COPY 1 OF 10

technical proposal

VERMONT AGENCY OF TRANSPORTATION

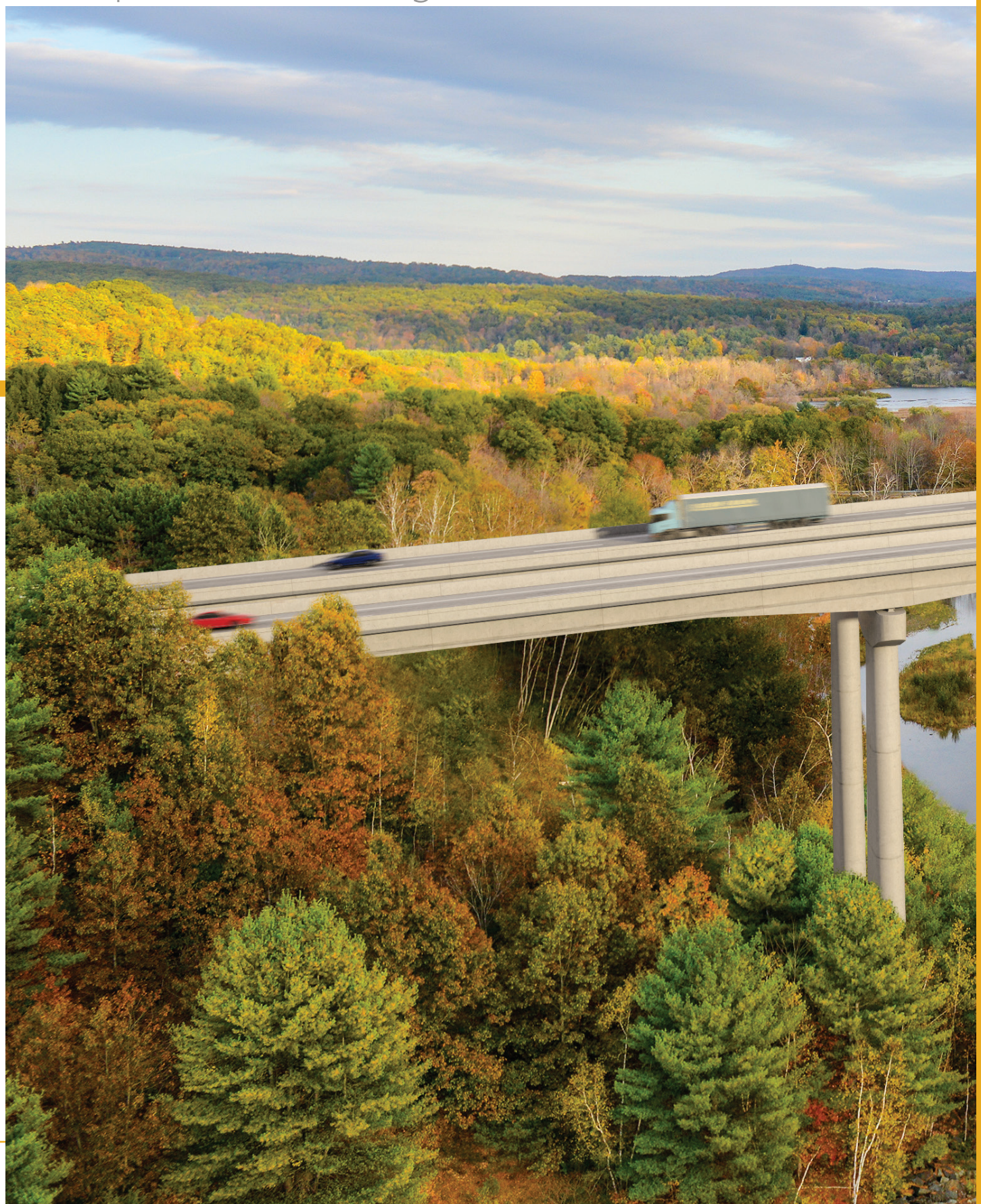
PROJECT NO. ROCKINGHAM IM 091-1(66) DESIGN BUILD

REED & REED

HDR

March 2016

TAB 5.1.3 Acknowledgement of Receipt of RFP Changes



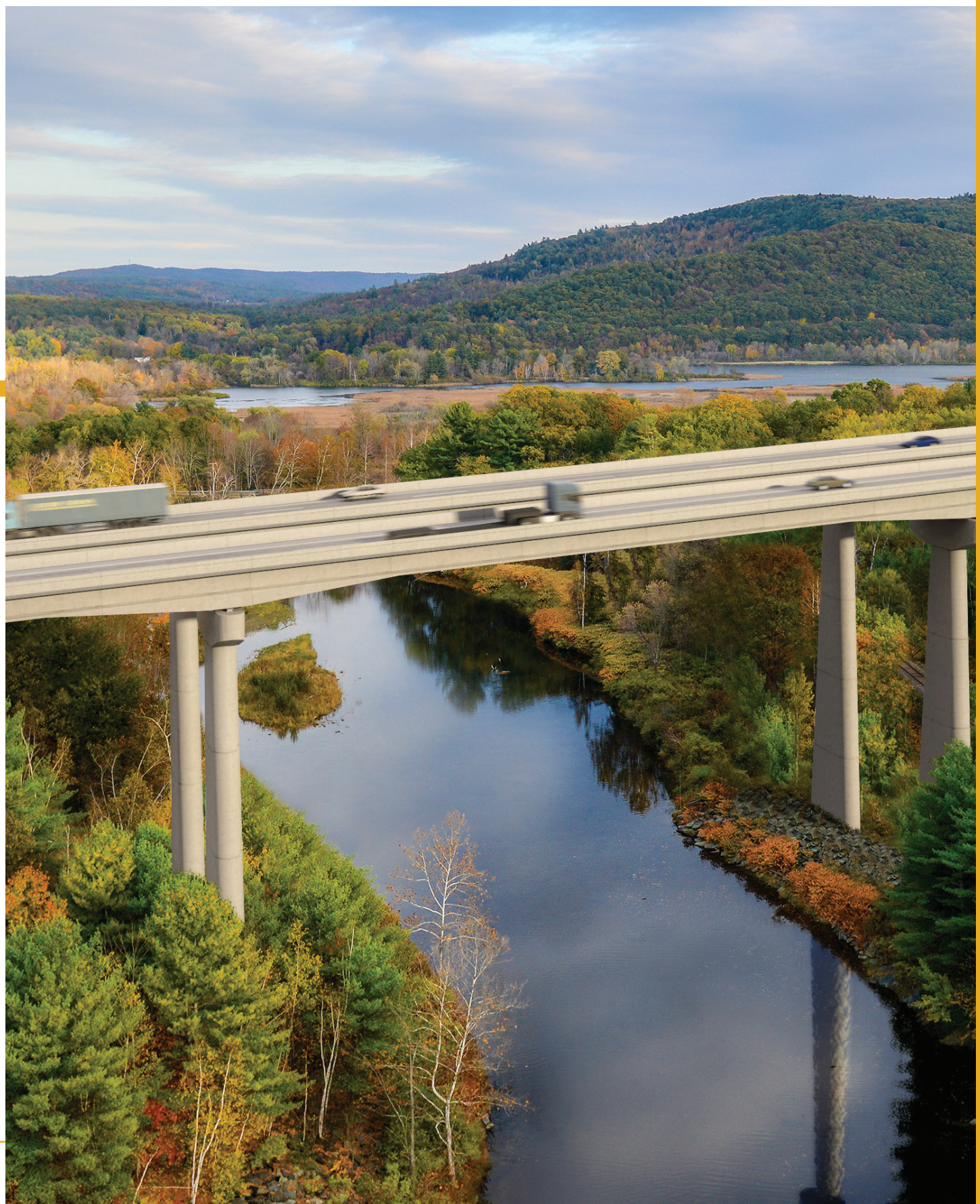
5.1.3 Acknowledgement of Receipt of RFP Changes

Reed & Reed acknowledges the following RFP Changes:

- RFP Change No. 1 Dated November 23, 2015
- RFP Change No. 2 Dated January 6, 2015
- RFP Change No. 3 Dated February 8, 2016
- RFP Change No. 4 Dated February 23, 2016

This Page Left Intentionally Blank

TAB 5.1.4 Letter of Submittal



REED & REED

P.O. Box 370, Woolwich, ME 04579 Tel: 207.443.9747 Fax: 207.443.2792 www.reed-reed.com

5.1.4 Letter of Submittal

March 16, 2016

Molly Perrigo, Specifications Coordinator
Vermont Agency of Transportation
Contract Administration, Second Floor Room 219
1 National Life Drive
Montpelier, VT 05633-5001

RE: Request for Proposals

A DESIGN-BUILD PROJECT
I-91 Bridge Improvements - Bridges 24N &24S
Town of Rockingham, Vermont
Project No.: Rockingham IM 091-1(66)

Dear Ms. Perrigo:

The Design-Build Team of Reed & Reed, Inc. (R&R) in association with HDR Engineering, Inc. (HDR) (**R&R Team**) is pleased to submit our Technical Proposal to the Vermont Agency of Transportation (VTrans) for the I-91 Bridge Improvements Project in Rockingham. R&R has assembled a team with the knowledge, experience, and dedication to make this project a success for VTrans and the various stakeholders.

R&R will be the contracting entity for our Design-Build (D-B) Team,and the following person has been designated as our official representative, point of contact and **D-B Project Manager**:

Mark Buckbee, PE – Director, Bridge and Marine
Reed & Reed, Inc.
P.O.Box 370
Woolwich, ME 04579
Phone: (207) 443-9747
Fax: (207) 443-2792
mbuckbee@reed-reed.com

HDR will direct the design out of their Boston, MA office. **Charles Swanson, PE**, a proven project manager with experience on D-B projects and who has worked successfully with VTrans throughout his career, will serve as the **Design Manager**. The design team assembled for this project offers proven, successful D-B experience and significant complex bridge design and construction experience.

Executive Summary

The R&R Team will approach the final design and construction of the Rockingham 24N & 24S Bridges in the same effective and successful manner that we implemented to develop the Team's approved Alternative Technical Concept (ATC) and this Technical Proposal, which were the result of establishing and adhering to our mission objectives:

R&R Team's Mission Statement

- ***Employ Effective Collaboration and Coordination within R&R Team and VTrans***
- ***Implement a Simple and Cost-Effective Design and Construction Approach***
- ***Exceed VTrans' 100-year Service Life Requirement for the Bridges***
- ***Reduce Life Cycle and Maintenance Costs***
- ***Reduce Environmental Impacts***
- ***Emphasize and Achieve Quality in Design and Construction***
- ***Reduce Schedule Duration and Develop Successful Recovery Plans***
- ***Successful Outreach and Transportation Management***

To illustrate the above principles, the following describes the collaborative approach we used to select the ATC bridge type.

Four alternatives were selected for further evaluation that met or exceeded VTrans requirements and the BTC. During this evaluation, the R&R Team continuously collaborated and coordinated on project elements related to construction, access, bridge, highway, traffic management, geotechnical and environmental commitments; and R&R Team members provided appropriate input relative to their disciplines and the above criteria. The R&R Team then developed pros and cons for each alternative considering, among other factors, durability and 100-Year Service Life, simple and effective design and construction, ease of maintenance, schedule, number of piers/bridge, number of bearings, elimination of joints, impacts to the railroad, traffic management and environmental permitting. Our thorough and coordinated evaluation led to the elimination of two of the alternatives.

The two remaining alternatives, twin structures consisting of spliced post-tensioned precast concrete girders or precast concrete segmental box girders, were presented at the VTrans Conceptual ATC meetings. The R&R Team then continued our evaluation of the two alternatives, incorporating VTrans' valuable input. As a result of the collaboration, coordination, design development and cost evaluation

by the R&R Team, the post-tensioned precast concrete girder alternative was the R&R Team's final ATC recommendation submitted to and approved by VTrans.

Approach to Design of the Technical Concept
The key to R&R Team's successful design approach was the effective coordination and active participation of R&R, HDR, and VTrans throughout design development. The highlights of our design solution include:

- Post-tensioned, precast concrete spliced girder structure with five girder lines per bridge
- 4-span layout optimizes span lengths and minimizes crane lifts and simplifies transportation
- Piers consist of single pier bents on pile foundations or spread footings with hammerhead caps
- Abutments are placed at the top of existing slopes to minimize earth excavation and backfill
- Maintenance free elastomeric bearings
- Two expansion joints per bridge that eliminate maintenance of intermediate joints
- Design and construction of bridges that exceeds the 100-Year Service Life Requirement

Our design solution is simple to design and to construct compared to the BTC. **Our simplicity results in: a lower total project cost; a shorter timeframe to construct; reduced effort to conduct design and construction QC; and substantially reduced project risk to VTrans.**

Approach to Construction of the Technical Concept
The key to R&R's approach to construction lies with the coordination and active participation of HDR, R&R, and VTrans. Our goal is to simplify construction, minimize traffic impacts, and mitigate or avoid construction-related project risks. The highlights of our construction approach include:

- Self-performing 90% of the work activities including all piling, erection, post tensioning & grouting, and forming and placing all concrete elements
- Providing site access via the ROW from Golden Hill Road and existing NB and SB traffic lanes
- Utilizing night-time, short-duration I-91 lane closures to offload concrete girders
- Reducing deck maintenance by taking the NB bridge out of service shortly after work starts
- Designating a Railroad Coordinator to plan and work with the railroad
- Placing bridge concrete during traditional seasons and avoiding the winter months

Risk Evaluation
The R&R Team focused our entire design and construction solutions on mitigating and avoiding the risks that VTrans provided in the Risk Evaluation Matrix, and additional risks the R&R Team identified.

The project scope is significantly reduced by the selection of a spliced girder bridge constructed within the existing ROW. Utilizing a simple multi-girder structure versus a CIP segmental structure reduces nearly all of VTrans' identified project risks from design through construction.

Project cost risk is also decreased with the spliced girder bridge concept versus a CIP segmental bridge. Our analysis of estimated costs showed a significant cost advantage with selecting the spliced girders. Virtually every aspect of design and construction is simpler, less time consuming and labor intensive; efficiencies that translate to real cost savings to VTrans in design reviews and construction inspections.

Project schedule risk is also reduced. The project schedule can be optimized to allow construction to proceed in the most weather-friendly months. The spliced precast girders will be cast offsite and are, therefore, not on the schedule critical path. Further risk mitigation is realized by constructing within the existing ROW and avoiding the risks inherent in the permitting process.

Environmental Commitments
The R&R Team and our **Environmental Commitments Officer (ECO), Matt Montgomery**, are committed to avoid, minimize, and mitigate impacts to environmental resources during all phases. Matt offers tremendous experience working on D-B projects for VTrans including the Milton and Brattleboro bridge projects. This knowledge and experience will ensure a smooth process and minimize risk to the project schedule and to VTrans. We will also:

- Establish and maintain an Environmental Commitments Database
- Host regulatory coordination meetings

Transportation Management
The R&R Team's Transportation Management sub-consultant, **Sebago Technics, led by Steve Sawyer**, has created a TMP framework that fits our construction plan with the objective of minimizing highway traffic delays and impacts. Key elements include:

- **Keeping Exit 6 NB On-Ramp open throughout the construction** to minimize impacts to the local citizenry
- No ramp closures in either direction for the project duration
- Queuing advance traveler information trailers at 2,000 and 5,000 feet upstream of the work zones
- Contingency plans for NB and SB traffic should a major incident occur within the work zone

Work Breakdown Structure
R&R's approach to our WBS is straightforward and logical; it provides a map the project will follow from project initiation to completion. The WBS forms the core of our approach. In other words, all of our planning and execution activities evolve from the WBS; the design, procurement, submittals, construction, QA/QC and closeout efforts are predicated on our WBS framework.

We have organized our WBS into four categories: Project Start-up; Project Design; Project Construction; and Project Completion. These are synchronized with our project schedule and align with major responsibilities and deliverables between R&R and HDR. In addition, we have: identified the organizations and individuals responsible for completing the tasks associated with each WBS Work Package; and assigned a Technical Challenge reference number that ties with the Risk Evaluation Matrix. Cross referencing to the associated risks will help the R&R Team and VTrans focus additional attention on those WBS activities that may have associated risks.

Proposal Schedule
Our proposed schedule shows a substantial completion date of November 15, 2019, **6 months ahead of the RFP requirements**. In addition, our schedule includes a significantly shorter time period, 11 fewer months, of traffic impact by construction operations.

Design Quality Management
The R&R Team has developed a comprehensive approach to Design QA/QC, for which HDR is responsible. Our keys to success focus on:

- Successfully integrating design and construction through constant communication and excellent document control
- Maintaining independence of QA and QC personnel and communication protocols
- Engaging the design professionals during field construction operations

Construction Quality Control
R&R's approach to **Construction QC will be led by Josh Marceau**, an experienced Construction QC Manager on design-build projects. R&R's differentiators in our approach to construction QC include:

- Josh's QC experience on design-build bridge projects and certifications (ACI and NETTCP)
- Formal Workmanship & Quality Training for field crews and refresher demonstrations
- A focus on pre-activity inspections that allow changes to materials/methods to minimize NCRs
- A commitment by R&R and Josh to interact and coordinate with the Resident Engineer and QAM on a daily basis

Public Relations Plan
The Public Relations Plan will be developed by **Stephanie Barrett, Public Relations Officer (PRO).** Her key to success is keeping the lines of communication open at all times.

Summary of Key Points and Strengths of the Reed & Reed Team

Values: The R&R and HDR team members share similar values; we truly believe and commit to being collaborative, inclusive and transparent in our interactions with VTrans and the Resident Engineer.
Resources: The R&R Team has resources available to staff and successfully complete this project.
Experience and Capabilities: Our team's extensive experience includes: long-span complex bridges; bridges with deep foundations; projects with successful public outreach efforts; permitting on Vermont transportation projects; and projects that implemented safe and efficient traffic control for VTrans. Our team has significant D-B project experience on projects in the Northeast and throughout the U.S.
Project Objective: Our objective is simple: deliver a safe and high quality construction project at a fair price and deliver it on schedule. Innovation, skilled labor, and utilizing the best means and methods are critical to our success.

The R&R Team, if selected, will enter into a contract with VTrans for the Project in accordance with the terms of this RFP.

The offer represented by the Proposal, due on March 16, 2016, will remain in full force and effect for 120 days after the date the Proposal is submitted to VTrans.

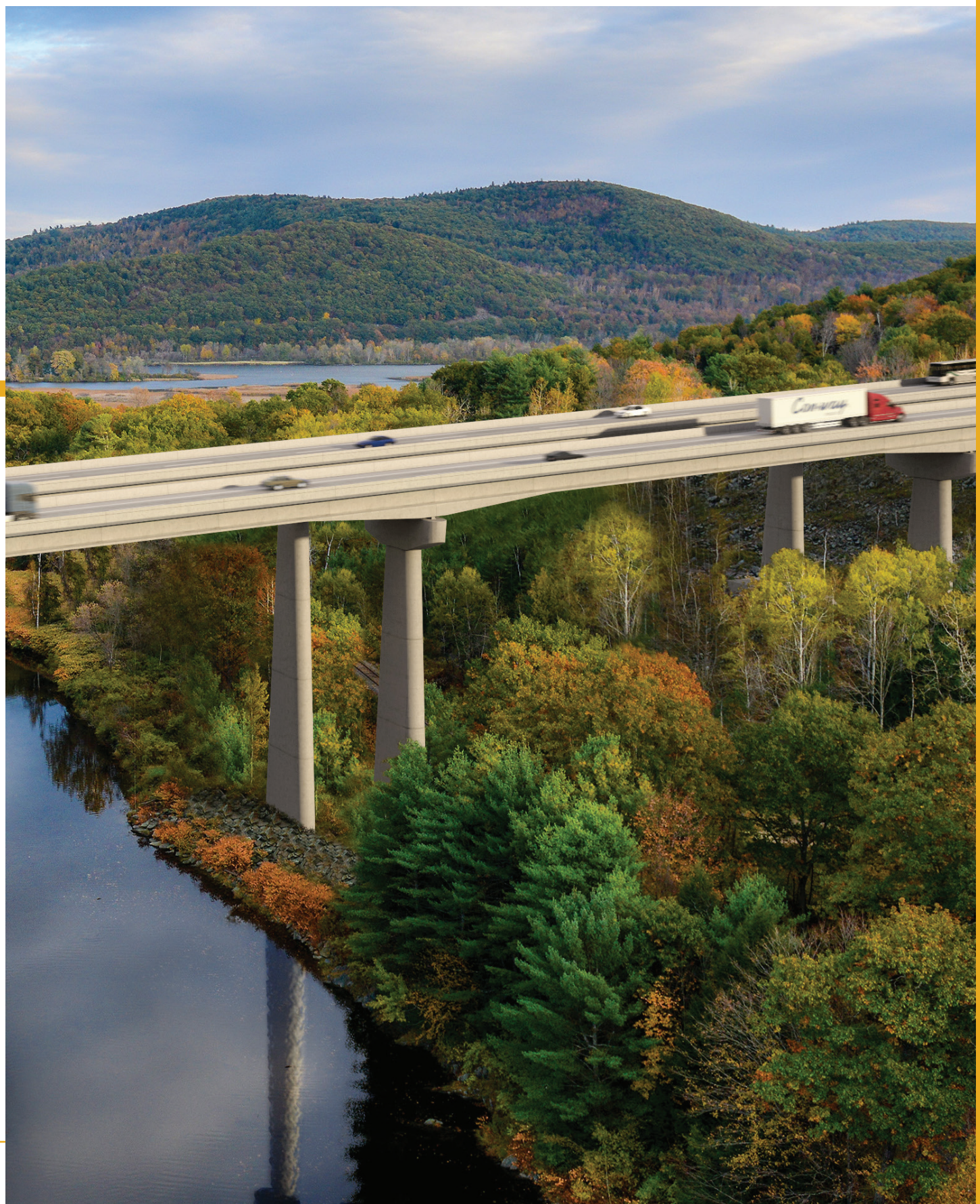
The R&R Team is priveleged to submit our Technical Proposal for this exciting project, and we look forward to your favorable review of our proposal.

Sincerely,

Jackson A. Parker
Reed & Reed, Inc,
President and CEO

Matthew Ryan
HDR Director of Operations, Northeast Region
Senior Vice President

TAB 5.1.5 ATC Documentation



State of Vermont
Agency of Transportation
1 National Life Drive
Montpelier, Vermont
05633-5001

VTrans

Working to Get You There

Contract Administration
Molly Perrigo, Alternative Contracting Specialist
Phone: (802) 828-6977
Fax: (802) 828-5545

NOTICE OF DETAILED ATC PROPOSALS RESPONSE

To: Reed & Reed, Inc./HDR Engineering Inc.

From: Molly Perrigo, Alternative Contracting Specialist

Date: February 19, 2016

Re: Rockingham IM 091-1(66) - Detailed Alternative Technical Concept (ATC) Proposal

Pursuant to Section 5.1.2.2 of the Request for Proposals for the above-referenced Vermont Agency of Transportation Design-Build Project (the "RFP") and based on review, the Detailed ATC submitted by your design-build team is hereby:

ATC: Detailed ATC #1 – Precast, post-tensioned, haunched, spliced concrete girders

Response: This ATC is approved. No additional information or submittals are required.

Comments: As a result of the Detailed ATC presentation and discussion, the following points of emphasis should be considered when incorporating this ATC into the Proposal.

- Schedule savings proposed in a Proposal become binding.
- Potential construction loads of concrete girders on existing bridge.
- Structures & Hydraulics Manuals provide guidance on bottom of footing elevations.
- Additional subsurface investigation
- Proximity of piers 2 & 3 to existing piers.

The Agency's approval of an Alternative Technical Concept does not relieve the Bidder from meeting all contract requirements listed as part of the RFP.

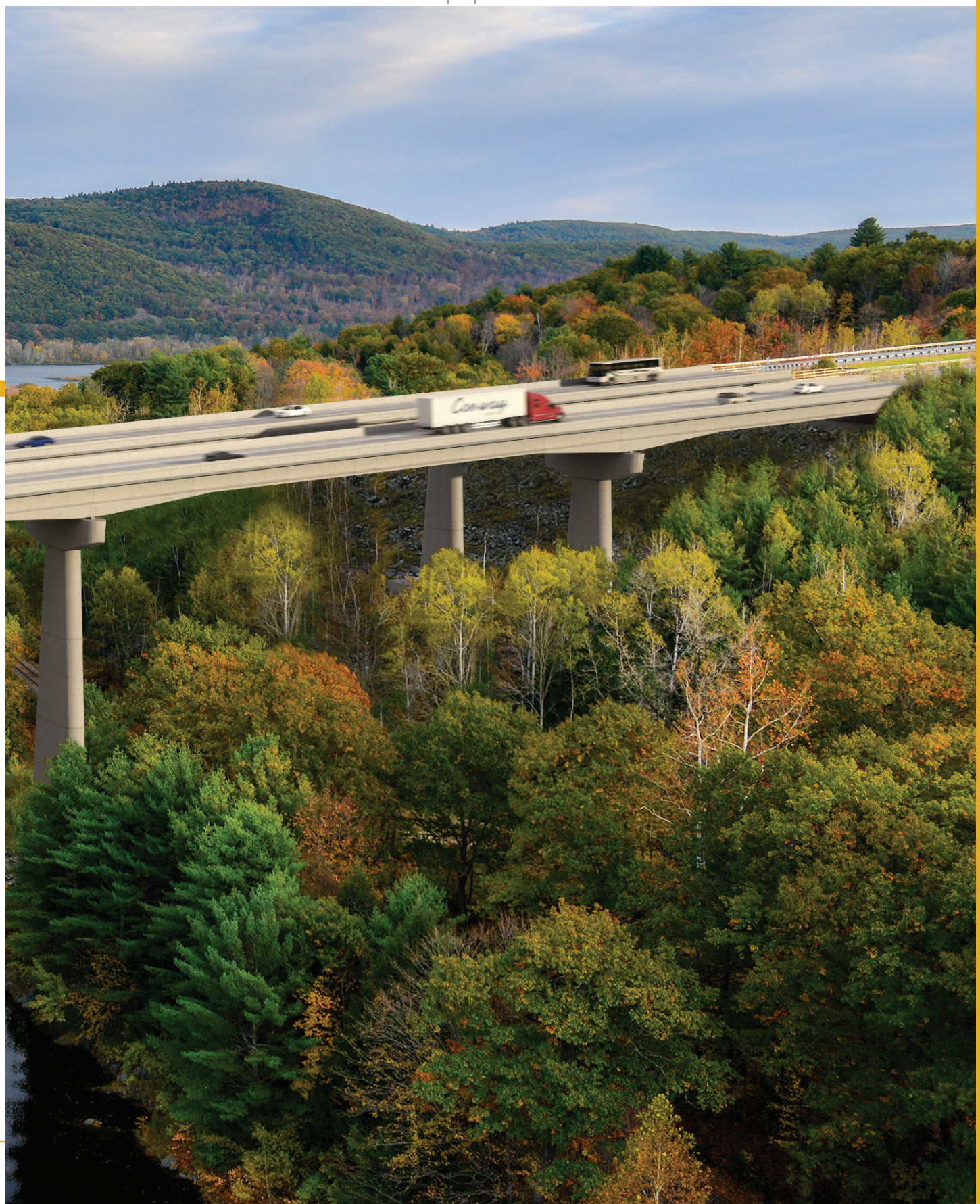
Thank you,

Molly Perrigo

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Molly K. Perrigo
Alternative Contracting Specialist
VTrans - Contract Administration
1 National Life Drive
Montpelier, VT 05633-5001
p 802.828.6977
f 802.828.5545
molly.perrigo@vermont.gov
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

TAB 5.1.6 Technical Approach



5.1.6 Technical Approach

Understanding Project Scope and RFP Requirements

As detailed in our Statement of Qualifications, R&R and HDR have assembled a premier Design-Build Team to deliver on all aspects of VTrans' Scope of Work for Design and Construction of the replacement of the Rockingham Bridges 24N & 24S. R&R will provide Project Management as the prime D-B Contracting Entity and provide management for all Construction Services. HDR will provide management for all Design Services.

The R&R's Team's Approved ATC is a Spliced Post-Tensioned Precast Concrete Girder Structure

We have thoroughly reviewed and understand the five parts to the RFP and the supplemental information provided by VTrans. The following sections of this Technical Proposal address the requirements of the RFP and describe the type of bridge presented and approved as an ATC, including design and construction of the Approved Technical Concept (ATC).

Approach to Design of the Technical Concept

Operation and Coordination of a Multi-Discipline Design Team

The R&R Team comprised of R&R, HDR and our subconsultants – Sebago Technics, Vermont Survey, GeoDesign, Vermont Compliance Monitoring, Count-on-It and Northstar Hydro will continue to operate and coordinate as successfully as we have in the development of this Technical Proposal. **Charlie Swanson, DM, will ultimately be responsible for our subconsultants' work**. Charlie will hold **bi-weekly project meetings with HDR's task leaders for bridge and civil design, Mark Buckbee and Charlie Guerette of R&R, and our subconsultants** for geotechnical, traffic management, environmental commitments, hydraulics and scour, and public outreach to maintain an ongoing Action Item List and to ensure constant communication, collaboration and coordination among the Multi-Discipline Design Team.

