

Original

JANUARY 20, 2023

Technical Proposal

VOLUME I

I-81 WIDENING

MM 221 to MM 225

Augusta County, Virginia

State Project No.: 0081-007-013, B638, B639, B640,
B641, B642, C501, D602, D603, P101, R201

Federal Project No.: NHPP-081-2(329)

Contract ID Number: C00116269DB116

lane 

in association with WSP USA Inc.

4.1 Letter of Submittal



January 20, 2023

Commonwealth of Virginia
Department of Transportation (VDOT)
1401 E. Broad Street, Richmond, Virginia 23219
Attention: Joseph A. Clarke, PE, DBIA (APD Division)

RE: I-81 Widening MM 221 to MM 225
State Project No.: 0081-007-013, B638, B639, B640, B641, B642, C501, D602, D603, P101, R201;
Federal Project No.: NHPP-081-2(329); Contract ID Number: C00116269DB116

Dear Mr. Clarke:

The Lane Construction Corporation (Lane) is pleased to submit this Technical Proposal for the above referenced project to the Virginia Department of Transportation (VDOT). Our response contains all information requested in the RFP dated October 19, 2022 and Addenda 1-4. Lane is teamed with **WSP USA Inc. (WSP)**, Lead Designer, to provide VDOT a Team with a solid reputation for completing complex projects innovatively, on time, and often ahead of schedule.

- 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 the RFP.
- 4.1.3 120-Day Declaration:** Pursuant to Part 1, Section 8.2, we declare that the offer represented by the Technical and Price Proposal will remain in full force and effect for one hundred twenty (120) days after the date the Price Proposal is submitted to VDOT.
- 4.1.4 Offeror’s Point of Contact Information:** John Havel, PE, Pursuit Manager, 14500 Avion Parkway, Suite 200, Chantilly, VA 20151; Tel: (412) 445-0423 Fax: (703) 222-5960; Email: JPHavel@laneconstruct.com
- 4.1.5 Offeror’s Principal Officer Information:** Ignacio Botella, President & CEO; 90 Fieldstone Court, Cheshire, CT 06410; Tel: (203) 235-3351 Fax: (203) 237-4260; Email: IBotella@laneconstruct.com
- 4.1.6 Final Completion Date:** Lane proposes a Final Completion Date of June 04, 2027.
- 4.1.7 Unique Milestone Dates:** Lane does not propose any Unique Milestone Dates.
- 4.1.8 Proposal Payment Agreement:** An executed Proposal Payment Agreement (Attachment 9.3.1) can be found in the Appendix of Volume 1.
- 4.1.9 Certification Regarding Debarment Forms:** Certifications for Debarment for Primary and Lower Tier Transactions can be found in the Appendix of Volume 1.
- 4.1.10 DBE Statement:** Lane commits to meet the 6% DBE participation goal for the entire value of the contract.
- 4.1.11 Confirmation of all Commercial and Professional Registration Requirements:** Lane confirms that all commercial and professional registration requirements set forth in Offeror’s Statement of Qualifications, including, but not limited to those requirements of the SCC and the DPOR are complete and accurate and that Offeror, and business entities on Offeror’s team, remain in good standing with all applicable regulatory bodies and are eligible to provide the services required on the Project.

We look forward to working closely with VDOT and stakeholders in our development and delivery to make the I-81 Widening project a landmark success for the citizens of Virginia.

Respectfully submitted,

David Rankin, Chief Operating Officer
The Lane Construction Corporation





4.2 Offeror's Qualifications



● 4.2 Offeror's Qualifications

4.2.1 Confirmation SOQ Remains True and Accurate

Since the submission of our Statement of Qualifications (SOQ) dated August 17, 2022, our Team has made the following Non-Key Personnel changes:

- Denny Luzier (Executive Committee) is no longer with Lane. He has been replaced by Lane's Chief Operating Officer, David Rankin.

Additionally, per the RFP, we have added a Deputy Design Manager to our Team.

- Jason Gorrie, PE, PMP, DBIA

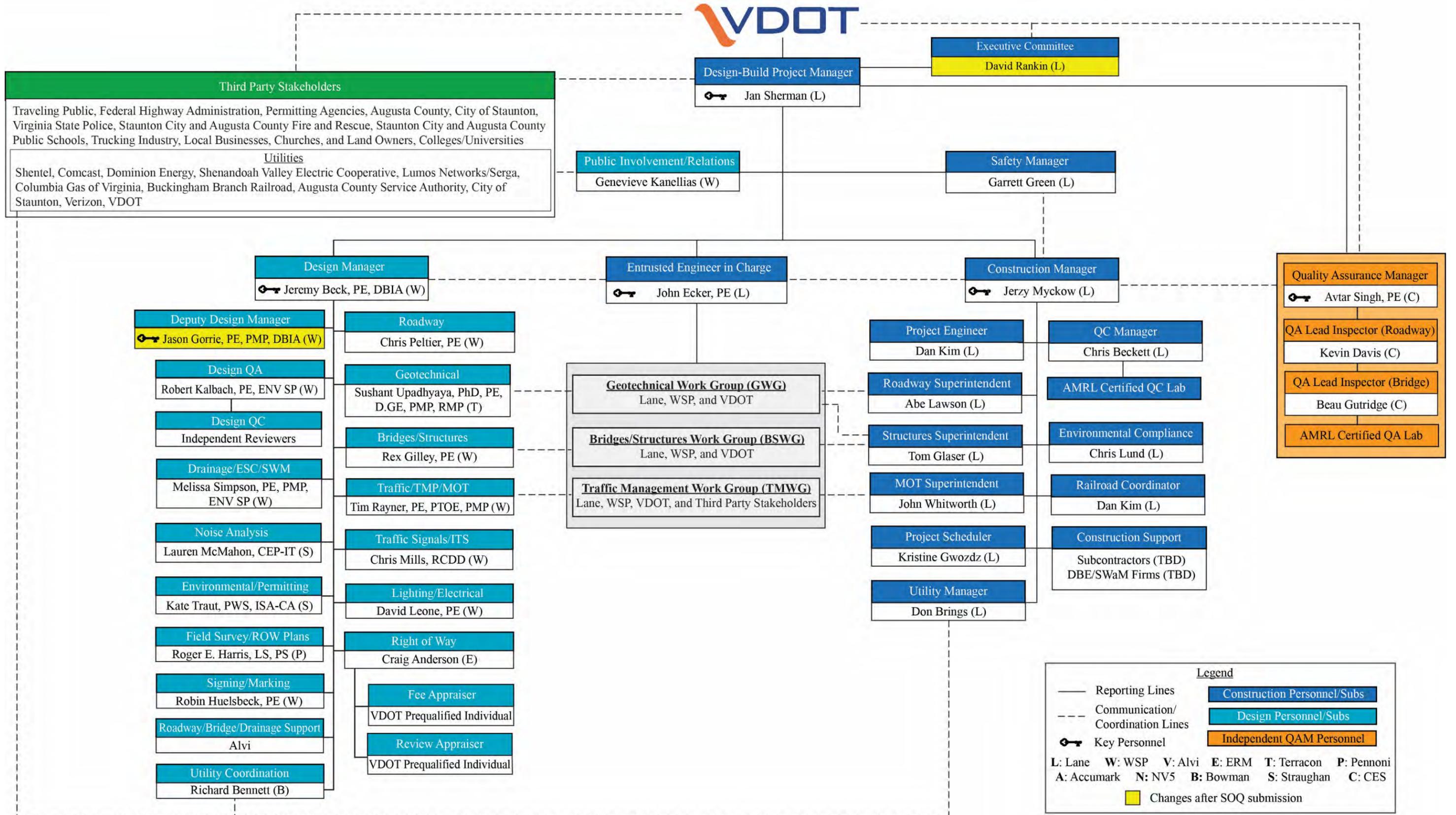
Lane confirms that all other information presented in the SOQ remains true and accurate in accordance with Part 1, Section 11.4. Our Team will remain intact for the duration of the contract.

Organizational Chart and Narrative

Under the leadership of our Design-Build Project Manager (DBPM), Mr. Jan Sherman, our Team is structured to effectively manage and deliver the design and construction of the Project. Our 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, lines of communication, and functional responsibilities clearly identified. Our organizational chart identifies key personnel and major functions to be performed for the successful management, design, and construction of this project. Though reporting relationships are rigid, communication within our Team will remain fluid and flexible to meet the requirements of each individual project task. Communication needs from team members to their VDOT counterparts will be directed and authorized in advance by Mr. Sherman and the VDOT Project Manager.

To support the training, growth, and promotion of staff to support VDOT's Design-Build program and initiatives, our Team has expanded our organizational structure to include Deputy Design Manager (DDM), Mr. Jason Gorrie, PE, PMP, DBIA (WSP). Mr. Gorrie is a Professional Engineer and has been providing transportation design and management services for over 22 years. He will report to the Design Manager (DM) and will communicate regularly with the design team. He will assist the DM with supervisory direction of the design team and interaction with VDOT and the public. He will be responsible for overseeing commercial aspects of the design work, allowing the DM to focus primarily on design related matters. He will attend certain coordination meetings and will be apprised of all design related matters. Mr. Gorrie's resumes (Attachment 4.2.1) can be found in the Volume I Appendix.

Our updated Team organization chart is included on the following page with the changes highlighted in yellow.





4.3 Design Concept



● 4.3 Design Concept

The purpose of this Project is to widen Interstate 81 (I-81) one lane in each direction toward the median while improving safety and traffic operations along the corridor. Our Conceptual Design Plans, presented in Volume II of our Technical Proposal, reflect VDOT's priorities and were prepared by an experienced team of designers and contractors focused on providing VDOT and the public with safe, cost-effective infrastructure that will meet and exceed the Request for Proposal (RFP) requirements while limiting risk. Throughout the preparation of our Technical Proposal, our Team held weekly Technical Work Group (TWG) meetings that identified Project risks and challenges, provided an open forum for discussing and coordinating solutions, allowed for overall collaboration, and facilitated wholistic decision-making so that our approach aligns with VDOT's Project intent.

Our TWGs were not only instrumental in identifying ways to enhance safety, minimize construction time and cost, and evaluate means and methods, they also allowed our Team to examine potential improvements, confirm constructability, and optimize Project elements. As a result of our TWGs and interaction with VDOT during the proprietary process, our Team was able to identify and provide several Design Enhancements presented in *Figure 4.3.1* below. These Design Enhancements have also been described in the narrative that follows and have been highlighted in our Conceptual Design Plans presented in Volume II.

Figure 4.3.1 Design Enhancements

Enhancement	Benefits to VDOT and the Traveling Public
Reduce I-81 SB Baseline Crown Shift just North of B640	<ul style="list-style-type: none"> Minimizes asphalt pavement wedge variable depth overlay Minimizes new full-depth pavement to minimize costs Simplifies milling and paving operations to improve constructability
Correct I-81 Cross Slopes on All Curves	<ul style="list-style-type: none"> Provides full superelevation in accordance with current VDOT St'd. TC-11 requirements Enhances available side friction factor and driver comfort to optimize safety Eliminates breakovers between lanes Simplifies milling and paving operations for improved constructability
Improve Route 250 Ramp A Alignment	<ul style="list-style-type: none"> Matches existing horizontal alignment of Ramp A to better fit proposed superelevation to existing cross slope Reduces full depth asphalt widening and variable depth overlays through gore area and ramp Simplifies construction operations in gore area
Implement 9' Post Guardrail	<ul style="list-style-type: none"> Maintains outer limits of disturbance to the existing roadway prism in certain locations where 6' posts would require sliver cut/fill construction
Provide Superelevation on I-81 SB Curve on B638	<ul style="list-style-type: none"> Improves safety for motorists by constructing a constant SE rate across the bridge deck Improves deck finish and rideability Meets current VDOT St'd. TC-5.11
Implement Six (6) Additional Bridge Pier Protection Systems (BPPS)	<ul style="list-style-type: none"> Reduces probability of pier failure due to collision Improves safety for traveling public Protects existing and proposed piers using the latest Manual of Structure and Bridge Division guidelines
Optimize Stormwater Management (SWM) Facilities	<ul style="list-style-type: none"> Eliminates nine (9) SWM BMP locations when compared to VDOT's RFP Plans Reduces access points and future maintenance operations Minimizes bedrock excavation and reduces overall excavation Maintains preconstruction flows to eliminate major cross culvert replacements Eliminates conflict with proposed B642 pier expansion
Re-align Lewis Creek	<ul style="list-style-type: none"> Reestablishes, stabilizes, and strengthens stream banks to reduce erosion and sediment deposit Improves hydraulic efficiency and maintains 100-year floodplain elevation
Utilize Lightweight Fill	<ul style="list-style-type: none"> Reduces waiting period and downdrag at B641 and B642
Implement Steel Pipe Casing	<ul style="list-style-type: none"> Minimizes downdrag and addresses global stability at B641 and B642
Eliminate Abutment Battered Piles	<ul style="list-style-type: none"> Improves constructability utilizing Mechanically Stabilized Earth (MSE) wall straps Eliminate bending on piles

	<ul style="list-style-type: none"> Limits obstructions to existing utilities
Provide New Elastomeric Bearings at Lewis Creek Bridges	<ul style="list-style-type: none"> Provides upgraded bearings for existing precast prestressed beams Reduces long-term maintenance
Add Temporary Scuppers	<ul style="list-style-type: none"> Manages spread on bridges adjacent to temporary barrier Improves safety

4.3.1 Conceptual Roadway Plans

Our Team’s conceptual roadway design meets or exceeds RFP requirements. All roadway improvements are contained within the existing and proposed Right-of-Way (ROW) and easement limits shown in VDOT’s RFP Plans. Furthermore, there are no additional Design Exceptions or Design Waivers required for the proposed roadway design than those provided in the RFP.

Our Team incorporated all information provided in the RFP Questions and Answers as well as VDOT’s responses to our Proprietary Meeting minutes to develop our Conceptual Design Plans. It should be noted that VDOT’s RFP Plans, as well as our Conceptual Design Plans, configure I-81 stationing from south to north for both Southbound (SB) and Northbound (NB). “Left” and “Right”, when used within our Technical Proposal is relative to the direction of traffic flow.

(a) General Geometry

Our roadway geometry was established using the design criteria as set forth in the RFP Attachment 2.2. No deviations were made to the design criteria provided by VDOT. Both directions of I-81 will be designed as a 70 MPH facility (65 MPH posted) from the Project’s southern terminus to MM 224.6 (I-81 SB Sta. 3198+00) and as a 75 MPH facility (70 MPH posted) from MM 224.6 (I-81 SB Sta. 3198+00) to the Project’s northern terminus. I-81 will adhere to the design criteria established in the RFP for Interstate GS-INT functional classification, rural non-mountainous terrain. When complete, I-81 will consist of three General Purpose travel lanes in each direction with appropriate auxiliary lanes and shoulders.

Where the proposed I-81 baseline is coincidental to the existing roadway alignment, our geometry will maintain existing travel lane widths as outlined in the RFP Attachment 2.2 footnote (3) and a new 12’ travel lane will be provided towards the median with full depth pavement as prescribed in the RFP and defined within our Conceptual Design Plans. Where the proposed baseline deviates from the existing roadway alignment, our geometry will provide 3-12’ travel lanes. *Figure 4.3.2* summarizes the design criteria of the RFP as used by our Team. Further details regarding proposed shoulder widths, which meet the requirements set forth in Attachment 2.2 of the RFP, can be found in Section 4.3.1.d.

Figure 4.3.2 Roadway Design Criteria Summary

Roadway	I-81	Interchange Ramps	Augusta Woods Drive	Route 250
Design Speed	70/75 MPH	25-45 MPH	25 MPH	50 MPH
Functional Classification	Interstate GS-INT	Interchange Ramp GS-R	Local Street GS-8	Other Principal Arterial GS-5
Terrain	Rural Non-Mountainous	N/A	Urban	Urban
Travel Lane Width	12’	12’-18’	12’	12’
Shoulder Width	10’/12’	6’/10’	-	10’

A 3D model of the proposed design was utilized to prepare our Technical Proposal and will be further developed during final design. Our model has been used to prepare, study, and optimize information pertaining to asphalt and aggregate, guardrail, concrete barrier, earthwork, unsuitable materials, potential conflicts, and other items facilitated by the creation of a 3D model. The model has allowed our Team to make critical design checks and decisions and has provided valuable insight on construction operations when preparing our Technical Proposal.

(b) Horizontal Alignments

Our proposed horizontal alignments were established with the design criteria set forth in the RFP. Horizontal alignments were located coincidental to the existing I-81 crown taking into consideration VDOT's RFP Plan alignments as well as the I-81 roadway and bridge plans originally used to construct I-81. Crown shifts, similar to those proposed in VDOT's RFP Plans were necessary up station and down station from bridges to facilitate the provision of full shoulders on the bridges - ensuring that existing overhangs and edge of bridge locations were maintained after the new decks are built. While Design Exception No. 4 allows for reduced shoulders at B638, approximate 3' crown shifts were required at B639, B640, B641, and B642 to provide required shoulder widths.

In studying VDOT's RFP Plans, our Team noticed that the 3' crown shift on I-81 SB just north of B640 could be eliminated from station 3094+54.81 to station 3121+21.82 without causing additional impacts to the outside of I-81 or the Project. In fact, by implementing large radii reverse curves requiring no superelevation to shift the crown back onto the existing crown (after departing B640), our Team was able to

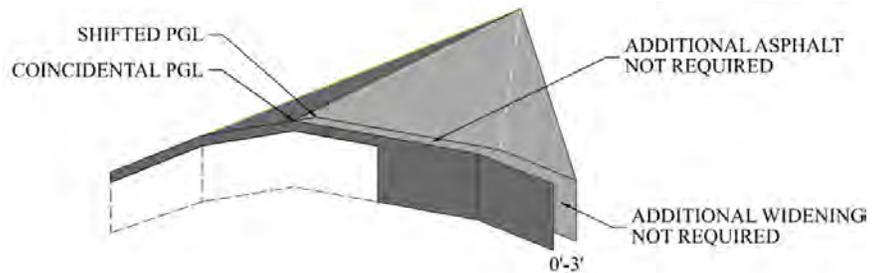


Figure 4.3.3 I-81 SB Crown Shift Elimination North of B640

eliminate just over one half-mile of variable depth pavement buildup and full depth pavement widening on I-81 SB as clarified in *Figure 4.3.3*. This optimization will minimize the amount of additional pavement required not only in variable asphalt wedge, but also in additional full-depth widening while continuing to provide three (3) 12' travel lanes and full shoulders. While reducing the amount and cost of new asphalt paving, **this enhancement will also minimize new impervious areas helping to reduce overall stormwater management requirements**. Further, eliminating the crown shift described above will benefit construction operations and driver safety, as paving operations will be simplified and minimized.

Our Team made other minor horizontal alignment optimizations, when compared to VDOT's RFP Plans, to better align with existing and proposed bridge geometry and the existing corridor. These changes are best seen in the layered PDF roll plot provided in Volume II.

Because crown shifts were required up station and down station from bridges and because the RFP indicated existing travel lane cross slopes and superelevation could be used, with the exception of certain conditions identified in the RFP, our Team paid particular attention to the horizontal alignments, vertical profiles (spline grade), and the application of superelevation on I-81 with regard to the resulting pavement overlay conditions. Specifically, we examined what it would take to correct all substandard cross slope and superelevation rates and bring them up to current VDOT standards while at the same time minimizing crown shifts and variable depth overlays.

As explained in more detail in Section 4.3.1.c below, after an exhaustive pavement surface gradient study, we found that **fixing substandard cross slopes on all superelevated sections along I-81 would benefit VDOT, the traveling public, and our construction operations with little to no impact on the overall Project cost**. As a result, our design provides full cross slope correction on superelevated sections of I-81 **enhancing driver comfort and operations** which, combined with our horizontal alignment optimizations, provides VDOT with a superior I-81 finished pavement surface.

Because mainline I-81 will be shifted 3' to the median through the Route 250 Ramp A gore area, Ramp A, as it converges with I-81 SB, will require a horizontal adjustment. Our Team will slightly adjust the horizontal alignment of the ramp near its gore when compared to VDOT's RFP Plans to better fit the existing interchange ramp alignment. Cross slope corrections would be necessary in either VDOT's or our alignment and best fitting to the existing ramp alignment will minimize overbuilding and simplify construction.

Our Team will develop interchange ramp gore areas for entrances and exits along the I-81 corridor in accordance with the VDOT Road Design Manual (RDM), Appendix C including nose offsets and "Z" recovery areas. Gore

taper lengths will be based upon a 70/75 mph design speed (depending on location), providing motorists with full recovery areas at each ramp location while delivering an efficient, cost-effective design to VDOT. The I-81 SB/Ramp No.1 gore will be designed such that maximum 4% breakovers are provided by lengthening the superelevation transition of Ramp No. 1.

Lastly, as identified by VDOT, and considered within our Conceptual Design Plans, a reduction of stopping sight distance to 35 MPH will be required along Ramp No.1 as it traverses underneath I-81 NB and I-81 SB as detailed in Design Exception No. 2. This reduction in stopping sight distance is required due to the existing piers adjacent to Ramp No. 1 and for the required Bridge Pier Protection System (BPPS) that will be installed.

(c) Maximum Grade for all Segments and Connectors

All longitudinal grades within the Project limits adhere to minimum and maximum allowable grades for roadway profiles as established in Attachment 2.2 of the RFP. Our maximum grades have been depicted in our Conceptual Design Plans, presented in Volume II.

Our Team performed a thorough investigation of the existing pavement gradients left and right of the existing crown every 50' to determine the adequacy of existing cross slopes against the requirements set forth in the RFP. Based on the RFP criteria, we determined that the majority of tangent sections did not require cross slope corrections because they meet a minimum 1.0% cross slope and less than a 6% breakover. We also determined that all but portions of five (5) curves (81SB C1, 81SB C2, 81SB C6, 81NB C1, and 81NB C2) will require cross slope correction per the guidelines set forth in the RFP. These curves are highlighted in our Conceptual Design Plans.

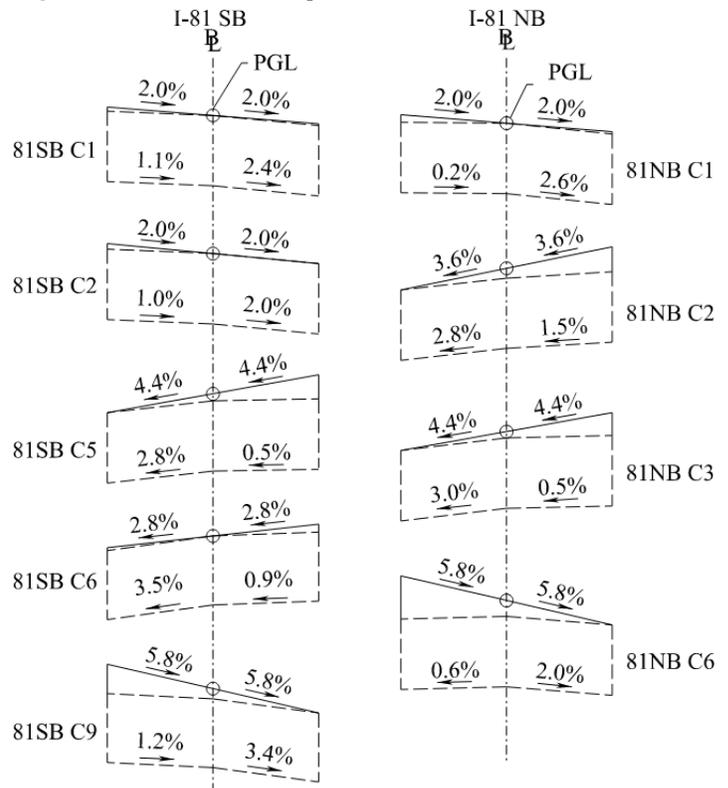
Our detailed pavement gradient investigation allowed us to assess the cost/benefit of simply correcting I-81 cross slopes, as opposed to utilizing the allowances set forth in the RFP. We concluded that correcting cross slopes on all I-81 superelevated curves within the Project limits, as well as cross slopes along tangent sections that do not meet the criteria defined in the RFP, **will provide VDOT and the traveling public with safety benefits by improving the available side friction factor and optimizing driver comfort.**

Our I-81 vertical profiles were established in conjunction with our horizontal and superelevation study to preclude milling of the existing pavement beyond 2", except where patching is required by the RFP. Our Team calculated and implemented the necessary spline grade to achieve our desired results of providing full superelevation, minimizing asphalt overlays, and providing appropriate K-Values.

When establishing our I-81 profiles on and immediately adjacent to each Project bridge, care was taken to account for requirements of the Manual of the Structure and Bridge Division and the RFP. The I-81 profiles were raised 1" to account for bridge wearing course standards and the profiles adjacent to B641 and B642 were raised additionally to account for new elastomeric bearing and their requisite details. Clearances of 16'-6" or greater will be achieved at all five (5) bridges where there is proposed deck replacement work. Where I-81 passes beneath Route 254 (New Hope Rd.), Design Waiver No. 2 in Addendum No. 4 allows for a minimum clearance of 16.2' on I-81 SB and 16.3' on I-81 NB which our Team will employ.

Our Team will utilize existing horizontal and vertical controls provided by VDOT and will establish additional ground points outside travel lanes and shoulders to verify clearances and offsets. **We will use a Leica MS 70**

Figure 4.3.5 I-81 Cross Slope Correction



Robotic Total Station with built-in High-Definition Laser Scanner (HDLS) to scan certain bridge elements from multiple locations, sides, and angles. A 3D model will then be created for use in design and surface verification, particularly with respect to the existing hammerhead pier offset adjacent to B638 and the clearances beneath the New Hope Rd overpass.

Our Team will establish interchange ramp connection profiles and design speeds based on existing conditions as well as the requirements of Interchange Ramps (GS-R) Standards and RFP Attachment 2.2. Profiles for ramps will be established based on spline grades, reflecting the required cross slopes on the mainlines as well as the ramps.

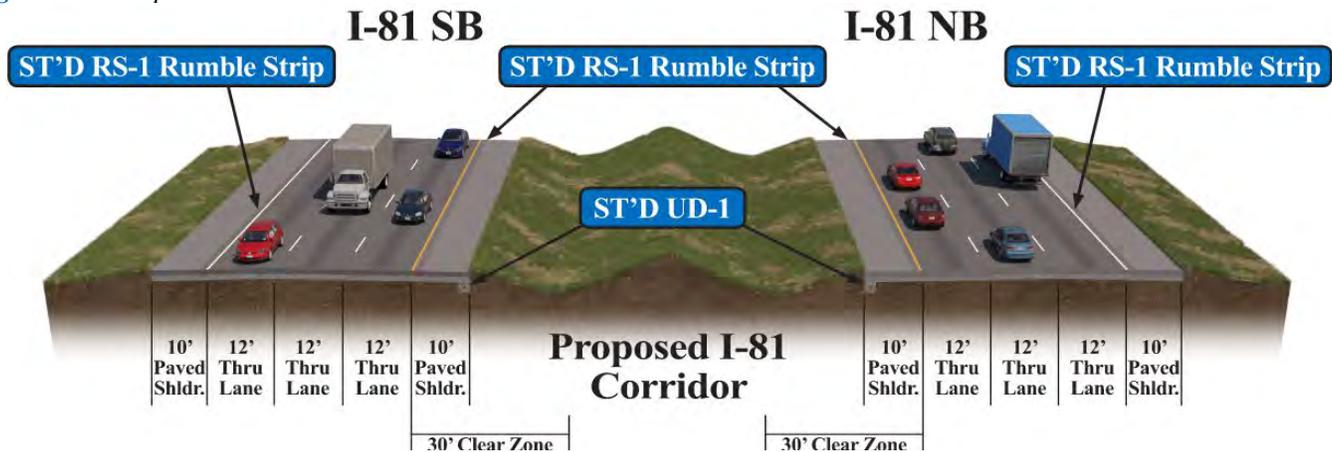
(d) Typical Sections of the Roadway Segments

Our Team’s proposed roadway typical section does not deviate from the RFP’s established design criteria. As shown in *Figures 4.3.6 and 4.3.7* below, the Project will add one lane in each direction of travel, effectively converting I-81 within the Project limits from its existing 4-lane configuration (2-lanes in each direction) to a 6-lane configuration (3-lanes in each direction). Travel lanes will be 12’ wide in most areas except where RFP Attachment 2.2 allows. Consistent with VDOT’s intent of **providing a clear zone free of as many obstacles as possible and for minimizing long-term maintenance, our Team will grade the I-81 median within the Project limits to eliminate the need for barrier**, except as needed to protect bridge approaches, overpasses, SWM facilities, and overhead sign/ITS structures.

Figure 4.3.6 Existing I-81 Corridor



Figure 4.3.7 Proposed I-81 Corridor



Right and left shoulders will provide 10’ paved and 2’ graded dimensions for a total of 12’ when guardrail/barrier is not present. When guardrail/barrier is present along shoulders, it will be placed 12’ from the edge of the traveled way and additional graded width will be provided behind the guardrail/barrier as appropriate. Per VDOT’s RFP Plans and the RFP, existing right shoulder paved widths will be matched when they exceed 10’. Where guardrail will be installed along the left shoulder, VDOT Standard MC-4 (paving beneath guardrail) will be provided.

Per Design Exceptions No.1 and No.4 as well as Design Waiver No.1, shoulder widths will be reduced at certain critical locations along the I-81 corridor which have been shown in our Conceptual Design Plans in Volume II. Use of non-standard parapet will be implemented on the eastern side of B638 per Design Exception No.3 and the allowable horizontal offset at the existing hammerhead pier will be reduced per Design Waiver No.3 to allow 6”.

VDOT Standard UD-1 will be implemented along I-81 to capture ground water that may impact the proposed pavement structure enhancing the longevity of the pavement structure. In certain locations, standard ditches may be lowered to facilitate UD-1 outfalls. Our Team will work closely with VDOT when laying out the UD-1, as well as VDOT Standard CD-1 and CD-2, to determine the appropriate configurations and outfall locations.

Due to particular I-81 slope corrections and existing conditions, certain locations along the outside of I-81, where grade changes between the existing and proposed roadway surface will not tie cleanly, the potential for sliver fills exists. To address this concern, simply construction, and minimize impacts, our Team will implement 9’ post guardrail and a reduced bench area behind the guardrail – effectively eliminating the need for sliver fills where feasible. Approximate locations where we envision implementing 9’ post guardrail can be found in our Conceptual Design Plans.

(e) Conceptual Hydraulic and Stormwater Management Design

Our Team’s hydraulic and stormwater management design concept meets or exceeds all requirements of the RFP. All drainage and stormwater management facilities are contained within the existing and proposed ROW/easement limits shown in the VDOT’s RFP Plans. Additionally, there are no Design Exceptions or Design Waivers required for the proposed hydraulic and stormwater management design. Our approach to stormwater management design for water quality is based on VDOT’s IIM-LD-195.13 Scenario 5.

Drainage Design: The primary goal of our drainage design is to accommodate the widening of I-81 using open and closed conveyance systems, minimize disturbance of environmentally sensitive natural resources, and limit VDOT’s future maintenance. We’ll **preserve existing drainage divides to the greatest extent possible and to minimize construction and maintenance activities, key existing cross culverts and storm sewer pipes will be reused and/or rehabilitated to the extent allowed in the RFP.** Proposed conveyance systems include a mix of storm sewer systems, culverts, and ditches to efficiently remove runoff from the Project.

Our Team will utilize temporary bridge scuppers to control spread into the travel lanes during construction to **improve driver safety during design storm events.** We preliminarily analyzed the temporary condition and provided sufficient inlets and/or scuppers to meet spread requirements throughout the Project. Our Team also **commits to a regular maintenance plan to clean temporary scuppers and barrier slots during construction,** allowing the use of a zero clogging design factor. Our conceptual design contains spread in permanent conditions within the shoulder with **no spread into the travel lanes.** In addition, the following RFP requirements will be met as part of our drainage design concept:

- End walls will be used in locations outside of clear zone or when buoyancy is a concern to **prevent the potential for undesired movement where fluctuating water levels may exist.**
- Adequate underdrain outfall locations will be provided with an access structure or an EW-12 to **maintain access for future maintenance purposes.**

Hydrologic and Hydraulic Analysis (H&HA): Our Team will perform H&HA, including scour analysis, for major culvert crossings that have a total 100-year discharge greater than 500 cfs and for Bridges B641 and B642 over Lewis Creek, in accordance with the RFP and VDOT Drainage Manual. Major culvert improvements will consist of constructing culvert connections within the I-81 median and adding culvert extensions where appropriate. During final design, we’ll perform a detailed H&HA on all drainage improvements, acknowledging the H&HA Report approval as a Hold Point. Our Team will analyze all culvert crossings to verify that the post-construction headwater elevations meet the allowable levels as established in the RFP and VDOT Drainage Manual. Existing culverts that have proposed storm sewer connections will be analyzed with the 50-year and 100-year design storms to verify there will be no impacts to adjacent structures and properties. **Based on preliminary analysis, no adjacent structures or property impacts are anticipated.**

Water Quality: Our Team’s stormwater management design satisfies technical criteria Part II B of the Virginia Stormwater Management Program (VSMP) regulations and requirements of the Construction General Permit. In accordance with IIM-LD-195.13 Requirements for Erosion & Sediment Control and Stormwater Management Plans for VDOT Projects, our Team will pursue a Scenario 5 approval to enable VDOT to exclude areas of existing impervious surface from the stormwater management requirements. This exclusion of impervious area within the Project’s limits of disturbance **reduces the amount of Stormwater Management (SWM) Best Management Practice (BMP) facilities required for compliance.** Gaining approval of Scenario 5 may be construed as a risk to the Project; however, our Team understands the submission and approval process and has achieved success gaining the necessary approvals to implement Scenario 5 successfully on past projects. To that end, we’ll work in partnership with the Staunton District to prepare necessary memorandums and exhibits for submission to VDOT Central Office and ultimately to the Virginia Department of Environmental Quality (VDEQ) for approval. The following RFP requirements are met with our Conceptual Design:

- No permanent wet-pool SWM BMP facility will be installed in the median of I-81.
- Vegetation for SWM Bioretention BMP devices will be a Virginia native herbaceous meadow seed mix with no shrubs nor tree plantings and will be reviewed and approved by the Staunton District.
- VDOT Standard EC-2 will be installed on the bottom and all side slopes of vegetated SWM BMP facilities.
- All SWM BMP facilities have adequate maintenance access via an authorized crossover.

The Project is located within the Lewis Creek (PS06) and Barter Branch-Christians Creek (PS09) Hydrologic Unit Code (HUC) boundaries. *Figure 4.3.10* provides a summary of disturbed areas and required phosphorus removal broken down by HUC. Our proposed stormwater management design concept utilizes the six pounds per year of nutrient credits that VDOT has already purchased, per the RFP.

Figure 4.3.10 Disturbed Area, Required Phosphorus Removal, and On-Site/Off-Site Split by HUC

Hydrologic Unit Code	Disturbed Area	Required Phosphorus Removal	On-Site Removal (BMP)	Off-Site Removal* (Nutrient Credit)
Barterbrook Branch-Christians Creek (PS09)	42.29 Acres	20.86 lb/yr	15.76 lb/yr (76%)	5.01 lb/yr (24%)
Lewis Creek (PS06)	21.36 Acres	12.82 lb/yr	11.99 lb/yr (94%)	0.83 lb/yr (6%)

**6 lbs of Nutrient Credit will be provided by VDOT (per the RFP)*

Based on preliminary analysis, the entire Project will require a phosphorus load reduction of approximately 34 pounds per year. When all stormwater management facilities are constructed, at least 75% of the pollutant load reduction required will be achieved for the Project onsite. Pre-treatment cells or forebays will be used appropriately for each SWM BMP facility. As shown in *Figure 4.3.11*, by eliminating nine (9) median stormwater management facilities shown in VDOT’s RFP Plans, our Team will **limit environmental impacts, minimize mitigation requirements, and avoid potential karst ground conditions** within the Project.

Our conceptual design includes two low-maintenance Hydrodynamic Separators (HDS) providing pretreatment and phosphorus removal in lieu of two high-maintenance bioretention basins. Proposed SWM BMP facilities **will not require additional ROW** beyond what is shown in the RFP and include required maintenance access as stipulated in the RFP. All SWM BMP types and applications will be designed in accordance with VDOT Part II B BMP Design Manual of Practice requirements including, but not limited to, those requirements that deal specifically with areas of potential karst topography. Our Team will not implement permeable pavement, constructed wetlands, sand filters, infiltration practices, and non-standard BMPs as part of our stormwater management design.

Figure 4.3.11 Proposed SWM BMP Facilities

Stream	HUC	SWM BMP Facility Type	Approx. I-81 Station(s)	Facility Name	Phosphorus Removal
Christians Creek	PS09	Grass Channel	SB 3036+50 to SB 3046+00	-	SWM BMP Eliminated
		Grass Channel	SB 3048+25 to SB 3052+50	-	SWM BMP Eliminated
		Detention	SB 3053+00 to SB 3058+25	-	SWM BMP Eliminated
		Detention	SB 3063+50 to SB 3070+50	BMP A	Quantity SWM BMP
		Hydrodynamic	SB 3071+75	BMP B	2.65 lb/yr
		Detention	SB 3070+75 to SB 3074+50	BMP C	Quantity SWM BMP
		Grass Channel	SB 3074+50 to SB 3079+50	-	SWM BMP Eliminated
		Detention	SB 3090+50 to SB 3092+00	-	SWM BMP Eliminated
		Bioretention	SB 3092+00 to SB 3094+25	-	SWM BMP Eliminated
		Bioretention	NB 2092+00 to NB 2094+25	-	SWM BMP Eliminated
		Grass Channel	SB 3095+00 to SB 3103+25	-	SWM BMP Eliminated
		Grass Channel	NB 2093+75 to NB 2103+00	-	SWM BMP Eliminated
		Detention	SB 3105+25 to SB 3107+50	BMP D	Quantity SWM BMP
		Bioretention	SB 3108+50 to SB 3110+25	BMP E	7.72 lb/yr
		Bioretention	SB 3158+00 to SB 3160+75	BMP F	5.39 lb/yr
Lewis Creek	PS06	Hydrodynamic	SB 3125+50	BMP G	3.33 lb/yr
		Bioretention	SB 3220+00 to SB 3221+25	BMP H	4.69 lb/yr
		Bioretention	SB 3124+00 to SB 3235+50	BMP J	3.97 lb/yr

*BMP I not used

Water Quantity: Within the Project limits, there are twenty stormwater outfalls. Our Team will perform field investigations to evaluate existing conditions and identify necessary remedial measures to stabilize and protect the outfall channels. We'll analyze water quantity flow reduction at each outfall using the appropriate technical requirement. No channel protection analysis will be required for receiving streams with drainage areas less than 100 times the drainage area at the outfall (1% Rule). Our Team will also conduct hydrologic and hydraulic routing analysis to size the SWM BMP facilities to achieve quantity control requirements at four (4) outfall locations. In addition, we'll analyze sheet flow throughout the Project to ensure that post-construction conditions do not exceed pre-construction conditions when runoff leaves the ROW. Figure 4.3.12 provides our Team's water quantity outfall analysis summary.

Figure 4.3.12 Outfall Analysis Summary

Approx. I-81 Outfall Station	Quantity Control	Approx. I-81 Outfall Station	Quantity Control
SB 3045+50	1% Rule	SB 3200+00	Drainage Area Reduction
SB 3070+75	BMP	SB 3205+50	Drainage Area Reduction
SB 3081+00	Drainage Area Reduction	SB 3217+75	1% Rule
5010+00 (Route 250)	Drainage Area Reduction	SB 3218+00	1% Rule
SB 3121+00	BMP	SB 3217+00	1% Rule
SB 3128+25	1% Rule	SB 3219+50	1% Rule
SB 3136+50	1% Rule	SB 3219+25	1% Rule
SB 3142+25	1% Rule	SB 3219+50	1% Rule
SB 3161+50	BMP	SB 3226+00	Drainage Area Reduction
SB 3183+50	Maintenance	SB 3234+00	BMP

Erosion and Sediment Control (ESC): Our Team's drainage design concept has been developed with consideration given for the required ESC during construction. Our ESC concept will include a two-phase plan with additional sub-phases as necessary to coordinate with our construction sequencing. Our ESC Plan will utilize best management practices such as silt fence, temporary sediment traps and basins, rock check dams, and inlet and outlet protection. Where steep slopes exist within the Project, temporary and permanent stabilization

can be difficult to achieve. Our Team will continuously monitor these areas throughout construction to ensure stabilization is achieved and maintained as needed. Our Team will submit a Stormwater Pollution Prevention Plan (SWPPP) for the Project to VDOT for approval prior to construction and obtain Virginia Pollutant Discharge Elimination System Construction General Permit coverage. We'll update the SWPPP and submit for approval as needed throughout the Project to address conflicts that could arise during construction and remain compliant with the permit.

(f) Proposed Right of Way Limits

Our Team's Conceptual Design embraces VDOT's approach to ROW for this Project – minimizing ROW acquisition as much as possible. Further, our Team's Conceptual Design is wholly contained within the ROW limits shown on VDOT's RFP Plans. Importantly, our Team's Conceptual Design does not require, nor does it envision, the need to adjust existing Limited Access features. An overlay of our Team's ROW and VDOT's RFP Plan's ROW has been provided in the layered PDF documents.

After thorough review of the information provided by VDOT as well as the preparation of our Conceptual Design, we have confirmed that ROW acquisition will be limited to Virginia Passenger Rail Authority (VPR) permanent aerial, bridge, and drainage easements and temporary construction easements as shown within our Conceptual Design Plans. As part of the Agreement executed between VDOT and Buckingham Branch Railroad (BBRR) and VPR on October 7, 2022, a temporary easement to the rail corridor to perform investigation and planning activities, including ingress/egress over public grade crossings, was granted to VDOT and the Design-Builder. Our Team, on behalf of VDOT, will obtain appropriate permanent easements from VPR, and CSX, if necessary, based on the Released for Construction plans prior to the completion of the Project. Anticipated ROW acquisition data has been provided in *Figure 4.3.13*.

Figure 4.3.13 Anticipated Right-of-Way Acquisition Data

Parcel No.	Landowner	Easements (square feet)				Proffers
		Permanent			Temporary	
		Aerial	Bridge	Drainage		
001	BBRR/VPR/CSX	4191	603	511	3511	No

(g) Proposed Utility Impacts

Our Team's mitigation strategies and proposed relocation process are described in greater detail in Section 4.4.2. Since improvements to I-81 will remain within the existing ROW and primarily in the median, impacts to utility facilities will be minimal. Our Team's approach has been to minimize and eliminate utility impacts which will continue through final design and construction. Utilities that will likely require relocation are generally located along Route 250 beneath the I-81 NB and SB bridges. These relocations are primarily a **result of our Team's desire to protect VDOT's existing infrastructure and enhance motorists safety by adding BPPS along Route 250 beneath both I-81 SB and NB bridges that were not shown in VDOT's RFP Plans.** The replacement of the existing guardrail and installation of BPPS, necessary to satisfy current VDOT criteria, has created potential conflicts with the gas, water, and telecommunications lines along both sides of Route 250 Eastbound (EB) not envisioned in VDOT's RFP Plans.

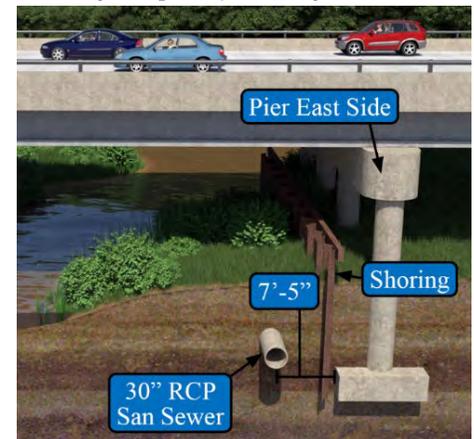
Our Team will verify these, and other, existing utility locations by performing a complete subsurface utility investigation using the VDOT provide material as our starting point. We'll also perform utility test holes on identified utilities so the exact utility location and configuration can be ascertained and avoidance steps can be taken. Based on our work to date, there are two (2) high priority utilities that warrant further discussion as described below.

Shentel Fiber Optic: The existing Shentel fiber optic lines, which also carry VDOT's Intelligent Transportation System (ITS) backbone along the I-81 corridor, is mostly located within the median today. VDOT has initiated planning for its relocation to the western existing ROW line. The actual relocation has been completed from the southern terminus of the Project to Augusta Woods Drive. That relocation included a new bored crossing between the B639 abutments and the retaining wall parallel to and just south of Augusta Woods Drive. For that

new crossing, our Team has developed an avoidance concept that would utilize vertical piles rather than battered piles under the abutment. This will provide clearance and allow those facilities to remain in place. Shentel has advised that the relocation of the northern section should be complete by March 2023.

Augusta County Service Authority's (ACSA) Sanitary Sewer: The 30" ACSA reinforced concrete pipe (RCP) sanitary sewer line crossing beneath B641 and B642 at Lewis Creek is located in close proximity to the northernmost existing and proposed piers of both bridges. Our structural engineers and utility team have minimized the B641 footing size to provide as much clearance as possible between the sanitary line and footing construction as presented in *Figure 4.3.14*. Even though 30" sanitary is a gravity line, we'll perform utility test holes to obtain the exact location early in the design process and implement temporary shoring to preserve the integrity of the sewer line during construction.

Figure 4.3.14 B641 Footing and 30" ACSA Sanitary Sewer Configuration Showing Temporary Shoring



(h) Noise Barrier Locations

VDOT performed a Preliminary Traffic Noise Study in May 2022. Twenty-eight noise sensitive areas and eight (8) Common Noise Environments (CNEs) were identified within the noise study representing residences, hotels, the Frontier Culture Museum, and the Commonwealth Center for Children and Adolescents. Our Team performed a desktop review of building permits adjacent to the Project area in December 2022, which found that there are no new proposed developments within the study area. Therefore, we anticipate that no new noise-sensitive areas will be evaluated as part of the Final Design Noise Analysis.

As indicated VDOT's Preliminary Traffic Noise Study, five (5) noise barriers were evaluated for feasibility and reasonableness. Four (4) of the noise barriers were feasible but not reasonable, and one (1) was not feasible nor reasonable. Since none of the noise barriers met VDOT's criteria and our Team is not proposing significant changes to the alignment or grade of the I-81 improvements, we do not envision constructing noise barriers as part of the Project.

Our Team will perform a final design noise analysis to evaluate potential traffic noise impacts and abatement measures in noise-sensitive areas that are within 500 feet of the Project's proposed roadway improvements. Noise monitoring will occur at the identified CNEs, and our Noise Monitoring Plan will be submitted to VDOT for review and comment prior to the Design Team performing the traffic noise monitoring. Once the field data is processed, noise model validation will be performed using TNM v2.5 to validate the modeled receivers within +/- 3 dB(A) of the measured noise levels (1.5 to 2 dB(A)), if possible. We anticipate that VDOT will review and provide comment on the validated traffic noise models. Our Team will then develop Existing Worst-Case, Future No Build, and Future Build noise models using predicted traffic volumes and speeds provided in VDOT's ENTRADA spreadsheets. Lastly, we'll prepare the Final Design Highway Traffic Noise Report and submit for VDOT's review and approval, conduct necessary citizen surveys, and work with VDOT to obtain concurrence.

(i) Other Key Project Features

Buckingham Branch Railroad (BBRR) and Virginia Passenger Rail Authority (VPRA) Crossing: An agreement was executed between VDOT, BBRR, and VPRA on October 7, 2022, to address the rehabilitation and widening of B639 that carries I-81 SB over a portion of the railroad owned by VPRA. In addition, our Team reviewed VDOT provided Special Provisions covering BBRR insurance requirements and railway-highway requirements, an application for railway Right-of-Entry, certain railway track/roadbed details, and the BBRR force account estimate. We will utilize these documents when conducting design and construction work within the rail corridor to meet or exceed expectations and to fast-track railroad activities.

Our Team's work within the rail corridor, after securing the necessary Right-of-Entry, will consist of designing and implementing temporary falsework, sheeting, and shoring necessary to provide a new bridge deck and

extend the northern B639 pier towards the I-81 median. We will design and construct a crash wall protecting the northern pier in accordance with the required offsets, implement slope erosion prevention measures to minimize silt fouling the railway roadbed and ditches, provide appropriate seeding and planting, and work with BBRR/VPRA/VDOT as necessary to coordinate design, construction, and ROW acquisition activities.

Our Team understands that the BBRR will perform/furnish, or caused to be performed/furnished, at the Project's expense, temporary or permanent changes to communication and signal lines and facilities, flagman/watchman services, design reviews, and information necessary to coordinate and execute the work. We also understand that BBRR may provide an inspector to protect its interests, and we are fully committed to coordinating with BBRR's inspector, if necessary.

Lewis Creek Re-Alignment: The I-81 bridges over Lewis Creek will require pier widening towards the median within the regulated 100-year floodplain. Both bridges cross the floodplain where the Base Flood Elevation (BFE) is 1,256', as shown in *Figure 4.3.16*. The widened northernmost pier of B642 will encroach into the main channel of Lewis Creek thereby requiring a realignment.

To address floodplain impacts caused the bridge widening and realignment, our Team will conduct a stream and subsurface assessment early in the design process to verify existing conditions and gather additional geotechnical data necessary to perform hydraulic and scour analysis. We'll ensure that B641 and B642 over Lewis Creek meet the minimum hydraulic opening requirements of the RFP and the VDOT Drainage Manual, comply with Federal Emergency Management Administration (FEMA) requirements, and address applicable City of Staunton floodplain ordinance restrictions.

Our Team will incorporate natural stream design, bank stabilization, natural material revetments and rock revetments into the Lewis Creek realignment to reduce future slope erosion and downstream sediment deposits. Our conceptual Lewis Creek realignment design will repair an eroded, degraded, and severely migrated portion of the waterway, restoring the integrity of Lewis Creek beneath I-81 and significantly reducing downstream sedimentation impacts in accordance with state and federal requirements. As presented in our Conceptual Design Plan, **our planned adjustment of Lewis Creek will remove existing constriction points, reduce erosive velocities, address scour, mitigate impacts to the overall stream environment, and protect against future bank erosion and downstream sedimentation.**

Virginia Transportation Research Council Instrumentation: Our Team will proactively coordinate with the Virginia Transportation Research Council (VTRC), specifically Brian Diefenderfer, PhD, PE, regarding their instrumentation that will be installed to measure long-term pavement performance. During design, we will work with Mr. Diefenderfer to establish the installation location (mile marker) based on final grades and the proximity to a suitable pull-off area for the research team and will ensure a plan call-out is provided for clarity. During construction, we will notify VTRC well in advance (7 days minimum) of placing Full-Depth Reclamation (FDR) in the selected installation location. Our Team will mark the location of the selected wheel path for 40' at the established mile marker and will provide access to the site along with temporary traffic control required to install the instrumentation.

Intelligent Transportation Systems (ITS): Intelligent Transportation Systems along the I-81 corridor within the Project limits consist of CCTV, vehicle detectors, a weather station and associated sensors, fiber communication, along with power conduit and cables. New ITS devices will not be added as a result of the Project and our Team will maintain all existing devices during construction, protecting them from damage and/or relocating them as necessary. Only devices that are in direct conflict with construction will be relocated from

Figure 4.3.16 I-81 over Lewis Creek Regulated Floodplain depicting B641 and B642



their existing location, leaving the rest in operation for continuous availability to VDOT. We have identified two ITS devices that will be relocated:

- The Roadway Weather Information System (RWIS) located just north of Route 250 within the I-81 median.
- The CCTV camera just north of the RWIS.

Both devices will be relocated to a new location near their existing location, but in coordination with permanent roadway and drainage features in the area. The new devices will be fully functional and integrated before the existing devices are removed from service.

Roadway Weather Information System (RWIS): The existing RWIS is solar powered and self-contained and includes onsite batteries and wireless communication. Its current location conflicts with the proposed guardrail to be installed as part of the I-81 SB widening. Our Team understands the importance of ITS devices to VDOT's mission of safely managing traffic. Accordingly, we'll coordinate with VDOT to install a new RWIS near the same location, outside of the deflection area of the proposed guardrail, and in coordination with the proposed drainage system in this area.

The new RWIS will include solar panels and batteries. The proximity of the relocated CCTV camera to the RWIS will allow for an ethernet connection to the new Layer 2 ethernet switch to be installed at the camera location, **connecting the RWIS to the fiber network and providing VDOT with more reliable service.**

The existing weather station features surface temperature sensors on both I-81 bridges over Route 250. The existing temperature sensors will remain operational throughout construction. New sensors will be installed and integrated with the new RWIS infrastructure. In addition to the surface temperature sensors, there is an existing bridge temperature monitoring sensor camera along I-81 NB. This sensor will not be impacted due to construction, rather it will be maintained in place during and integrated with the new RWIS upon installation.

CCTV Camera: The existing CCTV camera just north of the existing RWIS is currently connected via wireless cell drop with VDOT's Staunton Traffic Operations Center (TOC). While it is not in direct conflict with the I-81 widening or the proposed drainage facilities, **the I-81 median will be re-graded to provide for a clearzone free of as many obstacles as possible.** The I-81 median re-grading will require relocating the existing camera, pole, and cabinet. Therefore, we will install a new CCTV camera and cabinet on a new pole near the relocated RWIS and provide a new fiber branch cable, **enabling a faster and more reliable connection to VDOT's TOC.** A new Layer 2 ethernet switch will be installed in the CCTV cabinet to facilitate the fiber communication. A new pole and lowering device will be included, and access for future maintenance will be similar to the access of the existing camera.

