



VIRGINIA DEPARTMENT OF TRANSPORTATION

Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects

January 2012

July 2018

Minimum Requirements for Quality Assurance and Quality Control on
Design-Build and P3 Projects

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Contents Amendment Record

This ~~report~~Guide has been issued and amended as follows:

Issue	Rev	Description	Date	Signed
1	0	Original Issue	August 20, 2007	
1	1	Provides a translation of the percentage base testing frequencies (QA/QC/IA and IV) into tangible quantifiable frequencies and work descriptions and effects the following tables: <ul style="list-style-type: none">• Table 105.4, and• Table 105.5	July 28, 2008	
2	0	Document reformatted, updated and clarified for consistency with the Department's Contract Documents for both Design-Build and P3 procurements.	January 11, 2012	
<u>3</u>	<u>0</u>	<u>Document updated and clarified</u>	<u>July 05, 2018</u>	

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Section 1. Introduction

1.1 Purpose

1.1.1 This Guide details the Virginia Department of Transportation (the Department) minimum requirements for Quality Assurance (QA) and Quality Control (QC) for Design-Build (DB) and Public-Private Transportation Act (PPTA or P3) projects. The entity under contract with the Department, referred to herein as “Concessionaire/Design-Builder”, shall implement a Quality Assurance and Quality Control Plan (QA/QC Plan) under a Design-Build contract or a P3 Comprehensive Agreement. The QA/QC Plan is used interchangeably with the Quality Management System Plan (QMSP) for P3 Projects and defines the organization, work processes, and systems necessary to provide confidence and objective evidence that the facilities, components, systems, and subsystems that make up the Project meet the contract requirements. Unless specifically noted otherwise, projects referred to herein as “Design-Build” (DB) apply for both DB and P3 projects.

The production of a QA/QC Plan meeting these minimum requirements forms part of the submittals required under Design-Build Requests for Proposals (RFP) and P3 procurements. This Guide also details procedures for the Department to oversee the proper administration/implementation of a Concessionaire/Design-Builder’s QA/QC Plan.

This Guide establishes criteria for obtaining consistency in the Department’s approach to independent assurance, verification and oversight responsibilities on DB and P3 projects. It is recognized that contract requirements will vary from project to project and therefore project specific contract requirements will always take precedent in case of conflict.

1.1.2 In conforming to these minimum requirements, the Concessionaire/Design-Builder shall satisfy both State and Federal design and construction quality requirements.

1.2 Document Structure

1.2.1 This Guide sets out the required Quality Assurance and Quality Control plan requirements for both the design and construction phases of DB and P3 projects. The Guide is divided into five (5) sections as follows:

Section 1 – Establishes the purpose and document structure and includes a list of publications with which this Guide should be cross-referenced.

Section 2 – Provides a description of QA/QC Plan requirements including an organization chart for a basic Design-Build project.

Section 3 – Identifies a description of QA/QC staff roles and responsibilities including terms of reference for the key roles, reporting lines and key qualifications required.

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Section 4 – Describes QA/QC Plan requirements for design including design review, Departmental approvals and design changes. The Design-Build Review, Approval and Quality Management Process is depicted in Figure 4-1.

Section 5 – Describes QA/QC Plan requirements for construction including among other requirements Departmental and Concessionaire/Design-Builder responsibilities, Preparatory Inspection Meetings, DB inspection, sampling and testing requirements, verification and acceptance requirements, and Witness and Hold Points. ~~Comparison Tolerances for Testing are listed in Table 5-1, Testing of Materials by the Department for Off Site Plant QA Programs are listed in Table 5-2 and Minimum Requirements for Construction Inspection Checklists are included in Table 5-3.~~

1.2.2 The Guide includes ~~six (6)~~four (4) appendices that contain the following information:

Appendix 1 ~~sets out the:~~ Definitions of Abbreviations, Acronyms and Terms used in this Guide.

Appendix 2 ~~sets out the:~~ Table A2, Part I – Minimum Requirements for Concessionaire/Design-Builder’s Design QA/QC PlanMaterials Testing.

Appendix 3 ~~sets out the~~Table A-2, Part II – Minimum Requirements for Concessionaire/Design-Builder’s QA/QC Plans on Design-Build projects including reference to contractual requirements.

~~Appendix 4 sets out the Minimum Requirements for Concessionaire/Design-Builder’s Inspection, Sampling Compliance Monitoring and Testing Verification of Definable Features of Work including reference to contractual requirements~~Contractor Product Installation, Practices and Procedures.

Appendix 5 ~~contains VDOT Special Provision 3:~~ Table A-3: Owner’s Roles and Responsibilities for Project Communication and Decision Making (S100B00-0708).Inspection

Appendix 6 ~~contains~~4 – Sample Checklists.

1.3 Reference Documents

1.3.1 The Department’s Design-Build Contract Documents should be referenced in conjunction with this Guide. The following Parts are of particular relevance:

- .1 Part 2 – Technical Information and Requirements
- .2 Part 4 – General Conditions of Contract
- .3 Part 5 – Division I Amendments to the Standard Specifications

1.3.2 For P3 projects, applicable sections of the technical requirements and the Comprehensive Agreement should be referenced in conjunction with this Guide.

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1.3.3 The Concessionaire/Design-Builder shall take into account the FHWA Construction Program Management and Inspection Guide in developing the QA/QC Plan for federally-funded projects.

Section 2. Description of QA/QC Plan Requirements

2.1 General

2.1.1 These requirements ~~are intended to assist~~ shall be used by the Concessionaire/Design-Builder in the preparation of an acceptable Quality Assurance (QA) Plan and an acceptable Quality Control (QC) Plan. The Quality Assurance and Quality Control Plan (QA/QC Plan) used interchangeably with the Quality Management System Plan (QMSP) for P3 Projects should define a uniform process approach to design and construction quality management; quality procedures, records keeping and document management/control that the Concessionaire/Design Builder shall adhere to throughout the duration of the Project. ~~The QA/QC Plan (QMSP) should further describe the reporting and documentation processes and should outline appropriate responsibilities of the Concessionaire/Design Builder's organization. The QA/QC Plan (QMSP) consists of the Design QA/QC Plan (Design Quality Management Plan – DQMP) and the Construction QA/QC Plan (Construction Quality Management Plan – CQMP).~~

2.1.2 The QA Plan shall be separate and distinct from the QC Plan for both design and construction efforts. Both the QA Plan and the QC Plan are subsets of the overall QA/QC Plan. The submission of the QA/QC Plan shall be in accordance with the Section 2.2 of this Guide and the Department's RFP or P3 ~~procurement~~ documents. ~~Following award of a contract, an acceptable plan must be submitted to and approved by the Virginia Department of Transportation (the Department) in writing prior to commencing any design or construction work. The Department may, in its sole discretion, partially approve the QA/QC Plan and may request minor modifications to the QA/QC Plan as necessary.~~

2.1.3 The QA/QC Plan shall detail:

- .1 How the Concessionaire/Design-Builder shall provide QA and QC for both the design and construction elements of the Project, including but not limited to, sampling, testing, inspection, management control, ~~change management~~, document control, communication requirements, and non-compliant work corrective action plans to ensure that the work conforms to the contract requirements;
- .2 How the Concessionaire/Design-Builder's QA/QC ~~program~~ Plan for both the design and construction elements shall be ~~completed~~ coordinated by a subconsultant, subcontractor, supplier, vendor, agent, or other entity with contractual obligations to complete design or construction elements of the Project;
- .3 How the Concessionaire/Design-Builder's QA/QC organizations function, including ~~the expected minimum number of full-time equivalent employees with specific QA or QC responsibilities with an organizational chart showing lines of authority and reporting responsibilities;~~ a project-specific staffing plan that identifies QA and QC personnel by name, position/role, and organization. The

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staffing plan shall ensure that at any time an adequate number of QA personnel are available to observe all construction operations and QC activities;

.4 The relationship between the QA and QC organizations and the design and construction organizations interface to ensure that the decisions made by QA/QC personnel are not based upon the impact such decisions may have on the Project's schedule, contractor's performance or project profitability; and

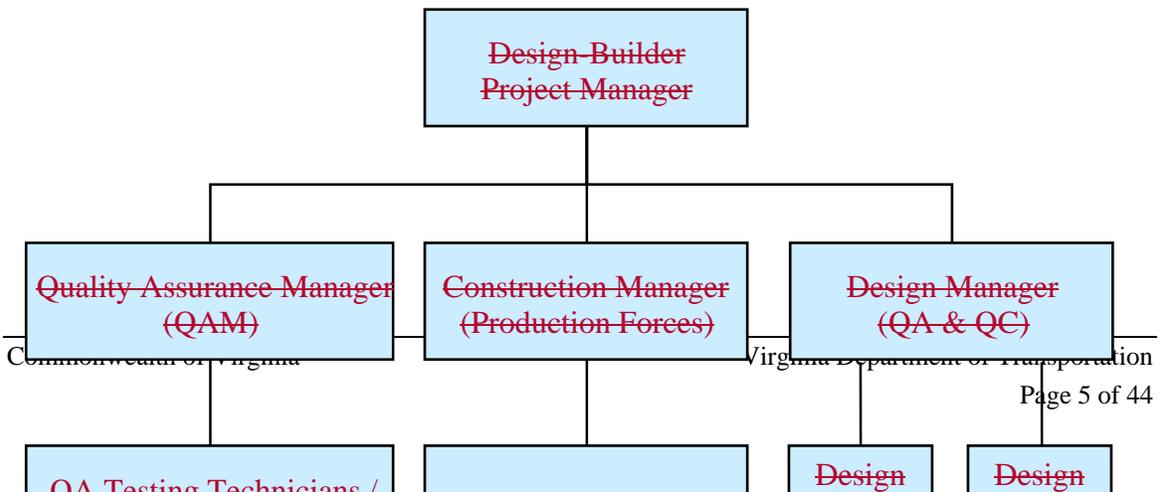
~~.5 That QA/QC shall be an integral part of each Work Package. That as part of each application for payment that includes completed Work Packages, Concessionaire/Design Builder's designated Quality Assurance Manager shall certify that each Work Package has been completed in accordance with the Contract Documents, and that all required QA/QC tests, measurements, permits or other requirements have been completed and all non-conformance reports relative to the respective Work Package have been resolved. The Concessionaire/Design Builder shall submit with each application for payment verifiable evidence from the Design Manager of the QA/QC reviews, including any checklists, summary data, high-level/outline calculations or design checks, and evaluations of the work and the qualifications of the responsible personnel that completed the work, etc., that the relevant QA or QC reviewer relied on to make its determination the work is complete and conforms to the requirements of the Contract Documents.~~

.5 QA/QC shall be an integral part of each Work Package in accordance with Section 5.24 of this Guide. The QAM shall verify that all design related Work Packages submitted for payment have been certified by the Design Manager as being in conformance with the Contract Documents and the Design QA/QC Plan.

2.1.4 To further ensure organizational independence, the Construction QA organization shall be distinct and separate from the QC organization and construction production forces staff. For design, the Design QA or QC functions may be performed by the same design organization. If design QA responsibilities are retained by the design organization the QA plan must show that the original designer is not responsible for the quality assurance of his/her own design work. All key personnel performing QA or QC functions shall be exclusively designated to such and shall not be assigned to perform conflicting duties or production work.

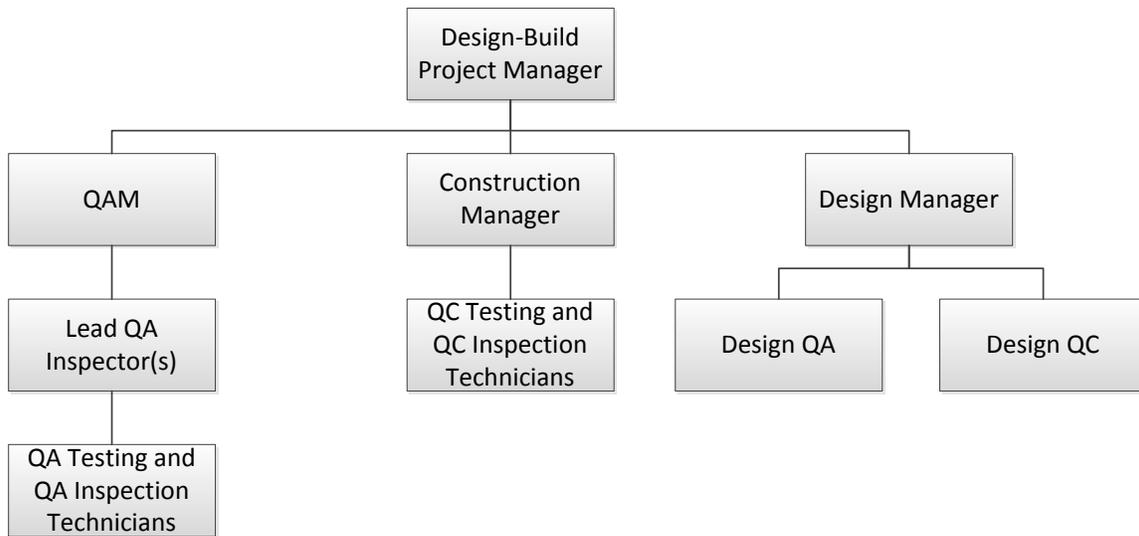
An example organizational chart illustrating the independence of the QA organization in the performance of a basic D-B project is shown in **Figure 2-1**.

Figure 2-1: Basic Minimum QA/QC Organizational Chart for Design-Build Projects



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2.1.5 The Department may, on a project specific basis, require additional QA/QC procedures for high-risk or unique elements of a project. Such additional procedures may include, for example, peer reviews by an independent firm, or a higher level of oversight or testing for critical construction elements. Any additional QA/QC procedures will be outlined in the ~~contract~~Contract documents. In the event of a conflict between this Guide and the Contract, the requirements set forth in the Contract shall take precedence.

2.1.6 The Department prefers QC testing and inspection be performed by an organization independent of construction activities. In cases where the Design-Builder chooses to self-perform quality control testing, the Design-Builder shall designate an individual(s) to perform quality control testing in the staffing plan. These individual(s) shall not perform dual roles during construction (i.e. Superintendent or Foreman cannot perform QC). QC testing and inspection shall be performed by individual(s) that meets the required qualifications listed in Sections 3.6 and 3.7 of this Guide.

2.2 Minimum QA/QC Plan Submittal Requirements

2.2.1 The QA/QC Plans for design and construction are dynamic documents and changes to the plan shall be issued as the program is refined and adapted throughout the life of the Project. This is especially true for the construction QA/QC program in which specific testing and inspection requirements cannot be established until the design of a particular work package has been completed.

~~2.2.1.2.2~~ Concessionaire/Design-Builder shall submit ~~its~~ a complete QA/QC Plan for ~~both~~ design and an initial QA/QC Plan for construction to ~~VDOT~~ the Department for review and approval at the ~~first meeting~~ Kick-Off Meeting held after the Concessionaire/Design-Builder's receipt of Department's Notice to Proceed or the date set forth in the Notice to Proceed ("**Date of Commencement**"), unless the parties mutually agree otherwise in writing, as set forth in the Design-Build or P3 Comprehensive Agreement. Along with the QA/QC Plan submittal, the Design Manager and Quality Assurance Manager ("QAM") shall provide a presentation of the QA/QC Plan for both design and construction utilizing Project related scenarios. ~~Project scenarios shall include but not limited to as defined in the Contract Documents. The QA/QC Plan for design shall be developed in accordance with the minimum requirements outlined in Section 4. The initial QA/QC Plan for construction should be developed as a baseline level document that establishes the framework of the entire QA/QC program taken into account the minimum requirements outlined in Section 5. Minimally, the initial QA/QC Plan for construction shall include:~~

- .1 ~~1~~—A project-specific staffing plan that identifies QA and QC Inspectors by name, position/role, and organization. QC and QA Testing Technicians shall be identified by quantity. The staffing plan shall include the anticipated number of hours on the project by both QA and QC personnel per month for the duration of all construction on the project.
- .2 An outline of all work packages that will require a Preparatory Inspection Meeting ~~requirement, including incorporation of at least one~~.

2.2.3 The Construction QA/QC Plan will need to be updated for ~~each, Witness and Hold Point, as set forth~~ Approved for Construction (AFC) work package submittal in accordance with Section 2.2.4 below.

2.2.4 The QA/QC Plan for construction shall be updated to include specific testing, inspection and staffing requirements and estimated quantities for each construction element associated with an AFC work package. Minimum requirements for the updated Construction QA/QC Plan are provided in Section 5.2 of ~~this Guide~~;— This update shall be provided at the time the AFC work package is submitted to the Department for plan approval by the Chief Engineer. Only the updated sections of the Construction QA/QC Plan shall be submitted. The updated Construction QA/QC Plan shall be approved by the Department prior to commencing the Preparatory Meeting for any construction element associated with an AFC work package.