R&R proposes to schedule a Partnering Meeting immediately after contract award. R&R will hire a **third-party facilitator, Steve Kent with Wheeler Hill International, who has worked with R&R** on previous D-B projects to spearhead the Partnering Meeting. The Partnering process initiates development of the framework for a successful project; it focuses on project goals and issues, establishes procedures and processes moving forward, and aids in development of a collaborative and transparent teaming environment.

Our subconsultants will be coordinated by HDR's task leaders for their related disciplines. June Wu, HDR's lead bridge foundation designer, will coordinate directly with Jason Gaudette of Geodesign for geotechnical input related to foundation design for piers and abutments. Seismic design will also be coordinated with GeoDesign. June will coordinate with Ellen O'Brien of Northstar Hydro regarding hydraulics and scour analysis as it relates to foundation design. Chuck Gregory, HDR's civil design task leader, will coordinate with Steve Sawyer of Sebago Technics for Traffic Management and with Charlie Guerette of R&R for site access and staging. Charlie Swanson and Mark Buckbee will work with Stephanie Barrett of Count On It for Public Relations.

Complying with the required Environmental Commitments will require a collaborative approach by Matt Montgomery of Vermont Compliance Monitoring and several of HDR's task leaders, R&R and our subconsultants. Several examples of the work required and the respective HDR, R&R or subconsultant leads include:

- Erosion and Sedimentation Control Plans – Steve Sawyer, Sebago
- Stormwater General Permit – Chuck Gregory, HDR
- ACT 250 Permit (if required) – Charlie Swanson, HDR and Mark Buckbee, R&R

HDR recognizes that to efficiently progress from 30% design plans to RFC plans on each design element, we need to fully understand each stage of construction. We will ensure this through our bi-weekly meetings. Charlie Swanson will host, chair, and document these meetings. These meetings will have an agenda and include appropriate staff to address all items. The following items will routinely be included in the agenda:

- Review of previous Action Items
- Work Package design updates including drawings as available
- Constructability and Inspectability coordination including for QA and QC
- Project Manager and Construction Manager Updates
- Environmental Permitting Update
- Geotech, Traffic Management, Public Outreach and Hydraulics updates
- Schedule, Work Package and Progress Updates
- Review of new action items including task owner responsibility and due date

At the conclusion of each meeting, Charlie Swanson will prepare minutes and distribute to the entire team within 48 hours to allow opportunity for comments and early resolution of open action items.

HDR has successfully developed excellent working relationships and has coordinated and communicated with all members of our Multi-Discipline Design Team in the development of our Technical Proposal, and we will continue this effective collaborative approach if selected for the project.

Coordination Between Designer and Constructor During Design Development

Construction decisions affect design; design decisions affect construction methods; and both ultimately affect schedule and cost. Based upon the R&R Team's experience, decision making is most effective when project leadership employs an integrated approach, ensuring that the responsible design and construction staff provide input into all decisions. Through our collective experience we have found that the most important aspect of D-B projects is the coordination between Project Manager (Mark Buckbee) and Design Manager (Charlie Swanson). To maintain schedule,

control costs, and excel at quality construction the **coordinated effort of the HDR Design Team and the R&R Construction Team is an absolute priority**. To that end the R&R Team is committed to maintaining open, honest, timely, and effective communication between Mark and Charlie, and it is the R&R Team's obligation to assure that this communication remains a priority.

HDR has a unique background relative to the coordination with R&R during design development. **HDR's has a dedicated construction engineering division, and this expertise of working with contractors during construction will be a great benefit to the R&R Team.** These experience factors will lead to a **set of design packages that can be readily constructed without conflicts.**

During the ATC and Technical Proposal development phases **R&R and HDR met face-to-face regularly, in HDR's Portland, Maine office.** This is a convenient location for HDR personnel from Boston and R&R staff from Woolwich, Maine. **R&R and HDR plan on continuing to use the Portland office for internal team coordination meetings**. The process we followed during these stages is exactly the process we intend to execute during design. The general project concept we proposed was developed through a series of brainstorming meetings. **We have found that these face-to-face meetings allow us to bring the most experienced designers and constructors together to develop concepts and strategize about the safest, most economical, and most efficient way to construct these concepts.**

The R&R's Team's Spliced, Post-Tensioned, Precast Girder Concept will Exceed VTrans Requirement for 100-Year Service Life

The **design development has been, and will continue to be, an iterative and collaborative effort between HDR and R&R**. Initial concepts were vetted for constructability during the conceptual design phase, and as the design is further developed regular meetings will be held between R&R and HDR to ensure that quality, constructability, low maintenance and inspectability remain the highest priorities.

Due to the aggressive schedules in the development of the ATCs and the Technical Proposal, there was constant communication between R&R and HDR, which resulted in a collaborative and cooperative relationship that was critical to successful design development. As a team the designers and the constructors have vetted our optimal design through many face-to-face meetings, e-mails and phone conversations. As we move through the final design phase we will continue this effective approach to refine the details to create a constructible and inspectable set of design documents.

Proposed Structural Concept to Meet the Requirements of the RFP

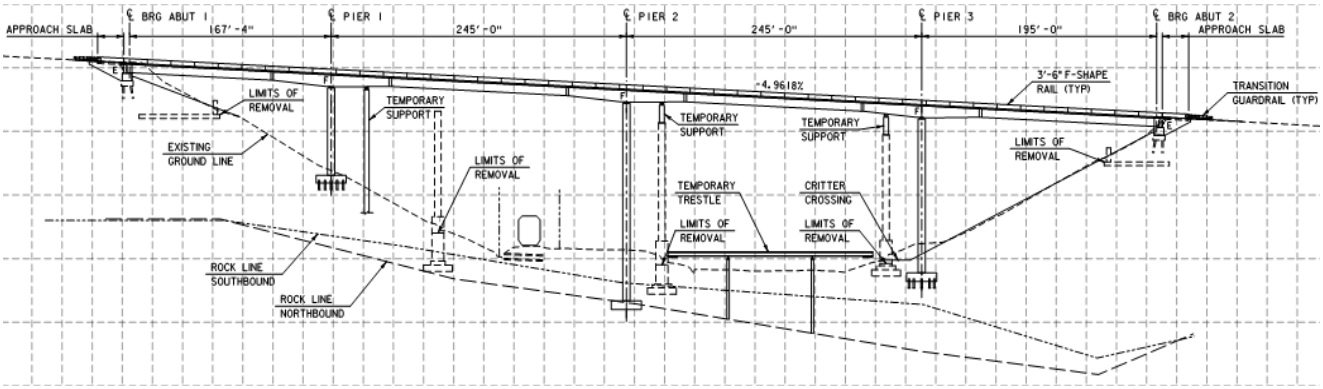
Our approach to the design of the bridges began with an in-depth evaluation of the existing structures, site conditions, and the Baseline Technical Concept (BTC) presented in the RFP. Working together, the designers and constructors of the R&R Team evaluated potential structure type options in accordance with project requirements and design criteria outlined in the RFP. Our goal in developing the optimum solution was to provide the most efficient and innovative solution that fulfills VTrans' expectations for this project while adhering to the tenets of our Team's Mission Statement for: **implementing a simple/cost effective design/construction approach; exceeding VTrans' 100-year service life requirement; minimizing life cycle and maintenance costs; and achieving a high level of quality.**

The R&R Team proposes an Alternative Technical Proposal (ATC) post-tensioned, precast concrete spliced girder structures for this project. **Our solution meets the project goals of quality, cost effectiveness, minimal maintenance, and minimum 100 year design life while providing an aesthetically pleasing structure with clean, simple lines.**

Key Benefits of Post-Tensioned Precast Spliced Girder Technical Concept	
Concept	Benefits
Span Arrangement	4-span layout optimizes the overall span lengths to minimize the number of crane lifts while limiting the weight of the girder segments for transportability and loading on existing bridge
Pier Layout	Layout of new pier locations has been optimized to locate piers farther away from the Williams River and provide ample clearance of railroad setbacks that allow construction procedures without undue impact to railroad operations. Pier locations are optimized to accommodate a more efficient structure type that will reduce both cost and risk
Abutment Layout	Abutments are placed at top of existing slopes to minimize earth excavation and backfill, and reduce end span length. Critter crossing was relocated next to Pier 3 near the Williams River to allow placing the abutments at top of existing slopes
Fast Erection Schedule	Speed of erection represents a huge advantage for the spliced girder alternative; the girders can be erected and the deck slab placed in the same year without disruption of winter
Low Construction Cost	Precast girders are relatively inexpensive compared to other concrete alternatives
Maintenance Free Bearings	Elastomeric bearings located under girders at piers and abutments are maintenance free with exceptionally long life
Variable Geotechnical Conditions	Utilized both spread footing and pile foundation designs to develop the most cost effective and structurally efficient solution at each pier location
Reduce Creep and Shrinkage	Precast girders are aged over 90 days and are composite with CIP deck slab, which considerably reduces creep and shrinkage movements at the joints
Reduced Seismic Loads	Overall lower weight of post-tensioned precast girders (as compared to BTC) results in lower seismic loads and results in reduced substructure requirements
Seismic Pier Design	Tapered pier walls with wide base easily accommodates large cantilever moments due to transverse loading
Only Two Expansion Joints per Bridge	Joints are limited to abutments only, which eliminates maintenance associated with intermediate joints and provides ease of inspection

We propose a four-span continuous, spliced girder bridge with span lengths of 167'-4", 245', 245' and 195', for a total structure length of 852'-4". This represents the optimal design for the unique and specific demands of this project. This concept provides for the greatest span lengths while utilizing the most cost effective structure type and optimizes the design and construction schedules. The new pier locations increase the clearance distance from the Green Mountain Railroad (GMR) to the nearest existing pier, and they are set farther back from the Williams River by locating them behind the existing piers. The location for Abutment 1 is the same as the BTC layout, but the location of Abutment 2 has

been shifted south by 27'-8" to position it at the top of the existing slope. We are able to move Abutment 2 by relocating the Critter Crossing closer to the river. **This is a value added benefit because it reduces overall earthwork on the river bank, reduces the overall length of the bridge, and provides better connectivity between the wildlife and the river**. The pier layout is also



optimized for construction, since existing Piers 2 & 3 are ideally situated to provide temporary support for the haunched girders during construction. **These types of innovations result in both cost savings and reductions in environmental impacts.**

Service Life Requirements that will Result in Exceeding a 100-year Design Life

A key requirement of this project is the integration of service life design, with the new I-91 Bridges 24N & 24S designed and constructed to exceed 100 years with no major structural maintenance.

HDR will leverage its recent experience with 100-year service life design completed for the Tappan Zee Bridge in an aggressive environment similar to the one in Rockingham, VT. For the Tappan Zee project, HDR evaluated the structure for many different zones (e.g. superstructure, substructure) and components, with exposure to different environmental factors, and provided a 100-year service life plan that addressed the specific requirements of each area and group of components.

HDR has adopted the **Strategic Highway Research Program 2 (SHRP 2) philosoph**y to achieve the goal of exceeding the 100-year service life required by VTrans. HDR was a key contributor in the development of the SHRP 2 R19A project with the University of Florida. This was a Transportation Research Board (TRB) funded project for the development of the "Design Guide for Bridges for Service Life." The goal of the project was to develop guidelines to achieve a service life for bridges beyond 100 years with a focus on innovative systems, subsystems and components.

In our development of the design for the bridges we have initiated a project-specific 100-year service life plan to guide the overall design from start to finish. This approach includes identifying the unique design requirements for each bridge zone based on the components included, materials involved, and specific environmental conditions at each zone. Life-365 will be used to analyze the unique conditions and materials in order to determine the specific requirements for each component. **We have considered site-specific exposure conditions, chloride exposure, environmental temperature, high-performance concrete mixture proportions, and surface barriers as part of a holistic approach to service life**. This service life plan will continue to be refined as the design develops. The 100-Year Service Life Plan includes the following:

- Definition of performance and service life criteria

- Definition of the applicable environmental exposure conditions for the different zones (e.g., de-icing salt spray, atmospheric, submerged, embedded)
- Modeling the actions caused by local environmental conditions for each component and the material's resistance against these actions to determine sufficient counter-measures (e.g., minimum requirements for concrete quality, cover thickness)
- Preemptive processes for qualification of materials and concrete mix designs,
- Conducting quality control testing during construction (e.g., chloride migration coefficient testing) to monitor production and verify performance criteria are fulfilled
- Conduct soil/water corrosivity studies to identify a corrosion allowance for the steel piles to provide adequate residual pile section to exceed the 100-year service life

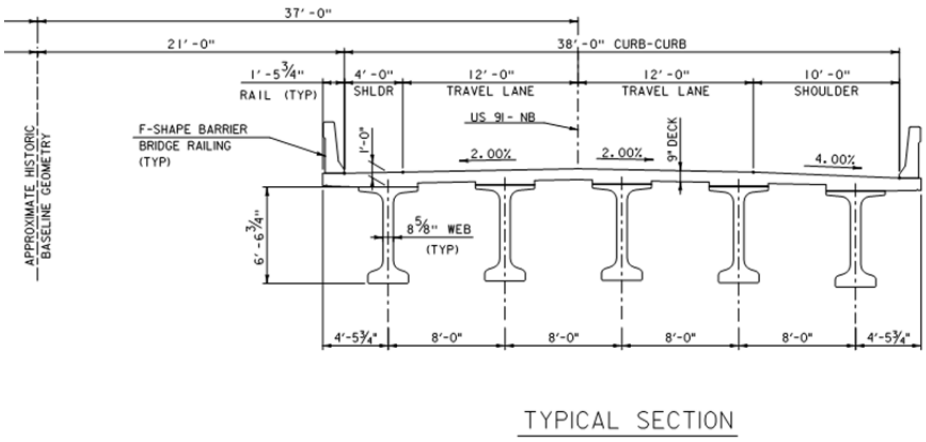
The R&R Team has incorporated design elements that exceed the AASHTO LRFD requirements associated with a target bridge design life of 75 years. In conjunction with the SHRP 2 based approach, the R&R Team has identified the **following solutions and proven details to reduce costs, provide low maintenance, improve inspectability and exceed the specified 100-year service life**:

100-Year+ Service Life Solutions and Benefits				
Concept	Cost Reduction	Low Maintenance	Improved Inspectability	100-Year + Service Life
Spliced, Post-Tensioned, Precast HPC Girders	✦	✦	✦	✦
Girders post-tensioned for zero tension under service load		✦		✦
Grouted post-tensioning installed during construction will be 100% internal with multiple levels of strand protection		✦		✦
High performance, low permeability concrete for decks, rails, girders, pier caps, pier stems, and abutments		✦		✦
Level III stainless steel reinforcement in deck		✦		✦
Use of precast girder bridge to reduce number of precast segments	✦	✦	✦	✦
Precasting elements reduce risks associated with CIP Concrete	✦	✦		✦
Elastomeric bearings in lieu of steel pot bearings	✦	✦	✦	✦
HPC deck with membrane and Superpave pavement	✦	✦		✦
Use of precast girder bridge to reduce number of grouted PT tendons	✦	✦		✦
Seismic design based on multimode response spectrum for 2,500-year earthquake incorporated into substructure design		✦		✦

Detailed Superstructure Concept - The superstructure will consist of two symmetrical, precast spliced girder bridges with five girder lines per bridge fabricated from High Performance Concrete (HPC) with low permeability characteristics. The girders will be spliced longitudinally at the approximate points of contraflexure and post-tensioned together to create one continuous girder for the length of the bridge. The lengths of the girders are optimized so that the drop-in girders and haunched girders are the same weight. **The proposed alignment of the new bridges will be along the same alignment as the existing bridges. This provides more than ample structure clearance to accommodate an inspection "snooper" truck and to mitigate any salt spray or snow removal crossover from structure to structure.**

Depth of structure for the haunched girder bridge varies from approximately 11' at the pier to approximately 7'-6" at mid-span. The haunched girder has a maximum depth of 10'-0" and tapers linearly to a shape that matches a NEBT 79 girder. **The precast girders are aged a minimum of 90 days to mitigate creep and shrinkage effects on the permanent structure**. The girders are spaced at 8'0" center-to-center with an overhang distance of 4'-5 ¾", which provides for a balanced design of

interior and exterior girders. The cast-in-place HPC deck will be 9". In accordance with our approved ATC, a waterproofing membrane will be spray applied to the structure and a Superpave overlay will be placed. **The overall depth of structure is shallower than the existing steel truss and when finished will be a slender, graceful structure crossing the Williams River**.



TYPICAL SECTION

Tensioning for the spliced girder design combines both pre-stressing strands and post-tensioning tendons. The prestressing strands will be designed for girder transportation and construction dead loads during staging and erection. The post-tensioning will consist of 3 – 19-strand tendons per girder that are parabolically draped in four-inch ducts, extend the full length of the bridge, and are double end stressed at the abutments. A small modification to the standard NEBT 79 girder shape will be required to accommodate the tendons. **The post-tensioning tendons will have multiple levels of corrosion protection and grout caps are ultimately encased in concrete pour backs in the abutment end diaphragms**. Post-tensioning will be designed to result in zero tension in the precast girders.

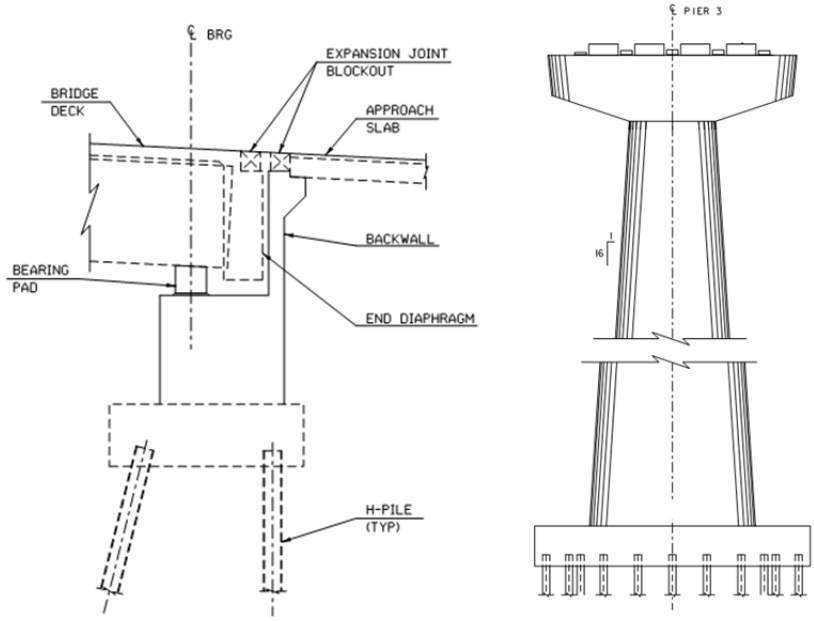
Level III stainless reinforcing steel will be used for all deck reinforcement and any girder reinforcement that penetrates into the deck. **Concrete barriers will also use Level III stainless steel reinforcement.** The bridge deck will incorporate 2.5" minimum top cover over reinforcing in accordance with VTrans Structures Manual Table 5.1.2.6-1. Barriers for the bridges will be 42" high and TL-5 crash tested in accordance with NCHRP-350.

Modular expansion joints will be installed at each end of the structure to accommodate movements due to temperature, creep, shrinkage, and braking loads. **The modular expansion joints were chosen for long life and ease of inspection and maintenance**. These joints will be designed and tested for fatigue loading and will have a rated service life of at least 100 years. Superstructure movement will be accommodated by a combination of fixed and expansion bearings at piers and abutments. The elastomeric bearings at the abutments will include a PTFE to stainless steel sliding surface to allow for creep and shrinkage. Small movements will be accommodated by the fixed elastomeric bearings at the piers. Elastomeric bearings are relatively maintenance free and have a substantially long life. **A bearing jacking plan will be included in the final design with jacking locations identified on the abutments and pier caps**.

Superstructure Design - PGSplice and CONSPLICE are sophisticated, industry proven programs that were the primary analysis tool for evaluating gravity loads (dead, live and construction), thermal loads, primary and secondary post-tensioning loads, and static equivalent loads for wind and seismic. These programs were used for the conceptual design of the bridges and will be the primary tool to perform the

final superstructure analysis. Seismic analysis will be performed with LARSA software and is based on multimode response spectrum analysis utilizing the 2,500-year event curve.

Detailed Substructure Concept - The splice girder superstructure will be supported by seat-type abutments and single pier bents with a combination of pile/pile-cap and spread footings foundations. Abutments were placed at the top of the existing slopes. Piers have been located outside the existing piers adjacent to the Williams River and provide required clearances to the GMR.



Abutment backwalls will accommodate both the block-out for one side of the expansion joint and a seat for one end of the approach slab. **All reinforcement in the backwall above the top of the bearing seat will be Level III stainless steel.** The abutment seat will be supported by a pile cap foundation with two rows of H-piles driven to rock. The front row of piles will be battered towards the middle of the bridge. Pile locations were designed to avoid the piles of the existing abutments and wingwalls. Similar to the original bridge design, wingwalls will be pile supported as well.

Single pier bents with hammerhead caps will be constructed on a combination of pile cap foundations and spread footings. Pier heights range from 68’ at Pier 1 to 154’ at Pier 2. Conceptually the piers are 8’ thick and have a width of 15’ at the base of the pier cap. **The sides of the pier bents will each taper 1:16, and the upstream and downstream noses will have an eight-foot rounding to match the ends of the pier cap and provide an attractive clean look. All reinforcement in the pier cap will be Level III stainless steel**.

Pier and Abutment Foundations - Proposed Abutment No. 1 and Abutment No. 2 will be located behind the existing south and north abutments. Pier No. 1 will be located within the 2H:1V embankment slope adjacent to Abutment No. 1. Pier No. 2 will be located on nearly level ground between the GMR tracks and the south bank of the Williams River. Pier No. 3 will be located at the toe of the embankment slope in the vicinity of the north bank of the Williams River.

The abutments, Pier No. 1, and Pier No. 3 foundations for both bridges and Pier No. 2 for the NB Bridge will be supported by steel H-piles. HP14X89 and HP14X117 pile types are anticipated at the abutments and piers, respectively. For conceptual design, it was assumed that blast rock fill may be encountered at the abutments and pile installation through rock/boulder obstructions will be mitigated by the use of H-piles. **Proposed foundations have been designed to avoid interferences based on the information available**; field interferences will be dealt with on a case by case basis if they occur. A WEAP analysis

has been performed to evaluate drivability of the south abutment piles with the contractor's proposed hammer, and the results indicated the piles can be driven to bedrock successfully. Behavior of the pile groups supporting each substructure was also evaluated using GROUP software for preliminarily computed limit state loads (vertical, lateral, and overturning moments). Lateral earth pressures acting on the abutments and piers were included in the applied loads and analyses.

Due to the proximity of Pier No. 3 to the river, the top of these pile caps will be located at the bottom of river channel elevation in accordance with the VTrans Hydraulics Manual guidelines. It is anticipated that the bottom of the pier cap will be 7 feet below the channel elevation; therefore a cofferdam, dewatering system, and tremie foundation seal will be required.

Pier No. 2 for the SB Bridge will be supported by a **spread footing foundation bearing on bedrock**. Selection of spread footings at Pier No. 2 was based on bedrock elevations and VTrans minimum pile lengths requirements. A cofferdam, dewatering system, and tremie foundation seal will be required for construction of this footing. Conceptual analyses have confirmed that the bedrock at SB Pier No. 2 will provide the required nominal bearing resistance based on expected pier loads. Depending on the slope of the exposed bedrock surface, excavating/benching or doweling into the bedrock may be required.

Innovation of the Design to Facilitate Inspection and Minimize Maintenance

Maintainability and inspectability are key components of our design approach by providing ease of access and durability. The superstructures will be constructed on the existing alignment to maintain clearance between structures and allow for inspection access. All elements of the superstructure, including joints and bearings, will be accessible from an Under Bridge Inspection Vehicle with a 75' reach. The **Bridges 24N & 24S precast post-tensioned girders will be easily accessible for inspection during and after construction**. The spliced girder bridge will be as easily inspected as any other girder bridge in the VTrans inventory. No special entry system is required. The proposed bridge has a 38'-0" curb-to-curb CIP deck supported by five girders. This allows for partial-deck replacement while maintaining traffic in reduced lanes without crossovers. In addition, the conventionally reinforced deck slab is easily patched, without concern of damaging or compromising critical post-tensioning elements during repairs.

A comprehensive Bridge Maintenance and Inspection Manual will be prepared with input from VTrans. The manual will provide checklists for inspection, field inspection forms, photographs of key elements in their as-built condition, and a set of record plans. The inspection manual will be developed in coordination with HDR's NBIS Certified Bridge Inspection Staff to ensure compliance with all state and federal inspection guidelines.

Utilization of Appropriate Concrete Mix Designs

CIP deck slabs will use VTrans Standard HPC A in accordance with the Structures Manual and will be modified to create a mix that provides a low permeable concrete to exceed a 100-year service life. Concrete for the precast girders will be a special HPC mix design to achieve 10,000 psi compressive strength. Concrete for the CIP closure diaphragms will use a HPC with a compressive strength that will obtain 8,000 psi prior to placement of the deck slab in order to provide adequate capacity under the stress limits associated with dead load and post-tensioning. All other diaphragms in the superstructure, including intermediate and end diaphragms at the abutments, will use a standard HPC A with a minimum strength of 4,000 psi. Concrete mix designs for footings, pier stems and caps will

use VTrans Standard HPC B. The mix designs for large footings and tremie seals will have their thermal profiles evaluated for maximum core temperatures and thermal gradients. If necessary, the mix designs may be modified by pozzolan substitution.

Incorporating Geotechnical Aspects as Part of Design

Additional subsurface explorations will be performed for Bridges 24N & 24S during final design to supplement existing VTrans soil boring data (RW, SB, and NB-series borings). The purpose of the supplemental borings is to satisfy AASHTO and FHWA requirements, and obtain necessary subsurface data for foundation design and construction, in our judgment, based on our interpretation of site conditions and the proposed foundation types.

The embankment side-slope geometries are expected to remain relatively unchanged and be approximately 2H:1V. The embankment slope geometries below the bridges (i.e., slopes in the north-south direction) will also be similar to the existing 2H:1V slopes. Some regrading of the embankment slope toe (e.g., near Pier No. 3) is anticipated to achieve the proposed 2H:1V configuration. Our design will be based on a minimum target Factor of Safety of 1.4 (equivalent resistance factor of 0.7) for the portions of slope supporting/containing the new structures since the geotechnical parameters for slope stability analysis are well defined in our opinion. Slopes which do not support structures will be designed for a computed Factor of Safety of 1.3 (equivalent resistance factor of 0.75).

Based on our conceptual evaluation, current factors of safety may be below target values on the south embankment due to a layer of very loose to loose fill encountered on the embankment face in the existing (Terracon) boring data. Target factors of safety will be achieved by employing a combination of slope surface stabilization methods including a stone fill surface layers and anchored and vegetated geotextile surface reinforcement.

Approach to Hydraulics and Scour

Pier 2 SB and Pier 3 NB are pile supported, located well behind the river banks and ground levels are above 100-year flood level by several feet; however, the river is dynamic so it is recommended that potential pier scour be considered. Since the piers are set back 20’ from flood edges, scour would only occur if the channel migrates sufficiently to place the piers within the flood zone. If this occurs, the channel would likely widen and the lower range of contraction scour is likely for that reason. The southern side of the river is most likely to experience river migration and potential contraction effects. Top of footings will be placed at the current thalweg elevation of 289 for these piers based on a preliminary assessment of site conditions related to scour.

Proposed Piers are Located Behind the Existing Piers Reducing Potential Scour Impacts

Pier 2 SB is located at a shallower rock elevation and will be a spread footing on rock with a tremie seal. Based on a preliminary assessment, the tremie seal will be placed on rock after excavation of 3’ of rock. The footings will then be placed with base of footing at 4’ below thalweg, on top of the tremie seal. Rock scour could only occur at this location if the channel migrates 20+/- feet to the south and removes 15’ of overburden to expose top of footing, which is very unlikely.

Approach to Construction of the Technical Concept

Self-Performed Work

R&R intends to self-perform approximately 90% of the contract work and subcontract 10%. The majority of the subcontracted scope will be earthwork. The below table indicates the major work components and the contractor responsible.

Self-Perform Work		Subcontract Work	
Site Access & Traffic Control	7.0%	QC - Third Party Testing	1.5%
Demolition	10.0%	Smart Work Zone	1.0%
Substructure	33.0%	Earthwork	5.0%
Superstructure	31.5%	Paving	1.0%
Design	8.0%	Guardrail & Striping	0.5%
Total	**89.5%**	Electrical	0.5%
		Rebar Installation	1.0%
		Total	**10.5%**

Construction Access and Temporary Facilities

The Access Plan provided in the Concept Plans shows the proposed layout of our access and temporary facilities. **It is R&R's intent to use the ROW for waste, borrow and staging areas**. R&R will utilize an area off RT-103 for temporary field offices and parking. **Access to the ground level pier area will be via the existing west gravel access road that enters the ROW from Golden Hill Road**. This access road will be improved to handle construction traffic and then restored after construction is completed.

