Maura Healey, Governor
Kimberley Driscoll, Lieutenant Governor
Monica Tibbits-Nutt, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator

massDOT
Massachusetts Department of Transportation
Highway Division

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF TRANSPORTATION

HIGHWAY DIVISION

Bridge Replacement, M-05-001=W-06-013 & W-06-016, Marion Road/Wareham Road (Route 6) over Weweantic River

Design-Build

in the Towns of

MARION-WAREHAM

Proposal No. 605311-128035

Design-Build Best Value RFQ/RFP Procurement

Federal-Aid Project No. HIP(NGB)-003S(786)X

Phase 2
Request for Proposals

VOLUME II OF III
Technical Provisions

September 12, 2024

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TABLE OF CONTENTS

APPENDIX A: TERMS AND DEFINITIONS

APPENDIX B: WAGE RATES FOR STATE AND FEDERAL PROJECTS

APPENDIX C: PROJECT REFERENCE DOCUMENTS

C.01 BASE TECHNICAL CONCEPT

- 605311_M-05-001=W-06-013 - CAD.zip
- 605311_W-06-016 - CAD.zip
- 605311_BTC_HIGHWAY PLANS
- 605311_BTC_BRIDGE PLANS M-05-001=W-06-013
- 605311 BTC BRIDGE PLANS W-06-016

C.02 VALUE ENGINEERING STUDY - [NOT APPLICABLE]

C.03 CIVIL

- 605311Accepted Right of Way Plans
- 605311Functional Design Report
- 605311Design Justification Workbook
- 605311Stormwater Management Report
- 605311-25% Water Quality Data Form (WQDF)
- A00815-Maint Contracts Work-Zone-Safety-December 2017 (Flip Book)
- A00816 Rumble Strip Details
- Work Zone Speed Limits – MassDOT S.O.P. No. TS-2023-002
- A00808 MassDOT Project Utility Coordination (PUC) Form

C.04 ENVIRONMENTAL

- Approved Environmental Permit Plans
- Wetland Replication-Mitigation Plan_Jan19_2024
- Coastal Zone Management Office Consistency
- MassDEP 401 Water Quality Certification (WW BRP 8 and 10)
- NEPA Approved Individual CE
- Natural Heritage and Endangered Species Program (NHESP) MESA Conditional No-Take (24-17064)
- NOAA Essential Fish Habitat Conservation Recommendations
- NOAA Essential Fish Habitat MassDOT Acceptance
- NOAA Essential Fish Habitat – Final Coordination Approval
- NOAA Section 7 Coordination Concurrence
- Section 106 Historic and Cultural No Effect Finding and Clearance

C.04 ENVIRONMENTAL (Continued)

- United State Army Corps of Engineers (USACE) Section 404 Individual Authorization (NAE-2023-00894)
- USFWS Section 7 NLAA Consistency Letter Marion Wareham 605311
- United States Coast Guard (USCG) Advanced Approval - MA 16590(1-3)
- 605311 Early Environmental Coordination Checklist
- EECC Hazardous Materials Memo

C.05 EXISTING CONDITIONS & RECORD PLANS

- W-06-016 US 6 over Weweantic River – 1926
- W-06-016 US 6 over Weweantic River - 1956
- M-05-001 US 6 over Weweantic River - 1901
- M-05-001=W-06-013 US 6 over Weweantic River – 1929
- M-05-001=W-06-013 US 6 over Weweantic River - 1956

- Record Highway Plans
  - N4 – 1958 Marion RD Briarwood Drive

- Record Utility Plans
  - River Road Watermain
  - National Grid Marion St – Briarwood Drive
  - Comcast Systems Maps Route 6 over Weweantic River

- Record SHLO Plans
  - SHLO 4354 SH-1
  - SHLO 4355 SH-1

- SHLO 4355 SH-2
  - SHLO 4355 SH-3
  - 1997 SHLO 7386
  - PB 10 PL 766_River Road Subdivision

C.06 GEOTECHNICAL

- 605311 Geotechnical Data Report Bridge No. M-05-001 = W-06-013, W-06-16 and the Causeway over Weweantic River Sept, 2024

C.07 [NOT APPLICABLE]

C.08 HYDRAULICS

- Hydraulic Report (To be issued by Addendum)

C.09 SPECIAL PROVISIONS

- 00713-SubSection 701-Cement Concrete SW-PedCurbs-Driveways 3-31-22
- 00715 Supplemental Specifications 6-30-24
- A00801 Draft BTC Special Provision (To be issued by Addendum)
- A00810 MassDOT Herbicide Use Report 7-18-2018
- Watering Log for MassDOT Plantings

C.10 STRUCTURAL

- Bridge Rating Reports
    - Marion SI&A
    - Rating Report M-05-001-45E g180
    - Rating Report W-06-016-45K g180
- Inspection Reports
    - M05001 10-16 Inspection Photo 13 of Steel Conduit
    - W06016 10-16 Inspection Photo 34 of Steel Pipe
    - W06016 10-16 Inspection Photo 35 of Steel Pipe
    - Routine Inspection M-05-001 10-16
    - Routine Inspection W-06-016 10-16
    - Underwater Inspection M-05-001
    - Underwater Inspection W-06-016

C.11 NETTCP MODEL QCP

- NETTCP Model Quality Control Plan
- MassDOT Quality Control Plan Commentary

C.12 COMMENT RESOLUTION - [NOT APPLICABLE]

C.13 ELECTRONIC DOCUMENT MANAGEMENT METHODOLOGY

- Document Control - Minimum Metadata Requirements
- SharePoint/Bluebeam DB Review Process
- Early Release Construction Submittal Process Flowchart

C.14 PUBLIC PARTICIPATION PLAN

- Draft Public Participation Plan
- Public Involvement and Outreach Plan Correspondence Protocol
- Project Tracking Documents
    - Issue Complaint and Question Intake Form
    - Design Public Comments Tracking Form
    - Construction Issues/Complaints and Questions Tracking Form

C.15 ACCESSIBLE ELECTRONIC DELIVERABLES

- Accessible Contract Language and Guidelines

APPENDIX D: GENERAL CONTRACT PROGRAM AND POLICY REQUIREMENTS

DOCUMENT 00210	REQUIREMENTS OF MGL CHAPTER 30, SECTION 39R; CHAPTER 30, SECTION 39O
DOCUMENT 00331	LOCUS MAP
DOCUMENT 00439	CONTRACTOR PROJECT EVALUATION FORM
DOCUMENT 00440	SUBCONTRACTOR PROJECT EVALUATION FORM
DOCUMENT 00760	FORM FHWA-1273 REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONSTRUCTION CONTRACTS
DOCUMENT 00811DB	MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT (HMA) MIXTURES DESIGN-BUILD
DOCUMENT 00812DB	MONTHLY PRICE ADJUSTMENT FOR DIESEL FUEL & GASOLINE DESIGN-BUILD
DOCUMENT 00813DB	PRICE ADJUSTMENTS FOR STRUCTURAL STEEL & REINFORCING STEEL DESIGN-BUILD
DOCUMENT 00814DB	PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES DESIGN-BUILD
DOCUMENT 00820	MASS. SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY, NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM
DOCUMENT 00821	ELECTRONIC REPORTING REQUIREMENTS CIVIL RIGHTS PROGRAMS AND CERTIFIED PAYROLL
DOCUMENT 00859	CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM
DOCUMENT 00860	COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYMENT LAWS
DOCUMENT 00870	STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS
DOCUMENT 00875	TRAINEE SPECIAL PROVISIONS
DOCUMENT A00875	POLICY DIRECTIVE P-22-001 AND POLICY DIRECTIVE P-22-002

APPENDIX E: PARTNERING

- Partnering Manual
- Partnering Terms and Forms

APPENDIX F: QUALITY MANAGEMENT PLAN REQUIREMENTS

- Quality Management Plan (QMP) Requirements
    - QMP Example (Bridge Replacement Br. No. H-12-039 Interstate 495 (NB & SB) over the Merrimack River, Haverhill, MA Approved QMP)

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SECTION 1.0: PROJECT REQUIREMENTS AND PROVISIONS FOR WORK

1.1 PROJECT MANAGEMENT

1.1.1 Project Description

The Massachusetts Department of Transportation, Highway Division (MassDOT) is undertaking a project to design and construct the Bridge Replacement, M-05-001=W-06-013 & W-06-016, Marion Road/Wareham Road (Route 6) over Weweantic River Design-Build in the Towns of Marion and Wareham.

1.1.2 General

The Design-Builder shall plan, schedule, and execute all aspects of the Work and shall be responsible for coordinating its activities with all parties who are directly impacted by the Work. The Design-Builder shall document and report all Work in accordance with the requirements of the Contract Documents.

The Design-Builder shall at all times provide a Design-Builder Project Manager ("Project Manager") who has been approved by MassDOT. The Project Manager will have full responsibility for the prosecution of the Work and will act as a single point of contact in all matters on behalf of the Design-Builder. The Design-Builder shall not change the Project Manager without the prior written approval of MassDOT in its sole discretion. In the event that the Design-Builder fails to obtain MassDOT's approval of a replacement before the existing Project Manager leaves, the Design-Builder shall not be entitled to receive any progress payments hereunder until such time as the approved replacement has started work on the Project.

The final design and details for the Project will be the responsibility of the Design-Builder. All plans/drawings, special provisions, reports and comments are referred to as the Base Technical Concept (BTC) and are provided as a reference; however, some components are mandatory, and are defined as such within this Request for Proposal (RFP). The BTC was developed to establish the minimum baseline requirements that shall be equaled or exceeded by the Design-Builder. In the event that the Design-Builder, through design development, proposes changes to their Technical Proposal or the BTC requirements, the Design-Builder, upon approval of the Designer of Record, shall submit a Request for Information (RFI) including written justification for MassDOT's review and concurrence before incorporating into a Design Submission. Any proposed changes to the BTC that are not demonstrated to be equal or better than the BTC will be rejected by MassDOT. The Design-Builder shall be required to provide a final, complete project design that is stamped, sealed and certified by their own Professional Engineers of Record and Land Surveyor of Record for review and approval by MassDOT and possibly third parties. The Professional Engineers and Land Surveyor must be registered in the Commonwealth of Massachusetts.

1.1.3 Project Management Plan

Within seven (7) Days of the issuance of the Notice to Proceed, the Design-Builder shall submit a Project Management Plan based on the Technical Proposal requirements detailed in RFP Volume I: Instructions to Proposers, Section 3.3 which describes the organization, authority, reporting relationships, and procedures to be implemented to manage and control the Work. The Design-Builder shall submit the Project Management Plan for review by MassDOT and FHWA, and shall obtain MassDOT's approval thereof, and shall at all times comply with the requirements thereof. The Project Management Plan shall be consistent with the Technical Proposal.

The Project management Plan shall identify and describe the functional relationship of the following key personnel:

- Project Manager (Full-time position)
- Quality Control (QC) Administrator
- Design Quality Control (QC) Manager
- Design Manager
- Lead Highway Engineer
- Lead Structural Engineer
- Lead Geotechnical Engineer
- Construction Manager
- Construction Quality Control (QC) Manager (Full-time position)
- Fabrication Quality Control Manager
- Construction Superintendent(s) – Full Time at site for Day/Night shift
- Lead Coastal Engineer
- Lead Permitting Manager (Design)
    - The Environmental Permitting Manager shall be an environmental practitioner with a minimum of 10 years' experience in the construction of intermediate roadway and bridge projects.

Key Quality Control personnel (QC Administrator, Design QC Manager, and Construction QC Manager, Fabrication Quality Manager) shall have the responsibilities and possess the minimum qualifications described in Section 2.4.

In addition to the key personnel listed above, the Project Management Plan shall also identify and describe the functional relationship of the following Project Team Members:

- Lead Traffic Engineer
- Traffic Control Supervisor
  The TCS will be the Responsible Person in Charge of the Project work site relative to all design and/or setup and maintaining temporary traffic control in the work zone. The TCS shall be certified by the American Traffic Safety Services Association (ATSSA) and shall have completed the Traffic Control Technician training as a prerequisite for the Traffic Control Supervisor training and meet all the minimum TCS certification requirements of the ATSSA Certification Board. The TCS certification must be current and remain current for the duration of the Project.
- Lead Permitting Manager (Construction)
    - The Environmental Compliance Manager shall be an environmental practitioner with a minimum of 10 years' experience in construction compliance for intermediate roadway and bridge projects.

- Wetland Specialist
    - The Wetland Specialist shall have a minimum of 5 years' experience with salt marsh mitigation and wetland science (Subitem 755.75).
- Wildlife Biologist
    - The Wildlife Biologist shall have a minimum of 5 years' experience implementing Turtle Protection Plans.
- Public Outreach Coordinator
- Utility Coordinator
- Document Control Engineer
- Project Scheduler
- DBE / Civil Rights Compliance Manager

1.1.4 MassDOT's Role

MassDOT will perform management oversight, design acceptance/approval and construction acceptance of the Work for the purpose of assuring that the Design-Builder Work meets the requirements of the RFP and Contract Documents approved by MassDOT. Oversight activities include design reviews, design acceptance/approval at key Design milestones (i.e. 75% and 100% Highway Design, and Bridge Design submittals; and Issued for Construction Design Submittal), and construction acceptance inspection and testing. MassDOT will also serve as a liaison with regulatory agencies in connection with the Design-Builder's application for Environmental Approvals/Clearances and/or amendments. However, none of MassDOT's oversight activities shall relieve the Design-Builder from its obligations as defined in the RFP.

MassDOT will review and respond to complete design and permit application/amendment submittals within thirty (30) days. All submissions from the Design-Builder must be complete and contain sufficient and/or required information such that the review can be completed and, as appropriate, the submission made to the environmental agencies. All submittals shall be in accordance with the Design-Builder's design quality management procedures as approved by MassDOT. MassDOT will respond within thirty (30) Days on re-submittals, provided that the re-submittal is complete and meets all terms and conditions of the design quality management procedures. Both initial and re-submittals will be returned without review if all Quality Control information is not provided in accordance with the approved Quality Management Plan.

MassDOT will be the applicant of record on all environmental permit applications unless otherwise required by statute, and all requests for permit amendments or regulatory consultations/amendments. These submissions will be made to MassDOT for initial review and comment. Once approved and signed, the Design-Builder is required to make the requests for permit amendments and regulatory approvals to the agencies and distribute all required copies to other parties. MassDOT will also be responsible for administering the resulting Contract, including: invoice review and approval for payment; schedule review and approval; performance evaluation; Extra Work Order negotiation; dispute resolution; and other activities indicated herein.

MassDOT will identify a MassDOT employee to serve as the MassDOT Design-Build Project Manager and may elect to retain the services of a Consultant (Designated Agent) to administer and oversee the Design-Builder's activities including engineering design services, construction, wetland and environmentally related items, and general support to MassDOT for administration of the Project. The MassDOT Designated Agent is not authorized to:

- Direct the performance of the Work unless continued performance of the Work appears likely to endanger the health, welfare or safety of workers or the public;
- Approve deviations from applicable standards and conditions;
- Authorize changes in or Design Exceptions from the approved Design Documents, or performance by the Design-Builder of extra Work or changed Work;
- Waive any requirements or Provisions of the RFP and Contract; or
- Approve Design Documents, Extra Work Orders, or RFP and Contract amendments.

All submittals will be made electronically and by hard copy to both MassDOT and the Designated Agent (if utilized by MassDOT) simultaneously. Upon Notice To Proceed, the Design-Builder will be provided a table showing each submittal category and the appropriate MassDOT recipient. The Design-Builder shall utilize the MassDOT's Sharepoint® web-based document control system to facilitate the reviews.

1.1.5 Federal Highway Administration Role

As part of its stewardship responsibilities under the State/Federal partnership of the Federal-Aid Highway Program, FHWA will perform Project oversight activity, including review and approval of Design Documents and Construction Documents. Design review activity will normally be performed concurrent with MassDOT at key Design milestones (i.e. 75% and 100% Highway and, First and Second Structural Design Submittals, and Issued for Construction Submittal). FHWA will also perform periodic inspection of Project Construction activity including progress of Work, quality of Work, and adequacy of Quality Control. A Final Inspection will be held upon final completion of all Work to support FHWA's issuance of Project Final Acceptance.

FHWA will also conduct oversight reviews to ensure compliance with FHWA rules and requirements. FHWA reviews will consist of checks to ensure that RFP and Contract requirements and design criteria are being followed and that Quality Control activities are following the Design-Builder's approved Quality Management Plan. It is FHWA's intent to provide acceptance of the submittals which meet all Contract and RFP requirements as confirmed by the QC Administrator in order for Construction to begin on any particular element of the Work.

1.1.6 Local Agency Role

It is assumed that the majority of work will occur within the existing Right-of-Way, however, if elements of the Work involve additional properties or local roads, these efforts will be subject to review, approval, inspection, testing, and/or acceptance by local agencies. The Design-Builder shall be responsible for obtaining and paying for any needed local Governmental Approvals and for ensuring coordination with Utility Providers. The Design-Builder shall be responsible for obtaining and paying for any required local permits, licenses, or fees from the local municipalities and any other local Government agencies required.

Off-site temporary detours, proposed truck routes, and changeable message sign installations shall be coordinated with local municipalities and approved by MassDOT.

1.1.7 Railroads Role

[**THIS SECTION NOT APPLICABLE**]

1.1.8 Design-Builder Obligations

The final design and details for the Replacement of Bridges along Route 6 (Wareham/Marion Road) and Route 6 (Marion Road) over the Weweantic River Design-Build will be the responsibility of the Design-Builder. All plans, special provisions, reports and comments provided are for reference only. The BTC was developed to establish the minimum baseline requirements that shall be equaled or exceeded by the Design-Builder. All Design-Builders acknowledge by receipt of such plans that they explicitly understand that while these plans have been advanced to the level identified above, the Design-Builder shall be required to provide a final, complete Project design that is stamped, sealed and certified by their own Professional Engineer of Record for review and approval by MassDOT and possibly third parties. The Professional Engineer shall be registered in the Commonwealth of Massachusetts.

The Design-Builder shall design and construct the Project as designed, in accordance with all professional engineering principles and construction practices, and in accordance with all standards identified in Section 1.2.2 and in Volume III: Draft Contract for State Highway Work, in a good and workmanlike manner, and free from defects in accordance with the terms and conditions of the Contract Documents. Except as otherwise specifically provided in the Contract Documents, all materials, services and efforts necessary to achieve Substantial Completion and Final Acceptance on or before the deadlines provided herein, shall be the Design-Builder's responsibility; and the cost of all such materials, services and efforts shall be included in the Design-Builder's Price Proposal.

The Design-Builder is required to design and construct the Project in accordance with Government approvals, Environmental Approvals/Clearances, environmental permits, the accepted Project schedule, the approved Project Management Plan, the approved Quality Management Plan (QMP), the Site Control Plan, the approved Construction Staging Plan, accepted Noise and Dust Control Plans, and the accepted Health and Safety Plan and all other applicable Laws, negotiations, regulations, ordinances, and other requirements, taking into account the Right-of-Way and other physical constraints affecting the Project, so as to achieve Substantial Completion and Final Acceptance by the deadlines specified herein.

To the extent not already obtained by or on behalf of MassDOT, the Design-Builder shall obtain and pay the cost of obtaining all Governmental Approvals, and/or amendments to Environmental Approvals/Clearances or permits. The Design-Builder shall undertake and perform all actions required by and all actions necessary to maintain in full force and affect all Governmental Approvals and Environmental Approvals/Clearances and/or permits, including the performance of all environmental mitigation measures required by the Contract Documents, Environmental Approvals/Clearances and/or permits and applicable Law.

The Design-Builder shall coordinate all work with utilities, which includes the relocation of overhead power lines, design and construction of underground duct banks to facilitate the relocation of existing communication lines, and installation of future electrical ducts. The work also includes relocation of the gas line at the east end of the project and cut and cap the waterline at Briarwood Drive. Also included is the placement of a 4" ductile iron pipe with gate valves for future water service from Briarwood drive crossing Route 6. The Design-Builder shall be responsible for the costs of any required permits necessary to construct utilities as shown on the BTC.

The Design-Builder shall monitor and protect existing utility infrastructure that could potentially be impacted by construction activities. See Section 6.0 for specific utility requirements.

The Design-Builder shall cooperate with MassDOT in connection with all matters relating to the Project, including review of the design of the Project and conducting inspections during the construction of the Project. This may include but not be limited to, over the shoulder design reviews and other design review meetings that appear appropriate based on schedule or contract issues as they arise, all shop tests and shop assembly checks as well as typical shop inspection access and participation in construction and erection meetings.

The Design-Builder shall mitigate delay to the Project and mitigate damages due to delay in all circumstances, including re-sequencing, reallocating or redeploying its forces as appropriate.

The Design-Builder is required to submit a work plan to MassDOT for approval of the specific work hours. Any work between 10:00 PM and 7:00 AM requires the prior approval of MassDOT and is subject to work restrictions. The Design-Builder's attention is called to the Noise Control Draft BTC Special Provision provided in Appendix C for additional requirements related to construction noise control, construction noise monitoring, and noise complaint procedures.

The Design-Builder shall submit a Construction Staging Plan to MassDOT for approval. At a minimum, the Construction Staging Plan shall identify construction staging areas with anticipated durations of use, proposed work hours, and employee parking areas.

The Design-Builder will be required to coordinate with District 5 for a highway access permit for staging and laydown areas.

The Design-Builder shall submit a Designated Truck Route(s) Plan to MassDOT for approval. The Design-Builder shall coordinate with the Towns of Marion and Wareham prior to submitting this Plan. The Designated Truck Route shall utilize state-owned roadways to the maximum extent practicable and shall avoid residential streets to the maximum extent practicable. This Route shall be utilized by all construction-related trucks, including material delivery trucks.

The Design-Builder shall provide the complete design for this Bridge Replacement Project in collaboration with MassDOT, and develop and complete the following documents and work efforts. Submission dates shall be noted in the Design-Builder's Schedule. Note that this list is not to be considered all inclusive:

- Project Schedule
- Project Management Plan
- Quality Management Plan
- Construction Quality Control Plans
- Public Participation Plan
- Graphics, presentation materials, and transcripts or meeting minutes for presentations to elected officials, Project stakeholders, and the public at large.
- Project Webpage
- Hazardous Materials Management Plan
- Health and Safety Plan
- Groundwater and Soil Management Plan
- Construction Staging Plan
- Temporary Traffic Control Plans
- Lead Abatement Plan
- Proposed Work Plan for approval of non-standard work hours (as applicable)
- Portable Changeable Message Sign Plan
- Designated Truck Route Plan
- Utility Plans in accordance with the submittal requirements of Engineering Directive E-19-004 to accompany the 75% and 100% Highway, First and Second Structural Bridge, and Issued for Construction Design Submittals
- Stormwater Management Plan
- Responses to MassDOT comments on the Formal 75% and 100% Highway, , First and Second Structural Bridge, and Issued for Construction Design Submittals
- Any and all environmental permits, authorizations, coordination plans, schedules, and supporting documentation and submittals (i.e. work start notifications) required to support the design and/or to allow any construction work to begin
- Construction Zone Safety Plans
- Structural Monitoring Plan
- Noise Control Plans

- Dust Control Plans
- Applications and supporting documentation for any required municipal permits for work in local streets/thoroughfares in the Towns of Marion and Wareham.
- Excavated Material Management Plan (EMMP)
- Stormwater Pollution Prevention Plan (SWPPP)/ Construction Period Pollution Prevention Plan (CP/PPP)
- Invasive Species Management Plan
- Environmental Monitoring Plan
- Landscaping and Salt Marsh Replication Material Procurement Plans
- Coordination with the local municipal fire departments for training related to emergency response
- Coordination with abutters, landowners, emergency services, local schools, environmental agencies, utilities, local boards and officials, and any other party with an interest in or impact from the Project. Coordination will be done in conjunction with MassDOT.
- Special Provisions
- 75% and 100% Design Submittal of all plans and highway designs
- Final Hydraulic and Scour Analysis Report
- Geotechnical Report
- First and Second Structural Bridge Design Submissions
- Issued for Construction Design Submittal of all plans, including bridge and highway designs
- Construction of all aspects of the final design, including any mitigation required from permits obtained by MassDOT in advance of Notice-to-Proceed to the Design-Builder.
- Turtle Protection Plan - to be approved by NHESP as identified in permitting documentation
- Wetland Mitigation Plan
- Sediment Sampling Plans and Results (2018, 2020/2021, and 2024)
- Construction Procedures as described in Section 10.15
- Shop Drawings as described in Section 10.16
- As-built drawings as described in Section 10.18 and/or required by Environmental Approvals/Clearances
- Bridge Structure Rating Reports as described in Section 10.19
- Contingency Plans as described in Section 10.20
- Materials and Workmanship Quality Certificate

1.1.9 Ownership and Management of Documents

The ownership and management of the Project documents produced by the Design-Builder is as follows: (a) Design Documents shall become the property of MassDOT upon preparation; (b) Construction Documents shall become the property of MassDOT upon delivery to MassDOT; and (c) information obtained or produced by the Design-Builder in connection with the performance of its obligations under this Contract, including studies, technical and other reports and the like, shall become the property of MassDOT upon the Design-Builder's preparation or receipt thereof.

In addition, permit applications for environmental permits and clearance documents issued by Local, State, or Federal agencies shall become the property of MassDOT upon delivery to MassDOT.

Shop Drawings shall become property of MassDOT upon delivery to MassDOT.

Copies of all such information shall be furnished to MassDOT upon preparation or receipt thereof by the Design-Builder. The Design-Builder shall furnish MassDOT with the original working drawings, final as-built drawings, and all maintenance and operation manuals for the Project as a condition of Final Acceptance.

As-built drawings shall be completed by the Design-Builder within thirty (30) days after final placement of work and shall be turned over to MassDOT upon completion.

Any patents granted related to elements or details shown in the Design Documents or to construction methodologies employed during the execution of the work under this Contract shall have their rights transferred to MassDOT upon completion. The Design-Builder shall utilize the MassDOT SharePoint ® web-based site to upload/download all project-wide submittals, including major milestone packages. This site will serve as a document management control system for the Design-Builder.

1.1.10 Electronic Document Management Methodology (EDMM)

The Design-Builder shall utilize the Department's SharePoint ® web-based document control software and records retention system to perform document control functions, from NTP until completion of the Project. The requirements in this Subsection are in addition to the document control requirements provided elsewhere in the Contract and do not replace any requirements for generating hardcopies and/or other submittal requirements. In addition to the requirements of this Subsection, all costs associated with the development, processing, organization, delivery, printing, transferring, and filing of all Project documents is to be included in the Contract price at no additional cost to the Department.

The Design-Builder shall appoint a Document Control Engineer to act as the Project's main point of contact for electronic document management. It should be anticipated that this will be a dedicated position for the duration of the Project. Any personnel changes to the Document Control Engineer shall be approved in writing by the Department prior to the replacement to ensure continuous administration of Project documents.

The Design-Builder shall be prepared to generate the Metadata for all aspects of all project documents and load that data onto the Department's SharePoint ® site, on a daily basis, and in a timely manner to support the project schedule. Metadata is the detailed digital information that is used to describe the content and the context of all of the project documents. Refer to Appendix C – Minimum Metadata Entry Requirements for examples. Once entered and verified by the Design-Builder, the Metadata and all of the relevant project documentation will be processed on the Department's Sharepoint ® site and will include, but not be limited to: correspondence, design submittals, extra work orders, non-conformance reports, requests-for-information, inspections, field changes, as-built drawings, schedule submissions, claims, material certifications, punchlists, and all other project documentation as directed by MassDOT.

The exchange and proper revision/change management of all of these documents are to be made available to key members of the project team, including members of MassDOT-Highway groups (District/HQ Construction, Bridge, Traffic Engineering, Project Controls, Environmental, Materials, Project Management, Design-Build, and District Project Development sections), as well as key members of MassDOT's Design Consultant, the Design-Builder, and the Design-Builder's Subconsultants/Contractors.

Data Backup and Redundancy - The Design-Builder will be responsible to develop and routinely maintain a back-up filing system that consists of hardcopies and will also be required to submit all project documents, as a searchable PDF, prior to the declaration of Substantial Completion. This requirement is in addition to the requirements of this Subsection and elsewhere in the Contract.

Administration - The Design-Builder will be required to utilize the Department's naming convention, workflow, and formatting as part of this document control system. The Design-Builder shall also provide routine administrative support to make changes, modifications, and/or updates, as required by MassDOT, and will be required to attend periodic meetings for the document control system.

Review Times - Reviews shall start on the day of notification, when notification is received prior to 12:00 PM (noon), otherwise review times shall commence the following day. Notifications shall only be sent out on MassDOT Business Days, and any notification of new or resubmitted document for review sent out after 12:00 PM (noon) on a Friday will have the associated review time commence on the next business day.

Date Stamped – In addition to the Metadata provided, all Project documents shall be date stamped on the digital record and the hard copies.

SharePoint/Bluebeam DB Review Process- The SharePoint/Bluebeam DB Review Process provided in Appendix C, shows MassDOT's current review process for Design-Build Projects.

The Design-Builder agrees not to rely upon the Department's document control system and agrees not to make claim for any slow speed or lack of access.

Other Documents requiring Design-Builder Metadata entry include but are not limited to the following:

- Design Reports
- Project Correspondence
- Special Provisions
- Design Submittals

- Quality Management Plan (QMP)
- Construction QC Plans
- Early Release for Construction Submittals
- Approved Shop Drawings
- Construction Submittals
- Issued for Construction Documents
- Working drawings
- Existing conditions inspection reports
- Materials Ledger (RMS 360)
    - Certificate of Compliances
    - Certificate of Analyses
    - Independent Test Reports
    - Mill Certifications
    - Mix Designs
    - Technical Data Sheets
- Quality Control inspection reports
- Quality Control sampling and testing reports
- Requests for Information (RFIs)
- Non-conformance Reports (NCRs)
- Deficiency Reports (DRs)
- Utility Coordination Reports
- Baseline Schedules
- Monthly Progress Schedules
- 3- Week Look Ahead Schedule for Design and Construction
- Meeting Minutes
- Environmental Submittals
    - Applications as well as Permits/Approvals/Clearances/
        - Turtle Protection Plan
        - Mitigation Plan
        - Construction Specifications
    - Mitigation Monitoring Reports
    - Environmental Compliance Tracking
- As-built Plans
- Other Project Documents as detailed in Document Library of the MassDOT Document Control Site

1.1.11 Additional Document Control Support

The Design-Builder shall provide 7 new Microsoft Surface Pro 9 or equal tablet computers and maintain as specified in Draft BTC Special Provision Item 740.3, Engineer's Field Office and Equipment, for MassDOT construction staff to use from the NTP of the Contract to the completion of the Contract. It will be the responsibility of the Design-Builder to provide updates and maintenance as needed. The purpose of those tablet computers will be to have remote or direct access to all construction drawings and documents (issued for construction, early start of construction, shop, and working).

It will be the responsibility of the Design-Builder to maintain the new Microsoft Surface Pro 9 or equal tablet computers with hotspot, and ensure that the latest information is contained within the memory of the tablet computer. The tablet computer will be a touch-screen device with a minimum diagonal screen dimension of 12.3", and a minimum of 128 gigabytes of storage. The tablet computer will include a minimum of a 1 gigahertz dual-core processor, and include gyroscope, accelerometer, and ambient light sensor. The tablets should be equipped with internet connection (Wi-Fi and LTE), all applicable software applications, and a mobile / data plan (LTE connection or higher with unlimited monthly data) with a capability to allow connection to the Project documents with or without the presence of a Wi-Fi connection. The tablets should be capable of taking digital photographs and videos at a resolution comparable with a standard digital camera. These tablets shall all be furnished with protective cases. These cases shall be waterproof and shock resistant. The tablets shall also have backup chargers and external keyboards.

The Design-Builder will be responsible for repairing or replacing any damaged tablets within 24 hours of being notified of the tablet not functioning properly.

Upon completion of the Project, the tablet computers will become the property of the Design-Builder.

1.2 REFERENCE DOCUMENTS AND STANDARDS

1.2.1 Reference Documents

Refer to Table of Contents Appendix C: Project Reference Documents for a complete listing of Project-specific reference documents. MassDOT will furnish a secured Dropbox link with Project specific reference documents to the Design-Builder as part of the RFP package. All plans, special provisions, reports, and comments are provided for reference use only. The BTC was developed to establish the minimum baseline requirements that must be equaled or exceeded by the Design-Builder. In the event that the Design-Builder, through design development, proposes changes to their Technical Proposal or the BTC requirements, the Design-Builder shall submit a Request for Information (RFI) including written justification for MassDOT's review and concurrence before incorporating into a Design Submission. Any proposed changes to the BTC that are not demonstrated to be equal or better than the BTC will be rejected by MassDOT. The Design-Builder acknowledges by receipt of such plans that they explicitly understand that while these plans have been advanced to the level shown by MassDOT, the Design-Builder will be required to provide a final, complete project design that is stamped and sealed by its own designer of record, for review and approval by MassDOT, FHWA and possible third parties. Revisions or additions to information in the reference plans being provided may be necessary based on comments received during the on-going MassDOT, FHWA plan review and permitting. MassDOT makes no representations as to the accuracy or completeness of information contained in any documents and will not be responsible in any way for the Design-Builder's reliance on or utilization of the contents of such documents. The Design-Builder shall perform supplemental testing, data collection, survey, borings, etc. as necessary.

The BTC Structural and Highway Plans have been developed to various stages of preliminary design. The Design-Builder shall independently develop their own CAD drawings in conformance with MassDOT Standards to provide the necessary design intent and design details required for the final design. The Design-Builder shall be solely responsible for the content and the accuracy of their drawings, including the verification by field survey of any critical existing dimensions. See Section 4.8.1 for details on field survey.

The Special Provisions included with the BTC are in draft form. The Design-Builder shall be responsible for developing final Special Provisions that are consistent with their design.

1.2.2 AASHTO, MassDOT, and Other Applicable Standards and Codes

AASHTO, MassDOT, and other reference standards are applicable to the final design and construction documents to be developed by the Design-Builder, including, but not limited to the list below. Access MassDOT Highway Information related to Construction, Design/Engineering, Contractor/Vendor Information, Approved Materials and Fabricators, Manuals, Publications and Forms at: https://www.mass.gov/orgs/highway-division

(Please note: the list below is not intended to represent a comprehensive list of all required documents. Additional standards may apply). All work performed under this Contract and Contract Amendments shall be in conformance with AASHTO and MassDOT standards, except to the extent that the Contract specifically allows exceptions there from. (This Project must be designed in English units.)

In the case of a conflict between MassDOT and AASHTO standards, the more stringent standards shall apply. Where dates are not specified, the most current version at the time of proposal submission shall apply.

- The MassDOT Design Build Procurement Guide, 2012 https://www.mass.gov/doc/design-build-procurement-guide/download
- MassDOT Project Development and Design Guide (PDDG) with latest online chapter revisions (https://www.mass.gov/manual/massdot-project-development-and-design-guide)
- MassDOT Right of Way Manual, latest edition
- MassDOT English Bid Item Nomenclature List, latest edition
- Commonwealth of Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges, 2024 Edition
- MassDOT Supplemental Specifications (latest issued)
- 1996 MassHighway Survey Manual
- MassHighway Schedule for Sampling and Testing Materials Guide (2005)
- All current MassDOT Engineering Directives
- MassDOT Bridge Manual, Hundredth Anniversary Edition: MassDOT Bridge Manual - Hundredth Anniversary Edition | Mass.gov

- 2020 AASHTO LRFD Bridge Design Specifications, 9th Edition, including Errata (November 2021) as amended by the MassDOT LRFD Bridge Manual and the provisions provided herein. If any conflicts arise between the MassDOT LRFD Bridge Manual and the AASHTO LRFD design code, the more stringent design code shall govern.
- AASHTO LRFD Bridge Construction Specifications, 4th edition, Includes Errata (2018) and 2020 Interim Revision 1 and 2022 Interim Revision 2.
- AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd edition, 2011 with 2012 2014, 2015, and 2022 Interim Revisions. For purposed of conducting Seismic Analysis, the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design (LRFD GS) shall be used instead of the AASHTO LRFD Bridge Design Specifications (AASHTO LRFD).
- AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing and Provisional Standards
- AASHTO/AWS D1.5 Bridge Welding Code, 8th Edition, 2020 with current AASHTO interim revisions
- AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges, 2nd Edition, with 2003 Interim Revisions
- AASHTO Guide Design Specifications for Bridge Temporary Works, Latest Edition with Interim Revisions
- AASHTO Guide Specifications for Bridges Vulnerable to Coastal Storms, 1st Edition, 2008 with all revisions including 2023 Interim Revisions (AASHTO BVCS-1-I1).
- PCI MNL-116 Manual for Quality Control for Plant and Production of Structural Precast Concrete Products, 5th Edition
- PCI MNL 135-00 Tolerance Manual for Precast and Prestressed Concrete Construction, 1st Edition
- FHWA Publication No. FHWA-IF-09-010 – "Connection Details for Prefabricated Bridge Elements and Systems" dated 3/30/2009 (Please note MassDOT standard details are included as Part III of the latest MassDOT Bridge Manual)
- FHWA Publication No. FHWA-HIF-17-019 – "Engineering Design, Fabrication, and Erection of Prefabricated Bridge Elements and Systems" dated June 2013.
- FHWA Publication No. FHWA-HIF-17-020 – "Contracting and Construction of Accelerated Bridge Construction Projects with Prefabricated Bridge Elements and Systems" dated June 2013
- FHWA Publication No. FHWA-NHI-15-044 – "Engineering for Structural Stability in Bridge Construction" latest edition.
- FHWA Post-Tensioned Box Girder Design Manual June 2016 FHWA-HIF-15-016
- FHWA Post-Tensioning Tendon Installation and Grouting Manual vers. 2.0 May 2013 FHWA-NHI-13-026.
- ACI 318-19 Building Code Requirements for Structural Concrete and Commentary
- PTI M50.3-12: Guide Specification for Grouted Post-Tensioning (June 2012)
- PTI M55.1-12(13): Specification for Grouting of Post-Tensioned Structures with Addendum #1 (June 2013)
- PTI M50.2-00: Anchorage Zone Design

- All current MassDOT Policy Directives
- AASHTO Standard Specifications For Structural Supports For Highway Signs, Luminaries and Traffic Signals – 2013 edition with the 2015 interim Revisions.
- AISC Steel Construction Manual 16th Edition
- MassDOT Construction Standard Details, dated October 2017 or the latest version
- 2009 Manual on Uniform Traffic Control Devices (MUTCD) with Revisions 1, 2, and 3, and the November 2022 Massachusetts Amendments to the MUTCD
- MassDOT Standard Sign Book, latest revision
- 1968 Standard Drawings for Traffic Signals and Highway Lighting
- 1990 Standard Drawings for Signs and Supports
- Notes on Walks and Wheelchair Ramp for designers and Construction Engineers, dated March 2012
- MassDOT Standard Traffic Control Plans for the Development of Traffic Management Plans (Latest approved version)
- 2016 Transportation Research Board's Highway Capacity Manual (HCM), 6th Edition
- NCHRP Web Only Document 326 – Design Guidelines for Test Level 3 through Test Level 5 Roadside Barrier Systems Placed on Mechanically Stabilized Earth Retaining Walls (2022)
- American Standard for Nursery Stock (ANSI Z-60.1-2014) or latest edition
- AASHTO A Policy on Design Standards – Interstate Systems, May 2016
- 2018 AASHTO A Policy on Geometric Design of Highways and Streets, 7th Edition
- 2011 AASHTO Roadside Design Guide, 4th Edition (w/Errata)
- 2012 AASHTO Guide for the Development of Bicycle Facilities, 4th Edition
- MassDOT Separated Bike Lane Planning & Design Guide
- 2016 AASHTO Manual for Assessing Safety Hardware, (MASH), 2nd Edition
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Massachusetts Architectural Access Board Regulations (521 CMR)
- Public Right-of-Way Accessibility Guidelines (PROWAG)
- MEC (Massachusetts Electrical Code) in accordance with the National Electrical Code (NEC) 2023
- Section 248 of the Commonwealth of Massachusetts Regulations (248 CMR): General Provisions Governing the Conduct of Plumbing and Gas Work Performed in the Commonwealth
- American National Standard Practice for Roadway and Area Lighting Equipment, ANSI/IESNA RP-8-14
- AASHTO Roadway Lighting Design Guide (October 2005 or Latest Edition)
- 2008 MassDEP Stormwater Handbook
- MassDOT, Stormwater Design Guide, 2023 Edition

- FHWA HDS 7, Hydraulic Design of Safe Bridges, 2012
- FHWA HEC 18, Evaluating Scour at Bridges, 5th Edition, 2012
- FHWA HEC 20, Stream Stability at Highway Structures, 4th Edition, 2012
- FHWA HEC 23, Bridge Scour and Stream Instability Countermeasures, Experience, Selection and Design Guidance, Volumes 1 and 2, 3rd Edition, 2009
- FHWA HEC 25, Highways in the Coastal Environment, 3rd Edition, 2020
- FHWA HEC 22 Urban Drainage Design Manual (Gutter Flow Analysis), 4th Edition, 2024
- National Environmental Policy Act
- Section 106 of the National Historic Preservation Act
- Section 9 of the Rivers and Harbors Act of 1899
- General Bridge Act of 1946
- Section 10 of the Rivers and Harbor Act
- Federal Endangered Species Act of 1973
    - Section 7 USFWS and NMFS / NOAA
- Fish and Wildlife Act of 1956
- Magnuson-Stevens Fishery Conservation and Management Act.
- Fish and Wildlife Coordination Act
- Marine Mammal Protection Act (MMPA)
- Massachusetts Endangered Species Act
- Clean Water Act
    - Section 401 - Water Quality Certifications
    - Section 402 – National Pollution Discharge Elimination System (NPDES)
    - Section 404 - USACE Permits and Wetlands
- American Iron and Steel Institute (AISI)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- American Society of Civil Engineers (ASCE)
- American Welding Society (AWS)
- Crane Manufacturers Association of America (CMAA)
- International Electrical Code (IEC)
- Occupational Safety and Health Administration (OSHA)
- Steel Structures Painting Council (SSPC)

- National Electrical Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- Underwriters Laboratory, Inc. (UL)
- ANSI/IESNA Recommended Practice for Roadway Lighting (RP-8)
- CIE Division 4 Visibility Design for Roadway Lighting
- NFPA 70 – National Electrical Code (NEC)
- IESNA Recommended Lighting for Walkways and Class 1 Bikeways (DG-5)
- IES Lighting for Exterior Environments RP-33
- IES Lighting Handbook – 10th Edition
- MassDOT Utility Accommodation Policy

1.2.3 Federal Highway Administration Standards

All federal standards applicable to Federal-Aid Highway Program projects must be met on this Project, including, but not limited to the following (Please note: the list below is not intended to represent a comprehensive list of all required documents. Additional standards may apply):

- Code of Federal Regulations
  - 23 CFR 625 – Design Standards for Highways
  - 23 CFR 626 – Pavement Policy
  - 23 CFR 630 – Preconstruction Procedures
  - 23 CFR 634 – Worker Visibility
  - 23 CFR 635 – Construction and Maintenance
  - 23 CFR 636 – Design-Build Contracting
  - 23 CFR 637 – Construction Inspection and Approval
  - 33 CFR Part 118.25 – Application Procedure, Approval of Lights and Other Signals

1.3 ADMINISTRATION AND COORDINATION

1.3.1 Briefings for Community Groups, MassDOT, and Others

Public involvement and communications are essential to the Project's development and construction phases. MassDOT will be conducting an extensive public outreach for this project with the general public (regional and local), local municipalities, neighborhood groups, local conservation commissions, adjacent business owners and elected officials. In order to fulfill commitments made during the public outreach process, MassDOT anticipates that extensive coordination and public outreach will be required during the final design and construction of this Project, which are reflected in the BTC.

MassDOT has separately engaged the service of a public engagement consultant. The Design-Builder will provide a public outreach consultant to work closely with MassDOT and their public engagement consultant to support effective communication of Project information to abutters, travelers, and the general public. MassDOT will use all available resources to communicate Project information including, but not limited to, broadcast and print media, variable message signs, a dedicated Project webpage, mobile media, existing MassDOT websites and other Commonwealth websites, fliers, fact sheets, social media, newsletters, e-mail, GovDelivery, presentations, briefings, meetings, and signs. The Design-Builder will have an important role in public involvement and communications and shall support MassDOT by preparing materials and presentations, providing content to MassDOT to update the Project webpage, and any other media required for communicating Project information to all interested parties. All materials, where appropriate, shall incorporate the Project's message points, which will be prepared in collaboration with MassDOT. The Design-Builder shall not be compensated by MassDOT for the preparation of these materials. The Design-Builder public involvement activities shall include, at minimum:

- Assign a Public Outreach Coordinator to work with MassDOT's public engagement consultant to support public outreach activities throughout design and construction.
- Attend meetings and briefings as needed with MassDOT, FHWA, State Police, Local Municipalities and their Emergency Services departments, local elected officials, the community, MetroWest Regional Transit Authority, utility owners, state and local commissions and others. The Design-Builder shall be responsible for attending presentation review meetings to finalize the presentation and participating in answering questions at any meeting at the appropriate time and in accordance with MassDOT requirements.
    - Public Information Meetings whether in person, or virtual.
        - The Design-Builder will be required to attend the 75% Highway Design public information meeting.
        - The Design-Builder will be required to attend meetings for the community with the first occurring thirty (30) days prior to the commencement of any construction activities.
        - Thirty (30) days before construction begins, the Design-Builder will be required to attend briefing to discuss construction management plans with abutters and other project participants as determined by MassDOT.
        - The Design-Builder will be required to attend a public meetings thirty (30) days prior to any major traffic changes through Full Beneficial Use, as well as fourteen (14) days prior to a long term, partial, or complete closure of any project roadway, and seven (7) days prior to the commencement of all short duration closures. The need for these meetings will be determined by MassDOT.
    - Meetings may be required with community members, neighborhood associations, business groups and affected agencies throughout the duration of the final design and the construction period. The Design-Builder may be required to attend these meetings as determined by MassDOT. These meetings may be either in person or virtual.

- Prepare project updates, graphics and other visual aids as needed for use by MassDOT. All material submitted shall be in an accessible format to those who are sight and hearing impaired. MassDOT will finalize all outreach material including, but not limited to, meeting presentations, project flyers, project fact sheets, FAQs, project webpage, etc. The Design-Builder will be required to provide the following to support the creation of outreach material:
    - Information for bi-weekly construction e-mail updates (to be sent by MassDOT), including 90-day look ahead schedules, detailed updates for the upcoming three weeks; including any traffic phase changes, anticipated issues, and any changes in information to be provided to the public. The Design-Builder will provide metrics needed by MassDOT for Project reporting.
    - Photographs and video footage of project activities for posting on the project website and social media (such as completion of superstructure demolition and erection, major traffic shifts, etc.). Photos and videos shall be available for MassDOT's use throughout the project.
    - Presentation slides, presentation boards, and graphics.
    - Daily traffic updates and alerts as conditions change.
    - Detour Maps of each detour route for use on the website and distribution to media, stakeholder groups, etc.
    - Written content and graphics for project newsletters and the website.
- Prepare meeting minutes for any public information meeting or briefing the Design-Builder attends in accordance with Section 1.1.2 Meeting Minutes.
- Provide a dedicated project hotline phone number for receiving and tracking comments, complaints, and questions from the public and stakeholders. The project hotline shall be activated 30 days prior to the start of construction. Comments, complaints, and questions received via the hotline will be logged, responded to, and tracked for resolution by the Design-Builder. All responses will be coordinated with and approved by MassDOT prior to responding to the inquiry. The protocol, sample forms, and tracking logs will be provided to the Design-Builder once MassDOT has finalized the Public Participation Plan.

1.3.1.1 Police, Fire, and Emergency

The Design-Builder shall coordinate through the MassDOT Resident Engineer Project work and informational updates, which will be forwarded to MassDOT District 5 for formal coordination with State Police, local Police, Fire, and Emergency Response. The Design-Builder shall provide up to date information on all detours, traffic restrictions, and lane closures to State Police, local Police, Fire, and Emergency Response.

1.3.2 Meeting Minutes

The Design-Builder shall attend all meetings involving the Design-Builder, MassDOT or its Designated Agent, FHWA, and third parties including, but not limited to, utility companies, municipalities, stakeholders, and regulatory agencies as appropriate. For all meetings at which the Design-Builder is in attendance, the Design-Builder shall submit to MassDOT objective draft meeting minutes within five (5) days after the meeting. The Design-Builder shall submit final meeting minutes incorporating any MassDOT comments within five (5) days after receipt of MassDOT's approval or comments on such draft meeting minutes, as applicable. Meeting minutes shall be submitted to MassDOT electronically.

The Design-Builder shall be responsible for the distribution of final MassDOT-approved meeting minutes to all meeting attendees. Excluded from this requirement are internal meetings between the Design-Builder's Team Members.

At a minimum, all meeting minutes shall contain a complete list of attendees (including their affiliations, email addresses, and telephone numbers), descriptions of issues discussed, decisions made, direction given, and remaining open issues (including identification of the party responsible for follow up and the target date for resolution).

1.3.3 Coordination with Other Projects

During the construction phase of the Project, the Design-Builder shall be required to coordinate the Design-Builder's efforts with local and government agencies, community groups, adjacent landowners, utility companies and other planned MassDOT projects that may be under design and/or construction during the construction phase of the Project. The coordination will include, but is not limited to providing sufficient notice of roadway closures and/or other significant operations prior to their occurrence. The Design-Builder shall review design plans, coordinate and monitor adjacent work or any entity performing or proposing work adjacent to this Project. The Design-Builder must anticipate allocating responsible personnel to this component of the Project. The following are some of the potential adjacent projects:

ACTIVE PROJECTS

ANTICIPATED PROJECTS
Project File Number 612229 - MARION- Improvements on Route 6, From Converse Road to Point Road.
Project File Number 607979 – MARION - Shared Use Path Construction (Phase 1), From the Marion-Mattapoisett T.L. to Point Road
Project File Number 612267 - WAREHAM- Improvements on Route 6, Briarwood Drive to Cromesett Road.
Project File Number 610647 - WAREHAM- Corridor Improvements on Route 6 At Swifts Beach Road.
Project File Number 606352 - WAREHAM- Culvert and Dam Replacement on Cranberry Highway at Route 28 and Route 6, Mill Pond Dam over Agawam River.
UTILITY PROJECTS:
MARION – Wareham Road (Route 6) Water Main Contract No, 2 (Point Road to River Road) In Design

The Design-Builder will be responsible for coordinating with any other potential adjacent projects during the execution of their work. The Design-Builder shall periodically contact MassDOT to obtain an updated list of adjacent projects.

1.3.4 Coordination of Traffic Officers

The Design-Builder shall coordinate all requirements for traffic officers or road flaggers through the MassDOT Highway Division District 5 construction offices, in accordance with Volume III: Draft Contract for State Highway Work. Traffic control shall adhere to MassDOT specifications, 701 CMR 7.00 and the Road Flagger and Police Detail Guidelines. Police details shall be compensated by MassDOT in accordance with Subsection 7.11 of the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition. The Design-Builder shall submit all Construction Zone Safety Plans to the local law enforcement agency having primary responsibility for the patrol and enforcement of vehicular law on the Public Road within which the Construction Zone is located.

