

EXECUTION VERSION

**I-95 Express Lanes - Opitz Boulevard Ramp
("Opitz") Project**

**Exhibit C-6
Technical Requirements**

**Attachment 1.5b
Standards and Specifications**

EXECUTION VERSION

The standards and specifications, special provisions, and reference guides applicable for the Construction Period shall be the version of those documents as noted herein below or those in effect as of the final issuance date of the RFP for the Opitz Construction Contract, including all supplements, errata, revisions, and interims. Following the Work Period, all subsequent design and construction must meet the standards and specifications current at the time the Work is performed. Groupings of standards are for ease of reference only and certain reference documents have been included. It is the responsibility of the Concessionaire to ensure that all relevant standards and specifications have been applied.

The Concessionaire must verify and use the latest version of the documents listed herein. The Concessionaire shall meet or exceed the minimum design standards and criteria.

A. Standards, Specifications, and Reference Documents

General

1. AASHTO Guide Specifications for Highway Construction, 9th Edition
2. VDOT Materials Approved Lists
3. VDOT Construction Manual (May 2016)
4. VDOT Post Construction Manual (December 2016)
5. VDOT Construction Inspection Manual (March 2018)
6. VDOT's Minimum Requirements for Quality Assurance & Quality Control on Design-Build & Public-Private Transportation Act Projects (July 2018)
7. VDOT Traffic Engineering Design Manual (2020)
8. VDOT Right of Way Manual of Instructions, Third Edition (May 11, 2016; Revised August 8, 2020)
9. VDOT Utility Manual of Instructions – Utility Relocation Policies and Procedures, Eleventh Edition (October 1, 2016; Revised August 14, 2017)
10. VDOT Land Use Permit Regulations Guidance Manual (May 20, 2013)
11. VDOT Land Use Permit Regulations 24 VAC 30-151 (March 17, 2010)
12. VDOT Policy Manual for Public Participation in Transportation Projects (July 2020)
13. VDOT Instructional & Information Memorandums (IIM) – All Divisions (as of date of RFP)
14. VDOT Road and Bridge Standards, Vol. 1 and Vol. 2 (2016; Revised December 2021),
15. VDOT Road and Bridge Specifications (2020) (Divisions II – VIII only)
16. VDOT Supplements to the 2020 Road and Bridge Specifications (Divisions II – VIII only)
17. VDOT Virginia Work Area Protection Manual 2011 Edition (Revision 2: September 1, 2019)

EXECUTION VERSION

18. FHWA 23 CFR 630, Subpart J - Workzone Safety and Mobility
19. 2010 ADA Standards for Accessible Design
20. Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way, dated (July 26, 2011)
21. Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities dated July 23, 2004 and amended May 7, 2014
22. VDOT Policy for Integrating Bicycle and Pedestrian Accommodations, adopted March 18, 2004 by the CTB
23. VDOT State Bicycle Policy Plan (September 2011)
24. Transportation Research Board Highway Capacity Manual, 6th Edition (2016)
25. VDOT Manual of Instruction for Material Divisions (2016), including all associated memoranda
26. VDOT CADD Manual (Issued April 20, 2021)
27. VDOT Highway Traffic Noise Impact Analysis Guidance Manual – Version 8 (February 20, 2018)
28. FHWA Highway Traffic Noise Analysis and Abatement Guidance (December 2011)
29. ISO 9001 Quality Management Systems (September 2015)
30. AASHTO Guide for Park-and-Ride Facilities, 2nd Edition October 2004
31. 2015 Virginia Uniform Statewide Building Code
32. Uniform Relocation Assistance and Real Property Act of 1970, as amended (as of date of RFP)
33. 1950 Code of Virginia, Titles 25.1 and 33.2, as amended (as of date of RFP)
34. VDOT Asbestos Project Monitoring and Clearance Air Monitoring Procedures
35. VDOT Guidelines for Management of Contaminated Soils Associated with Utility Installation and Maintenance Activities
36. VA Statewide Fire Prevention Code
37. Virginia Occupational Safety and Health Standards
38. National Fire Protection Association NFPA 70, National Electric Code NEC, 2020 Edition
39. National Fire Protection Association NFPA 502, Standard for Road Tunnels, Bridges, and other Limited Access Highways, 2020 Edition
40. National Fire Protection Association NFPA 58, Liquefied Petroleum Gas Code, 2020 Edition

