



# Project Execution Training

*Design-Build*

May 16 , 2024, 10:00AM – 12:00PM



# Introductions

**Mike O’Dowd – Director of Major Projects**

**Frank Welch – Deputy Director Major Projects**

**Narayana “Murthy” Kolla – Manager of Alternative Procurement and Delivery**

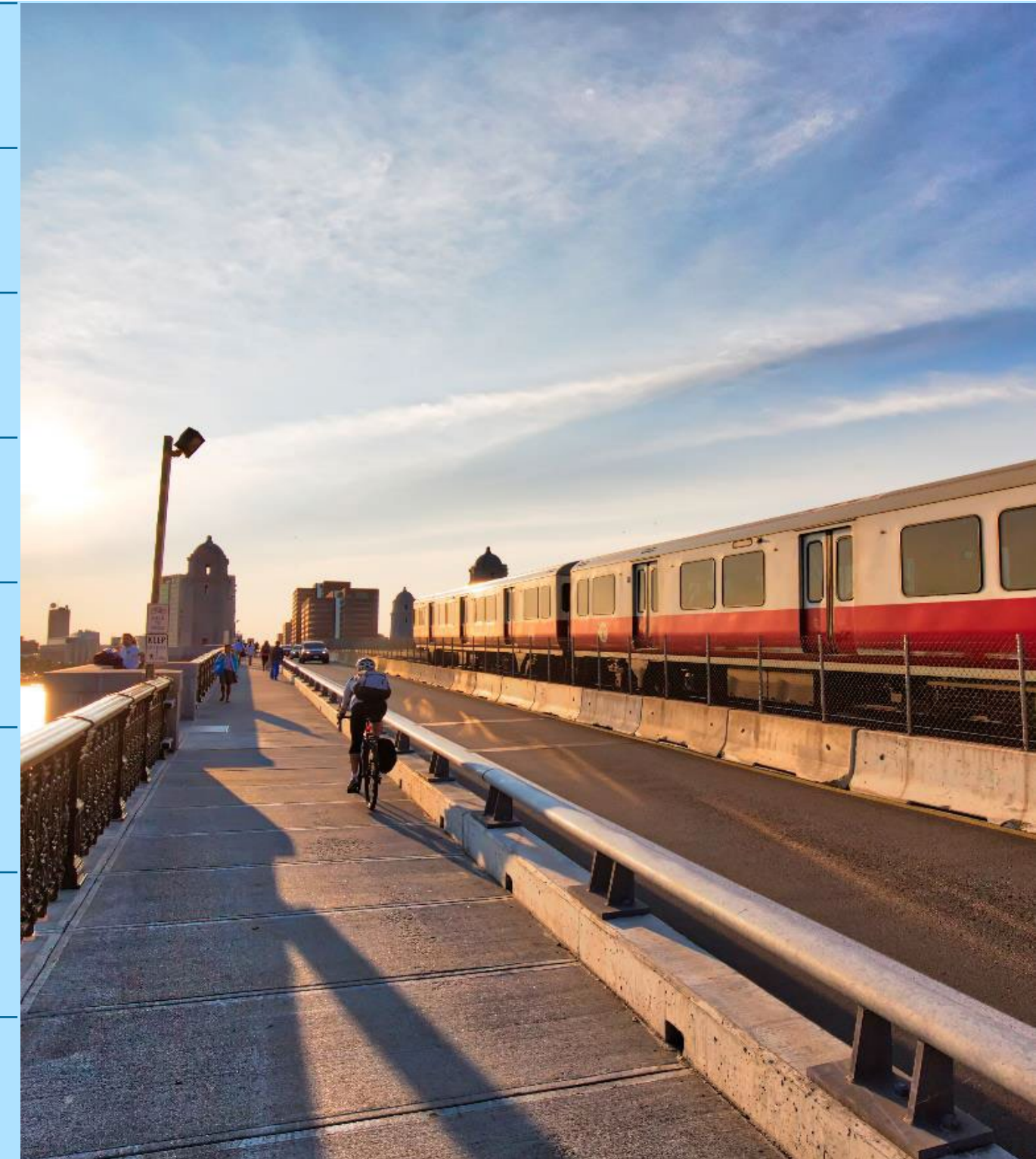
**Susan Harrington – Design-Build Project Manager**

**Marco Pereira – Design-Build Project Manager**

**Valerie Kilduff – Design-Build Project Manager**

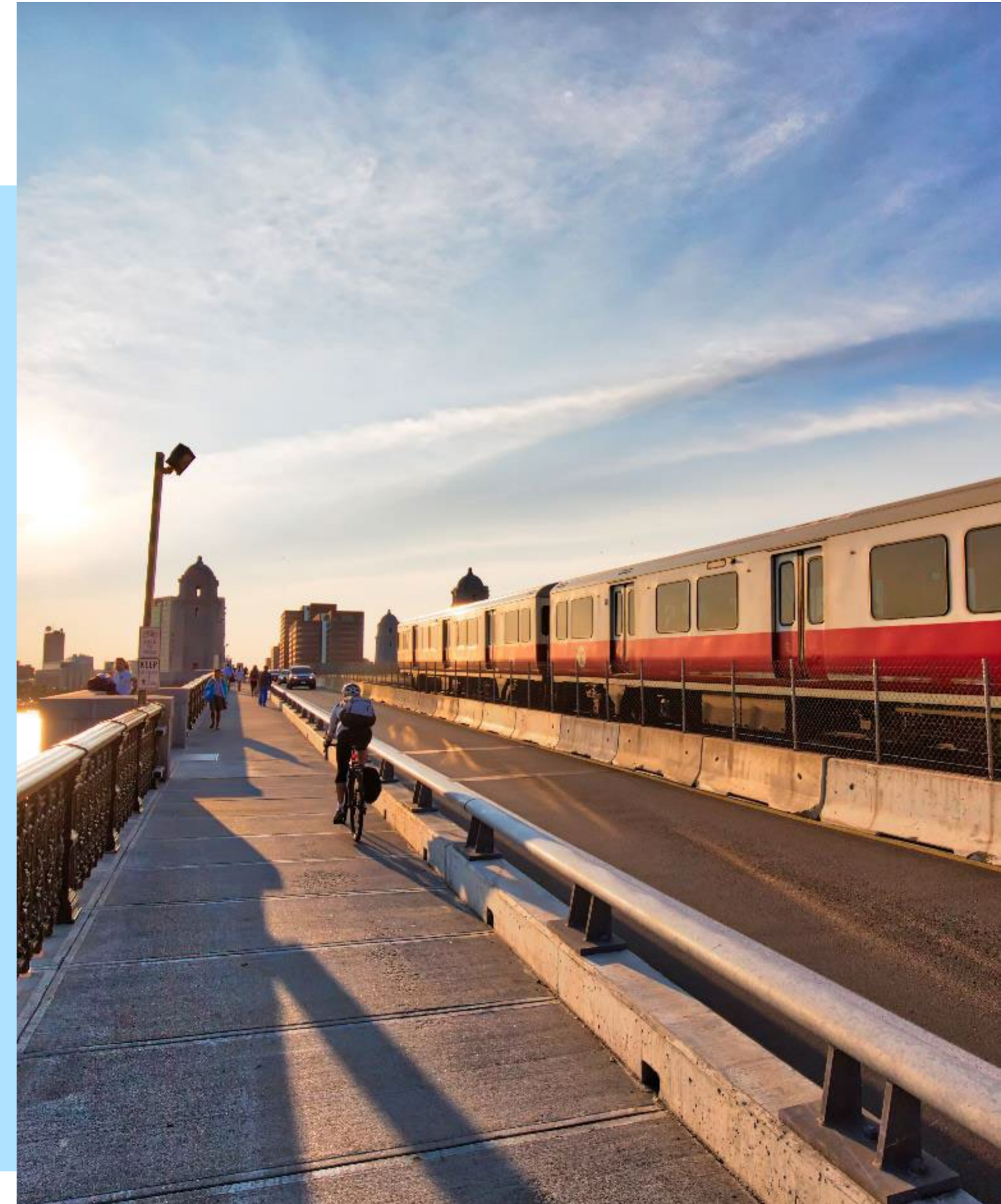
**Joe Stasio – Alt. Project Delivery Assistant District Construction Engineer**

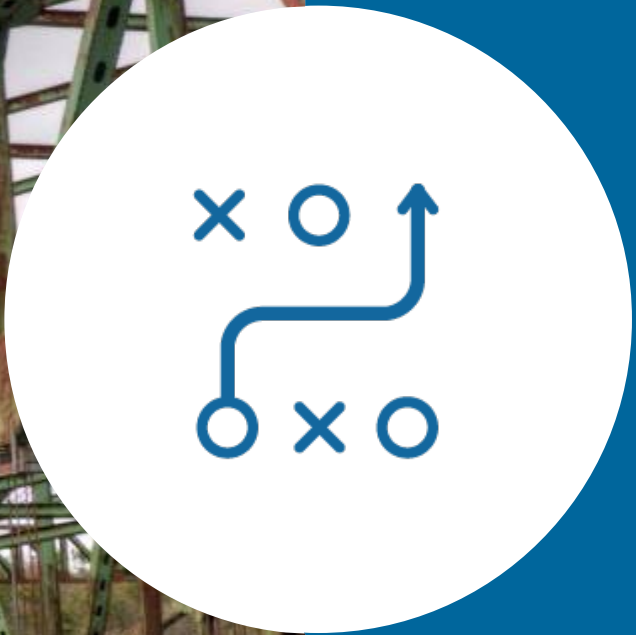
**Jean-Pierre Telemaque – Alt. Project Delivery Assistant District Construction Engineer**



# Agenda

1. Design-Build Project Development
2. Design-Build Procurement Process
3. Roles and Responsibilities
4. Post-Award Project Initiation
5. Contract Documents and Deliverables
6. Project Submittals and Reviews
7. Construction Procedures and Shop Drawings
8. Quality Assurance
9. Lessons Learned
10. Open Discussion



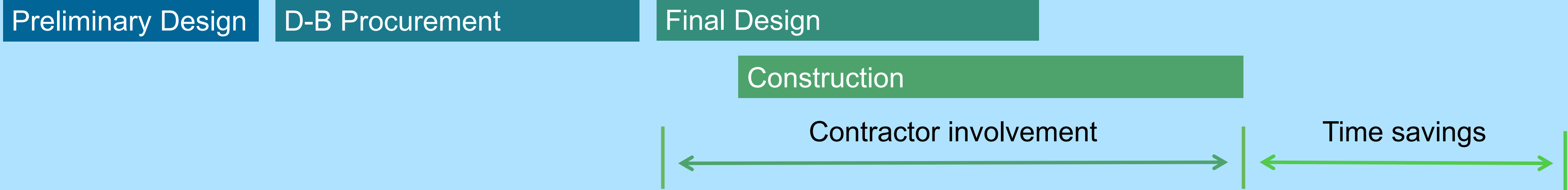


# Design-Build Project Development

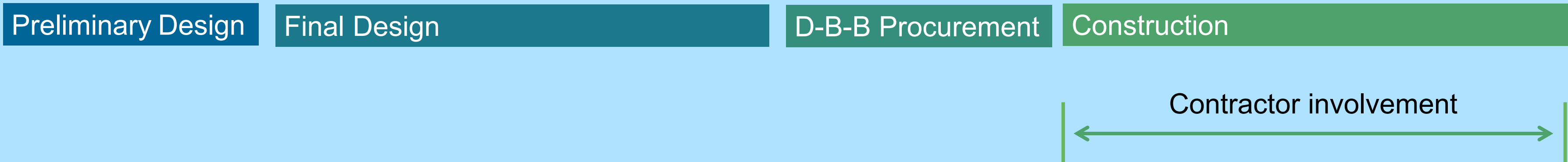
PROJECT SELECTION

# Project Delivery Sequence

## Design-Build (DB)



## Design Bid Build (D-B-B)



## PROJECT SELECTION

# What makes a project a good candidate?

- Scope provides opportunity for innovative design solutions such as minimizing traffic and environmental impacts
- Specialized scope warrants short-listing best qualified teams
- Project may benefit from earlier Contractor involvement
- Requires an expedited Project Delivery i.e. earlier construction start and completion



## PROJECT DEVELOPMENT

# Base Technical Concept (BTC)

- Project team meets to determine level of design development required
- The procurement documents are the Base Technical Concept (BTC)
  - Preliminary Design Plans
  - Request for Proposal Volumes I-III with draft special provisions, reports and reference documents
- The BTC may convey as much or as little design information as necessary to have a successful procurement/project
- Developed to represent MassDOT preferences and establish the minimum baseline requirements to be equaled or exceeded by a Design-Build Team.



## PROJECT DEVELOPMENT

# Request for Proposals

The Technical Provisions Include:

- Detailed scope of work
- Technical and design criteria (prescriptive and performance)
  - Prescriptive requirements (examples “Must Have”)
    - Number of travel lanes
    - Pavement design
    - Historic or architectural features
  - Performance requirements (examples)
    - Lighting system that meets code
    - Electronic toll system accuracy (99.9%)
    - 75-year design life
- Schedule requirements
- Traffic requirements

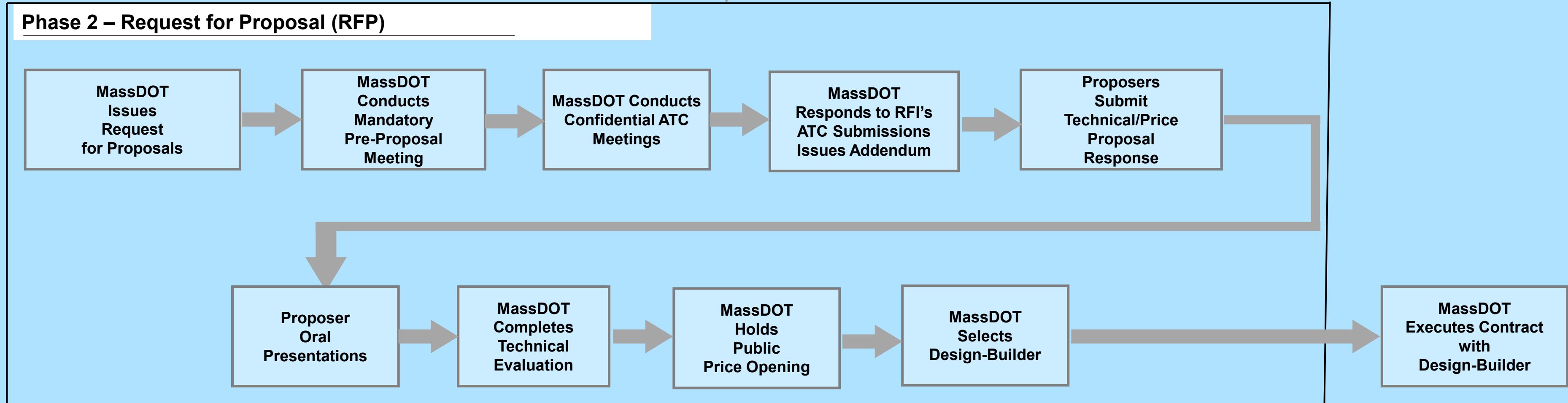
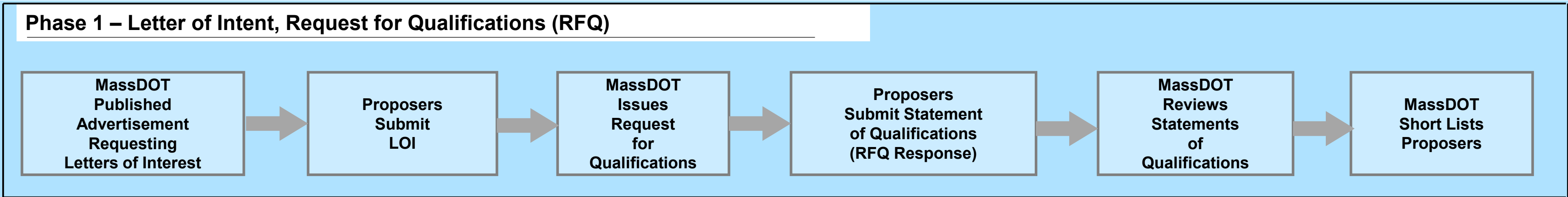