- ~~.2 At least one (1) material which the Department retains responsibility for testing, if any, as identified in this Guide;~~

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- ~~.3 Situation arising requiring the issuance of a Non-conformance Report, subsequent review of the report, including completion of corrective measures and the issuance of a Notice of Correction of non-conformance work with proper log entries and proper interface with auditing and recovery requirements as set forth in Section 5.11 of this Guide for nonconforming Work resulting from:
 - a. defective equipment
 - b. construction activities/materials which fail to conform as specified;~~
 - ~~.4 Inspection documentation capturing requirements as set forth in Section 5.18 of this Guide; as well as inspection of geotechnical elements that are to be performed and certified by a qualified license geotechnical engineer.~~
 - ~~.5 Application for payment for Work Package which includes work element, including review and approval by Quality Assurance Manager.~~
 - ~~.6 Detail two (2) sample entries in Materials Notebook showing completion of Form C-25, including subsequent submission and review by Department Project Manager as set forth in Section 5 of this Guide (see Chapter VII of Materials Manual of Instruction for Materials Acceptance and the Materials Notebook Program, and Section 805 of MOI to download Form TL-142S which is an example of a completed Materials Notebook.~~
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Section 3. Concessionaire/Design-Builder QA/QC Staff Roles and Responsibilities

3.1 General

3.1.1 As part of the QA/QC plan submission process, fully detailed resumes with references shall be submitted to the Department identifying the minimum qualifications and experience of the Concessionaire/Design-Builder's QCM (if used), QA Lead Inspector(s), and QA and QC staff for all personnel that will be employed in a supervisory or management position Inspectors and Technicians. The persons or organizations performing QA or QC shall have sufficient authority and organizational autonomy to identify quality problems, and to initiate, recommend, and verify implementation of solutions. The Concessionaire/Design-Builder Quality Assurance Manager (QAM) shall have full authority to initiate a work stoppage and be able to recommend to the Department to withhold payment for design and/or construction activities that are not acceptable. This authority must be in writing from the Concessionaire/Design-Builder to the QAM and must be included as part of the QA/QC Plan submitted for Department approval. At a minimum, the Concessionaire/Design-Builder QA and QC staff shall include the following persons holding the required qualifications, as detailed in **Table 3-1**.

Table 3-1: Concessionaire/Design-Builder QA/QC Staff Roles and Responsibilities

Position	Responsibility	Reports To	Required Qualifications*
Concessionaire/ Design-Builder Project Manager	Responsible for the overall Project design, construction quality management, and contract administration for the Project.	Concessionaire/ Design-Builder at the executive level.	
QAM	Overall responsibility for the development of and adherence to the Design-Build QA/QC Plan. <u>Responsible for certification of projects compliance to the Contract requirements.</u>	<ol style="list-style-type: none"> Concessionaire/ Design-Builder Project Manager or other <u>appropriate person at the executive level</u> Does not report to production forces. Cannot have any involvement on <u>Must be separate and independent</u> 	<ol style="list-style-type: none"> Professional Engineer licensed by the <u>State Commonwealth of Virginia; and,</u> Appropriate <u>supervisory</u> Supervisory experience in inspection and materials testing on relevant highway transportation projects or as specified in the Contract.

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Position	Responsibility	Reports To	Required Qualifications*
		to the construction operations for process and the Project <u>QC team.</u>	
Lead QA Testing Technicians QA Inspection Technicians <u>Inspector</u>	Responsible for QA testing observing construction as it is being performed, including all QC and QA activities to ensure that inspection and testing, and correction of items of work for conformance non-conforming Work are being performed in accordance with plans and specifications the Contract requirements. <u>Responsible for certifying the Project's compliance with the SWPPP, VPDES and Water Quality Permits and associated updates.</u>	QAM	<u>1. Holds current Department materials certifications or others as noted for each certification listed in Sections 3.6 & 3.7 of this Guide for the types of testing and/or .</u> <u>2. Holds current DEQ ESC Inspector certification.</u> 1-3. <u>3. Supervisory experience in inspection that they are assigned to perform and materials testing on relevant highway transportation projects or as specified in the Contract.</u>
<u>QA Testing Technicians</u>	<u>Responsible for QA testing of items of work for conformance with "approved for construction" (AFC) plans and specifications.</u>	<u>QAM/Lead QA Inspector</u>	<u>1. Holds current Department materials certifications or others as noted in Section 3.6 of this Guide for the types of testing that they are assigned to perform.</u>
<u>QA Inspectors</u>	<u>Responsible for QA inspection of items of work for conformance with "approved for construction" (AFC) plans and specifications.</u>	<u>QAM/Lead QA Inspector</u>	<u>1. Holds current Department materials certifications or others as noted in Section 3.7 of this Guide for the types of inspection that they are assigned to perform.</u>

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Position	Responsibility	Reports To	Required Qualifications*
Concessionaire/ Design-Builder Design Manager	Responsible for the design portion of the Design-Build QA/QC Plan and for ensuring production of Construction Documentation in accordance with the QA/QC Plan.	Concessionaire/ Design-Builder Project Manager.	<ol style="list-style-type: none"> Professional Engineer licensed by the State<u>Commonwealth</u> of Virginia, and. Appropriate supervisory<u>Supervisory</u> experience in design on relevant transportation projects.
Design QA Design QC	Responsible for QA or QC for design elements of the Project.	Design Manager.	<ol style="list-style-type: none"> When applicable, Professional Engineer licensed by the State<u>Commonwealth</u> of Virginia in the engineering discipline being reviewed. Appropriate design<u>Design</u> experience in the engineering discipline being reviewed.
Concessionaire/ Design-Builder Construction Manager	Responsible for <u>managing all Quality Control activities to verify adherence to</u> the construction portion of the Design-Build QA/QC Plan and for ensuring construction of the that material used and work in accordance with the QA/QC Plan <u>performed meet contract requirements.</u>	Concessionaire/ Design-Builder Project Manager.	<ol style="list-style-type: none"> Appropriate supervisory<u>Supervisory</u> experience in inspection or documentation or materials testing or combination thereof on relevant transportation projects; and. <u>DEQ Responsible Land Disturber (RLD) Certification and VDOT Erosion and Sediment Control Contractor Certification (ESCCC).</u> 2.3. Any other requirements specified in the RFP or P3 procurement documents.

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Position	Responsibility	Reports To	Required Qualifications*
QC Testing Technicians QC Inspection Technicians Quality Control Manager (not a required position – may be included at the discretion of the Design-Builder)	Responsible for <u>Assists the CM in managing Quality Control activities to ensure compliance with all QC testing and/or inspection contract requirements. Ensures adequate staffing of items of work for conformance with qualified QC plan testing and specifications inspection personnel.</u>	Contractor’s production forees. <u>Construction Manager</u>	1. Holds current Department materials certifications or others as noted for each certification listed in Sections 3.6 & 3.7 of this Guide for the types of testing and/or . 2. Supervisory experience in inspection that they are assigned to perform or documentation or materials testing or combination thereof on relevant transportation projects.. ±
<u>QC Testing Technicians</u>	<u>Responsible for QC testing of items of work for conformance with “approved for construction” (AFC) plans and specifications.</u>	<u>Construction Manager/QC Manager</u>	<u>1. Holds current Department materials certifications or others as noted in Section 3.6 of this Guide for the types of testing they are assigned to perform.</u>
<u>QC Inspectors</u>	<u>Responsible for QC inspection of items of work for conformance with “approved for construction” (AFC) plans and specifications.</u>	<u>Construction Manager/QC Manager</u>	<u>1. Holds current Department materials certifications or others as noted in Section 3.7 of this Guide for the types of inspection that they are assigned to perform.</u>

* Unless otherwise stated in the RFQ, RFP or the P3 Procurement Documents

3.2 Concessionaire/Design-Builder Quality Assurance Manager (QAM)

3.2.1 The QAM shall be from an independent firm that has no involvement in construction operations for the Project, and shall be responsible for the QA inspection and testing of all materials used and work performed on the Project, to include monitoring of the contractor’s quality control (QC) program.

~~**3.2.2** The QAM will ensure that all work and materials, testing and sampling are performed in conformance with the Contract, and the “approved for construction” plans and specifications.~~

~~**3.2.3**~~**3.2.2** The QAM shall verify that all ~~design~~Design related Work Packages submitted for payment have been certified by the Design Manager as being in conformance with the Contract Documents and the Design QA/QC Plan.

~~**3.2.3** The QAM (in conjunction with the Lead QA Inspector) shall ensure adherence to environmental permits and commitments and that all work and materials, testing and~~

sampling, and work zones are in conformance with the Contract, and the AFC plans and specifications. The QAM shall be responsible for maintaining and certifying the Materials Notebook as outlined in Section 5.23.2 of this Guide and Section VII of VDOT's Materials Manual of Instruction (MOI). Maintenance of the Materials Book shall not be delegated to QC personnel.

3.2.4 The QAM shall approve all applications of payment for all Work Packages including verification of the Design Manager's certification of Design Package submittals.

3.3 Concessionaire/Design-Builder Design Manager

3.3.1 The Concessionaire/Design-Builder Design Manager is the individual with responsibility of coordinating the individual design disciplines to include design subconsultants and ensuring the overall Project design is in conformance with the Contract Documents. ~~This person may be the same as the QAM, if approved by the Department.~~

3.3.2 The Design Manager shall be responsible for establishing and overseeing a QA/QC program for all pertinent disciplines involved in the design of the Project, including review of design, working plans, shop drawings, specifications, and constructability of the Project. This individual shall report directly to the Design-Builder's Project Manager, and is responsible for all of the design, inclusive of QA and QC activities. This individual shall be responsible for implementing, monitoring and, as necessary, adjusting the processes to assure acceptable quality of the design work. Any adjustments that deviate from the written QA/QC Plan should be approved by ~~VDOT~~the Department prior to being implemented.

3.3.3 The Design Manager's QA/QC team shall adhere to the design QA/QC requirements presented in Section 4 of this Guide.

3.4 Design QA and QC

3.4.1 Members of the Design QA and QC team are responsible for review of all design elements to ensure the development of the plans and specifications are in accordance with the requirements of the Contract Documents. Design QA should be performed by one or more member(s) of the lead design team that are independent of the Design QC. with no direct involvement in the design. The same member(s) of the lead design team should complete all design QA reviews throughout the duration of the Project.

3.4.2 In general, Design QA shall evaluate whether the designer assessed the problem appropriately, applied the correct analysis, and assigned qualified personnel to the task. Design QC shall include, but not be limited to, review of math and engineering computations, technical accuracy, and conformance to contract requirements to a level commensurate with the complexity of the design approach and the criticality of the design element. The Design QC shall be completed by an independent reviewer who does not have a direct role in the development of the design.

3.5 Concessionaire/Design-Builder Construction Manager

3.5.1 The Concessionaire/Design-Builder Construction Manager is required to be on the Project site full-time for the duration of the construction operations and is responsible for all Quality Control on the Project. This individual shall have responsibility for managing the construction process, to include all QC activities, to ensure the materials used and work performed meet contract requirements and the “approved for construction” (AFC) plans and specifications. This individual shall be responsible for implementing, monitoring and, as necessary, adjusting the processes to assure acceptable quality of the construction work.

3.6 QA and QC Testing Technicians

3.6.1 QA and QC Testing Technicians are staff who perform on-site materials testing including, but not limited to, density, ~~moisture~~ water content, air content of concrete, slump, and other required materials field tests. QA Testing Technicians shall report directly to the QAM and are not responsible for project production. The QA Technicians shall be employed by a firm that is completely separate of production work and QC testing services. QC Testing Technicians are to fulfill the requirements for materials testing for Quality Control ~~and may be employed by the Concessionaire/Design-Builder or subcontractor to the Concessionaire/Design-Builder.~~

~~**3.6.2** The QA and QC Testing Technicians shall hold current Department materials testing certifications for the types of materials testing that they are assigned to perform. Prior to the start of each Work associated with the AFC work activity, the package:~~

~~.1 The QAM shall identify ~~the~~ each QA Testing Technician(s) by name and provide a detailed qualification matrix for each type of materials testing required ~~illustrating each technician’s qualifications and respective test(s) that is (are) to be performed.~~~~

~~**3.6.2.2** The ~~Concessionaire/Design-Builder~~ Construction Manager shall ~~coordinate with the QAM and~~ identify ~~the~~ each QC Testing Technician(s) ~~prior to the start of each Work Package~~ by name and provide a detailed qualification matrix to the QAM for each type of materials testing required. ~~—These qualification matrices shall be submitted to the Department’s Project Manager for review and approval prior to the start of each Work Package.~~~~

3.6.3 ~~Material~~ QA and QC Testing Technicians shall have current Department certifications for the type of material testing they are assigned perform. Such material testing certifications may include, ~~but are not limited to, the following:~~

- .1 Asphalt Concrete, Field
- .2 Hydraulic Cement Concrete, Field
- .3 Soils and Aggregate
- .4 Pavement Marking
- .5 Confined Space

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~~.5.6~~ Nuclear Safety, and

~~.6.7~~ Others, as identified in the Contract

3.6.4 The qualifications of laboratory technicians employed by a laboratory accredited by the AASHTO Accreditation Program (AAP) may be accepted for AASHTO or ASTM laboratory test methods when confirmed by the laboratory's training and evaluation records and for such tests not covered by the Department's certification program.

3.7 QA and QC ~~Inspection Technicians~~Inspectors

~~3.7.1~~ Prior to the start of each ~~Work Package, the~~AFC work package:

~~3.7.1.1~~ The QAM shall identify each QA ~~Inspection Technician~~Inspector by name and provide a detailed qualification matrix for each type of inspection required.

~~3.7.2.2~~ ~~Prior to the start of each Work Package, the~~The Construction Manager shall identify each QC ~~Inspection Technician~~Inspector by name and provide a detailed qualification matrix to the QAM for each type of inspection required.

~~3.7.3~~3.7.2 QA and QC ~~Inspection Technicians~~Inspectors shall have the Department and other certifications applicable to the work to be performed.— Such certifications may include:

- .1 Asphalt Concrete, Field
- .2 Hydraulic Cement Concrete, Field
- .3 Soils and Aggregate
- .4 Surface Treatment
- .5 Slurry Treatment
- .6 Guardrail Installation
- .7 Pavement Marking

~~.8~~ Confined Space

~~.8.9~~ Nuclear Safety

~~.9.10~~ OSHA 10-Hour

~~.10.11~~ E&S Inspector (administered by the Department of Conservation and Recreation)

~~.11.12~~ Work Area Protection, and

~~.13~~ Intermediate Work Zone

~~.14~~ DEQ SWM Inspector

~~.12.15~~ Others as required by the nature of the Work and/or as identified in the Contract

3.8 Lead Quality Assurance Inspector(s)

3.8.1 The QAM shall assign a Lead QA Inspector(s) to the Project prior to the start of construction, meeting the requirements noted above. This individual(s), who must be on the site full time for the duration of all construction of the Project, shall physically observe construction (including QC and QA activities) as it is being performed and to ensure that inspection, testing and correction of any deficiencies or non-conforming Work are being performed in accordance with the contract requirements. The Lead QA Inspector shall report directly to the QAM.

3.8.2 The Lead QA Inspector shall perform QA inspections as required and, if necessary, be supported by other QA inspectors to ensure the requirements of Section 3.8.1 are satisfied.

3.8.3.9 Contact Information for Design Builder QA/QC Staff

3.8.13.9.1 The Concessionaire/Design-Builder shall ensure that the contact details and certifications of all QA/QC staff are maintained in a list issued to the Department with the QA/QC Plan and re-issued at each update of the list.

3.8.23.9.2 The list shall contain at a minimum the following details:

- .1 Title
- .2 Name
- .3 Reports To
- .4 Work Phone
- .5 Cell Phone
- .6 E-mail

Section 4. Design QA/QC Requirements

4.1 General

4.1.1 The Design QA and QC procedures shall be organized by each type of engineering discipline (e.g., structural, ~~civil~~ roadway, traffic, geotechnical, hydraulics, and utilities). These procedures shall specify measures to be taken by the Concessionaire/Design-Builder:

.1 To ensure that appropriate quality standards are specified and included in the drawings, specifications, and other design submittals and to control deviations from such standards, it being understood and agreed that no deviations from such standards shall be made unless they have been previously approved in writing by the Department at the Department's sole discretion;

~~.2~~ .2 Ensure execution of the Design QA and QC requirements defined in the Concessionaire/Design-Builder's Design QA/QC Plan;

~~.3~~ .3 For the selection of suitability of materials, and elements of the Work that are included in the Project;

~~.4~~ .4 To ensure the completed Work is safe and maintainable; and

~~.5~~ .5 To ensure the constructability of design in order to optimize the potential benefits of design-build project delivery.

4.1.2 In general, ~~design~~ Design QA shall evaluate whether the designer assessed the problem appropriately, applied the correct analyses, and assigned qualified personnel to the tasks.

.1 Design QA shall address whether the design solution meets the contract requirements.

.2 Design QA also shall ensure that the work required by the contract documents is completed applying appropriate skill and experience in accordance with the Design-Build Contract or applicable portions of the Comprehensive Agreement for P3 procurements. At minimum, the following shall apply:

.1 Specific standards, methods, and requirements set forth in the contract documents;

.2 All legal requirements;

.3 All governmental approvals;

.4 The application of professional engineering judgment taking into consideration safety, operational requirements, level of service, life cycle costs and the current version of the specific standards, methods, and requirements set forth in the contract documents;

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.5 Prudent industry practices, methods, techniques and standards and using the degree of care that would be expected to be exercised by a prudent, skilled and experienced ~~Concessionaire/Design-Builder~~ engineer engaged in the same kinds of undertakings as the project under the same or similar conditions at the same time and locality of the Project; and

.6 The requirements of insurance policies required to be maintained in accordance with the contract documents.

4.1.3 Design QA should be performed by one or more member(s) of the lead designer team that are independent of Design QC. The same member(s) of the lead designer team should complete all ~~design~~ Design QA reviews throughout the duration of the project.

4.1.4 Design QC may be performed at the office where the work was conducted.

4.1.5 Design QC shall include review of math and engineering computations; technical accuracy; conformance to contract requirements; review of form, content and spelling, and coordination with other disciplines including construction. The ~~design~~ Design QC review will be carried out to a level commensurate with the complexity of the design approach and the criticality of the design element.

