

## 93Fast14



### Preliminary Construction Planning

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## DESIGN TEAM

 <b>TETRA TECH</b>	Design Management, Highway Design, Traffic Engineering, Permitting
<b>GILL ENGINEERING</b>	Bridge Engineering Lead and Quality Control
 <b>Dewberry-Goodkind</b>	Bridge Engineering and Lighting Design
 <b>LIN ASSOCIATES, INC.</b> CONSULTING ENGINEERS	Bridge Engineering
<b>GEI</b>	Geotechnical Engineering
<b>PLANNERS COLLABORATIVE</b>	Public Outreach
 <b>FORTRESS</b> PROTECTION THROUGH PREPAREDNESS	Contingency Planning/ Emergency Preparedness

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## Work Plan

- Deploy Temporary Crossovers and Traffic Detours to facilitate the complete closure of one direction of Interstate I-93
- Demolish/Remove and Replace the Bridge Superstructure using Accelerated Bridge Construction Techniques

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### Work Plan

- Complete the work on a weekend from Friday 10 PM to Mon 5 AM during a 55 hour weekend work window
- Open Interstate 93 and the New Bridge to Traffic by Mon 5 AM
- Repeat process and perform this work on 14 Bridges over 10 weekends

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### Accelerated Schedule

EVENT	DATE
Notice to Proceed	February 2, 2011
First Bridge Replacement	June 3, 2011
Milestone #1 (Complete 14 Superstructure Replacements)	September 2, 2011
Milestone #2 (Substantial Completion of 14 Bridges)	October 15, 2011
Milestone #3 (Final Completion of 14 Bridges)	November 15, 2011
Milestone #4 (Complete Noise Barrier)	June 30, 2012
Milestone #5 (Final Acceptance of Project)	June 30, 2012

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### Bridge Replacement Sequence

Weekend	Dates		Bridge Replacement(s)
1	June 3-6	I-93 NB	Riverside Ave
2	June 10-13		Salem EB & Salem WB
3	June 17-20		Route 16
4	June 24-27	I-93 SB	Mystic River Ctr Span and Valley St/Fellsway
5	July 8-11		Mystic River Back Spans and Webster St
6	July 15-18		Salem EB and Salem WB
7	July 22-25		Mystic River Ctr Span and Valley St/Fellsway
8	July 29-Aug 1		Mystic River Back Spans and Webster St
9	Aug 5-8		Riverside Ave
10	Aug 12-15		Route 16
11	Aug 19-22		Contingency Weekend #1
12	Aug 26-29	Contingency Weekend #2	

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## SAFETY

- PUBLIC SAFETY
- WORKER SAFETY
- TRAFFIC SAFETY
- CRANES, HEAVY LOADS
- FALL PROTECTION



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## Getting Started

- Prepare Organizational Flow Charts
- Identify Key Personnel
- Define roles and responsibilities
- Empower Key Personnel to make decisions
- Make Key Personnel available to make decisions
- Partnering

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## Communication

- Establish Project Field office w/ MassDOT & Contractor in same building
- Weekly progress meetings
- Set up SharePoint Site for document control
  - Efficient transfer of information
  - Mutually agreed upon organization
  - Users can elect for discipline specific updates
- Correspondence/Submittal Distribution Chart
- Develop list of deliverables as required to facilitate fabrication/work schedule

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**Communication**

- Review and prioritize outstanding submittals at weekly meetings
- Establish Tracking Procedures
  - Correspondence
  - Design/Shop Drawing Submittals
  - Design Changes/RFI's/NCR's
- Establish Working Groups w/ decision-makers for various disciplines
- Promote "over the shoulder reviews" prior to formal submissions

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**Project Schedule**  
CPM Schedule Structure

- Detailed breakdown of work activities and durations
- Schedule logic competency
- Organization of critical paths
- Design and construction submittal management
- Resource loading

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**Material Procurement Schedule**

- Identify Schedule Critical Long Lead Items and Early Release Design Packages
  - Bridge Bearings
  - Structural Steel
  - Prefabricated Composite Bridge Deck Elements
  - Closure Pour Concrete Mix Design
  - Closure Pour Concrete Mix Trials
  - Moveable (Zipper) Barrier System
  - Misc. precast barrier/bridge end posts

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### Early Release Construction

- **Early Release Construction Activities**
  - Identify the construction activities that will be required to be performed during the weekdays and weeknights prior to weekend shutdowns
  - Identify the construction activities that can be performed during the weekdays and weeknights to reduce the amount of work required during weekend shutdowns
- **Early Release Design Packages**
  - Identify the design packages that will require an accelerated approval process to facilitate completion of Early Release Construction Activities prior to the weekend shutdowns

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### Early Release Construction Activities

- Material procurement
- Temporary Bridge Supports/Jacking
- Deleading/Coping at bridge deck girders
- Demo/Repair of exist substructure piers and abutments
- Construct new beam pedestals
- Utility relocations

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### Early Release Construction Activities

- Construct temporary crossovers/lighting
- Furnish and install movable (zipper) barrier
- Test deployment moveable barrier/crossovers
- Early removal of bridge parapets and median
- Trial Batches and Test Placements for High-early closure pour concrete

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***Early Release Design Packages***

- Bridge design
- Demolition plans
- Deleading
- Concrete repairs
- Traffic Management plans
- Concrete Design
- Quality Assurance/Quality Control

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***Quality Assurance***

- Acceptance (MassDOT)
  - Design Acceptance
  - Construction Inspection & Testing (onsite and plant fabrication)
  - Monitor DB Entity's QC Activities
- Quality Control (DB Entity White-Kiewit)
  - QSM (Quality Systems Manual)
    - Quality Control Organization and Roles
    - Design Quality Control Procedures
    - Construction Quality Control Procedures
    - Document Management Procedures