# Procurement Process

PROCUREMENT PROCESS

# Procurement Diagram



## PROCUREMENT PROCESS

# Selection Committee Process

- MassDOT Selection Committee is responsible for the evaluation and scoring of the Statement of Qualifications (SOQ) and Technical Proposals
- The Selection Committee is approved by the Chief's Office:
- Combination of District and HQ Staff
- Each participant involved in the selection process signs a Confidentiality Agreement
- Conversations are confidential, files are stored on a confidential SharePoint site with limited distribution



## PROCUREMENT PROCESS

# Alternative Technical Concepts (ATCs)

- Alternative Technical Concepts (ATCs) are requests by a Proposer to modify a contract requirement.
- Process utilized to allow the incorporation of innovation and flexibility into Technical Proposals.
- Approval is at MassDOT's sole discretion
- ATCs must provide an end product equal to or better than the BTC
- Typical timeline between Final ATC approval to Proposal Submission:
  - Small Projects – 4 Weeks
  - Complex Projects – 6 Weeks



## PROCUREMENT PROCESS

**ATC Process**

- Executive Summaries
- Confidential Meetings
  - Up to 3 FINAL ATCs may be submitted (permitted to propose more than 3 initial ATCs)
  - Selection Committee or designated PDC lead to ask questions
  - Follow-up questions if needed
  - No Commercial issues discussed evaluated on technical merit
  - Attendance –MassDOT, FHWA and PDC
- MassDOT provides written response within 3 business days after meeting (6 days for final submission)
  - Approved
  - Approved with conditions
  - Not Approved (with explanation provided)



PROCUREMENT PROCESS

# Example of Best-Value Selection


**Best Value = Lowest Overall Value Rating**

**HOPKINTON-WESTBOROUGH 607977-116673**



Federal-Aid No. NFP(IN)/HIP(BR)/NHP(IM)/HIP(IN)/GRT-495S(301)  
 Interchange Improvements, Interstate 495 (NB & SB)  
 at Interstate 90 (EB & WB)

PROJECT VALUE: \$340,000,000.00

HOPKINTON-WESTBOROUGH	<u>BHD-O&amp;G-AETNA</u> <u>I-495 I-90 JV</u>	<u>SKANSKA MCCOURT IV JV</u>	<u>THE MIDDLESEX CORP</u>	STEP
TECHNICAL SCORE	88.42	86.45	78.84	1 Pre-Entered by MassDOT
PRICE PROPOSAL	\$394,422,000.00	\$488,200,495.00	\$488,949,856.00	2 Transferred from Bid Express
OVERALL VALUE RATING = PRICE PROPOSAL / TECHNICAL SCORE	<b>4,460,778.105</b>	<b>5,647,200.636</b>	<b>6,201,799.290</b>	3 Calculated by MassDOT (step 2 / step 1)
				<b>Apparent Best Value</b>

PROCUREMENT PROCESS

# Example of Best-Value Selection

*Best Value is lowest price per quality score point*

Bridge Replacement (A-07-016=N-11-017) Whittier Bridge  
 Interstate 95 Improvement Project over the Merrimack River (ABP) (DESIGN/BUILD)

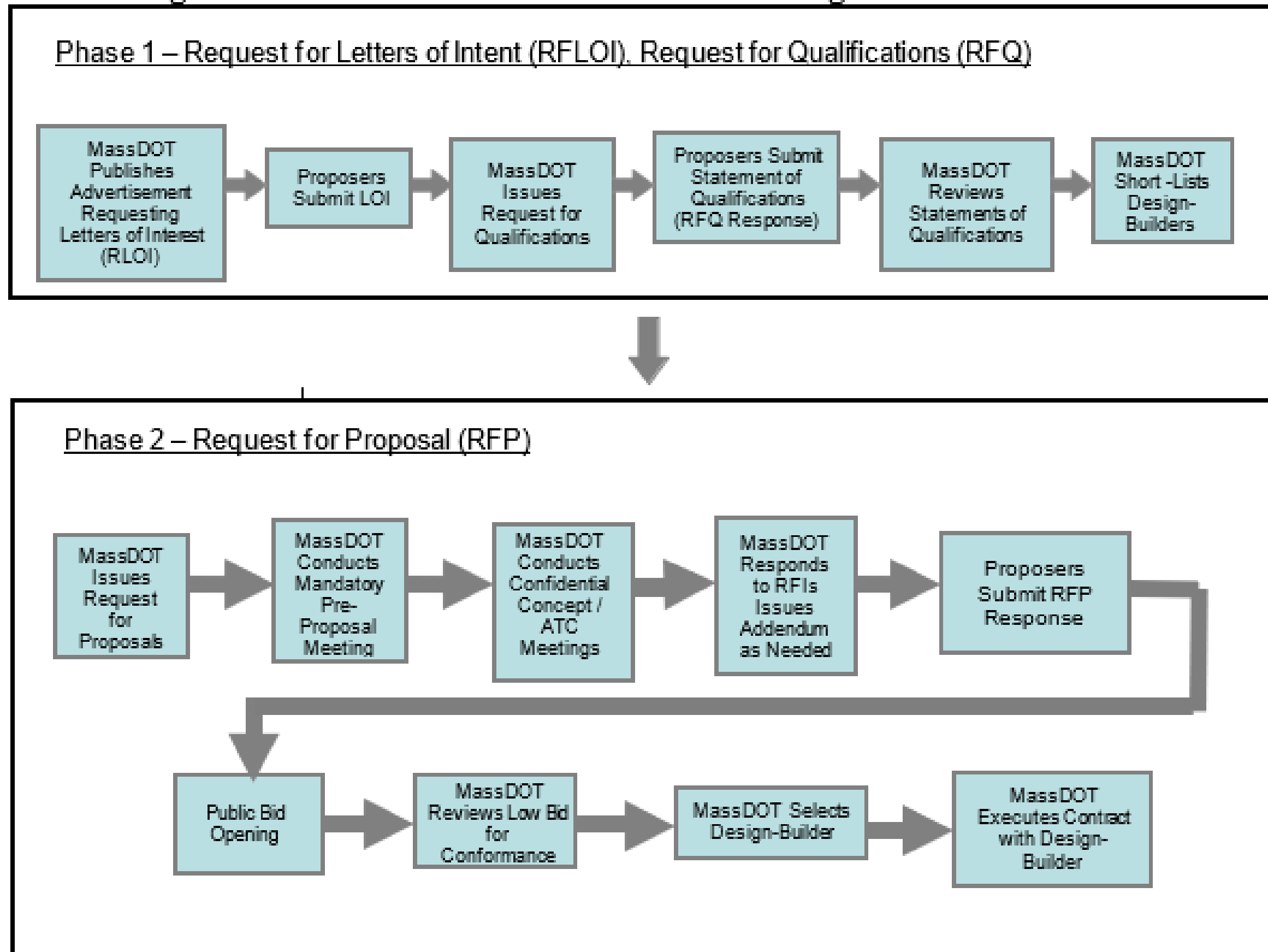


Whittier Bridge (A-07-016=N-11-017)	<u>Barletta Heavy/O&amp;G Joint Venture</u>	<u>Walsh-McCourt JV1</u>	<u>White - Kiewit Whittier (J.V.)</u>	STEP
TECHNICAL SCORE	786.75	904.18	778.12	1 Pre-Entered by MassDOT
SEALED PRICE PROPOSAL	\$262,100,100.00	\$292,155,280.00	\$345,985,970.00	2 Transferred from Bid-Express
OVERALL VALUE RATING = SEALED PRICE PROPOSAL / TECHNICAL SCORE	<b>333,142.80</b>	<b>323,116.28</b>	<b>444,643.46</b>	3 Calculated by MassDOT (step 2 / step 1)
		↑		Apparent Winning DB Entity

PROCUREMENT PROCESS

# Low Bid Design-Build (Pilot)

**Figure 1: Two-Phase Procurement Process Diagram**





## PROCUREMENT PROCESS

# Stipends and Debriefings

## Guidelines for Estimating Stipend Amounts

- Unsuccessful Proposers are provided a stipend to compensate for some of the cost of preparing their Proposal
- Grants MassDOT the ability to utilize any concepts proposed in unsuccessful Proposer's Technical Proposal
- Stipend amounts may vary by contract value and complexity
  - By policy MassDOT currently typically utilizes .002 or .2% of the office estimate (advertise cost)

## Debriefings

Phase 1 - *To request a debriefing, teams should email Murthy*

- Opportunity for proposers to view their SOQ score sheets
  - Learn about strengths and weakness of SOQ

Phase 2 - *After award (To request a debriefing, teams should email Murthy)*

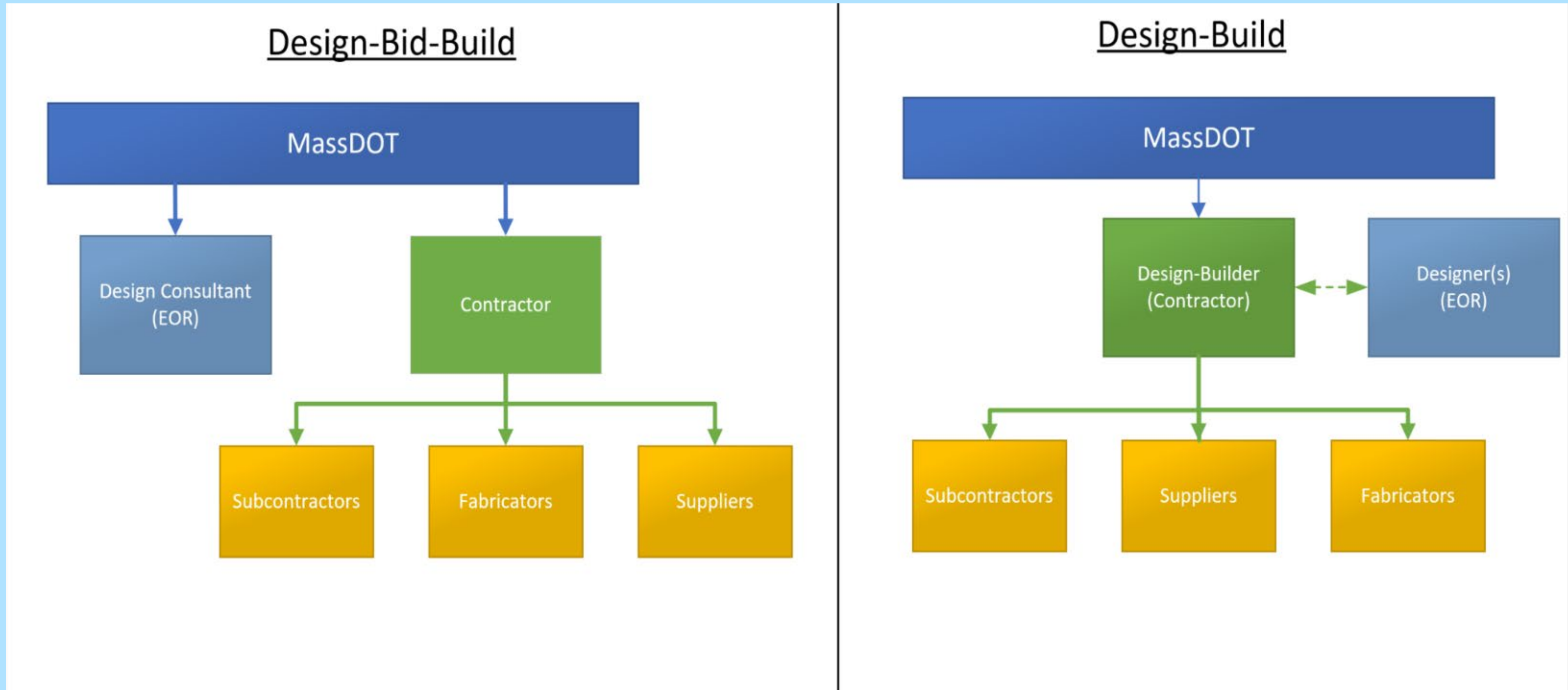
- Opportunity for shortlisted teams to view all team's technical scores
- Learn about main strengths and weaknesses of your proposal
- Opportunity to view other team's Technical Proposals



# Roles and Responsibilities

DESIGN-BUILD PROJECT EXECUTION

# DBB vs DB Structure



## DESIGN-BUILD PROJECT EXECUTION

# MassDOT Overview

The selected Design-Builder completes the design and constructs the project

Successful project execution relies on:

- Communication
- Expertise
- Teamwork

Projects are often accelerated as construction can commence prior to the completion of final design

Concurrent design and construction results in the Design-Build Project Manager and Resident Engineer having overlapping responsibilities:

