

I95 Express Lanes Lessons Learned

During the Design-Build Phase

NO.	ISSUE	PROCESS	PURPOSE OF PROCESS OR PROJECT ISSUE AS OBSERVED BY KEY PERSONNEL	RECOMMENDATIONS	WHERE REQUIRED BASED UPON THE I95 HOT LANES CONTRACT	DISPOSITION
1	Inclement weather lane closure restrictions need to be included in the Technical Requirements, along with enhanced coordination.	Traffic Management Plan Traffic Operations and Outreach	To create enhanced coordination during snow events between all projects and maintenance activities in the Traffic Management Plan corridor footprint to enhance mobility, safety and outreach (Snow Removal).	<p>In the Technical Requirements, snow handling and removal operations only falls under “Emergency or extraordinary circumstance.” Virginia Department of Transportation ("the Department") Northern Virginia ("NOVA") District Maintenance employs inclement weather lane closure restrictions which clearly state the procedures contractors must follow during these events (e.g. whether or not lanes may be closed). For coordination among projects, Department Traffic Operations Center, and Department NOVA District Maintenance include these restrictions in the Contract Documents of all projects. Additionally, include a representative from current and upcoming projects in the annual Department NOVA District Maintenance Winter Planning Meeting, and address winter lane closure restrictions in project meetings. Uniform snow operations lane closure restrictions should be dispersed to and followed by all projects, Department Traffic Operations Center, and Department NOVA District Maintenance, so there are no questions as to what is allowed during snow events.</p> <p>Add the following language to TR 1.8.3 : Inclement Weather Restrictions; The Department may restrict the implementation of lane closures as a result of inclement weather that may include heavy rains, icy road conditions and heavy snow events. These restrictions are necessary for the safety of the traveling public and workers treating the roadways. The following table defines the lane closure restrictions during winter inclement weather events. The contractor requesting lane closures during the period the restriction are in place must submit the Lane Closure Request to the Traffic Information Coordinator for consideration for approval one day in advance.</p>	TR 1.8.3 (Temporary Roadway Closures)	<p>TR 1.8.3 :</p> <ol style="list-style-type: none"> 1. Add new section under 1.8.3 as shown in "Recommendations" column. 2. Add Attachment No. 1 to these Lessons Learned to the new section

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2	The need for a method for the Concessionaire to inform the Department of work being performed that will affect the Department's assets.	Operational Traffic Management / Turnover Plan, Notice of Impact (NOI) to Department Assets Process	<p>The need for a Notice of Asset Impact (NOI) procedure.</p> <p>On the I-95 project, there were a large number of operational Intelligent Transportation System and electrical assets that required some form of interface simultaneously by the Design-Builder. The Department needed a system of tracking which assets were being taken out of service for work reasons, or for relocation, or for some other reason. The Notice of Impact (NOI) process afforded the Department the ability to pre-decide how and when to allow its assets to be impacted in order to understand the operational impacts.</p>	<p>Develop a Notice Of Impact ("NOI") procedure that requires Department notification and approval when any Department asset is impacted. Form and procedure shall specify dates and time of anticipated impact, and specific assets and their respective components. As part of the procedure, the contractor must be required to resubmit any changes to the plan in advance of performing the work. The NOI procedure shall be part of the overall Turnover Plan which becomes a part of the contractual requirements.</p> <p>(1) Contractor shall be required to adhere to the performance dates identified in the Notice of Impact document.</p> <p>(2) The Notice of Impact document shall include a plan of action on how remaining Department assets will be connected to existing Department networks.</p> <p>(3) The Notice of Impact document and design plans shall identify which as-built information is necessary to update network topology and diagrams.</p>	CA Exhibit V (Turnover Plan)	Modify CA Exhibit V to add a Notice of Impact Procedure to the Turnover Plan (Exhibit V), considering the parameters stated in "Recommendations" column.