We plan to construct a graveled access road under the bridge, across the river and railroad bed, within the existing bridge ROW. We will construct gravel work pads at each pier to support crawler cranes to construct the new bridges and demolish the existing bridges. The river will be crossed with a pile-supported trestle. The railroad will be crossed with an approved at-grade crossing.

R&R will provide access to both abutments using the existing NB or SB traffic lanes. During each construction phase, we will place traffic on one barrel through the entire work zone, allowing us to utilize the out-of-service barrel as construction access. We will also utilize the paved, idle lanes behind the bridge abutments as a staging and laydown areas during the work.

R&R intends to utilize night-time, short-term I-91 lane closures to facilitate the delivery and offloading of the concrete girders. This will occur over a two week period for each bridge phase. R&R intends to access through the ROW at the existing Golden Hill Road. Additionally, we may look to use lane closures, and R&R is currently evaluating options to utilize the railroad for some of the girder deliveries.

Maintaining Existing Structures Throughout the Project

R&R is responsible for maintaining existing structures throughout the project duration. **Our approach will be to inventory current conditions, limit the structures in service during construction and perform up-front repair to structures that must be maintained during construction.** This will minimize the amount of in-service repairs required during construction.

We will first inventory the condition of the deck structures (bridge decks, bridge joints, pavement and drainage) that will be in service during construction at the start of work. Based on the inventory, R&R will develop a plan to repair deck structures to a level to avoid further maintenance during construction. This inventory will also be used to provide an inspection checklist that we will use to evaluate structures throughout construction. At this time, we will also work with VTrans to make any needed structural steel repairs to be done on the deck trusses.

R&R's Repair Plan Implementation for the Existing Bridges Will Minimize In-Service Repairs During Construction

The most significant maintenance risks are the existing bridges. **R&R intends to remove the NB Bridge from service shortly after work starts on site. This will immediately eliminate this structure from any required maintenance.** The SB Bridge will be repaired prior to closure of the NB Bridge, maintaining two lanes of NB and one lane of SB through traffic during up-front repairs. Deck repairs will be performed via single lane closures. Additionally, necessary joint, drainage and wearing surface repairs will be completed at this time.

We will re-inspect the deck structures in the fall, before winter snow maintenance starts and in the spring, after winter snow maintenance concludes, to assess current maintenance needs. **These bi-annual inspections will be completed throughout the project.** Should any service repairs become necessary, the work will be accomplished in a timely manner through rolling roadblocks. Our Traffic Management Plan will have intended Traffic Control Plans that address and support repair work.

Approach to Bridge Demolition

Each bridge structure will be demolished individually to accommodate construction of the new bridge barrel. A detailed Demolition Plan will be developed and followed by R&R and approved by VTrans, with HDR providing construction engineering analysis for the truss demolition. Appropriate waste disposal sites will be selected and permitted. A separate Lead Paint Abatement Plan will be developed and implemented.

A Detailed Demolition Plan will be Followed by R&R Crews to Ensure Bridge Stability and Safety

R&R will install under-deck shielding to protect the river and land areas from loose debris. We will coordinate demolition activities with the railroad to minimize any rail impacts. Existing pavement will be stripped and recycled. The concrete bridge deck will be saw-cut, and then the slabs will be removed utilizing an excavator with a thumb. Deck removal will start at one abutment and progress toward the

other abutment, with equipment working on top of the existing deck. Concrete slabs will be trimmed of protruding steel and disposed of at an approved site, or crushed and recycled. Steel truss removal will be accomplished by removing large truss sections at each span. Large crawler cranes will be used to pick the bare truss spans and lower them to ground.

The detailed Demolition Plan will be followed by R&R field crews to assure bridge stability and safety. Localized de-leading at cut locations may be required to allow removal of large truss sections. R&R will use mechanical cutting methods such as shearing to limit lead hazard; however, it is likely that limited flame and/or abrasive cutting will be required to safely complete work. We will utilize excavator-mounted mechanical shears to process the steel and limit lead hazards. Steel will be cut into appropriate lengths and loaded into dumpsters for recycling. **At the completion of steel processing, the processing area will be cleaned of all lead paint chips; the chips will be sent to a licensed hazardous material disposal company.**

Pier demolition will be accomplished by removing large concrete components by crane and lowering to the ground for processing. Staging will be installed to allow the cutting of pier columns, while the removal piece is held by a crawler crane. The concrete pieces will be trimmed of protruding rebar and disposed at an approved site. A Hoe-ram and/or drop-ball will be used to demolish the pier footing concrete as necessary. Concrete rubble will be removed by excavator or clamshell and loaded into trucks for removal. We intend to cutoff and abandon the existing pile at the piers.

Abutment demolition will be accomplished in a similar fashion to pier demolition, but we may opt to pull and salvage the pile for our temporary use.

Approach to Substructure Construction

All piers and abutments for each bridge will be constructed in a single phase for each bridge.

R&R is Proposing Similar Economical Pier Construction as the Richmond Bridge Project

Piers will be constructed inside sheet-pile cofferdams. Piles will be driven inside the excavated cofferdams using a diesel hammer and a pile template. A WEAP analysis will be done on the pile/pile hammer combination, followed by dynamic load testing of the piles at each substructure unit. Concrete footings will be constructed on the pile foundations using steel forms. The pier shafts will be constructed in multiple lifts using steel forms. Rebar cages will be pre-tied and spliced in the air. The cofferdam will be backfilled, riprap or slope protection installed, and the sheet-pile cofferdam removed. The pier caps will be formed using steel forms. Pre-tied rebar cages will be placed in the hammerhead forms. All work will be serviced by crawler cranes located adjacent to the piers.

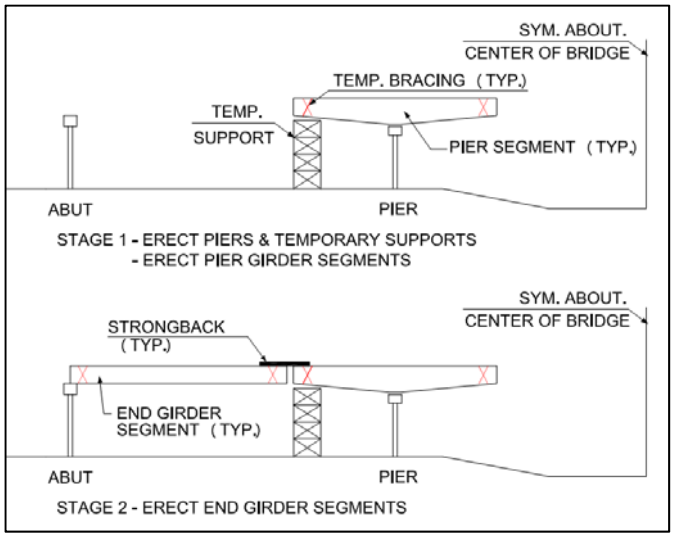
Abutments will require sheeting to protect the existing traffic, but will generally be open cut excavations. H-pile will be driven as described above. CIP concrete footings will be placed using steel

forms, followed by backwalls and wingwalls. The abutments will be backfilled and riprap or other slope protection placed before the superstructure girders are erected. All work will be serviced by a crawler crane located at the roadway elevation, behind the abutment.

R&R self-performs all cofferdam, piling and concrete work.

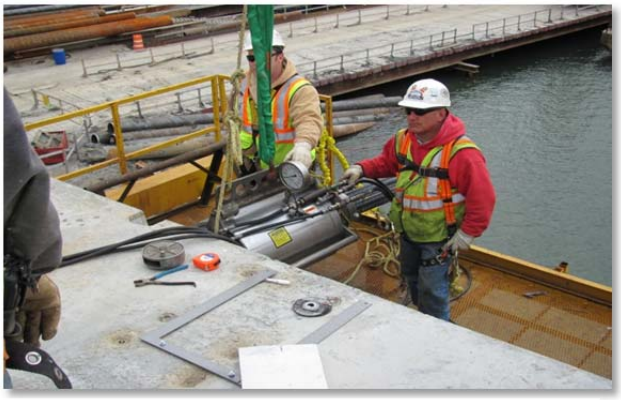
Approach to Superstructure Construction

Superstructure construction for each bridge will be completed in a separate phase following our WBS framework. A Superstructure Erection Plan will be developed and followed to assure safe and efficient erection of the girders. **This will include a Post-Tensioning and Grouting Plan with PTI and ASBI certifications for key R&R personnel**.



Once the substructure is complete, the bearings and temporary erection supports are installed. Erection supports consist of a steel frame, founded on the old pier foundations or temporary piles**. R&R anticipates unloading the NB girders from trucks located on the existing SB Bridge utilizing a slow roll, and HDR has performed a conceptual design review of that bridge and has verified it will safely support the precast girder loads. The lowest rated component of the bridge is the deck, and R&R will be repairing the deck that will improve the rating to a 5 or better. There are currently no load restrictions on the existing 24N & 24S bridges, and R&R will obtain the required permits to transport the girders.**

A pier girder will be erected first, supported by the bearing and the temporary erection support, and guyed in place. The abutment girder will have a strong-back installed at the pier girder end. This girder will be erected onto the abutment bearing and use the strong-back to attach and align with the pier girder. Additional guys will hold the girders in place. The erection continues with the next pier girder and abutment girder, completing the first span. The erection shifts to the next pier with the pier girder erected, followed by the drop-in girder between the two pier girders. The process is repeated until all the girders are erected.



R&R Erectors have Post-Tensioning Certifications to Perform the Spliced Girder PT

Survey will confirm the alignment of the girder runs and any final adjustments are made. Forms will be placed at the splice locations, and the CIP concrete closures and diaphragms will be placed. Longitudinal post-tensioning will be installed through the girder ducts, and the girders are jacked from both ends to the design PT load. The PT ducts will then be grouted. The deck will be formed using

Stay-In-Place steel forms for the inner bays and wood forms on overhang brackets for the fascias. The concrete deck will be placed using a Bidwell screed machine and a concrete pump. Concrete curb and parapet wall will be cast next. Installation of the deck membrane and bridge paving will be the final step.

Access to the superstructure erection will be via the piers. We will have stair-towers at each pier to provide access for our crews. Crawler cranes will erect the superstructure girders and service the deck forming. Crawler cranes at the abutments will also assist the deck forming. Stripping of the overhang forms will be done from the deck with a stripping buggy. **R&R self-performs all aspects of superstructure construction including survey, post-tensioning and grouting.**

Approach to Railroad Coordination

R&R has selected a bridge design that will minimize impacts to the railroad. Our concrete girder bridge allows for quick construction over the railroad and affords easy opportunity to shield the railroad from construction activities. Our demolition methodology utilizes large cranes to remove large truss sections which will limit overhead demolition work.

R&R and HDR have Extensive Experience Successfully Coordinating with Railroads

We will develop a Railroad Plan that details our interaction with the railroad. This will include requirements for flagging, inspection, railroad crossing, railroad protection, scheduling and other critical factors. **R&R will designate a Railroad Coordinator**, who will be responsible for communicating and coordinating all railroad impacts and activities. **A preconstruction Railroad Coordination Meeting will be scheduled to review the Railroad Plan and develop a working relationship with railroad stakeholders.** Each Bi-Weekly Coordination Meeting will have a specific agenda item to discuss railroad-related issues.

Approach to Variable Weather Conditions

As a New England based construction company R&R is very aware of the fluctuating weather conditions. Our primary approach to weather conditions for this contract is avoidance and minimization. When we evaluated several different bridge types during our conceptual design phase, we considered the weather impacts very carefully. The R&R Team has selected a spliced girder bridge design that has favorable weather-related implications and impacts. **This bridge type provides schedule flexibility over the segmental concrete option, allowing the bridge concrete to be placed almost entirely during the traditional construction seasons.**

Larger substructure concrete placements are scheduled for late winter and spring when we can easily mitigate weather impacts on these types of placements. Grouting of the spliced girder tendons occurs in the summer, avoiding cold weather issues. The concrete decks will be placed in late summer/early fall, again avoiding weather extremes. Although our schedule is favorable to avoid temperature extremes we will be prepared to deal with them when they occur. **We will be prepared to place deck concrete at night if daytime temperatures are expected to approach 90-degrees during a normally scheduled**

daytime placement. Additionally we will be prepared to use potable ice to cool incoming concrete temperatures and shield the work areas to minimize heat impacts if necessary.

R&R will follow ACI and PCI practices plus VTrans concrete placement and curing standards. All concrete work can be adequately protected from weather impacts with common means and methods. Critical concrete placements, such as the deck, will have Pre-Activity Meetings where curing and weather protection plans will be identified, in addition to construction QC standards and placement logistics. These requirements are communicated to field crews through our daily work plans via the Job Safety Analysis (JSA). For example, the JSA will identify the special curing and weather protection required and provide a list of the critical materials needed for each placement.

Although cold weather concrete is a concern of ours, protection from winter maintenance operations will be an easily mitigated issue with our bridge structure type and proposed schedule. The bridge superstructure will not be exposed during the construction operation. We intend to start superstructure concrete work in the spring and have each barrel complete and open to traffic in October. All concrete protective coatings will be in place on completed bridges prior to exposure to winter conditions. We know that snow removal operations on I-91 will create salt spray, and we will be prepared to protect the work from that condition. During the construction of the substructures, the work areas will be protected by tarps and insulated blankets during the winter maintenance months to prevent salt spray from contaminating the new construction.

Approach to Communication with Designers During Construction

Project communication is critical to success on Design-Build projects. We will look to develop a comprehensive communication system to assure that all stakeholders are aware and informed to optimize their project role and interaction. We post all relevant documents, including Released for Construction (RFC) drawings and approved shop drawings, on the Project Collaboration Site for access by team members. The Project Collaboration Site is continually accessible by authorized users and continually updated throughout the project.

The R&R Project Manager will be primarily responsible for coordinating design and construction functions. However, the R&R Construction Manager will have the ability to directly contact the design team as necessary. He will also be interacting and communicating daily with the Resident Engineer.

The Design Manager will be available for consultation by phone and computer throughout the project, in addition to attending Project Progress Meetings and making frequent jobsite visits. A communication tree and protocol will be developed to allow field construction personnel efficient access to appropriate design personnel as needed. The Design Manager will schedule any conference calls, pre-activity meetings and jobsite visits by design team members to assist the construction operations.

R&R's Construction QC Manager has the sole role of quality management. He will have direct access to the design team to answer any question or concerns. During the Administrative Submittal process we will develop a RFI process that allows for efficient and effective documentation of communication between the field crews and the design professionals. **The QC Manager will have authority to stop work if necessary to resolve a design/construction issue. The QC Manager will be responsible for identifying, tracking and closing any non-conformance issues**. He will have direct contact with

appropriate design personnel as necessary. Any non-conformance will be documented and posted on the Project Collaboration Site for access by design team members and VTrans.

Critical design personnel will attend Project Progress Meetings and meeting minutes will be distributed through the Project Collaboration Site to keep designers and VTrans involved as construction progresses. The QAM will hold Preparatory Meetings before work commences on critical scopes, such as pile driving or post-tensioning. Design team members will attend these Preparatory Meetings to assure that critical design concerns are addressed.

Incorporating QA as Part of Construction

We assure construction will follow the best industry standards, utilizing our in-house QC staff to complement and coordinate with VTrans QAM and QA staff to assure a quality product. Our QC staff is very experienced with executing complex project QA/QC programs, and understands the unique coordination and specialized documentation and testing required to meet industry and FWHA standards. **The VTrans QA activities will be fully integrated with both our Construction QC program and our construction operations to assure full compliance with the project quality goals.**

The project-specific integration of VTrans QA, R&R QC and construction operations will be detailed in our Construction QC Plan. This QC plan will complement the VTrans QAM Plan to assure that a singularly optimal quality level is achieved. The QC plan will spell out the specific responsibilities of R&R's QC Manager and our Construction Manager in producing work of the highest quality. It will detail how the R&R QC responsibilities and construction operations dovetail with VTrans QA requirements. The goal of the QC Plan will be to provide a comprehensive plan to truly integrate construction operations with QC and QA, assuring that quality is intrinsic to the construction process.

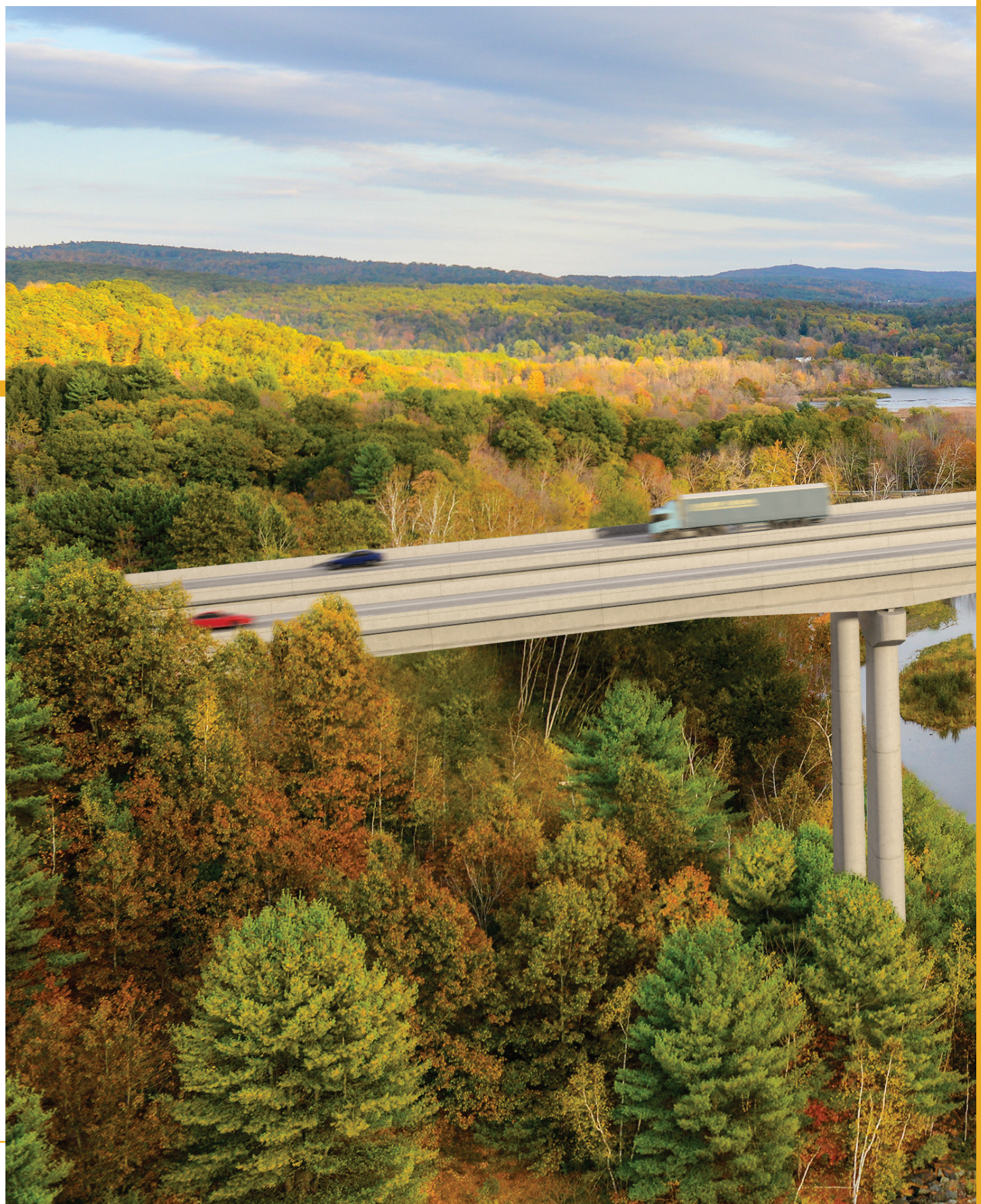
Communication is critical to assuring project quality goals. R&R will utilize bi-weekly meetings to provide overall coordination of quality functions with construction operations. A specific agenda item will be dedicated to quality and QC. Upcoming construction operation schedules will be presented and both QC and QA requirements detailed. Quality concerns will be discussed and resolutions developed as required. Break-out meetings may be scheduled as necessary for more complex issues.

Specific complex or critical work units, such as pile driving or post-tensioning, will involve a Pre-Activity Meeting. These meetings will review all requirements of the work, including means & methods, access, safety, documentation, etc. Both QA and QC requirements will be specifically reviewed in detail, including hold points and special testing or documentation requirements. The VTrans QAM will be a participant in these meetings. This will assure that quality is integrated with the completion of that scope of work. **This approach will ensure individuals do not forget important details, assuring all supervisors and foremen of quality requirements and expectations.**

R&R runs our projects, and coordinates the work with our crews, through the use of a daily JSA. This document spells out the task to be done, materials required, goals, safety concerns and quality concerns. It is reviewed at the start of work each day with the crews, who then sign the document to assure we perform in the most efficient manner. R&R includes QC and QA personnel in this daily JSA, providing direct integration of quality with construction operations.

This Page Left Intentionally Blank

TAB 5.1.7 Risk Evaluation



5.1.7 Risk Evaluation

A Design-Build project offers a unique opportunity to mitigate risk and provide an optimal design and construction combination. In contrast to traditional Design-Bid-Build, the Design-Builder is able to identify risks ahead of both design and construction, develop comprehensive mitigations, and therefore deliver the most efficient solutions to the project.

The Risk Evaluation Matrix is the primary tool for managing and mitigating the project's risks. Key risks are identified, and methods to mitigate or wholly avoid the risk are developed. **While the initial development of the Risk Matrix is a comprehensive task, drafted prior to the start of design, it is also a living tool that is continually updated to guide decision-making throughout the project.**

The R&R Team implemented the Risk Evaluation Matrix during development of our RFP Technical Proposal to select a bridge design solution that will most efficiently meet VTrans' project goals. We populated and expanded the Risk Evaluation Matrix provide by VTrans in the RFP. This process provides a comprehensive second review of risk, and leverages the Design-Build process to provide an optimal design. **Through this process, we determined that a Spliced Girder Bridge most effectively mitigated risk versus the BTC Segmental Concrete Bridge.**

The R&R Team has Determined that a Spliced Girder Bridge Poses Significantly Less Construction and Schedule Risk Than the BTC

The R&R Team is able to work iteratively, with both design and construction personnel, to develop efficient solutions. We are able to integrate the designer's perspective on design approach, structural solutions, life cycle costs, etc. with the contractor's input on cost, constructability, and traffic impacts. This assures that solutions are both innovative and workable, ultimately meeting the goal of reducing risk and delivering a better product.

The Risk Evaluation Matrix will be reviewed at the Project Kick-Off Meeting and at the initial Design Meeting to assure that risks are addressed. It will be revisited regularly throughout the project. Risks and mitigations can be expanded from the scope of the RFP Risk Evaluation Matrix as design is advanced. Risks will also be reviewed in Preparatory or Pre-Activity Meetings to highlight specific areas of concern and assure comprehensive risk mitigation.

The value of the Design-Build process is the ability to integrate construction techniques and procedures with the design development. As a part of the design process, we will look at the construction implications and how they affect overall project risk. **Construction involvement at this early stage of**

the project serves to reduce risk and provide opportunity for innovation. Construction team members will work with design team members to identify risks and suggest mitigation or avoidance strategies**. This process has already started in the development of the R&R Team's Technical Proposal.** These concepts will be advanced by the design team and reviewed iteratively with the construction team to optimize the final design.

An additional use of the risk evaluation will be to assess life cycle costs. Solutions developed by the combined design and construction collaboration will be analyzed for both initial and long-term costs. This allows our team to incorporate life cycle cost as a key variable when appropriate help guide rational decisions. VTrans participation in this analysis assures that life cycle costs are accurate and appropriate.

The Risk Evaluation matrix has been expanded to specifically address our spliced girder proposal. This matrix identifies the critical risks and our team's approach to mitigation. We have looked to mitigate risk, most specifically scope, cost and schedule risk.

Project scope is globally reduced by the selection of a spliced girder bridge constructed within the existing ROW. Limiting the complexity of the project scope by utilizing a simple multi-girder structure versus a segmental structure has favorable impacts on project risk. The simplified structure has ripple effects from design through construction, all mitigating or even eliminating risks. Further risk mitigation is realized by constructing within the existing ROW and avoiding the risks inherent in the permitting process.

Project cost risk is also decreased with our spliced girder bridge versus a CIP concrete segmental bridge. Our analysis of estimated costs showed a significant cost advantage utilizing spliced precast girders. **Additionally, almost every aspect of design, construction and inspection can be performed more cost-effectively utilizing our bridge design. We believe these costs savings also include real cost savings to VTrans in design review and construction inspection.** All of these savings are realized without compromising life cycle costs.

Project schedule risk is less when comparing our spliced girder bridge to a CIP concrete segmental bridge. **Virtually every aspect, both in design and construction, is simpler, less time consuming and less labor intensive. The project schedule can be optimized to allow construction to proceed in the most weather-friendly times. Moreover, the spliced precast girders will be cast offsite and are not on the schedule critical path.**

The R&R Team embraces the concept of Risk Evaluation. Our proposal has been developed using a Risk Matrix to guide our design process. We will look to continue to advance the final design and construction of project through effective use of risk analysis, evaluation and mitigation.