4.1.6 The Design QA/QC Plan shall specifically include constructability reviews and, as applicable, maintainability reviews.

4.2 Design QA/QC Plan Development

4.2.1 The Design QA/QC Plan shall be prepared such that the requirements for QA and the requirements for QC are detailed in individual plans or in separate sections of the overall plan such that they are capable of being read independently.

4.2.2 The Design QA/QC Plan shall set forth the following:

- .1 All QA and QC procedures proposed by the Concessionaire/Design-Builder for the design process shall be included in the Design QA/QC Plan. Procedures shall be included for preparing and checking all drawings, specifications, and other design submittals to the Department to ensure that they are independently checked by experienced and qualified professionals prior to submission;
- .2 Procedures to ensure that drawings, specifications, and other design submittals are to be stamped, signed and dated by the responsible Virginia licensed architect or engineer as required under the Contract provisions or by applicable laws. It is anticipated that a substantial portion of the Design QA/QC Plan shall rely upon the design consultant's use of licensed professionals who are governed by statutory requirements and standards of care;
- .3 The level, frequency and methods of review for the adequacy of the design of the Project, including the methods for independent review of the final drawings, specifications, and other design submittals to ensure compliance with Department's functional requirements for the Project as outlined in the Contract Documents;

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- .4 Procedures for coordinating work performed by different persons in the same or adjacent area, fabrication shops, casting yards and other pertinent fabrication facilities at remote locations, work element or project feature, or in related tasks to ensure that conflicts, omissions or misalignments do not occur between drawings or between the drawings and the specifications and to coordinate the review, approval, release, distribution and revision of documents involving such persons. The Design QA/QC Plan shall also set forth the procedures for ensuring Design QA and QC requirements are met for adequate right of way and avoidance of utility conflicts;
- .5 ~~Procedures~~ The Design QA/QC Plan shall include procedures to identify those elements of the Contract, drawings, specifications, and other design submittals, if any, requiring special construction QA and/or QC attention or emphasis, including applicable standards of quality or practice to be met, level of completeness and/or extent of detailing required, or Special Provisions to the Road and Bridge Specifications;
- .6 Identification by firm, discipline, name, qualifications, duties, responsibilities and authorities for all persons and entities proposed to be responsible for design QA and QC activities, including sub-consultants; ~~and~~
- .7 Design QA/QC functions, including scheduled activities for design QA and QC, identifying the drawings, specifications, and other design submittals to be delivered to the Department for its review at each stage of the design or work phase of the Project, shall be described in the Design QA/QC Plan. These submittals and the review process shall be in accordance with the Design-Build Contract or P3 Comprehensive Agreement ~~;~~ and
- .8 Procedures shall be included for preparing and reviewing all working drawings, to ensure that they are independently checked by experienced and qualified professionals prior to submission and/or construction.

4.3 Design QA/QC Plan – Minimum Requirements

4.3.1 The Concessionaire/Design-Builder is responsible for design quality. The Design Manager, assigned by the Concessionaire/Design-Builder, shall be responsible for overall management of the QA/QC programs for design. This individual shall report directly to the Concessionaire/Design-Builder's Project Manager and is responsible for all of the Design QA/QC activities. The quality control function during design is provided by design staff independently checking each other's work. Design production and design leads performing formal and documented coordination reviews at pre-determined times on each submittal and on all **Approved for Construction (AFC)** design packages. All design submittals and AFC plans will have written approval by the Design Manager certifying that he/she has audited and approved the submittal.

4.3.2 The project Design QA/QC Plan shall at a minimum include:

- .1 Written documentation and definition of the project's design criteria, standards, and processes;

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- .2 Procedures for the performance of senior experienced engineers' detailed checks of all design reports, calculations, drawings and specifications;
- .3 Directions for interdisciplinary reviews by technical and management staff to provide coordination and uniformity among section designs;
- .4 Procedures for design-build constructability reviews to facilitate the timely planning of construction activities.
- .5 Procedures for maintainability reviews to ensure feasibility of future maintenance and operation; and
- .6 Quality assurance audit checklists.

4.3.3 Individual design discipline leaders are responsible for the completion of all QC functions within the section and for the coordination of actual audit dates established by the Design Manager. During basic design services, documented internal technical design audits performed by the design discipline leaders determine if calculations, drawings, reports, and specifications meet both professional and contractually required standards.

4.3.4 The Design Manager shall perform audits to verify conformance with the approved Design QA/QC Plan and verify that the required checking and review functions are performed. These quality audits shall be based on project procedures applicable to the area to be audited and shall be documented using a quality assurance checklist.

4.3.5 Concessionaire/Design-Builder shall prepare and update a schedule for audits to reflect changes or refinements in the scope of the project work and the project schedule.

4.3.6 The Concessionaire/Design-Builder shall correct all nonconforming practices before plans are submitted to the Department. Copies of all audit information shall be retained in the Design Manager's QA File.

~~4.2.34.3.7~~ The Concessionaire/Design-Builder shall provide the Department with necessary verification that the design submittals and plans approved for construction meet all project contract requirements for Design QA/QC Plans are further detailed in Appendix 2. Documents which are "approved for construction" shall be accompanied by a Form signed by the Design Manager certifying that the "construction items" shown on the plans have been audited for and satisfy compliance with the Design QA/QC Plan, and with all requirements of the contract documents, including the Concessionaire/Design-Builder's Proposal and for P3 procurements, the Comprehensive Agreement.

4.3.8 The Design Manager is responsible for verifying the implementation and effectiveness of the corrective measures using informal observation and review or with a formal audit. The time allowed for such follow-up activities depends on the importance of the corrective action required.

4.3.9 To provide effectiveness, procedure preparation shall be coordinated through the Design Manager and designated staff so that their review and comments can be considered before finalizing the submittals. The Design QA/QC Plan is a dynamic document and changes should be incorporated as the program requires refinement or adaptation. The above-mentioned staff is also responsible for identifying those project

activities that require a new procedure, along with preparation and distribution of each procedure, as applicable.

4.3.10 A Table of Contents is provided that illustrates the minimum contents of the Project design QA/QC procedures.

SECTION 1 - GENERAL AND ADMINISTRATION

- 1.1 Preparation and Revision of Design QA/QC Procedures
- 1.2 Terms and Definitions
- 1.3 Quality Assurance Organization, Functions and Responsibilities
- 1.4 Documentation Control
- 1.5 Control of Customer-Supplied Product
- 1.6 Quality Records
- 1.7 Quality Control Coordinators Function and Responsibilities

SECTION 2 - PROJECT MANAGEMENT

- 2.1 Quality Program for Subconsultants
- 2.2 Quality Control and Verification of Computer Software
- 2.3 Preparation and Maintenance of the Project Procedures Manual
- 2.4 Contract Review and Coordination
- 2.5 Internal Quality Audits

SECTION 3 - PLANNING AND DESIGN

- 3.1 Checking of Calculations
- 3.2 Checking of Drawings
- 3.3 Checking of New Specifications. Revisions to Project Specifications and/or Special Provisions
- 3.3.1 New Specifications, Revisions to Corridor Specifications and/or Special Provisions
- 3.4 Checking of Input to Computer Programs
- 3.5 Review of Studies or Report-Type Documents
- 3.5.1 Review of Documents Prepared by Others including Working Drawings
- 3.6 Design Coordination Review (DCR) and Technical Coordination Review (TCR) of Interim Submissions
- 3.7 Final Package Review (FPR) of Documents
- 3.8 Quality Audits of Planning and Design Functions

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3.9 Quality Control of CADD-Produced Documents

3.10 Documentation and Transmission of Design Directives and Revisions

3.11 Documentation and Notice of Design Change

3.12 Field Design Changes

3.13 Implementation of Corrective and Preventive Action

3.14 Quality Control of Utility Design

3.15 Training

4.3.11 The Design Manager shall maintain close communication with Concessionaire/Design-Builder's Project Manager and shall ensure the Project is completed in accordance with the requirements of the Contract Documents. The Design Manager shall perform all of the design oversight reviews. The Department may participate in these reviews. Unless otherwise set out in the Contract, the Department retains the ultimate approval and disapproval authority for conformance with contract requirements. Under this procedure, the Design Manager will provide the Department with draft design plans for review and approval to confirm that the design work complies with the requirements of the Contract Documents herein prior to initiation of construction activities on the Project.

4.3.12 Plans to be reviewed shall be submitted to the Department's Project Manager in accordance with contract requirements. The Department's Project Manager will distribute plans for review and/or approval. The Department shall have the right to review and comment on all draft plans and specifications for compliance with the requirements of the contract documents and reference documents. The Concessionaire/Design- Builder shall be responsible to satisfy all such requirements.

4.3.13 The Concessionaire/Design-Builder shall revise and modify all draft design plans so as to fully reflect all comments and shall deliver the revised submittal to **the Department's Project Manager, who will distribute plans to appropriate staff for review and comments.**

4.3.14 Construction Plans are to be submitted to the Department for review and approval by the Chief Engineer prior to construction of that element of work. The schedule for plan review and approval shall be in accordance the requirements of the Contract Documents. The Concessionaire/Design-Builder shall be responsible for the design details and ensuring that the design and construction work are properly coordinated. The Concessionaire/Design-Builder shall be responsible for documenting any design exceptions or waivers that may be needed. The Department will submit the design waivers and design exceptions to the appropriate reviewing authority for review and approval.

4.34.4 Design Quality Review

4.3.14.4.1 Prior to the release of the final drawings, specifications, and other design submittals, the Concessionaire/Design-Builder shall complete review by architects and

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engineers experienced in the appropriate disciplines(s). Each Contract submission shall be accompanied by a certification from the Design Manager and the appropriate design or technical manager stating that the submission meets the requirements of the Contract and has been reviewed in accordance with the Design QA/QC Plan. In addition, the Concessionaire/Design-Builder shall review the submission and confirm the Contract and QA/QC procedures have been followed and properly documented.

4.3.24.4.2 The criteria used in such review shall include but not be limited to:

- .1 Conformity of the final drawings, specifications, and other design submittals with the Contract;
- .2 Assurance that all materials, equipment and elements of the Work provided for in such documents meet the Contract requirements and have been designed to perform satisfactorily for the purpose intended;
- .3 The technical and grammatical accuracy, appearance, and organization of such documents;
- .4 Verification that such documents have been checked and signed by the drafter, designer, and reviewers;
- .5 Where required under the Contract, generally accepted architectural or engineering practices or applicable law, verification that such documents have been stamped, signed and dated by the responsible Virginia registered engineer or architect;
- .6 Assurance that such documents fully provide suitable evidence for constructability, compatibility of materials and conformity to acceptance criteria for inspections and tests as provided in the Contract Documents; and
- .7 Documentation is provided, where required and/or appropriate, to demonstrate that life-cycle costs and maintenance requirements have been considered in the design.

4.3.34.4.3 Concessionaire/Design-Builder's Design ~~Quality Control~~ QA/QC Plan shall address interim design submissions, ~~related to Preliminary Field Inspection (PFI); Field Inspection and Right of Way (FI/RW); additional interim design submissions;~~ and Construction Documents that the Department may require; design review meetings; submittal schedule; publishing and distribution of design review meeting notes and design submission status; and other Design Development Services requirements as set forth in Part 4 of the Design-Build Contract or applicable portions of the P3 Comprehensive Agreement.

4.3.44.4.4 The Design QA/QC Plan shall clearly demonstrate that all design-related documents (~~e.g., reports, design calculations, plans, specifications, special provisions and estimates~~) are technically reviewed by competent, independent reviewers; said documents must include procedures to correct errors and deficiencies in the design documents prior to submitting them to the Department for review. Minimally, the Design QA/QC Plan shall identify design engineer, detailer, checker, quality assurance engineer, quality

control engineer, and engineer in responsible charge by organization, name and resume, including sub-consultants and interface among design consultants.

4.3.54.4.5 The Design QA/QC Plan shall identify other contract submissions that may fall outside the Design Manager's expertise. For each of these submissions, a QA and QC plan shall be developed, with appropriate staff identified for both QA and QC functions. Such other contract submissions may include, but not be limited to: ROW appraisals, data entry and RUMS, including completeness of contract information, utility agreements, and surplus property data.

4.4.5 Department Approvals and Review of Design Work

4.4.14.5.1 The Design Manager shall oversee the performance of all the design oversight reviews. The Department may participate in these reviews. Under this procedure, the Design Manager will provide the Department with draft design plans for review and (where required) approval to confirm that the design work complies with the requirements of the Contract Documents, especially requirements for design development and any Technical Information and/or Technical Requirements, before the Concessionaire/Design-Builder initiates construction activities on the Project.

4.4.24.5.2 Any review comments made by the Department will be provided, in writing, to the Concessionaire/Design-Builder. The Department will provide timely reviews per the Contract and (where required) approvals of interim design submissions, drawings, specifications, and other design submittals consistent with the turnaround times set forth in Concessionaire/Design-Builder's schedule, provided that Department shall have twenty-one (21) days after receipt of such submissions to act upon such submissions unless otherwise provided for in the Contract.

4.4.34.5.3 The Concessionaire/Design-Builder shall be solely responsible, at no additional cost to the Department, for the schedule impacts and costs of revisions arising from the Department's review of the drawings, specifications, and other design submittals for consistency with the requirements of the Contract and caused by the Concessionaire/Design-Builder's noncompliance with contract requirements.

4.4.44.5.4 In addition to contractual reviews, the Department may conduct regular monthly progress meetings in which quality issues are reviewed, discussed, and addressed.

4.5.4.6 Quality Assurance and Quality Control of Design and Field Changes

4.5.14.6.1 Changes, including field changes, in the design of the Project or any portion thereof as shown on the Construction Documents, shall be subject to design QA and QC measures and procedures commensurate with those applied to the original design of the portion of the Project being changed. ~~Further~~**Furthermore**, all changes shall be approved in writing by the organization that performed the original design, with the additional written acknowledgement and approval of the change by the Design Manager ~~with recommendation prior to submission~~ for approval by the Department. ~~Documents containing design and/or field changes shall be distributed according to the requirements of this Section 4.~~ Where required, revisions shall be signed and sealed. The Design-

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Builder shall develop a process for communicating changes within the Design-Builder's organization as well as with the Department in accordance with this Section 4. All changes shall be documented in the final As-Built plans. All changes should be handled using one of the following approaches:

.1 **Field Design Change (FDC)** is defined as any adjustment made in the field to match project elements with conditions encountered in the field. They are limited to minor dimensional and layout adjustments to AFC documents, and do not alter the design intent or impact the overall project construction and installation. The Department in its sole discretion may require the Design-Builder to submit FDCs through formal construction plan revision or document the field design changes in the as-built plans. The Department, in its sole discretion, will determine if Field Design Changes can be implemented prior to a formal construction revision or if field changes must be performed following a formal construction plan revision.

.2 **Notice of Design Change (NDC)** is defined as revisions to AFC documents that involve design changes that are considered to be major in scope or changes that may impact multiple disciplines. Any adjustment requiring signing and sealing of documents shall be through a NDC requiring a formal construction revision. Examples include revisions to major dimensions and layout, materials changes, or design revisions to accommodate adjustments to the work.

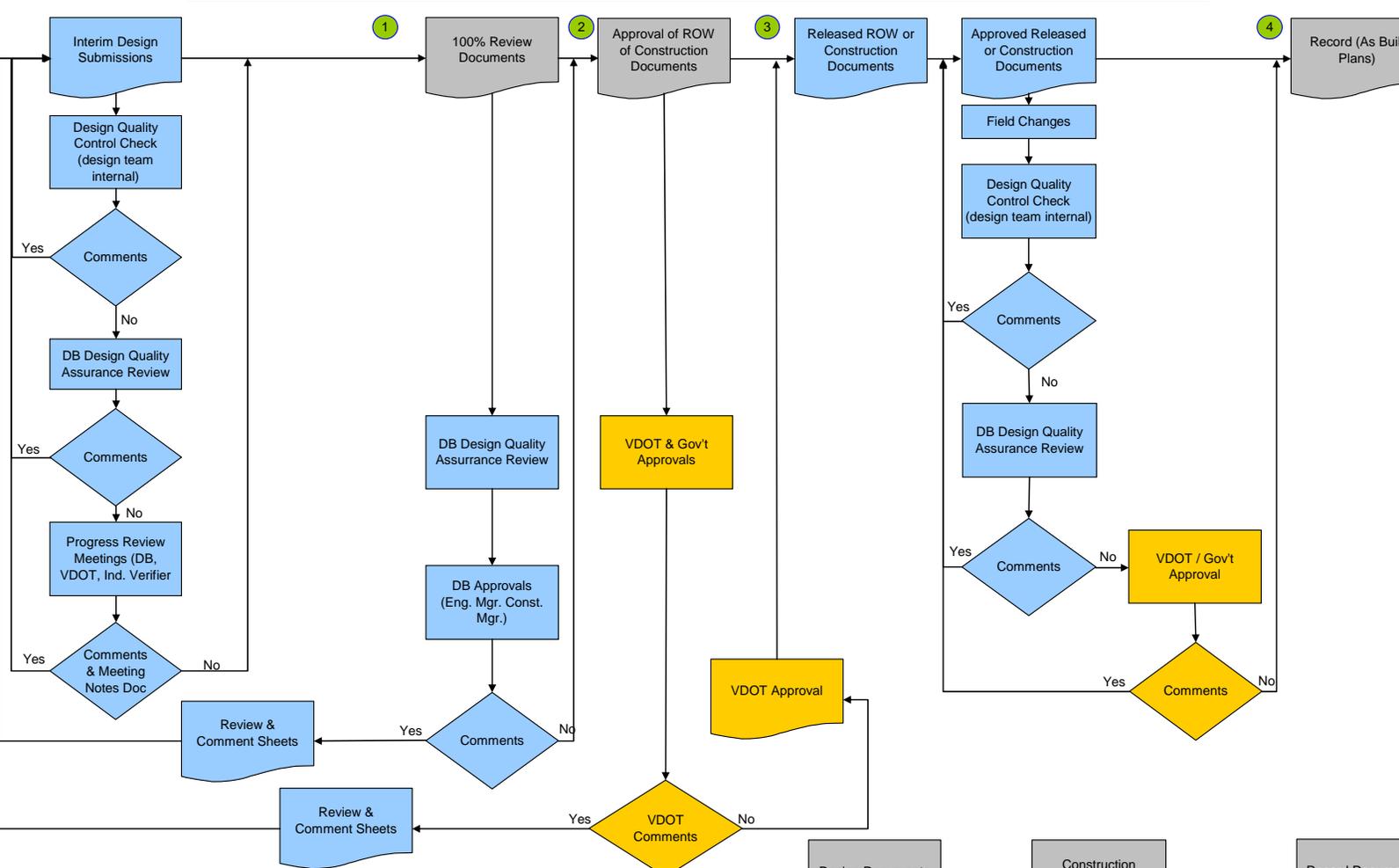
4.6.2 Design Request for Information (RFIs) are internal to the Design-Build Team and should not be submitted directly to the Department. The Design QA/QC Plan shall describe how Concessionaire/Design-Builder's internal RFIs will be communicated to the designer of record, how responses will be communicated back to the field personnel, and how and when the information will be communicated to the Department's project management staff. Any design-related RFIs initiated by the Concessionaire/Design-Builder should be transmitted to the designer with the Department copied on the final resolution. Design RFIs that result in changes to the Contract Documents or Approved for Construction Plans shall be transmitted to the designer and the Department concurrently, with the Department having final approval authority.