1.3.5 Railroad Coordination

[**THIS SECTION NOT APPLICABLE**]

1.3.6 Comments, Complaints, Questions and Tracking

The Design-Builder shall provide a means for receiving and tracking comments, complaints, questions from the public and stakeholders. This shall include but not be limited to the following:

- A dedicated project hotline provided by the Design-Builder
- A dedicated e-mail address will be provided by MassDOT and managed by the Public Affairs staff.
- The project hotline and e-mail will be activated prior to the start of major construction
- Comments, complaints and questions received via the hotline and e-mail will be logged, responded to and tracked for resolution. The protocol, sample forms and tracking logs are outlined and provided in Appendix C.

1.4 RISK IDENTIFICATION

The Design-Builders shall perform a Risk Assessment on the proposed Project, identifying risks to both budget and schedule. The Design-Builders shall address in their Technical Proposal how they will mitigate the risks below and also identify any other significant Project risks and propose mitigation as applicable:

- Traffic Management
- Contaminated Soils/Groundwater and Staging Areas
    - Contaminated Soil Disposal
    - Streambed Material Stockpiling and Reinstallation
- Subsurface Obstructions and Conditions
- Stage 1 Partial Demolition of Existing Parapet/Deck
- Early Materials Procurement
- Additional Encroachment on Wetland and Streambed Areas & Successful Salt Marsh Mitigation
- Modification to Environmental Permitting Strategy
- Schedule Impact with Seasonal Restrictions
- Noise Mitigation

1.4.1 Traffic Management

This Project involves traffic management of Route 6. The construction staging proposed in the BTC is based on providing a minimum of two lanes of traffic (one eastbound and one westbound) on Route 6 for the full duration of construction. See Section 4 for further details. The Design-Builder should carefully plan the Temporary Traffic Control Plan (TTCP) to account for realigned lanes, while maintaining access to all local streets (including Briarwood Drive). More complex traffic management, potentially including a temporary traffic light and night time lighting may be needed to ensure the safety of residents who use Briarwood Drive.

The project also includes the design and implementation of a Real Time Traffic Management System. Please refer to the BTC Special Provision Subitem 856.3.

The Design-Builder shall review the adjacent or upcoming projects list included above to identify any staging issues when preparing the TTCP.

The Design-Builder shall take note that increased traffic volumes due to summer time traffic combined with the reduced number of lanes during construction may create sever congestion around the project site during this time.

The proposed bridge replacement project will impact traffic, and potentially create delays as "rubbernecking" or curious drivers on adjacent travel lanes may watch ongoing construction activities, such as demolition and construction. The Design-Builder shall mitigate this traffic impact by installing temporary visual barriers on the adjacent structure and take additional measures to mitigate this risk.

1.4.2 Contaminated Soils/Groundwater/Staging Areas

The Design-Builder shall be aware that the work requires handling, on-site reuse and/or off-site disposal of potentially contaminated soils. Contaminated soils shall be managed in accordance with the Design-Builder's Soil and Groundwater Management Plan (SGMP) requiring oversight by a Licensed Site Professional (LSP), including sampling, analysis and characterization of potentially contaminated soil, and preparation of plans and reports to comply with the Massachusetts Contingency Plan (310 CMR 40.000) and/or other state and federal regulations. Refer to Section 5.7 – Subsurface Hazardous Materials. The Design-Builder shall be aware that contaminated groundwater may be encountered during dewatering activities. It will be the responsibility of the Design-Builder to ensure that contaminated water, if encountered and removed during dewatering operations is treated and disposed of in accordance with all applicable local, state and federal laws and regulations. Refer to Section 5.7 – Subsurface Hazardous Materials. The Design-Builder shall be responsible for obtaining the necessary rights for staging and laydown areas beyond what is shown in the construction contract. Specifically, the Design-Builder's attention is drawn to the recently enacted MassDOT Policy Directives P-22-001 and P-22-002. The first establishes new mandatory requirements before soils excavated on MassDOT projects can be moved to temporary off-site storage locations. The second requires contractors to obtain Access Permits to use MassDOT property for staging, laydown, storage or other construction-related operations that are not specifically defined in the Contract.

- 2024 Sediment Sampling in the proposed dredging areas indicated the presence of lead and benzopyrene and dibenzoanthracene in the easternmost bridge pier (~STA 105.6) of the Wareham bridge (W-06-016). Based on the disposal method review, there were no exceedances of the reuse levels for any contaminants. As a result of these sampling results, MassDOT proposes to remove all 164 cy of sediment associated with the excavation and installation of the proposed bridge pier from the site. This sediment will be disposed of at an upland, lined landfill by the Contractor since the identified lead-levels at W-SS-04 are above regulatory thresholds for reuse. The excavated streambed material from the westernmost pier of W-06-016, and that from the Marion Wareham bridge (M-05-001=W-06-013) is to be stockpiled and reused to cover all proposed new bridge piers.

1.4.3 Subsurface Obstructions and Conditions

Available subsurface information is included with this RFP. The Design-Builder shall be aware of the risks associated with subsurface design and construction in the area of previous bridges and in a marine environment and shall take additional steps to mitigate these risks. Risk mitigation actions may include performing additional subsurface explorations, including test pits, ground penetrating radar, additional soil borings and geotechnical laboratory testing, and other activities in addition to those required as described herein to support the Design-Builder's proposed design and construction approach.

There is the potential for underground obstructions to be encountered that will present challenges for roadway retaining wall and foundation construction.

The replacements for Bridge Nos. M-05-001 = W-06-013 and W-06-016 will be constructed within the footprints of the existing bridges and previous bridges. Therefore, excavations for the foundation elements for the new bridges will encounter substructures of the existing and previous bridges. The Design-Builder shall design the new structures with consideration of the presence of existing deep foundations and substructures.

The history of causeway widening, as discussed in more detail in section 4.10.1.1, also suggests that obstructions may be buried in the causeway fill.

1.4.4 Stage 1 Partial Demolition of Existing Bridge

The first stage of the Project involves the partial demolition of the existing bridge to remove and reconstruct the East side of the bridge and roadway. The Design-Builder will need to install a restrained temporary barrier at the stage construction line. The temporary restrained barrier shall be tied to the existing deck and shall not deflect more than 6 inches upon vehicular impact. The Design-Builder will also need to verify that the existing deck is in good structural condition and that the existing deck is capable of carrying the loads (both the dead loads and the potential loads from a vehicular impact) that may be transmitted to it from the temporary restrained barrier. The Design-Builder will need to carefully saw-cut and remove the existing east portion of the bridge without damage to the west portion while maintaining traffic on Route 6

1.4.5 Early Materials Procurement

These are material items that have a long lead time associated with their procurement. These materials shall be procured by the Design-Builder, and the timely coordination to accommodate staged construction is the responsibility of the Design-Builder. Materials identified as potentially having a long lead time associated with their procurement include, but are not limited to, the following:

- Planting Material (seed and stems)
- Precast Concrete (Precast Guardrail Transitions, NEXT F Beams, Etc)
- Structural Steel (Bridge Rail and Handrail, Piles, etc)

1.4.6 Additional Encroachment on Wetland and Streambed Areas & Successful Salt Marsh Wetland Mitigation

Various state and federal regulated wetland resource areas exist within and surrounding the project area. This includes adjacent to both sides of the highway corridor and within the median. Freshwater wetlands and salt marsh occur along the existing abutments and along the causeway. The bridges occur over the Weweantic River, a navigable and jurisdictional resource. Based on the BTC, the Project will result in unavoidable impacts to these resource areas. The Design-Builder shall avoid and minimize impacts to these resource areas to the greatest extent practicable and will be responsible for any costs and schedule impacts for necessary permit amendments or modifications if their final design and/or construction activities require impacts to resource areas above and beyond those permitted. The connection with drainage, stormwater, and outlet pad sizing will be important to prevent additional encroachment. Erosion and sediment controls and management of pollution and turbidity will be highly important through the construction phase.

Salt marsh replication, salt marsh and freshwater wetland restoration, and stream restoration are part of the BTC and permit conditions. This includes preparing effective water management plans and maintaining stream flow during construction. Mitigation success should be enhanced with evaluating the proposed locations and preserving appropriate mature trees or habitat features if, and when feasible. Target hydrology, elevations, soil conditions, and plant management will be critical to success. Refer to Section 5 of this document for an expanded discussion on environmental approvals/clearances, compliance, and mitigation.

The following Draft BTC Special Provisions shall be incorporated into the contract for Tree Protection (See Appendix C):

- Subitem 102.511 Tree Protection – Armoring & Pruning

1.4.7 Modification to Environmental Permitting Strategy

This Project shall provide water quality improvements to the maximum extent practicable as defined in the Stormwater Management Standards. Water quality improvements shown in the BTC plans include but are not limited to, deep sump catch basins and outlet protection which are intended to provide treatment to the maximum extent practicable. The stormwater improvements proposed by the Design-Builder shall meet or exceed those shown on the BTC plans. The drainage outlets shown on the BTC plans are intended to keep related construction impacts out of the vegetated wetlands and salt marshes. The Design-Builder should be aware that changes to the design intent of the concepts shown in the BTC Plans may trigger additional permitting/amendments and agency coordination which would be the responsibility of the Design-Builder. Refer to Section 5 of this document for an expanded discussion.

Schedule Impact with Seasonal Restrictions

The Design-Builder shall be aware that the following seasonal restrictions shall be adhered to as construction window allowed to avoid potential schedule impacts:

- Hot mix asphalt paving work restriction allows work to occur from April 1st to November 15th.
- No concrete placement, application of waterproofing sealant, and soil compaction will occur between December 1st and Match 15th.
- The seeding and planting work restriction allows work to occur from April 15th to May 31st and from August 15th to October 31st.
- Planting and seeding shall not take place between November 15th and April 15th, except as allowed by MassDEP in writing.
- Per final NOAA EFH coordination, turbidity producing (in-water E&S control installation) work should be completed outside of the provided time of year restriction (TOY) from March 1 to June 30 of any given year, to minimize adverse effects to NOAA trust resources. If work cannot meet this TOY restriction above, then to minimize adverse effects to fish, controls should not encroach one-third of the stream width measured from the OHW mark during the TOY restriction.
- Turtle Exclusion Fencing / Erosion and Sedimentation Controls must be installed during the turtles' inactive period to exclude turtles from the project. Generally speaking, the fencing must be installed prior to April 1, and no sooner than November 1 in any given year. NHESP may make additional recommendations or modifications to this timing as part of the Turtle Protection Plan (TPP) approval.
- Additional in-water work TOY's may be identified by NHESP as part of the TPP approval.

1.4.8 Noise Mitigation

The Design-Builder's obligations with respect to noise during construction are described in Section 5.6.6, Noise, and in Draft BTC Special Provision Subitem 119.5 – Construction Noise Control, provided in Appendix C. A comprehensive noise analysis of the BTC was conducted by HMMH for MassDOT in September, 2022; the results of which are documented in the report included in Appendix C Should the Design-Builder propose changes to the BTC which could potentially impact the conclusion of the HMMH report the Design-Builder shall perform analyses sufficient to fully evaluate the changed conditions and, if

warranted, shall develop and submit to the Department for review and approval appropriate noise abatement measures. Public outreach is to be considered if measures are to be adopted. Evaluation of the potential noise impact of departures from the BTC plans and the design and construction of mitigation measures shall be the responsibility of the Design-Builder, incidental to the Work.

Additionally, per NOAA Section 7 approval, proposed piles below the mean high-water line (MHW, see BTC plans) are to be pre-drilled for the first 10-15 feet, then the Design-Builder may implement a vibratory start / impact hammer to the required depth. No vibratory or impact hammer is anticipated for piles above the MHW, they can be drilled to full depths.

"Soft starts" for pile driving are required as follows: If pile driving is occurring during a time of year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold, a “soft start” is required to allow animals an opportunity to leave the project vicinity before sound pressure levels increase. In addition to using a soft start at the beginning of the work day for pile driving, one must also be used at any time following cessation of pile driving for a period of 30 minutes or longer.

For impact pile driving: pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one minute wait period, then two subsequent three-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.

For vibratory pile installation: pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.

The Project requires a 5 dB noise attenuation as sound pressure amplitudes above peak sound pressure levels and sound exposure levels can cause onset of physical injury to fish (further described in NOAA Section 7 approval).

SECTION 2.0: PROJECT QUALITY ASSURANCE

2.1 QUALITY ASSURANCE PROGRAM ELEMENTS

As defined by AASHTO, FHWA, and the Transportation Research Board, "Quality Assurance" (QA) is an overarching "umbrella term" that refers to the collective quality activities performed by all parties to assure Quality. Quality Assurance is the responsibility of both the Design-Builder and MassDOT. This includes Quality Control (QC) activities by the Design-Builder as well as Acceptance activities by MassDOT. To ensure that goals for project quality will be met, MassDOT has established a Design QA Program to address quality in the design process and a Construction QA Program to ensure the quality of construction, comprised of the elements below.

2.1.1 Design QA Program

The Design QA Program for DB Projects includes the following two elements:

- Design Quality Control (QC) system by the Design-Builder
- Design Acceptance system by MassDOT

2.1.2 Construction QA Program

The Construction QA Program for DB Projects includes the following six core elements:

- Construction Quality Control (QC) system by the Design-Builder
- Construction Acceptance system by MassDOT
- Independent Assurance (IA) by MassDOT
- Dispute Resolution system
- Qualified/Accredited Laboratories (The Design-Builder and MassDOT)
- Qualified/Certified Inspection & Testing Personnel (The Design-Builder and MassDOT)

2.2 QUALITY ASSURANCE PROGRAM RESPONSIBILITIES

2.2.1 Design-Builder Responsibilities

The Design-Builder shall establish and implement a Quality Control (QC) System to ensure that the performance of the Work fulfills the design and construction requirements of the Contract. The QC System shall address the Design-Builder's Quality Control organization and roles, document management procedures, Design QC activities, Construction QC activities, qualified/accredited QC laboratories, and qualified/certified QC inspection & testing personnel.

The QC System shall be implemented by the Design-Builder including all Subconsultants, Subcontractors, Producers, Fabricators, and Manufacturers.

The Design-Builder shall be proactive and use its QC System to control its design and construction processes to ensure that work conforms to the requirements of the Contract and specifications. The -Design-Builder shall not rely on MassDOT's Acceptance reviews, inspection or testing results in order to keep their processes in control. The Design-Builder will complete its own separate Quality Control reviews, inspection and testing.

2.2.2 MassDOT Responsibilities

MassDOT will be responsible for Design Acceptance and Approval actions, Construction Acceptance actions, an Independent Assurance (IA) system, and a Dispute Resolution system. During construction, MassDOT's role on the DB Project is to provide verification of the quality of materials and workmanship through Acceptance inspection, sampling and testing. MassDOT is also responsible for IA inspection, sampling and testing to periodically evaluate the reliability of MassDOT's Acceptance personnel and equipment and the Design-Builder's QC personnel and equipment.

MassDOT has an interest and a duty to perform due diligence on behalf of the public to verify the quality of the design and construction and accept all elements of the work. MassDOT's Acceptance inspection and testing, monitoring of the Design-Builder's Quality Control activities, and periodic IA evaluations are necessary and shall be accommodated by all members of the Design-Builder's organization and its agents. While MassDOT will be performing Acceptance inspection and testing of the work, independent of the Design-Builder's QC System, the Design-Builder maintains the sole responsibility for quality, safety, compliance with all applicable Laws, and other components both direct and indirect to the work.

At all points in performance of the Work at which specific Acceptance reviews, inspections, testing, or approvals by MassDOT are required, the Design-Builder shall not proceed beyond that point until MassDOT has completed such review, inspection, testing, or approval or waived its right in writing has been provided.

MassDOT reserves the right to check QC laboratory testing equipment, personnel procedures and techniques for compliance with specified standards under the Independent Assurance (IA) system. MassDOT also reserves the right to access the QC laboratory facilities, at no additional cost to MassDOT, to witness QC testing, and to verify compliance of the testing procedures, testing techniques, and test results with the Contract requirements and the Design-Builder's approved Quality Control (QC) System.

2.3 QUALITY CONTROL SYSTEM OBJECTIVES

The Design-Builder's Quality Control System is a critical component of this Project. It is intended to provide the Design-Builder with real-time information to control the quality of all work. The Quality Control System is intended to achieve the following objectives:

- Place the responsibility for achieving design quality and construction quality on the Design-Builder.
- Establish procedures for coordinating and ensuring consistency and quality of work performed by Subconsultants or Joint Venture firms, Subcontractors, Producers, Fabricators, and Manufacturers.
- Ensure that all Design Documents and Construction Documents developed by the Design-Builder are prepared in accordance with all standards identified in the RFP and the Contract.
- Ensure that the quality of the materials and workmanship of all completed construction work meets the quality requirements set forth by the RFP and the Contract.

2.4 QUALITY CONTROL ORGANIZATION

2.4.1 Quality Control Lead Personnel

The Design-Builder's QC System shall be developed and implemented by a formal Quality Control Team led by a QC Administrator, a Design QC Manager, and a Construction QC Manager. These QC personnel shall have the responsibilities and possess the minimum qualifications described below. In the event that one of these QC Team Members is temporarily absent, the Design-Builder shall have contingency plans indicating the delegation of authority in their absence.

2.4.1.1 Quality Control Administrator

- The Quality Control (QC) Administrator is considered one of the Project's Key Personnel. The QC Administrator shall be responsible for overall management of the QC System. The QC Administrator shall possess, at a minimum, a B.S. in Civil Engineering and be a Registered Professional Engineer currently licensed in the Commonwealth of Massachusetts and shall have a minimum of ten (10) years of experience in transportation design or construction. ***The QC Administrator shall be a certified NETTCP Quality Assurance Technologist***.
- The QC Administrator shall report directly to the Design-Builder's Project Manager or Project Executive and shall be involved throughout all stages of the Project and be available for in person meetings and job site walkthroughs, as needed. The QC Administrator will keep MassDOT informed of all Project QC issues in a timely manner. The specific duties of the QC Administrator shall be outlined in the QMP.
- The Design-Builder shall not replace the QC Administrator without prior written approval by MassDOT. The Design-Builder's request to replace the QC Administrator shall name a proposed replacement manager who shall be available within fifteen (15) business days of MassDOT approval. The replacement QC Administrator shall meet all of the same qualification requirements listed above.

2.4.1.2 **Design Quality Control Manager**

- The Design Quality Control (QC) Manager shall be responsible for leading a Design QC Team to implement all "Formal QC" procedures and activities for design. The Design QC Manager shall be a Civil Engineer with, at a minimum, a B.S. in Civil Engineering and be a Registered Professional Engineer currently licensed in the Commonwealth of Massachusetts with experience on Design-Build and/or accelerated construction projects and with a minimum ten (10) years of experience in highway and/or bridge design and shall report directly to the Design-Builder's QC Administrator. ***The Design QC Manager shall be a certified NETTCP Quality Assurance Technologist and located with front-line design personnel.***

2.4.1.3 **Construction Quality Control Manager**

- The Construction QC Manager shall be an Engineer with, at a minimum, a B.S. in Engineering and shall have experience on Design-Build and/or accelerated construction projects and with a minimum ten (10) years of experience in highway and/or bridge construction. In lieu of a B.S. in Engineering, the Construction QC Manager shall have an additional five (5) years of management or materials testing experience in highway and/or bridge construction. **The Construction QC Manager shall be certified as a NETTCP QA Technologist** and shall report directly to the Design-Builder's QC Administrator.

- The Construction Quality Control (QC) Manager shall be responsible for leading a Construction QC Team to implement all "Formal QC" procedures and activities for construction.

- The Construction Quality Control Manager shall be independent from the MassDOT Consultant Inspector assigned to the Project's fabricator(s). If a consultant company is used to provide the Construction QC Manager, that consultant company:

    - Shall not be employed by MassDOT to provide services at the same facility.
    - Shall not be employed by MassDOT to provide services at another location for this same Project (#605311).
    - May not be employed by MassDOT to provide services on any other project where the Design-Builder is under contract with MassDOT.

- Companies that are currently under contract to provide inspection services for MassDOT who wish to provide an individual to act as the Construction QC Manager for the Design-Builder are advised that there are potential conflict of interest concerns. The consultant company will be asked to provide additional details to MassDOT to determine to what extent this situation would present an actual conflict.

2.4.1.4 Fabrication Quality Control Manager(s)

- The Fabrication Quality Control (QC) Manager(s) shall be certified as a CWI by the American Welding Society (AWS) or certified as a Level I by the Precast/Prestressed Concrete Institute (PCI), as applicable. The Fabrication QC Manager(s) shall have a minimum of ten (10) years of bridge fabrication experience and be responsible for reviewing and approving fabrication procedures for MassDOT acceptance and assuring that the fabricator is following their QSM and the project specifications. The Fabrication QC Manager(s) shall report directly to the Design-Builder's Construction QC Manager. The Fabrication QC Manager(s) shall be independent from the MassDOT Consultant Inspector assigned to the Project's fabricator(s). If a consultant company is used to provide the Fabrication QC Manager(s), that consultant company:
    - Shall not be employed by MassDOT to provide services at the same facility.
    - Shall not be employed by MassDOT to provide services at another location for this same project (#605311).
    - May not be employed by MassDOT to provide services on any other project where the Design-Builder is under contract with MassDOT.
- Companies that are currently under contract to provide inspection services for MassDOT who wish to provide an individual to act as the Fabrication QC Manager for the Design-Builder are advised that there are potential conflict of interest concerns. The consultant company will be asked to provide additional details to MassDOT to determine to what extent this situation would present an actual conflict.

2.4.2 Project Design and Construction Personnel Role in Quality Control

- All Design and Construction "Production Personnel" (i.e. staff performing design and construction work activity) on the Project, including the Environmental Permitting Manager, Design Manager, Construction Manager, Construction Superintendent(s), and all personnel working under their direction, shall have responsibility to perform "Frontline QC" activities to ensure the quality of their work. Production Personnel are expected to apply QC "self-checks" or "self-inspection" throughout the process of work production.

- All Design and Construction Production Personnel shall 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. Additional periodic training on the QC system will be provided as determined necessary by the QC Administrator.
- Formal Quality Control checks will be performed independently of Design Production Personnel by the Design QC Team staff and formal QC inspection and testing will be performed independently of Construction Production Personnel by the Construction QC Team staff throughout design and construction. To be an effective QC team, the Design-Builder shall possess an organizational structure that provides a team of "Formal QC" personnel that operates, neither above nor below, but parallel to the team of Production personnel. Primarily, the "Formal QC" personnel shall 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.

2.5 QUALITY MANAGEMENT PLAN (QMP)

The Design-Builder shall develop, implement, and maintain a comprehensive Quality Management Plan (QMP) that is consistent with and which expands upon the QC System outlined in the Design-Builder's Technical Proposal. The QMP shall be organized following the format outlined in **Appendix F: Quality Management Plan Requirements**. The QMP shall address the information required in Appendix F and any additional Quality Control requirements included in this RFP and the Contract. The QMP shall contain the following five sections:

Section 1 – Introduction

Section 2 – Quality Control Organization

Section 3 – Document Management Procedures

Section 4 – Design Quality Control Procedures

Section 5 – Construction Quality Control Procedures

The Design-Builder shall schedule a meeting with MassDOT and FHWA in advance of the submission of the QMP to discuss the format and contents of the document as well as roles and responsibilities of the QC staff. Each Section of the QMP shall be submitted no later than the timeframes indicated in the table below, for review and approval by MassDOT and FHWA.

QMP Section	Submittal Timeframe (Calendar Days)
Section 1 – Introduction	14 Days After NTP
Section 2 – Quality Control Organization	14 Days After NTP
Section 3 – Document Management Procedures	14 Days After NTP
Section 4 – Design Quality Control Procedures	14 Days After NTP
Section 5 – Construction Quality Control Procedures	60 Days After NTP

MassDOT will not accept any Early Release for Construction (ERC) and Design Submittal packages until QMP Sections 1 through 4 have been submitted and reviewed at least once by MassDOT and FHWA. MassDOT reserves the right to require resubmission of the QMP Section 1 through 4 prior to submittal of ERC and Design Packages if initial QMP submission contains significant deficiencies or omissions. Shop Drawings and Construction Quality Control Plans may be submitted only after QMP Section 5 has been reviewed at least once by MassDOT and FHWA. The Design-Builder shall not revise any portion of the accepted QMP without the prior written acceptance of MassDOT and FHWA.

2.6 DESIGN QUALITY CONTROL

2.6.1 Design Quality Control System Requirements

- Design Quality Control activities shall be implemented in accordance with the approved QMP.
- Each formal Design submittal package (75%, and 100% Highway, Structural Bridge, and Issued for Construction) shall be reviewed by the Design QC Team prior to submittal to MassDOT and FHWA for review.

2.6.2 Frontline QC by Design Production Team

"**Frontline QC**" is the responsibility of the Design-Builder frontline Production staff who are developing the design. Frontline QC activities consist primarily of "self-checks" by the lead Designer staff and other Design Production staff members (Design Production Team) responsible for development of the design documents (i.e. calculations, plans, special provisions, and technical reports). This also includes cross-checks and reviews between members of the Design Production Team as the design development progresses. Examples of the primary Frontline QC activities that should be performed by the Design Production Team are as follows:

- Survey Field Checking
- Validating and Approving Computer Software
- Discipline Coordination Reviews
- Interdisciplinary Reviews (including regulatory compliance)
- Environmental Reviews
- Constructability Reviews
- Designer Self-Checks (Calculations, Plans, Specifications)
- Subconsultant Design Document Reviews
- Design Package Milestone Reviews of 75% and 100% Highway, First and Second Structural Bridge submittals, and Issued for Construction Bridge and Highway
- Shop Drawing Reviews

2.6.3 Formal QC by Design Quality Control Team

The Design QC Team is responsible for performing "***Formal QC***" activities independent of the Design Production Team. These Formal QC activities include "independent-checks" at key milestones in the design process and audits intended to confirm that the design process is functioning effectively. Examples of the primary Formal QC activities that should be performed by the Design QC Team are as follows:

- CAD Software QC Audits
- Independent Structural Design Check (Calculations)
- QC Audit of Studies, Reports, & Other Design Documents
- Environmental Compliance Review
- Independent Technical Review (at Design Package Milestones)
- QC Review of Shop Drawings

2.7 CONSTRUCTION QUALITY CONTROL

2.7.1 Construction Quality Control System Requirements

- Construction Quality Control Plans (QC Plans) shall be prepared for major construction Work Items in accordance with Section 2.7.2 below.
- Each Fabricator and Manufacturer is required to have their own Quality System Manual (QSM) documenting their QC system. The QSM shall follow the format and outline contained in AASHTO R38 (Section 5.2.1) or a similar format and outline that has been accepted by MassDOT. Each Fabricator and Manufacturer will provide the Design-Builder with a copy of their QSM. After review and approval by the Construction QC Manager to ensure conformance to the Contract Quality Assurance requirements, each Fabricator or Manufacturer QSM will be transmitted to MassDOT for their use and information prior to fabrication and manufacturing.
- The QC sampling and testing frequencies shall be no less than the frequencies specified in the Department's Schedule for Sampling and Testing Materials included in the RMS 360. *All QC Sampling shall be obtained using random sampling in accordance with ASTM D3665 (as taught by NETTCP), unless specified otherwise in the QMP or QC Plan for the Work Item being tested.*

- Inspection Attributes shall be identified for each major Work Item. Inspection Lot and Sublot sizes shall be established for each Inspection Attribute, unless already specified by MassDOT (e.g., Subsection 450). The minimum Attributes to be inspected for QC shall be in accordance with the Massachusetts Department of Transportation Standard Specifications for Highways and Bridges and shall address the following four primary inspection components:
    - Equipment
    - Materials
    - Environmental Conditions
    - Workmanship
- Standard QC Report Forms and Record Books shall be established for inspection, sampling, and testing of all Work Items. QC documentation for Hot Mix Asphalt (HMA) shall be in accordance with Subsection 450 Specifications of the Standard Specifications. NETTCP standard Test Report Forms (TRFs) and Inspection Report Forms (IRFs) shall be used to document all QC inspection, sampling, and testing results. Where NETTCP TRFs or IRFs do not currently exist, the Design-Builder shall develop and use their own forms to address such testing or inspection. Any form created by the Design-Builder shall include all the information required by the test or inspection method and shall be submitted to MassDOT.
- HMA and Concrete Producers must have prequalified mix designs.
- All Fabricators furnishing Fabricated Structural Materials shall be on the current MassDOT "Approved Fabricators List."
- All Standard Manufactured Materials shall be delivered to the Project site with a standard Certificate of Compliance (COC) for the corresponding Lot of material.
- All laboratories performing QC testing of Project Produced Materials shall be qualified through either the AASHTO Accreditation Program (AAP) or NETTCP Laboratory Qualification Program.
- All QC personnel shall have appropriate certifications, which shall be described in the corresponding QC Plan(s) and shall be subject to MassDOT approval. If pertinent certification is available through NETTCP, that shall be the required certification. If not available through NETTCP, other comparable certifications may be accepted by MassDOT.

2.7.2 Construction Quality Control Plans

Construction Quality Control Plans (QC Plans) shall be prepared for major construction Work Items and submitted to MassDOT for acceptance a minimum of forty-five (45) days prior to the planned start of work on the applicable Work Item. QC Plans shall be submitted for each of the major or critical Work Items that comprise the primary features of the roadway, bridge, or other major structural elements, including, but not limited to the following:

- Earthwork
- Bridge Substructure - Pre-Cast Elements
- Concrete Structure Elements - Cast-in-Place (Abutments, Piers, Retaining Walls, Bridge Barrier, & Walkways, Median Barrier)

- Bridge Superstructure - Steel Elements (Girders & Diaphragms/Cross Frames)
- Bridge Superstructure - Concrete Deck
- Bridge Superstructure - Precast Concrete Elements
- Bridge Superstructure - Closure Joints
- Bridge Superstructure - Deck Membrane Waterproofing System
- Hot Mix Asphalt Pavement
    - Utility Infrastructure (Water, Sewer, Fire Alarm, Telephone, Cable, Electric, Fiber, and Gas)
- Drilled Shafts
- Micro-piles
- Driven piles
- Bridge Bearings, Bridge seats and expansion joints
    - Prefabricated Modular Gravity Retaining Walls and Moment Slabs
- Bridge Demolition and Erection
- Drainage including headwalls and inlet and outlet structures
- Landscaping
- Salt Marsh Mitigation Plans
- Other Work Items (as deemed necessary by the Engineer as the work progresses)

It is expected that all major materials and construction processes needed to complete a Work Item will be addressed in the corresponding Quality Control Plan.

2.7.3 Quality Control Plan Format and Content

The Quality Control Plans shall use the NETTCP "Model Quality Control Plan" (Appendix F of the NETTCP QA Technologist Course Manual, December 2014) as a standard template; along with the MassDOT Quality Control Plan Commentary and shall address all aspects of the work needed to complete the subject Work Item. The "Model Quality Control Plan" and the Quality Control Plan Commentary is attached to this document for reference provided in Appendix C.

Each QC Plan shall include provisions to address corrective action procedures for any non-conforming work.

2.7.4 Quality Control Materials Sampling and Testing Ledger

As part of its Construction Acceptance responsibility, MassDOT will prepare and maintain, for the Project, an Acceptance Materials Sampling & Testing Ledger (RMS 360) to plan and document MassDOT's Acceptance sampling frequencies and Acceptance testing results. However, the Design-Builder is required to prepare and maintain its own ***Quality Control Materials Sampling & Testing Ledger*** and provide MassDOT with planned QC sampling & testing frequencies for all Work Items in accordance with the following requirements:

- With each required Design Submittal package, the Designer of Record shall include a list of Work Items and quantities contained in the submittal. The list shall include a breakdown of each Lump Sum item and non-standard item, along with any standard items. All items requiring a special provision per MassDOT requirements shall have an asterisk in a separate column adjacent to the item number identifying the special provision requirement. The Work Items shall be listed using MassDOT's standard nomenclature and item numbers. For non-standard items the Design-Builder shall assign an item number not already assigned to a non-standard item. MassDOT reserves the right to change the assigned item number for any non-standard item.
- The Design-Builder shall be responsible for creating and maintaining their own Quality Control Materials Sampling & Testing Ledger for the Project. The Design-Builder is not required to use the MassDOT form RMS 360, but may use it as a model for creating their QC Materials Sampling & Testing Ledger. MassDOT will provide the Design-Builder with a list of the standard Work Items and their material sampling & testing requirements. The QC Materials Sampling & Testing Ledger shall contain the following:
    - Item Number
    - Item Description
    - Estimated Quantity
    - Item Lot Size and Sublot Size
    - Source of Material
    - Location of Source
    - Sampling Frequency (*normally 1 QC sample per Sublot, unless otherwise specified by the Project Specifications or MassDOT's Specifications*)
    - The QC Sampling and Testing Documentation required for the Work Item
    - Construction QC Manager and QC Administrator signoff that QC sampling and testing and related documentation for each Work Item has been completed and verified
- It is the responsibility of the Construction QC Manager to review the QC Materials Sampling & Testing Ledger and ensure that it is current with all Issued for Construction work packages and the completed work. Once the Project is under construction, the Construction QC Manager shall review the QC Materials Sampling & Testing Ledger a minimum of once a week.
- If the Design-Builder fails to provide MassDOT with the necessary information in each of its Design Submittals to allow MassDOT to maintain a current RMS 360, MassDOT reserves the right to issue a Deficiency Report and hold all payments for any Work Items covered under that submittal until the deficient RMS 360 information is reconciled.
- The Design-Builder shall perform all QC sampling, testing, and inspection completely independent of MassDOT's Acceptance sampling, testing, and inspection. The Design-Builder is required to upload and maintain on the Project SharePoint site, all QC sampling, testing, and inspection documentation as required by the Project Specifications. This shall include, but is not limited to:
    - QC Random Sampling Report Forms
    - QC Test Report Forms (TRFs)
    - QC Inspection Report Forms (IRFs)
    - Materials Certificates of Compliance (COCs)
    - Certificates of Analysis (COA)
    - Mill Certifications
    - Independent Test Reports

- As part of their Construction Quality Control system, the Design-Builder shall place "Design Hold/Control Points" which require the QC Materials Sampling & Testing Ledger and MassDOT's RMS 360 to be current prior to the continuation of work. These Control Points shall be specified in the Design-Builder's Quality Management Plan.

If the Design-Builder fails to perform the above requirements for the QC Materials Sampling & Testing Ledger and MassDOT's RMS 360, an NCR and Deficiency Report shall be issued in accordance with the Contract requirements and the Department's Standard Operating Procedures.

2.8 HMA QA SPECIFICATIONS AND PAY ADJUSTMENTS

The MassDOT Quality Assurance Specifications for Hot Mix Asphalt (HMA) Pavement as specified in Subsection 450 of the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition shall be applied for construction of all pavement on the Project. The quality of each HMA Category A Lot and HMA Category B Lot produced and placed on the Project will be evaluated using Quality Level Analysis and must be at or above the Acceptance Limits specified in Subsection 450.77. Pay adjustment will be determined and applied to each Lot based on the final Lot Quality Level for each of the Quality Characteristics as specified in Subsection 450.92. The pay adjustment amount for each Lot will be based on the actual HMA quantity (Qi) in tons, contained in the Lot. The HMA Pay adjustment amount will be based on a unit price (Pi) of $110/ton of HMA.

2.9 NON-CONFORMANCE REPORT (NCR)

Completed work that does not conform to the Contract requirements for the quality of materials or workmanship shall be documented through a Non-Conformance Report (NCR) per Section 10.12 Non-Conforming Work. An NCR shall also be initiated by the Design-Builder if QMP and quality related processes are not followed. When an NCR is required, it shall be prepared and submitted to MassDOT one (1) business day after the non-conformance is identified.

The NCR shall clearly describe the element of Work that is non-conforming and the nature of the non-conformance. The NCR shall identify the root cause that led to the NCR. The NCR shall further address steps to be taken to ensure that the particular non-conformance is not repeated.

When a non-conformance impacts the performance, safety and life-cycle of the Project and its elements, the Design-Builder's Design Engineer of Record for the Work shall evaluate the effect of the non-conformance. Non-conformances related to non-compliance with the QMP and quality related processes do not require review by the Design Engineer of Record. The initial proposed resolution of the non-conformance, including remedial actions if necessary, shall be submitted after review and approval of the Design Engineer of Record within fourteen (14) days after the NCR is submitted to MassDOT, and shall be fully designed and documented. Any affected plans, specifications, calculations and Shop Drawings shall bear the stamp of a Registered Professional Engineer in the Commonwealth of Massachusetts as appropriate. The Design-Builder's Construction QC Manager and Quality Control Administrator shall also verify, by signing the NCR, that the resolution of the non-conformance, including any remedial actions, has undergone the appropriate level of QC review. Where the corrective action requires revision to the Issued for Construction Drawings and/or Special Provisions, a Field Design Change will be required to be submitted for MassDOT review and acceptance including any necessary calculations.

MassDOT shall retain the right to document deficiencies in the Work based on its Acceptance inspection, sampling and testing of the Work. The Design-Builder is responsible for providing MassDOT with QC inspection and testing results in a timely manner. MassDOT may use Deficiency Reports (DRs) to document deficiencies and withhold payment. These Deficiency Reports shall require the same review and ultimate closure by the Design-Builder as a Design-Builder initiated NCR. A DR may also be initiated by MassDOT if QMP and QC processes are not followed.

MassDOT shall review and accept the proposed resolution of any NCR prior to the Design-Builder implementing any corrective action. Where agreement cannot be reached regarding resolution of an NCR, a dispute resolution process shall be used. MassDOT shall ultimately have the authority to call for removal of any non-conforming work should MassDOT not agree that the remedial actions set forth by the Design-Builder are sufficient. MassDOT reserves the right to make cost adjustments for work that, although not in conformance with specifications, is nevertheless satisfactory to remain in place. Fabrication NCRs relating to precast concrete elements will be accepted by the Field Control Engineer and Fabrication NCRs relating to steel and other metal items are accepted by the Metals Control Engineer.

The Design-Builder shall maintain a log of all NCRs and submit this log to MassDOT and the Construction QC Manager on a bi-weekly basis, at a minimum, regardless of any status change. Each NCR shall be assigned a sequential number and shall include a brief description, the status and the expected date for closure for each NCR. MassDOT will not grant Final Acceptance or payment for any portion of the Work that has an outstanding NCR.

2.10 CONSTRUCTION PROCEDURES

The Design-Builder shall review and submit Construction Procedures for items that have the potential to affect public health and safety (such as erection plans, demolition plans, utility monitoring and protection plans, noise control and mitigation plan, dust control, temporary support of excavation, concrete placement, grouting, lead based paint management, structural monitoring, and others as deemed necessary as the work progresses) to MassDOT for review and acceptance. Construction Procedures are separate from Construction QC Plans and should not be combined with or inserted in QC Plans. It may be appropriate to reference relevant Construction Procedures in some QC Plans. All Construction Procedure submittals shall be signed by the Design-Builder's Design QC Manager (Major Participant Lead Engineering Design firm) and Quality Control Administrator indicating that these submittals are in accordance with the Quality Control process established in the approved QMP and in conformance with the Contract requirements. The Designer of Record for the Project shall also review the submittal for structural adequacy and conformance with the Issued for Construction Plans and Specifications and shall stamp the procedures “No Exceptions Taken” or “Reviewed with Comments” in accordance with MassDOT Bridge Manual Part I, Section 6.5.1.

2.11 SHOP DRAWINGS

The Shop Drawing distribution matrix shown in Table 6.3.4-2 of the MassDOT Bridge Manual shall be followed in addition to the submittal distribution list developed at the beginning of the Project. The Design-Builder shall develop a list of those submittals that will require an engineering review by MassDOT and include this list in the corresponding Quality Control Plans for Work Items that include Fabricated Structural Materials. This list shall be submitted in accordance with Section 10.16 and include, but not be limited to, all working drawings, structural steel Shop Drawings, and prestressed and precast concrete element Shop Drawings. All approved Drawings shall be provided to MassDOT three (3) business days prior to the start of Work detailed by the drawings. Any approved Shop Drawings submitted to Fabricators and Manufacturers should include the Special Provisions pertaining to the item and the drawings shall have the same details as listed in the Special Provision. The Drawings submitted to MassDOT shall start from Revision 0. The Design-Builder shall track internal revisions using a different notation from MassDOT. The QMP shall describe the method used by the Design-Builder to track revisions.

2.12 MOCK-UPS AND CONTROL SECTIONS

Mockup Panels shall be required as directed by the owner for MSE wall precast panels or other project elements should they be incorporated in the project design. Fabrication of granite shall be in accordance with the tolerances specified in National Building Granite Quarries Association (NBGQA) specifications and MassDOT Bridge Manual, as needed. Mockups shall be provided that demonstrate the quality, construction and assembly of the elements including but not limited to joints, color, holes, cut-outs, sinkages and openings in granite work for anchors, clamps, dowels, supports, and lifting devices, and methods of securing granite to concrete backing. Mockups shall be provided as needed following acceptance of 75% design plans or acceptance of first structural submittal.

2.13 EARLY RELEASE FOR CONSTRUCTION

The Design-Builder shall establish an Early Release for Construction (ERC) process in accordance with Section 4.6 Early Start of Construction Process. See ERC Submittal Process Flowchart in Appendix C.

2.14 MATERIALS AND WORKMANSHIP QUALITY CERTIFICATE

The Design-Builder shall submit with the as-built plans a “Materials & Workmanship Quality Certificate” signed by the Design-Builder's Construction QC Manager and Quality Control Administrator indicating that all materials and workmanship incorporated in the Project conform to the Contract requirements.

SECTION 3.0: INFORMATION SUPPLIED TO DESIGN-BUILDER/ ACKNOWLEDGEMENT BY DESIGN-BUILDER

The Design-Builder shall have full responsibility to complete the formal design of all Project elements, regardless of the fact that MassDOT has supplied certain preliminary design work for certain portions of the Project to the Design-Builder. All Design Documents shall be furnished to MassDOT after all review submissions have been completed. The Design-Builder shall acknowledge that it has diligently reviewed and verified the MassDOT-Supplied Design for errors, omissions, inconsistencies or other defects and has incorporated into the DB Price all costs associated with correction of any such errors, omissions, inconsistencies and other defects. The Design-Builder specifically shall acknowledge and agree that:

- The design documentation provided with this RFP – including plans, special provisions, and reports – are in general provided for reference only; and are conceptual in nature. The BTC was developed to represent MassDOT preferences and to establish the minimum baseline requirements that shall be equaled or exceeded by the Design-Builder. All Design-Builders acknowledge by receipt of such plans that they explicitly understand that while these plans have been advanced to a significant level of development, the Design-Builder shall be required to provide a final, complete Project design that is stamped, sealed, and certified by their own Massachusetts Registered Professional Engineer of Record for review and approval by MassDOT and possible third parties. However, in this narrative reference will be given to details presented in the plans which are developed to a higher level and are expected to be used as the minimum standard of acceptable design and detailing. Revisions or additions to information in the BTC Plans being provided may be necessary based on comments received;
- The Design-Builder is not entitled to rely on any documents or information provided by MassDOT other than the RFP Documents; and the Design-Builder's right to rely on the Reference Documents is subject to the limitations set forth herein;
- The Design-Builder is responsible for correcting any errors, omissions, and defects in the MassDOT-Supplied Design through the design and/or construction process, with the obligation to correct any errors, omissions, inconsistencies, and other defects affecting therein, all at no additional cost to MassDOT;
- MassDOT shall have no liability for errors, omissions and defects in the MassDOT-Supplied Design or documentation. The foregoing shall not be deemed to limit MassDOT's elimination of obligations with respect to Differing Site Conditions, or the Design-Builder's right to receive any available insurance proceeds;
- Design-Builder's Warranties and indemnities hereunder cover errors, omissions, and defects in the Project even though they may be related to errors, omissions, and defects in the MassDOT-Supplied Design;
- The Design-Builder has independently determined that the MassDOT-Supplied Design presents a feasible concept for the Project which can and shall be used as the basis for the completion of the Project, and agrees that it shall have no right to seek additional compensation or a time extension, except as specifically permitted by negotiated changes in the work; and

- The Design-Builder acknowledges and agrees that MassDOT shall not be responsible or liable in any respect for any loss, damage, injury, liability, cost, expense or cause of action whatsoever suffered by the Design-Builder, its employees, agents, officers or Subcontractors or any other Persons for whom the Design-Builder may be legally or contractually responsible, by reason of any use of any information contained in the MassDOT-Supplied Design or any action or forbearance in reliance thereon, except to the extent that negotiated changes in the work provides for an increase in the DB Price and/or extensions of the milestones with respect to such matter. The Design-Builder further acknowledges and agrees that: (i) if and to the extent the Design-Builder or anyone on the Design-Builder's behalf uses any of said information in any way, such use is made on the basis that the Design-Builder, not MassDOT, has approved of such use and information and is responsible for said information; and (ii) the Design-Builder is capable of conducting and is obligated hereunder to conduct any and all studies, analyses and investigations as it deems advisable to verify or supplement said information, and that any use of said information is entirely at the Design-Builder's own risk and at its own discretion.

SECTION 4.0: PROJECT DESIGN

4.1 PROJECT OVERVIEW AND EXISTING CONDITIONS

The proposed Project is being advanced by the Massachusetts Department of Transportation (MassDOT) to design and construct the full replacement of two bridges located in the Towns of Marion and Wareham, Massachusetts. Both bridges are under MassDOT jurisdiction. The Project will be known as the Bridge Replacement, M-05-001=W-06-013 & W-06-016, Marion Road/Wareham Road (Route 6) over the Weweantic River Design-Build (Proposal No. 605311-128035) and will be as described in this Request for Proposals (RFP). The Base Technical Concept (BTC) consists of bridge and highway BTC plan sets and Draft BTC Special Provisions.

The scope of work includes both design and construction of the partial removal and full replacement of the existing bridges. The scope also includes roadway reconstruction and widening of Route 6 Northbound and Southbound to create shared use paths on each side of the roadway.

MassDOT is proposing to replace the following bridges:

- Route 6 (Wareham/Marion Road) over the Weweantic River – Bridge No. M-05-001=W-06-013 (CBJ)
- Route 6 (Marion Road) over the Weweantic River – Bridge No. W-06-016 (CBH)

Both Route 6 (Wareham/Marion Road) over the Weweantic River Bridge No. M-05-001=W-06-013 (CBJ) and Route 6 (Marion Road) over the Weweantic River Bridge No. W-06-016 (CBH) were built in 1929 and widened in 1956. Bridge No. W-06-016 is three spans and Bridge No. M-05-001=W-06-013 is a 2-span bridge. The deck slabs for both bridges are 8” thick reinforced concrete integral with the concrete beams on the 1929 portion and 7” thick composite reinforced concrete on the 1956 portion. Both bridges have a bituminous concrete wearing surface of varying thickness. The main carrying elements on both bridges are reinforced concrete beams on the 1929 portion and rolled steel W beams on the 1956 portion. The abutments for both bridges consist of cast-in-place concrete abutments founded on timber. The piers for Bridge No. W-06-016 consist of cast-in-place concrete with a rectangular pier cap, wall type stem and footing founded on timber piles. The pier for Bridge No. M-05-001=W-06-013 consist of cast-in-place concrete with a rectangular pier cap, wall type stem, and footing founded on competent soil. Each bridge carries bidirectional traffic with two 11’-0” travel lanes in each direction no shoulders, a 5’-6” wide sidewalk on the west side and a 5’-7” wide sidewalk on the east side. Approximate span lengths are as follows:

- Route 6 (Wareham/Marion Road) over the Weweantic River, M-05-001=M-06-013 (CBJ) – South span 53’-0”” and North span 53’-0”
- Route 6 (Marion Road) over the Weweantic River, W-06-016 (CBH) - south span 46’-6”, center span 51’-6”, and north span 46’-6”

The limits of roadway construction extend along Route 6 from River Road in Marion to Sea Gull Lane in Wareham, a distance of approximately 0.57 miles. The Project includes roadway reconstruction and widening of Route 6 Northbound and Southbound to accommodate wider shoulders and shared use paths. The limits of work on Route 6 are determined primarily by the length needed to reconstruct the bridges while accommodating raising the vertical profile over the waterways

Roadway work includes vertical and horizontal alignment adjustments, milling and variable depth overlay; full-depth pavement construction, roadways for staged construction, grading, granite curb, cement concrete sidewalks, temporary and permanent drainage including salt marsh replication, signage, pavement markings, and other related work.

4.2 SCOPE OF WORK

The Work includes but is not limited to:

Final Design and Construction of all elements.

- Advancing Highway design through 75%, 100%, and Issued for Construction Highway, and through Construction of all elements.
- Advancing Bridge design through, Structural Bridge Submittals, and Issued for Construction Structural and through Construction of all elements.
- Partial demolition of the existing two bridges
- Construction of two new bridges.
- Roadway rehabilitation/reconstruction on Route 6 including sections of full depth HMA pavement, pavement milling, and variable depth HMA overlay and/or leveling course as required for development of proposed cross slopes and roadway profile.
- Geometric modifications to Route 6 including widening northbound and southbound to accommodate wider shoulders and shared use paths.
- Roadside barriers, guardrail, associated barrier end treatments, fences, granite curb, granite edging, and HMA berm, granite curb and edging.
- Construction of riprap along Route 6 for scour protection.
- Widening of Route 6 to facilitate the addition of Shared Use Paths on each side of the roadway, and construction of. ADA-compliant wheelchair ramps at the approaches.
- Temporary traffic control and management as required to maintain safe traffic operations and acceptable roadway conditions during staged construction.
- Construction of all improvements and modifications to drainage systems for temporary and permanent conditions including multiple stormwater control measures (SCMs).
- Construction of all signs and pavement markings and other traffic control devices, including overhead signs, guide signs and route markers, milled rumble strips, and slotted pavement markers.
- Landscaping and restoration of disturbed areas within the Project limits including: identifying invasive plant species and limits, providing appropriate management and treatment plans and specifications and execution of management plan.
- Construction of a Salt Marsh Mitigation area.
- Identifying invasive plant species and limits, providing appropriate management and treatment plans and specifications and execution of management plan.

- Construction of Pedestrian Hybrid Beacons at each approach.
- Installation, maintenance, and removal of all erosion control protections required for work activities, including but not limited to sedimentation fence, sedimentation barrier, silt sacks, combination protection fence, or other siltation and erosion control measures.
- Installation and maintenance of permanent turtle protection / exclusion fences, guardrails, retaining walls, etc. Installation, maintenance, and removal of all temporary turtle protection / exclusion fences
- Construction of a salt marsh mitigation area, restoration of temporarily disturbed vegetated wetland and salt marsh areas.
- Restoration of damaged pavement and disturbed areas within the Project limits.
- Design of temporary works to facilitate staged demolition of the existing bridges and construction of the proposed bridges.
- Off peak, night, and weekend work as required to facilitate demolition and construction.
- Protection in place and/or relocation of existing utilities and utility coordination.
- Constant monitoring, protection, and reinforcing (as necessary) of existing and/or temporary bridge elements to temporarily remain in service.
- Coordination with private and municipal utility owners.
- Coordination during design and construction with stakeholders, State/Municipal officials, local businesses, and residents in conjunction with MassDOT.
- Coordination with surrounding private and public construction activities.
- Community outreach program in conjunction with MassDOT, including maintenance of the Project website to distribute current construction information, particularly as it relates to traffic impacts.
- Compliance with applicable regulatory and environmental approvals and permits issued prior to Notice to Proceed and any amendments or reevaluation made during construction.
- Construction mitigation and proper disposal of Hazardous Materials in accordance with Regulations and Local Laws.
- Maintenance of access to abutters and local businesses throughout construction.
- Construction noise mitigation.
- Construction dust mitigation.