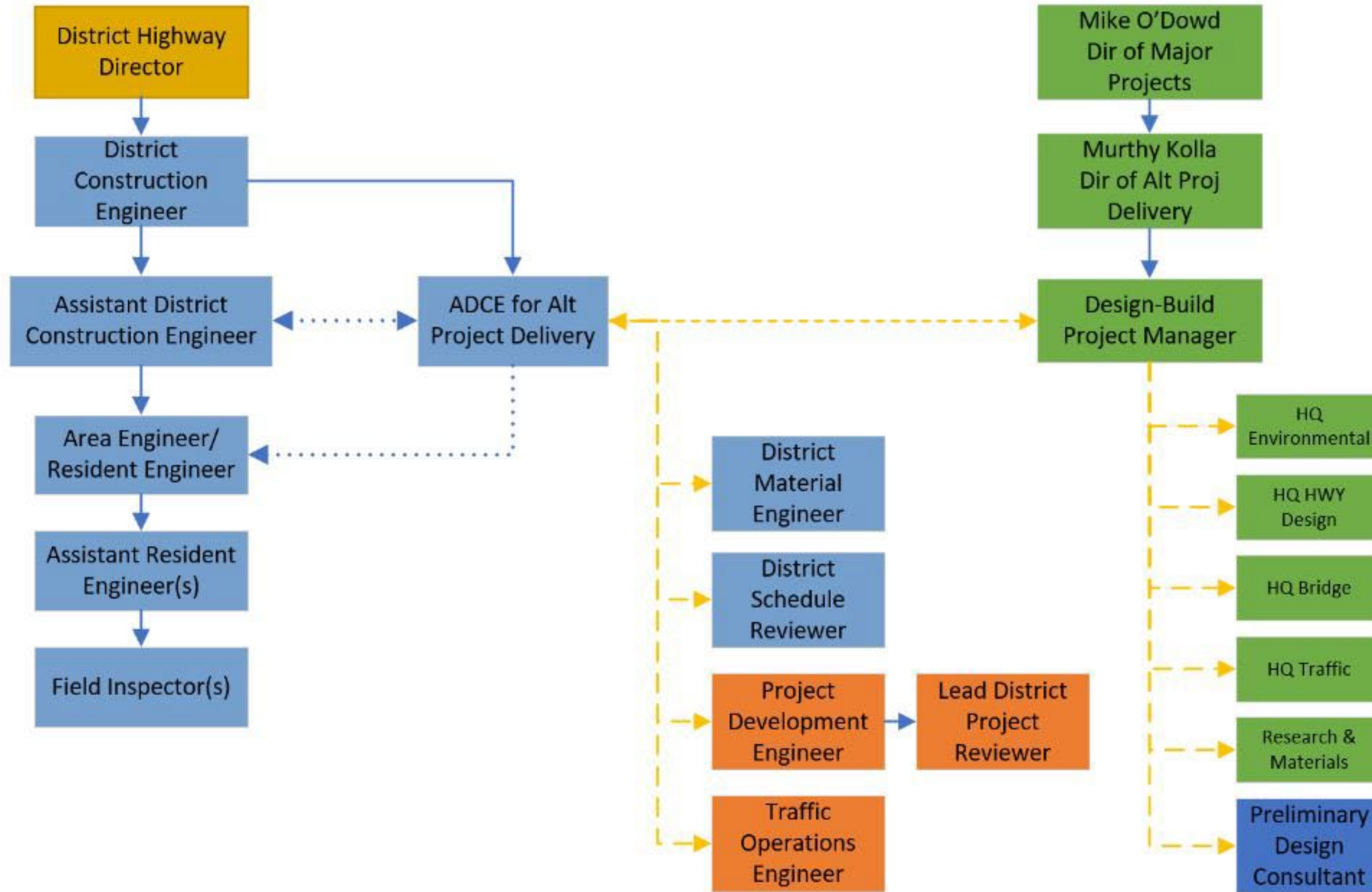
- Requests for Information
- Submittal Reviews
- Extra Work Order Reviews

DB PM and RE work together to contribute their expertise in resolving both design and construction issues

ROLES



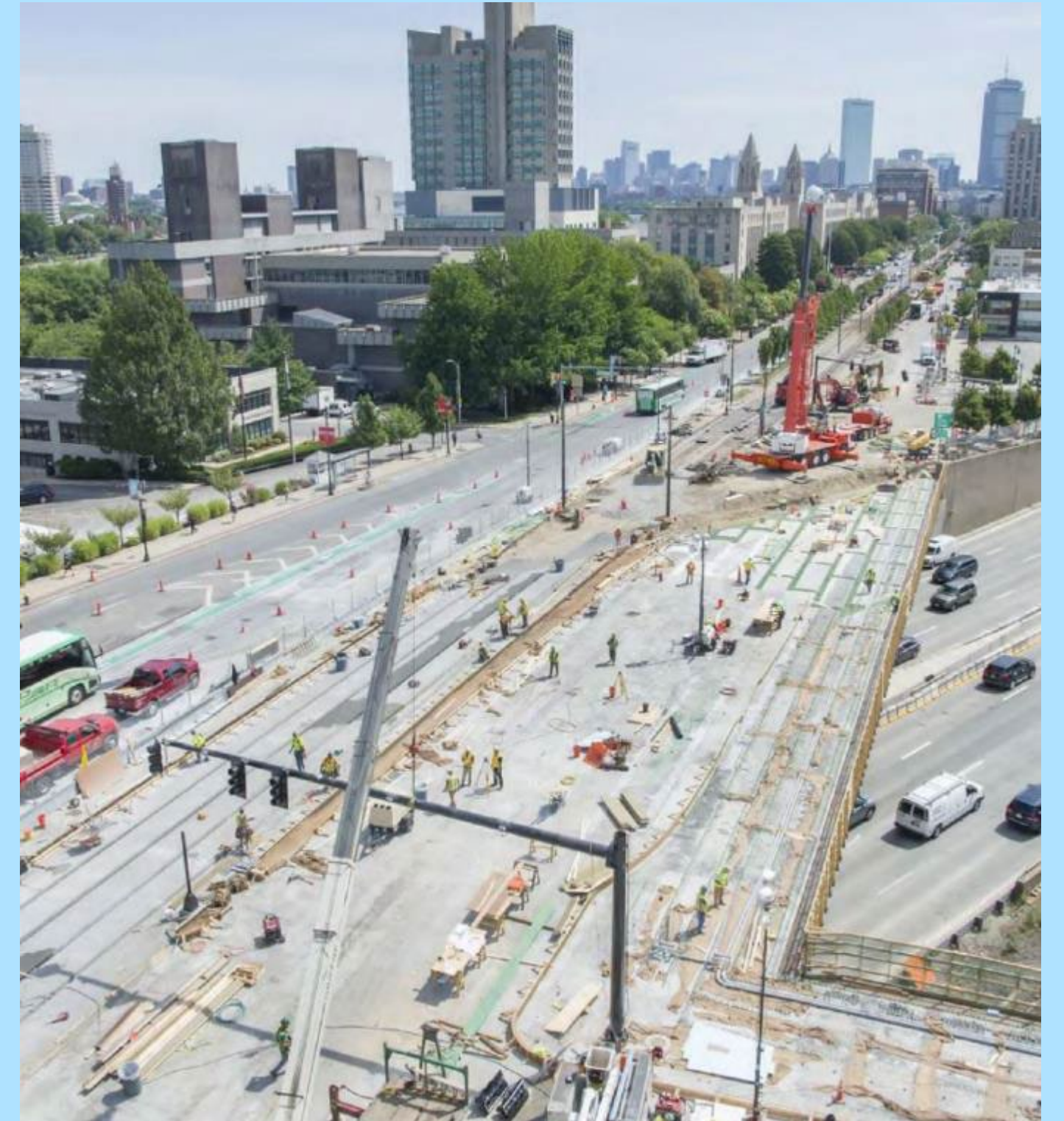
Typical Design-Build Project Organizational Chart



## ROLES AND RESPONSIBILITIES

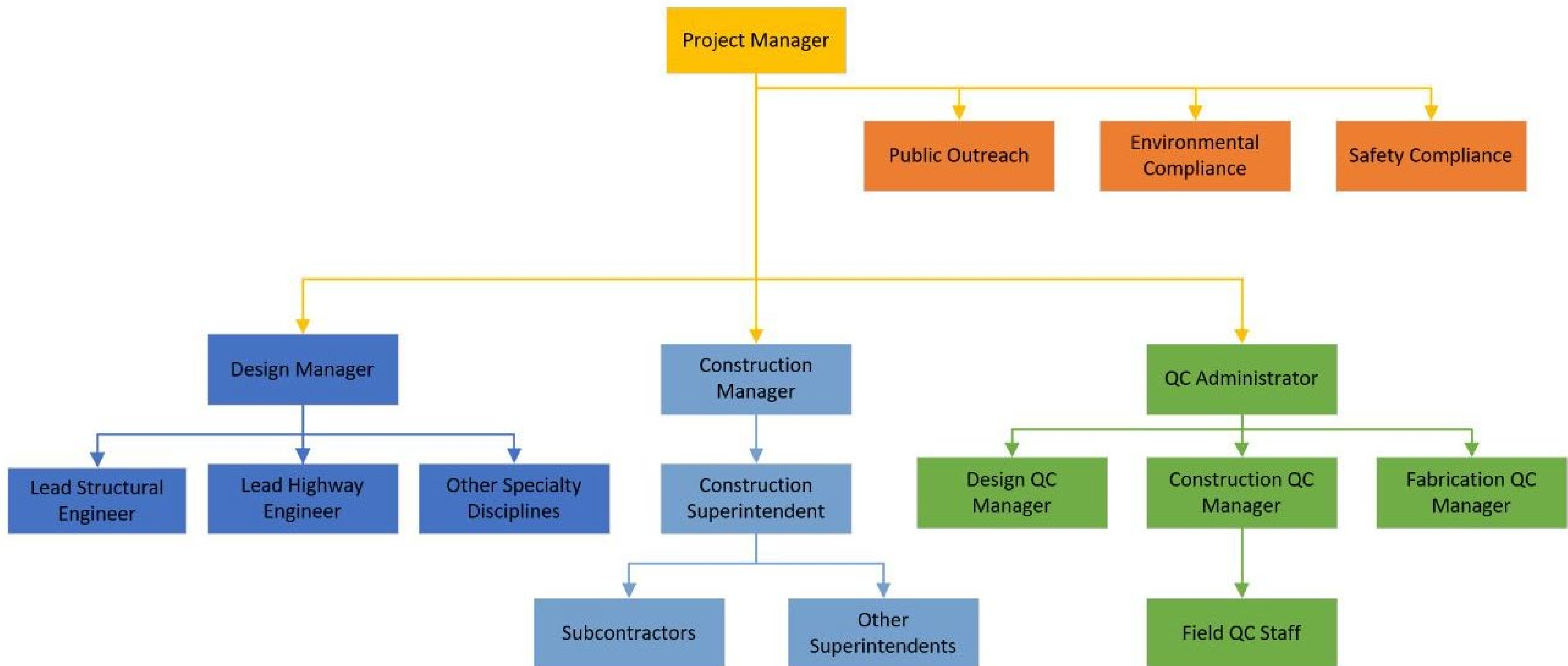
## Design-Builder's Project Manager

- Project Manager (PM) is designated as single-point of contact for the Project
- PM is responsible to coordinate both design and construction activities
- Design Manager, Construction Managers and Design-Builder's Quality Control Administrator reports to PM.
- Also coordinates Public Outreach, Environmental Compliance and Safety Compliance



ROLES AND RESPONSIBILITIES

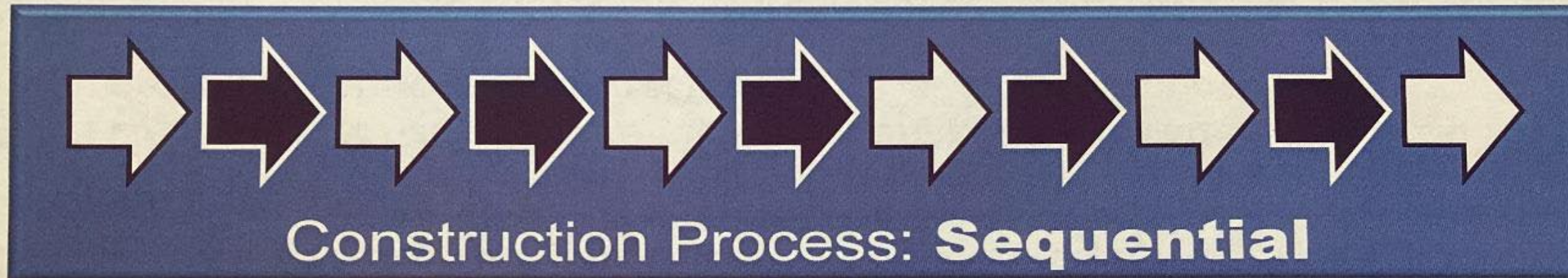
# Design-Builder's Typical Organizational Chart



ROLES AND RESPONSIBILITIES

# Post Award Roles & Key Interfaces

*Two Distinct Functions:*



**MUST MANAGE as an INTEGRATED PROCESS**



**DBIA**  
DESIGN-BUILD  
INSTITUTE OF AMERICA

**DESIGN-BUILD DONE RIGHT**

WWW.DBIA.ORG

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# Post-Award Project Initiation

POST-AWARD PROJECT INITIATION

# Early Action Items

Internal Start-Up Meeting

Design-Build Kick-Off Meeting

R&M Early Engagement

Pre-Construction Meeting

Regular Progress Meetings



## POST-AWARD PROJECT INITIATION

# Internal Start-Up Meeting

- Meeting at District and/or virtual option
- Discuss Reviewers Roles and Responsibilities
- Identify and Review High Risk Items
- Discuss Design-Build Mindset
- Review QA Expectations

## Meeting Members

- Design-Build PM
- MassDOT District Staff
  - Traffic
  - Projects
  - Construction
- MassDOT Boston Staff
  - Construction
  - Reviewers
  - Metals Control
- MassDOT Research and Materials
- Federal Highway Administration
- Preliminary Design Consultant
- Owner's Rep (when applicable)

## POST-AWARD PROJECT INITIATION

# Design-Build Kick-Off Meeting

- DB PM initiates Project Kick-off Meeting after award
- Informal Meet and Greet or Partnering Sessions
- Design-Builder provides overview of their Technical Proposal
- Should include a review of any ATCs incorporated into Proposal
- Discuss potential Risks and Mitigation Strategies
- Construction & Design Look-Ahead

## Meeting Members

- Design-Build PM
- Design-Builder Key Members
- Preliminary Design Consultant
- MassDOT Technical Reviewers
- MassDOT Construction
- Federal Highway
- Owner's Rep (when applicable)

## POST-AWARD PROJECT INITIATION

# R&M Early Engagement

Resident Engineer should coordinate to schedule a kick-off meeting with all Material and Metals personnel that will be involved with the project