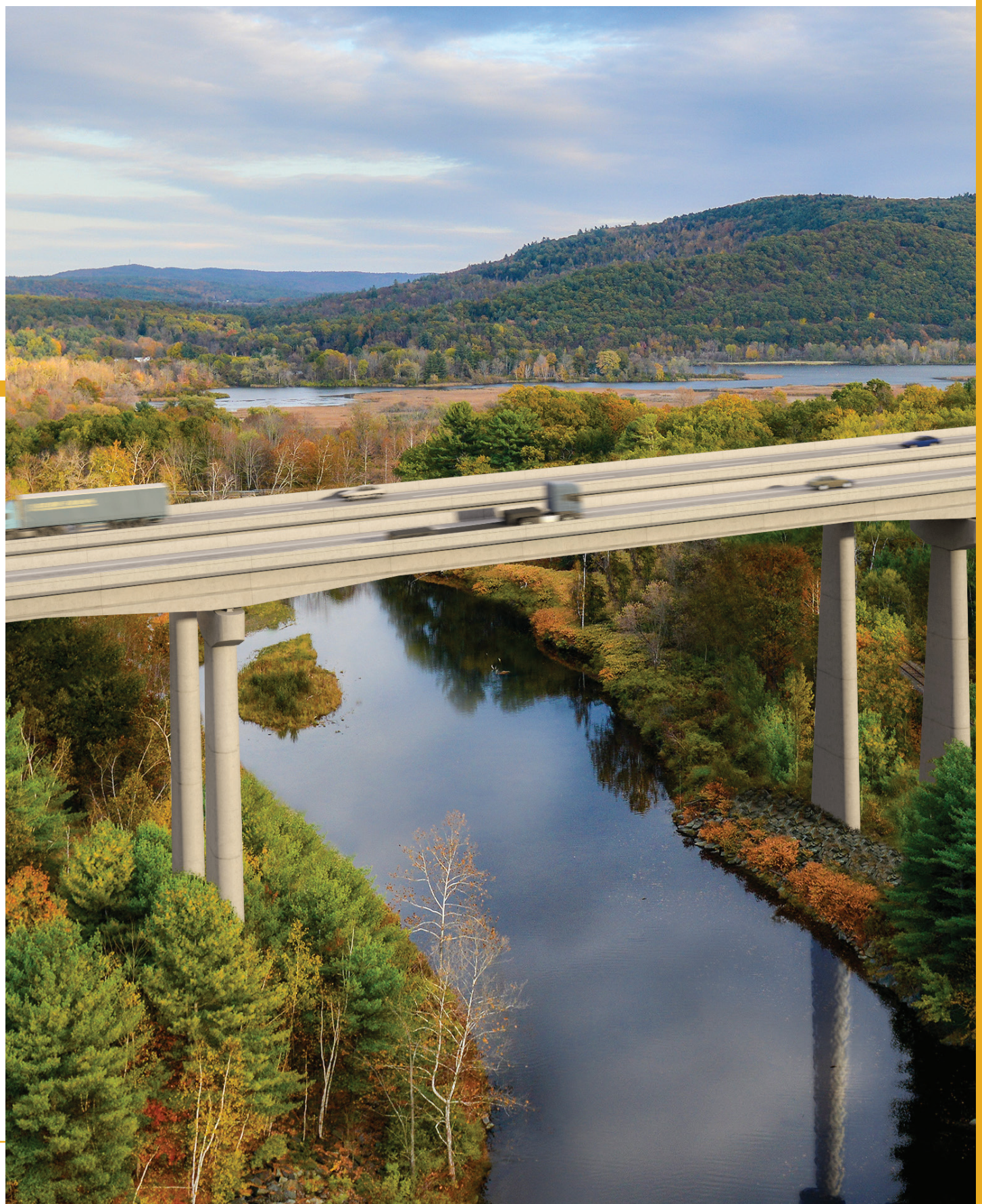
RISK EVALUATION MATRIX	Project Name:	Rockingham IM 091-1(66)		DECK TRUSS REPLACEMENT		
Risk Definition				**Risk Response**		
ID #	**Category**	**Title**	**Risk Statement**	**Risk Assumptions**	**Strategy**	**Response Actions**	**Risk Owner**
1	Construction	Cold Weather Construction	Performing construction activities in the winter will require additional planning and may require additional resources/construction efforts to mitigate cold weather affects. Cold weather construction is seen as a significant risk to the Project.	Cold-weather CIP concrete, most specifically superstructure concrete, is a higher risk for schedule and quality risks.	Avoid	Selection of spliced girder bridge allows optimization of schedule, placing substructure and deck concrete within favorable weather months. Additionally, there is significantly less critical CIP concrete in the spliced girder deck versus segment boxes. Concrete girders are made at a precast facility, virtually eliminating cold-weather concerns for this critical concrete.	Design-Builder
2	Construction	Railroad Interaction	The Green Mountain Railroad Corporation must remain open during construction. Coordinating impacts to the railroad is seen as a significant risk to the Project.	Construction impacts the GMRRC and any reduction in these risk impacts is favorable.	Mitigate	Selection of spliced girder bridge limits the overhead work tasks and requires a short time-frame to complete these tasks. Development of a Railroad Plan to efficiently coordinate work impacting the RR.	Design-Builder
3	Construction	Subsurface Conditions	Subsurface conditions, including solid rock location and characteristics, soil characteristics, obstructions, and groundwater, may vary from what is shown in the Geotechnical Data Report. Varying subsurface conditions are seen as a significant risk to the Project.	Subsurface conditions can vary from assumptions made from Geotechnical Report, increasing cost and schedule risk.	Mitigate	Borings were taken to support a 3 pier design, and the existing bridge as-builts provide additional applicable information. The new piers are sited to avoid existing pier foundations. Additional borings will be taken to provide complete boring information and mitigate risk. Selected H-pile foundations that are easily adapted to varying rock depths and avoidance of obstructions. H-piles are less dependent on rock quality than drilled shafts.	Design-Builder
4	Construction	Existing Concrete Deck Condition	The existing concrete decks on both bridge 24N and 24S are in very poor condition. They will need to be maintained by the Design-Build Team during the project. Maintenance of the bridge decks under interstate traffic is seen as a significant risk to the Project.	Repair of decks require traffic lane closures and can negatively affect public use of the interstate.	Mitigate	Thorough inventory of deck conditions prior to work start to identify initial deck repairs. Comprehensive initial repair of defects in a single lane closure, allows 3 open lanes during initial repair. Two-phase bridge replacement completely eliminates the need to repair and maintain one of the existing bridges.	Design-Builder

RISK EVALUATION MATRIX	Project Name:	Rockingham IM 091-1(66)		DECK TRUSS REPLACEMENT		
Risk Definition				**Risk Response**		
ID #	**Category**	**Title**	**Risk Statement**	**Risk Assumptions**	**Strategy**	**Response Actions**	**Risk Owner**
5	Construction	Transportation Management Plan and Traffic Control Evaluation	Once the initial traffic control plan has been implemented, it will need to be evaluated and monitored to determine any changes that will need to take place. An ineffective TMP and/or and ineffective Traffic Control Plan are seen as significant risks to the Project.	TMP & TMC changes increase the risk of traffic impacts.	Mitigate	Development of a comprehensive TMP, and utilizing lessons learned from the Brattleboro D-B Bridges 9N & 9S project . The spliced girder bridge Technical Concept offers an overall reduction in complexity and both design and construction risk, which translates into better schedule control and less risk of traffic impact variances. Effective use of Smart Work Zone. Consistent review of traffic issues in Progress Meetings. Utilization of web-based traffic information to aid both travelers and project.	Design-Builder
6	Organizational	Project Schedule	Achieving the Baseline Project Schedule is an important aspect of the Project. Project delays are seen as a significant risk.	Schedule delays are a significant project risk.	Mitigate	Detailed CPM schedule, consistently maintained and updated. Spliced girder bridge offers an overall reduction in design and construction risk, which translates into better schedule control. Offsite and off-critical path casting of the girders offers additional risk protection. Self-performing 90% of contract work allows direct control of schedule (and schedule recovery, if necessary).	Design-Builder
7	Environmental	Environmental Commitments	A complete set of environmental commitments and ensuring that they are met is an important part of the Project. Misunderstanding and/or violation of environmental regulations is seen as a significant risk to the Project.	Environmental impacts carry significant risk to the project.	Mitigate	The new bridge is sited within existing ROW to limit permit issues. New piers are located within RFP parameters regarding river set-backs. The selected spliced girder bridge limits over-river work. Detailed Environmental Plan, including environmental monitoring to assure compliance. Utilizing ECO familiar with VTrans D-B projects to reduce risk of environmental oversights and potential resulting delays. Trestle design will be required and has been preliminarily vetted with appropriate agencies.	Design-Builder

RISK EVALUATION MATRIX	Project Name:	Rockingham IM 091-1(66)		DECK TRUSS REPLACEMENT		
Risk Definition				**Risk Response**		
ID #	**Category**	**Title**	**Risk Statement**	**Risk Assumptions**	**Strategy**	**Response Actions**	**Risk Owner**
8	Design	Design Quality Requirements	Providing a constructible design that is low maintenance and meets the 100-year service life requirement is an important aspect to the project. Designs that don't meet these requirements are seen as significant risks to the Project.	100-year design life is a critical goal and is obtainable, reducing life-cycle cost risk.	Mitigate	The selected spliced girder design utilizes the key structural benefits of high-strength, low-permeability and post-tensioned concrete similar to the BTC. The deck design allows for the elimination of the multiple transverse joints required by segmental construction and requires only 2 expansion joints at the abutments. Use of stainless steel rebar, elastomeric bearings, metallized expansion joints and FRP bridge drains to support 100-year life. Membrane and paving bridge deck provides an effective and replaceable barrier to protect concrete deck. Development of a bridge O&M Manual to aid long-term maintenance.	Design-Builder
9	Construction	Construction Quality Requirements	Constructing a low maintenance bridge with materials and workmanship that meet and exceed quality requirements is an important aspect to the Project. Construction that doesn't meet these requirements is seen as a significant risk to the Project.	Construction QC provides for a high quality product that optimizes life-cycle costs and reduces risk associated with maintenance costs and inconveniences.	Transfer	Offsite precasting of the girders allow for the most stringent QC procedures to be employed on this critical element. Beams are easily inspected and defects identified and satisfactorily repaired or replaced under shop conditions, with no schedule critical path impact. Reed & Reed has outstanding experience with QA/QC on D/B projects. Development of a detailed and comprehensive CQCP and use of a dedicated QC Manager. Use of JSA to reinforce quality requirements to work crews. Pre-Activity Meetings to communicate requirements to the jobsite.	Design-Builder
10	Construction	Construction Access	Accessing the construction site, whether directly from the highway or via town highways is recognized as a significant risk to the Project.	Traffic impacts are an important aspect of project risk.	Mitigate	The spliced girder will allow delivery of girders in the dead lanes of I-91. The use of precast girders significantly reduces the ready-mix concrete truck deliveries, reducing truck traffic and risk. Construction of a trestle over the river and an at-grade RR crossing allow construction access below bridge deck level and out of traffic.	Design-Builder

RISK EVALUATION MATRIX	Project Name:	Rockingham IM 091-1(66)		DECK TRUSS REPLACEMENT		
Risk Definition				Risk Response		
ID #	Category	Title	Risk Statement	Risk Assumptions	Strategy	Response Actions	Risk Owner
11	Construction	Precast Supplier Availability	The precast supplier becomes a critical supplier to the project and therefore a risk consideration.	Precast suppliers unwillingness to bid & supply precast adds an element of risk.	Avoid	The spliced girder is a common precast element, and precast suppliers are available and interested in supplying this project. We have shared design and schedule requirements with precast suppliers and have multiple companies interested, familiar and able to deliver the product. We have already customized girder heights and weights based on precaster input. The precast is not required until 2018, making it a desirable backlog project to precasters'.	Design-Builder
12	Design	Design Risk	Complex and time-consuming design development and approvals can impact schedule.	The selected spliced girder bridge is a simpler design than the BTC, reducing risk to the project.	Mitigate	A spliced girder bridge is a simple and traditional design. There are fewer design elements versus the BTC and fewer difficulties to be detailed. Time of design is reduced along with the time of review. Shop drawings are similarly simplified over segmental requirements. Traditional design allows VTrans to use in-house designers to review and limits the risks with external consultant review.	Design-Builder
13	Construction	Construction Risk	Complex bridges can pose significant construction schedule risk.	The selected spliced girder bridge is a simpler construction than the BTC, reducing risk to the project.	Mitigate	A spliced girder bridge is a simpler and more traditional construction, fewer pieces to cast and/or erect. There is neither the constant change in element dimensions, nor is there the number of critical steps to complete. This design has less work-force risk, as it requires a smaller work-force and more traditional crew skills. The design is more schedule-friendly, requiring mostly seasonal-applicable work.	Design-Builder
14	Construction	Construction Risk	Location of the 3 piers could add risk for existing bridge substructure interferences.	Pier locations could interfere with existing foundations.	Accept	New piers will be located to avoid existing piers. In fact, existing pier foundations left in place provide scour protection to new piers. Additional borings will be located at the new/old pier interface to detect interferences. New pier pile foundations allows for repositioned piles to avoid interference with existing piles.	Design-Builder

TAB 5.1.8 Environmental Commitments



5.1.8 Environmental Commitments

The R&R Team will establish and maintain an Environmental Commitments Database following guidance set forth in AASHTO's Center for Environmental Excellence Practitioner's Handbook No. 4 "Tracking Compliance with Environmental Commitments and the Use of Environmental Monitors." This spreadsheet-based database will be maintained by the project's **Environmental Commitments Officer (ECO), Matt Montgomery of Vermont Compliance Monitoring**, to document and track all Environmental Commitments through permitting and construction.

Any plan modifications requiring changes to the permitted disturbance footprint will be independently reviewed by the ECO. Proposed changes involving protected resources will be communicated to the VTrans Resident Engineer and coordinated with regulatory agencies for acceptance, as necessary. Any updates to clearances or permit modifications will be incorporated in the database. The ECO will continually document contractor compliance with the terms and conditions of all project permits during construction using weekly reports, the EPSC Plan monitoring record, and the Commitments Database.

Approach to Acquiring Environmental Permits and Clearances

VTrans has completed some resource identification in the project area in support of the upcoming work and to obtain the project's preliminary Categorical Exclusion approval per the NEPA requirements. The R&R Team will use this resource information and collect any other supplemental information required to secure all remaining permits and clearances necessary for the construction of the project. We will strive to use a collaborative and transparent approach when communicating unavoidable construction impacts activities with the regulatory community. **To initiate a constructive dialog, the R&R Team plans to host a regulatory coordination meeting inviting all key personnel from regulatory agencies with jurisdiction over resources involved in the project.**

The Team will be responsible for obtaining additional clearances or permits that become necessary due to changes in construction means and methods that alter the project's permitted disturbance footprint. Based on the project setting and scope, the following permits and regulatory clearances are anticipated:

- NEPA CE Re-evaluation statement (FHWA)
- Construction Permit (ANR-Stormwater Program)
- Section 404 VT General Permit (ACOE)
- Water Quality Certification (ANR)
- Title 19 Consultation (ANR-Rivers Program)

Depending on the project's design, construction approach, or any additional resource inventory findings, the following permits and regulatory clearances may be required:

- VT Wetland Permit (ANR-Wetland Program)
- Threatened and Endangered Species Takings Permit (ANR-Natural Heritage Inventory)
- Operational Stormwater Permit (ANR-Stormwater Program)
- Section 106 Archeological Clearance (VTrans-Archaeology Officer)

No Vermont Act 250 permitting is anticipated. A Jurisdictional Determination will be requested from the VT Natural Resources Board's district environmental commission for confirmation. The Brattleboro I-91 Project, which was over the 10-acre threshold, received a Jurisdictional Determination that an Act 250 permit was not required.

Approach to Avoidance and Minimization of Lead Contaminated Soils and Management of Lead Containing Paint

We recognize that lead paint poses significant threats to human health and the environment. Steel in the existing structures is assumed to be coated with lead-based paint and primer. Baseline soil lead concentrations will be determined prior to work at the site. Torch cutting of coated structural steel members during demolition is not considered a 'Lead Abatement' activity and would not require a permit through the VT Department of Health or any other environmental regulatory coordination.

Scrap steel components will be handled as little as possibleto minimize the spread of lead paint chips. On-site processing will take place in designated areas where paint can be contained and collected. Coated steel will be transported off-site as scrap in open body trucks or flatbed trailers will have loose paint flakes removed and collected prior to being transported. Collected paint flakes will be disposed of as a hazardous material.

Approach to Construction Phasing for Erosion Prevention and Sediment Control

The R&R Team will develop a site-specific Erosion Prevention and Sediment Control ("EPSC") Plan for the project. The ECO will provide the EPSC Plan to the VTrans Construction Environmental Engineer for feedback prior to submittal to the Stormwater division of VT ANR. Once accepted, the ECO will be responsible for overseeing its implementation and monitoring, including seasonally variable inspections, stormwater turbidity monitoring and all required reporting. The ECO will document any required modifications to the EPSC Plan that would best prevent erosion or control sediment as the project progresses. EPSC monitoring will also be performed for all approved staging, temporary hauling, waste and borrow areas. To the extent feasible significant earth disturbances will be limited to the summer construction season.

The ECO is very familiar with VTrans and VT ANR monitoring protocols for EPSC and regularly assists contractors in developing EPSC plans for transportation projects. Matt Montgomery was the ECO for both the Milton IM 089-3(66) and Brattleboro IM 091-1(65) Design-Build bridge replacement projects which required non-standard solutions to manage erosion and sediment control.

Approach to Designing Permanent Stormwater Conditions

Our team will incorporate appropriate stormwater conveyance and management methodologies into the final design sufficient to prevent erosion and provide stormwater treatment as required. Stormwater permitting may become necessary if the project creates cumulative increases in impervious surface area, or substantially redeveloped roadway, of one acre or more. At this time, **conceptual planning indicates that less than an acre of new impervious surface would result from the construction of the project** so the VT Stormwater permit will likely not be required. A jurisdictional opinion from the VT DEC Stormwater program will be requested once preliminary roadway designs are completed, and we will address any comments from the VTrans Stormwater Engineer.

Approach to Avoiding, Minimizing, and Mitigating Impacts to Archeological, Historical, and Environmentally Sensitive Areas in the Design and Construction Phases

We are committed to avoid, minimize, and mitigate impacts to environmental resources during all phases of the project. The ECO will provide input during the conceptual design planning to help identify potential conflicts with known resources. Realistic construction limits will be established in collaboration with contractor's proposed means and methods.

Once conceptual planning is complete, the R&R Team will hold a regulatory stakeholders meeting to alert regulators to the upcoming work and the anticipated unavoidable impacts to natural resources. Specific means and methods that are planned by the Team to help minimize these impacts will be

discussed. After receiving feedback from the regulatory community, any additional field studies will be completed as required to obtain the necessary permits for the project.

Our team will make a continual effort to avoid historic, archeological and environmentally sensitive areas through the design-build process, including when locating staging, waste and borrow areas or other off-site activities. Sensitive areas will be identified in the field and mapped on the site plan. Protected resources will be clearly demarcated in the field.

Substantial wetland communities are mapped on both sides of the existing structure. A deer over-wintering area is present, unique natural communities and multiple Rare, Threatened, and Endangered (RTE) species are also found east of the project site and within the Connecticut River. According to the Resource Identification Report prepared by McFarland Johnson and dated August 31, 2015, no protected species are known to occur in the immediate project area.

Approach to Monitoring, Documenting, and Reporting Compliance and Violation with Environmental Commitments

The ECO will be responsible for monitoring compliance with all applicable permit requirements and state and federal environmental laws as required. Should any non-conformance items be identified during the construction phase of the project, the ECO will communicate them expediently and in a forthright manner to construction personnel. ECO will document the issues on EPSC monitoring reports, or ECO weekly reports, and work directly with the Design-Build Project Manager, QAM, and VTrans staff as necessary to bring operations back into compliance. Additionally, any environmental items documented in a Non-Compliance Report (NCR) by VTrans will be brought into compliance by our Team in a timely manner.

Unforeseen environmental impacts are never anticipated. If found to occur, Matt Montgomery has a record of negotiating solutions on other VTrans projects to the satisfaction of both D-B Teams and the regulatory community. He has recent experience documenting and resolving complicated commitment violations within the context of rare, threatened and endangered species regulations, and off-site activities.

Approach to Stream Design Requirements along with Title 19 Stream Alteration Consultation

The R&R Team plans to perform a scour analysis to determine if river armoring would be required under proposed final conditions. Fills below ordinary high water and in-stream work will be minimized and seasonal restrictions observed to the greatest extent feasible. Any work proposed in the active channel or lower floodplain of the Williams River will be described, shown on a site plan, and vetted by the Army Corps of Engineers and the district VT DEC Stream Alterations Engineer, per the required Title 19 Consultation. In-stream work will also require review from a VT DEC fisheries biologist.

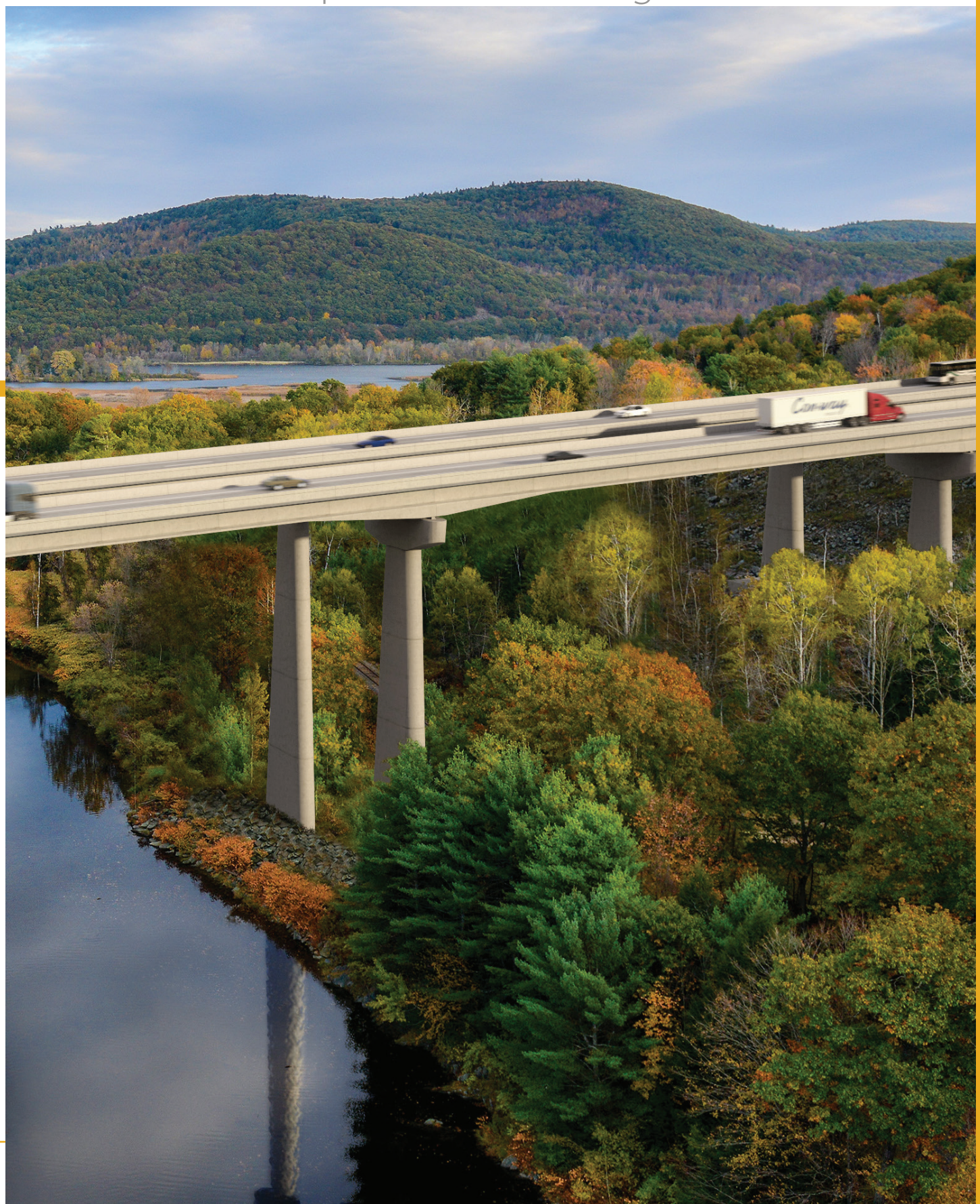
This project will require a temporary trestle that spans the Williams River for the duration of construction. The trestle could be considered a flood hazard by the regulatory community. Preliminary coordination with the above agencies suggest the temporary trestle would be agreeable to the regulatory community if certain design elements are incorporated to minimize the flood hazard risk.

Understanding of Permitting Implications Relative to the Project Schedule and Specific Permitting Time of Year Restrictions

The Team understands that obtaining the necessary permitting must be completed prior to commencing construction activities at the site. We understand some approvals have specific time-of-year restrictions associated with their issuance (e.g. wintertime specific EPSC measures and monitoring requirements, seasonal limitations for in-stream work) and these restrictions will be reflected in the project schedule. Consideration will be given for permits or clearances that require season-specific field data.

This Page Left Intentionally Blank

TAB 5.1.9 Transportation Management



5.1.9 Transportation Management

Approach to Minimizing Highway Traffic Delays

The R&R Team will assemble a Traffic Management Plan (TMP) for the replacement of Bridges 24S and 24N that will minimize highway and railroad traffic delays, and protect the traveling public and project personnel. The TMP will be a comprehensive document, detailing all facets of traffic control. In addition, our plan will benefit from the lessons learned on the replacement of Bridges 9S and 9N in Brattleboro and the lateral slide bridges in Hartford because the TMP designers (Sebago Technics) are the same as those who handled both of these other VTrans projects. Our proactive approach will have three key elements:

1. The preparation of an initial TMP document as part of the Administrative Submittals
2. Construction of NB and SB crossovers and installation of an advanced traveler information Smart Work Zone (SWZ)
3. Monitoring the performance of the TMP during phased construction, refining it as appropriate, and addressing situations during the construction process that require special attention

The TMP Document

Our contract TMP will be prepared in accordance with VTrans' Work Zone Safety & Mobility Guidance Document (WZS&MGD). The contract TMP will be completed as an Administrative Submittal immediately after contract award. A preview of the contents and organization is as follows:

Part 1 – Executive Summary - An overview of the entire plan.

Part 2 – Purpose and Objective - Our goals for this plan will be to:

- Provide a safe Work Zone for construction staff, motorists, pedestrians/bicyclists and the railroad
- Minimize construction-related delays
- Minimize impacts to the railroad
- Keep the public informed as to the status of construction throughout the project's development
- Reduce impacts to the local communities and businesses
- Provide safe access to and from the construction sites
- Monitor/maintain construction activities and traffic flow through the work zone

Part 3 – Project Description - This project is considered "significant" under VTrans' classification guidelines outlined in the Work Zone Safety & Mobility Guidance Document.

Part 4 – TMP Team Roles and Responsibilities - A comprehensive list of contacts for the project will be prepared that includes not only members of the Reed & Reed Team, but also VTrans' staff, various local officials, the railroad, state police, local first responders, and local towing companies. We will prepare a contact protocol, designating the people to be contacted within a target time-frame for key incidents.

Part 5 – Existing Conditions - An assessment of existing conditions within the work zone.

Part 6 – Work Zone Impact Management Strategies:

Temporary Traffic Control Plan - Temporary Traffic Control Plans (TTC) will show the location of traffic control devices within/in advance of the Work Zone. Given that the construction is anticipated to be accomplished in phases, these TTC's will include set-ups and arrays for each phase of the work.

Smart Work Zone Technologies will be Incorporated

Transportation Operations Plan (TOP) – Our TOP will include:
Advanced traveler information external to the Work Zone utilizing SWZ Technologies provided by Worksafe Vermont and ASTI Transportation Systems, Inc. An array of Portable Changeable Message Signs, WaveTronics microwave sensors, origin and destination sensors using Bluetooth technology, radar speed feedback signs, and video cameras will broadcast live data to a public website created for this Project using cellular technology. **Queue trailers with microwave sensors will be stationed at 2,000 and 5,000 feet upstream of the work zone in both directions to alert R&R when queues build up to these locations. Our experience in Brattleboro informs us that queues will not begin to build until traffic reaches 1,250 vehicles per hour, and this should be a rare occurrence in Rockingham where traffic is noticeably lighter than in Brattleboro.**

If queues build up to the 2,000 foot stations we will record the travel time through the work zone and post it on our advanced message boards. When the 5,000 foot stations are reached we will be able to post messages alerting drivers to consider an alternate route. The Bluetooth technology allows us to produce travel time reports through the work zone at any time of the day.

Our plan also includes provisions for conflict warning systems north and south of the new bridge construction in the Work Zone to warn motorists of construction vehicles entering the normal flow of traffic at reduced speeds. Included is a description of our Incident Response Team, led by the State Police and will include on-call wrecker service, local police, EMTs and Fire Department service from various surrounding communities. Specific response plans will be developed for minor, intermediate, and major incidents. These plans will include provisions for potential detour routes necessitated by longer term incidents, a description of the specific responsibilities for winter maintenance and the need for any road or ramp closures. ***Our proposed TOP will NOT require any ramp closures.***

Public Information Plan - This Plan will be carried out by our PRO as described in Section 5.1.10.5.

Part 7 – Implementation and Monitoring Plans - Our MOT Monitor will be responsible for implementing the TTC Program. **The SWZ will be installed/activated three weeks prior to the start of construction**, and its message boards will indicate the expected date of the start of construction and initial changes in traffic patterns. In addition, our PRO will issue initial notifications to our outreach venues outlining the beginning of the Project's construction. All subsequent changes in traffic patterns will be dealt with in a similar manner as far as public notification prior to implementation. The MOT Monitor shall also be responsible for regular reporting to VTrans throughout the Project.

The R&R Team's plan is to keep the Exit 6 NB On-Ramp open throughout construction to minimize impacts to the local citizenry. Should a major incident occur within the work zone, our TTC Plan will include a contingency for routing all I-91 NB traffic onto Route 5 at Exit 6 and directing them north along Route 5 to I-91, Exit 7. Permanent Alternate/Detour Route signage will be erected along Route 5 to facilitate rerouting. The SWZ message boards will notify motorists of this situation south of Exit 6. Our TTC will include a contingency for I-91 SB traffic should a major incident occur within the work zone in this direction. In this event, motorists will be directed off the interstate at Exit 7 and routed to Route 5 SB for travel to I-91 SB at Exit 6 in Rockingham. Permanent Alternate Route/Detour

signage will be erected for this direction similar to that referenced above for the NB direction. The SB SWZ message boards will provide advanced traveler notification of the interstate closure north of Exit 7.

Part 8 – Modification and Change Process – Procedures for making minor and major changes to the approved TMP. We recognize that the TMP must be adapted to meet changing traffic conditions.

Approach to Construction Phasing

The R&R Team is **proposing to complete the TMP related construction in five Stages**:

Stage 1 – Install SWZ and Traffic Control Devices and reduce I-91 to a single lane of traffic NB/SB
Stage 2 – Construct the median crossovers and shim outside shoulders as necessary.
Stage 3 – Shift the NB I-91 traffic to the median crossover, demolish the existing bridge 24N, and construct the new bridge 24N. **Exit 6 NB On-Ramp remains open during this phase.**
Stage 4 – Shift the SB I-91 traffic to the median crossover, demolish the existing bridge 24S, and construct the new bridge 24S. **Exit 6 NB On-Ramp remains open during this phase.**
Stage 5 – Remove the median crossovers and restore the I-91 mainline to their original condition.

Approach to Keeping the I-91 Exit 6 NB On-Ramp Open

The R&R Team does not envision closing the I-91 Exit 6 On-Ramp during the construction process, except for the possibility of a major incident within the work zone. Our Concept Plans illustrate a NB crossover design that maintains this on-ramp and a SB crossover that will allow the existing on-ramp to remain open as it is today.

Approach to Maintaining Railroad Traffic

A Railroad Protection Plan will be developed to detail operating procedures in proximity to the GMCRR. This plan will address requirements for RR flagging, inspection, RR crossing, RR protection, scheduling and other critical factors. GMCRR safety personnel will be consulted to define the safety rules required by the Railroad. **R&R will designate a Railroad Coordinator, who will be responsible for communicating and coordinating all RR impacts and activities**. The Railroad Protection Plan will be reviewed in a Railroad Coordination Meeting to be held with all key stakeholders prior to work in proximity to the Railroad. R&R intends to construct an at-grade RR crossing on site. We will limit crossing of RR tracks to this crossing. Railroad flaggers will be employed to protect personnel and GMCRR during work within the RR safety envelope. Shielding or other protection will be used to protect the RR from damage during certain overhead operations. **A Railroad Training Program will be developed and given to all personnel as a specific part of Jobsite Orientation**. This training will make clear the rules for working within proximity to the RR. Each Progress Meeting will have an agenda item to address RR issues and plans in proximity to the RR.

