



Virginia Department of Transportation

TECHNICAL REQUIREMENTS

U.S. Route 460 Corridor Improvements Project

through the

Public-Private Transportation Act

Addendum #1

TABLE OF CONTENTS

PURPOSE.....1

1.0 PROJECT MANAGEMENT.....2

1.1 Overview.....2

1.2 Project Administration.....2

1.3 Project Development Plans.....12

1.4 Schedules.....15

1.5 Standards and Specifications.....22

1.6 Project Right of Way.....23

1.7 Utilities.....26

1.8 Work Restrictions.....29

1.9 Maintenance of Traffic (MOT).....31

1.10 Reporting.....34

1.11 Third Parties and Permitting.....36

1.12 Emergency Services.....38

1.13 Safety.....39

2.0 PUBLIC INFORMATION AND COMMUNICATIONS.....42

2.1 Background.....42

2.2 Coordination.....42

2.3 Identification of Key Stakeholders.....42

2.4 Public Involvement and Information.....42

2.5 Contact with Governmental Authorities.....44

2.6 Media Relations.....44

2.7 Communication between the Department and the Concessionaire.....44

2.8 Crisis Communications.....45

3.0 DESIGN AND CONSTRUCTION REQUIREMENTS.....46

3.1 General.....46

3.2 Environmental.....48

3.3 Survey.....59

3.4 Geotechnical.....61

3.5 Hydraulics.....68

3.6 Roadway Design.....73

3.7 Bridges and Structures.....79

3.8 Railroad Design.....81

3.9 Miscellaneous Design and Construction.....81

3.10 Context Sensitive Design.....84

3.11 Traffic Control Devices.....86

3.12	Security	90
4.0	TOLLING AND TRAFFIC MANAGEMENT	91
4.1	General Information.....	91
4.2	Business and Toll Operating Model	91
4.4	ETTM System and TMS Design Documentation	93
4.5	ETTM System.....	94
4.6	Violation Enforcement System.....	94
4.7	Technical Shelters.....	95
4.8	Project ETTM Facility	95
4.9	Traffic Management System.....	96
4.10	Closed Circuit TV (CCTV) Video Coverage.....	97
4.11	Video based Automated Incident Detection Systems (AIDS).....	98
4.12	Video Recording	98
4.13	CCTV Communications Standards.....	98
4.14	Traffic Monitoring Sensors.....	99
4.16	Traffic Management System (TMS) Availability	99
4.17	Communications Infrastructure	99
4.18	Power	100
4.19	Interface with the Department System.....	100
4.20	Data Processing Capacity	101
4.21	Alarm reporting.....	102
4.22	Performance Recording and Reporting.....	102
4.23	Testing.....	102
4.24	Standards.....	103
4.25	Department obligations.....	103
5.0	OPERATIONS, MAINTENANCE, AND TOLLING REQUIREMENTS	104
5.1	General.....	104
5.2	Operations and Maintenance Inspection Requirements.....	104
5.3	Maintenance Requirements.....	106
5.4	Operation Requirements	108
5.5	Tolling Requirements.....	112
5.6	O&M Performance Requirements	115
5.7	Major Maintenance and Handback Requirements.....	117
5.8	Handback Reserve Fund	122

Attachments

- 1.0 Scope of the Project
- 1.3 Project Development Plans
- 1.5a Standards and Specifications
- 1.5b Division 1 Cross-References
- 2.0 Public Information Supplement
- 3.8 Structural Design Criteria
- 5.6 Performance Requirements Baseline Tables
- 5.7 Residual Life Tables

PART 2
TECHNICAL INFORMATION & REQUIREMENTS

PURPOSE

The purpose of this Part 2 is to identify the minimum scope and technical requirements (“Technical Requirements”) to develop and operate the Project. The Work required by the Technical Requirements shall be undertaken by or on behalf of the Concessionaire. Refer to Attachment 1.0 for a general summary of the scope of the Project and the Work.

1.0 PROJECT MANAGEMENT

1.1 Overview

1.1.1 The Concessionaire shall establish and maintain an organization that effectively manages all elements of the Project. This project management effort will be defined and guided by the Project Development Plans (PDP), as described in Section 1.3.

1.1.2 Project management activities, including scope, schedule, cost, and document management, shall be consistent with the Project Work Breakdown Structure (WBS) developed by the Concessionaire.

1.2 Project Administration

1.2.1 General Requirements

1.2.1.1 The Concessionaire shall:

- (a) Manage the planning, execution, and control of the Project;
- (b) Coordinate its activities with the Department, its subcontractors and suppliers, relevant Governmental Authorities and other entities who are directly or indirectly impacted by the Project; and
- (c) Provide documents and reports as required by the Agreement.

1.2.1.2 The Concessionaire's management approach shall provide all components of an effective and efficient management system, including communication and reporting; documentation of the Work; supervision of Work personnel and activities; all tools, facilities and materials; environmental protection and mitigation; safety of Work personnel; interface with stakeholders in accordance with the established communications procedures; and any other management elements needed to produce and document a high-quality, safe, efficient and operable Project that complies with the applicable Law.

1.2.1.3 All prospective Contractors shall prequalify with the Department and shall have received a certification of prequalification.

1.2.2 Department Staffing and Points of Contact

1.2.2.1 The Department will provide a project-specific management structure with a combination of dedicated and shared resources to manage the Department's rights and interests in the Project.

1.2.2.2 Authority of the Department Representative:

- (a) Inspection by the Department Representative shall not relieve the Concessionaire of any obligation to furnish acceptable materials or provide completed construction that is in accordance with the Agreement.

- (b) The Department Representative is authorized to conduct independent inspection and oversight of all work performed and materials furnished, in accordance with the Agreement.

1.2.3 Workers of the Concessionaire and Contractors

1.2.3.1 Workers employed by the Concessionaire and its Contractors shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special or skilled work shall have sufficient experience in such work and in the operation of equipment required to perform it properly and satisfactorily.

1.2.3.2 Any person employed by the Concessionaire or Contractor who, in the opinion of the Department, does not perform his or her work in a proper and skillful manner or is intemperate or disorderly shall, when directed in writing by the Department, be removed by the Concessionaire or Contractor employing the person and shall not be employed again on any portion of the Work without the written approval of the Department. If the Concessionaire fails to remove the person or furnish suitable and sufficient personnel for proper prosecution of the Work, the Department may withhold all monies that are or may become due the Concessionaire and are payable by the Department and may suspend the Work until the Concessionaire has complied with the Department's directive.

1.2.4 Quality Management System

1.2.4.1 The Concessionaire shall be responsible for developing and implementing a quality management system for the Work. The Concessionaire's Quality Management System Plan ("QMSP") shall include at a minimum the requirements identified in these Technical Requirements and in Attachment 1.3.

1.2.4.2 The Concessionaire may use the Department's resources following construction quality control activities where the Department routinely provides these services:

- (a) Offsite inspection, including supplier plant acceptance inspections; and
- (b) Offsite testing, including supplier plant acceptance testing.

1.2.5 Submittals

1.2.5.1 The Concessionaire shall coordinate, deliver, and process all submittals to the Department as required by the Agreement. The Concessionaire shall cause all draft, revised, and final submittals to be accurate, complete, and in a form and at a level of detail that satisfies the Department's submittal requirements.

1.2.5.2 The Concessionaire shall issue to the Department and other appropriate parties, or make available through EDMS, hard copies and electronic copies of all correspondence, meeting minutes, and other external documents (including emails) reflecting or constituting any and all communications with:

- (a) Governmental Authorities;
- (b) Business and Project stakeholders;
- (c) Landowners;
- (d) News media;
- (e) Utilities;
- (f) Railroads; and
- (g) Communities.

1.2.5.3 The Concessionaire shall provide all design and construction communications, submittals and documentation to the Department as required in both hard-copy and electronic files. Whenever the Concessionaire is required to provide submittals, these documents will not be deemed “received” by the Department (thereby triggering the applicable timeframe for review) until both the hard copy and electronic copy have been submitted. These documents may include (but are not limited to) the following items:

- (a) design calculations and analysis;
- (b) mix designs;
- (c) reports, studies, and investigations;
- (d) Project Schedules;
- (e) Design Public Hearing Documentation;
- (f) Design Documentation for Field Inspection and Right of Way
- (g) AFC Documents, Construction Documentation, construction sketches, shop drawings, and diagrams;
- (h) soil boring logs, laboratory test results, quality control records and audits, etc.;
- (i) communications (including all written communication such as correspondence, e-mail, and facsimiles);
- (j) meeting minutes;
- (k) Department Changes (including all related communications and disputes resolution proceedings);
- (l) Design-Build Contract change orders and any other proposed modifications to the Design-Build Contract;
- (m) Governmental Approvals; and
- (n) insurance policies.

1.2.5.4 The Concessionaire shall use computer software and applications for its work that is compatible with that used by the Department. The Concessionaire shall

coordinate the software and versions to be used with the Department to ensure continuity of efforts.

1.2.5.5 Design submittals shall be submitted in .pdf format and hard copy. The AFC Documents shall include the CADD files in dgn and pdf formats and hard copy. Document review timelines will begin when the Department has received both the electronic file and hard copy.

1.2.5.6 The Department may request the CADD .dgn files at interim design submittals to facilitate review.

1.2.5.7 The Concessionaire shall transfer all electronic document submittals into the Electronic Document Management System (“EDMS”) as described in Section 1.2.9 below. The file transfer shall be conducted as follows:

- (a) The Concessionaire shall not include any files as attachments to electronic mail (e-mail) messages.
- (b) E-mail may be used to notify the Department of the availability of the document files, and if a file transfer website is used, the e-mail must include a link to the document file to facilitate access and download.

1.2.5.8 Whenever the Concessionaire is obligated to make a submittal to the Department, the Concessionaire shall also provide a copy of the submittal to the Independent Engineer.

1.2.5.9 Whenever the Concessionaire is obligated to make a submittal to the Independent Engineer pursuant to the Independent Engineer Agreement, the Concessionaire shall to provide a duplicate to the Department.

1.2.5.10 The Concessionaire shall include in the Initial Baseline Schedule and in all other Project Schedules all proposed submittals of Design Documentation and Construction Documentation setting forth dates for submittal and the Department’s review and approval and identifying priorities.

1.2.5.11 Whenever the proposed submittal, review or approval dates for any Design Documentation or Construction Documentation change, the Concessionaire shall identify such changes on the Monthly Progress Schedule.

1.2.5.12 AFC Documents submitted for the Department’s approval, such as roadway or bridge plans, may be submitted in logical subsections (such as from bridge to bridge) and consisting of work packages such as: 1) clearing and grubbing along with erosion and siltation control, grading and drainage, 2) paving, 3) traffic control devices, and 4) maintenance of traffic. Individual bridge plans may be submitted in logical components such as: 1) foundation, 2) remaining substructure, and 3) superstructure. When submitting AFC Documents for approval, the Concessionaire shall assemble such submittals into comprehensive and self-contained packages that are capable of complete review. Where an

AFC Document submittal is made for part of the Project before the design of the entire Project has been completed, the submittal shall identify interfaces and dependencies with those parts of the design that are not yet complete, and shall show the status of the Concessionaire's design review for all interdependent design activities.

1.2.5.13 Whenever the Concessionaire submits Design Documentation or Construction Documentation for the Department's review before such documentation is deemed by the Concessionaire to be an AFC Document, the documentation shall be clearly marked "not for construction".

1.2.5.14 If the Concessionaire makes multiple submittals, the Concessionaire shall indicate to the Department and the Independent Engineer the priority assigned to each submittal to expedite review by the Department and the Independent Engineer. If the Concessionaire provides multiple, concurrent submittals, or if a submittal is voluminous or addresses complex issues, the Department shall provide its initial response within 21 days (which response shall not be binding on the Department), as well as an estimate for the time required to complete its review of the submittal. The Concessionaire and the Department shall coordinate their submittal and review schedules for such submittals, and any additional time required by the Department shall not be a basis of a Claim by the Concessionaire under the Agreement. Submittals of updates to the Baseline Schedule and Time Impact Analyses are examples of complex issues that may require more than 21 days for review.

1.2.5.15 Whenever the Concessionaire is obligated to make a submittal pursuant to this Section 1.2.5, the Concessionaire shall include with such submittal the signed cover sheets described below.

- i. A cover sheet, signed by the Concessionaire Representative, that includes the following certification:
 - a. The Concessionaire certifies the [description of submittal] was prepared by professionals having the requisite qualifications, skills, and experiences needed to prepare the submittal in accordance with Good Industry Practice and requirements of the Agreement.
 - b. The Concessionaire certifies that it has reviewed the submittal for completeness; the submittal accurately depicts the Work to be undertaken or performed; and the submittal was prepared in accordance to, and otherwise complies with:
 1. the Agreement (including Good Industry Practice);
 2. the Technical Requirements;
 3. the QMSP;
 4. Applicable Law; and
 5. Governmental Approvals.

- ii. A cover sheet, signed by the Contractor who prepared or is otherwise in responsible charge of the submittal, that includes the following certification:
 - c. The [name of Contractor], which is under contract with the Concessionaire or one of its Contractors to perform services related to the Agreement, certifies that it prepared or is otherwise in responsible charge of the [description of submittal].
 - d. The [description of submittal] was prepared by professionals having the requisite qualifications, skills, and experiences needed to prepare the submittal in accordance with Good Industry Practice and requirements of the Agreement.
 - e. The [description of submittal] accurately depicts the Work to be undertaken or performed and the submittal was prepared in accordance to, and otherwise complies with:
 - 1. the Agreement (including Good Industry Practice);
 - 2. the Technical Requirements;
 - 3. the QMSP;
 - 4. Applicable Law; and
 - 5. Governmental Approvals.

1.2.6 Plans and Working Drawings General Requirements

1.2.6.1 This Section 1.2.6 describes requirements for the preparation and submittal of plans produced by the Concessionaire, including drawings in connection with the Project that are deemed by the Concessionaire to be AFC Documents (working drawings).

1.2.6.2 All plans and working drawings shall be prepared in accordance with the most recent version of the VDOT's *Road Design Manual, Vol I*, VDOT's *CADD Manual* and VDOT's I&IM and VDOT's *Manual of Structure and Bridge Division, Vol. V, Part II, Design Aids and Typical Details*. Working drawings shall be furnished by the Concessionaire with appropriate signature blocks and Professional Engineer seal on the title sheets indicating approval for construction.

1.2.6.3 The Concessionaire shall submit all plans in electronic format using the latest versions of MicroStation and Geopak CADD software compatible with Department software at the time of submittal. The Department will furnish electronic files of all applicable standard detail sheets upon request by Concessionaire. The Concessionaire's files shall use standard Department cell libraries, level structures, linetypes, text fonts, and naming conventions as described in the most recent version of the VDOT *CADD Manual* and VDOT's *Manual of the Structure and Bridge Division, Vol. V- Part 2, Design Aids and Typical Details*. Any files furnished to Concessionaire in electronic format shall be returned

to the Department and removed from Concessionaire's computer equipment upon completion of this Project.

1.2.6.4 All drawings submitted for the Department's review or approval shall show such details as are necessary to give a comprehensive understanding of the work specified. Except as otherwise shown on the plans, dimensions shown on the plans are measured in the respective horizontal or vertical planes. Dimensions that are affected by gradients or vertical curvatures shall be adjusted as necessary to accommodate actual field conditions and shall be specifically denoted on the working drawings.

1.2.6.5 The Concessionaire shall maintain a set of working drawings for the Department and the Independent Engineer in accordance with the Agreement and the Technical Requirements. The Department may, during the progress of the Work, identify specific elements that it determines to be important and that shall be added to the schedule of submittals.

1.2.6.6 Working drawings shall not incorporate any changes from the requirements of the Agreement unless the changes are specifically denoted, together with justification, and are approved in writing by the Department. The Concessionaire shall identify working drawings and submittals by the complete state project and job designation numbers. Items or component materials shall be identified by the specific item number and specification reference in the Agreement.

1.2.6.7 A Professional Engineer shall certify working drawings for falsework supporting a bridge superstructure; concrete structures and pre-stressed concrete members; lighting, signal, and pedestrian poles; sign structures; breakaway support systems; anchor bolts; and foundations.

1.2.6.8 The Concessionaire shall provide six sets of submittals for which the Department's approval is required in accordance with the Agreement. The Department will return reviewed working drawings to the Concessionaire within the applicable timeframes set forth in the Agreement. The Concessionaire shall make the necessary submittals at appropriate times to enable review and approval by other entities/agencies such as railroads and municipalities.

1.2.6.9 The Concessionaire shall provide the Department with six full size sets and two half size sets of each submission of AFC Documents following approval by the Department.

1.2.7 Working Drawings Particular Requirements

1.2.7.1 Steel Structures

Each sheet of working drawings for any structure shall be completely dimensioned, and all elevations necessary for construction purposes shall be shown. The Concessionaire shall provide complete details for steel structures or steel components, showing all sizes and overall

dimensions of members, number and arrangement of all fasteners at joints, type and size of welds.

Working drawings for steel structures, including metal handrails, shall consist of shop detail, erection, and other working drawings showing details, dimensions, sizes of units, and other information necessary for the fabrication and erection of metal work. Such drawings shall be signed and sealed by a Professional Engineer.

1.2.7.2 Falsework

A Professional Engineer shall certify working drawings for falsework supporting a bridge superstructure; concrete structures and pre-stressed concrete members; lighting, signal, and pedestrian poles; sign structures; breakaway support systems; anchor bolts; and foundations.

1.2.7.3 Concrete Structures and Prestressed Concrete Members

Working drawings for concrete structures and prestressed concrete members shall provide such details as required for the successful prosecution of the work. Drawings shall include plans for items such as prestressing strand details and elongation calculations, location of lift points, falsework, bracing, centering, form work, masonry, layout diagrams and bending diagrams for reinforcing steel when necessary or when requested. Such drawings shall be signed and sealed by a Professional Engineer.

1.2.7.4 Lighting, signal and pedestal poles, overhead and bridge mounted sign structures, breakaway support systems, anchor bolts, framing units, panels, and foundations

Prior to fabrication or construction, the Contractor shall submit for review one original and six copies of each working drawing and design calculation for lighting, signal and pedestal poles, overhead and bridge mounted sign structures, breakaway support systems, anchor bolts, framing units, panels, and foundations. All sheets of these submittals shall include the Professional Engineer's signature and seal. Certification for foundations will be required only when the designs are furnished by the Contractor. The designs shall be in accordance with the specific editions of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* as required in *VDOT Road and Bridge Specifications* Section 700. Such designs shall be signed and sealed by a Professional Engineer.

1.2.7.5 Reinforced Concrete Pipe

Prior to manufacture of reinforced concrete pipe, the Concessionaire shall furnish to the Department a certification of the acceptability of the design of such pipe, as determined from a review which shall be made for the Concessionaire by a Professional Engineer. Such certification shall cover all design data, supporting calculations and materials. Pipe designs previously certified or approved by the Department will not require recertification.

1.2.7.6 As-Built Drawings

As a condition of Final Acceptance of the Project, the Concessionaire shall provide to the Department the record drawings of the Project, consisting of two hard-copy sets, one electronic file of each plan in .pdf format, one electronic file of each plan in .tif format, and one electronic file in MicroStation .dgn format of the final Construction Documentation. The as-built documents shall be organized and indexed to facilitate easy retrieval of information and shall be certified by the Concessionaire to reflect the actual condition of the constructed Work.

1.2.8 Location of Offices and Accommodations for Department staff

1.2.8.1 The Concessionaire shall establish a Project office on or adjacent to the Project.

1.2.8.2 The Concessionaire's construction staff shall be located in field offices located on or adjacent to the Project.

1.2.8.3 The Concessionaire shall provide and maintain in a neat, sanitary condition such accommodations for the use of its employees, as well as the employees or agents of the Department, as may be needed to comply with the requirements of applicable Law.

1.2.8.4 The Project office shall include two visitor offices and parking available for five visitors for the use of the Department and FHWA. Each visitor office shall have office equipment and appurtenances required for work activities and internet access and telephone conferencing facilities.

1.2.8.5 The main field office(s) shall contain Type I field office accommodations and satellite field office(s) (i.e., staging areas) shall contain Type III field office accommodations, as described in *VDOT's Road and Bridge Specifications* (Referenced in Attachment 1.5a).

1.2.9 Document Management Systems

1.2.9.1 The Concessionaire shall establish and maintain an Electronic Document Management System (EDMS) to store and record Work Product.

1.2.9.2 In the provision of a document management system, the Concessionaire shall:

- (a) Use data systems, standards and procedures with consistent naming and searching protocols;
- (b) Provide a secure EDMS, such that only authorized users have access and that it is protected from theft, damage, unauthorized or malicious use;
- (c) Provide a mechanism (mutually agreed upon by both parties) for the electronic transfer of meta data along with the associated document in

standard business file format for uploading into the EDMS employed by the Department;

- (d) Provide the Department with procedures for accessing all Work Product. All electronic information submitted to the Department shall be searchable and legible;
- (e) Provide a mechanism to notify the Department of the addition of new data to the EDMS, its status and any review, comment or approval actions required by the Department;
- (f) Organize data by means of a folder structure that is subject to the Department's approval; and
- (g) Ensure document retention for any minimum statutory periods.

1.2.9.3 The Concessionaire shall adopt an electronic format for O&M Records that is capable of being integrated into the EDMS.

1.2.10 Project Meetings

1.2.10.1 The Department's and the Concessionaire's project manager and senior representatives and other pertinent representatives of the parties shall meet within 10 days after the Agreement Date to discuss issues affecting the administration of the Work and to implement the necessary procedures, including those relating to submittals and approvals, to facilitate the ability of the parties to perform their obligations under the Agreement.

1.2.10.2 Within 14 days after the Design Work Commencement Approval, the parties and their respective representatives shall conduct a pre-construction meeting to discuss the Concessionaire's planned construction operations. At the pre-construction meeting, the parties shall discuss, among other things, the sequence of the Work, scheduling, constructability issues, coordination with Governmental Authorities and Utilities, and maintenance of traffic.

1.2.10.3 The Concessionaire shall hold monthly progress meetings with the Department. During such meetings, progress during the prior month, work to be undertaken during the next month, and encountered or anticipated issues shall be reviewed, and the Concessionaire shall collect information from any key Contractors responsible for Work completed during the specified duration and Work scheduled during the upcoming reporting duration. These meetings shall be attended by the Concessionaire Representative and other personnel as requested by the Department, including the Independent Engineer. Meetings will occur monthly beginning the month after the Agreement Date. The Concessionaire shall be responsible for preparing, maintaining and distributing minutes of the meetings to all attendees for review. The meeting minutes shall be provided to the Department within two calendar days after the monthly progress meetings.

1.2.10.4 As part of, and in conjunction with, the monthly meetings required by Section 1.2.10.3 above, the Concessionaire shall provide the Department with any proposed

update of the Baseline Schedule for the Department's review, and, if required by the Technical Requirements, approval, and a progress narrative that describes, at a minimum, the overall progress for the preceding month, a critical path analysis, a discussion of problems encountered and proposed solutions thereof, work calendars, constraints, delays experienced and any pending Time Impact Analysis ("TIA"), float consumption as a result of either Department, Concessionaire, or Design Build Contractor delays, documentation of any logic changes, duration changes, resource changes or other relevant changes. The monthly progress narrative shall also include the following:

- (a) comparisons of actual and planned progress, including: (1) illustrating schedule variance graphically by plotting the budgeted cost of work performed ("BCWP") and the budgeted cost of work scheduled ("BCWS"); and (2) reporting the schedule performance index ("SPI"), defined as the ratio of BCWP divided by BCWS;
- (b) a statement by the Concessionaire that this is the only schedule being executed to perform the Work;
- (c) details of any aspects of the Work which may jeopardize the completion in accordance with the Agreement; and
- (d) measures being (or to be) adopted to overcome such aspects and a list of approvals needed to adopt such measures.

1.2.11 Source of Supply and Quality Requirements

1.2.11.1 Unless otherwise specified, materials, equipment, and components that are to be incorporated into the finished Work shall be new. The Concessionaire shall submit a statement of the origin, composition, and manufacture of all materials to be used in the Work. The Concessionaire's statement shall be electronically submitted by use of Form C-25 at least two weeks before materials are incorporated into the Work.

1.2.11.2 All materials or equipment shall conform to the requirements of the Agreement, and the Concessionaire shall submit test data to document the quality of the material or equipment at least two weeks prior to its incorporation into the Work. The Concessionaire shall change the source of supply and furnish material or equipment from other approved sources if the requirements are not met and shall notify the Department of this change, and provide the same identifying information noted in this section, at least two weeks prior to delivery. Materials shall not contain Hazardous Substances or be furnished from a source containing Hazardous Substances.

1.3 Project Development Plans

1.3.1 Project Development Plan Requirements

1.3.1.1 The Concessionaire shall develop and implement Project Development Plans (PDPs) as defined in this section and Attachment 1.3.

1.3.1.2 The Concessionaire has full responsibility for each PDP and all quality control and quality assurance activities.

1.3.1.3 The Concessionaire shall be responsible for continuous control, quality assurance, and auditing of its PDPs. The Concessionaire shall produce and maintain current documentation showing its internal quality reviews and results including findings of compliance and non-compliance as well as corrective actions taken for situations of non-compliance.

1.3.1.4 The Concessionaire shall facilitate the audit by the Department of all activities described in the PDPs to assess the Concessionaire's compliance.

1.3.1.5 All statements and procedures contained in the PDPs shall be of an auditable nature.

1.3.1.6 PDPs shall:

- (a) Be consistent with ISO principles;
- (b) Be consistent with and contain relevant links to other PDPs;
- (c) Be compatible with and comply with the requirements of the QMSP; and
- (d) Incorporate all of Concessionaire's team structure, such as design, construction, operations, maintenance, consultants, subcontractors and suppliers.

1.3.2 Project Development Plan Contents

1.3.2.1 In addition to the requirements set forth in Attachment 1.3, each PDP shall contain:

- (a) Scope, goals and objectives;
- (b) Procedures for meeting Project requirements, applicable codes, standards, specifications, quality characteristics and regulatory requirements;
- (c) Identification of the individuals (together with their required professional certification and status) responsible for planning, approving, implementing, controlling and monitoring progress of key activities;
- (d) Identification of the resources and competencies required for defined roles and activities for successful execution of the plan, including requirements for staff training;
- (e) Requirements for the maintenance, retention, retrieval, and disposal of records;
- (f) Responsibility for Concessionaire internal review and approval of documents and data;

- (g) Procedures for the control of updates and revisions to each PDP and its processes;
- (h) Requirements and frequency for review and quality management of each PDP to maintain the adequacy and effectiveness of each plan, and ensure that these requirements flow through to PDP revision procedures;
- (i) Quality control and quality assurance procedures and internal audit procedures, including the processes to identify, record and report to the Department any non-conformances; and
- (j) Procedures for corrective action and preventative action reports with respect to non-conformances, including procedures to submit these reports to the Department, the Independent Engineer, and/or make them available to the Department for audit.

1.3.2.2 The PDPs shall be consistent with the requirements of FHWA Major Projects Guidance, March 2007 for Project Management Plans, as may be amended, concerning project management plans required by Section 1904(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Pub. L. 109-59, 119 Stat. 1144), which amended 23 U.S.C. § 106(h) with respect to Major Projects (defined therein to be projects with an estimated total cost of \$500 million or more that receive federal financial assistance).

1.3.3 Project Development Plan Updates

1.3.3.1 The Concessionaire shall continually update and improve the effectiveness of its PDPs and shall identify opportunities for improvement, shall record improvement actions undertaken, and shall include mechanisms for tracking and closeout of the process of PDP updates.

1.3.3.2 A PDP or procedure shall be updated at a minimum, as set forth in Attachment 1.3 and whenever a PDP:

- (a) Does not adequately address the matters it is intended to address;
- (b) Does not conform with the Agreement;
- (c) Has to be revised because an audit by the Concessionaire or by the Department identifies that the PDP does not represent current or appropriate practice;
- (d) No longer represents current or appropriate practice; or
- (e) Is required by the Department to be updated.

1.3.4 Submission and Approval of PDPs

1.3.4.1 The PDPs shall be developed in accordance with the milestones defined in Attachment 1.3.

1.3.4.2 PDPs shall be approved by the Department before implementation and following changes that materially affect the prosecution of the Work or operation of the Project. PDPs and amendments shall be submitted to the Department for approval on or before the dates set forth in Attachment 1.3 and no later than 30 days before the Concessionaire undertakes any Work that is described or controlled by a PDP.

1.3.4.3 Subject to the constraints on simultaneous submittals set forth in Section 1.2.5, the Department undertakes to review a PDP and provide its approval or disapproval together with any comments accompanying disapproval to the Concessionaire within 21 days of receipt.

1.3.4.4 Reasons for the Department's disapproval of a PDP include:

- (a) The PDP does not meet the requirements of the Agreement including this Section 1.3; or
- (b) The PDP is inconsistent with a requirement of an Outline Project Development Plan.

1.4 Schedules

1.4.1 Project Schedules

1.4.1.1 Purpose, Format, and Content of the Project Schedule:

- (a) Terms not defined herein or in the Agreement shall have the same meanings ascribed to them in the AACE International Recommended Practice No. 10S-90 ("Cost Engineering Terminology").
- (b) The purpose of the Project Schedule is to ensure that adequate planning, scheduling, and resource allocations occur to provide a reasonable and executable work plan, cash flow projections, and continuous monitoring and reporting for Work performed or remaining. The Baseline Schedule and the monthly updates to the Project Schedule shall be used for coordinating the Work, monitoring the progress of Work performed, identifying Work to be performed, evaluating changes, and utilized as a tool for measuring progress.
- (c) The Project Schedule shall consist of the Initial Baseline Schedule, the Baseline Schedule, the Project Schedule Updates, Project Recovery Schedule, and the As-Built Schedule.
- (d) The Initial Baseline Schedule is the Concessionaire's conceptual plan for the design and construction of the Project and is attached as Exhibit B-2 to the Agreement. This schedule shall be used to monitor performance of the Work until the Baseline Schedule is approved by the Department pursuant to Section 1.4.2 below.

