BRIDGING PENNSYLVANIA PARTNERS

Bridging Pennsylvania Partners

Technical Proposal for the PennDOT Pathways Major Bridge P3 Initiative – Volume II

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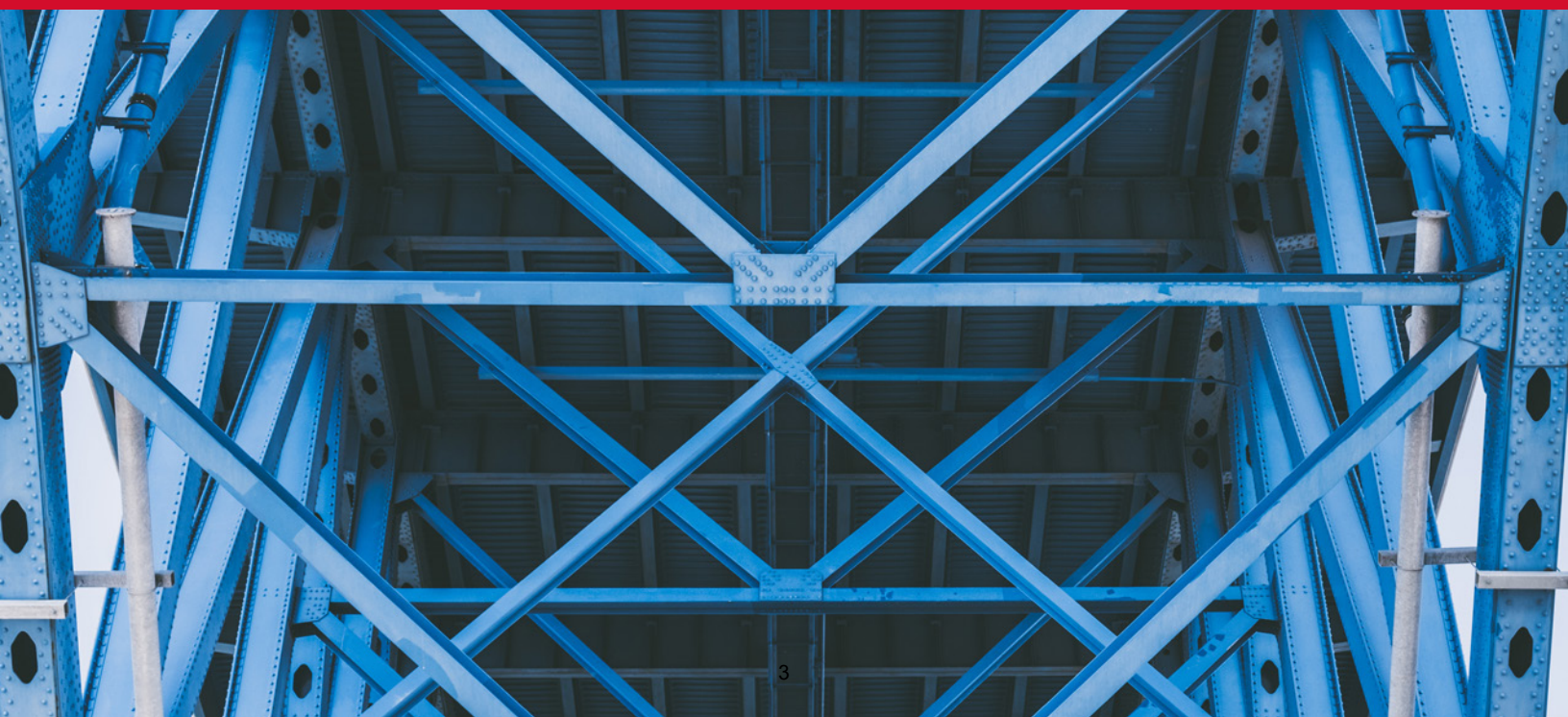

BRIDGING PENNSYLVANIA PARTNERS

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Technical Proposal General Information
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I-95 Section BRI Reconstruction, Pennsylvania
STV

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Summary and Order of Proposal Contents

Proposal Component	Form	ITP Cross- Reference	Page Limits	Proposal Cross-Reference
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Proposal Component	Form	ITP Cross- Reference	Page Limits	Proposal Cross-Reference
Approach to D&C for the First Package	N/A	Appendix 5, Section 3.3	30 pages	289-319
Preliminary Versions of PDA Work Submittals for the First Package	N/A	Appendix 5, Section 3.3	N/A	320-577

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Section 2 PDA Work Criteria

BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 2

Appendix 5, 3.2

PDA Work Criteria

Introduction to Proposer's High-Level Approach to Predevelopment and Packaging

Carmel Tunnels Toll Concession, Israel
Shikun & Binui

4.6.1(a) Introduction to Proposer's High-Level Approach to Pre-Development and Packaging

Bridging Pennsylvania Partners (BPP) is a long-term, local, forward thinking and experienced partner. BPP's performance on the PDA Work will draw upon the expertise and unique attributes of its members, all of whom are committed to working collaboratively with PennDOT. This collaboration is essential in order to maximize delivery certainty of the Program, accelerate and de-risk the schedule and manage the Commonwealth's exposure to risk.

4.6.1(A)(I) HIGH-LEVEL TIMELINE AND APPROACH TO PRE-DEVELOPMENT AND PACKAGING

4.6.1(a)(i)(a) HIGH LEVEL TIMELINE FOR THE PROGRAM

BPP has prepared a detailed Preliminary PDA Work Schedule to provide PennDOT with certainty that BPP will be able to meet all required deadlines and deliver the nine Bridges of the Program, in an efficient and accelerated manner, with financial close for all Packages anticipated by second quarter of 2024. Our Preliminary PDA Work Schedule includes a detailed description of all the required activities. These activities are broken down by workstreams and span from selection as Best Apparent Value Proposer to Financial Close of our second and last Package, anticipated June 2024. The schedule includes all activities, deliverables, milestones or hold points, appropriate logic ties to show sequencing, relationships between activities and required coordination that will be performed with PennDOT and other relevant stakeholders. The Preliminary PDA Work Schedule is presented in Section 4.6.1(b) – Preliminary PDA Work Schedule, the high-level summary timeline included on page 5 of this Section.

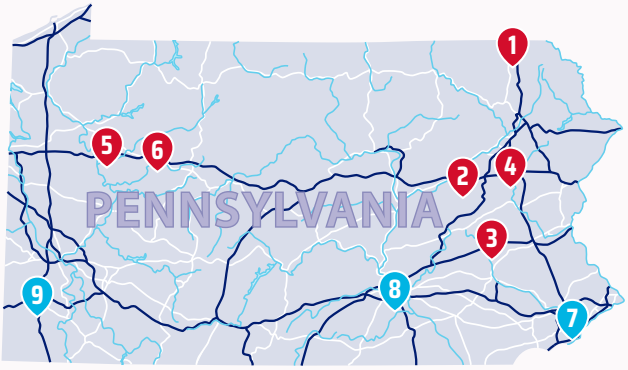
4.6.1(a)(i)(b) PRE-DEVELOPMENT AND PACKAGING APPROACH

BPP's approach to the PDA Work has been structured as a true partnership that aims to best achieve PennDOT's goals for the Project and to ensure collaboration at all levels. We recognize the multidisciplinary nature of the PDA Work and will ensure that all workstreams, in coordination with one another, develop compliant and responsive Package Proposals in an integrated, iterative and concurrent manner (see Section 4.6.1(c) – Preliminary PDA Organization for further detail on integration of disciplines).

Our approach to Packaging relies on four key objectives:

1. **Maximize the number of Bridges in the First Package** by selecting the largest number of Bridges that can be included in the First Package on an aggressive schedule, without compromising on certainty of delivery of the Package Submittals by their respective deadlines
2. **Minimize the number of Packages** by limiting the number of Packages to two and working toward a solution where all Bridges that couldn't reasonably be included in the First Package are delivered in a financeable and operable single Second Package
3. **Mitigate Delivery Risk of each Package** by selecting Bridges that have sufficiently progressed design and site investigations, are compatible with the Submittals schedule and requirements set out in the PDA, or for which we can demonstrate value in fast-tracking the PDA Work, including public outreach and stakeholder engagement
4. **Accelerate delivery of all Bridges** by progressing some development activities for the Second Package as soon as possible without compromising the PDA Work for the First Package

BPP has assessed all nine Bridges through a robust vetting process rating each Bridge against the following criteria: history of maintenance issues and elevated safety concerns, design and de-risking advancement, timing of the NEPA process and cost effectiveness of accelerating the PDA Work as detailed in Section 4.6.2(a) – First Package Approach, Schedule, and Organizational Strategy. The resulting Packaging from this analysis is outlined below.



FIRST PACKAGE	SECOND PACKAGE
1. I-81 Susquehanna	7. I-95 Girard Point
2. I-80 Nescopeck	8. I-83 South Bridge
3. I-78 Lenhartsville	9. I-79 Bridgeville
4. I-80 Lehigh River	
5. I-80 Canoe Creek	
6. I-80 North Fork	

4.6.1(a)(ii) STRATEGIES FOR A CONSISTENT APPROACH TO PACKAGING

BPP will implement a development and delivery framework for the Program that will promote uniformity in terms of design, construction, maintenance and tolling infrastructure implementation across all Bridges. This approach relies on the following key strategies:

- **Consistent Organizational Structure:** BPP's organizational structure, including (i) Macquarie Infrastructure Developments LLC (Macquarie) and Shikun and Binui Concessions USA, Inc. (SBC) together as PDA Entity, future Development Entities and maintenance contractor; (ii) Shikun & Binui Americas (SBA) and FCC Construcción (FCC) together as Lead Construction Contractor (noting FCC will only perform non-construc- [redacted] and (iii) STV Incorporated (STV) as Lead Engineering Firm, will remain the same during the Pre-Development Phase. The same team will develop both Packages, applying the same rigorous methodology and approach to all Bridges, with the support of its key advisors (legal, insurance, tax and accounting, financial and technical) who were engaged during the RFP Phase. Our Pre-Development Phase organization will benefit from integrated functional workstreams, strong internal governance, nimble decision-making and clear deadlock resolution procedures, across both Packages equally
- **Continuity of Personnel:** BPP's Management Team (as defined in Section 4.6.1(c) – Preliminary PDA Organization) will remain consistent throughout the entire Term of the PDA, with the same leadership and subject matter experts working across the development of both Packages and continuing to support the delivery of those Packages

Macquarie and SBC believe that continuity across project phases is essential to ensure superior delivery. BPP's Leadership Team will remain in place through the development and delivery of both Packages

- **Systematic Approach to Partnering:** As further detailed in Section 4.6.1(e) – Approach to PDA Partnering and Collaboration, BPP's partnering approach will ensure mutual understanding by all parties of the long-term goals and objectives for the Project and align interests into a shared vision of success. This approach relies on: effective and integrated working groups within BPP and with PennDOT, open and transparent communication and clear lines of responsibility and accountability. This approach will be applicable to all PDA Work, across the development of both Packages
- **Active Stakeholders and Community Engagement:** BPP will engage all stakeholders and approval agencies early and systematically, and demonstrate awareness of each party's specific interests, needs, processes and requirements in order to preempt any potential issues or delays to the Project. BPP is an expert at stakeholder management, having successfully navigated community concerns through the pre-development planning, design, approval and delivery of over 500 projects across Pennsylvania, such as the Betsy Ross Interchange and Jim Thorpe Bridge

On the Jim Thorpe Bridge project, Fay had daily interactions with the Reading Blue Mountain and Northern Railroad. Fay also assisted the client with communications and scheduling with the Lehigh Gorge Trail. All these stakeholders will also be key stakeholders on the Lehigh River Bridge.

- **Design, Construction and Maintenance Interoperability:** Consistency and interoperability will play a vital role in the successful outcome for the Program and the travelers who live and commute in the region. We will provide a solution that has a consistent design approach to all Bridges and a single maintenance contractor with a unified maintenance approach across the entire Program, irrespective of the Package. In its dual capacity as developer and maintenance contractor, BPP will leverage lessons learned to ensure that consistent, superior travel experience is provided to all users across all Project Phases

4.6.1(a)(iii) APPROACH TO RISK MITIGATION DURING PRE-DEVELOPMENT AND ACROSS ALL PACKAGES

During the Pre-Development Phase, BPP will focus on substantially de-risking the Project to improve delivery of all Packages. The below outlines our process to identify, assess, manage, mitigate and allocate the Project risks:

1. **Identify:** Identify and catalogue potential risks, assign a person-in charge for each risk and review risks and risk owners with PennDOT
2. **Assess**: Determine the likelihood of the risk materializing, triggers, schedule and cost impact
3. **Mitigate and Allocate**: Engage the relevant stakeholders to develop mitigation plans, evaluate their adequacy and approve mitigation strategies
4. **Implement and Evaluate**: If a risk materializes, implement the relevant mitigation plan, review the results and discuss future process improvements or changes

BPP started preparing a detailed risk and opportunity tracker that identifies the key risks for the Program. The main risks for the Project are outlined in the table below.

TABLE 2 - KEY PRE-DEVELOPMENT RISKS

RISK DESCRIPTION	RISK OWNER(S)	POTENTIAL COST/SCHEDULE IMPACT	MITIGATION STRATEGY	KEY ACTIONS	POST MITIGATION PROBABILITY
DESIGN SUBMISSION / APPROVAL	PDA Entity	Low / Medium	BPP has engaged an experienced and local design team with STV, as lead, supported by Dewberry, SEI, GPI and AGES. This team has experience with the proposed bridge structures and in all PennDOT Engineering Districts. Additionally, BPP has carefully planned its schedule to accommodate Design Submittals and approvals.	• Prepare robust Design Submittal and leverage resource pool across all Bridges • Optimize design process while ensuring compliance across all Bridges and standardization where possible	Low
PROGRAM AFFORDABILITY / MATERIALS, LABOR ESCALATION	PennDOT	High	BPP has carefully selected a combination of local design and construction subcontractors that understand the requirements for the Program, stakeholders and Bridge structures across Pennsylvania and will develop an affordable construction and financing program solution.	• Cost-effective construction means and methods, with green sheets developed (early purchases, local construction resources) and open-book collaboration with PennDOT • Identified set of local subcontractors who will work to be competitively solicited to nominated subcontractors and other firms (minimum of two quotes per subcontracted work element)	Low / Medium
ENVIRONMENTAL CONDITIONS / PERMITTING	PDA Entity / PennDOT	Medium	BPP knows Pennsylvania's environmental permitting process. Our team works in Pennsylvania and has a track record of managing environmental approvals. STV, our lead designer, has reviewed all the RIDs and has identified where gaps exist and how to manage these.	• Engage expert Pennsylvania permitting advisors for all agencies State/Federal and close collaboration with PennDOT • Perform additional geotechnical investigations and site surveys (where needed)	Low
PROHIBITIVE COST OF FINANCING / IMPOSSIBILITY TO ACHIEVE FINANCIAL CLOSE	PDA Entity	High	BPP's Equity Members have deep relationships with a variety of lenders and plan on early engagement with these lenders. BPP is experienced in all forms of financings in the US. The timetable presented is within the acceptable norms for financial close in the US.	• Lead early lender engagement • Maintain flexibility and redundancy in capital sources / lenders groups • Run financing competitions to structure and secure cost-effective and highly competitive debt financing products	Low
PUBLIC COMMUNICATION / STAKEHOLDER ENGAGEMENT	PDA Entity	Medium	BPP has carefully partnered with local contractors and key advisors who are experienced in supporting PDA projects through the political approvals process and coordinating with local stakeholders.	• Develop strong traffic diversion and control plans that coordinate with local communities to control cut-through traffic on neighborhood streets • Implement Public Information Campaign to communicate safety and mobility strategies • Develop Transport Operations Strategy that integrates and coordinates with existing transit services	Low
TOLLING TURNOVER	PDA Entity / PennDOT / PTC	Medium	BPP has prior experience with managing tolling handovers and successfully engaging stakeholders, including PennDOT and PTC. We will use this experience to plan our schedule around early handover of tolling and robust public outreach.	• Ensure close collaboration with PennDOT and PTC • Disseminate project information and engage extensively with stakeholders and the general public on traffic and tolling matters, including toll rates, policies and payment	Low

During the Pre-Development Phase, BPP will hold monthly risk management workshops with PennDOT, to jointly update this risk and opportunity tracker and ensure that all relevant risks continue to be identified and that their elimination and minimization stays a core focus of the PDA Work. Our communications workstream will also engage community stakeholders to solicit their feedback on any concern related to aspects of the Project. Importantly, we will keep the community partners informed about Project impacts and progress of the PDA Work. The risk and opportunity tracker will be a living document used as a tool to follow our PDA Work progress and help plan our de-risking activities. We will also conduct risk modeling analysis to better understand current and future Project risks. BPP will work with PennDOT to ensure that the knowledge gained from these de-risking activities is translated into the development of the Project Agreement, and Package Technical Provisions, and that the risks are allocated to the party best equipped to manage them in a cost efficient and expeditious manner.

4.6.1(A)(IV) APPROACH TO SUBCONTRACTING DURING PRE-DEVELOPMENT AND ACROSS ALL PACKAGES

BPP understands that a key objective of the Project is to ensure that its benefits are delivered by Pennsylvanians and retained in Pennsylvania. Our structure allows Pennsylvania-based entities to be well represented at each level of the consortium, ensuring sufficient support for local teams and local delivery. Our team notably includes local nominated subcontractors: Joseph B. Fay Co. (Fay), the H&K Group (H&K), Wagman Heavy Civil, Inc. (Wagman) and Kokosing Construction Company, Inc. (Kokosing), have unique experience in the region, that are either headquartered in or having significant operations in Pennsylvania. For example, Fay specializes in bridge construction and demolition and has worked on over 100 bridge projects with PennDOT. These subcontractors were embedded in our team during the RFP Phase and will continue to support the development of our Technical Proposal for each Package.

We are also focused on facilitating broad participation by subcontractors while emphazing the competitiveness of subcontractors and overall value to PennDOT. To accomplish this, we intend to attract subcontractors and craft labor personnel by implementing a combination of local hiring initiatives and local subcontractor engagement. This approach will be tailored to each phase and activity of the Project to ensure that we maximize participation opportunities to local subcontractors and DBE firms while also guaranteeing value to PennDOT. For example, during the Pre-Development Phase, BPP will self-perform some critical scopes, such as project management, personnel oversight, and design and construction engineering, with in-house and direct-hired labor forces to leverage our teams local engineering and construction expertise. In parallel, we will compete and subcontract other activities whenever possible, such as certain field site investigations or MOT, by getting quotes from at least two pre-qualified suppliers as well as any DBE firm interested in and able to provide such services.

For the Package Work, BPP will reach out to the broader contracting market in Pennsylvania, directly or indirectly, through its large group of nominated subcontractors, to meet the subcontracting requirement of 65-70% of the Package Work as set out in the Project Agreement Term Sheet. Through BPP's members and subcontractors, BPP can immediately access most of the contracting industry in the region.

Given the number of Bridges in the Program, we have also planned to ensure adequate labor resources are available to execute the work over the Project term. Through a series of meetings and existing partnerships with multiple entities, we have determined the market has sufficient resources to meet our delivery schedule and that our hiring strategies can procure high-quality local labor. An example of these strategies includes BPP's aim to develop a job portal website that will be used to increase targeted outreach to local organizations, track communication with partners, empower a larger pool of DBEs to participate by matching them up to opportunities and engaging educational institutions to offer local jobs and training programs. BPP has already established a "bench" of interested DBE firms through its website and will develop a network of community-based organizations, similar to what Macquarie established in its project in Maryland, to further engage the minority and DBE communities and enhance diversity on the Project. Further, while our team has extensive experience with on-the-job training and workforce development programs, we will work collaboratively with community-based organizations, including Philadelphia Works, who Macquarie is actively working with, to develop new programs where immediate employment opportunities would be established with the Project (see Appendix 1 of this Section for Philadelphia Works support letter). Finally, our communications team will engage with school districts as well as community colleges at each Bridge location. In addition to establishing transportation education programs for middle and high school students, we will work with local community colleges to identify more immediate job placement opportunities.

APPENDIX 1

Philadephia Works

PHILADELPHIA WORKS INC.

Building a Skilled and Thriving Workforce

December 23, 2021

Michael Bonini
Director
Pennsylvania Department of Transportation
P3 Office

Mr. Bonini,

Please accept this letter to signify support for Macquarie and their proposal for PennDOT's Major Bridge P3 Request for Proposals. As the Workforce Development Board for the city, Philadelphia Works is dedicated to supporting initiatives that will advance the economic and employment opportunities for the region. We believe that working together with Macquarie will provide such opportunities and strongly support their proposal.

Macquarie, through its partnership with SkillUp!, has begun to develop a successful relationship with Philadelphia Works. They have shown dedication to the Philadelphia area in support of this innovative workforce initiative.

In anticipation/preparation for PennDOT's Major Bridge P3, they recently engaged Philadelphia Works about expanding relationship and developing additional workforce development programs. Philadelphia Works looks forward to working with Macquarie and the Bridging Pennsylvania Partners team. We will support this work not only in Philadelphia, but will help coordinate similar activities throughout the Commonwealth to align geographically with the other bridges in the program

Please feel free to reach out with any questions; I can be reached at pblumenauer@philaworks.org.

Sincerely,

Patricia Blumenauer
Vice President, Operations

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1617 J.F.K. Boulevard, 13th Floor
Philadelphia, PA 19103

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Volume II Technical Proposal

Section 2
Appendix 5, 3.2

PDA Work Criteria
Preliminary PDA Work Schedule

US 219 New Highway Construction, Pennsylvania
Fay

Pathways Major Bridge Initiative Preliminary PDA Work Schedule

SB P3_2
TASK filter: All Activities

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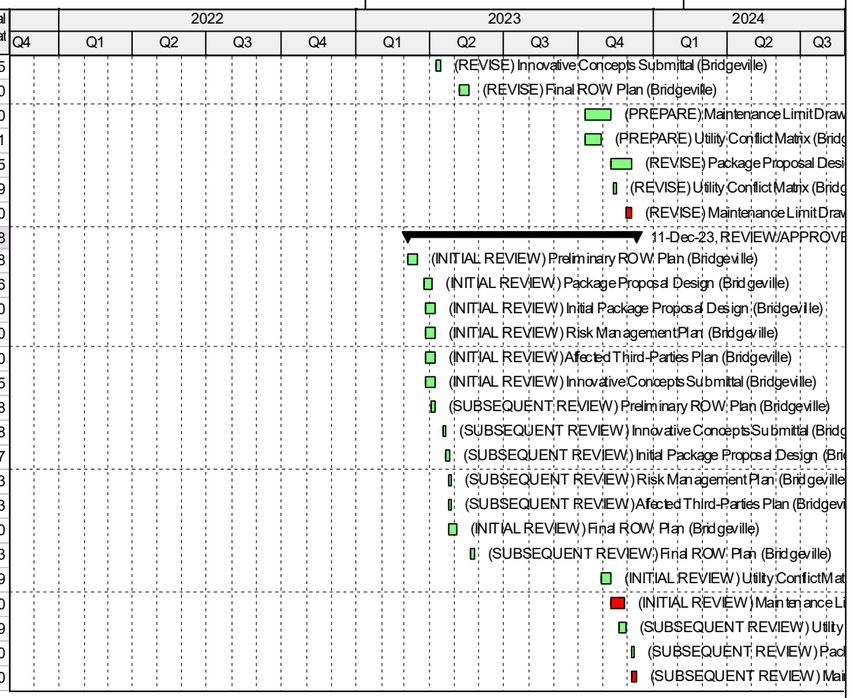
Data Date: 01-Nov-21

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
8.1.BRIDGEV.PREP.95	(REVISE) Innovative Concepts Submittal (Bridgeville)	5	10-Apr-23	14-Apr-23	165
5.1.BRIDGEV.PREP.95	(REVISE) Final ROW Plan (Bridgeville)	10	08-May-23	19-May-23	140
10.2.BRIDGEV.PREP.80	(PREPARE) Maintenance Limit Drawings (Bridgeville) – (Submit w/ Package Proposal Design)	32	09-Oct-23	10-Nov-23	0
6.BRIDGEV.PREP.80	(PREPARE) Utility Conflict Matrix (Bridgeville) – (Submit w/ Package Proposal Design)	20	10-Oct-23	30-Oct-23	11
8.2.BRIDGEV.PREP.90	(REVISE) Package Proposal Design (Bridgeville)	15	10-Nov-23	04-Dec-23	5
6.BRIDGEV.PREP.90	(REVISE) Utility Conflict Matrix (Bridgeville)	5	13-Nov-23	17-Nov-23	9
10.2.BRIDGEV.PREP.90	(REVISE) Maintenance Limit Drawings (Bridgeville)	5	28-Nov-23	04-Dec-23	0
REVIEW/APPROVE SUBMITTALS		280	06-Mar-23	11-Dec-23	58
5.1.BRIDGEV.REV.100	(INITIAL REVIEW) Preliminary ROW Plan (Bridgeville)	10	06-Mar-23	17-Mar-23	138
8.2.BRIDGEV.REV.70	(INITIAL REVIEW) Package Proposal Design (Bridgeville)	10	26-Mar-23	05-Apr-23	226
8.1.BRIDGEV.REV.70	(INITIAL REVIEW) Initial Package Proposal Design (Bridgeville)	10	27-Mar-23	07-Apr-23	160
2.4.BRIDGEV.REV.160	(INITIAL REVIEW) Risk Management Plan (Bridgeville)	10	27-Mar-23	07-Apr-23	160
2.7.1.3.BRIDGEV.REV.180	(INITIAL REVIEW) Affected Third-Parties Plan (Bridgeville)	10	27-Mar-23	07-Apr-23	160
8.1.BRIDGEV.REV.85	(INITIAL REVIEW) Innovative Concepts Submittal (Bridgeville)	10	27-Mar-23	07-Apr-23	165
5.1.BRIDGEV.REV.95	(SUBSEQUENT REVIEW) Preliminary ROW Plan (Bridgeville)	5	03-Apr-23	07-Apr-23	138
8.1.BRIDGEV.REV.90	(SUBSEQUENT REVIEW) Innovative Concepts Submittal (Bridgeville)	5	17-Apr-23	21-Apr-23	198
8.1.BRIDGEV.REV.80	(SUBSEQUENT REVIEW) Initial Package Proposal Design (Bridgeville)	5	21-Apr-23	26-Apr-23	287
2.4.BRIDGEV.REV.170	(SUBSEQUENT REVIEW) Risk Management Plan (Bridgeville)	5	24-Apr-23	28-Apr-23	193
2.7.1.3.BRIDGEV.REV.190	(SUBSEQUENT REVIEW) Affected Third-Parties Plan (Bridgeville)	5	24-Apr-23	28-Apr-23	193
5.1.BRIDGEV.REV.85	(INITIAL REVIEW) Final ROW Plan (Bridgeville)	10	24-Apr-23	05-May-23	140
5.1.BRIDGEV.REV.90	(SUBSEQUENT REVIEW) Final ROW Plan (Bridgeville)	5	22-May-23	26-May-23	173
6.BRIDGEV.REV.70	(INITIAL REVIEW) Utility Conflict Matrix (Bridgeville)	10	30-Oct-23	10-Nov-23	9
10.2.BRIDGEV.REV.70	(INITIAL REVIEW) Maintenance Limit Drawings (Bridgeville)	10	10-Nov-23	27-Nov-23	0
6.BRIDGEV.REV.80	(SUBSEQUENT REVIEW) Utility Conflict Matrix (Bridgeville)	5	20-Nov-23	28-Nov-23	9
8.2.BRIDGEV.REV.80	(SUBSEQUENT REVIEW) Package Proposal Design (Bridgeville)	5	04-Dec-23	09-Dec-23	60
10.2.BRIDGEV.REV.80	(SUBSEQUENT REVIEW) Maintenance Limit Drawings (Bridgeville)	5	05-Dec-23	11-Dec-23	0



BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 2 PDA Work Criteria

Appendix 5, 3.2 Preliminary PDA Organization

Mersey Gateway Bridge, UK
Macquarie

4.6.1(c) Preliminary PDA Organization

4.6.1(c)(i) PRELIMINARY PDA ROSTER AND ORGANIZATIONAL CHART

Bridging Pennsylvania Partners (BPP) is a fully integrated organization that will leverage the world-class expertise and local resources of its Team Members, based on the best available personnel. BPP's Preliminary PDA Roster and Organizational Chart, presented on pages 4 and 5 of this Section, provide more details on the role and responsibility of each personnel. The horizontal and cross-functional lines of communication and interface among workstreams, including the design and construction and maintenance workstreams, serves to facilitate maximum integration, collaboration and innovation amongst all Team Members and encourages the development of comprehensive solutions that will maximize value to the Commonwealth.

4.6.1(c)(ii) APPROACH TO PDA ORGANIZATION

4.6.1(c)(ii)(a) MANAGEMENT STRUCTURES AND SYSTEMS

BPP's organizational approach is based on a clear management structure outlined below:

- **BPP's PDA Entity Board** comprises two senior executives, one from each Equity Member. The Board provides guidance to the Leadership Team on the development of the Package Proposals and ensures appropriate governance, including the management of any conflicts that may arise within BPP or with PennDOT
- **BPP's Senior Executive Leadership Committee** comprises the BPP Board and senior executives from the Lead Construction Contractor. This committee discusses the progress of the Project and resolves any issues that have been escalated
- **BPP's Leadership Team** comprises the Project Manager and the Deputy Project Manager, both senior members with complementary expertise. The Leadership Team leads BPP's broader team during the Pre-Development Phase. They will implement strategy and guidance from the Board at the PDA Entity level and resolve any issues that are escalated from the workstreams
- **BPP's Management Team** comprises BPP's Leadership Team and each workstream's lead - which includes all BPP Key Personnel and the majority of Required Personnel. The BPP Management Team, which was mobilized during the RFP Phase, will provide continuity across disciplines, Packages and Project Phases. We will work with PennDOT to align with and match counterparts to streamline coordination and communication between the two parties

BPP has structured its Management Team to capitalize on lessons learned from many other projects, including the recent Op Lanes Maryland PDA. Most of BPP's Management Team live locally and have strong and relevant experience with transportation, PDAs, P3 and bridge projects. Resumes for all Key and Required Personnel, provided in Appendix 1, outline the breadth of experience, local relevance and diversity that are core to BPP's values.

- **BPP's workstreams** are clear working groups, centered on functions and disciplines and designed to progress specific elements of the PDA Work. BPP's structure is organized around six workstreams: Project Management, Design and Construction, Maintenance, Public and Community Engagement, Commercial and Legal and Finance, all of which are staffed with subject matter experts

Continuity is an essential element of BPP's organizational approach. Most of PDA Entity personnel will remain consistent across the Packages development, and if relevant, will transfer to the Development Entity of either Package, to ensure that knowledge and relationships with relevant stakeholders and PennDOT are transferred and built upon continuously for the whole Project life.

4.6.1(c)(ii)(b) INTEGRATION OF WORKSTREAMS AND PDA WORK STAFFING

During the Pre-Development Phase, BPP will undertake the PDA Work for each Bridge and each Package in an integrated and collaborative fashion between all workstreams, personnel and PennDOT. This approach will be the same throughout the entire Pre-Development Phase and will be tailored to continue through the delivery of both Packages. Each workstream will meet weekly to progress the PDA Work activities that the workstream is responsible for, including through interactions with PennDOT and other stakeholders.

The workstreams, and more specifically our Design and Construction and Maintenance workstreams, will coordinate through:

- **Technical Working Groups (TWGs):** BPP's organizational structure relies on integrated cross-workstreams groups that will ensure that all functions and disciplines are accounted for and work collaboratively while defining the solution for each Package. BPP currently contemplates the following TWGs: Stakeholder Coordination and Permitting, Quality Management, Safety Management, Environmental (including: impacts, hazardous material and noise), Right-of-Way, Site Investigations, Community Workforce and Engagement, Structures, Roadways, Utilities, Drainage, Stormwater Management and Erosion and Sediment Control, Landscaping and Aesthetics, Maintenance of Traffic, Tolling, Constructability, Pricing, Scheduling and Maintenance and Handback, each including representatives from PennDOT and BPP. In these meetings, all relevant disciplines will track design progress, address constructability and other technical issues, confirm compliance with the PDA Work Requirements and highlight and resolve issues on a specific element of the PDA Work. PennDOT will be invited to participate in these TWGs
- **Bridge Status Meetings:** In these meetings, all disciplines will coordinate and review design schedule, priorities and information needed to finalize design submittals on a Bridge-by-Bridge basis
- **Management Team Meetings:** Every Monday, BPP's Management Team will meet to discuss tracking of the PDA Work for both Packages against the baseline schedule and milestones and address key issues escalated by the workstreams

These meetings will support the integration of and coordination among workstreams.

4.6.1(c)(ii)(c) ISSUES RESOLUTION PROCESS

BPP's decision-making process delegates clearly defined authority across all levels of the team, empowering all staff to make decisions. This ensures that decision-making authority lies within each functional area of expertise and that decisions are made in a timely fashion. In addition, BPP is proposing a three-step issue resolution ladder detailed in the table below:

TABLE 1 - ISSUE RESOLUTION LADDER

RESOLUTION STEPS	INTERNAL ISSUE	BPP AND PENNDOT ISSUE
1.ISSUE WITHIN WORKSTREAMS: E.g., commercial disagreement on position in the Project Agreement within Commercial & Legal workstream	First discussed within the workstream with decision lying with workstream lead or between workstream leads if cross-workstream issue	Issue first discussed within workstream with decision lying between BPP and PennDOT's respective workstream leads
2.ISSUE NOT RESOLVED IN STEP 1 AFTER 7 DAYS	Escalated to the Management Team for decision by the Leadership Team	Escalated to the Project Steering Committee which intends to meet on weekly basis
3.ISSUE NOT RESOLVED IN STEP 2 AFTER 15 DAYS	Escalated to the BPP Board or Senior Executive Leadership Committee for resolution	Escalated to the Project Senior Executive Steering Committee comprised of senior executives from PennDOT, BPP and other relevant Project Stakeholders

This proposed resolution ladder ensures that issues can be discussed among the highest level of leadership, if required, of both PennDOT and BPP, within 3 weeks of arising in order to foster a rapid and acceptable resolution of any issue. This approach will mitigate any impact to the milestone deadlines that all parties will be working toward. Any dispute between or among the Parties, which is not settled by good faith negotiations per the resolution process outlined above, will be subject to the dispute resolution procedure of the governing agreements, i.e. teaming documents for BPP internal issues, using arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules; and Section 28 of the PDA for issues between BPP and PennDOT.

Project-First Mentality: Numerous checks and balances have also been included across our team to minimize disputes, incorporating best practices from recent PDA projects. Our contractual agreements have been developed to reflect our approach and include commitments for all members to continue with their respective obligations, including any disputed work, diligently and thereby minimizing potential cost and schedule impacts to the Project. **No BPP team member will stop, hinder, or delay work on the Project because of a dispute.**

4.6.1(c)(ii)(d) COMMUNICATION AND INTERFACE PROTOCOL

Although many elements of BPP's PDA approach promotes informal communication, BPP understands that establishing formal interface protocols across the full team, including subcontractors and suppliers, is essential to streamline decisions, reduce errors and rework, and promote a "one team" atmosphere required to deliver a successful Project. BPP's communication protocol will rely on:

- **Systematic meeting schedules:** Meetings amongst various workstreams and other groups will take place on a systematic basis, as presented in more detail in Section 4.6.1(g) – Approach to PDA Reporting. BPP will work with PennDOT early in the Pre-Development Phase to establish an agreed schedule for those standing meetings. Once the schedule is agreed, for each meeting, BPP will provide agendas and meeting minutes, and set an expectation of consistent attendance. A similar approach was used successfully during the RFP Phase. Table 2 below summarizes all anticipated pre-agreed meetings broken down by workstream
- **Email communication protocols:** Guidelines for email communication will distinguish between correspondence best suited for email, formal letters or meetings. This will create efficiencies for correspondence and help facilitate effective communication among the team
- **Co-location:** To the extent feasible, BPP and PennDOT, including consultant staff, will co-locate to streamline interfaces at all organizational levels and build rapport efficiently and rapidly. As mentioned in Section 4.6.1 (e) – PDA Partnering and Collaboration, BPP has already identified an office in Harrisburg ready to accommodate all staff from day-one of the Pre-Development Phase
- **Partnering Process:** BPP and PennDOT will implement a formal partnering process, outlined in a partnering charter that describes a common mission, goal, and issue resolution process. This process will include regularly scheduled partnering meetings throughout the Pre-Development Phase, facilitated by an external moderator, to discuss interface issues, division of responsibilities and continuously evaluate the effectiveness of our communication, teamwork, cooperation, integrity and respect in the workplace
- **Identified Points of Accountability for coordination with relevant approval agencies:** BPP understands the requirements, processes and procedures for each agency and has identified three key individuals to manage specific coordination activities, based on their previous experience with these agencies: (i) Design Lead, Alexander Houseal, P.E. for design standards, compatibility with planned transportation and utility infrastructure, design support for environmental permitting and systems interface with an existing transportation network; (ii) Environmental Compliance Manager, Arik Tapiero, for environmental permits, erosion control permits and required reporting; and (iii) Construction Manager, Greg Yavicoli, P.E. for maintenance and protection of traffic, safety regulations and emergency response procedures during construction
- **Third-Party Coordination and Utility Managers:** A Third-Party Coordination Manager and a Utility Manager, exclusively dedicated to the First Package, will be primary contacts with third parties and Utility Owners and (i) develop Project execution plans, third-party coordination work plans and Utility coordination plans; (ii) lead initiation and monthly coordination meetings and (iii) coordinate between the design team and third-party/ Utility Owner.

TABLE 2 – WORKSTREAM MEETINGS AND INTERFACE

PROJECT MANAGEMENT	DESIGN AND CONSTRUCTION	QUALITY MANAGEMENT	MAINTENANCE	PUBLIC AND COMMUNITY ENGAGEMENT	COMMERCIAL AND LEGAL	FINANCE
• Weekly PDA Work Progress Meetings • Project Steering Committee • As needed across workstream meetings • Management Team meetings • BPP Board meetings to address and advise on key Project decisions	• Weekly workstream meetings • Constructability and Innovation workshops • Technical Working Group meetings • Risk Workshops with PennDOT • Design Workshops	• Weekly workstream meetings • Meetings with the design team to provide Level 1 reviews and QA of submissions prior to PennDOT submission • Meetings with PennDOT to coordinate owner audits	• Weekly workstream meetings • Coordination meetings with Design and Construction, PTC, Commercial and Legal and Finance	• Weekly workstream meetings • DBE Compliance and Coordination Meeting • Weekly Meetings with PennDOT's Diversity Program Liaison • Meetings with third parties and stakeholders	• Weekly workstream meetings	• Weekly workstream meetings • Meetings with lenders, private placements and/ or TIFIA

Proposed BPP PDA Period Organizational Chart

- Exhibit 6 Key Personnel
- Exhibit 6 Required Personnel
- Lives Locally
- Communication
- Reporting
- Management Team

See Section 4.6.2(a) - Introduction to Proposer's High-Level Approach to Predevelopment and Packaging for continuity of personnel

BRIDGING PENNSYLVANIA PARTNERS

BPP [PDA Entity] Board
Mark Bradshaw
Sharon Novak

Commonwealth
pennsylvania DEPARTMENT OF TRANSPORTATION

LEADERSHIP TEAM

Deputy Project Manager
Lucas Lahitou

Project Manager
Sarah Schick

Package Coordination Proposal Manager
Britni Seaholm

Controls Manager
Mike Docherty

Quality Assurance Manager (QAM)
Ray Henney, P.E.

Design Quality Manager
Jason DeFlitch, P.E.

PUBLIC AND COMMUNITY ENGAGEMENT

Community /Local Workforce and DBE Engagement Manager
Geoff Segal

Public Information Coordinator
Carla Julian

Equality Employment Opportunity Manager
Joe Hernandez

Government Affairs
Stan Rapp

Labor Relations
Chris Heinz

Supporting Advisors
Modern Times
Kaleidoscope

DESIGN AND CONSTRUCTION

Deputy DB Project Manager
Maximo Serrano

DB Project Manager
Hezi Snir Schlinger

Construction Manager
Greg Yavicoli, P.E.

Project Delivery Lead
Mark Robbins, DBIA

Design Lead
Alexander Houseal, P.E. (STV)

Environmental Compliance Manager
Arik Tapiero

Safety Manager

Utility Manager
Tyson Hicks

Row Manager

Third Party Coordinator

Permitting Manager

Constructability Reviewers

Estimators
Ruben Rios

Schedulers

Lead Structures Engineer
Timothy Irwin, P.E.

Lead Geotechnical Engineer
James Morrison, P.E.

Lead Utilities Engineer
Mark Handler, P.E.

Lead Roadways & Pavement Engineer
Jonathan (J.T.) Lincoln, P.E.

Lead Traffic Control Engineer
Mark Geiser, P.E.

Lead ITS, Signalization & Lighting Engineer
Eric Meyer, P.E. (WRA)

Lead Hydraulics & Hydrology Engineer
Lisa Gardocki, P.E.

Lead Design Aesthetics & Landscaping Engineer
Julie Bush, ASLA

NEPA / Hazmat Manager

Stormwater / H&H Manager

Design Team and Key Consultants
Dewberry Engineers, Inc.
Greenman-Pederson, Inc.
Whitman, Requardt and Associates, LLP
Ground Reconsidered, Inc.
French Engineering, LLC
Specialty Engineering, Inc.
American Geotechnical & Environmental Services, Inc.
Monaloh Basin Engineers, Inc.
AWK Consulting Engineers, Inc.

Tolling Lead
Charles Hewson

MAINTENANCE

Maintenance Manager
Dan Dennis

Lifecycle Lead

COMMERCIAL AND LEGAL

Commercial and Legal Manager
Sam Headon

Deputy Commercial Manager

Supporting Advisors
Sponsor's Legal Advisors
Insurance Advisor

FINANCE

Financing Manager
Jason Chun

Treasurer / Accountant

Supporting Advisors
Financial Advisor
T&A Advisor
Rating Agencies
Lender's Technical Advisor
Lender's Legal Advisor

SENIOR EXECUTIVE TEAM

Mark Bradshaw
Board Member

Mark Bradshaw is the Global Head of Infrastructure Investments and Development at Macquarie. He has over 20 years of experience developing and managing infrastructure projects globally.

Sharon Novak
Board Member

Sharon Novak is the CEO of S&B USA and the Chairman of the Board of Shikun & Binui America. He is responsible for S&B USA's concessions and construction businesses in the US. He has experience leading large and complex transactions in the infrastructure sector. Sharon is based in Pittsburgh, Pennsylvania.

KEY PERSONNEL

Sarah Schick
Project Manager

Sarah Schick is an Associate Director at Macquarie. She brings 13 years of experience developing P3s across North America, Europe and Australia, and was the Transaction Director in charge of the Op Lanes Maryland project pursuit, for which she remains involved as a Board Member.

Hezi Snir Schlinger
Design-Build Project Manager

Hezi Snir Schlinger has over 29 years of highway transportation infrastructure experience and over 25 years leading P3 projects. Hezi is currently based in Pittsburgh, Pennsylvania.

Greg Yavicoli, P.E.
Construction Manager

Greg Yavicoli has 17 years of experience as a construction manager on design-build transportation projects throughout the Eastern United States.

Raymond Henney, P.E.
Quality Assurance Manager

Raymond J. Henney has 30 years of experience in design-build projects including long span steel bridges and several projects working in partnership with Fay in Pennsylvania. Ray is based in Pittsburgh, Pennsylvania.

Jason Chun
Financing Manager

Jason Chun is an Associate Director at Macquarie. He brings 13 years of infrastructure experience across financial advisory and principal investment transactions, including complex P3 transactions.

Dan Dennis
Maintenance Manager

Dan Dennis has over 25 years of experience in construction management and operations and maintenance and has worked on P3 projects in the US including Michigan, North Carolina, Georgia and Texas.

Alexander Houseal, P.E.
Design Lead

Alexander Houseal has over 35 years of experience in highway design and project management including 25 years of PennDOT and PA Turnpike highway and bridge projects. Alexander is based in Philadelphia, Pennsylvania.

WORKSTREAM	KEY AND REQUIRED PERSONNEL
PROJECT MANAGEMENT	• **Sarah Schick, Associate Director, Macquarie Capital – PDA Entity's Project Manager** The PDA Entity's Project Manager will be the single point of responsibility and contact to PennDOT for all obligations under the PDA including all contract administration and correspondence with PennDOT. Together with **Lucas Lahitou (Head of Origination and Structuring, Shikun & Binui Concessions), Deputy Project Manager,** she will be responsible for leading BPP's Management Team and broader team during the Pre-Development Phase. They will implement strategy and guidance from the Board at the PDA Entity level and serve as escalation for all issues arising from the workstreams. The Management Team will be empowered to commit resources to assure the Project is progressed and completed on schedule with an emphasis on safety, quality, and environmental compliance. They will be representatives of the PDA Entity at the Project Steering Committee, established in accordance with Section 8 of the PDA • **Mike Docherty, Director of Operations, Joseph B. Fay Co. – Controls Manager** The Controls Manager will oversee the tracking and reporting of controls throughout the PDA Term and manage documents, Submittals, Approvals, data, contracts, schedule and cost
QUALITY MANAGEMENT	• **Raymond Henney, P.E., Contractor Services Manager, SAI – Quality Assurance Manager (QAM)** The QAM will be responsible for the quality assurance aspects of the overall PDA Work and further design and construction activities for the Package. He will report jointly to and will owe a duty of care to the PDA Entity and PennDOT. He will develop and update the PDA Quality Management Plan (QMP), conduct staff training, coordinate project audits and PennDOT audits and coordinates Level 1 Reviews by IQF • **Jason DeFlitch, P.E., Project Manager, SAI Consulting Engineers, Inc. – Design Quality Manager (DQM)** The DQM will be responsible for managing the Quality Control program for the design and will provide quality assurance reviews of the design work during the PDA Term. He shall report directly to the Project Manager, independent of the day-to-day management. He will assist in developing the Design Quality Management Plan (DQMP), verify that methods and procedures contained in the DQMP are implemented and followed, facilitate Level 1 reviews and Project audits and assist the QAM in training on and modification of the DQMP during the Pre-Development Phase
MAINTENANCE	• **Dan Dennis, Vice President, STADIA Technical Advisors – Maintenance Manager** The Maintenance Manager will be responsible for the overall operation, design, construction, maintenance, contract administration and handback matters on behalf of the to-be-formed Development Entity during the Maintenance Period. He will develop a Plan for Package Maintenance and Handback, provide input into design and construction solution, Costing Models and design process to optimize design from a maintenance perspective
PUBLIC AND COMMUNITY ENGAGEMENT	• **Geoff Segal, Associate Director, Macquarie Capital – Community / Local Workforce and DBE Engagement Manager** The Community / Local Workforce and DBE Engagement Manager will be responsible for all BPP Community and Local Workforce initiatives (e.g., internships, training, apprenticeships, and education programs) and coordinate with the community, local workforce and public relations advisors. He will ensure community and stakeholder outreach, education and marketing campaigns are executed and ensure compliance with diversity goals by supporting PennDOT's Diversity Program, execution of Community Benefits Agreement and MOUs with community partners • **Joe Hernandez, President, Modern Times, Inc. – Equal Employment Opportunity (EEO) Manager** The EEO Manager will be responsible to ensure all community and workforce engagement requirements are achieved. He will implement all aspects of the community benefits program and bring the full support of Modern Times, Inc. staff • **Carla Julian, President, Kaleidoscope Public Relations, LLC – Public Information Coordinator** The Public Information Coordinator will be responsible for the public relations plan / program including media relations, community relations, construction information and crisis communication. She will ensure that all information related to design, construction, maintenance and tolling is shared and that all interested and vested parties and stakeholders are informed of progress
COMMERCIAL AND LEGAL	• **Sam Headon, Managing Director of Project Development, Shikun & Binui – Commercial and Legal Manager** The Commercial and Legal Manager will be responsible for all commercial issues and negotiation of the Project Agreement, drop-down agreements and other anciliary documents. He, with the Project Manager, will be the main point of contact for PennDOT across all commercial discussions and legal documentation
FINANCE	• **Jason Chun, Associate Director, Macquarie Capital – Financing Manager** The Financing Manager will be responsible for developing the Package Financing Plan and providing updates to PennDOT. He will provide the updated Financial Model that will be used to test key decisions and identify capital structure that maximizes value to PennDOT. He will manage the TIFIA and PABs application process from initial engagement to final approval, and he will engage with lenders, underwriters and credit rating agencies to ensure raising competitive funding from PABs, taxable bonds, private placement and bank finance, as needed, and manage advisors such as financial, tax, and accounting

WORKSTREAM	KEY AND REQUIRED PERSONNEL
DESIGN AND CONSTRUCTION	• **Hezi Snir Schlinger, COO, Shikun & Binui – Design-Build Project Manager** The Design Build Project Manager will be responsible for management, planning and execution of the design and construction for the Project, including permitting, coordinating with Governmental Entities and third-parties, scheduling and cost estimating. He will oversee the design activities and development and provide construction guidance as part of the PDA Work. He will drive the de-risking activities and advance the technical documents. He will manage various interfaces between design and construction members and ensure compliance with current contract document, budget and schedule • **Greg Yavicoli, P.E, Operations Manager, Shikun & Binui America – Construction Manager** The Construction Manager will be responsible for overseeing the planning of the day-to-day construction operations, materials, equipment and labor needs, including quality control for the future Package Work with a primary responsibility of ensuring adherence to design and construction specifications • **Alexander Houseal, P.E., Vice President, STV Incorporated – Design Lead** The Design Lead will be responsible to ensure that the Package Design Proposals are compliant with PDA Work Requirements and that the design criteria requirements are met • **Mark Robbins, P.E. (MD), DBIA, Vice President, STV Incorporated – Project Delivery Lead** The Project Delivery Lead will work closely with the Design-Build Project Manager and Design Lead to ensure that PDA Work for a Bridge is completed and coordinated with contractors • **Julie Bush, ASLA, Principal, Ground Reconsidered – Lead Design Aesthetics and Landscaping Engineer** The Lead Aesthetic and Landscaping Engineer will be responsible for the design efforts across the aesthetics and landscaping. She will ensure impacts to the landscape are remediated and trees replaced in accordance with the Package Technical Provisions and Technical Provisions Term Sheet • **Timothy Irwin, P.E., Senior Project Manager, STV Incorporated – Lead Structures Engineer** The Lead Structures Engineer will be responsible to ensure that each Bridge Design meets PennDOT Design Manual 4 and that structures' designs criteria and structures meet the Package Technical Proposal submission requirements and the Technical Provisions Term Sheet • **Jonathan Lincoln, P.E., Associate, Senior Project Manager, Dewberry – Lead Roadways and Pavement Engineer** The Lead Roadways and Pavement Engineer will be responsible for roadway and pavement designs to ensure they meet PennDOT Design Manual 2 and 3 criteria, and that the designs meet the Package Technical Proposal submission requirements and the Technical Provisions Term Sheet • **Mark Handler, P.E., Senior Highway Engineer, STV Incorporated – Lead Utilities Engineer** The Lead Utilities Engineer will be responsible for coordinating with Utility Owners' facility locations, impacts, outage timing, if required, and early utility adjustment work. He will maintain utility agreements and obtain utility clearance for each Bridge and determine needed utility site investigations • **Mark Geiser, P.E., Senior Associate/Assistant Dept. Manager, Highway, Dewberry – Lead Traffic Control Engineer** The Lead Traffic Control Engineer will be responsible for verifying and developing required traffic control plans for the roadway and Bridge sequencing as well as for off-site improvements and ensure that traffic control plans meet the Package Technical Proposal submission requirements and the Technical Provisions Term Sheet • **Eric Meyer, P.E., Vice President, WRA – Lead ITS, Signalization and Lighting Engineer** The Lead ITS, Signalization and Lighting Engineer will be responsible for the ITS development and coordinate with the Tolling Lead. He will manage signal and lighting design teams to coordinate signal plan development with owning municipality and ensure ITS, signalization and lighting are in accordance with the Package Technical Provisions and Technical Provisions Term Sheet • **Lisa Gardocki, P.E., Senior Engineer, STV Incorporated – Lead Hydraulics and Hydrology Engineer** The Lead Hydraulics and Hydrology Engineer will be responsible for the hydraulic and hydrology analysis including 2D modeling, coordinate with the Environmental Manager on waterway permits and manage development of storm water management design and plans • **James Morrison, P.E., Peng., Vice President, STV Incorporated – Lead Geotechnical Engineer** The Lead Geotechnical Engineer will be responsible for investigations and structure foundation designs and roadway slope stability studies. He will ensure that traffic control plans are in accordance with the Package Technical Proposal and Technical Provisions Term Sheet • **Arik Tapiero, Global Compliance and Sustainability Manager, Shikun & Binui America – Environmental Compliance Manager** The Environmental Compliance Manager will be responsible for oversight, training and tracking the PDA Entity's obligations and proposed Package Work to comply with Environmental Commitments and permit conditions. He will coordinate with PennDOT in the development of the environmental approval and approach. He will also provide NEPA support to PennDOT • **Tyson Hicks, Project Manager, Joseph B. Fay Co. – Utility Manager** The Utility Manager will be responsible for reviewing and accepting designs that involve utility relocation and/or coordination, facilitating coordination with Utility Owners and approving financial and technical modifications associated with utility adjustments and modifications to utility agreements. He will oversee the utility management program including daily coordination with BPP's team checking design against regulations and resolving conflict • **Charles Hewson, Director, Big River Consulting – Tolling Lead** The Tolling Lead will be responsible for overseeing the planning and coordination of the design and construction of the tolling civil infrastructure system, working closely with the Design and Construction workstream. He will interface with PennDOT and PTC to ensure that the tolling civil infrastructure is coordinated and work through open-book pricing process with PennDOT in the development of the Costing Models

APPENDIX 1

BPP Resumes

Mark Bradshaw, Development Entity Board Member

Respondent: Bridging Pennsylvania Partners

Firm: Macquarie

Years of Experience:

- Macquarie (15 years)
- Infrastructure experience (25 years)

Role: Development Entity Board Member

Education: University of New South Wales Australia, LL.B., Law. University of New South Wales Australia, B.S., Property, Engineering and Economics (Hons 1)

Professional Registrations / Licenses / Certifications: Solicitor of the Supreme Court of NSW, Australia

Summary of Prior Experience

Mark Bradshaw is the Head of Infrastructure Projects and Principal for North America and Europe at Macquarie Capital, leading a team of over 50 professionals across the New York, Los Angeles, London, Dublin and Amsterdam offices. Mark joined Macquarie in 2005 and has accumulated over 20 years of infrastructure experience across various jurisdictions and sectors. His key focus is on providing executive leadership as the Equity Member for Macquarie's consortiums involved in project finance infrastructure concessions. Mark's responsibilities include serving as the executive principally responsible for overseeing the contractual relationships between grantors (government counterparties) and the consortium. Mark has experience in construction, engineering and the legal profession, having previously worked in various roles in the infrastructure industry, including at Allen & Overy in London.

Select Project Experience

Silvertown Tunnel

Mark successfully led the Macquarie Team on the $1.5B Silvertown Tunnel P3 which involved the DBFM of a 0.6-mile twin-bored road tunnel under the River Thames in London, the first major road crossing across River Thames in 30 years. Mark played a key role in forming a winning consortium with deep design, construction and funding capabilities and with Macquarie as lead sponsor and sole financial advisor. Mark led the team in key negotiations with the Transport for London, contractors and lenders.

A9 Badhoevedorp-Holendrecht

Mark oversaw the Macquarie team during this market-leading proposal where Macquarie, as a sole equity sponsor and financial advisor, qualified with its technical advisors based on design and traffic management capabilities. Throughout this $1B DBFM of a 6.5-mile expressway in Amsterdam, Mark provided guidance and oversight over key technical and commercial decisions and the negotiations with the authority, the contractors and lenders, leading to successful financial close in December 2019.

A24 Blankenburg Tunnel

Mark successfully led the consortium, in which Macquarie acted as the lead sponsor, contributing 70% of equity and sole financial advisor, on closing this $1.1B Submerged Tunnel P3. The project included an immersed tube tunnel, a cut and cover tunnel and connections to major highways to improve road links between Rotterdam and its port. The DBFM contract has a concession term of 20 years during which the consortium will perform maintenance and lifecycle work. To achieve commercial and financial close on a large and complex project, the largest P3 awarded in the Netherlands to date, Mark was principally responsible for overseeing an integrated consortium composed of experienced parties in transport infrastructure in the Netherlands. Mark also leveraged his strong relationships with lenders, engaging a

sizeable number of funders to secure a competitive financing solution in achieving a swift financial close in October 2018.

Mersey Gateway Project

Mark led the Macquarie team in bidding on this $900M project, a greenfield development of a six-lane toll bridge over the river Mersey in England. The project was procured under a DBFOM model with a 30- year operating period. Mark successfully managed the consortium in securing the bid, despite a highly competitive process with 6 shortlisted teams and delivered an attractive commercial package despite a late change during the tender to bring in a new construction contractor. In addition, Mark demonstrated his deep P3 financing expertise, sourcing from a pool of over 40 global lenders and alternative investors to structure a complex debt funding solution, which delivered significant value to the procuring agency and allowed Macquarie's team to score the highest points on pricing. With Mark's leadership on all commercial and legal negotiations, the project reached financial close in March 2014 and became one of the top 10 most innovative and important infrastructure projects globally in KPMG's Infrastructure 100.

D4 / R7 Highway

Mark led the Macquarie team in this $1.2B DBFOM of sections on the D4 Highway (the Bratislava ring road in Slovakia) and the R7 Expressway. The road extends for around 37 miles including a 1.2-mile bridge over the Danube River. Macquarie was lead sponsor and sole financial advisor for consortium on this project. Mark oversaw the commercial negotiations with the authority as well as the negotiations with lenders and contractors

Julie A. Bush, ASLA, Lead Design Aesthetics & Landscaping Engineer

Respondent: Bridging Pennsylvania Partners
Firm: Ground Reconsidered, Inc.
Years of Experience:

- Ground Reconsidered (22 years)
- Experience (29 years)

Role: Principal-in-charge – Aesthetic and Landscape Design Services
Education: McGill University, Master of Architecture; Clemson University; Bachelor of Landscape Architecture
Registration: PA Landscape Architect LA-002810

Summary of Prior Experience

Julie is a principal at Ground Reconsidered. She contributes to the successful design and installation of the projects she works on through her excellent people and project management skills coupled with her ability to effortlessly shift from site scale to detail scale during the design process. Recently Julie has focused her efforts on public projects with multiple stakeholders and complex program requirements, demonstrating an innate ability to successfully conduct public meetings and achieve consensus among disparate stakeholders.

Select Project Experience

I-676 Bridges Cover Parks / Vine Street Expressway: Philadelphia, PA

Required replacement of the Vine Street Expressway overpasses' aging infrastructure presented Ground Reconsidered with an opportunity to design several new public gathering spaces in and around Philadelphia's Logan Square. This multi-year multiple stakeholder project involved several of Philadelphia's premier arts and cultural institutions along with governmental authorities and community groups. Improvements included: two pedestrian-only overpasses with programmed green spaces; paving, planting and street furnishing along adjacent at-grade streets; and realigning intersections to create a safer environment for pedestrians and vehicles. *Scope of services:* Site analysis, schematic design, design development, construction documentation and observation. *Role*: Principal-in-charge

Roosevelt Boulevard Multimodal Corridor Program: Philadelphia, PA

Ground Reconsidered was the design team's landscape architect and worked closely with OTIS, Philadelphia Streets Department, SEPTA, along with other stakeholders to develop changes to create a safer, more accessible and a more reliable Boulevard for all. The current conditions do not provide safe access or connectivity to the surrounding neighborhoods: crossing by foot to access transit and destinations is a challenge. Proposed designs include recommendations to improve both the pedestrian realm of the boulevard and the overall aesthetics. Improvements include planting, the addition of art, green stormwater infrastructure, improved sidewalks, crosswalks, medians and the creation of key gateways spaces. *Scope of services:* Mapping existing roadway conditions and conceptual design options for both 2025 and 2040 improvements. *Role*: Principal-in-charge

Benjamin Franklin Parkway Guidelines & Site Improvements 2100/2200 Blocks: Philadelphia, PA

Ground Reconsidered prepared a design standards manual to guide development of projects along the Benjamin Franklin Parkway and was then selected as the prime consultant to lead a team to design site improvements for the three parallel roadways of the Parkway 's 2100/2200 blocks. The work included reconstruction of the curb lines, new sidewalks, pedestrian refuge islands and bicycle lanes. GR worked closely with stakeholder organizations to develop alternatives to improve the pedestrian experience, to meet requirements for safe and efficient cycling and to accommodate the site's large volume of vehicular traffic.

Scope of services: Project management, public outreach, site analysis, planning, design, construction documentation and observation. *Role*: Principal-in-charge

BGE Triangles: Philadelphia, PA

The BGE Triangles sit at the intersection of Broad Street, on Germantown Avenue, Butler Street and Erie Avenue. The zone is a vital commercial district and public transportation hub, with notable architecture and a strong community presence. In 2017, the mayor formed the Broad, Germantown and Erie Task Force, composed of community groups, government, residents and merchants, to build on the community's work to correct this disparity. The Task Force is working on upgrades to the streets, sidewalks, buildings, businesses and parks. As part of the larger Broad, Germantown and Erie Project, Ground Reconsidered is working with Philadelphia City Planning Commission, the Office of Transportation, Infrastructure & Sustainability and the Commerce Department to design the landscape and streetscape amenities. Based on community feedback, the design incorporates pedestrian safety improvements and placemaking amenities such as low seat walls, tables and chairs, shade structures and a book kiosk and planting. The spaces at both triangles can be used for events and specialty markets or everyday gatherings. *Scope of services:* public outreach, site analysis and planning, design. *Role*: Principal-in-charge.

Maplewood Mall Reconstruction: Philadelphia, PA

Maplewood Mall is a curbless pedestrian-scale street in Philadelphia's Germantown Business District. Since no major physical improvements have been made since the mall's inception in 1970, the infrastructure of the mall was in poor condition. The goal of the project was to improve the physical condition of the mall and provide a community driven design for the roadway and the public plazas that supports the needs and desires of business owners and residents while re-energizing this once vibrant retail and community hub. Through a series of public meetings and presentations, the prime consultant and GR worked with the community to discuss and develop their vision for the mall while employing our design experience to implement low-maintenance infrastructure and placemaking strategies. *Scope of services:* public outreach, site analysis and planning, design, construction documentation and observation. *Role*: Principal-in-charge.

SRDC Walnut Street Bridge: Philadelphia, PA

Ground Reconsidered worked with a multi-disciplinary design team to improve functionality and flow on the Walnut Street Bridge, which connects Center City to Philadelphia's University City District. Project goals include tying the bridge – from both sides of the river – into the fabric of the city, improving the pedestrian and bicycle experience without altering the bridge's current volume of vehicular traffic and providing a gateway to the Schuylkill River Trail. The conceptual designs that GR developed were instrumental in securing the necessary TIGER funding for completion of the project. The improvements that GR designed in conjunction with the design team include widened sidewalks, restriped cartways and revised bicycle lanes. GR also designed and documented lighting and the gateway trellises on the bridges' stairway leading to the Schuylkill River Trail below. With input from stakeholders GR studied and designed paving patterns and unit paver improvements. *Scope of services:* Site analysis, schematic design, design development, construction documentation. *Role:* Principal-in-charge.

King of Prussia First Avenue Linear Park: King of Prussia, PA

The First Avenue Linear Park is part of the King of Prussia District and Upper Merion Township's comprehensive plan for multi-modal transportation improvements. Ground Reconsidered is the team's Prime Consultant responsible for concept design, preliminary and final engineering and construction observation, The First Avenue Linear Park is part of a growing network of multimodal trails and bike lanes in the greater metropolitan region that provide reliable and efficient transportation options. The Park is 2.6 miles in length and features specialty planting areas, solar-powered pedestrian lighting, active workstations and assorted recreational and social spaces. *Scope of services:* Public outreach, site analysis and planning, design. *Role*: Principal-in-charge.

Jason Chun, Financing Manager

Respondent: Bridging Pennsylvania Partners

Firm: Macquarie Infrastructure Developments LLC

Years of Experience:

- Macquarie (14 years)
- Experience (14 years)

Role: Senior Vice President – Infrastructure Investments and Development

Education: Korea University; B.S. in Electronic Engineering

Professional Registrations / Licenses / Certifications: Financial Conduct Authority (FCA) certification

Summary of Prior Experience

Jason is a Senior Vice President in Macquarie Capital's Infrastructure Investments and Development team. Jason has extensive experience in project finance, P3 procurement and long-term financing for infrastructure projects. Jason joined Macquarie in 2008 and has over 14 years of infrastructure experience across financial advisory and principal investment transactions. Over the last decade, he worked on several major complex P3 projects across Europe, Asia and South America.

Jason's focus is on providing bespoke financing solutions for a diverse range of infrastructure projects and transactions. Prior to working in Macquarie's New York office, Jason worked for Macquarie Capital in London, Hong Kong and Seoul, Korea.

Select Project Experience

Silvertown Tunnel P3, London UK

The project consists of the design, build, finance and maintenance of two greenfield twin-bored road tunnels under the Thames River in London. This availability-style public private partnership project is valued at $1.29M.[1] Jason's role on the project included:

- Serving as financial advisor to consortium co-led by Macquarie
- Overseeing competitive debt funding process and debt structuring
- Supervising term sheet and commitment negotiations
- Leading debt documentation and financial close process

Confidential Road Project, Chile (FC imminent)

The project consists of the improvement, operation and maintenance of an existing 137km road off the Ruta 5 highway in northern Chile, under a 15-year O&M concession. The project is availability-payment with minimal traffic risk and has an estimated value at $145M.[2] Jason's role on the project included:

- Serving as financial advisor to the Equity Sponsors, including Macquarie, from bid phase through to financial close
- Overseeing competitive debt funding process and debt structuring, negotiating with all local lenders for commitments and credit approval before commercial close
- Early engagement with local lenders to ensure comfort with international PF terms

Riksveg 555 P3, Norway (Ongoing)

[1] Exchange rate as of 1/1/21: USDGBP = 1.3673 (from exchangerates.org.uk).
[2] Exchange rate as of 1/1/21: USDCLP = 0.001407 (from exchangerates.org.uk).

The project consists of the design, build, finance, operation and maintenance of the new main land road connecting Sotra and Bergen in Norway (inclusive of bridges and tunnels). The project has an estimated value at $1.85B.[3] Jason's role on the project included:

- Serving as financial advisor to the Macquarie-led consortium
- Overseeing competitive debt funding process and debt structuring
- Leading term sheet and commitment negotiations

Manila LRT Extension P3, Philippines

The project is a $506M P3 for the rehabilitation of the Light Rail Transport line and construction of a new 11km extension to the Cavite region of Manila, under a 32-year concession. Jason's role on the project included:

- Serving as financial advisor on the first non-recourse project financing for a P3 in the region
- Managing lenders through the due diligence and approval process
- Assisting discussions with the Grantor in relation to key bankability issues in the Concession Agreement

D4 motorway P3, Czech Republic

The Availability-payment $494M, 30-year DBFOM P3 project involving the development of a new 32km motorway linking Pribram in central Bohemia to Pisek in south Bohemia.4 Jason's role on the project included:

- Serving as financial advisor to the consortium
- Raising committed financing from lenders for the project bid following a competitive process (including funding commitments from Export Credit Agencies)

[3] Exchange rate as of 1/1/21: USDkr = 0.1158 (from exchangerates.org.uk).
[4] Exchange rate as of 1/1/21: USDEUR = 1.2134 (from exchangerates.org.uk).

Jason M. DeFlitch, PE - Design Quality Manager

Respondent: Bridging Pennsylvania Partners

Firm: SAI Consulting Engineers, Inc.

Years of Experience:

- SAI (11 years)
- Experience (20 years)

Role: Project Manager

Education: Pennsylvania State University, B.S., Civil Engineering

Professional Registrations / Licenses / Certifications: PE Civil Engineering, Pennsylvania/District of Columbia/Ohio/Florida/West Virginia

Summary of Prior Experience

As project manager, Jason manages quality performance, schedule and budget of various types of design projects. Jason's duties include preparing and maintaining project schedules and budgets; client interface; supervision and direction of project teams(s); coordination of structure/ highway design efforts; and agency, utility and railroad coordination.

Select Project Experience

Trumbull Corporation/Pennsylvania Department of Transportation District 3-0 -- CSVT SR 0015 over West Branch of Susquehanna, Project Manager

Final alternate design of a 15-span steel multi-girder bridge with a total length of 4545' on a new alignment with a maximum span of 350'. The structure is part of the Central Susquehanna Valley Transportation project ($155M). Due to the alternate being bid and accelerated design schedule was needed to move the girders into fabrication and not impact the construction schedule. This major structure included 180' tall piers, river construction, high wind design conditions and long steel girder spans.

Joseph B. Fay Company/Pennsylvania Department of Transportation District 12-0 -- Charleroi-Monessen Design/Build, Project Manager

This Design/Build project included design of a three-span 1,013' (with main span of 498') steel multi-girder structure to replace a structurally deficient main span thru-truss section that is part of the 12 span 1,770' Charleroi-Monessen Bridge over the Monongahela River ($35M). It included significant work in the Monongahela River, cofferdams, railroad coordination and utilized 15' deep haunched steel girders.

Joseph B. Fay Company/Pennsylvania Department of Transportation District 11-0 – Stoops Ferry Design/Build, Project Manager

This Design/Build project included design of a 77' simple span bridge replacement and widening utilizing accelerated bridge construction methods to minimize traffic disruptions. The project utilized precast deck and girders pieces, ultra-high-performance concrete for closure pours and precast substructure elements.

Mekis Construction/Pennsylvania Department of Transportation District 1-0 – Kelly Road Bridge Design/Build, Project Manager

This Design/Build project included design of a long single span steel girder bridge (196') in phased construction to replace a deficient structure. The integral abutment bridge eliminated the river pier in the

Shenango River and included demolition and erection analysis to minimize the causeway requirements and reduce environmental impacts.

Pennsylvania Department of Transportation District 11-0 - Neville Island Bridge Preservation, Project Manager

Bridge preservation of the existing steel tied arch Neville Island Bridge carrying I-79 over the Ohio River. Preliminary Engineering and Final Design included preservation inspection, fatigue and fracture repairs, replacement of expansion rocker bearings and corrosion repairs. Structural analysis of the two girder-floorbeam-stringer system was included along with structural analysis of the tied arch span ($56M).

Pennsylvania Department of Transportation District 10-0 - SR 0436-552 Margiotti Bridge Replacement, Project Engineer

Alternatives analysis, preliminary and final design for bridge replacement project carrying SR 0436 over the Mahoning Creek, Buffalo & Pittsburgh Railroad and the Mahoning Shadow Trail. Project includes improvements to the SR 0436/SR 0036 intersection, relocation of 1,000' of Perry Street and new 810' long bridge on new alignment. Significant right-of-way and utility impacts ($15M).

Dan Dennis, PE, Maintenance Manager

Respondent: Bridging Pennsylvania Partners
Firm: Stadia
Years of Experience:

- Stadia (2 years)
- Engineering experience (25 years)

Role: Senior O&M Advisor
Education: Virginia Tech, B.S., Civil Engineering
Professional Registrations / Licenses / Certifications: Licensed Professional Engineer in the Commonwealth of Virginia

Summary of Prior Experience

Dan Dennis has over 25 years' experience in construction management and outsourced/privatized operations and maintenance. He has worked as a Project Manager and Estimator providing cost estimates for P3 Operations and Maintenance projects throughout Virginia, Florida, North Carolina, Michigan, Illinois, Texas, Georgia, Colorado and Canada. He has provided Technical Advisory Services for the following DOT clients and projects:

- Virginia Dept. of Transportation: I95 Hot Lanes, Hampton Roads Express Lanes, FredEx
- Georgia Dept. of Transportation on the Major Mobility Investment Program
- Illinois Dept. of Transportation on the I-55 Stevens Expressway

For Developer led projects, he has provided Maintenance Consulting Services for:

- PennDOT: Rapid Bridge Replacement Program
- CDOT: I-70 Central
- TxDOT: SH 288 & Pharr I2/I69
- MarylandDOT: Maryland Managed Lanes

Select Skills and Experience

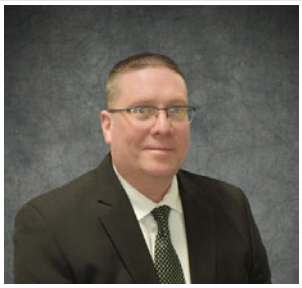
P3/DBFOM Experience

- P3/DBFOM O&M Project Cost Estimating
- Project profitability analysis

Engineering and Technical Experience

- Bridge and structure maintenance
- Management of project field personnel
- Direct oversight of large field O&M teams
- Business development and strategic planning
- Technical and performance specifications writing
- Snow / Weather and Incident management planning and implementation

Michael E. Docherty, Controls Manager



Respondent: Bridging Pennsylvania Partners
Firm: Fay
Years of Experience:

- Fay (4 years)
- Experience (22 years)

Role: Project Director
Education: University of Pittsburgh, B.S., Civil Engineering

Summary of Prior Experience

Michael has over 20 years of experience in construction management. Duties involve design survey coordination, design development, NEPA approvals, public information, ROW acquisition (and subsequent litigation support), utility relocations, DEP and regulatory permit approvals, as well as railroad coordination. He handles ongoing construction project issues with the three regional offices across the State. Coordination with CQAF during construction phase. Coordination with maintenance firm for project handover to final acceptance phase. Participated in major contract change orders as well as dispute resolution in commercial related items with PennDOT

Select Experience

Pennsylvania Rapid Bridge Replacement Project – Harrisburg, PA

- Project Director for construction joint venture for 558 bridge replacements
- Design and construction contract $900MM

Squirrel Hill Tunnel Rehabilitation Project – Pittsburgh, PA

- Prime contractor for the ceiling removal of tunnels as well as general rehab of lighting and other elements along with several structure rehabilitations
- Project included the coordination of numerous subcontractors and suppliers for multiple weekend shut downs of the tunnels.
- Design and construction contract $49.5MM

Lisa Gardocki, P.E., Lead Hydraulics and Hydrology Engineer

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- STV (<1 year)
- Total (17 years)

Role: Senior Civil Engineer
Education: Villanova University; B.S. in Civil Engineering

Summary of Prior Experience

Lisa has roadway design, stormwater management, erosion and sediment control, drainage and hydrologic and hydraulics (H&H) experience for a large variety of projects from conceptual and preliminary engineering through final design and construction services. Her project experience includes the preparation of permitting calculations and documents, construction plans, right-of-way plans, drainage and grading plans, erosion and sedimentation control (E&SC) plans, post construction stormwater management, traffic control plans and signing and pavement marking plans. Ms. Gardocki also has extensive PADEP Chapter 102 and Chapter 105 permitting experience for a wide variety of PennDOT, Pennsylvania Turnpike Commission and other roadway and railroad projects.

Select Project Experience

Bridge Project Management and Review Assistance, Berks, Carbon, Lehigh, Monroe, Northampton and Schuylkill Counties, PA

Responsible for the project setup within PennDOT's Engineering and Construction Management System (ECMS) and development of pre-design documents including scoping field views, scope of work development, estimated design cost estimates, cost monitoring (MPMS) and scope clarification. Program management services involved 35 projects under the five-year contract. Projects include local and state bridges replaced or reconstructed using traditional design/bid/build and design-build contracting methods. Upon award of the proceeding program management contract, responsibilities involved supervision and guidance of project setup for the latest projects.

SR 0078 Section 12M Total Reconstruction, Berks County, PA

Responsible for the preliminary H&H analysis and reports for six structures located over five miles of I-78 in Berks County between the Krumsville and Lenhartsville Interchanges, associated with the reconstruction and climbing lane addition to an existing four-lane, limited access facility for PennDOT District 5-0. Responsibilities also included the supervision of horizontal and vertical alignment development, grading and earthwork tasks; right-of-way plan completion; drainage design; E&S and PCSM facilities; and permitting requirements. The project includes shoulder widening, interchange improvements, culvert extensions and storm water best management practice installations.

SR 4008 over Little Swatara Creek Bridge Replacement, Berks County, PA

Responsible for the completion of H&H (HEC-RAS) analysis and report, PADEP Chapter 105 permitting and final design roadway tasks for this bridge replacement project for PennDOT District 5-0. Final design roadway tasks include coordinating and refining preliminary proposed horizontal and vertical alignments with final structure plans, drainage and guiderail designs, as well as the production of cross sections, final plan drawings, specifications and estimates and all other tasks required for construction

Pennsylvania Turnpike (I-76) Total Reconstruction and Widening from MP 302 to MP 308, Chester County, PA

Responsible for final design water resources engineering and permitting for the Early Action Bridge replacements (Adams Drive and Bulltown Road) and removal (Hedge Road) associated with the total reconstruction of approximately 5.5 miles of the Turnpike roadway, resulting in a six-lane typical section with twelve-foot outside shoulders and median widening totaling twenty-six feet.

SR 2003 North 5th Street and SR 1004 Erie Ave Bridges, Philadelphia, PA

Responsible for hydrologic and hydraulic analysis, stormwater analysis and erosion and sediment pollution control design to meet Philadelphia Water Department Stormwater requirements for a PennDOT District 6-0 project involving removal of an existing bridge superstructure and backfill to create embankment and construct new roadway to match the existing approach roadway. Also, involved in preparation of NPDES and JPA permit applications to PADEP.

Peach Street Bridge Replacement, Berks County, PA

Responsible for the H&H calculations and report for the PennDOT District 5-0 replacement of the Peach Street Bridge over Sacony Creek in support of the PADEP Chapter 105 permit. Services include the removal and replacement of the structure while assessing the existing geometry and drainage for conformance with current design standards and regulations.

LVTS Bridge Package #4 (E02931), Northampton County, PA

Responsible for the H&H calculations and reports for the reconstruction of three of the four bridge packages in support of PADEP Chapter 105 permits for PennDOT District 5-0. Services include the removal and replacement of the existing structures while assessing the existing geometry and drainage for conformance with current design standards and regulations.

I-95/I-276 Interchange Project Bucks County, PA

Responsible for supervision of water resources and National Pollutant Discharge Elimination System (NPDES) permitting efforts for final design. This project involves the total reconstruction of the Pennsylvania Turnpike (I-276) from four to six lanes between the Galloway Road overhead structure and the Bensalem Boulevard overhead structure. Her responsibilities included drainage design, storm water management design, erosion and sedimentation pollution control design and development of report and plans in support of PADEP Chapter 102 NPDES permitting.

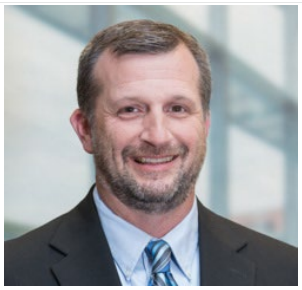
Pennsylvania Turnpike (I-76) Full Depth Roadway Reconstruction MP 312 to 319, Chester County, PA

Responsible for supervision of water resources and NPDES permitting efforts for final design for the total reconstruction and widening of the Turnpike from four to six lanes from milepost. Responsibilities included management of final drainage, storm water, E&S and H&H calculations; and design, report and plan preparation for a portion of the corridor in support of PADEP Chapters 102 and 105 environmental permits.

SR 0013 Section RBR, Philadelphia, PA

Served as deputy project manager for the PennDOT District 6-0 SR 0013 Roosevelt Boulevard Ramp over Route 1 bridge replacement. Responsibilities include assisting the project manager with tasks including the development of scope and fee prior to notice to proceed, coordination with subconsultants and project set up for quality assurance and financial tracking.

Mark Geiser, P.E., Lead Traffic Control Engineer



Respondent: Bridging Pennsylvania Partners
Firm: Dewberry Engineers, Inc.
Years of Experience:

- Dewberry (28 years)
- Total (28 years)

Role: Senior Associate / Assistant Department Manager, Highway
Education: University of Pittsburgh; B.S. in Civil Engineering
University of Pittsburgh; Certificate in Environmental Engineering

Summary of Prior Experience

Mark has more than 28 years of progressive experience in the preliminary and final design of PennDOT highway projects including highway relocations, interchange upgrades, corridor studies, intersection improvements, 3R Projects and bridge replacements. Included in his experience are preliminary engineering, final design, right-of-way plans, utility relocations, traffic signal designs, drainage design, erosion and sediment pollution control plans, PCSM plans, mitigation plans, maintenance and protection of traffic plans, incident management plans, lighting design, intelligent transportation system improvements, construction scheduling and preparation of plans, specifications and cost estimates.

Select Project Experience

I-81 (590), Susquehanna County, PA

Managed design of estimated $31 million interchange improvements at Exit 219 (Gibson) of I-81 for PennDOT District 4-0. The interchange contains three substandard ramps, and the southbound exit ramp has an accident cluster associated with it. The interchange is set adjacent to two truck stops and other commercial properties. Preliminary design included an alternatives analysis that recommended the replacement of the southbound ramps and upgrades to the northbound ramps. Two new ramp culverts, a culvert extension and the replacement of the two-span SR 848 bridge over I-81 will be necessary. Design tasks include field surveys, data collection, wetland studies, archaeology, historic structure surveys, hazardous waste studies, stream mitigation, H&H, TS&L, DFV, preliminary right-of-way plans, public involvement, utility coordination, wetland mitigation, ITS, traffic control plan alternatives for a temporary roadway and traffic control plan.

US Route 209 (007/18P/19I/021) and State Route 402 (001), Monroe County, PA

Managed preliminary engineering and final design of the $42M Marshalls Creek Bypass project for PennDOT District 5-0. Work involved design of approximately 3.5 miles of four-lane limited access highway on new alignment to move traffic around the Village and provide a direct connection to SR 402. Also included were 12 new bridges, the construction of three box culverts and the construction of five retaining walls. During final design, the project was right-sized due to funding limitations within the area planning organization. Rightsizing included alternative alignment studies, preparation of preliminary construction estimates and a FEIS Re-evaluation. The right-sized alternative modified the previously designed four-lane roadway to a two-lane limited access facility on a similar alignment. Three new signalized intersections were included. A new roundabout was designed to help reduce project costs and future maintenance. After preliminary design was completed, PennDOT decided to bid portions of the project as design-build to start construction ahead of the original schedule. Specific engineering challenges included major construction adjacent to Marshalls Creek which contains two species of endangered fish. Environmental aspects included Phase III archaeological recovery; historic properties; and wetland, stream and terrestrial mitigation and preservation. Due to wildlife movement through the corridor, the Army Corps of Engineers, the US Fish and Wildlife Service, the Environmental Protection Agency and the PA Department of Environmental Protection required the construction of three wildlife passages across the bypass corridor.

Two of the wildlife passages were box culverts and the third was a single span bridge on stub abutments. In addition to these structures, the environmental agencies also required the use of eight-foot-high fencing to direct animals toward the wildlife passages and prevent them from crossing the bypass roadway.

I-80 (M05), Columbia County, PA

Responsible for traffic control design for portions of the I-80 rehabilitation between Interchanges 232 and 241. Work included the reconstruction of six ramps at the Buckhorn Interchange (No. 232), the replacement of the 4-span, 504' long bridge carrying I-80 eastbound over Fishing Creek, the rehabilitation and deck replacement of the 4-span, 504' long bridge carrying I-80 westbound over Fishing Creek, the replacement of I-80 eastbound bridge over SR 4009 and structural repairs to eight other mainline I-80 bridges.

US Route 15, Sections G20 & G22 (E00113), Tioga County, PA

Project engineer responsible for portions of the traffic control design and incorporation of the geotechnical recommendations into the design package for the $118M, six-mile realignment of US 15 (Future I-99) for PennDOT District 3-0. This project continued the design process begun with Dewberry's development of a final environmental impact statement. The selected alternative was a four-lane roadway with 60-foot median that runs from PA 287 to the PA/NY State line. Significant features include two river crossings (Tioga and Cowanesque); two interchanges (PA 287 and PA 49); multiple right-of-way and construction packages; coordination with two State DOTs (PennDOT and NYSDOT); stream, terrestrial and wetland mitigation; and Section 106 coordination with various Native American Tribes. Three PS&E construction packages (grading and drainage, bridges and paving and signing) were prepared for this project. Four PS&E construction packages (grading and drainage, bridges (2) and paving and signing) were prepared.

I-78 (07M), Berks County, PA

Project engineer responsible for the $14M reconstruction of 3.5 miles of I-78, including the reconstruction of the Frystown Interchange and rehabilitation and partial replacements of two bridges, for PennDOT District 5-0. Design responsibilities included development of horizontal and vertical ramp geometry, sight distance and superelevation calculations, line and grade designs, design alternatives to minimize wetland impacts, traffic control plans, signing and pavement marking plans and erosion and sediment pollution control plans. Right-of-way work included courthouse research, deed mosaics, plan preparation, setting of required right-of-way lines and development of property plots.

Mark Handler, P.E., Lead Utilities Engineer

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- STV (11 years)
- Total (16 years)

Role: Senior Highway Engineer
Education: Swarthmore College; Bachelor of Science Engineering
Swarthmore College; Bachelor of Arts, Music

Summary of Prior Experience

Mark has 16 years of experience in highway engineering and design. He has worked on a number of bridge and highway projects for agencies in Pennsylvania, including the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania Turnpike Commission (PTC) and the Delaware River Joint Toll Bridge Commission (DRJTBC). Mark is adept at an array of software design programs and knowledgeable of design standards from state and regional departments of transportation

Select Project Experience

PennDOT District 6-0 I-95 Betsy Ross Interchange Reconstruction, Philadelphia, PA

Serving as utility lead for replacement of approximately 1,800 feet of a low-level bridge structure at the Betsy Ross Interchange on I-95 in Philadelphia for the Pennsylvania Department of Transportation (PennDOT). Deterioration of the existing piles and the economics of new bridge construction prompted a study of alternative foundation methods resulting in two alternatives (or a combination of the two) to support the roadway on grade: compensating fill and/or column-supported embankment. Mark is responsible for utility mapping, identification of potential conflicts and coordination of utility relocation. He has also provided construction support for previous project phases.

PTC Full Depth Roadway Reconstruction between Mileposts 320 and 326, Chester County, PA

Leading civil and highway design for a 6-mile section of I-76 that is being widened and reconstructed in Chester County for the Pennsylvania Turnpike Commission (PTC). The project scope includes alignment and grade adjustments, geotechnical studies, traffic control, erosion control and signing and pavement markings. Mark prepared the field survey and site studies during the survey and site study phase. His design tasks include corridor modelling, utility coordination, traffic control, NPDES permit coordination, construction plan and cross section preparation and construction support

PTC Swatara Creek Bridge Replacement, Dauphin County, PA

Designed and prepared plans to replace three main line bridges on I-76 in Dauphin County for the PTC. Mark design tasks included roadway widening, alignment and grade adjustments, stormwater drainage, traffic control and structural design, including sound wall, utility coordination and signing and pavement markings.

DRJTBC Scudder Falls Bridge Improvements, Ewing Township, NJ and Lower Makefield Township, PA

Serving as civil/highway lead for the design of 2.5 miles of I-295 roadway reconstruction and widening for the Pennsylvania approach to the Delaware River Joint Toll Bridge Commission (DRJTBC) Scudder Falls Bridge, which spans the Delaware River between Ewing Township, NJ and Lower Makefield Township, PA. Mark oversaw alignment and grade adjustments, erosion and sediment control, post-construction stormwater management, coordination with electronic toll facilities and signing and pavement markings and construction support. The estimated $424 million DRJTBC project included the reconstruction and reconfiguration of neighbouring highway interchanges and the construction of 8,500 feet of noise abatement walls.

DRJTBC Centre Bridge-Stockton Toll Supported Bridge Rehabilitation Project, Bucks County, PA and Hunterdon County, NJ

Designing substructure and superstructure repairs of the Centre Bridge-Stockton Bridge in Bucks County, PA and Hunterdon County, NJ. The project scope included roadway reconstruction/rehabilitation, utility relocation, signage and lighting design, stairway replacement and detour plans.

Lehigh County Linden Street Bridge Replacement, Lehigh County, PA

Designed and drafted plans for the accelerated preliminary design and development of design-build documents for the $6.5 million replacement of a 7-span, 360-foot-long masonry arch bridge in Lehigh County, PA. Mark developed structural alternatives, performed preliminary design and prepared preliminary plans for the selected alternative, which included coordinating utility relocation work, obtaining permits and preparing ROW documents.

PennDOT District 6-0 Bridge 202 and Bridge 2089 Replacements, Bucks County, PA

Reviewed traffic control plans for two PennDOT bridge replacement projects in Bucks County, PA. The project scope included an environmental clearance field survey, alignment and grade adjustments, hydrologic and hydraulic studies, geotechnical studies, traffic control, pavement design, erosion control, stormwater drainage, signing and pavement markings, structure design and public involvement, as well as type, size and location (TS&L) studies.

PennDOT District 4-0 Design-Build of Two Bridges, Wayne and Lackawanna counties, PA

Designed and drafted plans for the superstructure replacement of two bridges – one in Wayne County, PA and the other in Lackawanna County, PA. The project scope included roadway alignment and grade adjustments, stormwater drainage, roadway detours, erosion and sediment control, structure design and construction support services. Mr. Handler designed horizontal and vertical alignments, pavement drainage, erosion and sediment pollution control plans and detour plans.

Sam Headon, Commercial and Legal Manager

Respondent: Bridging Pennsylvania Partners
Firm: S&B USA Concessions
Years of Experience:

- S&B USA Concessions (1.5 years)
- Experience (18 years)

Role: Commercial/Legal Manager
Education: JSM, Law and Finance, Stanford University; BA, Law, Australian National University

Summary of Prior Experience

Sam is a Managing Director of Business Development for S&B USA Concessions, responsible for business development for our U.S. efforts in concessions for P3 infrastructure projects. Sam has over 15 years of experience in global construction and project finance transactions.
Prior to joining S&B USA Concessions in 2020, Sam was a Project Director for Skanska Infrastructure Development Inc. Before Skanska, Sam worked as a Senior Associate for a law firm where he served as counsel on many large projects, including P3s. He then joined WSP as Infrastructure Advisor to program management team supporting transportation construction projects.

Select Project Experience

Fargo-Moorhead Area Diversion Project

The $1B+ project includes the design, construction, financing, maintenance and operations of the proposed 30-mile Diversion Channel and associated infrastructure that will protect the Fargo-Moorehead-West Fargo metro area during times of extreme flooding. Sam served as Project Director on the project, his role included:

- Responsibility for S&B USA Concession's legal/commercial strategy on behalf of equity investment entity with the Metro Flood Diversion Authority and Project Partners
- Leading the deal for the first flood protection/resiliency P3 in the US
- Leading the consortium which established a green financing framework

Howard County Courthouse, MD

The $150M Skanska-led bid consortium for the Howard County Courthouse Project consisted of a new 230,000 sf, LEED Silver certified, courthouse and a structured parking facility. Sam was Project Bid Director on the project, his role included:

- Responsibility for the overall strategy and fully committed bid, including committed private placement bond finance, construction, design and 30-year O&M

LaGuardia Central Terminal B Redevelopment, New York, NY

The $4B The public-private partnership contract includes taking over operations of the existing Central Terminal Building and designing, building, financing, operating and maintaining a new replacement terminal for a lease term through 2050. Sam's role as Commercial Director on the project included:

- Responsibility for Skanska's legal/commercial strategy on behalf of equity investment entity with Port Authority, Airlines and Project Partners
- Advisor on the disposition of 5% equity interest in LaGuardia Gateway Partners to JLC Infrastructure

Downtown Tunnel/Midtown Tunnel/MLK Freeway Extension Project, "ERC", Norfolk, VA

The $2B project was to rebuild and expand the Downtown and Midtown tunnels between Norfolk and Portsmouth, as well as develop the Martin Luther King Boulevard extension to Interstate 264. Sam's M&A/Asset Management – Legal, Commercial role on the project included:

- Advisor on commercial issues

Skanska, Alexandria, VA

Sam served as Commercial Director to the bid team for many projects where he was responsible for legal/commercial strategy, negotiation, bid and financing documentation. These projects include:

- I-66 Express Lanes Project (Northern Virginia, VA)

- I-285 SR 400 Project (GA)
- Skanska/Macquarie consortium on the Purple Line Rail Project (MD), Champlain Bridge Project (Quebec, CAN) and Skanska/Plenary consortium for the C70 Project (CO)

Christopher D. Heinz, Labor Relations

Respondent: Bridging Pennsylvania Partners

Firm: Macquarie

Years of Experience:
Macquarie (11 years)
Labor relations experience (35 years)

Role: Labor Liaison

Education: University of Massachusetts at Amherst, M.S., Labor Studies.
University of Massachusetts at Boston, B.S., Economics

Professional Registrations / Licenses / Certifications: Journeyman Carpenter
35-year member of the United Brotherhood of Carpenters & Joiners of America.
OSHA Safety Trained

Summary of Prior Experience

Chris Heinz has a highly successful 35-year career in increasingly responsible positions within Carpenters Union and Macquarie, where he has led the implementation of Macquarie Infrastructure and Real Asset's Responsible Contractor policy and investor labor relations as well as working with the stakeholder / community relations team. Chris built a successful public affairs and lobbying practice representing labor organizations, corporations and non-profit organizations. He is recognized on Capitol Hill for having a balanced perspective on issues affecting the interests of clients, often partnering with industry groups to educate legislators on proposed and / or pending legislation. His experience extends to a broad range of areas including strategic planning and program development, labor-management cooperation organization of political support, media and public relations, educational programs, legislation research and analysis, ESG and legislative liaisons.

Select Experience

Macquarie Infrastructure and Real Assets

Currently working with newly acquired assets to integrate the Responsible Contractor Policy into their firms and monitor compliance. Chris also provides strategic advice to bidding teams for various acquisition projects, works with National and Local Building Trades labor partners on federal, state and local P3 initiatives and collaborate with these groups on overall ESG / Labor Policy issues at the investor level.

Heinz Strategies

Chris established a Government Affairs Consulting and Lobbying Practice serving labor union, corporation and non-profit organization clients. The firm focuses on legislative strategy and lobbying, public affairs campaigns, grassroot campaigns and labor-management cooperation.

United Brotherhood of Carpenters and Joiners of America

Chris served as National Political and Legislative Director and rebuilt the union's legislative and political program after a period of inactivity. He also recruited and trained Political Directors in 33 regions nationally and developed local grassroot political organizing programs focused on teaching. Chris was also responsible for implementing a legislative agenda at the national level, presented issue briefings to members of Congress, staff, federal officials and state governors.

New England Regional Council of Carpenters

Chris served as the Chief of Staff / Assistant Administrator at the New England regional level and managed a staff of 35 people with a $1M budget. In this role, Chris directed top-down organizing efforts to protect union jobs and create long-term community organization programs, promoted opportunities for union subcontractors and minority contractors, supported the passage of several laws in benefit of union members and oversaw research, strategy and back-office support systems.

Raymond J. Henney, PE, Quality Assurance Manager

Respondent: Bridging Pennsylvania Partners

Firm: SAI Consulting Engineers, Inc.

Years of Experience:

- SAI (37 years)
- Experience (40 years)

Role: Contractor Services Manager

Education: Pennsylvania State University, B.S., Civil Engineering

Professional Registrations / Licenses / Certifications: PE Civil Engineering, Pennsylvania/Maryland

Summary of Prior Experience

As the contractor services manager, Ray is responsible for all aspects of design-build projects and alternate designs. From coordinating the initial team assembly, reviewing contract documents to ensure design compliance with the project specifications, working with contractors to develop cost-effective solutions and managing the design process for quality, accurateness and budgets. Ray's duties include coordinating the technical effort and manpower to meet the project schedule; ensuring the quality of the work product; and addressing technical issues, coordinating technical issues with other departments, the client and subconsultants Ray has managed all of SAI's DB and alternate design projects since 2006. These projects include long span steel bridges, as well as a variety of prestressed girders, anchored retaining walls and box culverts. Prior to that, Ray served as a senior project engineer in the structure group working on all aspects of structural design. Ray's structural design/analysis experience includes abutments, retaining walls, arches, curved-steel girders, simple and continuous prestressed beams and trusses, tie-back walls and box culverts. Ray is knowledgeable in the requirements of the PennDOT and West Virginia DOT Criteria, as well as AASHTO, AREMA, AISC and ACI Codes.

Select Project Experience

Trumbull Corporation/PennDOT District 3-0 -- CSVT SR 0015 over West Branch of Susquehanna, Project Manager

The structure is part of the Central Susquehanna Valley Transportation project ($155M). Due to the alternate being bid and accelerated design schedule was needed to move the girders into fabrication and not impact the construction schedule. This major structure included 180-inch-tall piers, river construction, high wind design conditions and long steel girder spans. Ray was the overall project manager for the final alternate design of a 15-span steel multi-girder bridge with a total length of 4545 inches on a new alignment with a maximum span of 350 inches. Ray was responsible for coordinating all design efforts, reviewing designs for quality and completeness, establishing and monitoring design budgets, establishing and maintaining design schedules, shop drawings reviews and construction consultation on field issues that could arise. The tall piers and long spans resulted in significant movement that needed to be resolved and innovative solutions reduced costs and improved constructability.

Joseph B Fay/PennDOT District 1-0 -- I-90 over Six Mile Creek DB, Project Manager/Project Engineer

Ray was the overall project manager for this Design-Build project included final design of over one mile of full-depth roadway reconstruction with realignment of the west-bound lanes and replacement design of two 746 three-span continuous steel plate girder dual structures over Six Mile Creek ($34M). The existing truss bridges being replaced were in poor condition and an accelerated design and construction schedule were imperative for the safety of the travelling public. Ray was responsible for coordinating all design efforts, reviewing designs for quality and completeness, establishing and monitoring design budgets, establishing and maintaining design schedules, shop drawings reviews and construction consultation on field issues that could arise. The bridges spanned a deep gorge spanning Six Mile Creek and had to develop access roads and account for global stability of the steep slopes during design. Ray coordinated the phased construction to allow traffic to be maintained in both directions of the Interstate during construction.

Joseph B. Fay Company/ PennDOT District 12-0 -- Charleroi-Monessen DB, Project Manager

This project included design of a three-span 1,013' (with main span of 485') steel multi-girder structure to replace a structurally deficient main span thru-truss section that is part of the 12 span 1,770-inch Charleroi-Monessen Bridge over the Monongahela River ($35M). It included significant work in the Monongahela River, cofferdams, railroad coordination and utilized 15-inch deep haunched steel girders. Ray was responsible for

coordinating all design efforts, reviewing designs for quality and completeness, establishing and monitoring design budgets, establishing and maintaining design schedules, shop drawings reviews and construction consultation on field issues that could arise. Ray also coordinated with the railroad for demolition and construction, developed linear varying steel girder depths over the railroad to achieve vertical clearance and cofferdam designs in the Monongahela River.

Joseph B. Fay Company/ PennDOT District 11-0 – Stoops Ferry DB, Project Manager

This project included design of a 77' simple span bridge replacement and widening utilizing accelerated bridge construction methods to minimize traffic disruptions. The project utilized precast deck and girders pieces, ultra-high-performance concrete for closure pours and precast substructure elements. Ray was responsible for coordinating all design efforts, reviewing designs for quality and completeness, establishing and monitoring design budgets, establishing and maintaining design schedules, shop drawings reviews and construction consultation on field issues that could arise. Developed accelerated bridge concepts and designs to reduce costs and construction schedule. Ray was involved in working on the phased layout of the bridge construction to allow traffic to be maintained during the replacement /widening, with very limited closures allowed during construction.

Mekis Construction/ PennDOT District 1-0 – Kelly Road Bridge DB, Project Manager

This project included design of a long single span steel girder bridge (196 inch) in phased construction to replace a deficient structure. The integral abutment bridge eliminated the river pier in the Shenango River and included demolition and erection analysis to minimize the causeway requirements and reduce environmental impacts. Ray was responsible for coordinating all design efforts, reviewing designs for quality and completeness, establishing and monitoring design budgets, establishing and maintaining design schedules, shop drawings reviews and construction consultation on field issues that could arise. Ray was also involved with the removal of the existing truss and relocating the end sections to be used as a pedestrian bridge in the adjacent park. The long single span bridge used bracing against the existing bridge for stability during construction to minimize stream impacts and eliminate the need for towers.

Joe Hernandez, Equal Employment Opportunity Manager

Respondent: Bridging Pennsylvania Partners

Firm: Modern Times, Inc.

Years of Experience:
Modern Times, Inc. (13 years)
DBE and Jobs Programs (26 years)

Role: Senior community and local workforce advisor

Education: University of California Lose Angeles, B.S., Aerospace Engineering

Professional Registrations / Licenses / Certifications: UCLA Extension Construction Management Certification

Summary of Prior Experience

Joe Hernandez is President of Modern Times, Inc. (MTI), a small, disadvantaged business based in Los Angeles, California. Joe is an executive manager with 25 years of experience in the field of community programs, including small and disadvantaged business enterprise (SBE & DBE) programs, local hire and job training, labor compliance, equal employment opportunity and public and community relations. He has served as programs manager for public agency and private sector clients nationwide for major projects totalling over $20B in capital costs. Joe has extensive experience performing these services on alternative delivery approach
transportation projects including P3, CMGC and Design Build.

Select Experience

New NY Bridge (Tappan Zee Bridge)

Joe is the Technical Advisor and former DBE Program Manager for Tappan Zee Constructors (TZC), the project's design-builder. Joe and his team are responsible for implementing TZC's DBE program to meet Federal Highway Administration (FHWA) requirements for DBE participation. He has developed and implemented the revised DBE plan for the project, which includes a TZC "team approach," to meet the 10% DBE goal for the project and the various support activities undertaken to identify, prepare and gain DBE participation. With a significant focus placed on outreach activity, he works extensively with the project area DBE and SBE community to ensure these businesses are prepared to pursue work on the project. This includes conducting workshops and outreach events to inform interested businesses on how to work with TZC. He acts as TZC's liaison with NYSTA compliance representatives and prepares quarterly compliance reports on DBE commitments and attainments on the project. TZC has met and exceeded the project's $314M DBE goal, which is one of the largest DBE dollar value goals in FHWA history.

Lax Automated People Mover

Joe advises MTI's role as Certified Firms Program Manager for the LAX Integrated Express Solutions (LINXS) team on the first ever public- private partnership (P3) project at Los Angeles World Airports (LAWA). He supervises outreach programs to help interested firms find certification information, learn about upcoming opportunities and connect with the project. Specifically, $585M has been identified for Small Business Enterprise (SBE), Local Business Enterprise (LBE), Local Small Business Enterprise (LSBE) and Disabled Veteran Business Enterprise (DVBE) firms. The project will be completed in 2023 and is on track to meet and exceed these goals.

Green Line Extension

Joe is the Technical Advisor (formerly DBE program manager) for the Green Line Extension project in Boston, which will bring an additional six station stops north along the existing MBTA Green Line. The project has a $127MDBE goal ($9M for the design phase and $118M for the construction phase). MTI is responsible for

implementing and managing the project's DBE plan, which includes Good Faith Efforts (GFE) outreach to the DBE community. MTI utilizes its cloud-based customizable database system to track all outreach, which is then easily exported into a monthly or quarterly report for the owner to review. Additionally, Joe oversees and attends outreach events for the project and regularly meets with DBE firms in the community.

Purple Line

Joe is the Technical Advisor (formerly DBE program manager) for the Maryland Department of Transportation (MDOT) Purple Line project in Prince George's and Montgomery counties. He is overseeing local staff and support staff on MTI's team, who have been overseeing the DBE program for over 2 years. This project has a 22% design and 26% DBE goal. Joe was responsible for implementing the use of MTI's customized database system on this project, to track and document all GFE activities and for all reporting purposes. Additionally, Joe oversees the MTI team's activities on the project which includes not only GFE tracking and reporting, but also includes supportive services, contract compliance, subcontractor on-boarding support, performing Commercially Useful Function (CUF) reviews, site visits and regular communication with the project staff, local, state and federal agencies.

Jacob K. Javits Convention Center Expansion

Joe served as the DBE Program Manager for the first years of the Jacob K. Javits Convention Center Expansion Project and is currently the Technical Advisor to the MTI DBE Program team on the project. This iconic convention center in the heart of Manhattan will add 1.2 million square feet of exhibition space and also includes a 4-level truck marshalling facility that can house over 200 tractor-trailer trucks. Joe oversees the MTI DBE program team, who provide Good Faith Efforts (GFE) outreach, participation in outreach events and electronic collaterals materials. Joe initiated the monthly reporting template, which includes all outreach activities and prime contractor support services, to the Lendlease-Turner JV team on a monthly basis.

Mid-Coast Corridor Transit Project

Joe is the Technical Advisor (formerly Project Manager) to the MTI DBE Program team supporting the Mid-Coast Transit Constructors (MCTC) for this eleven-mile-long light rail project that is being constructed through a Construction Manager General Contractor (CMGC) delivery approach. The project is segmented into multiple contract supplements, each with a separate DBE goal, to account for various funding sources and related requirements. While the overall project DBE goal is 11.3%, Joe and the MTI team track DBE activity, commitment and attainment achievements separately for each supplement. MTI is responsible for implementing the project's DBE Plan and performs all Good Faith Efforts (GFE)-related outreach, Commercially Useful Function (CUF) reviews, DBE participation schedule tracking, DBE commitment / attainment reporting and monthly internal / external DBE reporting. MTI has implemented a custom-built database system for the DBE program to document, track and report on all DBE program related activities, which includes an enhanced module that tracks activity performed by the procurement team for subcontract awards, change orders and payments including prompt payment. Joe provides technical support to the MTI DBE program manager overseeing the project. The project is on track to meet the 11.3% overall DBE goal and the 15-20% overall SBE objective.

Charles Hewson, Tolling Lead

Respondent: Bridging Pennsylvania Partners
Firm: Big River Consulting
Years of Experience:

- Big River Consulting (3 years)
- Infrastructure experience (25 years)

Role: Community, Local Workforce and PR Advisor
Education: Queensland University, B.S., Civil Engineering
Professional Registrations / Licenses / Certifications: Post Graduate Certificate in Information Technology and Management, Sheffield Hallam University

Summary of Prior Experience

Charles is a senior executive with strategic experience of contact centre implementations and large mission critical transaction processing solutions spanning over 25 years, starting in the utilities industry before moving into business consultancy with PwC and IBM. He then held senior roles in the Telematics industry before establishing several subsidiary companies for Sanef's/Emovis. He has spent the last couple of years working in the parking, tolling and energy sectors. Charles has been instrumental in the establishment and operation of several businesses for Emovis (formerly Sanef) including the Dartford Crossing, Mersey Gateway Bridge, Port Mann Bridge (Vancouver, BC) and Sanef's UK Tag Issuer Sanef Tolling. Charles had full P&L responsibility for these businesses, successfully leading them from the "start-up" phase into operations, including the development of their business models, business operating models, employing staff, identifying business premises, negotiating subcontracts and managing the implementation of technology and supporting operations.

Select Experience

Big River Consulting

- Consulting role for Macquarie - 2 Major P3 projects in the US
- Consulting role for Egis - Manchester Clean Air Zone - Prepare to Operate Manager
- Consulting Role for Omni Energy - Director of Customer Operations
- Consulting role for AppyParking - implementing Smart City Parking (Harrogate, Halifax, Worcester & Portsmouth.
- Consulting role for Egis – Program Manager Milton Keynes smart parking
- Consulting role for Thales – working on a Transport for the North – Smart Ticketing Program
- Consulting role providing City of York Council with Project Management Support on a Traffic Management Research Project

Emovis Tag UK

- Led the project to introduce a new Spanish and Portuguese tag (www.emovis-tag.com) service offering. The Business now has over 200,000 UK subscribers.
- Led the marketing campaign including the pay per click and social media advertising. Wrote the press release and approved the final copy that was circulated via our PR advisor
- Led the investigation activities for the Clear Air Zones that are due to be implemented in several UK cities by 2020
- The establishment of a "European Cross Border Enforcement" entity to process enforcement action against foreign motorists that failed to pay
- To develop other MaaS business offerings including but not limited to a service for EETS providers to pay UK and Irish tolls by ANPR, paying for parking via ANPR, paying for other motoring expenses etc.

Emovis SA

- Responsible for all group commercial activities including developing new business (US focus), establishment of new partnerships, negotiation of key subcontracts

- Led the bid and completed the contractual negotiations for the Washington State RUC Pilot – 2017 – Project win

Emovis Operations

- Delivered the solution and made a profit in year 1 rising to 8M profit on a turnover of 26.5M
- Was a key member of the bid team and led all the key sub-contractor negotiations
- Led the Dartford implementation including key stakeholder integration and the migration from traditional barrier to Free Flow tolling
- The project was delivered under intense political and public scrutiny with minimal press
- Established team, sourced the temporary and permanent office and recruited the local team
- Won ITS "Project of the Year" award
- Implemented an innovative reward model to keep call center staff motivated and deliver our operational KPIs
- Led the marketing activities from a Sanef perspective, advising on "what works and what does not" from a communications perspective and what "delivers the most bang for buck". Identified and developed the Dart Charge brand concept and gained agreement from Highways England and the DfT
- Stakeholder management – advised and supported Highways England in their stakeholder outreach activities

Emovis Tag / Sanef Tolling

- UK Liber-T Service for UK customers of Sanef
- Developed the business model and convinced internal stakeholders to invest in the initiative.
- Successful deployment of complete CRM, billing and telephony platform enabling UK motorists to automatically pay tolls when visiting France and be billed in UK£
- Development of all Policy, Processes and Procedures
- Development and implementation of the Marketing strategy
- Service delivered ahead of time and to budget
- Tender development and contract negotiation of all key systems suppliers
- Sub-contractor management
- The business model and technology stack were then copied by Sanef and they have subsequently launched a small vehicle EETS entity BIP&Go that has over 1.2M subscribers

Tyson Hicks, Utility Manager

Respondent: Bridging Pennsylvania Partners
Firm: Fay
Years of Experience:

- Fay (12 years)
- Experience (21 years)

Role: Project Director
Education: B.S., Civil Engineering, Pennsylvania State University

Summary of Prior Experience

Tyson has over 20 years of experience in heavy highway construction involving utility management and relocations, structures, roadway, earthwork, demolition and design-build projects. Specializing in transportation-related projects, his daily responsibilities include overseeing multiple projects, ensuring their timely completion, while maintaining a safe workplace. Tyson has provided oversight and management on numerous award- winning transportation construction projects, including some difficult utility challenges. Many of the projects that he manages are for PennDOT and include some of the only PennDOT projects that have utility management as part of a partial design-build aspect.

Select Project Experience

PennDOT SR 30 Ardmore Boulevard Culvert Replacement, Pittsburgh, PA

This partial design-build project is for the replacement of three precast box culverts and roadway reconstruction along nearly two miles of SR 30 between Wilkinsburg and Forest Hills. Additional work will include utility relocation, drainage, traffic signal upgrades, as well as curb and sidewalk construction. Tyson's role on the project included:

- As part of the DB scope, Tyson was responsible for coordinating with utilities that would work around construction including means and methods to clear the utilities from the work zone. This is one of the most elaborate utility relocations that PennDOT has had as design-build
- Coordinated with utilities to complete PennDOT's CS4181 form to confirm schedule (People's Natural Gas, Verizon of Pennsylvania, Comcast Cable, AT&T, Duquesne Light and Wilkinsburg-Penn Joint Water Authority)

PennDOT SR50 Chartiers Creek Bridge Widening, Bridgeville, PA

This project includes the replacement of the superstructure, abutment widening (to accommodate a new 7 lane bridge structure), widening of SR 0050 and SR 3034 (Chartiers Street) and reconstruction/widening of bridge approach roadways to accommodate the additional lanes on the new bridge as well as to reduce existing congestion, queuing and better accommodate existing and projected future traffic. Extensive utility relocations are needed prior to and during construction to accommodate the new structure. Tyson's role on the project included:

- Coordinating and scheduling with utilities including DQE, Pennsylvania American Water, Comcast, Crown Castle, Verizon, Borough of Bridgeville and People's Natural Gas.

MDOT MD 85 at I-270 Interchange Reconstruction, Frederick, MD

The project covered one section of a 30-mile improvement designed for the I-270 corridor between western Maryland and Washington, DC. The interchange was rebuilt to provide congestion relief and increase safety on this urban roadway. Work on the project included the removal of I-270 twin bridges situated over MD 85 and the construction of a new three-span structure that is 450' long by 120' wide. Work also included 215,000 cy of excavation, roadway widening, reconstruction of ramps and approaches, utility (water, gas, sewer and electrical) relocations, the installation of stormwater pipe and stormwater management facilities and 92,000 tons of asphalt paving. Tyson's role on the project was:

- Managed the resequencing of utilities revised plans and phasing which included plan revisions to mitigate utility delays

PennDOT Babcock Boulevard Sinkhole Design-Build Repair, Pittsburgh, PA

Fay performed the design of several components as well as the construction efforts, which included a bridge replacement, full depth roadway reconstruction and reconstruction of curbing/sidewalk. Work on this also included installation of various components, including drainage, guide rail, signing/pavement markings and traffic signals. Tyson's role on the project included:

- Served as a project director for this design-build construction project to repair an area affected by a sinkhole
- Managed the Utility design-build aspects of the project (one of the first PennDOT projects to have utilities as a design-build component) including the permanent relocation of an electrical pole, coordinating this effort with Duquesne Light
- Coordinated utility efforts with Peoples Natural Gas, Verizon, Crown Castle, Comcast, Girty's Run Joint Sewer Authority, West View Borough Municipal Authority, DQE

PennDOT Liberty Bridge Rehabilitation, Pittsburgh, PA

This partial design-build project included traffic control, utility relocation, deck replacement, structural steel repairs and other miscellaneous construction covering 5,062 LF. Significant coordination occurred with CSX and Norfolk Southern Railroads (which had tracks near the project), the U.S. Coast Guard and other entities. The project won five awards -- the 2020 National Steel Bridge Alliance Prize Bridge Award, the 2019 ESWP Transportation Project of the Year, the 2018 PSPE Pittsburgh Chapter Outstanding Engineering Achievement Award, Award, the 2018 ABCD Pittsburgh Outstanding Rehabilitated Bridge and the 2018 ASCE Pittsburgh Section Civil Engineering Achievement Award. Tyson's role on the project included:

- Served as a project director for the high-profile rehabilitation of the Liberty Bridge, overseeing all work on the project, managing personnel and overseeing the schedule and budget
- Developed MPT plan and coordinated with signal lights, as this bridge has 4 lanes that can be 2-2, 3-1 or 1-3 directional based on traffic flow
- Managed subcontractor to install new electrical vaults

PennDOT SR51/88 Intersection Safety Improvement, Pittsburgh, PA

This high-profile intersection improvement project involved constructing a new 'jug-handle' interchange and replacing five structurally-deficient bridges, constructing a new sixth bridge and building a 320' long precast arch culvert. Fay also maintained two lanes of traffic throughout the project, adding storm drainage improvements to reduce flash flooding, supported public coordination efforts and added green spaces and sidewalks to make the area safer and more aesthetically pleasing.

- Serving as a project director for this high-profile, high traffic volume project, Tyson managed the entire project, overseeing personnel, schedule and the budget
- Revised, re-sequenced and coordinated MOT from original ten phases to three phases, saving over 1.5 years of delays resulting in saving the client money. This required extensive coordination with utilities to reduce the schedule and mitigate utility delays

Coordinated with utilities including Pennsylvania American Water Company, ALCOSAN, Pittsburgh Water and Sewer Authority, Comcast, Verizon, Duquesne Light and Columbia Gas of Pennsylvania

Alexander Houseal, P.E., Design Lead

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- STV (2 years)
- Total (33 years)

Role: Vice President / Senior Engineering Operations Manager
Education: Villanova University; Master of Science in Civil Engineering
Drexel University; B.S. in Civil Engineering

Summary of Prior Experience

Alex is a senior engineering operations manager with more than 35 years of experience in highway and bridge design project management, ranging from small scale projects performed under task order agreement to complex, multidiscipline new alignment and reconstruction projects. His area of expertise includes project management, preliminary and final design, traffic studies, NEPA compliance and construction oversight. His experience with managing highway design and traffic engineering includes the preparation of preliminary and final roadway plans, signalization plans and studies, drainage designs, alternative studies, site development, surveying, project coordination and liaison, maintenance and protection of traffic plans and signing plans.

Select Project Experience

Pennsylvania Turnpike/Interstate I-276 & I-95 Interchange, Bucks County, PA

Managed the alternatives analysis and engineering development of an environmental impact statement (EIS) for the new I-276 and I-95 interchange as part of the re-designation of I-95 to be continuous from Florida to Maine. Studies included various interchange and bridge alignments, traffic control staging, signing, lighting and storm water management alternatives to meet the project needs. Alex managed the design team in the performance of alternate alignment studies, complex roadway geometry designs and schematic structure TS&Ls for overpasses, alternate interchanges and a new Delaware River crossing. He managed the alternatives cost estimating needed to support the congestion management system analyses (CMS) of a major investment study (MIS) and analyzed various toll plaza designs for conventional, slow-speed and high-speed E-ZPass tolling. Alex managed the air quality, noise abatement, sensitive waste, soils, geology and topography, wetlands investigations and mitigation studies to support the EIS document, as well as performed extensive Section 4(f) avoidance alternative analyses. He participated in community advisory committee (CAC) meetings, public meetings and newsletter updates. Alex was responsible for the design and study of several interchange and Delaware River Bridge alternatives providing the best balance between design standards, community impacts, environmental impacts and cost. In addition, Alex prepared presentation materials addressing project status, joint state coordination and different construction funding scenarios.

I-95 Betsy Ross Interchange (BRI), Philadelphia, PA

Providing executive oversight of this PennDOT District 6-0 multiphase, $880 million, I-95 corridor improvement project linking I-95 with access to the Betsy Ross Bridge. STV is presently providing engineering and design services for later phase construction bid packages: Sections BR3 and BR4 (reconstruction of the north and southbound main line), Section BR5 (replacement or rehabilitation of the Conrail bridge over I-95, the removal of the Conrail bridge over abandoned Thompson Street and the rehabilitation of the Conrail Bridge over Ramps A and C) and Section BS3 (reconstruction of Aramingo Avenue between Church and Bridge Streets and Bridge Street from Aramingo Avenue to Tacony Street). Section BR2, designed by STV (replacement of two ramp structures, one elevated, with a total of seven structures, two large embankments and two retaining walls), is currently under construction. Many of the ramp structures are curved and complex, including Pennsylvania's first curved tubular flange girder bridge. STV is providing construction support services for this section.

US Route 15 Central Susquehanna Valley Transportation (CSVT) Project – Northern Section, Northumberland, Snyder and Union Counties, PA

Providing executive oversight of construction phase services for this $307 million, 5.3-mile limited access realignment of US Route 15. The project features a 15 span, 4,500-foot-long steel composite beam bridge (currently under construction) spanning the West Branch Susquehanna River, Norfolk Southern Railroad and local roads.

Pennsylvania Turnpike (I-76) Full-Depth Roadway Reconstruction between Mileposts 324 and 326, Chester County, PA

Providing executive oversight for the final design of the main line widening and reconstruction of the Pennsylvania Turnpike, between mileposts 324 and 326.The objective of this $150 million project is to rebuild the roadway, widen the existing 10-foot median to 26 feet and widen the roadway from two to three lanes of traffic in each direction.

Pennsylvania Turnpike (I-76) Fort Washington Slip Ramps Design and Construction Management, Montgomery County, PA

Managed the design and construction of the first electronic toll-only ramps on the Pennsylvania Turnpike at Fort Washington, including traffic and engineering planning studies for potential slip ramp locations. The project involved permit preparation and coordination with PennDOT and municipalities. Alex prepared right-of-way plans, structural and geometric design, interchange lighting and erosion and sedimentation pollution control design, maintenance and protection of traffic, signing and pavement marking layout. He also prepared construction estimates and contract documents, monthly payment estimates and as-built drawings and prepared and distributed all correspondence and submittals. Alex performed drainage and storm water management analysis, hydrologic and hydraulic studies and utility relocation coordination. He maintained logs, reviewed and prepared additional/extra work and change orders and monitored contractor's schedule, DBE and WBE participation, labor compliance and environmental compliance. Alex provided on-site inspection documentation of quantities and field reports, conducted final inspection with a closeout report and conducted monthly job progress meetings and recorded and distributed meeting minutes. In addition, he coordinated the development of a proto-type toll plaza utility building for E-ZPass only facilities.

I-95 Girard Avenue Interchange Improvement Project, Philadelphia, PA

Managed alternatives analysis, preliminary design, POA and environmental clearance for the widening and rehabilitation of a 1.3-mile-long viaduct, which borders the Fishtown Historic District, parallels SEPTA Trolley Route 15 and crosses Conrail in Philadelphia for PennDOT District 6-0. Work also included the design of additional access at the interchange to allow traffic to travel directly from I-95 southbound to Delaware Avenue. I-95 was widened to a continuous four lanes in each direction by eliminating the existing lane drops within the limits of the interchange. Extensive public and stakeholder involvement included the creation of a sustainable action committee (SAC) to coordinate these efforts. With over 189,000 vehicles per day (vpd) traveling this section of I-95, special attention to incident management and emergency response was required, as well as law enforcement coordination. Alex also acted as project director responsible for final design.

