

**Quality Assurance Plan (QAP)
For
Route 58 Improvements (UPC 10097) and
Manning Bridge Road Intersection Improvements (UPC 104359)
Cover Sheet**

- I. Date of Original QAP Submittal: April 10, 2020
- II. QAP Revision Date (if applicable):
- III. Locality Name and Physical Address:
City of Suffolk - Public Works Department
442 W. Washington St.
P.O. Box 1858
Suffolk, Va. 23439
- IV. Responsible Charge Engineer and Contact Person for QAP:

Printed Name: Don Lockard (Alpha Corp.) and Tom Druhot (AMT)
Contact Information:
Don Lockard: don.lockard@alphacorporation.com, 804-854-9574
Tom Druhot: tdruhot@amtengineering.com, 757-751-3699
- V. Locality Responsible Charge Person

Printed Name: Darryll D. Lewis, P.E., PMP
Contact Information: dlewis@suffolkva.us, 757-514-7683
- VI. Contact Person for the QAP:

Printed Name of QAP Contact Person: Vincent E. Riccio, PE
Consulting Firm: Kimley-Horn and Associates, Inc.
Contact Information: vince.riccio@kimley-horn.com, 757-213-8625
- VII. Organizational Chart:
- a. Owner – City of Suffolk
 - b. District Contact Person – TBD
 - c. Contractor – TBD
 - d. QC Testing Firm – TBD (Contractor)
 - e. Inspector – Don Lockard (Alpha Corp.); Tom Druhot (AMT)
 - f. Engineer of Record – Kimley-Horn and Associates, Inc.
 - g. QA Testing Firm – TBD
 - h. IA/VST Firm - TBD
 - i. QAP Development Firm – Kimley-Horn and Associates, Inc.

QAP Document

I. Mission Statement

All materials shall be approved, sampled, and/or tested in conformance with contract specifications and the Locally Administered Projects Manual (LAP MANUAL). Submittal of this QAP designates a commitment to adhere to its contents as well as the LAP MANUAL. Any deviation from this QAP shall not occur without a revision submittal of this QAP to the District Project Coordinator for approval.

This QAP identifies the guidelines under which the City of Suffolk's inspection and testing representatives and the Contractor's and/or the Contractor's material testing subcontractor will perform their jobs.

The testing staff will consist of the Contractor's subcontractor for materials testing (Quality Control or QC), TBD for quality assurance testing (QA), Independent Assurance and Verification Sampling Testing (IA/VST), and City Inspector Staff or their representative serving as the Inspector. VDOT will perform additional testing via the Off-Site Plant QA Programs as shown in Table 1 in Section 13.2.3 of the LAP Manual.

The Contractor will ultimately be responsible for the quality of the construction. However, City Inspectors or their representative will be on site to assess construction processes relative to the applicable standards and specifications. TBD will perform all required Quality Assurance (QA) testing and IA/VST testing in accordance with this QAP which is based on the current edition of the VDOT Materials Manual of Instruction (MOI), VDOT's Construction Manual, and the current edition of the VDOT LAP Manual. The QA Testing Staff will provide feedback to the City of Suffolk. The Inspector will assure that the necessary documentation regarding inspections and testing of materials and in-place construction has been performed and adheres to the contract before any payment is recommended for approval by the City of Suffolk.

Any deviation from this QAP shall not occur without a revised submittal of this QAP to the VDOT District Project Coordinator and the City of Suffolk for approval.

II. Personnel Certification and Licenses

Copies of Personnel Certifications and Licenses as required by the Contract Documents are kept on file readily available to the City, VDOT and its representatives for review. All personnel performing materials testing shall have the necessary certifications and experience/expertise required by the contract documents and the LAP MANUAL. No work shall be performed otherwise.

The Inspector will provide inspection to assess construction processes relative to applicable standards and specifications. The QA testing staff, QC testing staff and IAST testing staff will be responsible for performing and reporting of all sampling and testing reports directly to the Inspector. All team members providing testing and inspection will be required to follow the approved QAP. The identity of the testing staff will be given to the QA Inspector prior to the start of each work activity.

The Responsible Charge Engineer (RCE) role is defined in the scope of work of the Construction Administration Contract between the RCE's firm and the City. Generally, the RCE will be consulted by the Inspector for all changes or RFIs to the contract documents. The RCE for this project is **Don Lockard with Alpha Corporation and Tom Druhot with AMT**. The City of Suffolk is the Owner. The Owner's role is as defined in the contract between the RCE's firm and the Owner. Generally, the RCE will represent the Owner and recommend for approval of work performed and changes to the contract. Kimley-Horn has been tasked by the City of Suffolk to prepare this Quality Assurance Plan.

The Contractor's role is as defined in the contract between the Contractor and the Owner. The Contractor for this project is **TBD**. Generally, as related to this plan, the Contractor is responsible for conformance to the quality requirements of the work and all testing functions.

III. Independent Assurance and Verification Sampling and Testing

The Route 58 project (UPC 100937) and Manning Bridge Road project (UPC 104359) have federal funds and therefore will require Independent Assurance Sampling and Testing (IAST) as required in the LAP Manual for locally administered, federally funded projects.

All materials testing laboratories shall meet the requirements as outlined in the LAP MANUAL, Chapter 13.2 for "Qualified Laboratories". No work shall be authorized otherwise. Independent Assurance sampling & testing must be defined within the QAP and shall be attached to this document. The Materials Notebook shall be the mechanism to track Independent Assurance Samples. All Independent Assurance (IA) Tolerances shall be in accordance with the LAP MANUAL Appendix 13.2 E, Independent Assurance Tolerances. If IA testing is outside the specified tolerance, the testing equipment for both the QC and IA testing shall be evaluated and if applicable, the calibrations checked. If either equipment is found to be out of calibration, then the equipment shall be recalibrated, and the test repeated for the equipment out of calibration. On the other hand, if both pieces of testing equipment meet calibration

standards and the equipment tolerances specified in the applicable test method, third party testing shall be used to verify the test data and resolve the discrepancy.