- (e) The Department shall review submittals of the Project Schedule in accordance with AACE International Recommended Practice No. 29R-02 (“Forensic Schedule Analysis”).

1.4.1.2 General Requirements:

In the Project Schedule, the Concessionaire shall:

- (a) ensure that the actual number of activities in the schedule is sufficient to assure adequate planning of the Work and to permit monitoring and evaluation of progress and perform the analysis of alleged time impacts;
- (b) ensure that design activities identify AFC Document packages;
- (c) apply the Critical Path Method (“CPM”) of network calculation to generate the Project Schedule and prepare the Project Schedule using the Precedence Diagram Method (“PDM”) to establish relationships and interdependencies between the individual activities required to complete the Project;
- (d) ensure that activity identification numbers, textual descriptions, and codes are consistently applied in the Project Schedule and are unique for each specific activity;
- (e) divide all Work prior to Final Acceptance into activities with appropriate logic ties to show the Concessionaire’s overall approach to sequencing, include logical relationships between activities reflecting the Concessionaire’s actual intended sequence of Work, logically tie all activities to avoid open ends, and shall not use imposed constraint dates to begin or complete any activity unless such dates are called for specifically in the Agreement;
- (f) show the Project milestones including the issuance of Design Work Commencement Approval, Construction Work Commencement Approval, and the Guaranteed Substantial Completion Date;
- (g) show phasing of the Work as detailed in the plans, subcontractor work, procurement, fabrication, delivery, installation, testing of materials and equipment, commissioning of systems, and any long-lead time orders for major or significant materials and equipment;
- (h) allocate an estimated cost/planned value to each lowest level elements of the Work Breakdown Structure (“WBS”);
- (i) depict the required coordination with and work to be performed by other Contractors, Utility owners, Governmental Authorities, engineers, architects, subcontractors, and suppliers;
- (j) identify Governmental Approvals required and the dates by which such approvals are necessary;
- (k) incorporate the ROW Acquisition and Relocation Plan; and
- (l) with each submission of the Project Schedule, the Concessionaire also shall include:

1. Two sets of compact disks containing an electronic working copy of the Project Schedule (in XER file format). Each submission shall have a unique file name to indicate the type and order of submission. Each compact disk shall be labeled to indicate the type of submission, file name, and schedule data date.
2. A narrative progress report of the Project Schedule that describes, at a minimum, the Concessionaire's plan of operation for meeting the interim milestones and the Guaranteed Substantial Completion Date, an evaluation of the Critical Path, a discussion of Project-specific issues encountered since the last submission as such issues relate to the schedule, proposed solutions thereof, work calendars, constraints, delays experienced, and the status of any submitted or pending Time Impact Analyses, float consumption, documentation of any logic changes, duration changes, resource changes or other relevant changes.
3. Time-scaled logic diagram indicating the Critical Path, early start and early finish dates, Total Float, sorted and grouped by the WBS.
4. Tabular schedule reports sorted by total Float, work areas, and a detailed predecessor and successor report sorted by activity number. The Tabular Schedule Reports also must include the Schedule of Values and major work item quantities generated from the Project Schedule. For each WBS, the cost reports shall depict the activity number, description, original duration, percentage completion, original budgeted cost, cost this period, cost to date, and cost to complete.
5. Earning schedule or cash flow projection that depicts the monthly projections generated from the Project Schedule. The earning schedule or cash flow projection curve shall depict the cumulative values for the budgeted cost of work scheduled ("BCWS") for the Project to date and the monthly projections through Final Acceptance.

1.4.1.3 For each occurrence of Major Maintenance or construction of a Department or Concessionaire Project Enhancement during the Operating Period, the Concessionaire shall follow the principles above for the preparation and approval of a Project Schedule relating to such work and will perform progress monitoring and reporting.

1.4.1.4 The scheduling software employed by the Concessionaire shall be compatible with the Department's scheduling software. The Concessionaire shall implement any new operating practices as a result of the Department's amendments to any such software, standards, and procedures. The Concessionaire's scheduling software must have

the capability to import and export data in the Primavera proprietary exchange format (XER). As of the Agreement Date, the Department's scheduling software is the latest version of Primavera's Project Management software (currently P6 version 6.1).

1.4.1.5 Float available in the Project Schedule, at any time, shall not be considered for the exclusive use of either the Department or the Concessionaire. During the course of the Work, any Float generated due to the efficiencies of either party is not for the sole use of the party generating the Float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather is less than expected, will also contribute to the reserve of Float. A schedule showing work completing in less time than the Guaranteed Substantial Completion Date, and accepted by the Department, will be considered to have Project Float. Project Float will be a resource available to both the Department and the Concessionaire.

1.4.2 The Baseline Schedule

1.4.2.1 Within 60 days of issuance by the Department of the Design Work Commencement Approval, the Concessionaire shall submit to the Department for its review and approval a proposed Baseline Schedule, which shall include the Concessionaire's detailed plan for design and construction of the Project. The Concessionaire shall develop its proposed Baseline Schedule from the Initial Baseline Schedule. The Concessionaire shall submit to the Department six hard copies (printed on 11" by 17" paper) of its proposed Baseline Schedule, along with a CD version (2 copies) of the proposed Baseline Schedule created in the Primavera proprietary exchange format (XER).

1.4.2.2 The Concessionaire shall address any and all comments received from the Department on the proposed Baseline Schedule until the Department approves the proposed Baseline Schedule. Upon approval by the Department, the proposed Baseline Schedule will become the Baseline Schedule.

1.4.2.3 The Baseline Schedule shall include a well organized WBS, the development of which is based on a deliverable-oriented methodology that captures all the Project activities. The WBS shall allow schedule summarization at a minimum of four hierarchical WBS Levels, such as: Project areas (Level 1), WBS elements (Level 2), work packages and deliverables (Level 3) and the detail control level (Level 4) to which the individual schedule activities are assigned their WBS code.

1.4.2.4 Activities in the Baseline Schedule shall be assigned project-specific activity codes.

1.4.2.5 The Baseline Schedule shall include all major activities of the Work in sufficient detail to enable the IE and the Department to monitor and evaluate design and construction progress from Design Work Commencement Approval until Final Acceptance.

1.4.2.6 The Baseline Schedule shall include separate activities for major submittals proposed by the Concessionaire, together with appropriate activities for the Department's review or approval, provided that such review and/or approval times by the Departments shall be no less than the time provided for such reviews in the Agreement.

1.4.2.7 The Baseline Schedule shall be resource-loaded, broken down into work packages and deliverables generally completed in not less than one but no more than 30 days (unless such deliverable is a procurement or other non-construction activity), with dollar value (price) of each lowest level element of the WBS identified. The total cost loaded into the Baseline Schedule shall be equal to the total cost of the Design-Build Contract.

1.4.3 Monthly Progress Reports and Project Schedule Updates

1.4.3.1 The Project Schedule will be current, reflecting actual progress at the time of submittal to the Department and will be kept current and submitted as a component of the Monthly Progress Report (further described below).

1.4.3.2 The Monthly Progress Report shall describe the work performed since the previous update as well as the Concessionaire's plan for accomplishing the remaining Work. It shall describe the current status of the Project and any deviations from scheduled performance as well as the causes and effects of the deviations. It shall also describe any progress deficiencies or schedule slippages as well as any actions taken or proposed to avoid or mitigate the progress deficiencies or schedule slippages.

1.4.3.3 Monthly Progress Reports shall have a reporting period ending on the last day of each calendar month on or before the 15th of the month following the reporting period. The Monthly Progress Report shall be submitted in accordance with this [Section 1.4.3.3](#) for the Department's review and comment on document/Project issues that will require updates by the Concessionaire. .

1.4.3.4 The Department will notify the Concessionaire of corrections required within five days of receipt of an acceptable submission.

1.4.3.5 Project Schedule Updates:

- a) Concessionaire shall update the Project Schedule monthly to reflect actual progress to date and to forecast progress going forward (the "Project Schedule Updates"). The Project Schedule Update shall be submitted as an attachment to the Monthly Progress Report. The last day of the reporting period shall be the status date or data date used to calculate the schedule. Project Schedule Updates shall comply in all respects with the schedule requirements set forth in this section.
- b) The Initial Baseline Schedule will be the basis for Project Schedule Updates until such time as the Baseline Schedule is approved by the

Department. Thereafter the Baseline Schedule shall be the basis for Project Schedule Updates.

- c) Project Schedule Updates shall depict activities that have started, are on-going, or completed as of the new data date; show actual start dates for activities that have started; and actual finish dates for completed activities.
- d) Project Schedule Updates shall depict percent complete for on-going activities. Activity percent complete for work-in-place shall be based on the amount of work completed relative to the total amount of work planned for the activity (cumulative actual dollar value of work completed relative to the total contract value allocated to the activity).
- e) Project Schedule Updates shall depict remaining duration for on-going activities. Remaining duration for unfinished activities shall be based on the amount of time required to complete the remaining work as of the new data date.
- f) Activity relationships for the remaining activities shall be modified as necessary to correct out-of-sequence progress for on-going activities or to reflect the Concessionaire's current plan for completing the remaining Work.
- g) Changes to the Project Schedule shall be documented in the Monthly Progress Report. Such changes include: additional, revised or deleted activities, durations, calendar assignments, or logic ties.
- h) The Project Schedule Update submitted with the last Monthly Progress Report will be identified by the Concessionaire as the As-Built Schedule.

1.4.4 Revisions to the Baseline Schedule

1.4.4.1 If the Department believes the Baseline Schedule needs a specific revision either in logic, activity duration, WBS, manpower, or cost due to Delays, Department Changes, Project Recovery Schedules, or other events that materially impact the schedule, the Department will request in writing the Concessionaire to make such revisions. The Concessionaire shall make such revisions within seven days after receiving the Department's request. Once approved, this update shall then become the revised Baseline Schedule. At no time shall the Concessionaire continue to reflect an item of non-concurrence from the Department in the updates to the Baseline Schedule.

1.4.4.2 In the event of a Department Change or a Delay Event for which the Department grants relief from the Guaranteed Substantial Completion Date to the

Concessionaire in accordance with the terms of the Agreement, the Baseline Schedule shall be revised and submitted to the Department for approval in accordance with Section 1.4.2 above.

1.4.5 Project Recovery Schedule

1.4.5.1 Pursuant to Section 8.14 of the Agreement, whenever the Project Schedule Update shows the Guaranteed Substantial Completion Date has 60 days of negative float, the Concessionaire shall submit a Project Recovery Schedule to the Department for approval. Project Recovery Schedule submittals shall include a list of all activities changed, added or deleted along with all logic changes, and an accompanying narrative explaining the nature of the changes.

1.4.5.2 Once a Project Recovery Schedule is reviewed and approved by the Department, with no exceptions, it shall become the Baseline Schedule and be used as the basis for subsequent Project Schedule Updates. The Concessionaire shall archive all approved Project Schedules.

1.4.6 Time Impact Analysis (“TIA”) for Proposed Extensions of Time

The following shall apply if a Time Impact Analysis (“TIA”) is required by the Agreement:

1.4.6.1 The TIA shall be based on the date on which the alleged Delay Event is claimed to have occurred, or, in the event of a proposed Department Change, the date on which such Department Change was delivered to the Concessionaire.

1.4.6.2 The TIA shall show the current status of the Work using the current Baseline Schedule. The time computation of all affected activities shall be shown in the TIA along with a demonstration of steps used to mitigate impacts.

1.4.6.3 Each TIA shall include a Fragmentary Network (“fragnet”) demonstrating how the Concessionaire proposes to incorporate the impact into the Baseline Schedule. A fragnet is defined as the sequence of new activities and/or activity revisions, logic relationships, and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Concessionaire shall insert the fragnet into the Baseline Schedule, run the schedule calculations, and submit the impacted schedule in accordance with this section. The Concessionaire shall include a narrative report describing the effects of new activities and relationships to Agreement milestones and the Guaranteed Substantial Completion Date with each TIA.

1.4.6.4 The Concessionaire shall not be entitled to any extension of the Guaranteed Substantial Completion Date automatically as the result of an activity delay. The Concessionaire recognizes that certain events will not affect the existing critical activities or

cause non-critical activities to become critical, thereby not causing any effect on the Guaranteed Substantial Completion Date.

1.4.6.5 Two copies of each TIA report together with an electronic file (in XER file format) of the Project Schedule impact analysis shall be submitted to the Department in accordance with the applicable section of the Agreement.

1.4.6.6 Upon approval, a copy of the TIA signed by the Department will be returned to the Concessionaire and incorporated into the next update to the Baseline Schedule.

1.4.6.7 The approved TIA related to a Department Change shall be incorporated into, and attached to the applicable Change Order.

1.5 Standards and Specifications

1.5.1 General Requirements

1.5.1.1 The Work shall conform to the Agreement, these Technical Requirements and the standards, specifications, guides, Special Provisions and Special Provision Copied Notes (hereafter referred to as “standards and specifications”) as listed in Attachment 1.5a. The order of precedence in the event of conflict between documents is set forth in Article 26 of the Agreement.

During the Work Period the Work shall be performed in accordance with the version and publication date of the standards and specifications as set forth in Attachment 1.5a. If the publication date of a document is not stated in Attachment 1.5a then the most current published version (in print or electronic media) as of the Agreement Date shall apply. In addition, all supplements, errata, revisions, and interims for those publications, whether published prior to or after the Agreement Date, shall apply.

Where the Concessionaire’s design requires design methods or construction procedures not covered by any of the standards and specifications set forth in Attachment 1.5a, the Concessionaire shall obtain the Department’s approval before using these methods or procedures.

1.5.1.2 During the Operating Period the Work shall be performed in accordance with the current published version of the standards and specifications as set forth in Attachment 1.5a (in print or electronic media) at the time the Work is performed. In addition, all supplements, errata, revisions, replacements and interim versions for those publications that are in effect at the time of the Work shall apply.

1.5.1.3 Unless specified otherwise in the Agreement, the Concessionaire shall provide for the Department’s review of the functional classifications, design speeds, special load requirements, design criteria, and other applicable design issues using the Technical Requirements and the standards and specifications set forth in Attachment 1.5a.

1.5.1.4 The Concessionaire shall submit proposed design exceptions and design waivers in accordance with the procedures set forth in Section 3.1.3.

1.5.1.5 “Division I – General Provisions” of the Department’s Road and Bridge Specification (“Division I”) shall not apply to the Project and are superseded by the Agreement and Technical Requirements. Where sections of Division I are referenced in the Standards and Specifications identified in Attachment 1.5a of the Technical Requirements, the Concessionaire shall refer to the corresponding provisions of the Agreement and Technical Requirements, if any, identified in Attachment 1.5b.

1.6 Project Right of Way

1.6.1 The Concessionaire shall act on behalf of the Commonwealth of Virginia and provide all Project Right of Way (ROW) acquisition services, including those related to Utility Relocations. ROW acquisition services shall include appraisal, appraisal review, negotiations, relocation assistance services, title examinations, closings and legal services.

1.6.2 All appraisers and acquisition firms shall be selected from the Department’s pre-approved list. The Department will retain authority for approving just compensation, relocation benefits, and settlements. The Concessionaire shall not initiate or make any offers to acquire the property prior to receiving a Notice to Commence Right of Way Acquisition from the Department for the affected parcel(s). Further, the Concessionaire shall not commence construction on the property prior to receiving Construction Segment Approval from the Department for the affected parcel(s). The Concessionaire shall carry out the responsibilities as follows:

1.6.2.1 The Concessionaire shall acquire property in accordance with all applicable Federal and State laws and regulations, including but not limited to the Uniform Relocation and Real Property Acquisition Policies Act of 1970, as amended (the “Uniform Act”) and Titles 25.1 and 33.1 of the 1950 Code of Virginia, as amended. The acquisition of property shall follow the guidelines as established by the Department and other State and Federal authorities and the VDOT *Right of Way Manual*.

1.6.2.2 The Department will designate a hearing officer to hear any relocation assistance appeals. The Department agrees to assist with any out of state relocation by persons displaced within the Project Right of Way by arranging with such other state(s) for verification of the relocation assistance claim.

1.6.2.3 In accordance with Section 1.3, the Concessionaire shall submit a Right of Way Acquisition and Relocation Plan which details the procedures for handling Project Right of Way acquisitions and relocations to the Department for approval prior to commencing Project Right of Way activities. These procedures are to show the Concessionaire’s methods, including the appropriate steps and workflow required for title examinations, appraisals, review of appraisals, negotiations, and relocation. These procedures shall include an

appropriate time allowance for the Department to review and approve just compensation, approve relocation benefits, and approve administrative settlements.

1.6.2.4 For the purpose of the following description of the review and approval process, the term “acquisition package” shall mean a complete package of documentation and information for the acquisition of a parcel for the Project Right of Way that is subject to the Department’s review and approval, including: the required identification information for each parcel, the legal description of the parcel adequate to effect the desired acquisition of the parcel, the title examination report, a copy of the appraisal report and all supporting documentation, the proposed initial offer letter, memorandum of agreement or similar, and any other forms required by the Department’s Right of Way and Utilities Management System (“RUMS”). The required forms, letters, etc. for all ROW activities are located within RUMS.

1.6.2.5 In developing the Right of Way Acquisition and Relocation Plan, the Concessionaire shall incorporate adequate time periods for the Department’s review and approval of acquisition packages. The Concessionaire may assume that the reviews performed by the Department will require a minimum 21 days for submittals that are final and complete, up to a maximum of five acquisition packages.

1.6.2.6 For any submittals that would require the Department to review more than five acquisition packages within any 21 day period, the Department may defer its review of any such acquisition packages to a subsequent 21 day period (or periods as necessary). The Department will notify the Concessionaire of its election to defer any excess acquisition packages within 10 days after receipt. The balance of acquisition packages in excess of five will be rolled over to the next 10 day period and added to the acquisition package submittals made by the Concessionaire in that period.

1.6.2.7 If the Department notifies the Concessionaire that any submitted acquisition package has a deficiency, the Concessionaire shall correct such deficiency and resubmit the package to the Department, which resubmissions shall be treated as a new acquisition package as described above. An acquisition package shall be deficient, as determined by the Department, if any of its components fails to meet any of the criteria established by this section for such component, or contains any material errors or omissions.

1.6.2.8 The ROW Acquisition and Relocation Plan shall identify a schedule of Project Right of Way activities including the specific parcels to be acquired and all relocations. The plan shall allow for the orderly relocation of displaced persons based on time frames not less than those provided by the “Uniform Act.” This plan shall be updated as necessary during the life of the Project. The ROW Acquisitions and Relocation Plan shall contain an exhibit depicting the Project Right of Way. Attachment 1.3 includes additional information that must be included in the plan.

1.6.2.9 The Concessionaire shall obtain access to and use RUMS to manage and track the acquisition process. RUMS shall be used for Project status reporting; therefore, entries in RUMS shall be made in a timely manner to accurately reflect current Project status.

The Department standard forms and documents, as found in RUMS, shall be used. Any proposed changes to the forms and documents shall be submitted to the Department for review and approval. Training in the use of RUMS and technical assistance will be provided by the Department.

1.6.2.10 The Concessionaire shall provide a current title examination (no older than sixty days) for each parcel at the time of initial offer to landowner. Each title examination report shall be prepared by a Department-approved title company in accordance with VDOT's *Right of Way Manual* and shall include title insurance. Should the Concessionaire select a law firm to certify title examinations, the certifying attorney shall show evidence of professional liability insurance. The Department reserves the right to determine if the professional liability insurance coverage is sufficient. If any title examination report has an effective date that is older than sixty days, an update shall be required from the Concessionaire prior to making an initial offer to the landowner.

1.6.2.11 The Concessionaire shall prepare appraisals in accordance with VDOT's *Appraisal Guidelines*.

1.6.2.12 The Concessionaire shall provide appraisal reviews complying with technical review guidelines of VDOT's *Appraisal Guidelines* and make a recommendation of just compensation. The reviewer shall be approved by the Department and shall be on the Department's approved fee appraiser list. The Department shall have final approval of all appraisals. The Department must approve any settlements above the most recent approved appraisal.

1.6.2.13 The Concessionaire shall make direct payments of benefits to property owners for negotiated settlements, relocation benefits, and payments to be deposited with the court. A check in the amount of the negotiated acceptance or the certificate amount shall be submitted with the Acquisition Report (RW-24).

1.6.2.14 The Concessionaire shall prepare, obtain execution of, and record documents conveying title to such properties to the Commonwealth and deliver all executed and recorded general warranty deeds to the Department. For all property purchased for the Project, title shall be acquired in fee simple (except that the Department may, in its sole discretion, direct the acquisition of a Right of Way easement, in lieu of fee simple title, with respect to any portion of the rights of way) and shall be conveyed to "Commonwealth of Virginia, Grantee" by a Department-approved general warranty deed, free and clear of all liens and encumbrances except encumbrances expressly permitted by the Department in writing in advance. All easements, except for private utility company easements, shall be acquired in the name of "Commonwealth of Virginia, Grantee". Private utility company easements shall be acquired in the name of each utility company, except in cases where eminent domain is invoked.

1.6.2.15 The Concessionaire acknowledges that in all offers, negotiated settlements and acquisitions of Project Right of Way it is acting as an agent on behalf of the Commonwealth. The Department shall therefore make the ultimate determination in each

case as to whether settlement is appropriate or whether the filing of a condemnation action is necessary, taking into consideration the recommendations of the Concessionaire. The Concessionaire shall not request the filing of a certificate until the landowner has been given a minimum of 30 days to consider the offer or the landowner terminates negotiations. When the Department authorizes the filing of a certificate, the Concessionaire shall prepare a Notice of Filing of Certificate. All required documents necessary to file a certificate shall be forwarded to the Department Representative, who will coordinate review and approval. Upon review and approval, the Department Representative will return the package to the Concessionaire who will record the certificate. Once the Certificate has been recorded, the Department will be responsible for the resolution of the condemnation.

1.6.2.16 The Concessionaire shall provide the necessary staff and resources to work with the Department and its representatives throughout the entire condemnation process until the property is acquired by entry of a final non-appealable order, by deed, or by an Agreement after Certificate executed and approved by the Department and the appropriate court. The Concessionaire shall provide updated appraisals (i.e., appraisal reports effective as of the date of taking) and expert testimony supporting condemnation proceedings upon request by the Department.

1.6.2.17 The Concessionaire shall be responsible for all contacts with landowners for Project Right of Way or construction items.

1.6.2.18 The Concessionaire shall use reasonable care in determining whether there is reason to believe that property to be acquired for Project Right of Way may contain concealed or hidden wastes or other materials or hazards requiring remedial action or treatment. When there is reason to believe that such materials may be present, the Concessionaire shall take steps consistent with the Department policy and practices to investigate. The Department shall be notified of the presence of such materials before an offer is made to acquire the property.

1.6.2.19 The Concessionaire shall be responsible for the demolition and disposal of all existing buildings within the Project Right of Way and permanent easements.

During the acquisition process and until the Commonwealth has indefeasible title to the property, all Work Product related to Project Right of Way acquisitions, and not previously delivered to the Department, including design and engineering costs, construction costs, costs of acquisition of rights of way, and all documents and records necessary to determine compliance with the laws relating to the acquisition of rights way and the costs of relocation of utilities, shall be maintained and made available to the Department for inspection or audit.

1.7 Utilities

1.7.1 General Requirements

1.7.1.1 The Department has identified known major utility crossings that may come in conflict with the Project, and these are included as Project Reference Documents.

1.7.1.2 The relocation of all Utilities shall comply with these Technical Requirements and the standards and specifications set forth in Attachment 1.5a (including VDOT's *Utility Relocation Policies and Procedures Manual*).

1.7.1.3 The Concessionaire shall develop a Utilities Plan in accordance with Section 1.3 and Attachment 1.3 of the Technical Requirements. The Concessionaire shall coordinate Project construction with all Utilities that may be affected and as identified in the Utilities Plan. The Concessionaire shall be responsible for coordinating the work of its subcontractors and the various Utilities. The resolution of any conflicts between Utilities and the construction of the Ultimate Configuration shall be the responsibility of the Concessionaire.

1.7.1.4 The Concessionaire shall be responsible for utility designations, utility locates (test holes), conflict evaluations, cost responsibility determinations, utility relocation designs, utility relocations and adjustments, utility reimbursement, replacement land rights acquisition and utility coordination required for the Ultimate Configuration. The Concessionaire shall initiate early coordination with all Utilities located within the Project Right of Way. The Concessionaire shall identify and acquire any replacement utility easements or required Right of Way needs of all utilities necessary for relocation due to conflicts with the Ultimate Configuration. The Concessionaire shall be responsible for all necessary utility relocations and adjustments to occur in accordance with the accepted Baseline Schedule.

1.7.1.5 The Concessionaire shall conduct all negotiations with utility owners, regardless of whether adjustments are required for the Project or if the Concessionaire desires the temporary or permanent adjustment of utilities to suit its working methods.

1.7.1.6 The Concessionaire shall make all reasonable efforts to design the Project to avoid conflicts with Utilities, and shall minimize impacts where conflicts cannot be avoided.

1.7.1.7 The Concessionaire shall provide all utilities with roadway design plans as soon as the plans have reached a level of completeness adequate to allow them to fully understand the Project impacts. The Concessionaire shall cause the Utility Owner to prepare relocation plans and estimates using the Concessionaire's design plans as a basis. If a party other than the Utility Owner prepares relocation plans, there shall be a concurrence box on the plans where the Utility Owner signs and accepts the relocation plans as shown.

1.7.1.8 The Concessionaire shall coordinate and conduct a preliminary review meeting with all affected Utility Owners to assess and explain the impact of the Project. The Department Representative and other appropriate Department representatives shall be included in this meeting.

1.7.1.9 The Concessionaire shall verify the prior rights of each utility's facilities if claimed by a utility owner. If there is a dispute over prior rights with a utility, the

Concessionaire shall be responsible for resolving the dispute. The Concessionaire shall prepare and submit to the Department a Preliminary Utility Status Report within 120 days of the Design Work Commencement Approval that includes a listing of all utilities located within the Project limits and a conflict evaluation and cost responsibility determination for each utility. This report shall include copies of easements, plans, or other supporting documentation that substantiates any compensable rights of the utilities. The Concessionaire shall obtain the following from each utility that is located within the Project limits: relocation plans including letter of "no cost" where the utility does not have a compensable right; utility agreements including cost estimate and relocation plans where the utility has a compensable right; letters of "no conflict" where the utility's facilities will not be impacted by the Ultimate Configuration.

1.7.1.10 The Concessionaire shall review all relocation plans to ensure that relocations comply with VDOT's *Utility Relocation Policies and Procedures Manual* and VDOT's *Land Use Permit Manual*. The Concessionaire shall also ensure that there are no conflicts with the proposed roadway improvements, and ensure that there are no conflicts between each of the utility's relocation plans. The Concessionaire shall prepare and submit to the Department all relocation plans. The Concessionaire shall assemble the information included in the relocation plans in a final and complete form and in such a manner that the Department may approve the submittals with minimal review. The Concessionaire shall meet with the Department Representative within 45 days of the Design Work Commencement Approval to gain a full understanding of what is required with each submittal. The Concessionaire shall receive written approvals from the Department prior to authorizing utilities to commence relocation construction. The Utilities shall not begin their relocation work until authorized by the Concessionaire. Each relocation plan submitted shall be accompanied by a certification from the Concessionaire stating that the proposed relocation will not conflict with the proposed roadway improvement and will not conflict with another Utility's relocation plan.

1.7.1.11 When the Concessionaire is responsible for performance of the construction of the utility work, the Concessionaire shall coordinate with the Utility Owner to obtain necessary Project Right of Way/easements and agreements.

1.7.1.12 The Concessionaire shall accurately show the final location of all Utilities on the as-built drawings for the Project.

1.7.2 Concessionaire's Responsibility for Utility Property and Services

1.7.2.1 At points where the Concessionaire's operations are on or adjacent to the properties of any utility, including railroads, and damage to which might result in expense, loss, or inconvenience, work shall not commence until arrangements necessary for the protection thereof have been completed. The Concessionaire shall cooperate with owners of Utilities so that:

- (a) removal and adjustment operations may progress in a timely, responsible, and reasonable manner,

(b) duplication of adjustment work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted.

1.7.2.2 If any utility service is interrupted as a result of accidental breakage or of being exposed or unsupported, the Concessionaire shall promptly notify the proper authority and shall cooperate fully with the authority in the restoration of service. If utility service is interrupted, repair work shall be continuous until service is restored.

1.7.2.3 No Work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

1.7.2.4 When the Concessionaire's Work requires the disconnection of "in service" fire hydrants, the Concessionaire shall notify the locality's fire department or communication center at least 24 hours prior to disconnection. In addition, the Concessionaire shall notify the locality's fire department or communications center no later than 24 hours after reconnection of such hydrants.

1.7.3 Restoration of Work Performed by Others

1.7.3.1 The Department may construct or reconstruct any Utilities within the limits of the Project or grant a permit for the same at any time. The Department will provide assistance in coordination with third parties.

1.7.3.2 When authorized by the Department, the Concessionaire shall allow any person, firm, or corporation to make an opening in the highway within the limits of the Project upon presentation of a duly executed permit from the Department or any municipality for sections within its corporate limits.

1.7.3.3 Any repair work is the responsibility of the permitted utility for full restoration.

1.7.3.4 All repair work and restoration shall be performed in accordance with the VDOT Land Use Permit Manual (LUPM)

1.8 Work Restrictions

1.8.1 Work Hours

1.8.1.1 The Concessionaire is advised that its general operations may proceed seven days a week, 24 hours a day, throughout the Work Period except as may be modified herein.