I-95 and Cottman Avenue Interchange Project, Philadelphia, PA

As a subconsultant on this PennDOT District 6-0 project, worked closely in the alternative analysis and preliminary plans development for the widening, rehabilitation and reconstruction of 1.2 miles of I-95, including the complete reconstruction of the Cottman Avenue Interchange. This section of the interstate carries 162,000 vehicles per day (vpd), with traffic projected to reach 181,500 vpd in the design year and passes through several City historic districts, neighborhoods and commercial districts. As a subconsultant, Alex was responsible for the design of bridge structures, including geotechnical foundation recommendation reports and traffic control. He managed the preparation of structure plans for eight bridges and the maintenance and protection of traffic plans for both the I-95 construction and all the off-route construction on local roads necessary for the interchange improvements.
red to maintain traffic.

Timothy Irwin, P.E., Lead Structures Engineer

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- STV (7 years)
- Total (25 years)

Role: Senior Structural Engineer
Education: Virginia Polytechnic Institute and State University; B.S. in Civil Engineering

Summary of Prior Experience

Tim has more than 20 years of experience as a structural designer and project manager, with expertise designing bridges delivered under design-build and design-bid-build contracts. His project design experience includes reinforced concrete, steel plate girder and continuous prestressed concrete beam structures. Mr. Irwin has also designed retaining walls and viaducts. He has performed in-service safety inspections for bridges, culverts and sign structures. Mr. Irwin is well acquainted with the requirements of the Pennsylvania Department of Transportation (PennDOT) and the Virginia Department of Transportation (VDOT), as well as National Bridge Inspection Standards (NBIS), American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA).

Select Project Experience

I95 Betsy Ross Interchange (BRI) Reconstruction, Philadelphia, PA

Provided preliminary and final structural designs and final plans for several ramp widening and rehabilitations and two new structures as part of the $880 million rehabilitation, reconstruction, replacement and resurfacing of 4,247 feet of I-95, including the Betsy Ross Interchange (BRI). Tim assisted in the design of new steel plate girders, analysis of existing girders to remain and deck designs for staged construction. Additional work included field splice and bridge-mounted sign structure design along with various challenging design details for the widening and rehabilitation of bifurcated structures.

Green Line Extension DP35, Boston MA

Providing project management and preliminary through final design engineering services for the $1.3 billion light rail transit extension in Boston, for the Massachusetts Bay Transit Authority (MBTA). This design of a 16-span raised viaduct to support the extension of the MBTA Green Line was performed as part of a design-build partnership with Green Line Extension Constructors Project included extensive coordination with multiple disciplines including geotechnical, civil, track design, signals, communications, fire protection and traction power. Tim oversaw the design of superstructure including simple-span and curved, continuous girders and the substructure including single-column and multi-column piers supported on drilled shafts. Mr. Irwin was also responsible for the project management associated with this design package, as well as coordination with the design leads of the five other viaduct design packages. Design of project, from preliminary to final design, was completed on an accelerated schedule in 11 months.

I-581/Valley View Boulevard Interchange Improvements Design-Build, Roanoke, VA

Provided structural design services for a double box culvert extension associated with the I-581/Valley View Boulevard Interchange design-build project for the Virginia Department of Transportation. The $43 million project included widening and rehabilitation of the existing bridge carrying Valley View Boulevard over I-581, a shared use path bridge over I-581 and ramps W and X, retaining walls, an extension of an existing box culvert and sound walls. The box culvert was modified to allow the roadway to be widened.

Route 61 over New River and Old Virginia Avenue Bridge Replacement Design-Build, Narrows, VA

Developed preliminary and final bridge design for the Route 61 bridge replacement design-build project for the Virginia Department of Transportation. The $15.6 million project replaced the structurally deficient existing bridge carrying Route 61 (MacArthur Avenue) across the New River (Route 460) and Old Virginia Avenue with a new 1,140-foot, 2-lane bridge. Mr. Irwin designed the superstructure, including the beam layout and design and deck layout and design. The new structure is a 9-span, continuous for live load superstructure using prestressed concrete bulb-tee beams with sidewalks and reconstructed roadway approaches at both ends. The superstructure is supported on reinforced concrete piers consisting of a cap and two round

columns founded on a single drilled shaft under each column. Abutments are reinforced concrete founded on drilled shafts on the south side and driven steel H-piles on the north side.

VDOT Route 15/460 Approaches and Bridge over Buffalo Creek Design-Build, Farmville, VA

Prepared preliminary and final design of a 3-span steel plate girder bridge with a concrete deck carrying Route 15/460 over Buffalo Creek for the Virginia Department of Transportation. Tim was responsible for the final design and preparation of plans for superstructure elements, including steel plate girders and concrete deck and substructure elements including fully integral abutments, two solid shaft piers and reinforced concrete terminal wing walls. He developed the pier design with a footing on piles. Phased construction allowed uninterrupted traffic on the existing bridge).

Cherry Hill Construction Fairfax County Parkway Phases I, II and IV Design-Build, Fairfax County, VA

Developed preliminary and final design of Barta Road over Fairfax County (VA) Parkway. Tim designed a 2-span continuous prestressed concrete beam structure for Fairfax County Parkway and Ramp D over Accotink Creek and dual structures for the parkway over Accotink Creek and Boudinot Road over Tributary to Accotink Creek. Plans observed principles of load and resistance factor design for the concrete deck, prestressed concrete beams designed continuous for live load, fully integral abutments, tall reinforced concrete piers with drilled shaft footings and layout of mechanically stabilized earth retaining wall abutments.

Carla M. Julian, Public Information Coordinator

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- Kaleidoscope Public Relations (2 years)
- Total (21 years)

Role: Senior Structural Engineer
Education: Virginia Polytechnic Institute and State University; B.S. in Civil Engineering
Professional Registrations / Licenses / Certifications:

- Member, International Society of Female Professionals
- Member, Advisory Council, Women in Leadership Executive Program at The George Washington University, School of Business
- 2017 Engineering News Record New York Top Young Professionals
- Women Builders Council Board of Directors (2013-2016); (2020-present)

Summary of Prior Experience

Carla has more than 20 years of versatile public relations and media management leading construction-related public information planning encompassing strategic communications, public affairs, community outreach and media strategy on the nation's largest, high-profile transportation infrastructure Projects.

Select Project Experience

Purple Line Light Rail Project (P3), Montgomery County and Prince George's County, MD, MTA MDOT. Senior Public Affairs/Community Outreach Manager (2016-Present)

Ms. Julian leads the public affairs and community outreach program supporting the MTA MDOT with overall responsibility for the public involvement and outreach for the $2 Billion design-build contract on the P3 Purple Line Light Rail Project. She serves as the spokesperson for the design-builder fielding hundreds of media inquiries. She has coordinated and placed feature pieces on the project in the Washington Post, Engineering News Record and numerous other outlets. Supporting the client, she has led a team that has held nearly 600 stakeholder/community meetings to date. She manages a $4 Million budget and a staff of communications professionals that are responsible for an extensive notification process along the 16-mile alignment as well as business outreach and very hands-on resident education program. Julian serves as the project spokesperson for all design-build construction related issues.

Tappan Zee Hudson River Crossing, Tarrytown and South Nyack, NY., NYSTA. Community Outreach/Diversity Manager (2012-2016)

Ms. Julian led the public involvement and DBE teams for Tappan Zee Constructors, LLC (TZC) with overall responsibility for the public involvement and outreach for the $3.1 Billion design-build contract on the Tappan Zee Hudson River Crossing Project. She served as the spokesperson for the design-builder fielding hundreds of media inquiries. She has coordinated and placed feature pieces on the project in the New York Times, Engineering News Record and numerous other outlets. Supporting the client, she has led a team that has held nearly 800 stakeholder/community meetings touching nearly 6,000 stakeholders impacted by the project.

Intercounty Connector (ICC) Contract A, Montgomery County, MD. MDSHA. Community Liaison/Community Outreach Manager, (2008-2011)

Ms. Julian was responsible for implementing the design builder's and the state's community outreach plan as outlined in the $484 M design-build contract. This included proactive and informative communications with elected officials, media, residents and local businesses along the 7.2 mile, six-lane project. The new road was a limited access new alignment toll road with three major interchanges. The public relations and outreach activities for this contract affected approximately 10,000 residents aligning Contract A of the ICC.

Ms. Julian submitted and won the following awards for this project team:

- 2012 Alliant Build America Award from the Associated General Contractors of America (AGC)
- 2012 ARBTA-First Place, Major Highway (Project > $100 Million)
- 2011 Engineering News Record (ENR) –Northeast Region Best Project

Lucas Lahitou, Deputy Project Manager

Respondent: Bridging Pennsylvania Partners
Firm: S&B USA Concessions
Years of Experience:

- S&B USA Concessions (5 years)
- Experience (17 years)

Role: Head of Origination and Structuring
Education: MS, Civil Engineering, University of Texas at Austin; B.S., Civil Engineering, Escuela Sup. Tecnica del Ejercito "Gral. Div. M. N. Savio

Summary of Prior Experience

Lucas Lahitou is an accomplished infrastructure professional with extensive experience in engineering, tolling, operations and maintenance and alternative project delivery across a wide variety of markets, including the United States, Canada and Latin America. Lucas is currently serving as Head of Origination and Structuring for Shikun & Binui Concessions USA, overseeing the development and implementation strategy in all technical, operations, innovation and finance domains for prospective assets. With nearly two decades of P3 development experience, Lucas has contributed to the successful development of several high-profile private infrastructure projects, representing a combined value of over $8 billion dollars in financing, including the recently closed Fargo Moorhead Flood Diversion Project and the North Tarrant Express Segments 3A and 3B, a project that resulted from work performed under a pre-development agreement with TxDOT. In addition, Lucas serves on the Board of Directors for Perimetral Oriental de Bogota S.A.S, Shikun & Binuis' Colombian affiliate responsible for the development, financing and operations of a toll road that constitutes a part of a planned beltway surrounding the capital city of Bogota.

Select Project Experience

Fargo-Moorhead Area Diversion Project, Fargo, North Dakota

This $1.5 billion project is designed to protect the Fargo-Moorhead-West Fargo metro area from extreme flooding. Developed by the U.S. Army Corps of Engineers and the Diversion Board of Authority under a split delivery model, most project structures will be delivered through a 30-year DBFOM Agreement including 30 miles of channel, 2 aqueducts, 2 river inlets, 2 channel outfalls, 4 railroad bridges, 4 interstate highway bridges, 10 county road bridges and associated recreational and environmental mitigation features. Lucas was Bid Director on the project, his role included:

- Conducting commercial / policy negotiation with the Authority
- Negotiating financial terms of senior debt with lenders
- Managing expert consultants / advisors, including finance, legal, tax, insurance, technical and operations
- Assessing project risks and requirements including O&M specifications and formulating efficient solutions

North Tarrant Express Segments 3A-3B (NTE I-35W), Tarrant County, Texas

The Interstate 35W Corridor through Tarrant County, Texas, is one of the oldest, most congested corridors in the region. Procured under a revenue risk DBFOM Agreement that resulted from work performed under a pre-development agreement, the $1.35B project comprised (1) the design, construction and financing of Segment 3A and interchange, (2) the design, construction, installation and testing of the ITS and tolling system including gantries, tolling equipment and communication networks and (3) the O&M over a 50-year term. Lucas's role on the project as Bid Director included:

- Conducting commercial / policy negotiation with the Authority
- Managing expert consultants / advisors, including finance, legal, tax, insurance, technical and operations
- Producing and integrating value enhancements (ATCs) into design and construction to improve revenue generation and value for money for the Client
- Managing complex project partner and stakeholder relationships with transit agencies, business alliances and others in support of federal funding applications needed to financially optimize the project

- Developing technical solutions and DB contract technical specification to support implementation of the Toll Collection System (TCS), Intelligent Transportation System (ITS) and Network Communication System

Cundinamarca Eastern Ring Road, Cundinamarca, Colombia

This project comprises the construction, rehabilitation, improvement and O&M of the Perimetral Oriental de Bogota perimeter road corridor in Eastern Cundinamarca, under a DBFOM P3 structure with revenue or demand risk. Lucas's role on the project as Member of Board of Directors included:

- Directly responsible for project staffing, schedule, budget, cost control and subcontractor relations
- Providing corporate oversight to meet the project expectations of the Authority and developer's shareholders
- Directing the developer's leadership team and other supervisory staff

VIA 40 Express, Bogota, Colombia

The $1.1 billion project involves rehabilitating and operating nearly 100 miles of roads between Bogotá and GirarDOT along Colombia's most travelled route connecting the capital city to the Pacific coast. The Via 40 Express Project was delivered under a revenue risk DBFOM agreement with the aim to improve mobility, safety and user comfort, with the addition of over 30 miles of third lanes and several tunnels. Lucas's role on the project as Principal-in-Charge included:

- Providing project direction, contract management, client liaison and project structuring in the bid phase
- Overseeing the successful management of roadway operations, including road safety, traffic monitoring and roadside assistance services, tolling and maintenance post award
- Checking that all performance conditions and clauses in the PPP contract are acted upon
- Leading set up of O&M teams, processes and procedures for the Project in preparation for asset handover

Kim Larkin, Environmental Compliance Manager

Respondent: Bridging Pennsylvania Partners
Firm: Dewberry Engineers, Inc.
Years of Experience:

- Dewberry (22 years)
- Total (35 years)

Role: Senior Environmental Scientist
Education: University of Pittsburgh; B.S. in Environmental Science

Summary of Prior Experience

Kim is a regulatory specialist in Dewberry's Water Resources Engineering Department and is experienced in permitting involving U.S. Army Corps of Engineers, Maryland Department of the Environment, Virginia Department of Environmental Quality (DEQ), Maryland Department of Natural Resources and Virginia Marine Resources Commission (VMRC). She has extensive experience in NEPA processing, regulatory permitting and design build experience and oversees teams of office and field scientists. She has extensive experience in Section 10 and Clean Water Act (CWA) Sections 404/401 tidal and non-tidal wetland permits and wetland delineation, Section 402 NPDES permitting, wetland mitigation and stream restoration. She knows the regulations and requirements of USACE, USFWS, NOAA Fisheries, EPA, Maryland and Virginia Resource agencies, as well as cultural and historic considerations Maryland Historic Trust and VDHR. Ms. Larkin works closely with design engineers to avoid and minimize impacts and assures the inclusion of items like necessary utility relocations to assure quantitative project impacts are considered and addressed on a wide variety of projects including municipal, roadway, land development, wetland and stream restoration and utility projects, particularly on constrained urban MS4 projects

Select Project Experience

Dulles Corridor Metrorail - Project Phase 2, Fairfax and Loudoun Counties, VA

Environmental manager responsible for obtaining all water quality permits for the first phase of this $1.4 Billion design-build project, assured compliance with the NEPA document and oversaw the modification of VDEQ and Corps of Engineers water quality permits for the second phase of the project. Obtained other necessary permits including the required air and NPDES permits for a concrete batch plant, as well as assured utility relocation permits were included and incorporated into permits. Completed permitting and water quality impact assessments submittal for the Tysons east station and Kiss and Ride facility, as well as a stormwater management pond retrofit and MS4 stream restoration project to ensure project compliance with the Chesapeake Bay Act. In addition, she has conducted three Wood Turtle surveys for the project as required by the regulatory permits.

Route 28 PPTA, Phase II, Loudoun County, VA

Senior wetland and regulatory specialist for project that involved permitting and construction of a total of 10 roadway interchanges and two roadway widening projects that included numerous utility relocations and upgraded facilities on new locations. Responsible for completing wetland delineations, obtaining all necessary regulatory permitting including Clean Water Act Section 404/401 and subaqueous bed permits from VMRC and ensuring permit compliance during construction. Several crossings involved National Historic Preservation Act Section 106 and Land and Water Conservation Act Section 6(f) issues required investigations, mitigation and findings with the DHR, Fairfax County Park Authority, the NVRPA and Dulles Airport –included developing an EA level NEPA document for a roadway project under the FAA jurisdiction. Blended the two different NEPA regulations of FAA and the FHWA into a cohesive document. One crossing had the potential to impact the state threatened Wood Turtle; problem mitigated by conducting survey. Led the design and successfully used the relocations as on-site mitigation. Facilitated public involvement

processes on this project. Dewberry served as the Engineer of Record for this design build widening and interchange project. Construction value was $328 million.

MD 4 Woodyard Road Interchange, Prince George's County, MD

Environmental scientist responsible for regulatory permitting and oversight for the Reconstruction of MD 4 and MD 223 Interchange (Woodyard Road Interchange) and new alignment of Woodyard Road to the Westphalia Town Center. She worked with design engineers to avoid and minimize impacts to wetlands and stream channels, on the project to obtain the non-tidal wetlands permits from MDE and MDSPGP.

Battlefield Parkway over W&OD Railroad Regional Park and Tuscarora Creek, Leesburg, VA

Lead Environmental Scientist. responsible for ensuring compliance of design and construction in accordance with all required elements of the NEPA documents completed by VDOT, as well as a revision to the original EA. Successfully obtained the Clean Water Act (CWA) Section 404 & 401 permits from the Virginia Department of Environmental Quality (DEQ) and USACE as well as a sub-aqueous bed permit from the Virginia Marine Resources Commission (VMRC), which included mitigation requirements. Extensive coordination with the Northern Virginia Regional Park Authority (NVRPA) to comply with 4(f)/Section 106 historic portions of the environmental assessment and the necessary permits to cross the trail including mitigation for both temporary and permanent impacts.

Jonathan (JT) Lincoln, P.E., Lead Roadways & Pavement Engineer

Respondent: Bridging Pennsylvania Partners
Firm: Dewberry Engineers, Inc.
Years of Experience:

- Dewberry (<1 years)
- Total (25 years)

Role: Associate, Senior Project Manager
Education: Point Park University; B.S. in Civil Engineering Technology

Summary of Prior Experience

Jonathan has more than 25 years of experience in roadway design. His experience includes project management of roadway and bridge projects, horizontal and vertical alignments, interchange design, typical sections, cross sections, drainage design, pavement design, traffic control, traffic analysis, erosion and sedimentation control, stormwater management, utility coordination and QA/QC. JT has completed design work per PennDOT, PTC and AASHTO requirements. His technical skills include MicroStation, InRoads, AutoCAD, DarWin, AutoTurn, Asta Powerproject, Microsoft Project and AutoTAB.

Select Project Experience

SR 36-B00 Bridge, Forest County, PA

Managed roadway design for the SR 36 offline and online alternates crossing over Tionesta Creek for PennDOT District 1-0. Existing structure is a 350-foot long four span bridge.

I-81 D52, Luzerne County, PA

Managed preliminary and final design of four mainline bridges and one culvert extension along I-81 for PennDOT District 4-0. Project includes widening mainline I-81 to three lanes at the new structures, horizontal and vertical alignments, typical sections, cross sections, drainage design, NPDES General Permit, JPA, alternative analysis and maintenance and protection of traffic.

Lake Gordon Bridge, Bedford County, PA

Managed design for roadway approaches needed for the PennDOT District 9-0 superstructure replacement of a reinforced-concrete deck arch bridge over Lake Gordon, built in 1916 to accommodate Lake Gordon Dam and reservoir. Total length of bridge is 222' with 11 spans. Responsibilities included reviewing and assembling plans, specifications and estimate (PS&E) submission package.

SR 0528-255 over SR 0422 Bridge Replacement, Butler County, PA

Managed roadway geometry, guide rail, drainage and ramp interchange design for the replacement of an existing 150-foot-long, three-span prestressed reinforced concrete box beam bridge carrying SR 528 over US 422 for PennDOT District 10-0.

SR 2009-451 Huff Bridge Replacement, Indiana and Westmoreland Counties, PA

Managed roadway geometry, guide rail and drainage for the replacement of a 500-foot-long, five-span superstructure over the Conemaugh River for PennDOT District 10-0, connecting West Wheatfield Township, Indiana County and the Borough of New Florence in Westmoreland County.

SR 2087-A01 Greensburg Pike Bridge Replacement, Allegheny County, PA

Managed roadway geometry, traffic control plans, drainage, E&S control plans, signing and pavement marking plans and construction scheduling for the replacement of this 89-foot, single-span curved girder bridge for PennDOT District 11-0.

Pennsylvania Turnpike (I-76) MP 149 – MP 155, Bedford County, PA

Managed challenging design of a 6-mile section of the PA Turnpike from MP 149.5 to MP 155.5. The project involves widening the turnpike from a 4-lane, 82-ft-wide divided roadway to a 6-lane, 122-ft-wide roadway section. The project includes six state and Snake Spring and West Providence Township roadway improvements, a joint permit application and an NPDES Individual Permit. Project includes 260 acres of disturbance, 10 sound barriers, 2 retaining walls, 4 mainline bridge replacements, 2 culvert extensions and 21 stormwater management basins. The early action project at T-617 Earlston Road, MP 154.42, was recently constructed.

I-95/I-276 Interchange Improvements, Bucks County, PA

Managed final design of the 3-mile widening of the PA Turnpike MP 351 to MP 353 to provide high-speed E-ZPass lanes in Bucks County. The project involved widening the turnpike from a 4-lane divided roadway to a 6-lane divided roadway with installation of a new barrier toll plaza including open road tolling lanes and manual toll lanes at MP 352.7. Project also included the removal of the Delaware Valley and Delaware River Bridge Toll Plazas at MP 358.2. Open road tolling / Toll by Plate was placed in the westbound direction of I-276 at the previous location of the Delaware River Bridge toll plaza.

I-76 Beaver River Bridge Replacement Project, Beaver County, PA

Assisted with design project management for the relocation, widening and full-depth reconstruction of approximately two miles of I-76, the reconfiguration of the Beaver Valley Interchange, the widening of SR 0018 at the interchange, a viaduct replacement, two overhead railroad bridge replacements, a mainline bridge replacement and two new retaining walls. The project is being conducted in three phases: feasibility study, preliminary design and final design.

Pennsylvania Turnpike Mon/Fayette Expressway, PA 51 to I-376, Section 53E, Allegheny County, PA

Provided design project management assistance for various highway elements, including line and grade, typical sections, cross sections, drainage (storm sewer drainage, stormwater management, E&S control, H&H studies), traffic control and traffic studies for Sections 53E of the Mon/Fayette Expressway, a new limited access highway to connect SR 51 near Clairton, to I-376 near Pittsburgh.

Eric Meyer, P.E., Lead ITS, Signalization & Lighting Engineer

Respondent: Bridging Pennsylvania Partners
Firm: Whitman, Requardt and Associates, LLP
Years of Experience:

- WRA (16 years)
- Total (31 years)

Role: Vice President
Education: Pennsylvania State University; B.S. in Civil Engineering

Summary of Prior Experience

Eric has 31 years of progressive transportation engineering design and project management experience working with PennDOT and local agencies throughout Pennsylvania. He leads an experienced team of structure & highway engineers/designers responsible for designing over 100 projects in the past 13 years. Eric's project management experience includes interchanges, high speed interstates, corridor improvements, intersection improvements, as well as small and large bridges. Eric also has extensive experience leading design/build projects across Pennsylvania. His experience includes project management, structure and roadway design, traffic control plans, utility coordination, right-of-way plans, public involvement and QA/QC.

Select Project Experience

I-79-A65/SR 910 Interchange Improvements, Allegheny County, PA

Project manager for the development of the alternative study and preliminary engineering for the improvements for the SR 910 Interchange for PennDOT District 11-0. The improvements are to address existing safety and operational deficiencies.

US 30 Corridor Improvements, Westmoreland County, PA

Project manager for this project that involves preliminary engineering and final design for PennDOT District 12-0 to perform a reconstruct of approximately 3.0 mi. of Rt. 30 corridor in North Huntingdon and North Versailles townships to improve safety and mobility on the corridor transportation network.

US 222/US 322 Interchange Improvements, Lancaster County, PA

Provided QA/QC for this PennDOT District 8-0 interchange improvement project at a highly congested, high-accident interchange. Project included developing alternatives to reduce accidents and address low clearance under US 222. Following completion of alternative analyses and preliminary engineering, WRA developed final construction plans that involved design of a diverging diamond interchange (DDI). Responsible for reviewing all the alternatives as well as the DDI geometrics and alternative feasibility of the interchange improvements.

SR 356 Truck Climbing Lane, Westmoreland County, PA

Project manager for the addition of a truck climbing lane along SR 356 corridor in Allegheny Township for PennDOT District 12-0. Developed alternatives analysis that examined three options for adding additional lanes along the mountainous terrain of the SR 356 corridor.

SR 322/SR 6/SR 19/SR 98 "Big I" Roundabout, Crawford County, PA

Provided QA/QC for this assignment to design a multi-lane roundabout to improve safety, pedestrian connectivity and traffic flow at the intersection of SR 322, SR 19, SR 6 and SR 98 in Vernon Township for PennDOT District 1-0. This project was one of the recommendations from the Meadville Traffic & Land Use Study conducted under WRA's Agreement E02331 to evaluate safety and mobility along the corridor.

US 62/SR 3008 Roundabout, Hermitage, Mercer County, PA

Provided QA/QC for design of a multi-lane roundabout to improve safety, pedestrian connectivity and traffic flow at the intersection of SR 3008 (E. State Street) and SR 0062 in the City of Sharon for PennDOT District 1-0. The project will include full depth pavement in the roundabout area, widening to the east on SR 3008, as well as milling and overlaying the roundabout approaches. The project also includes completing sidewalk

connections from SR 0018/SR 3008 intersection to the west to Snyder Rd to the east, as well as landscaping, lighting, R/W acquisition and drainage design.

SR 0228/SR 2005, Cox's Corner Intersection Improvements, Butler County, PA

Project manager for the PennDOT District 10-0 Cox's Corner Intersection improvement project, with the goal to reduce congestion and improve traffic flow, safety and sight distance at this rural intersection. The project included a feasibility study concluding that both roadway widening with a signalized intersection and construction of a roundabout met the project's purpose and need, however, the roundabout was determined to be the better alternative based on the cost-benefit ratio and operational analysis. Project responsibilities included: realignment of the intersection to accommodate a roundabout, geometric design of the roundabout and the approach roadways, oversight of construction plans preparation (roadway plans, traffic control plans, highway lighting, landscaping plans), review of construction plans, coordination of internal work and review of subconsultant work. The project included extensive public involvement, the low bid came in within 8% of WRA's engineering estimate and the project was constructed in 2018.

SR 0019-A13 Wexford Flats Widening, Pine Township & Town of McCandless, Allegheny County, PA

Project manager for the design and development of final construction plans, right–of-way plans and storm sewer design for this PennDOT District 11-0 project that involved widening SR 19 in Wexford Flats to add a continuous center left-turn lane and pedestrian accommodations. Project included several retaining walls, storm drain system design, maintenance of traffic, utility coordination and coordination with property owners in a densely developed 2.3-mile corridor. Project involved upgrading roadway to increase the width of existing travel lanes, installing a center turning lane, adding pedestrian access along corridor (sidewalks along both sides, ADA ramps), as well as significant utility coordination and coordination with local businesses to accommodate driveway entrances.

SR 28/I-279 (SR 0279-A64) Missing Ramp Project, Allegheny County, PA

Final design of a direct connection ramp from SR 28 S to I-279 S on Pittsburgh's North Side for PennDOT District 11-0. WRA's tasks included data collection/analysis, traffic signal optimization, signing & pavement marking design, ITS design, maintenance and protection of traffic plans and development of a project-specific incident management plan, as well as traffic-related services during construction. Performed QA/QC for signing, pavement marking and traffic control plans.

SR 0050-A26 Widening Project, Collier Township, Allegheny County, PA

Project manager for preliminary engineering, final design and construction consultation for the widening of approximately one mile of SR 50 between Thoms Run Road and Vanadium Road. Exclusive left turn lanes and a dual center turn lane between the Mayer Street and Thoms Run Road Intersection to reduce congestion and improve traffic flow and safety were achieved on this PennDOT District 11-0 project.

James A. Morrison, P.E., Lead Geotechnical Engineer

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- STV (<1 years)
- Total (39 years)

Role: Vice President, Engineering Chief
Education: Michigan Technical University; Master of Science in Civil Engineering
Michigan Technical University; B.S. in Civil Engineering

Summary of Prior Experience

Jim is a civil engineer with nearly 40 years of experience providing design for transportation projects across North America. Hi portfolio includes complex multidisciplinary efforts including bridges, tunnels and highways that have benefitted from his expertise in geotechnical engineering, earth retaining systems and tunneling technology. He has successfully led projects through varying delivery models including design-build and design-bid-build efforts. A subject matter expert, he has led expert review teams, design teams, quality review teams, forensic evaluation teams and expert panel review teams responsible for both quality assurance (QA) and forensic troubleshooting and actively participates on Dispute Review Boards.

Select Project Experience

City of Hot Springs Lake Ouachita Lake Tap Design-Build, Hot Springs, AR

Oversaw design for a design-build project to install 2500 feet of 60-inch direct pipe through Blakely Mountain, for the City of Hot Springs. A critical element in the city's $100 million plan to increase by 60% the regional water system's daily capacity with a water flow from Lake Ouachita. The $19 million tunnel project will push 60-inch diameter micro-tunnel 300 feet beneath the mountain through highly variable layered bedrock, with a wet retrieval. The project required U.S. Army Corps of Engineers (USACE) and U.S. Forest Service (USFS) permit approvals.

USACE Mud Mountain Dam 9-Foot Tunnel Relining, Enumclaw, WA

Managed the design and engineering of the $9 million re-armoring of the 9-foot Mud Mountain Dam bypass tunnel. The 9-foot wide, 1,900-foot-long horseshoe shaped tunnel is used to flush sediment from the bottom of the 432-foot-tall dam, which was built in the 1940s to minimize flooding in an area with a current population of approximately 400,000. Mr. Morrison's team designed an innovative retrofit for steel-lined tunnel with cut granite blocks for wear resistance. This value engineering solution is expected to improve the tunnel's service life by a factor of 10 times over the original steel design and was the first to use of concept in North America. The effort, completed under budget and nearly a year ahead of schedule, received a Design-Build Institute of America (DBIA) Federal Project of Year award and an ENR Northwest region award.

CHSRA Palmdale-Bakersfield Tunnel, Palmdale and Bakersfield, CA

Directed conceptual design and oversaw quality reviews for nine tunnel design alternatives to serve the planned California High Speed Rail Authority (CHSRA) service between Palmdale and Bakersfield. Jim evaluated alternate alignments and developed conceptual tunnel designs for that considered the various mixed rock conditions, including tunnel boring (TBM), sequential excavation (SEM) and cut and cover construction methods.

NYCDEP Rondout West Branch Tunnel Risk Evaluation, Newburgh, NY

Managed probabilistic risk evaluation of construction options for repair, rehabilitation and construction of a new bypass tunnel design of aqueduct system beneath the Hudson River.

Caltrans Devil's Slide Tunnel, Pacifica, CA,

Managed the sequential excavation method (SEM) construction of twin, 5000-foot highway tunnels for the California Department of Transportation (Caltrans). The $439 million project on State Route 1 includes 32 jet-powered fans for ventilation and 10 fireproof shelters between the tunnels to protect the travelers. Jim directed the excavation team through extremely variable and seismically sheared rock, in a process that

included headwall rock stabilization and high-pressure dewatering. He also performed time-management studies to improve construction efficiency.

Alaska Department of Transportation Whittier Rail Tunnel, Whittier, AK

Provided geotechnical design input, conceptual construction methods, risk management and coordination of specialty design subconsultants for clearance improvements and track lowering and upgrade of rail transportation corridor. Technical challenges included variable rock conditions, drainage and ice control improvements, scheduling construction to maintain daily rail operations.

Tren Urbano Subway Authority Rio Piedras Subway Section 7 Design-Build, San Juan, Puerto Rico

Geotechnical Engineer of Record for design-build of 3 miles of twin subway tunnel and two stations beneath Rio Piedras, Puerto Rico. Project included four major construction methods, including TBM, SEM, stacked drift mining and open cut/cover section. in San Juan, Puerto Rico. Challenges included constructing a mined station excavation beneath an urban center with 15 feet of overburden.

Sharon Novak, Development Entity Board Member

Respondent: Bridging Pennsylvania Partners
Firm: Shikun & Binui (S&B)
Years of Experience:

- Shikun & Binui (4 years)
- Experience (11 years)

Role: CEO, Shikun & Binui USA
Education: Bachelor of Science in Economics and Psychology from the University of Toronto and an MBA from Ryerson University

Summary of Prior Experience

As CEO of Shikun & Binui USA (S&B USA) and Chairman of S&B USA Construction, Sharon is responsible for the US group's equity, development and O&M arm, S&B USA Concessions, as well as all US construction activities through S&B USA Construction.

During the past 4 years, Sharon has served in different roles in Shikun & Binui Ltd. (S&B). Sharon joined S&B as the VP Finance of the Global Concession Division, was later appointed as the Head of US Concessions and additionally since Q1 2020 is serving as S&B USA's CEO.

In his career, Sharon has led large and complex transactions in the Infrastructure, Transportation and Energy sectors for which the vast majority of them are P3 / project finance type deals.

Prior to joining S&B, Sharon led Project Finance and Infrastructure practices as a Partner in a financial consulting firm. Prior to that, Sharon served as a Senior Financial Advisor to the Israeli Ministry of Finance where, among other things, he was leading the structuring and drafting of the Israeli P3 Standard documents (which are still used by government entities to procure P3 projects in Israel).

Select Project Experience

In his position, Sharon is leading and directly responsible for execution and results of all of the group's projects in the US and South America. These include:

Fargo-Moorhead Area Diversion Channel P3

The project is a $1.5B, 35-year P3 procured with the Metro Flood Diversion Authority for the DBFOM of the Fargo-Moorhead Area Diversion Channel which will construct a 30-mile diversion channel for flood protection. Sharon serves as a Member of the Executive Committee for both the Equity JV and the Construction JV.

SH288 Toll Highway P3

The $1.06B P3 project consists of the planning, financing, construction, operation and maintenance of 10.3 miles of managed toll road, as well as upgrading, operation and maintenance of existing infrastructures for the SH288 road in Harris County (Houston, Texas, USA). It includes construction of 56 bridges, 18 new connector ramps and erection of 541 structural columns as well as 48 years of road and tolling operation. Sharon serves as a Member of the Executive Committee for the Equity JV that is preforming the operations of the project.

Perimetral del Oriente de Cundinamarca P3 Project

This $840M P3 toll road project was part of the 4G Colombia P3 program. Sharon is a member of the Executive Committee for the Equity JV.

Jason M. Philip, PE – Maintenance Quality Manager

Respondent: Bridging Pennsylvania Partners
Firm: SAI Consulting Engineers, Inc.
Years of Experience:

- SAI (21 years)
- Experience (23 years)

Role: Construction Inspection

Education: Pennsylvania College of Technology, B.S., Civil Engineering/Surveying

Professional Registrations / Licenses / Certifications: PE Civil Engineering

Summary of Prior Experience

Proficient in the following: earthwork, MSE walls, concrete beams, bridge construction, piling subgrade/subbase, fabricated structural steel repairs/erection, concrete paving, latex concrete, bituminous paving, storm drainage, traffic signals, E&S controls, soldier piles/caissons, precast box culverts, cast-in-place culverts, slip line snap tite pipe liners, pile driving, highway signing, sign structures, structure concrete, structure rebars, rock anchors, bridge decks, M&P of Traffic, CDS NeXtGen, bridge maintenance, as-built drawings, guide rail , ADA ramps and sidewalk, ECMS, CPM schedules.

Select Project Experience

SAI/PTC - T110.12-SR 601 over PA Turnpike/TCM

Total overpass bridge replacement at MP 110 with use of a temporary bridge. Management of entire project.

SAI/PennDOT, District 9-0 - SR 0219-Section 20 A/B & C/TCIS-2

Construction of new Four-Lane Meyersdale Bypass Project. Supervised the inspection of all project activities.

SAI/PennDOT, District 9-0 - SR 0099-012, Blair County/TCM-2

Interstate 99 Sproul to Newry Pull-Off, Blair County. Management of the inspection of bituminous paving, subbase, placement, guide rail updates, MPT, E&S controls and material sampling of testing.

SAI/PennDOT, District 9-0 -- SR 0030-027, Bedford County/TCM-1

Concrete roadway preservation project. Concrete patching and bituminous overlay of the Bedford Bypass. ($6.5M). Management of the inspection of concrete roadway patching, bituminous overlay, guide rail updates, MPT curbing and highway signage (concurrent with SR 0220 project).

SAI/PennDOT, District 9-0 - SR I-99-08M, 013 & 027 - SR0220-12M & 13M, Bedford County/TCM-1

Concrete roadway preservation project. Reconstruction of I-99-08M, SR 0220 from I-99 to the two-lane transition and vertical grade adjustments on SR 0220-13M. ($8.6M). Management of the inspection of concrete roadway pathing, bituminous overlay, temporary road construction, roadway vertical alignment adjustments, subgrade undercuts, subbase placement, bridge painting, MPT, slip line snap tite pipe liners, guide rail updates, concrete sidewalk, ADA ramps, curbing and highway signage (concurrent with the SR 0030 project).

SAI/PennDOT, District 9-0 - I-99 - 006, Blair County/TCM-1

Concrete roadway preservation project. Reconstruction of I-99 from Leamersville to Plank Road. ($14.3M). Management of the inspection of concrete roadway patching, bituminous overlay, lane reconstruction, slip line snap tite pipe liners, rehabilitation of 10 sets of dual structures, bridge painting and MPT.

SAI/PennDOT, District 9-0 - SR 0030 - 017, Bedford County/TCIS

Route 30 - Bedford Bypass Rehabilitation. Rehabilitation of 3.5 miles of four-lane highway and ramps. ($8.5M). Supervision of inspection for concrete roadway patching, expansion dam replacement, latex bridge decks, deck replacement, substructure spall and special concrete repairs and MPT.

SAI/PennDOT, District 9-0 - SR 0030-B07-C07, Bedford County/TCIS-Structures

Roadway upgrades from two-lane to four-lane, new roadway and structures. ($55.0M). Supervision of inspection of cast-in-place soldier pile retaining wall, precast box culvert, MSE wall, new single-span precast I-Beam bridge, simple-span integral abutment bridge, new 5-span concrete I-Beam bridge, rehabilitation of historic 5-span concrete arch bridge.

SAI/PennDOT, District 2-0 - SR 6026-A02, Centre County/TCIS-Structures

New Construction: Four-lane concrete roadway, 4 steel-beam bridges, 5 concrete I-Beam Bridges. ($28.0M). Supervised 7 TCIs, complete structure inspection and documenting from footer excavation/piling through the construction of the parapets, steel I-beam erection.

SAI/PennDOT, District 2-0 - SR 0322-C04, Centre County/TCI

Lewistown Bypass. Resurfacing of a four-lane highway, structure repairs, guide rail and signing. ($8.0M). Bituminous paving, line painting, structure repairs and signing.

Stanley Rapp, Government Affairs

Respondent: Bridging Pennsylvania Partners
Firm: Greenlee Partners, LLC
Years of Experience:

- Greenlee Partners (37 years)
- Experience (42 years)

Role: Founder and Partner
Education: Penn State University
Certifications & Training: Penn State University Board of Trustees Herbert, Rowland & Grubic Board

Summary of Prior Experience

He is one of the most recognizable figures in Pennsylvania politics -- an iconic figure in Harrisburg and omnipresent in the Capitol halls. Stan is a pragmatist who understands the art of the achievable. He is driven by our clients' needs and passionate about the outcomes. Stan graduated from Penn State University in 1975. He has been active in local, state and federal elections his entire adult life. Early in his career, Stan served as Chief of Staff to the PA Senate President Pro Tempore as well as the Chief Clerk of the PA Senate. In 1985, Stan founded Greenlee Associates with William Greenlee. When Mr. Greenlee retired in 2000, Stan kept the vision and company alive by establishing Greenlee Partners.

Select Experience

Greenlee Partners, LLC

Co-Founder, 1985 to present

Penn State Board of Trustees

Member, 2017 to present

Senate of Pennsylvania

Majority Staff Administrator, 1980 to 1984

Chief Clerk, January to June of 1981

Minority Staff Administrator, 1978 to 1980

Chris Reefer, CSP, Safety Manager

Respondent: Bridging Pennsylvania Partners
Firm: Fay, S&B USA Construction
Years of Experience:

- Fay (15 years)
- Experience (16 years)

Role: Safety Director
Education: Slippery Rock University; B.S. in Safety and Environmental Management
Certifications & Training: Certified Safety Professional, OSHA 500 Training, Certified Instructor-First Aid, CPR and AED

Summary of Prior Experience

Chris is the Safety Director for Fay, S&B USA Construction, managing all aspects of safety for the Company and has helped lead the organization to multiple streaks in excess of 1 million work hours without a lost time incident. Under his management, the company has repeatedly been recognized and awarded for their best-in-class safety performance. Which includes two Construction Safety Excellence Awards given by the Associated General Contractors of America and five Platinum Level awards from the National Railroad Construction & Maintenance Association. Chris is also very active in several industry safety committees. Chris has extensive experience as a health and safety professional and director in the construction industry. His knowledge base includes the health and safety requirements of the Occupational Safety and Health Administration (OSHA), Federal Railroad Administration (FRA), US Army Corp. of Engineers (USACE) and the Mine Safety and Health Administration (MSHA).

Select Project Experience

US 219 New Highway Construction, Earthwork and Bridge Construction Contracts, Somerset and Meyersdale, PA

These $177.9M PennDOT contracts included earthwork and bridges phases in the construction of a new 11-mile, 4-lane highway from Somerset to Meyersdale, PA. Specific work included mass excavation (moving approximately 13,000,000 cy of earth), the demolition of two bridges over railroads, the construction of five sets of dual bridges and the construction of two separate bridges. Chris was Regional Safety Director on the projects, his role included:

- Overseeing project safety staff and overall management of project health and safety
- Assisting in internal site-specific safety audits to ensure compliance with health and safety requirements
- Supporting project safety staff in providing OSHA complaint health and safety training
- Reviewing subcontractor health and safety performance and compliance with subcontract requirements

Southern Beltway, Section 55B, Washington and Allegheny Counties, PA

This $96M project of a new highway construction project included clearing 250 acres, mass excavation of 5.6 million cy of material, the construction of a 3.2-mile roadway and construction of two adjacent 1,100’ long dual lane bridges with curved steel girders. Specific project work includes excavation, concrete placement, steel fabrication and installation, drilled shafts, concrete/asphalt pavement, drainage installation, demolition, mine grouting and utility relocation. Chris was Regional Safety Director on the project, his role included:

- Overseeing project safety staff and overall management of project health and safety
- Coordinating with Owner Controlled Insurance Program (OCIP) and PA Turnpike Health and Safety personnel on claim investigation and overall management
- Participating in OCIP health and safety inspections
- Assisting in internal site-specific safety audits to ensure compliance with health and safety requirements

I-79 Restoration - Neville Island to I-279, Pittsburgh, PA

This $26.5M partial design-build project (traffic control plan and bridge structure) that includes the rehabilitation and preservation of five bridges, sign structures, asphalt milling and resurfacing, drainage and pavement markings for 6.1 miles of highway. Major MPT phases to occur in four different set-ups to perform I-79 rehab, along with structure work. Chris is serving as Safety Director on the project, his role includes:

- Overseeing project safety staff and overall management of project health and safety
- Assisting in internal site-specific safety audits to ensure compliance with health and safety requirements
- Supporting project safety staff in providing OSHA complaint health and safety training
- Reviewing subcontractor health and safety performance and compliance with subcontract requirements

Liberty Bridge Rehabilitation, Pittsburgh, PA

Fay performed this $81.7M major rehabilitation of the Liberty Bridge, a 2,664 ft., 16-span deck truss bridge that spans the Monongahela River and connects downtown Pittsburgh with the South Hills. This complex project included maintaining traffic with only limited lane closures throughout the duration of the project. Significant coordination was required with our client, PennDOT, as well as numerous stakeholders and the general public. Fay replaced the structure's full deck during the project with an accelerated concrete mix which allowed us to minimize disruption to traffic. This was the first exodermic deck installation in the entire state of Pennsylvania; previously filled grid decks were utilized but were not exodermic. This new innovation allows for a more lightweight deck and because the deck sections can be prefabricated and staged, this accelerated bridge technique results in less shutdown. The use of rapid set latex on the weekends helped the bridge be ready for traffic by the following Mondays while helping the project to remain on schedule. Chris was Regional Safety Director on the project, his role included:

- Overseeing project safety staff and overall management of project health and safety
- Assisting in internal site-specific safety audits to ensure compliance with health and safety requirements
- Supporting project safety staff in providing OSHA complaint health and safety training
- Reviewing subcontractor health and safety performance and compliance with subcontract requirements

I-579 Capping and New Bridge Construction, Pittsburgh, PA

This high-profile $29.3M project involves the building of a 'cap' structure (bridge with a 225' x 225' deck) on top of the I-579 roadway and interchange ramps, which will include a large community park. The Park will serve as a connector from the Lower Hill District neighborhood to Pittsburgh's downtown area. This project includes 12 phases of traffic for demolition, substructure construction and superstructure construction work. Specific work also includes excavation, concrete placement, drainage installation, landscaping preparation and decorative signage. Some specifics include the installation of more than 1,000,000 pounds of rebar, 126 box beams, each weighing 140,000 lbs., along with 776' of 4" pavement drainage and 850' of 6" pavement drainage along with associated drain outlets. Chris was Safety Director on the project, his role included:

- Overseeing project safety staff and overall management of project health and safety
- Assisting in internal site-specific safety audits to ensure compliance with health and safety requirements
- Supporting project safety staff in providing OSHA complaint health and safety training
- Reviewing subcontractor health and safety performance and compliance with subcontract requirements

Ruben Rio, Development Entity's Estimator

Respondent: Bridging Pennsylvania Partners
Firm: FCC Construccion SA
Years of Experience:

- FCC Construccion SA (7 years)
- Experience (7 years)

Role: Bid Manager
Education: Salamanca Engineer School; B.S. Industrial Engineer

Summary of Prior Experience

Ruben is a head of studies in the FCC Headquarters, he is responsible for leading the tender, carrying out, as the main functions, estimating and controlling budgets, checking and proposing technical variants and alternatives, preparing and/or reviewing technical reports and the work plan, analyzing risks and, finally, reviewing the documents to be presented to the client.
Ruben has experience in Asia, Europe and North and South America being the FCC lead in many projects. He has experience in P3 projects and in long term infrastructure projects. Ruben always have been working in FCC which let him to have a good knowledge about the FCC methods and he have been working with BPP Partners in projects before.

Select Project Experience

Design and Construction of Mersey Gateway Bridge PPP Project in Liverpool, United Kingdom

The project consisted of the design and building of a new bridge more than 2 km long over the River Mersey in Liverpool, located to the east of the existing Silver Jubilee bridge (inaugurated in the 1960). It also included major urban remodeling of the bridge approach motorways involving 7 km of roads of which some about 1 km are on new viaducts. The most important element was the bridge itself with three lanes per direction. The budget for this project was $710 million. Ruben's role on this project include:

- Check plans, drawings and quantities.
- Oversee the selection of materials and plant to be used on site.
- Ensure that all the works are done in accordance with all the approved construction drawings, contract documents, specifications and all applicable standards.
- Day-to-day management of the site, including supervising and monitoring the site labor force and the work of any subcontractors.
- Plan with the Section Managers the work and efficiently organize the plant and site facilities in order to meet agreed deadlines.
- Inform and be involved in the resolution of any unexpected technical difficulties and other problems that may arise.
- Submit site daily reports, inspection requests, estimates and all applicable monitoring reports on regular basis or as required and maintain a daily site diary

Jorge Chavez New International Airport in Lima, Peru

The Project comprises the design and construction of a new runway, a new passengers' terminal together with a contact and remote platform for aircrafts, urbanization works and accesses to a business complex with new logistic areas and stores, parking areas, a new fire station building and one utilities farm. His role in this project include:

- Responsible for interpreting the customer´s invitation to bid requirements and assuring its completion.
- Address and obtain any opportune clarifications from the Customer.
- Coordinate with partners & subcontractors their correct involvement in the preparation of the technical and commercial proposal.

- Managing and directing the internal preparation of tenders, coordinating the different departments involved.
- Coordinate with the Construction Management the construction strategy.
- Responsible for the correct emission of the technical – commercial proposal.
- Responsible for the bid project in terms of budget, time and quality and ensure that the necessary and sufficient actions are taken.
- Tracking and closing the offer; prepare the subsequent clarifications and amendments.

E18 Langangen in Rugtvedt, Norway

The stretch has a total length of 17 km, of which approx. 6.6 km in tunnel, as well as several bridges, the largest being a new Grenland bridge that must go parallel with the old one. His role in this project include:

- Lead the estimation of the main task and obtain their quantities and their associate cost.
- Responsible for interpreting the customer´s invitation to bid requirements and assuring its completion.
- Address and obtain any opportune clarifications from the Customer.
- Coordinate with partners & subcontractors their correct involvement in the preparation of the technical and commercial proposal.
- Managing and directing the internal preparation of tenders, coordinating the different departments involved.
- Coordinate with the Construction Management the construction strategy.

A465 Heads of the Valleys Dualling in United Kingdom

This road project is known as the A465 Heads of the Valleys section 5 and 6. The project will extend between Hirwaun and Dowlais Top for 11 miles (17.7km). The new road will be a 70mph dual carriageway with 6 junctions. Slip roads on and off the A465 carriageway will connect the joining roads. Ruben´s role in this project include:

- Lead the estimation of the main task and obtain their quantities and their associate cost.
- Lead and coordinate with the Construction Management the construction strategy.
- Responsible for interpreting the customer´s invitation to bid requirements and assuring its completion.
- Coordinate with partners & subcontractors their correct involvement in the preparation of the technical and commercial proposal.
- Managing and directing the internal preparation of tenders, coordinating the different departments involved.

Vegachi-Altos Rio Magdalena in Dolores, Colombia

Vegachi project has a length of approximately 37 kilometers and corresponds to a completely new way, involves the construction of 1 tunnel and two overpasses in Maceo exchangers. Likewise, the construction of a series of structures of new bridges is contemplated. His role in this project include:

- Lead the estimation of the main task and obtain their quantities and their associate cost.
- Lead and coordinate with the Construction Management the construction strategy.

Mark F. Robbins, P.E., DBIA, Project Delivery Lead

Respondent: Bridging Pennsylvania Partners
Firm: STV Incorporated
Years of Experience:

- STV (23 years)
- Total (34 years)

Role: Construction Services Manager / Vice President
Education: North Carolina State University; B.S. in Civil Engineering

Summary of Prior Experience

Mark manages the construction services group for the Southeast region of STV and has 34 years of experience providing and managing bridge and roadway design throughout the Southeast. He has particular expertise in design-build projects for a variety of highway-related projects and is certified professional with the Design-Build Institute of America. Prior to joining STV, Mr. Robbins had an 11-year career with the North Carolina Department of Transportation (NCDOT), including 7 years as a senior bridge engineer, primarily working in structural design. He has provided roadway design, traffic control and consultant coordination for multidisciplinary projects involving curved steel girders, seismic/dynamic isolation, permitting, 3-D bridge modeling, value engineering, phasing plans and construction engineering. Mr. Robbins's experience also includes a construction services group providing contractors with construction engineering for cofferdams, erection, demolition, temporary shoring, temporary falsework/formwork and value engineering.

Select Project Experience

US Route 15 Central Susquehanna Valley Transportation (CSVT) Project – Northern Section, Northumberland, Snyder and Union Counties, PA

Provided constructability and traffic planning reviews for two bridge sites as part of a 5.3-mile, 4-lane limited access highway on a new alignment that is part of the Northern Section of the Central Susquehanna Valley Transportation (CSVT) project. The $265 million Pennsylvania Department of Transportation (PennDOT) project in Northumberland, Snyder and Union counties, PA, consists of four construction packages with an estimated $307 million construction cost, featuring a 15-span crossing of the West Branch Susquehanna River.

I-495/I-270 P3 Managed Lane Project – Montgomery County, MD

Managed STV's bridging document design services for the I-270/I-370 Interchange segment at the northern terminus of the project. Mark led team developing an alternative interchange design which reduced the project's overall cost by $50 million dollars. The alternative interchange lowered the interchange height, eliminated two long high-level curved steel girder flyover bridges and simplified construction staging affecting the high traffic volumes on I-270 and I-370. A second interchange was revised from a single point urban interchange to a diverging diamond interchange, increasing the level of service and simplifying construction staging.

Northern Beltway Interchange at US 52 Design-Build (R-2247E), Winston-Salem, NC

Managing full design services for this $134 million North Carolina Department of Transportation design-build project to add a directional new interchange on the beltway at US 52/Future I-74/Winston-Salem-Beltway and widen 2.6 miles of US 52 near NC 65 (Bethania - Rural Hall Road) to a 6-lane divided highway. The project includes design services for the roadway and 14 bridges as well as hydraulics, permitting and environmental work, erosion and sediment control and utilities. Management included coordinating permitting, right-of-way acquisition, railroad coordination/agreements and utility relocation including the relocation of two transmission lines and a mile of steel gas line.

I-85 over the Yadkin River Design-Build (I-2304AC), Forsyth County, NC

Oversaw full design services for the $135 million reconstruction and widening of I-85 for the North Carolina Department of Transportation. Mark led the design effort for the project, which included the widening of a 3-mile-long stretch of I-85 roadway to eight lanes and construction of six new bridges, including 3,000-foot-long dual bridges over the Yadkin River, wetlands and Norfolk Southern and North Carolina railroads. Additionally, an 800-foot-long crossing was designed for the US 29 crossing of the Yadkin River, which was between a railroad truss bridge and an existing concrete arch. The design utilized an innovative top-down

method/trestle to access the site and construct the six 140-foot spans of 77-inch-deep prestressed concrete girders.

US 70 Improvements Design-Build (U-5713/R-577 A&B), Craven County, NC

Managing upgrades to approximately five miles of US 70 with 6-lane and 4-lane divided facilities. The $203 million North Carolina Department of Transportation project will also convert five at-grade intersections to grade-separated interchanges (peanut-style roundabouts in a compressed diamond configuration), as well as upgrade connections to access roads on both sides of US 70. Mark is managing design services.

Future I-74 Northern Beltway Design-Build (U-2579D, E, F), Winston Salem, NC

Managing the STV design effort on a 3-mile section of the larger $140 million alignment, which extends 6.9 miles between University Boulevard and US 311 north of Winston-Salem, consists of a 6-lane divided highway, three interchanges, five Y-lines and multiple service roads and will alleviate congestion from heavy truck traffic. The scope of work includes 10 bridges and a new interstate alignment associated with the design-build delivery of Sections D, E and F of the Winston-Salem Beltway in Forsyth County, NC, for North Carolina Department of Transportation. Mark is overseeing design of a new interchange at Baux Mountain Road and includes work from there to the project limits of the overall 6.9-mile widening.

Future I-295 Fayetteville Outer Loop Design-Build (U-2519AA&AB), Robeson and Cumberland Counties, NC

Overseeing structural design for the $130 million Future I-295 Fayetteville Outer Loop from I-95 in Robeson County to south of SR 1003 (Camden Road) in Cumberland County. The approximately 6.1-mile North Carolina Department of Transportation. design-build project will provide a 4-lane divided facility on new location with 12 bridges. Mark is managing structures design and he assisted in development of alternative technical concepts (ATCs) that will result in approximately $8.2 million in savings related to construction cost, long-term maintenance, ROW and construction scheduling for this section.

Palmetto Parkway (I-520) Phase I Design-Build, Aiken County, SC

Provided bridge design for the four bridges on this South Carolina Department of Transportation design-build project which consisted of 4.2 miles of new interstate alignment. The structures consisted of dual bridges on I-520 over US 1, Dittman Court Bridge over I-520, the I-520 bridge over the Norfolk Southern Railway and a bridge carrying I-520 over an aquifer seepage wetland overflow.

Sarah Schick, Development Entity's Project Manager

Respondent: Bridging Pennsylvania Partners
Firm: Macquarie Infrastructure Developments LLC
Years of Experience:

- Macquarie (2 years)
- Experience (13 years)

Role: Senior Vice President – Infrastructure Investments and Development
Education: EMLYON Business School; MScs (Hons) in Management

Summary of Prior Experience

Sarah is a Senior Vice President in Macquarie Capital's Infrastructure Investments Development team, leading the development of and investment into P3 projects in North America. Sarah has extensive experience in project finance, P3 procurement and long-term infrastructure projects. Over the last 13 years, she worked on several major complex P3 projects across North America, Europe and Australia from their origination to their construction completion.
Prior to joining Macquarie in 2019, Sarah was a Director for Plenary Asia Pacific origination team. Before Plenary, Sarah worked as Associate Director for Meridiam, where she supported several successful major complex P3 projects across Europe and North America. She then joined KPMG in Australia as a Director within the Infrastructure and Project Group, where she has played key leadership roles for and on behalf of the State of Queensland in the procurement of large social and entertainment infrastructure projects.

Select Project Experience

American Legion Bridge I-270 to I-70 Relief Plan P3. Maryland

The project is a $3.0B, 50-year P3 procured through Pre-development Agreement (PDA) with the Maryland Department of Transportation (MDOT) for the DBFOM of the Capital Beltway and Interstate 270 high-occupancy toll roads. Sarah was Transaction Director on the project, her role included:

- Led Macquarie's RFP effort and interaction with MDOT resulting in a successful bid
- Led the commercial negotiations of the PDA and other project documentation
- Led Macquarie's internal investment committee approvals to commit equity to fund predevelopment of the project
- Currently leading Macquarie's early predevelopment work which is being completed at risk prior to signing PDA in August 2021

Gold Coast Light Rail Extension P3 in Queensland, Australia

The $1.0B project consists of the DBFOM of the largest public transport project undertaken on the Gold Coast to date and is Queensland's first light rail network. Stage 1 of the project has been operational since 2014. Sarah's role on the project included:

- Supporting construction completion and transition to operations of Stage 2 of the project consisting of the $400M, 4.5 miles extension of the network north of Phase 1
- Working directly with the State of Queensland from April 2017 to September 2019 to expand the light rail with a new Stage 3 of the project, that includes a $320M 6.7km extension south of the existing rail network from Broadbeach South to Burleigh Heads, as commercial lead for the concessionaire and Plenary. Variation of the contract and extension have been awarded in 2020

A-66 Motorway - Benavente to Zamora P3, Spain

The $205M, 30-year availability-based design, build, financing, operations and maintenance project consisted of the construction of a 49-km motorway between the Castrogonzalo and the bypass of Zamora. Sarah's role on the project was:

- Finance lead and commercial support in structuring the project and achieving financial close
- Supporting commercial processes from June 2012 to financial close in July 2013 and post-financial close up to September 2014 as a Board member of the concessionaire

Port of Miami Tunnel P3 in Florida, USA

The project consists of the 30-year DBFOM of a 0.8-mile tunnel linking the Port of Miami to the MacArthur Causeway, feeding one of the largest cruise port terminals and relieving city center traffic. Operational since 2014, the project is valued at $900M. Sarah's role on the project included:

- Supporting the development of the consortium winning proposal, supporting the financial and commercial workstreams on behalf of Meridiam, 90% equity investor and lead developer
- Representing Meridiam, in supporting the project company to manage contractual and financial obligations during delivery of the project
- Managing and successfully resolving a complex dispute with regard to a large geotechnical relief event between the Florida DOT, the concessionaire and the design and build contractor that had potential material implications on the project timeline and cost of delivery
- Involved in the delivery phase from October 2010 to December 2012, including March 2011 to June 2012 within the concessionaire (MAT Concessionaire) as commercial manager

Fulcrum Infrastructure LIFT projects in London, UK

The project was a portfolio of 41 community healthcare facilities, representing close to $450M of investment across areas of West and South London. Sarah's role on the project included:

- In design stage, supporting commercial work during the development of 2 facilities and acquisition of 3 facilities from January 2010 to December 2010 and continuing on a supporting capacity up until June 2011

Acting as financial manager and modeler, supporting the transition from delivery to operations for 10 out of the 41 CHC facilities

Queen's Wharf Brisbane P3 in Queensland, Australia

The $3.0B project consists of the DBFOM of a redevelopment of a twenty-six-hectare site across land and water in the north bank of Brisbane into a mixed-use residential, commercial and retail and integrated resort, including casino, entertainment facilities, 1,100 hotel rooms. Sarah's role on the project included:

- Leading Commercial and Financial advisor to the State on the integrated resort development component of the project, including support in development of the tendering documentation, management of the interactive negotiation process regarding the project commercial principles up to the initial and final proponents' offers
- Leading the financial value assessment and risk analysis of the bids and final recommendation to the State to facilitate the selection of a preferred bidder and supporting the State in the resolution of outstanding issues up to contractual close and financial close of the project

Brian L. Schull, PE - Construction Quality Assurance Manager

Respondent: Bridging Pennsylvania Partners
Firm: SAI Consulting Engineers, Inc.
Years of Experience:

- SAI (27 years)
- Experience (30 years)

Role: Project Manager
Education: University of Pittsburgh, MSCE
Professional Registrations / Licenses / Certifications: PE Civil Engineering, Pennsylvania/Florida

Summary of Prior Experience

As Assistant Department Manager in the construction department, Mr. Schull's specific duties include customer liaison, contract administration, supervision of project inspectors, approval of contractor's monthly estimates and coordination and review of shop drawings and submissions. Mr. Schull has experience with schedule management, including initial review, coordination and monitoring during construction and delay claim analysis of CPM schedules.

Select Project Experience

Brookline Boulevard, City of Pittsburgh Department of Public Works – Contract Administrator

Construction inspection and contract administration for improvements to Brookline Boulevard between Pioneer Avenue and Starkamp Street. Improvements include new sidewalk and curb in business district and residential area, six new signalized intersections, new decorative street lighting and bituminous milling and paving of Brookline Boulevard and connecting streets ($5.3M).

Browns Hill Road/Beechwood Boulevard, Phase 2, City of Pittsburgh Department of Public Works – Contract Administrator

Construction inspection and contract administration for improvements to Beechwood Boulevard from Browns Hill Road to Monitor Street. Improvements include two new signalized intersections, new street lighting, new ADA-compliant curb ramps and bituminous milling and paving of Beechwood Boulevard and connecting streets ($2.8M).

Pittsburgh International Airport North Baggage Handling System Building, Allegheny County Airport Authority – Project Manager

Construction management and inspection of a one-story, 20,000-sf building and state-of-the-art baggage handling system with in-line explosive detection capabilities at the Pittsburgh International Airport ($15.8M).

New Customer Service and Training Facility, ALCOSAN – Project Manager

Construction management and inspection of a two-story, 20,000-sf LEED-certified building that is designed for customer service and staff training at ALCOSAN's main facility in Pittsburgh, Pennsylvania ($6.8M).

Martin Luther King Jr. East Busway Extension, Port Authority of Allegheny County – Project Manager

Construction management and inspection of the Phase I extension of the Busway, which included oversight of eight construction contracts. Busway extension requires construction of

2.25 miles of 13" PCCP, four mainline structures, three pedestrian bridges, one railroad bridge, four stations, four park-and-ride lots, 1.5 miles of linear park, five stormwater management chambers and a two-mile, fiber-optic communication ductbank system ($40M).

Garfield Heights Phase I, Urban Redevelopment Authority of Pittsburgh – Project Manager

Construction management and inspection services necessary for the site and infrastructure development of a $60 million, 265-home public housing development in Allegheny County, Pennsylvania ($2.6M).

Southpointe Boulevard/Morganza Road Intersection Improvements, Washington County Authority – Project Manager

Construction inspection for intersection improvements at Southpointe Boulevard and Morganza Road as part of the Southpointe II Development project. Improvements include roadway widening, bridge modifications, turning lanes and traffic signal design/installation ($3.5M).

Brandon R. Schulze, EIT, Traffic Control Manager

Respondent: Bridging Pennsylvania Partners

Firm: H&K Group, Inc.

Years of Experience:

- H&K (3 years)
- Experience (10 years)

Role: Project Engineer/Assistant Roadway Superintendent

Education: The Pennsylvania State University, B.S. Civil Engineering

Professional Registrations / Licenses / Certifications: Engineer In Training (EIT); PennDOT Concrete Field Technician; ACI Concrete Field-Testing Technician; PennDOT Bituminous Field Technician; and OSHA 10 Hour Safety Training

Summary of Prior Experience

The H&K Group, Inc. Skippack, Pa (November 2018 – Present)

Project Engineer/Assistant Roadway Superintendent

Wagman Heavy Civil, Inc. York, Pa (September 2015 – November 2018)

Construction Field Engineer/Traffic Control Superintendent

McTish, Kunkel & Associates, Allentown, Pa (May 2013 – September 2015)

Construction Inspector, TCI-3

Wessner's Excavating, LLC. orefield, Pa (March 2012 – May 2013)

Project Manager/Estimator

Select Project Experience

I-78-12M Interstate Reconstruction, ECMS 10466

- Managed field and office operations to support 60,000+ LF of storm drainage installation for up to 8 pipe crews at a time
- Planned and supervised traffic control operations including incident management
- Scheduled and managed subcontractors for numerous aspects of work with emphasis on E&S, highway lighting and pavement base drain
- Coordinated all utility relocation, demolition/hazmat abatement on the project

SR22-400 Lehigh River Bridge & Fullerton Avenue Interchange Reconstruction, ECMS 57615

- Planned and managed all major traffic control operations
- Tracked daily work quantities and payment quantities received from owner
- Scheduled and coordinated subcontractors for all aspects of work
- Prepared material and shop drawing submittals

I-84-14R Interstate Reconstruction, ECMS 75762

- Performed construction inspection for a multitude of operations on both roadway and bridge reconstruction and rehabilitation
- Supervised traffic realignment operations and traffic control device maintenance for 9-mile roadway reconstruction project
- Completed concrete and rebar quantity checks, calculations, performed concrete QC testing, observed placements for all aspects of bridge structures

Geoff Segal, Community, Local Workforce and DBE Engagement Manager

Respondent: Bridging Pennsylvania Partners

Firm: Macquarie

Years of Experience:

- Macquarie (14 years)
- Infrastructure experience (22 years)

Role: Community, Local Workforce and PR Advisor

Education: Pepperdine University, M.S., Public Policy. Arizona State University, B.A., Political Science

Professional Registrations / Licenses / Certifications: FINRA Series 79, 63. 54. 52 and 50

Summary of Prior Experience

Geoff Segal leads Macquarie Capital's government advisory and affairs team, where he coordinates and manages business development, public affairs and government relations programs. With over 20 years of experience in public policy and infrastructure development, Geoff has developed and executed strategies for outreach and education on multiple infrastructure projects throughout the United States.

Prior to joining Macquarie Capital, Geoff spent a decade at Reason Foundation where he directed the privatization and infrastructure research and policy program that provided original research and guidance to executive and legislative officials throughout the United States.

Select Project Experience

American Legion Bridge I-270 to I-70 Relief Plan P3 Maryland

The project is a $3.0B, 50-year P3 procured through Pre-development Agreement (PDA) with the Maryland Department of Transportation (MDOT) for the DBFOM of the Capital Beltway and Interstate 270 high-occupancy toll roads. Sarah was Transaction Director on the project, her role included:

- Led Macquarie's RFP effort and interaction with MDOT resulting in a successful bid
- Led the commercial negotiations of the PDA and other project documentation
- Led Macquarie's internal investment committee approvals to commit equity to fund predevelopment of the project
- Currently leading Macquarie's early predevelopment work which is being completed at risk prior to signing PDA in August 2021

Elizabeth River Tunnels

Led the political outreach and communications team on the Elizabeth River Tunnels project in Virginia which was procured through a PDA. Geoff developed and executed outreach and communications strategies to generate local support and understanding of the project and managed political risk for the project and team. He managed a broad coalition of support comprising of local business, civic and homeowner groups and associations that were activated for multiple "campaigns" to support various initiatives critical to project success, including a TIFIA loan allocation, enabling the secure passage of new toll enforcement legislation and securing government support and permits. Furthermore, Geoff managed political relationships across all levels of government including the US Navy and supported the DBE / Workforce Development team by entering into strategic partnerships with COMTO and local workforce development and education institutions.

Goethals Bridge Replacement

Led the political outreach and communications team on the Goethals Bridge Replacement project in New York and New Jersey. Geoff liaised with multiple stakeholders raising

awareness and understanding of the project. He developed and managed political and third-party outreach efforts supporting project execution. Geoff was also part of the team that liaised with the building trades, securing a Project Labor Agreement.

I-70 Central 70

Managed client interaction and led the development of the initial Value for Money analysis and pre-procurement finance team. Geoff played a pivotal role in identifying public policies, budget and fiscal conditions that could impact the potential financial plans and corridor configurations. He also assisted the client in the development of collateral educational material to generate project awareness, value and need.

KentuckyWired

This project was the first ever fiber optic P3 in the U.S. and it was procured through a PDA process. Geoff held a key role in building political support for the KentuckyWired project, as well as managing the outreach and educational initiatives across elected officials and staff members to ensure sufficient collaboration to effectively deliver PDA milestones.

Maximo Serrano, Development Entity's Design-Build Deputy Project Manager

Respondent: Bridging Pennsylvania Partners
Firm: FCC Construccion SA
Years of Experience:

- FCC Construccion SA (13 years)
- Experience (21 years)

Role: Project Manager
Education: ICCP Santander Engineer School; MScs in Civil Engineer

Summary of Prior Experience

Maximo is an FCC Project Manager located in USA in this moment, he is responsible for leading the projects which budget is over $500M and leading the construction parts in the FCC tenders giving to the project his expertise and his knowledge working in multidisciplinary teams around the world. Maximo has extensive experience in mega projects including P3 infrastructure projects, being a key part in the biggest contract from FCC (Riyadh Metro Project) till the date which more than $7 Billion as budget.
Maximo has experience in Asia, Europe and North and South America being the FCC Project Manager in many projects. He has experience in P3 projects and in long term infrastructure projects. He always has been working in multinationals construction companies which let him to have a good knowledge about the construction methods.

Select Project Experience

Riyadh Metro Project: Lines 4, 5 and 6

The project is one of the biggest one construction projects in Saudi Arabia which more than $7B as budget and 10 years of construction with the Kingdom of Saudi Arabia as Client. Maximo was the Site Manager for the line 5 which consist in 2 tunnels erect with TBM, 11 underground stations, 12 vertical shafts and 1 depot. His role include:

- Lead construction of deep underground stations which mainly dimensions are: 140 m x 27 m x 26 m depth with 3 underground levels
- Lead innovative construction methodology of the station around the tunnel during the tunnel execution coordinating with the TBM team for the civil works of the tunnel
- Lead and manage all the relocation of urban services (potable water, wastewater, storm water, electricity, telecom, irrigation, lighting poles) with the stakeholders

Pavement Strengthening and Rehabilitation of Highways A-52 and N-525 in Zamora, Spain

The $20M budget for repair and pave more than 130 km of highways with the road in operations for 4 years. Maximo's role on the project was:

- Lead the Pavement reparation of 130 km of highways and roads, the milling and replacement (base layer) and management of the main subcontractors as metal barriers installation or road painting

Benavente Bridge in Benavente, Spain

The project consists of the construction of a precast beam bridge with reinforced concrete abutments, cyclopean concrete foundations and create a clay's peninsulas material. Maximo's role on this project included:

- Lead the design phase, submission of the project, meetings with Castilla y Leon DOT, foundation work, structural work and pavement work

A-62 Highway Construction in Salamanca, Spain

The project consists in add two lanes in each direction to the highway with a budget of $100 Million for 25 km of construction. Maximo's role on the project included:

- Lead the design phase
- Lead the submission of the project

Scott Shimko, P.E., DBIA, Lead Utilities Engineer

Respondent: Bridging Pennsylvania Partners
Firm: KCI Technologies
Years of Experience:

- KCI Technologies (1 year)
- Total (19 years)

Role: Utility Coordinator
Education: Villanova University; B.S. in Civil and Environmental Engineering

Summary of Prior Experience

Scott is an experienced highway engineer and project manager proficient in PennDOT design practices, including highway design, maintenance and protection of traffic design, bid package preparation, construction cost estimate preparations, specification writing, drainage design and utility coordination. He has more than 20 years of highway design experience and extensive knowledge of PennDOT policies and procedures, Design-Manual 2, RC-Standards, ECMS and Publication 408 Construction Specifications. He also has a very high level of design-build expertise from working with various contractors on highway and bridge projects, ranging from small culvert replacements to multi-span bridge replacement projects, which provides a unique understanding to how contractors approach projects and provides perspective during constructability reviews.

Select Project Experience

SR 3014-370 Bridge Replacement over Nescopeck Creek, Luzerne County, PA

Completed highway design and final utility coordination tasks, including upload and management of the utility relocations in the PennDOT's URMS database and assisted in project management.

This PennDOT District 4-0 project involves environmental studies, preliminary engineering, final design and construction consultation for the replacement of the existing Parker camelback steel truss bridge over Nescopeck Creek at the junction of SR 3015. During preliminary design, the bridge was determined eligible for listing in the National Register of Historic Places. KCI prepared a Historic Bridge Rehabilitation Analysis Report which established the Purpose and Need, provided pertinent site-specific information and determined that rehabilitation would not meet the Purpose and Need. KCI is designing the replacement bridge, which is a three-span prestressed concrete beam bridge.

SR 0068-376 Dolby Street to Trout Run, Clarion County, PA

Performed highway design tasks and assisted with project utility coordination including upload and management of the utility relocations in PennDOT's URMS database. This PennDOT District 10-0 project involves preliminary engineering, final design and construction-phase services for widening the road from two to three lanes. It includes replacement of an existing 8' long concrete slab bridge with a concrete box culvert.

SR 1009 and SR 3026 Bridge Rehabilitations, Middle Smithfield and Chestnut Hill Townships, Monroe County, PA

Managed design of the superstructure replacement of the SR 3026 bridge over McMichael Creek and a deck replacement of SR 1009 over Longshore Creek for PennDOT District 5-0. The project was a design-build with bridge design and utility coordination as the design items. Roadway plan revisions were required as part of the final bridge design.

SR 2017 over Schuylkill River, Exeter and Robeson Townships, Berks County. PA

Managed design of this PennDOT District 5-0 project involving the superstructure replacement of the 2-lane, 6-span Gibralter Road bridge over the Schuylkill River. The as-designed bridge utilized NEXT beams as the superstructure replacement type and a roadway closure using a full detour was only allowed for a maximum of three months. During the advertisement period, a design utilizing traditional PA concrete bulb tee beams with cast-in-place deck was developed in an attempt to reduce construction costs. The design was presented to prospective bidders and the winning contractor elected to bid and build the alternate design. The design was completed and approved in time for the start of construction in accordance with the pre-bid schedule

Hezi Snir Schlinger, Design-Build Project Manager

Respondent: Bridging Pennsylvania Partners
Firm: Shikun & Binui
Years of Experience:

- Shikun & Binui (29 years)
- Experience (31 years)

Role: Chief Operating Officer
Education: The Technion Institute of Technology, B.Sc. in Engineering
Professional Registrations / Licenses / Certifications: Engineering License #70320, Ministry of Labor and Social Affairs

Summary of Prior Experience

Hezi is the COO of SBC USA Construction where his primary role is to broaden executive oversight in project acquisition and operations, preparing SBC USA Construction for larger opportunities that being part of the Shikun and Binui family allows. Prior to joining the SBC USA Construction management team, Hezi was CEO of SolelABen (a joint venture of Solel Boneh, Israel and Abengoa and later TSK, Spain) and CEO of Israel Metro Builders (IMB).

Select Project Experience

P3 TxDOT SH288 Express Toll Lanes Project in Houston, TX

The SH 288 Toll Lanes Project, with a construction value $815M, relieves congestion by adding express lanes along Houston's third most-congested roadway, which accommodates daily traffic volumes of between 150,000 and 170,000 vehicles.

This P3 project includes the design, finance, construction, operation and maintenance of 10.3 miles of fast toll roads, as well as upgrading, operation and maintenance of existing infrastructure. In addition to the toll lanes, the project includes the construction of 16 new flyover ramps, 2 major interchanges, new direct connectors, road widening/ reconstruction, 25,000 linear feet of retaining/ noise wall and the relocation of utilities. Hezi's role on the project included:

- Providing corporate oversight to meet the expectations of TXDOT and directing the DBJV's leadership team and other supervisory staff and overseeing construction for the on-time delivery of large, complex structural transportation project with complex environmental conditions

Fargo-Moorhead Metropolitan Area Flood Risk Management Project

The $1.5 B (total project cost) project includes the design, construction, financing and maintenance of the proposed 30-mile Diversion Channel and associated infrastructure SBC USA has 42.5% equity, has 35% of the construction JV and will provide operations and maintenance for the project following construction completion for a term of 29-years. Additional work includes the design and construction of four interstate bridges, twelve county road bridges, four railroad crossings, two aqueducts, eleven drain inlets and two drop structures that divert flows from tributaries into the diversion channel.

P3 Ashalim Thermo Solar Project for the Israel Ministry of Finance in Ashalim, Israel

The $815M EPC work included design and construction of 160 miles of process steel piping works, including 5 miles of steel bridges, 10 miles of roads, earth infrastructure works, thermal oil storage and piping, procurement and installation of turbines, sewage and water piping infrastructure, evaporation ponds, boilers, tanks and heat exchangers, cooling towers, logistics infrastructure and warehouses, as well as many other electrical, instrumentation and control work systems. Hezi's role on the project included:

- Overall responsibility for the project and direct accountability to the client
- Providing oversight and leadership of all construction activities, quality and safety

- Managing 130 EPC members and 1,200 site workers, executive level relationships with the client and other stakeholder
- Exit of the project-specific partnership lending partner and the increase in Solel-Boneh's stake from 50% to 67.5%

P3 Cross Israel Toll Concession Project – Central Section Construction in Location

Israel's first and largest P3 project, encompasses approximately 73 miles (470 lane miles) of highway, 20 interchanges, 2 tunnels, more than 150 bridges and numerous culverts, overhead signs, other roadway appurtenances and the complete provision, installation, commissioning and maintenance of the ITS and electronic toll collection system. Current AAWDT (Average Annual Weekday Daily Traffic) is over 250,000.

The purpose of the $1.1B project was to connect peripheral residential areas across Israel with its central region and to serve as a main north-south transportation corridor.

Hezi's role on the project included:

- Providing overall construction leadership for the project
- Managing and overseeing construction personnel, activities and quality
- Planning and scheduling of work activities to achieve the overall schedule (construction activities were completed 6 months ahead of schedule)
- Overseeing coordination with the Ministry of Environment and relevant environmental authorities to ensure minimal impact on the environment
- Managing subcontractors, including confirmation of bills
- Providing quality assurance
- Promoting and enforcing construction safety
- Establishing and maintaining budget control

Other projects:

- Light Railway in Tel Aviv Project
- Karmiel Interchange
- Refurbishment of Highway 90
- Building road 6400 in Nazareth

Arik Tapiero, Environmental Compliance Manager

Respondent: Bridging Pennsylvania Partners

Firm: Shikun & Binui International Holdings

Years of Experience:

- SBA (10 year)
- Experience (25 years)

Role: Global HR, Compliance & Sustainability Manager

Education: University of Haifa, B.S. in Geography and Archaeology; University of Haifa M.S. in Geography

Professional Registrations / Licenses / Certifications: Diploma, Management and Training Development, Kibbutzim Seminar

Summary of Prior Experience

Sustainability Manager – SBI International Holdings AG

- Developing policies relating to a company's ethical, sustainable and environmental responsibilities
- Devised strategies for modifying existing policies to better integrate sustainability initiatives
- -Developed sustainability project goals, objectives or strategies in collaboration with other professionals
- Conducted research into different sustainability plans to identify useful solutions and develop deployment plans
- Monitored or tracked sustainability indicators such as energy usage, waste generation and recycling
- Ensuring a company has a positive impact on local communities and the environment
- Raising public awareness of a company's social responsibility commitments through marketing, activities and donations
- Conducting research into best practice
- Writing and actioning a company's social responsibility strategy
- Creating partnerships with the company stockholders
- Ensuring that a company's policies meet legal and commercial needs
- Reporting on social responsibility activity to senior managers
- Execute internal and external Audits in order to maintain the company certifications - ISO 9001 and 45000

Global EHS Manager – SBI International Holdings AG

- Recruiting new employees
- Streamlined HR efficiencies, coordinated new hire orientations and provided onboarding and training for new employees
- Collaborated with legal and compliance teams to review employment agreements, paperwork, obtain feedback and procure available information for new training processes
- Maintained company compliance in the operation countries in addition to established organizational standards
- Motivated employees through special events, incentive programs and constructive feedback
- Implemented performance review and motivational strategies to elevate HR team results
- Implementing values cross the board - local employees, expatriate and management
- Monitored and handled employee claims

Team Leader of the Tel Aviv Metropolitan Mode Split Model, Ayalon Highways

- Managing the Modeling Team and the professional consultants in order to Maintain and update the metropolitan Model in accordance with Ayalon Highways Requirements
- Determine transportation planning scenarios (Public transit, networks, demographic scenarios etc.)
- Representation and co-operation with government ministries

Select Project Experience

SH288 Toll Lanes P3 DBFOM, Houston, Texas - $1.06B

This P3 project to improve a 10.3 mile stretch of SH288 including the planning, financing, construction, operation and maintenance of fast toll roads, as well as upgrading, operation and maintenance of existing infrastructures. The project was to improve the functionality of interchanges and add several new direct connectors to relieve traffic in Houston. It includes 56 bridges, construction of 18 new connector ramps and erection of 541 structural columns.

Cundinamarca 010 Toll Road P3, Bogota, Columbia -$790M

This Design-Build project was for 124 miles of road rehabilitation in a rural and remote areas. This work was challenging due to the climate and social and environmental conditions. This project includes bridges up to 90 yards, inclined box culverts and massive slope stabilizations. This project also involves the mobilization, logistics and earthworks workplan including the renovation and operation of quarry 4000 cu. yds./day with drilling and blasting operations.

Kabaale International Airport, Hoima district, Uganda - €303M ($340M)

This turnkey project, with a runway length of 3500m and a width of 75m including shoulders will be constructed within the already acquired refinery land of approximately 29 square kilometers. The airport will operate under Visual Flight Rules (VFR). The airport will also comprise a taxiway of width of 25 m and 60 m length including shoulders. A taxi lane will be constructed along the western edge of the apron to facilitate access to stands.

Greg Yavicoli, P.E., Construction Manager

Respondent: Bridging Pennsylvania Partners
Firm: Shikun & Binui America
Years of Experience:

- SBA (1 year)
- Experience (27 years)

Role: Operations Manager
Education: State University of New York, B.S. in Civil Engineering.
Erie Community College, A.S. in Construction Technology
Professional Registrations / Licenses / Certifications: Professional Engineer in MD and IL

Summary of Prior Experience

With 27 years of project experience including alternate procurement opportunities (Design-Build and Best Value), Greg is responsible for leading the project teams and providing management and leadership in project management & construction operations, strategic planning, project estimating, cost analysis, safety regulations, contract negotiations and client relations.

Prior to joining in 2020, Greg served as construction/regional manager for nearly 20 years with companies including Granite Construction, F.H. Paschen and Kiewit.

Select Project Experience

DDOT Design-Build Frederick Douglass Memorial Bridge, Washington, D.C.

This $440M project was to replace the structurally deficient bridge with a 1,600 foot. architecturally unique triple arch suspension bridge spanning the Anacostia River, utilizing innovative bridge design solutions and construction techniques. Work also includes reconstruction of the Suitland Parkway/I-295 interchange and reconstruction of 8 lane-miles of I-295, along with the complete demolition and replacement of three urban bridges. Significant utility coordination and relocations along with multi-phased MOT were required. On this project, Greg:

- Organized, coordinated and attended public outreach meetings
- Directly worked with local agencies and residents in order to effectively communicate and avoid all traffic, pedestrian and businesses' impacts
- Was responsible for safety and quality, contract administration, environmental compliance and QA/QC

WMATA Design-Build Redline Rehab Project in Washington, D.C.

This $194M project included rehabilitating and reconstructing eight at-grade and elevated stations, including full structural rebuild, cast in place concrete platforms, track work and architectural upgrades. Greg's role on the project included:

- Managing the design and construction
- All aspects of safety, quality, cost, schedule, equipment and craft resource management
- Managing the entire field staff of superintendents and field engineers

MDOT SHA Design-Build ICC Contract B in Montgomery County, Maryland

This $547M project consisted of approximately seven miles of new controlled access six-lane highway. Rich in wetlands, streams and other natural features, the area traversed by Contract B is considered the most environmentally sensitive stretch of the 18-mile ICC. Contract B included construction of five new bridges that carry the highway through the sensitive parks. These bridges were designed and constructed to minimize the footprint of the highway, avoiding and reducing impacts to resources within the parks.

Foundations for these bridge piers were deep large diameter drilled shafts. Abutments were H-pile founded. Superstructure main support members were 95" Concrete Bulb Tee Beams with lengths to 165'. Five additional bridges were built to carry state and local roads over the ICC. These bridges were designed to be signature aesthetically pleasing structures. Greg's role on the project included:

- Managing the design and construction of ten bridges and large underground precast water filtration vaults
- Managing the project in all aspects of safety, quality, cost, schedule, equipment and craft resource management
- Managing the entire field staff of superintendents and field engineers

Chicago Transit Authority O'Hare Blue Line Ties, Chicago, Illinois

This $101M project was for the rehabilitation/replacement of 106,000 track-feet of light rail system, replacing 4,700 direct fix tunnel fasteners adjacent to operating O'Hare station platforms. The project included the installation of 20,000 anchor bolts in a 12-day period working 24/7 in tunnel environment, as well as the upgrading of signal systems and a power transmission system to meet current rail standards. This complex, high-risk project was schedule critical with high weekly LD's. Work was completed between inbound-outbound lanes of Kennedy Expressway (I-90) with 32 phases performed weekends and nights in multiple locations. Provided significant coordination with the CTA, Illinois DOT, City of Chicago and O'Hare Airport Operations. Greg's role on the project included:

- Providing start-up planning, scheduling, execution, budgeting, contract administration
- Managing construction of at-grade and tunnel track work

BRIDGING PENNSYLVANIA PARTNERS

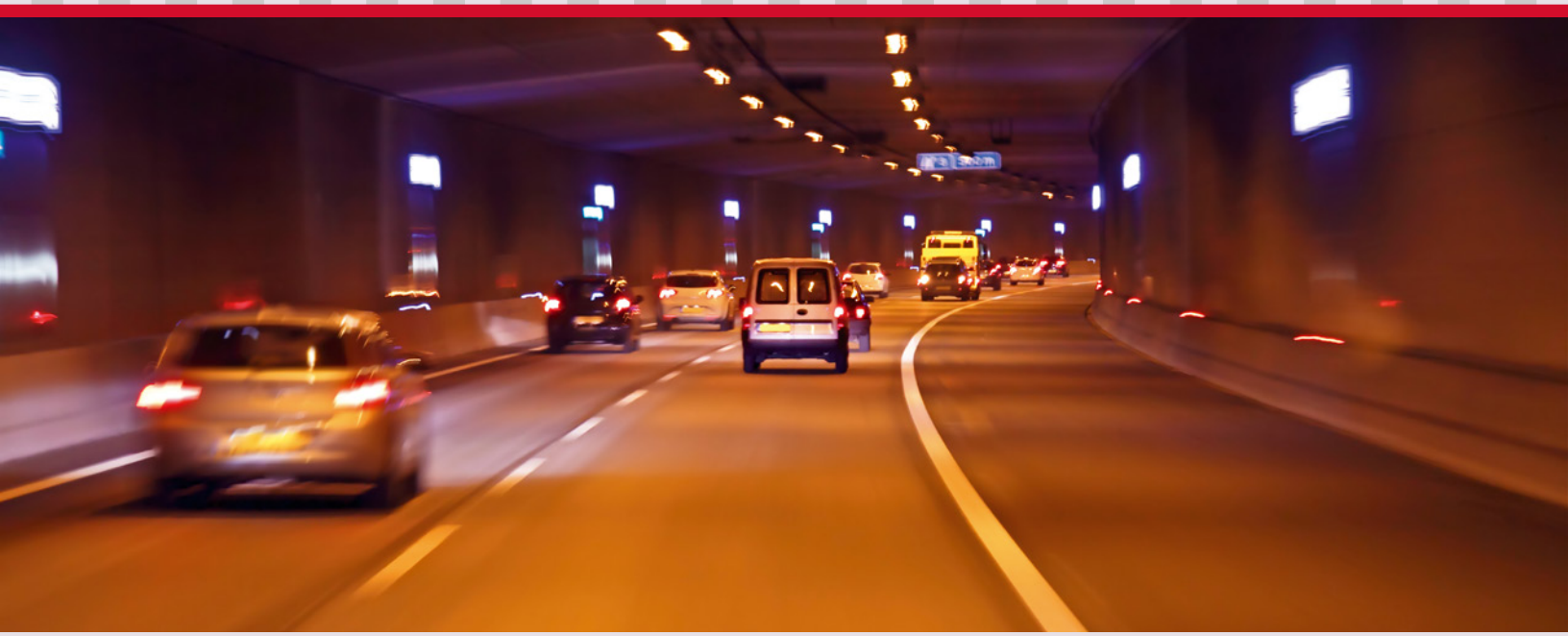
Volume II Technical Proposal

Section 2

Appendix 5, 3.2

PDA Work Criteria

Approach to D&C Work Pricing and Maintenance Work Pricing for Packages



A24 Blankenburg Tunnel, Netherlands
Macquarie

4.6.1(d) Approach to D&C Work Pricing and Maintenance Work Pricing for Packages

Bridging Pennsylvania Partners (BPP) will work with PennDOT to develop the most suitable, efficient and fully wrapped technical solution for each Package. We will balance design, construction, maintenance, renewal and financing considerations on a whole-of-Project basis and achieve the best possible value to the Commonwealth and Pennsylvania travelers. BPP will work with PennDOT through a transparent, collaborative and open-book process to develop and agree to the D&C and Maintenance Cost pricings for each Package. Our Project cost will be reasonable, documented, certain and acceptable to all parties, considering the final risk allocation on the Project.

4.6.1(d)(i) APPROACH TO D&C WORK PRICING

BPP is uniquely positioned to deliver a transparent, comprehensive, thorough, and affordable D&C Cost for each Package, in part due to our extensive local construction market knowledge, our relationships with the craft unions, and our ability to hedge volatile commodity prices.

Collectively, BPP and its partners have successfully completed over 500 projects worth over $4B in the Commonwealth over the past 20 years. BPP will draw upon the strong experience and lessons learned by its personnel, team and local Nominated Contractors - Joseph B. Fay, H&K, Wagman, and Kokosing. They will review designs for feasibility and constructibility, analyze alternatives, plan construction means and methods and develop detailed and accurate cost estimates and schedules.

4.6.1(d)(i)(a) D&C COSTING MODEL

Due to the unique composition of its team, BPP is geared to simultaneously undertake major de-risking activities (including studies and site investigations), advance design on all Bridges included in the First Package from day-one of the Pre-Development Phase, and work with PennDOT to build a transparent D&C Costing Model informed by competitively solicited and provided pricing elements.

During the RFP Stage, BPP has produced green sheet pricing for each Bridge by leveraging BPP and local subcontractors' knowledge of local conditions and jurisdictional requirements, as well as the information provided in the RIDs. Our preliminary pricing for each Bridge accounts for: market pricing and local inputs, appropriate contingency to account for level of design and potential variance in future market pricing and labor rates, reasonable utility assumptions through preliminary mapping of utilities to identify potential conflicts for avoidance where possible and margin, general conditions, and design costs that reflect the current heavy civil construction market.

Building upon the outputs from the progression of the PDA Work, BPP will prepare a first draft of the D&C Costing Model within the first 30 days of the Pre-Development Phase for the First Package, which we will update continuously for all elements, risks and assumptions related to the D&C Work up to submission of the final version with the Technical Package Proposal for that Package. BPP will prepare the D&C Costing Model using Microsoft Excel, which will provide accessibility and readability to PennDOT. The Costing Model will follow the recommendations and procedures outlined in the PennDOT Estimating Manual that are relevant and practical in the context of a design-build rather than a design-bid-build.

The D&C Costing Model will also outline the D&C General Conditions and D&C Mark-up costs, the dollar values of which will be derived from the application of the D&C General Conditions Cost and the D&C Mark-up Percentages identified in our Financial Proposal, consistent with the calculation and definitions presented in the ITP.

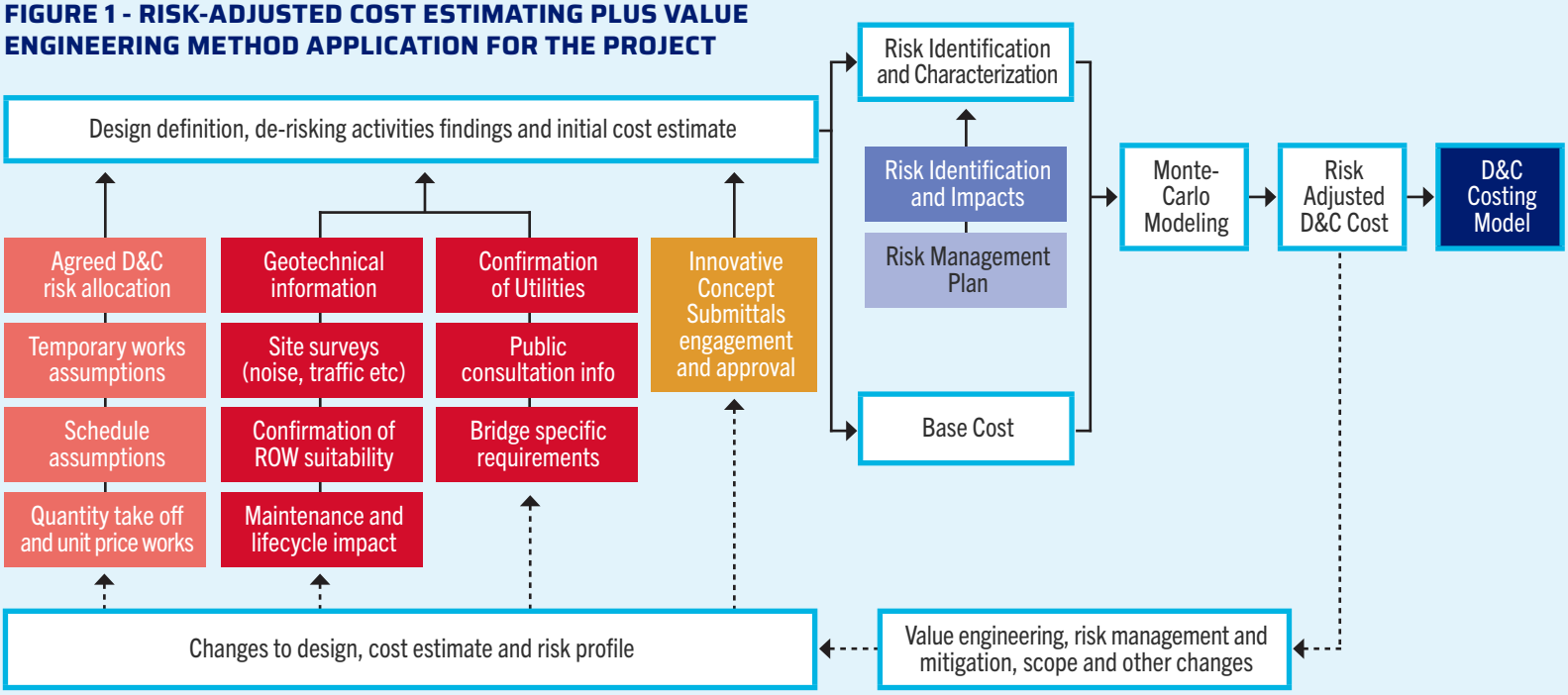
4.6.1(d)(i)(b) RISK-BASED COST AND VALUE ENGINEERING PRICING METHODOLOGY

BPP's D&C Costing Model will be developed to meet the requirements of Section 12 of the PDA Work Requirements and be based on a risk-adjusted cost estimating plus value engineering (RCE+VE) process, as illustrated in Figure 1.

This approach will combine the construction industry standard of quantity take-off and unit rate price validation procedures plus value engineering, along with a robust quantitative risk analysis.

> Quantity Take Off: BPP will develop an independent base price using the "quantity take off" method, which will produce a detailed direct cost price based on estimated quantities and unit rate prices for the activities required

FIGURE 1 - RISK-ADJUSTED COST ESTIMATING PLUS VALUE ENGINEERING METHOD APPLICATION FOR THE PROJECT



to produce the work. Independent quantities will be established for main direct-cost, or D-group categories of work to be performed. Categories will be further broken down into sub-categories, in a similar fashion to line or pay items typically included in construction project bid sheets.

> Unit Rate Price: Unit rate prices will be determined on the basis of historical production rates observed on similar projects across Pennsylvania adjusted for location, access conditions, labor considerations, inflation, and other considerations unique to that specific Bridge such as temporary work (MOT, falsework and dewatering) and waste. Detailed calculations may also be performed to determine unit prices in some circumstances that will be shared with PennDOT upon request.

> Risk Analysis and Contingency: Pricing of contingencies will be dependent on the level of design development and the understanding and management of each Bridge and Package's associated risks. It will evolve over time and be refined through progression of the PDA Work and de-risking of the Package up to finalization and submission of the Technical Package Proposal. In developing its D&C Cost pricing, BPP will undertake various Microsoft Excel-based Monte-Carlo simulations to assess the cost and delay impact that each identified Bridge and Package's risks could have should they materialize. This is based on each risk's probability of occurrence, severity of impact, and consideration of all available mitigants. The simulations' outputs will be used to facilitate overall contingency planning, understanding of uncertainty and variability, and to ultimately generate a likely range of costs and schedule for the Package. The total amount of contingency included in the D&C Costing Model will be sized to mitigate and partially cover a combination of impacts arising from potential risk events retained by the Development Entity and D&C Contractor for that Package. From our preliminary risk assessment, we are confident that we have identified the key risks for each Package, and based on our understanding of these risks and our unique knowledge of the local conditions, we anticipate these contingencies to be within market ranges (see Section 4.6.2(c) - Preliminary Versions of PDA Work Submittals for the First Package for preliminary risk matrix and Figure 2 for illustration of the Monte-Carlo analysis).

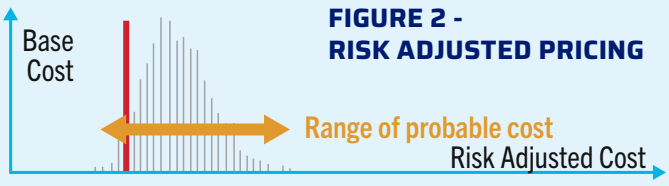


FIGURE 2 - RISK ADJUSTED PRICING

4.6.1(d)(i)(c) COLLABORATIVE COSTING PROCESS AND DETERMINATION

The D&C Costing Model's level of detail will evolve to a high level of granularity as the PDA Work progresses and BPP shares, evaluates and validates the model outputs with PennDOT through an open and transparent process. In accordance with the PDA Work Requirements, the D&C Costing Model will be submitted with the Initial Package

Proposal Design, the Package Proposal Design and the Package Technical Proposal.

BPP proposes a gateway pricing process, as described below. Early in the Pre-Development Phase, PennDOT and BPP will:

- Agree if it is preferable for this gateway approach to be conducted separately for each Bridge or across categories within a Package on a combined Bridges basis for each Package. BPP anticipates that the combined Bridges approach will be the preferred basis for the First Package
- Define each open-book process "gate" which BPP will update the D&C Costing Model and pricing and provide to PennDOT, with all available supporting documentation, for review, evaluation, audit and comment
- Detail for each gate the level and format of the information that will be made available to PennDOT, including pricing documentation, calculations, risk analysis, quantifications and assumptions used to determine pricing. These may include BPP's assumptions related to schedule, composition of equipment spreads, equipment rates, productivity, estimating factors, design and productivity allowance, agreed-upon contingencies, mark-ups and risk analysis along with any other information that PennDOT may require and deem necessary to obtain FHWA approval

Based on our experience with comparable projects, we anticipate three main gates prior to Technical Proposal Submission for each Package presented in Table 1 below.

We will use this framework to ensure that all disciplines deliver the necessary information in a structured fashion. This framework will allow for effective coordination in an open environment to ensure innovation, optimization and change. The D&C Costing Model produced at each gate will iteratively inform financing, design development (including updates through further work and surveys), maintenance and lifecycle, tolling civil infrastructure, construction methodology, schedule and overall Project pricing.

We acknowledge that agreeing on the reasonableness of BPP's costs and price with PennDOT will be an iterative process through the Pre-Development Phase requiring a high degree of cooperation and communication between the teams. BPP will work collaboratively with PennDOT and its advisors to progress review, determine and validate the design work, provide supporting information and studies, develop constructibility plans and construction schedules and confirm D&C contingencies upon which the D&C Costing Model will be built. BPP will agree on strategies with PennDOT to address any affordability concerns, maximize value of the Project and manage risks through agreed reasonable contingencies and risk allocation process to deliver a successful Project. These strategies will include organizing a series of value engineering and risk sensitivity analysis workshops with PennDOT and its

TABLE 1 - PRICING REVIEW

INDICATIVE GATE	KEY ACTIVITIES
GATE 1 – INITIATION	• Agree on all information requirements of PennDOT and format of pricing, quantity tables and other reporting templates • Define scope and categories of PDA and D&C Work to be performed for the Package • Review execution plan that includes draft Baseline PDA Work Schedule, interim milestones, and site due diligence plan • Prepare a first draft of a D&C Costing Model
GATE 2 – DEVELOPMENT	• Develop the Package Technical Provisions, starting with first draft release from PennDOT post PDA Effective Date • Update the D&C Costing Model for the design development, underlying assumptions, Innovative Concept Submittals, and information from surveys, field exploration and observations, soil boring and sampling and any other Reasonable Investigations in order to improve value to the Commonwealth across maintenance, operational, financing, design, and construction aspects of the Package • Approve any form of documentation and pricing template that would be required from subcontractors related to any portion of the work that is intended to be competitively solicited and priced, which should be sufficiently detailed to permit quantities, Limits of Disturbance (LOD), ROW, utility and environmental impacts, constructability issues, and risks portion of the D&C Work to be understood and validated • Approve Baseline Project Schedule and Package Proposal Design
GATE 3 - FINALIZATION	• Approve final Package Technical Provisions • Approve final update to the D&C Costing Model following development of detailed preferred solution and based on mutually agreed quantities, units of measurement, price reconciliation, and contingency approved by PennDOT

advisors to jointly discuss BPP's calculations of quantities used, unit rate prices and risks associated with each Bridge, and how best to mitigate those risks.

As presented in Section 4.6.1(g) - Approach to PDA Reporting, BPP will provide and record minutes of the relevant workstreams and Technical Working Group meetings and on-going information on the development of its D&C Cost pricing, that will be made available to PennDOT for review and discussion outside of the formal "gate" review of the D&C Costing Model. The free-flowing and continuous update of information is intended to facilitate a transparent and collaborative costing process between the parties.

4.6.1(d)(ii) APPROACH TO MAINTENANCE WORK PRICING

BPP will self-perform the maintenance of all Bridges to provide a unified maintenance regime across the Project. BPP's approach to Maintenance Work Pricing will adhere to Section 13 of the PDA Work Requirements and will rely on a strong integration of our in-house maintenance capabilitites, which include over 20 years of maintenance work on P3 projects, 900 lane-miles of assets in operation and 250 bridges constructed. This integration ensures that BPP provides the Commonwealth with a best value solution for each Package that achieves the optimal balance between D&C upfront and Maintenance long-term costs.

BPP will also engage specialist advisors including, but not limited to, pavement and structural advisors to supplement our in-house team. They will review designs, routine maintenance schedules, handback requirements, and major maintenance interventions. These experts will ensure that critical elements like pavement design are optimized to ensure compliance with the KPIs over the concession term while minimizing the number of interventions that are required. This approach will also ensure that maintenance considerations, like bridge bearing locations, are optimized to facilitate maintenance interventions, which will result in enhanced user experience and best value for the Commonwealth.

After ensuring that maintenance and rehabilitation concerns are appropriately considered in each Bridge's design, BPP's Maintenance workstream will collaborate with the Design and Construction workstream to develop quantity transfer sheets that will enable easy coordination between the D&C and Maintenance Costing Models. Concurrently, our Maintenance workstream will develop a schedule of routine and major maintenance interventions will ensure that the that the Bridges are operated in accordance with the KPIs. These quantities and work cycle schedules that will be linked to unit rate prices to determine the lifecycle cost of a given maintenance intervention and presented in the Maintenance Costing Model.

The Maintenance Costing Model will also identify the Maintenance Work General Conditions Cost, which will be capped at the amount derived from applying the Maintenance General Conditions Cost Percentage identified in our Proposal to the Maintenance Cost. This will be consistent with the calculation and definitions presented in the ITP. Any risk items in the quantities, KPIs, technical standards, and General Conditions will have a risk contingency allocated to a specific line item, calculated based on a series of iterative Monte-Carlo simulations, comparable to the process used for the D&C Costing Model. Monte-Carlo simulations will also be used to model potential availability and present performance KPI deductions in scenarios presenting good, average and sub-optimal maintenance contractors of the Bridges in order to assess potential impacts to the indexed portion of the Availability Payment.

All of these elements, including Base Maintenance Costs, General Conditions and contingency will be combined into a comprehensive Maintenance Costing Model built in Microsoft Excel. This model will be continuously updated with the progress of the PDA Work until submission of its final version as part of the Technical Package Proposal for each Package. The initial draft of the Maintenance Costing Model will be provided with the Initial Package Proposal Design. A similar methodology to the D&C Costing Model will be used for the development and finalization of the Maintenance Costing Model, using defined gateways between PennDOT and BPP.

BPP's local approach, experience with comparable projects and long-term presence in the area will support accurate pricing for future lifecycle optimizations and interventions, thereby further achieving best value for the Commonwealth. In developing the maintenance solution, BPP will look at ways to maximize value to PennDOT by leveraging its maintenance services to expand the maintenance scope where beneficial to the Commonwealth. This could apply for example to surrounding assets of the Bridges. BPP will detail this analysis in the Maintenance Costing Model prepared at each gateway.

BRIDGING PENNSYLVANIA PARTNERS

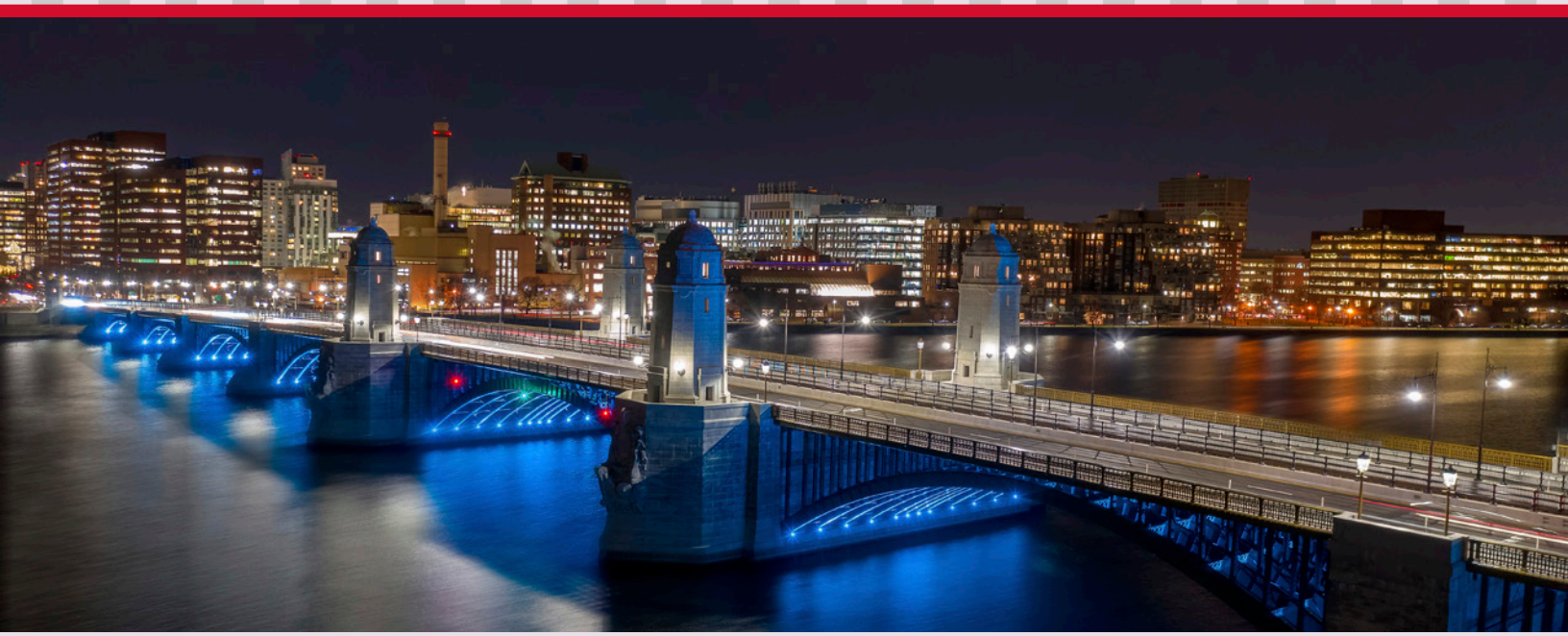
Volume I Technical Proposal

Section 2

Appendix 5, 3.2

PDA Work Criteria

Approach to PDA Partnering and Collaboration



Longfellow Bridge Rehabilitation, Massachusetts
STV

4.6.1(e) Approach to PDA Partnering and Collaboration

BRIDGING PENNSYLVANIA PARTNERS

4.6.1(e)(i) BPP PDA PARTNERING APPROACH AND BENEFITS

Bridging Pennsylvania Partners (BPP) will be a true partner to PennDOT across all Project Phases, from selection as Best Apparent Value Proposer to handback of the assets. BPP believes that true partnership is based upon mutual understanding by all parties of the long-term goals for the Project and proactive alignment of interests into a shared vision of success. BPP's proposed partnering approach is tailored to achieve these underlying objectives, acknowledging that efficiency from day-one will be necessary for the Project to be successful. This approach is essential given the short timeframes BPP and PennDOT will be working under to deliver the First Package. Our approach is based on four key principles, outlined below:

1. **Integration and Collaboration:** BPP will promote cross-expertise, collaboration, and integration of disciplines
2. **Continuity and Empowerment of Personnel:** BPP will implement a clear governance framework and vetted lines of responsibility across each functions, managed by empowered personnel, to streamline decisions-making and issues resolution
3. **Alignment and Open Communication:** BPP will maintain transparent interfaces and open lines of communication with PennDOT to facilitate consensus-driven decisions
4. **Proactive Stakeholder Engagement:** BPP will engage with all stakeholders and approval agencies, early and systematically, to address each party's specific needs, processes and requirements and preempt any issues or delays to the Project they may cause

4.6.1(e)(i)(a) INTEGRATION AND COLLABORATION

BPP is organized into functional workstreams, which roles and responsibilities are detailed in our response to Section 4.6.1(c) – Preliminary PDA Organization. These workstreams are integrated through Technical Working Groups (TWGs), pairing representatives from construction, design, maintenance and other subject matter experts to expedite resolution of issues, enhance plan development and improve coordination. This organizational approach is derived from a risk mitigation strategy that was started during the RFP Phase and that will continue during the Pre-Development Phase and through the delivery of each Package. This structure purposefully requires cross-collaboration between functions to ensure all elements of the PDA Work are coordinated, all parties apply a whole-of and best-for Project approach in progressing activities, and that the integration risk arising from a more siloed approach is reduced.

While the TWGs have been created to meet the specific needs of the Project, starting with the development of the First Package Proposal, they can be customized over time to best fit the needs of each Project Phase. The TWGs may be adapted to PennDOT's organization to provide clear points of contact and accountability for each PennDOT function and to integrate with the interfaces already contemplated in the PDA Work Requirements.

PennDOT's participation in the TWGs will facilitate free flow of information, support quick and efficient decision-making and foster a "one-team" culture between the parties and across all functions. BPP will onboard its partners, including contractors and participating DBE firms, to the appropriate TWGs upon selection. The TWGs will serve as primary forums in which BPP integrates all its specialist consultants, subcontractors, suppliers and other key Project stakeholders. BPP will require the same level of cooperation and engagement from all of its partners.

The integration of the different workstreams through the TWGs provides diverse perspectives on issues, which allows for risks to be more quickly identified, prioritized and addressed. From a Project-wide, long-term, and sustainable perspective, using this structure, BPP will be able to optimize scope, incorporate innovations and develop a robust risk management approach for each Bridge and Package of the Project.

4.6.1(e)(i)(b) CONTINUITY AND EMPOWERMENT OF PERSONNEL

BPP's workstreams comprise over 60 staff working on the Project, of which the majority is local to the Project. The BPP Project team lives and works in the Project area, interfaces with Pennsylvania agencies and counties and already serves the local traveling public and community. Collectively the BPP team has worked in all districts and has over 2,300 employees based in Pennsylvania. These personal and professional experiences give BPP an unmatched understanding of the complexity of Pennsylvania's requirements, goals, political priorities and local regulations.

As further detailed in Section 4.6.1(c) – Preliminary PDA Organization, BPP's organizational structure for the Pre-Development Phase relies on defined workstreams, with clear objectives, roles and responsibilities, tailored for the Project. BPP's Leadership and Management Team will remain the same through delivery of each Package, with the team being supplemented over time to meet anticipated requirements. The clear reporting lines up to BPP's Project Manager foster empowerment and accountability at every level with decision-makers being local and dedicated to the Project. This approach provides direct lines of communication with PennDOT at each functional level to ensure that activities are progressed quickly and efficiently and issues are being assessed in real time by all parties. This approach will also facilitate direct interactions between BPP and PennDOT. It ensures that no individual can unnecessarily and involuntarily act as a blockage and hinder progress of the PDA Work, while maintaining accountability for the PDA Work.

While the leadership responsibilities may shift across the various Project Phases, our systematic approach to staffing **provides continuity of key individuals that will build up Project knowledge and trusting relationships over time with PennDOT.** Continuity is an essential element of our partnering and delivery approach for the Project.

4.6.1(e)(i)(c) ALIGNMENT AND OPEN COMMUNICATION

Based on lessons learned from the successful delivery of past projects across Pennsylvania and a selection of large infrastructure projects globally, BPP strongly believes that Project success is highly dependent on the parties identifying and agreeing Project objectives toward which they will jointly work.

BPP acknowledges that the definition of Project success might differ for each Project stakeholder. Early **understanding of what success means for each party and mutually agreeing to its definition will be key to ensuring that all parties are incentivized to work toward consensus-driven decisions with the right amount of urgency.**

The parties will need to frequently and regularly assess their progress toward these mutual goals, via constant, open and transparent communication, through a set of interface methods and forums, outlined below:

- **Establish a Kick-Off Meeting:** To be organized within 2 weeks of selection as Best Apparent Value Proposer, between PennDOT and BPP's Project teams and senior leadership. This meeting will be the first face-to-face meeting between the parties and serve to: confirm understanding of the goals and objectives and define success for the Project, agree on the key interfaces, communication and data sharing protocols, including the development of a Project Management Plan that clearly outlines roles and responsibilities of all team members and identify potential areas of concerns and a resolution ladder between workstreams and BPP Project Management and Leadership Teams. During this meeting, BPP and PennDOT will also establish the risk and opportunity register that will be developed and updated on an ongoing basis during the Pre-Development Phase as part of the overall Risk Management Plan
- **Utilize Collaboration Workshops:** To be organized at least every two months, post Kick-Off Meeting up to closing of the last Package, between BPP Senior Executive Leadership, Leadership and Management Teams and Management Teams of each party and their PennDOT counterparts. These workshops will be facilitated by third-party partnering professional and serve to: discuss and attempt to resolve blockage points and areas of concern related to work progress or team dynamics with a focused group of decision makers prior to any escalation to the Steering Committee, define top-down messaging to be communicated to the Project team and ensure that team expectations and behaviors are set toward a common goal of delivering a successful Project. Macquarie has been successfully using these sessions for the development of Op Lanes Maryland with the Maryland Department of Transportation, which has helped ensure that all parties remain focused on achieving common goals for the Project within the set deadlines and maintaining the right level of urgency by all parties
- **Utilize Design Field View Submissions:** To review and evaluate preliminary design and engineering commitments (PIF/NEPA) under field conditions with the involvement of PennDOT district units, central office and other stakeholders to review comments, reach consensus on critical issues, approve a final design

for development and identify aspects of the Project requiring special attention in final design development

- **Utilize a Single Project Document Management System:** to be in place before the PDA Work fully commences for document management and as a conduit for information sharing from Project onset.

These forums are to be considered in addition to the reporting, meeting and data sharing requirements that are set out in the PDA Work Requirements. As further detailed in Section 4.6.1(g) – Approach to PDA Reporting, BPP already has established a preliminary schedule for these recurring meetings, to be presented and reviewed with PennDOT during the Kick-Off Meeting. Together, these interface forums will act as an invaluable foundation for success, continually exceeding the expectations of all parties and creating an atmosphere of trust and collaboration.

BPP will also favor face-to-face interactions at any time and has already identified a main project office (currently an STV office) in Harrisburg, 6.5 miles away from PennDOT's office, where most of BPP's team will be co-located. The office is set up to accommodate any meeting with PennDOT, its consultants and advisors and any other Project stakeholders. We also have identified satellite offices in the vicinity of each Bridge, which will be used to host targeted activities, such as local stakeholders' engagement, community and DBE outreach.

4.6.1(e)(i)(d) PROACTIVE STAKEHOLDERS ENGAGEMENT

BPP's proven reputation as a reliable partner and track record of solving problems and sticking to objectives for each project pursued has been demonstrated regionally, and globally. BPP is an expert at proactively engaging and managing stakeholders, having successfully navigated community concerns through predevelopment, planning, design, approvals and delivery of various projects. BPP will find creative solutions and work collaboratively with all partners to provide the kind of resilience that governments and communities need and expect. For example, on the Fargo-Moorhead Metropolitan Area Flood Diversion Project, BPP's Equity Member, SBC, demonstrated resilience and a willingness to invest significant development costs at risk (and electing to support the project while other developers and contractors withdrew) and worked with project's stakeholders through extensive outreach during a procurement that spanned over 5 years. This allowed them to reach financial close in a two-month period after selected preferred proposer and keep the project on track to provide flood protection by the spring of 2027 despite the procurement delay.

BPP strongly believes that proactively spending the time and resources necessary to **create stakeholder and community buy-in is critical to the success of this Project.** BPP's partnering approach with PennDOT will extend to all local stakeholders, with whom BPP's members have been establishing trust-based relationships for decades. BPP will engage early and continuously with all local stakeholders through a comprehensive public and stakeholder outreach program to identify and address any specific concerns and requirements, and work with PennDOT to make commensurate adjustments to the scope of the Project.

4.6.1(e)(ii) POTENTIAL RISKS OF BPP'S PROPOSED PARTNERING APPROACH

BPP's approach assumes that all stakeholders involved in the Project will embrace a "one-team" culture and the key principles outlined above. Untenable negotiation position, accentuated by an "us" v. "them" approach, is a main risks for the Project and the First Package more specifically, given the short timeframe avaiilable to reach Financial Close. Given the compressed timeframes all parties will have to deliver a compliant First Package Proposal by September 7, 2022, both parties will need to share a high level of urgency in progressing the PDA Work, ensure progression of activities, real-time integration of functions and efficient decision-making process is effective from day-one.

This will be best achieved if all parties are willing and able to rely on direct, and sometime informal, communications and interactions in addition to the formally agreed set of interface methods between them. Ensuring access to the right participants and decisions makers in this forum will be key in order to avoid duplication of tasks and meetings, unnecessary rework of critical activitites and ensure agreed upon milestones and deadlines are met. BPP has tailored its approach to encourage a strong, collaborative "one-team" environment that it believes is necessary for early effective partnership, but it acknowledges that constant effort from all parties, at every staff level, will be required to maintain common goals as guiding principles during the Pre-Development Phase.

4.6.1(e)(iii) ILLUSTRATIVE EXAMPLES AND LESSONS LEARNED

BPP's partnering approach provides PennDOT with clear and real-time insight as to the Project development status, risks and opportunities, through daily interaction, participation, and transparency. BPP's approach directly leverages its experience developing similar projects, lessons learned and best practices, as illustrated by the two US project examples presented below.