The City of Suffolk will follow all independent assurance sampling and testing frequencies outlined in the LAP Manual and Materials Manual of Instructions for this project.

IV. Communication Channels

Once Construction starts, the Inspector will coordinate, as appropriate, with the Contractor and the QA testing agency regarding the inspection and testing frequencies outlined in the QAP, ensuring that adequate inspection and testing forces are available to meet the scheduled construction activities. The Inspector will interface on a daily basis with the Contractor and testing team. The Inspector's primary point of contact on site will be the Superintendent. The QC testing staff/QA testing staff, including the technicians and laboratory, will submit all daily documentation to the Inspector for review and acceptance. The Inspector will review and audit these documents routinely (no less than monthly) to assure they are accurate and complete. Lab results may be submitted at a later date in conjunction with internal QA/QC reviews. Any unacceptable work identified by the QA/QC staff will be schedule for correction, to include additional inspection and testing requirements. In conjunction with the Contractor's weekly look-ahead schedules, the Inspector will assure that upcoming work items are inspected and tested in accordance with the QAP. Communications will be handled through regularly scheduled progress meeting and periodic QA/QC staff meetings.

The Contractor will provide a look-ahead schedule to the Inspector regularly and perform daily coordination with the Inspector for advance notice of inspection/testing. The Contractor will contact its subcontractor performing the materials testing and/or quality control testing as required. The Inspector will contact QA Testing staff when testing is required. The Inspector will oversee all on-site materials testing and will also coordinate directly with the RCE, the Owner, and all testing staff as needed.

V. Resolution Procedure

In the event of unclear contract specifications, published guidelines, or disputes related to substandard materials, the dispute will be resolved in the following manner: The Contractor shall immediately report to the RCE, in writing, all discrepancies that it finds between the Contract Documents and site conditions and any inconsistencies or ambiguities in the Contract Documents. The RCE shall promptly correct such

discrepancies, inconsistencies, or ambiguities in writing. Work done by the Contractor after it discovers such discrepancies, inconsistencies, or ambiguities but before the RCE has provided a written correction, shall be performed at the Contractor's risk. The most stringent requirement will be considered the controlling requirement.

VI. Progress Reports

Progress reports shall be provided by the Inspector to the Owner and the RCE on a daily and weekly basis.

A sample "Progress Report" is attached to this document.

VII. Materials Acceptance Records and Test Data

Materials Acceptance records and test data shall be kept and readily available for inspection at all times by the Owner. These records shall be kept for a minimum of 5 years after project completion.

VIII. Materials Testing Methods and Frequencies

All materials testing, testing methods and frequencies shall follow the LAP Manual Appendix 13.2-G, Materials Testing Methods and Frequencies Table. Work will be sampled so that it meets the 2016 VDOT Road and Bridge Specifications, the current version of the Construction Manual, Materials Manual of Instructions, and LAP Manual (Chapter 13). In addition, any material that appears defective or inconsistent with similar material being produced will be sampled, unless such material is voluntarily removed and replaced or corrected. Samples will be taken in accordance with Virginia Test Methods (VTM), American Association of Highway and Transportation Officials (AASHTO) procedures or other acceptable procedures approved by VDOT.

All QC testing will be performed at the direction of the Inspector. Field and laboratory testing will be performed for each material type that meets the frequencies outlined in the LAP Manual. The QC testing requirements can be found in Appendix A. Copies of the all test results will be furnished to the Inspector as soon as possible after the test has been performed, recorded, and the results checked to ensure compliance with the appropriate testing guidelines.

A preliminary testing plan for each material type has been developed and is provided in Appendix A. More specific testing quantities and/or frequencies will be established

by the Inspector. At a minimum, the project schedule will be evaluated in “look ahead” 30-day increments to establish more finite testing quantities applicable within that period.

All material testing laboratories shall meet the requirements outlined in the LAP Manual, Chapter 12.3 for “Qualified Laboratories”.

IX. Right to Inspect

The “right to inspect” by the Owner is agreed upon for any and all project items and recognized by submittal of this QAP. No hold Points have been identified at this time.

X. Non-Compliance

Non-compliance to this QAP shall be promptly reported through the established communications process in this QAP.

Throughout the course of a project, items may be identified that do not meet specifications. Most of these items are identified as they happen and consequently are corrected immediately. There are two classifications of non-compliant work:

1. Level 1: Deficient work identified and corrected on the same day. The Inspector points out the deficiency to the Contractor, who corrects it immediately. This issue is noted in the diary by the Inspector. The Inspector notes what was found and what the Contractor did to correct the issue. The issue is closed.
2. Level 2: Deficient work identified and corrected at a later date. These are items that an inspector identifies in the field, notifies the Contractor, the Contractor agrees to fix the item, and the Inspector notes in his diary what the issue is, the corrective action agreed to, and the date it will be completed. The Issue Log is reviewed by the QA team on a regular basis to ensure that all items are corrected. The inspection team performs re-inspection of the item prior to removing it from the Issue Log. All issues must be corrected before the Contractor receives 100% payment for that item. In the event of disputes, or non-compliant work that is not resolved by the Contractor, refer to Part V of the QAP, and the applicable contract documents.

Attachments:

- Progress Report template
- Non-Compliance Report (NCRPT) template
- Audit and NCR Recovery Plan (NCRRP) template

Submitted By: Vincent E. Riccio, PE – Kimley-Horn and Associates, Inc.