1.8.1.2 All construction activities are contingent upon attaining a noise variance before beginning construction activities, as stated in Section 1.11 (Third Parties and Permitting).

1.8.2 Holiday Restrictions

1.8.2.1 For the purposes of these Technical Requirements, the term “holiday” herein shall apply to New Year’s Day, Martin Luther King Jr. Day, President’s Day, Easter, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran’s Day, Thanksgiving Day, and Christmas Day.

1.8.2.2 Unless included by the Concessionaire in its Transportation Management Plan and approved by the Department, no temporary lane restrictions or closures on existing Department roadways shall take place between 12:00 noon on the Friday preceding and 12:00 noon Tuesday following Memorial Day and Labor Day; or any State or federal holiday if these holidays occur on Saturday, Sunday or Monday. If any state or federal holiday falls on a week day other than Monday, there shall be no temporary lane restrictions or closures between 12:00 noon the day before and 12:00 noon the day after each of these holidays. No lane restriction shall take place between 12:00 noon Wednesday preceding and 12:00 noon the Monday following Thanksgiving Day.

1.8.3 Weekend Restrictions

Unless included by the Concessionaire in its Transportation Management Plan and approved by the Department, no weekend lane closures are allowed. All lane closures are subject to the work restrictions of this Section 1.8.

1.8.4 Size and Weight Limitations

1.8.4.1 Hauling or Moving Material and Equipment on Public Roads Open to Traffic: The Concessionaire shall comply with legal size and weight limitations in the hauling or moving of material and equipment on public roads open to traffic unless the hauling or moving is covered by a hauling permit.

1.8.4.2 Hauling or Moving Material and Equipment on Public Roads Not Open to Traffic: The Concessionaire shall comply with legal weight limitations in the hauling or moving of material and equipment on public roads that are not open to traffic unless the hauling or moving is permitted elsewhere herein or is otherwise covered by a hauling permit.

1.8.4.3 The hauling or moving of material and equipment on the pavement structure or across any structure outside the Project Right of Way during various stages of construction shall be subject to additional restrictions as specified or directed by the Department.

1.8.4.4 Furnishing Items in Component Parts of Sections: If the size or weight of fabricated or manufactured items together with that of the hauling or moving vehicle exceeds the limitations covered by hauling permit policies and other means of transportation are not available, permission will be given to furnish the items in component parts of sections with adequately designed splices or connections at appropriate points. Permission for such

adjustments shall be requested in writing, and approval in writing shall be secured from the Department prior to fabrication or manufacture of the items. The request shall state the reasons for adjustment and shall be accompanied by supporting data, including working drawings where necessary.

1.8.5 Use of Explosives

1.8.5.1 Explosives shall be stored and used in a secure manner in compliance with applicable Law. Prior to prosecuting the Work, the Concessionaire shall conduct an on-site review of the work involved and develop a plan of operations for performing excavating work. Where feasible, the Concessionaire shall explore other means of loosening and or reducing the size of the excavation without blasting. When blasting becomes necessary, the Concessionaire's plan of operations shall include a blasting plan detailing the blasting techniques to be used during excavation operations requiring the use of explosives. Both plans shall be submitted to the Department for review prior to commencing blasting operations.

1.8.5.2 Explosives shall be purchased, transported, stored, used, and disposed of by a Virginia Certified Blaster in possession of a current criminal history record check and commercial driver's license with hazardous materials endorsement and a valid medical examiner's certificate.

1.8.5.3 The Concessionaire shall notify each property owner and Utility Owner having a building, structure, or other installation above or below ground in proximity to the site of the Work of its intention to use explosives. Notice shall be given sufficiently in advance of the start of blasting operations to enable the owners to take steps to protect their property. The review of the Concessionaire's plan of operations, blasting plan, and notification of property owners shall in no way relieve the Concessionaire of its responsibility for damage resulting from its blasting operations.

1.9 Maintenance of Traffic (MOT)

1.9.1 General

1.9.1.1 The Concessionaire shall conduct all work necessary to provide safe and efficient MOT during construction and operations, including provisions for the movement of people, goods, and services through and around the Project while minimizing impacts to pedestrians, local residents and businesses.

1.9.1.2 The Concessionaire shall develop and deliver a Transportation Management Plan in accordance with the Department's Instructional and Informational Memoranda IIM-LD-241.3 (Work Zone Safety and Mobility) and TE-351.1, and other Department documents listed in Attachment 1.5a and Attachment 1.3. The Concessionaire shall provide a Work Zone Traffic Coordinator whose primary responsibility is to handle all traffic control issues. The Transportation Management Plan shall be provided in accordance with the schedule included in Attachment 1.3.

1.9.1.3 Work zone information shall be shared with the Department and the Independent Engineer.

1.9.1.4 Plans/estimate shall include portable Dynamic Message Signs to ensure adequate notice is provided to the traveling public of Incidents or of significant changes in conditions within the Project.

1.9.2 Work Zone Traffic Control Requirements

1.9.2.1 At least one non-supervisory crew member on each work crew shall have successfully completed the Basic Work Zone Traffic Control training course and have a valid Department-approved training card in their possession when performing work zone traffic control activities. In addition, at least one supervisory position shall have successfully completed the Intermediate Work Zone Traffic Control training course and have a valid Department-approved training card in their possession and be present on the jobsite whenever work zone traffic control activities are underway.

1.9.2.2 Detour plans shall be developed by the Concessionaire and presented to the Department for approval and coordinated with local, state and federal agencies (as applicable) as submitted and updated in the Transportation Management Plan in accordance with the Project Schedule of any planned detour activity. The Concessionaire shall be responsible for all planning, consultation and coordination with impacted parties, design, implementation and monitoring, and maintenance of detours-whether within or outside the Project Right of Way. The provision of detours and marking of alternate routes will not relieve the Concessionaire of the responsibility for ensuring the safety of the public or from complying with any requirements of the Agreement.

1.9.2.3 Project Right of Way for temporary highways, diversion channels, sediment and erosion control features or bridges required by the Technical Requirements shall be planned, designed and provided by the Concessionaire.

1.9.2.4 During any suspension of Work, the Concessionaire shall temporarily open to traffic such portions of the Project and temporary roadways as may be agreed upon by the Concessionaire and the Department.

1.9.2.5 Certified flaggers shall be provided in sufficient number and locations as necessary for control and protection of vehicular and pedestrian traffic in accordance with the requirements of the *Virginia Work Area Protection Manual* (VWAPM). Flaggers shall be able to communicate to the traveling public in English while performing the job duty as a flagger at the flagger station. Flaggers shall use sign paddles to regulate traffic in accordance with the requirements of the VWAPM. Flagger certification cards shall be carried by flaggers while performing flagging duties. Flaggers found not to be in possession of their certification card shall be removed from the flagging site and operations requiring flagging will be suspended by the Department. Further, flaggers performing duties improperly will have their certifications revoked.

1.9.2.6 Connections with roads and public and private entrances shall be kept in a reasonably smooth condition at all times. Stabilization or surfacing material shall be applied to connections and entrances.

1.9.2.7 The Concessionaire shall schedule construction operations so that approved continuous access is provided for all roads and properties. Connections or entrances shall not be disturbed by the Concessionaire until necessary. Once connections or entrances have been disturbed, they shall be maintained and completed as follows:

- (a) Connections that had an original paved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using pavement. Connections that had an original unpaved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using either the required material or a temporary aggregate stabilization course that shall be placed as soon as practicable after connections are disturbed.
- (b) Mainline connections shall have all lanes open during construction. If there are delays in prosecution of work for other connections, connections that were originally paved shall have at least two lanes maintained with a temporary paved surface. Those that were not originally paved shall be maintained with a temporary aggregate stabilization course.
- (c) Mainline access/egress connections shall have all lanes open during construction unless otherwise agreed with the Department. Other entrances shall be graded concurrently with the roadway with which they intersect. Once an entrance has been disturbed, it shall be completed as soon as is practicable, including placing the required base and surface course or stabilization. If the entrance must be constructed in stages, such as when there is a substantial change in the elevation of the roadway with which it intersects, the surface shall be covered with a temporary aggregate stabilization course or other suitable salvaged material until the entrance can be completed and the required base and surface or stabilization course can be placed.

1.9.2.8 When the Concessionaire elects to complete the rough grading operations for existing Department roadways and the entire Project or exceed the length of one full day's surfacing operations, the rough grade shall be machined to a uniform slope from the top edge of the existing pavement to the ditch line.

1.9.2.9 When the surface is to be widened on both sides of the existing Department roadways pavement, construction operations involving grading or paving shall not be conducted simultaneously on sections directly opposite each other. The surface of pavement shall be kept free from soil and other materials that might be hazardous to traffic. Prior to opening of new pavement to traffic, shoulders shall be roughly dressed for a distance of three feet from the edge of the paved surface.

1.9.2.10 Where the Concessionaire places obstructions such as suction or discharge pipes, pump hoses, steel plates or any other obstruction on an existing Department roadway that must be crossed by vehicular traffic, they shall be bridged as directed by the Department at the Concessionaire's expense. Traffic shall be protected by the display of warning devices both day and night. If operations or obstructions placed by the Concessionaire damage an existing traveled roadway, the Concessionaire shall cease operations and repair damages.

1.9.2.11 The Concessionaire shall construct, maintain, and remove temporary structures and approaches necessary for use by traffic. After new structures have been opened to traffic, temporary structures and approaches shall be removed. The proposed design of temporary structures shall be submitted to the Department for its approval together with other associated Design Documentation prior to Construction Segment Approval.

1.10 Reporting

1.10.1 The Concessionaire shall prepare and provide regular reports to the Department during the Work Period and the Operating Period. All reports prepared by Concessionaire shall include, at a minimum, those items shown below in a format mutually agreed to with the Department and at the minimum shall be sufficient to allow the Department to meet its regulatory reporting responsibilities. The Department shall identify additional reporting requirements as needed and notify the Concessionaire of these requirements as they occur for the Work Period and Operating Period.

1.10.2 During the Work Period, the Concessionaire shall submit a weekly report within two days of the end of the reporting period that shall include the following:

- (a) specific construction schedule activities performed for the concluding week and planned for the upcoming week to include locations, staff and equipment utilization, and non-compliance or related construction issues;
- (b) rolling three (3) week forward-looking inspection notice, which shall include the fabrication schedule and planned construction activities; and
- (c) MOT weekly update, regarding any scheduled lane closures and identification of work areas for the ensuing two (2) weeks.

1.10.3 During the Work Period, the Concessionaire shall submit a monthly report within seven days of the end of the reporting period that shall include the following:

- (a) progress schedule status for the month and overall progress to date for the Project;
- (b) planned and actual start and finish dates for Work performed, percentage complete and days remaining to complete activities in progress;
- (c) specific activities and deliverables for the previous month and the next two reporting periods;
- (d) action items, outstanding schedule issues;
- (e) digital photos logged depicting progress to date;

- (f) narratives of current progress to date, reasons for schedule slippage and corrective actions to be taken by the Concessionaire;
- (g) summary of cost expenditures linked to schedule of values and WBS;
- (h) summaries and action items from all meetings held with media, the public, governmental entities, and others as applicable;
- (i) cumulative list of submittals and re-submittals to the Department and status of each;
- (j) upcoming submittals for the next reporting period;
- (k) test results and verifications for the month and planned testing for the next reporting period;
- (l) quality management reporting as required by the Concessionaire's QMSP to include related inspection reports, compliance reports, Independent Engineer reports, identified Defects and corrective actions status;
- (m) list of non-compliance items, Performance Points assessed, status of uncured Defects;
- (n) status of work related to environmental approvals and any violations;
- (o) health and safety compliance status;
- (p) DBE/SWAM utilization
- (q) status of Project Development Plan actions and intended revisions for review; and

1.10.4 During the Operating Period, the Concessionaire's quarterly O&M Report, which shall be submitted within 14 days of the end of the reporting period, shall be mutually agreed to with the Department and may include the following:

- (a) ongoing planning and implementation of operations activities, including work plans for the future periods;
- (b) status of systems operations and integration with the Department;
- (c) customer service and management report to include requests, complaints and disposition, and marketing initiatives and results;
- (d) roadway operations, traffic, and maintenance of traffic reports and issues;
- (e) incident response reports to include number, types, and response times;
- (f) Ordinary Maintenance activities schedule and performance status;
- (g) Major Maintenance activities schedule and performance status;
- (h) customer service log, detailing complaints or requests, and their disposition;
- (i) O&M inspections reports and outstanding issues;
- (j) quality management reporting as required by the Concessionaire's QMSP to include related inspection reports, compliance reports, Independent Engineer reports, identified Defects and corrective actions status;
- (k) list of non-compliance items, Performance Points assessed, status of uncured Defects;
- (l) health and safety compliance status;
- (m) DBE/SWAM utilization status; and
- (n) status of Project Development Plan actions and intended revisions for review.

1.10.5 During the Operating Period, the Concessionaire's annual report, which shall be submitted within 30 days of the end of the reporting period, shall include but not be limited to the following:

- (a) summary of Project Schedule activities and narrative of key events and issues;
- (b) summary of information provided in quarterly reports;
- (c) summary of issues and trends as required for the Department's reporting to FHWA;
- (d) annual maintenance and operational activities and cost in accordance with the maintenance performance targets; and
- (e) Audit reports for toll and related operations.

1.10.6 The Concessionaire shall maintain at all times at its office, at a minimum, one hard copy complete set of all reports shown above. All reports shall be available to the Department for inspection and audit.

1.10.7 The Concessionaire shall prepare and provide the information required by the Department to distribute applicable Project related reports to other agencies to include the Hampton Roads and Crater Planning District Commissions (PDC), Hampton Roads and Tri-Cities Metropolitan Planning Organizations (MPO), Virginia Port Authority, and other organizations as the Department deems appropriate.

1.11 Third Parties and Permitting

1.11.1 General

1.11.1.1 The Concessionaire shall coordinate with Governmental Authorities and other entities having interests in the Project, with assistance from the Department as reasonably requested. The Concessionaire shall make available copies of all permits and permit modifications to the Department upon receipt.

1.11.1.2 The Concessionaire shall obtain any required waiver or variance of each applicable city or county noise ordinance as needed to prosecute the Work. The Department will make reasonable efforts to assist the Concessionaire in obtaining any such waiver or variance, when it deems appropriate. The Concessionaire shall adhere to the requirements of the noise waiver in planning and performing any construction.

1.11.2 Third Parties Coordination

1.11.2.1 If any portion of the Project is located within the limits of a municipality, military installation, or other federally owned property, the Concessionaire shall cooperate with the appropriate officials and agents in the prosecution of the work to the same extent as with the Department.

1.11.2.2 The Concessionaire's obligation to coordinate with third parties includes the following:

- (a) Norfolk Southern Railroad Company for coordination of design, construction and operations for Project activities on or around its facilities that are impacted by the Project. This may include special use permits associated with construction work adjacent to and at crossing locations relative to the railroad. Additional requirements are included in Section 3.8 herein.
- (b) Agreements to share certain operational information and reports prepared by the Concessionaire and/or the Department with other agencies to include FHWA, PDC, MPO, etc. as applicable.

1.11.3 Construction Over or Adjacent to Navigable Waters

1.11.3.1 The Concessionaire shall be responsible for obtaining a permit from the U.S. Coast Guard for the anticipated construction activities that cross a waterway under the jurisdiction of the U.S. Coast Guard.

1.11.3.2 Prior to starting demolition or construction operations the Concessionaire shall schedule and attend a coordination meeting with the Department and the U.S. Coast Guard to present its planned operations and the potential impacts those operations may pose to water traffic. The Concessionaire shall, in consultation with the US Coast Guard, establish the proper protocol for emergency closures and be governed accordingly. The protocols shall be confirmed in writing with the Department and the US Coast Guard and incorporated in the Project Development Plans.

- a) **Activities subject to Coast Guard regulation under the Permit.** Following the U.S. Coast Guard coordination meeting, the Concessionaire shall incorporate its proposed schedule of operations as part of its PDPs to the Department. The Concessionaire shall incorporate the Department's comments and submit its notice of scheduled operations to the Department and to the U.S. Coast Guard at least 45 days prior to commencement of any permitted construction activities. U.S. Coast Guard acceptance of the Concessionaire's written schedule of operations affecting navigable waters is a condition precedent to the Concessionaire's commencement of any construction activities.
- b) **Activities that require channel closures or restrictions.** In addition to the submittal of its proposed schedule of operations as described above, Concessionaire shall submit plans that comply with the Coast Guard Permit for falsework, cofferdams, floating equipment and other obstructions to the channel or channels to the Department. The Concessionaire's attention is directed to the possibility that advance notification for consideration of approval may vary depending on the type and duration of proposed closures,

the time of year for requested closure(s), and location of existing bridge(s) and waterway(s) involved, and the impact to entities served along or through the waterway(s).

The Department shall review and provide written comments, if applicable, to the Concessionaire within twenty one (21) calendar days following receipt of the Concessionaire's plans. The Concessionaire shall incorporate the Department's comments and submit its plans to the Department and to the U.S. Coast Guard at least 45 days prior to commencement of any permitted construction or demolition operations. The Concessionaire may not commence activities that require channel closures or restrictions without the prior written approval of the Department and the U.S. Coast Guard. The Concessionaire shall be responsible for complying with all operational requirements that the U.S. Coast Guard may place on the Concessionaire as conditions of approval.

In addition, the Concessionaire shall request and obtain Department and U.S. Coast Guard approval in writing before commencing any operations that deviate from the Concessionaire's schedule of operations when these operations interfere or have the potential to interfere with navigation of water traffic outside of timeframes previously approved by the Department and the U.S. Coast Guard.

1.11.3.3 Notices shall be sent to the U.S. Coast Guard, Fifth District Bridge Office (OBR), 431 Crawford Street, Portsmouth, VA 23704-5004. Payment of any penalty or fine that may be levied by the U.S. Coast Guard for Concessionaire violations of bridge regulations found in 33 CFR Parts 115, 116, 117 and 118 shall be the responsibility of the Concessionaire.

1.12 Emergency Services

1.12.1 Liaison

The Concessionaire shall participate in industry and statutory initiatives regarding emergency services.

1.12.2 Emergencies and Extraordinary Circumstances

1.12.2.1 During the Operating Period, the Concessionaire shall address the following requirements to ensure that::

- (a) Safety of motorists, pedestrians and workforce personnel shall be the primary objective for all decisions and actions.
- (b) Clearance of a travel lane for emergency response vehicles shall be by the most expedient means. In such circumstances, the decision of the Department Representative or emergency services in charge shall govern.

- (c) Military vehicles acting in an emergency response capacity or in defense of the sovereign homeland of the United States of America shall be given free and unrestricted access to the Project.
- (d) it fully cooperates with and complies with the U.S. Secret Service's (USSS) and the Virginia State Police's (VSP) instructions with respect to lane closures and traffic management during movements through the Project by the President of the United States or other dignitaries or individuals who are deemed by either party to require special security measures. The USSS and VSP will determine the movements of and security needs for such individuals. In addition, the Concessionaire shall allow USSS and VSP access to other facilities including, but not limited to, traffic management cameras in order to maintain security measures leading up to and during such activities.
- (e) The Concessionaire shall participate in emergency exercises conducted by Governmental Authorities.
- (f) The Project will be available as a lane reversible facility to expedite the flow of traffic from the Hampton Roads area during times of emergency declared by the Governor, and as directed by the Department Representative.

1.12.2.2 During special events that have significant impact on traffic flow, Concessionaire shall designate a responsible party in charge to work with the Department Representative to develop traffic management plans for the event.

1.13 Safety

1.13.1 General

1.13.1.1 The Department and the Concessionaire recognize that in every circumstance, activity and decision related to this Project, safety of the public, Concessionaire/Project staff, and the Department's personnel is of primary concern.

1.13.1.2 The Concessionaire shall designate a Project safety officer for the Term. The safety officer will ensure that designated Project personnel can be contacted by the Department and emergency services personnel at all times.

1.13.1.3 The Concessionaire shall address the requirements in this Section 1.13 as part of its Health, Safety and Security Plan.

1.13.2 Construction Safety and Health Standards

1.13.2.1 Compliance with construction safety and health standards is a condition of the Agreement, and it shall be made a condition of each subcontract entered into pursuant to the Agreement, that the Concessionaire and any subcontractor shall not require any worker employed in performance of the Agreement to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to their health or safety, as determined under construction safety and health standards promulgated by the U.S. Secretary

of Labor in accordance with the requirements of Section 107 of the Contract Work Hours and Safety Standards Act.

1.13.2.2 The Concessionaire shall comply with the Virginia Occupational Safety and Health Standards adopted under the Code of Virginia and the duties imposed under the Code. Any violation of the requirements or duties that is brought to the attention of the Concessionaire by the Department or any other person shall be immediately abated.

1.13.2.3 At a minimum, all Concessionaire personnel shall comply with the following, unless otherwise determined unsafe or inappropriate in accordance with OSHA regulations:

- (a) Hard hat shall be worn while participating in or observing all types of field work when outside of a building or outside the cab of a vehicle, and exposed to, participating in or supervising construction.
- (b) Respiratory protective equipment shall be worn whenever an individual is exposed to any item listed in the OSHA Standards as needing such protection unless it is shown that the employee is protected by engineering controls.
- (c) Adequate eye protection shall be worn in the proximity of grinding, breaking of rock and/or concrete, while using brush chippers, striking metal against metal or when working in situations where the eyesight may be in jeopardy.
- (d) A safety vest shall be worn by all exposed to vehicular traffic and construction equipment.
- (e) Standards and guidelines of the current *Virginia Work Area Protection Manual* shall be used when setting, reviewing, maintaining, and removing traffic controls.
- (f) Flaggers shall be certified in accordance with the Virginia Flagger Certification Program.
- (g) No person shall be permitted to position themselves under any raised load or between hinge points of equipment without first taking steps to support the load by the placing of safety bar or blocking.
- (h) All electrical tools shall be adequately grounded or double insulated. Ground Fault Circuit Interrupter (“GFCI”) protection must be installed in accordance with the National Electrical Code (“NEC”) and current Virginia Occupational Safety and Health agency (“VOSH”). If extension cords are used, they shall be free of defects and designed for their environment and intended use.
- (i) No person shall enter a confined space without training, permits, and authorization.
- (j) Fall protection shall be required whenever an employee is exposed to a fall six feet or greater.

1.13.3 Outdoor Advertising

Under §33.1-353 of the Code of Virginia the Commonwealth Transportation Commissioner has been delegated authority to regulate outdoor advertising erected on private property but visible from public highways. In accordance with §33.1-252 of the Code of

Virginia Department personnel assigned this activity shall be given free access to the Project to perform inspections and surveillance of outdoor advertising structures adjacent to the Project.

2.0 PUBLIC INFORMATION AND COMMUNICATIONS

2.1 Background

- 2.1.1** The Department, in coordination with the Concessionaire shall prepare a Public Information and Communication Plan to cover communication, consultation, public outreach, community outreach and education. The purpose of the Communication Plan is to facilitate effective communication by the Department and the Concessionaire with internal and external stakeholders.
- 2.1.2** All information to be released to the public will be approved and controlled by the Department. .
- 2.1.3** The requirements for the Public Information and Communication Plan are contained in Attachment 1.3. Further information regarding the Department's approach to matters contained in this Section 2 is contained in Attachment 2.0.

2.2 Coordination

- 2.2.1** The Concessionaire shall provide appropriately qualified personnel to staff a communications team, to be established as a joint enterprise between the Department and the Concessionaire, to coordinate communication activities, to keep internal and external audiences informed about the Project, to perform the obligations set forth in this Section 2.0 and to fulfill the requirements of the Public Information and Communication Plan.

2.3 Identification of Key Stakeholders

- 2.3.1** The Concessionaire shall prepare and maintain a complete list of key stakeholders and other interested parties for whom targeted communications will be developed. Such a list shall include: chambers of commerce; business organizations; major employers; other transportation organizations /agencies /departments including shipping interests; emergency response organizations; homeowners' associations; trucking and distribution companies; local governments; state and federal elected officials; school systems and churches.
- 2.3.2** A database containing addresses, phone numbers, fax numbers and e-mail addresses for key stakeholders shall be developed and maintained by the Concessionaire. This information shall be made available to the Department, upon request.

2.4 Public Involvement and Information

- 2.4.1** The Concessionaire in coordination with the Department shall provide several opportunities for public participation, in accordance with the approved Public Information and Communication Plan, following, at a minimum, VDOT's *Policy Manual for Public Participation in Transportation Projects* and *Public Notice Guide*.

Attachment 2.0 contains additional information regarding the Department's approach to public involvement to assist the Concessionaire in meeting this obligation.

- 2.4.2** In discharging its responsibilities for public involvement and public participation, the Concessionaire shall comply with all state and federal laws and regulations regarding public notification and applicable Civil Rights requirements and all other legal requirements. The Concessionaire shall encourage public input through a variety of communications methods targeted to specific audiences. These shall include required public hearings, information meetings, collateral materials, interactive Web sites, and other communications tools/materials to be coordinated with and approved by the Department, with the Department controlling release of the information.
- 2.4.3** The Concessionaire shall draft the content of collateral materials for any public hearings, including advertisements, brochures and handouts, display boards, etc., for approval by the Department.
- 2.4.4** The Concessionaire shall implement methods to measure the effectiveness of communication methods to ensure that target audiences are receiving the intended messages and that the information they need is readily available.
- 2.4.5** The Concessionaire shall assist the Department to ensure that Project-related communications efforts are coordinated with other statewide, regional or district-specific public outreach already contained within the Department's public outreach strategy, to maximize the efficiency of use of the Department's resources and to meet the goal of consistency in message delivery.
- 2.4.6** Notwithstanding approval by the Department of the Public Information and Communication Plan, no public outreach effort shall be undertaken without approval by the Department.
- 2.4.7** All products used in external communications shall reflect the Department's branding and style guidelines; however, Project specific branding proposals, to include examples and justification may be developed at the discretion of the Department.
- 2.4.8** The Concessionaire shall assist the Department with the responsibility for maintenance and operation of the Project website as a method of public information. Maintenance, operation, and further development of the Project website shall be in accordance with Department standards and guidelines for such sites.
- 2.4.9** In the event of any request from community groups or similar organizations for public presentations the Concessionaire shall immediately notify the Department for a Department Representative to attend. The Concessionaire shall maintain a record of presentation requests received and fulfilled and the approximate numbers of people in attendance at each presentation. Any presentation materials produced by the Concessionaire for such events shall be submitted to the Department for review and approval prior to use.

2.4.10 The Concessionaire shall develop and maintain electronic and print mailing lists as a means of notifying targeted stakeholders and/or the public of upcoming events, Project milestones and updates. At a minimum, the lists shall include appropriate state and local elected officials; government representatives of affected cities, towns and/or counties; chambers of commerce; libraries; interest groups; citizens/homeowners associations and interested citizens.

2.4.11 The Concessionaire shall submit to the Department for approval a series of Frequently Asked Questions (FAQ) for use in responding to routine inquiries from citizens regarding the general status of the Project. Once approved, answers to the FAQ shall be developed jointly by the Department and the Concessionaire.

2.5 Contact with Governmental Authorities

2.5.1 The Concessionaire shall notify the Department of the agenda and attendance for any planned contact or meeting with any Governmental Authority at least two days before it is due to take place. In the case of any contact or meeting with a Governmental Authority for which prior notice to the Department was not possible the Concessionaire shall provide the Department with a summary of the attendance, topics and action items from these contacts/meetings within one business day of its occurrence.

2.6 Media Relations

2.6.1 The Concessionaire shall act at all times to facilitate the Department to meet its goal of building and maintaining positive media relations and of providing proactive, factual and open communication with the media relations are an essential component of a communications plan. Attachment 2.0 includes additional information on the Department's approach to media relations to assist the Concessionaire in understanding and meeting this obligation.

2.6.2 The Concessionaire shall act at all times to assist the Department in meeting its obligation to respond to FOIA requests within five business days and to facilitate their tracking using the Department's FOIA Tracker system. In the event that the Concessionaire receives a FOIA request in connection with the Project, it shall immediately transmit any such request to the Department and assist the Department in its subsequent processing. The Concessionaire shall support the gathering of information and preparation of responses as required by the Department.

2.7 Communication between the Department and the Concessionaire

2.7.1 The Concessionaire shall notify the Department whenever an issue arises that may trigger interest from the public and/or media and shall work with the Department to craft an appropriate response.

2.7.2 The Concessionaire shall ensure the availability of its staff assigned to the communications team and other senior managers of the Concessionaire as needed to attend regular coordination meetings will be held between the Department and the Concessionaire to ensure information is shared and to set common goals and milestones.

2.7.3 The Department will be cognizant of the Concessionaire's responsibilities to shareholders and to the market, including the disclosure of market-sensitive information.

2.7.4 The Concessionaire shall act at all times to facilitate the Department's responsibility as a public agency to operate with complete transparency to the public, including disclosure requirements outlined in the FOIA.

2.8 Crisis Communications

2.8.1 The Concessionaire shall act at all times to assist the Department in its response to a crisis, to foster public trust and confidence in the Department's abilities to manage a crisis and to prevent ineffective, fear-driven, and potentially damaging public responses to an accident, incident, emergency/mass evacuation, or crisis situation. Refer to Attachment 1.3 for components of the Public Information and Communication Plan relevant to crisis response.

2.8.2 The Concessionaire and the Department shall jointly conduct a risk assessment of the Project which considers potential man-made and natural disasters, such as injuries or death of workers, property damage, vehicle accidents, release of Hazardous Substances, environmental damage, weather emergencies, construction or design flaws, and other Force Majeure events.