Lessons Learned and Application to the Project:

This project demonstrates best practices in the development, risk management and execution of innovative, equity-backed solutions of complexity and strong experience in balancing rapidly evolving stakeholder and geopolitical priorities with the financial and organizational discipline required to safeguard project viability and delivery certainty. **BPP will apply these lessons to the Project management, kicking off the partnership by defining what success looks like to all parties, ensuring that each party works toward a clearly defined common goal, with accountability for achieving it.**

ELIZABETH RIVER TUNNELS (ERT)

In 2011, Macquarie and its partners entered into a predevelopment framework with the Commonwealth of Virginia to develop a financially feasible project that met the transportation needs of the region, balancing three competing objectives: toll affordability – as the new tunnel would serve as a critical connection to one of Virginia's most disadvantaged, minority communities, project costs – that would accommodate a new immersed tunnel tube under the Elizabeth River and complex interfaces with sensitive US Navy sites and resilience – the region's three existing, aging tunnels had more than $50M in deferred maintenance and required repair. The partners agreed to a 58-year P3 concession and tolling strategy with higher-than-usual escalation to keep initial pricing low through construction and support $2.1B of project costs, optimized through the selection of an immersed tunnel methodology that had not yet been attempted in the US. **This allowed the project to proceed on a viable financial footing and demonstrated Macquarie's credentials in assessing, backing and managing complex construction risk.**

After starting construction, challenges arose from a change in Virginia's political leadership and concerns over the toll rates underpinning the project's financial viability. **Macquarie, working with the Virginia Department of Transportation (VDOT) and key stakeholders, identified and evaluated numerous alternative structures while always safeguarding project certainty and viability.** Ultimately, the parties agreed to a modified tolling approach with public contributions to offset lost revenue. **Macquarie and its partners invested in an intensified stakeholder outreach and community program,** including scholarships for local students, toll relief for low-income families, community grants and a hiring and contracting policy that led to outperformance of the project's DBE goals. The project's headquarters was also placed in the most economically distressed area of the region to spur local job creation and growth.

Challenges also arose from unplanned turnover of VDOT's project leadership personnel during delivery. The teams worked together to prevent disruption with the developer bringing in its most experienced construction executives to lead delivery and establishing escalation protocols **to ensure high levels of transparency and engagement at multiple levels.** Combined, these measures contributed to the successful and safe completion of the project 11 months ahead of schedule – with Macquarie's collaborative, disciplined approach helping to protect project benefits such as over $1B of construction work for local companies, 200 permanent jobs and 1,500 jobs through delivery.

SH 288 TOLL LANES PROJECT

The SH288 Toll Lanes project, procured by the Texas Department of Transportation (TxDOT), consists of the construction of two additional tolled lanes per direction along a 10-mile segment of Houston's third most congested roadway, SH288, which accommodates daily traffic volumes of between 150,000 to 170,000 vehicles. In addition to the toll lanes, the project includes the construction of 16 new flyover ramps, 2 major interchanges, new direct connectors, road widening and reconstruction, 25,000 linear feet of retaining and noise wall and the relocation of utilities. Shikun & Binui is a joint lead equity investor of the concessionaire, and the D&C contractor.

While successful, the project faced challenges including some difficulties with utility relocations, impacts and disruptions from intense weather events and the introduction of several changes to the project scope by TxDOT. Despite these, TxDOT and the concessionaire were able to successfully deal with these issues due to the strength of their relationship and joint commitment to ensure the project was delivered with limited impact. The parties worked collaboratively to overcome these challenges and agreed a revised delivery schedule for both the original construction work and additional scope, which greatly mitigated any costs of delay. **Effective project management and constant collaboration between the key parties resulted in the project commencing tolling operations in 2020 without any formal disputes, achieved by issues being handled through senior management escalation.**

Shikun & Binui also worked closely with the State of Texas on proactive and robust transition planning to operations which, following completion, has seen traffic volumes in line or in excess of expectations. **The parties understood the challenges of transition to operations early and began planning and coordinating for the road opening and commencement of tolling over one year prior to the anticipated opening date, including interagency coordination, customer education and pre-operations planning.** Opening plans were closely coordinated between TxDOT and the concessionaire, law enforcement and other transportation and community partners to ensure a smooth and safe opening, including through extensive testing of the end-to-end system, which was critical to verifying the accuracy and reliability of revenue collection and enforcement activities, as well as ensuring a positive experience for toll-paying customers.

Shikun & Binui has worked very closely with TxDOT and all local stakeholders to minimize disruption to the local community caused by the traffic closures, including constructing and installing emergency repairs and temporary works and waiving tolls on a portion of the toll lanes.

Lessons Learned and Application to the Project:

BPP understands that a strong relationship between the owner, the concessionaire and other key stakeholders helps mitigate the impacts of unforeseen issues, caused by external factors, such as delays in utility relocations or disruption from natural disasters.

Proactive, early and robust planning is critical to transition from each project phase efficiently. In this situation the two years of planning helped ensured that there were no issues during the start-up of tolling operations. BPP will apply the same approach to collaborate with PennDOT.

Regardless of risk allocation, BPP also understands that there are some risks that need to be closely managed by all parties to avoid reputational damage and potential economic impacts. In particular, the upfront consideration of ground conditions, the employment of a robust risk management framework and the availability of properly-sized contingencies will provide tangible benefits and flexibility in dealing with risk outcomes satisfactorily. **BPP will ensure that these de-risking activities are prioritized, applying a whole-of and best-for project approach to the PDA Work.**

BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 2 PDA Work Criteria

Appendix 5, 3.2 Preliminary PDA Quality Management Plan

Carmel Tunnels Toll Concession, Israel
Shikun & Binui

4.6.1(f) Preliminary PDA Quality Management Plan

BRIDGING PENNSYLVANIA PARTNERS

BPP's preliminary PDA Quality Management Plan (QMP), outlining how BPP will provide quality assurance and quality control during the Pre-Development Phase is included in Appendix 1.

4.6.1(F)(I) LOCAL INDEPENDENT QUALITY FIRM

4.6.1(f)(i)(a) SAI EXPERTISE

BPP's PDA QMP will be led by SAI, a Pennsylvania-based Independent Quality Firm (IQF) who will oversee all quality assurance aspects of the PDA Work while remaining independent from their delivery. SAI is a leader in implementing quality assurance programs for transportation design and construction management. SAI has provided government and private sector clients with accurate and reliable design and construction engineering services in a variety of roles for nearly 60 years. SAI has acted as owner's engineer and design manager in charge of ensuring design quality and compliance with local and federal requirements across the transportation sector.

4.6.1(f)(i)(b) LOCAL EXPERIENCE

SAI has successfully completed work on many projects in the Commonwealth with headquarters in Pittsburgh and several regional offices across Pennsylvania, including within close proximity of PennDOT's office in Harrisburg and of all nine Bridges of the Program (see Figure 1).

SAI has executed over 200 projects across the Commonwealth and will leverage their experiences and strong relationship with PennDOT and PTC on this Program. SAI worked has on various projects with PennDOT, including providing reviews on the Rapid Bridge Re-placement Program. SAI has also completed Level 1 quality reviews for multiple PennDOT projects in-cluding the Freeport Bridge Rehabilitation, South Junction Interchange and four structures for the SR 6219 Section 020. SAI has also been selected to complete Minor Projects Design Procedures (MPDP) on projects such as SR 711 over Tubmill Creek (SR0711 Sec 03M) and Great Trough (SR0913 Section 01B). Per the PennDOT MPDP process, SAI verifies that internal quality procedures are followed and there is minimal oversight from the Department.

In addition, SAI acted as design manager on four projects with PTC (MP 31 to 38, MP 67 to 75, MP 199 to 227, and A38 to A44 with PTC). On these projects, SAI was responsible to ensure that the design consultants stayed on schedule for the setting dates and to provide detailed reviews of the consultants' design to confirm compliance with PTC Design Consistency Guidelines as well as PennDOT, AASHTO and other governing standards. These reviews included Type, Size & Location (TS&L), Hydrologic and Hydraulic reports, foundation submissions and final structure plans of culvert, bridges, retaining walls and noise walls as Line/Grade/Typical Section development, traffic control plans, drainage/Storm Water Management design, signing and pavement marking plans, erosion and sedimentation control plans, permitting and agency coordination and traffic studies for interchange and side road improvements.

FIGURE 1 - SAI LOCATIONS

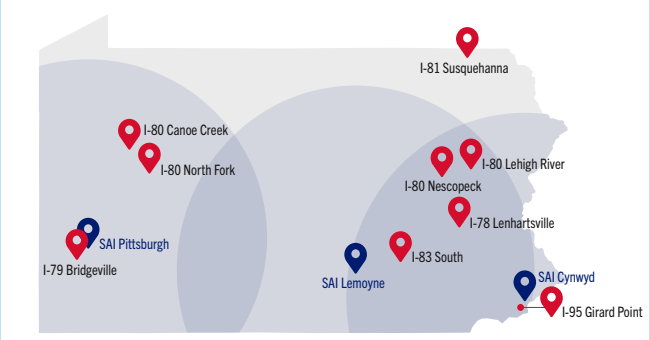
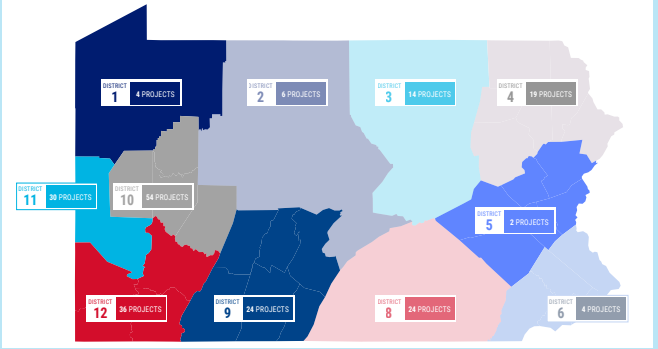


FIGURE 2 - SAI PROJECTS ACROSS PA



SAI's ability to develop unique solutions to projects with high quality is evidenced by winning awards for major bridge structures including the ABCD Pittsburgh 2018 Outstanding New Major Bridge Replacement over the Mahoning Creek, Buffalo and Pittsburgh Railroad and the Mahoning Shadow Trail on a new alignment in Jefferson County, Pennsylvania. The new bridge is an 810' four-span steel haunched (weathering steel) multi-girder bridge. SAI's alternate design of the CSVT Bridge over the West Branch of the Susquehanna is a 4545' multi-steel girder structure is also currently submitted for multiple awards both locally and nationally.

4.6.1(f)(ii) QUALITY MANAGEMENT PLAN

During the Pre- Development Phase, BPP will develop and submit to PennDOT a PDA QMP, consistent with ISO 9001 and 14001 standards for quality and environmental management systems. Our PDA QMP will meet the guidelines included in the PDA Work Requirements and will provide a tailored approach to quality that is consistent with PennDOT's expectations for major and bridge projects.

Over the course of the Pre-Development Phase, SAI will work with PennDOT to develop the requirements for various QMP for the Pre-Development, delivery and maintenance phases of the Project through series of workshops. The Plans will include the PDA QMP (including the PDA Design Quality Management Plan (DQMP)), the Construction Quality Management Plan (CQMP) and the Maintenance Quality Management Plan (MQMP). The PDA QMP will cover all activities that pertain to the PDA Work Requirements and include:

- A glossary of defined terms for the Project to facilitate clear communication and understanding between all parties involved
- Defined quality control procedures to be utilized to verify, check and review the quality of the PDA Work (including the quality and accuracy of data)
- Defined quality assurance procedures for the design work to confirm that the quality control procedures are being appropriately followed
- Quality-related Key Personnel
- An organizational chart for the Pre-Development Phase, which we will be always kept up to date. This will ensure understanding of the responsible parties with their expectations
- A detailed description of the roles and responsibilities for each party
- A Design Quality Management Plan

4.6.1(f)(ii)(a) PDA QUALITY RELATED KEY PERSONNEL

SAI's senior quality assurance personnel outlined in Table 1 below will be in charge of implementing the PDA QMP within BPP.

TABLE 1 - PDA QMP PERSONNEL

ROLE	PERSONNEL	EXPERIENCE
QUALITY ASSURANCE MANAGER (QAM)	Ray Henney	30+ years of experience in design-build projects including long span steel bridges and several projects working in partnership with Fay. Ray was the Engineer of Record on the I-90 over Six Mile Creek and Charleroi Monessen design-build projects as well as the CSVT Susquehanna River Bridge alternate bridge design
DESIGN QUALITY MANAGER (DQAM)	Jason DeFlitch	20+ years of progressive experience in major bridges including Engineer of Record for the Margiotti Bridge project previously mentioned. Jason also has experience on Level 1 reviews via the South Junction Interchange and SR 6219 Section 020. His experience working on P3 projects includes reviews on Rapid Bridge Replacement Program and design on I-4 Ultimate Project in Florida
CONSTRUCTION QUALITY CONTROL MANAGER (CQCM)	Brian Schull	30+ years of construction management and inspection experience on heavy highway and structures projects. Brian is familiar with all phases of the construction process from preliminary design review and value engineering studies through construction, commissioning, and closeout. He developed and implemented SAI's corporate Construction Department Quality Control Plan

BPP's QAM will report directly to the BPP's Project Manager, coordinate with PennDOT as needed and owe a duty of care to both the PDA Entity and PennDOT. Each responsible party in the organizational chart will be verified by the QAM to meet the minimum requirements set forth in PDA Work Requirement.

SAI personnel will also train all BPP required staff to ensure that the PDA QMP is understood and followed as intended. These trainings will start soon after execution of the PDA and continue incrementally throughout the Pre-Development Phase to train any new hires on the Project or to educate existing staff on major changes included in the PDA QMP. Post training, the staff will be certified to work on the Program and a record of all certified staff will be maintained up to date at all times.

4.6.1(f)(ii)(a) PDA QUALITY ROLES AND RESPONSIBILITIES

The roles and responsibilities for each party during the Pre-Development Phase and for all design activities are outlined in Table 2 below. Once the guidelines for the Construction QMP are provided a similar table describing roles and responsibilities will be developed for the construction activities of the Project. Some of the roles relevant to the construction phase of each Package will also have responsibilities related to the PDA Work.

TABLE 2 - KEY COMMUNICATION SCHEDULE AND PROTOCOL

PDA TASK	ENTITY	RESPONSIBILITY
QUALITY CONTROL TRAINING	SAI	Develops training program related to the PDA QMP Administers training to all design staff working on the project
MAINTAIN RECORDS OF INSPECTION, SAMPLING AND TESTING	Design Staff	Maintains records per the PDA the QMP and will perform quality audits as needed
DESIGN QUALITY CONTROL	Design Staff	Provides quality control will be provided in accordance with the provisions of the DQMP and PDA QMP
DESIGN QUALITY ASSURANCE	SAI	Performs audits to ensure the PDA Entity complies with the PDA DQMP and PDA QMP Audits include record maintenance of inspections, sampling and testing
COORDINATE AUDITS WITH PENNDOT	SAI	Coordinates PennDOT's audits and provides PDA Entity quality records. Distributes outcomes of PennDOT's audit and ensures design team follow up.
OWNER QUALITY AUDITS	PennDOT	Performs audits on PDA work including but not limited to plans, calculations, QA Forms and comment responses

4.6.1(f)(iii) DESIGN QUALITY MANAGEMENT PLAN

4.6.1(f)(iii)(a) DQMP FRAMEWORK

SAI will develop a PDA QMP that will cover all BPP entities, and SAI will prepare a PDA DQMP as part of the PDA QMP describing policies, procedures, and staffing to manage the quality of the design work performed as part of the PDA Work.

A preliminary PDA DQMP is attached to BPP's Preliminary QMP, included in Appendix 1.

The first layer of quality assurance will be the design team quality control led by the Design Quality Manager or DQM. The DQM will verify the Design Submittals for each Package to ensure these include the necessary information in accordance with the DQMP, review the submitted information for conformance with the DQMP and coordinate with the QAM, BPP Project Manager and Design Lead as needed. Any comments provided by the DQM to the Design Submittals will be addressed by BPP design workstream prior to submission to PennDOT.

The PDA Design Quality Management Plan will be consistent across all Bridges, even though the nine

Bridges of the Program do not have the same level of design progression. The DQMP will be tailored based on the level of existing design performed for each Bridge. Compliance with the DQMP will ensure that each Bridge is completed following the same design and quality process even though the submittal requirements for each Bridge may differ based on the level of advancement of each one. The PDA DQMP will include a matrix of required information to be included for each submission, including clear statement of the design intent and a checklist for all the documents that the Lead Designer and the design team has reviewed. This creates a record of all the available information for each Bridge (including NEPA, traffic control, TS&L) that has been reviewed prior to the beginning of the PDA Work.

The PDA DQMP will also state the governing criteria for each discipline working on the Project, consistent with the standards, specifications, manuals and publications included in Attachment 4 of the PDA Work Requirements. Design calculations will be required to include a checked methodology stating the appropriate governing criteria utilized. The DQM will review calculations to ensure the appropriate criteria are being utilized and verify criteria during audits.

Internally, ProjectWise will be utilized for the Project to manage sharing/distribution of files and submissions. A consistent file naming convention and folder structure will be utilized for clarity of reviews and audits. The team will be trained on file management, along with compliance in technical completion of calculations, plans and special provisions. They will be required to utilize a standard system for file storage. BPP's Design Lead will be required to sign a cover sheet to each submission confirming that the file management follows the standard format, and this cover sheet will be provided to SAI for review during project audits.

The preliminary PDA DQMP includes an appendix of sample forms and checklists to use on the Project for clarity. Where appropriate, PennDOT forms will be referenced with the appropriate location in standard PennDOT publications (e.g. structure submissions will utilize DM-4 Appendix A checklists and utility coordination will utilize standard D-4181 and D-4181-UC forms).

BPP Design team will utilize a standard meeting minutes form that will be started by the DQM, for completion after the meeting and again prior to submission, confirming that the action items were addressed.

If PennDOT notes any deficiencies with the DQMP, the QAM will coordinate with PennDOT to adjust the DQMP for compliance and provide quality assurance oversight on the design items of concern. PennDOT may suspend the PDA Work for correction of design and modification of the DQMP.

4.6.1(f)(iii)(b) DQMP QUALITY CONTROL

Quality control procedures are defined within the preliminary DQMP. A checking process will be defined including a standard color coding for comments and assessing concurrence along with a standard production check stamp. The checking process will include procedures for checking calculations and drawings. The stamp will include signature by the originator. A checker will indicate changes in red and highlight acceptance in yellow. The originator will then review the checks to provide green checkmarks or red crosses to indicate agreement or disagreement. Finally, inclusion will be indicated by green highlight and final verification by the checker will be marked in blue. This process will be followed on all documentation including calculations, plans and special provisions.

In addition, the DQMP will define acceptable computer programs consistent with PennDOT's Accepted Commercially Available or Consultant Developed Software or utilize PennDOT's standard software. The DQMP will include procedures for checking computer models and inclusion in submissions. Procedures will indicate the level of documentation to be maintained for input and output of standard PennDOT software. For other programs, such as analysis software, a cover sheet will be used to indicated portions of input and output checked and provide guidance on documentation to be included. The checking process will utilize the color-coded stamp procedures indicated above.

The DQM will review the meeting minutes of BPP and PennDOT collaboration and develop checklists as needed to ensure that the commitments made by each party at these meetings are implemented at the appropriate time of the Project. The same process will continue through

the Project Agreement term with tracking sheets for the construction, maintenance, and rehabilitation phases of each Package. This documentation will be also provided for review during project audits.

The Environmental Commitments and Mitigation Tracking System (ECMTS) will track environmental concerns throughout the Pre-Development Phase. The DQM will be required to review the ECTMS documentation for compliance during the Pre-Development Phase, and later on during delivery of each Package. This review will be evidenced by the DQM signature of a cover sheet. The cover sheet will be included with the submission and provided for review during project audits.

During the Pre-Development Phase, BPP will consider the implementation of the District Preferences contained in the PennDOT ECMS File Cabinet. This will be evidenced in each submission by the usage of the preference documents as a checklist. This checklist will be initiated by the originator and checker following the color-coded quality control procedures detailed above.

4.6.1(f)(iii)(c) DQMP REVIEWS AND AUDITS

Design team reviews will be performed at designated stages to ensure quality-consistent submissions. Reviews will be conducted for constructability, interdisciplinary and consistency between adjacent structures, utilities, right-of-way and geotechnical among others. Reviews will utilize standard PennDOT forms where possible such as the procedure and associated checklist in PennDOT Publication 10X for constructability reviews. For cross-discipline reviews, a project specific form will be generated to verify design intent, right-of-way, utility impacts and environmental impacts. A submissions matrix will be created in the DQMP identifying the appropriate reviews required at each stage.

SAI will conduct Level 1 reviews consistent with Design Manual 4, PP 1.3.4. The appropriate typical PennDOT stamps will be utilized. The use of standard Microsoft Excel review forms will be consistent throughout the Pre-Development Phase to support the intended collaborative process. This will allow BPP and PennDOT staff to have a common ground of expectations that will facilitate expedited delivery of each Package.

The DQMP will also include an audit process. The audit process will be two-fold and describe the process for the PDA Entity's internal audits by SAI and PennDOT audits coordinated through SAI. The internal audits will be either scheduled or run randomly. To begin these audits, the QAM will notify the DQM of the audit to be completed. The DQM will then gather the appropriate information for the audit and place the information in the designated file on the Project SharePoint site. Such information will include, but not be limited to:

- Microsoft Excel Comment Matrix including PennDOT and SAI audits, QC reviews, Level 1 reviews, previously reviewed comments and responses
- QA Forms and Checklists including standard PennDOT QA Checklists (DM-4 Appendix A Checklists, etc.), Project Specific Checklists (DQM review of ECMTS items, etc.)
- PDF Submission: Clean Submission set of calculations, plans, special provisions
- PDF Documentation of Quality Control Process: color-coded documents utilizing review stamp

Review comments will be tracked via a Microsoft Excel Project standard form and include lines for submission being reviewed, comments and responses, as well as individuals commenting and responding. The form will note status of each comment (either closed or deferred).

Comments will be reviewed within seven days. To minimize turnaround addressing comments and additional rounds of reviews, a meeting will be conducted to provide the opportunity to commentators to clarify their comments and to BPP to request additional information. Deferred comments will be transferred to a new comment form for later submission. The DQM will sign that form, and the form will be provided for future review during Project audits.

Issues of non-conforming product will be logged in a Non-conformance Chart to ensure any non-conformance is addressed. SAI will provide a multi-step method to ensure non-conformance would not reoccur. This process begins with developing training to educate staff on non-conforming work. Work that has been deemed non-compliant will be subject to more stringent reviews resubmissions, and processes in the DQMP will be evaluated for improvement.

APPENDIX 1

Preliminary Quality Management Plan

Preliminary PDA Quality Management Plan

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

Bridging Pennsylvania Partners

Preliminary PDA Quality Management Plan

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Introduction

This Pre-Development Agreement (PDA) Quality Management Plan (QMP) has been prepared by SAI Consulting Engineers, Inc. (the Independent Quality Firm) and is an important part of the overall Quality Management approach outlined in the Project Management Plan (PMP). The purpose of this QMP is to set the processes and procedures that will be implemented to complete and monitor the PDA Work indicated in the PDA so that the PDA Work is completed in accordance with the PDA and general engineering practice. The QMP covers quality assurance and control process related to Site Investigations for PDA Work. The quality assurance and control process for design PDA Work is in the DQMP, which is attached as Appendix D.

The Quality Assurance Manager (QAM), Ray Henney, P.E., is responsible for the development, maintenance, and administration of the QMP and has a duty both to Bridging Pennsylvania Partners (BPP) and to the Pennsylvania Department of Transportation (PennDOT).

The QAM is an employee of the Independent Quality Firm (IQF). The duties of the QAM include, but are not limited to:

- Developing and administering the QMP
- Identifying the need to correct/update the QMP and overseeing those changes
- Obtaining PennDOT approval prior to implementation of any changes to the QMP
- Administering and monitoring of the PDA Work in accordance with the PDA Contract Documents
- Leading management of the QMP programs for the PDA Work
- Cooperating with and assisting PennDOT representatives in conducting audits and reviews
- Maintaining records of all inspections, sampling, and testing of existing site and facility conditions
- Overseeing the performance of the IQF

BPP, including its Lead Engineering Firm, Lead Construction Contractor, subcontractors and subconsultants, is required to perform the PDA Work in accordance with the QMP. All firms will be required to follow the outlined quality processes and procedures. Each Team Member must understand the Project objectives, apply sound engineering principles and produce quality documents that are accurate and complete. The PDA Entity Project Manager is responsible for providing the QMP to all Team Members, including subcontractors and subconsultants.

The QMP embodies a philosophy that includes:

- Establishing a commitment to quality as envisioned by the QAM to set expectations of those Team Members completing PDA Work
- Developing comprehensive procedures for quality work activities
- Providing technically-qualified staff for both Quality Control and Quality Assurance work
- Continuously training staff on quality processes and procedures
- Ensuring proper planning, execution, and checking of PDA Work
- Performing assessments of PDA Work via project audits
- Leading assessments of nonconforming work to address and prevent reoccurrence
- Maintaining of the QMP to improve processes and procedures

The QMP will be consistent with ISO 9001 and ISO 14001 standards for quality and environmental management systems.

Section 1 – Administration

Terms and Definitions

Accepted Software: Software which is accepted by PennDOT.

Bridge: Any one, or a specific one, of the nine sites identified below:

(a) I-80 Nescopeck
(b) I-80 Lehigh River
(c) I-80 Canoe Creek
(d) I-80 North Fork
(e) I-81 Susquehanna
(f) I-78 Lenhartsville
(g) I-83 South Bridge
(h) I-95 Girard Point
(i) I-79 Bridgeville

Checking: The process of evaluating PDA Work for conformance with the PDA Contract Documents.

PDA Contract Documents: Pre-Development Agreement including all Exhibits within the signed document.

Design-Build Project Manager (DBPM): Individual who reports to the PDA PM and is responsible for the completion of the work in accordance with the PDA Contract Documents.

Design Lead (DL): Individual who reports directly to the DBPM with the responsibility of managing the design work related to a Bridge or Bridges and ensuring that the design satisfies the PDA Contract Documents.

Design Lead Quality Manager (DLQA): Individual with responsibility to ensure the PDA Work satisfies the PDA Contract Documents and for approving design submittals by overseeing the design QA/QC program. The DLQA completes a review of each submission and certifies the submission was completed in accordance with the QMP.

Discipline Design Leads (DDLs): Responsible for completing designs for a particular discipline in accordance with the PDA Contract Documents. Completes cross-discipline reviews to ensure consistency between discipline designs for a particular bridge.

Independent Quality Firm (IQF): Firm that has a duty to both the PDA Entity and PennDOT to ensure quality work is being performed via proper implementation of the QMP and audits.

Nonconforming Action Request: A request developed using the standard project form to document Nonconforming Work, to recommend actions taken to correct the Nonconforming Work, and to suggest preventive measures to ensure against the Nonconforming Work.

Nonconforming Work: PDA Work that fails to meet the standards set by the PDA Contract Documents and general industry practice.

Nonconforming Work Correction: Measures taken to address and prevent Nonconforming Work.

PDA: Pre-Development Agreement.

PDA Entity: The special purpose entity formed to perform the PDA Work under the PDA.

PDA Entity's Project Manager (PDA PM): The single point of contact with PennDOT responsible for ensuring completion of the PDA Work.

PDA Design Quality Management Plan (DQMP): The QA/QC Plan relating to the design elements of the PDA Work as defined in the PDA. Prepared for Quality Assurance and Quality Control of the design work in accordance with the PDA Contract Documents.

PDA Quality Management Plan (QMP): The QA/QC Plan relating to the PDA Work as defined in the PDA. Prepared for Quality Assurance and Quality Control of the PDA Work in accordance with the PDA Contract Documents.

PDA Work: Work performed by the PDA Entity in accordance with the PDA Work Requirements to prepare, propose, and finalize the design of the Bridges for the Project and otherwise perform the scope of work as set forth under the PDA.

PennDOT: The Pennsylvania Department of Transportation.

Project: The broader delivery of all nine Bridges.

Project Management Plan (PMP): An overall document that defines the organization of the Project team and processes for the execution and management of the Project. The Project Management Plan is developed and submitted by the PDA Entity in accordance with Exhibit 6 of the PDA.

Project Agreement (PA): The public-private partnership agreement executed between PennDOT and a Development Entity that is used to deliver the design, construction, finance and maintenance works for a Package.

QA Audit: An audit performed by the QAM to verify that the QC processes and procedures outlined in the QMP have been implemented during the preparation of the Site Investigation submittal.

QC Review: A review of the Site Investigation Quality Control Plan and documents by the DL for conformance with the QMP, completeness, errors and omissions and compliance with the PDA Contract Documents.

Quality Assurance (QA): The policies and procedures utilized to provide adequate confidence that Site Investigation documents satisfactorily fulfill the QMP.

Quality Assurance Certification of Compliance: Document signed by the QAM with each PDA Phase submittal to certify that a QA review has been performed and that the QC process and procedures described in the QMP have been performed.

Quality Assurance Manager (QAM): Person responsible to administer and monitor the PDA Work in conformity with the PDA Contract Documents. The QAM shall observe the PDA Work to determine the progress and quality of work, identify discrepancies, and have full authority to report significant discrepancies to PennDOT.

Quality Control (QC): The operational techniques and activities that are used to verify that the PDA Work meets the requirements of the PDA Contract Documents.

Site Investigation: Any inspections, testing, or sampling of the existing site or facilities such as geotechnical borings or pavement core extractions required to advance the PDA Work.

Site Investigation Quality Control Plan: A document prepared ahead of any Site Investigation, which will detail specific actions related to the Site Investigation that will be implemented to ensure quality.

Site Investigation Scope Document: A document prepared ahead of any Site Investigation, which will contain at a minimum:

- Inspection, sampling and/or testing procedures and method
- Location of proposed inspections, samples to be obtained or tests to be performed including identification access requirements including environmental clearances and permits
- Detailed schedule for all inspections, sampling and testing
- Final report format and information, which at a minimum will include the date of performance of the inspection, sampling or testing, note the location of the inspection, sampling or testing, describe the inspection, sampling or testing methodology performed, and list the results of the inspection, sampling or testing performed

Team Member: Individual tasked with performing PDA Work.

Quality Assurance Responsibilities

The QAM administers and monitors the PDA Work such that the Project is ultimately constructed in conformity with the PDA Contract Documents. The QAM has the ultimate responsibility for the overall management of the QMP programs for the PDA Work. The QAM, assisted by the IQF staff, will use these tools to continually monitor the progress of the PDA Work.

Additionally, the QAM attends regular meetings, as detailed in the PMP, for the purpose of discussing design development and providing input to issue resolution. The QAM will provide input for and monitor status reports to ensure information is presented accurately and note inconsistencies.

To support the goal of conformance with the PDA Contract Documents, each of the Team Members below plays a particular role relating to quality.

The management team, comprised of the PDA PM, DBPM, and DL are responsible for the overall execution of the PDA Work. The quality assurance team, comprised of the QAM and the DLQA, ensures that the execution is in accordance with the QMP.

- The PDA PM is responsible for oversight of the entire PDA Work. The PDA PM coordinates the design work through the DBPM and DL and, along with those roles, provides guidance to ensure the PDA work is completed in accordance with PDA Contract Documents
- The DBPM is responsible for the design and construction of the overall Project. The DBPM facilitates coordination with the QAM and the DL during the PDA Phase
- The DL is responsible for the PDA Work scope in PDA Exhibit 6. The DL is responsible for implementing and overseeing the QMP program, including review of the design, plans, specifications, and constructability of the Project PDA. The quality assurance and control process for these elements is in the DQMP, which is attached as Appendix D. The DL is also responsible for implementing the QMP program for any Site Investigations, which are addressed in this QMP. The DL is responsible for assessing the quality of work being performed and implementing new procedures as needed to ensure quality work
- The DLQA ensures the execution of the QMP by providing QA of the PDA work provided by the DL and DDLs. Prior to submittal of the deliverable, the DLQA performs a QA Certification to confirm the procedures described in this document have been implemented. Upon successful resolution of the audit findings, the DLQA provides documentation to the DL and QAM that the submittal package conforms to the requirements of the QMP. The DLQA gathers submittal documents for submission to the QAM
- The QAM is responsible for the overall implementation of the QMP and is responsible to ensure the QMP is implemented via independent audits of whether the QMP procedures are being followed. The QAM issues certification that the submittal meets the QMP via a submission audit
- PennDOT is responsible for review of the QMP as well as providing owner QA audits and reviews of submissions. PennDOT may provide comments for adjustment to the QMP. Through the review process PennDOT may note Nonconforming Work

Documentation Control

Documentation related to the QMP quality procedures is outlined in the Document Management Procedure. This document covers documents associated with implementation of the QMP.

Quality documents, including but not limited to records associated with any PDA Phase Site Investigations, will be filed in the appropriate folder per the procedure and utilize the appropriate naming convention.

Once the DLQA verifies the comments were addressed via the DLQA Form, the DLQA then posts the Site Investigation documents and notifies the QAM it is ready for submission audit. These documents include:

- Record copies of all submitted field inspection, sampling, and testing work plans, field notes, laboratory results, sampling and testing results, and any other documents to be reviewed and submitted

- Comment responses if applicable from quality control and quality assurance reviews
- Reference documents applicable (Design Directives, meeting minutes, ECMTS tracking, correspondence, or other quality assurance forms) to complete the review and/or approval
- PennDOT Audit comments and responses

The noted quality records supplied by the DLQA above will be supplied for audit for each submission and as requested for periodic Project audits as determined by the QAM.

The QAM reviews the package upon receipt for completeness through a submission audit.

PennDOT may elect to perform a project audit. The same documentation above will be provided via the QAM to PennDOT for audit. Audit comments will be filed by PennDOT within the appropriate folder and the QAM notified. The QAM will review the audit comments and provide the comments to the DLQA. The QAM will assess issues on nonconformance and repeated comments.

Quality Records

The QAM is responsible for the appropriate filing and retention of quality documents. These records include, but are not limited to the following:

- Documents submitted by the DLQA
- Site Investigation Quality Control Plans
- Project audit forms and comments
- Documentation for PennDOT Audit
- Approvals

The documents remain in the folder as documentation of the quality assurance procedure completion. The DLQA is responsible for distributing comments and approvals to design staff and assuring comments are addressed at future submissions. SAI will use ProjectWise for internal document control. PennDOT submissions are to be made through e-Builder.

Training

QMP training is essential to ensure the proper implementation of the plan and to achieve a high-quality product. Training will be provided by the QAM to Team Members directly responsible for Site Investigation quality tasks. Training is developed via electronic presentation (PowerPoint, or similar) and provided via presentations. Completion of training is documented and posted to the project folder. The QAM tracks attendance and completion of the training and cross-checks the list of trained employees with those actively working on the Project in a design, Site Investigation, or management role. Initial training will be implemented in multiple sessions to allow for maximum engagement. Subsequent training will be scheduled at intervals for new Team Members. A quarterly meeting will be held to determine if existing training has been sufficient, or training will be refreshed for all Team Members.

When required, revisions to the training documents are provided for clarification or process improvements. For example: The updated version of the training document is distributed via the Project folder to the DL for distribution to staff. Updates of the QC processes in the QMP are communicated to

the design team through the Nonconforming Work Prevention process outlined in Section 4. Supplemental training will be provided for common or widespread inconsistencies in compliance.

The DLs will notify the QAM when new persons are added to the Project. The QAM will provide training prior to a new Team Member beginning any Site Investigation QC activities. The QAM will also provide training to QA staff.

Section 2 – Requirements

Contract Review and Coordination

The PDA Entity is required to comply with the PDA Contract Documents in completion of the PDA Work:

- PDA.
- PDA Exhibits including PDA Work Requirements - Exhibit 6.

Throughout the PDA Phase, the DBPM and DL communicate with the DDLs to ensure that the contract requirements are being addressed. The DL and the design and Site Investigation teams working on the Bridge are responsible to review the PDA Contract Documents and ensure that the requirements are reflected in the Site Investigation work plans. The DLQA is required to review the submissions to ensure these requirements have been included in the submission.

Additionally, the PDA Entity will conduct meetings with PennDOT. Meeting minutes will be completed by the DL or their designee and shared with PennDOT in line with the process and timelines outlined in the PDA Work Requirements. The minutes will include Action Items. Action Items pertaining to the PDA Work will be tracked by requiring the DLQA to ensure minutes have been reviewed by staff prior to submission via the DLQA Form.

PDA Work Criteria

The basis of PDA Work for the Project is described in the PDA Contract Documents. These requirements include but are not limited to:

PDA Exhibit 6, Attachment 1
Draft Project Agreement Technical Provisions Term Sheet Part 1: Bridge-specific Technical Requirements

PDA Exhibit 6, Attachment 2
Draft Project Agreement Technical Provisions Term Sheet Part 2: Project-wide Technical Requirements

PDA Exhibit 6, Attachment 3
Draft Project Agreement Technical Provisions Term Sheet Part 3: List of Special Specifications and Provisions

PDA Exhibit 6, Attachment 4
Draft Project Agreement Technical Provisions Term Sheet Part 4: List of PennDOT Publications, Standards, Manuals, Specifications and References

Accepted Software

Software utilized on the Project is required to be PennDOT Standard Software. In accordance with Chapter 12 of Publication 14M (DM-3), MicroStation will be utilized. Roadway designs will be completed using InRoads or OpenRoads Designer.

Structure designs will utilize standard PennDOT software and follow the Bridge Design and Technology Division “Accepted Commercially Available or Consultant Developed Software" document dated October 28, 2021.

Software does not have to be independently validated by the design or Site Investigation teams prior to use on the Project.

Subconsultants

Subconsultants engaged in design or Site Investigations are required to adhere to the QMP. Subconsultant submittals will require a DLQA Form completed by the DLQA ensuring the subconsultant work was completed in accordance with the QMP. The DLQA then submits the subconsultant submittal via similar procedure to the PDA Work.

The QAM will perform a QA Certification to verify adherence to the QMP and distributes for review similar to prime submission.

Section 3 – Quality Control

Quality Control Process for PDA Work

In support of the QMP, any Site Investigations necessary during the PDA Phase to advance the design in accordance with the Pre-Development Work Requirements will be identified and provided to PennDOT early in the PDA Phase. Prior to any Site Investigation being performed, the scope of the proposed Site Investigations will be clearly defined by the Team Member performing the Site Investigation in a Site Investigation Scope Document. The Site Investigation Scope Document will include:

- Inspection, sampling and/or testing procedures and methods
- Location of proposed inspections, samples to be obtained or tests to be performed including identification access requirements including environmental clearances and permits
- Detailed schedule for all inspections, sampling and testing
- Final report format and information, which at a minimum will include the date of performance of the inspection, sampling or testing, note the location of the inspection, sampling or testing, describe the inpection, sampling or testing methodology performed, and list the results of the insection, sampling or testing performed

All Site Investigations will be performed by qualified Team Members specifically trained to perform the inspection, sampling or testing procedures identified in the Site Investigation Scope Document. Team Members performing Site Investigations will be selected based on their past performance, their experience with the type of work needed to perform, project schedule, and other project requirements. Staff qualifications will be verified prior to assignment and performance of the work by the DLQA in charge of the Site Investigation.

Availability and use of specialty equipment necessary to perform the Site Investigation will be confirmed prior to performance of the work by the Team Member. This will include the documentation and confirmation of all required equipment calibrations. The required accreditations of any testing laboratories used to perform specified testing will be verified prior to assignment by the DLQA.

The Site Investigation Team Members will be required to attend training in accordance with Section 1 - Training and will develop a Site Investigation Quality Control Plan prior to each Site Investigation. This Site Investigation Quality Control Plan will detail specific actions related to the Site Investigation that will be implemented to ensure quality, such as having a Senior Engineering Geologist provide peer reviews on a geotechnical drilling plan prior to performing borings. The Site Investigation Quality Control Plan will be reviewed by the DLQA prior to the commencement of the Site Investigation. During the Site Investigation process key dates (field sampling and testing begin and end dates, due dates, submission dates, etc.), compliance with the Site Investigation Quality Control Plan, and progress will be tracked to ensure that all required deadlines are met. The Team Member leading each Site Investigation will submit this information and the Site Investigation Quality Control Plan in the final report.

Once a Site Investigation is complete, any sampling and testing reports will be reviewed by a Professional Engineer (PE) or other senior staff member, as needed. The report reviewer will examine all portions of the report to verify that it is complete, technically accurate, and consistent throughout the report sections. Quality standards for field sampling and testing will be verified through a QA Audit

process. QA Audits will be performed on a percentage of Site Investigations and reports. QA Audit procedures and checklists, as well as reports of QA Audit results, will be in accordance with the QMP.

Section 4 – Quality Assurance

Quality Assurance and Audits

Quality Assurance of Submissions: A QA Certification is required prior to a filing of PDA Entity Site Investigation. The purpose of the QA Certification is to verify that the QC Review processes and procedures outlined in the QMP have been implemented during the preparation of a Site Investigation report. The QA Certification is documented on the DLQA Form. The QAM will check and sign the portion of the DLQA Form once the submittal satisfies the procedures outlined in the QMP. The QAM has the authority to delay the Site Investigation submittal until the submittal satisfies the procedures.

Internal Quality Audit: Internal Quality Audits will be performed by the IQF, and these can either be scheduled or random. The QAM will initiate this effort by requesting all Quality Control related documents for a particular Site Investigation from the appropriate Team Member. Upon receipt of the material, the QAM examines all the QC documentation of the Site Investigation. The QAM determines if the required QC activities were performed as outlined in the Site Investigation Quality Control Plan. Incomplete Site Investigation documents are returned to Team Members for completion / documentation of the QC activities. Upon receipt of complete QC documentation, the QAM pages through the submittal to confirm that comments/markups were resolved.

The following items are reviewed as part of the Internal Quality Audit:

- Completeness of Documents**:** The DL shall assemble the QC Review documents in an organized format for review by the QAM. Depending upon the Site Investigation, items included may consist of field inspection, sampling, and testing work plans, field notes, laboratory results, sampling and testing results.

- Adherence to the QMP: The QAM will verify the documents relating to a Site Investigation comply with the Site Investigation Quality Control Plan and the QMP.

- Concurrence Sign-Off: The QAM will verify that all review comments, including those deferred from previous submissions, have responses and that the DL or DDL has concurred with the responses.

- PennDOT Comments Incorporation and Verification by QAM: The QAM will review the prior PennDOT Site Investigation record comments, if any, and verify each comment has the responsible Team Member's initials next to the response indicating their verification that the comment was addressed as noted in the response.

- Documentation of Second Round Mark-Ups: The QAM performs a spot check to verify that the second-round mark-ups are documented correctly. For example, if during the verification process, items are found to be incorrect or incomplete, a new record should be marked with the needed corrections. Additional records marked for changes should be stapled behind the original check record.

- Nonconformance: The QAM will review the previous items of logged nonconformance.

Comments identified by the Internal Quality Audit will be summarized on the Periodic Audit Form. This form will identify if the above criteria Meet Compliance, if there is Opportunity for Improvement or if there is a Deficiency that needs to be addressed. The Internal Quality Audit will be summarized by utilizing the Periodic Audit Report. Both documents will be provided to the DL. If deficiencies are found to exist, a Nonconforming Work Correction will be required prior to any new submissions.

PennDOT Owner Audits: The IQF will initiate contact with PennDOT to inquire if an Owner Audit is desired of the submission that is being Internally Audited. If so, the QAM will upload the QC documentation via e-Builder and coordinate with PennDOT regarding any comments that they may have. All PennDOT comments will be logged in the Periodic Audit Form for the QAM to address.

Comments

Site Investigation records receive review comments from various sources and are addressed as described below.

General

Comments may be made one of two ways: comment response form and PDF mark-up. For PDF comments, the comments will be completed such that the name of the commentor is with the comment being made. Responses to PDF comments will be completed in PDF format next to the comment being made with the responder initials included.

Comments may also be made utilizing a comment response form, which will be developed in the PDA Phase. Comments will clearly state who the commentor is and on which document the comment is being made. Comments of the same Site Investigation record will continue sequential numbering for clarity.

Review Comments

Comments are provided by the QAM to the DL for each submission of Site Investigation records. The DL, or designee, develops draft responses and routes to the DBPM for concurrence. The DL completes work for resubmission based on comment responses. The DL may request clarification of comments via email to the QAM and additional clarification can be provided on comment documents, or a clarification meeting may be called. The IQF team will develop and distribute meeting minutes if a meeting is held.

When Site Investigation records are modified in response to comments, QC documentation is required to assure conformance to the QMP. These submittals require:

- Signoffs (initials) from the Responsible Professional.
- PDF Overlay of the original and revised Site Investigation record with responses.

PennDOT Comments

PennDOT Comments are provided to the DL via the QAM. The DL would follow the same process as above to evaluate and develop comment responses. If clarification is needed, the DL will coordinate with

the QAM to distribute to PennDOT or schedule a clarification meeting. The IQF team will develop and distribute meeting minutes if a meeting is held.

Nonconforming Work

The purpose of this document is to provide a procedure that assures against Nonconforming Work; however, the QAM may note such Nonconforming Work through audit, meeting or discussion. Conditions adverse to quality require action to prevent recurrence, investigation and evaluation regarding similar work, and a root cause determination. Such conditions will be reported to the DL. Based on this reporting, a plan for communicating the correction or prevention will be developed. The QAM will prepare the communication and distribute the information to the PDA PM.

A PennDOT Audit will include comment on the implementation of the QMP. The QAM will take these under advisement and consider correction or prevention.

When corrective or preventive actions are initiated by the QAM, the DL will be notified as to the nature of the action and the reasons; therefore, such actions are reported to PennDOT through regular meetings or email. Nonconforming Work Correction and Prevention will extend to the subconsultants.

Nonconforming Work Correction

The QAM may identify an adverse condition during an audit or while performing normal work activities during a Site Investigation. The QAM will inform the party performing the work of the adverse condition. Nonconforming Work Correction aims to evaluate the nonconforming work, identify the root cause, and determine a course of action to rectify the situation.

Each condition is tracked from its identification to verification of the completion of all correction measures and closure. The QAM will document the adverse condition by completing a Nonconforming Work Correction Form and placing the condition in the Nonconforming Work Correction Log.

Following the review and corrective action form completion, the QAM will inform the DLQA and DL of the Corrective Action request, collaborate to determine a root cause and corrective action, identify other affected individuals if appropriate, and determine a projected completion date.

The QAM will implement the correction, verify the action was successful, close the correction request, and update the Correction Log. PennDOT additionally will have access to review and add items to the log via the IQF and in the absence of compliance by the IQF, by itself.

The QAM has the authority to advise PennDOT of Corrections.

Nonconforming Work Prevention

The QAM or other management Team Members may use prevention to facilitate, in part, continuous improvement or to prevent a condition adverse to quality, which can lead to a non-conformance. Based on PennDOT Audit comments, the QAM may assess a potential need for prevention. The QAM may also

receive a request for a clarification of a process or procedure from the design team. The need for a preventive action may arise out of an audit.

When opportunities for improvement are identified, prevention may occur in several ways. Meetings are a good time to disseminate prevention items. Training may also be developed if needed to educate a broader audience.

When the need to formally communicate a preventive action occurs, the QAM, in collaboration with the DL, will determine a course of action and will distribute the preventive action or process clarification.

The effectiveness of the preventive action is assessed by the QAM during subsequent reviews of QC documentation or other design QC activity, as applicable. If required, the QAM will re-issue the preventive action email or commence with a corrective action. A Nonconforming Work Prevention Log is to be maintained by the QAM.

Submittal to PennDOT

Before each Site Investigation record is uploaded to PennDOT, the QAM will validate that QC procedures were performed according to the QMP and prior comments from previous reviews were resolved and incorporated as applicable. The QAM will sign and transmit a Certificate of Compliance to the DL. The DL then transmits the package of Site Investigation records to PennDOT for review.

APPENDIX A

Quality Team

Quality Team

A current listing of the quality team professionals is maintained on ProjectWise. This list is reviewed periodically and updated as quality team members are added or are no longer working on the Project.

A sample template of the information provided in the spreadsheet is shown below for informational purposes only.

Firm	Discipline	Name	Duties	Responsibilities
SAI	N/A	Ray Henney	QAM	QMP Implementation

APPENDIX B

Quality Forms

Quality Forms

Form	Name
1	DLQA Form
2	Periodic Audit Form
3	Nonconforming Work Correction Form
4	Training Completion Log

DLQA Form

Project: Major Bridge P3 Initiative Date: _____

Bridge: _____ Sub Bridge: _____

Document Name: _____

Discipline Design Lead(s) (DDL): _____ Initials: _____

Design Lead (DL): _____ Initials: _____

Design Lead Quality Manager (DLQA): _____ Initials: _____

PDA Site Investigation Type:

□ Inspection □ Testing □ Sampling □ Other

Does the Submission:	**YES**	**NO**	**N/A**
○ Follow the processes and procedures set forth in the QMP?			
○ Contain addressed meeting minutes action items?			
○ Contain addressed comments?			
○ Contain addressed deferred comments?			

_____

QAM Date

Periodic Audit Form

PERIODIC AUDIT FORM ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE** INITIAL PACKAGE PROPOSAL DESIGN	DATE:

AUDITOR:	*NAME*	*DATE:*
RESPONDER:	*NAME*	*DATE:*
SUBMISSION:	*SUBMISSION NAME*	*DATE:*
STATUS	C = COMPLIANCE D = DEFICIENY OFI = OPPORTUNITY FOR IMPROVEMENT	

NUMBER	**REFERENCE**	**REQUIREMENT**	**EVIDENCE**	**VERIFIED BY INSPECTION OR INTEREVIEW**	**STATUS**	**COMMENTS**

Nonconforming Work Correction Form

Audit Number:

Audit Date:

Submission Audited:

Preamble:
{text}

Findings:
{text}

	Total Audit Items	Conforming	OFI	Deficient	Comments
Audit Items					

Summary and Conclusion
{text}

Training Completion Log

TRAINING COMPLETION LOG ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE**	DATE:

FIRM	**NAME**	**ROLE**	**TRAINING DATE**

APPENDIX C

Document Management and Procedures Memorandum

Document Management and Procedures Memorandum

Purpose
The purpose of this procedure is to present document control numbering system for Quality Assurance PDA Work. The memo provides guidelines for the following documents:

1. Folder System
2. Technical Documents
3. Correspondence Documents
4. References for Documents

I. Folder System

The following system is proposed for the folder system.

	-		-		-		
Project	-	Bridge	-	Type	-	Version Number	

a. Project:

This field defines the Project:

BPP

b. Bridge:

This field defines the Bridge:

BPP	-	Nescopeck

Nescopeck	-	I-80 Nescopeck Creek Bridges
Lehigh	-	I-80 Lehigh River Bridge
Canoe	-	I-80 Canoe Creek Bridges
North Fork	-	I-80 North Fork Bridges
Susquehanna	-	I-81 Susquehanna
Lenhartsville	-	I-78 Lenhartsville Bridge Replacement
South Bridge	-	I-83 South Bridge
Girard Point	-	I-95 Girard Point Bridge Improvement

Bridgeville	-	I-79 Widening, Bridges and Bridgeville Interchange Reconfiguration

d. Type:

This field defines the Type of the document:

BPP	-	Nescopeck	-	INSP

I	N	S	P	-	Inspections
S	A	M	P	-	Sampling Data
T	E	S	T	-	Test Results
Q	A	Q	C	-	Quality Program QA/QC
M	I	S	C	-	Miscellaneous

e. Version Number:

This field defines the Version Number:

BPP	-	Nescopeck	-	INSP	-	01

f. Example:

The first submission of Site Investigation inspections notes related to the I-80 Nescopeck Creek Bridges.

BPP	-	Nescopeck	-	INP	-	01

II. Technical Documents

The following system is proposed for the technical document to ensure consistent numbering/naming for the project.

	-		-		-	
Project	-	Bridge	-	Type	-	Version Number

a. Project:

This field defines the Project:

B	P	P

b. Bridge:

This field defines the Bridge:

B	P	P	-	0	1

0	1	-	I-80 Nescopeck Creek Bridges
0	2	-	I-80 Lehigh River Bridge
0	3	-	I-80 Canoe Creek Bridges
0	4	-	I-80 North Fork Bridges
0	5	-	I-81 Susquehanna
0	6	-	I-78 Lenhartsville Bridge Replacement
0	7	-	I-83 South Bridge
0	8	-	I-95 Girard Point Bridge Improvement
0	9	-	I-79 Widening, Bridges and Bridgeville Interchange Reconfiguration

c. Type:

This field defines the Type of the Document:

B	P	P	-	0	1	-	S	A	M	P

S	I	N	S	-	Site Inspections
S	A	M	P	-	Sampling Data
T	E	S	T	-	Testing Results
M	I	S	C	-	Miscellaneous

d. Version Number:

This field defines the Version Number:

B	P	P	-	0	1	-	S	A	M	P	-	0	1

g. Example:

The first submission for sampling data taken from the I-80 Nescopeck Creek Bridges.
.

B	P	P	-	0	1	-	S	A	M	P	-	0	1

III. Correspondence Documents

The following numbering system is proposed for the correspondence documents to ensure consistent numbering/ naming for the project.

			-			-			-				-		

Project	-	Bridge	-	Type	-	Sequential Number	-	Version Number

a. Project:

This field defines the Project:

B	P	P

b. Bridge:

This field defines the Bridge:

B	P	P	-	0	1

0	1	-	I-80 Nescopeck Creek Bridges
0	2	-	I-80 Lehigh River Bridge
0	3	-	I-80 Canoe Creek Bridges
0	4	-	I-80 North Fork Bridges
0	5	-	I-81 Susquehanna
0	6	-	I-78 Lenhartsville Bridge Replacement
0	7	-	I-83 South Bridge
0	8	-	I-95 Girard Point Bridge Improvement

0	9	-	I-79 Widening, Bridges and Bridgeville Interchange Reconfiguration

c. Type:

This field defines the Type of Document:

B	P	P	-	0	1	-	C	O	M

N	C	R	-	Nonconformance
L	E	T	-	Letter
M	E	M	-	Memo
M	I	N	-	Meeting Minutes
T	R	S	-	Transmittals
C	O	M	-	Comments
R	S	P	-	Responses

d. Sequential Number:

This field defines the four-digit numerical numbers to be used sequentially.

B	P	P	-	0	1	-	C	O	M	-	0	0	0	1

IV. References for Documents:

All Documents should be submitted in PDF format. The PDF sheet number should be the page number (e.g., a cover or title sheet would be page 1). References including comments and responses should reference to document name above and the PDF page number.

APPENDIX D

Preliminary Design Quality Management Plan

Preliminary Design Quality Management Plan

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

Bridging Pennsylvania Partners

Preliminary Design Quality Management Plan

TABLE OF CONTENTS

Introduction

This Pre-Development Agreement Design Quality Management Plan (DQMP) has been prepared by SAI Consulting Engineers, Inc. and is an important part of the overall Quality Management approach outlined in the Project Management Plan (PMP). The purpose of this DQMP is to set the processes and procedures that will be implemented to complete and monitor design work indicated in the Pre-Development Agreement (PDA) so that the work is completed in accordance with the PDA and general engineering practice.

The Quality Assurance Manager (QAM), Ray Henney, P.E., is responsible for the development, maintenance, and administration of the DQMP and has a duty both to Bridging Pennsylvania Partners and to the Pennsylvania Department of Transportation (PennDOT).

The QAM is an employee of the Independent Quality Firm (IQF). The duties of the QAM include, but are not limited to:

- Developing and administering the DQMP
- Identifying the need to correct/update the DQMP and overseeing those changes
- Obtaining PennDOT approval prior to implementation of any changes to the DQMP
- Administering and monitoring the design work such that the Project is constructed in accordance with the PDA Contract Documents
- Leading overall management of the DQMP programs for the PDA Work
- Approving of all design submittals via project audits and Level 1 Reviews
- Cooperating with and assisting PennDOT representatives in conducting audits and reviews
- Maintaining records of inspections, sampling, and testing
- Overseeing the performance of the IQF

Bridging Pennsylvania Partners, including its Lead Engineering Firm and design subconsultants, is required to perform design work in accordance with the DQMP. All firms completing PDA Work, will be required to follow the outlined quality processes and procedures. Each Team Member must understand the Project objectives, apply sound engineering principles, and produce quality documents that are accurate and complete. The PDA Project Manager is responsible for providing the DQMP to all Team Members including subconsultants.

The DQMP embodies a philosophy that includes:

- Establishing a commitment to quality, envisioned by the QAM, to set expectations of those completing PDA Work.
- Developing comprehensive procedures for quality work activities.
- Providing technically qualified staff for both Quality Control and Quality Assurance work.
- Continuously training staff on quality processes and procedures.
- Proper planning, execution, and checking of work.
- Performing an assessment of PDA Work via Level 1 Reviews and project audits.
- Leading assessments of nonconforming work to address and prevent reoccurrence.
- Maintaining the DQMP to improve processes and procedures.

Section 1 – Administration

Terms and Definitions

The terms within this document are defined as follows:

Accepted Software: Software which is accepted by PennDOT.

Backchecker: Individual who reviews the responses to the comments made by the checker to determine if the correct course of action was implemented. The individual should be the Checker.

Bridge: Any one, or a specific one, of the nine sites identified below:

(a) I-80 Nescopeck
(b) I-80 Lehigh River
(c) I-80 Canoe Creek
(d) I-80 North Fork
(e) I-81 Susquehanna
(f) I-78 Lenhartsville
(g) I-83 South Bridge
(h) I-95 Girard Point
(i) I-79 Bridgeville

Checker: Individual who performs a check on PDA Work. The individual is a Team Member independent of the work being performed and has the technical experience and capacity to perform the required check.

Checking: The process of evaluating PDA Work for conformance with the PDA Contract Documents.

Constructability Review: A review of PDA Contract Documents to refine project design, increase construction efficiency, and identify potential issues during construction.

Construction Quality Management Plan (CQMP): The QA/QC Plan relating to the D&C Work completed in accordance with the Design Documents. Prepared for Quality Assurance and Quality Control of the D&C Work.

Construction Lead (CL): Individual who reports directly to the DBPM with the responsibility of managing the construction planning and field activities to satisfy the PDA Contract Documents.

PDA Contract Documents: Pre-Development Agreement including all Exhibits within the signed document.

Cross-Discipline Review (CDR): A design review completed by a DDL to ensure consistency between discipline designs and conducted prior to DLQA review of a particular submission.

Design-Build Project Manager (DBPM): Individual who reports to the PDA PM and is responsible for the completion of the work in accordance with the PDA Contract Documents.

Design Directives: Issued to the PDA Work team by the PDA Entity PM or their designee to formally document significant decisions or direction.

Design Documents: All drawings (including plans, profiles, cross-sections, notes, elevations, typical sections, details, and diagrams), specifications, reports, studies, calculations, electronic files, records and submittals necessary for, or related to, the completion of design PDA Work.

Design Lead (DL): Individual who reports directly to the DBPM with the responsibility of managing the design work related to the Bridge and ensuring that the design satisfies the PDA Contract Documents.

Design Lead Quality Manager (DLQA): Individual with responsibility to ensure the design satisfies the PDA Contract Documents and is responsible for approving design submittals by overseeing the design QA/QC program. The DLQA completes a review of each submission and certifies the submission was completed in accordance with the DQMP.

Design Quality Manager (DQM): The person appointed by the QAM who is responsible for implementation of the DQMP. The DQM audits the Design Documents in accordance the requirements of the DQMP. The DQM is responsible for managing the implementation of design quality procedures.

Discipline Design Leads (DDLs): Responsible for completing designs for a particular discipline in accordance with the PDA Contract Documents. Completes cross-discipline reviews to ensure consistency between discipline designs for a particular bridge.

Engineer of Record (EOR): The Professional Engineer registered in the Commonwealth of Pennsylvania that is responsible for the preparation of the Design Documents. The EOR signs and seals the Design Documents.

Engineer's Review: Review of drawings performed by the originator of the calculations to ensure consistency with the design intent.

Independent Quality Firm (IQF): Firm who has a duty to both the PDA Entity and PennDOT to ensure quality work is being performed via proper implementation of the DQMP, audits, and Level 1 Reviews.

Level 1 Review: An independent engineering firm review completed by the Independent Quality Firm in accordance with PennDOT Level 1 Reviews stated in DM-4 1.3.4.1.

Maintainability Review: A review of PDA Contract Documents to evaluate design maximizes useful life and is reasonable to maintain.

Nonconforming Action Request: A request developed using the standard project form to document Nonconforming Work, recommend actions taken to correct the Nonconforming Work, and preventive measures to ensure against the Nonconforming Work.

Nonconforming Work: PDA Work that fails to meet the standards set by the PDA Contract Documents and general industry practice.

Nonconforming Work Correction: Measures taken to address and prevent Nonconforming Work.

Originator: Individual responsible for the initial development of PDA Work who completes the work in accordance with the PDA Contract Documents.

PDA: Pre-Development Agreement.

PDA Entity: The special purpose entity formed to perform the PDA Work under the PDA.

PDA Entity's Project Manager (PDA PM): The single point of contact with PennDOT responsible for ensuring completion of the PDA Work.

PDA Proposal Commitments (Commitments): The commitments made by the PDA Entity that are contained in Exhibit 9 (PDA Proposal Commitments).

PDA Design Quality Management Plan (DQMP): The QA/QC Plan relating to the PDA Work as defined in the PDA. Prepared for Quality Assurance and Quality Control of the design work in accordance with the PDA Contract Documents.

PDA Work: Design work as described in Exhibit 6 (PDA Work Requirements).

PennDOT: The Pennsylvania Department of Transportation.

PennDOT Design Manual (Indicated DM-X with X the Part Number): All parts and components of the design specifications available on PennDOT website, including Publication 10, Publication 13M, Publication 14M, Publication 15M, and Publication 16M.

Production Check: A comprehensive check of the design calculations and plans to ensure the design complies with the PDA Contract Documents and is ready for review by the DLQA.

Project Management Plan (PMP): An overall document that defines the organization of the Project team and processes for the execution and management of the project. The Project Management Plan is developed and submitted by the PDA Entity in accordance with Exhibit 6 of the PDA.

Project: The nine candidate bridges selected for delivery.

Project Agreement (PA): The public-private partnership agreement executed between PennDOT and a Development Entity that is used to deliver the design, construction, finance and maintenance works for a Package.

QA Audit: An audit performed by the DQM to verify that the QC processes and procedures outlined in the DQMP have been implemented during the preparation of the phase submittal.

QC Review: A review for major design elements by a Checker in order to confirm conformance to PennDOT design standards, economy, suitability, maintainability, accuracy, completeness, errors and omissions, compliance with the PDA Contract Documents, and verify resolution of CDR comments, if applicable.

Quality Assurance (QA): The policies and procedures utilized to provide adequate confidence that Design Documents satisfactorily fulfill the DQMP.

Quality Assurance Certification of Compliance: Document signed by the QAM or DQM with each PDA Phase submittal to certify that a quality assurance review has been performed and that the QC process and procedures described in the DQMP have been performed.

Quality Assurance Manager (QAM): Person responsible to administer and monitor the design PDA Work in conformity with the PDA Contract Documents. The QAM shall observe the design PDA Work to determine the progress and quality of work, identify discrepancies, and have full authority to report significant discrepancies to PennDOT.

Quality Control (QC): The operational techniques and activities that are used to verify that the design meets the requirements of the PDA Contract Documents.

Release for Construction: The status of a Design Document which has been fully accepted by PennDOT in the PA phase for final design and intended for use in construction.

Software Output Review: A check utilizing engineering judgement on software (computer software, excel sheets, MathCAD (or similar), etc.) output to ensure the output results are within acceptable range including a verification of warnings/errors and evaluation that design checks within the program are adequate. Includes an understanding of how the program processes input information for the particular output result.

Team Member: Individual tasked with performing PDA Work.

Utility or Utility(ies): A privately, publicly, or corporately-owned line, facility, or system for transmitting or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, a combined stormwater and sanitary system, or other similar commodities, including wireless telecommunications, television transmission signals and publicly-owned fire and police signal systems, which directly or indirectly serve the public. The term “Utility” excludes:

(a) Streetlights and traffic signals.
(b) Intelligent transportation systems and intelligent vehicle highway system facilities.
(c) Any other line, facility, or system that otherwise meets this definition, but whose owner is PennDOT.

The necessary appurtenances to each Utility facility will be considered part of such Utility. Any service line connecting directly to a Utility will be considered an appurtenance to that Utility, regardless of the ownership of such service line.

Utility Owner: Has the meaning set forth in PDA Exhibit 8 (Project Agreement Term Sheet).

Quality Assurance Responsibilities

The QAM administers and monitors the design and D&C Work such that the project is constructed in conformity with the PDA Contract Documents. The QAM has the ultimate responsibility for the overall management of the DQMP programs for the design work. The QAM, assisted by the IQF staff, will use these tools to continually monitor the progress of the design development.

Additionally, the QAM attends regular meetings, as detailed in the PMP, for the purpose of discussing design development and providing input to issue resolution. The QAM will provide input for and monitor status reports to ensure information is presented accurately and note inconsistencies.

To support the goal of conformance with the PDA Contract Documents, each of the Team Members below plays a particular role relating to quality.

The management team, comprised of the PDA PM, DBPM, and DL are responsible for the overall execution of the design effort. The quality assurance team, comprised of the QAM, DQM, and the DLQA ensure that the execution is in accordance with the DQMP.

- The PDA PM is responsible for oversight of the entire PDA Work. The PDA PM coordinates the design work through the DBPM and DL and, along with those roles, issues Design Directives and guidance to ensure the design work is completed in accordance with PDA Contract Documents.

- The DBPM is responsible for the design and construction of the overall Project. The DBPM facilitates coordination with the QAM and the DL during the PDA phase.

- The DL is responsible for the design scope in PDA Exhibit 6. The DL is responsible for implementing and overseeing the design DQMP program, including review of the design, plans, specifications, and constructability of the Project. The DL is responsible for assessing the quality of work being performed and implementing new procedures as needed to ensure quality work.

- The DLQA ensures the execution of the DQMP by providing QA of design work provided by the DL and DDLs. Prior to submittal of the deliverable, the DLQA performs a QA Certification to confirm the procedures described in this document have been implemented. Upon successful resolution of the audit findings, the DLQA provides documentation to the DL and DQM that the submittal package conforms to the requirements of the DQMP. The DLQA gathers submittal documents for submission to the DQM.

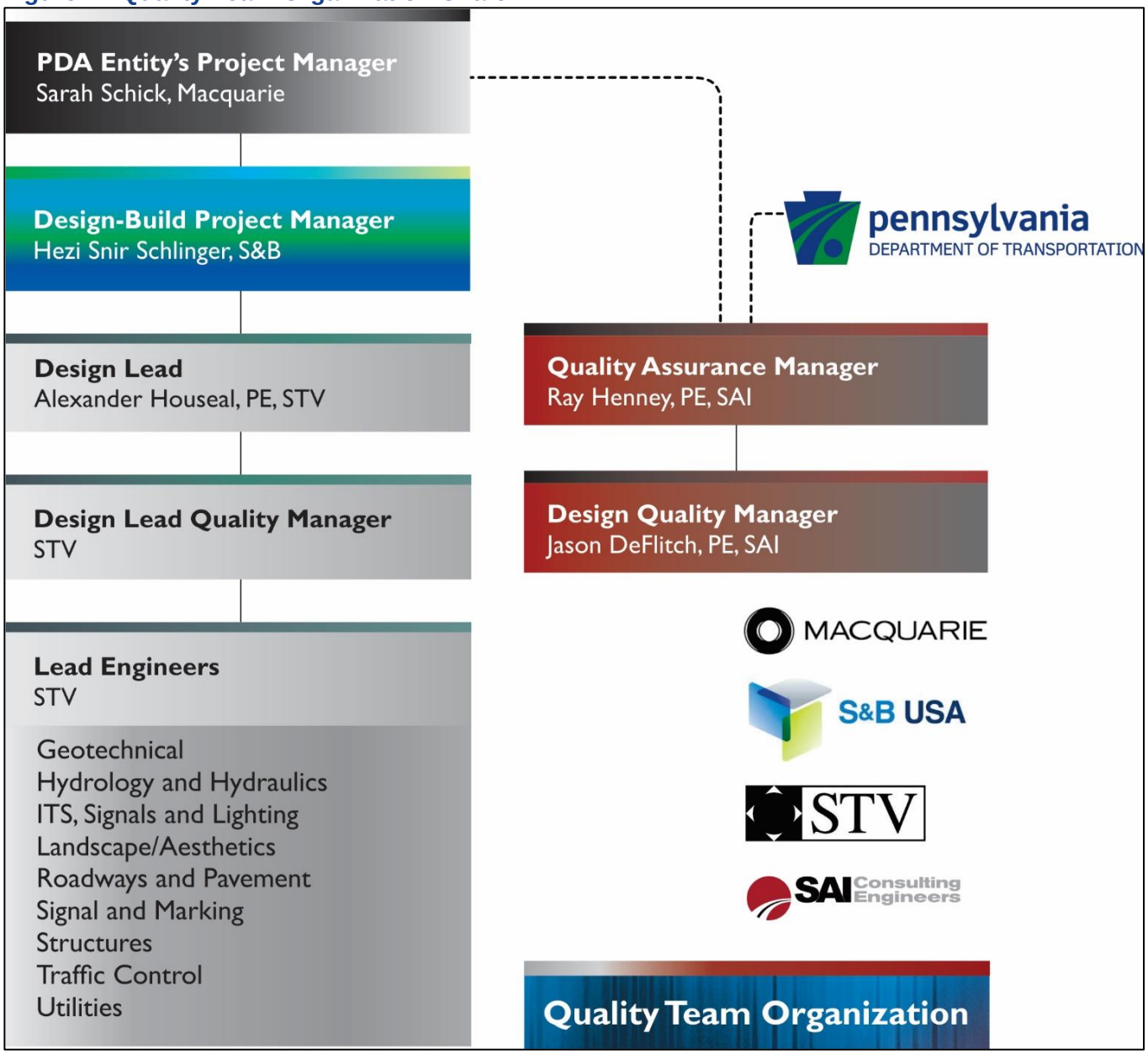
- The DQM is responsible to ensure the DQMP is implemented via independent audits of whether the DQMP procedures are being followed and independent design reviews. The DQM issues certification that the submittal meets the DQMP via a submission audit. In addition, the DQM oversees the Level 1 Reviews completed of submissions.

- The QAM is responsible for the overall implementation of the DQMP and working with the DQM on related tasks.

- PennDOT is responsible for review of the DQMP as well as provide owner QA audits and reviews of submissions. PennDOT may provide comment for adjustment to the DQMP. Through the review process PennDOT may note nonconforming work.

The PDA Phase Organization Chart within the PMP depicts the roles of the design organization. The PDA phase Quality Team Organization Chart shown in Figure 1 indicates the quality flow.

Figure 1 - Quality Team Organization Chart



Documentation Control

Documentation related to the DQMP quality procedures is outlined in the Document Management Procedure. This document covers documents associated with implementation of the DQMP. Filing of project design documents will be as determined by the DL.

Quality documents will be filed in the appropriate folder per the procedure and utilize the appropriate naming convention.

Once the DLQA verifies the Production Check is complete, comments were addressed, Design Directives implemented, etc., via the DLQA Form, the DLQA then posts the submittal documents and notifies the DQM it is ready for submission audit and Level 1 Review. These documents include:

- Record copies of all submitted plans and documents to be reviewed and submitted.
- Production Check sets with color-coded checking process complete.
- Comment Responses if applicable from quality control and quality assurance reviews.
- Reference documents applicable (Design Directives, meeting minutes, ECMTS tracking, correspondence, or other quality assurance forms) to complete the review and/or approval.
- Record copies of all submitted plans and documents.
- PennDOT Audit comments and responses.
- Level 1 Review comments and responses.

The noted quality records supplied by the DLQA above will be supplied for audit for each submission and as requested for periodic project audit as determined by the QAM. Level 1 Reviews will only be conducted for submissions indicated in the PDA Work Initial Package Proposal Design and Package Proposal Design.

The DQM reviews the package upon receipt for completeness through a submission audit. If the submission is complete, the DQM coordinates the completion of Level 1 Reviews and distributes comments to the DLQA

PennDOT may elect to perform a project audit. The same documentation above will be provided via the DQM to PennDOT for audit. Audit comments will be filed by PennDOT within the appropriate folder and the DQM notified. The DQM will review the audit comments and provide the comments to the DLQA. The DQM will assess issues on nonconformance and repeated comments.

Quality Records

The DQM is responsible for the appropriate filing and retention of quality documents. These records include, but are not limited to the following:

- Documents submitted by the DLQA.
- Project Audit forms and comments.
- Level 1 Review comments and stamped documents.
- Documentation for PennDOT Audit.
- Approvals.

The documents remain in the folder as documentation of the quality assurance procedure completion. The DLQA is responsible for distributing comments and approvals to design staff and assuring comments are addressed at future submissions. PennDOT submissions are to be made through E-Builder, where additional storage for quality assurance is required, SAI will use e-Builder or other document management systems depending on the situation.

Training

DQMP training is essential to ensure the proper implementation of the plan and to achieve a high-quality product. Training will be provided by the DQM to design staff directly responsible for quality tasks. Training is developed via electronic presentation (PowerPoint, or similar) and provided via presentations.

Completion of training is documented and posted to the project folder. The DQM tracks attendance and completion of the training and cross-checks the list of trained employees with those actively working on the Project in a design or management role. Initial Training will be implemented in multiple sessions to allow for maximum engagement. Subsequent Training will be scheduled at intervals for new Team Members. A quarterly meeting will be held to determine if existing training has been sufficient, or training will be refreshed for all Team Members.

When required, revisions to the training documents are provided for clarification or process improvements. For example: The updated version of the training document is distributed via the project folder to the DL for distribution to staff. Updates of the QC processes in the DQMP are communicated to the design team through the Nonconforming Work Prevention process. Supplemental training will be provided for common or widespread inconsistencies in compliance.

The DLs will notify the DQM when new persons are added to the Project. The DQM will provide training prior to a new Team Member beginning any design QC activities. The DQM will also provide training to QA and Level 1 Review staff.

Section 2 – Requirements

Contract Review and Coordination

The PDA Entity is required to comply with the PDA Contract Documents in completion of the PDA Work:

- PDA.
- PDA Exhibits including PDA Work Requirements - Exhibit 6.

Throughout the design development, the DBPM and DL communicate with the DDLs to ensure that the contract requirements are being addressed. The DL and the design team working on the bridge are responsible to review the PDA Contract Documents and ensure that the requirements are reflected in the design documents. These requirements include technical requirements, Project commitments, right of way commitments, discipline specific criteria and existing agreements. The DLQA is required to review the submissions to ensure these requirements have been included in the submission.

Additionally, the PDA Entity will conduct meetings with PennDOT. Meeting minutes will be completed by the DL or their designee and shared with PennDOT in line with the process and timelines outlined in the Predevelopment Work Requirements. The minutes will include Action Items. Action Items pertaining to the design PDA Work will be tracked by requiring the DLQA to ensure minutes have been reviewed by staff prior to submission via the DLQA Form.

PDA design commitments made pursuant to PDA Exhibit 9 will transferred to a Commitment Checklist for verification the commitments have been considered in the design or deferred to later submission.

During the PDA phase and negotiation with PennDOT, BPP will consider the implementation of the District Preferences contained in PennDOT ECMS File Cabinet. Documentation that the preferences were reviewed will be included with the appropriate submissions by utilizing the preference documents as a checklist to be initialed by originator and utilizing the Production Check Stamp during review.

Design Development Criteria

The basis of design for the Project is described in the PDA Contract Documents. These requirements include but are not limited to:

PDA Exhibit 6, Attachment 1
Draft Project Agreement Technical Provisions Term Sheet Part 1: Bridge-Specific Technical Requirements

PDA Exhibit 6, Attachment 2
Draft Project Agreement Technical Provisions Term Sheet Part 2: Project-wide Technical Requirements

PDA Exhibit 6, Attachment 3
Draft Project Agreement Technical Provisions Term Sheet Part 3: List of Special Specifications and Provisions

PDA Exhibit 6, Attachment 4

Draft Project Agreement Technical Provisions Term Sheet Part 4: List of PennDOT Publications, Standards, Manuals, Specifications and References

Accepted Software

Software utilized on the Project is required to be PennDOT Standard Software. In accordance with Chapter 12 of Publication 14M (DM-3), MicroStation will be utilized. Roadway designs will be completed using InRoads or OpenRoads Designer.

Structure designs will utilize standard PennDOT software and follow the Bridge Design and Technology Division “Accepted Commercially Available or Consultant Developed Software" document dated October 28, 2021.

Software does not have to be independently validated by the design team prior to use on the Project. In order to verify the software performs as intended, the Checker verifies the input is correct and accurate and performs a software output review. The Checker will also check all supporting work, such as diagrams and input assumptions.

As part of the Level 1 Review, the software selection (including corresponding version) is reviewed for reasonableness for the intended use.

Subconsultants

Subconsultants engaged in design are required to adhere to the DQMP. Subconsultant submittals will require DLQA Form completed by the DLQA ensuring the subconsultant work was completed in accordance with the DQMP. The DLQA then submits the subconsultant submittal via similar procedure to the prime design work.

The DQM will perform a QA Certification to verify adherence to the DQMP and distributes for review similar to prime submission.

Section 3 – Quality Control

Quality Processes

Design Documents will undergo the quality checking and review processes described in this section (see Figure 2):

1) Checking is performed during the development of the Design Documents. Checking occurs on discrete elements of the design as listed below. Checking is performed by a Checker. Refer to the following sections for a description of the Checking Process:

   Calculations
   Spreadsheets
   Drawings
   Specifications
   Computer Programs (Modeling)
   Response to Comments

2) Supplemental reviews are performed for specific functions, such as high-risk elements or high potential for design conflicts. Supplemental reviews include:

   Cross-Discipline Reviews
   Constructability and Maintainability Reviews
   Coordination of Adjacent Packages

3) Design Lead Quality Manager reviews the submission for completeness and compliance with the DQMP.

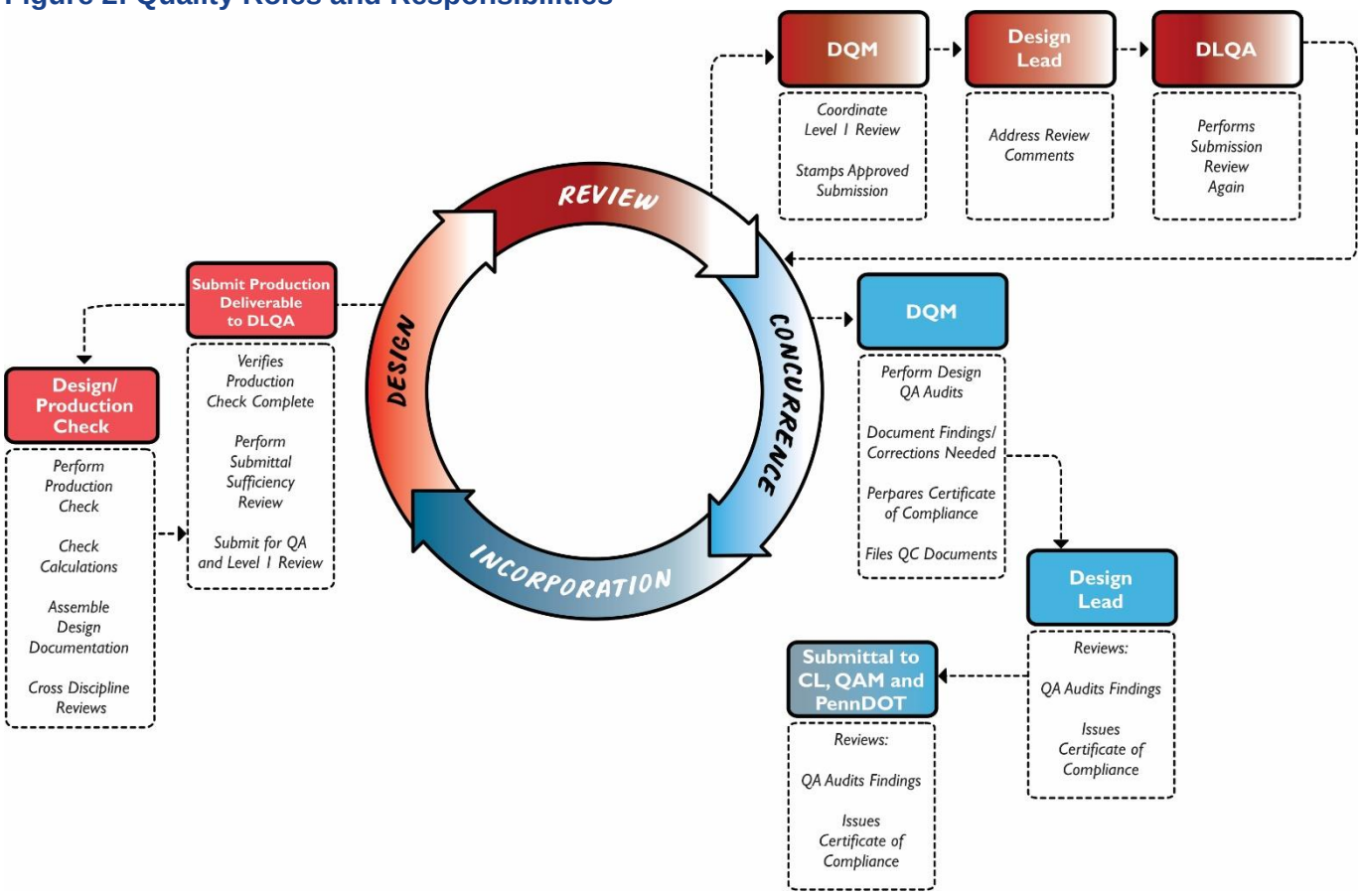
4) Quality Assurance Certification is performed in advance of the submission and verifies the submission is compliant with the DQMP prior to submitting for review.

5) Level 1 Review is performed concurrent with the Quality Assurance Review and includes addressing comments and resubmittal.

6) Concurrence is performed after the review process is complete.

7) PennDOT Submittal after concurrence the submission is made to the owner. Comments are addressed through the checking process above and process commences again.

Figure 2: Quality Roles and Responsibilities



Checking

The Project design team is the first level of quality. In order to ensure the deliverables are complete and ready for submittal, the Project team is responsible for checking their own work. This check, referred to as checking, is a comprehensive check of the design. Once the design team has deemed the documents are production ready, they are submitted to the EOR for each discipline to perform a Production Check.

This Production Check is performed by the EORs to ensure that the deliverable is complete, complies with the Technical Requirements, and is ready for submission. The Production Check Tracking Stamp in Figure 3 is used to document the completion of the Production Check.

The color-coding process is used to document that all information contained in the documents to be submitted has received a Production Check. The Production Check Tracking Stamp is used on the first page of the check set of each discipline for documenting this procedure. Notation should be included to confirm the page range checked. Multiple production check sheets may be required to document a complete production check has been completed. If multiple Team Members are involved in a particular review element, multiple stamps may be used to document each reviewer's involvement.

Any disagreements found during this process must be resolved to both the Checker and the Originator's satisfaction. If an agreement cannot be reached, the issue is brought to the attention of the DDL or EOR, and the DQM. Unresolved disagreements involving technical issues are decided by the EOR.

For each submittal, the latest check print and clean original set are part of the review performed by the DLQA before submission and the QA Certification by the DQM.

Checking of Calculations

All final calculations receive a complete check using the Detailed Check Method or the Alternate Method for Structures Calculations. Checking is performed on copies of the original calculation sheets referred to as a "check set of calculations." The original calculation sheets are kept by the Originator. After checking is completed for all calculation sheets, the Checker also initials and dates the calculation cover sheet.

Detailed Check Method:

The Detailed Check Method involves a thorough check by the Checker of the calculations, associated means and methods, and the resulting final outcome developed by the Originator. The purpose is to verify the accuracy and completeness of the calculations in satisfying the Technical Requirements.

The Checker first verifies that all reference data, information, and assumptions provided by others and used as a basis for the calculations is reasonable for use.

The Checker reviews, checks, and agrees with:

- Assumptions and/or Methods (standard or client specific).
- Code requirements are addressed.
- Formulas and mathematical hand computations.
- Appropriate use of computer programs.
- Spreadsheet output accuracy.
- Validity of computer models used for analysis and that the software is on the project approved software list.
- Accuracy of computer program input.
- Resulting output, including sketches, graphs, and figures.

For spreadsheets and computer programs, a summary description of the input and output is provided in the calculation package. Output from spreadsheets and computer programs is evaluated for reasonableness before checking the calculations which use the computer program and/or spreadsheet output.

The EOR verifies that all calculation sheets have been checked and documented per QMP procedures. This includes verification that any design changes that may have occurred before, during and/or after the checking process have been incorporated into the final calculations and ultimately into the design phase submittal.

Spreadsheet Checking:

Standard spreadsheets may be developed for Project wide use. The spreadsheet originator provides the proposed spreadsheet to the DL for review. The DL transmits the spreadsheet to a Checker who uses the Detailed Check Method identified above to check complete spreadsheet results and printouts. The spreadsheet Checker checks the header and input data and verifies the reasonableness of the spreadsheet results.

The accuracy and results of cell formulas may be verified in one of the following alternative ways:

- A spreadsheet printout with formulas displayed within the cells for checking spreadsheets with short formulas that can be fully printed out.
- Hand calculations may be used to verify the accuracy of spreadsheet cell results. Hand calculations, if used, are performed in accordance with the requirements listed within this section. When hand-checking standard spreadsheets that are used for multiple applications, caution should be taken to verify the accuracy and validity of all hard-coded variables and of all possible logical decisions within the spreadsheet.

Header information for standard spreadsheet printouts is required to include information that identifies the author of the standard spreadsheet and the date it was developed or last revised, as well as the Checker of the standard spreadsheet and the corresponding date it was checked. The DL, or designee, signs off on the use of the standard spreadsheet for project use. A copy of standard spreadsheets available for the project is available upon request.

When standard spreadsheets are used for the Project, the header information identifies the person who used the standard spreadsheet and the corresponding date, and the person who checked the input data and the corresponding date. Header information also identifies the person (DL or DDL) who approved the use of the standard spreadsheet on a specific project and the corresponding date.

Users should not modify the Project standard spreadsheet except to enter project-specific information in the header or highlighted input data. For normal operation, only the header and input cells should be open for editing; all other spreadsheet cells shall remain locked/protected. If items other than the header information or input data are revised in any way, the spreadsheet is considered modified. A modified spreadsheet requires the Checker to check modified cell formulas in accordance with the process described above. Additionally, the Checker reviews the entire modified spreadsheet to verify that the modifications do not alter other portions of the spreadsheet.

Checking of Drawings

The Originator of the design calculations will perform an Engineer's Review of the drawings to verify that the drawings conform to the design intent by reviewing the basic design dimensions, structural member sizes, connections, reinforcements, and other features critical to structural adequacy. This is not intended to be a detailed check of all dimensions and such a check should occur before the Engineer's Review of Drawings based on the process above. The Engineer's Review is to be conducted in a similar manner as a Production Check utilizing the color-coding process and Production Check Tracking Stamp. The review may be performed on only a portion of the drawing set as applicable to the work by the Originator.

When drawings are developed in stages and checked in stages, such as highway plan sheets, each stage check print is to be stapled together so that a complete audit trail is available to show how the drawing was developed and how each stage was checked.

No one is to work on or make changes to any drawing that has been checked without coordinating with the EOR. Any such changes are subject to the checking procedure.

All plans shall be 100% electronically generated using CADD software following PennDOT Publication 14M, Design Manual Part 3, Plans Presentation.

Checking of Specifications Package

The design team should utilize Standard Design and Construction Specifications and items to the extent possible. Standard Specifications will be selected by the Originator. When special circumstances require an item not addressed by the Standard Specifications, a Special Provision will be developed. Special Provisions need to ensure the Description, Materials, Construction Methods, and Unit of Payment are concise and clear.

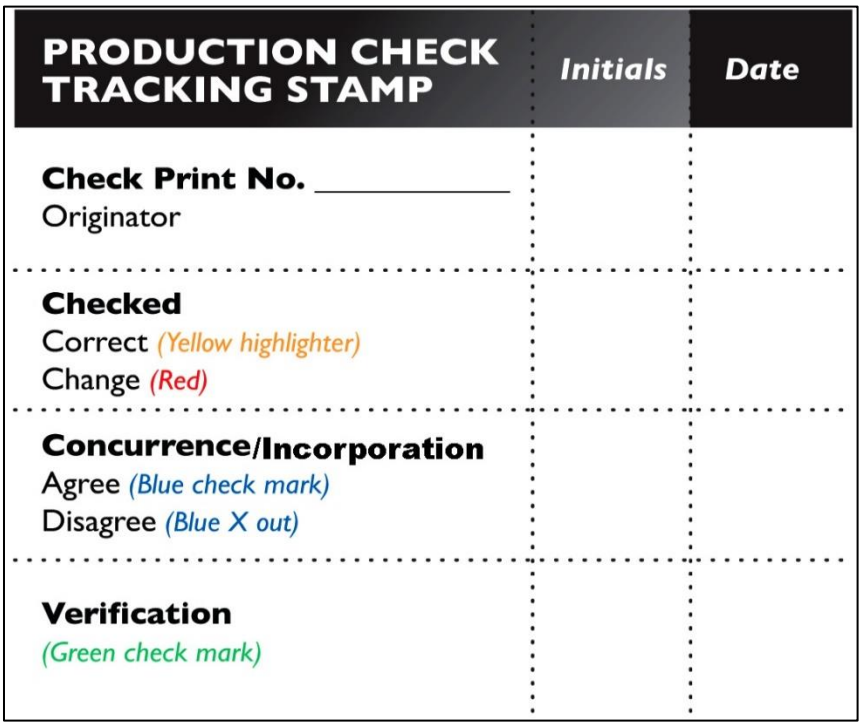
The Originator provides the proposed specification selections to a checker who performs an initial review.

The EOR will review all specifications to ensure the content matches the design intent and follows the color-coding process and utilize the Production Check Tracking Stamp.

Checking of Input to Computer Programs

The Originator is responsible for reviewing the input and output for completeness and for correctness with regards to the basis of design, etc. Upon determination that input and output is complete and ready for detailed checking, the Originator copies the input and output to create the check print, stamps it with the Production Check Tracking Stamp, and provides the set to the Checker. The Checker checks the input for accuracy and continues the checking/editing process.

Figure 3: Production Check Tracking Stamp



Color-Coding Process

A color-coding process is used for Checking and QC Review as follows:

- *Yellow* is used by the Checker to indicate agreement.
- *Red* is used by the Checker indicate corrections and additions.
- *Blue* check is used by the Originator to indicate concurrence with the corrections and additions and the edits have been incorporated.
- *Blue* "X" is used by the Originator to indicate disagreement with the corrections and additions.
- *Green* check is used by the Backchecker to verify that changes were made.
- *Red* can be used by the Backchecker to indicate unincorporated items or incorrect items on new plot.
- Non-record comments or instructions must be written in black or clouded.

A yellow line or highlight is marked through on the document being reviewed as an indication the item has been checked and verified. If the Checker disagrees with an item on the sheet, the Checker circles or crosses out the item in red and writes what is deemed to be correct in red, directly above or adjacent to the original item. Items to be added are also marked in red. The Checker may add non-record comments or instructions to the Originator in black.

Once the Checker has completed checking/QC Reviewing the document, the Checker gives the check set to the Originator for review and concurrence with all marked-up items. If the Originator agrees that the change will be incorporated, the Originator incorporates the edit and marks the change with a blue check. Disagreement is indicated by crossing out in blue. In the case of QC Review, the Backchecker then verifies that the changes were made by marking with a green check.

Independent Structures Calculation Checking

As an alternate to the Detail Check Method, structural calculations may be checked by completing an independent check. When checking results from a software program, either a second independent Accepted Software program or calculation method will be utilized.

The input for the original calculation and the independent check will be created independently by each calculation originator. The results should be reviewed by both originators to note differences in the output of each model and to reconcile those differences. Both the original calculation and the independent check will be placed in the calculation book for comparison.

Revisions After RFC

Changes, including field changes, in the design of the Project or any portion thereof as shown on the Design Documents, are subject to design QA/QC measures and procedures commensurate with those applied to the original design of the portion of the Project being changed. All changes should be approved by the original design firm. Documents containing design and/or field changes will be distributed according to the requirements of the CQMP developed for that stage.

Further detail as to the processes will be included in the CQMP and the DQMP will be amended to incorporate that detail, if needed, when the CQMP is approved.

Shop Drawing and Construction Submission Review

Shop drawings are drawings, diagrams, schedules, and other data specifically prepared to illustrate some portion of the Design Documents. The CQMP will outline details for filing and naming convention.

The shop drawings will be organized for ease of PennDOT upload to the BMS2 system post construction.

Shop drawings should be reviewed by the original design firm. Shop drawings will be reviewed using the procedures noted in PennDOT Design Manual 4, Appendix B. and PennDOT Publication 408 Section 105.02(d). Shop drawings are required where indicated in PennDOT Publication 408 and on the Design Documents.

DM-4 Appendix B provides guidance on review and after completion of the review, the appropriate stamp in that section will be utilized to indicate the status of a submission.

The DBPM, or designee, will coordinate will the shop drawing generation and supply the shop drawings for review to the original designer. The designer will follow the process noted above. Accepted drawings will be submitted to the DQM for storage and for submission to PennDOT. Prior to submission to PennDOT the DQM will perform a QA check on the shop drawing in accordance with the CQMP.

Construction Submissions are prepared and submitted like shop drawings to cover items not requiring the specifics of shop drawing format. These submissions include erection plans, demolition plans, shoring designs, etc. The review process for these documents will follow the same flow as Shop Drawings indicated in the CQMP with an exception. A Construction Submission may be finalized as “Accepted as Noted” if in the opinion of the review engineer the remaining comments are minor in nature. Construction submissions will be reviewed by the original designer.

The DBPM, or designee, will coordinate will the construction submission generation and supply the submission for review to the original designer. The designer will follow the process noted in the CQMP. “Accepted” and “Accepted as Noted” submissions will be submitted to the DQM for storage and for submission to PennDOT. Prior to submission to PennDOT, the DQM will perform a QA check on the submission in accordance with the CQMP.

Request for Information (RFI)

RFIs will be submitted by the DBPM, or designee, to the DL. The DL will coordinate with the appropriate DDLs to provide clarification or information in response to the RFI. The CQMP will outline a process for naming and submitting RFIs similar to PennDOT’s PPCC program. The DLs will coordinate the response and submit back to the DBPM.

Released for Construction Plan Revisions

Revisions to plans will follow DM-3 2.10 to indicate changes after design acceptance and prior to construction. Revisions may be completed using PDF or CADD. Standard revision symbols will be utilized with revisions clouded. If entire sheets are modified, the sheet will be crossed-out with an “X” and a new sheet generate with standard PennDOT numbering.

Revisions will be completed prior to construction but after plan approval. The completion of RFC plan revisions will follow the Production Check process outlined in this document. Submissions of revisions will follow the standard submittal process with review by DLQA and subsequent submittal and QA review by DQM. After DQM approval, the DL will submit to PennDOT for review and acceptance.

As-Built Record Plans

As-builts will be developed similar to RFC plan revisions based on information maintained by construction inspection staff. The as-built process will be further developed in the CQMP and updated here. Construction inspectors will note information in PDF format for field adjusted items. Construction inspectors will submit the information to the DLs for distribution to the appropriate staff for review and completion. The design team will utilize these notes similar to design comments and make adjustments via PDF or CADD to complete the changes.

As-builts will be completed to note changes during construction and will be completed at the end of construction. The completion of as-builts will follow the Production Check process outlined in this document. Submissions of as-builts will follow the standard submittal process with review by DLQA and subsequent submittal and QA review by DQM. After DQM approval, the DL will submit to PennDOT for review and acceptance.

Section 4 – Consistency Reviews

Cross-Discipline Review (CDR)

The objective of the CDR is to coordinate design between and within the various design disciplines in order to verify there are no conflicts, omissions, or misalignments between integrated or adjacent work. The deliverable for inclusion with the submission will be the completed Cross-Discipline Review Form.

The DL coordinates the CDR with a progress package prior to submission. The DL may also elect to conduct additional CDRs at other stages of design development. CDRs will refer to the most current information available.

The DL uses the Cross-Discipline Review Form to identify the disciplines to be included in the review. The DL is responsible for designating the appropriate DLLs, or their designee, engaging the DL utilities subconsultant (required participant), inviting the CL, scheduling the meeting and documenting the outcome.

The CDR may be accomplished by a “roll plot” review meeting with the DLLs (Roadway, Drainage, MPT, Structures, ITS, Tolling, Lighting, Signals, Utilities, etc.) where all these designs are referenced on one roll plot or reviewed live on computer screen. Documentation is transmitted to the DQAM as part of the submission package.

The Geotechnical Professional Engineer participating in the CDR shall review all phases of the plans and specifications to ensure that the geotechnical recommendations have been correctly incorporated. CDR documentation is provided.

The QAM will be advised when CDR reviews are initiated and will be invited to attend any related meetings or workshops. This will ensure that the QAM will be abreast of these reviews and able to certify their occurrence.

Constructability and Maintainability Review

Constructability is reviewed at multiple stages of design development. Prior to the Design Field View (DFV) Submission, a Constructability and Maintainability Review will be conducted, and the documentation will be part of the DFV Submission. This Review will be initiated by the DL and will include the DDL’s and staff from the CL. The Review is to follow PennDOT Publication 10C, Section 4.13.A and PennDOT Publication 10X, Appendix N. The deliverable for inclusion with the DFV Submission will be the completed Constructability/Maintainability Preliminary Engineering Checklist within Publication 10X, Appendix N.

Constructability and Maintainability Reviews are performed in advance of a phase submittal. For this Review, the DL compiles an internal progress package for the DDLs and DBPM for Constructability and Maintainability Review. The DL provides a sufficient level of detail in design packages for Constructability and Maintainability Review in accordance with the level of detail required for a phase submittal. The DBPM transmits the design package to the CL and indicates when the Constructability and Maintainability Review comments are expected to the DL. The CL provides comments to the DL for concurrence and incorporation. Comments provided by the CL are tracked by the DL and comment resolution is documented through meeting minutes, comment Review spreadsheets, or similar documentation. Documentation will be included in the Design Field View.

Also, the DDLs will host routine meetings which provide the opportunity for constructability and/or maintainability discussions of design components. Additionally, Level 1 Reviews will include a constructability element.

The QAM will be advised when Constructability and Maintainability Reviews are initiated and will be invited to attend any related meetings or workshops. This will ensure that the QAM will be abreast of these Reviews and able to certify their occurrence.

Adjacent Bridge Coordination

There are two sets of structures on Interstate 80 within significant proximity such that the Bridge cannot be considered entirely independent. The DLQA will ensure that the adjacent bridges are considered in the design process via the standard DLQA Form. For the following Bridges, the DLQA will ensure a CDR is completed for the other bridge. For this review the DL or designated DDLs will review the adjacent Bridge for compatibility with the current bridge design.

The following are the adjacent Bridges to be considered:

- I-80 Nescopeck and I-80 Lehigh River
- I-80 Canoe Creek and I-80 North Fork

Section 5 – Quality Assurance

Quality Assurance and Audits

Quality Assurance of Submissions: A QA Certification is required prior to a design phase submittal. The purpose of the QA Certification is to verify that the QC Review processes and procedures outlined in the DQMP have been implemented during the preparation of the design phase submittal. The QA Certification is documented on the DLQA Form. The DQM will Check and Sign the portion of the DLQA Form once the submittal satisfies the procedures outlined on the DQMP. The DQM has the authority to delay the client submittal until the submittal satisfies the procedures.

The DLQA Form is to be attached with each submittal to the QAM.

Internal Quality Audit: Internal Quality Audits will be performed by the IQF and these can either be scheduled or random. The QAM will initiate this effort by requesting all Quality Control related documents for a particular submittal from the DL or DDL. Upon receipt of the material, the DQM examines all the QC documentation of the design phase submittal. The DQM determines if the required QC activities were performed as outlined in the DQMP on the complete submittal package. Incomplete packages are returned to the DL or DDL, as appropriate, for completion/ documentation of the QC activities. Upon receipt of complete QC documentation, the DQM pages through the submittal to confirm that comments/markups were resolved.

The following items are reviewed as part of the Internal Quality Audit:

- Completeness of Documents**:** The DL shall assemble the QC Review documents in an organized format for review by the DQM. Depending upon the submittal, such item may consist of the Production Check set, QC Review sets, QC Review comments, design calculation and documentation, QC Review sets prior client Phase Submittal review comments initialed, verifying incorporation of comments, and the original copy of each phase submittal document.

- Adherence to the DQMP: The DQM will verify the Production Check and QC Review documents and verify the Production Check Tracking Stamp is present on each document with the Checker initials, date, color coding, concurrence, incorporation, and verification have been performed per the DQMP.

- Use of Proper Color-Coding: The DQM performs a spot check to verify proper color-coding was used throughout the documents per the DQMP.

- Concurrence Sign-Off: The DQM will verify that all review comments, including those deferred from previous submissions, have responses and that the EOR has concurred with the responses by his signature and date on the Level 1 Review Form.

- Incorporation by EOR: The DQM will review the Level 1 Review Form to verify each comment has a response, the incorporation column is indicated, and the checker's initials are noted next to each comment, verifying incorporation.

- PennDOT Comments Incorporation and Verification by EOR: The DQM will review the prior phase submittal review comments and verify each comment has the responsible Team

Member's initials next to the response indicating their verification that the comment was addressed as noted in the response.

- Use of Production Check Tracking Stamp: The DQM will verify the appropriate Production Check Tracking Stamp was used and properly completed.

- Design Calculations Checking: The DQM verifies that the original design calculations have been initialed by the Originator, Checker, and Backchecker. The DQM will verify that the calculations have been checked according to the DQMP.

- Documentation of Second Round Mark-Ups: The DQM performs a spot check to verify that the second-round mark-ups are documented correctly. For example, if during the verification process, items are found to be incorrect or incomplete, a new plot should be marked with the needed corrections. Additional sheets marked for changes should be stapled behind the original check print.

- Readability of Half-Size Plans: The DQM will verify that the design phase submittal package is readable and meets the expected level of print quality.

- Constructability/Maintainability Review: The DQM verifies that a constructability and/or maintainability review has been performed and that comments have been documented and resolved or deferred.

- Cross-Discipline Review: The DQM verifies that a CDR has been performed and that comments have been documented and resolved or deferred.

- Nonconformance: The DQM will review the previous items of logged nonconformance. Comments identified by the Internal Quality Audit will be summarized on the Periodic Audit Form. This form will identify if the above criteria Meet Compliance, if there is Opportunity for Improvement or if there is a deficiency that needs to be addressed. The Internal Quality Audit will be summarized by utilizing the Periodic Audit Report. Both documents will be provided to the DL. If deficiencies are found to exist, a Nonconforming Work Correction will be required prior to any new submissions.

PennDOT Owner Audits: The IQF will initiate contact with PennDOT to inquire if an Owner Audit is desired of the submission that is being Internally Audited. If so, the DQM will upload the QC documentation via e-Builder and coordinate with PennDOT regarding any comments that they may have. All PennDOT comments will be logged in the Periodic Audit Form for the BDM to address.

Level 1 Reviews

The DQMP procedures are based upon two responsible and qualified individuals concurring on the correctness of the work product. To accomplish this, the quality process identifies two levels of control: Production Check and Level 1 Review. All documents that directly constitute the design phase submittals will undergo a Level 1 Review by one or more individuals prior to submittal to PennDOT.

It is more efficient to prevent errors and omissions from inception rather than find and correct mistakes during the Level 1 Review process. A Production Check is to be completed prior to a DLQA review of the submission prior to the official submission.

PDA Submittals

PDA submittals have been established in the PDA Contract Documents. The DQMP requires Level 1 Review of submittals. The Submittals below require a Level 1 Review:

- **Initial Package Proposal Design**
  Design Field View (including Design Exceptions)
  Type Size and Location Studies
  Structure Foundation Report
  Geotechnical Engineering Report
  Traffic Control Staging Plans

- **Package Proposal Design**
  Design Field View
  Pavement Studies
  Drainage
  ITS
  Tolling
  Lighting
  Landscape
  Traffic Control
  Consistency with Utilities
  Type Size and Location Studies
  Structure Foundation Report
  Geotechnical Engineering Report

Submissions will be sealed by the responsible Professional Engineer.

Each submittal requires a completed DLQA Form stating that the submittal complies with the requirements of the DQMP. The DLQA will notify the DQM 21 days in advance of a submission.

Reviewers

Reviewers should review items within the reviewer's area of expertise and the reviewer should have sufficient experience to conduct the review. The QAM will be responsible to ensure the individual with the appropriate amount of experience in a particular area of expertise is reviewing the submissions. Resumes of the reviewers will be collected and available upon request.

Level 1 Review Process: Level 1 Reviews will be conducted on the noted submissions. The Level 1 Review is defined in DM-4 PP.1.3.4 and will be conducted due to the nature of this design-build Project. As stated, this is an independent review conducted by another consultant.

After the DQM review and submission of a particular submission, a Level 1 Review will be conducted before PennDOT submission. The scope of the Level 1 Review as stated below from DM-4 PP.1.3.4.1.

Level 1: A detailed review shall consist of the following, as applicable, and additional requirements that may be unique to a particular bridge:

1) Evaluation of design methods and design assumptions.

2) Evaluation of computer program used in design (or check of design using a different computer program acceptable to PennDOT).
3) Check of manual calculations.
4) Check of construction methods, including applicable safety regulations, when required, to ensure that the intent of the design can be realized.
5) Check of erection stresses, where applicable.
6) Check of plans to ensure that design information is adequately and correctly presented.
7) Check of construction dimensions is not required, except as in 6) above unless specified in the engineering agreement.
8) Quantity check is not required.
9) Constructability check is not required for contractor-designed alternates and Design-Build projects, except as noted in 4) above.
10) Constructability check is required for review of design prepared by the consultants retained by PennDOT.
11) Review for cost-effectiveness when design is prepared by another consultant retained by PennDOT.
12) Review for compliance with PennDOT criteria and standards, as applicable.

In addition, the Reviewer will check for compliance with the project specific Design Development Criteria.

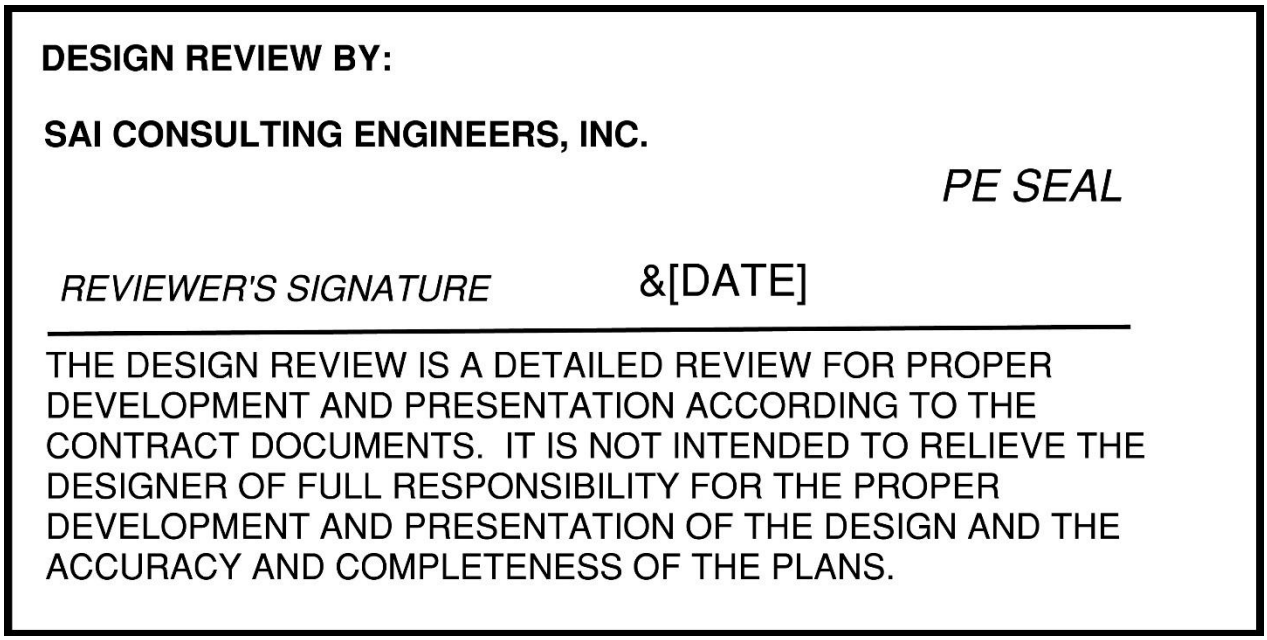
The Level 1 Review is intended to be a comprehensive, thorough verification of the original work. All independent reviews include, but not be limited to, the independent confirmation of the following when applicable:

1) Compatibility of bridge geometry with roadway geometrics including typical sections, horizontal alignment, and vertical alignment.
2) Compatibility of construction phasing with Traffic Control Plans.
3) Critical horizontal and vertical clearances.
4) Potential conflicts with underground and overhead utilities.
5) Design methodology and assumptions.
6) Design results/recommendations (independent verification of the design).
7) Completeness and accuracy of plans.
8) Special Provisions.
9) Constructability issues.

Comments will be made in accordance with the Comments section of this document.

Once the review has been completed with all comments addressed or agreed to be deferred the submission may be approved utilizing the stamp below (similar to DM-4 Figure 1.3.4.2).

Figure 4 - Level 1 Review Stamp



Level 1 Documentation to PennDOT: Level 1 Review documents will be included by the QAM in the submission to PennDOT via e-Builder for review and approval.

Level 1 Review of Documents Prepared by Others: If there are Design Documents prepared by a firm that is not a member of the PDA Entity, the Level 1 Review will consist of consistency with PDA Entity design. These items will not be audited and included as-is.

Comments

Submittal packages receive review comments from various sources and are addressed as described below.

General

Comments may be made one of two ways: comment response form and PDF mark-up. For PDF comments, the comments will be completed such that the name of the commentor is with the comment being made. Responses to PDF comments will be completed in PDF format next to the comment being made with the responder initials included. The comments and responses will follow the color-coding scheme defined for the Production Check. Typically plan presentation comments are completed via PDF.

Comments may also be made utilizing a comment response form. A standard comment response form is included with this document. Comments will clearly state who the commentor is and on which document the comment is being made. Comments of the same submission will continue sequential numbering for clarity. Typically, calculation and descriptive comments to plans are made via the Level 1 Review Form.

Review Comments

Comments are provided by the DQM to the DL for each submission. The DL, or designee, develops draft responses and routes to the DBPM and EOR for concurrence. The DL completes work for resubmission based on comment responses. The work required for addressing comments will follow the Production Check process and the resubmission will follow the DLQA review similar to the initial submission. The DL may request clarification of comments via email to the DQM and additional clarification can be provided on comment documents or a clarification meeting may be called. The DQM will develop and distribute meeting minutes if a meeting is held.

When design documents are modified in response to comments, such as the progression from Initial Package Proposal Design to Package Proposal Design, QC documentation is required to assure conformance to the DQMP. These submittals require:

- Level 1 Review Form which includes responses to comments.
- Signoffs (initials) from the Responsible Professional.
- PDF Overlay of the plan set with responses.
- Production Check at the discretion of the DL for plans and calculations depending on the extent of comments.

PennDOT Comments

PennDOT Comments are provided to the DL. The DL would follow the same process as above to evaluate and develop comment responses. If clarification is needed, the DL will coordinate with the QAM to distribute to PennDOT or schedule a clarification meeting. The DQM will develop and distribute meeting minutes if a meeting is held.

Deferred Comments

If appropriate a comment may be deferred to a future submission or another submission type. The response to the comment will indicate that addressing the comment has been deferred and to which future submission or different submission type the comment has been deferred. The comment will be added to the deferred comment list for that Bridge. The future submission or different submission type should include the list of deferred comments indicating those comments have been addressed with the current submission.

Nonconforming Work

The purpose of this document is to provide a procedure that assures against Nonconforming Work; however, the DQM may note such Nonconforming Work through audit, meeting or discussion. Conditions adverse to quality require action to prevent recurrence, investigation, and evaluation regarding similar work, and a root cause determination. Such conditions will be reported to the DL. Based on this reporting, a plan for communicating the correction or prevention will be developed. The DQM will prepare the communication and distribute the information to the DM and QAM.

A PennDOT Audit will include comment on the implementation of the DQMP. The DQM will take these under advisement and consider correction or prevention.

When corrective or preventive actions are initiated by the DQM, the DL and QAM will be notified as to the nature of the action and the reasons; therefore, such actions are reported to PennDOT through regular meetings or email. Nonconforming Work Correction and Prevention will extend to the subconsultants.

Nonconforming Work Correction

The DQM may identify an adverse condition during an audit or while performing normal work activities. The DQM will inform the DL and/or QAM of the adverse condition. Nonconforming Work Correction aims to evaluate the nonconforming work, identify the root cause, and determine a course of action to rectify the situation.

Each condition is tracked from its identification to verification of the completion of all correction measures and closure. The DQM will document the adverse condition by completing a Nonconforming Work Correction Form and placing the condition in the Nonconforming Work Correction Log.

Following the review and corrective action form completion, the DQM will inform the DLQA and DL of the Corrective Action request, collaborate to determine a root cause and corrective action, identify other affected individuals if appropriate, and determine a projected completion date.

The DQM will implement the correction, verify the action was successful, close the correction request, and update the Correction Log. PennDOT additionally will have access to review and add items to the log via the IQF and in the absence of compliance by the IQF, by itself.

The QAM has the authority to advise PennDOT of Corrections.

Nonconforming Work Prevention

The DQM or other management Team Members may use prevention to facilitate, in part, continuous improvement or to prevent a condition adverse to quality, which can lead to a non-conformance. Based on Level 1 Review and PennDOT Audit comments, the DQM may assess a potential need for prevention. The DQM may also receive a request for a clarification of a process or procedure from the design team. The need for a preventive action may arise out of an audit.

When opportunities for improvement are identified, prevention may occur in several ways. Meetings are a good time to disseminate prevention items. Training may also be developed if needed to educate a broader audience.

When the need to formally communicate a preventive action occurs, the DQM, in collaboration with the DL and/or QAM, will determine a course of action and will distribute the preventive action or process clarification.

The effectiveness of the preventive action is assessed by the DQM during subsequent reviews of QC documentation or other design QC activity, as applicable. If required, the DQM will re-issue the preventive action email or commence with a corrective action. A Nonconforming Work Prevention Log is to be maintained by the DQM.

Documentation of Changes

Any design changes that occur at the Design Field View Stage prior to moving into Final Design will need documented and distributed to the Design Team. Any change in design that will impact the Line, Grade, Typical Sections, TS&L, Structure Foundation Report, or Limit of Disturbance will need to be documented on The Notice of Design Change (NODC) form.

The NODC will be transmitted to the DQM and posted to the project folder, and the QAM, DL, CL, DQM, and DDLs will be copied.

Submittal to PennDOT

Before each deliverable is submitted to PennDOT, the DQM will validate that QC procedures were performed according to the DQMP and prior comments from previous reviews were resolved and incorporated as applicable. The DQM will sign and transmit a Certificate of Compliance to the DL. The DL then transmits the package to PennDOT for review.

APPENDIX 1

Quality Team

Quality Team

A current listing of the quality team professionals is maintained on Sharepoint. This list is reviewed periodically and updated as quality team members are added or are no longer working on the Project.

A sample template of the information provided in the spreadsheet is shown below for informational purposes only.

Firm	Discipline	Name	Duties	Responsibilities
SAI	N/A	Ray Henney	QAM	DQMP Implementation
SAI	N/A	Jason DeFlitch	DQM	DQMP Implementation

APPENDIX 2

Submittals Subject to the DQMP

Submittals Subject to the DQMP

Initial Package Proposal Design

- LOD Mapping
- Design Field View Submissions
- Design Exception Requests
- Type, Size and Location Studies
- Structure Foundation Report
- Master Utility Relocation Plan
- Geotechnical Engineering Reports
- Traffic Control Staging

Package Proposal Design

- Site Investigation Results
- Utility Mapping
- Railroad Mapping
- ROW Boundaries
- LOD Mapping
- Listing of Properties for Environmental Assessment
- Additional Stakeholder and District Requirements
- Wetland Delineation
- Alignments, Profiles, and Typical Cross-Sections for Roadways
- Type, Size and Location Studies
- Waterway Permit
- Structure Foundation Report
- Geotechnical Engineering Report
- Preliminary Pavement Designs
- Preliminary Drainage Stormwater Management Designs
- Draft Utility Adjustment Work
- Preliminary ITS Layout
- Tolling Infrastructure Installation Work Plans
- New or Modified Traffic and Pedestrian/Bike Signals
- Preliminary Lighting Concept
- Landscape Concept
- Traffic Control
- Work to be Performed by Stakeholders
- PA Work Plans to relocate, reconstruct, or maintain facilities which are not PennDOT-owned

APPENDIX 3

Quality Forms

Quality Forms

Form	Name
1	DLQA Form
2	Certificate of Compliance
3	Commitment Checklist
4	Cross Discipline Form
5	Deferred Comment Form
6	District Preferences Example
7	Existing Information Review Form
8	Level 1 Review Form
9	Nonconforming Work Correction Form
10	Nonconforming Work Correction Log
11	Nonconforming Work Prevention Log
12	Notice of Design Change
13	Periodic Audit Form
14	Periodic Audit Report
15	Training Completion Log
16	RIDs Change Form

DLQA Form

Project: Major Bridge P3 Initiative Date: _____

Bridge: _____ Sub Bridge: _____

Document Name: _____

Discipline Design Lead(s) (DDL): _____ Initials: _____

Design Lead (DL): _____ Initials: _____

Design Lead Quality Manager (DLQA): _____ Initials: _____

Design Package Status:

□ Initial Package Proposal Design □ Package Proposal Design

Does the Submission:	**YES**	**NO**	**N/A**
○ Follow the processes and procedures set forth in the DQMP?			
○ Contain a Production Check of Calculations?			
○ Contain a Production Check of Specifications and Special Provisions			
○ Contain a Production Check of Plans?			
○ Contain a Production Check of Reports or Studies?			
○ Contain initialed ECMTS matrix indicating incorporation?			
○ Contain reviewed Commitment Checklist?			
○ Contain design meeting the Design Development Criteria?			
○ Contain addressed meeting minutes action items?			
○ Contain addressed comments?			
○ Contain addressed deferred comments?			
○ Contain Adjacent Bridge Review?			
○ Contain a Cross-Discipline Review by required disciplines?			

***Cross Disciplinary*:**	**Notes:**	**N/A**
□ Roadway		
□ Drainage		
□ TCP		
□ Structures		
□ Environmental/Permitting		
□ Signal/SPMP		
□ Lighting/Electrical		
□ ITS		
□ Landscape/ Aesthetics		
□ Utilities		
□ Other		

_____

DQM Date

Certificate of Compliance

To:
From:
Date:
Subject:
County:
Description: QUALITY ASSURANCE CERTIFICATION
Submittal:

This document is to certify that a Quality Assurance Certification has been performed to verify that the Quality Control (QC) process and procedures described in the DQMP have been implemented during the Checking and QC Review of the above referenced submittal. The Project team has completed and signed the applicable documentation and this submittal complies with the requirements of the DQMP. This QA Certification was conducted on *Date*, after all QC procedures were complete. The QC Review documents, and associated review comments are available for your review upon request.

SIGNED: _____

Name
Design Quality Manager

SIGNED: _____

Name
Design Lead

_____

Name
Quality Assurance Manager

Commitment Checklist

COMMITMENT CHECKLIST ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE**			DATE:		
NUMBER	**DISCIPLINE**	**COMMITMENT**	**INTENDED SUBMISSION FOR INCLUSION**	**INCLUDED**	**SUBMISSION DEFERRED TO**

Cross-Discipline Review Form

Project: Major Bridge P3 Initiative Date: _____

Bridge: _____ Sub Bridge: _____

Document Name: _____

Discipline Design Lead(s) (DDL): _____ Initials: _____

Design Package Status:

☐ Initial Package Proposal Design ☐ Package Proposal Design

For The Subject Submission:	**YES**	**NO**
○ Plans depict latest/appropriate design details.		
○ Latest/appropriate reference files are attached.		
○ Plan title(s) is consistent with upfront sheets.		
○ Plan presentation quality/continuity is acceptable.		
○ The horizontal geometry, vertical geometry, and cross slopes/superelevation agree.		
○ The horizontal and vertical clearances agree.		
○ Parapet and guiderail connections agree.		
○ Approach slab details agree. This includes stations, offsets, cross slopes and grade points at the approach slab and roadway pavement interface.		
○ Unsuitable material that may be encountered during construction has been identified and coordinated.		
○ Traffic control phasing matches throughout plan set.		
○ Appropriate standards are referenced.		
○ Utilities are identified and have been coordinated.		
○ Lighting/Signing/ITS/Tolling/Traffic Signal details are verified as being detailed correctly.		
○ Other		

***Additional Comments*:**

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Deferred Comment List

DEFERRED COMMENT LIST ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE** INITIAL PACKAGE PROPOSAL DESIGN				DATE:	
SUBMISSION:		*SUBMISSION NAME*		*DATE:*	
DOCUMENT:					
DEFERRAL BY:		*FIRM – NAME*			
COMMENT NUMBER	**BY**	**SHEET OR PAGE**	**COMMENT**	**REASON FOR DEFERRAL**	**DEFERRED UNTIL**

District Preferences Example

DISTRICT 10-0 BRIDGE UNIT

STRUCTURE PLAN, DESIGN AND DEVELOPMENT GUIDELINES

This is a sample District Preferences documentation. The preferences would be utilized as much as possible as a checklist indicating for clarity that preference items are included.