Approach to Mitigation of Traffic Control Issues arising during Construction

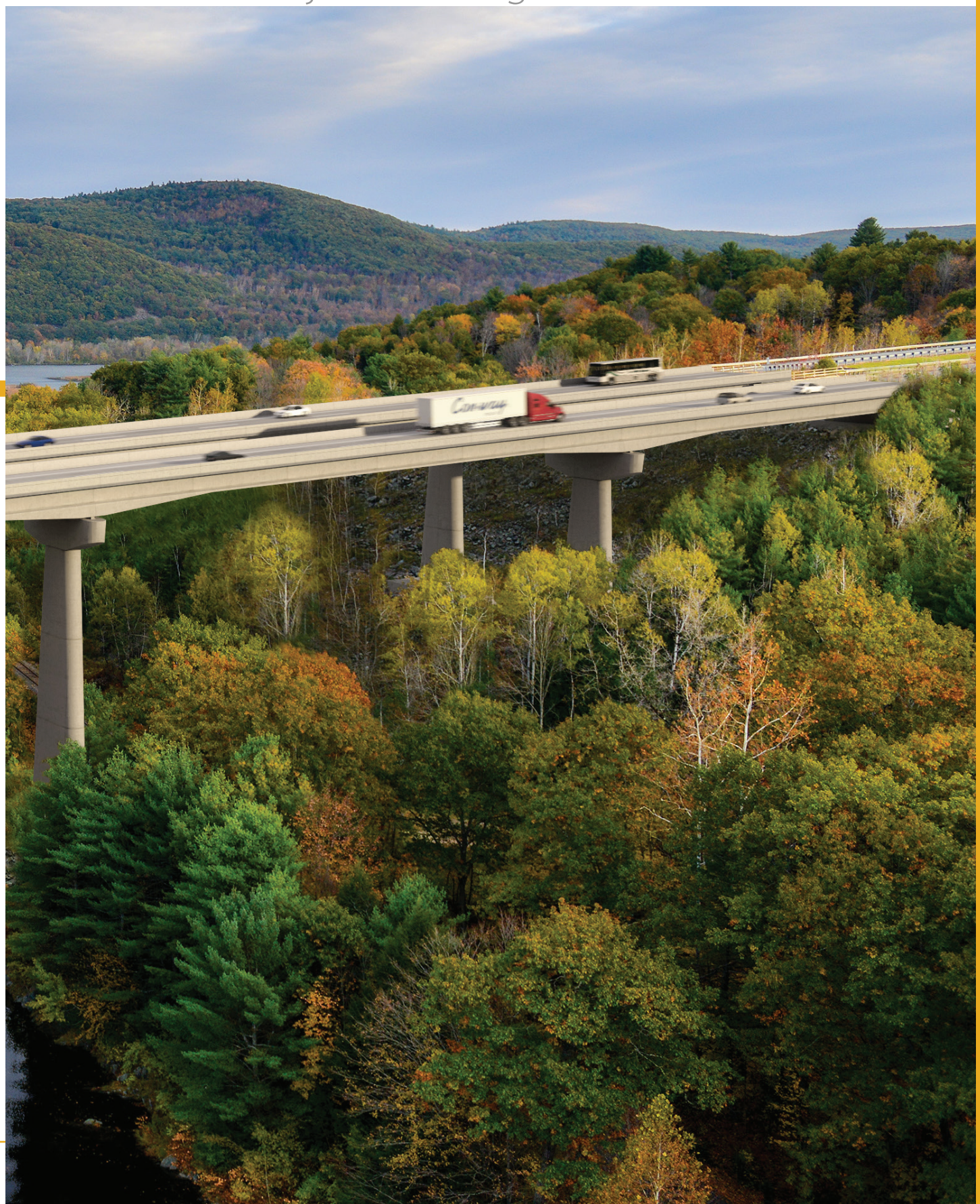
The TMP will be a "living document" that will be reviewed and updated as the work progresses based on lessons learned. Specific project construction activities may require the preparation and approval of special traffic control plans, such as for girder deliveries or pavement patching on the existing bridges, which could require, for example, the implementation of "rolling road blocks."

Approach to Accommodating Recreational Traffic on the Williams River

VTrans will not require that recreational boating be maintained through the construction site and will instead require adequate buoying and signage both upstream and downstream noting the closing to potential users. Public outreach and offsite signing will be provided by the R&R Team.

This Page Left Intentionally Blank

TAB 5.1.10 Project Management



5.1.10 Project Management

What does it really take for a Design-Build firm to be successful in a project management role on the Rockingham project? Our industry is fairly simple; it is driven by technical competence and by people. Most larger firms have the required technical skills; however, many lack the project management and people skills required to work collaboratively, transparently and cooperatively. The R&R Team intends to **engage VTrans immediately following NTP** to develop and implement a productive and supportive teaming environment. As discussed earlier, we will initiate this effort at an initial Partnering Meeting, which will be led by a Third-Party facilitator who will focus on topics such as project issues, roles/responsibilities, project schedule, communication protocols, and problem resolution. This will ensure effective involvement and buy-in by VTrans and the R&R Team and is a value added service that we believe is a key to **"What Differentiates the R&R Team"?**

People and Culture

R&R and HDR work successfully throughout New England, and we have created excellent reputations. R&R and HDR embrace our commitment to VTrans, and we select our teammates carefully. We require **individuals who will interact well with the Agency** and who have excellent communication skills. We searched for firms with individuals who are responsible and upstanding people and are capable professionally. We also sought compatible cultures that thrive on shared values such as integrity, transparency, quality and open communication. R&R's cultural and project objectives involve safety, quality, performance and identification and mitigation of risk. HDR's culture focuses on successful operation and coordination of a multi-discipline teams, effective coordination between HDR and our D-B partners, and quality. HDR's culture of work-sharing among our various offices, particularly with regard to bridge design, is potentially second to none in the consulting industry.

R&R and HDR competed for the I-91 Brattleboro Bridges 9N & 9S project, and both organizations enjoyed this collaborative effort. In addition, team members earned a great deal of mutual respect for each other. This experience created the foundation of our relationship on the Rockingham project, and we are utilizing many of the same key personnel – **Mark Buckbee, Project Manager, Charlie Guerette, Construction Manager, and Stephanie Barrett, PRO, and we have added additional key personnel; Charlie Swanson, Design Manager, and Matt Montgomery, ECO**, both who have worked successfully on VTrans D-B projects.

Mission Statement for Rockingham

The R&R Team identified the following objectives for the Rockingham Project I-91 Bridges 24N & 24S replacement project, and we will continue to adhere to these tenets through final design and construction.

- ***Employ Effective Collaboration and Coordination within R&R Team and VTrans***
- ***Implement a Simple and Cost Effective Design and Construction Approach***
- ***Exceed VTrans' 100-year Service Life Requirement for the Bridges***
- ***Minimize Life Cycle and Maintenance Costs***
- ***Reduce Environmental Impacts***
- ***Emphasize and Achieve Quality in Design and Construction***
- ***Reduce Schedule Duration and Develop Successful Recovery Plans***
- ***Execute Successful Outreach and Transportation Management***

This Page Left Intentionally Blank

5.1.10.1 Work Breakdown Structure

The R&R/HDR proposal contains a Work Breakdown Structure (WBS) that provides a map the project will follow from project initiation to completion. The WBS forms the core of our approach to the Rockingham Bridges 24N & 24S replacement project. All of our planning and execution activities evolve from the WBS; the design, procurement, submittals, construction, QA/QC and closeout efforts are predicated on our WBS framework. Please refer to the detailed WBS on the following page.

Our WBS includes all required project detail in an organized fashion and is used as the guiding framework for creating the Project Schedule. **In addition, we have: 1) identified the organizations and individuals responsible for completing the tasks associated with each WBS Work Package; and 2) assigned a Technical Challenge reference number that corresponds with the Risk Evaluation Matrix.** Cross referencing to the associated risks will assist the R&R Team and VTrans focus additional attention on those WBS activities that may have associated risks; this strategy will provide the R&R Team potential "caution flags" regarding development of the Work Packages and ensure focus on avoiding problems that have potential risks and impacts to the project.

WBS Framework

The WBS framework is comprised of four Categories: Project Start-Up; Project Design; Project Construction Phases 1 and 2; and Project Completion. The WBS details the Work Packages within each Category. Typical Work Packages include tasks for design, design QA/QC reviews, submissions to VTrans, field construction, construction QC inspection and testing, and preparation of final documents. **Work Packages are independent and unique and represent the complete project scope.**

The Project Start-Up (Category 1) includes Project Initiation Work Packages and **individual Work Packages for each Administrative Submittal**. Category 2 of our WBS contains the Project Design Work Packages. This section includes a complete design scope of the project and allows for design QA/QC and VTrans reviews. This phase also includes the Early Release Work Packages and proceeds on a path that **reflects our schedule needs relating to design activities**.

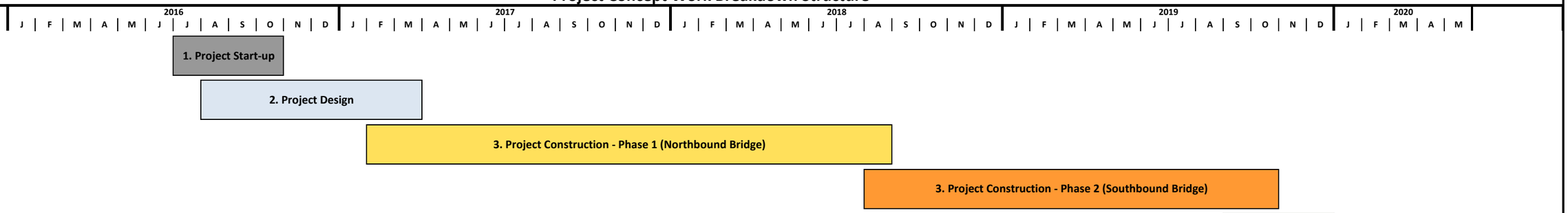
Category 3 of our WBS covers Project Construction. This Category begins with Major Material Fabrication Work Packages and long-lead items. Then it breaks out the Construction - Phase 1 (I-91 NB) Work Packages followed by Construction - Phase 2 (I-91 SB) Work Packages. **This section is organized in parallel with our project schedule** and also forms the basis for Construction QC.

The fourth and final Category of our WBS details Project Completion Work Packages. This section outlines the procedures and deliverables that will provide VTrans with project documentation, punch list completion, record drawings and QC documentation.

The WBS will form the basis for the invoicing of the project through the various Phases. The R&R Team will allocate project monies across the various WBS Work Packages, and we will be paid on a stepped percentage - 23% at Work Package initiation, 75% at Substantial Completion of the Work Package and 2% at Work Package approval for the Project Initiation phase, Release for Construction of Design Work Packages and final acceptance of the work for Construction Work Packages. We plan on discussing the necessary inspections and documentation required for gaining substantial completion at the Project Kick-Off Meeting.

This Page Left Intentionally Blank

Project Concept Work Breakdown Structure



Work Package		Responsibility		* Technical Challenge
1. Project Start-Up				
1	**Project Initial**			
1.1	Partnering Meeting	R&R	PM	
1.2	Kick Off Meeting	R&R	PM	
1.3	Establish Project Collaboration Worksite	R&R	PM	
1.4	Design Review Meeting	HDR	DM	
2	**Administrative Submittals**			
2.1	Baseline Project Schedule	R&R	CM	6
2.2	Geotechnical investigation Plan	HDR	DM	3,14
2.3	Design Quality Management Plan	HDR	DQA	8
2.4	Construction Quality Control Plan	R&R	CQM	1,9
2.5	Transportation Management Plan	ST	SS	5,10
2.6	NEPA Reevaluation Statement	VCM	ECO	7
2.7	Schedule of Payments	R&R	PM	
2.8	Public Relations Plan	COI	PRO	5
2.9	Environmental Commitments Tracking Database	VCM	ECO	7
2.10	Project Specific Safety Plan	R&R	PM	
3	**Railroad Agreement**	R&R	PM	2
4	**Environmental Commitment and Permits**			7
4.1	NEPA Compliance / Environmental Documentation	VCM	ECO	7
	Permitting Agency - FHWA			
	Agency Review Time - Varies			
4.2	Vermont Land Use Law: Act 250 (unlikely to be needed)	VCM	ECO	7
	Permitting Agency - VT Natural Resources Board			
	Agency Review Time - Varies			
4.3	Waste, Borrow, and Staging Areas	R&R	CM	7
	Permitting Agency -VAOT Environmental Unit			
	Agency Review Time - Varies			
4.4	Historic or Archaeologically Sensitive Resource Areas	VCM	ECO	7
	Permitting Agency - VAOT Environmental Unit			
	Agency Review Time - Varies			
4.5	VT Construction General Permit	VCM	ECO	7
	Permitting Agency - VT DEC Storm water			
	Agency Review Time - 30 Days			
4.6	Wetlands and Water Quality Permits	VCM	ECO	7
	Permitting Agency - U.S. Army Corp of Ends & VT ANR			
	Agency Review Time - 30 Days			
4.7	Rare, Threat & Endanger Species Taking Permit-if required	VCM	ECO	7
	Permitting Agency - VT Fish & Wildlife			
	Agency Review Time - 25 Days			
4.8	Storm water General Permit 3-9015- if required	HDR	DM	7
	Permitting Agency - VT ANR			
	Agency Review Time - 40 Days			

Work Package		Responsibility		* Technical Challenge
2. Project Design				
5	**Early Release Work Packages**			
5.1	30% Project Design	HDR	DM	8
5.2	Erosion Prevention and Sediment Control (30% - RFC)	ST	SS	
5.3	Temp Traffic Control / Median Crossover Design (30% - RFC)	ST	SS	
5.4	Site Access Rd / Staging Areas (30% - RFC)	R&R	PM	
5.5	Bridge Demolition Plan NB (30% - RFC)	R&R	PM	2,7
5.6	Pier Foundation & Footing Design NB (30% - RFC)	HDR	DM	8
5.7	Geotechnical Investigation Plan/ Borings /Report	HDR	DM	
6	**Design Remaining Portions of NB Bridge**			
6.1	Pier Shaft & Cap Design -NB (30% - RFC)	HDR	DM	8
6.2	Abutment Design -NB (30% - RFC)	HDR	DM	8
6.3	Bridge Superstructure Design -NB (30% - RFC)	HDR	DM	8
6.4	Approach Roadwork Design -NB (30% - RFC)	HDR	DM	7,9
7	**Design South Bound Bridge**			
7.1	Bridge Demolition Plan -SB (30% - RFC)	R&R	PM	2,7
7.2	Pier Foundation, Footing, Shaft & Cap Design SB (30% - RFC)	HDR	DM	8
7.3	Abutment Design -SB (30% - RFC)	HDR	DM	8
7.4	Bridge Superstructure Design -SB (30% - RFC)	HDR	DM	7,8
7.5	Approach Roadwork Designs -SB (30% - RFC)	HDR	DM	7,9
8	**Fabrication Drawings Submittal and Review**			
8.1	Expansion Devices	R&R	PM	9
8.2	Bridge Barrier	R&R	PM	9
8.3	Bearing Devices	R&R	PM	9
8.4	Reinforcing Steel	R&R	PM	9
8.5	Post Tensioning	R&R	PM	9
8.6	Precast Girder Beams	R&R	PM	9
9	**Construction Engineering & Submittals**			
9.1	Temporary Sheeting at Abutments	R&R	PM	7,8
9.2	Temporary Trestle Across Williams River	R&R	PM	7,8
9.3	Protective Coatings of Concrete Surfaces	R&R	CM	
9.4	Temporary Shoring Superstructure	R&R	PM	7,8
9.5	Cofferdams at Piers if Required	R&R	PM	7,8
9.6	Deck Overhang Formwork Design	R&R	PM	
9.7	Deck SIP Form Panels	R&R	PM	
9.8	Precast Girder Handling and Erection Plan	R&R	PM	

Work Package		Responsibility		* Technical Challenge
3. Project Construction				
10	**Major Material Fabrication**			
10.1	Precast Beam Fabrication NB	R&R	PM	5,9,11
10.2	Bearing Device Fabrication NB	R&R	PM	
10.3	Expansion Device Fabrication NB	R&R	PM	
10.4	Rebar NB	R&R	PM	
10.5	Post Tensioning System NB	R&R	PM	
10.6	Precast Beam Fabrication SB	R&R	PM	5,9,11
10.7	Bearing Device Fabrication SB	R&R	PM	
10.8	Expansion Device Fabrication SB	R&R	PM	
10.9	Rebar SB	R&R	PM	
10.10	Post Tensioning System SB	R&R	PM	
11	**Construction Mobilization and Temporary Access**	R&R	CM	
12	**Demolition of Bridge Structure NB**			
12.1	Remove Bridge Decks NB	R&R	CM	
12.2	Remove Steel Truss NB	R&R	CM	
12.3	Remove Piers and Abutments NB	R&R	CM	6,7,9
	Substructure Construction - Phase 1			6,7,9
13	**Pier Foundations & Footings NB**	R&R	CM	
14	**Pier Shafts and Caps NB**	R&R	CM	6,7,9,10
15	**Abutments NB**	R&R	CM	6,9
16	**Superstructure NB**			6,9,10
16.1	Set Precast Girders NB	R&R	CM	
16.2	Form and Place Bridge Deck NB	R&R	CM	5,6,9
16.3	Bridge Electrical Conduit System	R&R	CM	5,6,9
16.4	Complete Superstructure NB / Switch Traffic over	R&R	CM	5,6,9
17	**Roadway Approach NB**			5,9
17.1	South End	R&R	CM	
17.2	North End	R&R	CM	5,9
18	**Demolition of Bridge SB**			
18.1	Remove Bridge Decks SB	R&R	CM	6,7,9
18.2	Remove Steel Truss SB	R&R	CM	6,7,9
18.3	Remove Piers and Abutment SB	R&R	CM	6,7,9
	Substructure Construction - Phase 2			
19	**Pier Foundations & Footings SB**	R&R	CM	6,7,9,10
20	**Pier Shafts and Caps SB**	R&R	CM	6,9
21	**Abutments SB**	R&R	CM	6,9
22	**Superstructure SB**			
22.1	Set Precast Girders SB	R&R	CM	5,6,9
22.3	Form and Place Bridge Deck SB	R&R	CM	5,6,9
22.3	Bridge Electrical Conduit System	R&R	CM	5,6,9
22.4	Complete Superstructure SB / Open to Traffic	R&R	CM	5,9
23	**Roadway Approach Construction SB**			
23.1	South End	R&R	CM	5,9
23.2	North End	R&R	CM	5,9

Work Package		Responsibility		* Technical Challenge
4. Project Completion				
24	**Inspections and Acceptance**			
24.1	Joint Inspections with VTrans	R&R	PM	
24.2	Certificates of Substantial Completion	R&R	PM	
24.3	Final Acceptance	R&R	PM	
25	**Completion and Demobilization**			
25.1	Restore Disturbed Areas	R&R	CM	
25.2	Address Punch List Items	R&R	CM	
25.3	Remove Traffic Control Devices	R&R	CM	
25.4	Demobilize Equipment and Field Offices	R&R	CM	
26	**Project Closeout Documents**			
26.1	Project Correspondence	R&R	PM	
26.2	Project Reports	R&R	PM	
26.3	Project Permits	VCM	ECO	
26.4	Project Calculation Book	HDR	DM	
26.5	Project Design Plans	HDR	DM	
26.6	Original Working Drawings	HDR	DM	
26.7	Construction Documents	R&R	PM	
26.8	As-Built Plans and Record Documents	HDR	DM	
26.9	As-Built Load Rating Calculation	HDR	DM	
26.10	Maintenance and Inspection Manual	HDR	DM	

LEGEND:

R&R - Reed & Reed
HDR - Designer
VCM -Vermont Compliance Monitoring
ST - Sebago Technics
COI- Count On It Business Solutions, Inc.
PM - Project Manager
DM - Design Manager
ECO-Environmental Compliance Officer
PRO-Public Relations Officer
CM - Construction Manager
SS - Steve Sawyer of Sebago Technics
CQM- Construction Quality Control Manager

*

Technical challenge numbers represent item of discussion on our enclosed Risk Evaluation Matrix. Each item lists a concern or challenge to the completion of the project and we provide a means and method to minimize the technical challenge.

This Page Left Intentionally Blank

5.1.10.2 Proposal Schedule

The R&R Team's proposal contains a detailed Project Schedule that is based upon and driven by the WBS. The WBS and the schedule outline the Project from beginning to end, detailing our four major Categories: Project Start-Up; Project Design; Construction Phases 1 and 2; and Project Completion.

Improvement to RFP Milestone Schedule

Our proposed schedule shows a substantial completion date of November 15, 2019, six months ahead of the RFP requirements. Final completion will be by June 22, 2020. In addition to an early completion date **we also intend to restrict traffic to one lane in each direction and subject traffic to temporary cross-overs for thirty-two months and only two winter seasons.**

Our schedule is based upon completing pile driving, pier foundations and substructure concrete during cold weather months. R&R has extensive experience constructing mass concrete structures during winter months; we are very confident that we can protect the freshly placed concrete from freezing temperatures and deliver a quality product. **Our approach will allow us to complete the NB deck superstructure (Construction Phase 1) during the warm weather months of 2018 and the SB barrel (Construction Phase 2) during the warm weather of 2019. Our schedule is based on working one shift, five days a week. We plan on utilizing three crews that total 20-25 individuals. Our estimated hours worked per week will be 50 to 55 hours.**

Work Packages

The WBS is clearly defined and included within our Project Schedule and the numbering system and project sequence from the WBS is consistent with our schedule, making it easy to compare the logic and sequence from the WBS to our Project Schedule.

Means and Methods to Plan and Control Scheduling of Work

Primavera P6 software has been, and will continue to be utilized to create and maintain the Project Schedule. The Project Schedule and design submittals and material procurement will be discussed at all bi-weekly progress meetings; the schedule will be compared with the original and the most recent current schedule. R&R will review and update the important critical path activities that drive the schedule; this effort will identify potential schedule problem areas. We will the evaluate whether to either re-sequence work or to add field resources to accelerate specific activities to maintain our schedule. In addition, **all VTrans personnel involved in the project will have the opportunity to comment on their areas of schedule concern; our approach is transparent and collaborative and requires participation by VTrans**. R&R's Construction Manager, Charlie Guerette, will be responsible for maintaining and updating an accurate Project Schedule.

Method of Monitoring Work Package Progress and Updating Schedule

R&R utilizes a combination of a Three Week Look-Ahead Schedule and the Project Schedule. The Look-Ahead Schedule focuses on the short-term, enabling the Construction Manager and crews to review means and methods, staffing resources, materials and equipment required to perform the work. Our Look-Ahead schedules are updated weekly and reviewed with our crews and with the VTrans Resident Engineer.

R&R also updates the Project Schedule monthly. Our approach includes a site tour to assess completed work and progress to date. We then obtain input from our crews and subcontractors to determine

whether we will remain on schedule or whether there might be a potential schedule impact. Our Construction Manager then updates the project schedule and cross references to the WBS as necessary. Our Construction Manager will review our updated Project Schedule at the bi-weekly meetings or as needed with VTrans, the QAM and the Resident Engineer.

Approach to Mitigate Risks and Challenges to Meeting Completion Dates

Working together throughout the proposal process has allowed the R&R Team to design a project that minimizes the risk to us and to VTrans. The WBS and the schedule delineate areas of the project that require early effort and focus; these early reviews will enable us to uncover potential delays in construction, allowing time to resolve these issues long before construction activities begin.

The R&R's Team's Spliced Girder Technical Concept will Shorten the Construction Schedule and Minimize

Our main strategies for minimizing schedule risk are outlined on the Risk Evaluation Matrix in Section 5.1.7. The most **significant factor and component in reducing schedule risk is the R&R Team's approved Technical Concept – spliced, post-tensioned, precast concrete girders for the 24N and 24S Bridges. Spliced girders will shorten the R&R Team's schedule and mitigate schedule risk by simplifying design and reducing the complexity of construction. In addition, R&R optimizes the construction schedule by placing deck concrete within favorable weather months.** In summary, our approach minimizes project completion schedule risks by using various strategies that either mitigate or avoid them as demonstrated in the Risk Evaluation Matrix.

Timeframes for Permitting within the Schedule

The work package activities include sufficient time for the permitting process, design QC reviews and VTrans reviews. We have prior experience working in Vermont with VTrans, and we have obtained input from HDR and their key sub-consultants, including Matt Montgomery, ECO of Vermont Compliance Monitoring regarding timeframes for permitting including regulatory agency review. With a Notice of Intent to Award date of June 1, 2016 we have built sufficient time into our schedule to complete all administrative submittals and the majority of all design work before R&R begins construction in the spring of 2017.

Assigning Appropriate Durations

R&R will self-perform approximately 90% of all construction activities on this project, and we have extensive experience working in the Northeastern U.S. under all weather conditions. The scope of work activities on the Rockingham Bridges 24N & 24S replacement project is work we have completed many times in the eighty-five year history of R&R. After fully evaluating and understanding the scope of the project, we have provided HDR with design and construction preferences for all aspects of the work (e.g. foundation types, substructure configurations, bridge type) that complement our construction and R&R's personnel experience and provided input into design details that are more easily constructed by our construction team. We also understand the environmental requirements of the project and the weather conditions of the local area. The durations of activities contained in our project schedule

involve specific work scopes that we have completed in the past. **Thus, we are confident that our activity durations are accurate.**

Recovery of Lost Time

All too often when construction firms fall behind schedule they simply update the construction schedule and "get back on schedule" by simply reducing the subsequent durations. If this methodology is employed the underlying problem still exists and is not remediated; the schedule durations are shortened, and the problem is "pushed down stream" and remains unresolved. Moreover, there is then little or no time left to react to the issues and to remediate and recover. At R&R we pride ourselves on analyzing the schedule and determining what the root issue is if we begin falling behind on our schedule. For example, we look at productivity, assigned supervision, number of field workers and classification mix, cranes and equipment, material deliveries and weather conditions. **We identify the real issue as soon as possible to provide us adequate time to devise a solution and an effective recovery schedule, and to implement the recovery schedule solution without compromising the overall construction schedule.**

Options to maintain schedule should we start to slip include:

1. Adding a small, second shift crew to concentrate on specific work items.
2. Working a partial crew on Saturdays.
3. Bringing in a complete second shift complete with supervision and construction QC.
4. Adding equipment and operators.

Since R&R self-performs the majority of the work, we control our "destiny" and the construction schedule, and we do not have to rely on subcontractors. If we fall behind, we simply add more labor and supervision.

A schedule item specific to the Rockingham project is **R&R's reliance on precast concrete girder suppliers to meet our required girder delivery schedule**. **R&R has verified availability of precast girder plant capacity** and the precasters' ability to meet our schedule with several suppliers; we are confident they have the resources to meet our schedule. This item is included in the Risk Evaluation Matrix.

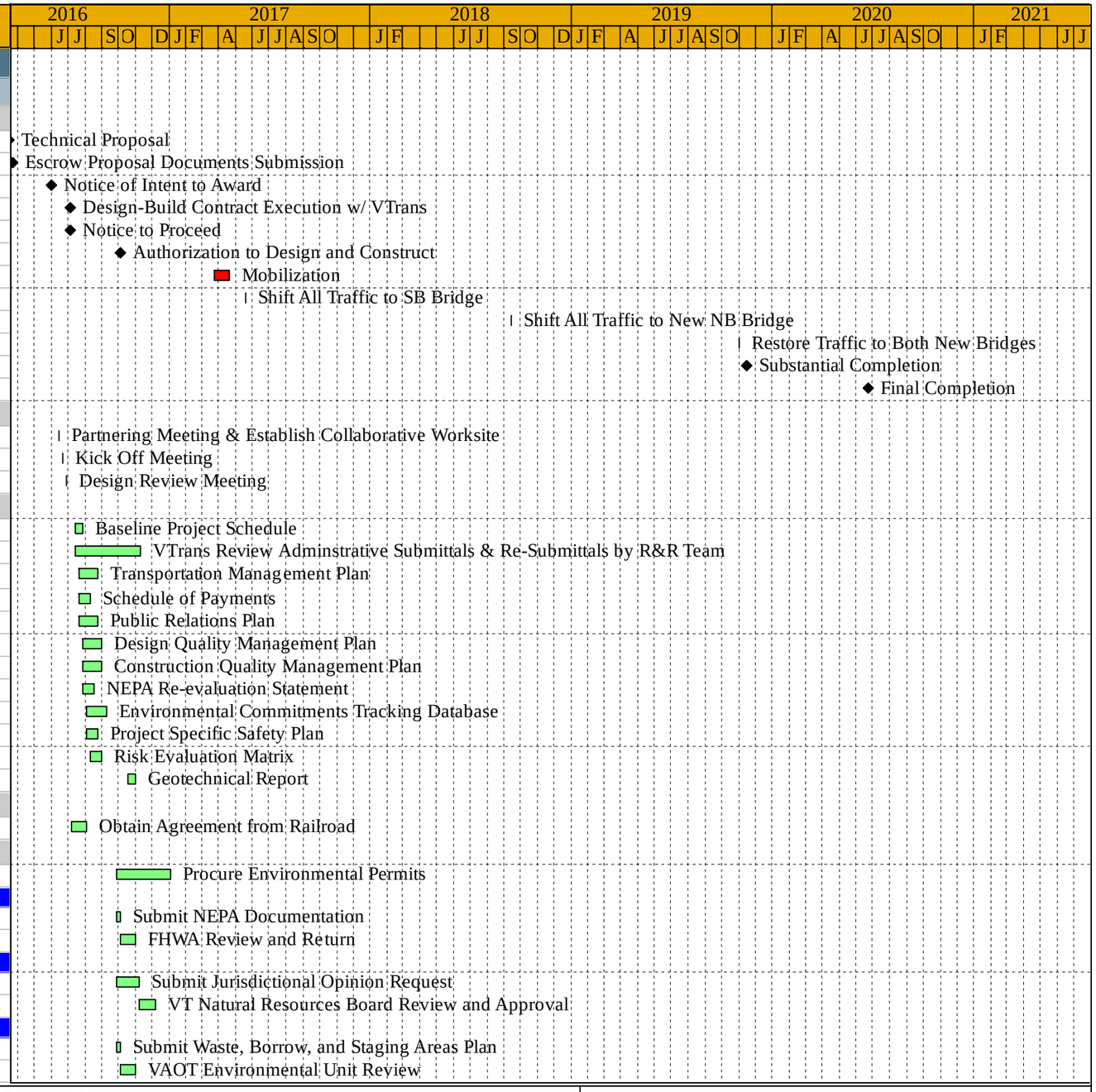
Every project will encounter schedule issues, but what is of great importance is how a construction company identifies, addresses and mitigates these issues to enable the project to adhere to the original construction schedule. R&R is extremely confident that we can complete the project in accordance with our proposed Project Schedule.