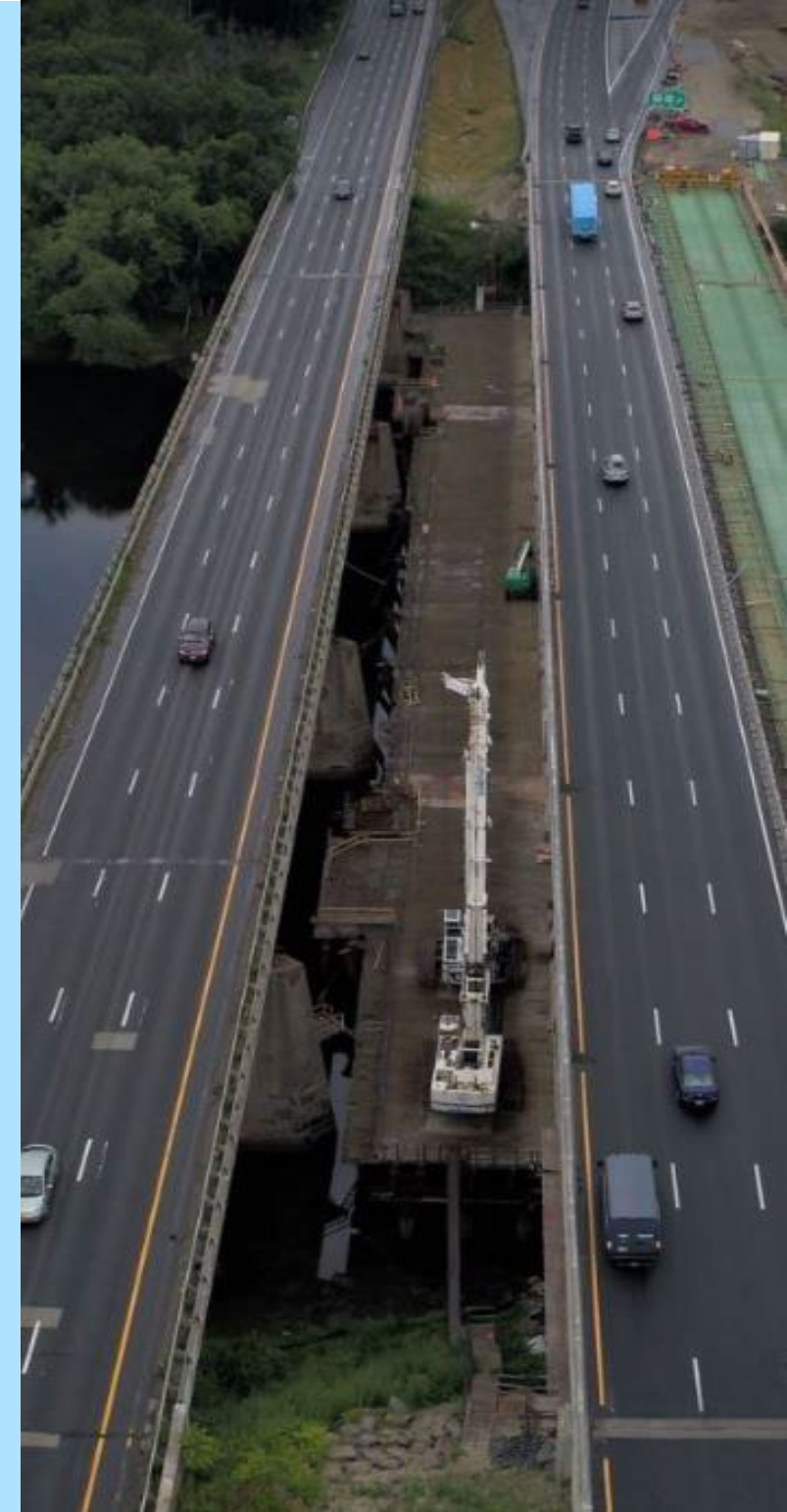
Introduce POCs from Metals, R&M and District Materials

Discuss document control roles and responsibilities

Identify key ERC packages and expected schedules

Discuss roles and responsibilities in populating and maintaining RMS360

Ensure all parties understand their responsibilities relative to quality assurance



## POST-AWARD PROJECT INITIATION

# Pre-Construction Meeting

Scheduled and facilitated by the District, soon after NTP. Should follow the format of typical Pre-Construction Meetings, with the following additions:

DB PM is introduced at Point of Contact for project design, submission reviews, and to the stakeholders

DB PM should speak on communication protocols, Quality Management Plan, review process goals

Resident Engineer introduced as Point of Contact for Construction Issues

District Materials Engineer, R&M and ODCR invited to speak

Design-Builder should present a brief overview of their Technical Proposal

Key Stakeholders such as City/Town representatives, Utility Companies, Emergency Services are invited



## POST-AWARD PROJECT INITIATION

# Additional Project Meetings

## Quality and Value

- Invest time and effort into planning and executing project meetings

Limit attendees to key stakeholders and decision makers

Agenda should be developed for all meetings and shared ahead of time

Design-Builder is responsible for taking and distributing meeting minutes

- Accurate and timely distribution is critical

Standing Bi-Weekly meetings should be utilized for status updates

- Design-Builder should present design and construction look ahead schedules
- Should discuss status of Submittals, RFI, NCR, Materials, etc.
- Technical Breakout sessions should be utilized in lieu of larger meetings whenever appropriate to reduce the time investment of all staff





# Contract Documents and Deliverables



CONTRACT DOCUMENTS AND DELIVERABLES

# Overview

Project Management

- Project Management Plan
- Quality Management Plan
- Environmental Permitting Matrix
- Public Participation Plan
- Project Schedule
- Submittal Review and Distribution Matrix

Formal Submissions from Design-Builder

- Design Submittals
- Construction Submittals
- Early Release for Construction and Fabrication Submittals

CONTRACT DOCUMENTS AND DELIVERABLES

# Project Management Plan

Objective

Scope of Work

Organization (Key Personnel from Design-Builder/MassDOT)

Administrative Management

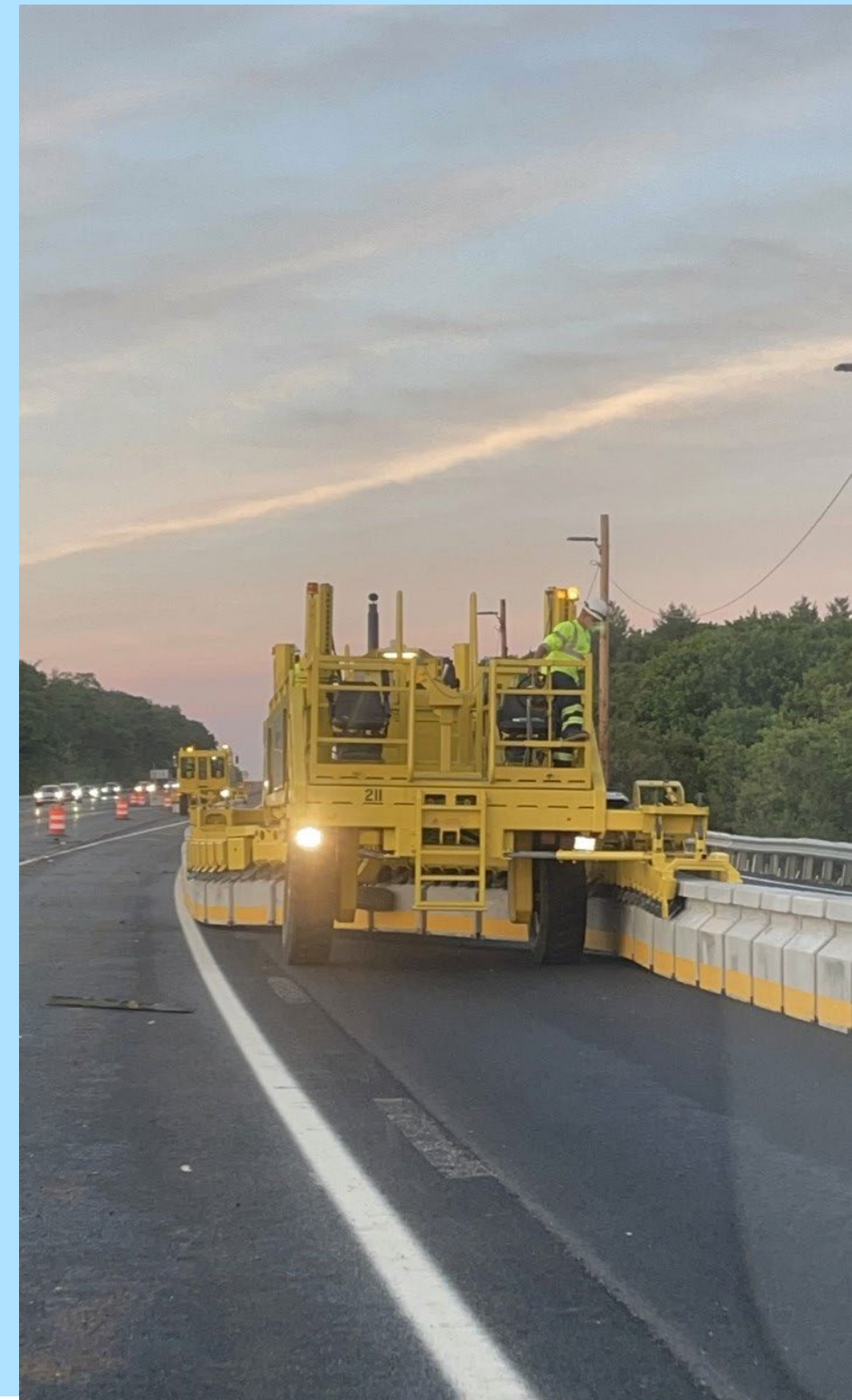
Design Management

Construction Management

Procedures to Manage and Control the Work

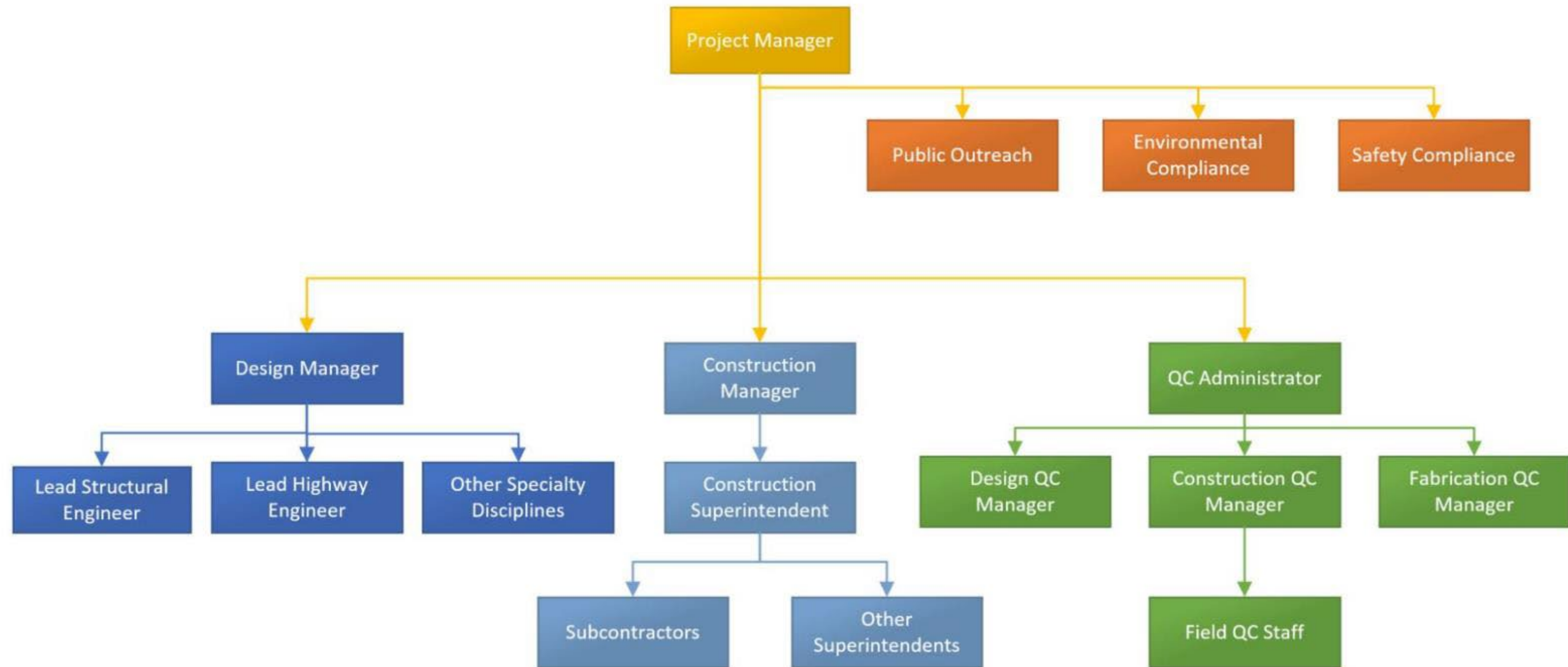
Cross Reference against Key Personnel in RFP & SOQ

Dedicated Personnel added to RFP (ex. Safety, QC Fab Manager, etc)



CONTRACT DOCUMENTS AND DELIVERABLES

# Project Management Plan



# CONTRACT DOCUMENTS AND DELIVERABLES

## Quality Management Plan

### Introduction

### Quality Control Organization

- Project Team
- Management Personnel
- Quality Control Team

### Document Management Procedures

- Electronic Record Sys/Std. naming Convention
- Transmittals/Submittals
- NCR Reporting/Resolution/Closeout

### Design Quality Control Procedures

- Design Production Team
- Design QC Team

### Construction Quality Control Procedures

- Construction Production Team
- Construction QC Team



# CONTRACT DOCUMENTS AND DELIVERABLES

## Environmental Permitting Matrix

Massachusetts Department of Transportation I-495 Bridge Replacement, Haverhill MA Summary of Permit Conditions US Army Corp of Engineers MA General Permit; MA Department of Environmental Protection 401 Water Quality Certification, National Marine Fisheries Section 7 Consultation						
Action Item	Action Due Date	Permit Citation	Responsible Party	Submittal Required	Status of Action (to be updated throughout construction)	Action Completed (Date and
The contractor will be required to provide the dredge material disposal location to the MassDEP prior to disposal. The estimated volume to be stored, prior to transport to the disposal location, shall be reported to MassDEP.	Prior to dredging	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 25	DBE	Yes		
No later than 21-days prior to commencement of dredging activity, a Dredged Material dewatering plan shall be submitted to MassDEP and review and approval. At a minimum, the dewatering plan shall include but not be limited to the type of containment, method of dewatering (i.e. mechanical or by gravity), method of collecting the dewatered effluent and method of disposal. Measures shall be taken to assure the adjacent wetland resource areas are adequately protected during dewatering.	21 days prior to dredging	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 26	DBE	Yes		
No activity authorized by the 401 WQC may begin prior to expiration of the 21-day appeal period or until a final decision is issued by MassDEP if an appeal is filed	Prior to construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 34	DBE			
A stockpile of erosion control materials shall be kept on-site at all times for emergency and routine replacement. The materials may include but are not limited to silt fence, hay bales, stone riprap, filter dikes, compost filter tubes or any other devices planned for use during construction.	Throughout construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 15	DBE			
It is the responsibility of the contractor to assure that all wetland resource areas are adequately protected with erosion and sedimentation controls. Additional erosion and sedimentation control barriers beyond that which is shown on the plan may be required.	Throughout construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 16	DBE			
Best Management Practices (BMPs) shall be implemented during transportation of the dredged material to the licensed receiving facility. At a minimum, when transported upon public roadways, all dredged material shall have no free liquid as determined by the Paint Filter Test or other suitably analogous methodology acceptable to MassDEP, and a tarpaulin or other means shall be used to cover the dredged material during transport.	Throughout construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 28	DBE			
No Special Condition set forth herein shall be constructed or operate to prohibit MassDEP from taking enforcement against the DOT or its contractors for any failure to comply with the terms and requirements of this 401 Water Quality Certification.	Throughout construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 33	DBE			
Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable general conditions and activity-specific conditions to a written verification.	During and after construction.	USACE GP, General Condition 32	MassDOT			
Within 180 days of project completion, the applicant shall forward a set of project plans and relevant technical documentation to the Risk Analysis Branch, Mitigation Division, Federal Emergency Management Agency (FEMA), Region 1, 99 High Street, Boston Massachusetts, 02110. This submission shall be made in a digital format, and provide a level of content detail, acceptable to FEMA Region 1 personnel.	Within 180 of project completion	USACE File # NAE-2013-01690, Special Condition 4	DBE/MassDOT	Yes		
Future maintenance dredging is not authorized under the 401 WQC	After construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 30	MassDOT			
Upon completion of construction and once areas have been stabilized all erosion control barriers shall be removed	After construction	DEP WQC Transmittal No: X268500(Fill) & X268505(Dredge), Special Condition 32	DBE			
<b>DISCLAIMER:</b> This document is not to be considered complete description of all permit requirements. Please refer to the permits /applications included with this document.						
<b>Key:</b>			<b>Responsible Parties</b>		National Marine Fisheries Service =	NMFS
(orange) = Prior to construction			Massachusetts Department of Transportation	MassDOT	Department of Environmental Protection =	MassDEP
(yellow) = During project construction			Design/ Build Entity =	DBE	U.S. Army Corps of Engineers =	USACE
(green) = After completion of construction			Not Applicable =	N/A		