NOTE: The District Bridge Unit prepared the information contained within these guidelines for use when preparing submissions for review and approval. For assistance with these guidelines, their modifications or the required submissions, please contact the Assistant District Bridge Engineer – Design (724-357-5970). These guidelines along with the checklists are based on the DM-4 April 2015 edition.

The District checklists listed in Appendix J are encouraged for use to ensure consistency when preparing submissions for review and approval. They are not required to be included with Department submissions.

Initials and date of reviewer → XXX XX-XX-XXXX

Structure Plans and Notes:

1. BRADD Plans (PP 1.4.2)

a. When BRADD is not being used for final plan development, submit to the District Bridge Engineer for review and approval written justification for not using the Department software. Submit the justification when the consultant Legal Agreement/Work Order is executed

b. Address all Designer and Drafting Notes and include verifications in final plan calculations

2. Basic Information – Title Block (PP 1.6.2.1)

a. Provide the local bridge name (BMS2 name) in a small block just above the top left corner of the title block. Include this on all structure plan sheets

b. Provide all four digits for the Segment and Offset

3. Structure Plan Number (S-Number) (PP 1.6.2.5)

a. Submit a completed S-Number request form to the Assistant District Bridge Engineer – Design during the TS&L submission stage

b. For separated, dual structures, obtain a separate S-Number for each structure

4. Layout (PP 1.6.4.1)

a. Provide only bar scales on the structure plans

5. Checking (PP 1.6.4.3)

a. Do not indicate the Designer and Design Checker of a plan sheet as the same person. Do not indicate the Drafter and Drawing Checker of a plan sheet as the same person.

b. Ensure that all plan sheets and design calculations are initialed and dated by the Drafter and Designer and Checker

6. Duplication of Details (PP 1.6.4.6)

a. Minimize the duplication of dimensions or details in more than one place on the structure plans

7. Cross-Referencing (PP 1.6.4.7)

a. When details and/or notes appear on another structure plan sheet, cross reference that structure plan sheet

8. Reinforcement Bar Schedules (PP 1.6.4.10)

a. Provide overall rebar lengths to the nearest one inch

b. For new bridge projects, do not use the same bar mark for reinforcing bars within the same unit. For example, in an abutment, the bars might start out F401, EF 502, F403, etc. Then when the letter mark changes, the numbering should continue in sequence and not start over with 01, 02, 03 etc.

c. To eliminate any confusion in the field, the District prefers to use different sets of numbers for abutments and piers. For example, use 01, 02, 03 for Abutment No. 1 and 51, 52, 53 for Abutment No. 2. Same thought goes for piers – 21, 22, 23 for Pier No. 1 and 41, 42, 43 for Pier No. 2 and 71, 72, 73 for Pier No. 3

9. General Requirements - General Plan, Elevations, Typical Sections, Details, etc. (PP 1.6.4.11):

a. Provide the applicable notes from PP 1.7

b. Do not show Temporary Construction Easement and existing or proposed R/W lines on the General Plan view for all District Bridge Unit submissions

c. Provide a plan view that is clean and clearly shows the proposed bridge structure. Eliminate excessive existing topo and contour lines as needed. Consider dithering and dashing existing contour lines and using 2-ft contour intervals when large fill slopes are associated with a project.

d. Place the Index of Drawings on Structure Sheet No. 1. If not possible, place the index on Structure Sheet No. 2 and refer to this location on the first structure sheet

N/A e. ~~Identify horizontal and vertical limits for riprap. Provide horizontal limits to the nearest foot~~

N/A f. ~~Choke riprap at abutments only with R-3 riprap. Assume 30% 40% of total volume of riprap for the quantity of R-3 riprap~~

Strikethrough with N/A indicates preference not applicable to this Bridge.

N/A g. ~~Specify riprap thickness per Pub. 408 Section 850~~

h. Show temporary excavation and support protection system as a solid, straight line per D 11.1.1.8P

i. Do not indicate the Normal Water Surface Elevation on the structure sheets

j. For structures that require the construction of causeways and access roads, provide the following note in the Notice to Contractor special provision:

i. The Contractor is responsible for any damages resulting from increased backwater caused by the causeway and access road. No additional payment will be made for repair or replacement of the causeway and access road or multiple mobilization and demobilization of Contractor equipment and materials necessary during construction of this project. Time extensions will be based on the following water elevations and associated activities:

1. Construction of the pier – Water elevation **XXXX**
2. Construction of the abutments – Water elevation **XXXX**
3. Construction of the superstructure – Water elevation **XXXX**

One day will be added for each day that the water elevation has been met or exceeded for each work activity. See ECMS-26072, S-32518 and ECMS-24914, S-33235 for examples.

Yellow highlight indicates inclusion

k. Provide subsurface drain outlet endwalls (pup walls) as Roadway items when structure foundation drains outlet beyond the wingwalls and in front of the abutments, where feasible. Refer to RC- 31M

l. Specify only Schedule 40 PVC pipe for structure foundation drains and structure drain outlet pipes. For all structure foundation drains, provide perforated Schedule 40 pipe in accordance with Pub. 408 Section 610.2(a)1.1c. Provide a note on the structure plans that denotes this. No special provision is required

m. Reference the most current BC Standard drawings on the final structure plans

n. Do not repeat Section letters on the structure plans

o. Do not detail AASHTO No. 57 coarse aggregate and geotextile around foundation drains and at weepholes

p. ~~Detail weld symbols in accordance with the Bridge Welding Code and the AISC Manual of Steel Construction~~

Strikethrough with accompanying text indicates preference not applied and why.

Existing Information Review Form

Project: Major Bridge P3 Initiative Date: _____

Bridge: _____ Sub Bridge: _____

Discipline Design Lead(s) (DDL): _____ Initials: _____

Design Lead (DL): _____ Initials: _____

Design Lead Quality Manager (DLQA): _____ Initials: _____

Does the Submission:	**YES**	**NO**	**N/A**
○ DQMP (including training)?			
○ Reference Information Documents (RIDs)			
○ Design Development Criteria			
○ ECMTS Matrix			
○ Commitment Checklist			
○ Previous Comments and Responses (if applicable)			
○ Meeting Minutes (if applicable)			
○ District Preference (if applicable)			

Level 1 Review Form

LEVEL 1 REVIEW FORM ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE** INITIAL PACKAGE PROPOSAL DESIGN				DATE:
SUBMISSION:	*SUBMISSION NAME*		*DATE:*	
DOCUMENT:				
COMMENTS BY:	*SAI CONSULTING ENGINEERS, INC. (SAI) – NAME*			
EOR CONCURRENCE	*NAME*		*DATE:*	
COMMENT NUMBER	**BY**	**SHEET OR PAGE**	**COMMENT**	**RESPONSE**

Nonconforming Work Correction Form

Purpose: *Evaluate nonconforming work, identify the root cause and determine a course of action to rectify the situation.*	
Date:	**Bridge:**
Discipline:	**Sub Bridge.:**
Preparer:	**Submission:**
Nonconforming Work:	

Sections below are to be completed by a reviewer as assigned by the QAM.

Problem Statement:	
Description of Existing Process Associated with the Quality Issue:	
Resolutions/Recommendations:	
Date Form was Processed by Reviewer:	
Follow-Up Comments:	
Recorded on Nonconforming Work Correction Log:	☐ **Yes** _____ Number ☐ **No**

Nonconforming Work Correction Log

NONCONFORMING WORK CORRECTION LOG ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE**	DATE:

NCW NUMBER	**DISCIPLINE**	**NONCONFORMING WORK**	**INTENDED COMPLETED DATE**	**COMPLETED DATE**	**VERIFIED DATE**

Nonconforming Work Prevention Log

NONCONFORMING WORK PREVENTION LOG ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE**					DATE:
NCW NUMBER	**DISCIPLINE**	**NONCONFORMING WORK**	**PREVENTATIVE ACTION**	**ACTION DATE**	**CLOSURE VERIFICATION**

Notice of Design Change

Initiated By:
(Name, Role)

NODC #:
(Assigned by QAM)_____

Note:
Initial submittal of this form serves as notice to the Design Lead (DL) that revisions are in process and proceeding with construction without revised plans is at the contractor's risk and could result in removal of the items constructed. Contact the engineer immediately before proceeding with construction. Complete the ACKNOWLEDGEMENT block on the lower left.

REASON FOR CHANGE:
☐ Substandard feature
☐ Constructability concerns
☐ Conflicting design elements
☐ Conflicting with existing features
☐ Other

DESCRIPOTION OF REVISION:

PLAN SET(S) TO BE REVISED:

ATTACHMENTS:

ACKNOWLEDGEMENT	
Design Discipline Lead	Date
Design Lead	Date
QAM	Date
CL Designee	Date

Return to:
☐ CL _____
☐ DL _____
☐ QAM _____
☐ Design Lead _____
☐ Design Discipline Lead_____

ROW Impacts? ☐ Y ☐N
Env. Impacts? ☐ Y ☐N
Structural Feature Impact? ☐ Y ☐N
Roadway Feature Impact? ☐ Y ☐N

COPY DISTRIBUTION:

☐ File ☐ PennDOT

Periodic Audit Form

PERIODIC AUDIT FORM ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE** INITIAL PACKAGE PROPOSAL DESIGN						DATE:
AUDITOR:	*NAME*			*DATE:*		
RESPONDER:	*NAME*			*DATE:*		
SUBMISSION:	*SUBMISSION NAME*			*DATE:*		
STATUS	C = COMPLIANCE		D = DEFICIENY	OFI = OPPORTUNITY FOR IMPROVEMENT		
NUMBER	**REFERENCE**	**REQUIREMENT**	**EVIDENCE**	**VERIFIED BY INSPECTION OR INTEREVIEW**	**STATUS**	**COMMENTS**

Periodic Audit Form

Audit Number:

Audit Date:

Submission Audited:

Preamble:
{text}

Findings:
{text}

	Total Audit Items	Conforming	OFI	Deficient	Comments
Audit Items					

Summary and Conclusion
{text}

Training Completion Log

TRAINING COMPLETION LOG ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE**	DATE:

FIRM	NAME	ROLE	TRAINING DATE

RIDS Change Form

RIDS CHANGE FORM ***MAJOR BRIDGE P3 INITIATIVE*** **BRIDGE** **SUB BRIDGE** INITIAL PACKAGE PROPOSAL DESIGN			DATE:
SUBMISSION:	*SUBMISSION NAME*	*DATE:*	
DOCUMENT:			
COMMENTS BY:	*FIRM – NAME*		
The purpose of this form is not to list all minor changes but rather major concept changes to assist reviews.			

CHANGE NUMBER	DISCIPLINE	NATURE OF CHANGE	REASON

APPENDIX 4

Document Management and Procedures Memorandum

Purpose
The purpose of this procedure is to present document control numbering system for Quality Assurance PDA Work. The memo provides guidelines for the following documents:

1. Folder System
2. Technical Documents
3. Correspondence Documents
4. References for Documents

V. Folder System

The following system is proposed for the folder system.

	-		-		-		-		
Project	-	Bridge	-	Stage	-	Type	-	Version Number	

b. Project:

This field defines the Project:

BPP

b. Bridge:

This field defines the Bridge:

BPP	-	Nescopeck

Nescopeck	-	I-80 Nescopeck Creek Bridges
Lehigh	-	I-80 Lehigh River Bridge
Canoe	-	I-80 Canoe Creek Bridges
North Fork	-	I-80 North Fork Bridges
Susquehanna	-	I-81 Susquehanna
Lenhartsville	-	I-78 Lenhartsville Bridge Replacement
South Bridge	-	I-83 South Bridge
Girard Point	-	I-95 Girard Point Bridge Improvement

Bridgeville	-	I-79 Widening, Bridges and Bridgeville Interchange Reconfiguration

c. Stage:

This field defines the submission stage:

BPP	-	Nescopeck	-	Initial Package

Initial Package	-	Initial Package Proposal Design
Package Proposal	-	Package Proposal Design

d. Type:

This field defines the Type of the document:

BPP	-	Nescopeck	-	Initial Package	-	TSLS

P	L	A	N	-	Drawings/Plans
S	P	E	C	-	Specification
C	A	L	C	-	Calculations
R	E	P	T	-	Technical Report
D	F	V	I	-	Design Field View
T	S	L	S	-	Type, Size and Location
S	F	R	T	-	Structure Foundation Report
G	E	R	T	-	Geotechnical Engineering Report
S	H	O	P	-	Shop Drawing
S	C	H	O	-	Program
Q	A	Q	C	-	Quality Program QA/QC
M	I	S	C	-	Miscellaneous

e. Version Number:

This field defines the Version Number:

BPP	-	Nescopeck	-	Initial Package	-	TSLS	-	01

f. Example:

The first submission for the Type, Size and Location for I-80 Nescopeck Creek Bridges in the

initial package proposal Design.

BPP	-	Nescopeck	-	Initial Package	-	TSLS	-	01

VI. Technical Documents

The following system is proposed for the technical document to ensure consistent numbering/naming for the project.

			-			-				-					-			-				-			
Project			-	Bridge		-	Type			-	Package				-	Version Number		-	Stage						

a. Project:

This field defines the Project:

B	P	P

b. Bridge:

This field defines the Bridge:

B	P	P	-	0	1

0	1	-	I-80 Nescopeck Creek Bridges
0	2	-	I-80 Lehigh River Bridge
0	3	-	I-80 Canoe Creek Bridges
0	4	-	I-80 North Fork Bridges
0	5	-	I-81 Susquehanna
0	6	-	I-78 Lenhartsville Bridge Replacement
0	7	-	I-83 South Bridge
0	8	-	I-95 Girard Point Bridge Improvement
0	9	-	I-79 Widening, Bridges and Bridgeville Interchange

			Reconfiguration

c. Type:

This field defines the Type of the Document:

B	P	P	-	0	1	-	T	S	L	S

P	L	A	N	-	Drawings/Plans
S	P	E	C	-	Specification
C	A	L	C	-	Calculations
R	E	P	T	-	Technical Report
D	F	V	I	-	Design Field View
T	S	L	S	-	Type, Size and Location
S	F	R	T	-	Structure Foundation Report
G	E	R	T	-	Geotechnical Engineering Report
S	H	O	P	-	Shop Drawing
S	C	H	O	-	Program
Q	A	Q	C	-	Quality Program QA/QC
M	I	S	C	-	Miscellaneous

d. Package:

This field defines the Version Number:

B	P	P	-	0	1	-	T	S	L	S	-	S	T	R	C

M	I	S	C	-	Miscellaneous
B	D	W	Y	-	Roadway Drainage
S	P	M	P	-	Signing & Pavement Markings
S	I	G	L	-	Signalization
I	T	S	Y	-	ITS
L	G	H	T	-	Lighting
L	A	N	D	-	Landscape
A	R	C	H	-	Architectural
S	T	R	C	-	Structural
G	E	O	T	-	Geotechnical
U	T	I	L	-	Utilities
T	C	P	L	-	Traffic Control
E	N	V	I	-	Environmental

T	O	L	L	-	Tolling

e. Version Number:

This field defines the Version Number:

B	P	P	-	0	1	-	T	S	L	S	-	S	T	R	C	-	0	1

f. Stage:

This field defines the submission stage:

B	P	P	-	0	1	-	T	S	L	S	-	S	T	R	C	-	0	1	-	0	1

0	1	-	Initial Package Proposal Design
0	2	-	Package Proposal Design

g. Example:

The first submission for the Type, Size and Location for I-80 Nescopeck Creek Bridges in the Initial Package Proposal Design.

B	P	P	-	0	1	-	T	S	L	S	-	S	T	R	C	-	0	1	-	0	1

VII.Correspondence Documents

The following numbering system is proposed for the correspondence documents to ensure consistent numbering/ naming for the project.

			-			-			-				-			-						

Project	-	Bridge	-	Type	-	Sequential Number	-	Version Number

b. Project:

This field defines the Project:

B	P	P

b. Bridge:

This field defines the Bridge:

B	P	P	-	0	1

0	1	-	I-80 Nescopeck Creek Bridges
0	2	-	I-80 Lehigh River Bridge
0	3	-	I-80 Canoe Creek Bridges
0	4	-	I-80 North Fork Bridges
0	5	-	I-81 Susquehanna
0	6	-	I-78 Lenhartsville Bridge Replacement
0	7	-	I-83 South Bridge
0	8	-	I-95 Girard Point Bridge Improvement
0	9	-	I-79 Widening, Bridges and Bridgeville Interchange Reconfiguration

c. Type:

This field defines the Type of Document:

B	P	P	-	0	1	-	C	O	M

N	C	R	-	Nonconformance
L	E	T	-	Letter
M	E	M	-	Memo
M	I	N	-	Meeting Minutes
T	R	S	-	Transmittals
C	O	M	-	Comments
R	S	P	-	Responses

d. Sequential Number:

This field defines the four-digit numerical numbers to be used sequentially.

B	P	P	-	0	1	-	C	O	M	-	0	0	0	1

VIII. References for Documents:

All Documents should be submitted in PDF format. The PDF sheet number should be the page number (e.g., a cover or title sheet would be page 1). References including comments and responses should reference to document name above and the PDF page number.

APPENDIX 5

Hypothetical-Design Scenario

Hypothetical-Design Scenario

The following scenario demonstrates the DQMP operation for a typical Project deliverable.

1. As part of the DQMP planning for a deliverable, the design, checking, review, audit, and submittal schedule is communicated by the DBPM and the DL to the Team. The DBPM and DL development the Commitment Checklist based on the PDA Proposal.

2. Design and management staff complete training based on the DQMP. Individuals who have completed training are noted in the Training Completion Log.

3. DLQA, DL, and DDLs complete the Existing Information Review Form.

4. The Design Team completes the production of the deliverable.

5. When the deliverable is ready for detailed checking, the DL and DDL work together to assign qualified detailed checkers for the work. The detailed check is performed in accordance with the Production Check process.

6. The Quality Control process includes some or all of the following post-checking reviews:
    a. Production Check by a senior expert(s) in the field,
    b. Cross Discipline Review by the DDL's or their delegate(s),
    c. Constructability and Maintainability Review by the Lead Construction Contractor or delegate

    These reviews are documented via markups and/or comments, resolved, and revisions made to the deliverable. If there are concept changes from the RIDs the RIDs Change Form is completed and included with the submission. The QAM is notified of the upcoming reviews.

7. Following the successful resolution and incorporation of all detailed check markups and QC comments, the package is assembled by the DL and given to the DLQA who completed the DLQA Form.

8. Following the successful resolution and incorporation of DLQA comments during reviews, the package is assembled by the DL and provided in SharePoint to the DQM for audit.

9. The DQM completes an audit of the submission to verify the DQMP compliance of the work being submitted and nonconformances are noted and logged. The DQM then signs the bottom of the DLQA Form. The DQM communicates to the QAM that QA Audits are underway.

10. Concurrently the DQM coordinates the independent Level 1 Review by an appropriate expert in the field. The Level 1 Review is completed making PDF markups using the Production Check and placing comments in the Comment Response Form. The DQM coordinates addressing the comments through the DL and DLQA. The comments are addressed and resubmitted for approval. The process continues until all comments are addressed or agreed for deferral. The DQM creates the Deferred Comment List.

11. As the DQM notes nonconforming work, it is logged in the Nonconforming Work Log and a

Nonconforming Work Correction Form is filled out. The DQM works with the DL and DDLs to disseminate the nonconforming work correction as indicated on the form.

12. As the DQM notes the need for preventative measures, the Nonconforming Prevention Log is filled out and the DQAM works with the DL and DDLs on the preventative action.

13. The DQM signs the Certificate of Compliance for the submission once all comments are addressed and coordinates with the DL the submission to PennDOT via e-Builder.

14. PennDOT input is received and stored on SharePoint with the submission.

15. The DL and DDLs address any outstanding issues and resubmit for final PennDOT approval.

BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 2

Appendix 5, 3.2

PDA Work Criteria

Approach to PDA Reporting

Gerald Desmond Bridge, California
FCC

4.6.1(g) Approach to PDA Reporting

4.6.1(g)(i) BPP'S REPORTING APPROACH AND COORDINATION MEETINGS

Bridging Pennsylvania Partners (BPP) understands the urgency to "hit the ground running" in order to maximize expedited delivery of the Bridges and maximizing the number of Bridges to be included in First Package. BPP has organized its approach to meetings and reporting to align with PennDOT's goals for the Project. As detailed in Section 4.6.1(e) - Approach to PDA Partnering and Collaboration, BPP will formally initiate its partnering relationship with PennDOT through the organization of a **kick-off meeting** within the first two weeks of its selection as Best Apparent Value Proposer. During the kick-off meeting, the parties will agree all key interfaces, communication and data sharing protocols consistent with the PDA Work Requirements and **a preliminary schedule of meetings through submission of the First Package Proposal.** These meetings between PennDOT and BPP will include:

- PDA Work Progress Meetings, every two weeks
- Monthly PDA Progress Meetings, every month
- Steering Committee Meetings, every month
- Workstream Meetings, every week for each workstream. As detailed in Section 4.6.1(c) - Preliminary PDA Organization, BPP's workstreams include: Project Management, Design and Construction, Maintenance, Public and Community Engagement, Commercial and Legal, and Finance
- Technical Working Group meetings, every two weeks or as required
- Stakeholders' Engagement Meetings, every month
- Collaboration Workshops, every two months

More detail on these meeting frequency, attendees and objectives are presented in Table 1.

PennDOT and BPP will also establish **a joint risk and opportunity tracker,** that will be updated and reviewed at each subsequent PDA Work Progress Meeting and included in the Bi-Weekly Progress Reports.

For each coordination meeting, BPP will circulate an agenda before the meeting, with the meeting's purpose and objectives listed, for review by PennDOT. Based on the agenda, each party will be encouraged to ensure that the right participants attend the meeting having regard to their expertise and decision-making ability. BPP will work with PennDOT to ensure that all meetings remain targeted and agenda-focused, especially given the timeframes under which the parties must complete the PDA Work for the First Package. For each meeting, BPP will have a nominated person in charge of circulating the record of attendees and minutes. The minutes will be circulated for comments after the meeting, before being finalized, to ensure that these documents record an accurate depiction of the interactions and that the action items are understood by all.

4.6.1(g)(ii) DATA SHARING AND SUBMITTALS

BPP will comply with all the data sharing and Submittals requirements detailed in Section 2.5 of the PDA Work Requirements, including the implementation of PennDOT's e-Builder system no later than 14 days after execution of the PDA. PennDOT will have full viewing, downloading and uploading rights to the documents at all times. BPP will provide joint training sessions for BPP and PennDOT's personnel as necessary for the use of e-Builder and work with PennDOT to ensure that any required transfer is compatible with its electronic storage and management systems and any data transfer requirements have been met prior to Package Proposal submissions.

BPP will use the following additional software:

- **Microsoft Teams** to manage document and information flows
- **Bluebeam** to communicate and record comments on design plans. Bluebeam also allows reviewers to electronically collaborate in real time and reviewer is able to see added comments. It also serves as a record of comments received
- **Bentley System's ProjectWise**, a secure internet-based collaboration tool, to update and maintain in-progress design drawings. ProjectWise is also used to share design files, offering increased functionality for viewing and editing drawings without the need for cumbersome downloading of files. ProjectWise facilitates "real-time" drawing control which is

necessary in a fast-paced design-build environment. The program allows multiple authorized users to simultaneously edit drawings, pushing all edits to the master drawing for instant updates

BPP will maintain a complete file index for each platform, providing easy navigation and document review. In accordance with Section 2.5.2 of the PDA Work Requirements, BPP will submit to PennDOT a list of submittals, for which BPP and PennDOT will agree content and purpose, status, planned schedule for submission, anticipated level of review by PennDOT and whether the submittal will be subject to a QA/QC process.

Each Submittal will be uploaded to the system with a transmittal cover sheet, an example of which is presented Appendix 1. BPP's proposed transmittal cover sheet format is based on those successfully used on other projects, including projects procured as PDAs and can be updated to best fit PennDOT's reporting needs.

4.6.1(g)(iii) PROGRESS REPORTS

As part of the kick-off meeting, BPP will agree with PennDOT the forms of the progress reports to be prepared during the Pre-Development Phase, consistent with the PDA Work Requirements and proposed BPP's partnering approach.

4.6.1(g)(iii)(a) PDA BI-WEEKLY PROGRESS REPORTS

BPP will prepare and update Bi-Weekly Progress Reports, a sample of which is provided in Appendix 2, that will be submitted to PennDOT with the proposed agenda for each PDA Progress Meeting. These reports will cover all information required in Section 2.5.3 of the PDA Work Requirements, including:

- Status of the PDA Work, with consolidation of all relevant inputs from the risk and opportunity tracker, D&C and Maintenance progress, Costing Models and stakeholders. The status of the PDA Work will be compared against the Baseline PDA Work Schedule and updates from previous periods
- Summary of all formal meetings and BPP's activities for the previous period as well as an eight-week look ahead for all key activities and meetings. This includes
  - any site and other field investigations, testing, or studies completed
  - progress of the ROW acquisition process
  - stakeholder coordination activities, status, and any required actions
  - public outreach and community engagement activities
- Status of the commercial development of key documents and open issues between the parties
- Listing of properties where additional environmental assessments occurred, might occur or for which the environmental risk is unknown
- Updated list of Submittals for the PDA Work
- Updated Affected Third Party Plan and Utility Conflict Matrix as necessary
- Risk and opportunity tracker updated for any issues encountered, mitigating steps taken and any issues resolved since the last report
- Tracking of all Allowed Costs incurred against anticipated budget and Pre-Development Cost Cap
- Status of the DBE/SBE engagement and outreach against participation goals, and
- List of decisions or approvals needed within the next ninety days and party responsible

4.6.1(g)(iii)(b) WORKSTREAM REPORTING

As presented above, each BPP workstream will establish weekly coordination meetings with their PennDOT counterparts. During these meetings, the parties will cover:

- BPP's activities from the previous week, a one-week look-ahead of upcoming activities and meetings related to the workstream and action items for each party
- The results of any investigations or de-risking activities and impact on the workstream activities
- All stakeholder coordination activities, status, and any required actions by BPP, PennDOT, a Governmental Entity or a third-party in relation to the workstream
- Any issue or opportunity encountered, mitigation steps or action taken, and resolution since the last report in relation to the workstream

The mutually agreed meeting minutes from these weekly coordination meetings will be used to inform the PDA Bi-Weekly Progress Reports that will consolidate the information for all workstreams.

TABLE 1 - KEY COMMUNICATION SCHEDULE AND PROTOCOL

MEETINGS	FREQUENCY	ATTENDEES	OBJECTIVES
PDA Required Coordination Meetings			
PDA WORK PROGRESS MEETINGS Reporting: Meeting attendees; agenda with purpose, objectives, and action items with responsible parties for each	Weekly from PDA Effective Date to Financial Close of each Package or as often as deemed necessary by PennDOT.	• BPP's Leadership Team and PennDOT's Management Team • As required: BPP's Management Team or workstream member and PennDOT's function leads • As required: BPP and PennDOT's advisors	• Discuss progress against planned activities, risk assessments, and mitigation activities for each Bridge and Package – including review of the risk and opportunity tracker • Discuss submittal approvals and areas for collaboration • Discuss any unresolved items, areas of concern or actions taken
MONTHLY PDA PROGRESS MEETINGS Reporting: PDA Bi-Weekly Reporting; risk and opportunity tracker; and Minutes	Monthly, within 30 days after PDA Effective Date up to Financial Close for each Package	• BPP's Leadership Team and PennDOT's Management Team • As required: BPP's Management Team and PennDOT's function leads • As required: BPP's and PennDOT's advisors	• Review of the previous period Progress Reports and eight-week look-ahead for all PDA Work activities • Discuss progress against planned activities, risk assessments and mitigation activities for each Bridge and Package relative to the Baseline PDA Work Schedule and critical path • Report on Allowed Costs incurred to date against budget and look forward • Discuss any unresolved items, areas of concern or actions taken – including status of approvals from governmental agencies and third parties and submittals • Summary of stakeholder coordination and public outreach
STEERING COMMITTEE Reporting: Minutes and Resolutions	Monthly from Kick Off Meeting, or as required	• BPP's Board Members and Project Manager • PennDOT's Representatives	• Formally escalate any issue or areas of concerns in the progress of the PDA Work for resolution • Develop and issue recommendation to BPP and PennDOT Management Teams regarding critical issues to the Project • Assist in dispute resolution between the parties, or with third-parties
BPP Proposed Partnering Meetings			
KICK-OFF MEETING	Once, as soon as possible, and within two weeks of selection as Apparent Best Value Proposer	• BPP Leadership Team, Management Team and selected work-stream members • Lead Construction Contractor and Lead Engineering Firm and other members as required • PennDOT's team members and advisors, as required • Senior Executive Leadership from both parties	• Confirm understanding of the goals and objectives and define success for the Project • Agree the key interfaces, communication and data sharing protocols • Identify potential areas of concerns and resolution ladder between workstreams, project management and senior leadership team • Establish first draft of the risk and opportunity tracker
WORKSTREAM MEETINGS (i.e. Design & Construction, Maintenance, Public and Community Engagement, Commercial and Legal, and Finance) Reporting: Minutes and Action Lists Workstream Reporting (as required)	Weekly, from Kick Off Meeting	• BPP and PennDOT's Leadership Team • BPP and PennDOT's respective workstream lead and workstream members (including advisors as required)	As relevant for the workstream: • Update stakeholders on key deliverables and progress on key commercial, technical or financing activities and resolve as required • Negotiate key commercial agreements for each Package, including and technical provisions • Organize value engineering and constructability workshops • Support risk identification and mitigation workshops • Prepare design coordination meetings • Organize look-ahead for scheduled meetings and activities • Prepare estimating system for an open book price / reasonability assessment • Discuss and agree optimal financing structure, including use of TIFIA and PABs for debt financing
TECHNICAL WORKING GROUPS (i.e. ROW, Environmental, Quality, Safety, etc.) Reporting: Minutes and Action Lists	As required, but no less than every two weeks from Kick Off Meeting	• BPP's Leadership Team and Management Team (as required) • PennDOT and relevant advisors • BPP's subject matter experts relevant to the TWG	• Coordinate and plan discussions on PDA Work • Lead interdisciplinary coordination across the technical and non-technical workstreams • Schedule look-ahead for upcoming activities and field work • Identify governmental agency or third-party coordination needs
STAKEHOLDERS' ENGAGEMENT MEETINGS Reporting: Minutes and Action Lists	Ad-hoc, but no less than monthly from PDA Effective Date	• Public and Community Engagement workstream • BPP's Leadership Team • PennDOT and relevant advisors • As required: third party or relevant stakeholder(s)	• Partner and collaborate with the community of stakeholders • Provide resources to foster public understanding and engagement with the Project • Listen to concerns and better understand issues and challenges that may be created by the Project • Develop a subcontractor and DBE Utilization Plan
COLLABORATION WORKSHOPS Reporting: Minutes and Action Lists	Every two months from Kick Off Meeting, or as required	• BPP and PennDOT's Leadership and Senior Executive Teams • External Partnering Facilitator	• Discuss and escalate blockage points and areas of concerns related to work progress or team dynamics with a focused group of decision makers ahead to any escalation to the Steering Committee • Define top-down messaging to be communicated to the BPP and PennDOTs teams • Ensure that team expectations and behaviors are set toward our common goal of delivering a successful Project

APPENDIX 1

BPP Transmittal Cover Sheet Template

BPP SUBMITTAL COVER SHEET

To:	**Mr. Michael Bonini, Director** Public-Private Transportation Partnership Office 400 North Street - 6th Floor Harrisburg, PA 17130	A	**From:**	**Ms. Sarah Schick** Bridging Pennsylvania Partners	B **Date Submitted:**

C **PennDOT e-Builder FIELDS - Choose from drop down list**

LETTER/TRANSMITTAL	Transmittal	**TRAN**
TYPE:	Exhibit 6 Submittal	
REQUEST ACTION:	For Review and Comment	
PennDOT DISCIPLINE:	Project Controls	
Submittal ID #:	PH1-TRAN-BPP-1900-00022	

BPP FIELDS - Choose from drop down list

CONTRACT SEGMENT:	[To be Included]
ELEMENT:	[To be Included]
TECHNICAL DISCIPLINE CODE:	[To be Included]
PACKAGE NO.:	[To be Included]
SUBCONTRACTOR ID:	[To be Included]
SPECIFICATION NO.:	[To be Included]
INPUT SUBMITTAL ID.	00022 *See Note below*
BPP INTERNAL TRANSMITTAL NUMBER:	[To be Included] **REV NO.:** 00
RELATED TO ANOTHER SUBMITTAL:	NO
INPUT RELATED SUBMITTAL #:	[redacted]

Note *BPP SUBMITTAL ID. # above shall be provided by BPP **Document Control** and entered into Submittal Cover Sheet.*
*BPP INTERNAL TRANSMITTAL NUMBER will **auto generate**.*

D Title of Submittal

BPP Predevelopment Schedule

E Description of Submittal

This Baseline of the PDA Work Schedule has been prepared and is submitted in line with the requirements outlined in Section 2.6.3. The PDA Work Schedule of Exhibit 6 of the Project Agreement. This BaselinePDA Work Schedule is a refinement to the originally provided Proposal Schedule and carries the full scope of work as outlined in the Predevelopment Work requirements, in addition to the follow-on D&C work. We are prepared to submit schedule updates as soon as this Baseline Schedule is accepted by PennDOT.

Number of File Attachments in Submittal: 5

File Attachments ☐ NO ☑ YES. Include File List File Format:--> ☐ DGN ☐ DWG ☐ XLXS ☑ PDF ☐ DOCX ☑ OTHER: XER

#	File Name include Extension	#	File Name include Extension	#	File Name include Extension
1	00022 Transmittal Cover Sheet.pdf	6		11	
2		7		12	
3		8		13	
4		9		14	
5		10		15	

F

TYPE OF DISTRIBUTION:	SHA	3rd Party Entity	Utility Owner
☐ Information			
☐ Review & Comment			
☐ Review & Approval			

G VARIANCE

NO [X] YES [ ] If yes, please provide list and references. _____

H

DISCIPLINE LEAD SUBMITTED BY:		DATE:	
DISCIPLINE LEAD SIGNATURE			

I LEAVE THIS AREA EMPTY (For Internal Use Only)

APPENDIX 2

BPP Bi-Weekly Report Template

Draft

BPP Bi-Weekly Progress Report

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

Bridging Pennsylvania Partners

Bi-Weekly Progress Report

TABLE OF CONTENTS

1. Introduction

This report covers work activities carried out under the Public-Private Transportation Partnership Pre-Development Agreement (PDA) by Bridging Pennsylvania Partners (BPP) and its agents, that have occurred in the period from [X] to [X]. Where relevant, the update also covers the period to the time of writing in [X].

As required in Exhibit 6 Section 2.5.3, this report is intended to update the Pennsylvania Department of Transportation (PennDOT) on work under the PDA completed and anticipated in the upcoming eight weeks to [X].

The following items required under the same Section will be submitted to PennDOT in separate submittals to this report through e-Builder with the corresponding transmittal numbers:

1. DBE submittals are packaged in the DBE Monthly Report ([X] submitted [X])
2. BPP Allowed Costs Report ([X] submitted [X])

2. Status of PDA Work

This section report status of the PDA Work, broken down by workstreams and compared to the PDA Baseline Schedule, and will include:

- D&C PDA Work Progress including:
  - Design Submittals
  - Site and Field Investigations
  - D&C Costing Model
  - Risk Workshops and Analysis
  - Technical Provisions
  - Subcontracting and DBE approach
- Maintenance PDA Work Progress, including Maintenance Costing Model
- Commercial and Legal PDA Work Progress including negotiation of the Project Agreement and other Ancillary Documents
- Finance PDA Work Progress including financing structure, debt and equity process
  Public and Community Engagement (including Stakeholders') PDA Work Progress

3. Summary of meetings and activities

3.1 Previous period meetings and activities

The following table summarizes the PDA Entity's key activities anticipated and completed for the period from [X] to [X], broken down by workstream. [Note: This table should be based on anticipated activities for that period included in previous period report]

Table 1 - PDA Work Activities for the Period

Workstream	Scheduled Activities for the Period	Completed Activities for the Period
Project Management	• [XX]	• [XX]
Design and Construction	• [XX]	• [XX]

Workstream	Scheduled Activities for the Period	Completed Activities for the Period
Maintenance	• [XX]	• [XX]
Public and Community Engagement	• [XX]	• [XX]
Commercial and Legal	• [XX]	• [XX]
Finance		

All meetings that occurred during the period of this report, in which the PDA Entity participated are listed in the table below. [Note: This table should be based on anticipated meetings for that period included in previous period report]

Table 2 - Meetings for the Period

Date	Title	Workstream	Attendees	Name and Location of Minutes File
[MM-DD-YY]	[X]	[Project Management / Commercial and Legal / Finance / Design and Construction / Maintenance / Public and Community Engagement]	• [XX]	File Name [hyperlink]
…				

3.2 Upcoming period meetings and activities

Upcoming meetings between BPP and PennDOT are listed in Table 3. Some meetings may be cancelled or rescheduled to accommodate holidays or conflicts.

Table 3 - Meetings Scheduled for Upcoming Period

Date	Title	BPP Attendees	PennDOT Attendees	Third Party Attendees	Responsible Party
[MM-DD-YY]	[Progress Meeting]	• [XX]	• [XX]	• [XX]	[XX]
[MM-DD-YY]	[Commercial Workstream Meeting]	• [XX]	• [XX]	• [XX]	[XX]
[MM-DD-YY]	[Design Review Workshop]	• [XX]	• [XX]	• [XX]	[XX]
[MM-DD-YY]	[Steering Committee]	• [XX]	• [XX]	• [XX]	[XX]
…					

Table 4 summarizes meetings coming up relating to community and stakeholder engagement.

Table 4 - Stakeholders and Community Engagements Meetings

Date	Title	BPP Attendees	Third Party Attendees	Responsible Party
[MM-DD-YY]	[XX]	• [XX]	• [XX]	[XX]
…				

The following table summarizes the PDA Entity's key activities anticipated over the next 8 weeks, for the period from [X] to [X], broken down by workstream.

Table 5 -8-week look-ahead of key PDA Work Activities

Workstream	Scheduled Activities
Project Management	• [XX]
Design and Construction	• [XX]
Maintenance	• [XX]
Public and Community Engagement	• [XX]
Commercial and Legal	• [XX]
Finance	• [XX]

4. Commercial development: key documents and open issues

4.1 PDA

This section outlines any open point of discussion, claim or relief being raised or negotiated between the PDA Entity and PennDOT under the Pre-Development Agreement.

4.2 Project Agreement

This section summarizes all open items in the negotiation of the Project Agreement between BPP and PennDOT.

Table 6 - Commercial Open Issues

Section of the Project Agreement	BPP Position	PennDOT Position	Status
…	…	…	…

4.3 Other Ancillary Documents

This section summarizes all open items in the negotiation of the other Ancillary Documents for each Package between BPP and PennDOT.

Table 7 - Commercial Open Issues

Document	Section of the Agreement	BPP Position	PennDOT Position	Status
	…	…	…	…

5. Environmental Assessments

This section summarizes all properties where additional environmental assessment has occurred, might occur or which the environmental risk in unknown.

6. Updated list of Submittals for PDA Work

The list of Submittals required under Section 2.5.2 of Exhibit 6 of the PDA (PDA Work Requirements) is presented in Table 8 below.

Table 8 – PDA Work List of Submittals

Date	Submittal and Type	Description	Level and Duration of Review	Status
….				

7. Updated Risk and Opportunity Tracker

Table 9 below present the updated risk and opportunity tracker updated for the period from [X] to [X].

Table 9 – Risk and Opportunity Tracker

Risk / Opportunity	Owner	Potential Cost/Schedule Impact	Mitigation Strategy	Actions
[X]	[BPP] / [PennDOT]	[High / Medium / Low]	[XX]	[XX]
…				

Key changes and notable events from previous period include:

- [XX]

8. Allowed Costs update

Table 10 below present the costs incurred by BPP in undertaking the PDA Work updated for the period from [X] to [X].

Table 10 – Cost and Allowed Cost Incurred

Costs Category	Allowed Cost incurred during period	Total Allowed Costs incurred to date	Predevelopment Cost Cap	Other Cost Incurred during period	Total Cost Incurred to Date
[X]	$[X]	$[X]	$[X]	$[X]	$[X]
….					

9. Decisions and Approvals

This section summarizes decisions and approvals that was undertaken by either party during this reporting period.

BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 3 First Package Work Criteria

BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 3

Appendix 5, 3.3

First Package Work Criteria

First Package Approach, Schedule, and Organizational Strategy

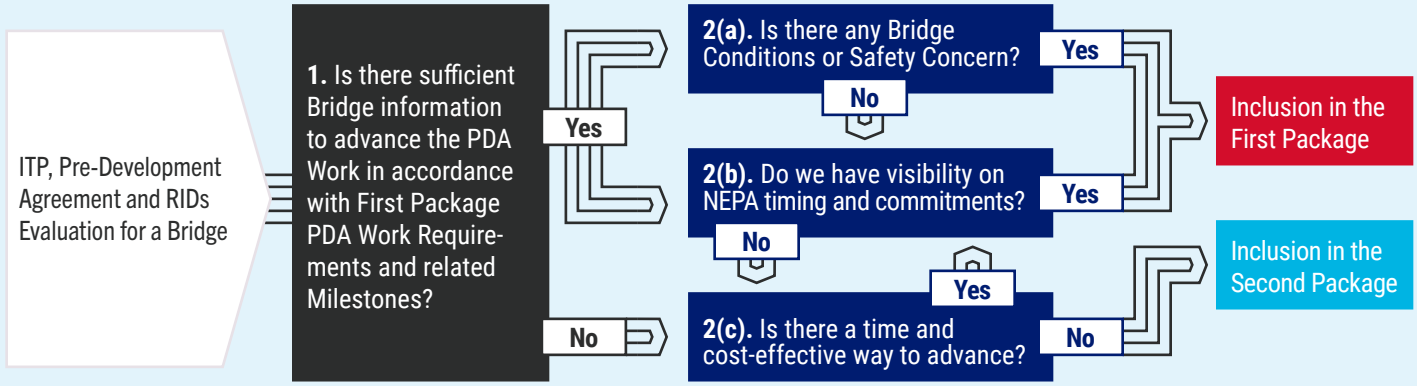
Cross Israel Highway, Israel
Shikun & Binui

4.6.2(a) First Package Approach, Schedule and Organizational Strategy

4.6.2(a)(i) PRELIMINARY APPROACH FOR THE FIRST PACKAGE

As introduced in our response to Section 4.6.1(a) – Introduction to Proposer's High-Level Approach to Pre-Development and Packaging, Bridging Pennsylvania Partners' (BPP) approach to Packaging intends to (i) maximize the number of Bridges included in the First Package, (ii) minimize the number of Packages, (iii) mitigate the delivery risk for each Package and (iv) accelerate the delivery of all Bridges. This approach provides an all-around best value solution through a firm commitment to delivering the Program objectives, with schedule certainty and value realization. With these objectives in mind, we developed our proposed Packaging based on a thorough evaluation of each of the nine Bridges against a set of defined criteria to achieve the Project goals. This approach is summarized in the process flow diagram shown in Figure 1 below.

FIGURE 1 - BRIDGE EVALUATION PROCESS



As illustrated above, and later detailed in this Section, our vetting process began with an extensive review of the Reference Information Documents (RIDs) and associated Project Documents. Our principal criterion was to determine if we could sufficiently progress the PDA Work to confidently meet the Pre-Development Milestones by their respective deadlines in accordance with Exhibit 5 (Pre-Development Milestones and Deadlines) and Exhibit 6 (PDA Work Require-ments) of the PDA. Once this gating question was addressed for each of the nine Bridges in the Package, BPP continued its evaluation of each Bridge against the following criteria:

- Bridge **condition issues and elevated safety concerns** based on inspection reports and condition assessments provided in the RIDS
- Confirming **visibility of the NEPA process** and certainty for NEPA approval to be obtained sufficiently in advance of the key Design and Proposal submittals due dates
- Determining the **potential for and cost effectiveness of accelerating the PDA Work** for a Bridge to be included in the First Package without putting the timeline at risk

The evaluation results for all nine Bridges of the Program are summarized in Table 1 on the following page.

BPP identified six Bridges that should be included in the First Package: I-81 Susquehanna, I-80 Nescopeck, I-78 Lenhartsville, I-80 Lehigh River, I-80 Canoe Creek and I-80 North Fork. The remaining three Bridges will be included in the Second, final Package.

Once our Bridge Packaging evaluation process was concluded, BPP also reviewed each Package individually to confirm that each would be financeable and operable as a single project, by running a high-level indicative viability analysis of each Package. This analysis relied on in-house preliminary traffic and revenue forecasts based on range of toll rates in-line with current PTC pricing, traffic counts provided in the RIDs and publicly available information, diversion metrics from existing benchmarks, and future traffic growth derived from macro and micro socioeconomic factors in the region. These estimates were then tested against estimated capital, maintenance and financing costs for each Bridge.

TABLE 1 – PACKAGING EVALUATION PROCESS

	I-81 Susque-hanna	I-80 Nescopeck	I-78 Lenhartsville	I-80 Lehigh River	I-95 Girard Point	I-83 South Bridge	I-80 Canoe Creek	I-80 North Fork	I-79 Bridgeville
1. Sufficient Level of Bridge information provided in the RIDs	YES	PARTIAL	YES	YES	NO	NO	YES	PARTIAL	PARTIAL
2(a). Bridge Condition or Safety Concern	NO	NO	NO	YES	YES	YES	YES	YES	NO
2(b). Visibility on NEPA timing and commitments	YES	YES	YES	YES	NO	NO	YES	YES	NO
2(c). Cost-effectiveness and potential to accelerate PDA Work	YES	YES	YES	PARTIAL	NO	NO	YES	PARTIAL	NO
Package Determination	1	1	1	1	2	2	1	1	2
Main Rationale	Schedule Certainty	Cost Effective-ness of PDA Work Acceleration	Schedule Certainty	Safety and Reliability	Complexity, Low design development and higher risk	Complexity, Low design development and higher risk	Safety and Reliability	Safety and Reliability	Complexity, Low design development and higher risk

Our analysis confirmed that each Package should provide value to the Commonwealth and is financeable and operable as a single project. BPP will make its in-house expertise available to PennDOT during the Pre-Development Phase to support PennDOT's traffic and revenues forecast efforts, should it be helpful for the development of the Project.

Our First Package, with six Bridges, accomplishes the following PennDOT Program objectives:

> **Enhanced safety** and minimized risk of bridge restrictions or closures with the inclusion of three fracture critical bridges,

> **Optimized Schedule acceleration** with the inclusion of the maximum number of Bridges able to be processed through the design submittal process without jeopardizing the deadline for Package Proposal submission and

> A sustainable and diversified **funding stream** across the Commonwealth with the inclusion of three major Interstate routes

4.6.2(a)(i)(a) MAIN RATIONALE FOR I-80 LEHIGH RIVER, I-80 NORTH FORK, AND I-80 CANOE CREEK: SAFETY

BPP assessed at-risk Bridge conditions looking to improve safety and minimize the potential for time and financial impacts resulting from Bridge restrictions and/or closures.

We quickly identified three Bridges: I-80 Lehigh River, I-80 North Fork and I-80 Canoe Creek as having the highest risk of restrictions and/or closures based on their maintenance and inspection records. These existing structures are two girder fracture critical superstructures with a history of detailed inspections including an increased inspection frequency requirement of every six months due to their condition. The inspection reports also note the necessity of numerous cracks and other structural repairs. I-80 Canoe Creek and I-80 North Fork also have a history of slope failures which is a serious cause of concern for the integrity of the substructure. **Our team considers replacement of these three Bridges as the highest priority for improving safety and reliability, meeting the first two Program objectives of Schedule Acceleration and User Experience.**

BPP analyzed the substantial amount of work that has been undertaken on these Bridges, providing key information relating to the completion of the geotechnical investigations and foundation recommendation documents, which are key items of their design development. Given the relative similarity among these three Bridges, BPP has identified synergies that may improve cost effectiveness of the PDA Work and D&C Work for the First Package, through concurrent design and coordination efforts. We anticipate that this approach could result in common steel girder design features applicable to all three Bridges and facilitate economies of scale.

4.6.2(a)(i)(b) MAIN RATIONALE FOR I-81 SUSQUEHANNA RIVER AND I-78 LENHARTSVILLE: SCHEDULE CERTAINTY

Two Bridges: I-81 Susquehanna River and I-78 Lenhartsville, are further advanced, in terms of design development and site investigation information compared to the other Bridges of the Program (apart from I-80 Canoe Creek) which make their accelerated delivery and completion of the PDA Work by the required deadlines for the First Package more easily achievable.

These Bridges also service critical corridors, and their renewal would achieve several Program objectives, in addition to renewal schedule acceleration, such as:

- **Safety enhancements**: the Bridges' renewal and broader enhancements will increase safety in their corridors by improving alignments, acceleration and deceleration lengths, widen shoulders and implement FHWA's MASH roadside safety features
- **Expanded coverage of sustainable funding streams**: these Bridges provide a diversified funding stream over a wider geographic area by including a major north south route, I-81, which traverses across the Commonwealth from Maryland to New York, and I-78 the east west route connecting the capital of the Commonwealth to the Eastern Seaboard

4.6.2(a)(i)(c) MAIN RATIONALE FOR I-80 NESCOPECK: COST EFFECTIVENESS OF PDA WORK ACCELERATION

I-80 Nescopeck is a relatively simpler bridge and smaller in scope and construction cost than the other Bridges. This allows for design development and site investigations to be more rapidly and cost effectively advanced in line with the First Package submittal schedule requirements. BPP believes that accelerating the PDA Work associated with this Bridge represents value for the Commonwealth because according to our preliminary financial viability analysis, this is one of the Bridges in the Program with the highest revenue / cost ratios, increasing the affordability and viability of the First Package. We also note that if constructed simultaneously with I-81 Susquehanna River and I-78 Lenhartsville, it would complete the one-way tolling pair with I-80 Lehigh River, which would minimize user interruptions due to construction along this corridor.

4.6.2(a)(i)(d) COMPATIBILITY WITH PACKAGE PROPOSAL SUBMITTAL REQUIREMENTS

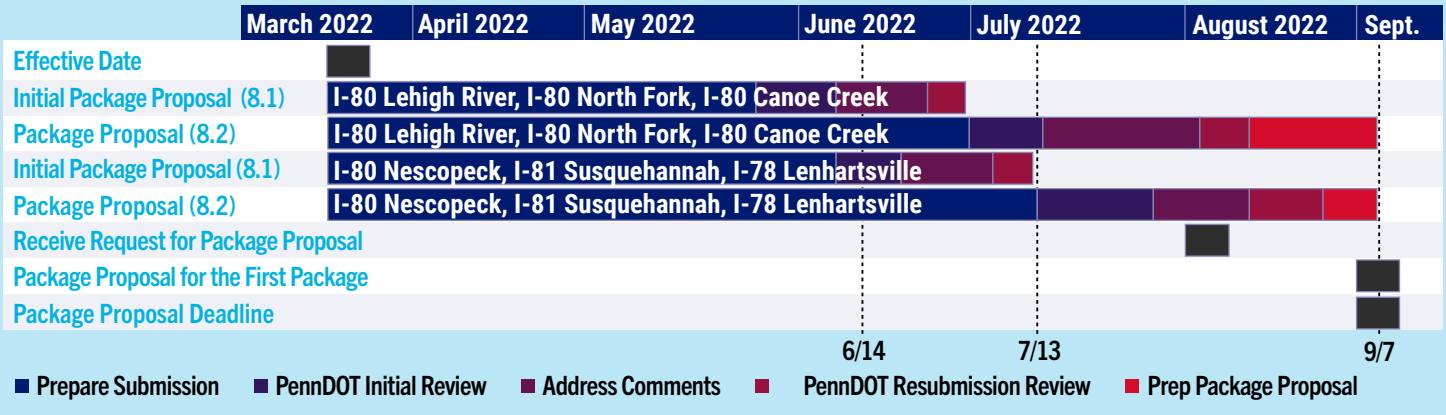
The design efforts and obligations outlined in Section 8 of the PDA Work Requirements are on the critical path for submission of a compliant First Package Proposal by the required deadline of September 7, 2022, with two key milestones:

- the Initial Package Proposal Design to be submitted at least 60 business days prior to the Package Proposal, i.e. by June 14, 2022 (2.5-3 months post execution of the PDA) and
- the Package Proposal Design to be submitted at least 40 business days prior to the Package Proposal, i.e. by July 13, 2022

The compressed timeframes associated with these milestones provide an additional limitation on the number of Bridges that can be included in the First Package.

In addition, given the limitation on the number of Package Proposal Design submittals included in the PDA Work Requirements (no more than five Initial Package Proposal Designs and three Package Proposal Designs within 10 business days of PennDOT initial review, at one time), BPP will work on the basis of two groups of three Bridges for Design submittals as shown in Figure 2, which illustrates the intended Design development process for the First Package Proposal submission.

FIGURE 2 – CRITICAL PATH TO PACKAGE PROPOSAL SUBMISSION



4.6.2(a)(i)(e) SECOND PACKAGE CONSIDERATIONS

Given our team's local roots and familiarity with all Bridges in the Program, the remaining three Bridges - I-95 Girard Point, I-83 South Bridge and I-79 Bridgeville - present significant complexity, with less design development, and substantially higher risk profiles given their earlier stage of development. Our review of the RIDs indicates that the timeframe is 80 to 90 days from execution of the PDA to submission of the Initial Package Proposal Design for the First Package, 80-90 days would not be sufficient to advance the necessary PDA Work for I-95 Girard Point, I-83 South Bridge and I-79 Bridgeville to a level necessary to comply with PDA Work Requirements.

Any of these Bridges, if included in the First Package, would pose an unnecessary and insurmountable threat to the ability of any PDA Entity to meet the required deadlines for the First Package and Program objectives.

In addition, all three of these Bridges would benefit from the additional development time provided by their inclusion into our Second Package (see Section 4.6.1(b) – Preliminary PDA Work Schedule for more details on timing). The combination of the above factors and high level of risk, unlikely to be mitigated even with outsized contingencies, results in substantial decrease of value to the Commonwealth. BPP strongly believes that additional time to undertake the PDA Work for these Bridges, evaluate current conditions and renewal options, coordinate with Third-Party stakeholders, perform Reasonable Investigations and progress the design to a proper level is necessary to provide the best value to the Commonwealth and the communities that these Bridges serve.

4.6.2(a)(i)(f) BPP PACKAGING BENEFITS

BPP is committed to the success of the entire Program, and our approach to Packaging provides two major Program victories:

1. **Proving the effectiveness of the PDA process** by achieving significant schedule acceleration while providing value to the Commonwealth. The emphasis of the First Package is delivery certainty under an expedited schedule.
2. **Creating an extensive stakeholder engagement process for the Second Package**. While the Second Package will be developed on an accelerated schedule, it will benefit from the involvement of stakeholders as well as robust site investigations including an extensive, and seasonally restricted, drilling campaign required for the I-83 South Bridge and undertaking an exhaustive condition assessment for the rehabilitation work required on I-95 Girard Point. The emphasis of the Second Package is maximizing value-for-money while delivering stakeholders satisfaction.

On the $1.1B SH288 Managed Lanes P3 Project S&B's alternative concept for the SH288/I-610 interchange moved express lanes from a proposed fifth level fly-over with limited connectivity to I-610 to continuous ground-level express lanes with full connectivity in all 4-directions. Despite full reconstruction of a 4-level, 8-ramp I/C, construction cost was reduced by off-setting revenues. Our accelerated, timeline for the Second Package will provide BPP with the opportunity for innovation on complex bridges like I-83 South Bridge and I-95 Girard Point

4.6.2(a)(ii) PRELIMINARY SCHEDULE FOR THE FIRST PACKAGE

BPP prepared a Baseline Schedule for each Bridge of the First Package to understand the permitting, constructability, and third-party constraints unique to each Bridge. We then looked at the Package as a whole to identify synergistic opportunities to accelerate the delivery of that Package, while avoiding or minimizing time and financial impacts, and maximizing value to the Commonwealth, through de-risking activities and reduction of risk contingencies.

Similar to the PDA Work Schedule, our Preliminary Project Baseline Schedule, presented in Attachment 1, complies with the PDA Work Requirements and all key activities, deliverables, milestones or hold points, appropriate logic ties showing sequencing and relationships between activities, as well as required coordination to be performed with PennDOT and other relevant stakeholders during the delivery of the Package. Table 2 on the following page, outlines some of our key First Package D&C Work milestones.

The Preliminary Project Baseline Schedule will serve as the basis for our draft Baseline Project Schedule that will be updated throughout the Pre-Development Phase and submitted with each of the Package Proposal Design submittals. After Financial Close of the First Package, the Baseline Project Schedule will be updated and submitted to PennDOT within 60 days after the effective date of NTP1. Acceptance of this Schedule by PennDOT is a condition to NTP2 and it will be updated through Final Acceptance, in accordance with the Project Agreement.

TABLE 2 – FIRST PACKAGE WORK MILESTONES

	I-80 LEHIGH RIVER	I-80 NORTH FORK	I-80 CANOE CREEK	I-80 NESCOPECK	I-81 SUSQUEHANNA	I-78 LENHARTSVILLE
Tolling Civil Infra. Comp. Date	June 2024	August 2024	October 2024	April 2024	August 2024	July 2024
Final Acceptance	April 2027	March 2027	October 2027	June 2027	October 2027	December 2026

4.6.2(a)(iii) PRELIMINARY ORGANIZATIONAL STRATEGY FOR THE FIRST PACKAGE

4.6.2(a)(iii)(a) BPP'S PRELIMINARY ROSTER AND ORGANIZATIONAL STRUCTURE

Our Preliminary Roster and Organizational Chart for the Development Entity of the First Package, presented in pages 7 and 8 of this Section have been deliberately assembled to ensure a seamless transition from the challenges of a fast-paced Pre-Development Phase into the successful delivery of the First Package Work. Compliant to the requirements of Section 2.1.2 of the PDA Work Requirements, BPP Key and Required Personnel during the Pre-Development Phase will remain the same for the delivery of the First Package. See Section 4.6.1(a), Appendix 1 for Key Personnel resumes.

BPP's organizational strategy for the First Package will allow for the Development Entity personnel to benefit from the knowledge, experience, relationship building and background on the Project gained by the PDA Entity since the start of the Pre-Development Phase. Key features of our proposed structure include:

- **Consistency of Management and Leadership:** The Development Entity Management Team including all workstream leads together with the Development Entity Project Manager will transition from the development to the delivery of the First Package. BPP's Project Manager will remain the single point of contact for all correspondence and interface with PennDOT. In addition, we anticipate selected advisors to transition into the delivery phase of the Package while continuing to support BPP with the PDA Work
- **Robust Staffing:** BPP anticipates that the Development Entity and its contractors, will have a minimum of 35 staff members during the Project Agreement Term, excluding Bridge-specific construction personnel and maintenance crew. Dedicated resources, not involved in the development of the First Package will be recruited by the Development Entity to support the delivery of each Bridge, prior to submission of the First Package Proposal. This will ensure that the team benefits from an early start on the Project and gets involved in all activities leading to Financial Close. The PDA Entity will also reinforce its team to support the development of the Second Package
- **Clear Lines of Communication:** The Management Team will maintain a direct line of communication and report to the Development Entity Project Manager. BPP's Design-Build Project Manager, employed by the D&C Contractor and in charge of the First Package D&C Work, will also have a reporting line to the Development Entity Technical Director. BPP's Quality Assurance Manager will report to the Project Manager, with Design, Construction and Maintenance Quality Managers working closely with their counterparts in each function
- **Package and Bridge Specific Personnel:** The D&C Contractor presents a relatively flat organization with Bridge-specific project managers directly interfacing with BPP's Construction Manager, who has broad decision-making ability, and reports directly to the Design-Build Project Manager. Supporting Package D&C managers, such as the Utility, Safety, Traffic Control, Environmental Compliance, Tolling Managers, as well as, the design team will also report to the Construction Manager. This structure will facilitate efficient communication at Bridge and Package level and allows personnel to be fully aware of the daily activities at all levels
- **Co-location with the PDA Entity:** For the initial period of the First Package delivery, BPP anticipates that the Development Entity personnel will be co-located with the PDA Entity to foster a knowledge sharing environment, increase efficiency and smooth transitioning from development to delivery

4.6.2(a)(iii)(b) STRATEGIES AND APPROACHES TO ACHIEVE SELF-PERFORMING AND SUBCONTRACTING REQUIREMENTS FOR THE FIRST PACKAGE

We believe BPP is uniquely placed to deliver the First Package Work timely and efficiently, thanks to the local make-up of our team, long-standing familiarity with PennDOT and local permitting agencies and global DBFOM expertise. We will allocate work on a 'Best

Fit' basis, to be self-performed or subcontracted. This approach will optimize PennDOT's various interests such as cost effectiveness and affordability, certainty of delivery or relevant local and district experience. BPP's familiarity with PennDOT requirements and processes will streamline the integration between PennDOT, the Lead Construction Contractor and the Lead Engineering Firm and will allow this process to happen from the outset.

BPP will meet the Project Agreement requirements for the First Package and has identified various possible scopes of self-perform work to achieve the Project Agreement Term Sheet requirements for self-performance and subcontracting as outlined in Table 3.

Under this approach, we anticipate that some functions such as project management, contract administration, safety, material and equipment procurement, technical, design and engineering services and finance and accounting functions will be best self-performed under the Project Agreement.

We fully understand the benefits of a robust subcontractor engagement program and already benefit from a deep bench of nominated subcontractors - Fay, H&K, Wagman and Kokosing. Together, these firms have completed more than $4B worth of construction work across the Commonwealth and have performed work for PennDOT on hundreds of projects.

With decades of local construction history, BPP has a substantial database of pre-qualified constractors who have performed successfully on past PennDOT projects, and we welcome the participation of any qualified subcontractors in the Commonwealth. We will leverage current relationships and build new ones to garner competitive pricing on a broad range of work scope, such as foundations, structural components, pavement, earthwork, pipe, retaining walls, overlay or MPT. BPP has set several internal mechanisms among its team members to ensure that PennDOT will receive competitive and transparent quotes for every scope of the work. As BPP's team members are almost exclusively local to each of the Bridges and include 4 of the 10 largest heavy civil contractors in Pennsylvania, this process is expected to produce very cost-effective and competitive prices.

Early in the Pre-Development Phase, BPP will employ a pre-qualification process to guarantee broad-based bidding opportunities to all qualified subcontractors ensuring work items being competed are broken down into economically feasible units to facilitate DBE participation. We will use BPP's extensive network of certified and highly capable MBE and DBE firms, in addition to an extensive outreach effort including public subcontractors information days and leveraging the PennDOT Directory of Certified MBE and DBE firms to ensure that we extend our outreach to the entire contracting market in Pennsylvania.

For the Maintenance Work, BPP anticipates self-performing routine maintenance activities and to competitively tender and subcontract specialized non-routine maintenance work, that might include coatings or joint and bearing replacements. This will be accomplished by leveraging our relationships with the local subcontracting community to run broad based competitive solicitations. From experience on similar projects, this approach will provide the best value to PennDOT by ensuring that all activities that require specialized equipment, knowledge or certifications such as recoating of structural steel, are carried out with up-to-date industry best practices, specially trained and certified technicians and state-of the art equipment.

Both the D&C and Maintenance subcontracted scopes of work will follow the D&C and Maintenance Work Pricing requirements of the PDA Work Requirements.

TABLE 3 - SELF PERFORMANCE AND NOMINATED SUBCONTRACTORS COMPETENCY MAPPING

	I-81 SUSQUEHANNA	I-80 NESCOPECK	I-78 LENHARTSVILLE	I-80 LEHIGH	I-80 CANOE CREEK	I-80 NORTH FORK
Structures	CJV, H, F	CJV, H, F, W	CJV, H, F, W	CJV, H, F, W	CJV, F, K	CJV, F, K
Pavement	CJV, H	CJV, H	CJV, H	CJV, H	CJV, K	CJV, H, K
Earthwork	CJV, H	CJV, H	CJV, H	CJV, H	CJV, F, K	CJV, H, F, K
MPT/Mech/Other Civil	CJV, H	CJV, H, F, W	CJV, H, F, W	CJV, H, F, W	CJV, F, K, W	CJV, F, K, W
Potential 'Turn-Key'[1]	CJV, H	CJV, H, F	CJV, H, F	CJV, H, F	CJV, F, K	CJV, F, K

CJV = Lead Construction Contractor; H=H&K; F= Fay; K=Kokosing; W= Wagman

1. Potential turn-key approach on several Bridges for one Nominated Subcontractor to take end-to-end responsibility under the CJV leadership

Proposed BPP Development Entity (DE) Organizational Chart

BRIDGING PENNSYLVANIA PARTNERS

- Leadership
- Quality Assurance
- Public & Community Engagement
- Commercial and Legal
- Design & Construction
- Finance
- Maintenance

- Communication
- Reporting
- Maintenance Period Personnel
- Exhibit 6 Key Personnel
- Exhibit 6 Required Personnel

Development Entity Board
Mark Bradshaw
Sharon Novak

BPP (PDA Entity)

Commonwealth
pennsylvania
DEPARTMENT OF TRANSPORTATION

Project Agreement (First Package)

IQF
- **Quality Assurance Manager (QAM)** — Ray Henney, P.E.
- **Design Quality Manager** — Jason DeFlitch, P.E.
- **Construction Quality Control Manager** — Brian Schull, P.E.
- **Maintenance Quality Manager** — Jason Philip, P.E

BPP DE (First Package)

Administrative Support

Project Manager — Sarah Schick

Technical Director

Community /Local Workforce and DBE Engagement Manager — Geoff Segal
- **DBE Compliance**
- **Equal Employment Opportunity Manager** — Joe Hernandez
- **Public Information Coordinator** — Carla Julian

Commercial Manager

Financing Manager — Jason Chun
- **Modeler**
- **Treasurer**

Controls Manager — Mike Docherty
- **Lifecycle Manager**

Maintenance Manager — Dan Dennis

Maintenance Team
Bridge Manager / Superintendent (6 FTEs, one per First Package Bridge)
Inspection Crew, Structural Maintenance Crew, RoW Maintenance Crew, Roadway Maintenance Crew, Landscaping Crew

D&C Contractor (First Package)

DB Project Manager — Hezi Snir

Deputy DB Project Manager — Maximo Serrano

DBE Coordinator

Construction Manager — Greg Yavicoli, P.E.
- **Utility Manager** — Tyson Hicks
- **Safety Manager** — Chris Reefer
- **Traffic Control Manager** — Brandon Schulze

Environmental Compliance Manager — Arik Tapiero

Tolling Lead — Charles Hewson

Design Lead — Alexander Houseal, P.E.
- **Structures** — Timothy Irwin, P.E.
- **ITS, Signalization and Lighting** — Eric Meyer, P.E.
- **Hydraulics and Hydrology** — Lisa Gardocki, P.E.
- **Utilities** — Mark Handler, P.E.
- **Geotechnical** — James Morrison, P.E.
- **Traffic Control** — Mark D. Geiser, P.E.
- **Roadways and Pavements** — J.T. Lincoln, P.E.
- **Design Aesthetics and Landscaping** — Julie Bush, ASLA

I-81 Susquehanna
Project Manager
Construction Manager (Sr. Project Manager)
General Superintendent
4 Area Superintendent (Bridges, Earthwork, Walls, Drainage and Utilities)
4 Field Engineers (Bridges, Walls, Drainage and Utilities)
Schedule Engineer
Safety Engineer
Demo Team (PM, Super, Engineer)
Procurement Manager (Ramp-Up)

I-80 Nescopeeck
Project Manager
Construction Manager (Sr. Project Manager)
General Superintendent
2 Area Superintendent (Bridges, Earthwork and Roadway)
2 Field Engineers (Bridges, Earthwork)
Schedule Engineer
Safety Engineer
Traffic Control Manager
Demo Team (Super)

I-78 Lenhartsville
Project Manager
Construction Manager (Sr. Project Manager)
General Superintendent
2 Area Superintendent (Bridges, Earthwork and Roadway)
2 Field Engineers (Bridges, Earthwork)
Schedule Engineer
Safety Engineer
Traffic Control Manager
Demo Team (Super, Engineer)

I-80 Lehigh River
Project Manager
Construction Manager (Sr. Project Manager)
General Superintendent
2 Area Superintendent (Bridges, Earthwork and Roadway)
2 Field Engineers (Bridges, Earthwork)
Schedule Engineer
Safety Engineer
Traffic Control Manager
Demo Team (Super)

I-80 Canoe Creek
Project Manager
Construction Manager (Sr. Project Manager)
General Superintendent
4 Area Superintendent (Bridges, Earthwork/ Roadway, Walls, Drainage and E&S)
4 Field Engineers (Bridges, Earthwork, Walls, Drainage & Utilities)
Schedule/Cost Control Engineer
Safety Engineer
Demo Team (PM, Super)
Procurement Manager (Ramp-Up)

I-80 North Fork
Project Manager
Construction Manager (Sr. Project Manager)
General Superintendent
4 Area Superintendent (Bridges, Earthwork/ Roadway, Walls, Drainage and E&S)
4 Field Engineers (Bridges, Earthwork, Walls, Drainage & Utilities)
Schedule/Cost Control Engineer
Safety Engineer
Demo Team (PM, Super)
Procurement Manager (Ramp-Up)

Note: these Bridge-level employees may be staffed either within the D&C Contractor or its subcontractors

4.6.2(a) First Package Approach, Schedule, and Organizational Strategy

WORKSTREAM	KEY AND REQUIRED PERSONNEL
PROJECT MANAGEMENT	• **Sarah Schick, Associate Director, Macquarie Capital - Development Entity's Project Manager** The Development Entity's Project Manager will be the single point of responsibility and contact to PennDOT for all obligations under the Project Agreement including all contract administration and correspondence with PennDOT. She is empowered to commit resources to ensure the Project is completed and operated on schedule with focus on stakeholders needing early engagement, customer service and minimizing impacts to the community. She will be empowered to engage in trade-off discussions • **Mike Docherty, Director of Operations, Joseph B. Fay Co. – Controls Manager** The Control Manager will oversee the tracking and reporting of project controls throughout the Project Agreement Term including but not limited to managing documents, Submittals, Approvals, data, contracts, schedule and cost
QUALITY MANAGEMENT	• **Raymond J. Henney, P.E., Contractor Services Manager, SAI - Quality Assurance Manager (QAM)** The QAM will be responsible for the quality assurance aspects of the overall Package D&C Work and will report jointly to and will owe a duty of care to the Development and PennDOT. He will ensure that the D&C Contractor implements the Quality Management Plan, conducts staff training, coordinates internal project and PennDOT audits • **Jason DeFlitch, P.E., Project Manager, SAI Consulting Engineers, Inc. - Design Quality Manager (DQM)** The DQM will be responsible for managing the quality control program for the design and will provide quality assurance reviews of the design work during the Project Agreement Term. He will report directly to the Project manager and QAM and will not be involved in direct scheduling, design, or production activities and will be independent of the day-to-day management of the Project. He will verify that methods and procedures contained in the Design Quality Management Plan are implemented and followed by the Development Entity design staff in the performance of the Package Work • **Brian Schull, P.E., Assistant Department Manager, SAI Consulting Engineers, Inc.- Construction Quality Control Manager (CQCM)** The CQCM will be responsible for management of the quality Construction Work and will report directly to the Project Manager and the QAM and will not be involved in direct construction activities and will be independent of the day-to-day management. He will verify methods and procedures contained in the Construction Quality Management Plan are implemented and followed by the Development Entity construction staff in the performance of the work • **Jason Philip, P.E., Construction Inspection, SAI Consulting Engineers, Inc – Maintenance Quality Manager (MQM)** The Maintenance Quality Manager will be responsible for oversight and implementation of the Maintenance Quality Management Plan (MQMP) and shall be devoted to the Project as needed to perform their duties throughout the Project Agreement Term. He will report directly to the Project Manager and the QAM and will be independent of the day-to-day management of the Project. The MQM shall verify the methods and procedures contained in the MQMP are implemented and followed by the Development Entity
MAINTENANCE	• **Dan Dennis; Vice President, STADIA Technical Advisors - Maintenance Manager** The Maintenance Manager will be responsible for the overall operation, design, construction, maintenance, contract administration and handback matters on behalf of the Development Entity during the Maintenance period • **Lifecycle Manager** The lifecycle lead will be responsible for ensuring that lifecycle considerations are adequately considered during the design of each Bridge. During the Maintenance Phase, the Lifecycle Lead will develop the lifecyle intervention schedule and interface with the Maintenance Manager to either have the Maintenance Team perform lifecye interventions or develop plans for subcontracting the scope • **Maintenance Team** The Maintenance Team will be responsible for the day-to-day maintenance of the bridges including inspections and any structural, right-of-way, roadway, landscaping, or other routine maintenance. The Maintenance Team may be augmented with subcontractors for speciality scopes such as underwater bridge inspections
PUBLIC AND COMMUNITY ENGAGEMENT	• **Geoff Segal, Associate Director, Macquarie Capital - Community, Local Workforce and DBE Engagement Manager** The Community / Local Workforce and DBE Engagement Manager will be responsible for all BPP Community and Local Workforce initiatives (e.g. internships, training, apprenticeships and education programs) and coordinate with community, local workforce and Public Relations advisors. He will ensure community and stakeholder outreach, education and marketing campaigns are executed and ensure compliance with diversity goals by supporting PennDOT's Diversity Program, Project Leadership and execution of Community Benefits Agreement and MOUs with community partners • **Joe Hernandez; President, Modern Times, Inc. - Equal Employment Opportunity (EEO) Manager** The EEO Manager will be responsible for ensuring all community and workforce engagement requirements are achieved. He will implement all aspects of the community benefits program and bring the full support of Modern Times, Inc. staff • **Carla Julian; President, Kaleidoscope Public Relations, LLC - Public Information Coordinator** The Public Information Coordinator will be responsible for the public relations plan / program including media relations, community relations, construction information and crisis communication. She will ensure that all information related to design, construction, maintenance and tolling is shared and that all interested and vested parties and stakeholders are informed of progress • **DBE Compliance Manager** The DBE Compliance Manager will review and audit DBE participation within the D&C Contractor and will work with the DBE Coordinator to ensure that PennDOT receives the proper documentation attesting to DBE participation • **DBE Coordinator** The DBE Coordinator will be responsible for the day-to-day interface between the Development Entitites or its contractors and any DBEs performing work
COMMERCIAL	• **Commercial Manager** The Commercial and Legal Manager will be responsible for all commercial issues related to the contractual documentation for the Package. He will be the main point of contact for PennDOT across the commercial documents and will negotiate any claim or required changes to the agreements with PennDOT, contractors and other parties as necessary to complete the Package Work
FINANCE	• **Jason Chun, Associate Director, Macquarie Capital - Financing Manager** The Finance Manager will be responsible for managing the financing for the Package, relationship with the lenders (including TIFIA), advisors and auditors and providing updates to PennDOT on funding and repayment or any change to payments considerations and providing updates to PennDOT. • **Modeler** The modeler will be responsible for updates to the Financial Model during the Project Agreement Term as required by PennDOT, lenders or other parties • **Treasurer** The Treasurer will be responsible for working with tax and accounting advisors to prepare financial statements as required by PennDOT, lenders and other parties throughout the Project Agreement Term

WORKSTREAM	KEY AND REQUIRED PERSONNEL
DESIGN AND CONSTRUCTION	• **Development Entity Technical Director** The Development Entity Technical Director will be in charge of overseeing the design and construction activities undertaken by the D&C Contractor and manage the interface between the design build workstream and the financing, commercial, maintenance, and other workstreams during the Project Agreement Term at the Development Entity level • **Hezi Snir Schlinger, COO, Shikun & Binui - Design-Build Project Manager** The Design Build Project Manager will be responsible for management, planning and execution of the design and construction during the Project Agreement Term, including permitting, coordinating with Governmental Entities and third-parties, scheduling and cost estimating. He will oversee the design activities performed by our Lead Designer, STV and oversee the construction activities performed by the D&C Contractor, Designated Subcontractors and other subcontractors. He will provide construction guidance for the design development and Project / Bridge de-risking. He will oversee various interfaces between D&C members, ensure compliance with current contract document and be responsible for budget and schedule management **Design** • **Alexander Houseal, P.E., Vice President, STV Incorporated - Design Lead** The Design Lead will be responsible for ensuring that the designs are in accordance with Package Work Requirements and that the design criteria requirements are met • **Julie Bush, ASLA, Principal, Ground Reconsidered - Lead Design Aesthetics and Landscaping Engineer** The Lead Aesthetic and Landscaping Engineer will be responsible for the design efforts across the aesthetics and landscaping. She will ensure that the landscaping design complies with the Package Technical Provisions • **Timothy Irwin, P.E., Senior Project Manager, STV Incorporated – Lead Structures Engineer** The Lead Structures Engineer will be responsible for bridge designs to ensure they meet PennDOT Design Manual 4 criteria and structures meet the Package Technical Provisions • **Jonathan Lincoln, P.E. Associate, Senior Project Manager, Dewberry - Lead Roadways & Pavement Engineer** The Lead Roadways & Pavement Engineer will be responsible for roadway and pavement designs to ensure they meet PennDOT Design Manual 2 and 3 criteria, and that the designs meet the Package Technical Provisions • **Mark Handler, P.E., Senior Highway Engineer, STV Incorporated – Lead Utilities Engineer** The Lead Utilities Engineer will be responsible for coordinating with utility owners' facility locations, impacts, outage timing, if required, and early utility adjustment work. He will maintain utility agreements and obtain utility clearance for each Bridge and determine needed utility site investigations • **Mark Geiser, P.E. Senior Associate/Assistant Dept. Manager, Highway, Dewberry - Lead Traffic Control Engineer** The Lead Traffic Control Engineer will be responsible for verifying and developing required traffic control plans for the roadway and bridge sequencing as well as for off-site improvements and ensure that traffic control plans meet the Package Technical Provisions • **Eric Meyer, P.E., Vice President, WRA - Lead ITS, Signalization and Lighting Engineer** The Lead ITS, Signalization & Lighting Engineer will be responsible for the ITS development and coordinate with the Tolling Lead. He will manage signal and lighting design teams to coordinate signal plan development with owning municipality and ensure ITS, signalization and lighting are in accordance with the Package Technical Provisions • **Lisa Gardocki, P.E., Senior Engineer, STV Incorporated - Lead Hydraulics and Hydrology Engineer** The Lead Hydraulics & Hydrology Engineer will be responsible for the hydraulic and hydrology analysis including 2D modeling, coordinate with environmental manager on waterway permits and manage development of storm water management design and plans. She will ensure that that the stormwater management plans meet the Package Technical Provisions • **James Morrison, P.E., Vice President, STV Incorporated - Lead Geotechnical Engineer** The Lead Geotechnical Engineer will be responsible for investigations and structure foundation designs and roadway slope stability studies. He will ensure that traffic control plans are in accordance with the Package Technical Provisions • **Tyson Hicks, Project Manager, Joseph B. Fay Co. - Utility Manager** The Utility Manager will be responsible for reviewing / accepting designs that involve utility relocation and/or coordination, facilitating coordination with utility owners and approving financial and technical modifications associated with utility adjustments and modifications to utility agreements. She will oversee utility management program including daily coordination with project team and checking design against regulations and resolving conflict **Construction** • **Greg Yavicoli, P.E, Operations Manager, Shikun & Binui America - Construction Manager** The Construction Manager will be responsible for overseeing the planning of the day-to-day construction operations, materials, equipment and labor needs, including quality control for the Package Work with a primary responsibility of adherence to design and construction specifications • **Chris Reefer - Safety Manager** The Safety Manager will be responsible for achieving the safety goals of the Project Agreement. He will work closely with the D&C Contractor and specifically each Bridge's project manager to ensure that safety goals and procedures to achieve these goals are implemented at each Bridge • **Brandon Schulze – Traffic Control Manager** The Traffic Control Manager will be responsible for overseeing the construction and maintenance of all traffic control devices • **Arik Tapiero, Global Compliance & Sustainability Manager, Shikun & Binui America - Environmental Compliance Manager** The Environmental Compliance Manager will be responsible for oversight, training and tracking the Development Entity's obligations to comply with Environmental Commitments and permit conditions. He will provide NEPA support to PennDOT • **Charles Hewson; Director, Big River Consulting – Tolling Lead** The Tolling Lead will be responsible for overseeing the coordination of the design and construction of the tolling system infrastructure

APPENDIX 1

Preliminary Baseline Project Schedule

BRIDGING PENNSYLVANIA PARTNERS

Volume II Technical Proposal

Section 3

Appendix 5, 3.3

First Package Work Criteria

Approach to D&C for the First Package

Goethals Bridge Replacement, New York & New Jersey
Macquarie

4.6.2(b) Approach to D&C Work for the First Package

With over 250 years of combined experience working for PennDOT, Bridging Pennsylvania Partners (BPP), its Lead Construction Contractor, Lead Engineering Firm and Nominated Subcontractors, offer a highly tailored approach to the First Package, and the entire Program, through our unmatched familiarity with the scope of work, geographic conditions, stakeholders, PennDOT's engineering districts and local community and workforce engagement. A cornerstone of our execution plan for the entire Program is to partner with PennDOT and stakeholders in a positive and collaborative way to expeditiously deliver each Bridge with a focus on safety, accelerated delivery, environmental responsibility, cost effectiveness, and enhanced user experience. To successfully accomplish this, BPP will capitalize on our Team Members' unrivaled experience with PennDOT's procedures, the Commonwealth's stakeholders and processes created to enhance communication and ensure compliance with the Project requirements. The strategic composition of our team provides us with unique geographical diversity across the Commonwealth as it applies to team members' office locations, Bridge locations and involvement of multiple districts concurrently. BPP can leverage this geographic diversity and focus on the Commonwealth to increase participation by the local workforce and subcontracting community.

BPP brings a wealth of experience and has previously delivered hundreds of PennDOT projects, some of which are illustrated in Figure 1. These projects are similar to the Bridges in the program and have demonstrated our team's existing commitment to work with PennDOT and deliver successful projects, while working in cooperation with each district office that will lead a Bridge. Figure 1 and Table 1 on the following pages illustrate and describe the type of work, geographic conditions and other identified challenges along with our approach to solve them.

As described in Section 4.6.2(a) - First Package Approach, Schedule, and Organizational Strategy, BPP took an analytical approach to determining which Bridges could reasonably be included in the First Package to be compliant with the PDA Work requirements and schedule constraints. The six Bridges selected for inclusion in the First Package (I-81 Susquehanna, I-80 Nescopeck, I-78 Lenhartsville, I-80 Lehigh River, I-80 Canoe Creek and I-80 North Fork) represent a Package that, while ambitious in scale and timeline, can successfully be advanced to achieve Financial Close by December 2022. This achieves PennDOT's required deadlines for the delivery of the First Package and acceleration of the delivery of significant benefits to users. These benefits include improvements to safety, mitigated time and financial impacts to the travelling public through the reduction of maintenance closures, providing more opportunities and system improvements relating to capacity, safety, sustainability, and mobility. Table 1 on page 3 of this Section illustrates our team's analysis and summary of the technical conditions of the Bridges to be included in the First Package based on a set of criteria that include the level of information available in the RIDs, history of maintenance and safety concern, visibility on the NEPA process timing and cost effectiveness of acceleration of the PDA Work.

In accordance with the requirements of the ITP, the following sections describe our approach for the First Package to:

- Introducing innovative D&C methods (see sub Section 4.6.2(b)(i))
- Performing demolition of structures (see sub Section 4.6.2(b)(ii))
- Staging construction (see sub Section 4.6.2(b)(iii))
- Evaluating the Bridges designs provided in the RIDs (see sub Section 4.6.2(b)(iv))
- Achieving 100-year Bridge service life (see sub Section 4.6.2(b)(v))
- Ensuring conformance to D&C specifications (see sub Section 4.6.2(b)(vi))

In addition, we have also provided a table listing the top three structural, roadway, and geotechnical design challenges that we have identified for each Bridge in the First Package in sub Section 4.6.2(b)(vii).

FIGURE 1 - BPP LOCAL PROJECT EXPERIENCE

BRIDGE KEY ELEMENTS

- Demo of two girder multi-span continuous steel bridge
- Continuous Steel Bridge
- Long Span Steel
- Pre-Stressed Girders
- Slope Stability issues
- Railroad Crossing
- Cast-in-Place (CIP) Tall Columns

FIRST PACKAGE BRIDGES

1	I-81 Susquehanna
2	I-80 Nescopeck
3	I-78 Lenhartsville
4	I-80 Lehigh River
5	I-80 Canoe Creek
6	I-80 North Fork

IN-STATE BPP EXPERIENCE

A	Lynn Avenue Bridge SR7301 DBB
B	PTC Replacement of Bridge NB-205 (MP A-41) and Bridge NB-218 (MP A-44) DBB
C	Ridgeway Street SR2024 DBB
D	443 Roadway Improvments DBB
E	I-95 Section BRI Reconstruction DBB
F	Central Susquehanna Valley Transportation DBB
G	PennDOT Jim Thorpe Bridge (Demo) DBB
H	PTC Southern Beltway 55B DBB
I	I-90 Six Mile Creek Gorge Twin Bridges Replacement DB
J	US219 New Bridge Construction DBB
K	SR 40 Youghiogheny River Crossing DB
L	I-80 over Susquehanna River DBB (A+B)
M	SR 22 over Lehigh River & Canal DBB (A+B)

OUT-OF-STATE BPP EXPERIENCE

Opportunity Corridor DB
Corridor H DB
SH288 Toll Lanes DBFOM
Gerald Desmond Bridge Replacement DB
I-75 Reconstruction Maumee River Crossing DB
Longfellow Bridge Rehabilitation DB
Route 52 Causeway Reconstruction DBB

TABLE 1 - SUMMARY OF FIRST PACKAGE BRIDGES CHARACTERISTICS

CHARACTERISTICS / PROJECT	ROADWAY	PRIMARY SUPERSTRUCTURE TYPES	SUBSTRUCTURE	GEOGRAPHIC CONDITIONS	OTHER CHALLENGES
I-81 SUSQUEHANNA (District 4)	Interstate roadway bridge reconstruction including interchange work and grade separation reconstruction	CIP deck with continuous prestressed concrete girders for live load	CIP concrete post and beam piers	Minor urban rolling terrain	NYDOT involvement, staged construction
I-80 NESCOPECK (District 4)	Interstate roadway bridge approach	CIP deck with continuous prestressed concrete girders for live load	CIP concrete post and beam piers	Rural relatively level terrain	Staged construction
I-78 LENHARTSVILLE (District 5)	Interstate roadway bridge approach reconstruction with ramp involvement	CIP deck with continuous prestressed concrete girders for live load	CIP concrete post and beam piers	Minor urban rolling terrain	Restricted site access, endangered species restrictions, staged construction, adjacent ramp terminals
I-80 LEHIGH RIVER (District 4)	Interstate roadway bridge approach reconstruction with ramp involvement	CIP deck with continuous long span structural steel girders	CIP tall column hammerhead style piers	Rural mountainous terrain	Railroad, public trail and park protection, staged construction with restricted site access. Notes 1,2,3,4
I-80 CANOE CREEK (District 10)	Interstate roadway bridge approach reconstruction	CIP deck with continuous long span structural steel girders	CIP tall column hammerhead style piers	Rural mountainous terrain	Restricted site access, slope stability, weather restrictions. Notes 1,2,3,4
I-80 NORTH FORK (District 10)	Interstate reconstruction including grade separation replacement	CIP deck with continuous long span structural steel girders	CIP tall column hammerhead style piers	Rural mountainous terrain	Park and utility protection, staged construction. Notes 1,2,3,4

Footnotes: 1. Fracture Critical existing bridge demolition 2. Long span plate girder steel erection 3. Protection of existing bridge foundations 4. Restricted site access

4.6.2(b)(i) APPROACHES TO INTRODUCING INNOVATIVE D&C METHODS FOR THE FIRST PACKAGE

4.6.2(b)(i)(a) INNOVATIVE D&C CONCEPTS

BPP will approach the D&C innovation process as an 'open book' process with PennDOT, in which BPP will constantly explore innovative concepts and present them to PennDOT for consideration. Our innovative thinking process will be led by a multidisciplinary team which will consider ways to innovate within various aspects such as safety, user experience, capital and maintenance costs and schedule. PennDOT will have full visibility on work product and our thought process during our Technical Working Groups (TWGs) meetings further detailed in Section 4.6.1(c) - Preliminary PDA Organization. PennDOT, as the client, will have the discretion to approve any proposed innovative concept while prioritizing between the different goals of the Project in accordance with the mechanism outlined in Section 10.6 - Innovative Concept Submittal of the PDA.

As noted, we believe that some of these changes can be easily implemented during the Pre-Development Phase, as they do not require significant changes to the current design and are consistent with the NEPA process to date (such as the change of sequence in Canoe Creek and North Fork presented in sections 4.6.2(b)(iii) and 4.6.2(b)(iv) below). Others include certain trade-offs which might be challenging to implement during the Pre-Development Phase without impacting the schedule of the First Package and corresponding deadlines, but could be developed post Financial Close, under the value engineering mechanism of the Project Agreement or as an Innovative Concept Submittals (ICSs) on the Second Package.

During the Pre-Development Phase, BPP will methodically advance our execution plan and schedule for the Delivery Phase of the First Package, allocating specific activities and time to developing these innovative D&C methods, in parallel with the solutions included in the RIDs. BPP will work with PennDOT to schedule meetings to discuss innovations for the First Package and implement them in a timely and effective manner if they add value to the Program. In the case that insufficient value is seen from these innovations, BPP will continue developing the designs already developed in the RIDs. This approach has been similarly applied by BPP globally on other P3 and Design-Build projects.

TABLE 2 - BPP PRELIMINARY IDENTIFIED INNOVATIONS AND POTENTIAL INNOVATIONS

POTENTIAL INNOVATIONS	INNOVATION TYPE	I-81 SUSQUEHANNA	I-80 NESCOPECK	I-78 LENHARTSVILLE	I-80 LEHIGH RIVER	I-80 CANOE CREEK	I-80 NORTH FORK
POLYESTER POLYMER CONCRETE	Materials	✓	✓	✓	✓	✓	✓
ESCALATION PROTECTION	Materials	✓	✓	✓	✓	✓	✓
NEW STAGING SEQUENCE USING MEDIAN	Traffic Control	✓		✓	✓	✓	
BI-DIRECTIONAL TEMPORARY TRAFFIC PATTERN ON NEW BRIDGE	Traffic Control				✓	✓	✓
BEAM LAUNCHER	Means and Methods	✓	✓	✓	✓		
TEMPORARY TRESTLE	Means and Methods				✓		✓
BRIDGE INCREMENTAL LAUNCHING	Means and Methods					✓	✓
ACCELERATED BRIDGE CONSTRUCTION ON OVERHEAD BRIDGES	Means and Methods	✓					✓

4.6.2(b)(i)(b) INNOVATION ON MATERIALS

BPP anticipates using the following material innovations on all of the Bridges in the First Package:

POLYESTER POLYMER CONCRETE (PPC)

PPC will be used as overlay on all Bridge decks to protect them from chloride migration. When placed on the new bridge decks, PPC overlays can have a 20+ year service life and reduce long term maintenance costs. They are also more economical compared to Latex Modified Concrete (LMC) overlays and require shorter lane closure durations during installation or replacement of the overlay.

ESCALATION PROTECTION

BPP can leverage unique financial instruments for hedging of commodity prices as part of its pricing strategy. These tools can result in significant savings for PennDOT in several market scenarios (e.g. a market in which the future curve is trending down) and assure that the impact of external supply chain events on material prices will be significantly mitigated. BPP's members have used such strategies successfully in the past on various commodities (e.g. steel, bitumen, fuel) and passed the savings along to the client through a discounted fixed price. This strategy has been used on recent projects in recent transactions in Pennsylvania and West Virginia which involved large steel quantities.

4.6.2(b)(i)(c) INNOVATION ON TRAFFIC CONTROL

BPP has identified the following innovations related to traffic control that impact safety, efficiency and duration of construction:

STAGING AND SCHEDULE ACCELERATION

BPP's innovation process will include the evaluation of sequencing and staging to deliver a better Project, across its lifecyle and with an optimized construction schedule. For example, while BPP is aligned with PennDOT on the utilization of dual Bridges, we will further discuss the opportunity to utilize the first Bridge of the proposed dual Bridges constructed to carry both directions of traffic during construction as an option to accelerate delivery. This idea could be leveraged at Canoe Creek and North Fork, which have 56 feet clear roadway, allowing two temporary lanes in each direction with a barrier in between. Utilizing this innovative staging allows BPP to deliver these bridges sooner.

For further examples of schedule acceleration, please refer to subsequent sections 4.6.2(b)(iii) and 4.6.2(b)(iv).

BI-DIRECTIONAL TEMPORARY TRAFFIC PATTERN ON NEW BRIDGE

As demonstrated in section 4.6.2(b)(iii)(a), bi-directional temporary traffic on a new Bridge will allow for the use of a newly built one-way structure as a temporary means to carry bi-directional traffic, while older structures are being demolished and the new structure for counter-direction traffic is built.

4.6.2(b)(i)(d) INNOVATION ON MEANS AND METHODS

BPP understands the importance of accelerating delivery of the First Package, while minimizing environmental impacts and maximizing safety. BPP has considered the possibility of implementing means and methods that may not be commonly used in the Commonwealth, or may not provide substantial construction cost savings but can provide other significant benefits in terms of schedule acceleration, environmental impact mitigation, and safety improvements.

Many of the Bridges cross rivers and creeks, and the construction and demolition work will require heavy equipment to be operated from the ground. In addition, there will be time of year restrictions to perform work in rivers. With these constraints, any system that either reduces the need of equipment on the ground, or that allows for the advancement of superstructure works in areas adjacent to the rivers, will reduce both environmental and schedule impacts. The construction methodologies that can minimize the amount of equipment of ground or advance superstructure works adjacent to rivers and that BPP has considered and will evaluate further during the Pre-Development Phase, in partnership with PennDOT, are the following:

BEAM LAUNCHER

A system which allows placing beams with the launcher supported in piers/abutments, without the need of placing cranes on pads in environmentally sensitive or difficult access areas. Some advantages of this system include:

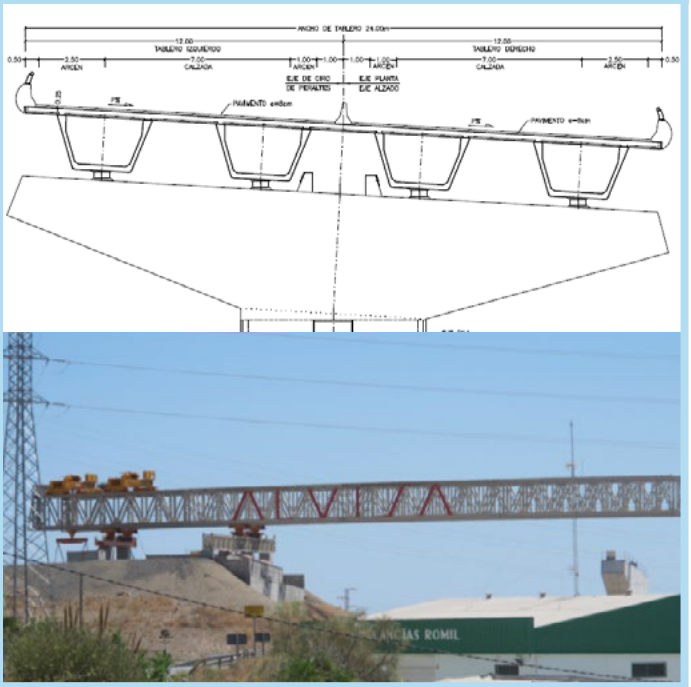
- Equipment can be applied to many spans as designed in the current RIDs. There is a possibility (requiring Program coordination) to use the same launchers in adjacent Bridge construction to make the method more cost effective

- Temporary causeways are reduced, as they will be needed only for pier and foundation construction
- Work can be performed in worse weather conditions than traditional methods and work is not impacted by river flooding, which will reduce weather contingencies and increase Construction Period safety
- This equipment can also be used for the demolition of the existing bridges cutting big portions of the deck and moving the elements out of the bridge footprint to advance additional operations. If used for this purpose, BPP believes there is the potential for cost efficiencies and increased worker safety.

The use of a beam launcher system is common in BPP's international work. FCC has used it in different projects across Europe where project specific conditions made it a valuable tool. Examples include:

- Molvizar Bridge with a total length of 1,432 feet with 4 U-Trough beams and 120 feet spans at the A-7 Mediterranean corridor in Spain (Figure 2)
- Mayorazgo Bridge with a total length of 1,040 feet and concrete T-Beams at the A-7 Highway East Ring Road of Malaga, Spain

FIGURE 2 - MOLVIZAR BRIDGE BEAM LAUNCHER



TEMPORARY TRESTLE

The use of temporary trestles can provide access and support equipment during substructure and superstructure construction and has potential environmental advantages over the use of rock fill causeways. Advantages include:

- Minimize in-stream impacts during construction
- Environmental approvals and permits may be eased as compared to the use of rock fill that will require special characteristics

There are two Bridge locations that have been identified as potentially benefiting from the use of alternate trestle access:

- The I-80 North Fork's new east and westbound Bridge construction and demolition of the existing eastbound Bridge could benefit from the use of trestle access platforms over the Brookville Reservoir to minimize potential impacts to water quality in the reservoir related to the use of a rock causeway
- The I-80 Lehigh River's new east and westbound Bridge construction along with the demolition of both existing structures could benefit from the use of trestle access platforms along the river bank to minimize the impact footprint area versus using a rock causeway along the Lehigh River shoreline, a Pennsylvania Department of Conservation and Natural Resources (DCNR) designated Scenic River

Fay has constructed and demolished numerous bridge structures using trestles of various lengths and access configurations. This capital stock of trestle system is maintained by Fay and could be leveraged for use on any of the Bridges noted above if desired during the D&C period. Some examples of recent projects Fay has used trestle are the Nimmo Parkway Bridge, the Tuckahoe Bridge (Figure 3), the Sandbridge Road Bridge and the Nottoway Bridge.

FIGURE 3 – TUCKAHOE BRIDGE TEMPORARY TRESTLE

BRIDGE INCREMENTAL LAUNCHING

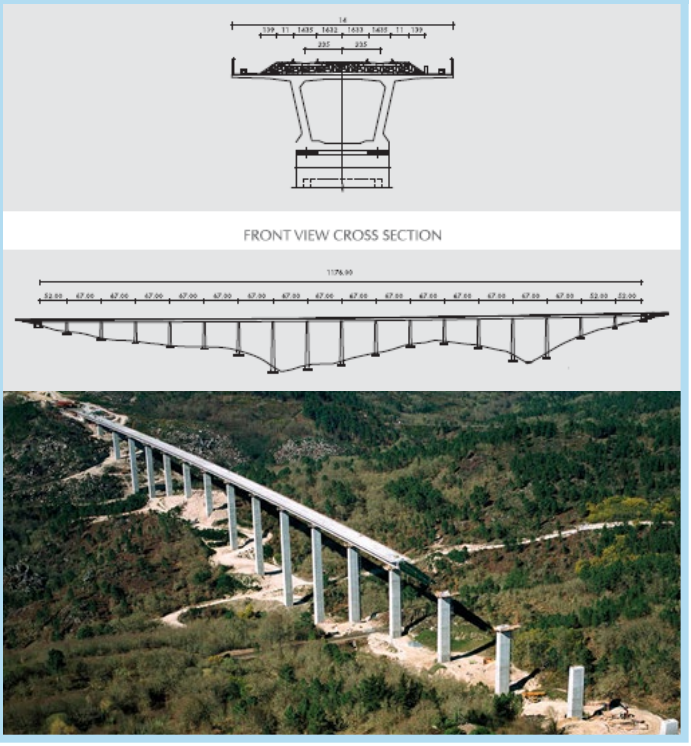
Another innovative approach is building the superstructure along the approaches and launching it in a controlled environment to its final position. Advantages include:

- Equipment can be applied effectively to the longer spans included in the First Package. The same launcher could be used in Canoe Creek Bridge and North Fork, making it more cost efficient
- Temporary causeways are reduced, as they will be needed only for pier and foundations construction

The use of Incremental Launching is common in BPP's international work. FCC has used it in multiple projects with both steel and concrete superstructures to expedite the construction schedule. Examples include:

- Tina Menor viaduct in Cantabria, Spain, launching 394 feet spans with a 4-lane steel caisson cross section and a 1,242 feet long bridge crossing a river
- Arenteiro and Bergantiños viaducts (3,773 feet and 3,858 feet long bridges respectively) with concrete box girder sections and 320 feet tall piers for the North-Northwest High-Speed Rail Corridor in Spain (Figure 4)

FIGURE 4 – ARENTEIRO VIADUCT INCREMENTAL LAUNCHING



ACCELERATED BRIDGE CONSTRUCTION (ABC) ON OVERHEAD BRIDGES

ABC methods can be utilized in lieu of traditional superstructure construction methods for secondary roads over the interstate mainline to minimize impacts to interstate travelers while constructing the superstructure. The main advantage is that the bridge delivery can be accelerated, which minimizes the impacts of closures and detours to the local stakeholders that typically use the overpass bridges frequently.

ABC Methods could be effectively used for structures at I-81 Susquehanna and North Fork Bridges.

4.6.2(b)(ii) APPROACH TO DEMOLITION FOR THE FIRST PACKAGE

4.6.2(b)(ii)(a) OVERALL APPROACH FOR DEMOLITION OF A TWO GIRDER MULTI-SPAN CONTINUOUS STEEL BRIDGE

Our approach to demolition of any Bridges in the First Package will be consistent with PennDOT procedures and associated stakeholders' requirements for the Bridge's site conditions. These procedures include an assessment of the hazardous material present on the existing structure such as lead based paint, asbestos or other potential hazardous materials which may have been used. For sites involving a railroad crossing and consistent with PennDOT DM-4 requirements, design team professionals working in concert with the construction team personnel will prepare a detailed demolition procedures and schematic plans for the proposed demolition. The Lead Construction Contractor will further refine this approach into detailed plans that address procedures, sequencing, methods, crane locations, lifting radii, lift weights and sequenced lifts, which will be submitted to PennDOT.

At site locations involving railroad entities such as I-80 Lehigh River and I-81 Susquehanna, this detailed submittal will also be submitted to the Reading Blue Mountain and Northern (RBM&N) and New York and Susquehanna and Western (NYS&W) railroads for review and approval. For existing crossings over roadways demolition plans will be coordinated with PennDOT and the local district. Further coordination will be conducted for sites involving appropriate additional stakeholders such as the Lehigh Gorge Trail, recreational waterway users and the park areas associated with the I-80 North Fork Bridge. Operations involving the public traffic, vehicular or pedestrian, will be scheduled during non-operating hours or involve approved detours or closures.

We believe that the demolition of the majority of the Bridges will be straight-forward. There are three Bridges in the Program for which particular attention is warranted.

FIGURE 5 - JIM THORPE BRIDGE DEMO WORKING FROM CAUSEWAY

These Bridges include the demolition of two girder fracture critical dual structures at:

- I-80 Canoe Creek which has a public roadway;
- I-80 North Fork which has a roadway, existing facilities, and Walter Dick Memorial Park, and;
- I-80 Lehigh River which has public roadway, Lehigh Gorge Trail, recreational river use and the RBM&N Railroad

At these Bridges, we will follow the demolition procedure outlined in section 4.6.2(b)(ii)(b) below.

4.6.2(b)(ii)(b) DETAILED ENGINEERING APPROACH TO ENSURE THE CRITICAL STAGE OF DEMOLITION SATISFIES KEY STRUCTURAL CONSIDERATIONS

Given its diversity of stakeholders, BPP has selected I-80 Lehigh River for additional discussion of a detailed engineering approach. Given the similarities, it is of particular interest to note our experience on the SR 903 Jim Thorpe Bridge which is located near the I-80 Lehigh River site and involves the same stakeholders, similar construction and access issues.

Table 3 includes more comparative information and the pictures and captions within the detailed approach illustrate additional similarities.

TABLE 3 - JIM THORPE BRIDGE CASE STUDY

COMPARISON CRITERIA	I-80 OVER LEHIGH RIVER, WHITE HAVEN, PA	SR 903 (NORTH ST.) JIM THORPE BRIDGE, JIM THORPE, PA
TWO GIRDER MULTI-SPAN STEEL BRIDGE	✓	✓
125' PLUS SPANS	✓	✓
LEHIGH RIVER	✓	✓
CAUSEWAY ACCESS	✓	✓
RBM&N RR	✓	✓
LEHIGH GORGE TRAIL & PARKING	✓	✓
NORFOLK SOUTHERN RR	✗	✓
RIVER ROAD	✓	✗

The driving principal for any demolition plan is the protection of the public, personnel, existing facilities and the environment. This is achieved through site investigation and testing, detailed planning, coordination, clearing utility conflicts, engineering analysis, appropriate submittal reviews, follow through resolving all comments, approval by stakeholders and detailed execution at the site.

Demolition in general is a reverse engineering process surgically removing the last component installed at build time, beginning with parapet and deck, first and working backward through the bridge superstructure unit to the substructure footings. Utilizing a structural engineering analysis of each and every step during the process to ensure stability of the remaining portions of the existing structure, safety of the employees, environment, traveling public, as well as pedestrians adjacent to the work area.

Figure 6 and narrative below provides the detailed engineering approach to Lehigh River.

FIGURE 6 - DETAILED ENGINEERING APPROACH

A. INVESTIGATION, ENGINEERING AND COORDINATION

Demolition of Lehigh River will begin with BPP taking samples of the existing paint system on the superstructure steel. The samples will be sent to an independent lab for testing and analysis. If the results show that the paint system contains heavy metals such as lead, zinc or other heavy metals, lead awareness and respirator plans will be implemented. Any employee flame cutting steel that has been coated with lead-based paint systems will be protected and the work performed in compliance with all applicable OSHA regulations. These include but are not limited to blood testing, pulmonary function testing, personal air monitors and the use of full face forced air respirators and protective clothing.

Special consideration in the engineering analysis and calculations will be taken into account as part of the removal procedure to ensure that the deck sawing lay out works with the loading of the equipment, mainly tracked excavators, to maintain stability of the structure throughout the deck removal sequence. Continuous multi-span superstructures need to be checked for stability as the dead load of the deck is removed to identify areas of potential concern such as uplift in adjacent unloaded spans, capacity at points of inflection and lateral stability, all dictating the equipment size, type and load that can be placed upon the bridge as the deck removal process progresses. Additional engineering analysis and calculations will also be performed for the stability of the steel removal encompassing the strategic floor beams, main girders and bracing procedures required as the structure is precisely severed. The railroad specifications will also be addressed for specific requirements pertaining to lifting loads over the railroad ROW.

A Factor of Safety (FOS) will be set according to the configuration of the existing steel members to establish the anticipated load or pick weights. The FOS for general picking will be 1.1 to 1.25 and will be increased to 1.5 to incorporate the requirements of the railroad for lifting over their ROW.

With the anticipated pick weights established, the center pin locations of the cranes will be identified and dimensionally tied to the existing structure in the removal plan thereby establishing the pick radii and verification of the selected crane's capacity.

During this stage of planning, we will also consider the landing areas, tail swing, swing path and boom clearances to surrounding structures and improvements, such as track clearances. This information will be provided in plan and elevation view along with a pick chart showing: radius, capacity and anticipated load including FOS for each crane location. The sequence of removal for the continuous multi-span two girder system will be analyzed for stability as each member or portion of each member is removed in line with the engineering analysis. Reverse engineering the erection sequence of the continuous units allows for taking advantage of the ability to remove portions of predetermined spans, letting the remaining portions of the span cantilever and utilizing the back spans to hold the cantilevered portion, maintaining structural stability.

The existing I-80 Lehigh River dual bridges consist of a two-span continuous unit on the Western end and a five span continuous unit on the Eastern end. The two-span continuous unit is over the RBM&N Railroad and the Lehigh Gorge Trail. Our approach would be to remove the two-span unit over the railroad and trail first, and then moving to the eastern end and proceeding with removal over River Road. This would retain most of the existing bridge increasing overall stability while the portions over the public facilities are removed.

B. ACCESS AND PROTECTION

The Lehigh River is classified as both a trout-stocked stream and wild trout stream. As a result, there will be instream work restrictions that extend from March 1st to June 15th and October 1st to December 31st. No other construction activities affecting the stream (below ordinary high water mark) can occur during the restricted time period. This creates access

issues to the spans over the river and the piers, which are positioned in the river or directly adjacent to it. A non-erodible causeway made from clean stone traversing portions of the River will be designed to minimize restriction to the River flow, wildlife and recreation, yet provide protection to the riverbed and the water resource itself while creating safe and secure access for the removal and construction activities. The demolition team will have critical input into the design and positioning of the causeway prior to permitting to ensure proper access for crane and aerial lift placement to maintain stability of the existing structure during steel removal.

FIGURE 7 - TRAIL CANOPY AND ACCESS AT JIM THORPE BRIDGE

Access to the river spans will be created in conjunction with protecting the pedestrians on the Lehigh Gorge Trail. In previous projects performed over the Lehigh Gorge Trail, a canopy providing a dedicated safe and secure path of access for trail users through the work site was utilized. Engineered underdeck shielding to protect improvements below the work area will be utilized where applicable such as over the Trail, River Road, and RBM&N railroad. In addition to the Bridge-level protective shielding, at grade ballast protection will be installed per the railroad's specifications, which typically consist of non-woven geotextile fabric and additional tie protection (normally plywood). BPP will work with the railroad to coordinate right of entry, flagging, access, and maintain train operations.

C. CONCRETE DECK PREPARATION AND LAYOUT

After access to the structures has been established and proper engineered protections put in place, any existing utilities have been relocated or verified abandoned and traffic has been diverted from the structure per the Maintenance and Protection of Traffic (MPT) plans, the deck preparation can begin. At this stage, the risk of falls is elevated and to protect the workforce and public, BPP will implement a robust fall protection plan. Typically, the existing height of the parapets do not meet the OSHA requirements for that of a top rail. Either an engineered top rail system will be installed or a complete system such as Garlock safety railing is deployed to provide fall protection at the deck level for all staff on the Project. The next steps will involve a detailed lay out of the structural members of the Bridge. The stringers, floor beams, and main girders will be laid out and physically identified on the deck in orange paint. Once the structural members have been verified, then the lines for saw cutting can be laid out on the deck and parapet in white. The color coordination is yet another safety precaution for the saw cutting operation. Deck thickness on fully demolished structures such as this will be verified by strategically placed holes in the deck. In conjunction with the lay out, expansion dams, scuppers and any other embedded items will be removed in preparation of the saw cutting.

FIGURE 8 - DECK AND SELECT STEEL REMOVAL AT JIM THORPE BRIDGE

D. CONCRETE DECK REMOVAL

Saw cutting will be performed with self-propelled saws equipped with the proper concrete cutting blades, typically cooled by water creating necessary lubrication for the cutting blade as well as controlling airborne silica dust. The resulting slurry created by the cooling water will be diverted and collected by hand tools and vacuums. The slurry will

then be placed into containment areas similar to concrete wash out basins to filter the liquefied concrete particles from the water. The dried concrete powder will then be loaded out to waste or recycling with deck slabs. In other areas, such as when we will be plunge cutting the parapet, overhang shields or boxes hung from equipment or the adjacent parapet will be utilized to control the slurry.

Deck lifting operations (Figure 9) will be performed in accordance with the engineered plan. Slabs will be typically lifted utilizing excavators equipped with slab lifting buckets from the existing deck. Once the slab is removed from the structural steel, it is loaded onto awaiting trucks, normally tri-axle dump trucks with swing gates to be transported to a waste or recycling facility.

FIGURE 9 - DECK LIFTING AT JIM THORPE BRIDGE

In areas of the structure with shear connectors installed, the deck removal process is primarily the same. However, in lieu of sawing the deck into slabs, the slabs will be removed by creating a slot along edges of the top flange of the beams and transversely at the pre-determined length exposing the rebar. The slabs will be slotted to size utilizing an excavator equipped with a hydraulic impact breaker. The slab will then be rigged to the excavator and the exposed rebar will be torch cut to free the slab and placed into an awaiting dump truck similar to the saw cut slabs. Debris resulting from this operation will be cleaned up shielded from below as work progresses.

E. MAIN GIRDER STABILIZATION AND SELECT MEMBER REMOVAL

As the deck is removed, ancillary operations will also be performed to meet or exceed the requirements of the removal procedure to maintain stability. This could include installations of tie downs at the piers of the unloaded continuous spans to prevent an uplift condition where the girders or beams raise out of their bearings. At this time, any bracing required to facilitate the stability of the structure for the main steel removal will also be installed per the removal procedure and the engineering analysis. All work performed overhead will require the presence on the ground of safety personnel to ensure that the work zone below is clear of pedestrians, vehicles, river traffic, and train traffic. The Safety Manager will have constant communication with the overhead operations via two-way radio and have authority to stop the work in the event a situation may become unsafe or work needs to be paused to allow the safe passage of people or vehicles.

As part of the stability analysis, the steel floor beams and girders will need be prepared for lifting. This includes rigging windows pre-burnt into the webs of the members and cable softeners installed to allow for secure rigging points. If the analysis verifies adequate capacity, pre-burning of member web plates at the pre-determined cut locations may be done to expedite the removal operation.

F. MAIN GIRDER REMOVAL

Cranes of required size and capacity will be mobilized to the site and erected in accordance with the pick sequence laid out in the removal procedure and engineering analysis (Figure 10). Aerial work platforms will be placed according to plan to allow safe access for burners to rig, sever, and control the picks with the use of tag lines. Critical lift plans will be prepared and reviewed with the proper entities when applicable. Rigging for all picks will be designed and analyzed for ample capacity based upon factored anticipated pick weights along with crane block capacities, line pull, and number of parts of line.

BPP will adhere to the sequence of removal outlined below, which assumes starting at the western end span of the two continuous units and working toward the Lehigh River:

Step 1 Remove the critical floor beams

Step 2 Remove 2/3s of the near girder (note bracing discussed above)

Step 3 Further removing two thirds of the far girder

Step 4 The above process will repeat for the removal of the remaining 1/3 span left in a cantilevered configuration back to within two feet of the bearing stiffener of the next back span

Step 5 Repeating steps one and four span by span until reaching the final span of the continuous unit. Depending upon the pick weights and if the required radii are within the required crane chart capacities, work during this portion of the sequence would typically be performed by a single crane to minimize the location footprint otherwise multiple cranes would be utilized when the conditions required

Step 6 Based on the unbraced length of that span, if required bracing details that can be implemented to reduce the unbraced length

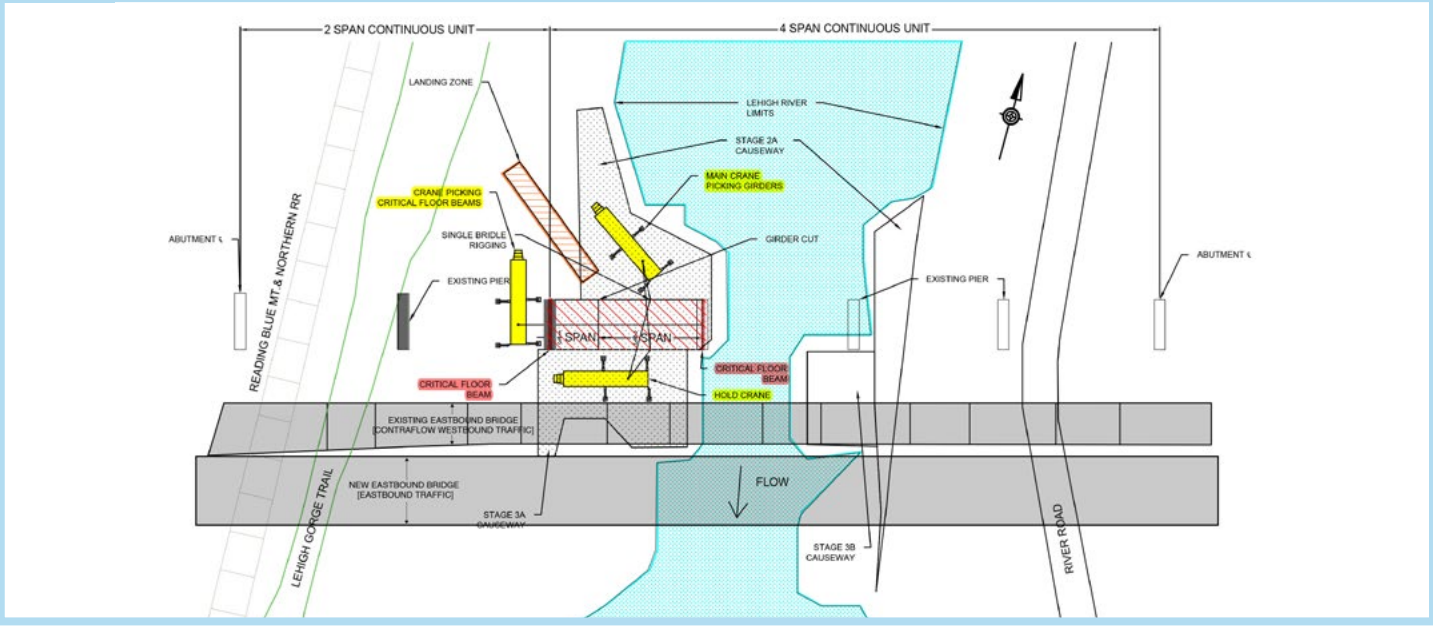
Step 7 Using a hold crane on the far girder, a smaller crane will remove floor beams while the main crane is rigged to the near girder

Step 8 Picking and landing the near girder and then rigging the main crane over the hold crane to the far girder. The load is then transferred to the main crane before releasing the hold crane

Step 9 Once the hold crane has been released and clear, the main crane will pick and land the far girder

FIGURE 10 - STEEL REMOVAL AT JIM THORPE BRIDGE

FIGURE 11 - CRITICAL DEMOLITION STAGE SKETCH



Coordination of the causeway design is a critical component to the removal sequence for the placement of crane pads, aerial lifts and landing zones when removing the spans over the river and the adjacent banks.

All steel removed from the structure (Figure 12) will be downsized and loaded out onto trucks for disposal. All steel will be disposed of at a facility capable of handling steel coated with lead-based paint systems if encountered. Depending upon the condition of the paint system at the time of removal any members with loose or flaking lead-based paint will be transported under tarps.

FIGURE 12 - STEEL REMOVAL AT JIM THORPE BRIDGE

G. SUBSTRUCTURE REMOVAL

Substructure removal (Figure 13) will typically be performed utilizing conventional bulk concrete removal methods. These methods include appropriately sized excavators equipped with specially selected boom and stick configurations to match the height of the substructure units coupled with suitably sized hydraulic impact hammers. Pre-planning of the access and the work areas will be coordinated with adjacent improvements to ensure that debris resulting from the substructure removal can be contained. Where needed and in appropriate weather, water can be utilized for dust control measures. In areas that may have improvements too close to allow the breaking of concrete and the resulting debris, cutting and picking techniques can be utilized. The cutting could be performed with track mounted wall saws or wire saws and core drills. Pieces would be sized to be rigged and picked with the appropriately sized crane, then downsized for transport. All debris generated from the substructure removal will be loaded from the site and hauled to waste or a qualified recycling facility.

FIGURE 13 - ULTRA HIGH REACH EXCAVATOR ON DEMO OF SUBSTRUCTURE AT JIM THORPE BRIDGE

H. FOUNDATION REMOVAL

Typically foundations are removed to a limited depth (two feet to five feet) below the existing or anticipated surface elevation. This would involve excavations below the elevation of the existing substructure once removed and may require shoring or other support of excavation. Once exposed to an adequate depth for access, the piling can be cut off. For foundations that require removal below the water, equipment available in-house would be used to shear off concrete or steel piling underwater without requiring dewatering.

As part of the design and construction process, the new structure foundation locations are optimized in design to be situated outside of the footprint of the existing foundations. When due to span arrangement, geotechnical, environmental or other constraints, or avoiding the existing foundation is not practical, the foundations will be removed by pulling the piles with a crane with appropriate capacity and rigging, usually facilitated by a vibratory hammer.