4.6.4.7 Design QA/QC Overview

4.6.14.7.1 A flow chart depicting the design review, approval and quality management process is shown in **Figure 4-1**.

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- 1 Checked by Engineer of Record & Issued for Formal Review. Make up of review packages based on construction needs.
- 2 Sealed by Engineer of Record & Issued to D-B Design Manager
- 3 Ten (10) sets of approved construction documents to Department prior to Construction
- 4 Process includes documentation of work orders, field changes, correction of defective work and any other changes to approved construction documents

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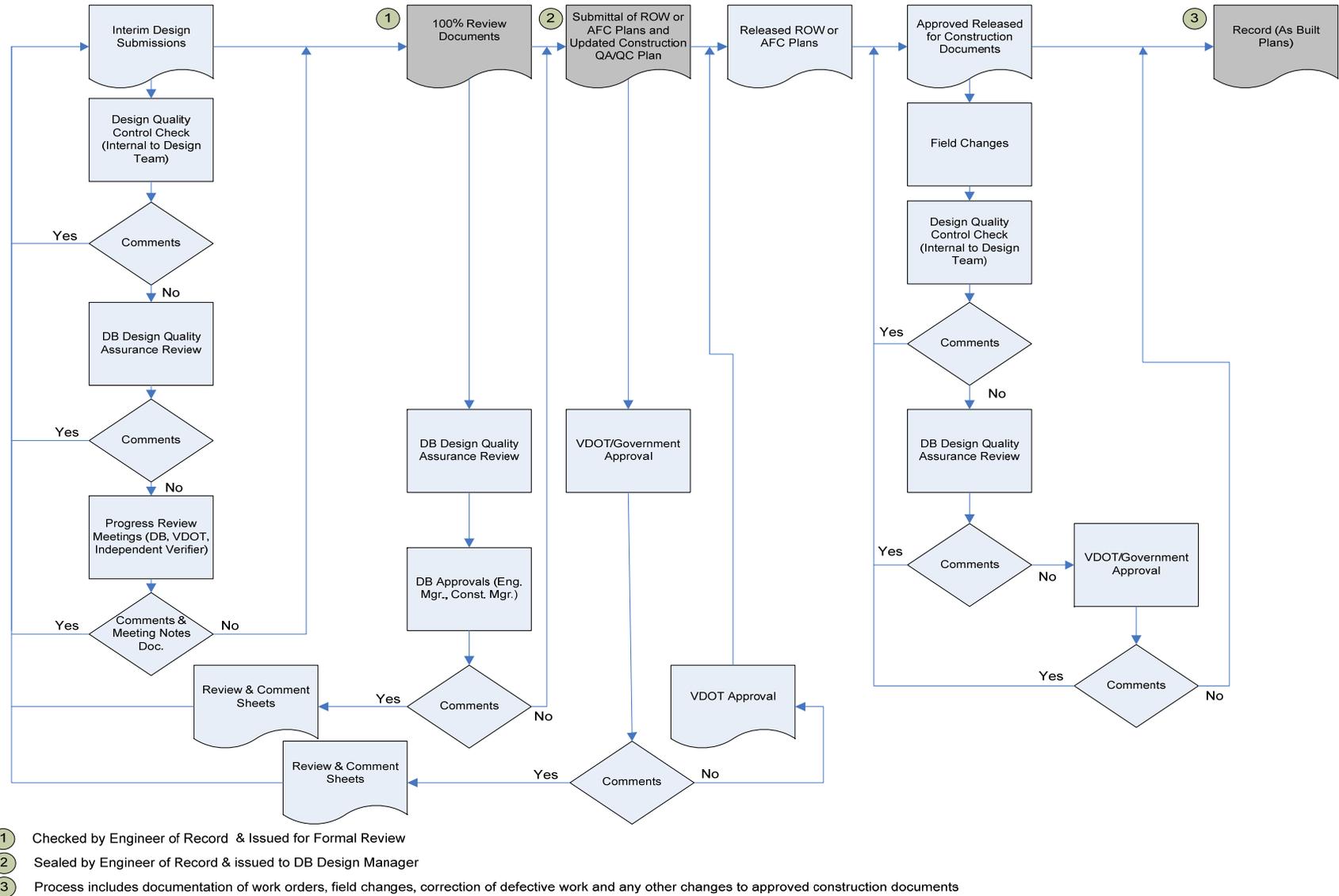


Figure 4-1: Design-Build Review, Approval and Quality Management Process

Section 5. Construction QA/QC Requirements

5.1 General

5.1.1 The Concessionaire/Design-Builder shall be responsible for the quality of workmanship and materials incorporated into the Project. The Concessionaire/Design-Builder's QA and QC measures shall insure that operational techniques and activities provide workmanship and materials of acceptable quality. Concessionaire/Design-Builder sampling ~~and~~, testing, and inspection shall be performed to control the processes and determine the degree of workmanship and materials compliance with the Construction and Contract Documents.

5.1.2 The Concessionaire/Design-Builder shall develop, operate and update as required a QA/QC Plan which will detail how the requirements of this Section 5 will be achieved.

5.1.3 The Contract may require specific QA and QC measures for certain materials. When so required, the Concessionaire/Design-Builder shall provide all personnel, equipment, supplies, and facilities necessary to perform QA and QC functions, obtain samples, perform tests and inspections required in the Construction and Contract Documents.

5.1.4 The QAM shall certify, as part of each request for payment, that all of the Work has been completed in conformance with the requirements of the approved Construction QA/QC Plan, the Construction Documents and the Contract.

5.2 Construction QA/QC Plan

5.2.1 The Construction QA/QC Plan shall detail how the Concessionaire/Design-Builder will achieve the minimum requirements for Construction QA/QC set out in this Section 5. It is imperative that the Construction QA/QC Plan adequately distinguishes between the separate functions of QA and QC, as described in this Guide. The Construction QA/QC Plan shall therefore be prepared such that the requirements for QA and the requirements for QC are detailed in individual plans or in separate sections of the overall plan such that they are capable of being read independently.

5.2.2 The minimum content requirements for the initial Construction QA/QC Plan submitted at the project Kick-off Meeting are provided in Section 2.2.2.

~~5.2.2.3~~ **5.2.2.3** The minimum content requirements of the updated Construction QA/QC Plan submitted with each AFC work package are as follows:

- .1 Describe the Staffing Plan in accordance with Section 5.3.
- .2 Inspection Plan in accordance with Section 5.4.
- .3 Testing Plan in accordance with Section 5.5.
- .4 Construction Inspection Checklists in accordance with Section 5.6.

5.3 Staffing Plans

5.3.1 ~~The Concessionaire/Design-Builder's QA~~Builder shall provide a project-specific staffing plan that identifies the following:

- ~~.1 Name, position/role, organization and QC organization, including the minimum number of full-time equivalent employees, including resume of QA and QC Inspectors and Testing Technicians;~~
- ~~.2 Name, qualifications, duties, responsibilities and authority of Design Team members, with specific Construction responsible for construction QA or QC;~~
- ~~.3 Current and QC responsibilities relevant certifications for Inspectors and including an Testing Technicians;~~
- ~~.4 Anticipated number of hours on the project by both QA and QC personnel per month for the duration of construction on the project; and~~
- ~~.5 An organizational chart showing lines of authority, functional relationships and reporting responsibilities;~~

5.3.2 ~~The staffing plan shall ensure that at any time an adequate number of QA personnel are available to observe all construction operations and QC activities. If the QA and/or QC staffing level is not sufficient to provide testing and/or inspection in accordance with the contract requirements, the Design-Builder must rectify.~~

5.4 Inspection Plans

5.4.1 ~~During the design of the Project, each item of work shall be reviewed to determine what significant characteristics of the item need to be monitored/inspected during construction in the field. This review is to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. The QAM, in consultation with the Design Manager, shall develop the inspection plan for each element of the Work. Each inspection plan shall include the appropriate criteria, tests, and inspection requirements identified in the Contract and requirements as set forth herein. The inspection plans developed shall be incorporated as part of the Concessionaire/Design-Builder's Construction QA/QC Plan. The following elements shall be addressed within each work item inspection plan:~~

- ~~.1 Identification – Work items included in the plan.~~
- ~~.2 Characteristics – What characteristics of the item(s) will be inspected and to identify design team members that are required to be involved in the inspection.~~
- ~~.3 Acceptance Criteria – Directly or by reference, provide sufficient information for the inspector to use to determine if the item or activity is acceptable or not.~~
- ~~.4 Inspection – Identify QC and QA staff that will be required to perform the monitoring/inspection.~~

5.4.2 Maximum use of checklists shall be made for the purpose of QA and QC Inspection. The plan should indicate the actions to be taken for items found to be non-conforming and all the steps necessary to determine the extent of the non-conformance.

5.5 Testing Plans

5.5.1 The Concessionaire/Design-Builder shall provide to the Department a testing plan developed by the QAM for each material type that meets the minimum frequencies referenced above for separate QA (IA and IVST) and QC testing. The testing plan shall be developed using a random selection process such as ASTM D 3665 and shall reflect the estimated quantities calculated using the project drawings, specifications, and/or other design submittals. The test plan shall also include the estimated total number of QC, QAM IA, QAM VST, OIA and OVST tests required based on the estimated quantities and the required minimum and sampling testing frequencies included in this Guide. The testing plan, including quantities, sampling and testing frequencies, and testing estimates along with any assumptions made in development of the plan shall be submitted and signed by the QAM with recommendation for approval by the Department prior to the beginning of production or placement of the material. The process for tracking the delivery of each material to the site and incorporation of each material into the Work shall be identified in the testing plan for each material and documented in the Materials Notebook for the project. This includes all Buy America requirements as applicable.

5.5.2 QA and QC laboratories must be accredited by the AASHTO Accreditation Program (AAP) in the AASHTO and ASTM test methods cited in the frequency tables outlined in the attached Appendix 2, Table A-2 and Appendix 3, Table A-3. This includes any AASHTO and ASTM methods associated with the VTM test methods shown in these tables. For test methods not accredited by AAP, the laboratory must comply with AASHTO R18 (most current Edition) or ASTM C1077 (for concrete test methods), and must be approved by the Department at its sole discretion. The Department will check laboratory records and certifications prior to start of construction. This includes calibration of equipment used in the field supplied by the laboratory (i.e. concrete, asphalt, and soil test equipment).

5.5.3 The Department may elect to allow the QAM to accept small quantities of materials without normal sampling and testing frequencies. The determination to accept materials using this provision rests solely with the Department and must be provided by the Department in writing. Structural concrete will not be considered under the small quantity definition.

5.4.3.1 The Department may consider an item as a small quantity if the proposed project quantity for a specific item is less than one sub-lot or one-half of a sub-lot for mainline paving.

5.4.3.2 Factors that the Department will consider prior to use of small quantity acceptance are:

- .1 Has the material been previously approved?
- .2 Is the material certified?

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.3 Is there a current mix design or reference design?

.4 Has it been recently tested with satisfactory results?

.5 Is the material structurally significant?

5.4.3.3 Small quantity acceptance may be accomplished by visual, certification, or other appropriate methods. Acceptance of small quantities of materials by these methods must be fully documented. Documentation of materials under these methods must be provided by the QAM accepting the material. For visual documentation, an entry should be noted on field records, with a statement as to the basis of acceptance of the material and the approximate quantity involved. A separate list of items and quantities accepted on visual inspection shall be maintained by the QAM and included in the Materials Notebook.

5.6 Construction Inspection Checklists

5.6.1 The Concessionaire/Design-Builder's Construction QA/QC Plan shall include inspection checklists for all anticipated construction operations and/or processes. These checklists shall be used by the Concessionaire/Design-Builder's QA and QC inspection personnel. The individual checklists shall be approved by the Department as part of the overall approval of the Concessionaire/Design-Builder's QA/QC Plan. The checklist for each work activity shall include the construction requirements stated in the standard specifications or Contract for that work activity. As a minimum each checklist shall address the following as shown in Table 5-6:

Table 5-6: Minimum Requirements for Construction Inspection Checklists

<u>Checklist Item</u>	<u>Item Description</u>
<u>Date and Time:</u>	<u>Date and time inspection was performed</u>
<u>Location:</u>	<u>.1 Pier or structure component</u> <u>.2 Drainage Structure Number</u> <u>.3 Compaction Report (referenced to Centerline Station and Sub-grade Elevation, etc.)</u>
<u>Specification Requirement:</u>	<u>List of applicable specifications for this item</u>
<u>Frequency:</u>	<u>Indicated test or inspection frequency, if any</u>
<u>Elements or Items Inspected:</u>	<u>List of elements or items inspected</u>
<u>Conformation to Specifications:</u>	<u>Check that work and materials meet the appropriate specification/standard</u>
<u>Deficiencies Noted:</u>	<u>Note any deficiencies to specifications/standards</u>

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<u>Checklist Item</u>	<u>Item Description</u>
<u>Individual Notified:</u>	<u>Individual notified for corrective action</u>
<u>Corrective Action Noted:</u>	<u>What form of corrective action is recommended</u>
<u>Action Taken:</u>	<u>What corrective action was taken</u>
<u>Material Documentation:</u>	<u>List and attach a copy of all required documentation (test reports—such as, but not limited to, compaction, aggregate gradation, mill tests, manufacture’s certification, and catalog cut or product specifications).</u>
<u>Responsible Party Notified:</u>	<u>Name of the foreman or worker responsible for the work</u>
<u>Signature of Inspector:</u>	<u>Signature of Inspector who performed inspection</u>

5.6.2 Appendix 4 contains sample checklists for standard work items commonly used on Department Projects. The Concessionaire/Design-Builder shall confirm the completeness and suitability of the lists for the Project and shall develop the checklists for its QA/QC Plan based upon the style and format of the appended sample checklists.

