

ORIGINAL

TECHNICAL PROPOSAL - VOLUME I

I-66 EASTBOUND WIDENING INSIDE THE BELTWAY

A DESIGN-BUILD PROJECT

**FROM: DULLES CONNECTOR ROAD (ROUTE 267)
TO: FAIRFAX DRIVE (ROUTE 237)**

FAIRFAX COUNTY AND ARLINGTON COUNTY, VIRGINIA

STATE PROJECT NO.:

I-66 EBW (0066-96A-417, P101, R201, C501), UPC 108424

I-66 EDA (0066-96A-493, P101, C501, B686), UPC 110629

FEDERAL PROJECT NO.: NHPP-066-1(356)

CONTRACT ID NO.: C00108424DB92

SEPTEMBER 27, 2017

PREPARED FOR:



SUBMITTED BY:





September 27, 2017

Mr. Bryan W. Stevenson, P.E.
Alternative Project Delivery Division
Virginia Department of Transportation
1401 East Broad Street
Annex Building, 8th Floor
Richmond, Virginia 23219

RE: I-66 Eastbound Widening Inside the Beltway

State Project No.: I-66 EBW (0066-96A-417, P101, R201, C501), UPC 108424
I-66 EDA (0066-96A-493, P101, C501, B686), UPC 110629

Federal Project No.: NHPP-066-1(356)
Contract ID Number: C00108424DB92

Dear Mr. Stevenson:

The Lane Construction Corporation (LANE) is pleased to present our Technical Proposal for the above referenced Design-Build (D-B) project. Our response contains all information requested in the RFP dated April 7, 2017 and Addenda 1, 2, 3 and 4. LANE is teamed with Rinker Design Associates, P.C. (RDA), Lead Designer, to provide the Virginia Department of Transportation (VDOT) a Team with a solid reputation for completing complex projects innovatively, on time, and often ahead of schedule. Our Team's experience enables us to deliver the high quality and technically-sound project both VDOT and the public expects. Our Team has taken every opportunity to include enhancements, provide value-added features, diligently manage and mitigate risk, and reduce both construction and long-term maintenance costs. By focusing on our quality, safety, public information, and environmental protection programs, VDOT, the traveling public, business and residential stakeholders will benefit by the final results as this Project is completed.

4.1.1 Offeror's Full Legal Name:

The Lane Construction Corporation
90 Fieldstone Court
Cheshire, CT 06410

4.1.2 Declaration of Intent: It is LANE's intent, if selected, to enter into a contract with VDOT for the Project in accordance with the terms of this RFP.

4.1.3 120- Day Declaration: Pursuant to Part 1, Section 8.2, we declare that the offer represented by this Technical Proposal will remain in full force and effect for one hundred twenty (120) days after the date the Technical Proposal is actually submitted to VDOT.

4.1.4 Offeror's Point of Contact Information: Mr. Ali Alkouraishi is the authorized representative and point of contact for the LANE Team for all matters associated with this submittal.

Ali Alkouraishi, Pursuit Manager
14500 Avion Parkway, Suite 200
Chantilly, VA 20151
Tel: (703) 222-5670 Fax: (703) 222-5960
Email: AAlkouraishi@laneconstruct.com

4.1.5 Offeror's Principal Officer Information: Mr. David J. Rankin is a Principal Officer of LANE.
David J. Rankin, Senior Vice President
6125 Tyvola Centre Drive
Charlotte, NC 28217
Tel: (704) 553-6500 Fax: (704) 553-6598
Email: DJRankin@laneconstruct.com

4.1.6 Interim Milestone and Final Completion Dates: In accordance with RFP Section 2.3.1, LANE proposes an Interim Milestone Completion Date of November 10, 2020 and a Final Completion Date of October 1, 2021.

4.1.7 Proposal Payment Agreement: An executed Proposal Payment Agreement (Attachment 9.3.1) can be found in the Appendix of Volume 1.

4.1.8 Certification Regarding Debarment Forms: Certifications for Debarment for Primary and Lower Tier Transactions have been completed and executed for the Offeror and all subconsultants, subcontractors, and other entities as identified as members of the LANE Team. These can be found in the Appendix of Volume 1.

The LANE Team will deliver this project safely, on time, and within budget. We appreciate the opportunity to present our qualifications and look forward to working with VDOT on this important project.

Respectfully submitted,



Ali Alkouraiishi
Pursuit Manager
The Lane Construction Corporation

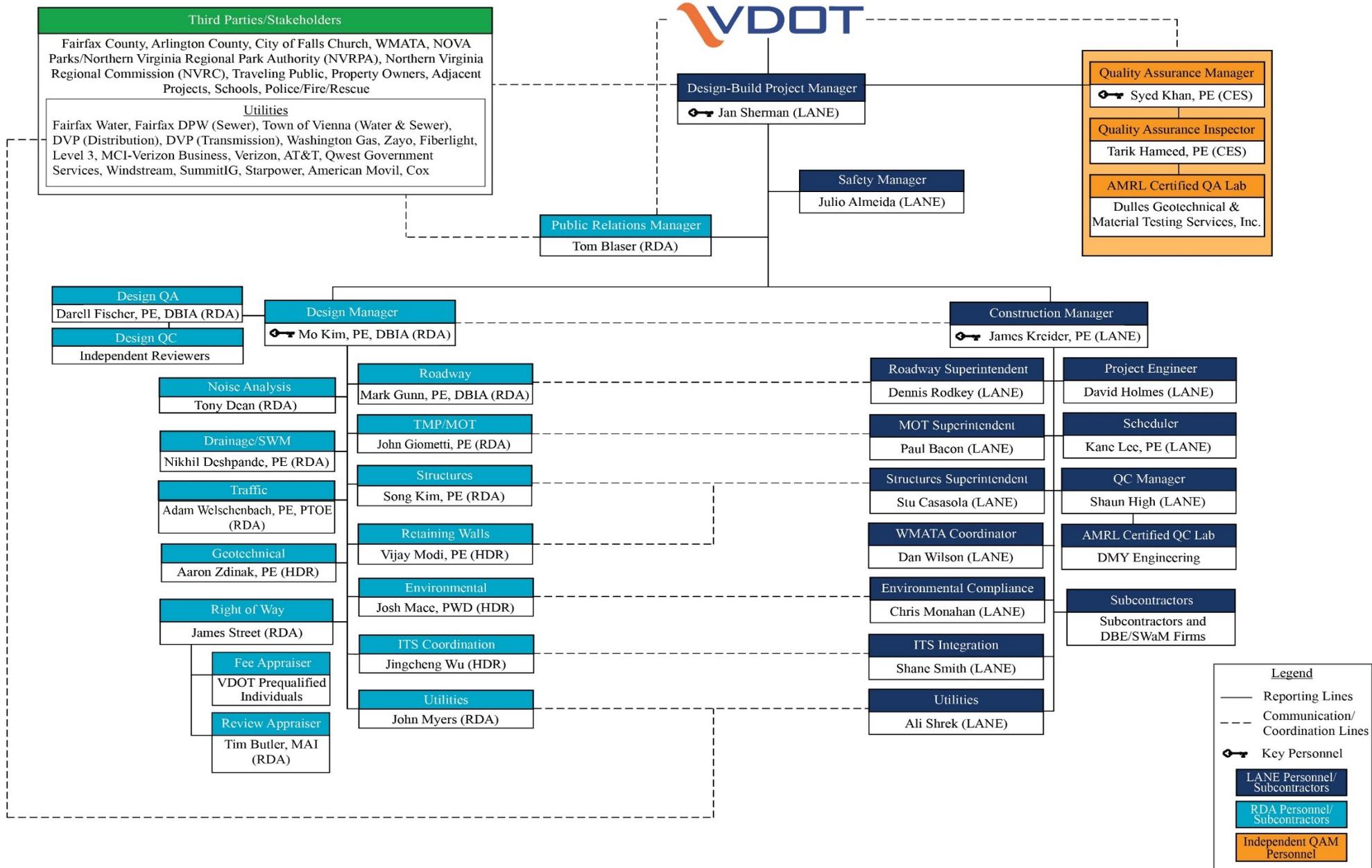
4.2 | OFFEROR'S QUALIFICATIONS

4.2.1 Qualifications of Key Personnel

LANE confirms all information presented in the Statement of Qualifications (SOQ) dated January 17, 2017 remains true and accurate in accordance with Part 1, Section 11.4. As demonstrated in the organizational chart presented on the following page, the team proposed by LANE, including but not limited to our organizational structure, lead contractor, lead designer, key personnel, and other individuals identified pursuant to Part 1, Section 4.2, will remain intact for the duration of the contract.

4.2.2 Organizational Chart

Under the leadership of our Design-Build Project Manager (DBPM), Jan Sherman, the LANE Team is structured to effectively manage and deliver the design and construction of this project. The LANE Team is organized to provide VDOT with a single-source point of contact, responsible for all design and construction activities. Our Team organization has a straightforward chain of command, with individual tasks and functional responsibilities clearly identified. This organizational chart identifies key personnel and major functions to be performed for the successful management, design, and construction of the project. Though reporting relationships are rigid, the lines of communication within the Team will remain fluid and flexible to meet the requirements of each individual project task. In order to prevent unnecessary project delays, it may be prudent at times for other members within the LANE Team to communicate directly with their counterparts at VDOT. This will be directed and authorized in advance by Mr. Sherman and the VDOT Project Manager.



4.3 | DESIGN CONCEPT

Introduction of Design Strategy

The LANE Team’s design strategy is centered around providing innovative and value-added solutions that meets or exceeds all the project objective without compromising the design criteria. Our team’s proven success is the foundation in which we continue to integrate design enhancement to achieve equal to or better than results to the Department and the public. Our goal to provide a better solution may be subtle on the surface but the reduced impacts to the public during construction and savings to the Department are significant. The LANE team has meticulously reviewed the project requirements to provide the appropriate level of improvements while minimizing future maintenance and right-of-way impacts. The LANE Team’s proposed design concept is based on a comprehensive review of the RFP, Addenda, supporting documents, and responses to our Proprietary Meeting minutes. Our approach focused on optimizing the design by **achieving or exceeding all Design Criteria Table requirements (Attachment 2.2)**; ensuring that **construction limits meet the right-of-way (ROW) requirements** outlined in the RFP and Addenda; and eliminating, minimizing, or mitigating the need for design waivers (DWs) or design exceptions (DEs) while ensuring that **no elements are proposed that require DWs or DEs beyond those identified in the RFP or Addenda.**

The LANE Team has met or improved upon the RFP requirements by making enhancements to the proposed design which will reduce traffic impacts to the public, accelerate construction of the improvements, and reduce future maintenance costs.

Implementation of our approach fully considered the types of materials used, the methods of construction, and the functionality of proposed elements to reduce future maintenance and inspection. Key factors into how each optimization was evaluated for incorporation include: **pedestrian and vehicular safety, construction phasing, schedule, stakeholder buy-in, and cost.** The following table depicts key project elements, how the LANE Team design resolved them, and their benefit to the project.

I-66 Eastbound Widening (EBW)		
Location/Feature	Description	Project Benefit
Bon Air Park 4(f) issues	Adjusted the horizontal alignment, lanes widths (all 3 lanes are 11’ minimum), and composition of the compound curves to eliminate widening to the outside along Bon Air Park	<ul style="list-style-type: none"> Eliminates widening the bridge over Custis Trail to the outside – COST and SCHEDULE Significantly minimizes construction directly adjacent to and over pedestrian traffic – SAFETY Eliminates reconstruction/new retaining walls compared to the RFP design – COST, SCHEDULE, and IMPROVED MEANS & METHODS Minimizes land disturbance and avoids impact to the existing noise barriers – COST and SCHEDULE
Stormwater Management (SWM)	Reviewed the SWM Report provided in the RFP and reevaluated the corridor to determine the impact of improvements on the amount of required phosphorus removal. Determined that the project falls under the 10 lb/yr threshold.	<ul style="list-style-type: none"> Eliminate all mechanical BMP facilities – COST and SCHEDULE Purchase nutrient credits (up to 100%) in lieu of on-site quality management – COST Reduces future maintenance – COST
Utilities	Adjusted the alignments (horizontal and vertical) of Custis Trail through Bon Air Park to avoid impacts to a Dominion Energy distribution duct bank. Developed a Dominion Energy approved strategy to pass an existing distribution duct bank through Piers 4 and 5 of the proposed W&OD Trail Bridge to avoid impacts.	<ul style="list-style-type: none"> Eliminated costly impact of duct bank at Bon Air Park – COST Eliminated costly impact of duct bank at the W&OD Trail Bridge – COST

4.3.1 Conceptual Roadway Plans

The LANE Team’s conceptual roadway design is described below. The narrative is broken down by **Base Scope** and **Option 1** scope to clearly define these two distinct elements of work. Our Conceptual Plans which show each of the required elements are provided in Volume II.

Base Scope. I-66 when complete, will be transformed in to a high occupancy toll facility providing a predictable alternative route on one of our region’s most congested corridor. The LANE Team understands the value of the I-66 EBW improvements inside the beltway with LANE having constructed the adjacent I-66 WBW for the Department and observing the benefits to the public upon completion. The proposed I-66 EBW improvements will provide a much-needed relief while meeting the forecasts for tolling conversion by adding a through lane for nearly 4-miles from Dulles Connector Road to Fairfax Drive. In addition, ramp modifications, bridge improvements, and a new grade separated crossing of the W&OD trail encompasses the objectives of the Base Scope of work.

Option 1. The LANE team recognizes today’s challenge in accessing the West Fall Church Metro Station when traveling from the Eastbound direction of I-66. Current configuration at I-66 and Route 7 require drivers to travel EB on Route 7 and almost immediately merge toward the dual left turn lane at Haycock Road. This side street competes for access with local residents, George Mason HS, University of Virginia / VA Tech Northern Virginia Campus, and Metro, imposing tremendous frustration to the public throughout the day. Option 1 will provide a direct access to the Metro diverting thousands of vehicles per day from Haycock Road.

(a) General Geometry Including Horizontal Curve Data and Associated Design Speeds, the Number and Widths of Lanes and Shoulders

Base Scope. The LANE Team design closely follows the RFP Concept Plan (four lanes from the western terminus up to the US 29 – Station 120+00 to Station 176+00, three lanes from US 29 to the end of the project at the I-66/Fairfax Drive split – Station 176+00 to Station 305+00). In accordance with the RFP and related documents (i.e. RFP Addenda, Attachment 2.2 Design Criteria Table, and the RFP Concept Plans), I-66 is being developed based on a 60-mph design speed with 12-foot lanes. The paved shoulder widths vary with 4- foot left and 12-foot right being the minimum, except as allowed for by Design Exceptions and Design Waivers identified in the RFP and Addenda.

Our design provides for all required lanes, lane widths, shoulders, gore improvements, ramp adjustments, and emergency pull-offs along the eastbound lanes of I-66 in accordance with the RFP documents. The full-depth widening and shoulder improvements as described above will be supplemented by milling and overlay of the existing mainline lanes.

Option 1. The LANE Team has advanced the design provided in the RFP Conceptual Plans for the Eastbound Direct Access (EDA) to the Metro station. We have been careful to fully address the added requirement of meeting the design criteria defined, not only by Attachment 2.2, but also contained in the Interchange Modification Report (IMR) provided in Addendum 3. Prior to the release of the IMR and Addendum 3, our team explored the feasibility of providing an at-grade solution to eliminate the proposed merging of 300 vehicles from EB I-66 with a 1000 vehicles from EB Route 7 and to minimize the weave into the West Falls Church Metro Station from EB I-66. Although we saw some potential, we acknowledge that the Option 1 presented in the RFP is more efficient; therefore, we are not proposing an at-grade option in compliance with the RFP technical requirements.

(b) Horizontal Alignments

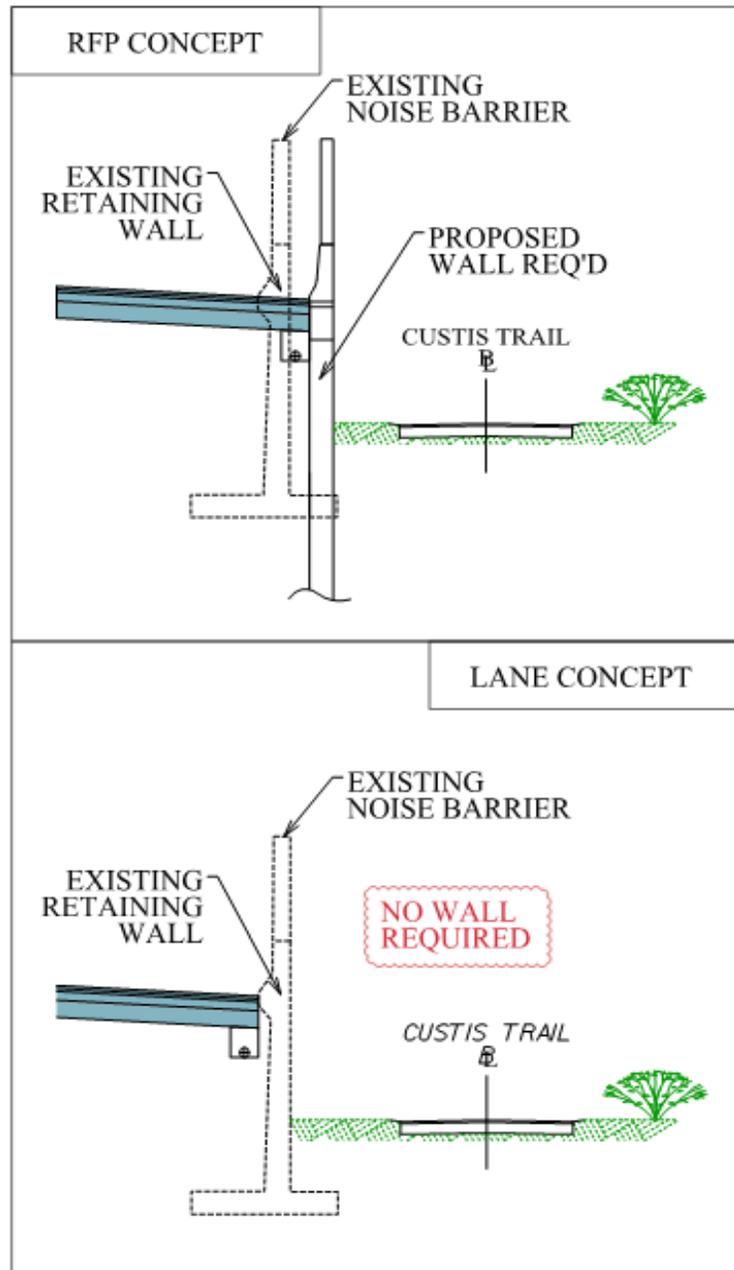
The LANE Team’s horizontal geometric design meets or exceeds the requirements outlined in the RFP (and Addenda) and summarized on Attachment 2.2 Design Criteria Table. In addition to meeting/exceeding the Design Criteria Table, adjustments to the horizontal alignments and roadway improvements stay within the right-of-way (ROW) defined by the RFP and Addenda.

Horizontal Curve Data

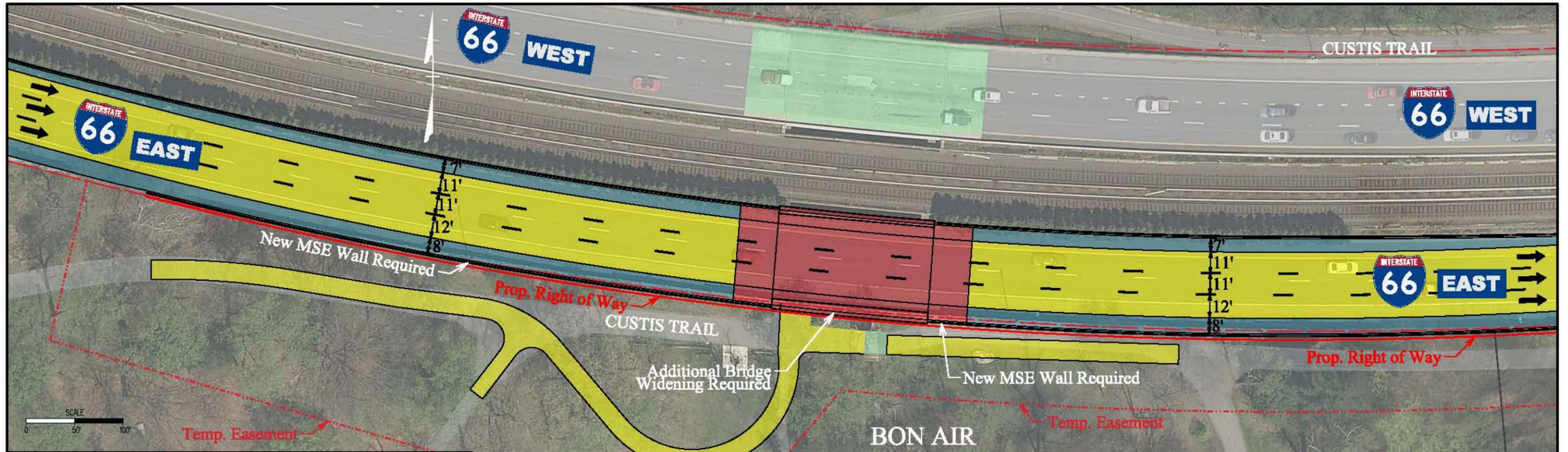
The LANE Team’s design refined the RFP Conceptual Plan design and eliminated two curves through the Bon Air Park portion of the Project which avoids outside widening.

Base Scope. Our design alignments are consistent with those provided in the RFP Conceptual Plan. However, our design provides an important optimization through the Bon Air Park, a 4(f) property. Our design replaces the compound horizontal curve on approach to the bridge over Custis Trail with a single radius ($R=2,634.00'$) curve and eliminates the reverse curve just beyond the bridge. Additionally, the LANE Team has utilized 11-foot lane widths as allowed by Addendum 2 of the RFP. In order to utilize 11-foot lanes, the LANE Team assumes the risk of preparing and obtaining the necessary Design Exception. The RFP Conceptual Plan widens the Bon Air Park bridge on both sides to develop a 7-foot shoulder left of traffic for improved sight distance. Our design maintains a 5-1/2-foot shoulder left of traffic while meeting or exceeding the sight distance provided by the RFP Conceptual Plan. As a result, the bridge only needs to be widened approximately 1.5-foot left of traffic and maintains the required 1.5-foot separation to WMATA facilities. Aside from the obvious benefits of reduced roadway and bridge widening into Bon Air Park, which also eliminates the need for new retaining walls right of traffic, our alternative at this location significantly improves safety by eliminating construction adjacent to the Custis Trail (see graphic to the right). In fact, the only impact to Bon Air Park is the required trail realignment to facilitate safer trail traffic.

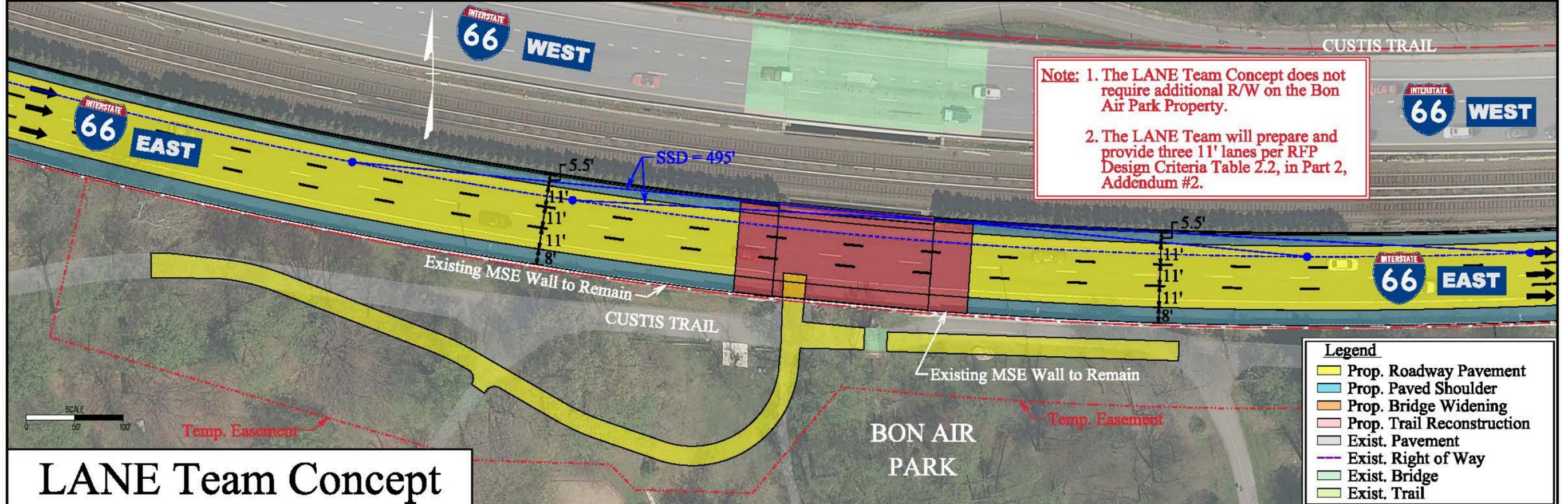
Option 1. The LANE Team has implemented the design as provided in the RFP Conceptual Plan and IMR. Our design does not deviate from the horizontal alignments provided.



The LANE Team's unique design solution avoids all roadway impacts to the Bon Air Park



RFP Conceptual Plan



LANE Team Concept

(c) Maximum Grade for All Segments and Connectors

Given the nature of a widening project, the only changes in vertical grades are insignificant to optimize the milling and buildup design to achieve proper clearances, cross slopes, and reveals along existing barrier faces. The LANE Team design meets or exceeds all requirements of the RFP, Attachment 2.2 of the RFP, and the Road Design Manual – in order of precedence.

Base Scope. The LANE Team design generally follows the vertical profile design provided in the RFP Conceptual Plans. The table below defines the maximum grades allowed as compared to the maximum grades provided.

Roadway	Maximum Profile Grades (%)	
	LANE Concept Plan	Max. Grade Allowed
I-66 EBL	4.90%	6.00%
Off-Ramp – I-66 EBL to Westmoreland St.	4.00%	6.00%
Off-Ramp – I-66 EBL to US Route 29/Washington St./Lee Hwy.)	8.00%*	5.00%
On-Ramp – Sycamore St. to I-66 EBL	4.00%	5.00%
Off-Ramp – I-66 EBL to Fairfax Drive)	3.50%	5.00%

*matches existing grade and RFP Conceptual Plan

Option 1. Our design follows the alignment grades provided in the RFP Concept Plan and thus exceed the requirements of the Design Criteria Table.

Roadway	Maximum Profile Grades (%)	
	LANE Concept Plan	Max. Grade Allowed
I-66 EBL (Ramp B parallel to I-66)	~0.75% (spline)	N/A (Ex. Cond.)
Ramp B	~3.60% (spline)	6.00%
Ramp W	3.82%	7.00%
Ramp A	~4.60% (spline)	7.00%

(d) Typical Sections of the Roadway Segments to Include Ramps, Retaining Walls and Bridge Structures

In developing our unique solution for widening I-66 eastbound, we have ensured that all typical sections meet or exceed the RFP requirements defined by the RFP and related documents (i.e. RFP Addenda, Attachment 2.2 Design Criteria Table, and the RFP Concept Plans). Additionally, the RFP’s minimum pavement sections have been utilized in our design for milling, widening, and reconstruction areas. Volume II includes the Team’s Conceptual Plans which clearly depict the typical sections for all roadway segments, ramps, retaining walls, and bridge structures. Below is a narrative summary of the typical sections being implemented along the project **Base Scope** and **Option 1**.

Base Scope. The I-66 EBW design develops a 4-lane section (12-foot lanes with variable shoulders) from west of Great Falls St. to exit ramp at Lee Highway. The design then transitions to a 3-lane section (12-foot lanes with variable shoulders) to the project completion at Fairfax Drive. Due to the urban nature of the corridor, much of the Project is contained by guardrail and barrier (existing and proposed) both left and right of traffic. Each of these features are shown in our Conceptual Plans provided in Volume II.

Option 1. The I-66 Eastbound Direct Access (EDA) ramp to the Metro provides for the widening of two existing ramps (Ramp B and Ramp A) along with the construction of a connector ramp (Ramp W). The ramp widening typicals show a varying width from 12- to 16-feet per lane while Ramp W provides a variable width from 14.5- to 16-feet. Each of these conditions is depicted on our typical sections contained in Volume II.

(e) Conceptual Hydraulic and Stormwater Management Design

Base Scope. The I-66 EBW Inside the Beltway project was grandfathered to the old regulations (Part IIC). As

such, the design must meet MS-19 requirements for outfalls if quantity management is not provided. Project drainage can typically be separated into two distinct elements – stormwater management (SWM) and roadway drainage. The LANE Team carefully evaluated the SWM quality needs and determined that the amount of Phosphorus removal is significantly less than what the RFP defined (see Hydraulic Plan Sheets in Volume II for calculations and depiction) which allows us to purchase up to 100% of nutrient credits vs. providing on-site removal. SWM quantity control is being addressed through proof of adequate outfalls and retrofit of existing SWM facilities along the corridor. In accordance to our verified calculations, the LANE Team has **eliminated the need for the installation of proposed underground facilities** identified in the RFP plans. This **removes the challenges of installation, future access, and maintenance of these facilities** within this segment of I-66.