## POST-AWARD PROJECT INITIATION

# Public Participation Plan

## Comprehensive Plan of public participation on this specific project

- Describes the division of labor between MassDOT and the Design-Builder
- Lists the activities, meetings, written and graphic materials that will be prepared as well as traditional, social and mobile media that will be used disseminate information
- Lays out a general proposed schedule for these activities

## Includes plans for updating the public on the status of the project

- Coordinating other briefings (for elected and municipal officials, for example);
- Providing strategic planning, coordination and staffing for public meetings



## ROLES AND RESPONSIBILITIES

## Project Schedule

- Project Schedules include both Construction and Design activities
- Cost-Resource Loaded Schedule
- Progress payments made based on completion of schedule activities
- Complex schedules with more interim milestones
- Often include Incentive/Disincentive clauses
  - Important to avoid owner directed changes that impact schedule whenever possible.
  - Allow Design-Builder flexibility to mitigate schedule risks





# Project Submittals and Reviews



## PROJECT SUBMITTALS AND REVIEWS

# Design-Build Submittal and Review Process

## Design-Builder submits to MassDOT for review

- Formal Design Submittals (75% Highway, 100% Highway, and First and Second Structural)
- Early Release Submittals
- Construction Submittals
- Quality Control Plans

## MassDOT must respond within contractual timeframe – Typically 30 Days

- Increased need for collaboration throughout review

## Keys to a successful review

- Productive Over-the-Shoulder Reviews
- Coordination between reviewers on outcomes

## Submittal Distribution Matrix

- Project specific spreadsheet that lists all submittal types and individuals responsible for reviewing
- Created by the DB-PM at project initiation



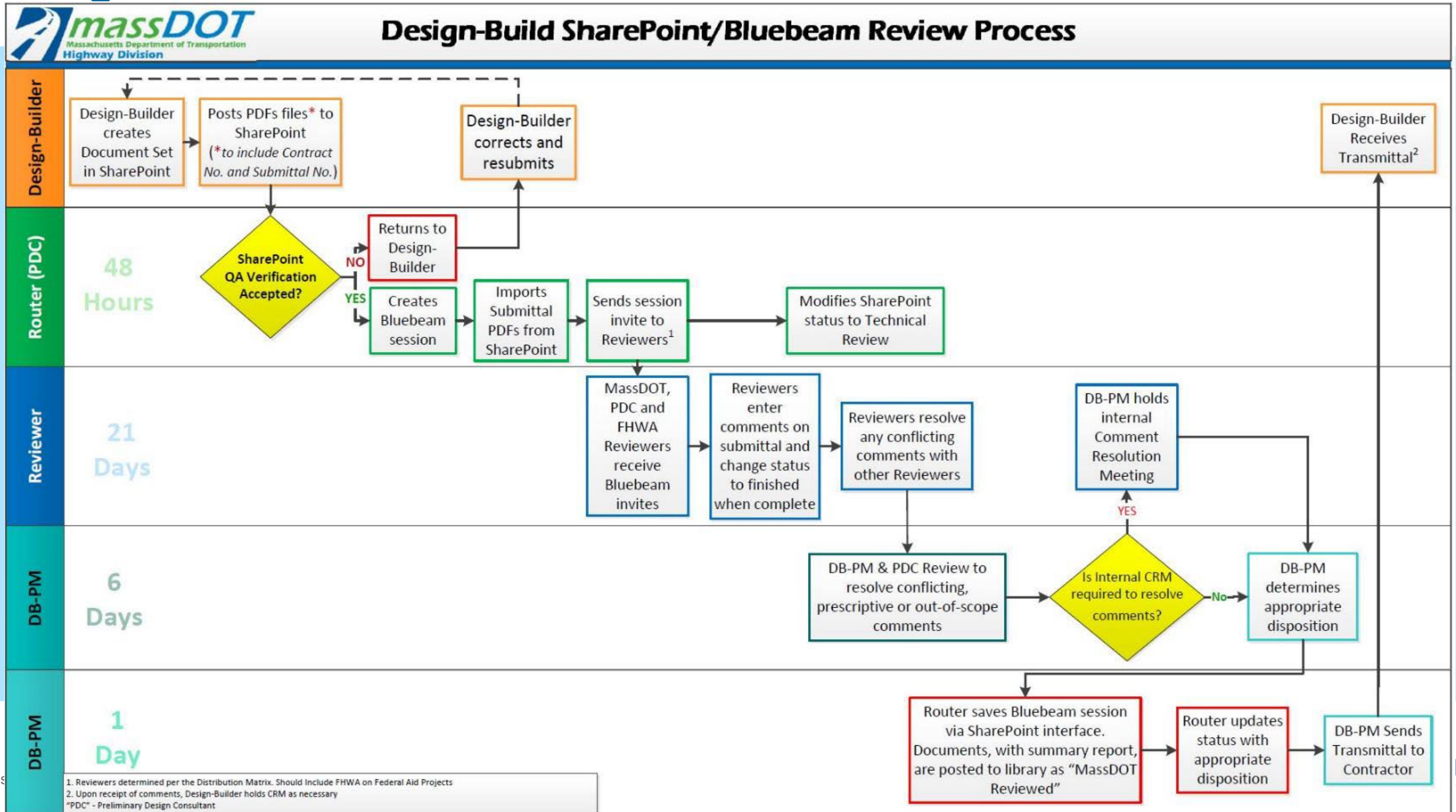
# PROJECT SUBMITTALS AND REVIEWS

## Submittal Distribution Matrix

Document Type	MassDOT Project			FHWA			MassDOT District 5 Design Reviewers						MassDOT District 5 Construction					
	Consultant (TransSystems) Paul Yu, Mike Reiger	Owners Representative rlittlefield@chappellengineering.com	Project Manager valerie.kiduff@dot.state.ma.us, Theodore.Boyle@dot.state.ma.us	QC Engineer/Field Operations Joshua.Grzegorzewski@dot.gov	environmental protection specialist cassandra.ostrander@dot.gov	Structures Engineer Michael.Arpino@dot.gov	Major Projects Engineer ken.coelho@dot.gov; fhwa-ma-eng@dot.gov	District Design/Build and Major Projects Engineer Alex.Duggan@dot.state.ma.us	Projects Pamela.Haznar@dot.state.ma.us(FIO), Richard.Bilski@dot.state.ma.us (FIO)	Traffic Kenneth.Charlton@dot.state.ma.us(FIO), David.Soaress@dot.state.ma.us(FIO),Rebello, Thomas.Rebello@dot.state.ma.us	Bridge david.mccombs@dot.state.ma.us, Edmund.H.Newton@dot.state.ma.us, Shane.Souza@dot.state.ma.us(FIO)	D.U.C.E. Richard.Bilski@dot.state.ma.us, Christopher.Betourney@dot.state.ma.us, Robert.Wheeler@dot.state.ma.us (FIO)	Environmental Andrea.Coates@dot.state.ma.us, Robert.Wheeler@dot.state.ma.us (FIO)	Construction Engineer Gerald.Bernard@dot.state.ma.us (FIO)	Asst Construction Engineer Michael.J.McGrath@dot.state.ma.us	District Area Construction Engineer Marc.Cardinal@dot.state.ma.us	Resident Engineer/Field Office Emanuel.F.Aguilar@dot.state.ma.us, Patrick.Arsenault@dot.state.ma.us,	Materials Jason.Lema@dot.state.ma.us
<b>PROJECT MANAGEMENT</b>																		
Project Management Plan (PMP)	BB	BB	BB			BB							E(I)	BB	BB	BB		
Project Schedules (Baseline Schedules, 3 Wk Look-Ahead, Cash Flow Projections)			E(I)			E(I)	E(I)	E(I)					E(I)	E	E	E	E(I)	
Quality Management Plan (QMP)	BB	BB	BB	BB(I)		BB	BB			BB			E(I)	BB	BB	BB	BB	BB
Contingency Plan	BB		E(I)			BB			BB	BB(I)			E(I)	BB	BB	BB		
Public Outreach Plan, Graphics & Project Website		BB(I)	BB			BB	BB(I)	BB(I)	BB(I)	BB(I)	BB(I)	BB(I)	E(I)	BB	BB	BB		
<b>ENVIRONMENTAL</b>																		
Environmental Permits/ Amendment Submittals	BB		E(I)		BB	BB						BB	E(I)	BB	BB	BB		
Hazardous Materials Management Plan			E(I)		BB	BB(I)						BB(I)	E(I)	BB	BB	BB		
Soil & Groundwater Management (SGMP) Plan			E(I)		BB	BB(I)						BB	E(I)	BB	BB	BB		
Health & Safety (HASP) Plan			E(I)		BB	BB(I)						BB(I)	E(I)	BB	BB	BB		
SWPPP Plan	BB		E(I)		BB	BB(I)						BB	E(I)	BB	BB	BB		
Lead Containment Plan			E(I)		BB	BB(I)						BB(I)	E(I)	BB	BB	BB		
Dust Control Plan			E(I)		BB	BB(I)						BB	E(I)	BB	BB	BB		

PROJECT SUBMITTALS AND REVIEWS

# Design-Build Reviews – Best Practices



## PROJECT SUBMITTALS AND REVIEWS

# Design-Build Reviews – Best Practices

## Avoiding Prescriptive Requirements or Design Direction

- Transfers risk and accountability back to MassDOT
- Restricts opportunities for creative solutions
- Reduces the Design-Builder's ability to control cost

## Greater the Risk – Greater the Oversight

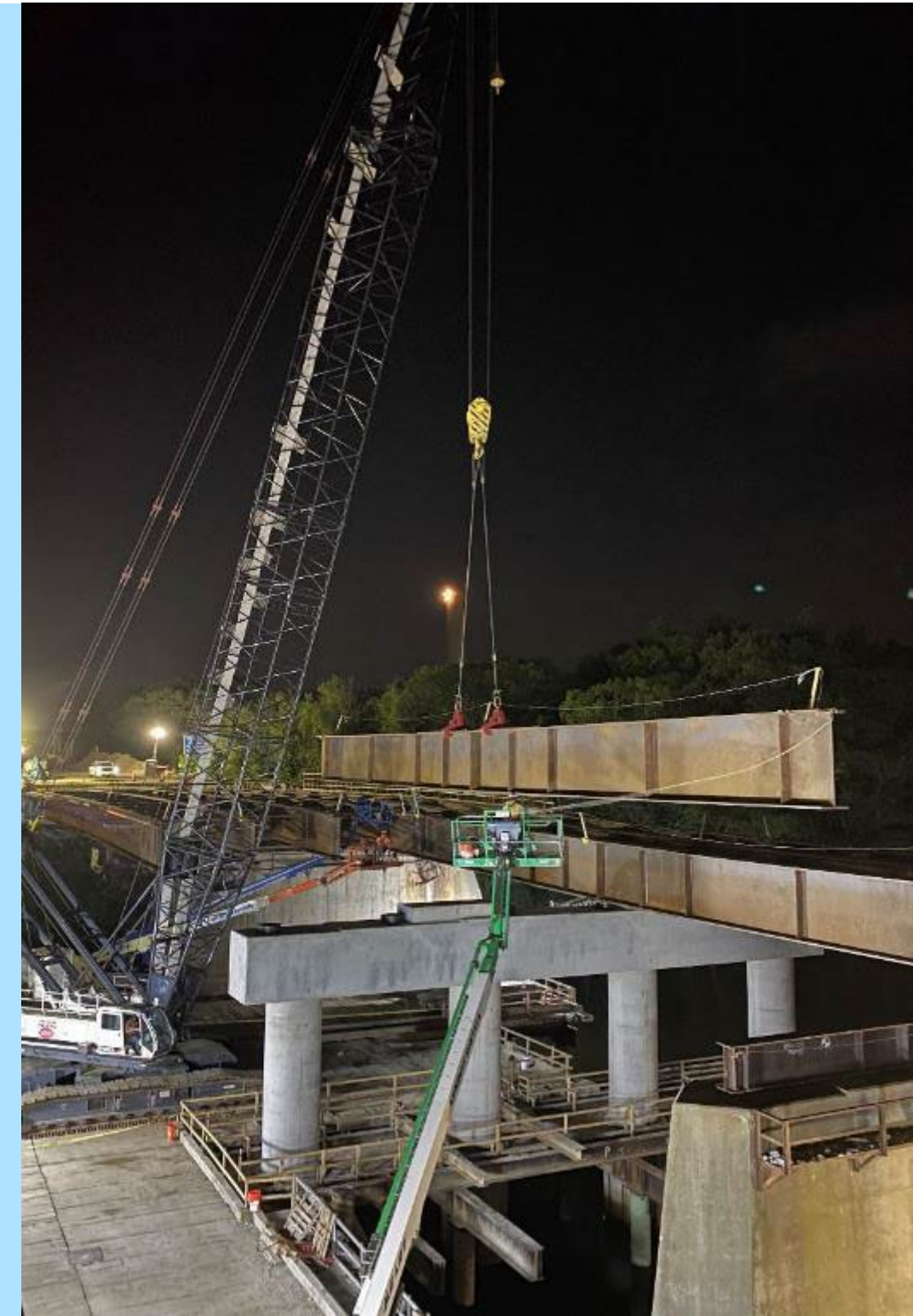
## Technical Reviewers role is to evaluate submissions based on RFP and Technical Proposal

- Is Design-Builder's proposed solution "Equal or Better"

## Avoid Preferential of Prescriptive comments outside RFP criteria

- These comments need to be resolved before returning submission to Design-Builder
- Commercial and Schedule impacts need to be assessed
- Reviewers must allow for flexibility within the design parameters