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***Quality Assurance***

- **Independent Assurance**
  - MassDOT Research and Materials Section
- **Qualifications**
  - NorthEast Transportation Training and Certification Program (NETTCP)
  - American Concrete Institute (ACI)
  - Precast/Prestressed Concrete Institute (PCI)
- **Certified Independent Mobile Testing Lab**
- **Documented Design Constructability Reviews**

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**Construction QC Plans**

- **Task-Specific QC Procedures**
  - Bridge substructure repairs
  - Bridge substructure beam seat pedestals
  - Bridge superstructure bearings
  - Bridge deck closure pour concrete
  - Strip Seal joints
- **Vendor-Specific QC Procedures**
  - Membrane waterproofing
  - Hot mix asphalt paving

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**Ultra-High Performance Concrete**

- Mix Design Development and Testing
- On-Site Concrete Testing Laboratory
- Concrete Placement and Finish
- Concrete Cure
- High-Early strength gain
- Confined Shrinkage Test

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**Design/Submittal Approval Process**

- Weekly Working Group Meetings
- All disciplines in attendance
  - Bridge, Traffic/Highway, Materials/Quality Assurance, Construction/Schedule, Public Outreach
  - Promotes innovation, collaborative design process
  - Helps avoid missteps and delay in design development
  - Decisions makers present at all major team meetings to expedite resolution

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**Design/Submittal Approval Process**  
**90%-100% Design Process Summary**

- Weekly "Over the Shoulder" 90% design development meetings
- DB submits preliminary 90% design drawings to MassDOT for preliminary review (5 days to review)
- Weekly "Over the Shoulder" review and redline markup of 90% design drawings (DB 5 days to make corrections)

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**Design/Submittal Approval Process**  
**90%-100% Design Process Summary |**

- DB submits 90% design drawings to MassDOT for review (30 days to review)
- DB receives comments from MassDOT and prepares response to written review comments (DB 5 days to prepare response)
- Weekly "Comment Resolution Meeting" of 90% design drawings  
(Objective: By the end of the meeting all the comments on the client side and DB side have been aired and resolved)

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**Design/Submittal Approval Process**  
**90%-100% Design Process Summary**

- DB incorporates final comments from "Comment Resolution Meeting" into the 90% Design Drawings and submits 100% Design Drawings to MassDOT for Approval (DB 5 days to make corrections)
- MassDOT returns 100% Design Drawings Approved (10 days to review)
- DB distribute 100% Approved for Construction

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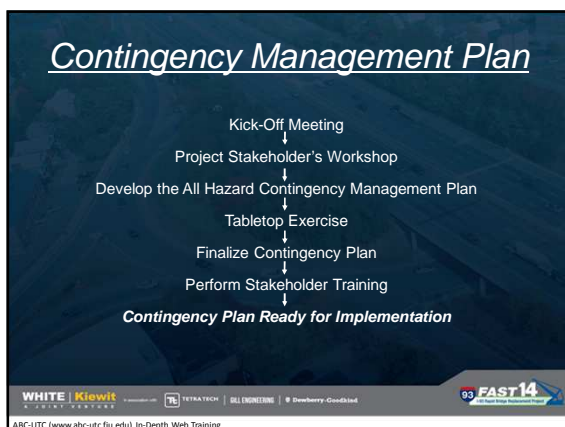
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### Contingency Management Plan

**Objective:**  
Identify potential scenarios that would impact traffic flow or construction operations and develop contingency plans or measures to address their associated scenarios.

- Construction equipment scenarios
- Construction activity scenarios
- Weather scenarios
- Traffic scenarios

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### Contingency Management Planning

- Concept of Operations
  - Event
  - Incident Assessment/Notification
  - Coordination and implementation of contingency plan or mitigation efforts
- Contractor monitors construction related scenarios
- MassDOT monitors traffic related scenarios
- MSP monitors emergency response, vehicular crash and construction support scenarios

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### Additional Contingency Measures

Mock up drills

- Zipper lane barrier deployment
- Precast erection and assembly
- Concrete formwork installation
- Reinforcing steel installation
- Closure pour concrete
- Concrete trial batch mixes
- Closure pour steel plates

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### Traffic Management Plans

TMP Sequence – 8 PM Friday

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### Traffic Management Plans

TMP Sequence – 9 PM Friday

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### Traffic Management Plans

**TMP Sequence – 10 PM Friday**

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### Traffic Management Plans

**TMP Sequence – Monday 5 AM**

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### Public Outreach

- MassDOT Website
- Local Agencies
- Residents

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### **Conventional Bridge Construction**

- **Benefits**
  - Familiarity with standard industry means and methods construction processes
- **Challenges**
  - Long duration (5 stages, projected duration of 4 years)
  - Traffic Impacts – Reduced lane widths, Ramp issues
  - Worker safety (Traffic Splits, close quarters)
  - Concern over durability of existing decks during construction

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### **Accelerated Bridge Construction**

- **Benefits**
  - Project duration reduced through aggressive TMP, and Accelerated Bridge means and methods utilizing prefabricated components
  - Minimal impacts to weekday commuters
- **Challenges**
  - New construction techniques and materials
  - Traffic queues could result in regional traffic impacts
  - Widespread public outreach component necessary

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### **Lessons Learned**

- Early involvement of all stakeholders
- Community relations and Public Outreach
- Additional design, review, procurement and fabrication time
- Sharepoint site critical for compressed design and review coordination
- Review/Approval Process
  - Identify Joint expectations and list of deliverables
  - Complete Early Release and Submittal packages
  - Over the shoulder review and approvals
  - Adequate resources

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**Questions?**



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