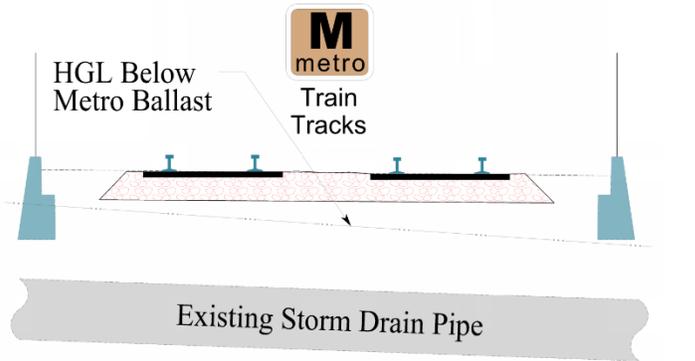


Figure 4.3.1-1. The LANE Team’s design eliminates the need for the proposed underground facilities.

The LANE Team’s roadway drainage design is shown in Volume II of our Technical Proposal and shows our intended approach to supplementing or replacing the existing drainage infrastructure. Reuse/replacement of existing drainage systems is in accordance with the RFP. Furthermore, our design and analysis of the storm drain systems is predicated, in part, on ensuring that hydraulic grade lines (HGL) do not encroach into the ballast under the WMATA tracks.

Option 1. The I-66 EDA (Option 1), in accordance with the RFP must meet the new stormwater requirements (Part IIB). In order to meet the SWM requirements, the design incorporates an on-site SWM facility between Ramp A and I-66 EBL (see Volume II for roadway and drainage design plans) for water quantity control; however, water quality control will be provided through the purchase of nutrient credits.

(f) Proposed Right of Way Limits

The LANE Team’s approach optimizes the design and minimizes the need for right-of-way (ROW). As required, our plans (contained in Volume II) clearly depict changes in the ROW footprint as compared to the RFP Conceptual Plan.

Base Scope. The LANE Team design complies with the ROW requirements as defined by the RFP and Addenda. Through a horizontal alignment adjustment and utilizing three 11-foot lanes, we have been able to remove the need for permanent ROW on Bon Air Park by eliminating all roadway widening along the right side through the Park. However, temporary easements will still be provided for the trail realignment as required by the RFP.

Option 1. Our proposed design is wholly contained within the ROW limits shown and meets or reduces the ROW requirements of the RFP and Addenda.

(g) Proposed Utility Impacts

The LANE Team approach in addressing any challenge is to remove or avoid those issues that are substantially outside of our control. Utilities is one of those challenges. Where the cost of impact is a project cost, avoidance is the obvious best solution. However, given that schedule is such a driver in a project’s success, avoidance when the cost is the utility’s to bear can also be advantageous, even if it add some additional cost to the project. With these strategies in hand, our team has substantially designed around the significant impacts – primarily the Dominion Energy transmission lines and 9 Phase duct under the W&OD Trail.

Base Scope. In developing our design, a major focus was given to avoiding or minimizing utility conflicts. The table below provides a summary of those efforts.

Utility Company	Locations	Mitigation
Dominion Energy (distribution power)	Aerial line at Route 29 and the new W&OD Trail bridge	Impacted power pole that cannot be avoided.
	Underground duct (9 Phase) at Fairfax Drive under the W&OD Trail bridge	Construct foundation around existing duct bank to avoid unnecessary relocation per discussions with Dominion Energy.
	Underground duct (12 Phase) along Custis Trail through Bon Air Park	Redesign proposed trail alignment to avoid impact.
Dominion Energy (transmission power)	Transmission (lines and towers) between US 29 and Sycamore Drive	Construction around and under these lines will adhere to clearance requirements of OSHA and Dominion Energy. A 5-day outage will be coordinated to allow for critical construction of the bridge.
Washington Gas	Station 126+25 transverse crossing	Utility test hole data will determine if drainage can be designed around this impact.
	4" line crossing along Fairfax Drive is impacted by the bridge construction	Gas line approximately 6 feet from proposed pier construction – monitor and avoid.
	Station 299+30 transverse crossing	Conflict avoided through elimination of retaining wall.
AT&T Long Distance	48 pair fiber optic at Route 29 Ramp	The fiber optic line is in conflict with the new W&OD Trail bridge and will be relocated.
Verizon South	Large fiber optic crossing at Station 242+50	Based on information obtained, our design can avoid impacting this line.
CATV	Various locations along the corridor	Although impacts may be imminent, they do not pose a threat to design or construction schedule.
Arlington Water	A 6" water line crossing Fairfax Drive appears to conflict with the W&OD Trail bridge	Our team anticipates that approximately 280 feet of waterline will be relocated.
Arlington Sewer	An 8" sewer line may be in conflict with our proposed drainage system	Redesign of that portion of the drainage system is underway to avoid the sewer line impact.

Option 1. Given the location of existing utilities within the corridor, avoidance is the probable outcome.

Utility Company	Locations	Strategy
Verizon South	Underground fiber optic along Route 7 may be in conflict with drainage systems	Adjustments in the drainage system design avoids impacts.
Washington Gas	A 16" transmission line and a 12" distribution line are under Route 7 WB roadway	Our design provides for milling and overlay along Route 7 but no significant construction that will impact these lines.
Fairfax Water	A 16" water line is in Route 7 EB roadway	Our design provides for milling and overlay along Route 7 but no significant construction that will impact this line.
Fairfax DPW (sewer)	No identified sewer lines	N/A

(h) Noise Barrier Locations

In accordance with the RFP, our design will provide permanent noise mitigation in compliance with VDOT’s noise barrier policy. As part of that design, we acknowledge the special design considerations outlined in the RFP for noise barriers located near Dominion Energy energized 230 KV lines.

Base Scope. The I-66 EBW Inside the Beltway project RFP Information Package provided a preliminary analysis which is depicted on the RFP Conceptual Plans. The noise barrier quantities (height, length, and total square footage) of feasible and reasonable barriers as shown on the RFP Conceptual Plans in coordination with the Preliminary Noise Analysis have been accounted for in our design. They include both new and replacement noise barriers along the east and westbound directions, both contiguous to and disconnected from the roadway and bridges.

Old metal noise barriers will be replaced by lower maintenance, absorptive noise barriers.

Option 1. The widening of Ramp A will impact an existing noise barrier on the right side of traffic and the east side of the bridge. As a replacement in kind, our design provides a new noise barrier that meets the required height and length in accordance with the Preliminary Noise Analysis to provide noise attenuation.

(i) Trail Horizontal and Vertical Alignments

Base Scope. At Bon Air Park, our unique solution to the roadway design and construction avoids encroachment into the park which could eliminate the need for replacement of trail elements that were in conflict. However, understanding the need for better trail transition and safety, all trail improvements shown on the RFP Conceptual Plans have been incorporated into our design, provided in Volume II.

At the W&OD Trail crossing of US 29, our team evaluated the profile provided in the RFP Conceptual Plans and determined that the critical vertical clearance point at the fire access lane was not considered. This, coupled with concerns over the overall structure depth, caused our Team to adjust the vertical profile up approximately one foot while meeting or exceeding all design criteria. Our adjustment, based on an in-depth analysis, remains below the clearance envelopes required for the Dominion Energy transmission lines.

The LANE Team’s design of the W&OD Trail Bridge accommodates all required clearances – vertical clearance under the bridge and horizontal and vertical clearances to the transmission lines.

Option 1. Not applicable.

(j) Any Other Key Project Features

ITS and Tolling elements are critical components of the project. Maintaining continual use of the ITS systems and uninterrupted use of the Tolling facilities is paramount. The LANE Team’s design creates minor impacts on the exiting ITS and Tolling systems (i.e. communication junction boxes, power feeds, and CCTV poles/cameras). In these instances, the LANE Team intends to either relocate or replace the existing facilities. Regardless, we will maintain continued service. Additionally, the LANE Team will construct a new CCTV pole and install a new CCTV camera near the end of the project to obtain full coverage as needed. Furthermore, in accordance with the RFP, the LANE Team will coordinate with TransCore regarding shifting of the facilities (VCARS, OPUS, and DVAS systems) located above the center of each lane. However, our design and construction will not physically impact the gantries along the corridor.

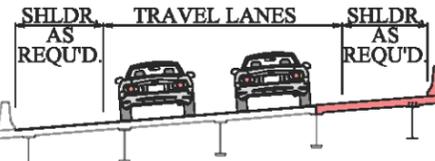
4.3.2 Conceptual Structural Plans

Design Approach

The LANE Team is proposing to follow the conceptual approach as outlined in the RFP and the associated concept plans except as noted in this proposal utilizing established VDOT standards whenever applicable. See our **Bridge Concept Design** graphic on the next page for an overview of the bridges. The widening designs will be based on AASHTO LRFD Bridge Design Specifications (7th Edition with the interims, VDOT modifications, and Additional Foundation Criteria) and AASHTO LRFD Guide Specifications for Design of Pedestrian Bridges (2nd Edition with 2015 Interim Revisions and VDOT modifications). Additional loads (such as future wearing surface and construction tolerance) will be accounted in the designs. In addition, the existing structures rehabilitation/repair will include continuous deck retrofit over the piers and joint reconstruction at the abutments and other repairs outlined in the proposed concept plans. The rehabilitation/repair work will be performed per the VDOT specifications and standards and RFP quantities. The construction sequence will maintain the number of existing travel lanes and safe pedestrian/bicyclist access per the approved TMP and ADA Guidelines for State and Local Government Facilities.

LANE Team Benefits
<ul style="list-style-type: none"> • Greatly reduces impact to Bon Air Park and users (improved safety for pedestrians, cyclists, and motor vehicles) by eliminating retaining walls right of traffic • Bon Air Park bridge - new concrete deck with no precast pieces improving service life. • Continuity in aesthetics and materials throughout project corridor • No impact to historic features at W&OD Trail and LANE concept ensures all clearances are met • No impacts to WMATA operations or facilities

B686 Ramp A over Route 7 WIDENING (OPTION 1)



Proposed Superstructure Work:

- * Grade 50W steel beams (painted) composite with concrete deck
- * Mill and overlay (latex modified concrete) new and existing deck

Proposed Substructure Work:

- * Abutments: CIP concrete stub type founded on steel piles
- * Piers: CIP concrete single column, cap and footing founded on drilled shaft

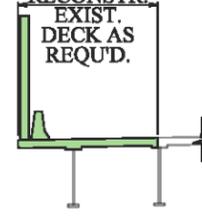
Benefit: Reduce future maintenance and extend the service life of the exist. deck

B682 I-66 WB over Williamsburg Blvd. NOISE BARRIER

Note: These features are typical for B683 and B684.

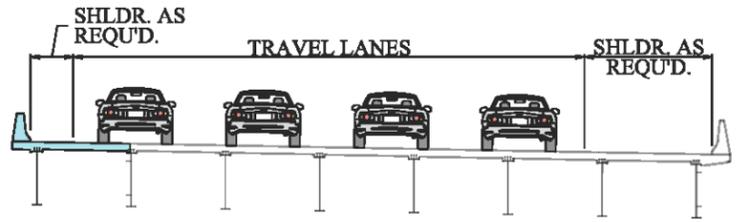
Proposed Superstructure Work:

- * New noise barrier on the outside of bridge
- * Partial deck and parapet removal.
- * New deck and parapet to reconstruct the removed parts



Benefit: All new noise barrier components providing the maximum service life

B677 I-66 EB over Westmoreland St. WIDENING



Proposed Superstructure Work:

- * Grade 50W steel beams (painted) composite with new concrete deck
- * Eliminate deck joints at piers
- * Joint reconstruction at abutment

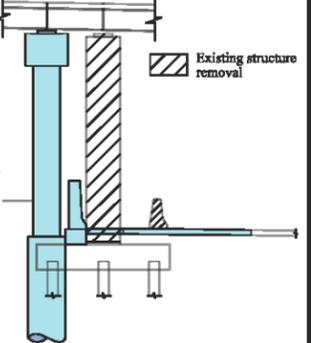
Proposed Substructure Work:

- * Abutments: CIP concrete, stub type founded on existing piles and new drilled piles
- * Piers: CIP concrete, single column, cap, and footing founded on spread footing

Benefit: Reduced load demand on foundation
Low maintenance from less deck joints

Benefit: Improved schedule by utilizing exist. foundation
Minimized disturbance to exist. structures including WMATA

B686 Hiking and Biking Trail No. 4 over I-66 PIER RELOCATION



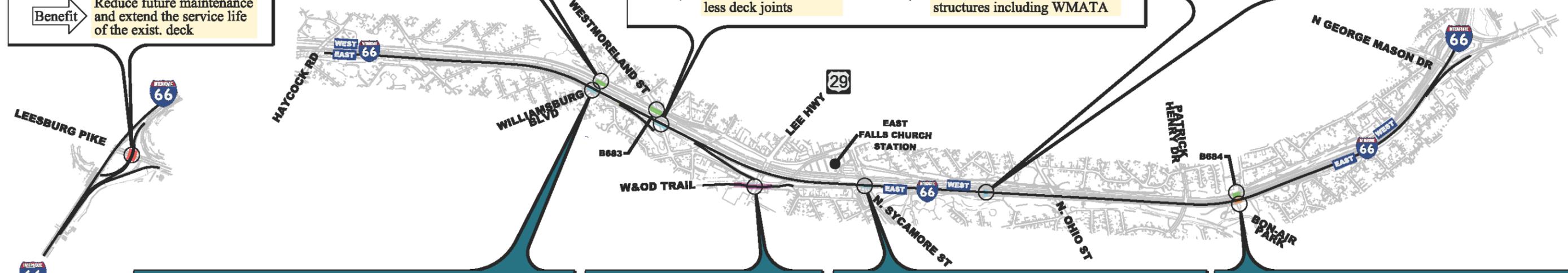
Proposed Superstructure Work:

- * New steel end diaphragm at new pier
- * New bearing stiffener
- * Strengthen existing beam bottom flanges adjacent to the new pier using bolted cover plates

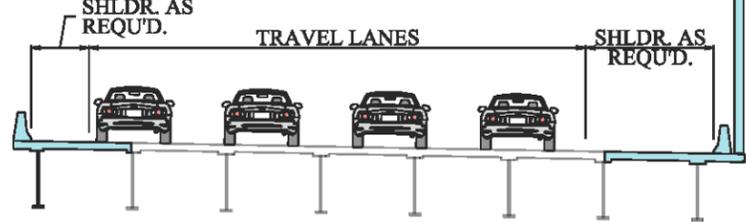
Proposed Substructure Work:

- * CIP concrete cap and columns founded on drilled shafts

Benefit: Min. impact to pedestrians and bicyclists
No new fatigue prone details
Minimum disturbance to I-66 EB traffic



B675 I-66 EB over Williamsburg Blvd. WIDENING



Proposed Superstructure Work:

- * Grade 50W steel beams (painted) composite with new concrete deck
- * New noise barrier on the outside of the bridge by rebuilding portion of existing deck
- * Continuous deck retrofits at piers
- * Joint reconstruction at abutment

Proposed Substructure Work:

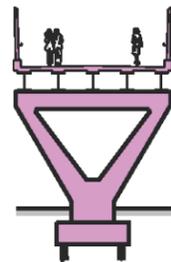
- * Abutments: CIP concrete, stub type founded on existing piles
- * Piers: CIP concrete, single column, cap, and footing founded on drilled shaft

Benefit: Reduced load demand from light superstructure
Low maintenance from less deck joints

B680 W&OD Trail over Route 29 NEW BRIDGE

Proposed Superstructure Work:

- * Grade 50W steel continuous beams (painted) composite with lightweight concrete deck
- * Pedestrian fence/rail with V-shaped posts

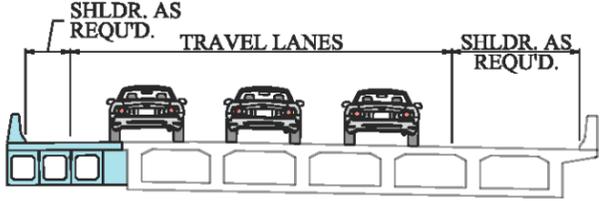


Proposed Substructure Work:

- * Abutments: jointless abutments retained by MSE walls
- * Piers: CIP concrete aesthetically treated V-piers founded on steel piles

Benefit: V-motif and architectural treatment to create gateway bridge for local community

B678 I-66 EB over N Sycamore St. WIDENING



Proposed Superstructure Work:

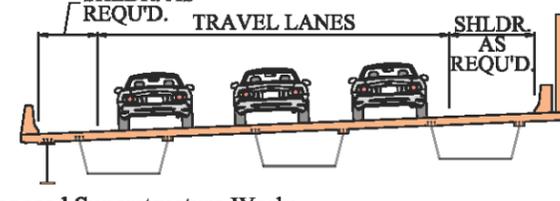
- * Precast, prestressed (PC/PS) concrete box beams composite with new deck

Proposed Substructure Work:

- * Abutments: use existing concrete abutments and foundation
- * Piers: CIP concrete, single column, cap, and footing founded on drilled shaft

Benefit: Improved constr. schedule from fast erection time and safe utilization of exist. substructure and found.
Min. impact to veh. and ped. traffic on Sycamore St.

B679 I-66 EB over Bon Air Park WIDENING



Proposed Superstructure Work:

- * Grade 50W steel beam (painted) composite with deck
- * Replace the entire concrete deck with no overlay
- * Implement abutment deck extension eliminating deck joints
- * Install new noise barrier on the outside of the bridge

Proposed Substructure Work:

- * Use existing abutments and foundation; rebuild backwalls

Benefit: Longer service life with less maintenance from monolithic deck without precast panels
Accelerated constr. schedule from safe utilization of exist. sub structure and found.

For the benefit of the travelling and local public, the LANE Team will apply its knowledge of the project corridor and its unique set of features that were gained through recently completed I-66 WB Segment II Spot Improvement Project. These include the understanding of the traffic patterns and restrictions on the interstate and local routes, WMATA train schedules and restrictions, detailed understanding of the most efficient construction means and methods to provide the required safety for the public.

Superstructure

The existing eastbound bridges in the Project corridor will be widened to the inside of the roadway. Deck-overhangs will be removed to the first existing exterior beam. At each widening, a new beam and deck will be installed providing the required width for the additional lane and shoulder. The widening of the I-66 EB bridge (B679) over Bon Air Park will also include a whole new deck replacement with new noise barrier and parapets.

For the new bridge carrying W&OD Trail over Lee Highway, the Team will further develop on a multi-steel girder bridge concept that VDOT has provided and presented to the Arlington County, City of Falls Church, and the citizens through numerous public meetings. The LANE Team's design will incorporate the aesthetics, structure clearance requirements to the existing utilities (including the overhead Dominion Energy transmission lines), historic features, and access to the adjacent properties, as required in the RFP. The fencing on the bridge will adhere to the aesthetics (V-motif) of the structure while providing required safety including clearance from the overhead powerline.

For Eastbound Direct Access (EDA, Option 1), the bridge B686 (Ramp A over Route 7) will be widened to the outside to accommodate an additional lane and shoulder. The existing deck overhang will be removed to the exterior girder. A new steel girder will be added and the deck will be placed back providing the specified widening. Additionally, a new latex modified overlay will be installed for the entire deck including the widened portion.

When applicable, joints over piers will be eliminated using continuous deck retrofit and link slabs. The joints over existing abutments will be reconstructed with the exception of I-66 EB over Bon Air Park. However, LANE Team is aware that VDOT is in process of implementing an **asphalt plug detail** to eliminate existing abutment joints, and we will investigate this detail for applicability for the I-66 EB bridges over Williamsburg Blvd., Westmoreland Street, and Sycamore Street at an appropriate time. At the I-66 EB over Bon Air Park Bridge, abutment joints will be eliminated by incorporating deck extensions. On the W&OD over Route 29 Bridge, there will be no deck joints over the piers. However, there will be covered tooth joints at the abutments. This is due to the long span lengths, the two-horizontal s-curves in the alignment and to accommodate movements inherent in this layout. In addition, the abutment joints will be moved off the bridge by implementing Virginia Alternate Abutment detail.

The **previous 11x17 graphic and those contained in Volume II** provide details of our Team's proposed improvements with respect to superstructure work. These improvements meet or exceed the requirements of the RFP.

Substructure

For bridge widenings, the LANE Team proposes extending the existing abutments for the new beams and deck and new piers in line with existing piers. When applicable, pile foundations will be drilled rather than driven to limit vibration to existing structures and other features including WMATA facilities.

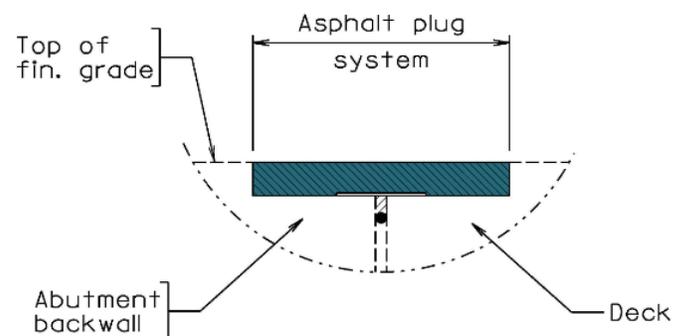


Figure 4.3.2-1. The Team has incorporated an asphalt plug detail into our design to eliminate existing abutment joints.

The **graphics on the previous page and in Volume II** provide a summary of our Team’s proposed improvements with respect to substructure work. These improvements meet or exceed the requirements of the RFP.

Retaining Walls

The LANE Team has optimized the overall corridor design and reduced the number of major retaining walls. The following are the proposed major retaining walls to accommodate the widening and new structures:

LOCATION	WALL TYPE	REASONS/BENEFITS
I-66 EB BL Sta. 193+00 right to Sta. 199+50	Post and Panel	<ul style="list-style-type: none"> • Minimize earthwork cut and disturbance • Improved construction schedule
Ramp 1 BL Sta. 12+50 right to Sta. 17+00	Post and Panel	<ul style="list-style-type: none"> • Minimize earthwork cut and disturbance • Improved construction schedule
W&OD BL Sta. 54+00 (Abutment A)	MSE with specified aesthetic treatment	<ul style="list-style-type: none"> • No disturbance to historic Benjamin Elliott’s Coal Trestle • Minimize conflict with existing underground utilities • Panels allow for desired textures and patterns consistent with overall aesthetics
W&OD BL Sta. 61+50 (Abutment B)	MSE with specified aesthetic treatment	<ul style="list-style-type: none"> • Minimize conflict with existing underground utilities • Panels allow for desired textures and patterns consistent with overall aesthetics

Major Drainage Structures

No major drainage structures (such as culverts or culvert extensions) are anticipated for this structure except for the existing culvert carrying Four Mile Run near I-66 EB BL Sta. 217+00. However, the LANE Team does not anticipate modifications (for example extension) to this existing structure because the widening will be towards the inside of the roadway.

Critical to the success of the project are several key criteria (safety, operations, schedule, construction, public acceptance, and reduced maintenance). Summarized below is how the LANE Team’s approach meets or exceeds the requirements of the RFP for each of these criteria.

Design Concept Benefits

Safety: For the new W&OD bridge, the LANE Team’s concept will provide full height (8’-4” to 11’-3”) fencing over Lee Highway. The full height fencing will provide added fall safety for pedestrians and cyclists from the moving vehicle traffic below. The full height fencing will be outside the 20’ clearance envelope around the nearest overhead transmission line. The joints at the abutments will be covered providing smooth, continuous surface for the hikers and bikers on the Trail. In Bon Air Park, the LANE Team’s unique design approach eliminates conflict points with pedestrian traffic which significantly improves safety. For example, by eliminating the outside widening and associated retaining wall construction, impacts to Custis Trail through Bon Air Park are limited to areas below the bridge. This will also minimize overall impacts to I-66 EB traffic through the Bon Air Park area of the project. Furthermore, the LANE Team’s design provides the required sight distances for the permanent condition as well as all temporary construction phases. Similar to the Bon Air Park bridge, our team will implement fall protection features at the Sycamore Street Bridge (B678) to provide complete protection for pedestrian traffic. The details of our approach can be found in **Section 4.5.1 Sequence of Construction**. Finally, our shoulder strengthening approach allows us to shift traffic and perform large portions of work safely behind Temporary Barrier Service.

Operations: Implementation of the LANE Team’s design concept will undoubtedly have an impact on operations through the corridor. However, we have taken extra measures to ensure that service is uninterrupted or that the interruption is managed through off peak hours where operations can accommodate the impact. Furthermore, the safety measures identified above also provide the benefit of ensuring that operations are facilitated.

Schedule: Many features of our design approach were chosen to improve schedule. Paramount of these was our choice to use the existing substructures at widened abutments. These locations included the bridges carrying I-66 Eastbound over Williamsburg Blvd., Westmoreland Street, Sycamore Street and Bon Air Park. Another example is our concept to eliminate roadway widening through Bon Air Park which avoids time consuming retaining wall work and restrictions on construction within the park facility.

Construction: Based on the LANE Team design concept, construction of the project is significantly simplified and maintains capacity along the corridor except for certain night time operations. The goal of our design is to eliminate disruption of traffic due to construction activities. Although elimination cannot be attained, our design comes as close as can be reasonably achieved.

Public Acceptance: The biggest element of public acceptance is the W&OD Trail Bridge over Lee Highway. The new pedestrian bridge will utilize the major characteristics of the bridge that have been vetted through the public meetings conducted by VDOT. For example, the LANE Team's concept implements the V-piers with opening ("Option 1"), V-post fencing on the bridge, and multi-girder superstructure with concrete deck. In addition, the LANE Team furthered VDOT's concept by providing vertical underclearance of 17'-0" at critical points not previously considered (such as the underclearance to Fairfax Drive access entrance). To accomplish this, the LANE Team redesigned the bridge profile while maintaining the required clearances to the Dominion Energy overhead power transmission lines. Elsewhere, the reduced impacts on Bon Air Park provide added commitment by our Team and the Department to minimize impacts on critical features important to the public.

Materials, Methods and Functionality Used to Reduce Future Inspection and Maintenance: For the widening portion of the project, the existing bridges' pier joints will be eliminated using continuous deck retrofits. Additionally, there will be no deck joints over the piers. Elimination of joints will improve future maintenance by limiting exposure of the girders, bearings, and substructures to corrosive roadway runoffs.

For I-66 EB over Bon Air Park bridge, the abutment joints will be eliminated by using the VDOT deck extension detail. Additionally, the new girder will be weathering steel which has superior corrosion resistance compared to traditional steel, further minimizing future maintenance. Finally, the replacement deck will **not** require any permanent precast elements (typical in accelerated bridge construction) which tend to cause future maintenance problems. With innovative construction sequencing, the new deck will be all cast-in-place which enhances service life and will minimize future maintenance.

4.4 | PROJECT APPROACH

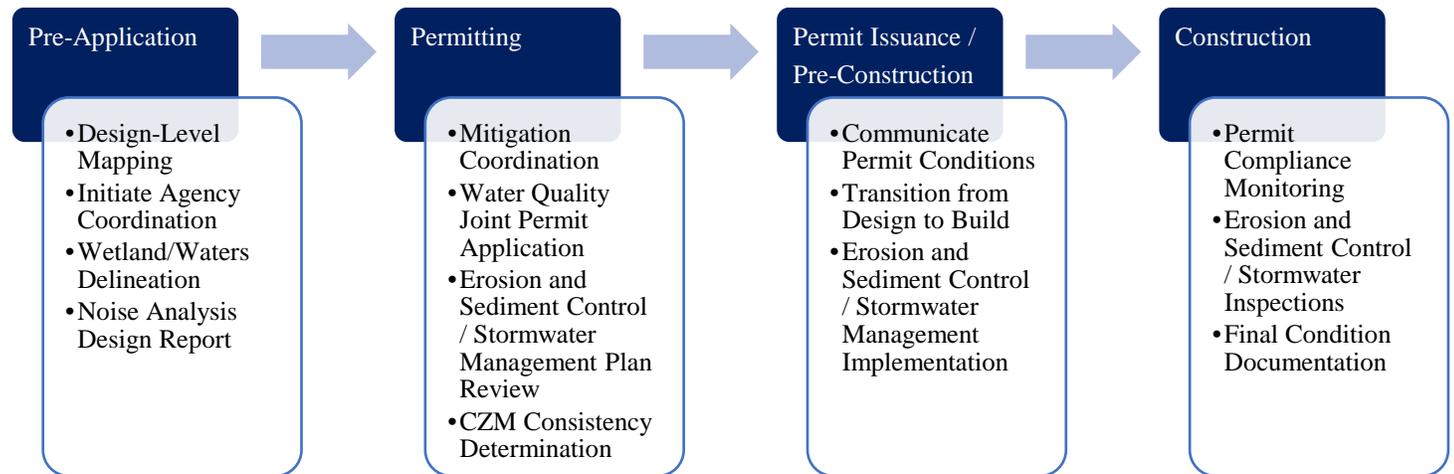
4.4.1 Environmental Management

Our Team’s approach to environmental management began with the issuance of the RFP, integrated all critical design disciplines, and will continue throughout the life of the Project. The LANE Team is committed to the successful completion of this Project in a manner that minimizes impacts to natural resources and adheres to the project schedule while complying with applicable federal, state, and local laws and regulations, VDOT specifications and special provisions, and the Project environmental goals and commitments. Our Team utilizes a cohesive approach, employing the Team’s same environmental staff during design and construction, which allows us to consistently and cohesively coordinate environmental needs and requirements throughout the Project. We are well versed in the environmental issues and requirements that accompany D-B projects and are strategically implementing our plan so that the Project is completed on-time and within budget.