Existing Fiber Optics: Segra (formerly Lumos) owns and operates a fiber line running east to west within the Route 250 median that will be impacted by construction. VDOT currently has a resource sharing agreement with Segra to use four (4) fibers that will be utilized to connect the new fiber branch cable mentioned above. In addition, Shentel owns a fiber optic cable currently within the I-81 median which has been partially relocated towards the western ROW south of Route 250. Shentel has committed to relocate the remainder of their fiber line north of Route 250 prior to the start of construction. Our Team will coordinate with Shentel as necessary to accommodate this relocation.

Signing: Our Team will design and construct signing in accordance with the Manual of Uniform Traffic Control Devices (MUTCD), the Virginia Supplement to the MUTCD, the Virginia Standard Highway Signs manual, VDOT IIM and TE Memoranda, and the VDOT Road and Bridge Standards and Specifications. All signs will be replaced with new panels and supports, including regulatory, warning, Integrated Directional Sign Program (IDSP), as well as overhead and ground-mounted guide signs. Our Team will coordinate with the IDSP Program Manager, who will provide the sign designs to our Team to fabricate and install.

Guide signs are critical for providing a safe and efficient facility. Our Team understands how important these assets are and will follow the guidelines listed above. Additionally, **we commit to using 20" letters for overhead guide signs pertaining to the I-81/I-64 system interchange instead of the current 16" sign letters.** In addition, our signs will be designed using the Clearview font recommended by VDOT TE-337.3. Together, **the font and letter size will promote greater visibility for all drivers and lead to greater safety.**

Bridge Pier Protection Systems: Our Team performed a thorough investigation of existing and proposed bridge piers within the Project limits to determine the adequacy of the existing/proposed protection system as they relate to the envisioned bridge work. In order to address the RFP requirements, we will implement the eight (8) Bridge Pier Protection Systems (BPPS) envisioned within VDOT's RFP Plans as shown in *Figure 4.3.17* and our Conceptual Design Plans. In addition, as **an added benefit of our approach to safety and protecting vital infrastructure**, our Team will implement an additional six (6) BPPS as shown in *Figure 4.3.17* and our Conceptual Design Plans to meet the Manual of the Structure and Bridge Division's guidelines on pier protection. These additional BPPS are believed to be required based on the guardrail work depicted in VDOT's RFP Plans as well as RFP requirements, and to a certain extent, the RFP Questions and Answers. These additional BPPS will **reduce the probability of a critical pier failure due to collision and improve the level of safety for the traveling public**, particularly along Augusta Woods Drive and Route 250 within the Project work areas.

Figure 4.3.17 Proposed BPPS Locations

VDOT's RFP Plans and our Conceptual Design Plans (Eight (8) BPPS Locations)	Our Conceptual Design Plans (Six (6) Additional BPPS Locations)
Ramp No. 1 beneath I-81 SB (LT/RT) Route 250 WB beneath I-81 SB (LT/RT) I-81 SB beneath New Hope Rd. (LT/RT) I-81 NB beneath New Hope Rd. (LT/RT)	Augusta Woods Drive beneath I-81 SB (RT) Route 250 EB beneath I-81 SB (LT/RT) Route 250 EB beneath I-81 NB (LT/RT) Route 250 WB beneath I-81 NB (LT)

4.3.2 Conceptual Structural Plans

Our Team's approach to bridge design and rehabilitation is to provide a solution which meets or exceeds the RFP requirements. We will utilize reliable, durable, long-lasting materials to provide for safe, dependable bridges that **reduce long-term maintenance, increase long-term asset performance, improve constructability, and support widespread public acceptance**. Our superstructures will utilize standard VDOT F-shape lightweight concrete parapets, lightweight concrete decks, as well as steel-rolled beams and prestressed concrete beams compatible with existing beams. These features will facilitate standard phased construction techniques, satisfy minimum vertical clearance requirements, and produce low-maintenance solutions. Our substructure elements and foundation types will be selected based on their proven performance with respect to durability, reliability, functionality, and constructability.

Our Team's bridge design will follow AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017 including errata and VDOT modifications. Our foundation analysis and design will adhere to the additional criteria included in the RFP (Attachment 2.3) and will incorporate VDOT's design requirements such as 20 psf construction tolerances and 15 psf future wearing surface (FWS) in accordance with IIM-S&B-80. Our final bridge design and construction will **meet or exceed the requirements specified in the RFP** and relevant design specifications including VDOT and AASHTO requirements, **reducing VDOT's future maintenance**.

Our Team will prepare and submit for approval Stage I bridge plans and reports that will expand upon our Conceptual Design Plans found in Volume II and verify the type of structure, size, location, and details that define the bridge elements for the Project. Our Team's **bridge structures will not contain elements utilizing post-tensioning, timber, or fracture-critical members and no steel pile bents will be utilized**. Upon VDOT's approval of our Stage I submittals, our Team will proceed to final design (Stage II plans) in accordance with the Project Schedule. We'll continue to collaborate with VDOT when developing our Stage II plans to facilitate VDOT's review and approval and ensure bridge elements are as expected by the Staunton District. Key RFP requirements pertaining to Project bridge elements include, but are not limited to, the following:

- Utilizing lightweight low shrinkage class A4 modified concrete for replacement decks and parapets.
- Providing superelevation rates and deck cross slopes meeting RFP criteria and current VDOT standards.
- Providing an extra ½" of deck thickness resulting in a 1" integral wearing surface.
- Using Corrosion Resistant Reinforcing (CRR) steel per IIM-S&B-81 with CRR Class III being provided in the deck and superstructure.
- Implementing architectural treatment on the outside face of the western parapet and terminal wall of B640.

At abutments, our Team will retrofit bridge widenings to utilize buried approach slabs with deck extensions, a jointless detail that will protect the superstructure and the bulk of the substructure from corrosive deck drainage runoff. We'll remove existing backwalls and construct a seat to support the buried approach slabs. Our Team will reuse existing abutment backwall reinforcing where possible and will add additional reinforcing as needed via drilling and doweling into the existing concrete. We'll implement plumb piles with Mechanically Stabilized Earth (MSE) wall straps at abutments to carry lateral loads as well as flexible link slabs to provide protection of the beam bearings and pier caps. Details such as these provided by our Team will **improve the durability of the structure and reduce future maintenance.**

We'll design new structural steel beams and crossframe connections to avoid the use of fatigue prone details and will replace existing bearings to provide compatibility with movements and rotations of the beams to foster **increased long-term asset performance and reduced future maintenance.** Our Team will perform beam analysis and evaluation for the range of conditions and traffic loadings during the various construction phases. Resultant differential dead load deflections will be examined to assist in decisions regarding the need for longitudinal closure pours. We'll utilize RFP Attachment 2.3.2b requirements, shown graphically in *Figure 4.3.18*, when implementing closure pours. **This process of tooling and sealing the deck construction joint in conjunction with a thin epoxy overlay will provide a highly durable deck.** Additional measures our

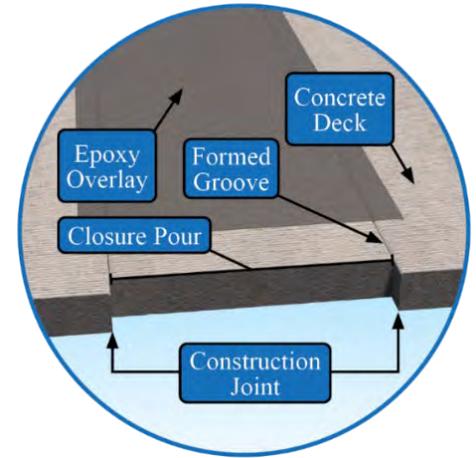


Figure 4.3.18 Closure Pour Detail

Team will undertake to improve deck quality include optimizing rebar spacing and concrete mix design as well as minimizing truck traffic near concrete deck pours to minimize vibrations. Graphics depicting our Team's envisioned bridge construction phasing are presented in Section 4.5.

Our Team understands the critical nature designing and constructing bridge deck widenings under traffic. As design progresses, we'll integrate construction methods and means into the process to ensure construction phasing and traffic vibration concerns are addressed, helping to ensure VDOT will be provided with high-quality, durable bridge decks. We have already planned and located deck construction joints based upon necessary construction phasing considering the location of traffic and its impacts which will expedite our design.

As discussed in Section 4.3.1.e, there will be bridge runoff related spread limitations in both the temporary and permanent condition. The permanent condition will have shoulders of sufficient width so spread will not be an issue. However, during construction, when traffic is shifted and shoulders are at a minimum, spread will become a significant issue that must be mitigated. **To address spread concerns during construction, our Team will provide temporary scuppers in the existing bridge decks** utilizing established details that will minimize the amount of work in the existing bridge deck such as core drilling through the deck.

Our Team has evaluated and incorporated the following Design Exceptions and Design Waivers for bridge-related elements:

- Design Exception No. 3: Utilize a non-standard parapet on the east side of B638 and modify the VDOT Standard BPB-4 to accommodate the required 54" barrier height as shown in RFP Attachment 2.3.4.1.
- Design Exception No. 4: Reduce the minimum shoulder widths on B638.
- Design Waiver No. 3: Reduce the horizontal offset at existing hammerhead pier at Bridge B638.
- Design Waiver No. 2: Reduce the minimum vertical clearance of 16.2' on I-81 SB and 16.3' on I-81 NB.

Bridge Structures

General bridge information for the four (4) widened I-81 SB bridges and one (1) widened I-81 NB bridge are provided in *Figure 4.3.19*. The final bridges will consist of a new bridge deck, bridge widening to accommodate an additional lane of traffic, along with repairs and rehabilitation of existing elements to remain. Detailed information regarding specific member sizes and types, geometric clearances as well as enhancement that our designs will provide to VDOT are identified within our Conceptual Design Plans presented in Volume II.

Figure 4.3.19 General Bridge Information

Bridge	Vertical Clearance (minimum required) (ft-in)	Widening (perpendicular to baseline) (ft-in)	Superstructure Description	Substructure Description
I-81 SB over Ramp 1 (B638)	16'-6"	14'-10" Inside	<ul style="list-style-type: none"> • 210' long • 53'-6" width face-to-face of barrier • 3-12' travel lanes, 8'-2" outside shoulder, and 9'-4" inside shoulder • 2% superelevated bridge deck (added as an enhancement by our Team) • 3-span steel beam structure • Steel rolled beams • Reduced offset to existing hammerhead pier • Modified 42" F-Shape parapet per the RFP to provide a 54" F-Shape parapet 	<ul style="list-style-type: none"> • Abutments will be widened 19' along the length of the abutment • Cross section will generally match existing abutments • Existing abutments will be partially demolished and rebuilt to allow for the use of buried approach slabs and deck extensions to minimize deck joints • Abutments will be supported on steel H-piles similar to existing and the piles nearest the existing abutment will be shifted to allow ample space to drive piles • Piers will be founded on spread footings bearing on competent rock
I-81 SB over Augusta Woods Drive and BBRR (B639)	16'-6" over Augusta Woods Drive; 22'-5" over BBRR	21'-4" Inside	<ul style="list-style-type: none"> • 176' long • 72' width face-to-face of barrier • 3-12' travel lanes, 1-12' auxiliary lane, and 12' left and right shoulders • 3-span steel beam structure • Steel rolled beams 	<ul style="list-style-type: none"> • Abutments will be widened 21' along the length of the abutment • Cross section will generally match existing abutments • Existing abutments will be partially demolished and rebuilt to allow for the use of buried approach slabs and deck extensions to minimize deck joints • Abutments will be supported on steel H-piles or spread footings similar to existing • Existing soil nail wall will be inspected before and during construction • Plumb abutment piles will be used to avoid conflict with the wall and existing utilities • Piers will be founded on spread footings bearing on competent rock • Railroad crash wall will be constructed at pier 2
I-81 SB over Route 250 (B640)	16'-6"	21'-4" Inside	<ul style="list-style-type: none"> • 224'-8" long • 60' width face-to-face of barrier • 3-12' travel lanes and 12' left and right shoulders • 4-span steel beam structure • Steel rolled beams • Architectural treatment with a 2" reveal on the outside face of the west parapet and terminal walls 	<ul style="list-style-type: none"> • Abutments will be widened 21' along the length of the abutment • Cross section will generally match existing abutments • Existing abutments will be partially demolished and rebuilt to allow for the use of buried approach slabs and deck extensions to minimize deck joints • Abutments and pier 2 will be supported on steel H-piles or spread footings similar to existing • Piers 1 and 3 will be founded on spread footings bearing on competent rock • Pier footing designs will be coordinated to accommodate water and gas utilities
I-81 SB over Lewis Creek (B641)	10.7' freeboard	21'-4" Inside	<ul style="list-style-type: none"> • 227'-10" long • 60' width face-to-face of barrier • 3-12' travel lanes and 12' left and right shoulders • 3-span steel beam structure • Prestressed concrete beams (PCB-3) • Elastomeric bearing pads 	<ul style="list-style-type: none"> • Abutments will be widened 22' along the length of the abutment • Cross section will generally match existing abutments • Existing abutments will be partially demolished and rebuilt to allow for the use of buried approach slabs and deck extensions to minimize deck joints • Abutments will be supported on steel H-piles or spread footings similar to existing • H-piles will be placed inside steel pipe piles which will stabilize slopes and prevent downdrag on the H-piles • Lightweight fill will be utilized to minimize settlement and reduce settlement waiting period. • Piers will be founded on drilled shafts to minimize environmental impacts, large scale excavation and dewatering. Additional investigation will be performed during final design to evaluate drilled shafts versus spread footings on competent rock • Pier 2 foundation construction will be coordinated to protect and minimize impacts to the existing 30" sanitary force main • Lewis Creek will be realigned beneath the structure
I-81 NB over Lewis Creek (B642)	6.4' freeboard	23'-4" Inside	<ul style="list-style-type: none"> • 212'-10" long • 62' width face-to-face of barrier • 3-12' travel lanes, 14' left shoulder, and 12' right shoulder • 3-span steel beam structure • Prestressed concrete beams (PCB-3) • Elastomeric bearing pads 	<ul style="list-style-type: none"> • Abutments will be widened 24' along the length of the abutment • Cross section will generally match existing abutments • Existing abutments will be partially demolished and rebuilt to allow for the use of buried approach slabs and deck extensions to minimize deck joints • Abutments will be supported on steel H-piles similar to existing • H-piles will be placed inside steel pipe piles which will stabilize slopes and prevent downdrag on the H-piles • Lightweight fill will be utilized to minimize settlement and reduce settlement waiting period • Piers will be founded on drilled shafts to minimize environmental impacts, large scale excavation and dewatering. Additional investigation will be performed during final design to evaluate drilled shafts versus spread footings on competent rock • Pier 2 foundation construction will be coordinated to protect and minimize impacts to the existing 30" sanitary force main • Lewis Creek will be realigned beneath the structure • Dry Riprap, Class II 38" with Choking Stone, will be provided between Abutment A toe of fill and Pier 1 as well as between Abutment B toe of fill and Pier 2 to minimize erosion in the areas adjacent to the slope protection.

Retaining Walls

Our Team does not anticipate roadway related retaining walls on this Project. However, our Team will design and construct a crash wall beneath B639 adjacent to the existing BBRR and VPRA railroad line in accordance with the RFP.

Major Drainage Structures

Several existing culverts throughout the Project will be impacted by the envisioned I-81 widening. Our design and construction goal for these major drainage structures is to reuse the existing culverts to the greatest extent possible. To that end, we will inspect and verify each major drainage structure is in a serviceable condition to accommodate the needs of the Project, now and for future service life. Depending on the specific location, this may include performing spot repairs as recommended by inspection reports, lining pipes, extending and/or connecting existing culverts to accommodate roadway widening, headwall/end wall modifications and/or replacement, and cleaning out the culverts as needed. Each culvert extension location has been evaluated to ensure that **impacts to existing streams and wetlands have been minimized**. *Figure 4.3.20* provides a summary of culvert locations, sizes, and proposed improvements. The proposed improvements shown in the table will be further evaluated and optimized in the design phase.

With respect to structural load capacities of existing culverts that are to remain in place, our Team will perform a structural inspection and assessment to ensure the culvert can adequately support any proposed increase in cover over the pipe due to widening of I-81. VDOT Standard Details for the drainage elements will be utilized in the final design as much as possible to streamline design and construction.

Figure 4.3.20 Summary of Existing Culverts

Approx. I-81 Location	Size	Treatment Approach
NB 2045+30 & SB 3033+60	Double 5'x7' RCB	Inspect condition and verify structural load capacity.
SB 3077+30	Single 5'x7' Metal	Inspect condition and verify structural load capacity.
SB 3072+40 & NB 2073+00	Single 66" Metal	Inspect structure and perform spot repairs (if needed).
SB 3121+80	Single 5'x5' RCB	Replace headwall with drainage structure and connect to proposed storm sewer system.
NB 2163+00	Triple 6'x6' RCB	Extend upstream end to connect with SB 6'x6' structure.
SB 3161+00	Triple 6'x6' RCB	Extend downstream end to connect with NB 6'x6' structure.
NB 2196+00 & SB 3194+40	Single 4'x6' RCB	Inspect structure and perform spot repairs (if needed).
NB 2232+50 & SB 3234+00	Single 4'x4' RCB	Extend downstream end, extend upstream end, and replace two sets of wing walls.

4.4 Project Approach



● 4.4 Project Approach

Our Team provides VDOT with highly qualified, seasoned design and construction personnel, subject matter experts, and subconsultants that will safely and efficiently deliver the Project while minimizing potential risks for all stakeholders. Having **diligently planned for and managed the schedule, risk, and cost** through all aspects of design and construction, our approach will **minimize VDOT's role** to an expected oversight function and facilitate continuous advancement from milestone to milestone. Our proactive management style encourages our staff to openly communicate internally, take responsibility, and collaborate with VDOT to foster a real sense of partnership. Our Team believes that hard work, dedication, preparation, and openness will best serve the Project. We're excited to deliver this important I-81 improvement and work hand-in-hand with VDOT and other stakeholders to deliver success.

4.4.1 Environmental Management

Our Team understands the importance of a comprehensive and environmentally conscious approach to navigate the Project's permit and compliance process. Our efforts have been and will continue to be rooted in a firm understanding of applicable state and federal regulations and approvals and a real desire to provide environmental stewardship. **We commit to achieving environmental compliance while meeting the Project Schedule which will be achieved through constant interdisciplinary communication and coordination.**

Our hands-on approach will include early and routine meetings with each permit agency to confirm permit pathways and requirements and to obtain buy-in among reviewers. Concurrently, our environmental staff will continue our pursuit-phase partnership with the design disciplines, working closely to avoid and minimize resource impacts and associated schedule risks. Throughout the Project duration, we will promote monitoring and inspection activities to verify compliance and to flag potential issues for early resolution. *Figure 4.4.1* provides a summary of applicable Project regulations.

Figure 4.4.1 Project Regulations

Agency	Permits/Clearances/Coordination
U.S. Army Corps of Engineers (USACE)	Impacts to wetlands and Waters of the U.S. (WUS): In accordance with Section 404 of the Clean Water Act (CWA), the Project will likely require applicable USACE Nationwide Permits (NWPs) or Regional Permit. The Lewis Creek realignment and/or other proposed reestablishment of WUS systems may require pre- and post-construction monitoring.
Virginia Department of Environmental Quality (VDEQ)	Impacts to state-regulated surface waters, including wetlands: A Water Protection Permit for activities will likely be required concurrently with the USACE authorization. VDEQ will also issue CWA Section 401 Water Quality Certification as part of this process to certify Section 404 permitted impacts comply with state water quality standards.
Virginia Marine Resource Commission (VMRC)	VMRC will act as the permit application clearing house for tracking and disbursing Section 404/401 applications to applicable agencies.
US Fish and Wildlife Service (USFWS)	USFWS will require compliance with Categorial Exclusion (CE)/Biological Assessment Section 7 Consultation (informal and formal) regarding bats and other Threatened & Endangered (T&E) species.
Virginia Department of Wildlife Resources (VDWR)	VDWR will require coordination regarding Virginia Endangered Species Act regarding removing or trimming trees to protect bats.
Department of Conservation and Recreation (VDCR)	VDCR will require coordination through the Natural Heritage Program regarding Loggerhead Shrike habitat.
U.S. Coast Guard (USCG)	USCG will require coordination in accordance with Section 9 of the Rivers and Harbors Act for bridge work over navigable waters, even if no permit is required.
Virginia Department of Agriculture and Consumer Services (VDACS)	Our Team will coordinate with VDACS regarding best practices related Spotted Lanternfly infestations.

Our environmental staff understands that facilitating efficient and defensible environmental permitting and compliance will be critical for maintaining the Project Schedule. To ensure this occurs, our environmental

approach will be fully outlined in our Environmental Management Plan (EMP) which will adhere to the framework of CE commitments, preliminary jurisdictional determination (PJD), threatened and endangered (T&E) species coordination, applicable time of year restrictions (TOYRs), and anticipated regulatory and resource compliance procedures. Our EMP will outline our environmental commitments, stewardship goals, environmental staff responsibilities, documentation requirements, environmental milestones, and processes and protocols regarding monitoring, risks, and conflict resolution, among other key elements. The EMP will be provided to VDOT for review and approval semi-annually (or as determined by VDOT).

Natural Resources Permitting During Design Phase

Upon receiving notice-to-proceed (NTP), our Environmental Coordinator will initiate rapport with the agencies to establish points of contact and confirm Project-specific critical path issues identified during the proposal development phase. This will specifically include confirming permitting pathways, TOYRs for tree clearing, and recent regulatory process changes related to Northern Long-eared Bat (NLEB). Furthermore, our Environmental Coordinator will develop and maintain our EMP, continue close internal coordination to integrate permits and regulatory processes into the developing design, and establish comprehensive environmental permit system to track the development and approval of permits, environmental commitments, and permit conditions. Setting up these lines of communication, expectations, and tracking system will allow us to identify and manage specific environmental risks and ensure active collaboration with design and construction personnel as well as VDOT and the permitting agencies.

During the design phase, hallmarks of our environmental management approach will include, but will not be limited to:

- Providing guidance on avoidance and minimization of impacts while maintaining constructability, inclusive of developing constraints mapping, as shown in *Figure 4.4.2*, for use across disciplines to communicate locations of sensitive environmental areas to be avoided to the maximum extent practicable
- Coordinating all aspects of water quality regulations to verify alignment/inclusion of approaches
- Confirming that design and jurisdictional impacts are within limits of the CE and permit parameters
- Establishing routine communication with agency reviewers to keep the Project at the top of their minds and to leverage our rapport to stay up to date on changing policies or concerns (e.g., NLEB ruling)
- Tracking permit obligations and compliance in a matrix and coordinating internally on critical path environmental items to avoid schedule delays.
- Ensuring permit packages and subsequent modifications are complete and avoid challenging and confusing information that could cause unnecessarily protracted agency reviews
- Providing timely responses to agencies' comments and requests for additional information

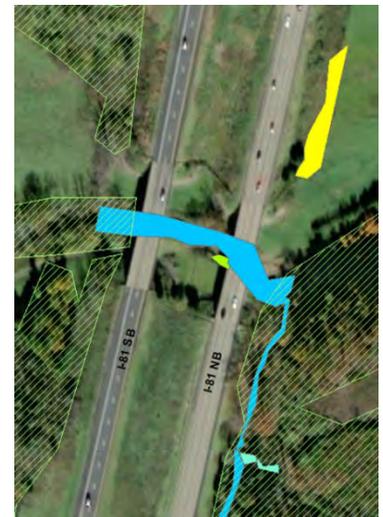


Figure 4.4.2 Detail of Environmental Constraints Map showing Lewis Creek and associated systems, per the Preliminary Jurisdictional Determination maps

Natural Resources Compliance During Construction Phase

Our Environmental Compliance Team will work together to seamlessly transition to the construction phase of the Project. The Environmental Compliance Manager will carry forward leadership of the compliance team using the Environmental Management Plan and permit/commitment tracking database developed during the design phase.

- Once the design is completed, and in order to have the Project released for construction, we will coordinate as needed with VDOT on finalizing the RW Authorization (EQ-201), PS&E Authorization (EQ-200), and the Environmental Certification/Commitments Checklist (EQ-103)

- Prior to initiating construction activities we will arrange a preconstruction and construction environmental constraints meetings to educate the parties on the allowable limits of work near regulated areas, including awareness of the referenced TOYRs and invasive species
- Provide onsite environmental compliance oversight during construction. Such monitoring can proactively identify any field modifications needed if there are potential deviations from the permitted impacts
- Anticipating and facilitating construction-phase permit modifications in a timely manner to avoid construction delays

Efforts to Avoid/Minimize Project Impacts

Based on our Team's analysis, it appears that VDOT's RFP Plans, when overlaid with the WUS systems presented in the September 2022 Preliminary Jurisdictional Determination (PJD), may result in greater WUS impacts than those estimated by VDOT in the preceding May 2022 Categorical Exclusion (CE). The additional impacts appear to be a result of certain stream features being classified as Jurisdictional Ditch – Intermittent, although a conclusive determination could not be made with the available information. These additional impacts, not caused by our Conceptual Design, may exceed the threshold for a Nationwide Permit 23 and may require National Environmental Policy Act (NEPA) re-evaluation. To address this potential challenge and avoid potential Project impacts, our Team will:

- Conduct a field verification to confirm/adjust boundaries and classifications of delineated systems identified in the PJD and promptly engage the agencies in a subsequent field determination to confirm jurisdictional systems per RFP Part 2 Section 4.4
- **Continue to employ avoidance and minimization efforts**
- **Coordinate with VDOT and the permitting agencies to help maintain the CE level document decision, inclusive of the Nationwide Permit 23 finding**

Upon NTP, we will also initiate preparation of a Joint Permit Application (JPA) in coordination with the advancing design – ensuring avoidance and minimization efforts are completed. Facilitating this early, separate coordination, will allow our Team to progress through design without encumbering time-sensitive environmental investigations and permitting processes required for construction. With the proposed realignment of Lewis Creek as well as permit and NEPA matter described above, it will be important for our Team to engage the agencies early to walk through the justification of impacts, identify potential onsite ecological uplift and/or mitigation opportunities, and confirm the applicable permit for the work. If needed for anticipated permit conditions, we will conduct pre-construction stream assessments to establish a baseline for any post-construction monitoring that may be required.

As design progresses, we will continue our close internal collaboration, allowing us to quickly flag and address potential impact increases to resources through over-the-shoulder reviews. Our environmental team will be particularly vigilant to confirm that proposed impacts comply with permit thresholds and criteria. Concurrent with the USACE authorizations, we will pursue a Water Protection Permit and Water Quality Certification from VDEQ. **To expedite agency review and coordination, the construction JPA package will be prepared and submitted to VMRC, USACE, VDEQ, and VDWR as soon as possible**, with the understanding that subsequent design adjustments will be provided to the agencies as we actively engage them in their review.

Likewise, our environmental staff will work closely with the design team to minimize clearing and identify items straying outside thresholds and commitments related to T&E species habitat and water quality issues. We will document these efforts to avoid and minimize impacts as part of permit submittals, as this effort will help guide and expedite mitigation opportunities. If compensatory wetland/WUS mitigation is needed, we will facilitate payment into a local approved mitigation bank for any offsite mitigation credit. We will also be vigilant to **capitalize on any onsite mitigation opportunities that benefit the permitting and mitigation schedule and costs.**

During the construction phase, our Team will mandate awareness and adherence to T&E and invasive species best management practices (BMPs), which at this time are known to be the NLEB, the Loggerhead Shrike, and the Spotted Lantern Fly. This may include verifying if any additional bat surveys are required.

Throughout design and construction, our Team will monitor known environmental risks and will identify and mitigate new risks to avoid impacts to the Project. Our Team has already been working across disciplines during our TWG meetings to identify risks and opportunities to avoid, minimize and if necessary, provide mitigation, with special emphasis on potential risks highlighted in *Figure 4.4.3* below.

Figure 4.4.3 Environmental Risk Assessment and Avoidance Strategy

Potential Environmental Risks	Avoidance, Minimization and Risk Mitigation Steps
Water Quality Permitting – Overlay of VDOT RFP plans with PJD may result in greater impacts than identified in CE, resulting in extensive permitting effort and NEPA re-evaluation, potentially causing Project delays	<ul style="list-style-type: none"> • Reverify system boundaries and classifications with agencies • Maintain impacts within CE/permit thresholds • Engage agencies in permit pathway avoiding an Individual Permit • Identify onsite mitigation opportunities
Final Design Changes - Add/increase impacts potentially exceeding impact thresholds, add T&E species concerns, and/or trigger additional or protracted permitting and mitigation efforts	<ul style="list-style-type: none"> • Implement EMP to clarify processes and guide risk avoidance • Conduct frequent impact review and avoidance meetings • Provide dynamic constraints mapping • Promptly coordinate with regulatory agencies regarding any new unavoidable impacts
Biological Resources Risks - Potential for roosting T&E bat species (Indiana, NLEB), nesting migratory birds, and the designation of loggerhead shrike habitat within the Project limits	<ul style="list-style-type: none"> • Follow TOYRs and conduct periodic bridge surveys • Promptly coordinate with regulatory agencies regarding potential impacts • Prioritize efforts to avoid and minimize impacts to potentially suitable nesting bird habitat

Addressing Environmental Conditions/Areas of Concern within the Project Footprint

Based on our preliminary analyses and agency coordination, we know that in addition to avoiding and minimizing wetland and waterway impacts (described above), TOYRs for activities such as tree clearing will be a critical schedule item. As such, we have incorporated TOYRs into our Project Schedule and will revisit them with the agencies to help demonstrate our commitment to protecting T&E species and habitat and to find potential opportunities to alleviate schedule constraints. This underscores our dedication to proactive coordination early and often and will also help to ensure we have clear guidance from regulators.

Our Team will coordinate with VDACS regarding the Spotted Lanternfly (SLF) quarantine regulations (*Regulations for the Enforcement of Virginia Tree and Crop Pests Law*), promote its awareness, and follow best practices to help prevent their spread throughout the Commonwealth.

Based on our review of the CE and associated special provisions, there are several resources that will have no or minimal impact from the Project and/or have been cleared as part of the CE approval as not requiring additional studies (assuming no changes in initial footprint), including cultural resources and Section 4(f) resources. Similarly, air quality has been dismissed from further scrutiny. During construction, the Project will need to comply 9 VAC5-50-60 et seq., Fugitive Dust Precautions. Activities will also need to comply with all other federal, state, and local air quality regulations.

Hazardous Materials

Our Team reviewed the October 2022 Asbestos Containing Materials Inspection Reports of the five (5) bridges included in the Project, applicable Special Provisions, and the contract documents with regard to hazardous materials. B641 and B642 both contain Category II Non-Friable Asbestos Containing Materials (ACMs) in their rail pads which constitute Known Pre-existing Hazardous Materials.

Early in the design process, our Team will conduct a hazardous materials survey and lead based paint (LBP) survey to confirm there is no LBP present and there are no additional suspected ACMs, other than those identified in the provided ACM Inspection Reports. If the hazardous materials survey identifies LBP, we will conduct work that disturbs LBP in accordance with Virginia and federal requirements.

Our Team will provide appropriate notifications and perform asbestos abatement, abatement monitoring (if required), and demolition in accordance with VDOT procedures and specifications. Prior to demolition activities associated with B641 and B642 (or other structures found to contain ACMs), we will abate regulated asbestos materials (RACMs), identified in the rail pads, and non-RACMs that may become friable during demolition. This work will be performed by a licensed asbestos abatement contractor, and the waste will be disposed of in accordance with Virginia and federal requirements.

We will prepare waste profiles, shipping manifests, and bills of lading for asbestos waste and other non-hazardous waste generated during the Project. Our Environmental Compliance Manager will review waste profiles while our staff will be responsible for signing the waste shipping manifest(s) and/or bill(s) of lading for these materials. If RCRA hazardous waste is generated during the Project, our Team will be considered the co-generator and will be responsible for preparing the hazardous waste shipping manifest(s) for the VDOT's signature and as otherwise consistent with the signatory requirement under Section 411 of the 2020 VDOT Road and Bridge Specifications.

Finally, our Team will prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan as required by Virginia and federal regulations. In the event of spills or releases of petroleum products and other hazardous liquids or solid materials, immediate action will be taken to contain and eliminate the spill release, including the deployment of environmental protection measures to prevent spill migration into the waters of the United States, and of worker exposure protection measures. The VDOT Project Manager will be notified immediately of instances involving the spill, discharge, dumping, or any other releases or discovery of hazardous materials into the environment. Our overall goal is to be outstanding stewards of hazardous materials.

Project Schedule Integration

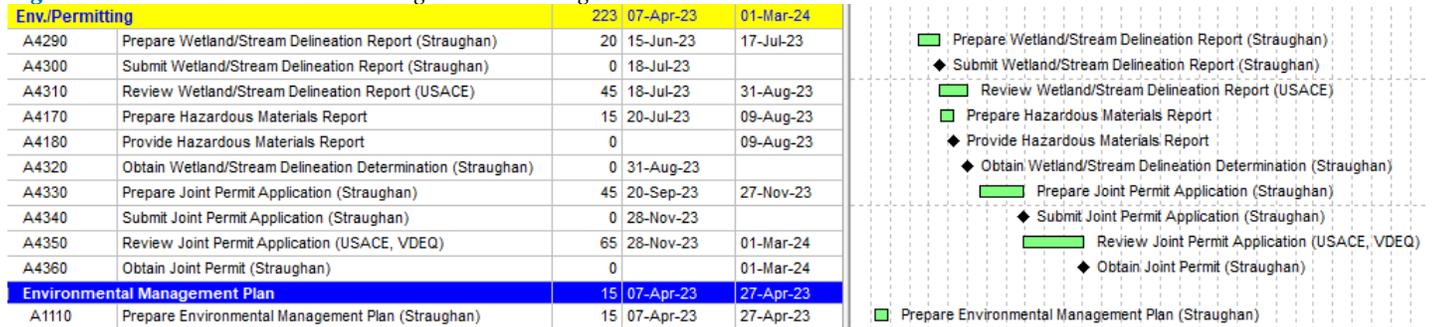
Securing timely environmental permit approvals will be a principal component of maintaining our Project Schedule. To ensure we can acquire the necessary permits on time, our Team has thoroughly reviewed the VDOT provided environmental information and reviewed it against our Conceptual Design Plans. In order to account for permit related predecessor and successor activities, we have incorporated appropriate design and permitting tasks and created environmentally related hold points in our Project Schedule (*Figure 4.4.4*).

As discussed earlier in this section, we have identified that the permit type and/or NEPA document may need to be adjusted based on the extent of actual stream impacts needed to construct the Project. As discussed, this is not a result of our Conceptual Design Plan, but rather a difference in stream classification that cannot be confirmed at this time. Depending on the final stream classification, a Project Schedule modification to account for longer permitting agency review times and/or NEPA re-evaluations may become necessary. However, to help mitigate this potential schedule challenge, **our Team will partner with VDOT and leverage our relationships with agency representatives to identify and discuss stream impacts and expedite environmental permit acquisition**, regardless of the final impact value.

In addition, we will commence fieldwork, due diligence activities, and agency coordination immediately after NPT. Our activities will result in obtaining a formal Waters of the U.S. delineation approved by USACE and VDEQ, thus laying the groundwork for environmental considerations throughout the design phase. Once the design has sufficient detail in regard to temporary and permanent impacts, grading, and drainage, we will submit a Joint Permit Application (JPA) and associated deliverables to VMRC, USACE, VDEQ, and VDGIF to verify compliance and coverage under the State Programmatic General Permit and Virginia Water Protection Permit. We will also provide timely information to VDOT with respect to any NEPA work that may become necessary.

Our experience has shown to successfully permit projects in a timely manner, a comprehensive and thorough JPA package will be necessary - which our Team is well positioned to provide. Our efforts will remain focused on public support and conscious of the overall Project conditions. We will adhere to all conditions identified in the permit, such as verifying all fill material is free of contaminants, timely stabilization of exposed slopes and streambanks, monitoring nonimpacted areas, and restoring temporary impacts to preexisting conditions among a multitude of best practices to promote environmental responsibility. Most-importantly, our Team will work with VDOT and the permitting agencies to deliver the Project on time.

Figure 4.4.4 Environmental/Permitting Schedule Integration



4.4.2 Utilities

While this Project has numerous utilities with facilities crossing I-81, most cross the existing ROW either aerially or within underground casing that are from outside the ROW to outside the ROW. They are Columbia Gas, Dominion Energy (both transmission and distribution), Shenandoah Valley Electric Coop, and Verizon. At Lewis Creek, Augusta County Service Authority has a 30” gravity sewer crossings under I-81 along the creek and on Route 250 the City of Staunton, Columbia Gas and Segra (Lumos) have water, gas, sanitary sewer, and telecom lines running parallel and crossing under the existing I-81 bridges. Lastly, Shentel has a shared-use arrangement with VDOT which placed a fiber optic backbone facility in the median and along the shoulders. It contains fiber lines that are a part of the VDOT ITS system. The Segra (Lumos) fiber optic lines in the median of Route 250 also contain VDOT ITS fiber under a shared-use agreement.

Our Team has initiated coordination with the affected utilities and reviewed potential conflicts and solutions to minimize the required utility relocations. Our proactive approach will continue upon contract award. During final design, our Team will secure utility test holes and fully consider horizontal and vertical locations of each utility facility near the proposed construction to design solutions eliminating conflicts wherever possible. For conflicts that cannot be avoided, our Team will achieve success through early, frequent, and open communication with the utility owners.

Approach for Utility Coordination, Adjustments, and Relocations

Our Team has identified three (3) utility relocations summarized in *Figure 4.4.5* below, however, our efforts during final design will confirm that utility owners fully understand the proposed construction and agree that their concerns have been addressed. **It should be noted that the 10” water main and 3” gas line relocations result from our Team’s desire to protect VDOT’s existing infrastructure and enhance motorists safety by adding BPPS along Route 250 beneath both I-81 SB and NB bridges that were not shown in VDOT’s RFP Plans.**

We appreciate that unanticipated utility relocations can have disastrous impacts to the Project Schedule. To help mitigate this, our Team has and will continue to rely on our Utility Manager, Richard Bennett, who has more than 50 years of experience in transportation related design, development, utility coordination, and construction. Upon contract award, he will continue our Team’s positive working relationships with the utility companies through design, conflict analysis, utility relocations, and construction. Richard worked for VDOT for 37 years, serving as VDOT’s State Utilities Engineer where he was responsible for the utility relocation program. **Our Team will utilize his vast knowledge of VDOT’s utility processes and excellent working relationship with utility companies to benefit VDOT and the Project.**

Our approach follows the VDOT guidelines, but it is our experience and expertise that will ensure the utility relocation process will be completed as planned with little to no surprises. The major steps our Team will undertake to successfully complete the necessary utility coordination required for this Project are as follows:

1. Review all provided information and plan for the unexpected
2. Validate utility designations and obtain test holes information
3. Complete conflict resolution and determine prior rights and cost responsibilities
4. Review plans for relocations or avoidance and prepare UT-9

5. Hold Utility Field Inspection (UFI) meeting and establish relocation plan budget and schedule, including meeting with public utilities to finalize relocation plans or avoidance
6. Incorporate utility relocation plans into design documents, coordinate utility relocations with MOT and other activities
7. Review utility plans, specifications, and estimates (PS&E), verify conformance with VDOT's Standards and Policies, provide documents with recommendation for approval, and enter data into RUMS
8. Verify approved utility relocations plans are in accordance with our Project Schedule and identify critical path relocations
9. Proceed with relocations and maintain open communications to mitigate unforeseen conflicts and verify relocations were done accurately

Our utility staff will assemble previous utility information and prepare a Utility Investigation Plan to confirm utilities are completely identified. This will include extending/verifying VDOT provided subsurface utility engineering (SUE) data in areas needed and performing utility test holes to verify horizontal and vertical positions of the facilities. Our Team is already aware of new lines that Shentel has installed since the initial survey. As a part of our utility efforts, we'll recontact each utility owner to secure more detailed information about the size of the facilities and any extraordinary relocation requirements. We'll verify information obtained during the additional SUE work and with the original data and prepare and maintain a utility status report.

Having this additional information on hand, our Utility Manager will work with the Design-Build Project Manager and Construction Manager to update the Project schedule to reflect any new adjustment or relocation construction schedule information. Our utility team will work with the design engineers to further evaluate potential utility conflicts and solutions based on the additional test holes at critical points to complete the conflict analysis and relocation design. **Early interactions between the design and utility team members will avoid and address utility conflicts at the lowest level** – which generally has a significant positive influence on constructability and continuous Project advancement.

As the Project advances, Our Team will distribute the ROW Plans plans to the utility companies and schedule a UFI meeting to review the utility conflicts, relocation designs, and other challenges and special conditions. Using our extensive experience, these will be very detailed UFI meetings. Conflicts will be fully explained and potential utility relocations alternatives that can be accommodated will be presented and discussed. Our Team will prepare and distribute a UFI report and other customary documents and will update the RUMS information. We'll also develop schedules for the utility companies' submission of easements and PS&Es for the necessary relocations.

Our utility members will continue to work with each utility owner to confirm their final PS&Es are progressing on schedule and will resolve issues between the Project plans and the utility plans. Our utility design engineers will develop relocation plans for the City of Staunton's in-plan water relocations and will schedule and attend coordination meetings for plan review and plan approval. As the utility company's plan and estimates are submitted our Team will review them in accordance with federal/state regulations and procedures as well as the RFP requirements. Our Team will finalize the cost responsibility determination and will provide a recommendation for approval to VDOT. We'll ensure that applicable utility relocation agreements, executed by the utility company, will be provided to VDOT as part of the PS&E assembly.

Once VDOT approves the PS&E, the utility owner will be authorized to proceed with the utility relocation. Our Team will hold preconstruction meetings with the utility contractor and verify stakeout for the relocated utility. We'll monitor the utility adjustment and relocation schedule, ensuring their work remains off of the critical path. Our Team will inspect the utility relocations and will complete notes for the record, verifying utility work has been completed in accordance with the Project requirements.

Our Utility Manager will oversee the entire process and will prepare and maintain monthly Utility Status Reports to confirm work is proceeding as scheduled. He will review and implement solutions to utility related issues that may arise during construction. Our Utility Manager, along with design and construction personnel, will remain involved in reviewing the issues and agreeing to the solution.

As the utility adjustments or relocations are completed, our utility inspector will prepare the as-builts drawings and our Utility Manager will secure final billings and ensure that the utility owners receive any applicable VDOT land use permits.

Utility Conflicts

Figure 4.4.5 summarizes our Team's evaluation of potential utility conflicts and those requiring relocation. We will continue evaluating alternatives to avoid or minimize these utility relocations during final design, using the utility test hole information we obtain. As mentioned previously, we have proactively engaged the utility companies during the preparation of our Technical Proposal to fully understand their requirements and possible relocation plans.

Figure 4.4.5 Utility Conflict Evaluation & Relocation Plan

Utility Owner	Utility and Location	Potential Conflict	Conflict Resolution / Relocation Plan
Shentel	Fiber Optic I-81 SB from station 3061+50 to station 3080+00	I-81 widening, grading, etc.	Relocation has already been performed by Shentel
	Fiber Optic I-81 SB from station 3080+00 to station 3243+00		Relocation will be performed by Shentel per VDOT direction
	Fiber Optic Augusta Woods Drive EB from station 4002+75 to station 4004+00 RT	Proximity to B639 widened abutment foundation	Avoided conflict by utilizing vertical piles
Segra (Lumos)	Fiber Optic Route 250 EB from station 5016+00 to station 5022 LT	B640 pier and BPPS (added as an enhancement by our Team)	<u>Move fiber optic cable to relocated VDOT ducts</u>
City of Staunton	10" Water Main Route 250 EB from station 5020+75 to station 5022+50 RT		<u>Offset 10" water main</u>
Columbia Gas	3" Gas Line Route 250 EB from station 5017+75 to station 5022+50 RT		<u>Offset 3" gas line</u>
Augusta Co Service Authority	30" RCP Sanitary Sewer Line I-81 SB station 3218+80 (Beneath B641)	Proximity to B641 widened pier	Avoided conflict by adjusting B641 pier design and implementing temporary shoring (see Figure 4.3.14)
Verizon	Fiber Optic I-81 SB station 3234+50 (Beneath BMP J)	BMP J grading	Avoided conflict by adjusting BMP J bottom elevation

Mitigation Strategies

Avoid/Mitigate Utility Conflicts by Design: As noted in Section 4.3.1.g., our Team zeroed in on avoiding or mitigating some major utility conflicts. We focused our conceptual design review and changes on minimizing impacts to the utility facilities and found solution to avoid most. Our Team has thoroughly evaluated the corridor for unknown utilities and potential new utilities to avoid delays and identify issues. **In the event an unknown utility is discovered, we are prepared to pivot and adjust the design efforts to maintain the Project Schedule and avoid impacts to the critical path.** With the Shentel relocation advancing, only minor utility relocations are anticipated which will not create significant design or scheduling risks. As demonstrated in our Project Schedule, anticipated utility relocation activities and milestones have been integrated to minimize the chance of delays.

Avoid/Mitigate by Construction Means and Methods: Additional information obtained during our utility validation process and from additional utility test hole excavations will be available to our construction personnel working on the site, including utility relocation plans and schedules for all relocations. Our construction team will plan operations considering the utility's location. For example, after Miss Utility marks the lines, additional pot holing by hand digging may be completed at points along an underground utility to verify the amount of clearance or exact configuration. Additionally, protective sheeting will be used where necessary to allow excavations for road or bridge construction while protecting the nearby utility facilities.

Our construction approach also accounts for certain potential delays, as it is understood that utility relocations may occur concurrent with construction. Our Project Schedule shows that we will keep relocations ahead of the construction activity to avoid this scenario.

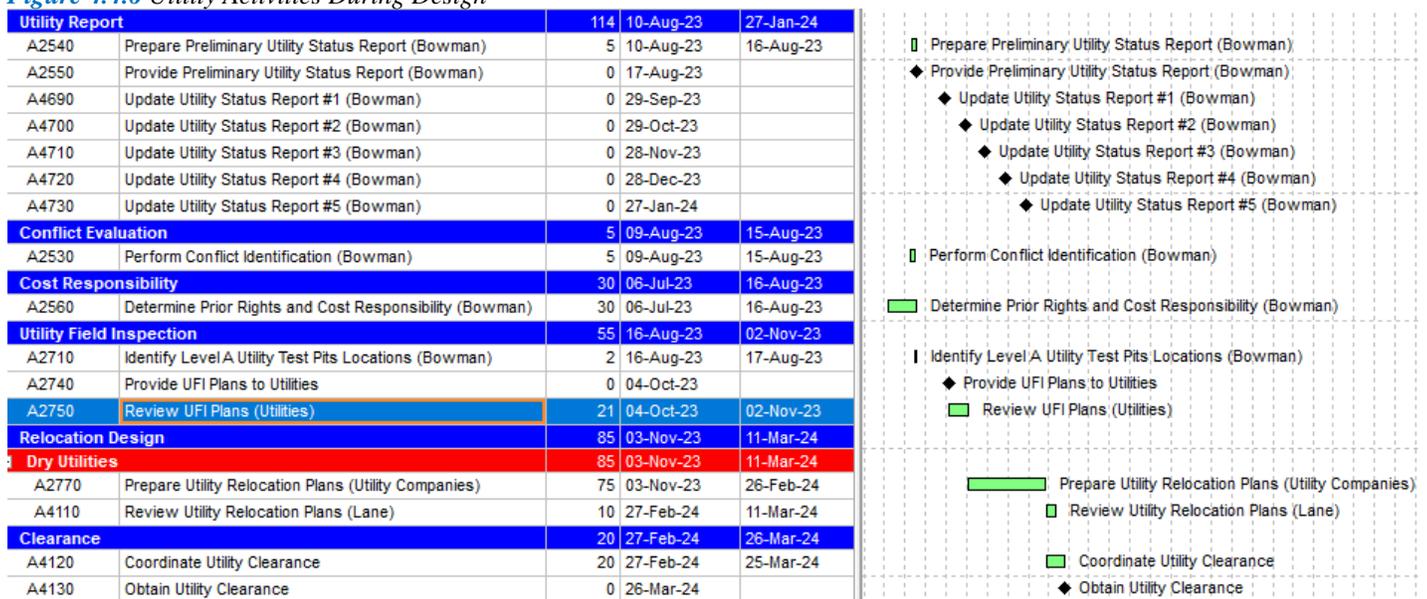
Avoid/Mitigate Unexpected Utility Conflicts: During construction, if any unexpected utility facilities are encountered, we'll immediately bring the utility owners and appropriate team members to the site where potential solutions will be reviewed and determined. However, because our Team will complete a thorough utility investigation prior to construction, unexpected utility conflicts will be minimized, if not completely avoided.

Integration into Project Sequencing

In preparation of our Technical Proposal, our Team coordinated with the design disciplines during our TWG meetings and with the utility owners to develop relocation parameters. We have integrated the results of these interactions into our overall Project Schedule (Figures 4.4.6) which reflects that the fact that the utility companies need certain information before they can evaluate the final impact and the requirements for the needed utility relocation.

Design Activities

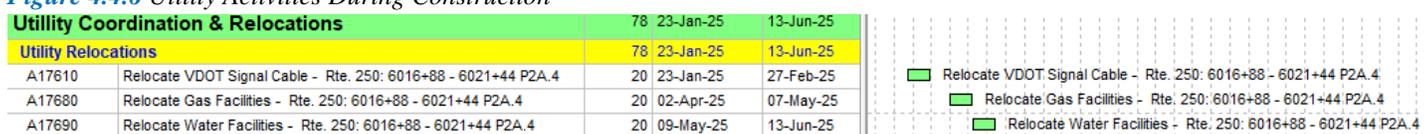
Figure 4.4.6 Utility Activities During Design



Prioritizing Utility Relocations to Expedite Construction Sequencing: in our Team’s experience, we understand that some utility relocations require significantly more relocation timeframes. Therefore, we have prioritized long utility relocation durations such as telecommunication facilities which includes service disruption requirements. Having these requirements included in our Project Schedule will help to ensure that the utility relocations will be managed to mitigate potential schedule impacts. In addition, our construction team are well prepared to react to unexpected issues with the utility locations, such as extended work schedules or encountering unknown utilities.

Construction Activities

Figure 4.4.6 Utility Activities During Construction



4.4.3 Geotechnical

Based on our Team's collaborative effort, our geotechnical design concept meets or exceeds requirements of the RFP and applicable VDOT Standards and Special Provisions. Additionally, our design and mitigation measures do not impede the short- and long-term performance of the existing structures. We have developed an understanding of the subsurface conditions anticipated within the Project limits by reviewing the available geotechnical data reports, historical aerials, topographic maps, soil survey maps, and USGS geologic maps. The geology beneath I-81 within the Project Limits, as it passes through the axis of the Great Valley, ranges from calcareous rock, with the potential for karst terrain, to highly plastic/compressible soils. While not encountered in the subsurface information VDOT provided, there are certain areas that are likely to form sinkholes, sinking streams, irregular "pinnacled" bedrock/soil interface, and include the possibility of encountering the Madison Cave Isopod (MCI) – a federally listed threatened species. These varying subsurface conditions would highly influence the design and construction approach and duration as well as the long-term performance of various elements included within the Project.

To address concerns related to varying subsurface conditions, our Team thoroughly reviewed the geotechnical and pavement data presented by VDOT and conducted TWGs to develop Conceptual Design Plans and approaches that will minimize geotechnical risks. Correctly identifying and addressing these varying subsurface conditions will be crucial for the long-term viability of the constructed work and maintaining our Project Schedule, leading to a successful outcome.

Our geotechnical field investigation and design will follow VDOT and AASHTO LRFD requirements. VDOT has provided sufficient geotechnical information with the RFP. However, our Team will perform additional subsurface investigations to validate and confirm our proposed design and minimize the potential for encountering unforeseen geotechnical issues during construction that could impact the Project. In addition to the minimum requirements, our Team will perform in-situ test (Cone Penetration Testing (CPT), Dilatometer Test (DMT), and Vane Shear Tests). The in-situ tests at the Lewis Creek Bridges (B641 and B642) will be extremely critical for the design of the embankment and bridge foundations since subsurface profiles indicate very soft and loose highly plastic soils.

For pavement thickness and subgrade evaluation, we will perform additional GPR testing using a 24-channel Kontur GPR system and falling weight deflectometer (FWD). **Recollecting the GPR and FWD data, specifically in the shoulders, and performing additional pavement cores, will provide a more accurate representation of the asphalt layer and subbase thickness along the proposed widening alignment.**

Identifying/Mitigating Geotechnical Risks

Mitigating geotechnical risks will involve the following critical steps:

- Identifying issues early on during the design with an adequate program of subsurface investigation and ground characterization
- Preparing appropriate designs and developing ideal construction methods with continuous communication between design and construction personnel
- Involving the geotechnical design team during construction so that any unanticipated subsurface conditions will be properly handled

Our Team, in close coordination with internal subject matter experts (SME), has identified and developed mitigation strategies to address geotechnical risks which are discussed below. Throughout the Project, we will continue to evaluate geotechnical risks which will be discussed within our continuing TWG meetings. These risks conversations will guide our geotechnical field investigation, laboratory testing, design, and construction activities. In addition, our Project Schedule has incorporated geotechnical elements, including additional testing and construction items. Finally, our Team will monitor, assess, and address geotechnical risks as we progress through design and construction – coordinating completely with VDOT to deliver Project success.