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3	The reversible gates, Dynamic Message Signs, and other Department electrical assets were significantly impacted by the Project.	Operational Traffic Management / Gates/ Dynamic Messaging Systems / Electrical Systems	The need for a work procedure specific to electrical components during Construction Period. On the I-95 project there were multiple instances of the Design-Builder having its electrical subcontractor work inside the Department's Intelligent Transportation System cabinets or electrical service panels without either documenting the work performed, baselining the condition of the existing cabinet, or identifying the work necessary to be done inside the cabinet. For example, new wiring would be installed and old wiring removed without the old wiring being re-terminated, thus leaving a circuit out of service. Many lighting circuits remained out of service for weeks at a time because the electrical subcontractor damaged or removed part of the circuit and failed to restore the circuit using the reason of "we are working on the new installation." Further, after work was completed by the Design-Builder, Department staff conducting an audit of the work completed found the Design-Builder work to be noncompliant. The Department expended many hours sweeping behind the Design-Builder because the Design-Builder did not manage its subcontractor with an adequate plan.	All maintenance work on existing assets to be modified or replaced should be performed by the Design Builder in accordance with the approved Quality Management System Plan which must have a dedicated section on Intelligent Transportation System quality. The Project must meet existing Department operations maintenance requirements or the new contract requirements by having the Design-Builder demonstrate proficiency in conducting interface operations without negatively impacting the operational system.	TR 1.3.1.3 (Quality Management System Plan) TR 3.17 (Maintenance During Const) (H) and (L)	Modify TR's 1.3.1.3: Add dedicated section on Intelligent Transportation Systems. TR 3.17: Add language specific to Gates and Dynamic Message Signs during transition.

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4	Post-Construction As-Built Documentation	As-Built-Intelligent Transportation Systems / Roadway / Drainage / Electrical Assets	The need for thorough and accurate as-built information for all assets installed as part of the construction project. This is particularly important as new facilities will be sharing boundaries and common right of way with Department-maintained facilities as the 95 Express Lanes adjoin general purpose lanes. With the exception of bridges, the 95 Express Lanes project requirements did not have specific requirements on the production of Intelligent Transportation Systems and other specific as-built documentation.	The process for As-Built documentation must include specific technical requirements for roadway, drainage, Intelligent Transportation System, and electrical assets.	TR 3.18 (As-Built Documentation)	Add to TR 3.18 (As Builts) specific sections for roadway, drainage, ITS, and electrical assets.
5	Establish a more efficient design review process that reduces the number of submissions and streamlines approval. Over the Shoulder Design Reviews.	Design Management	The I-95 project established a proven design review process that incorporated the use of Department and GEC design staff. Engaging the design staff early in the design process in order to create greater alignment on design issues reduced the overall design timeline and mitigated inefficiencies. Specifically, by using an over-the-shoulder review process, The Department was able to establish the necessary elements of the different design packages for the Design-Build team so that they knew what the Department would be checking for during the plan review process. By establishing this thorough over-the-shoulder process, the timeline was reduced for design reviews by the Department because the Design-Build team already knew in advance what the Department would be seeking in order for the design packages to be approved the first time through the Department's review cycle.	Add to TR 3.1: The Concessionaire shall require the Design-Builder (DB) to facilitate an Over-the Shoulder (OTS) review process. The OTS shall be a process that affords the Department opportunity to participate in the early discussions, meetings, preliminary design concept planning sessions, or other such opportunities in advance of any submission of an actual design package. The purpose of this early participation by the Department or its representatives is to establish a clear understanding and expectation of the minimum necessary design packages for the Project. The OTS is intended to generate alignment among the parties as to the criteria the Department will use to evaluate the design package submissions and determine if they have achieved the Contract requirements for approval. The OTS generally shall occur through in-person meetings, teleconferencing, or other electronic conference media formats in order to facilitate a smooth and seamless communication. The Department will not use the OTS process to influence the design outcome in terms of personal or historic preference unless such preference is integral to the scope of the Project. The DB shall document for record the OTS process using meeting minutes or other approved formats, and incorporate that documentation into the overall Quality Management System process as required by the Contract. The DB shall provide the Department with a minimum 14 days advance notice of any scheduled OTS meeting. The DB shall provide the Department with a schedule of all OTS meetings with sufficient advance notice that the Department can meet the schedule needs of the DB and the Project.	TR 3.1 (Design and Construction Requirements)	TR 3.1: Add to the language in "Recommendations" column.