- ~~.2— List by discipline the name, qualifications, duties, responsibilities and authorities for all persons, to include Design Team members, proposed to be responsible for Construction QA and QC;~~
- ~~.3— List current and relevant certifications for technicians;~~
- ~~.4— Demonstrate how QA and QC activities will be reflected in the project progress schedule integral to Work Package requirements as set forth in the Design-Build or P3 Contract;~~
- ~~.5— Produce submittal schedule integral to Work Package requirements as set forth in the Design-Build or P3 Contract;~~
- ~~.6— Detail inspection requirements, the Inspection Plans, which will include a detailed description of testing and inspection activities and frequencies that meet the minimum requirements outlined in the attached Appendix 3, Table A-3 and Appendix 4, Table A-4;~~
- ~~.7— Provide Quality Control and Quality Control sampling, testing, and analysis plan with frequencies, location and methods that meet the minimum requirements outlined in the attached Appendix 3, Table A-3 and Appendix 4, Table A-4. Include a description of how random locations for testing and sampling are determined;~~
- ~~.8— Describe procedures for instrumentation and survey monitoring for verification of the performance of the project geotechnical and pavement features;~~

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- ~~.9 Describe procedures for load testing and integrity testing required to verify adequacy of the foundation capacity, soil reinforcement elements, or adequacy of ground stabilization or as otherwise set out in the Contract;~~
- ~~.10 Identify the accredited laboratory(ies) to be used for each type of testing;~~
- ~~.11 Provide current and relevant certifications for each test the laboratory will perform. Laboratory certifications for each test method applicable to the project shall be maintained for the entire duration of the project and confirmed by the QAM prior to submission of each Work Package;~~
- ~~.12 Specify documentation for QA and QC activities; and~~
- ~~.13 Demonstrate procedures to meet the Department's requirements for corrective action when Quality Assurance and/or Quality Control criteria are not met. For example, demonstrate how non-compliant material will be addressed at the construction site before placement.~~

5.35.7 Preparatory Inspection Meetings

~~**5.3.15.7.1** Prior to the start of any work activity the Concessionaire/Design-Builder shall hold a Preparatory Inspection Meeting to ensure that all project personnel have a thorough understanding of the upcoming ~~work~~Work. The purpose of the Preparatory Inspection Meeting is to ~~provide~~facilitate coordination and communication between the Concessionaire/Design-Builder's production personnel, the appropriate Design Team members, QC personnel and the ~~QAM's~~QA personnel, as well as the Department's (Owner's) Independent Assurance (OIA) and Verification Sampling and Testing (OVST) personnel. Work activities and/or Work Packages should generally correspond to the sections of the Department's Standard Road and Bridge Specifications. The Construction Manager, QAM, Quality Control Manager (if applicable), and appropriate QC testing technicians, QC inspectors, QA testing technicians, and QA inspectors that will be involved in the QA and QC of the Work shall attend the Preparatory Inspection Meeting.~~

~~**5.7.2** Prior to the start of each work activity, the QAM shall identify the QA Inspector(s) and Testing Technician(s) by name and provide a detailed matrix for each type of inspection and testing required illustrating each technician's qualifications/certifications and respective inspection(s) and test(s) that is (are) to be performed. The QAM shall also identify the Department's testing and inspection requirements that are to be performed for each work activity. The Concessionaire/Design-Builder Construction Manager or QCM shall coordinate with the QAM and identify the QC Inspectors and Testing Technician(s) prior to the start of each Work Package and provide a detailed matrix for each type of inspection and testing required illustrating each technician's qualifications/certifications and respective inspection(s) and test(s) that is (are) to be performed. The matrix shall also identify any design personnel that may be required (such as the Lead Geotechnical Engineer or qualified representative) and the inspections and/or tests to be performed by the respective design personnel. These qualification matrices shall be submitted to the Department's Project Manager for review and approval and transmitted to all parties prior to the start of each Work Package.~~

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5.3.25.7.3 The Preparatory Inspection Meeting shall be led by the QAM and shall not be delegated to others. The Preparatory Meetings shall include discussions of what will be accomplished, by whom it will be performed, and where, when, and how the work will be ~~done-performed by the contractor, testing technicians, and inspectors. This shall include reviewing the inspection plan for each element of the Work, the testing plan for each material to be incorporated into the Work, all relevant construction inspection checklists, and the list of any QA and QC laboratories that will be involved in the materials testing process.~~ The Preparatory Inspection Meetings are to ensure that all parties have the same understanding of the design intent and to confirm the completeness and suitability of the plans. These inspection meetings also ensure that all parties have the appropriate approved for construction plans, specifications, manufacturer or vendor requirements, and any special details and/or submittals. Any safety regulations and procedures that need to be followed should be addressed at this meeting. At this time, the QA (IA and IVST) and ~~or~~ QC-approved inspection checklists for the specific work package or activity shall be reviewed to confirm completeness and suitability.

5.3.35.7.4 The Preparatory Inspection Meeting shall be ~~completed just~~ held no more than two weeks prior to the beginning of the scheduled activity once all associated plans have been approved for construction and all permits required to complete the Work have been obtained; all preliminary documents shall be reviewed as outlined in Appendix ~~32~~, Table A-~~32~~ and Appendix ~~43~~, Table A-~~43~~. The ~~Department's OIA and OVST personnel~~ Department, including the National Pollutant Discharge Elimination System (NPDES) Coordinator and assigned Environmental Compliance Inspector (ECI), shall be invited to attend the Preparatory Inspection Meetings but are not required to at least seven (7) days prior to the meeting and a representative(s) for the Department will attend. The meetings shall be planned and conducted by the QAM who, in turn, shall arrange for minutes of the meeting to be taken to document any actions, clarifications and understandings related to the construction of the item or definable feature of work that may not otherwise be clearly documented elsewhere. Meeting minutes will be distributed for comment and approval within two (2) business days to all attendees, the Department's Project Manager and Department's OIA and OVST personnel even if they are not present. Minutes shall be ~~reviewed and~~ finalized no later than ~~two (2)~~ five (5) business days after the meeting ~~or as otherwise stipulated in VDOT Special Provision for Project Communication and Decision Making (S100B00-0708). A copy and prior to start of Special Provision S100B00-0708 is provided in Appendix 5 associated Work activities.~~ Preparatory Inspection Meetings are classified as Hold Points and shall be identified in the Concessionaire/Design-Builder's QA/QC Plan and in the CPM Schedule. Finalized minutes from each Preparatory Inspection Meeting shall be appended to the Construction QA/QC Plan.

5.45.8 Concessionaire/Design-Builders QA and QC Inspections

5.4.15.8.1 The Concessionaire/Design-Builder shall provide both Quality Assurance and Quality Control inspections for all work activities and Work Packages for conformance with the construction requirements in the Construction and Contract Documents.

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~~5.4.25.8.2~~ Both the QA (IA and IVST) and QC components of the Construction QA/QC Plan shall contain separate inspection plans for each construction work item included in the Project ~~whether performed by the Concessionaire/Design Builder or a subcontractor or vendor.~~ Work items shall be definable features or items of work meeting the requirements set forth in the Design-Build or P3 Contract.

~~5.4.35.8.3~~ The Construction QA/QC Plan shall use industry standard inspection procedures as well as those outlined in the Department's Construction Manual, Inspection Manual, Materials Manual of Instruction, Road and Bridge Standard Specifications, Survey Manual, Construction Documents, Contract and the minimum requirements outlined in the attached Appendix ~~32~~, Table A-~~32~~ and Appendix ~~43~~, Table A-~~43~~.

~~5.4.4~~ ~~During the design of the Project, each item of work shall be reviewed to determine what significant characteristics of the item need to be monitored during construction in the field. This review is to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. The inspection plans shall include the appropriate criteria, tests, and inspection requirements identified in the Contract and requirements as set forth herein. The following elements shall be addressed within each item inspection plan:~~

~~1 Identification Work items included in the plan.~~

~~2.1 Characteristics What characteristics of the item(s) will be inspected and to identify design team members that are required to be involved in the inspection.~~

~~3.1 Acceptance Criteria Directly or by reference, provide sufficient information for the inspector to use to determine if the item or activity is acceptable or not.~~

~~5.4.51.1.1 Maximum use of checklists shall be made for the purpose of QA and QC Inspection. The plan should indicate the actions to be taken for items found to be non-conforming and all the steps necessary to determine the extent of the non-conformance.~~

~~5.4.65.8.4~~ Inspections shall be performed during all phases of the Project from Notice to Proceed to Final Acceptance in order to assure that the work meets, and is being performed in accordance with Construction Documents and the Contract.

~~5.4.75.8.5~~ Appropriate follow-up inspections, sampling and testing of materials shall be performed to satisfy, at a minimum, the frequencies shown in Appendix ~~32~~, Table A-~~32~~ and Appendix ~~43~~, Table A-~~43~~ as each item of work progresses to assure consistency in workmanship, compliance with contract requirements including design and Construction Documents, and to assure satisfactory performance of the work in service.

~~5.55.9~~ Concessionaire/Design-Builder QA and QC Sampling and Testing

~~5.5.15.9.1~~ The Concessionaire/Design-Builder field and laboratory sampling and testing shall be performed at frequencies specified in the minimum requirements outlined in Appendix ~~32~~, Table A-~~32~~, the Department's current Standard Road and Bridge Specifications, Special Provisions, and the Materials Manual of Instruction and other

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documents as appropriate and approved by the Department and/or as otherwise specified in the Contract. Sampling and testing shall be performed by qualified testing personnel as defined in Section 3 of this Guide. Concessionaire/Design-Builder QA sampling and testing shall consist of both Independent Assurance (QAM IA) and Verification Sampling and Testing (QAM VST).

~~**5.5.25.9.2** The Concessionaire/Design-Builder shall furnish~~submit~~ copies of QA (IA and IVST) and QC test results to electronically into the ~~Department's Project Manager or other authorized Department representative~~project's designated document management system within 24 ~~hours~~ of ~~completing the test result of the acquired sample or the next day of business.~~ The Department Project Manager or authorized Department representative may allow submissions electronically.~~completion.~~~~

~~**5.5.3** The Concessionaire/Design-Builder shall provide to the Department a testing plan for each material type that meets the minimum frequencies referenced above for separate QA (IA and IVST) and QC testing. The testing plan shall be developed using a random selection process such as ASTM D 3665 and shall reflect the proposed total project quantities as may be calculated in the project drawings, specifications, and/or other design submittals. The test plan shall also include the estimated total number of QC, QAM IA, QAM VST, OIA and OVST tests required based on the calculated quantities. The testing plan, including quantity and testing estimates shall be submitted and approved by the QAM with recommendation for approval by the Department prior to the beginning of production or placement of the material.~~

~~**5.6** Concessionaire/Design-Builder QA and QC Laboratories~~

~~All sampling and testing shall be performed by a laboratory that is accredited in the applicable AASHTO procedures by the AASHTO Accreditation Program (AAP). For test methods not accredited by AAP, the laboratory must comply with AASHTO R18 (most current Edition) and must be approved by the Department at its sole discretion.~~

~~**5.7.5.10** Records~~

~~**5.7.15.10.1** The Concessionaire/Design-Builder shall prepare separate test reports for QA (IA and IVST) and QC activities, meeting the requirements of AASHTO R18, ASTM C1077, or may use the current appropriate Department forms. The Concessionaire/Design-Builder shall also prepare, maintain, and submit to the Department's Project Manager completed test records and final materials certification in accordance with the requirements of these Minimum Requirements for QA (IA and IVST), QC and the Department's Construction Manual, and Materials Manual of Instruction.~~

~~**5.8.5.11** Department's Independent Assurance (OIA) and Verification Sampling and Testing (OVST)~~

~~**5.8.1** The Concessionaire/Design-Builder's laboratory shall participate in the Department's Independent Assurance and Verification Sampling and Testing Program. Findings of all Independent Assurance observations and test results will be provided to~~

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~~the QAM by the Department's Project Manager. Failing test results will be communicated immediately to the QAM by the Department's Project Manager or designated authorized representative. The Concessionaire/Design-Builder shall immediately take corrective action to resolve any noted deficiencies.~~

5.8.25.11.1 Department's Independent Assurance (OIA) and Owners Verification Sampling and Testing (OVST) will be performed by the Department to validate Concessionaire/Design-Builder QA/QC sampling and testing program. The results of the Department's OIA and OVST observations and testing will be provided to the QAM by the Department's Project Manager. Failing tests will be communicated immediately to the QAM by the Department's Project manager or designated authorized representative. The Concessionaire/Design-Builder shall immediately take corrective action to resolve any noted deficiencies in accordance with Section 5.12 of this Guide.

5.11.2 An Owner system based approach will be used for Owner Independent Assurance on concrete and soils instead of attempting to track quantities of asphalt, concrete and aggregate/soils placed. Owner Verification Sampling and Testing (OVST) will be based on quantities of material placed. Guidance regarding the Department's system based IA approach is provided in Materials Memorandum MD 414-18.

5.8.35.11.3 The Department shall hold final authority for determining the acceptance of materials and workmanship incorporated into the Project. The acceptance decision will consider;

- .1 Results of Concessionaire/Design-Builder QA (IA and IVST) and QC sampling and testing at specified frequencies and locations,
- .2 The Department's Independent Assurance (OIA) and Verification Sampling and Testing (OVST) at specified frequencies and locations,
- .3 Inspection by the Department of the attributes and processes that may affect the quality of the finished product, and
- .4 Any dispute resolution procedures to resolve discrepancies between the Department's Verification Sampling and Testing and the Concessionaire/Design-Builder sampling and testing.

5.95.12 **Resolution of Discrepancies in Test Results**

5.9.15.12.1 If a discrepancy in the test results occurs, a cooperative effort by the Department and the Concessionaire/Design-Builder to identify the cause of the non-specification material or the discrepancy in the test results will include the following actions:

- .1 Check of test data, calculations and results;
- .2 Observation of the Concessionaire/Design-Builder's sampling and testing by the Department's Project Manager; and
- .3 Check of test equipment by the Department's Project Manager.

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5.9.25.12.2 When the source of test result discrepancies between the Concessionaire/Design-Builder and the Department’s laboratories cannot be resolved, a referee split sample shall be obtained and tested; this work will be performed ~~by~~for the Department utilizing an independent laboratory. The testing of the sample will be performed in duplicate by the independent laboratory without knowledge of the specific project conditions such as the identity of the Concessionaire/Design-Builder, the test results of the Department or Concessionaire/Design-Builder, or the specification targets. The results of these tests will be binding on both the Concessionaire/Design-Builder and the Department. The Concessionaire/Design-Builder or its representative may witness the testing if requested. Costs incurred for referee testing will be paid by the party found in error, at the established laboratory rates.

5.9.35.12.3 A comparison of tolerances which will trigger the referee and disputes processes ~~is~~are summarized in **Table 5-1.12**. Some of the referee procedures are presented in the Materials Manual of Instructions.

Table 5-112: Comparison Tolerances for Testing

Test	IA Comparison Tolerance	Source
Soil/Aggregate Wet Density using Nuclear gauge in Direct Transmission	Soil—2.1 pcf Subbase—3.0 pcf Aggregate Base—3.0 pcf	Values adjusted from AASHTO T-310
Soil/Aggregate Density using Sand Cone	2.0 pcf	Values adjusted from ASTM D1556
Soil/Aggregate Moisture using Nuclear gauge (backscatter)	Soil—2.1 pcf Subbase—3.0 pcf Aggregate Base—3.0 pcf	Values adjusted from AASHTO T-310
Soil/Aggregate Moisture determined by oven dry	14% difference*	ASTM D2216
One Point Proctor – density Lab Proctor – density	4.5 pcf 4.5 pcf	AASHTO T-99
One Point Proctor - moisture	15% difference*	AASHTO T-99
Concrete Slump	0.82 inch for 1” to 2” slump 1.10 inch for 3” to 4” slump 1.50 inch for 5” to 6” slump	ASTM C143
Concrete Air	0.8% points using Pressure Method 32% difference using Volumetric Method	ASTM C231 ASTM C173
Concrete	2 degrees F	ASTM C 1064

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Test	IA Comparison Tolerance	Source
Temperature		
Concrete Unit Weight	2.31 pef	ASTM C138
Concrete Permeability	51% difference*	VTM 112
Concrete Strength—Single Operator Concrete Strength—Multiple Operators	<p>8%* Percent difference on calculation shall be % diff ≤ (Absolute Value [W₁-W₂] / ((1/2) * (W₁+W₂))) * 100</p> <p><u>IA Comparison Tolerances for Soils and Aggregate Density and Depths are listed in the average Material Manual of 3 cylinders Instruction (MOI) Chapter III (MD 416-18); IA Comparison Tolerances for Hydraulic Cement Concrete tests are listed in the Materials MOI Chapter IV (MD 414-18); IA Comparison Tolerances for Bulk Specific Gravity on identical cores taken from asphalt pavement are listed in the Materials MOI Chapter V.</u></p> <p><u>15% difference on the average of 3 cylinders Tolerances for asphalt concrete and hydraulic cement concrete pavement shall be in accordance with Sections 315.07 and 316.06 (k) of the VDOT Road and Bridge Specifications, respectively.</u></p> <p><u>Gradation and depth check tolerances for cold central plant recycling material (CCPRM), full depth reclamation (FDR), and cold in-place recycling are provided in the Contract Documents, if applicable.</u></p>	Values adjusted from ASTM C39
Asphalt Bulk Specific Gravity Identical plug/core Plug/core split sample (close proximity)	<p>Less than 0.015</p> <p>Less than 0.030</p>	Values adjusted from AASHTO T-166
<p>* Percent difference calculation shall be % diff ≤ ((absolute value[W₁-W₂]) / ((1/2) * (W₁+W₂))) * 100</p>		

5.9.45.12.4 The testing of referee samples to resolve disputes will be performed as set forth in the Section 5.912.2. In addition to its testing responsibilities, the Department will also perform ~~Owners~~Owner Independent Assurance and Owner Verification Sampling and Testing inspections as outlined in Appendix ~~32~~, Table A-~~32~~ and Appendix ~~43~~, Table A-~~43~~. The QAM will resolve QAM IA and QAM VST discrepancies with QC. The Department will resolve OIA and OVST discrepancies with the QAM. This represents a Hold Point until the discrepancy is resolved.

5.9.55.12.5 Any material deemed unacceptable shall be handled in accordance with Section 5.~~42~~15 of this Guide.

5.105.13 Quality Assurance Auditing and ~~Noneonformance~~Nonconforming Work Recovery Plan Requirements

5.13.1 The Concessionaire/Design-Builder shall establish and maintain a Quality Assurance Auditing and ~~Noneonformance~~Nonconforming Work Recovery Plan (AR Plan) for uniform reporting, controlling, correction~~and~~, disposition, and resolution of ~~noneonformance~~nonconforming Work (including disputed nonconforming ~~items~~Work) issues that may arise on the Project. ~~The Concessionaire/Nonconforming Work is any Work performed by the Design-Builder's AR Plan shall establish a process for review and disposition of nonconforming workmanship, material~~Builder that is not in compliance with contract requirements and may include, but is not limited to, design, R/W, utility relocation, equipment or other, materials, construction means and methods, quality control, quality assurance, and design elements of the Work including the submittal Design Review process.~~project management.~~ The AR Plan shall specifically address a recovery plan to ~~increase~~:

5.10.1.1 Increase QA (IA and IVST) and QC testing frequencies for tests that fail to meet comparison tolerances as set forth in Table 5-~~12~~.

.2 Investigate the cause of nonconforming Work and the corrective action needed to prevent recurrence (such as increased sampling and testing frequencies, etc.).