Working Within the Vicinity of Existing Structures and Maintaining Existing Structures

Our Lead Geotechnical Engineer has experience working on bridge widening and rehabilitation projects (*I-81 Bridges, I-64 Segment I and III, I-66 Outside the Beltway, and Route 7 Corridor Improvements*), and our Team

understands the precautions that will need to be taken while working in the vicinity of existing foundations, including the need to develop solutions during the design process that will facilitate these structures. *Figure 4.4.7* depicts a recent bridge widening near an existing bridge and railroad, similar to B639, that our Lead Geotechnical Engineer previously worked on to provide geotechnical recommendations and an instrumentation monitoring plan. The subsurface profile consisting of soft and loose soils, similar to the conditions anticipated at the Lewis Creek Bridges (B641 and B642).



Figure 4.4.7 Bridge Widening Near Railroad with Soft and Loose Subsurface Soils that our Lead Geotechnical Engineer Worked on

Our Team developed a Project specific list of critical considerations for widening existing bridges that have been preliminarily coordinated and will be fully addressed in final design:

1. Differential settlement will likely cause localized distress on bridge joints which must be considered
2. Downdrag on existing and new piles will likely result which must be mitigated
3. Vibration due to pile driving and construction activities will occur which must be evaluated
4. Lateral squeeze due to soft soils must be addressed in order to maintain existing slopes

In addition, **our Team prepared a Project specific list of geotechnical challenges and construction constraints that have been preliminarily coordinated and will be fully addressed in final design:**

1. Up to 20 feet of fill in median and near bridges B641 and B642 must be considered
2. Working as close as 3-5 feet of existing bridges/structures must be evaluated and addressed
3. Highly plastic soils between 2 to 15 feet beneath proposed widenings (B638, B,639, B641, and B642) must be evaluated and addressed

Mitigation Strategies: Our experience with bridge rehabilitation projects will help to minimize the construction and long-term performance risk. Our team will minimize identified risks (settlement, downdrag, vibration, slope stability and lateral squeeze) by performing various analyses during the design phase and implementing a robust instrumentation and monitoring program during construction activities. For embankment widening and new fill being placed near existing structures, the risk will be minimized by performing settlement and global stability analysis for various construction sequences and by utilizing lightweight materials (*e.g., Foamed Glass Aggregates or Expanded Shale Aggregate*), where necessary. **We will perform additional field investigation, including in-situ testing and laboratory testing, that will allow us to better understand subsurface conditions and facilitate the implementation of optimal solutions.**

Based on our current examination of the data, the total estimated settlement at the B641 and B642 is estimated to be about 1.5" - 5.5" as shown in *Figure 4.4.8*. We understand that the proposed bridge will be structurally connected to the existing bridge; therefore, the settlement of the existing ground due to new fill should be completed before the connection is made. We closely coordinated the construction sequence with the team to come up with a most cost-effective solution given the time constraints. **We will use light weight fill (LWF) (*e.g.: Expanded Shale or Foamed Glass Aggregates*) and/or a combination of various materials to limit the settlement.** In addition to the LWF, we may use a permanent sheet pile wall to limit the effect of the placement of new fill on existing bridge foundations.

While the use of LWF will reduce downdrag on the proposed piles, they will not completely eliminate it. Therefore, we plan to install proposed H-Piles within 24" diameter rock socketed pipe piles, filling the void space with clean sand. Additionally, **we will eliminate**

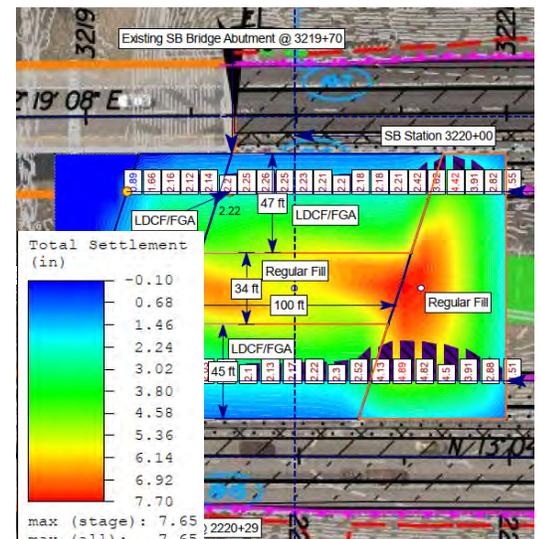


Figure 4.4.8 Settlement Analysis Lewis Creek Bridge

battered piles because of the increase in bending moment due to downdrag loads. Finally, our Team will install settlement plates and vibrating wire piezometers in the vicinity of Lewis Creek Bridges.

Due to the potential of exceeding vibration criteria (*2" per second*) during pile driving, our Team will vibrate the piles to a depth of around 15 feet and then drive to refusal from there to limit the vibrations. As mentioned above, **we will utilize a combination of drilled foundation system and driven piles at Lewis Creek Bridge to reduce vibrations and downdrag on the proposed piles.**

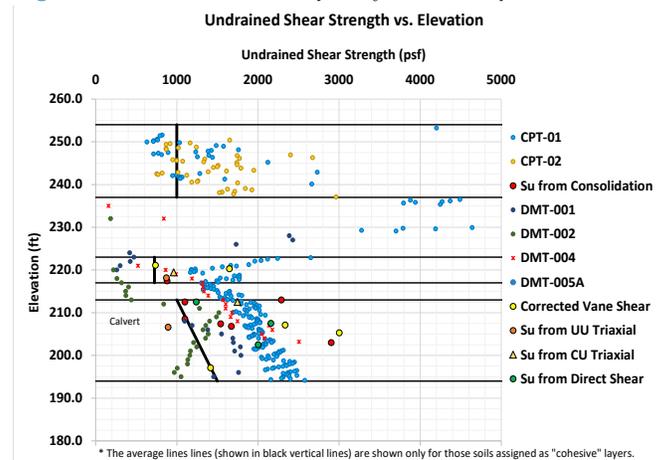
A preconstruction survey of the adjacent bridge will be performed and the existing conditions will be documented before construction activities commence within the vicinity of existing bridges. Additionally, our Team will perform crack and vibration monitoring during construction by both visual inspection and by installing temporary instrumentation, such as geophones and seismographs, in the vicinity of existing bridges. After the construction is completed, **our Team will conduct a postconstruction survey to verify acceptable conditions of the existing bridge and to close out the construction.**

Slope/Global Stability and Lateral Squeeze of Bridge Widening

Our Team reviewed the GDR data and performed a site visit to evaluate potential issues with modifying and protecting existing slopes. The GDR data does not point to significant concerns with existing fill slopes, and site reconnaissance did not observe slope failures. However, the placement of new fill at the bridge abutments will likely cause instability due to the presence of highly plastic and soft soils. Based on the laboratory test results and boring logs provided in the GDRs, we anticipate that soils at design subgrade elevations will generally consist of lean clays, clayey sands, and more importantly highly plastic soils. Test borings drilled along the bridge alignment shows ELASTIC SILT (MH) and FAT CLAY (CH) at varying elevations.

Mitigation Strategies: One of the main focuses of our engineering analysis will be to properly characterize the fully softened and peak shear strength properties of these clays. The shear strength will be evaluated from in-situ testing, laboratory tests such as direct shear tests and triaxial tests, and from published correlations of Liquid Limit, Plasticity Index, and clay fraction. We will develop shear strength plots with elevation, as shown in *Figure 4.4.9*, that will help us to make reliable estimates of soil properties. **Our Team will perform a comprehensive statistical analysis to estimate the distribution and variance of the shear strength values that will be used to evaluate the selected design shear strength value in probabilistic terms.**

Figure 4.4.9 Statistical Analysis of Laboratory Data



While full evaluation of the entire Project area was not feasible during the preparation of our Technical Proposal, preliminary slope stability results indicate that slope stability will most-likely be a concern near the Lewis Creek Bridges and a few cut areas along the I-81 alignment. The slopes may need to be flattened to meet minimum factor of safety. Factor of safety and potential remediation measures for Lewis Creek Bridges have been provided below in *Figure 4.4.10*, based on our preliminary review of information presented in the RFP.

Figure 4.4.10 Lewis Creek Bridges – Slope/Global Stability

Location	Minimum Factor of Safety – Long Term		Potential Stabilization Measures
	Without Stabilization Measures	With Stabilization Measures	
Lewis Creek Bridges (B641 and B642) North Abutments	1.1	1.5	<ul style="list-style-type: none"> Utilize Foam Glass Aggregate Provide Geogrid Layers Install 24-inch Steel Pipe Pile
Lewis Creek Bridges (B641 and B642) South Abutments	1.0	1.5	

Location	Minimum Factor of Safety – Long Term		Potential Stabilization Measures
	Without Stabilization Measures	With Stabilization Measures	
Lewis Creek I-81 Median Area	1.0	1.5	<ul style="list-style-type: none"> • Provide Geogrid Layers • Utilize a Combination of Foam Glass Aggregate, Geogrids, and regular fill

Our Team will further reduce slope stability risks through implementing the following measures:

- Refining assumptions made during preliminary analysis, including subsurface profiles, soil properties, groundwater, and slope geometry
- Incorporating laboratory test results from vane shear testing that may indicate reliable in-situ undrained shear strength of unconsolidated soils
- Installing inclinometer(s) in the vicinity of Lewis Creek Bridges to monitor the stability of the embankments

Coordination of Geotechnical Design Concepts and Construction Activities

Our geotechnical design team will be involved during the entire duration of the construction activities. Our geotechnical engineer of Record (GEOR) and senior engineer/geologist will visit the site at critical junctures and as listed below and, when necessary, evaluate critical construction activities and provide improvement recommendations.

- Bridge foundation construction
- Geotechnical instrumentation installation at the Lewis Creek Bridges
- Load testing for micropiles for the crash wall at B639

Our Team's review of instrumentation data will be critical for construction of the Lewis Creek Bridges. **Our geotechnical team will review the instrumentation data weekly and provide directions to construction personnel regarding construction activities and sequencing.** Design changes, if required, will be discussed with design and construction leads and will be provided to VDOT for review and approval before implementation. The geotechnical team will also provide consultation during construction if unforeseen conditions arise during earthwork, slope construction, and/or foundation construction. **To provide VDOT with confidence in our geotechnical approach during construction, our Team will provide a monthly geotechnical certification letter attesting that construction work was completed per the approved plans and specifications.**

4.4.4 Quality Assurance/ Quality Control

Our Team completely understands that providing quality work that meets and/or exceeds Project-specific requirements will be absolutely critical for minimizing VDOT Quality Assurance/Quality Control (QA/QC) oversight efforts and providing functionally appropriate infrastructure to the public in a fiscally responsible and time-sensitive manner. Notably, our Team commits to providing VDOT with unbiased evidence that the design deliverables and construction activities have been prepared and completed in accordance with our approved QA/QC Plan, VDOT's *Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects (QA/QC Guide)*, as well as other contractual requirements. Our QA/QC Plan will define a uniform approach to design and construction quality management, quality procedures, independent assurance and verification, record keeping, as well as document control. Our QA/QC Plan will be dynamic – changes will be issued to the plan throughout the duration of the Project as conditions merit. For example, our Construction QA/QC Plan will be updated to include specific testing, inspection, and personnel requirements for elements contained in our Released for Construction (RFC) plans.

To achieve superior quality, our Team will establish a cohesive QA/QC Plan that identifies, obligates, and integrates experienced design and construction quality personnel with distinctly separate QA and QC functions in a manner so that appropriate resources and time are devoted to the Project to meet QA/QC requirements. Our

QA/QC Plan will be prepared, managed, and adjusted as necessary by our QAM and strictly enforced by our DBPM, DM, and CM. Our Team will require that all design and construction personnel adhere to the approved QA/QC Plan and will continuously and purposefully overlap design and construction activities and personnel to preserve continuity throughout the Project duration. Our Team’s QA and QC personnel as well as our approach to QA/QC during both design and construction have been explained in more detail below.

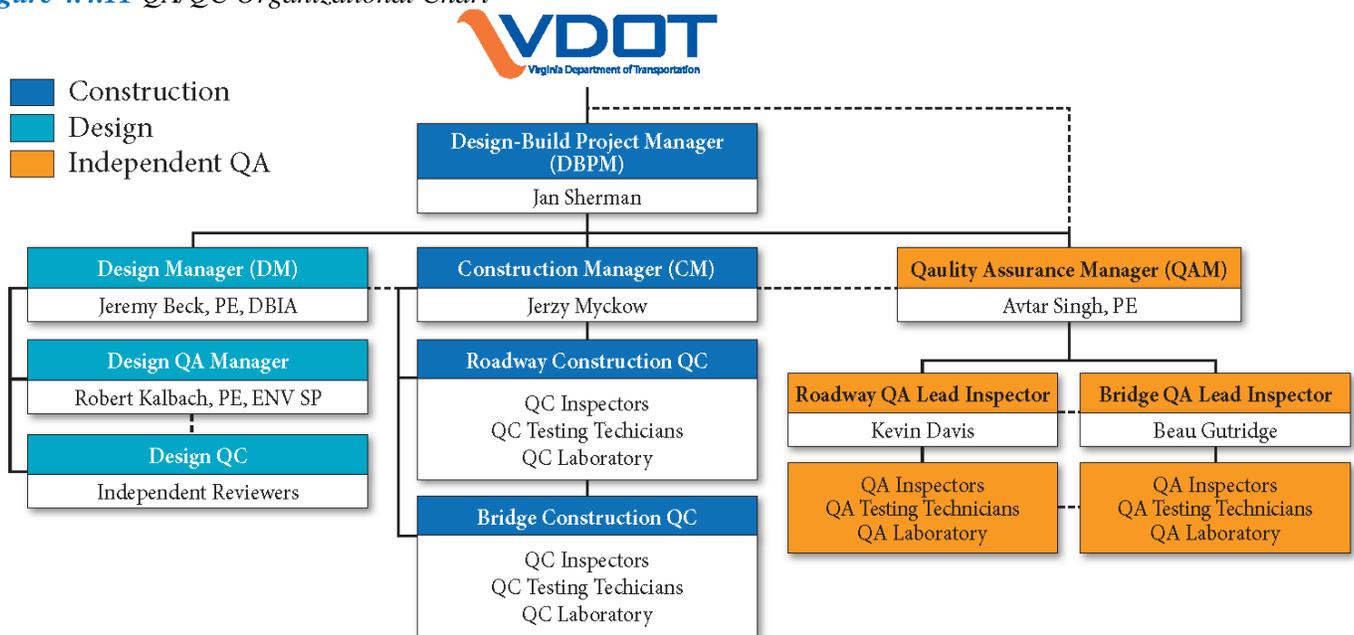
QA/QC Personnel

Our QA/QC Plan will make sure proper quality design and construction personnel are in place, quality tasks are completed at the appropriate time, and work is prepared and conducted correctly the first time. As depicted in our QA/QC Organizational Chart in *Figure 4.4.11*, three distinct quality personnel groups (**Independent QA**, **Design QA and QC**, and **Construction QC**) will perform specific and distinct functions while also interacting under the direction of our DBPM to provide Project-wide QA/QC. Our QA/QC personnel have the necessary experience and applicable certifications required by the *QA/QC Guide* for the quality work they will be conducting. Our DBPM, QAM, DM, and CM will confirm adequate QA/QC personnel are assigned to satisfactorily implement the overall quality program.

Our QA/QC efforts will focus on the processes and procedures established in our QA/QC Plan, with QA/QC personnel exclusively designated to either Quality Assurance (QA) or Quality Control (QC) functions and not assigned to perform conflicting duties or production work. For example, our design QA will mandate that the original designer is not responsible for quality assurance of his/her own design work, while our construction QA efforts will be separate and distinct from construction production and construction QC.

As part of our QA/QC Plan, our Team will provide fully detailed resumes with references identifying the qualifications and experience QA/QC personnel. Our QA/QC personnel will have sufficient authority and autonomy to identify quality problems and to initiate, recommend, and verify solutions, while our QAM will have full authority to initiate work stoppage and recommend pavement withholding for design and/or construction activities that are not acceptable.

Figure 4.4.11 QA/QC Organizational Chart



Approach to QA/QC during Design

Design QA/QC Plan

Our Design QA/QC Plan will be founded on the International Organization for Standardization (ISO) 9001:2015 Quality Management Standard as well as ISO 14001 Environmental Management System and will clearly indicate that our Team is responsible for design quality. Design QA/QC activities will provide

confidence and objective evidence that the design was prepared under correct supervision and that it meets the contract requirements. In general, QC functions will incorporate reviews of math and engineering computations, technical accuracy, form, content, and spelling, as well as performing constructability reviews. QA activities will evaluate whether the designer assessed the problem appropriately, applied the correct analysis, and assigned qualified personnel.

Our Design QA/QC Plan will verify that clear, accurate, and comprehensive plans are prepared, design work is coordinated, constructability reviews are performed, suitable materials are specified, training and audits take place, and most importantly safe, quality designs are provided. Our efforts will culminate in well-structured, easily audited documents that will minimize VDOT's review efforts, optimizing the benefits of design-build delivery. To accomplish this, our DM will establish and oversee the design portion of our QA/QC Plan that comprehensively details QA and QC activities and requirements in separate sections such that they are capable of being read and followed independently.

Specifically, our Design QA/QC Plan will:

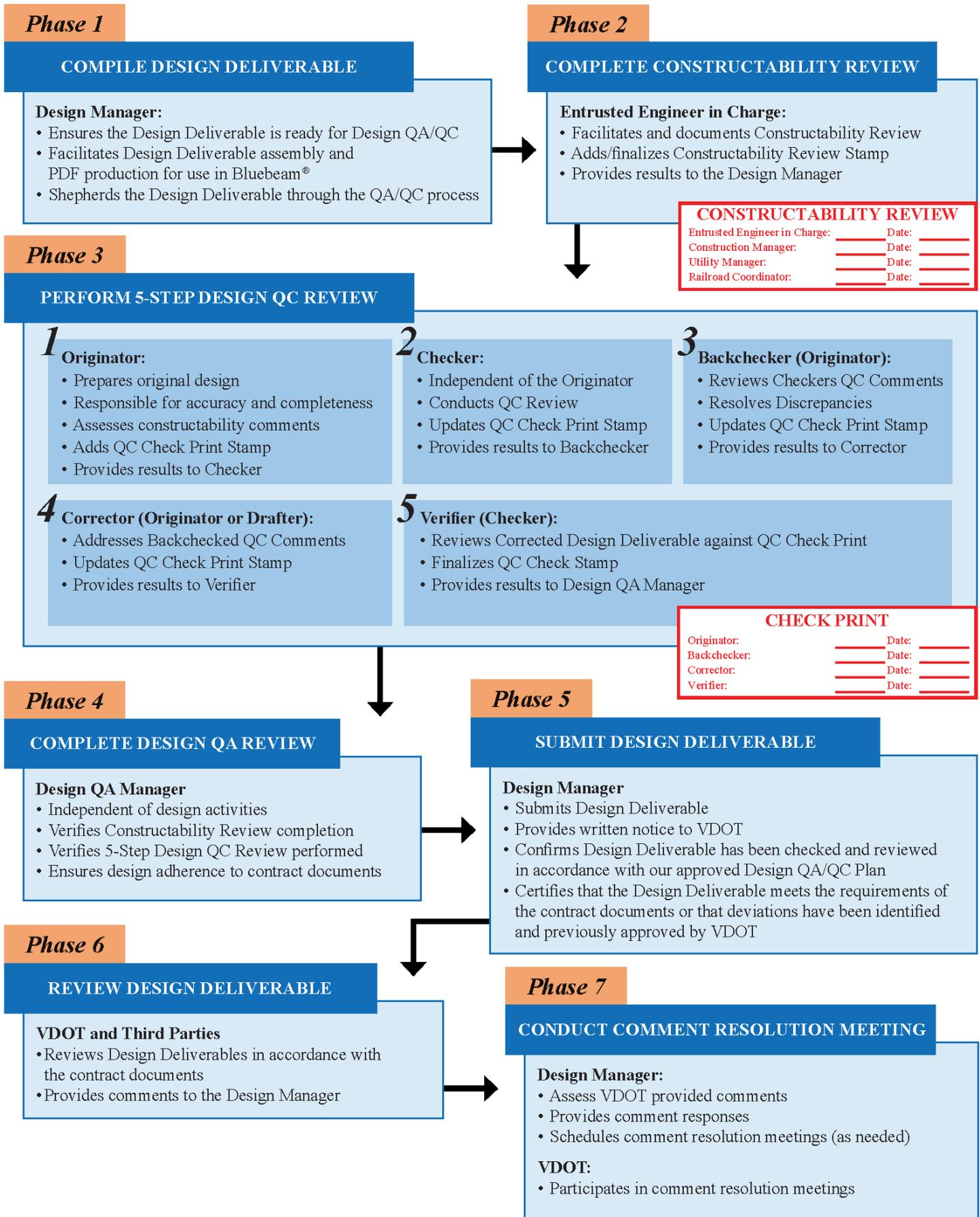
- Be organized by discipline (e.g. roadway, drainage, and structural)
- Include procedures and identify documents for preparing and checking all drawings, specifications, and design submittals for accuracy, conformance with the contract documents, and performance of the intended purpose
- Confirm drawings, specifications, and design submittals are stamped, signed, and dated by the responsible Professional Engineer registered and licensed in the Commonwealth of Virginia
- Establish the level, frequency, and methods for various types of reviews, inclusive of computer software
- Set the procedures for coordinating work performed by different persons to eliminate conflicts, errors, omissions, and/or misalignments
- Establish procedures for ensuring QA/QC requirements are achieved for right-of-way and utility items
- Identify items requiring special attention or emphasis
- Identify by firm, discipline, name, qualifications, duties, responsibilities, and authorities' persons responsible for design QA/QC activities, including subcontractors
- Provide instructions related to Design QA/QC Plan revisions as well as document control and records
- Discuss design corrective and preventative actions along with quality training requirements

Finally, our Design QA/QC Plan will describe design deliverables to be submitted to VDOT and will provide a design deliverables schedule for VDOT's planning purposes. It should be noted that draft design deliverable dates have been included in our Project Schedule submitted with our Technical Proposal. After VDOT's review, responses and revisions will be provided in accordance with the contract documents, and we will schedule and attend comment resolution meetings as needed to resolve concerns. Our Design QA/QC Plan will clearly indicate that our Team is solely responsible for schedule impacts arising from providing design deliverables that are inconsistent with the contract documents. Our QA/QC Plan will also require that changes to the design after RFC will be subject to Design QA/QC processes commensurate with those applied to the original design.

Design Review Process

Our design review process will be conducted in phases as depicted below in *Figure 4.4.12*. The process will be established within our Design QA/QC Plan and will apply to all design related documents (reports, calculations, plans/drawings, specifications, and special provisions). The phases will occur to assess and adjust design elements at a time when corrective action can be taken to substantially decrease the likelihood that appreciable non-conforming elements would be incorporated into the project. Certain review phases will be completed via the use of Bluebeam® to facilitate reviews across multiple locations and organizations and to verify records are retained. Others will be conducted in-person or virtually using appropriate technology to facilitate personnel locations, speed, and accuracy.

Figure 4.4.12 Design Review Process



Design QA/QC Staffing Plan

Our Team has reviewed the requirements of the Design QA/QC Plan inclusive of the staffing levels needed to facilitate compliance and adhere to the Project Schedule. We have considered the necessary experience and personnel, inclusive of their availability, when preparing the table below which identifies our Design QA/QC staffing plan.

Figure 4.4.13 Design QA/QC Staffing Plan

Position/Discipline	Firm	Design Lead	QC Lead
Entrusted Engineer in Charge	Lane	John Ecker, PE	
Design Manager	WSP	Jeremy Beck, PE, DBIA	
Design QA Manager	WSP	Robert Kalbach, PE, ENV SP	
Roadway	WSP	Chris Peltier, PE	Chris Davis, PE
Drainage/ESC/SWM	WSP	Melissa Simpson, PE, PMP, ENV SP	Robert Cade, PE
Bridges/Structures	WSP	Rex Gilley, PE	Shiwei Luo, PE
Traffic/TMP/MOT/ITS	WSP	Tim Rayner, PE, PTOE, PMP	Nancy Geisler, PE
Signing/Marking	WSP	Robin Huelsbeck, PE	Kristin Belfield, PE, PTOE
Geotechnical	Terracon Consultants, Inc.	Sushant Upadhyaya, PhD, PE, D.GE, PMP, RMP	Linsay Valentino, PG
Utility Coordination	Bowman Consulting Group Ltd.	Richard Bennett	David Peterson, PE
Environmental/Permitting	Straughan Environmental, Inc.	Kate Traut, PWS, ISA-CA	Brian Bernstein, AICP, ISA
Noise Analysis	Straughan Environmental, Inc.	Lauren McMahon, CEP-IT	Tracy Seymour, PE, Assoc. DBIA, LEED Green Associate
Field Survey/Right-of-Way Plans	Pennoni Associates, Inc.	Roger Harris, LS, PS	Kevin Wood, LS

Approach to QA/QC during Construction

The Construction QA/QC Plan provides clear and complete procedures for construction inspection, testing, and oversight of the Project and its processes. **Our Construction QA/QC Plan will operate with real-time data collection and on-site reporting.** All Team members, as well as the subcontractors and suppliers, for the Project will be required to submit corresponding Quality Plans confirming compliance with our Construction QA/QC. Any variance from the Project standards will not be tolerated; and as such, continuous audits will be performed to verify adherence to the Construction QA/QC Plan.

Our Team's QA/QC Plan will meet or exceed the specific requirements outlined in the VDOT QA/QC and in the Project RFP. These requirements include but are not limited to:

- The Quality Assurance Manager (QAM) will be onsite full-time for the duration of construction
- Lead QA Inspectors – one for structures and one for roadway – will be supplemented by an appropriate number of QA Inspectors reporting to the Lead QA Inspectors
- Staffing levels will assure adequate coverage of the Work precluding the need for VDOT resources
- All inspectors will hold VDOT materials certifications for all activities they inspect/test
- QA will have a presence on-site during all construction activities
- QA and QC laboratories will be separate entities that are accredited in the applicable AASHTO procedures by the AASHTO Accreditation Program (AAP)
- Form C-25 will be utilized for submission and approval of all construction material
- The QA staff will populate the Materials Notebook with actual quantities during the life of the Project
- The QA/QC Plan will feature a robust Quality Assurance Auditing and Non-Conformance Recovery Plan complete with forms for recording and resolving any issues that may arise
- All Project documentation will be uploaded to ProjectWise during the life of the Project

- Tablet-based inspections will be instituted complete with PlanGrid serving as the plan depository
- Check lists will be utilized for inspection to the maximum extent possible
- Each inspector will provide a Daily Work Report to be vetted by the QA Staff
- QA will log all unresolved issues on the Issue Log; the log will be a topic of the Weekly QA/QC meetings
- NCR's will be tracked on the NCR Log and be made available to all team members and VDOT

Construction Quality Control (QC). Management and leadership will be provided by the Construction QC Manager (CQCM), Chris Beckett. The Construction QA/QC Plan addresses every task, operation, and completed activity. Continuous assessments of all activities will be made throughout construction, and when necessary, adjustments to methods or materials to achieve the required quality levels will be made. Mandatory Preparatory Inspection Meetings (PIM) will be led by the QAM and shall include relevant design, construction, QA/QC, and VDOT personnel; and will take place prior to commencing an activity. The meetings will be key to identifying processes, inspections, testing, and hold points that will gauge quality so that operations are not moving forward without confirmation. PIMs and Hold-points have been included in our Proposal Schedule so that they are not missed during construction. In the case of a Non-Conformance Report (NCR), we will react rapidly to correct the non-conforming work in accordance with the approved correction plan and to adjust processes, materials, or techniques to correct and re-establish a process that is significantly improved with results meeting the Project requirements. **Our proven and robust Construction QA/QC validates quality with respect to all aspects of the Project requiring minimal input from VDOT.**

Construction Quality Assurance (QA). CES will provide Quality Assurance services. Led by QAM, Mr. Avtar Singh, PE; 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 RFP requirements, specifications and special provisions are being met or exceeded. The independent role of the QAM provides direct information to the DBPM, Entrusted EIC, and VDOT outside of the Construction QC chain of command. Additionally, QA will monitor and audit QC procedures and activities to verify proper performance. The QAM has absolute authority for the acceptance of all work products on the Project. He will verify that the Construction QA function is effective and **minimizes the requirement of resources and involvement by VDOT.** The QAM is authorized to stop work on this Project if quality procedures, measures and controls are not being properly maintained.

Construction QA/QC Staffing Plan. For a project of this size, scope, and complexity, our Team know that QA/QC staff must be experienced and robust to verify final product delivery meets or exceeds requirements. Proven processes and procedures will be incorporated to standardize and streamline the construction quality approach. The DBPM will have ultimate responsibility so that Project policies are effectively implemented. The construction quality team will consist of three main entities:

Construction Field Engineers (FEs) will perform in-process surveillance inspections on construction activities under their work areas according to the inspection and test plans (ITPs). **Performing in-process quality surveillance is a proactive approach that identifies potential quality concerns before they become an issue and impact schedule, cost, or requirements for VDOT oversight.** In-process inspections assist in the Lane Team's "right the first time" philosophy. FEs are responsible for QC of the construction and fabrication activities and for making sure that equipment and facilities are erected and installed in compliance with Project plans, specifications, and other appropriate requirements.

The **Construction Quality Control Manager (CQCM)** verifies that inspectors and FEs **know the requirements of the Contract and are adhering to the design requirements toward a quality finished product, resulting in minimal VDOT oversight being required.** The CQCM works closely with the FEs. The CQCM and assigned inspectors will perform inspections on finished work products in line with the ITP. The CQCM also is responsible for the review of subcontractor QC documentation to confirm its compliance with the Project requirements. QC Inspectors examine ongoing work as required per the ITP. FEs will coordinate with the QC inspectors to verify and confirm that work is constructed in accordance with the requirements. The CQCM, in coordination with the QAM, is responsible for preparing the ITPs, which will be prepared in consultation with the FEs.

Coordination is key to the success of a quality project. Upon transition from the design phase to the construction phase, the design organization will evolve into a delivery function supporting construction of the new project. With design personnel integrated into the construction team, the Lane Team will be an effective and cohesive team focused on compliance with quality requirements.

The **QAM** has overall responsibility for the development of and adherence to the QA/QC Plan. **He will manage and direct action on all quality matters, will schedule and coordinate all QA audits and prepare and submit monthly quality reports to VDOT in a format that will minimize VDOT review time.** The QAM will be supported by one lead roadway QA inspector, Kevin Davis, and one lead bridge QA inspector, Beau Gutridge. The QA inspectors will be responsible for QA testing and/or inspection of items of work for conformance with plans and specifications. The QAM manages and directs action on all quality matters, scheduling and coordinating all QA audits and preparing and submitting monthly quality reports to VDOT. Audits will be conducted internally and on subcontractors throughout the life of the Project. The QAM will oversee follow-up, documentation, and positive closure of all observations and findings arising from Quality Audit and inspection activities.

Geotechnical representation will support QA and QC activities during construction for verification that conditions are consistent with the basis of design and that work is being completed consistent with the geotechnical recommendations and in accordance with the VDOT QA/QC Manual. Recommendations will be modified as needed based on conditions encountered, related to the bridge foundations, roadway subgrade, subgrade transitions, and slope construction, and other key aspects as construction occurs.

Lane will provide a Utility Inspector to monitor utility construction activities performed for private and public utilities on the Project. Our Utility Inspector will see that all utilities on the Project are relocated according to the approved plan and estimate (P&E). They will obtain approval for any field changes to the approved P&E from our Utility Coordinator, Richard Bennett. They will also maintain UT-7 daily records of utility work being performed. Our Utility Inspector will assist in creating a set of red-lined As-Built Drawings that depicts any changes made from the approved plan and estimate.

Communication is key to the success of every project. During construction, the QAM will communicate with key team members and staff, including the CM, on a regular basis. The QC and QA staff will also meet/communicate on a daily basis to confirm proper inspection coverage of the work. The QA staff will assist the QAM in notifying the VDOT Project Manager in a timely manner for proper coordination of Witness Points, Hold Points, Independent Assurance, and Verification Sampling and Testing. Other key meetings include:

- **Weekly QA/QC Meeting:** The CM, QAM, and the Lead QA/QC Inspectors will meet to review the progress of the work. Any issues and/or concerns will be discussed and addressed. Minutes will be prepared and all issues and/or concerns that are not resolved during a meeting will be tracked until resolution. The VDOT Project Manager and staff will have a standing invitation to attend this meeting.
- **Preparatory Inspection Meetings:** As mentioned above, the QAM will conduct these meetings per the approved QA/QC Plan to discuss who, what, when, where, and how work is to be done on a particular construction activity. He will confirm that the agenda is complete and that each item is thoroughly vetted.
- **Monthly Progress Meetings:** The DBPM will meet monthly with team members including the VDOT PM, DM, Construction, Lead QA Inspectors, QAM and other applicable team members to discuss the work and the progress of the Project. A standard agenda will be established at the first meeting and then followed throughout, and modified as necessary, to emphasize special activities for a given month. Key items will be discussed each month, such as the status of plans, the Project Schedule, and materials, environmental/ permitting, ROW, safety, and community interface. Minutes will be prepared for each meeting and promptly distributed, and any issues or concerns not taken care of or resolved during the meeting will be diligently tracked until resolution.



4.5 Construction of the Project



● 4.5 Construction of the Project

Our Team’s approach to successfully delivering the I-81 improvements is predicated on providing quality construction through the use of state-of-the-art equipment - operated by highly skilled personnel - led by knowledgeable managers with applicable VDOT and Design-Build experience. Our people travel the I-81 corridor regularly and our children attend colleges and universities along the corridor. We truly grasp the importance of delivering this Project in a safe and efficient manner. We also understand that I-81 is the lifeline for commerce and the traveling public for Augusta County, the City of Staunton, and the Commonwealth. **Our Team focused our construction approach around one main goal: providing safe and practical construction solutions that will minimize or eliminate disruptions to the traveling public while providing an optimized mix of enhancements and price.**

The following enhancements demonstrate how our construction approach will achieve this goal and deliver the Project **4 days earlier** than the RFP Final Completion Date. **Our Team’s capacity to self-perform a significant portion of the work provides the control needed to achieve a timely Project.**

Enhancement	Benefits to VDOT and the Traveling Public
Linear MOT and Minimal Construction Phases	<ul style="list-style-type: none"> Improves safety by reducing impacts to the traveling public Reduces duration of construction vehicles entering/exiting the work zone into I-81 Increases driver expectations by reducing the number and frequency of traffic shifts Reduces damage to existing roadway and bridge decks when restriping and resetting barrier
Early Work Packages and Schedule Completion	<ul style="list-style-type: none"> Utilizing Early Work Packages for design and construction Early design packages for long-lead items such as steel piling, steel and concrete beams Early construction activities for erosion and sediment control, clearing and grubbing and bridge demolition Early demolition, foundation, and abutment construction at B639 Provides for substantial completion 04 days ahead of VDOT schedule
Temporary and Permanent Drainage	<ul style="list-style-type: none"> Temporary scuppers utilized at each bridge to control spread during construction Commitment to regular maintenance and cleaning plan of temporary drainage inlets as well as temporary barrier slots to address spread concerns
SWM Enhancements	<ul style="list-style-type: none"> Eliminates nine (9) SWM BMP facilities envisioned in VDOT’s RFP Plans, resulting in significant cost and schedule savings as well as reduced construction impacts Construction of two low-maintenance Hydrodynamic Separators (HDS) as water quality BMPs eliminates two high-maintenance bioretention basins Realignment of Lewis Creek accommodates bridge widening, floodplain requirements, provides channel stabilization, and improves hydraulic efficiency of waterway crossing Existing flows maintained to avoid replacement of six major drainage structures to maintain Project budget, schedule, and safety
Railroad Coordination	<ul style="list-style-type: none"> WSP has coordinated recently on projects in the Staunton area affecting BBRR and has also worked on past CSX projects. These established relationships will facilitate early and direct interaction with BBRR necessary to achieve project success Lane provides a comprehensive schedule of activities pertaining to railroad ROW activities to BBRR and VPRA so they have the requisite advance notice to provide staff resources. This enhances safety and minimizes disruption to railroad operations.
Permanent and Temporary MOT Signing and Pavement Markings Upgrades	<ul style="list-style-type: none"> Providing 20” letters on overhead signs related to the I-81/I-64 interchange. This improves the existing condition of 16” letters and meets a higher standard Additional temporary raised pavement markers in tangent sections, particularly along the centerline between lanes. Improves visibility of lane lines at night and during inclement weather. Lane will monitor and maintain the condition of the RPMs during winter months. Radar speed feedback signs within the work zone contribute to improved work zone safety by promoting "speed harmonization". Self-contained solar powered units will be located to target sensitive areas such as merges and the southbound area between US 250 and I-64. It will display an approaching vehicles speed and flash for speeds over the posted speed.

4.5.1 Sequence of Construction

To accomplish a balance among safety, design, MOT, construction, quality, maintenance, and final acceptance, our team of engineers, estimators, and construction operations personnel jointly participated in TWG meetings during the pre-bid phase. Our process of integrating design and construction professionals allowed our Team to progress the safest, most efficient, and economical, low-maintenance Project for VDOT. Through the iterative TWG process, our Team developed improvements in all areas over VDOT's RFP Plans, resulting in our proposed design and Sequence of Construction (SOC).

The proposed SOC was selected to allow the Project to commence mobilization, setting up the field office in **January of 2024**. Overall, construction activities are divided into four distinct phases, Phase 1 through Phase 4, with each having specific areas and scopes of work. Phase 1 also includes a sub-phase 1A defining work to grade and construct temporary median access areas.

Phase 1 exclusively involves the MOT and construction activities associated with I-81 SB and NB outside shoulder work for the entire corridor, beginning in **January 2024**. This includes milling and excavation, shoulder strengthening, temporary pavement markings, shifting of traffic, and setting temporary concrete barrier in preparation for subsequent phases.

Phase 1A provides activities associated with seven strategically located temporary median access locations, beginning in **June of 2024**. Refer to *Figure 4.5.6* for ingress/egress locations.

Phase 2 begins major roadway and bridge reconstruction activities in **June of 2024**. For both I-81 SB and NB, there are 8 distinct Areas designated for construction. SB work covers approximate STA 3027+00 to 3245+00. These limits include roadway widening, drainage, Bridge B638, Ramp 1, Bridge B639, Route 250 Ramp A, Augusta Woods Drive, Bridge B640, Route 250 Ramp C, Route 250 utility relocations, and Bridge B641. NB work covers approximate STA 2025+14 to STA 2244+00. These limits include roadway widening, drainage, and Bridge B642.

Phase 3 begins major roadway and bridge reconstruction activities in **October of 2025**. For both I-81 SB and NB, there are also 8 distinct Areas designated for construction. SB work covers approximate STA 3027+00 to 3245+00. These limits include outside roadway improvements, drainage, Bridge B638, Ramp 1, Bridge B639, Route 250 Ramp A, Bridge B640, Route 250 Ramp C, Bridge B641 and Route 262 Ramp C. NB work covers approximate STA 2025+14 to STA 2244+00. These limits include outside roadway improvements, sign structures, Loop D, Ramp F, drainage, Bridge B642 and Route 262 Ramp A.

Phase 4 pushes activities towards the completion of the project, beginning in **April of 2027**. For both I-81 SB and NB, the Project-wide activities include milling and asphalt overlay, along with the installation of permanent signing and pavement markings.

Project punchlist activities begin in **May of 2027** with Final Completion on **June 04, 2027**, a total of 4 days ahead of the RFP schedule.

Additional descriptions and graphics summarizing our SOC are included in the following pages.

Approach to Construction Phasing

Our Team's approach to construction phasing reduces the number of MOT phases and short-term lane closures, greatly improving safety by minimizing impacts to the traveling public during construction.

As described above and in the following pages, our construction operations are organized logically and systematically, each with established areas of work. Each Phase is specifically established to achieve our early Final Completion Date. Dividing the Project into strategically defined Phases allows the Team to effectively coordinate our design and construction elements and efficiently manage the resources required for environmental permitting, ROW, stakeholder coordination, safety, and utility relocations. Unforeseen **delays to any specific location can be mitigated by shifting resources to the other areas within a Phase that can continue independent of the affected location**. Additionally, this approach enables the approximate four-mile

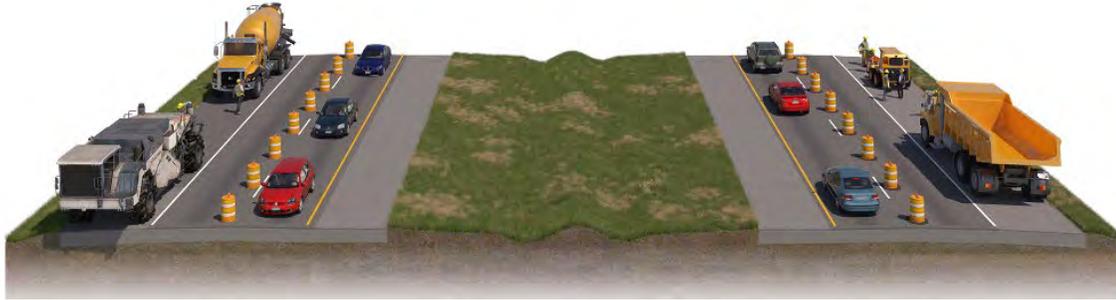
corridor to be constructed efficiently while allowing the Team **flexibility during construction to mitigate delays and impacts to the traveling public.**

General Sequence of Activities

Our Team has developed a sequence of activities to accommodate the various construction activities while maintaining safe and efficient travel through the work zone. Our approach considers the phasing required for the roadway and bridge construction. The roadway requires fewer phases of construction than the bridges require, and some bridges have more phases than others. *Figure 4.5.1* illustrates the basic roadway phasing.

Figure 4.5.1 I-81 Roadway Phasing

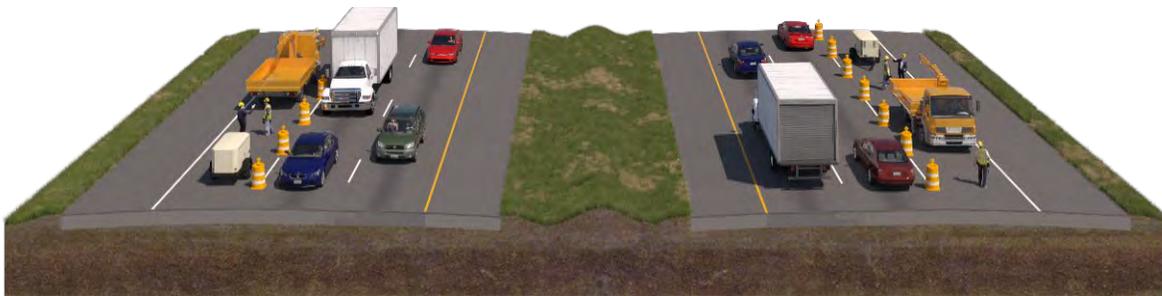
Phase 1 (Roadway) – Perform Outside Shoulder Strengthening



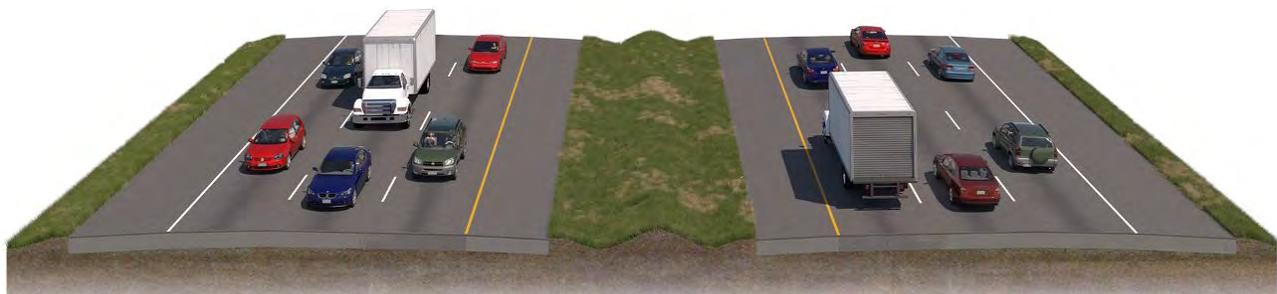
Phase 1A and Phase 2 (Roadway) – Construct Median Access and Inside Roadway Widening



Phase 3 (Roadway) – Construct Outside Roadway Improvements

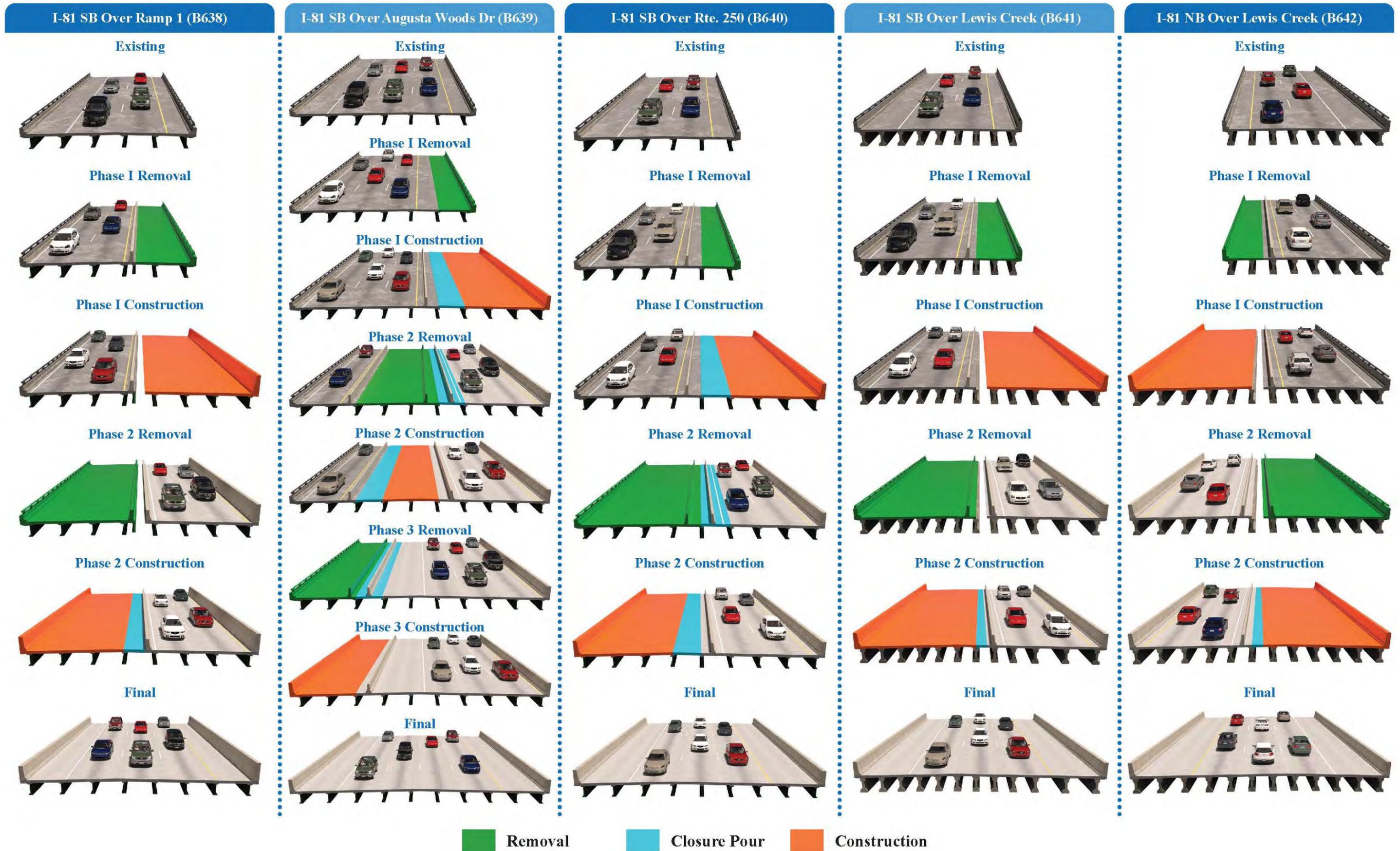


Phase 4 (Roadway) – Perform Mill and Overlay and Final Signing and Striping



Bridges will be constructed primarily in two phases, except for B639 which will be constructed in three phases. Phasing for all five bridges is illustrated in *Figure 4.5.2* below.

Figure 4.5.2 I-81 Bridge Phasing



The Team has carefully considered the transitions in traffic from I-81 roadway phasing to bridge phasing with the goal of providing a safe travel experience without reducing the efficiency of constructing the widening. *Figure 4.5.3* below describes how our Team will address these differences in phasing and the transitions they create. *Figures 4.5.4* and *4.5.5* provide a more detailed look at how the phasing aligns with the transitions required.

Figure 4.5.3 Project Phasing

Project Phase	I-81 Roadway Phase	I-81 Bridge Phase	Description of Work	Traffic Impact	Primary TTC
1	1	--	Includes milling and excavation, shoulder strengthening, temporary pavement markings, shifting of traffic, and setting temporary concrete barrier in preparation for subsequent phases	Single outside lane closure during allowable closure hours	TTC 16.2
1A	1A	--	Install median access lanes per <i>VDOT's Typical Median Access Detail</i>	Single outside lane closure during allowable closure hours	TTC 15.2
2	2	1	Shift traffic to outside and begin major roadway and bridge reconstruction for both I-81 SB and NB including roadway widening and drainage on roadway and bridges.	Long-term 2 lane shift to outside	TTC 40.2
2	2	2	Transition traffic on bridges to newly widened inside bridge and continue reconstruction for both I-81 SB and NB. Traffic on roadway remains in same location as the previous phase.	Maintain long-term 2 lane shift to outside	TTC 40.2
2	2	2/3	Traffic on bridges and roadway remain in same location as previous phase and continue reconstruction of bridges for both I-81 SB and NB. Traffic from the on-ramp from US-250 to SB I-81 is shifted from outside of the bridge to the center of the bridge, adjacent to mainline lanes, to accommodate the remaining phase of construction of the bridge over Augusta Woods Rd. Traffic on roadway remains in same location as the previous phase.	Maintain long-term 2 lane shift to outside	TTC 40.2
3	2/3	2/3	Traffic on bridges and roadway remain in same location as previous phase and continue reconstruction of bridges for both I-81 SB and NB. Traffic from the on-ramp from US-250 to SB I-81 is shifted from outside of the bridge to the center of the bridge, adjacent to mainline lanes, to accommodate the remaining phase of construction of the bridge over Augusta Woods Rd. Traffic on roadway will transition from phase 2 to phase 3 as appropriate to construct outside roadway improvements	Maintain long-term 2 lane shift to outside	TTC 40.2
4	4	--	Mill existing pavement and overlay entire roadway and shoulders. Install permanent signing and pavement markings.	Single lane closures during allowable closure hours similar to a maintenance paving operation	TTC 15.2 & 16.2

Figure 4.5.4 Project Phases 1, 1A, and 2

Project Phase 1



Roadway and bridges are one lane; no traffic shifts required between roadway and bridge

Project Phase 1 - Install single lane closure during allowable lane closure hours to construct shoulder strengthening. Shoulders will be needed to accommodate the shifting of traffic to the right in subsequent phases. Bridge construction has not started. Lane closure is removed during non-allowable closure hours and traffic is returned to two lanes.



Roadway and bridges are one lane

After outside shoulder strengthening is complete temporary pavement markings, shifting of traffic, and setting temporary concrete barrier begins in preparation for subsequent phases.

Project Phase 1A and Phase 2



Roadway and bridges are two lanes but are shifted to the right; traffic shifts are required between roadway and bridges

Project Phase 1A - Install temporary median access lanes during allowable lane closure hours. Bridge construction has not started. Lane closure is removed during non-allowable closure hours and traffic is returned to two lanes.



Maintain two lanes of traffic on roadway

Project Phase 2 - Concrete barrier installation is complete along roadway and traffic has shifted traffic to the right onto the strengthened shoulder, leaving an 8' right shoulder. Install concrete barrier on bridges shifting traffic to the right. Transitions will be required to shift traffic from the roadway to the bridges and back again as shown in Figure 2-1 to accommodate the difference in shoulder width on the roadway and bridges. Barrier will be in place full time.



Maintain two lanes of traffic on bridges

Figure 4.5.5 Project Phases 3 and 4

Project Phase 3



Roadway remains shifted to the right; traffic on bridges is shifted to the left; traffic shifts are required between roadway and bridges

Project Phase 3 – Concrete barrier along roadway remains in place with traffic shifted to the right onto the strengthened shoulder, leaving an 8' right shoulder. Bridge construction continues and concrete barrier is installed on bridges, shifting traffic to the left onto the newly constructed bridge widening. Transitions will be required to shift traffic from the roadway to the bridges and back again, as shown in Figure 3-1, to accommodate the difference in shoulder width on the roadway and bridges. Barrier will be in place full time.

As roadway construction continues, barrier wall will be removed. However, traffic will remain shifted to the right until outside roadway improvements are to be constructed. While outside roadway improvements are constructed, drums will delineate the travel way and transitions to the bridges will be adjusted as appropriate.



Maintain two lanes of traffic on roadway



Maintain two lanes of traffic on roadway to complete outside works



Maintain two lanes of traffic on bridges

Project Phase 4



Roadway and bridges are complete

Project Phase 4 - Remove all channelizing devices and concrete barrier. Mill and overlay roadway under allowable closure hours and install final signing and pavement markings.