4.3 BTC DESIGN INTENT AND ATC RESTRICTIONS

MassDOT has advanced the design development for the Bridge Replacement, M-05-001=W-06-013 & W-06-016, Marion Road/Wareham Road (Route 6) over the Weweantic River Design-Build Project through the BTC stage. The BTC design was advanced from other alternatives based on meeting the project purpose. The intent of the BTC design is to improve safety, operational efficiency, pedestrian access, cyclist accommodations, and the vertical profile at both bridges. The BTC design will increase safety for all movements within the Project area and address deficient traffic conditions for the movement of people, bicyclists and motorists This Project has the following objectives:

- Improve public safety by replacing the deteriorating bridges.
- Increase vertical clearance to accommodate future sea level rise
- Provide improved multimodal transportation through the construction of Shared Use Paths along Route 6 to accommodate bicycles, and pedestrians

MassDOT has advanced the design development for the bridge replacements through the BTC stage. Abbreviated Bridge Type Selection Worksheets and Formal Sketch Plans will be required to be submitted before advancing to First Structural Submission. ATCs may be submitted for review, and, if accepted, incorporated in the Final Design documents. The MassDOT Bridge Manual, MassDOT Construction Standard Details, and other specific project criteria will be required for the design, detailing, and construction of all components of this Project if not specifically required by the contents of this RFP. The Design-Builder will be required to submit a minimum of four Final Design submissions (Formal with Geotechnical Report, 75% Highway/First Structural Design Submittal; 100% Highway/Second Structural Design Submittal, and Issued for Construction (IFC) Highway/Structural) including Plans and Special Provisions advancing the BTC as required by the MassDOT Project Development and Design Guide (PDDG). Approved ATCs that modify the BTC Plans shall be included in the technical proposal concept plans. The Proposer's concept plans shall show all principal design elements to a level of detail consistent with the Bridge Manual Sketch Plans.

4.3.1 BTC Elements

- The BTC is based on the bridges and span configurations, highway and bridge alignments, profiles, lane configurations, roadside elements, and retaining walls as shown on the BTC plans, and the projected and existing traffic volumes shown in the Functional Design Report.
- Bridges shall be designed and detailed for existing and future utilities as described in Section 4.10 and/or depicted on the BTC plans and detailed so as to be accessible for future maintenance, replacement, and/or upgrading.
- Roadside elements, shall be designed to maximize maintenance access and minimize required roadside protections.
- Proposed limits of work, as shown in the BTC plans are developed to minimize impacts to adjacent properties and the waterway to the extent practicable.

- The BTC depicts temporary barriers for use in staged construction. Temporary barriers shall meet the performance requirements specified in Section 4.9.7. The Design-Builder shall specify how these barriers are to be restrained. Through bolting any portion of the proposed deck that is to remain in the final condition is prohibited. Anchor rods grouted into the deck and removed without damaging the deck once the barrier is removed (or equivalent method) shall be used. The Design-Builder shall develop specifications and testing requirements for anchor rods/bolts used on existing decks to verify adequacy. Through bolting of existing bridge decks is permitted.

4.3.2 ATC Restrictions

ATCs will be evaluated and either accepted or rejected per guidelines presented in Volume 1 of the RFP. The Design-Builder shall provide a design in all ATCs presented to the Department that is equal to or better than the BTC design it intends to supersede. The following is a list of ATC restrictions.

- Any ATC reducing the vertical clearances below Route 6 over the Weweantic River. Any ATC that proposes a steel superstructure.
- Any ATC reducing the horizontal clearances of the Weweantic River.
- Any ATC which incorporates the re-use of existing substructure elements for a permanent structure.
- Any ATC where Mechanically Stabilized Earth (MSE) Abutments or retaining walls are proposed.
- Any ATC which proposes GRS-IBS structures.
- Any ATC which proposes “lean on bracing”.
- Any ATC which does not maintain the required number of vehicular lanes and shoulder dimensions in the final condition on Route 6 shown in the BTC.
- Any ATC that does comply with the proposed low chord identified in the USCG Advanced Approval.
- Any ATC which does not maintain the required Shared Use Paths in the final condition on Route 6 shown in the BTC.
- Any ATC using precast butted box beams or partial depth precast deck panels.
- Any ATC which incorporates lightweight concrete on the bridge deck and/or CF-PL3 or CP-MTL3 barriers.
- Any ATC which does not allow for continuous two lanes of traffic, one in each direction on Route 6 during construction except where allowed in Section 4.9.1.
- Any ATC which does not allow for continuous access to abutting properties except where allowed in Section 4.9.1.
- Any ATC which does not achieve a minimum 45 mph design speed on temporary roadway configurations carrying Route 6. Short term lane shifts and tapers for lane closures on Route 6 shall meet or exceed 55 mph design speed.
- Any ATC will comply with the proposed low chord identified in the USCG Advanced Approval.
- Any ATC that does not maintain the roadway cross section provided in the BTC in the final condition.

4.4 CODES, STANDARDS, AND SPECIFICATIONS

All design and construction shall be governed by Codes, Standards and Specification relevant to public works for Highways and Bridges. AASHTO and MassDOT standards are applicable to the final design and construction documents to be developed by the Design-Builder, including but not limited to the list provided in Section 1.2.2. MassDOT documents are available on the MassDOT web page.

For items that may require special provisions, the Design-Builder will consult with MassDOT to ensure that the Department has not already developed a special provision for said item. When a special provision does exist, MassDOT will provide the Design-Builder with the most current special provision at the time of the request.

The Work shall be completed in conformance with all current engineering and policy directives, and other correspondence normally available and distributed to design consultants from MassDOT.

For Utility related work, the Design-Builder shall be responsible for obtaining and ensuring adherence of design and construction to the respective standards and criteria.

See Appendix C for Project Draft BTC Special Provisions.

4.5 DESIGN REVIEWS AND SUBMITTALS

4.5.1 MassDOT Reviews

Oversight reviews will consist mainly of checks to ensure that RFP and Contract requirements and design criteria are being followed and that Quality Control activities are following the Design-Builder's approved Quality Management Plan. Oversight Reviews, at MassDOT's discretion, include, but are not limited to, review of Design Documents, electronic files, calculations, reports, specifications, geotechnical data, and other relevant design information. It is MassDOT's intent to provide acceptance of the submittals which meet all Contract and RFP requirements as confirmed by the QC Administrator in order for Construction to begin on any particular element.

4.5.2 FHWA Reviews

FHWA will also conduct oversight reviews to ensure compliance with FHWA rules and requirements. FHWA reviews will consist of checks to ensure that RFP and Contract requirements and design criteria are being followed and that Quality Control activities are in conformance with the Design-Builder's approved Quality Management Plan. It is FHWA's intent to provide acceptance of the submittals which meet all Contract and RFP requirements as confirmed by the QC Administrator in order for Construction to begin on any particular element of the Work.

4.5.3 Towns of Marion and Wareham Reviews

Any design impacting traffic and facilities in Marion and/or Wareham, including but not limited to, temporary local detours and truck routes, the Design-Builder will be required to advance design of these items based on Towns of Marion and Wareham and MassDOT reviews. The Design-Builder will be required to organize and host comment resolution meetings for all reviews in coordination with the MassDOT Project Manager.

4.5.4 Reviews by Environmental Regulatory Agencies

The Design-Builder is responsible for all final design and construction phase submissions as required by the environmental permits and approvals. Further information is available in Section 5 and in Appendix C.

The Design-Builder shall assume design phase review of all permit plan changes. Acceptance of modifications will be a condition of construction.

4.5.5 MBTA Reviews

[**THIS SECTION NOT APPLICABLE**]

4.5.6 Design Submittal Review Process

In conformance with Sections 1.1.9 and 1.1.10, the Design-Builder shall make available all Project-wide submittals, including major milestone packages, to facilitate review, approval, and acceptance of the Contract documents. The Design-Builder shall establish a Master Submittal list of Design and Construction Submittals for MassDOT review. The Submittal list should include a short explanation of each submission. The Design-Builder shall provide a schedule for the Submittals that reflects the feasibility of MassDOT completing the reviews within the allotted timeframes. The Submittal list should identify early action or enabling submissions, indicating what work the submission enables and demonstrating the necessity of the enabling work. MassDOT shall use this list to determine the required reviewers and establish a distribution matrix. This list shall be updated periodically by the Design-Builder as the work progresses and submissions are broken up to support Early Release for Construction and resubmitted to MassDOT to determine the required reviewers.

All submittals are subject to review and approval/acceptance by MassDOT, its designated reviewer, if any, FHWA, utility companies, and others as provided herein. Re-submittal for review and approval of any Design Document or Construction Document may be required as appropriate to obtain approvals. MassDOT maintains the right to refuse and reject any submittal that does not comply with the MassDOT requirements related to the preparation and submittal of Contract Documents and Project requirements. Refusal or rejection of submittals will not constitute grounds for delays in schedule.

All design submittals shall be in accordance with the latest MassDOT Project Development and Design Guide including any published revisions, updates or supplements, and shall be in English units. All submittals shall conform to the approved Quality Management Plan (QMP) submitted by the Design-Builder and include a statement of conformance from the QC Administrator. All submittals shall be electronic as well as hard copy. All submittals are required to be part of the overall schedule for the Project and such schedule shall show the thirty (30) Day duration for initial review, duration for response to comments and a resubmittal activity with thirty (30) Day duration for resubmittal review. If submittals are received after 12 PM (noon), the review duration will start on the next business day.

4.5.6.1 Distribution of Submittals

The Design-Builder shall be responsible for the timely distribution of submittals. Submittals shall be distributed to reviewers in accordance with the Project's distribution matrix. The distribution matrix shall be based on the Master Submittal list and shall be updated as necessary for the duration of the Contract.

4.5.6.2 Design Exceptions

Design exceptions are required for the following elements by roadway facility:

- Shoulders, the additional 2' offset to vertical elements over 6 inches in height is not provided.

A Design Justification Workbook (DJW) has been completed and approved by MassDOT and is included in Appendix C. If additional design exceptions are required as a result of an ATC or other design changes incorporated by the Design-Builder, the Design-Builder shall document and submit all design exceptions with the process outlined in the MassDOT Project Development and Design Guide. Any additional design exceptions must be approved by MassDOT and FHWA (as applicable) prior to the 75% Highway Design and initial Structural Bridge Design submittals.

Changes or additions to the current design exceptions may require the Design-Builder to update the approved DJW.

4.5.6.3 Over the Shoulder Reviews & 75% Highway Design, and First Structural Design Submittals

Over the Shoulder (OTS) reviews are examinations by MassDOT and FHWA of design documents during the design process. The over-the-shoulder reviews will be conducted in the field office of the Design-Builder with an option for participants to attend virtually and in the presence of the Design-Builder's design personnel with the intent to minimize disruption of on-going design work. Formal assembly and submittal of drawings or other documents will not be required. The review may be of progress prints, computer images, draft documents, working calculations, draft specifications and reports, or other design documents and these review materials shall be submitted at least three (3) days in advance of the schedule meeting. The Design-Builder shall provide an agenda and short narrative of the items to be discussed with the review material for the meeting. The Design-Builder shall schedule at least one over-the-shoulder review prior to each of the design submittals which includes any Early Release submittals, Formal 75% Highway Design, and First Structural Bridge, 100% Highway Design, Second Structural Bridge, and Issued for Construction Documents. The Design-Builder shall utilize the MassDOT's SharePoint ® site in conformance with Section 1.1.10 and make available all design documents necessary to facilitate over the shoulder reviews.

The Design-Builder shall prepare meeting minutes for all the over the shoulder reviews. Meeting minutes shall be distributed within 2 business days of the meeting and reviewed for completeness by all attendees. Meeting minutes shall be included as part of the design submittal package.

The 75% Highway Design and Structural Bridge submittals shall consist of all documents required by MassDOT in its design materials. First Structural Bridge submittal shall not be submitted prior to review of the Bridge Geotechnical Report. The applicable Geotechnical Reports and Water Quality Data Form (WQDF) shall be submitted concurrently with the Highway and Bridge submittals. The work shall be completed in conformance with all current engineering and policy directives, and other correspondence normally generated and distributed to Design Consultants for MassDOT. Acceptance of the 75% and 100% Highway Design, and Structural Bridge Design submittals shall be obtained from MassDOT prior to proceeding to Issued for Construction. The Design-Builder may continue its design efforts beyond the 75% Highway Design and Bridge Structural plans prior to receiving acceptance of the 75% Highway Design and 1st Structural Bridge from MassDOT at its sole risk, and shall only submit subsequent design submissions for MassDOT review and acceptance after full consensus (from Bridge section; FHWA and any third party as required) with all general highway design and bridge substructure and superstructure design elements have been reached. Such continuation in no way relieves the Design-Builder of the responsibility to incorporate MassDOT and FHWA comments into the Design Documents, nor does it entitle the Design-Builder to any additional compensation or time extension resulting from changes to the Design Documents required by the Design-Builder's QC Team.

4.5.6.4 **Second Structural Bridge and 100% Highway Design Submittal**

The Second Structural Bridge and 100% Highway Design Submittal shall consist of detailed, complete, and checked drawings, reports, and specifications necessary for construction of the applicable portion of the Project and shall be at least 6 weeks prior to starting any physical work. The applicable Geotechnical reports shall be submitted concurrently with the Highway and Bridge submittals. Acceptance of the Second Structural Bridge and 100% Highway Design Documents will be in the form of a designation of "Issued for Construction." All documentation, including MassDOT and FHWA written acceptance, relating to Design Exceptions from design standards shall be provided with the Second Structural Bridge and 100% Highway Design Submittal. The Design-Builder shall schedule at least one over-the-shoulder review prior to the Final Design Submittal. The Design-Builder shall determine an appropriate method (i.e., memorandum) to call reviewers attention to any changes that have been made since the acceptance of the 75% Highway Design & First Structural Bridge submissions; specifically, those changes that were not a result of a comment.

4.5.6.5 **Re-submittal Process**

Re-submittals of any Design Submittal may be required if deemed necessary by MassDOT, or any Federal, State or local regulatory agency with jurisdiction over the Project. Each re-submittal shall address all comments received from a prior submittal. The Design-Builder shall not be entitled to any additional compensation or time extension due to any re-submittal requirement by MassDOT or Federal, State, or local agency.

Resubmittals shall include a summary narrative of design changes from the original submittal, including those that were not the result of a project comment.

The Design-Builder may continue its design efforts, at its sole risk, during the design submittal or re-submittal review process, and shall only submit subsequent design submissions for MassDOT review and acceptance after full consensus (from Bridge section; FHWA and any third party as required) with all general highway design and bridge substructure and superstructure design elements have been reached. Such continuation in no way relieves the Design-Builder of the responsibility to incorporate MassDOT comments into the Design Documents, nor does it entitle the Design-Builder to any additional compensation or time extension resulting from changes to the Design Documents required by the Design-Builder's QC Team.

MassDOT will review and respond to complete design and permit application/amendment submittals within thirty (30) Days. However, the Design-Builder acknowledges that MassDOT has not guaranteed any specific review period for internal reviews or reviews by Federal, State, local agencies, or utility owners. The period for each such review shall be established by the reviewing entity, at its discretion, after a plan submittal has been made to such entity.

After "Issued for Construction," Design Documents are accepted, the Design-Builder shall, at a minimum, provide MassDOT with four (4) sets of signed and sealed Design Documents and with two (2) sets of signed and sealed Design Documents (one (1) full-size copy and one (1) half-size copy of each submittal). In addition, the Design-Builder shall post these documents to the SharePoint IFC library and provide MassDOT with a USB Drive of electronic files consisting of all signed and sealed plans.

4.5.6.6 **Issued for Construction/Approval/Acceptance**

Within thirty (30) days of MassDOT and FHWA written acceptance of the Second Structural Bridge and 100% Highway design of all items and segments of the Project, the Design-Builder shall provide the Design Documents (plans, specifications, reports, calculations, and materials list) organized and indexed in accordance with MassDOT's project development uniform file system. All plans, specifications, and reports shall be signed and sealed by the Professional Engineer registered in the Commonwealth of Massachusetts who is in responsible charge. A written statement shall accompany the final Design Submittal from the QC Administrator indicating that the Issued for Construction Design Submittal is in conformance with all RFP and Contract requirements.

The Design-Builder acknowledges and agrees that acceptance of the 100% Highway Plans and Second Structural plans shall be obtained from MassDOT and applicable local agencies prior to the submission of an "Issued for Construction" Design Documents to MassDOT. MassDOT will also seek and receive FHWA concurrence (as applicable) prior to the acceptance of an "Issued for Construction" (IFC) Design Documents.

4.5.6.7 **Design Change Notices**

For this Project, Design Change Notices, DCNs, are defined as changes to existing Issued for Construction Design Drawings or Special Provisions prior to the commencement of the related construction or material fabrication. These are changes that are not necessitated by a non-conformance corrective action, nor necessitated by a changed field condition. Changes required by the above shall be submitted as Field Design Changes. Design Change Notices include changes implemented by the Designer based on coordination with the Design-Builder, Design-Builder's Fabricator, or MassDOT District or Construction Division personnel. Justification for the design change shall be provided to MassDOT for review and concurrence.

Design Change Notices will be required to be submitted for MassDOT review and acceptance including any necessary calculations. Revisions to the issued for construction (IFC) Drawings shall be in accordance with MassDOT Bridge Manual, Part I, Section 4.4.2.1. Upon acceptance by MassDOT, all revised project documents that were affected are to be redistributed by the Design-Builder within 72 hours.

4.5.6.8 **Field Design Changes**

For this Project, Field Design Change Notices, FDC's, are defined as Designer of Record design changes to existing Issued for Construction Design Drawings or Special Provisions necessitated by a non-conformance corrective action or a changed field condition that were not the intent of the design at the time of Issued for Construction and at the time of MassDOT and FHWA's previous acceptance. Field Design Change Notices will be required to be submitted for MassDOT and regulatory agency review and acceptance including any necessary calculations.

4.6 EARLY START OF CONSTRUCTION PROCESS

The Design-Builder's schedule and work plan shall identify the items, segments, or stages, including but not limited to rock excavation, clearing and grubbing, utility investigation and protection, demolition, temporary construction, and environmental protection mitigation that the Design-Builder plans to release for early construction (i.e., construction that is to start prior to completion of Issued for Construction Design Submittal Documents). The Design-Builder will maintain a log for all Early Release Construction/Fabrication (ERC/ERF) Packages.

MassDOT and FHWA will conduct a meeting to go over the proposed Early Release Design and all other associated components (e.g. approved shop drawings, procedures, reports, etc.). that will be necessary to allow the fabrication or construction for said item or segment to begin. Following this meeting the Design-Builder shall prepare a formal Design Submittal of ERC/ERF using the same QC process established in the approved QMP to MassDOT and FHWA that shall include:

- All design plans;
- Design calculations;
- Design reports;
- Specifications and Special Provisions;
- List of Items and Quantities; (standard and non-standard) including an asterisk adjacent to each and every item requiring a special provision per MassDOT guidance;

Note: see Section 2.7.4 for RMS 360 quantity and specification requirements for all submittals.

There are two categories of Early Release Packages for submission after MassDOT concurrence with the Design Submittal:

- Early Release for Fabrication
- Early Release for Construction

When the Design-Builder has obtained acceptance of the design and other associated components for an item or segment and wishes to proceed with the early start of construction/fabrication thereof, the Design-Builder will submit an Early Release Package, as described in Sections 4.6.1 and 4.6.2. Within this Package, the QC Administrator shall certify that:

- The Design meets all applicable requirements;
- The Design has been checked in accordance with the Design-Builder's approved QMP;
- Said item or segment is ready for construction; and
- The Design-Builder has obtained all required State, Local, Environmental, and Utilities approvals and permits.
- The ERC/ERF package includes all items referenced in 4.6.1 or 4.6.2 as applicable.

4.6.1 Early Release for Fabrication Packages

The Early Release for Fabrication package shall include (as applicable):

- Design Documents
- Shop Drawings with ERC Stamp
- Welding and other applicable fabrication Procedures
- Fabrication Schedule
- List of Items and Quantities: (standard and non-standard)
- Special Provisions (relevant to fabrication)
- Fabricator’s Quality System Manual (QSM)
- QC Plan(s) and Checklist for the work item(s)

4.6.2 Early Release for Construction Packages

The Early release for Construction package shall include (as applicable):

- Design Documents
- Special Provisions
- Documentation that the Design-Builder has obtained all required Governmental, Environmental Regulatory Agencies, and Utility Owner Approvals
- QC Plan(s) and Checklist for the work items
- Shop Drawings with ERC Stamp (for field constructed items)
- Construction Procedure
- Traffic Management Plan
- List of Items and Quantities: (standard and non-standard)

The Design-Builder shall not commence fabrication or construction until the MassDOT review is complete and MassDOT concurs in writing with the QC Administrator's statement approving construction. MassDOT's concurrence with the QC Administrator's approval statement will not constitute approval or acceptance of the design or subsequent construction, nor relieve the Design-Builder of its responsibility to meet the requirements hereof. Irrespective of whether MassDOT provides the Design-Builder with the authority to begin construction on elements of the Project prior to completion of the entire design, the Design-Builder shall bear the responsibility to assure that construction meets the RFP and Contract requirements. Any approved components procured under the Early Start of Construction process shall have their actual dimensions and unique fabrication information incorporated into all subsequent design and construction submittals.

4.7 CONSTRUCTION SEQUENCING

The BTC Plans provided in Appendix C outline a suggested sequence of construction. The sequence of construction reflects the requirements to maintain vehicular traffic along Route 6. Additional limitations and requirements associated with construction sequencing are outlined in Section 4.8. MassDOT's suggested sequence of construction was developed to minimize reductions of capacity on these roadways.

The BTC Plans contain conceptual construction sequencing for informational purposes and show each stage's intent for temporary traffic movements. The Design-Builder will be required to develop and submit its own proposed phasing and associated TTCPs. This is not intended to be an exhaustive list, but to provide major traffic changes, and work activities as described in the BTC plans' staging. Within each stage, it is anticipated that smaller traffic shifts and work setups will occur to accommodate individual Project element construction. The Design-Builder shall prepare plans for all temporary traffic patterns and work setups that occur within each stage. It is expected that some design elements shown in any one individual stage can be completed before the schedule critical elements. The Design-Builder shall open proposed facilities as they are completed and as traffic patterns allow.

Route 6

Stage 1:

1. Relocate existing telephone into existing communications ductbank.
2. Install Temporary Traffic Control and shift traffic to the western portion of the existing structures.
3. Demolish east portion of existing structure.
4. Construct east portion of the new structure.
5. Construct duct bank system to accept the relocation of communication lines.
6. Relocate existing telephone facilities into newly constructed ductbank (by others)

Stage 2:

1. Construct temporary pedestrian sidewalk and shift traffic to the east portion of the new structure.
2. Demolish and construct the western portion of the bridge.
3. Construct electrical ductbank system.

Stage 3:

1. Shift traffic to the western portion of the new structure.
2. Construct eastern shared use path.

4.8 HIGHWAY DESIGN

4.8.1 Survey

The Design-Builder is responsible for obtaining any additional survey as required for use in the preparation of the construction documents for any proposed roadway improvements, stormwater locations, proposed changeable message sign installations, and any other work within or outside the limits of the work shown on the BTC Plans. The survey base plan shall be in conformance to all MassDOT survey requirements and shall be stamped and sealed by a Professional Land Surveyor registered in the Commonwealth of Massachusetts. All available survey files needed to generate the existing BTC Plans are provided in Appendix C. The Design-Builder shall verify the accuracy of survey information provided.

On-the-ground instrument survey was performed by Dawood Engineering in 2017. The survey files are included in Appendix C.

The Design-Builder is responsible for verifying and accepting the available survey for use in preparation of the Final Design Documents. The Design-Builder is responsible for confirming the requirements for the installation of permanent bounds. The Design-Builder shall be responsible for the placement of permanent bounds consistent with the State Highway Layout Alteration Plans. This work will need to be performed by a land surveyor registered in Massachusetts.

4.8.1.1 **Project Survey Control**

All survey control for projects done by or for MassDOT shall be tied into the current State Plane coordinate system and Project vertical datum. Those datums are currently North American Datum of 1983 (2011) Epoch 2010.00 for horizontal control and National Geodetic Vertical Datum 1988 for vertical control.

The survey control points are shown on the Construction Baseline Tie Plans as part of the BTC Plans and are provided in Appendix C. All control points shall be maintained and protected throughout the construction duration. All on the ground and GPS surveys must be localized to the established horizontal and vertical control as provided.

The datum used on the original 1929 bridge plans is not stated. The datum used on the 1956 plans is the Sea Level Datum of 1929.

Survey data, from preliminary design through as-built data after construction, shall be on the datums listed above. Care should be used with electronic CAD data during the entire Project that no translation or rotation of the data occurs. Field notebooks shall be obtained from the District Survey Office and all field notes shall be entered into those department books.

Prior to the Design-Builder establishing any construction baselines or extending the Project Survey Control, the Survey Section at MassDOT headquarters shall be contacted for advice on nearby control and procedures to achieve the required accuracy for the Project. When the control observations have been completed and adjusted, a copy of the adjustment results along with tie sketches of the points established and a brief description of the equipment and procedure used shall be submitted to the Survey Engineer at MassDOT headquarters.

Satellite based project network observations shall be tied to the nearest Federal Base Network (FBN) station or the nearest Cooperative Base Network (CBN) station as found on the National Geodetic Survey (NGS) website (http://www.ngs.noaa.gov/PROJECTS/FBN/), and adjustments shall achieve an accuracy of 0.015m horizontally, and 0.025m vertically (2 sigma or 95 percent confidence). Differential leveling observations shall be tied to the nearest second-order or better vertical control station retrieved from the National Geodetic Survey Datasheet website (https://www.ngs.noaa.gov/datasheets/) or from the MassDOT Geodetic Control website(http://gis.MassDOT.state.ma.us/maptemplate/geodeticcontrol) and double-run leveling shall achieve a closure of less than 6 mm x $(km)^{1/2}$ (km of loop).

4.8.1.2 **Construction Baseline**

The Design-Builder is responsible for creating the construction baselines required for the Project from the information provided on the BTC plans. All available survey files needed to generate the existing BTC Plans are included in Appendix C.

4.8.2 Roadway Design Standards

In addition to all other requirements applicable to the Design hereunder, the Design-Builder shall prepare the final horizontal and vertical design of the roadway elements of the Project in accordance with the standards referenced herein. The roadway design shall be in accordance with the improvement concepts presented in the BTC Plans.

Details such as roadway alignments shall be adjusted to meet the design standards and criteria specified and in accordance with the reference documents and standards in Section 1.2, and additional impacts shall be addressed to satisfy MassDOT and regulatory agencies. The Design-Builder acknowledges and agrees that any significant change to the BTC design provided in Appendix C may require the acquisition of additional properties and also may require amendment(s) to the environmental permits and approvals.

The Design-Builder acknowledges and agrees that a final design not meeting any of the remaining Controlling Criteria, or negative changes to lane and shoulder widths in the design exception currently approved by MassDOT, will require a new Design Justification Workbook be prepared, reviewed and approved by MassDOT. If a Design Justification Workbook is required, the Design-Builder shall be responsible for its preparation and for seeking its approval.

The Design-Builder shall be responsible for preparing design plans and documents stamped by an Engineer registered in the Commonwealth of Massachusetts that are in conformance with the latest MassDOT Project Development and Design Guide.

4.8.2.1 **Roadway Design Documents**

Highway Design BTC plans are included in Appendix C.

The Design submittals shall include at a minimum, the following and all supporting documents/reports as detailed in the latest MassDOT Project Development and Design Guide:

- 75% Highway Design Submittal
- Design Justification Workbook (if required prior to approval of 75% Highway Design Plans)
- 100% Highway Design Submittal, including highway design calculations
- Issued for Construction Highway Design Submittal Documents

The Issued for Construction roadway design documents shall include, but not be limited to, the plans and Special Provisions as required by the latest MassDOT Project Development and Design Guide.

MassDOT submission requirements as defined in MassDOT codes and standards and in current MassDOT Engineering Directives shall also be met.

Plan sets and sheet types for partial construction work elements, or early start of construction, prior to a completed Issued for Construction design shall comply with the Design-Builder's QMP and their QC process and MassDOT oversight and as per Section 4.6.

4.8.3 Roadway Design Criteria

The following subsections specify the roadway design criteria to be used for all roadways within Project limits.

4.8.3.1 Alignment Criteria

The horizontal and vertical alignment and roadway configurations for the facilities to be designed and constructed in the Project limits are defined by the criteria the table below. Unless noted, design speed is the governing factor for all criteria. The design for the roadways shall meet or exceed these criteria in accordance with BTC plans and the approved design exceptions:

Design Criteria for Roadway Facilities within Project Limits

Roadway	Design Speed (mph)	Travel Lane Width (ft)	Inside Shoulder Width (ft)	Outside Shoulder Width (ft)	Max. Vertical Grade	Bicycle Facility/ Width (ft)	Pedestrian Facility/ Width (ft)
Route 6	55	11 typ	N/A	4 typ 2 min	4%	10’ SUP	10’ SUP

Route 6 shall consist of 2 lanes in each direction as shown in the BTC plans.

Any design that changes controlling values shown in the DJWB such as, but not limited to design speed, maximum grade, etc. may be considered as an ATC.

4.8.3.2 Pavement Design

The Design-Builder shall construct pavement sections in conformance with MassDOT Standard Specification Subsection 450 Hot Mix Asphalt Pavement and Subsection 415 Pavement Milling of the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition. New full depth pavement for Route 6 shall be designed for a minimum design life of 40 years and a 20-year design life shall be used for the resurfacing sections.

All embankment, sub-base, and sub-grade shall be constructed in accordance with MassDOT Standard Specifications for Highways and Bridges, 2024 Edition, and all Supplemental Specifications.

The estimated traffic level to be used for all Superpave HMA mixture designs for this Contract expressed in Equivalent Single Axle Loads (ESALs) is **3.4 Million 18-kip (80-kn) ESALs** Pavement grades for each pavement type shall be in accordance with MassDOT Standard Specifications for Highways and Bridges, 2024 Edition.

The performance grade asphalt binder (PGAB Grades) selected for this Contract is PG64-28. Superpave Intermediate and Bases Courses shall be PG64-28. Superpave Surface Course and Superpave Bridge Surface and Bridge Protective Courses shall be PG 64E-28. The PG64E-28 asphalt binder shall meet requirements of PG64E-28 as specified in AASHTO M 332. The curve in Figure X1.1 in Appendix X1 of AASHTO M 332 will be used as an indicator of the presence of a significant elastic response in a binder at a given non-recoverable compliance (Jnr). All references provided in Subsection 450 referring to AASHTO M 320 shall be replaced with AASHTO M 332. The Superpave HMA mixture shall have a certificate of analysis with the AASHTO M 332 test results

The Pavement Design provided below and in the BTC Plans shall be constructed by the Design-Builder and shall meet the following minimum criteria:

PROPOSED FULL DEPTH PAVEMENT
(Route 6 Mainline)

Surface Course: 1.75" Superpave Surface Course – 12.5 (SSC – 12.5 - P) over

Intermediate Course: 2.5" Superpave Intermediate Course – 19.0 (SIC-19.0) over

Base Course: 4.5" Superpave Base Course - 37.5 (SBC-37.5) over

Subbase: 4" Dense Graded Crushed Stone for Sub-Base over
8" Gravel Borrow for Sub-Base

Shared Use Paths and Sidewalks
Surface Course: 4" Cement Concrete (4000 PSI, 0.75", 610) Placed in one Layer, Broom Swept over

Subbase: 8" Gravel Borrow Type B

Milling and Overlay
Surface Course: 1.75" Superpave Surface Course – 12.5 (SSC – 12.5 - P) over

Milling: 1.75" Pavement Fine Milling

OTHER PAVEMENTS

Proposed Bridge Pavement
Surface Course: 1.75" Superpave Bridge Surface Course over – 9.5 Polymer (SSC-B-9.5-P) over

Protective Course: 1.5" Superpave Bridge Protective Course – 12.5 – Polymer (SPC-B-12.5-P)

WHEELCHAIR RAMPS AND DRIVEWAYS

Proposed Wheelchair Ramps
Surface: 4" Cement Concrete (Air Entrained, 4,000 PSI, 3/4", 610) Placed in One Layer, Broom Swept Over
Subbase: 8" Gravel Borrow (Type b)

Proposed Driveway Pavement
Surface: 4" Hot Mix Asphalt Placed in Two Layers
1.5" Superpave Surface Course - 9.5 (SSC-9.5) Over
2.5" Superpave Surface Course - 12.5 (SSC-12.5) Over
Subbase: 8" Gravel Borrow (Type b)

++Where existing gravel is found to be suitable, the existing gravel may be used in proposed subbase, after approval by the Engineer.

Notes:

1. All embankment sub-base and sub-grade materials shall be in accordance with the Standard Specifications for Highways and Bridges Division III: Materials Specifications. Materials for gravel borrow, special borrow and/or reclaimed pavement borrow to be graded and compacted 95% dry density in lifts as required. Unsuitable material shall be removed and replaced. Existing subbase not conforming to the material specification M1.03.0 Gravel Borrow, Type B will be removed to the required depth and replaced with Gravel Borrow, Type B.
2. Prior to substantial completion, the Design-Builder shall mill and resurface the HMA pavement surface course from beginning to end of traffic management plan (including bridge decks) to restore pavement, lane lines and markings as directed by MassDOT. Should the Design-Builder extend the Project limits they are responsible for milling and final paving of the full Project limits as directed by the Engineer.
3. All grooved, milled, and/or scarified pavements must be paved (temporarily or otherwise) in advance of the winter pavement moratorium so as to ensure effective snow and ice removal operations, unless otherwise directed by the Engineer.
4. For bridge decks, concrete surface shall cure a minimum of 48 hours before preparation for spray applied waterproofing membrane shall commence.
5. If the Design-Builder proposes vehicular traffic to travel on an alternative pavement course for an extended duration, the HMA pavement shall be polymer modified.
6. Leveling Courses shall be keyed into the underlying pavement layer.
7. For bridge decks, spray applied membrane and HMA protective course shall be completed no later than 30 days after new bridge decks are open to traffic.
8. All hot mix asphalt pavements shall be constructed in accordance with Section 450 Quality assurance for HMA.
9. Asphalt emulsion for tack coat (Item 452.) Shall be spray applied for triple overlap coverage in accordance with Subsection 450.43 (G) of the Standard Specifications.
10. HMA joint adhesive (Item 453.) shall be applied in surface course at all vertical cold joints prior to HMA paving.
11. Surface paving to be completed at the end of the Project and as directed when it can be placed in its entirety.
12. In Locations of standard milling & overlay, intermediate course and/or variable depth leveling course is to be overlaid within 48 hours to protect the milled surface.

4.8.3.3 **Maintenance of Existing Pavement**

The Design-Builder will be responsible for temporary patching and other minor repairs to ensure the existing pavement, within the Project limits, is maintained at all times during the duration of the Project in a safe condition for traffic or as directed by MassDOT.

During prosecution of the work, MassDOT will identify locations of any necessary pavement repairs, emergency or otherwise, based on observations from the Engineer and alerts by the Design-Builder. Requests for emergency repair by MassDOT must be responded to by the Design-Builder within two hours of notification. The Design-Builder will coordinate with the Resident Engineer to locate the limits of the pavement repairs and the and the limits of all repairs shall be agreed upon by MassDOT prior to the execution of repair.

The Design-Builder will be compensated for the temporary patching and other minor repairs to maintain the existing pavement under the following Contract pay item:

Item	Description	Unit
451.	HMA FOR PATCHING	Ton

Compensation for traffic management and all mobilizations for the existing pavement repairs will be paid under the following Pay Item:

Item	Description	Unit
851.11	TRAFFIC MANAGEMENT AND MOBILIZATION	DAY

This item is only applicable if the work requires a traffic setup outside of an already established work zone. Upon NTP for Maintenance of Existing Pavement issued by District 5, the Design-Builder shall be responsible for the maintenance and repair of the existing Project pavement up until final acceptance. The Design-Builder must anticipate repairs and maintain forces, materials and equipment for such events. The Design-Builder should independently monitor the pavement for defects and make repairs as necessary. Requests for repair by MassDOT must be responded to by the Design-Builder within **two hours** of notification.

If existing pavement is damaged due to the actions of the Design-Builder during construction, any said damage will be repaired at the expense of the Design-Builder as required by MassDOT.

The Special Provisions for these items are included in Appendix C.

Compensation for traffic management of emergency deck repairs and HMA patching will include temporary illumination for work zone. All repair activities are to be coordinated with MassDOT.

4.8.4 Roadway Clear Zone

The Project shall include clear zones that are clear of obstructions. The clear zones shall be in conformance with the latest MassDOT Project Development and Design Guide, AASHTO's Roadside Design Guide (latest edition), and AASHTO's A Policy on Geometric Design of Highways and Streets (2018). The Design-Builder shall design and construct MassDOT standard roadside barriers that meet the requirements of AASHTO Manual for Assessing Safety Hardware (MASH) if designed and tested after December 31, 2010 where clear zone criteria cannot be met.

4.8.5 Roadway Alignment

The Design-Builder shall undertake all work and account for all schedule adjustments required to obtain any new required approvals and/or permits if the final design of the horizontal and/or vertical alignment is changed.

4.9 TRAFFIC ENGINEERING

The Design Justification Workbook (DJW) is provided in Appendix C. MassDOT will review any project design changes from the BTC for consistency with their Policies. Any design changes to the roadway configuration shall meet or exceed the approved elements. Any design changes that require a DJW will be considered an ATC.

The Design-Builder shall utilize the traffic data contained within the Functional Design Report to perform the traffic operational analysis using appropriate software approved by MassDOT to re-evaluate the operational requirements of the design.

Significant design changes to the BTC roadway design will require a reassessment of the approved DJW. These design changes include, but are not limited to, the following:

- Changes to roadway alignment or profile which are not in conformance with the current Controlling Criteria as set forth in Engineering Directive E-20-001.
- Modification to number of travel lanes that require widening (striping modifications would be acceptable)

To determine if the design changes are not less than the approved design per the MassDOT Policies, the Design-Builder shall be required to submit a DJW for review and approval by MassDOT.

A Functional Design Report entitled “Marion & Wareham – Bridge Replacement, M-05-001=W-06-013 & W-06-016”, dated December 2021, (provided in Appendix C) shall be used for reference by the Design-Builder for the approach to traffic design and maintenance of traffic as shown in the BTC Plans. Any modification of the BTC roadway or ramp configurations (permanent or temporary) shall meet or exceed the traffic operations described in the BTC plans and FDR. The Design-Builder shall obtain approval from MassDOT for any lane configurations or ramp locations (permanent or temporary) that vary from the BTC with the submission of a revised FDR. The revised FDR will be evaluated in terms of traffic operations, safety, and overall Project goals represented within the BTC.

4.9.1 Temporary Traffic Control Plan (TTCP)

The Design-Builder shall maintain at least one travel lane in each direction on US Route 6. The Design-Builder shall maintain access to and from all adjacent roadways and provide, at a minimum, the lane configurations per the BTC plan set. Exceptions to the above roadway capacity requirements within the Project area are listed in the RFP below.

Roadway capacity may be reduced during the hours indicated in the following lane closure tables:

US Route 6

LANE RESTRICTION HOURS

	# of lanes open*	Northbound	Southbound
Monday - Thursday	2	6AM - 10PM	6AM - 10PM
	1	10PM – 6AM (Next Day)	10PM – 6AM (Next Day)
Friday	2	6AM - 10PM	6AM - 10PM
	1	10PM – 6AM (Next Day)	10PM – 6AM (Next Day)
Saturday	2	8AM - 7PM	8AM - 9PM
	1	10PM – 6AM (Next Day)	10PM – 6AM (Next Day)
Sunday	2	6AM - 10PM	6AM - 10PM
	1	10PM – 6AM (Next Day)	10PM – 6AM (Next Day)

* Minimum number of through travel lanes required to remain open to traffic.

The Design-Builder will be required to submit a temporary traffic control plan (TTCP) and a Real Time Traffic Management (RTTM) system consistent with their final design for MassDOT approval. Preliminary traffic management and construction staging plans are provided in the BTC Plans. The BTC Plans depict the intended staging and lane requirements during construction and are conceptual in nature. The Design-Builder shall provide traffic control plans consistent with project delivery in their proposal, and advance the traffic control plans to final design. Alternative approaches proposed for the construction of the bridges may result in a modified approach to TTCP's (from the BTC) during the different construction phases. The Design-Builder shall respond to District and Boston Traffic review comments in developing the final traffic control plans. These requirements include, at a minimum, the following:

- One (1) through lane in each direction on Route 6 shall be maintained throughout construction with the exception of short-term lane closures during off-peak hours as indicated in the above referenced lane closure table.
- Minimum lane widths of 11 feet are required on Route 6 for two lanes between barriers.
- Consistent with the outreach requirements of Section 1.1.8 and the contingency planning requirements of Section 10.20; the Design-Builder shall provide temporary traffic staging plans to police, fire, and other emergency and highway assistance services in advance of every traffic detour and every change in temporary traffic control setup.

- The Design-Builder shall provide a Traffic Control Supervisor (TCS) who will be the Responsible Person in Charge of the Project work site relative to all design and/or setup and maintaining traffic control in the work zone. The TCS shall be certified by the American Traffic Safety Services Association (ATSSA) and shall have completed the Traffic Control Technician training as a prerequisite for the Traffic Control Supervisor training and meet all the minimum TCS requirements of the ATSSA Certification Board. The TCS certification must be current and remain current for the duration of the Project.

The Design–Builder shall provide a Real Time Traffic Management System (RTTM). The system will be required to monitor and collect traffic data along various roadway segments, and adjacent roadways impacted by the project and disseminate real-time travel time information through the work zone based on collected or third-party data on a Design-Builder supplied and maintained website via the internet and the traveling public via field installed PCMS. The RTTM System shall provide travel time information through the work zone including determining and displaying heavy traffic conditions. It should also be capable of stopped/slow traffic warning detection. The RTTM software may be accessed via a web portal or utilizing client-side system software. Should software installation be required for access, the Design-Builder shall install, configure, and troubleshoot the software required on any MassDOT computer as necessary to access the full functionality of the system software. The RTTM software shall provide a US DOT Work Zone Data Exchange (WZDx) data feed. The feed shall be accessible by and compatible with the latest version of MassDOT Work Zone Manager (WZM) via HTTP across the internet. The Design-Builder shall provide an Application Program Interface (API) from the RTTM software to the WZM software. The Real Time Traffic Management (RTTM) System design shall consider all proposed lane closures and traffic shifts throughout the project. Portable Changeable Message signs (PCMS) shall be provided on Route 6 to inform the travelling public of the Project, its major construction events, and the Project website throughout the duration of the Project phases that will impact roadway capacity. The locations of PCMS displaying travel time information should be coordinated with the existing Go-Time boards. The Design–Builder shall be responsible for providing, placing and maintaining PCMS and for using them to communicate Project information to the public. The messages posted on the PCMS shall be approved by MassDOT. The Design–Builder shall provide MassDOT with a plan for all proposed PCMS locations and a weekly report of PCMS content. Refer to the BTC plans and Draft BTC Special Provision Subitem 856.3 for Real Time Traffic Management System for Work Zones provided in the Appendix C for additional requirements.

TEMPORARY ALIGNMENT CRITERIA

Route 6

Temporary roadways, alignments, lane shifts and tapers on Route 6 shall meet or exceed the following in accordance with the BTC Plans:

Design Speed:	45mph (horizontal and vertical alignment)
Configuration:	1 travel lane in each direction
Travel Lane Width:	11’ minimum

All short and long term lane shifts and tapers for lane closures shall meet or exceed 45 mph design speed prior to entering project limits, or for initial work zone setups.

LOCAL ROADS

The Design-Builder shall maintain continuous access to side streets and to all abutters' private accesses. The Design-Builder shall also gain all necessary agency and town approvals prior to implementing any short-term overnight detours. The closure shall be noticed to all abutters within 200 feet radius of the Project limits and 14 calendar days prior to implementation.

ADDITIONAL REQUIREMENTS:
The Design-Builder shall coordinate with MassDOT operations and remove traffic management devices as directed to allow for storm clean-up activities should the need arise.

The Design-Builder shall take into consideration the effects of snow removal operations on temporary barriers, fences and traffic management devices remaining in place during storm cleanup activities.

The Design-Builder is responsible for the design, procurement, maintenance and removal of all temporary guide signs required to implement all temporary arrangements. This includes the need to provide temporary signs to replace existing signs which are in conflict with temporary roadways used for traffic management during construction staging. Sign designs and locations shall conform to MUTCD standards and be submitted for approval prior to placement.

The Design-Builder shall reference AASHTO Table 3-9 for limiting factors of superelevations for use in developing TTCP alignments/superelevations.

4.9.2 Roadside Elements

All temporary and permanent roadside design elements within the Project limits and at any advance signing, including but not limited to highway guardrail, temporary and permanent construction barriers, sign supports, drainage outlets, etc. shall be designed in accordance with the most current AASHTO Roadside Design Guide, AASHTO Manual for Assessing Safety Hardware (MASH), MassDOT Standards and all amendments. Sign supports and luminaires shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, latest Edition.

Ground mounted signs shall be designed in accordance with MassDOT design standards and construction standard details. Reflective sheeting for and ground mounted signs shall comply with Materials Subsection M9.30.0.

Proposed signing plans shall include the layouts showing the locations of existing and proposed ground mounted signs, warning and regulatory signs, special sign details, legend, and foundation requirements.

The Design-Builder will be responsible for the maintenance and/or removal of any roadside elements found to be impeding the safe operation of traffic including but not limited to minimum vertical clearance requirements at the discretion of MassDOT. New signage shall be provided as required for the proposed design. If the Design-Builder determines that an existing sign is not consistent with the proposed design, it shall be the responsibility of the Design-Builder to replace as required. The Design-Builder shall replace the existing highway guardrail with new guardrail conforming to the latest AASHTO MASH requirements within the Project.

4.9.3 Pavement Markings

The Design-Builder shall provide temporary and permanent pavement markings, and slotted pavement markers as required within the Project limits to complete the Project. The Design-Builder will be required to design, install and remove pavement markings and markers in accordance with MassDOT and MUTCD standards and specifications.

Pavement markings along Route 6 shall be Recessed Wet Reflective Thermoplastic

All temporary pavement markings shall be as follows:

- Wet reflective paint
- Wet reflective temporary tape for short term use (no more than 7 days) or on milled surfaces

Temporary pavement markings shall be refreshed as necessary for the duration of the Project to remain visible and as directed by MassDOT. The Design-Builder should assume that all temporary paving markings shall be refreshed every 3 months for the duration of the Project or as directed by MassDOT. It should also be assumed that the temporary markings shall be refreshed at least once for any stage that encompasses a winter period.

Temporary pavement markings shall consist of furnishing, applying, maintaining, and removing temporary white and/or yellow reflectorized pavement markings during construction and maintenance operations. Temporary pavement markings shall conform to Materials Subsections M7.01.07, M7.01.14, and M7.01.16, of the Standard Specifications. Other materials which will provide satisfactory durability and reflectivity may be used with prior approval of MassDOT. Any conflicting pavement markings shall be completely eradicated by an approved method. Any conflicting existing recessed pavement markers shall be fully removed, and the recess shall be patched by an approved method.

The Design-Builder shall be responsible for the maintenance/replacement of all temporary and permanent pavement markings and markers within the Project limits through the entire Project duration. Prior to final placement of proposed pavement markings, all temporary and existing pavement markings shall be entirely removed from the pavement surface. Areas where pavement markings are removed on the final surface shall be newly milled, resurfaced and restriped.

The Design-Builder shall promptly respond to all requests by MassDOT to refresh markings during the Project.

Temporary markings shall be provided for all temporary lane alignments on Route 6, required by the sequence of construction implemented. The Design-Builder will be required to modify the existing and temporary markings as necessary each time a revision to temporary lane alignments are implemented.

4.9.4 Guardrail and Substructure Protection Barrier

The Design-Builder shall replace the existing highway guardrail with new guardrail conforming to the latest AASHTO MASH requirements within the limits of work.

4.9.5 Bicycle Lanes and Bicycle Accommodations

The Design-Builder shall construct Shared Use Paths no less than that shown in the BTC plans. The bicycle and pedestrian accommodations will need to meet the specifications and requirements of the 2012 AASHTO Guide for the Development of Bicycle Facilities, the MassDOT Project Development Design Guide Book as well as the MassDOT Separated Bike Lane Planning & Design Guide and will need to be approved by MassDOT.

4.9.6 Temporary Barrier Systems for Construction and Maintenance Operations

The Design-Builder shall utilize MASH performance requirements for deployments of temporary barrier per Engineering Directive E-16-002 and E-20-004.

Refer to the Draft BTC Special Provision Subitem 853.33 Temporary Barrier-Limited Deflection (TL-3) barriers provided in Appendix C for additional requirements.

4.10 BRIDGE DESIGN AND OTHER STRUCTURES

4.10.1 General

MassDOT is proposing to replace the following bridges:

- Route 6 (Wareham/Marion Road) over the Weweantic River – Bridge No. M-05-001=W-06-013 (45E & 9TV)
- Route 6 (Marion Road) over the Weweantic River – Bridge No. W-06-016 (45K)

The Design-Builder shall design, demolish, and construct the above structures and make the Project fully functional in accordance with all contract requirements.

The BTC plans detail the general configuration, bridge type and elements/treatments that have been developed through the preliminary concept phase of the Project. The preliminary roadway alignment, profile, and cross section shown on the BTC plans were developed through coordination performed for the Project. Final bridge design will be required as part of this Project. Further details on modification limitations in the final design are outlined in this RFP.

The Design-Builder will finalize the bridge design in conformance with the latest MassDOT LRFD Bridge Manual, AASHTO standards, and all other standards as applicable. The final design will meet the current seismic requirements of the MassDOT Bridge Manual as amended in Section 4.10.3.2. Bridge Rating Reports (per MassDOT Bridge Manual, Chapter 7) of the as-built replacement structures will be prepared by the Design-Builder after the bridges are constructed, open for full beneficial use, and inspected by MassDOT.

In general, the scope of work for this Project is based on the BTC shown on the reference Plans issued with this RFP. The final design, details, and means and methods of construction for the Work will be the responsibility of the Design-Builder. This narrative will specify components and concepts to establish a minimum level of design and detailing that must be equaled or exceeded by the Design-Builder. All Design-Builders acknowledge by receipt of such plans that they explicitly understand that while these plans have been advanced to the preliminary design level, the Design-Builder shall be required to provide a final, complete Project design that is stamped, sealed and certified by their own Professional Engineer of Record for review and approval by MassDOT and possible third parties. The Professional Engineer must be registered in the Commonwealth of Massachusetts.

The structural integrity of existing structures and utility infrastructure must be maintained throughout construction until and unless those structures or utilities are removed from service. The Design-Builder shall verify locations of all existing structures and utilities, and shall also provide a final design of proposed structures needed to maintain the integrity of the existing structures and utilities, until they are removed from use and/or demolished.