LANE Team Benefits

- Vast experience with VDOT D-B projects
- Consistent and cohesive staffing from project start to finish
- Early and continuous coordination with regulatory agencies

Our Team’s approach to environmental management establishes realistic objectives and targets to meet environmental compliance and reduces risks to the Project especially related to 4(f) impacts. Environmental risk management requires a substantial investment of resources to coordinate commitments across the project team. A team that engaged during this pursuit and will remain involved through closeout of the project. An integral part of these realistic objectives and targets is understanding that they will need to be flexible there are inevitable changes during design and often construction. As a result, these changes may alter how the environmental commitments must be implemented. Our Team is experienced at expediting these modifications and delivering multi-projects under D-B contracts with strict timelines. Our methodology ensures coordination and compliance throughout the entire project. We have used this approach on each of our D-B projects, and it has enabled us to complete every Project without delay due to environmental commitment compliance.



Approach to Environmental Risk Management During Design to Avoid/Minimize Project Impacts to Environmental Resources

Environmental studies and surveys will be completed to identify the exact locations of environmental resources and information on critical areas, sensitive properties, protected species, wetlands and streams. These surveys will be presented on design-level mapping. Design level-mapping will be shared with the entire Team, including design, utility, and construction staff. Having this information at the outset of preliminary design activities ensures that avoidance and minimization efforts can be investigated early in the design process, as opposed to after significant design details have been developed. Additionally, early coordination with US Army Corps of Engineers (USACE), Virginia Department of Environmental Quality (DEQ), and US Fish and Wildlife Service

(USFWS), as may be required, will be initiated to identify potential environmental issues early in the design process. Early coordination regarding Northern Long-eared bat impacts will be critical to maintain schedule.

Although the LANE Team design does not impact wetlands or Waters of the United States (WOUS), our team will continue to track these element as any impacts will require a USACE jurisdictional determination to support the acquisition of water quality permits. If needed, a wetland and WOUS delineation will be done as soon as possible to obtain the necessary information to prepare a joint permit application (JPA). When necessary, the wetland and WOUS delineation will be performed using the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (2010) and *Unified Stream Methodology* (2007), as well as the Fairfax County Stormwater Planning Division *Perennial Streams Field Identification Protocol* (2003). A USACE Jurisdiction Confirmation and Fairfax and Arlington Counties Resources Protection Area Determination Letter will be requested immediately following the delineation should advancement of our design impact wetlands or WOUS.

**The LANE Team's
design avoids impacts to
wetlands and Waters of
the United States.**

The Team's environmental permit preparers will work with the design engineers throughout the process to ensure that permit application documents detail all impacts to wetlands and WOUS, thus minimizing the potential for future permit modifications. During preliminary design, our environmental team will work with the engineers to identify the environmental constraints and assist the designers to avoid impacting these areas. Critical to this project will be avoidance or minimization of 4(f) properties such as Bon Air Park and the Benjamin Elliott's Coal Trestle. This details of this information will allow the team to develop the construction access and temporary work areas along with utility relocations to avoid or minimize impacts to these sensitive areas. Once design has progressed to a detailed level (approximately 60%), our environmental staff will prepare the necessary permit plates, exhibits, and documentation for submission to the permitting agencies. We will then immediately apply for the appropriate permits. If impacts are identified, the water quality permit acquisition process will take approximately six (6) to nine (9) months to complete.

Should impacts be identified based on design changes, our Team will work closely with the regulatory agencies to minimize the impacts to those jurisdictional areas and prepare restoration approaches for temporary impact areas. We have found that early and consistent coordination with the agencies has facilitated and expedited the permitting process. We anticipate the standard wetlands compensation ratios of 2:1 for forested, 1.5:1 for scrub-shrub, and 1:1 for emergent associated with permanent wetland impacts. A 1:1 ratio will be utilized for wetlands habitat within the interchange. If stream impacts are identified at a later date, our Team will complete the Unified Stream Methodology (USM) to determine compensation requirements for the Project's permanent stream impacts. If necessary, mitigation needs will be met through the purchase of mitigation bank credits. Several mitigation banks are located within the watershed and currently have competitively priced mitigation credits available for both wetland and stream impacts.

Our Team understands the environmental sensitivity for water quality on this Project. All work will be in accordance with VDOT requirements, as well as the Virginia Erosion and Sediment Control (ESC) Handbook and Regulations. As part of the project QC plan, these ESC designs will be reviewed by a DEQ Certified Plan Reviewer on our Team, as well as the construction staff. We have found this review minimizes last-minute modifications and maximizes environmental protection measures to the receiving waters.

Once the specific project environmental clearances are obtained, our team will record them in the Environmental Compliance Matrix (ECM). The ECM will be coordinated with VDOT to complete the necessary EQ103, EQ200, and EQ201 forms.

Approach to Environmental Risk Management During Construction to Avoid/Minimize Project Impacts to Environmental Resources

Our approach to fulfilling environmental commitments during construction is to ensure they are communicated effectively to the construction staff. We are experienced at providing environmental engineering design solutions for construction implementation, negotiating with regulatory agencies to solve difficult environmental

issues, and identifying efficiencies to minimize project delays. We encourage workable solutions to keep projects on schedule and in compliance with environmental commitments.

Once all permits are obtained and plans are released for construction, our environmental staff will transition to the monitoring and compliance assistance phase. Our team will avoid and minimize impacts to environmental resources during construction by evaluating locations of soil borrow/disposal areas, staging locations, and use of temporary/permanent easements. Monitoring and inspection will occur during construction of the Project for compliance with the water quality permit conditions, erosion and sediment control plans, stormwater

The LANE Team has proven success in providing effective environmental compliance and monitoring on D-B projects.

management plans, and current VDOT standards. Our environmental staff will continue working with the team for permit monitoring. The same environmental staff who secured the environmental clearances will perform the monthly site visits to ensure areas of avoidance are protected and that the site is either temporarily or permanently stabilized as required by the permit conditions. Proper erosion and sediment controls will be installed in accordance with approved plans. Dedicated erosion and sediment control staff will inspect the site on a regular basis pursuant to DEQ standards. Inspections will also be conducted after each major storm event as defined

by current VDOT standards and any damaged or deteriorated measures will be repaired or reinstalled prior to resuming work within that drainage area. At the completion of construction, environmental staff will perform a site visit to document the final conditions. Final project compliance documentation will then be sent to the agencies. We have successfully used this approach on other D-B projects (i.e. I-95 Express Lanes), none of which have experienced a significant environmental non-compliance issue.

Approach and Potential Solutions for Addressing Recognized Environmental Conditions/Areas of Concern within the Project Footprint

The LANE Team completed a project environmental constraints analysis using the environmental commitments, natural, cultural, historic, biological, recreational, conservation and geological resources within the project corridors. Our analysis identified aspects of design and construction that could have an environmental impact and assessed the potential impact of that activity on the environmental resource. Upon award, our Team will evaluate noise effects on adjacent properties utilizing the Preliminary Noise Study, disclose impacts to cultural resources, coordinate potential impacts to T&E species, secure water quality permits, and obtain a Coastal Zone Management (CZM) consistency determination. These milestones are critical to completing the environmental certifications for this Project prior to construction. To minimize the effects on the project schedule, we will initiate these efforts upon Notice to Proceed (NTP). We are staged to begin the Noise Analysis Design Report (NADR), which involves ambient noise and the TNM modeling and abatement analysis and design at NTP. This will allow a decision on the noise abatement requirements for the project during the early stages. Concurrently, our team will finalize any wetland delineations and WOUS assessments to obtain the USACE Jurisdictional Determination to provide the best opportunities to consider further avoidance and minimization actions that will support the submittal of the coastal zone management documentation and the permit applications at approximately 60% design. As part of the wetland delineation, our Team will also review all available Threatened and Endangered (T&E) species information to evaluate potential impacts and begin coordination as early as possible. Identified cultural resources within the project area will be avoided where practical to mitigate potential impacts. In particular, our team will implement Vibration Control around Benjamin Elliot's Coal Trestle, a 4(f) issue of significance. We feel our approach to these identified constraints will minimize any affects to the project schedule.

Right after issuance of the RFP, our Team identified a few key environmental commitments and required project authorizations necessary to complete the Department's EQ103, EQ200, and EQ 201 (Table 4.4.1-1).

Table 4.4.1-1 – Environmental Commitments

Environmental Commitments	
NEPA	<ul style="list-style-type: none"> • Applicable environmental studies if project footprint is changed.
Cultural Resources	<ul style="list-style-type: none"> • Coordinate with VDHR on Benjamin Elliot’s Coal Trestle and avoid impacts • Vibration Control • Post interpretive sign for the W&OD Trail Pedestrian Bridge
Water Quality Permits	<ul style="list-style-type: none"> • Prepare and submit Joint Permit Application
Hazardous Materials	<ul style="list-style-type: none"> • Perform Phase I ESA if additional property is to be acquired
Threatened and Endangered Species	<ul style="list-style-type: none"> • Coordinate with USFWS and VDGIF for impacts to wood turtle and Northern long-eared bat
Air	<ul style="list-style-type: none"> • Adhere to Special Provision 107E for Volatile Organic Compound Emissions Control Areas
Noise	<ul style="list-style-type: none"> • Final Noise Abatement Design Report
Erosion and Sediment Control & Stormwater Management	<ul style="list-style-type: none"> • Erosion and Sediment Control Plan Review and implementation • Stormwater Pollution Prevention Plan Review and implementation
CZM Consistency Determination	<ul style="list-style-type: none"> • Adherence to Virginia Coastal Zone Management Program

Our Team is particularly focused on limiting affects on 4(f) sites within the project area. We understand the benefit and citizen support for publicly owned parks and recreation areas and we strive to avoid and minimize construction impacts to these areas. An example of this commitment to minimize impacts to 4(f) sites is our proposed redesign near Bon Air Park. This reduction in impact will be accomplished by eliminating outside widening along I-66 through the park and limiting construction within the park to the beneficial features of the trail realignment.

Another example of our commitment to protecting and reducing impacts to 4(f) sites is the avoidance of the Benjamin Elliott’s Coal Trestle adjacent to our W&OD Trail bridge. The design of Abutment A and the integral MSE walls were optimized to ensure avoidance.

The LANE Team design reduces impacts to Bon Air Park from 1.3 acres in the RFP design to 0.9 acres.

As design progresses after NTP, we will continually look for economical opportunities to reduce impacts to 4(f) sites affected by this project which provide a public benefit but also maintains constructability.

Integration of Environmental Management into the Project Schedule to Minimize Delays

Our Team has established a detailed, efficient plan for the environmental clearances that supports and ensures that on-time delivery is achieved, even if unanticipated impacts are identified at a later date. When establishing our project schedule, it was key to determine critical milestones in the plan development to meet the informational requirements for the required environmental clearances. Once these milestones were identified, we used them to support the project design and construction schedule.

During the detailed design development (after NTP), our team’s environmental group will continue to work closely with the design group to ensure there is sufficient detail for items like grading, drainage, and temporary construction to identify potential impacts. Additionally, we will begin agency coordination to introduce the Project and discuss potential impacts prior to submitting a JPA, should one be required. This early and frequent coordination amongst agencies expedites the permitting process. Our Team will also perform constructability reviews during design development considering logistical, economic and environmental constraints to confirm that environmental commitments are reflected in the project plans prior to construction activities. We will continually identify project risk reduction opportunities by determining the variables and effects of NEPA documentation, noise clearances, permit acquisition, environmental certifications, permit required monitoring, the phases of erosion and sediment controls, stormwater management implementation, and project construction activities. After the permits are secured, we will transition into the construction phase and facilitate permit compliance until project completion.

4.4.2 Structures

The existing W&OD trail, in the vicinity of the intersection of Route 29 with Fairfax Drive in Arlington, Virginia, is an at-grade asphalt paved trail extensively utilized by pedestrians and bicyclists. The trail crosses Route 29 at the signalized intersection of Lee Highway and Fairfax Drive. Bicyclists and pedestrians must wait for the signal in order to cross the road and continue on the trail. The large amount of pedestrian traffic coupled with the heavy volume of vehicular traffic results in difficult operation and unsafe pedestrian conditions.

In order to facilitate improved operational movements and increase safety, a grade separated overpass of the W&OD Trail was envisioned by VDOT to alleviate pedestrian and traffic conflicts at the intersection of Washington Boulevard/Lee highway (Route 29) and Fairfax Drive. The new structure will provide safe access across the roadway for bicycle and pedestrian users of the W&OD Trail. The bridge will be a highly visible structure being located across a major arterial road in an area with a large volume of pedestrian and bicycle traffic. The proposed trail bridge is located just west of East Falls Church Metro Station and close to the border between Arlington County and the City of Falls Church. For these and other reasons, aesthetics are an important consideration for the bridge.

The proposed bridge is located in close proximity to the historically significant Benjamin Elliott's Coal Trestle, hotel property, and a residential apartment building, among other structures. The LANE Team's proposed bridge avoids impacts on the historic Benjamin Elliott's Coal Trestle both in design and construction. Further, the design meets the clearance requirements for Lee Highway, the overhead Dominion Energy transmission lines, and Fairfax Drive access.

LANE Team Benefits

- Open pier design as preferred from Public Involvement Presentation
- Utility duct under Piers 4 and 5 will not have to be relocated reducing construction schedule
- Longer main span allowing for unimpeded future widening of Lee Highway
- All substructure elements founded on driven piles eliminating different types of foundation equipment
- Virginia Alternate Abutment used keeping water away from ends of beams, bearings and substructure
- Same girder depth and number of girder lines used in all spans to maintain smooth line of sight (aesthetics)
- Substructure elements designed to Exposure Class 2 to reduce effects due to cracking which would impact appearance and future repairs

Approach to the Design and Construction of the W&OD Trail Pedestrian Bridge

The W&OD pedestrian bridge over Route 29 (Lee Highway) will be a 623'-0", 7-span structure supported on cast-in-place concrete V-shaped piers and standard abutments. The longest span will be cross over Route 29 at 153'-0" in length with the other spans ranging between 90'-0" and 97'-6". A minimum vertical clearance of 17'-0" over Route 29 and Fairfax Drive access will be maintained.

Given that Lee Highway is a critical and very busy corridor in the region, LANE Team is maintaining the 153' main span to allow for more opening width between Piers 3 and 4 to provide VDOT with more options for future widening of Route 29. In addition, no pier protection will be necessary further enhancing overall aesthetics of the bridge and the park below.

Design: The proposed structure will consist of a concrete deck supported by steel plate girders. We envision using a lightweight concrete deck to reduce dead load. The bridge will be multi-span with the superstructure being continuous over the piers. The substructure is proposed to be cast-in-place concrete supported on piles. The abutments will be Virginia Alternate Abutments. The abutment breastwalls and wing walls will entail reinforced earth techniques.

The bridge design is based on current AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, 2nd Edition with 2015 Interim Revisions, AASHTO LRFD Bridge Design Specifications, 7th Edition and VDOT modifications. The following design criteria and constraints will determine how the bridge is developed and constructed:

Agency	Constraint
Virginia Department of Transportation	<ul style="list-style-type: none"> Preferred 17'-6" feet vertical clearance over Route 29 (Lee Highway) – 17'-0" minimum
Northern Virginia Regional Park Authority	<ul style="list-style-type: none"> Minimum 20'-0" wide bridge clearance Minimum 12'-0" vertical clearance above bridge deck
Arlington County	<ul style="list-style-type: none"> Minimum 20'-0" wide horizontal clearance from edge of curb on Fairfax Drive to bridge for emergency (fire truck) access to Crescent Falls Church Apartments with no vertical obstruction
Dominion Energy	<ul style="list-style-type: none"> Minimum 25'-6" vertical clearance from deck Minimum 22'-6" vertical clearance to structure of bridge Minimum 20'-0" vertical clearance from fence or railing Minimum 17'-6" horizontal clearance to closest part of bridge from a wind displaced conductor Any excavation/soil disturbance within 25'-0" of a transmission foundation will need to be reviewed by Dominion Energy's Engineering Department
Miscellaneous	<ul style="list-style-type: none"> The superstructure is limited to a maximum depth of 3'-6" from top of deck to bottom of flange in order to provide a minimum vertical clearance of 17'-0" over Route 29 and to meet the minimum clearances required to top of deck required by Dominion Energy Maximum grade 4%; 3% preferred (on approaches and on structure) A minimum design speed of 18 mph. Vertical clearance beneath bridge: preferred: 10', minimum: 6' 6". Concrete V-piers shall be constructed as shown in Addendum 2. Based on input received during the public information meetings, it was determined that open V-piers are preferred. Open V-piers are required unless final structural design indicates that solid V-piers are the only feasible option, in which case a board form architectural treatment shall be provided in the location shown in the renderings for each solid V- pier, and on both sides of the pier. V-shaped posts (similar to the preliminary plans and renderings provided in the RFP Information Package with Addendum 2) shall be used for the fence and railings. Approval of the fence shall be made by the VDOT Project Manager. Fence openings shall not exceed 1" (vertical) x 3" (horizontal). 8. Chain link fence is prohibited. All concrete and steel elements shall be grey colored. Approval of the color shall be made by the VDOT Project Manager. Fracture critical structures and structural members are prohibited. All girders shall be supported via bearings. Joints at the piers and abutments are prohibited. VDOT's jointless criteria for bridges shall apply. Use of a truss structure is prohibited. Use of Fiber-reinforced polymer (FRP) deck is prohibited. Use of post-tensioning is prohibited. Hammerhead piers are prohibited. The design shall not preclude any options for future improvement as depicted in the East Falls Church Area Plan: https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2014/03/E-Falls-Church1.pdf

Covered tooth joints will be provided at the abutments per the VDOT standard for the Virginia Alternate Abutments. The bridge has also been placed in a vertical curve to obtain the required under clearances for Route 29 and a portion of Fairfax Drive where it connects to Lee Highway. The original vertical profile set in the preliminary plans from VDOT has been adjusted vertically in order to obtain the required minimum vertical clearance of 17'-0" as set forth in the RFP and to accommodate a deeper structure depth than that envisioned by VDOT.

At Piers 4 and 5, there is an existing utility duct bank that runs through the proposed location of the piers. The presence of this duct bank and layout of the bridge requires either the relocation of the utility or for the foundation/footing cap of the pier to span the duct. Based on the plans presented at the Public Involvement Meetings, the top of the footings for the piers is to be located 2'-0" below ground level. As the utility duct is located only 3'-0" below ground level, the footing cap will need to be placed at ground level in order to provide enough thickness in the footing cap section to resist the loading applied by the pier. The LANE Team discussed this strategy with Dominion Energy is open to this solution with a monitoring and protection of their duct bank during pile installation.

A preliminary design was performed to size the superstructure and substructure elements. The superstructure was designed using a 3-D line girder analysis program which takes into account the horizontal geometry of the structure. The worst case between a loading of either an H-10 truck or 90 PSF pedestrian load per the AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, 2nd Edition with 2015 Interim Revisions along with all other loads and load factors specified was used in the design of the structure.

Superstructure – The deck is designed to have a 6” minimum thickness at the edges sloping up to 6 ¼” at the centerline of the structure. With this layout, the deck will have a flat bottom rather than following the cross-slope and will allow the girders to all be placed at the same elevation at a pier or abutment. Looking from below, the bottom flanges will all be at the same elevation rather than a typical bridge which has a constant deck thickness and girders create a ‘V-shape’ when viewed transversely. The use of the deck with a thicker cross-section in the middle also adds weight to the superstructure which aids in the design of the girders by adding additional weight to help balance out the forces created due the continuous girders. To ensure that the added weight is appropriately managed, the deck will use light-weight concrete having a unit weight of 120 PCF.

Due to the geometry of the structure with several reverse curves, steel plate girders will be used for all spans in the pedestrian bridge including tangent sections to maintain the aesthetic appearance throughout. Five (5) lines of girders spaced at 4’-9” with an overhang of 1-6” are proposed. The steel plate girders will all have a web depth of 30” and a maximum flange width of 20”. The flange thickness will vary based on location. Steel used in the plate girders will be 50 ksi steel and will be painted light grey color chosen by VDOT. As noted above, the girders will be placed at the bottom of the flat deck and will have a constant elevation across the cross-section. The superstructure is designed per the AASHTO Guide Specifications for the Design of Pedestrian Bridges. The AASHTO LRFD Bridge Design Specifications have also been considered, as applicable to a pedestrian bridge. Due to the superstructure depth constraint of 3’-6”, the proposed pedestrian bridge will not comply with *Section 2.5.2.6.3 – Optional Criteria for Span-to-Depth Ratios*; however, this is anticipated to be permissible as the pedestrian bridge should not experience vehicular traffic. Furthermore, the serviceability criteria of L/360 per the AASHTO Guide Specifications for the Design of Pedestrian Bridges is met with the calculated deflection less than required by code.

Substructure – The abutments, due to the geometry of the bridge, will be Virginia Alternate Abutments on driven piles. The joint at the abutment will be a covered tooth joint specified in the VDOT standard details for this type of abutment but will require design for movement in both the longitudinal and transverse directions due to the geometry of the bridge. However, this type of abutment will still function as a jointless bridge as the water drains into an integral concrete trough under the joint and on the back side of the abutment. This arrangement keeps water away from the ends of the girders, bearings, and other substructure elements.

Bearings for the bridge will be disc bearings. Disc bearings will accommodate the longitudinal and transverse movements of the bridge related to the geometry of bridge.

Piers for the bridge will be an open ‘V’ (delta) design with the depth set at Pier 4 which will be 15’-0” from the top of the cap to the top of the footing and have a width of 3’-9”. This use of the open pier design matches the desired option for the piers as shown in the Public Involvement Presentation. All other piers will either have a column section at the bottom of the ‘V-section’ to accommodate a taller pier or the legs of the delta section will be shorter and frame into the foundation for the shorter piers. The piers will be designed for LRFD Exposure Class 2 which will limit the amount of cracking which could affect the appearance of the concrete and will reduce the amount of maintenance required in the future due to excessive cracking.

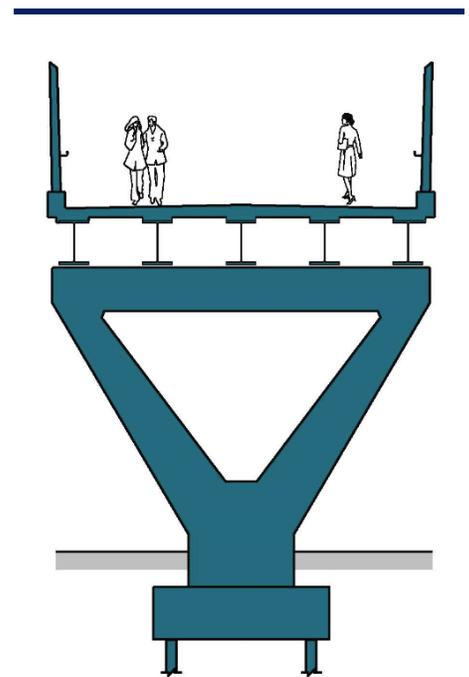


Figure 4.4.2-1. Typical bridge section (W&OD Trail)

Piers 1, 2 and 3 will all have a footing cap that will be placed 2'-0" below the finished ground line having dimensions of 3'-0" thick, 10'-0" wide, and 12'-6" long. Pier 1 will have a total height to the top of the footing cap of 14'-6" keeping the footing cap 2'-0" below grade. A 15'-0" tall pier, similar to all others besides Pier 5, can be used if the distance to the top of the footing cap is increased to 2'-6". Piers 2 and 3 will use the full pier height of 15'-0" supported on a column to the top of the footing cap.

Pier 4 will require a footing cap to be placed at ground level under the pier to avoid impacting an existing utility duct running under the centerline of the pier. No column is required here as this is the pier from which the depth of the open 'V' (delta) design is set. Pier 4 will have 4 piles located on each side of the duct bank which is located under the center of the pier and have a minimum clearance from the piles to the duct bank of 1'-0". In order to minimize potential vibration impacts to the duct, a portion of the piles may be drilled.

The details of the design described in this section can be seen on the bridge plan sheets for B680 contained in Volume II of this proposal.

At Pier 5, the footing cap will also be required to span the duct bank, but here the duct is offset south from the centerline of the pier to the centerline of the duct approximately 4'-6". Due to the location of the ground line in relation to the 'V-columns', the location of the duct bank and the required development length of the additional reinforcing required to span the duct bank, the footing cap will have a length of 21'-6". The footing cap here will have 6 piles to the north of the duct and 4 piles to the south, again with a minimum clearance from the piles to the duct of 1'-0".

The footing cap for both Pier 4 and 5 will be 2'-6" thick leaving 6" of clearance between the top of duct bank and the bottom of the slab. The width of the footing cap will be 9'-0". At both Pier 4 and 5, in order for the cap to span the duct, the section will require reinforcing of at least No. 14 bars and 6.0 ksi concrete.

PIER DETAILS					
Pier	Pier Height	Length	Width	Depth	No. of Piles
1	14'-6"	12'-6"	10'-0"	3'-0"	6
2	16'-6"	12'-6"	10'-0"	3'-0"	6
3	17'-2"	12'-6"	10'-0"	3'-0"	6
4	15'-0"	16'-0"	9'-0"	2'-6"	8
5	8'-8"	21'-6"	9'-0"	2'-6"	10

The abutments and piers will be supported by HP 12x53 driven piles which are designed as end-bearing piles. The piles at the location of the W&OD pedestrian bridge will be driven to an approximate elevation of 240'.

Architectural Treatments – The aesthetic elements of the proposed pedestrian bridge over Route 29 have been developed by VDOT and presented to the public on numerous occasions. Citizen work groups established a range of architectural features for the bridge to include:

Abutment aesthetics	A board form architectural treatment shall be provided to the concrete abutments unless an MSE wall is provided along the front and sides of the abutment which will have and architectural treatment.
Pier shape and aesthetics	All concrete and steel elements shall be grey colored. Approval of the color shall be made by the VDOT Project Manager.
Bridge color	All concrete and steel elements shall be grey colored. Approval of the color shall be made by the VDOT Project Manager.
Fence/railing	V-shaped posts (similar to the preliminary plans and renderings provided in the RFP information Package with Addendum 2) shall be used for the fence and railings. Approval of the fence shall be made by the VDOT Project Manager. Fence openings shall not exceed 1" (vertical) x 3" (horizontal) and chain link fence is prohibited.
Lighting	Light poles are prohibited on the bridge. Lighting for the bridge will be located in the 'V' posts for the fencing. The galvanized conduit for the lighting can be run within a hollow structural tubing section or can be placed on the back side of the proposed sidewalk railing. If mounted externally, it will need to be mounted with bolts, preferably a pan head bolt on the pedestrian side of the railing, with a pull box mounted between light locations.

Construction: Construction of the W&OD Trail Bridge is disassociated from the critical path of rest of the I-66 Eastbound widening project. The bridge can be constructed according to a separate schedule and may be set for a time period within the overall project construction duration.

The only roadway directly affected by the construction of the pedestrian bridge is Route 29 (Lee Highway) which is crossed by the main bridge spans. Impact to the road can be minimized by constructing the foundations and substructure on either side of the road while the road remains in operation, and then installing the plate girder superstructure over the road during a brief total shut down of the road – performed in accordance with VDOT standards and specifications.

Other than the main span, the rest of the bridge construction will have minimal to no impact on vehicular traffic. The LANE Team will coordinate with the local emergency responders to provide required and access to Fairfax Drive during construction.

Pedestrian and bicycle users will be temporarily re-routed around the construction site during bridge construction.

Several utilities have been identified at the location of the proposed bridge, both overhead and underground. The high-tension overhead power lines will remain in place during construction and will limit available crane location and set up for the superstructure erection. The underground utilities will need to be located by test pitting but preliminary design indicates that they can be protected in place. At Piers 4 and 5 there are underground utility duct banks that will run underneath the new piers. With these two piers, pile will be placed on either side of the duct bank. A 2'-6" thick cap placed with top at ground level with reinforcing consisting of at least No. 14 bars and 6.0 ksi concrete will be required for the cap to span the duct bank.

Approach to the Design and Construction of the Noise Barrier

The RFP identifies a noise barrier between Fairfax Drive and the W&OD Trail, east of Lee Highway. The feasibility and rationale of the wall will be further evaluated when the Final NADR is developed.

Design: Assuming the wall is found to be both reasonable and feasible, there is minimal room between the existing curb of Fairfax Drive and the proposed trail bridge. A minimum lateral offset from the curb to the wall will be maintained and barrier will be provided as needed to ensure clearzone protection. Furthermore, the wall will be designed with gaps in accordance with VDOT standards. Gaps are usually provided for maintenance considerations. In this case, the wall will gap for the future trail spur that parallels Fairfax Drive.