Accepted By:

Locality Project Manager Date

Printed Name _____

Accepted By:

Responsible Charge Engineer Date

Printed Name _____

Approved By:

VDOT District Contact Date

Printed Name _____

ATTACHMENTS

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
INSPECTORS' MONTHLY CONSTRUCTION PROGRESS REPORT

DISTRICT: _____ RESIDENCY: _____ COUNTY: _____ PERIOD ENDING: _____
 RTE.: _____ PROJECT. NO.: _____ CONTRACT ID. NO.: _____ FHWA NO.: _____
 FROM: _____ TO: _____
 LENGTH & TYPE: _____
 CONTRACTOR: _____
 CONTRACT VALUE (A): \$ _____ EST. INCREASE OR DECREASE (B): \$ _____ ADJ. VALUE (C): _____
 COST TO DATE (D): \$ _____ MISC. COST (E): \$ _____ COST OF WORK COMP., TO DATE (F): _____
 PERCENT OF WORK COMPLETED TO DATE (G): _____ DAILY DOLLAR VALUE (H) _____
 DATE OF CONTRACT (I): _____ NOTIFIED TO PROCEED ON (J) _____ WORK STARTED (K) _____ TIME LIMIT (L): _____
 ORIGINAL TIME LIMIT (M): _____ NO. DAYS EXT. (N): _____ E. T. L. (O): _____ E. D. C. (P): _____
 ORIGINAL TIME (Q): _____ NO. DAYS EXT. FOR EXTRAS WORK (R): _____ ADJ. TIME (S): _____
 NO. DAYS USED (T): _____ PERCENT TIME USED (U): _____

PERCENT OF PROGRESS BY MONTH (V)

ANT. - MEANS % OF WORK ANTICIPATED TO BE COMPLETED AS SHOWN ON PROGRESS SCHEDULE
 ACT. - MEANS % OF WORK ACTUALLY COMPLETED BASED ON DOLLAR VALUE OF PROGRESS SCHEDULE

(V-I) DATE	(V-II) ANT.	(V-III) ACT.	DATE	ANT.	ACT.	DATE	ANT.	ACT.	DATE	ANT.	ACT.	DATE	ANT.	ACT.

NOTE: WHEN THE DOLLAR VALUE OF ITEMS COMPLETED (F) HAS REACHED 90 PERCENT OF THE CONTRACTOR'S LATEST APPROVED PROGRESS SCHEDULE PROGRESS IS DETERMINED ON A TIME BASIS IN ACCORDANCE WITH SECTION 102.01 AND PERCENT OF TIME USED (U) AND PERCENT OF WORK COMPLETE (G) ARE TO BE SHOWN IN LIEU OF (V-II) AND (V-III) RESPECTIVELY AND SO NOTED.

TIME EXTENSIONS ON SHUT DOWNS (W)

PERIOD OF SHUT DOWNS (INC.) (I)		KIND (II)	CAL. DAYS IN SHUT DOWN (III)	AMT OF WORK DONE DURING SHUT DOWN (IV)	WORK DAYS EQUIVALENT (V)	EXTENDED TIME DUE (VI)		TIME LIMIT (VII)	
						PERIOD (a)	TOTAL (b)	CONT. (a)	EXT'D. (b)
FROM	TO								

PROJECT STAFFING (X)
(INCLUDING INSPECTOR IN CHARGE)

TITLE	NO.	TITLE	NO.	TITLE	NO.

NO. OF PICK-UPS ASSIGNED _____

REMARKS (Z):

COPIES:

DISTRICT ADMINISTRATOR
AREA CONSTRUCTION ENGINEER
INSPECTOR
CONTRACTOR

INSP. IN CHARGE OR CONST. MAN. _____
INSPECTOR IN CHARGE: _____
FIELD OFFICE PHONE NO.: _____

TO CONTRACTOR:		NOTIFICATION #:	
PROJECT:		PROJECT /UPC #:	
OWNER:		TIME:	AM / PM
ENGINEER:		OBSERVER:	

Pursuant to the GENERAL CONDITIONS of the Contract, you are hereby notified of the following noncompliance violation:

Specification Section: _____ Paragraph: _____

Violation
Click here to enter text.

Contract Requirement:
Click here to enter text.

VIOLATION DETECTED BY	<input type="checkbox"/>	TEST	<input type="checkbox"/>	INSPECTION	<input type="checkbox"/>	OBSERVATION
NONCOMPLIANCE WORK IS	<input type="checkbox"/>	DEFECTIVE	<input type="checkbox"/>	REJECTED		

Contractor's Proposed Recommendation

Click here to enter text.

Engineer:
Authorized Representative
Date: _____

Received by:
Contractor

Title

Date

- Distribution:**
1. Engineer
 2. Owner
 3. Field Office

<i>Locality Name</i> Click here to enter text.	AUDIT and NCR RECOVERY PLAN
---	------------------------------------

TO	Click here to enter text.	NOTIFICATION #		DATE	Click here to enter a date.
PROJECT	Click here to enter text.	PROJECT / UPC#			
OWNER	Click here to enter text.				
ENGINEER	Click here to enter text.				

The below listed nonconformance work has been re-inspected and the results of the Contractor's corrective actions have placed the work in compliance with the Contract Documents.

Description of Violation

Click here to enter text.

Description of Correction

Click here to enter text.

Engineer : _____
Authorized Representative

Date: _Click here to enter a date._ _____

Distribution:

1. Engineer
2. Owner
3. Field Office

APPENDIX A

Route 58 Improvements (UPC 10097)