The Design-Builder shall address construction loading on all existing and proposed bridge elements, including but not limited to loads on the existing bridge's superstructure, abutments, wingwalls, and piers. Construction loading on existing and new bridge elements is not addressed on the BTC Plans.

Construction plans for the existing structures are included in Appendix C. A brief description of each existing structure is provided below. The existing utilities listed for each bridge are approximately as shown on the BTC plans; the Design-Builder is responsible for verifying existing utilities and existing utility locations. The Design-Builder shall also refer to the Utility plans and Section 6.0.

The Design-Builder shall be aware that all existing paint is assumed to be lead based or containing lead.

4.10.1.1 **Description of Existing Bridges**

The following section provides a description of the existing bridges.

Bridge M-05-001=W-06-013 (45E & 9TV): The existing bridge which carries Route 6 (Wareham/Marion Road) over the Weweantic River consists of two continuous clear spans of approximate lengths of 49'-9" with an overall length of 139'-0" from endpost to endpost. The bridge does not have a skew. The 1929 superstructure main carrying members are composed of 6 continuous concrete cast-in-place Tee Beams with monolithic concrete deck. The 1957 widened portion of the superstructure main carrying members are composed of 4 steel beams with a cast-in-place concrete deck. The wearing surface is bituminous concrete of varying thickness with membrane waterproofing. There are 5'-7" sidewalks on both sides of the bridge.

The bridge has an out-to-out dimension of 58'-6" and carries two-way traffic with four, 11'-0" travel lanes, two lanes in each direction with no shoulders. The superstructure is supported by C.I.P. reinforced concrete abutments founded on timber piles. Intermediate support is provided by C.I.P. reinforced concrete pier with a rectangular pier cap, founded on tremie with existing sheeting left in place. Substructures are faced with granite block masonry. The bridge supports telecommunication conduit for various utilities.

Bridge W-06-016 (45K): The existing bridge which carries Route 6 (Marion Road) over the Weweantic River consists of three continuous spans of approximate lengths; South 46'-6", center 51'-6"and North 46'-6". The bridge does not have a skew. The 1929 superstructure main carrying members are composed of 6 continuous concrete cast-in-place Tee Beams with monolithic concrete deck. The 1957 widened portion of the superstructure main carrying members are composed of 4 steel beams with a cast-in-place concrete deck. The wearing surface is bituminous concrete of varying thickness with membrane waterproofing. There are 5'-7" sidewalks on both sides of the bridge.

The bridge has an out-to-out dimension of 58'-6" and carries two way traffic with four, 11'-0" travel lanes, two lanes in each direction with no shoulders. The exterior spans of the superstructure are supported on C.I.P. reinforced concrete abutments founded on timber piles. Intermediate support is provided by C.I.P. reinforced concrete piers with a rectangular pier cap founded on timber piles. Substructures are faced with granite block masonry. The bridge supports telecommunication conduit for various utilities.

Bridge Plans Dated 27 April 1901

At least two bridges were built at the subject site prior to the existing bridge. Plans for Bridge No. M-05-001 = W-06-013 from 1901, 1904, 1929, and 1956 are available. It appears that, prior to 1901, the causeway was supported by stone retaining walls and riprap and was wider at the abutments. We are not aware of any drawings that show this earlier bridge but the outlines of the abutments and retaining walls are shown on the 1901 drawings. It also appears as though there were 3 rectangular piers (most likely of stone masonry construction) supporting this earlier bridge. Although the exact locations of the prior substructures are not clear, they appear to have been in about the same location as the current bridge. Therefore, it seems reasonable to assume that there are most likely remnants of the prior bridge structures and foundations buried beneath the existing causeway and in the river.

As part of the 1901 bridge replacement, the causeway elevation was increased by placing fill berms adjacent to the existing stone retaining walls on each side of the causeway, creating a buttressing slope protected by riprap. The 1901 drawings show the "West Bridge" (which is now Bridge No. M-05-001 = W-06-013) was to be supported on 10-in. dia. cast iron piles with 4 river piers spaced at about 16.5 ft on center. These drawings also show the abutments supported on timber piles and a 30-ft wide bridge deck with both a roadway and train or trolley tracks.

The 1904 drawing appears to be a survey of the top of the bridge's wheel-guard and deck, perhaps done in response to some settlement of the bridge.

Bridge Plans Dated February 1929

Drawings dated 1929 show the replacement for the circa 1901 bridge. This 1929 bridge still exists as the northern roughly 2/3 of the current bridge, which was expanded to the south in the 1950's (as discussed below). These drawings indicate that the 1929 bridge has rubble concrete abutments bearing on timber piles and that the center pier was constructed on a rubble concrete spread footing, built within a cofferdam.

As part of the 1929 construction, the new abutments were constructed about 12 ft inboard of the existing abutments and the width of the causeway opening between abutments was increased. While the above water portions of the original abutments appear to have been removed, timber piles foundations (and possibly timber cribbing and masonry) are likely still in place.

The location of the abutments of the 1929 bridge relative to the 1901 bridge is shown on the 1929 drawings. The centerline alignment of the 1929 bridge is about 10 ft south of the 1901 bridge and the 1929 bridge was slightly wider. A 20-ft wide temporary bridge supported on timber piles is also referenced which was constructed at an unknown location to maintain traffic flow during the 1929 construction.

Bridge Plans Dated November 1956

The 1956 bridge drawings were for widening the bridge 20 ft to the south using similar foundations to the ones used for the 1929 bridge. Presumably the causeway was also widened in 1956. The 1959 drawings indicate that the timber piles driven to widen the bridge were designed for a 36-kip capacity.

MassDOT Timber Pile Driving Records dated 1957

The timber pile records suggest the piles are generally less than 50 ft long at Bridge No. M-05-001 = W-06-013.

4.10.2 Demolition

4.10.2.1 General

The demolition work included in this Project consists of removal and disposal of the existing bridge superstructures and portions of existing bridge substructures, including all attachments and existing pile foundations that interfere with the proposed work, as identified in this section, and as shown on the BTC Drawings.

All existing abutments, wingwalls, and piers shall be demolished to the limits shown in the BTC plans. Where demolition is required, existing structures shall be demolished to a minimum of 2'-0" below final grade unless noted otherwise in the BTC plans, in this Request for Proposals, or as required to allow for new construction. The Design-Builder shall confirm that any portions of existing substructures to remain below final grade do not impact the proposed work (proposed substructures, utilities, structural elements, concrete barriers, etc.) and shall be, at a minimum, 1'-0" away from any proposed work.

The Design-Builder shall verify that existing piers, and abutments, have sufficient capacity to accommodate the Design-Builder's proposed bridge staging. Additional support/reinforcing, as required, shall be designed and installed by the Design-Builder.

The Design-Builder shall verify the adequacy of existing concrete to support any anchorages that are proposed to facilitate construction staging or demolition.

The Design-Builder shall verify the existing utilities on and around the structures being demolished, prior to demolition. The Design-Builder shall also coordinate with all utility companies to include any utility shifts and temporary utility placements between demolition stages.

4.10.2.2 Demolition Limits and Scope of Work

The following is a list of the bridges that are to be demolished per the BTC drawings:

- Route 6 (Wareham/Marion Road) over the Weweantic River – Bridge No. M-05-001=W-06-013 (45E & 9TV)
- Route 6 (Marion Road) over the Weweantic River – Bridge No. W-06-016 (45K)

The demolition limits shown on the BTC plans are necessary to construct the new bridges. If the Design-Builder chooses to propose a design that is different from what is shown on the BTC plans and requires different demolition limits, then they shall perform the necessary investigations with respect to impacts to ROW, permitting, planning, environmental, staging, etc. All demolished portions of the bridges shall be disposed of in accordance with Section 4.10.2.3. At a minimum, all existing piers within the river shall be demolished to 2'-0" below mudline. After demolition of the existing piers in the river, the areas of the streambed that were disturbed shall be restored according to the details and special provisions for Streambed Restoration. All existing abutments and land piers shall be demolished to top of footing, or 2'-0" below final grade, whichever is lower.

Staged demolition is required for all structures in order to maintain the required two through lanes on Route 6, as shown on the BTC Plans and as required by Section 4.9. The Design-Builder shall manage roadway drainage between existing and proposed structures throughout all stages of demolition and construction. Utility relocations are required to be accommodated as part of the staged demolition and construction.

4.10.2.3 **Demolition Methods**

Protection:

The Design-Builder shall take care not to damage existing portions of structures that are to remain through the various construction phases. Any item damaged, or otherwise made unsatisfactory for continued use due to demolition operations, shall be repaired or replaced with an equal or better product at the expense of the Design-Builder. The Design--Builder shall ensure the structural stability and integrity of all structures during all stages of demolition. This shall be demonstrated in a detailed demolition plan submission as described in Section 4.10.2.3.8.

The Design-Builder shall ensure the safe passage of vehicular, pedestrian, bicycle and marine traffic around demolition areas and prevent injury to persons and damage to property through the use of appropriate temporary shielding, protective barriers and enclosures and temporary earth support during the removal of substructure elements. Temporary Protective Shielding shall be placed on the existing super/substructures prior to demolition.

Bridge stringers shall be disposed of at a legal location, in accordance with Section 4.10.2.3.4

Condition of Structures:

The Design-Builder shall investigate and assure itself of the condition of the work to be demolished and shall take all precautions to ensure safety of persons and property. In addition, the Design-Builder shall be aware that all existing paint is assumed to be lead-based or contains lead.

4.10.2.3.1 *Utilities:*

Maintain all utilities except those requiring relocation. Keep utilities in service and protect from damage. The Design-Builder shall coordinate with all utility companies involved in the Project limits prior to any structural demolition.

The Design-Builder shall be responsible for adequately protecting existing utility lines to remain in service. If any utilities are damaged due to the Design-Builder's operations, they shall be repaired at the expense of the Design-Builder.

4.10.2.3.2 *Traffic:*

Conduct operations and removal of debris to ensure minimum interference with the normal use of public ways and other adjacent facilities. Do not close or obstruct traffic ways, streets, walks or other used facilities without the written permission of MassDOT, the towns of Wareham and Marion.

4.10.2.3.3 *Salvage:*

All materials removed under this Section which are not to be re-used on the proposed structure shall become the property of the Design-Builder and shall be removed from the job site and disposed of legally.

4.10.2.3.4 *Explosives:*

The use of explosives shall not be permitted under any circumstances in the demolition process.

4.10.2.3.5 *Demolition/ Construction Staging:*

The BTC plans show suggested staging/phasing plans for all bridges.

4.10.2.3.6 *Hazardous Materials:*

Refer to Section 5.6.10 for Hazardous Waste requirements for the Project.

4.10.2.3.7 *Submittals:*

The Design-Builder shall be responsible for submitting the information listed in this section to MassDOT for review and acceptance for each bridge structure to be demolished.

1. Plan identifying off-site disposal locations.

2. Agency certification(s) for off-site disposal locations.

3. Prior to the submission of a periodic invoice for payment for Work including materials disposal, the Design-Builder shall submit all disposal receipts from the solid waste facility or the recycling site. Such receipts shall bear the printed name of the facility operator and shall specify the date of delivery, the quantity and type of material delivered, and shall be signed by an on-site representative of the facility operator. For disposal of materials that qualify for payment, no payments will be made for the disposal of materials for which there are no signed disposal receipts.

4. A demolition scheme shall be submitted for review and approval for each structure indicating procedures, sequence of operations, placement of shields, barriers, equipment types and placement, dust control, and plan of demolition. The demolition scheme shall be a part of an overall demolition scheme for the Project and shall be coordinated with proposed construction sequencing and Temporary Traffic Control Plans (TTCP). At a minimum, the following information shall be included in the submittal.

    a. Plan(s) showing the location of all roadways, utilities, structures to be removed, protective barriers and shielding as required and other appurtenances in the vicinity of the demolition areas.

    b. Provide details of shielding showing materials and methods of securing it in place.

    c. Identification of crane and lifting equipment type and model, set-up location(s), and intended operating radii and pick loads during each stage.

d. Crane and lifting equipment technical information including rating data. Information shall include equipment geometry, weight, boom lift capacity and crawler/outrigger pressure tables.

e. Identification of the order and sequence of lifts, repositioning of equipment, and intended pick weights.

f. If applicable, identify methods and materials proposed for temporary structures or strengthening of specific structural members for stability during the demolition process.

g. Identification of other equipment proposed for use in the demolition process.

h. A schedule of demolition operations identifying durations and sequence.

i. Any other pertinent information that describes the proposed demolition procedure.

5. The methods and schemes proposed for demolition and shielding shall be prepared under the supervision of, and be signed and sealed by a Professional Engineer registered in the Commonwealth of Massachusetts. Such Engineer must be familiar with these specifications, those of the American Association of State Highway and Transportation Officials (AASHTO), The Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, the Work, and be experienced in the technical field. All drawings and calculations shall be stamped with the seal of the supervising Engineer.

6. Calculations evaluating each existing bridge's superstructure and substructure during each stage of demolition and construction. The submissions shall be prepared, signed, and sealed by a Professional Engineer registered in the Commonwealth of Massachusetts.

7. These submittals shall be reviewed and approved by the Design-Builder's Designer of Record prior to being submitted for review and acceptance by MassDOT.

8. Any acceptance of the above submissions by MassDOT shall not relieve the Design-Builder of complete responsibility for all demolition procedures and operations.

4.10.3 Bridge Design Criteria

All design shall conform to the following:

- AASHTO LRFD Bridge Design Specifications (current edition)
- MassDOT LRFD Bridge Manual (current edition with any revisions)

4.10.3.1 **Structure Design Requirements**

The proposed replacement bridge structures shall be designed according to the specifications contained herein including any current updates or revisions. The Design-Builder shall work within the constraints provided to advance a concept that meets all technical and functional requirements. For conflicts between the MassDOT Bridge Manual and the AASHTO design codes, the more stringent requirements shall apply.

4.10.3.2 **Seismic Design Requirements**

The final design of all new bridges prepared by the Design-Builder shall include a seismic analysis of each structure in conformance with the MassDOT LRFD Bridge Design Manual, including the use of the following documents:

- Seismic Design Criteria as specified in Part 1 Section 3 of the latest MassDOT LRFD Bridge Manual.
- AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd edition, 2011 with 2012, 2014, and 2015 and 2022 Interim Revisions.

Note, seismic design requirement for buried structures shall be in accordance with AASHTO LRFD Section 12.6.1.

The Design-Builder shall clearly define their method of seismic analysis in their Technical Proposal. The final design for the structures will need to follow the requirements of the AASHTO Guide Specifications for LRFD Seismic Bridge Design (Section 5).

4.10.3.3 **Geotechnical Requirements/Existing Substructures**

A Geotechnical Data Report for the Project is included in Appendix C. The Final Geotechnical Reports based on the provided Geotechnical Data Report and any further geotechnical investigation conducted by the Design-Builder shall be completed by the Design-Builder as part of this RFP and at no additional cost to MassDOT.

The Final Geotechnical Reports shall be prepared and submitted for review and approval in accordance with the latest MassDOT LRFD Bridge Manual Part I. See Section 4.11 for additional information on the Final Geotechnical Reports. A separate report for each bridge is required.

4.10.4 Bridge Design Intent

4.10.4.1 **General**

The Project as shown on the BTC plans contains areas of specific design intent. The design intent is for the Design-Builder to propose and design bridge structures that incorporate design innovations, best engineering practices and accelerated bridge techniques that best meet the requirements of the Project as specified in the RFP documents and BTC Plans.

Design intent shown on the BTC shall be followed. The Design-Builder is responsible for the final bridge configuration. Pre-approved ATC(s) meeting the design criteria and standards listed in Section 4.10.3 and the criteria specified in the following sections may be presented in the Technical Proposal. Refinements consistent with the BTC design intent introduced by the Design-Builder to the design shown on the BTC are not considered an ATC.

At the time of this RFP and BTC development, the Hundredth Anniversary Edition of the MassDOT Bridge Design Manual was forthcoming prior to Technical Proposal and Price Proposal submission. Upon Contract Award, NTP, and commencement of design development, bridge design and detailing shall follow the newly issued MassDOT Bridge Design Manual.

4.10.4.2 **Bridge Design Criteria**

The following is a list of bridge design criteria that applies to all structures **unless specified within each bridge heading succeeding this list**:

General:

- All bridges included here are not considered critical and essential structures and shall follow the requirements for a "non critical-non essential bridge" in the MassDOT LRFD Bridge Manual.
- Design shall be based on Load and Resistance Factor Design (LRFD) for HL-93 Live Loading.
- The bridges shall be designed and constructed with a minimum design life of 75 years.
- Steel Superstructures shall not be allowed on this project.
- The proposed design will ensure the minimum vertical clearance of Route 6 over the Weweantic River is maintained, as shown on the BTC plans.
- Bridge types are not restricted to those historically (as detailed in LRFD Bridge Manual) used by MassDOT. The Design-Builder may propose other types of components and submit to MassDOT for approval as an ATC. MassDOT will make its determination by considering, among other factors, whether the proposed type has been accepted for general use by other transportation authorities and the Design-Builder has demonstrated the bridge type and components will perform under Project conditions.
- The Design-Builder shall utilize, as applicable, the MassDOT Bridge Construction Special Provisions on the MassDOT website: https://www.mass.gov/info-details/bridge-construction-special-provisions.
- The design and construction of any temporary bridges proposed as part of this Project shall follow the MassDOT LRFD Bridge Manual and AASHTO LRFD Guide Design Specifications for Bridge Temporary Works. Temporary bridges shall be able to accommodate MASH TL-3 bridge barriers.
- All cast in place concrete, including but not limited to substructure, foundation elements, and approach slabs, shall be 5000 psi, HP concrete, as indicated in the Bridge Manual.
- Design-Builder shall coordinate with MassDOT for current bridge standard title and subsequent sheet format.
- BTC bridge joint concept as depicted in the BTC is based on the design intent for the reduction or elimination of bridge joints.
- Minimum requirements of Bridge Manual Part I-3 for conventional bridges shall be followed for design development of any final superstructure detailing.

Superstructure:

- All bridge wearing surfaces shall be designed in accordance with Section 4.8.3.2.
- Any bridge deck on which traffic will be placed shall receive the full 3" pavement (wearing and protective course). The 1½" surface course shall be milled and paved once traffic is in the final alignment before final striping. If bolt down barrier is used on bridge decks, deck details shall be included for restoring the deck, waterproof membrane and overlay on the structure for the final condition following removal of the bolted down temporary barrier.
- Bridge decks shall be HP concrete in accordance with the MassDOT LRFD Bridge Manual. The decks shall be composite along their entire lengths including any negative moment regions.
- Open or filled grating decks, cast-in-place bare decks, partial depth concrete deck panels and orthotropic decks shall not be permitted.
- Cast-in-place bridge decks shall be made continuous through each stage of construction by utilizing mechanical reinforcing bar splicers or adequately developed bars extending from one stage to the next.
- Stay-in-place metal deck forms shall be used except as noted in Section 3.5.2.4 of the MassDOT LRFD Bridge Manual.
- Adjacent concrete boxes are to not be used for any superstructure type within this Project. However, spread boxes with standard composite decks are allowed.
- The Design-Builder shall provide a structural design for the moment slab supporting the traffic barriers on the approach embankment of all bridges if proposed. The design shall consider any additional loads resulting from all roadway light poles, sign support haunches, etc. in addition to the dead and vehicular loads in accordance with AASHTO LRFD Bridge Design Specifications.
- The Design-Builder shall not modify the basic structure widths beyond limits previously stated (Section 1.1.1.) from those provided in the BTC. A bridge barrier shall be provided to separate the shared use paths from the roadway on all structures.
- For bridges carrying utilities, the Design-Builder shall place all utilities as shown on the BTC plans or as approved by the utility companies and MassDOT. The utility bays shall be designed by the Design-Builder per the MassDOT LRFD Bridge Manual. Proposed utilities shall not extend below the low chord of the proposed bridges. The bridge type should take into consideration the proposed utilities. The Design-Builder shall provide a removable approach slab on all approaches for bridges with a proposed or future utility bay in accordance with the Bridge Manual. The Design-Builder shall brick up all backwall utility penetrations after utility installation.
- Both bridges shall be a consistent superstructure type.

Substructure:

- Pier and abutment geometry, including clear openings shall be the minimum shown in the BTC.
- If the Design-Builder proposes to place the proposed substructures more than 15 feet from the location shown on the BTC plans, then the Design-Builder shall perform new borings and provide geotechnical data and calculation to validate the placement of the substructures. The Design-Builder shall account for additional borings in their bid. See Geotechnical requirements section of this document for more information.
- All bearings shall be in conformance with the MassDOT Bridge Manual, based on the selected superstructure type selected type. Elastomer will have a hardness of 60 durometer. A single bearing type will be used throughout the project. The Design-Builder shall investigate if vertical tie downs are required to resist against the buoyant force during the design flood event.
    a. Design-Builder to follow AASHTO Guide Specifications for Bridges Vulnerable to Coastal Storms (BVCS) (AASHTO 2008 including 2023 Interim).
    b. Refer to Draft Hydraulic Report included in the RFP appendices for Hydraulic Loadings used for preliminary design of Bridges provided in BTC plans.
- The proposed span arrangements shown in the BTC plans have associated borings, geophysical, or other information with each substructure element, either existing borings or new borings as part of this project and in accordance with the Bridge Manual. See Section 4.10 for geotechnical requirements.
- All foundations shall be scour resilient and designed to be socketed into bedrock.

MassDOT has advanced the design development for the bridges included in this project through the BTC stage. The following is a description of each bridge proposed in the BTC plans. Following the descriptions are specific attributes and design requirements to each bridge. Unless specifically stated herein, the dimensions and structural elements shown on the plans are for schematic purposes only.

4.10.4.2.1 *Route 6 Bridges*

The BTC proposes both bridges be concrete superstructure bridges supported by drilled shaft supported abutments behind the existing abutments, and piers supported by a pile cap on drilled shafts.

The bridge cross sections will accommodate the following lane configurations as shown in the BTC Plans as follows:

- Route 6 (Wareham/Marion Road) over the Weweantic River – Bridge No. M-05-001=W-06-013 (CBJ) - four 11’-0” travel lanes (two in each direction) and 4’-0” shoulders and 10’-0” Share Use Paths on each side of the bridge.
- Route 6 (Marion Road) over the Weweantic River – Bridge No. W-06-016 (CBH) - four 11’-0” travel lanes (two in each direction) and 4’-0” shoulders and 10”-0” Share Use Paths on each side of the bridge.

In order to maintain the required two travel lanes on Route 6, staged construction is proposed as shown in the BTC plans. No thru bolting of the proposed deck is allowed.

All in-water work shall comply with the time-of-year (TOY) restrictions as listed in the environmental permits.

The BTC proposes piers within the Weweantic River as columns founded on a shaft cap on drilled shafts as shown in the BTC Alternative pier designs will require a submittal of an ATC for MassDOT review.

Scour/Stability Analysis shall be conducted in conformance with the MassDOT LRFD Bridge Manual – Part I and Part II. Additionally, the piers within the river shall be designed for both the un-scoured/scoured conditions for the Extreme limit states. The scour to be included with the Extreme Limit States I & II equals 50% of the total scour for the 100-Year Design Flood.

- Preliminary design looked at the bridge un-scoured/scoured conditions for strength and Extreme limit states per AASHTO LRFD and per BVCS 2008 load combinations.
- For preliminary study, scour depth and hydraulic loadings are taken from the Draft Hydraulic Report included in the RFP appendices.
- For lateral soil loading behind abutment wall for Extreme Events combination with Earthquakes, Design-Builder may only consider soil pressure above top of deep foundation for scoured conditions.
- Preliminary design incorporated section properties of drilled shafts with permanent steel casing for Extreme limit states with EQ and or Hydraulic wave loading per BVCS.
- If the Design-Builder proposes to use drilled shafts with permanent steel casing (CFST or RCFST), they need to follow design procedures per AASHTO LRFD Sections 6.9.6 & 6.12.2.3.3 and the detailing recommendations per following references:
    - FHWA-NHI-18-024: Drilled Shafts – Construction Procedures and Design Methods
    - NCHRP Research Report 872 (Project 12-93): Contribution of Steel Casing to Single Shaft Foundation Structural Resistance
    - Washington State DOT Design Memorandum dated October 07, 2012: Structural Design Recommendations of CFT and RCFT for Bridge Foundation

Each exterior bay will hold FRE conduits for Verizon, comcast and Eversource. An 18" pipe sleeve for future sewer pipe shall be installed at each abutment backwall.

Approach slabs shall include removable panels at utility locations to allow future access to the utilities.

In the event non cast in place deck is utilized, structural framing shall be designed to accommodate future cast in place deck replacement.

4.10.5 Employment of Accelerated Bridge Construction Techniques

MassDOT is committed to the use of innovative and accelerated project development and construction. As a result, accelerated bridge construction techniques are encouraged to facilitate on-time, on-budget project completion with minimum disruption to people and commerce. MassDOT encourages the use of accelerated construction techniques on this Project, including but not limited to rapid demolition and erection methods.

4.10.6 Erection Procedure

The Design-Builder shall design the proposed erection procedures for all bridges, which include but are not limited to, rigging, lifting attachments, temporary shoring, bracing systems, supports, falsework, crane locations, crane capacity charts, other lifting equipment, and jacking necessary to allow construction of all structural components. The calculations, drawings and erection sequences shall be signed and sealed by a registered Professional Engineer in the Commonwealth of Massachusetts and shall be submitted to the Engineer of Record for review and approval and then to MassDOT for review and acceptance.

Erection Procedures that exceed the limitations of the environmental permit documents may be considered but would require submission of amendment requests and necessary regulatory agency approvals with no additional time or compensation provided to the Design-Builder.

The Erection Procedure developed by the Design-Builder shall include, at a minimum:

- Description of where materials and structural components will be stored prior to transportation to the site.
- Description of how materials and structural components will be transported to the site assembled and erected.
- Description of where equipment required will be stored prior to transportation to the site.
- Description of how the required equipment and materials will be transported to the site, staged, assembled, and moved into position, and removed from the site as required for use during the erection.
- Description of how safe working distances from high voltage transmission lines will be maintained.
- Procedures for preventing impacts to vehicular travel during construction.
- Contingency planning including spare equipment, parts, materials, and other items required during erection.
- Calculations to address stresses on existing and proposed structural elements due to erection.

Design in accordance with MassDOT Standard Specifications, including incorporating factors of safety similar to Subsection 960.61

Erection work will not be allowed over live traffic.

4.10.7 Inspection, Maintenance and Repair of Existing Bridges

4.10.7.1 Inspection of Existing Bridge and Newly Constructed Stages Open to Traffic

MassDOT is responsible for conducting the required inspections for the existing bridge on the NBIS. The Design-Builder shall coordinate with MassDOT and allow access once construction begins for all necessary bridge inspections of the existing structure, or portions of the existing structure during staged construction to maintain its existing NBIS inspection.

4.10.7.2 Repair of Existing Bridges

During prosecution of the work, MassDOT may identify locations of any necessary deck repairs, emergency or otherwise, based on observations from the Engineer and alerts by the Design-Builder. The Design-Builder shall coordinate with the Resident Engineer the location of repairs through sounding or other approved testing methods and limits of all repairs shall be agreed upon by MassDOT prior to the execution of repair. The Design-Builder will fully design repairs and submit to MassDOT for acceptance prior to commencement of work. See the Draft BTC Special Provisions provided for temporary deck repair information. All mobilizations for repair activities are to be coordinated with MassDOT.

Compensation for traffic management and all mobilizations for the deck repairs and HMA for Patching will be paid under the following Pay Item:

Item	Description	Unit
851.11	TRAFFIC MANAGEMENT AND MOBILIZATION FOR REPAIRS	DAY

This item is only applicable if the work requires a traffic setup outside of an already established work zone. Upon NTP for Maintenance of Existing Bridges issued by District 5, the Design-Builder shall be responsible for the maintenance and repair of each of the existing Project bridge decks up until final acceptance. The Design-Builder must anticipate emergency repairs and maintain forces, materials and equipment for such events. The Design-Builder should independently monitor the decks for defects and make repairs as necessary. Requests for emergency repair by MassDOT must be responded to by the Design-Builder within **two hours** of notification.

The Design-Builder will be compensated for the emergency deck repairs on the sounded deck under the following Contract pay items:

Item	Description	Unit
127.4	REINFORCED CONCRETE EXCAVATION (FULL DEPTH)	Square Yard
127.41	REINFORCED CONCRETE DECK EXCAVATION (PARTIAL DEPTH)	Cubic Yard
909.5	RAPID SET CONCRETE	Cubic Yard
910.1	STEEL REINFORCEMENT FOR STRUCTURES – EPOXY COATED	Pound

The Special Provisions for these items are included in Appendix C.

Compensation for traffic management of HMA patching will include temporary illumination for work zone. All repair activities are to be coordinated with MassDOT.

4.10.8 Drawings and Calculations

The Design-Builder will be required to submit drawings and calculations according to the Bridge Design Manual and specifications. All Design submittals shall conform to the approved Quality Management Plan (QMP) submitted by the Design-Builder. These documents will be reviewed by MassDOT and comments returned for response and implementation where required. An Issued for Construction Submittal will then be required, consisting of updated calculations, plans and specifications, stamped by a Massachusetts Registered Professional Engineer shall be submitted. Work will be allowed to proceed on a conditional basis prior to the submission of the final documents in accordance with Section 4.6.

Drawings for all structures shall be in accordance with the most current edition of the MassDOT Bridge Manual using Bridge Manual standards, details and title blocks. One (1) set of design calculations along with one (1) set of independent design check calculations will be required. Each of the bridge design calculation packages shall receive a documented internal quality control check. The documentation can be by checker initialing or other. Documentation shall be provided that any differences between the two sets of calculations have been reconciled and an explanation of the differences shall be provided as part of the submission. Internal quality control checks and documentation to be outlined in the Design-Builder's Technical Proposal as part of Design Quality Control Process.

4.10.9 Materials and Samples

All construction materials shall be in accordance with the Standard Specifications and the Qualified Construction Materials List as maintained by MassDOT's Research and Materials Section. Traffic materials shall be in accordance with the Standard Specifications and the Qualified Traffic Control Equipment list as maintained by MassDOT's Traffic Section. No experimental or previously un-approved materials shall be used without prior written approval by MassDOT. Steel superstructure will not be permitted on this project.

4.10.10 Provisions for Adverse Weather

The Design-Builder shall make provisions for standard snow removal methods on the proposed bridge structures.

4.10.11 Bridge Structure Rating Report

A Bridge Structure Rating Report (per MassDOT Bridge Manual, Chapter 7) of the as-built structures shall be submitted by the Design-Builder after each bridge is constructed, open for full beneficial use, and inspected by MassDOT. The preferred analysis software for rating each bridge shall be AASHTOWare Bridge Rating.

In addition to the above, the Design-Builder shall submit preliminary load rating calculations and electronic files in accordance with MassDOT Bridge Manual Part I, Section 4.3 to allow MassDOT to perform overload permit analysis.

4.10.12 Bridge Temporary Works

The Design-Builder is responsible for the means and methods of construction for all elements within the construction contract including temporary access. Temporary work required for construction shall be designed, implemented, and removed by the Design-Builder. The Design-Builder shall submit structural or fill/embankment designs, stamped by a Registered Professional Engineer in the Commonwealth of Massachusetts, to the Design Engineer and Engineer for review. Temporary structure designs may include temporary trestles/work platforms and erection supports. Temporary structure design shall be in accordance with AASHTO including *AASHTO Guide Design Specifications for Bridge Temporary Works*. Upon removal of the Temporary Works the affected areas must be restored to the original condition.

The Design-Builder may utilize any method of access to the project site as detailed in the environmental permit documents. Alternative method or techniques for temporary works may be considered and will be the Design-Builder's responsibility to maintain such procedures, methods and techniques within compliance of the Environmental Permits. Any deviations from the approved permit plans that will introduce new impacts to resource areas will require permit amendment approvals to be obtained by the Design-Builder. Any alternative methods deviating from the BTC suggested temporary works proposed by the Design-Builder, regardless of whether they have any environmental impacts, shall be submitted as part of the RFP Technical Proposal submission and concept plans.

4.10.13 Retaining Walls

4.10.13.1 **Retaining Wall Design Criteria**

As shown on the BTC plans, retaining walls are proposed to support the causeway from the widened roadway and will have the added benefit of serving as a turtle protection barrier. The Post and Panel walls increase the global stability of the Causeway to an acceptable factor of safety (FOS) and support lateral earth pressure loading and traffic surcharge loading. Soldier piles for the BTC Post and Panel walls would be installed in predrilled temporarily cased holes backfilled with concrete to the bottom of the concrete panels. It is anticipated that predrilling or pile installation would not occur until after excavation to remove existing rip-rap and other obstructions down to the lightweight fill subgrade elevation. The design of the Post and Panel walls is coupled to the lightweight fill ground improvement and both contribute to increasing the global stability FOS to an acceptable level while allowing for widening and increasing the grade of the causeway and reducing settlement.

1. Final retaining wall design for all walls shall be completed by the Design-Builder in accordance with AASHTO Section 11 for both internal (structural) stability and external stability (including sliding, overturning, bearing resistance, settlement, and short-term and long-term overall stability) for each of the wall structures. For specialty wall types, the final design calculations shall be performed by the specialty wall designer, stamped by a Professional Engineer licensed in Massachusetts, and be approved by the Designer of Record.

2. Wall embedment shall be based on wall type but should be a minimum of 4 feet below ground surface, or deeper if needed to satisfy external stability requirements, unless founded on bedrock. The Design-Builder shall consult wall manufacturers and standard design guides for embedment depths.

3. The Design-Builder shall use the same wall type within a continuous stretch of wall. Continuity of wall appearance throughout the Project site is also desired for aesthetic continuity.

4. In locations where existing and proposed utilities are located, the Design-Builder shall coordinate with the utility company prior to selecting a wall type in order to accommodate the potential for any utility openings or supports on the walls or any external reinforcements/straps/anchors.

5. Wall drains shall be determined by the Design-Builder based on wall type and shall conform to the wall manufacturer's specifications if a proprietary wall system is used.

6. The Design-Builder will maintain roadway drainage throughout construction of the retaining walls for all walls spanning over or adjacent to waterways (culverts, streams, rivers, ponds, etc.) to assure no untreated drainage enters the waterways

7. .Surface treatment of the retaining walls shall have form finish or concrete facing .

8. Gabion walls, metal bin walls, and concrete masonry unit (CMU) block walls, and MSE walls are not accepted walls to be used on this Project.

4.11 GEOTECHNICAL

The following section shall apply to all Project elements. Refer to Section 4.10, for additional geotechnical information and requirements related to the bridges.

4.11.1 General

Preliminary geotechnical explorations have been conducted for this Project, including the two bridges and associated approaches and causeway. A Geotechnical Data Report (GDR) has been prepared for each of the two bridges and a separate report has been prepared for the associated causeway embankment. These reports show the soil conditions at multiple locations within the Project limits in support of the BTC. This document is provided in Appendix C. The Design-Builder shall review and accept the provided Geotechnical Data Report and other geotechnical documents.

The Final Geotechnical Reports shall be based on the provided Geotechnical Data Report and any further geotechnical investigation conducted by the Design-Builder and shall be completed by the Design-Builder as part of this RFP and at no additional cost to MassDOT.

The Design-Builder shall perform additional geotechnical investigations, testing, research, and other measures appropriate to comply with the minimum standards in the latest MassDOT LRFD Bridge Manual and AASHTO LRFD Bridge Manual. The Design-Builder shall prepare Final Geotechnical Reports for each bridge structure and a separate report for all Highway Elements. At a minimum, additional explorations will be required along the retaining walls.

The Design-Builder shall ensure the geotechnical investigations and analyses are both thorough and complete, so as to provide accurate information for the design and construction of roadways, pavements, foundations, structures, and other facilities that result in a Project that is safe and meets operational standards and final acceptance requirements.

The Design-Builder shall be responsible for all grading and related work such as remedial excavation and embankment/foundation settlement monitoring required for construction of the Project. No grading operations and foundation construction for the Project shall commence until the Geotechnical Report(s) for the area of grading and foundation construction has been approved by MassDOT and, as applicable, local agencies.

The Design-Builder shall design all bridge foundations such that unsuitable/organic soils are removed, bypassed, or improved. The Design-Builder shall design causeway embankment widening and grade increase to meet all settlement, stability (including global stability) requirements using lightweight fill and/or structural support walls. The Design-Builder may use ground improvement techniques to improve poor ground conditions when traditional over-excavation and replacement is not feasible for environmental, technical, or economic reasons. Ground improvement methods must meet the limitations provided herein.

4.11.2 Use of Geotechnical Information

The Design-Builder shall use the subsurface information and all Reference Documents provided in Appendix C at their own risk. While the MassDOT provided information does identify subsurface conditions at the exact location of specific borings, test pits, probes, and/or geophysical lines, any further interpretations of subsurface conditions beyond or in addition to that information are the Design-Builder's sole responsibility.

It is the responsibility of the Design-Builder to review soil samples and rock cores from the subsurface explorations, which are located at the MassDOT Storage Facility in Lawrence, MA.

4.11.3 Subsurface Investigations by the Design-Builder

Subsurface explorations shall be conducted for any new and modified structures so that the requirements of AASHTO LRFD Bridge Design Specifications Article 10.4 and Table 10.4.2-1, MassDOT's LRFD Bridge Manual and the requirements below are met. The BTC plans show borings based on assumed structures and span arrangements. Any changes to this may require additional borings as needed to meet the requirements of AASHTO LRFD Bridge Design Specifications, MassDOT's LRFD Bridge Manual, and the requirements below. The Design-Builder acknowledges that it may be necessary to supplement the existing subsurface information, and that MassDOT may require additional borings, test pits, probes, geophysical surveys or cone penetration tests in connection with any of MassDOT's reviews.

- If an ATC proposes to shift a substructure (piers or abutments) and its proposed location is more than 15 feet away from BTC boring locations, additional borings are required.
- If an ATC proposes to shift a substructure (piers or abutments) and its proposed location is within 15 feet of the BTC boring locations, additional borings are not required.
- A minimum of two borings, drilled within 15 feet of the substructure, are required at each end of proposed pier and abutment locations regardless of the pier width.

The Design-Builder shall perform and analyze additional borings, test pits, and other subsurface investigations, along with laboratory soil and rock testing, necessary to complete the design and construction of the Project, including the design and installation of temporary bridges, trestle structures, causeways, and temporary roadway embankments.

If the location of proposed infrastructure is more than 15 feet from the location shown on the BTC, then additional subsurface exploration is required. Relocation of substructure locations greater than 15 feet from the BTC locations shall require submittal of an ATC. Once the additional borings are conducted post NTP and Geotechnical Report developed, submittal of Bridge Sketch plans will be required for MassDOT review and acceptance.

The Design-Builder shall deliver to MassDOT digital copies of logs, in an AutoCAD compatible format and PDF format, for all additional investigations conducted. The Design-Builder shall also provide a database (or excel file) of all subsurface investigations including exploration ID, town, northing, easting, ground elevation, boring elevation, total boring depth, ground water elevation, structure ID, bedrock core (Y/N), digital pictures of all rock cores, laboratory test results, and any other relevant information.

The Design-Builder shall obtain all Governmental Approvals necessary for geotechnical investigations, including Dig Safe, and all approvals required for access road grading, drilling permits, and groundwater protection from inter-aquifer contamination. Boxes of soil and rock samples, with an as-drilled exploration plan, are to be delivered to the MassDOT Storage Facility in Lawrence, MA. Any soil or rock samples which are taken for laboratory testing must be returned to their respective boxes after testing is complete.

4.11.4 Geotechnical Reports

Each geotechnical report provided by the Design-Builder shall be accompanied by a separate volume containing all applicable calculations signed and sealed by a Professional Engineer registered in the Commonwealth of Massachusetts. The calculations shall be categorized into sections, with each section prefaced with a cover sheet that includes a brief narrative of the calculation and all subsequent sheets properly indexed with page numbers. Each sheet shall be initialed by the person performing the calculation and by the checker/reviewer. All revisions and backup calculations shall be initialed and certified by a Professional Engineer registered in the Commonwealth of Massachusetts.

The Design-Builder shall submit a separate Geotechnical Report **for each permanent structure, each temporary bridge structure (if proposed), and one for all Highway Elements (see Section 4.11.5**) and shall include the requirements outlined in the latest MassDOT LRFD Bridge Manual and those listed below:

1. Interpretation and analysis of soil and bedrock conditions based on the geotechnical information available and other investigations conducted by the Design-Builder.

2. Design and construction recommendations for the following, as applicable:
   a. Bridge substructures: Axial and lateral resistance of spread footings, and/or deep foundations and total and differential settlement, and lateral deflection. Recommended foundation types, foundation sizes, bearing material and estimated tip elevations for deep foundations.
   b. Retaining walls: Type, global stability (static and seismic), sliding and overturning stability, bearing resistance, settlement (total and differential), foundation support, and backfill requirements. If retained embankment load-balancing or net unloading using lightweight fill is proposed, provided specifics regarding the properties and placement of the lightweight fill.

3. Construction Quality Control, including inspection, testing, and load testing programs to verify design resistances and installation procedures for foundation elements (piles and/or drilled shafts).

4. Instrumentation programs, where necessary, to monitor embankment, substructure, or adjacent structures response to construction activities.

5. Plan view of exploration locations, exploration logs, and laboratory test results used to characterize soil and rock conditions.

6. Interpretive subsurface profiles along centerline of all new bridge structures showing the soil and rock conditions as interpreted from the explorations.

The Design-Builder shall prepare geotechnical report addenda to incorporate changes made during the progression of the Work. Any such addenda shall be incorporated into the revised final geotechnical report when the design is complete. The report, including the addenda, shall be submitted prior to start of construction, and shall be reviewed and approved by MassDOT. Construction shall not proceed on the revised portion before written approval.

Each report shall be signed and sealed by a Professional Engineer registered in the Commonwealth of Massachusetts. These reports shall be delivered to MassDOT in a searchable electronic PDF format.

The applicable Geotechnical reports shall be submitted concurrently with the Highway and Bridge submittals.

4.11.5 Highway Elements

For the following Highway Elements, the Design-Builder is responsible for providing analyses, design and construction details in the Geotechnical Report, and on the Plans and/or Special Provisions:

1. Sign Structures: The Design-Builder is responsible for the design and construction of all sign support structures, including overhead traffic structures in accordance with the latest geotechnical engineering practice.

2. Embankments: The Design-Builder is responsible for the design and construction of new, heightened or widened embankments, including embankment support, in accordance with latest geotechnical engineering practice.

3. Soil and Rock slopes (cut and fill cases): The Design-Builder must ensure the stability and erosion protection of slopes, in their temporary and permanent conditions, in accordance with latest geotechnical engineering practice.

4. Retaining Walls: The Design-Builder is responsible for the design and construction of all retaining walls in accordance with the latest geotechnical engineering practice. The Design-Builder must ensure the stability of walls, in their staged (temporary) and final (permanent) conditions.

For the evaluation of embankments, slopes and walls, analysis shall include the following (as applicable): bearing resistance, settlement, sliding, maximum eccentricity (overturning), and overall global stability.

If a soil nail wall system is proposed, its design and construction shall be in accordance with publication "Geotechnical Engineering Circular (GEC) No. 7 - Soil Nail Walls, 2015, FHWA-NHI-14-007.

4.11.6 Bridge Foundations

The Design-Builder is responsible for the analysis, design, and construction of the bridge abutments, piers, and their foundations. All design calculations must be in accordance with AASHTO LRFD and the MassDOT Bridge Manual. See Section 4.10 for additional information specific to bridge foundations.

Bridge foundations which are located behind retaining walls shall be independently supported on deep foundations.

Where any proposed subsurface steel elements are exposed to soil and groundwater (not embedded in a pile cap), the Design-Builder shall conduct corrosion testing of the soils at that structure to determine an appropriate sacrificial thickness for the corrosion allowance for the steel elements to retain minimum required capacity for the entire 75-year project design life. This includes all exposed surfaces of driven piles and permanent casing for drilled foundations. Irrespective of the results of the testing, a minimum corrosion allowance of 1/16" over 75 years, or 0.00083 inches/year, shall be used for design.

The Design-Builder shall provide Quality Assurance and Control guidance for the installation of proposed deep foundation elements following the latest accepted industry standards to assess plumbness and movement tolerances. Installation records shall be submitted to MassDOT after completion of bridge foundations.

As-built foundation data on substructure elements that will be reused and/or abandoned in place and which differs from the original design plans shall be revised on the final plans. This shall include information such as plan locations, additional piles or shafts, changes in diameter, tip elevation, and/or bottom of footing elevation.

Drilled Shafts

The design of Drilled Shafts shall be in accordance with Geotechnical Engineering Circular No. 10 - Drilled Shafts: Construction Procedures and LRFD Design Methods FHWA-NHI-18-024.

If Drilled Shafts are proposed, shafts shall be socketed into bedrock and all axial resistance shall be derived from the bedrock, without consideration of overburden soils. Drilled shaft lateral resistance may be derived from soil below the depth of scour and bedrock.

One (1) Bi-directional Axial Compressive Load Test must be completed on a sacrificial (non-production) drilled shaft. The Bi-directional Load Test (previously known as the Osterberg Test) shall be loaded to failure to determine nominal side and tip resistances in the rock socket. The location of the Trial Drilled Shaft is to be performed near one of the abutments of Bridge M-05-001=W-06-013

The minimum scope of work outlined in Draft BTC Special Provision Subitem 945. for thermal integrity profiling and inspection of the bottom of the shafts using a shaft inspection device is a requirement of the Project."

Refer to Draft BTC Special Provision Subitem 945.01 for additional drilled shaft installation and testing requirements.

See NOAA Section 7 Programmatic approval for other requirements related to “soft starts.”

4.11.7 Ground Improvement

Through a variety of ground treatment methods and geo-construction technologies, weak and unsuitable in-situ soils can be improved to meet specific Project requirements, thus making this alternative method a safe and potentially economical solution.

Design and construction of ground improvement techniques shall be done in accordance with the Ground Modification Methods Reference Manual FHWA-NHI-16-027 and FHWA-NHI-16-028. The manual introduces the web-based GeoTechTools (http://www.geotechtools.org) which is a decision-making tool that identifies many geotechnical solutions for design and construction of embankments on soft soils, embankment widening, and pavement foundations. These tools help select and apply the most appropriate method to the site-specific problems and conditions.

The Design-Builder may consider the following ground improvement techniques for unsuitable/organic soils located below proposed roadway embankments and retaining walls.

1. Lightweight Fills: Reduce settlement and/or improve stability of embankments located above deep unsuitable soil which can’t be excavated. Only the fills listed below may be considered for this project.
    - Geofoam – expanded polystyrene (EPS)
    - Low density cellular concrete (LDCC), also known as foamed concrete
    - Tire shreds – tire-derived aggregate (TDA)
    - Expanded shale, clay and slate (ESCS)
    - Foamed Glass Aggregate (FGA)

If used, geofoam shall be fully encapsulated with a petroleum resistant membrane.

The selected lightweight fill type shall be proven suitable for use in a marine environment over the design life of the project. The lightweight fill must also be placed with sufficient soil cover as to not be buoyant during extreme flooding events.

2. Aggregate Columns: Increase bearing resistance of underlying soil, reduce settlement, improve slope stability, and reduce liquefaction potential of soil. Aggregate columns shall not be used to support the bridges. Vibro-replacement or Vibro-displacement may be used. Unless Aggregate Columns are used to mitigate liquefaction, an engineered load transfer platform (LTP) will be needed to transfer loads uniformly to the underlying improved soils. Due to the presence of organic soils onsite, aggregate piers, if used, would need to be fully grouted.

3. Column Supported Embankments (CSE): Stiff vertical formed-in-place columns that transfer the load of the embankment through the soft compressible soil layer to a firm bearing strata. Soil mix columns, aggregate columns, and cement-based columns may be used.

   Timber piles may be used on the Project with the exception of locations directly under bridge foundations and under rigid retaining wall foundations, such as cast in place footings. The Design-Builder shall demonstrate that proposed timber piles will be permanently submerged in groundwater for the entire project design life. Alternatively, timber piles which are not fully submerged shall be treated with a wood preservative. The Design-Builder shall demonstrate that treated piles will last for the entire project design life. Piles shall be treated in accordance with the requirements of Subsection M9.05 of the Standard Specifications

   An engineered load transfer platform (LTP) will be needed to transfer the load from the embankment soils to the columns.

The potential for obstructions in the causeway fill shall be anticipated when considering the use of Aggregate Columns or CSE.

The Design-Builder shall take into consideration existing utilities in areas of proposed ground improvements. Such improvements shall not impede the utility owner from accessing their facilities.

The Design-Builder shall conduct performance monitoring during ground improvement operations to ensure that the contractor's work is performed according to the contract requirements, and that adjacent structures are not being damaged.

The Design-Builder shall provide a sacrificial (non-production) test section for each proposed ground improvement method with applicable load testing and Quality Control round of in-situ testing.

4.11.8 Geotechnical Instrumentation and Monitoring

The Design-Builder shall be responsible for the installation and monitoring of all instrumentation necessary to ensure the safety of the public and construction workers, as well as the stability and integrity of the existing or modified bridges and structures. The Design-Builder shall also be responsible for visual and survey monitoring in accordance with Draft BTC Special Provision Subitem 981.01.

The Design-Builder shall prepare a geotechnical instrumentation program to monitor vibration, accelerations, vertical settlement and lateral movement of temporary support structures, permanent structures, adjacent ground, and existing structures during construction through Project completion according to accepted industry standards. The Design-Builder shall prepare a Working Plan that details the proposed program of instrumentation and monitoring, shall establish threshold values of the monitored parameters, and shall describe a Response Plan that will be implemented when the threshold parameters are exceeded. The design of instrumentation within the Working Plan shall demonstrate an understanding of the need, purpose and application of each proposed type. The Design-Builder shall provide, install, and monitor instrumentation during and after construction.

The Design-Builder shall provide weekly Construction Instrumentation Monitoring Reports to MassDOT including interpretation of data by the Design-Builder's Lead Geotechnical Engineer. Should any threshold values be exceeded, the Design-Builder shall notify MassDOT immediately and take corrective action in accordance with the Response Plan.

Before installing any instrumentation, submit for MassDOT review and approval, an Instrumentation Plan showing the location of all monitoring points and a description of methods, equipment, materials and other details consistent with the above requirements.

The allowable post construction Causeway settlement of pavements and sidewalks more than 50 ft from bridges shall be 2 inches. The allowable differential settlement shall be 0.5 inches over 10 ft. In no case shall post construction settlement or differential settlement exceed the settlement tolerance of proposed utility installations.

Post construction Causeway settlement of pavements and sidewalks within 50 ft from bridges shall be 1 inch. The allowable differential settlement shall be 0.25 inches over 10 ft. In no case shall post construction settlement or differential settlement exceed the settlement tolerance of proposed utility installations or approach slabs.

Allowable lateral deflection of permanent retaining walls shall be less than 1 inch, measured at the top of the wall relative to the bottom of the wall.

4.11.9 Temporary Excavation Support

All temporary support of excavations (SOEs) shall be designed and constructed such that Occupational Safety & Health Administration (OSHA) requirements are met or exceeded. SOEs in the vicinity of roadway shall also meet the requirements contained in the latest MassDOT LRFD Bridge Manual.