Timetable for Temporary Traffic Control Phasing, Maintenance and Winter Closure

The RFP allows for traffic impact and lane closures from October 2016 through May of 2020, or 43 months. **Our schedule significantly reduces the amount of time traffic will be impacted by construction by 11 months.** We believe we can detour traffic, remove the NB Bridge and replace it in 14 months. Thus, we do not plan to impact I-91 traffic until March of 2017 and are planning to complete all traffic impact related activities by October 30, 2019, or 32 months and two winter seasons of traffic impact.

This Page Left Intentionally Blank

Activity ID	Activity Name	Duration	Start	Finish
I-91 Rockingham Bridge over Williams River		1110	16-Mar-16	22-Jun-20
1. Project Start-Up		1110	16-Mar-16	22-Jun-20
Milestones		1110	16-Mar-16	22-Jun-20
A1340	Technical Proposal	0	16-Mar-16*	
A1350	Escrow Proposal Documents Submission	0	23-Mar-16*	
A1010	Notice of Intent to Award	0	01-Jun-16*	
A1030	Design-Build Contract Execution w/ VTrans	0		06-Jul-16*
A1035	Notice to Proceed	0		06-Jul-16*
A1360	Authorization to Design and Construct	0		05-Oct-16*
A2000	Mobilization	20	24-Mar-17	20-Apr-17
A4000	Shift All Traffic to SB Bridge	1	19-May-17	19-May-17
A4130	Shift All Traffic to New NB Bridge	1	13-Sep-18	13-Sep-18
A4360	Restore Traffic to Both New Bridges	1	01-Nov-19	01-Nov-19
A4380	Substantial Completion	0		15-Nov-19
A4390	Final Completion	0		22-Jun-20
WBS 1 Project Initial		11	15-Jun-16	29-Jun-16
A1015	Partnering Meeting & Establish Collaborative Worksite	1	15-Jun-16	15-Jun-16
A1045	Kick Off Meeting	1	22-Jun-16	22-Jun-16
A1025	Design Review Meeting	1	29-Jun-16	29-Jun-16
WBS 2 Administrative Submittals		85	14-Jul-16	10-Nov-16
A1330	Baseline Project Schedule	10	14-Jul-16	27-Jul-16
A1570	VTrans Review Adminstrative Submittals & Re-Submittals by R	85	14-Jul-16	10-Nov-16
A1400	Transportation Management Plan	25	21-Jul-16	24-Aug-16
A1420	Schedule of Payments	15	21-Jul-16	10-Aug-16
A1430	Public Relations Plan	25	21-Jul-16	24-Aug-16
A1380	Design Quality Management Plan	25	28-Jul-16	31-Aug-16
A1390	Construction Quality Management Plan	25	28-Jul-16	31-Aug-16
A1410	NEPA Re-evaluation Statement	15	28-Jul-16	17-Aug-16
A1440	Environmental Commitments Tracking Database	25	04-Aug-16	08-Sep-16
A1450	Project Specific Safety Plan	15	04-Aug-16	24-Aug-16
A1460	Risk Evaluation Matrix	15	11-Aug-16	31-Aug-16
A1370	Geotechnical Report	10	18-Oct-16	31-Oct-16
WBS 3 Railroad Agreement		20	07-Jul-16	03-Aug-16
A1470	Obtain Agreement from Railroad	20	07-Jul-16	03-Aug-16
WBS 4 Environmental Commitments & Permits		203	27-Sep-16	07-Jul-17
A7120	Procure Environmental Permits	70	27-Sep-16	03-Jan-17
4.1 NEPA Compliance / Environmental Documentation (FHWA)		25	27-Sep-16	31-Oct-16
A1480	Submit NEPA Documentation	5	27-Sep-16	03-Oct-16
A1490	FHWA Review and Return	20	04-Oct-16	31-Oct-16
4.2 Vermont Land Use Law: Act 250 (VT Natural Resources Board)		50	27-Sep-16	06-Dec-16
A1500	Submit Jurisdictional Opinion Request	30	27-Sep-16	07-Nov-16
A1510	VT Natural Resources Board Review and Approval	20	08-Nov-16	06-Dec-16
4.3 Waste, Borrow, and Staging Areas (VAOT Environmental Unit)		25	27-Sep-16	31-Oct-16
A1520	Submit Waste, Borrow, and Staging Areas Plan	5	27-Sep-16	03-Oct-16
A1530	VAOT Environmental Unit Review	20	04-Oct-16	31-Oct-16

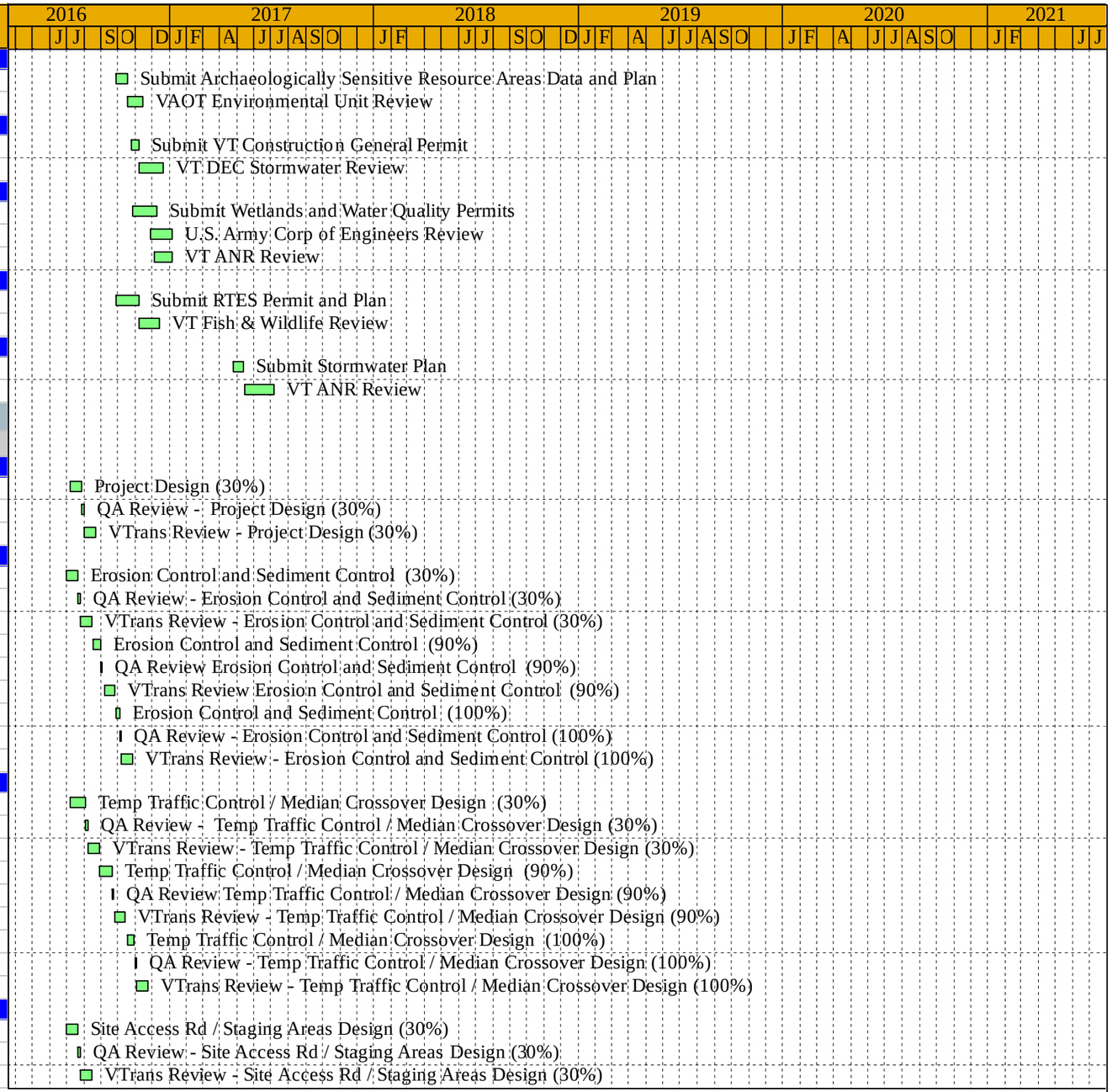


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
	4.4 Historic or Archaeologically Sensitive Resource Areas (VAOT Environmental Unit)	35	27-Sep-16	14-Nov-16
A1540	Submit Archaeologically Sensitive Resource Areas Data and Plan	15	27-Sep-16	17-Oct-16
A1550	VAOT Environmental Unit Review	20	18-Oct-16	14-Nov-16
	4.5 VT Construction General Permit (VT DEC Stormwater)	40	25-Oct-16	20-Dec-16
A1670	Submit VT Construction General Permit	10	25-Oct-16	07-Nov-16
A1680	VT DEC Stormwater Review	30	08-Nov-16	20-Dec-16
	4.6 Wetlands and Water Quality Permits (U.S. Army Corp of Engineers & VT ANR)	50	28-Oct-16	06-Jan-17
A1600	Submit Wetlands and Water Quality Permits	30	28-Oct-16	09-Dec-16
A1610	U.S. Army Corp of Engineers Review	30	28-Nov-16	06-Jan-17
A1650	VT ANR Review	25	05-Dec-16	06-Jan-17
	4.7 Rare, Threatened & Endangered Species Taking Permit (VT Fish & Wildlife) (If Rec	55	27-Sep-16	13-Dec-16
A1560	Submit RTES Permit and Plan	30	27-Sep-16	07-Nov-16
A1620	VT Fish & Wildlife Review	25	08-Nov-16	13-Dec-16
	4.8 Stormwater General Permit 3-9015 (VT ANR)	55	24-Apr-17	07-Jul-17
A1630	Submit Stormwater Plan	15	24-Apr-17	12-May-17
A1640	VT ANR Review	40	15-May-17	07-Jul-17
	2. Project Design	364	30-Jun-16	24-Nov-17
	WBS 5 Early Release Work Packages	220	30-Jun-16	08-May-17
	5.1 30% Project Design	33	07-Jul-16	22-Aug-16
A6070	Project Design (30%)	15	07-Jul-16	27-Jul-16
A6080	QA Review - Project Design (30%)	3	28-Jul-16	01-Aug-16
A6090	VTrans Review - Project Design (30%)	15	02-Aug-16	22-Aug-16
	5.2 Erosion Prevention and Sediment Control (30% - RFC)	84	30-Jun-16	27-Oct-16
A1090	Erosion Control and Sediment Control (30%)	15	30-Jun-16	21-Jul-16
A1100	QA Review - Erosion Control and Sediment Control (30%)	3	22-Jul-16	26-Jul-16
A1110	VTrans Review - Erosion Control and Sediment Control (30%)	15	27-Jul-16	16-Aug-16
A1150	Erosion Control and Sediment Control (90%)	10	17-Aug-16	30-Aug-16
A1160	QA Review Erosion Control and Sediment Control (90%)	3	31-Aug-16	02-Sep-16
A1170	VTrans Review Erosion Control and Sediment Control (90%)	15	06-Sep-16	26-Sep-16
A1210	Erosion Control and Sediment Control (100%)	5	27-Sep-16	03-Oct-16
A1220	QA Review - Erosion Control and Sediment Control (100%)	3	04-Oct-16	06-Oct-16
A1230	VTrans Review - Erosion Control and Sediment Control (100%)	15	07-Oct-16	27-Oct-16
	5.3 Temp Traffic Control / Median Crossover Design (30% - RFC)	99	07-Jul-16	23-Nov-16
A1060	Temp Traffic Control / Median Crossover Design (30%)	20	07-Jul-16	03-Aug-16
A1070	QA Review - Temp Traffic Control / Median Crossover Design	3	04-Aug-16	08-Aug-16
A1080	VTrans Review - Temp Traffic Control / Median Crossover Des	15	09-Aug-16	29-Aug-16
A1120	Temp Traffic Control / Median Crossover Design (90%)	15	30-Aug-16	20-Sep-16
A1130	QA Review Temp Traffic Control / Median Crossover Design (9	3	21-Sep-16	23-Sep-16
A1140	VTrans Review - Temp Traffic Control / Median Crossover Des	15	26-Sep-16	14-Oct-16
A1180	Temp Traffic Control / Median Crossover Design (100%)	10	17-Oct-16	28-Oct-16
A1190	QA Review - Temp Traffic Control / Median Crossover Design	3	31-Oct-16	02-Nov-16
A1200	VTrans Review - Temp Traffic Control / Median Crossover Des	15	03-Nov-16	23-Nov-16
	5.4 Site Access Rd / Staging Areas (30% - RFC)	84	30-Jun-16	27-Oct-16
A5280	Site Access Rd / Staging Areas Design (30%)	15	30-Jun-16	21-Jul-16
A5290	QA Review - Site Access Rd / Staging Areas Design (30%)	3	22-Jul-16	26-Jul-16
A5300	VTrans Review - Site Access Rd / Staging Areas Design (30%)	15	27-Jul-16	16-Aug-16

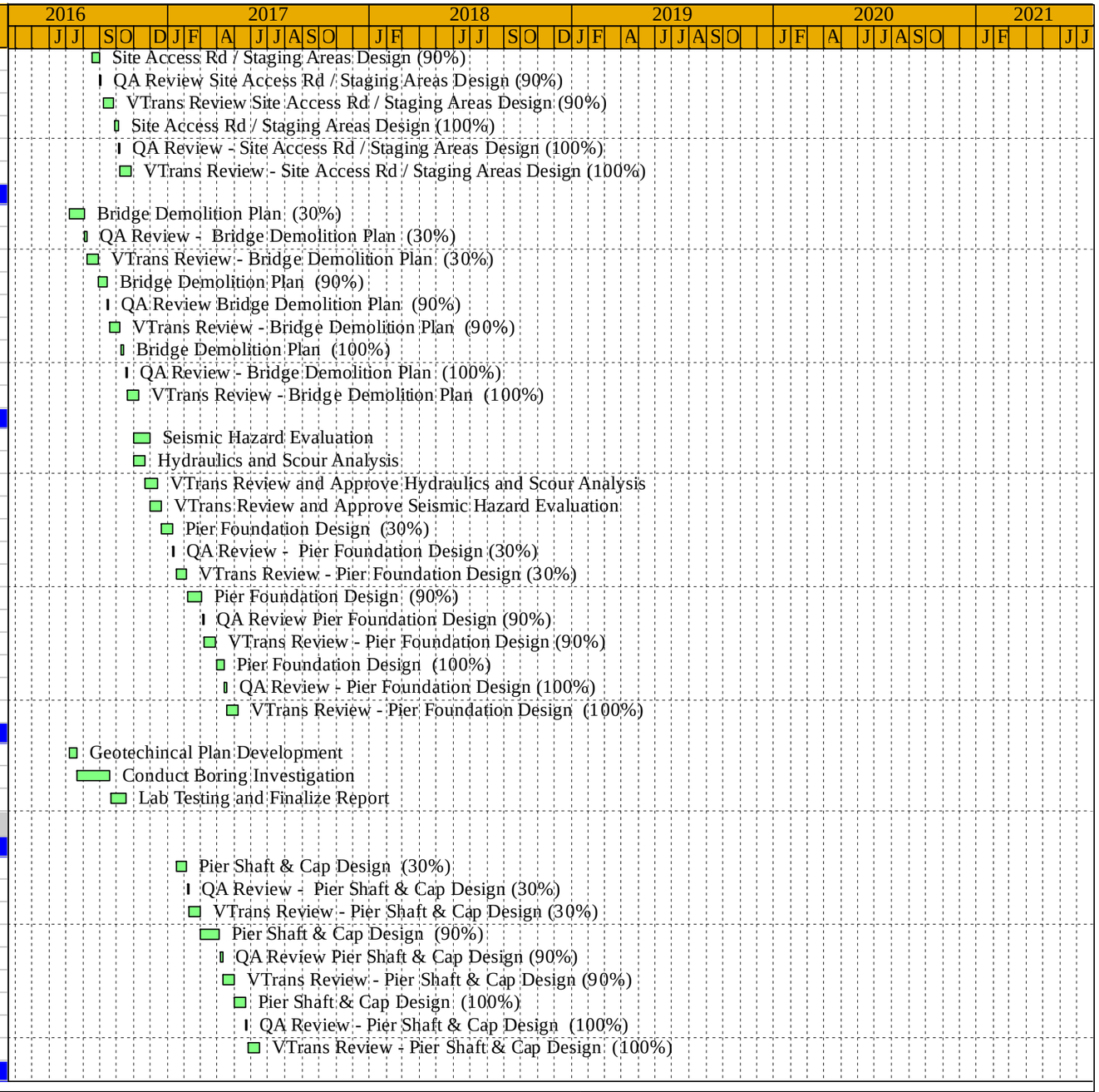


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
A5310	Site Access Rd / Staging Areas Design (90%)	10	17-Aug-16	30-Aug-16
A5320	QA Review Site Access Rd / Staging Areas Design (90%)	3	31-Aug-16	02-Sep-16
A5330	VTrans Review Site Access Rd / Staging Areas Design (90%)	15	06-Sep-16	26-Sep-16
A5340	Site Access Rd / Staging Areas Design (100%)	5	27-Sep-16	03-Oct-16
A5350	QA Review - Site Access Rd / Staging Areas Design (100%)	3	04-Oct-16	06-Oct-16
A5360	VTrans Review - Site Access Rd / Staging Areas Design (100%)	15	07-Oct-16	27-Oct-16
5.5 Bridge Demolition Plan - NB (30% - RFC)		89	07-Jul-16	09-Nov-16
A5370	Bridge Demolition Plan (30%)	20	07-Jul-16	03-Aug-16
A5380	QA Review - Bridge Demolition Plan (30%)	3	04-Aug-16	08-Aug-16
A5390	VTrans Review - Bridge Demolition Plan (30%)	15	09-Aug-16	29-Aug-16
A5400	Bridge Demolition Plan (90%)	10	30-Aug-16	13-Sep-16
A5410	QA Review Bridge Demolition Plan (90%)	3	14-Sep-16	16-Sep-16
A5420	VTrans Review - Bridge Demolition Plan (90%)	15	19-Sep-16	07-Oct-16
A5430	Bridge Demolition Plan (100%)	5	10-Oct-16	14-Oct-16
A5440	QA Review - Bridge Demolition Plan (100%)	3	17-Oct-16	19-Oct-16
A5450	VTrans Review - Bridge Demolition Plan (100%)	15	20-Oct-16	09-Nov-16
5.6 Pier Foundation & Footing Design - NB (30% - RFC)		134	01-Nov-16	08-May-17
A6170	Seismic Hazard Evaluation	20	01-Nov-16	29-Nov-16
A6180	Hydraulics and Scour Analysis	15	01-Nov-16	21-Nov-16
A6480	VTrans Review and Approve Hydraulics and Scour Analysis	15	22-Nov-16	13-Dec-16
A6470	VTrans Review and Approve Seismic Hazard Evaluation	15	30-Nov-16	20-Dec-16
A5980	Pier Foundation Design (30%)	15	21-Dec-16	10-Jan-17
A5990	QA Review - Pier Foundation Design (30%)	3	11-Jan-17	13-Jan-17
A6000	VTrans Review - Pier Foundation Design (30%)	15	16-Jan-17	03-Feb-17
A6010	Pier Foundation Design (90%)	20	06-Feb-17	03-Mar-17
A6020	QA Review Pier Foundation Design (90%)	3	06-Mar-17	08-Mar-17
A6030	VTrans Review - Pier Foundation Design (90%)	15	09-Mar-17	29-Mar-17
A6040	Pier Foundation Design (100%)	10	30-Mar-17	12-Apr-17
A6050	QA Review - Pier Foundation Design (100%)	3	13-Apr-17	17-Apr-17
A6060	VTrans Review - Pier Foundation Design (100%)	15	18-Apr-17	08-May-17
5.7 Geotechnical Investigation Plan/ Borings/ Report		72	07-Jul-16	17-Oct-16
A6190	Geotechincal Plan Development	10	07-Jul-16	20-Jul-16
A6650	Conduct Boring Investigation	42	21-Jul-16	19-Sep-16
A6660	Lab Testing and Finalize Report	20	20-Sep-16	17-Oct-16
WBS 6 Design Remaining Portions of NB Bridge		205	31-Aug-16	15-Jun-17
6.1 Pier Shaft & Cap Design - NB (30% - RFC)		109	16-Jan-17	15-Jun-17
A6740	Pier Shaft & Cap Design (30%)	15	16-Jan-17	03-Feb-17
A6750	QA Review - Pier Shaft & Cap Design (30%)	3	06-Feb-17	08-Feb-17
A6760	VTrans Review - Pier Shaft & Cap Design (30%)	15	09-Feb-17	01-Mar-17
A6770	Pier Shaft & Cap Design (90%)	25	02-Mar-17	05-Apr-17
A6780	QA Review Pier Shaft & Cap Design (90%)	3	06-Apr-17	10-Apr-17
A6790	VTrans Review - Pier Shaft & Cap Design (90%)	15	11-Apr-17	01-May-17
A6800	Pier Shaft & Cap Design (100%)	15	02-May-17	22-May-17
A6810	QA Review - Pier Shaft & Cap Design (100%)	3	23-May-17	25-May-17
A6820	VTrans Review - Pier Shaft & Cap Design (100%)	15	26-May-17	15-Jun-17
6.2 Abutment Design - NB (30% - RFC)		109	16-Jan-17	15-Jun-17

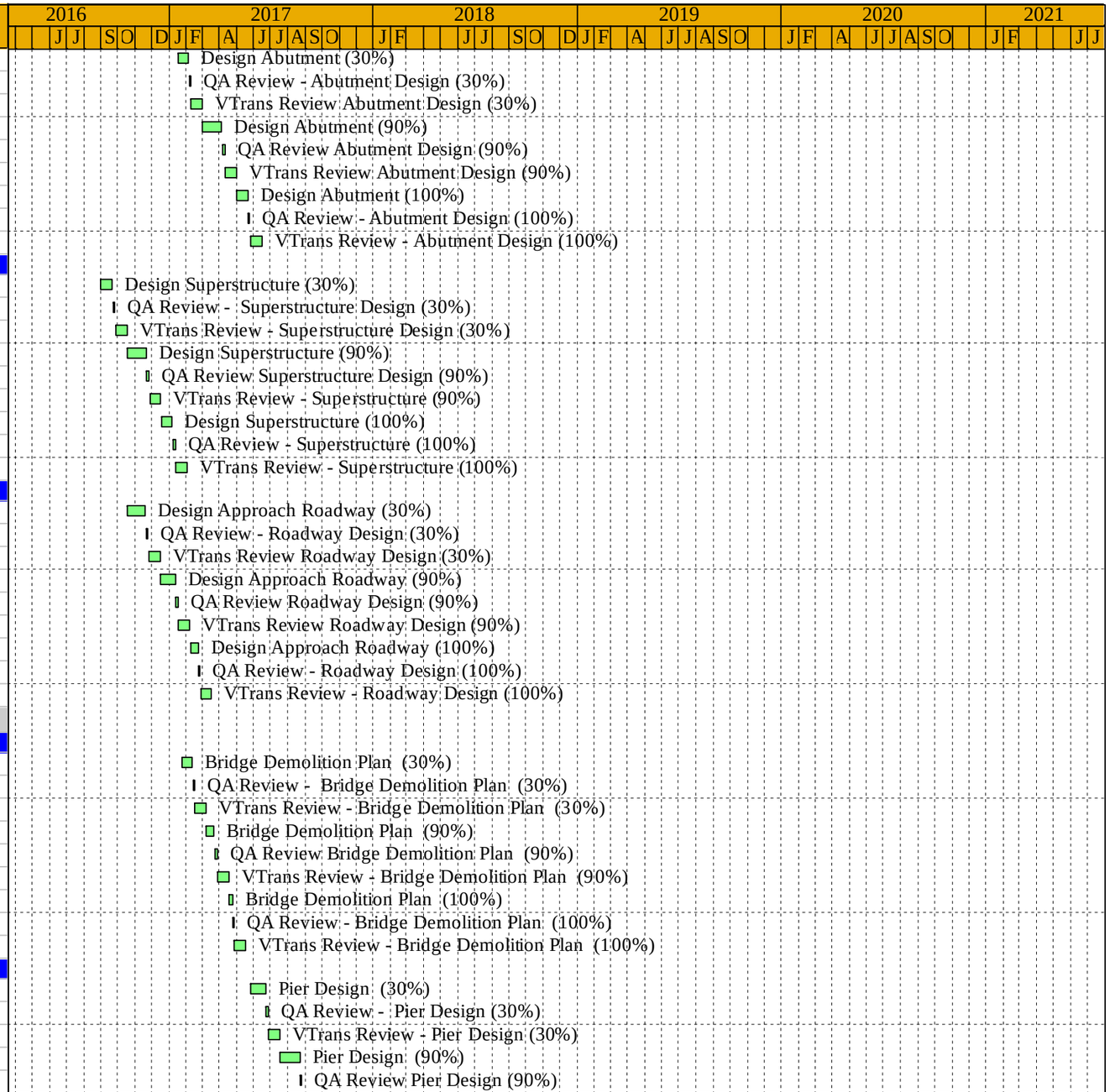


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
A5500	Design Abutment (30%)	15	16-Jan-17	03-Feb-17
A5510	QA Review - Abutment Design (30%)	3	06-Feb-17	08-Feb-17
A5520	VTrans Review Abutment Design (30%)	15	09-Feb-17	01-Mar-17
A5530	Design Abutment (90%)	25	02-Mar-17	05-Apr-17
A5540	QA Review Abutment Design (90%)	3	06-Apr-17	10-Apr-17
A5550	VTrans Review Abutment Design (90%)	15	11-Apr-17	01-May-17
A5560	Design Abutment (100%)	15	02-May-17	22-May-17
A5570	QA Review - Abutment Design (100%)	3	23-May-17	25-May-17
A5580	VTrans Review - Abutment Design (100%)	15	26-May-17	15-Jun-17
6.3 Bridge Superstructure Design - NB (30% - RFC)		109	31-Aug-16	01-Feb-17
A5800	Design Superstructure (30%)	15	31-Aug-16	21-Sep-16
A5810	QA Review - Superstructure Design (30%)	3	22-Sep-16	26-Sep-16
A5820	VTrans Review - Superstructure Design (30%)	15	27-Sep-16	17-Oct-16
A5830	Design Superstructure (90%)	25	18-Oct-16	21-Nov-16
A5840	QA Review Superstructure Design (90%)	3	22-Nov-16	25-Nov-16
A5850	VTrans Review - Superstructure (90%)	15	28-Nov-16	16-Dec-16
A5860	Design Superstructure (100%)	15	19-Dec-16	06-Jan-17
A5870	QA Review - Superstructure (100%)	3	09-Jan-17	11-Jan-17
A5880	VTrans Review - Superstructure (100%)	15	12-Jan-17	01-Feb-17
6.4 Approach Roadwork Design - NB (30% - RFC)		109	17-Oct-16	17-Mar-17
A6200	Design Approach Roadway (30%)	25	17-Oct-16	18-Nov-16
A6210	QA Review - Roadway Design (30%)	3	21-Nov-16	23-Nov-16
A6220	VTrans Review Roadway Design (30%)	15	25-Nov-16	15-Dec-16
A6230	Design Approach Roadway (90%)	20	16-Dec-16	12-Jan-17
A6240	QA Review Roadway Design (90%)	3	13-Jan-17	17-Jan-17
A6250	VTrans Review Roadway Design (90%)	15	18-Jan-17	07-Feb-17
A6260	Design Approach Roadway (100%)	10	08-Feb-17	21-Feb-17
A6270	QA Review - Roadway Design (100%)	3	22-Feb-17	24-Feb-17
A6280	VTrans Review - Roadway Design (100%)	15	27-Feb-17	17-Mar-17
WBS 7 Design SB Bridge		213	09-Jan-17	01-Nov-17
7.1 Bridge Demolition Plan - SB (30% - RFC)		84	23-Jan-17	18-May-17
A6290	Bridge Demolition Plan (30%)	15	23-Jan-17	10-Feb-17
A6300	QA Review - Bridge Demolition Plan (30%)	3	13-Feb-17	15-Feb-17
A6310	VTrans Review - Bridge Demolition Plan (30%)	15	16-Feb-17	08-Mar-17
A6320	Bridge Demolition Plan (90%)	10	09-Mar-17	22-Mar-17
A6330	QA Review Bridge Demolition Plan (90%)	3	23-Mar-17	27-Mar-17
A6340	VTrans Review - Bridge Demolition Plan (90%)	15	28-Mar-17	17-Apr-17
A6350	Bridge Demolition Plan (100%)	5	18-Apr-17	24-Apr-17
A6360	QA Review - Bridge Demolition Plan (100%)	3	25-Apr-17	27-Apr-17
A6370	VTrans Review - Bridge Demolition Plan (100%)	15	28-Apr-17	18-May-17
7.2 Pier Foundation, Footing, Shaft, & Cap Design - SB (30% - RFC)		114	26-May-17	01-Nov-17
A6380	Pier Design (30%)	20	26-May-17	22-Jun-17
A6390	QA Review - Pier Design (30%)	3	23-Jun-17	27-Jun-17
A6400	VTrans Review - Pier Design (30%)	15	28-Jun-17	18-Jul-17
A6410	Pier Design (90%)	25	19-Jul-17	22-Aug-17
A6420	QA Review Pier Design (90%)	3	23-Aug-17	25-Aug-17