Final roadway configuration



Final bridge configuration

Safety and Operations During Construction

Safety in the construction zone is critically important to the Lane Team. Clear and comprehensive traffic control plans will be developed to maintain safety. We will implement a safety training program for every employee, and subcontractors will be safety certified prior to starting their work. Safety performance will be closely monitored, and any injuries will be investigated, documented, and reviewed by the Safety Manager. The Safety Plan will be aggressively communicated and enforced to all subcontractors.

The Safety Manager and all Lane foremen hold American Red Cross First Aid certification and receive OSHA 10-Hour training. Activity plans will be developed to determine and identify the hazards inherent to any work activity and provide information to protect the employee against these hazards. All employees participating in this activity will be oriented prior to beginning work. Orientation includes the following:

- Working in traffic (including safely installing lane closure setups)
- Working in tight spaces (including asphalt paving in close proximity to temporary concrete barrier)
- Work zone ingress and egress (for material haulers, supervisors, subcontractors, etc.)
- Work zone maintenance and protection of traffic

Due to the nature of the work involved, the Team will employ the following safety considerations, at a minimum:

Protection of work zone from traveling public: Our traffic control plan provides safe ingress and egress to construction work zones. Our Team has identified access points in areas outside of ramps to avoid areas of heavy inflow of vehicles entering the corridor.

- Scheduling of construction deliveries outside of peak hours, when practical
- Developing safe I-81 median and secondary roadway access points, supported by appropriate work zone notification and advanced warning signage for trucks entering or exiting a work zone
- Utilizing radar speed feedback signs within the work zone to improve work zone safety by promoting speed harmonization
- Notifying stakeholders along the corridor so that public schools, police, and emergency management personnel are updated on all traffic shifts and phasing to maintain ingress and egress through the Project

Site-specific ingress and egress locations: Our design and construction personnel collaborated on identifying specific work zone access locations in accordance with VDOT Work Area Protection Manual requirements within each ingress or egress area. These areas provide the most benefit from a safety, traffic, and construction operations perspective in accordance with our SOC. Below is the illustration identifying our proposed work zone access locations, including origins to and from I-81, Route 250, and Woodrow Wilson Parkway:

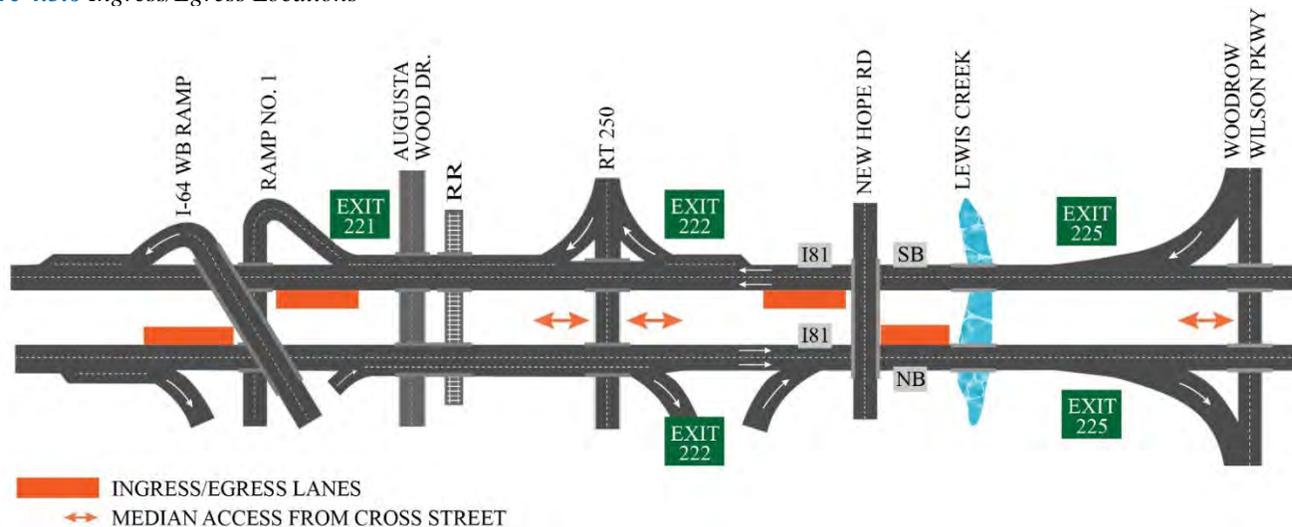
Innovative safety programs the Team will implement include:

The **“4 Seconds for Safety”** program uses regularly posted signage on site to remind personnel to spend four seconds prior to performing any work to ask four basic questions: (1) Am I trained? (2) Do I have the proper PPE? (3) Do I need help to do this? (4) Is there a better/safer way? Since its inception in 2017, Lane’s 4 Seconds for Safety program has **led to a 25% decrease in incidents nationwide.**

“Safety Through Teamwork” (ST2) is geared to provide our craft workers with a voice. Its aim is to empower our workers to embrace and take ownership of our policies and programs, and to build an unbreakable safety culture that will keep us all safe on and off the jobsite.

Safety Assurance Program. Lane implemented an easily accessible safety module to the HCSS time and production platform on all foreman and superintendent i-Pads that collects, stores, and disseminates real-time safety alerts, topics, documentation, and information. This comprehensive platform contains all JHAs, Safety Advisories, Near Miss Reporting, and crew safety observations/improvements that can be accessed, managed, and audited by the safety management team.

Figure 4.5.6 Ingress/Egress Locations



Working within construction areas of restricted movement: Working within narrow zones creates “pinch points” where the safety of construction employees could be compromised. Employee orientations will emphasize the recognition and avoidance of these areas. Toolbox talks will remind equipment operators of the dangers of these zones and the daily “walk-around” inspection of their equipment including a functioning back-up alarm. Activity pre-planning will identify operations requiring the use of “spotters”, and onsite equipment will be evaluated for “blind spots” to determine the need for and installation of rear-mounted cab cameras for backing.

Our Team understands the design and construction complexities associated with the proposed three-phase construction staging for Bridge B639. During the preliminary type, size, and location plan submission to VDOT, additional site-specific details will be provided, outlining our approach to protecting roadway users, adjacent vehicles, construction personnel, vehicular and pedestrian traffic beneath and near the bridge, and the BRR during each stage. Items such as details for additional signage, temporary lighting, minimum clearance zones for active equipment, off-peak work phases, emergency vehicle access, railroad coordination and incident management plans will be evaluated and included with the submission.

Night work: A special safety program will be implemented specifically for the night work environment. Pre-shift planning will require the evaluation of the amount of portable lighting necessary for each operation. Sufficient back-up lighting equipment will be maintained and made available during night shift operations in the event that unanticipated additional lighting is necessary.

Coordination with Active and in-the-vicinity Construction Projects: Lane is familiar with scheduling and participating in the process of coordinating with active construction projects in the vicinity of this job to achieve success throughout the I-81 corridor. In addition, we will organize and conduct joint meetings on a quarterly basis involving VDOT and contractor personnel for the: (1) Interstate 81 Southbound Auxiliary Lane and Route 635 Bridge Replacement, and: (2) the Plant Mix – Interstate Patching projects in accordance with the RFP. We will maintain communication with VDOT during construction in the event any new projects within the vicinity are added to VDOT’s program.

Traffic control measures: Appropriate traffic control measures will be utilized where work encroaches upon, or is close in proximity to, traveled roadways. Our procedures will comply with VDOT standards for uniform traffic control signs and devices. Barricades and warning and directional signs will be placed to alert the public of lane closures and other traffic control measures. Flaggers, in addition to barricades and signs when necessary, will be utilized at all equipment crossings to control traffic.

Bridge demolition: There is an extensive scope of bridge construction, including five bridge widenings with rehabilitation. Our Demolition Policy requires all demolition operations to be completed in accordance with OSHA 29 CFR 1926.850. Prior to any demolition, a Site-Specific Demolition Plan will be prepared prior to the start of work. The Plan will outline in detail the following:

- Policies and procedures in place to assure employee safety
- Procedure for the identification and removal of hazardous materials
- Site control including protection of the public and adjacent structures and daily inspection procedures
- Methods used to demolish the structure
- Equipment necessary for demolition operations
- Fire protection methods
- Removal of material from the site
- Approved silica protection plan identifying mitigation risk procedures

Lane will develop and submit for review and approval *conceptual* and *complete* demolition and erection plans at the appropriate stages in accordance with the RFP.

Incident Management Plan: Our Team will develop an Incident Management Plan (IMP) to define our response and management of incidents. The IMP will be developed in coordination with VDOT, local EMS, and other stakeholders to identify the protocols pertaining to those parties that will be contacted in case of an incident, including coordination with the police. Our Team will also coordinate and schedule a stakeholder meeting to inform them on the development and content of the IMP. The IMP will be reviewed and approved by VDOT before any work zones and/or lane closures become active on the Project. This plan will detail our response and support for the type of incident, estimated duration and will define key project team members, EMS and the procedures required to clear the incidents to meet the requirements of Part 2, Section 2.10.2. The IMP will demonstrate that Lane has full control of matters pertaining to incidents that occur within the Project area. The IMP will also be included as an appendix in the TMP.

Staging and Storage Areas

For site-specific staging and storage areas, we focused on two primary goals: 1) maximizing the safety of the traveling public, including site access with the least possible impact on traffic and 2) optimizing production to reduce cost and minimize the overall Project schedule. **The location of our proposed staging and storage areas is critical to the success of the construction operations.**

Our Team has identified several potential locations within the corridor and two outside of the corridor which will facilitate a safe and efficient use of existing ROW for material staging and storage. The existing median provides an effective area for staging in a protected environment to the traveling public and through multiple phases of structure, drainage and grading operations of the Project.

Figure 4.5.7 Potential staging/storage area



We have initiated discussions with the property owner along Sangers Lane, shown above, near the interchange of I-81 and Route 250. The property is already permitted for disposal of approved waste materials.

Although a little further out beyond the Project limits, additional staging and storage areas under consideration are located inside the interchanges of I-81 with Route 612, and another one at Route 654 White Hill Road. These sites appear to be used recently for similar operations.

Key issues that will be addressed specifically in our staging and storage area plans include:

- Safety of the traveling public as well as security for employees and visiting personnel
- Safe ingress and egress for construction vehicles, workers, and equipment to and from the construction site
- Appropriate environmental controls required for stored material and equipment

Coordination with Railroad Agencies (BBRR, VPRA, and CSX)

Our Team will coordinate with Brandon Shumaker (BBRR) and Debra Haislip (VDOT) when communicating with BBRR, and our correspondence will reference the location as: BBRR Staunton, VA; Milepost 218.29 and DOT No. 224750F. In fact, members of our Team recently coordinated with Brandon Shumaker, David Dixon, and Chad Morris to acquire a Right-of-Entry Agreement with flagger services for another recent project in the Staunton area affecting BBRR and have also worked with Patrick DesMarais (force account) on past CSX projects. **These established relationships will facilitate the early and direct interaction with BBRR necessary to achieve success on behalf on the Project.**

Following contract award, a coordination meeting will be scheduled with BBRR, VPRA, CSX, and VDOT to establish positive and direct communications between all relative parties. We will complete the necessary access application and provide the requisite insurance requirements. Coordination will be performed for developing design, providing plans for review and approval, and communicating and harmonizing construction activities with the BBRR and affiliated authorized track users as required. Furthermore, a comprehensive schedule of planned activities in or over the railroad right-of-way will be provided to BBRR and VPRA, which will be updated as necessary to guarantee they have the necessary advanced notice to provide any Radio Flagman or Line of Road Engineer as necessary.

We will plan and coordinate operations with the BBRR, VPRA, and CSX to achieve minimal impact to their operations and provide maximum safety precautions for all personnel involved. Railroad safety briefings will be conducted on-site with all Team members, and training will be provided regarding the hazards of working near tracks, engines, or cars.

4.5.2 Transportation Management Plan

Our Team will develop a Transportation Management Plan (TMP) focused on our plan to construct the improvements while focusing on safety. The TMP development will follow the RFP requirements and VDOT's IIM-LD-241.7/TE-351.5 Work Zone Safety and Mobility, by our Team's experienced and collaborative group of MOT designers and constructors. The TMP will consist of three primary sections: 1) Temporary Traffic Control Strategies, 2) Public Communication Strategies, and 3) Transportation Operation Strategies.

Regular Technical Work Group (TWG) meetings will be held between the design and the construction teams to collaborate and consistently coordinate the design of traffic control plans, construction means and methods, and other disciplines. Our temporary traffic control strategies are not only focused on safety, but also constructability. In addition, during the design phase, we will host regular over-the-shoulder meetings to keep VDOT and stakeholders, informed of the design as it progresses. This allows input, as well as an understanding of the design, so there are no surprises when the traffic control plans and the TMP are submitted for approval.

We will submit the TMP following the approval of the traffic control plans for each design package and before work begins on that package. The TMP is a living document and is expected to be submitted with updates for each design package and as needed in response to revisions to the Project design that substantially changes our approach to traffic control strategies. The first TMP submittal will include the incident management plan to facilitate the field work necessary for the design to commence.

Limiting Impacts on SB I-81 between the 250 Interchange and the I-64 Interchange

The area between the Route 250 on-ramp and the I-64 off-ramp along southbound I-81 is a critical area in terms of safety and requires particular focus. Our collaborative team will focus on limiting construction time without compromising design features that could impact safety, such as maximizing the length of the weave area. In addition, our Team will target this area for additional raised pavement markers and speed feedback signs to promote a more uniform travel speed.

Maintaining Traffic through all Construction Phases

Our Team's construction phasing and SOC is described in Section 4.5.1. During the development of sequencing, we focused on safety and the principles to promote it, such as consistency and meeting or exceeding the requirements of the Virginia Work Area Protection Manual. Two lanes of I-81 will be maintained, with the exception of lane closures during allowable lane closure hours. All ramps will also remain open for the duration of construction.

Other Transportation Management Plan Elements

Element	Our Team's Project Specific Approach	Achieve RFP Requirement
Lane and Ramp Closures	<ul style="list-style-type: none"> Minimize need for lane and/or ramp closures 	✓
Temporary Detours	<ul style="list-style-type: none"> Eliminate need for temporary detours 	✓
Time of Day Restrictions	<ul style="list-style-type: none"> Eliminate lane or shoulder closures within the time-of-day restrictions 	✓
Flagging Operations	<ul style="list-style-type: none"> Avoid flagging operations (except for as need for the Buckingham Branch Railroad) 	✓
Minimum Lane Widths	<ul style="list-style-type: none"> Maintain at least 32' of clear width pavement during construction Remove temporary barrier as soon as practical to provide additional clear zone, vehicle recovery, and breakdown area 	✓
Work Zone Speed Reductions	<ul style="list-style-type: none"> Design traffic control plan for 70 mph Implement work zone speed limit of 60 mph 	✓

Project Stakeholders

Our Team has developed and will implement an effective plan for continuous stakeholder input to mitigate issues and concerns. We will hold regularly scheduled meetings during construction with stakeholders so that concerns are addressed in an orderly/timely fashion. This outreach will be fully coordinated with VDOT's Staunton District Construction Division and Public Affairs staff. This outreach will include representatives from:

Major Stakeholder	Potential Impacts	Mitigation Strategies
VDOT	<ul style="list-style-type: none"> Perceptions / issues raised by residents, motorists, and business owners 	<ul style="list-style-type: none"> Weekly coordination meetings Notification of traffic impacts
City of Staunton, Augusta County	<ul style="list-style-type: none"> Perceptions / issues raised by residents, motorists, and business owners 	<ul style="list-style-type: none"> Inclusion in design process regarding minor roads and detours Cooperatively address outreach and responses to businesses and property owners
EMS, Police, Fire, and Rescue	<ul style="list-style-type: none"> Reduced shoulders and/or congestion along I-81 	<ul style="list-style-type: none"> Providing adequate lane/shoulder widths on I-81 for first responders Holding coordination meetings prior to implementing detour routes
Utility Companies	<ul style="list-style-type: none"> Direct impacts to facilities throughout the corridor 	<ul style="list-style-type: none"> Early coordination during the design process to locate relocations advantageous for both parties
Buckingham Branch Railroad	<ul style="list-style-type: none"> Impacts to railroad operations 	<ul style="list-style-type: none"> Conducting early coordination and following the guidelines established in the VDOT/BBRR/VPRA executed agreement

Approach to Public Outreach

Our Team appreciates that timely and appropriate stakeholder communication will be vital to Project success. To address this need, and to provide VDOT with assurance that our Team will be there to support public processes throughout the duration of the Project, **our Team will provide a Public Involvement/Relations Manager (PIM) specializing in transportation projects to assist VDOT with public communications and organize information needs within our Team.** Our PIM will work with VDOT to develop a Strategic Communications Plan (SCP) to identify proactive communications techniques, messaging, activities, and milestones to help VDOT keep the public informed throughout the Project. Specifically, our PIM will:

- Define activities, processes, and protocols for holding informational meetings
- Include a list of stakeholders including contact information and describe coordination processes
- Provide an emergency contact list our Team’s key personnel and a response plan for onsite emergencies, including any work zone incidents in accordance with IIM-LD-241
- Describe the timing and content of design and construction information to be provided to VDOT suitable for posting on its website
- Define the process for providing traffic alerts to VDOT
- Define activities and protocols associated with keeping the VDOT Staunton District Communications Office up to date
- Require a database of public inquiries and comment capturing citizen information, dates, inquiries/concerns, and how the inquiry was addressed
- Provide photos and other Project information as needed to describe and document progress appropriate for public consumption
- Correlate to and reference the TMP

Our Team has successfully supported VDOT with “Pardon our Dust” public information meetings in accordance with the VDOT Public Involvement Manual by preparing meeting materials, PowerPoint presentations, information handouts, GoToWebinar meetings, and developing public e-blasts and press releases for VDOT’s use to inform the public of upcoming public meetings.

Public Safety

Safety is our team’s highest priority, and safety of the traveling public is a critical part of that approach. We understand that safety doesn’t just happen – it needs to be built into every plan, activity, operation, and program. Our approach to safety is not simply reducing the number of incidents, but also decreasing the severity of each incident, minimizing secondary incidents, and maximizing response when incidents do occur. Our approach limits disruptions by focusing on two principles: work zone geometry that is predictable, and forgiving and reducing speeds. The following are extra safety measures our Team has identified to improve the driver experience and minimize risk throughout the Project work zone:

- Minimize the number of shifts and tapers to the minimum necessary for construction sequencing, increasing the predictability of drivers repeatedly traveling through the work zone. This will also minimize the chance “ghost” stripes are left in the work zone that could confuse drivers.
- Minimize the number of MOT phases to the minimum necessary, increasing the predictability of drivers repeatedly traveling through the work zone. This will also minimize the chance “ghost” stripes are left in the work zone that could confuse drivers.
- Utilize temporary raised pavement markers in locations other than just in shift taper to help align drivers when striping may be less visible, such as during weather events.
- Remove concrete barrier wall where and when it is safe and practical. Barrier wall is a fixed object by itself, and its use should be limited to protecting the safety of workers and travelers from active hazards that cannot be otherwise moved or avoided.
- Install speed feedback signs within the work zone to remind drivers of the post speed limit and their speed.
- Meet/exceed the requirements regarding temporary spread by increasing shoulder widths, adjusting proposed inlets to provide benefit in the temporary condition, and coordination of bridge construction to adequately manage drainage on the proposed bridge decks.



4.6 Proposal Schedule

● 4.6 Proposal Schedule

4.6.1 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 is organized by using a hierarchical Work Breakdown Structure (WBS) into major phases of the Project. These include, but are not limited to, Project milestones, design and project management, Scope Validation Period, design, public involvement, environmental permitting, ROW acquisition, utility relocation, and construction. The Proposal Schedule also depicts the anticipated critical path, reviews by VDOT, FHWA, and other regulatory agencies, material procurement, and other involved parties' activities. The Proposal Schedule is included in Volume II. Per the RFP requirement, our Team has provided also provide the schedule source file in "XER" format.

4.6.2 Proposal Schedule Narrative

Plan to Accomplish the Work

Our Proposal Schedule details our plan to successfully complete the work in accordance with the Contract Documents. The narrative provides an explanation of the sequencing, description, and explanation of the critical path, proposed means and methods, and other key assumptions upon which the schedule is based.

The Schedule was developed in a Critical Path Method format (CPM) utilizing Primavera software version 21.12, based on the RFP information, available resources, design concepts, and construction means that our Team has chosen.

Through our proposed design improvements and sequence of construction, our Team intends to complete the Project **4 days ahead of the RFP Final Completion Date**. Key terms of our schedule are summarized below.

Schedule Overview

Notice of Intent to Award	February 24, 2023
Notice to Proceed	April 7, 2023
Design Activities	March 2023 – March 2024
Construction Activities	January 2024 – May 2027
Proposed Final Completion	June 04, 2027
RFP Final Completion	June 8, 2027

Design and Permitting

The Work Breakdown Structure (WBS) of our Project Schedule associated with design and permitting has been organized into logical Level 2 and 3 Design Elements as shown in *Figure 4.6.1*. These Level 1 Elements capture 100% of the items needed to obtain Released for Construction (RFC) Plans and approved permits. Subsequent levels have been organized to manage the complexities and interrelationships of design and permitting activities needed to achieve success within the established timeline.

Certain design and permitting effort will begin immediately upon receipt of CTB Approval/Notice to Award to facilitate the start of critical field, design, and permitting activities as quickly as possible. Actual field activities that impact travel lanes or shoulders will commence after an Incident Management Plan (IMP) and other items

-	Project Design
+	Scope Validation
+	Stakeholder Meetings
+	Adjacent Project Meetings
+	Design Management
+	Field Survey
+	Research
+	Design
+	Virginia Transportation Research Council
+	Utilities
+	Right-of-Way
+	Env./Permitting
+	Work Packages

Figure 4.6.1 Design and Permitting WBS Level 2 and 3 Elements

have been approved by VDOT. Field activities will verify data provided by VDOT and/or obtain information needed to complete design and permitting efforts. These include, but are not limited to, obtaining various existing field conditions, performing subsurface utility surveys, delineating wetlands, evaluating streams, and conducting hazardous material inspections and geotechnical borings.

Particular design efforts that do not rely on field information will begin upon Notice to Proceed (NTP) while other design efforts will begin upon obtaining requisite field information. Design activities have been arranged by discipline (e.g. roadway, drainage, structures, etc.) and organized following the acquisition of necessary data as well as the natural progression of design. Many design activities will occur simultaneously or in direct succession of others as shown in our Proposal Schedule. Design activities will culminate in various Work Packages inclusive of, but limited to, Right-of-Way (ROW), Construction, and RFC Plans, Stage I and Stage II Bridge Plans, the Geotechnical Engineering Report, and the Lewis Creek Floodplain Study. Some deliverables, such as the H&HA, represent hold points which have been accounted for in our schedule.

To expedite construction, our Team identified Early Work Packages such as the B639 Demolition and Foundation Plan, a Clearing and Grading Plan, and an early Buckingham Branch Railroad (BBRR) Plan to facilitate early coordination with BBRR and VPRRA. Our design activities are prioritized and arranged to address these Early Work Packages.

Our Project Schedule fully accounts for durations necessary for our Team to internally review each Work Package, along with other design and permitting deliverables, following our Team's approved Design QA/QC Plan, inclusive of constructability reviews. Our Project Schedule also incorporates the timeframes necessary for VDOT and third party reviews, some of which exceed the 21-day VDOT duration. A plan review fragnet typical of our Project Schedule is provided in *Figure 4.6.2*.

Figure 4.6.2 Fragnet of Typical Plan Review Activities

Roadway		120	12-Sep-23	07-Mar-24
Right-of-Way Plans		55	12-Sep-23	04-Dec-23
A2570	Compile Roadway Right-of-Way Plans	3	12-Sep-23	14-Sep-23
A2620	Perform Roadway Right-of-Way Plan Constructability Review (Lane)	5	15-Sep-23	21-Sep-23
A2630	Perform Roadway Right-of-Way Plan Interdisciplinary Review	5	15-Sep-23	21-Sep-23
A2640	Perform QAQC Review and Adjust Roadway Right-of-Way Plans	8	20-Sep-23	29-Sep-23
A2690	Print Roadway Right-of-Way Plans	2	02-Oct-23	03-Oct-23
A2650	Submit Roadway Right-of-Way Plans	0	04-Oct-23	
A2660	Review Roadway Right-of-Way Plans and VSMP (VDEQ)	60	04-Oct-23	02-Dec-23
A4750	Review Roadway Right-of-Way Plans and VSMP (VDOT)	21	04-Oct-23	24-Oct-23
A4760	Review VDOT Right-of-Way Plan Comments	5	24-Oct-23	31-Oct-23
A2670	Conduct Roadway Right-of-Way Plans Comment Resolution Meeting	0	31-Oct-23	
A2680	Finalize Roadway Right-of-Way Plans	15	31-Oct-23	22-Nov-23
A2700	Obtain Notice to Commence Right-of-Way Acquisition	0	04-Dec-23	

Scope Validation

Scope validation activities will commence upon receipt of NTP to facilitate our ability to notify VDOT of issues that are materially different from what was provided in the RFP. Generally, these activities include investigation and evaluations of subsurface conditions, requiring approval of our Geotechnical Field Investigation Plan and boring stake-out, redetermining wetland and stream impacts, pavement validation, and existing utilities. Our Project Schedule acknowledges the scope validation period and arranges pertinent work to be completed within 120 days of NTP.

Environmental and Permitting Constraints

Environmental permitting constraints and hold points have been included into our Project Schedule, which are based on the requirements of the contract documents as well as the host of permits necessary to complete the Project. Durations necessary to confirm wetland/stream delineations/assessments, develop plans to a level

necessary to prepare complete water quality permits, as well as the time needed for regulatory agencies to make final determinations have been incorporated. Permits needed to conduct certain design investigative activities have also been accounted for.

Our Project Schedule organizes construction activities to avoid impacts to regulated areas until all applicable water quality permits are issued and the VDOT Project Manager releases the work in writing and accounts for notification periods. Before initiating clearing or construction activities associated with Water Quality Permits, our Environmental Compliance Manager (ECM) will conduct an Environmental Pre-construction Meeting to help provide understanding of and compliance with permit requirements.

Virginia Storm Water Management Program as well as Construction General Permit requirements inclusive of Stormwater Pollution Prevention Plan (SWPPP) and the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for discharging stormwater from construction activities have been well thought-out and included in our Project Schedule. Preparation and completion of VPDES information and forms (plans, LD-445, and LD-445C) have been accounted for and arranged in coordination with design activities.

Because our Team plans to construct the Project in phases using Early Work Packages, the VPDES Construction Permit application will include the total proposed Land Disturbance Area (LDA) for that phase and the total LDA for the entire Project. Therefore, our Project Schedule accounts for submitting a SWPPP as may be needed for each Early Package that includes the scope of land disturbing for the particular work. Our schedule also accounts for durations needed to obtain the requisite release of work for initial and follow-on packages.

In addition to applicable Time of Year Restrictions (TOYR), other restrictions, such as verifying concrete has hardened before contacting any stream and restricting in-stream activities to low-flow conditions, have been incorporated into our Project Schedule to achieve permit compliance.

Right-of-Way

ROW acquisition for this Project will be limited to obtaining VPRA permanent aerial, bridge, and drainage easements and temporary construction easements. Our Project Schedule provides appropriate activities and durations needed to verify existing right-of-way boundaries, conduct right-of-way research, and hold the ROW Kickoff Meeting with VDOT. Our schedule also facilitates the establishment of proposed right-of-way based on advanced design, includes preparation of the right-of-way data sheet and right-of-way plans, recognizes the need to obtain Notice to Commence Right-of-Way Acquisition, and accounts for durations needed to conduct appraisals, negotiations, and other acquisition services for the identified easements.

Utilities

Utility relocation for this Project will be limited to relocating the existing fiber/traffic signal communication line within the Route 250 median beneath the widened portion of B640, relocation of two short segments of the 3" gas main along the south shoulder of the EBL and the relocation of about 170' of 10" water main, also located along the south shoulder. Our Project Schedule includes the verification of existing underground utilities (Level B and Level A locating) and reserves times to determine/confirm prior rights and cost responsibilities. Our schedule also allocates appropriate time to perform conflict resolution, coordinate with the utility companies, inclusive of the Utility Field Inspection (UFI) Meeting, prepare and review utility relocation plans, complete (and update) the Utility Status Report, and manage utility aspects of VDOT's Right-of-Way and Utilities Management System (RUMS).

QA/QC

QA/QC activities will be performed as required in the contract documents and relevant tasks are included in our proposal schedule. The activities included in our Project Schedule consist of, but not limited to:

1. Prepare Design QA/QC Plan
2. Perform QA/QC Review of Early Work Packages
3. Perform QA/QC Review of ROW, Roadway and Bridge Plans
4. Perform QA/QC Review of GER

Construction

Our overall approach to construction begins with Early Work Packages (EWP) including design and construction activities associated with demolition and foundation construction at Bridge B639, and Clearing/Grading/ESC/TMP and TTCP packages throughout the corridor.

The proposed SOC was selected to allow the Project to commence mobilization, setting up the field office in **January of 2024**. Overall, construction activities are divided into four distinct phases, Phase 1 through Phase 4, with each having specific areas and scopes of work. Phase 1 also includes a sub-phase 1A defining work to grade and construct temporary median access areas.

Phase 1 exclusively involves the MOT and construction activities associated with I-81 SB and NB outside shoulder work for the entire corridor, beginning in **January 2024**. This includes milling and excavation, shoulder strengthening, temporary pavement markings, shifting of traffic, and setting temporary concrete barrier in preparation for subsequent phases.

Phase 1A provides activities associated with seven strategically located temporary median access locations, beginning in **June of 2024**.

Phase 2 begins major roadway and bridge reconstruction activities in **June of 2024**. For both I-81 SB and NB, there are 8 distinct Areas designated for construction. SB work covers approximate STA 3027+00 to 3245+00. These limits include roadway widening, drainage, Bridge B638, Ramp 1, Bridge B639, Route 250 Ramp A, Augusta Woods Drive, Bridge B640, Route 250 Ramp C, Route 250 utility relocations, and Bridge B641. NB work covers approximate STA 2025+14 to STA 2244+00. These limits include roadway widening, drainage, and Bridge B642.

Phase 3 begins major roadway and bridge reconstruction activities in **October of 2025**. For both I-81 SB and NB, there are also 8 distinct Areas designated for construction. SB work covers approximate STA 3027+00 to 3245+00. These limits include outside roadway improvements, drainage, Bridge B638, Ramp 1, Bridge B639, Route 250 Ramp A, Bridge B640, Route 250 Ramp C, Bridge B641 and Route 262 Ramp C. NB work covers approximate STA 2025+14 to STA 2244+00. These limits include outside roadway improvements, sign structures, Loop D, Ramp F, drainage, Bridge B642 and Route 262 Ramp A.

Phase 4 pushes activities towards the completion of the Project, beginning in **April of 2027**. For both I-81 SB and NB, the Project-wide activities include milling and asphalt overlay, along with the installation of permanent signing and pavement markings.

Project punchlist activities begin in **May of 2027** with Final Completion on **June 04, 2027**, a total of 4 days ahead of the RFP schedule.

Critical Path

After contract execution and issuance of NTP, the Critical Path for this Project starts with the preparation of the Field Management Plans to allow field survey and geotechnical exploration to begin. Once enough field data has been gathered, early work package design will begin. Early Work Packages will consist of upland clearing and grading, erosion control, and traffic control. As early package RFC plans become available, work will begin on outside shoulder strengthening for the SB roadway starting in Area 8 and working south toward Area 1. Shifting SB traffic onto the strengthened shoulder and setting barrier wall will follow the shoulder strengthening to begin the inside roadway widening for the length of the Project. NB shoulder strengthening will follow SB from Area 1 toward Area 8. Once Phase 1 is complete the Critical Path continues with Phase 2 inside roadway and bridge widening for the SB direction starting with Bridge 641 followed by 642, 640, 639, and finally 638. Once all SB inside widening work is complete traffic is shifted to the new inside roadway and work on Phase 3 begins consisting of bridge deck replacements. The bridge deck replacement follows the sequence starting with Bridge 641 then to 642, 640, 639, and 638. The final milling and overlay followed by placing permanent pavement markings will conclude the Critical Path and end with substantial completion. Punchlist activities will commence leading to final completion of the Project.

Work Breakdown Structure (WBS)

The WBS is a multi-level, hierarchical arrangement of the Work to be performed on the Project. Our Team has arranged the WBS to break down the major phases of the Project by Type of Work and Locations. Level 1 of the WBS was assigned to the Project name, VDOT I-81 Widening MM 221 to MM 225. A brief description of the Level 2 WBS is below, followed by a table showing the Level 2 - Level 4 WBS used on the Project.

1. **Project Administration / Milestones:** As required by the RFP, the major Project milestones are included under this WBS as well as the administrative activities associated with the milestones. It includes all contractual milestones such as NTP and Final Completion.
2. **General Conditions:** Work Activities Associated with the contractual obligation of the Design-Build Team to administer the Project. Quality assurance and quality control efforts required to meet with VDOT minimum requirements for D-B are included here, as are any contractual hold points.
3. **Project Design:** Under this WBS, all the design efforts with their respective submission and review/approval timeline are included. A further breakdown of this division is shown on the table below.
4. **Utility Coordination & Relocations:** This section shows the coordination, design, and construction activities associated with any required Utility Relocations.
5. **Engineering and Procurement:** This section includes approval and delivery of all major offsite materials and construction support that is not provided by the Lead Designer.
6. **Construction:** This WBS section depicts the construction activities grouped by MOT Phase and Area Locations. Further breakdowns are included in *Figure 4.6.3*.

Figure 4.6.3 High-level WBS

Level 2 WBS	Level 3 - Level 4 WBS
Project Administration / Milestones	<ul style="list-style-type: none"> • Key RFP Contractual Milestones including Final Completion
General Conditions	<ul style="list-style-type: none"> • Contractual Hold Points • Scope Validation • Stakeholder Meetings • Adjacent Project Meetings • Design Management • Field Survey
Project Design	<ul style="list-style-type: none"> • Research • Design – Roadway, Drainage, Bridge, Traffic, Noise, Geotechnical • VTRC Coordination • Utilities • Right-of-Way • Environmental/Permitting • Work Packages
Utility Coordination and Relocations	<ul style="list-style-type: none"> • Utility Coordination • Utility Relocations – VDOT Signal Cable, RT. 250 Gas and Water
Engineering and Procurement	<ul style="list-style-type: none"> • Bridge Shop Drawings • Roadway Shop Drawings • Procure Bridge Girders • Procure Roadway and Drainage Items
Construction	<ul style="list-style-type: none"> • Maintenance of Traffic • Phase 1 <ul style="list-style-type: none"> ○ Milling/Excavation/Outside Shoulder Strengthening • Phase 1A <ul style="list-style-type: none"> ○ Median Access Construction • Phase 2 <ul style="list-style-type: none"> ○ 8 Distinct Areas ○ Inside Roadway Widening. B638, Ramp 1, B639, RT. 250 Ramp A, Augusta Woods Dr., B640, RT. 250 Ramp C, RT. 250, B641, B642, Bridge Repairs • Phase 3 <ul style="list-style-type: none"> ○ 8 Distinct Areas ○ Outside Roadway Improvements, B638, Ramp 1, B639, RT. 250 Ramp A, B640, RT. 250 Ramp C, B641, RT. 262 Ramp C, Loop D, Ramp F, B642, RT. 262 Ramp A • Phase 4 <ul style="list-style-type: none"> ○ Milling and Asphalt Overlay, Permanent Pavement Markings and Signage

Assumptions

The Project Schedule was built based on the following key assumptions:

1. **Weather days** – The number of weather days allocated in the schedule is described in detail in the calendar section below, but they were estimated using the NOWData information on the National Weather Service website (Weather.gov). This data is updated monthly, and the year range used for weather history for this Project is 22 years (2000 to 2022).

2. **Crews** – The crew counts for this Project is based on worker availability and needs to meet the schedule milestones. Multiple crews will be utilized as needed. This includes both Roadway and Structures, where the schedule typically shows work ongoing at multiple bridges at any time.
3. **Design/Construction Start** – This Project assumes that the design of the Early Work Packages will be advanced and approved, allowing the outside widening work/shoulder strengthening work to begin in January 2024. Major construction work will begin in the Spring of 2024.
4. **VDOT Review Periods** – This schedule assumes that VDOT will utilize their full review period for all design and construction submittals. This period is 21 days for all submittals shown in our Project Schedule

Calendars

The Five Project calendars were used in the schedule and include:

1. **7-Day Work Week - Calendar Days** are based on a seven-day week. This is used for VDOT review periods and other activities whose durations are defined as calendar days in the contract, as well as some design, and procurement activities
2. **5-Day w/Holidays - Admin** is based on five working days per week and includes holiday restrictions. Used for most design activities and other work not impacted by adverse weather.
3. **5-Day w/Holidays & Weather** is based on five working days per week, accounting for holiday restrictions and anticipated weather days. This calendar was used for most construction activities.
4. **5-Day w/Holidays & Weather -Earthwork (Limited)** - is based on five working days per week, accounting for holiday restrictions and additional cold weather impact days beyond the calendar mentioned above. This calendar was used for earthwork, aggregate subbase activities and other activities where cold temperatures would be an impact (Paving calendar listed below).
5. **5-Day w/Holidays & Weather - Paving** is similar to the 5-Day Holidays and Weather calendar described above, except it does not allow any work from the start of December through March. This is used for permanent paving and striping activities that have temperature restrictions.

As noted above, the number of weather days were estimated using the NOAA data from the weather.gov website. The table shown below is an example of one year of the Project, other years will be similar. Additional weather days were included in the calendar to account for temperatures below 32 deg together with precipitation greater than 0.5”.

Typical yearly calendar breakdown (workdays, non-workdays due to weather)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Workdays per month (Mon-Fri) Included in schedule	16	16	16	17	18	15	17	17	16	20	16	12
Nonworking (Mon-Fri) per month included in the schedule (holidays/weather days)	6	5	5	5	5	5	6	5	5	3	3	3

Schedule Management Means and Methods

The schedule will be constantly reviewed and maintained to avoid slippage, as well as impacts discussed as part of the monthly partnering process and finalize mitigation and recovery solutions should they be needed. Systems to manage the design and construction sequencing will be clear and concise and include:

- Weekly design/construction scheduling and coordination meetings during the design phase
- Weekly construction scheduling meetings during the construction phase
- Utility relocation tracking sheets during the design and construction phases

- ROW progress tracking spreadsheets (if needed) during the design and construction phases
- Review and approval tracking spreadsheets of design element submittals
- Shop drawings status tracking sheets
- Material submittals and delivery schedules
- Non-conformance logs by QC and QA for design and construction
- RFI logs
- Monthly progress/partnering meetings with the major stakeholders, including VDOT, our Team's designers, major subcontractors/vendors, and local businesses. Affected utilities will also be invited for the current stage of work.

At the internal weekly meetings, issues/concerns will be identified using the above tracking aids and action items identified and assigned to someone who can resolve it. Five-week and long term "look-ahead schedules" will be prepared and discussed to analyze schedule and quality impacts. Similar information will be discussed, and action items assigned at the Monthly Progress/Partnering meetings with key stakeholders. Other stakeholders may be invited for anticipated issues during upcoming schedule activities.

Updating Process. Each month, starting with Notice to Proceed, the Preliminary Schedule will be updated as the Team prepares, submits, and receives approval of the Baseline Schedule. Once the Schedule is approved it will be updated and submitted to VDOT for approval monthly until Final Completion of the Project. Each update will be accompanied with a narrative report and tables as prescribed in the Design-Build Project Schedule special provision. The updated schedule and narrative will reflect:

- Activities started or completed during the period
- Actual start and finish dates
- Activities on-going during the period
- Remaining duration for on-going activities
- Modified relationships to correct out-of-sequence progress
- Modified relationships to reflect our plan for completing the remaining work
- Change Orders
- Relief events
- Compensation events

Schedule Recovery. If during the course of the Project, changes or unforeseen circumstances arise that impact the Project Schedule, the Team will immediately notify VDOT (and other appropriate stakeholders) and prepare a schedule recovery plan to recover lost time. This plan may include increasing work shifts, adding crews and resources to construct critical path activities concurrently, changing MOT schemes or modifying the design to remove activities from the critical path. If it is early in the Project at the time of the impact is encountered, schedule recovery may require adjustments by any or all of the discipline managers including design, permitting, ROW, utility relocation, and construction. In the event all other design-build disciplines have completed their tasks, re-sequencing the construction schedule by the Construction Manager will be the primary focus in order to mitigate impacts.

Mitigating Risks

The experience our Team has obtained in working on projects of similar nature will be critical to the timeliness of resolving design and construction hurdles as they occur. Our Team has successfully utilized a rolling design process on other jobs that enables critical construction phases and activities requiring normally long lead times to be under production simultaneously with final designs. We pride ourselves in solving construction and design issues rapidly without sacrificing the quality of the Project. Based on our preliminary knowledge of the proposed scope of work for this Project and our experience on previous projects of the same size and complexity, the following risks, issues, or problems may cause schedule delays and may require mitigation:

Right-of-Way. ROW acquisition and relocations can take several months to negotiate and if eminent domain is necessary even longer. We will hit the ground running as soon as we receive NTP and aggressively complete the ROW and relocation process.

Utility Relocations. There is a risk of schedule delays if the utility companies take longer than anticipated to relocate their utilities with respect to the Project. Specifically, coordination is required with Segra (Lumos) as our Team will be constructing the relocated VDOT ducts and Segra will be placing and splicing the fiber optic cables within. Fortunately, that utility relocation only affects the construction of the SB median pier and the timing has been included in the schedule. The relocation of the gas and water mains are required to accommodate the BBPS construction which has a much later construction timeframe.

Design Approvals. There is a risk that the design approval process could exceed that anticipated in our Project Schedule which could shorten the time available for construction. In order to take advantage of the D-B process to its greatest extent, we feel it is necessary to develop the construction plans in a manner conducive to staying “one step ahead” of construction. By breaking up the design into early work packages, we will be able to obtain “release for construction” plans sooner to enhance progress and avoid delays.

Environmental Impacts and Permits. The Water Quality Permitting path identified in the CE/permit determination documents is likely a Nationwide 23 permit. Overlay of VDOT’s RFP Plans with PJD mapping may result in increased impacts above CE and NWP23 thresholds, which could require more extensive permitting processes and/or additional or more involved NEPA evaluation and documentation, potentially impacting the Project Schedule. To mitigate this risk, we will reverify delineated systems to confirm boundaries and classifications and confirm any updates with agencies; maintain impacts within CE/permit thresholds as possible, through continuous/iterative coordination between the environmental team and design disciplines; engage agencies early in the Project in negotiating expedited, defensible regulatory processes to avoid an Individual Permit; and identify opportunities to reestablish wetlands and streams onsite to minimize cost associated with offsite mitigation.

Subcontractor Scheduling. There is a significant workload for high priority subcontractors; scheduling will be jointly coordinated and done well in advance to avoid delays. We will mitigate potential delays using a partnered approach for open and often communication with subcontractors.

Material Lead Time. The Team identified schedule critical elements associated with longer lead time materials (i.e., girders, bridge piling) and has designated when they are needed so that the design and release of these items is adequately prioritized. This will also expedite the shop drawing process to minimize the risk of delays to the Project Schedule.

Project Phasing. Our approach to the phasing and sequence of construction requires many of the Project features to be constructed concurrently, and/or in a specific sequence. To help mitigate this, the Team has sequenced the Project into four main phases of construction, with each phase having several specific work “Areas” (ranging from 800 LF to 3800 LF) using the bridges as separators between areas. This allows the Areas to be constructed independently from one another. This enables the approximate four-mile corridor to be progressed efficiently, allowing the Team measured flexibility during construction to mitigate delays and limit impacts to the traveling public.

Summary

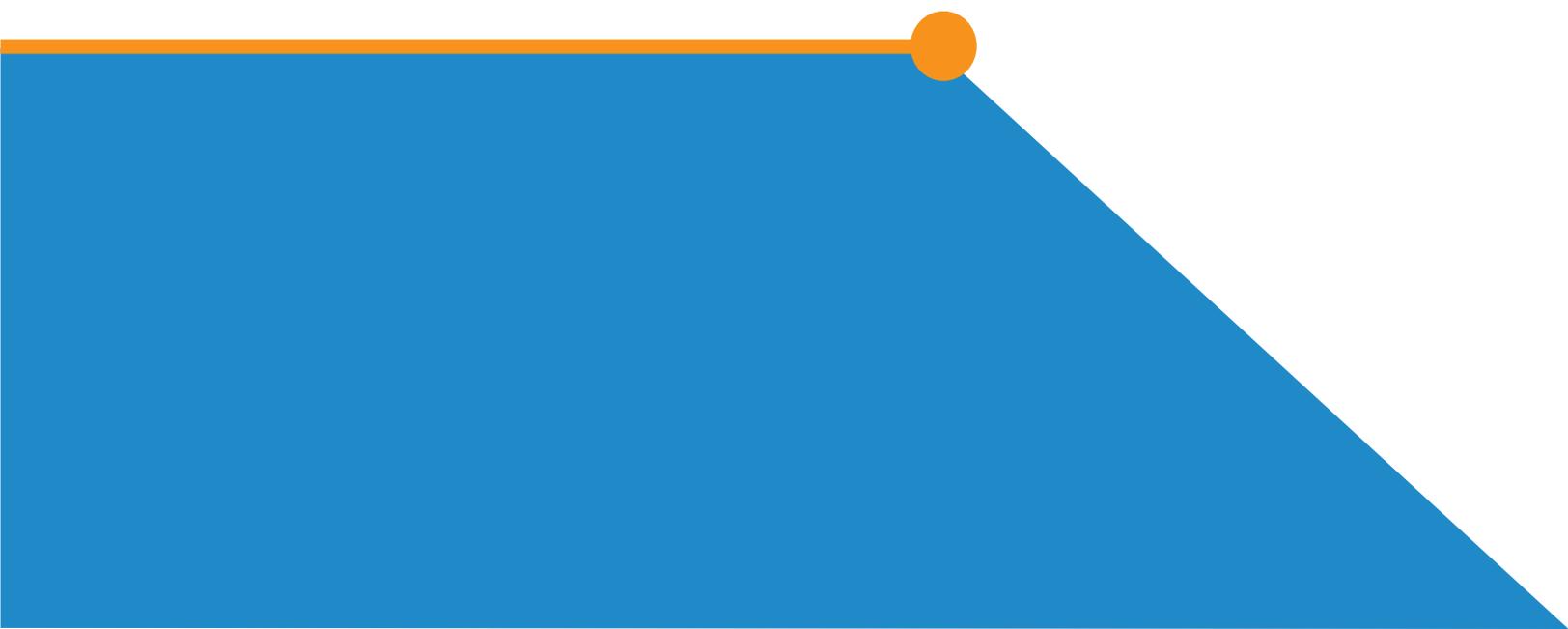
Our Team has developed a Proposal Schedule and Proposal Schedule Narrative that demonstrates our understanding of the complexities and interrelationships of the technical elements of the Project. Additionally, our Proposal Schedule takes the following into account: internal plan reviews, VDOT plan reviews and approvals, environmental permitting and constraints, ROW acquisition, utility relocation, construction activities and QA/QC inspection and testing. Our Team is committed to continuously improving the Schedule to better serve VDOT, associated stakeholders, and the traveling public.

Appendix





Attachment 4.0.1.1
TECHNICAL PROPOSAL CHECKLIST
AND CONTENTS



ATTACHMENT 4.0.1.1

I-81 WIDENING MM 221 to MM 225

Contract ID No. C00116269DB116

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Offerors shall furnish a copy of this Technical Proposal Checklist, with the page references added, with the Technical Proposal.

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Technical Proposal Checklist and Contents	Attachment 4.0.1.1	Section 4.0.1.1	no	Appendix
Acknowledgement of RFP, Revisions, and/or Addenda	Attachment 3.6 (Form C-78-RFP)	Sections 3.6, 4.0.1.1	no	Appendix
Letter of Submittal	NA	Sections 4.1		1
Letter of Submittal on Offeror's letterhead	NA	Section 4.1.1	yes	1
Identify the full legal name and address of Offeror	NA	Section 4.1.1	yes	1
Authorized representative's original signature	NA	Section 4.1.1	yes	1
Declaration of intent	NA	Section 4.1.2	yes	1
120 day declaration	NA	Section 4.1.3	yes	1
Point of Contact information	NA	Section 4.1.4	yes	1
Principal Officer information	NA	Section 4.1.5	yes	1
Final Completion Date	NA	Section 4.1.6	yes	1
Unique Milestone Date(s)	NA	Section 4.1.7	yes	1
Proposal Payment Agreement or Waiver of Proposal Payment	Attachment 9.3.1 or 9.3.2	Section 4.1.8	no	Appendix
Certification Regarding Debarment Forms	Attachment 11.8.6(a) Attachment 11.8.6(b)	Section 4.1.9	no	Appendix

ATTACHMENT 4.0.1.1

I-81 WIDENING MM 221 to MM 225

Contract ID No. C00116269DB116

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Written Statement to Achieve 6% DBE Goal	NA	Section 4.1.10		1
Confirmation of SCC and DPOR from SOQ	NA	Section 4.1.11		1
Offeror's Qualifications	NA	Section 4.2		2-3
Confirmation that the information provided in the SOQ submittal remains true and accurate or indicates that any requested changes were previously approved by VDOT	NA	Section 4.2.1	yes	2
Deputy Key Personnel	Attachment 4.2.1	Section 4.2.1	no	Appendix
Organizational chart with any updates since the SOQ submittal clearly identified	NA	Section 4.2.1	yes	3
Revised narrative when organizational chart includes updates since the SOQ submittal	NA	Section 4.2.1	yes	2
Design Concept	NA	Section 4.3		4-19
Conceptual Roadway Plans and description	NA	Section 4.3.1.1	yes	5-16; 52-70
Conceptual Structural Plans and description	NA	Section 4.3.1.2	yes	16-19, 71-80
Project Approach	NA	Section 4.4		20-38
Environmental Management	NA	Section 4.4.1	yes	20-25
Utilities	NA	Section 4.4.2	yes	25-28

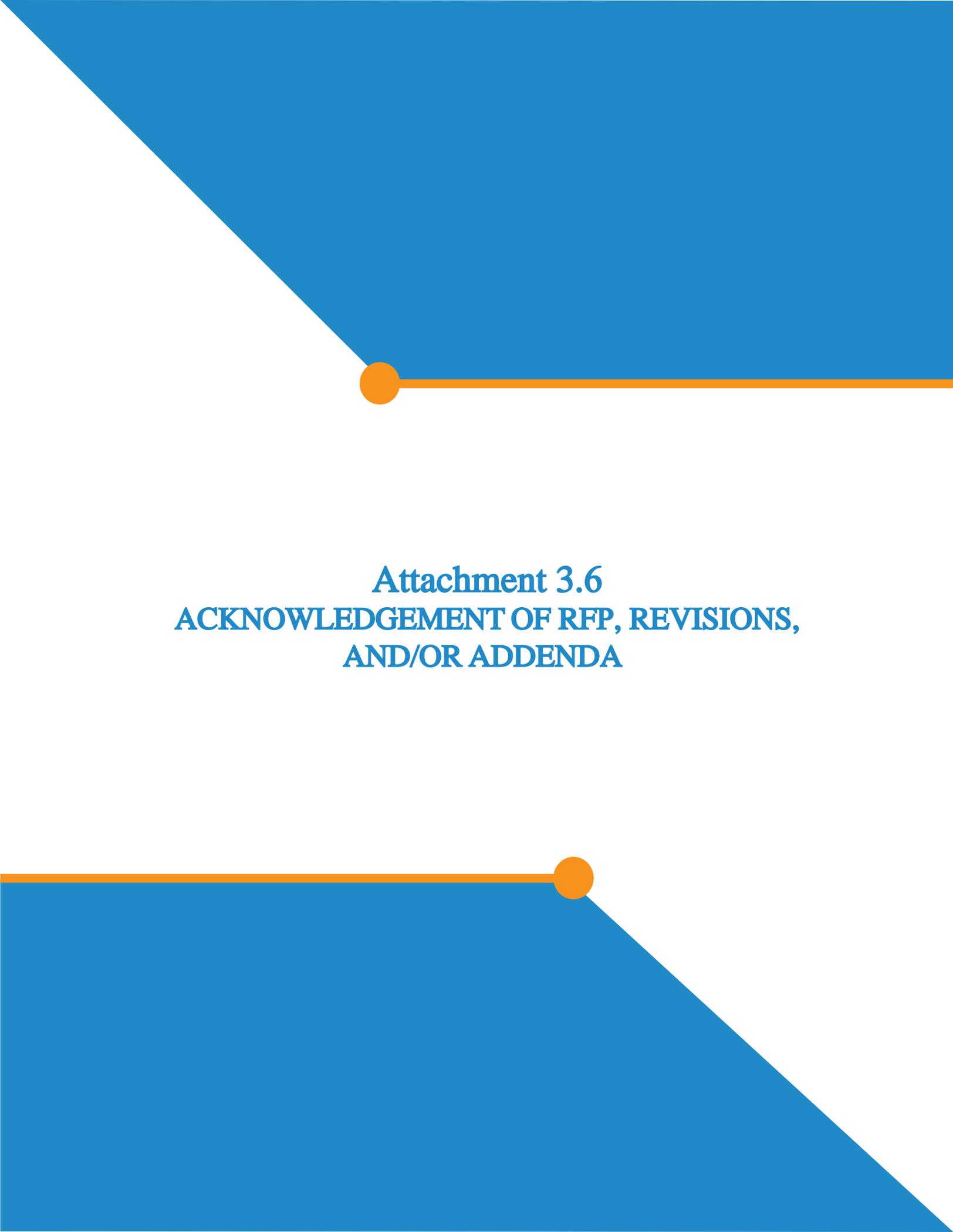
ATTACHMENT 4.0.1.1

I-81 WIDENING MM 221 to MM 225

Contract ID No. C00116269DB116

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Geotechnical	NA	Section 4.4.3	yes	29-32
Quality Assurance/ Quality Control (QA/QC)	NA	Section 4.4.4	yes	32-38
Construction of Project	NA	Section 4.5		39-51
Sequence of Construction	NA	Section 4.5.1	yes	40-49
Transportation Management Plan	NA	Section 4.5.2	yes	49-51
Proposal Schedule	NA	Section 4.6		S1-S35
Proposal Schedule	NA	Section 4.6.1	no	S10-S35
Proposal Schedule Narrative	NA	Section 4.6.2	no	S1-S9
Proposal Schedule in electronic format	NA	Section 4.6	no	Electronic

The page features a white background with blue geometric shapes. A blue triangle is in the top-left corner, and another blue triangle is in the bottom-right corner. Two horizontal orange lines are positioned above and below the text, each starting from the left edge and ending with a solid orange circle.