.3 Analyze all processes, work operations, concessions, quality records, service reports, and audits necessary to detect and eliminate potential causes of nonconforming Work.

.4 Initiate preventive actions to deal with problems at a level corresponding to risks/deficiencies encountered.

.5 Apply controls to ensure that effective corrective actions are taken.

.6 Implement and recording changes in procedures resulting from corrective action.

5.10.25.13.2 Further, the AR Plan shall clearly delineate the Concessionaire/Design-Builder's procedures for addressing construction and design deficiencies in the Work and shall also ~~address submittal~~ register submissions which have been delayed by more than 60 days, or are undergoing more than two submissions. The Concessionaire/Design-Builder's deficient work, delays of submissions, and/or repetitively-revised submissions

shall be addressed in such a manner as not to cause additional oversight by the Department.

~~5.10.35.13.3~~ In addition to the requirements outlined in Part 4, Section 2.10 or as otherwise set out in the Comprehensive Agreement for P3 projects, the Concessionaire/Design-Builder's AR Plan shall include recovery measures necessary to commence correction of such nonconforming Work, including the correction, removal or replacement of the nonconforming Work and any damage caused to other parts of the Work affected by the nonconforming Work, at no additional cost to the Department. The timing for the recovery plan submission shall be in accordance with the requirements of Part 4, Section 2.10.2 or as otherwise set out in the Comprehensive Agreement for P3 projects.

~~5.10.45.13.4~~ Where ~~deficiencies in the Work~~ nonconforming work can be corrected, in accordance with the design approved by the Engineer of Record, the QAM or designee shall cause performance of such corrective action as ~~is~~ appropriate. Re-tests or re-inspections shall be made by the QAM or designee to determine the acceptability of the materials after corrective measures have been taken. ~~The cost of removing, replacing or correcting defects in the materials will be the sole responsibility of the Concessionaire/Design Builder at no additional cost to the Department. The cost of repairing or replacing other materials~~ accordance with VDOT, or Work damaged by the removal, replacement or in absence therein, industry standards (i.e. ACI, AISC, etc.). Nonconforming Work that is correctable by established means and methods and complies with the contract requirements upon correction of defects in the workmanship and materials shall be considered a Deficiency and documented in a Deficiency Log. Nonconforming Work that is not correctable, such as safety or environmental permit violations, shall be considered a Nonconformance, issued a Nonconformance Report and documented in a Nonconformance Log. In addition, Deficiencies that do not have a corrective action plan agreed upon by the Department at the time of the subsequent application for payment shall be considered a Nonconformance, issued a Nonconformance Report, and documented in the Nonconformance Log. Any items identified as active on the sole responsibility of the Concessionaire/Design Builder at no additional cost to the Department Nonconformance Log shall be ineligible for payment.

5.14 Control procedures Procedures for Reporting and Documenting Nonconforming Work

~~5.10.55.14.1~~ The Construction QA/QC Plan shall provide for identification, evaluation, segregation and, when practical, disposition of nonconforming ~~material, equipment or other elements of the Work~~ and for notification to the ~~Concessionaire/Design-Builder's Project Manager, the Department Project Manager and all personnel involved in the affected Work. The responsibility for review and for the disposition of nonconforming material, equipment or other Work shall be as established by the Construction QA/QC Plan~~ Work and at a minimum shall provide for the following:

- ~~1 Nonconformance Procedures~~ Maintain and use procedures that define methods and responsibilities for identification, documentation, control, and processing of

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~~nonconforming items. A nonconformance exists when equipment, parts, materials or services exhibit deficiency in physical characteristics, functional performance, or documentation. Apply nonconformance procedures to all items, including actions associated with installation and construction which fail to conform as specified or to other product descriptions. Develop a Nonconformance Report (NCR) form to document and provide the following information:~~

.1 Deficiency Log – A deficiency log that describes, at a minimum, the deficiency, location, date of occurrence, corrective action narrative, and date of correction shall be utilized to enable tracking of deficiencies. All deficiencies, even those corrected the same day, shall be included within the log for purposes of recognizing systematic quality-related issues. Entries shall include necessary information to trace deficiencies back to initial documentation and to summarize status. The QAM or designee shall be responsible for maintaining the deficiency log throughout the duration of the project. Delegation of the maintenance of the deficiency log shall not relieve the QAM of responsibility for the accuracy of the deficiency log. The log shall be a living document accessible for Department review at all times and shall be included with each monthly report submittal.

.2 Nonconformance Report and Log – The Nonconformance Report and Notification Log provided in Appendix 4 shall be utilized to enable tracking of Nonconformances. Include necessary information to trace nonconformance back to initial documentation and to summarize status. The QAM shall be responsible to maintain the Nonconformance Log throughout the duration of the project and provide for the Department’s review along with the monthly application for payment. Among other items, the Nonconformance Report (NCR) shall document the following information:

- .1 Identification of ~~nonconformances~~ nonconformance and date of occurrence
- .2 Documentation
- .3 Evaluations/Recommendations
- .4 Separation/removal/tagging
- .5 Recommendation for “repair” or “use as is” dispositions
- .6 Cause of nonconformance
- .7 Proposed corrective action to prevent recurrence
- .8 Responsibility for accomplishing corrective action
- .9 Schedule for resolution (due date for correction)

~~.2 Nonconformance Log – Develop and maintain Nonconformance Log to enable tracking of nonconformances. Include necessary information to trace nonconformance back to initial documentation and to summarize status.~~

.3 Reports and Disposition – RespondThe QAM shall respond to all Nonconformances by the NCRs by date specified on NCR and include investigative actions, causes of ~~nonconformances~~ Nonconformances, how ~~nonconformances~~ Nonconformances were

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disposed, and corrective actions taken. Dispositions of “use as is” and “repair” for nonconforming items require review and acceptance by the Department Project Manager and concurrence by the Concessionaire/Design-Builder Design Manager and the QAM.

.4 Status Tags – Define procedures for controlling use, logging, installation, and authorized removal of status tags. ~~Authorization for removal can be approved only by originator of NCR or that person’s supervisor and the QAM, and only when demonstrated that nonconforming item meets acceptance criteria or has been reviewed and Accepted for use by the Department Project Manager. Unauthorized removal of nonconformance status tags is prohibited.~~ to track the correction of Deficiencies and Nonconformances.

.5 Corrective and Recovery Action – ~~The Construction QA/QC Plan shall establish and maintain written procedures for:~~

- ~~.1 Investigating the cause of nonconforming material, equipment or other elements of the Work and the corrective action needed to prevent recurrence (such as increased sampling and testing frequencies, etc.)~~
- ~~.2 Analyzing all processes, work operations, concessions, quality records, service reports, and audits to detect and eliminate potential causes of nonconforming material, equipment or other elements of the Work~~
- ~~.3 Initiating preventive actions to deal with problems at a level corresponding to risks/deficiencies encountered~~
- ~~.4 Applying controls to ensure that effective corrective actions are taken~~
- ~~.5 Implementing and recording changes in procedures resulting from corrective action.~~

5.11.15 Correction of Nonconforming Work

5.11.15.1 Any ~~deficient condition~~ Nonconforming Work, whether the result of poor workmanship, use of materials containing defects, damage through carelessness, or any other cause, ~~found by, or disclosed to, the QAM and/or Department~~ shall be removed and replaced by ~~with~~ work and materials which conform to the Construction and Contract Documents or shall be remedied ~~unless otherwise as~~ agreed upon by the Department as noted in Section 5.11.15.2 of this Guide. ~~Upon failure on the part~~ In accordance with Part 4, Section 2.10.2 of the Concessionaire/Design Builder to comply promptly with any order to remedy, remove or replace Work which is nonconforming or contains defects, the Department will notify the QAM that payment shall be withheld not only for that portion of the Work in nonconformance, but for that portion of the quality plan Work Package shown in the CPM schedule. The Department Contract, the Department Project Manager may also cause such ~~nonconforming~~ Nonconforming Work ~~or deficiency~~ to be remedied or removed and replaced by separate contractors employed by the Department at the Concessionaire/Design-Builder’s expense. In such event, the costs of such removal,

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remediation and replacement shall be deducted from any monies due or to become due the Concessionaire/Design-Builder under the Contract.

~~5.11.25.15.2~~ In the event the QAM and/or Department finds, as a result of monitoring of the Concessionaire/Design-Builder quality assurance and quality control activities, that any materials, equipment or the finished product in which materials, equipment or finished product are used are not in conformity with the Construction Documents and Contract requirements, the ~~The~~ Department may elect ~~in~~at its sole discretion to accept ~~otherwise unacceptable~~ Nonconforming Work at a reduced price ~~and/or extended warranty~~. If the Department determines that the Nonconforming Work should be accepted, the Concessionaire/Design-Builder may be required by the Department to initiate a deductive Work Order request which will provide for an appropriate adjustment in the Contract Price in accordance with Part 4, Section 9.4. For P3 projects, payment shall be made to the Department.

~~5.11.35.15.3~~ In making a determination on the acceptability of ~~nonconforming work~~ Nonconforming Work the Department reserves the following rights:

- .1 Right of Rejection – If damage, defect, error, or inaccuracy is found in any specified item or Work, the Department has the right to put the Concessionaire/Design-Builder on notice of corrective action to bring ~~item or the~~ Nonconforming Work into conformance with the Construction and Contract Documents.
- .2 Correction Costs – Costs incurred in correcting rejected ~~items or~~ Nonconforming Work will be borne by the Concessionaire/Design-Builder. ~~Remove rejected items from the Project unless in-place correction is reviewed and accepted by the Department or as noted in Section 5.11.2.~~
- .3 Investigative Costs – The Department may require the Concessionaire/Design-Builder to provide test apparatus and labor ~~to~~ so the QAM and/or Department may investigate, inspect, and test ~~defective~~ Nonconforming Work ~~or nonconforming materials. Correct deficiencies if Work or materials are in nonconformance. Any~~ investigative costs shall be borne by the Concessionaire/Design-Builder.
- .4 Negative Price Adjustment – The Department may require the Concessionaire/Design-Builder to initiate a deductive Work Order request which will provide for an appropriate adjustment in the Contract Price.

~~5.11.45.15.4~~ If the Department so directs at any time prior to Final Acceptance, the Concessionaire/Design-Builder shall remove or uncover such portions of the finished Work as may be directed, ~~for reasons including, but not limited to, lack of material documentation or an insufficient amount of QC or QA tests and/or inspection.~~ After examination, the Concessionaire/Design-Builder shall restore such portions of the Work to the standards required by the Construction and Contract Documents. Any costs associated with removing or uncovering Work shall be borne by the Concessionaire/Design-Builder.

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~~5.11.5~~ Should the Work thus exposed or examined prove acceptable the Concessionaire/Design Builder may submit a Work Order for an adjustment in the Contract Price and, if appropriate, Contract Time for the Work subject to, and in accordance with, Changes in the Work, for the uncovering or removing and replacing of the covering or making good of the finished Work. Should the Work so exposed or examined prove unacceptable, the uncovering or removing and replacing or satisfactorily improving shall be at the Concessionaire/Design Builder's sole expense and time.

5.12—Rejected Material

~~5.12.1~~ The following actions shall be undertaken with regard to defective materials:

- ~~.1~~ Rejected by Concessionaire/Design Builder (QAM IA, QAM VST or QC): The Concessionaire/Design Builder shall remove any defective material and replace it with new material at no additional cost to the Department. Any such new material shall be sampled, tested and statistically evaluated for acceptance in accordance with the Concessionaire/Design Builder's Construction QA/QC Plan.
- ~~.2~~ Rejected by the Department (OIA or OVST): The Concessionaire/Design Builder may remove any defective material and replace it with new material at no additional cost to the Department. The Department may elect in its sole discretion to accept otherwise unacceptable material at a reduced price. If the Department determines that the material should be accepted, the Concessionaire/Design Builder may initiate a deductive Work Order request which will provide for an appropriate adjustment in the Contract Price in accordance with Part 4, Section 9.4. For P3 projects, payment shall be made to the Department.

5.13—Non-Statistical Acceptance of Small Quantities of Materials

~~5.13.11.1.1~~ The Department may elect to allow the QAM to accept small quantities of materials without normal sampling and testing frequencies. The determination to accept materials using this provision rests solely with the Department. Structural concrete will not be considered under the small quantity definition.

~~5.13.25.4.3.1~~ The Department may consider an item as a small quantity if the proposed project quantity for a specific item is less than one sub lot or one half of a sub lot for mainline paving.

~~5.13.35.4.3.1~~ Factors that the Department will consider prior to use of small quantity acceptance are:

- ~~.1~~ Has the material been previously approved?
- ~~.2~~ Is the material certified?
- ~~.3~~ Is there a current mix design or reference design?
- ~~.4~~ Has it been recently tested with satisfactory results?
- ~~.5~~ Is the material structurally significant?

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~~5.13.4 Small quantity acceptance may be accomplished by visual, certification, or other appropriate methods. Acceptance of small quantities of materials by these methods must be fully documented. Documentation of materials under these methods must be provided by the QAM accepting the material. For visual documentation, an entry should be noted on field records, with a statement as to the basis of acceptance of the material and the approximate quantity involved. A separate list of items and quantities accepted on visual inspection shall be maintained by the QAM.~~

5.145.16 _____ Witness and Hold Points

5.16.1 Witness and Hold Points shall be established where notification of the Department and/or the Concessionaire/Design-Builder's design team (for elements of a project that require design team members certification prior to continuation of Work), ~~where applicable,~~ is required for observing or visually examining a specific work operation or test.

5.16.2 Witness Points are points identified within the Construction QA/QC Plan and CPM schedule which require notification of the Department and/or design team, ~~where applicable.~~ Work may proceed beyond a Witness Point with or without participation by the Department provided proper notification has been given. However, Work shall not proceed until certification from the required design team member is obtained.

5.14.15.16.3 Hold Points are mandatory verification points identified within the Construction QA/QC Plan and CPM schedule beyond which work cannot proceed until mandatory verification is performed and a written release is granted by the Department. Witness and Hold Points shall be identified in the Construction QA/QC Plan and CPM schedule where critical characteristics are to be measured and maintained, and at points where it is nearly impossible to determine the adequacy of either materials or workmanship once work proceeds past this point.

5.155.17 _____ Witness and Hold Point Coordination

5.15.15.17.1 The QAM shall designate a primary point of contact for ~~notifications for inspection notifying the Department~~ at Hold Points and Witness Points. ~~An alternate individual may be designated to function in this capacity in his/her absence.~~ For ~~Witness and Hold points where the Department's involvement is required,~~ the Department's Project Manager or designee will ~~be designated to handle~~ provide responses to the Concessionaire/Design-Builder with written reports or releases.

5.15.25.17.2 The time necessary to respond to the notification for inspection at Hold and Witness Points shall be no less than three (3) business days, specifically stated in the Construction QA/QC Plan, mutually agreed to by both the Concessionaire/Design-Builder and the Department, and incorporated in the Design-Builder's CPM schedule.

5.165.18 _____ Hold Points – Minimum Requirements

5.16.15.18.1 Project-specific Hold Points may be identified in the Construction and Contract Documents. In addition, the Concessionaire/Design-Builder shall identify all Preparatory Inspection meetings, Design Development Services submissions as identified

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in Part 4, Section 2.4, or as otherwise set out in the Comprehensive Agreement for P3 projects; Environmental submittals, Certifications ~~and~~, Permits, ~~and~~ Governmental Approvals ~~as Hold Points and shall identify and~~ other Hold Points shall be identified in ~~the~~ Construction QA/QC Plan to allow the Department to perform its OIA and/or OVST functions as identified in Appendix 2, Table A-2 and Appendix 3, Table A-3 and Appendix 4, Table A-4 and to allow design team certification, where applicable. Among other things, this shall include survey stakeout and environmental delineation prior to beginning construction, installation of erosion and sediment control measures prior to beginning grading activities, proof rolling and approval of subgrade prior to placement of aggregate base or subbase stone, and the placement of reinforcement steel prior to concrete pours.

5.175.19 Witness Points – Minimum Requirements

5.17.15.19.1 Project-specific Witness Points may be identified in the Construction and Contract Documents. In addition, the Concessionaire/Design-Builder shall identify other Witness Points in its QA/QC Plan to allow the Department to perform its OIA and/or OVST functions as identified in Appendix ~~32~~, Table A-~~32~~ and Appendix ~~43~~, Table A-~~43~~.

5.185.20 Performance Verification of Project Geotechnical Elements/Features

5.18.15.20.1 The Construction QA/QC Plan shall include QC inspection and verification tests to be performed by the Concessionaire/Design-Builder's geotechnical engineer of record (or his/her designated representative that is qualified to review geotechnical elements and develop a report for the geotechnical engineer to use for certification purposes). During construction the geotechnical engineer of record shall determine the integrity of foundation structures and other geotechnical elements and to verify that their performance is as anticipated from the design and other geotechnical requirements as set forth in the specifications, special provisions, technical requirements, or as otherwise included in the Construction and Contract Documents. This shall include, but not be limited to slopes/embankments, foundation and pavement subgrade, installation and load testing of deep foundations, installation and monitoring of instrumentation, assessment and treatment for potential weak or unsuitable soils, rock excavation/slopes, and retaining structures that include tie-backs, soil nails, or anchors.

5.20.2 The Concessionaire/Design-Builder's geotechnical engineer ~~shall~~ certify whether of record shall identify the elements of the project in which the geotechnical engineer (or his/her qualified representative) is required to monitor/inspect during construction to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. These items shall be included as part of the Concessionaire/Design-Builder's inspection plan outlined in Section 5.4 of this Guide. In conjunction with the QAM, the geotechnical engineer shall develop an inspection and testing plan prior to initiating each work activity. Inspection of geotechnical elements shall not be delegated to production QC Inspectors.

