Expediting Project Delivery Webinar – Improving Project Delivery Outcomes in Documentation and Construction

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Laura Stone, VTrans

November 15, 2017
Safety: Fostering safer driving through analysis of driver, roadway and vehicle factors in crashes, near crashes, and ordinary driving.

Renewal: Rapid maintenance and repair of the deteriorating infrastructure using already-available resources, innovations, and technologies.

Capacity: Planning and designing a highway system that offers minimum disruption and meets the environmental, and economic needs of the community.

Reliability: Reducing congestion and creating more predictable travel times through better operations.
• Five-dimensional project management approach to identify any issues that should be planned for and managed proactively in the following project elements:
  - Cost
  - Schedule
  - Technical
  - Financial
  - Context

• The planning methods are:
  - Define critical project success factors
  - Assemble project team
  - Select project arrangements
  - Prepare early cost model and finance plan
  - Develop project action plans
R10 Project Management Tools

- Tool 1: Incentivize Critical Project Outcomes
- Tool 2: Develop Dispute Resolution Plans
- Tool 3: Perform Comprehensive Risk Analysis
- Tool 4: Identify Critical Permit Issues
- Tool 5: Evaluate Applications of Off-Site Fabrication
- Tool 6: Determine Involvement in ROW and Utilities
- Tool 7: Determine Work Packages and Sequencing
R10 Project Management Tools (cont.)

- Tool 8: Design to Budget
- Tool 9: Colocate Team
- Tool 10: Establish Flexible Design Criteria
- Tool 11: Evaluate Flexible Financing
- Tool 12: Develop Finance Expenditure Model
- Tool 13: Establish Public Involvement Plans
• Expediting Project Delivery identifies 24 strategies for addressing or avoiding 16 common constraints in order to speed delivery of transportation projects.

• Strategies Grouped Under Six Objectives:
  1. Improve internal communication and coordination;
  2. Streamline decision-making;
  3. Improve resource agency involvement and collaboration;
  4. Improve public involvement and support;
  5. Demonstrate real commitment to the project; and
  6. Coordinate work across phases of project delivery.
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Stage of Project Planning or Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Early Planning</td>
</tr>
<tr>
<td>1. Change-control practices</td>
<td></td>
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<tr>
<td>2. Consolidated decision council</td>
<td></td>
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<tr>
<td>3. Context-sensitive design and solutions</td>
<td>○</td>
</tr>
<tr>
<td>4. Coordinated and responsive agency involvement</td>
<td>○</td>
</tr>
<tr>
<td>5. Dispute-resolution process</td>
<td></td>
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<tr>
<td>6. DOT-funded resource agency liaisons</td>
<td></td>
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<tr>
<td>7. Early commitment of construction funding</td>
<td>●</td>
</tr>
<tr>
<td>8. Expedited internal review and decision-making</td>
<td>●</td>
</tr>
<tr>
<td>9. Facilitation to align expectations up front</td>
<td>○</td>
</tr>
<tr>
<td>10. Highly responsive public engagement</td>
<td>●</td>
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<tr>
<td>11. Incentive payments to expedite relocations</td>
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<tr>
<td>12. Media relations manager</td>
<td></td>
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<tr>
<td>13. Performance standards</td>
<td>○</td>
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<tr>
<td>14. Planning and environmental linkages</td>
<td>●</td>
</tr>
<tr>
<td>15. Planning-level environmental screening criteria</td>
<td>●</td>
</tr>
<tr>
<td>16. Programmatic agreement for Section 106</td>
<td></td>
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<tr>
<td>17. Programmatic or batched permitting</td>
<td></td>
</tr>
<tr>
<td>18. Real-time collaborative interagency reviews</td>
<td>○</td>
</tr>
<tr>
<td>19. Regional environmental analysis framework</td>
<td>○</td>
</tr>
<tr>
<td>20. Risk management</td>
<td>●</td>
</tr>
<tr>
<td>21. Strategic oversight and readiness assessment</td>
<td>○</td>
</tr>
<tr>
<td>22. Team co-location</td>
<td></td>
</tr>
<tr>
<td>23. Tiered NEPA process</td>
<td>○</td>
</tr>
<tr>
<td>24. Up-front environmental commitments</td>
<td></td>
</tr>
</tbody>
</table>
SHRP2 on the Web