Roadway Design

1. VDOT Road Design Manual (Issued January 2005, Revised July 2021)
2. AASHTO – A Policy on Geometric Design of Highways and Streets, 7th Edition (2018)
3. AASHTO – Roadside Design Guide, Fourth Edition, October 2011 (updated Chapter 6)
4. AASHTO – A Policy on Design Standards Interstate System, 2016
5. AASHTO – Guide for High-Occupancy Vehicle (HOV) Facilities, 3rd Edition (2004)
6. AASHTO – Guide for the Development of Bicycle Facilities, 4th Edition (2012)
7. AASHTO – Guide for the Planning, Design, and Operation of Pedestrian Facilities, July 2004
8. AASHTO – Update to the Guide for the Planning, Design, and Operation of Pedestrian Facilities, October 2010

Geotechnical and Pavement Design

1. VDOT Soil Design Parameters for Sound Barrier Walls, Retaining Walls and Non-Critical Slopes – January 10, 2019
2. AASHTO Guide for Design of Pavement Structures 4th Edition with 1998 Supplement (Rigid Pavement and Flexible Pavement) (1993 Edition and subsequent revisions)
3. AASHTO Manual on Subsurface Investigations 1st Edition (1998)
4. VDOT Pavement Design Guide for Subdivision and Secondary Roads (Revised August 2018)
5. VDOT Manual of Instruction for Materials Division (as of date of RFP)
6. VDOT Manual of Structure and Bridge Division, Part 11 Geotechnical Manual for Structures (February 2017)
7. FHWA 23CFR626 - Part 626 Pavement Policy – April 7, 2011
8. Development and Implementation of Pavement Condition Indices for the Virginia Department of Transportation: Phase I – Flexible Pavements – September 2002
9. AASHTOWare Pavement ME, Version 2.2.6 and VDOT’s AASHTOWare Pavement ME User Manual, dated September 2017
10. AASTHO LRFD Bridge Design Specifications (8th Edition - 2017)
11. ASTM Standards, Soil and Rock, Volumes 04.08 and 04.09
12. ASTM Standards, Concrete and Aggregates, Volume 04.02
13. US Army Corps of Engineers Laboratory Soils Testing EM-1110-2-1906
14. Duncan, J.M. (April 2000), Factors of Safety and Reliability in Geotechnical Engineering, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Discussions and Closure August 2001

EXECUTION VERSION

15. Virginia Test Method 106 – Ride Quality Testing on Ride Specifications Projects – (Pavement Design) – May 1, 2001

Structures

1. VDOT Manual of Structure and Bridge Division, Parts 1 through 12 (as of date of RFP)
2. AASHTO Guide Specification for LRFD Seismic Bridge Design, 2nd Edition, 2012; 2014 and 2015 Interim Revisions
3. AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017; and VDOT Modifications
4. AASHTO Standard Specifications for the Design of Highway Bridges, 16th Edition, 1996; 1997 and 1998 Interim Specifications; and VDOT Modifications
5. AASHTO Construction Handbook for Bridge Temporary Works, 2nd Edition, 2017
6. AASHTO Guide Design Specifications for Bridge Temporary Works, 2nd Edition, 2017, with 2020 Interim Revisions
7. AASHTO Manual for Bridge Evaluation, 3rd Edition, 2018, 2019, and 2020 Interim Revisions
8. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition, 2013 with 2015, 2019, and 2020 Interim Revisions
9. AASHTO Guide Specifications for Structural Design of Sound Barriers, – 1989 with 1992 and 2002 Interim Revisions
10. FHWA Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signals (March 2005), FHWA NHI 05-036
11. FHWA Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges, December 1995, including Errata sheets and Revisions
12. VDOT Inventory and Appraisal Coding Guide for Virginia’s Structures – February 2021
13. FHWA 23CFR625 – Design Standards for Highways (December 1995, including Errata sheets and Revisions)
14. FHWA 23CFR630 Subpart B – Plans, Specifications, and Estimates
15. FHWA 23CFR650 - Subpart C – National Bridge Inspection Standards (“NBIS”)
16. Stage I - Plan Review Check List – October 2018
17. VDOT Structure and Bridge Stage I Bridge Report Form (current version)
18. Stage II - Plan Review Check List – October 2018
19. AASHTO LRFD Guide Specifications for Design of Pedestrian Bridges, 2nd Edition with 2015 Interim Revisions; and VDOT Modifications