Construction: Construction of the wall will require close coordination with Dominion Energy. To address concerns regarding constructing under the transmission line, our Team discussed with Dominion Energy the option of a 5-day power outage which they were agreeable to but subject to situational needs. As a contingency plan, our Team has also evaluated the potential for tilt-up construction of the noise barrier.

Approach to the Design and Construction of the Retaining Wall Work

At the W&OD pedestrian bridge, there will be retaining walls along the approaches and in front of the abutments. The retaining walls will be MSE type that will extend from the abutment to finished ground.

Design: Design of the MSE Walls on approach to the bridge will be accomplished by confirming global and external stability of the wall and considering the potential impact to the adjacent historic trestle located along the southern edge of the western approach with respect to settlement and lateral surcharging. Based on the subsurface conditions depicted in borings RW-4 (west abutment) and RW-5 (east abutment), the expected impacts are considered manageable by careful construction sequencing and analysis of settlement and lateral surcharge pressures induced by the approach fill away from the face of the MSE wall. If the calculated settlements are found to exceed the “no damage” threshold, they can be mitigated at the location of the trestle through the use of zoned MSE wall reinforced backfill consisting of lighter weight (VDOT No. 57 stone or other open graded aggregate) or lightweight aggregate (expanded shale). By using lower weight backfills, the predicted settlements can be reduced by up to approximately 50% if needed to control the amount of settlement that may be induced as a result of the planned construction.

As part of the design, instrumentation will be provided to monitor the existing structure in order to confirm the analysis with respect to anticipated behavior. This will include monitoring of maximum particle velocity during pile foundation installation, as well as movements (lateral and vertical) by using settlement targets and potentially inclinometers during construction. Observed distresses exceeding the threshold values will result in planned contingency to alter the construction methods which may require pre-drilling of piles or extending the zone of light weight reinforced zone/embankment fill within the area of conflict in order to maintain the integrity of the trestle and other potentially impacted structures.

Additionally, the proposed retaining walls will be located 3'-0" in front of the abutments and under the outside of the approach roadway. The walls will be designed by the MSE wall supplier who shall design the straps using the AASHTO LRFD Bridge Design Specifications. The wall shall have a minimum of three layers to resist the required load. The unfactored load to be used in the design of the straps is: Horizontal Earth Pressure (EH) = 3.3 kips/ft.

Finally, the MSE walls shall have a 'board form' pattern as shown in the Public Involvement Presentation.

Construction: The locations of the MSE walls and abutments (A & B) for the W&OD bridge (B680) could present challenges and constraints during construction stage of the walls. As a result, we have identified the following constraints and mitigation to complete the construction work:

- The existing overhead 230 KV transmission line belong to Dominion Energy will be in close proximity of our construction envelope. During pursuit, the LANE Team discussed these issues with Dominion Energy to fully understand their outage requirements if certain critical activities require encroachment into their vertical and horizontal clearance envelopes. Dominion Energy indicated that springtime and/or fall would be the ideal time of the year for such outage requests to be granted. Also, Dominion Energy indicated that the outages can be scheduled for 5 consecutive days as a maximum duration to perform any/all required work. During construction, overhead power lines will be tagged and visibly identified to keep away booming equipment and workers to safe distance requirements. Survey of the transmission lines and towers will be performed prior to the start of any construction activity to maintain the required distance during excavation, installation of the MSE walls panels and backfill.
- Abutment A is the closest part of the structure to Benjamin Elliott's Coal Trestle historic feature. The LANE Team will complete a full survey of the site prior to any construction activities. Crack monitoring gauges will be installed at practical and accessible locations and will be monitored by LANE Team and data will be shared with the stake holders when requested. We are well aware of the significance of this historic site, and our operation (such as excavation and pile installation) will limit and/or control vibrations that are detrimental to the historic feature. We are anticipating a minimal amount of excavation in the vicinity of the trestle for the perpetration of the MSE wall installation.
- During the construction of the MSE walls and bridge construction, the LANE Team will be committed of keeping the Fairfax Drive emergency access and the shared use path open at all times. This will be coordinated and planned with NOVA Park.

Impacts of the W&OD Trail Pedestrian Bridge and Retaining Wall Work on the Traveling Public

As described previously, the only traffic or roadway that will be affected by the W&OD Trail Bridge construction is US 29 (Lee Highway) which runs beneath the pedestrian bridge and is spanned by the longest bridge segment. To minimize impacts to the travelling public, the substructure elements will be constructed while the Route 29 remains open and when these are complete, the plate girder superstructure will be installed with a shutdown of the roadway underneath.

A larger impact will be to the pedestrian traffic that currently use the existing sidewalks and at-grade crossings. During construction of the bridge (superstructure and substructure elements), the pedestrian traffic will be required to detour around the construction areas until construction is complete.

Construction of the retaining wall will not affect vehicular traffic on Route 29, but will require the same detour for pedestrian traffic as noted above for construction of the bridge. As the Benjamin Elliott’s Coal Trestle historic site is located along south side of the west approach construction means and methods will be required to avoid disturbance of this historic site during erection of the adjacent retaining wall.

Materials, Methods and Functionality Used to Reduce the Need for Future Inspection and Maintenance

The concrete elements, deck, piers, abutments and pile caps will all be designed to LRFD Exposure Class 2 which will limit the amount of cracking and will reduce the future maintenance requirements resulting from excessive cracking and delaminations.

Per FHWA and AASHTO standards, the bridge should be inspected at intervals not to exceed 24 months. However, FHWA Technical Advisory T 5140.21 will allow an increase in the interval contingent upon prior approval from the FHWA and criteria set forth in the Technical Advisory.

Consideration that the structure is a pedestrian bridge, that the superstructure uses five (5) lines of girders not considered fracture critical, and the piers are not fracture critical, a strong case can be made to increase the inspection interval.

There will be no deck joints over the piers. The joints at the abutments are allowed by the RFP and VDOT Structure and Bridge Manual. The deck runoff will be contained, isolated, and diverted away from the structures at the abutments. This feature will minimize future maintenance and extend the service life of the bridge.

The only material item that will aid in reduced maintenance costs of the structure based on the criteria set forth in Addendum 2 is the use of disc bearings instead of pot bearings. Disc bearings typically have less parts to replace when they fail. The other item associated with bridge that if different could reduce maintenance is the steel superstructure requirement to be painted. If the superstructure was manufactured of weathering steel, maintenance over the lifespan of the bridge would be less with the possible exception of the joints.

4.4.3 Quality Assurance/Quality Control (QA/QC)

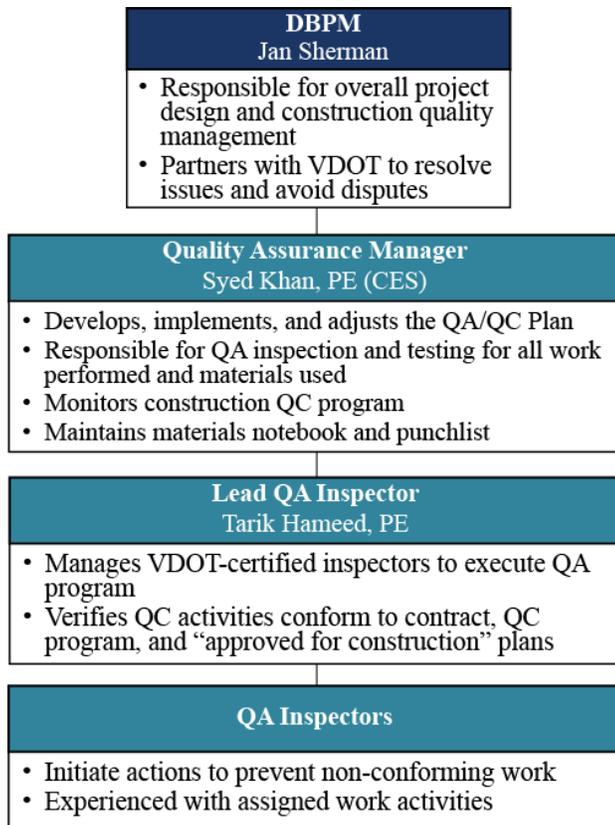
Design-Build is predicated on all of the design, construction, and oversight parties working together in a unified partnership. The QA/QC process is where this alliance is most apparent. The LANE Team comprised of design and construction staff, QC inspectors, and an independent QAM and QA unit, will work side-by-side with VDOT to ensure the project meets or exceeds the requirements established by the RFP. The QA/QC Plan which will be based on the VDOT’s Minimum Requirements for QA and QC on Design-Build and PPTA Projects, January 2012 and will be a “living” document that is updated as elements or situations arise that require specificity not previously included. The QA/QC Plan will not only include roles, responsibilities, authorities, and organizational structure; it will provide for mechanisms to address and report nonconforming (NCR) workmanship, materials, and/or equipment and auditing and recovery plans (AR) to control and repair deficient items.

LANE Team Benefits

- Proven and documented process on numerous DB projects.
- Clear and concise approach and chain of communication
- Minimizes the need for VDOT oversight

The LANE Team provides this sound approach that has been used by LANE to develop, execute, and update seven individual QA/QC plans for successful VDOT design-build projects. With each successful D-B Project, LANE’s quality, design, and construction teams have gained additional experience and lessons learned to improve the effectiveness of the next QA/QC Plan. The LANE Team will provide a well-structured, easily audited plan that minimizes the need to expand VDOT’s contract administration efforts.

Approach to the Overall QA/QC



Our Team’s approach to quality management is focused on continuous improvement and ensuring that all levels of the design and construction team obtain, understand, implement, monitor, and document quality procedures. The project QA/QC Plan will include:

- Clear provisions for identifying, notifying, and tracking potential non-conforming work, materials, or equipment and administering a quality assurance auditing and nonconformance recovery plan (AR)
- Clear stipulation that the QAM does not report to production forces, has the authority to stop work, and will communicate daily with the CM / lead inspector based on daily monitoring of the QC program
- A design QA/QC plan which specifies cross-disciplinary and constructability reviews
- A construction QC Plan which requires qualified, VDOT certified, QC inspectors and uses checklists to document inspections

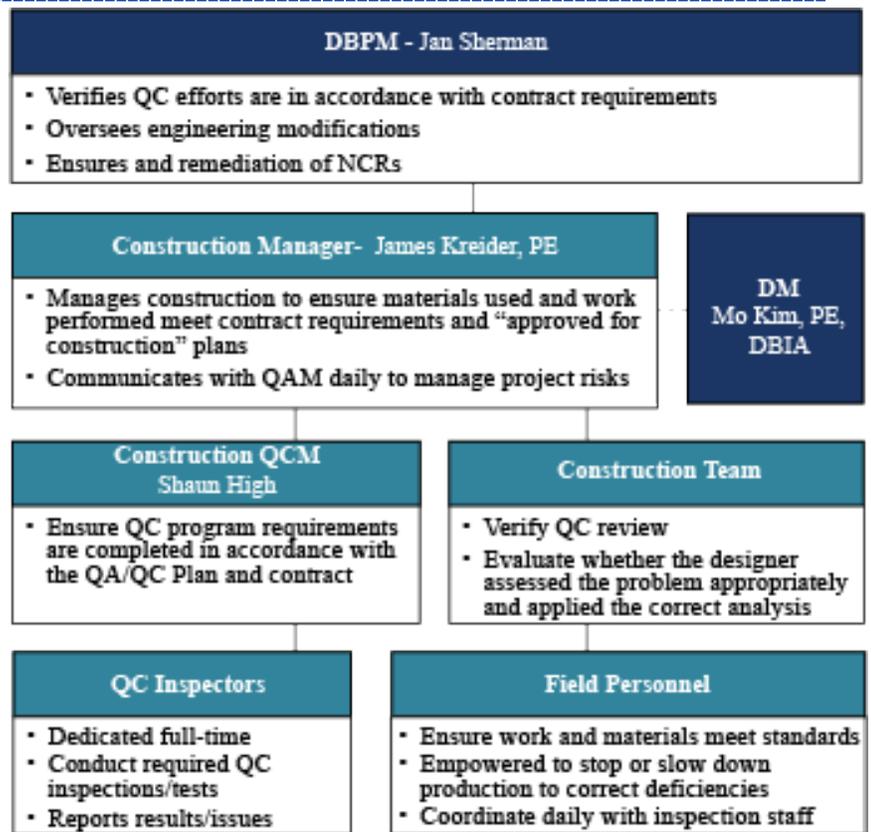
The LANE QA Team depicted above, overseen by the DBPM, and led by the QAM, will implement the Project’s QA/QC plan to verify contract requirements are met; work

and materials are performed in the manner for which they are intended; and records, materials notebook, and documentation are accurate and complete.

Approach to QA/QC During Design (Design Quality Management)

Our approach to design QA/QC is a team effort involving the Design Manager (DM), design leads, Construction Manager (CM), and the Design-Build Project Manager (DBPM). The Design QA/QC, overseen by the DBPM, will be led by the DM to provide quality designs and plans in accordance with VDOT’s QA/QC Guide and minimize VDOT’s administrative efforts by:

- Designing features that are safe and meet (or exceed) VDOT regulations and established criteria
- Conforming to the standards and reference documents in the RFP
- Designing elements that are constructible, durable, economical, and minimize future maintenance
- Meeting design schedule, budget, and construction staging requirements
- Providing an organized and indexed set of design calculations, criteria, and assumptions



To kick-off the design QA/QC process, the DM, lead discipline engineers, and Design QA Manager will establish the design criteria and checklists for each design element, then distribute to assigned staff engineers and sub-consultants. Design deliverables will be prepared under the lead discipline engineers and reviewed to ensure completeness and all necessary and appropriate construction requirements/details. The processes/procedures defined in the QA/QC Plan will be strictly enforced and thoroughly documented to minimize VDOT reviews. To ensure well-structured and easily audited documents, forms and certifications will be completed and electronically submitted with each design submittal to digitally track drawing review certifications, calculation review certifications, and release for deliverables.

Weekly design meetings, led by the DM, will include the Lead Engineers, CM, and other field engineers as needed. All plans will be reviewed by the CM and field engineers for constructability and means/methods.

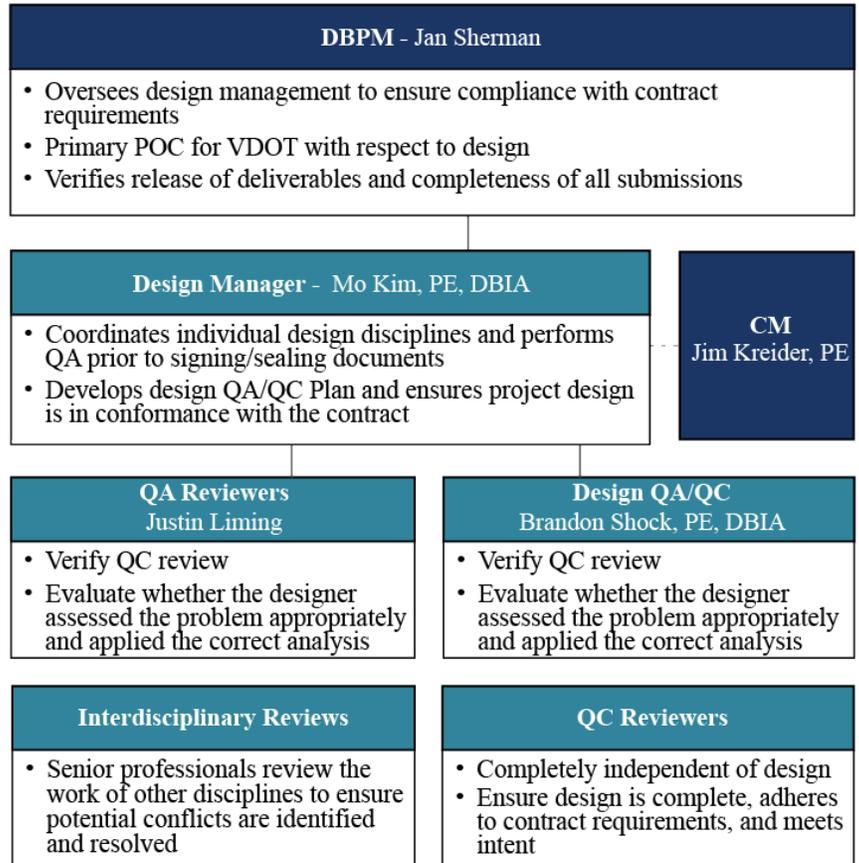
VDOT and key stakeholders will be invited to participate in over-the-shoulder reviews to streamline the review process by citing preferences and clarifications.

The QAM will certify that all QA/QC efforts are completed in accordance with the required procedures and the DM and DBPM will sign-off on their acceptance. For final submissions, deliverables will be signed and sealed by discipline leads prior to submitting to VDOT for acceptance.

Design changes during construction will be reviewed using the same process as the original design. Changes, such as field design changes and nonconformance evaluations, will be maintained in a database to track revisions and update the as-built documents.

Approach to QA/QC During Construction (Construction Quality Management)

Construction QA/QC is established in our Quality Management Plan (QMP) to provide clear and complete procedures for construction inspection, testing, and the oversight of the project and its processes. While VDOT will provide verification, our QMP will continue to reduce their involvement level by providing a streamlined process with readily available access to reports/documents, such as inspection forms and photos that we will quickly create, maintain, and submit thru the HCSS Heavy Job Project Management system. All team members, as well as the subcontractors and suppliers for the project, will be required to submit corresponding Quality Plans that are compliant with respect to our QMP. Any variance from the implemented standards will not be tolerated and as such, continuous audits will be performed to verify adherence and to deploy updates, betterments, and amendments as the Project progresses.



Construction Quality Control (QC) - LANE is responsible for the QC during construction where it begins at the working level with LANE’s QC inspectors. Management and leadership is provided by Shaun High in his role of Construction QC Manager and ultimately with Jan Sherman as the DBPM. All work will be in accordance with the QMP derived from LANE’s in-house construction QC Plan, the requirements of the RFP and VDOT’s Minimum Requirements for Quality Assurance and Quality Control on Design-Build and Public-Private

Transportation Act Projects. The QC Program will make continuous assessments of all activities and when necessary make adjustments to methods or materials to achieve or exceed the required quality levels. Continuous verification of the QC program by the RCE will allow engineering decisions to be implemented responsibly, efficiently, and effectively throughout construction. Our QC personnel for this project will possess and maintain current VDOT certifications. This proven and strong QC program is self-contained with respect to operations, management and documentation thus requiring minimal oversight by VDOT's resources.

Construction Quality Assurance (QA) - Led by Quality Assurance Manager (QAM), Syed Khan, PE, (CES), the Quality Assurance program operates independently from the construction QC program and has oversight/verification responsibilities for all QC testing and monitoring activities. The QAM provides confirmation that all RFP requirements, specifications and special provisions are being met or exceeded. The independent role of the QAM provides direct information to the DBPM and VDOT outside of the Construction QC chain of command. Additionally, the QA operation will monitor and audit QC procedures and activities to verify proper performance. A high level of authority is given the QAM to make certain that the Construction QA function does its job and as such minimizes the requirement of resources and involvement by VDOT. The QAM is authorized to stop any and all work on this project if quality measures and controls are not being properly maintained.

Staffing Plan

Our highly-experienced Team includes dedicated QA/QC members as well as integrated design, construction, and project management personnel to ensure that all requirements and commitments are met. The roles, responsibilities, and commitments of each of these members is defined below:

DBPM (Jan Sherman) – Jan oversees all aspects of the project with a focus on delivering a quality project to the Department. He enforces the approved QA/QC program and implements changes where processes or procedures need adjustment to ensure that the design is of a high quality and the construction follows suit.

QAM (Syed Khan, PE) – Syed is responsible for developing and maintaining the QA/QC Plan in accordance with VDOT requirements. He is also tasked with ensuring that all products, materials, and work implementation, to include testing/sampling, is performed in accordance with the QA/QC Plan and contract documents. Although Syed's focus will be on recommending immediate remedial actions if a violation is encountered, he is also fully empowered to "stop work" should the violation be severe enough or linger unacceptably.

QA Inspection – CES Consulting, LLC will provide all required QA inspection. Their Lead QA Inspector (Tarik Hameed, PE) will be on-site fulltime for the duration of construction activities and reports directly to Syed. Tarik will be assisted by an office engineer and support inspectors whose numbers will fluctuate based on construction activities and schedules. The QA inspection team is responsible for observing the QC inspections, performing independent inspections based on frequencies defined in the QA/QC Plan, and initiating procedures to correct non-conformance issues not identified by the QC staff. The QA Inspection Team is supported by Dulles Geotechnical & Material Testing Services, Inc. – our independent geotechnical lab.

QC Inspection – Our Team's QC inspection is led by our QCM (Shaun High) who reports to the project CM (James Kreider). Shaun will be assisted by numerous QC inspectors, determined by construction activities and schedules, that are fully qualified and certified to observe all construction activities and perform required testing/sampling in accordance with the QA/QC Plan. Supporting the QC Inspection Team is our independent geotechnical lab, DMY Engineering Consultants Inc.

DM (Mo Kim, PE, DBIA) – Mo directs and oversees all design efforts to include changes required during construction. Mo ensures that the approved Design QA/QC Plan is strictly followed and that all design efforts, regardless of the stage of the project, follow these procedures.

Design QA and QC Staff – RDA's independent design QA reviews are led by Darell Fischer, PE, DBIA. Darell is responsible for performing the QA reviews in accordance with the Design QA/QC Plan once QC reviews are completed. All Design QC reviews are performed by independent senior staff not associated with the project.

QA/QC Procedures for our Unique Design Element: W&OD Trail

VDOT has been performing interstate widenings since late 1970's across the Commonwealth. The proposed Eastbound Widening (EBW) of I-66 inside the beltway is a continuation of that effort with its own set of challenges. However, what really sets I-66 EBW project apart from other interstate widenings is the new bridge carrying **W&OD Trail over Lee Highway**. This new pedestrian bridge is an adjunct to EBW and, practically speaking, will not have significant impact to the EBW's design and construction schedule. However, for Arlington County, City of Falls Church, and the local community, this bridge and EBW are important parts of their overall vision of smart growth that integrates alternative modes of transportation including improved pedestrian and bicycle access. More specifically, the delivery of this bridge presents a unique challenge due to the combination of public acceptance (which includes implementation of the distinct **V-motif** aesthetics culled through VDOT's public outreach) and tight geometric constraints (both horizontal and vertical) posed by existing features such as high voltage overhead electric transmission lines and historic Elliott Coal Trestle. With an enhanced QA/QC procedure that is tailored for these unique aspects and requirements, the LANE Team will successfully deliver the new pedestrian bridge consistent with the vision and desires of the local community, localities, and VDOT.

The LANE Team has already started the QA/QC process on the bridge concept for this proposal, with a focus on the clearances to the existing features such as Dominion Energy's overhead transmission lines, the historic Elliott Coal Trestle, Lee Highway, and other adjacent facilities. For example, through the LANE Team effort thus far, it has been found that the RFP's bridge profile did not provide the required minimum vertical clearance of 17'-0" over Lee Highway and a portion of Fairfax Drive under the exterior beams. So, the LANE Team redesigned the profile for the proposal concept to provide the required minimum clearance while still satisfying clearances to other existing features through coordination with the utility owners such as Dominion Energy. The LANE Team will continue this QA/QC process through the preliminary and final designs.

Preliminary design QA/QC will be critical to the overall success. First step in the Quality Assurance is to layout a detailed delivery schedule that clearly identifies all critical activities including public meetings, utility coordination, design and construction milestones. The LANE Team believes that **early public involvement and feedback** are essential, and it will continue the public outreach and communication that VDOT has conducted for last two years. Rinker Design Associates (RDA) has extensive experience in conducting successful public outreach and meetings for high profile projects in Northern Virginia and across the region. RDA and LANE recently completed the I-66/Route 15 DDI project which had included a very successful community outreach program that eased the public's concerns over navigating a DDI and changed the minds of the local jurisdictions to become advocates of the project. RDA will work with the public, VDOT, and the rest of the LANE Team; effectively conduct early public outreach that is relevant, informative, responsive, and accessible; and the public input received will be clearly and effectively communicated to the stakeholders and rest of the team.

The LANE Team also understands that the **early utility coordination** is crucial, especially the consideration of clearances to Dominion Energy's high voltage overhead electric transmission line and buried duct bank. The LANE Team will coordinate, confirm and identify all utilities above and below grade in and around the proposed bridge, and provide the data to the engineers for the preliminary design. In turn, the engineers will use this information and the public input to finalize the basic bridge horizontal, vertical alignments, and bridge aesthetics. In addition, the LANE Team **will assure that the critical clearances are met** at this early stage of the design.

The LANE Team will finalize and submit the preliminary design report and plans (final TS&L) to VDOT for approval. The finalization of the submittal will not only entail the design quality control of calculations, plans, and reports per the documented project QA/QC plan, but it will also include comprehensive review of the proposed designs of the bridge and retaining walls by the Design-Build Project Manager, Construction Manager, Design Manager, Utilities Manager, Public Outreach Manager, Bridge and other Discipline Leads to ensure that the design has incorporated the aesthetics desired by the public, all critical clearances are met, and basic interdisciplinary coordination is complete. In addition, the Bridge Discipline Lead will separately review the

bridge plans to ensure that the design has incorporated all applicable **VDOT Structure and Bridge best practices**, such as joint-less details to minimize the number of deck joints to enhance future maintenance reduction, and assure that all critical technical design items have been fully addressed. Some of the identified critical design items are: installation of Piers 4 and 5 foundations around Dominion Energy’s duct bank, control of superstructure vibration susceptibility due to shallow girder depth, vertical clearance to Dominion Energy’s high-voltage transmission lines, Abutment A clearance to historic Elliott Coal Trestle, and vertical under-clearance to Lee Highway and Fairfax Blvd access.

The LANE Team believes that early focus on QA/QC is imperative in the successful delivery of the new W&OD Pedestrian bridge and allow the design team to efficiently carry out and complete the final design with the secured buy-in from the stakeholders the unique and critical design elements. During the final design, the Lane Team will rigorously apply the project QA/QC plan to the reviews and checks of design calculations (including the final verification of the critical clearances), details, and plans and documentation of these activities. The final plans will be reviewed by qualified senior engineers with the right expertise. In addition, another interdisciplinary review will be performed to finalize the coordination before the plans are approved by the LANE Team and VDOT. The interdisciplinary review will also include the Construction to ensure the constructability of the design and details is incorporated so that the approved-for-construction plan is indeed approved for “construction”. The Bridge Discipline Lead will ensure that all applicable review comments from different stages of submittal (Stage I, “Over-the-Shoulder” review, 100% review) are fully addressed prior to the plans approved for construction.

QA/QC Procedures for our Unique Construction Element: W&OD Trail

The LANE Team has identified several aspects of the W&OD Trail Bridge construction as critical with respect to the QA/QC process. Providing clear and concise quality control and quality assurance measure for the horizontal and vertical clearances associated with bridge as well as avoidance of underground utilities are paramount to the success of the project and VDOT’s acceptance accordingly.

Clearances associated with the W&OD Trail bridge are critical to worker safety and construction acceptance. Specifically, the minimum vertical clearance requirement of 17’-0” of the W&OD bridge over Lee Hwy and bridge clearances (20’-0” to the fence and 25’-6” to the top deck) to the overhead Dominion Energy transmission line are the most critical elements from a construction perspective for QA/QC. Our design and construction team have carefully reviewed the RFP Conceptual Bridge Plans, the RFP Part 2 Criteria, and current field conditions to revise and develop a quality design and construction approach. Our plans will ensure all RFP criteria is met.

Upon execution of Approved for Construction Plans, our team will perform a preconstruction survey of the existing conditions to document the geometry, elevations, and exact location of the road and the existing power lines. The survey information will be used and implemented to the design of the bridge. The LANE construction team and QA/QC teams will meet with VDOT and Dominion Energy prior to construction to review the plans and outline our planned approach for the bridge construction.

During all key phases of construction, survey checks and bench marks will be performed to ensure all elements of the bridge are constructed to the line and grades specified in the plan and meet the clearance constraints identified. All survey information will be submitted to QA/QC for review.

At piers 4 and 5 the proposed foundation (piles and footings) will be constructed around the existing buried utility duct bank that runs through the proposed location of the pier foundations. The LANE Team will survey/test hole the location of the duct banks and place marker balls as needed in the test holes. This information will be used to finalize the design of the foundations. Once in construction, the marker balls will assist in uncovering the duct bank. The pile locations will be staked in the field so that QC and QA can observe and document the intended location with respect to the duct bank and so Dominion Energy can provide a field check and sign-off on the proposed work adjacent and above their facility prior to construction. Vibration monitoring will be implemented so that QC and QA can ensure protection of the utility. Once pile are in place, the footers will be staked and form work erected. Construction will only begin once QA, QC, and Dominion Energy have had a chance to inspect the site and sign-off on moving ahead. Given the tight constraints and our approach of

“bridging” over the duct bank with our foundations, added QC and QA documentation is anticipated and expected to ensure that Dominion Energy’s facility is protected and future issues don’t arise.