3.0 DESIGN AND CONSTRUCTION REQUIREMENTS

3.1 General

- 3.1.1** The Work shall not conflict with local, state, and federal long-range transportation planning improvements.
- 3.1.2** The Concessionaire is solely responsible for obtaining required approvals for design exceptions and design waivers, as follows:
- (a) The Concessionaire shall submit a design waiver or design exception to the Department using form LD-440 (available on the Department's external website. The Department will review and provide the appropriate response (request denial, comments for resubmission, or approval/concurrence). Design Documentation that does not meet the Department's minimum criteria will require a design waiver. Design Documentation that does not meet American Association and State Highway and Transportation Officials (AASHTO) standards and specifications will require a design exception.
 - (b) The Department's design exception concurrence does not guarantee FHWA approval. The Department will not be responsible for obtaining approval for design exceptions on behalf of the Concessionaire. The Department will make a reasonable effort to assist the Concessionaire in obtaining timely approval or otherwise for design waivers/exceptions submitted to the Department/FHWA.
 - (c) Previously approved design exceptions and design waivers are subject to reevaluation if additional information becomes available that was not known at the time of initial approval or conditions change that were used in the analysis of the original design exception or design waiver.
- 3.1.3** The Concessionaire shall ensure that the condition of existing buildings, structures, roadways, lighting and signal equipment, or other property that is to remain is not affected by the performance of the construction activities and the operations activities. The Concessionaire shall perform property pre-condition surveys and associated monitoring. The Department shall be given the opportunity to witness any pre-condition surveys and/or monitoring and the Concessionaire shall provide the results to the Department before commencing any Work that may affect the property.
- 3.1.4** Whenever the final design requires a widening or major rehabilitation of an existing bridge, where the typical section of the bridge will change, and/or where the bridge modifications will affect the classification and future Federal funding eligibilities at any time under the Highway Bridge Program (HBP), the Concessionaire shall demonstrate in its Design Documentation, that the entire structure, including any pre-existing components, are in compliance with the standards and specifications set forth in Attachment 1.5a.
- 3.1.5** Values for properties of materials to be used in the Work shall conform to the specified values or range of values specified in the Technical Requirements. Less than complete

conformity may be tolerated if obtaining exact or complete conformity would not be feasible and if authorized by the Department. If permissible tolerances are exceeded or if consistent deviations from the plans or abrupt changes in grade occur, even though within the tolerances, the Concessionaire shall ensure that the affected areas are reconstructed to conform to the specified tolerance such that the Work is fit for its intended purpose.

- 3.1.6** The Concessionaire is responsible for maintenance of the Project Right of Way and other areas impacted by the Work and ensuring continual and un-interrupted removal from the Project of rubbish, scrap material, and debris. The work site shall have a neat, safe and orderly appearance at all times. Within 30 days after Final Acceptance, the Concessionaire shall remove its construction equipment, materials and debris from the Project Right of Way and property adjacent to the Project.
- 3.1.7** When removal of mailboxes and newspaper boxes is made necessary by construction operations, the Concessionaire shall place them in temporary locations so that access to them will not be impaired. Prior to Final Acceptance, the boxes shall be placed in their permanent locations as agreed with the Department and left in as good condition as when found.
- 3.1.8** The Concessionaire shall preserve property and improvements along the boundary lines of and adjacent to the Work unless the removal or destruction is absolutely required and consistent with the Construction Documentation. The Concessionaire shall use suitable precautions to prevent damage to such property. If property is damaged, the Concessionaire shall restore property to a condition similar or equal to that existing before such damage was done by repairing, rebuilding, or restoring, as may be directed by the Department, or making settlement with the property owner. The Concessionaire shall secure from the owner a release from any claim against the Department. A copy of this release shall be furnished to the Department.
- 3.1.9** The Concessionaire is advised that the Project is considered part of the Strategic Highway Network (STRAHNET).
- 3.1.10** The design of all toll collection facilities shall incorporate the principles of crime prevention through environmental design (CPTED). The Concessionaire shall confirm that a member of the Project design team has completed training regarding CPTED principles. The Concessionaire shall arrange for a review of its toll facilities by the Virginia State Police Crime Prevention Unit.
- 3.1.11** All Design Documentation and Construction Documentation shall be in English Units.
- 3.1.12** All Design Documentation and Construction Documentation shall comply with the requirements of applicable Governmental Authorities. Selected requirements of Governmental Authorities are listed in Attachment 1.5a, but the Concessionaire shall be responsible for obtaining and complying with any other applicable requirements.

- 3.1.13** The Project will be utilized as a hurricane and emergency evacuation route and shall be designed as a lane reversible facility with gating at interchanges such that all lanes might be used for a westward flow of traffic.
- 3.1.14** The Concessionaire shall provide certified letters to the property owners at the address on record that comply with the Code of Virginia § 33.1-94, Right of Entry. Copies of the letters, signed return receipt or proof of delivery shall be provided to the Department fifteen days after the proof of delivery. Notice of intent to enter shall be deemed made on the earlier of the date of mailing, if mailed, or on the date delivered.
- 3.1.15** The Department shall lead all required design public hearings. The Concessionaire shall provide all the information and support required by the Department to conduct effective public hearings. The Concessionaire shall receive and utilize the input and results of the public hearings in the performance of Project requirements.

3.2 Environmental

3.2.1 General

3.2.1.1 The Concessionaire shall ensure that commitments made in the NEPA Documents are implemented at the appropriate phase of Project development. Supporting documentation shall be provided to the Department as commitments are implemented, and shall be compatible with the EDMS described in Section 1.2.9 above.

3.2.1.2 If the Concessionaire becomes aware of new information that may have a bearing on environmental impacts or the Concessionaire proposes changes to the Modified CBA-1, it shall initiate consultation immediately with the Department to determine the need for a re-evaluation of the NEPA Document. The Department shall be responsible for preparation of any re-evaluation of the NEPA Document. The Concessionaire shall assist the Department with applicable technical studies upon request in support of the re-evaluation of the NEPA Document.

3.2.1.3 Prior to issuance by the Department of the Notice to Commence Right of Way Acquisition for total and partial takes, the Concessionaire shall provide the Department with a completed PM-130 form and Right of Way Acquisition and Relocation Plan. The Department will perform the Right of Way re-evaluation review to determine the Project Right of Way to be acquired is in compliance with the NEPA Documents. If the plans are not consistent with the NEPA Documents, the Concessionaire shall revise the plans until they are consistent. If the Concessionaire is unable to achieve compliance with the NEPA Documents, the provisions of Article 8 of the Agreement shall apply.

3.2.1.4 Prior to Construction Segment Approval, the Concessionaire shall provide the Department with a completed PM-130 form and Right of Way Acquisition and Relocation Plan. The Department will perform the environmental certification review and plans, specifications, and estimates (PS&E) re-evaluation review and determine if plans are consistent with the scope of the NEPA Document and all environmental commitments. If the

plans are not consistent with the NEPA Document, the Concessionaire shall revise the plans until they are consistent.. If the Concessionaire is unable to achieve compliance with the NEPA Documents, the provisions of Article 8 of the Agreement shall apply

3.2.1.5 The Concessionaire is responsible for compliance with applicable Law for potential staging and disposal areas outside the Project Right of Way. The Concessionaire is also responsible for obtaining a property owner agreement for its use in connection with the Project of potential staging and disposal areas outside the Project Right of Way. Any such potential locations within the existing Project Right of Way will require the Concessionaire to obtain a Land Use Permit from the Department, as further defined in references within Attachment 1.5a.

3.2.2 Water Quality Permits

3.2.2.1 The NEPA Documents identify impacts on water quality, terrestrial and aquatic resources threatened and endangered species, wetlands, streams, etc. Avoidance, minimization, and potential mitigation strategies explored to date with the Governmental Authorities have also been documented by the Department in the FEIS and supporting technical studies.

3.2.2.2 The Concessionaire shall be responsible for obtaining in its name all necessary state and federal water quality permits. The Concessionaire shall be responsible for compliance with pre-construction, construction-related, and post-construction permit conditions. Any compensation required for impacts to streams and wetlands are also the responsibility of the Concessionaire. Construction of any compensatory mitigation site(s) shall be conducted concurrently with the Project construction and in accordance with the permit plans and Agreement. The Concessionaire may, with the approval of the applicable Governmental Authority, consider payment of a fee or purchase of a wetland banking credit in lieu of the construction of compensation specific to the Project.

3.2.2.3 If the Concessionaire dumps, discharges, or spills any oil or chemical that reaches or has the potential to reach a waterway, it shall immediately notify all appropriate Governmental Authorities and shall take immediate actions to contain, remove, and properly dispose of the oil or chemical in accordance with applicable Law.

3.2.2.4 Constructing new bridge(s) and dismantling and removing existing bridge(s) shall be accomplished in a manner that will prevent the dumping or discharge of construction or disposable materials into rivers, streams, or impoundments. Construction operations in rivers, streams, or impoundments shall be restricted to those areas where channel changes are permitted and the construction of structures would not be practical without entry into the river, stream or impoundment. Rivers, streams, and impoundments shall be cleared of falsework, piling, debris, or other obstructions placed therein or caused by construction operations.

3.2.2.5 Excavation materials shall be disposed of in approved areas above the mean high water mark shown on the plans in a manner that will prevent the return of solid or

suspended materials to state waters. If the mark is not shown on the plans, the mean high water mark shall be considered the elevation of the top of stream banks.

3.2.2.6 The Concessionaire shall conduct all operations near rivers, streams, or impoundments in accordance with applicable water quality permits and shall not conduct clearing or grubbing within 100 feet of the limits of ordinary high water or a delineated wetland unless specifically authorized in the permits.

3.2.2.7 Stabilization of the streambed and banks shall occur immediately upon completion of work if work is suspended for more than 15 days. The Concessionaire shall prevent stream constriction that would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.

3.2.2.8 The Concessionaire shall submit a temporary stream relocation design to the Department for review and acceptance in sufficient time to allow for discussion and correction prior to beginning the work the design covers. Temporary bridges or other appropriate structures shall be used wherever an appreciable number of stream crossings will be made.

3.2.3 Hazardous Substances

3.2.3.1 This section shall be read in conjunction with Article 16 of the Agreement, and both shall set forth the Concessionaire's responsibilities for the overall management of Hazardous Substances.

3.2.3.2 The FEIS, DEIS and additional studies performed by the Department have identified several sites that contain or potentially contain Hazardous Substances within the Modified CBA-1. These studies are available as Project Reference Documents. The Concessionaire shall perform any additional studies and investigations as necessary to constitute an appropriate level of due diligence and/or determine actions to ensure due care with respect to Hazardous Substances and, in accordance with the Agreement. The Concessionaire shall utilize appropriate American Society for Testing Materials (ASTM) environmental site assessment standard(s) as applicable. The Concessionaire shall submit copies of the environmental site assessments to the Department for approval, along with detailed recommendations for further study or site evaluation, if such studies or evaluations are necessary to determine project impacts from identified or suspected contamination. With approval of the Department, the Concessionaire shall cause further studies and evaluations to be performed and submit a summary of findings to the Department.

3.2.3.3 If the properties proposed for acquisition are determined to have environmental impairments from Hazardous Substances, the Concessionaire shall prepare a Remedial Action Plan. The plan shall be submitted to the department for approval. The Concessionaire shall implement all approved Remedial Action Plan activities in accordance with applicable Law.

3.2.3.4 Following the acquisition and vacation of properties, the Concessionaire shall perform asbestos inspections of all structures and perform asbestos abatement and abatement monitoring in accordance with all applicable Laws and consistent with applicable standards and specifications as set forth in Attachment 1.5a.

3.2.3.5 The Concessionaire shall retain copies of all property studies, documents prepared for containment, management, mitigation and/or remediation and any other asbestos-related records in the Electronic Document Management System.

3.2.3.6 Upon discovery of previously unidentified Hazardous Substances during the Work Period or the Operating Period, the Concessionaire shall immediately stop work in the affected area and notify the Department and all other Governmental Authorities requiring such notice by Law.

3.2.4 Historic Properties

3.2.4.1 The Project effects on historic and archaeological properties (jointly referred to as historic properties) were addressed in accordance with Section 106 of the National Historic Preservation Act. The DEIS, FEIS, and various technical reports contain detailed information on historic properties.

3.2.4.2 On September 7, 2007, FHWA (serving as lead federal agency for Section 106 compliance on behalf of the U.S. Army Corps of Engineers), the Virginia State Historic Preservation Officer (“VA SHPO”) and the Department executed a Programmatic Agreement (“PA”) pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act. The PA includes specific stipulations covering future identification of archaeological properties, assessment of effects, and treatment of archaeological sites determined eligible for listing in the National Register of Historic Places. The PA is included as an attachment to FEIS, available as a Project Reference Document. Wherever an obligation is contained in the PA requiring the Department to take an action, implement an avoidance, minimization, or treatment strategy, address post review discoveries, or coordinate or consult with Governmental Authorities or other parties, the Concessionaire shall have the same obligation. The Concessionaire shall provide supporting documentation to the Department evidencing fulfillment of these obligations at the appropriate phase of project development.

3.2.4.3 The Concessionaire shall be responsible for completion of technical studies identified in the PA. To complete efforts to identify historic archaeological properties potentially affected by the Modified CBA-1, a Phase II archaeological study of site 44PG0504 is needed. Phase I archaeological surveys, and any subsequent Phase II archaeological studies, are also needed in three areas:

- (a) Parcels between Sta. 1700 and 1715, where property access was denied by the landowners in 2006;
- (b) Various parcels between Sta. 2080 and 2340, the location of the late alignment shift in Isle of Wight County in the vicinity of the Mill Creek subdivision; and

- (c) Parcels between Sta. 2430 and 2475, where property access was denied by the landowners in 2006.

3.2.4.4 The PA also requires that the Concessionaire assess the affects of the Modified CBA-1 on five known archaeological sites listed in the PA and on any other archaeological sites determined eligible for listing on the National Register of Historic Places as a result of the Phase I and II studies described above. If adverse effects to any of these sites cannot be avoided, the Concessionaire shall be responsible for implementing a treatment plan for the site, which may include but is not limited to archaeological data recovery.

3.2.4.5 In the event that a previously unidentified archaeological site is discovered during ground disturbing activities associated with construction of the Modified CBA-1, the Concessionaire shall immediately notify the Department and halt all construction work involving subsurface disturbance in the area of the resource and in surrounding areas where additional subsurface remains can reasonably be expected to occur. The Concessionaire shall then fulfill the obligations assigned to the Department in Stipulation IV of the PA.

3.2.4.6 If human remains and associated funerary objects are encountered during the course of construction activities, the Concessionaire shall immediately notify the Department and halt all construction work involving subsurface disturbance in the area of the remains and in surrounding areas where additional subsurface remains can reasonably be expected to occur. The Concessionaire shall then fulfill the obligations assigned to the Department in Stipulation VI of the PA.

3.2.4.7 The Concessionaire shall obtain a permit from the Director of the Virginia Department of Historic Resources prior to conducting any archaeological investigations on state-controlled lands (including state-controlled highway Right of Way) pursuant to §10.1-2302 of the Code of Virginia,

3.2.5 Environmental Monitoring

3.2.5.1 The Concessionaire is responsible for daily monitoring of compliance with all applicable Environmental Laws and Governmental Approvals. Should any non-compliant item(s) be identified during the Work by the Concessionaire, immediate and continuous corrective action shall be taken by the Concessionaire to bring the item(s) back into compliance. Notification of this circumstance shall be provided immediately to the Department.

3.2.5.2 The Concessionaire shall be responsible for monitoring the work area for nesting migratory bird species and complying with the Migratory Bird Treaty Act for recommended time of year restrictions.

3.2.5.3 The Department will perform quality assurance monitoring to ensure environmental commitments to Governmental Authorities are implemented.

3.2.6 Environmental Stipulations

The Concessionaire hereby stipulates that any facility to be used in the performance of the Agreement (unless the Concessionaire confirms that the Project is exempt under the Clean Air Act as amended (42 U.S.C. 1857, et seq., as amended by P.L. 91-604), the Federal Water Pollution Control Act as amended (33 U.S.C. 1251 et seq. as amended by P.L. 92-500), and Executive Order 11738 and regulations in implementation thereof (40 C.F.R., Part 15) is not listed on the EPA's List of Violating Facilities pursuant to 40 C.F.R. 15.20.

3.2.7 Erosion and Siltation

3.2.7.1 The Concessionaire shall exercise temporary and permanent measures, throughout the Term to control erosion and prevent or minimize siltation of rivers, streams, lakes, and impoundments consistent with applicable standards and specifications, including those set forth in Attachment 1.5a and the requirements included in Section 3.5.4 and 3.5.5.

3.2.7.2 Erosion and sediment control measures shall be applied to erodible material exposed by any activity associated with construction, including local material sources, stockpiles, disposal areas, and haul roads. Temporary measures shall be coordinated with the Work to ensure effective and continuous erosion and siltation control. Permanent erosion control measures and drainage facilities shall be installed and operational as the work progresses before temporary measures are removed.

3.2.7.3 The Concessionaire shall maintain, within the Project Right of Way during all land disturbing activities, an employee certified by the Department Erosion and Sediment Control Contractor Certification (ESCCC) Program as a certified Department in Erosion and Sediment Control Contractor by the Department of Conservation and Recreation ("DCR") Inspection Certification Program who shall inspect erosion and siltation control devices and measures for proper installation and deficiencies immediately after each rainfall, at least daily during prolonged rainfall, and weekly when no rainfall event occurs. Deficiencies shall be corrected immediately.

3.2.7.4 Failure on the part of the Concessionaire to maintain appropriate erosion and siltation control devices in a functioning condition may result in the Department notifying the Concessionaire in writing of specific deficiencies. The Concessionaire shall correct or take appropriate actions to correct the specified deficiencies within 24-hours after receipt of such notification.

3.2.7.5 Failure of the Concessionaire to maintain a Department certified Erosion and Sediment Control employee within the Project Right of Way will result in a Project non-compliance and suspension of Work related to any land disturbing activity until such time as a certified Erosion and Sediment Control employee is present on the Project.

3.2.8 Air Pollution

3.2.8.1 The Concessionaire shall comply with the provisions of the Agreement and the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.

3.2.8.2 Burning shall be performed in accordance with all applicable local laws and ordinances and under the constant surveillance of watchpersons. Care shall be taken so that the burning of materials does not destroy or damage property or cause excessive air pollution. The Concessionaire shall not burn rubber tires, asphalt, used crankcase oil, or other materials that produce dense smoke. Burning shall not be initiated when atmospheric conditions are such that smoke will create a hazard to the motoring public or airport operations. Provisions shall be made for flagging vehicular traffic if visibility is obstructed or impaired by smoke. At no time shall a fire be left unattended.

3.2.8.3 Asphalt mixing plants used in connection with the Project shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the Rules of the State Air Pollution Control Board. Emission standards for asbestos incorporated in the EPA's National Emission Standards for Hazardous Air Pollutants apply to the demolition or renovation of any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof that contains friable asbestos.

3.2.9 Noise Mitigation

Barriers

3.2.9.1 The Concessionaire shall comply with Virginia State Noise Abatement Policy as well as current industry practices and procedures including, but not limited to, neighborhood continuity.

3.2.9.2 The final design noise analysis shall utilize design year traffic data that has been previously verified by the Department.

3.2.9.3 The Concessionaire shall present all feasible and reasonable sound barriers as “barriers under consideration” on design plans at the design public hearing.

3.2.9.4 Upon completion of the design public hearing, the Concessionaire shall schedule a meeting with the Noise Abatement Committee (NAC). The findings shall be presented to the NAC for final determination of which barriers will be constructed. A concurrence letter outlining the results of the NAC meeting shall be prepared for the Department and FHWA. Letters are to be prepared and mailed “certified return receipt” to the protected citizens for barriers that are being carried through construction. Any significant changes made to the barriers during the final design process that occur after the Department/FHWA concurrence shall be presented to the Department for approval. Upon completion of the public survey, a second concurrence letter shall be prepared documenting the results.

Construction Noise

3.2.9.5 The Concessionaire's operations shall be performed so that exterior noise levels measured during a noise-sensitive activity shall be not more than 80 decibels. Such noise level measurements shall be taken at a point on the perimeter of the construction limit that is closest to the adjoining property on which a noise sensitive activity is occurring. Noise-sensitive activity is any activity affecting a noise sensitive site for which exceeding the stated noise level could adversely affect the occupants of the site or for which lower noise levels are essential if the activity is to serve its intended purpose. Such noise-sensitive activities include those activities associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.

3.2.9.6 The Concessionaire shall monitor construction-related noise if requested by local agencies, the Department or neighboring property owners. If construction noise levels exceed 80 decibels, the Concessionaire shall take corrective action before proceeding with operations.

3.2.9.7 The Concessionaire shall determine whether certain portions of the Project that produce objectionable noise (as an example; where property owners and/or localities have registered or received formal noise related complaints) should be restricted or prohibited between 10 P.M. and 6 A.M. If other hours are established by local ordinance, the local ordinance shall govern.

3.2.9.8 Equipment shall in no way be altered and shall be properly maintained so as to result in noise levels that are no greater than those produced by the original equipment. When feasible, the Concessionaire shall establish haul routes that direct the Concessionaire's vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

3.2.9.9 These construction noise requirements are not applicable if the noise produced by sources other than the Concessionaire's operation at the point of reception is greater than the noise from the Concessionaire's operation at the same point.

3.2.10 Forests

3.2.10.1 The Concessionaire shall take all reasonable precautions to prevent and suppress forest fires in any area involved in construction operations or occupied by the Concessionaire as a result of such operations.

3.2.10.2 The Concessionaire shall cooperate with the proper authorities of the state and federal governments in reporting, preventing, and suppressing forest fires. Labor, tools, or equipment furnished by the Concessionaire upon the order of any forest official issued under authority granted the official by law shall not be considered a part of the Agreement.

3.2.10.3 The Concessionaire shall negotiate with the proper forest official for compensation for such labor, tools, or equipment.

3.2.11 Archeological, Paleontological and Rare Mineralogical Findings

3.2.11.1 In the event fossils, meteorites, or other articles of paleontological or rare mineralogical interest are discovered during the prosecution of work, the Concessionaire shall act immediately to suspend work at the site of the discovery and notify the Department.

3.2.11.2 The Department will immediately notify the proper Governmental Authority charged with the responsibility of investigating and evaluating such finds. The Concessionaire shall cooperate and assist the Department in protecting, mapping, and removing the findings as determined necessary by the Department in consultation with the proper Governmental Authority. Finds on state-controlled lands (including state-owned highway Right of Way) are the property of the Commonwealth. Finds recovered from other than state-controlled lands are the property of the landowner unless other agreement is reached with the owner.

3.2.11.3 When such findings delay the progress or performance of the work, the Concessionaire shall notify the Department immediately.

3.2.12 Local Material Sources (Pits and Quarries)

3.2.12.1 Local material sources, other than active commercial sand and gravel and quarry operations, opened by the Concessionaire or its subcontractors shall be concealed from view from the completed roadway and any existing public roadway. Concealment shall be accomplished by selectively locating the pit or quarry and spoil pile, providing environmentally compatible screening between the pit or quarry site and the roadway, or using the site for another purpose after removal of the material, or restoration equivalent to the original use (such as farm land, pasture, turf, etc.).

3.2.12.2 Should the Concessionaire wish to source construction materials from (non-commercial) new pits or quarries the Concessionaire shall furnish the Department a statement signed by the property owner in which the property owner agrees to the use of their property as a source of material for the Project. Upon completion of the use of the property as a material source, the Concessionaire shall furnish the Department a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources, sources owned by the Concessionaire, and sources furnished by the Department.

3.2.12.3 Local material pits and quarries that are not operated under a local or State permit shall not be opened or reopened without authorization by the Department. The Concessionaire shall prepare a site plan, including, but not limited to, the following:

- (a) the location and approximate boundaries of the excavation;
- (b) procedures to minimize erosion and siltation;

- (c) provision of environmentally compatible screening;
- (d) restoration;
- (e) cover vegetation;
- (f) other use of the pit or quarry after removal of material, including the spoil pile;
- (g) the drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;
- (h) location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;
- (i) constructed or natural waterways used for discharge;
- (j) a sequence and schedule to achieve the approved plan and;
- (k) The total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Concessionaire shall certify that the sediment trap or basin design is in compliance with the standards and specifications set forth in Attachment 1.5a and applicable Law. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

3.2.12.4 The Concessionaire's design and restoration shall be in accordance with applicable Law.

3.2.13 Disposal Areas

3.2.13.1 Unsuitable or surplus material shall be disposed of by the Concessionaire off the Project Right of Way. The Concessionaire shall obtain the necessary rights to property to be used as an approved disposal area. An approved disposal area is defined as that which is owned privately, not operated under a local or State permit and has been approved by the Department for use in disposing unsuitable or surplus material.

3.2.13.2 The Concessionaire shall submit a disposal area site plan to the Department for approval prior to Construction Segment Approval. The plan shall show:

- (a) the location and approximate boundaries of the disposal area;

- (b) procedures to minimize erosion and siltation;
- (c) provision of environmentally compatible screening;
- (d) restoration;
- (e) cover vegetation;
- (f) other use of the disposal site;
- (g) the drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;
- (h) location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;
- (i) constructed or natural waterways used for discharge;
- (j) a sequence and schedule to achieve the approved plan and;
- (k) the total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Concessionaire shall certify that the sediment trap or basin design is in compliance with the standards and specifications set forth in Attachment 1.5a and applicable Law. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

3.2.13.3 Disposal areas shall be cleared but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and haul roads thereto. After the material has been deposited, the area shall be shaped to minimize erosion and siltation of nearby streams and landscaped in accordance with the approved plan for such work or shall be used as approved by the Department. The Concessionaire's design and restoration shall conform to the requirements of the Agreement and applicable Law.

3.2.13.4 The Concessionaire shall furnish the Department a statement signed by the property owner in which the owner agrees to the use of their property for the deposit of material from the Project. Upon completion of the use of the property as an approved disposal area, the Concessionaire shall furnish the Department a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources, sources owned by the Concessionaire, and sources furnished by the Department.

3.3 Survey

3.3.1.1 The Concessionaire shall conduct all survey requirements associated with Project design and construction consistent with the current VDOT *Survey Manual* to include the delivery of digital data files. The Concessionaire shall review its survey plan and operations with the Department prior to commencing survey activities. The Concessionaire shall provide completed base survey files in MicroStation format in accordance with *Survey Manual* standards. Prior to submission of final digital files, the Concessionaire shall provide the digital files for the Department's review and approval. All other electronic data files furnished by the Concessionaire shall be in the format of the Department's current computer hardware and software and shall be made available to the Department through the Concessionaire's EDMS. All drawings, field notes, and computations from such survey work performed by the Concessionaire shall be included with the Design Documentation and made available to the Department through the EDMS.

3.3.1.2 The Department has updated conventional aerial photography and design level survey information to support the development of detailed proposals. The Department has provided six-inch Digital Elevation Model ("DEM"), one-foot contours and a 7.5-inch pixel digital ortho photo at a width of 2000 feet for the 55 mile proposed mainline corridor and those crossroads that will have interchanges with the mainline.

3.3.1.3 The work performed by the Concessionaire for the Project shall utilize any published government (National Geodetic Survey) horizontal and vertical controls as well as the Department established control published in the LD-200 cards for this survey project to the best extent possible. All survey control and check points shall be established by a land surveyor licensed in the Commonwealth of Virginia. All control shall be established and documented by the Concessionaire in LD-200 file format and submitted to the Department upon completion.

3.3.1.4 The Concessionaire shall be responsible to obtain any additional survey and right of entry needed to acquire and monument Project Right of Way, to relocate utilities, to locate and/or designate underground utilities, support final design and engineering, and to construct the Project. Project Right of Way and boundaries affecting property ownership, horizontal and vertical controls for bridges, horizontal and vertical control for box culverts and culverts having spans or opening larger than 48 inches, horizontal and vertical control for culverts with design grades, and horizontal and vertical controls for additional centerlines or baselines for roadways, ramps, loops, and connections shall be performed by or under direct control and personal supervision of a land surveyor who is licensed in the Commonwealth of Virginia as a land surveyor and is experienced in highway construction. Plats for the monumentation of Project Right of Way shall be prepared and certified by a land surveyor licensed in the Commonwealth of Virginia and three copies of the plats submitted to the Department. Examples of the plats are shown in the Department *Survey Manual*, Chapter 8. Additionally, the Concessionaire shall be responsible for any update (property owner changes, subdivisions, etc.) that may occur and such changes shall be reflected on the plans in order to acquire Project Right of Way and to complete the final Design Documentation.

Any additional survey changes shall be verified, certified, and submitted in final Design Documentation.

3.3.1.5 The Concessionaire shall preserve all survey control monuments established by the Department and shall notify the Department as soon as it is known that a monument is in a position that will interfere with new construction or with Concessionaire activities. If a monument is disturbed, or cannot be preserved in place, the Concessionaire shall set the new monument in accordance with the *Survey Manual*, as identified in Attachment 1.5a, and shall notify the Department.

3.3.1.6 The Concessionaire shall make available to the Department hard copy and electronic files of all survey data, for existing and new conditions and infrastructure, which at a minimum include:

- (a) Survey control data
- (b) Digital Terrain Model (DTM) and Construction Cross-Sections: Compatible to the Department's current DTM format.
- (c) Borrow Pits: All borrow pit DTM's or cross-sections, originals and finals.
- (d) Horizontal and Vertical Control for Bridges: Certified plats, field notes, coordinates and computations shall be furnished by the Concessionaire prior to the Concessionaire beginning work on these structures.
- (e) Pipes, Culverts, Ditches and Related Appurtenances: Existing, newly installed control and as-built survey data for existing and new pipes, culverts and ditches which at a minimum include horizontal and vertical controls, type, size, materials and inlet/outlet control, catch basins and manhole and other related infrastructure.
- (f) Project Right of Way: Existing, newly constructed/installed control and as-built survey data for Project Right of Way cross section showing roads, planning, shoulders, access and egress ramps and connections, embankments, utilities, drainage and all infrastructure within the Project Right of Way, and for areas where connecting roads and infrastructure are impacted by the Work. The survey interval shall not be farther than 100-foot intervals. The data prepared by the Concessionaire shall include coordinates, type, size, material and references.