Attachment 3.6
ACKNOWLEDGEMENT OF RFP, REVISIONS,
AND/OR ADDENDA

ATTACHMENT 3.6**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION**RFP NO. C00116269DB116PROJECT NO.: 0081-007-013**ACKNOWLEDGEMENT OF RFP, REVISION AND/OR ADDENDA**

Acknowledgement shall be made of receipt of the Request for Proposals (RFP) and/or any and all revisions and/or addenda pertaining to the above designated project which are issued by the Department prior to the Letter of Submittal submission date shown herein. Failure to include this acknowledgement in the Letter of Submittal may result in the rejection of your proposal.

By signing this Attachment 3.6, the Offeror acknowledges receipt of the RFP and/or following revisions and/or addenda to the RFP for the above designated project which were issued under cover letter(s) of the date(s) shown hereon:

1. Cover letter of RFP – October 19, 2022
(Date)
2. Cover letter of Addendum No. 1 – November 8, 2022
(Date)
3. Cover letter of Addendum No. 2 – November 22, 2022
(Date)
4. Cover letter of Addendum No. 3 – December 20, 2022
(Date)
5. Cover letter of Addendum No. 4 – January 13, 2023
(Date)



SIGNATURE

1-20-2023

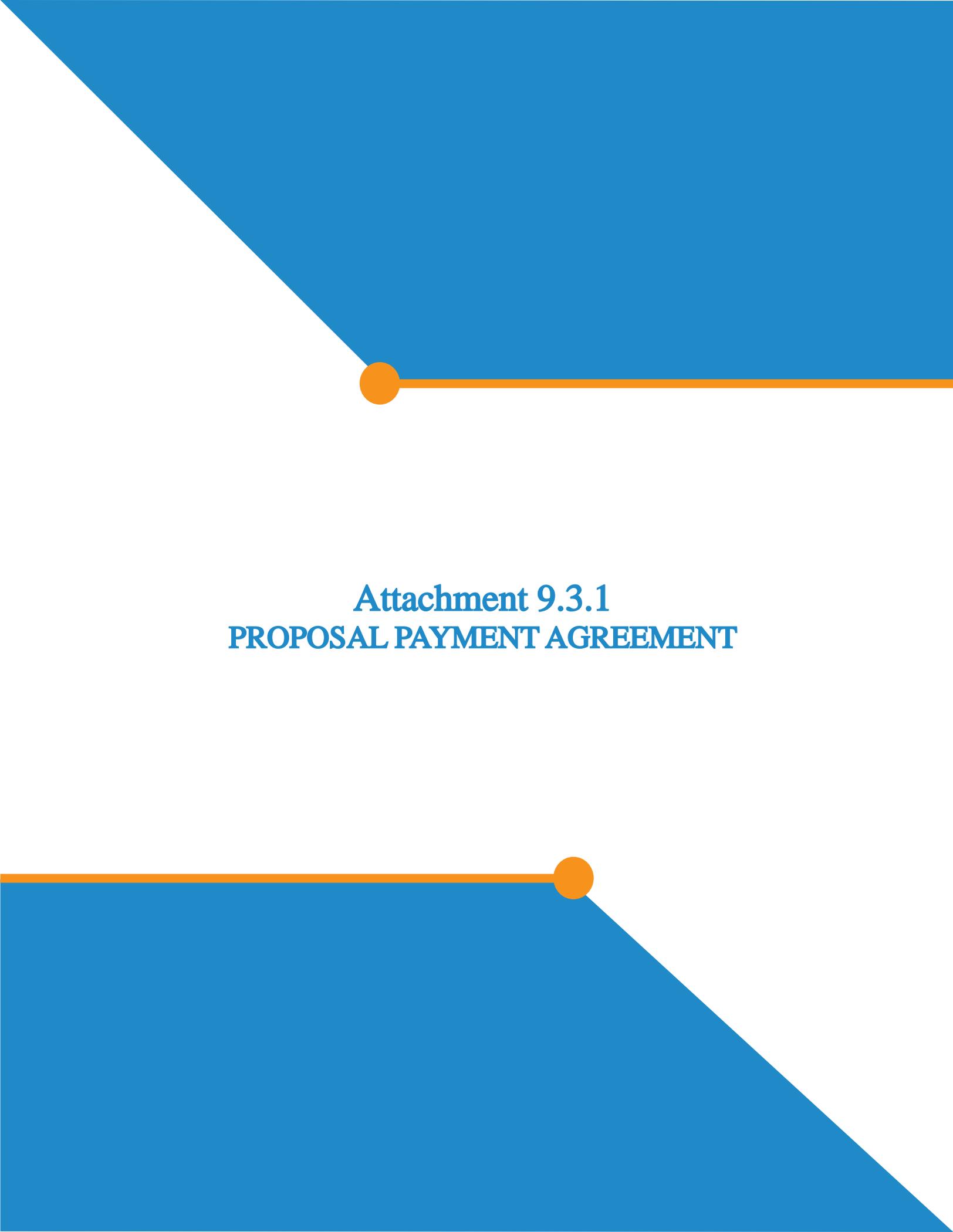
DATE

David Rankin

PRINTED NAME

Chief Operating Officer

TITLE

The page features a white background with blue geometric shapes. A blue triangle is in the top-left corner, and another blue triangle is in the bottom-right corner. Two horizontal orange lines are positioned above and below the text, each starting from the left edge and ending with a solid orange circle. The text is centered between these lines.

Attachment 9.3.1
PROPOSAL PAYMENT AGREEMENT

ATTACHMENT 9.3.1
PROPOSAL PAYMENT AGREEMENT

THIS PROPOSAL PAYMENT AGREEMENT (this “Agreement”) is made and entered into as of this 20 day of January, 2023, by and between the Virginia Department of Transportation (“VDOT”), and The Lane Construction Corporation (“Offeror”).

WITNESSETH:

WHEREAS, Offeror is one of the entities who submitted Statements of Qualifications (“SOQs”) pursuant to VDOT’s October 19, 2022 Request for Qualifications (“RFQ”) and was invited to submit proposals in response to a Request for Proposals (“RFP”) for the **I-81 Widening MM 221 to MM 225, Project No. 0081-007-013** (“Project”), under a design-build contract with VDOT (“Design-Build Contract”); and

WHEREAS, as part of the procurement process for the Project, Offeror has already provided and/or furnished to VDOT, and may continue to provide and/or furnish to VDOT, certain intellectual property, materials, information and ideas, including, but not limited to, such matters that are: (a) conveyed verbally and in writing during proprietary meetings or interviews; and (b) contained in, related to or associated with Offeror’s proposal, including, but not limited to, written correspondence, designs, drawings, plans, exhibits, photographs, reports, printed material, tapes, electronic disks, or other graphic and visual aids (collectively “Offeror’s Intellectual Property”); and

WHEREAS, VDOT is willing to provide a payment to Offeror, subject to the express conditions stated in this Agreement, to obtain certain rights in Offeror’s Intellectual Property, provided that Offeror submits a proposal that VDOT determines to be responsive to the RFP (“Offeror’s Proposal”), and either (a) Offeror is not awarded the Design-Build Contract; or (b) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror; and

WHEREAS, Offeror wishes to receive the payment offered by VDOT, in exchange for granting VDOT the rights set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement and other good and valuable consideration, the receipt and adequacy of which are acknowledged by the parties, the parties agree as follows:

1. **VDOT's Rights in Offeror's Intellectual Property.** Offeror hereby conveys to VDOT all rights, title and interest, free and clear of all liens, claims and encumbrances, in Offeror's Intellectual Property, which includes, without restriction or limitation, the right of VDOT, and anyone contracting with VDOT, to incorporate any ideas or information from Offeror's Intellectual Property into: (a) the Design-Build Contract and the Project; (b) any other contract awarded in reference to the Project; or (c) any subsequent procurement by VDOT. In receiving all rights, title and interest in Offeror's Intellectual Property, VDOT is deemed to own all intellectual property rights, copyrights, patents, trade secrets, trademarks, and service marks in Offeror's Intellectual Property, and Offeror agrees that it shall, at the request of VDOT, execute all papers and perform all other acts that may be necessary to ensure that VDOT's rights, title and interest in Offeror's Intellectual Property are protected. The rights conferred herein to VDOT include, without limitation, VDOT's ability to use Offeror's Intellectual Property without the obligation to notify or seek permission from Offeror.

2. **Exclusions from Offeror's Intellectual Property.** Notwithstanding Section 1 above, it is understood and agreed that Offeror's Intellectual Property is not intended to include, and Offeror does not convey any rights to, the Escrow Proposal Documents submitted by Offeror in accordance with the RFP.

3. **Proposal Payment.** VDOT agrees to pay Offeror the lump sum amount of **one hundred twenty thousand and 00/100 Dollars (\$120,000.00)** ("Proposal Payment"), which payment constitutes payment in full to Offeror for the conveyance of Offeror's Intellectual Property to VDOT in accordance with this Agreement. Payment of the Proposal Payment is conditioned upon: (a) Offeror's Proposal being, in the sole discretion of VDOT, responsive to the RFP; (b) Offeror complying with all other terms and conditions of this Agreement; and (c) either (i) Offeror is not awarded the Design-Build Contract, or (ii) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror.

4. **Payment Due Date.** Subject to the conditions set forth in this Agreement, VDOT will make payment of the Proposal Payment to the Offeror within forty-five (45) days after the later of: (a) notice from VDOT that it has awarded the Design-Build Contract to another Offeror; or (b) notice from VDOT that the procurement for the Project has been cancelled and that there will be no Contract Award.

5. **Effective Date of this Agreement.** The rights and obligations of VDOT and Offeror under this Agreement, including VDOT's ownership rights in Offeror's Intellectual Property, vests upon the date that Offeror's Proposal is submitted to VDOT. Notwithstanding the above, if Offeror's Proposal is determined by VDOT, in its sole discretion, to be nonresponsive to the RFP, then Offeror is deemed to have waived its right to obtain the Proposal Payment, and VDOT shall have no obligations under this Agreement.

6. Indemnity. Subject to the limitation contained below, Offeror shall, at its own expense, indemnify, protect and hold harmless VDOT and its agents, directors, officers, employees, representatives and contractors from all claims, costs, expenses, liabilities, demands, or suits at law or equity (“Claims”) of, by or in favor of or awarded to any third party arising in whole or in part from: (a) the negligence or wilful misconduct of Offeror or any of its agents, officers, employees, representatives or subcontractors; or (b) breach of any of Offeror’s obligations under this Agreement, including its representation and warranty under Section 8 hereof. This indemnity shall not apply with respect to any Claims caused by or resulting from the sole negligence or wilful misconduct of VDOT, or its agents, directors, officers, employees, representatives or contractors.

7. Assignment. Offeror shall not assign this Agreement, without VDOT's prior written consent, which consent may be given or withheld in VDOT’s sole discretion. Any assignment of this Agreement without such consent shall be null and void.

8. Authority to Enter into this Agreement. By executing this Agreement, Offeror specifically represents and warrants that it has the authority to convey to VDOT all rights, title, and interest in Offeror’s Intellectual Property, including, but not limited to, those any rights that might have been vested in team members, subcontractors, consultants or anyone else who may have contributed to the development of Offeror’s Intellectual Property, free and clear of all liens, claims and encumbrances.

9. Miscellaneous.

a. Offeror and VDOT agree that Offeror, its team members, and their respective employees are not agents of VDOT as a result of this Agreement.

b. Any capitalized term used herein but not otherwise defined shall have the meanings set forth in the RFP.

c. This Agreement, together with the RFP, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto.

d. It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the Commonwealth of Virginia, validity of the remaining portions or provisions shall not be affected,

and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

e. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia.

IN WITNESS WHEREOF, this Agreement has been executed and delivered as of the day and year first above written.

VIRGINIA DEPARTMENT OF TRANSPORTATION

By: _____

Name: _____

Title: _____

The Lane Construction Corporation

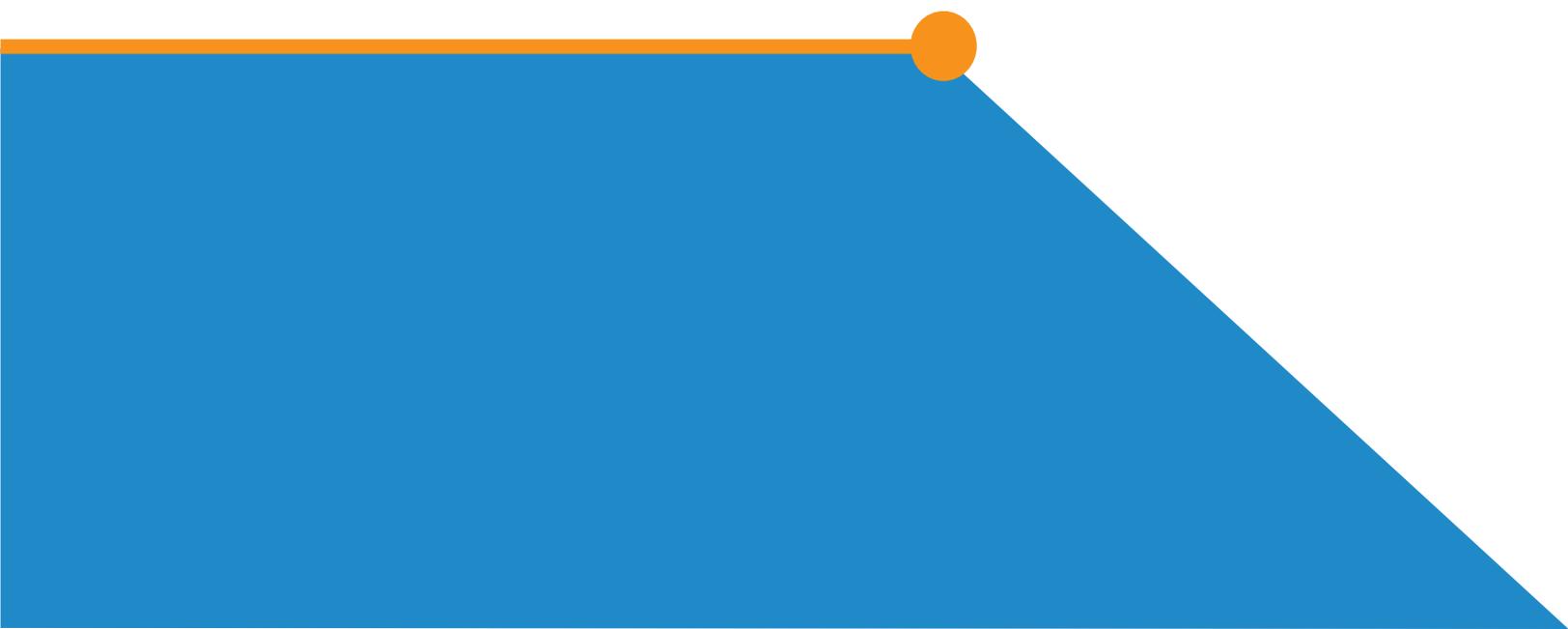
By:  _____

Name: David Rankin

Title: Chief Operating Officer



Attachment 11.8.6(a)
DEBARMENT FORM
PRIMARY COVERED TRANSACTIONS



ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project No.: 0081-007-013

1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; and have not been convicted of any violations of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or receiving stolen property;

c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1) b) of this certification; and

d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	1-20-2023	Chief Operating Officer
Signature	Date	Title

The Lane Construction Corporation
Name of Firm



Attachment 11.8.6(b)
DEBARMENT FORM
LOWER TIER COVERED TRANSACTION



ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.



1/4/2023

Vice President, Senior Director -
Herndon Transportation Lead

Signature

Date

Title

WSP USA Inc.

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	1/10/2023	Vice President
_____ Signature	_____ Date	_____ Title
Accumark, Inc.		
_____ Name of Firm		

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.



	January 4, 2023	President & Chief Engineer
Signature	Date	Title

Alvi Associates, Inc.

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	1/9/2023	Director of Right of Way & Utility Coordination
Signature	Date	Title

Bowman Consulting Group Ltd.

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	01/05/2023	President
Signature	Date	Title

ERM & Associates, LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	1/5/2023	Associate Vice President
_____ Signature	_____ Date	_____ Title
Roger Harris, LS, PS		

Pennoni Associates Inc.

Name of Firm

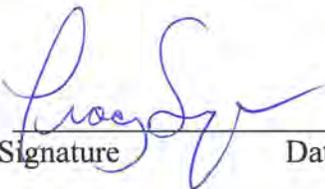
ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	January 10, 2023	Tracy Seymour, PE
Signature	Date	President & CEO
		Title

Straughan Environmental, Inc.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0081-007-013

- 1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- 2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

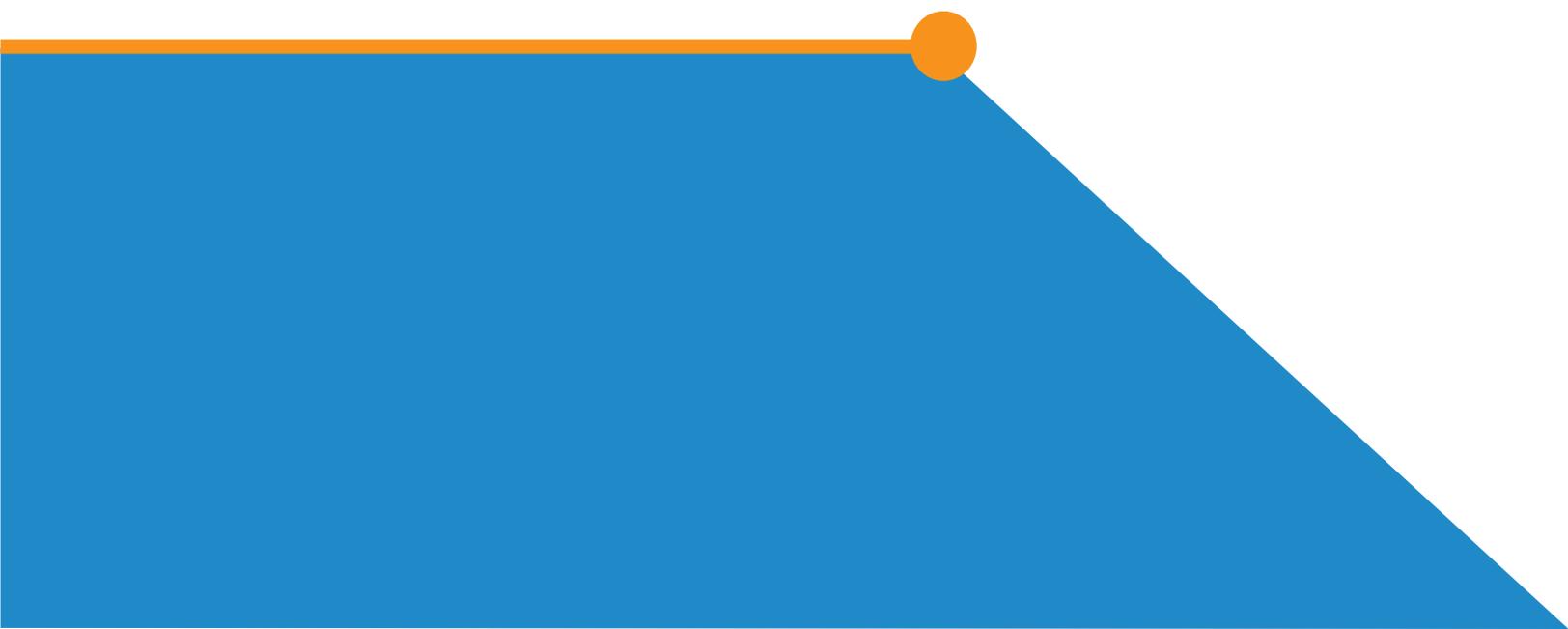
The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

	<u>01/04/2023</u>	<u>Principal/Office Manager</u>
Signature	Date	Title

Terracon Consultants, Inc.
Name of Firm



Attachment 4.2.1
DEPUTY KEY PERSONNEL RESUME FORM



ATTACHMENT 4.2.1

DEPUTY KEY PERSONNEL RESUME FORM

Brief Resume of Key Personnel anticipated for the Project.	
a. Name & Title: JASON GORRIE, PE, PMP, DBIA / SENIOR VICE PRESIDENT	
b. Project Assignment: DEPUTY DESIGN MANAGER	
c. Name of the Firm with which you are employed at the time of submitting Technical Proposal: WSP USA Inc.	
<p>d. Employment History: With this Firm <u>11</u> Years With Other Firms <u>10</u> Years Please list chronologically (most recent first) your employment history, position, general responsibilities, and duration of employment for the last fifteen (15) years. (NOTE: If you have less than 15 years of employment history, please list the history for those years you have worked. Project specific experience shall be included in Section (g) below):</p> <p><u>WSP USA Inc., Senior Vice President, Senior Project Manager, 7/2012 – Present:</u> Jason is a professional engineer that provides design and project management services for major transportation projects. His current focus provides project management services for Design-Build projects in the southeastern United States. Jason serves as the main point of contact with contractors and owners. In this role, Jason implements effective commercial and change management best practices on Design-Build projects during the pursuit and delivery phases of the project. He manages scope, schedule, budgets, risk and claims. He collaborates with the design team to establish, monitor, and administer the project risk register and change log. Jason reviews contract documents, participates in contract negotiations, and ensures contract requirements are implemented and maintained. Jason’s technical knowledge complements his integrity and single-minded client focus, which has sustained long-term relationships with state DOT, contractor, and municipal clients nationwide.</p> <p><u>STV Inc., Senior Traffic Engineer, 2/2008 – 7/2012:</u> Traffic Analysis and Traffic Design Lead on design-build projects and transportation projects. Project Manager for Traffic Engineering Studies and Alternative Analysis projects.</p> <p><u>Stantec, Project Engineer, 6/2007 – 1/2008:</u> Project Manager for water and sewer rehabilitation projects.</p> <p><u>Dewberry, Project Engineer, 1/2001 – 6/2006:</u> Project Engineer on design-build projects and signal design projects.</p>	
e. Education: Name & Location of Institution(s)/Degree(s)/Year/Specialization: Virginia Polytechnic Institute and State University / Blacksburg, VA / Master of Science / 2007 / Environmental Engineering. Auburn University / Auburn, AL / Bachelor of Science / 2000 / Civil Engineering	
<p>f. Active Registration: Year First Registered/ Discipline/VA Registration #:</p> <p>2008 / Professional Engineer / VA #0402041230, 2008 / Professional Engineer / NC #034224, 2008 / Professional Engineer / SC #26454, 2009 / Professional Engineer / TN #113555, 2011 / Professional Engineer / FL #73602, 2011 / Professional Engineer / GA #036549, 2017 / Project Management Professional (PMP) / #4936976, 2020 / Design Build Professional (DBIA) / #D-3387</p>	
<p>g. Document the extent and depth of your experience and qualifications relevant to the Project.</p> <ol style="list-style-type: none"> 1. <i>Note your role, responsibility, and specific job duties for each project, not those of the firm.</i> 2. <i>Note whether experience is with current firm or with other firm.</i> 3. <i>Provide beginning and end dates for each project; projects older than fifteen (15) years will not be considered for evaluation.</i> <p>(List only three (3) relevant projects for which you have performed a similar function. On-call contracts with multiple task orders (on multiple projects) should not be listed as a single project.</p>	
NCDOT, I-3819B, U-6039, I-40/I-77 Interchange Project, Statesville, NC (DESIGN-BUILD)	
Name of Firm: WSP USA Inc.	Project Role: Design Project Manager
Beginning Date: 11/2018	End Date: Present (Est. Completion xxx)
<p><i>Specific Responsibilities:</i> Jason secured commitments from all design subconsultants and assisted in negotiating the terms of the teaming agreements and subcontract agreements with the contractor, Lane Construction, and all subconsultants. He prepared and negotiated the design fee and prepared the schedule. As Project Manager, Jason is responsible for the project execution and delivery of all design deliverables to Lane Construction and NCDOT. He reported all progress (tracked actual and financial progress) to Lane Construction and WSP. Jason is the main point of contact with Lane Construction executives regarding the project and meets regularly with Lane Construction, our team members and NCDOT to discuss progress.</p> <p><i>Project Relevance:</i> The I-3819B, U-6039 project reconstructs the existing I-40/I-77 cloverleaf interchange to a Turbine interchange, which was part of an Alternative Technical Concept (ATC) that eliminates 3rd level structures, improves constructability, optimizes structure quantities, reduces costs, and expedites construction. The project widens I-40 (concrete) and I-77 (asphalt) in each direction for 1-2 miles. The project reconstructs the I-77 & Broad St interchange and implements access management strategies on Broad St through median installations, signal upgrades, and road realignments. The Design-Build contract was awarded for \$260 million.</p>	

NCDOT, I-5507, R-0211EC, U-4714AB, I-485 Express Lane Project, Charlotte, NC (DESIGN-BUILD)	
Name of Firm: WSP USA Inc	Project Role: Deputy Design Project Manager
Beginning Date: 10/2018	End Date: 07/2019
<p>Specific Responsibilities: Jason served as the deputy pursuit manager and deputy Project Manager on this project, from inception to the submission of Right-of-Way (65% Roadway) Plans. He secured commitments from all design subconsultants and assisted in negotiating the terms of the teaming agreements and subcontract agreements with the contractor, Blythe Construction, and all subconsultants. He prepared and negotiated the design fee and prepared the schedule. As Deputy Project Manager, Mr. Gorrie assisted in the project execution and delivery of all design deliverables to Blythe Construction and NCDOT. He provided schedule updates to the contractor, documented project changes, updated the risk management plan, and managed project controls for the Design-Build Team and owner.</p> <p>Project Relevance: The I-5507, R-0211EC, U-4714AB, project adds one express lane in each direction on I-485 between I-77 and US 74; 17 miles. The project also adds on general purpose lane in each direction along I-485 between Rea Rd and Providence Rd. The project constructs two new interchanges at Weddington Rd and Westinghouse Rd, which provides a direct access to the Express Lanes. The project reconstructs the John St interchange with loop ramps and reconstructs the Johnston Rd interchange with 3rd level bridges that provide direct access to the Express Lanes. An All Electronic Toll (AET) toll zone facility along the Express Lanes will offer drivers the option of more reliable travel times. The Design-Build contract was awarded for \$346 million.</p>	
NCDOT, I-3802A, I-85 Widening Project, Charlotte, NC (DESIGN-BUILD)	
Name of Firm: WSP USA Inc.	Project Role: Lead Traffic Engineer
Beginning Date: 06/2014	End Date: 09/2016
<p>Specific Responsibilities: Jason served as the lead traffic engineer responsible for capacity analyses, traffic control plans, and signal plans. Jason updated the project IMR to include the roundabout capacity analysis and interchange configuration revisions and developed traffic control plans for the phased construction of the project.</p> <p>Project Relevance: The I-3802A project widens 8-miles of interstate I-85, reconstructs 3 interchanges, and replaces several bridges over the interstate, including 1 railroad bridge. As part of the D-B procurement process, Jason implemented an MOT strategy that placed two new bridges outside the footprint of the existing bridges, avoiding staged construction by allowing existing bridges to remain in service during construction activities. This approach limited disruption to the existing traffic pattern and reduced the overall construction schedule. Another innovative MOT strategy designed a temporary diamond interchange at the US 29/US 601 interchange to facilitate the MOT during the Interchange Modification from a full clover interchange to a Diverging Diamond Interchange (DDI). The temporary signals for the diamond were strategically located at the future cross over locations of the DDI to maximize construction away from traffic and facilitate future implementation of the DDI.</p>	

Original

JANUARY 20, 2023

I-81 WIDENING

MM 221 to MM 225

Augusta County, Virginia

Technical Proposal

VOLUME II

State Project No.: 0081-007-013, B638, B639, B640,
B641, B642, C501, D602, D603, P101, R201

Federal Project No.: NHPP-081-2(329)

Contract ID Number: C00116269DB116



in association with WSP USA Inc.

4.3.1 Conceptual Roadway Plans

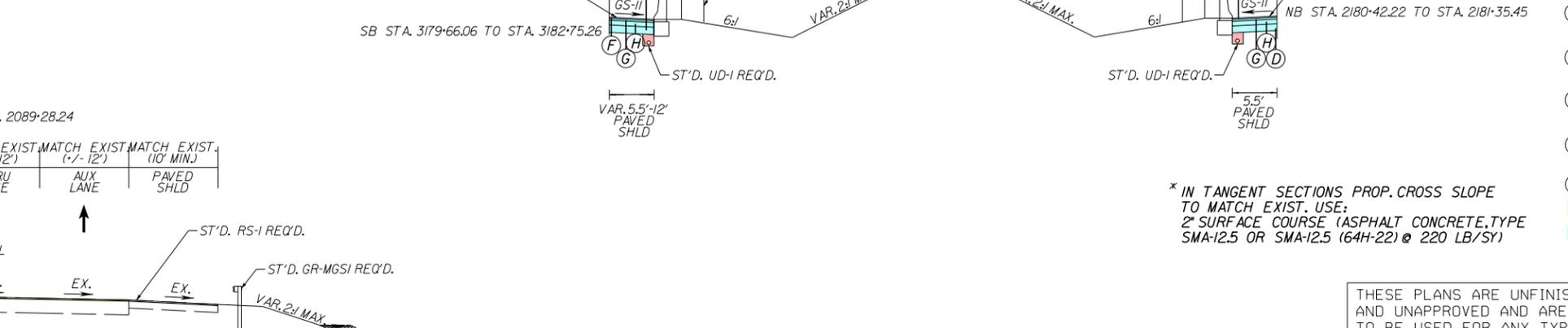
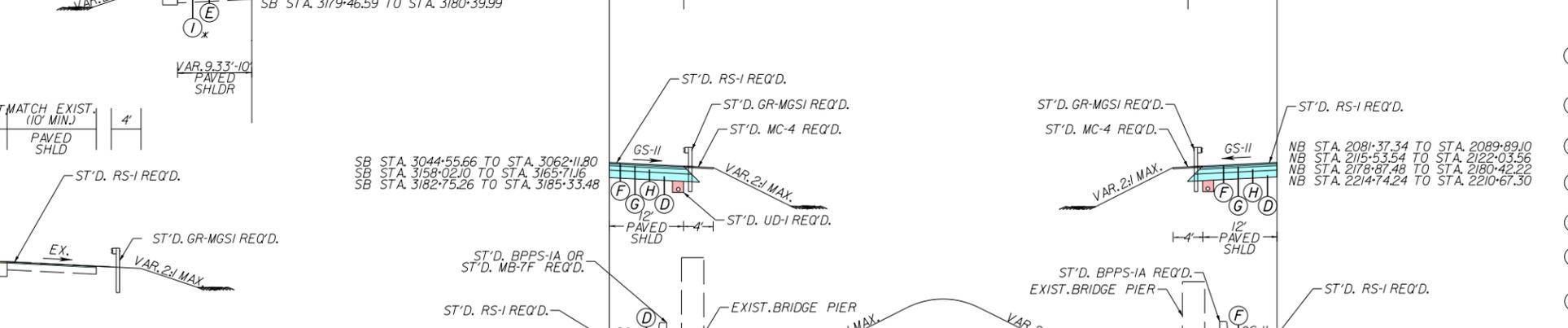
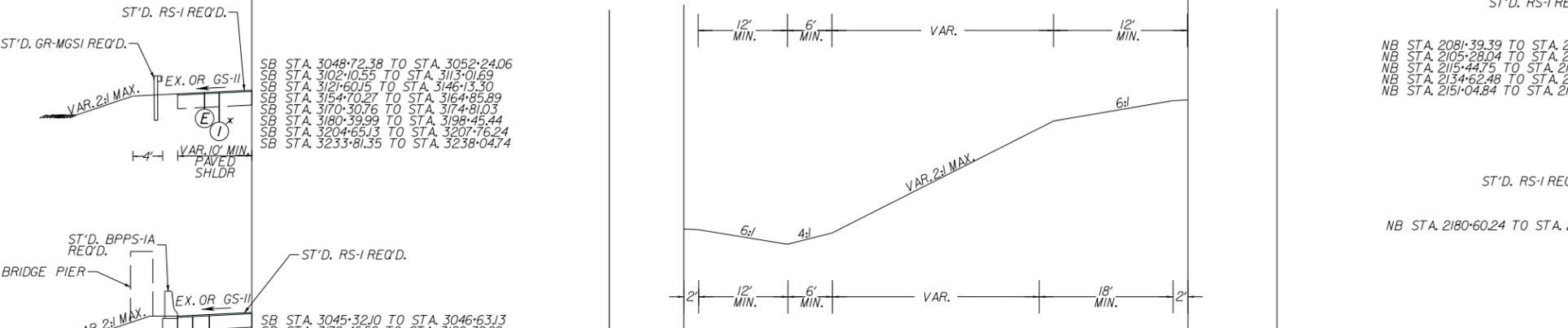
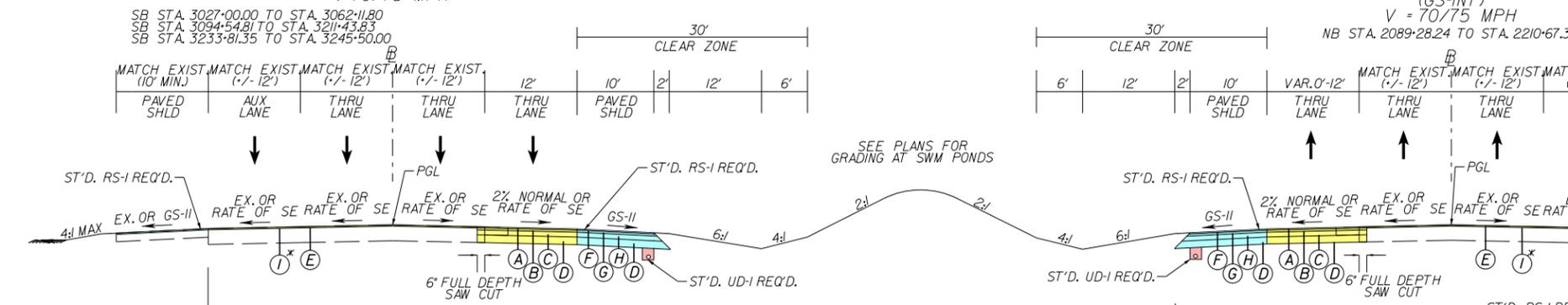
Technical Proposal Plans - Volume II

TYPICAL SECTIONS

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	2A

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

B638: SB STA. 3046+45.77 TO STA. 3048+55.88
 I-81 SB (GS-INT) V=70/75 MPH
 SB STA. 3027+00.00 TO STA. 3062+11.80
 SB STA. 3094+54.81 TO STA. 3211+43.83
 SB STA. 3233+81.35 TO STA. 3245+50.00



- LEGEND:**
- (A) 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SMA-12.5 (64H-22) @ 220 LB/SY)
 - (B) 3" INTERMEDIATE COURSE (ASPHALT CONCRETE, TYPE SMA-19.0 (64H-22) @ 330 LB/SY)
 - (C) 7.5" BASE COURSE (ASPHALT CONCRETE, TYPE BM-25.0D)
 - (D) 12" SUBBASE COURSE (FULL-DEPTH RECLAMATION UTILIZING IMPORTED NO.10 SCREENINGS)
 - (E) 2" MAX. PAVEMENT MILLING
 - (F) 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SM-12.5A @ 220 LB/SY)
 - (G) 3" INTERMEDIATE COURSE (ASPHALT CONCRETE, TYPE IM-19.0A @ 330 LB/SY)
 - (H) 7.5" BASE COURSE (ASPHALT CONCRETE, TYPE BM-25.0A)
 - (I) VAR. DEPTH ASPHALT OVERLAY PER RFP ATTACHMENT 2.6.J.2
 - (J) 7" REINFORCED CONCRETE PAVEMENT ST'D. PR-2
 - (K) 8" AGGREGATE TYPE I, NO. 21B
 - (L) 6" CRUSHER RUN NO. 25 OR 26
- PROPOSED ROADWAY
 PROPOSED SHOULDER
 PROPOSED UNDERDRAIN

* IN TANGENT SECTIONS PROP. CROSS SLOPE TO MATCH EXIST. USE:
 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SMA-12.5 OR SMA-12.5 (64H-22) @ 220 LB/SY)

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SCALE: 0 10' 20'

PROJECT: 0081-007-013 SHEET NO. 2A

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Technical Proposal Plans - Volume II

TYPICAL SECTIONS

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	2B

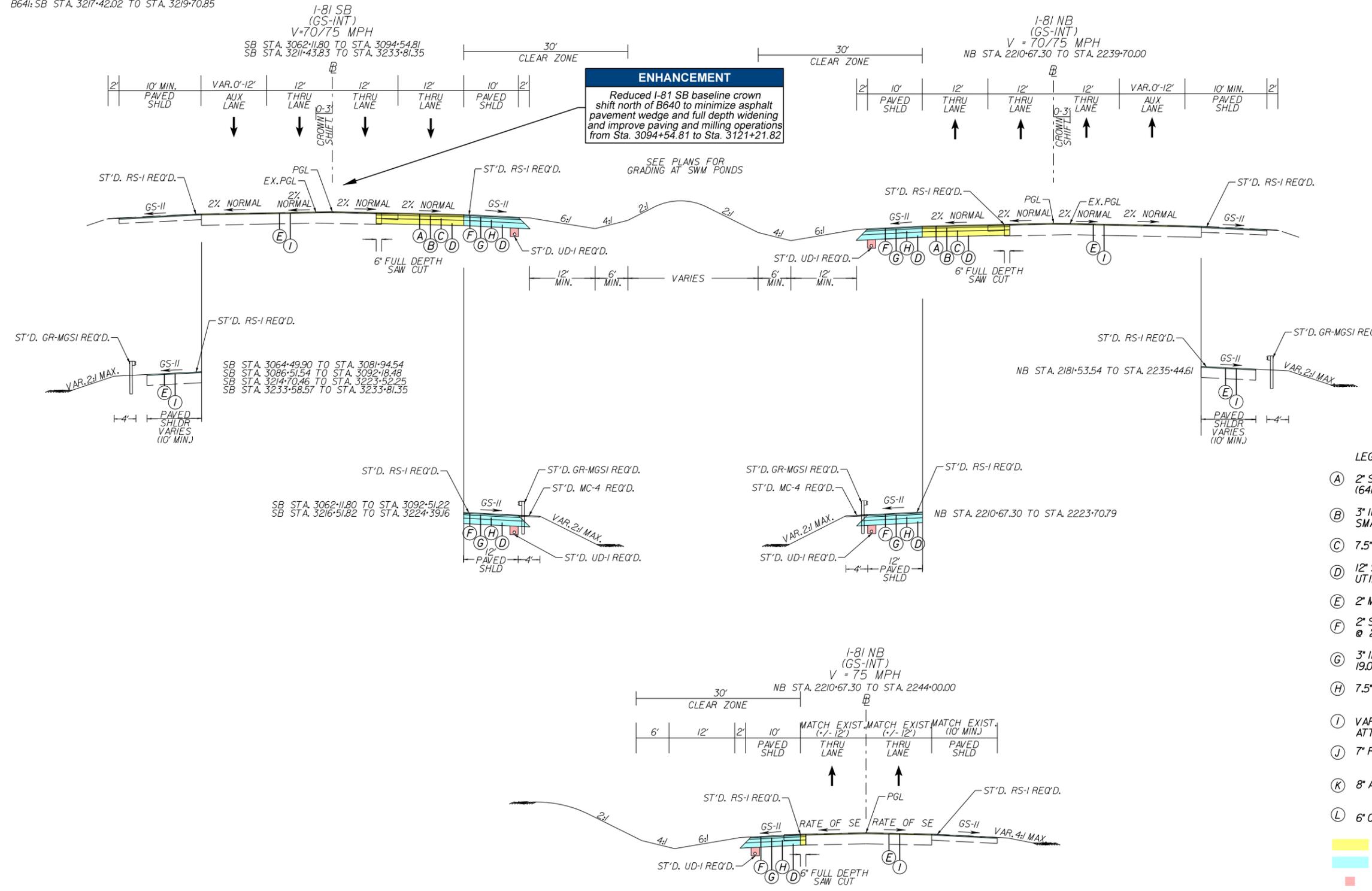
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

B639: SB STA. 3079+82.59 TO STA. 3081+58.59
B640: SB STA. 3087+13.37 TO STA. 3089+38.04
B641: SB STA. 3217+42.02 TO STA. 3219+70.85

I-81 SB
(GS-INT)
V=70/75 MPH
SB STA. 3062+11.80 TO STA. 3094+54.81
SB STA. 3211+43.83 TO STA. 3233+81.35

B642: NB STA. 2218+16.11 TO STA. 2220+28.94

I-81 NB
(GS-INT)
V = 70/75 MPH
NB STA. 2210+67.30 TO STA. 2239+70.00



- LEGEND:**
- (A) 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SMA-12.5 (64H-22) @ 220 LB/SY)
 - (B) 3" INTERMEDIATE COURSE (ASPHALT CONCRETE, TYPE SMA-19.0 (64H-22) @ 330 LB/SY)
 - (C) 7.5" BASE COURSE (ASPHALT CONCRETE, TYPE BM-25.0D)
 - (D) 12" SUBBASE COURSE (FULL-DEPTH RECLAMATION UTILIZING IMPORTED NO.10 SCREENINGS)
 - (E) 2" MAX. PAVEMENT MILLING
 - (F) 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SM-12.5A @ 220 LB/SY)
 - (G) 3" INTERMEDIATE COURSE (ASPHALT CONCRETE, TYPE IM-19.0A @ 330 LB/SY)
 - (H) 7.5" BASE COURSE (ASPHALT CONCRETE, TYPE BM-25.0A)
 - (I) VAR. DEPTH ASPHALT OVERLAY PER RFP ATTACHMENT 2.6J.2
 - (J) 7" REINFORCED CONCRETE PAVEMENT ST'D. PR-2
 - (K) 8" AGGREGATE TYPE I, NO. 21B
 - (L) 6" CRUSHER RUN NO.25 OR 26
- PROPOSED ROADWAY
 PROPOSED SHOULDER
 PROPOSED UNDERDRAIN

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SCALE: 0 10' 20'

PROJECT: 0081-007-013

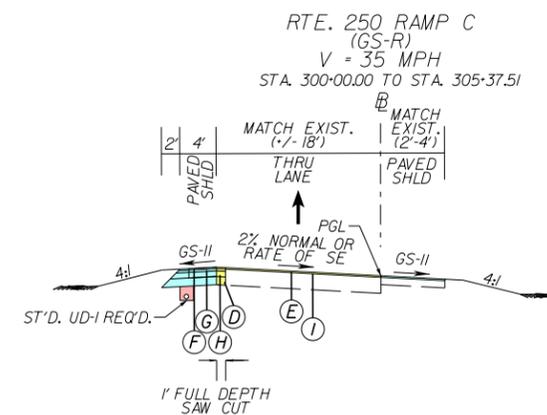
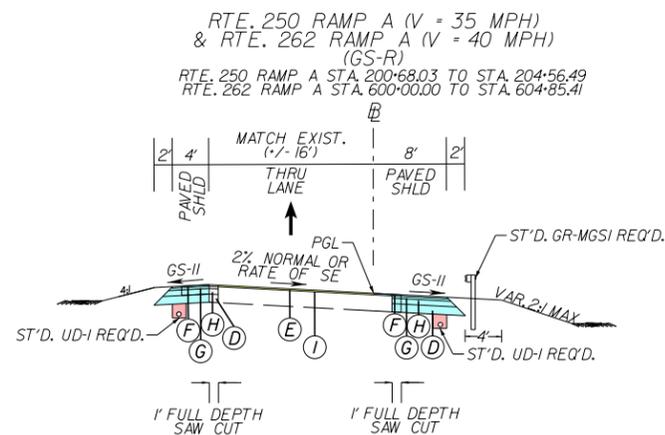
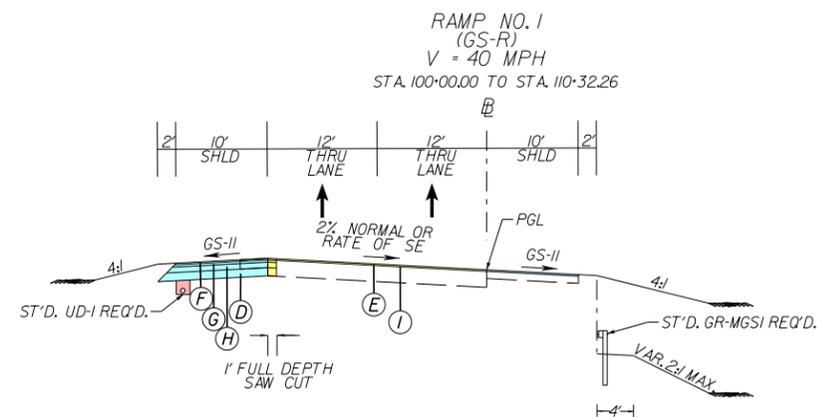
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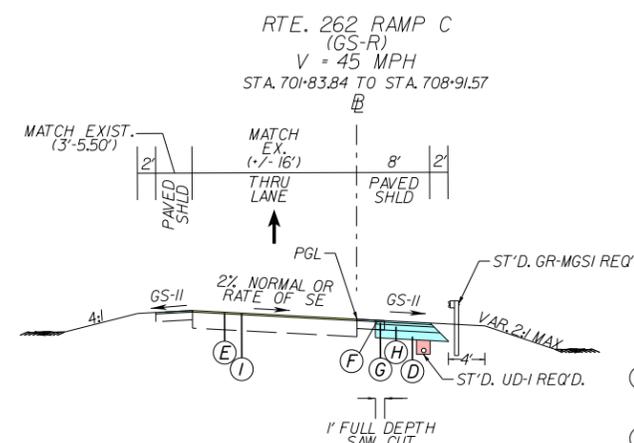
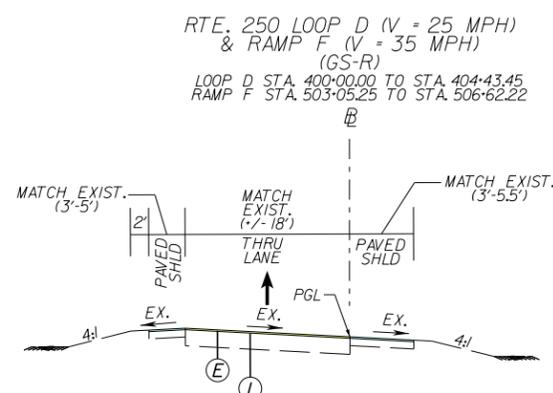
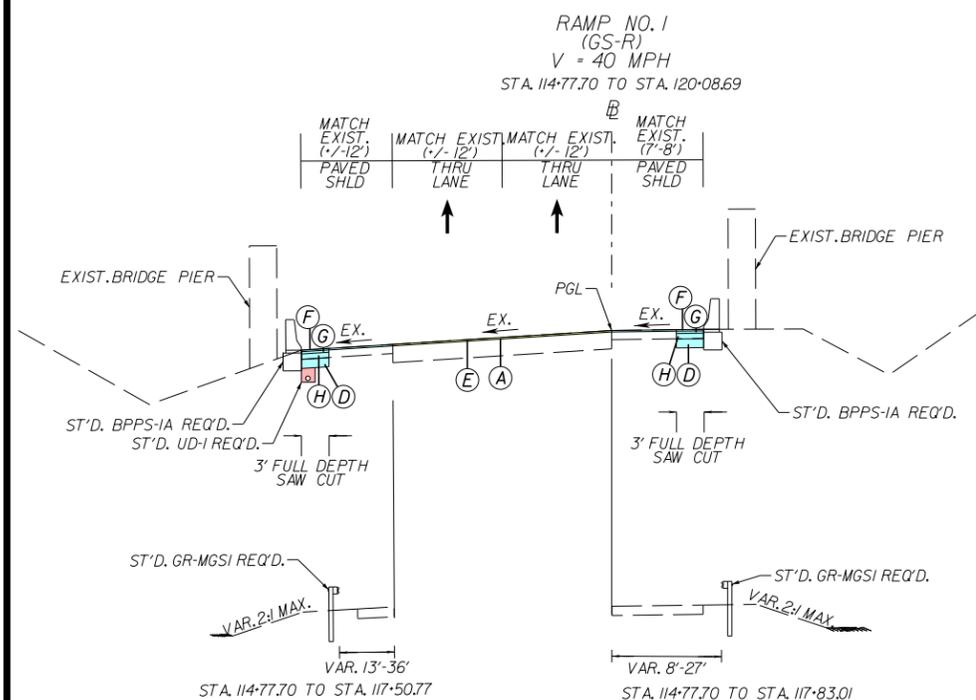
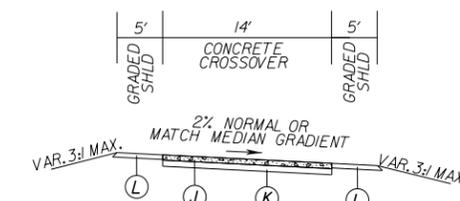
Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	2C

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

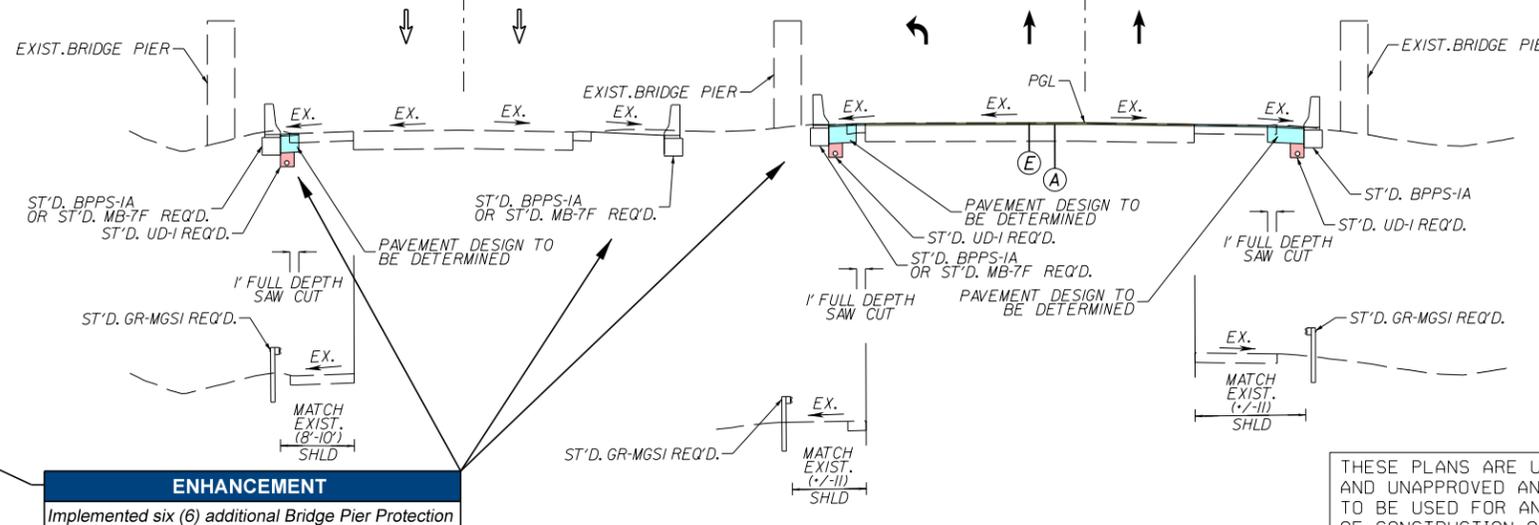
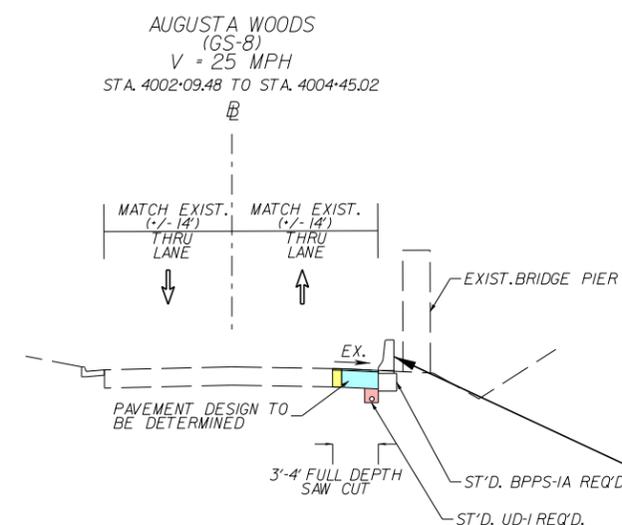