5.20.3 The Concessionaire/Design-Builder's geotechnical engineer shall:

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- .1 Certify that the Work was subjected to the necessary testing and inspection requirements, ~~whether;~~
- .2 Certify that its representatives were qualified by education, experience and training to conduct the referenced activities, ~~shall note;~~
- .3 Note any non-compliance issues,; and ~~shall certify whether~~
- .4 Certify that the Work ~~is deemed acceptable or unacceptable.~~ meets specifications.

~~5.18.25.20.4~~ The ~~QAM's summary reports~~ Concessionaire/Design-Builder's monthly status report to the Department shall include the ~~Concessionaire/Design-Builder's~~ geotechnical engineer's certification of completed Work.

5.19.5.21 Plant Manufactured Materials Acceptance

5.19.15.21.1 The Concessionaire/Design-Builder shall identify to the Department any and all off-site fabricated materials such as structural steel, prestressed concrete beams and posts, traffic signal poles, light poles, sign structures, bridge rails, ancillary structures, bearing pads and any items from producers not in an existing Department QA/QC program. Precast Concrete structure and pipe producers must be on existing approved lists #34, #25, #26 or #42. The inspection of project-specific fabricated items will be accomplished by the Department using its own forces and/or Department agent. To facilitate these inspections, the Concessionaire/Design-Builder will promptly notify the Department of the intended fabricator and provide two copies of the Approved Shop Drawings. In addition, the Concessionaire/Design-Builder shall submit a Source of Materials, Form C-25, for those materials the Department retains responsibility for testing. An advanced notice of at least one month shall be provided to allow the Department in order to ~~conduct~~ set up on-site ~~acceptance of the inspection at a Plant into the~~ or fabricator not having an inspection contract with the Department's approved QA/QC program, with the exception of Precast Concrete Structures, which shall require a minimum of three months advanced notice. Precast structures section. Structural steel fabricating facilities/shops must be AISC certified. Prestressed concrete facilities must be PCI certified plants. Precast concrete and concrete pipe producers must be within 200100 miles of Virginia's border to and be considered for on list #34 at the time of contract award.

5.19.25.21.2 Unless otherwise noted, the Department, using its own resources, will provide quality assurance inspection and/or testing of off-site fabricated materials listed in **Table 5-221**.

Table 5-221: Testing of Materials by the Department for Off-Site Plant QA Programs

Item	Point of Contact
Prestressed Concrete Structural Elements (beams, girders(AASHTO and bulb-T), and piles	Central Office Materials – Structures Section

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Item	Point of Contact
Metal Traffic Signal and Light Poles and Arms	Central Office Materials – Structures Section
Structural Steel Elements (beams and girders)	Central Office Materials – Structures Section
Laminated Bridge Bearing Pads	Central Office Materials – Physical Lab
Precast Concrete Structures	Central Office Materials – Quality Assurance Section – Approved List #34
Pipe (concrete, steel, aluminum and high density polyethylene) for culverts, storm drains and underdrains	Central Office Materials – Quality Assurance Section – Approved List #25, #26 and #42
Asphalt Concrete QA program	District Materials Section
Hydraulic Cement Concrete Plant and Truck Inspections	National Ready Mix Concrete Association (NRMCA) Plant and Truck Certification required
Hydraulic Cement Concrete Mix Designs	District Materials Section
Aggregate CMA QA program	District Materials Section
<u>CCPRM, CIR and FDR Mix Designs</u>	<u>District Materials Section</u>

5.21.3 The Concessionaire/Design-Builder shall be responsible for acceptance of materials at the time of delivery to the project site. The Department is not responsible for materials approved at the Plant that become damaged during transit or during storage on-site. The Concessionaire/Design-Builder will be responsible to assure all materials are free from damage prior to use in the Work.

~~5.19.31.1.1~~ ~~The Concessionaire/Design-Builder shall be responsible for acceptance of materials at the time of delivery to the project site. The Department is not responsible for materials approved at the Plant that become damaged during transit or during storage on-site. The Concessionaire/Design-Builder will be responsible to assure all materials are free from damage prior to use in the Work.~~

5.205.22 Inspection and Testing Documentation

5.22.1 Each of the Concessionaire/Design-Builder's QA and QC Inspectors shall summarize their daily inspection activities in a daily report. The Department's Inspectors Daily Work Report or a similar form as approved by the Department shall be used for maintaining a written record of inspection results. Copies of the inspector's records shall be submitted electronically into the project's designated document management system within 24-hours from the time the inspection/testing was performed. The report shall consist minimally of the following key points of record:

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- .1 Work performed by the firm, subcontractor, or material supplier, identified by Work Package notation;
- .2 Weather conditions, including daily measured precipitation amount;
- .3 Inspections performed and their results;
- .4 Communications;
- .5 Delays encountered;
- .6 Identification of any safety-related problems and corrective action taken;
- .7 Identification of all non-conforming work and the corrective action taken; and
- .8 Signature of inspector.

~~5.20.11.1.1 Testing and Inspection~~ Each of the Concessionaire/Design-Builder's QA and QC Testing Technicians shall summarize their daily ~~inspections, test~~testing and material sampling activities in a daily report. ~~The Department's Inspectors Daily Work Report or a similar form as approved by the Department shall be used for maintaining a written record of inspection results. Copies of the inspector's records shall be provided to the Department's Project Manager within 24 hours of completing the inspection. The report shall consist minimally of the following key points of record:~~

- ~~.1 Work performed by the firm, subcontractor, or material supplier, identified by Work Package notation;~~

5.22.2 The Department's Inspectors Daily Work Report or a similar form as approved by the Department shall be used for maintaining a written record of test results. Copies of the Testing Technician's records shall be submitted electronically into the project's designated document management system within 24-hours from the time the testing was performed. The report shall consist minimally of the following key points of record:

- .1 Date and time test performed and time on site (arrival/departure);
- .2 Weather conditions, including daily measured precipitation amount;
- .3 Type, location, and results of all tests performed;
- ~~.3.1 Inspections performed and their results;~~
- ~~.4.1 Communications;~~
- ~~.5.1 Type, location, and results of all tests performed;~~
- ~~.6.1 Delays encountered;~~
- ~~.7.1 Identification of any safety-related problems and corrective action taken;~~
- ~~.8.1 Identification of all non-conforming work and the corrective action taken; and~~
- ~~.9.1 Signature of inspector.~~
- .4 Signature of Testing Technician.

5.215.23 Design-Builder's Testing and Inspection Documentation and Reporting Process ~~and Progress Payment Certification~~

5.23.1 The Project shall be constructed in accordance with standards and requirements related to construction, safety, environmental compliance, quality assurance and quality control as required in the ~~Construction and~~ Contract Documents, including but not limited to the VDOT Inspection Manual and Appendix 32, Table A-3-2 of this QA/QC Guide. In the event of a conflict between any of the standards and requirements for quality control and quality assurance identified in the contract, the most stringent shall govern. The objective of Table A-32 is to identify and summarize minimum inspection, sampling and testing coverage and frequencies; verification and observation schemes, and documentation and reporting requirements to be included in Concessionaire/Design-Builder's QA/QC Plan. Any work activities that are not identified in Table A-2 shall conform to the requirements of the VDOT Inspection Manual. The Department's Project Manager will review the Concessionaire/Design-Builder's QA/QC Plan for conformance with the requirements as set forth in the Contract. The Concessionaire/Design-Builder shall not begin any construction activities without the Department's approval of the Concessionaire/Design-Builder's QA/QC Plan.

~~5.21.11.1.1 The Department's Project Manager will review the Concessionaire/Design-Builder's QA/QC Plan for conformance with the requirements as set forth in the Contract. The Concessionaire/Design-Builder shall not begin any construction activities without the Department's approval of the Concessionaire/Design-Builder's QA/QC Plan.~~

5.21.25.23.2 The QAM shall maintain the Project's Materials ~~Book~~Notebook, recording materials used, source of material, and method of verification used to demonstrate compliance with Department standards. ~~The Materials Book~~Notebook shall be maintained ~~according to and reviewed in accordance with Chapter VII of the Department's Materials Division requirements and will be reviewed on a monthly basis by the Department's Project Manager. The monthly review shall consist of spot checking at least five (5) materials and their source documentation. Minimally, the Department Project Manager will review all components of the materials notebook during the first two (2) months of commencement of Concessionaire/Design-Builder's planned or scheduled field operations to ensure all records are set up correctly.~~Manual of Instructions. The QAM shall also maintain project daily reports and shall be responsible for approval of all Inspectors' Daily Reports. The Design-Builder's Construction Manager shall ensure all QC daily field reports and records are submitted electronically into the project's designated document management system within 24-hours from the time the inspection/testing was performed. Inspector Daily reports should reviewed by the QAM daily and shall be certified by the QAM as being correct and complete prior to monthly application for payment.

5.23.3 The QAM shall approve all Materials Test Reports prior to submission to the Department. The QAM's approval of Materials Test Reports shall also include those for which the Department retains responsibility for review and acceptance.

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~~5.21.31.1.1~~ The QAM shall approve all Materials Test Reports prior to submission to the Department. The QAM's approval of Materials Test Reports shall also include those for which the Department retains responsibility for review and acceptance.

~~5.21.45.23.4~~ Concessionaire/Design-Builder's QA and QC staff shall be responsible for project documentation, testing, and inspection; the ~~Department's Project Manager~~QAM will be responsible for ~~monitoring ensuring that~~ the Concessionaire/Design-Builder's ~~compliance with Builder conforms to~~ its approved QA/QC Plan and maintains appropriate project documentation. The Department will ~~also~~ be responsible ~~to administer~~for administering Independent Assurance (OIA) and Verification Sampling and Testing (OVST) of materials used during construction of the Project. The QAM is responsible for the coordination and scheduling of all OIA and OVST sampling and testing required to be conducted during construction operations.

5.23.5 The Concessionaire/Design-Builder shall provide, prior to Final Application for Payment, a complete set of Project records that included, but are not limited to the following:

- .1 Project correspondence
- .2 Project diaries
- .3 As-built Record Documents
- .4 Test reports
- .5 Invoices
- .6 Materials Notebook
- .7 Certified survey records
- .8 DBE-SWaM/EEO records
- .9 Warranties
- .10 Maintenance Manual
- .11 Buy America Certifications
- .12 Special Tools, etc.

Upon receipt and acceptance of the project records prescribed above, the Concessionaire/Design-Builder will provide the Department with a Final Application for Payment. The information required with submission for Final Application of Payment is outlined in RFP Part 4, Section 6.6.3.

5.24 Progress Payment Certification

5.24.1 Concessionaire/Design-Builder's QA (IA and IVST) and QC shall be an integral part of each Work Package. ~~Concessionaire/Design-Builder's QA (IA and IVST) and QC shall be an integral part of each Work Package. That as~~As part of each application for payment ~~that includes for any completed~~ construction-related Work Packages, Concessionaire/Design-Builder's ~~designated~~ Quality Assurance Manager shall certify

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that each Work Package has been completed in accordance with the Construction and Contract Documents, and that ~~all the~~ required QA/QC tests, measurements, permits or other requirements have been completed and all non-conformance reports relative to the respective Work Package have been resolved. ~~The~~ This includes compliance with Buy America requirements as outlined in the Contract Documents.

~~5.21.55.24.2~~ All daily reports shall be included with the monthly application of payment. The Department, at its discretion, may withhold payment until all QA and QC reports from the previous month have been submitted. For design-related Work Packages, the Concessionaire/Design-Builder shall submit with each application for payment ~~evidene~~ verifiable evidence from the Concessionaire/Design-Builder's Design Manager of the QA/QC reviews, including any checklists, summary data, high-level/outline calculations or design checks, and evaluations of the work and the qualifications of the responsible personnel that completed the work, etc., ~~that~~ which the relevant QA or QC reviewer relied on to make its determination that the work is complete and conforms to the requirements of the ~~Construction and~~ Contract Documents. The QAM shall verify that all Design related Work Packages submitted for payment have been certified by the Design Manager as being in conformance with the Contract Documents and the Design QA/QC Plan.

~~5.21.61.1.1~~ The Concessionaire/Design Builder shall provide, prior to final application for Payment, a complete set of Project records that included, but are not limited to the following:

- ~~1~~ Project correspondence
- ~~2~~ Project diaries
- ~~3~~ As-built Record Documents
- ~~4~~ Test reports
- ~~5~~ Invoices
- ~~6~~ Materials books
- ~~7~~ Certified survey records
- ~~8~~ DBE-SWaM/EEO records
- ~~9~~ Warranties
- ~~10~~ Maintenance Manual
- ~~11~~ Special Tools, etc.

~~5.22.5.25~~ Department Inspection Validation and Administration Process

~~5.22.15.25.1~~ As set forth in Part 5, Section 105.03 or as otherwise set out in the Comprehensive Agreement for P3 projects, the Department shall have the right to audit, monitor, inspect and test the Work as it progresses and Concessionaire/Design-Builder shall accommodate this process. Appendix 43, Table A-43 delineates the Department's construction oversight of inspection validation for items of work and identifies

~~requirements for Preparatory, Intermediate, and Completion Inspections to be~~ performed by the Concessionaire/Design-Builder during Preparatory, Intermediate, and Completion phases of the Work. Additionally, the Department will perform Owners Independent Assurance (OIA) and Owner Verification Sampling and Testing (OVST), ~~observations and oversight~~ and will observe, oversee, and independently assess and validate work items as set out in this Section 5 and Appendix ~~43~~, Table A-~~43~~.

5.23 — Preparatory Inspections and Testing

5.23.15.25.2 Inspection - Prior to the start of each new construction phase, type of work or after a change in previously approved types of materials, the Concessionaire/Design-Builder's QAM and Construction Manager shall meet with representatives of the Department for the Preparatory Inspection ~~for that work~~ Meeting in accordance with Section ~~5.37~~ of this Guide. The purpose of the Preparatory Inspection is to verify (1) that the pre-construction activities, such as safety training and the approval of design documents, permits, certifications, reference documents, safety training, material approvals, and materials have been completed; and that (2) construction activities such as scheduled inspections, ~~and~~ test types, locations, and frequencies have been satisfactorily ~~completed~~ identified prior to beginning the work.

5.23.2 ~~At the Preparatory Inspection, the QAM shall identify the type and frequency of inspections and testing that will be performed by QA and QC personnel, as documented in the QA/QC Plan and as approved by the Department.~~ All project work activities shall be preceded by a Preparatory Inspection ~~and Testing~~ as identified in this Section 5 and Appendix ~~43~~, Table A-~~43~~.

5.24 — Intermediate Inspection and Testing

5.24.15.25.3 - Throughout the course of construction, the Concessionaire/Design-Builder shall accommodate Department's performance of Intermediate Inspections ~~and Testing~~. Details regarding the frequency and types of inspections and testing are described in this Section 5 and Appendix ~~43~~, Table ~~A4A-3~~.

5.25 — Completion Inspection and Testing

5.25.15.25.4 - Some types of work may require inspection and testing by the Department upon substantial completion. Completion Inspection ~~and Testing~~ will allow the Department Project Manager's verification that all necessary and supporting documentation is available to support Concessionaire/Design-Builder's application for final payment as identified in the approved CPM schedule.

5.26 Punch ~~out~~ Out Inspection

5.26.1 Concessionaire/Design-Builder shall be responsible for punch out inspection. The punch list shall be maintained by the QAM and shall be created ~~near~~ in coordination with the ~~end of the Project~~ CM or ~~at the time of Substantial Completion~~ QCM prior to Final Acceptance. The punch out inspection shall be performed on all ~~definable features of the~~ Work, against approved Construction Plans, Specifications and other related Construction

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and Contract Documents and note any discrepancies thereof. The QAM shall review the project records to ensure that all items addressed by non-conformance reports, including areas where Department OIA and OVST testing produced discrepancies, have been corrected, or have been included on the punchlist for corrective action.

5.26.2 The Department will monitor the development of the Concessionaire/Design-Builder’s punchlist for the Project. The Department will review the Concessionaire/Design-Builder’s punchlist documentation prior to the final acceptance walkthrough to determine that all punchlist activities have been performed and shall physically verify correction of ~~a minimum of~~no less than 10% of the punchlist items in the field. Discrepancies found in the physical verification by the Department ~~may result in a greater percentage of physical verification of punchlist items depending on the severity, at Concessionaire/Design-Builder’s sole expense. Increase in frequency or percentage of verification will be made at Department’s sole discretion.~~shall be corrected by the Concessionaire/Design-Builder prior to Final Acceptance.