- GoSHRP2
  www.fhwa.dot.gov/GoSHRP2
  Apply for Implementation assistance
  Learn how practitioners are using SHRP2 products

- SHRP2 @AASHTO
  http://SHRP2.transportation.org
  Implementation information for AASHTO members

- SHRP2 @TRB
  www.TRB.org/SHRP2
  Research information

- FHWA R10 & C19 Websites
  https://www.fhwa.dot.gov/GoSHRP2/Solutions/Renewal/R10
  https://www.environment.fhwa.dot.gov/strmng/shrp2-c19/default.asp
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Integrating SHRP2 Into NMDOT Projects
Benefits

- **Early communication** in the process
- **Early identification** of complexity based on needs of the specific project
- **Early preparation** of the financials, schedule, and resources
- Looking at **context** and **financing** as drivers of the project
- Earlier identification of **critical success factors**
- Creates a **realistic balance** between the **available funding and scope**
- **Reduces uncertainties**
- Develop **project action plans and/or more defined scope report** for success
**HOW have other STATES incorporated SHRP2?**

**Round 1 Lead Adopter**
- Federal Lands
- Georgia
- Massachusetts
- Michigan
- New Mexico

**Round 4 User**
PROJECT DEFINITION

- Identify key project issues
- Dimension rank and rating
- Develop complexity map
- Follow-up questions
- Identify critical success factors
- Identify key team members
- Develop preliminary action plan
### Project Team Member Analysis

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Required? (yes or no)</th>
<th>In-House (I) or Consultant (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public involvement officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost model expert</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract administration engineer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Development Engineer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant District Engineer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Project Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic engineer</td>
<td></td>
<td></td>
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<tr>
<td>Geotechnical engineer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavement engineer</td>
<td></td>
<td></td>
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<tr>
<td>Utility coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right-of-Way specialist</td>
<td></td>
<td></td>
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<tr>
<td>Environmental specialist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADA coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FHWA representatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local jurisdiction representatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultant staff (specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 NMDOT developed this worksheet, which covers method 2, assemble the project team.
Project Definition – IDENTIFY Key Project ISSUES

- **Cost** – Factors that affect cost
- **Schedule** – Time requirements and constraints to achieve project delivery
- **Technical** – All technical aspects of a project, including engineering requirements
- **Context** – External factors that can impact a project
- **Financing** – How will the project be paid for, including constraints and timing of funding (cash flow)
# Project Definition – *IDENTIFY* Key Project *ISSUES*

<table>
<thead>
<tr>
<th>Cost Factors</th>
<th>Schedule Factors</th>
<th>Technical Factors</th>
<th>Context Factors</th>
<th>Financing Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency usage</td>
<td>Timeline requirements</td>
<td>Project scope</td>
<td>Public</td>
<td>Legislative process</td>
</tr>
<tr>
<td>Risk analysis</td>
<td>Risk analysis</td>
<td>Owner’s internal structure</td>
<td>Political</td>
<td>Uniformity restrictions</td>
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<tr>
<td>Estimate formation</td>
<td>Milestones</td>
<td>Bidder prequalification</td>
<td>Owner</td>
<td>Transition to alternate funding sources</td>
</tr>
<tr>
<td>Owner resource cost allocation</td>
<td>Schedule control</td>
<td>Warrants</td>
<td>Jurisdictions</td>
<td>Project manager financial training</td>
</tr>
<tr>
<td>Cost control</td>
<td>Optimization’s impact on project schedule</td>
<td>Disputes</td>
<td>Designer(s)</td>
<td>Federal funding</td>
</tr>
<tr>
<td>Optimization’s impact on project cost</td>
<td>Resource availability</td>
<td>Delivery methods</td>
<td>Maintaining capacity</td>
<td>State funding</td>
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<tr>
<td>Incentive usage</td>
<td>Scheduling system/software</td>
<td>Contract formation</td>
<td>Work zone visualization</td>
<td>Bond funding</td>
</tr>
<tr>
<td>Material cost issues</td>
<td>Work breakdown structure</td>
<td>Design method</td>
<td>Intermodal</td>
<td>Borrowing against future funding</td>
</tr>
<tr>
<td>User costs/benefits</td>
<td>Earned value analysis</td>
<td>Reviews/analysis</td>
<td>Social equity</td>
<td>Advance construction</td>
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<tr>
<td>Payment restrictions</td>
<td>Other (specify)</td>
<td>Existing conditions</td>
<td>Demographics</td>
<td>Revenue generation</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>Other (specify)</td>
<td>Work breakdown structure</td>
<td>Construction quality</td>
<td>Monetization of existing assets</td>
</tr>
</tbody>
</table>