<u>Material</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Type of Test</u>	<u>QC Test Performed By</u>	<u>Number of QC Tests Required</u>	<u>QA Test Performed By</u>	<u>Number of QA Tests Required</u>	<u>VST Test Performed By</u>	<u>Number of VST Tests Required</u>	<u>IA Test Performed By</u>	<u>Number of IA Tests Required</u>
Pipes, Culverts, and Storm Drains											
All Pipe (length/depth)	27974'/5' avg	LF	In Place Density (VTM-10)	Contractor	-	Inspector	700	City	NA	City	1
Box Culvert (length/depth)	95'/4'	LF	In Place Density (VTM-10)	Contractor	-	Inspector	6	City	NA	City	1
Retaining Wall (length/depth)	164'/4'	LF	In Place Density (VTM-10)	Contractor	-	Inspector	10	City	NA	City	1
Excavation, Embankment, and Undercut											
Backfill (All types, incl. underdrain)	12433	CY	Moisture Density Relation (VTM-1)	Contractor	-	Inspector	69	City	NA	City	1
	12433	CY	Standard Proctor (VTM-12)	Contractor	-	Inspector	69	City	NA	City	1
	12433	CY	Atterberg Limits (VTM-7)	Contractor	-	Inspector	69	City	NA	City	1
	12433	CY	In Place Density (VTM-10)	Contractor	-	Inspector	69	City	NA	City	1
	12433	CY	Grain Size Analysis (VTM-25)	Contractor	-	Inspector	69	City	NA	City	1
Embankment	120205	CY	Moisture Density Relation (VTM-1)	Contractor	-	Inspector	112	City	NA	City	1
	120205	CY	Standard Proctor (VTM-12)	Contractor	-	Inspector	112	City	NA	City	1
	120205	CY	Atterberg Limits (VTM-7)	Contractor	-	Inspector	112	City	NA	City	1
	120205	CY	In Place Density (VTM-10)	Contractor	-	Inspector	112	City	NA	City	1
	120205	CY	Grain Size Analysis (VTM-25)	Contractor	-	Inspector	112	City	NA	City	1
Select Material, Subbase & Aggregate Base											
Subbase Material	6 Lane-Miles		In Place Density (VTM-10)	Contractor	-	Inspector	12	City	-	City	1
Aggr. Base Material	6 Lane-Miles		Depth Check (VTM-38B)	Contractor	-	Inspector	12	City	-	City	1
Aggr. Base Material	6 Lane-Miles		In Place Density (VTM-10)	Contractor	-	Inspector	12	City	-	City	1
Asphalt Concrete Pavement											
Asphalt Concrete	18 Lane-Miles		Roller Pattern (VTM-76)/ Density (VTM-6)	Contractor	18	Inspector	-	City	4	City	2
	18 Lane-Miles		Control Strip (VTM-6)/ Density (VTM-32)	Contractor	18	Inspector	-	City	4	City	2
	18 Lane-Miles		Depth Check (VTM-32)	Contractor	18	Inspector	-	City	-	City	1
	18 Lane-Miles		Cores (VTM-6)	Contractor	9	Inspector	-	City	2	City	2
	18 Lane-Miles		Cores (VTM-32)	Contractor	9	Inspector	-	City	2	City	2
Concrete Items											
Hydraulic Cement Concrete	1500	CY	Air Entrainment (ASTM C231/ ASTM C173)	Contractor	-	Inspector	15	City	-	City	-
	1500	CY	Slump (ASTM C143)	Contractor	-	Inspector	15	City	-	City	-
	1500	CY	Temperature (ASTM C1064)	Contractor	-	Inspector	15	City	-	City	-
	1500	CY	Unit Weight (ASTM C138)	Contractor	-	Inspector	15	City	-	City	-
	1500	CY	Sets (3) of Cylinders (ASTM C31/ C39)	Contractor	-	Inspector	15	City	-	City	1
Pavement Markings											
Pavement Markings	60 Days of Work		Moisture (VTM-94)	Contractor	60	Inspector	-	City	-	City	-
Pavement Markings	60 Days of Work		Film Thickness (VTM-94)	Contractor	60	Inspector	-	City	60	City	1
Pavement Markings	60 Days of Work		Glass Bead Application (VTM-94)	Contractor	60	Inspector	-	City	-	City	-

Manning Bridge Road Intersection Improvements (UPC 104359)

<u>Material</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Type of Test</u>	<u>QC Test Performed By</u>	<u>Number of QC Tests Required</u>	<u>QA Test Performed By</u>	<u>Number of QA Tests Required</u>	<u>VST Test Performed By</u>	<u>Number of VST Tests Required</u>	<u>IA Test Performed By</u>	<u>Number of IA Tests Required</u>
Pipes, Culverts, and Storm Drains											
All Pipe (length/depth)	3036'/5' avg	LF	In Place Density (VTM-10)	Contractor	-	Inspector	76	City	NA	City	1
Excavation, Embankment, and Undercut											
Backfill (All types, incl. underdrain)	1350	CY	Moisture Density Relation (VTM-1)	Contractor	-	Inspector	20	City	NA	City	1
	1350	CY	Standard Proctor (VTM-12)	Contractor	-	Inspector	20	City	NA	City	1
	1350	CY	Atterberg Limits (VTM-7)	Contractor	-	Inspector	20	City	NA	City	1
	1350	CY	In Place Density (VTM-10)	Contractor	-	Inspector	20	City	NA	City	1
	1350	CY	Grain Size Analysis (VTM-25)	Contractor	-	Inspector	20	City	NA	City	1
Embankment	13000	CY	Moisture Density Relation (VTM-1)	Contractor	-	Inspector	25	City	NA	City	1
	13000	CY	Standard Proctor (VTM-12)	Contractor	-	Inspector	25	City	NA	City	1
	13000	CY	Atterberg Limits (VTM-7)	Contractor	-	Inspector	25	City	NA	City	1
	13000	CY	In Place Density (VTM-10)	Contractor	-	Inspector	25	City	NA	City	1
	13000	CY	Grain Size Analysis (VTM-25)	Contractor	-	Inspector	25	City	NA	City	1
Select Material, Subbase & Aggregate Base											
Subbase Material	0.6 Lane-Miles		In Place Density (VTM-10)	Contractor	-	Inspector	3	City	-	City	1
Aggr. Base Material	0.6 Lane-Miles		Depth Check (VTM-38B)	Contractor	-	Inspector	3	City	-	City	1
Aggr. Base Material	0.6 Lane-Miles		In Place Density (VTM-10)	Contractor	-	Inspector	3	City	-	City	1
Asphalt Concrete Pavement											
Asphalt Concrete	1.8 Lane-Miles		Roller Pattern (VTM-76)/ Density (VTM-6)	Contractor	2	Inspector	-	City	1	City	1
	1.8 Lane-Miles		Control Strip (VTM-6)/ Density (VTM-32)	Contractor	2	Inspector	-	City	1	City	1
	1.8 Lane-Miles		Depth Check (VTM-32)	Contractor	2	Inspector	-	City	-	City	1
	1.8 Lane-Miles		Cores (VTM-6)	Contractor	2	Inspector	-	City	1	City	1
	1.8 Lane-Miles		Cores (VTM-32)	Contractor	2	Inspector	-	City	1	City	1
Concrete Items											
Hydraulic Cement Concrete	130	CY	Air Entrainment (ASTM C231/ ASTM C173)	Contractor	-	Inspector	2	City	-	City	-
	130	CY	Slump (ASTM C143)	Contractor	-	Inspector	2	City	-	City	-
	130	CY	Temperature (ASTM C1064)	Contractor	-	Inspector	2	City	-	City	-
	130	CY	Unit Weight (ASTM C138)	Contractor	-	Inspector	2	City	-	City	-
	130	CY	Sets (3) of Cylinders (ASTM C31/ C39)	Contractor	-	Inspector	2	City	-	City	1
Pavement Markings											
Pavement Markings	8 Days of Work		Moisture (VTM-94)	Contractor	8	Inspector	-	City	-	City	-
Pavement Markings	8 Days of Work		Film Thickness (VTM-94)	Contractor	8	Inspector	-	City	8	City	1
Pavement Markings	8 Days of Work		Glass Bead Application (VTM-94)	Contractor	8	Inspector	-	City	-	City	-