In conclusion, while the process for removing a two girder multi-span steel bridge such as the I-80 over the Lehigh River is complex, BPP has significant experience removing similar structures throughout Pennsylvania and surrounding states. As with all construction operations, and more specifically with regard to removing the I-80 Lehigh River Bridge, the safety of stakeholders (the Lehigh River itself and River Traffic, Lehigh Gorge Trail users, RBM&N Railroad, River Road traffic and adjacent structures) is the top priority throughout the demolition process. Our team will be successful through significant pre-planning and detailed engineering plans along with the required submittals and approvals. Finally, the work will be performed by experienced D&C Contractor's supervision and craft workers to ensure the planning and engineering efforts are executed correctly in the field.

4.6.2(b)(iii) APPROACH TO CONSTRUCTION STAGING FOR THE FIRST PACKAGE

Our team's overarching focus for all staging optimizations is providing a safe environment for both the traveling public and the construction crews. Secondary to this priority, BPP will evaluate all opportunities for innovations that provide schedule acceleration and/or maintain schedule with a potential cost reduction. Much like the innovation vetting process described on 4.6.2(b)(i) our decision making process regarding staging and potential changes in sequencing will be made in partnership with PennDOT. BPP will work collaboratively with PennDOT to ensure that our staging strategies maximize the Program's goals and objectives.

BPP believes that, through collaboration with PennDOT, there are design elements on specific Bridges that can be altered to accelerate schedule and reduce cost while delivering the same level of performance and quality. For example, standardization of piers, piling methods or paving types on adjacent Bridges (such as I-80 Canoe Creek and I-80 North Fork or I-80 Nescopeck, I-80 Lehigh River and I-78 Lenhartsville) could be implemented to achieve schedule or cost savings.

As summarized in Table 4 below, the RIDs for the Bridges that will be included in the First Package have a high level of construction staging planning and development already provided. In particular, two of the First Package Bridges (I-81 Susquehanna and I-78 Lenhartsville) have completed staging plans. BPP will still evaluate opportunities for improvement to these plans, being mindful of the fact that changes in staging need to be considered in a wider context, such as additional ROW or LOD impacts that could result in a delay to the overall delivery schedule. Table 4 below summarizes the existing traffic control and staging while the following subsection presents examples where BPP identified potential optimizations for staging that we would look to pursue in the Pre-Development Phase.

4.6.2(b)(iii)(a) STAGING: INNOVATIONS AND OPTIMIZATIONS

BPP's approach to construction staging is aligned with the Program's safety and delivery acceleration goals. Fewer stages of construction will accelerate the delivery of the completed structure and improve the user's experience by minimizing the construction staging impacts to the traveling public. This approach will also improve the cost effectiveness of the construction process and ultimately reduce costs which will benefit the Commonwealth. Additionally, through this process, we evaluated solutions which would improve construction operations via better access to the work or larger workable areas as these benefits would also accelerate completion and reduce costs. We plan to further develop and collaborate with PennDOT during the Pre-Development Phase to accelerate delivery and reduce costs. We have included several examples of the possible staging optimizations to benefit the program below.

I-81 SUSQUEHANNA

- Evaluate modifying the Bridge and roadway construction sequence in the median, by maintaining the full roadway width and beams of the current Bridge and constructing partial width new Bridges and roadway. Temporarily joining the northbound and southbound structures and pavement generates a wider and unrestricted roadway, which can be better utilized for temporary traffic shifts while each new roadway alignment is being constructed
- This optimization will be constructed concurrently with the new Bridge and ramp roadways at the adjacent interchange with SR 171 and is also compatible with the median reconstruction along the rest of the alignment
- Investigate the modification of the Bridge structure over the NYS&W Railroad to a simple span concrete beam superstructure in lieu of the precast arch. This approach can simplify staging geometry and equipment within the median, thereby reducing the staging and cost.

TABLE 4 - FIRST PACKAGE STAGING SUMMARY

PROJECT NAME	I-81 SUSQUEHANNA RIVER	I-80 NESCOPECK	I-78 LENHARTSVILLE	I-80 LEHIGH RIVER	I-80 CANOE CREEK	I-80 NORTH FORK
CONSTRUCTION STAGES	10	4	7	12 (Stages & Phases)	5	5
CROSSOVERS	#1 Stages 4 & 5; #2 Stage 6; #3 Stages 6C & 8	Stage 2A EB;	No	WB Stage 1 Ph6 & Stage 2 Ph 1	Stage 2 WB & Stage 3 EB	WB Stages 2 & 3
SHORT TERM DETOURS	No	No	SR 143 under I-78 (not permitted in Stages 3 or 4)	SR 1005, Stages 1 & 2 closures during overhead work	No	Water Plant Road, Stages 1A-3 closures during overhead work
LONG TERM DETOURS	Susquehanna Street Stages 2-5; Ramp C Stage 8	SR 3016 Stage 1	Ramp C, D & CD (Stage 3), Ramp A, B & AB) Stage 4	Ramp C Stage 1 Ph2 & 3; Ramp B Stage 2 Ph 2 & 4	SR 4005 Phase 1, 2, 4	SR 4003 Stages 1A & 1B; SR 4005 1A-3
TRAFFIC SPLITS	Stages 7 & 8 SB	Yes	Stages 4 WB and Stages 5 WB & EB	Yes	No	No
TEMPORARY BRIDGING	Susquehanna St	No	No	No	No	No
TEMPORARY PAVEMENT	Yes	Yes, Stage 1 EB	No	Yes	Stage 1 Shoulders, Stage 3 Median	Yes
TEMPORARY RAMPS	Stage 5 Ramp D; Stages 7 & 8A Ramps B&C	No	No	Ramp B Stage 2 Ph 3	No	No
EMERGENCY PULL-OFFS	Yes	No	No	No	Yes	Yes
AIDS TO NAVIGATION	Yes	Yes	Yes	Yes	Yes	Yes

- Utlize ABC methods such as Folded Steel Plate Girders with integrated precast concrete slabs or North EXtreme Tee Beams in the replacement of the SR 1029 structure over I-81 to minimize the impacts to local stakeholders during the signalized one lane phases of replacement

I-78 LENHARTSVILLE

- Modify the sequence of construction to use the existing median width by temporarily connecting both existing superstructures, this optimization could reduce the seven I-78 traffic stages to as little as three
- The current staging design shows construction of the outside sections of the new structures occurring concurrently on both sides. In the optimized sequence, phasing the work to construct one side of the new structure at a time allows for the following benefits:
  - Reduce the overall traffic stages to maintain traffic though just three temporary conditions, thereby increasing the safety of the traveling public
  - Optimize the manpower and equipment while maintaining the schedule with less overall risk
- Construction of the new Bridge one side at a time allows more flexibility in maintaining the traffic on the entrance and exit ramps, and reduces the risk of accidents

I-80 CANOE CREEK

- After construction of the new eastbound Bridge and roadway approaches, utilize the added width of that structure and the temporary westbound crossover to provide bi-directional traffic on new eastbound Bridge which removes traffic from both fracture critical structures as soon as possible and will optimize the

demolition of both existing Bridges (see Figures 14 and 15 below for proposed MOT configuration)

- Solve the problem of the different elevations of the decks reducing the earthworks required for the detour of the westbound to the eastbound in the current proposal

I-80 NORTH FORK

- Similar to the Canoe Creek bi-directional traffic optimization, after construction of the new eastbound Bridge and roadway approaches, utilize the added width of that structure and the temporary westbound crossovers to provide bi-directional traffic on new eastbound Bridge which removes traffic from both fracture critical structures as soon as possible and will optimize the demolition of both existing Bridges (see Figures 14 and 16 below)
- Utilize ABC methods such as Folded Steel Plate Girders with integrated precast concrete slabs or North EXtreme Tee Beams in the replacement of the SR 4005 structure over I-80 to minimize the impacts of the SR 4005 closure detour on local stakeholders.

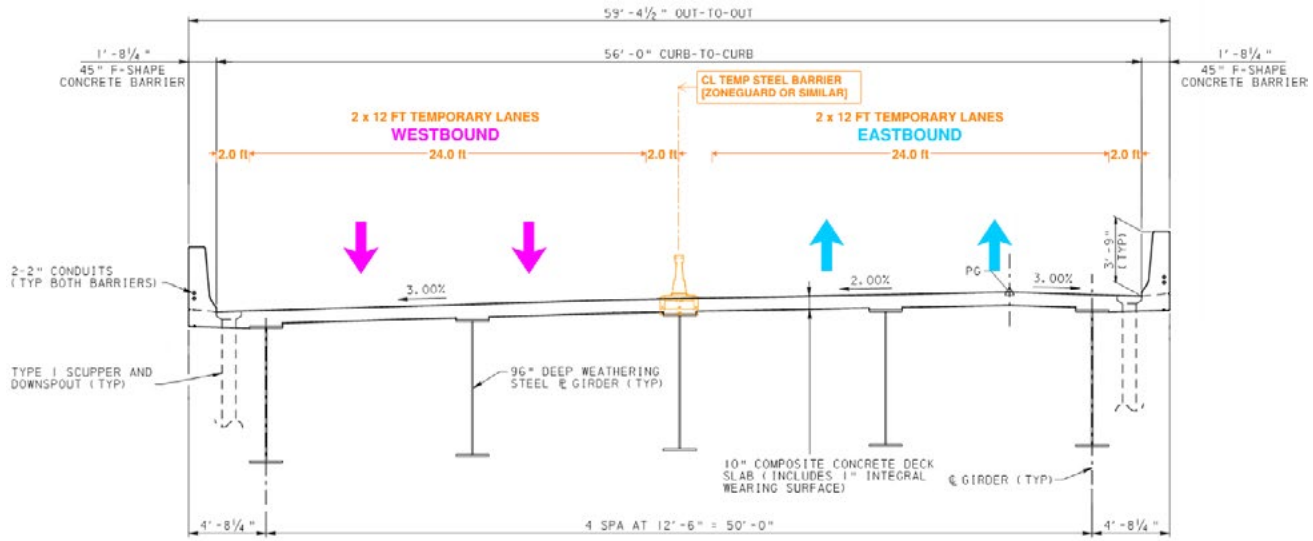
I-80 LEHIGH RIVER

- Similar to the I-80 Canoe Creek bi-directional traffic optimization above, after construction of the new eastbound Bridge and roadway approaches, utilize the added width of that structure and the temporary westbound crossovers to provide bi-directional traffic on new eastbound Bridge which removes traffic from both fracture critical structures as soon as possible and will optimize the demolition of both existing bridges
- Alternatively, construct the westbound structure in the existing median gap which appears feasible and would eliminate the temporary diversion of the westbound traffic to the current eastbound. It is possible to maintain the traffic of westbound in the current alignment which reduces several of the phases of the second stage. The sequence for the eastbound would be utilized as shown in the RIDs
- Traffic will be removed from the fracture critical bridge a season earlier by the implementation of this traffic phasing

I-80 NESCOPECK

- Current design has the eastbound widening with four beams outside the current deck to get the necessary space for diverting the traffic, this solution generates a significant final over-width that may not be necessary
- If these over-widths are not required, it would be possible to construct 23-feet of the new structure in the existing median gap

FIGURE 14 - PROPOSED TEMPORARY BI-DIRECTIONAL TRAFFIC AT I-80 CANOE CREEK BRIDGE



EASTBOUND BRIDGE SECTION
TEMPORARY BI-DIRECTIONAL TRAFFIC

FIGURE 15 - ALTERNATIVE TRAFFIC CONTROL WITH CONCURRENT EXISTING BRIDGE REMOVAL AT I-80 CANOE CREEK BRIDGE

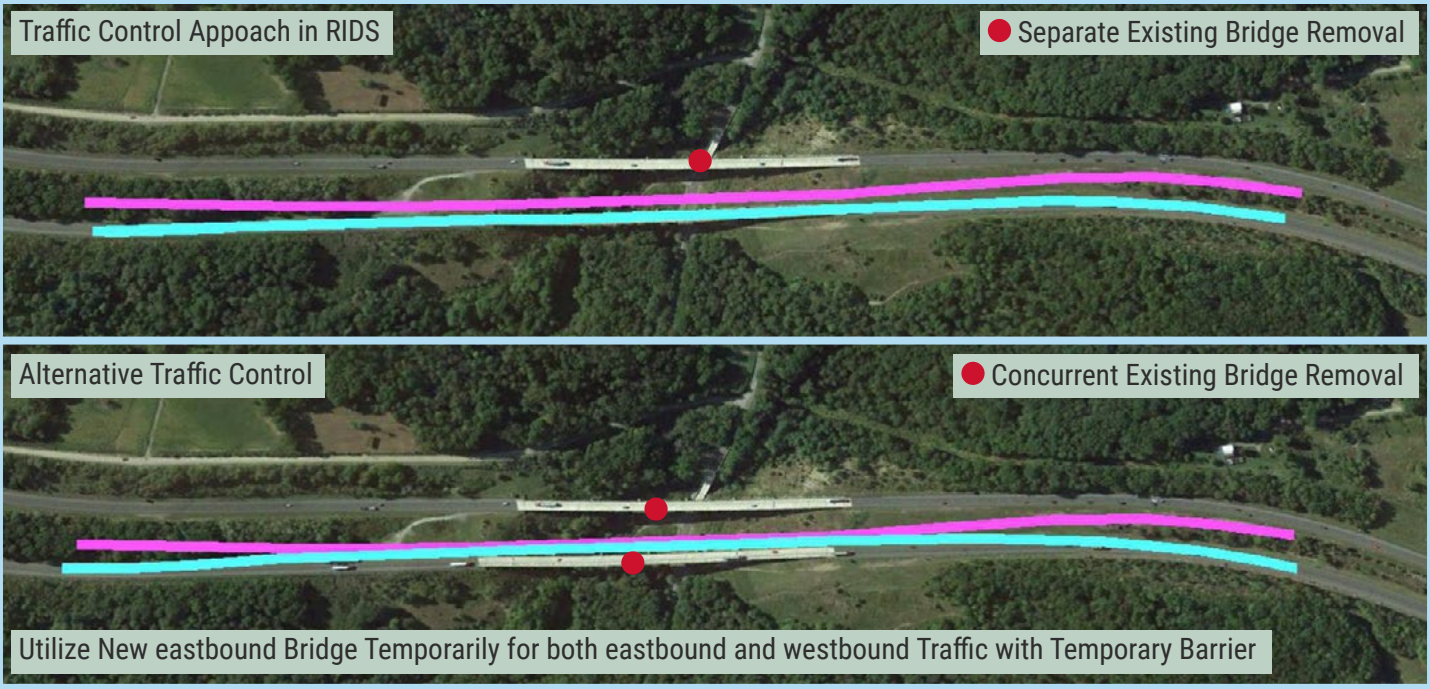


FIGURE 16 - ALTERNATIVE TRAFFIC CONTROL WITH CONCURRENT EXISTING BRIDGE REMOVAL AT I-80 NORTH FORK BRIDGES

- Using this partial section of the westbound deck and making a temporary detour of one lane of eastbound traffic on this new deck, reduce the final eastbound deck width by using three beams instead of four in phasing 1 and avoiding unnecessary over widening

In conclusion, the traffic control plans and sequences included in the RIDs for the Bridges included in the First Package are logical and a good baseline. However, as noted, BPP has identified multiple potential optimizations that we will work with PennDOT during the Pre-Development Phase to have approved and implement. We believe that these optimizations will create value for PennDOT and will provide better community relations, increase value, improve traffic flow, increase user and worker safety, and minimize impacts to all stakeholders of the Program.

4.6.2(b)(iv) APPROACH TO EVALUATING BRIDGE DESIGNS PROVIDED IN THE RIDS FOR BRIDGES CONSIDERED FOR THE FIRST PACKAGE

As detailed in Section 4.6.2(a) - First Package Approach, Schedule, and Organizational Strategy, BPP went through a systematic review of the RIDs against the Program's goals and PDA Work Requirements.

Our review was focused on answering the following questions for the RIDs associated with each Bridge:

- Is there sufficient Bridge information to advance the PDA Work in accordance with the First Package PDA Work Requirements and related milestones?
- Is there any Bridge Condition or Safety Concern?
- Do we have visibility on NEPA Timing and commitments?

If any of the answers to any of these questions prohibited inclusion in the First Package, we studied if there was a cost-effective way to advance the RIDs to a sufficient level in a timeline that would allow for inclusion in the First Package by September 7, 2022.

Within this question framework, the RIDs were evaluated with integrated inputs from all BPP's workstreams, which assessed the RIDs against design criteria, PennDOT standards, construction techniques, alternative approaches and design submittal requirements during the Pre-Development and Delivery Phases of the First Package. The workstreams created a matrix of all the available RID documents, their corresponding level of development and the extent of future Site Investigations needed. The team then met together in-person to present findings and rated the RIDs numerically against each criterion as presented in Table 1 of Section 4.6.2(a) - First Package Approach, Schedule, and Organizational Strategy.

We note that the I-83 South Bridge, I-79 Bridgeville, and I-95 Girard Point Bridge, NEPA clearances are not anticipated until the summer of 2022. In addition (and as a result of the status of the NEPA process) plans for these bridges have not been advanced to the same degree as the other Bridges. Given these factors, it was determined that these three Bridges would not meet the PDA Work schedule requirements and would jeopardize achieving Financial Close by December 2022 and therefore are not included in the First Package.

4.6.2(b)(iv)(a) SUMMARY OF APPROACH TO RIDS REVIEW BY KEY DISCIPLINES

BPP's approach to the review of the RIDs by key disciplines and our preliminary assessment of additional Site Investigations is presented below:

RIGHT OF WAY

BPP reviewed each Bridge's Right-of-Way (ROW) limits. Our review was focused on evaluating the level of detail shown for drainage and stormwater management along the project perimeter, the existing ROW limits and the need for any potential additional ROW acquisition. Our review included the need for any temporary construction easements in relation to the needs for construction staging areas, lay down areas and site access.

ENVIRONMENTAL

Our review of the Environmental RIDs was focused on ensuring that there was clear visibility for each Bridge to a NEPA decision ahead of the PDA Effective Date. This is the case for all the Bridges that we have included in the First Package.

After reviewing for this first condition, we focused our review on determining if there were any Bridges where the potential for contamination of soil and/or groundwater exists. Our review of the RIDs indicates that additional Site Investigations are needed for I-80 Lehigh River related to the former landfill and its overlap with the LOD, which creates the potential for soil and groundwater contamination from the landfill.

BPP's approach also considered any environmental impacts related to species disturbances. Based on this element of our review, we believe that at I-78 Lenhartsville, the schedule for construction will be driven by in stream construction restrictions related to trout and the redbelly turtle. In addition, due to its location, traffic staging will have to be carefully coordinated to provide an efficient schedule and minimize construction staging impacts to the public.

Our reviews of the RIDs also flagged agency coordination for a Submerged Lands License 6 (f) land conversion at I-80 Lehigh River and North Fork as an area of further coordination during the Pre-Development Phase.

GEOTECHNICAL

BPP's review of the geotechnical RIDs focused on a comprehensive review of the Structure Foundation Recommendations. This document was noted as complete for four locations where the geotechnical investigation was provided.

Data within the reports includes the number of borings provided, the compliance to PDA Work requirements, the need for additional borings, slope stability, and concerns with the individual sites such as proximity to existing structures and approaches to address the concerns.

UTILITIES

We reviewed the existing utility conflicts to determine the nature of the conflict, schedule for relocation, potential relocation cost and the level of coordination conducted to date. Our review was particularly focused on identifying conflicting utility facilities within dedicated ROW or easements were identified as these typically have the most schedule and cost risk. For example, this includes the steel gas lines at Canoe Creek. We also assessed the adjacent railroads, where present, and assessed the potential schedule needs for acquiring an access agreement with the railroad.

ROADWAYS

As part of our review of the roadway designs and plans, we weighted the PDA Work requirements against RID data and design exceptions. We discussed potential realignments which would expedite the construction delivery of each Bridge. For example, we considered a permanent realignment involving a single Bridge solution at Canoe Creek, which seems to already have been contemplated by PennDOT who still opted for the dual Bridge configuration to provide system redundancy.

HYDRAULICS AND HYDROLOGY

BPP reviewed the Hydraulics and Hydrology (H&H) reports and assessed what information was available and what additional information would be needed to complete any studies and determine the best construction strategy. Major focus points of these discussions included cost estimating, the level of design presented relative to stormwater drainage and treatment facilities, their relationship to the provided LOD/ROW and the waterway crossing studies.

Current hydraulic studies only include 1D modeling of the major bridge crossings. 2D hydraulic modeling of the interstate Bridges will be completed during the Project Agreement phase to address the resiliency of the proposed Bridges while 2D hydraulic modelling of I-83 South will also include analysis of temporary impacts of stage construction on the Susquehanna River (completed during Pre-Development Phase). As the 2D study is an element of the Package Work, BPP understands that only preliminary results will be used during the Pre-Development Phase.

4.6.2(b)(iv)(b) APPROACH TO DETERMINING WHETHER BRIDGE TYPE, SPAN ARRANGEMENT, SUPERSTRUCTURE AND SUBSTRUCTURE DESIGNS ARE CONSIDERED EFFICIENT

Each of the six Bridges included in the First Package were further evaluated to assess the efficiency of the Bridge type, span arrangement, superstructure and substructure design included in the RIDs. The evaluation of efficiency also included the condition of each Bridge and the schedule impacts of potential design activities and revisions during the Pre-Development Phase.

Our review of efficiency also included the impacts of current economic conditions, such as inflation and material price increases, and focused in particular on the steel industry and current steel pricing.

Our design diligence for each Bridge began with a review of the Bridge type, span arrangement, superstructure and substructure as they are directly tied together in evaluating bridge alternatives. At each Bridge, the typical section was also reviewed by the design and construction team.

A summary of our determination of whether the Bridge type, span arrangement, superstructure and substructure presented in the RIDs for each Bridge included in the First Package is efficient as presented in the Table 5 below:

TABLE 5 - APPROACH TO DETERMINING WHETHER BRIDGE TYPE, SPAN ARRANGEMENT, SUPERSTRUCTURE AND SUBSTRUCTURE DESIGNS ARE CONSIDERED EFFICIENT

	BRIDGE ELEMENTS	BRIDGES REVIEW AND CONSIDERATIONS FOR PDA PHASE	
I-81 SUSQUEHANNA	Bridge Type	The use of CIP deck and prestressed beams are the efficient solution for I-81 Susquehanna River. A separate grade separation over the railroad using a precast arch solution is included in the RIDs. This structure is to be replaced using staged construction. Our review of the RIDs identified a potential more efficient improvement by changing the type of bridge to a single span bridge. In the current RIDs design, the precast arches are	perpendicular to the railroad at this site and when this is combined with bridge skew to the road and the staging, temporary shoring conditions are created which will be costly and increase the schedule. Our proposed single span alternative will be further refined and discussed during the Pre-Development Phase to evaluate the railroad agreement status and the potential schedule implications of a change at this point.
	Span Arrangement	The span layout was considered efficient.	
	Superstructure	Pennsylvania bulb tee beams with a CIP deck is an efficient solution.	
	Substructure	As it relates to the substructure at I-81Susquehanna River, we identified an area with geologic conditions where pile driving could result in drivability issues.	We would further investigate other deep foundation types for comparison to determine if the cost efficiency could be improved.
I-80 NESCOPECK	Bridge Type	The structure type for I-80 Nescopeck is prestressed concrete beams which was determined to be the most efficient and economical bridge type.	
	Span Arrangement	At this Bridge, our review of the span arrangement noted a potential efficiency to discuss in the Pre-Development Phase related to the span configuration from the eastbound to the westbound bridges. Our concern is that while the span configuration is identical for the eastbound and westbound bridges, the bridges are shifted relative to the alignment stations. This results in the substructure elements being staggered from one bridge to the other. This stagger creates constructability concerns for	the piers. This warrants additional evaluation during the Pre-Development Phase relative to the H&H and foundation type to determine if the cost could be improved for the substructure foundation. Staggered piers are generally considered less desirable because of the potential to collect debris and in the case of Nescopeck create additional cost relative to the construction in the river and the associated staging of the construction.
	Superstructure	Pennsylvania bulb tee beams with a CIP deck is an efficient solution.	
	Substructure	The relative stagger substructure location and associated staging will require consideration of a drilled caisson and wall pier solution to address constructability.	

	BRIDGE ELEMENTS	BRIDGES REVIEW AND CONSIDERATIONS FOR PDA PHASE	
I-78 LENHARTSVILLE	Bridge Type	Pennsylvania bulb tee beams with a CIP deck is an efficient solution.	
	Span Arrangement	The span layout was considered efficient.	
	Superstructure	Pennsylvania bulb tee with a CIP deck is an efficient solution. However, it was noted a potential to improve staging do be discussed during the Pre-Develpment Phase.	
	Substructure	Based on our review of the RIDs, BPP notes that given the time of year restrictions, construction phasing and their projected interaction, the substructure design may require a longer construction schedule. BPP believes that this concern could be alleviated if the substructure design	was further evaluated for a drilled caisson solution with a wall. Our team would discuss this opportunity with PennDOT during the Pre-Development Phase to determine if this efficiency could be implemented to accelerate the construction schedule of this Bridge.
I-80 LEHIGH RIVER, I-80 CANOE CREEK AND I-80 NORTH FORK	Bridge Type	Each of these sites include an opportunity to utilize a single structure which could potentially reduce the cost and schedule of the Bridge. However, given the progress to date and the noted comment within the RIDs for a redundant solution, it was acknowledged a single bridge for the crossing would not be efficient when the development to date is factored into the evaluation. At these Bridges, precast and cast in place segmental options were eliminated as they would not be economical for the bridge crossings in this project and their geographical separation. BPP also discussed the potential of implementing long span prestressed concrete girders and post-tensioned prestressed I-girder solutions. These solutions were noted as reducing risk relating to steel industry market variations.	However, these solutions would also require transportation and erection of heavy superstructure girder elements and, as barge access is not available, the elements would require roadway permits and specialized transport. Even if the delivery was resolved from a permitting aspect, once on site these girders would require specialized launching equipment at a high cost, would increase technical complexity and would need to be moved between the applicable sites. These issues reduced the cost efficiency of this potential design solution. For these reasons as well as a strong desire to expedite the replacement of the fracture critical bridges our team eliminated this type of solution and considered the long span steel solution presented in the RIDS as the most efficient approach with all the factors considered.
	Span Arrangement	Our review of alternatives to the long span steel solution presented in the RIDs, such as long span prestressed concrete girders and post-tensioned, prestressed I-girder solutions, determined that these solutions would	increase the number of required piers, making the long span steel solution the most efficient.
	Superstructure	The designs are considered efficient however during the Pre-Development Phase their efficiency could be increased by further coordination of the	girder designs to improve the structural steel purchase by maximizing common plate details to the extent possible.
	Substructure	The substructure designs were reviewed and discussed for efficiency with the primary focus on the taller substructure elements. The configuration shown in the RIDs were found to be economical approaches with refinements to be further evaluated in final design relative to the detail consistency (such as column widths) and surrounding topography where temporary or permanent shoring would be necessary at some locations to maintain slope stability during construction and in the permanent condition. The temporary shoring would also provide protection of adjacent existing structures during construction. Foundation types recommended were	considered cost effective with additional analysis during the Pre-Development Phase to select preferred foundation type and develop consistency for improving cost efficiency. During the Pre-Development Phase, we will also further explore and progress design for the size of the drilled caissons presented in the foundation recommendations as the sizes presented above 60” would require larger equipment and would result in fewer options for effective pricing. Additional smaller diameter caissons may provide a more efficient solution.

4.6.2.(b)(v) APPROACH TO ACHIEVE 100-YEAR BRIDGE SERVICE LIFE

BPP fully understands the importance of enhancing the service life of new Bridges. We are familiar with the goals and policies as outlined in PennDOT's DM-4 Appendix E regarding bridge asset management and service life. Our maintenance and lifecycle experts will be integrated with the design team from day-one to ensure that lifecycle considerations are incorporated into the design and that our maintenance plan is aligned with the proposed design and desired 100-year Bridge service life.

In addition to implementing AASHTO, DM-4 and PennDOT standards, policies, and preferences, our proposed collaborative partnering efforts will identify the potential use of higher performance materials or innovative details. In our recurring workstream meetings we will analyze the cost-effectiveness of each alternative and select solutions to realize a 100-year service life or beyond most cost-effectively. As presented below, the goal of our approach is to achieve a 100-year bridge service life for each Bridge component in the First Package.

4.6.2(b)(v)(a) DECK

Deterioration of bridge decks is typically the single cause for bridge deficiency in Pennsylvania. Given the extensive use of deicing salts, particularly on interstates, the intrusion and concentration of chlorides are typically the initial cause for bridge deficiency ratings impacting the service life of bridge decks. A typical bridge deck's life is limited to only 40-50 years depending on routine maintenance. To extend this initial life concrete overlays will be applied as part of the initial construction as well as prior to the hand back of these bridges to PennDOT. This will limit the chloride penetrations into the structural deck, extending the service life of the deck beyond the anticipated 50 years.

Table 6 lists the approaches and best practices will be applied during design and initial construction of the bridge decks to maximize service life.

TABLE 6 – DECK APPROACHES AND BEST PRACTICES THAT WILL BE CONSIDERED TO MAXIMIZE SERVICE LIFE

DESIGN MEASURES
Ensure that the distribution of reinforcing steel in the slab is appropriate
Determine an appropriate pouring sequence to limit tension in the slab
Verify that beam configuration allows for future half-width re-decking
MATERIAL SELECTION
Use epoxy coated reinforcement at a minimum, but consider stainless steel or galvanized reinforcement bars, where cost-effective
Use Class AAAP cement concrete
Install concrete overlays in accordance with the PDA Work Requirements, creating a low-permeability protective layer over the conventional concrete
CONSTRUCTION MEASURES
Perform deck pours when ambient conditions are favorable
Utilize proper curing times and moisture retention systems
DISTRICT BEST PRACTICES
Deck concrete will be placed per Pub 408 Section 1001 per PennDOT standards
Allow 14 days of water curing and 7 days of dry curing
Apply penetrating sealers 28 days after concrete has been placed
Specify additional ¼" deck/overlay thickness for mechanical grinding
Apply penetrating sealers on entire bridge deck and bridge barriers down to drip notches
Consider power washing the deck early in the Spring to remove deicing salt residue

4.6.2(b)(v)(b) EXPANSION JOINTS

Deck expansion joints are widely known as a structure's weak point, often leaking water, salt, and other chemicals onto critical elements below. Even with proper maintenance, a typical deck joint's service life averages just 25 years. Completely eliminating, or at least minimizing, deck joints is highly desired, but often cannot be fully realized on lengthy bridges.

BPP's approach to minimize/eliminate deck joints on the Bridges will be to maximize the utilization of continuous deck slabs, which removes the typical joint locations over the abutments, and places them back at the end of the approach slabs.

Appropriate details that enable easy access for cleaning and flushing of drainage troughs also help to maximize deck joint service life. BPP has experience on similar large bridge projects, such as I-95 BRI and CSVT, that required the development of details that enable the proper access for cleaning and flushing of drainage troughs, reduction in fatigue prone details, and other best practices, that will be implemented on this Project.

During the Delivery Phase, our team will also strive to ensure proper joint alignment, adequate cleaning of the formed area, attention to concrete consolidation in and around the joint, correct reinforcing steel installation and appropriate temperature settings at installation, all of which play a major role in the long-term performance of the joint.

Our daily maintenance patrols will ensure constant tracking of expansion joint condition and quick replacement or treatment of any joints that are beginning to fail before they begin to leak water, salt, and other chemicals onto bearings or other structural elements.

4.6.2(b)(v)(c) SUPERSTRUCTURE

Attention to detail in the implementation of the PennDOT standards by experienced design personnel is fundamental in extending superstructure service life. This provides structures with PennDOT's proven standards which are based on decades of experience in the local conditions for which they are built.

BPP will implement the approaches outlined in Table 7 to prolong the life of the bridge superstructure elements.

TABLE 7 – SUPERSTRUCTURE ELEMENT DESIGN APPROACH TO EXTENDING SERVICE LIFE

SUPERSTRUCTURE DESIGN ELEMENT	DESIGN APPROACH
Pre-Stressed Concrete Beams	Follow established design practice, using PennDOT approved beam shapes to provide sufficient capacity, limit deflections, and accommodate appropriate reinforcement. Beams will be fabricated with approved concrete mixes by approved PennDOT fabricators with inspection staff on-site during fabrication
Steel Beams	Use weathering steel for bridges over watercourses provided that they meet the requirements of DM-4. Painted steel systems will only be considered for roadway overpasses
Diaphragms	Provide bolted connections to girders. Steel diaphragms on concrete girders will be painted. Investigate use of galvanized steel intermediate diaphragms with concrete girders to enhance service life and eliminate potential issues with painting of intermediate diaphragms with concrete girders
Bearings	Accommodate future bearing replacement with details included as part of the final bridge designs. Jacking locations will provided at each girder or under a diaphragm, and pedestals will be used under each bearing to allow for future adjustment of bearing height
Drainage System	Eliminate low points on bridges if possible. Design proper structure end drainage systems and scuppers in accordance with PennDOT standards

4.6.2(b)(v)(d) SUBSTRUCTURE

Substructure elements face common factors that reduce service life including scour undercutting, concrete deterioration from chloride infiltration, and seized/misaligned bearings that result in damaged anchor bolts. Less common extreme events such as seismic, vessel/ vehicle impacts, and fire can have catastrophic effects to a Bridge's substructure.

BPP's approach to maximizing substructure service life will take both types of events into account and will include designing appropriate scour countermeasures and ensuring adequate protection from chloride infiltration through utilization of PennDOT standards, policies, and leveraging BPP's experience with the district preferences to ensure that these are implemented. The impact of extreme events will be mitigated through implementation of the appropriate design specification and PennDOT standards including, but not limited to those included in Table 8.

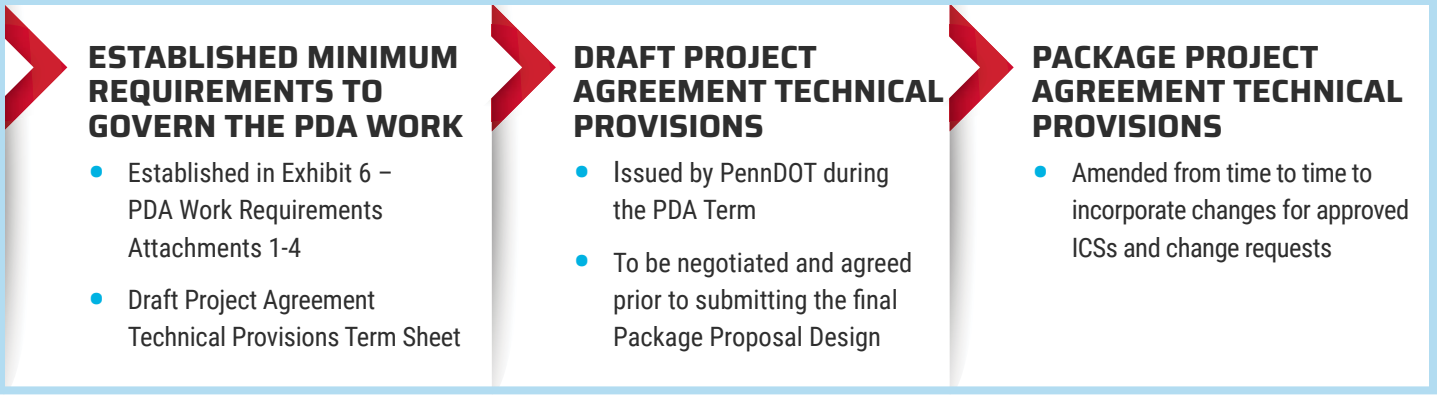
4.6.2(b)(vi) APPROACH TO ENSURE CONFORMANCE TO D&C SPECIFICATIONS FOR THE FIRST PACKAGE

BPP has assembled experienced and skilled personnel in Design-Build and PDA projects, including bridge design and construction engineers and quality personnel, many of whom live near and use these Bridges in their daily commutes. As long-term, local partners we will collaborate with PennDOT to successfully deliver the Project because we will still be here once the Project has been built. Our design and construction expertise, along with our team's local knowledge and experience of successfully delivering PennDOT projects, will expedite Package delivery while ensuring conformance to the D&C specifications. Our approach to ensuring conformance to D&C specifications draws on our team members' best practices, experience

TABLE 8 – APPROACH TO MITIGATING EXTREME EVENT IMPACT TO SUBSTRUCTURE ELEMENTS

SUBSTRUCTURE DESIGN ELEMENT	APPROACH TO MITIGATING EXTREME EVENT IMPACT
Abutments	• Use integral abutments where possible and ensure that all abutments are located out of the 100-year floodplain • Design drains for positive drainage and outlet
Piers	• Locate piers outside of the waterway as much as possible, and if they are within the waterway, they will be aligned with the flow of the stream as to avoid unfavorable flow patterns • Ensure that for multi-column bents a solid wall will meet the requirements of 1inch above 100-year flood event • Propose tulip piers at bridge locations with tall piers which are less prone to cracking than typical hammerhead type piers • Use high-strength corrosion-resistant reinforcement, where efficient, to reduce reinforcement congestion in the piers and provide for additional corrosion protection
Foundations	• Ensure proper design for extreme event loading along with meeting required scour depth and design • Locate spread footings below the scour design depth • Design piles and drilled shafts for unsupported lengths based on the height as determined by the maximum scour depth

FIGURE 17 -BPP'S PROCESS FOR DEVELOPMENT OF FINAL PROJECT AGREEMENT TECHNICAL PROVISIONS



and our robust quality process. Figure 17 above represents BPP's process for the development of the final Project Agreement Technical Provisions. This understanding is key in defining the Technical Provisions governance structure across the different phases of work during the Pre-Development Phase.

The key to the successful execution of the First Package within the timeframe allotted is the ability to hit the ground running. BPP has established a preliminary implementation plan to facilitate a quick mobilization with a structured approach to ensuring conformance to D&C specifications. Critical to this implementation plan is establishing a centralized office with formal document control procedures.

4.6.2(b)(vi)(a) CO-LOCATION AND DOCUMENT CONTROL

BPP has already secured a Project office in Harrisburg where critical BPP personnel, including the Project Manager, Technical Director, Design-Build Project Manager, Lead Designer and Construction Manager, and their staff will be co-located during the PDA Work and early portions of the D&C Work. This proximity to PennDOT during the Pre-Development Phase will facilitate rapid and close communication among all stakeholders, including real-time access to BPP leadership and working groups for both formal and informal meetings and discussions. Co-location is also essential to ensuring quality and consistency in the Delivery Phase and BPP's Quality Assurance Manager and Design Quality Assurance Manager will also co-locate with the team.

BPP's Electronic Document Management System (EDMS) and document control managers will be centralized at the Project office and leverage the latest technology to enable cloud access to the design drawings at all Bridge construction sites. This feature will ensure a consistent approach to document control across the entirety of the Project. BPP's EDMS will be tailored to the Project requirements, and will build in Project-specific PennDOT folder structures, document standards, CAD standards, workflows, and version control. All submissions to PennDOT will be submitted through and tracked using e-Builder.

From notification of Apparent Best Value Proposer, BPP will start populating the EDMS with the Draft Project Agreement Technical Provisions identified in Attachments 1-4 of Exhibit 6 – PDA Work Requirements. These specifications will establish the minimum requirements under which BPP will carry out the PDA Work and will serve as the 'source-of-truth' documentation that will be used as the baseline to track any deviations or changes that to the Technical Provisions that have been agreed with PennDOT.

The Draft Project Agreement Technical Provisions, once received from PennDOT, will also be stored on the EDMS with strict administration, editing and access controls in place. The development of the Draft Project Agreement Technical Provisions will follow the requirements of Section 3 – Technical Provisions, of Exhibit 6 – PDA Work Requirements, and is further discussed in section 4.6.2(b)(vi)(d) Design Conformance below.

During the Pre-Development Phase, BPP will develop and maintain a separate Draft Project Agreement Technical Provisions working document for each Package and track proposed changes to the Draft Project Agreement

Technical Provisions, using version control, as they are negotiated and discussed with PennDOT. Bridge-specific Technical Provisions will be developed by the team's Bridge design project manager and verified by the technical discipline lead. Project-wide specifications and provisions will be developed by the appropriate discipline Lead Engineer and incorporated into the Draft Project Agreement Technical Provisions once agreed with PennDOT. All proposed revisions will be reviewed and approved by Alex Houseal (Design Lead) prior to submitting to PennDOT for approval. All reviews and comments of these draft technical revisions will be documented in Microsoft Word via track changes and accepted once approval has been granted by PennDOT, including revisions due to approved ICSs. Versions of the Draft Project Agreement Technical Provisions will be documented through bi-weekly versions stored on e-Builder. BPP will clearly identify if the proposed changes are Package-specific, Bridge-specific, or Program-wide. BPP will document the PennDOT-approved changes through emails and meeting notes with records stored on e-Builder.

Once the Project office, EDMS and document control procedures have been established, we will then turn to our team of experts to carry out the work.

4.6.2(b)(vi)(b) EXPERIENCED AND KNOWLEDGEABLE TEAM

The advantage BPP has in ensuring conformance to the D&C specifications is that our team is made up of local design and construction firms who are already intimately familiar with PennDOT specifications and standards as well as proven comfort with District preferences and construction requirements. BPP's local team members bring a deep understanding of PennDOT standards and practices, while being supported by team members with global PDA expertise. BBP's Lead Engineering Firm, STV Incorporated (STV), is headquartered in Douglassville, PA with additional Pennsylvania offices in Philadelphia, Harrisburg and Pittsburgh and has been supporting PennDOT in delivering major highway and bridge projects since the mid-1960's.

To ensure the delivery certainty of the PDA Work within the First Package Deadlines, STV has developed a deep team of supporting engineering firms, with strong presences in the Commonwealth, including Dewberry Engineers, Inc. (Dewberry), Greenman-Pedersen Inc. (GPI) and Whitman Requardt and Associates, LLP (WRA). In addition to the above, the team will be joined by specialty and DBE firms to create a comprehensive design team that is familiar with the D&C specifications and PennDOT requirements. All subconsultants will be required to go through a Project orientation process in which they will be introduced to the Project and Project Documents and instructed on EDMS procedures. They will be fully informed of Project requirements, including identification of the latest Technical Provisions and quality procedures, prior to performing any work.

While STV will be the entity primarily responsible for design and engineering work delivered during the Pre-Develpment Phase, the design effort for each Bridge in the First Package will be bolstered by one of the supporting design firms who will then continue into the Delivery Phase, through final design and construction of the Bridge. This will ensure that D&C specifications that have been coordinated and developed and agreed during the Pre-Development Phase will be seamlessly implemented as part of the Package Work, with the history and knowledge of their development and any specific nuances. Table 9 includes BPP design leads for the First Package D&C Work. BPP's engineers will continue from the Pre-Development through the Delivery Phase, providing consistency across the First Package and ensuring that procedures established during the PDA Work that ensure conformance with the specifications will remain in place throughout the delivery of the Bridges.

TABLE 9 – FIRST PACKAGE DESIGN LEADS

DESIGN FIRM	BRIDGES
STV	I-81 Susquehanna, I-80 Lehigh River and I-80 North Fork
Dewberry	I-78 Lenhartsville and I-80 Canoe Creek
GPI	I-80 Nescopeck
WRA	Offsite Improvements at all Bridges

Each firm noted above is a local Pennsylvanian firm as well as each individual identified as a Lead Engineer on BPP's organizational charts and rosters (see sections 4.6.1(c) – Preliminary PDA Organization and 4.6.2(a)(iii) – Preliminary Organization Strategy for the First Package). All Lead Engineers are local Pennsylvania engineers with numerous years of experience leading their respective disciplines on projects across the Commonwealth.

4.6.2(b)(vi)(c) QUALITY

As IQF, SAI Consulting Engineers is well versed in the requirements of PennDOT, Pennsylvania Turnpike Commission, AASHTO, and other governing bodies. SAI has provided design and IQF services on a multitude of PennDOT and PTC projects including Freeport Bridge Rehabilitation, South Junction Interchange, SR 6219 Section 020, MP 31 to 38, MP 67 to 75, MP 199 to 227, and A38 to A44, among others. SAI will use this experience to ensure compliance with PennDOT requirements.

BPP, in partnership with SAI, has established a preliminary PDA Quality Management Plan (QMP) that includes a preliminary Design Quality Management Plan (DQMP), among other subsections (see 4.6.1(f) Preliminary PDA Quality Management Plan). The QMP and DQMP establish formal criteria and processes to ensure conformance to the Draft Project Agreement Technical Provisions and these criteria and processes will be more fully fleshed out at the beginning of the PDA Work, will be updated as required, and will remain in place throughout the D&C Work.

The draft DQMP will be based on the existing, proven, Quality Assurance/Quality Control (QA/QC) processes that are currently used by BPP's Lead Engineering Firm and will be augmented, as necessary, to comply with the additional PDA or Project Agreement requirements. The final DQMP will include a design responsibilities/oversight matrix, a summary of the production process and built-in QC, list of design hold-points, milestones and deliverables, process for addressing/closing comments, and other sections as needed.

The QMP will ensure the quality and conformance of the overall D&C Work by ensuring multiple levels of quality control, quality assurance and verification throughout all phases of the Project.

Prior to beginning the Package D&C Work, the Lead Construction Contractor will prepare a Construction QMP (CQMP) that will expand upon the existing Lead Construction Contractor's internal QA/QC plan and will be reviewed by SAI to confirm compliance with the Project Agreement requirements. Throughout the D&C Work, SAI will perform submittal reviews, random field audits, testing and verification to confirm that the construction period QMP is being adhered to and ensure conformance with the D&C specifications.

This approach will ensure SAI's direct involvement throughout all periods of the Project and creates a robust, two-layered approach to ensuring conformance to the D&C specifications.

4.6.2(b)(vi)(d) DESIGN CONFORMANCE

The first line of defense in ensuring conformance to D&C specifications will be the design team's internal QC. Before any designs are submitted to the DQM, the internal QC group will go through a checklist of items to ensure conformance to the technical requirements. The DQM will then verify each Design Submittal to ensure it includes the necessary information and is compliant with the DQMP, including the current version of the D&C specifications. The DQM will coordinate with the QAM, BPP Project Manager and BPP Design Lead to rectify any Design Submittals as needed. BPP will address any comment arising from this review, including non-conformance to the D&C specifications, prior to submission of each Design Submittal to PennDOT. At all times throughout the PDA and Package Work, the EDMS will be used as the location for the current, agreed upon version of the D&C specifications.

As noted in the previous section 4.6.2(b)(iv)(c) Quality, BPP's Lead Engineering Firm has established quality control procedures that will be strictly implemented, and BPP's IQF, SAI, will perform Design QA on all PDA Work and D&C Work to ensure conformance to the Draft Project Agreement Technical Provisions and the Package Project Agreement Technical Provisions.

BPP will maintain design conformance by providing a clear management structure, knowledgeable and experienced staff, clear communication and direction and implementing a proven process for QC and QA.

4.6.2(b)(vi)(e) CONSTRUCTION CONFORMANCE

During the preconstruction phase, BPP will require that the Lead Construction Contractor for each Package will develop their own CQMP. That CQMP is the first and most important step in ensuring conformance with the First Package D&C specifications. Each Package will have its own set of Package Technical Provisions that will provide the basis from which the technical requirements for the D&C Work will be derived.

The Lead Construction Contractor will reference the Project Agreement Technical Provisions to create submittals, identify required compliance checkpoints, procure materials, perform material source inspections, purchase equipment and services and perform the D&C Work in general.

The Package CQMP will be a go-to resource throughout the Project duration for the Lead Construction Contractor and SAI's Construction Quality Control Manager (CQCM) and supporting staff in the field to ensure the D&C Work is in compliance with and conforms to the Project Agreement Technical Provisions. It will outline the required tracking and compliance checkpoints for all work and materials to ensure they meet D&C. All project QC documentation will be completed timely and submitted as Project record by the CQCM as required in the CQMP.

4.6.2(b)(vii) TOP THREE STRUCTURAL DESIGN, TOP THREE ROADWAY DESIGN, AND TOP THREE GEOTECHNICAL DESIGN CHALLENGES FOR EACH POTENTIAL BRIDGE IN THE FIRST PACKAGE

There are several project-wide design challenges which encompass structural, roadway and geotechnical, as well as other disciplines. Overall, the demanding PDA timeline / deliverable schedule and the need to produce documents, field investigations, and the related QC processes is the biggest design challenge for the Project.

While each Bridge has its own design challenges, there is a significant amount of similarity between the nine Bridges included in the program. For example, three Bridges, I-80 Lehigh River, I-80 Canoe Creek, and I-80 North Fork are relatively long span steel plate girders bridges with tall substructures. Table 10 includes the top three design challenges for the structural, roadway and geotechnical disciplines for each of the six Bridges BPP has included in the First Package. In our analysis, we considered other disciplines such as drainage and traffic control under the roadway category of challenges being identified.

As part of our risk analysis, we also identified the following over-arching design challenges (as color coded on the number marker in Table 10 shown in the following pages):

- Optimizing design while ensuring compliance: Will be addressed through an 'open book' design process with PennDOT. We will push for standardization while being mindful for PennDOT's over-arching considerations and compliance requirements and District preferences.
- Lacking critical information which requires further due diligence and coordination: We will address such challenges by working on a collaborative manner with PennDOT and representatives to complete requirement studies and coordination activities, while focusing on the key elements required for compliance and the risky elements in order to reduce risk and as a result cost.
- Staging and its impact on Safety, Environmental and MPT: BPP will develop in collaboration with PennDOT solutions which minimize traffic pattern shifts, provide efficient construction operations for schedule acceleration and comply with environmental commitments to enhance safety and mobility.

For additional comprehensive challenges and mitigation identified by BPP please see our risk register presented in our Risk Management Plan included in Section 4.6.1(c) - Preliminary Version of the PDA Work Submittals for the First Package.

TABLE 10 - STRUCTURAL, ROADWAY AND GEOTECHNICAL DESIGN CHALLANGES

LEGEND:

Optimizing design while ensuring compliance	Lack of critical information which requires further due diligence and coordination	Staging and its impact on Safety, Environmental and MPT

	STRUCTURAL DESIGN CHALLENGES	ROADWAY DESIGN CHALLENGES	GEOTECHNICAL DESIGN CHALLENGES
I-81 SUSQUEHANNA	1. Coordination of the structural, design with scour requirements and foundation design	1. Minimization of ROW impacts for off-site improvements, such as total takes at US 11 and SR 492 intersection	1. Coordination of the structural design and geotechnical recommendations to address scour, staged construction, and cost-effective construction
	2. Coordination of the traffic control staging and structural staging	2. LOD confirmation related to drainage, storm water treatment, and establishment of E&S controls for access, staging, and stockpiling areas	2. Slope stability for rock cuts and roadway embankments
	3. Railroad crossings agreement and staged arch construction	3. Temporary alignments and cross sections to provide temporary drainage during construction	3. Foundation selection and constructability review for foundations involving subsurface with boulders
I-80 NESCOPECK	1. Coordination of the structural design and geotechnical recommendations for proposed bridge and protection of existing foundations	1. Determination of limits of potential contaminated soils from the prior Lehigh River landfill and storm water management	1. Coordination of the structural design and geotechnical recommendations addressing constructability, cost effectiveness and staging
	2. Long structural steel spans addressing capacity, fatigue, stability in coordination with other bridges for cost effective steel plate purchases	2. Design alternatives to eliminate limited sight distance design exception on I-80 WB at SR 940 bridge	2. Design for protection of existing foundations
	3. Railroad crossing agreement	3. Tie-in to the existing ramps while maintaining traffic during construction staging	3. Implementation of geotechnical investigation including coordination with Phase I, II and III landfill investigation
I-78 LENHARTSVILLE	1. Coordination of the structural design and geotechnical recommendations	1. Elimination of design exception for I-78 super-elevation and the Ramp B and C horizontal curves to stay within the LOD	1. Geotechnical recommendation addressing constructability, cost-effectiveness and construction staging
	2. Structural design for temporary stages and effects on existing structure	2. Staged construction: Interchange ramp alignment shifts and Temporary alignments	2. Coordination of scour analysis and design with hydraulics and structures
	3. Long span prestressed girders design for serviceability, strength, and stability	3. Stormwater treatment, drainage measures and its impacts on LOD and ROW	3. Geotechnical investigation for due diligence scheduling and review

LEGEND:

Optimizing design while ensuring compliance	Lack of critical information which requires further due diligence and coordination	Staging and its impact on Safety, Environmental and MPT

	STRUCTURAL DESIGN CHALLENGES	ROADWAY DESIGN CHALLENGES	GEOTECHNICAL DESIGN CHALLENGES
I-80 LEHIGH RIVER	1. Coordination and evaluation of bridge Type Size and Location Drawings (TS&L) to address potential debris collection with staggered piers	1. Temporary alignments and cross sections to provide for adequate cross overs temporary drainage during construction	1. Rock corrosion and rough cuts on current slopes for the appropriate treatment and discharge
	2. Foundation design for staged construction relative to existing substructure	2. Minimization/elimination of retaining wall between I-80 WB and SR 3016 (Tank Rd)	2. Geotechnical investigation for due diligence scheduling and review
	3. Long span prestressed girders for serviceability, strength, and stability	3. Provision of adequate access for bridge replacement while minimizing temporary and permanent impacts to wetlands	3. Retaining wall design and construction approach to minimize impacts on existing local traffic
I-80 CANOE CREEK	1. Coordination of the structural design and geotechnical recommendations for proposed bridge and protection of existing foundations	1. Lifecycle optimization of asphalt vs concrete (and standardization with North Fork)	1. Coordination of the structural design and geotechnical recommendations for proposed bridge and protection of existing foundations
	2. Long span design of superstructure girders; Capacity stability and fatigue design; High Performance Steel; Lateral bracing; Deck pour sequencing/analysis; Fatigue detailing of long term performance	2. Efficient temporary crossover geometry to allow for smooth transitions between bounds allowing for safe work zone and emergency pull-off areas	2. Slope stability investigation, design and detailing given historical slope failure issues encountered at the site
	3. Tall piers; Longitudinal flexibility for piers, bearings, and joint design; Variable height piers affect center of movement; Influence joint and bearing design; Mass concrete specification	3. Maintenance of median crossovers to allow for effective cycle times for winter maintenance	3. Implementation of technical provisions for the construction of slopes and protection of existing structures
I-80 NORTH FORK	1. Long span design of superstructure girders; Capacity stability and fatigue design; High Performance Steel; Lateral bracing; Deck pour sequencing/analysis; Fatigue detailing of long term performance.	1. Lifecycle optimization of asphalt vs. concrete (and standardization with Canoe Creek). Preliminary pavement design includes asphalt design however Canoe Creek is concrete. Volume of concrete pavement will be costly.	1. Foundation design coordination with structures along with addressing protecting adjacent utilities, existing dam and structures
	2. Coordination of the structural design and geotechnical recommendations for proposed bridge and protection of existing foundations	2. Evaluation of design revisions which could reduce borrow material needed for construction of large embankment in phase 1 and minimize waste material in last stage	2. Slope stability investigation and design to address site's history of slope failures
	3. Tall piers; Longitudinal flexibility for piers, bearings, and joint design; Variable height piers affect center of movement; Influence joint and bearing design; Mass concrete specification	3. Development of traffic diversion plans to identify ROW takes and LOD impacts, particularly at intersection improvements where geometry and turning lane additions are required	3. Foundation evaluation comparing similar sites to enhance cost effectiveness through utilization of the same or similar details as appropriate

Volume II Technical Proposal

Section 3

Appendix 5, 3.3

First Package Work Criteria

Preliminary Versions of PDA
Work Submittals for the First Package

US 219 New Highway Construction, Pennsylvania
Fay

PRELIMINARY VERSIONS OF PDA WORK SUBMITTALS FOR THE FIRST PACKAGE

In accordance with Appendix 5, Section 3.3 of the ITP, please find attached preliminary versions of the following PDA Work Submittals for the First Package:

(i) Preliminary Risk Management Plan for First Package
(ii) Preliminary Safety and Security Plan for First Package
(iii) Preliminary Public Information and Communications Plan for First Package
(iv) Preliminary Plan for Maintenance Work and Handback Requirements for First Package

Preliminary

Risk Management Plan for First Package

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

BRIDGING PENNSYLVANIA PARTNERS

Preliminary Risk Management Plan for First Package

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Glossary

Candidate Risk
A candidate risk is an identified “threat” or “opportunity” that is pending adjudication / validation by the Risk Review Board (RRB).

Consequence
A consequence is the quantitatively or qualitatively expressed outcome of a risk that may lead to negative or positive impacts in performance with respect to one or more performance measures, such as an injury, fatality, destruction of key assets, cost overruns or savings, schedule slippages or surplus or other events that may prevent a desired outcome from occurring or may result in a windfall.

Consequence Category
A consequence category describes a functional area in which a risk can impact a project.

Impact Time Frame
Impact time frame represents the time when the risk may occur. The impact time frame is defined by two distinct moments, a sunrise date which indicates the earliest time the risk could become realized, and a sunset date which indicates the latest time the risk could become realized.

Likelihood
Likelihood is a measure of the possibility that a consequence is realized. This probability accounts for the frequency of the consequence and the time frame in which the consequence can be realized. Likelihood can be either assessed qualitatively or quantified in terms of frequency of probability.

Priority Score
The priority score is numerically represented by a cross-reference of the likelihood and consequence scores of a risk plotted on a Risk Matrix.

Project Team Member
Project Team Members are personnel assigned to work on a defined Project or activity. Project Team Members can be BPP direct employees or contract employees. Project Team Members are responsible for bringing potential risks to the attention of their Project Managers and may also be requested to assist or perform risk analysis to determine the consequence and likelihood associated with a risk. The Project Team Members also may collect data to assist in the monitoring and tracking of a risk. A Project Team Member may be an owner of a risk or simply a subject matter expert that can supply critical information to support analysis of the risk. Project Team Members include, but are not limited to:

- Project Stakeholders
- Project Manager
- Design-Build Project Manager
- Construction Manager
- Safety Manager
- Utility Manager
- Traffic Control Manager
- Project Controls Manager
- Geotechnical Engineer
- Tolling Lead
- Maintenance Manager
- Public Information Coordination
- Equal Employment Opportunity Manager
- Quality Assurance Manager

- Environmental Compliance Manager
- Design Team
- Design Lead
- Design Quality Manager
- Construction Quality Control Manager
- Maintenance Quality Control Manager
- Other specialist or personnel as required

Risks & Opportunities Management System (ROMS)
A ROMS is a framework used to identify, manage and mitigate risks and opportunities of a project.

Risk
A risk is a future event that may occur at any given time in a project's lifecycle and has the potential for negative or beneficial impacts to performance and/or the achievement of explicitly established and stated performance goals, requirements, and objectives. Risk performance measures usually involve one or more of the following elements:

- Cost
- Schedule
- Safety
- Technical (Quality, Scope)

Risk Analysis
Risk analysis examines risks in detail to determine the extent of the risks and the relationships among them. Risk analysis also classifies risks into sets of related risks and ranks them according to importance. Risk analysis evaluates all identified risks to estimate the likelihood of occurrence, consequence of occurrence and timeframe for necessary mitigation actions.

Risk Assessment
Risk assessment is the qualitative and/or quantitative evaluation of the likelihood and consequence of a risk occurring.

Risk Attribute
Risk attributes are characteristics of likelihood and consequence that describe or define standard ways of assessing the consequence or success of a Risk Mitigation Plan. Risk attributes are chosen during risk management planning and provide meaningful information that can enable more informed control decisions.

Risk Identification
Risk identification examines each element of a project to identify risks that may impact the Program / Project, and then documents the risks found. Risk identification occurs at all organizational levels and begins as early as possible in a successful project continuing throughout the lifetime of that project.

Risk Management
Risk management is an overarching process that encompasses identification, analysis, mitigation planning and tracking of root causes and their consequences.

Risk Management Planning
Risk management planning develops and documents an organized, comprehensive, and interactive strategy for identifying and tracking root causes. Additionally, risk management planning involves the

development of Risk Mitigation Plans, performance of continuous risk assessments, and the assignment of adequate resources within the organization.

Risk Management Team
The Risk Management Team owns the risk management process and provides training on the implementation of that process. The Risk Management Team uses a metrics-based approach to understand how well the risk management process is working and to improve process when needed.

Risk Matrix
A Risk Matrix is a graphical representation of the likelihood and consequence scores of a risk. The rows of a Risk Matrix show likelihood scores, while the columns show the consequence scores. Each cell in a Risk Matrix can be represented by a Priority Score.

Risk Mitigation
Risk mitigation is an action, or a series of actions, taken to reduce the severity of a risk by reducing the likelihood of its occurrence and/or minimizing the consequences of occurrence.

Risk Mitigation Plan
A Risk Mitigation Plan is a document that captures the actions to be taken to reduce the likelihood of risk occurrence. This document is the output of risk mitigation planning.

Risk Mitigation Planning
Risk mitigation planning is the process of analysing a risk to determine actions that may be taken to reduce the likelihood of risk occurrence.

Risk Owner
A risk owner is the entity, usually a named individual, designated as the lead for overseeing the implementation of the agreed disposition of that risk.

Risk Review Board (RRB)
Risk Review Boards (RRBs) are formally established groups of people assigned specifically to review risk information. Their output is twofold: (1) to improve the management of risk in the area being reviewed and (2) to serve as an input to decision-making bodies in need of risk information. This generally takes the form of understanding and approving candidate risks as well as evaluating proposed mitigation plans and approving them.

Risk Stakeholder
A risk stakeholder is a person, group or organization that is affected by a risk or a risk mitigation strategy.

Risk Tracking
Risk tracking is the capturing, compiling, and reporting of risk attributes and metrics that determine whether risks are being mitigated effectively, and whether Risk Mitigation Plans are implemented correctly.

Acronyms

Acronym	Reference Term
BPP	Bridging Pennsylvania Partners
BPC	Bridging Pennsylvania Contractors
IQF	Independent Quality Firm
PennDOT	Pennsylvania Department of Transportation
PM	Project Manager
ROMS	Risk & Opportunities Management System
RRB	Risk Review Board

Introduction

Risk Evaluation Strategy

BPP plans to develop and document an organized, comprehensive, and interactive risk evaluation strategy for identifying and tracking candidate risks, root causes, developing risk mitigation plans, performing continuous risk assessments and assigning adequate resources.

BPP will utilize the Risks & Opportunities Management System (ROMS) framework to identify, manage and mitigate the Project's risks and opportunities for both PDA Work and Package Work. The ROMS provides a set of tools, including procedures, templates, and matrices to enable project teams to manage both risks and opportunities within the Project's tolerances and towards achievement of the Project's goals.

The objectives of the ROMS are as follows:

- Establish a rigorous and reliable basis for decision-making and planning based on detailed analysis of risks and opportunities
- Improve risks and opportunities identification
- Improve operational effectiveness and efficiency through preventive management, and thereby avoiding reactive management approaches
- Enhance the efficiency in the communication, distribution and use of resources
- Reduce management costs and improve incident management
- Improve compliance with relevant legal and regulatory requirements and international standards
- Increase confidence, credibility, and trust
- Enable continual improvement
- Reduce negative impacts and enhance positive impacts

BPP's ROMS Process Flow Diagram is depicted in the next pages.

Figure 1 - ROMS Process Flow Diagram (Part 1)

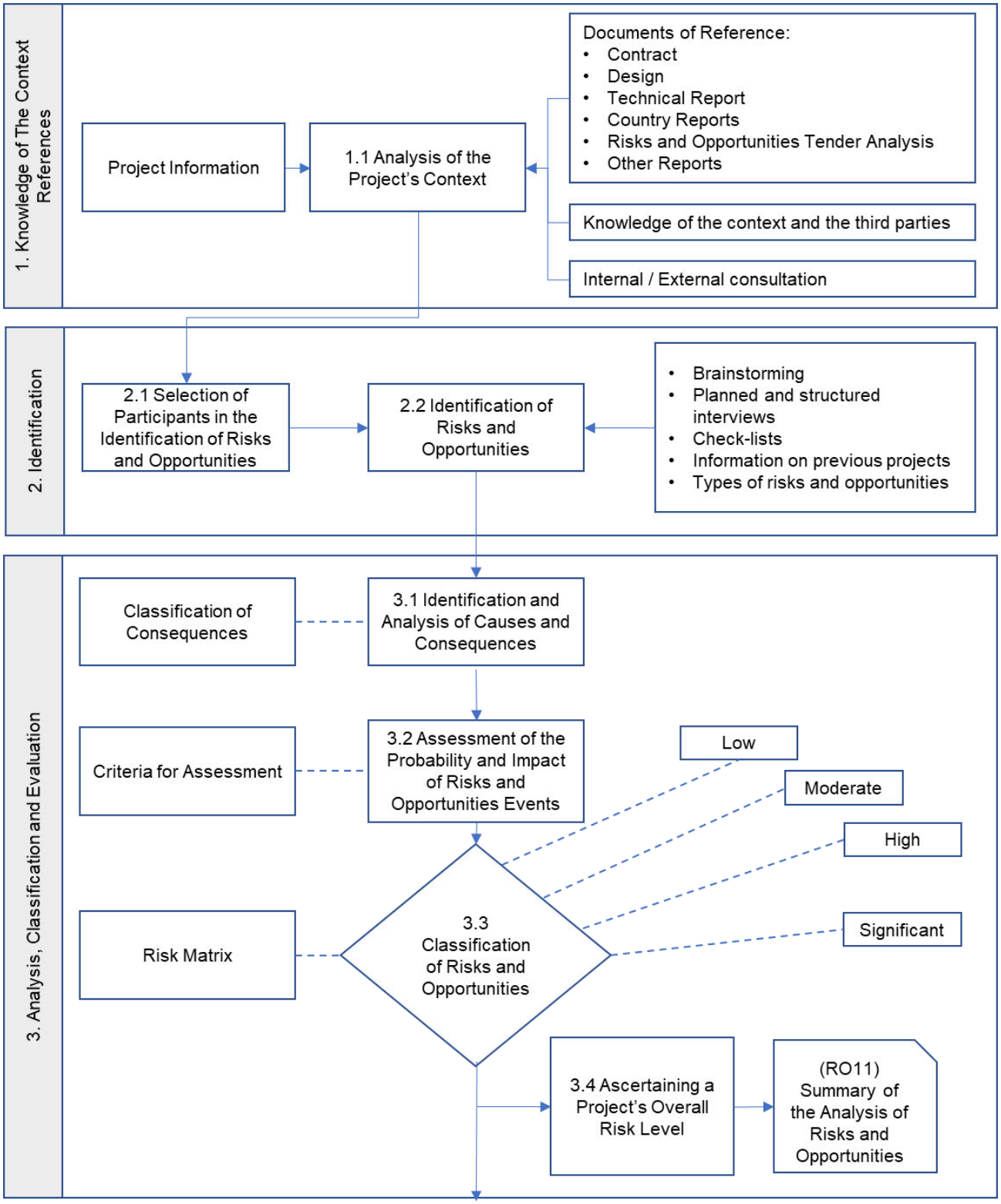
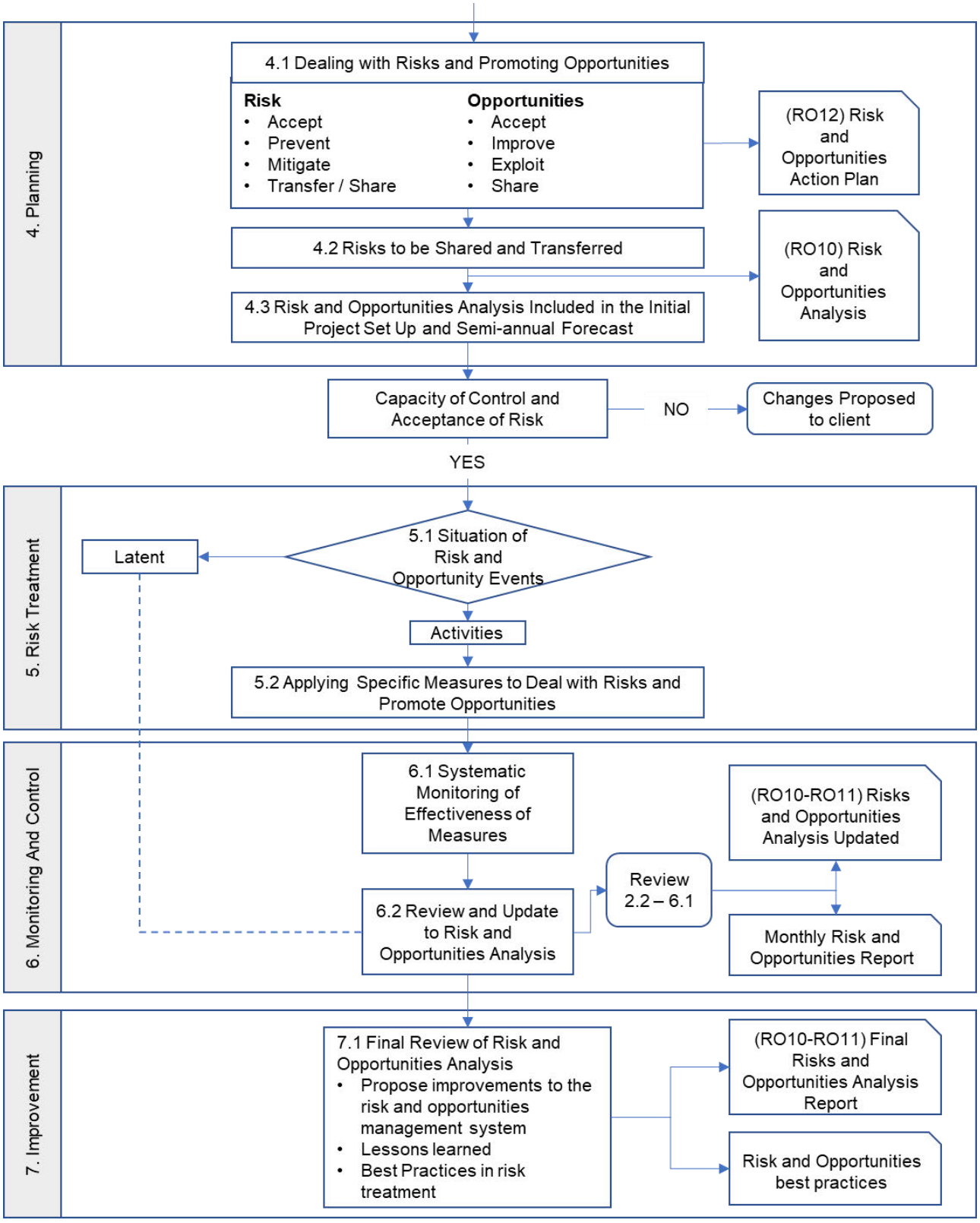


Figure 2 - ROMS Process Flow Diagram (Part 2)



Stakeholders

Project stakeholders will be involved in the risk management plan activities to utilize their skills and experience as well as to ensure understanding of and commitment to the risk management process. Risk Stakeholders who will be included in the Risk Management Plan activities are:

- Procuring Authority: Pennsylvania Department of Transportation (PennDOT)
- Development Entity: Bridging Pennsylvania Partners (BPP)
- Lead Construction Contractor: Bridging Pennsylvania Contractors (BPC)
- Lead Engineering Firm: STV Incorporated
- Routine and Major Maintenance Contractor: Bridging Pennsylvania Partners (BPP)
- Independent Quality Firm: SAI Consulting Engineers
- Others: Pennsylvania Turnpike Commission, PennDOT district office, City and County offices, Utilities, Railroads, Agencies having jurisdiction or others as determined by Risk Management Team

Roles and Responsibilities

While risk management involves all stakeholders, the key roles that are dedicated to supporting risk management are:

Role	Responsibility
Project Manager	• Responsible for endorsing and supporting the risk management for the Project.
Controls Manager	• Monitors risk activities and make updates to the risk register and reports to the Project Manager as required for risk avoidance and / or mitigation
Risk Owners	• The lead for overseeing the implementation of the agreed management approach for that risk. • Monitor their assigned risks, take agreed actions, and provide relevant information on the status of, or changes to, risk characteristics.
Risk Review Board	• Review risk information. • Provide output to: (1) to improve the management of risk in the area being reviewed and (2) to serve as an input to decision-making bodies that require risk information. (See definition of Risk Review Board in glossary above) • Review and approve all Risk Mitigation Plans

Section 1 – Risk Management Procedures

1.1 Risk Evaluation Procedures

Risk identification depends heavily on both open communication and a forward-looking perspective. It is a process that encourages all personnel to communicate new risks and to plan beyond their immediate problems. Teamwork improves the chances of identifying new risks because contributions from different individuals with different knowledge of the Project allows for wider coverage of potential risks. BPP shall begin risk identification as early as possible and ensure it continues throughout the project lifecycle, using the following procedures:

- **Develop detailed scope of risk and opportunity evaluation** – BPP's Project Team Members will be responsible for bringing potential risks to the attention of the Project Manager, Controls Manager and the Risk Review Board and may also be requested to assist with or perform risk analysis to determine the consequence and likelihood associated with a risk. The Project Team Members also may collect data to assist in the monitoring and tracking of a risk. A Project Team Member may be an owner of a risk or simply a subject matter expert that can supply critical information to support analysis of the risk.
- **Identify the Risk Review Board** – Risk Review Board, comprised of representatives from various stakeholders, will be formally established to review risk information and serve as an input to decision-making bodies in need of risk information. All Risk Mitigation Plans will be reviewed and concurred upon by the Risk Review Board.
- **Lead the identification, evaluation, and management of risks** – The Project Manager shall lead the Project Team's efforts in identifying, evaluating, and managing risks in accordance with the process flow diagram depicted in the figures above. The Project Manager will coordinate regular workshops to identify and evaluate risks.
- **Assign risk owners** – Each risk category will be assigned by the Project Manager to a risk owner who will be experienced in managing, monitoring, avoiding, and mitigating the risk and its impact. These risk owners will operate with the full support of the Project's management team and will be afforded the necessary resources to successfully accomplish their assignments.
- **Perform continual evaluation and management of risks** – BPP will maintain and update the Risk Management Plan, re-evaluate, and categorize each risk and hold monthly risk workshops. BPP's Project Manager may also choose to have periodic risk assessments beyond the monthly risk workshops for the following situations: occurrence of a major or unexpected risk, analysis of a complex change request, phase-end review, re-planning, or major development in the Project.

1.2 Risk Matrix

See Appendix 1 – Risk Register which identifies significant risk categories during the Term, the potential consequences of the identified risks and the probability/likelihood of risks.

1.2.1 Tools for Conducting Risk Sensitivity Analysis

BPP will establish risk / opportunity workshops (RO Workshops) which involve members from all relevant Project teams including, at a minimum, the following workstreams: commercial and legal, design and construction, quality, environmental, public and community engagement.

The RO Workshops will evaluate the causes, likelihood, and consequence of each risk, using the ROMS framework.

1.2.2 Determining Risk and Opportunity Likelihood

Using the ROMS framework's five-point scale, the team will determine likelihood according to the following criteria:

Objective Criteria to Determine Likelihood of Risks and Opportunities:

Likelihood	Criteria
A: Almost Certain (5)	P > 59% during the applicable impact time frame
B: Likely (4)	40% < P < 59% during the applicable impact time frame
C: Medium (3)	20% < P < 39% during the applicable impact time frame
D: Unlikely (2)	10% < P < 19% during the applicable impact time frame
E: Rare (1)	P < 10% during the applicable impact time frame

1.2.3 Determining Risk and Opportunity Consequence

RO Workshop members are provided with a matrix of objective criteria to establish the consequence of each risk type.

The consequence score will be determined by assessing the consequence of the risk and assigning a consequence score from 1 to 5 based on the criteria in the table below. Risks will be analyzed and scored on each separate consequence category.

Risk Consequence Criteria

Consequence Category	1	2	3	4	*5*
Performance	Minimal consequence to objective/goals	Minor consequence to objective/goals	Unable to achieve a particular objective / goal but remaining objectives / goals represent better than minimum success or outcome	Unable to achieve multiple objectives / goals but minimum success can still be achieved or claimed	Unable to achieve objectives / goals such that minimum success cannot be achieved or claimed

Consequence Category	1	2	3	4	5
Health and Safety	No effects	Risk may cause minor incidents without casualties	Risk may only cause minor accidents	Risk could result in serious, non-fatal accidents	Risk could cause fatal accidents
Schedule	Minimal consequence	Critical path is not slipped, total slack of slipped tasks will not impact critical path in less than 10 days	Critical path is not slipped, total slack of slipped tasks is within 10 days of impacting the critical path	Critical path slips	Critical path slips and one or more critical milestones or events cannot be met
Cost	Minimal cost consequence	Minor cost consequence	Moderate cost consequence	Significant cost consequence	Catastrophic cost consequence

1.2.4 Determining Scores for Each Risk and Opportunity

Once consequence and likelihood have been determined, each risk is classified using a quantitative score, as shown in the figure below.

		CONSEQUENCE				
		Insignificant (1)	Low (2)	Medium (3)	Major (4)	Huge (5)
		Impact Rating 1	Impact Rating 2	Impact Rating 4	Impact Rating 8	Impact Rating 16
PROBABILITY	A Almost Certain (5)	Moderate	Significant	High	High	High
	B Likely (4)	Moderate	Moderate	Significant	High	High
	C Medium (3)	Low	Moderate	Moderate	Significant	High
	D Unlikely (2)	Low	Low	Moderate	Moderate	Significant
	E Rare (1)	Low	Low	Low	Moderate	Moderate

Risk and Opportunity Classification Matrix to Determine Quantitative Score

For a particular impact, the combination of the probability rating of the risk occurring and the impact rating positions the risk into one of the four colored zones in the risk matrix, giving it a priority score. The color of the zone indicates the priority of the risk for response: red zone signifies high importance, orange signifies high to medium importance, yellow is medium importance and green is low importance.
For example, a risk having a "Likely" probability and a "Major" impact falls into the red zone. Its impact score is 4 x 8 = 32.

1.2.5 Risk-Mitigation Strategies

BPP will carry out a thorough risk analysis to determine the suitable management strategy, which will include one of the following:

- Accept: Suitable for low and moderate risk levels.
- Prevent: Establish actions and steps aimed at preventing the causes that give rise to risk.
- Mitigate: Establish actions and steps aimed at minimizing impact when risks arise.
- Transfer or share: Negotiate changes, transfer to subcontractors and suppliers, subscribe to specific insurance policies.

BPP will carry out a thorough opportunity analysis to determine the suitable management strategy, which will include one of the following:

- Accept. Make the most of opportunities when and as they arise, without taking special steps.
- Improve. Take measures to increase the likelihood of opportunities and their positive impact.
- Exploit. Establish actions and measures aimed at giving rise to opportunities.
- Share. Depending on the type of contract in place, help to increase the likelihood of opportunities by sharing with: Clients, Subcontractors and Suppliers.

For each high and significant risk, the Project Team, led by the Project Manager, must design an action plan to manage these risks, as follows:

- Select and define the most efficient actions (lowest cost and greatest return).
- Assign these tasks to one of the team members.
- Draw up timing and schedules.
- Draw up a follow-up/monitoring program.

1.2.6 Ongoing Risk Tracking, Management and Reporting

BPP will perform ongoing risk tracking and assess its management actions based on controls established in the action plans in order to verify their effectiveness and document the costs incurred in their management.

BPP will designate an individual responsible for gathering and recording the information on the implemented measures, indicating how each was applied and the results. This individual will report this information monthly to the Project Manager.

The Project Manager will consolidate the risk information for monthly reporting.

APPENDIX 1

PRELIMINARY RISK REGISTERS FOR FIRST PACKAGE BRIDGES

LEVEL 2 - RISK REGISTER Qualitative Analysis	**Project Name:** P3 - Major Bridges - I-80 Nescopeck	MPMS No:	Project Manager:	
Risk Identification		**Risk Assessment[1]**		**Risk Response[2]**

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	1	Threat	Construction	Maintenance of Traffic	As a result of overruns in the performance of construction activities, longer than anticipated traffic closures and detours may be required, which could lead to an increase in construction support costs, increased construction capital costs, and reduced public satisfaction.	Develop early communication and coordination with the traveling public to provide early notification of upcoming lane closures and anticipated durations. Sequence construction activities to maintain two lanes of traffic in each direction during construction and avoid the need to implement detours of I-80 for the reconstruction of the bridges.	2-Low											
Active	2	Threat	Construction	Difficulties to hire skilled / unskilled labor	As a result of pandemic-induced labor shortages and the additional demands these projects will put on the Pennsylvania labor market, construction contractors and subcontractors may struggle to find enough qualified workers to hire to perform construction activities, which could lead to higher than forecasted labor costs, productivity impacts, project delays and increase in schedule and cost.	H&K has significant history working in this region and can leverage that experience to tap into their local labor resources to construct this project. Additionally, BPP and H&K will partner with local trade groups & organizations, community colleges and trade schools to continue to develop skilled labor resources needed throughout this project.	2-Low											
Active	3	Threat	Construction	Permits	As a result of the project falling within the Northeast Regional Office of Pennsylvania Department of Environmental Protection and PA Fish and Boat Commission, and Luzerne County Conservation District jurisdictions; GP-11 and Chap 102/NPDES permits along with T&E Agency Clearance, PHMC Concurrence, and Aid to Navigation Plan approvals are required, and a delay in application for and/or receipt of permits or appeals may occur, which would lead to a delay in the project and possible project changes to comply with permit conditions.	Identify all approval and permit requirements and coordinate early with regulatory agencies to streamline the approval process Leverage STV's and local subcontractors past success in coordinating similar permits for past projects with permitting agencies Highlight activities that depend on permits or agreements in the CPM schedule and develop contingency work-around plans if needed.	3-Medium											

[1] To be completed further during PDA Work
[2] To be completed further during PDA Work

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	4	Threat	Construction	Covid-19	As a result of compliance with unforeseeable Covid-19 rules, orders or directives, normal design, construction, and maintenance procedures or workforce may be affected which could lead to reduced performance and/or increase in cost.	Consider best practices and measures currently applied in similar construction project in the United States and the Commonwealth of Pennsylvania	3-Mediu m											
Active	5	Threat	Construction	Materials escalation	As a result of supply chain disruptions, and commodities pricing volatility, material cost increases and delays in delivery for certain construction materials such as steel, asphalt, fuel and portland cement may occur, which could lead to higher construction capital cost and delay construction contract acceptance.	Identify specific materials or material categories that may be at risk for significant volatility in current conditions Identify suppliers for these “at-risk” materials that may provide fixed pricing for a fixed period of time. Pre-order materials if feasible	2-Low											
Active	6	Threat	Construction	Waste Management	As a result of the discovery of unknown contaminated soils on project ROW, additional waste management and hazmat remediation actions may be necessary, which would lead to an increase in cost and delays.	Design to avoid work in areas with a known potential for hazardous materials and utilize construction methods to minimize disturbance, if possible Perform additional / confirmatory site investigations Develop action plans with established protocols for handling / disposal of materials in a safe and sound manner.	3-Mediu m											
Active	7	Opportunity	Construction	Polyester Polymer Concrete	As a result of the use of polyester polymer concrete as an overlay on the bridge deck, useful life may be extended which would reduce long term maintenance costs.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	4-High											
Active	8	Threat	Construction	Flooding Events	As a result of unforeseen ground conditions, weather or flood events, construction delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Allow construction time float for uncertainty. Determine most likely flood season and program around those periods if possible.	2-Low											
Active	9	Threat	Construction	Lack of borrow pits / waste sites near the project	As a result of insufficient design or unexpected site conditions, additional borrow / waste material may be generated, which could lead to an earthwork unbalance.	Design project to produce balance earthwork. Make provisions to borrow or waste material as necessary (determine locations for borrow and waste sites before final design plans).	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	10	Threat	Construction	Road User Liquidated Damages (RULD)	If schedule is delayed and roadway is shut down more than specification allows, RULD's may be assessed	Perform a complete staging, constructability, and maintenance of traffic assessment of the project during Final Design. Work cooperatively and - coordinate activities with PennDOT and other stakeholders during construction to resolve potential deviations on assumptions without incurring penalties.	2-Low											
Active	11	Threat	Construction	Sub-contractor Design-Build Field Issue Resolution	If the project is subcontracted out, the management of the design by BPP will inherently cause a contractual tension due to schedule and/or cost impacts if, during construction, design issues impact the progress in the field. If the subcontractors on site are not proactively reviewing plans for these issues and they make it to the field regularly this can have negative effects.	BPP Field Staff must be alert to issues that would normally be caught had our project team/craft been constructing the work and partner between the designers and subcontracting team to mitigate these issues quickly when they crop up.	1-Very Low											
Active	12	Opportunity	Construction	Group or Interconnect Project Areas by material types, location, or operations	By grouping similar regional projects together for buying out materials or for sharing resources (manpower, equipment, etc.) the buying/negotiating power of the overall project is increased.	If implemented, the grouping decisions would have to be made to account for any operational risk that accompany linking parts of projects together (i.e., using the same beam gantry on more than 1 project)	4-High											
Active	13	Threat	Construction	Issuance of NCE (Nonconformance Events) points	PennDOT implements a rigid NCE program during the PA phase that could result in numerous points assessments that BPP will have no recourse.	It is unusual for noncompliance points to apply during construction. To the extent PennDOT believes such a regime should be applicable during the construction period, the scope of failures / non-conformance events that would give rise to the assessment of non-compliance points and associated economic penalties should be limited to material nonconformances or persistent non-material nonconformances. No consequences should be faced from immaterial failures to perform or other failures that Development Entity has successfully remedied prior to the expiration of agreed upon cured periods.	4-High											
Active	14	Threat	Construction	Bonding / Repair of Local Roads	To gain access underneath of the structures, road bonds will be required to be supplied for any roads that are weight limited and or restricted.	The cost of the bond is minimal; however, the costs is not providing the bond to a Municipality as much as it is the cost to repair the road such that Municipality does not move against the bond.	2-Low											
Active	15	Threat	Construction	Unanticipated Archeological Discoveries	As a result of the discovery of unanticipated archaeological resources, further evaluations and possibly recovery activities may need to	Archaeological monitoring may be required during construction depending on the outcome of the archaeological investigations.	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
					occur, which could lead to considerable impacts on time and cost.													
Active	16	Threat	Construction	Extreme weather events that can cause closure of the Interstate	There is history that some of these interstates (particularly I-80) shutting down due to extreme weather events, which can restrict access to the Projects and disrupt the flow of construction activities.	Weather days will be forecasted into construction contract schedule. Public information outreach will include educating the public if delays are caused by weather. This could cause project to be slightly delayed.	4-High											
Active	17	Threat	Design	Design Development	As a result of the transition of the project documents/knowledge to the Development Entity, functional design/coordination files may be omitted/lost, which would lead to the need to reproduce design product files which were previously created and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT to conduct a bridge design handoff meeting to review and discuss design/coordination status and the efficient transition to Development Entity Team Members	4-High											
Active	18	Threat	Design	Design Review Process and approval	As a result of the transition of the project responsibilities to the Development Entity, misunderstanding of task execution responsibilities may occur, which would lead task progression/communication delays and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders a bridge responsibility handoff meeting for each bridge to review and discuss task responsibility/status and the efficient transition to development entity team members	4-High											
Active	19	Threat	Design	Traffic Diversions	As a result of diversion route design progression, additional design / coordination issues may occur, which would lead to increased design and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders to identify and resolve issues throughout design.	3-Mediu m											
Active	20	Opportunity	Design	Basic Configuration	As a result of the EB widening shown on the design plans being only required to accommodate traffic diversion during construction, alternative solutions that would eliminate this widening would allow the new structure to be built in the existing median gap, which would lead schedule and construction capital cost reductions.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	3-Mediu m											
Active	21	Opportunity	Design	Implement Proven Alternative	Using the broad experience of BPP to integrate other DOT Standards and/or approved materials that have a proven track record	Leverage Lead Engineering Firm and Lead Construction Contractor and Subcontractors' experience	3-Mediu m											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
				Standard and/or Materials	outside PennDOT of betterment in construction and lifecycle maintenance.													
Active	22	Threat	Environmental	Environmental Constraints and Requirements	As a result of unexpected environmental constraints and requirements that impact bridge construction, an increase in the number of working days may occur which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP to initiate early consultation with resource agencies such as USACE, PADEP, PFBC in an effort to determine all feasible environmental constraints early in the process and to develop a realistic project schedule. Nescopeck Creek is listed as an Approved Trout Water by the Pennsylvania Fish and Boat Commission (PFBC). Therefore, in-stream work restrictions will be required between March 1 to June 15, unless a waiver is obtained. The project area also has potential for Indiana bat habitat so there will be a tree cutting restriction between November 15 and March 31. It is anticipated minor stream and wetland mitigation requirements will be required.	3-Medium											
Active	23	Threat	Environmental	Environmental Constraints and Requirements	As a result of the existing Bridge providing potential bat roosting habitat, the need for avoiding bats may arise, leading to installing bat exclusions, other and conservation measures.	Conduct bat surveys, If bats are present, there are options for bridge demolition such as installing bat exclusions prior to demolition or demolishing the bridge outside of bat season. Additionally, tree cutting activities will only occur during the period between November 15 and March 31 (Hibernation).	3-Medium											
Active	24	Threat	Lifecycle	Lifecycle budget insufficient to cover costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for lifecycle	Make sure scope is clear with PennDOT and that there is sufficient contingency in lifecycle budget	2-Low											
Active	25	Threat	Lifecycle	Accelerated lifecycle repairs due to increased traffic or more rapid than anticipated asset deterioration	As a result of increased use or poor maintenance, asset deteriorates ahead of forecast requiring earlier interventions	Ensure strong maintenance plan is implemented with robust asset monitoring to ensure that we understand exact asset condition and can implement minor repairs in lieu of accelerating lifecycle repairs	2-Low											
Active	26	Threat	Maintenance	Inadequate Maintenance Regime	As a result of an inadequate inspection regime one of the following events occurs: need for corrective maintenance, loss of life, serious injury, damage to property, catastrophic failures or disruption to network, which could lead to closures and diversions, increase repair costs, claims and reputational damage	Implement regular safety inspections, timely reactive repairs, targeted planned maintenance works.	1-Very Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	27	Threat	Maintenance	Negative media influence	As a result of negative media influence, increased complaints, a gap between public expectations and what can be achieved may occur, which could lead to changes in political priorities and reputational damage	Regular engagement with residents, stakeholders, and customers, including use of customer satisfaction surveys. Setting priorities to match customer wishes.	2-Low											
Active	28	Threat	Maintenance	Committed M&R budget not sufficient to cover anticipated costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for annual maintenance and rehabilitation (M&R).	Make sure scope is clear with PennDOT and that there is sufficient contingency in annual budget.	2-Low											
Active	29	Threat	Maintenance	M&R staff ramp up or turnover during Maintenance phase is greater than anticipated	As a result of increased turnover, there are challenges providing the required staffing for the maintenance plan, risking lower asset quality.	Provide competitive benefits and compensation to increase retention. Leverage local firms to ensure that we have a deep bench of talent that can replace any departures.	2-Low											
Active	30	Threat	Maintenance	Scope changes materially from what has been presented in RIDs	As a result of negotiations during the PDA phase, the maintenance scope changes materially from what is presented in the Reference Information Documents (RIDS).	Ensure that commercial and budgeting teams are kept abreast of scope changes so that these are captured.	1-Very Low											
Active	31	Threat	Maintenance	Lack of interest from sub-contractors for sub-contracted M&R scope	As a result of scope or risk transfer there is limited interest from subcontractors.	Leverage list of subcontractors from local firms and generated through DBE outreach to ensure deep bench. Provide web tool for new contractors to register for pre-qualification	1-Very Low											
Active	32	Threat	Maintenance	PennDOT / PTC operations / maintenance items impact asset performance	As a result of PennDOT / PTC interventions on operational elements like tolling, incident response, and winter maintenance, asset performance is impacted and there is a potential for KPI or other deductions.	Ensure strong interface with PennDOT / PTC. Validate that risk transfer around interfaces is clearly defined.	3-Medium											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	33	Threat	Maintenance	Other third-party impacts assets performance or maintenance regime	As a result of third-party (utility / railroad) operations or a change in requirements, there is an impact to maintenance regime	Ensure strong commercial protections for changes and robust third-party agreements.	2-Low											
Active	34	Threat	Maintenance	Design changes not communicated / captured in M&R budget	As a result of a failure of communications, maintenance or rehabilitation budget / approach does not capture a design change and there is a budget gap	Ensure strong engagement between maintenance and design teams to make sure no gaps.	1-Very Low											
Active	35	Threat	ROW - Railroads - Utilities	Delays in Utility Relocations	As a result of the number of anticipated utility impacts/relocations involving utility owners or discovery of unknown utility conflicts, utility relocation delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will send utility verification plans during the PDA and we will be updating the utility impact matrix. Coordination meetings will be scheduled upon PDA execution. Perform additional potholing, meet with utility companies early in the process, utilize local subcontractors who have worked extensively with local utility companies. Highlight activities that depend on Utility relocations in the schedule and develop contingency work-around plans.	3-Medium											

LEVEL 2 - RISK REGISTER Qualitative Analysis	**Project Name:** P3 - Major Bridges - I-80 Lehigh	**MPMS No:**	**Project Manager:**	
Risk Identification		**Risk Assessment**		**Risk Response**

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	1	Threat	Construction	Maintenance of Traffic	As a result of overruns in the performance of construction activities, longer than anticipated traffic closures and detours may be required, which could lead to an increase in construction support costs, increased construction capital costs, and reduced public satisfaction.	Develop early communication and coordination with the traveling public to provide early notification of upcoming lane closures and anticipated durations. Sequence construction activities to maintain two lanes of traffic in each direction during construction and avoid the need to implement detours of I-80 for the reconstruction of the bridges.	2-Low											
Active	2	Threat	Construction	Difficulties to hire skilled / unskilled labor	As a result of pandemic-induced labor shortages and the additional demands these projects will put on the Pennsylvania labor market, construction contractors and subcontractors may struggle to find enough qualified workers to hire to perform construction activities, which could lead to higher than forecasted labor costs, productivity impacts, project delays and increase in schedule and cost.	H&K has significant history working in this region and can leverage that experience to tap into their local labor resources to construct this project. Additionally, BPP and H&K will partner with local trade groups & organizations, community colleges and trade schools to continue to develop skilled labor resources needed throughout this project.	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	3	Threat	Construction	Permits	As a result of the project falling within the Northeast Regional Office of Pennsylvania Department of Environmental Protection and PA Fish and Boat Commission, Philadelphia District of US Army Corps of Engineers, Carbon and Luzerne County Conservation Districts jurisdictions, a JPA permit including the Chap 102/NPDES and ATON plans are required. As part of the JPA, coordination with PA DCNR will be required due to state park, scenic river, and Leigh River Gorge Trail. Obtaining the existing submerged lands license agreement or working with the local municipalities to update the license will also be required. A delay in application for and/or receipt of permits or appeals may occur, which would lead to a delay in the project and possible project changes to comply with permit conditions.	Identify all approval and permit requirements and coordinate early with regulatory agencies to streamline the approval process Leverage STV's and local subcontractors past success in coordinating similar permits for past projects with permitting agencies Highlight activities that depend on permits or agreements in the CPM schedule and develop contingency work-around plans if needed.	3-Medium											
Active	4	Threat	Construction	Covid-19	As a result of compliance with unforeseeable Covid-19 rules, orders or directives, normal design, construction, and maintenance procedures or workforce may be may be affected which could lead to reduced performance and/or increase in cost.	Consider best practices and measures currently applied in similar construction project in the United States and the Commonwealth of Pennsylvania	3-Medium											
Active	5	Threat	Construction	Materials escalation	As a result of supply chain disruptions, and commodities pricing volatility, material cost increases and delays in delivery for certain construction materials such as steel, asphalt, fuel and portland cement may occur, which could lead to higher construction capital cost and delay construction contract acceptance.	Identify specific materials or material categories that may be at risk for significant volatility in current conditions Identify suppliers for these “at-risk” materials that may provide fixed pricing for a fixed period of time. Pre-order materials if feasible	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	6	Threat	Construction	Waste Management	As a result of the discovery of unknown contaminated soils on project ROW, additional waste management and hazmat remediation actions may be necessary, which would lead to an increase in cost and delays.	Design to avoid work in areas with a known potential for hazardous materials and utilize construction methods to minimize disturbance, if possible Perform additional / confirmatory site investigations Develop action plans with established protocols for handling / disposal of materials in a safe and sound manner.	3-Medium											
Active	7	Opportunity	Construction	Polyester Polymer Concrete	As a result of the use of polyester polymer concrete as an overlay on the bridge deck, useful life may be extended which would reduce long term maintenance costs.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	4-High											
Active	8	Threat	Construction	Flooding Events	As a result of unforeseen ground conditions, weather or flood events, construction delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Allow construction time float for uncertainty. Determine most likely flood season and program around those periods if possible.	3-Medium											
Active	9	Threat	Construction	Lack of borrow pits / waste sites near the project	As a result of insufficient design or unexpected site conditions, additional borrow / waste material may be generated, which could lead to an earthwork unbalance.	Design project to produce balance earthwork. Make provisions to borrow or waste material as necessary (determine locations for borrow and waste sites before final design plans).	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	10	Threat	Construction	Road User Liquidated Damages (RULD)	If schedule is delayed and roadway is shut down more than specification allows, RULD's may be assessed	Perform a complete staging, constructability, and maintenance of traffic assessment of the project during Final Design. Work cooperatively and -coordinate activities with PennDOT and other stakeholders during construction to resolve potential deviations on assumptions without incurring penalties.	2-Low											
Active	11	Threat	Construction	Subcontractor Design-Build Field Issue Resolution	If the project is subcontracted out, the management of the design by BPP will inherently cause a contractual tension due to schedule and/or cost impacts if, during construction, design issues impact the progress in the field. If the subcontractors on site are not proactively reviewing plans for these issues and they make it to the field regularly this can have negative effects.	BPP Field Staff must be alert to issues that would normally be caught had our project team/craft been constructing the work and partner between the designers and subcontracting team to mitigate these issues quickly when they crop up.	1-Very Low											
Active	12	Opportunity	Construction	Group or Interconnect Project Areas by material types, location, or operations	By grouping similar regional projects together for buying out materials or for sharing resources (manpower, equipment, etc.) the buying/negotiating power of the overall project is increased.	If implemented, the grouping decisions would have to be made to account for any operational risk that accompany linking parts of projects together (i.e., using the same beam gantry on more than 1 project)	4-High											
Active	13	Threat	Construction	Issuance of NCE (Nonconformance Events) points	PennDOT implements a rigid NCE program during the PA phase that could result in numerous points assessments that BPP will have no recourse.	It is unusual for noncompliance points to apply during construction. To the extent PennDOT believes such a regime should be applicable during the construction period, the scope of failures / non-conformance events that would give rise to the assessment of non-compliance points and associated economic penalties should be limited to material nonconformances or persistent non-material	4-High											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
						nonconformances. No consequences should be faced from immaterial failures to perform or other failures that Development Entity has successfully remedied prior to the expiration of agreed upon cured periods.												
Active	14	Threat	Construction	Bonding / Repair of Local Roads	To gain access underneath of the structures, road bonds will be required to be supplied for any roads that are weight limited and or restricted.	The cost of the bond is minimal; however, the costs is not providing the bond to a Municipality as much as it is the cost to repair the road such that Municipality does not move against the bond.	2-Low											
Active	15	Threat	Construction	Recreational Stakeholder Safety & Coordination	The significant number and duration of Cyclists/Hikers/Boaters using the paths, trails, and waterways around the Lehigh River (especially in the summer season) can enter jobsite areas or access roads that cannot be protected by fencing or closed gates.	Areas of the job that cannot be secured will require active management from safety personnel to prevent recreational stakeholders from entering the jobsite and endangering themselves or workers.	4-High											
Active	16	Threat	Construction	Unanticipated Archeological Discoveries	As a result of the discovery of unanticipated archaeological resources, further evaluations and possibly recovery activities may need to occur, which could lead to considerable impacts on time and cost.	Archaeological monitoring may be required during construction depending on the outcome of the archaeological investigations.	2-Low											
Active	17	Threat	Construction	Extreme weather events that can cause closure of the Interstate	There is history that some of these interstates (particularly I-80) shutting down due to extreme weather events, which can restrict access to the Projects and disrupt the flow of construction activities.	Weather days will be forecasted into construction contract schedule. Public information outreach will include educating the public if delays are caused by weather. This could cause project to be slightly delayed.	4-High											
Active	18	Threat	Design	Design Development	As a result of the transition of the project documents/knowledge to the Development Entity, functional design/coordination files may be omitted/lost, which would lead to the need to reproduce design product files which were previously created and an increase in construction support costs, increased	BPP will coordinate with PennDOT to conduct a bridge design handoff meeting to review and discuss design/coordination status and the efficient transition to Development Entity Team Members	4-High											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
					construction capital costs, and delay construction contract acceptance.													
Active	19	Threat	Design	Design Review Process and approval	As a result of the transition of the project responsibilities to the Development Entity, misunderstanding of task execution responsibilities may occur, which would lead task progression/communication delays and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders a bridge responsibility handoff meeting for each bridge to review and discuss task responsibility/status and the efficient transition to development entity team members	4-High											
Active	20	Threat	Design	Traffic Diversions	As a result of diversion route design progression, additional design / coordination issues may occur, which would lead to increased design and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders to identify and resolve issues throughout design.	3-Medium											
Active	21	Opportunity	Design	Implement Proven Alternative Standard and/or Materials	Using the broad experience of BPP partners to integrate other DOT standards and/or approved materials that have a proven track record outside PennDOT of betterment in construction and lifecycle maintenance.	Leverage Lead Engineering Firm and BPP's Lead Construction Contractor and Subcontractors' experience	3-Medium											
Active	22	Threat	Design	Park Agreement	As a result of the need for an agreement with the Park for the relocated bridge, agreement coordination/resolution delays may occur, impacting design and construction cost and schedule.	BPP will coordinate with PennDOT and Park representatives.	3-Medium											
Active	23	Threat	Design	RBM&N Railroad Agreement	As a result of the need for an agreement with the RBM&N for the relocated bridge, agreement coordination/resolution delays may occur, impacting design and construction cost and schedule.	BPP will coordinate with PennDOT and RBM&N representatives and submit the bridge design details.	4-High											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	24	Threat	Design	Lehigh Valley Trail	As a result of the construction over and adjacent to the Lehigh Valley Trail needing access restrictions, potential construction delays may occur, impacting cost and schedule	BPP will coordinate with the Park and applicable stakeholders during the PDA and PA to identify restrictions, develop a plan and provide public notices.	2-Low											
Active	25	Threat	Design, Construction	RBM&N Railroad Right of Entry	As a result of the need for a right of entry agreement with the RBM&N for site access and construction, insurance and agreement processes delays may occur, impacting design and construction cost and schedule.	BPP will coordinate with RBM&N representatives and implement applicable processes for right of entry.	2-Low											
Active	26	Threat	Environmental	Environmental Constraints and Requirements	As a result of unexpected environmental constraints and requirements that impact bridge construction, an increase in the number of working days may occur which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP to initiate early consultation with resource agencies such as USACE, PADEP, PFBC in an effort to determine all feasible environmental constraints early in the process and to develop a realistic project schedule. Lehigh River is classified as a Stocked Trout Waters with in-stream time of year restrictions between March 1 to June 15. Additionally, DCNR considers this section of the Lehigh to be part of their Scenic Rivers Program.	3-Medium										
Active	27	Threat	Final Design	Utilities	As a result of the number of anticipated utility impacts /relocations that involve railroad and city coordination, utility relocation delays may happen, impacting construction cost and schedule.	BPP will send utility verification plans during the PDA period and will be updating the utility impact matrix. Coordination meetings will be requested as the design progresses.	2-Low											
Active	28	Threat	Lifecycle	Lifecycle budget insufficient to cover costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for lifecycle.	Make sure scope is clear with PennDOT and that there is sufficient contingency in lifecycle budget.	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	29	Threat	Lifecycle	Accelerated lifecycle repairs due to increased traffic or more rapid than anticipated asset deterioration	As a result of increased use or poor maintenance, asset deteriorates ahead of forecast requiring earlier interventions.	Ensure strong maintenance plan is implemented with robust asset monitoring to ensure that we understand exact asset condition and can implement minor repairs in lieu of accelerating lifecycle repairs	2-Low											
Active	30	Threat	Maintenance	Inadequate Maintenance Regime	As a result of an inadequate inspection regime one of the following events occurs: need for corrective maintenance, loss of life, serious injury, damage to property, catastrophic failures, or disruption to network, which could lead to closures and diversions, increase repair costs, claims and reputational damage.	BPP will implement regular safety inspections, timely reactive repairs, targeted planned maintenance works.	1-Very Low											
Active	31	Threat	Maintenance	Negative media influence	As a result of negative media influence, increased complaints, a gap between public expectations and what can be achieved may occur, which could lead to changes in political priorities and reputational damage	Regular engagement with residents, stakeholders, and customers, including use of customer satisfaction surveys. Setting priorities to match customer wishes.	2-Low											
Active	32	Threat	Maintenance	Committed M&R budget not sufficient to cover anticipated costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for annual maintenance and rehabilitation (M&R)	Make sure scope is clear with PennDOT and that there is sufficient contingency in annual budget	2-Low											
Active	33	Threat	Maintenance	M&R staff ramp up or turnover during Maintenance phase is greater than anticipated	As a result of increased turnover, there are challenges in providing the required staffing for the maintenance plan, risking lower asset quality.	Provide competitive benefits and compensation to increase retention. Leverage local firms to ensure that we have a deep bench of talent that can replace any departures.	2-Low											
Active	34	Threat	Maintenance	Scope changes materially from what has been presented in RIDs	As a result of negotiations during the PDA phase, the maintenance scope changes materially from what is presented in the Reference Information Documents (RIDS)	Ensure that commercial and budgeting teams are kept abreast of scope changes so that these are captured	1-Very Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	35	Threat	Maintenance	Lack of interest from subcontractors for subcontracted M&R scope	As a result of scope or risk transfer, there is limited interest from subcontractors.	Leverage list of subcontractors from local firms and generated through DBE outreach to ensure deep bench. Provide web tool for new contractors to register for pre-qualification.	1-Very Low											
Active	36	Threat	Maintenance	PennDOT / PTC operations / maintenance items impact asset performance	As a result of PennDOT / PTC interventions on operational elements like tolling, incident response, and winter maintenance, asset performance is impacted and there is a potential for KPI or other deductions.	Ensure strong interface with PennDOT / PTC. Validate that risk transfer around interfaces is clearly defined.	3-Medium											
Active	37	Threat	Maintenance	Other third-party impacts assets performance or maintenance regime	As a result of third-party (utility / railroad) operations or a change in requirements, there is an impact to maintenance regime	Ensure strong commercial protections for changes and robust third-party agreements.	2-Low											
Active	38	Threat	Maintenance	Design changes not communicated / captured in M&R budget	As a result of a failure of communications, maintenance or rehabilitation budget / approach does not capture a design change and there is a budget gap	Ensure strong engagement between maintenance and design teams to make sure no gaps.	1-Very Low											
Active	39	Threat	Right of Way acquisition	Previously Abandoned White Haven City Landfill limits	As a result of the potential overlap of the project right of way acquisition and abandoned landfill boundary, contaminated or hazardous material may need to be removed, causing impacts to the construction cost and right of way acquisition delays.	BPP will coordinate with PennDOT for the Phase I, II and III site investigations to determine if contaminates are present and need to be removed.	3-Medium											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	40	Threat	ROW - Railroads - Utilities	Delays in Utility Relocations	As a result of the number of anticipated utility impacts/relocations involving utility owners or discovery of unknown utility conflicts, utility relocation delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will send utility verification plans during the PDA and we will be updating the utility impact matrix. Coordination meetings will be scheduled upon PDA execution. Perform additional potholing, meet with utility companies early in the process, utilize local subcontractors who have worked extensively with local utility companies. Highlight activities that depend on Utility relocations in the schedule and develop contingency work-around plans.	3-Medium											
Active	41	Threat	ROW - Railroads - Utilities	Access to ROW	As a result of delays in obtaining access to project required ROW, delays in construction commencement or achievement of construction milestones may occur, which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Highlight activities that depend on ROW acquisition in the WBS schedule and develop contingency-arounds plans if needed	3-Medium											
Active	42	Threat	ROW - Railroads - Utilities	Working Adjacent to Railroads	As a result of railroad requiring work to occur during specific times based on their train schedules, work disruption and delay may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Continue early coordination into the PA Phase to develop initial railroad agreements. Work closely with PennDOT to devise alternatives to mitigate the issue.	3-Medium											
Active	43	Threat	ROW - Railroads - Utilities	Availability of Railroad Flaggers	Prior to the Pandemic there were challenges in obtaining railroad flaggers for operations near/over/adjacent to railroads, this has most likely been exacerbated by the Pandemic.	Allow construction time float for uncertainty. Try to pass on responsibility for provision of Railroad flaggers to the Railroad under the railroad agreement. Include contractual protections for uncooperative railroads under the Project Agreement.	3-Medium											

LEVEL 2 - RISK REGISTER Qualitative Analysis	**Project Name:** P3 - Major Bridges - I-80 Canoe Creek	**MPMS No:**	**Project Manager:**	
Risk Identification		**Risk Assessment**		**Risk Response**

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	1	Threat	Construction	Maintenance of Traffic	As a result of overruns in the performance of construction activities, longer than anticipated traffic closures and detours may be required, which could lead to an increase in construction support costs, increased construction capital costs, and reduced public satisfaction.	Develop early communication and coordination with the traveling public to provide early notification of upcoming lane closures and anticipated durations. Sequence construction activities to maintain two lanes of traffic in each direction during construction and avoid the need to implement detours of I-80 for the reconstruction of the bridges.	2-Low											
Active	2	Threat	Construction	Difficulties to hire skilled / unskilled labor	As a result of pandemic-induced labor shortages and the additional demands these projects will put on the Pennsylvania labor market, construction contractors and subcontractors may struggle to find enough qualified workers to hire to perform construction activities, which could lead to higher than forecasted labor costs, productivity impacts, project delays and increase in schedule and cost	Work with local community colleges and trade schools to help develop skilled labor Leverage the team robust local construction subcontractor resources to perform work and implement strategies for mentoring and job training Leverage relationships with local trade groups and organizations.	3-Medium											

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Active	3	Threat	Construction	Permits	As a result of the project falling within the Northwest Regional Office of Pennsylvania Department of Environmental Protection and PA Fish and Boat Commission, Pittsburgh District of the US Army Corps of Engineers, Clarion County Conservation District jurisdictions, a JPA permit including Chap. 102/NPDES are required. Coordination with USACOE for potential stream mitigation and restoration will be required. A delay in application for and/or receipt of permits or appeals may occur, which would lead to a delay in the project and possible project changes to comply with permit conditions.	Identify all approval and permit requirements and coordinate early with regulatory agencies to streamline the approval process Leverage STV's and local subcontractors past success in coordinating similar permits for past projects with permitting agencies Highlight activities that depend on permits or agreements in the CPM schedule and develop contingency work-around plans if needed.	3-Medium											
Active	4	Threat	Construction	Covid-19	As a result of compliance with unforeseeable Covid-19 rules, orders or directives, normal design, construction, and maintenance procedures or workforce may be affected which could lead to reduced performance and/or increase in cost.	Consider best practices and measures currently applied in similar construction project in the United States and the Commonwealth of Pennsylvania	3-Medium											
Active	5	Threat	Construction	Materials escalation	As a result of supply chain disruptions, and commodities pricing volatility, material cost increases and delays in delivery for certain construction materials such as steel, asphalt, fuel and portland cement may occur, which could lead to higher construction capital cost and delay construction contract acceptance.	Identify specific materials or material categories that may be at risk for significant volatility in current conditions Identify suppliers for these “at-risk” materials that may provide fixed pricing for a fixed period of time. Pre-order materials if feasible	2-Low											

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Active	6	Threat	Construction	Waste Management	As a result of the discovery of unknown contaminated soils on project ROW, additional waste management and hazmat remediation actions may be necessary, which would lead to an increase in cost and delays.	Design to avoid work in areas with a known potential for hazardous materials and utilize construction methods to minimize disturbance, if possible Perform additional / confirmatory site investigations Develop action plans with established protocols for handling / disposal of materials in a safe and sound manner.	3-Medium											
Active	7	Opportunity	Construction	Polyester Polymer Concrete	As a result of the use of polyester polymer concrete as an overlay on the bridge deck, useful life may be extended which would reduce long term maintenance costs.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	4-High											
Active	8	Threat	Construction	Flooding Events	As a result of unforeseen ground conditions, weather or flood events, construction delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Allow construction time float for uncertainty. Determine most likely flood season and program around those periods if possible.	2-Low											
Active	9	Threat	Construction	Lack of borrow pits / waste sites near the project	As a result of insufficient design or unexpected site conditions, additional borrow / waste material may be generated, which could lead to an earthwork unbalance.	Design project to produce balance earthwork. Make provisions to borrow or waste material as necessary (determine locations for borrow and waste sites before final design plans).	1-Very Low											

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Active	10	Threat	Construction	Road User Liquidated Damages (RULD)	If schedule is delayed and roadway is shut down more than specification allows, RULD's may be assessed	Perform a complete staging, constructability, and maintenance of traffic assessment of the project during Final Design. Work cooperatively and coordinate activities with PennDOT and other stakeholders during construction to resolve potential deviations on assumptions without incurring penalties.	2-Low											
Active	11	Threat	Construction	Subcontractor Design-Build Field Issue Resolution	If the project is subcontracted out, the management of the design by BPP will inherently cause a contractual tension due to schedule and/or cost impacts if during construction, design issues impact the progress in the field. If the subcontractors on site and project personnel are not proactively reviewing plans for these issues and they make it to the field regularly this can have negative effects.	BPP Field Staff must be alert to issues that would normally be caught had our project team/craft been constructing the work and partner between the designers and subcontracting team to mitigate these issues quickly when they crop up.	3-Medium											
Active	12	Opportunity	Construction	Group or Interconnect Project Areas by material types, location, or operations	By grouping similar regional projects together for buying out materials or for sharing resources (manpower, equipment, etc.) the buying/negotiating power of the overall project is increased.	If implemented, the grouping decisions would have to be made to account for any operational risk that accompany linking parts of projects together (i.e., using the same beam gantry on more than 1 project)	4-High											
Active	13	Threat	Construction	Issuance of NCE (Nonconformance Events) points	It will be PennDOT's intent to implement a rigid NCE program during the PA phase that could result in numerous points assessments that BPP will have no recourse.	Explore with PennDOT the idea of an NCR (Non-Conformance Report) system rather than an NCE. The NCR can be tracked so that the nonconformance can be closed without NCE point assessments and financial impacts.	4-High											
Active	14	Threat	Construction	Bonding / Repair of Local Roads	To gain access underneath of the structures, road bonds will be required to be supplied for any roads that are weight limited and or restricted.	The cost of the bond is minimal; however, the costs is not providing the bond to a Municipality as much as it is the cost to repair the road such that Municipality does not move against the bond.	4-High											

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Active	15	Threat	Construction	Unanticipated Archeological Discoveries	As a result of the discovery of unanticipated archaeological resources, further evaluations and possibly recovery activities may need to occur, which could lead to considerable impacts on time and cost.	Archaeological monitoring may be required during construction depending on the outcome of the archaeological investigations.	2-Low											
Active	16	Threat	Construction	Extreme weather events that can cause closure of the Interstate	There is history that some of these interstates (particularly I-80) shutting down due to extreme weather events, which can restrict can restrict access to the Projects and disrupt the flow of construction activities.	Weather days will be forecasted into construction contract schedule. Public information outreach will include educating the public if delays are caused by weather. Could cause project to be minimally delayed.	4-High											
Active	17	Threat	Construction	Existing Conditions	As a result of the existing condition of the fracture critical structure, maintenance inspection may identify a significant repair issue which would lead to resource reallocation resulting in additional cost and schedule delays.	BPP will propose/collaborate with PennDOT an alternative temporary control pattern utilizing the new I-80 EB structure to minimize this risk occurring.	2-Low											
Active	18	Threat	Construction	Existing Structures	As a result of the proximity of the existing SR 4005 bridge to construction, construction means and methods may be questioned, which would lead to schedule delays and cost increases	BPP will coordinate with PennDOT to implement technical specifications to document and monitor existing conditions, appropriately control means and methods and will monitor facilities during construction.	1-Very Low											
Active	19	Threat	Construction	Existing Structures	As a result of the proximity of the existing I-80 bridge foundations relative to the proposed foundations construction, construction means and methods may be questioned, which would lead to schedule delays and cost increases	BPP will coordinate with PennDOT to perform design analysis and implement technical specifications to document and monitor existing foundations, appropriately control means and methods and will monitor facilities during construction.	3-Medium											

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Active	21	Threat	Design	Design Development	As a result of the transition of the project documents/knowledge to the Development Entity, functional design/coordination files may be omitted/lost, which would lead to the need to reproduce design product files which were previously created and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT to conduct a bridge design handoff meeting to review and discuss design/coordination status and the efficient transition to development entity team members	4-High											
Active	22	Threat	Design	Design Review Process and approval	As a result of the transition of the project responsibilities to the Development Entity, misunderstanding of task execution responsibilities may occur, which would lead task progression/communication delays and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders a Bridge responsibility handoff meeting for each Bridge to review and discuss task responsibility/status and the efficient transition to development entity team members	4-High											
Active	23	Threat	Design	Traffic Diversions	As a result of diversion route design progression, additional design / coordination issues may occur, which would lead to increased design and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders to identify and resolve issues throughout design.	4-High											
Active	24	Opportunity	Design	Implement Proven Alternative Standard and/or Materials	Using the broad experience of BPP partners to integrate other DOT Standards and/or approved materials that have a proven track record outside PennDOT of betterment in construction and lifecycle maintenance.	Leverage Lead Engineering Firm and Lead Construction Contractor and Subcontractors' experience	3-Medium											
Active	25	Threat	Environmental	Environmental Constraints and Requirements	As a result of unexpected environmental constraints and requirements that impact bridge construction, an increase in the number of working days may occur which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP to initiate early consultation with resource agencies such as USACE, PADEP, PFBC in an effort to determine all feasible environmental constraints early in the process and to develop a realistic project schedule.	3-Medium											

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Active	26	Threat	Final Design	Utilities	As a result of the combination of gas/electric utilities crossing under bridge construction areas, utility relocation delays may happen, impacting construction cost and schedule.	BPP will send utility verification plans during the PDA, compare site location information to clearly identify conflicts and will update the utility impact matrix. Coordination meetings will be scheduled upon PDA execution.	3-Medium											
Active	27	Threat	Final Design	Slope Stability	As a result of additional slope stability geotechnical investigations, the scope of the slope stability construction may increase, which would increase design and construction costs and delay schedule	BPP will implement geotechnical slope stability investigation, preformation evaluations and determine potential revisions necessary.	3-Medium											
Active	28	Threat	Lifecycle	Lifecycle budget insufficient to cover costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for lifecycle	Make sure scope is clear with PennDOT and that there is sufficient contingency in lifecycle budget	2-Low											
Active	29	Threat	Lifecycle	Accelerated lifecycle repairs due to increased traffic or more rapid than anticipated asset deterioration	As a result of increased use or poor maintenance, asset deteriorates ahead of forecast requiring earlier interventions	Ensure strong maintenance plan is implemented with robust asset monitoring to ensure that we understand exact asset condition and can implement minor repairs in lieu of accelerating lifecycle repairs	2-Low											
Active	30	Threat	Maintenance	Inadequate Maintenance Regime	As a result of an inadequate inspection regime one of the following events occurs: need for corrective maintenance, loss of life, serious injury, damage to property, catastrophic failures or disruption to network, which could lead to closures and diversions, increase repair costs, claims and reputational damage	Implement regular safety inspections, timely reactive repairs, targeted planned maintenance works.	1-Very Low											
Active	31	Threat	Maintenance	Negative media influence	As a result of negative media influence, increased complaints, a gap between public expectations and what can be achieved may occur, which could lead to changes in political priorities and reputational damage	Regular engagement with residents, stakeholders, and customers, including use of customer satisfaction surveys. Setting priorities to match customer wishes.	2-Low											