1 Exhibit PM-1 was modified from the [Guide to Project Management Strategies for Complex Projects](#).
Create a statement explaining unique aspects of the project for:

- Cost
- Schedule
- Technical
- Context
- Financing
<table>
<thead>
<tr>
<th>Project Dimension Ranking</th>
<th>1 (least complex)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (most complex)</th>
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</thead>
<tbody>
<tr>
<td>Cost</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Schedule</td>
<td>☐</td>
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<tr>
<td>Technical</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Context</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Financing</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</table>
### Project Definition – Dimension RATING

#### Dimension Rating Exercise

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Scale</th>
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<tbody>
<tr>
<td><strong>Cost Complexity</strong></td>
<td>Minimal</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Schedule Complexity</strong></td>
<td>Minimal</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Technical Complexity</strong></td>
<td>Minimal</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Context Complexity</strong></td>
<td>Minimal</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Financing Complexity</strong></td>
<td>Minimal</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>50</td>
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<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>
### Complexity Map Exercise – Comparing Ranks and Relative Score

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Rank</th>
<th>Rate/Relative Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>Schedule</td>
<td>3</td>
<td>60</td>
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<tr>
<td>Technical</td>
<td>4</td>
<td>85</td>
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<tr>
<td>Context</td>
<td>5</td>
<td>90</td>
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<tr>
<td>Financing</td>
<td>1</td>
<td>50</td>
</tr>
</tbody>
</table>
Project Definition – DEVELOP Complexity MAP

Complexity Map

Area =

Cost

Finance

Schedule

Context

Technical

Ave Area = 6,000; Max Area = 24,000
1. Incentivize project outcomes
2. Develop dispute resolution plans
3. Perform risk analysis
4. Identify critical permit issues
5. Special environmental reports
6. Evaluate off-site fabrication
7. Determine involvement of right-of-way and utilities
8. Design to budget
9. Co-locate team
10. Establish flexible design criteria
11. Evaluate flexible financing
12. Develop finance expenditure model
13. Establish public involvement plans
Vicinity Map
Funding of the Project

Funding $8 million

- Consists of construction, ROW, design/engineering, stipends, and construction management

- Risk in Cost
  - Rock Excavation
  - Lighting
  - Urban Design
Schedule

- Environmental Process
- Right of Way
- Property Surveys
- Utility Relocations
Technical

- American with Disabilities Act
- Driveways
- Urban Section
- Limited Right of Way
- Maintenance of Traffic Control
- Public Involvement

NORTH OF PINE STREET - OPTION 2 - PERSPECTIVE (LOOKING SOUTH)
Context

- Cycling Community
- Steep Slopes
- Utility Relocation
- Lighting Agreements
Financing

Financing

• State and Federal aid – highway funds
• Town of Silver City lack of necessary financing for lighting and utility relocations.
HOW has NMDOT incorporated SHRP2 to date?

NM 15 Silver City Project

Cost – Determined risk in cost was rock excavation, lighting, urban design.

Schedule – Determined that right of way and utility relocation will affect schedule.

Financing – Town of Silver City lacks necessary funds for lighting and utility relocations.

Context – Cycling community, steep slopes, utility relocation, public involvement

Technical – ADA, urban section, limited right of way

Note: This project’s estimate is about $8 million.
Integrating specific aspects of SHRP2 that will apply to most NMDOT projects

Most of the work will occur during project definition

Pavement preservation projects will not be required to complete the SHRP2 elements that have been integrated into project development

Other NMDOT projects, including rehabilitation, reconstruction, new construction, and all consultant-led projects will require SHRP2 documentation
HOW is NMDOT integrating SHRP2?