The historic Benjamin Elliott Coal Trestle will be protected from construction activities by establishing a “no fly” zone around the trestle. This area will be protected by fencing to ensure that construction equipment and workers avoid contact. Furthermore, the Construction Manager will hold a kickoff meeting with all crews that may come in contact with the W&OD Trail portion of work to ensure that they understand the significance of the historic feature to Arlington County and daily plans account for this feature and its protection as necessary. These measures will ensure that the QC Manager (and QA Manager) on-site can perform an easy periodic check of the trestle and document that it remains protected.

The site for the proposed bridge is well travelled by both vehicles and pedestrians. W&OD Trail will be in operation through the construction of the bridge, and LANE Team’s QA/QC procedure will include a consideration for pedestrian safety and access during construction. The construction team assigned to the site will prepare their daily plan to include provisions for pedestrian and bicycle access and safety. LANE Team believes that awareness is half the battle

4.5 CONSTRUCTION OF THE PROJECT

4.5 | CONSTRUCTION OF THE PROJECT

The LANE Team has developed a sequence of construction which will meet the milestones for the project and complete construction by the final completion date of October 1, 2021. The project will be sequenced into five (5) major construction work zones with the construction of the I-66 Eastbound Widening (EBW) as the critical path for the project completion. The phasing sequence will allow us to incorporate the elements of our design and project approach to manage resources required to work through permitting, ROW, stakeholder coordination, safety, and utility relocation/protection. In addition to the base scope, a separate construction operation will be delegated to the I-66 EDA (Option 1) to prioritize the improvement of traffic flows in this congested portion of the corridor. During construction, the LANE Team is committed to maintaining the existing number of lanes which will minimize impacts to the public except for off-peak temporary lane closures needed to perform critical construction activities. See Section 4.5.2 Transportation Management Plan for a detailed discussion of safety, traffic operations, public transportation, and public outreach during construction stages

The construction of I66 EBW project will be a well-coordinated effort that takes advantage of LANE's well-established and time-tested management skills, means & methods, and material type selection to efficiently and safely complete all work while maintaining safe and efficient movement of vehicular and pedestrian traffic. Under the leadership of Mr. Jan Sherman and Mr. James Kreider (Key Personnel) which were both involved in managing the I-66 Spot improvement, the I-66/15 DDI, and I-495 HOT Lanes projects. Their previous knowledge and experience will be an asset to delivering this project successfully.

4.5.1 Sequence of Construction (SOC)

The LANE Team has recent, extensive, and successful experience with urban construction projects in VDOT's Northern Virginia District. To name a few projects: I-66 Spot Improvements – Section 2 (UPC 78828), I-495 Express Lanes, and the I-95 Express Lanes project. All of these projects required construction in similar urban environments to the I-66 Eastbound Widening – Inside the Beltway Project, and the LANE Team completed each one on-time. More recently, the LANE Team completed the I-66/Route 15 Interchange Reconstruction project, also on I-66, on-time and on-budget. In the development of our Technical Proposal, we took successful elements from these past projects and applied them to the development of our means and methods for the I-66 Eastbound Widening Project and development of a sequence of construction/temporary traffic control plan (TTCP).

The LANE Team approach to the project sequence of construction has many benefits to the project success. In addition to the details described in each construction phase, we have listed our LANE Team benefits in the table to the right.

Project Work Zones

To efficiently and safely implement our TTCP, the project has been broken into five major Work Zones as shown in **Figure 4.5.1-1** below. The Project's Work Zones have been set up based on the improvement requirements of the Base Scope and Option 1 along with logistical break points for construction access and maintaining traffic. Our TTCP has also been set up to avoid (as much as practical) active construction activity on both sides of the roadway and to ensure constructability of high quality work:

LANE Team Benefits

- Proven, safe, pre-engineered systems to complete activities such as excavation supports, demolition shields, and public protection canopies
- Multiple crews working simultaneously in different areas/work zones of the project to complete the project schedule milestones on-time
- Past projects with similar experience and success in the I-66 Corridor (Spot Improvements 1 and 2)
- Early delivery of MOT/Phase 1A design package for approval to complete the temporary shoulder strengthening.
- Night-time lane closures for critical work to avoid public inconvenience and traffic jams
- Avoidance of temporary barrier service on both side of I-66 EB
- Phased construction to allow for emergency pull-offs and acceleration lanes during the entirety of the construction stage
- Elimination of impacts to existing buried utilities at the W&OD Bridge design foundation

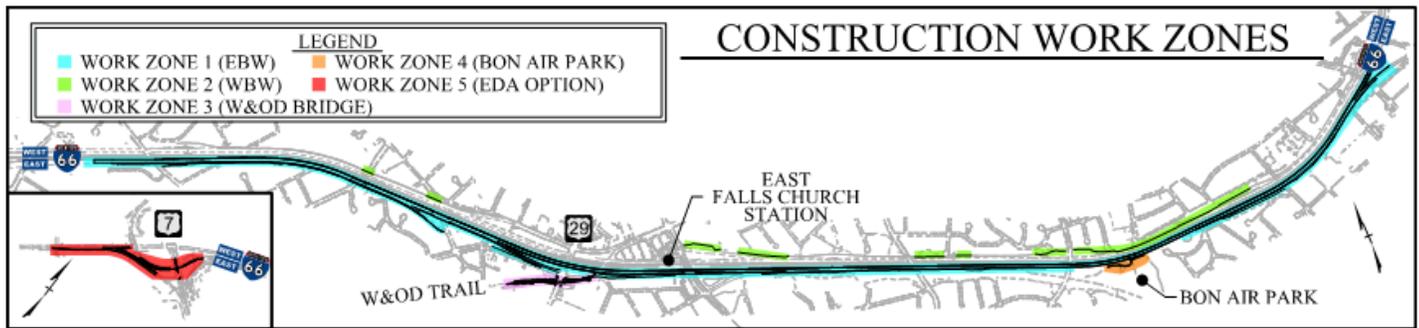


Figure 4.5.1-1. Construction Work Zones

General Sequence of Construction/Activities

The LANE Team commits to constructing the Project in a well-organized and coordinated effort, employing quality construction management and a “common sense” approach to means & methods while maintaining safe and efficient movements of vehicular and pedestrian traffic. The LANE Team’s outline for constructing the Project is based on the Work Zone’s identified above, the Team’s TMP detailed in Section 4.5.2, and the Proposal Schedule detailed in Section 4.7 and detailed below:

- **Base Scope Sequence of Construction**

- Work Zone #1 & #4, Phase 1A: I-66 EB, Outside Shoulder Strengthening
- Work Zone #1 & #4, Phase 1B: I-66 EB, Median/Left Widening Construction
- Work Zone #1 & #4, Phase 2: I-66 EB, Right Widening Construction
- Work Zone #1 & #4, Phase 3: I-66 EB, Completion of Middle Section of Bon-Air Bridge & Final Surfacing Work
- Work Zone #3, Independent Phase, W&O Bridge over U.S. Route 29
- Work Zone #2, Independent Phase, I-66 WB bridge modification and noise barriers

- **Option 1 Sequence of Construction:**

- Work Zone #5, Independent Phase, Option 1 Construction at I-66/Route 7:

All elements of the TTCP will be implemented in accordance with the Virginia Work Area Protection Manual and FHWA’s MUTCD. To ensure that the Project can be constructed safely, the LANE Team developed a preliminary TTCP shown in Volume 2 (Pages 22 through 26) of this proposal, which can be utilized to follow along with the detailed descriptions below.

Base Scope Sequence of Construction:

Work Zone #1 & #4, Phase 1A: I-66 EB, Outside Shoulder Strengthening:

To permit room for installation of temporary traffic controls and temporary barrier service concrete (TBSC) for subsequent phases of construction, the eastbound lanes of I-66 within the project limits need to be shifted two to six feet to the outside. In review of the Geotechnical Data Report provided in the RFP and the RFP requirements for temporary pavement strength, the outside shoulder will need to be strengthened to support traffic loads. The existing shoulder will be removed to a depth of 6” by milling and repaved. The exact pavement depth will be determined during the design phase (meeting the RFP’s requirements for Part 2, Section 2.6.2). The shoulder strengthening operations and shifting of traffic (i.e. new pavement markings and re-surfacing per RFP) will be performed at night per the allowable lane closures shown in the RFP document.

See **Phase 1B** typical sections for shifted traffic configurations. The LANE Team commits that at no time, will the milled/repaved section be opened to traffic without the paving being completed to within 2” of the existing pavement surface. Also, affected utilities MH covers, drainage structures, junction boxes, ITS components and buried cables and conduits will be located and marked and/or relocated to eliminate conflicts with the new temporary traffic pattern.

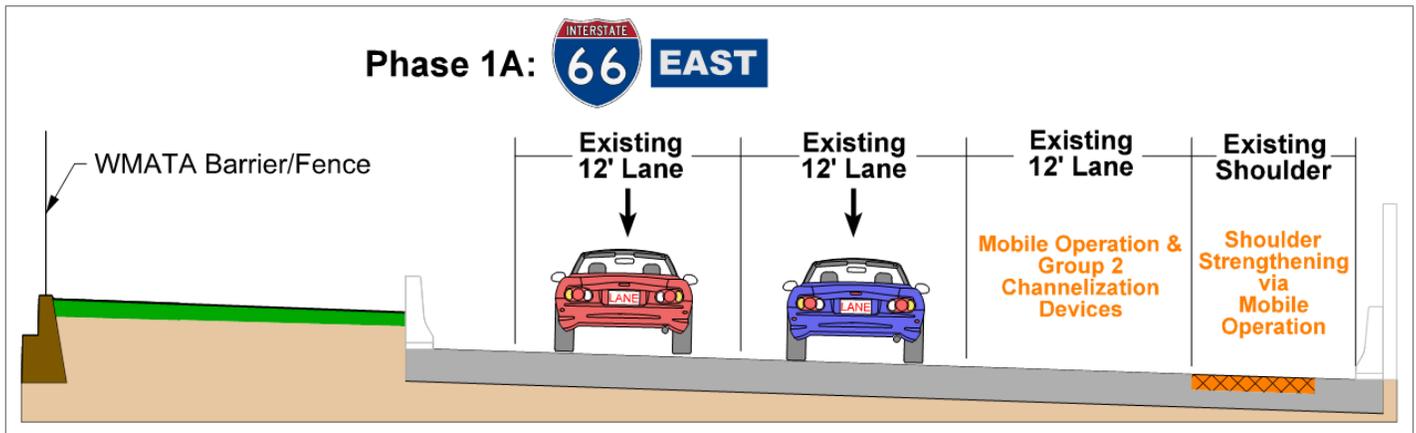


Figure 4.5.1-2. Phase 1A Sequence of Construction

As part of **Phase 1A** and prior to the start of substantial work, construction signs and PCMS boards will be installed to alert the traveling public of the upcoming construction work. The LANE Team will work with VDOT to inform the public and project stakeholders in advance of roadway closures. Since Phase 1A is within VDOT's existing right of way and requires minimal utility/drainage adjustments, the LANE Team will advance this work, upon approval of the TTCP, to allow the lane shifts to be completed by the time the project's permitting and plan approval is obtained in September 2018.

Work Zone #1& #4: Phase 1B: I-66 EB, Median/Left Widening Construction: (including bridge work)

Phase 1B includes the construction of all widening and or shoulder reconstruction to the left (inside) of the existing lanes, including any bridge widening to the left (inside). Details of **Phase 1B** are discussed in two parts: 1) Roadway Widening and 2) Bridge Widening.

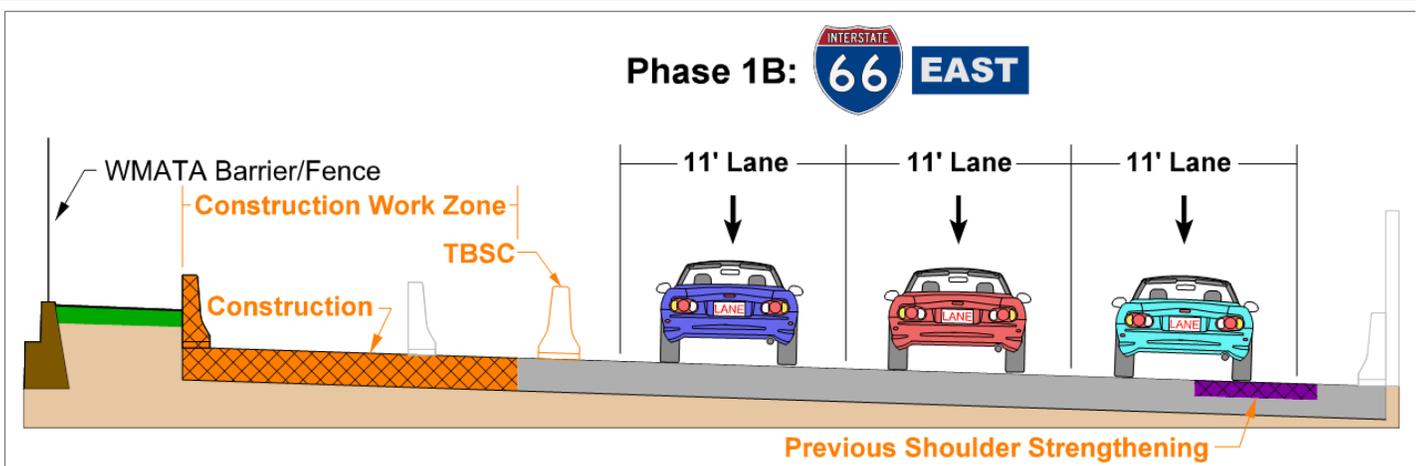


Figure 4.5.1-3. Phase 1B Sequence of Construction

I-66 EB Roadway Widening to Left (Inside):

The general sequence of construction for the roadway elements once the I-66 eastbound lanes are shifted onto the strengthened right shoulder (Phase 1A) is as follows:

1. Install additional maintenance of traffic devices, signage and protective measures;
2. Install/modify E&S Controls and adjust any remaining drainage structures as needed.
3. Clear and Grub
4. Demolish existing permanent traffic control devices and remove existing shoulders/pavement

5. Install permanent drainage per the design plans
6. Excavate/fill subgrade and install full depth pavement, shoulders and new permanent barrier

Additionally, as required by the Virginia Work Area Protection Manual (VWAPM), a minimum of one emergency pull-off will be maintained per mile of TBSC placement in the direction of the I-66 EB.

I-66 EB Bridge Widening to Left (Inside):

While construction is progressing on the roadway elements for I-66 EB, separate crew(s) will simultaneously construct the inside widening for the following bridges: EB Williamsburg Blvd. Bridge (B675), EB Westmoreland St. Bridge (B677), EB N. Sycamore St. Bridge (B678), EB Bon Air Park Bridge (B679), and the Hiking/Biking Pedestrian Bridge at Approx. Sta.226+10 over I-66 (B681).

WMATA Considerations: All work will be coordinated and scheduled in advance for train flagging person(s), particularly for bridge pile installation, girder erection, deck placement, and all other activities that use crane & boom equipment and within 30’ of the track. Furthermore, instrumentation control will be implemented to monitor potential vibrations due to drilling and bridge demo. Plans will be coordinated with WMATA for any additional measures as may be required when working adjacent to WMATA facilities.

The general sequence of construction for the all bridge widening is as follows: (All work on I-66 will be behind the TBSC)

1. Testing for Hazardous Materials (i.e. lead paint) on existing infrastructure per RFP Section 2.4.6.3. (If any is found to exceed allowable thresholds, the LANE Team will perform required environmental mitigation measures.)
2. Finalize coordination/planning with WMATA, including locating any adjacent utilities or infrastructure
3. Set schedule for coordination of all major work requiring flagger(s) for the trains
4. Install additional maintenance of traffic devices, signage and protective measures
 - a. Including devices/signage on under passing roadways
5. Install E&S Controls, particularly underneath bridges and on local roadways as appropriate
6. Install additional protective shielding for broken concrete/debris for required strategic demolition (ensure preservation of existing decking/reinforcing to remain)
7. Portions of concrete deck, existing overhang and barrier will be carefully removed
8. Install additional piers (as appropriate), piling/footing, abutment widening and bridge deck widening to accommodate the required width shown in the design plans.
 - a. For Hiking/Biking Pedestrian Bridge at Approx. Sta.226+10 over I66 (B681), only the pier in conflict with the roadway widening will be relocated.



Figure 4.5.1-4. LANE’s I-66 WB (Spot Improvements) project involved many similarities to this Project, including: roadway construction, pier construction, and deck rehabilitation adjacent WMATA facilities

Special Considerations for Phase 1B: EB Williamsburg Bridge (B675) and EB Westmoreland St. Bridge (B677):

The LANE Team, as part of I-66 Spot Improvements – Section 2 constructed the widening necessary for the westbound bridges at this location, and detailed knowledge of all maintenance of traffic measures that will be required for the eastbound bridges to maintain traffic while pedestrian/bicycle traffic is maintained on the roadways below. For the erection of girders and other bridge work on/over Williamsburg Blvd. and Westmoreland St., requiring lane closures or temporary roadway closures, detour routes will be evaluated and plans will be submitted for VDOT approval. Additionally, since there are active sidewalks and bicycle

facilities, plans for securing the work zone and providing protective measures for the pedestrian facilities will be included in the project’s design plans for implementation during construction.

EB N. Sycamore St. Bridge (B678) and EB Bon Air Park Bridge (B679): These two bridges present unique challenges with respect to pedestrian traffic passing through/under the construction zone. The I-66 EB N. Sycamore St. Bridge (B678) crosses over Sycamore Street which not only carries pedestrian and vehicular traffic, but also doubles as the entrance to WMATA’s East Falls Church Metro Station. The EB Bon Air Park Bridge (B679) crosses over the Custis Trail which carries pedestrian/bicycle traffic and connects various parks adjacent to I-66.

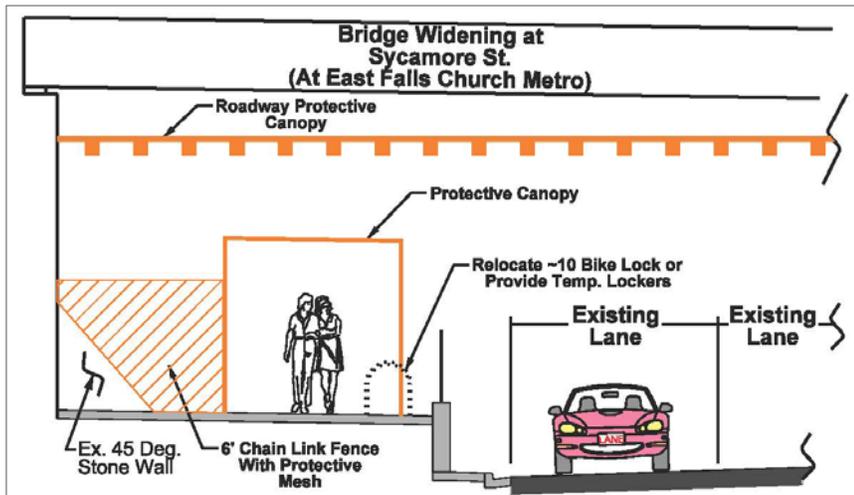


Figure 4.5.1-5. Our design includes the installation of protective canopies to provide protection to pedestrians.

B678: To protect the work zone and permit continued access to the East Falls Church Metro Station, an engineered shielding canopy will be designed to protect pedestrians as shown in the graphic to the left.

To manage vehicular traffic while constructing the pier in the median of N. Sycamore St., our TTCP will close the inside lane in both directions. Lane closures will be during allowable lane hours as defined by the RFP. Additionally, lane closures, short duration total closures, or roadway/pedestrian detours will be implemented when erecting girders.

Detour plans will be evaluated and submitted to VDOT and other stakeholders for review and approval prior to any implementation.

B679: Similar to the EB N. Sycamore St. Bridge, a protective canopy will be provided during construction to protect pedestrian/bicycle traffic on Custis Trail which serves the adjacent Bon Air Park. A pedestrian/bicycle detour will be implemented as further discussed in Section 4.5.2. The plan for which will be evaluated and submitted to VDOT and other stakeholder for review and approval prior to implementation. However, unique to the Bon Air Park bridge is the need/requirement to replace the deck which will be done in three phases (**Phase 1B, Phase 2, and Phase 3**)

Work Zone #1 & #4, Phase 2: I-66 EB, Right Widening Construction: (Includes: EB Ramps, EB Side Noise barriers, U.S. Route 29 Signals, Cusits Trail Improvements, and Emergency Pull-Offs)

Following completion of **Phase 1B, Phase 2** will construct all necessary widening and/or shoulder reconstruction to the right (outside) of the existing lanes (including outside bridge widening and noise barrier construction). **Phase 2** begins by shifting traffic toward the median onto the newly constructed areas in **Phase 1B**. All lane shifts, surfacing, line painting, resetting of TBSC, and signage will be conducted with allowable lane closures per the RFP and during night time operations. Details of **Phase 2’s** construction is discussed in two parts below: 1) Roadway Widening and 2) Bridge Work/Noise barrier Construction.

I-66 EB Roadway Widening to Right (Outside):

The general sequence of construction for the roadway elements, after shifting to the median, is as follows:

1. Install additional maintenance of traffic devices, signage and protective measures
2. Install/modify E&S Controls and adjust remaining drainage structures as needed
3. Clear and Grub
4. Demolish existing permanent traffic control devices and remove existing shoulders/pavement
5. Install new permanent drainage per the design plans
6. Excavate/fill subgrade and install full depth pavement, shoulders and new permanent barrier

As required by the Virginia Work Area Protection Manual (VWAPM), a minimum of one emergency pull-off will be maintained per mile of temporary barrier placement in the direction of the I-66 EB.

Also, included in **Phase 2** are the two signals on U.S. Route 29, the Custis Trail improvements at Bon Air Park "Work Zone #4", select permanent overhead signage, and ITS installation. A pedestrian/bicycle detour will be implemented for the Custis Trail improvements, which is further discussed in Section 4.5.2.

I-66 EB Bridge Work/Noise Barrier Construction (Outside):

Simultaneous to the right side roadway construction for I-66 EB, separate crew(s) will construct the outside widening for the following bridges: EB Williamsburg Bridge (B675) and EB Bon Air Park Bridge (B679). Additionally, proposed noise barriers along the right side of I-66 EB will be installed per the design plans.

Noise barrier Construction Considerations: LANE, as part of the I-66 Spot Improvements – Section 2 and the I-495 Express Lanes, constructed noise barrier adjacent to private property and residential homes. Based on this and other experience, our Team fully understands the potential impacts to the surrounding community and the needs of the affected stakeholders. The LANE Team will ensure that new noise barriers are constructed within the required 30-day time window for any existing walls removed. Based on past experience within this corridor, we will restrict a majority of the noise generating construction activities to day time operations to minimize noise impacts and maximize construction efficiencies. Additionally, we will communicate directly with affected property owners to help mitigate the impact of these activities.



Figure 4.5.1-6. LANE’s I-66 WB (Spot Improvements project) also included noise barrier installation.

Once traffic has been shifted to the inside, the general sequence of construction for the bridge and noise barrier work is as follows: (Note: All work on I-66 will be behind the TBSC)

1. Test for Hazardous Materials (i.e. lead paint) on existing structures per RFP Section 2.4.6.3. (If found to exceed allowable thresholds, the LANE Team will perform required mitigation measures.)
2. Install additional maintenance of traffic devices, signage and protective measures (including devices/signage on under passing roadways).
3. Install/modify E&S Controls – particular attention will be given to the areas beneath bridges and on local roadways.
4. Install additional protective shielding for falling debris and required demolition (ensure preservation of existing decking/reinforcing that remains).
5. Carefully remove required portions of concrete deck, existing overhang and barrier.
6. Construct bridge widening to accommodate the required parapet barrier (and noise barrier) as shown in the design plans.
7. Install noise barriers C, D, E, and H once clearing and downstream drainage controls are in place.

Work Zone #1 & #4, Phase 3: I-66 EB, Completion of Middle Section of Bon-Air Bridge & Final Surface Work: (Includes: B679 Middle section Re-Decking, per RFP), I-66 EB Asphalt Build-Up, Project Final Milling/Overlay)

Following completion of **Phase 2**, **Phase 3** allows for construction of the middle and final section of deck on the Bon Air Park Bridge (B679), final milling/overlay, and installation of all traffic control devices and final pavement markings, and final asphalt surfaces along I-66 EB. Details of **Phase 3’s** construction is discussed in two parts below: 1) Completion of Bon Air Park Bridge (B679) and 2) Final Paving

Completion I-66 at EB Bon Air Park Bridge (B679) Work:

At the start of **Phase 3**, I-66 EB traffic in Work Zone #1 will be shifted to a split phase configuration as shown in our MOT sheets contained in Volume II (page 25). The LANE Team will work with VDOT to finalize these details to ensure a safe work and traffic control plan. Once implemented, the middle deck section of the Bon Air

Park Bridge (B679) will be demolished and replaced. *The split phase configuration on I-66 EB provides adequate sight distance to meet the existing speed limit as required by the RFP.* The LANE Team will close the right/outside lane during allowable lane closure hours per the RFP (i.e. at night) to allow for major materials deliver to the site. The pedestrian/bicycle trails that pass under the bridge will be detoured as discussed in Section 4.5.2 when needed due to overhead operations.

Final Pavement/Surface Work on I-66:

The general sequence of construction for the final surface work, is as follows: (A majority of this work will be completed with daily/nightly allowable lane closures per the RFP. Temporary traffic control devices and signage will be provided accordingly.)

1. Install/modify E&S Controls
2. Mill and overlay/build-up to meet required roadway super-elevation adjustments.
 - a. Mill/overlay and place final surface for uniform roadway paving as required by the RFP.
3. Install remaining permanent traffic control devices and ITS devices
4. Install project landscaping.

Special Considerations for Phase 3:

Upon completion of the Bon Air Park bridge, the LANE Team will open all lanes to traffic (to be completed by October 2020). The lanes will remain open while final paving is uniformly installed per RFP requirements utilizing allowable lane closures.

Work Zone #2, Independent Phase, I-66 WB Work:

The construction of Work Zone #2, WB work, will operate under an independent schedule. Separate crews are anticipated to be utilized for this work while construction in Work Zone #1 is on-going. Nearly all of the work is within VDOT's existing rights of way and can be advanced as an early work package. The work to be completed includes proposed noise barriers along the outside of I-66 WB to include the following bridges: WB Williamsburg Bridge (B682), WB Westmoreland St. Bridge (683), WB Bon Air Park Bridge (B684).

Noise barrier Construction Considerations: As previously discussed for I-66 EB Noise Barrier construction, the same procedures will apply for the westbound work. As part of the I-66 Spot Improvements – Section 2 Project, LANE constructed noise barriers adjacent to private property and residential homes within this same corridor. The LANE Team brings that experience to this Project, with a full understanding of the stakeholder needs and concerns.



Figure 4.5.1-7. Milling and paving will be performed overnight to minimize impacts to the traveling public.

The general sequence of construction for all westbound bridge work and proposed noise barrier construction (once traffic is appropriately shifted) is as follows: (Note: All work on I-66 will be behind the TBSC.)

1. Testing for Hazardous Materials (i.e. lead paint) on existing infrastructure per RFP Section 2.4.6.3. (If found to exceed allowable thresholds, the LANE Team will perform required mitigation measures.)
2. Install additional maintenance of traffic devices, signage and protective measures, including devices/signage on under passing roadways.
3. Install E&S Controls – particular attention will be given to the areas beneath bridges and on local roadways.
4. Install additional protective shielding for falling debris and required demolition (ensure preservation of existing decking/reinforcing that remains).
5. Carefully remove required portions of concrete deck, existing overhang and barrier.

6. Construct bridge widening to accommodate the required parapet barrier (and noise barrier) as shown in the Volume II plans and the graphic below.
7. Install noise barriers R, P, N, and O (Extension West, Central, and East), once the clearing and downstream drainage controls are in place.