The Design-Builder shall be responsible for ensuring that all SOEs shall be designed and constructed to maintain a safe system and will provide support for existing facilities and utilities. The Design-Builder shall take full account of all relevant factors, including surcharge pressures due to structure live loads and construction loads in lateral earth pressure diagrams. Global stability shall also be considered.

The Design-Builder shall ensure the design and drawings for the temporary earth support system(s) are signed and sealed by a Professional Engineer registered in the Commonwealth of Massachusetts.

The Design-Builder is cautioned of excavation considerations at both existing bridge substructures to provide proper earth support and where the presence of batter piles as shown on the existing bridge plans could interfere with excavation support systems.

4.12 BRIDGE HYDRAULICS AND SCOUR

THIS SECTION WILL BE ISSUED IN A FUTURE ADDENDUM

4.13 DRAINAGE DESIGN

4.13.1 Objectives

The Design-Builder shall provide a well-drained Project and a safe environment for those that use and maintain the Facility. The design and construction of all drainage structures and appurtenances shall adequately address functionality, durability, ease of maintenance, maintenance access, safety, aesthetics, and protection against vandalism. In fulfilling the requirements for drainage design and construction, the Design-Builder shall fulfill both the requirements related to drainage features or systems and other required design elements on the Project.

The Design-Builder is responsible for the functioning roadway drainage system within the Project Limits, during staged construction of the Project. The Design-Builder shall maintain and repair drainage features at the request of MassDOT.

The Design-Builder shall be aware and fully comply with Federal, State, and local Laws related to drainage design including the MassDOT Stormwater Guidebook (2023 Edition) and MassDEP Stormwater Handbook (2008 Edition), as well as all applicable Governmental Approvals, including Environmental Approvals, and shall perform the design such that there will be no substantial adverse effects on adjacent properties or drainage systems.

The pipe network layout shown in the BTC presents a conceptual layout of structures intended to maintain existing drainage patterns, replace existing corrugated metal pipes, drain the roadway and either maintain existing point discharges or provide a treatment train of stormwater control measures to mitigate the impact of the increase in impervious cover created by the Project. Rim, invert, pipe sizes and slopes are provided on the BTC as a concept to accompany the pipe network shown on the BTC. It shall be the responsibility of the Design-Builder to prepare a final drainage design which meets the requirements of the PDDG, this RFP and in accordance with approved Project permitting. The stormwater control measures have been designed to present a conceptual layout which attempts to maximize the use of available practical upland space as determined by preliminary soil testing within the Project limits. The Design-Builder will prepare a final design which will meet these objectives for this Project to the maximum extent practicable.

4.13.2 General

The Design-Builder shall be responsible for the design, including locating, sizing, and constructing of all temporary and permanent drainage facilities. It is anticipated that any proposed drainage elements will tie into the existing drainage system within the Project limits. The design shall comply with the ten Stormwater Performance Standards of the Wetland Protection Act to the maximum extent practicable as further defined in the 2008 MADEP Stormwater Handbook. The design shall also comply with Chapter 8 of the MassDOT PDDG and the MassDOT, Stormwater Design Guide, 2023 Edition.

The Design-Builder shall design and install temporary and permanent drainage facilities, perform a gutter flow analysis and address existing deficiencies within the Project limits.

The Design Documents shall include, but are not limited to, the following:

- Stormwater Management Plan (SMP)
    - Stormwater Management Report
    - Supporting Calculations and Analysis
    - Operation and Maintenance Plan
    - Long Term Pollution Prevention Plan
    - Drainage Atlas
- Storm Drain Plans, Details and Quantity Summaries
- Grading Plans
- Plans and details of structural stormwater management Best Management Practices (BMP's) designed in conformance with the MassDEP Stormwater Management Handbook and the MassDOT, Stormwater Design Guide, 2023 Edition.
- Erosion Control Plans
- Right of Way Protection/Erosion Control plans during the conduct of the Work
- Final Stormwater Management Plan
- Stormwater Pollution Prevention Plan (SWPPP) Construction Period Pollution Prevention Plan (CP/PP)
- Construction Staging Stormwater Management Plans (for each stage).

The Design-Builder shall confirm applicable standards with MassDOT and MassDEP prior to commencing design work.

All drainage systems shall be designed to avoid objectionable backwater or excessive velocities which may adversely affect structure and embankment stability, adjacent property, existing storm drain facilities, natural drainage courses, or floodplain limits. The Design-Builder shall address existing deficiencies in the stormwater collection within the Project limits as feasible to eliminate standing water in low areas, either through minor re-grading or through the addition of catch basins. Any new catch basins as well as existing catch basins within the limit of work shall be equipped with standard grates and frames conforming to the MassDOT Construction Standard Details and as specified in Engineering Directive E-16-003. Any new catch basins shall also be constructed with 4-foot deep sump basins as defined by the MassDOT Stormwater Handbook.

The drainage systems for the Project shall accommodate the drainage runoff and off-site runoff from properties affected by the Project. The Design Documents shall include provisions for maintenance access in accordance with MassDOT, MassDEP and local agency requirements and recommendations.

The Design-Builder shall submit preliminary drainage studies showing the hydrology, hydraulic calculations, and preliminary plans of the proposed Stormwater drainage system improvements to MassDOT, and appropriate agencies, in accordance with permitting requirements, for review prior to submitting the Project's final drainage design documents. The drainage system improvements shall comply with the Stormwater Management Policy and shall include Best Management Practices (BMP's), where applicable. The Design-Builder shall identify and prepare individual drainage reports and plans for any

and all Stormwater drainage systems affected by the Project. MassDOT and local agencies require final drainage reports, plans and specifications to be submitted with any applications for Environmental Approvals that are required.

- The scope of the stormwater management design shall be consistent with all applicable State and Federal permits, as required.
- Stormwater design shall be performed in accordance with the latest MassDOT Stormwater Design Guide or as approved by the District Stormwater Engineer.

4.13.3 Temporary Drainage Structures

The Design-Builder is responsible for the design and construction of all temporary drainage components that will be required through the various stages of the Project. Several areas of the Project will require temporary drainage structures in order to address an interim spread condition into a travel way as an effect from temporary alignments, lane shifts or tapers.

The lane shifts and tapers are to be engineered such that the stormwater is processed without creating unsafe driving conditions. All manholes, storm drains, or other structures exposed to live traffic are to be sufficiently rated for traffic loading and restrained from dislodgment. The Design-Builder should be aware that the existing structures are a different standard. Confirm that all existing drop inlet frames, grates and catch basin frames that are to be maintained during construction are hook and lock bar grate or welded shut. All structures to be adjusted shall have new castings that shall comply with MassDOT Engineering and Policy Directives. Existing manholes castings within the traveled way shall be replaced with new casting with bolted covers.

4.13.4 Approach to Compliance with Stormwater Management Policy

The Work shall meet the ten Stormwater Management Standards (SMS) defined in the MassDOT, Stormwater Design Guide, 2023 Edition to the maximum extent practicable as defined by the SMS. The goal of these standards is to address concerns relative to the quality of the discharge to wetlands or waters of the Commonwealth of Massachusetts, control flooding and maintain groundwater levels. These conditions are achieved by improving the existing conditions regarding the peak rates of runoff, groundwater recharge, and water quality treatment. The Project shall incorporate water quality improvements to the maximum extent practicable, as defined by the SMS. The stormwater improvements proposed by the Design-Builder shall provide water quality improvements as defined in the SMS to mitigate the increased impervious area created by the project to the maximum extent practicable. Water quality improvements in the BTC include the construction of infiltration basins, swales, and catch basin structures with deep sumps and are intended to demonstrate a feasible means of meeting this requirement as documented in the Stormwater Management Report provided in Appendix C. Test pits shall be performed as directed by the Engineer.

The Design-Builder’s submissions shall be completed to thoroughly document that stormwater runoff from the Project complies with this requirement.

4.13.5 Compliance with Local Approvals

[** THIS SECTION NOT APPLICABLE**]

4.13.6 Stormwater Management Plan

The BTC provides limited information for improvement and management of stormwater. The information, findings, and summaries identified in the BTC are based on the environmental planning process and do not reflect engineering design.

The Design-Builder shall be responsible for preparing a Stormwater Management Plan (SMP). As a result of these programs, the BMP's to be used shall address the overall drainage, stormwater runoff management, water quality, floodplain impacts, groundwater impacts and associated environmental and mitigation measures. The SMP for the Project shall comply with the National Pollutant Discharge Elimination System (NPDES) permit requirements and the Massachusetts Stormwater Management Policy (Policy). As a result of these programs, the BMP's to be used shall address the overall drainage, stormwater runoff management, water quality, floodplain impacts, groundwater impacts and associated environmental and mitigation measures.

The Design-Builder may move or modify the proposed BMPs provided that the new design meets or exceeds the water quality benefits provided by the current design when evaluated using the macro approach. All changes will require permit modifications and must be approved by MassDEP. In addition, if the modified design results in any negative impacts on the micro level, these must also be communicated to and approved by DEP.

The SMP shall include a Stormwater Management Report that documents how the proposed stormwater management design meets the applicable criteria. The SMP shall include supporting calculations and analysis. Following the approval of the SMP by MassDOT, the Design-Builder shall furnish final drainage reports and plans for the Project.

4.13.7 Gutter Flow Spread Analysis

In accordance with the PDDG, there are specific requirements with respect to the allowable spread. The Design-Builder shall perform a gutter flow spread analysis for each construction stage of the Project. This analysis shall include all existing, temporary, and proposed drainage elements for a given stage based on the stormwater collection measures proposed for each specific stage of the Project. Gutter spread analysis does not need to consider a snowbank condition. The Design-Builder shall perform an analysis of the downstream piping to verify that there is sufficient capacity. Under the final design conditions the maximum allowable gutter spread shall be as defined in the PDDG.

4.13.8 Additional Project Specific Drainage Requirements

The following is a list of items that were identified during preliminary design that might require additional consideration as the Project advances into design. The Design-Builder shall incorporate the necessary provisions into the design and construction of the Project, including but not limited to the following:

- The Design-Builder may move or modify the closed drainage system design provided that the new design meets or exceeds the current design and/or existing conditions. The Design-Builder may not propose a design that worsens gutter spread, pipe capacity, freeboard, velocity, beyond PDDG limits, or have other negative impacts.
- Drainage for temporary roadways during all construction phases.
- When temporary barrier is utilized, it will be necessary to clear the slotted drainage openings in the bottom of the barrier from any snow, ice, or debris that may build up as a result of a weather event or winter condition within 48 hours of the weather event or as directed by MassDOT.
- Temporary drainage structures shall be located outside of the vehicle wheel path, where practical. All permanent drainage structures shall be located outside of the proposed travel lanes and future travel lanes.
- The Design-Builder is responsible for the existing and temporary drainage structure maintenance during the course of the Project.
- The drainage design shall meet the requirements at median locations with the 50-year drainage design median capacity.
- Existing corrugated metal pipes located in the roadway within the project limits are to be replaced or abandoned.
- The bridge deck drainage (temporary and permanent) shall be designed to avoid direct discharge of runoff into the Weweantic River.
- Temporary slotted drains may be needed on temporary roadways and if temporary cross slopes create channels.
- The Design-Builder is responsible for the existing drainage during the course of the Project. Note that more frequent maintenance may be required due to characteristics.
- In areas where no curbing is required, the Design-Builder shall ensure water will flow off the pavement and into existing drainage ditches. This may require removal of existing material from under guardrail or beyond edge of pavement.
- Curb and Gutter systems may be needed according to the MassDOT PDDG. The Design-Builder should evaluate the necessity for curbing along portions of the roadway.
- Existing drainage outfalls shall be removed and set back from wetland resource area boundaries whenever practicable.
- The soil at the bottom of the new infiltration basins shall not be compacted or smeared. The Stormwater Control Measures (SCMs) or Best Management Practices (BMPs) shall be tilled to a depth of 24 inches to restore infiltration capacity following final grading.

- In accordance with Subsection 227 of the Standard Specifications, all accumulated sediment and debris in drainage structures and pipes within the Project limits shall be removed and disposed of legally.

4.14 LIGHTING

The following section shall apply to all highway lighting Project elements to the limits as depicted on the BTC plans. Light trespass outside of the State and City Highway Layout should be eliminated the greatest extent possible. There shall be zero light trespass into private residential properties.

Temporary lighting shall be provided as required for staging the work and to maintain required lighting conditions within the Project limits; and to provide illumination to temporary roadways. The Design-Builder shall identify and submit a listing of temporary lighting required throughout the Project including limits of lighting and methods of meeting requirements.

Temporary Illumination levels shall be based on National Cooperative Highway Research Program (NCHRP) Report 498 on Illumination Guidelines for Nighttime Highway Work and FHWA Lighting Handbook, with uniformity levels modified to a stricter 6:1 ratio. Light measurement shall be based on the illuminance method and the lighting levels based on the classification of construction activity taking place. Task Classifications and recommended illumination levels are provided in the BTC Special Provisions.

Mounting height of permanent luminaires and locations of light poles shall be designed by the Design-Builder to meet or exceed the illumination requirements outlined in Section 4.14.1 and as specified under Subitem 820.12 of the Draft BTC Special Provisions. Upon completion of the Project the temporarily light poles and luminaires shall be removed.

Temporary lighting of complex traffic shifts, and traffic crossovers with limited sight distance, intersection streets and driveways, will be required.

Temporary pole design shall be submitted to MassDOT review and approval.

Permanent pole mounted street lighting, power, and pedestrian hybrid warning beacon shall be required at the cross walk locations.

Permanent pole design shall be submitted to MassDOT review and acceptance.

4.14.1 Scope

Permanent Lighting

A new highway lighting system shall be designed and constructed on the Project by the Design-Builder for the Pedestrian Hybrid Beacons (PHB) crosswalks. The Design-Builder shall conduct all work necessary to provide all lighting located inside the Project limits. This includes all transportation related permanent lighting of the roadway facilities. The Design-Builder shall also provide all lighting associated with the temporary roadways for the usage and construction of the Project per MassDOT Standard Specifications for Highways and Bridges.

Features included under this requirement include new luminaires, controls, poles, mounting, load centers, service cabinets, wiring, conduits, grounding, handholes, pole and cable tags, containment, procurement, installation, focusing, commissioning, and as-built information necessary for delivering a complete and functional system. Any new light poles should be protected by guardrail. This system shall meet the following requirements:

Highway lighting for temporary and permanent conditions: The permanent lighting shall be designed according to the IESNA-RP-8 (2018) Roadway Lighting and the AASHTO Roadway Lighting Guides (October 2005 or Latest Edition). The designer shall meet the Luminance, Veiling Luminance, and Uniformity Ratio criteria to ensure the appropriate illumination level is provided for the driver to have the maximum visibility and minimum glare for Freeway Class A.

Utilizes energy efficient and long-life low maintenance lighting technologies that are reviewed and accepted by MassDOT.

Utilizes photocontrol switch systems with timeclock that automatically activates lamps before dusk and deactivates the system past dawn. Photocell shall turn on the system and the timeclock shall turn off the system with elapsed time.

The Design-Builder shall prepare the necessary design and engineering studies. Applicable design reports to describe and justify all lighting components to be incorporated into the Project.

The Design-Builder shall coordinate with MassDOT to ensure the appropriate design methods, procedures, submittals, plan preparation, analysis, review and comment processes, approval procedures, specifications, and construction requirements are met.

The Design-Builder is responsible for disposing of all equipment to be removed. Prior to disposal, the Design-Builder shall coordinate with MassDOT to determine if they would like any of the equipment turned over to them for future re-use at their discretion.

The Design-Builder shall be responsible for all required coordination with the local utilities including initiation of contact, development of loading calculations, and service requests.

4.15 LANDSCAPE RESTORATION

4.15.1 Qualifications

The Design-Builder's landscape design team shall include the following individuals and services:

Invasive plant specialist to develop an invasive plant management strategy (IPMS) to manage invasive plant species and soils on site. Qualifications and work shall be per the MassDOT special provision for Invasive Plant Management Strategy for this Project (Subitems 102.3 and 102.33).

Licensed applicators to implement herbicide treatment as required by the IPMS, the MassDOT Landscape Architect, and the DB Native Seed Specialist for seeded areas.

Two landscape architects. Qualifications of the Design-Builder's landscape design team shall be submitted for approval by MassDOT Landscape Architect. At least one landscape architect shall have at least ten years of experience with restoration design and oversight. The second landscape architect or restoration specialist shall have at least five years of experience, including field experience overseeing and inspecting planting in the field and submitting field inspection reports. They shall demonstrate familiarity with proper planting procedures, DOT material specifications and standard planting details.

The landscape architects shall provide design services for revising the BTC planting and seeding plans if and as needed for built conditions and for the wetland mitigation areas, as needed, and they shall oversee all upland planting and plant care. The landscape architects shall work with the MassDOT Landscape Architect and Project Wetland Scientist on all aspects of design and planting.

Field work will include determining final configuration of planting beds and seeded areas based on built conditions, layout of plants, oversight to ensure proper planting, adherence to the planting specifications, review contractor submittals, and provide periodic inspection as outlined in the special provision for planting. The landscape architects shall also be responsible for coordinating with the wetland scientist and considering the ecology and restoration of the entire site for the full duration of construction to ensure the preservation of existing areas that will remain untouched, advise on erosion prevention for both construction phase and specified establishment period, they shall coordinate with Engineers to review and advise on stormwater swale and basin design, ensure that upland restoration blends visually and ecologically with wetland mitigation and infiltration basin areas, and all other matters to meet requirements under Sections 4.15.2 and 4.15.3. They shall work with the MassDOT Landscape Architect and Design-Builder native seed specialist as needed.

A native seeding specialist. The native seeding specialist shall have demonstrated experience with designing and overseeing large scale native seeding in New England, ideally for public projects. They shall have familiarity with ecological restoration concepts and have solid plant identification and weed management knowledge. Qualifications shall be submitted for approval by MassDOT Landscape Architect. They shall provide a resume, references, and photo examples of successfully seeded grasslands/meadows to MassDOT Landscape Design Section of representative projects that are at least three years old.

The individual shall work with the MassDOT Landscape Architect (LA) to provide a schedule of seeding based on the roadway construction phasing, create a form to be submitted for each scheduled seeding application (area seeded, date, seed mix, quantity delivered, etc.), oversee seeding application in the field, collect and approve (in conjunction with MassDOT LA) submittals specified in the MassDOT native seeding specifications, inspect seeded areas a minimum of twice a year, submit brief reports of meadow establishment, and recommend and inspect weed management. Services will be required prior to actual seeding to review mixes proposed and submittal forms, during seeding operations, and for the two years of management after seed is applied. The Specialist shall work with the MassDOT Landscape Architect on all aspects including submittal requirements and data to be assessed and reported.

Construction Services

Invasive Plant Management

Within 60 days of the NTP, there shall be an initial site visit to review the invasive plants on site and develop the Invasive Plant Management Strategy for species and locations. Treatment of *Phragmites australis* (common reed) shall begin as soon as possible within the effective season(s). Invasive plant management will continue for the duration of the Contract, the two years of seeding establishment, and the duration of the monitoring period for the wetlands, and as specified in the special provisions for subitems 102.3 and 102.33.

Native Seeding Oversight

The native seed specialist (NSS) shall review proposed mixes and recommend modifications, if necessary, based on built or other conditions. The NSs in coordination with the MassDOT LA shall review and create submittal forms for seed, inspections, and meadow maintenance. The NSS shall work with the MassDOT LA to review the stormwater basins and select final seed mix based on built conditions and maintenance expectations and requirements. Site inspections shall include all upland and stormwater areas seeded with native seed.

In addition to being on site during initial seeding operation to inspect seed and collect tags, the NSS shall perform inspections as follows:

The NSS shall inspect seeded areas at least two times a year. Generally, depending on seeding application, the first inspection shall be between July 7th and August 15th unless otherwise agreed upon. The NSS shall review conditions with the MassDOT Landscape Architect and determine a strategy, if necessary, for weed management and, if necessary, overseeding. The NSS shall provide a summary report of status of establishment, invasive and aggressive weeds shall be identified, and recommendations shall be provided. The NSS shall review those same areas for the fall inspection and follow the same procedure or as agreed upon with the MassDOT LA.

The NSS shall review seeded areas in the second season after seeding and follow the same procedures as the first season. The NSS shall provide a brief report of final conditions and recommendations at the end of the 2nd season.

In the event of seed failing to germinate, incorrect seed being used, weed infestations, or plants failing to establish as expected, the NSS shall perform additional inspections as needed until the condition is remediated.

Planting Design and Oversight

The BTC plan is expected to serve as the final planting and seeding plan. However, if the current proposed plan requires redesigning the current planting areas, relocating plants, or changing the proposed seeding, the Design-Builder's Landscape Architects will be required to provide updated Landscape Plans.

The Design-Builder's Landscape Architects shall work with the MassDOT Landscape Architect and shall review plant submittals, tag plants at the nursery, and approve site preparation prior to shipment of plants, and perform duties as required per the planting special provisions.

The Landscape Architects shall be on site when the plants arrive to inspect plants and oversee plant layout and planting and ensure that proper planting procedures are followed.

The Landscape Architects will inspect plantings during establishment and the one-year warranty as specified in the special provision (ex., Conditional Acceptance, Interim, and Final). They shall be responsible for ensuring that plants are watered, weeded if necessary, and replaced in accordance with the specifications. They shall submit a brief report with findings and recommendations to the MassDOT LA after each inspection.

4.15.2 Landscape Design

The landscape design team shall develop the final design in conformance with all applicable environmental clearances/approvals, including the Wetland Mitigation Plan which was approved by regulators.

Seventy-Five Percent Design (75%), One Hundred Percent Design (100%), and Issued for Construction (IFC) Landscape Plans and Special Provisions shall be prepared by the Design-Builder's Landscape Architect and submitted for approval by MassDOT Landscape Architect. Landscape restoration shall be in accordance with the current MassDOT Project Development and Design Guide and MassDOT Engineering Directive No. E-93-011 (EOT Landscape Restoration Policy). These plans shall meet or exceed the requirements set forth in the Standard Specifications and BTC Special Provision Requirements provided in Appendix C for specifications and forms.

The guiding approach to the landscape design shall be landscape and ecological restoration and enhancement. The goal of the mitigation area will be to successfully establish over two times the area of salt marsh being impacted by construction activities related to this project. The successful establishment of salt marsh will include a vegetated berm that will help direct stormwater runoff away from the mitigation area, as well as maintaining existing native vegetation wherever practical. Other goals of the design shall be to restore and enhance the ecosystem and promote diversity of native species. The natural spread of native plant species shall be fostered by introducing native "flagstaff" plants into isolated landscape restoration areas in order to increase local seed sources. The selection and placement of plants shall enhance and protect habitats for native pollinators and other wildlife by providing vegetative buffers, plantings to filter and cool stormwater run-off from paved and rock surfaces, shade over adjacent wetlands, and short- and long-term erosion and sedimentation control on steep slopes and toward adjacent salt marsh and vegetated wetlands. This will also include the removal of existing debris and inappropriate soils, and the replacement with sand-based planting media and temporary browser protection.

The BTC landscape plan shall be modified, if required, and developed concurrently with the overall design of the Project, including roadway improvements and structures and environmental impact mitigation, and shall be coordinated with all other work including but not limited to the horizontal and vertical geometry, existing land use, existing right-of-way, existing easements and rights, grading, drainage, stormwater management, and layout of structures such as walls and barriers.

The landscape design shall identify where the Project may impact local neighborhoods by exposing views and noise of the highway and take measures to mitigate them.

Goals of the design shall be:

1. Unified project landscape:
    a. Integrate elements such as roadways, stormwater practices, waterways, and native restoration areas into an overall attractive, well-considered, landscape design.
    b. Landscape plan as designed shall follow or improve logical drainage patterns.
    c. Integrate roadway project into existing site with naturalistic grading such that slopes steeper than 2:1 are minimized where possible. Intersections of graded vertical and horizontal planes shall transition gently with rounded curves. Care with grading shall allow for simple maintenance (i.e. mowing) and minimize opportunity for soil erosion.
    d. Invasive plants shall be identified in an invasive plant management strategy and managed during construction.

2. Mitigate impacts to residences, drivers, and other users:
    a. Provide screening with fencing and planting where neighborhoods are exposed to views of the roadway.
    b. Provide shade, pollution mitigation, and a more pleasant environment.

3. Improve natural resources. Given the complexity of establishing native meadows, preservation of existing native vegetation on site may be the most successful and economical strategy to increase pollinators and native grasses and forbs for this project.
    a. Preserve, define, restore, and (when opportunity allows) expand native pollinator areas within the Project.
    b. Improve water quality by developing stormwater BMPs.
    c. Improve pollinator habitat, adding desirable pollinator plants.
    d. Improve air quality by increasing quantity of vegetation.
    e. Restore construction impacts such as laydown areas.
    f. Repair and revegetate compacted soils such as areas of former roadways and construction staging areas.
    g. Remove / replace invasive plants with sustainable alternative vegetation.

The above goals shall be designed consistent with MassDOT landscape PDDG and shall consider ways that restore and enhance local ecology and promote diversity of native species.

The landscape design team shall develop the design in conformance with the Project objectives as shown in all applicable environmental clearances/approvals.

Where appropriate to site conditions and context, native woody and herbaceous plant species should be native to EPA Level III Ecoregions of the Project area. For this Project, that is 59 Northeastern Coastal Zone. An exception to the native plant species requirement may be some non-native grasses in the MassDOT native warm season grass mixes.

Landscape restoration shall include an invasive plant management plan, and herbicide treatment to promote native seed establishment, as specified in the Draft BTC Special Provisions.

4.15.3 Soil Restoration and Enhancement

Compacted areas soils, including temporary access ways and laydown areas, shall be decompacted and restored with organic amendments as recommended to ensure sufficient drainage for landscape function and plant growth.

Slopes up to 2H:1V shall be surfaced with compost blanket to mitigate potential erosion and enhance plant establishment.

Where modified rock fill is used for slope armoring, rock shall be surfaced with compost conforming to the material requirements of Compost Blanket, hydraulically applied over the rock at the rate 300 CY per acre and seeded with an approved Native seed mix.

Compost shall conform to MassDOT Special Provisions except that the material specifications and requirements of the AASHTO material specifications for compost, included in Appendix C. Vendors shall be active participants in the US Compost Council quality assurance program. Compost derived from biosolids shall not be used in areas that drain to resource areas.

4.15.4 Seeding

The Design-Builder's landscape design team shall develop methods of preparing substrates, installation procedures, erosion control procedures and maintenance procedures that will result in healthy full ground coverage of the specified plant species. Final design plans shall provide details and locations for the materials and procedures used to provide short term erosion control and long-term establishment of the specified seed mixes.

Proposed seed mixes and methods shall conform to MassDOT Special Provisions and agency approvals.

Areas to be maintained as lawn shall be seeded with an appropriate seed mix for lawns placed over loam.

Areas that will have minimal maintenance such as steep slopes shall be seeded with appropriate native grass seed mix as shown on the Plans or as selected from the from the MassDOT website (Landscape Design and Roadside Maintenance | Mass.gov). Other appropriate seed mixes may be accepted upon written approval of MassDOT Landscape Architect. Specific seed mix will be selected based on site conditions, such as solar orientation, slope, soil moisture and soil composition.

The intent for the bioretention swale is to utilize seed mixes that promote the filtering of stormwater pollutants in the bioretention swale, and adjacent perimeters, control erosion, promote native plant diversity and provide food and habitat to wildlife, including pollinators. Areas shown as seed mixes in and around the bioretention swale shall be kept clear (mown yearly or bi-annually) in order to facilitate maintenance personnel and vehicle access. Woody plants shall not be planted in these areas, including the maintenance access drives.

- The seeding and planting work restriction allows work to occur from April 15th to May 31st and from August 15th to October 31st.
- Planting and seeding shall not take place between November 15th and April 15th, except as allowed by MassDEP in writing.

4.15.5 Maintenance of Plantings and Seeded Areas

Refer to the MassDOT Landscape Design and Roadside Maintenance website for guidance regarding basic plant care and establishment of native seed mixes: https://www.mass.gov/lists/landscape-design-and-roadside-maintenance. Watering the marsh area is not to be required.

Woody plantings (trees and shrubs) shall be inspected for acceptance per the Standard Specifications, with the following inspection schedule:

- Spring planting of trees and shrubs shall be inspected in September, following the growing season and for final acceptance the following spring, one year following completed installation.
- Summer and fall planting of trees and shrubs shall be inspected in September, again the following spring, and again for final acceptance one year following installation.
- Failed or failing plants shall be replaced as directed at each inspection. Watering logs for watering during growing season shall be required.

Inspection and maintenance of all areas subject to Regulatory Review shall be subject to these specifications and all permit requirements. Coordinate any planting or work near Wetland replication area with Wetland Specialist for permit compliance.

4.16 INVASIVE PLANT SPECIES AND INFESTED SOIL MANAGEMENT

The Design-Builder is required to develop an Invasive Plant Management Strategy (IPMS) to eradicate invasive plant species on site and prohibit the transport of Invasive Plant species infested soils to non-affected areas on site or other offsite areas. Invasive Plant treatment shall be for the entire project duration and as approved in the Invasive Plant Management Strategy.

Seventy-Five Percent Design (75%), One Hundred Percent Design (100%), and IFC Landscape Plans and Special Provisions shall be submitted for approval by prepared by the Design-Builder's Landscape Architect and submitted for approval by the MassDOT Landscape Architect. Work under these items shall meet or exceed the requirements set forth in the Draft BTC Special Provision Requirements provided in Appendix C for specifications and forms.

Treatment of invasive plants shall be conducted in accordance with BTC Special Provisions Subitem 102.3 Herbicide Treatment for Invasive Plants and BTC Special Provisions Subitem 102.33 Invasive Plant Management Strategy. Invasive Plant growth shall be monitored following treatment and re-delineated for continuing treatment for the Project duration.

The Design-Builder shall determine whether or not to reuse infested soils on site with approval from MassDOT Landscape.

All soils in areas that have been treated under Special Provisions Subitem 102.3 Herbicide Treatment for Invasive Plants and are subsequently scheduled for excavation shall be considered suitable for reuse contingent on the Engineer's determination that no evidence of invasive plant growth or propagation has been documented in the area to be excavated for the 6-month period prior to excavation.

If Invasive Plant growth or propagation is discovered in treated areas immediately prior to scheduled excavation for stockpiling for reuse despite having been treated according to the approved IPMS, then the excavated soil shall be segregated from successfully treated excavated soil prior to reuse on site. All construction schedule submissions shall include line items for work related to management of segregated excavated soil with the intent that temporary stockpile locations will be identified and reserved on the project to the maximum extent possible without affecting other work. Infested, segregated stockpiles shall be treated according to Special Provisions Item 102.3, Herbicide Treatment for Invasive Plants, for subsequent reuse when there is no evidence of invasive plant propagation for 6 months. All stockpiles of infested soil shall be managed for the duration of the contract in accordance with these requirements and the requirements in the SWPPP.

When stockpiling of infested segregated soil on site cannot be accommodated according to the submitted construction schedule, then the infested segregated soil shall be hauled and stockpiled at a location approved in the IPMS and managed for 6 months as stipulated above prior to re-use. MassDOT does not require herbicide treatment of infested soils prior to removal for offsite disposal.

SECTION 5.0: ENVIRONMENTAL APPROVALS/ CLEARANCES, COMPLIANCE, MITIGATION

5.1 GENERAL STATEMENTS

Federal and State jurisdictional wetland resources documented in the Project area include but are not limited to: Bordering Vegetated Wetlands (BVW) / Vegetated Wetlands, Bank and the buffer zone Waterbodies, and FEMA National Flood Hazard Layer 1% Annual Chance/Zone A Floodplain. As a bridge-exempt project, permits will only specifically address federally-jurisdictional Waters/Wetlands.

The Project Area is not located within the mapped boundaries of any state-designated Area of Critical Environmental Concern (ACEC), which are places in Massachusetts that receive special recognition because of the quality, uniqueness and significance of their natural and cultural resources.

The Design-Builder is responsible for all aspects of final mitigation area design and construction in accordance with environmental clearances and BTC plans.

It is the responsibility of the Design-Builder, in coordination with MassDOT's Environmental Compliance for Construction Section, to obtain all required Environmental Approvals/Clearances to the extent not already obtained by or on behalf of MassDOT as described in Section 5.2. The Design-Builder will be required to prepare all documentation required for any application for any such Environmental Approval/Clearance or any amendment to any such Environmental Approval/Clearance. The Design-Builder is also responsible for the preparation of all documentation required to satisfy any conditions to the Design-Builder's scope of work contained in Environmental Approvals/Clearances or amended Environmental Approvals/Clearances prior to the start of work and/or following the completion of work, as directed by the applicable condition.

The Design-Builder is responsible for complying with: (a) all conditions and schedules in any Environmental Approvals/Clearances, whether obtained by MassDOT or the Design-Builder, and (b) all applicable Environmental Laws and Policies. Failure to comply with conditions or schedules in the Environmental Approvals/Clearances will be grounds for termination hereof.

The Design-Builder shall be responsible for all costs, liability, penalties, expenses, damages, including economic, property, natural resource and personal injury, or delays resulting from any non-compliance with Environmental Approvals/Clearances.

The Design-Builder is encouraged to engage with MassDOT and the regulatory agencies to ensure that its designs will be acceptable from an environmental perspective. The coordination process is described in Section 5.4. MassDOT takes no responsibility for any time delay or cost associated with submissions that are refused, rejected, conditioned, or modified by MassDOT or any regulatory agency or for any redesigns such agencies or MassDOT may require.

5.2 CONSTRUCTION-RELATED PERMITS AND ENVIRONMENTAL APPROVALS/CLEARANCES TO BE OBTAINED BY THE DESIGN-BUILDER

At the time of the preparation of this RFP, the following Environmental Approvals/Clearances are outstanding. The Design-Builder will be responsible for obtaining all construction-related permits, as well as any amendments to the permits already obtained, if needed due to design changes.

The Design-Builder will be responsible for obtaining the following construction-related permit(s):

- National Pollution Discharge Elimination System (NPDES) – General Permit for Stormwater Discharges from Construction Activities (CGP), U.S. Environmental Protection Agency.
- NPDES – General Permit for dewatering and remediation activity discharges, US Environmental Protection Agency.

Note: Discharge of uncontaminated and non-turbid groundwater is allowed in accordance with the conditions of the CGP.

5.2.1 NPDES Construction General Permit

The Project is subject to the Environmental Protection Agency (EPA) Construction General Permit. Pursuant to the Federal Clean Water Act, construction activities which disturb one acre or more of land are required to apply to the U.S Environmental Protection Agency (EPA) for coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities. On January 18, 2022 (87 FR 3522), EPA signed its 2022 Construction General Permit (CGP) for stormwater discharges from construction activities. The 2022 CGP, which became effective on February 17, 2022, replaces the 2017 CGP. The CGP expires on February 16, 2027.

The NPDES CGP requires all "Operators" including MassDOT (as owner with operational control over construction plans and specifications) and the Design-Builder (as party with day-to-day control of those activities at a project that are necessary to ensure compliance with the permit conditions) to electronically submit Notice of Intents (NOIs) to the EPA prior to the start of construction (defined as any earth-disturbing activity including clearing, grading, excavation, grubbing, and/or other related activities, such as stockpiling of fill material or demolition that could lead to the generation of pollutants). In cases where a municipality or other party is classified as an "Operator", said Municipality or party must also submit an NOI. The Design-Builder is responsible to ensure that all required "Operators" have submitted an NOI and shall provide proof of same to the MassDOT prior to the start of any work.

The CGP requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the provisions of the Federal Clean Water Act. The SWPPP shall include the NPDES CGP conditions and detailed descriptions of stormwater controls, erosion and sedimentation controls, pollution prevention controls, and construction dewatering controls to be implemented during construction. It is the responsibility of the Design-Builder to complete the SWPPP, provide all information required, and obtain all certifications, as required by the CGP. Any amendments to the SWPPP required by site conditions, schedule changes, revised work, construction methodologies, and the like are the responsibility of the Contractor, and require the approval of the Engineer prior to implementation. For all projects subject to regulation under the Massachusetts Wetlands Protection Act Stormwater Management Standards, DEP

requires submission of a Construction Pollution Prevention Plan (CP/PP) for review and approval. DEP allows for a combined CP/PP and SWPPP submittal, provided DEP's and EPA's filing requirements are followed. Note that while the Project is exempt from the Wetlands Protection Act as a provision of the Bridge Exempt status, the project is subject to the Stormwater Management Standards. Therefore, DEP approval of a CP/PP will be required, but may be combined with the SWPPP. It is the responsibility of the Design-Builder to comply with the current CGP conditions and the conditions of the DEP 401 Water Quality Certification, Army Corps of Engineers Section 404 Individual Permit conditions and other environmental permits applicable to the Project; including the SWPPP, and the methods and means necessary to comply with applicable conditions of said permits, authorizations, and approvals.

Included in the current CGP conditions, is the requirement for inspection of all erosion controls and site conditions on a weekly basis as well as within 24 hours of the occurrence of a storm event of 0.25 inches or greater, significant high tides, or the occurrence of runoff from snowmelt sufficient to cause a discharge or the occurrence of runoff from snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

The 2022 CGP includes new turbidity monitoring requirements and discharge sampling requirements. Activities required to comply with these requirements should be included in the construction schedule. MassDOT will not allow delay claims associated with these or any other CGP requirements.

The Design-Builder shall choose a qualified individual (herein after referred to as the "SWPP Inspector") who will be on-site during construction to perform these inspections. MassDOT must approve the Design-Builder's SWPP Inspector. In addition, if MassDOT determines at any time that the SWPP Inspector's performance is inadequate, the Design-Builder shall provide an alternate SWPP Inspector within three (3) calendar days. Written weekly inspection forms, and Monthly Summary Reports must be completed and provided to the Engineer within seven (7) calendar days of the conclusion of the event. Monthly Summary Reports must include a summary of construction activities undertaken during the reporting period, general site conditions, erosion control maintenance and corrective actions taken, the anticipated schedule of construction activities for the next reporting period, any SWPPP amendments, and representative photographs.

The Design-Builder is responsible for preparation of the SWPPP, including all related certifications, inspections, reports and any corrective actions necessary to comply with the provisions of the NPDES CGP. Any amendments to the SWPPP required by site conditions, schedule changes, revised work, construction methodologies, or regulatory changes are the responsibility of the Design-Builder and require the approval of MassDOT prior to implementation. The Design-Builder shall provide MassDOT with at least five (5) copies of all documents associated with the SWPPP including, but not limited to, the final approved SWPPP, required SWPPP amendments (including revisions/addenda pre, during and post- construction), certifications, NOIs, Notices of Terminations (NOT's), Weekly Inspection forms, Storm Event Inspection forms, Monthly Summary reports (including photographs). These are to be distributed by the Design-Builder to MassDOT's Construction Engineer, Area Engineer, Resident Engineer, MassDOT's Environmental Engineer, and Construction Environmental Coordinator. Additional copies are to be provided by the Design-Builder if requested by MassDOT. Work associated with performance of inspections of all erosion/sediment controls and site conditions is considered incidental to this Item.

Refer to Draft BTC Special Provision Subitem 756. for additional requirements. The Design-Builder shall submit proof of any training required under Subitem 756. to the Engineer for review and approval before commencing any work.

The Standard Specifications require adequate erosion/sediment controls and pollution protection practices for the duration of the Contract. Inspection of these controls is considered incidental to the applicable items. Additional erosion/sediment controls and pollution prevention practices beyond those specified in the RFP documents which are selected by the Design-Builder to facilitate and/or address the Design-Builder's schedule, methods, and prosecution of the work shall be considered incidental to this item. The NPDES CGP requires the submission of a Notice of Termination (NOT) from all "Operators" when final stabilization has been achieved, as well as removal and proper disposal of all construction materials, waste and waste handling devices, removal of all equipment and construction vehicles, removal of all temporary stormwater controls, etc. Approval of final stabilization by MassDOT and confirmation of submission of the NOT will be required prior to submission of the Resident Engineer's Final Estimate.

5.2.2 Expected Submittals as Part of Permit Conditions

As part of the approvals/clearances provided by MassDOT, there are anticipated conditions and submittals that the Design-Builder will be required to prepare for agency approval prior to construction. All submittals will be coordinated, reviewed, and approved through MassDOT. These include but are not limited to:

- Water Management Plan
- Dewatering Management Plan
- Flood Contingency Plan for work in the Floodplain
- Dredged Material Dewatering Plan
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan / SWPPP
- Final set of Construction Plans
- Invasive Plans Management Plan in conjunction with Item 102.33.
- Approved Turtle Protection Plan
- Health and Safety Plan
- Monitoring reports showing success of vegetative cover in restoration areas
- Work-Start Notification and Compliance Certification Forms and Checklists to all relevant approvals
- Proof of Environmental Training
- Annual Report to MassWildlife / Any observations of state-listed turtles

5.3 ENVIRONMENTAL APPROVALS/CLEARANCES TO BE PROVIDED BY MASSDOT

Environmental permits and approvals have been coordinated and received throughout the preliminary design phase. The Design-Builder acknowledges that any Environmental Permit or Approval provided by MassDOT is based on the Project's Base Technical Concept (BTC) as presented in the application materials and that the Environmental Permits/Approvals may require amendment as the design progresses. The Design-Builder, in coordination with MassDOT, shall be responsible for obtaining any required amendments to Environmental Permits/Approvals necessitated by the Design-Builder's work. Coordination with regulators will occur as described in Section 5.4. The Design-Builder, in coordination with MassDOT, shall be responsible for ensuring compliance with conditions and schedules regarding the amendment of any Environmental Permit/Approval. The most current copies of the applications are provided in Appendix C. Table 1 provides a status summary of all applicable procedural regulatory reviews and environmental Permits based on the Project's Base Technical Concept (BTC).

Table 1: Summary of Applicable Procedural Regulatory Reviews and Environmental Permits		
Federal		
Regulation/Administering Agency	**Category**	**Status**
National Environmental Policy Act (NEPA)/ Federal Highway Administration	Individual Categorical Exclusion (ICE)	ICE approved by FHWA May 21, 2024
Section 106 of the Historic Preservation Act of 1966 / State Historic Preservation Officer	Consultation and Project Notification form	Cleared by MHC July and August 2021
US Army Corps of Engineers / Section 404 of the Clean Water Act	Individual Permit (IP) Coverage	Received July 26, 2024
Section 7 of the Federal Endangered Species Act/U.S. Fish and Wildlife Service	Northern-long eared bat (NLEB) Programmatic Opinion Consultation[1]	Guidance and requirements are included in this RFP and the BTC Special provisions NLEB is listed as Endangered, and a No Effect determination was issued on 7/13/2023 due to a negative presence / absence survey performed in 2021. Due to an adjacent positive survey in 2022, General, Lighting, Tree, and Bridge AMMs will be required. Documentation included in this RFP and the BTC Special provisions. (Received January 17, 2024)
United States Coast Guard (USCG)	Advance Approval	Received January 17, 2024
Section 7 of the Federal Endangered Species Act / National Oceanic and Atmospheric Administration (NOAA)	Endangered Species Act (ESA) Section 7 NLAA FHWA Programmatic	NLAA decision received February 8, 2024
Essential Fish Habitat (EFH) / National Oceanic and Atmospheric Administration (NOAA)	Abbreviated Consultation	Federal Interagency Comment Form / Conservation Recommendations received February 22, 2024, and finalized March 12, 2024.

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[1] Additional Consultation required if/when any additional species are uplisted in project vicinity.

State		
Regulation/Issuing Agency	**Category**	**Status**
Massachusetts Endangered Species Act/ Natural Heritage Endangered Species Program (NHESP)	MESA Determination	MESA determination issued by NHESP, File No 24-17064 as a Conditional No-Take. (See Section 5.3.9 for information on protection of listed species.)
MassDEP Section 401 of the federal Clean Water Act & 314 CMR 9.00 / Massachusetts Department of Environmental Protection	Minor Dredge Project Certification (BRP WW 08) Major Fill Project (BRP WW10);	Received June 28, 2024
Massachusetts Office of Coastal Zone Management (CZM)	Federal Consistency Review	Consistency Received July 3, 2024
Marion Conservation Commission (Massachusetts Wetlands Protection Act)	Order of Conditions	Exempt - Courtesy Notification Letter to be sent by Design-Builder prior to construction
Wareham Conservation Commission (Massachusetts Wetlands Protection Act)	Order of Conditions	Exempt - Courtesy Notification Letter to be sent by Design-Builder prior to construction

The Design-Builder must ensure there are no impacts to wetland resource areas beyond those approved by permitting authorities. Any deviations from the approved permitted areas will require additional regulatory review and approval will be the responsibility of the Design-Builder. The Design-Builder shall not work in, alter, impact or disturb any wetland resource area other than those areas of proposed impacts as designated and depicted within the applicable permit applications and permitted by the regulatory agencies. Unpermitted wetland impacts shall be avoided through worker isolation techniques including permanent and temporary chain link fence, sedimentation fence, haybales, and limit of work signage. Erosion control barriers, fencing and signage shall delineate the permitted work areas.

The Design-Builder shall utilize upland areas within state highway layout for staging or laydown area. If the Design-Builder chooses to create staging areas outside of the state highway layout, the Design-Builder shall delineate all environmental resource areas adjacent to such staging areas and must isolate such wetland resource areas from staging areas with orange snow fence, compost filter tubes and limit of work signage. The creation of staging areas outside of the state highway layout will not result in any environmental resource area impacts beyond those permitted within the applicable environmental permits; such applies to the entire project area, including any additional areas chosen by the Design-Builder for staging access and/or construction access.

5.3.1 National Environmental Policy Act (NEPA)

The Project is subject to the National Environmental Policy Act. The Massachusetts Department of Transportation (MassDOT) prepared a Categorical Exclusion (CE) Checklist for the Project, dated May 21, 2024. Based on the information prepared, the Project qualifies as an Individual CE. A copy of the CE, with supporting documentation, is provided in Appendix C.

The Design-Builder is encouraged to take specific consideration of the circumstances during final design and construction that may trigger the need to reevaluate approved NEPA documentation, including but not limited to:

- Changes in project engineering or design (e.g., shifting or modifying the project footprint, or modifying project termini)
- Changes in affected environment or circumstances (e.g., designation of new threatened or endangered species, which has the potential to inhabit the project area)
- Changes in required right-of-way (ROW) or easements
- Changes in nature and severity of environmental impacts due to changes in project design or changes in the affected environment
- Changes to environmental commitments (e.g., avoidance, minimization, and/or mitigation measures)

Project changes may require field review and additional analyses to evaluate the environmental implications of the change. Additional analysis can be incorporated into the reevaluation to demonstrate that the approved NEPA document remains valid. The Design-Builder shall consult with the Resident Engineer and MassDOT Environmental Services to ensure necessary regulatory reviews are conducted and that NEPA reevaluations are properly documented during final design and construction. The Design-Builder, in coordination with MassDOT, shall be responsible for documentation of the reevaluation process necessitated by the Design-Builder's work.

5.3.2 Section 106 of the National Historic Preservation Act

This Project was reviewed pursuant to Section 106 of the National Historic Preservation Act due to federal actions involving financial assistance and permitting. There are no state or other Federally-listed historic or cultural resources located within the project area. A review of the MHC archaeological maps revealed no recorded pre-contact or historic archaeological sites in the vicinity of the project area.

The Project has been designed to avoid and minimize impacts to inventoried historic properties. The Marion and Wareham Historical Commissions were solicited for comment on the Project but no response has been received from Wareham. In a reply dated August 10, 2021, the Marion Historical Commission determined that they *"...foresee no impact on historic resources as a result of the current scope of work*." The Mashpee Wampanoag Tribe, the Wampanoag Tribe of Gay Head (Aquinnah), and the Narragansett Indian Tribe were notified of the project and invited to comment but have not provided responses. In a reply dated July 6, 2021, the Massachusetts Board of Underwater Archaeological Resources (BUAR) along with the determined that the "…*Board expects that this project is unlikely to impact submerged cultural resources*" but also noted that "*that undisturbed submerged areas in the vicinity of the project area may be generally archaeologically sensitive*."

MassDOT CRU staff submitted a Project Notification Form to the State Historic Preservation Officer / the Massachusetts Historical Commission (MHC) for review under Section 106 of the National Historic Preservation Act of 1966, as amended. In a reply dated July 13, 2021, the MHC determined that "*this project is unlikely to affect significant historic or archaeological resources*." No further review of the project is required under Stipulation VB "No Historic Properties Affected" of the Section 106 Programmatic Agreement among FHWA, MHC, MassDOT and the ACHP. Should the Design-Builder change the scope of work, the Design-Builder would be responsible for reevaluating any new impacts to section 106 properties.

5.3.3 Section 404 of the Clean Water Act

Section 404 Individual Permit authorization from the U.S. Army Corps of Engineers (USACE) was received July 26, 2024. The Design-Builder shall adhere to all the requirements and conditions within the USACE permit. Should the Design-Builder change the scope of work, the Design-Builder would be responsible for reevaluating any new impacts under the jurisdiction of Section 404 of the CWA and file for any necessary modifications/amendments to permit said activities. Copies of the Section 404 Individual Permit authorization are provided in Appendix C.

5.3.4 Section 7 of the Endangered Species Act

5.3.4.1 U.S. Fish and Wildlife Service (USFWS) - Northern Long-Eared Bat Protection

The U.S. Fish and Wildlife Service (USFWS) has listed the northern long-eared bat (*Myotis septentrionalis*; NLEB) and tricolored bat (*Perimyotis subflavus*; TCB) as federally endangered or proposed endangered, respectfully, under the Endangered Species Act (ESA). The USFWS developed this guidance to address ESA compliance and promote conservation of NLEB and TCB. This project has been consulted with the USFWS through the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA) Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat revised February 5, 2018 and amended March 31, 2023.

On behalf of FHWA, the lead federal agency for Section 7 consultation, MassDOT submitted a FHWA, FRA, FTA Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat to the USFWS through the Information for Planning and Consultation (IPaC) webpage. Therefore, the project has completed Section 7 consultation through the ESA.

In advance of the uplisting of the TCB to endangered under the ESA, the following Avoidance and Minimization Measures (AMMs) must be strictly adhered to in order to protect NLEB and TCB and to be in compliance with the ESA. Contact MassDOT Environmental Services - Wildlife Unit Supervisor (David Paulson, david.j.paulson@dot.state.ma.us, 857-262-3378) for questions about project limits, restrictions, or conservation measures.

General AMM

- The Contractor shall ensure all personnel working in, or on the project site are aware of all environmental commitments related to NLEB and TCB, including all applicable AMMs. NLEB and TCB information (https://www.fws.gov/midwest/endangered/mammals/nleb and https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus) shall be made available to all personnel.

Lighting AMMs

- Direct temporary lighting away from suitable habitat during the active season: **April 1 to October 31**.
- When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable.