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Active	32	Threat	Maintenance	Committed M&R budget not sufficient to cover anticipated costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for annual maintenance and rehabilitation (M&R).	Make sure scope is clear with PennDOT and that there is sufficient contingency in annual budget	2-Low											
Active	33	Threat	Maintenance	M&R staff ramp up or turnover during Maintenance phase is greater than anticipated	As a result of increased turnover, there are challenges providing the required staffing for the maintenance plan, risking lower asset quality.	Provide competitive benefits and compensation to increase retention Leverage local firms to ensure that we have a deep bench of talent that can replace any departures	2-Low											
Active	34	Threat	Maintenance	Scope changes materially from what has been presented in RIDs	As a result of negotiations during the PDA phase, the maintenance scope changes materially from what is presented in the Reference Information Documents (RIDS).	Ensure that commercial and budgeting teams are kept abreast of scope changes so that these are captured	1-Very Low											
Active	35	Threat	Maintenance	Lack of interest from sub-contractors for sub-contracted M&R scope	As a result of scope or risk transfer there is limited interest from subcontractors.	Leverage list of subcontractors from local firms and generated through DBE outreach to ensure deep bench. Provide web tool for new contractors to register for pre-qualification	1-Very Low											
Active	36	Threat	Maintenance	PennDOT / PTC operations / maintenance items impact asset performance	As a result of PennDOT / PTC interventions on operational elements like tolling, incident response, and winter maintenance, asset performance is impacted and there is a potential for KPI or other deductions.	Ensure strong interface with PennDOT / PTC Validate that risk transfer around interfaces is clearly defined	3-Medium											
Active	37	Threat	Maintenance	Other third-party impacts assets performance or maintenance regime	As a result of third-party (utility / railroad) operations or a change in requirements, there is an impact to maintenance regime	Ensure strong commercial protections for changes and robust third-party agreements.	2-Low											
Active	38	Threat	Maintenance	Design changes not communicated / captured in M&R budget	As a result of a failure of communications, maintenance or rehabilitation budget / approach does not capture a design change and there is a budget gap	Ensure strong engagement between maintenance and design teams to make sure no gaps.	1-Very Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	39	Threat	ROW - Railroads - Utilities	Delays in Utility Relocations	As a result of the number of anticipated utility impacts/relocations involving utility owners or discovery of unknown utility conflicts, utility relocation delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will send utility verification plans during the PDA, and we will be updating the utility impact matrix. Coordination meetings will be scheduled upon PDA execution. Perform additional potholing, meet with utility companies early in the process, utilize local subcontractors who have worked extensively with local utility companies. Highlight activities that depend on Utility relocations in the schedule and develop contingency work-around plans.	3-Medium											
Active	40	Threat	ROW - Railroads - Utilities	Access to ROW	As a result of delays in obtaining access to project required ROW, delays in construction commencement or achievement of construction milestones may occur, which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Highlight activities that depend on ROW acquisition in the WBS schedule and develop contingency-arounds plans if needed	3-Medium											

LEVEL 2 - RISK REGISTER Qualitative Analysis	**Project Name:** P3 - Major Bridges - I-80 North Fork	MPMS No:	Project Manager:	
Risk Identification		**Risk Assessment**		**Risk Response**

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	1	Threat	Construction	Maintenance of Traffic	As a result of overruns in the performance of construction activities, longer than anticipated traffic closures and detours may be required, which could lead to an increase in construction support costs, increased construction capital costs, and reduced public satisfaction.	Develop early communication and coordination with the traveling public to provide early notification of upcoming lane closures and anticipated durations. Sequence construction activities to maintain two lanes of traffic in each direction during construction and avoid the need to implement detours of I-80 for the reconstruction of the bridges.	2-Low											
Active	2	Threat	Construction	Difficulties to hire skilled / unskilled labor	As a result of pandemic-induced labor shortages and the additional demands these projects will put on the Pennsylvania labor market, construction contractors and subcontractors may struggle to find enough qualified workers to hire to perform construction activities, which could lead to higher than forecasted labor costs, productivity impacts, project delays and increase in schedule and cost.	H&K has significant history working in this region and can leverage that experience to tap into their local labor resources to construct this project. Additionally, BPP and H&K will partner with local trade groups & organizations, community colleges and trade schools to continue to develop skilled labor resources needed throughout this project.	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	3	Threat	Construction	Permits	As a result of the project falling within the Northwest Regional Office of Pennsylvania Department of Environmental Protection, Northcentral Regional Office of PA Fish and Boat Commission, Pittsburgh District of US Army Corps of Engineers, Brookville Borough, Jefferson County Conservations District jurisdictions, JPA permit is required including Chap 102/NPDES permits are required. Coordination with PA DCNR for the Walter Dick Memorial Park will be included in the permit. Additional geomorphology studies are necessary for the Haugh Water Works site and final Noise Study will require public involvement actives. A delay in application for and/or receipt of permits or appeals may occur, which would lead to a delay in the project and possible project changes to comply with permit conditions.	Identify all approval and permit requirements and coordinate early with regulatory agencies to streamline the approval process Leverage STV's and local subcontractors past success in coordinating similar permits for past projects with permitting agencies Highlight activities that depend on permits or agreements in the CPM schedule and develop contingency work-around plans if needed.	3-Medium											
Active	4	Threat	Construction	Covid-19	As a result of compliance with unforeseeable Covid-19 rules, orders or directives, normal design, construction, and maintenance procedures or workforce may be affected which could lead to reduced performance and/or increase in cost.	Consider best practices and measures currently applied in similar construction project in the United States and the Commonwealth of Pennsylvania	3-Medium											
Active	5	Threat	Construction	Materials escalation	As a result of supply chain disruptions, and commodities pricing volatility, material cost increases and delays in delivery for certain construction materials such as steel, asphalt, fuel and portland cement may occur, which could lead to higher construction capital cost and delay construction contract acceptance.	Identify specific materials or material categories that may be at risk for significant volatility in current conditions Identify suppliers for these “at-risk” materials that may provide fixed pricing for a fixed period. Pre-order materials if feasible	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	6	Threat	Construction	Waste Management	As a result of the discovery of unknown contaminated soils on project ROW, additional waste management and hazmat remediation actions may be necessary, which would lead to an increase in cost and delays.	Design to avoid work in areas with a known potential for hazardous materials and utilize construction methods to minimize disturbance, if possible Perform additional / confirmatory site investigations Develop action plans with established protocols for handling / disposal of materials in a safe and sound manner.	3-Medium											
Active	7	Opportunity	Construction	Polyester Polymer Concrete	As a result of the use of polyester polymer concrete as an overlay on the bridge deck, useful life may be extended which would reduce long term maintenance costs.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	4-High											
Active	8	Threat	Construction	Flooding Events	As a result of unforeseen ground conditions, weather or flood events, construction delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Allow construction time float for uncertainty. Determine most likely flood season and program around those periods if possible.	2-Low											
Active	9	Threat	Construction	Lack of borrow pits / waste sites near the project	As a result of insufficient design or unexpected site conditions, additional borrow / waste material may be generated, which could lead to an earthwork unbalance.	Design project to produce balance earthwork. Make provisions to borrow or waste material as necessary (determine locations for borrow and waste sites before final design plans).	1-Very Low											
Active	10	Threat	Construction	Road User Liquidated Damages (RULD)	If schedule is delayed and roadway is shut down more than specification allows, RULD's may be assessed	Perform a complete staging, constructability, and maintenance of traffic assessment of the project during Final Design. Work cooperatively and coordinate activities with PennDOT and other stakeholders during construction to resolve potential deviations on assumptions without incurring penalties.	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	11	Threat	Construction	Subcontractor Design-Build Field Issue Resolution	If the project is subcontracted out, the management of the design by BPP will inherently cause a contractual tension due to schedule and/or cost impacts if during construction, design issues impact the progress in the field. If the subcontractors on site and project personnel are not proactively reviewing plans for these issues and they make it to the field regularly this can have negative effects.	BPP Field Staff must be alert to issues that would normally be caught had our project team/craft been constructing the work and partner between the designers and subcontracting team to mitigate these issues quickly when they crop up.	3-Medium											
Active	12	Opportunity	Construction	Group or Interconnect Project Areas by material types, location, or operations	By grouping projects together for buying out materials or for sharing resources (manpower, equipment, etc.) the buying/negotiating power of the overall BPP JV is increased.	If implemented, the grouping decisions would have to be made to account for any operational risk that accompany linking parts of projects together (i.e.- using the same beam gantry on more than 1 project)	4-High											
Active	13	Threat	Construction	Issuance of NCE (Nonconformance Events) points	It will be PennDOT's intent to implement a rigid NCE program during the PA phase that could result in numerous points assessments that BPP will have no recourse.	Explore with PennDOT the idea of an NCR (Non-Conformance Report) system rather than an NCE. The NCR can be tracked so that the nonconformance can be closed without NCE point assessments and financial impacts.	4-High											
Active	14	Threat	Construction	Bonding / Repair of Local Roads	To gain access underneath of the structures, road bonds will be required to be supplied for any roads that are weight limited and or restricted.	The cost of the bond is minimal; however, the costs is not providing the bond to a Municipality as much as it is the cost to repair the road such that Municipality does not move against the bond.	4-High											
Active	15	Threat	Construction	Unanticipated Archeological Discoveries	As a result of the discovery of unanticipated archaeological resources, further evaluations and possibly recovery activities may need to occur, which could lead to considerable impacts on time and cost.	Archaeological monitoring may be required during construction depending on the outcome of the archaeological investigations.	2-Low											
Active	16	Threat	Construction	Extreme weather events that can cause closure of the Interstate	There is history that some of these interstates (particularly I-80) shutting down due to extreme weather events, which can restrict access to the Projects and disrupt the flow of construction activities.	Weather days will be forecasted into construction contract schedule. Public information outreach will include educating the public if delays are caused by weather. This could cause project to be minimally delayed.	4-High											
Active	17	Threat	Construction	Existing Conditions	As a result of the existing condition of the fracture critical structure, maintenance inspection may identify a significant repair issue which would lead to resource	BPP will propose/collaborate with PennDOT an alternative temporary control pattern utilizing the new I-80 EB structure to minimize this risk occurring.	3-Medium											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
					reallocation resulting in additional cost and schedule delays													
Active	18	Threat	Construction	Existing Structures	As a result of the proximity of the dam, buildings, and utilities and dam, construction means and methods may be questioned, which would lead to schedule delays and cost increases.	BPP will coordinate with PennDOT to implement technical specifications to document and monitor existing conditions, appropriately control means and methods and will monitor facilities during construction.	3-Medium											
Active	19	Threat	Design	Design Development	As a result of the transition of the project documents/knowledge to the Development Entity, functional design/coordination files may be omitted/lost, which would lead to the need to reproduce design product files which were previously created and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT to conduct a bridge design handoff meeting to review and discuss design/coordination status and the efficient transition to development entity team members	4-High											
Active	20	Threat	Design	Design Review Process and approval	As a result of the transition of the project responsibilities to the Development Entity, misunderstanding of task execution responsibilities may occur, which would lead task progression/communication delays and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders a bridge responsibility handoff meeting for each bridge to review and discuss task responsibility/status and the efficient transition to development entity team members	4-High											
Active	21	Threat	Design	Traffic Diversions	As a result of diversion route design progression, additional design / coordination issues may occur, which would lead to increased design and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders to identify and resolve issues throughout design.	3-Medium											
Active	22	Opportunity	Design	Implement Proven Alternative Standard and/or Materials	Using the broad experience of BPP partners to integrate other DOT Standards and/or approved materials that have a proven track record outside PennDOT of betterment in construction and lifecycle maintenance.	Leverage Lead Engineering Firm and BPP's Lead Construction Contractor and Subcontractors' experience	3-Medium											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	23	Threat	Design	Scheduling	As a result of construction within Walter Dick Memorial Park, stakeholder comments may occur impacting construction means and methods, which would lead to increases in construction costs and schedule delays.	BPP will coordinate with PennDOT/stakeholders to confirm/identify concerns for resolution and will collaboratively address for resolution.	2-Low											
Active	24	Threat	Design	Noise Walls	As a result of noise wall analysis/process, changes to the noise wall limits may occur, which would lead to changes to the roadway, drainage or right of way details affecting construction costs and schedule.	BPP will coordinate with PennDOT/stakeholders to confirm the noise wall details at the earliest date possible.	2-Low											
Active	25	Threat	Environmental	Environmental Constraints and Requirements	As a result of unexpected environmental constraints and requirements that impact bridge construction, an increase in the number of working days may occur which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP to initiate early consultation with resource agencies such as USACE, PADEP, PFBC in an effort to determine all feasible environmental constraints early in the process and to develop a realistic project schedule.	3-Medium											
Active	26	Threat	Final Design	Utilities	As a result of the combination of wet and dry utilities crossing under bridge construction areas, utility relocation delays may happen, impacting construction cost and schedule.	BPP will send utility verification plans during the PDA and we will be updating the utility impact matrix. Coordination meetings will be scheduled upon PDA execution.	3-Medium											
Active	27	Threat	Lifecycle	Lifecycle budget insufficient to cover costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for lifecycle	Make sure scope is clear with PennDOT and that there is sufficient contingency in lifecycle budget	2-Low											
Active	28	Threat	Lifecycle	Accelerated lifecycle repairs due to increased traffic or more rapid than anticipated asset deterioration	As a result of increased use or poor maintenance, asset deteriorates ahead of forecast requiring earlier interventions	Ensure strong maintenance plan is implemented with robust asset monitoring to ensure that we understand exact asset condition and can implement minor repairs in lieu of accelerating lifecycle repairs	2-Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	29	Threat	Maintenance	Inadequate Maintenance Regime	As a result of an inadequate inspection regime one of the following events occurs: need for corrective maintenance, loss of life, serious injury, damage to property, catastrophic failures, or disruption to network, which could lead to closures and diversions, increase repair costs, claims and reputational damage	Implement regular safety inspections, timely reactive repairs, targeted planned maintenance works.	1-Very Low											
Active	30	Threat	Maintenance	Negative media influence	As a result of negative media influence, increased complaints, a gap between public expectations and what can be achieved may occur, which could lead to changes in political priorities and reputational damage	Regular engagement with residents, stakeholders, and customers, including use of customer satisfaction surveys. Setting priorities to match customer wishes.	2-Low											
Active	31	Threat	Maintenance	Committed M&R budget not sufficient to cover anticipated costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for annual maintenance and rehabilitation (M&R).	Make sure scope is clear with PennDOT and that there is sufficient contingency in annual budget	2-Low											
Active	32	Threat	Maintenance	M&R staff ramp up or turnover during Maintenance phase is greater than anticipated	As a result of increased turnover, there are challenges providing the required staffing for the maintenance plan, risking lower asset quality.	Provide competitive benefits and compensation to increase retention Leverage local firms to ensure that we have a deep bench of talent that can replace any departures	2-Low											
Active	33	Threat	Maintenance	Scope changes materially from what has been presented in RIDs	As a result of negotiations during the PDA phase, the maintenance scope changes materially from what is presented in the Reference Information Documents (RIDS).	Ensure that commercial and budgeting teams are kept abreast of scope changes so that these are captured	1-Very Low											
Active	34	Threat	Maintenance	Lack of interest from sub-contractors for sub-contracted M&R scope	As a result of scope or risk transfer there is limited interest from subcontractors.	Leverage list of subcontractors from local firms and generated through DBE outreach to ensure deep bench. Provide web tool for new contractors to register for pre-qualification	1-Very Low											

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivenes	Updated
Active	35	Threat	Maintenance	PennDOT / PTC operations / maintenance items impact asset performance	As a result of PennDOT / PTC interventions on operational elements like tolling, incident response, and winter maintenance, asset performance is impacted and there is a potential for KPI or other deductions.	Ensure strong interface with PennDOT / PTC Validate that risk transfer around interfaces is clearly defined	3-Medium											
Active	36	Threat	Maintenance	Other third-party impacts assets performance or maintenance regime	As a result of third-party (utility / railroad) operations or a change in requirements, there is an impact to maintenance regime	Ensure strong commercial protections for changes and robust third-party agreements.	2-Low											
Active	37	Threat	Maintenance	Design changes not communicated / captured in M&R budget	As a result of a failure of communications, maintenance or rehabilitation budget / approach does not capture a design change and there is a budget gap	Ensure strong engagement between maintenance and design teams to make sure no gaps.	1-Very Low											

LEVEL 2 - RISK REGISTER Qualitative Analysis	**Project Name:** P3 - Major Bridges - I-81 Susquehanna	MPMS No:	Project Manager:	
Risk Identification		**Risk Assessment**		**Risk Response**

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	1	Threat	Construction	Maintenance of Traffic	As a result of overruns in the performance of construction activities, longer than anticipated traffic closures and detours may be required, which could lead to an increase in construction support costs, increased construction capital costs, and reduced public satisfaction.	Develop early communication and coordination with the traveling public to provide early notification of upcoming lane closures and anticipated durations. Sequence construction activities to maintain two lanes of traffic in each direction during construction and avoid the need to implement detours of I-80 for the reconstruction of the bridges.	2-Low											
Active	2	Threat	Construction	Difficulties to hire skilled / unskilled labor	As a result of pandemic-induced labor shortages and the additional demands these projects will put on the Pennsylvania labor market, construction contractors and subcontractors may struggle to find enough qualified workers to hire to perform construction activities, which could lead to higher than forecasted labor costs, productivity impacts, project delays and increase in schedule and cost.	H&K has significant history working in this region and can leverage that experience to tap into their local labor resources to construct this project. Additionally, BPP and H&K will partner with local trade groups & organizations, community colleges and trade schools to continue to develop skilled labor resources needed throughout this project.	2-Low											
Active	3	Threat	Construction	Permits	As a result of the project falling within the Northeast Regional Office of Pennsylvania Department of Environmental Protection, PA Fish and Boat Commission, Baltimore District of US Army Corps of Engineers jurisdictions, a JPA permit including Chap 102/NPDES permits, and ATON Plan are required. A delay in application for and/or receipt of permits or appeals may occur, which would lead to a delay in the project and possible project changes to comply with permit conditions.	Identify all approval and permit requirements and coordinate early with regulatory agencies to streamline the approval process Leverage STV's and local subcontractors past success in coordinating similar permits for past projects with permitting agencies Highlight activities that depend on permits or agreements in the CPM schedule and develop contingency work-around plans if needed.	3-Medium											

Active	4	Threat	Construction	Covid-19	As a result of compliance with unforeseeable Covid-19 rules, orders or directives, normal design, construction, and maintenance procedures or workforce may be affected which could lead to reduced performance and/or increase in cost.	Consider best practices and measures currently applied in similar construction project in the United States and the Commonwealth of Pennsylvania	3-Medium											
Active	5	Threat	Construction	Materials escalation	As a result of supply chain disruptions, and commodities pricing volatility, material cost increases and delays in delivery for certain construction materials such as steel, asphalt, fuel and portland cement may occur, which could lead to higher construction capital cost and delay construction contract acceptance.	Identify specific materials or material categories that may be at risk for significant volatility in current conditions Identify suppliers for these “at-risk” materials that may provide fixed pricing for a fixed period of time. Pre-order materials if feasible	2-Low											
Active	6	Threat	Construction	Waste Management	As a result of the discovery of unknown contaminated soils on project ROW, additional waste management and hazmat remediation actions may be necessary, which would lead to an increase in cost and delays.	Design to avoid work in areas with a known potential for hazardous materials and utilize construction methods to minimize disturbance, if possible Perform additional / confirmatory site investigations Develop action plans with established protocols for handling / disposal of materials in a safe and sound manner.	3-Medium											
Active	7	Opportunity	Construction	Polyester Polymer Concrete	As a result of the use of polyester polymer concrete as an overlay on the bridge deck, useful life may be extended which would reduce long term maintenance costs.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	4-High											
Active	8	Threat	Construction	Flooding Events	As a result of unforeseen ground conditions, weather or flood events, construction delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Allow construction time float for uncertainty. Determine most likely flood season and program around those periods if possible.	3-Medium											

Active	9	Threat	Construction	Lack of borrow pits / waste sites near the project	As a result of insufficient design or unexpected site conditions, additional borrow / waste material may be generated, which could lead to an earthwork unbalance.	Design project to produce balance earthwork. Make provisions to borrow or waste material as necessary (determine locations for borrow and waste sites before final design plans).	3-Medium											
Active	10	Threat	Construction	Road User Liquidated Damages (RULD)	If schedule is delayed and roadway is shut down more than specification allows, RULD's may be assessed	Perform a complete staging, constructability, and maintenance of traffic assessment of the project during Final Design. Work cooperatively and coordinate activities with PennDOT and other stakeholders during construction to resolve potential deviations on assumptions without incurring penalties.	2-Low											
Active	11	Threat	Construction	Subcontractor Design-Build Field Issue Resolution	If the project is subcontracted out, the management of the design by BPP will inherently cause a contractual tension due to schedule and/or cost impacts if, during construction, design issues impact the progress in the field. If the subcontractors on site are not proactively reviewing plans for these issues and they make it to the field regularly this can have negative effects.	BPP Field Staff must be alert to issues that would normally be caught had our project team/craft been constructing the work and partner between the designers and subcontracting team to mitigate these issues quickly when they crop up.	1-Very Low											
Active	12	Opportunity	Construction	Group or Interconnect Project Areas by material types, location, or operations	By grouping similar regional projects together for buying out materials or for sharing resources (manpower, equipment, etc.) the buying/negotiating power of the overall project is increased.	If implemented, the grouping decisions would have to be made to account for any operational risk that accompany linking parts of projects together (i.e., using the same beam gantry on more than 1 project)	4-High											
Active	13	Threat	Construction	Issuance of NCE (Nonconformance Events) points	PennDOT implements a rigid NCE program during the PA phase that could result in numerous points assessments that BPP will have no recourse.	It is unusual for noncompliance points to apply during construction. To the extent PennDOT believes such a regime should be applicable during the construction period, the scope of failures / non-conformance events that would give rise to the assessment of non-compliance points and associated economic penalties should be limited to material nonconformances or persistent non-material nonconformances. No consequences should be faced from immaterial failures to perform or other failures that Development Entity has successfully remedied prior to the expiration of agreed upon cured periods.	4-High											
Active	14	Threat	Construction	Bonding / Repair of Local Roads	To gain access underneath of the structures, road bonds will be required	The cost of the bond is minimal; however, the costs is not providing the	3-Medium											

					to be supplied for any roads that are weight limited and or restricted.	bond to a Municipality as much as it is the cost to repair the road such that Municipality does not move against the bond.												
Active	15	Threat	Construction	Unanticipated Archeological Discoveries	As a result of the discovery of unanticipated archaeological resources, further evaluations and possibly recovery activities may need to occur, which could lead to considerable impacts on time and cost.	Archaeological monitoring may be required during construction depending on the outcome of the archaeological investigations.	2-Low											
Active	16	Threat	Construction	Extreme weather events that can cause closure of the Interstate	There is history that some of these interstates (particularly I-81) shutting down due to extreme weather events, which can restrict can restrict access to the Projects and disrupt the flow of construction activities.	Weather days will be forecasted into construction contract schedule. Public information outreach will include educating the public if delays are caused by weather. Could cause project to be minimally delayed.	3-Medium											
Active	17	Threat	Design	Design Development	As a result of the transition of the project documents/knowledge to the Development Entity, functional design/coordination files may be omitted/lost, which would lead to the need to reproduce design product files which were previously created and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT to conduct a bridge design handoff meeting to review and discuss design/coordination status and the efficient transition to Development Entity Team Members	4-High											
Active	18	Threat	Design	Design Review Process and approval	As a result of the transition of the project responsibilities to the Development Entity, misunderstanding of task execution responsibilities may occur, which would lead task progression/communication delays and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders a bridge responsibility handoff meeting for each bridge to review and discuss task responsibility/status and the efficient transition to development entity team members	4-High											
Active	19	Threat	Design	Traffic Diversions	As a result of diversion route design progression, additional design / coordination issues may occur, which would lead to increased design and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders to identify and resolve issues throughout design.	3-Medium											

Active	20	Opportunity	Design	Implement Proven Alternative Standard and/or Materials	Using the broad experience of BPP partners to integrate other DOT Standards and/or approved materials that have a proven track record outside PennDOT of betterment in construction and lifecycle maintenance.	Leverage Lead Engineering Firm and BPP's Lead Construction Contractor and Subcontractors' experience	3-Medium											
Active	21	Threat	Design	Construction in adjacent NY State	As a result of the design and construction overlapping the NY State line, agreement coordination/resolution delays may occur, impacting design and construction cost and schedule.	BPP will coordinate with PennDOT and NYSDOT representatives.	3-Medium											
Active	22	Threat	Design	Central NY Railroad Agreement	As a result of the completed agreement with the Central NY railroad for the bridge replacement, design details inconsistencies may occur, impacting design and construction cost and schedule.	BPP will coordinate with previous submittals and PennDOT representatives to avoid conflicting details.	1-Very Low											
Active	23	Threat	Design	Utilities	As a result of the number of anticipated utility impacts/relocations that involve railroad and City coordination, utility relocation delays may happen, impacting construction cost and schedule.	BPP will send utility verification plans in the PDA and we will be updating the utility impact matrix. Coordination meetings will be requested as the design progresses.	2-Low											
Active	24	Threat	Design	Diversion Routes	As a result of the available site conditions along diversion route improvements, potential unknown utility conflicts delays may occur, impacting cost and schedule	BPP will coordinate with the Park and applicable stakeholders during the PDA and PA to identify restrictions, develop a plan and provide public notices.	3-Medium											
Active	25	Threat	Design, Construction	Central NY Railroad Right of Entry	As a result of the need for a right of entry agreement with the Central NY for site access and construction, insurance and agreement processes delays may occur, impacting design and construction cost and schedule.	BPP will coordinate with Central NY representatives and implement applicable processes for right of entry.	2-Low											
Active	26	Threat	Environmental	Environmental Constraints and Requirements	As a result of unexpected environmental constraints and requirements that impact bridge construction, an increase in the number of working days may occur which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP to initiate early consultation with resource agencies such as USACE, PADEP, PFBC in an effort to determine all feasible environmental constraints early in the process and to develop a realistic project schedule.	3-Medium											

Active	27	Threat	Lifecycle	Lifecycle budget insufficient to cover costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for lifecycle	Make sure scope is clear with PennDOT and that there is sufficient contingency in lifecycle budget	2-Low												
Active	28	Threat	Lifecycle	Accelerated lifecycle repairs due to increased traffic or more rapid than anticipated asset deterioration	As a result of increased use or poor maintenance, asset deteriorates ahead of forecast requiring earlier interventions	Ensure strong maintenance plan is implemented with robust asset monitoring to ensure that we understand exact asset condition and can implement minor repairs in lieu of accelerating lifecycle repairs	2-Low												
Active	29	Threat	Maintenance	Inadequate Maintenance Regime	As a result of an inadequate inspection regime one of the following events occurs: need for corrective maintenance, loss of life, serious injury, damage to property, catastrophic failures, or disruption to network, which could lead to closures and diversions, increase repair costs, claims and reputational damage	Implement regular safety inspections, timely reactive repairs, targeted planned maintenance works.	1-Very Low												
Active	30	Threat	Maintenance	Negative media influence	As a result of negative media influence, increased complaints, a gap between public expectations and what can be achieved may occur, which could lead to changes in political priorities and reputational damage	Regular engagement with residents, stakeholders, and customers, including use of customer satisfaction surveys. Setting priorities to match customer wishes.	2-Low												
Active	31	Threat	Maintenance	Committed M&R budget not sufficient to cover anticipated costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for annual maintenance and rehabilitation (M&R).	Make sure scope is clear with PennDOT and that there is sufficient contingency in annual budget	2-Low												
Active	32	Threat	Maintenance	M&R staff ramp up or turnover during Maintenance phase is greater than anticipated	As a result of increased turnover, there are challenges providing the required staffing for the maintenance plan, risking lower asset quality.	Provide competitive benefits and compensation to increase retention Leverage local firms to ensure that we have a deep bench of talent that can replace any departures	2-Low												
Active	33	Threat	Maintenance	Scope changes materially from what has been presented in RIDs	As a result of negotiations during the PDA phase, the maintenance scope changes materially from what is presented in the Reference Information Documents (RIDS).	Ensure that commercial and budgeting teams are kept abreast of scope changes so that these are captured	1-Very Low												

Active	34	Threat	Maintenance	Lack of interest from sub-contractors for sub-contracted M&R scope	As a result of scope or risk transfer there is limited interest from subcontractors.	Leverage list of subcontractors from local firms and generated through DBE outreach to ensure deep bench. Provide web tool for new contractors to register for pre-qualification	1-Very Low											
Active	35	Threat	Maintenance	PennDOT / PTC operations / maintenance items impact asset performance	As a result of PennDOT / PTC interventions on operational elements like tolling, incident response, and winter maintenance, asset performance is impacted and there is a potential for KPI or other deductions.	Ensure strong interface with PennDOT / PTC Validate that risk transfer around interfaces is clearly defined	3-Medium											
Active	36	Threat	Maintenance	Other third-party impacts assets performance or maintenance regime	As a result of third-party (utility / railroad) operations or a change in requirements, there is an impact to maintenance regime	Ensure strong commercial protections for changes and robust third-party agreements.	2-Low											
Active	37	Threat	Maintenance	Design changes not communicated / captured in M&R budget	As a result of a failure of communications, maintenance or rehabilitation budget / approach does not capture a design change and there is a budget gap	Ensure strong engagement between maintenance and design teams to make sure no gaps.	1-Very Low											
Active	38	Threat	ROW - Railroads - Utilities	Delays in Utility Relocations	As a result of the number of anticipated utility impacts/relocations involving utility owners or discovery of unknown utility conflicts, utility relocation delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will send utility verification plans during the PDA and we will be updating the utility impact matrix. Coordination meetings will be scheduled upon PDA execution. Perform additional potholing, meet with utility companies early in the process, utilize local subcontractors who have worked extensively with local utility companies. Highlight activities that depend on Utility relocations in the schedule and develop contingency work-around plans.	3-Medium											
Active	39	Threat	ROW - Railroads - Utilities	Access to ROW	As a result of delays in obtaining access to project required ROW, delays in construction commencement or achievement of construction milestones may occur, which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Highlight activities that depend on ROW acquisition in the WBS schedule and develop contingency-arounds plans if needed	3-Medium											

Active	40	Threat	ROW - Railroads - Utilities	Working Adjacent to Railroads	As a result of railroad requiring work to occur during specific times based on their train schedules, work disruption and delay may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Continue early coordination into the PA Phase to develop initial railroad agreements. Work closely with PennDOT to devise alternatives to mitigate the issue.	3-Medium												
Active	41	Threat	ROW - Railroads - Utilities	Availability of Railroad Flaggers	Prior to the Pandemic there were challenges in obtaining railroad flaggers for operations near/over/adjacent to railroads, this has most likely been exacerbated by the Pandemic.	Allow construction time float for uncertainty. Try to pass on responsibility for provision of Railroad flaggers to the Railroad under the railroad agreement. Include contractual protections for uncooperative railroads under the Project Agreement.	3-Medium												

LEVEL 2 - RISK REGISTER Qualitative Analysis	**Project Name:** P3 - Major Bridges - I-78 Lenhartsville	**MPMS No:**	**Project Manager:**	
Risk Identification		**Risk Assessment**		**Risk Response**

Status	ID #	Type	Category	Risk Factor	Risk Statement	Current Status/Assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Response Phase	Risk Owner	Cost Effectivene	Updated
Active	1	Threat	Construction	Maintenance of Traffic	As a result of overruns in the performance of construction activities, longer than anticipated traffic closures and detours may be required, which could lead to an increase in construction support costs, increased construction capital costs, and reduced public satisfaction.	Develop early communication and coordination with the traveling public to provide early notification of upcoming lane closures and anticipated durations. Sequence construction activities to maintain two lanes of traffic in each direction during construction and avoid the need to implement detours of I-80 for the reconstruction of the bridges.	2-Low											
Active	2	Threat	Construction	Difficulties to hire skilled / unskilled labor	As a result of pandemic-induced labor shortages and the additional demands these projects will put on the Pennsylvania labor market, construction contractors and subcontractors may struggle to find enough qualified workers to hire to perform construction activities, which could lead to higher than forecasted labor costs, productivity impacts, project delays and increase in schedule and cost.	H&K has significant history working in this region and can leverage that experience to tap into their local labor resources to construct this project. Additionally, BPP and H&K will partner with local trade groups & organizations, community colleges and trade schools to continue to develop skilled labor resources needed throughout this project.	2-Low											
Active	3	Threat	Construction	Permits	As a result of the project falling within the South-Central Regional Office of Pennsylvania Department of Environmental Protection and Southeast Regional Office of Fish and Boat Commission, Baltimore District of US Army Corps of Engineers, and Berks County Conservation District jurisdictions a JPA permit is required including Chap. 102/NPDES and ATON are required. Additional geomorphology studies are necessary for the Grims Farm once ROW is required. A delay in application for and/or receipt of permits or appeals may occur, which would lead to a delay in the project and possible project changes to comply with permit conditions.	Identify all approval and permit requirements and coordinate early with regulatory agencies to streamline the approval process Leverage STV's and local subcontractors past success in coordinating similar permits for past projects with permitting agencies Highlight activities that depend on permits or agreements in the CPM schedule and develop contingency work-around plans if needed.	3-Medium											

Active	4	Threat	Construction	Covid-19	As a result of compliance with unforeseeable Covid-19 rules, orders or directives, normal design, construction, and maintenance procedures or workforce may be affected which could lead to reduced performance and/or increase in cost.	Consider best practices and measures currently applied in similar construction project in the United States and the Commonwealth of Pennsylvania	3-Medium													
Active	5	Threat	Construction	Materials escalation	As a result of supply chain disruptions, and commodities pricing volatility, material cost increases and delays in delivery for certain construction materials such as steel, asphalt, fuel and portland cement may occur, which could lead to higher construction capital cost and delay construction contract acceptance.	Identify specific materials or material categories that may be at risk for significant volatility in current conditions Identify suppliers for these “at-risk” materials that may provide fixed pricing for a fixed period. Pre-order materials if feasible	2-Low													
Active	6	Threat	Construction	Waste Management	As a result of the discovery of unknown contaminated soils on project ROW, additional waste management and hazmat remediation actions may be necessary, which would lead to an increase in cost and delays.	Design to avoid work in areas with a known potential for hazardous materials and utilize construction methods to minimize disturbance, if possible Perform additional / confirmatory site investigations Develop action plans with established protocols for handling / disposal of materials in a safe and sound manner.	3-Medium													
Active	7	Opportunity	Construction	Polyester Polymer Concrete	As a result of the use of polyester polymer concrete as an overlay on the bridge deck, useful life may be extended which would reduce long term maintenance costs.	Work closely with PennDOT during the PDA Phase and during the Construction Period to identify most efficient solutions	4-High													
Active	8	Threat	Construction	Flooding Events	As a result of unforeseen ground conditions, weather or flood events, construction delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Allow construction time float for uncertainty. Determine most likely flood season and program around those periods if possible.	3-Medium													
Active	9	Threat	Construction	Lack of borrow pits / waste sites near the project	As a result of insufficient design or unexpected site conditions, additional borrow / waste material may be generated, which could lead to an earthwork unbalance.	Design project to produce balance earthwork. Make provisions to borrow or waste material as necessary (determine locations for borrow and waste sites before final design plans).	2-Low													

Active	10	Threat	Construction	Road User Liquidated Damages (RULD)	If schedule is delayed and roadway is shut down more than specification allows, RULD's may be assessed	Perform a complete staging, constructability, and maintenance of traffic assessment of the project during Final Design. Work cooperatively and coordinate activities with PennDOT and other stakeholders during construction to resolve potential deviations on assumptions without incurring penalties.	2-Low												
Active	11	Threat	Construction	Subcontractor Design-Build Field Issue Resolution	If the project is subcontracted out, the management of the design by BPP will inherently cause a contractual tension due to schedule and/or cost impacts if during construction, design issues impact the progress in the field. If the subcontractors on site and project personnel are not proactively reviewing plans for these issues and they make it to the field regularly this can have negative effects.	BPP Field Staff must be alert to issues that would normally be caught had our project team/craft been constructing the work and partner between the designers and subcontracting team to mitigate these issues quickly when they crop up.	1-Very Low												
Active	12	Opportunity	Construction	Group or Interconnect Project Areas by material types, location, or operations	By grouping projects together for buying out materials or for sharing resources (manpower, equipment, etc.) the buying/negotiating power of the overall BPP JV is increased.	If implemented, the grouping decisions would have to be made to account for any operational risk that accompany linking parts of projects together (i.e.- using the same beam gantry on more than 1 project)	4-High												
Active	13	Threat	Construction	Issuance of NCE (Nonconformance Events) points	It will be PennDOT's intent to implement a rigid NCE program during the PA phase that could result in numerous points assessments that BPP will have no recourse.	Explore with PennDOT the idea of an NCR (Non-Conformance Report) system rather than an NCE. The NCR can be tracked so that the nonconformance can be closed without NCE point assessments and financial impacts.	4-High												
Active	14	Threat	Construction	Bonding / Repair of Local Roads	To gain access underneath of the structures, road bonds will be required to be supplied for any roads that are weight limited and or restricted.	The cost of the bond is minimal; however, the costs is not providing the bond to a Municipality as much as it is the cost to repair the road such that Municipality does not move against the bond.	1-Very Low												

Active	15	Threat	Construction	Unanticipated Archeological Discoveries	As a result of the discovery of unanticipated archaeological resources, further evaluations and possibly recovery activities may need to occur, which could lead to considerable impacts on time and cost.	Archaeological monitoring may be required during construction depending on the outcome of the archaeological investigations.	2-Low												
Active	16	Threat	Construction	Extreme weather events that can cause closure of the Interstate	There is history that some of these interstates (particularly I-78) shutting down due to extreme weather events, which can restrict can restrict access to the Projects and disrupt the flow of construction activities.	Weather days will be forecasted into construction contract schedule. Public information outreach will include educating the public if delays are caused by weather. Could cause project to be minimally delayed.	4-High												
Active	17	Threat	Design	Design Development	As a result of the transition of the project documents/knowledge to the Development Entity, functional design/coordination files may be omitted/lost, which would lead to the need to reproduce design product files which were previously created and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT to conduct a bridge design handoff meeting to review and discuss design/coordination status and the efficient transition to Development Entity Team Members	4-High												
Active	18	Threat	Design	Design Review Process and approval	As a result of the transition of the project responsibilities to the Development Entity, misunderstanding of task execution responsibilities may occur, which would lead task progression/communication delays and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders a bridge responsibility handoff meeting for each bridge to review and discuss task responsibility/status and the efficient transition to development entity team members	4-High												
Active	19	Threat	Design	Traffic Diversions	As a result of diversion route design progression, additional design / coordination issues may occur, which would lead to increased design and an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will coordinate with PennDOT/stakeholders to identify and resolve issues throughout design.	3-Medium												

Active	20	Opportunity	Design	Implement Proven Alternative Standard and/or Materials	Using the broad experience of BPP partners to integrate other DOT Standards and/or approved materials that have a proven track record outside PennDOT of betterment in construction and lifecycle maintenance.	Leverage Lead Engineering Firm and BPP's Lead Construction Contractor and Subcontractors' experience	3-Medium											
Active	21	Threat	Environmental	Environmental Constraints and Requirements	As a result of unexpected environmental constraints and requirements that impact bridge construction, an increase in the number of working days may occur which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP to initiate early consultation with resource agencies such as USACE, PADEP, PFBC in an effort to determine all feasible environmental constraints early in the process and to develop a realistic project schedule. Maiden Creek is classified as a Stocked Trout Waters and potential red belly turtle habitat with in-stream time of year restrictions between March 1 to June 15 and November 1 to April 30. PA Fish & Boat does not designate Maiden Creek as a water trail.	3-Medium											
Active	22	Threat	Final Design	Utilities	As a result of the combination of electric utilities crossing under bridge construction areas, utility relocation delays may happen, impacting construction cost and schedule.	BPP will send utility verification plans during the PDA, compare site location information to clearly identify conflicts and we will update the utility impact matrix. Coordination meetings will be scheduled upon PDA execution.	3-Medium											
Active	23	Threat	Lifecycle	Lifecycle budget insufficient to cover costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for lifecycle	Make sure scope is clear with PennDOT and that there is sufficient contingency in lifecycle budget	2-Low											
Active	24	Threat	Lifecycle	Accelerated lifecycle repairs due to increased traffic or more rapid than anticipated asset deterioration	As a result of increased use or poor maintenance, asset deteriorates ahead of forecast requiring earlier interventions	Ensure strong maintenance plan is implemented with robust asset monitoring to ensure that we understand exact asset condition and can implement minor repairs in lieu of accelerating lifecycle repairs	2-Low											

Active	25	Threat	Maintenance	Inadequate Maintenance Regime	As a result of an inadequate inspection regime one of the following events occurs: need for corrective maintenance, loss of life, serious injury, damage to property, catastrophic failures, or disruption to network, which could lead to closures and diversions, increase repair costs, claims and reputational damage	Implement regular safety inspections, timely reactive repairs, targeted planned maintenance works.	1-Very Low												
Active	26	Threat	Maintenance	Negative media influence	As a result of negative media influence, increased complaints, a gap between public expectations and what can be achieved may occur, which could lead to changes in political priorities and reputational damage	Regular engagement with residents, stakeholders, and customers, including use of customer satisfaction surveys. Setting priorities to match customer wishes.	2-Low												
Active	27	Threat	Maintenance	Committed M&R budget not sufficient to cover anticipated costs	As a result of productivity, performance standards, or frequency of interventions, there is a need for more budget for annual maintenance and rehabilitation (M&R).	Make sure scope is clear with PennDOT and that there is sufficient contingency in annual budget	2-Low												
Active	28	Threat	Maintenance	M&R staff ramp up or turnover during Maintenance phase is greater than anticipated	As a result of increased turnover, there are challenges providing the required staffing for the maintenance plan, risking lower asset quality.	Provide competitive benefits and compensation to increase retention Leverage local firms to ensure that we have a deep bench of talent that can replace any departures	2-Low												
Active	29	Threat	Maintenance	Scope changes materially from what has been presented in RIDs	As a result of negotiations during the PDA phase, the maintenance scope changes materially from what is presented in the Reference Information Documents (RIDS).	Ensure that commercial and budgeting teams are kept abreast of scope changes so that these are captured	1-Very Low												
Active	30	Threat	Maintenance	Lack of interest from sub-contractors for sub-contracted M&R scope	As a result of scope or risk transfer there is limited interest from subcontractors.	Leverage list of subcontractors from local firms and generated through DBE outreach to ensure deep bench. Provide web tool for new contractors to register for pre-qualification	1-Very Low												
Active	31	Threat	Maintenance	PennDOT / PTC operations / maintenance items impact asset performance	As a result of PennDOT / PTC interventions on operational elements like tolling, incident response, and winter maintenance, asset performance is impacted and there is a potential for KPI or other deductions.	Ensure strong interface with PennDOT / PTC Validate that risk transfer around interfaces is clearly defined	3-Medium												

Active	32	Threat	Maintenance	Other third-party impacts assets performance or maintenance regime	As a result of third-party (utility / railroad) operations or a change in requirements, there is an impact to maintenance regime	Ensure strong commercial protections for changes and robust third-party agreements.	2-Low												
Active	33	Threat	Maintenance	Design changes not communicated / captured in M&R budget	As a result of a failure of communications, maintenance or rehabilitation budget / approach does not capture a design change and there is a budget gap	Ensure strong engagement between maintenance and design teams to make sure no gaps.	1-Very Low												
Active	34	Threat	ROW - Railroads - Utilities	Delays in Utility Relocations	As a result of the number of anticipated utility impacts/relocations involving utility owners or discovery of unknown utility conflicts, utility relocation delays may occur, which could lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	BPP will send utility verification plans during the PDA and we will be updating the utility impact matrix. Coordination meetings will be scheduled upon PDA execution. Perform additional potholing, meet with utility companies early in the process, utilize local subcontractors who have worked extensively with local utility companies. Highlight activities that depend on Utility relocations in the schedule and develop contingency work-around plans.	3-Medium											
Active	35	Threat	ROW - Railroads - Utilities	Access to ROW	As a result of delays in obtaining access to project required ROW, delays in construction commencement or achievement of construction milestones may occur, which would lead to an increase in construction support costs, increased construction capital costs, and delay construction contract acceptance.	Highlight activities that depend on ROW acquisition in the WBS schedule and develop contingency-arounds plans if needed	3-Medium												

Preliminary

Safety & Security Plan for First Package

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

Bridging Pennsylvania Partners
Safety & Security Plan for First Package

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Compliance with the Pre-Development Agreement Requirement

The following table details how this Draft Safety and Security Plan complies with the requirements of Exhibit 6 Pre-Development Agreement, Section 2.9 Safety Management.

Pre-Development Agreement Requirement	Document/Section Reference
1) Fully describe the to-be-formed Development Entity's policies, plans, training programs, Bridge Sites controls, and incident response plans to ensure the health, safety and security of Project personnel.	Entirety of document- see Table of Contents for specific sections
2) Describe all precautions to be used to safeguard the general public during the PA Term.	Section 19.
3) Discuss the roles, responsibilities, and reporting lines for the to-be-formed Development Entity's safety and security personnel.	Section 2.
4) Describe the measures to be used to provide for the security of the Bridge Sites including the PennDOT occupied portions of the to-be-formed Development Entity's facilities.	Section 15.
5) Document the procedures to protect all electronic documents and records.	Section 15. Reference to Document and Data Management Plan
6) Present how the to-be-formed Development Entity shall comply with Applicable Law, regulations, provisions, and policies governing safety and health.	Section 1. Section 18 And various specific areas throughout the document
7) Address procedures for immediately notifying PennDOT of all Incidents arising out of or in conjunction with the performance of the Work, regardless of the location of the Incident.	Section 9.

Introduction

This Safety & Security Plan has been established for the Development Entity to assist in the promotion of safety and to limit, reduce, and control hazards and risks associated with the project development, investigation, coordination, design, construction, repair, maintenance, and related services associated with the Project.

All contractors are responsible for all aspects of safety and accident prevention while under contract with the Development Entity.

Safety & Security performance must not only meet regulatory requirements but go beyond commonly accepted safety practices and expectation from agencies such as the Occupational Safety and Health Administration (OSHA). The most effective way to achieve this type of environment is to ensure that all parties involved are committed to excellence in safety. Positive safety performance must be cultural and cannot be realized through process alone; it must be a values-based culture functioning within the entire project and endorsed by all individuals involved. The Development Entity is committed to delivering a quality project with zero safety incidents.

Contractors and all tiered subcontractors are responsible for complying fully with all applicable laws, statutes, ordinances, rules, regulations and/or orders from any public authority (federal, state, local) as they relate to safety of persons, environment, public, or property. In the event of a conflict between the provision of these guidelines and applicable local, state or federal safety and health laws, regulations and/or standards, contract documents or the contractor's plan, the most stringent regulation or guideline shall apply.

Each contractor shall develop its own written Site-Specific Health, Safety & Security Plan (SSHSSP) and shall be responsible for administering their plan throughout the duration of this project. The SSHSSP shall be submitted and accepted by the Development Entity's Safety Manager before the contractor initiates work under the scope of their contract. Review and acceptance of the contractor's plan shall not impose any liability on the Development Entity or their representatives. All contractors shall monitor and enforce any tiered subcontractors for implementation of their respective safety programs at the project site. The Development Entity, the contractor, PennDOT or their representatives shall have the authority to intervene with work when either site conditions and/or work practices present an imminent danger or noncompliance with the safety program.

The goal of each project we undertake is to create designs that will reduce risk to the safety of clients, builders, users, those who service and maintain the work, and any other stakeholders who could be affected by our work. The best and most cost-effective way to do this is to plan for safety and security right from the start, when design decisions can most proactively influence the way by which the project is constructed, used and maintained. This process has many benefits, some of which include:

- Significant reductions in work related injuries, particularly during the construction and maintenance stages of a project's lifecycle.
- Improvement in the health and wellbeing of workers.
- Reductions in damage to property and the environment, with reductions in related costs.

- Elimination of potential hazards at the beginning of the project, which is often cheaper and easier than minimizing their effects later in the lifecycle.
- More efficient and effective risk management at the design stage rather than retrofitting for safety and security during the use and maintenance stages.
- Reductions in operational maintenance and litigation cost when things go wrong.

Overarching principles to achieve safety in design are to consult, coordinate and cooperate with the client and all others involved from the design to the completion of the project. The steps utilized to ensure safety in the design process include:

- Engage with the client to help understand the safety and security risks of the project.
- Research and brainstorm to find the best options for each stage of the project's lifecycle.
- Assess and understand the safety and security risks throughout the lifecycle of the design project.
- Check design ideas for safety and adapt design to reduce the risk of harm to contractors and uses of the completed project. Follow approved codes, standards, and regulations.
- Document and provide information to the client and all involved parties on the mitigating measures which have been introduced as well as any residual risks that remain.
- Review the design for safety and security learning at the end of the project which can be applied to future work or other areas of the project.

Section 1 – General Rules and Precautions

List of General Rules and Precautions

The Company will strictly comply with federal, state, and local regulations with particular emphasis on the Occupational Safety and Health Act of 1970 (OSHA) and the OSHA requirements that apply to our operations.

All newly hired employees and subcontractor employees, regardless of their position, are required to attend a project safety orientation before beginning their duties on site. Each trained individual will receive a hard hat decal as proof of orientation.

Approved hard hats and safety glasses with side shields are required to be worn at all times while on the jobsite.

All employees working on the project shall wear a minimum Class II ANSI/ISEA certified green reflective traffic vest, shirt, or jacket at all times.

Safety Meetings and Daily Task Plan meetings will be held by the supervisor to discuss any possible hazards that may be present during that day's tasks. (Mandatory for all site employees to attend)

All personnel must be aware of the "Seven Rules to Live By", failure to comply will result in immediate suspension or termination.

1. Always use fall protection when exposed to falls of six feet or greater.
2. Do not enter an unprotected excavation or trench that is five feet or deeper.
3. Do not enter a confined space without proper authorization and atmospheric testing.
4. Always wear seatbelts in vehicles and equipment.
5. Do not use alcohol or drugs while working or driving.
6. Do not use handheld cell phones while driving or operating equipment
7. Do not dig within the tolerance zone of marked unexposed underground utilities.

Every employee on the project is given the authority, without fear of reprimand or retaliation, to immediately:

- Stop work if a condition change creates a hazardous condition.
- Stop any activity that presents danger to any employees, the public, or the environment.
- Get involved, question and rectify any situation that is identified as not being in compliance with our health, safety and security policies.
- Report any unsafe condition or potential negative project impacts.
- Question any work activity that involves violation of established safety or security policies.

Project supervisors must emphasize safety to all employees and subcontractors on a daily basis through communication and enforcement.

A "Stretch and Flex" program is an important component of project safety. Stretches will be performed daily during safety meetings on site.

All project personnel must take responsibility for their own safety as well as not reporting to work in a condition as to endanger the safety of their fellow workers. Personnel must immediately notify their supervisor if they are not physically and/or mentally fit to perform their job function safely.

As part of the project hazardous communication program, all site contractors shall maintain an inventory of hazardous materials used on the project for their activities. A chemical inventory list shall be submitted as part of their SSHSSP.

COVID-19 procedures must be followed by all project personnel pursuant to Appendix C.

Section 2 – Safety Policy Responsibilities

It is the policy of the Development Entity to provide a safe and healthy place of employment for all of its employees and subcontractors.

It is, therefore, the purpose of this stated policy to:

- Abide by all federal, state and local regulations as they pertain to our operations.
- Apply good sense and safe practices to all jobs.
- Exercise good judgment in the application of this policy.
- Protect the public from any and all hazards that result from our operations.

To further these goals, the following assignments of responsibilities are made:

Project Leadership and Construction Manager

- Provide goals, allocate resources, assign responsibilities and evaluate performance in corporate safety and health. Leadership is fully responsible and accountable for the overall effectiveness of the Development Entity Safety and Security Plan.
- Ensure the full cooperation and support of the Safety and Security Plan by all employees, sub-contractors and suppliers.
- Periodically monitor project accident experience to ensure that the Safety and Security Plan is being implemented and is effective in reducing losses and loss exposures.
- Require all subcontractors to abide by the Safety and Security Plan and owner/client requirements. Ensure the appropriate Safety and Security language is contained within all subcontract agreements.
- Consider a project's Safety and Security performance and the individual's attitude for compliance with the corporate goals and requirements in all employee performance evaluations.
- Perform monthly project visits to ensure Safety and Security performance. Document and address deficiencies that are discovered.

Project Manager, Design-Build Project Manager and Project Engineers

- Collaborate with the Safety and Security personnel in the development of the project SSHSSP.
- Provide subcontractors and suppliers with a copy of the SSHSSP in effect on the project.
- Comply with and inform site personnel of specific contract provisions dealing with safety and loss prevention requirements.
- Compile and maintain necessary records, logs and other reports pertaining to safety as required by contractors, owners/clients, and federal, state, and local Regulations.
- Maintain an open line of communication through all levels of supervision regarding safety.
- Plan production so that all work can be performed within established safety regulations.
- Communicate a positive safety attitude to all employees.
- Ensure safe performance by others on the site, including owner and architect/engineer representatives.

- Perform regular project visits to ensure Safety and Security performance. Document and address deficiencies that are discovered.

Project Superintendents

- Participate in pre-job planning for safety prior to the start of the project.
- Participate in periodic safety department and/or insurance representative assessments.
- Communicate to all employees a positive safety attitude by example, enforcement, and follow-up.
- Take responsibility for on-the-job safety and health, enforcement of the entire safety program, and special requirements deemed necessary for unusual conditions or hazards.
- Maintain an open line of communication through all levels of supervision and employees regarding safety.
- Make necessary training available for employees to perform their task safely.
- Provide personal protective equipment for employees where required.
- Conduct jobsite safety meetings and provides employees with proper instruction on safety requirements.
- Impress upon all the responsibility and accountability of each individual to maintain a safe workplace.
- Plan production so that all work will be done in compliance with established safety regulations.
- Instruct foreman or lead personnel in safety requirements.
- Review near-misses and accidents, supervise correction of unsafe practices.
- Discipline any employee disregarding this policy and notify Project Leadership if applicable.
- Implement and maintain an effective housekeeping program in all areas of work. Inform all employees and subcontractors of their housekeeping responsibilities.
- Provide for the protection of the public from our operations.
- Ensure safe performance by others on the site, including owner and architect/engineer representatives, the general public, visitors, and the employees of subcontractors. This can be accomplished through training, communications, and terms in contracts/purchase orders.

Project Foremen / Supervisors

- Carry out safety programs at the work level.
- Participate in periodic safety department and/or insurance representative assessments.
- Remain aware of all safety requirements and safe working practices.
- Prepare, implement, and enforce Job Safety Analysis (JSA) and daily task plans.
- Plan all work activities to comply with safe working practices.
- Instruct all employees on safe working practices through JSAs and/or daily task plans before performing a new task.
- Install and maintain devices to protect the public from company operations.
- Make sure protective equipment is available and used properly.
- Correct all hazards, including unsafe acts and conditions.
- Ensure work is performed safely and that no unsafe conditions or equipment are present.
- Provide first aid and secure prompt medical attention for any injured employees.
- Report near-misses, safety violations, and injuries to the Safety Department.
- Take pictures of site conditions and safety inspections.

Site Safety and Security Personnel

Provide guidance, support, and oversight to the project on all Safety and Security matters under this plan, specifically:

- Report directly to the Construction Manager on the project and the Safety Manager outside of the project.
- Indoctrinate all new employees to the corporate and project safety and security programs.
- Promote safety awareness at daily and weekly safety meetings.
- Perform daily health, safety and security assessments of the project and all work in progress.
- Monitor the safety of all Sub-contractors onsite.
- Review and enforce all Daily Task Plans and JSAs.
- Provide OSHA compliant training as required for specific hazards.
- Maintain all safety-related documentation for the project.
- Administer general first aid, as needed.
- Ensure compliance with all federal, state, local and project owner requirements.
- Perform industrial hygiene monitoring, as needed.
- Ensure completion of all safety equipment inspections.
- Identify and eliminate workplace hazards to prevent potential losses for the Development Entity, Lead Construction Contractor, and project owners.
- Conduct thorough accident investigations and ensure that corrective measures are implemented.
- Compile and maintain site Safety Data Sheets (SDSs) and chemical inventories.

Workers

- Work safely in such a manner as to assure their own safety as well all others on site.
- Request help when unsure about how to perform any tasks safely.
- Correct unsafe acts or conditions.
- Report any uncorrected unsafe acts or conditions to the appropriate supervisor.
- Report for work in good mental and physical condition.
- Participate in company- and industry-sponsored safety trainings and programs.
- Properly use and maintain all safety devices provided.
- Maintain and properly use all tools under their control.
- Follow all safety rules.
- Provide fellow employees with help on safety requirements.

All Personnel

- Strive to make all operations safe.
- Maintain mental and physical health conducive to working safely.
- Keep all work areas clean and free of debris.
- Assess the results of their actions on the entire workplace. Work will not be performed in ways that cause hazards for others.

- Report all witnessed or known non-compliance to the provisions in this plan to the site safety coordinator. Possessing knowledge of non-compliance to this plan or any other regulations and not reporting it may be grounds for termination.
- Abide by the safety rules and regulations of every construction site. Utilize stop work authority, as necessary.
- Before leaving work, replace or repair safety precautions signs removed or altered. Unsafe conditions will not be left to imperil others.
- Work in strict conformance with federal, state, and local regulations.

Sub-Contractors and Suppliers

- Check in with jobsite supervision before entering the jobsite.
- Notify all other contractors when their activities could affect the health and safety of other site personnel.
- Abide by all Development Entity safety rules.
- Ensure personnel are trained and Competent Persons (defined in subsequent section) are assigned to each task as required.
- Inform the Development Entity of all near-misses and injuries to workers.
- Report to Development Entity any unsafe conditions that come to their attention.

Owners and Visitors

-
- Check in with the jobsite supervisor so personal protective equipment may be provided, such as hard hats, eye protection, and traffic vests if necessary.
- Inform Project Superintendent of the site (Superintendent) before entering a construction site.
- Abide by all Development Entity safety rules.

Multi-Employer Jobsites

- Ensure adherence to all safety regulations and procedures for this group is the responsibility of onsite supervisors.
- Supervisors must notify in writing the other contractors affected by any hazards created by the Development Entity's construction activities.
- Ensure that when a hazardous area is created, proper protection and posting is required.

Section 3 – Competent Persons

Prior to the start of construction, each contractor including all tiered subcontractors will designate Competent Persons per the applicable OSHA regulation (Competent Persons) for the various activities performed by that contractor on the project that require such Competent Person. These shall be submitted as part of the contractor's SSHSSP. The contractor will make the designation in writing submitted to the Development Entity Safety Team or by use of an equivalent form of documentation.

Contractors are responsible for ensuring that the forms are current and that any personnel changes are reflected in changes made to those forms. Each contractor is responsible to ensure that individuals identified as Competent Persons have the requisite knowledge, experiences, training and authority to fulfill their duties as Competent Persons including, if necessary, the authority to stop work and implement corrective action when a particular activity or condition under their control is being performed in a hazardous manner.

Section 4 – Safety Orientation, Training and Communications

Instituting and reinforcing a safety program requires a carefully planned and communicated program of safety education, training, and informational activities. These activities help ensure that all employees know their obligations and responsibilities to the overall safety effort.

Safety Orientation

Orientation to the project site is the first line of defense in identifying and addressing the hazards that can be found on the project and those mitigation measures to be implemented to control these known project hazards. Every individual assigned to the project will be required to complete a site orientation prior to commencing work on the project. Each attendee will complete a knowledge check and will receive a hard hat decal as proof of completion. At a minimum the orientation process will review:

- Stop work authority
- Drug and alcohol/substance abuse
- Safety planning/Daily Task Plans
- Personal protective equipment
- Head protection
- Eye and face protection
- Hearing protection
- Hand protection
- Foot protection
- Traffic vests/jackets/shirts
- General clothing
- Additional PPE
- Housekeeping
- Fire Extinguishers
- Handheld tools
- Chemicals on site
- Heavy equipment
- Cranes and rigging
- Electric/power tools and equipment
- Lock out/tag out
- Fall protection
- Scaffolding
- Ladders/stairs/ramps
- Mobile elevating work platforms
- Excavations
- Confined spaces
- Working over or adjacent to water
- Welding and cutting
- Demolition operations
- Lead/silica/respiratory hazards

- Traffic control
- Vehicle and driver safety
- Accident and incident reporting
- Employee safety responsibilities
- Injury management
- Reporting of unsafe acts or conditions
- Disciplinary action
- Emergency procedures

Safety Training

In addition to the new employee orientation, a dedicated team or outside agency will provide additional training, as necessary, over the course of the project to address specific jobsite hazards with all affected employees including but not limited to:

- OSHA 30-hour and OSHA 10-hour for Construction
- Fall Protection
- Mobile Elevating Work Platforms
- Confined Spaces
- Excavations and Safe Digging Operations
- Underground and Overhead Utilities
- Blind Spot Awareness and Equipment Operations
- Respirable Crystalline Silica Awareness
- Line of Fire Hazard Awareness
- Lead Awareness
- Fire Extinguisher Use
- Respiratory Protection
- Hazard Communication
- Emergency Evacuation
- Material Handling and Rigging
- Qualified Signalperson
- Crane Setup and Hazard Awareness
- Scaffolding
- Temporary Traffic Control (Flagging)
- Temporary Traffic Control Setup and Maintenance
- First Aid, Cardiopulmonary Resuscitation (CPR), and Automated External Defibrillator (AED)
- Defensive Driving
- Federal Railroad Administration- Roadway Worker Protection
- Life Saving Skiff / Man Overboard

Training needs will be determined during project start up and will be reevaluated as the work progresses to ensure the training plan remains effective in educating personnel and preventing incidents resulting from inadequate training.

A training matrix will be developed to act as a guide for supervisor training at the Development Entity. Each field supervisor within the organization is subject to specific training requirements dependent upon

the type of work they perform and oversee. “Supervisors in training” are also provided with training responsibilities under this plan.

Competence of training information/material shall be verified through written or oral exams, observation of practical application, or other means as needed to gauge knowledge of the subject matter depending on the training source.

Retraining shall be completed as needed to maintain competence. Employees who do not meet the minimum requirements for competence on a particular subject matter shall not perform work covered by the subject matter for which they did not meet the requirements for competence.

Safety Communications

There are additional safety program elements that the Development Entity uses to enhance the safety of our projects and personnel. The following information represents the major elements of the comprehensive communication/training program:

-
- General project meetings
- Project bulletin boards
- Safety newsletters and bulletins
- Safety signage and posters
- Lessons Learned and incident sharing
- Safe Operating Procedures (SOPs)

Section 5 – Hazard Identification and Risk Assessment

Effectively identifying hazards and the risks associated with a task allows project teams to preplan the safe completion of their tasks. There are any many tools that contractors use to perform these functions. The minimum requirements for hazard identification and risk assessment for this project are a Job Safety Analysis, Daily Task Plan (Safety) Meetings, and Weekly Site Safety Meetings.

Job Safety Analysis (JSA)

A JSA or similar form will be required on all work activities and the hazards associates with those activities and will be included in the contractor's Site-Specific Health, Safety & Security Plan. A JSA is a procedure which integrates accepted health and safety principles and practices into a particular operation.

In a JSA, each basic step of the overall task is examined to identify potential hazards, impacts and to determine the safest way to complete the task. Below are some basic elements to consider when preparing a JSA:

- Selecting the activity to be analyzed
- Breaking the activity down into a sequence of steps
- Identifying potential hazards, impacts and equipment used for the work activity
- List training requirements for personnel performing the activity
- Determining preventative measures to overcome these hazards

JSA's are intended to be a starting point and must be reviewed (and modified as appropriate) by the entire work team prior to initially conducting the activity. JSA's are living documents and shall be reviewed and updated as necessary to address changes in site conditions, operations, equipment and as hazards originally not anticipated for the activity arise.

JSA's shall be required when through planning, it is determined that the process, equipment, or procedure indicates potential for serious injury and/or property damage. The contractor shall also prepare a JSA upon request by the Development Entity or their representative. The following hazardous work operations are some examples of some but not all the cases requiring a JSA:

- Excavation/trenching/borings
- Crane critical lifts
- Crane assembly/disassembly
- Crane supported work platforms
- Overhead lifting and rigging operations
- Asbestos/Lead abatement
- Concrete work (forming, placement, form stripping)
- Demolition
- Utility repair or installations
- Abrasive/sand/hydro blasting
- Potential injury from burns, both chemical and thermal
- Respirator use

- Entry into confined spaces
- Work in or along streets and highways
- Lock out/tag out
- Operations involving fall exposures 6-feet or greater
- Structural steel or other beam erection
- Handling of hazardous materials
- Painting/coating
- Suspended scaffolds
- Scaffold erection or dismantlement
- Electrical work (installation and live work)
- Drilling and pile driving

To complete a detailed JSA form, the responsible supervisor/competent person obtains a JSA form and identifies individuals who will be performing the activity. With the assistance of those employees performing the activity, the responsible supervisor/competent person should go through the 5 stages of planning or basic elements listed above.

The responsible supervisor must review all JSA's with all project personnel who will be performing the activity in a safety briefing/meeting, prior to activity performance.

Any new crew members shall be briefed of the JSA prior to performing the activity. The completed JSA will serve as a teaching aid for initial job training. The JSA is to be used as a standard for health and safety observations and it will assist in completing comprehensive accident investigations. An example JSA form can be found in Appendix A.

Safety Meetings

Daily Task Plans (DTPs) are instituted on all projects to help identify daily task hazards, plan safe working practices, and determine protective equipment needed to perform daily job tasks. These meetings are reiterated throughout the day and updated when conditions or job task change. They are often crew specific and are mandatory for all personnel. An example DTP form can be found in Appendix A.

A key component to DTPs is open-ended engagement questions to encourage interaction between the responsible supervisor and crew. Questions such as those listed below should be included in all DTP meetings:

- How will we access the work area?
- How will we maintain housekeeping?
- How could we be injured?
- What equipment/property/3rd party claims are possible?
- How will we prevent these incidents?
- Is there any line of fire concerns?
- Are there any dropped object concerns?
- What do we do in an emergency?
- Is there anything that was missed during this meeting?
- Do we need to correct anything from our last work shift that could affect this shift?

Weekly Safety Meetings are held prior to commencement of the first shift of the work week to address the hazards and safe working practices/procedures pertinent to that week's job tasks. These meetings are most often jobsite wide and are mandatory for all employees to attend. Prior to the conclusion of each safety meeting, employees and subcontractors can ask questions, make comments, or discuss any concerns that arose during the previous week's work. Some work fronts may schedule these broader meetings daily to aid in coordination between crews and subcontractors.

Section 6 – Safety Assessments and Observations

Assessments of work areas and audits of safety programs and procedures are important tools used to identify hazards and unsafe acts prior to these conditions resulting in injuries or other losses. Development Entity will utilize a smart device assessment program (iAuditor) to identify and track identified hazards, unsafe acts, and corrective actions taken at all project locations.

The Development Entity's Health and Safety Assessment/Audit Program will evaluate, at a minimum, the following:

- Processes or steps used to complete tasks safely.
- Present safety policies and procedures for each performed task.
- Position and actions of personnel, including their use of personal protective equipment.
- Safety and use of tools and other equipment needed to complete the task.
- Layout (physical and ergonomic considerations) and housekeeping.

During the assessment/audit process the Development Entity will:

- Verify that the safe work rules and procedures that have been established are followed.
- Verify and examine the effectiveness and content of safety training and meeting programs.
- Examine our safety program to reveal weaknesses in it.
- Correct unsafe acts or condition when they are observed or discovered.
- Examine the effectiveness and ability of site supervision to manage safety in their assigned work areas.
- Motivate craft personnel and site supervision to work safely by giving them continual feedback on their individual and collective safety performance.
- Increase safety awareness among all site personnel.

Daily Jobsite Safety Assessment

Daily health and safety compliance will be monitored by project supervision and the site safety coordinator with a Daily Jobsite Safety Assessment. Items identified through the daily assessment will be reviewed and corrected by the supervisor overseeing the operation or the site safety coordinator.

Monthly Jobsite Safety Assessment

As a minimum, each project is thoroughly assessed, on a monthly basis, for health and safety compliance by the safety team with a Monthly Jobsite Safety Assessment.
These extremely thorough assessments are completed utilizing the iAuditor app on a smart device and are based on nearly 200 areas of emphasis tailored to the specific operations which will be performed on the Project. Items identified through the monthly assessment are immediately mitigated when possible or assigned to a responsible supervisor for timely correction. This monthly assessment covers the following assessment areas, at a minimum:

- Posters and Recordkeeping
- Housekeeping and Sanitation

- Fire Protection
- First Aid / CPR
- Personal Protective Equipment
- Tools and Portable Equipment
- Electrical and Utilities
- Access and Walking / Working Surfaces
- Fall Protection
- Traffic Control
- Welding and Cutting
- Heavy Equipment and Vehicles
- Trenches and Excavations
- Crane Operations
- Material Handling and Rigging
- Marine Activities and Working Over or Near Water
- Pile Driving and Drilling
- Silica and Concrete Work
- Confined Space Work
- Lead Work
- Scaffolding and Mobile Elevating Work Platforms
- Subcontractors
- Positive Safety Observations
- Items Removed from Service
- Items Issued by Assessor
- List of any disciplinary action taken
- Catalogue of pictures taken

Once completed, the assessment is reviewed with and signed by the Project Superintendents, Design Build Project Manager, and Site Safety Coordinator. Once signed the assessment will be distributed electronically to the project team and responsible project leadership members, as necessary.

Project Supervision Safety Observation

At a minimum, Design Build Project Manager and Project Superintendents will observe the project's safety performance and actively engage with site personnel monthly. The observation consists of a hazard assessment checklist and a section of open-ended employee engagement questions which allows the observer to engage with both a long-term employee and a short service employee. The areas assessed include:

- Task preplanning and review of the Daily Task Plan document
- Stretch and Flex completion
- Housekeeping
- PPE usage
- Access and Slip / Trip Concerns
- Pinch Point / Line of Fire Concerns
- Trenching and Excavating

- Fall Protection
- Cranes and Rigging
- Overhead and Underground Utilities
- Silica Controls
- Subcontractor Safety

Employee engagement questions discuss:

- Contents of the Daily Task Plan
- Risk taking
- Perception of site safety
- Experience with past employer's safety
- Safety expectations
- Comments / concerns / suggestions
- Recent safety training
- Recommended improvements or changes

Project Leadership Safety Observations

At a minimum, Project Leadership is required to complete a safety observation on a project on a quarterly basis. As with the Project Supervision Safety Observation, this consists of a hazard assessment checklist and a section of open-ended employee engagement questions which allows Project Leadership to engage with both a long term and short service employee.

Section 7 – Substance Abuse

The Project is committed to a Health and Safety System that prevents and controls situations that may cause injury, ill health to its staff, contractors or the public, or cause damage to property resulting from workplace accidents. To minimize the risk of unsafe and unsatisfactory performance due to the use of alcohol or other drugs, all project personnel are expected to comply with the following requirements, and to report fit for work and remain so throughout their workday or shift. The following requirements have been set for any activity undertaken while on project business, premises, or worksites or while operating a project vehicle or equipment.

All employees are responsible for their own and others' health and safety performance and are expected to take appropriate action where they believe there is a safety risk or potential violation. Any violation of this Policy will be considered a fundamental breach of the employment contract and employees will be subject to disciplinary action up to and including termination. Failure of supervisors to meet their additional responsibilities under this Policy will be grounds for disciplinary action.

All contractors will be advised of the applicable provisions of the Project Substance Abuse Policy and will be expected to enforce these requirements for their employees, subcontractors, and agents. Any contravention will be considered a breach of their contract.

Alcohol and Drugs - the following are prohibited:

- The use, possession, distribution, offering or sale of beverage alcohol or drugs or other mood-altering substances, or drug paraphernalia.
- Reporting to work or being at work while under the influence of alcohol, drugs, or other mood-altering substances. This includes prescription medications which are used or obtained illegally.
- A positive alcohol test result as determined through the testing protocol. Individuals covered by this Policy will not:
    - Report for duty under the influence of alcohol
    - Have an alcohol test result of .04 Blood Alcohol Content ("BAC") or greater prior to the start of their work or post incident.
    - Use alcohol within the first eight hours after an incident until tested or advised a test is not required.
    - Be negligent in the consumption of alcohol in the 24 hours preceding their shift.
    - Use of alcohol during meals and breaks during their shift.
    - Consume or possess alcohol in the workplace.

Substance Abuse Testing
Project personnel will be subject to testing in the following circumstances:

- Pre-employment Testing
- Post-Accident/Incident Testing
- Return to Service Testing
- Unannounced Random Project Testing
- Reasonable Cause Testing
- Any additional testing required by the client or contract

Substances tested for:

- Alcohol
- Marijuana, Cocaine, Amphetamines, Methamphetamines, Barbiturates, Benzodiazepines, MDMA/Ecstasy, Opiates/Morphine, Oxycodone, Phencyclidine, Propoxyphene, and Methadone.

Section 8 – Emergency Response

Dealing effectively with any type of emergency situation requires prompt notification, coordinated mobilization, quick implementation of specific duties and assignments, and the optimum use of jobsite and community emergency response resources. A project emergency response plan will be developed to provide core guidance on actions necessary for an emergency situation that could cause hazard to life or property from accidental or natural causes. Whenever an emergency occurs on site the project's Emergency Management and Disaster Recovery Plan (EMDRP) shall be implemented and adhered to.

The EMDRP provides an outline of actions that must be taken for a crisis event, emergency, incident or similar event with the potential to disrupt or damage the project. The plan defines the actions necessary and the responsibility assigned for such actions.

A crisis is any event that has created and/or may still pose an immediate threat to life, property, business as usual or an event that attracts media attention. Such situations may include, but are not limited to:

- Incidents involving serious bodily harm and/or deaths, or physical damages
- Bomb threats, terrorist attacks
- Collapse of a structure/building or portion of a structure/building or tunnel.
- Earthquake, hurricane, tornado, flood
- Fire/explosion
- Equipment failure such as the collapse of a crane
- Workplace violence
- Environmental exposures

All project personnel must be familiar with the specifics of the EMDRP and the responsibilities of each member to minimize/avoid loss exposures. The extent of actions required will be dictated by the severity of the event. Timely and sound judgment is essential to the success of any crisis management plan. It is critical that information about the event be quickly communicated up the chain of management for their involvement in further actions and maintenance of relationships with clients, communities, and all involved parties.

The key to success in loss avoidance during and after an unanticipated event rests with the team's knowledge and preparedness for such an event. In addition to a pre-event checklist, the plan provides immediate action responses, specific information regarding catastrophic incidents, fatalities, fire, bomb threats, workplace violence and severe weather. Action checklists and sample emergency telephone lists are also included.

The Development Entity is committed to the development of a culture that promotes an "Injury Free Environment" and provides the safest workplace possible for our employees, contractors, clients and the communities in which we work. Therefore, it is our hope that these comprehensive crisis management plans never need to be utilized at any site.

Each contractor will be required to provide a person on site to coordinate emergency response efforts (Designated Persons) either within their project locations or as a joint effort on the Project as a whole. Each employee on the jobsite is responsible for notifying the Designated Person immediately of the nature of the emergency, evacuating the work area (if in their judgment an immediate danger to life / health exists) and for securing access to the area.

the Development Entity's Designated Person onsite will ensure that only necessary emergency related vehicles and personnel are allowed access to the incident site.

Section 9 – Incident Reporting and Investigation

Timely reporting of incidents is a critical component in claims management, minimizing project impact and determining corrective action. Accident/Incident investigation is a must for safety and loss control. Without a complete report of accidents/incidents the project investigation staff will not be able to identify the root cause. Without identifying the root cause, the conditions may persist.

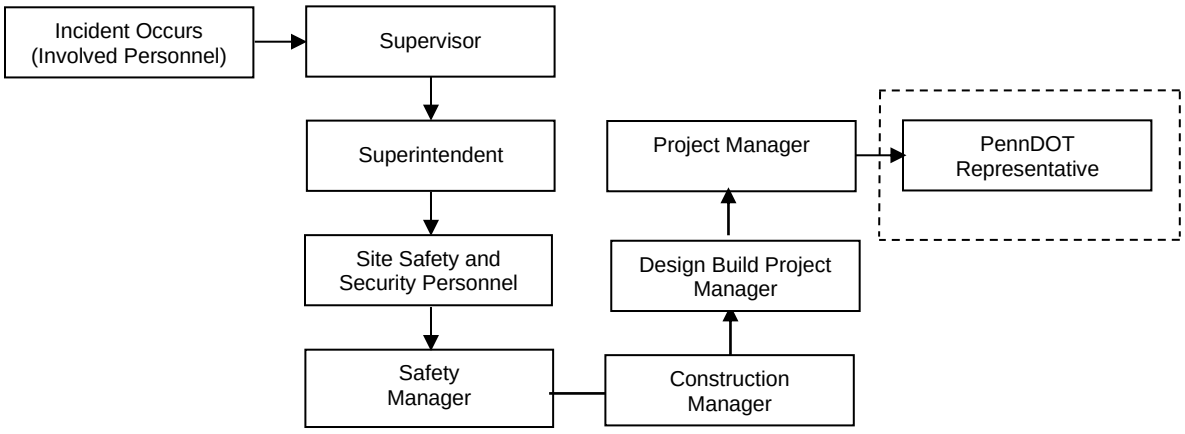
All contractors and subcontractors are responsible for immediately reporting all injuries, third party incidents, or other significant incidents to a Development Entity representative.

An Incident Investigation Report including root cause analysis and lessons learned will be completed by the responsible contractor in a timely manner; following any recordable injury, reportable spill or significant property damage/equipment damage, or near misses which have serious injury potential.

Incident investigation will:

- Provide a specific description of the incident, including any underlying deficiencies, root causes and other factors that may have caused or contributed to the incident.
- Identify the need for corrective action and preventative action.
- Identify opportunities for continual improvement.
- Communicate preventative actions and lessons learned.

The Project Manager will notify PennDOT in accordance with the communication protocol established for the Project of all incidents arising out of or in conjunction with the performance of the Project work, regardless of the location of the incident. The following reporting chart will be followed for all incidents:



A post incident review meeting may be required by the Development Entity for any severity of incident. This meeting will be used to explain the nature of the accident/injury, results of the related investigation and actions necessary and/or taken to prevent reoccurrence.

Section 10 – Injury Management and Return to Work Program

A modified, transitional, or light-duty program provides meaningful work activity for employees who are temporarily unable to perform all, or portions, of their regular work assignments or duties (Return to Work Program). This policy applies to employees suffering from work-related injury or illness.

The goal of this program is to allow valued employees to return to productive, regular work as quickly as possible. By providing temporary transitional or modified work activity, injured and recovering employees remain an active and vital part of the project. All contractors are required to participate in the project's Return to Work Program.

If an injury occurs, treatment locations have been identified for personnel to receive care. Pertinent phone number and directions to these locations are found in Appendix D.

Section 11 – Emergency Actions

Call # **911** and provide as much information as you can (location of the injury, nature of injury, body part, conscious / unconscious, etc.).

Let Emergency Medical Services (EMS) know where the Emergency Vehicle Entrance is located and send the Development Entity employee to meet them.

Do not move the individual (spinal injury, etc.), unless the employee is in imminent danger.

Keep the injured person calm until EMS arrives.

Clear a path for the EMS and emergency personnel.

Secure the work area where the injured employee is located.

Section 12 – Evacuation Procedures

Should an evacuation or partial evacuation be necessary, personnel will be directed to the Designated Personnel Staging Area as established during the JSA and Daily Safety Meeting in coordination with the overall site plan. All personnel must remain at the staging area. A supervisor will do a roll call to account for any missing employee(s).

Personnel are instructed to “Remain, do not leave, and wait for instructions”. If any employee is considered missing, a rescue team will be assembled to look for any personnel unaccounted for.

Personnel must not re-enter the work area until specific instructions and authorization are received from management.

Section 13 – Emergency Spills

If a spill occurs the Comprehensive Environmental Protection Plan (CEEP) provisions shall apply, at a minimum the following will occur:

- Clear all personnel from the area with the exception of those needed to deal with the spill.
- Determine the size and source of the spill; also consult the Safety Data Sheet (SDS) to determine the seriousness of the spill and the necessary precautions that need to be taken.
- There are certain Hazardous Material spills that require immediate notification of federal, state, and local authorities. Depending on the severity of the spill and the hazardous materials involved, notify the local fire department(s) or a specific governmental agency.
- Control or stop the spill whenever possible. In addition, to the SDSs, the chemical inventory list will be posted on the jobsite. All fuel tanks, containers, and chemicals are required to have labels on them to denote what chemical is in each container.
- Use spill kits containing the necessary equipment to safely contain and collect spilled materials. These are located within the jobsite tool trailers, on all floating plants and in all other areas as determined by the CEEP.

Spill notification:

Any size discharge that affects or threatens to affect navigable waters or adjoining shorelines must be reported immediately to the Site Safety Coordinator.

The person reporting the discharge must provide the following information:

- Name, location, organization, and telephone number
- Name and address of the party responsible for the incident
- Date and time of the incident
- Source and cause of the release or discharge
- Types and quantities of material(s) released or discharged
- Danger or threat posed by the release or discharge
- Number and types of injuries (if any)
- Media affected (i.e., water, land, air)
- Weather conditions at the incident location
- Any other information that may help emergency personnel.

Section 14 – Fire Procedures

Site personnel will notify the local fire department (Call 911) immediately.

Any person who discovers a fire should quickly and carefully remove anyone who is injured or in immediate danger and must be careful not to risk personal injury as it is most important that he or she remain conscious and is able to report the fire.

The person reporting the fire shall provide the following information to the Fire Department: what is on fire; the specific location of the fire; and the name, telephone number, and location of the person reporting the fire.

Extinguishing the fire should be attempted only if there is portable firefighting equipment available and the fire is in its incipient that is, initial or beginning, state and can be safely controlled or extinguished with this equipment. If the size of the fire presents an immediate danger to life or health, evacuation should be the primary objective, not firefighting.

When evacuation is deemed necessary, there should be no hesitation in requiring personnel to immediately vacate the area. All personnel must report to the designated staging area and a roll call will take place to assure that all employees are present. Once out of the immediate danger area, no one will be allowed to re-enter until the area is deemed safe.

Section 15 – Security Plan

Security risks vary according to the construction type and site location and can originate not only from the external population but also from the Project's own workforce. An initial site security assessment must be completed for each element of the project and should be periodically reviewed and revised to reflect site changes. The following must be considered as major factors in determining security needs:

- Project location - Exposures arising from neighboring properties and specific to urban or rural locations.
- Project type - Nature of the Project and value of equipment and material utilized.
- Location of specific exposures - Does the site location influence arson or intrusion? What is the socioeconomic profile of the locality, including crime rate and nature of crimes?
  - Low level risk- Better economic and social condition
  - Medium level risk- Deteriorating social, economic conditions or crime level increase
  - High level risk- Recent event in the vicinity or socio-economic unrest
- Project public support - Is the project a benefit or an inconvenience to the surrounding public in the area? Does the project enjoy public support or is it perceived as a detriment and a likely target for vandalism, theft or trespass?

Once the risk level and impact to the site is assessed, mitigation measures can be devised based on the common security related threats below:

- Theft of equipment and/or tools, fuel, or material from the site or off-site project storage areas
- Vandalism
- Arson
- Breaches of security into existing buildings/trailers/offices or partially completed project areas
- Robbery of or attacks on construction workers
- Trespassers: both accidental and intentional
- Cyber-attack or disabling of site security systems
- Protesters (either related to site activity or simply for publicity)

The primary designs for a site security system include video, audio, lighting, physical barriers, and a form of response mechanism.

Prior to commencing work at each new element of work the following site security protocols will be implemented:

- Liaise with local law enforcement agencies to assess the risks
- Assign supervisory security responsibilities
- Secure the site perimeter with appropriate fencing (as per risk assessment) as a first line of defense
- Illuminate the job site perimeter fence, high value storage areas, and building/trailer/office entrances
- Identify key assets and property onsite and then produce an inventory to track them regularly. Consider using asset tagging and tracking systems for high value items
- Where practical, secure all available high value materials and secure/immobilize vehicles and equipment. Consider installing hidden ignition disable switches to prevent theft.
- Control site access by limiting the access points and monitor those entry points.
- Restrict site entry only to authorized personnel

- Provide guards when necessary (as per risk assessment)
- Limit onsite vehicle access and provide parking areas off site to employees and visitors
- Include employees and subcontractors in this plan and ask them to take personal responsibility for a secure site and engage them to immediately report any incident of theft or vandalism
- Install a video monitoring system with advanced capabilities designed to detect and alert in the event of intrusion, vandalism, theft, and fire
- Install signage indicating if guards or video surveillance are in use on the site
- Periodically review the security plan with special attention to boundary changes and high-risk areas as the Project progresses. Be aware of how changes to the Project scope affect security

Additional security precautions

- General Public
  - If at any time a member of the public enters the construction site, intentionally or accidentally, please ask the person(s) to leave the site to avoid unnecessary injury to themselves
  - If necessary, escort the individual(s) off the site and instruct them that the area is closed and that they must use an alternative route
  - Assess how the intrusion occurred and make any necessary changes
  - If precautions are taken prior to project commencement, intrusion by the general public should not occur
- Theft
  - Keep all tools in the conex boxes, tool trailers and pickup trucks when not in use and at the end of the work shift to avoid theft
  - Make sure that all tools and mobile equipment (air compressors, welders, light plants, arrow boards, fuel tanks, job trucks, etc.) are locked with the appropriate security devices and/or tires removed / tongues removed
  - Conex boxes and tool trailer must be properly secured with two different locking devices
  - Office trailers should have cages on all windows and two different locking devices. An alarm system may also be necessary on office trailers depending on contents and location
- Vandalism
  - At the end of the shift, lock all machines and place window covers on them if available, remove all used paint cans from the jobsite, place fire extinguisher in conex / tool trailer, lock all fuel tanks and gang boxes, and park equipment away from the general public and highway to avoid vandalism
- Cyber security / Protection of electronic documents and records
  - Information regarding the project's cyber security protocols and procedures for protection of electronic documents and records will be addressed in the Document and Data Management Plan
  - The Development Entity's Electronic Document Management System (EDMS) and document control will be centralized at the Project office, providing for cloud access to the individual Bridge construction sites. This feature will ensure consistency in document control, and robust data protection protocols across the entirety of the Project. All submissions to PennDOT will be submitted through and tracked using e-Builder, which will

act as a duplicate record depository. Individual access to the EDMS will be strictly managed in accordance with the Documents and Data Management Plan

Section 16 – First Aid Measures

Each Project location will have a designated first aid station equipped with all of the first aid supplies necessary for quick deployment in the event of a workplace illness or injury.

Portable first aid kits will also be available in all Project vehicles and tool trailers on the jobsite for treatment of minor injuries.

Personnel trained in first aid, CPR, and AED will be available on the jobsite to render timely treatment of injured employees. There will be a minimum of two trained individuals on each shift or crew depending on site size. All contractors on site are responsible for ensuring the necessary amount of trained personnel are available to respond if an illness or injury occurs during the completion of their work tasks.

Section 17 – Media Procedures

If at any time the media is on the project, personnel are not to comment or confront any members of the media. Personnel must refer members of the media to the Development Entity's Public Information Coordinator on the project. The Public Information and Communications Plan will be utilized as the guide for all public relations and media interactions.

Section 18– Adherence to Safety Rules and Disciplinary Action

Failure to comply with federal, state or project specific safety requirements will result in immediate enforcement. The Development Entity and its management team is responsible for the enforcement of these requirements, and consequently any contractors to the Development Entity must enforce these requirements. Assessments of the work area shall be made daily to ensure compliance.

Safety violations will generally be handled using progressive discipline. The first violation will be a verbal warning given by the supervisor or site safety personnel. The second violation of the same safety rule will result in a written warning and possibly a suspension based on the violations severity. Any employee (including contractors) receiving a written warning with a suspension will be sent home for the remainder of the day, plus at least one additional day, unpaid. The supervisor or safety personnel will have the employee sign a written violation report. If the employee refuses to sign the violation report, it shall be noted on the employee's record. The third violation of the same safety rule will result in termination of employment or removal from the Project. However, at any time if the violation shows a blatant disregard for safety the progressive steps may be bypassed directly to a written warning plus suspension or directly to termination of employment or removal from the project, even on the first offense.

Section 19 – Public Protection

Operations performed at construction projects are inherently dangerous and project controls and training can lessen and eliminate those exposures for project personnel. However, the general public can also be exposed to site hazards. The best way to keep people who are near or passing by a construction site safe is to physically keep them out of the site. Setting up boundaries using fencing is the primary way to prevent unauthorized access to the Project site. Signs must be posted on these boundaries to warn the public not to enter the construction area. These measures can keep pedestrians from getting too close to the work activities and they can also deter trespassers.

The major hazards posed to the public from project operations are:

- Openings and holes
- Falling and flying objects
- Vehicles, equipment and traffic
- Dangerous materials
- Slip, trip and fall hazards
- Noise, Vibration, Dust

The following controls for the major hazards listed above shall be implemented, at a minimum, to protect the public during the performance of Project activities:

- All holes within the worksite shall be fenced in/guarded or covered. Covers shall meet OSHA requirements when installed
- No work shall be performed over or adjacent to live traffic, sidewalks, buildings, structures, parks, parking lots, or other occupied areas without appropriate shielding, nets, or other means to prevent objects from falling below. When working aloft all tools and materials shall be tethered or the area below shall be barricaded and free of personnel. Be aware of potential flying objects when chipping or hammering and during high wind events
- Manage the travel of all vehicles, equipment, and traffic in and around the project. Utilize flaggers/spotters when working near site personnel or in an area that could impact the public
- Keep in mind that signs or barricades can block the vision or motorists or pedestrians
- Ensure all traffic signage is appropriately installed and maintained during the project. Locate signs away from sidewalks when possible and maintain required paths
- Don’t store construction supplies or materials within public access areas without appropriate barricading and signage
- Maintain all sidewalks and travel paths or provide alternative safe access. Ensure surfaces are slip resistant and free from trip hazards. When steel plates are used in travel paths ensure they are secured and edges are painted with a high visibility color
- Provide noise barriers around all equipment when feasible. Plan noisy tasks during daylight hours and use alternative methods when possible, to reduce the level of noise during nights and weekends
- Complete preconstruction surveys of all adjacent structures and facilities prior to performing tasks that can create hazardous vibrations. Install vibration monitoring equipment near all structures and facilities during vibration creating tasks such as pile driving and concrete demolition

- Utilize water trucks and other wet methods to control the travel of fugitive dust from the project. Sweep streets and sidewalks regularly to reduce the buildup and presence of dust.

Section 20 – Project Safety Standards

Personal Protective Equipment

All contractors working on the Project shall be required to be compliant with OSHA 29 CFR 1926, Subpart E- Personal Protective and Life Saving Equipment, American National Standards Institute (ANSI), and product Safety Data Sheets recommendations by the manufacturer, in addition to the following procedures and requirements:

General construction clothing:

- Pants: Full length trousers without excessive length. Shorts and sweatpants are prohibited.
- Shirts: Must cover the entire midsection and sleeves shall be at least 4 inches long measured from the shoulder seam. Sleeveless shirts, tank tops, net/mesh shirts, halter tops or shirts with derogatory language or offensive graphics are prohibited.

Eye protection:

- All safety glasses shall comply with ANSI Z87.1 Standards. ANSI Z87.1 should be stamped on the lens or the arm of the glasses for identification purposes.
- Personnel that wear prescription eyeglasses shall wear ANSI Z87.1 approved prescription safety eyeglasses with side shields or ANZI Z87.1 Over-the-Glasses protection.
- Dark lens safety glasses shall not be worn inside of buildings, enclosed areas, at nighttime or in other low light conditions. Clear safety glasses shall be worn.
- Face shields and safety glasses (both) shall be worn to provide face and eye protection from flying debris/particles, splashes or mist. In addition, face shields and safety glasses shall be worn when using abrasive wheels, chop saws, portable grinders, chipping concrete or stone, pressure washers, or using powder actuated tools.
- Chemical splash proof goggles and a face shield shall be worn when handling or dispensing liquid chemicals. Refer to chemical product manufacturer SDS's for specific PPE requirements.
- When using welding hood employee(s) shall use filter lenses that have a shade number appropriate for the work being performed to protect from optical radiation.

Head protection:

- Hardhats shall comply with ANSI Z89.1 standard. ANZI Z89.2 type hardhats must be worn when exposed to 600 Volts or greater.
- Hardhats shall be worn per manufacturer's specifications.
- Western style hardhats, aluminum hardhats, and bump caps are prohibited on construction projects. Only manufacturer approved hardhat liners or other head coverings will be approved beneath hardhats.

Hand protection:

- Appropriate gloves are required during operations where the hands are exposed to cuts, burns, abrasions, crushing hazards, extreme cold, etc. as determined by the Contractor's JSA or other risk assessment tool.

Arm protection:

- Appropriate arm protection is required during operations where the arms are exposed to cut hazards.
- Examples of these activities are working with sheet metal or deck pans, working in tight areas with exposed ends of reinforcing steel or tie wire, or working with any other cut off metal components.

Foot protection:

- All personnel who are within an active construction area shall wear leather work boots with a minimum of six-inch ankle support. Boots must be in good condition, puncture resistant, and not show excessive wear in the heal and sole.
- Safety toed boots are required where there is an exposure to a crush injury to the toes and metatarsal protection is required in conjunction with safety toed boots where there is a crush exposure to the top of the foot as determined by Contractor's JSA or other risk assessment tool.
- Rubber or vinyl boots are required when working in wet concrete, wastewater or sewage, poisonous plants or when exposed to hazardous chemicals in the water or soil.

Hearing protection:

- Appropriate hearing protection shall be used in designated areas as determined by the contractor's JSA or other risk assessment tool.
- Approved protective devices, muffs, plugs, or both shall be worn by all personnel who are exposed to noise levels above those indicated in the table below:

Hours / Day	Sound Level dBA
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
½	110
¼ or less	115

High-visibility clothing:

- ANSI Class 2 high-visibility vest, shirt, or jacket are required to be worn in all construction areas.
- Flaggers and personnel installing and maintaining traffic control devices are required to wear ANSI Class 3 high-visibility apparel.

Respiratory protection:

- Each contractor shall have a written respiratory protection program if their work requires the use of a respirator. The written program shall include selection of respirators, medical evaluation and monitoring, fit testing, respirator use, care and maintenance, training and record keeping.

- Respiratory protection shall be used in accordance with safety data sheets and manufacturer's recommendations.

Additional PPE

- Items such as fire retardant (FR) clothing, chain saw chaps, leather or chemical aprons, personal floatation devices, etc. shall be required as determined by the Contractor's JSA or other risk assessment tool.

Fall Protection

The Development Entity's fall protection program will be implemented on this jobsite, where employees are required to work near or be exposed to, fall hazards, that are six feet or greater.

The following safety precautions will be utilized to enhance employee safety:

- Each contractor must have a designated competent person on the Project who will be responsible for implementing their respective fall protection program.
- The competent person will be responsible for evaluating the daily work activities to ensure that the proper fall protection systems and equipment are in place and being used properly.
- Prior to performing any operation that will create, or has, a fall hazard, safety procedures shall be implemented to provide protection during all stages of work in these areas.
- Any time personnel are working within six feet of a fall six feet or greater they will be required to wear a full body harness equipped with a double lanyard, or retractable lifeline and be 100% tied off or 100% protected by a guardrail system.

Additional fall protection systems and practices implemented for this project:

Guardrail systems:

All guardrails shall meet the following criteria:

- Top rails height – 42 inches +/- 3 inches
- Mid rails 21 inches high
- Intermediate member openings – no greater than 19 inches
- Top rails withstand without failure, a 200 pound downward/outward force
- Mid rails withstand 150 pounds downward/outward force
- Toe board minimum 3 ½ inches tall

Portable manufactured guardrail systems may also be used on this project. All components must be used and erected as per the manufacturer's requirements. Mixing and matching of different manufacturer's systems and components shall not be allowed.

Personal fall arrest system:

- A competent person must install all horizontal lifelines. May be utilized as a tie off point when guardrails cannot be installed or during installation of guardrails.
- Full body harnesses and lanyards will be inspected prior to each use. If deficiencies are found the harness must be immediately removed from service.
- All non-engineered anchorage points must be 5,000 pounds per anchored employee.

- Self-Retracting Lifelines (SRLs) will be utilized to perform specific activities and need to be inspected prior to use. It is important to remember that SRLs can create swing hazards when used improperly. SRLs being used for a leading-edge application must be certified for that use. Metal cable lifelines shall not be used when there is a potential for contact with electrical current. SRLs should be anchored overhead to avoid swing falls.

Cover system:

- Each gap or void 2” or more in its least dimension shall be protected
- Vehicular traffic – cover able to support two times the maximum axle load of the largest vehicle.
- Foot traffic – cover able to support two times the weight of expected load.
- Secured to prevent displacement.
- Marked “hole / cover” or color-coded.

Protection of Protruding Reinforcing Steel:

- Employees working at grade or at the same surface as exposed protruding reinforcing steel or other similar projections shall be protected against the hazard of impalement by guarding all exposed ends that extend up to 6 feet above grade or other work surface, with protective covers, or troughs.
- Employees working above grade and exposed to protruding reinforcing steel or similar projection shall be protected against impalement. Protection shall be provided by:
  - Approved guardrail systems,
  - Approved fall protection systems,
  - Protective covers, or
  - Protective troughs.

Protective covers when used shall:

- Be made of wood, plastic, or other material of equal or greater strength,
- Have a minimum 4-inch by 4-inch square surface area, or if round, a minimum diameter of 4 ½ inches.
- Be engineered and/or purchased from a manufacturer that meets OSHA requirements.

***** Additional fall protection systems may be used in different areas of the project. Each system will be engineered by a third party and implemented and enforced by the competent person.

Training requirements:

- All employees required to wear a full body harness for fall protection will be trained in the proper use of the equipment and tie off system prior to starting work.
- Employees will be trained to recognize fall hazards.
- JSA/DTP will be completed and reviewed with the crew prior to commencing work.
- A competent person qualified in the specific fall protection plan will perform training.
- Record of fall protection training will be required.
- Retraining of each employee will be required when the employee does not have the understanding and skills required, change in workplace and changes in the type of fall protection systems or equipment used renders previous training obsolete.

Ladder Safety

Ladders are used in most construction work. They provide a means of reaching locations too high to reach otherwise. They allow access to trenches and excavations, and ladders gain access to beams and trailers.

There are various types of ladders. There are Fixed Ladders, Extension Ladders, and Step Ladders. These ladders can be made of aluminum, wood, metal, plastic or fiberglass. Fixed Ladders are attached to a structure and not adjustable in length. An Extension Ladder is a non-self-supporting, portable ladder that is adjustable in length. Then there are Step Ladders, which are self-supporting portable ladders that are not adjustable in length. When selecting a ladder, you should consider the capacity of the ladder, its height and footing requirements, and whether it will be used inside or outside.

Personnel using an extension ladder should inspect it for defects before using it and be sure to look for overhead hazards that may interfere with the set-up. Personnel should not use electrical wires and ladders simultaneously. The user must extend the ladder to the required height and engage the extension hooks. The base of the ladder should be 1' away from the wall or support for every 4' of vertical extension (an angle of approximately 75 degrees). When using the ladder to access an upper level, the user must be sure the ladder extends 36' above the landing. The user must secure the ladder by tying it off to prevent shifting.

When using a stepladder, the user must:

- inspect the ladder for defects, broken rails, and split steps, and ensure that the spreader lock works property.
- place the ladder on solid ground and secure the spreader lock.
- fully extend and expand A-frame legs.
- never stand on the top two steps; if the user needs to reach higher, the user must get a larger ladder.

The user must never lean a stepladder and use it without the spreader locks engaged.

When climbing a ladder, the user must always maintain three points of contact, face forward and have a good grip. The user must not try to “one hand it” or climb facing away. The user must take only one step at a time. The user must always hoist tools with hand line.

A few additional safety tips include never reaching too far, keeping belt buckle between the rails, keeping ladders free from slippery materials and removing defective ladders from service immediately.

Job-Made Ladders

Side Rails

- Use construction-grade lumber for all components.
- Side rails of single-cleat ladders up to 24 ft. long should be made with at least 2 in. nominal stock lumber.
- Side rails should be continuous unless splices are the same strength as a continuous rail of equal length.

- The width of single-rung ladders should be at least 16 in. but not more than 20 in. between rails measured inside to inside.

Cleats

- Cleats should be equally spaced 12 inches on center from the top of one cleat to the top of the next cleat.
- Cleats must be secured with nails. Take care not to split the cleat.
- Making cuts in the side rails to receive the cleat is not advisable.
- Cleats should be at least 1 in. by 4 in. for ladders 16 ft. to 24 ft. in length.

Filler Blocks

- Filler should be 2 in. by 2 in. wood strips.
- Must be installed between cleats with nails. Take care not to split the filler or side rail.
- Nail filler at the bottom of each side rail first. Nail the ends of a cleat to each side rail with three 12d common nails. One nail is placed 1-1/2 inch in from each end of the filler block.
- Nail the next two fillers and cleat, and then repeat. The ladder is nailed at the top of each rail.

Work Zone Traffic Safety

A designated Traffic Control Manager shall be on site during all work zone traffic setups to supervise and continuously monitor the installation and maintenance of all traffic control devices.

This specific project will have long-term traffic control devices in place to control the traffic flow throughout the duration of the Project. Short-term stationary work zones may also be utilized to perform work activities in many locations for short periods of time. The following safety procedures will be followed when working in these work zones:

- A JSA/DTP form will be completed and reviewed with employees prior to performing any traffic work zone on the project.
- All work involving work zone traffic control will be carried out in full compliance with all applicable laws, regulations, and contract requirements.
- The work zone supervisor will ensure a high level of safety for our employees, other workers, the public, and minimize adverse traffic impacts associated with the construction work zone in terms of delays and congestion.
- The state police will be contacted by the work zone supervisor to provide patrols throughout the Project to enforce speed limits and other regulations, especially during critical operations such as lane closures.
- All devices and material used will meet the specific requirements of the Project and provide an acceptable high level of safety. (Signs, sign supports, cones, drums, barricades, warning lights, etc.)
- Each vehicle used for work zone setups will have a revolving amber beacon light attached to the center of the roof and a construction vehicle sign located on the rear of each vehicle.
- The supervisor will assure the work zone setups include the appropriate devices, safety features, and that they are placed in the proper pattern on the roadway.
- All employees shall wear a high visibility, class 2 or 3, reflective traffic vest, shirt, or jacket always.

- Flaggers will be properly trained and certified with the PennDOT flagger-training requirements prior to performing any duties if training is needed contact the Safety Department.
- Warning signs will be in place, including flagger-warning signs for all operations with flaggers.
- Warning signs will also be posted at locations where work vehicles regularly exit or enter traffic.
- When working in high-traffic speed areas the supervisor for the work zone shall consider the following added safety measures:
  - Post reduced work zone speed limits.
  - Arrange for police enforcement.
  - Arrange for media “Driver Awareness” coverage.
  - Provide traffic spotters / flaggers.

Silica Exposure Control

Site personnel may be exposed to respirable crystalline silica dust during this project. During any operation where silica exposure is likely, the Development Entity will utilize the Exposure Control Plan found in Appendix B to protect employees and contractors from the hazards of silica exposure.

Vertical Concrete Formwork

Due to the widespread use of concrete formwork on construction sites it is imperative that procedures be adhered to ensure that formwork is used properly. Proper use of concrete formwork will greatly reduce the potential for an employee injury or property damage. These procedures describe conventional procedures for erecting, using, and dismantling forming systems and are intended to supplement the instructions and procedures provided by the manufacturer or supplier of the specific equipment being used.

General

- All form components and hardware must be kept clean and properly lubricated.
- All form components must be inspected on a regular basis for damage or excessive wear. Any equipment found to be in unusable condition shall be replaced immediately and not reused.
- No field repairs of components (excluding plywood repairs) are permitted without explicit consent from the manufacturer.
- All form layouts shall be prepared and approved by an individual properly qualified to analyze the loadings and stresses that are induced during the construction process.
- All forming installation and pouring procedures must comply with all applicable regulations, codes, and ordinances.

Erection of Formwork

- Should not deviate from layout drawings without the approval of a qualified designer.
- Should ensure all wall ties are in place and secured as per manufacturer’s recommendations. Do not weld, bend, or otherwise alter wall ties as it may reduce their strength.
- Ensure adequate temporary bracing is in place while initially setting formwork.
- Formwork should be properly braced and stabilized against wind and other external forces.
- Safe working platforms must be installed per applicable safety standards.
- When gang forming, lifting devices must be properly spaced and securely attached as per manufacturer’s recommendations. Rigging must be arranged so that any one lifting bracket is not overloaded. Spreader beams with load equalizers are recommended for complex lifts.

- A minimum of two tag lines should be used to control movement of crane handled formwork. Do not permit personnel on or directly under any gang form while it is being moved or suspended in the air.
- Do not erect gang forms when jobsite wind conditions prevent safe maneuvering of gangs.
- Form work should be adequately braced, re-anchored, or otherwise secured prior to releasing lifting mechanism.
- Wall forms must not be erected so as to support deck concrete loading unless the wall forms are a designed part of the deck support system.

Bracing

- Alignment devices and plumbing struts are considered only as alignment devices with no provisions for withstanding concrete pressure or any portion thereof. Forms must be maintained plumb when pouring concrete to ensure the alignment devices and plumbing struts are not supporting or stabilizing concrete pressures.
- Braces intended to withstand concrete pressure must be designed by a qualified formwork designer.
- Unless otherwise specified, wind loading, and other external lateral loads are not considered in manufacturer's layout drawings.
- The adequacy of stakes, dead-men, sills, anchor bolts, etc., must be determined to ensure safe support of imposed load brace loads. The responsibility for adequate anchorage of braces should be assigned only to those personnel with sufficient experience.
- Prior to removing braces, make sure concrete has attained sufficient strength to safely support the imposed load at support locations.
- Do not exceed the rated load of the braces.
- Inspect installed braces immediately after installation for correct spacing and proper attachment device.

Walkway Systems

- All walkway systems must be properly positioned, spaced, and fastened per manufacturer's specifications and all applicable safety regulations.
- Walkway systems must be in place along the upper level of formwork. Workers must never attempt to walk or stand on top of forms.
- Scaffold brackets must be attached with the manufacturer's recommended devices. Never used substitutes or make-shift devices. Never hang brackets from wall ties after removal of forms.
- All walkway platforms must use a minimum of two planks laid side by side and must overlap their support ledger a minimum of 6". Unsupported ends of scaffold planks must not project more than 12" past their supports.
- Scaffold planks must be a minimum of 2"x10" nominal lumber and must be scaffold grade or must be of materials having equivalent or greater strength. All scaffold planks must safely support a minimum of 25 pounds per square foot over a maximum span of 8 feet.
- Scaffold planks must be nailed and clinched, bolted, or otherwise positively secured against dislodgment from the effects of wind, weather, gang form lifting operations, etc. Bolt heads and nails must be driven flush with top of planks.
- All scaffold platform brackets must be equipped with guardrails, mid-rails, and toe-boards along all open sides and be properly maintained and secured. Guardrails must be constructed in accordance with OSHA regulations.

- Spacing between scaffold brackets is not to exceed 8’ unless the walkway system has been designed for a greater distance. Unless designed otherwise, scaffold brackets are designed to support a maximum load of 25 pounds per square foot on 8’ centers.
- Always brace or support forms and scaffold from overturning due to the attachment or use of scaffold brackets.
- Never allow employees to work on one level of walkways if others are working directly below or overhead unless proper protection is provided.
- Access ladders or other suitable safe methods must be used to obtain access to walkway platforms. Do not place ladders so their weight can affect the strength or stability of the scaffold and formwork.
- If the use of walkways is not practical, personnel must be protected by using 100% fall protection.

Special Applications

- Fasteners for support brackets, friction collars and other friction devices must be pre-tensioned to the manufacturer’s specification during erecting and re-checked immediately after placing concrete.
- Ensure anchor brackets are attached properly and with proper thread engagement.
- Ensure the proper anchor bolts and inserts are used and of adequate strength for combined shear and tension loads.
- Anchor brackets must be installed so they are loaded equally and installed correctly prior to setting formwork. Anchor bolts must be tight and brackets level.
- When erecting forms for battered walls, allowance must be provided for proper anchorage to resist uplift forces.
- Layouts must be prepared by a qualified formwork designer for all one-sided and cantilevered wall forming applications.
- Consult the manufacturer for all other special applications such as, jump forms, climbing forms, etc.

Inspection

- Inspect completed formwork prior to placing concrete to ensure proper placement and secure connections of ties and associated hardware. All threaded components must be checked for proper thread engagement.
- Inspect erected walkways prior to each use.
- Inspect bracing attachments and form alignment after each cycle. Inspect installed forms and braces immediately prior to pour and during pour.

Concrete Placing

- Verify prior to and during concrete placement that the method of placement and rate of pour is consistent with formwork design. Do not overload.
- Avoid vibrator contact with wall ties. External vibrators must not be attached to formwork unless the formwork was designed for their use.

Stripping Formwork

- Follow manufacturer's recommended field procedures. Ensure concrete has sufficiently set and is able to carry its own weight and any imposed loads.
- When gang forming, secure the lifting mechanism prior to removal of ties, anchors, and/or bracing.
- Use extreme caution to ensure that no panel, walkway bracket, brace or any other form component is unfastened prematurely.
- Ensure that all disconnects have been made and the bond of the formwork to concrete has been broken prior to lifting of gang forms.

Working Safely with Concrete

Concrete is easy to work with, versatile, durable, and economical. By observing a few basic precautions, it is also safe, one of the safest known building materials. Over the years, relatively few people involved in mixing, handling, and finishing concrete have experienced injury. Outlined below are instructions to ensure safety of employees or contractors working with cement and concrete.

Eye Protection

- Proper eye protection is essential when working with cement or concrete. Eyes are particularly vulnerable to blowing dust, splattering concrete, and other foreign objects. On some jobs it may be advisable to wear full-cover goggles or face shields in addition to safety glasses. Eyes should be protected by using proper safety equipment and remaining alert.

Back Protection

- All materials used to make concrete, cement, coarse aggregate, sand, and water can be quite heavy even in small quantities. When lifting heavy materials, your back should be straight, legs bent, and the weight between your legs as close to the body as possible. Do not twist at the waist while lifting or carrying these items. Rather than straining your back with a heavy load, get help. Remember to use your head, not your back.
- Let mechanical equipment work to your advantage by placing concrete as close as possible to its final position. After the concrete is deposited in the desired area by chute, pump, or wheelbarrow, it should be pushed, not lifted, into final position with a shovel. A short-handled, square-end shovel is an effective tool for spreading concrete, but special concrete rakes or come-along also can be used. Excessive horizontal movement of the concrete not only requires extra effort but may also lead to segregation of the concrete ingredients.

Skin Protection

- When working with fresh concrete, care should be taken to avoid skin irritation or chemical burns. Prolonged contact between fresh concrete and skin surfaces, eyes, and clothing may result in burns that are quite severe, including third-degree burns. If irritation persists, consult a physician. For deep burns or large affected skin areas, seek medical attention immediately. Remember, concrete affects everyone differently and every batch is slightly different from the last. Protect your skin every time.
- The A-B-Cs of fresh concrete's effect on skin are:
  - **A**brasive Sand contained in fresh concrete is abrasive to bare skin.
  - **B**asic & Portland cement is alkaline in nature
  - **C**austic concrete and other cement mixtures are strongly basic (pH of 12 to 13). Strong bases like strong acids are harmful, or caustic to skin.

- **D**rying cement is hygroscopic it absorbs water. In fact, cement needs water to harden. It will draw water away from any material it contacts, including skin.

- Clothing worn, as protection from fresh concrete should not be allowed to become saturated with moisture from fresh concrete because saturated clothing can allow a chemical burn to the skin.
- Waterproof gloves, a long-sleeved shirt, and long pants should be worn. If you must stand in fresh concrete while it is being placed, spread, or floated, wear rubber boots high enough to prevent concrete from getting into them. The best way to avoid skin irritation and hexavalent chromium contamination is to wash frequently with pH neutral soap and clean water.

Placing and Finishing

- Waterproof pads should be used between fresh concrete surfaces and knees, elbows, hands, etc., to protect the body during finishing operations. Eyes and skin that come in contact with fresh concrete should be flushed thoroughly with clean water. Clothing that becomes saturated from contact with fresh concrete should be rinsed out promptly with clean water to prevent continued contact with skin surfaces. For persistent or severe discomfort, consult a physician. When working with fresh concrete, begin each day by wearing clean clothing and conclude the day with a bath or shower.

Warning

- Contact with wet (unhardened) concrete, mortar, cement, or cement mixtures can cause skin irritation, severe chemical burns (third-degree), or serious eye damage. Frequent exposure may be associated with irritant and/or allergic contact dermatitis. Wear waterproof gloves, a long-sleeved shirt, full-length pants, and proper eye protection when working with these materials. If you must stand in wet concrete, use waterproof boots that are high enough to keep concrete from flowing into them. Wash wet concrete, mortar, cement, or cement mixtures from your skin immediately. Flush eyes with clean water immediately after contact. Indirect contact through clothing can be as serious as direct contact, so promptly rinse out wet concrete, mortar, cement, or cement mixtures from clothing. Seek immediate medical attention if you have persistent or severe discomfort.

Mobile Elevating Work Platforms (MEWPs)

Employees will be required to operate or work out of MEWPs of various sizes to perform numerous operations on this specific project. To ensure safe work practices are implemented during the use of the aerial lifts, the following procedures will be implemented:

- Training on the proper use and operation of the lift must be provided to all employees required to work from a MEWP prior to doing so. This will be done by the Safety Department or approved third party and documentation of all trained employees will always remain onsite.
- The MEWP shall be given a pre-start inspection by the operator - visual inspection (walk around) and functional test at the beginning of each shift prior to operating. If the manufacturer has provided a checklist, it should be used to document the inspection. If one is not provided by the manufacturer the Development Entity's inspection checklist must be used.
- Before the MEWP is used and during use, the operator shall perform a workplace inspection to check the area in which the lift is to be used for possible hazards such as but not limited to:
  - Drop-offs or holes.
  - Bumps and floor obstructions.
  - Debris.
  - Overhead obstructions and high voltage conductors.

- Hazardous locations.
- Inadequate surface and support to withstand all load forces.
- Wind and weather conditions.
- Presence of unauthorized persons.
- Other possible unsafe conditions

The MEWP shall be used in accordance with all applicable standards. The operator shall ensure the following before each elevation of the platform:

- Ensure the MEWP is operated on a surface within the limits specified by the manufacturer.
- Ensure the outriggers, stabilizers, extendible axles, or other stability enhancing means, are used as required by the manufacturer.
- Ensure that guardrails are installed and access gates or openings are closed per manufacturer's instructions.
- Ensure the load and its distribution on the platform and any platform extension(s) are in accordance with the manufactures rated capacity for that specific configuration.
- Ensure there is adequate clearance from overhead obstructions.
- Ensure that the minimum safe approach distances to energized power lines and parts are maintained.
- Ensure all personnel in the platform are wearing and utilizing fall protection devices that provide 100% protection.

Excavating Operations

The scope of work on this specific project is made up of a portion of excavation work. This work will include but not be limited to sloping, benching and shoring operations. The following safety precautions will be utilized to enhance the safety of our employees and the public:

- Each contractor performing excavation work must have a designated competent person on this Project who will be responsible for implementing the Project's excavation program and the specific excavating activities.
- Prior to beginning work in an excavation, a daily excavation checklist must be completed by the competent person.
- A JSA/DTP should be completed with the crew addressing the hazards of the excavating operation prior to commencing work.
- Preliminary survey of the Project will be done by the field supervisor, which will include pre-construction pictures of any pre-existing conditions in the worksite. This would include but not be limited to landscaping, pavement, sidewalks, adjoining structures, etc.
- Pedestrians and traffic will be protected from entering the work area by barrels, cones, guardrails, placards, permanent/temporary barriers, construction fence, etc.
- Adjacent structures will be protected when needed to prevent settlement or undermining of the structure during our excavating operations.
- The competent person will remove or support any surface objects, which may be hazardous to those employees working in the excavation.
- Proper exit/entry points will be in place (stairway, ladder, ramp) in the excavation when they are 4 feet or deeper.

- The competent person will perform two soil tests daily to determine the soil classification to assure the proper sloping/benching requirement are continuing to be met.
- All simple slope operations 20 feet or less will meet the minimum allowable slope depending on the soil classification. Type A - ¾ :1, Type B -1:1, Type C -1½ :1
- Excavations shall not exceed 5' in vertical depth unless made in entirely stable rock or an adequate protective system is used to protect employees from cave-ins.
- Benched excavations 20 feet or less in type A and B soils shall have a maximum bench dimension vertically of 4 feet. In addition, the vertical height of each bench must not exceed the horizontal distance of that bench. There will be no benching operation in type C-soil.
- The competent person shall monitor accumulating water in an excavation and take the proper steps. Employees will be removed from the excavation unless water removal equipment and operations are in place.

Overhead Utilities

The Project will have overhead utility lines throughout the work area and adjacent routes. The Development Entity will be required to work under and around these lines, which will be in the Project work areas throughout the duration of the Project.

The following procedures will be followed while working in the vicinity of the any overhead lines:

- Prior to beginning work, the field supervisor will be responsible for contacting the utility owner of the overhead lines and attempt to request the following be done with the lines:
  - Have them de-energized during working hours if possible.
  - Move the lines temporarily during the construction.
  - Install insulated sleeves on the overhead lines.
  - Install warning stringers on the lines to enhance awareness of the line.

- The field supervisor shall add one or more of the following safety precautions needed if the utility owner is not being cooperative with providing assistance in protecting the lines:
  - Install flagged warning lines to mark horizontal and vertical power line clearance.
  - Use non-conductive tools and material if feasible.
  - Use an observer/spotter while working under overhead lines
  - Install warning signs at operator's/driver's eye level as a reminder of overhead lines.

- The field supervisor will keep additional equipment and other work activities that don't need to be under the lines at a safe distance from the overhead lines.
- All overhead wires are considered energized unless the field supervisor confirms it with the utility owner to be different.
- The field supervisor will assure a minimum distance of 10 feet or more is kept from any overhead line rated at 50kV or less and an additional 4 inches is to be added for every 10kV over 50kV. The clearance requirements for working with cranes shall follow those listed in the crane and rigging safety section of this plan.
- If the operator cannot see an overhead line, a spotter must be used. The spotter and operator must have a direct line of communication and review hand signals to be used prior to working in the area.
- Trucks will lower their beds before pulling away after dumping in areas of overhead utilities.

Underground Utilities

The project will encounter private underground utilities during the operation of our work. The following safety procedures will be followed to protect our employees and prevent accidental damage to underground utility installations:

- Contact the Pennsylvania “One Call System” at 811 with the specific locations and information on each excavation work area on the project. This is required at least full three working days but not more than ten working days prior to the start of the actual excavation. The construction manager / safety coordinator will continue to update the call during the project. All information shall be documented on the Safe Digging Plan.
- If an exact location cannot be given, the field supervisor will establish the proposed route or boundary of each work area with white paint. This will provide locators with an accurate picture of the proposed excavation areas.
- On larger sites that would be difficult to identify without specific information, the Superintendent of the site may choose to call for a pre-construction meeting with the utility owners. The meeting request shall be governed by the rule not less than three working days nor more than ten working days of the beginning of the work.[1]
- Prior to commencing underground work activities, a JSA/DTP will be completed with the crew involved. It will address the specific hazards and locations of utilities in the work area.
- When approaching a tolerance zone (the horizontal space within 24 inches of the outside wall or edge of a line or utility), hand-digging tools will be utilized until the marked utility line is exposed.
- If the operator is unable to see the excavating work area, the field supervisor will appoint a spotter to be utilized to assist in directing the movement of the machine and material. Operator and spotter must review hand signals prior to doing so.
- While the excavation is open the field supervisor will assure the underground utilities are protected, supported, or removed as necessary to safeguard employees.
- If a utility line is damaged during our operation, the field supervisor will assure the work site is safe before contacting the utility owner.
- The uniform use of a color-coded system to surface mark the location and route of buried lines are as follows:

Red	Electric power lines, cables, conduit and lighting cables.
Yellow	Gas, oil, steam, petroleum, or gaseous materials.
Orange	Communication, alarm or signal lines, cables, or conduit.
Blue	Water, irrigation and slurry lines.
Green	Sewers and drain lines.
Pink	Temporary survey markings.
White	Proposed excavation.

Heavy Equipment and Truck Safety

More than 100 workers each year are killed by mobile heavy equipment - including backhoes/excavators, mobile cranes, road grading and surfacing machinery, loaders, bulldozers, concrete trucks and tractors on construction sites.

[1] Communications with utility owners will follow any requirement outlined in the Project Agreement

The main causes of death are:

- Workers on foot are struck by equipment, usually when it's backing up or changing direction.
- Equipment rolls over and kills the operator while on a slope or when equipment is loaded or unloaded from a flatbed/lowboy truck.
- Operators or mechanics are run over or caught in equipment when the brakes aren't set, equipment is left in gear, wheel chocks are not used, or the equipment and controls aren't locked out.
- Workers on foot or in a trench are crushed by falling equipment loads, backhoe buckets, or other moving parts.