Updating our project development process

• Project Definition
  - Determine project complexities
  - Identify project challenges and success factors
  - Identify key team members
  - Develop a preliminary action plan

• Project Scoping and Conceptual Design
  - Update complexity map
  - Update the project action plan
  - Optional exercises to help with cost and financing issues

• Preliminary Design
  - Update complexity map
  - Update the project action plan
  - Optional exercises to help with cost and financing issues
1. How are you going to address your most complex dimension?
2. What resource allocation issues need to be addressed as part of project planning for each dimension?
3. When are you going to address these complexity factors?
• For projects involving RFP development for consultants, this up front work should help form the basis of the consultant RFP.
  – Consultants have indicated that the preliminary action plan and complexity map would be helpful for them to see in an RFP
  – The goal would be to improve the RFP process for both NMDOT and consultants.

• For internal design projects, this upfront work will help to develop a solid scope of work. The intent of the work is to minimize scope creep as the project progresses.

• Documentation becomes part of the project file.
Lesson Learned

Small Project

• Currently utilizing most of the items in daily design development process.

• Small complex project – IT WORKS TO GET THE COMMUNICATION ON THE PROJECT STARTED.

• Method works great on design build projects.

• Great Process for Young Project Development Engineers
SHRP2 C19 Expediting Project Delivery – VTrans Accelerated Bridge Program

Expediting Project Delivery Webinar – Improving Project Delivery Outcomes in Documentation and Construction
November 15, 2017

Laura J. Stone, PE
VTrans
Accelerated Bridge Program (ABP)

• ABP Created in 2012
• Reorganized into two new sections
  – Accelerated Bridge Program (ABP)
  – Project Initiation and Innovation Team (PIIT)
Accelerated Bridge Program (ABP)

- Programmatic approach to accelerating projects
- Project Delivery 24 months from Project Defined to Bid Advertisement
- Programmatic use of ABC
- Initial goal of 25% of all bridge projects
• Early Project Coordination
  – Public outreach
  – Contractor Input
  – Internal and External Stakeholders

• Streamline/expedite the project delivery process
  – Maximize flexibility in rules and process
  – Evaluate risk but run concurrent activities

• Develop and use standard details for ABC

• Design projects to be successful for ABC
• Dedicated team of scoping Engineers and Technicians
• All bridge projects start here
• Approximately 20-30 projects initiated and scoped per year
• Heavy emphasis on collaboration
• Public Engagement in Process
• ABC option is always first consideration.
SHRP2 C19
Leveraging Strategies to Remove Impediments and Deliver Projects
- 16 Constraints
- 24 Strategies
In October 2013, VTrans was selected as a Lead Adopter of SHRP2 C19.

Program Assessment of Project Delivery
- Leadership
- Data management
- Scoping
- Design
- Resources
- Public Outreach

Development of Action Plan
Implementation of Action Items
Final Report of Experience
5 Key Strategies for Expediting Project Delivery

• **Strategy 3**: Context Sensitive Design/Solutions
• **Strategy 8**: Expediting Internal Review and Decision Making
• **Strategy 10**: Highly Responsive Public Engagement
• **Strategy 21**: Strategic Oversight and Readiness Assessment
• **Strategy 22**: Team Co-Location
C19 Desired Outcomes

• Evaluate risks to timely project delivery
• Identify opportunities to expediting projects with special emphasis on the strategies described in the Expediting Project Delivery report
• Identify resource demands for the ABP and how this may differ from conventional project delivery
• Analyze the VTrans organizational structure for opportunities for increased efficiencies
• Identify potential process improvements
• Build relationships with internal and external partners
C19 Action Plan Drawing Upon Key Strategies

1. **ABP Process/Program Review**
   - July 23 & 24, 2014

2. **Expediting Project Delivery Assessment Workshop**
   - Sept. 3 & 4, 2014

3. **Develop Action Plan with Deliverables and Performance Measures**
   - June 2015

4. **Implement Action Items**
   - May 2016

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**Project Initiation Process Improvements**

- Develop an Operations Questionnaire
- Add Collaboration Phase
- Heightened Stakeholder Coordination

**Documenting the PIIT/ABP Process**

- Document the PIIT and ABP Process
- Develop Performance Measures for the PIIT and ABP
- Document Resource Demands

**Public Outreach**

- Public Involvement Plan
- Website Development
- Early Coordination with Stakeholders
- Outreach Products
- Tools to Engage the Public