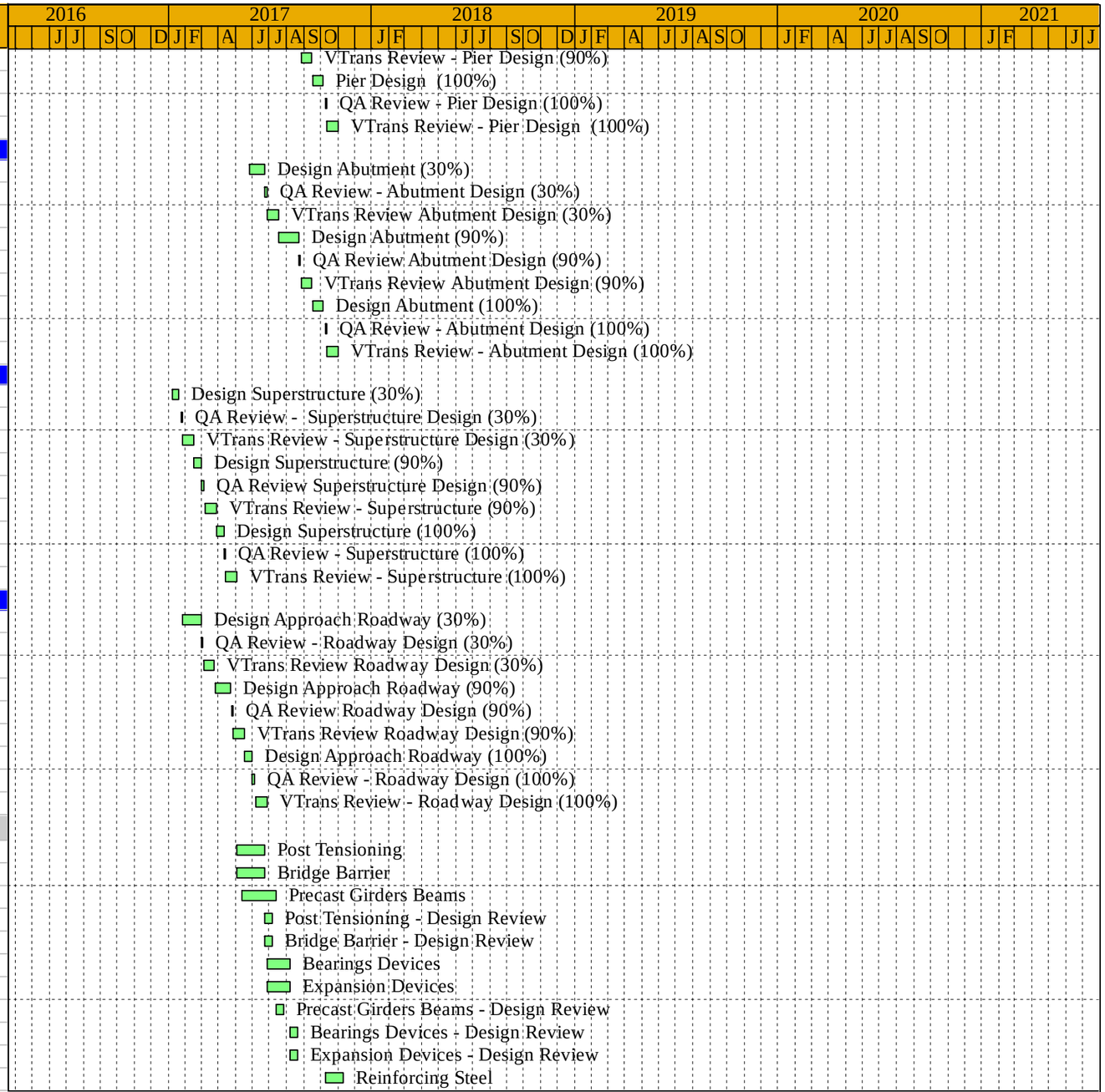


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
A6430	VTrans Review - Pier Design (90%)	15	28-Aug-17	15-Sep-17
A6440	Pier Design (100%)	15	18-Sep-17	06-Oct-17
A6450	QA Review - Pier Design (100%)	3	09-Oct-17	11-Oct-17
A6460	VTrans Review - Pier Design (100%)	15	12-Oct-17	01-Nov-17
7.3 Abutment Design - SB (30% - RFC)		114	26-May-17	01-Nov-17
A6830	Design Abutment (30%)	20	26-May-17	22-Jun-17
A6840	QA Review - Abutment Design (30%)	3	23-Jun-17	27-Jun-17
A6850	VTrans Review Abutment Design (30%)	15	28-Jun-17	18-Jul-17
A6860	Design Abutment (90%)	25	19-Jul-17	22-Aug-17
A6870	QA Review Abutment Design (90%)	3	23-Aug-17	25-Aug-17
A6880	VTrans Review Abutment Design (90%)	15	28-Aug-17	15-Sep-17
A6890	Design Abutment (100%)	15	18-Sep-17	06-Oct-17
A6900	QA Review - Abutment Design (100%)	3	09-Oct-17	11-Oct-17
A6910	VTrans Review - Abutment Design (100%)	15	12-Oct-17	01-Nov-17
7.4 Bridge Superstructure Design - SB (30% - RFC)		84	09-Jan-17	04-May-17
A6920	Design Superstructure (30%)	10	09-Jan-17	20-Jan-17
A6930	QA Review - Superstructure Design (30%)	3	23-Jan-17	25-Jan-17
A6940	VTrans Review - Superstructure Design (30%)	15	26-Jan-17	15-Feb-17
A6950	Design Superstructure (90%)	10	16-Feb-17	01-Mar-17
A6960	QA Review Superstructure Design (90%)	3	02-Mar-17	06-Mar-17
A6970	VTrans Review - Superstructure (90%)	15	07-Mar-17	27-Mar-17
A6980	Design Superstructure (100%)	10	28-Mar-17	10-Apr-17
A6990	QA Review - Superstructure (100%)	3	11-Apr-17	13-Apr-17
A7000	VTrans Review - Superstructure (100%)	15	14-Apr-17	04-May-17
7.5 Approach Roadwork Designs - SB (30% - RFC)		109	25-Jan-17	26-Jun-17
A1240	Design Approach Roadway (30%)	25	25-Jan-17	28-Feb-17
A1250	QA Review - Roadway Design (30%)	3	01-Mar-17	03-Mar-17
A1260	VTrans Review Roadway Design (30%)	15	06-Mar-17	24-Mar-17
A1270	Design Approach Roadway (90%)	20	27-Mar-17	21-Apr-17
A1280	QA Review Roadway Design (90%)	3	24-Apr-17	26-Apr-17
A1290	VTrans Review Roadway Design (90%)	15	27-Apr-17	17-May-17
A1300	Design Approach Roadway (100%)	10	18-May-17	31-May-17
A1310	QA Review - Roadway Design (100%)	3	01-Jun-17	05-Jun-17
A1320	VTrans Review - Roadway Design (100%)	15	06-Jun-17	26-Jun-17
WBS 8 Fabrication Drawings Submittal and Review		146	05-May-17	24-Nov-17
A1910	Post Tensioning	35	05-May-17	22-Jun-17
A1930	Bridge Barrier	35	05-May-17	22-Jun-17
A1810	Precast Girders Beams	45	12-May-17	13-Jul-17
A7110	Post Tensioning - Design Review	10	23-Jun-17	06-Jul-17
A7070	Bridge Barrier - Design Review	10	23-Jun-17	06-Jul-17
A1800	Bearings Devices	30	27-Jun-17	07-Aug-17
A1880	Expansion Devices	30	27-Jun-17	07-Aug-17
A7100	Precast Girders Beams - Design Review	10	14-Jul-17	27-Jul-17
A7080	Bearings Devices - Design Review	10	08-Aug-17	21-Aug-17
A7090	Expansion Devices - Design Review	10	08-Aug-17	21-Aug-17
A1900	Reinforcing Steel	25	09-Oct-17	10-Nov-17

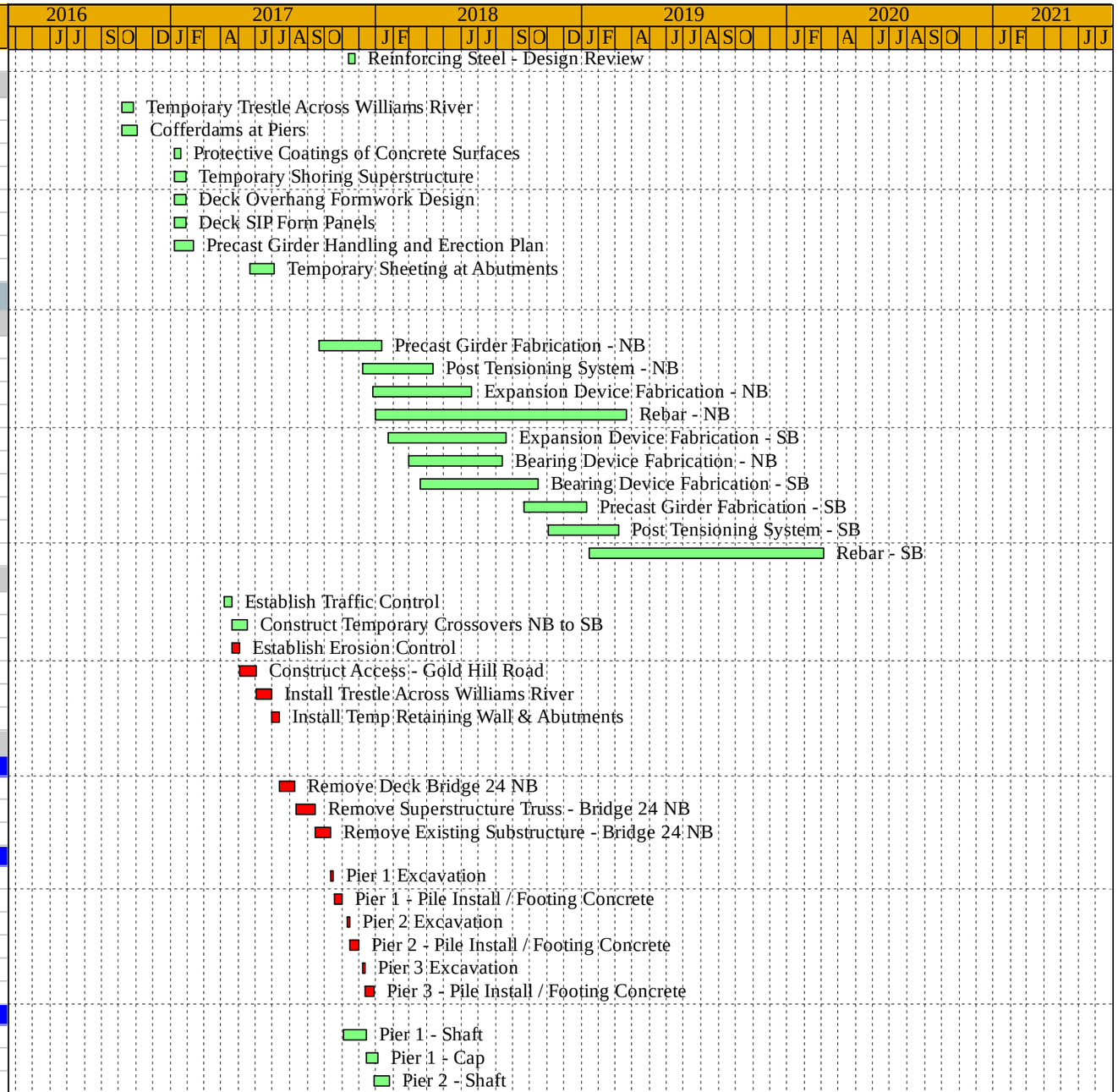


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
A7060	Reinforcing Steel - Design Review	10	13-Nov-17	24-Nov-17
WBS 9 Construction Engineering & Submittlas		192	06-Oct-16	03-Jul-17
A4020	Temporary Trestle Across Williams River	15	06-Oct-16	26-Oct-16
A4190	Cofferdams at Piers	20	06-Oct-16	02-Nov-16
A4030	Protective Coatings of Concrete Surfaces	10	09-Jan-17	20-Jan-17
A4110	Temporary Shoring Superstructure	15	09-Jan-17	27-Jan-17
A4200	Deck Overhang Formwork Design	15	09-Jan-17	27-Jan-17
A4210	Deck SIP Form Panels	15	09-Jan-17	27-Jan-17
A4220	Precast Girder Handling and Erection Plan	25	09-Jan-17	10-Feb-17
A4010	Temporary Sheeting at Abutments	30	23-May-17	03-Jul-17
3. Project Construction		761	07-Apr-17	06-Mar-20
WBS 10 Major Material Fabrication		641	22-Sep-17	06-Mar-20
A1850	Precast Girder Fabrication - NB	80	22-Sep-17	11-Jan-18
A1870	Post Tensioning System - NB	90	08-Dec-17	12-Apr-18
A1830	Expansion Device Fabrication - NB	125	26-Dec-17	18-Jun-18
A1860	Rebar - NB	320	01-Jan-18	22-Mar-19
A7020	Expansion Device Fabrication - SB	150	23-Jan-18	20-Aug-18
A1840	Bearing Device Fabrication - NB	120	27-Feb-18	13-Aug-18
A7030	Bearing Device Fabrication - SB	150	20-Mar-18	15-Oct-18
A7050	Precast Girder Fabrication - SB	80	21-Sep-18	10-Jan-19
A7040	Post Tensioning System - SB	90	02-Nov-18	07-Mar-19
A7010	Rebar - SB	300	14-Jan-19	06-Mar-20
WBS 11 Construction Mobilization and Temporary Access		70	07-Apr-17	13-Jul-17
A2100	Establish Traffic Control	10	07-Apr-17	20-Apr-17
A2010	Construct Temporary Crossovers NB to SB	20	21-Apr-17	18-May-17
A4400	Establish Erosion Control	10	21-Apr-17	04-May-17
A4410	Construct Access - Gold Hill Road	20	05-May-17	01-Jun-17
A4420	Install Trestle Across Williams River	20	02-Jun-17	29-Jun-17
A4430	Install Temp Retaining Wall & Abutments	10	30-Jun-17	13-Jul-17
Constructio Phase 1 - Northbound Bridge		305	14-Jul-17	13-Sep-18
WBS 12 Demolition of Bridge Structures - NB		65	14-Jul-17	12-Oct-17
A4100	Remove Deck Bridge 24 NB	20	14-Jul-17	10-Aug-17
A4120	Remove Superstructure Truss - Bridge 24 NB	25	11-Aug-17	14-Sep-17
A4350	Remove Existing Substructure - Bridge 24 NB	20	15-Sep-17	12-Oct-17
WBS 13 Pier Foundations and Footings - NB		55	13-Oct-17	28-Dec-17
A2050	Pier 1 Excavation	3	13-Oct-17	17-Oct-17
A2060	Pier 1 - Pile Install / Footing Concrete	12	18-Oct-17	02-Nov-17
A4050	Pier 2 Excavation	3	10-Nov-17	14-Nov-17
A4140	Pier 2 - Pile Install / Footing Concrete	12	15-Nov-17	30-Nov-17
A4040	Pier 3 Excavation	3	08-Dec-17	12-Dec-17
A4080	Pier 3 - Pile Install / Footing Concrete	12	13-Dec-17	28-Dec-17
WBS 14 Pier Shafts and Caps - NB		103	03-Nov-17	27-Mar-18
A2070	Pier 1 - Shaft	30	03-Nov-17	14-Dec-17
A2090	Pier 1 - Cap	15	15-Dec-17	04-Jan-18
A4150	Pier 2 - Shaft	20	28-Dec-17	24-Jan-18

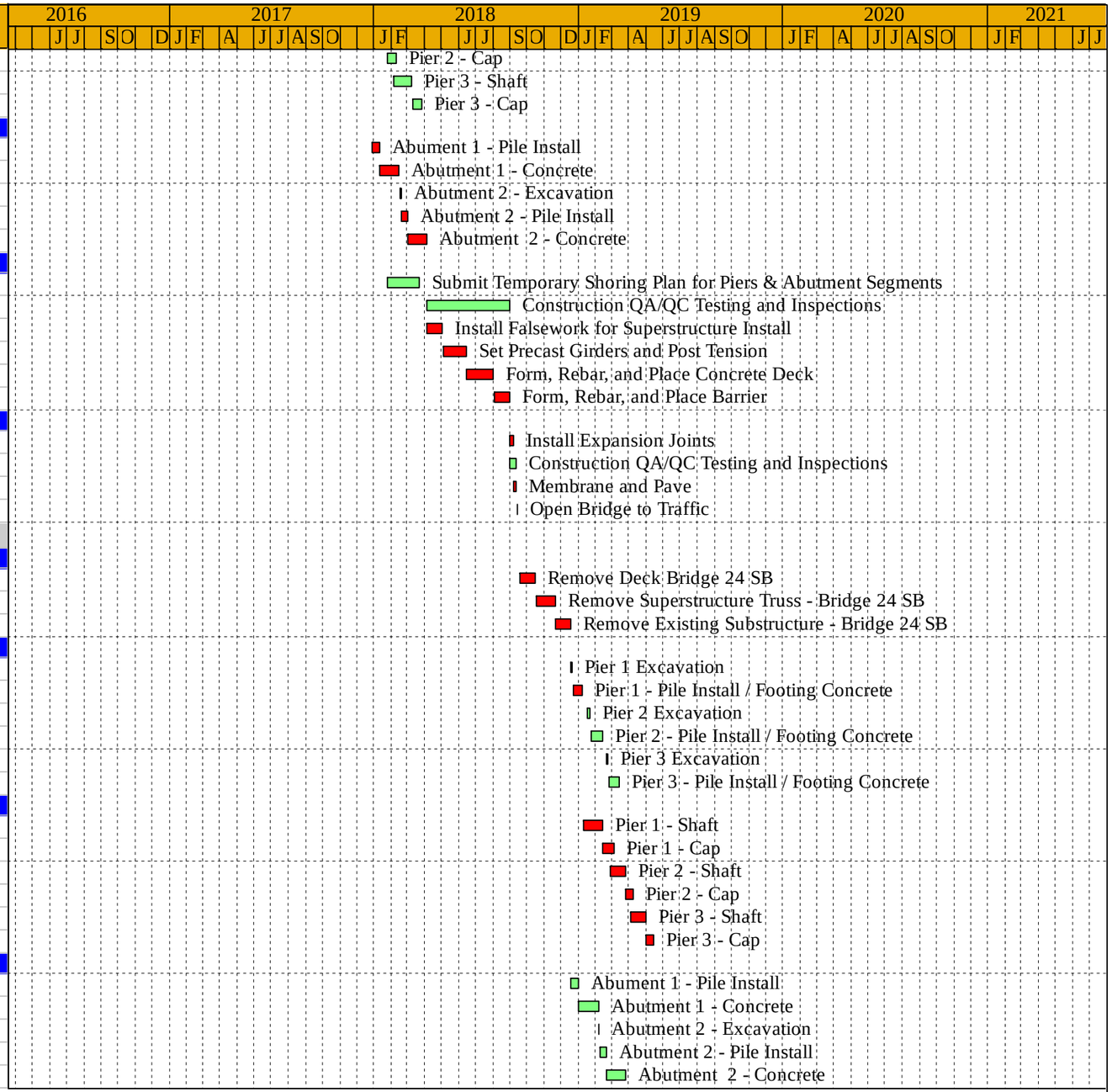


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
A4160	Pier 2 - Cap	12	25-Jan-18	09-Feb-18
A4440	Pier 3 - Shaft	25	05-Feb-18	09-Mar-18
A4450	Pier 3 - Cap	12	12-Mar-18	27-Mar-18
	WBS 15 Abutments - NB	70	29-Dec-17	05-Apr-18
A2020	Abument 1 - Pile Install	10	29-Dec-17	11-Jan-18
A2030	Abutment 1 - Concrete	25	12-Jan-18	15-Feb-18
A4170	Abutment 2 - Excavation	2	16-Feb-18	19-Feb-18
A4460	Abutment 2 - Pile Install	8	20-Feb-18	01-Mar-18
A4180	Abutment 2 - Concrete	25	02-Mar-18	05-Apr-18
	WBS 16 Superstructure - NB	155	26-Jan-18	30-Aug-18
A2500	Submit Temporary Shoring Plan for Piers & Abutment Segments	40	26-Jan-18	22-Mar-18
A2540	Construction QA/QC Testing and Inspections	105	06-Apr-18	30-Aug-18
A2520	Install Falsework for Superstructure Install	20	06-Apr-18	03-May-18
A2510	Set Precast Girders and Post Tension	30	04-May-18	14-Jun-18
A4060	Form, Rebar, and Place Concrete Deck	35	15-Jun-18	02-Aug-18
A4070	Form, Rebar, and Place Barrier	20	03-Aug-18	30-Aug-18
	WBS 17 Roadway Approach - NB	10	31-Aug-18	13-Sep-18
A2530	Install Expansion Joints	5	31-Aug-18	06-Sep-18
A3040	Construction QA/QC Testing and Inspections	9	31-Aug-18	12-Sep-18
A3000	Membrane and Pave	4	07-Sep-18	12-Sep-18
A3010	Open Bridge to Traffic	1	13-Sep-18	13-Sep-18
	Construction Phase 2 - Southbound Bridge	291	19-Sep-18	30-Oct-19
	WBS 18 Demolition of Bridge Structure - SB	65	19-Sep-18	18-Dec-18
A4560	Remove Deck Bridge 24 SB	20	19-Sep-18	16-Oct-18
A5220	Remove Superstructure Truss - Bridge 24 SB	25	17-Oct-18	20-Nov-18
A5590	Remove Existing Substructure - Bridge 24 SB	20	21-Nov-18	18-Dec-18
	WBS 19 Pier Foundations and Footings - SB	63	19-Dec-18	15-Mar-19
A5600	Pier 1 Excavation	3	19-Dec-18	21-Dec-18
A5610	Pier 1 - Pile Install / Footing Concrete	12	24-Dec-18	08-Jan-19
A5630	Pier 2 Excavation	5	16-Jan-19	22-Jan-19
A5640	Pier 2 - Pile Install / Footing Concrete	15	23-Jan-19	12-Feb-19
A5650	Pier 3 Excavation	3	20-Feb-19	22-Feb-19
A5670	Pier 3 - Pile Install / Footing Concrete	15	25-Feb-19	15-Mar-19
	WBS 20 Pier Shafts and Caps - SB	91	09-Jan-19	15-May-19
A5620	Pier 1 - Shaft	25	09-Jan-19	12-Feb-19
A5660	Pier 1 - Cap	15	13-Feb-19	05-Mar-19
A5680	Pier 2 - Shaft	20	26-Feb-19	25-Mar-19
A5690	Pier 2 - Cap	10	26-Mar-19	08-Apr-19
A5700	Pier 3 - Shaft	20	04-Apr-19	01-May-19
A5710	Pier 3 - Cap	10	02-May-19	15-May-19
	WBS 21 Abutments - SB	70	19-Dec-18	26-Mar-19
A5720	Abument 1 - Pile Install	10	19-Dec-18	01-Jan-19
A5730	Abutment 1 - Concrete	25	02-Jan-19	05-Feb-19
A5740	Abutment 2 - Excavation	2	06-Feb-19	07-Feb-19
A5750	Abutment 2 - Pile Install	8	08-Feb-19	19-Feb-19
A5760	Abutment 2 - Concrete	25	20-Feb-19	26-Mar-19

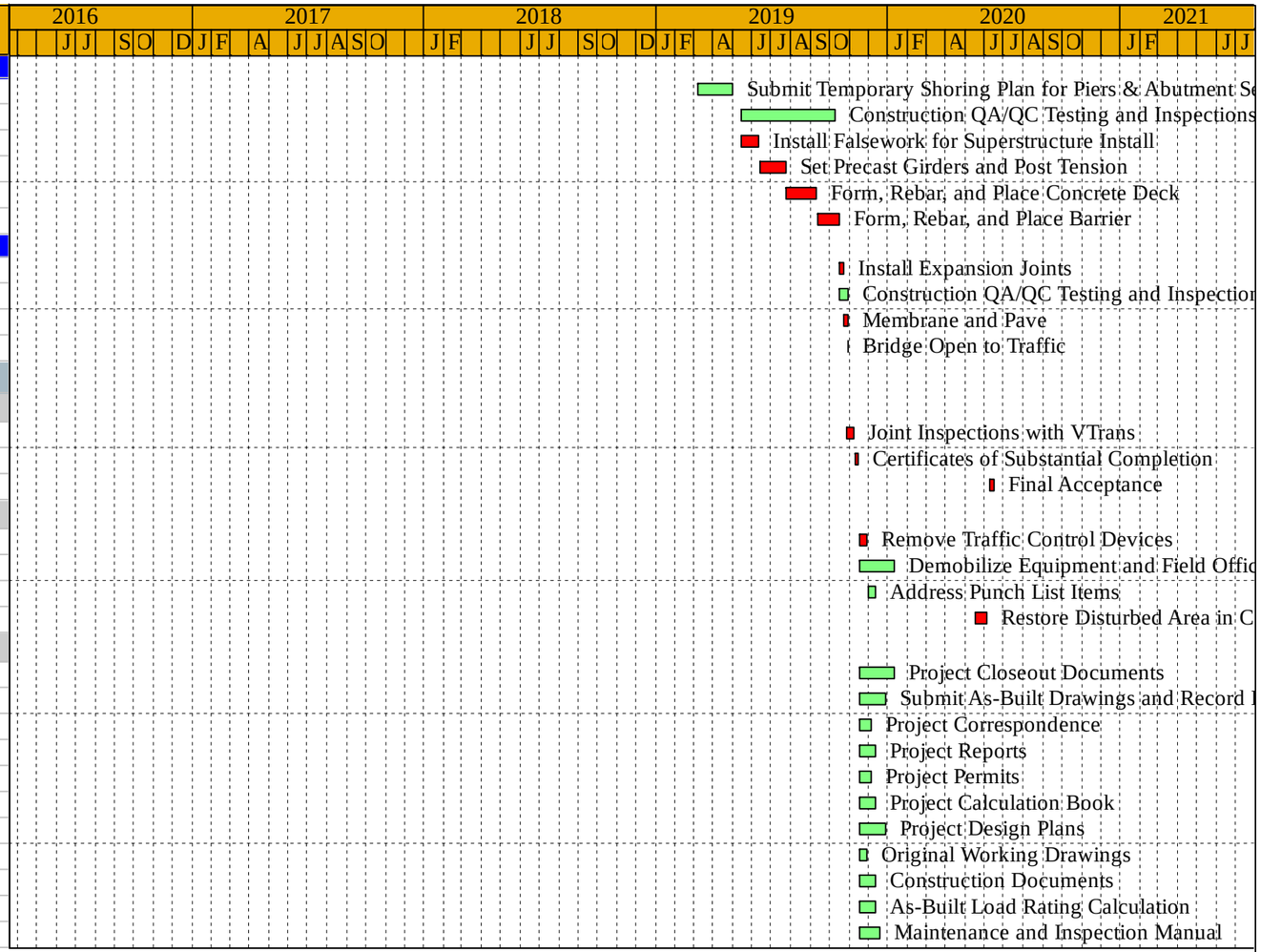


Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

Activity ID	Activity Name	Duration	Start	Finish
	WBS 22 Superstructure - SB	160	07-Mar-19	16-Oct-19
A4890	Submit Temporary Shoring Plan for Piers & Abutment Segments	40	07-Mar-19	01-May-19
A5460	Construction QA/QC Testing and Inspections	105	16-May-19	09-Oct-19
A5770	Install Falsework for Superstructure Install	20	16-May-19	12-Jun-19
A4900	Set Precast Girders and Post Tension	30	13-Jun-19	24-Jul-19
A4910	Form, Rebar, and Place Concrete Deck	35	25-Jul-19	11-Sep-19
A4920	Form, Rebar, and Place Barrier	25	12-Sep-19	16-Oct-19
	WBS 23 Roadway Approach - SB	10	17-Oct-19	30-Oct-19
A5230	Install Expansion Joints	5	17-Oct-19	23-Oct-19
A5480	Construction QA/QC Testing and Inspections	9	17-Oct-19	29-Oct-19
A5240	Membrane and Pave	4	24-Oct-19	29-Oct-19
A5250	Bridge Open to Traffic	1	30-Oct-19	30-Oct-19
	4. Project Completion	166	28-Oct-19	15-Jun-20
	WBS 24 Inspections and Acceptance	166	28-Oct-19	15-Jun-20
A4500	Joint Inspections with VTrans	10	28-Oct-19	08-Nov-19
A4510	Certificates of Substantial Completion	5	11-Nov-19	15-Nov-19
A4520	Final Acceptance	5	09-Jun-20	15-Jun-20
	WBS 25 Completion & Demobilization	145	18-Nov-19	05-Jun-20
A4370	Remove Traffic Control Devices	10	18-Nov-19	29-Nov-19
A3260	Demobilize Equipment and Field Offices	40	18-Nov-19	10-Jan-20
A3270	Address Punch List Items	10	02-Dec-19	13-Dec-19
A3250	Restore Disturbed Area in Compliance w/ Permits Issued	15	18-May-20	05-Jun-20
	WBS 26 Project Closeout Documents	40	18-Nov-19	10-Jan-20
A4530	Project Closeout Documents	40	18-Nov-19	10-Jan-20
A4505	Submit As-Built Drawings and Record Documentation	30	18-Nov-19	27-Dec-19
A4515	Project Correspondence	15	18-Nov-19	06-Dec-19
A4525	Project Reports	20	18-Nov-19	13-Dec-19
A4535	Project Permits	15	18-Nov-19	06-Dec-19
A4545	Project Calculation Book	20	18-Nov-19	13-Dec-19
A4555	Project Design Plans	30	18-Nov-19	27-Dec-19
A4565	Original Working Drawings	10	18-Nov-19	29-Nov-19
A4575	Construction Documents	20	18-Nov-19	13-Dec-19
A4585	As-Built Load Rating Calculation	20	18-Nov-19	13-Dec-19
A4595	Maintenance and Inspection Manual	25	18-Nov-19	20-Dec-19



Actual Work
Remaining Work
Critical Remaining Work
Milestone

I-91 Bridge Improvements

Reed & Reed Inc.