3.3.1.7 Project Right of Way shall be staked by the Concessionaire prior to the start of the Project. Project Right of Way stakes shall be placed at a minimum of 100-foot intervals on each side of the roadway or as directed by the Department and the stakes shall be marked with both the station and offset back to centerline. All final boundary stakeouts shall be performed by the Concessionaire.

3.3.1.8 Final Project Right of Way monumentation shall be performed by the Concessionaire in accordance with the following:

- (a) RM-1: The Concessionaire shall furnish and install RM-1 Right of Way monuments in accordance with the standards and specifications included in Attachment 1.5a.
- (b) RM-2: The Concessionaire shall furnish and install RM-2 Right of Way monuments and optional locator posts, including the required caps, in accordance with the standards and specifications included in Attachment 1.5a.

3.3.1.9 The Department will determine if an alternative form of permanent monumentation will be used if RM-1 or RM-2 monuments are unsuitable for marking the Project Right of Way at various locations.

3.3.1.10 The Concessionaire shall indicate this alternative monument usage on the final as-built plan in accordance with the Department's *Survey Manual*. Electronic data files along with paper sketches and drawings shall be furnished by the Concessionaire as specified above.

3.3.1.11 Additional surveying work and supplemental layout work shall be performed by the Concessionaire as needed to successfully complete the work. The Concessionaire shall provide and protect temporary construction benchmarks within the construction limits. Temporary construction benchmarks shall be located not farther than 500 feet apart for the total length of the Project. Temporary construction benchmarks that are disturbed during construction operations shall be reestablished by the Concessionaire.

3.4 Geotechnical

3.4.1 Geotechnical Investigations

3.4.1.1 The Department has completed a preliminary geotechnical subsurface investigation at key points along the alignment of the Project to include seven interior interchanges, secondary road crossings, railroad crossings and at selected major water crossings. The results of the investigation are presented in the Geotechnical Engineering Data Report prepared by the Department dated December 8, 2008, and included with the Project Reference Documents. Previous geotechnical data at the Project termini at I-295 and Route 58 and along isolated locations of existing U.S. Route 460 are also available as Project Reference Documents.

3.4.1.2 The Concessionaire shall perform a design level geotechnical investigation that meets or exceeds both Chapter 3 of VDOT's *Manual of Instructions* ("MOI") for Material Division and the current AASHTO LRFD *Bridge Design Specifications, Customary U.S. Units, 4th Edition 2007* and the Department modifications.

3.4.1.3 The Concessionaire shall perform a geotechnical evaluation of embankments, soil cuts, culverts, bridge and wall structures, sound walls, storm water management facilities, minor structures including drainage pipes, and any other earth supported structures or elements of highway design and construction. The Concessionaire shall obtain water quality and other required permit(s) for any additional borings needed in performance of the Concessionaire's geotechnical investigation for this Project. The Concessionaire shall complete laboratory tests in accordance with pertinent ASTM or AASHTO standards and analyze the data to provide design and construction requirements. Soils and materials tests shall be performed by a laboratory accredited by AASHTO for each test it conducts for the Project, unless otherwise approved by the Department. The concessionaire shall have an approved geotechnical report before commencing construction. The Concessionaire shall be responsible for any costs incurred based upon geotechnical assumptions.

3.4.1.4 The Concessionaire shall provide all records of subsurface explorations and describe the soils encountered and their depth limits in accordance with the requirements outlined in Chapter 3 of the VDOT's Manual of Instruction for Materials Division as referenced in Attachment 1.5a. The Concessionaire shall provide electronic copies of all subsurface explorations in accordance with the boring log template available on the website address included in Chapter 3 of the VDOT's *Manual of Instruction for Materials Division*. The electronic files shall be provided by a certified professional geologist or a suitably qualified registered professional engineer in the Commonwealth of Virginia, in gINT© software. Upon request, the Department will provide its gINT and ACCESS file structures for the Geotechnical Database Management System ("GDBMS").

3.4.2 Minimum Pavement Requirements

3.4.2.1 The Concessionaire shall develop pavement sections for secondary roads and for private roads in accordance with VDOT's *Pavement Design Guide for Subdivision and Secondary Roads in Virginia*. . The Concessionaire shall develop pavement sections for primary roads in accordance with the *Manual of Instructions for Materials Division* (Chapter VI of Pavement Evaluation and Design).

3.4.2.2 Pavements shall be designed to meet the Performance Requirements included in Attachment 5.6 to the Technical Requirements.

3.4.2.3 All roadways shall be designed to ensure positive drainage on the pavement surface and within the pavement structure, including connecting to existing or any new sub drainage systems.

3.4.2.4 Any pavement reconstruction on arterials or local streets or other roadways adjacent to and crossing the Project that are affected by the construction activities of the Project shall match the existing pavement type, unless otherwise approved by the Department. Reconstructed pavement sections shall be designed in accordance with the standards referenced in Section 3.4.2.1 above. The Concessionaire shall design all tie-in

work to avoid differential settlement (bump at the tie-in) between the existing and new surface in accordance with the Performance Requirements.

3.4.2.5 The Work shall include rumble strips in the paved shoulders along the proposed mainline consistent with VDOT standards and specifications.

3.4.2.6 Concessionaire's plans, typical sections, profiles and cross-sections shall include the appropriate elements identified as a result of the drainage analysis/design and the pavement design. This shall include, but is not limited to, underdrains, stormwater inlets and pipes, and pavement sections reflecting the elements identified in the Concessionaire's final pavement design.

3.4.2.7 The area surrounding pavements shall be graded to direct surface water away from paved areas. Any utility excavations or excavations for storm drains within pavement areas shall be backfilled with compacted structural fill in accordance with applicable sections of the Road and Bridge specifications.

3.4.2.8 The Concessionaire shall submit to the Department for its review 90 days before the submittal of associated final Design Documentation a pavement design report that documents the assumptions, considerations, and decisions contributing to the Concessionaire's proposed pavement design, including the following:

- (a) Pavement design details by location, including structural layer materials, general specifications, and thicknesses;
- (b) Lifecycle management analysis to form the basis of the Life Cycle Management Plan, including the predicted Major Maintenance interventions for resurfacing, reconstruction, and other rehabilitation measures and the predicted dates of these interventions throughout the Term;
- (c) Relevant pavement evaluation data (structural and functional) and condition information on adjacent roads;
- (d) Relevant geotechnical data and drainage requirements to verify the pavement design(s);
- (e) Design criteria used in determining the pavement design(s), including annual average daily traffic, percentage heavy vehicles, cumulative traffic loading, pavement material strength factors, and pavement design life; and
- (f) Design calculations documenting the pavement design(s) in accordance with the specified design methodology

3.4.3 Geotechnical Requirements

3.4.3.1 The Concessionaire shall analyze methods to minimize differential settlement of the approach to the bridge structures (bump at the bridge) for new construction and shall submit to the Department for its review construction recommendations to address soil-structure interaction to accommodate the construction methods applied to this Project. This submittal shall be at least 90 days in advance of any final Design Documentation that is dependent on the analysis. All geotechnical work shall be completed to satisfy the Performance Requirements as set forth in Attachment 5.6.

Note that the lesser amount of total or differential settlement satisfying this section shall have precedence. Reliability assessments shall be incorporated in design as referenced below.

3.4.3.2 The Concessionaire shall design and construct pavements, subgrades, and embankments to meet the following requirements:

- (a) Total vertical and/or differential settlements will not be a deterrent to achieve and maintain the post-construction contract Performance Requirements for overall ride quality, local roughness and grade tolerances of the pavement surface, bridge approach slabs and pavement tie-ins to the Project.
- (b) Settlement will not impede positive drainage of the pavement surface especially within the travel lanes at all times nor subject the roadway to flooding.
- (c) Settlement does not result in damage to adjacent or underlying structures, including utilities.

3.4.3.3 The Concessionaire shall consider settlement and design foundations (bridges, retaining walls, pipes, and other structures) based upon Section 9 of Attachment 3.8; Structural Design Criteria.

In summary this section outlines two options for managing settlement of structures; a) limit total settlement to 1/2" and subsequently limits the need for a refined analysis of the superstructure and substructure or b) allow the Concessionaire to design the structure for his estimates of elastic, consolidation and secondary settlement (total settlement) and subsequently communicate the total and differential settlement in a General Note. In either case, a General Note is placed on the plans which communicate the amount of settlement evaluated and accommodated by the structure. Specific General Note language along with Notes to Designer are located in Section 9 of Attachment 3.8; Structural Design Criteria.

3.4.3.4 The Concessionaire shall design stable cut slopes and embankment slopes and evaluate stability for interim construction stages, for the end of construction condition, and for design-life conditions. Design shall satisfy the following criteria:

- The maximum slope ratio to be used for cut and/or roadway embankment fill slopes shall not be steeper than 2H:1V.
- The following factors of safety are to be used with limit equilibrium methods of analysis to determine factors of safety for representative sections of all soil cut and soil embankment fill slope areas greater than 10 feet in height and/or where slopes are supporting on, or are supported by, retaining structures. The factors of safety listed in Table 3.4a below are valid for subsurface investigations performed in accordance with Chapter 3 of the Manual of Instruction for Materials Division or for site specific investigation plans approved by the Department. Table 3.4a is not applicable for rock cut slopes.

Soil Slope analysis parameters based on:	Factor of Safety	
	Involves Structure or Critical Slope	Non-Critical Slope
In-situ or lab. tests and measurements	1.5	1.3
No site specific tests	N/A	1.5

- (a) A critical slope is defined as any slope that is greater than 25 feet in height, affects or supports a structure, or whose failure would result in significant cost for repair, or may result in damage to private property.
- (b) Site specific in-situ tests include both ground water measurements and SPT testing but may also include CPT or DMT.
- (c) Parameters for critical slopes involving structures must be based on specific laboratory testing.
- (d) Problem soils (very soft soils, very loose soils, or heavily over-consolidated soils) shall be analyzed using shear strength parameters determined from appropriate laboratory strength tests.
- (e) Minimum requirements for soil types consistent with the parameters used in slope analyses shall be specified on the Construction Documentation.

3.4.3.5 Where applicable, the Concessionaire shall incorporate reliability assessments in conjunction with standard analysis methods. An acceptable method for evaluation of reliability is given by Duncan, J.M. (April 2000) *Factors Of Safety And Reliability In Geotechnical Engineering*, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Discussions and Closure August 2001. A suitable design will provide a probability of success equal to or greater than 99 percent. The aspects of this Project for

which reliability assessments shall be made include: (1) the selection of soil parameters used in the design of all foundations and retaining walls, (2) the factors of safety for slope stability, and (3) the settlement and bearing capacity of embankments. Except as mentioned in (1) above, reliability assessments need not be performed for structural foundations and retaining walls, which will be evaluated based on the required limit states in LRFD. The Concessionaire may propose to identify specific, non-critical features, and alternative methods for evaluating variability of subsurface conditions, reliability and minimum factors of safety, prior to submission of its design calculations and drawings. The Department may, in its sole discretion, accept or reject such proposed methods.

3.4.3.6 The Concessionaire shall submit to the Department for its review at least 90 days prior to the submittal of any associated final Design Documentation, the geotechnical design and construction memoranda that summarize pertinent subsurface investigations, test, and engineering evaluations on which the final Design Documentation will be based. Technical specifications for construction methods that are not adequately addressed in the standard specifications shall be submitted by the Concessionaire as part of the final Design Documentation. Prior to submittal of any final Design Documentation to the Department, the Concessionaire shall review the final Design Documentation to assure that it appropriately incorporates the geotechnical components and shall submit evidence of this review to accompany the final Design Documentation. The Concessionaire shall reference the drawings that incorporate the pertinent results. The Concessionaire's Quality Management System Plan shall document how each specific geotechnical recommendation or requirement will be addressed in the Construction Documentation. The results of the geotechnical investigation and laboratory results shall support design and construction efforts to meet the requirements of this Section.

3.4.4 Materials

3.4.4.1 Rights for and Use of Materials Found on Project

The Concessionaire may use in the Project any materials found in the excavation that comply with the standards and specifications set forth in Attachment 1.5a. The Concessionaire shall replace with other appropriate material the excavation material removed and used that is needed for use in embankments, backfills, approaches, or otherwise. The Concessionaire shall not excavate or remove any material from within the construction limits that is not within the grading limits, as indicated by the slope and grade lines.

3.4.4.2 Samples, Tests, and Cited Specifications

The responsibility for quality control, quality assurance, and ensuring compliance with applicable specifications and testing requirements lies with the Concessionaire. The Concessionaire's QMSP shall outline the procedures for quality assurance, quality control, and compliance with the Technical Requirements. The Department, at its discretion, may conduct testing and audits.

3.4.4.3 Material Delivery

The Concessionaire shall advise the Department at least two weeks prior to the delivery of any material from a commercial source. Upon delivery of any such material to the Project, the Contractor shall make available to the Department invoices and related information associated with these deliveries through EDMS (prices are not required).

3.4.4.4 Plant Inspections

If the Concessionaire elects to use materials from a plant that is part of the Department's materials QA program wherein the Department inspects materials at the source, the following conditions shall be met:

- (a) The Department shall have the cooperation and assistance of the Concessionaire and producer of the materials.
- (b) The Department shall have full access to parts of the plant that concern the manufacture or production of the materials being furnished.
- (c) The Concessionaire shall provide sufficient notice to the Department of its intent and shall be responsible for obtaining copies of the Department's plant inspection reports.

3.4.4.5 Storing Materials

- (a) Materials shall be stored in a manner so as to ensure the preservation of their quality and fitness for the Work. When considered necessary by the Department, materials shall be stored in weatherproof buildings on wooden platforms or other hard, clean surfaces that will keep the material off the ground. Materials shall be covered when directed by the Department. Stored material shall be located so as to facilitate its prompt inspection. Approved portions of the Project Right of Way may be used for storage of material and equipment and for plant operations. However, equipment and materials shall not be stored within the clear zone of the travel lanes open to traffic.
- (b) Additional required storage space shall be provided by the Concessionaire. Private property shall not be used for storage purposes without the written permission of the owner or lessee. Copies of the written permission shall be furnished to the Department. Upon completion of the use of the property, the Concessionaire shall furnish to the Department a release signed by the property owner indicating that the property has been satisfactorily restored.
- (c) Chemicals, fuels, lubricants, bitumens, paints, raw sewage, and other harmful materials as determined by the Department shall not be stored within any floodplain unless no other location is available and only then shall the materials be stored in a secondary containment structure(s) with an

impervious liner. Also, any storage of these materials in proximity to natural or man-made drainage conveyances or otherwise where the materials could potentially reach a waterway if released under adverse weather conditions, must be stored in a bermed or diked area or inside a container capable of preventing a release. Double-walled storage tanks shall meet the berm/dike containment requirement except for storage within flood plains. Any spills, leaks, or releases of such materials shall be addressed in accordance with the Agreement and applicable Law. Accumulated rain water may also be pumped out of the impoundment area into approved dewatering devices.

3.4.4.6 Handling Materials

Materials shall be handled in a manner that will preserve their quality and fitness for the work. Aggregates shall be transported from storage to the Project in vehicles constructed to prevent loss or segregation of materials.

3.4.4.7 Unacceptable Materials

Materials that do not conform to the Technical Requirements shall be considered unacceptable. Such materials, whether in place or not, will be rejected and shall be removed from the site of the Work. If it is not practical for the Concessionaire to remove rejected material immediately, the Concessionaire shall mark the material for identification. Rejected material whose defects have been corrected shall not be used until approval has been given by the Department.

3.4.4.8 Materials Furnished by the Department

- (a) The Concessionaire shall furnish all materials required to complete the Work except those specified to be furnished by the Department.
- (b) Material furnished by the Department will be delivered or made available to the Concessionaire at the points specified in the Agreement.
- (c) After receipt of the materials, the Concessionaire shall be responsible for material delivered to the Project, including shortages, deficiencies, and damages that occur after delivery.

3.5 Hydraulics

The criterion detailed herein is provided as an addendum to that shown in the VDOT *Drainage Manual* (see Attachment 1.5.a) and associated Hydraulic Design Advisories and Instructional and Informational Memoranda (see the Department website) and relates specifically to minimum flood protection of the roadway and bridge structures. All other hydraulic criteria not referenced herein, including but not limited to, increases in existing flood levels, bridge scour protection, protection of downstream waterways, upstream and downstream property impacts and

compliance with environmental and safety requirements, shall be in accordance with the above noted documents.

3.5.1.1 Headwater/Backwater Elevation Criteria

(a) For the Design Storm

Meets the standard the Department criteria outlined in Section 8.3.2.2 in Chapter 8 of the Department *Drainage Manual*.

(b) For the Review/Check Storm

At or below the lowest affected roadway shoulder elevation.

(c) Bridge Freeboard

The design storm shall pass under the bridge structure with minimum of four feet of freeboard (clearance) between the water surface elevation and the lowest point of the superstructure.

3.5.1.2 Flood Frequency Criteria

(a) For Minor Crossings (Where the 100 year discharge is less than 500 cfs and site is not covered by a FEMA study)

- Design Storm – 50 year Frequency
- Review/Check Storm – 100 year frequency

(b) For Major Crossings (Where the 100 year discharge is 500 cfs or greater or the site is covered by a FEMA study)

- Design Storm – 100 year Frequency
- Review/Check Storm – Not Applicable

3.5.2 General

Final Design Documentation for any hydraulic design shall include a complete set of final drainage computations.

3.5.3 Hydrologic and Hydraulic (H&H) Analysis and Scour Analysis

3.5.3.1 The proposed structures shall be designed by the Concessionaire to meet all applicable hydraulic requirements, including current FEMA, FHWA, and Department guidelines as described in the 2002 VDOT *Drainage Manual* (including current Errata Sheet), Hydraulic Design Advisories and applicable Instructional and Informational Memorandum (IIM or I&IM) and all current revisions and/or Department modifications. The Concessionaire shall submit for the Department's review and approval a final H&H Analysis and a final Scour Analysis for each proposed bridge design and box culvert. These

analyses shall be submitted at least 90 days prior to commencement of design work for bridges and culverts.

3.5.3.2 The scour analysis shall be performed in accordance with accepted design and analysis procedures outlined in FHWA publications HEC-18, HEC-20, and HEC-23. Once scour countermeasures and armoring are identified, the H&H Analysis shall be updated to account for the scour countermeasures and armoring placement.

3.5.3.3 These analyses shall also be accompanied by a completed VDOT LD-293 form. The Concessionaire shall provide the Department two (2) paper and two (2) electronic copies (pdf format) of the final H&H Analysis, Scour Analysis, HEC-RAS Files and LD-293.

3.5.4 Drainage

Drainage Design Documentation shall include the design of culverts, open channels, storm sewers, bridge drainage assemblies and structures, adequate outfall analysis (in accordance with DCR Minimum Standard 19), stormwater management facilities, and erosion and sediment control in compliance with the standards and specifications listed in Attachment 1.5a and the VDOT Erosion and Sediment Control and Stormwater Management Program.

3.5.5 Storm Water Pollution Prevention Plan

3.5.5.1 General

- (a) The Concessionaire shall prepare a Stormwater Pollution Prevention Plan (SWPPP) that identifies the locations and descriptions of potential sources of pollutants which may reasonably be expected to affect the stormwater discharges from the construction site and any off site support areas and describes and ensures implementation of practices which will be used to reduce pollutants in such discharges. The SWPPP shall include a description of the controls to reduce, prevent, and control pollutants from these sources including spill prevention and response. The Concessionaire shall submit the SWPPP and required documentation to the Department for review and approval at least 90 days prior to commencement of construction. .
- (b) The SWPPP is comprised of, but not limited to, the erosion and sediment control plan, the stormwater management plan and shall be in accordance with related specifications and standards included in Attachment 1.5a. The SWPPP shall be required for all land-disturbing activities that disturb 10,000 square feet or greater, or 2,500 square feet or greater in Tidewater, Virginia.
- (c) Land-disturbing activities that disturb 1 acre or greater, or 2,500 square feet or greater in an area designated as a Chesapeake Bay Preservation Area, require coverage under the DCR's Virginia Stormwater Management Program (VSMP) General Permit for the Discharge of Stormwater from Construction Activities (hereafter referred to as the VSMP Construction Permit). The Department will apply for and retain coverage throughout the Work Period under the VSMP Construction Permit for any land

disturbing activities in connection with the Project for which a VSMP Construction Permit is required.

- (d) The required contents of a SWPPP for those land disturbance activities requiring coverage under the VSMP Construction Permit are found in Section II D of the General Permit section of the VSMP Regulations (4VAC50-60-1170). While a SWPPP is an important component of the VSMP Construction Permit, it is only one of the many requirements that must be addressed in order to be in full compliance with the conditions of the permit.
- (e) The Concessionaire and all other persons that oversee or perform activities covered by the VSMP Construction Permit shall be responsible for reading, understanding, and complying with all of the terms, conditions and requirements of the permit and the Project's SWPPP including, but not limited to, the following:

3.5.5.2 Project Implementation Responsibilities

The Concessionaire shall be responsible for the installation, maintenance, inspection, and, on a daily basis, ensuring the functionality of all erosion and sediment control measures and all other stormwater and pollutant runoff control measures identified within or referenced within the SWPPP, plans, specifications, permits, and other contract documents.

The Concessionaire shall take all reasonable steps to prevent or minimize any stormwater or non-stormwater discharge that will have a reasonable likelihood of adversely affecting human health or public and/or private properties.

3.5.5.3 Certification Requirements

In addition to satisfying the personnel certification requirements contained herein, the Concessionaire shall certify its activities by completing, signing, and submitting Form C-45 VDOT SWPPP Contractor and Subcontractor Certification Statement to the Department at least 7 days prior to commencing any project related land-disturbing activities, both on-site and off-site.

3.5.5.4 SWPPP Requirements for Support Facilities

Where not included in the layout and design of any support facility, the Concessionaire shall develop erosion and sediment control plan(s) and stormwater pollution prevention plan(s) for submission and acceptance by the Department prior to usage of any on-site or off-site support facilities including but not limited to, borrow and disposal areas, construction and waste material storage areas, equipment and vehicle storage and fueling areas, storage areas for fertilizers or chemicals, sanitary waste facilities and any other areas that may generate a stormwater or non-stormwater discharge directly related to the construction process. Such plans shall document the location and description of potential pollutant sources from these areas and shall include a description of the controls to reduce, prevent and control pollutants from these sources including spill prevention and response. The Concessionaire shall submit such plans and documentation as

specified herein to the Department and, upon review and approval, they shall immediately become a component of the project's SWPPP and VSMP Construction Permit (where applicable) and shall be subject to all conditions and requirements of the VSMP Construction Permit (where applicable) and the Agreement.

3.5.5.5 Reporting Procedures

(a) Inspection Requirements

The Concessionaire shall be responsible for conducting inspections in accordance with the requirements herein. The Concessionaire shall document such inspections by completion of Form C-107 (a) and (b), Construction Runoff Control Inspection Form and Continuation Sheet, in strict accordance with the directions contained within the form.

(b) Unauthorized Discharge Requirements

The Concessionaire shall not discharge into state waters sewage, industrial wastes, other wastes or any noxious or deleterious substances nor shall otherwise alter the physical, chemical, or biological properties of such waters that render such waters detrimental for or to domestic use, industrial consumption, recreational or other public uses.

1. Notification of non-compliant discharges

The Concessionaire shall immediately notify the Department upon the discovery of or potential of any unauthorized, unusual, extraordinary, or non-compliant discharge from the land disturbing activity. Where immediate notification is not possible, such notification shall be not later than 24 hours after said discovery. The Concessionaire shall immediately notify the appropriate Governmental Authority, if required.

2. Detailed report requirements for non-compliant discharges

The Concessionaire shall submit to the Department within 5 days of the discovery of any actual or potential non-compliant discharge a written report describing details of the discharge to include its volume, location, cause, and any apparent or potential effects on private and/or public properties and state waters or endangerment to public health, as well as steps being taken to eliminate the discharge. A completed Form C-107 (a) and (b) shall be included in such reports.

3.5.5.6 Changes, Deficiencies and Revisions

(a) Changes and Deficiencies

The Concessionaire shall report to the Department when any planned physical alterations or additions are made to the land disturbing activity or deficiencies in the project plans or contract documents are discovered that could significantly change the nature or increase the quantity of the pollutants discharged from the land disturbing activity to surface waters.

(b) Revisions to the SWPPP

Where site conditions, construction sequencing or scheduling necessitates revisions or modifications to the erosion and sediment control plan or any other component of the SWPPP for the land disturbing activity, such revisions or modifications shall be approved by the Department and shall be documented by the Concessionaire on a designated plan set (Record Set). Such plans shall be maintained on the Project site or the Project office and shall be available for review upon request during normal business working hours.

3.6 Roadway Design

Design criteria and roadway functional classifications shall be in accordance with the standards and specifications set forth in Attachment 1.5a, as more particularly described below.

3.6.1 Mainline Roadway Design Criteria

- (a) The functional classification shall be Rural Principal Arterial freeway GS-1;
- (b) The design speed (as defined in the Department's geometric design standards) shall be 70 mph;
- (c) The Project mainline shall be designed to allow expansion to the Ultimate Configuration. The Concessionaire shall demonstrate in its design that a future expansion would utilize, to the maximum extent possible, all lanes constructed as part of the Project without major reconstruction;
- (d) Each mainline lane shall be capable of safely accommodating a flow of traffic contrary to its normal direction during hurricanes and other evacuations or emergencies; and
- (e) The design shall use a WB-65 design vehicle for all turning movements and the Concessionaire shall demonstrate in its Design Documentation that the design accommodates the following vehicles which are permitted to use the route as defined in the Surface Transportation Assistance Act of 1982 (STAA):
 - (i). Twin-trailers – maximum trailer length of 28 ½ feet;
 - (ii). Automobile and watercraft transporters – maximum 65 feet total length unless -Stinger-Steered which may be up to 75 feet maximum total length;
 - (iii). Truck/trailer combinations transporting watercraft – maximum 65 feet total length; and
 - (iv). Saddlemount combinations – maximum 97 feet total length.

3.6.2 Eastern Terminus

3.6.2.1 In the design of the eastern terminus the Concessionaire shall:

- (a) Design as a “system to system” interchange, characterized by high-speed, free-flow ramps connecting the individual traffic movements, not as a service interchange as

- would typically be designed between a controlled access highway and a lesser class facility such as an arterial or collector;
- (b) Design ramps capable of safely accommodating traffic contrary to its normal direction during hurricanes and other evacuations or emergencies and conveying this traffic efficiently and safely to and from the Project mainlanes operating in reverse flow;
 - (c) Design all interchange entrances/exits on right side;
 - (d) Achieve a design speed on all ramps of 45 mph minimum with no operational impacts such as delays to or spillbacks onto the mainlines of U.S. Route 58 and/or on the Project;
 - (e) Accommodate the ability to widen the existing U.S. Route 58 to the inside or the outside by one lane in each direction with minimum disruption to road users and without major reconstruction;
 - (f) Provide a Level of Service of C or better (as defined by the *Highway Capacity Manual*) for all ramp and weave movements throughout the Term;
 - (g) Prepare an Interchange Justification Report (IJR) as required by VDOT's I&IM 200.3, November 2006, together with an operational analysis as described in Section 3.6.4 below; and
 - (h) Maintain eastbound and westbound U.S. Route 58/Pruden Boulevard connections and U.S. Route 58/Main Street connections with no reduction in connectivity.
 - (i) Maintain continuity on Route 638, Murphys Mill Road; and
 - (j) Provide a design that closes Route 635, General Early Drive for consideration by the Department.

3.6.3 Western Terminus

3.6.3.1 In the design of the western terminus the Concessionaire shall:

- (a) Maximize use of the existing ramps to and from I-295 with no impact to any loop ramps;
- (b) Provide a Level of Service of C or better throughout the Term for all ramp and weave movements and for all relocated portions of existing U.S. Route 460, Route 629, Bull Hill Road, Stewart Road, West Quaker Road and any other facilities within the interchange area that are in the State system.
- (c) Provide a constant design speed for the Project with no reduction through the interchange;
- (d) For those new ramps that interface with existing ramps, achieve a design speed consistent with the applicable design speed of the existing ramp designs with no operational impacts to the existing U.S. Route 460 and/or the Project;
- (e) Design ramps capable of safely accommodating traffic contrary to its normal direction during hurricanes and other evacuations or emergencies and conveying this traffic efficiently and safely to and from the Project mainline operating in reverse flow;
- (f) Accommodate the ability to widen the existing U.S. Route 460 by 1 lane in each direction on each road;

- (g) Perform an operational analysis, as described in Section 3.6.4 below, to determine traffic impacts on the existing U.S. Route 460/I-295 interchange. A draft operational analysis shall be submitted to the Department for review and comment. Based on the results of the Department approved operational analysis and traffic impacts, an Interchange Modification Report (IMR) may be required in accordance with VDOT's I&IM 200.3, November 2006; and
- (h) Support the Department in its coordination with FHWA for approval should the design impact the existing I-295 interchange.