To ensure Heavy Equipment and Truck Safety, personnel must:

- Try to use only heavy equipment that has rollover protective structures (ROPSs) and seat belts.
- Use only flatbed/lowboy trucks and ramps that are suitable for transporting heavy equipment.
- Ensure that a copy of the operating manual is on all machinery or available to the operator.
- Identify the hazards of overhead and underground power lines and utilities and establish procedures for working around them. Before excavation begins, use the one-call system for utility cutoffs.
- Make sure the manufacturer's safety features work.
- Set a limited access zone and/or a swing radius for each piece of equipment.
- Provide training on equipment hand signals.
- Provide trained spotters or signal persons to alert operators to workers or pedestrians in the blind spots of the equipment - including workers in trenches or manholes.

An operator of Heavy Equipment should:

- Review operating, safety, and shutdown procedures in the operator's manual before working with a new piece of equipment.
- Check/inspect the equipment and controls every day before operator begins work.
- Keep grease and fluids off the walking/working surfaces and use three points of contact when entering and exiting equipment (such as two hands and one foot or two feet and one hand).
- Avoid travel or work parallel to steep grades or embankments or on unstable soil.
- Avoid jumping if it has a ROPS and seatbelt; there is a better chance of riding it out with a ROPS and seat belt fastened.
- Always put the transmission in park, shut off the motor, set the brakes, and perform any other needed shutdown procedures/lockout of controls and/or attachments before working on or around the equipment.

To protect other workers or pedestrians, employees who work with Heavy Equipment should follow the below instructions:

- Do not back up unless you are sure no one is behind you. Utilize a spotter for all backing operations around workers and equipment. Use mirrors, where appropriate and cease backing when sight is lost of the spotter.
- Do not depend only on backup alarms. They are not always heard on noisy construction sites.
- Use barriers to separate workers on foot, pedestrians, and vehicles from moving equipment, where possible.

- When loading or unloading materials, make sure that only essential workers are in the area and have a spotter/signal person to let you know where they are. No one should be under a suspended load.
- Never allow other workers to ride on equipment.
- Don't speed; be extra careful around other traffic, hills, obstacles, and curves.

Crane and Rigging Safety

Crane and rigging equipment will be utilized to perform numerous job tasks during the length of this Project. During any of these operations, the following safety procedures will be followed to protect all personnel from the hazards associated with these operations.

Safety procedures:

- All crane operators must be qualified to operate the specific crane in use on the project. They must be in possession of a current Certified Operator license valid for the crane being used.
- Hazard warnings and load capacities will be posted on all equipment, visible to the operator while at the controls and all manufacturers' ratings and limitations shall be followed.
- Hand signals for crane operations shall be posted on the cab of crane and understood by each employee working with the crane. Any signaling that is performed when the load travel is not in full view of the operator will be done by a qualified signal person.
- A competent person shall inspect the crane prior to and during each use. This person will complete the daily inspection checklist for the crane, and if any part is found unsafe, it shall be fixed promptly.
- Annual inspection sticker shall be posted and legible for each crane and boom truck. Rental cranes must also be checked and have an annual inspection decal posted on the crane, a daily, weekly, monthly inspection logbook, and a copy of the insurance certificate obtained.
- Cranes shall be set up level (within one percent) on firm supporting surfaces.
- Blocking and cribbing is required under crane floats at all times unless there is specific technical data showing the supporting surface will support the load.
- All lifts shall be performed in a smooth, controlled manner. Tag lines shall be used on all loads unless their use creates a greater hazard.
- Side loading the boom, shock loading the equipment or dragging a load is not permitted.
- All employees must be kept clear of suspended loads and operators shall not leave the controls while a load is suspended.

Crane operations near overhead electrical lines:

- All overhead electrical lines are to be considered energized
- Before beginning equipment operation, the employer must identify the work zone by either:
  - Demarcating boundaries (such as with flags and prohibiting the operator from operating the equipment past those boundaries, or
  - Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius
  - Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius, could get closer than 20 feet to a power line. If so, the requirements for one of these options must be met:

Option (1) – Deenergize and ground
Option (2) – Maintain a 20-foot clearance as well as instituting the measures listed below.
Option (3) – Utilize the Table of Minimum Clearance Distances:

Up to 50 kV, 10 feet
Over 50 to 200 kV, 15 feet
Over 200 to 350 kV, 20 feet
Over 350 to 500 kV, 25 feet
Over 500 to 750 kV, 35 feet
Over 750 to 1,000kV, 45 feet

If utilizing either Option (2) or (3), clearance shall be maintained by implementing all the following measures:

- Conduct a planning meeting
- If tag lines are used, they must be nonconductive (i.e., polypropylene rope)
- Erect and maintain elevated warning lines, barricades, or line of signs, in view of the operator, equipped with flags or similar high visibility marking, at the minimum approach distance
- Utilize a dedicated spotter

With Option (3) the utility owner of the lines must provide the voltage information within two working days of the employer's request.

When utilizing a dedicated spotter, they must:

- Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to:
  - A clearly visible line painted on the ground;
  - A clearly visible line of stanchions;
  - A set of clearly visible line of sight landmarks.
- Be positioned to effectively gauge the clearance distance
- Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
- Give timely information to the operator so that the required clearance distance can be maintained.

To be considered a dedicated spotter, the signal person qualifications must be met and his/her sole responsibility is to watch the separation between the power line and the equipment, load line and load (including rigging and lifting accessories) and ensure through communication with the operator that the applicable approach distance is not breached.

Operations below power lines are not allowed unless the employer has confirmed that the utility owner has deenergized and visibly grounded the line or the boom in the fully extended position, at true vertical would be further away than the clearance listed in the table above.

Rigging general guidelines:

- The rigger and operator must know the weight of the load prior to picking it.
- All rigging equipment will be inspected prior to use by a competent person. Any items found defective will be immediately tagged out and/or removed from the project.
- Rigging equipment shall not be modified or repaired by anyone other than the equipment manufacturer.
- Rigging equipment shall not be loaded in excess of their rated capacities.
- Sharp edges in contact with slings shall be padded with materials of sufficient strength to protect the sling.
- Loads shall be rigged so that the center of gravity is beneath the load hook prior to hoisting. Loads shall be balanced to prevent slippage.
- Basket hitches will not be used when hoisting loose material or material that could slip from the basket if load balance is lost.

Rigging qualification:

- Qualified riggers are required:
  - During hoisting activities for assembly and disassembly work
  - Whenever workers are within the fall zone and hooking, unhooking, or guiding a load, or doing the initial connection of a load to a component or structure.
- Fall zone: means the area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall in the event of an accident.
- A qualified rigger is a person that:
  - Possesses a recognized degree, certificate, or professional standing, or
  - Has extensive knowledge, training, and experience, and
  - Can successfully demonstrate the ability to solve problems related to rigging loads.

Safety walks around inspection require answering the following questions:

- Is swing radius properly barricaded?
- Is the surface condition that the crane is set up on safe?
- Any overhead obstructions or hazards noticeable?
- Is crane set up next to an excavation, and is it the proper distance from the excavation?
- Is crane set up to close to any other obstacles that may interfere with the swing radius?
- Is the crane in a flood zone that may cause unstable conditions of the surface?
- Are the outriggers beams fully extended or properly set with secondary chart?
- What is the condition of the floats and are they properly secured?
- Are the floats properly supported with blocking or cribbing?
- Is the blocking or cribbing correct in size and correctly assembled?
- Are crane tires clear of ground surface, if applicable?
- Are tires damaged in any manner?
- What is the general condition of the crane? (Appearance, leaks, etc.)

- Is the boom angle indicator present and working properly?
- Windows broke or distorted that will interfere with the safe operation of the machine?
- Is there an accessible fire extinguisher available of 5BC rating or higher?
- Are the warning decals in place and legible on the crane?
- Are the steps and ladders attached to the crane damaged in any manner?
- Are there any loose, missing, or damaged parts of critical nature?
- What condition is the hook, ball, and block in?
- Is safety latch on hook in operating condition?
- Are cables in good condition, do they need lubricated?
- Is there any visible damage to the boom assembly?
- Is the annual inspection sticker present and legible?
- What condition is the cab in? (Operator seat, controls, and gauges)
- Is the specific load chart for the machine present in the cab?
- Is the manufacturers operator's manual present in the cab?
- If load computer is available, is it functioning properly?
- What is the general housekeeping of the crane and the surrounding area?

Suspended Personnel Platform

A suspended personnel platform may be utilized at certain times on the Project to safely transport employees to and from pier caps and bridge decks. Prior to any contractor utilizing a suspended personnel platform on the Project, the Development Entity personnel must be contacted to determine if alternative methods for access can be used. The following guidelines and safety precautions must be strictly adhered to in order to prevent serious injuries from working with suspended personnel platforms.

To help ensure that the proper procedures are followed, a competent person must hold a pre-lift meeting with all personnel involved with the operation. This meeting will include the crane operator, signal person(s) (if necessary), and the personnel to be lifted. The meeting must be held prior to the trial lift at each new work location must hold a pre-lift meeting, and each time employees are newly assigned to an operation, which requires use of the personnel platform.

Inspecting the platform

- A qualified person must design the platform and a qualified welder must perform all welding. In particular, each platform must have:

  - A design factor of 5:1.
  - A guardrail and an inside grab rail.
  - Sufficient headroom for personnel to stand.
  - No rough edges, which might snag personnel.
  - Permanent indication of its unladen weight and rated capacity.
  - Overhead protection must be provided where personnel could be exposed to falling objects (hard hats are insufficient by themselves).
  - Each platform must be enclosed to the mid-rail.
  - Access gates (if fitted) must swing inwards only and be prevented from opening accidentally.

Selecting the crane

- In addition to meeting standard criteria for inspection and maintenance, cranes used for personnel lifting must be derated by 50%, i.e., all capacities shown in the crane's load chart must be halved.
- Cranes must be equipped with:
  - An anti-two-block device
  - A boom angle indicator
  - A boom length indicator
  - Controlled load lowering. No free fall is permitted.
  - Load lines must be able to lift seven times the maximum intended load, (i.e., a 7:1 design factor), or ten times for rotation resistant ropes (i.e. a 10:1 design factor).

Selecting the rigging

- The rigging selected for personnel hoisting must not be used for any other purpose and should be kept apart from other rigging or clearly identified in some way. In addition, all rigging must meet the following guidelines:
  - Must be capable of handling 5 times the maximum intended load.
  - Wire rope bridles must be attached to a master link or bolt type shackle to ensure secure and even load distribution.
  - All hooks must have lockable latches.
  - Eyes in wire rope must be fabricated with thimbles.

Trial and Test Lifts

- The usual correct procedure for setting up the crane must be followed. In particular, the crane must be on a firm surface and level to within 1% of grade.
- Before any hoisting with a personnel platform begins, a proof test and a trial lift must be conducted.
- Proof Test:
  - Must be conducted at each new job site to 125% of the platform's rated capacity.
  - The load must be evenly distributed and held for five minutes.
- Trial Lift:
  - Must be conducted for each location the platform will be lifted to with 100% of the total anticipated load.
  - Must be repeated each time the crane is moved to a new position.

Final Pre-Lift Inspection

- A competent person must make a visual inspection of the crane, rigging, and platform after the trial lift is completed. The visual inspection shall be made by removing the test weight and raising the platform a few inches off the ground. This final inspection shall be completed prior to hoisting personnel.
- Checks must be made to ensure the hoist rope is:
  - Not twisted.
  - Free of kinks.

- Centered over the platform.
- Properly seated on drums and in sheaves.

Preparing to lift

- Care must be taken to ensure the platform us loaded evenly and within its rated capacity. Only personnel required to perform the job are permitted to be in the platform. Necessary tools and materials are permitted in the platform as long as they are evenly distributed and properly secured.
- Unless work is being done over water, all personnel must be tied off to the platform or load block/headache ball.

Lifting to the work location

- Hoisting must be slow, controlled and cautious at all times. Traveling/crawling of the crane while personnel are inside the platform is prohibited.
- All parties must remain in constant visual or radio communication. With sole exception of the signal person, personnel in the platform must take care to keep all body parts inside during hoisting operations.
- Tag lines must be used to help control the platform unless their use creates an unsafe condition.
- Once the platform has reached the work location, the crane operator must engage all brakes and remain at the controls. Before any personnel are allowed to leave the platform, it must be landed on, or tied off to a structure, unless it would be unsafe to do so.
- Lifting operations shall be stopped during bad weather (as determined by the competent person) and also when wind is over 20 miles per hour.

Pile Driving (Diesel Hammer)

Piles, usually columns or sheets, are driven into the ground to support bridges, buildings or other structures, and may also be used for earth retention systems. Pile driving activities typically involve the use of a crane, either on land or on water, to hoist the pile and suspend the hammer. The type of pile determines the method of installation. This includes assistance from jetting, vibratory or impact hammers, depending on the soil and environment.

General Requirements

- The competent person must completely review the approved pile driving procedure and applicable safety plan in place for the specific project prior to operation commencement.
- All overhead and underground utilities shall be identified and located prior to the start of any pile driving operation, including the unloading of pile driving equipment on the jobsite.
  - When pile activity is to occur within the tolerance zone of any underground utilities the exact location of the utilities shall be determined through hand digging or other non-damaging means. Additional protection or an engineering survey may be required.
  - When pile activity is to occur adjacent to overhead utilities, the requirements listed in this section and within 29CFR 1926 shall be observed.
- Pile driving equipment shall not be assembled or used unless the ground conditions on which they are moved or placed are firm, graded and, unless the work is being performed in marshes or

wetlands, drained, to the extent that the equipment manufacturer's specifications for adequate support and degree of level are met.

- The manufacturer's recommendations for the assembly and disassembly, inspections, maintenance, and operation of the installation equipment and piling element installation shall be followed.
- Cranes shall be set up on a firm surface, within 1 percent of level.
- All employees involved in pile installation, extraction, and related operations shall wear head, eye, hearing, hand, and foot protection. 100% fall protection is required when climbing leads or when fall exposures exceed six feet.
- The area around the installation, driving, hoisting and/or extracting activities should be barricaded to prevent access by persons not directly involved in the operations. If intrusion occurs, all operations shall cease and shall not resume until all individuals have been moved to a safe location.
- Determination of weights and radius of the pile driving operation must be completed by the competent person and reviewed with the machine operator prior to activity commencement.
- Do not use the crane to pull piles that are frozen to the ground. Use other suitable or mechanical means to free them i.e.) loader or forklift.
- A blocking device, capable of safely supporting the weight of the hammer, shall always be provided for placement in the leads under the hammer while employees are performing any type of work under the hammer.
  - Where it is necessary for an employee to momentarily lean through the leads to spot a pile under the pile hammer, it is not required that the pile hammer be secured in the leads.
- All personnel need to be kept clear when piling is being hoisted into the leads.
- Before any type of pile is placed in position for driving, the pile head must be cut square to the driving head and free of frozen material, steel fragments, or other debris.
- No person shall stand under the kicker or directly under, in front of, or within 12 feet of the pile hammer or pile when a pile is being driven.
- A signal person shall be positioned in full view of the equipment operator before any pile driving equipment is relocated at the work site. The operator shall accept signals only from the designated signal person except for an emergency stop signal, which may be given by anyone.
- Lifting and hoisting equipment, rigging, guidelines and leads must be inspected prior to use and maintained properly. Shackles shall be secured against unintended opening by steel wire or equivalent. Field-made lifting devices are prohibited. Shop-made lifting devices shall be designed by a registered professional engineer.
- All driving operation shall be suspended if the load-line from a pile being driven is or becomes detached.
- The driving hammer shall be inspected at least once every shift. All bolts, cable clamps, cushion blocks, fuel lines, rail bolts, cocking and trip mechanisms, fuel pumps, injectors, and drive head retaining pins shall be inspected.
- Guards must be in place across the top of the head block to prevent the cable from jumping out of the sheaves.
- When pile driving with swing leads the ball or block should be used with a choker in place between the lead and the ball/block. This practice will eliminate excessive slack in the cable which causes damage to the cable, ball, block and lead.

- With certain impact hammers a choker should be installed between the hammer and the crane's wedge socket to prevent the piston from damaging the wedge socket or the pin. The competent person must check each impact hammer prior to use.
- When driving piles in any batter configuration, the equipment (crane, piling leads, kicker, and pile hammer) shall be suitable for the intended batter. Lead feet must be securely anchored to prevent slippage during battering operations.
- When battering piles, the pile shall rest in a guide. When plumb or batter piles are driven with an impact hammer without the use of a template, the lead must have a gate system at the bottom of the leads to maintain control of the pile. At no time is any employee to open the gates while a pile hammer is driving a pile.
- Pile leads shall be provided with a ladder or horizontal bracing that is uniformly spaced at intervals not greater than 18 inches and which prevents employees from contacting the pile hammer. Such assemblies shall be equipped with adequate anchorages for personal fall protection equipment.
- If an employee is required to climb the driving leads, the operator of the equipment shall apply all brakes and necessary safety switches to ensure there is no uncontrolled motion of the equipment.
- Safety chains, whip checks, or equivalent means, shall be installed at each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected.
- Hammers shall be lowered to the bottom of the leads while the crane and leads are being moved/swung to the next location.
- Pile hammers, when stored, shall be secured against accidental displacement.
- When maintenance is being performed on pile hammers, they must be properly supported to prevent accidental displacement or movement.

Vibration

- Vibration due to pile driving activities accounts for the majority of adjacent property damage claims. If construction activities are to take place next to other structures, an evaluation must be performed to determine which pile driving method will pose the least risk to the structures.
- Prior to pile driving activities the proposed site should be examined to help identify and anticipate problem areas.
- Adjacent property owners shall be notified of the work to be performed and a pre-construction survey of the property shall be completed to detect any conditions that may require modified construction activities.
- Survey documentation should include written building condition reports by a professional engineer, photographs, videotapes and survey points.
- A qualified engineer or consultant should perform vibration monitoring during pile load tests and actual pile driving activities.

Noise

- The noise from pile driving operations is a major contributor to noise-induced hearing loss.
- Impact sound can exceed 140 decibels during pile driving operations. Unprotected personnel exposed to these high sound levels can incur permanent hearing loss.
- Impact hammers produce the highest sound levels. A cushion placed between the ram and pile may reduce impact noise levels. When driving steel piles, a canvas hood can be used to isolate the noise.

- Pre-boring and the use of vibratory hammers may produce lower sound levels but will likely contribute to vibration issues.
- Where noise must be eliminated, jacking and screwing methods are likely to provide the least disturbance.

Unloading, Handling, and Storage of Piles

- All non-essential personnel must be kept away from the unloading and handling operations. Unloading and handling operations are to be performed only by individuals who have been trained in the hazards associated with the task.
- The unloading equipment's manufacturer's specifications and limitations shall be followed at all times.
- Only rigging of adequate capacity, configuration, and capacity shall be used to handle piles.
- Piles shall not be hoisted or sorted with open hooks or open sheeting shackles unless they are designed for that purpose.
- Piles or sheet piling stored on the ground shall be adequately supported by blocking/cribbing to prevent shifting or collapse.
- Pipe piles shall be stacked in well supported and braced racks or frames, unless other provisions are made to prevent unintended movement.
- The handling and storage of precast concrete piles shall be performed in a manner that prevents damage to the piles.
- Material shall be clear of overhead power lines. If not feasible, be aware of the overhead hazards and take the appropriate steps to warn the employees of the overhead hazard.
- Taglines shall be used for controlling all loads.

Excavation Work

- All excavation work must meet the requirements listed within this plan and within 29CFR 1926 Subpart P.

Diesel Pile Hammer Requirements

- The pile hammer, clamp, power unit, and supply hoses shall be inspected in accordance with their manufacturer's recommendations. Associated equipment such as the boiler, support and lifting equipment, rigging, couplings and retaining bolts shall be inspected before each shift and periodically during use.
- The pile hammer and leads shall be of a compatible size, shape and capacity.
- The pile driving crewmembers shall be familiar with how the specific diesel-powered pile hammer is started and stopped during normal and emergency conditions.
- Hammers shall not be lubricated, serviced or repaired while in operation.
- All crew members shall be trained in and demonstrate familiarity with:
  - The safe operation of the hammer's diesel trip mechanism; and
  - The fire, explosion and exhaust-related hazards associated with cold starts.

Lead Requirements

- Leads shall be assembled in accordance with their manufacturer's specifications using only the approved fasteners and required torque values. Bent or otherwise deformed or damaged lead

sections shall not be used. All repairs to leads and lead components shall be made in accordance with their manufacturer's specifications.

- Shop made piling leads and attachment connections shall be designed by a registered professional engineer.
- Stop blocks shall be provided for the leads to prevent the hammer from being raised against the head block. Proper length leads are required to prevent the ram from striking the head block when in operation.

Cutting Driven Pile

- Remove any unnecessary personnel from the area prior to cutting piles.
- When it is necessary to cut off the tops of driven piles, pile driving operations shall be suspended except where the cutting operations are located at least twice the length of the longest pile from the driver.
- If the pile being cut off is not secured in the leads, leave a one-inch tab uncut so the pile remains upright. The pile buck can visually verify that the area is clear prior to pushing the pile over.
- The requirements for oxy/fuel cutting and usage shall meet the requirements found in this plan.

Pile Splicing

- For piles driven deeper than the minimum penetration depth, splicing may be necessary to raise the tops of piles to the correct cut-off elevation. Either commercial splices or field welded splices may be used.
- When commercial splices are used, ensure that they are of an approved type and fastened in accordance with the manufacturer's recommendations.
- The splicing of piles by welding must be done by a certified welder per engineered procedures.
- The loose end of all piles being spliced must be held / supported until sufficient (engineered) amount of weld is provided to allow a freestanding connection.

Pile Extraction

- If piling cannot be pulled without exceeding the load rating of the equipment. A pile extractor shall be used.
- When pulling piling, crane booms shall not be raised more than 60 degrees above the horizontal. (This requirement does not apply to vibrating-type pulling devices.)
- Piling shall not be pulled by tipping the crane, releasing the load brake momentarily and catching the load before the crane has settled.
- Hydraulic cranes should not be used for extracting piles; boom damage frequently occurs.
- Crane boom must be perpendicularly in front of or behind the batter pile when pile extraction operation is being done.
- Based on the condition of the pile being extracted or when 50% of the hammer capacity being used is met, a second drum line must be secured to a firm anchor point to prevent boom backlash.

Welding and Cutting

Gas Welding and Cutting

- Transport, moving, and storing compressed gas cylinders

- Valve protection caps shall be in place and secured. Valve protection caps shall not be used for lifting cylinders from one vertical position to another.
- When cylinders are hoisted, they shall be secured on a cradle, slingboard, approved cart or pallet. They shall not be hoisted or transported by means of magnets or choker slings.
- Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.
- Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed, and valve protection caps shall be in place before cylinders are moved.
- A suitable cylinder cart, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use. When work is finished, when cylinders are empty, or when cylinders are moved at any time, the cylinder valve shall be closed.
- Compressed gas cylinders shall be secured in an upright position at all times, if necessary, for short periods of time while cylinders are actually being hoisted or carried, they may lie on their side. Acetylene cylinders should never be allowed to lie on their side.
- Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.
- Cylinders should be stored in assigned places away from stairs, or gangways. Assigned storage places shall be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering.

- Placing cylinders
  - Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them. When this is impractical, fire-resistant shields shall be provided.
  - Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.
  - Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.

- Use of fuel gas
  - Fuel gas shall not be used from cylinders through torches or other devices without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.
  - Before a regulator is connected to a cylinder valve, the valve shall be opened slightly and closed immediately. The person cracking the valve shall stand to one side of the outlet, not in front of it.
  - In order to quickly close valves in the event of emergency fuel gas cylinders shall not be opened more than 1-1/2 turns.
  - When a special wrench is required to close a cylinder valve, it shall be left in position on the stem of the valve while in use so that the fuel gas flow can be shut off quickly in case of an emergency.
  - Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.
  - If a leak is found around the valve stem, the valve shall be closed, and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the work area.
  - If the fuel gas should leak from the cylinder valve, rather than from the valve stem, and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the work area.

- Fuel gas and oxygen manifolds
  - Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Hose connections shall be kept free of grease and oil.
  - Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

- Hoses
  - Fuel gas and oxygen hose shall be distinguishable from each other. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage shall not be used.
  - When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 12 inches shall be covered by tape.
  - All hose in use shall be inspected at the beginning of each working shift. Defective hose shall be removed from service. Hose which has been subject to flashback, or which shows evidence of severe wear or damage, shall be tested to twice the normal pressure to which it is subject, but in no case less than 300 p.s.i. Defective hose, or hose in doubtful condition, shall not be used.
  - Hoses, cables, and other equipment shall be kept clear of passageways, ladders, and stairs.

- Torches
  - Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills, or other devices designed for such purpose.
  - Torches in use shall be inspected at the beginning of each working shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.
  - Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work. Torches shall never be lit using cigarette lighters or other fuel filled ignition source.

- Regulators and Gauges
  - Oxygen and fuel gas pressure regulators, including their related gauges, shall be in proper working order while in use.

Arc Welding and Cutting

- Manual electrode holders
  - Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safely handling the maximum rated current required by the electrodes, shall be used.
  - Any current-carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

- Welding cables and connectors
  - All arc welding and cutting cables shall be of the completely, insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.
  - Only cable free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used, except those cables with standard

insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.
  - Cables in need of repair shall not be used. When a cable, other than the cable lead referred to above, becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tape or other equivalent insulation.
  - When it is necessary to connect or splice lengths of cable to one another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are affected by means of cable lugs, they shall be securely fastened together to give good electrical contact and the exposed metal parts of the lugs shall be completely insulated.

- Ground returns and machine grounding
  - A ground return cable shall have a safe current-carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current-carrying capacity shall exceed the total specified maximum output capacities of the all the units which it services.
  - Pipelines containing gases or flammable liquids, or conduits containing electrical circuits, shall not be used as a ground return.
  - When a structure or pipeline is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks, or heat at any point shall cause rejection of the structures as a ground circuit.
  - When a structure or pipeline is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.
  - The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
  - All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

- Operating instructions
  - When welding cannot be conducted safely the operation shall not be performed.
  - When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be placed or protected so that they cannot make electrical contact with employees or conducting objects.
  - Hot electrode holders shall not be dipped in water; to do so may expose the arc welder or cutter to electric shock.
  - When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.
  - Any faulty or defective equipment shall be reported to the supervisor. Any such equipment shall not be used until repairs have been completed.

- Shielding

- Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flameproof screen which will protect employees and other persons working in the vicinity from the direct rays of the arc.

Fire Prevention

- Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state or readiness for instant use.
- When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel/fire watch shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed, and for a sufficient period of time, at least ½ hour after completion of the work to ensure that no possibility of fire exists.
- For the elimination of possible fire in enclosed spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch period. Overnight and at the change of shifts, the torch and hose shall be removed from the enclosed space.

Ventilation and Protection

- Mechanical ventilation
  - Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.
  - Ventilation shall be deemed adequate if it is of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep their concentration in the breathing zone within safe limits as defined in Subpart D of Part 1926.
  - Contaminated air exhausted from a workspace shall be discharged clear of the source of intake air. All air replacing that which is withdrawn shall be clean and respirable.
  - Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.

Training

- Welders/cutters and their supervisors must be trained by an authorized person.
- Training shall include at a minimum:
  - Safe operation of equipment; and
  - Safe performance in welding and cutting processes.
- Employees acting as a fire watch will be trained in the safe and proper use of fire extinguishing equipment and in the procedures to use in the event of an emergency.

Fire Hazards and Prevention

The following information discusses the typical fire hazards frequently found on construction sites and the methods used to control them. It may not cover every possible fire hazard that is encountered on the Project. Additional fire risks should be evaluated as each new phase begins and appropriate corrective actions taken to avoid an incident. The following information will outline areas of concern and actions than can be taken to reduce fire losses on the project.

Fires do not occur with frequency or regularity and therefore workers are not particularly concerned about them. Another word for this is complacency, an environment in which danger grows and thrives.

Almost every construction worker has at one time, or another seen someone injured by a fall or being struck by an object. Very few have seen a person burned in a fire or seen valuable property and months of work reduced to smoke and ashes.

Personnel need to be reminded regularly of the ever-present danger of fire and need to know the different types of fires and extinguishers that may be encountered on this Project.

A fire today could mean loss of life, loss of a job, personal injury, or property damage. Fire prevention and good housekeeping go hand in hand for obvious reasons. Fires can start anywhere, at any time, and therefore it is important to know how to use a fire extinguisher correctly and also to know which extinguisher to use for different types of fires that may be encountered on this Project.

Fire extinguishers

- Fire extinguishers are typically the first line of defense for combating a fire, and are classified by the type of fuel that is burning and the media necessary to extinguish it:
  - CLASS 'A' FIRES: These fires consist of wood, paper, rags, rubbish and ordinary combustible materials, the kinds of materials typically found on a construction site.
    RECOMMENDED EXTINGUISHERS - Water, through use of a hose, pump-type water cans, pressurized extinguishers, and (ABC) dry chemical extinguishers.

    FIGHTING THE FIRE - Put lots of water on the fire and soak it completely, even the embers.
  - CLASS 'B' FIRES - These consist of flammable liquids, oil and grease.

    RECOMMENDED EXTINGUISHERS - (ABC) dry chemical type.
    FIGHTING THE FIRE - Start at the base of the fire and use a sweeping motion from left to right always keeping the fire in front of you.
  - CLASS 'C' FIRES - are electrical fires, usually dealing with some type of electrical equipment

    RECOMMENDED EXTINGUISHERS - (ABC) dry chemical type. FIGHTING THE FIRE - Use short bursts on the fire. When the electrical current is shut off on a “Class ‘C’ Fire, it can become a Class ‘A’ Fire if materials around the original fire are ignited.

    Remember PASS when using a fire extinguisher. Pull the pin, Aim the hose at the base of the fire, Squeeze the handle, and Sweep the fire from side to side.
- Fire extinguishers for construction sites should be of the multi-purpose type: Class A, B and C.
- This type of extinguisher is effective in extinguishing all three types of fires typically found on construction sites: general combustibles, flammable liquids and electrical sources.
- Fire extinguishers must be kept in good working condition. Regular inspections and tests, as well as preventive maintenance, will ensure that fire extinguishers function properly.
- A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of protected area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

- A ½-inch diameter garden-type hose line, not to exceed 100 feet in length and equipped with a nozzle, may be substituted for a 2-A rated fire extinguisher, providing it is capable of discharging a minimum of 5 gallons per minute with a minimum hose stream range of 30 feet horizontally.

Housekeeping

- Poor housekeeping contributes to fire hazards on many construction sites. A small fire can quickly become an inferno when it spreads to piles of scrap or waste materials.
- All combustible refuse should be removed regularly. All waste piles or dumpsters should be located in an area clear of any type of ignition source. Do not expose waste piles or dumpsters to elevated welding or cutting.

Welding and cutting

- Welding and cutting operations are directly related to numerous and serious construction fires.
- Combustible materials should be removed from these work areas. Where removal of combustible materials is impractical, the materials should be covered with flame-retardant tarpaulins or other suitable material.
- Suitable fire extinguishing equipment shall be immediately available in the work areas. (A fire extinguisher in the gang box out by the trailers is not considered to be immediately available.)
- Oxyacetylene units and fire extinguishers should always travel together, never one without the other.
- When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed, and for at least ½-hour after the completion of the work to ensure that no possibility of fire exists.
- Welding and cutting should not be conducted in confined spaces or where flammable vapors may be present, unless the appropriate precautions have been taken.

Compressed gas cylinders

- Oxygen and fuel-gas cylinders in storage should be separated by a minimum distance of 20 feet or separated by 5-foot-high barriers of noncombustible material. When not in use, valve protection caps should be placed over cylinder valves to prevent accidental valve damage or displacement.
- Because of the extreme flammability of liquid petroleum gas, it should never be stored inside a building.
- Oil and grease in the presence of pure oxygen can burn with explosive force if ignited. Never use these materials around pure oxygen.

Cut-off saws

- Spark-producing cut-off saws are often overlooked. Workers frequently are surrounded by oil-soaked plywood forms while using cut-off saws to cut rebar. If these conditions exist, a fire extinguisher should be immediately available, and a fire watch should be posted at the work location for at least ½-hour after the work is completed.

Flammable and combustible liquids

- Fuel storage and handling areas should be:
  - Located away from all fire exposures
  - Free from accumulated debris or undergrowth
  - Properly grounded and bonded
  - Posted with "no smoking" signs
  - Close to fire extinguishers

- Use approved safety cans for storing and dispensing small quantities of flammable liquids. The flash-arresting screens inside safety cans should not be removed. The screens are designed to keep any ignition source from igniting the vapors inside the can.
  - A fire extinguisher is required on all service/fueling trucks
  - Additional fire extinguisher requirements are contained in the applicable OSHA standards (see references)
- At least one portable fire extinguisher having a rating of not less than 20-B units shall be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

Temporary heating

- All heating equipment must be installed with proper clearances from combustible materials and with proper ventilation. Heaters not suitable for use on wood floors shall not be set directly upon them or other combustible materials. When such heaters are used, they shall rest on suitable heat insulating material or at least 1-inch concrete, or equivalent. The insulating material shall extend beyond the heater 2 feet or more in all directions.
- Solid fuel salamanders are prohibited in buildings and on scaffolds
- Take care when using temporary enclosures. Temporary enclosures should be made with flame-resistant tarpaulins or materials with low flammability.

Foam, plastic, or other combustible solids

- Many types of foam, plastic, and other combustible solid material used on construction sites are extremely combustible.
- Welding and cutting is not allowed near these materials.
- Materials should be sheathed with fire-resistant products as soon as possible to reduce the exposure or removed from the work area.

Smoking

- Smoking is prohibited in areas with potential fire risks, including fuel storage and dispensing areas, woodworking areas that generate large amounts of dust, near combustible solid materials, and in areas with high concentration of paint, solvent or adhesive vapors.

Lead Paint - Demolition

Site personnel may be exposed to lead paint during the removal of painted steel from project bridges. During any operation that requires burning of steel coated with lead-based paint, site personnel will utilize a lead and respirator program to protect employees from the hazards of lead fumes and dust. The following safety precautions will be used to ensure employees are protected from the hazards of exposure to lead paint fumes and dust.

Employee training: All employees who are qualified to torch cut steel coated with lead-based paint must receive, a minimum, annual training on the hazards of working with steel coated with lead-based paint. This training is part of what qualifies the employee to work with steel coated with lead-based paint.

Lead Concentration: Prior to starting any work related to the steel structure a determination of lead concentration will be made from a paint sample taken from the bridges.

Initial Controls:

- All employees who will be burning steel coated with lead-based paint will have appropriate blood lead testing and physicals to determine initial lead and ZPP levels. All records will be kept at the jobsite for review upon request.
- A self-contained decontamination trailer, which includes three separate change areas (“dirty”, “wash”, and “clean”) will be set up on site at the start of the project.
- Signs indicating “Lead Work Area Poison No Eating or Use of Tobacco Products” will be posted in the “lead zone.” This zone will be established by evaluating existing field conditions and by utilizing ambient air monitors.

Personal Protective Equipment and Engineering Controls:

- Protective clothing will be given to all employees required to burn steel coated with lead-based paint. This clothing will consist of burn resistant coveralls, gloves, boot protection and burning glasses or face shields. All protective clothing will remain on site on a daily basis and cleaned or disposed of as needed.
- Positive Air Powered Respirators (PAPR’s) with HEPA filters will be given to each employee involved in the burning operation for respiratory protection. Filters will be changed as required.
- While burning, employees will be positioned upwind from the burning area.
- All burners will use a 4-foot-long torch to help keep them out of the immediate work area.
- Air movers will also be utilized, when feasible, to keep fumes and smoke away from the burner.

Determination of Lead Exposure:

- Air monitoring will be conducted for the initial 8 hours of burning to determine the actual lead exposure an employee is getting. These air monitors will be attached to the employee actually performing the burning operation. Other monitors will be placed away from the work area so that a “lead zone” can be established. These ambient air monitors will be placed per the Project specifications.
- Additional air monitoring will be conducted as work tasks change to ensure all controls and exposures are being maintained.

Program Implementation:

- Once the air monitoring results have been analyzed, a determination of the amount of lead protection and engineering controls required for this project will be made. This decision will be based on OSHA’s 1926.62 lead standard as well as past history in performing work similar to this project.
- The Development Entity understands the specific requirements regarding worker lead exposure. Through past exposure monitoring data, the Development Entity can show that the work practice and engineering controls chosen for this project will adequately protect the employees from lead exposure.
- Weekly safety meetings will be held for all employees to discuss any specific safety measures that need to be implemented for the following week.

Abrasive Blasting

A key component of this Project involves abrasive blasting of painted bridge components. While most of the safety precautions related to abrasive blasting should be obvious, some procedures may be less apparent.

Although abrasive blasting started with sand there are several different materials that can be used as abrasive blasting media today and choosing the right one can reduce the over safety exposure. The most common abrasive elements are:

- Steel shot or grit
- Glass beads
- Crushed glass
- Garnet
- Plastic grit
- Copper or coal slag

Organic materials can also be used for abrasive blasting such as:

- Walnut shells
- Corn cobs
- Apricot powder

The hazards associated with abrasive blasting include hearing loss, respiratory illness, skin irritation, eye damage, skin abrasion, or lead poisoning. The procedures for abrasive blasting shall take into account the requirements for lead paint and silica exposure as well.

The following safe work procedures shall be followed at all times when performing abrasive blasting operations:

Education and Training: before workers operate abrasive blasting tools, they should be trained and educated on the possible dangers. Knowing these risks will motivate them to utilize proper safety procedures on the project. Training may also be necessary to illustrate how to use the machinery and the PPE required for each task.

Separate blasting from other activities: dry blasting creates dust clouds that can travel around the job site. Even though workers may not be directly in the “blast zone,” they can still end up breathing in harmful dust. When blasting, workers performing the blasting must be sure to keep all other workers a safe distance away from the area. A containment structure or system which includes ventilation and housekeeping provisions should be installed prior to blasting.

Proper cleaning procedures should be completed once blasting operations are complete to ensure a non-toxic environment. When cleaning dry dust or grit, personnel should not use compressed air but utilize wet and dry vacuums instead.

PPE: Selection of the right PPE is vital to employee safety and health while abrasive blasting. Since abrasive blasting can use superfine particles, all PPE needs to be rated for this kind of work.

- Respirators: workers should have a self-contained breathing apparatus (SCBA) when dry blasting. This device ensure that they won’t accidentally breathe any particles into their lungs.
- Face shield and helmets: Employees should have an enclosed helmet that protects every inch of their head. While eye protection can work, particles can get into a person’s hair or stick to their skin, creating potential irritation and other health problems.

- Hearing protection: Earplugs should work well at keeping out the loud noises that come from abrasive blasting, but some situations may require double protection or alternative means.
- Blast suit: Workers should wear a full-body suit while blasting to prevent particles from getting into their clothing. Ideally, the suit will also include a head covering for complete protection.
- Gloves and boots: Hands and feet should be protected at all times with thick leather boots and gloves. Suits should be tucked into these items to prevent gaps. Ideally worker should seal these points with tape for extra protection.

Painting and Coating Application Safety

This Project will require the application of paint or other coatings which can have a negative effect on worker health if performed improperly. As with any chemical, the likelihood of a reaction and the extent and type of health effect depends on many factors:

- Amount of chemical in the air
- Length of time a person is exposed
- Age
- Pre-existing medical conditions
- Susceptibility

The potential hazards associated with painting and coating operations include:

- Rashes, swelling form short term skin contact
- Eye irritation, sore throat, cough, fatigue, nausea, dizziness from short term inhalation
- Liver, kidney, lung, digestive system, central nervous system damage from long term or massive exposure
- Fire/Explosion

Most paint or coatings are not an especially high-risk substance, but many contain ingredients that can cause health and safety problems. Many times, paint selection is limited by project specifications and this leaves little room to choose those that are less hazardous. The Safety Data Sheet must always be consulted for the paint prior to determining the required and necessary safety precautions.

Safety precautions

Workers must always follow the below safety precautions relating to painting and coating:

- Always read and follow all the instructions and safety precautions on the label- do not assume you already know how to use the product.
- Make sure there is plenty of fresh air or adequate ventilation during and after applying paint or other coatings.
- Keep paint away from ignition sources and never smoke in areas where paint is used or stored.
- Separate painting operations from all other site operations.
- Store paint and coatings in appropriate flammable storage cabinets or rooms.
- Ensure necessary fire protection equipment is available for use in the event of a fire.
- Utilize a paint containment structure installed per the project's approved containment plan.
- Ensure proper PPE is selected and utilized based on the SDS and other site requirements.
- Follow the appropriate first aid measure in the event of a paint exposure situation.

Railroad Safety

A portion of work on this Project may occur with an active railway in close proximity. The following safety precautions will be utilized to enhance the safety of our employees, subcontractors, and representatives:

- As necessary when working in close proximity, the Development Entity will comply with the Roadway Worker Protection Program as required by FRA Railroad Workplace Safety Regulations, 49 CFR Part 214.
- Particular attention must be paid to the provisions regarding the Roadway Worker in Charge (RWIC), and following the instructions given by the RWIC. Each worker must know, at all times, who the designated RWIC is. All work shall be planned to allow for advanced notice to railroad to provide a flagman.
- Two-way radios shall be provided to allow for communication between the flagman and project supervision to provide notification of train traffic.
- The Development Entity must, at all times, maintain documentation that all employees and subcontractors have been properly trained in the Roadway Worker Protection Program for the current year, and fully understand their responsibility regarding their safety, and the safety of co-workers.
- One of the best measures that can be taken to prevent accident or injury is for everyone involved in a task to understand the roles and responsibilities of each group member. This is accomplished through a job briefing. A job briefing will review the following steps known as “SHEPUF”:
  - **S**teps to be taken to accomplish the work.
  - **H**azards which can be anticipated.
  - **E**quipment that may be affected.
  - **P**ersonal Protective Equipment (PPE) to be utilized.
  - **U**nderstanding of the work to be performed.
  - **F**ollow-up Plan to assure safety during work.
- Participation and involvement in Job Briefings are required and must be done:
  - At the beginning of each shift
  - When work changes
  - When the work becomes confusing or new tasks are started
  - When a rule violation is observed

- Employees must always be on the alert for moving equipment. Employees must always expect movement on the adjacent track, at any time, in either direction. Before stepping over or crossing tracks, look in both directions.
- Employees must always be on the alert of equipment swing radius clearance to eliminate fouling the active track. All work shall be conducted so that scheduled train speeds can be maintained and that all trains and railroad facilities will be protected and safeguarded at all times.
- Employees must not foul a track unless it is necessary for the performance of their duties. If fouling is required, employees must ensure that on-track safety is being provided by checking in with the RWIC If the railroad Flagman is not on site when scheduled to be no work shall be performed that will foul the track.
- Employees must not step on top of or cross over any temporary warning barrier that may be between the work and active tracks. Barricades, warning devices, sheeting and shoring shall be used in areas to protect track and railroad facilities.
- All workers must wear a minimum Class II traffic vest at all times.

- In passing around the ends of standing rail cars, engines, roadway machines or work equipment, employees must leave a minimum of 25 feet between yourself and the end of the equipment. No worker should go between pieces of equipment if the opening is less than 50 feet at a minimum.
- Employees must avoid walking or standing on the active track unless authorized by the Railroad Worker in Charge (RWIC).
- Employees must not sit on, lie under or cross between cars except as required in the performance of your duties and only when the equipment has been protected against movement and authorized by the RWIC.
- No tools, materials or equipment are to be stored in close proximity to the tracks. Unless approved by the engineer all personnel and equipment shall be kept at least 25 feet from the nearest rail of any live track on the project.
- Trucks, tractors, or other equipment is not to touch ballast line without specific permission of the designated railroad employee. All access roads shall be maintained during the Project for railroad vehicular traffic. Roadways which parallel active tracks shall not be closed for any reason.
- Employees who handle materials or work around machinery must not wear rings and must not wear other adornments or clothing that may be snagged.
- Undivided attention is required while working onsite. While on duty, employees must not engage in any activity that will jeopardize their personal safety or the safety of others, interfere with or distract their attention, or circumvent the requirements of the safety rules or special instructions.
- Cranes and other equipment shall be considered as fouling a track whenever they are located in such a position that failure of the crane or other equipment, with or without load, would bring any part of the equipment within the fouling limits of the track.

Marine Activities and Working Over or Near Water

As part of this Project, various activities will be performed from on, over or near the water. Working in these locations adds serious safety hazards, even under normal conditions, which need to be addressed to ensure a safe operation. Work over or within 6 feet of the water's edge requires additional precautions.

- Employees working over or near water where the danger of drowning exists, shall wear a Type I, II, III or V U.S. Coast Guard approved life jacket or buoyant work vest at all times. The life jacket or buoyant work vest must be marked for use as a work vest, for commercial use, or for use on vessels. When working over or adjacent to water without 100% fall protection, Personal Floatation Devices (PFDs) that will provide an unconscious user flotation in a face-up position must be used. Employees who are protected by 100% fall protection, or other approved fall prevention measures such as guardrails, may do so without PFDs.
- Employees must work in pairs and exercise extreme caution in performing their work. At least two workers must be in sight of each other at all times.
- US Coast Guard approved 30" ring buoys with at least 90 feet of line shall be readily available for an emergency rescue operation. Ring buoys must be located on each floating plant/barge, in the life saving skiff, along the riverbanks being worked, and along the bridge structure. Distance between ring buoys shall not exceed 200 feet.
- A lifesaving skiff will be immediately available at locations where employees are working over or adjacent to water. Skiff operators will be properly trained on the operation of the skiff and safe retrieval methods.
- Portable air horns will be located on each floating plant/barge, in the life saving skiff, and along the riverbanks being worked, to alert everyone on the Project of an emergency. Air horns should be kept with all ring buoys.

- The river will be constantly monitored by the Superintendent, the safety personnel and supervisors onsite for dangerous conditions such as ice, drift and debris, turbulence and weather. These conditions may affect the safety of the operation and require the evacuation of the activity. (See below Evacuation Procedures)
- Vessels being used to move the floating plant / barge shall be of adequate size and horsepower to move safely in these locations.
- Floating plant/barges shall be inspected and tested by a qualified person and determined to be in safe operating condition before it is put into use.
- Each floating plant/barge must be equipped with at least one portable or permanent ladder (Jacobs ladder), which will reach the top of the apron to the surface of the water.
- Equipment/material loaded onto the floating plant/barge deck will be limited to safe capacity (engineered to determine capacity) and properly secured-anchored to the deck from displacement. Working surfaces of the decks shall be maintained in a safe condition free of obstructions and tripping hazards. A three-foot clear space will be maintained on the edge of each floating plant / barge deck.
- Proper ramp or safe walkway shall be provided for access to each floating plant / barge unless employees can step safely to or from the wharf, float, barge, or river vessel.

Emergency Actions

In case of emergency a worker should follow the below instructions:

- When an emergency occurs, make sure to act accordingly to eliminate any further injuries to the individual.
- Call 911 and provide as much information as you can (location of injury, nature of injury, body part, conscious / unconscious, etc.)
- Leave the EMS know where the emergency vehicle entrance is located and send a Company employee to meet them.
- Do not move the individual (spinal injury, etc.) unless the employee is in imminent danger.
- Keep the injured person calm until EMS arrives.
- Clear a path for the EMT and emergency personnel.
- Secure the work area where the injured employee is located.

Employee Evacuation Procedures

- Employee evacuation or partial evacuation be necessary on the project; the following procedures will apply.
- Contact the proper emergency service needed for the evacuation problem.
- All personnel will be directed to the Designated Personnel Staging Areas and wait for instructions.
- All personnel must remain at the staging area.
- Each supervisor will do a roll call to account for any missing employee (s). Remain, do not leave, and wait for instructions.
- If any employee is considered missing, a rescue team will be assembled to look for any personnel unaccounted for.
- Do not re-enter the work area until specific instructions and authorization is received from management.
- Equipment is secondary to the safety of all site personnel if an emergency evacuation is needed.

River Work Evacuation Procedures

- The Development Entity and its contractors will be performing a large portion of their work on the river, working from floating plants/barges. Due to the potential hazard of severe weather, storms, high winds, and flooding. The following procedures will be followed for the evacuation of marine work:
  - The security personnel and supervisors onsite are responsible for the monitoring of water levels, severe weather, river conditions, river levels, discharges and flow of the river on a continuous basis at the jobsite.
  - Marine weather broadcasts NOAA must be monitored full-time while working in exposed locations with this potential hazard by the supervisor onsite. They shall also use other local commercial weather forecasting services available.
  - If water conditions are deemed to be unsafe all marine work activities will immediately cease and the floating plant/barges moved to a safe harbor location.
  - The vessel being used to move the floating plant / barges shall be of adequate size and horsepower to move against tides, current, and winds anticipated during these conditions.
  - Once floating plant/barges have been moved to the safe harbor location, it must be properly secured/ moored to prevent dislodgment during these conditions.
  - Severe conditions may warrant equipment / material to be removed from the decks of the floating plants/barges and withdrawn from the river due to potential flooding. The Construction Manager will maintain personnel and equipment in a standby status to rapidly remove as much feasible equipment/material as possible from these locations.
  - During these conditions the supervisor must have individuals available to adjust the mooring lines on the floating equipment at the safe harbor location.
  - Crewmembers performing the river work operations will be directed to the designated personnel staging location and remain there for instructions.

Emergency Rescue Operation

- This Rescue Plan is designed for a possible person overboard emergency on the jobsite while performing work near, over, or on the river. Everyone must be trained and aware of the following steps, which need to be taken to ensure the employees safe recovery.
- Alarm System: Portable air horns will be used for alerting everyone on the project of a person overboard. Portable air horns will be located on each floating plant/barge, in the life saving skiff, and along the riverbanks/shorelines being worked
- Emergency Devices: Lifesaving rings with at least 90 feet of line must be located on each floating plant/barge, in the life saving skiff, and along the riverbanks/shorelines being worked. They shall have no more than 200 feet distance between each of them. All employees are required to wear life vest at all times while working over or near water. (See marine activities)
- Lifesaving skiff will be immediately available to be used for an emergency rescue operation of an individual from the river.
- Emergency Plan: Training of each employee on the jobsite is required on the proper air horn procedures, which need to be followed for persons overboard.

1 – Air Horn Blow Approximately - 5 seconds

- The first individual that becomes aware of a person overboard must immediately sound the air horn available at the noted locations. This will alert all employees on the project of the emergency rescue operation needed.

- All employees must immediately place the rescue operation as their primary concern and assist in any manner that they can.
- At this time, it is very critical that the person overboard is retrieved from the water in a safe manner to avoid any other employees going overboard and to reduce hypothermia.
- If the person overboard is conscious and coherent a lifesaving ring buoy may to thrown to the individual for retrieval.
- If the person overboard is unconscious, incoherent or too far from the location of the ring buoy, we must immediately retrieve the individual with the lifesaving skiff available at the immediate work location.
- Depending on the time of the year and the water temperature. Hypothermia will begin if the body temperature drops to or below 95 ºF (35 ºC). Normal body temperature - 98.6 □F / 37 □C

Signs of Hypothermia:

- Fatigue or drowsiness, uncontrolled shivering, cool bluish skin, slurred speech, clumsy movements, irritable, irrational or confused behavior.
- What should be done:
  - Call for emergency help (i.e., ambulance or call 911). Body heat is lost up to 25 times faster in water.
  - DO NOT remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
  - Get out of the water as quickly as possible or climb on anything floating. DO NOT attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses the body's heat and reduces survival time by about 50 percent.
  - If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely until help arrives.

Equipment Inspection

- Prior to equipment being placed in use, it shall be inspected and tested by a competent person and certified to be in safe operating condition.
- Inspection records shall be maintained on the jobsite and will be available upon request. Equipment being used will be inspected on a daily basis to ensure safe operating conditions.
- Equipment shall be operated only by designated qualified personnel in accordance with the manufacturer's instructions and recommendations. Safeguards will be installed to prevent machinery and equipment operating on floating plants from going into the water.

Clearing and Grubbing

The scope of work on the project includes the clearing and grubbing of existing trees and ground cover vegetation. The following safety procedures will be taken to ensure a safe work environment for our employees and the general public:

- A JSA/DTP will be completed covering the hazards prior to commencing work with all employees.
- Employees must be properly clothed (long sleeves) to protect against irritant toxic plants such as poison ivy / poison oak. The supervisor needs to address if any employee is allergic to these types of toxic plants prior to placing the employee in the exposed areas.
- The proper personal protective equipment will be required during this operation.

1. Hardhat and safety glasses will be worn at all times
2. Ear protection will be required when working in the area, operating chain saw, operating the chipper and working in open cab equipment.
3. Chap-pants and a screen shield will be worn by the chain saw operator at all times during the tree cutting process. The feed operator for the woodchipper will also wear screen shields at all times.

- The following items will be avoided or removed during the clearing and grubbing operations:
  - Loose hanging clothing will not be permitted
  - Sleeves and shirttails will be tucked in at all times.
  - Long hair will be properly confined.
  - Wrist watches, rings and necklaces will be removed.

- The field supervisor will assure the public, spectators; other employees not involved with the operation, and equipment are kept at a safe distance away from the tree removal and wood chipping operations.
- All machines used will be in good operating condition and all safety devices, including shields, slip resistant strips, are installed and functioning properly.
- Equipment used for this operation will be equipped with a horn, back up alarm system and rollover cab protection.

Poisonous Plants

Many native and exotic plants are poisonous to humans when ingested or if there is skin contact with plant chemicals. However, the most common problems with poisonous plants arise from contact with the sap oil of several native plants that cause an allergic skin reaction—poison ivy, oak, and sumac.

Poison ivy, poison oak, and poison sumac release oil when the leaf or other plant parts are bruised, damaged, or burned. When the oil gets on the skin an allergic reaction, referred to as contact dermatitis, occurs in most exposed people as an itchy red rash with bumps or blisters. When exposed to 50 micrograms of oil, an amount that is less than one grain of table salt, 80 to 90 percent of adults will develop a rash. The rash, depending upon where it occurs and how broadly it is spread, may significantly impede or prevent a person from working.

Although over-the-counter topical medications may relieve symptoms for most people, immediate medical attention may be required for severe reactions, particularly when exposed to the smoke from burning these poisonous plants. Burning these poisonous plants can be very dangerous because the allergens can be inhaled, causing lung irritation.

Outdoor workers may be exposed to poisonous plants. It is important for employers to train their workers about their risk of exposure to poisonous plants, how they can prevent exposures and protect themselves, and what they should do if they come in contact with these plants.

Plant Identification:

The old saying "*Leaves of three, Let it be!*" is a helpful reminder for identifying poison ivy and oak, but not poison sumac which usually has clusters of 7-13 leaves. Even poison ivy and poison oak may have more than three leaves and their form may vary greatly depending upon the exact species encountered, the local environment, and the season. Being able to identify local varieties of these poisonous plants

throughout the seasons and differentiating them from common nonpoisonous look-a-likes are the major keys to avoiding exposure.

Poison Ivy

- Eastern poison ivy is typically a hairy, ropelike vine with three shiny green (or red in the fall) leaves budding from one small stem
- Western poison ivy is typically a low shrub with three leaves that does not form a climbing vine
- May have yellow or green flowers and white to green-yellow or amber berries

Poison Oak

- Typically, a shrub with leaves of three, similar to poison ivy
- Pacific poison oak may be vine-like
- May have yellow or green flowers and clusters of green-yellow or white berries

Poison Sumac

- Woody shrub that has stems that contain 7-13 leaves arranged in pairs
- May have glossy, pale yellow, or cream-colored berries

Symptoms:

- Signs or symptoms associated with dermal contact with poisonous plants may include:
  - Red rash within a few days of contact
  - Possible bumps, patches, or weeping blisters (blister fluids are not contagious)
  - Swelling and itching

Recommendations:

- Workers can prevent contact with poisonous plants by taking these steps:
  - Wear long sleeves, long pants, boots, and gloves.
  - Wash exposed clothing separately in hot water with detergent.
- Barrier skin creams, such as a lotion containing bentoquatum, may offer some protection before contact.
  - Barrier creams should be washed off and reapplied twice a day.
  - After use, clean tools with rubbing alcohol (isopropanol or isopropyl alcohol) or soap and lots of water. Oil can remain active on objects for up to 5 years.
  - Wear disposable gloves during this process.
- Do not burn plants that may be poison ivy, poison oak, or poison sumac. Inhaling smoke from burning plants can cause severe allergic respiratory problems.
- Workers who have come in contact with poisonous plants should:
  - Immediately rinse skin with rubbing alcohol, specialized poison plant washes, degreasing soap (such as dishwashing soap) or detergent, and lots of water.
  - Rinse frequently so that wash solutions do not dry on the skin and further spread the oil.
  - Scrub under nails with a brush.
  - Apply wet compresses, calamine lotion, or hydrocortisone cream to the skin to reduce itching and blistering.
  - Follow the directions on any creams and lotions. Do not apply to broken skin, such as open blisters.
  - Oatmeal baths may relieve itching.

- An antihistamine such as Benadryl can be taken to help relieve itching.
- Follow directions on the package.
- Drowsiness may occur.
- In severe cases or if the rash is on the face or genitals, seek professional medical attention.

Confined Space Entry

Each contractor that will be performing confined space entry operation must have a designated competent person on the project who will be responsible for implementing the project's Confined Space program.

Confined Space is space that (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; (2) Has limited or restricted means for entry or exit; and (3) Is not designed for continuous employee occupancy.

Permit-Required Confined Space is a confined space that has one or more of the following characteristics:

a. Contains or has the potential to contain a hazardous atmosphere; or
b. Contains a material that has the potential for engulfing an entrant; or
c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
d. Contains any other recognized serious safety and health hazard

The worksite shall be evaluated by the competent person to determine if any spaces that are to be entered are permit-required confined spaces through consideration and evaluation of the elements of that space, including testing as necessary.

If the workplace contained permit spaces, exposed employees shall be informed by posting danger signs or by any other equally effective means, of the existence and location of, and the danger posed by, each permit space; and if employees are not authorized to work in permit spaces effective measures to prevent employee from entering the permit space shall be implemented and the spaces shall be effectively controlled to ensure entry cannot be made.

If entry shall be made within permit spaces, a written permit space program will be developed and implemented by the contractor.

The requirements for working in permit spaces differ depending on the hazards present in the space. There shall be no work in Immediately Dangerous to Life and Health (IDLH) conditions. Entry into permit spaces shall be determined based on the actual or potential hazards or condition present within the space.

All employees required to enter a confined space shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the following procedures and practices.

Testing of Atmosphere	Rescue
Ventilation	Lockout/Tagout
Communication	Tools and Equipment
Entry Permits (if required)	Entry and Exit
First Aid	Fire Prevention and Protection

All employees will be instructed that no one will be permitted to access a confined space area without proper permission by the Development Entity-designated competent person.

Drilling Operations

This section will provide the requirements to protect employees from hazards associated with drilling operations.

This Drilling Safety Program will be implemented on all jobsites where employees are required to perform drilling operations. All subcontractors will also comply with this program.

General Requirements

- The competent person must be on the jobsite during all drilling operations. The competent person will verify that all utilities have been marked and that a current ticket number is on file.

Drill Crew

- At a minimum, the drill crew will consist of one (1) drill rig operator and one (1) ground assistant. The drill rig operator and the ground assistant will work in a manner that maintains visual contact.
- The drill crew will remove all surface and overhead obstructions that may create a hazard prior to drilling.
- The drill crew will ensure that unauthorized personnel stay clear of the drill auger during drilling operations.

Operations

- No employee will advance on a hole in which the drill auger is rotating. Advancement will only be done when the drill is not rotating in any manner.
- The ground assistant will maintain a safe distance of at least 6 feet while the drilling operation is being done. If someone must be within 6 feet, drilling must cease before advancement and the employee must be protected by an approved guardrail or fall protection equipment if a fall into the hole is possible.
- Once drilling is complete, the hole must be immediately covered with a covering capable of supporting at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time. The covering shall be secured and marked “Hole”, guard railed or have a form tube installed high enough to constitute a guardrail to protect from possible fall. No hole will be left uncovered or unprotected when work is taking place in that hole. The competent person will monitor the holes for stability and ensure proper protection is provided.
- During general operations, a minimum distance of 10 feet is to be maintained from overhead utilities. An additional 4 inches is required per every 10kv over 50kv.If drill rig needs relocated, ensure that the mast is not in its raised position. Tag lines will be used to control all loads.

Post Operations

- At the end of the work shift, the Supervisor will be responsible for checking that all holes are covered, secured, or properly protected.
- The covers, guardrails, or form tubes shall remain in place until the hole has been filled to finish grade and a fall hazard is no longer present.

Shotcrete Operations

This Project may involve shotcrete operations to support unstable or inadequate slopes. While the material component of shotcrete is essentially concrete, the process of shotcrete application is unique. It

involves pneumatic projection so that compaction is achieved on the receiving surface. Only qualified personnel must be allowed to operate, repair, or troubleshoot the shotcrete pump. All personnel operating, assembling, transporting, or maintaining the shotcrete pump should be aware of and comply with the following safety regulations:

- Operators and anyone working within the vicinity of the machine must wear appropriate PPE (hard hat, class 2 safety vests, and ANSI approved eye protection) required by federal, state, local and job site regulations.
- The below instructions must be followed:
  - Do not operate the unit unless it has been leveled, stabilized, blocked, and chocked.
  - Do not operate a malfunctioning machine. Report all damage, defects, problems, or accidents to your supervisor immediately.
  - Make sure all safety devices and operating instructions are legible and usable.
  - Do not clean, oil, adjust, or service unit while it is operating. If repair or other work must be performed inside the hopper, ensure that the engine is OFF and accumulator pressure reads zero.
  - Never open the concrete delivery system or loosen fittings without relieving the pressure.
  - To prevent a fire, do not ever fill the fuel tank while the engine is running or hot to.
  - Do not pour material into hopper without grate in place. Operators must prevent foreign objects from breaching the grate.
  - Operators should be aware of surroundings and make sure the area is clear before extending outriggers. Whenever outriggers or accessories are operated, maximum engine RPM should be used to prevent damage to hydraulic components.

Although small when compared to some construction equipment, the pump trailer still requires the same care and attention during transportation.

- The pump trailer is designed to be towed at highway speeds not to exceed 55 MPH.
- Truck & trailer tires must be inspected for sufficient pressure, cuts, and excessive wear.
- The hitch/lock, break away cable, and electrical cables controlling lights must all be attached and in working condition before hauling.

The below instructions must be followed:

- Do not tow the unit with concrete in the hopper. Also, remove all concrete delivery line components from the pump.
- All lifting devices used to move or place the shotcrete pump must be of sufficient capacity and all four provided lifting eyes must be utilized.

It should be a common practice that the operator performs a thorough walk-around inspection before each day's operation. If any discrepancy is noted during the pre-inspection, perform a lock out-tag out procedure and do not operate the unit until repairs are made. Pre-inspection includes an overview of:

- Overall machine condition
- Engine
- Battery
- Hydraulic system
- Hopper
- Delivery system

Additional Precautions:

- Emergency buttons and monitor gauges shall be reviewed and understood before operating the pump. In case of emergency, the qualified person shall know how to disengage the motor.
- In the case of a blockage in the delivery system, immediately switch of the concrete pump. Change the pump direction switch to REVERSE. Turn PUMP switch to ON allowing the pump to stroke two or three times in reverse. After relieving some pressure from the delivery line, warn all persons in the immediate area before disconnecting the clamping device. NEVER attempt to clear a blockage in the delivery system using pump pressure or compressed air!
- The concrete delivery system must be capable of withstanding the machine's concrete working pressure listed on the machine rating. If a rubber hose is used, it must have a burst pressure that is at least 3 times the working pressure.
- When hand mixing concrete; refer to the silica awareness section of the site specific.
- When loading shotcrete pump with pre-loaded concrete truck; refer to the heavy equipment and truck safety section of the site specific.
- All connections on hoses and delivery system must be securely fastened to prevent displacement/leaks.
- The pump shall be cleaned after every pumping operation is concluded to prevent blockages and exterior damage to the unit. Also, maintenance shall be performed on any defect of the unit immediately to prevent employee injury.
- When cleaning the hopper with the grate up; ensure that it is properly secured to prevent unexpected closure and possibly injury or death.

Cold Weather Safety

Working in cold environments can be dangerous. More than 700 people die of hypothermia each year in the United States. Prolonged exposure to freezing or cold temperatures can result in health problems such as trench foot, frostbite, and hypothermia.

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. The likelihood of injury or illness depends on factors such as physical activity, clothing, wind, humidity, working and living conditions, and a person's age and state of health. Employees shall follow these tips to stay safe in cold weather:

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help workers.
- Train workers about cold-induced illnesses and injuries.
- Encourage workers to wear proper clothing for cold, wet and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).
- Wear a hat, preferably one that covers your ears - most of your body heat is lost through your head.
- Wear mittens as they provide more warmth to your hands than gloves.
- Wear waterproof insulated boots to help avoid hypothermia or frostbite by keeping your feet warm and dry and to maintain your footing in ice and snow.
- Be sure that workers take frequent short breaks in warm dry shelters to allow the body to warm up.
- Try to schedule work for the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.

- Use the buddy system -- work in pairs so that one worker can recognize danger signs.
- Drink warm, sweet beverages (sugar water, sports-type drinks) and avoid drinks with caffeine (coffee, tea, sodas or hot chocolate) or alcohol.
- Eat warm, high-calorie foods such as hot pasta dishes.
- Remember that workers face increased risks when they take certain medications, are in poor physical condition or suffer from illnesses such as diabetes, hypertension or cardiovascular disease.
- Get out of wet clothes immediately and warm the core body temperature with a blanket or warm fluids like hot cider or soup. Avoid drinking caffeine or alcohol if you expect you or someone you are trying to help has hypothermia or frostbite.
- Recognize the symptoms of hypothermia that can be a serious medical condition: confusion, dizziness, exhaustion and severe shivering. Seek medical attention immediately if you have these symptoms.
- Recognize frostbite warning signs: gray, white or yellow skin discoloration, numbness, waxy feeling skin. Seek medical attention immediately if you have these symptoms

APPENDIX A

JOB SAFETY ANALYSIS TEMPLATE

SUPERVISOR'S DAILY TASK PLANNER TEMPLATE

JOB SAFETY ANALYSIS FORM

Supervisor:
Date:
Jobsite Number:
Project Name:

Work Activity:

_____

Employees Trained - Signature

KEY OPERATIONAL STEPS	POTENTIAL HEALTH HAZARDS	SAFE WORK PRACTICES	PROTECTIVE EQUIPMENT / ACTIONS	COMMENTS:

SUPERVISOR'S DAILY TASK PLANNER FORM

Project:_____ Date: _____

Contractor: _____

Supervisor's Name (Print): _____ (Sign): _____

WORK DESCRIPTION (List each task)

Task #1: _____ Task #2: _____

RECOGNIZED HAZARDS (Check all that apply)

- □ Caught In Between/Pinch Points
- □ Struck By/Dropped Objects
- □ Falls
- □ Electrical
- □ Slip/Trips
- □ Exc./Trench- **Safe Dig Plan**
- □ Vehicles/Traffic
- □ Manual Lifting
- □ Stairways/Ladders
- □ Crane Operations
- □ Material Handling/Rigging
- □ Working Over/Near Water
- □ Scaffolding
- □ Caisson/Shaft Drilling
- □ Pile Driving
- □ Welding/Cutting- **Hot Work Permit**
- □ Fire/Explosion
- □ Overhead/Underground Utilities
- □ Working w/ Concrete
- □ Working On/Near Railroad
- □ Heavy/Mobile Equipment
- □ Confined Space- **Permit**
- □ Flagging/Traffic Control
- □ Chipping/Hammering
- □ Clearing/Grubbing
- □ Impalement Hazards
- □ Noise

Weather Conditions

- □ Heat
- □ Cold/Ice/Snow
- □ Rain
- □ Wind
- □ Rough Water/Waves

Biological

- □ Plants/Animals/Insects

Health/Industrial Hygiene

- □ Lead
- □ Silica
- □ Welding Fumes
- □ Other: _____
- □ Other Contractors
- □ Other: _____

PPE CONSIDERATIONS

- □ Hard Hat

Eye and Face Protection

- □ Safety Glasses/Side Shields
- □ Face Shield/Goggles
- □ Welding/Cutting Protection

Foot Protection

- □ Safety Toed Boots
- □ Metatarsal Guards
- □ Rubber Boots

- □ Hand Protection
- □ Fall Protection
- □ Respiratory Protection
- □ Hearing Protection
- □ Traffic/Reflective Clothing
  - □ Class 2 Vest
  - □ Class 3 Vest
  - □ Hi-Viz Pants/Leggings

Special Clothing

- □ Life Jacket / PFD
- □ Chainsaw Chaps
- □ FR/Lead Suit
- □ Cut Level Sleeves

TOOLS/EQUIPMENT

- □ Excavator
- □ Loader
- □ Bulldozer
- □ Roller- Walk/Ride
- □ Skid Steer
- □ Articulated/Rock Truck
- □ Truck/Trailer
- □ Crane/Boom Truck- **Daily Checklist**
- □ Aerial Lift/MEWP- **Daily Checklist**
- □ Pile Hammer
- □ Drill Rig/Auger
- □ Compressor/Light Plant
- □ Welder/Torch Cart- **Hot Work Permit**
- □ Concrete/Grout Pump
- □ Chop Saw- **Hot Work Permit**
- □ Demolition Saw- **Hot Work Permit**
- □ Chain Saw
- □ Circular Saw
- □ Drill (Hand/Core)
- □ Grinder
- □ Tamper (Plate/Jumping)
- □ Concrete Vibrator

DESCRIBE SAFE WORKING PROCEDURES

General Safety Information: _____

_____

_____

How Will We Access the Work Area: _____

How Will We Maintain Housekeeping:_____

How Could We Be Injured: _____

_____

What Equip/Property/3rd Party Claims Are Possible: _____

_____

How Will We Prevent These Incidents? _____

_____

Are There Any Line of Fire Concerns:_____

Are There Any Dropped Object Concerns: _____

What Do We Do In An Emergency:_____

Crew Comments: Is there anything that I missed? Do we need to correct anything from our last work shift that could affect this shift?

SOP REVIEWED:

☐ Yes ☐ No Topic: _____

LESSONS LEARNED / NEAR MISS / GOOD CATCH REVIEWED: ☐ Yes ☐ No

TRAINING REQUIRED FOR TASK(S):

☐ Fall Prot. ☐ MEWP ☐ Excavation ☐ Confined Space ☐ Rigging ☐ Signaling ☐ Silica ☐ Lead

☐ Other _____

ADDITIONAL CHECKLISTS / PERMITS REQUIRED FOR TASK(S):

☐ Safe Dig/Excavation ☐ MEWP(s) ☐ Crane(s) ☐ Confined Space ☐ Life Saving Skiff ☐ Hot Work

DAILY WORKSITE SAFETY ASSESSMENT

Mark OK for safe; NA for not applicable; and C for correction with a description under comments.

Area Assessed	Status OK/NA/C
1. **Housekeeping / Sanitation-** Waste and trash removed, material properly stacked, hose/cables/cords out of walkways	
2. **Fire Prevention / Fuel Storage / Welding / Cutting-** Fire extinguishers present, fuel containers stored properly, tanks protected from collision, fire hazards removed from area, cylinders upright and separated, leads and hoses inspected	
3. **PPE / Respiratory Protection-** Necessary PPE worn for hazard, respirators inspected and appropriate for hazard, wearer is clean shaven and properly trained	
4. **Tools / Portable Equipment-** Tools/equipment properly inspected and used as intended, guards and handles on all tools, tongues locked, air hoses couplers secured	
5. **Electrical / Utilities-** Assured grounding program implemented, cords properly used, overhead utilities identified w/ signs/flags, proper distances maintained	
6. **Access / Stairs / Ramps / Ladders / Walking / Working-** Access provided at 19" or more breaks in elevation, ladders inspected and used properly, 3 points of contact maintained, ramps not too steep and cleated, walkways 18" or wider	
7. **Fall Protection / Holes-** 100% protection at 6', employees trained and equipment worn properly, equipment, systems, and guardrails inspected, projection hazards capped	
8. **Traffic Control-** Signs/channelizers in good shape and installed properly, employees protected, flaggers trained	
9. **Heavy Equip. / Vehicles-** Operators qualified, seat belts worn, equipment used properly and inspected, horns/back up alarms functioning, proper berms in place, drivers have MVR's	
10. **Trenches / Excavations-** Safe dig plan completed, 24" tolerance observed on utilities, excavations deeper than 5' properly protected, access/egress provided w/in 25', trench boxes used properly	
11. **Cranes / Material Handing / Rigging-** cranes/rigging inspected, personnel trained/qualified, crane set up properly, swing radius barricaded, taglines used, weather appropriate	
12. **Marine Activities / Work Over / Adjacent to Water-** Skiff available and properly equipped, PFD's worn, barges/equip. used properly, Jacobs ladders installed, rings/horns present	
13. **Pile Driving / Drilling-** hammer assembled properly, pile heads square and free of material/debris, fall protection used	
14. **Silica / Lead Work-** engineering controls used, personnel trained, wash station available & used, proper protection used	
15. **Confined Spaces-** personnel trained, monitoring performed, permit completed, proper equipment used	
16. **Scaffolding / Mobile Elevated Work Platforms-** Daily inspection completed, personnel trained, worksite safe for use, proper distance from hazards	
17. **Subcontractors-** Following all rules/policies/procedures	

Comments:	CREW (Print)

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INCIDENT REPORTS

Supervisor- Print	**Sign**	**Date**
Superintendent Print **Sign**		**Date**
Safety Representative- Print	**Sign**	**Date**

APPENDIX B

Silica Exposure Control Plan

Silica Exposure Control Plan

Company: Building Pennsylvania Constructors

Person Completing the Plan/Title: Name - Title

Jobsite/Project: XXXXXXXXX

Description of Work: Removal and replacement of concrete structures and repair of concrete piers via gunite/shotcrete placement.

Competent Person(s): XXXXXXXXX

Tasks:

1. Abrasive Blasting- Concrete

    Equipment and Control(s):

        Respiratory Protection - Abrasive Blasting

    Task/Control Description:

        The Development Entity will utilize a continuous flow air-line respirator constructed so that it will cover the wearer's head, neck and shoulders to protect them from rebounding abrasive, pursuant to rule 29 CFR 1910.94(a)(1)(ii) during all abrasive blasting operations. The Development Entity will also utilize non-silica containing shot to perform these operations. Where feasible a wet method will be utilized to minimize silica dust exposure.

2. Cutting/sawing- Concrete

    Equipment and Control(s):

        Hand-Held Masonry Saw with Water (Table 1 Entry), 2) Walk-Behind Saw with Water (Table 1 Entry)

    Task/Control Description:

        The Development Entity will utilize a walk-behind saw equipped with a water to saw cut deck sections. Any hand held sawing will be performed with a hand held saw with integrated water delivery or hand held sprayer/hose. When water delivery is in feasible respiratory protection will be provided in conjunction with exposure monitoring.

3. Demolishing/disturbing- Concrete

    Equipment and Control(s):

        Heavy Equipment with Cab Filtration System (Table 1 Entry), 2) Hydraulic Breaker

    Task/Control Description:

        Equipment operators will perform work from within closed cabs equipped with appropriate filters. All ground personnel will remain away from demolition operations or be provided respiratory protection in conjunction with exposure monitoring.

4. Drilling/coring- Concrete

    Equipment and Control(s):

        Hand-Held Drill with Dust Extraction (Table 1 Entry), 2) Hand-Held Drill with Vacuum (Table 1 Entry)

    Task/Control Description:

        During the course of this project it may be necessary to drill into the concrete deck, parapet, piers, or jersey barrier. When performing this work, The Development Entity personnel will use hand-held drills with either a vacuum or dust extraction equipment. When in feasible work will be performed with respiratory protection in conjunction with exposure monitoring.

5. Grinding- Concrete

    Equipment and Control(s):

        Hand-Held Grinder with Vacuum (Table 1 Entry), 2) Hand-Held Grinder with Water (Table 1 Entry)

    Task/Control Description:

        Employees performing grinding or finishing of concrete will perform operations with hand-held grinders equipped with shrouds for dust collection or water will be supplied to the work area. Where this is in feasible work will be performed with respiratory protection in conjunction with exposure monitoring.

6. Jackhammering- Concrete

    Equipment and Control(s):

        Pneumatic chipping hammer

    Task/Control Description:

        Employees performing chipping or hammering will perform operations with pneumatic chipping guns and will utilize a handheld sprayer/hose, where feasible. All work will be performed with respiratory protection in conjunction with exposure monitoring.

7. Earthmoving- Soil (fill dirt, top soil, soil w/ fly ash added)

    Equipment and Control(s):

        Heavy Equipment with Cab Filtration System (Table 1 Entry)

    Task/Control Description:

        When performing excavation work where there could be potential silica exposure equipment operators will perform this work from within closed cabs equipped with appropriate filters. All ground personnel will remain away from excavation operations or be provided respiratory protection in conjunction with exposure monitoring.

8. Earthmoving- Stone (including: granite, limestone, quartzite, sandstone, shale, slate, cultured, etc.)

Equipment and Control(s):

Respiratory Protection

Task/Control Description:

When performing excavation work or placement of stone where there could be potential silica exposure equipment operators will perform this work from within closed cabs equipped with appropriate filters. All ground personnel will remain away from excavation or stone placement operations or be provided respiratory protection in conjunction with exposure monitoring.

9. Sweeping/cleaning up

Equipment and Control(s):

Vacuum, 2) Water - Wet Surface

Task/Control Description:

When performing housekeeping of the bridge deck and debris removal from under decking water shall be used where feasible to control dust. Where feasible a HEPA vacuum will also be used. All work will be performed with respiratory protection in conjunction with exposure monitoring.

10. Mixing/Pouring- Gunite/Shotcrete

Equipment and Control(s):

Towable grout mixer and pump

Task/Control Description:

The Development Entity may utilize a towable grout mixer equipped with a pre-dampening function to add water to dry gunite/shotcrete. All work will be performed with respiratory protection in conjunction with exposure monitoring.

Safety of Others:

Work areas with the potential of releasing respirable crystalline silica will be identified with warning signage, where feasible and access will be restricted by use of hard barricade or warning tape.

Worker Training:

Employees will be trained on the following: the health hazards associated with exposure to respirable crystalline silica; the specific tasks in the workplace that could result in exposure; the specific measures that the Development Entity has implemented to protect employees from exposure, including the engineering controls, work practices, and respirators to be used; the contents of 1926.1153; the identity of the competent person on the project; and the purpose and a description of the medical surveillance program required by the standard.

Housekeeping:

Project housekeeping with regard to respirable crystalline silica will be performed utilizing the wet method or with HEPA vacuums. Dry sweeping or brooming shall not be allowed where such activity could contribute to employee exposure. Use of compressed air to clean work areas and clothing shall also not be allowed. Where

feasible saw cutting slurry shall be cleaned with a wet vacuum immediately to avoid drying. If slurry dries prior to cleaning water will be applied to re-wet and a wet vacuum should be used. Any hand shoveling of silica containing materials or debris shall be done so with respiratory protection and in conjunction with exposure monitoring.

Medical Surveillance:

All workers exposed to silica dust shall have an initial medical examination within 30 days after initial assignment unless they have received a medical examination meeting the requirements of the standard within the last three years. The examination shall consist of: A medical and work history, a physical examination, a chest x-ray, a pulmonary function test, testing for latent tuberculosis infection, and any other tests deemed appropriate by the Physician or other Licensed Health Care Professional (PLHCP). Periodic examinations shall be made available at least every three years, or more frequently if recommended by the PLHCP.

Other Considerations:

Additional consideration for using water as a control:

Collecting the water; tools with water collection systems can help avoid creating wet, slippery ground and walking surfaces. During cold weather a layer of ice can form on wet surfaces and increase the risk of slips and falls. Depending on the system, wet cutting can result in run-off that may need to be controlled. Remove silica-containing debris while wet to prevent the dust from becoming airborne and hazardous once dry. Avoid electric shocks when using an electric-powered tool with a water control by making sure that the electrical cords and extensions are rated for the tool's power requirements, regularly inspected, and used in combination with ground fault interrupt circuits.

Additional considerations for using vacuum controls:

Vacuum controls must be located as close to the dust generation as possible to be effective. A shroud may be needed to contain the dust so the vacuum can capture it. The shroud must be kept as close to the work surface as is practical to provide adequate dust capture. The shroud should be connected to the vacuum with 2-inch, or greater, diameter tubing with a relatively smooth interior. For dust containing silica, it is important to use as high efficiency (HEPA) filters. HEPAs require routine cleaning or disposal of prefilters, which can cause exposures to those performing the filter maintenance. For operations that generate large amounts of dust, cyclonic collection units may be a good option. Vacuum performance must be monitored on a regular basis to ensure the control’s effectiveness. A vacuum with a pressure gauge allows for frequent and easy monitoring of air flow. Vacuums require an adequate power source -- large electric vacuums commonly require 20 amp electrical circuits in addition to the power required for the tool.

Other considerations:

Avoid using gasoline-powered equipment in areas without adequate ventilation or confined spaces to prevent carbon monoxide poisoning. When using gas-powered equipment, small, personal air monitors should be worn by the operator to warn of unacceptable exposures. Monitor noise levels and ensure workers use hearing protection. Equipment-control combinations may generate sound levels that are greater than the OSHA Permissible Exposure Limit (PEL).

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA.				
Construction Task or Equipment Operation		**Engineering and Work Practice Control Methods**	**Required Respiratory Protection**	
			≤4 hours/shift	**>4 hours/shift**
2a	Handheld power saws (any blade diameter) when used outdoors	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
2b	Handheld power saws (any blade diameter) when used indoors or in an enclosed area	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
4a	Walk-behind saws when used outdoors	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
7	Handheld and stand-mounted drills (including impact and rotary hammer drills)	• Use drill equipped with commercially available shroud or cowling with dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. • Use a HEPA-filtered vacuum when cleaning holes.	None	None
10a	Jackhammers and handheld powered chipping tools when used outdoors	• Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. or • Use tool equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10b	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	• Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. or • Use tool equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA.				
Construction Task or Equipment Operation		**Engineering and Work Practice Control Methods**	**Required Respiratory Protection**	
			≤4 hours/shift	**>4 hours/shift**
12a	Handheld grinders for uses other than mortar removal for tasks performed outdoors only	• Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. or • Use grinder equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	None
12b	Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area	• Use grinder equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
17a	Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	• Operate equipment from within an enclosed cab. or • When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
18a	Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	• Apply water and/or dust suppressants as necessary to minimize dust emissions. or • When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None

When implementing the control measures specified in Table 1, each employer shall:

1. For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;

2. For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;

3. For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:

   (A) Is maintained as free as practicable from settled dust;
   (B) Has door seals and closing mechanisms that work properly;
   (C) Has gaskets and seals that are in good condition and working properly;
   (D) Is under positive pressure maintained through continuous delivery of fresh air;
   (E) Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (e.g., MERV-16 or better); and
   (F) Has heating and cooling capabilities

APPENDIX C

COVID-19 Exposure Prevention, Preparedness, and Response Plan

COVID-19 Exposure Prevention, Preparedness, and Response Plan

(As of November 2021)

[Entity Name to be inserted] (the "Company") takes the health and safety of our employees very seriously. With the spread of the coronavirus or "COVID-19," a respiratory disease caused by the SARS-CoV-2 virus, the Development Entity must remain vigilant in mitigating the outbreak. The Company is a proud part of the construction industry, which many have deemed "essential" during this Declared National Emergency. The ever changing events in regard to the COVID-19 situation have raised all of our stress levels and increased pressures on our families. Our planning will continue to evolve as we learn more from medical and government professionals. To provide a level of safety consistent with our culture and core values certain procedures need to be applied to prevent the spread of infection and to limit the potential for exposure to COVID-19. We have developed this COVID-19 Exposure Prevention, Preparedness, and Response Plan to be implemented, to the extent feasible and appropriate, throughout the Development Entity and at all of our jobsites. The Company has also identified a team of employees to monitor the related guidance that U.S. Center for Disease Control and Prevention ("CDC") and Occupational Safety and Health Administration ("OSHA") continue to make available.

This Plan is based on information available from the CDC and OSHA at the time of its development, and is subject to change based on further information provided by the CDC, OSHA, and other public officials. This plan will be utilized as the primary training document for all Company personnel and retraining will occur as necessary to ensure understanding by all individuals. Proof of training will be documented on the Record of Safety Training document found in Appendix 1 of this plan. Signatures will not be required to verify attendance. Each trainer will complete the training document by listing the attendees on the provided lines.

I. Responsibilities of Infection Control Administrator(s)- ICA

The Infection Control Administrators are responsible for the implementation of all aspects of this plan, making necessary updates to the plan, ensuring the plan is being adhered to on all projects and coordinating with appropriate medical and government personnel. They are also responsible for staying up to date on CDC, OSHA, US and State Departments of Health recommendations and updates regarding COVID-19. The Infection Control Administrators for the project are:

Name	Title	Phone
Name	Title	Phone

II. Responsibilities of Site Safety Representative

The Site Safety Representative must be familiar with this Plan and ensure that this plan has been reviewed with all employees and is being properly implemented at all sites. Site Safety Representative must enforce the elements of this plan and perform regular audits of the plan's effectiveness and implement changes as necessary to ensure personnel safety. If plan elements cannot be followed the Site Safety Representative shall immediately contact the ICA for review and a possible, site stand down.

III. Responsibilities of Managers and Supervisors

All managers and supervisors must be familiar with this Plan and ensure that this plan has been reviewed with all employees. Managers and supervisors must set a good example by following this Plan at all times. This involves practicing good personal hygiene and jobsite safety practices to prevent the spread of the virus. Managers and supervisors must encourage this same behavior from all employees. The Project Superintendent is the **Designated Representative** responsible for implementation of the plan at the project level.

IV. Responsibilities of Employees

The Company is asking every one of our employees to help with our prevention efforts while at work. In order to minimize the spread of COVID-19 at our jobsites, everyone must play their part. As set forth below, the Development Entity has instituted various housekeeping, social distancing, and other best practices at our jobsites. All employees must follow these guidelines. In addition, employees are expected to report to their managers or supervisors if they are experiencing signs or symptoms of COVID-19, as described below and they should not report for work if symptoms develop at home. If you have a specific question about this Plan or COVID-19, please ask your manager or supervisor. If they cannot answer the question, **please contact the Infection Control Administrator(s)**.

CDC highly recommends individuals to self-isolate if they become sick or are exposed to an individual that is sick. Symptoms that may appear 2-14 days after exposure include:

- Fever or chills
- Cough
- Shortness in breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

It also recommended that all personnel contact their Primary Care Physician (PCP) and seek immediate medical care if experiencing any of the following:

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion
- Inability to wake or stay awake
- Bluish lips or face

This list is not all inclusive. Please consult a medical provider for any other symptoms that are severe or concerning.

V. Responsibilities of Subcontractors, Suppliers, and Visitors

All subcontractors, suppliers, and visitors must be familiar with this Plan. Subcontractor managers and supervisors must set a good example by following this Plan at all times. This involves practicing good personal hygiene and jobsite safety practices to prevent the spread of the virus. Subcontractor managers and supervisors must encourage this same behavior from all of their employees. Subcontractors, suppliers and visitors must ensure that they **DO NOT ENTER THE SITE** if they have symptoms consistent with COVID-19 or have had a potential exposure to COVID-19 in the past 14 days.

This plan as well as the Subcontractor/Visitor/Vendor Screening form (Appendix 2) will be forwarded to all subcontractors and vendors for review with their personnel prior to arriving on site and it shall be updated accordingly as the plan evolves and crews expand.

VI. Training all personnel on illness prevention

Human coronaviruses are most commonly spread from an infected person to others through:

- Droplet transmission in the air by coughing and sneezing
- Close personal contact, such as touching or shaking hands
- Touching an object or surface with the virus on it, then touching your mouth, nose, or eyes before washing your hands

To lessen the potential for exposure the following procedures shall be observed:

- Wash your hands often with soap and water for at least 20 seconds, especially after you have been in a public place, or after blowing your nose, coughing or sneezing.
    - If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry.
- Avoid touching your eyes, nose and mouth with unwashed hands.
- Practice social distancing to avoid close contact with other people. Put distance between yourself and others. A good distance between personnel is at least 6 feet. Common social distancing requirements are outlined within this plan and additional procedures will be implemented on a project and task specific basis.
- Refrain from all skin to skin contact with other people and abstain from handshakes or other common close interactions.
- Wear an approved face covering/mask OR clear face shield at all times when social distancing of 6 feet is difficult to maintain and at all times in indoor/enclosed work areas or common areas within trailers, offices, etc. Use of face coverings/mask may be required at all times while at specific worksites due to state, local, or client/owner mandates. If face coverings/masks are required they will be provided by the company. However, employees may wish to wear homemade face coverings/masks which may allow for added comfort and a more custom fit. If homemade face coverings/masks are worn at the worksite they must meet the CDC's recommendations to be approved by the Development Entity .
- All face covering/masks must:
    - Fit snugly but comfortably against the side of the face
    - Are secured to the head with ties, ear loops, or other means
    - Include multiple layers of fabric
    - Allow for breathing without restriction
    - Are able to be laundered and machine dried without damage or change to shape
- The use of a face covering or mask is not required if it impedes an individual's vision, if they have a medical condition, or if it would create an unsafe condition in which to operate equipment or execute a task. During times of excess heat or strenuous physical activities the use of a face covering is not required when proper social distancing can be maintained. These situations create additional safety concerns that can be exacerbated by the use of face coverings or masks. An evaluation and determination shall be made by the Designated Representative, the ICA, and the Safety Department prior to approving the removal of face coverings/masks. All personnel shall keep a face covering/mask on their person for quick deployment if social distancing cannot be maintained.
- Inform subcontractors, suppliers, and other visitors that there will be limited availability to our personnel and they will be required to follow the exposure control measures found in this plan when visiting our sites.
- Cover your mouth and nose with a tissue when you cough or sneeze, or use the inside of your elbow.
    - Throw used tissues in the trash.
    - Immediately clean your hands.
- Clean and disinfect frequently touched surfaces daily (doorknobs, light switches, handles, keyboards, phones, desks, etc.).

In addition, employees must familiarize themselves with the symptoms of COVID-19, which include the following:

- Coughing;
- Fever;
- Shortness of breath, difficulty breathing; and

- Early symptoms such as chills, repeated shaking, muscle/body aches, sore throat, headache, diarrhea, nausea/vomiting, runny nose, and new loss of taste or smell.

If you develop a fever and symptoms of respiratory illness, such as cough or shortness of breath, **DO NOT COME TO WORK** and call your supervisor and healthcare provider right away. Likewise, if you come into close contact with someone showing these symptoms, call your supervisor and healthcare provider right away.

VII. Jobsite Protective Measures

The Company has instituted the following protective measures at all jobsites.

A. General safety policies, rules, and social distancing guidelines

- To ensure the continued success of this plan all employees and site personnel are responsible to identify and report noncompliance to their respective supervisor or manager so appropriate and prompt corrective actions can be implemented.
- Noncompliance will be handled in accordance with the Development Entity 's Progressive Discipline Policy. The first violation will result in a verbal warning, the second violation will result in a signed written warning, and the third violation will result in dismissal. At any time if the violation shows a blatant disregard to the requirements in this plan the steps may be bypassed directly to a written warning or dismissal.
- Prescreening of all site personnel (employees, subcontractors, etc.) may be performed over the phone or by using the online screening from prior to personnel arriving on site. If prescreened, it must be performed no earlier than 24 hours prior to arriving on site. The Designated Representative or other responsible supervisor will ensure that all site personnel have be screened prior to allowing access to site. Any personnel answering "yes" to a screening question will not be permitted on site.
- All site personnel (employees, subcontractors, etc.), if not prescreened prior to arriving on site, will meet at the project office to complete an online COVID-19 Screening Form by using their smartphone and the QR code or hyperlink found on the project bulletin board or outside the office entrance. If an individual is unable to complete the online form the Designated Representative or other responsible supervisor will verbally review the COVID-19 Screening Form with all personnel and document their responses to each question either online or on a hard copy form. Any employee/contractor/visitor answering "yes" to a screening question or showing symptoms of COVID-19 will be asked to immediately leave the jobsite and return home. The ICA shall also be notified by the supervisor or manager and the requirements listed in section X- Jobsite Exposure Situations will be followed.
- Limit the number of people on the jobsite and allow personnel to work from home when possible. Evaluate all tasks to determine what personnel are essential for the task to minimize exposure.
- Safety meetings will be by telephone, radio, megaphone, if possible. All safety meetings will begin with a discussion on the signs and symptoms of COVID-19 and employees will be directed to return home if they are experiencing any on those symptoms.
- If safety meetings are conducted in-person, attendance will be collected verbally and the foreman/superintendent will sign-in each attendee. Attendance will not be tracked through passed-around sign-in sheets or mobile devices. During any in-person safety meetings, avoid gathering in groups of more than 10 people and participants must remain at least six (6) feet apart.
- Employees must avoid physical contact with others and shall direct others (coworkers/contractors/visitors) to increase personal space to at least six (6) feet, where possible. Where work trailers are used, only necessary employees should enter the trailers and all employees should maintain social distancing while inside the trailers and face coverings/masks must be worn. If enclosed spaces are required to be entered such as conex boxes, tool trailers, break trailers, manholes, etc. only one person shall be allowed in each space at a time.
- All in-person meetings will be limited. To the extent possible, meetings will be conducted by telephone.
- Employees will be encouraged to stagger breaks and lunches, if practicable, to reduce the size of any group at any one time to less than ten (10) people. Modify lunch and break areas to aid in maintaining 6-foot distancing.

- The Development Entity understands that due to the nature of our work, access to running water for hand washing may be impracticable. In these situations, the Development Entity or applicable contractor will provide, if available, alcohol-based hand sanitizers and/or wipes.
- Employees should limit the use of co-workers' phones, tools, and equipment. To the extent tools must be shared, the Development Entity will provide alcohol-based wipes or a bleach solution and paper towels to clean tools before and after use. When cleaning tools and equipment, consult manufacturing recommendations for proper cleaning techniques and restrictions.
- Employees are encouraged to limit the need for N95 respirator use, by using engineering and work practice controls to minimize dust. Such controls include the use of water delivery and dust collection systems, as well as limiting exposure time.
- Employees are encouraged to minimize ride-sharing. While in vehicles, employees must ensure adequate ventilation and wear face coverings/masks if not the sole occupant.
- If practicable, each employee should use/drive the same truck or piece of equipment every shift.
- In lieu of using a common source of drinking water, such as a cooler, employees should use individual water bottles. Use of a common cooler for individual water bottles must be avoided. Employees should place a sufficient supply of individual water bottles in their personal cooler/lunchbox, etc. at the beginning of the work shift to avoid constant touching of a common cooler. If this cannot occur employees will be required to wash or sanitize hands thoroughly prior to and after using a common cooler.
- Projects and tasks shall be evaluated to determine what addition social distancing measures can be implemented such as providing clear plastic screens between workers in aerial lifts, suspended scaffolds, and other work stations.
- At worksites where face coverings/masks are NOT mandated by state, local, or client/owner guidelines and when social distancing and other administrative and engineering controls cannot be maintained a face covering/mask OR solid clear face shield shall be worn or the task will not be completed.
- Signage and posters shall be placed on site in conspicuous locations to identify that a COVID-19 plan is in effect, to help identify COVID-19 signs and symptoms, and to encourage staying at home when sick, cough and sneeze etiquette, and hand hygiene.

B. Jobsite Visitors

- The number of visitors to the job site, including the trailer or office, will be limited to only those necessary for the work.
- All visitors will be screened utilizing the COVID-19 Employee and Subcontractor/Visitor/Vendor Screening Form (Appendix 2) in advance of arriving on the job site. The Superintendent will be responsible for distributing this plan and the screening form to all subcontractors/visitors/vendors and ensuring that the necessary documentation is provided prior to arriving on site and as new individuals are assigned to the project. Receipt of completed forms shall be done electronically through the use of the provided QR code or hyperlink wherever possible to avoid potential exposure. The Superintendent will also keep a log/spreadsheet of all subcontractors/visitors/vendors to ensure that all site personnel have been properly screened. If COVID-19 Screening Forms are not provided prior to arriving on site all visitors will be screened as they arrive at the project entry point or project office by the Designated Representative or other responsible supervisor. If the individual answers "yes" to any of the following questions, he/she should not be permitted to access the jobsite:
    - Have you come into close contact with someone who has a suspected or confirmed COVID – 19 diagnoses in the past 14 days either at home or on a jobsite, etc.?
    - Have you had a fever (greater than 100.4^{o}F or 38.0^{o}C) OR symptoms such as cough, shortness of breath, difficulty breathing, chills, headache, sore throat, muscle pain, new loss of taste or smell, vomiting or diarrhea in the past 14 days?
    - Are you currently experiencing a fever (greater than 100.4^{o}F or 38.0^{o}C) OR symptoms such as cough, shortness of breath, difficulty breathing, chills, headache, sore throat, muscle pain, new loss of taste or smell, vomiting or diarrhea?

- Site deliveries will be permitted but should be properly coordinated in line with the Development Entity's minimal contact and cleaning protocols. Delivery personnel should remain in their vehicles at all times, if possible. If close contact with site personnel is possible delivery personnel must complete the screening form in advance of arriving on the job site.
- One individual shall be designated to collect all delivery tickets or other delivery paperwork. Scanned delivery documents are preferred to comply with social distancing requirements, but other measure such as the use of a drop box that can be appropriately sealed and quarantined for 24 hours may also be necessary.

C. Personal Protective Equipment (PPE) and Work Practice Controls

- In addition to regular PPE for workers engaged in various tasks (fall protection, eye protection, hard hats, hearing protection), the Development Entity will also provide:
  - Face coverings/masks: Due to specific state, local, or owner/client mandates face coverings/masks may be required at all times while at the worksite. Employee may also wear homemade face coverings/masks if they meet the CDC's recommendations. As face coverings/masks create additional safety concerns, such as impeding vision, during high temperature/humidity environments and when performing strenuous physical activity, they will not be required as long as social distancing can be maintained in outdoor environments.
  - Face shields: Face protection shall be worn when performing specific tasks that pose a risk to flying objects and in cases where workers may be unable to maintain 6-foot social distancing requirements. If a task is to be performed where 6 feet is not able to be maintained and another barrier is not in place (such as a face covering/mask) all personnel shall wear a clear face shield until social distancing can be restored.
  - Employees must wear N95 respirators or other approved respirators, if the task subject the employee to possible respiratory hazards (i.e., silica, lead).
  - To lessen the need for N95 respirators, the following Work Practice Controls should be followed:
    - Keep dust down by using engineering and work practice controls, specifically through the use of water delivery and dust collection systems.
    - Limit exposure time to the extent practicable.
    - Isolate workers in dusty operations by using a containment structure or distance to limit dust exposure to those employees who are conducting the tasks, thereby protecting nonessential workers and bystanders.
    - Institute a rigorous housekeeping program to reduce dust levels on the jobsite.

VIII. Jobsite Cleaning and Disinfecting

The Company has instituted regular housekeeping practices, which include cleaning and disinfecting frequently used tools and equipment, and other elements of the work environment, where possible. Employees shall regularly do the same in their assigned work areas.

Certain supplies may be difficult to acquire as a result of panic buying and other limitations. When possible, all work locations should have a supply of the following items for use and the locations of such supplies shall be communicated to all personnel through project safety meetings:

- Soap, water, and disposable hand towels
- Alcohol based hand sanitizer that contains at least 60% alcohol
- Disinfecting wipes- Clorox/Lysol/etc.
- Spray bottles for bleach or other cleaning solution and paper towels
- Disposable rubber/latex/nitrile gloves
- N-95 single use facemasks
- Tissues
- Trash cans with trash bags

The following items and frequencies for cleaning shall be implemented, at a minimum, and the Designated Representative (Project Superintendent) shall be responsible for ensuring completion:

- Routinely (at least daily) clean all frequently touched surfaces in each office, such as workstations, tabletops, doorknobs/handles, phones, sink knobs/levers, copy/fax machine, elevator buttons, stair rails, etc. Use the cleaning agents that are usually used in these areas and follow the directions on the label.
- Routinely clean all frequently touched surfaces on each project, such as portable toilets, conex box/tool trailer doors, handrails/stair rails, tool handles, vehicle/equipment interior and exterior door handles, steering wheels and other controls, etc.
- Wear appropriate gloves when handling or coming in contact with cleaning supplies and ensure proper ventilation in enclosed spaces.
- Provide disposable wipes so that commonly used surfaces (for example, doorknobs, keyboard/mouse, desks, etc.) can be wiped down by employees before each use.
- Any trash collected from the jobsite must be changed frequently by someone wearing nitrile, latex, or vinyl gloves.
- Any portable jobsite toilets should be cleaned by the leasing company twice per week, if possible, and disinfected on the inside. The Company will ensure that hand sanitizer dispensers are always filled.
- Frequently touched items (i.e. door pulls and toilet seats) will be disinfected frequently. If cleaning cannot be performed at this frequency by the leasing company, the inside of all potable jobsite toilets should be sprayed down with a disinfecting or bleach solution at regular intervals.
- Vehicles and equipment/tools should be cleaned at least once per day and before change in operator or rider. If vehicles and equipment/tools are used on multiple shifts or by multiple workers, they should be cleaned prior to use and immediately after use.
- No additional disinfection beyond routine cleaning is recommended by the CDC at this time.
- OSHA has indicated that a reliable report that an employee has tested positive for COVID-19 does not typically require an employer to perform special cleaning or decontamination of work environments, unless those environments are visibly contaminated with blood or other bodily fluids.
  Notwithstanding this, the Development Entity will clean those areas of the jobsite that a confirmed-positive individual may have contacted by utilizing the following procedure, and it will do so before employees can access that workspace again.
  - Immediately after being notified that an individual has tested positive for COVID-19 the areas in which the individual frequented or had the potential to contact shall be properly disinfected. The ICA will determine what methods will be employed, including the use of a third-party organization specializing in infection control clean up if needed.
  - The following procedures shall be observed to clean and disinfect the work area:
    - Close off area(s) used by the sick person
    - Open outside doors and windows to increase air circulation in the area. Wait 24 hours (or as long as possible) before cleaning or disinfecting. Per CDC guidelines if more than 7 days have passed since the sick person visited the site or facility additional cleaning or disinfecting is not necessary.
    - Clean and disinfect all areas used by the sick person such as offices, bathrooms, common areas, shared electronic equipment, touch screens, computer equipment, tools/equipment, etc.
- For proper disinfection follow the CDC's recommendations:
  - Use diluted household bleach solutions if appropriate for the surface. Check to ensure the product is not past its expiration date. Unexpired household bleach will be effective against coronaviruses when properly diluted.
  - Follow manufacturer's instructions for application and proper ventilation. Never mix household bleach with ammonia or any other cleanser.
  - To make a bleach solution, mix: 5 tablespoons (1/3rd cup) bleach per gallon of water or 4 teaspoons bleach per quart of water.
  - Use household cleaners and disinfectants such as Clorox or Lysol wipes. Clean the area or surface with soap and water or another detergent if it is dirty. Then, use a household disinfectant.

- Keep the surface wet for several minutes, at least 5 minutes, to ensure germs are killed.
- For electronics use alcohol-based wipes or sprays containing at least 70% alcohol. Dry surface thoroughly.

- The Company will ensure that any disinfection shall be conducted using one of the following:
  - Common EPA-registered household disinfectant;
  - Alcohol solution with at least 60% alcohol; or
  - Diluted household bleach solutions (if appropriate for the surface).
- The Company will maintain Safety Data Sheets of all disinfectants used on site.

IX. Exposure Risk and Exposure Types

The Company will follow the current CDC risk assessment guidelines and the guidelines listed below, including the Exposure Flow Chart in Appendix 4, when determining what actions should be taken if an employee has been identified as having close contact with a person who has tested positive for COVID-19.

A. Employee's Risk of Exposure

The type of work that is performed by each employee will determine the amount of risk that the employee has of coming in close contact with someone who is positive for COVID-19. Obviously, some tasks have higher exposures than others and each situation must be discussed with the ICA to appropriately classify the risk and to implement the necessary precautions to lower the risk of exposure. The following categories have been developed to assign a risk level to differing types of work:

1. Low Risk (Caution)

   Jobs that do not require close contact (within 6 feet for a total of 15 minutes or more over a 24-hour period) with other people. Workers in this category have minimal occupational contact with the public and other coworkers. Examples include:
   - Remote workers (i.e., those working from home during the pandemic).
   - Office workers who do not have frequent close contact with coworkers or the public.
   - Outdoor workers who work alone or within equipment or vehicles that are isolated from others.
2. Medium Risk

   Jobs that require either frequent close contact (within 6 feet for a total of 15 minutes or more over a 24-hour period) or sustained close contact as noted below. Most field employees fall into this exposure category. Examples of workers in this category include:
   - Those who have frequent or sustained contact with coworkers, including under close working conditions outdoors or in well ventilated spaces and mask are being worn properly by both parties.
   - Those who have frequent outdoor or well-ventilated contact with the general public.
   - Those living in apartments, houses, hotels or similar shared housing facilities.

   * Because any given person may be an asymptomatic carrier, workers' exposure risks may increase when they have repeated, prolonged contact with other people in these situations, particularly where physical distancing and other infection prevention measures may not be possible or are not robustly implemented and consistently followed.

3. High Risk

   Jobs with a high potential for exposure to known or suspected sources of SARS-CoV-2. Examples of workers in this category include:
   - Those who have frequent or sustained contact with coworkers, including under close working conditions indoors or in poorly ventilated spaces, including those that are outdoors when face coverings/masks are not being worn properly.

- Those who share vehicles with coworkers.
- Those who have frequent indoor or poorly ventilated contact with the general public, including the use of public transportation.

B. Exposure Types

Depending on the type of exposure and the risks associated as listed above, the Development Entity has determined the following exposure classifications for use on the Exposure Flow Chart when determining case management needs:

3.1. High Risk Exposure

Personnel are considered to have had a high-risk exposure when they have had direct physical contact with an individual who is positive for COVID-19. Direct physical contact includes:
- Handshake;
- Hug
- Kiss; and
- Any other skin to skin contact

A high-risk exposure is also categorized as having close contact without the use of face coverings/masks or other protective devices in indoor or enclosed space environments.

3.2. Medium Risk Exposure

Personnel are considered to have had a medium risk exposure when they have had close contact with an individual who has tested positive for COVID-19 in an indoor or enclosed space environment with the use of face coverings/masks, or other protective device, and when close contact is outdoors where ventilation is sufficient and face coverings/masks are not being worn properly.

3.3. Low Risk Exposure

Personnel are considered to have had a low-risk exposure when they have been within the same room, facility, or work area as someone who has tested positive, but were not within 6 feet for 15 minutes or more over a 24-hour period and face coverings/masks were being worn properly. A low-risk exposure is also categorized as having close contact in outdoor environments where ventilation is sufficient and face coverings/masks are being worn properly. Individuals that have been fully vaccinated at least two weeks prior to an exposure will be considered low risk. Jobsite Exposure Situations

X. Jobsite Exposure Situations

At the current time the following procedures will be followed for all jobsite exposure situations:

A. Employee Exhibits COVID-19 Symptoms

If an employee exhibits COVID-19 symptoms while at home, they will not be allowed at work. The Company will similarly require an employee who reports to work with symptoms to return home. If the COVID-19 symptoms develop at work the following procedures will be used to separate them from other personnel and to remove them from the site:

- Immediately after an individual shows signs of being sick at the work location they need to be separated from the other individuals on site until they can leave site. The Designated Representative and ICA shall be contacted immediately.

- If necessary, an enclosed room with closed windows can be used temporarily to stage sick employees until necessary measures can be taken to limit interaction with other personnel.
- If the individual must pass through common areas or be escorted from site all personnel shall leave these areas and the employee should wear a face covering/mask while leaving site. If they are unable to wear a face covering/mask due to health concerns the escort must wear a face covering/mask.
- If the individual must be transported off site in a vehicle both the sick individual and the driver must wear a face covering/mask and all windows shall be down. The sick individual should also wear gloves if they will contact surfaces within the vehicle (seatbelt, door handle, etc.) Ensure that proper environmental cleaning/disinfecting of the vehicle occurs after transporting.

- Prior to returning to work after self-isolation due to possible COVID-19 symptoms, but not medically diagnosed all personnel must be symptom free. All of the following things must have happened to be considered symptom free and be eligible to return to work:

  - Regular communication has been made with the Infection Control Administrator (ICA)
  - 14-day quarantine period has been completed or a physician's release has been provided.
  - The Individual has had no fever for at least 24 hours (without the use of medicine that reduces fevers) and
  - Other symptoms have improved (for example, when cough or shortness of breath have improved) and
  - At least 10 days have passed since the symptoms first appeared

B. Employee Tests Positive for COVID-19 and exhibits symptoms

If an employee tests positive for COVID-19 they will be directed to self-quarantine away from work.

- If a follow up test is not required by a physician to determine if the individual still contagious, they may return to work after all of these things have happened:

  - Regular communication has been made with the Infection Control Administrator (ICA)
  - The individual has had no fever for at least 24 hours (without the use of medicine that reduces fevers) and
  - Other symptoms have improved (for example, when cough or shortness of breath have improved) and
  - At least 10 days have passed since the symptoms first appeared or a physician's release has been provided.

- If a follow up test is required by a physician to determine if the individual is still contagious, they may return to work after all of these things have happened:

  - Regular communication has been made with the Infection Control Administrator (ICA)
  - The individual has had no fever (without the use medicine that reduces fevers) and
  - Other symptoms have improved (for example, when your cough or shortness of breath have improved) and
  - A negative test is received or a physician's release has been provided.

- If the Development Entity learns that an employee has tested positive, the Development Entity will conduct an investigation to determine co-workers who may have had close contact (within 6 feet for about 15 minutes) with the confirmed positive employee in the 48 hours prior to symptom onset to the time at which the patient isolated. Those individuals, if asymptomatic, will be pre-screened before the start of each shift for COVID-19 symptoms. Screening shall include a temperature check. As long as the employee remains asymptomatic they shall self-monitor for symptoms throughout the shift, wear a face covering/mask at all times, and maintain strict social distancing for a period of 14 days after exposure. Alternatively, those individuals who have had close contact with the confirmed-positive employee may be directed to self-quarantine for 14 days from the last date of close contact with that employee and to self-monitor during this 14-day period. If the

employee becomes sick during work the procedures listed in section “A. Employee Exhibits COVID-19 Symptoms” will be followed.

If applicable, the Development Entity will also notify any clients, subcontractors, vendors/suppliers or visitors who may have had close contact with the confirmed-positive employee.

C. Employee Tests Positive for COVID-19 and does not exhibit symptoms

If an employee tests positive for COVID-19 they will be directed to self-quarantine away from work.

- If a follow up test is not required by a physician to determine if the individual is still contagious, they may return to work after all of these things have happened:
  - Regular communication has been made with the Infection Control Administrator (ICA)
  - At least 10 days have passed since the positive test or a physician’s release has been provided.

D. Employee Has Close Contact with an Individual Who Has Tested Positive for COVID-19

- If an employee has come into close contact (away from work) with an individual who has tested positive for COVID-19 they must alert a supervisor or manager and will be directed to self-quarantine for 14 days from the last date of close contact with that individual. Close contact is defined as six (6) feet for a prolonged period of time, typically 15 minutes. In addition to self-quarantining all personnel should maintain social distancing and self-monitoring during this 14-day period. Employees may also elect to seek a medical opinion or voluntarily have themselves tested. If testing is negative they may return to work only if they are cleared by a medical professional, self-monitor prior to the shift, wear a face covering/mask at all times, avoid close contact at the work site and continue to monitor themselves throughout the shift for symptoms for 14-days after their close contact.
- If the employee has been fully vaccinated at least two weeks prior to the close contact with a positive person, they will not be required to quarantine. They will however be required to receive COVID-19 test within 3-5 day of exposure and must wear a face mask at all times until a negative test result is received. If they experience symptoms they will be required to quarantine.

XI. Traveling

COVID-19 cases have been reported in all 50 states, and the situation is constantly changing. Traveling should be avoided wherever possible as it increases your chances of getting infected and spreading COVID-19. Consider canceling or delaying all travel especially to areas where there is active or increased spreading of COVID-19.

A. Essential Business Travel Approval

- All business travel shall be preapproved to ensure that all of the necessary safety precautions are taken prior to, during, and after traveling.
  - If traveling out of town (including air travel), approval must be made by a Vice President.
- If traveling for any purpose, follow the CDC recommendations:
  - Avoid travel by bus, train, and airplane when possible. These modes of transportation do not generally allow for social distancing and contain many surfaces that have been contacted by many people.
  - If traveling by personal or company vehicle plan trips to avoid stopping at busy rest areas and service stations. Choose less crowded off highway options when possible. Bring supplies from home such as drinks and snacks.
  - Clean your hands often
    - Wash your hands with soap and water for at least 20 seconds, especially after you have been in a public place, after touching surfaces frequently touched by others, after blowing your nose, coughing, or sneezing, and before touching your face or eating.

    - If soap and water are not available, bring and use hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub your hands together until they feel dry.
  - Avoid touching your eyes, nose, or mouth.
  - Avoid close contact with others, keep 6 feet of physical distance from others.
  - Wear a cloth face covering in public.
  - Cover coughs and sneezes.
  - Pick up food at a drive-through, curbside restaurant service, or stores.

B. Traveling Overnight

- When essential business travel requires an overnight stay there are some items that should be considered when choosing your accommodations:

  - Use options for online reservation and check-in, mobile room key, and contactless payment when possible.
  - Before you go, call and ask if all staff are wearing cloth face coverings at work and always wear a cloth face covering in public areas.
  - Look for any extra prevention practices being implemented by the hotel, such as plexiglass barriers at check-in counters, and physical distancing signs in the lobby.
  - Ask if the hotel has updated policies about cleaning and disinfecting or removing frequently touched surfaces and items such as pens, room keys, tables, phones, doorknobs, light switches, elevator buttons, ice/vending machines, and remote controls.
  - Ask if the hotel has contactless delivery for any room service order.

C. Post Travel Considerations

- After any travel (personal or business) be vigilant for the development of any signs and symptoms of COVID-19 for at least 14 days after returning. Some states recommend a 14-day self-isolation after traveling to certain “hotspots”. If you develop any symptoms consistent with COVID-19 DO NOT GO TO WORK, contact your medical provider.

D. State Specific Requirements

- As the COVID-19 pandemic progresses states may continue to impose specific requirements regarding travel to and from their state. Employees should be aware of these requirements and communicate any concerns or questions with the Development Entity ’s ICA.

XII. Vaccines

As vaccines become available the Development Entity encourages those employees who are eligible to get their vaccine. Personnel who are vaccinated must continue to follow the face covering/mask requirement in this plan and continue to practice good hygiene and social distancing. Personnel should educate themselves on what to expect when receiving the vaccine and understand that symptoms similar to COVID-19 may arise after receiving the vaccine and they should discuss these situations with the Infection Control Administrator(s). A link to a CDC COVID-19 Vaccine fact sheet can be found in the resource section of this plan.

XIII. Confidentiality/Privacy

Except for circumstances in which the Development Entity is legally required to report workplace occurrences of communicable disease, the confidentiality of all medical conditions will be maintained in accordance with applicable law and to the extent practical under the circumstances.

When it is required, the number of persons who will be informed that an unnamed employee has tested positive will be kept to the minimum needed to comply with reporting requirements and to limit the potential for transmission to others. The Company reserves the right to inform other employees that an unnamed co-worker has been diagnosed with COVID-19 if the other employees might have been exposed to the disease so the employees may take measures to protect their own health. The Company also reserves the right to inform sub-contractors, vendors/suppliers or visitors that an unnamed employee has been diagnosed with COVID-19 if they might have been exposed to the disease so those individuals may take measures to protect their own health.

XIV. General Questions

Given the fast-developing nature of the COVID-19 outbreak, the Development Entity may modify this Plan on a case-by-case basis. If you have any questions concerning this Plan, **please contact the ICA(s)**.

XV. Resources

- CDC Coronavirus Update: https://www.cdc.gov/coronavirus/2019-ncov/index.html
- Hand washing: https://www.youtube.com/watch?v=d914EnpU4Fo&feature=youtu.be
- CDC Handouts: https://www.cdc.gov/coronavirus/2019-ncov/communication/factsheets.html
- Full List of EPA disinfectants: https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2
- CDC: Cleaning and Disinfecting: https://www.cdc.gov/coronavirus/2019-ncov/prepare/disinfecting-building-facility.html
- Coronavirus Q&A from the World Health Organization (WHO): https://www.who.int/news-room/q-a-detail/q-a-coronaviruses
- Department of Labor OSHA Guidance on Preparing Workplaces for COVID-19: https://www.osha.gov/Publications/OSHA3990.pdf
- CDC/Apple Self Check Screening Tool: https://www.apple.com/covid19
- CDC COVID-19 Vaccine Fact Sheet: COVID-19 Vaccines (cdc.gov)

XVI. Appendices

- Appendix 1- Record of Safety Training
- Appendix 2- COVID-19 Screening Forms (Employee and Subcontractor/Visitor/Vendor)

Record of Safety Training

Project: _____ **Subcontractor**: _____

Date: _____

Attendees Names Should Be Printed By Trainer **(Do Not Pass Around Sign-In Sheet)**

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Safety Items Covered:

Coronavirus (Covid-19) Exposure, Prevention, Preparedness, and Response Plan

- Plan Responsibilities- ICA, Site Safety Rep., Managers and Supervisors, All Employees, Subcontractors, Suppliers, and Visitors
- Training all personnel on illness prevention
  - Common means of transmission
  - Personal hygiene
  - COVID-19 symptoms
- Jobsite Protective Measures
  - General safety policies, rules, and social distancing guidelines
  - Jobsite Visitors
  - Personal Protective Equipment and Work Practice Controls
- Jobsite Cleaning and Disinfecting
- Exposure Risk and Exposure Types
- Jobsite Exposure Situations
- Traveling
- Vaccines
- Confidentiality/Privacy
- General Questions
- Resources
- Appendices

_____

Training Given By- Signature

COVID – 19 Employee and Subcontractor/Visitor/Vendor Screening Form

This form must be completed, either online or in person, by all new employees, subcontractors, visitors and vendors prior to accessing the worksite. The following link or QR code should be used for online completion of the form no earlier than 24 hours prior to arriving onsite.

Hyperlink: QR Code:

https://iiconusa.forms-db.com/view.php?id=10658

If completed in person, the screened individual should not complete their own form.

Date: _____

Name: _____

Project: _____

Contractor: _____

The following questions shall be asked to all employees, subcontractors, visitors and vendors prior to allowing access to the workplace and/or jobsite.

1. Have you come into close contact with someone who has a suspected or confirmed COVID – 19 diagnoses in the past 14 days either at home or on a jobsite, etc.?

   Yes No

2. Have you had a fever (greater than 100.4^{o}F or 38.0^{o}C) OR symptoms such as cough, shortness of breath, difficulty breathing, chills, headache, sore throat, muscle pain, new loss of taste/smell, vomiting, or diarrhea in the past 14 days?

   Yes No

3. Are you currently experiencing a fever (greater than 100.4^{o}F or 38.0^{o}C) OR symptoms such as cough, shortness of breath, difficulty breathing, chills, headache, sore throat, muscle pain, new loss of taste/smell, vomiting or diarrhea?

   Yes No

*__NOTE__: If an individual answers 'Yes' to any of the above questions, ask them to leave the workplace or jobsite immediately and seek medical evaluation.

Supervisor reviewing form with individual:

Signature:_____ Date:_____

APPENDIX D

Emergency Phone Numbers
Hospital Directions

EMERGENCY PHONE NUMBERS AND HOSPITAL DIRECTIONS

Ambulance/Police/Fire: 911

State Police: XXX-XXX-XXXX

Hospital: XXX-XXX-XXXX

(XXXXXX Hospital)

Directions from XXXXXX

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Minor Injuries: XXX-XXX-XXXX

(XXXXXX)

Directions from XXXXXX

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Preliminary Public Information and Communications Plan for First Package

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

Bridging Pennsylvania Partners

Preliminary Public Information and Communications Plan

TABLE OF CONTENTS

Introduction

The Pennsylvania Department of Transportation (PennDOT) has embarked on an innovative approach to address the delivery of major bridges throughout the Commonwealth as part of the PennDOT Pathways Major Bridge P3 Initiative (the Program).

The Program will allow for the delivery of nine major bridges (each a Bridge), across two or more packages of bridges (each a Package) throughout the Commonwealth utilizing the P3 delivery model for each Package and will help PennDOT achieve the following goals:

- Schedule Acceleration: Accelerate the renewal of major bridges with a focus of delivery as many Bridges as feasibly possible as part of the First Package, with a required Financial Close for the First Package by December 2022
- Safety Enhancement: Ensure public safety and provide accelerated safety enhancement in all Project areas
- User Experience: Avoid or mitigate time and financial impacts to the travelling public, notably coming from travel diversion resulting from Bridge restrictions and closures due to Bridge condition
- Value and Affordability: Help offset gas tax revenue losses, as identified by the State Transportation Advisory Committee (TAC) and exacerbated by the coronavirus pandemic and provide a sustainable funding model for the renewal of these assets where all users (including out of state traffic) contribute fairly based on asset usage

The Program forms part of PennDOT's broader effort to explore sustainable transportation funding options noting that 74% of highway and bridge funding is generated through gas taxes but that fuel consumption has been progressively decreasing. This initiative will aim to provide travelers, residents and businesses with high-quality transportation infrastructure by implementing alternative funding solutions that address near- and long-term highway and bridge needs.