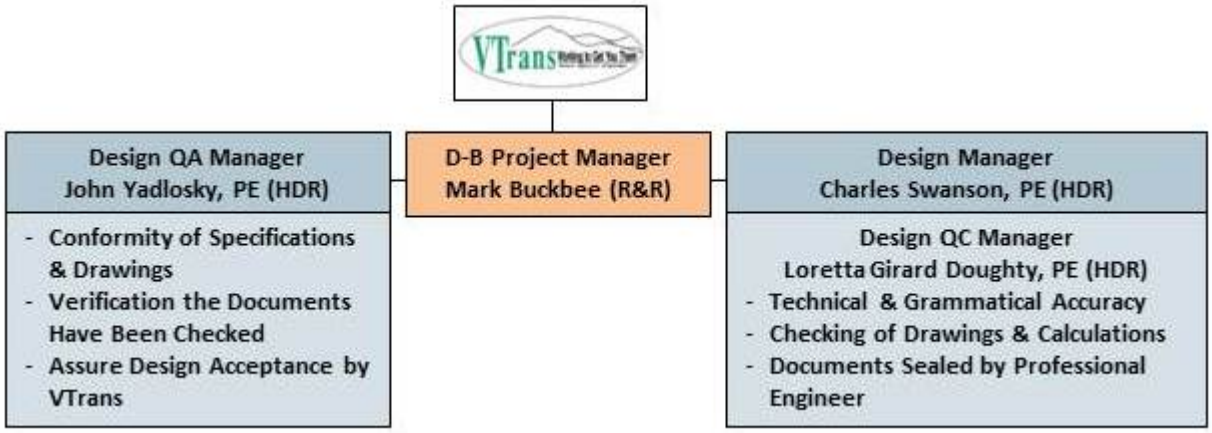
5.1.10.3 Design Quality Management

QC and QA During Design of Project Elements

The R&R Team is responsible for providing Quality Control (QC) and Quality Assurance (QA) activities for all design aspects for the duration of the Project. A program that consists of a Design Quality Management Plan (DQMP) will govern all activities. We believe the success of our QA/QC program depends on four major factors:

- Clearly defined roles and responsibilities including methods of disagreement resolution
- Independence between design QA and QC
- Effective integration and interface of QA/QC activities during design
- Constant communication between designers and contractor, and strong document control

Quality management is complex given the number of individuals and firms involved in a wide range of responsibilities and roles. The **chart below provides the organization** of our Design Quality Management Team, the individuals in charge, and their major responsibilities.



Understanding the Difference/Separation between QA and QC Relative to Design Development

Mark Buckbee, Project Manager, has the ultimate responsibility for successfully planning and executing the construction and design quality programs. The R&R Team's QA/QC organization will function in a manner similar to VTrans. Design QC will include: the review of methodology; math and engineering computations; technical accuracy; conformance to contract requirements; review of form, content and grammar; and coordination with other design disciplines. Design QA will evaluate whether the designer assessed the problem appropriately, applied the correct analysis, assigned qualified personnel and followed the required QC procedures. Integration of QA and QC activities can be challenging, considering the number of groups involved and the strict requirements of independence. Our team expects/demands interaction and transparency from all individuals related to QA/QC management and design development; **it is essential to have construction quality personnel participate during design**.

Extent to Which the System for QA allows for Organizational Independence from QC

Independence between design QA and QC is critical to success. Our goal is to eliminate conflicts that may compromise quality, and we have structured our team so that **QA and QC responsibilities are separated as illustrated above**. **Design QA needs to verify that all QC checks were performed properly.** Design-related QA and QC activities are kept separate from the construction side, and the design QA and QC responsibilities are held with separate individuals who report to different individuals

within the Team; Loretta Doughty, Design QC Manager, reports to Charlie Swanson, Design Manager, and Charlie and John Yadlosky, Design QA Manager, report to Mark Buckbee.

John and Loretta will perform **their respective design QA/QC responsibilities independently** by working with Mark and Charlie on each design package submittal. Loretta will ensure the methods and procedures in the approved DQMP are implemented and followed by the R&R Team, and John will assure design acceptance by VTrans. John and Loretta will review each design package independently prior to submitting to VTrans. The DQMP will specifically describe the process, documentation, and comment resolution for a constructability/inspectability review prior to a design submission.

Organization and Approach to Design Quality Management

HDR will implement established procedures designed to consistently provide services that meet VTrans requirements and applicable standards of care. The HDR QA/QC Program documents will include the following categories:

- Quality Assurance Procedures (QAPs) define planned and systematic actions that provide adequate confidence to VTrans that an activity or service consistently fulfills the requirements for its intended purpose.
- Quality Control Procedures (QCPs) define actions that provide a means to control and measure the characteristics of a service, activity or product with respect to established requirements.
- Technical Procedures (TPs) identify product or service characteristics, or provide guidance on how a technical activity is accomplished.

The following HDR QAPs and QCPs will be used organize our QA/QC processes for the work performed on the Rockingham project and illustrate **our Teams' understanding of the difference/separation between design QA and QC**:

QAP-005	Project Guide	QCP-001	QC Review of Project Deliverables
QAP-006	Project Communication	QCP-002	Checking of Calculations
QAP-007	Project Filing	QCP-003	Drawing Checking
QAP-008	Project Reviews	QCP-004	QC Review of Spreadsheets/calcs
QAP-010	CAD Procedures	QAP-012	Project Close-Out
QAP-011	Project Initiation		

HDR's QA/QC program (QCP-001) requires that a Project QCP be created for each project. This document sets out the specific quality practices, resources and sequence of activities that will be used to fulfill VTrans QA/QC requirements of the Rockingham project.

HDR's Project Planning and Initiation Phase begins with the preparation of a Project Guide (QAP-005). Preparation of Project Guides is one of the mandatory requirements of HDR's national QA/QC program. HDR will provide a copy of this document to R&R and VTrans. The Project Guide represents a communication tool used to inform the project team of pertinent project information and provides the basis for ongoing project reviews; it will include the following:

- Project background, purpose and description
- Define the project team, including key client contacts, sub-consultants and other organizations' phone, fax, e-mail and mailing address
- **HDR will utilize the VTrans Project Collaboration Site** for all electronic data exchanges and contain documentation control procedures for all project communication

- Documentation of the Scope of Services, task assignments, budgets, project schedule and project deliverables
- Technical requirements for the production of plans, calculations, software and reference documents to be used on the project, and applicable design criteria
- Administrative procedures for project/electronic filing, invoicing and progress reporting

Design Professionals' Engagement during Field Construction

HDR's design professionals will remain engaged with the project team throughout the duration of the project. During construction activities field crews may require additional information, clarifications, resolution of field conflicts, specification interpretation and approval for design changes. To accurately track and expedite the flow of technical information between field crews and design professionals a formal RFI process will be utilized. The RFI process will be established within the DQMP, and each RFI will be assigned to an individual by the Design Manager or his designee. **Field changes which affect the design of a Work Package as shown on previously Released for Construction Documents will be subject to the Design QA and QC process that was applied to the original design. These field changes will not be incorporated into the field construction until they have been approved and Released for** Construction **by the VTrans Resident Engineer.**

Construction non-conformances (NCR) will be reviewed by the design professionals. The Project Manager, Design Manager and Construction QC Manager will evaluate the NCRs and determine their effect on the performance, safety, durability, long-term maintenance and life of the item in question and determine if the NCR can be used as is, remediated, or removed and replaced. For dispositions that include remediation, the DM will also provide a Design Quality Certification that states the remedial actions to be used have undergone the same level of Design Quality as required for the original design.

Approach to Well Structured and Easily Audited Document Control Methods

Successful integration of design and construction rely on constant communication and excellent document control. We will accomplish this through effective meetings, communication tools and the R&R Team will put in place effective measures to ensure well-structured and easily audited documents that facilitate VTrans' review. Our approach is **based upon simplicity, and we will coordinate with a VTrans designated "gatekeeper" for document control**. We will organize our design around the design work packages, and these drawings will be indexed. If a drawing is revised, the older drawing will be stamped "Superseded" and will be archived separately. The drawings will be uploaded and maintained in the VTrans' Project Collaboration Site. Within the website, each work package will have its own folder, and within each will be subfolders for separate design iterations (30%, 90%, 100%, and Release for Construction). As the drawings evolve, the current drawings will be held in an "Active" subfolder, while older drawings will be placed in an "Archive" folder.

This Page Left Intentionally Blank

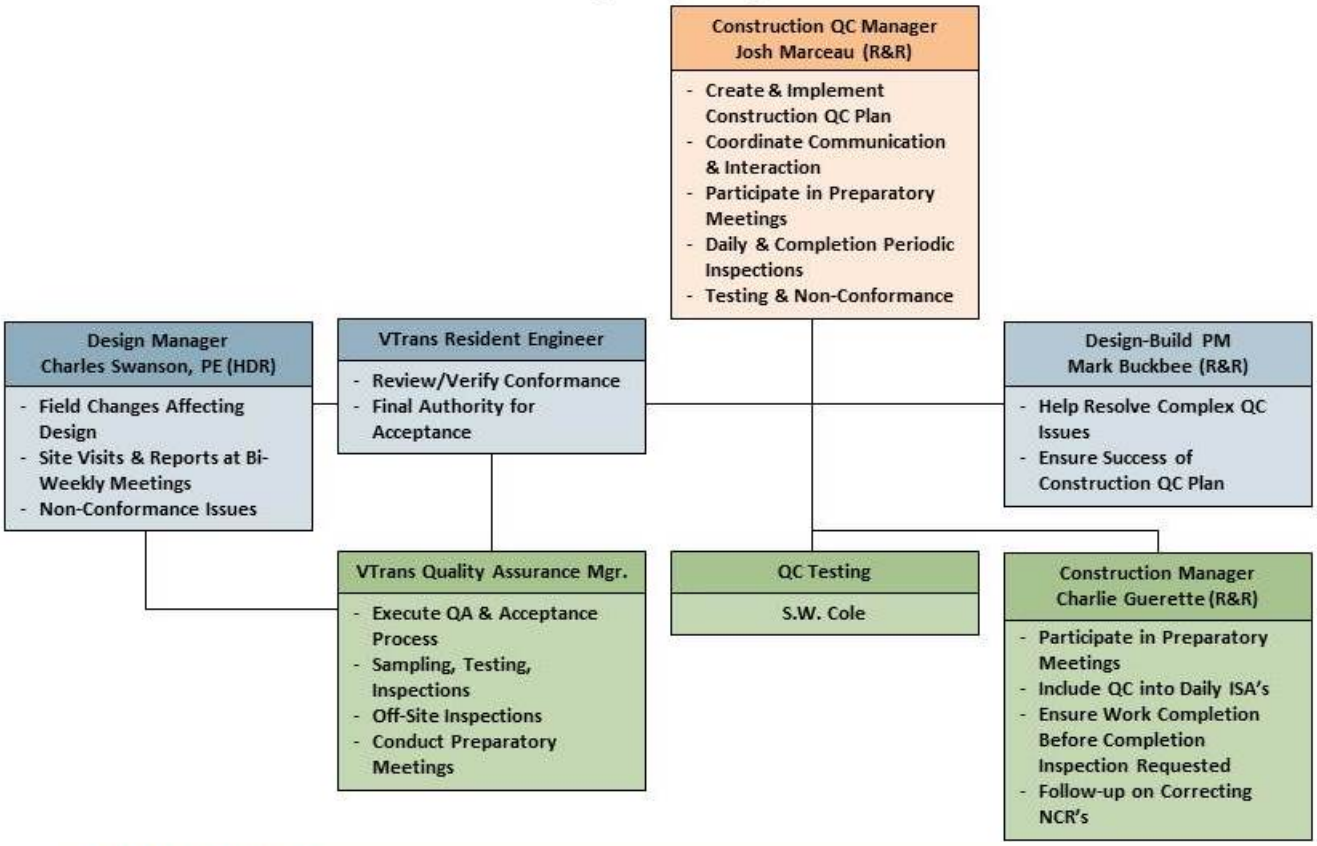
5.1.10.4 Construction Quality Control

The objective of R&R's Construction Quality Control Program (CQCP) is simple; to ensure that all materials and workmanship incorporated into the Rockingham Replacement Bridges are in conformity with the requirements of the Released for Construction Plans and Specifications; but its successful execution is far more challenging and complex. In reality construction QC begins at a project's inception and runs through final completion and acceptance. **R&R breaks its approach to construction QC into two components: Plan Creation and Plan Implementation**. These are outlined below and form the basis of our CQCP, which comprises an Administrative Submittal prior to the beginning of construction.

Plan Creation	Plan Implementation
* Organization: Roles & Responsibilities	* Release of Design Documents for Construction
* Construction Documents and Data	* WBS Quality Standards & Inspection Procedures
* Procurement of Items and Services	* Weekly QC Meetings
* Product Identification and Traceability	* Preparatory & Pre-Activity Inspection Meetings
* Inspection and Testing	* Inspections (daily and final acceptance)
* Control of Measuring & Testing Equipment	* Non-Conformance Reports
* Control of Deficient Items	* Subcontractor and Supplier QC Plans
* Quality Records	* Inspection and Test Plans

Organization Chart

An essential component of our CQCP Plan establishes the roles and responsibilities of the Rockingham QC Team. **The "center" of our Construction QC organization is represented by our QC Manager, Josh Marceau.** He is tasked with creating and implementing the Construction QC Plan, and this effort requires involving multiple individuals from several different organizations as shown below.



Understanding of QC and Separation of QC and Quality Acceptance

R&R will be responsible for all construction QC activities, while VTrans will manage the overall project QA functions governed by the VTrans Quality Assurance Plan (QAP) issued March 1, 2010. R&R will develop its Construction Quality Control Plan (CQCP) in collaboration with VTrans' Quality Assurance Manager (QAM) and Resident Engineer, and it will be compatible with the VTrans QAP. R&R's Construction QC Manager manages the process of construction QC, proactively interacting with individuals from HDR, R&R, and VTrans. We understand **the Resident Engineer has the final responsibility and authority for acceptance; the final Quality Acceptance lies with VTrans.**

Approach to Systematic Quality Control

R&R's systematic approach to QC includes several components; these include properly trained staff, establishing QC standards for each major work activity (WBS), formal field crew training, frequent QC inspections and testing, flexibility in making adjustments, and timely reporting.

R&R has experienced and well trained individuals. Our QC staff technicians have their ACI (concrete) and NETTCP certifications. **Very importantly, we provide formal Workmanship and Quality training for our field personnel annually where we focus on the technical and quality elements of concrete and steel, core competencies of R&R. Before beginning a new activity we will provide a refresher demonstration or review.** For example, we will review the proper concrete vibration or finishing techniques and expectations to each crew. We will also maintain a training log throughout the project. Our training and refresher demonstrations help to produce quality products from the beginning.

The Construction QC Manager in collaboration with the Design Manager, Resident Engineer, D-B PM and the QAM will establish QC standards for each major work activity (WBS) within the logical subsections of work. Each major work activity will include construction duration, specific construction means and method steps, a submittal schedule requirement and construction QC Standards.

We expect and demand frequent construction QC inspections; our goal is to control the work. The QC Manager focuses on pre-activity inspections before materials are incorporated into the work. For example, Josh will undertake pre-placement inspections before the placement, inspecting forms, rebar placement, and coverage. **It is also important to note that a failed QC inspection or test is not an NCR; it provides R&R the opportunity to make adjustments or modifications so that the end product will meet its QC standards. These inspections and any modifications need to occur before the QA inspections, and they will help minimize NCR's.** Josh will complete the documentations and upload reports to the Project Collaboration Site within 48 hours; it is important for the Resident Engineer and the QAM to stay informed and up to date on issues.

Preparatory and Pre-Activity Inspection Meetings

The purpose of the preparatory meetings is to make sure that all project personnel have a thorough understanding of the upcoming work activity, ensuring coordination and communication takes place between field operations (Construction Manager), construction QC and VTrans (Resident Engineer and QAM), and appropriate subcontractors. Each construction WBS will have a preparatory meeting.

The QAM will lead these meetings in collaboration with the Construction QC Manager and the R&R Project Manager. A typical process might include the following components: Within ten days of the

commencement of a major work item, the Construction QC Manager will inform the QAM of the upcoming WBS activity, including work off-site in a fabrication facility, and request a Preparatory meeting. The QAM will schedule a Preparatory Inspection meeting within three days and will send out an agenda at this time. Thus, participants have a week to prepare in advance such as reviewing shop drawings and specifications. At the meeting the QAM and the Construction QC Manager will have handouts to help focus the review. For example, handouts may include the specification section with key sentences underlined or a list of concerns based upon prior experience. Meeting minutes will be distributed, reviewed and uploaded to the Project Collaboration Site within 48 hours.

Approach to Coordination with the Resident Engineer

Josh will successfully communicate information and issues by fully utilizing the Project Collaboration Site where this knowledge will be stored and be accessible. **Josh will have the organizational authority and autonomy to identify quality problems and to initiate, recommend and verify implementation of the final solutions. But his true construction QC success depends on the interaction, input and coordination with those surrounding him; he cannot perform this role alone.** In particular his primary, daily interfaces will be with VTrans (Resident Engineer and the QAM), QC testing personnel and our Construction Manager, Charlie Guerette. Josh will be proactive, updating and providing input to these individuals daily.

This approach not only keeps them informed but also enables them to provide input back to Josh. Other interactions will take place with the Design Manager, VTrans QAM, and the Design-Build PM on a weekly basis at a minimum. For example, Josh will interact with: Charlie Swanson, Design Manager, during site visits and regarding any non-conformance issues; with the QAM with respect to Preparatory Meetings before a new WBS commences construction; and with our Construction Manager regarding QC expectations and criteria that are then subsequently translated into a part of our daily JSA safety and work details review.

Inspections

The Construction QC Manager, or his designee, will perform the daily and periodic inspections together with the Construction Supervisor and appropriate subcontractor representatives. The objective is to assure the continuity and continuing conformance of the work to the contract requirements and workmanship standards established during the preparatory meetings and initial inspections. Daily inspections will be documented in the Daily Quality Control Report. The Construction QC Manager will make modifications to materials or methods if an inspection or QC tests fails. Moreover, he will then also undertake more frequent testing. These steps are important in minimizing any NCRs that arise.

Any deficient or non-conforming item will be referenced and noted on the report, followed up with a Non-Conformance Report. The Construction QC Manager will lead the effort, collaborating with the Design Manager, QAM, Resident Engineer, and Construction Manager, to fully understand the non-conformance and to come up with either a recommended remediation or solution. Once an approach or remediation is agreed to with the Resident Engineer and the Team, these solutions will be inspected as they are implemented.

On a bi-weekly basis the Design Manager will tour the site with the Construction QC Manager and the Construction Manager. They will review work progress and any design or non-conformance issues. The Construction QC Manager will create a monthly design and QC report; any pertinent issues or non-

conformance items will be reviewed at the monthly meeting with VTrans. We will handle the approach to any non-conformance items through the non-conformance process.

Approach to Well Structured, Easily Audited Document Controls

Another very important component of our CQCP Plan establishes the responsibilities and requirement for the identification, preparation and maintenance of records that furnish documented evidence of meeting technical and quality requirements. We believe that it is important for the Team to create and establish a well structured document control system for the Project Collaboration Site. The structure must be intuitive, simple and easily audited by VTrans. This will enable any individual within the design, VTrans, and construction teams to find any particular document. The major folders within the Collaboration Site indicate major groupings, which tend to be self explanatory. These might include folder titles such as Team Directory, Meetings, Public Announcements and Work Breakdown Structures. Each major category folder will have sub-folders such as:

DIVISION 500 - STRUCTURES	
Section 540 Precast Concrete	**Section 541 - Structural Concrete**
* Material and Equipment Certs	* Mix Designs and Trial Batching
* Post-tension grout installation	* Concrete Placement Inspections
* Material Test Reports	* Delivery Slips
* Post-Tensioning Reports	* Concrete test results & control charts
* Construction QC	* Construction QC

To ensure development of an easily retrievable and auditable document system we also will create a detailed Table of Contents document that is updated periodically; it will help to show an individual how and where documents are stored within the Project Collaboration Site.

Understanding/Commitment to Follow Industry Standard Practices for Construction QC

R&R is committed to following industry standard practices for the Construction QC. **Josh Marceau, our Construction QC Manager, is very experienced in the construction QC role; he has worked on the Veterans Memorial Bridge and the Turner-Greene bridges, both Design-Build projects, and he is ACI and NETTCP certified. Josh understands the importance of following standard QC practices; he is passionate about the follow-up and follow-through with construction QC.**

Quality Control Technicians and Material Testing Laboratories

The CQCP Plan will also include the firm that will supply the Quality Control Technicians (QCT) and the testing laboratories. **R&R has selected S.W. Cole to supply the QCTs for the Rockingham Project. The level of their certifications will depend on the specific scope of work**. For example, a Concrete Technician will be ACI certified and will provide field acceptance or rejection of materials by monitoring, sampling and testing in accordance with the CQCP Plan. On the other hand, a Driven Foundation Pile Inspector will be NETTCP certified for driving piles and will provide inspection, pile splicing, driving equipment and procedures review, load testing, and final location and alignment tolerances in accordance with CQCP Plan. R&R may augment S.W. Cole's QCTs with some of its own. S.W. Cole will perform most of the testing within their own testing lab. Some testing might have to be sent to another laboratory. All testing laboratories will be Vermont approved.

5.1.10.5 Public Relations Plan

Count On It Business Services, Inc. has been performing Public Relations on numerous projects with VTrans since 1997 when the Agency added this item to their projects within the scope of work for general contractors. Count On It understands the great responsibility of its service. Keeping the lines of communication open at all times is the key to success. As the Public Relations Officer (PRO) for the I-91 Rockingham Project, Count On It will follow the steps below in assuring that the information is distributed to the public and stakeholders and available online.

Construction Activities/Project Progress & Schedule

At a minimum of a weekly basis, notifications will go out informing of the upcoming construction schedule and activities that are taking place. These notifications will be issued via email to include but not limited to Emergency Services, Town of Rockingham, Village of Bellows Falls, State of Vermont District 2 Office and other State Agencies, local Schools & School Transportation Companies, local Chamber of Commerce, Local Television and Radio Stations, Brattleboro Reformer and all local Community Newspapers, Front Porch Forum, VT Truck & Bus Association, State of Vermont 511 service and Vermont Rail Systems. This contact list will grow as interested parties become aware of the project and want to be included in the updates.

Social media, being what it is today, will be the power tool for this project. The PRO will build and maintain a project-specific Website prior to the start of construction. This site will be updated regularly. The PRO will correspond with designated onsite personnel (Resident Engineer and R&R Project Manager) with construction photographs that can be posted on the website throughout the progress of the project. This site will also have a link to the VTrans 511 Site and a link to Twitter. The site will also include the weekly anticipated schedule and track the timeliness of the project.

A request for Automatic Text Updates will be implemented. At any time during the project anyone with texting abilities will be able to send a text to a specified “code” which will sign them up for the updates. In turn, a minimum of a weekly text will be sent with a brief overview of the project progress.

Maintenance of Traffic/Traffic Conditions

Along with the weekly emails to the List of Contacts built by the PRO, to include but not limited to all correspondence stated above, a project specific Twitter account will also be set up. This account will be included on all correspondence to follow and will have a link on the project website. “Tweets” will go out weekly and/or as any changes occur.

Emergency & Incident Information

The PRO will stay in close contact with the R&R Team and the Resident Engineer throughout the project. It will be strongly emphasized that the PRO is to be one of the first in line of communication when any changes and/or emergencies occur so we can get the information out to the traveling public and all parties affected. It will be the responsibility of the onsite team to contact 911 not the PRO. In the event of an emergency causing traffic delays and/or lane closures, upon notification, the PRO will immediately contact the local radio, television stations and VTrans 511 of the event asking them to please let the traveling public know of the situation. A Tweet & Text will be sent out along with an email to any other appropriate contacts that should be notified. The website will also be immediately updated.

Project Related Events

The PRO's toll-free telephone will be effective at the start of the project. This telephone line will ring directly into Count On Its office in South Burlington, and the PRO will be able to manage issues directly. This number will be on all correspondence throughout the project. If the line is unattended, the voice mail greeting will include a contact number where the PRO can be reached in case of an emergency. Any and all calls will be kept in a log in the PRO's office. When calls are fielded, the Resident Engineer and/or Reed & Reed's Project Manager will be contacted if necessary. The PRO will follow-up with the caller or the Team member to conclude the call in the Public Relations Log File.

Media Relations

The local television and radio stations along with the newspaper will be notified individually via email to advise them of the scope of the project, starting date and projected completion date at a minimum of two weeks prior to the project start date. They will be given a telephone number for any questions/concerns anyone may have. The PRO will ask they stress the fact, to the motorists, that the traffic flow will be maintained at all times. If the media would like to do interviews, then a time and place will be set up with the appropriate parties involved. As with all the other contacts, the media will be updated weekly or on an as needed basis if changes occur.

Community and Business Relations

A preconstruction informational meeting will be scheduled at a location agreed upon by VTrans, The Town of Rockingham/Village of Bellows Falls, and the R&R Team inviting all interested parties and the general public. This will enable the team to implement a safety plan and allow for the general public to air questions and concerns. Prior to the start of the following construction seasons, the PRO will organize and advertise informational community meetings to update the public of the anticipated construction plan for the year and allow the public an opportunity to communicate any questions or concerns.

Not included in any of the above is a Facebook page. This can be added but Count On It would like to discuss with all parties involved prior to setting it up. The PRO concerns are the potential negativity that might result from a road/bridge construction project. If the Team chooses to have this project posted on Facebook, it will be updated periodically as required. The page will also have links to follow the project on Twitter or to view the website.

Again, it is the PRO's goal to keep the lines of communication open and provide as much information to the traveling public as possible. Before any releases are distributed they will be submitted to the appropriate team member for approval. All links to social media will be given to VTrans to include on their website.

REED & REED

Reed & Reed, Inc.
P.O. Box 370
Woolwich, ME 04579
(207) 443-9747