CONCRETE CROSSOVER DETAIL



LEGEND:

- (A) 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SMA-12.5 @ 220 LB/SY)
 - (B) 3" INTERMEDIATE COURSE (ASPHALT CONCRETE, TYPE SMA-19.0 @ 330 LB/SY)
 - (C) 7.5" BASE COURSE (ASPHALT CONCRETE, TYPE BM-25.0D)
 - (D) 12" SUBBASE COURSE (FULL-DEPTH RECLAMATION UTILIZING IMPORTED NO.10 SCREENINGS)
 - (E) 2" MAX. PAVEMENT MILLING
 - (F) 2" SURFACE COURSE (ASPHALT CONCRETE, TYPE SM-12.5A @ 220 LB/SY)
 - (G) 3" INTERMEDIATE COURSE (ASPHALT CONCRETE, TYPE IM-19.0A @ 330 LB/SY)
 - (H) 7.5" BASE COURSE (ASPHALT CONCRETE, TYPE BM-25.0A)
 - (I) VAR. DEPTH ASPHALT OVERLAY PER RFP ATTACHMENT 2.6.1.2
 - (J) 7" REINFORCED CONCRETE PAVEMENT ST'D. PR-2
 - (K) 8" AGGREGATE TYPE I, NO. 21B
 - (L) 6" CRUSHER RUN NO. 25 OR 26
- PROPOSED ROADWAY
 PROPOSED SHOULDER
 PROPOSED UNDERDRAIN
 PROPOSED CONCRETE CROSSOVER



ENHANCEMENT
Implemented six (6) additional Bridge Pier Protection Systems to reduce the probability of pier failure due to collision and improve safety for the traveling public.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane

SCALE: 0 10' 20'

PROJECT: 0081-007-013 SHEET NO.: 2C

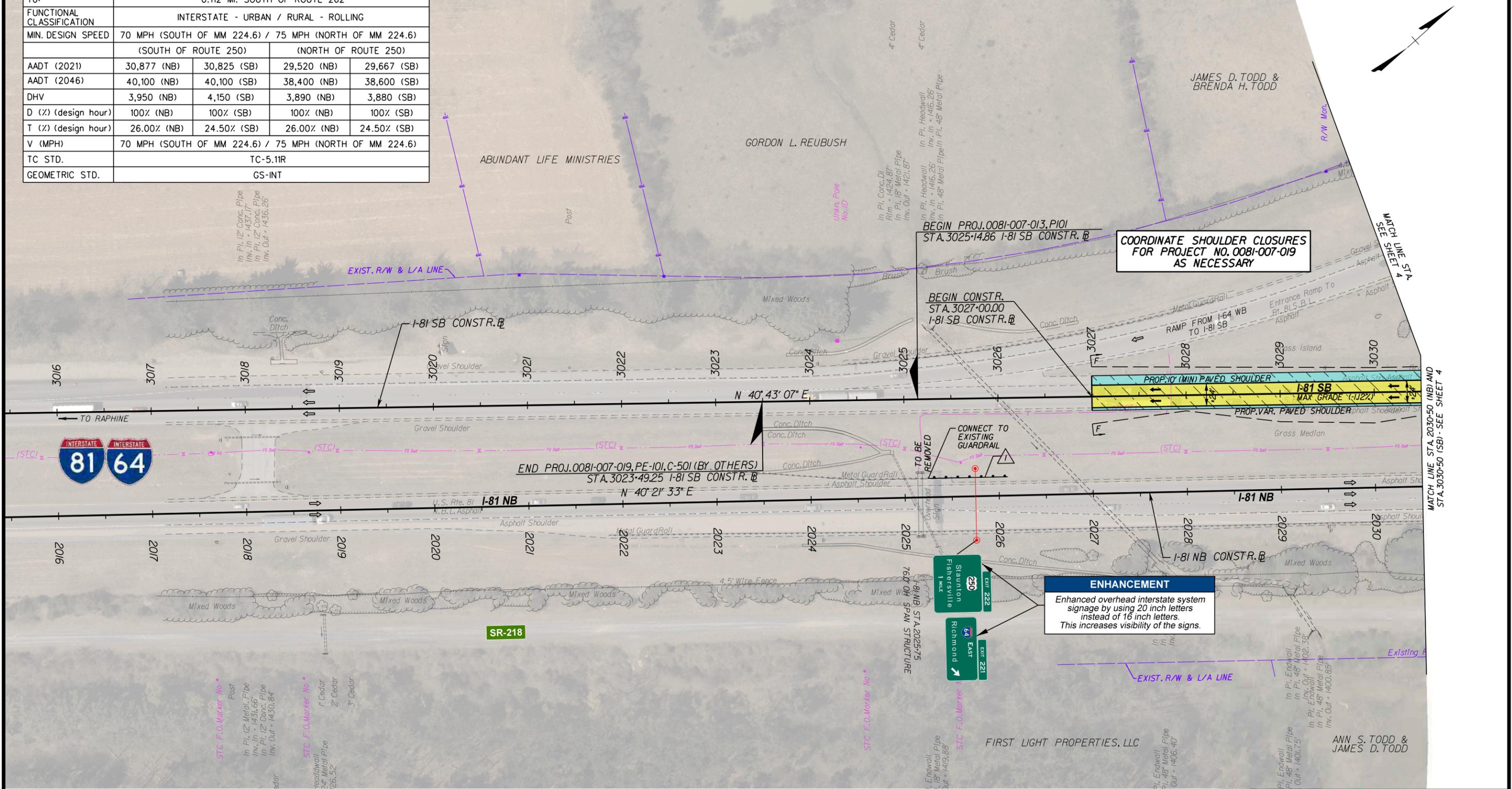
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	3

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

FUNCTIONAL CLASSIFICATION AND TRAFFIC DATA				
INTERSTATE 81				
From:	0.424 MI. SOUTH OF I-64 INTERCHANGE			
To:	0.112 MI. SOUTH OF ROUTE 262			
FUNCTIONAL CLASSIFICATION	INTERSTATE - URBAN / RURAL - ROLLING			
MIN. DESIGN SPEED	70 MPH (SOUTH OF MM 224.6) / 75 MPH (NORTH OF MM 224.6)			
	(SOUTH OF ROUTE 250)		(NORTH OF ROUTE 250)	
AADT (2021)	30,877 (NB)	30,825 (SB)	29,520 (NB)	29,667 (SB)
AADT (2046)	40,100 (NB)	40,100 (SB)	38,400 (NB)	38,600 (SB)
DHV	3,950 (NB)	4,150 (SB)	3,890 (NB)	3,880 (SB)
D (%) (design hour)	100% (NB)	100% (SB)	100% (NB)	100% (SB)
T (%) (design hour)	26.00% (NB)	24.50% (SB)	26.00% (NB)	24.50% (SB)
V (MPH)	70 MPH (SOUTH OF MM 224.6) / 75 MPH (NORTH OF MM 224.6)			
TC STD.	TC-5.11R			
GEOMETRIC STD.	GS-INT			



LEGEND:	
	PROPOSED FULL DEPTH PAVEMENT
	DEMOLITION OF PAVEMENT
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY
	PROPOSED PAVEMENT PATCHING
	PROPOSED VDOT ST'D.MC-4
	PROPOSED SWM LOCATION
	PROPOSED ROADWAY
	PROPOSED SHOULDER
	PROPOSED BRIDGE WIDENING
	PROPOSED CONCRETE CROSSOVER
	VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED DRAINAGE
	PROPOSED UNDERDRAINS
	PROPOSED OVERHEAD STRUCTURE
	EXISTING UTILITIES
	PROPOSED GUARDRAIL
	PROPOSED BPPS
	PROPOSED CONCRETE BARRIER
	PROPOSED CURBING
	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SCALE: 0 100' 200'

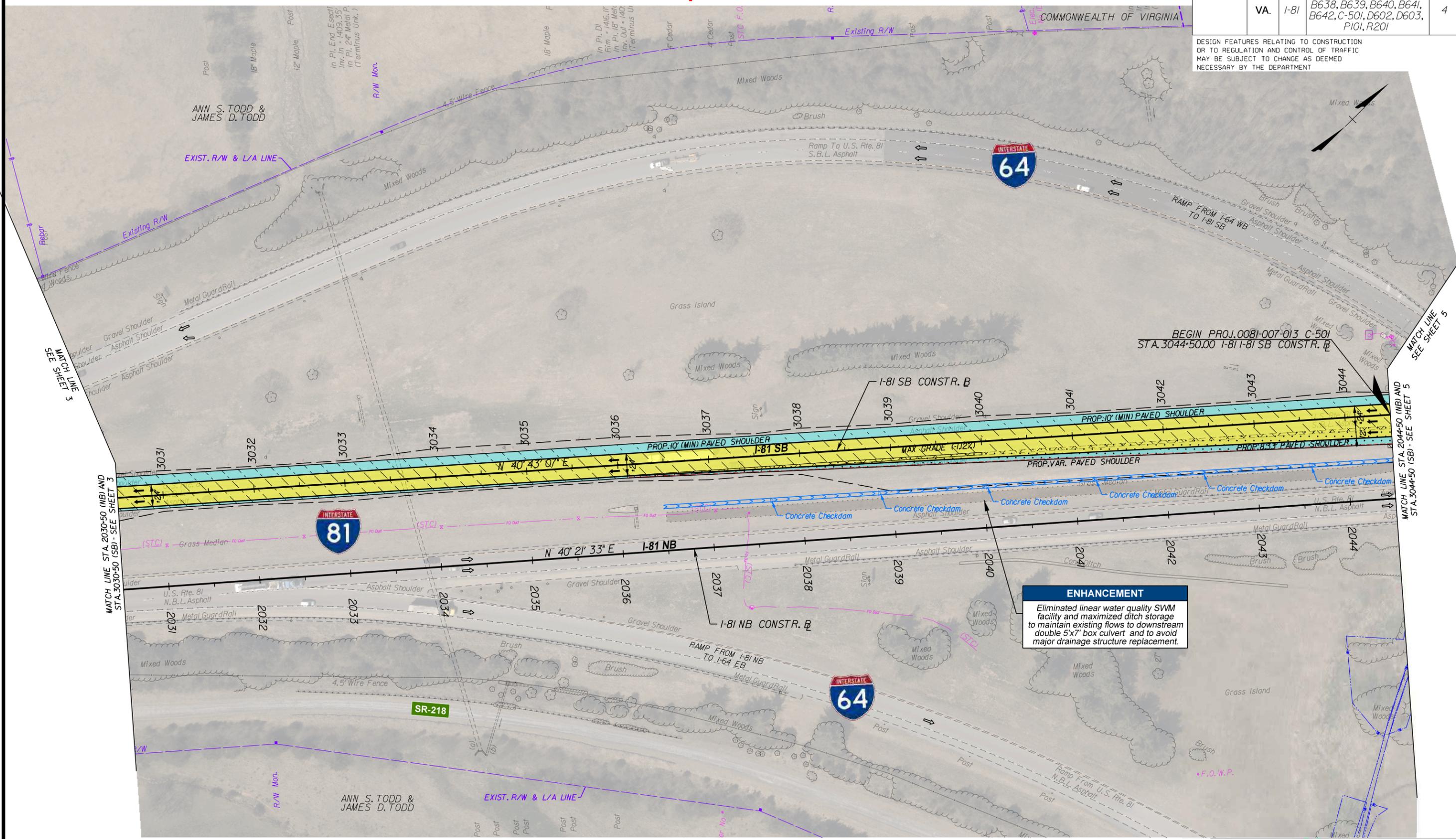
PROJECT	0081-007-013
SHEET NO.	3

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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	4

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



ENHANCEMENT
Eliminated linear water quality SWM facility and maximized ditch storage to maintain existing flows to downstream double 5'x7' box culvert and to avoid major drainage structure replacement.

LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED CONCRETE CROSSOVER		PROPOSED GUARDRAIL
	DEMOLITION OF PAVEMENT		VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS		PROPOSED BPPS
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		PROPOSED CONSTRUCTION LIMITS IN CUTS		PROPOSED CONCRETE BARRIER
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY		PROPOSED CONSTRUCTION LIMITS IN FILLS		PROPOSED CURBING
	PROPOSED PAVEMENT PATCHING		PROPOSED DRAINAGE		PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	PROPOSED VDOT ST'D.MC-4		PROPOSED UNDERDRAINS		REMOVE STRUCTURE OR PIPE
	PROPOSED SWM LOCATION		EXISTING UTILITIES		
	PROPOSED ROADWAY				
	PROPOSED SHOULDER				
	PROPOSED BRIDGE WIDENING				

CONCEPTUAL ROADWAY PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane

SCALE: 0 100' 200'

PROJECT: 0081-007-013

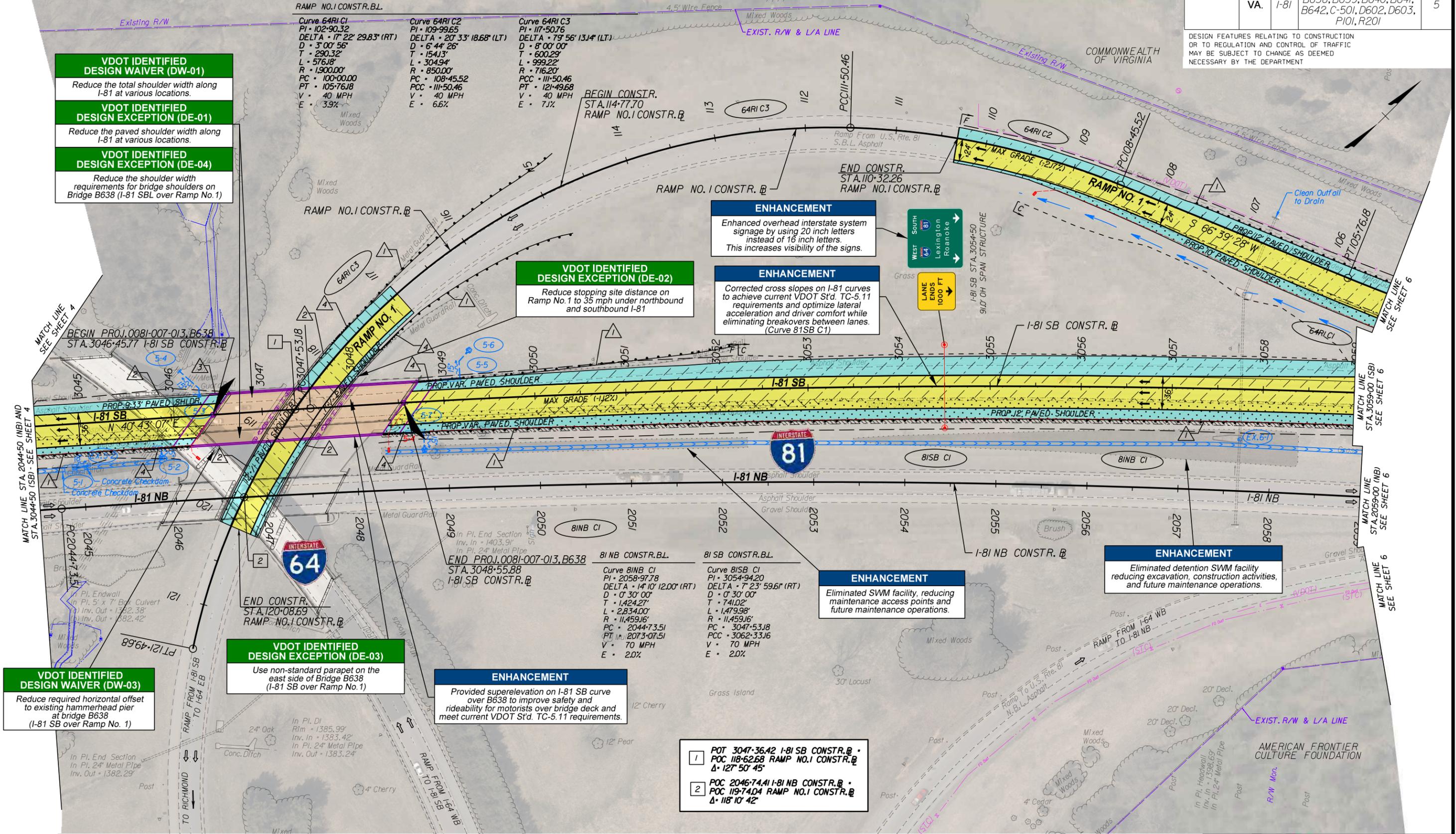
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	5

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED CONCRETE CROSSOVER
	DEMOLITION OF PAVEMENT		VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		PROPOSED DRAINAGE
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY		PROPOSED UNDERDRAINS
	PROPOSED PAVEMENT PATCHING		PROPOSED OVERHEAD STRUCTURE
	PROPOSED VDOT ST'D. MC-4		EXISTING UTILITIES
	PROPOSED SWM LOCATION		PROPOSED GUARDRAIL
	PROPOSED ROADWAY		PROPOSED BPPS
	PROPOSED SHOULDER		PROPOSED CONCRETE BARRIER
	PROPOSED BRIDGE WIDENING		PROPOSED CURBING

	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

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lane

SCALE: 0 100' 200'

PROJECT: 0081-007-013

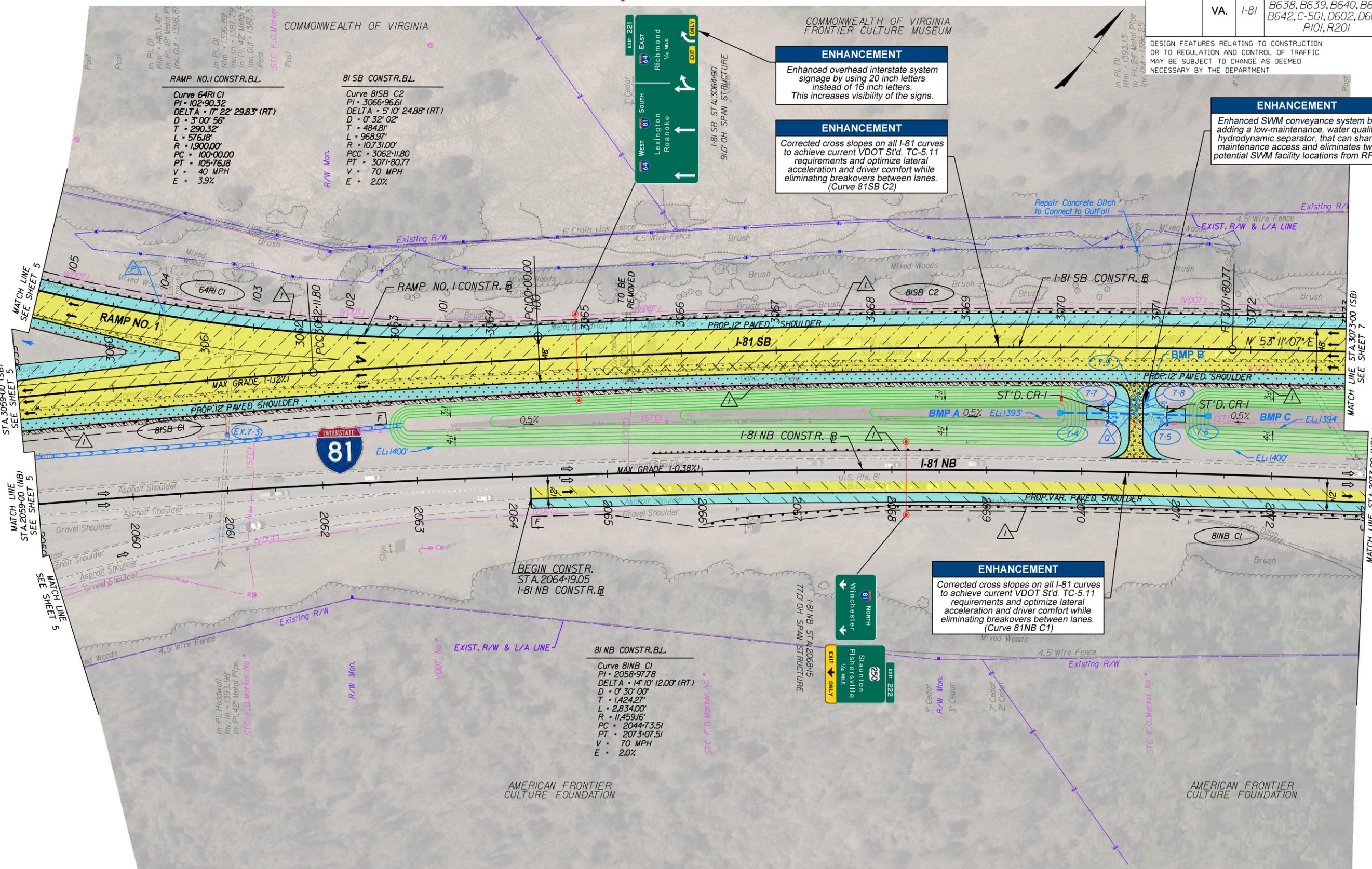
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	6

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:	
	PROPOSED FULL DEPTH PAVEMENT
	DEMOLITION OF PAVEMENT
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY
	PROPOSED PAVEMENT MILLING AND 2\"/>
	PROPOSED PAVEMENT PATCHING
	PROPOSED VDOT ST'D.MC-4
	PROPOSED SWM LOCATION
	PROPOSED ROADWAY
	PROPOSED SHOULDER
	PROPOSED BRIDGE WIDENING
	PROPOSED CONCRETE CROSSOVER
	VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED DRAINAGE
	PROPOSED UNDERDRAINS
	PROPOSED OVERHEAD STRUCTURE
	EXISTING UTILITIES
	PROPOSED GUARDRAIL
	PROPOSED BPPS
	PROPOSED CONCRETE BARRIER
	PROPOSED CURBING
	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

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lane

PROJECT: 0081-007-013

SHEET NO.: 6

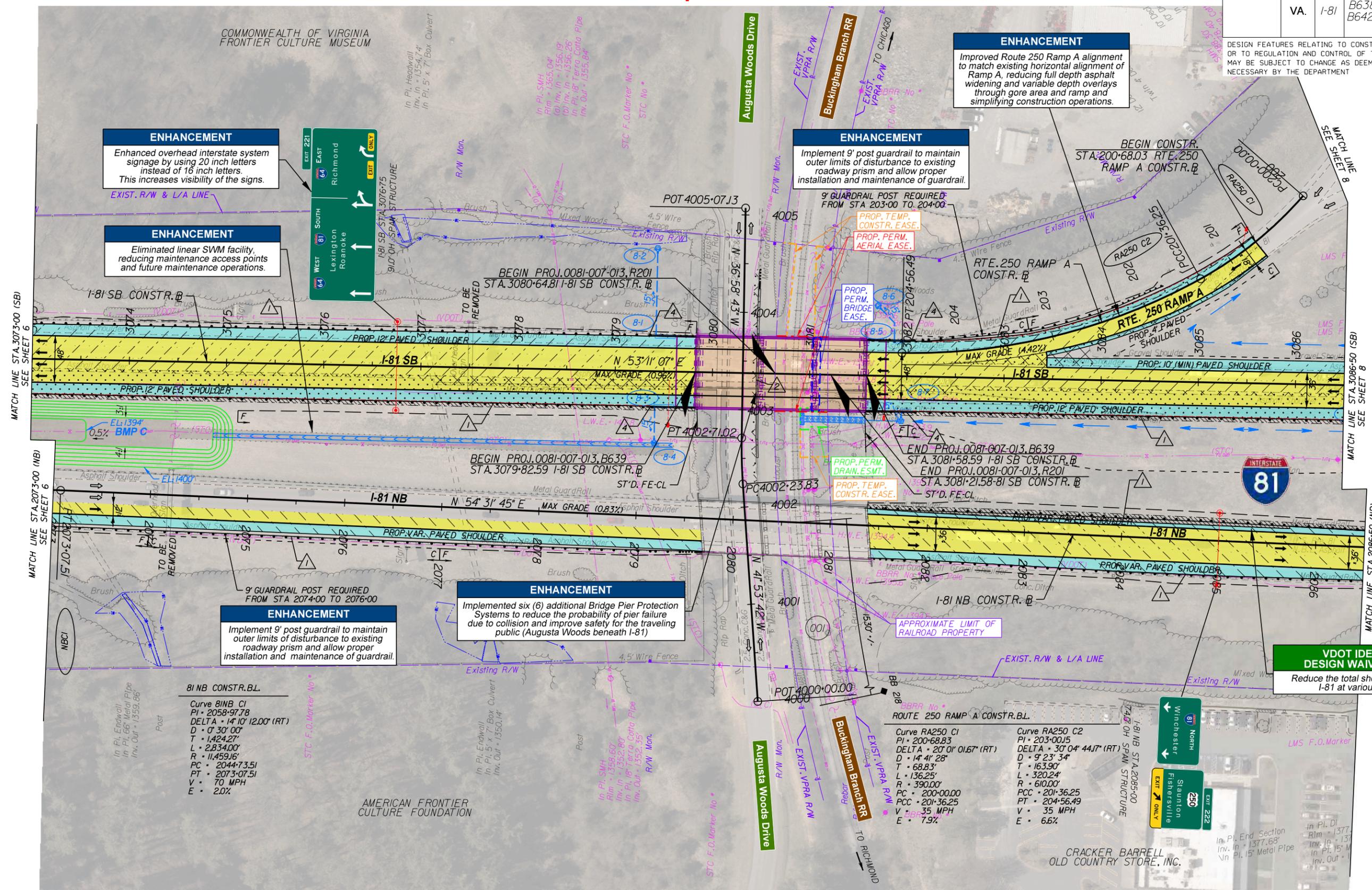
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	7

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



ENHANCEMENT
Enhanced overhead interstate system signage by using 20 inch letters instead of 16 inch letters. This increases visibility of the signs.

ENHANCEMENT
Eliminated linear SWM facility, reducing maintenance access points and future maintenance operations.

ENHANCEMENT
Implement 9' post guardrail to maintain outer limits of disturbance to existing roadway prism and allow proper installation and maintenance of guardrail.

ENHANCEMENT
Improved Route 250 Ramp A alignment to match existing horizontal alignment of Ramp A, reducing full depth asphalt widening and variable depth overlays through gore area and ramp and simplifying construction operations.

ENHANCEMENT
Implemented six (6) additional Bridge Pier Protection Systems to reduce the probability of pier failure due to collision and improve safety for the traveling public (Augusta Woods beneath I-81)

ENHANCEMENT
Implement 9' post guardrail to maintain outer limits of disturbance to existing roadway prism and allow proper installation and maintenance of guardrail.

VDOT IDENTIFIED DESIGN WAIVER (DW-01)
Reduce the total shoulder width along I-81 at various locations.

81 NB CONSTR.B.L.
Curve 81NB C1
PI - 2058-97.78
DELTA - 14' 10" 12.00" (RT)
D - 0' 30' 00"
T - 1,424.27'
L - 2,834.00'
R - 11,459.16'
PC - 2044-73.51
PT - 2073-07.51
V - 70 MPH
E - 2.0%

ROUTE 250 RAMP A CONSTR.B.L.
Curve RA250 C1
PI - 200-68.83
DELTA - 20' 0" 01.67" (RT)
D - 14' 4" 28"
T - 68.83'
L - 136.25'
R - 390.00'
PC - 200-00.00
PCC - 201-36.25
V - 35 MPH
E - 7.9%

Curve RA250 C2
PI - 203-00.15
DELTA - 30' 04' 44.17" (RT)
D - 9' 23' 34"
T - 163.90'
L - 320.24'
R - 610.00'
PC - 201-36.25
PT - 204-56.49
V - 35 MPH
E - 6.6%

- LEGEND:**
- PROPOSED FULL DEPTH PAVEMENT
 - DEMOLITION OF PAVEMENT
 - PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY
 - PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY
 - PROPOSED PAVEMENT PATCHING
 - PROPOSED VDOT ST'D.MC-4
 - PROPOSED SWM LOCATION
 - PROPOSED ROADWAY
 - PROPOSED SHOULDER
 - PROPOSED BRIDGE WIDENING
 - PROPOSED CONCRETE CROSSOVER
 - VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
 - PROPOSED CONSTRUCTION LIMITS IN CUTS
 - PROPOSED CONSTRUCTION LIMITS IN FILLS
 - PROPOSED DRAINAGE
 - PROPOSED UNDERDRAINS
 - PROPOSED OVERHEAD STRUCTURE
 - EXISTING UTILITIES
 - PROPOSED GUARDRAIL
 - PROPOSED BPPS
 - PROPOSED CONCRETE BARRIER
 - PROPOSED CURBING
 - REMOVE AND ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
 - REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane  WSP 

SCALE: 0 100' 200'

PROJECT: 0081-007-013

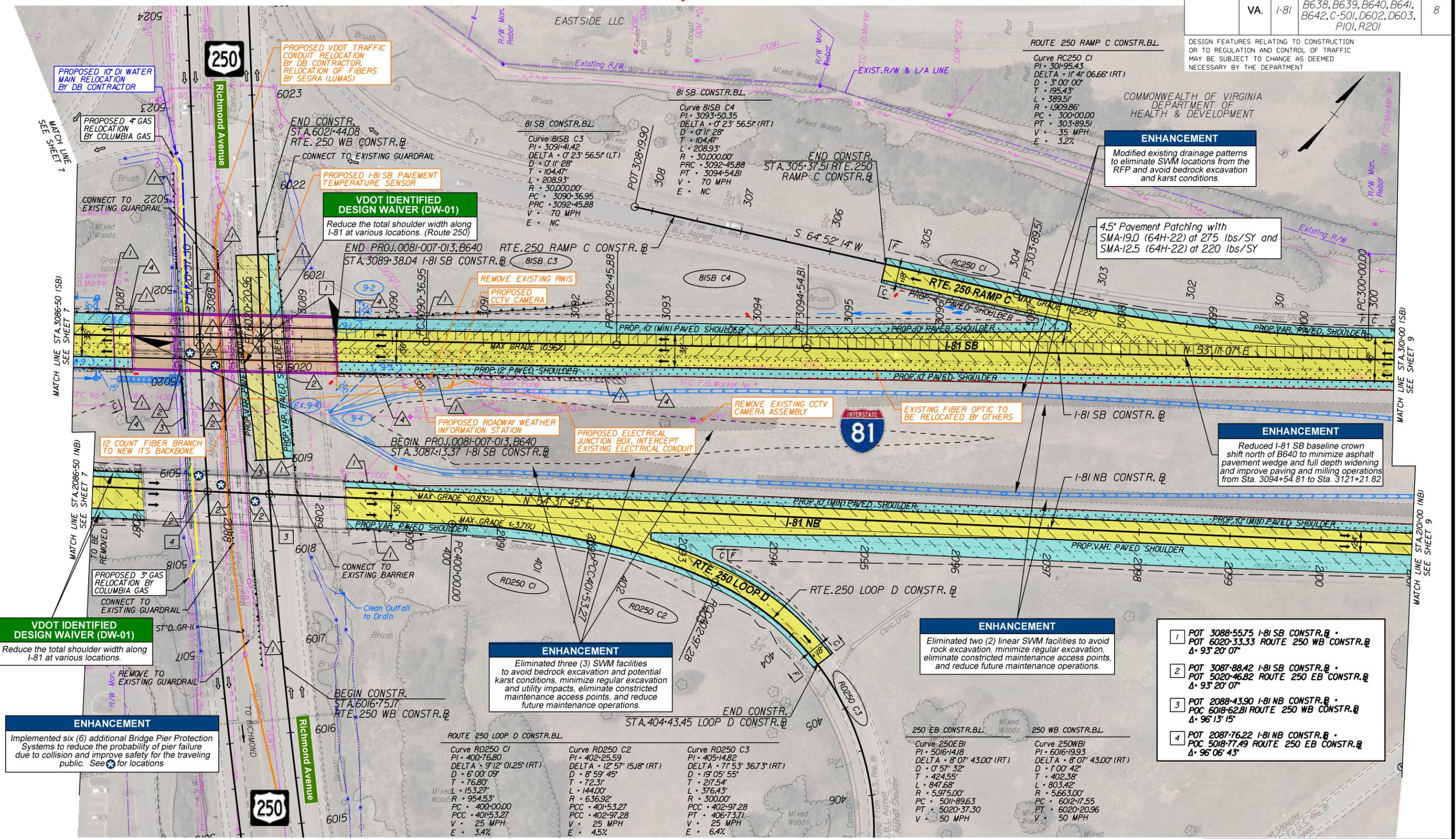
SHEET NO.: 7

Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	8

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF
HEALTH & DEVELOPMENT



ENHANCEMENT
Modified existing drainage patterns to eliminate SVM locations from the RFP and avoid bedrock excavation and karst conditions.

4.5" Pavement Patching with SMA-19.0 (64H-22) at 275 lbs/SY and SMA-12.5 (64H-22) at 220 lbs/SY

ENHANCEMENT
Reduced I-81 SB baseline crown shift north of B640 to minimize asphalt pavement wedge and full depth widening and improve paving and milling operations from Sta. 3094+54.81 to Sta. 3121+21.82

ENHANCEMENT
Eliminated two (2) linear SVM facilities to avoid rock excavation, minimize regular excavation, eliminate constricted maintenance access points, and reduce future maintenance operations.

ENHANCEMENT
Eliminated three (3) SVM facilities to avoid bedrock excavation and potential karst conditions, minimize regular excavation and utility impacts, eliminate constricted maintenance access points, and reduce future maintenance operations.

ENHANCEMENT
Implemented six (6) additional Bridge Pier Protection Systems to reduce the probability of pier failure due to collision and improve safety for the traveling public. See [Symbol] for locations

VDOT IDENTIFIED DESIGN WAIVER (DW-01)
Reduce the total shoulder width along I-81 at various locations. (Route 250)

VDOT IDENTIFIED DESIGN WAIVER (DW-01)
Reduce the total shoulder width along I-81 at various locations.

- 1 POT 3088-55.75 I-81 SB CONSTR. B. • POT 6020-33.33 ROUTE 250 WB CONSTR. B. Δ 93° 20' 07"
- 2 POT 3087-88.42 I-81 SB CONSTR. B. • POT 5020-46.82 ROUTE 250 EB CONSTR. B. Δ 93° 20' 07"
- 3 POT 2088-43.90 I-81 NB CONSTR. B. • POC 6018-62.81 ROUTE 250 WB CONSTR. B. Δ 96° 13' 15"
- 4 POT 2087-76.22 I-81 NB CONSTR. B. • POC 5018-77.49 ROUTE 250 EB CONSTR. B. Δ 96° 06' 43"

LEGEND:

[Symbol] PROPOSED FULL DEPTH PAVEMENT	[Symbol] PROPOSED VDOT ST'D.MC-4	[Symbol] PROPOSED CONCRETE CROSSOVER	[Symbol] PROPOSED DRAINAGE	[Symbol] PROPOSED GUARDRAIL
[Symbol] DEMOLITION OF PAVEMENT	[Symbol] PROPOSED SVM LOCATION	[Symbol] VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS	[Symbol] PROPOSED UNDERDRAINS	[Symbol] PROPOSED BPPS
[Symbol] PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY	[Symbol] PROPOSED ROADWAY	[Symbol] PROPOSED CONSTRUCTION LIMITS IN CUTS	[Symbol] PROPOSED OVERHEAD STRUCTURE	[Symbol] PROPOSED CONCRETE BARRIER
[Symbol] PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY	[Symbol] PROPOSED SHOULDER	[Symbol] PROPOSED CONSTRUCTION LIMITS IN FILLS	[Symbol] EXISTING UTILITIES	[Symbol] PROPOSED CURBING
[Symbol] PROPOSED PAVEMENT PATCHING	[Symbol] PROPOSED BRIDGE WIDENING			[Symbol] REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane

SCALE: 0 100' 200'

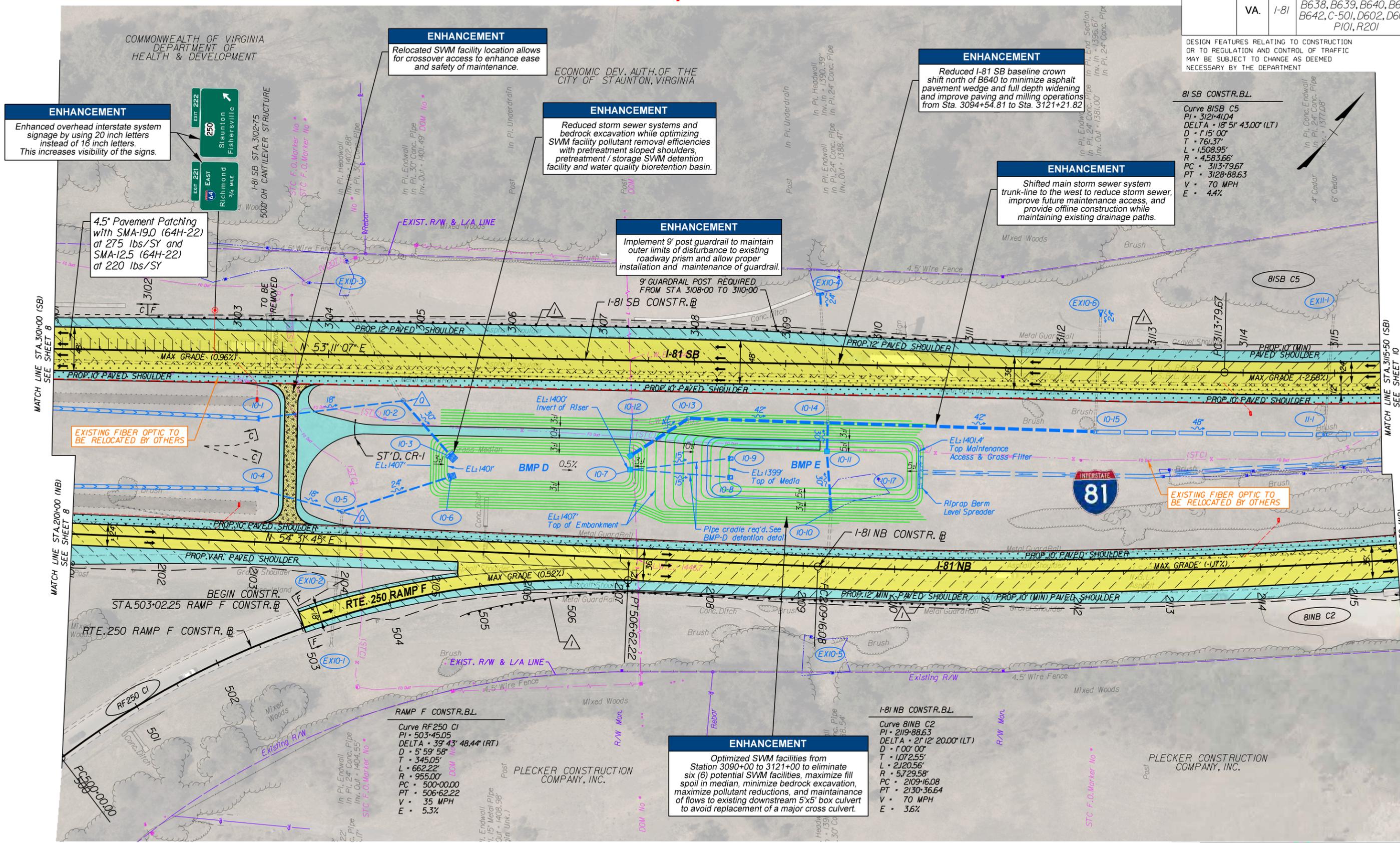
PROJECT: 0081-007-013

SHEET NO.: 8

Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	9

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED VDOT ST'D.MC-4
	DEMOLITION OF PAVEMENT		PROPOSED CONCRETE CROSSOVER
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY		PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED PAVEMENT PATCHING		PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED VDOT ST'D.MC-4		PROPOSED DRAINAGE
	PROPOSED SWM LOCATION		PROPOSED UNDERDRAINS
	PROPOSED ROADWAY		PROPOSED OVERHEAD STRUCTURE
	PROPOSED SHOULDER		EXISTING UTILITIES
	PROPOSED BRIDGE WIDENING		PROPOSED GUARDRAIL
			PROPOSED BPPS
			PROPOSED CONCRETE BARRIER
			PROPOSED CURBING
			PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
			REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane

WSP

SCALE: 0 100' 200'

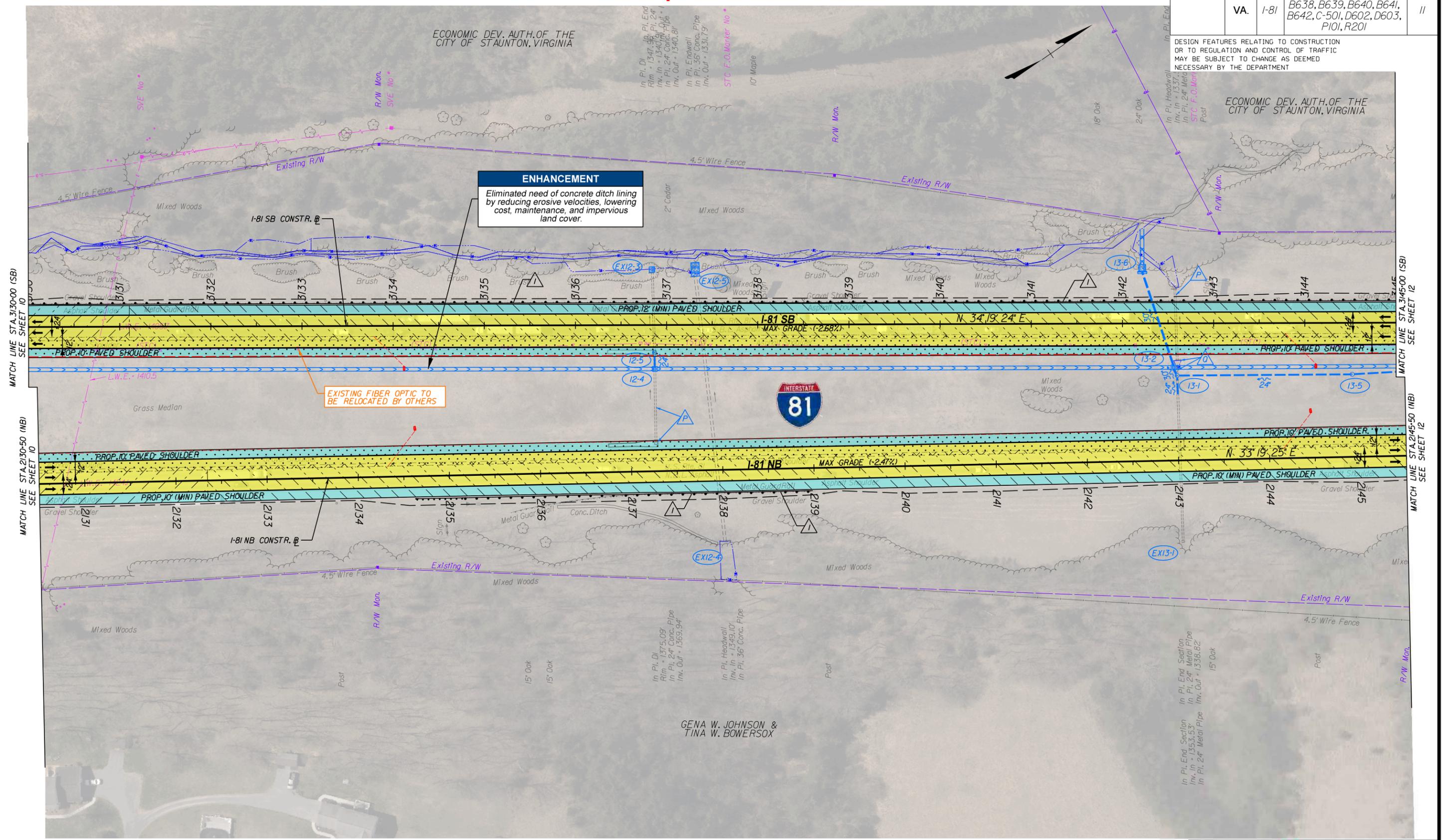
PROJECT: 0081-007-013

SHEET NO.: 9

Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	11

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



ENHANCEMENT
Eliminated need of concrete ditch lining by reducing erosive velocities, lowering cost, maintenance, and impervious land cover.

EXISTING FIBER OPTIC TO BE RELOCATED BY OTHERS

LEGEND:	
	PROPOSED FULL DEPTH PAVEMENT
	DEMOLITION OF PAVEMENT
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY
	PROPOSED PAVEMENT PATCHING
	PROPOSED VDOT ST'D.MC-4
	PROPOSED SWM LOCATION
	PROPOSED ROADWAY
	PROPOSED SHOULDER
	PROPOSED BRIDGE WIDENING
	PROPOSED CONCRETE CROSSOVER
	VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED GUARDRAIL
	PROPOSED BPPS
	PROPOSED CONCRETE BARRIER
	PROPOSED CURBING
	PROPOSED DRAINAGE
	PROPOSED UNDERDRAINS
	PROPOSED OVERHEAD STRUCTURE
	EXISTING UTILITIES
	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

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lane

PROJECT: 0081-007-013
SHEET NO.: 11

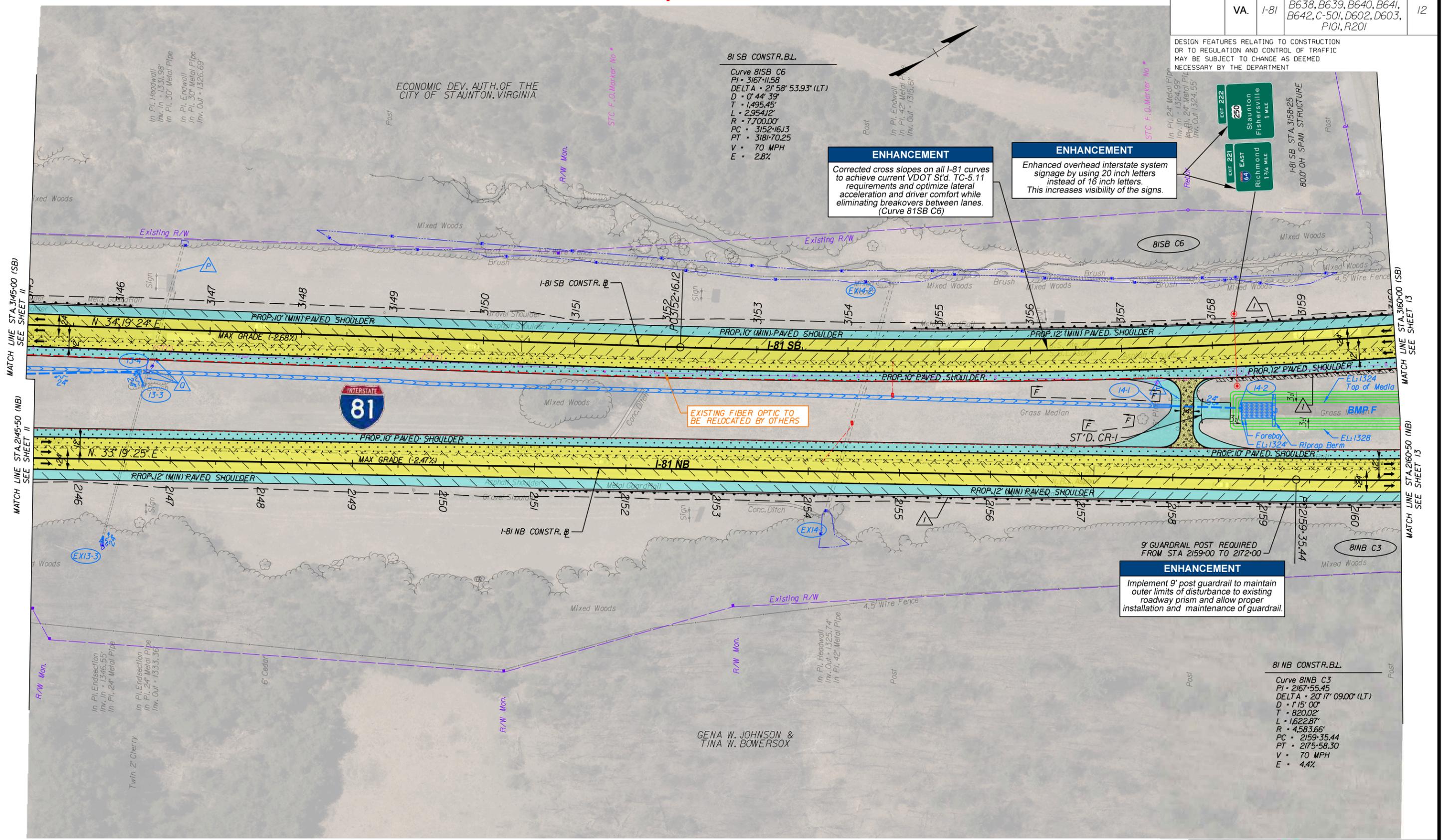
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	12

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:	
	PROPOSED FULL DEPTH PAVEMENT
	DEMOLITION OF PAVEMENT
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY
	PROPOSED PAVEMENT PATCHING
	PROPOSED VDOT ST'D. MC-4
	PROPOSED SWM LOCATION
	PROPOSED ROADWAY
	PROPOSED SHOULDER
	PROPOSED BRIDGE WIDENING
	PROPOSED CONCRETE CROSSOVER
	VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED DRAINAGE
	PROPOSED UNDERDRAINS
	PROPOSED OVERHEAD STRUCTURE
	EXISTING UTILITIES
	PROPOSED GUARDRAIL
	PROPOSED BPPS
	PROPOSED CONCRETE BARRIER
	PROPOSED CURBING
	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

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lane

WSP

SCALE: 0 100' 200'

PROJECT: 0081-007-013

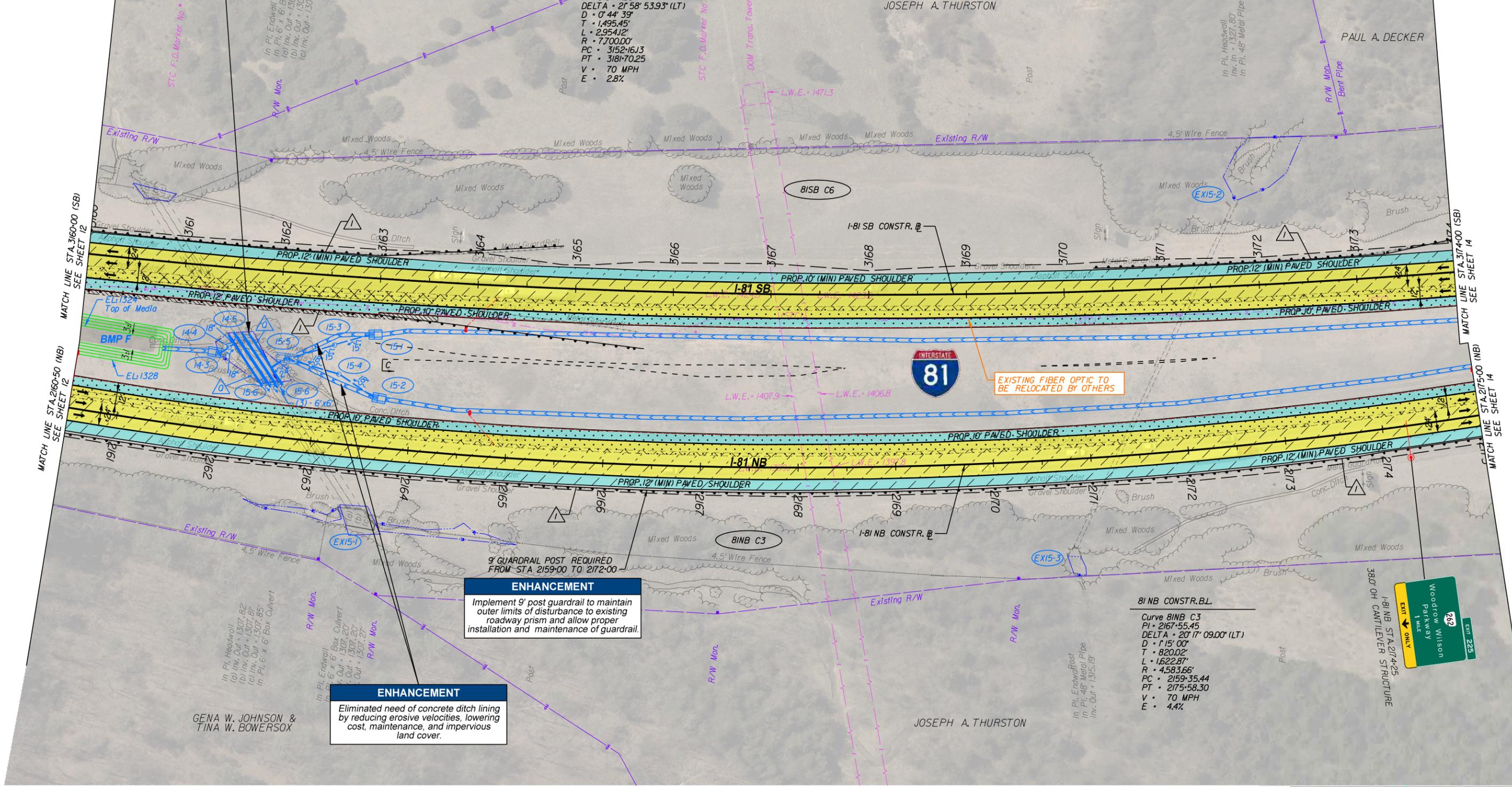
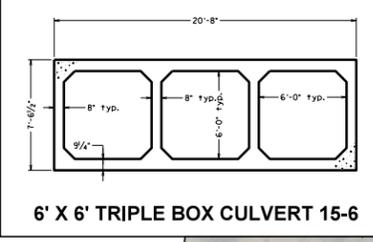
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	13