This Public Information and Communication Plan (PICP) has been prepared by Bridging Pennsylvania Partners (BPP or the Development Entity) and is an important part of the overall approach to a robust public outreach and community engagement outlined in the Project Management Plan (PMP) for the First Package.

Section 1 - Description of the First Package

The First Package includes six Bridges of the Program: I-81 Susquehanna, I-80 Nescopeck, I-78 Lenhartsville, I-80 Lehigh River, I-80 Canoe Creek, and I-80 North Fork, which specificities is further detailed in this Section.

1.1 I-81 Susquehanna

The I-81 Susquehanna Bridge is a nine-mile stretch of reconstruction and repair work along I-81 from New Milford Borough to the New York border.

D&C Work includes the replacement of the dual bridges over the Susquehanna River between Hallstead Borough and Great Bend Borough, which were built in 1961 and rehabilitated in 1979, 1993 and 2006. Combined, the bridges carry about 27,000 vehicles per day, approximately 41 percent of which is truck traffic. The combined daily traffic is expected to more than double by 2045 to around 55,000.

The purpose of the I-81 Susquehanna Bridge renewal is to address aging pavement and infrastructure along I-81 including the bridge over the Susquehanna River and to lengthen on and off ramps to meet current interstate design standards and improve safety.

The Project is intended to address the following needs:

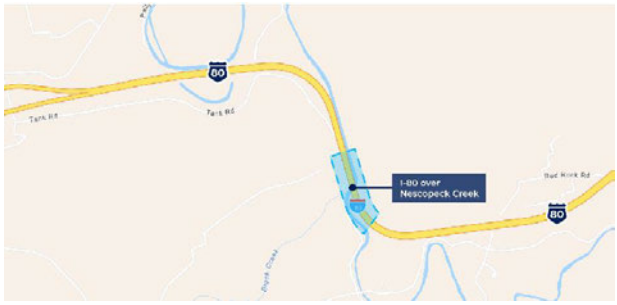
- Aging infrastructure: Most of the pavement in the corridor is nearly 60 years old and the Susquehanna River bridges are approaching the end of their serviceable lifespan
- Outdated interchange designs: The on and off ramps at the interchanges throughout the corridor do not meet current and future traffic design standards
- Outdated construction methods: All structures on the corridor were constructed with reinforced concrete that contains more chloride ion content than modern standards allow. While safe, this type of reinforced concrete has a shorter lifespan than most reinforced concrete used today
- Drainage concerns: The storm system built into much of the corridor has exceeded its serviceable lifespan

The D&C Work for this Bridge involves a number of construction activities, including:

- Repaving all roadway in the corridor
- Replacing five dual bridge structures, including the bridges over the Susquehanna River and one overpass structure
- Replacing the drainage system
- Replacing all guiderails, barriers and signage in the corridor
- Construction work on Susquehanna Street, PA-171 and PA-1029 (Randolph Road)

Through the National Environmental Policy Act (NEPA) environmental review process, I-81 Susquehanna Bridge renewal was approved as a Categorical Exclusion (CE) in 2017 and the PennDOT team was allowed to move forward with final design, right-of-way acquisition and construction.

1.2 I-80 Nescopeck



The I-80 Nescopeck Creek Bridges are dual structures (one eastbound and one westbound) built in 1965 and with preservation repairs last conducted in 2005. These bridges cross over Nescopeck Creek in Black Creek Township, Luzerne County. Combined, the bridges carry an average of 33,000 vehicles per day, approximately 36% percent of which are trucks.

The purpose of the I-80 Nescopeck Bridge renewal is to provide a safe and reliable crossing over Nescopeck Creek. As part of the D&C Work, the Development Entity will replace and widen the bridges to provide wider shoulders that meet current standards and accommodate and facilitate future maintenance activities on the bridge. Once complete, the new bridges will improve traffic flow, extend the life of existing infrastructure and enhance traffic safety.

To comply with the NEPA environmental review process, the I-80 Nescopeck renewal is being advanced as CE and impacts to natural, social, economic and cultural resources are being assessed.

1.3 I-78 Lenhartsville

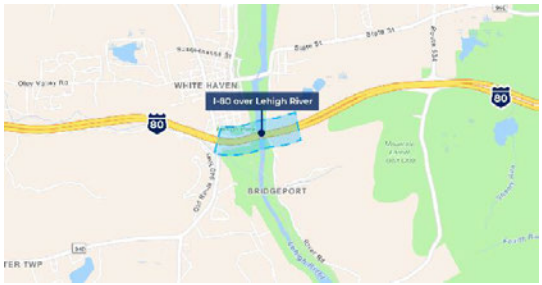
The I-78 Lenhartsville Bridge was built in 1955 and was last rehabilitated in 1985. This bridge is in a rural setting and crosses Maiden Creek in Greenwich Township, Berks County. It also serves as an overpass to PA-143. The bridge carries 51,080 vehicles daily, approximately 30 percent of which is truck traffic.

The purpose of the I-78 Lenhartsville Bridge replacement project is to replace the existing bridge over Maiden Creek and PA-143 and widen it to accommodate the addition of auxiliary lanes and full inside and outside shoulders on I-78 in each direction. These modifications will provide a consistent typical section along the I-78 corridor.

The project is intended to address the substandard I-78 westbound deceleration and I-78 eastbound acceleration lane lengths to and from the PA-143 interchange.

Through the NEPA environmental review process, the I-78 Lenhartsville Bridge Replacement Project was approved as a CE in 2019 and the PennDOT team has moved forward with final design and right-of-way acquisition.

1.4 I-80 Lehigh River



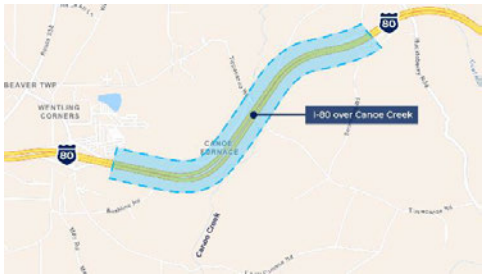
These bridges are eastbound/westbound structures built in 1965 and are approaching the end of their serviceable life. These bridges cross over the Lehigh River, Lehigh Gorge State Park, Reading Blue Mountain and Northern Railroad and SR--1005 (River Road) in Carbon and Luzerne Counties. Combined, the bridges carry an average of 27,400 vehicles per day, about 44 percent of which is truck traffic.

The purpose of this replacement project is to address the deterioration of the aging bridge structures and

to provide safe and structurally sufficient bridges that will provide connectivity for interstate travelers, commuters, commercial users, emergency services, tourists and local residents. The project will replace the aging bridges with wider structures; increase the length of the eastbound on-ramp auxiliary lane, the height of the bridges' barriers and the width of the shoulders to meet current interstate design standards; and improve safety in the corridor.

To comply with the NEPA environmental review process, the Project is being advanced as CE and impacts to natural, social, economic and cultural resources are being assessed.

1.5 I-80 Canoe Creek



The I-80 Canoe Creek bridges are dual multi-span structures (one eastbound and one westbound) that were built in 1966, were extended in 1985 and underwent multiple retrofits for fatigue-induced cracking since 2013. These bridges cross over Canoe Creek and SR 4005 (Tippecanoe Road) in Beaver Township, Clarion County. Combined, they will carry an estimated average of 30,119 vehicles per day by 2025. About 50 percent of the traffic over these bridges is truck traffic.

The purpose of the I-80 Canoe Creek Bridges replacement project is to provide a safe and reliable crossing of I-80 over Tippecanoe Road and Canoe Creek.

The project is intended to replace the existing structures and update the roadway within the Project limits to meet current design criteria and improve safety along the corridor. While both bridges have been repaired several times throughout their lifespan, recent inspections show the westbound bridge is in poor condition and the eastbound bridge is in fair condition.

The project includes the total replacement of both the eastbound and westbound Canoe Creek bridges, as well as improved roadway alignment and geometry. The limits of the project extend approximately three miles on I-80, from the Knox interchange over the bridges to a pair of weigh stations near milepost 56.5.

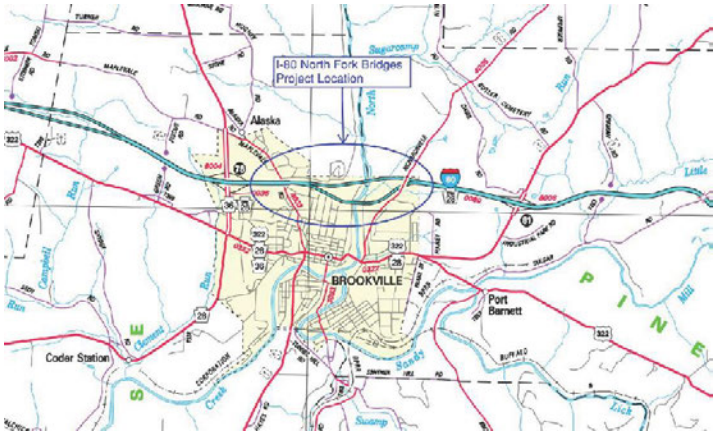
Part of the D&C Work also includes the rehabilitation of an existing reinforced concrete arch culvert that carries an unnamed tributary to Canoe Creek under I-80. The existing wingwalls at the inlet and outlet of the culvert are deteriorated and will be replaced. In addition, a reinforced concrete slab will be constructed along the floor of the culvert to prevent further scour of the streambed within the limits of the culvert.

Through the NEPA environmental review process, the I-80 Canoe Creek bridges project was approved

as a CE in April 2020 and the Project team was allowed to move forward with final design, right-of-way acquisition and construction.

No detour route is planned for the project during construction. However, through travelers on SR 4005 (Tippecanoe Road) can expect an occasional detour. These intermittent detours will only be short-term events as required for the removal and erection of the bridge structure.

1.6 I-80 North Fork



The I-80 North Fork Bridges are dual structures (one eastbound and one westbound) built in 1962 and most recently rehabilitated in 2013.These bridges cross over the North Fork Redbank Creek and Water Plant Road in Brookville Borough and Pine Creek Township, Jefferson County, PA. Combined, these bridges are expected to carry approximately 30,897 vehicles daily. Approximately 44 percent of the traffic over the bridges is truck traffic.

The purpose of the project is to provide safe, efficient and effective crossings of I-80 over North Fork Redbank Creek and Water Plant Road that appropriately accommodate interstate traffic with respect to connectivity, mobility, loading and geometry.

The main spans of the existing bridges are steel two-girder systems with floor beams and stringers; the bridges are fracture critical since many components of the bridges are nonredundant. Both bridges have problematic fatigue details which have received multiple retrofits during the service lives of the structures. The eastbound bridge is in poor condition and the westbound bridge is in fair condition; inspections are required on a 6-month and 1-year basis, respectively. The existing bridges are separated by approximately 1,100 feet, with the Walter Dick Memorial Park located between and below the two bridges. Both bridges are reaching the end of their serviceable lifespan.

This section of I-80 has a posted speed limit of 70 miles per hour (mph) and has horizontal and vertical geometry that does not meet 70 mph design criteria. Many crashes, nearly twice the statewide average, have occurred on this segment of I-80 due to a substandard curve on the western approach to the eastbound bridge.

In addition to the replacement of the I-80 North Fork Bridges, this Project will include the replacement of the I-80 eastbound and westbound bridges over SR 4003 (Jenks Street), as well as the replacement of

the SR 4005 (Richardsville Road) bridges over I-80. The project will also include the extension of the North Fork Park Culvert, which carries I-80 traffic over the tributary to North Fork Redbank Creek.

To comply with the NEPA, the project is being advanced as CE and impacts to natural, social, economic, and cultural resources are being assessed.

As part of the environmental review process, PennDOT is analyzing how bridge tolling may impact local communities and how alternate routes drivers could take to avoid the toll may impact local traffic and roadways.

A detour is anticipated during the replacement of the I-80 bridges over SR 4003 (Jenks Street). This 3.1-mile detour route would use SR 0028 (West Main Street), SR 0036 (Allegheny Boulevard) and SR 0322 (US 322; West Main Street). PennDOT will continue to coordinate with the Brookville Area School District throughout the design process. A temporary bus stop will be added south of the I-80 bridges over Jenks Street to transport students in the area to school during construction. Jenks Street is posted at 10 tons and truck travel along the street is restricted except for local deliveries.

Section 2 - Public Outreach and Engagement Objectives

2.1 Objectives

BPP has set the following objectives for our Public Information and Communications Plan for the First Package:

- Support PennDOT with public outreach and engagement activities including public forums and workshops
- Facilitate an early and ongoing collaborative dialogue to engage stakeholders and the public
- Effectively communicate with all stakeholders to ensure understanding of what the Project is and the benefits that stakeholders can expect as next steps in the process / timeline as well as any impact or traffic delay information
- Maintain an open and honest dialogue through exceptional customer service and responsive correspondence
- Ensure that communication protocols are in accordance with PennDOT Publication 295, Transportation Project Development Process – Public Information Handbook and PennDOT Publication 746, Project Level Environmental Justice Guidance

2.2 Illustrative Examples of Successful Public Outreach and Engagement

2.2.1 H&K District 5 Public Engagement

The I-78 project, where six bridges were erected across three stages per bridge in District 5, H&K, one of BPP's nominated subcontractors, coordinated with PennDOT, Pennsylvania State Police, local emergency services, local municipalities and nearby affected residences and the traveling public when closures and detours were required due to demolition. H&K worked closely with these stakeholders to ensure that everyone was aware of the impacts of the traffic with a detailed scope of work and completion time.

Additionally, H&K approached the department and proposed a new idea to complete the traffic switches in a more effective manner, saving project time and resulting in less impact to the traveling public. The original plan was going to take approximately two weeks to complete switching of traffic between stages. H&K proposed a weekend traffic switch, which put traffic into a single lane configuration for a 56-hour window. This weekend switch was successfully implemented eight times, with each time being completed within 36-48 hours. This took multiple community outreaches, communication with local agencies and safe and successful execution of the around-the-clock-operations.

For this project, H&K conducted several community outreach meetings for the local involvement, including addressing the following topics:

- **Emergency Medical Services – Traffic Incident Command** – Conducted an open meeting including Pennsylvania State Police, 911 call centers, multiple counties, several PennDOT

Districts, local fire companies/ambulance companies and others. In these meetings, H&K demonstrated phasing and limited access points to make sure all involved safety officials had access to and from the limited access highway. H&K also aided as requested for traffic control, closing the interstate, removing/relocating/repairing temporary concrete barriers and clean-up. H&K also setup a smart work zone, with traffic cameras, queue detectors, and message boards, which monitored speed, volume counts and provided warnings of slowdowns throughout the District Intelligent Transportation System (ITS), with direct links and controls to local PennDOT District office, as well as the main traffic unit in Harrisburg.

- **Local Schools** – H&K led meetings with the local school districts, demonstrating what local roads would have limited access, one way, etc. to make sure that the school districts would be available to pick-up and drop-off students at the current locations. This continued throughout all phases of the construction period.

- **Dump Sites** – H&K worked with local Conservation Districts, Department of Environmental Protection, Fish and Boat Commissions, Local Preservation Programs, to develop dump sites to accept the surplus of excavated material of over 800,000 CY for the project scope. This also included a dump site on local Township accepting over 200,000 CY of clean fill. H&K worked with the Township to develop the land into a township sponsored athletic complex.

- **Temporary on-site Concrete Batch Plant** – H&K worked with local Conservation district for approval, then with both Zoning and Land Development for Greenwich Township approval to erect, maintain and operate a concrete batch plant required for the Project.

2.2.2 Macquarie Op Lanes Maryland Community Engagement

Macquarie participated in 100+ public meetings in the early stages of pre-development for the Op Lanes Maryland project. Using early, proactive engagement, Macquarie along with its partner addressed community concerns about tolling and construction impacts. Additionally, we engaged on the benefits and importance of the project highlighting the team's many above and beyond commitments.

By engaging the public, we helped strengthen relationships and foster a positive reaction to the project. We remain a partner to the community and have continued this engagement with ongoing communication and public involvement.

Section 3 – Target Audiences

3.1 Target Audiences

Anticipated target audience for the First Package include:

- Media
- Government entities
- General public residing or working within the bridge sites
- Business owners
- Utilities, railroads, transportation authorities and providers affected
- Neighborhood associations, community groups and other organizations with special interest in the Project
- Major traffic generators which could be affected by closures or construction
- Elected officials
- Schools
- First responders
- Local government officials
- Commonwealth elected officials
- Industry associations
- Businesses and organizations, with special support for small and disadvantaged business and organizations
- Workforce development organizations

Target Audience List will be finalized between PennDOT and BPP as part of the PDA Work for the First Package

3.2 Specific Audiences by Bridge

Target Audience:	State	Local Municipalities	Utility	Railroads	PA Fish & Boat / Environmental	Pennsylvania Park System	Other Third Parties
I-81 Susquehanna	• Pennsylvania • New York	• New Milford Township • New Milford Borough • Great Bend Township • Great Bend Borough • Hallstead Borough • Jackson Township • Borough of Binghamton, New York	• Hallstead/Great Bend Joint Sewer Authority • Claverack Rural Electric Cooperative • Williams • Pennsylvania American Water • Northeastern PA Telephone Company • First Energy • Sprint Communications Co. LP • Frontier Communications • Adams Cable TV • AT&T	• Norfolk Southern Railway Company leased to Central New York Railroad Company			
I-80 Nescopeck		• Nescopeck Township • Black Creek Township	• PPL Electric • Frontier Communications Corporation	• Nescopeck Township • Black Creek Township	• Trout Stream (Stocking)		

Target Audience:	State	Local Municipalities	Utility	Railroads	PA Fish & Boat / Environmental	Pennsylvania Park System	Other Third Parties
		• Property Owners on SR 3016 - Tank Rd	• Pennsylvania American Water • Zito Media • PennDOT Utilities (Electric, Communications, Weather Station, ITS)	• Property Owners on SR 3016 - Tank Rd	• Migratory Fishes		
I-78 Lenhartsville		• Greenwich Township	• Met-Ed - First Energy • Verizon		• Trout Stream (Stocking) • Migratory Fishes • Red Belly Slider Turtle		
I-80 Lehigh River		• Kidder Township • White Haven Borough • East Side Borough	• Aqua Pennsylvania Wastewater, Inc • Atlantic Broadband (Communication) • PPL Electric Utilities Corp. (Electric) • UGI Utilities, Inc. (Gas)	• Reading Blue Mountain Railroad	• PA Fish & Boat Commission	• Pennsylvania Department of Conservation and Natural Resources	• River Rafting Outfitters • Biking and Trail Riding Outfitters

Target Audience:	State	Local Municipalities	Utility	Railroads	PA Fish & Boat / Environmental	Pennsylvania Park System	Other Third Parties
			• Verizon Pennsylvania, LLC (Communication)				
I-80 Canoe Creek			• Columbia Gas of Pennsylvania • Central Electric Cooperative, Inc.				
I-80 North Fork		• Brookville Municipal Authority	• National Fuel Gas • Penelec • United Electric Cooperative Inc. • Windstream • Comcast • Zito Media				

Section 4 – Approach to Public Information and Communications

BPP as Development Entity for the First Package will be a trusted and long-term partner supporting PennDOT with public outreach and engagement.

BPP will work collaboratively in a responsible manner, ensuring the needs of the community and stakeholders of the First Package are heard and addressed. BPP understands the unique requirements, and regional priorities of the Program and has worked successfully with all key public stakeholders and will ensure that the community benefits from the Project.

BPP understand that the viability of the Package is integrally linked with local government or municipal concerns. Whether at the local, regional, Commonwealth or even the federal level, BPP team members have the expertise to communicate effectively. BPP will approach every outreach effort as an opportunity to engage, inform and educate.

BPP's public information and communication team has experience working with PennDOT and will assist any event, public forums or workshop.

Experience shows that delivering early information is critical to success, bringing up to a 20% reduction in the traffic volume during detour times.

BPP's public information and communication team will communicate and collaborate with Elected Officials, adjacent property owners, local businesses, county representatives, emergency response services and schools on the status of each Bridge.

BPP will support PennDOT in outreach campaigns prior to the commencement of physical construction. Throughout these campaigns and structured meetings, elected officials will be able to inform their constituents the progress of each Bridge and any potential impacts it will have on them.

BPP will also participate in "Tabletop" exercises to ensure that the local EMS services know what stage of work each Bridge is in and specific details such as which lanes will be opened, closed and where the muster points on each Bridge are located in the event that emergency services are required.

Section 5 – Organizational Structure

BPP has set up a public information and communications program that leverages experience from previous major design-build, P3 and pre-development projects and is coupled with local experienced resources.

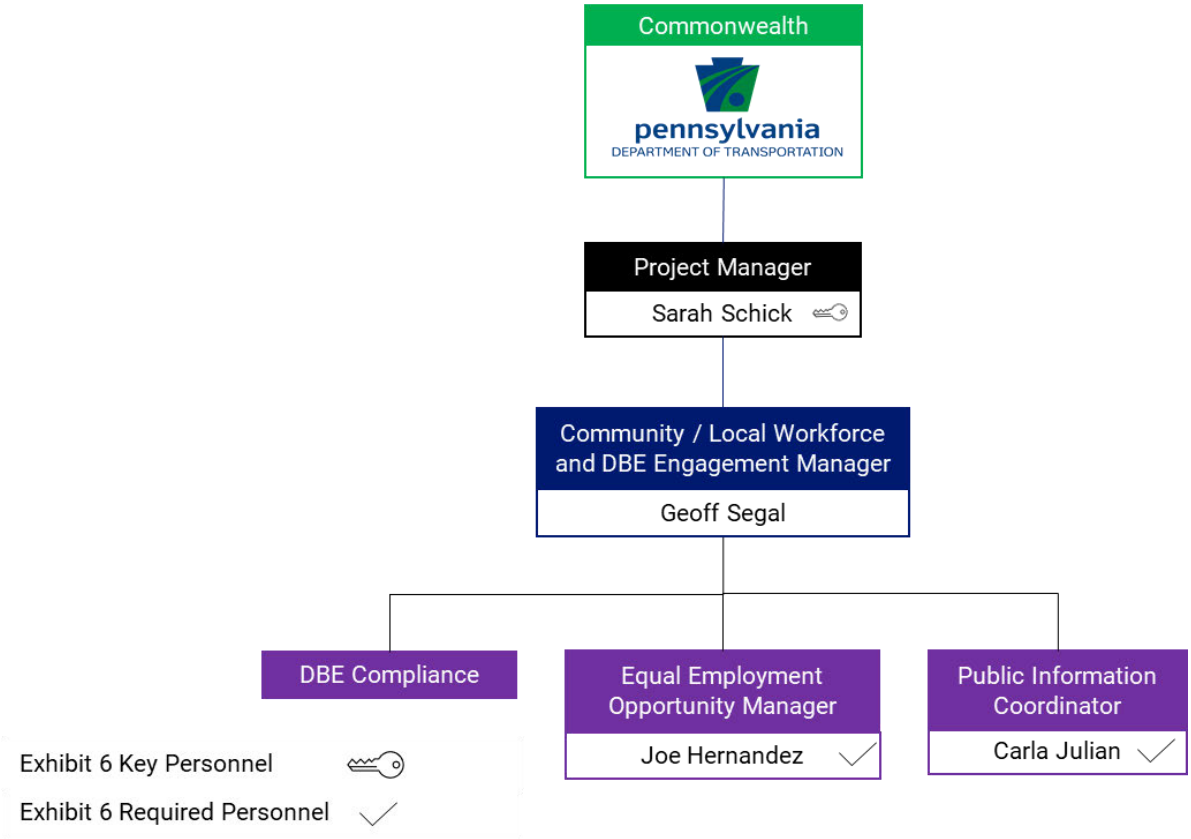
The organizational structure of the Development Entity has similarly been staffed with a team of seasoned communication experts with more than 30 years of experience executing successful outreach and engagement programs on some of the nation and region's largest, most high-profile transportation projects including the Op Lanes Maryland P3, the Goethals Bridge Replacement and the new Tappan Zee Bridge.

In addition to the senior leadership, the team will utilize additional local resources for each individual bridge. For example, Fay has worked on 12 projects in PennDOT District 10 over the past 20 years and will bring their excellent working relationships with stakeholders in that area to bear. Additionally, H&K has supported heavy civil contracting operations and associated construction materials facilities in all PennDOT Districts included within the program area (Districts 3, 4, 5, 6 and 8). H&K's operational footprint has been firmly rooted within the eastern half of Pennsylvania over the last half-century and the company has completed hundreds of heavy civil infrastructure Projects grossing upwards of $3 Billion in contract values within this same Project area. Over the last 20 years, H&K has completed major infrastructure work on I-78, I-80, I-83, I-81, I-95 and the Schuylkill Expressway, demonstrating H&K's contribution and legacy to the region's vital transportation network.

BPP's Communications Team has a dedicated, experienced team of communicators, creative thinkers, public relation specialists, grassroots marketers, copywriters, media planners/buyers and researchers who have undertaken hundreds of transportation programs focusing on diverse populations and geographic areas. BPP's team of trusted communicators and talented creative designers bring a solid understanding of transportation, public safety, construction and traffic management. BPP's approach to communications and public engagement is to craft behavior-driven messages and deliver them to the appropriate audiences through media channels they see and/or use every day. For example, BPP will develop a custom notifications-based system, for each Bridge in the First Package, that allows users to sign up for notifications based on neighborhood. Users can receive notifications via text, email or by visiting a website, all in multiple languages. This will be a powerful tool to provide information and updates to impacts to stakeholders**.** It will also enable us to measure the effectiveness of BPP's outreach efforts.

The organizational structure of BPP's public information and Communications Team is presented in Figure 1.

Figure 1: BPP's Public Information and Communications Team



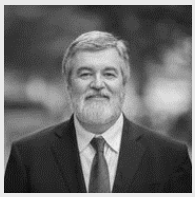
Section 6 – Personnel and Advisors

6.1 Personnel

To provide PennDOT with the highest level of service and expertise, BPP has put together a team of experts who bring experience, fresh ideas and the ability to meaningfully engage diverse stakeholders with a wide range of agendas.

NAME / ROLE	RESPONSIBILITIES	QUALIFICATIONS
Development Entity Personnel		
 Geoff Segal, Community / Local Workforce and DBE Engagement Manager	• Ensure community and stakeholder outreach, education and marketing campaigns are executed to keep community informed on Project status and opportunities • Lead all BPP Community and Local Workforce initiatives (e.g., internships, training, apprenticeships, and education programs) • Ensure compliance with diversity goals by supporting PennDOT's Diversity Program and through Project Leadership • Oversee the development and implementation of our WDP and DBE Performance Plan • Ensure execution of Community Benefits Agreement, and Memorandum of Understandings with community partners • Coordinate with full suite of Community, Local Workforce, and PR advisors	Geoff has more than 20 years of public policy and infrastructure development experience. Specifically in the last 14 years he has been developing and executing communications and public outreach on P3 projects in both the predevelopment and delivery stages. Some of the recent projects that he has developed and executed stakeholder and community engagement tactics, including toll education campaigns, during the Predevelopment Stage are the Elizabeth River Tunnel project and the Op Lanes Maryland Project.
 Carla Julian; Public Information Coordinator	• Responsible for the coordination of the public relations plan / program including media relations, community relations, construction information and crisis communication • Ensure that all information related to design, construction, maintenance, and tolling is shared and that all interested and vested parties and stakeholders are informed of progress • Carla Julian will be supported by Eric as the Public Information Coordinator.	Carla has more than 20 years of versatile public relations and media management leading construction-related public information planning encompassing strategic communications, public affairs, community outreach and media strategy on the nation's largest, high-profile transportation infrastructure projects. She has worked on MD Intercounty Connector (ICC), NY Tappan Zee Hudson, River Crossing and MD Purple Line Light Rail.

NAME / ROLE	RESPONSIBILITIES	QUALIFICATIONS
 Joe Hernandez; Equal Employment Opportunity Manager	• Joe will be the EEO and will be supported by the broader Modern Times, Inc. (MTI) team. • Joe has day-to-day responsibility over the implementation of BPP's Diversity and Equal Employment Opportunity Program, specifically the DBE Plan, DBE commitment/attainment tracking and GFE outreach related to procurement activities of the BPP team.	Joe Hernandez is President of MTI, a small, disadvantaged business with a Philadelphia office. Joe is an executive manager with 22 years of experience in the field of community programs, including small and disadvantaged business enterprise (SBE and DBE) programs, local hire and job training, labor compliance, equal employment opportunity, and public and community relations. Joe has led the design, implementation, and management of community programs on the largest and most complex transportation projects in metropolitan areas throughout the United States.
Supporting Team and Advisors		
 Eric McAndrew Public Relations Manager	Eric will be principally responsible for: • Communications/Marketing Planning, Research • Branding • Creative Development • Website Development/Production/Hosting • Collateral Materials • Grassroots Programs • Graphic Design • Media Strategy/Planning • Digital and Social Media Strategy	For over 20 years Eric has directed creative efforts for more than 75 transportation and public safety campaigns. He has developed successful transportation campaigns for The Maryland Department of Transportation, the Maryland Transportation Authority, the Delaware Department of Transportation, The District Department of Transportation, the North Jersey Transportation Planning Authority and Accelerate Maryland Partners. He has won multiple local, regional, national and international awards.
 Stan Rapp Government Affairs	• Stan, with Greenlee Partners, will assist in strategic partnership development and government relations.	Stan has more than 30 years' experience of successfully navigating the government relations industry within Harrisburg, which results from his well-established standing in Pennsylvania politics. Stan has been an integral component to many of the Commonwealth's transportation infrastructure projects. In particular, his knowledge of the General Assembly and deep-rooted connections played a fundamental role in the passage of Act 44 of 2007, which provided a much-needed dedicated revenue source for the Commonwealth's critical infrastructure.

NAME / ROLE	RESPONSIBILITIES	QUALIFICATIONS
 Chris Heinz Labor Relations	Chris Heinz has a highly successful 35-year career in increasingly responsible positions within the Carpenters Union and Macquarie, where he has led the implementation of Macquarie Infrastructure and Real Asset's Responsible Contractor policy and investor labor relations as well as working with the stakeholder / community relations team. Chris built a successful public affairs and lobbying practice representing labor organizations, corporations, and non-profit organizations. He is recognized on Capitol Hill for having a balanced perspective on issues affecting the interests of clients, often partnering with industry groups to educate legislators on proposed and / or pending legislation. His experience extends to a broad range of areas including strategic planning and program development, labor-management cooperation, organization of political support, media and public relations, educational programs, legislation research and analysis, ESG, and legislative liaisons.	
First Package Design and Construction Supporting Team		
 Stephen M. Nelson Human Resource & Safety and Risk Management Director	Stephen serves as H&K's Human Resource Director and Risk and Safety Manager, a role which he assumed in 2013. Prior to that, Stephen held roles throughout H&K in both construction as well as finance, including serving as Chief Financial Officer from 2007-2013.	
 Lisa O'Connor D&C EEO	Lisa manages compliance for H&K's Human Resource Department for approximately 80 companies and affiliates. She has created applicant tracking systems for 80 companies, developed key partnerships with PA Career Links, Vocational Tech High Schools as well as established an apprenticeship program with Lehigh County Technical Institute. As EEO, Lisa's responsibilities include: • Identify legal requirements and government reporting regulations with EEO and hiring to ensure policies, procedures and reporting are in compliance • Recruit, interview and select employees to fill vacant positions • Perform and record EEO audits • Coordinate management training in interviewing, hiring, terminations, promotions, performance reviews, safety, EEO and sexual harassment	
	Anthony is a mining, engineering and heavy civil construction professional with over 30 years of technical, communications and public relations experience. Mr. Jeremias provides strategic delivery of industry leading corporate identity, communications, marketing, public relations and government affairs initiatives for H&K Group, Inc. Mr. Jeremias will oversee, direct and/or manage the following:	

NAME / ROLE	RESPONSIBILITIES	QUALIFICATIONS
Anthony Jeremias Public Relations	• Corporate Communications • Public & Media Relations • Community Relations • Government Affairs • Advertising & Marketing – for Outreach/Engagement Campaigns • Outreach/Engagement Event Planning & Administration	

6.2 Public Relations Advisors

McAndrew Company

The McAndrew Company, a registered DBE firm, has provided marketing and communications solutions for more than 30 years, specializing in transportation related issues, such as highway and bridge construction communications/traffic safety campaigns. They have extensive experience in the region having worked with several regional transportation agencies including the Maryland Department of Transportation, the Maryland Transportation Authority, the Delaware Highway Safety Office, the Delaware Department of Transportation, the District Department of Transportation, the North Jersey Transportation Planning Authority and Accelerate Maryland Partners.

The McAndrew Company focuses solely on delivering creative marketing results for their clients. Cultivating creative talent, utilizing data driven approaches, developing custom marketing approaches and staying on top of innovative technologies and methodologies have been critical tactics that McAndrew has used to deliver exceptional marketing results.

Kaleidoscope Public Relations, LLC

Kaleidoscope Public Relations, a Philadelphia-based, woman-owned, small business founded in 2020, whose DBE certification is pending, was established by Carla Julian after 20 years in the trenches leading national transportation/infrastructure projects. Kaleidoscope serves clients in the transportation/infrastructure/construction industry while working with other clients/issues that lend to further developing the City of Philadelphia into a known destination city. Top issues she devotes pro-bono investment towards are inclusivity, veteran affairs, mental health wellness, affordable housing and programs to provide learning/mentoring opportunities to children.

Over the span of her experience, Carla has been a part of successfully delivering over $10.5 billion of the nation's largest transportation/infrastructure projects. Carla has established massive strategic communications plans for these projects utilizing her relationships and managing liability while meaningfully partnering with impacted stakeholders.

"A true professional in construction communications, Julian combines her industry knowledge and ability to communicate with the media and public into an enormous asset for any project. Julian has an innate sense of how to work with people, explain construction activities in way that makes them understandable, and the perseverance to succeed at getting projects across the finish line." - Kelly MacMillan, former Director, Public Infrastructure Projects, Empire State Development Corporation

Section 7 – Roles and Responsibilities

PennDOT will remain the face of the Project and the official spokesperson. PennDOT Project Manager and the relevant District Communications team will direct all outreach initiatives.

All outreach materials must be reviewed and approved by the Project Manager. In addition, all media, website, social media and letters distributed on PennDOT letterhead must be approved by the District Communications team.

BPP will support PennDOT's outreach and engagement efforts and will collaborate in coordination and preparation for community and stakeholder engagement program. This includes:

- Assisting in preparing materials needed for any stakeholder and community outreach, including meeting advertising, presentations, display boards, handouts, and meeting summaries
- Ensuring that the outreach process, including meeting advertising, materials and conduct, are completed so that Environmental Justice and Title VI populations can fully participate
- Meeting with stakeholders and elected officials as needed to provide Project information and gain feedback from stakeholders
- Meeting with established community, business and professional groups as needed or requested
- Holding public meetings/open houses/workshops as needed to provide Project information and gain feedback from community members and stakeholders
- Attending community events to share Project information as requested
- Providing initial content for a Project website and quarterly website updates
- Providing newsletter content when requested
- Drafting letters, press releases, emails and social media postings as needed
- Working with PennDOT to respond to information requests received
- Assisting PennDOT with maintaining a record of all public information requests, comments and responses
- Assisting PennDOT with maintaining contact/mailing lists for all Project stakeholders

Additionally, the Project Communications Team is responsible for managing communication with each Bridge in the First Package. Specific tasks include:

- Maintaining www.bridgingpennsylvaniapartners.com and any subsequent website
- Facilitating responses to inquiries from the Project website and newsletters
- Publicizing design and construction milestones through the Project website, newsletter, flyers and other tools as appropriate
- Maintaining a master contacts database
- Maintaining a master list of public inquiries and responses

- Preparing press releases and other public notifications for distribution as directed by the relevant District Press Office

Carla Julian, as the Public Information Coordinator shall have the following responsibilities:

- Coordination of the public relations plan for each Bridge in the First Package. This includes media relations, community relations, construction information and crisis communication
- Ensuring that all information related to design, construction, maintenance and tolling is shared and that all interested parties and stakeholders are informed

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Section 8 – Public Outreach and Engagement Initiatives

Given the nature of the Project and its geographic diversity, there are many different audiences to consider throughout the Commonwealth. While BPP have become virtually adept during the current pandemic, not everyone has equal access to tools that allow a virtual connection.

In order to reach all members of the target audiences, BPP outreach initiatives will use traditional as well as visual and virtual communications tools to execute public outreach and engagement at the highest level and make the best use of PennDOT's resources.

- **Message Mapping and Audience Alignment:** BPP will use the Project goals, procedures and standards to develop the overall plan, while engaging communities early on in the Design Period. BPP will revisit and realign key messages with PennDOT to highlight improvements, convey the need for any potential community impacts, increase redundancy to build confidence and credibility with the target audiences in the community
- **Stakeholder and Community Database:** A database will be developed to identify primary target audiences, such as corridor-specific residents, businesses, civic associations and commuters for each bridge. Elected officials, industry organizations and minority businesses will be included in the database. If there is an existing PennDOT database, that will be used as a foundation for building Project-specific community coordination champions or small focus groups who can help advocate for and educate local opinion leaders and, in turn, their communities or organizations, about important program elements while also dispelling negative or false information. The database will be updated monthly
- **Content and Collateral Development and Management:** As part of BPP information dissemination strategy, flyers, brochures, FAQs, presentations, emails, newsletters, videos, posters and other materials to support community meetings will be developed, as needed. These materials will ensure all stakeholders have consistent and cohesive information about the Project. Materials will address genuine concerns of the community and will incorporate strategies to ensure credibility and transparency throughout the Project. Further analysis of the Project area and neighborhoods will drive the final decision of material and collateral development, as well as strategies and tactics based on the unique needs of an organization or community
- **Meetings, Events and Other Site Opportunities:** A calendar of events with opportunities to communicate directly with the target audience will be developed. BPP will work closely with PennDOT to identify potential opportunities to engage the community. The calendar will include schedules for public/community meetings, events, elected officials' meetings and communications, industry events/meetings and minority business outreach meetings. The calendar will be updated weekly
- **First Package Website Development:** A First Package website will be developed and include a "virtual information room" to include all community meetings materials online. The room will include display boards, presentations with audio, interactive First Package map, brochures, FAQs and more. The virtual information room will be another communications tool for stakeholders who are unable to attend meetings in-person. The virtual room will be promoted on all public outreach materials and social media

- **Community Engagement Reporting:** A weekly activities report will include a review of the previous week's progress and upcoming communications activities emailed to the BPP and PennDOT team at the start of each week
- **Crisis Communications:** Crisis planning is an integral part of communications planning. While every possible safety measure will be taken by the all the teams involved in the First Package, the very nature of the First Package requires BPP to develop a crisis management plan. BPP will work with PennDOT to review existing incident management plans and develop an effective, responsive and proactive Crisis Communications Plan. This Plan details contact information of key decision makers, protocols for information dissemination and various information about appropriate responses during emergency related incidents – whether physical or media/reputation related

Section 9 – Community and Stakeholder Outreach Meetings

9.1 Public Meetings

BPP will organize and facilitate meetings with the general public at the beginning of a new Bridge. For each meeting, the BPP team will collaborate with PennDOT to prepare/complete the following:

- Update the stakeholder contact list
- Secure a meeting location (or virtual meeting room)
- Mail meeting invitation postcards to nearby residents
- Email meeting invitations to stakeholders
- Post the meeting invitation on the Project website
- Develop a meeting agenda
- Create a meeting sign-in sheet
- Provide staff name tags
- Prepare presentation materials, workshop materials and/or handouts
- Post a meeting summary, meeting notes and materials on the Project website after the meeting

9.2 Community, Business and Professional Group Meetings

BPP will proactively reach out to community, business and professional groups to update them on Project progress and seek their input. The team will also attend meetings in response to requests from these groups. For each meeting, BPP team will prepare/complete the following:

- Coordinate with the stakeholder group and PennDOT on meeting content
- Email notification of the meeting to key agency stakeholders
- Presentation materials
- Handouts
- Meeting notes

9.3 Community Events

When requested, and with the approval of the PennDOT Project Manager, BPP will participate in community events to provide Project information and listen to community ideas and concerns.

9.4 Stakeholders and Elected Officials

The BPP team will set up meetings with key Project stakeholders. For each meeting, the BPP team will prepare/complete the following:

- Coordinate with the stakeholders and PennDOT on meeting content
- Presentation materials
- Agenda
- Sign in sheet
- Handouts
- Meeting notes

9.5 First Package Outreach Activities

BPP has provided a sample of the types of outreach activities BPP can anticipate on some of the First Package Projects. A full list of activities, for each Bridge, will be built out in collaboration with PennDOT and District Staff during the Pre-Development Phase to ensure adequate planning and engagement.

9.5.1 I-80 Canoe Creek

There are existing Gas Pipelines owned by Columbia Gas of PA, Dan Stover, Inc. and Deitz Gas & Oil, Inc. under the I-80 bridges to be demolished and replaced. Pending confirmation of the span layouts and foundations selected, any pipelines identified that require relocation due to foundation conflicts will be coordinated between BPP and each of the gas pipeline owners during design to relocate their individual service with the minimum disruption possible.

In addition, any pipelines that will require protection from heavy equipment either in their existing or relocated condition will be identified by consultation between BPP and the pipeline owners and the appropriate mitigation (plates, mats, added cover, etc.) will be agreed to by both parties.

Fay has specifically dealt with gas line relocations on many PennDOT Design-Build projects in the past. The Stoops Ferry Bridge Replacement project required relocation of a 4” Peoples Gas line.

Communication with Peoples Gas had to commence as soon as Fay received Notice to Proceed. The project staff conducted bi-weekly utility coordination meetings not only for Peoples Gas, but all the other utilities that were affected and had to be relocated within the project limits. The project was an accelerated bridge project and the gas line could only be out of service for a certain timeframe. Preplanning meetings were held months in advance of the bridge detour between Fay and Peoples Gas to set expectations for both sides in order to successfully execute the relocation of this gas line. Peoples and Fay worked hand-in-hand during the bridge closures to relocate this line within the allowable timeframes.

9.5.2 I-80 North Fork

Meetings will be held prior to the Project with local business owners that are located at the Interchange that will need to remain open for traffic. Early notification and communication will enable them to understand what will happen, but also allow an opportunity to address their concerns. Impacted businesses include mostly restaurants (Arby's, McDonald's. etc.), gas stations (Flying J and the TA Travel Plaza), motels (Super 8 and Roadway Inn) and a few others.

Jenks St (SR 4003) Bridge Construction & Utility Relocations

The Brookville Area High School & Hickory Grove Elementary School complex is located directly north of the I-80 bridges over Jenks St (SR 4003). Construction operations at that location include the replacement of the I-80 bridges and the lowering of SR 4003 under the bridge. These operations will also require substantial utility relocations both for overhead and underground utilities. For the duration of those operations there will be periods of impacts to the school bus and student drop off/pick up traffic using Jenks St that will require significant coordination with the school district to mitigate delays in travel time to the school complex along with maintaining safe travel through the worksite during operations. Along with the school district, communication with the Brookville Volunteer Fire Department regarding any delays or detours will be maintained throughout the duration of construction due to rerouting impacts from the fire station in downtown to the school complex adding approximately an additional 3-4 minutes to the response time to the schools. In conjunction with the Fire Department impacts, an EMS detour rerouting impact to/from the school complex and Penn Highlands Brookville Hospital would add approximately an additional two minutes to the ambulance response time each way.

The construction operations of replacing the existing WB I-80 bridge and construction of the new EB I-80 bridge over Water Plant Rd, Brookville Reservoir and Walter Dick Memorial Park will require communication with several stakeholders.

Access to the Brookville Municipal Authority water treatment plan uses Water Plant Rd as the primary access to that facility and as such, coordination with any construction operations will need to be made to mitigate any impacts on traffic that would affect the operation of the Municipal Authorities water facility. Along with coordination of access, the Brookville Reservoir water supply will need to be protected and monitored throughout construction operations that could potentially affect the water quality of the reservoir.

The Walter Dick Memorial Park lies directly between the existing EB and WB I-80 bridges and will require communication and coordination with recreational users during construction operations that will occur immediately adjacent to the park areas along with the construction traffic that will utilize Water Plant Rd to access the jobsite which is also the access road to the park. In particular, the demolition operations of the existing EB I-80 bridge will require public notice and communication of potential park access limitations for periods when Water Plant Rd will be closed due to overhead work.

Section 10 – Public Education and Awareness Program: Modes of Communication and Measures of Effectiveness

A public education and awareness program will be implemented to increase awareness and support of the First Package. A multi-pronged media approach will be used that includes a combination of earned media and paid media. The paid media (if needed) will include radio (broadcast and streaming), digital, video-on-demand, social (Facebook and Instagram) and grassroots outreach. The media targeting approach will be location-targeted, based on neighborhoods surrounding the different corridors in the First Package. In these locations, the campaign messages will be geo-targeted through digital, social and grassroots outreach. This targeting approach ensures that the correct message is delivered to the appropriate audience.

It should also be noted that each individual community affected by the plan may respond differently to the public education and awareness program. Connecting specific message points to specific communities is important. Presenting those messages solely through community events and/or meetings may not reach all potential supporters. Utilizing additional methods, such as digital advertisements, direct mail or grassroots outreach will more effectively raise awareness and subsequently increase support.

10.1 Public Surveys

Public surveys and/or focus groups can be a useful tool to engage the community, gauge impressions of the Project or gain feedback on specific issues. Pre and post outreach surveys and opinion polls are also effective tools to measure performance of the outreach program and helps shape messages and measure changes in awareness or shared beliefs.

10.2 Website

The website, https://www.penndot.gov/ProjectAndPrograms/p3forpa/Pages/Major-Bridges.aspx, is the central source of information for the Major Bridges Project.

Additionally, www.bridgingpennsylvaniapartners.com can be used to supplement (note a website outline is provided later in Appendix A). The Project Communications Team manages the website, conveying Project messages in graphic and text formats. BPP will review web content at least quarterly and provide updates to the Project Communications Team, who will incorporate the changes into the website. In addition, the BPP team will provide meeting notices and materials for posting on the website.

BPP will utilize website analytics (e.g. page views, time on site) to measure effectiveness of the website.

10.3 Earned Media

Media List Development: A comprehensive media list for outreach will be developed. Building from any existing PennDOT media list, a comprehensive list will be developed that includes local media outlets in each Project corridor. Harrisburg related media lists including radio stations and print media will be included. Target media will also include reporters covering varied beats including safety, transportation and mobility, traffic and weather reporters.

BPP has identified key media for each Project. This list will be finalized in collaboration with PennDOT and District Staff during the PDA Phase.

Media	Newspapers	Radios	Local Television
I-81 Susquehanna	• Susquehanna Transcript • Carbondale News • Scranton Times/Tribune/Sunday Times • The Scranton Times	• WPEL • WELD AM • WSGD • Magic 93 • WEZX • WWDL • Oldies 92 • Clear Channel • Route 81 Radio	• WYOU • WNEP (ABC) • WSWB • WOLF
I-80 Nescopeck	• Bloomsburg Press Enterprise • Hazleton Standard-Speaker • Wilkes-Barre Citizens Voice • Wilkes-Barre Times Leader • Wilkes-Barre Weekender • Northeast Pennsylvania Business Journal • Scranton Times-Tribune • Valley Advantage • Pocono Record	• WGMF AM 730 • WHLM AM 930 • WILK AM 980 • WBWX AM 1280 • WITK AM 1550 • WVIA FM 89.9 • WRTY FM 91.1 • WBBY FM 100.3 • WMMZ FM 103.5 • WPZX FM 105.9	• WBRE TV 28 (NBC) • WNEP TV 16 (ABC) • WOLF TV 56 (Fox) • WYOU TV 22 (CBS) • WFMZ TV 69 • WBPH TV 60 • PTN (Pocono Television Network)

Media	Newspapers	Radios	Local Television
		• WKBP FM 107.1 • WKRF FM 107.9	
I-78 Lenhartsville	• Morning Call • Reading Eagle (Berks) • East Penn Press (Lehigh) • Lehigh Valley Business Journal • Pottsville Republic Herald (Schuylkill)	• WAEB AM790 • WSAN AM 1470 • WZZO FM 95.1 • WCTO FM 96.1 Cat Country • WAEB FM B104.1 • WODE FM 99.9 Hawk • WLEV FM 100.7 • WDIY FM88.1	• WMFZ TV69 | Allentown • KYW TV3 (CBS) | Philadelphia • WPVI TV6 (ABC) | Philadelphia • WXTF TV29 (FOX) | Philadelphia • WCAU TV10 (NBC) | Philadelphia • WNEP TV16 (ABC) | Scranton • WBRE TV11 (NBC) | Scranton
I-80 Lehigh River	• White Haven Journal-Herald • Hazleton Standard-Speaker • Wilkes University Beacon (university) • Wilkes-Barre Citizens Voice • Wilkes-Barre Times Leader • Wilkes-Barre Weekender • Northeast Pennsylvania Business Journal • Scranton Times-Tribune	• WILK AM 980 • WITK AM 1550 • WVIA FM 89.9 • WCLH FM 90.7 • WRTY FM 91.1 • WQFM FM 92.1 • WMGS FM 92.9 • WBYX FM 93.3 • WBHT FM 97.1	• WBRE TV 28 (NBC) • WNEP TV 16 (ABC) • WOLF TV 56 (Fox) • WYOU TV 22 (CBS) • WFMZ TV 69 • WBPH TV 60 • PTN (Pocono Television Network)

Media	Newspapers	Radios	Local Television
	• Valley Advantage • Pocono Record	• WBSX FM 97.9 • WKRZ FM 98.5 • WRGN FM 100.3 • WPZX FM 105.9 • WKRF FM 107.9	
I-80 Canoe Creek	• The Clarion News • Explore Clarion • The Clarion Democrat	• WCGT 88.7 • WCUC 91.7 • WCCR 92.7 • W231DR 94.1 • WKQW 96.3 • WGYI 98.5 • WKFT 101.3 • WKQL 103.3 • WMKX 105.5 • WCGH 106.1 • WKQW 1120 • WWCH 1300	• KDKA (Pittsburgh) • WTAE (Pittsburgh) • WJAC (Johnstown) • FOX8 (Johnstown) • WPXI (Pittsburgh) • WCWB (Pittsburgh) • WMKX
I-80 North Fork	• The Jeffersonian Democrat • Clarion is also close (16 miles)	• WCGT 88.7 • WCUC 91.7 • WCCR 92.7	• KDKA (Pittsburgh) • WTAE (Pittsburgh) • WJAC (Johnstown)

Media	Newspapers	Radios	Local Television
		• W231DR 94.1 • WKQW 96.3 • WGYI 98.5 • WKFT 101.3 • WKQL 103.3 • WMKX 105.5 • WCGH 106.1 • WKQW 1120 • WWCH 1300	• FOX8 (Johnstown) • WPXI (Pittsburgh) • WCWB (Pittsburgh) • WMKX • WJAC

Effectiveness will be measured by the number of stories posted by media types (e.g., TV, radio, newspaper and social media). Each outlet has predictable reach which can be converted into media impressions.

- **Materials Development:** Media materials such as press releases and advisories will be drafted throughout the Delivery Phase of the Package. As part of this effort, news hooks about Project benefits will be written to appeal to all media targets and target audiences. Press release will also announce when BPP's Project benchmarks have been met.
- **Digital Press Kit Development:** To further reach and engage the media, a brief summary, related assets, fact sheets, short video and spokesperson contact will comprise a flash drive that will serve as an informational press kit. These will be delivered to top reporters, transportation, safety and mobility advocates throughout predevelopment.
- **Tailored, Proactive Outreach:** Local and Pennsylvania based journalists, transportation reporters and bloggers are pillars of this campaign's proactive media relations efforts. Targeting key transportation advocates will help bring the message to ensure resonance among audiences.

Figure 2 - Example Business Outreach Report

BPP will proactively pitch transportation and mobility reporters. On-line social and digital information (including videos) will be shared to communicate information about the Project and its benefits in order to build support. BPP will identify local influencers and reporters with large followings; stories will be pitched to them to highlight the importance of the Project, particularly its benefits and BPP commitments to the community.

10.4 Paid Media

BPP will explore the use of Paid Media.

10.4.1 Media Schedule

A media schedule will be developed around public engagement activities, announcements and other First Package milestones. Effectiveness will be measured by the number of media impressions (i.e. the number of times the ad was seen or heard).

10.4.2 Digital (including videos)

Digital ads will be placed across mobile and online display, digital radio and video. This approach ensures online and mobile consumers will receive the Project's message when they are active with their desktop or mobile devices.

- Digital Display Approach: A cross platform approach to digital display buying will include a combination of banner and video ads running on mobile, tablet and desktop devices.
- Digital Radio/Audio: Digital radio (Pandora, iHeart, Radio.com, Tune-in and Spotify) and podcasts will be used to enhance the broadcast radio buy. Both the digital radio and digital ads will be targeted through zip codes and neighborhoods that correlate to the Project corridor and outreach events.
- Video-on-Demand: 15- and 30-second videos will run on apps like Amazon Fire, Apple TV, Roku, Sling, Hulu and more. These ads will be purchased through market wide providers and run on non-skippable pre-roll and mid-break programs on many channels like ABC, CBS, FOX, NBC, TBS, etc. Video-On-Demand will geo-targeted like the digital ad buys – through zip codes and neighborhoods.

The digital ads' message and delivery will be tailored for different communities needs and understanding and support for the Project. For example, if there is a community that is strongly against the Project then digital ads will be geo-targeted to the community with messages focusing on the benefits of the Project. The ads will direct the audience to a web page explaining the benefits in detail.

10.4.3 Social Media

Content for the Project will be developed that engages the audience and gives a call to action (i.e. learn more, register for an event, sign up for the newsletter or email alerts). The social media content will include posts, graphics and videos educating the audience about the Project, benefits or upcoming events. A Project hashtag will be used to link content threads on all social media. Hashtags and tagging like-minded organizations will help further extend the social outreach with the goal of reaching local communities.

Each month, a digital toolkit will be developed which will include a social media calendar that will serve all online activity and guide Twitter, Facebook, Instagram and LinkedIn content. The toolkit will include posts, stories, graphics, videos and more for social, web and digital use. The toolkit will be shared with PennDOT and other agency partners to use and share with partners and stakeholders.

Figure 3 - Example Social Media Post

In order to build likes and followers and further reach target audiences (and have them respond), an ad placement buy will be implemented in the feeds on Facebook, Instagram and Twitter. Ads will be delivered to the target audience and will be geo-targeted using the same strategies as the digital ads. Ads will encourage the audience to like/follow the Project social media pages, sign up for emails or newsletters and go to the Project website the learn more. The ads will also promote public engagement events.

Social Media Platforms considered include

- LinkedIn – Focus on industry outreach
- Facebook – Focus on benefits of Project
- Twitter – Daily news, updates in the moment
- Instagram – Benefits of Project through images
- YouTube – Videos

Figure 4 - Twitter Post for Local Event hosted at Independence Hall

Effectiveness will be measured by the amount of engagement with BPP's content (e.g. shares or likes).

10.4.4 Radio

The radio buy will include traffic sponsorships on radio stations in Project corridor markets. Traffic sponsorships are a cost-efficient way to get the Projects core message out to the audience at a time when you know they will be listening. A natural message will be to counter any breaking traffic news with benefits of the Project.

10.4.5 Grassroots Outreach

Grassroots outreach will be used to reach residents "on the ground". Door hangers will be developed, printed and distributed to neighborhoods along the Project corridor. Door hangers will include information about the Project and benefits. The placement of the door hangers will be geo-targeted to neighborhoods/zip codes with residents who are more likely to use the new bridges on their commute. The hangers will include a QR code that is specific for that neighborhood. The code will direct the audience to web page speaking directly to that community. These locations will be determined with PennDOT. The door hangers will be distributed before construction begins.

Effectiveness will be measured by number of contacts and coalition development.

10.6 Newsletter and Flyers

The BPP team will respond to requests from the Project Communications Team for information for Project flyers as needed.

Section 11 – Public Education and Awareness Timeline

Public Education and Awareness Timeline	

Financial Close	• Establish relationship with Influencers
	• Utilize pipeline of events for media opportunities
	• Development of public education and awareness materials
	  ○ Media list
	  ○ Media schedule
	  ○ Press Releases
	  ○ Flash Drive Press Kits
	  ○ Videos
	  ○ Digital, Radio and Social ads
	  ○ Social media toolkit
	• Launch of Project/consortium social media channel(s)

Financial Close +45 days	• Finalize public education and awareness materials
	  ○ Media List
	  ○ Media Schedule
	  ○ Press Releases
	  ○ Digital Press Kit
	  ○ Videos
	  ○ Digital, Radio and Social Ads
	  ○ Social Media Toolkit
	• Launch of Public Awareness Campaign
	  ○ Radio Interviews
	  ○ Digital Press Kit delivered to reporters
	  ○ Digital, Radio and Social ads promoting Project benefits

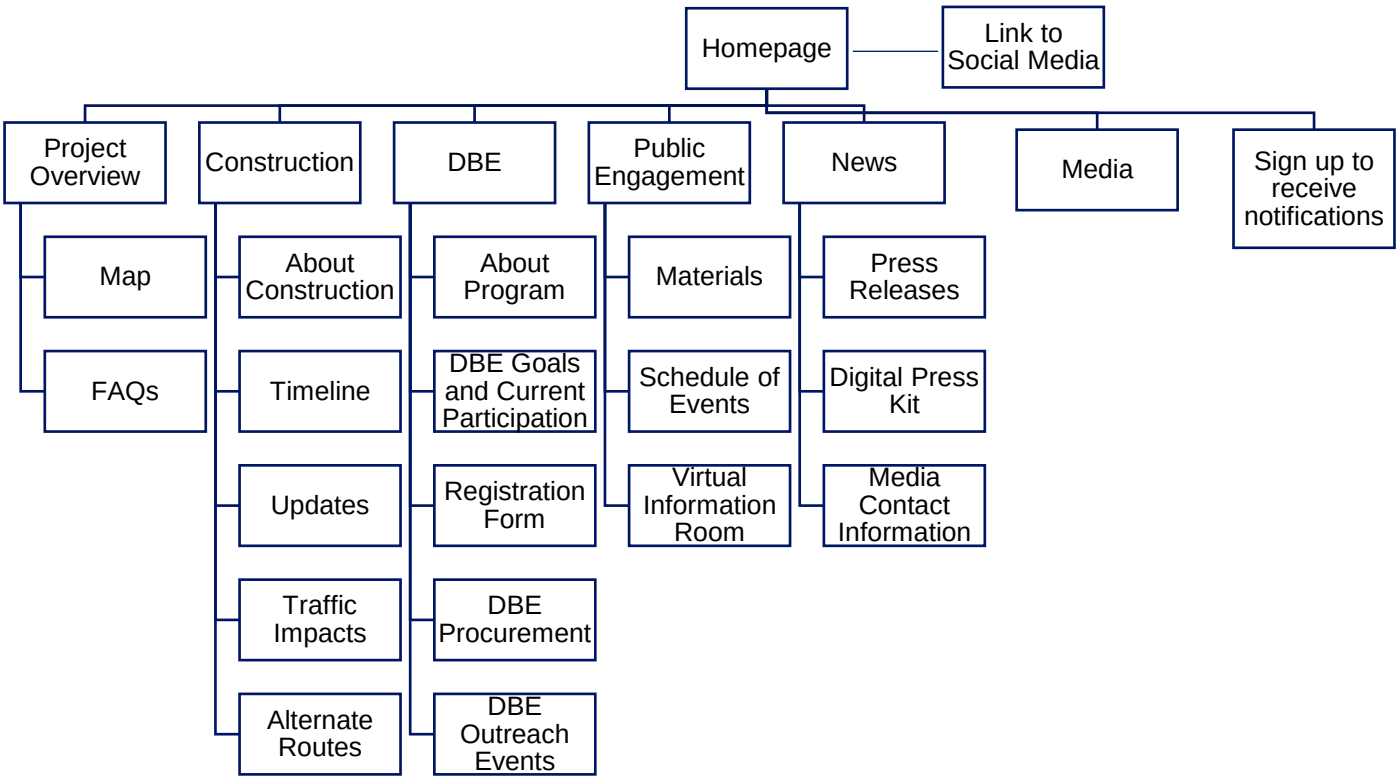
Financial Close +75 days	• Continued Public Awareness Campaign • Social Media kit delivered to PennDOT and partners • Digital, Radio and Social ads promoting Project benefits

APPENDIX A

Website Page Architecture

Website Page Architecture

Anticipated architecture to the future BridgingPennsylvaniaPartners.com website



Preliminary Plan for Maintenance Work and Handback Requirements for the First Package

Project Name:

Pathways Major Bridge P3 Initiative

Project Owner:

Pennsylvania Department of Transportation

Prepared by:

Bridging Pennsylvania Partners (BPP)

Bridging Pennsylvania Partners

Preliminary Plan for Maintenance Work and Handback Requirements for the First Package

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Foreword

In accordance with the Instructions to Proposers (ITP), this plan is a preliminary draft of the Plan for Maintenance Work and Handback Requirements for First Package that outlines BPP's approach to planning for the Maintenance Work and Handback requirements in alignment with the expectations outlined in Section 10 of the PDA Work Requirements. The Plan for Maintenance Work and Handback Requirements for First Package will be refined during the PDA Phase to clearly identify the approach, methods, staffing, schedule, inspections, reporting frequencies, systems and procedures necessary for the to-be-formed Development Entity to perform Maintenance Work and ensure each element continuously meets or exceeds the requirements of the Project Documents and the Maintenance Performance Requirements during the Construction and Maintenance Periods in accordance with the Project Agreement (PA) and the Technical Requirements.

Section 1 – Overall Approach

Approach

As Developer, BPP's Equity Members, Macquarie and SBA, will act as the Lead Maintenance Contractor, taking ultimate responsibility for maintenance and lifecycle risk.

BPP's Maintenance Team will work to meet project requirements and deliver exemplary performance by:

- Applying BPP's national and international experience while leveraging local suppliers and subcontractors to the maximum extent possible
- Focusing on reducing risks through appropriate levels of management, supervision and planning
- Applying proven services management and supervision processes, systems and tools
- Making sure staff understand and perform their responsibilities and contributions to overall service performance and monitoring and measuring that performance
- Developing action plans to minimize availability, delay and inconvenience to users and performance failures, as determined by the Maintenance Performance Requirements
- Focusing on the safety of users and staff
- Anticipating staff needs, promoting training and implementing effective and safe processes
- Focusing on effective communication with PennDOT and third parties

Management Policies and Procedures

BPP will carry out maintenance activities as stipulated in the PA and in a manner that supports the responsible and effective functioning of the Project while minimizing the potential for negative impacts to the surrounding environment and neighboring communities. BPP's Maintenance Team, will be deeply integrated with the Developer's organization and will perform maintenance and renewal activities in a prompt and efficient manner, addressing both scheduled and unscheduled requirements to maximize the lifecycle of the Bridges while adhering to established protocols and contractual requirements laid out in the PA. Some of the strategies BPP will plan to employ are:

- **Engaging Maintenance and Lifecycle Experts –** BPP's maintenance and lifecycle experts will be engaged with the design team from day one of the PDA Phase to ensure that maintenance and lifecycle considerations are incorporated into the design early to maximize overall value to the Commonwealth
- **Possessing a Proactive Asset Management Approach –** BPP's asset management program is designed to be proactive and to focus on preventive maintenance. BPP will perform services on key assets when BPP detects minimal problems, thereby reducing the cost of asset preservation and achieving a higher level of performance. For example, BPP will immediately, upon observation, perform preventive maintenance to rectify minor defects that BPP observes on pavement and Bridges, such as sealing joints or cracks

- **Evaluating Bridges and Pavements to Determine Candidate Maintenance Activities on a Consistent Basis –** BPP will maintain the bridges and pavements in accordance with the Maintenance Performance Requirements. In addition, BPP will employ a systematic inspection process to determine when infrastructure is in need of extensive repair, when it is suitable for preventive maintenance, and when it requires corrective maintenance. BPP will use bridge and pavement management systems to determine restoration timelines and the optimum time to perform preventive maintenance to remain in compliance with all KPIs. BPP's Maintenance Management System (MMS) will log deficiencies as discovered and track repairs, ensuring that BPP has a digital record of all interventions
- **Utilizing Deterioration Modeling Systems –** BPP will also use deterioration modeling systems and will explore possible digital twin solutions for pavement and Bridges to:
  - Determine rate of deterioration – BPP will analyze site specific information about the rate of change in the condition of a particular pavement section or structure.
  - Predict the timeline for intervention – Using the log mentioned above, BPP will leverage this and its experience to provide accurate predictions of when the minimum acceptable level of service will occur.
- **Applying a Life Cycle Cost Analysis (LCCA) to Determine Optimal Treatment Options –** BPP will use LCCA to determine when maintenance treatments will be cost-effective, or if extensive structural or pavement restoration should be undertaken. In determining which option to pursue, in accordance with LCCA, BPP will consider the following risk factors: anticipated treatment performance, expected contract unit price, unavailability cost forecast treatment design life and Maintenance Period discount rates
- **Developing a Pragmatic Approach to Development Entity Interfacing with PennDOT –** BPP will provide full transparency to PennDOT during the Term and will communicate daily, provide access to the MMS, and other notifications and reports as follows:
  - Access to the MMS – The MMS will track all service requests and interactions with PennDOT, which will be time and date stamped. The MMS will provide a complete history of interactions and activities performed as a result of a request. Data will be accessible by PennDOT through a web portal at any time
  - Daily management contact – The Maintenance Manager will be the direct contact with PennDOT and will communicate daily
  - Notification of corrective actions – BPP will automatically notify PennDOT when corrective actions are completed, whether initiated by PennDOT or by others
  - Access to service history via the MMS – BPP will enable PennDOT to generate a service request log history over any specified time period
- **Adapt to Changes in Good Industry Practice –** BPP is committed to investigating and incorporating advances in the field of highway and bridge maintenance during the term. To remain abreast of advancements, BPP will perform the following:
  - Monitor PennDOT's website for potential changes in standards and specifications that may impact maintenance operations. Additionally, BPP will review changes to standards with PennDOT during periodically scheduled Project meetings
  - Gather information from industry associations – BPP's management personnel are active

in industry associations and serve on industry committees, such as AASHTO, Transportation Research Board and the International Bridge and the Tunnel and Turnpike Association. BPP will remain engaged with these associations to keep up with the best practices of bridge design and maintenance, international transportation agencies, and toll agencies

  - Train employees in industry trends and pilot innovations – BPP embraces innovations and, if feasible and beneficial for the Project, BPP will propose innovative solutions for maintenance and rehabilitation. BPP will implement a training program to expose employees to industry maintenance trends and technological innovations, and BPP will invite subcontractors to demonstrate innovative techniques and work methods

- **Adjusting the Annual Work Plan -** BPP's policy is to strive to always manage assets above the Maintenance Performance Requirements. BPP will adjust elements of the work plan, such as cyclical frequencies or response times, to implement the following:
  - Extending the life cycle of assets approaching threshold limits – BPP's maintenance operations will, as standard procedure, continuously assess asset infrastructure, which BPP will feed into BPP's work plan. As part of this, Maintenance staff will plan work on asset elements that are approaching the threshold limits set out in the PA
  - Revising cyclical maintenance triggered by changes to the work plan – Each month, the Maintenance Manager and the Maintenance Quality Manager will revise the rolling 12-month work plan based on their review of historical performance, field condition assessments and projected work needs. BPP will determine if changes to the work plan warrant adjustments to cyclical maintenance frequencies or defect identification procedures. BPP will also schedule work at the optimal time to minimize the impact to users

Responsibilities of Contractors and Affiliates

Table 1, located below, details which tasks and responsibilities will be self-performed and/or subcontracted out to BPP's properly certified and licensed subcontractors. Development of this matrix will be ongoing as the Project's features and components are constructed and put into service and as fully documented procedures are established. Whenever possible, BPP intends to address Maintenance Work with internal resources.

Table 1 - Internal and Subcontracted Responsibilities

Element - Task	PennDOT P3 MBI Maintenance Responsibility Matrix Reference	Primary Responsibility[1]	Notes
Design and Construction Period			
Bridge – Routine Maintenance	D&C 1 – 18, excluding 6	Lead Construction Contactor[2]	Lead Construction Contractor will self-perform scope with specialty subcontractors leveraged as needed (e.g., for underwater inspections)
Bridge – Emergency / First Response	D&C 6	PennDOT	BPP and Lead Construction Contractor to support PennDOT
Local Roadways	D&C 19	Lead Construction Contactor[2]	Lead Construction Contractor will self-perform scope
Other Structure – Graffiti Removal	D&C 20	Lead Construction Contactor[2]	Lead Construction Contractor will self-perform scope
Right-of-Way Routine Maintenance	D&C 21 – 26	Lead Construction Contactor[2]	Lead Construction Contractor will self-perform scope
Roadway – Routine Maintenance	D&C 27 – 42, excluding 34	Lead Construction Contactor[2]	Lead Construction Contractor will self-perform scope with specialty subcontractors leveraged as needed (e.g., for light pole electrical maintenance)
Roadway – Emergency / First Response	D&C 34	PennDOT	BPP and Lead Construction Contractor to support PennDOT
Roadway – Winter Maintenance	D&C 43	PennDOT	BPP and Lead Construction Contractor to coordinate with PennDOT
Maintenance Period			
Bridge – Routine Maintenance	Maintenance 1 – 19, excluding 6	BPP	BPP will self-perform scope with specialty subcontractors leveraged

[1] As indicated in the PennDOT P3 MBI – Maintenance Responsibility Matrix provided within the RIDs
[2] BPP's Lead Construction Contractor will act on behalf of Developer, during the Construction Period, as General Contractor and Maintenance Contractor to provide all the operational and maintenance responsibilities as defined under the PA.

Element - Task	PennDOT P3 MBI Maintenance Responsibility Matrix Reference	Primary Responsibility[1]	Notes
			as needed (e.g., for anti-icing system)
Bridge – Emergency / First Response	Maintenance 6	PennDOT	BPP to support PennDOT
Local Roadways	Maintenance 20	PennDOT	No BPP responsibility
Other Structure - Graffiti Removal	Maintenance 21	BPP	BPP will self-perform
Right-of-Way Routine Maintenance	Maintenance 22 – 26	BPP	BPP will self-perform
Right-of-Way – Traffic Cameras, ITS (non-tolling related)	Maintenance 27	PennDOT	BPP to coordinate with PennDOT
Roadway – < Type A Signage Inspection	Maintenance 28	PennDOT	BPP to coordinate with PennDOT
Roadway – Routine Maintenance	Maintenance 29 – 34	BPP	BPP will self-perform
Roadway – Guardrail / Barrier and Transitions	Maintenance 34	PennDOT	BPP to coordinate with PennDOT
Roadway – Incident Response	Maintenance 35	PennDOT	BPP to support PennDOT
Roadway – Emergency / First Response	Maintenance 36	PennDOT	BPP to support PennDOT
Roadway – Inspection, damage assessment and identification/performance of repairs for safe reopening, if any, (post emergency/first response)	Maintenance 37		BPP to coordinate with PennDOT
Roadway – Light Pole, Striping and Slope Routine Maintenance	Maintenance 38 – 41 & 44	BPP	BPP will self-perform scope with specialty subcontractors leveraged as needed (e.g., for electrical repairs)
Roadway – Pothole / Surface Remediation	Maintenance 42	PennDOT	BPP to coordinate with PennDOT
Roadway – Shoulder and Drainage Maintenance	Maintenance 43	PennDOT	BPP to coordinate with PennDOT
Roadway – Winter Maintenance	Maintenance 45	PennDOT	BPP to coordinate with PennDOT

Project Management and Administration

The organization of the operations and maintenance function is an integral part of the Project. This Section of the Maintenance Management Plan describes the organizational arrangement and structure within BPP and identifies key staff and positions:

Figure 1- Preliminary First Package Design and Construction Period Maintenance Org Chart

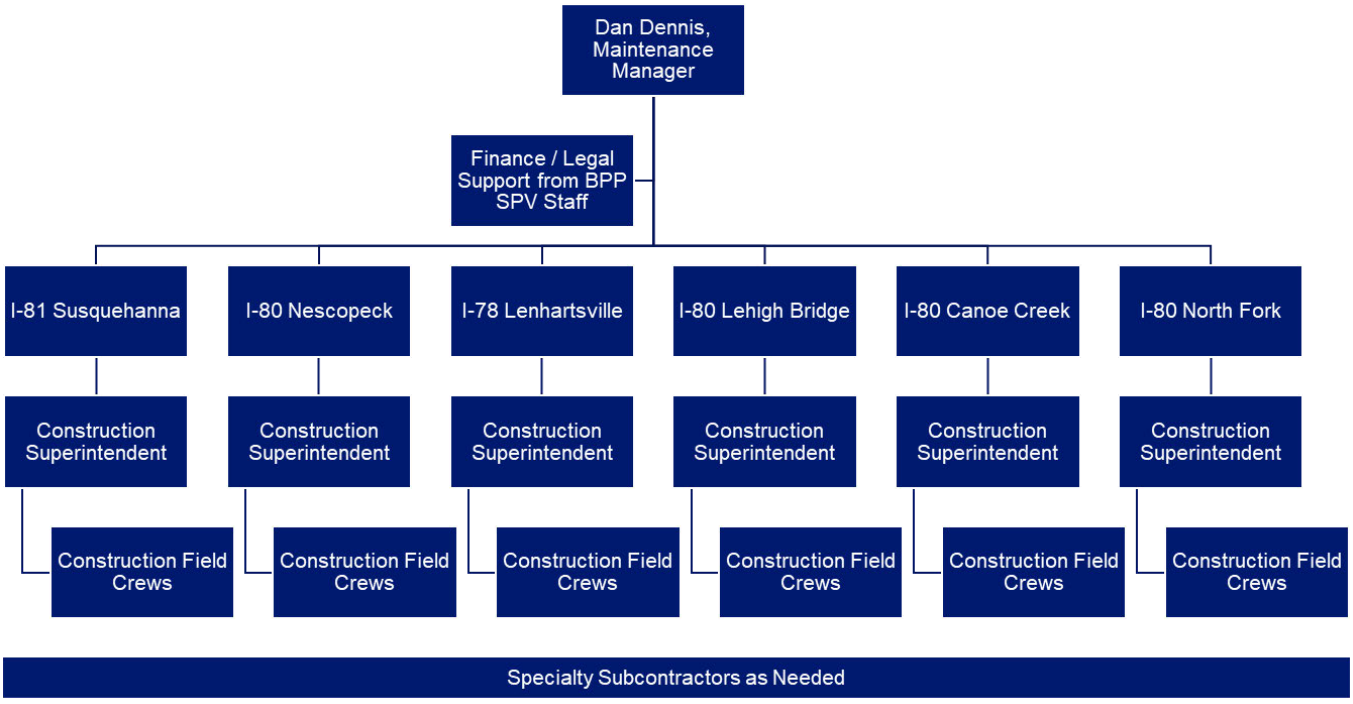
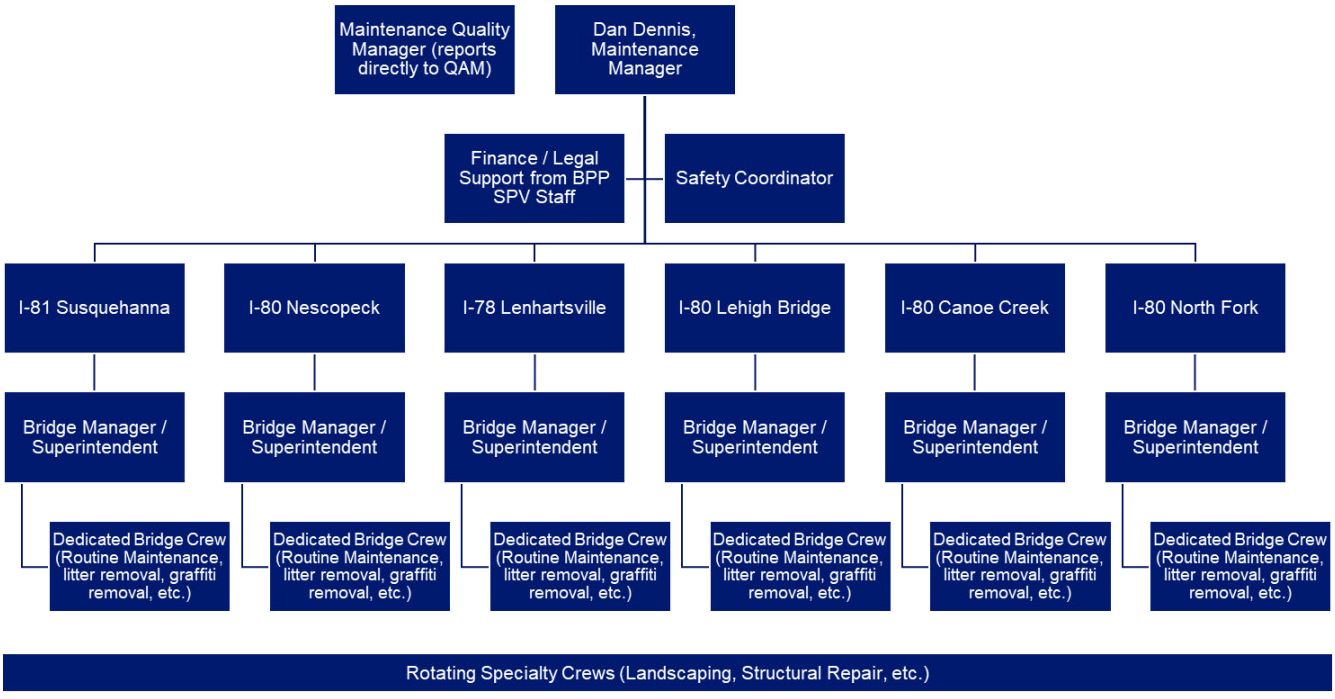


Figure 2 – Preliminary First Package Maintenance Period Org Chart



The Maintenance Team be led by the Maintenance Manager and will use its experience from other similar projects to help staff and equip the Development Entity's Project office. To oversee and manage the maintenance activities and office, a permanent management team will be put in place that is deeply experienced in project administration as well as infrastructure and facility management, operation and maintenance. This team will be supported by BPP's SPV staff for legal and financial support.

BPP's intent is for the maintenance of each Bridge in the First Package to be led by an individual Bridge Superintendent / Manager with a dedicated crew handling the daily maintenance activities such as patrols, litter collection, graffiti removal and other related tasks. This would be supplemented by shared specialty internal crews or subcontractors who would rotate between bridges performing landscaping, structure steel repairs and other specialty maintenance scopes. There will also be a core of full-time, fully skilled and trained inspection staff, which will be supplemented on an as needed basis. This model has proven most effective given the seasonal variation of the Maintenance Work that is anticipated (mowing, vegetation control, etc.). Due to the need for local staff, it will also increase local links with the Project.

Additionally, an "approved list" of qualified local subcontractors who are skilled, licensed and equipped, will be developed to address major renewal or rehabilitation works as they are required. BPP will maintain a website throughout the Maintenance Period where new subcontractors can submit applications to be added to the "approved list".

Staffing Plan

BPP will hire and engage—with sufficient lead time to allow for proper day-one performance—the following personnel to perform and/or oversee the maintenance activities to be undertaken for the Project.

Maintenance Manager - the Maintenance Manager will comply with the Predevelopment Work Requirements and will be the person to whom all members of the Maintenance Team described below will report to. Responsibilities include:

- Leading the Maintenance Team and its subcontractors
- Developing Maintenance plans, procedures, practices
- Assisting in developing maintenance employee schedules as well as renewal and inspection schedules
- Overseeing preventive and corrective maintenance
- Reviewing all inspection reports and participating in forecasting the necessary rehabilitation works
- Reviewing monthly performance reports identifying critical planning issues, failures, successes and payment deductions
- Reporting on performance to PennDOT and identifying critical planning issues
- Collaborating with PennDOT in the preparation and coordination of key messaging points and communications

- Ensuring Maintenance Work is performed within budget

Bridge Manager / Superintendent - the Bridge Manager / Superintendent will be staffed full-time on each Bridge and will be directly responsible for all aspects of inspections and management work carried out at each Bridge. The Bridge Manager / Superintendent will be responsible for:

- Supervising in-house and subcontracted maintenance/rehabilitation works and staff
- Confirming that Maintenance Work complies with the agreed procedures, safety and environmental regulations and safe work practices
- Managing day-to-day inspections and maintenance activities, including labor, physical plant and resources
- Coordinating with inspectors and laborers and delivering daily briefings
- Establishing and administering performance management tools and receiving information from staff and other contributors
- Implementing tracking mechanisms, charts, work orders and logs
- Inspecting and signing off on maintenance activities to confirm they have been completed correctly
- Accounting for materials and forecasting future needs as described in the Maintenance Quality Plan
- Identifying performance requirements, defining how these will be delivered, or modifying as appropriate
- Working with the inspectors to identify capable and reliable subcontractors to deliver the works
- Supporting the Maintenance Manager to link asset management, maintenance activities and work management to performance management
- Reporting on staff and asset performance at defined frequencies
- Providing data for calculating Nonconformance Events and the Nonconformance Deductions
- Collecting, managing and maintaining the asset records in the MMS, including confirming the accuracy of the asset inventory
- Developing procedures to confirm that test records, maintenance manuals and as-built drawings are retained, accurate and updated as required, and that all manuals and any other documents that are essential requirements for effective maintenance management and the safe operation of the assets are kept current and available to PennDOT
- Providing PennDOT with monthly reports (in a form to be agreed with the PennDOT) on Maintenance Work and Bridge performance
- Sharing information, record drawings, manuals and miscellaneous documents with PennDOT

Inspector - Inspectors will be certified to perform inspections per local, Commonwealth and Federal Requirements. They will oversee all required inspections across all Project elements.

- Implementing routine maintenance on Bridge, Roadway and other project elements and any other Maintenance Work to meet the required schedules and contract terms

- Supporting the Bridge Manager / Maintenance Superintendents to identify capable and reliable local subcontractors to deliver the works
- Supervising or performing Maintenance Works
- Confirming that Maintenance Work and Project components and facilities comply with safety regulations and safe work practices
- Making sure that maintenance equipment, tools and materials are available and in good working order
- Managing day-to-day maintenance activities, including labor and resources provided by others
- Confirming that work is done appropriately and follows manuals, drawings and approved technical methods when performed
- Implementing and completing tracking documentation, work orders and daily logs
- Making sure that personnel follow safety, quality and environmental procedures, as detailed within the method statements and Maintenance manuals
- Performing audits on work performed and inspecting completed work activities
- Reviewing, evaluating and then signing off on maintenance activities to confirm they have been completed correctly
- Accounting for materials and forecasting future needs
- Overseeing staff, both internal and subcontracted
- Delivering information and daily briefings to the Maintenance Superintendent and the Maintenance Manager
- Reporting daily, or as needed, on incidents or issues as they may be identified

Safety Coordinator - Person responsible for the development and implementation of all health and safety and environmental policies and procedures for the Maintenance Team. Responsible for:

- Performing safety control on maintenance tasks and activities and ensuring safety practices are enforced and followed by all Maintenance Team members.
- Confirming that maintenance activities are consistent with the National Environmental Policy Act; the Clean Water Act; the Clean Air Act; the Endangered Species Act; the National Historic Preservation Act; and other federal, state and local government requirements
- Preparing the Safety and Environmental Compliance Plans plan(s) and related documents under the PA

Maintenance Quality Manager - Person responsible for the development and implementation of all quality policies and procedures for the Maintenance Team. Will report directly to the Quality Assurance Manager. Responsible for:

- Overseeing the effective implementation of the Maintenance Quality Plans, including conducting reviews at intervals as agreed to with the PennDOT and as identified in the PA, to maintain the Project's continued readiness, suitability and effectiveness

- Managing quality assurance reviews for all Maintenance Work
- Developing plans to address Nonconformances and follow-up to confirm that mandated or recommended actions have been implemented
- Coordinating issues relating to certification and quality management
- Tracking the adequacy of quality records produced through monitoring procedures, corrective actions, verification procedures and inventories
- Liaise with providers, subcontractors, third parties and internal and external resources, on all matters relating to quality management

Field Crews - Full-time or part-time position, supporting the direct performance of planned in-house Maintenance Work activities, patrolling and other responsibilities. Can be dedicated to an individual bridge or shared across multiple bridges.

Section 2 – Meeting Maintenance Responsibilities

Plan for Maintenance during D&C and Maintenance Periods

BPP will leverage the staffing plan outlined above to conduct regular inspections and maintenance to identify and resolve issues as they arise, proactively targeting potential problems before they occur. The schedule and activities for the Maintenance Work will be developed during the PDA Work once BPP understand the KPI requirements in the Project Documents, however BPP has developed the following preliminary schedule and sample activities of routine maintenance inspections, which will drive the routine interventions, based on BPP's experience and industry best practices.

Table 2 – Anticipated Inspection Frequency by Element

Routine Maintenance Item	Preliminary Inspection Schedule
Asset Patrol to review for standing water, graffiti, litter and other items	Daily
Pavement Condition Assessment	Yearly
Roadway Drainage Assessment	Yearly
Underdrains	Every 4 years
Storm Drain, pipes, channels and ditches	Every 2 years
Reinforced Concrete Elements	Every 2 years
Steel Elements	Every 2 years
Bearings	Every 2 years
Joints	Every 2 years
Pavement Markings	Every Year
Delineators and Markets	Every Month
Sign Structures	Every 4 years
Permanent Signs	Monthly
Earthwork	Monthly
Sound Barriers	Every 4 Years
Lighting	Monthly
Guardrails	Monthly

Table 3 – Sample List of Routine Maintenance Activities by Project Element

Project Element	Sample Routine Activities
Measurement and Reporting Systems	Test communication systems
Roadway	Repair signage, guardrails, impact attenuators and other safety devices
	Clear roadway of debris and animal carcasses
	Repair fencing, repair safety barriers
	Maintain pavement in accordance with performance and functional requirements
	Perform spall repairs, pothole repairs, skim patching / minor mill and overlays, crack sealing, joint sealing and/or grinding, etc.
	Maintain ROW including landscaping
Bridges	Sweep bridge decks and approach slabs, clean expansion joints and flush the deck
	Clean bridge drainage system
	Repair concrete deck spalls, parapet and breams
	Seal cracks
	Clean and lubricate bearings
	Repaint handrails
Inspections	Test IRI on Roadways
	Conduct pre-winter inspections
	Perform bi-annual NBIS inspection on defined structures
	Inspect overhead bridges, traffic signs and DMS units
	Perform daily patrols
Other	Manage corridor access
	Provide Incident and Emergency Response support

Additional inspections such as NBIS and other state and federal inspections will be performed within the required timelines and scheduled to minimize impact to users. In addition to traditional inspection methods, BPP will also work with PennDOT to explore the use of drones for periodical assets inspections, which will reduce the impact of inspections to users. The drones can provide high quality images of the different elements of the inspected asset with little to no interference with traffic. The

images taken by drones will allow BPP to quickly focus on hard-to-access suspected defects and minimize the use of lifts and other tools which can require road closures and detours.

BPP will also explore other innovative elements to ensure that each element meets or exceeds the requirements in the Project Documents. As an example, BPP intends to explore using Digital Twin technology to optimize maintenance intervention cycles and improve assessment. The Digital Twin will allow BPP's Maintenance Team to create a digital model of the asset that will reflect its exact, current condition, which could be tracked through a variety of sensors embedded in each Bridge. Using a Digital Twin drastically improves the ability to track and monitor defects, and, with the use of Artificial Intelligence, can provide predictive maintenance insights and preventive maintenance recommendations that will allow the Maintenance Team to tailor the necessary remedy actions.

BPP inspectors and field crews will patrol the project ROW daily, inspecting the project elements to identify any existing or potential Nonconformance events. These daily patrols and frequent inspections will be documented, recorded and entered into the MMS database in accordance with BPP´s quality and maintenance plans. Any Nonconformance identified will result in additional inspection or the appropriate personnel will be notified to initiate repairs or renewal. If circumstances or extent of a Nonconformance is unclear, additional analysis will be performed to determine the appropriate course of action. Follow-up actions on the Nonconformance resolution will likewise be documented and logged into the MMS.

Survey data will be analyzed to help determine small-scale changes in structures or landscape settlement which might not be apparent to the naked eye and might not appear on drone or other inspection footage. As part of these reports, potential issues will be noted and earmarked to be addressed before issues occur. Similar assets/components will also be subsequently inspected to see if the same potential issue exists elsewhere. These reports will be uploaded to the MMS and serve as part of the baseline to schedule maintenance.

Monitoring and Recording Measures

To monitor and record all Maintenance Work activities performed by BPP during the term, BPP will provide reports documenting the following to PennDOT:

- Inspection and condition reports of all the routine maintenance and renewal activities (self-performed and subcontracted). Both scheduled and unscheduled works will be reported on, tracked and evaluated within the Maintenance Team's MMS system, to better manage the Bridges overall
- Reports on all operational events, including damage assessments, performance monitoring and suggestions for enhancements or improvements
- Reports on public user participation and usage of the facilities, including direct user feedback, reports on incidents, emergency services calls, etc.
- Information gathered through surveys, published contact phone numbers and information submitted electronically
- Reports on positive or negative performance trends, with the end goal of suggesting improvements or improving performance thresholds
- Reports on Bridge and structural changes or deviations, including regular and unexpected costs

or circumstances, lifecycle performance, sign and roadway conditions, etc.

- Report on updates and improvements to the operational and maintenance manuals, including annual review and updating and incorporating lessons learned

All reporting procedures and processes will undergo at least an annual analysis and review. These, coupled with the regular inspection program will enable continuous improvement.

The Maintenance Team will prepare additional monthly reports per PA requirements on potential or actual Nonconformance events, activities performed (routine maintenance, repairs and lifecycle workings), inspections carried out, and status of the Project Elements. Scheduled and unscheduled Maintenance Works, as well as planned renewal works, will be reviewed with PennDOT as required, but at least monthly. For meetings with PennDOT, agenda items will be proposed and developed in advance, to provide full coverage of topics of interest to both parties. BPP will be open to information sharing and will solicit feedback from PennDOT on potential improvements to maintenance activities performance or procedures.

Approach to Minimizing Delay and Inconvenience to Patrons

BPP is very experienced at minimizing delay and inconvenience resulting from maintenance and rehabilitation across the projects that BPP has delivered. BPP's approach to minimizing delay and inconvenience begins with planning and ensuring a robust routine / preventative maintenance regime is in place to ensure that each Bridge is performing within the boundaries of the KPI regime and that interventions are completed before any Project Element becomes critical. This approach reduces the likelihood of any unanticipated repairs that would require lane closure that would inconvenience the public. Planning and tracking these interventions will take place inside of BPP's MMS system. The MMS will also track key spare inventory, ensuring that BPP has adequate spares to comply with the KPI regime and that extras are ordered in a timely fashion to minimize the chance of procurement delays.

The second key element of BPP's approach to minimizing delay and inconvenience is strong communication, both with PennDOT and the travelling public. From the MMS, BPP will generate a quarterly required intervention list that will be reviewed by PennDOT along with the potential impact and proposed scheduling. In this manner, PennDOT will have strong visibility on planned interventions, their impact and expected duration so that this can be communicated to the traveling public. Where possible, interventions will be scheduled in off-peak hours and using accelerated delivery techniques to mitigate the impact to users.

Minimizing Risk of Harm to the General Public and Damage to Property

BPP will take a zero-tolerance approach to unsafe situations and will actively pursue a goal of minimizing unsafe situations for the users of and workers on the Project in all Phases. Across all phases, BPP's approach to minimizing the possibility of harm to the general public and damage to property is guided by four pillars:

- Incorporate safety and risk professionals in all Project Phases to ensure that safety and risk concerns are considered in all design, construction and maintenance decisions

- Establish strong communication with PennDOT and third parties to ensure that all parties are aware of work that might create situations with the potential for harm to the general public or damage property and are involved in any mitigation planning
- Emphasize a zero-incident through approach that aims to prevent accidents and potential harmful situations through an emphasis on pre-task planning and safety audits
- Where the risk of harm cannot be completely mitigated, use robust safety and protective measures to mitigate the risk to the general public and property

When a situation with the potential for harm or damage to property is identified, BPP's Maintenance Team will leverage the following approach to mitigate the risk:

BPP's approach to minimizing the risk of harm will not be limited to input from only the BPP team. In order to allow users to report any safety issues, BPP will open different communication channels, including potentially through a website, mobile application, or via social media, that will make public reporting of any potential situations that could create harm to the general public or damage property as easy as possible. Any responses received through these channels will be flagged for review by BPP's Maintenance Team to ensure a rapid response to any situation that is identified by the public.

With regards to local disturbances during the Design, Construction and Maintenance Periods, the primary concerns to neighboring facilities will be impacts in traffic patterns and it is critical to develop methods to minimize these traffic impacts. The Maintenance and Protection of Traffic (MPT) Manager

during the Construction Period and the Maintenance Manager during the Maintenance Period will be responsible to review the overall impact of all proposed temporary MPT or work zones within the system, and ensure they are in compliance with the PA requirements. Lanes closure requests associated with routine maintenance activities will be submitted to the PennDOT at least 14 days prior to work activities. Shorter durations will be subject to PennDOT approval. In case of unforeseen emergencies, shorter closure notices and requests might be necessary. BPP will also strive to avoid scheduling closures during holidays, special events or in parallel with improvement work on diversion routes.

Coordinating with PennDOT and Third Parties

BPP's approach to liaising with PennDOT and PTC for toll and ITS operations includes the following:

- Defining clear interface roles and maintenance responsibilities for ITS and Tolling Infrastructure with PennDOT and PTC early in the PDA Period
- Promptly notifying PennDOT and PTC of anything that could adversely affect toll and ITS operations
- Reporting and tracking all defects on ITS or Tolling Infrastructure and Systems, regardless of their cause, within the MMS
- Holding coordination meetings with all relevant parties
- Liaising with the ITS and toll integrator when lane closures are required to perform Maintenance Work on non-developer-maintained elements

With regards to other third-parties such as utility owners, the Maintenance Team will provide logistical and administrative support for any new utility placement or other third-party construction requests, as well as ongoing support for the maintenance and servicing of existing utilities and other third-party elements within the Project's ROW. The Maintenance Team will coordinate and support third-parties by:

- Maintaining continuous visual inspections of the Project including inspection across easements and ROW's and providing notification to utilities or other third parties of observed causes for concern
- Acting as first responder to secure and prevent further damage to any utility or other third-party property whenever possible
- Protecting the immediate safety of public users of the ROW
- Providing access to the workplace and support in case of utility repair or re-entry
- Maintaining and updating an inventory of utilities and other third-party assets present, their locations and the reporting or contact information for the utilities' responsible parties

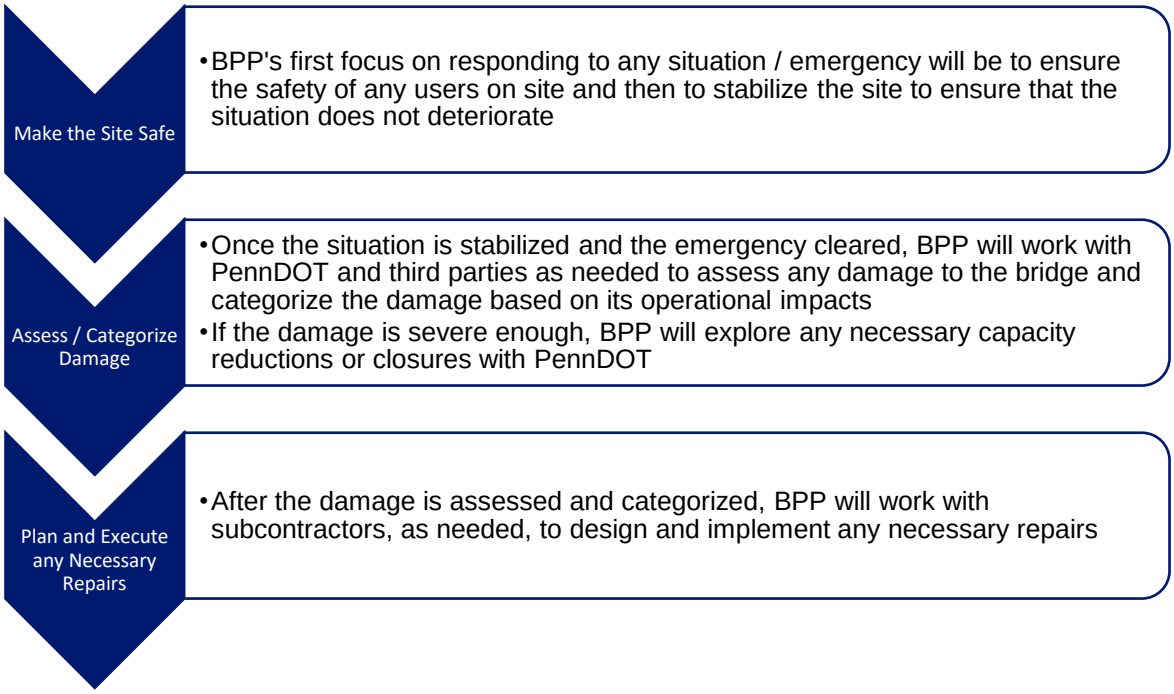
Coordinating with PennDOT and Third Parties

BPP's approach to adhering to NBIS Standards on the Existing Bridges and any future requirements for NBIS inspections aligns with BPP's overall approach to maintenance and will be proactive and tracked electronically to ensure compliance. At the beginning of the PDA Phase, BPP's team will build a list of

required NBIS inspections on the existing Bridges and required timing into BPP's MMIS system. This will ensure that any required inspections are included in BPP's D&C and Maintenance Period schedule. Inspections will be performed proactively, well in advance of deadlines and if accelerated Rehabilitation Work is required as a result of an NBIS required inspection, BPP will work diligently to expedite that work. This approach ensures that at all times, BPP understands the condition of each bridge, which will inform and help to optimize the delivery of any Maintenance Work and minimize any impact or delay from unscheduled maintenance.

Approach to a Bridge Emergency at an Existing Bridge

BPP's approach to responding to any unplanned situation such as a Structure Hit or Failure (i.e., a Bridge Emergency) will follow the approach outlined below:



Avoiding Obsolescence

All monitoring, reporting, measurement and electrical equipment will be upgraded, replaced and renewed as required per schedules and the PA requirements. Mechanical and electrical equipment will be replaced, renewed, or maintained based on performance and service history, and manufacturers' suggestions and lifecycle recommendations will play an integral part in the maintenance and renewal of all of these items.

Self-Monitoring Process

Every employee, no matter position, has a responsibility to understand the methods and actions required to meet or exceed the designated standards for each work activity they perform, and must have the

capability to identify and rectify the occurrences when their work leads to non-compliance. The Maintenance Team will be responsible for ensuring these practices are instilled on all employees and subcontractors. Self-monitoring involves three main parts.

Self-Monitoring		
1. Identifying Compliance Requirements	2. Identifying work methods that ensure compliance	3. Compliance verification for continuous improvement

Identifying Compliance Requirements

Knowing activity compliances and the measures to which they must meet is the first step in the self-monitoring process. The sources for determining compliance criteria are:

- Contract documents
- Federal, State, or Agency standards, specifications, policies, procedures, manuals, guidelines etc.
- Internal Company procedure/Policies
- Industry best practices

The Maintenance Team will be responsible for collecting and compiling all requirements and presenting this information to the Project management staff in a comprehensive and concise manner.

This process will be performed for all activities that are identified either in the PA or applicable documents. During this process the Maintenance Manager will work with PennDOT to ensure an understanding and comprehension of contractor requirements and where all the information is derived.

Identifying Work Methods that Ensure Compliance

Work methods will vary for each maintenance or operational activity performed, however specific resources can be used to ensure the best and most effective work methods are utilized. The following formats and resources have proven successful in the self-monitoring process:

- Routine Customer and Internal Progress Meetings- A standardized format will be used to cooperatively identify completed, current and future work actions and discuss the achievements and areas of improvement in the routine Maintenance Works
- Generation of routine maintenance service requests (RMSR's)- Periodic inspections will identify maintenance needs and identify work to be performed.
- Detailed Activity Standard Operating Guidelines (SOG's) and Checklist- These will provide a series of performance indicators that are required to be met to successfully complete a maintenance activity
- Maintenance Management System - A software application that will plan, monitor, track and record all maintenance activities. The MMS will account for all resources used to perform Maintenance Work and provide plan and actual cost information for each activity. Additionally, within the quality module of the MMS, BPP will have the capability to record quality findings which

link back to report that summarizes the quality findings

In addition, BPP will schedule progress meetings to provide a forum to discuss planned maintenance and operational activities as well as results from methods employed to complete these activities. This feedback to field crews and other project staff will ensure the most effective work methods are used. In addition, monthly coordination meetings will occur to verify project progress, performance and ensure the monthly reporting responsibilities to PennDOT are on target.

Detailed activity standard operating guidelines (SOGs) are activity specific forms that provide the key standards and guidance to work crews for the repair or Maintenance Work of an asset in order to ensure correctness. Extensive lists of the most common maintenance and repair activities associated with an asset maintenance contract will be developed. The utilization of these SOGs during a work activity will aid in the reduction or elimination of non-compliances with maintenance standards and specifications. SOGs will be developed in the PDA Phase, however for a potential template, please see the guardrail example in the figure below.

Table 4 – Bridge Guardrail Repair SOG Example

#	Guardrail Maintenance / Repair Checklist	OP's SOG	COMMENTS:
1	Is the guardrail height for single panel, double rail or standard three-beam installed between 20-24" high at center of rail?		
2	Is the guardrail height for rail with rub rail, and modified three-beam installed between 23-27" high at center of rail?		
3	Is the rub rail installed 12" from center of panel?		
4	Is the post spacing to 6'3"?		
5	Are all posts in good condition, function as intended, and aligned? (I.e.- not twisted, damaged, split)		
6	Are all panels lapped according to traffic flow, and in good condition? (I.e., no perforations, sever pancake)		
7	Are the offset blocks intact and function as intended? (I.e., not split, cracked)		
8	Are offset blocks secured with 16D-galvanized nails?		
9	Are the object markers spaced properly & correct type utilized? (Make sure the set of the first object marker is allowing visibility for driving lane)		
10	Is all connecting hardware utilized correctly and in accordance with PennDOT Specifications per Design Index?		
11	Is work area clear of all debris and excess material?		
12	Is groundwork completed in working zone?		

For self-monitoring the MMS is utilized daily for tracking and reporting all maintenance activities to ensure time/allowance criteria and maintenance performance measures are being met. Its quality

control function is used with the quality control activity to schedule and track quality control inspections and outcomes.

Compliance Verification for Continuous Improvement

Compliance verification is the final steps in self-monitoring. This step involves laborers verifying conformance with maintenance procedures or identifying a non-conformance issue and taking corrective actions to address the problem. Verifying conformance involves reviewing the complete work action and ensuring it meets its compliance indicator as identified in the first step of the process. If the compliance is met, no additional action is needed. If the work action is identified as non-compliant, several remedial actions may result notification to client, manager, supervisor or other: on site remediation: or development of remediation plan to ensure future non-conformances do not occur.

Maintenance Manuals

BPP will begin to compile the Maintenance manuals as soon as Project construction starts. Initially, procedures will be drafted with the input of BPP's Design, Construction and Maintenance personnel, with the latter leading and directing the effort. There will be two sets of manuals, one specifically for maintenance and one for supporting PennDOT led operational activities. Each manual will occasionally reference the other since there will be some crossover between the two distinct activities. Both manuals will be developed in accordance with the requirements and KPIs established under the PA.

The maintenance manual will include, as appropriate, manufacturers' information, replacement part numbers, lifecycle information, component supplier and ordering information, photos and videos showing "tips" for effective servicing and replacement, location information, and any other pertinent information that will support an effective inspection, servicing and replacement regime. The manual will be reviewed and updated at least annually and likely more frequently than that, as components and processes will change more often than the detailed operational procedures.

The operational manual will be focused on steps to be taken to coordinate with and support PennDOT's response to winter snow and ice conditions, traffic control and incident management and response. There will be step-by-step instructions on what activities and procedures to perform and when and how each activity "fits" within the overall operational activity. This manual will address the escalating scale of activities to be performed depending upon the forecasted magnitude of an event and will detail at what magnitude of event certain activities will be required. There will also be specific sections detailing communications and numerous other procedures to be implemented to respond, mitigate or correct unplanned events (e.g., accidents, structure hits or failures, severe weather, natural disasters, flooding, tolling interruptions, etc.).

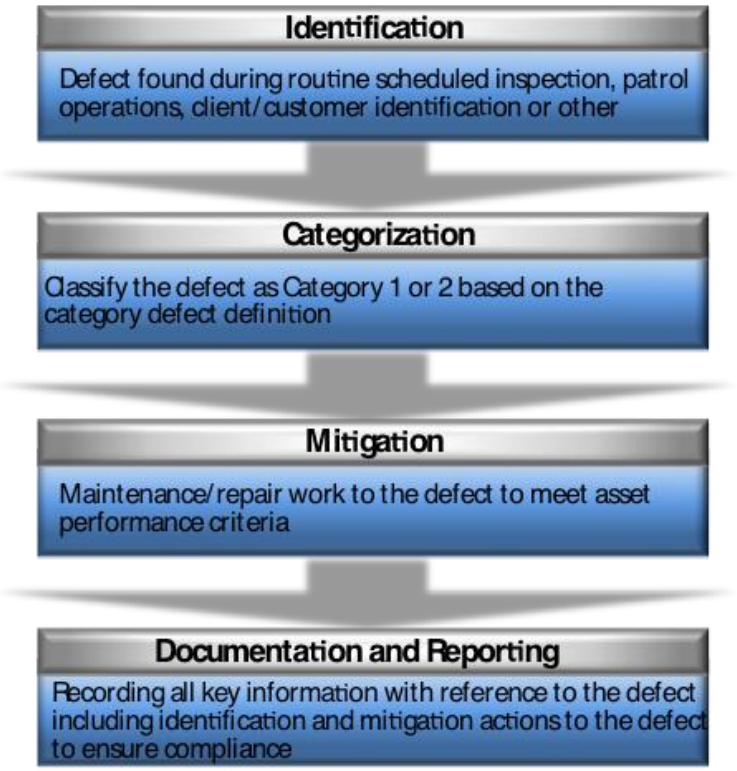
Maintenance Scheduling and Records Plan

Activity Schedule

BPP will develop and follow a baseline annual regular Maintenance Work program for planning and organizing Maintenance Work activities and inspections, in line with what is suggested in Table 2. This schedule will define how and when work will be carried out. Once the annual plan has been approved by BPP Management and PennDOT, BPP will procure and schedule the resources necessary to carry out the planned maintenance activities. The schedule will be adjusted and reviewed regularly to maximize lifecycle and reliability while minimizing maintenance costs, including adjustments based on field inspections and performance indicators.

When a defect or corrective actions need is identified BPP will follow a defect corrective process as illustrated in Figure 3. When the defect is identified BPP will be responsible for categorizing the defects. The classification of the current condition of the asset will define what mitigation actions will be implemented to rectify the defect. Defect categorization will be done in accordance with the PA. For illustrative purposes, BPP has assumed defects will fall under either of two defect categories:

Figure 3 – Sample Defect Corrective Process



- Category 1 - Immediate Action (hazard mitigation and permanent remedy): Represents an immediate or imminent health or safety hazard to patrons or staff
- Category 2 - Permanent Remedy: Any other defect that does not fall under Category 1. Category 2 defects shall be monitored and not allowed to deteriorate into a Category 1 defect

Categorizing the defects will identify the severity of the deficiency, which in turn, initiates the priority level. The priority level establishes when and what corrective action will take place. Once the defects are identified and prioritized, they are rectified. The repair or maintenance action will vary; however, at a minimum it must meet the response time and condition criteria established in the PA.

The patrol program will facilitate the majority of defects or potential defects identification. As part of their responsibility patrols will identify issues and log them into the MMS. The process for identification and reporting is as follows:

- Work need is identified and entered in the MMS. If the defect is identified as a category 1 defect

the Bridge Manager / Superintendent is notified verbally

- The work need goes into MMS's master work backlog where it is prioritized by the MMS administrator based on the category level, and its associated performance measure
- The priority is verified by the Bridge Manager / Superintendent and confirmed by the Maintenance Manager, who will issue a call for work

Each work needs and associated response will have its own work record accounting, which will also be entered into the MMS. The minimum information required will include: start and end of the mitigation work, engineering documentation, if required, labor, equipment and material usage and photographic documentation. A comprehensive report of each event will be accessible in real-time from the MMS.

Inspection Forms

BBP will develop template forms for all inspections to be carried out during the term. Initial drafts will be compiled during the PDA Phase in coordination with the design and construction team's input and will include such pertinent information as component suppliers, historical data, supplier-recommended frequency or lifecycle data, etc. They will be based on PennDOT's requirements and forms and tailored to better reflect and report on the assets, use and nuances of this Project's features and components.

Reporting Requirements

All reports will meet PennDOT's requirements for detail and frequency and will include such information as:

- Date work performed
- Type of work
- Location
- Affected element
- Personnel who performed the work
- Machinery used
- Type of failure detected
- Date failure was detected
- Date action taken
- Any pertinent historical information concerning maintenance frequency or lifecycle

Record Keeping and Document Control Procedures

All documentation resulting from inspections or works performed will be stored in the MMS system. As part of the quality management plan, the Maintenance Manager will review and validate these reports and after validation will store them securely within the database.

The Maintenance Team will conduct a weekly review of work performed and issues noted to proactively identify components or items prone to failure or whose maintenance requirements fall outside the

currently scheduled reporting frequency. These meetings will become a part of the record keeping process and will be used in planning and scheduling and as a tool for identifying high incidences of failure.

Documents will have a redundant backup located off site to protect the safety and security of this ongoing data storehouse.

Employee Education and Training

Consultants and contract workers will be deemed employees for environmental purposes and will be subject to the same safety orientation, training and supervision as regular maintenance personnel.

Competency and eligibility for employment with the Maintenance Team will be gauged on the basis of appropriate training, experience and employment history. Training will be provided in Project-specific disciplines, so employees are able to perform the required tasks. Training and awareness sessions will be held prior to the start of the maintenance period and regularly thereafter, so all staff and subcontractors are aware of and understand the Project's environmental protection measures. All staff and subcontractors will be required to attend these sessions.

Environmental training protocols will be reviewed and updated regularly and evaluated to confirm its effectiveness. Records of any training or related actions taken will be retained. Training and awareness sessions will be held at scheduled times throughout the Maintenance Period so that all staff and subcontractors are aware of and understand any updates, changes, or improvements to the environmental protection requirements and measures. BPP will submit the planned frequency of these meetings, together with any related changes to the environmental protection measures, to PennDOT or appropriate Agency having Jurisdiction for review. Training on specific environmental aspects as they relate to the Project will be tailored and customized to confirm employee understanding and compliance.

Workers will be aware of:

- The importance of adhering to the environmental policies and permitting requirements
- Potential impacts associated with their work
- The sensitivity and importance of all Environmental Agencies' requirements and the potential impact

Integrating Environmental Requirements

All employees will participate in training on environmental practices and procedures. No matter their role, it is important all employees understand and support the environmental aspects of the Project. Outside resources, specialists and regulators will periodically be brought in to provide demonstrations and present at staff meetings so staff remain aware of the importance the firm places on adhering to environmental requirements. The training process will include discussion on the potential ramifications to the environment if employees do not follow appropriate actions and precautions. Likewise, it will be important all staff know and fully understand the permitting implications of failing to adhere to permit requirements in full. Part of each weekly and monthly staff meeting will be conducted by an Environmental Compliance Specialist to regularly reinforce this topic's importance for staff.

During the Term of the Agreement, there may be changes to some regulations and environmental practices. The Environmental Compliance Specialist will be responsible for identifying and incorporating applicable changes into the Maintenance Team's practices and procedures where applicable.

All regular environmental reporting will be performed in accordance with the requirements of the PA and regulators.

Overloaded / Oversized Vehicles

BPP will work with PennDOT to develop plans for the permitting of overloaded / oversized vehicles during the PDA period.

Section 3 – Procurement

Where BPP lacks internal resources, BPP will procure resources for the delivery of maintenance activities and will always strive to achieve the best value. BPP will follow “best practices” when sourcing services, supplies and consumable materials from vendors. This will involve obtaining multiple competitive bids from pre-approved suppliers and updating those prices on a regular basis (at least annually). This process guarantees best value-for-money and proves most effective at minimizing costs and expenses. Additionally, BPP will:

- Develop and maintaining a detailed record of approved contractors and suppliers
- Employ a “weighting factor” to provide fair consideration to small, local suppliers within the community
- Deal fairly with all suppliers and use a fixed payment schedule
- Avoiding unnecessary administrative barriers
- Review and approve protocols for the use of new or unusual products or requirements

Quotes for single-use, large-expense items or major service contracts (subcontracts) will require a minimum of three quotes (from pre-approved suppliers) whenever possible and a detailed bid review process to consider prices, warranty, historical costs, bidders’ track record and record of reliability.

In association with the procurement practices, regular reviews of all expenses and purchases will confirm that best value-for-money is being obtained. Items or components changed out from poorly functioning elements will be evaluated for replacement with improved products or, if suitable, kept as temporary spare replacements (no retention of potentially critical parts). Any parts changed out on “spec” to identify problem components, will be catalogued and tracked so they are quickly identifiable should they fail in the future.

Section 4 – Office and Equipment

Project Office

BPP foresees having multiple a field office near each Bridge as well as one central office near the PennDOT central office in Harrisburg. The central office will serve as the site for the management and administrative needs of the of the maintenance program including consolidation of the monthly reporting requirements, training center, overall program progress accounting etc.

Equipment and Staging Areas

The following table outlines the anticipated machinery and equipment needed to perform Maintenance Work during the Maintenance Period. BBP will either lease or purchase or rent the equipment based on which option provides the best value for money and rent specialized equipment when needed if activities are to be self-performed.

Table 5 – Anticipated Maintenance Equipment[3]

Type	Equipment	Quantity
Machinery	Skid Steer / Cat Loader Mower Utility / Gooseneck Trailer Roller / packers / milling equipment Ditch bucket excavator	TBD based on KPIs
Equipment / Tools	GPS Equipment Mortar Mixer Chainsaw Bushcutting machine Portable electric power generators Portable light tower Signroad Kit Signing Cones MPT Equipment	TBD based on KPIs

[3] This list is not intended to be all inclusive

	Backpack herbicide spreader	
	Shovels, hand-tools, wheelbarrows	
	Jack hammer	
	Portable air compressor	
Vehicles	Pickup Trucks (standard duty)	TBD based on KPIs
	Pickup Trucks (Heavy duty)	
	Service Utility / Passenger Van	
	Bucket Truck (high and low reach)	
	Truck mounted attenuators	
	Tandem axle dump truck	

Shared equipment and specialized materials will be stored in a centralized warehouse. BPP will rent specialized equipment from local contractors when required and as determined by events (e.g., to sweep Bridge decks, machinery will be rented or BPP will subcontract the activity). BPP will have a list of pre-approved subcontractors including their available equipment.

Equipment Servicing Requirements

BPP will work with PennDOT to develop equipment servicing requirements to ensure compliance with the KPIs.

Staging Areas

Routine Maintenance Work will not generally require stockpiling significant amounts of materials, equipment or consumables. For the most part, materials, equipment or consumables will be purchased and supplied on an “as required” basis and therefore no staging areas are at this point in time deemed to be necessary.

Renewal Work will have more extensive material requirements that will depend on what feature is being renewed. For the most part, when Renewal Work is major or structural in nature, it will be subcontracted out, and those contracts will include provision of all required materials and staging areas.

Section 5 – Renewal Work Plan

The Renewal Work Plan will identify and describe the Renewal Work, schedule, inspections and trigger criteria for the Term. BPP's Renewal Work Plan, as part of this Maintenance Management Plan, will be developed and submitted to the PennDOT in accordance with the timing requirements established under the PA, with updates submitted annually thereafter.

Renewal works anticipated during the term include the following:

- Basic maintenance will be performed at all times throughout the Project area, including some minor Renewal Work on completed portions of the project (treatments on bridges, roadway, signage and striping, etc.)
- Scheduled renewal work based on an agreed Renewal Work Schedule based on individual Project Element design life and Handback requirements

Newly constructed roads and bridges, including signage and traffic controls, will be maintained and renewed as per PA to keep them in the appropriate condition.

BPP's approach to managing Renewal Work involves:

- Regularly consulting with PennDOT to understand their requirements, priorities, upcoming plans and preferences
- Assessing project element condition as per the PA requirements, entering the assessment into the MMS and following up with an analytical and evaluation process to determine next steps relative to the project element
- Using the MMS, and potentially digital twin technology, as a platform to monitor asset condition and criticality, estimate asset life, analyze failure data, predict equipment performance and potential failures and assess replacement and refurbishment requirements
- Using the MMS, as well as service history, employee recommendations and other factors, to build detailed Renewal Work schedules and to implement a monitoring plan to confirm these works are completed as scheduled
- Establishing the nature, extent and timing of asset rehabilitation and replacement activities, based on maintenance, operational and economic assessments. Together, these assessments will allow us to prioritize future asset rehabilitation and replacement, based on an asset's performance, availability and condition and to also forecast short-term and long-term costs

Useful Life and Anticipated Renewal Schedule

Specific works and renewal schedules will be identified based on construction completions and lifecycle data, with consideration of other relevant data. The following table show the anticipated years when the Renewal Work is anticipated to be done.

Table 6 – Anticipated Renewal Schedule

Element	Anticipated Renewal Activity	Anticipated Renewal Schedule
Bridge	Waterproofing	5 years
	Expansion Joints	10 years
	Seal cracks	3 years
	Repaint	10 years
	Signage	10 years
	Deck (overlay)	12 years
Roadway	Restore PCI / IRI	10 years
	Seal pavement joints	2 years
	Patching, Chip Seal	2 years
	Signage	10 years
Other	Fencing	10 years
	Lighting Poles	10 years

Evaluating and Inspecting Project Conditions

See the following:

- Section 2 – Monitoring and Recording Measures
- Section 2 – Plan for Maintenance during the D&C and Maintenance Periods
- Section 2 – Maintenance Scheduling and Records Plan

Renewal Work Triggers

BPP will monitor actual asset performance data on a pre-scheduled and ongoing basis throughout the Term to assess the lifecycle deterioration trends of each element and to optimize routine activity levels to achieve design life. These ongoing assessments identify correctable deteriorations that could shorten the useful life of an asset. To determine the optimal timing of these various maintenance strategies (corrective, preventive, or restoration/renewal), BPP will use probabilistic LCCA techniques. LCCA will enable the team to determine when maintenance treatments are effective, when restoration is more effective than continued corrective maintenance, and the optimal time to perform preventive maintenance. In general, treatment selection will follow the principle that if the cost of repairing is higher than the renewal cost, then the project element should be renewed.

Preparing for Handback

The Handback transitioning process will begin during the last five to three years of the Term. BPP will prepare and submit Handback Report and documentation in accordance with the submittal requirements under the PA based on inspections, current condition and predicted upcoming needs. This report will set out the calculations to define Handback funding needs and work plans. Maintenance documentation, including contracts and warranties, will be transferred and updated at Handback. Communication during this period will be reinforced to optimize the transference of documents and information.

Renewal Inspection Log

See the following:

- Section 2 – Monitoring and Recording Measures
- Section 2 – Maintenance Scheduling and Records Plan

Coordinating with PennDOT and affected Third Parties in the Planning and Execution of Renewal Work

The Maintenance Team will schedule all Renewal Work with PennDOT and any affected Third Parties. No works that affect availability will be scheduled until properly scoped, designed, reviewed and approved by PennDOT. If Third Parties may be impacted, schedule approval will be required from all parties and will be coordinated with affected parties before and after inspections. The Maintenance Team will also accommodate any Third-Party inspection requirements.

One-Year and Five-Year Renewal Work Schedules and Inspections

Plan for Renewal Work and Inspections will be provided based on the forecasted lifecycle, inspection results, MMS analysis and employee and other inputs for the next one-year and five-year periods.

Summary of Renewal Work and Inspections Completed in the Previous Year

BPP will provide reporting documenting Renewal Work and Inspections completed in the previous year as required.

Section 6 – Work Breakdown Structure / Product Breakdown Structure

BPP will develop and provide to PennDOT work Breakdown Structure / Product Breakdown Structure schedules for the Maintenance Period in accordance with all requirements set forth in the PA, including submittal requirements. The submittal will incorporate, among other things, the timing for the Renewals Work, the inspections to be done and the workforce and the equipment to employ for the Work.