5.27.1 Construction Inspection Checklists

~~**5.27.1** The Concessionaire/Design-Builder’s QA/QC Plan shall include inspection checklists for all anticipated construction operations and/or processes. These checklists shall be used by the Concessionaire/Design-Builder’s QA and QC inspection personnel. The individual checklists shall be approved by the Department as part of the overall approval of the Concessionaire/Design-Builder’s QA/QC Plan. The checklist for each work activity shall include the construction requirements stated in the standard specifications or Contract for that work activity. As a minimum each checklist shall address the following as shown in Table 5-3:~~

Table 5-3: Minimum Requirements for Construction Inspection Checklists

Checklist Item	Item Description
Date and Time:	Date and time inspection was performed
Location:	 <ul style="list-style-type: none"> 1 Pier or structure component 2.1 Drainage Structure Number 3.1 Compaction Report (referenced to Centerline Station and Sub-grade Elevation, etc.)
Specification Requirement:	List of applicable specifications for this item
Frequency:	Indicated test or inspection frequency, if any
Elements or Items Inspected:	List of elements or items inspected
Conformation to Specifications:	Check that work and materials meet the appropriate specification/standard

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Checklist Item	Item Description
Deficiencies Noted:	Note any deficiencies to specifications/standards
Individual Notified:	Individual notified for corrective action
Corrective Action Noted:	What form of corrective action is recommended
Action Taken:	What corrective action was taken
Material Documentation:	List and attach a copy of all required documentation (test reports — such as, but not limited to, compaction, aggregate gradation, mill tests, manufacture’s certification, and catalog cut or product specifications).
Responsible Party Notified:	Name of the foreman or worker responsible for the work
Signature of Inspector:	Signature of Inspector who performed inspection

~~5.27.21.1.1 Appendix 6 contains sample checklists for standard work items commonly used on Department Projects. The Concessionaire/Design-Builder shall confirm the completeness and suitability of the lists for the Project and shall develop the checklists for its QA/QC Plan based upon the style and format of the appended sample checklists.~~

5.285.27 Project Communications and Submittals

~~5.28.15.27.1 A timeline and process for making decisions and managing communications. The Concessionaire/Design-Builder shall maintain all project documentation electronically in an online location that is accessible to all personnel associated with the Project (to include contractor personnel, QC personnel, QA personnel, design personnel, right of way personnel, and Department personnel) at all times for the entire duration of the Project. The document management system specified in the Contract Document shall be utilized. A timeline and process for making decisions and managing communications in the document management system shall be established as part of the QA/QC Plan. These processes are to ensure that required information is provided in a timely and efficient manner and that decisions are made at the lowest appropriate level of authority. —The processes shall include the guidelines for communications generated by the Concessionaire/Design-Builder Team (designers, production forces, the QC personnel, and the QA personnel) and the Department.~~

5.295.28 Quality Assurance and Quality Control Documents Order of Precedence

~~5.29.15.28.1 This Guide together with certain referenced standards and publications details the Department’s minimum testing and inspection requirements and frequencies which the Concessionaire/Design-Builder is to shall perform. It is recognized that contract~~

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requirements will vary from project to project and therefore project specific contract requirements will always take precedent in case of conflict. If the QA/QC testing and inspection requirements set forth in this Guide are more stringent than Federal and State QA/QC testing and inspection requirements, then those set forth herein shall govern.

~~5.29-25.28.2~~ In the event of a conflict among any standard, provision or publication applicable to the Project, the Department shall have the right to determine, ~~in~~at its sole discretion, which ~~provision~~requirement applies regardless of the order of precedence of the documents in which such standards, provisions, or ~~publication~~publications are referenced. Concessionaire/Design-Builder shall request in writing Department's determination respecting the order of precedence involving the referenced standards, provisions, and ~~publication~~publications promptly upon becoming aware of any such conflict.

Appendix 1

Definitions of Terms, Abbreviations and Acronyms

Terms, Abbreviations and Acronyms

Terms, Abbreviations and Acronyms shall be as stated in Section 101.01 of the VDOT ~~2007~~ Road and Bridge Specifications and Part 4, General Conditions of Contract. Additional or key terms and abbreviations relative to the Department's Requirements for Contractor QA/QC Plans on Design-Build and P3 Projects are as follows:

Approved for Construction (AFC) ~~*Issued for Construction (IFC) Documents*~~ – All drawings, specifications, revisions thereto, and any other items necessary to construct the Work, sealed by a professional engineer licensed by the State Commonwealth of Virginia.

Audit - A documented activity performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that applicable elements of the Quality Assurance and Quality Control program have been developed, documented, and effectively implemented in accordance with specified requirements.

Concessionaire/Design-Builder – Any individual, partnership, corporation, or joint venture that contracts with the Department to perform the Contract.

Contract – Any contract, subcontract, or other form of agreement to perform any part of the Work or provide any materials, equipment or supplies for the Project and/or the utility relocations included in the Work, on behalf of the Concessionaire/Design Builder or any other Person with whom any Contractor further subcontracted any part of the Work, at all tiers.

Contractor – As applicable to P3 procurements, means any Person with whom the Concessionaire has entered into any contract to perform any part of the Work or provide any materials, equipment or supplies for the Project and/or the Utility Relocations included in the Work, on behalf of the Concessionaire, and any other Person with whom any Contractor has further subcontracted any part of the Work, at all tiers. The term “Contractor” will include the Design-Build Contractor and the Operations and Maintenance (O&M) Contractor.

Construction Documentation – All Design Documentation, AFC or IFC Documents, and all shop drawings, working drawings, fabrication plans, material and hardware descriptions, specifications, construction quality control reports, construction quality assurance reports and samples necessary for construction of the Project and/or the Utility Relocations included in the Work, in accordance with the Agreement and the other Project Agreements.

Construction QA/QC Plan – Used interchangeably with the Construction Quality Management Plan (CQMP) for P3 Projects. The plan developed by the Concessionaire/Design-Builder that provides the organization, relationship and

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procedures that define clear lines of responsibility and well defined approach for meeting Project requirements and innovation in construction approach, as described in more detail in the Contract Documents.

Deficiency – Nonconforming work that is correctable by established means and methods and will comply with the contract requirements upon correction.

Design Documentation – Such plans, drawings, specifications and other design documentation (including design standards, design or durability reports, models, samples and calculations) in computer readable and written formats prepared by or on behalf of the Concessionaire/Design-Builder for the purposes of the performance of the Work or any component thereof in accordance with the Design Build Contract and /or Comprehensive Agreement.

Design QA/QC Plan – Used interchangeably with the Design Quality Management Plan (DQMP) for P3 Projects. The plan developed by the Concessionaire/Design-Builder that provides the organization, relationship and procedures that define clear lines of responsibility and well defined approach for meeting Project requirements and innovation in design approach.

Hold Point – Mandatory verification points identified within the QA/QC Plan and CPM schedule beyond which work cannot proceed until mandatory verification is performed and a written release is granted by the Department.

~~**Inspection Technician** – Staff who performs on-site inspection.~~

Nonconformance – Any deviation from a contract requirement, specification, standard or procedure, a safety or permit violation, or failure to adhere to laws or regulations. A nonconformance might affect subsequent construction activities, warrant destructive sampling or testing, redesign, or reconstruction.

OIA – Owner Independent Assurance (OIA) – Oversight performed by the Department (or agent) to satisfy VDOT and FHWA’s requirements for documenting that proper QC and QA management is being performed. This oversight provides an independent assessment of Concessionaire/Design-Builder’s implementation of and compliance with the approved Quality Control and Quality Assurance plan This may include split samples, calibration checks, certification verification, and/or observations.

Owner Verification Sampling and Testing (OVST) – Oversight performed by the Department (or agent). The focus of owner validation is to verify Concessionaire/Design-Builder’s QC and QA compliance and confirm that the quality characteristics of the products incorporated in the project conform to specifications and are valid for payment in accordance with Part 4, Article 6 or applicable portions of the P3 procurement documents.

Quality Assurance Manager Independent Assurance (QAM IA) – Inspection performed by the QAM to independently evaluate all sampling, equipment, and testing procedures used by quality control that are used in the acceptance program. This may include split samples, calibration checks and/or observations.

Quality Assurance Manager Independent Verification Sampling and Testing (QAM IVST) – Inspection performed by the QAM that serves as an oversight role for the Concessionaire/Design-Builder’s QA/QC Team. Independent Verification and Testing is performed to satisfy the QAM’s verification process for documenting that proper QA/QC is being performed on the Project and to provide adequate assurance that the public is receiving the desired quality in the project undergoing construction.

~~**OIA – Owner Independent Assurance (OIA)** – Oversight performed by the Department (or agent) to satisfy VDOT and FHWA’s requirements for documenting that proper QC and QA management is being performed. This oversight provides an independent assessment of Concessionaire/Design-Builder’s implementation of and compliance with the approved Quality Control and Quality Assurance plan.~~

~~**Owner Verification Sampling and Testing (OVST)** – Oversight performed by the Department (or agent). The focus of owner validation is to verify Concessionaire/Design-Builder’s QC and QA compliance and confirm that the quality characteristics of the products incorporated in the project are valid for acceptance and payment in accordance with Part 4, Article 6 or applicable portions of the P3 procurement documents.~~

Punch List – Itemized list of Work which remains to be completed ~~after Substantial Completion of the Project has been achieved and~~ before Final Acceptance, the existence, correction, and completion of which will have no adverse effect on the normal uninterrupted and safe use and operation and which can be performed without shutting down a traffic lane or shoulder.

Quality Assurance (QA) – The overall process performed independently of the construction contractor (contractor’s production forces) for the purpose of determining the conformance of the work by examining the QC data and/or providing objective evidence (independent sampling and testing), to verify the contractor’s quality control sampling and testing. The ~~contractor~~ **QAM** will (organizationally through services independent of production forces) provide the QA inspection normally provided by ~~VDOT~~ **The Department** or its consultant on a traditional Design-Bid-Build project.

Quality Assurance/Quality Control Plan (QA/QC Plan) – Used interchangeably with Quality Management System Plan (QMSP) for P3 Projects. The plan developed by the Concessionaire/Design Builder that defines the quality management systems during the design, construction and for P3 procurements, the operations and maintenance phases of the Project. This plan details how the Concessionaire/Design-Builder will provide quality control (QC) and quality assurance (QA) for both the design and construction elements of the project, obtain samples for Design- Builder quality control testing, perform tests for Concessionaire/Design-Builder quality control, provide inspection, and exercise management control (e.g. quality assurance testing) to ensure the work conforms to the contract requirements. This document includes the Design QA/QC Plan (DQMP) and the Construction QA/QC Plan (CQMP).

~~**Quality Assurance Manager (QAM)** – The Concessionaire/Design-Builder’s designee responsible for providing Quality Assurance of the Work, and ensuring conformance with~~

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~~the Contract Documents is the individual with overall responsibility for the development of and adherence to the Design-Build QA/QC Plan. The QAM is responsible for supervising the performance of all field materials tests performed by the Concessionaire/Design-Builder including but not limited to, density, moisture, air content of concrete, slump, and other required materials field tests.~~

Quality Control (QC) – Performed by the Concessionaire/Design-Builder to assess and adjust design, production, and construction processes to ensure conformance with contract requirements and to control the level of quality being produced in the Project. The purpose of QC is to measure those quality characteristics and to inspect those activities that affect the production at a time when corrective action can be taken to substantially decrease the likelihood that appreciable non-conforming material will be incorporated in the Project.

~~**Testing Technician**—Staff who performs on-site materials testing.~~

Verification – The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.

VDOT – The Virginia Department of Transportation, “Department”, or a duly authorized representative thereof.

Witness Point – Points where critical characteristics are to be measured and maintained, and/or at points where it is nearly impossible to determine the adequacy of either materials or workmanship once work proceeds past this point. Advance notification is to be given to the Department so that it may observe the status of the work at witness points. Work may proceed beyond a witness point with or without participation by ~~VDOT~~the Department provided proper notification has been given.

Appendix 2

Minimum Requirements for Design QA/QC Plans

~~The Concessionaire/Design Builder is responsible for design quality. The Design Manager, assigned by the Concessionaire/Design Builder, shall be responsible for overall management of the QA/QC programs for design. This individual shall report directly to the Concessionaire/Design Builder's Project Manager and is responsible for all of the design QA/QC activities. The quality control function during design is provided by design staff independently checking each other's work and the Design, Design production and Design leads performing formal and documented coordination reviews at pre-determined times on each submittal and on all *Issued-for-Construction (IFC) or Approved for Construction (AFC)* design packages. Documented evidence of performance of the project design control plan will provide the Department assurance that the design plans and submittals will meet all project requirements. All design submittals and IFC or AFC plans will have written approval by the Design Manager certifying that he/she has audited and approved the submittal.~~

~~The project design control plan includes:~~

- ~~• 1 Written documentation and definition of the project's design criteria, standards, and processes;~~
- ~~• 1 Procedures for the performance of senior experienced engineers' detailed checks of all design reports, calculations, drawings and specifications;~~
- ~~• Directions for interdisciplinary reviews by technical and management staff to provide coordination and uniformity among section designs; and~~
- ~~• Execution of design/build constructability reviews to facilitate the timely planning of construction activities.~~

~~**1.1.1** Audits performed by the Design Manager should verify conformance with the approved QA/QC Plan and should verify that the required checking and review functions are performed. The quality audits are in accordance with audit checklists, which are based on project procedures applicable to the area to be audited. During basic design services, documented internal technical design audits performed by the design discipline leaders determine if calculations, drawings, reports, and specifications meet both professional and contractually required standards.~~

~~**1.1.1** Individual design discipline leaders are responsible for the completion of all QC functions within the section and for the coordination of actual audit dates established by the Design Manager. Concessionaire/Design Builder shall prepare and update a schedule for audits to reflect changes or refinements in the scope of the project work and the project schedule.~~

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~~The Concessionaire/Design Builder shall correct all nonconforming practices before plans are submitted to the Department. Copies of all audit reports shall be retained in the Design Manager's QA File.~~

~~The Concessionaire/Design Builder provides the Department the necessary verification that the design submittals and plans released for construction will meet all project requirements. Documents which are "issued or approved for construction" are accompanied by a Form that is signed by the Design Manager certifying that the "construction items" shown on the plans have been audited for and satisfy compliance with the Design Control Plan, all requirements of the contract documents, including the Concessionaire/Design Builder's Proposal and for P3 procurements, the Comprehensive Agreement.~~

~~**1.1.1** The Design Manager verifies the implementation and effectiveness of the corrective measures using informal observation and review or with a formal audit. The time allowed for such follow-up activities depends on the importance of the corrective action required.~~

~~To provide effectiveness, procedure preparation is coordinated through the Design Manager and designated staff so that their review and comments can be considered before finalizing the submittals. The design control plan is a dynamic document and changes will be issued, as the program requires refinement or adaptation. The above-mentioned staff is also responsible for identifying those project activities that require a new procedure, and for defining the scope and content, along with preparation and distribution of each procedure, as applicable.~~

~~**1.1.1** A Table of Contents is provided that illustrates the minimum contents of the Project design QA/QC procedures.~~

~~**SECTION 1 – GENERAL AND ADMINISTRATION**~~

~~1.1 – Preparation and Revision of Design QA/QC Procedures~~

~~1.2 – Terms and Definitions~~

~~1.3 – Quality Assurance Organization, Functions and Responsibilities~~

~~1.4 – Documentation Control~~

~~1.5 – Control of Customer Supplied Product~~

~~1.6 – Quality Records~~

~~1.7 – Quality Control Coordinators Function and Responsibilities~~

~~**SECTION 2 – PROJECT MANAGEMENT**~~

~~2.1 – Quality Program for Subconsultants~~

~~2.2 – Quality Control and Verification of Computer Software~~

~~2.3 – Preparation and Maintenance of the Project Procedures~~

~~— Manual~~

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~~2.4 Contract Review and Coordination~~

~~2.5 Internal Quality Audits~~

~~SECTION 3 PLANNING AND DESIGN~~

~~3.1 Checking of Calculations~~

~~3.2 Checking of Drawings~~

~~3.3 Checking of New Specifications, Revisions to Project Specifications and/or
Special Provisions~~

~~3.3.1 New Specifications, Revisions to Corridor Specifications and/or Special
Provisions~~

~~3.4 Checking of Input to Computer Programs~~

~~3.5 Review of Studies or Report Type Documents~~

~~3.5.1 Review of Documents Prepared by Others~~

~~3.6 Design Coordination Review (DCR) and Technical Coordination Review
(TCR) of Interim Submissions~~

~~3.7 Final Package Review (FPR) of Documents~~

~~3.8 Quality Audits of Planning and Design Functions~~

~~3.9 Quality Control of CADD Produced Documents~~

~~3.10 Documentation and Transmission of Design Directives and Revisions~~

~~3.11 Documentation and Notice of Design Change~~

~~3.12 Field Design Services~~

~~3.13 Implementation of Corrective and Preventive Action~~

~~3.14 Quality Control of Utility Design~~

~~3.15 Training~~

~~The Design Manager shall maintain close communication with Concessionaire/Design Builder's Project Manager and shall ensure the Project is completed in accordance with the requirements of the Contract Documents. The Design Manager shall perform all of the design oversight reviews. The Department may participate in these reviews. Unless otherwise set out in the Contract, the Department retains the ultimate approval and disapproval authority for conformance with contract requirements. Under this procedure, the Design Manager will provide the Department with draft design plans for review and approval to confirm that the design work complies with the requirements of the Contract Documents herein prior to initiation of construction activities on the Project.~~

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~~1.1.1 Plans to be reviewed shall be submitted to the Department's Project Manager in accordance with contract requirements. The Department's Project Manager will distribute plans for review and/or approval. The Department shall have the right to review and comment on all draft plans and specifications for compliance with the requirements of the contract documents and reference documents. The Concessionaire/Design Builder shall be responsible to satisfy all such requirements.~~

~~1.1.1 The Concessionaire/Design Builder shall revise and modify all draft design plans so as to fully reflect all comments and shall deliver the revised submittal to VDOT's Project Manager, who will distribute plans to appropriate VDOT staff for review and comments.~~

~~1.1.1 Construction Plans are to be submitted to the Department for review and approval by the Chief Engineer prior to construction of that element of work. The schedule for plan review and approval shall be in accordance the requirements of the Contract Documents. The Concessionaire/Design Builder shall be responsible for the design details and ensuring that the design and construction work are properly coordinated. The Concessionaire/Design Builder shall be responsible for documenting any design exceptions or waivers that may be needed. The Department will submit the design waivers and design exceptions to the appropriate reviewing authority for review and approval.~~