3.6.4 Requirements for Operational Analysis

3.6.4.1 General Requirements

- (a) The following identifies the requirements for an operational analysis to be undertaken for the termini interchanges in support of any Interchange Justification Reports (IJRs) or Interchange Modification Reports (IJMs). The Concessionaire shall be responsible for providing an operational analysis for each terminus. It is anticipated that an IJR will be required for the eastern terminus, and that an IMR will be required for the western terminus.
- (b) The operational analysis shall demonstrate that the Concessionaire's design of the termini interchanges do not have a significant adverse impact on the safety and operation of any existing facility based on an analysis of current and future traffic. Traffic and operational analysis shall be performed for existing and proposed conditions, including crossroads and other roads and streets to the extent necessary to assure their ability to collect and distribute traffic effectively to and from the Project.
- (c) The effect of the termini interchanges on the existing adjacent roadways shall not be considered in an isolated or localized manner. Sufficient study/analysis shall be performed to evaluate their effects on the whole existing facility. The analysis area for the eastern terminus shall include U.S. Route 58 from the Godwin Boulevard (U.S. Route 10) interchange to the Pitchkettle Road interchange. The analysis area for the western terminus shall include the I-295/I-95 interchange and all movements through the existing I-295/U.S. Route 460 interchange.

3.6.4.2 Layout and Design

- (a) The Concessionaire shall identify the basic geometry of the terminus and an arrow diagram showing the number of lanes for all movements, including ramps and through lanes, the number of mainline and crossroad lanes; including any auxiliary lanes or collector-distributor roads.
- (b) The Concessionaire shall, in addition to any other requirements of this Section 3.6.4, design the termini following Good Industry Practice. Any design not meeting the criteria shall be submitted to the Department and to FHWA for design waiver or exception approval in accordance with the procedures set forth in Section 3.1.3.

3.6.4.3 Traffic Volumes and Level of Service

For all through lanes, ramps and crossroads associated with or potentially affected by the interchange, the Concessionaire shall:

- (a) Identify traffic volumes in Annual Daily Traffic (ADT) including turning movements and directional distribution for the current year, the projected opening year and the design year. Design year to be identified by Concessionaire shall be not less than 22 years after Service Commencement for Rural Minor Collector and Urban Collector for new construction of major improvements or expansion of the facility; and all roads in the National Highway System, all Freeways, all Rural and Urban Arterial, and all Rural Major Collector functional classifications. Design year shall be not less than 11 years after opening day for Rural Minor Collector and Urban Collector for all restoration in kind or minor improvements; and for all Rural Local and Urban Local functional classifications.
- (b) Provide a plan view map showing AM/PM peak hour traffic volumes for the current year, design year without Project and design year with Project.
- (c) Provide a plan view map showing AM/PM peak hour Level of Service for design year without Project and design year with Project.

3.6.4.4 Traffic Analysis

The following traffic analysis shall be undertaken as part of the operational analysis of the termini interchanges for the current year, design year without Project and design year with Project:

(a) Freeway Analysis

A freeway Level of Service analysis shall be undertaken using the requirements of the *Highway Capacity Manual*, based upon minimum Design Speed, quantitative terrain type (percent grade and length), percent of trucks for each movement, lane widths and offset distance to side obstruction if less than 6' and peak hour factor (PHF).

(b) Ramp Junction Analysis

Queue lengths shall be calculated for ramps, in order to verify that the length of ramps are sufficient to accommodate predicted queues, and that there is adequate allowance for stopping sight distance and taper length.

- (c) The Concessionaire shall utilize the US Department of Transportation's comprehensive microscopic traffic simulation, applicable to surface streets, freeways, and integrated networks (CORSIM) in connection with traffic analysis calculations undertaken according to the *Highway Capacity Manual*.

3.6.4.5 Information Requirements

The following shall be submitted as information to support the operational analysis:

- (a) A summary of the *Highway Capacity Manual* raw input and output data used for the operational analysis (both in hard copy and electronic form), showing the Level of Service of each element (basic freeway, all ramp gores, weaving sections) for AM/PM peak hours and no-build/build conditions for both the year of opening and the design year.
- (b) The following information associated with the CORSIM analysis:
 1. a CD with a copy of the .trf files;
 2. a description of the method used to calibrate the CORSIM model;
 3. an explanation of what default values were changed and why;
 4. an explanation of the number of runs and random seeds used to develop the final CORSIM output;
 5. a summary of the CORSIM results in graphic or tabular format; and
 6. a summary chart showing the Level of Service results from the operational analysis.
- (c) The following additional information shall be provided:
 1. traffic data certified by a transportation professional;
 2. analysis results from any other software used in support of the operational analysis such as the US Department of Transportation's Highway Capacity Software; and
 3. any other information that might help explain and/or support the operational analysis.

3.6.5 Intermediate Interchanges

3.6.5.1 Interchanges, where provided as part of the Project, shall be designed at a minimum as complete diamond interchange designs.

3.6.5.2 Whether or not intermediate interchanges are included in the Project:

- (i) The Concessionaire, at a minimum, shall prepare for the Department's approval a design of each intermediate interchange conforming to the Department's Right of Way Stage of plan development showing Project Right of Way for, at a minimum, a diamond interchange configuration.
- (ii) The Concessionaire shall identify in its design the necessary extent of access control along the crossing roadway as defined in the VDOT *Road Design Manual* to prevent development close to interchange ramps; and

(iii) The Concessionaire shall acquire the necessary Project Right of Way and associated access control rights to accommodate each diamond interchange configuration.

3.6.5.3 Bridge crossing designs at intermediate interchange locations shall include the necessary set back of abutments and piers to allow for future widening of the Project as referred to in Section 3.6.1 above and for any connecting roadways or future interchange ramps. The Concessionaire shall demonstrate in its Design Documentation that it can achieve this requirement.

3.6.6 Secondary and Private Road Requirements

3.6.6.1 The Department has identified preliminary crossroad requirements as provided in its Preliminary Reference Design and other Project Reference Documents. The Concessionaire shall provide its plan for crossroad configurations as part of its Design Documentation.

3.6.6.2 The Concessionaire shall submit with its Design Documentation a report demonstrating that its design connectivity within the corridor is consistent with VDOT's Access Management Regulations and Standards.

3.6.6.3 In the event the Project design causes a parcel or parcels to be land locked and without access to a public road, the Concessionaire shall either purchase the parcel or parcels or obtain the necessary Project Right of Way for and construct a service road providing the parcel or parcels with access. The service road shall be designed and constructed to a standard GS-9 in the VDOT *Road Design Manual*.

3.6.6.4 For those private roads that are terminated and there are no other impacts from the termination point to the existing Department maintained connection point, the road will remain private.

3.6.6.5 The Concessionaire and the Department shall work cooperatively, following approval by the Department, to request that the CTB to accept all such service and private roads into the secondary system.

3.6.6.6 Secondary roads shall be designed and constructed in accordance with traffic volumes and Department functional classification requirements.

3.6.6.7 All dead ends resulting from the Project shall incorporate a cul de sac or other turnaround suitable for use by local emergency vehicles (i.e., fire trucks) as well as any other local government criteria for turnarounds.

3.6.6.8 The Concessionaire shall be responsible for the operation and maintenance of all Assets it constructs and installs as part of the Project in accordance with the Agreement, with the exception of the Project Assets identified in Section 1.8.2 of Attachment 1.0 to the Technical Requirements.

3.7 Bridges and Structures

3.7.1 General

3.7.1.1 Permanent structures covered by this Section 3.7.1 include bridges, retaining walls, sound walls, bridge class culverts, sign structures, lighting structures, and system equipment structures, toll gantries and technical shelters.

3.7.1.2 Bridge crossing clearance and related requirements shall comply with applicable AASHTO and Department standards to include those required by STRAHNET and comply with applicable Law.

3.7.1.3 Prior to commencing final design of bridge structures, the Concessionaire shall submit Stage I bridge plans to include size and location (S&L) of the proposed preliminary bridges. The preliminary bridge design submittal shall include identification of any issues pertaining to bridge location, aesthetics, sidewalks, lighting, constructability, maintainability, site and environmental constraints. Additionally, the submittal shall include a plan, elevation and transverse section of the proposed structure. Each submittal shall include the Stage I Plan Checklist, which is available as a Project Reference Document.

3.7.1.4 The design criteria for bridges; gantry, sign, and high mast lighting; and culverts, retaining walls, MSE walls, and standard structures are included in Attachment 3.8.

3.7.1.5 The parapets and barrier walls on bridges may be built using slip form construction.

3.7.1.6 The design for the structures, toll gantries and supports for the violation enforcement, Traffic Management System (TMS) and ETTM System roadside equipment shall be standardized.

3.7.1.7 The design for toll gantries shall accommodate the following:

- (a) toll and enforcement equipment dead loads and Performance Requirements; and
- (b) natural frequency requirements.

3.7.1.8 The vertical deflection of the toll gantry shall not exceed 1.5 inches.

3.7.1.9 The toll gantry columns and beams shall be galvanized steel.

3.7.1.10 When spread footings are proposed, the Concessionaire shall conform to Section 401 of VDOT *Road and Bridge Specifications 2007*, Structure Excavation. The Concessionaire shall ensure that all recommendations related to the suitability of foundation material for spread footings at the time of construction shall be made in the field by a qualified geotechnical engineer. Foundation recommendations for all permanent structures

shall be submitted to the Department for review and comment prior to the submittal of final Design Documentation.

3.7.2 Safety and Acceptance Inspections for Bridges, Culverts, Overhead Sign Structures, and High Mast Light Poles:

Acceptance of a bridge, culvert, overhead sign structure or high mast light pole will require the following two independent inspections by the Department:

3.7.2.1 A satisfactory safety / inventory inspection by the Department as described in Section 3.7.3 is required prior to Substantial Completion and opening the structure to public traffic.

3.7.2.2 A satisfactory final construction inspection by the Department is required prior to Final Acceptance of the structure. While it is suggested that these two inspections be held simultaneously, simultaneous inspection is not a requirement since on some projects as this may not be practical.

3.7.3 Safety / Inventory Inspection of Structures

3.7.3.1 This safety/inventory inspection by the Department will serve as the initial inspection of the structure. Data gathered will include location, date completed, alignment, description, horizontal / vertical clearances, stream data, structure element description and condition data, and traffic safety features.

3.7.3.2 To facilitate inspection of all structures by the Department, the Concessionaire shall ensure that all structural elements are accessible and shall provide adequate resources including:

- Man-lifts, bucket trucks, under bridge inspection vehicles, boats, or other equipment necessary to inspect the structure as well as properly trained staff of sufficient composition to support the inspections.
- Plans, procedures, personnel, and equipment to implement traffic control measures.

3.7.3.3 The Concessionaire shall provide a minimum of 30 days' notice to the Department whenever it requires the Department to undertake an inspection. The Concessionaire's notice to the Department shall include as-built drawings, traffic control procedures, a description of the items to be inspected and an anticipated schedule for the inspections, all in accordance with the requirements contained in Attachment 3.8.

3.7.3.4 Unless otherwise approved by the Department, structures shall be substantially complete (i.e. roadway, curbs, and slopes on the approaches and underneath the structure are already in place) before the inspection will be performed.

3.8 Railroad Design

3.8.1 The Concessionaire shall incorporate the appropriate railroad design requirements for railroad crossings and any roadway that may parallel or encroach on Norfolk-Southern (NS) or other railroad right of way, such as a frontage road. Designs impacting on NS or other railway right of way shall meet or exceed the applicable requirements or criteria, as provided by the railroads. Railroad requirements on Department-led projects are included in the Project Reference Documents.

3.8.2 The Concessionaire shall coordinate directly with the railroads impacted by the Project. The Concessionaire shall coordinate with the Norfolk-Southern Chief Engineer -Bridges and Structures during the Work Period of the Project. The Chief Engineer - Bridges and Structures can be reached at the following address:

Norfolk Southern Corporation
1200 Peachtree Street
Atlanta, Georgia 30309

3.9 Miscellaneous Design and Construction

3.9.1 Bicycle and Pedestrian Accommodation

3.9.1.1 The Concessionaire shall conduct an analysis of bicycle and pedestrian accommodations. The information in Section 3.9.1.4 below has been obtained from the counties and cities along the corridor to identify existing and proposed bicycle and pedestrian crossings that could possibly be impacted by or need to be considered with respect to the Project. This information, in conjunction with the Concessionaire's coordination with counties and cities, should be utilized in consideration and development of the Concessionaire's bicycle and pedestrian plan.

The bicycle and pedestrian plan shall be developed for implementation within the Project Right of Way and shall be consistent with the CTB's Policy for Integrating Bicycle and Pedestrian Accommodations located in the Project Reference Documents.

In addition, the Concessionaire shall demonstrate in its bicycle and pedestrian plan the steps it has taken to coordinate with the local and regional jurisdictions for final determinations prior to final designs.

Isle of Wight County – Local plan approved 2006, currently being implemented.

Prince George County – Regional plan, *2026 Transportation Plan-Tri-City Bike Plan*, approved 2004

Southampton County – No current plan available

City of Suffolk – New plan under development

Surry County – Regional plan, *2026 Transportation Plan-Tri-City Bike Plan*, approved 2004

Sussex County – Regional plan, *2026 Transportation Plan-Tri-City Bike Plan*, approved 2004

3.9.1.2 The Concessionaire shall submit its bicycle and pedestrian plan including any analysis to the Department for review and approval.

3.9.1.3 Once developed and approved by the Department, the Concessionaire shall incorporate the bicycle and pedestrian plan into its design, construction, and maintenance operations for the Project as applicable.

3.9.1.4 The following routes and crossings are currently used for bicycle and/or pedestrian activities and shall be included in the analysis.

Isle of Wight County:

Existing bike club routes:

- Route 644 (Fire Tower Road) and existing U.S. Route 460
- Route 657 (Antioch Road) and existing U.S. Route 460
- Route 603 (Church Street)/ Route 610 (Court Street) and existing U.S. Route 460

A proposed signed bike route crossing at Route 645 (Yellow Hammer Road) and existing U.S. Route 460

Pedestrian Crossings:

- Route 603/Route 610 and existing U.S. Route 460

Also, there are proposed sidewalks and other pedestrian improvements proposed for the section of U.S. Route 460 from Route 603/Route 610 to Route 600 (Lovers Lane) and for a section of Route 258 starting at existing U.S. Route 460.

Suffolk:

- Suffolk has a planned crossing at Nansemond Parkway and Route 58/U.S. Route 460 By-pass. There are also parking, shelter, bicycle racks, benches and a picnic area planned for this area that is referred to as the "Nansemond River Trail Head" in the Suffolk Seaboard Coastline Trail.

3.9.1.5 Additional resources available to the Concessionaire are provided as part of the Project Reference Documents.

3.9.2 Fences and Barriers

3.9.2.1 The Concessionaire is responsible for securing the Project and providing all temporary fencing necessary to ensure the safety of the work force and members of the public.

3.9.2.2 The Concessionaire shall provide temporary 6-foot-high (minimum) chain link security fencing to separate the sound wall erection work zone and adjacent properties when a safety risk analysis determines it would be necessary.

3.9.2.3 Fences shall be placed on all new bridges or bridges that require widening or major rehabilitation regardless of whether a bridge has a sidewalk or not.

3.9.3 Capital Asset Facilities

3.9.3.1 If the Concessionaire constructs a building within the Right of Way on state property, the Concessionaire shall submit plans and specifications to the Department of General Service's (DGS) Bureau of Capital Outlay Management (BCOM) to obtain a building permit. At completion, the Concessionaire shall have the building inspected by BCOM to obtain an occupancy permit. Also any building project constructed on state property costing \$100,000 or more will require an Environmental Impact Review (EIR) processed through the Virginia Department of Environmental Quality (VDEQ) and approved by the Governor. The Department does not guarantee that the Concessionaire's request will be desired or accepted. The Concessionaire's plans must be approved by the Governor as required by Section 2.2-2402 of the Code of Virginia. Further, all construction work shall comply and be consistent with the Uniform Federal Accessibility Standards as applied to buildings on government property. Also, the Concessionaire shall obtain any other permits and approvals required under applicable Laws.

- (a) If the Concessionaire wants to make changes, additions or improvements to the structure in the future, BCOM approval is required.
- (b) Section 2.2-1149 of the Code governs the acquisition of property for office space, district offices, residencies or area headquarters and provides that for such acquisitions, Governor approval is required and the normal DGS requirements for acquisition of capital outlay property would apply.

3.9.3.2 The overall design and construction shall comply with Virginia Energy Conservation and Environmental Standards, DEB Notice 12018 and all applicable building and fire codes.

3.9.3.3 The Concessionaire shall obtain building permits and Governmental Approvals for construction and occupancy.

3.9.3.4 The Concessionaire shall procure any zoning variances required for construction and occupancy.

3.9.3.5 The Department has determined that it will not permit sharing of existing facilities between the Concessionaire and the Department for operations and maintenance activities. If the Concessionaire should seek to construct a building at one of the Department's maintenance facilities, the same requirements for construction outlined above will apply. The Concessionaire will be required to sign a lease agreement to construct a new

building or to lease all or part of the Department's existing facilities at one of these locations. A minimum of four months would be required to obtain a lease which would require the Governor's approval.

3.9.3.6 If the Concessionaire buys property outside of the Project Right of Way with the intention of retaining ownership of it throughout the Term and then transferring it to the Department when the Agreement expires, then all of the requirements for construction listed above will apply. If the Concessionaire buys vacant property that will ultimately be owned by the state at the end of the Term, the Concessionaire will be required to have building permits and occupancy permits for any new structures. If the Concessionaire buys land with existing buildings and the property will ultimately be owned by the state, the Concessionaire will have to obtain an occupancy permit approved by BCOM.

3.9.3.7 If the Concessionaire buys property outside the Project Right of Way, and the property will ultimately be owned by the state at the end of the Term, the Department will conduct an environmental site assessment and develop an agreement concerning the initial environmental condition of the property. The agreement shall allow the Department to periodically inspect the property for environmental or other issues and allow the Department to perform another site assessment before the property becomes state property to assure the property is environmentally acceptable. If the property is not acceptable, the Concessionaire shall clean the property to standards acceptable to the state before the property will be approved/accepted by the Department.

3.9.4 Safety Rest Areas

3.9.4.1 The Concessionaire shall design and construct Safety Rest Areas (SRA) consistent with its Design Documentation. The number, location, and design of SRA shall be determined by the Concessionaire consistent with the *AASHTO Guidelines for Development of Rest Areas on Major Arterials and Freeways, 2001*. Any SRA shall accommodate both traffic directions to include adequate parking for cars, trucks, and buses, with special emphasis on truck parking; enclosed restroom buildings, lighting, and related appurtenances. Design and construction of facilities shall be in accordance with the requirements in Section 3.9.3.

3.9.4.2 The Concessionaire shall provide a preliminary SRA design report for the Department's approval prior to commencing final Design Documentation, identifying the proposed layout and facilities to be included in any SRA and giving consideration to overnight parking/staging of trucks; provision of special services such as picnic facilities and pet rest areas; hurricane evacuation staging area/supply facilities; TMS applications to provide real-time traveler information; and additional SRAs to be located within short distances of drop/pickup points.

3.10 Context Sensitive Design

The Concessionaire shall consider context sensitive solutions in its design. Additional information is available at <http://www.fhwa.dot.gov/csd/index.cfm>. The Project shall be designed

to harmonize with the local environment as well as the developed themes of the local setting. The Concessionaire shall coordinate with local and state agencies to develop a Project concept to achieve this harmonization. The Project concept shall include (but not be limited to) the following elements to be incorporated into the final Design Documents.

3.10.1 Landscape

3.10.1.1 Develop planting themes that utilize native-area and/or naturalized plant materials that exhibit good drought tolerance to the extent possible.

3.10.1.2 Identify existing natural, environment assets and avoid negative impacts to the extent possible.

3.10.1.3 Emphasize and enhance the existing natural context and landscape to the extent possible.

3.10.1.4 Preserve existing trees to the extent possible.

3.10.1.5 Ensure that contour grading, slope rounding, channel treatment, and drainage match existing slopes and landscaping.

3.10.1.6 Ensure that the restoration of slopes, including regular seeding and planting of vegetation can be carried out in accordance with the standards and specifications set forth in Attachment 1.5a.

3.10.1.7 As part of the O&M Plan, establish regular mowing limits and meadow mowing management plan that will carry these established elements and principles through to Project maintenance procedures.

3.10.2 Aesthetic Treatments

3.10.2.1 Aesthetic treatments shall be designed to harmonize with the local landscape and architecture, as well as the developed themes of the local setting. As part of the Project design, the Concessionaire shall coordinate with local and state agencies to develop an aesthetic concept to achieve this harmonization, including coordination with the Noise Abatement Committee and State Historic Preservation Office (SHPO) as applicable.

3.10.2.2 The following items shall be considered in defining the aesthetics concepts for the Project design:

- (a) material, finish, color, and texture of sound walls, retaining walls, bridge barriers, parapet walls, abutments, wingwalls, and piers;
- (b) consideration of alternative sound wall types, such as “living walls”
- (c) paved and/or planted slope treatments and hardscapes at interchanges and intersections;
- (d) median or other specialty paving, including material, finish and color;

- (e) fencing;
- (f) signage (including overhead, attached, ground-mounted, and gantries);
- (g) lighting poles and lamps; and
- (h) any permanent building construction for the Project, including ancillary support, operational, rest areas and toll collections.

3.10.2.3 Simple geometric shapes for structures shall be used to the extent possible for continuity along the entire length of the Project.

3.10.2.4 All bridges and other structures shall be simplified in their design, and to the greatest extent possible kept small in size, bulk, and mass.

3.10.2.5 All structures shall be carefully detailed to achieve the greatest level of aesthetic quality and fit within the corridor context.

3.10.2.6 Graphics, signage, and lighting shall be consistent along the entire length of the Project.

3.10.2.7 Aesthetic elements shall be easy to maintain and resistant to vandalism and graffiti.

3.10.2.8 Aesthetics elements shall be fully integrated with the overall landscape design.

3.10.2.9 Where structural elements have no aesthetic surface treatments specified, elements shall receive a smooth concrete finish in accordance with the Attachment 1.5a.

3.10.2.10 Anti-graffiti coating shall be provided on all noise barriers and any other structural element accessible by foot.

3.11 Traffic Control Devices

Traffic control devices shall include:

- a) all signs, signals, pavement markings, pavement markers, roadway interchange and parking lot lighting and delineators necessary within the Project limits;
- b) signs outside the Projects limits that are necessary to lead traffic to the Project; and
- c) traffic signals outside of the Project limits that are warranted due to the volumes of traffic generated by the Project.

Signs shall include toll related signage necessary to inform customers of the tolled facility, provide information on toll rates, and direct vehicles to the appropriate payment lanes. The Concessionaire shall provide plans for all traffic control devices with its Design Documentation. Transition from new markings, markers, and delineators to existing shall be planned such that road users will discern no noticeable change in concept. Design Documentation for the Department's review and approval for traffic control devices shall be submitted as a complete package for each Construction Segment. All new and existing traffic control devices within the

Project limits and those signs outside the Project limits shall be installed modified or replaced in accordance with standards and specifications included in Attachment 1.5a.

3.11.1 Signs

3.11.1.1 Static Signs - The Project shall include all necessary modifications to existing signs and sign structures such that they will be in compliance with current practice and all necessary new signs and structures. All sign sheeting materials shall be ASTM type VIII, IX or other as approved by the Department. Sign panel design shall be accomplished using GUIDESIGN software, or the then current software in use by the Department. All permanent ground mounted sign supports shall be square tube steel post or Type V-A or Type VI-A structures.

(a) As a general requirement, sign lighting is not needed on overhead signs; however, the Concessionaire shall provide evidence with its Design Documentation that it has reviewed each overhead sign to verify that vehicle headlight alignment will produce the desired retroreflective effects and qualities. Sign lighting shall be included wherever the vertical or horizontal alignment of the Project might reduce the ability of headlights to reach the sign, such that the motorists would not have the proper perception and reaction time. Any required sign lighting for overhead structures shall be 150 watt high pressure sodium luminaries. Cantilevered sign structures shall have a maximum arm length of 50 feet. Additionally, all overhead sign structures shall be engineered to enable sign lighting and light retrieval systems to be added without the need to modify the strength or height of the structure.

(b) Construction signs shall be installed, maintained, adjusted, and removed by the Concessionaire throughout the duration of the Project in accordance with the latest *Virginia Work Area Protection Manual*.

(c) The Concessionaire shall be responsible for planning for, coordination and obtaining Governmental Approvals, if required, and removing and disposing of structures and obstructions. The Concessionaire shall relocate all signs within the construction limits that conflict with construction work. Signs that are not needed for the safe and orderly control of traffic during construction may be removed and stored in a manner that will preclude damage and reinstalled in their permanent locations prior to final acceptance.

3.11.1.2 Dynamic Message Signs - The Concessionaire shall incorporate into its designs dynamic message signs, including blank out signs. Dynamic message signs shall not be installed on cantilever structures. Additional information is included in Section 4.0.

3.11.1.3 Integrated Directional Sign Program - Under the Integrated Directional Sign Program (IDSP) the Department has assigned an entity to develop, coordinate, implement, operate and maintain a statewide system of highway directional and other special sign programs. The four basic categories are 1) Specific Travel Services Signing commonly referred to as LOGO, 2) Tourist Oriented Directional Signing (TODS), 3) Supplemental

Guide Signing, and 4) General Motorist Service Signing. Special programs include such categories as wayfinding, trails, and signing for waterways and scenic rivers. The Department or the entity acting on behalf of the Department shall be given access, (subject to reasonable notice) to the Project to implement, operate and maintain any signs included under the IDSP, such access not to be denied unless it would interfere with the Concessionaire's scheduled construction or maintenance activities. The Concessionaire shall have no involvement or responsibility for signage implemented under the IDSP.

3.11.2 Signals

3.11.2.1 The Concessionaire shall design and install fully-actuated permanent traffic signals incorporating both pedestrian and vehicle detectors at all intersections for the Project where traffic signals are required based on the warrant studies below. In addition, the Concessionaire shall modify, as appropriate, any existing traffic signals impacted by the Project. The Concessionaire shall coordinate with the Department and the applicable Governmental Authority to define appropriate traffic signal design requirements.

3.11.2.2 The Concessionaire shall ensure continuous communication with the traffic signal system within the Project, and shall provide all communication hardware/equipment for the Department or the applicable Governmental Authority to communicate with the signal systems within the Project.

3.11.2.3 The Concessionaire shall notify and coordinate with the Department for the implementation of signal timing plans that optimize traffic flows and provide signal coordination with adjacent intersections and arterials for all existing or new traffic signals, modified signals, and interconnected signals. Unless timing maintenance is otherwise provided by a Governmental Authority, the Department, in coordination with the Concessionaire, shall be responsible for updating signal timing as necessary to maintain optimized flow.

3.11.2.4 As part of the final Design Documentation, the Concessionaire shall collect traffic data and prepare traffic warrant studies for intersections within or affected by the Project. The warrant studies shall address all signal warrant criteria in the MUTCD. The Concessionaire shall make recommendations for new signal installations based on these warrant studies in consultation with the Department and the applicable Governmental Authorities. The Department will reasonably determine if a signal or modification is required, based upon the warrant study. All requests for signals within the Project Right of Way throughout the Term shall be subject to the Department's approval.

3.11.2.5 Signal warrant studies shall be based on actual traffic and/or opening year traffic projections. The Concessionaire shall conduct additional traffic signal warrant studies for all intersections affected by the Project, commencing six months after Service Commencement. If additional signals or modifications to existing signals are warranted, based on the traffic volumes obtained through these studies, the Concessionaire shall be responsible for installation of additional traffic signals or modification of previously-installed traffic signals.

3.11.2.6 New traffic signal installations shall be in accordance with Department standards for mast arms unless otherwise approved by the Department. All conductor/communication cables shall be in conduit and junction boxes, no direct burial cable allowed. To extent practical, a signal head cluster shall be displayed for each approach lane.

3.11.2.7 Any construction (temporary) signalization necessary shall be designed, installed, maintained adjusted and removed in accordance with the standards and specifications included in Attachment 1.5a.

3.11.3 Pavement Markings / Markers

3.11.3.1 The Concessionaire shall provide and maintain all required pavement markings and raised pavement markers. All pavement markings shall be classified as “Wet Reflective” as approved by the Department. The mainline and all gore areas along the Project shall have permanent raised markers (snow-plowable) installed and maintained. Contrast markings are required on all Portland cement road surfaces including bridge structure surfaces. All pavement marking (temporary and permanent) are to be installed by the Concessionaire.

3.11.4 Delineators

The Concessionaire shall include all required delineators.

3.11.5 Roadway, Interchange, and Parking Lot Lighting

The Concessionaire shall analyze planned road sections (between interchanges), and each planned interchange, applying traffic volumes projected to five years after construction to determine where lighting is required. This analysis and any lighting developed for the roadway shall be consistent with the following requirements.

- Lighting needs shall be determined using the lighting warrants listed in the USDOT Roadway Lighting Handbook.
- Lighting design shall be determined by the use of AGI-32 computer software.
- Point to point lighting analysis and calculations of the illuminated areas shall be submitted to the Department for review and approval.
- High pressure sodium luminaries shall be used unless otherwise approved by the Department.
- All conductor cables shall be in conduit and junction boxes; no direct burial cable allowed.
- The lighting system will require equipment grounding conductors in non-metallic conduits in accordance with Article 250 of the NEC. Lighting system grounding conductors shall be the same size as the largest power conductor within the non-metallic conduit.

In addition, the Concessionaire shall analyze each planned facility parking lot to determine where lighting (both operational and security) is necessary. Prior to the preparation of final Design Documentation, the Concessionaire shall submit the results of its lighting study to the Department for review. Where the Department agrees that lighting should be provided, the Project shall include all necessary lighting and lighting structures. All lighting and lighting structures shall be designed in accordance with the standards and specifications included in Attachment 1.5a.