## Is the Design-Builder's Solution Technically Feasible?



PROJECT SUBMITTALS AND REVIEWS

# Over-The-Shoulder (OTS) Meetings

**What?**

Provide guidance during final Design Development

**Why?**

Assist in expediting submittal review process

**Who?**

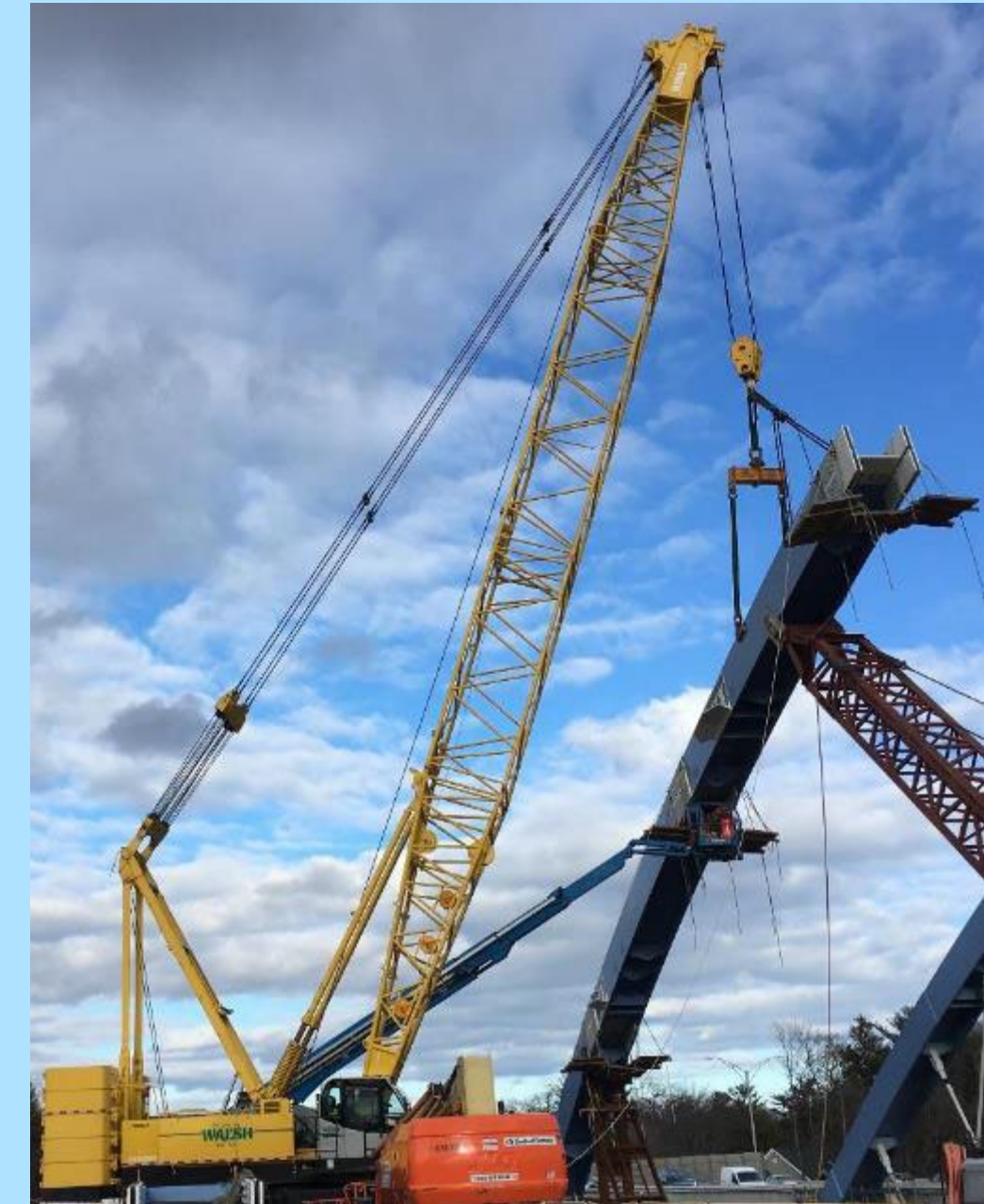
Design-Builder, MassDOT Reviewers & PDC

**When?**

Required Prior to Formal Submission

**How?**

In Person (recommended) or virtual roundtable discussion



## PROJECT SUBMITTALS AND REVIEWS

# OTS Meeting

Advance Material distribution at least 3 days prior. Include Agenda with the meeting's purpose including specific items to be discussed.

Timely and accurate meeting minutes are critical

Meeting agenda and minutes should be included as part of formal submissions

- This allows reviewers that were unable to attend to make themselves aware of the issues discussed

Best Practice – An effective tool is to track comments and provide responses on how the issue was/will be addressed



## PROJECT SUBMITTALS AND REVIEWS

# Early Release Packages

Develop the design of specific elements of the project to a level where Fabrication or Construction can progress prior to the final design.

Design-Builder to include cover letter/description of items included, and not included in ERC packages

The DB contract details the processes for design, review, and approval of Early Start of Construction packages.

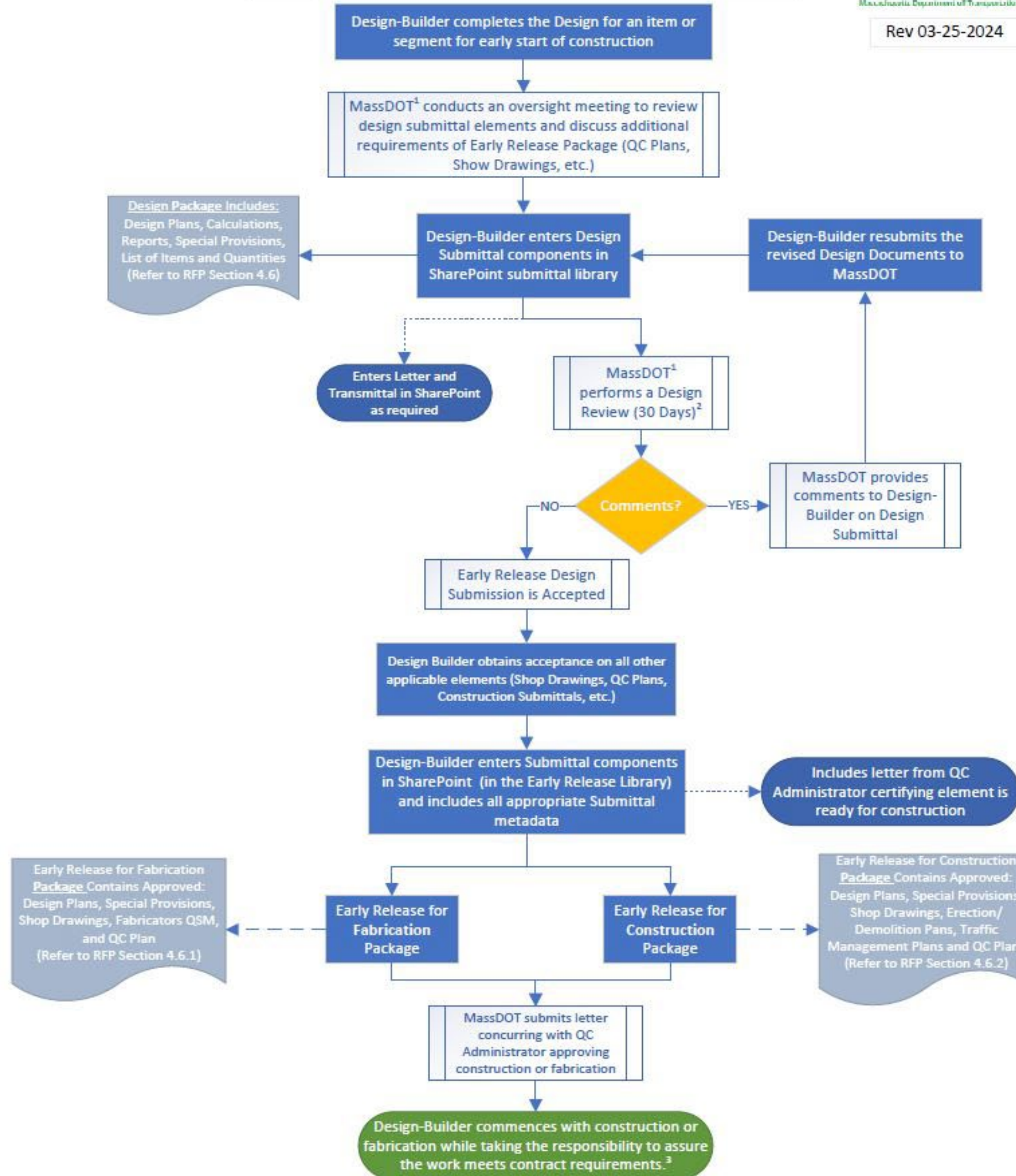
Upon Acceptance of the Early Release Package, the Design-Builder may proceed with Fabrication, Material Procurement of Construction

Critical in overall project schedule and success

Any RFI, NCR, DR or Material Failures are to be incorporated into subsequent Design Submittal Package.



### Early Release Submittals Process Flowchart





## PROJECT SUBMITTALS AND REVIEWS

# Requests for Information

## Questions from Lead contractor to their designer

- Design-Builder's Designer to provide response. MassDOT must concur with responses

## Questions from Design-Builder to MassDOT

- Answered by PDC/Resident Engineer/Project Manager – Finalized by RE

## RFI responses do not necessarily constitute an EWO/EOT

## Categories:

- Clarification, Minor Change, Additional Information
- Changes to BTC/Technical Proposal require more justification and receive a more in-depth review to ensure the Design-Builder provides “equal to or better” than BTC

## RFIs are not substitutes for NCRs



## PROJECT SUBMITTALS AND REVIEWS

# Issued for Construction Drawings

- Design-Builder shall confirm all comments concerning the Final Design have been resolved prior to submission of the “Issued for Construction” Plans
- Posted to SharePoint site to the Issued for Construction Library
- The IFC plans must be stamped by the Engineer of Record before posting to the Library
- IFC Drawings supersede all ERC packages and shall include all accepted revisions to date



## PROJECT QUALITY ASSURANCE

# Design Change Notices and Field Design Changes

Additional processes in DB projects to facilitate plan revisions:

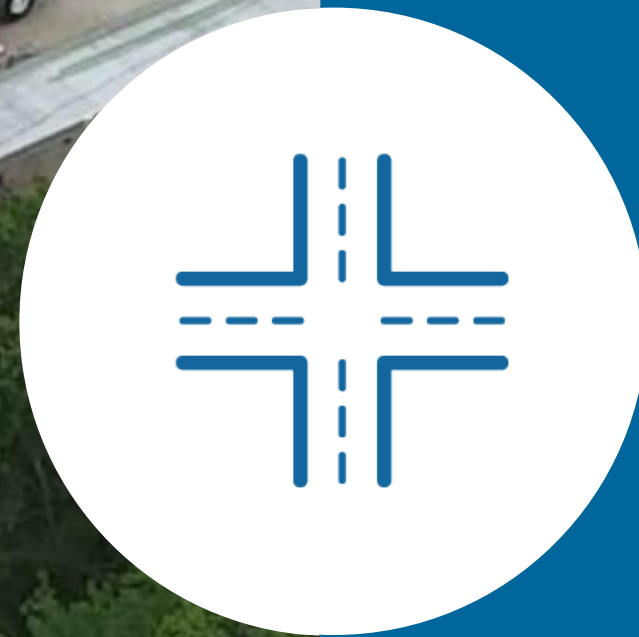
Design Change Notice (DCN) – Utilized when the Design-Builder requests to change a previously approved Issued for Construction or ERC/ERF Drawing (before construction has begun on that element)

Field Design Change (FDC) are design changes necessitated by an NCR or changed field condition

FDCs & DCNs must be reviewed by MassDOT and FHWA for acceptance similar to any other design submission

Any plans, specifications, shop drawings, etc., that are updated as part of these processes, need to be reissued to all construction personnel prior to work taking place





# Construction Procedures and Shop Drawings

## CONSTRUCTION PROCEDURES AND SHOP DRAWINGS

# Construction Procedures

Construction Procedures that have the potential to impact public safety shall be reviewed and approved by the Design-Builders Lead Engineering Firm and submitted to MassDOT for review and acceptance

## Examples of Construction Submittals

- Erection Plans
- Demolition Plans
- Support of Excavation
- Environmental Compliance
- Construction Monitoring Plans
- Other Documentation (RFP 10.14)
- AND as Deemed Necessary



## CONSTRUCTION PROCEDURES AND SHOP DRAWINGS

# Accepted Shop Drawings

Drawing or set of drawings prepared by the fabricator

- Submitted to the Design-Builder and reviewed and approved by the Engineer of Record (EOR).
- When Accepted they are uploaded to the appropriate library in Share Point and sent via E-Mail to R&M or Metals as appropriate

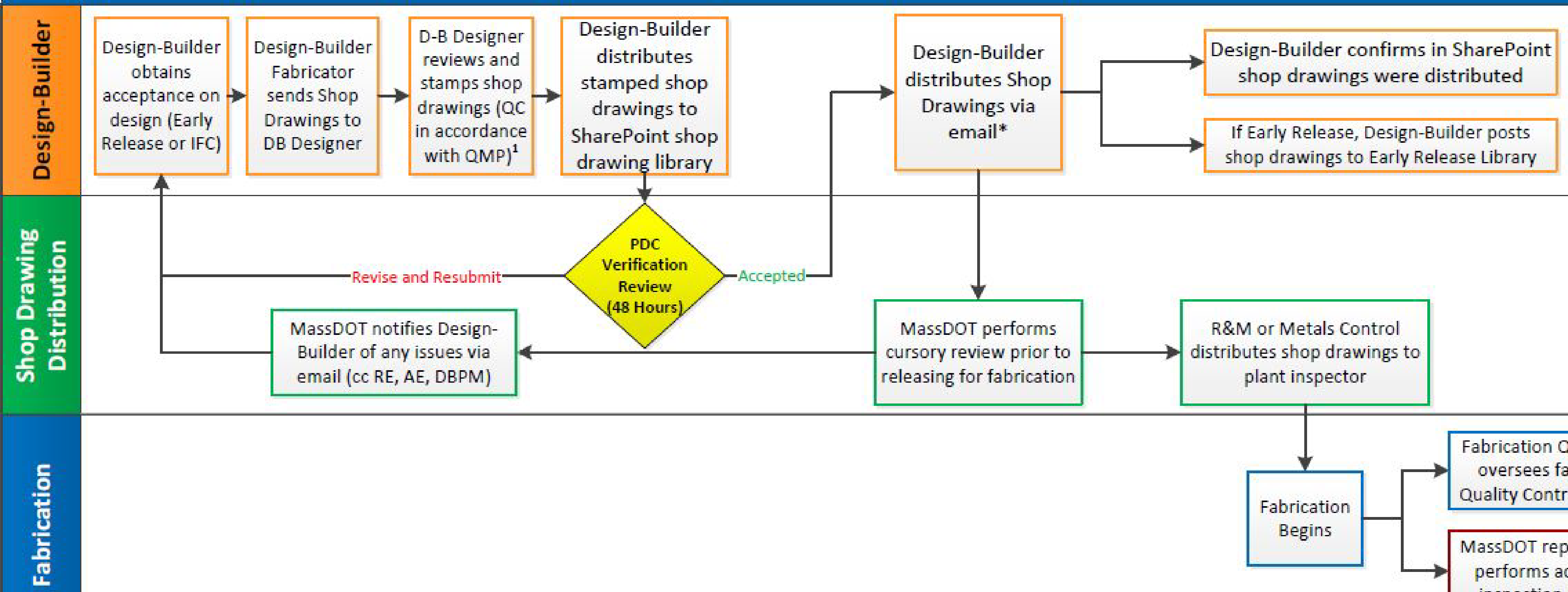
The Design-Builder's EOR is the primary reviewer for shop drawings. Shop drawings must go through the QMP design review process