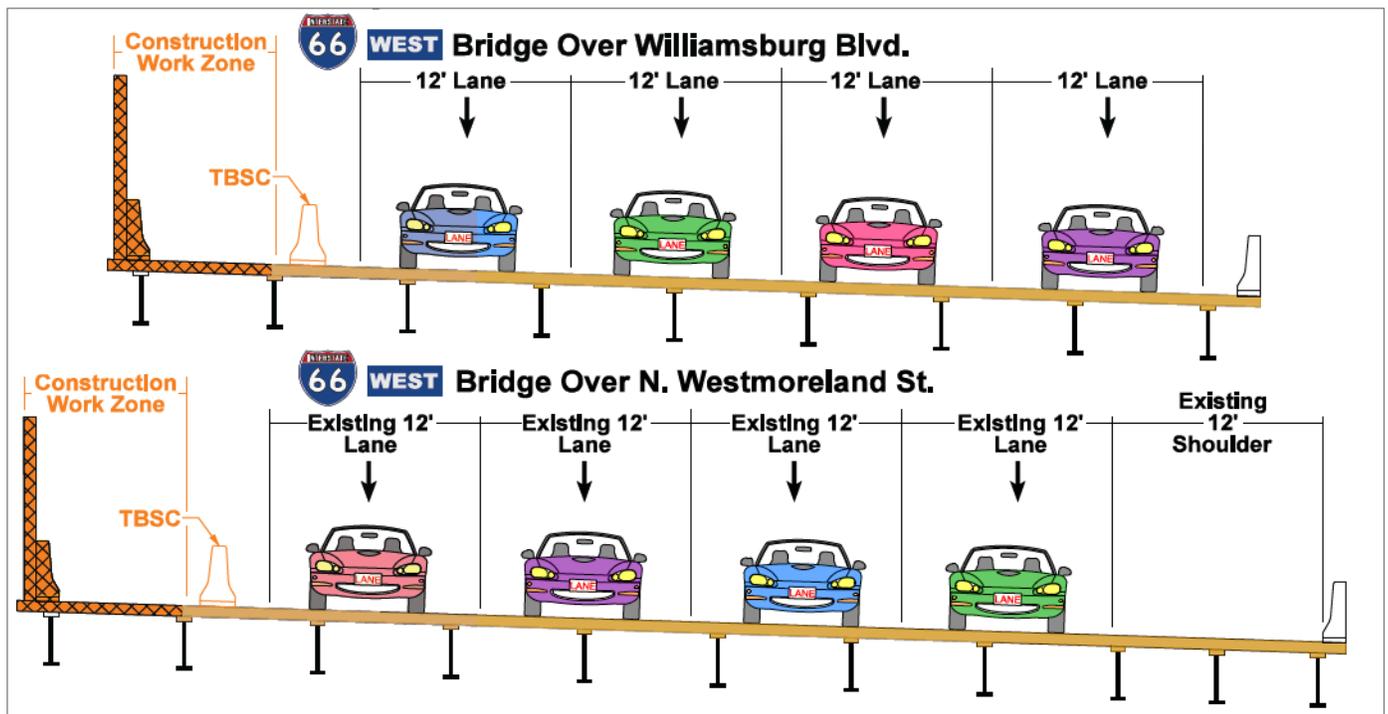


Figure 4.5.1-8. Sequence of construction for bridge work.

Work Zone #3, Independent Phase, W&OD Bridge over U.S. Route 29:

The construction of the Washington & Old Dominion (W&OD) Shared Use Path (SUP) and Bridge will be performed on an independent schedule from all other Work Zones. Separate crews are anticipated to be utilized for this work while construction for Work Zone #1 and #4 are on-going. During the design of the W&OD Bridge and SUP improvements, the LANE Team will work with VDOT and stakeholders to mitigate concerns and ensure continuity of the pedestrian, bicycle, and hiking facilities during construction. Prior to construction, utility coordination and relocation will be performed to address significant utility facilities in close proximity. As a proactive measure, our Team has discussed the bridge construction with Dominion Energy to ensure that proper clearances are met with the bridge, bridge fencing, and pier foundations with respect to the overhead transmission lines and the underground 9 Phase duct bank. A detour plan for the trail will be developed to ensure pedestrian safety and SUP continuity during disruptive construction activities. The detour, which will be coordinated, evaluated, and approved in conjunction with VDOT and other stakeholders, will be implemented once approval is obtained. Additionally, to control vehicular traffic on U.S. Route 29 while constructing girders and piers, our TTCP's will close the outside lanes in both directions during allowable lane closure hours in accordance with the RFP. When erecting girders over the roadway, we will implement pedestrian and vehicular detour plans to ensure safety. All detour plans will be submitted for review and approval by VDOT and other stakeholders.

Option 1: Sequence of Construction

Work Zone #5, Independent Phase, Option 1 Construction at I-66/Route 7:

The construction of Work Zone #5, Option 1, will operate under an independent schedule. If given NTP by VDOT, separate crews are anticipated to be utilized for this work while of the Base Scope work is on-going. The LANE Team is committed to having adequate construction crews to enable this to be completed in a timely manner. The LANE Team has prepared a TTCP showing the phasing of this construction which can be found in Volume 2 (page 27) of this proposal. The LANE Team will conduct lane closures and temporary roadway/ramp closures in accordance with the allowable closure hours defined by the RFP. Furthermore, our

Team will work with interested stakeholders to ensure that lane closures do not significantly impact existing traffic patterns to WMATA, UVA/VA-Tech Campus or other high volume traffic generators and/or destinations. Night detours are anticipated for the construction of Ramp A and Route 7 during erection of girders. All detour plans will be submitted for review and approval by VDOT and stakeholders. If VDOT executes Option 1, the LANE Team commits to completing the work (and opened to traffic) by September 20, 2021.

Other Critical Elements to Sequence of Construction:

Minimize/Mitigate Construction Noise Impacts (Night Operations):

The LANE Team assembled for this project is well versed with mitigating noise from construction in narrow urban (residential) corridors. Most recently, as part of the I-66 Spot Improvements – Section 2 and the I-495 Express Lanes, LANE’s Construction Team implemented a wide range of mitigation measures to reduce construction noise, particularly during night time operations. The following actions are items we plan to implement as part of this project:

- Noise Barrier construction adjacent to residential houses/properties will be conducted during the day.
- The LANE Team commits to changing the sequence of construction if warranted by stakeholder (or VDOT) concerns. The LANE Team is a member of the northern Virginia community and understands the interruptions construction noise can have on personal property owners, day or night.
- The LANE Team’s Sequence of Construction, by design, allows for early construction of the westbound noise barriers, which will also mitigate long-term noise impacts due to highway and construction activities.

Minimize Impacts to the Tolling Equipment and Operations:

During construction of the project (all Work Zones and Phases), the LANE Team commits to responsibly notify and seek approval from VDOT and TransCore for any work around the tolling facilities and electronic signage. As required by the RFP, Part 2, Section 2.9.8, the LANE Team commits to the following:

- Development of a separate construction package (Replacement, Relocation and/or Modification Plan) for review and approval, that exceeds the RFP requirements by submitting these plans a minimum of 90 days in advance (45 days sooner than required) to ensure proper review and coordination.
- Ensure that the toll gantry at Sta. 130+00 (Gantry EB-1) will not require more than three adjustments and that the toll gantry at Sta. 283+00 (Gantry EB-3) will not require more than four adjustments, in accordance with the RFP and supported by the LANE Team’s TTCP presented in Volume II.
- Identifying and protecting during milling operations existing sensors currently installed in the pavement.
- Compliance with the RFP (i.e. tolling equipment, coordination meetings and elements listed in Section 2.9.8 of Part 2).

The LANE Team, having been a major part of the construction for the I-495 and I-95 Express Lanes, understands the critical nature of and need to protect the tolling infrastructure. Furthermore, our Team’s TTCP presents three well-defined phases that ensure that the tolling infrastructure will not be adversely impacted.

Safety and Operations

The LANE Team considers the safety of its employees and the general public to be a matter of prime importance. Our ability to achieve a good safety record is clear evidence of strong management and we will do everything within reason to maintain and improve our position. Our Team intends to provide a healthy and safe place of employment for all employees, to abide by all relevant Federal, State, and local laws and regulations, and be guided by good practices as dictated by location and circumstances. We also understand VDOT’s commitment to safety of the public/stakeholders. In partnership with VDOT, the LANE Team will develop a project specific Safety Plan to meet and exceed expectations. The LANE Team’s Safety Program for this project is led by Julio Almeida. Julio has the overall responsibility to ensure the Project is delivered with a “**Safety is First**” approach.

Safety Approach:

Pedestrian & Traffic Safety (including limiting disruptions): The project does not plan to close any pedestrian facilities, but rather provide adequate and well defined detours. Shown in Section 4.5.2 (below), the LANE

Team has developed reasonable pedestrian detours, subject to VDOT/stakeholder review and approval, that can be utilized for the Project to ensure pedestrians are appropriately guided around (or through) the work zone in a safe and practical manner. The LANE Team will work with VDOT Traffic Operations Center to ensure the most updated information is relayed (via PCMS signage, etc.) to inform vehicular traffic. The LANE Team will ensure signage, pavement markings and other traffic control features remain in good condition for the life of the project.

Adjacent Public Transportation Facilities and Roadways (including limiting disruptions): During construction, as discussed earlier, the LANE Team will work closely with WMATA to limit (if any) disruptions to their facilities. All work that could potentially impact train service will be conducted at night when train service is not operational. To minimize impacts to local roadways, our TTCP implements allowable lane closures per the RFP which ensures minimized traffic delays. Further, our work requiring complete roadway closure (i.e. erecting girders etc.) will incorporate VDOT approved detours.

Project Work Zone Safety: The LANE Team utilizes VDOT’s Work Zone Safety Checklist, found in the Virginia Work Area Protection Manual (VWAPM) as the minimum criteria for ensuring all work areas of the project meet safety requirements. These checks are conducted daily and with every change in traffic pattern. Additionally, Section 4.5.2 provides discussions on features to enhance overall work zone safety to the benefit of VDOT, the public, and the D-B Team.

Approach to Safety Controls:

The LANE Team’s safety approach is simple – simple measures save lives. Simple actions make a difference. It starts and ends with each individual on the Team, from the designers to the construction workers in the field striving to work safer every single day so they can return home safe at night. Safety is paramount, so much so that LANE has included it in their core values (**integrity, honesty and openness, teamwork, safety, trust, and care for people**). As a statement of LANE’s commitment to safety and in keeping with our “Safety Policy Statement”, we are committed to the following “added” safety controls:

Pre-Construction:

- **Employee Training/Orientation:** All construction employees and Sub-Contractors are required to complete an orientation prior to working on the project.
- **Sub-Contractor Requirements:** As part of every Sub-Contractor’s contract with LANE, we require provisions outlining their safety requirements. Our Safety Program Manger meets with each Sub-Contractor prior to the start of work to review safety protocols and expectations.
- **Project Plans & Over-the-Shoulder Design Review:** Through over-the-shoulder reviews of the design by the construction team and Safety Program Manager, we ensure proper staging areas are identified, construction access is appropriate and safe, and constructability doesn’t inadvertently create unsafe conditions.

During Construction:

- **Team Approach/Meetings:** The LANE Team holds daily meetings with each work crews to review and remind everyone of all protocols and potential work/project hazards and to discuss the work to be accomplished that day. The Project’s Safety Manger meets with all the crew chiefs and project superintendents regularly to review protocols and ensure continued compliance with OSHA/VOSH provisions.
- **Employee Empowerment:** The LANE Team fosters a proactive safety culture by educating employees through safety programs and adopting a strong sense of accountability. The Lane Construction Corporation has internal initiatives and programs that encourage employees to work safer and proactive in accident prevention.

Geotechnical Constraints

The LANE Team has thoroughly reviewed the Geotechnical Data Report and understands the challenges and constraints associated with geotechnical elements and how they will affect construction. These challenges and constraints are highlighted by two major geotechnical elements: subgrade conditions and potential impact to adjacent structures. As a result, our construction team will continually evaluate subgrade conditions to ensure

that recommendations (use of geosynthetics, undercut and replace, or lime augmentation) in the Geotechnical Engineering Report prepared by the EOR can be achieved or if conditions are different than identified in the report. Furthermore, to address concerns regarding adjacent structures, our construction team will implement vibration monitoring as needed to ensure that our approach of using predrilled non-displacement piles, drilled-in and grouted piles, drilled shafts, and/or micropiles avoids unintended impacts.

Environmental Impacts

For a project of this size, the environmental constraints and potential to impact resources during construction are significantly small. Although we have designed around wetland and stream impacts, our Team will prepare construction fencing exhibits for implementation in the field to prevent accident impact of natural resources. Additionally, historic and other 4(f) properties or facilities will also be protected by physical barriers to prevent accidental encroachment. All work in or around these resources will only commence when either the permit is received or environmental clearance has been provided.

ROW Acquisition

As with every D-B project, the proposed right-of-way and easement acquisition process is one area that must be well integrated into all facets of the schedule. For this Project, there is minimal proposed right-of-way/easements required for construction. Regardless, the LANE Team has developed our schedule and sequence of construction in such manner as to permit adequate time to obtain the land rights needed for the project. Our plan constructs Phase 1A, the shoulder strengthening activities (all within VDOT right-of-way) and Phase 1B, the widening of I-66 towards the median, in the Base Scope, all within existing VDOT right-of-way. Sequencing the construction in this manner has eliminated the right-of-way process from the critical path of the Proposal schedule presented in Section 4.7.

Our Proposal Schedule included in Section 4.7 outlines the complete acquisition process. In summary, the LANE Team's right of way staff/resources are dedicated to managing the acquisition process. The highest priority parcels are those land rights needed for the W&OD Bridge and Shared Use Path improvements in Work Zone #3 and the temporary construction easements noise barrier construction in Work Zone #2. Our schedule of work has provided the maximum amount of time to acquire these properties, by conducting the median widening first in Work Zone #1.

Construction Access, Staging and Storage Areas

Indicative of high speed and interstate, facilities construction access is a critical consideration that must account for multiple factors such as: posted speed, location of desired access, and ability of construction vehicles to maneuver around access points. Simultaneously, ingress and egress of construction vehicle must not cause impacts to existing traffic flow. Finally, the locations of access points need to be efficient to maintain optimized operations for construction staging and storage of equipment and materials, in relation to the construction work to occur.

The LANE Team has reviewed the project site for Base Scope and Option 1, and has pre-selected potential locations to access the Project site away from I-66 to the greatest extent practicable. Two example areas are shown below, which provide access and potential staging and materials storage for the project.

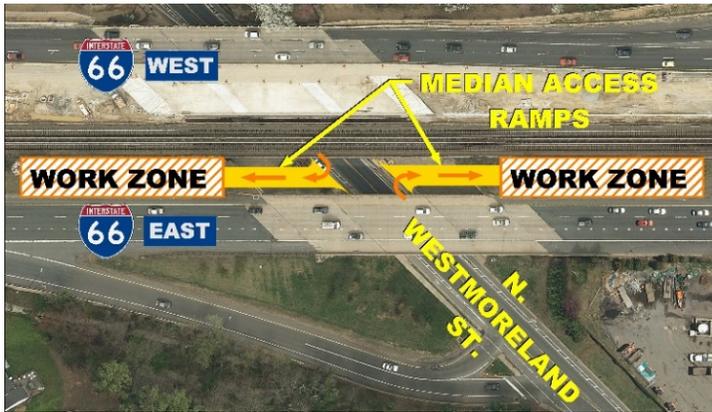


Figure 4.5.1-9. Potential work zone access.

The LANE Team has been exploring several locations along the corridor to use a storage yard. The corridor along I-66 has limited available space for laydown of materials and staging large deliveries. The LANE Team will request to utilize the area of exit 71 to Route 237 (Fairfax Dr.) as a yard for storage where materials will be brought into the work area when needed (see graphic below). However, multiple smaller staging areas will be required near the actual work (i.e. Bon Air Park bridge, Custis trail, W&OD bridge, and I-66 EDA). This approach keeps the work area clean, efficient, and frees up space for construction. Large deliveries, such as girders, wall panels, will be staged off-site and brought on-site when scheduled for erection. To facilitate this approach, in phase 2 of our TTCP, we have created wide longitudinal areas along the Project that will provide sufficient width behind TBSC which can double as staging/storage areas for the project. Storing material within the work zone will help minimize the amount of truck deliveries to the project and potential traffic interruption. In areas of restricted, narrow space, the LANE Team will implement lane closures within the allowable lane closures per the RFP to deliver/remove materials from the site, as discussed in Section 4.5.2.

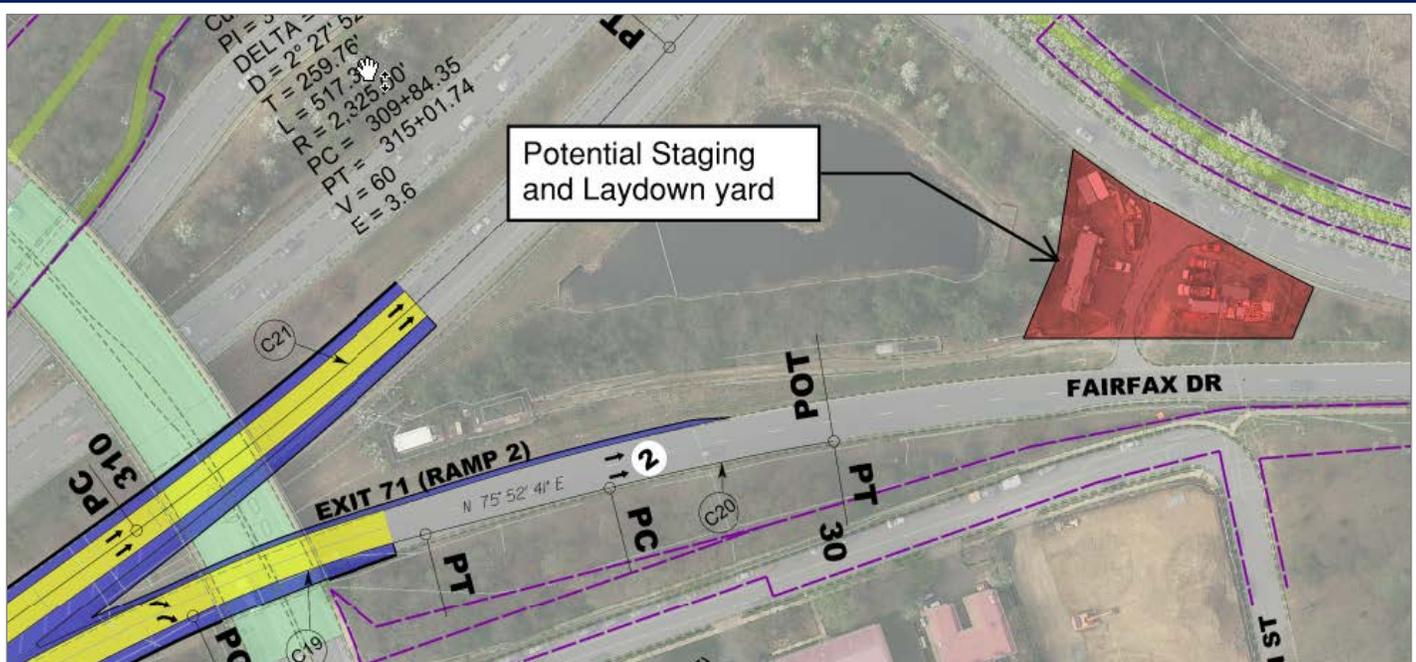


Figure 4.5.1-10. The LANE Team’s potential staging and laydown yard for the Project.

Permanent and temporary material deliveries, construction equipment, and the project team comprise most of the construction traffic coming in and out of the site. Safety considerations include the scheduling of deliveries during non-peak traffic hours and transporting of craft personnel in groups. To separate construction traffic from motorists, site ingress and egress will be carefully selected, designed, and routinely checked for effectiveness.

Public Involvement/Stakeholder Coordination and Governmental Approvals

The Public Involvement/Public Relations effort for the Project, given the number of public agency stakeholders and sensitive nature of the surrounding residential communities, requires a proactive approach. The LANE Team has designated Tom Blaser (from Rinker Design Associates, P.C) to be responsible for coordinating with the VDOT NOVA District Public Relations and Traffic Operations Center on all messaging and information to be provided to the public. Furthermore, our Team will be responsible for managing a program (tailored to address Project specifics) for Public Involvement and Public Relations as identified in the RFP, to facilitate responding to and addressing community concerns. The summary list below contains some of the major responsibilities the LANE Team commits to for the duration of the project.

- *Required by RFP*
 - Support VDOT in holding informal meetings with affected stakeholders;
 - Hold five public information meetings for the project and provide technical and engineering support (renderings, visual aids, brochures etc.);
 - Hold an initial “Pardon our Dust Meeting” prior to any construction activities and one for each Phase change or initiation of independent work area for the project;
 - Hold a public meeting to present the preliminary bridge design for the W&OD Trail Shared Use Path Bridge over US 29 (B680), including providing 28 required renderings/visual aids;
 - Provide VDOT with an emergency contact list of project personnel in the event of onsite emergency or work zone incidents;
 - Coordinate with VDOT to provide regular updates to all surrounding jurisdictions and public agencies;
- **Value-Added** – assist the NOVA District Communications Office and Traffic Operations Center with a work plan and an overall schedule to support VDOT’s webpage and “Messaging to Travelers”;
 - Provide project specific updates on a weekly basis to include lane or shoulder closings and any potential impacts to traffic for I-66, adjacent pedestrian/bicycle facilities and intersecting roads;
 - Two-week advance notice of complete traffic stoppages on I-66, U.S. Route 29 and Route 7 (for Option 1 if implemented), as allowed per allowable lane closures in RFP;
- **Value-Added** – assist the Communications Office and Public Relations Office as needed in conducting project tours for media and stakeholders;
- **Value-Added** – provide information to the Communications Office as needed to answer questions received from stakeholders or concerned citizens;
- **Value-Added** – manage social media campaigns (i.e. Twitter and/or Facebook) to inform residents of project news, milestones, detours, start of new phases of work, completion of phases of work, lane closures, etc.;
- **Value-Added** – place newspaper ads in local newspapers at pre-determined times for major milestone events on the project.

In addition to public involvement, the Lane Team will coordinate inspections and approvals for all Arlington County and City of Falls Church maintained facilities to include, but not limited to, water and sewer relocations and traffic signal construction. We will also coordinate with Arlington County and City of Falls Church for any of their planned construction or maintenance activities that may coincide with I-66 construction. We also understand that any detours utilizing local neighborhood streets will require approvals from Arlington County and/or City of Falls Church.

Anticipation & Mitigation of Any Potential Construction Delays

Members of the LANE Team, since release of the RFP, have met twice a week – once a week with just design disciplines and once a week with design, construction, estimating and scheduling staff. We developed our technical design plans and proposal schedule in an integrated environment to ensure that “show-stoppers” are clearly identified and mitigated in the schedule. We have also game planned potential unknowns to help identify necessary float time in the schedule for schedule recovery. Finally, we identified areas within the design and construction where unrealized optimizations could further facilitate schedule recovery. Ultimately, potential construction delays for the project are most likely to occur in one of three areas.

Design Plans – As the design phase kicks-off, the LANE Team’s construction staff will hold bi-weekly over-the-shoulder meetings for review, providing construction feedback and requests for changes for ease of construction due to availability of materials and/or accelerated acquisition of land rights for construction and utility relocations. The weekly meetings solidify an on-going dialogue between the construction staff and the engineers to minimize the internal RFI’s during the Construction Phase of the project. During this Phase, the project schedule is baselined and once finalized, it is communicated to each discipline, construction staff, subcontractor and stakeholder for input. To accommodate these inputs and the unknown associated with challenges or successes along the way, the schedule is a living document that is regularly checked by the Design-Build Manger and Discipline Leads to ensure the RFP’s scheduling requirements are met.

Utility Relocation & Right of Way – Without good planning and communication, the biggest headaches for Design-Build projects are utility coordination/relocation efforts and land acquisition needs for construction. The LANE Team’s TTCP sequencing has been set up to ensure that early construction activities are not dependent on locations where utility relocations and land acquisitions are needed (See Section 4.7). As previously discussed, this method removes these elements from the critical path. However, based on extensive experience in Design-Build and ROW acquisition, the LANE team will track these elements as if they are on the critical path.

Specifically, the LANE Team has identified potential conflicts, that if not properly addressed, could cause significant impacts. Workarounds and solutions have been developed to mitigate potential issues. *Table 4.5.1-11* lists potential issues and our Team’s mitigation approach.

Table 4.5.1-11. Conflict Mitigation

Element (s)	Location	Issue/Conflict	Mitigation/Solution
Utilities	Station 126+25	Washington Gas line conflict with proposed drainage.	Timely relocation of the utility by its owner will mitigate the issue. The LANE Team will coordinate with the utility owner accordingly to prevent schedule impact.
	WO&D SUP Bridge	Dominion Power aerial power line conflict with bridge alignment,	Timely relocation of the utility by its owner will mitigate the issue. The LANE Team will coordinate with the utility owner accordingly to prevent schedule impact.
ROW	WO&D Bridge, Noise Barrier, & Bon Air Trail	Delay access to work area.	The LANE Team’s phasing plan intentionally defers the work dependent on ROW, thus avoids impacting the Critical Path of the schedule.
Permit	Project-Wide	Approval of environmental permits can impact the start of construction.	Develop comprehensive Interface Plan with regulatory agencies to expedite the approval process.
Unforeseen Site Condition	Project-Wide	Unforeseen Site Condition can cause schedule impact and delay	Investigate during scope validation, development of geotechnical report and UFI; Incorporate resolutions into the design and construction.

Construction Phase - As the Project transitions to construction, whether it be shoulder strengthening operations or utility relocations, the Construction Manager and Design-Build Manager work closely to monitor and update the schedule on a weekly basis. The LANE Team, having worked together on several projects, believes that weekly meetings, in include all disciplines, creates a face-to-face opportunity to address and mitigate issues that may arise. These weekly meetings, held at the project offices, ensure the schedule is relayed to the entire team, including utility companies and QA/QC. In turn, following these weekly meeting, the schedules are

communicated to VDOT and other public agency stakeholders to provide a regular and consistent update. These meetings foster an “all hands on deck” evaluation of options to avoid delays or to facilitate schedule recovery, including reevaluation of the sequence of work due to unforeseen conditions.

4.5.2 Transportation Management Plan Narrative (TMP)

The LANE Team’s commitment to safety is a deeply ingrained culture that is evident in the design and construction personnel on the team. On VDOT’s I-66 at Route 15 Interchange Project, for which the LANE Team was the Design-Builder, there were zero construction incidents for 2016, making it one of LANES most successful “safety” projects. The LANE Team intends to utilize the same key personnel to implement the same level of dedication to safety to show our continued commitment along the I-66 corridor. A major component of this commitment is the development and implementation of a reliable Transportation Management Plan (TMP) strategy to ensure continued multi-modal mobility along the corridor. The LANE Team is resolute in ensuring that all aspects of the TMP and Temporary Traffic Control Plans (TTCP) are developed with a focus on transparency for all stakeholders, safety of the traveling public and construction personnel, and reducing potential travel delays for the life of construction.

The following represents a summary of these measures:

- TMP Plan completes the requirements for Interim Milestone #1: Early substantial completion for I-66 EBW (excluding Landscaping) and Signal Reconstruction on Lee Highway
- TMP Plan completes the project for the “Early Final Completion” timeline
- An approach that maintains traffic (i.e. vehicular and pedestrian/bicyclist) safely and continuously for the life of construction
- A Sequence of Construction (SOC) that considers the following:
 - A TMP & SOC that minimizes roadway detours, ramp closures and lane closures
 - A TMP & SOC that incorporates the importance of multi-modal components, such as providing detailed way-finding signage for pedestrian detours & bicycle detours
- Conducts a review of the existing corridor and addresses safety concerns as part of the project’s construction activities.
- Commitment by the LANE Team to provide extensive public outreach and utilize a wide range of public outreach tools, such as social media and PCMS signs
- Commitment by the LANE Team to involve the stakeholders to ensure all voices are heard

The LANE Team Culture & TMP Plan Approach

Transparency and Safety Culture: The LANE Team’s TMP plan is generated with a focus on four basic concepts as shown in **Figure 4.5.2-1**. These concepts ensure that the TMP plan is transparent to all parties and promotes a culture that emphasizes safety for everyone indirectly (i.e. property owners) or directly (i.e. travelers and construction workers) connected to the Project. The TMP plan will comply, as required by the RFP, with VDOT’s IIM-241/TE-351 for a Type C, Category V level plan. The plan’s focus will be on stakeholder involvement, maintaining flow for all modes of traffic, safety of all parties, and constructability in conformance with the

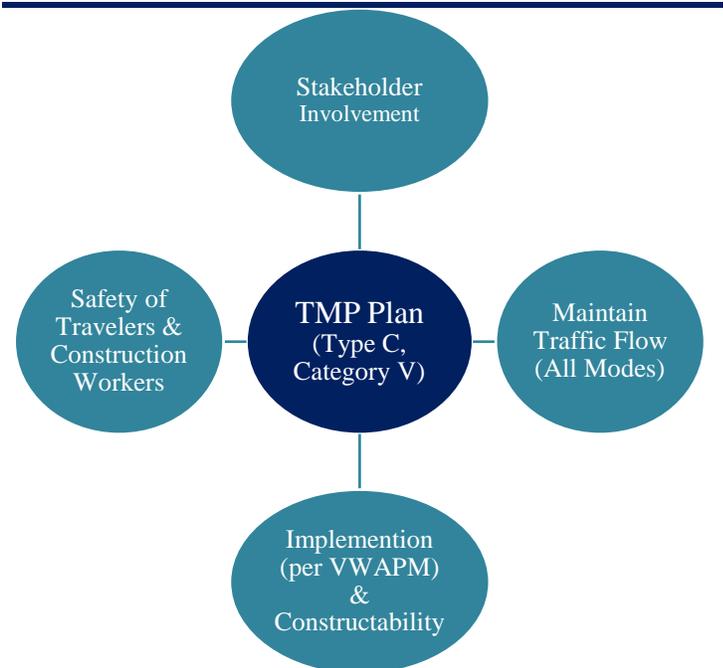


Figure 4.5.2-1. Key concepts the LANE Team’s TMP will focus on to promote a transparent and safe culture.

VWAPM/MUTCD. This level of planning will be implemented throughout all areas of the Project to ensure consistency and uniformity on all affected users whether they be vehicular traffic on I-66 and side roads or pedestrians utilizing the local network of sidewalks and shared use paths.