Acceptance/VST/IA Frequency - Soil & Aggregate

Material Type	Spec Section	Test Reference	Acceptance Testing	VST	IA
Backfill	Contract Special Provisions				
Moisture Density Relations- Standard Proctor, Atterberg Limits & Grain Size Analysis (All Backfill Types)		VTM-1, VTM-7, & VTM-25	Done during project development	NA	Non required if performed in VDOT or AMRL accredited laboratory
One Point Proctor Check Compare to Nuclear Gauge		VTM 012	As needed.	NA	Run split sample when needed. 1 test per project to check procedure and equipment.
In Place Density Tests:					
Box Culverts, Pipes & other Drainage Structures	302,303	VTM-10	A minimum of one (1) test shall be performed per lift on alternating sides of the structure for each 300 linear ft. or portion thereof in structure length. This test pattern shall begin after the first 4-in. compacted layer above the structure's bedding and shall continue to one (1) foot above the top of the structure.	NA	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations.

<p>Abutments, Retaining Walls and MSE Walls</p>	<p>Sections 303,401</p>	<p>VTM-10</p>	<p>A minimum of two (2) tests every other lift up to 100 linear ft. shall be performed. Testing shall be performed behind these structures at a distance from the heel no farther than a length equal to the height of the structure plus 10 ft.</p> <p>For MSE Walls, Less than 100 linear ft. a minimum of one (1) test every other lift shall be performed. The testing shall be performed a minimum distance of 8 ft. away from the face of the wall, to within three feet of the back edge of the zone of the reinforced fill area. Test sites shall be staggered throughout the length of the wall to obtain uniform coverage. Testing shall begin after the first two (2) lifts of reinforced fill have been placed and compacted. Walls more than 100 linear ft., a minimum of two (2) tests every other lift not to exceed 200 linear ft. shall be performed.</p>	<p>NA</p>	<p>One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations.</p>
<p>SOILS/ EMBANKMENT</p>					

Moisture Density Relations- Standard Proctor, Atterberg Limits & Grain Size Analysis (Soils/Embankment)		VTM-1, VTM-7, & VTM-25	Done during project development	NA	1 test per year during production; minimally perform one (1) in first five (5) tests taken for QA
One Point Proctor Check Compare to Nuclear Gauge (Soils/Embankment)		VTM 012	As needed.	NA	1 test per year during production; minimally perform one (1) in first five (5) tests taken for QA
Embankment in Place Density (Soils/Embankment)	Sect. 303	VTM-10	The minimum number of field density tests required shall be one for each 2500 yd ³ or less of fill material placed, with the following additional requirements: (a) For fill areas less than 500 ft. in length, a minimum of one (1) field density test for every other 6-in. compacted layer from the bottom to the top of fill starting with the second lift. (b) For fills 500 to 2000 ft. in length, a minimum of two (2) field density tests for each 6-in. compacted layer within the top five (5) ft. of fill. (c) For fills greater than 2000 ft. in length, break into equal sections not to exceed 2000 ft. and test each section in accordance with (b) above.	NA	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations
Subgrade	Sec. 305	VTM-10	In the finished subgrade in both cut and fill sections, a minimum of one (1) test represented by the average of five nuclear density	NA	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment,

			readings shall be performed for each 2000 linear ft. of subgrade for each roadway (full width).		retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations
Aggregate Base and Subbase Material	VDOT Sections 306, 307, & 309				
Depth Checks		VTM-38	<p>For Method VTM-38A, one (1) depth test shall be conducted for each one-half (1/2) mile of stabilization per paver (mixer) application width. In other words, each separately applied width of stabilization, regardless of roadway width, shall require a series of tests.</p> <p>For method VTM-38B, the project shall be divided into lots, with each lot stratified, and the location of each test within the stratified section determined randomly. A lot of material is defined as the quantity being tested for</p>	NA	Minimum of one per project, unless quantity of individual material(Base, sub-base, etc.) is less than 500 tons per project, in which case no IA test required for that material

			<p>acceptance, except the maximum lot size shall be two (2) miles for each paver application width. The randomization procedure used shall be at the direction of the Engineer. (See VTM-38 for example.) Samples shall be taken from the lot at the following rate:</p> <p>Lot Size No. of Samples Required</p> <p>0 - 1 Mile 2</p> <p>1 - 1 1/2 Miles 3</p> <p>1 1/2 - 2 Miles 4</p>		
In Place Density		VTM-10	<p>When the subgrade, consisting of material-in-place or imported material other than aggregate base, subbase, or select material, is stabilized with cement or lime, one density test (average of 5 readings) shall be conducted for each one-half (1/2) mile of stabilization per paver (mixer) application width. In other words, each separately applied width of stabilization, regardless of roadway width, shall require a separate series of tests.</p>	NA	<p>One test per project, consisting of the average of 5 readings. Minimum of 5 readings per project, unless total quantity of individual material(Base, sub-base, etc.) is less than 500 tons per project, in which case no IA test</p>