Tree Removal AMMs

- If additional cutting is proposed by the Contractor that is outside the scope of this contract, additional review is required by the MassDOT Highway Division's Environmental Services Section, and additional review and restrictions may be required by the USFWS.
- Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).
- No tree cutting shall be conducted during the active season: **April 1 to October 31**.
- No tree cutting shall be conducted during the active season: **April 1 to October 31**, or if cutting outside of this timeframe is required, tree removal is limited to 10 or fewer trees per project at any time of year within 100 feet of existing road/rail surface and outside of documented roosting/foraging habitat or travel corridors; and a visual emergence survey must be conducted by MassDOT Highway Division's Environmental Services Section or appointed representative with no bats observed.
- Do not remove **documented** or NLEB roosts that are still suitable for roosting, or trees within 0.25 miles of roosts, or **documented** foraging habitat any time of year.
- The Contractor shall ensure all personnel working in or on the project site are aware of all environmental commitments related to NLEB, including the TOY restriction. If this restriction needs to be waived at any location(s) the Resident Engineer shall send a locus map of the proposed work to MassDOT Highway Division's Environmental Services Section for review and a determination if the restriction can be waived.

Bridge AMMs

- An inspection of the bridge for the presence of, or evidence of use by, bats shall be completed by the MassDOT Wildlife Unit prior to commencing bridge work. The Contractor shall notify the MassDOT Wildlife Unit no later than thirty (30) days prior to the start of work or reinitiating work on the bridge to provide adequate time for inspection. If bats are found to be present, or, if there is evidence of bat usage, work at the bridge shall not commence until the MassDOT Wildlife Unit has completed coordination with the U.S. Fish and Wildlife Service to determine the appropriate follow up or mitigative actions. If bridge work is not complete within 2 years of the initial bridge inspection, another inspection of the bridge for the presence of, or evidence of use by, bats shall be completed.

Structure AMMs

- This category includes manmade structures that may provide bat roosting or hibernation habitat that are not bridges (i.e., buildings, sheds, culverts). An inspection of the structure for the presence of, or evidence of use by, bats shall be completed by a Qualified Bat Consultant or MassDOT Biologist prior to commencing structure work. The Contractor shall notify the MassDOT Wildlife Unit no later than thirty (30) days prior to the start of work or reinitiating work to provide adequate time for inspection. If bats are found to be present, or, if there is evidence of bat usage, work at the bridge shall not commence until the MassDOT Wildlife and Endangered Species Unit has completed coordination with the USFWS to determine the appropriate follow up or mitigative actions.

Hibernacula AMMs

- For projects located within karst areas, on-site personnel will use best management practices, secondary containment measures, or other standard spill prevention and countermeasures to avoid impacts to possible hibernacula. Where practicable, a 300-foot buffer will be employed to separate fueling areas and other major containment risk activities from caves, sinkholes, losing streams, and springs in karst topography.

Copies of the USFWS Section 7 coordination are provided in Appendix C.

5.3.4.2 National Oceanic and Atmospheric Administration (NOAA) - Marine Protection

Per NOAA Section 7 approval, proposed piles below the mean high water line (MHW, see plans) are to be pre-drilled for the first 10-15 feet, then the Design-Builder may implement a vibratory start / impact hammer to the required depth. No vibratory or impact hammer is anticipated for piles above the MHW, they can be drilled to full depths.

"Soft starts" for pile driving are required as follows: If pile driving is occurring during a time of year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold, a “soft start” is required to allow animals an opportunity to leave the project vicinity before sound pressure levels increase. In addition to using a soft start at the beginning of the work day for pile driving, one must also be used at any time following cessation of pile driving for a period of 30 minutes or longer.

For impact pile driving: pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one minute wait period, then two subsequent three-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.

For vibratory pile installation: pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.

The Project requires a 5 dB noise attenuation as sound pressure amplitudes above peak sound pressure levels and sound exposure levels can cause onset of physical injury to fish (further described in NOAA Section 7 approval).

Copies of the NOAA Section 7 application and authorization are provided in Appendix C.

Copies of the NOAA EFH application and authorization are provided in Appendix C.

5.3.5 Massachusetts Environmental Policy Act (MEPA)

[**THIS SECTION NOT APPLICABLE**]

5.3.6 Chapter 91 of the Public Waterfront Act

[**THIS SECTION NOT APPLICABLE**]

5.3.7 401 Water Quality Certification - BRP WW 10 Major Project (Fill)

Section 401 Water Quality Certification, BRP WW 10 – Major Project from the Massachusetts Department of Environmental Protection (MassDEP) was received June 28, 2024. The Design-Builder shall adhere to all the requirements and conditions within the authorization. Should the Design-Builder change the scope of work, the Design-Builder would be responsible for reevaluating any new impacts under the jurisdiction of Section 401 of the CWA and file for any necessary modifications/amendments to permit said activities.

Copies of the WQC application and authorization are provided in Appendix C.

5.3.8 401 Water Quality Certification - BRP WW 8 Minor Project (Dredge)

Section 401 Water Quality Certification, BRP WW 8 – Minor Dredge Project from the Massachusetts Department of Environmental Protection (MassDEP) was received June 28, 2024. The Design-Builder shall adhere to all the requirements and conditions within the authorization. Should the Design-Builder change the scope of work, the Design-Builder would be responsible for reevaluating any new impacts under the jurisdiction of Section 401 of the CWA and file for any necessary modifications/amendments to permit said activities.

Copies of the WQC application and authorization are provided in Appendix C.

5.3.9 Massachusetts Endangered Species Act

The entire Project area south of Route 6 is recognized by the Natural Heritage and Endangered Species Program (NHESP) as Estimated Habitat of Rare Wildlife and Priority Habitat of Rare Species for the Northern Diamond-backed Terrapin (*Malaclemys terrapin*). Northern diamond-backed terrapin is listed by the NHESP as a threatened species pursuant to the Massachusetts Endangered Species Act (MESA, MGL c. 131A) and MESA's implementing Regulations (321 CMR 10.00), common tern (*Sterna hirundo*) is listed as a species of special concern, and roseate tern (*Sterna dougallii*) is listed as endangered. On January 8, 2024, MassDOT obtained a Conditional No-Take letter from the Massachusetts Division of Fisheries and Wildlife (MassWildlife). The Design-Builder shall adhere to all Best Management Practices confirmed by MassDOT, which includes following a Turtle Protection Plan (TPP). Should the Design-Builder change the scope of work, the Design-Builder would be responsible for reevaluating any new impacts under MESA jurisdiction and file for any necessary amendments to permit said activities. Any changes to the proposed Project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. Copies of the Conditional No-Take letter are provided in Appendix C.

As noted in the MESA Determination, MassWildlife & NHESP require the Design-Builder to develop a TPP that subsequently must be approved by the agencies and then fully implemented. Methods for installing Turtle Exclusion Fencing and Erosion and Sedimentation Controls will be described in the TPP and follow all project approvals. These items must be installed during the turtles' inactive period to avoid impacts to individual turtles and to exclude turtles from the project limits prior to the beginning of their nesting period, so that they do not nest in the project area. Generally speaking, the fencing must be installed prior to April 1, and no sooner than November 1 in any given year. NHESP may make additional recommendations or modifications to this timing as part of the TPP approval. Turtle sweeps will be required with exclusionary fence installation. Additionally, the TPP will define how often the Design-Builder must inspect the fencing to ensure it is in good repair and functioning as intended. The Design-Builder must notify MassDOT and NHESP when work will begin, 60 days before the start of work.

Additional in-water work TOY's may be identified by NHESP as part of the TPP approval.

The following Draft BTC Special Provisions shall be incorporated into the contract for the Turtle Protection Plan (See Appendix C):

Subitem 754.23 – Turtle Protection Plan

5.3.10 Massachusetts Wetlands Protection Act

[**THIS SECTION NOT APPLICABLE**]

5.3.11 NOAA Essential Fish Habitat (EFH) Protection

Per final NOAA Essential Fish Habitat (EFH) coordination, turbidity producing (in-water E&S control installation) work should be completed outside of the provided TOY from March 1 to June 30 of any given year, to minimize adverse effects to NOAA trust resources. If work cannot meet this TOY restriction above, then to minimize adverse effects to fish, controls should not encroach one-third of the stream width measured from the OHW mark during the TOY restriction.

5.4 COORDINATION BETWEEN THE DESIGN-BUILDER, MASSDOT AND REGULATORY AGENCIES

MassDOT will serve as the applicant of record for all Environmental Approvals/Clearances. MassDOT will review all applications for Environmental Approvals or amendments prepared by the Design-Builder, sign as the applicant and submit the application to the agency with jurisdiction.

The Design-Builder shall be responsible for preparing all documentation necessary to support applications for Environmental Approvals. MassDOT shall be provided a reasonable opportunity to review and comment on completed applications for Environmental Approvals prior to their submission.

MassDOT will serve as liaison between the Design-Builder and regulatory agencies. The Design-Builder is encouraged to establish a working relationship with the regulatory agencies and MassDOT. The Design-Builder shall not be authorized to negotiate with regulatory agencies on behalf of MassDOT but shall coordinate all negotiations with MassDOT.

The Design-Builder shall prepare the following materials (including but not limited to) for MassDOT to review, approve, and submit as necessary to agency with jurisdiction:

- Verification of training under MassDOT Erosion Prevention & Sediment Control Training Program
- NOI and SWPPP for submission to EPA
- List of submittals as noted in Sections 5.2.1, 5.2.2 and 5.2.3
- Specific importance is placed on the submittal requirements and design review timeframes established by the environmental approvals. The Design-Builder should address this coordination in their Project Schedule and Project Management Plan.

5.5 DUTY OF COMPLIANCE

The Design-Builder is responsible at all times for complying with: (a) all conditions and schedules in any Environmental Approvals/Clearances, whether obtained by MassDOT or the Design-Builder; and (b) all applicable Environmental Laws and Regulations. Failure to comply with conditions or schedules in Environmental Approvals/Clearances may be grounds for termination thereof. The Design-Builder shall be responsible for any and all costs, liability, penalties, expenses, damages, including economic, property, natural resource and personal injury, or delays resulting from any noncompliance with Environmental Approvals/Clearances.

5.6 ENVIRONMENTAL MITIGATION

In the event that impacts to wetland resources, protected habitats, or cultural resources beyond those permitted in the BTC are determined to be unavoidable, the Design-Builder is responsible for preparing all designs and specifications for environmental mitigation and for complying with all mitigation requirements and schedules contained in Environmental Approvals/Clearances, including requirements for noise control, water quality monitoring, and precautions for construction adjacent to "sensitive resource areas." As of the date of this RFP, it is assumed that work will occur in State or Federally regulated wetland resource areas. The Design-Builder's Price includes the cost of all mitigation, including any additional mitigation required as a result of amendments to Environmental Approvals/Clearances, except where such additional mitigation is required solely as a result of a MassDOT-directed change.

Public involvement and communications are very important aspects of this Project's development and construction phases. MassDOT has conducted extensive public outreach for this Project with the general public, abutters, local elected officials, local municipalities, local historical commissions, Federal and State agencies, and adjacent business owners.

The Design-Builder will be responsible for all mitigation commitments and permit conditions established in the aforementioned permits including potential amendments and approvals, and during the extensive public outreach process. In addition to those items already mentioned herein, this shall include but not be limited to:

- Adherence to Subitem 119.5 Construction Noise Control and Subitem 440.5 Construction Dust Control Draft BTC Special Provisions provided in Appendix C.
- A third-party Environmental Monitor is required, per USACE IP.
- Use of a Wetland Mitigation Specialist during construction of the wetland replication site to ensure the site constructed and monitored in accordance with permit conditions and BTC Special Provisions.
- Invasive Species Management as specified in the BTC and specifically developing a plan and implementation for the wetland mitigation areas.
- Adherence to contract restrictions on parking in residential neighborhoods and routing truck traffic through residential neighborhoods.
- Construction of Storm Water Best Management Practices (BMPs).
- Submission of a Temporary Traffic Control Plan (TTCP) to MassDOT for review and approval. The TTCP will be coordinated with the elected, engineering, planning, and public safety officials in the affected municipalities of Marion and Wareham.
- Submission of a draft Public Participation (Outreach) Plan, prepared by a qualified professional, for review and acceptance by MassDOT.
- Submission of a Soil and Groundwater Management Plan for review and acceptance by MassDOT.

The mitigation commitments described below shall not be considered all-inclusive and shall be in addition to the requirements described in other Sections of the RFP.

5.6.1 Water Resources

The Project results in unavoidable impacts to WOTUS (wetlands and waterways), associated with the expansion of the causeway and work at the abutments from the roadway work and shared-use-path (SUP) installation. Mitigation for the Project's unavoidable impacts will be provided in accordance the USACE New England District Regulatory Division Compensatory Mitigation Standard Operating Procedure (December 29, 2020) and MassDEP's Guidance. The amount of compensatory mitigation required by MassDEP for impacts to jurisdictional resources must be, to the extent practicable, sufficient to replace lost wetland or aquatic resource functions, and at minimum 1:1 in area. See Section 5.6.2 for wetland mitigation proposed. USACE has indicated that for this Project, in lieu fee payment is preferred over wetland creation and enhancement measures, and per the approved permit, payment is also required.

While the USACE preference is in lieu fee payment, mitigation measures also include salt marsh / wetland creation, and wetland and waterway restoration (in areas of temporary impacts due to traffic crossovers). This is necessary to meet the requirements of the MassDEP 401 WQC. The proposed location of the wetland creation site is a parcel at the northeast of the project site along Marion Road. Restoration of temporary impacts to WOTUS is proposed and required throughout the Project limits. Construction impacts on water resources and floodplain will be further limited by the adherence to the project erosion and sedimentation control plan as well as the Best Management Practices detailed in the BTC.

5.6.2 Wetland Resource Area Mitigation

On a parcel abutting the project at the northeast of the project and immediately adjacent to existing salt marsh and the Weweantic River, approximately 5,930 sf total of upland area will be excavated to appropriate grades and tie into the adjacent salt marsh and planted as a salt marsh wetland community. A tidal flushing study was completed in 2020 to gather data about tidal elevations on the site. Preliminary plans have been developed to show the general limits, layout, grading, and planting/revegetation for the site. This plan and associated performance criteria notes were reviewed and approved by MassDEP during the 401 Water Quality Certification application review processes.

The Design-Builder will be required to submit any final wetland creation plan details, associated design narrative, construction work plan and post-construction monitoring plan for MassDOT review and acceptance. The intent is for retaining mature, existing cedar tree(s) for site stability where feasible to facilitate revegetation and reforestation. The Design-Builder can evaluate and specify where this may be feasible along with an on-site Wetland Specialist during construction. In general, while not subject to the inland replication guidance of the Wetland Protection Act (WPA as a coastal, bridge exempt, salt marsh mitigation project, mitigation is designed within the loosely applied accordance with 314 CMR 9.00 and 310 CMR 10.55(4)(b) (BVW Wetland Replication Requirements), and MassDEP's Massachusetts Inland Wetland Replication Guidelines (2002).

The salt marsh creation area must be designed to provide functions and values similar to the areas that will be lost by the project and provide similar characteristics with regard to surface area, groundwater and surface elevations, hydrology, community type, wetland plant species, and soil types. The replication area must be planted using a diverse variety of native, predominantly salt marsh emergent species, shrubs, seeds and plugs. Guidance specifications and planting schedules have been provided and changes must be approved as amendments to regulatory agencies and MassDOT.

During construction, a Wetland Specialist, as dictated in the permitted conditions and BTC Special Provisions must be on site to review the excavation, grading and planting of the replication area. This Wetland Mitigation Specialist must also inspect plant materials prior to planting to ensure viability and source from native stock. During construction, preventative measures must be taken to minimize colonization by invasive species. Wetland soil must be sourced appropriately to ensure that invasive species are not present in the material brought on site. Furthermore, trucks and construction equipment (including tires or tracks) must be washed prior to entry to the replication site to remove/ rinse off any potentially contaminated soils or undesirable seeds. The area upland of the replication area must be installed with plants per details and under the direction of the Wetland Specialist, and stabilized with weed free straw mulch that will serve to protect against erosion and inhibit opportunistic invasive seed germination. Mulch shall not be used for plantings within the intertidal zone below the High Tide Line (spring high tide) line. Wetland and salt marsh restoration (temporary impact areas) will be similarly completed prior to the completion of construction.

Post-construction monitoring by a Wetland Specialist must occur in accordance with the loosely applied MassDEP Inland Wetland Replication Guidelines (2002) in order to ensure general compliance with 310 CMR 10.55(4)(b) which requires that "*The surface of the replacement area to be created ("the replacement area") shall be equal to that of the area that will be lost ("the lost area"); At least 75% of the surface of the replacement area will be reestablished with indigenous (native) wetland plant species within two growing seasons.*" These Guidelines detail post-construction monitoring to occur during the spring and fall growing seasons for a period of two years (or longer, in accordance with permit requirements). Monitoring will include vegetation transects (or other similar methods) to determine vegetative coverage and additional information as required in accordance with the special conditions and performance standards set forth in the permits.

Summary data of each monitoring visit must be provided in an annual report submitted to USACE, and MassDEP as specified in 401 WQC permit conditions. These reports must also detail remediation recommendations required for compliance, such as supplemental plantings or grading modifications. During these monitoring periods, the presence of invasive species must also be documented and if determined to be present, hand-pulled and properly disposed off-site. A definitive treatment plan must be developed that will comply with BTC specifications, relevant state regulations, and as conditioned with Permit approvals. Based upon the data collected during sampling events, the Wetland Specialist must render a conclusion within each report as to the success of the wetland mitigation area in terms of 310 CMR 10.55(4)(b) and permit conditions. Monitoring and reporting must be consistent with permit requirements and MassDOT's annual report monitoring requirements.

The following Draft BTC Special Provisions shall be incorporated into the Contract for Wetland Restoration (See Appendix C):

- Subitem 755.2 – Tidal Wetland Mitigation Areas - Tidal
- Subitem 755.45 - Wetland Restoration
- Subitem 755.75 - Wetland Specialist
- Subitem 755.76 - Wetland Monitoring Reports

5.6.3 Streambed Restoration

As part of the construction associated with the proposed bridge replacement, significant in-water work will be required. Streambed to be restored per the typical detail included in the permit plan set and the Subitem provided in the Draft BTC Special Provisions. The Weweantic River is a major tidal waterbody described in the permitting applications and approvals. The excavated streambed material from the westernmost pier of W-06-016, and that from the Marion Wareham bridge (M-05-001=W-06-013) is to be stockpiled and reused as practicable and as identified by the Wetland Specialist to cover all proposed new bridge piers. As a result of the 2024 Sediment Sampling, streambed material at the easternmost bridge pier (~STA 105.6) of the Wareham bridge (W-06-016) is not to be reused on-site (See Section 5.7). Streambed restoration specification has been provided.

The Design-Builder will also be responsible for preparing a phased water management plan to ensure continuous streamflow is not inhibited while work is actively conducted in dry conditions without causing turbidity or sedimentation. Restoration must comply with BTC Special Provisions, relevant state regulations, and as conditioned with Permit approvals. Streambed restoration is proposed in the Weweantic River in temporarily where existing bridge piers will be removed. Streambed Restoration shall be constructed in accordance with the BTC Special Provisions Subitem 983.521 provided in Appendix C. This work shall be performed in accordance with the 401 WQC and Section 404 IP authorization.

5.6.4 Invasive Insect Pests

As part of its environmental obligations, the Design-Builder shall be responsible for notifying Massachusetts Department of Agricultural Resources (MDAR) of construction activities and regularly coordinating with them to receive bulletins and updates for invasive species, including Asian longhorn beetle, emerald ash borer, spotted lanternfly.

In addition, prior construction activities, the Design-Builder shall provide mandatory training for all personnel, including compliance training as required, for invasive insect species. Training sessions shall be MDAR personnel or their designated specialists. Training shall be for the listed pests and additional subjects as recommended by MDAR. Design-Builder shall be responsible for arrangements, as well as all reproduction costs and distribution of training materials.

Contact at MDAR is

Jennifer Forman Orth, Ph.D.
Environmental Biologist
Massachusetts Department of Agricultural Resources
251 Causeway St., Suite 500
Boston, MA 02114-2151
jennifer.forman-orth@mass.gov
p: (617) 626-1735
f: (617) 626-1850
http://massnrc.org/pests

5.6.5 Air Quality

See Draft BTC Special Provision Subitem 440.5 provided in Appendix C for specific requirements related to Dust Control during construction. This Special Provision identifies the minimum MassDOT requirements for Dust Control on this Project.

Mitigation measures will be implemented to reduce air quality impacts during construction. Air quality specifications are incorporated into Contract documents to ensure compliance with applicable provisions of Massachusetts General Laws and Massachusetts Department of Environmental Protection (MassDEP) regulations, such as prohibiting trucks from idling more than 5 minutes; notifying MassDEP prior to the start of construction; and filing necessary forms such as BWP AQ 06, "Notification Prior to Construction or Demolition" with the Bureau of Waste Prevention.

The Design-Builder will be required to develop and submit a Dust Control Plan to MassDOT that will include but not be limited to the following: construction will not result in excessive particulate matter emissions, nuisance dust conditions, or PM_{10} (particulate) concentrations exceeding national and Massachusetts ambient air quality standards; use of watering trucks to minimize dust; covers for dust-producing materials (e.g. dirt) when hauling; stabilization of the surface of dirt piles if not removed immediately; cover truck contents when transferring materials; and use of approved dust suppressants on traveled paths that are not paved.

In addition, all diesel-powered non-road construction equipment and vehicles greater than 50 brake horsepower will have engines that meet either the Environmental Protection Agency (EPA) particulate matter emission standards or emission control technology verified by the EPA or the California Air Resources Board (CARB); or emission control technology certified by manufacturers to meet or exceed emission reductions verified by EPA or CARB. Emission control devices, such as diesel oxidation catalysts or diesel particulate filters, will be installed on the exhaust system side of the diesel combustion engine equipment.

5.6.6 Noise

During construction, residential neighborhoods in proximity of the bridge may experience temporary noise impacts from the demolition and operation of heavy equipment during the construction period. See Draft BTC Special Provision Subitem 119.5 provided in Appendix C for specific requirements related to Noise Control during construction. This Special Provision identifies the minimum MassDOT requirements for Noise Control on this Project.

The Design-Builder will employ an acoustical engineer who will develop for MassDOT's review and approval a Noise Control Plan which will include mitigation measures to control noise impacts during construction. The plan will require the Design-Builder to establish standard work hours between the hours of 7 AM and 10 PM and to notify MassDOT for any exceptions to the standard work hours unless allowed as an exception by MassDOT with sufficient mitigation and justification. The Design-Builder shall collect and submit baseline noise measurements as necessary to prove future compliance with the Noise Control Plan (NCP). Prior to collection of the baseline noise measurements, the Acoustical Engineer shall submit a plan showing proposed monitoring locations, equipment, and procedures for review and approval by MassDOT.

The Design-Builder will be required to comply with the construction noise limits for the daytime, evening and nighttime hours, except where noise limit exceedances occur when utilizing mitigation in accordance with the NCP. Typical noise control mitigation measures that the Design-Builder may be required to use include mufflers, shrouds or other kinds of enclosures or barriers, or restrict usage. The Design-Builder will be required to utilize construction equipment fitted with exhaust systems and mufflers that have the lowest associated noise whenever those features are available. In addition, the Design-Builder will be required to submit a staging plan for review and approval by MassDOT that establishes equipment and material staging areas away from sensitive receptors.

Noise monitoring will be required to document compliance with the noise monitoring plan. Predicted or measured noise levels that exceed or approach recommended construction noise limits will be mitigated.

To address potential noise issues arising during construction, the Design-Builder will establish a noise complaint hotline and designate a point of contact to address noise complaints. The Design-Builder's acoustical engineer will be notified if needed, as well as MassDOT's Resident Engineer, to ensure resolution of community noise issues.

If any nuisance noise issues cannot be reasonably mitigated, then the associated activities shall be limited to 8 am-6 pm Monday through Friday, and 10 am-5 pm on Saturday and Sunday. Nuisance complaints must be addressed within 24 hours of the complaint and maximum noise level complaints must be addressed within 48 hours of the complaint.

The Design-Builder shall also provide a noise measuring device for the Engineer's use for the Project duration. The noise measuring device shall be regularly maintained and calibrated in accordance with the manufacturer's recommendations.

5.6.7 Traffic

Given the nature of the Project, impacts to traffic during construction are expected. Mitigation measures will be implemented to reduce traffic congestion during construction. The Design-Builder will prepare a Temporary Traffic Control Plan (TTCP). This plan will be based on the TTCP shown in the BTC documents; and coordinated with the elected, engineering, planning, and public safety officials in the Towns of Marion and Wareham. Measures in the TTCP will include: identification of a construction truck route; establishment of employee parking areas away from residences and the job site (except within the protected work zone); communication of construction information by electronic changeable message signs suggesting alternate routes; reducing roadway construction activities during high traffic volume periods; and the possible utilization of alternate work schedules to reduce traffic impacts, but only if noise control parameters can be met. To limit impacts on adjacent community facilities, businesses, and residents, MassDOT and the Design-Builder will assess measures to provide adequate notice and assistance as needed to maintain access to adjacent residential properties, as well as local businesses.

5.6.8 Continued Coordination and Public Involvement

MassDOT will continue to work closely with the Towns of Marion and Wareham and other local affected communities through their representatives, abutting residences and businesses, and all other stakeholders during construction. Public information meetings and/or other means of providing the public with up-to-date and easy-to-understand construction information will continue throughout project development and construction. The Design-Builder will grow its database of contacts who want to and need to know about the construction schedule and will regularly update the contacts through e-mail, mobile media, and telephone. The Design-Builder will also be responsible for updating the Project website and coordinating these updates with MassDOT.

The Towns of Marion and Wareham contacts to address community concerns during construction are:

- Dave Menard, Wareham Director of Municipal Maintenance, 508-295-5300,
- Rebecca Tilden Director Public Works Department 508-748-3540 rtilden@marionma.gov

These individuals will have the opportunity to attend regularly scheduled Design-Builder coordination meetings with the MassDOT Resident Engineer, who has the authority to negotiate resolutions to issues.

5.6.9 Cultural Resources

There are no National Register-listed or eligible properties, districts, or sites within the Area of Potential Effect (APE) of the Project. Any proposed plan changes that would result in land disturbance outside of the state highway layout shall be reviewed by the MassDOT Cultural Resources Unit.

5.6.10 Hazardous Waste/Waste Regulated Materials

Mitigation measures will be implemented to reduce hazardous waste impacts during construction. The Design-Builder will develop and implement a Soil and Groundwater Management Plan during construction and will be required to comply with MassDOT's standard provisions for handling and disposal of contaminated soil and groundwater. See the Draft BTC Special Provisions provided in Appendix C for additional requirements, specifically with regard to the presence of lead-based paint. Design-Builder must test concrete coating for lead. Updated sediment sampling results will identify if there are any contamination concerns. The Design-Builder shall evaluate site conditions related to hazardous/regulated building materials that will be disturbed by this Project and include any costs for the proper handling, removal, disposal and recycling of that material during demolition activities. Work must be performed in accordance with all Federal, State and local laws and regulations. The cost should include the preparation of any required work plans for agency and/or MassDOT approval. The Draft BTC Special Provisions shall be incorporated into the Contract (See Appendix C).

The Design-Builder shall be responsible for the proper management and disposal of hazardous/regulated building material generated during the project. Hazardous/regulated building materials include, but are not limited to, lead-based paint, polychlorinated biphenyls (PCB) contained in caulking and highway lighting ballasts, mercury containing lamps and asbestos containing materials (pipe, waterproofing, etc.).

ASBESTOS CONTAINING MATERIAL - ASBESTOS LIABILITY INSURANCE

Since the locations of the work involving asbestos are unknown, the Contractor will not be required to submit the necessary asbestos insurance amounts prior to execution of the Contract.

If asbestos-containing material is anticipated to be encountered (in the event that an existing asphaltic plug joints being removed from a bridge encounters roofing felt that may be ACM), prior to any testing or removal of asbestos, Asbestos Liability Insurance shall be obtained for this Project in accordance with Subsection 7.05 of the Standard Specifications. The Contractor and the Massachusetts Department of Transportation shall be named as additional insureds. The actual receipted costs will be reimbursed to the Contractor.

If any existing material is a possible ACM (asbestos containing material), the Contractor must perform all asbestos inspection, testing, removal, and proper disposal in accordance with the required rules and regulations included in the Draft BTC Special Provisions and as required by the Engineer.

The following Draft BTC Special Provisions shall be incorporated into the contract for the handling, reuse and disposal of asbestos containing material. (See Appendix C):

- Item 182.1 - Inspection and Testing for Asbestos
- Item 182.2 - Removal and Disposal of Asbestos)

5.6.11 Rodent Control

The Design-Builder shall develop and implement rodent control measures consistent with those outlined in Subsection 119 of the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition. The measures shall be submitted for MassDOT review and approval prior to the start of any demolition under this Project.

5.7 SUBSURFACE HAZARDOUS MATERIALS

The Design-Builder will be responsible for researching site conditions (i.e. a review of regulatory agency records and site history) within the Project Limits and as otherwise impacted by the Design-Builder's operations in order to identify potential sources of contamination that could impact work on this Project.

The Design-Builder will develop a Soil and Groundwater Management Plan (SGMP) that will be implemented during construction to manage soil, sediment and groundwater that may be impacted by oil and/or hazardous materials. The SGMP will be based upon existing data and information generated by the Design-Builder through its own research. The SGMP should detail soil sampling and management techniques that will be performed under the direction of an LSP as well as ways to avoid and/or reuse contaminated media in accordance will all applicable regulations. Only soil that is intended for off-site disposal should be sampled unless an alternative plan is submitted and approved by MassDOT. The Design-Builder's work must comply with all State and Federal laws and regulations pertaining to the reporting, handling, reuse and disposal of contaminated soil and groundwater, including the Massachusetts Contingency Plan, (310 CMR 40.0000) and Massachusetts Department of Environmental Protection policies and guidance.

The Design-Builder should include costs for the proper handling, removal, disposal, and recycling of all materials, hazardous and non-hazardous. The Design-Builder's Price Proposal shall include the cost of minimizing contact with or avoiding excavation of soil and dewatering in known contaminated areas by design approach and/or construction techniques. Where excavation or dewatering is unavoidable, the Design-Builder shall utilize appropriately trained personnel and shall select the most cost-effective approach to Hazardous Materials Management, which may include onsite reuse where allowed by the regulations. To assist in the preparation of an SGMP and estimated disposal costs, the MassDOT Pre-25% EECC Hazardous Materials memorandum is included in Appendix C.04.

In the event the Design-Builder encounters contamination within the right-of-way, the Design-Builder shall (a) promptly notify MassDOT; (b) comply with all requirements applicable to the Design-Builder; and (c) take reasonable steps including revisions to construction techniques, to limit excavation or dewatering in areas with contamination. The Design-Builder shall afford MassDOT the opportunity to inspect sites containing contamination before any action is taken which would inhibit MassDOT's ability to ascertain the nature and extent of the Unknown Contamination.

Where excavation or dewatering of contamination materials is unavoidable, the Design-Builder shall follow the SGMP as described above and the Draft BTC Special Provisions included in Appendix C. Compensation shall be according to RFP Volume III Section 3.8 Compensation for Hazardous Materials Management.

The following Draft BTC Special Provisions shall be incorporated into the contract for the handling, reuse and disposal of contaminated soil and groundwater (See Appendix C):

- Item 180.03 – License Site Professional Services (Hour)
- Item 181.11 – Disposal of Unregulated Soil (Ton)
- Item 181.12 – Disposal of Regulated Soil In-State Facility (Ton)
- Item 181.13 – Disposal of Regulated Soil Out-of-State Facility (Ton)
- Item 181.14 – Disposal of Hazardous Waste (Ton)
- Item 183.1 Treatment of Contaminated Groundwater
- Item 183.2 Disposal of Granular Activated Carbon
- Item 184.1 – Disposal of Treated Wood Products (Foot)
- Subitem 227.3 Removal of Drainage Structure Sediments
- Subitem 227.31 Removal of Drainage Pipe Sediments

Compensation for Items 180.03 through 181.14 and 181.14 will be made at the contract unit bid prices for these items. Compensation for Treatment for Contaminated Groundwater (Item 183.1) and Disposal of Granular – Activated Carbon (Item 183.2), if necessary, will be made under an additional work order in accordance with RFP Volume III, Section 3.

The Design-Builder will not release, dispose, store, or transport hazardous materials at, on, under or from the project area except in strict compliance with all State and Federal laws and regulations governing hazardous materials and hazardous waste. Should a release of hazardous materials to the environment occur on with the project area caused by the Design-Builder's or its subcontractors' negligence or intentional misconduct, the Design-Builder will be responsible for conducting any and all response actions to mitigate the hazardous material release and to achieve regulatory closure at its own expense. The Design-Builder will promptly notify MassDOT of all spills or releases of hazardous materials or hazardous waste caused by the Design-Builder's or its subcontractors' actions and activities and for which the Design-Builder may have an obligation to report the DEP.

5.8 ENVIRONMENTAL HEALTH AND SAFETY PLAN

An Environmental Health & Safety Plan (EHASP) shall be prepared by a Certified Industrial Hygienist or other experienced individual with the appropriate training required by OSHA to prepare such a plan, and shall include the components required by OSHA 29 CFR 1910.120(b) as well as the appropriate components of 310 CMR 40.0018. The preparer's name and work experience shall be included as part of the EHASP submittal. The EHASP must be stamped by a Certified Industrial Hygienist certifying that it complies with all applicable laws, regulations, standards, and guidelines, and that it provides a degree of protection and training appropriate for implementation on the Project during the execution of this Contract. The HASP shall be submitted to MassDOT for review and acceptance within thirty (30) days of Notice to Proceed.

The EHASP shall be designed to identify, evaluate, and control health and safety hazards resulting from any on-site chemical contamination present in air, soil, water and sediment during work on this Project and provide for emergency response if needed. The EHASP shall be a dynamic document with provision for change to reflect new information, new practices, or procedures, changing site environmental conditions or other situations which may affect site workers and the public. Health and safety procedures provided by the Design-Builder shall comply with all the appropriate regulations that address employee working conditions (e.g. OSHA, RCRA, and CERCLA). In addition, guidelines of NIOSH, OSHA, MBTA, EPA, etc. shall be followed. Equipment used for the purpose of health and safety shall be approved for their intended use and meet pertinent standards and specifications of the appropriate regulatory agencies.

A copy of the EHASP shall be maintained on-site at all times by the Design-Builder. The on-site copy shall contain the signature of the Certified Industrial Hygienist and each on-site employee of MassDOT, the Design-Builder and Subcontractors. The employee's signature on the EHASP Plan shall be deemed prima facie evidence that the employee has read and understands the plan. Signature sheets shall be submitted monthly, or at the request of MassDOT and a final copy of the EHASP with all signatures shall be submitted to MassDOT at the conclusion of the Contract, or at MassDOT's request.

The following Draft BTC Special Provisions shall be incorporated into the Contract for additional EHASP requirements (See Appendix C):

- Item 180.01 – Environmental Health and Safety Program (Lump Sum)
- Item 180.02 – Personal Protection Level "C" Upgrade (Hour)
- Item 180.03 - Licensed Site Professional (Hour)

SECTION 6.0: UTILITIES

6.1 GENERAL STATEMENT

MassDOT has conducted preliminary coordination with the owners of utilities within the Project area. Construction of the Project will affect existing utilities. The Design-Builder shall complete their own Utility investigation to ensure that Utilities are properly identified and that all necessary relocations occur so as to enable the Design-Builder to achieve completion of the Project in accordance with the Contract Document requirements. The Design-Builder shall expect to devote resources to utility investigation, coordination, monitoring, protection, and construction as required to complete the Project.

Anticipated services include but are not limited to: the identification of utilities requiring relocation or protection, notifications, and coordination of design and construction efforts for the Utility Work. The Design-Builder shall coordinate with any utility agency (private, state or municipal) which may be impacted by the Project. MassDOT has coordinated with some of the owners of public utilities in the Project area, including communications, electric, cable, gas, and water utilities; however, it is recommended that the Design-Builder meet with all owners of affected utilities within thirty (30) days from Notice to Proceed to brief affected utilities on proposed construction schedules, anticipated design changes, detours, etc. Permits may be required to work in the vicinity of existing utilities. It will be the responsibility of the Design-Builder to obtain any permits sufficiently in advance of the work. Any costs related to acquisition of permits will be borne by the Design-Builder. Final utility coordination will be the responsibility of the Design-Builder.

6.2 ASCERTAINING THE LOCATION OF UTILITIES

The Design-Builder bears full responsibility at its own expense for ascertaining the existence and exact location and size of any utility to be relocated or otherwise impacted on either a temporary or permanent basis. As utility investigation and planning will be an integral aspect of the final design, the Design-Builder shall schedule and complete all utility investigations no later than 90 calendar days after the NTP. This early investigation work is to be scheduled in the Baseline Schedule submission and updated as part of the monthly Schedule Updates.

6.2.1 Existing Utilities Known to MassDOT

NOTE: This section is intended to be used for informational purposes only and reflects the BTC Plans and the early coordination process undergone by MassDOT and various Utilities. The Design-Builder shall be ultimately responsible for confirming all existing conditions in the field prior to commencing work. The Design-Builder shall be responsible for all necessary coordination with various utility agencies as required to complete the Project. The Design-Builder should reference the Project Utility Coordination (PUC) Form provided in Appendix C for additional information related to utility relocations and construction staging.

Utility Relocations, Constraints and Protection

- Comcast owns underground communication lines which will be temporarily relocated into Verizon's existing telephone duct bank system on the north side of Route 6 to accommodate the proposed construction staging as shown on the BTC plans. Verizon will install risers, conduit, and will break into the existing telephone system in order to provide a pathway for Comcast. Once the temporary pathway is provided, Comcast shall temporarily relocate their existing underground communication lines into Verizon's existing system.

- Eversource Electric has pole set in the Town of Wareham and owns overhead power lines which run along Route 6 which will require re-location. The Design-Builder will construct an underground electrical duct bank in accordance with the BTC Plans for future use. Eversource will relocate poles in Wareham and the overhead power lines. The installation of the power lines in the underground duct will not be under a Force Account agreement with MassDOT.

- Verizon has pole set in the Town of Marion and owns overhead telephone lines which run along Route 6 and will require relocation. Verizon will relocate poles in Marion and the overhead lines as shown on the BTC plans.

- Comcast, and Open Cape have overhead communication lines which will require relocation to the proposed utility pole locations as shown on the BTC plans.

- Underground communication lines will require relocation to a new underground duct bank. This relocation will be performed under a force account agreement with MassDOT with the following utility owners: Verizon, Comcast, and Open Cape. The Design-Builder shall furnish and install concrete encased conduits and manholes for the proposed telephone duct bank system in accordance with the BTC plans.

- The Design-Builder shall coordinate the relocation of a National Grid owned gas line at the east end of the project to avoid interference with the proposed Eversource electric duct bank and proposed guardrail in accordance with the BTC Plans.

- The town of Wareham owns and maintains all existing utility pole mounted luminaries. Several utility poles will be removed as part of the project and the existing luminaries will be removed and stacked at a location that is approved by the Town. This work will be performed as a contract item and not under a force account agreement.

Complete layout of existing known utilities can be found on the BTC plans. See Appendix C for Utility Contacts contained within the Project Utility Coordination Form, as well as MassDOT's Utility Contact Website.

6.3 DESIGN-BUILDER AND UTILITY OWNER RESPONSIBILITIES

6.3.1 Design-Builder's Responsibilities

This section defines the responsibility of the Design-Builder and MassDOT, with regard to the initial utility relocation plan and changes that occur as the prosecution of the Work progresses. MassDOT, with assistance from the Design-Builder shall coordinate with Utility companies that are impacted by the Design-Builder's operations. To support this effort, the Design-Builder shall provide routine and accurate schedule updates, provide notification of delays, and provide documentation of the steps taken to resolve any conflicts for the temporary and/or permanent relocations of the impacted utilities. The Design-Builder shall provide copies to MassDOT of the Design-Builder communication with the Utility companies, including but not limited to:

- Providing advanced notice, for all utility-related meetings initiated by the Design-Builder.
- Providing meeting minutes for all utility-related meetings that the Design-Builder attends.
- Providing all test pit records.
- Request for *Early Utility* work requirements of this section (see below).
- Notification letters for any proposed changes to Utility start dates and/or sequencing.
- Written notification to MassDOT of all apparent utility delays within seven (7) Calendar Days after a recognized delay to actual work in the field – either caused by a Utility or the Design-Builder Notification of any utility-related delays to the critical path shall meet the requirements of Section 9.1.3.
- Any communication, initiated by the Design-Builder, associated with additional Right-of-Way needs in support of utility work.
- Submission of completed Utility Completion Forms.

The Design-Builder shall coordinate with any utility agency (private, state or municipal) which may be impacted by the Project. The Design-Builder shall meet with all owners of affected utilities within thirty (30) calendar days from the Notice to Proceed to brief affected utilities on proposed construction schedules, detours, etc. The Design-Builder shall be required to submit design plans to utilities for review and approval of utility work. The Design-Builder shall be responsible to communicate changes or alterations to the proposed utility relocations shown on the Preliminary Plans to MassDOT and the Utilities. In addition, the Design-Builder shall also be responsible to communicate changes or alterations to the proposed construction sequence that may affect the timing of utility relocations. Permits may be required to work in the vicinity of existing utilities. It will be the responsibility of the Design-Builder to obtain any permits sufficiently in advance of the work. Any costs related to acquisition of permits will be borne by the Design-Builder.

The Design-Builder shall be responsible for the planning, coordination and construction of Utility Work required for completion of the Project. The Design-Builder shall carry out any of the Utility Work carefully and skillfully and shall support and secure its work so as to avoid damage to all utilities and bridge members. Unless otherwise required by the Utility Owner, the Design-Builder shall not move or remove any utility without the Utility Owner's written consent. The Design-Builder shall provide thirty (30) days' notice to

any utility owner whose infrastructure will require relocation. MassDOT shall be provided a copy of the written notice. If utility assets are damaged by the Design-Builder's operations, it shall notify the affected Utility Owners and MassDOT, and shall assume any costs related to its repair. The Design-Builder shall be responsible for coordinating design changes with Utility Owner.

The Design-Builder shall notify MassDOT upon becoming aware that a Utility owner is not advancing the work in accordance with the approved utility schedule. Such notice shall be provided to MassDOT no later than seven (7) calendar days after the occurrence of the event that the Design-Builder believes to be a utility delay. After such notice, MassDOT and the Design-Builder shall continue to diligently seek the Utility Owner's cooperation in performing their scope of Work.

In order to demonstrate that a critical path delay has been caused by a third-party Utility, the Design-Builder must demonstrate, through the requirements of the monthly Progress Schedule submissions and the supporting contract records associated with Section 9.0 that the delays were beyond the control of the Design-Builder.

All documentation provided in this section is subject to the review and verification of MassDOT and, if required, the Utility Owner. In accordance with MassDOT Specifications Time Extension will be granted for a delay caused by a Utility, only if the actual duration of the utility work is in excess of that shown on the Project Utility Coordination Form, and only if;

1) the Design-Builder appropriately scheduled utility investigation activities well in advance of the final design and properly incorporated those findings into the design.
2) the Design-Builder provided proper Notification of Delay was provided to MassDOT in accordance with the time requirements that are specified in this Section.
3) the utility delay is a critical path impact to the Baseline Schedule (or most recently approved Progress Schedule).

The Design-Builder shall also design, furnish and install conduit duct banks, manholes, risers, pull ropes, sleeves, earth support, backfill and dewatering systems as required within the Project limits, unless otherwise noted. The Design-Builder is responsible to coordinate with utility companies to ascertain applicable specifications for material, installation, etc. and shall comply with all utility company policies. The number of conduit shown on the plans is based on preliminary coordination and shall be confirmed by the Design-Builder through their coordination efforts.

The following at a minimum is a list of Project specific Design-Builder requirements. Refer to the BTC plans for all utility specific relocation details not listed in this section:

- Evaluating existing utility conditions and notifying the utility owner(s) of any existing deficiencies and/or any impacts that might be associated with the Project during or after construction.
- Existing utility service shall be maintained throughout construction unless noted otherwise. Minimize disruption to traffic on the approaches and adjacent ramps.
- Construction and maintenance of any required temporary earth support and dewatering systems to construct any deep utility trenches.
- Protection and monitoring of existing utilities and utility coordination.

- The point of contact with MassDOT is:
  Chris Lockett
  District Utility and Constructability Engineer
  Massachusetts Department of Transportation, Highway Division
  District 5
  1000 County Street
  Taunton MA 02780
  Phone: 857 368 5073
  Email: Chris.Lockett@dot.state.ma.us
- The Design-Builder shall monitor and protect existing utility infrastructure that could potentially be impacted by construction activities. This work shall include vibration monitoring as needed to protect existing adjacent structures.
- The Design-Builder shall accurately locate the existing utility lines. The Design-Builder shall protect all utility lines during all phases of construction.
- The Design-Builder shall provide a detailed utility relocation plan including both temporary and permanent utility relocations for each stage as part of the Issued for Construction Design Construction Staging Plans.
- The Design-Builder is responsible to complete any necessary tree trimming or clearing and grubbing required for either temporary or permanent utility relocations.
- The Design-Builder is required to submit weekly utility coordination reports to MassDOT outlining coordination attempts made (meetings, emails sent, and phone calls) and utility progress for that week.
- The Design-Builder shall coordinate any utility abandonment with respective Utility Owners.
- No temporary utilities shall be removed until the permanent system is operational to the utility company's requirements.
- All existing or proposed manholes, vaults, hand holes or other structures exposed to traffic are to be rated for traffic loading (HS-25). The Design-Builder shall coordinate with utility companies to make provisions for installation of traffic loading rated structures and/or covers if necessary.
- The size and type of utility owned manholes shall be based on the number of ducts required and current Standards. Spacing of manholes shown on the plans is approximate.

Every effort shall be made to locate manholes, vaults, hand holes or other structures exposed to traffic outside of the travel lanes.

The Design-Builder shall verify design and details of utility supports including capacity of utility support members, conduit and utility supports for all utilities.

The Design-Builder shall perform Shop Drawing reviews for all conduit and utility supports.

6.3.2 Utility Responsibilities / Work by Others

Utilities owning infrastructure within the Project Limits shall be allowed to monitor the Design-Builder's Work around their infrastructure.

The table below outlines the proposed relocation of utilities within the Project limits and summarizes the responsibilities of the Utility Owners and the Design-Builder for the relocations. Approximate limits of relocation, associated structures, and ancillary work are shown on the BTC Utility Plans. For additional information, see Section 6.2.1 and the associated PUC Form.

Work identified as Design-Builder Responsibility shall include items listed and all ancillary support tasks.

The Design-Builder shall also verify that all items installed on behalf of each utility company adhere to all design standards and specifications required by their respective owner and that the proposed locations for these facilities have been approved by the utility owner Available standards and specifications have been included in Appendix C, however the design-builder shall coordinate with each utility company to verify or acquire the latest standards and/or specifications.

Location, Utility, and Owner	**BTC Proposed Disposition**	**Utility Owner Responsibilities**	**Design-Builder Responsibilities**
Route 6, Underground Communication Lines, Verizon	Temporary relocations during staged construction	Perform all work associated with providing a pathway for Comcast to temporarily relocate existing underground communication lines into existing telephone duct bank system on the north side of Route 6 to accommodate the proposed construction staging.	Coordinate construction activities with Verizon and Comcast.
Route 6, Underground Communication Lines, Comcast	Temporary relocations during staged construction	Perform all work associated with temporarily relocating underground communication lines into Verizon's existing telephone duct bank system on the north side of Route 6 to accommodate the proposed construction staging.	Coordinate construction activities with Verizon and Comcast.
Route 6 Overhead / Underground Power Lines Eversource	Relocate	Perform all work associated with relocating utility poles in Wareham and relocating overhead power lines to new poles.	Coordinate construction activities with Eversource Furnish and install concrete encased conduits, manholes and risers for future use.

Location, Utility, and Owner	BTC Proposed Disposition	Utility Owner Responsibilities	Design-Builder Responsibilities
Route 6, Overhead Telephone Lines, Verizon	Relocate	Perform all work associated with relocating utility poles in Marion and relocating overhead telephone lines to new poles.	Coordinate construction activities with Verizon.
Route 6, Overhead Communication Lines Open Cape	Relocate	Perform all work associated with relocating overhead communication lines to new poles.	Coordinate construction activities with Open Cape.
Route 6, Overhead Communication Lines, Comcast	Relocate	Perform all work associated with relocating overhead communication lines to new poles.	Coordinate construction activities with Comcast.
Route 6, Underground Communication Lines Verizon, Comcast, and Open Cape	Relocate during staged construction	Perform all work associated with relocating utilities to new underground duct bank constructed by the design builder.	Coordinate construction activities with utilities. Furnish and install concrete encased conduits, manholes and risers.
Route 6, Overhead utility pole mounted luminaries Wareham DPW	Remove and Stack	Coordinate an approved drop off location with the Design-Builder to R&S all existing utility pole mounted luminaries.	Coordinate construction activities with Wareham DPW. R&S existing pole mounted luminaries.

Location, Utility, and Owner	BTC Proposed Disposition	Utility Owner Responsibilities	Design-Builder Responsibilities
Route 6 Underground Gas Main National Grid Gas	Relocate	Perform all work associated with relocating 4" plastic gas main	Coordinate construction activities (guardrail and proposed electric duct bank) with NGrid Gas.

6.4 NOTIFICATION TO UTILITIES

Following completion of an existing utility survey, the Design-Builder shall coordinate with any Utility whose assets may be affected by the Project. See Appendix C and MassDOT's Utility Contact Website for a partial list of Owners whose assets are likely to be affected. It is the responsibility of the Design-Builder to confirm, add and modify this information.

6.5 EARLY RELOCATION OF UTILITIES

Prior to the Notice to Proceed, some of the above-mentioned utilities may be relocated, replaced or augmented by their respective owners. The Design-Builder shall monitor any such utility relocations and coordinate with any utility agencies if existing utilities are in conflict with the proposed work at the time of construction.

Based on the construction sequence of the concept offered in this document, MassDOT has undergone early coordination with the utility companies owning utilities to be relocated or to provide services on the new bridges.

Should the Design-Builder decide to relocate additional utilities other than those described in this section, the Design-Builder will be responsible for costs and scheduling impacts associated with those relocations.

6.6 COMMENCEMENT OF UTILITY WORK

Subject to the availability of Right-of-Way, the Design-Builder may commence the Utility Work at any time following the date specified in the Notice to Proceed under an approval by MassDOT for the early start of construction. The Design-Builder is responsible for causing the Utility Work to be completed in order to permit construction of the Project according to the construction schedule as approved by MassDOT.

6.7 MEETINGS AND COOPERATION WITH UTILITY OWNERS

The Design-Builder shall be responsible for all coordination with the affected Utility Owners that is necessary in order to accomplish the Utility Work (including obtaining information, coordination of scheduling, design review, inspections, approvals and acceptances). The Design-Builder shall notify MassDOT at least two (2) Business Days in advance of each meeting with a Utility Owner's representative

scheduled by the Design-Builder and shall allow MassDOT to participate in the meeting. The Design-Builder shall complete meeting minutes for all meetings held with utility representatives and shall submit minutes to MassDOT and the Utility within two (2) days of the meeting. The Design-Builder shall provide copies of all correspondence with the Utility Owner within seven (7) days after receipt or sending.