Maintaining Traffic (Multi-Modal Traffic): Where existing infrastructure exists, the Project must balance the needs of the current traveling public (all modes) against the needs to construct improvements efficiently. The LANE Team has developed a sequence of construction concept, as presented in Section 4.5.1, and a TMP, as described in this section, that maintains a balance between these conflicting needs. Upon NTP, the TMP will be finalized under the direction of John Giometti P.E. (RDA). John’s 29 years of experience in the industry and as a former District L&D Engineer for VDOT will guide the development of a successful plan. Under the LANE Team’s culture for transparency and safety, the TMP Plan will ensure that all lanes of traffic are maintained in conformance with RFP and will minimize lane and shoulder closures while providing detours for roadway and/or pedestrian traffic where full closures are needed for construction. The LANE Team, full understands, based on our experience in the corridor, that lane closures can have a negative domino effect on traffic through the corridor. As a result, the SOC presented in Section 4.5.1 was created to minimize lane closures and, when necessary, only as permitted by the RFP. When detours (as permitted by RFP) are required, the LANE Team will prepare a Work-Zone Traffic Analysis as required by IIM 241/TE-351, in accordance with VDOT’s Traffic Operations and Safety Analysis Manual (TOSAM) for vehicular and non-vehicular modes. With this in mind, our Team has paid extra attention to the operations of pedestrian/bicycle facilities, an area that is often overlooked or minimized within typical TMP plan. Within the project limits are a multitude of pedestrian/bicycle facilities that are directly or indirectly impacted by the Project. The LANE Team commits to providing additional way-finding signs and meeting with stakeholders to address the needs of non-vehicular traffic to ensure continuity of all modes.

Stakeholder Involvement: A major element contributing to the success of this Project is an integrated stakeholder program. As such, stakeholder concerns must be transparently addressed within the project’s TMP plan. A summary of some of the critical elements of stakeholder involvement are as follows:

- On-going coordination with traveling public (vehicular and non-vehicular modes).
 - The LANE Team will ensure PCMS boards are updated regularly (with remote connectivity to TOC) and ensure pedestrian detours are clearly signed for the duration of the project.
 - The LANE Team, as require by the RFP, will hold public involvement meetings and will commit to meeting stakeholders separately in order to address their individual concerns.
- The LANE Team will coordinate with adjacent projects such as Transform 66 in order to ensure work-zones are not in conflict with each other.
- The LANE team will keep have open communication with TransCore and the VDOT TOC to ensure lanes are maintained as required by the RFP and to mitigate any lane closures (as permissible by RFP) as the need arises for the Project’s construction.

For more details specific to critical stakeholders, please see sub-section entitled: “Impacts to Major Stakeholders” below, near the end of Section 4.5.2.

Incident Management Plan: The I-66 Corridor (within the project limits) for both EDA and EBW is a congested, high speed corridor. Thus, contingency plans in the event of an unexpected incident are a necessity. The LANE Team is fully prepared to respond quickly to mitigate the impacts to traffic and to restore full traffic operations. The LANE Team’s tool box for Incident Management consists, but not limited to, the following:

- Includes a comprehensive “telephone tree” of the order of calls to be placed to critical stakeholders in the event of an incident any hour of the day;
- As required by the RFP, the LANE Team will utilize a 24/7 wrecker service that can remove stranded vehicles from the roadway that may be blocking travel lanes;

- Pre-designed detour routes will be generated; stand-by equipment (i.e. “pink” VWAPM signs for emergency use) will be available; and on-site, existing equipment (i.e. PCMS, drums) will be re-used for full mobilization and implementation by dedicated crews trained for incident management;
- The LANE Team commits to regular contact with the TOC in order to maintain acceptable operational flows during unexpected incidents.

Constructability vs. LANE Team TTCP Plan

The LANE Team’s SOC, as presented in Section 4.5.1, is broken in to five work areas of construction, identified as Work-Zones. The LANE Team, in coordination with all stakeholders, plans to construct the Project in multiple phases and sub-phases as outlined in Section 4.5.1. The LANE Team has developed a plan that will begin construction within existing right of way. Upon completion of right side shoulder strengthening utilizing nighttime lane closures, the construction will focus on the median widening, providing visual perception of good progress for stakeholders. This allows for maximized schedule allotment to obtain necessary land rights and coordination of utility relocations. The TTCP, in subsequent phases, provides flexibility within the Project to allow crews to work within various areas along the I-66 EB corridor. The LANE Team commits to being transparent and to providing additional mitigations where feasible and practical to address stakeholder concerns during construction as they arise.

As shown in Volume 2 (pages 22 through 27), the LANE Team has carefully developed a plan that will ensure all lanes (existing number) are maintained during construction (as shown in typical sections) for each phase of construction, while ensuring construction personnel/equipment are adequately protected from vehicular traffic and vehicular traffic is provided clear guidance for traffic control for their protection. Additionally, all features of the Project’s sequence of work consider the geometric requirements of the existing facilities to maintain adequate transitions, lane shifts, tapers and buffer-zones as well as proper acceleration and deceleration lengths.

Discussion of Select Project TMP Challenges

Every project presents it’s own unique set of challenges requiring additional attention and stakeholder involvement (transparency) to minimize impacts to infrastructure users and schedule risks and to provide incident prevention measures that improves the safety of everyone involved with the Project. While all the challenges cannot be presented or foreseen, some of them are discussed below, along with the LANE Team’s planned approach:

Bon Air Park Bridge (B679), Middle Section Re-decking – TTCP Phase 3: This element of construction will be unique and present challenges for all stakeholders, including the LANE Team. As discussed in Section 4.5.1, the LANE Team has prepared a split-phase TTCP concept. During design we will work with VDOT L&D staff, VDOT’s TOC and the VDOT Public Relations/Communication Office to ensure all stakeholders have a clear understanding of these operations. The LANE Team will provide increased signage to include advance signage and PCMS as necessary for implementation of this element of the TTCP. Please see Volume 2 (page 24) for more details.

Maintenance of Overhead Signs, ATCs and ITS Equipment: The LANE Team understands that this is a corridor with a heavy reliance on ITS Technology and Automated Traffic Controls (ATCs). The LANE Team will coordinate with TransCore for any impacts to their systems to maintain continuity of service for the duration of construction. The LANE Team will install overhead structures prior to the removal of existing structures to allow for seamless transition regarding messaging. The SOC, presented in Section 4.5.1, advances construction in such a manner to ensure all messaging and ITS components are continually maintained during construction – installing temporary devices as needed in coordination with the TOC to ensure continuity of operations and service.

Barrier Installation vs. Worker Safety: As part of the culture of safety, the LANE Team is fully committed to protecting all users (vehicles, pedestrians, construction personnel). The LANE Team will ensure that all concrete traffic barrier service (TBS) is installed to permit the maximum deflection zone (as physically possible) behind the barrier, providing additional space between the travel lanes and the work zone. This provides a



secondary benefit of not having to anchor the barrier on straight sections of roadway that would require additional lane closures for pavement restoration due to damage caused by concrete TBS anchoring/pinning.

Pedestrian Accommodation and Detours (Custis Trail, W&OD Trail and Hike/Pedestrian Bridge B681):

As discussed briefly in Section 4.5.1 and earlier in this Section, the LANE Team has evaluated and proposes detours for the existing adjacent trails along the I-66 corridor. These detour plans will be further evaluated with VDOT and NVRPA (& other stakeholders) as applicable for final design and implementation in the field. The key to success on a pedestrian detour is ensuring that adequate way-finding signage is provided. The LANE Team commits to providing an effective signing plan that incorporates requests by stakeholders. Upon implementation of the detours, based on user feedback, the LANE Team commits to continued monitoring of the detours and providing additional signage as necessary to ensure their effectiveness. As an example, one of the detours for the Custis Trail during construction is shown above. Signage will be provided at all turn points and regular intervals along straight sections. The LANE Team present each of these detours for discussion with VDOT/NVRPA and other stakeholders for the W&OD Trail bridge, WB Noise barriers installation (impacting adjacent trails), and other adjacent pedestrian/hiking and/or biking facilities.

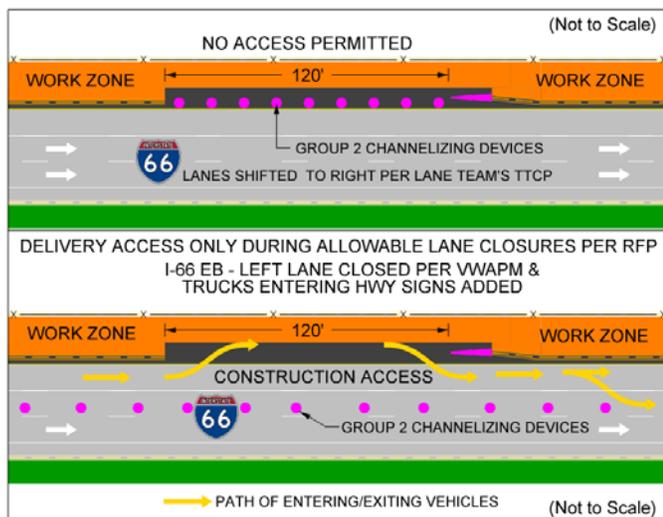


Figure 4.5.2-2 The LANE Team has developed preliminary access plans for Construction Access Points.

Construction Access Points: As discussed in Section 4.5.1, construction access is an element that must have full evaluation and consideration. A potential challenge the LANE Team foresees is managing access in and out of the work-zone in the narrower sections of I-66 Eastbound, particularly from N. Sycamore St. to the end of the project during the median widening phase (Phase 1B). The LANE Team has developed a preliminary access plan, as shown in Figure 4.5.2-2. The LANE Team will limit access for major deliveries/operations to times when allowable lane closures are permitted per the RFP. This will create maneuvering space for construction vehicles (deceleration and acceleration) while ensuring I-66 vehicular traffic is controlled away from the access point.

Considerations of Existing Condition & Potential Remedies: No project's TMP plan is complete without an evaluation of existing conditions. The LANE Team, as part of the overall project safety awareness, has evaluated the existing conditions for the project limits. The LANE Team will implement a variety of additional mitigation measures to increase roadway users, pedestrian users, and construction personnel safety. In review of the corridor's incident history, the prevailing accident types are rear-end crashes and lane-change/lane swipe crashes, particularly on I-66 at the beginning of the project limits. **Figure 4.5.2-3** shows a snap-shot of our findings and the measures the LANE Team intends to implement as a representative of the approach we have for the entire project.

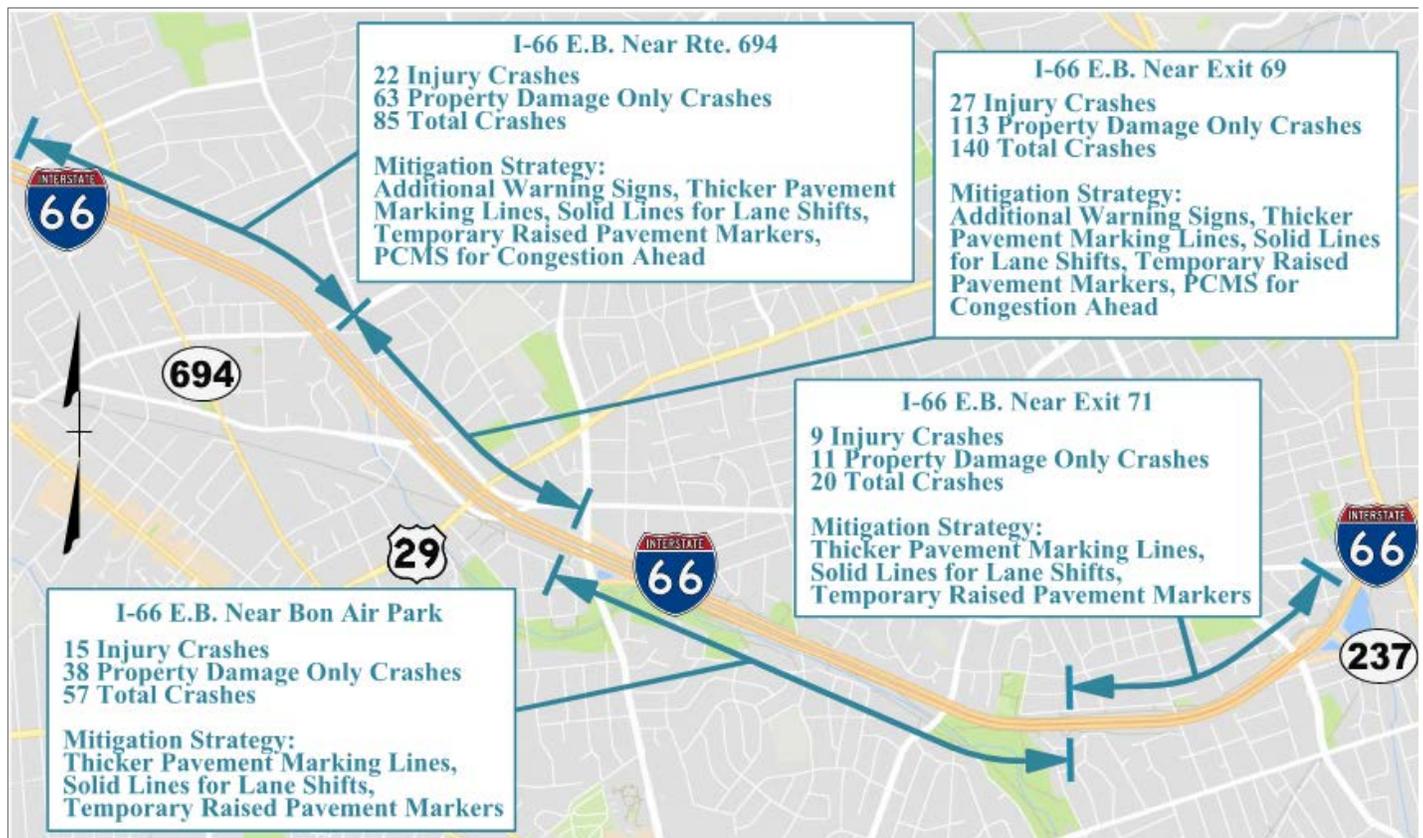


Figure 4.5.2-3 The LANE Team evaluated the existing conditions of the project limits to full understand the safety measures that need to be in place on this Project.

Overview of Planned Traffic Control for the Project

The LANE Team will begin detailed development of the project's TMP plan concurrent with the design of the project's improvements. We recognize the multi-modal character of the I-66 corridor within the Project limits that serves both vehicular and non-vehicular traffic (i.e. pedestrians and bicyclist etc.), all which must be maintained during construction. The LANE Team is committed to ensuring all stakeholder voices are heard to find the best mitigation to potential impacts as the project's design plans and TMP plans are developed.

The TMP Plans will be developed for each phase of the project as shown in Volume 2 (pages 22 through 27). The LANE Team has developed a preliminary TMP plan, which will be further developed and fine-tuned with stakeholder involvement to mitigate travel delays, driver confusion, and appropriate guidance for pedestrians and bicyclists. These TMP Plans will show all temporary traffic control devices (i.e. traffic barrier service, construction access points, temporary pavement markings and limits of required mill/overlay for temporary pavement markings, PCMS devices, temporary drainage, construction signage and all other requirements per the VWPAM, VDOT's IIM-241.7, and the Manual on Uniform Traffic Control Devices).

The LANE Team recognizes there are two common shortfalls that affect TMP plan development. They are consideration (or lack thereof) for adequate access points and consideration for pedestrians and bicyclists. The

LANE Team is committed to avoiding these pitfalls and to exceeding the RFP and VWAPM/MUTCD requirements with respect to development of these key features of the TMP. *(Please see “Select Project Challenges” section below for how the LANE Team plans to address these key features.)*

In accordance with the RFP, Part 2, Section 2.12.1, all TMP traffic control measures/devices will be designed (i.e. geometric features, sight distance etc.) and implemented to meet the existing posted speed (or advisory speed for ramps) for any affected roadway or trail for both the EBW and EDA project. Additionally, the LANE Team’s TMP plan will comply with the RFP Technical requirements relating to **1) Lane Closures, 2) Ramp Closures, 3) Temporary Detours, 4) Flagging Operations, 5) Lane Widths, 6) Time of Day Restrictions** as follows:

I-66 (EDA & EBW) Mainline

- Minimum 11’ lanes will be maintained
- No long-term lane closures are planned and no temporary detours are planned
- Time of day restrictions will follow RFP, Part 2, Section 2.12.3 (and VDOT Special Provision for Section 108.02 – Limitations of Operations dated Feb. 17, 2017)
- Temporary lane closures will be implemented for night-time paving, shoulder strengthening for construction duration, delivery of materials and installation of traffic barrier service
- Temporary 20-minute total closures for overhead signage work and/or toll gantry work
- Flagging operations will not be implemented.

I-66 On-Ramps and Exit Ramps (EBW) and I-66/Route 7 Interchange Ramps (EDA)

- Minimum 11’ lanes will be maintained
- No long-term ramp lane closures or ramp detours are planned
- Single night temporary detours are anticipated for night time paving operations – Overnight detours will be analyzed per RFP, Part 2, Section 2.12.1 in accordance with VDOT’s IIM-241 and the TOSAM
- Time of day restrictions will follow RFP, Part 2, Section 2.12.3 (and VDOT Special Provision for Section 108.02 – Limitations of Operations dated Feb. 17, 2017)
- Temporary 20-minute total closures for overhead signage work
- Flagging operations will not be implemented.

U.S. Route 29 and Fairfax Drive (EBW)

- Minimum 11’ lanes will be maintained
- No long-term lane closures
- Single night temporary detours are anticipated for night time roadway closures for W&OD Trail Pedestrian Bridge – Overnight detours will be analyzed per RFP, Part 2, Section 2.12.1 in accordance with VDOT’s IIM-241 and the TOSAM
- Time of day restrictions will follow RFP, Part 2, Section 2.12.3 (and VDOT Special Provision for Section 108.02 – Limitations of Operations dated Feb. 17, 2017)
- Temporary 20-minute total closures for overhead signage and signal reconstruction work
- Flagging operations are anticipated – All flaggers will be certified and properly dressed, and have the appropriate tools. Additionally, all flagging operations will be consistent with the VWAPM.

Williamsburg Blvd., N. Westmoreland St. and N. Sycamore St. (EBW) and Leesburg Pike (EDA)

- No long-term lane closures
- Single night temporary detours are anticipated for night time roadway closures for I-66 bridge work – Overnight detours will be analyzed per RFP, Part 2, Section 2.12.1 in accordance with VDOT’s IIM-241 and the TOSAM
- Time of day restrictions will follow RFP, Part 2, Section 2.12.3 (and VDOT Special Provision for Section 108.02 – Limitations of Operations dated Feb. 17, 2017)
- Temporary 20-minute total closures for bridge work, noise barriers and bridge pier work

- Flagging operations are anticipated – All flaggers will be certified and properly dressed, and have the appropriate tools. Additionally, all flagging operations will be consistent with the VWAPM.

Washington & Old Dominion (W&OD) Trail (EBW)

- A total closure will not be implemented by the LANE Team
- A long-term detour is anticipated in order to construct the new pedestrian bridge
 - Temporary detour will be analyzed per RFP, Part 2, Section 2.12.1 in accordance with VDOT’s IIM-241 and the TOSAM
 - *The LANE Team is committed to exceeding the RFP requirements* to provide additional way-finding signage to guide the W&OD Trail users along the temporary detour. The LANE Team will work with all stakeholders to generate a plan and will conduct periodic reviews to update signage as required.
- Time of day restrictions will follow RFP, Part 2, Section 2.12.3 (and VDOT Special Provision for Section 108.02 – Limitations of Operations dated Feb. 17, 2017)
- Flagging operations are not anticipated.
- Trail width will be no less than existing conditions

Custis Trail at Bon Air Park & Pedestrian Bridge over I-66 at Sta. 226+00(+/-) (EBW)

- *The LANE Team is committed to exceeding the RFP requirements* by not implementing a total weekend closure for the Custis Trail or Pedestrian Bridge over I-66.
- A long-term detour is anticipated in order to construct the new pedestrian bridge
 - Temporary detour will be analyzed per RFP, Part 2, Section 2.12.1 in accordance with VDOT’s IIM-241 and the TOSAM
 - *The LANE Team is committed to exceeding requirements* to provide additional way-finding signage to guide trail users along the temporary detour. The LANE Team will work with all stakeholders to generate a plan and will conduct periodic reviews to update signage as required.
- Time of day restrictions will follow RFP, Part 2, Section 2.12.3 (and VDOT Special Provision for Section 108.02 – Limitations of Operations dated Feb. 17, 2017)
- Flagging operations are not anticipated.
- Trail width will be no less than existing conditions

Work Zone Speed Reductions

In evaluation of Part 2, Section 2.12.1 Maintenance of Traffic, the RFP specifically states “The TMP shall be designed to meet the posted speed.” *The LANE Team commits to implementing a TMP plan that eliminates the need for work zone speed reductions for all phases of the project.*

Impacts to Major Project Stakeholders

The LANE Team, for this project understands transparent communication with all project stakeholders is paramount to a successful TMP, particularly given the vocal nature of the adjacent property owners, traveling public, and regulatory jurisdictions/agencies along the corridor. The LANE Team will strive to minimize impacts. However, some reasonable inconveniences should be anticipated. Transparent communication with all stakeholders regarding any impacts will be well presented with all mitigations being installed prior to implementing construction. The LANE Team is committed to providing additional PCMS signs for motorist guidance, additional “Pardon our Dust” meetings for each major phase of construction, engaging adjacent property owners, and utilizing social media (i.e. Twitter and/or Project Page) to actively engage the traveling public in concert with VDOT.

Table 4.5.2-4 – Potential Impacts to Project Stakeholder vs. Communication/Mitigations Strategies

STAKEHOLDERS	IMPACTS	COMMUNICATION AND MIGITATION STRATEGIES
W&OD Trail Users NOVA Parks	EBW – New grade separation at Route 29	<ul style="list-style-type: none"> • Public Information Meeting prior to Final Design • Pardon Our Dust Meeting prior to construction start

		<ul style="list-style-type: none"> • Additional Public Information Meeting prior to start of grade separation construction • Signs and flyers along trail to inform users of upcoming meetings and construction activities • One on one meetings with NOVA Parks administration/staff
Adjacent Property Owners and Local Residents	<p>EDA- Construction noise EBW – Construction noise and noise barrier construction</p>	<ul style="list-style-type: none"> • Public Information Meetings during the design process (minimum of 5) • Pardon Our Dust Meeting prior to construction start • Additional Public Information Meeting prior to start of each major phase of construction • Social media
Custis Trail/Bon-Air Park Nova Park Users Arlington Parks & Recreation	<p>EBW - Realignment of Custis Trail in Bon Air Park and noise barrier replacement</p>	<ul style="list-style-type: none"> • Pardon Our Dust Meeting prior to construction start • Signs and flyers along trail to inform users of upcoming meetings and construction activities • One on one meetings with Arlington Parks and Recreation Parks administration/staff
Police, Fire & Rescue	<p>EBW - General construction impacts limiting shoulders and road closures (and/or detours?) for setting bridge beams EDA – General construction impacts and road closures (and/or detours?) for setting bridge beams</p>	<ul style="list-style-type: none"> • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
I-66 Express Toll/TransCore	<p>EBW– General construction impacts to traffic and impacts to tolling infrastructure EDA – General construction impacts to traffic</p>	<ul style="list-style-type: none"> • Design review coordination as needed when impacting toll facility infrastructure • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
Traveling Public	<p>EBW – Traffic shifts, lane closures, detours, etc. EDA – Traffic shifts, lane closures, detours, etc.</p>	<ul style="list-style-type: none"> • Public Information Meetings during the design process (minimum of 5) • Pardon Our Dust Meeting prior to construction start • Additional Public Information Meeting prior to start of each major phase of construction • Social media • PCMS signs alerting travelers of upcoming public meetings, traffic shifts, lane closures, detours, etc.
WMATA	<p>EBW– no direct impacts expected EDA – no direct impacts expected</p>	<ul style="list-style-type: none"> • Courtesy design reviews • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
Arlington County	<p>EBW – Utility relocations, traffic signal construction, local road closures, lane closures, and/or detours</p>	<ul style="list-style-type: none"> • Design review coordination • Traffic signal coordination • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
Falls Church	<p>EDA - Local road closures, lane closures, and/or detours</p>	<ul style="list-style-type: none"> • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
Fairfax County	<p>EBW – General construction EDA – General construction</p>	<ul style="list-style-type: none"> • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
Utility Companies (Dominion Energy, Washington Gas,	<p>EBW – General construction EDA – General construction</p>	<ul style="list-style-type: none"> • Provide early impact analysis / UT-9’s prior to UFI so that each utility can evaluate and prepare for the UFI

Verizon South, AT&T, CATV, Arlington County, Fairfax Water, Fairfax DPW)		<ul style="list-style-type: none"> • Maintain continued contact with affected utilities and facilitate relocation designs by providing relocation alignments that avoid further impact or complication
Transform 66 Outside the Beltway project	EBW – General construction EDA – General construction	<ul style="list-style-type: none"> • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
VDOT Traffic Operations Center	EBW – Road closures, lane closures, traffic shifts, and detours EDA – Road closures, lane closures, traffic shifts, and detours	<ul style="list-style-type: none"> • Enter information into VDOT’s Lane Closure Advisory Management System (LCAMS) • Weekly “look ahead” notifications to alert of upcoming traffic shifts, lane closures, detours, etc. • One on one meetings as necessary
Education Facilities: UVA/VA-Tech Campus George Mason High School Mary Ellen Henderson Middle School and others	EBW – General construction EDA – General construction	<ul style="list-style-type: none"> • Public Information Meetings during the design process (minimum of 5) • Pardon Our Dust Meeting prior to construction start • Additional Public Information Meeting prior to start of each major phase of construction • Social media • One on one meetings as necessary

LANE Team Commitment for Project’s TMP Plan

Our Team is adamant about providing and maintaining a safe work zone. To this end, we look for ways to improve traffic patterns not only during design but during construction. Therefore, with the inclusion of the features detailed above, we are committed to exceeding the RFP safety and mobility requirements. With features such as reduced lane closures, use of temporary geometry accommodating full posted speeds, and enhanced safety devices, we look forward to the privilege of successfully designing and constructing this critical Project.

4.6 DISADVANTAGED BUSINESS ENTERPRISES (DBE)

4.6 | DISADVANTAGED BUSINESS ENTERPRISES (DBE)

The LANE Team embraces and supports VDOT's DBE program and is committed to meeting or exceeding the 15% goal for the design and construction of this project. We will take all necessary and reasonable steps to provide SWaM firms with the maximum opportunity to compete for and perform services on this contract.

DBE Subconsultants. The LANE Team includes the following highly qualified DBE subconsultants: CES Consulting, LLC, DMY Engineering Consultants, Inc., and Dulles Geotechnical & Material Testing Services, Inc.

Subcontracting Plan. LANE implements a subcontracting plan on all of our projects to offer the maximum opportunity for DBE and SWaM subcontractors to qualify for and provide services. The first step is source selection. LANE researches the capabilities of a wide range of subcontractors. This includes an evaluation of past performance, socioeconomic status, financial condition, current availability, and safety performance. Based on this research, a list of potential subcontractors is developed. The second step is the outcome of the proposal process. Once a solicitation for pricing has been set, potential subcontractors have the opportunity to respond with their site-specific worker protection program and best price proposals. LANE reviews the price proposal to determine price reasonableness. The final selection of the subcontractor is made by combining the results of the safety and price evaluations to determine the proposal that provides the best value to VDOT and LANE.

Safety is an integral part of any scope of work performed on this project. Accordingly, a subcontractor's safety approach is a key component of our evaluation process. All subcontractors must meet our stringent safety requirements to be a member of the Team.

LANE also conducts a technical evaluation of the qualifications presented in the subcontractor's proposal, as well as an independent review of their past performance. References provided with their price proposal are contacted and questioned about the subcontractor's past performance. The topics covered include safety, schedule and cost compliance, and quality of work. If the potential subcontractor has worked for LANE before, its past performance and safety record for LANE will be evaluated. If the potential subcontractor is required to submit a Quality Control Program or Worker Protection Program with their proposal, these documents will also be evaluated. If the subcontractor has not worked for LANE previously, a project interview will be required.

LANE solicits subcontractor and supplier price proposals and evaluates for award of a subcontract or purchase order based on quality, past performance, and competitiveness. Once these reviews are complete, our evaluation team members discuss the results and select the subcontractors and suppliers that best satisfy the requirements of the contract. Any subcontractor that fails to meet these requirements will be eliminated without further consideration. This approach was successfully employed on the I-495 and I-95 Express projects. Both projects obtained their goals; I-495 Express Lanes was awarded the Virginia DBE project of the year.

4.7 PROPOSAL SCHEDULE

4.7 | PROPOSAL SCHEDULE

4.7.1 Proposal Schedule

The Proposal Schedule utilizes Primavera P6 software and CPM scheduling to depict the scope and sequence of Work to design and construct the Project per the RFP requirements. The Proposal Schedule and Schedule narrative are included in Technical Proposal - Volume I. Per the RFP requirement, the LANE Team has provided “PDF” copies of the proposal schedule and narrative, as well as a back-up copy of the schedule source file in “XER” format (Ver 16.2.2) on a CD-ROM.