3.11.6 Power

3.11.6.1 The Concessionaire shall design, install, connect, and maintain electrical power service to sustain all operations for the ETTM Equipment and Facility, including all other capital asset facilities, required for the Project.

3.11.6.2 The Concessionaire shall install and have connected power service for traffic signals, lighting, (sign, roadway, interchange, parking lot) for the Project.

3.11.6.3 The Concessionaire shall provide back-up electrical power service to support all O&M Work in emergency situations where the primary power source is not available.

3.12 Security

3.12.1 General Requirements

3.12.1.1 Subject to the requirements of the Agreement, the Concessionaire shall adhere to the intent of the Department policy on Critical Infrastructure Information and Sensitive Security Information (CII/SSI) to the extent such information is directly related to the Concessionaire's performance of its obligations under the Agreement. The Concessionaire shall ensure that relevant CII/SSI is protected and not disclosed to unauthorized persons. The Concessionaire shall ensure that all personnel having access to CII/SSI for the Concessionaire and all subcontractors have completed the required non-disclosure forms.

3.12.1.2 The Department may request fingerprint-based criminal history background checks on contractors working on specific structures or functions.

3.12.1.3 The Concessionaire shall review with the Department any information that should be designated as CII/SSI as specific design details become available. Any requirements for security review or other inspections will be mutually agreed to with the Department.

4.0 TOLLING AND TRAFFIC MANAGEMENT

4.1 General Information

The Concessionaire shall be responsible for the planning, design, installation and maintenance, and operation of Electronic Toll and Traffic Management (ETTM) Systems and ETTM Facilities, toll collections, incident and emergency management and traveler information in accordance with the following requirements. Operation and maintenance of those systems and facilities are further described in Section 5.

The Concessionaire shall develop and implement the Project such that the operational facility is integrated with and becomes a component of the regional transportation system. The Concessionaire shall coordinate and share information with the Department on a near or real time basis.

The proposed ETTM System and associated facilities for the corridor shall include the following components, as further described in this section:

- ETTM Facilities
- ETTM System and Equipment including an Open Road Tolling (ORT) toll system with optional separated credit card/cash payment facilities
- Fiber-optic backbone and network nodes
- Dynamic Message Signs
- Traffic Management system
- CCTV camera system for surveillance
- Automated incident detection
- Traffic monitoring sensors including counters at entrance/exit lanes

4.2 Business and Toll Operating Model

4.2.1 The business and toll operating model shall comply with the requirements of the Agreement.

4.2.2 An ETTM Facility shall be provided to support facility administration, traffic management, incident detection and response, maintenance and tolling operations including handling of services directly related to the operation and maintenance of the Project. In addition to the administration/operations center, ETTM Facilities shall include the toll gantries, technical cabinets, utility connections, lighting facilities, and other facilities associated with electronic toll and traffic management.

4.2.3 ETTM equipment shall be installed to facilitate electronic collection of tolls on the Project by means of an E-ZPass compliant (and any successor system to E-ZPass utilized on State Highways) Electronic Toll Collection (ETC) System. An ORT model based on E-ZPass and video technology shall be implemented for toll collection to ensure mainline toll collection does not impede vehicle flow. The Concessionaire may also deploy credit card/cash payment options as long as such options do not impede traffic flow accessing

or on the Project including or using the ORT toll lanes. Credit card payment systems, if used, shall comply with payment card industry data security standards (PCI-DSS) and credit card/cash payments shall be managed, controlled and audited according to industry standards. The Concessionaire shall make all efforts to make toll payment as convenient as possible and to maximize patron vehicle mobility through the tolling points.

- 4.2.4** Electronic toll collection devices such as transponders or other on-vehicle units (i.e. E-ZPass tag) shall be in compliance with E-ZPass (and any successor system to E-ZPass utilized on State Highways), either issued by the Department or by another member of the E-ZPass Interagency Group.
- 4.2.5** A Violation Enforcement System (VES) shall be implemented on the ORT lanes to enable detection, payment collection and toll enforcement for vehicles for which a valid E-ZPass tag is not read. Enforcement shall follow practices established on similar systems and shall be in compliance with applicable Law. It may include manual processes, video enforcement, integrating customer service, technology and operational performance elements. Violation enforcement may also be deployed on cash/credit lanes if this is consistent with the Concessionaire's business plan.
- 4.2.6** The Agreement provides the Concessionaire the option to enter into an Electronic Toll Collection Service Agreement and/or a Violation Processing Services Agreement with the Department for enforcement of toll collection and enforcement of penalties for toll violations.
- 4.2.7** An enforcement area shall be provided at or near each tolling point where practical to provide a safe location adjacent to the toll gantries for law enforcement vehicles.

4.3 Systems Integration and Protocols

- 4.3.1** The Concessionaire shall implement a system engineering approach in the development of systems and their associated interfaces. The system engineering approach shall address the following items where applicable:
 - (a) system architecture
 - (b) system specification
 - (c) interface identification
 - (d) Interface Specification
 - (e) interface control
 - (f) system integration
 - (g) configuration management
- 4.3.2** As part of the ETTM System, the Project Traffic Management System (TMS) shall interface to the Department's Advanced Traffic Management System (ATMS).

4.3.3 The Concessionaire shall provide standards, protocols and interfaces to make the TMS interoperable with the Department's ATMS in accordance with the Interface Specification including any mutually agreed revisions during the Operating Period.

4.4 ETTM System and TMS Design Documentation

4.4.1 The ETTM System Design Documentation shall be prepared and submitted to the Department for review and approval 90 days prior to issuance of the construction commencement as follows:

- (a) ETTM System Design Plan – shall be Design Documentation which identifies the location of the ETTM System components to include toll gantries, barriers, segments, ramps and other equipment on the plans.
- (b) Functional Specifications – ‘Concept of Operations’ - shall be a document or documents prepared by the Concessionaire which outlines the characteristics of the ETTM System with regard to its intended capability. It shall describe the intended behavior and functionality of the ETTM System and the operational interaction with the Department's ATMS.
- (c) Technical Specifications - shall be a document or documents prepared by the Concessionaire which specifies the technical design of the integrated sub-systems that will comprise the ETTM System and its interfaces.
- (d) Interface Specification - shall be a document prepared by the Concessionaire that describes the physical and logical architecture of system interface between the ETTM Facility and the Department.
- (e) The Process Definition Deliverable or other agreed document shall be a document prepared by the Concessionaire which sets out the business processes relating to the ETTM System provided by the Concessionaire (and the requirements of the Agreement) and the processes for interacting with the appropriate Department system and/or other systems as required.
- (f) The Test Strategy - shall be a document prepared by the Concessionaire which sets out the principles of, and the Concessionaire's approach to, the testing of the ETTM System and its interfaces, including the test stages and processes.
- (g) The Security Plan shall be a document (or part of another document) prepared by the Concessionaire which sets out how the security of the ETTM System, including the sub systems, communication links, roadside equipment and ETTM Facility shall meet the relevant requirements identified in Section 5.5.7.2 and that data are held securely, are only accessible to authorized personnel, and are protected from tampering.

- (h) The Disaster Recovery Plan shall be a document prepared by the Concessionaire which sets out the procedures to be adopted in the event of failure of the ETTM System.

4.5 ETTM System

- 4.5.1** An ETTM System shall be provided to impose, charge, collect, use and enforce payment of tolls and other incidental fees and charges reasonable and customary for vehicles using the Project.
- 4.5.2** The ETTM System is to comprise the following equipment and/or systems:
 - (a) ETTM System road side equipment
 - (b) ETTM System equipment and/or sub-systems
- 4.5.3** The ETTM System road side equipment is to comprise:
 - (a) vehicle detection equipment
 - (b) E-ZPass tag detection equipment
 - (c) vehicle classification equipment where toll payments are based on vehicle types
 - (d) credit card/cash payment equipment if deployed
 - (e) control equipment
- 4.5.4** The Concessionaire shall provide toll charge information in compliance with the Interface Specification.
- 4.5.5** The Concessionaire shall develop interface file format and transfer protocols for the transmission of the ETTM data in cooperation with the Department in accordance with the Agreement, including the Interface Specification and the Electronic Tolling Collection Agreement. If the Concessionaire chooses to utilize the Department for violation processing, a Violation Processing Services Agreement will also need to be signed in accordance with the Agreement.
- 4.5.6** Communications between the ETTM System road side equipment and the ETTM Facility shall be via the fully redundant fiber optic network.

4.6 Violation Enforcement System

- 4.6.1** A Violation Enforcement System (VES) shall be provided that detects vehicles using the Project that do not have a valid transponder.
- 4.6.2** The VES shall comprise:
 - (a) Image capture equipment
 - (b) Control equipment
- 4.6.3** When tolls are suspended there shall be a means to suspend violation enforcement.

4.7 Technical Shelters

- 4.7.1** The Concessionaire shall provide suitable technical shelters housing electrical cabinets for the ETTM System and TMS equipment as required.
- 4.7.2** The technical shelters shall be equipped with the following provisions:
- (a) HVAC
 - (b) fire detection
 - (c) intrusion detection
- 4.7.3** Each service panel for the technical shelters shall be equipped with telemetry equipment that reports, for the main power and each branch circuit, the current flow and any ground faults.
- 4.7.4** The telemetry shall be powered by an Uninterruptible Power Source (UPS) to enable the telemetry to communicate for the first 20 minutes after a power failure.
- 4.7.5** Service panels feeding technical shelters shall be equipped with a backup generator which shall be sized to accommodate the attached electrical load including Dynamic Message Signs connected to the service panel.

4.8 Project ETTM Facility

- 4.8.1** The Concessionaire shall design, construct, equip, and staff an ETTM Facility adequate to perform the operational requirements for the Term.
- 4.8.2** The Concessionaire shall provide an ETTM Facility that complies with the applicable building and fire codes, and as noted in Section 3.9.3.
- 4.8.3** The Concessionaire shall obtain building permits and all Governmental Approvals required for the construction and occupancy of the ETTM Facility, Section 3.9.3.
- 4.8.4** The Concessionaire shall procure any zoning variances required for the property to be used for the ETTM Facility.
- 4.8.5** The Concessionaire shall provide an ETTM Facility that includes:
- (a) offices
 - (b) meeting rooms
 - (c) control room
 - (d) computer equipment room with means for cable distribution
 - (e) restrooms, showers, and locker room
 - (f) external and internal access security system
 - (g) HVAC system
 - (h) fire detection and alarm system
 - (i) emergency and back up power system

- (j) maintenance and storage rooms
- (k) employee and visitor vehicle parking spaces

4.8.6 The control room shall be equipped with ETTM equipment and systems and shall accommodate required operations.

4.8.7 All offices and rooms shall be Americans with Disabilities Act (ADA) accessible to all employees and visitors.

4.9 Traffic Management System

4.9.1 A Traffic Management System (TMS) shall be provided that enables the Concessionaire to monitor and manage traffic flow on the Project subject to the following:

4.9.2 The TMS must allow the Concessionaire to:

- (a) enable real-time traffic information, public service announcements, construction/maintenance lane closures, and incident notifications;
- (b) support response to emergency situations on the Project in the shortest possible time frame;
- (c) optimize the traffic flow;
- (d) detect and manage traffic incidents effectively, through a comprehensive incident management system, to mitigate the impacts of incidents and prevent secondary incidents occurring;
- (e) provide credible and timely driver information about travel times, traffic conditions and incident situations;
- (f) provide an interface with the Department ATMS in accordance with the Interface Specification;
- (g) support provision of driver aid to motorists in vehicles that have stopped on the Project;
- (h) permit the Department to control the TMS in situations of declared emergencies;
- (i) provide for the control and monitoring of TMS components and sub-systems through a modern and comprehensive computer based control facility utilizing intuitive graphical user interface (GUIs); and
- (j) monitor and maintain facilities, plant and equipment.

4.9.3 The TMS road side equipment shall comprise:

- (a) Dynamic Message Signs (DMSs) serving both directions of traffic for the Project to provide toll and traffic management information as applicable. The locations of DMSs shall be developed by the Concessionaire, should include approaches to the Project and be included as part of the TMS component of the O&M Plan. Displayed messages shall comply with the Department policies and procedures and be developed as part of a traveler information plan.
- (b) Behavioral studies and market research shall be undertaken to confirm the requirements for the type and format of messages to be provided on the DMS and

static signage for optimum information provision. Findings and recommendations shall be provided to the Department for review during the design review process and no later than 6 months prior to Substantial Completion. The type and format of DMS messages must comply with the requirements of MUTCD and/or the Department practices as appropriate.

- (c) Pan Tilt Zoom (PTZ) closed circuit television (CCTV) cameras to provide video surveillance at locations identified as critical along the corridor.
- (d) Traffic monitoring sensors to provide traffic volume, lane occupancy and speed data.
- (e) The TMS road side equipment shall have an In Service Availability (ISA) of at least 99.9%.
- (f) Equipment cabinets shall be provided for the TMS road side equipment at appropriate locations along the alignment and within the Project Right of Way.

4.9.4 The –ETTM Facility based equipment and/or systems are to comprise:

- (a) an Automatic Incident Detection (AID) subsystem.
- (b) a CCTV subsystem.
- (c) A Central Control Computer System (CCCS).

4.10 Closed Circuit TV (CCTV) Video Coverage

4.10.1 Dedicated CCTV cameras shall be provided at locations that the Concessionaire has identified as critical to the effective flow of traffic along the corridor to support the following functions:

- (a) Automatic Incident Detection (AID); and
- (b) General surveillance of traffic and activities.

4.10.2 CCTV video coverage must be provided by Pan Tilt Zoom CCTV cameras mounted on poles to enable the Project's ETTM Facility to observe traffic at locations identified as critical at all hours of the day and in all weather conditions normally encountered in Virginia, consistent with reported visibility restriction (i.e. during snow storms, fog etc.). The video provided must be stable, jitter free and suitable for video based Automated Incident Detection (AID).

4.10.3 CCTV line of sight distances shall generally be less than two miles to avoid image degradation.

4.10.4 The video surveillance system shall enable the identification of the number and vehicle types involved in an incident at all locations within the surveillance area.

4.10.5 The video provided shall be stable at all zoom settings when viewing objects up to 1 mile away.

4.10.6 The Concessionaire shall provide the Department unrestricted access to full-quality imagery from these cameras with the intention of delivering imagery to the public and

first responders through the Department's 511 website and Statewide Video Distribution network.

4.11 Video based Automated Incident Detection Systems (AIDS)

4.11.1 For critical locations along the corridor, the Concessionaire may implement video based AID for the Project. This should be at locations where:

- (a) the risk of traffic incidents is expected to be higher than average, or
- (b) rapid detection of incidents is required for special reasons e.g. near critical infrastructure.

4.11.2 The video based AIDS system should be capable of:

- (a) detecting 95% of incidents involving stopped vehicles, slow vehicles and slow traffic that are within the field of view of a CCTV camera,
- (b) detecting pedestrians on the roadway,
- (c) a false alarm rate of less than 1 false alarm per 10 true alarms, and
- (d) detecting incidents and provide an alarm to the Traffic Management Center in less than 30 seconds.

4.11.3 Upon detection of an incident the AID system must record the video at a rate of at least five frames per second for the period 30 seconds before the incident and 60 seconds after the incident.

4.12 Video Recording

4.12.1 The video recording system shall be capable of simultaneously recording video from all CCTV cameras at a rate of at least one frame per second.

4.12.2 The video recording system shall have sufficient capacity to store the recorded video from all CCTV cameras for up to five days and continue to record video without intervention.

4.12.3 The video recording system shall be capable of simultaneously recording the video on at least two video monitors in the ETTM Facility for a continuous period of at least two hours. Video quality must be equivalent to at least the Department approved format at a minimum of 24 frames per second.

4.13 CCTV Communications Standards

CCTV communications standards shall be MPEG-4 at 4Mbps or H.264 or mutually agreed equivalent. Video performance requirements shall be based on a minimum requirement of D1 resolution as defined by NTSC, 30 frames per second video image and no pixilation upon panning or tilting of the camera. Final video rates/formats to be agreed prior to activation of the system.

4.14 Traffic Monitoring Sensors

4.14.1 Traffic monitoring sensors shall be installed by the Concessionaire at locations deemed needed by the Concessionaire.

4.14.2 Traffic monitoring sensors shall be installed to monitor and report in real time traffic volume, speed and travel times.

4.14.3 Information collected by the Concessionaire on the Project shall be provided to the Department. Where practical, data shall be aggregated in increments to be mutually agreed but in any case at a maximum of five-minute increments and transmitted at a maximum of five-minute increments.

4.14.4 Traffic counters shall be installed on all facility entrance and exit lanes that provide, at a minimum, vehicle counts in 15 minute increments.

4.15 Dynamic Message Signs (DMS)

4.15.1 The Traffic Management DMS shall have the following minimum features:

- (a) full graphics monochrome LED display providing a minimum of three lines of text
- (b) capability to display traffic management information including warning and recommended diversions,
- (c) advanced fault detection and reporting, and
- (d) conformance to the industry protocol approved by the Department.

4.15.2 The DMS shall not display erroneous information due a fault with the sign or the loss of pixels.

4.15.3 The Concessionaire shall have portable signs available for placement/installation anywhere on the roadway. Placement/installation of portable signage shall be completed within 30 minutes of identified need.

4.16 Traffic Management System (TMS) Availability

In cases where redundancy is provided, the system must switch between redundant components seamlessly (without impact to operator functionality). The system shall also provide the capability to manually switch between redundant devices in order to support software upgrades/reversion and maintenance procedures

4.17 Communications Infrastructure

4.17.1 Communications between the ETTM System road side equipment and the ETTM Facility shall be via a fully redundant fiber optic network using Spanning Tree Protocol (or equivalent) to ensure no single points of failure and reliability and shall comprise:

- (a) a trunk fiber optic loop
- (b) local distribution fiber optic loops
- (c) 2 dark fibers dedicated for the Department use.

4.17.2 The trunk fiber optic loop shall be comprised of new fiber optic cable and fibers from existing Department fiber optic cable, subject to availability.

4.17.3 The local distribution fiber optic loops shall be comprised of new fiber optic cable.

4.17.4 The Concessionaire shall provide and install the underground fiber optic communications network in a conduit bank within the Project Right of Way with a connection between the ETTM Facility and the Department. Capacity shall be provided to allow a possible future connection with and between Department facilities.

4.17.5 The Concessionaire may make use of existing buried empty Department conduit for the installation of the fiber optic network for the Project subject to availability.

4.17.6 The new communications conduit bank for the length of the Project shall consist of 2 four-inch diameter PVC conduits. One shall be for use by the Concessionaire. One conduit shall be for Department use. The Department shall be responsible for the maintenance of this conduit and shall coordinate with the Concessionaire as needed during this maintenance. The Concessionaire shall cooperate with the Department in the Department's maintenance activities. The Department shall not be responsible for any impacts to the Concessionaire's conduit or its functions.

4.17.7 DMSs may utilize spread spectrum radio (or equivalent wireless connectivity) to provide communication in place of a distribution fiber optic cable, such that specified reliability is not compromised.

4.17.8 Conductor/communication cables shall be installed in buried conduit, embedded conduit or bridge mounted conduit.

4.18 Power

Refer to Section 3.11.6 above.

4.19 Interface with the Department System

4.19.1 The ETTM System should operate consistent with any limited access to the Department facility. The interface to the Department system shall comply with the requirements of the Interface Specification.

4.19.2 The Concessionaire's TMS shall not effect any change to the Department system or the procedures for the operation and maintenance of the Department system unless otherwise required by the provisions of the Technical Requirements and the Interface Specification.

4.19.3 The ETTM System shall not cause any unscheduled interruption or adverse affect to the continued functioning of the Department system or the operations supporting it.

4.19.4 The Department system shall not cause any unscheduled interruption or adverse affect to the continued functioning of the ETTM System or the operations supporting it.

4.19.5 The ETTM System shall be capable of being electrically (and where relevant optically) and mechanically isolated from the Department system.

4.19.6 The Concessionaire shall:

- (a) provide external electronic interfaces between the ETTM System and the Department system in accordance with the Interface Specification;
- (b) work with the Department and its sub-contractors to construct, test and operate all specified interfaces; and
- (c) prepare and document the functional and technical designs, the Test Strategy, the lanes operating manual and all other aspects of the interface definition. This may include but not be limited to:
 - (i). the content of the data to be exchanged;
 - (ii). the format of the data to be exchanged;
 - (iii). the static data which are required to decipher the meaning of the data exchanged;
 - (iv). the bearer protocols to be used;
 - (v). any sequencing constraints or assumptions;
 - (vi). error handling measures;
 - (vii). measures to ensure data integrity;
 - (viii). the nature of testing and the associated test data to be used; and
 - (ix). any other information necessary for the interface to operate correctly.

4.19.7 The ETTM System shall have a mechanism to control the rate of transmission of messages/file to the Department system, such mechanism shall be mutually agreed and in accordance with the Interface Specification.

4.19.8 If the interface to the Department system is unavailable, the ETTM System shall be capable of storing all records for a period of five days minimum on secure media and then transmitting the data to the Department system once the interface is restored.

4.20 Data Processing Capacity

The Concessionaire shall ensure that the ETTM System has at all times sufficient data processing capacity.

4.21 Alarm reporting

The Tolling and TMS shall have the capability to monitor the status of all relevant components and to raise alarms in the event of component failure, performance degradation or any other potential issues that might adversely affect the operation or performance of the Tolling and TMS.

4.22 Performance Recording and Reporting

The Tolling and TMS shall incorporate the necessary tools to enable the recording and reporting of performance to meet the requirements under the Agreement.

4.23 Testing

4.23.1 The Concessionaire shall submit to the Department a Test Strategy for the ETTM System that shall include as a minimum:

- (a) the scope, requirements and objectives;
- (b) an overall high level plan for the testing of the ETTM System, including the test stages and processes and the scheduling of all tests prior to Service Commencement Date; and
- (c) the roles and responsibilities of all those involved with the testing program and any dependencies on Third Parties including the Department personnel.

4.23.2 Testing and commissioning where applicable shall be based on the application of a systems engineering methodology such as ANSI/GEIA EIA-632. Testing and commissioning shall utilize:

- (a) a Verification Cross Reference Index (VCRI) shall be developed and documented by the Concessionaire for the purposes of establishing the way in which requirements are satisfied. The VCRI shall utilize test, demonstrate, inspect and analyze as methods for acceptance
- (b) test series shall be conducted by the Concessionaire to demonstrate compliance with the Performance Requirements through a test strategy and procedures
- (c) a testing strategy document shall be developed by the Concessionaire which details how the testing plan will be implemented to demonstrate conformance of the proposed solution to the various functional, technical and Performance Requirements
- (d) a test plan document shall be developed by the Concessionaire detailing how the testing strategy will be executed to demonstrate the various functional, technical and Performance Requirements for compliance to requirements. This test plan shall include:
 - (i). test specifications for each of the test cycles;
 - (ii). detailed requirements traceability matrix linking each of the test series to relevant requirement(s); and
 - (iii). detailed test script(s) for each of the test series, including input / process / output at each of the steps so that conformance can be monitored.

4.23.3 The testing strategy shall be developed by the Concessionaire for the ETTM System. The strategy shall provide the level of detail necessary to ensure compliance with the overall testing requirements. This testing strategy shall include:

- (a) system design and integration overview
- (b) User Acceptance Testing (UAT) - to ensure that individual functions operate as defined in the requirements specification or similar documents and the complete end-to-end process is tested
- (c) Factory Acceptance Testing (FAT) - tests to be conducted at the supplier's premises to verify that the equipment, sub-system or system complies with the functional and performance requirements of that supplier's subcontract
- (d) Site Acceptance Testing (SAT) - tests to be conducted at the point of installation (Tolling Point and ETTM Facility) to confirm the FAT results, plus any omissions and/or errors noted during the FAT
- (e) Integration Acceptance Testing (IAT) - a test conducted to ensure that the complete Tolling and Traffic Management System (TMS) meets the end-to-end system-level functional and performance requirements in normal operating conditions.

4.24 Standards

The ETTM System shall be designed, implemented, maintained, repaired and replaced by the Concessionaire in accordance with all relevant national and international standards as detailed in Attachment 1.5a.

4.25 Department obligations

The Department will actively participate in the requirements for testing and integration as outlined above to meet the required timeframes.

5.0 OPERATIONS, MAINTENANCE, AND TOLLING REQUIREMENTS

5.1 General

- 5.1.1** The Concessionaire is responsible for operation and maintenance of the Project for the Operating Period.
- 5.1.2** The Concessionaire shall operate and maintain the Project in a manner that provides a safe and reliable transportation system which will:
- (a) facilitate the efficient transportation of goods and people;
 - (b) provide hurricane / Emergency evacuation;
 - (c) minimize delay and inconvenience for road users;
 - (d) minimize the risk of damage, disturbance to or destruction of third party property resulting from the operation of the Project and during the performance of maintenance activities; and
 - (e) coordinate with and enable the Department and others with statutory duties or functions in relation to the Project to perform such duties and functions.
- 5.1.3** The Concessionaire shall implement an effective Operations Management System to include: traffic management, monitoring, control and enforcement, facility management and administration, and tolling administration, operations, enforcement, and collection.
- 5.1.4** The Concessionaire shall implement an effective Maintenance Management System to record inventory, failures, repairs, maintenance activities, inspections performed, communications, and notifications of Incidents and Defects.
- 5.1.5** The Concessionaire shall meet all operations, maintenance, and tolling Performance Requirements.
- 5.1.6** The failure to correct Defects in accordance with Section 5.6 shall be recorded by the Concessionaire within its Maintenance Management System.

5.2 Operations and Maintenance Inspection Requirements

5.2.1 General Requirements

5.2.1.1 The Concessionaire shall employ and cause trained and competent personnel to plan and implement a program of inspections of the Project, the ETTM Facilities and the ETTM System. The inspection program shall:

- (a) provide a method of proactive and reactive inspections in order to ensure the continuing safety of road users;
- (b) identify, prioritize and report separately any Defect that requires prompt attention because it represents an immediate or imminent hazard, or there is a risk of immediate or imminent structural deterioration, or there is an immediate or imminent risk of damage to a third party's property or equipment, or there is an immediate or imminent risk of damage to the environment (a Type 1 Defect);

- (c) record all Defects that have been temporarily and permanently repaired;
- (d) identify the nature and extent of all Defects using inspection techniques that will enable any Defects which may affect the long term performance of the Project to be assessed in the Concessionaire's annual Life Cycle Maintenance Plan and repaired under an agreed program of Major Maintenance;
- (e) provide mechanisms to respond to reports, inquiries or complaints received from stakeholders about the physical condition of the Project;
- (f) monitor and track all Incidents and Emergencies affecting the Project;
- (g) monitor the impacts created by extreme weather conditions; and
- (h) collate data to monitor the condition of the Project and to determine the schedule for future operations and maintenance.

5.2.1.2 The Concessionaire shall require personnel performing inspections of road pavements and structures to be certified as inspectors in accordance with standards and specifications set forth in Attachment 1.5a.

5.2.2 Inspection Frequency

5.2.2.1 The Concessionaire shall establish inspection procedures and conduct/perform inspections at sufficient frequency to enable the Timeliness Requirements for rectification of Defects set forth in Section 5.6.2 below to be met.

5.2.2.2 The Concessionaire shall investigate reports and complaints on the condition of the Project received from all sources. The Concessionaire shall record these reports and complaints as O&M Records together with details of all relevant inspections and actions taken in respect of Defects, including temporary protective measures and repairs. These O&M Records shall be made available to the Department upon request.

5.2.3 Inspection Standards

Inspection and reporting shall be performed according to Attachment 1.5a and applicable Law.

5.2.4 Safety Inspections

The Concessionaire shall conduct regular safety inspections of all lanes of the Project, to identify conditions that are unsafe or have the potential to become unsafe; to identify conditions that could threaten the infrastructure; and attend to existing or changing conditions. Safety Inspections shall be conducted at least once every twenty-four hours during normal operating conditions, but no less frequently than every two hours during significant weather events.

The record of a safety inspection shall include details of the weather conditions, road surface condition and any unusual features of the inspection.

5.2.5 General Inspections

The Concessionaire shall perform General Inspections in accordance with its Operations and Maintenance Plan so that the repairs of all Defects are included in planned programs of work through Ordinary Maintenance and Major Maintenance.

O&M Records with respect to General Inspections shall include details of the manner of inspection (e.g. center lane closure or shoulder), the weather conditions and any other unusual features of the inspection. These reports shall be made a part of Project documentation and be available to the Department upon request.

5.3 Maintenance Requirements

5.3.1 General Requirements

5.3.1.1 The Concessionaire shall take all necessary action to:

- (a) maintain the Project according to Good Industry Practice appropriate for a highway of the character of the Project and for use by the traffic which is reasonably expected to use the Project;
- (b) minimize delay to road users;
- (c) respond to all Incidents and Defects as quickly as possible and minimize their adverse effects according to Good Industry Practice;
- (d) provide road users with relevant information and advance notice of any matters affecting, the smooth operation of the Project;
- (e) protect the safety of road users, workers or other persons on the Project, on land adjacent to the Project or those individuals using related transportation facilities in accordance with Good Industry Practice;
- (f) minimize the risk of adverse effects on the environment and on the amenity enjoyed by the owners and occupiers of land adjacent to the Project and to related transportation facilities;
- (g) minimize the risk of damage or disturbance to or destruction of third party property;
- (h) enable the Department and others with statutory duties or functions in relation to the Project or related transportation facilities to perform those duties and functions through agreed protocols;
- (i) perform inspections in accordance with provisions in this section;
- (j) operate and maintain the Service Rest Areas, and other capital assets over the Term including provision of security for the public using these facilities; and
- (k) return the Project to the Department at the end of the Term in a condition that meets the Handback Requirements.