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6	Milestone Completions: ensuring all requirements are met	Milestones	Although the Comprehensive Agreement specifies what defines the milestone completions, various other specific sections also carry milestone completion requirements, resulting in the risk that certain requirements will not be satisfied.	<p>Formulate a milestone completion Requirements Matrix for each milestone that the stakeholders can all agree on and follow. Create separate forms for the requirements for Substantial Completion, Service Commencement and Final Acceptance. Conduct regular meetings to follow the progress.</p> <p>Add new section to TR 3.2: 3.23 Milestone Completion Requirements: The Concessionaire will prepare a comprehensive listing of every requirement for . [Substantial Completion (8.08), Final Acceptance (8.09), Service Commencement (9.02)] in an Excel matrix format that includes columns for item required, agency requiring completion of the item, authoritative citation, description of required item, party responsible, and status. Concessionaire will provide the list to the Department 90 days in advance of each milestone.</p>	TR 3.0 (Design and Construction Requirements)	Add new section to TR 3.0 the Language in "Recommendations" column.
7	Requirement for a Substantial Completion Inspection Plan	Project Closeout: Substantial Completion	The larger scale Design-Build and P3 projects currently don't require Concessionaire or Design-Bulder to develop and implement a project Substantial Completion plan that compartmentalizes the elements of the project into a workable plan that allows adequate time and access for the Department to inspect the project before the official notice of Substantial Completion from the Design-Builder or Concessionaire.	Modify the Technical Requirement language to require the Concessionaire to submit a detailed project Substantial Completion plan for review and approval 18 months before the Substantial Completion date on larger projects and at least 6 months before the Substantial Completion date on smaller Design-Build projects.	TR Attachment 1.3 (Project Development Plans) TR Attachment 1.3.2 (Project Development Plans - Submission Timetables)	Project Development Plan: add 1.3.1.15: "Substantial Completion Plan". Add "Substantial Completion Plan" to submission timetable with submission date 18 months prior to Substantial Completion.
8	Dynamic Messaging System Board for Trucks	Operational Traffic Management	Creating driver awareness of significant construction truck traffic in and out of the median work zones along the project corridor is an important safety concern.	The Department recommends the practice of utilizing portable Dynamic Message Signs to create greater driver awareness of the hazards created by the presence of significant construction truck traffic entering and exiting the median work zones throughout a project corridor. The I-95 project implemented these portable Dynamic Message Signs and they were proven to work. The messages on the signs advised drivers to be alert for construction vehicles entering and exiting the median.	TR 1.13.2 (Safety)	Modify TR 1.13.2 by adding portable Dynamic Message Signs requirements for traffic entering and exiting median work zones.

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9	Responsibility for Maintenance of Electrical and Intelligent Traffic Systems prior to Service Commencement	Electrical & Intelligent Traffic Systems Assets	The Technical Requirements currently require the Department maintain existing electrical and Intelligent Traffic Systems assets (Dynamic Messaging Signs, Gates, Signals, etc.)	Maintenance responsibility for operation of existing Dynamic Message Signs and/or gates replaced by and/or worked on by the Concessionaire but still operated by the Department until Service Commencement should remain with the Concessionaire.	TR 3.17 (H) (Maintenance During Construction).	Modify TR 3.17 (H) and (L) to require Concessionaire maintain these assets
10	Create a 2-Step Opening Plan in order to allow the facility to open and prove to be safe and operational before tolling begins.	Service Commencement; commencement of tolling operations	There is a need to safely test the Intelligent Transportation Systems, and other operational aspects of the facility prior to opening the tolling operations.	<p>Step 1 : Open the facility, including gates, signals, etc., without Service Commencement of the tolling operations.</p> <ul style="list-style-type: none"> • Address transition issues affecting the Traffic Management System & Tolling systems separately • Operate the reversible gate system under live traffic before tolling starts • Test tolling system on live traffic • Address any system or operational issues <p>Step 2: Complete Service Commencement and begin tolling</p>	CA 9.02 (Conditions Precedent to Service Commencement)	Add new language to CA 9.02: Define the 2 step opening as outlined in "Recommendations" column.
11	Safe Transfer of Gate Operations	Operational Traffic Management	To safely and reliably be able to operate the reversible gates requires extensive repetitive operations to build familiarity with the system and to know how long it will take to reverse the entire system.	Transfer of gate operations should occur at least four weeks prior to facility opening to allow for the necessary testing and live operations by the Concessionaire. This timeframe should be made a contractual requirement. The reason for establishing a longer lead time for transfer of operations is the very likelihood of the new Concessionaire needing that much time to gain situational awareness of how to operate the system despite the training that would also take place in advance.	CA Exhibit V (Turnover Plan)	Modify CA Exhibit "V" 1.0.2 To add: "...and to effect transition of gate operations at least 4 weeks prior to service commencement."
12	Operations-Responsibility Matrix Development	Operations, Maintenance of Facility	The Comprehensive Agreement is a complex document that governs the operations of the project for decades. In order to effectively administer it, duties need to be segregated from the Comprehensive Agreement and summarized into a simple to follow form, and modified during the Operations Period, as needed.	<p>Mandate incorporation of a Responsibility Matrix into the Technical Requirements and develop it in cooperation with the Concessionaire early in the Project.</p> <p>Add the requirement to develop an Operations Responsibility Matrix in an excel spreadsheet format to include columns for responsible department; governing document / section; citation of governing document; oversight description, whether routine or extraordinary; whether a recurring task; frequency; responsible party; task of responsible party.</p>	TR 4.0 (Operations, Maintenance, and Tolling for the HOT Lanes).	Add to: Technical Requirements 4.0 requirements in "Recommendations" column.