4.7.2 Proposal Schedule Narrative

The LANE Team has developed the following Proposal Schedule narrative for our overall plan to execute the work. The narrative includes overall sequencing of Project, the Critical Path, the LANE Team’s strategy to ensure the successful delivery of the Project on time and within budget, and other key assumptions on which the schedule is based. We also explain how the LANE Team optimizes the benefits of the D-B delivery method to mitigate known risks, conform to MOT requirements, minimize impacts of construction activities on the environment, and deliver the Project on-time.

Sequence of Work

The LANE Team will work diligently to achieve the Interim Milestone and Final Complete on or before the required dates. The LANE Team evaluates the Project in three stages of progress:

1. Design and Permitting – The objectives of this stage is to complete all preliminary and final design for the Project, obtain approval of all permits, resolve all utility conflicts, and perform ROW acquisitions.
2. Procurement – The objective of this stage is to procure all lead items for the projects, which includes shop drawing development and approval, fabrication of material and its delivery.
3. Construction - The objective of this stage is to physically construct the 100% of the Project. This also includes the VDOT inspection and acceptance of Work, system testing, punchlist, burn-in periods, and project close-out.

These three stages of progress are sequential. In order to optimize the Project, the LANE Team will prioritize Design and Permitting as follow:

- Focus on the design that is required for permit application. The goal is to apply for permits as soon as possible after NTP, which, in turn, will allow construction to start sooner.
- Knowing that the bridge girders are major long lead items of the Project. The LANE Team will develop work packages for these girders so the procurement of this material can start as early as possible. The goal is to remove procurement of materials from the critical path.
- The RFP states that all final design plans, that utilize the geotechnical report, cannot be submitted until at least 90 days after VDOT is in receipt of the report. The LANE Team will expedite the development of the geotechnical investigations and report, so it will not impact the progress of final design.

Execution of the Project will focus on completing the Project on or before the RFP milestones. In an overview, there are five distinct work zones in the Project. The LANE Team will tackle these work zones as follow:

- Work Zone 1: I-66 Eastbound Widening (EBW) – This is the critical path of the Project. It contains most of the work scope of all work zones. The LANE Team will construct the work zone in 3 phases:
 - Phase 1 – widening I-66 in the median.
 - Phase 2 – reconstruction and widening of I-66 on the outside shoulder, and installation of new noise barrier.
 - Phase 3 – complete Bon Air Park bridge deck replacement, final paving, punch list, and project close-out.

- **Work Zone 2: I-66 Westbound Work (WBW)** – This is non-critical path of the Project (Interim Milestone). The main scope of work is to replace portion of the existing noise barrier in the alignment, expend / new noise barrier, and modify 3 existing bridges to feature noise barrier. The Work can be constructed independent of I-66 EBW, but the LANE Team will share construction resources between the 2 areas.
- **Work Zone 3: WO&D Pedestrian Bridge** – The work is on near parallel alignment to I-66 EBW, and can largely be construct independent of the I-66 EBW phasing. The area has the highest exposure to the general public, and the LANE Team will address this risk on the design, planning and construction accordingly.
- **Work Zone 4: Custis Trail Improvements in Bon Air Park (Bon Air Park)** – This is a non-critical path element of work (Interim Milestone). The main scope of work is to reconstruct portions of Custis Trail to provide safer pedestrian and bicycle traffic.
- **Work Zone 5: I-66 EDA (Option 1)** – This is the Option 1 work and predecessor to Project Final Completion. In the early stage of construction, the LANE Team intend to construct a temporary connector between the 2 existing ramps, and provide an early relief to the traffic congestion in the area.

Incentive for Early Completion

The Proposal Schedule currently depicts the LANE Team achieving the Interim Milestone on the RFP milestone date – November 10, 2020. VDOT has offered an “No Excuse” incentive for early completion of the Intern Milestone. The provision clearly dictates the terms and condition required for collecting this payment, and the LANE Team fully intend to modify our sequence work to achieve early completion post award. The modifications can be summarized as follow:

- Start design at risk after Notice of Intent to Award. The goal is to perform as much as design as possible between Notice of Intent to Award and NTP, thus the overall design period of the Project can be reduced.
- Early preparation of bridge demolition for protecting travel public under the bridge, which can reduce the overall duration of bridge construction, and potentially reduce the overall duration of the project.
- Early clearing of trees on the outside during shoulder strengthening. This will reduce the clearing time for I-66 EBW Phase 2 (noise barrier construction), and potentially reduce the overall duration of the project.

The LANE Team will evaluate the aforementioned modifications after Notice of Intent to Award to determine need and viability for implementation. Although not needed based on our current schedule which starts at NTP, implementing these strategies will provide additional float in the schedule should unforeseen issues arise.

Critical Milestone

The LANE Team is committed to the Interim Milestone of November 10, 2020 and Final Completion date of October 1, 2021. The table below identifies Key Milestone dates, which in order to meet, will require coordination not only between the D-B Team, and VDOT but also other reviewing agencies (FHWA, City of Arlington, etc.). Post Project award, the LANE Team will implement our assertive D-B approach, local experience, and relationships to potentially improve these dates to meet the Interim Milestone Early Completion of September 11, 2020 and Early Completion of the Project of August 2, 2021.

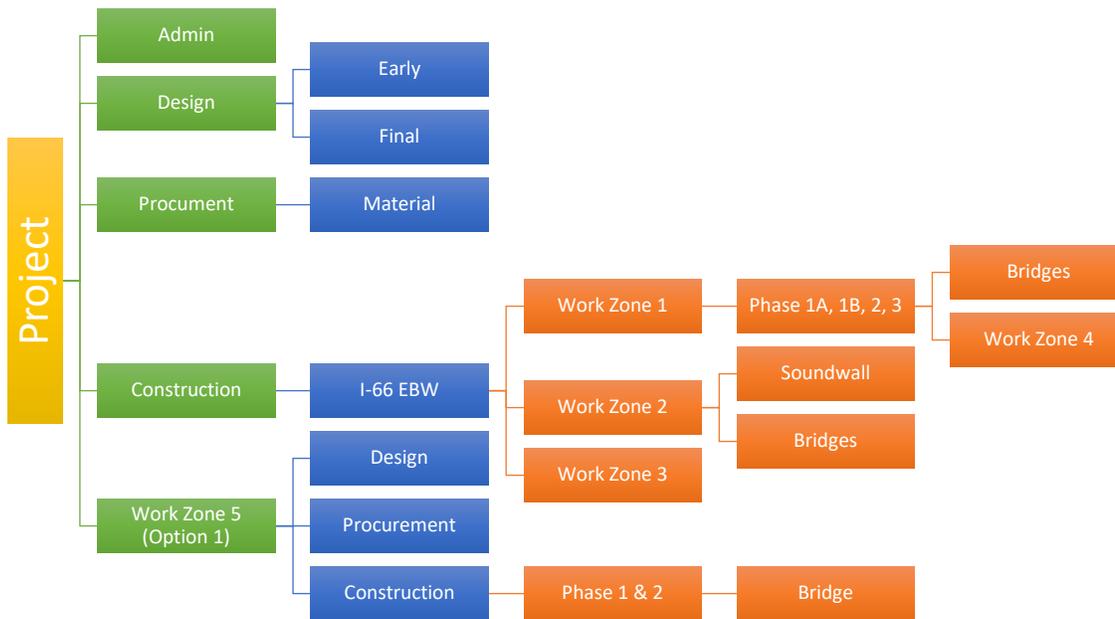
Key Milestone	Milestone Date
Technical Proposal Submission Date	September 13, 2017
Price Proposal Submission Date	October 24, 2017
Notice of Intent to Award	October 26, 2017
CTB Approval / Notice to Award	December 6, 2017
Design-Build Contract Execution	January 5, 2018
NTP	January 8, 2018

Scope Validation Period Complete	May 8, 2018
Interim Milestone	November 10, 2020
Final Completion Date	October 1, 2021

Work Breakdown Structure (WBS)

The WBS is a multi-level, hierarchical arrangement of the work to be performed on the Project. The LANE Team has laid out the WBS to break down the major phases of the Project by Project Element and type of work. The type of work has been broken down by Phases, Work Zones and respective components such as Milestones, Project Management, Scope Validation, Environmental/Permitting, ROW, Design, Public Involvement, Utility Relocation, and Construction.

The WBS areas for the Project have been developed as a collaborative effort between the design and construction teams by evaluating the components of the Project as a single Project including type of work along the alignments design considerations, and management of the construction efforts.



Level 1 is the Project, while Level 2 through 6 of the WBS as depicted in the Proposal Schedule include but are not limited to the following items for the respective Project components:

- Administration: includes the contract milestones, the start and completion milestones of major project components, and monitoring of project durations.
- Design: includes the development of all design plans, scope validation, utility, permit, ROW acquisition, QA/QC plans, construction plans, etc.
- Procurement: includes the procurement and fabrication of girders and piles for the Project.
- Construction: includes the entire construction scope of the Project, which includes but not limited to: MOT, erosion & sediment controls, QA/QC, storm water management, drainage, lighting, ITS, phasing, bridge construction, mill-and-overlay paving, noise barrier wall, and roadway construction.

Calendars

The LANE Team uses 5 different calendars to represent a variety of work scenarios:

- **“5 Days / Week with Holiday”** – Based on five working days per week and includes standard holidays. Used for design activities and work not impacted by adverse weather and holiday restrictions.
- **“5 Days / Week with Weather & Holidays”** – Based on five working days per week, specified holiday restrictions, and anticipated weather days. Used for construction activities.
- **“5 Days / Week for Paving”** – Based on the “5 Days with Weather & Holidays” with non-working periods from December through February. Used for asphalt paving activities.

- **“5 Days / Week for Final Paving”** – Based on the “5 Days with Weather & Holidays” with non-working periods from December through April. Used for mill-and-overlay and final asphalt paving activities.
- **“Calendar Days”** – Based on seven days per week and is used for review periods and milestones.

For weather analysis, the LANE Team has reviewed the weather data (Apr 2012 to March 2017) provided by NOAA observation center at Washington Reagan National Airport, VA. Using on 0.1 inch of participation per day as the threshold for weather impact and taking into consideration of weekends, the LANE Team schedule accounts the following number of weather days each month:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Anticipated Weather Days	4	4	4	4	5	6	5	4	3	4	3	6

The LANE Team will observe the New Year, Memorial Day, 4th of July, Labor Day, Thanksgiving, Friday after Thanksgiving, and Christmas holidays from 2018 to 2021, and marks these dates as non-work days in the schedule.

Activity Identification

The LANE Team is proposing a smart activity identification system in the Proposal Schedule, in which a unique alphanumeric is utilized. Each activity identification is broken down into five parts: Phase of Work, Work Area, Sub-Location, and Unique Identifier, described in detail below:

As an example is **C 00 - 2680**

Type of Work	Phasing	Sub-Area	Unique Identifier
Types of work for the project with the abbreviations	Construction phasing of the Project with the abbreviations:	Sub-Area of construction	The last four digits in the activity identification structure are numeric increments starting with 1000, and incremented in steps of 10. This is done to leave ample room between activities so that additional activities may be inserted as necessary.
A = Administration	00 = Project	1 = Area 1	
D = Design	01, 02, etc... = Phase 1, Phase 2, etc.	2 = Area 2	
P = Procurement	1A, 2A, etc... = Phase 1A, Phase 2A, etc.	3 = Area 3	
C = Construction			

Scope Validation Period

The scope validation period is 120 day after NTP, and the schedule depicts activities that are relevant to the validation work, and VDOT review of the submittal.

Plan and Strategy

The LANE Team has developed a comprehensive MOT / phasing plan to complete the Project in a timely manner. Our Plan is to organized the Project into four independent work zones, and the LANE Team will pursue all available work zones concurrently to maximize the construction progress on the Project. Our MOT plan constructs the critical I-66 EBW in three phases for Area 1 and two phases for Area 5 with independent phases to build Areas 2, 3, and 4. Furthermore, the MOT plan incorporates the bridge widening and retrofitting work seamlessly with roadway operations. The LANE Team’s key strategy for the design and construction is transparency between the design-builder and VDOT.

Design

The LANE Team will advance the design from the current RFP documents and incorporate any new design elements into final design and construction documents. Design activities will include surveying, roadway design, bridge design, traffic control devices, MOT plans, signs, guardrail, pavement markings, drainage design, design of SWM facilities, geotechnical investigation including borings and analysis, materials analysis, hydraulic design and pavement design. The Project will be delivered by completing three phases of design: Preliminary, ROW, and Final. Design-related activities to be performed during each phase are outlined below.

- *Preliminary design activities* will focus on expanding the RFP documents and preparing a set of preliminary plans and reports for submission to VDOT for review and approval. The LANE Team will perform supplemental field surveying; additional subsurface exploration investigations for utilities; and perform a thorough geotechnical field investigation to confirm geotechnical conditions for the bridge foundations, roadway design, and noise barrier design. All reports will be prepared in a timely manner and submitted for VDOT review and approval in accordance with the RFP. If the findings of these investigations are materially different than the RFP documents, the LANE Team will present the unknown aspects to VDOT for review and evaluation as outlined in the Scope Validation process for the project.

Preliminary roadway plans will be developed to include: geometric design; cross sections development and limits of construction; SWM and erosion and sediment control design; Maintenance of Traffic (MOT) and Transportation Management Plans (TMP); and preliminary bridge plans through close coordination with the geotechnical engineer. Right of Way (ROW) limits (proposed ROW, permanent easements, and temporary easements) will be evaluated and established on the plans, and preliminary utility relocation plans will be prepared.

- *ROW/roadway design submittal* will occur after receiving and addressing preliminary plan approval from VDOT. Plan development will include design completion sufficient for ROW acquisition. Early release packages (i.e. shoulder strengthening, grading and drainage, girder design, etc.) will be prepared at this time for review and approval to initial preliminary construction activities. The ROW, environmental coordination and approval, and utility relocation plan activities will be separated and developed for individual submissions to VDOT and other regulatory agencies for review and approval.
- *Final design submittal* will occur after receiving ROW/roadway design plan approval from VDOT and will finalize all remaining elements of work to include final signing and pavement marking, final bridge plans, final roadway plans, etc. The LANE Team will submit the final design plans and reports to VDOT for review and approval.

Environmental /Permitting

Preliminary environmental activities will begin shortly after receiving NTP and will include a thorough environmental evaluation and confirmation of the information provided in the RFP documents. The LANE Team will prepare a comprehensive environmental management plan that includes a matrix of environmental commitments and compliance requirements; identifies milestone dates and integrates those into the project schedule; identifies the responsible party; and summarizes requirements. Final environmental activities will begin immediately after receiving preliminary plan approval from VDOT. A Stormwater Pollution Prevention Plan (SWPPP) will be developed and the registration statement for the VSMP will be submitted immediately following the SWPPP development.

ROW Acquisition

The LANE Team will evaluate the proposed ROW and easements as shown on the plans. If changes are required, either due to a change in the required ROW or a change based on the results of legal research, the Team will prepare updated preliminary ROW plans and a ROW data sheet for VDOT review and approval. Preliminary ROW activities will begin after receiving NTP. Our Team will begin performing the legal research for the identified parcels on the preliminary plans in conjunction with our survey crews validation of field run data.

Utility Relocation

Utility coordination will continue based on the groundwork performed during the development of this Technical Proposal. After NTP and development of UT-9s based on preliminary design, a Utility Field Investigation (UFI) will be held. Each utility company will be supplied with the preliminary plans and a UT-9. The UT-9 will show our understanding of cost responsibility (prior rights). The utility companies will be given the opportunity to produce documentation that may change our assessment of prior rights. After which, pro-rates will be established for the project. Every effort will be made to avoid or minimize utility impacts. However, for those utilities that cannot be avoided, relocation plans will be requested, reviewed and approved prior to relocating each utility impacted.

Procurement

The Procurement Stage includes activities related to the material procurement efforts in the Project, which includes the development shop drawings, VDOT review and approval of the documents, and the fabrication of the material. The types of material are as follows:

- Noise barrier on roadway
- Noise barrier on bridges
- Bridge steel girders
- Bridge box girders

Construction

The LANE Team's sequences of construction on which this schedule is based, has been developed to achieve project milestones, mitigate impacts to the traveling public, delays to construction and ultimately, to facilitate successful completion of the project. Some potential delays include (but not limited to): utility relocation, environmental impacts, and right of way acquisition. The LANE Team employs the following strategy to avoid these potential delays:

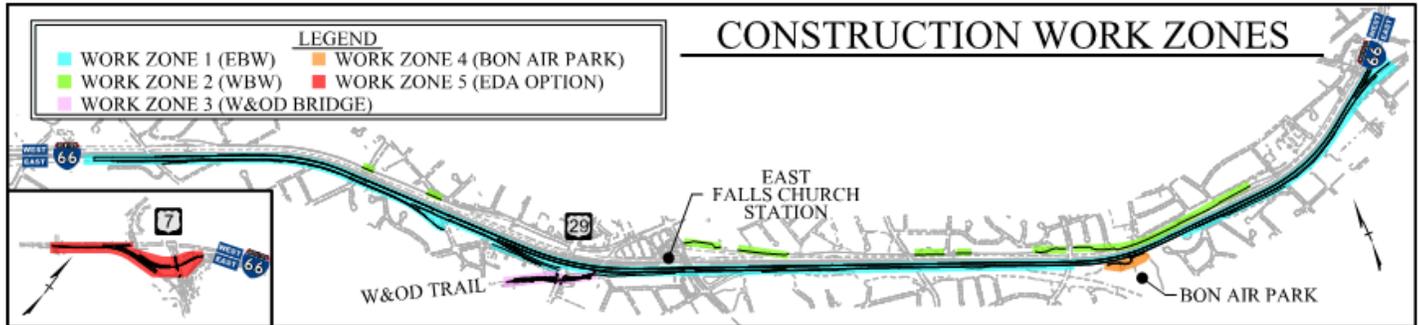
- Utility relocate – the LANE Team's approach is to identify and verify the conflict as soon as possible, and design our work around the conflict thus minimizing the scope of utility relocation, and its potential to impact to start construction.
- Environmental Impact – the LANE Team's approach is to develop permit application as quickly as possible, all the meanwhile coordinate the efforts with the responsible agency representatives with open communication. This should reduce overall development, risk of application rejection, and agency review and approval time.
- Right of Way Acquisition – the LANE Team's phasing has us working on the outside shoulder in the later stage of the project, where the ROW restrictions apply. Thus, ROW impact is largely mitigated through phasing.

Public Involvement / Public Relations

The LANE Team will provide the Public Involvement / Public Relations service as required by the RFP Part 2 Section 2.13. The Proposal Schedule depicts the LANE Team providing to VDOT project update information and support throughout both the design phase and the construction phase; as well as the LANE Team conducting the public meeting to present the preliminary bridge design from Bridge B680 prior to initiating final design.

Sequence of Construction

The construction of the four areas in the Project Base Scope can start when the corresponding permits are approved, and the final design plans have been reviewed by VDOT. The individual construction activity duration accounts the construction operation, any incidental environmental protection work, and any QC/QA inspection and testing for the construction operation. The LANE Team intends to construct the five areas of the Project as follow:



Work Zone 1 & 4 – I-66 Eastbound Widening

1. Phase 1A – Construct the outside strengthening along the I-66 alignment under night-time lane closure.
2. Phase 1B
 - Shift traffic towards the strengthened shoulder and adjust toll transponders.
 - Tolling and roadway equipment installation and testing by TransCore.
 - Install temporary barrier wall at the median.
 - Demo exist roadway per VDOT requirement.
 - Construct roadway widening and median barrier walls.
 - Install drainage.
 - Widen Williamsburg Bridge, Westmoreland Bridge, and Sycamore Bridge
 - Widen Bon Air Park bridge, and replace the inside lanes of the bridge deck – inside widening
 - Construct relocation of the Hiking and Biking pedestrian bridge over I-66 (B681).
3. Phase 2
 - Shift traffic towards the median widening and adjust toll transponders.
 - Tolling and roadway equipment installation and testing by TransCore.
 - Relocate barrier wall.
 - Demo existing roadway.
 - Re-construct and widen outside shoulder.
 - Install drainage.
 - Modify east bound Williamsburg bridge to incorporate sound barrier wall, and overlay deck with latex concrete.
 - Replace Bon Air Park bridge deck, and install sound barrier wall.
 - Construct new sound barrier wall – C1, D1, D2, H1 extension, and partially replace existing sound barrier wall E1 and H.
 - Install signage, lighting and ITS.
 - Tolling and roadway equipment installation and testing by TransCore.
 - Replace existing signal at Fairfax / Lee intersection.
4. Phase 3A & 3B
 - Install MOT to close the middle lane at Bon Air Park bridge.
 - Replace the middle lanes of Bon Air Park bridge deck.
 - Roadway final paving.
 - Mill-and-overlay existing roadway.
 - Project Close-out and punch list.

Work Zone 2 – I-66 Westbound.

- Install MOT / temporary wall to close outsider shoulders on roadway and bridges.
- Modify westbound Williamsburg Bridge, Westmoreland Bridge, and Bon Air Bridge to incorporate sound barrier walls.
- Construct sound barrier walls – P1, N1 and O extension.

Work Zone 3 – WO&D Trial and Pedestrian Bridge

- Install MOT to protect both vehicular and pedestrian traffic.
- Construct new pedestrian bridge.
- Re-align existing sidewalk.
- Beautification of bridge area.

Work Zone 4 – Custis Trail through Bon Air Park

- Construct Custis Trail realignment.
- Install landscape as required.

Work Zone 5 – Option 1 – EDA

- Design and procurement independent of base scope work.
- Phase 1 – Construct ramps and bridge widening and new connector.
 - Construct roadway widening for Route 7 southbound entrance flyover ramp.
 - Construct bridge (B686) pier protection Route 7
 - Construct roadway widening for I-66 exit ramp to Route 7 southbound.
 - Construct widening of Route 7 flyover bridge (B686).
- Phase 2
 - Construct ramp connector between I-66 eastbound exit ramp and Route 7 southbound entrance flyover ramp
 - Mill-and-overlay of existing roadway.
 - Final Paving and Striping.
 - Site restoration and landscape
 - Remove and replace existing bridge deck joints with closure joint (B686).
 - Mill-and-overlay existing bridge deck (B686).

Means and Methods:

Drawing from decades of civil infrastructure design and construction experience that the LANE Team has in the North Virginia and Washington areas, we have developed various mean and methods in the design and construction to meet the RFP requirements. The objective of this developments is to provide VDOT an end product that require low long term maintenance, safe to construct for both the builder and the general public, minimize disruption to public with the least amount of phasing, and reliable, proven, yet innovative design to minimize VDOT personnel resource involvement in the Project.

Bridge Widening

There are three bridge widening in the Project – Williamsburg Blvd., Westmoreland St., and Sycamore St. The LANE Team’s approach for design and constructing the Work as follows:

- Work take place simultaneous with roadway construction to minimize phasing and disruption to traveling public.
- WMATA coordination in design and construction for long term safety of the end product and operation safety during the construction, respectively.
- Protective shielding to protect public from demolition debris.
- Day-time demolition to minimize noise impact to the stalk holders, and meet the hours of operation restriction.
- Utilize DIP piles to minimize vibration impact to WMATA structures and tracks.

Bon Air Bridge Widening and Deck Replacement

- Construct the deck in 3 phase – Phase 1B, 2 and 3A.
- Work take place simultaneous with roadway construction to minimize phasing and disruption to traveling public in Phase 1B and 2.
- Protective shielding to protect public from demolition debris.

- Day-time demolition to minimize noise impact to the stalk holders, and meet the hours of operation restriction.
- Utilize temporary bridge support to supplement bridge structural capacity during construction, and maintain 2 traveling lanes in all 3 phases of construction.
- Construct Custis Trail realignment during Phase 2, which should provide sufficient time for utility relocation in the area and avoids utility impact to the schedule.

Median Widening

- Construct all inside widening to construct the work in Phase 1B.
- All construction operation behind temporary barrier wall.
- Pavement design that meet the RFP requirement.
- No lane shift inside the Project for a continuous and disruption-free traffic pattern.

Shoulder Re-Construction / Widening

- Construct all inside widening to construct the work in Phase 2.
- Simultaneously construct all outside of shoulder (ITS/lighting), sound barrier wall (roadway & bridge), and SWM BMP facility with roadway work to minimize construction phasing.
- All construction operation behind temporary barrier wall.
- Pavement design that meet the RFP requirement.
- No lane shift inside the Project for a continuous and disruption-free traffic pattern.
- Integrate the construction of pier protection as part of the Phase 2 roadway construction sequence to minimize phasing.

Noise Barrier Construction

- Construct all eastbound work during Phase 2 roadway work.
- Start construction on all westbound work when sufficient material is fabricated.
- Westbound work is independent of eastbound phasing plan.
- Start procurement of material as early as possible to avoid start of construction delay.
- Fabricate sufficient material to meet the operation restriction on replacing existing wall.
- Coordinate existing wall demolition and new wall installation to meet the existing wall replacement requirement.

WO&D Trail & Pedestrian Bridge

- Work sequence independent of I-64 eastbound roadway phasing.
- Design and construct the pier to meet the public's preference of "open V-pier".
- Custom-made fence to provide a safe and visually pleasing SUP / bridge deck façade.
- Resolve utility conflict is critical to the start of construction.
- Additional effort in public coordination, work site access, and traffic (pedestrian) control for the work scope due to higher norm public exposure.
- Coordinate with Arlington County and Northern Virginia Park Authority to maintain trail connectivity to East Falls Church metro station.

Critical Path

The two Project milestones are Interim Milestone on November 10, 2020 and Final Completion on October 1, 2021. The Critical Path for achieving the Interim Milestone starts with NTP, which is following supplemental survey and the development of bridge design plans. The Critical path stay with the review and revise process of the bridge plan, until VDOT and FHWA approve the RFC plans. Then the Critical Path goes into the construction phase, more specifically the Phase 1B construction of Williamsburg Blvd bridge (B675). The Critical Path follows the construction of the bridge, which leads to the completion of Phase 1B construction, and the start of Phase 2 construction. The Critical Path follows the roadway construction sequence of Phase 2,

and Critical Path, the schedule is completed. The Project Control Team will generate the Baseline Schedule document, as required, for submission to VDOT.

The Baseline Schedule will indicate the necessary procurement and construction activities for each Segment of the project. Various calendars will be incorporated into the Project Schedule to reflect holidays, seasonal work, temperature, and other requirements. The activities within the Project Schedule will be organized by WBS. An Activity Coding Structure will be utilized in the project schedule to organize data output. The Schedule will be the tool used for coordination by the LANE Design and Construction team. Schedule updates will be used by design and construction managers to review progress and coordinate the efforts of all entities involved.

Separate short-term (3 week look-ahead) detailed schedules (Level 5) will be used by the Construction Manager to plan and monitor specific items of work and will be prepared, as necessary, to deal with specific work packages or smaller work activities as the need arises. As the work progresses, start dates, finish dates, percent complete, and remaining durations will be updated to report the progress of each work activity. The Construction Manager will incorporate updated data into the CPM schedule on a monthly basis, review the results internally and with VDOT, and prepare the required reports for submittal. Monthly updates of the CPM schedule provide the foundation of progress reports utilized by the Team.

When changes or unforeseen circumstances arise that impacts the Project Schedule, the LMB Team will immediately notify VDOT (and other appropriate stakeholders) and begin incorporating changes into the “live” CPM schedule. If any changes result in schedule slippage, the DBPM will evaluate the issue to determine if additional manpower, equipment, multiple shifts, a change in subcontractor, or additional subcontractors is required. If so, the necessary resources will be mobilized to correct the slippage and maintain the schedule. Throughout the Project, the Schedule will be clearly communicated to all subcontractors and key suppliers. Delays and schedule slippage will not be tolerated.

Conclusion

LANE has developed a Proposal Schedule and Proposal Schedule Narrative that demonstrates our understanding of the complexities and interrelationships of the technical elements of the Project. The LANE Team proposal Schedule offers the following advantage:

- Mitigate the utility impact of WO&D Trail construction on the schedule by separating its construction sequence from I-66 eastbound widening phasing.
- Mitigate the utility impact of Custis Trail construction on the schedule by performing the work during Phase 2 of I-66 eastbound widening.
- Provide early traffic congestion relieve to I-66 EDA by constructing a temporary connector.
- Construct all roadway and all bridge widening except for Bon Air Park bridge for I-66 Eastbound in just two phases (1B and 2) – minimize the construction impact to I-66 traffic.
- Reduce realignment scope for Custis Trail by eliminating the outside widening of Bon Air Park bridge. Thus reducing the construction impact to the pedestrian traffic on Custis Trail.

Additionally, our Proposal Schedule considers: internal plan reviews, VDOT plan reviews and approvals, environmental permitting, right of way acquisitions, utility relocations, QA/QC testing and inspection, and construction activities.

The LANE Team is committed to develop an accurate and robust Baseline Schedule to better serve, VDOT, all associated stakeholders, and the traveling public. Once we have notice to proceed and the final design process begins, all team members will actively work to make this project more efficient, high quality and award winning.