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED CONCRETE CROSSOVER		PROPOSED GUARDRAIL
	DEMOLITION OF PAVEMENT		VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS		PROPOSED BPPS
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		PROPOSED CONSTRUCTION LIMITS IN CUTS		PROPOSED CONCRETE BARRIER
	PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY		PROPOSED CONSTRUCTION LIMITS IN FILLS		PROPOSED CURBING
	PROPOSED PAVEMENT PATCHING		PROPOSED DRAINAGE		PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	PROPOSED VDOT ST'D.MC-4		PROPOSED UNDERDRAINS		REMOVE STRUCTURE OR PIPE
	PROPOSED SWM LOCATION		EXISTING UTILITIES		
	PROPOSED ROADWAY				
	PROPOSED SHOULDER				
	PROPOSED BRIDGE WIDENING				

CONCEPTUAL ROADWAY PLANS

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lane

WSP

SCALE: 0 100' 200'

PROJECT: 0081-007-013

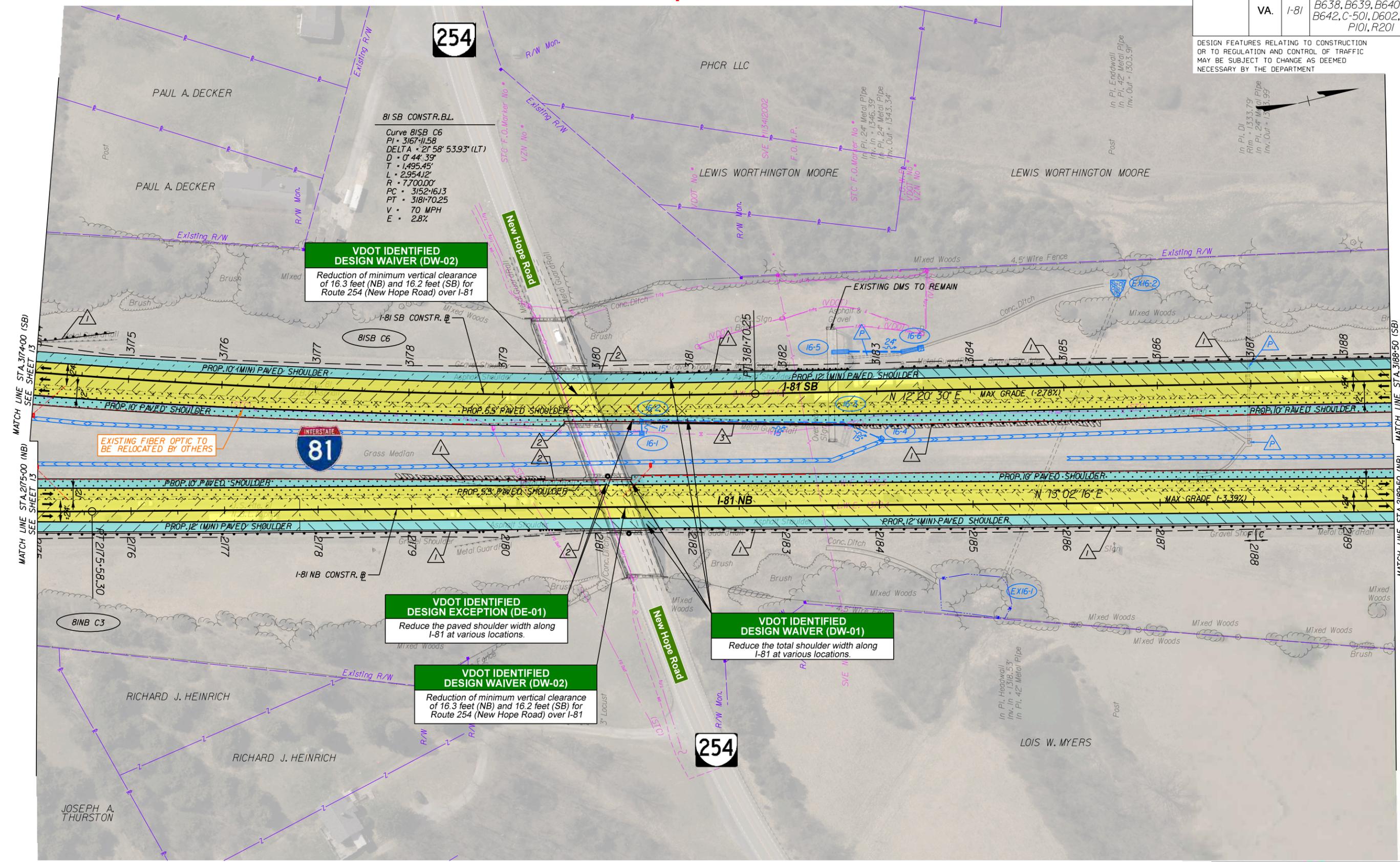
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	14

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED VDOT ST'D.MC-4		PROPOSED CONCRETE CROSSOVER		PROPOSED DRAINAGE		PROPOSED GUARDRAIL		PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
	DEMOLITION OF PAVEMENT		PROPOSED SWM LOCATION		VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS		PROPOSED UNDERDRAINS		PROPOSED BPPS		REMOVE STRUCTURE OR PIPE
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		PROPOSED ROADWAY		PROPOSED CONSTRUCTION LIMITS IN CUTS		PROPOSED OVERHEAD STRUCTURE		PROPOSED CONCRETE BARRIER		
	PROPOSED PAVEMENT MILLING AND 2\"/>		PROPOSED SHOULDER		PROPOSED CONSTRUCTION LIMITS IN FILLS		EXISTING UTILITIES		PROPOSED CURBING		
	PROPOSED PAVEMENT PATCHING		PROPOSED BRIDGE WIDENING								

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lane

WSP

SCALE: 0 100' 200'

PROJECT: 0081-007-013

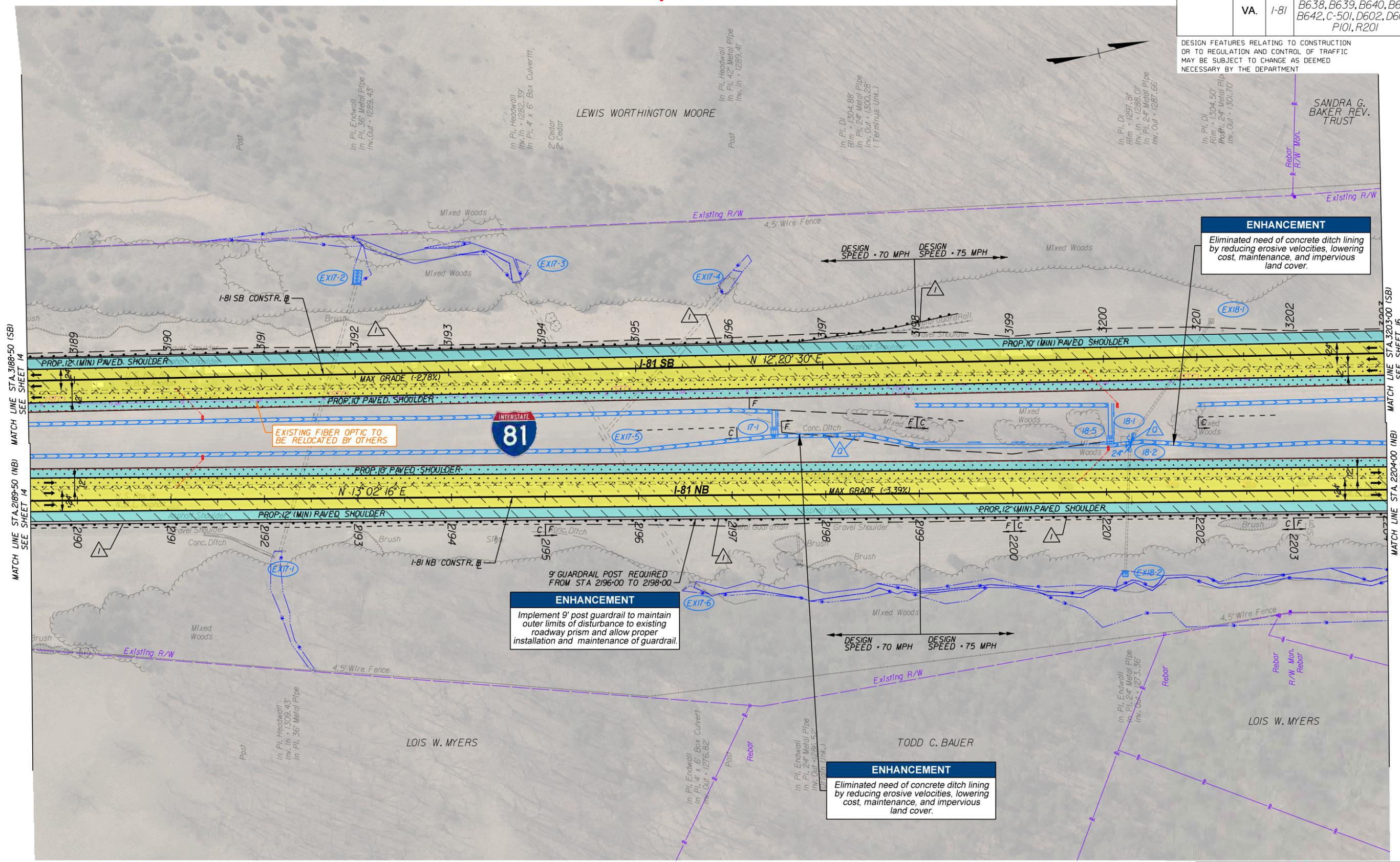
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	15

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED CONCRETE CROSSOVER
	DEMOLITION OF PAVEMENT		VDOT'S RFP PLANS
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED PAVEMENT MILLING AND 2\"/>		PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED PAVEMENT PATCHING		PROPOSED DRAINAGE
	PROPOSED VDOT ST'D.MC-4		PROPOSED UNDERDRAINS
	PROPOSED SWM LOCATION		PROPOSED OVERHEAD STRUCTURE
	PROPOSED ROADWAY		EXISTING UTILITIES
	PROPOSED SHOULDER		PROPOSED GUARDRAIL
	PROPOSED BRIDGE WIDENING		PROPOSED BPPS
			PROPOSED CONCRETE BARRIER
			PROPOSED CURBING
			PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
			REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

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lane

WSP

SCALE: 0 100' 200'

PROJECT: 0081-007-013

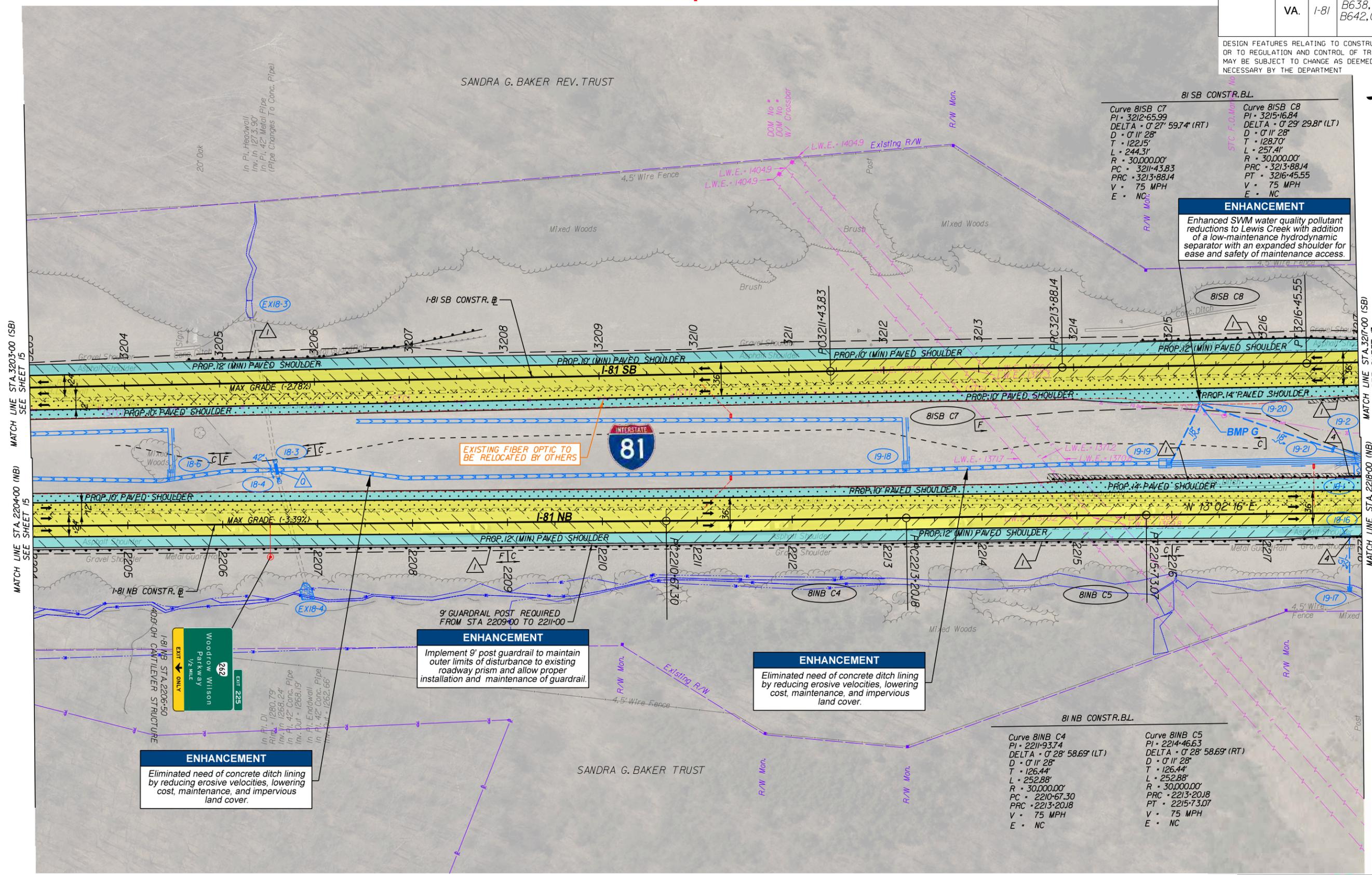
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	16

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



81 SB CONSTR. BL.

Curve 81SB C7 PI - 3212-65.99 DELTA - 0° 27' 59.74" (RT) D - 0° 11' 28" T - 122.15' L - 244.31' R - 30,000.00' PC - 3211-43.83 PRC - 3213-88.14 V - 75 MPH E - NC	Curve 81SB C8 PI - 3215-16.84 DELTA - 0° 29' 29.81" (LT) D - 0° 11' 28" T - 128.70' L - 257.41' R - 30,000.00' PC - 3213-88.14 PRC - 3216-45.55 V - 75 MPH E - NC
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ENHANCEMENT
Enhanced SWM water quality pollutant reductions to Lewis Creek with addition of a low-maintenance hydrodynamic separator with an expanded shoulder for ease and safety of maintenance access.

EXISTING FIBER OPTIC TO BE RELOCATED BY OTHERS

ENHANCEMENT
Implement 9' post guardrail to maintain outer limits of disturbance to existing roadway prism and allow proper installation and maintenance of guardrail.

ENHANCEMENT
Eliminated need of concrete ditch lining by reducing erosive velocities, lowering cost, maintenance, and impervious land cover.

ENHANCEMENT
Eliminated need of concrete ditch lining by reducing erosive velocities, lowering cost, maintenance, and impervious land cover.

81 NB CONSTR. BL.

Curve 81NB C4 PI - 2211-93.74 DELTA - 0° 28' 58.69" (LT) D - 0° 11' 28" T - 126.44' L - 252.88' R - 30,000.00' PC - 2210-67.30 PRC - 2213-20.18 V - 75 MPH E - NC	Curve 81NB C5 PI - 2214-46.63 DELTA - 0° 28' 58.69" (RT) D - 0° 11' 28" T - 126.44' L - 252.88' R - 30,000.00' PC - 2213-20.18 PRC - 2215-73.07 V - 75 MPH E - NC
---	---

LEGEND:

PROPOSED FULL DEPTH PAVEMENT	PROPOSED VDOT ST'D.MC-4	PROPOSED CONCRETE CROSSOVER	PROPOSED DRAINAGE	PROPOSED GUARDRAIL
DEMOLITION OF PAVEMENT	PROPOSED SWM LOCATION	VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS	PROPOSED UNDERDRAINS	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY	PROPOSED ROADWAY	PROPOSED CONSTRUCTION LIMITS IN CUTS	PROPOSED OVERHEAD STRUCTURE	REMOVE STRUCTURE OR PIPE
PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY	PROPOSED SHOULDER	PROPOSED CONSTRUCTION LIMITS IN FILLS	EXISTING UTILITIES	
PROPOSED PAVEMENT PATCHING	PROPOSED BRIDGE WIDENING			

CONCEPTUAL ROADWAY PLANS

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lane

SCALE: 0 100' 200'

PROJECT: 0081-007-013

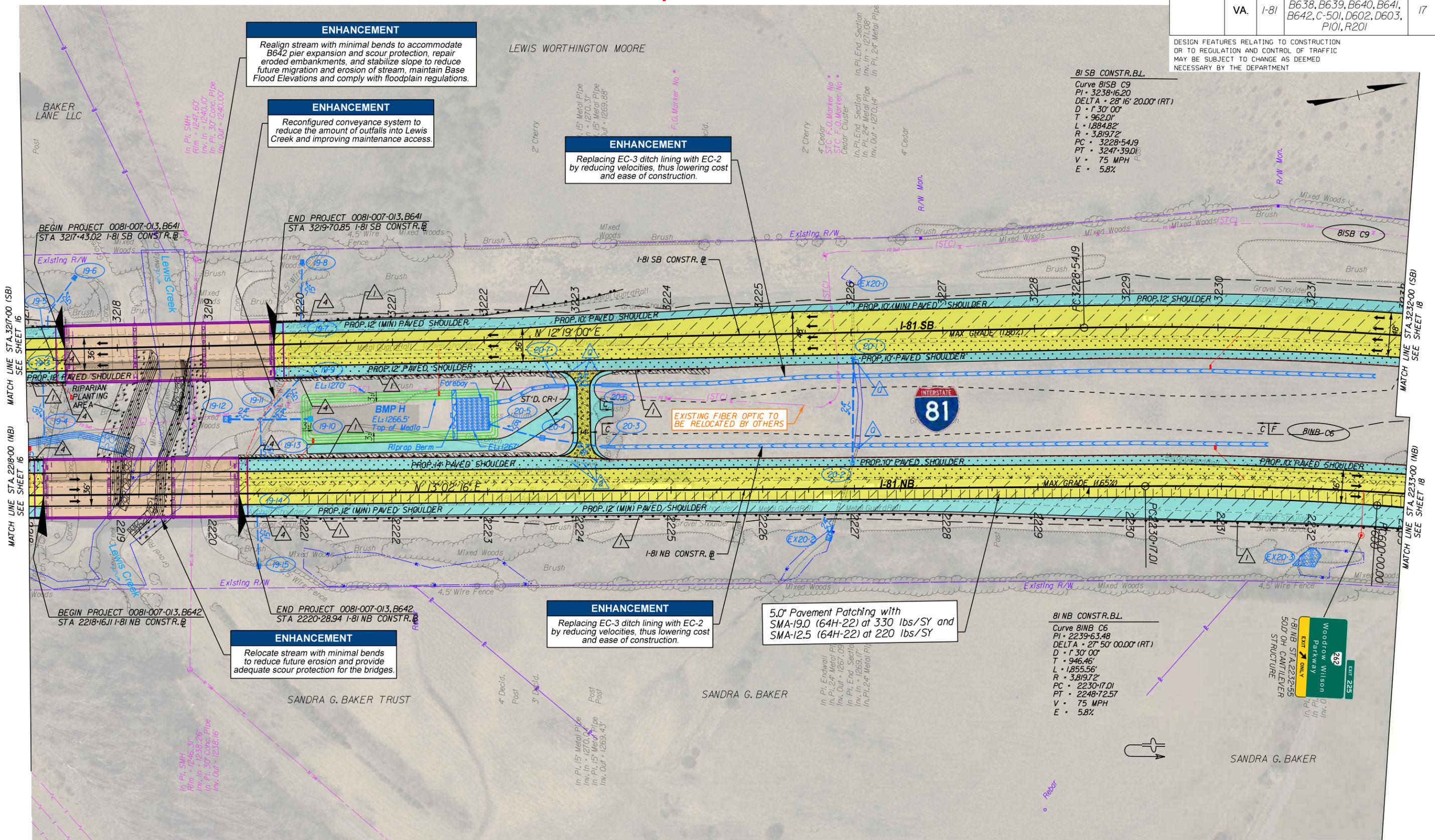
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	17

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



LEGEND:

	PROPOSED FULL DEPTH PAVEMENT		PROPOSED VDOT ST'D.MC-4		PROPOSED CONCRETE CROSSOVER
	DEMOLITION OF PAVEMENT		PROPOSED SWM LOCATION		VDOT'S RFP PLANS STORMWATER MANAGEMENT LOCATIONS
	PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY		PROPOSED ROADWAY		PROPOSED CONSTRUCTION LIMITS IN CUTS
	PROPOSED PAVEMENT MILLING AND 2\"/>		PROPOSED SHOULDER		PROPOSED CONSTRUCTION LIMITS IN FILLS
	PROPOSED PAVEMENT PATCHING		PROPOSED BRIDGE WIDENING		PROPOSED DRAINAGE

	PROPOSED UNDERDRAINS		PROPOSED GUARDRAIL
	PROPOSED OVERHEAD STRUCTURE		PROPOSED BPPS
	EXISTING UTILITIES		PROPOSED CONCRETE BARRIER
	PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE		PROPOSED CURBING
	REMOVE STRUCTURE OR PIPE		

CONCEPTUAL ROADWAY PLANS

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lane

WSP

SCALE: 0 100' 200'

PROJECT: 0081-007-013

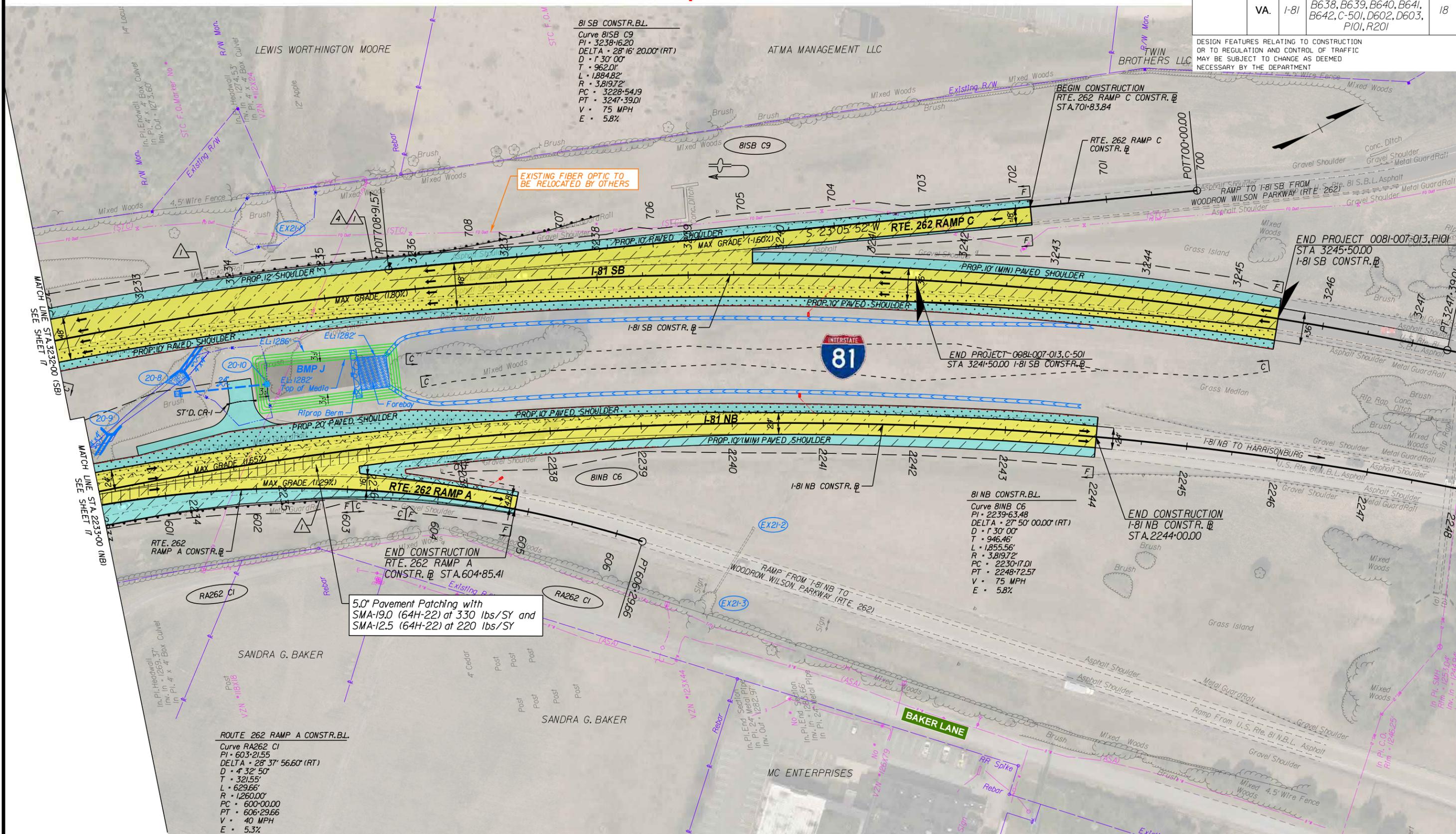
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Technical Proposal Plans - Volume II

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	18

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



- LEGEND:**
- PROPOSED FULL DEPTH PAVEMENT
 - DEMOLITION OF PAVEMENT
 - PROPOSED PAVEMENT MILLING AND VAR. DEPTH ASPHALT OVERLAY
 - PROPOSED PAVEMENT MILLING AND 2" ASPHALT OVERLAY
 - PROPOSED PAVEMENT PATCHING
 - PROPOSED VDOT ST'D.MC-4
 - PROPOSED SWM LOCATION
 - PROPOSED ROADWAY
 - PROPOSED SHOULDER
 - PROPOSED BRIDGE WIDENING
 - PROPOSED CONCRETE CROSSOVER
 - VDOT'S RFP PLANS STORMWATER MANAGEMENT STRUCTURES
 - PROPOSED CONSTRUCTION LIMITS IN CUTS
 - PROPOSED CONSTRUCTION LIMITS IN FILLS
 - PROPOSED DRAINAGE
 - PROPOSED UNDERDRAINS
 - PROPOSED OVERHEAD STRUCTURE
 - EXISTING UTILITIES
 - PROPOSED GUARDRAIL
 - PROPOSED BPPS
 - PROPOSED CONCRETE BARRIER
 - PROPOSED CURBING
 - PLUG & ABANDON EXIST. DRAINAGE STRUCTURE OR PIPE
 - REMOVE STRUCTURE OR PIPE

CONCEPTUAL ROADWAY PLANS

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lane **WSP**

SCALE 0 100' 200'

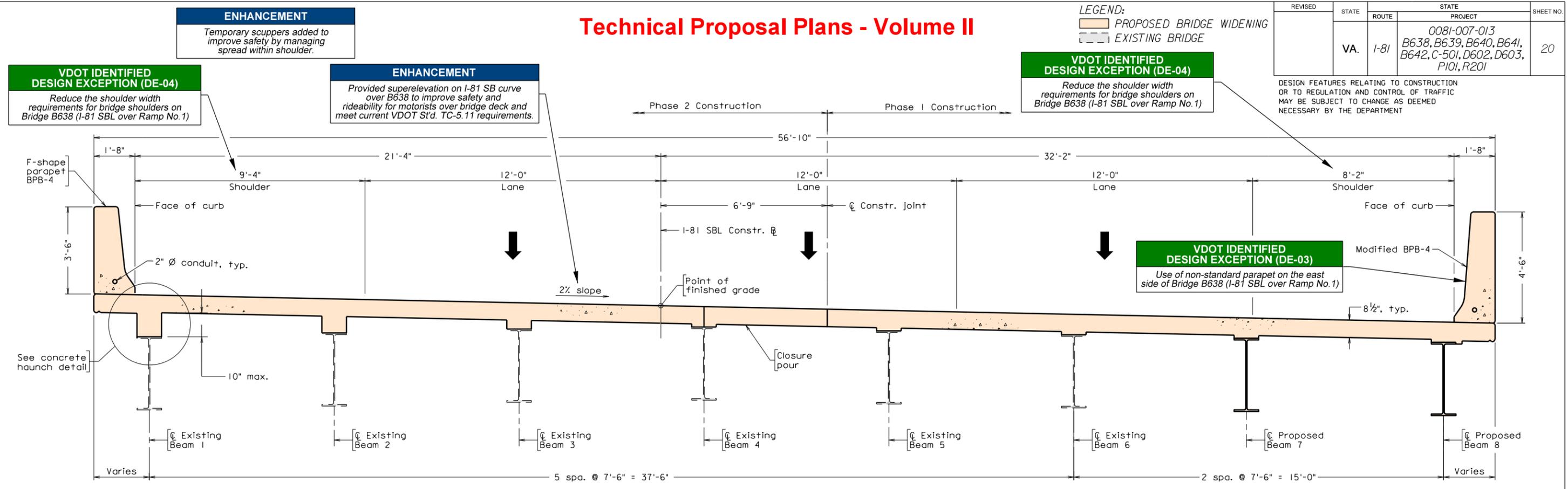
PROJECT 0081-007-013 SHEET NO. 18

4.3.2 Conceptual Structural Plans

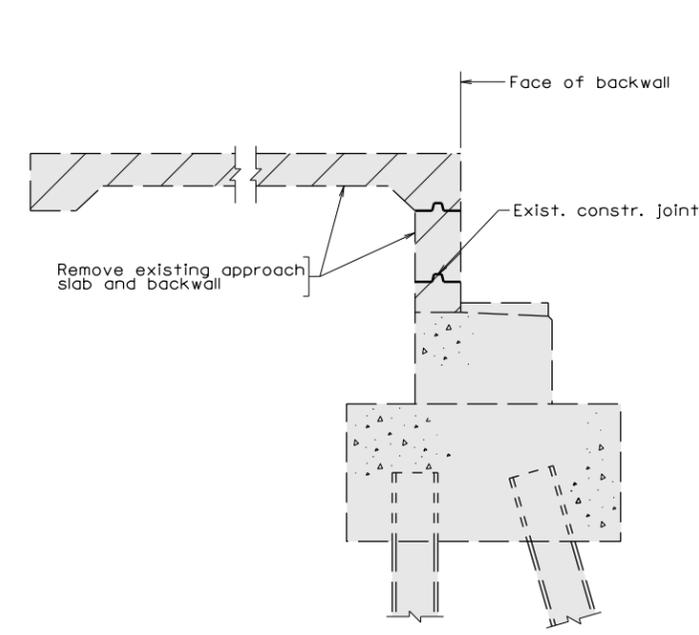
Technical Proposal Plans - Volume II

LEGEND:
 PROPOSED BRIDGE WIDENING
 EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	20

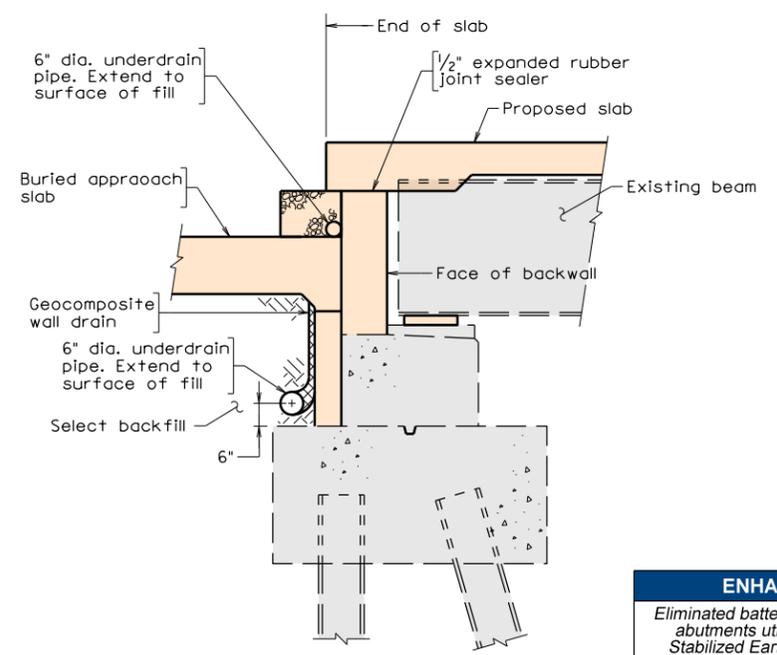


TRANSVERSE SECTION SBL OVER RAMP I (B638)



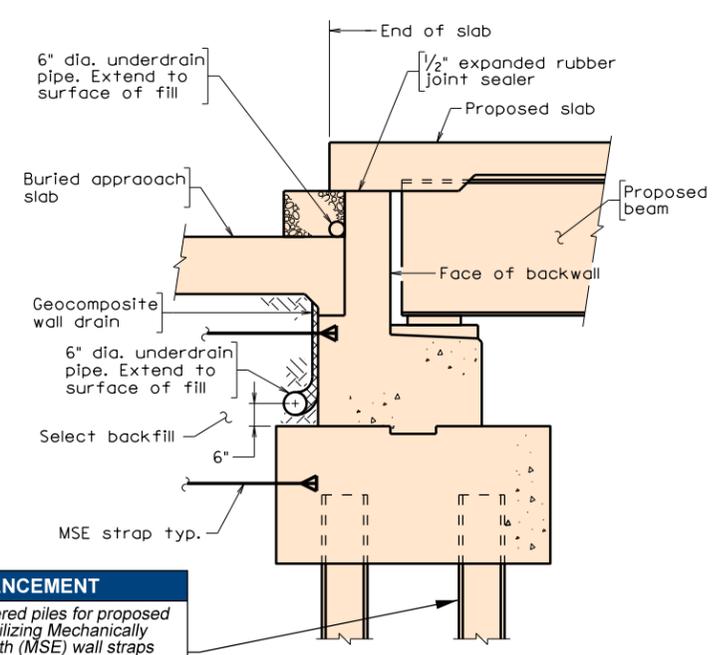
TYPICAL ABUTMENT DEMOLITION
Scale 1/4" = 1'-0"

 Existing structure to be removed

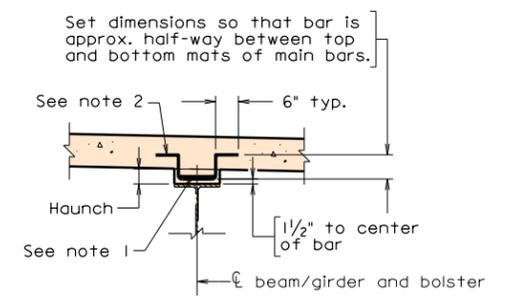


EXISTING ABUTMENT RECONSTRUCTION
Scale 1/4" = 1'-0"

ENHANCEMENT
Eliminated battered piles for proposed abutments utilizing Mechanically Stabilized Earth (MSE) wall straps to improve constructability, eliminate bending on battered piles and limit obstructions to existing utilities.



PROPOSED ABUTMENT SECTION
Scale 1/4" = 1'-0"



CONCRETE HAUNCH DETAIL
Not to scale

- Notes:
 1. #4 bars for haunches ≤ 4", #6 bars for haunches > 7"
 2. #4 bars @ 12" for haunches ≤ 4", #4 bars matching the transverse bar spacing for haunches > 7".

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lane  **WSP** 

SCALE: 1/4" = 1'-0" PROJECT: 0081-007-013 SHEET NO.: 20

Technical Proposal Plans - Volume II

LEGEND:

- PROPOSED BRIDGE WIDENING
- EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	21

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

DESIGN EXCEPTION(S):

EXISTING STRUCTURE GENERAL NOTES:

Capacity: HS-20-44 loading and Bureau of Public Roads modified loading for military vehicles.

Specifications:

General: Virginia Department of Highways Road and Bridge Specifications, 1958.

Design: AASHTO Standard Specifications for Highway Bridges, 1961.

PROPOSED STRUCTURE GENERAL NOTES:

The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures, is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Width: 72'-0" face-to-face of curbs.

Span layout: 65'-8" - 55'-0" - 50'-8" steel rolled beams.

Capacity: HL-93 loading.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2020.

Design: AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017; and VDOT Modifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.

These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the contract documents.

All structural steel, including bearings, shall be ASTM A709 Grade 50W and shall be painted.

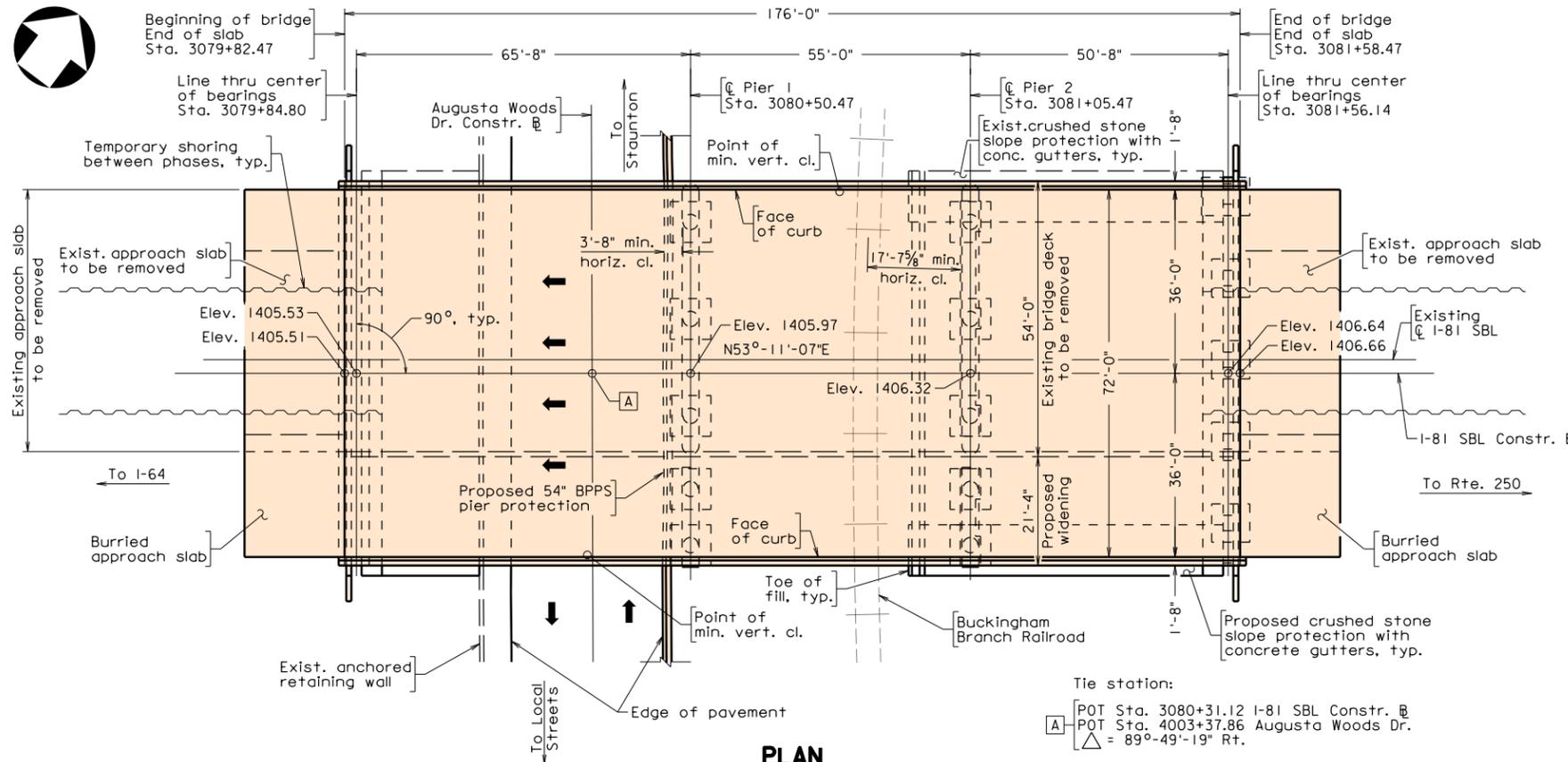
Concrete in decks shall be Lightweight Low Shrinkage Class A4 Modified Concrete with a maximum fresh density of 120 pcf. Concrete in rails and terminal walls shall be Low Shrinkage Class A4 Modified Concrete. Concrete in substructure shall be Class A3.

Virginia Structure No. of existing bridge is 2045. Plan No. 193-07 and 193-07A.

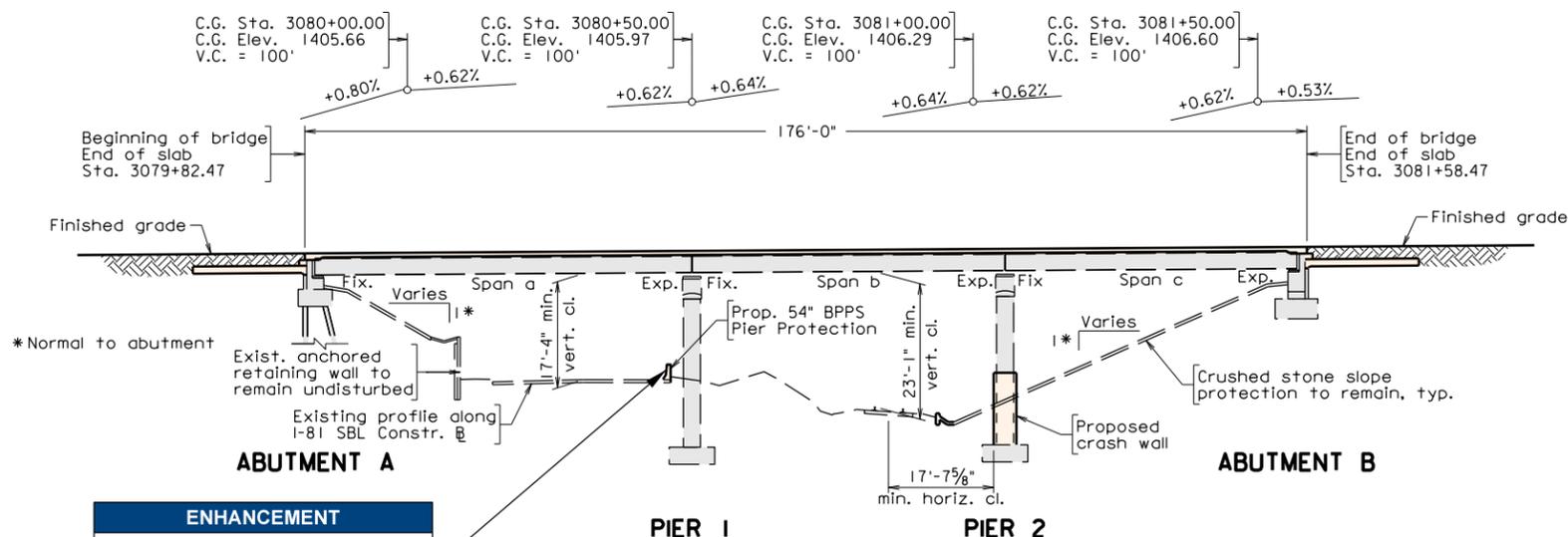
The existing structure is designated a Type B structure in accordance with Sec. 411.

The Contractor shall be thoroughly familiar with the plans and the existing structure and shall field verify all existing dimensions prior to the start of construction.

The Contractor shall note that Abutment B is supported by columns with spread footings.



PLAN



DEVELOPED SECTION ALONG I-81 SBL CONSTR. B

ENHANCEMENT
Implemented six (6) additional bridge pier protection systems to reduce the probability of pier failure due to collision and improve safety for the traveling public (Augusta Woods Drive beneath I-81)



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
PROPOSED BRIDGE REPAIRS AND WIDENING
I-81 SBL OVER AUGUSTA WOODS DRIVE
AND BUCKINGHAM BRANCH RAILROAD
AUGUSTA COUNTY - 0.6 MI. N. OF
I-81/I-64 INTERCHANGE
PROJECT 0081-007-013, B639

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.



PROJECT	SHEET NO.
0081-007-013	21

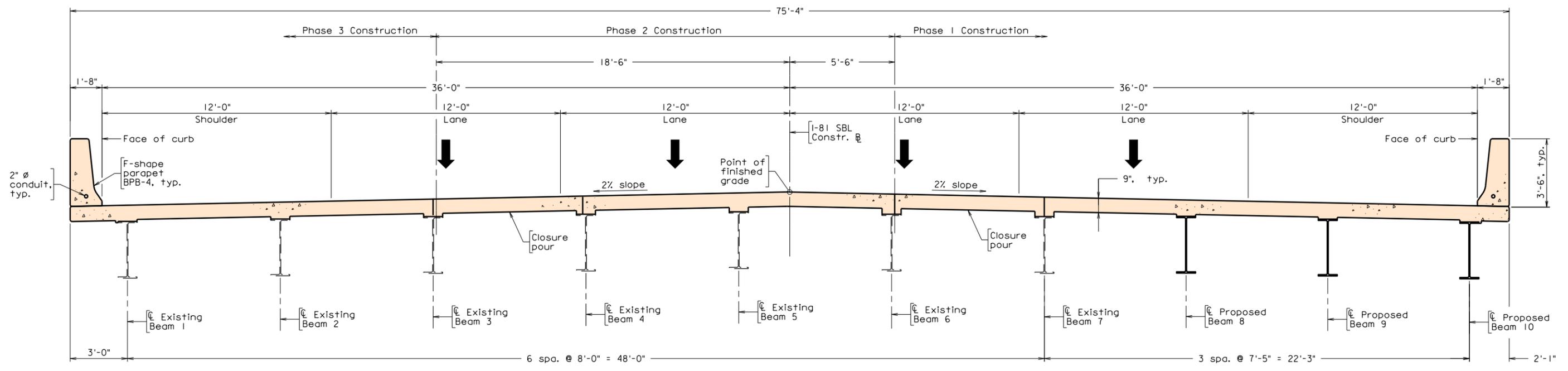
Technical Proposal Plans - Volume II

LEGEND:
 PROPOSED BRIDGE WIDENING
 EXISTING BRIDGE

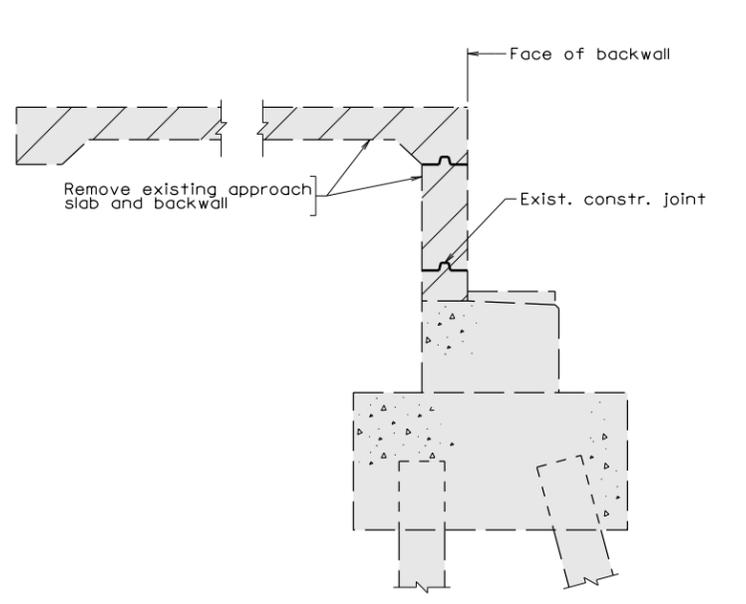
REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	22

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

ENHANCEMENT
 Temporary scuppers added to improve safety by managing spread within shoulder.

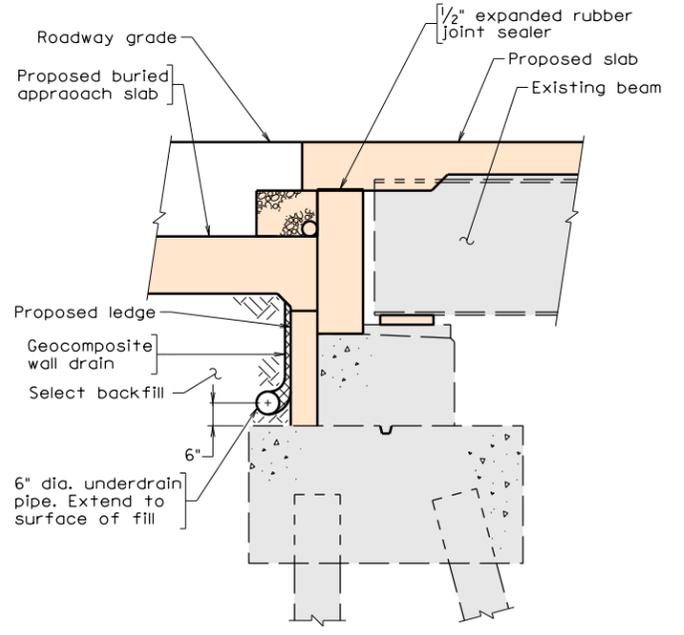


TRANSVERSE SECTION SBL OVER AUGUSTA WOODS (B639)

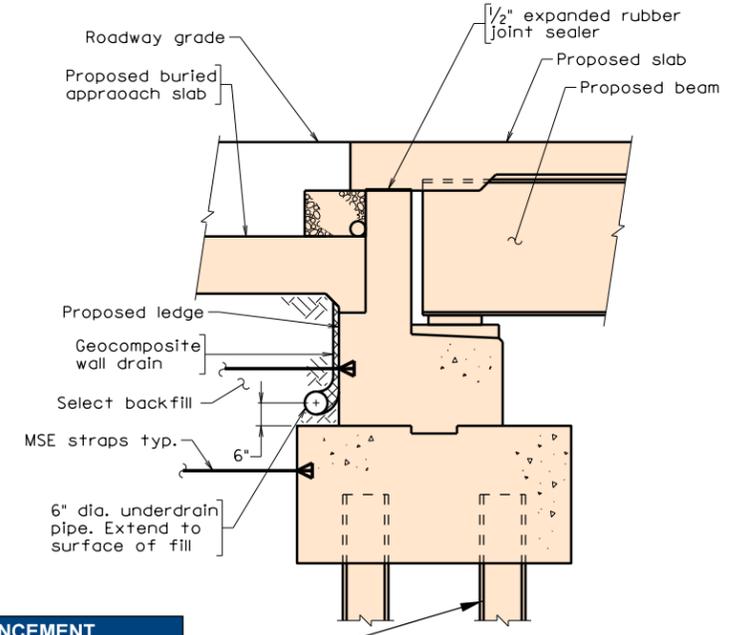


TYPICAL ABUTMENT DEMOLITION
 Scale 1/4" = 1'-0"

Existing structure to be removed



EXISTING ABUTMENT RECONSTRUCTION
 Scale 1/4" = 1'-0"



PROPOSED ABUTMENT SECTION
 Scale 1/4" = 1'-0"

ENHANCEMENT
 Eliminated battered piles for proposed abutments utilizing Mechanically Stabilized Earth (MSE) wall straps to improve constructability, eliminate bending on battered piles and limit obstructions to existing utilities.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.



SCALE	PROJECT	SHEET NO.
3/8" = 1'-0"	0081-007-013	22

\\wspaw\lcs\0\CS_pdf_work_dir\17154619185_3193-07B_002.dgn 22/17

Technical Proposal Plans - Volume II

LEGEND:

- PROPOSED BRIDGE WIDENING
- EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	23

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

DESIGN EXCEPTION(S):

EXISTING STRUCTURE GENERAL NOTES:

Capacity: HS-20-44 loading and Bureau of Public Roads modified loading for military vehicles.
 Specifications:
 General: Virginia Department of Highways Road and Bridge Specifications, 1958.
 Design: AASHTO Standard Specifications for Highway Bridges, 1961.

PROPOSED STRUCTURE GENERAL NOTES:

The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures, is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Width: 60'-0" face-to-face of curbs.
 Span layout: 46'-0" - 62'-0" - 62'-0" - 50'-0" steel rolled beams.
 Capacity: HL-93 loading.
 Specifications:
 Construction: Virginia Department of Transportation Road and Bridge Specifications, 2020.
 Design: AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017; and VDOT Modifications.
 Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.

All structural steel, including bearings, shall be ASTM A709 Grade 50W and shall be painted.

Concrete in decks shall be Lightweight Low Shrinkage Class A4 Modified Concrete with a maximum fresh density of 120 pcf. Concrete in rails and terminal walls and backwalls shall be Low Shrinkage Class A4 Modified Concrete. Concrete in substructure shall be Class A3.