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13	Operations-Responsibility Matrix Calendar Development	Operations, Maintenance of the Facility	Once the Responsibility Matrix is developed for the operation of the project, it is still difficult to define exactly when the specific duties are to be delivered.	Create a monthly-based excel table/calendar from the Responsibility Matrix and update when necessary, but at a minimum on an annual basis. Include in the monthly cells: the governing document; description of responsibility; and frequency throughout the year.	TR 4.0 (Operations, Maintenance, and Tolling).	Add to: TR 4.0 the requirements in the "Recommendations" column.

Lessons Learned Attachment No. 1
Exhibit xx - Lane Closure Weather Restrictions

Weather Forecast	Mobilization Level	VDOT Response Plan	I-66 Program Restrictions
Precipitation: 20% or Greater Accumulation: Ice/Snow Possible Ambient or Pavement Temp: 30-36	Anti-Ice	Springfield Interchange, Spot Treatment of Other Critical Structures & Locations	Lane closures permitted but must allow VDOT to treat the roads
Precipitation: 20-49% or greater Accumulation: Snow Possible Ambient or Pavement Temp: 30-36	Skeleton Crews	Spot Treatment of Critical Structures & Locations Respond to Icy Conditions As needed	Lane closures permitted but must allow VDOT to treat the roads
Precipitation: 20-49% or greater Accumulation: Snow Possible Ambient or Pavement Temp: 30-36	1	Springfield Interchange, Spot Treatment of Other Critical Structures & Locations	Lane closures are permitted on case by case basis with prior approval
Precipitation: 50-100% Chance Accumulation: Up to 1 inch of snow Ambient or Pavement Temp: 25-29	2	Light Salting Operation; Limited Work in Subdivisions. Includes Cold Spot Treatment in Subdivisions & Gravel Roads	No lane closures permitted on major roadways.
Precipitation: 50-100% chance Accumulation: Up to 2 inches of snow or up to 1/10 inch of ice Ambient or Pavement Temp: 20-24	3	Salting Operation; Potential for Plowing; Includes Cold Spot Treatment in Subdivisions & Gravel Roads	No lane closures permitted on any roadways.
Precipitation: 50-100% chance Accumulation: Up to 6 inches of snow or up to 1/4 inch of ice Ambient or Pavement Temp: 15-19	4	Salting/Plow Operation; Includes Plowing Subdivisions & Sanding as Necessary	No lane closures permitted on any roadways.
Precipitation: 50-100% chance Accumulation: More than 6 inches of snow or more than 1/4 inch of ice Ambient or Pavement Temp: 10-14	5	Salting/Heavy Plow Operation; Includes Plowing Subdivisions & Sanding as Necessary. ALL RESOURCES ARE DEPLOYED!	No lane closures permitted on any roadways.