MassDOT and PDC only review shop drawings for completeness of package





# Design-Build Fabrication Quality Assurance Process



## CONSTRUCTION PROCEDURES AND SHOP DRAWINGS

# Contract Amendments

## What is a Contract Amendment?

- Reasons
  - Scope Changes
  - Differing Site Conditions

## Implementation of Contract Amendments

- EWOs are reviewed with Design and Construction costs
- Engineering costs have overhead rates (See contract language)







# Project Quality Assurance

## PROJECT QUALITY ASSURANCE

# Construction Quality Control

## Design-Builder's Responsibility

- Design-Builder may utilize consultants to assist in Quality Control activities

## Quality Control Administrator

- Responsible for all QC activities on the project (Design and Construction)

## Construction QC Manager

- Full time Key Personnel responsible for managing implementation of QC Plans
- Requirements include NETTCP Certification and a combination of experience and education

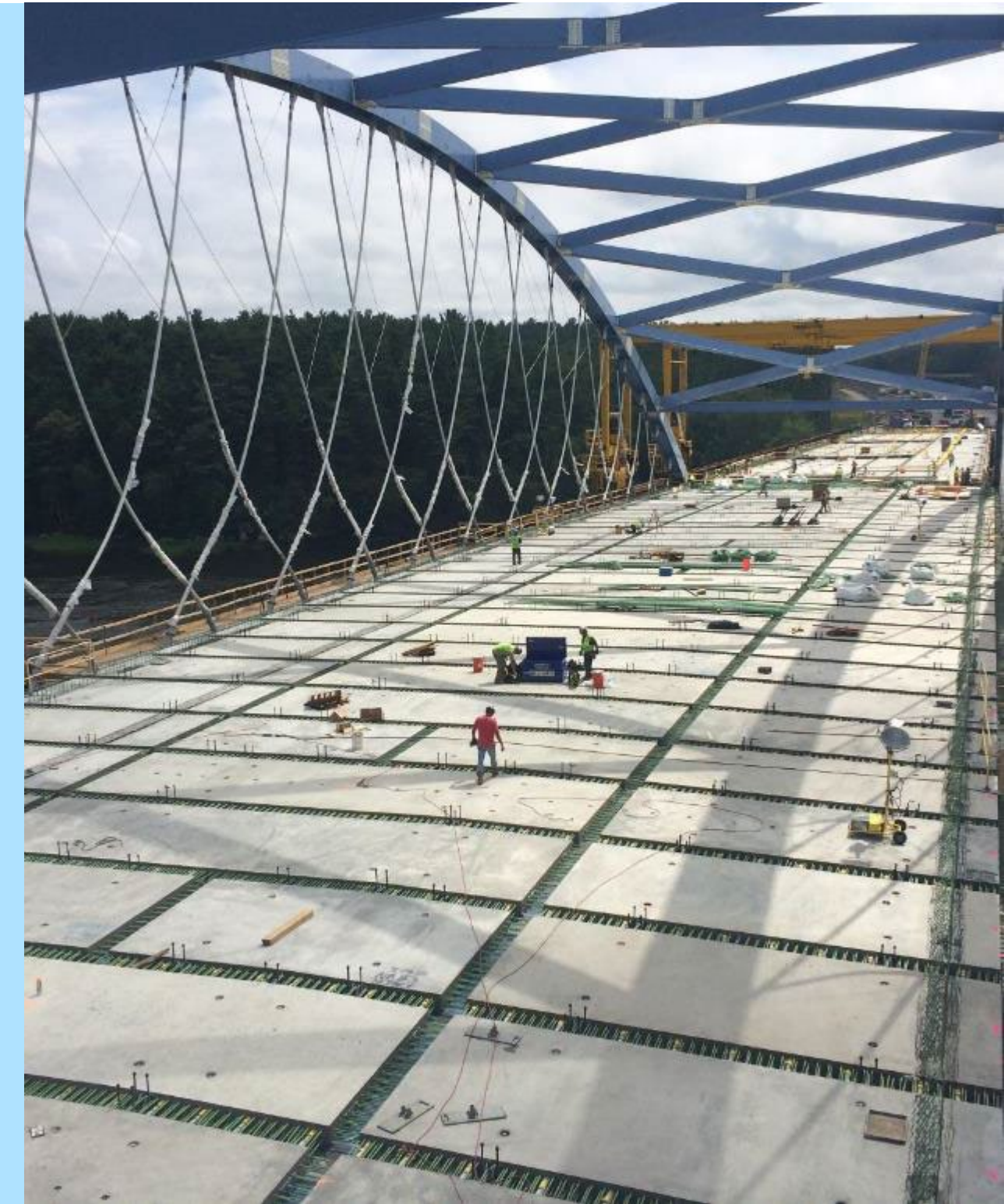
## Fabrication Quality Control Manager

- Independent from the MassDOT Consultant Inspector
- Ensures that the Fabricator is meeting the requirements of the QSM
- Certified by AWS or PCI w/ 10 years experience
- Approves fabrication procedures for MassDOT acceptance

## QC Plans submitted for each major work item outline:

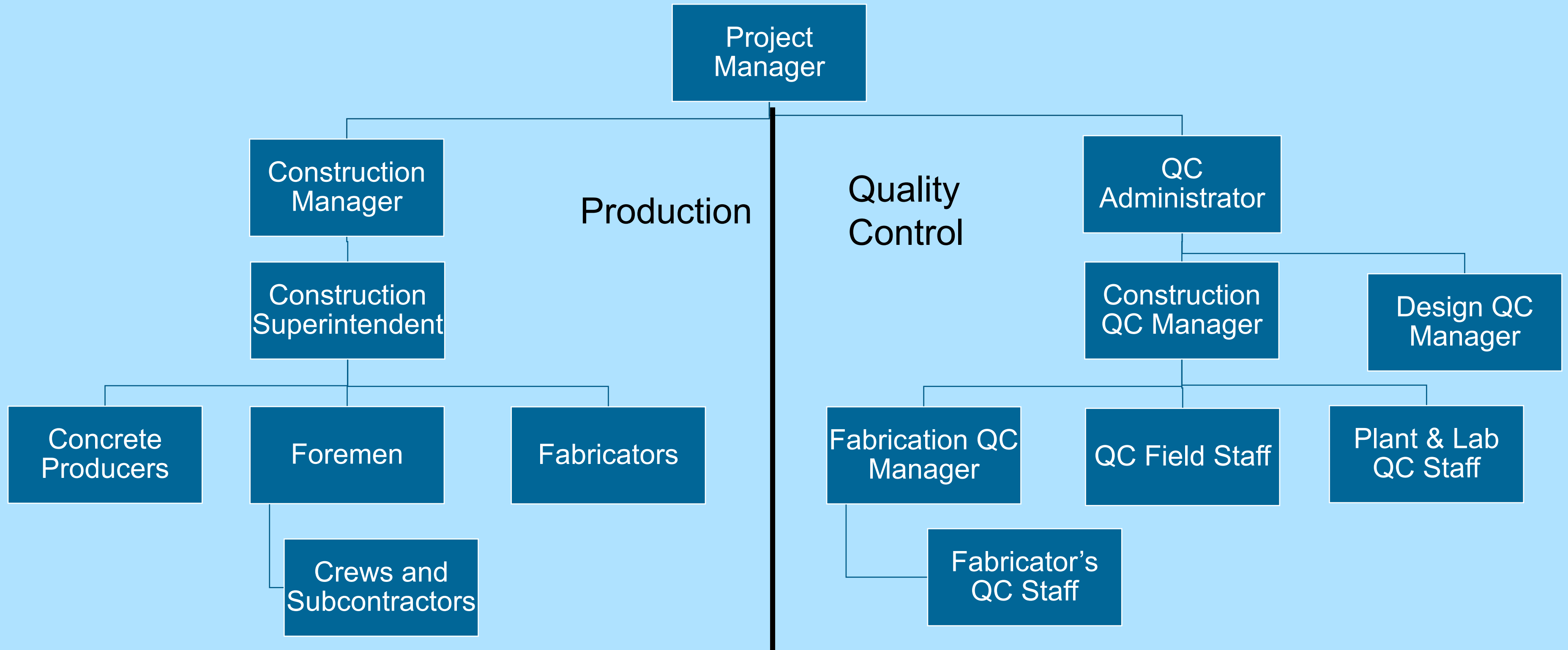
- QC Sampling and Testing frequencies (shall be no less than MassDOT acceptance frequency).
- Inspection attributes and frequency of inspection

## Maintain daily and monthly QC logs on SharePoint



PROJECT QUALITY ASSURANCE

# Quality Control Structure: Design-Builder



## PROJECT QUALITY ASSURANCE

# Quality Control Structure: Design-Builder

## Production Personnel

- Should perform “Frontline QC” activities - QC “self-checks” or “self-inspection” throughout the process of work production.
- Should receive initial training on the Quality Control procedures in the Quality Management Plan under the direction of the QC Administrator and “Formal QC” Team staff.

## Formal Quality Control

- Formal QC inspection and testing performed independently of Construction Production Personnel by the Construction QC Team staff.
- Constantly monitor and measure each production or placement process in order to determine if it is in control and providing a product that is in conformance with requirements.

PROJECT QUALITY ASSURANCE

# Quality Control

QC Plans are identified in the QMP for Major Items of Work such as:

Hot Mix Asphalt

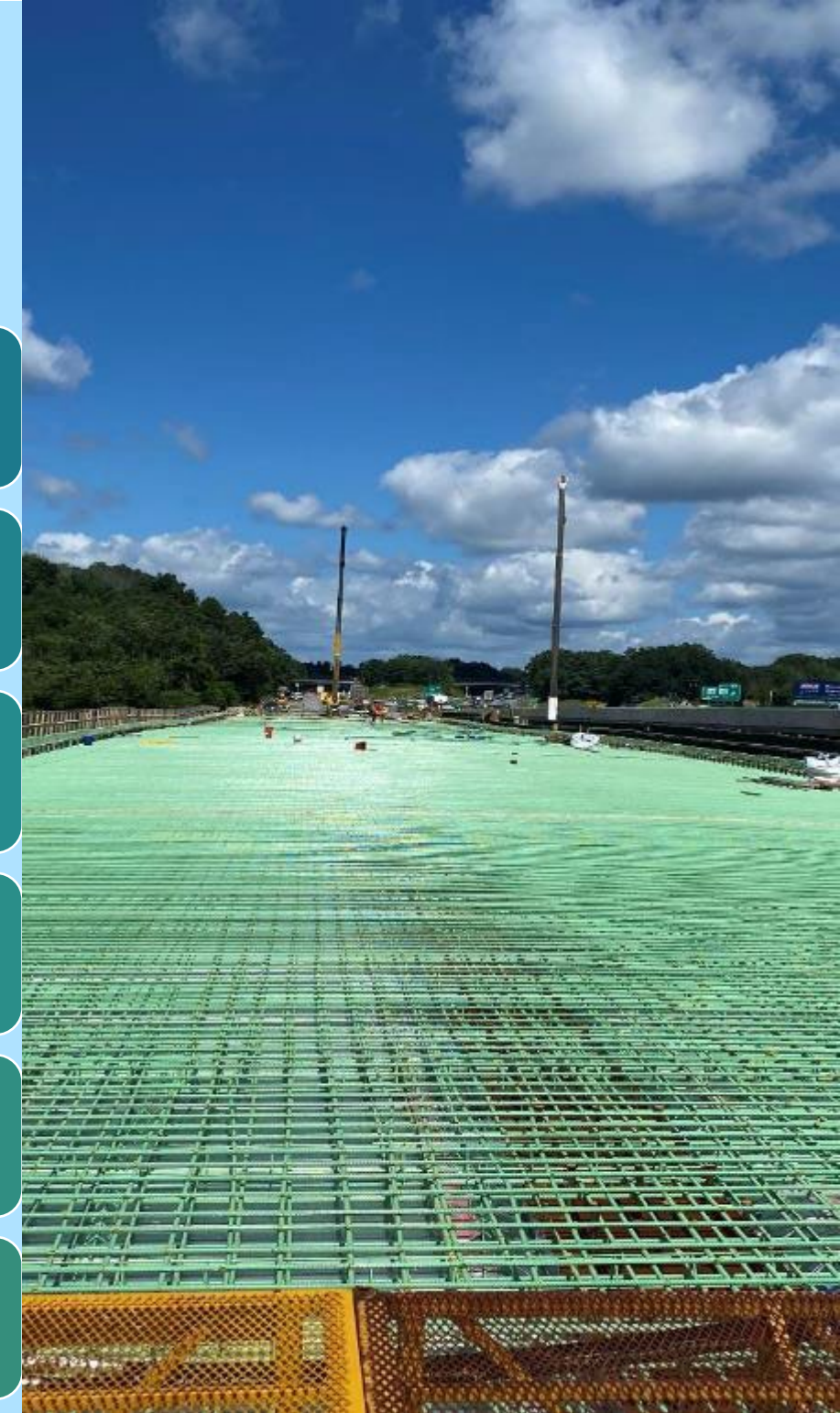
Earthwork

Precast Concrete (PCC)

