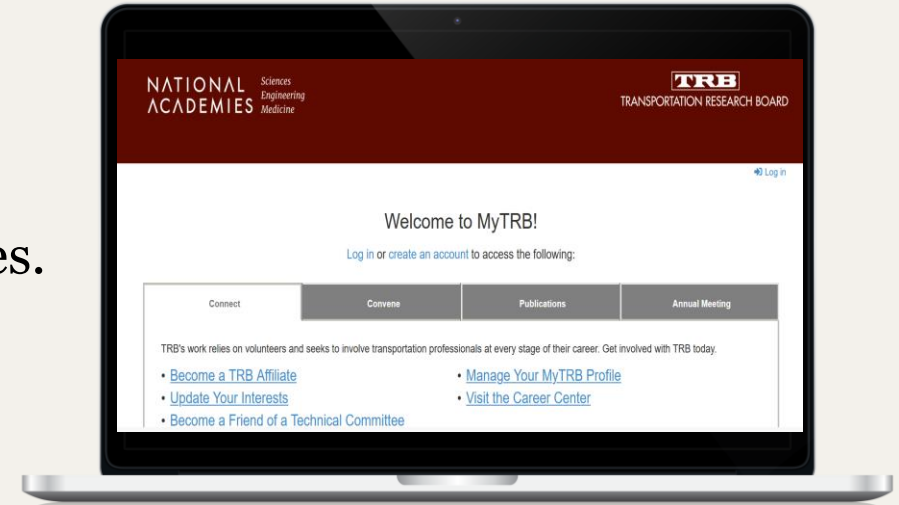


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