5.3.1.2 The Concessionaire's obligations with respect to meeting the Performance Requirements are set forth in Section 5.6 below

5.3.1.3 The Concessionaire shall update the Performance Requirements Baseline Tables 90 days before the Service Commencement Date to reflect current Good Industry Practices, and then 90 days before every annual anniversary of the Service Commencement Date. The Department shall approve the updated tables 30 days before the Service Commencement Date and then 30 days before every annual anniversary of the Service Commencement Date.

5.3.1.4 Updates shall include improvements to inspection and measurement methods, measurement records, performance targets, tolerance and criteria as are necessary to comply with Good Industry Practice on similar highways in the Commonwealth of Virginia.

5.3.1.5 Within these Technical Requirements, reference to the Performance Requirements Baseline Tables means the latest approved version of the Performance Requirements Baseline Tables.

5.3.2 Maintenance Management System

5.3.2.1 Prior to the Service Commencement Date the Concessionaire shall implement a computer based Maintenance Management System (MMS) to record inventory, failures, repairs, maintenance activities, inspections performed, communications and notifications of Incidents and Defects. The Concessionaire shall enter all of the Assets into the MMS with Asset Identifications (IDs) consistent with those descriptions and units of measure used by the Department including the Roadway Network System (or its future replacement) and PONTIS for structures and bridges (or its future replacement). The inventory shall, where appropriate, include separate records for subcomponents of each Asset. All information shall be recorded in a consistent manner and shall be searchable by individual attributes.

5.3.2.2 The MMS shall include relevant condition information with respect to each Asset, including but not limited to, location, equipment nomenclature, serial number, name, date of installation, technician ID, type of failure, date and time of failure, date and time of response to the site and date and time returned to service, preventive maintenance work, scheduled work, work repair code, failure and repair history, Asset Residual Life, and statistical data on Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR). The MMS shall be configured to report work by function code, Asset (or subcomponent), reference marker, crew and unit of measurement.

5.3.2.3 Defects and responses to Defects shall be recorded on the MMS within 3 days of them coming to the attention of Concessionaire or action being taken. All other recording requirements shall be recorded on the MMS within 15 days of completion or occurrence of the relevant activity.

5.3.2.4 The Concessionaire shall ensure that the MMS is capable of generating the information required to demonstrate achievement of the Performance Requirements for each Asset.

5.3.2.5 The Concessionaire shall provide the Department access to the MMS at all times for the purposes of auditing the accuracy of the Concessionaire's O&M Records. Such access shall not require advance notice and access shall not be delayed or hindered.

5.3.2.6 The MMS shall be kept updated and operational throughout the Term.

5.4 Operation Requirements

5.4.1 General Requirements

5.4.1.1 The Concessionaire shall be responsible for:

- (a) employment and training of competent personnel to carry out all aspects of the Operations Management Plan;
- (b) coordination of activities of third parties with interests within the Project limits;
- (c) monitoring the condition and operational performance of the Project;
- (d) incident response, management and reporting;
- (e) traffic operations restrictions, as identified in the Transportation Management Plan, including periods of lane closure restrictions;
- (f) tolling integration with other tolling agencies;
- (g) standard operating and communication procedures for Emergency preparation, response, and recovery, including impacts from extreme weather conditions;
- (h) planning and coordination with all affected Governmental Authorities, including Emergency services;
- (i) liaison with any Traffic Management Centers that the Department or other entities may establish;
- (j) analysis of vehicular accident patterns to identify safety issues and implement cost effective solutions to maximize safety;
- (k) identification, containment and disposal of Hazardous Substances;
- (l) prompt investigation of reports or complaints received from all sources; and
- (m) toll enforcement and coordination with law enforcement for the Project.

5.4.1.2 The Concessionaire shall monitor and observe weather and weather forecasts to proactively deploy resources to minimize delays and safety hazards due to heavy rains, snow, ice or other severe weather events.

5.4.2 Corridor Management

5.4.2.1 The Concessionaire shall coordinate access to the Project by the Department, other Governmental Authorities, and others who have a legitimate need to work within the Project Right of Way.

5.4.2.2 Trends in traffic injuries and deaths from motor vehicle crashes shall be monitored and compared to similar highway trends to determine if appropriate countermeasures need to be deployed. Police crash reports shall be summarized and reviewed

annually to determine high and severe crash locations and crash trends in accordance with VDOT's Crash Analysis Procedure and Roadway Safety Assessment Process. The data shall be tracked, at a minimum, for:

- (a) crashes;
- (b) injuries (minor/serious);
- (c) deaths; and
- (d) work zone crashes.

5.4.2.3 If a crash trend is established or there are more people injured or killed annually within a quarter mile than the Hampton Roads District average per quarter mile for similar limited access highways, then a Roadway Safety Assessment shall be conducted and appropriate counter measures agreed with the Department and deployed.

5.4.3 Incident Management

5.4.3.1 The Concessionaire shall liaise with the Department in the development of the Concessionaire's O&M Plan and the implementation of incident management and emergency response operations.

5.4.3.2 The Concessionaire shall provide equipment and trained personnel as necessary to support Incident and Emergency management operations 24 hours a day, 7 days a week. Incident detection and notification may be generated by any source (Concessionaire, public, localities, the Department, etc.), at any time, and shall be responded to by the Concessionaire within the Timeliness Requirements. The Concessionaire shall take necessary action using appropriate resources to handle any and all traffic control needs to ensure the safety of the incident scene and road users and to minimize related congestion and the potential for pollution of stormwater runoff, watercourses or groundwater.

5.4.3.3 In the event of an Incident, the Concessionaire shall provide traffic management, real time traffic information and CCTV access to the Department and responding agencies, police, Emergency Services, as appropriate, depending on the nature of the Incident.

5.4.3.4 Where structural damage to the Project's structures is suspected, the Concessionaire shall ensure that qualified personnel meeting qualification requirements in Article 650.307 of the National Bridge Inspections Standards and/or suitably qualified bridge/structural engineer, licensed as a Professional Engineer in the Commonwealth of Virginia is available to evaluate the structure. Also, a suitably qualified bridge/structural engineer, licensed as a Professional Engineer in the Commonwealth of Virginia, shall be available to advise on temporary repairs and/or shoring that may be needed to provide safe clearance of the Incident or Emergency.

5.4.3.5 The Concessionaire shall not remove any vehicle or other item that may assist the Incident or Emergency investigation until authorized to do so by the relevant Governmental Authority.

5.4.3.6 The Concessionaire shall not reopen any damaged area of the Project which has been closed, until all appropriate safety and traffic management measures have been completed.

5.4.3.7 At all times following acceptance of the O&M Plan, the Concessionaire shall ensure that procedures are established to provide: public/agency notifications, Incident management, safety of road users, abatement of Hazardous Substances, coordination with the Department, police and other emergency personnel with respect to an Emergency or an Incident.

5.4.3.8 The Concessionaire shall analyze the need and cost/benefits of implementing a Safety Service Patrol (SSP) to assist stranded motorists, provide traffic control support during traffic incidents, and other related services as needed along the Project. This analysis shall be performed in preparation for Service Commencement and on an annual basis in coordination with the Department to determine when and to what extent such an SSP is warranted and shall be implemented on the Project. As warranted, the SSP will be incorporated into the O&M Plan. The Concessionaire shall be responsible for the planning, implementation, and expenses associated with the SSP. The analysis, planning and implementation of SSP services shall follow guidelines and meet the service outcomes established by the Department and the Transportation Research Council (TRC).

5.4.4 Traffic Management System (TMS)

The Concessionaire shall have primary responsibility for, access to and control of all DMS, CCTV, and vehicle detection systems placed on, and data/video generated from, the Project. The Department shall have access to these facilities in coordination with the Concessionaire.

5.4.5 Road User Information

5.4.5.1 The Concessionaire shall utilize the TMS to provide road users with relevant information and advance notice of any matters affecting, the smooth operation of the Project such as major weather or sporting events.

5.4.5.2 DMS shall be left blank except when appropriate, relevant and up-to-date messages are necessary for road users.

5.4.5.3 The Concessionaire shall develop compatible communications protocols for communicating with road users through the DMS, to include portable signs and including the use of DMS to impart information on behalf of the Virginia Department of Emergency Management. Protocols for on-road and off-road communications shall be developed as part of the Public Information and Communication Plan.

5.4.6 Hurricane/Emergency Evacuation

5.4.6.1 The Project is anticipated to be designated as a hurricane/emergency evacuation route for the Hampton Roads area. The Concessionaire shall control access to the Project throughout the corridor under the direction of the Department should an evacuation be directed pursuant to a Governor-declared emergency. These requirements will apply during all Governor-declared emergencies.

5.4.6.2 The Concessionaire shall develop and implement a hurricane evacuation plan in coordination and consistent with plans, programs, and requirements of the Commonwealth of Virginia, to include the Department, the Virginia Evacuation Coordination Team for Operational Response (VECTOR), VSP, and the Virginia Department of Emergency Management (VDEM). The plan shall include a plan for lane reversal, and standard operating procedures that identify all required tasks to be performed, who will perform these tasks, and how these tasks will be accomplished. The plan shall include the performance and documentation of one annual drill for hurricane evacuation and emergency procedures.

5.4.6.3 The Concessionaire shall provide for the effective implementation of the hurricane evacuation plan and the lane reversal plan, in coordination with the Department. This implementation shall include:

- a. facilitation of large scale traffic movements during evacuations and re-entry;
- b. implementation and provision of traffic information and advisories using various traveler information media and systems;
- c. providing manpower, equipment, and materials as needed to control traffic during evacuation and lane reversals;
- d. monitoring traffic conditions and providing timely incident response and management during evacuations;
- e. providing local access from reversed lanes as applicable;
- f. providing permanent and/or temporary service areas for the location and provision of fuel (unleaded and diesel), portable toilet facilities, wrecker services, water and ice, etc;
- g. establishing and providing access to a backup facility with a generator to be used as a command center for hurricane or other emergency evacuations. This facility shall be developed and located in consultation with the Department; and
- h. providing procedures for effective termination of lane reversal at the conclusion of the declared emergency.

5.4.6.4 The Concessionaire shall participate in the development and update of future state, regional, and local hurricane and emergency evacuation plans with other stakeholders including the Department, Virginia State Police (VSP), VDEM, and others agencies/organizations. It shall send a representative to participate throughout the Term in any annual statewide coordination meetings for hurricane evacuation and emergency services held during the year.

5.4.6.5 The Concessionaire shall establish service contracts to provide, fuel (unleaded and diesel), portable toilet facilities, wrecker service to road users, and to deliver and supply water and ice during hurricane or any other emergency evacuations. The location and extent of such services shall be related to the Concessionaire's final design and the number of access points provided for the Project. The Department may assist with locating vendors to perform these services.

5.4.7 Enforcement

The Concessionaire shall coordinate with the VSP, Department of Motor Vehicles (DMV), and other appropriate law enforcement agencies as needed to provide tolling, law, and regulatory enforcement on the Project consistent with that provided on similar facilities within Virginia.

5.5 Tolling Requirements

5.5.1 General

The ETTM System shall be operated and maintained by the Concessionaire:

- (a) to fulfill its obligations under the Electronic Toll Collection Services Agreement;
- (b) if the Department's VPS services are utilized, to fulfill the obligations of violation processing any agreement as described in the Agreement; and
- (c) such that all the Performance Requirements are met.

5.5.2 Transactions

5.5.2.1 The Department will supply Tag status information which shall be loaded and distributed through the system and utilized for each transaction to ensure images are recorded for the correct vehicles. The Department reserves the right to reject any transactions that appear to be duplicates.

5.5.2.2 Upon notification that the Concessionaire has requested payment from an account which the Department has previously informed the Concessionaire is invalid and/or no longer in good standing, the Concessionaire shall reconcile or audit the data transmission within three business days to identify all other instances that may have occurred.

5.5.2.3 Upon notification of a duplicate transaction or an incorrect toll amount, the Concessionaire shall reconcile or audit the data transmission within three business days to identify any and all other duplicate transactions or incorrect toll charges that may have occurred.

5.5.3 Roadside Equipment Support and Maintenance

5.5.3.1 The Concessionaire shall supply and maintain all roadside equipment and infrastructure installed for the Project and related to its operations.

5.5.3.2 The Concessionaire shall maintain the fiber optic cable during the Operating Period with damage response and repair times not exceeding 24 hours.

5.5.4 IT Support and Maintenance

The Concessionaire shall carry out IT service management in accordance with Good Industry Practice.

5.5.5 Anti-virus Scanning and Protection

The Concessionaire shall maintain anti-virus and protection procedures to protect the ETTM System from viruses and other destructive devices, and to manage the impact of virus attacks including transmission to the Department's Traffic Management System, or other Department or third party systems.

The Concessionaire shall immediately notify the Department of any systems impacted or infected by computer virus or similar destructive devices.

5.5.6 Interfaces

The Concessionaire shall continuously monitor all interfaces for the ETTM System. The monitoring shall include availability, throughput, performance, buffer usage, queue lengths, hardware status, system alarms and warnings, and any other diagnostic data provided by the Concessionaire's implementation of the interfaces.

5.5.7 Security

5.5.7.1 In accordance with Section 4.4.1, the Concessionaire shall prepare and submit to the Department a Security Plan.

5.5.7.2 The Security Plan shall embody the following key principles for the protection of data:

- (a) integrity: data shall be protected from being corrupted by unauthorized changes whether by system error, human error or intentional alteration. Data shall only be modified by authorized users according to defined privileges and procedures. An audit trail shall be maintained that tracks changes by individual user with this audit trail subject to the same data integrity requirements as other system data.;
- (b) confidentiality: data shall be protected from unauthorized disclosure. Access to systems shall be restricted to authorized users with privileges appropriate to the confidentiality of the data; and

- (c) availability: data shall be prevented from being lost or becoming inaccessible. Authorized users shall be able to gain access to information to which they are privileged whenever they are authorized to do so.
- (d) Transaction and image data used for violations shall be securely encrypted on-site in digital form as close to the source as possible to prevent tampering. Any additional data security requirements associated with the ability to pursue toll payments and/or violations via video images that are prescribed by law at the time of the writing of the security plan shall be incorporated.

5.5.8 System Back-up and Recovery

In accordance with Section 4.4.1, the Concessionaire shall provide data security for the ETTM System. Data security shall include, but not be limited to:

- (a) backup of all software and configuration following each release of, or change to, the system, including any Disaster Recovery site;
- (b) daily back-up of all new/changed data held on the ETTM System;
- (c) removal of the media used for the daily back-up to a secure off-site location within 24 hours (or other agreed timeframe); and
- (d) storage of one month of the data back-ups in a secure off-site location.

Backups shall not affect the ETTM System's ability to capture, store or process detection data.

5.5.9 System Failure

5.5.9.1 The Concessionaire shall notify the Department without delay on it becoming aware of any event of or the likely event of any system failure that results in a critical element of the ETTM System not functioning or results in or is likely to result in an unacceptable impact on road users or on the Department or a third party.

5.5.9.2 The Department will notify the Concessionaire without delay on it becoming aware of any event or of the likely event of any system failure that results in a critical element of the Department's system not functioning or results in or is likely to result in an unacceptable impact on road users or on the Concessionaire or a third party.

5.5.9.3 Where the relevant system failure affects or may affect, a third party or the Department or its agents, the Concessionaire shall give the Department all necessary co-operation in resolving the relevant system failure by co-operating fully and expeditiously with the third party or the Department or its agents, as appropriate, to resolve the same.

5.5.9.4 Where the relevant system failure was caused by the Department or its agents, the Department shall give the Concessionaire all necessary co-operation in resolving

the relevant system failure, by co-operating fully and expeditiously with the third party or Concessionaire, as appropriate, to resolve the same.

5.5.10 Disaster Recovery

5.5.10.1 As required in Section 4.4.1, the Concessionaire shall prepare, implement and maintain a Disaster Recovery Plan for the O&M Work which shall include but not be limited to:

- (a) mitigating any adverse impact on the ETTM System and its operation and/or TMS, in any circumstances where the ability of the Concessionaire to provide the operation of the ETTM System would otherwise be impaired; and
- (b) making provision for action to be taken by the Concessionaire in the event of non availability of its premises.

5.5.10.2 The Disaster Recovery Plan shall identify the measures to be taken in the event of:

- (a) ETTM Facility site loss;
- (b) roadside equipment site loss;
- (c) system data loss or corruption;
- (d) systems failure;
- (e) failure of the communications link with the Department, TMS, or other applicable systems;
- (f) failure of the communication links between the roadside equipment and the ETTM Facility;
- (g) loss of power in the locality; and
- (h) inability of staff to gain access to, or work effectively at, the ETTM Facility.

5.6 O&M Performance Requirements

5.6.1 General

5.6.1.1 The Concessionaire shall meet the Performance Requirements.

5.6.1.2 The Concessionaire shall update the Performance Requirements Baseline Tables as required under Section 5.3.1.3.

5.6.1.3 Updates shall include improvements and updates to inspection and measurement methods, measurement records, performance targets, tolerances, criteria and Timeliness Requirements as are necessary to comply with Good Industry Practice.

5.6.1.4 Reference to the Performance Requirements Baseline Tables means the latest approved version of the Performance Requirements Baseline Tables.

5.6.2 Defect Rectification – Standard of Remedy or Repair

5.6.2.1 Defects are to be rectified such that the remedy or repair of any Asset shall meet or exceed the criteria identified in the column entitled "Asset Condition Criteria" in the third column of Table 5.6a and the criteria listed under "Ordinary Maintenance Criteria" in the fourth column of Table 5.6b. An O&M Record shall be created by the Concessionaire to verify that this requirement has been met.

5.6.2.2 The Concessionaire shall rectify all Defects within the Timeliness Requirements stated in the Performance Requirements Baseline Tables and create an O&M Record to verify that this requirement has been met. The O&M Record shall identify whether the Defect was categorized by the Concessionaire as a Type 1 Defect or a Type 2 Defect.

5.6.2.3 Unless otherwise stated, the periods set forth in the Performance Requirements Baseline Tables for Timeliness Requirements shall be deemed to start upon the earlier of the date the Concessionaire first reasonably should have known of the Defect and the date the relevant Defect was first identified by or notified to the Concessionaire.

5.6.3 Tolling Performance Requirements

The ETTM System shall meet the Performance Requirements set forth in Attachment 5.6. Records shall be transmitted to the Department in the IAG specification format, or as otherwise agreed between the Department and the Concessionaire, except where VES manual quality control checks have not been completed.

5.6.4 Performance Reporting

5.6.4.1 The Concessionaire shall prepare the Quarterly Performance Report in a format to be agreed between the Concessionaire and the Department before the Service Commencement Date. The Quarterly Performance Report shall record the Concessionaire's performance in meeting the Performance Requirements.

5.6.4.2 The number of responses to Type 1 Defects that meet the "Timeliness Requirements" set forth in the fourth column of Attachment 5.6, Table 5.6b shall be reported for each Asset Group as a percentage of total responses recorded for the Asset Group.

5.6.4.3 The Concessionaire shall implement a program of inspections supplemented by the Maintenance Management System to demonstrate compliance with the Performance Requirements Baseline Tables at all times and shall report for each Asset, its performance in meeting all applicable criteria and Timeliness Requirements in the Quarterly Maintenance Report.

5.6.4.4 The Project shall be subject to the Department's Maintenance Rating Program (MRP), or subsequent updated or replacement program. The Concessionaire shall use the MRP to verify performance of each Asset against the targets and criteria set out in the Performance Requirements Baseline Tables. The Concessionaire shall include in the end of

year report outlined in Section 1.10, a summary of the results of annual assessments in a format to be agreed between the Concessionaire and the Department.

5.6.4.5 The Project shall also be subject to National Bridge Inspection Standards and Critical Condition Index.

5.7 Major Maintenance and Handback Requirements

5.7.1 Major Maintenance and Life Cycle Maintenance Plan

5.7.1.1 The Concessionaire shall perform Major Maintenance as and when necessary so that all Assets are capable of meeting the appropriate Performance Requirements when subject to Ordinary Maintenance and so that any Defects which may affect the long term performance of the Project are repaired in good time to prevent undue deterioration of any Asset.

5.7.1.2 In order to properly identify and plan for Major Maintenance throughout the Term, the Agreement describes the requirements for a Life Cycle Maintenance Plan to include a description of all Major Maintenance to be undertaken during the following five-year period.

5.7.1.3 In addition to the requirements set forth in the Agreement the Concessionaire shall submit the following as components of the Life Cycle Maintenance Plan:

- (a) the Concessionaire's proposals for Major Maintenance, including the timing and nature of work that Concessionaire proposes during each of the following five years;
- (b) the estimated service life of each Asset (being the expected period that each Asset is expected to meet the Performance Requirements when first constructed and installed, subject to normal wear and tear and subject to standard programs of Ordinary Maintenance);
- (c) the Residual Life of each Asset;
- (d) a description of the type of Major Maintenance anticipated to be performed at the end of the Asset's service life;
- (e) a brief description of any Major Maintenance anticipated to be performed before the end of the Asset's service life, including reasons why this work should be performed at the proposed time;
- (f) the team organization, key roles and responsibilities including details of suppliers and subcontractors needed to perform Major Maintenance; and

- (g) how the Concessionaire will meet the Asset inventory requirements associated with Major Maintenance.

5.7.1.4 Pavement Deterioration Model

The Concessionaire shall submit a pavement deterioration model with its annual updates to the Life Cycle Maintenance Plan to include the following:

- (a) Using the accumulated traffic and truck classification data the Concessionaire shall compare, for each segment of the Project, the accumulated Equivalent Standard Axle Loading (ESALs) with the original design ESALs.
- (b) The prediction of remaining life until Major Maintenance shall be based on performing back calculations using the principles contained in the final pavement design report submitted in accordance with Section 3.4 and the Life Cycle Management Plan.
- (c) The Concessionaire shall demonstrate by means of forward projection of established trends of ride quality, other specified criteria and traffic loading that, subject only to Ordinary Maintenance, throughout the entire Project, the mainlanes and ramps would continue to meet all the Performance Requirements up until the time of next scheduled Major Maintenance.

5.7.1.5 The Life Cycle Maintenance Plan updates during the last five years of the Term will be subject to additional oversight by the Department and shall be informed by the Residual Life Methodology and testing requirements set forth in Section 5.7.2 below.

5.7.2 Residual Life Methodology and Inspections

5.7.2.1 General Requirements

The Concessionaire shall prepare and submit to the Department for approval a Residual Life Methodology, five years before the end of the Term. The inspection requirements and Residual Life Methodology requirements are identified below.

The Residual Life Methodology shall contain the evaluation and calculation criteria to be adopted for the calculation of the Residual Life of each Asset at the end of the Term. The scope of any Residual Life testing shall be included, together with a list of all independent testing organizations proposed by the Concessionaire. These organizations shall be financially independent of the Concessionaire.

The Department may verify the inspection results by attending the Concessionaire's inspections, performing separate inspections, and/or conducting spot checks.

The Department's approval of the Residual Life Methodology, including the scope and schedule of inspections, shall be required before commencement of Residual Life inspections.

The Residual Life Methodology and associated inspections shall have the following components:

5.7.2.2 Road Pavements

- (a) Inspection Requirements - Pavement inspections shall be undertaken by independent testing organizations. Inspections shall provide a continuous or near-continuous record of Residual Life in each lane. Where the inspection method does not provide a continuous record of Residual Life, the number of valid measurements in each 0.1 mile section shall be sufficient to give a statistically valid result. Inspections shall be repeatable to an agreed level of accuracy and inspection contracts shall include an agreed proportion of inspections to verify accuracy. Inspections shall include ride quality, skid resistance and rutting.
- (b) Residual Life Methodology Requirements - The Residual Life Methodology for road pavements shall be capable of calculation of Residual Life for each 0.1 mile section.

5.7.2.3 Structures

- (a) Inspection Requirements - Inspections of structures shall be undertaken by independent testing organizations. Inspections shall follow the latest inspection guidelines (as they apply at the relevant date that the testing is undertaken) recognized by the Department. A close examination shall be made of all parts of each structure. Non-destructive tests shall be undertaken appropriate to the type of structure. These shall include the measurement of structural deflection under calibrated load, the identification and measurement of de-lamination in bridge decks, the measurement of chloride and carbonation profiles from surface to reinforcement and/or tendon level, and the in-situ strength testing of concrete elements. Testing of steel structures shall include the depth of corrosion and/or the measurement of remaining structural thickness for hidden and exposed parts. All lengths of weld shall be tested for cracking at key areas of structural steelwork.
- (b) Residual Life Methodology Requirements - The Residual Life Methodology for structures shall:
 - (a) draw on historical asset maintenance records, inspection and test histories for each structure;
 - (b) take account of the Department and FHWA records of other structures with similar characteristics;
 - (c) include an assessment of load carrying capacity based on the original structural design calculations, the as built drawings and results of load deflection tests where appropriate; and
 - (d) take account of any trends in asset deterioration to determine the rate of deterioration and to predict the future condition of individual elements and the entire structure.

5.7.2.4 Buildings and Enclosed Facilities (Structural Elements)

- (a) Inspection Requirements - Inspections for buildings and enclosed facilities shall comply with Good Industry Practice. The inspection scope and depth shall be determined by the inspecting organization but as a minimum shall be based upon FHWA requirements.
- (b) Residual Life Methodology Requirements - The Residual Life Methodology for buildings shall draw on historical asset maintenance records, inspection and test histories and life cycle and durability analysis for each building and maintenance facility.

5.7.2.5 Building Mechanical Equipment (plumbing and HVAC)

- (a) Inspection Requirements - Inspection scope and depth shall be determined by the inspecting organization but as a minimum shall be based upon FHWA requirements and manufacturer's inspection requirements.
- (b) Residual Life Methodology – Shall draw on historical inspection, maintenance and rehabilitation records for system components, including life cycle and durability analysis.

5.7.2.6 Building mechanical equipment (fire systems)

- (a) Inspection Requirements - Inspection scope and depth shall be determined by the inspecting organization but as a minimum shall be based upon FHWA requirements, manufacturer's inspection requirements and applicable NFPA Standards. Inspection shall be undertaken by a qualified Fire Protection Engineer or person(s) having NICET Level III certification.
- (b) Residual Life Methodology – Shall draw on historical inspection, maintenance and rehabilitation records for system components, including life cycle and durability analysis.

5.7.2.7 Building Electrical Systems

- (a) Inspection Requirements - Inspection scope and depth shall be determined by the inspecting organization but as a minimum shall be based upon FHWA requirements, manufacturer's inspection requirements and applicable NFPA Standards. Inspection of electrical systems shall be undertaken by qualified individuals (NETA or equivalent for electrical, NICET for fire alarm, other) and performed in accordance with NFPA 70B, as a minimum.
- (b) Residual Life Methodology - Shall draw on historical inspection, maintenance and rehabilitation records for system components, including life cycle and durability analysis.

5.7.2.8 Drainage

- (a) Inspection Requirements - Inspection of storm sewer systems shall include closed circuit TV inspection of all buried pipe work. Groundwater level monitoring at selected locations may be required to provide assurance of a 10 year Residual Life for groundwater interceptor drains. Inspection of stormwater management systems to include ditches, stormwater basins, etc.
- (b) Residual Life Methodology - shall draw on historical asset maintenance records, inspection and test histories for each element of the drainage system. The Concessionaire shall include a methodology to determine the Residual Life of filter drains designed to intercept groundwater.

5.7.2.9 Earthwork Slopes

- (a) Inspection Requirements - For embankment and cut slopes a risk based inspection procedure shall be adopted following Good Industry Practice. Deformation monitoring will be required to provide assurance of the required Residual Life.
- (b) The Residual Life Methodology shall draw on historical asset maintenance records, inspection and test histories for each ancillary element.

5.7.2.10 Ancillary items (beams, barriers, signals, fences, curbs, gutters)

Inspections of all ancillary items shall be undertaken by personnel having adequate training on modes of failure, risk assessment and observational skills.

5.7.3 Major Maintenance for Handback

5.7.3.1 The Concessionaire shall prepare enhanced annual updates to the Life Cycle Maintenance Plan during the last five years of the Term taking into account the results of the Residual Life Methodology and associated inspections and testing described above.

5.7.3.2 The Concessionaire shall submit for the Department's review the results of each annual inspection of each Asset, undertaken during the final five years of the Term, together with the Concessionaire's interpretation, based on these results, of the predicted Residual Life of each component of the Project as set forth on Attachment 5.7. The test results and interpretations shall be used by the Concessionaire to update the Life Cycle Maintenance Plan so that it contains an accurate description of the Major Maintenance necessary to meet the specified Residual Life Requirements.

5.7.3.3 The Concessionaire shall provide the Department with warranties for work performed in the final five years of the Term in accordance with the Agreement.

The Concessionaire shall estimate the Residual Life of each Asset based on:

- (a) The Concessionaire's reasonable expectations respecting the manner of use, levels of traffic, and wear and tear;
- (b) the results of the Project inspections described above;
- (c) the assumption that the Asset will continue to be subject to Ordinary Maintenance conforming with the Performance Requirements throughout its service life;

5.7.3.4 The Life Cycle Maintenance Plan for each of the five years before the end of the Term shall include, in addition to any other requirements specified in the Agreement:

- (a) the Concessionaire's calculation of Residual Life for each component of the Project as set forth on Attachment 5.7 calculated in accordance with the Residual Life Methodology and taking into account the results of the inspections set forth above; and
- (b) the estimated cost of the Major Maintenance needed for each component of the Project as set forth on Attachment 5.7 so that, at the end of the Term, each component will achieve its specified Residual Life.

5.8 Handback Reserve Fund

5.8.1 The Concessionaire shall establish a Handback Reserve Fund in accordance with the Agreement with respect to the Concessionaire's obligations to meet the Handback Requirements.

END OF PART 2
TECHNICAL REQUIREMENTS