Bridge Superstructure- Structural Steel

Drainage

Prefabricated Elements



PROJECT QUALITY ASSURANCE

# Fabrication Quality Control

## Fabrication QC Manager Shall:

### Be Certified As:

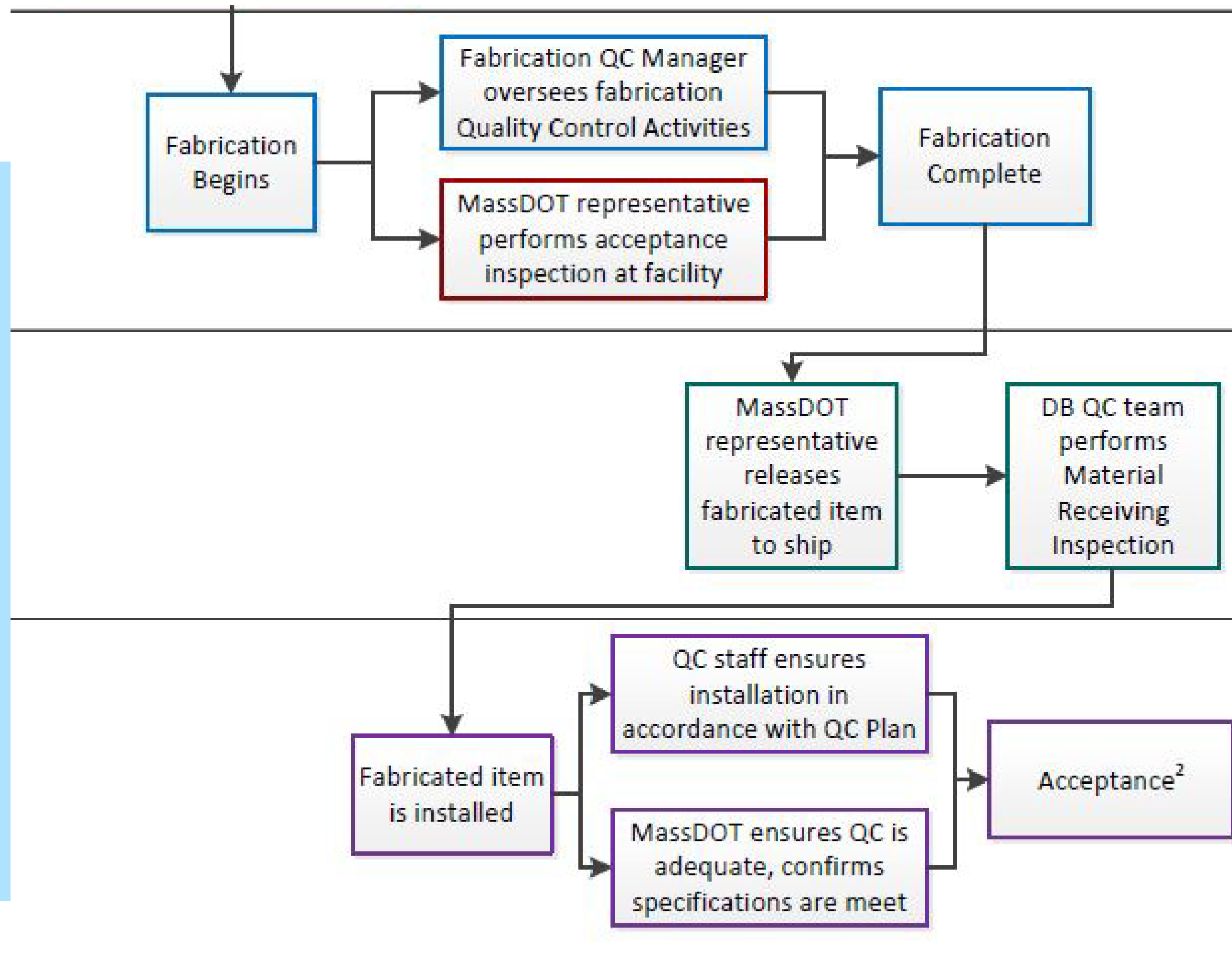
- CWI for Steel Fabrication
- Level I by PCI for Precast Concrete

Oversee implementation of fabricator's QSM

Review Fabrication Procedures to ensure conformance to Specifications

Identify and Document Non-Conformances and Oversee Resolution





PROJECT QUALITY ASSURANCE

# Construction Quality Control

## Formal Construction Quality Control:

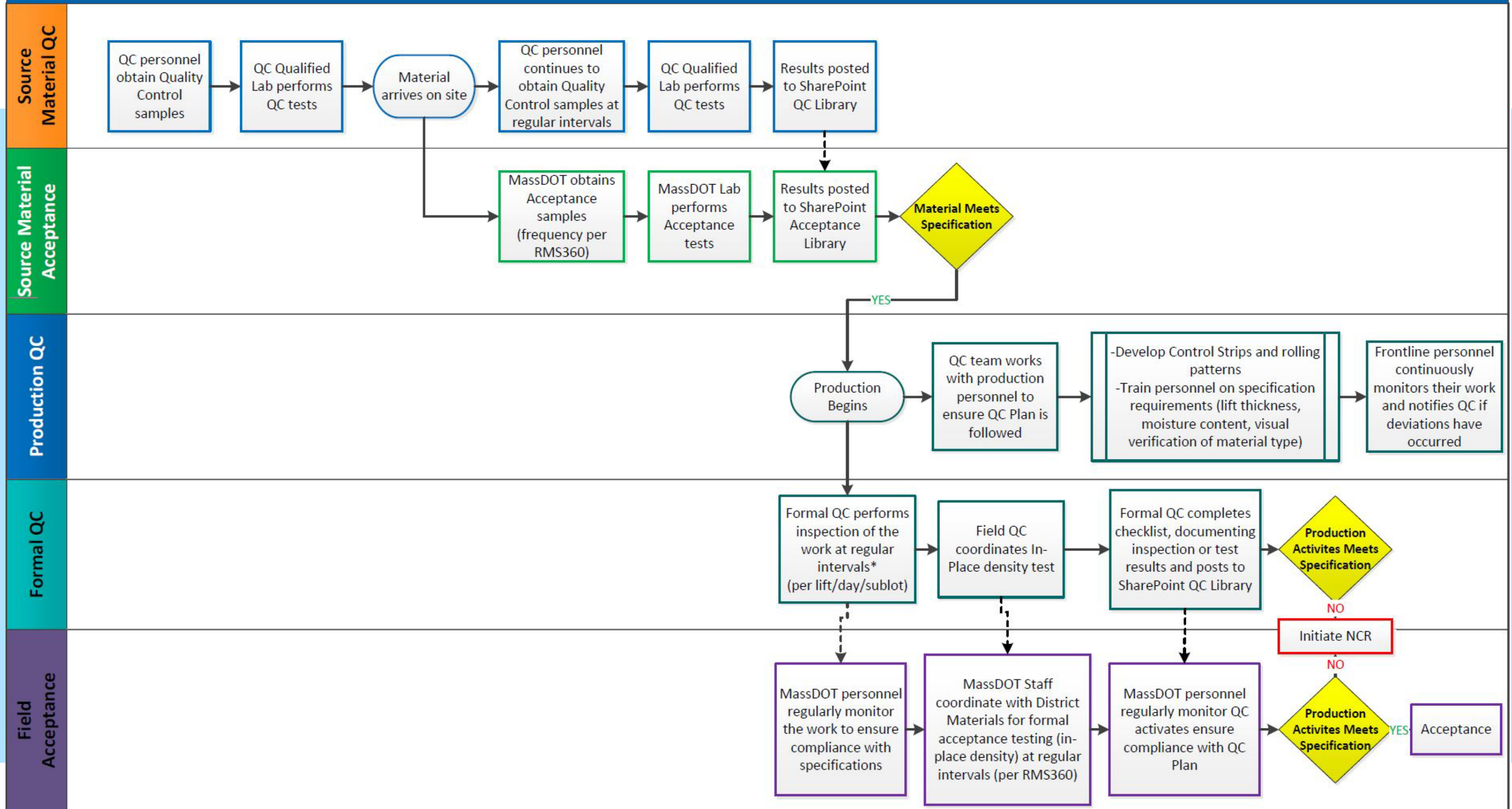
- Ensure Implementation of Quality Control Plan
- Perform Material Receiving Inspection Reports
- Ensure Material Delivered to the site has corresponding Documentation (COC, Mill Cert, etc.)
- Perform Inspections in Accordance with QC Plan
  - Equipment
  - Materials
  - Environmental Conditions
  - Workmanship
- Document Inspections/Testing on QC Inspection or Testing Report Forms
- Ensure Proper QC Sampling and Testing Independent of Acceptance Sampling and Testing
- Identify and Documenting Non-Conformances and Oversee Resolution
- Design-Builder Required to Submit “Materials & Workmanship Quality Certificate” upon Completion of Project







## Design-Build Earthwork Quality Assurance Process



PROJECT QUALITY ASSURANCE

# MassDOT Acceptance

Inspection (Plant and Field)

Confirming that the Design-Builder is following their QMP and QC Plans.

Testing and Sampling Frequency per MassDOT RMS360

Acceptance of construction still rests with MassDOT



PROJECT QUALITY ASSURANCE

# Non-Conformance Reports (NCRs)

## What is an NCR?

- Non-Conformance to Contract specifications and standards
- Non-Conformance to QMP

## Who Initiates an NCR

- Based on QMP the expectation is that the DB team identifies and initiates NCRs
- MassDOT can also initiate NCRs

## Types of NCRs

- Field
- Fabrication Steel
- Fabrication Precast
- Fabrication Other
- Other

## Avoiding Repeat NCRs

- Quantity of NCRs alone is **not** a good measure of Quality Control performance

**Non-Conformance Report (NCR)**

**Initiation**

NCR No: \* [ ] NCR Date: 1/22/2019 Contract Name: Haverhill

Contract No: 103045 Subcontractor/Fabricator's NCR Form (.pdf) [Click here to attach a file](#)

Contractor: SPS NEW ENGLAND INC Subcontractor/Fabricator: \*

Subject of NCR: \*

Location of Affected Component (ex. Pier 1): \*

Is this NCR a Repeated issue?

Is this NCR related to an Early Release for Fabrication or Construction Action? ERC Package Reference: [ ]

Contract Requirements: \*

Non-Conformance: \*

Referenced Drawing(s): [ ] [Click here to attach a file](#)

Referenced Spec(s): [ ] [Click here to attach a file](#)

Photos: [Click here to insert a picture](#) [Click here to insert a picture](#) [Click here to insert a picture](#)

I hereby acknowledge that I have initiated this NCR form,

Signature [ ] Initiated Date [ ]

PROJECT QUALITY ASSURANCE

# Non-Conformance Reports (NCRs)

MassDOT Field Verification with D-B Entity to ensure Corrective Action Taken

- Use As Is (with credit)
- Scrap
- Rework
- Repair
- Other

### Field Verification of Corrective Action

**Action Taken:**

Select...  
 Use As Is  
 Scrap  
 Rework  
 Repair  
 Other

**Action Date:**

Click here to attach a file

Click here to attach a file

Click here to insert a picture

Click here to insert a picture

**Approval:**

  
SPS NEW ENGLAND INC

**Date:**

**Inspection Completion Date:**

**Inspection/Verification:**

Select...
▼

**Approvals Needed:**

Select...
▼

**Approval:**

  
MassDOT Field Representative

**Date:**

**Fabricator NCR Representative**

Signoff Attachment

Click here to attach a file

# Lessons Learned

BTC should address all identified risks associated with the Project

Identify best reviewers for each submission (Design Submissions, QMP, QC Plans)

Baseline Schedule should include all design activities and appropriate review durations and resubmissions

Design-Builder needs to plan and prioritize to allow full review durations - Expedited reviews should not be expected

Early Release packages should be declared early and revisited regularly and clearly communicated

Submissions should be complete, and in accordance with QMP and Design Schedule (no piecemeal submissions)

Quality expectations should be communicated early and monitored closely

Many instances of EOR approving Shop Drawings then Design changes occur and changes not incorporated into Shop Drawings

Conduct Post-Construction Lessons Learned Workshops



# Lessons Learned – Quality Control and Materials

Embracing and Understanding Quality Assurance Principles

DB typically has more non-standard items making the RMS360 more complicated

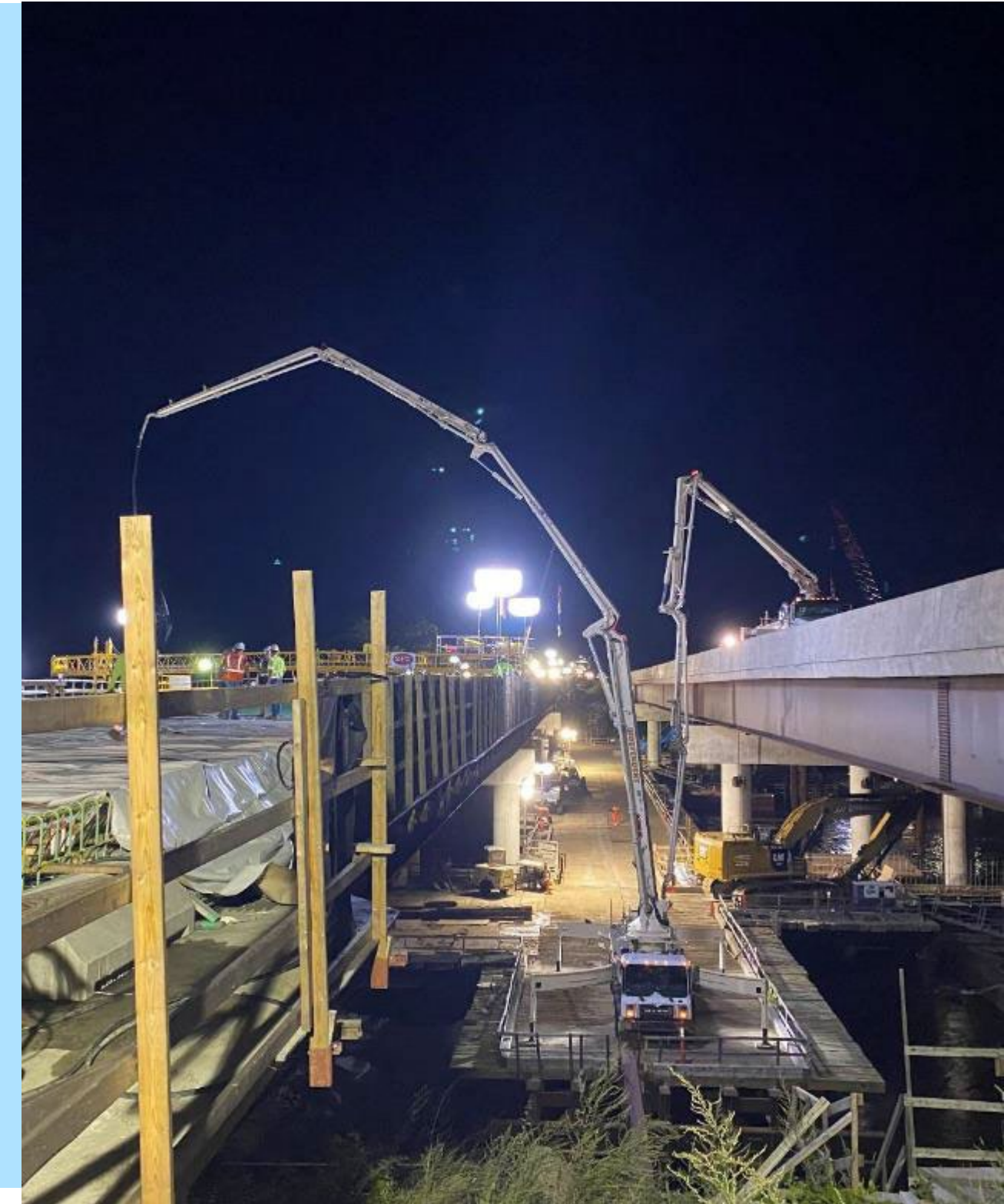
Important to develop RMS360 early in construction and update often as quantities change

Approving new materials/mix designs time consuming – clearly flag new products and plan ahead

Ensure receipt of Material Receiving Inspection Reports per QMP

Design-Builders should not proceed at own risk with fabrication

Design-Build Manual nearing draft completion to continue to standardize policies and procedures





# Discussion

# Open discussion

Questions

Comments

Suggestions

Feedback