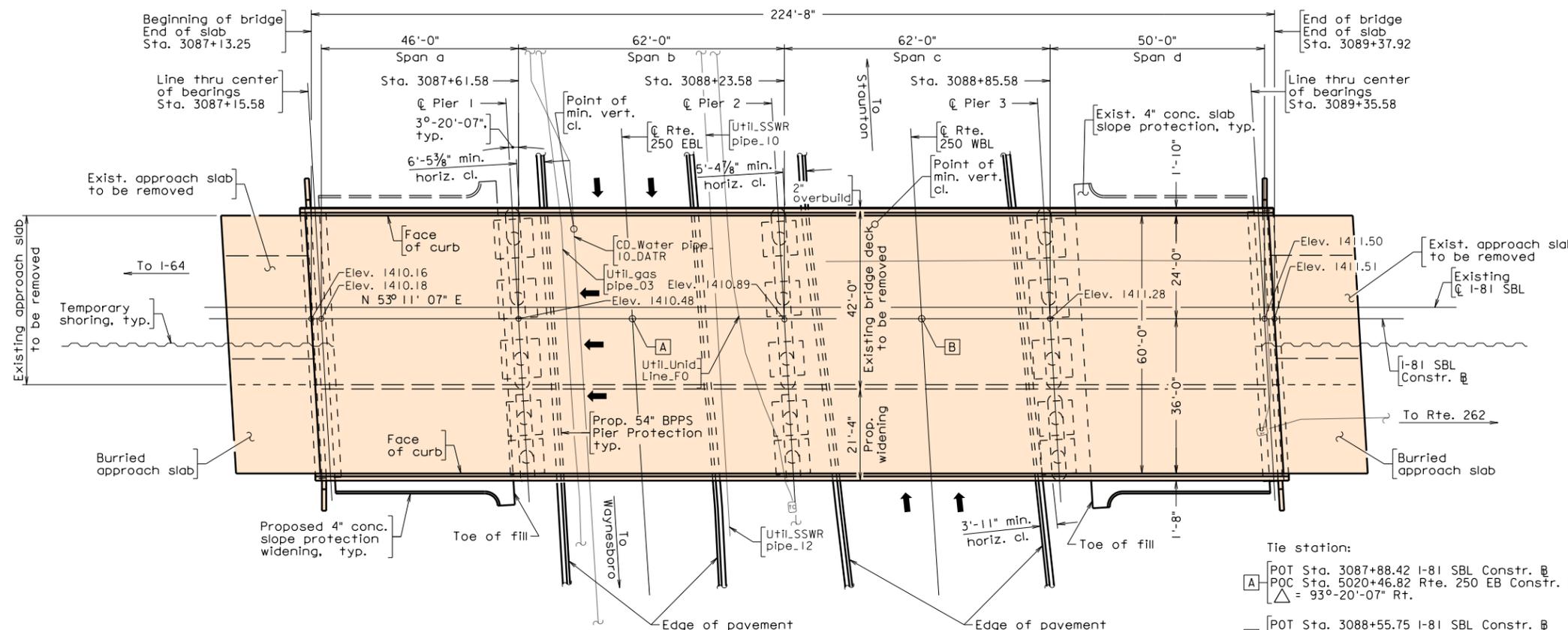
These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the contract documents.

Virginia Structure No. of existing bridge is 2047. Plan No. 193-08 and 193-08A

The existing structure is designated a Type B structure in accordance with Sec. 411.

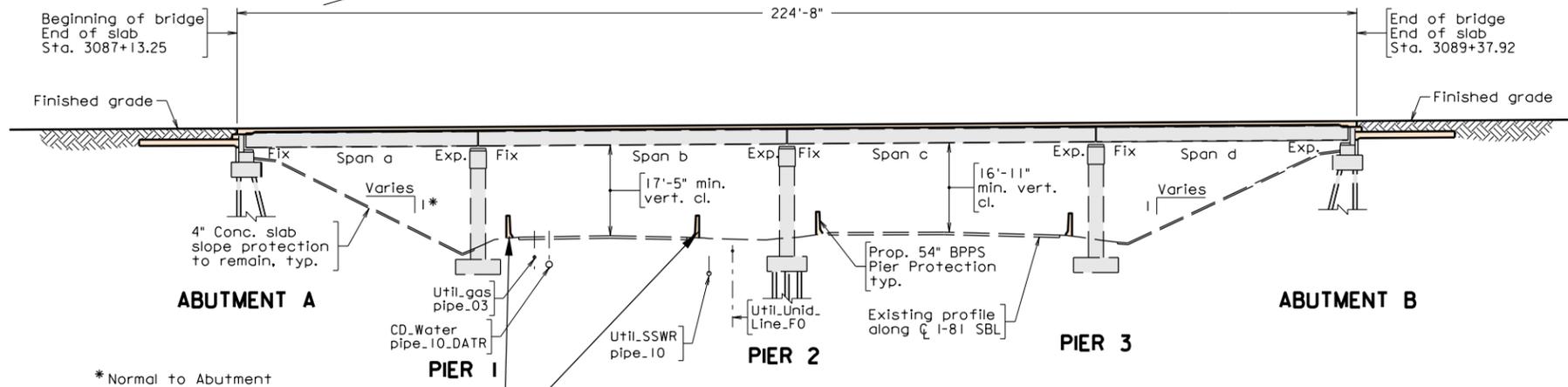
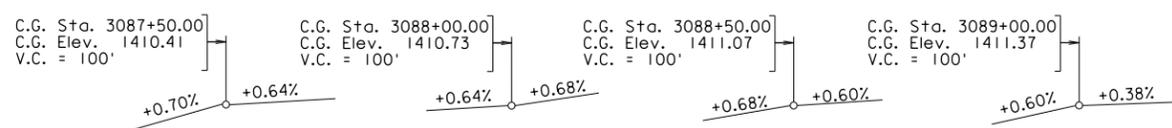


COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION PROPOSED BRIDGE REPAIRS AND WIDENING I-81 SBL OVER RTE. 250 AUGUSTA COUNTY - AT 0.8 MI. N. OF I-81/I-64 INTERCHANGE PROJECT 0081-007-013, B640



PLAN

- Tie station:
- [A] POT Sta. 3087+88.42 I-81 SBL Constr. $\Delta = 93^{\circ}-20'-07''$ Rt.
 - [B] POT Sta. 3088+55.75 I-81 SBL Constr. $\Delta = 93^{\circ}-20'-07''$ Rt.
 - [C] POT Sta. 5020+46.82 Rte. 250 EB Constr. $\Delta = 93^{\circ}-20'-07''$ Rt.
 - [D] POT Sta. 6020+33.33 Rte. 250 WB Constr. $\Delta = 93^{\circ}-20'-07''$ Rt.



DEVELOPED SECTION ALONG I-81 SBL CONSTR. Δ

ENHANCEMENT
 Implemented six (6) additional bridge pier protection systems to reduce the probability of pier failure due to collision and improve safety for the traveling public (Rte. 250 NB beneath I-81)

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SCALE 1/2" = 1'-0"	PROJECT 0081-007-013	SHEET NO. 23

Technical Proposal Plans - Volume II

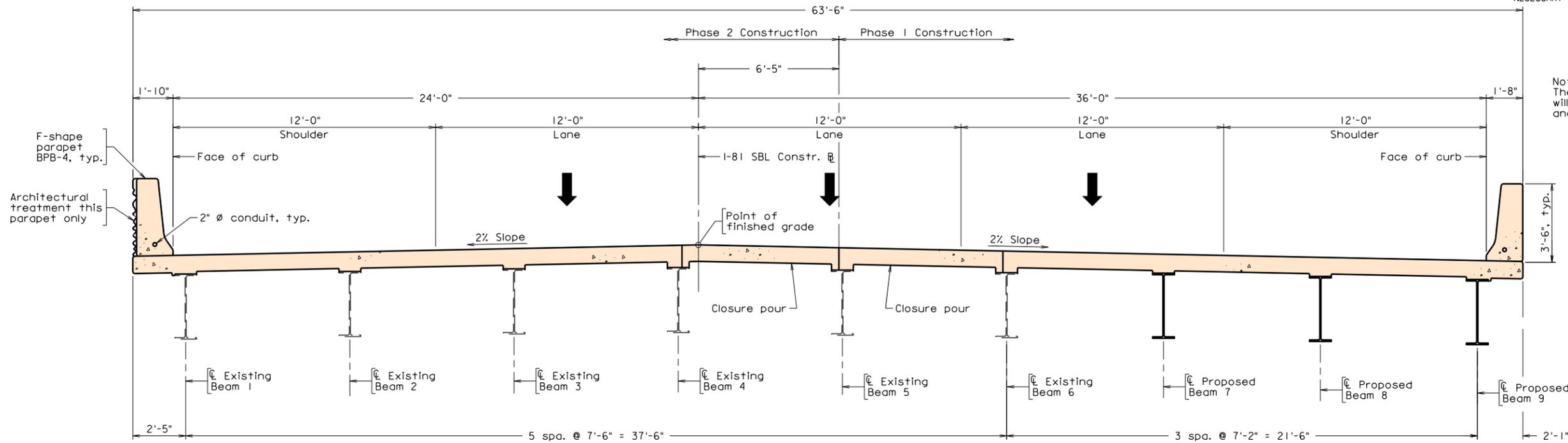
LEGEND:
 PROPOSED BRIDGE WIDENING
 EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	24

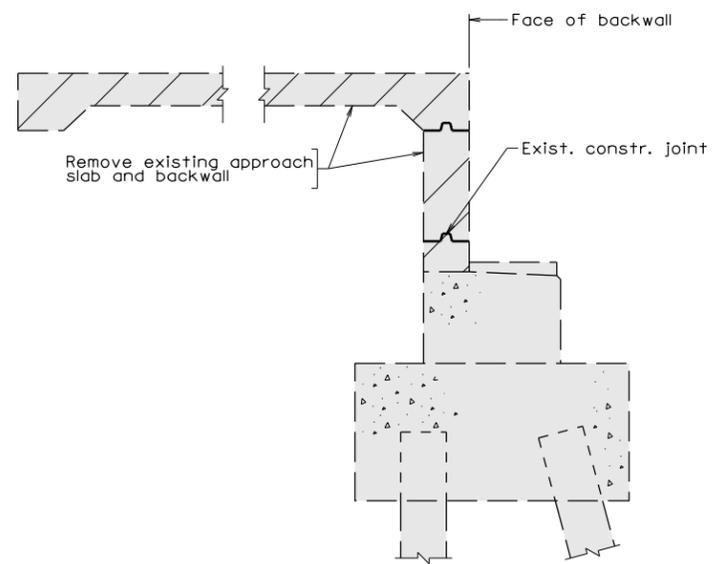
ENHANCEMENT
 Temporary scuppers added to improve safety by managing spread within shoulder.

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Note:
 The existing surface temperature sensor will be relocated to the newly widened bridge and remain there permanently.



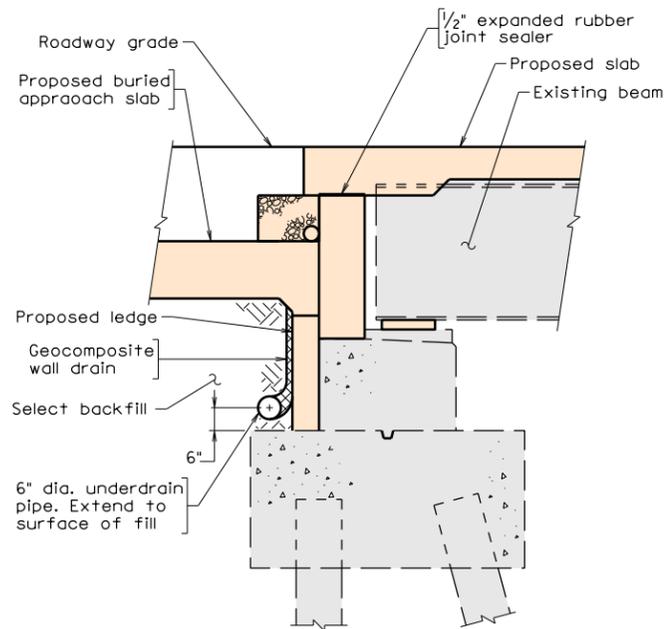
TRANSVERSE SECTION SBL OVER RTE. 250 (B640)



TYPICAL ABUTMENT DEMOLITION

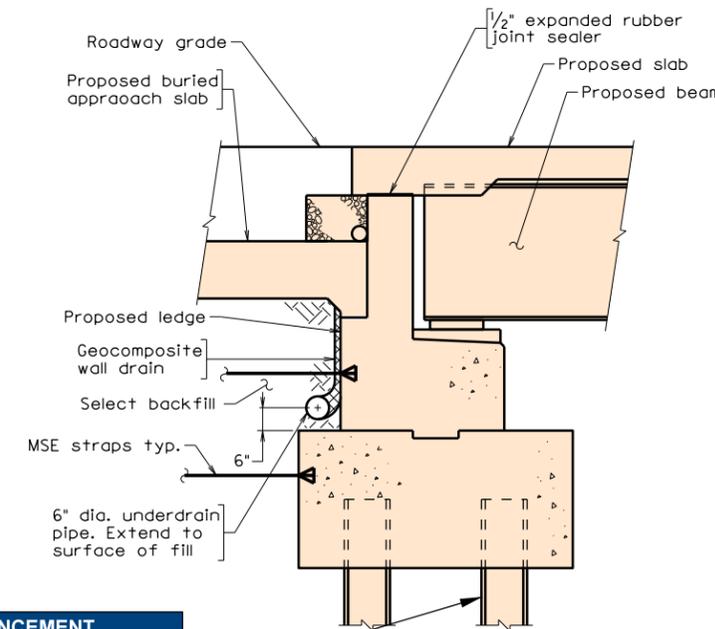
Scale 1/4" = 1'-0"

 Existing structure to be removed



EXISTING ABUTMENT RECONSTRUCTION

Scale 1/4" = 1'-0"



PROPOSED ABUTMENT SECTION

Scale 1/4" = 1'-0"

ENHANCEMENT
 Eliminated battered piles for proposed abutments utilizing Mechanically Stabilized Earth (MSE) wall straps to improve constructability, eliminate bending on battered piles and limit obstructions to existing utilities.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane  **WSP** 

SCALE 3/8" = 1'-0"	PROJECT 0081-007-013	SHEET NO. 24
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Technical Proposal Plans - Volume II

LEGEND:
 PROPOSED BRIDGE WIDENING
 EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	25

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

DESIGN EXCEPTION(S):

GENERAL NOTES:

The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures, is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Width: 60'-0" face-to-face of curbs. Includes widening with 21'-4" on left of traffic.
 Span layout: 74'-0" - 75'-0" - 74'-0" prestressed concrete 45" deep I-beam spans.

Capacity: HL-93 loading.
 Drainage area: 20.0 sq. mi.
 Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2020.

Design: AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017; and VDOT Modifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.
 These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the Contract documents.

Concrete in decks shall be Lightweight Low Shrinkage Class A4 Modified Concrete with a maximum fresh density of 120 pcf. Concrete in rails and terminal walls shall be Low Shrinkage Class A4 Modified Concrete. Concrete in substructure shall be Class A3.

Prestressed concrete in PCB-3 beams shall be Class A5 having a minimum compressive cylinder strength of 28 days equal to 8000 psi and a minimum compressive cylinder strength of time of release of strands equal to 6400 psi.

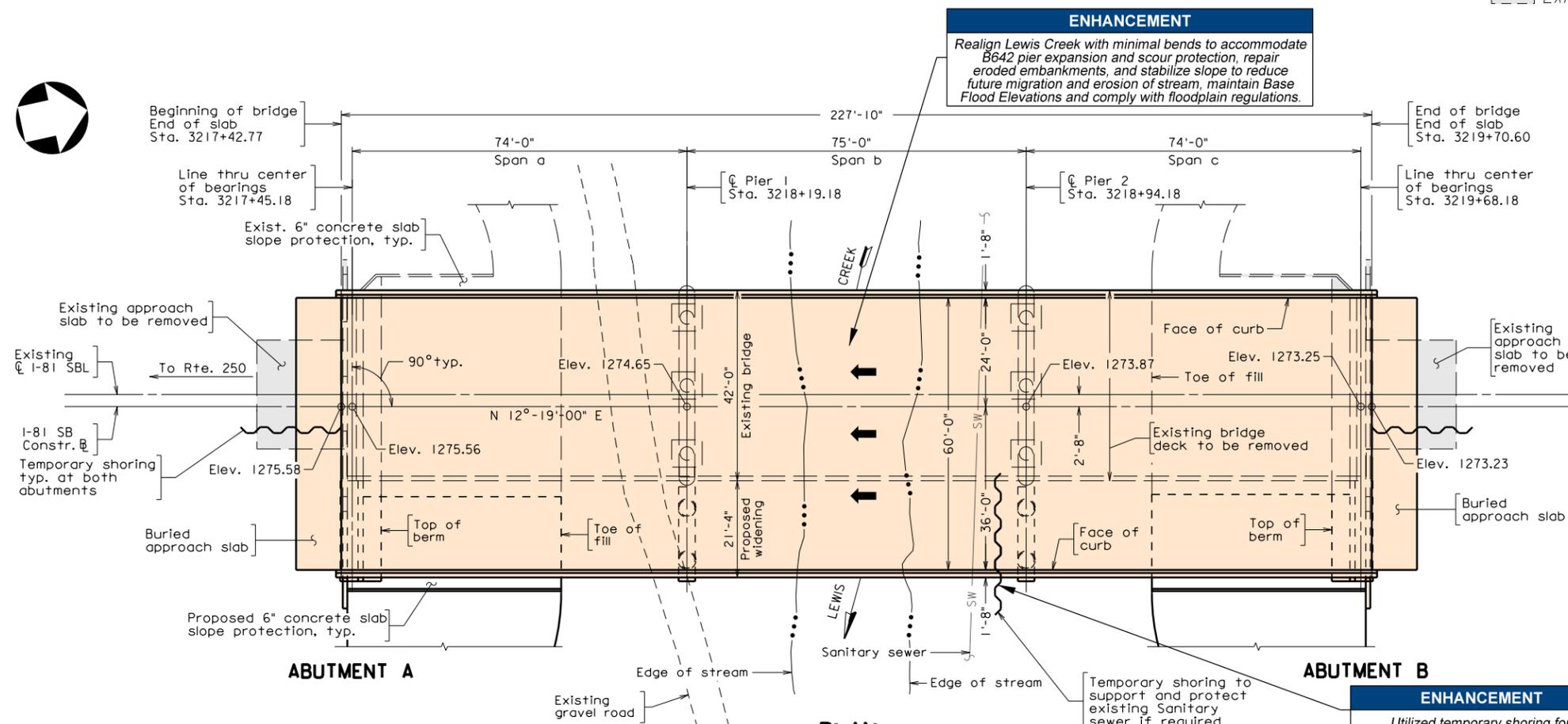
Virginia Structure No. of existing bridge is 007-2106. Plan No. is 200-23.

Lewis Creek shall be realigned back to its original position before migration.



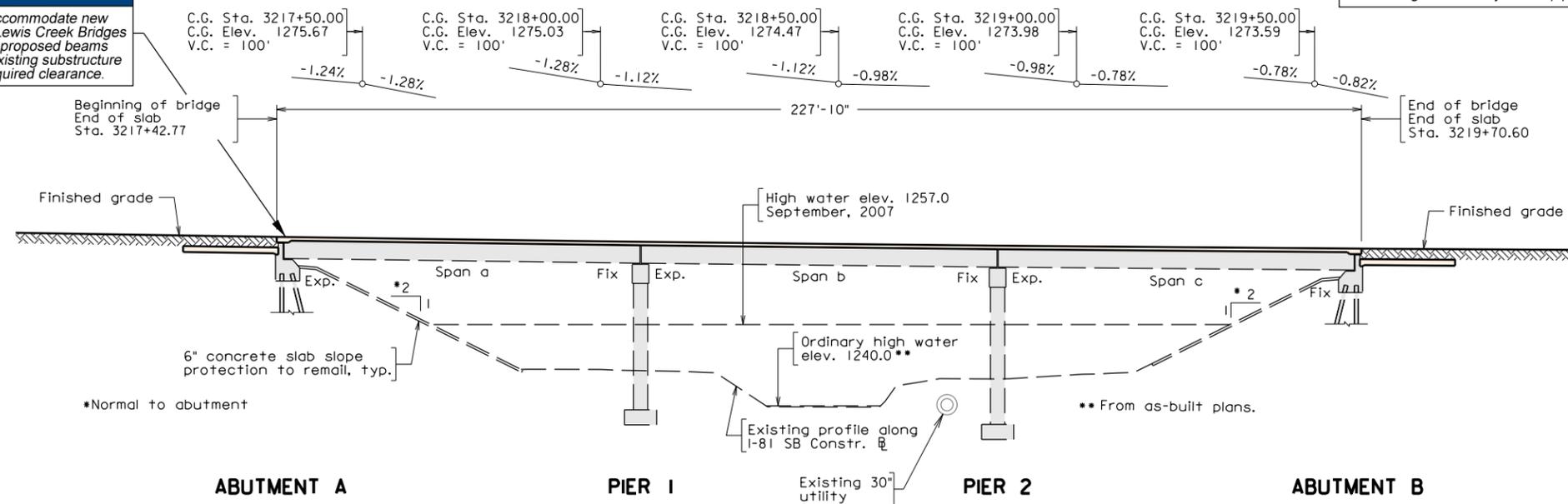
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION PROPOSED BRIDGE WIDENING ON

I-81 SBL OVER LEWIS CREEK
 AUGUSTA CO. - 0.61 MI. S. OF RTE. 262
 PROJ. 0081-007-013, B641



PLAN

ENHANCEMENT
 Raised the profile to accommodate new elastomeric bearings for Lewis Creek Bridges under the existing and proposed beams without obstructing the existing substructure while improving the required clearance.



DEVELOPED SECTION ALONG I-81 SBL CONSTR. B

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

lane  

PROJECT: 0081-007-013
 SHEET NO.: 25

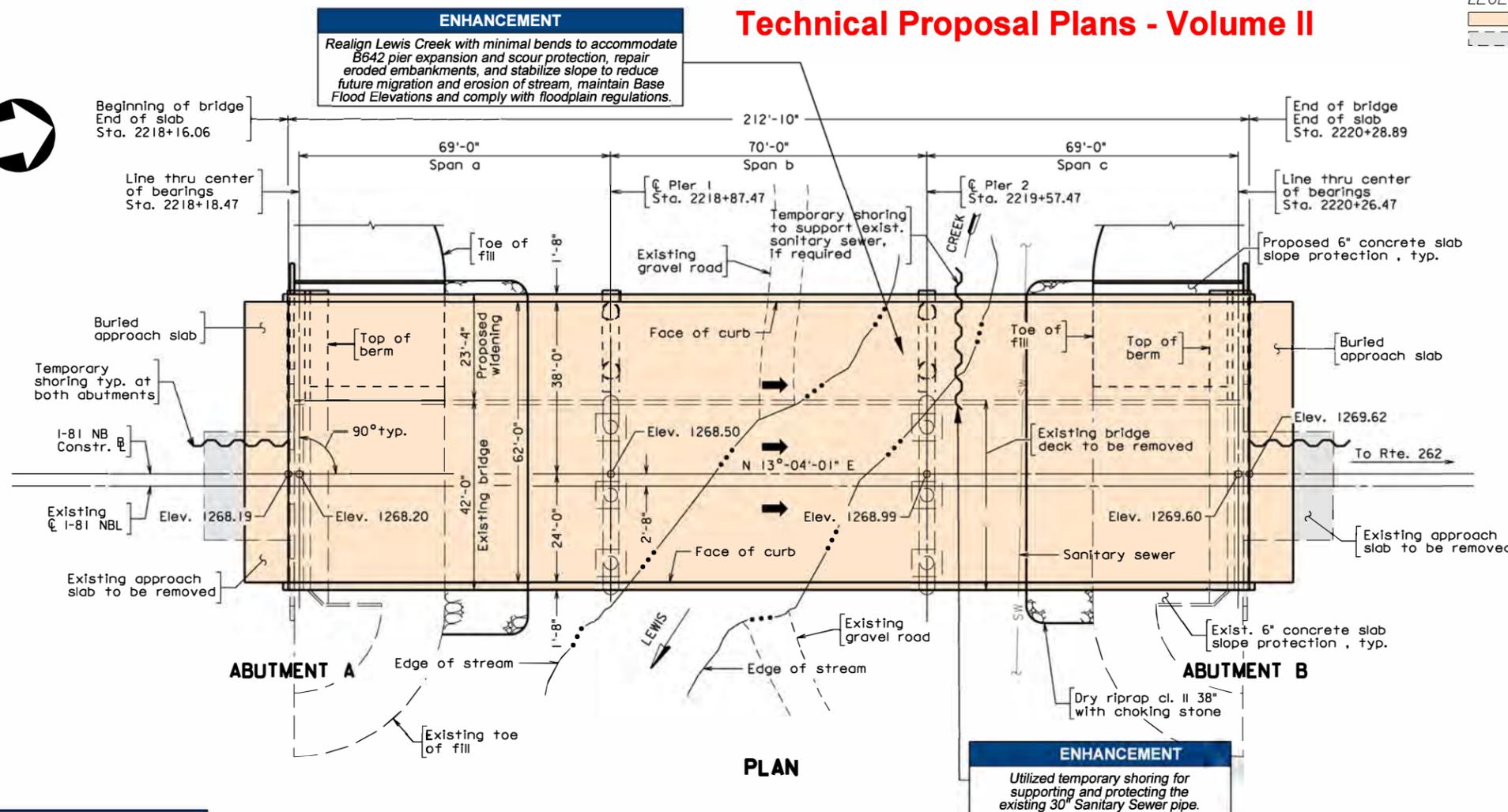
200-23B_001.dgn

Technical Proposal Plans - Volume II

LEGEND:
 PROPOSED BRIDGE WIDENING
 EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	27

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



DESIGN EXCEPTION(S):

GENERAL NOTES:

The original approved sheet, including original signatures, is filed in the VDOT Central Office. Any misuse of electronic files, including scanned signatures, is illegal. Violators will be prosecuted to the full extent of the applicable laws.

Width: 62'-0" face-to-face of curbs. Includes widening with 23'-4" on left of traffic.

Span layout: 69'-0" - 70'-0" - 69'-0" prestressed concrete 45" deep I-beam spans.

Capacity: HL-93 loading.
 Drainage area: 20.0 sq. mi.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2020.

Design: AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017; and VDOT Modifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.

These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the Contract documents.

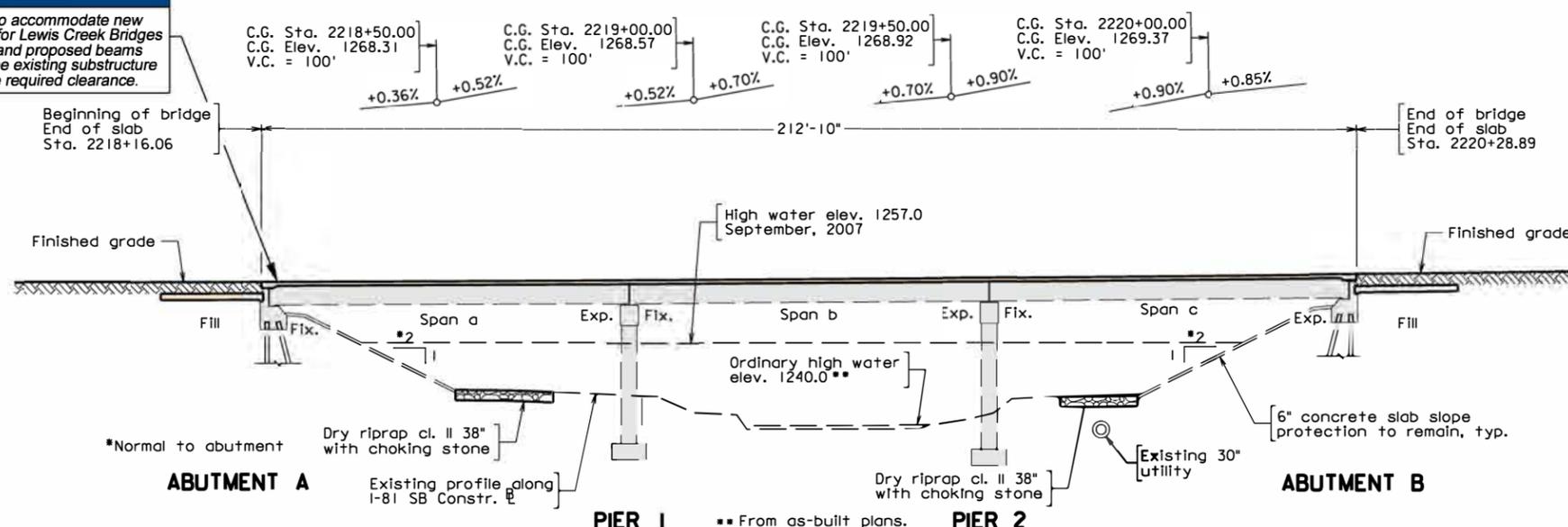
Concrete in decks shall be Lightweight Low Shrinkage Class A4 Modified Concrete with a maximum fresh density of 120 pcf. Concrete in rails and terminal walls shall be Low Shrinkage Class A4 Modified Concrete. Concrete in substructure shall be Class A3.

Prestressed concrete in PCB-3 beams shall be Class A5 having a minimum compressive cylinder strength of 28 days equal to 8000 psi and a minimum compressive cylinder strength of time of release of strands equal to 6400 psi.

Virginia Structure No. of existing bridge is 007-2107. Plan No. is 200-23.

Lewis Creek shall be realigned back to its original position before migration.

ENHANCEMENT
 Raised the profile to accommodate new elastomeric bearings for Lewis Creek Bridges under the existing and proposed beams without obstructing the existing substructure while improving the required clearance.



DEVELOPED SECTION ALONG I-81 NBL CONSTR. B

VDOT
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
PROPOSED BRIDGE WIDENING ON
I-81 NBL OVER LEWIS CREEK
AUGUSTA CO. - 0.61 MI. S. OF RTE. 262
PROJ. 0081-007-013, B642

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

PROJECT: 0081-007-013
 SHEET NO.: 27
 Scale: 1/32" = 1'-0"

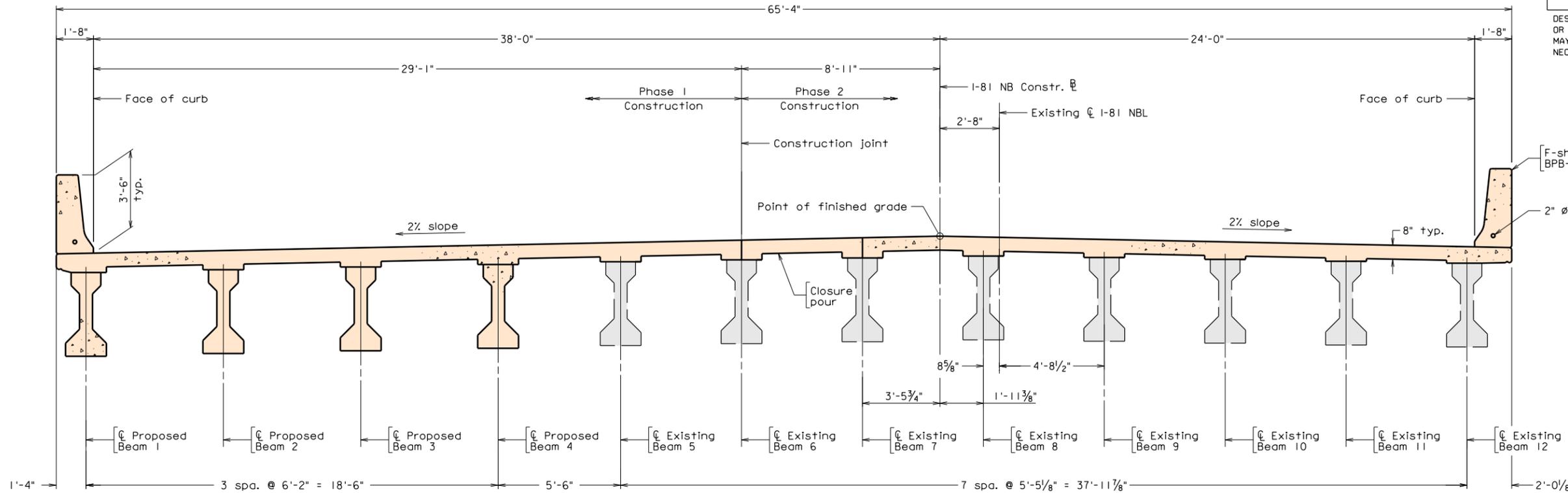
Technical Proposal Plans - Volume II

ENHANCEMENT
Temporary scuppers added to improve safety by managing spread within shoulder.

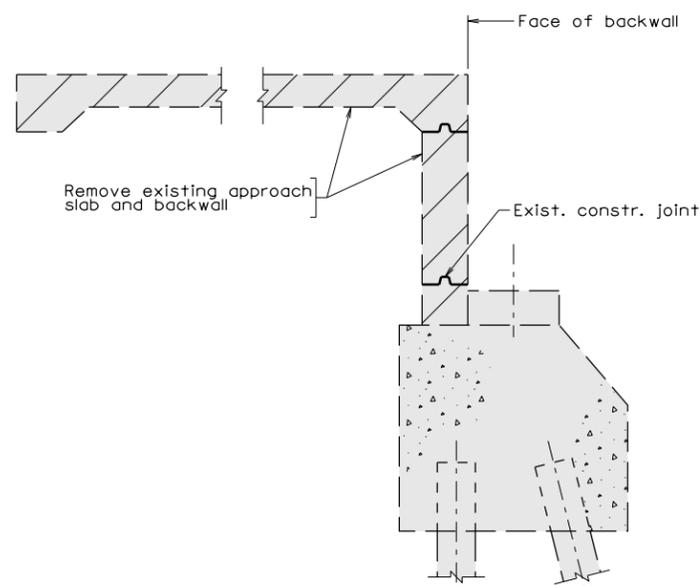
LEGEND:
 PROPOSED BRIDGE WIDENING
 EXISTING BRIDGE

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	I-81	0081-007-013 B638, B639, B640, B641, B642, C-501, D602, D603, P101, R201	28

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

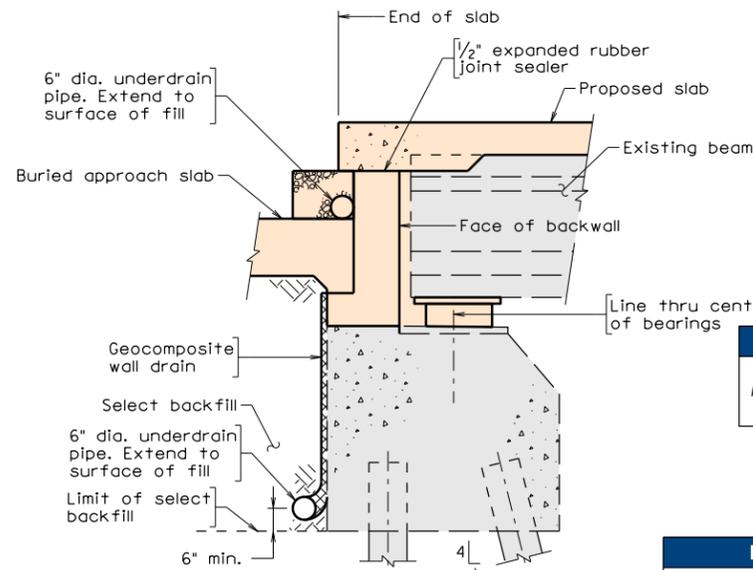


TRANSVERSE SECTION I-81 NBL OVER LEWIS CREEK (B642)



TYPICAL ABUTMENT DEMOLITION
Scale 1/4" = 1'-0"

 Existing structure to be removed

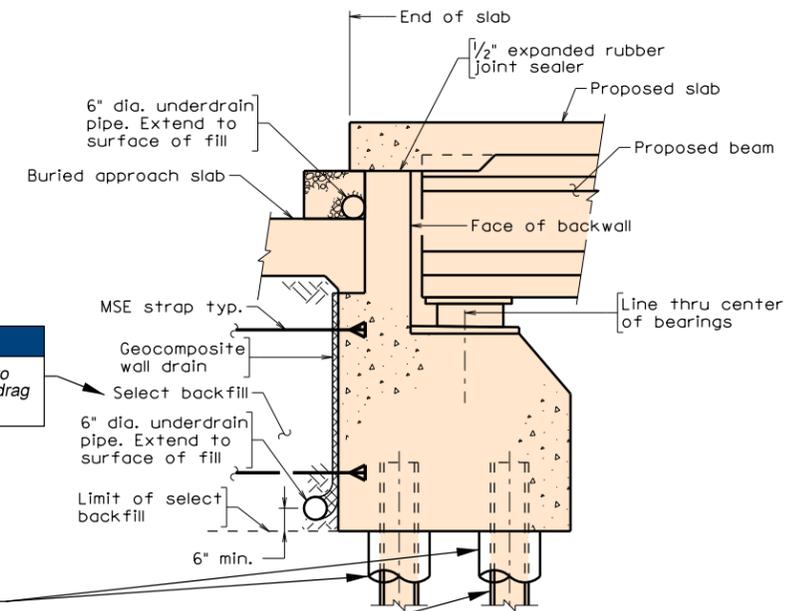


EXISTING ABUTMENT RECONSTRUCTION
Scale 1/4" = 1'-0"

ENHANCEMENT
Lightweight Fill Implemented to reduce waiting period and downdrag at B641 and B642

ENHANCEMENT
Pipe Piles Implemented to serve as sleeves for H-piles at abutments to minimize downdrag as well as stabilize slopes at B641 and B642

ENHANCEMENT
Eliminated battered piles for proposed abutments utilizing Mechanically Stabilized Earth (MSE) wall straps to improve constructability, eliminate bending on battered piles and limit obstructions to existing utilities.



PROPOSED ABUTMENT SECTION
Scale 1/4" = 1'-0"

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.



SCALE	PROJECT	SHEET NO.
3/8" = 1'-0" Unless Otherwise Noted	0081-007-013	28

4.6.1 Proposal Schedule

VDOT I-81 Widening MM 221 to MM 225

Activity ID	Activity Name	Original Duration	Start	Finish	2023												2024												2025												2026												2027												2028																																																							
					J				F				M				A				M				J				J				A				S				O				N				D				J				F				M				A				M				J				J				A				S				O				N				D				J				F				M				A				M			
					J				F				M				A				M				J				J				A				S				O				N				D				J				F				M				A				M				J				J				A				S				O				N				D				J				F				M				A				M			
Bridge		179	10-Jul-23	27-Mar-24																																																																																																																				
I-81 SBL Over Ramp 1		168	10-Jul-23	13-Mar-24																																																																																																																				
B638 Stage I		15	10-Jul-23	31-Jul-23																																																																																																																				
A2070	Prepare B638 Preliminary Plan	10	10-Jul-23	21-Jul-23	■ Prepare B638 Preliminary Plan																																																																																																																			
A2160	Submit Stage I B638	0	31-Jul-23		◆ Submit Stage I B638																																																																																																																			
B638 Stage II		133	28-Aug-23	13-Mar-24																																																																																																																				
A3270	Prepare B638 Final Plan	65	28-Aug-23	01-Dec-23	■ Prepare B638 Final Plan																																																																																																																			
A4440	Prepare B638 Load Ratings (Alvi)	15	08-Nov-23	01-Dec-23	■ Prepare B638 Load Ratings (Alvi)																																																																																																																			
A3380	Prepare Stage II B638 RFC Plans	15	16-Jan-24	05-Feb-24	■ Prepare Stage II B638 RFC Plans																																																																																																																			
A4190	Prepare FHWA Bridge Construction Unit Cost Report B638	25	06-Feb-24	12-Mar-24	■ Prepare FHWA Bridge Construction Unit Cost Report B638																																																																																																																			
A4280	Provide FHWA Bridge Construction Unit Cost Report B638	0	13-Mar-24		◆ Provide FHWA Bridge Construction Unit Cost Report B638																																																																																																																			
I-81 SBL Over Augusta Woods Drive and Buckingham Branch Railroad		176	10-Jul-23	22-Mar-24																																																																																																																				
B639 Stage I		17	10-Jul-23	02-Aug-23																																																																																																																				
A2080	Prepare B639 Preliminary Plan	12	10-Jul-23	25-Jul-23	■ Prepare B639 Preliminary Plan																																																																																																																			
A2230	Submit Stage I B639	0	02-Aug-23		◆ Submit Stage I B639																																																																																																																			
Demolition and Foundation Package		25	13-Sep-23	19-Oct-23																																																																																																																				
A2970	Prepare B639 Demo./Found. Plan	25	13-Sep-23	19-Oct-23	■ Prepare B639 Demo./Found. Plan																																																																																																																			
BBRR Package		15	26-Jul-23	15-Aug-23																																																																																																																				
A2880	Prepare B639 BBRR Means and Methods (Lane)	15	26-Jul-23	15-Aug-23	■ Prepare B639 BBRR Means and Methods (Lane)																																																																																																																			
A2890	Prepare B639 BBRR Demolition and Erection Procedures (Lane)	15	26-Jul-23	15-Aug-23	■ Prepare B639 BBRR Demolition and Erection Procedures (Lane)																																																																																																																			
A2900	Prepare B639 BBRR Excav and Shoring (Lane)	10	26-Jul-23	08-Aug-23	■ Prepare B639 BBRR Excav and Shoring (Lane)																																																																																																																			
A2910	Prepare B639 BBRR Track Monitoring Procedures (Lane)	5	09-Aug-23	15-Aug-23	■ Prepare B639 BBRR Track Monitoring Procedures (Lane)																																																																																																																			
B639 Stage II		139	29-Aug-23	22-Mar-24																																																																																																																				
A3280	Prepare B639 Final Plan	65	29-Aug-23	05-Dec-23	■ Prepare B639 Final Plan																																																																																																																			
A4450	Prepare B639 Load Ratings (Alvi)	15	09-Nov-23	05-Dec-23	■ Prepare B639 Load Ratings (Alvi)																																																																																																																			
A3460	Prepare Stage II B639 RFC Plans	15	17-Jan-24	07-Feb-24	■ Prepare Stage II B639 RFC Plans																																																																																																																			
A4200	Prepare FHWA Bridge Construction Unit Cost Report B639	25	15-Feb-24	22-Mar-24	■ Prepare FHWA Bridge Construction Unit Cost Report B639																																																																																																																			
A4270	Provide FHWA Bridge Construction Unit Cost Report B639	0	22-Mar-24		◆ Provide FHWA Bridge Construction Unit Cost Report B639																																																																																																																			
I-81 SBL Over Route 250		179	10-Jul-23	27-Mar-24																																																																																																																				
B640 Stage I		15	10-Jul-23	31-Jul-23																																																																																																																				
A2100	Prepare B640 Preliminary Plan	10	10-Jul-23	21-Jul-23	■ Prepare B640 Preliminary Plan																																																																																																																			
A2300	Submit Stage I B640	0	31-Jul-23		◆ Submit Stage I B640																																																																																																																			
B640 Stage II		144	28-Aug-23	27-Mar-24																																																																																																																				
A3290	Prepare B640 Final Plan	75	28-Aug-23	15-Dec-23	■ Prepare B640 Final Plan																																																																																																																			
A4460	Prepare B640 Load Ratings (Alvi)	15	27-Nov-23	15-Dec-23	■ Prepare B640 Load Ratings (Alvi)																																																																																																																			
A3540	Prepare Stage II B640 RFC Plans	15	30-Jan-24	21-Feb-24	■ Prepare Stage II B640 RFC Plans																																																																																																																			
A4210	Prepare FHWA Bridge Construction Unit Cost Report B640	25	21-Feb-24	27-Mar-24	■ Prepare FHWA Bridge Construction Unit Cost Report B640																																																																																																																			
A4260	Provide FHWA Bridge Construction Unit Cost Report B640	0	27-Mar-24		◆ Provide FHWA Bridge Construction Unit Cost Report B640																																																																																																																			
I-81 SBL Over Lewis Creek		168	10-Jul-23	13-Mar-24																																																																																																																				
B641 Stage I		15	10-Jul-23	31-Jul-23																																																																																																																				
A2110	Prepare B641 Preliminary Plan	10	10-Jul-23	21-Jul-23	■ Prepare B641 Preliminary Plan																																																																																																																			
A2370	Submit Stage I B641	0	31-Jul-23		◆ Submit Stage I B641																																																																																																																			
B641 Stage II		133	28-Aug-23	13-Mar-24																																																																																																																				
A3300	Prepare B641 Final Plan	65	28-Aug-23	01-Dec-23	■ Prepare B641 Final Plan																																																																																																																			
A4470	Prepare B641 Load Ratings (Alvi)	15	08-Nov-23	01-Dec-23	■ Prepare B641 Load Ratings (Alvi)																																																																																																																			
A3620	Prepare Stage II B641 RFC Plans	15	16-Jan-24	05-Feb-24	■ Prepare Stage II B641 RFC Plans																																																																																																																			
A4220	Prepare FHWA Bridge Construction Unit Cost Report B641	25	06-Feb-24	12-Mar-24	■ Prepare FHWA Bridge Construction Unit Cost Report B641																																																																																																																			
A4250	Provide FHWA Bridge Construction Unit Cost Report B641	0	13-Mar-24		◆ Provide FHWA Bridge Construction Unit Cost Report B641																																																																																																																			
I-81 NBL Over Lewis Creek		168	10-Jul-23	13-Mar-24																																																																																																																				
B642 Stage I		15	10-Jul-23	31-Jul-23																																																																																																																				

■ Remaining Level of Effort
 ■ Remaining Work
 ◆ Milestone
 ■ Critical Remaining Work
 ■ WBS Summary



VDOT I-81 Widening MM 221 to MM 225

Activity ID	Activity Name	Original Duration	Start	Finish	2023 2024 2025 2026 2027 2028																																																																				
					2023												2024												2025												2026												2027												2028								
					J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
A1630	Perform Roadway and Strm Drg Borings (Terracon)	15	16-Jun-23	11-Jul-23	■ Perform Roadway and Strm Drg Borings (Terracon)																																																																				
Laboratory																																																																									
A1640	Perform Bridge Boring Laboratory Testing (Terracon)	40	26-Jun-23	22-Aug-23	■ Perform Bridge Boring Laboratory Testing (Terracon)																																																																				
A1650	Perform Roadway and Strm Drg Boring Laboratory Testing (Terracon)	35	12-Jul-23	29-Aug-23	■ Perform Roadway and Strm Drg Boring Laboratory Testing (Terracon)																																																																				
Reporting																																																																									
Preliminary Geotechnical Recommendation Report																																																																									
A1670	Prepare Preliminary Geotechnical Recommendation Report (Terracon)	15	05-Jul-23	25-Jul-23	■ Prepare Preliminary Geotechnical Recommendation Report (Terracon)																																																																				
A1680	Provide Preliminary Geotechnical Recommendation Report (Terracon)	0	26-Jul-23		◆ Provide Preliminary Geotechnical Recommendation Report (Terracon)																																																																				
Geotechnical Engineering Report																																																																									
A1710	Prepare Geotechnical Engineering Report (Terracon)	35	09-Aug-23	27-Sep-23	■ Prepare Geotechnical Engineering Report (Terracon)																																																																				
A1720	Perform GER Constructability Review (Lane)	3	28-Sep-23	02-Oct-23	■ Perform GER Constructability Review (Lane)																																																																				
A1730	Perform GER Interdisciplinary Review	3	28-Sep-23	02-Oct-23	■ Perform GER Interdisciplinary Review																																																																				
A1740	Perform QAQC Review and Adjust GER (Terracon)	5	02-Oct-23	06-Oct-23	■ Perform QAQC Review and Adjust GER (Terracon)																																																																				
A1750	Submit GER (Terracon)	0	10-Oct-23		◆ Submit GER (Terracon)																																																																				
A1760	Review GER (VDOT)	21	10-Oct-23	30-Oct-23	■ Review GER (VDOT)																																																																				
A4490	Review VDOT GER Comments (Terracon)	5	30-Oct-23	06-Nov-23	■ Review VDOT GER Comments (Terracon)																																																																				
A1770	Conduct GER Comment Resolution Meeting (Terracon)	0	06-Nov-23		◆ Conduct GER Comment Resolution Meeting (Terracon)																																																																				
A1780	Finalize GER (Terracon)	30	06-Nov-23	21-Dec-23	■ Finalize GER (Terracon)																																																																				
A1790	Obtain Geotechnical Engineering Report Approval (Terracon)	0	21-Dec-23		◆ Obtain Geotechnical Engineering Report Approval (Terracon)																																																																				
Virginia Transportation Research Council																																																																									
A4430	Coordinate VTCR Instrumentation Location	10	04-Dec-23	15-Dec-23	■ Coordinate VTCR Instrumentation Location																																																																				
Utilities																																																																									
Utility Report																																																																									
A2540	Prepare Preliminary Utility Status Report (Bowman)	5	10-Aug-23	16-Aug-23	■ Prepare Preliminary Utility Status Report (Bowman)																																																																				
A2550	Provide Preliminary Utility Status Report (Bowman)	0	17-Aug-23		◆ Provide Preliminary Utility Status Report (Bowman)																																																																				
A4690	Update Utility Status Report #1 (Bowman)	0	29-Sep-23		◆ Update Utility Status Report #1 (Bowman)																																																																				
A4700	Update Utility Status Report #2 (Bowman)	0	29-Oct-23		◆ Update Utility Status Report #2 (Bowman)																																																																				
A4710	Update Utility Status Report #3 (Bowman)	0	28-Nov-23		◆ Update Utility Status Report #3 (Bowman)																																																																				
A4720	Update Utility Status Report #4 (Bowman)	0	28-Dec-23		◆ Update Utility Status Report #4 (Bowman)																																																																				
A4730	Update Utility Status Report #5 (Bowman)	0	27-Jan-24		◆ Update Utility Status Report #5 (Bowman)																																																																				
Conflict Evaluation																																																																									
A2530	Perform Conflict Identification (Bowman)	5	09-Aug-23	15-Aug-23	■ Perform Conflict Identification (Bowman)																																																																				
Cost Responsibility																																																																									
A2560	Determine Prior Rights and Cost Responsibility (Bowman)	30	06-Jul-23	16-Aug-23	■ Determine Prior Rights and Cost Responsibility (Bowman)																																																																				
Utility Field Inspection																																																																									
A2710	Identify Level A Utility Test Pits Locations (Bowman)	2	16-Aug-23	17-Aug-23	■ Identify Level A Utility Test Pits Locations (Bowman)																																																																				
A2740	Provide UFI Plans to Utilities	0	04-Oct-23		◆ Provide UFI Plans to Utilities																																																																				
A2750	Review UFI Plans (Utilities)	21	04-Oct-23	02-Nov-23	■ Review UFI Plans (Utilities)																																																																				
Relocation Design																																																																									
Dry Utilities																																																																									
A2770	Prepare Utility Relocation Plans (Utility Companies)	75	03-Nov-23	26-Feb-24	■ Prepare Utility Relocation Plans (Utility Companies)																																																																				
A4110	Review Utility Relocation Plans (Lane)	10	27-Feb-24	11-Mar-24	■ Review Utility Relocation Plans (Lane)																																																																				
Clearance																																																																									
A4120	Coordinate Utility Clearance	20	27-Feb-24	25-Mar-24	■ Coordinate Utility Clearance																																																																				
A4130	Obtain Utility Clearance	0	26-Mar-24		◆ Obtain Utility Clearance																																																																				
Right-of-Way																																																																									
A2600	Establish Proposed Right-of-Way	2	12-Sep-23	13-Sep-23	■ Establish Proposed Right-of-Way																																																																				
A4150	Prepare Right-of-Way Plan Sheets (Pennon)	10	14-Sep-23	27-Sep-23	■ Prepare Right-of-Way Plan Sheets (Pennon)																																																																				
A2610	Prepare Right of Way Data Sheet	1	28-Sep-23	28-Sep-23	■ Prepare Right of Way Data Sheet																																																																				

■ Remaining Level of Effort
 ■ Remaining Work
 ◆ Milestone
 ■ Critical Remaining Work
 ■ WBS Summary



VDOT I-81 Widening MM 221 to MM 225

17-Jan-23 16:20

Activity ID	Activity Name	Original Duration	Start	Finish	2023												2024												2025												2026												2027												2028												
					J F M A M J J A S O N D												J F M A M J J A S O N D												J F M A M J J A S O N D												J F M A M J J A S O N D												J F M A M J J A S O N D												J F												
					J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F											
Phase 4: I-81 NB		25	01-Apr-27	05-May-27																																																																									
A16330	Milling/Asph Overlay - Phase 4: I-81 NB - P4.A9	15	01-Apr-27	28-Apr-27																																																																									
A16340	Install Permanent Pvmt Markings - Phase 4: I-81 NB - P4.A9	10	12-Apr-27	28-Apr-27																																																																									
A16350	Install Permanent Signage - Phase 4: I-81 NB - P4.A9	10	21-Apr-27	05-May-27																																																																									

- Milling/Asph Overlay - Phase
- Install Permanent Pvmt Mar
- Install Permanent Signage

■ Remaining Level of Effort	■ Remaining Work	◆ Milestone
■ Actual Work	■ Critical Remaining Work	— WBS Summary