<p>Treated Subgrade/Subbase, Aggregate Base Material, and Cement Treated Aggregate Base Material</p>	<p>VDOT Sections 306, 307, & 309</p>				
<p>Depth Checks</p>		<p>VTM-38</p>	<p>For Method VTM-38A, one (1) depth test shall be conducted for each one-half (1/2) mile of stabilization per paver (mixer) application width. In other words, each separately applied width of stabilization, regardless of roadway width, shall require a series of tests.</p> <p>For method VTM-38B, the project shall be divided into lots, with each lot stratified, and the location of each test within the stratified section determined randomly. A lot of material is defined as the quantity being tested for acceptance, except the maximum lot size shall be two (2) miles for each paver application width. The randomization procedure used shall be at the direction of the Engineer.</p>	<p>NA</p>	<p>Minimum of one per project, unless quantity of individual material(Base, sub-base, etc.) is less than 500 tons per project, in which case no IA test required for that material</p>

			(See VTM-38 for example.) Samples shall be taken from the lot at the following rate: Lot Size No. of Samples Required 0 - 1 Mile 2 1 - 1 1/2 Miles 3 1 1/2 - 2 Miles 4		
In Place Density		VTM-10	When the subgrade, consisting of material-in-place or imported material other than aggregate base, subbase, or select material, is stabilized with cement or lime, one density test (average of 5 readings) shall be conducted for each one-half (1/2) mile of stabilization per paver (mixer) application width. In other words, each separately applied width of stabilization, regardless of roadway width, shall require a separate series of tests.	NA	One test per project, consisting of the average of 5 readings. Minimum of 5 readings per project, unless total quantity of individual material(Base, sub-base, etc.) is less than 500 tons per project, in which case no IA test
Clearing and Grubbing	VDOT Section 301				
Ensure activities are confined to limits and seeded within 30 days of disturbance		N/A	Daily		Weekly

Erosion and Siltation Control	VDOT Section 303.03 & Current Virginia DCR Specifications				
Monitor for correct installation and Maintenance		N/A	Daily		After rain event
Undercut	VDOT Section 303.04				
Review area to determine need for undercut		N/A	Prior to start of work at each location	All reports reviewed by Locality Project Manager to verify qualified inspector and correct equipment	One (1) report reviewed per month during production to verify qualified inspector and qualified personnel
Measure undercut area		N/A	Prior to backfill at each location	All calculations/reports checked/reviewed by Locality Project Manager to verify qualified inspector and correct equipment	One (1) calculation/report checked/reviewed to verify qualified inspector and correct equipment
Overlay Sands					
Grade D Silica Sand	Special Provision		One bag per project tested in AMRL lab.	NA	NA

Acceptance/VST/IA Frequency - Hydraulic Cement Concrete

Material Type	Spec Section	Test Reference	Acceptance Testing	VST	IA
Cast-In-Place Structures and Bridge Concrete	VDOT Section 217				
Concrete Entrained Air Content (CIP Concrete)	217.08	ASTM C231 or C173	Test every load, except for bridge decks, in which case one test per truck-load for the first 3 trucks and then one test for every third truckload thereafter, provided results remain within 1.0% of median of design range. Test also required when making compressive specimens	NA	One test shall be made on the same batches of concrete from which cylinders are taken
Slump of Hydraulic Cement Concrete (CIP Concrete)	217.08	ASTM 143	Test every load and when making compressive specimens	NA	One test shall be made on the same batches of concrete from which cylinders are taken
Temperature of Concrete (CIP Concrete)	217.10	ASTM C1064	Test every load and when making compressive specimens	NA	One test shall be made on the same batches of concrete from which cylinders are taken

Compressive Strength of Concrete Cylinders (CIP Concrete)	217.08	ASTM C31 & C39	One set of three cylinders per every 100 CY and at least two sets of cylinders per structure per class of concrete.	NA	Minimum of one set per 1000 cubic yards of structural concrete. Not required for projects having less than 300 cubic yards. Cylinders should be from the same load as acceptance samples.
Chloride Permeability Concrete Cylinders (CIP Concrete)	Check Plan sheets	VTM-112	One set of two cylinders per every 100 CY and at least two sets of cylinders per structure per class of concrete.	NA	Non required if performed in VDOT or AMRL accredited laboratory
Concrete Reinforcing Steel (CIP Concrete) elongation, yield strength and ultimate strength	223	ASTM A615	Accepted based on certification provided by the fabricator. Verify manufacturer's certificates for every shipment for acceptance prior to placement.	One sample per project per manufacturer per most common size bar.	Non required if performed in VDOT or AMRL accredited laboratory
Pavement	VDOT Section 217				
Concrete Entrained Air Content (Pavement)	217.08	ASTM C231 or C173	One test per hour & when casting flexural specimens	NA	One test per four roadway miles or fraction thereof, with a minimum of one per project

Slump of Hydraulic Cement Concrete (Pavement)	217.08	ASTM 143	Two tests daily & when making flexural specimens	NA	One test shall be made on the same batches of concrete from which cylinders taken
Temperature of Concrete (Pavement)	217.10	ASTM C1064	One test per hour & when casting flexural specimens	NA	One test shall be made on the same batches of concrete from which cylinders taken.
Compressive Strength of Concrete Cylinders (Pavement)	217.08	ASTM C31 & C39	If pavement is accepted based on cylinder strength. One (1) set of three (3) cylinders cast for every 100 cy and at least one for each days concreting operation	NA	Minimum one set per 1000 cubic yards of structural concrete, except that IA will not be required for projects having less than 300 cubic yards.
Flexural Strength Beams	316.04	ASTM C293	If pavement is to be used as haul road or prior to 14 days then, At least one beam cast for each days concreting operation.	NA	NA
Concrete Reinforcing Steel (pavement) elongation, yield strength and ultimate strength	223	ASTM A615	Accepted based on certification provided by the fabricator. Verify manufacturer's certificates for every shipment for acceptance prior to placement.	One sample of two pieces 24 inches long from the most prevalent bar size per structure, with no two samples being the same size	Non required if performed in VDOT or AMRL accredited laboratory
Miscellaneous Concrete	VDOT Section 217				
Concrete Entrained Air Content (Miscellaneous Concrete)	217.08	ASTM C231 & C173	One test per day and when making compressive specimens	NA	NA