The Design-Builder shall make diligent efforts to obtain the cooperation of each Utility Owner as necessary for the Project. The Design-Builder shall immediately notify MassDOT if the Design-Builder becomes aware that a Utility Owner is not cooperating in providing needed Work or approvals. After such notice, the Design-Builder shall continue to diligently seek to obtain the Utility Owner's cooperation, and shall assist MassDOT as reasonably requested by MassDOT, with regard to the dispute. The Design-Builder shall incorporate all utility phases of construction into the overall work schedule. No additional time or compensation will be provided resulting from delays due to utility coordination and phasing. MassDOT agrees to use its reasonable efforts to assist the Design-Builder in obtaining the cooperation of the Utility Owners, but such assistance shall not be deemed to relieve the Design-Builder of its sole and primary responsibly for the satisfactory compliance of its obligations set forth in the Contract Documents.

The Design-Builder shall be responsible for all work associated with progressing work, maintaining schedule, and resolving conflicts for the temporary and/or permanent relocations of the impacted utilities. In addition, the Design-Builder shall be responsible for checking and verifying material quantity and labor hours submitted by the Utility Companies for reimbursement on behalf of MassDOT.

MassDOT will be responsible for payments directly to the Utility Owners as follows:

- 50% reimbursement, except as noted below, for any existing utilities that need to be relocated or replaced on the Project provided the utility meets or beats their schedule duration of work provided in force accounts submitted to MassDOT.
- Municipal utilities or utilities holding ownership fee to property or occupancy easement rights, MassDOT shall reimburse the owners of these utilities 100% of the actual costs incurred for necessary relocation of their facilities.
- Project reimbursement will be made through MassDOT utilizing conventional force account agreements.
- The Design-Builder shall furnish to the Resident Engineer a written daily report of labor, materials and/or units installed, equipment, and salvage, exclusive of prices, in connection with work by each utility within two (2) working days from the close of the working day reported.
- Upon the completion of the physical work, the Design-Builder shall submit a record plan to the Resident Engineer showing the work actually performed by the utility and, written notification that said work has been completed.
- Payment to the utilities will be for the actual costs and related indirect costs accumulated in accordance with a work order accounting procedure prescribed by the applicable Federal or State regulatory body for the adjustment of each utilities facilities, including the preliminary engineering performed by the utility in conjunction with this Project. MassDOT will be responsible for verifying and making all payments to utilities. MassDOT shall utilize the Design-Builder's daily force account reports in verifying work completed. The Design-Builder shall assist in verifying work has been completed as requested by MassDOT.

- Should utility relocations overrun the estimated cost submitted to MassDOT and included in the force account agreement, the utility shall submit a written explanation of the cost overrun to MassDOT for verification as outlined in the Force Account Agreement. If requested, the Design-Builder shall assist MassDOT in verifying the reason for the overrun through a review of the Design-Builder's force account daily sheets.

6.8 INSPECTION OF UTILITY WORK

The Design-Builder shall permit Utility Owners to inspect the Utility Work.

6.9 ENVIRONMENTAL COMPLIANCE PERTAINING TO UTILITY WORK

The Design-Builder shall comply with all applicable Environmental Laws in performance of the Utility Work, including the requirement set forth in Section 5.0.

6.10 AGREEMENTS BETWEEN DESIGN-BUILDER AND UTILITY OWNERS

The Design-Builder shall not enter into any agreement with any Utility Owner that purports to bind MassDOT in any way, nor shall any agreement be deemed to modify the terms of the Contract Documents.

6.11 POLICY OF AVOIDING RELOCATIONS

The location of utilities and potential impacts of Relocations shall be considered by the Design-Builder in developing changes to MassDOT Supplied Designs with the following goals: (a) avoiding Relocations to the extent practicable; (b) if a Relocation is not reasonably avoidable, protecting the utility in place to the extent practicable; and (c) otherwise minimizing the potential costs and delays relating to the Relocations to the extent practicable.

6.12 LEGAL ACTIONS

Should the Design-Builder reasonably believe that any Utility Owner will not undertake or permit any Relocation in a manner consistent with the timely completion of the Project, MassDOT will consider requests by the Design-Builder to exercise any legal rights that MassDOT may have (as deemed appropriate by MassDOT in its sole discretion) with respect to the Utility Owner. Such request shall be accompanied by evidence reasonably satisfactory to MassDOT that the Design-Builder has made diligent efforts to obtain the Utility Owner's cooperation but has been unsuccessful.

6.13 SCHEDULING AND COST RISKS

The Design-Builder shall be solely responsible to communicate changes or alterations to the proposed utility relocations shown on the Preliminary Plans to the Utility and MassDOT. In addition, the Design-Builder shall also be responsible to communicate changes or alterations to the proposed construction sequence that may affect the timing of utility relocations. Should the Design-Builder propose additional relocations other than those described in the RFP for their convenience, the Design-Builder shall be responsible for payment of costs and scheduling impacts of those relocations.

Any and all changes to the BTC sequencing and scope of utility relocation work shall be the Design-Builder's responsibility to mitigate any impacts to the Project schedule and no time or compensation will be provided to the Design-Builder. Changes to the BTC sequencing and scope of utility relocation may require the effected utility companies to revise and resubmit their force account documentation. This may include, but not limited to, revisions to the respective utilities cost estimate, submitted durations and scope. The schedule delays and cost required for the utility companies to revise documentation shall be the Design-Builder's responsibility to mitigate. The Design-Builder shall consider Right-of-Way implications when proposing alternatives to the utility relocations proposed in the Base Technical Concept. The Design-Builder shall be responsible for all schedule impacts due to additional Right-of-Way required for relocations as specified in Section 8.0

6.13.1 Project Utility Coordination Form

The utility schedule and sequence information provided in the Project Utility Coordination (PUC) Form included in Appendix C is the best available information at the time of the Technical and Price Proposal due date and has been considered in setting the Contract Duration. The information is provided for the Design-Builder's use in developing their bids and the Baseline Schedule Submission.

If the Design-Builder intends to submit a schedule that contains durations or sequencing that varies from those provided in the Project Utility Coordination Form, the Design-Builder must submit a Proposal Schedule in accordance with Section 9.0 hereinafter. As a prerequisite to the Proposal Schedule submission, and in advance of the utility notification(s) period, the Design-Builder shall coordinate the proposed utility changes with MassDOT and the utility companies, to develop a mutually agreed upon schedule, prior to the start of construction. The submission of the Baseline Schedule should not include any of these types of proposed utility changes and should not delay the submission of the Baseline Schedule.

MassDOT will issue initial notice-to-proceed dates to each utility company based on either the:

1) Design-Builder's accepted Baseline Schedule
2) An approved Early Utility Request in the form of an Early Utility sub-net schedule (in accordance with the requirements of this Subsection)
3) An approved Proposal Schedule

A time extension will be granted for the Design-Builder for a utility delay only if the actual duration of the utility work is in excess of that shown on the Project Utility Coordination Form and only if the delay impacts the critical path, only if the Design-Builder did nothing to interfere with the progression of the Utility, only if the Design-Builder properly coordinated with MassDOT, and only if the delay is demonstrated as part of an acceptable Time Entitlement Analysis, per Section 9.4. The Design-Builder will be responsible to recover any time lost as a result of changes made to the durations or sequencing provided in the Project Utility Coordination Form.

Inclusion of the Project Utility Coordination Form information shall not be construed as changing or superseding any other provision of the Contract. Utility delays, as defined in Section 9.0, are non-compensable delays. The sole remedy for utility delay is a time extension as specified under Section 9.0.

6.13.2 Utility Work Prior to Schedule Submission

If the Design-Builder anticipates that any utility work will need to start prior to the first schedule submission required by Section 9.0, the Design-Builder shall present that information at the pre-construction conference in the form of the Initial Schedule, Section 9.0, Subsection 9.1.2, detailing when each early utility activity is required to start.

6.14 UTILITY DIARIES/AS-BUILTS

The Design-Builder shall maintain “utility diaries” and “as-built” utility maps of a quality acceptable to MassDOT. The standards for preparation of all Design Documents relating to utilities and final as-built plans shall conform to all applicable MassDOT requirements. A status of this effort will be provided to MassDOT no less than every thirty (30) Days. The Design-Builder will be responsible for recording daily Utility work force reports. The start, suspension, re-start, and completion dates of each of the utilities, within each phase of the utility relocation work, will be monitored and agreed to by MassDOT and the Design-Builder as the work progresses.

At the completion of the Project “As-Built” utility maps shall be provided electronically to each utility company.

SECTION 7.0: RAILROAD COORDINATION

[**THIS SECTION NOT APPLICABLE**]

SECTION 8.0: RIGHT-OF-WAY

8.1 GENERAL STATEMENT

Right-of-Way acquisitions are not required for this Project, as shown on the BTC plans included in Appendix C. Also, no acquisitions are being specifically obtained for additional construction access or temporary work zones.

The following requirements detail the process if any acquisitions, easements, or any other Right-of-Way action are required.

Existing site features within temporary construction easements, including but not limited to sidewalks, excavation, pavement, striping, landscaping, signage, and utilities, shall be retained or restored unless otherwise noted on the BTC Plans.

8.2 ADDITIONAL PROPERTIES

The Design-Builder shall make reasonable efforts to restrict additional costs to the Project by ensuring that all elements of the Project fall within the limits of the Right-of-Way currently available for the Project as an alternative to the acquisition of Additional Properties wherever possible. The Design-Builder shall exercise particular care to avoid the need to acquire land owned by a public entity and used for a use inconsistent with highway use, since the acquisition of such properties by MassDOT may require the enactment of special legislation.

The Design-Builder shall be responsible for assembling a team that has experience working with the MassDOT Right of Way Bureau on the acquisition process. The team will require approval from the MassDOT Right of Way Bureau. The approved ROW Acquisition Team will be responsible for completing the Right-of-Way administrative process as set forth in this Section 8.0 in order for MassDOT to acquire the Additional Properties. Acquisition of the Additional Properties will be limited to that land and those interests in land necessary for Project purposes, but will also include any portions of the Additional Properties deemed by the owners of such Additional Properties and MassDOT to be an uneconomic remainder. Additional Properties will not be considered to include properties necessary for excessive work space (as determined by MassDOT), the Design-Builder lay-down areas or material storage areas.

8.3 PLANS FOR ACQUISITION OF ADDITIONAL PROPERTIES

8.3.1 General

The Design-Builder shall be responsible for the preparation of all property/land acquisition materials related to any Additional Property in accordance with MassDOT Project Development and Design Guidelines, the Federal Aid Policy Guide (FAPG) relating to such documentation, and with MassDOT Standards. All dimensions are to be shown in the English system. Bar scales shall be provided on all plans. The Design-Builder acknowledges that it is familiar with the requirements of MassDOT's Right-of-Way Bureau and Manual and with the requirements applicable to Right-of-Way plans.

Included as a part of the Work, is the preparation of Preliminary and Final Right-of-Way plans. If the proposed design layouts result in the need to acquire any Additional Property for the Project or to transfer any property to a municipality (to the extent required), separate layouts will be required for each municipality. The Design-Builder shall be required to prepare separate plans and written instruments for advance takings and/or additional easements to the extent required by MassDOT.

8.3.2 Schedule

The Design-Builder shall, within 30 Days of determining the need to acquire Additional Property, prepare a schedule for the delivery of any Additional Property then identified and submit the same to MassDOT for approval and shall integrate the delivery schedule into the overall Project schedule. The schedule shall indicate the date for the acquisition of the Additional Properties and the completion of the plans and other Right-of-Way activities required by the Contract Documents. The schedule shall allow MassDOT at least six months following MassDOT's approval of a Case File to provide access to any Additional Property that is vacant and shall allow at least 18 months from the date of MassDOT's approval of a Case File for any Additional Property which involves the relocation of occupants, except in the case where the acquisition of Additional Property will require the enactment of special legislation, in which case no schedule can be estimated by MassDOT. Delays that cause any Additional Property (except for those requiring special legislation) to be inaccessible to the Design-Builder beyond the time set forth above shall be considered an Owner-Caused Delay to the extent that the Critical Path is delayed. MassDOT shall notify the Design-Builder of any such delay in the dates for acquisition of the Additional Properties. In such an event, the Design-Builder shall immediately determine whether the delay impacts the Critical Path and, if so, to what extent the delay may be avoided through alternative construction methods or otherwise. Upon such notice, the Design-Builder shall promptly meet with MassDOT to determine the best course of action.

8.4 THE DESIGN-BUILDER'S RIGHT-OF-WAY RESPONSIBILITIES

The Design-Builder shall be responsible for completing all necessary administrative activities and for preparing all required documentation sufficient for MassDOT to acquire the Additional Properties by either eminent domain or negotiated purchase, except that MassDOT will retain the primary responsibility for title review, appraisal review, approval of the Real Estate Review Board (if necessary) and (to the extent applicable) the Federal Highway Administration, acquisition negotiation (with assistance from The Design-Builder and the Design-Builder's consultants as necessary), and the approval by MassDOT of acquisition documents, and the adoption and recording of acquisition documents. All Right-of-Way activities must be completed in compliance with the Right-of-Way Manual and the Federal Highway Administration's Right-of-Way Project Development Guide (PDG).

After identifying the Additional Properties as set forth in Section 8.2, but before beginning the preparation of the Case Files as set forth in Section 8.4.3, the Design-Builder’s ROW Acquisition Team shall meet with the Director of MassDOT's Right-of-Way Bureau or their representative to discuss Right-of-Way acquisitions.

8.4.1 Acquisition Process Summary

The Design-Builder's major activities with respect to the acquisition of the Additional Properties include:

- Identification of Additional Properties
- Meeting with the Director of the Right-of-Way Bureau
- Owner and occupant interviews
- Preparation of title examinations
- Survey and plan preparation work (ROW and Layout Plans)
- Preparation of real/personal property report, if applicable
- Identification and valuation of tenant-owned improvements, if applicable

- Obtain appraisals
- Create and compile Case Files using MassDOT format in SharePoint
- Prepare the layout schedule
- Prepare a recordable order of taking and taking plan
- Establish use and occupancy charge, if applicable
- Initiate Negotiations with Offer letter
- Manage properties, if applicable

8.4.2 Relocation Process Summary

The Design-Builder shall be required to coordinate and perform the administrative requirements necessary in order to relocate any occupants from any Additional Property proposed to be acquired by the Design-Builder. All work prepared by the Design-Builder with respect to relocation shall be performed in accordance with applicable State and Federal Law (including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended).

The Design-Builder's major activities with the relocation of occupants from the Additional Properties include:

- Interview owner/occupant
- Prepare relocation plan
- Obtain approval as relocation advisory agency
- Identify alternative sites
- Prepare personal property inventory*
- Identify specific relocation site*
- Obtain move-cost estimates*
- Review estimates
- Issue recommendation
- Obtain approval of relocation amount from Right-of-Way Bureau
- Issue authorization to move
- Monitor relocation
- Prepare claim package
- Check outstanding claims
- Obtain relocation claim approval from MassDOT

* Performed in cooperation with occupant.

8.4.3 The Design-Builder's Responsibilities for Case Files

The Design-Builder shall prepare and submit to MassDOT for each Additional Property a case file (using MassDOT's electronic case file format) containing all necessary documentation for acquiring the Additional Property, including that information set forth below. A separate Case File shall be prepared for each owner. The Design-Builder shall provide all field survey work, base mapping and other services necessary to complete the Case File documentation at its own expense. The Case File shall be labeled using the case file contents naming guide and shall contain the documentation as required in Section 8.4.4 through Section 8.4.9, inclusive.

8.4.4 Eforms

MassDOT Right of Way Eforms shall be used to collect all relevant property information and to generate the following:

- Journal
- Notice to Owner
- Property Interview Mail out letter (if necessary)
- Property Interview Record
- Layout Schedule (Recorded Land or Registered Land)
- Personal Property Report (if applicable)
- Structure and Occupancy Report (if applicable)
- Right of Entry (if applicable)
- Land Damage Agreement (if applicable)
- Offer Letter
- Notification of Award of Damages Report
- Notification of Award of Damages Report Mail out letter (if necessary)
- Owner’s Request for Review (if necessary)
- Payment & Computation Schedule

8.4.5 Parcel Sketch

The Design-Builder shall provide parcel sketch in electronic form. An accepted preliminary Right of Way plan is required to prepare the parcel sketch. The parcel sketch shall show the total Additional Property with the taking and remainder areas clearly noted.

8.4.6 Appraisal(s)

For each Additional Property, the Design-Builder shall cause a fair market value appraisal of the real property to be prepared, including the improvements making up a part of the realty (fixtures and equipment). The appraisal(s) shall be prepared by an appraiser(s) listed on MassDOT's list of approved real estate appraisers. For properties expected to cost more than $300,000.00 to acquire, two complete appraisals are required. All appraisals shall be prepared in conformance with Law (including the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, Public Law 91-646, as amended) and with professional appraisal methods for each Additional Property to be acquired. The form of all such appraisals shall be approved by MassDOT.

8.4.7 Real/Personal Property Report

The real/personal property report shall detail the items making up each Additional Property, and classify such items as real estate, tenant-owned improvements or personal property. Particular attention should be paid to items which have questionable classifications.

8.4.8 Title Examination

The Case File shall include a current title report for each Additional Property and a copy of each exception listed. The title process requires delivery of a preliminary title report for review by MassDOT, followed by an amended title report if necessary. Each title report shall note any encumbrances or title clearance requirements. The title report included in each Case File shall be updated to 30 Days or less prior to the date of the Case File's submittal to MassDOT and shall incorporate all corrections requested by MassDOT. Title examinations shall be completed by licensed attorneys on MassDOT's approved list. As soon as practicable following its completion, a copy of each title examination shall be forwarded to: Director, MassDOT, Right-of-Way Bureau, 10 Park Plaza, Boston, MA 02116.

8.4.9 Recording Document

A legal description section shall be included in the Case File noting the form of granting instrument (fee, easement, etc.) adequate to effect the desired acquisition of the Additional Property, signed by a land surveyor licensed to practice in the Commonwealth of Massachusetts. A separate legal description is required for each parcel of the Additional Property. The Design-Builder shall also cause a plan or plans to be prepared showing the dimensions of each Additional Property. For properties intended to be placed within the State Highway Location Line, a State Highway Alteration Plan is required. All plans shall be in recordable form and shall be prepared in a form and manner acceptable to MassDOT in all respects.

8.5 REPRESENTATIONS BY THE DESIGN-BUILDER

The Design-Builder or its representative shall not represent himself as an agent of MassDOT while communicating with any of the owners or occupants of the Additional Properties for the purposes of completing any of the documentation to be contained in the Case Files without prior MassDOT approval. The Design-Builder or its representative shall not appear before any owner or occupant of any Additional Property for the purposes of completing any of the documentation to be contained in the Case Files without either being accompanied by an authorized representative or employee of MassDOT or first presenting to that owner or occupant a letter, executed by MassDOT, stating that neither the Design-Builder nor its agent or representative is an agent or representative of MassDOT for the purposes of the acquisition of the Additional Property or the preparation of any relevant documentation. The Design-Builder or its representative shall at all times conform to the requirements of applicable Law in all communications with the owners or the occupants of the Additional Properties.

8.6 REVIEW OF THE CASE FILES

Within 30 Business Days following MassDOT's receipt of a completed Case File, MassDOT shall review the documents contained therein and shall notify the Design-Builder of any deficiencies. If the Case File is deficient in any way, the Design-Builder shall correct every deficiency and resubmit the Case File for MassDOT's approval. With each re-submittal, a 10 Day review period begins during which time MassDOT may approve or disapprove the information in the Case File. This process shall continue until MassDOT has received a complete Case File with no deficiencies.

8.7 AMENDMENTS TO CASE FILES

The Design-Builder shall be responsible for any expenses incurred by MassDOT associated with the Design-Builder's request to amend information in a Case File after its submission to MassDOT.

8.8 NEGOTIATIONS AND RELATED PROCEEDINGS

Negotiations and/or condemnation proceedings for any Additional Property will be brought by MassDOT at MassDOT's expense within a reasonable time following MassDOT's approval of the Case File for said Additional Property. The Design-Builder shall assist MassDOT as requested during the negotiation and/or condemnation proceedings, including providing updated or new appraisals, preparing for court testimony, negotiating with the property owner(s) and providing witnesses to testify with respect to the Design-Builder's work products. The Design-Builder will not be required to provide any expert witnesses other than the Person who originally performed the work and/or that Person's employees.

Once begun, MassDOT will provide the Design-Builder with updates as requested regarding the status of the acquisition process for any Additional Property. MassDOT shall notify the Design-Builder of the availability of the Additional Property within seven Days after MassDOT has received access to said Additional Property and shall notify the Design-Builder of any access restrictions.

8.9 COOPERATION AND COORDINATION WITH MASSDOT

At all times throughout the Right-of-Way acquisition process set forth in this Section 8, the Design-Builder shall cooperate and coordinate its activities with the Director of MassDOT’s Right-of-Way Bureau.

SECTION 9.0: PROJECT SCHEDULING

9.1 GENERAL – PROSECUTION OF WORK (MILESTONES)

(Supplementing Subsection 8.03 of the Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition)

MassDOT has determined that the Design-Builder shall utilize accelerated and/or conventional construction techniques, including prefabricated elements, that expedite construction with a minimum disruption to road users and minimal impact to environmental resources while providing work zone safety and an enhanced quality for this Project.

In submitting a Price Proposal for this RFP, the Design-Builder acknowledges that a detailed plan has been developed to meet the Contract Time for all aspects of the RFP; including shift work; extended work hour requirements/restrictions; all the limitations of operations; utility coordination, as well as the planning of all subcontractor and supplier operations.

The following Milestones are to be included in the Design-Builder's Baseline and Contract Progress Schedule submissions. The Design-Builder shall identify the completion of the work pertaining to each Contract Milestone through the inclusion of a Finish Milestone in the Baseline Contract Progress Schedule.

It is anticipated that the Notice to Proceed will be issued to the Design-Builder on or before the date specified in RFP Volume I: Instructions to Proposers, Schedule of Events. The following Contract Milestones are to be included in the Design-Builder's Baseline and Contract Progress Schedule submissions. The Design-Builder shall identify the completion of the work pertaining to each Contract Milestone through the inclusion of a Finish Milestone in the Baseline Contract Progress Schedule.

The Design-Builder shall complete the Work in accordance with the following milestones:

- Milestone No. 2: Full Beneficial Use/Substantial Completion
- Milestone No. 1: Design-Builder Field Completion

These Milestones are defined and restricted as identified below:

The Design-Builder shall complete the Work in accordance with the following milestones:

Milestone No. 2 – Full Beneficial Use/Substantial Completion

Full Beneficial Use is defined as: The majority of contract Work has been completed and the asset(s) has been opened for full multi-modal transportation use, except for limited contract work items that do not materially impair or hinder the intended public use of the transportation facility. All anticipated lane takings have been completed, except for minor, short term work items.

- All travel lanes, shoulders, sidewalks, and shared-use-path accommodations are in their final configuration.
- Fulfillment of the requirements identified in the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition.

Substantial Completion is defined as: A walkthrough of the entire contract Work has been performed by the Resident Engineer, a Punch List has been generated and the Work required by the contract, including paper work, has been completed, except for work having a contract price of less than one percent of the adjusted total contract price, including overruns, underruns and all contract amendments. All material submittals have been received by the District Materials Lab.

In addition, Milestone No. 2 – Substantial Completion also includes the following:

- Completion of all environmental mitigation and restoration areas.
- Completion of the roadway resurfacing, final drainage, guardrail barrier, and lane markings.
- Punch List has been developed.
- Fulfillment of the requirements identified in the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition.

The Design-Builder shall achieve Milestone No. 2 within **XXX Calendar Days** from NTP.

Milestone No. 1 – Contract Completion

Contractor Field Completion is defined as: All physical contract Work is complete including Punch List. The Contractor has fully de-mobilized from field operations.

In addition, Milestone No. 1 – Contractor Field Completion also includes the following:

- Completion of the Project including Milestone No. 2 and all Punch List Work.
- Acceptance of As-Built Drawings and Rating Reports.
- Fulfillment of the requirements identified in the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition.

The Design-Builder shall achieve Milestone No. 1 within **XXXX Calendar Days** from NTP.

9.1.1 Working Hours

HOLIDAY WORK RESTRICTIONS
(Supplementing Subsection 7.09)

The District Highway Director (DHD) may authorize work to continue during these specified time periods if it is determined by the District that the work will not negatively impact the traveling public. DHD may allow work in those areas on a case by case basis and where work is behind barrier and will not impact traffic

Below are the holiday work restrictions:

New Year's Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Martin Luther King's Birthday (Federal Holiday)
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

President's Day (Federal Holiday)
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Evacuation Day (Suffolk County State Holiday)
No work restrictions due to traffic concerns.

Patriot's Day (State Holiday)
Work restrictions will be in place for Districts 3 and 6 along the entire Boston Marathon route and any other locations that the DHD in those districts determine are warranted so as to not to impact the marathon. All other districts work restrictions will be as per DHD.

Mother's Day
No work on Western Turnpike and Metropolitan Highway System from 5:00 AM on the Friday before, until the normal start of business on the following day.

Memorial Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Bunker Hill Day (Suffolk County State Holiday)
No work restrictions due to traffic concerns.

Juneteenth
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Independence Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Labor Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Columbus Day (Federal Holiday)
No work on major arterials from 5:00 AM on the Friday before, until the normal start of business on the following day

Veterans' Day (Federal Holiday)
No work restrictions due to traffic concerns.

Thanksgiving Day (Federal Holiday)
No work on major arterials from 5:00 AM two days before until the normal start of business on the following Monday.

Christmas Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day.

9.1.2 Schedule of Operations

(Replace Subsection 8.02 of the Standard Specifications with the following:)

An integrated cost and schedule controls program shall be implemented by the Contractor to track and document the progress of the Work from Notice to Proceed (NTP) through the Contractor Field Completion (CFC) Milestone. The Contractor's schedules will be used by the Engineer to monitor Project progress, plan the level-of-effort required by the Department's work force and consultants and as a critical decision-making tool. Accordingly, the Contractor shall ensure that it complies fully with the requirements specified herein and that its schedules are both accurate and updated as required by the specification throughout the life of the Project. Detailed requirements are provided in Section 9.1.3.

9.1.3 Construction Scheduling

9.1.3.1 General

The Design-Builder's approach to prosecution of the Work shall be disclosed to the Department by submission of a Critical Path Method (CPM) schedule and a cost/resource loaded Construction Schedule when required in this Section. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.

The requirements for scheduling submissions are established based on the Project Value at the time of the bid and are designated as Type A, B, C or D. The definitions of these Schedule Requirement Types are summarized below. Complete descriptions of all detailed requirements are established elsewhere in this specification.

Type A – for all Site-Specific Contracts with a Project Value over $20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Resource-Loading
- Resources Graphic Reporting
- Cash Flow Projections from the CPM
- Cash Flow Charts
- Cost-loaded CPM
- Design-Builder -furnished CPM software, computer and training

Type B – for all Site-Specific Contracts with a Project Value between $10 Million and $20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Cost-loaded CPM
- Resource-Loading
- Monthly Projected Spending Report (PSR)
- Design-Builder -furnished CPM software, computer and training

Type C – for all Site-Specific Contracts with a Project Value between $3 Million and $10 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Monthly Projected Spending Report (PSR)
- Design-Builder -furnished CPM software, computer and training

Type D - for all contracts with a Project Value less than $3 Million; various locations contracts of any dollar amount; contracts with durations less than one-hundred and eighty (180) Calendar Days; and other contracts as determined by the Engineer.

- Bar chart schedule updated monthly or at the request of the Engineer (See Section 9.1.3.5.B - Bar Charts.)
- Monthly Projected Spending Report (PSR) (See Section 9.1.3.5.F - Projected Spending Reports.)

9.1.3.2 **Materials, Equipment, Personnel**

General

A. Software Requirements (Types A, B and C)

The Design-Builder shall use Primavera P6 computer scheduling software.

In addition to the requirements of Subsection 740 – Engineer's Field Office and Equipment, the Design-Builder shall provide to the Department one (1) copy of the scheduling software, one (1) software license and one (1) computer capable of running the scheduling software for the duration of the Contract. This computer and software shall be installed in the Engineer's Field Office within twenty-eight (28) Calendar Days after Notice to Proceed. The computer and software shall be maintained and serviced as recommended by the computer manufacturer and/or as required by the Engineer during the duration of the Contract at no additional cost to the Department. The Design-Builder shall provide professional training in the basic use of the software for up to eight (8) Department employees. The trainer shall be approved by the Engineer. This training shall be provided within twenty-eight (28) Calendar Days after Notice to Proceed.

B. Scheduler Requirements

For all schedule types, if the Design-Builder plans to use outside scheduling services, the scheduler shall be approved as a subcontractor by the Engineer.

For Type A, B and C Schedules the name of the Design-Builder's Project Scheduler together with his/her qualifications shall be submitted to the Department for approval by the Engineer within seven (7) Calendar Days after NTP. The Project Scheduler shall have a minimum of five [5] years of project CPM scheduling experience, three [3] years of which shall be on projects of similar scope and value as the project for which the Project Scheduler is being proposed. References shall be provided from past projects that can attest to the capabilities of the Project Scheduler.

9.1.3.3 **Construction Methods**

General

A. Schedule Planning Session
(Types A, B and C)

The Design-Builder shall conduct a schedule planning session within seven (7) Calendar Days after the Design-Builder receives the NTP and prior to submission of the Baseline Schedule. This session will be attended by the Department and its consultants. During this session, the Design-Builder shall present its planned approach to the project including, but not limited to:

1. the Work to be performed by the Design-Builder and its subcontractors;
2. the planned construction sequence and phasing; planned crew sizes;
3. summary of equipment types, sizes, and numbers to be used for each work activity;
4. all early work related to third party utilities;
5. identification of the most critical submittals and projected submission timelines;
6. estimated durations of major work activities;
7. the anticipated Critical Path of the project and a summary of the activities on that Critical Path;
8. a summary of the most difficult schedule challenges the Design-Builder is anticipating and how it plans to manage and control those challenges;
9. a summary of the anticipated quarterly cash flow over the life of the project.

This will be an interactive session and the Design-Builder shall answer all questions that the Department and its consultants may have. The Design-Builder shall provide a minimum of five (5) copies of a written summary of the information presented and discussed during the session to the Engineer. The Design-Builder's Baseline Schedule and accompanying Schedule Narrative shall incorporate the information discussed at this Schedule Planning Session.

B. Schedule Reviews by the Department (All Types)

1. Baseline Schedule Reviews
   The Engineer will respond to the Baseline Schedule Submission within thirty (30) Calendar Days of receipt providing comments, questions and/or disposition that either accepts the schedule or requires revision and resubmittal. Baseline Schedules shall be resubmitted within fifteen (15) Calendar Days after receipt of the Engineer's comments.

2. Contract Progress Schedule / Monthly Update Reviews
   The Engineer will respond to each submittal within twenty-one (21) Calendar Days. Schedules shall be resubmitted by the Design-Builder within five (5) Calendar Days after receipt of the Engineer's comments.

   Failure to submit schedules as and when required could result in the withholding of full or partial pay estimate payments by the Engineer.

9.1.3.4 **Schedule Content and Preparation Requirements**
(Types A, B and C unless otherwise noted)

Each Contract Progress Schedule shall fully conform to these requirements.

A. LOGIC

The schedules shall divide the Work into activities with appropriate logic ties to show:

1. conformance with the requirements of this Section and Section 9.1.2 - Schedule of Operations
2. the Design-Builder's overall approach to the planning, scheduling and execution of the Work
3. conformance with any additional sequences of Work required by the Contract Documents, including, but not limited to, Section 9.1 - Prosecution of Work and Standard Specifications Subsection 8.06 – Limitations of Operations.

B. ACTIVITIES

The schedules shall clearly define the progression of the Work from NTP to Contractor Field Completion (CFC) by using separate activities for each of the following items:

1. NTP
2. Each component of the Work defined by specific activities
3. Detailed activities to satisfy permit requirements
4. Procurement of fabricated materials and equipment with long lead times, including time for review and approval of submittals required before purchasing
5. The preparation and submission of the Quality Management Plan, design submittals, shop drawings, procedures and other required submittals, with a planned duration that is to be demonstrated to the Engineer as reasonable
6. The review and return of design submittals, procedures and other required submittals, approved or with comments, the duration of which shall be thirty (30) Calendar Days, unless otherwise specified or as approved by the Engineer
7. Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third-party work affecting the Contract
8. The Critical Path, clearly defined and organized
9. Float shall be clearly identified
10. Access Restraints – restrictions on access to areas of the Work that are defined by the Department in the bid package, in Subsection 8.06 – Limitations of Operations of the Standard Specifications or elsewhere in the Contract
11. Milestones listed in Section 9.1 - Prosecution of Work or elsewhere in the Contract Documents
12. Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
13. Full Beneficial Use (FBU) Contract Milestone per the requirements of Section 9.1 - Prosecution of Work
14. Design-Builder's request for validation of FBU (ready to open to traffic)
15. The Department’s confirmation of completed work to allow for FBU
16. Substantial Completion Contract Milestone per the requirements of Subsection 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes of the Standard Specifications and Section 9.1 - Prosecution of Work

17. Design-Builder's request for validation of Substantial Completion
18. Punchlist Completion Period of at least thirty (30) Calendar Days per the requirements of Standard Specifications Subsections 5.11 - Final Acceptance, 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and Section 9.1 - Prosecution of Work
19. Contractor confirmation that all punchlist work and documentation has been completed
20. Physical Completion of the Work Contract Milestone per the requirements of Standard Specifications Subsections 5.11 - Final Acceptance and Section 9.1 - Prosecution of Work
21. Documentation Completion per the requirements of Standard Specifications Subsection 5.11 - Final Acceptance and Section 9.1 - Prosecution of Work
22. Design-Builder Field Completion Contract Milestone per the requirements of Standard Specifications Subsection 5.11 - Final Acceptance and Section 9.1 - Prosecution of Work
23. Utility work to be performed in accordance with the Project Utility Coordination (PUC) Form as provided in Standard Specifications Subsection 8.14 - Utilities Coordination, Documentation and Monitoring Responsibilities and Appendix C, Draft BTC Special Provisions.
24. Traffic work zone set-up and removal, night work and phasing
25. Early Utility Relocation (by others) that has been identified in the Contract
26. Right-of-Way (ROW) takings that have been identified in the Contract
27. Material Certifications
28. Work Breakdown Structure in accordance with the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit
29. For Type A and B Contracts only: All items to be paid, including all Unit Price and Lump Sum pay items, shall be identified by activity. This shall include all non-construction activities such as engineering work; purchase of permanent materials and equipment, purchase of structural steel stock, equipment procurement, equipment delivery to the site or storage location and the representative amount of overhead/indirect costs that was included in the Design-Builder's Bid Prices.

C. EARLY AND LATE DATES

Early Dates shall be based on proceeding with the Work or a designated part of the Work exactly on the date when the corresponding Contract Time commences. Late Dates shall be based on completing the Work or a designated part of the Work exactly on the corresponding Contract Time, even if the Contractor anticipates early completion.

D. DURATIONS

Activity durations shall be in Work Days. Planned Original Durations shall be established with consideration to resources and production rates that correspond to the Design-Builder's Bid Price. Within all of the Department-required schedules, the Design-Builder shall plan the Work using durations for all physical construction activities of no less than one (1) Work Day and no greater than fourteen (14) Work Days, unless approved by the Engineer as part of the Baseline Schedule Review.

Should there be an activity with a duration that is determined by the Engineer to be unreasonable, the Design-Builder will be asked to provide a basis of the duration using bid documents, historic production rates for similar work, or other form of validation that is acceptable to the Engineer. Should the Design-Builder and the Engineer be unable to agree on reasonable activity durations, the Engineer will, at a minimum, note the disagreement in the Baseline Schedule Review along with a duration the Engineer considers reasonable and the basis for that duration. A schedule that contains a substantial number of activities with durations that are deemed unreasonable by the Engineer will not be accepted.

E. MATERIALS ON HAND (for Types A and B only)

The Design-Builder shall identify in the Baseline Schedule all items of permanent materials (Materials On Hand) for which the Contractor intends to request payment prior to the incorporation of such items into the Work.

F. ACTIVITY DESCRIPTIONS

The Design-Builder shall use activity descriptions in all schedules that clearly describe the work to be performed using a combination of words, structure numbers, station numbers, bid item numbers, work breakdown structure (WBS) and/or elevations in a concise and compact label as specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit.

G. ACTIVITY IDENTIFICATION NUMBERS

The Design-Builder shall use the activity identification numbering system specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

H. ACTIVITY CODES

The Design-Builder shall use the activity codes specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

I. CALENDARS

Different calendars may be created and assigned to all activities or to individual activities. Calendars define the available hours of work in each Calendar Day, holidays and general or project-specific non-Work Days such as Fish Migration Periods, time of year (TOY) restrictions and/or area roadway restrictions.

Examples of special calendars include, but are not limited to:

- Winter Shutdown Period, specific work is required by separate special provision to be performed during the winter. See Section 9.1 (if applicable)
- Peak traffic hours on heavily traveled roadways. This shall be from 6:30 am to 9:30 am and from 3:30 pm to 7:00 pm, unless specified differently elsewhere in the Contract.
- Special requirements by sensitive abutters, railroads, utilities and/or other state agencies as defined in the Contract.
- Cape Cod and the Islands Summer Roadway Work Restrictions: A general restriction against highway and bridge construction is enforced between Memorial Day and Labor Day, unless otherwise directed by the Engineer. Refer to the Project Special Provisions for specific restrictions.
- Cape Ann Summer Roadway Work Restrictions: While there are no general restrictions for Cape Ann as there are for Cape Cod and the Islands, project-specific restrictions may be enforced. Refer to the Project Special Provisions for specific restrictions.
- Turtle and/or Fish Migration Periods and/or other in-water work restrictions: Refer to the Project Special Provisions for specific restrictions.
- Working over Waterways Restricted Periods: Refer to the Project Special Provisions for specific restrictions.
- Night-time paving and striping operations, traffic and temperature restrictions: Refer to the Project Special Provisions for specific restrictions.
- Utility Restrictions shall be as specified within the Contract.

J. FLOAT

For the calculation of float in the CPM schedule, the setting for *Retained Logic* is required for all schedule submissions, starting with the Baseline Schedule Submission. Should the Design-Builder have a reason to propose that an alternative calculation setting such as *Progress Override* be used, the Design-Builder shall obtain the Engineer's approval prior to modifying to this setting.

K. COST AND RESOURCE LOADING (Types A and B only)

For all Type A and B Schedules, the Design-Builder shall provide a cost and resource-loaded schedule with an accurate allocation of the costs and resources necessary to complete the Work. The costs and resources shall be assigned to all schedule activities in order to enable the Design-Builder to efficiently execute the Contract requirements and the Engineer to validate the original plan, monitor progress, provide cash flow projections and analyze delays.

1. Each schedule activity shall have an assigned cost that accurately represents the value of the Work. Each schedule activity shall have its resources assigned to it by craft and the anticipated hours to accomplish the work. Each schedule activity's equipment resources shall be assigned to it by equipment type and hours operated. Front-loading or other unbalancing of the cost distribution will not be permitted.
2. The sum of the cost of all schedule activities shall be equal to the Design-Builder's Bid Price.
3. Indicating the labor hours per individual, per day, by craft and equipment hours/day will be acceptable.

4. The Engineer reserves the right to use the cost-loading as a means to resolve changes, disputes, time entitlement evaluations, increases or decreases in the scope of Work, unit price renegotiations and/or claims.
5. For all Type A and B Schedules, all subnets, fragnets, Proposal Schedules, and Recovery Schedules shall be cost and resource- loaded to help to quickly validate and monitor the duration of the Work to be performed.
6. For Type A Schedules, cost-loading of the schedule will also be used for cash flow projection purposes.
7. The cost-loading of each activity shall indicate the portion of the cost for that activity that is applicable to a specific bid item (cost account.) The total cost for each cost account must equal the bid item price.
8. For Type A Schedules, each month, the Design-Builder will be paid using the Cost-loaded CPM activities for Lump Sum payment items. This requirement supersedes any requirements elsewhere in this Contract regarding partial payments of schedule-of- values for all Lump Sum items.

L. NOT TO BE USED IN THE CONTRACTOR'S CPM SCHEDULE

1. Milestones or constraint dates not specified in the Contract
2. Scheduled work not required for the accomplishment of a Contract Milestone
3. Use of activity durations, logic ties and/or sequences deemed unreasonable by the Engineer
4. Delayed starts of follow-on trades
5. Float suppression techniques

9.1.3.5 **Submittal Requirements**

All schedules shall be prepared and submitted in accordance with the requirements listed below.

Each monthly Contract Progress Schedule submittal shall be uniquely identified.

Except as stated elsewhere in this subsection, schedule submittals shall include each of the documents listed below, prepared in two formats, for distribution as follows:

1. Posted to the Project SharePoint site, in accordance with Section 1.1.10.
2. E-Mail submission of the narrative, the xer file, the bar charts (all activities, critical path, comparison with previous month), update Monthly Projected Spending Report (PSR) electronically (email)
    - To: District 5 Project Controls – Fred Wijnen-Riems & Brian McKenney
    - Subject: Contract # - BL/UP/TEAXX - DDXX.XX.XXXX Project Name, Location
    - CC: Resident Engineer, Area Engineer, Assistant Construction Engineer

A. Narratives

A written narrative shall be submitted with every schedule submittal. The narrative shall:

1. itemize and describe the flow of work for all activities on the Critical Path in a format that includes any changes made to the schedule since the previous Contract Progress Schedule / Monthly Update or the Baseline Schedule, whichever is most recent;
2. provide a description of any specification requirements that are not being followed. Identify those that are improvements and those that are not considered to be meeting the requirements;

3. provide all references to any Notice of Delay that has been issued, within the time period of the Contract Progress Schedule Update, by letter to the Engineer. Note that any Notice of Delay that is not issued by letter will not be recognized by the Engineer. See Section 9.1.3.7.A - Notice of Delay;
4. provide a description of each third-party utility's planned vs. actual progress and note any that are trending late or are late per the durations and commitments as provided in the PUC Form; provide a description of the five (5) most important responses needed from the Department and the need date for the responses in order to maintain the current Schedule of Record;
5. provide a description of all critical issues that are not within the control of the Design-Builder or the Department (third party) and any impact they had or may have on the Critical Path;
6. provide a description of any possible considerations to improve the probability of completing the project early or on-time;
7. compare Early and Late Dates for activities on the Critical Path and describe reasons for changes in the top three (3) most critical paths ;
8. describe the Design-Builder's plan, approach, methodologies and resources to be employed for completing the various operations and elements of the Work for the top three (3) most critical paths. For update schedules, describe and propose changes to those plans and verify that a Proposal Schedule is not required;
9. describe, in general, the need for shifts that are not 5 days/week, 8 hours/day, the holidays that are inserted into each calendar and a tabulation of each calendar that has been used in the schedule;
10. describe any out-of-sequence logic and provide an explanation of why each out-of-sequence activity does not require a correction, if one has not been provided, and an adequate demonstration that these changes represent the basis of how these activities will be built, including considerations for resources, dependencies and previously-approved production rates;
11. identify any possible duration increases resulting from actual or anticipated unit price item quantity overruns as compared to the baseline duration, with a corresponding suggestion to mitigate any possible delays to the Critical Path. If the delay is anticipated to impact the Critical Path, refer to Standard Specifications Subsections 4.06 - Increased or Decreased Contract Quantities and 8.10 - Determination and Extension of Contract Time for Completion and submit a letter to the Engineer notifying of a potential delay;
12. include a schedule log consisting of the name of the schedule, the data date and the date submitted.

B. Bar Charts (Types A, B, C and D)

One (1) time-scaled bar chart containing all activities shall be prepared and submitted using a scale that yields readable plots and that meets the requirements of Section 9.1.3.4 - Schedule Content and Preparation Requirements Activities shall be linked by logic ties and shown on their Early Dates. Critical Paths shall be highlighted and Total Float shall be shown for all activities.

A second time-scaled bar chart shall also be prepared containing only the Critical Path or, if the Critical Path is not the longest path, the Longest Path using a scale that yields readable plots and that meets the requirements of Section 9.1.3.4 - Schedule Content and Preparation Requirements. Activities shall be linked by logic ties and shown on their Early Dates. Total Float shall be shown for all activities.

Bar Charts shall be printed in color and submitted on 11" X 17" paper or, if approved by the Engineer, as a .pdf file.

C. Detailed Activity Schedule Comparisons

A Detailed Activity Schedule Comparison (DASC) is a simple reporting tool in the format of a graphical report that will provide Resident Engineers with immediate, timely and up-to-date information. The DASC consists of an updated bar chart that overlays the current time period's bar chart onto the previous time period's bar chart for an easily-read comparison of progress during the present and previous reporting periods. The DASC shall be prepared and submitted in accordance with the instructions contained in the Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit

The reports described in Subsections D, E and F below shall be submitted with all of the schedules listed in Section 9.1.3.1 - General:

D. Activity Cost Report and Monthly Cash Flow Projections (Type A only)

With each Contractor Quantity Estimate (CQE), the Design-Builder shall submit an Activity Cost Report and Cash Flow Projection that includes all activities grouped by Contract Bid Item.

The Activity Cost Report shall be generated from the Schedule of Record and shall be the basis of the Monthly Cash Flow Projection. Within each contract Bid Item, activities shall be sequenced by ascending activity identification number and shall show:

1. activity ID and description,
2. forecast start and finish dates for each activity and,
3. when submitted as a revised schedule, actual start and finish dates for each completed activity.

For Unit Price pay items, in addition to the above, estimates to complete and any variance to the estimated Contract quantity shall be shown.

E. Resource Graphs (Type A only)

Monthly and cumulative resource graphs for the remaining Contract period using the Early Dates and Late Dates in the Contract Progress Schedule shall be included as part of each schedule submittal.

F. Projected Spending Reports (Types B, C and D)

A Projected Spending Report (PSR) shall be prepared and submitted in accordance with the instructions listed at the end of this section. The PSR shall indicate the monthly spending (cash flow) projection for each month from NTP to Contractor Field Completion (CFC). Each month's actual spending shall be calculated using all CQEs paid during that month. If the difference between the Design-Builder's monthly projections vs. the actual spending is greater than 10%, the Design-Builder's monthly spending projection shall be revised and resubmitted within fifteen (15) Calendar Days.

The Projected Spending Report (PSR) shall be depicted in a tabular format and printed in color on 11 x 17-sized paper or larger as approved by the Engineer. For additional instructions and a template for preparing the Projected Spending Report (PSR), refer to the Contractor's Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit or consult with the District Construction Scheduler.

9.1.3.6 Progress Schedule Requirements

A. Baseline Schedule

The Baseline Schedule shall be due thirty (30) Calendar Days after Notice to Proceed (NTP). The Baseline Schedule shall only reflect the Work awarded to the Design-Builder and shall not include any additional work involving Extra Work Orders or any other type of alleged delay. The Baseline Schedule shall be prepared and submitted in accordance with Sections 9.1.3.4 - Schedule Content and Preparation Requirements and 9.1.3.5 - Submittal Requirements. Once the Baseline Schedule has been accepted by the Engineer, with or without comments, it shall represent the as-planned schedule for the Work and become the Contract Progress Schedule of Record until such time as the schedule is updated or revised under Section 9.1.3.6.C - Contract Progress Schedules / Monthly Updates, Section 9.1.3.7.C - Recovery Schedules and Section 9.1.3.7.D - Proposal Schedules.

The Cost and Resource-Loading information (Types A and B only) shall be provided by the Design-Builder's within forty-five (45) Calendar Days after NTP.

The Engineer's review comments on the Baseline Schedule and the Design-Builder's responses to them will be maintained for the duration of the Contract and will be used by the Engineer to monitor the Design-Builder's work progress by comparing it to the Contract Progress Schedule / Monthly Update.

B. Interim Progress-Only Schedule Submissions

The first monthly update of the Contract Progress Schedule/Monthly Update is due within seventy (70) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule review period ends at sixty (60) Calendar Days after NTP, see, Section 9.1.3.3.B - Schedule Reviews by the Department. If the Baseline Schedule has not been accepted within sixty (60) Calendar Days after NTP, an Interim Progress-Only Schedule shall be due within seventy (70) Calendar Days after NTP. The purpose of the Interim Progress-Only Schedule is to document the actual progress of all activities, including non-construction activities, from NTP until the Baseline Schedule is accepted.

C. Contract Progress Schedules / Monthly Updates (Types A, B, C and D)

The first Contract Progress Schedule shall be submitted by the Design-Builder no later than seventy (70) Calendar Days after NTP. The data date for this first Progress Schedule shall be sixty (60) Calendar Days after NTP. Subsequent Progress Schedules shall be submitted monthly.

Each Contract Progress Schedule shall reflect progress up to the data date. Updated progress shall be limited to as-built sequencing and as-built dates for completed and in-progress activities. As-built data shall include actual start dates, remaining Work Days and actual finish dates for each activity, but shall not change any activity descriptions, the Original Durations, or the Original Resources (as planned at the time of bid), without the acceptance of the Engineer. If any activities have been completed out-of-sequence, the Design-Builder shall propose new logic ties for affected in-progress and future activities that accurately reflect the previously-approved sequencing. Alternatively, the Design-Builder may submit to the Engineer for approval an explanation of why an out-of-sequence activity does not require a correction and an adequate demonstration that the changes accurately represent how the activities will be built, including considerations for resources, dependencies and previously approved production rates. Once approved by the Engineer, the Design-Builder may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

No revisions to logic ties; sequence, description or duration of future activities; or planned resource costs shall be made without prior approval by the Engineer.

Any proposed logic changes for in-progress or future activities shall be submitted to the Engineer for approval before being incorporated into a Contract Progress Schedule. The logic changes must be submitted using a Proposal Schedule or a schedule fragnet submission. Once approved by the Engineer, the Design-Builder may incorporate the logic in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

For any proposed changes to the original sequence, description or duration of future activities, the Design-Builder shall submit to the Engineer for approval an explanation of how the proposed description or duration change reflects how the activity will be progressed, including considerations for resources and previously approved production rates. Any description or duration change that does not accurately reflect how the activity will be progressed will not be approved by the Engineer. Once approved by the Engineer, the Design-Builder may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Design-Builder shall submit a Recovery Schedule if any Contract Progress Schedule/Monthly Update indicates a failure to meet the Contract Dates.

The Design-Builder shall require each fabricator of critical items (Steel Girders, Pre-cast Elements) to provide a Monthly Fabrication schedule which shall be submitted to MassDOT with each Statused Contract Progress Schedule on a monthly frequency.

D. Short-Term Construction and Design Schedule

The Design-Builder shall provide a Short-Term Construction Schedule that details daily work activities, including any multiple shift work that the Design-Builder intends to conduct, in a bar chart format. The daily activities shall directly correspond to the Contract Progress Schedule activities, with a matching reference to the activity identification number in the Contract Progress Schedule, and may be at a greater level of detail. The Design-Builder shall also provide a Short-Term Design Schedule that details all design activities, focusing on the anticipated submittal date to MassDOT, highlighting any requested expedited reviews.

The Short-Term Construction Schedule shall be submitted every two weeks. It shall display all work for a thirty-five (35) Calendar Day period consisting of completed work for the two (2) week period prior and all planned work for the following three (3) week period. The Design Schedule shall be submitted monthly and shall display all anticipated submittals within the next three (3) months. The initial submission shall be provided no later than thirty (30) Calendar Days after NTP or as required by the Engineer.