**Scanning Tour**

- Conduct Scanning Tour

**Generate Final Report of Findings**

- Prepare Final Report
Strategy 3: Context Sensitive Design Solutions

Objective: Improve public involvement and support

- Enhanced project scoping in the PIIT
- Community and Operations Questionnaires
- Addition of “Collaboration Phase” during project definition
- Proper Selection of selected alternatives (avoidance, minimization, and mitigation)
Objective: Streamline decision making

- Batching of scoping projects for resource ID
- Heightened Communication and Collaboration
  - Collaboration Phase During Project Definition
  - Team Meetings
  - Constructability Review Meetings
  - Pre-closure Contractor Meeting
- Concurrent Activities and Decision Tree
Objective: Improve public involvement and support

- Providing Financial Incentives on TH Projects (ACT 153)
- Public Meetings throughout the life of the project
- Effective Public Engagement
  - Audience Response Systems
- Public Involvement Plans
- Project Outreach Coordinators
- Customer Satisfaction Surveys
Objective: Improve internal communication and coordination

• Creating a Culture that Values Innovation
• Strong and Effective Project Management
• Developing Key Planning Documents
  – Traffic Management Plans
  – Public Involvement Plans
  – Risk Registry
  – Credible Schedules and Spending Profiles
• Standardized Design Details
Objective: Improve internal communication and coordination

- Resource Groups Housed Together
- Dedicated Utility Relocation Specialists
- Project Development Team Meetings
- Constructability Review Meetings
C19 Peer Exchanges

- Peer Exchanges with MassDOT, NYSDOT and MaineDOT
  - Project teams from VTrans in Attendance
  - Program Overviews
  - Accelerated Program Emphasis Areas
  - Shared New Initiatives, Innovations, and Lessons Learned

- Numerous Takeaways from the Program/Process Review, Peer to Peer Exchanges, and Stakeholder Interviews
Peer to Peer Exchanges
NYS DOT
September 22 and 23, 2015
Our C19 Journey Has Just Begun

• Explore Enhancements in the PIIT process
  – Leverage expertise in VTrans to help refine recommended alternatives
  – Develop truncated scoping report for Preventative Maintenance and Emergency Projects
  – Explore effective methods to engage upper lever management on high risk and high cost projects
  – Develop prescreening GIS tool for resource ID
54 ABC projects
Delivered from 2012 to date, which is 50% of all Projects
Representing $84 Million Construction costs

100%
New Bridges Opened on Time
40% savings in Engineering costs

- ABC Standardized approach
- Shorter duration design process = Preliminary Engineering (PE) Savings
- ABC = Shorter Construction Durations and Construction Engineering (CE) Savings

<table>
<thead>
<tr>
<th></th>
<th>PE</th>
<th>CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerated</td>
<td>$236,182</td>
<td>$398,305</td>
</tr>
<tr>
<td>Conventional</td>
<td>$451,725</td>
<td>$398,305</td>
</tr>
</tbody>
</table>
ABP – Resource Demands

70-75% savings in resource demands

- ABC = Less impact to existing Utilities
- ABC = Less ROW impacts
- ABC = Less Environmental impacts
- Team Co-organization and Co-location efficiencies

BRIDGE PROJECT AVERAGES

<table>
<thead>
<tr>
<th>Category</th>
<th>Accelerated</th>
<th>Conventional</th>
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<tbody>
<tr>
<td>ROW</td>
<td>$17,838</td>
<td>$59,115</td>
</tr>
<tr>
<td>Environmental</td>
<td>$3,424</td>
<td>$13,174</td>
</tr>
<tr>
<td>Utilities</td>
<td>$3,549</td>
<td>$15,579</td>
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</tbody>
</table>
ABC Construction Savings

18% Savings
ABC vs Conventional Projects based on 37 new projects
Customer Survey Results

- How satisfied were you with ABC?
  397 Responses from 9 2015 projects

- How satisfied are you with the information you received about the bridge project?

- Overall, how satisfied were you with how VTrans delivered this project?
Want to Know More...

- Final Report Completed in September 2017

- VTrans Public Involvement Guide

- Project Case Study Sheet

- Contact Us
Thank You
Questions?

Please remember to type in your questions to the question prompt.

Thank you for participating!
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