Slump of Hydraulic Cement Concrete (Miscellaneous Concrete)	217.08	ASTM C143	One test per day and when making compressive specimens	NA	NA
Temperature of Concrete (Miscellaneous Concrete)	217.10	ASTM C1064	One test per day and when making compressive specimens	NA	NA
Compressive Strength of Concrete Cylinders (Miscellaneous Concrete)	217.08	ASTM C31 & C 39	One (1) set of three (3) cylinders per every 250 CY and at least one set per day	NA	One (1) set of three (3) cylinders per every 25,000 CY (cumulative) minimum 1 per project.
Concrete Reinforcing Steel (Miscellaneous Concrete)	223	ASTM A615	Accepted based on certification provided by the fabricator. Verify manufacturer's certificates for every shipment for acceptance prior to placement.	One sample of two pieces 24 inches long from the most prevalent bar size per structure, with no two samples being the same size	Non required if performed in VDOT or AMRL accredited laboratory
Concrete Curing Materials	VDOT Section 220				
Burlap		AASHTO M182, class 3	Verification of LM # and lot numbers if from QA supplier Approved list 44, if not test one sample per lot number	NA	Non required if performed in VDOT or AMRL accredited laboratory
White liquid membrane Curing Compound		VTM - 2	Verification of LM # and batch numbers if from QA supplier Approved list 44, if not test one sample per batch number	NA	Non required if performed in VDOT or AMRL accredited laboratory
Fugitive Dye Liquid Membrane Curing Compound		VTM - 2	Verification of LM # and batch numbers if from QA supplier Approved list 44, if not test one sample per batch number	NA	Non required if performed in VDOT or AMRL accredited laboratory

Polyethylene Film		AASHTO M171	Verification of LM # and lot numbers if from QA supplier Approved list 44, if not test one sample per lot number	NA	Non required if performed in VDOT or AMRL accredited laboratory
-------------------	--	----------------	--	----	---

QC/VST/IA Frequency - Asphalt

Material Type	Spec Section	Test Reference	Contractor QC Testing	VST	IA
Asphalt Concrete Pavement	VDOT Section 315				
Pavement Density by Nuclear Method with In Place Pavement Density (Asphalt Pavement)		VTM-76, VTM-6	Establish Roller pattern, control strips and test sections, 10 stratified random density test sites per test section (5,000 ft.)	VST is performed on Twenty (20) percent of QC lots. Obtain two cores in one randomly selected QC lot out of five lots to verify in place density. Minimum one VST sample per project.	IA=10%*QC Readings Locality representative observe and witness QC testing to assure gauge is calibrated and accurate. Observe and verify test sites are random and match selected sites. Verify that QC tests are done using proper procedures. Observe one control strip per density technician and obtain all cores from control strip for reweighing in laboratory (randomly select a minimum 10% of cores) to confirm field density testing.

In Place Pavement Density (for all asphalt except Stone Matrix Asphalt (SMA))		VTM-006; VTM-32	Density - min. 1 core per location not long enough to establish roller pattern/control strip	Density - One (1) random core per 10 QC locations. Independent of contractor cores.	Obtain cores taken for density. Reweigh at least 10% of these cores in laboratory to confirm density. Observe one (1) density determination per ten (10) locations performed by QC technician. Minimum 1 per project.
Depth Checks		VTM-32	Depth checks of surface and intermediate material required only if specific plan depths are called for, not when plans specify rate of application. One (1) per 1/2 mile per lane width, minimum one (1) test per roadway, maximum lot size 2 mile (4 tests)	NA	Select one (1) QC core per five (5) lots and remeasure thickness. A minimum of one (1) per project.
In Place Pavement Density and Depth Checks by cores for Stone Matrix Asphalt (SMA)		VTM-006	Establish trial section and test sections. Minimum of one (1) sample per 1,000 feet with a maximum of 5 samples per day/night's production for density and depth for test sections. Three (3) cores for test strip.	Two (2) stratified random cores per one day/ night production obtained independently of contractor. Minimum two (2) per project.	Locality Representative Independently weigh and measure a minimum of one (1) QC core per day/night's production Locality representative will observe the taking of these cores and will maintain control of these cores once obtained
Permanent Pavement Marking	VDOT Section 512		Contractor QC Testing	VST	IA

Permanent Pavement Marking - Preformed Tape		VTM-94	Daily perform VTM 94 at start up with periodic checks every three hours of operation	Randomly select three (3) ten foot in place sections of markings per day and measure thickness and width. Skip lines and edge lines are considered separately. Inspect PM for correct placement, straightness and edges. Observe the bead embedment, color (night and day) and brightness/reflectivity. Inspect structure of tape to ensure patterned waffles have not been damaged by roller	Review all C-85 reports during production to verify that plan quantities match application quantities and that daily measurements are performed according to VTM 94.
Permanent Pavement Marking - Liquid Materials (Paint, thermoplastic and epoxy)		VTM-94	Daily perform VTM 94 at start up with periodic checks every three hours of operation	Randomly select three (3) ten-foot in place sections of markings per day and measure thickness and width. Skip lines and edge lines are considered separately. Inspect PM for correct placement, straightness and edges. Observe the bead embedment, color (night and day) and brightness/reflectivity. Review application rates to ensure proper thickness has been applied	Review start up calibrations. Ensure one plate sample is taken and tested for thickness, width, bead distribution and embedment. Retain sample for further testing if needed. Review all C-85 reports during production to verify that calculated quantities match application rates and that daily measurements are performed according to VTM 94.