The Design-Builder shall be prepared to discuss the Short-Term Construction Schedule, in detail, with the Engineer in order to coordinate field inspection staff requirements, the schedule of work affecting abutters and any corresponding work with affected utilities. Short-Term Construction and Design Schedules shall be prepared and submitted in accordance with Sections 9.1.3.4 - Schedule Content and Preparation Requirements and 9.1.3.5 - Submittal Requirements.

Failure to submit Short-Term Construction Schedules every two (2) weeks may result in withholding of full or partial payments by the Engineer.

9.1.3.7 Impacted Schedule Requirements

A. Notice of Delay

The Design-Builder shall notify the Engineer in writing, with copies to the District and State Construction Engineers, within three (3) Calendar Days of the start of any delays to the Critical Path that are caused by actions or inactions that were not within the control of the Design-Builder. Delay notifications that are not provided in a letter to the Engineer, such as a delay notification in the schedule narrative, will not be recognized as contractual notice in the determination of any Time Extension related to the impacts to the work associated with this specific alleged delay. Should such delay continue for more than one (1) week, the Design-Builder shall note it in the Schedule Narrative until the delay is no longer impacting the Critical Path for the completion of the Contract Milestones. The Engineer will evaluate the alleged delay and its impact and will respond to the Design-Builder within ten (10) Calendar Days after receipt of a notice of delay.

B. Time Entitlement Analysis

A Time Entitlement Analysis (TEA) shall consist of a descriptive narrative, prepared in accordance with Section 9.1.3.5.A - Narratives, and an as-built CPM schedule, which may be in the form of a schedule fragnet (that has been developed from the project's Contract Progress Schedule of Record, and illustrates the impact of a delay to the Critical Path, Contract Milestones and/or Contract Completion Date as required in Standard Specifications Subsection 8.10 - Determination and Extension of Contract Time for Completion. TEAs shall also be used to determine the schedule impact of proposed Extra Work Orders (EWO) as also required in Subsection 8.10.

TEAs shall be prepared and submitted in accordance with the requirements of Sections 9.1.3.4 - Schedule Content and Preparation Requirements and 9.1.3.5 - Submittal Requirements and shall be based on the Contract Progress Schedule of Record applicable at the start of the delay or impact from an EWO. A TEA fragnet must start with a specific new activity describing the work contained in either a Notice of Delay previously submitted to the Department per Section 9.1.3.7.A - Notice of Delay or an EWO.

TEAs shall be submitted:

1. as part of any Extra Work Order that may impact Contract Time,
2. with a request for a Time Extension,
3. within fourteen (14) Calendar Days after a request for a TEA by the Engineer for any other reason.

A TEA shall be submitted to the Engineer before any Time Extension is granted to the Design-Builder. Time Extensions will not be granted unless the TEA accurately reflects an evaluation of all past delays and the actual events that occurred that impacted the Critical Path. The TEA must also demonstrate a plan for the efficient completion of all of the remaining work through an optimized CPM Schedule. The analysis shall include all delays, including Design-Builder-caused delays, and shall be subdivided into timeframes and causes of delays.

TEAs shall incorporate any proposed activities, logic ties, resource considerations, and activity costs required to most efficiently demonstrate the schedule impacts in addition to detailing all impacts to existing activities, logic ties, the Critical Path, Contract Milestones and the Contract Completion Date. In addition, TEAs shall accurately reflect any changes made to activities, logic ties, restraints and activity costs, necessitated by an Extra Work Order or other schedule impact, for the completion of the remaining work. The Design-Builder shall provide TEAs that demonstrate that all delays have been mitigated to the fullest extent possible without requiring an Equitable Adjustment to the original bid basis.

All TEAs shall clearly indicate any overtime hours, additional shifts and the resource that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts. The Engineer shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions if it is determined to be in the best interest of the Department to do so.

When accepted, the changes included in a TEA shall be incorporated into the next Contract Progress Schedule per the requirements of Section 9.1.3.6.C - Contract Progress Schedules / Monthly Updates.

During the review of any TEA, all Contract Progress Schedules shall continue to be submitted as required.

The Engineer may request that the Design-Builder prepare a Proposal Schedule or a Recovery Schedule to further mitigate any delays that are shown in the accepted TEA/Contract Progress Schedule.

C. Recovery Schedules

The Design-Builder shall promptly report to the Engineer all schedule delays during the prosecution of the Work. Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Design-Builder shall submit a Recovery Schedule within fourteen (14) Calendar Days of a Contract Progress Schedule submission that shows failure to meet the Contract Dates. This requirement is critical to the Department’s ability to make informed decisions regarding Contract Time and costs.

During the prosecution of the Work, should the Design-Builder's progress on a critical operation clearly not meet anticipated production, without cause by fault of the Department, or should a critical activity or series of activities not be staffed in accordance with the Design-Builder's approved Baseline Schedule resource planning, the Design-Builder shall be obligated to recover such delay. Recovery Schedules shall be prepared and submitted in accordance with Sections 9.1.3.4 - Schedule Content and Preparation Requirements and 9.1.3.5 - Submittal Requirements within fourteen (14) Calendar Days of any of the cases listed above.

Recovery Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in to the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts and shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions, without additional compensation for any Design-Builder delays, if it is determined to be in the best interest of the Department to do so.

During the review of any Recovery Schedule, all Contract Progress Schedules shall continue to be required every month.

The Engineer may request that the Design-Builder prepare a Recovery Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

Changes represented in accepted Recovery Schedules shall be incorporated into the next Contract Progress Schedule.

D. Proposal Schedules

A Proposal Schedule is an alternative schedule used to evaluate proposed changes to the Contract scope or significant alternatives to previously approved approaches to complete the Work, which may include changes to activity durations, logic and sequence. For Types A and B Schedules, the Proposal Schedule shall be cost and resource-loaded.

A Proposal Schedule may be requested by the Department at any time or may be offered by the Design-Builder. The Engineer may request that the Design-Builder prepare a Proposal Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

The Design-Builder shall submit the Proposal Schedule within thirty (30) Calendar Days of a request from the Department.

The Proposal Schedule shall not be considered a Schedule of Record until the logic, durations, narrative and basis of the Proposal Schedule have been accepted by the Engineer. If the Proposal Schedule took the form of a fragnet, it must be incorporated into the Contract Progress Schedule of Record showing the current progress of all other activities and the impacts/results of the changes made by the Proposal Schedule before the Proposal Schedule is accepted by the Department.

Proposal Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts.

Changes represented in accepted Proposal Schedules shall be incorporated into the next Contract Progress Schedule. During the review of any Proposal Schedule, all Contract Progress Schedules shall continue to be required every month.

E. Disputes (Types A, B, C and D)

All schedules shall be submitted, reviewed, dispositioned and accepted in the timely manner specified herein so as to provide the greatest possible benefit to the execution of this Contract.

Any dispute concerning the acceptance of a schedule or any other question of fact arising under this subsection shall be determined by the Engineer. Pending resolution of any dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

9.1.3.8 **Compensation**

Method of Measurement and Basis of Payment (Types A, B, C and D)

The Special Provisions will specify the fixed-price amount to be paid to the Design-Builder for the Project Schedule requirements contained herein. Each Proposer shall include this lump-sum, fixed-price bid item amount in his/her Price Proposal. Failure to do so may be grounds for the rejection of the bid.

All required schedule-related work, including, but not limited to computers, computer software, the planning and coordination with utilities, training, schedule preparation and schedule submittals will be paid for under the fixed price amount.

This fixed price amount is for payment purposes only and is separate from what the Department considers to be the Contractor's General Condition costs. If the Design-Builder deems it necessary to include additional costs to provide all of the requirements of this section, these additional costs shall be included in the Design-Builder's overall Price.

Twenty percent (20%) of this pay item will be paid upon the Engineer's acceptance of the Design-Builder's Baseline Schedule, prepared and submitted in accordance with Section 9.1.3.6.A.

The remaining eighty percent (80%) of this pay item will be paid in equal monthly installments distributed across the Contract Duration from Notice to Proceed (NTP) to Contractor Field Completion (CFC), less the 2 months required for the submittal and review of the Baseline Schedule in accordance with the following formula:

$$\text{Monthly Payment} = \frac{\text{Remaining Fixed Price amount (80\% of Item 100.)}}{\text{Contract Duration in whole months} - 2 \text{ months}}$$

The timely and accurate submission of the Baseline Schedule is critical to the Contract and the Department's ability to make informed decisions. Only payments under Item 740.3 - Engineer's Field Office and Equipment and Item 748 – Mobilization will be made until the Baseline Schedule is accepted by the Engineer.

No payment for any other pay item will be processed beyond seventy-five (75) Calendar Days from Notice to Proceed (NTP) until the Baseline Schedule is accepted by the Engineer. Until the Engineer's acceptance of the Baseline Schedule, the combined total of all payments made to the Design-Builder will be limited to an amount no greater than the total price for Item 748 - Mobilization or 3% of the contract price, whichever is less.

All Contract Progress Schedule Updates submitted later than ten (10) Calendar Days after the CQE (Contract Quantity Estimate) completion date, or greater than forty (40) Calendar Days from the Data Date of the previous submission, will be deemed to be no longer useful and will not qualify for payment. Late submittal of missed Contract Progress Monthly Updates will not result in recovery of the previously forfeited portion of the Schedule of Operations Fixed Price Payment Item.

Failure to submit schedules as and when required may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

Failure to submit schedules that are acceptable to the Engineer may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

The Schedule of Operations pay item will be adjusted to pay for only the actual quantity of schedules that have been submitted in accordance with this section.

The Design-Builder's failure or refusal to comply with the requirements of this Section shall be reasonable evidence that the Design-Builder is not prosecuting the Work with due diligence and may result in the withholding of full or partial payments by the Engineer.

Should there be a Time Extension granted to the Design-Builder, the Engineer may provide an Equitable Adjustment for additional Contract Progress Schedule Updates at intervals directed by the Engineer. Item 100. will be the basis for this Equitable Adjustment.

Payment Items

100.	SCHEDULE OF OPERATIONS - FIXED PRICE	LUMP SUM

9.2 ACCESS RESTRAINTS

[**THIS SECTION NOT APPLICABLE**]

9.3 INCENTIVE/DISINCENTIVE REQUIREMENTS

[**THIS SECTION NOT APPLICABLE**]

9.4 DETERMINATION AND EXTENSION OF CONTRACT TIME FOR COMPLETION (TIME EXTENSIONS)

(In cases of delay and except as defined in Section 9.3 above, if applicable)

A. General

It is an essential part of all Contracts that the Design-Builder shall perform the Work fully, entirely and in an acceptable manner within the Contract Duration.

The Contract Duration is based upon the requirements of public convenience and the assumption that the Design-Builder will prosecute the Work efficiently and with the least possible delay, in accordance with the maximum allowable working time, as specified in the Contract.

The Contract Duration has been carefully considered and has been established for reasons of importance to the Department. The Contract Duration will be enforced and it is understood that the Design-Builder accepted this concept at the time of the submission of the bid. The timing of the Notice to Proceed (NTP) has been taken into account in the determination of the Contract duration and the timing of the issuance of the NTP shall not, by itself, be a reason for a time extension.

An extension of Contract time will be granted only if entitlement to a time extension has been clearly demonstrated to the satisfaction of MassDOT by a documented time entitlement analysis, performed in accordance with the requirements of this Section.

B. Requests for Additional Contract Time (Time Extensions)

In response to a request for a time extension, an extension of contract time may be granted for demonstrated delays resulting from only one, or, in the case of concurrent delays, a combination of the following causes:

1. Extra Work

Each extra work order (EWO) proposal shall include an evaluation of the impact of the EWO on contract time, expressed in calendar days. If there is no impact to the critical path as a result of the EWO, the EWO shall indicate this by stating that zero (0) calendar days of additional time is being requested. The need for a time extension as a result of the EWO must be clearly demonstrated by a documented time entitlement analysis (TEA) performed by the Design-Builder in accordance with the requirements of this Section. No Time Extension will be granted for any change that does to impact the current critical path and/or any critical path impact that can be mitigated by means of various recovery options to be presented to MassDOT in a timely manner. A documented preliminary TEA supporting the EWO proposal shall be submitted to MassDOT as part of the EWO proposal.

2. MassDOT-Caused Delays

If any part of the Work is delayed or suspended by the Department, the Design-Builder will be granted a time extension to complete the Work or any portion of the Work only if entitlement to this time extension has been clearly demonstrated by a documented time entitlement analysis and a clear impact to the current critical path. Department-caused delays shall not include delays to or suspensions of the Work that result from the fault or negligence of the Design-Builder.

3. Delays Not Caused by Design-Builder Fault or Negligence

When delays occur due to reasonable causes beyond the control and without the fault or negligence of the Design-Builder, including, but not restricted to: "Acts of God"; war, whether or not declared, civil war, insurrection, rebellion or revolution, or to any act or condition incident to any of the foregoing; acts of the Government; acts of the State or any political subdivision thereof; acts of other contracting parties over whose acts the Design-Builder has no control; fires; floods; epidemics; abnormal time of Winter freezing or Spring thawing; strikes, except those caused by improper acts or omissions of the Design-Builder; extraordinary delays in delivery of materials caused by strikes, lockouts, wrecks, and/or freight embargoes; a time extension will be granted only if entitlement to a time extension has been clearly demonstrated to have impacted the critical path, only if a presentation of alternative recovery options has been determined to be not acceptable to MassDOT, and only if the delays have been documented by a timely and acceptable time entitlement analysis.

An "Act of God" as used in this Section is construed to mean an earthquake, flood, cyclone, hurricane, tornado, or other cataclysmic phenomenon of nature beyond the power of the Design-Builder to foresee and/or make preparations against. Additional consideration may be given to severe, abnormal flooding in local rivers and streams that has been reported as such by the National Weather Service. Rain, wind, snow, and/or other natural phenomena of normal intensity, based on National Weather Service reports, for the particular locality and for the particular season of the year in which the Work is being prosecuted, shall not be construed as an "Act of God" and no time extension will be granted for the delays resulting therefrom.

Within the scope of acts of the Government, consideration will be given to properly documented evidence that the Design-Builder has been delayed in obtaining any material or class of labor because of any assignment of preference ratings by the Federal Government or its agencies to defense contracts of any type.

4. Delays Caused by Public Service Corporations, Municipal Departments or Other Third Parties

If any part of the Work is delayed by public service corporations, municipal departments or other third parties, a time extension will be granted only if entitlement to a time extension has been clearly demonstrated by a documented time entitlement analysis.

C. Time Extension Determination

1. When the Design-Builder submits a request for a time extension, placing the MassDOT on notice of a delay due to any of the causes listed, it shall be submitted in writing to MassDOT within fifteen (15) calendar days after the start of the delay. No time extension will be granted if a request for a time extension is not filed within fifteen (15) calendar days after the start of the delay.

A documented preliminary time entitlement analysis (TEA) supporting the request for a time extension and meeting the requirements of this Section, shall be submitted to MassDOT no later than fifteen (15) calendar days after the request for a time extension is submitted to MassDOT or thirty (30) calendar days after the start of the delay. A documented final TEA shall be submitted to MassDOT no later than fifteen (15) calendar days after the end of the delay. During the time between the preliminary and final TEAs, the delay shall be documented in statused contract progress schedules submitted in accordance with the requirements of this Section.

2. No time extension will be granted for any delay or any suspension of the Work due to the fault of the Design-Builder.

3. No time extension will be granted if the request for a time extension is based on any claim that the originally established contract duration was inadequate.

4. Time extensions will only be granted for delays, including concurrent delays, to activities affecting contract milestones, the contract completion date and/or other critical path activities as demonstrated to the satisfaction of MassDOT by a detailed time entitlement analysis that clearly states the number of calendar days of extra time being requested.

5. The probable slowdown or curtailment of work during inclement weather and winter months has been taken into consideration in determining the contract duration and therefore no time extension will be granted.

6. Any work restrictions related to weather, permit conditions, community accommodation, traffic or any other restriction specified in the Contract or reasonably expected for the particular locality and for the particular season of the year in which the Work is being prosecuted must be considered in the analysis of each individual time extension and shall not be considered, in itself, justification for an extension of time.

7. Any time entitlement analysis prepared for the purpose of requesting a time extension shall clearly indicate any proposed overtime hours or additional shifts that are incorporated in a cost and resource loaded Critical Path Method Schedule. MassDOT shall have final approval over the use of overtime hours and additional shifts and shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of time extensions if it is determined to be in best interest of the MassDOT to do so.

D. Disputes

Any dispute regarding whether or not a time entitlement analysis demonstrates entitlement to a time extension, the number of days granted in a time extension or any other question of fact arising under this Section shall be determined by MassDOT.

The Design-Builder may dispute a determination by MassDOT by filing a claim notice within fourteen (14) calendar days after the Design-Builder's request for additional time has been denied or if the Design-Builder does not accept the number of days granted in a time extension. The Design-Builder's claim notice shall include a time entitlement analysis that sufficiently explains the basis of the time-related claim. Failure to submit the required time entitlement analysis with the claim notice shall result in denial of the Design-Builder's claim.

SECTION 10.0: CONSTRUCTION

10.1 PROJECT OFFICE LOCATION

Design-Builders submitting Proposals in response to this RFP must have an established, fully staffed office or shall establish a Project office within one (1) mile of the Project location in Marion or Wareham, Massachusetts. The Design-Builder shall provide a field office for MassDOT and Project staff. The Design-Builder shall establish the field office within one (1) month of NTP. MassDOT strongly recommends that both parties' staff be located together with separation between offices.

The Design-Builder shall furnish office furniture, equipment, phone services, computer and all office supplies and maintain a field office for MassDOT and Project staff for 6 MassDOT staff members in accordance to the relevant provisions of Subsection 740 of the MassDOT Standard Specifications for Highways and Bridges, 2024 Edition except as modified by BTC Special Provisions Item 740.3 Engineer's Field Office and Equipment as contained in Appendix C. In addition, the field office shall include a conference room with a conference table and chairs to accommodate all Project meetings.

MassDOT has not identified in the BTC any MassDOT owned property outside of the Project limits available for the Design-Builder's use for laydown or staging. The Design-Builder is responsible for securing any additional areas from MassDOT or from private owners for use as staging and laydown to support operations. This may require the Design-Builder to enter into agreements with third parties for the use of private property for staging and laydown. The Design-Builder shall identify in their proposal areas they have identified as potential areas for staging and laydown and any agreements, executed or pending, with the owners of these properties.

10.2 PRICE ADJUSTMENTS

This Contract contains price adjustments for hot mix asphalt cement mixtures, diesel fuel, and gasoline. For this Project the base prices are as follows: liquid asphalt $575.00 per ton, diesel fuel $2.713 per gallon, Portland concrete $425.53 per ton, and gasoline $2.666 per gallon and Steel Base Price Index 415.9 MassDOT posts the **Price Adjustments** on their Highway Division's website at https://www.mass.gov/service-details/massdot-current-contract-price-adjustments

STEEL PRICE ADJUSTMENT

This Contract contains Price Adjustments for reinforcing steel and structural steel. See Document 00813DB - Price Adjustment for Structural Steel and Reinforcing Steel Design-Build provided in Appendix D for their application and base prices.

10.3 QUALITY ASSURANCE REQUIREMENTS

The Design-Builder shall perform the QC inspection, sampling and testing activities outlined in the Design-Builder's approved Quality Management Plan and all required Construction QC Plans. As part of MassDOT's oversight role, all materials and Work shall be subject to Acceptance inspection sampling, testing, and inspection by MassDOT. At all points in performance of the Work at which MassDOT Acceptance sampling, testing, inspection, or related approvals are required by the Contract, the Design-Builder shall not proceed beyond that point until MassDOT has completed such Acceptance activities or waived its right in writing.

As part of MassDOT's oversight role, all materials and each part or detail of the Work shall also be subject to Acceptance inspection and testing by MassDOT.

10.4 MATERIALS QUALITY ASSURANCE REQUIREMENTS

The Design-Builder is required to prepare and maintain its own Quality Control Materials Sampling & Testing Ledger for the Project and provide MassDOT with planned QC sampling & testing frequencies for all Work Items in accordance with the requirements of Section 2.7.4 of the Technical Provisions. MassDOT will prepare and maintain an Acceptance Materials Sampling & Testing Ledger (RMS 360) to plan and document MassDOT's Acceptance sampling frequencies and Acceptance testing results in accordance with the following procedures:

- The Resident Engineer in coordination with the District Materials Engineer shall be responsible for creating, maintaining, and updating the RMS 360 in accordance with current MassDOT procedures. The RMS 360 shall be maintained on MassDOT's Laboratory Information Materials Management System (LIMMS).

- When the Project design is split into multiple Work Packages (i.e. Bridge 1, Bridge 2, Highway, etc.), the Work Packages and their Work Items shall be listed separately from one another within the RMS 360. For example:

  995.01 Bridge A

  a. Concrete
  b. Reinforcing Steel
  c. Spray Applied Membrane Waterproofing
  d. Etc.

  995.02 Bridge B

  a. Concrete
  b. Reinforcing Steel
  c. Spray Applied Membrane Waterproofing
  d. Etc.

- Once an Early Release for Construction (ERC) package or Issued for Construction package is approved for construction the MassDOT RMS 360 shall be updated to reflect the final list of Work Items.

- MassDOT shall only pay for completed Work Items listed on the RMS 360 and which are accompanied with all necessary Design-Builder QC documentation and MassDOT Acceptance documentation as required by the Project Specifications and the RMS 360.

- MassDOT will periodically audit the Design-Builder's Quality Control Materials Sampling & Testing Ledger and all required QC documentation. This includes all documentation requirements specified in the RMS 360. If non-conformances are found, a Deficiency Report will be initiated by MassDOT in accordance with Section 2.9 of the Technical Provisions.

10.5 SUPERVISION AND CONSTRUCTION PROCEDURES

The Design-Builder shall take all reasonable precautions and be solely responsible for the safety of, and shall provide protection to prevent damage, injury or loss to: (a) all employees of the Design-Builder and its Subcontractors performing the Work and other persons who are on site or would reasonably be expected to be affected by the Work; (b) the Work and materials and equipment to be incorporated therein; and (c) all other property on, adjacent to, or near the Right-of-Way.

The Design-Builder shall provide adequate security for the site and shall be responsible for damage or loss to all property at the site.

The Design-Builder shall provide appropriate security for MassDOT designated/approved staging areas and shall be responsible for damage or loss to all property at the site owned by the Design-Builder, MassDOT or any other Person which results from Work or is directly related to the Design-Builder's actions.

The Design-Builder shall be solely responsible for the safety and security of the work zone, including the installation and maintenance of perimeter controls such as fences and gates in areas that do not impact the traveled way. The Design-Builder shall not interfere with access into or through private property via existing entrances and pathways, and shall maintain alternative temporary accessible pedestrian detour routes, where applicable, at all times.

The Design-Builder shall ensure that all of its activities and the activities of its employees, agents, officers and Subcontractors and all other Persons for whom the Design-Builder may be legally or contractually responsible are undertaken in a manner that will minimize the effect on surrounding property and the public to the maximum extent practicable.

In the event of the Design-Builder's discovery of (a) any historic, archaeological or paleontological resources; or (b) any Differing Site Conditions, the Design-Builder shall immediately notify MassDOT verbally, to be followed immediately by written notification. The Design-Builder shall immediately stop work in and secure the area pending further instructions. In such event, MassDOT shall view the location within 48 hours of receipt of such notification and shall advise the Design-Builder at that time whether Work may be resumed or whether further investigation is required.

In the event of the Design-Builder's discovery of any remains that appear to be human, the Design-Builder shall immediately suspend work, secure the area, and verbally notify the Plymouth Medical Examiner's Office and MassDOT. If the remains are determined to be human and are judged to be more than 100 years old, MassDOT shall notify the State Archaeologist and arrange for a site visit. The Design-Builder shall not resume work in the affected area until so directed by MassDOT.

MassDOT shall promptly conduct further investigations as deemed appropriate. MassDOT shall use reasonable efforts to determine within five (5) business days after receipt of such notification whether the resource or condition falls within the scope of causes (a) or (b) of the preceding paragraph and shall immediately notify the Design-Builder of its determination once made. MassDOT shall at that time also advise the Design-Builder of any action to be taken regarding the situation. (If a threatened or endangered species, or archaeological or paleontological or historic resource is present, the notice shall also advise the Design-Builder what course of action MassDOT intends to take with respect thereto and whether the location shall be fenced off or whether Work may resume.)

MassDOT shall have the right to require the Design-Builder to recommence Work in the area at any time, even though an investigation may be on-going. The Design-Builder shall promptly recommence Work in the area upon receipt of notification from MassDOT to do so.

Notwithstanding the foregoing, the Design-Builder shall not be obligated to stop Work upon discovery of (a) any resources or conditions which the RFP documents indicate are present in the location in question, or (b) where the Design-Builder can take actions pertaining to the resources or conditions permitted under the terms of a Government Approval. The Design-Builder shall provide prompt notice to MassDOT of any such discovery.

10.6 COMMENCEMENT OF CONSTRUCTION

The Design-Builder shall not commence construction of any portion of the Project prior to occurrence of all the following events except with the prior written approval of MassDOT:

- MassDOT shall have approved or accepted: (i) the Hazardous Materials Management Plan when planned construction involves or may involve contact with Hazardous Materials,; (ii) the Project Schedule; and (iii) the Design related to that portion of the Project; (iv) any applicable construction means and methods as required; (v) the Project Quality Management Plan (QMP) and all relevant Quality Control Plans; and (vi) the Project Management Plan; (vii) Construction Staging Plans including a designated truck route and employee parking areas; (viii) Noise Control Plans; and (ix) Dust Control Plans.
- All Governmental Approvals necessary for construction of the applicable portion of the Project shall have been obtained and all conditions of such Governmental Approvals which are a prerequisite to commencement of such construction shall have been performed.
- All required insurance and bonds shall remain in full force and effect.
- The Design-Builder shall have completed all required investigations to establish and confirm the existence and location of Utilities in such portion of the Project.

- All rights of entry or other approvals are obtained as necessary in order to permit the Design-Builder to enter into physical possession of the property upon which the Project will be constructed.
- All required Pre-Construction meetings have been held.
- The Design-Builder has posted a sign at the job site that clearly provides the following information to the general public: MassDOT job name, MassDOT contract number, name of Design-Builder with contact telephone number for members of the public. The telephone number shall be staffed at all times (24 hours per day, 7 days per week, 365 days per year) for the purposes of receiving questions and complaints.

Any Early Start of Construction shall be at the sole and complete risk of the Design-Builder, and any changes, reconstruction, removals and schedule delays required for compliance with the final approved Design Documents shall be at the Design-Builder's sole cost and expense. If the accepted Design Documents for the Project require changes to the Work previously performed, the Design-Builder shall make such changes to the Work at its sole cost and expense, and with no Contract time extension.

10.6.1 Construction Monitoring Plans

The Design-Builder shall be responsible for preparing a construction monitoring plan to monitor vibration, accelerations, vertical settlement, damage, and lateral movement of existing substructures and adjacent ground, temporary excavation support systems and adjacent ground, and existing structures and infrastructures during construction including the existing bridges, ancillary structures and infrastructure. The Design-Builder shall be responsible for the implementation of its construction monitoring plan prior to commencing Stage 1 of the BTC. Refer to Section 4.11.8 Geotechnical Instrumentation and Monitoring.

The Design-Builder’s construction monitoring plan shall include details on the proposed instrumentation, monitoring frequency, threshold values of monitored parameters, and describe the response plan that will be implemented if threshold parameters are exceeded. The construction monitoring system shall be in good working condition, and if damaged, repairable to good working condition such that there is minimal disruption to monitoring capabilities. The design and distribution of instrumentation within the Working Plan shall demonstrate an understanding of the need, purpose, and application of each proposed type. The Design-Builder shall provide, install, and monitor instrumentation during and after construction.

During staged demolition of the existing structures and installation of support of excavation systems, the Design-Builder shall provide daily Construction Instrumentation Monitoring Reports to MassDOT including interpretation of data by the Design-Builder’s Lead Geotechnical Engineer. For all other times the Design-Builder shall provide weekly report for times with construction activities are performed. The daily and weekly reports shall include clear and explicit statements of exceedances of any pre-determined threshold value. Should any threshold values be exceeded, the Design-Builder shall verbally notify MassDOT immediately and take corrective action in accordance with the Response Plan where instrumentation data indicate adverse conditions.

Before installing any instrumentation, submit for MassDOT review and acceptance, the location of all monitoring points and a description of methods, equipment, materials and other details consistent with the above requirements.

10.6.2 Utility Protection Plan

The Design-Builder shall be responsible for preparing a utility monitoring plan to monitor vibration, vertical settlement, and lateral movement of the existing utilities throughout all phases of construction. The Design-Builder shall be responsible for the implementation of its utility monitoring plan prior to commencing Phase I of the BTC and any construction that may cause ground vibration.

10.7 HOUSEKEEPING AND MAINTENANCE OF RIGHT-OF-WAY

Throughout all phases of construction, including suspension of Work, and until Final Acceptance, the Design-Builder shall keep the Right-of-Way and work site clean and free from rubbish and debris.

The Design-Builder shall not discharge smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate applicable Environmental Laws or Governmental Approvals, and shall fully comply with BTC Special Provision Subitem No. 119.5: Noise Control and Special Provision Subitem No. 440.5: Dust Control as provided in Appendix C.

If the Design-Builder defaults or neglects to maintain the Project free from accumulation of waste and rubbish as set forth above or otherwise fails to comply with the use of site and clean-up procedures required by the RFP, and fails within a 24 hour period after receipt of oral notice, subsequently confirmed in writing, to commence and continue correction of such default or neglect with diligence and promptness, MassDOT may after such twenty-four (24) hour period, immediately, without prejudice to other remedies MassDOT may have, correct such deficiencies. In such case, MassDOT shall deduct from payments then or thereafter due the Design-Builder, the cost of correcting such deficiencies. If payments then or thereafter due to the Design-Builder are not sufficient to cover such amounts, the Design-Builder shall pay the difference to MassDOT on demand.

The Design-Builder shall be responsible for snow and ice removal within the work zone, staging areas, and construction access driveways. Snow removal in the active traveled way will continue to be performed by the entity performing such activities prior to the Contract.

The Design-Builder shall clean drainage structures and outlets receiving runoff from the Project limits throughout the duration of construction activities to ensure that pre-Contract drainage patterns are preserved.

10.8 INSPECTION AND MAINTENANCE OF NEW/TEMPORARY BRIDGE STRUCTURES

The Design-Builder shall be responsible for inspection and maintenance of all new and temporary structures within the project limits until Final Acceptance.

The Design-Builder shall also coordinate and allow access for MassDOT NBIS inspections following staged construction phases once those portions of the new structure are open to traffic as well as following the overall completion of the bridge construction.

10.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

The Design-Builder shall protect existing features to be retained within the limits of the work shown on the BTC and shall not cause damage or injury to any property beyond those limits. If the Design-Builder causes damage or injury to areas beyond those limits, the Design-Builder shall restore any damaged or injured property to a condition similar or equal to that existing before the damage or injury occurred. The repairing, restoring, rebuilding, or making good such damage or injury shall be at no additional cost to MassDOT. The Design-Builder shall identify the limit of work line on the final design plans.

Should the Design-Builder significantly alter the tree line along residential areas beyond what is shown on the BTC they shall propose and install a landscape restoration plan that provides for a similar level of screening. This plan shall be reviewed and accepted by MassDOT prior to implementation.

10.10 ENVIRONMENTAL CONSTRUCTION COMPLIANCE

The Design-Builder is solely responsible for compliance with any Environmental Approvals or approvals applicable to the Project as provided by MassDOT, or as amended or obtained by the Design-Builder.

Prior to the commencement of work, the Design-Builder shall identify and flag the edge of all resource areas located within 50 feet of the estimated limits of work. The Design-Builder shall also delineate the limits of work as included in the Environmental Approvals obtained by or on behalf of MassDOT. Such limits shall be re-delineated as permit amendments are secured.

Prior to any site activity including site preparation or clearing, the Design-Builder shall attend a preconstruction meeting with MassDOT and applicable regulatory agencies.

The Design-Builder shall comply with BTC Special Provisions Subitems119.5 and 440.5 for Noise Control and Dust Control, respectively, as provided in Appendix C.

Upon completion of all work included in the Contract documents and prior to Final Acceptance, inclusive of mitigation designed and constructed by the Design-Builder, the Design-Builder shall submit to MassDOT:

- A written statement by a Professional Engineer registered in Massachusetts, certifying that the Project has been developed and constructed in accordance with the conditions of the Environmental Approvals and amendments.

10.11 MATERIAL ON SITE

The Design-Builder may use materials such as stone, gravel, sand or other materials found in excavations within the area of construction within the state highway layout within the Limits of Work of the BTC if such material conforms to MassDOT Specification requirements. Sufficient samples shall be taken to ensure uniformity and continued compliance with previously submitted testing reports as material gradation and quality can vary significantly within a given natural deposit. Material which is excavated and does not meet specification shall be removed as excess material from the Right-of-Way and disposed of off-site by the Design-Builder at no cost to MassDOT.

10.12 NON-CONFORMING WORK

Non-conforming Work is Work that MassDOT determines does not conform to the requirements of the Contract Documents. Non-conforming Work shall be removed and replaced so as to be in conformity with the requirements of the Contract Documents, at the Design-Builder's expense, and the Design-Builder shall take all action necessary to prevent similar deficiencies from occurring in the future. The fact that MassDOT may not have discovered the Non-conforming Work shall not constitute acceptance of the Non-conforming Work. If the Design-Builder fails to correct (or begin correction of) the Non-conforming Work within ten (10) days of receipt of notice from MassDOT requesting correction, MassDOT may cause the Non-conforming Work to be remedied or removed and replaced, and may deduct the cost of doing so from any moneys due or to become due to the Design-Builder and/or otherwise obtain reimbursement from the Design-Builder for such cost.

The Design-Builder shall be solely responsible for identifying, documenting, and reporting to MassDOT all instances of Work that have not been constructed with the absolute strictest adherence to the accepted/approved drawings and specifications. An NCR shall also be initiated by the Design-Builder if QMP and quality related processes are not followed. The Design-Builder is responsible for coordinating with MassDOT on test results so that they have current information. The Design-Builder will report in the form of a Non-Conformance Report (NCR), which shall be submitted to MassDOT in writing within 24 hours. A copy of the NCR shall be simultaneously sent to the Design-Builder's Design Engineer.

The NCR shall clearly describe the element of Work that is non-conforming and the reason for the non-conformance. The NCR shall further address steps to be taken to ensure that the particular nonconformance is not repeated. The Design-Builder's Design Engineer of Record for the Work shall evaluate the effect of the non-conformance on performance, safety and life of the Project and its elements. If remedial actions are necessary, they shall be documented and bear the stamp of a Registered Professional Engineer in the Commonwealth of Massachusetts. The Design-Builder's Construction QC Manager must also sign off on the NCR stating that the remedial actions to be employed have undergone the appropriate level of QC review.

The Design-Builder shall maintain a log of all NCRs and submit this log to MassDOT and the Construction QC Manager on a bi-weekly basis regardless of any status change. Each NCR shall be numbered sequentially, given a brief description, a status if it is not closed, and an expected date for closure. MassDOT will not grant final acceptance for any portion of the Work that has an outstanding NCR. All NCRs must be closed with a stamp of the Design-Builder's Professional Engineer registered in the Commonwealth of Massachusetts.

MassDOT shall have the authority to call for removal of any Non-conforming Work should MassDOT not agree with the remedial actions set forth by the Design-Builder in any given NCR. MassDOT shall also retain the right to write its own Deficiency Reports (DRs) based on the observance, sampling, and testing of the Work. MassDOT shall withhold payment related to DRs and DRs shall require the same review and ultimate closure by the Design-Builder as a Design-Builder-generated NCR. MassDOT reserves the right to make cost adjustments for work that, although not in conformance with specifications, is nevertheless satisfactory to remain in place.

10.13 SCHEDULING AND NOTICE TO OWNER

The Design-Builder shall notify MassDOT in writing at least five (5) business days prior to commencing planned construction activities, including fabrication, to allow MassDOT to schedule its resources. In addition, the Design-Builder shall notify MassDOT in writing by Friday noon of all scheduled construction activities for the following week.

10.14 DOCUMENTATION

During performance of the Work, the Design-Builder shall collect and preserve the following data in written form acceptable to MassDOT:

- Daily manpower and equipment reports for the Design-Builder and each Subcontractor for construction-related activities.
- Daily occurrence logs for construction-related activities maintained by the Design-Builder's Project executive or his designee(s), in which shall be recorded daily in narrative form all significant occurrences on the Project, including (i) weather; (ii) asserted Force Majeure events; (iii) events and conditions causing or threatening to cause any significant delay or disruption or interference with the progress of the Work; (iv) significant injuries to person or property; (v) a listing of each activity depicted on the current Project Schedule status submittal which is being actively prosecuted; and (vi) a daily record of all labor, materials and equipment expenses which are being incurred. For any local agency betterments or utility-related Work such data shall be maintained separately for each local agency or Utility. For Hazardous Materials Management, such data shall be maintained separately for each site. If it becomes necessary to progress Work for which an Extra Work Order has not been executed or that may be the subject of a future claim, the Design-Builder shall identify this Work on separate daily occurrence logs.
- Quality records documenting all Quality Control operations, inspections, activities, sampling and tests performed, including the work of Subcontractors (including Producers, Fabricators, and Manufacturers). Such records shall include any delays encountered and work that does not conform to the requirements of the RFP together with the corrective actions taken regarding such work. Material documentation, testing and acceptance are required prior to payment placed on an estimate for payment.
- Certifications and QC Reports.

The Design-Builder shall maintain and submit records weekly that include factual evidence that required activities and tests have been performed, including the following: (i) type, number, and results of Quality Control activities, including reviews, inspections, tests, audits, monitoring of work performance, and materials analysis; (ii) related data such as qualifications of personnel, procedures, and equipment and qualified testing laboratory used; (iii) the inspector or data recorder, the type of test or observation employed, the results and the acceptability of the work and action taken in connection with deficiencies; (iv) nature of non-conforming work and causes for rejection; (v) proposed corrective action; (vi) corrective actions taken; and (vii) sampling and test results of corrective actions.

A Construction "Materials & Workmanship Quality Certificate" and any related quality documentation shall be submitted at completion of all work with the As-Built plans and signed by the Design-Builder's Construction QC Manager and Quality Control Administrator, indicating that all materials and workmanship incorporated in the Facility conform to RFP and Contract requirements.

10.15 CONSTRUCTION PROCEDURES

The Design-Builder shall consult with MassDOT and all other applicable agencies that may require review of construction procedures, and shall coordinate the preparation, submittal and review of all construction procedures. Where permits are required from Utilities, or other local agencies, construction procedures shall be submitted to them for review and approval in accordance with their requirements.

Construction procedure drawings (such as erection plans, demolition plans, temporary support of excavation, grouting and others as deemed necessary as the work progresses) that have the potential to affect public safety shall be reviewed and approved by the Design-Builder's Design Engineer (Major Participant Lead Engineering Design Firm) and these submittals shall follow the same QC process established in the approved QMP. These approved construction procedures will be submitted to MassDOT for review and acceptance.

The Design-Builder shall include these construction procedures in their Master Submittal list. MassDOT shall use this list to determine the required reviewers. This list shall be updated periodically by the Design-Builder as the work progresses and submissions are broken up to support Early Release for Construction and resubmitted to MassDOT to determine the required reviewers.

10.16 SHOP DRAWINGS

Shop Drawings for the permanent Work shall include, but not be limited to structural steel fabrication plans, precast concrete fabrication plans, bearing fabrication plans, abutment rehabilitation plans, concrete reinforcing plans, anchor bolt layouts, shop details, erection plans, equipment lists and any other information specifically required by the Standard Specifications for Highways and Bridges, 2024 Edition, Special Provisions, or local agencies. The Shop Drawings shall be reviewed and approved by the Design-Builder's design engineers who prepare the Design Documents and shall follow the same QC process established in the approved QMP.

Structural steel Shop Drawings shall include complete details for fabrication, camber, erection, and shop assembly of members and details, schedules, procedures, special erection equipment, and diagrams showing the sequence of erection. They shall include details of cuts, connections, camber, Charpy values, FCM designations, holes, and other pertinent data. Welds shall be indicated by standard AWS symbols; and the size, length, type, and testing of each weld shall be shown.

The Design-Builder shall obtain all necessary approvals for Shop Drawings for fabrication and said approvals along with copies of all approved drawings shall be provided to MassDOT three (3) business days prior to the start of Work detailed by the drawings. Incomplete packages shall be returned to the Design-Builder for resubmission. Fabrication may not proceed until resubmission to MassDOT. The Design-Builder must include a Table of Contents for all shop and working drawings on the transmittals and Shop Drawings submitted to MassDOT. Any changes to Shop Drawings must be approved by the Engineer of Record and clearly indicated on the Shop Drawings prior to transmitting to MassDOT. Only the most current Shop Drawing shall be posted on MassDOT's SharePoint ®.

10.17 OPERATION AND MAINTENANCE MANUALS

[**THIS SECTION NOT APPLICABLE**]

10.18 AS-BUILT RECORD DRAWINGS

As a condition to Final Acceptance, the Design-Builder shall provide to MassDOT the Project's as-built Record Drawings consisting of files of electronic pdf images created from within AutoCAD, containing layer information, in accordance with current MassDOT CAD Standards and provide each Highway and Bridge Title Sheet that includes the signature blocks for MassDOT final project acceptance in accordance with the MassDOT Engineering Directive E-21-004. The Design-Builder shall also provide two (2) full size hard copy sets, and the 3-D electronic drawing files of final plans (Record Documents). The Record Drawings shall depict the final completed Project, including all changes with all of the relevant data showing drainage systems, underground utilities, traffic controls, signing placement, highway alignment and grade revisions, and bridge detail changes. Previous design packages that were issued as portions of the overall project design in order to support milestones shall be combined and organized in conformance with MassDOT Standards. Design Change Notices shall be included without previous revision notation as these are considered coordinated project design. The Record Drawings shall be reissued, restamped, and dated by the respective Record Designers. Field Design Change Notices may continue to include revision notations showing the changes from what was issued for construction in order to document any non-conforming work or changed field condition that necessitated the change. Changes that warrant as-built documentation, but which have not been previously issued as a Design Change Notice or a Field Design Change during construction shall be certified by the Design-Builder and issued as a final "As-Built Revision". The Design-Builder shall also provide other relevant Project data such as bridge shop plans, boring logs, and pile driving records in hard copy sets as well as electronic files for archiving as stipulated in relevant provisions of the MassDOT Standards Specifications for Highway and Bridges, 2024 Edition.

- All Record Drawings shall be consistent with MassDOT Standards, the requirements of the conditions of the Project permits, and as further defined above. Operation and maintenance manuals and instructions shall be provided for all systems and equipment.
- As-built foundation data which differs from the original design shall be revised on the final plans. This shall include information such as additional piles or shafts, changes in diameter, tip elevation, or bottom of footing elevation.
- An additional pdf copy of the As-Built drawings shall also be sent to the affected utility companies. See PUC Form provided in Appendix C for contact information.

- In addition to the As-Built Drainage System File referenced above, provide a GIS Layered Drainage Atlas Map that will follow existing drainage symbology that has been established by MassDOT. See Appendix C.

As-Built Drawings will be compensated as part of a fixed price under Item 900.9:

Payment Items

900.9	PUNCHLIST AS-BUILT REQUIREMENTS FIXED PRICE	LUMP SUM

10.19 AS-BUILT BRIDGE STRUCTURE RATING REPORTS

As a condition of Final Acceptance, the Design-Builder shall provide to MassDOT a Structure Rating Report establishing the load carrying capacities for each bridge. These reports shall be prepared by a Professional Engineer registered in the Commonwealth of Massachusetts in full compliance with the requirements of Chapter 7 of the Massachusetts Department of Transportation LRFD Bridge Manual. Per the LRFD Bridge Manual Section 3.1.4.3, rating calculations are required for the Final Design Submission and shall analyze the proposed structures during each stage of construction. The bridges may be opened to traffic after these calculations are accepted and the construction is complete and accepted. The full rating reports shall be prepared and submitted after the Initial Inventory Inspection has been performed.

10.20 CONTINGENCY PLANNING

- The Design-Builder shall develop contingency plans for potential problems that may arise during construction that will have an effect on the overall progress schedule. The plans shall be prepared by an emergency response specialist familiar with bridge construction and shall include, but not be limited to the following:
- Poor or severe weather forecast that may impact operations
- Equipment breakdowns, malfunctions or failure, including sufficient additional equipment, parts, supplies, operators and power sources
- Incident involving delivery of material
- Accident within Project limits.
- Accident involving delivery of girders or precast concrete elements resulting in damaged units
- Traffic Management plan implementation equipment breakdown or staff non-responsiveness
- Contingency schedule and plan should delivery of necessary materials be delayed or are missing.
- Preliminary contingency plans shall be submitted as part of the technical proposal. More detailed contingency plans shall be developed for acceptance in advance of the associated phase of work.

- Incident within the Project limits, including on Route 6 (as it may impact construction operations) and all associated roadways.
- Obstructions encountered within excavations.
- Emergency Repairs to the existing structure.
- Emergency Repairs to Utility Infrastructure.
- Incident management staging, equipment and response plan for incidents within the Project limits.
- Homeland security threats to the Project or the area that may impact continuity of operations including an evacuation plan.
- Any event that may require altering construction conditions or roadway configurations

Plans should be all-hazards in nature but should also be narrowly tailored and specific to hazards identified that could impact the Project, and should consider critical assets or infrastructure in the area, geographic terrain, abutting entities and properties, and/or environmental concerns in the area. Plans should be developed with the involvement of multiple stakeholders, including but not limited to management staff of the Highway Operations Center, relevant District personnel, public safety and life safety first responders, and other interests. The plans should detail multi-disciplinary actions to be taken throughout the course of an incident from detection to recovery. Plans should also be reviewed with all stakeholders in an appropriate training or exercise forum prior to project commencement of the associated phase of work.

10.21 CONSTRUCTION DIGITAL RECORDING

10.21.1 Time Lapse Videography

MassDOT desires time lapse documentation of the project. The Design-Builder shall be responsible for the development of coordinating, shooting, and producing a short time-lapse movie documenting the replacement of all bridges, conforming to the following minimum requirements:

1. Separate camera coverage of each bridge shall be provided unless the Design-Builder can demonstrate to MassDOT's satisfaction that a single camera location can adequately capture construction on both bridges simultaneously.
2. High definition (1080i or 1080p) color, still photos shall be taken every day at noon throughout the duration of construction. A sufficient number of images shall be taken each day to mitigate any error that may occur in a given photo.
3. Time lapse Digital Video, in high definition 1080p color at sufficiently high resolution to achieve same. The finished video time shall be compressed as required by MassDOT.

4. Images for the movie shall be shot from a fixed location which will be able to show the entire work area as approved by MassDOT. The location shall be identified by the Design-Builder and approved by MassDOT. MassDOT reserves the right to require test images from the proposed location
5. The images shall be taken every two minutes for the periods of significant activity as directed by MassDOT.
6. The images may be taken every 30 minutes for all other periods of construction. The use of a standard two-minute interval for all periods is also acceptable.
7. The final video shall be a total length of approximately two minutes per major project element. Scene changes may be used to omit periods of inactivity provided that the video identifies the facts such as:
    a. The introduction of the video should note periods of inactivity.
    b. Each scene change should identify the start and stop date of the scene.
8. The equipment utilized shall be sufficiently robust both physically and electronically to assure quality images. The equipment shall have the capabilities to clearly record the activities regardless of the site conditions, including but not limited to, extreme temperature changes, vibration, lighting conditions, weather cycles and other site factors.
9. The equipment shall be maintained throughout the duration to assure capture of the required information.
10. 3 DVD copies of the finished movies shall be prepared and submitted. MassDOT will retain ownership and all rights to the video. The video shall be non-copyrighted and not copy protected.
11. The movie shall be free of logos, copy rights, trademarks or any other identifying marks not indicated above.

10.21.2 Camera and Internet Requirements

The Design-Builder shall provide live color time-lapse photography which will be available for always viewing by MassDOT via the internet.

The Design-Builder shall locate cameras for time lapse photography in fixed locations as needed to sufficiently show the project site. The cameras shall be placed so that they capture all work. Time lapse photography feeds shall be available for always viewing via the internet by MassDOT.

The Design-Builder will provide MassDOT with the means to watch all video and time-lapse feeds at one time. All video and time-lapse photography will be available for MassDOT to download and use at any time during the Project. All photographs and video will be the property of MassDOT.

If an account is needed in order to view the photograph and video feeds, the Design-Builder will provide MassDOT with no fewer than 20 accounts.

10.22 DIGITAL CONSTRUCTION DOCUMENTS

After acceptance, all final Project Documents, including the documents listed in Section 1.1.10 shall be submitted to MassDOT via the Electronic Document Management Methodology (EDMM) as a searchable PDF, with embedded two-way links between associated design drawings and details, working drawings and details, Shop Drawings, other submittals, Requests for Information (RFIs), etc. as applicable.

10.22.1 Accessible Electronic Deliverable Requirements

The Design-Builder is required to provide accessible electronic deliverables. For purposes of this provision "accessible" shall be construed to mean accessible and usable by people with disabilities, including use with assistive technologies. For the purposes of this provision, the term "electronic deliverables" includes, but is not limited to any or all of the following: pamphlets, presentations, specifications, cost estimates, studies, reports, web pages and applications.

Deliverables, or components thereof, such as plans, drawings, schedules, field notes, measurements or calculations that cannot reasonably be made accessible will be exempt from these requirements, subject to review and approval by MassDOT. Conformance with the following standards ("Accessibility Standards") is required to ensure accessibility of electronic deliverables:

Web Content Accessibility Guidelines (WCAG) 2.0 Level AA -- http://www.w3.org/TR/WCAG20/ and when applicable

Enterprise IT Accessibility Standards -- https://www.mass.gov/guides/enterprise-it-accessibility-standards

Prior to delivery, the Design-Builder is responsible for confirming deliverable compliance with the Accessible Electronic Deliverable Requirements (see Guidelines for Consultant/Contractor Accessible Electronic Deliverable Creation provided in Appendix C). The Design-Builder shall be responsible for curing each instance of non-conformance identified by MassDOT with the foregoing accessibility requirements at no additional cost.

10.23 FINAL CLEAN-UP

As a prerequisite to Final Acceptance of the Project by MassDOT, the Design-Builder shall remove and dispose of all debris, excess materials, temporary structures, and construction equipment from the Right-of-Way and all parts of the Project shall be left in a neat and presentable condition.

SECTION 11.0: PARTNERING

MassDOT intends to encourage the foundation of a cohesive partnership with the Design-Builder and its Subcontractors. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives include effective and efficient Contract performance and completion within budget, on schedule, and in accordance with the Contract Documents.

This partnership will be bilateral in makeup and participation will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by both parties and will be shared equally with no change in Contract price. The Design-Builder shall pay all costs and submit paid invoices to MassDOT for 50% reimbursement. It is anticipated that the beginning phase of the work will include some education and training in the Partnering process. This will be followed by a team-building workshop attended by the Design-Builder's key on-site staff and Department personnel. Follow-up workshops should be held periodically throughout the duration of the Contract as agreed to by the Design-Builder and MassDOT.

An integral aspect of partnering is the resolution of issues in a timely, professional, and non-adversarial manner and in accordance with the Contract Documents. See Partnering Documents in Appendix E for additional information and guidance.

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