QC/VST/IA Frequency - Misc Roadway and Structure

Material Type	Spec Section	Test Reference	QC Testing	VST	IA
Pre-cast Structures	VDOT Section 404				
Verify bedding material is installed properly and that pre-cast materials are not chipped or cracked		N/A	Daily and when shipment arrives on project	Inspect Precast structure before backfilling operations begin.	Inspect Pre-cast structures when received on job site. Inspect bedding before setting structure.
Load Bearing Piles	VDOT Section 403				
Monitor operation and document blow counts		N/A	Continuously	Review documentation weekly.	Daily
Perform Center of Gravity Calculations		N/A	For each Foundation	one out of every twenty (20) foundations	one out of every ten (10) foundations
Structural Steel	VDOT Section 407				
Receive Bolts, sample, verify the documentation is complete and perform laboratory Skidmore, tension and galvanized coating testing	VDOT 226.02(h)		Each nut-bolt-washer (NBW) assembly lot shall be sampled at a minimum rate of 2 assemblies per NBW lot. The documentation	Ea. NBW assembly lot shall be tested, one bolt in direct tension, one assembly for galvanized coating and one nut and bolt for rotational capacity testing (Rot-	The documentation shall be reviewed to insure all parts are present and that the required tests have been performed by the producers and that the markings match the

			shall be collected from the bolt supplier and the galvanizer for each lot and supplied along with the samples to the QAM. QC personnel shall monitor the storage and conditions of the bolts to insure they remain in good well lubricated condition.	Cap) as per section 226	suppliers. The results of the VST shall be reviewed to insure the material passed the tests.
Verify daily Skidmore testing is performed IAW (in accordance with) proper procedures for each lot Note: NBW assembly may be reused after Skidmore testing in a connection if no defects are noted in visual inspection and the nut runs freely up the bolt for the full thread length - Only new NBW assemblies may be tested each day	VDOT 407.06(c)		Ea. Day & Ea. NBW lot (3 bolts per lot) used shall be Rot-Cap tested in the Skidmore device IAW proper procedures	Minimum three (3) NBW assemblies for each lot being installed shall be observed by the IA inspector	Three NBW assemblies from each lot shall be Rot-Cap tested at the QAMs lab independently each week during erection
Verify the installation crews are using proper installation procedures IAW specs. to tension the bolts	VDOT 407.06		Monitor ea. Crew (2-3 workers) during erection to insure proper technique (TOTN – turn-of-the-nut or DTI – direct tension indicating washers) is followed	NA	Monitor ea. Crew (2-3 workers) for a half dozen NBW assemblies once at the beginning of each four hour work period
Verify the bolted connections have been tensioned properly using statistical sampling frequency and a calibrated torque wrench	VDOT 407.06(c)4	ASTM 325	For each connection, test 10% or a minimum of 2 NBW assemblies verifying the required torque. Complete testing before the deck is formed.	Test 2 NBW assemblies in 25% of the slip critical connections (minimum of 2 connections per splices) and 2 NBW assemblies in 10% of the secondary member connections	Monitor all the torque testing for each main member connection (slip-critical connections) and at the beginning of each period where secondary members are being checked.

Rebar Splicer (Tension Test)		ASTM A615	1 sample per manufacturer per most common size per structure (Contractor is to install pieces)	NA	Verify Machine Calibration annually
Protective Coating of Metal Structures	VDOT Section 411		Contractor QC testing	VST	IA
Monitor surface preparation		SSPC-PA	Three surface profile measurements per day of blasting.	Review all reports showing the preparation protocols	Two (2) surface profile measurements per week of blasting.
check coating thickness according to SSPC -PA		SSPC-PA	Five(5) spot measurements (15 Readings) per day as defined in PA-2 for coating thickness after each layer of paint at each location	Review all reports showing-painting application rates including the tests performed on profiles and thicknesses.	One spot measurement (3 readings) as defined in PA-2 for coating thickness after each layer of paint at each location
Underdrains	VDOT Section 501				
Inspect to ensure no deficiencies		VTM 108	All accessible outlet locations; Additionally a minimum of 10% of longitudinal sections	One (1) every twenty-five (25) outlet locations. A minimum of one per project independent of IA.	Observe 10% of outlet locations; Additionally a minimum of 1% of longitudinal sections
Guardrail	VDOT Section 505				
Verify that guardrail is installed per specifications and at proper height			Daily	Spot-check every 50 linear feet for proper height	Spot-check every 500 linear feet for proper height.

Fencing	VDOT Section 507				
Verify fencing type, height and location		N/A	Daily	Weekly	
Barbed Wire	VDOT Section 242	ASTM A121	One sample every 50 rolls or spools	NA	NA
Chainlink Fence	VDOT Section 242	AASHTO M181	One sample from 3 rolls for every 50 rolls.	NA	NA
ROW Monuments	VDOT Section 503				
Verify monument type and location		N/A	10% of ROW monuments	1% of ROW monuments	
Maintenance of Traffic	VDOT Section 512				
Monitor installation and maintenance and use Work Zone Safety Checklist		N/A	Daily (Locality Inspector)	Weekly (Locality Project Manager)	
Sound Wall Barriers	VDOT Section 519				
Verify location and installation with shop drawings		N/A	Daily	Weekly	
Topsoil and Seeding	VDOT Section 602/603				

Verify proper material is utilized at application rates from plans		N/A	Daily	Weekly	
Traffic Signs	VDOT Section 512				
Verify that signs meeting current standards are utilized in locations per plans		N/A	Daily	Weekly	
Traffic Signals	VDOT Section 703				
Monitor installation for conformance with plans and specifications		N/A	Daily	Weekly	
Water and Sewer Facilities	VDOT Section 520				
Monitor installation for conformance with plans and specifications		N/A	Daily	Weekly	
Electrical and Signal Components	VDOT Section 238				
Tether Wire		ASTM A475	One sample per project	NA	NA
Span Wire		ASTM A475	One sample per project	NA	NA
Masonry	VDOT Section 202				
Wall Units			one sample consisting of 10 units per 10,000	NA	NA

		units		
--	--	-------	--	--

- Verification testing shall be required if contractor's workforce performs QC testing that is used for Acceptance testing. If Locality or its consultant performs Acceptance testing, Verification testing shall not be required.
- IA testing shall be conducted by different personnel and different equipment than used for the QC/acceptance testing, QC/acceptance sampling or Verification testing.