EXECUTION VERSION

20. AASHTO LRFD Bridge Construction Specifications, 4th Edition, 2017 with 2020 Interim Revisions
21. AASHTO Guide for Protective Screening of Overpass Structures, 2nd Edition, 1990
22. AASHTO Guide Specifications for Seismic Isolation Design, 4th Edition
23. AASHTO Guide Specifications for Highway Bridge Fabrication with HPS 70W (HPS 485W) Steel, 3rd Edition, 2011.
24. AASHTO Manual for Bridge Element Inspection, 2nd Edition, with 2019 Interim Revisions
25. AASHTO Guide Specifications - Thermal Effects in Concrete Bridge Superstructure, 1st Edition, 1989
26. AASHTO/AWS D1.5M/D1.5: Bridge Welding Code, 8th Edition, 2020
27. AASHTO/NSBA Steel Bridge Collaboration Shop Detail Drawing Presentation Guidelines, G1.3 - 2002
28. ANSI/AWS D1.2/D1.2M: Structural Welding Code - Aluminum, current edition
29. ANSI/AWS D1.1/D1.1M: Structural Welding Code - Steel, current edition
30. gINT Manual
31. NCHRP Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features
32. AASHTO Manual for Assessing Safety Hardware, 2nd Edition, 2016
33. AASHTO/FHWA Joint Implementation Plan for the AASHTO Manual for Assessing Safety Hardware, 2009
34. VDOT Supplement to the AASHTO Manual for Bridge Element Inspection, 2016
35. VDOT Memorandum – Asbestos Containing Materials on Bridges – October 23, 2009
36. Virginia Department of Transportation Asbestos Inspection Procedures, dated May 14, 2004
37. PCI Recommended Practice for Lateral Stability of Precast, Prestressed Concrete Bridge Girders, 1st Edition, 2016, CB-02-16
38. FHWA Engineering for Structural Stability in Bridge Construction, 2015, FHWA-NHI-15-044
39. AASHTO Guide Specifications for Wind Loads on Bridges During Construction, 1st Edition, 2017
40. AASHTO/NSBA Steel Bridge collaboration S10.1-2019 Steel Bridge Erection Guide Specification

Drainage

1. VDOT 2002 Drainage Manual (including current Errata Sheets) and revisions (Revised January 2021)

EXECUTION VERSION

2. 2013 Virginia Stormwater Management Handbook, Second Edition, Virginia Department of Environmental Quality
3. Virginia Stormwater BMP Clearinghouse (2011 Design Specifications), Virginia Department of Environmental Quality
4. Virginia Erosion and Sediment Control Handbook (Third Edition – 1992), Department of Conservation and Recreation [now Virginia Department of Environmental Quality]
5. FHWA Hydraulic Design Series Number 2 (HDS-2), Highway Hydrology, October 2002
6. FHWA Hydraulic Design Series Number 4 (HDS-4), Introduction to Highway Hydraulics, June 2008
7. FHWA Hydraulic Design Series Number 5 (HDS-5), Hydraulic Design of Highway Culverts, 2012
8. FHWA Hydraulic Design Series Number 6 (HDS-6), River Engineering for Highway Encroachments, 2001
9. FHWA Hydraulic Engineering Circular Number 14 (HEC-14), Hydraulic Design of Energy Dissipaters for Culverts and Channels, 2006
10. FHWA Hydraulic Engineering Circular Number 15 (HEC-15), Design of Roadside Channels with Flexible linings, Third Edition, 2005
11. FHWA Hydraulic Engineering Circular Number 21 (HEC-21), Design of Bridge Deck Drainage Systems, 1993
12. FHWA Hydraulic Engineering Circular Number 22 (HEC-22), Urban Drainage Design Manual, 2009, Revised August 2013
13. FHWA Culvert Design for Aquatic Organism Passage (HEC-26), 2010
14. USDA, NRCS, Urban Hydrology for Small Watersheds, TR-55, June 1986
15. FHWA Culvert Inspection Manual, 1986
16. Virginia Erosion and Sediment Control Law and Regulations
17. FEMA National Flood Insurance Program Regulations
18. Virginia SWM Law (as listed in the Code of Virginia)
19. Virginia SWM Regulations (as listed in the Virginia Administrative Code)
20. U.S. Environmental Protection Agency, EPA Stormwater Management Model (EPA SWMM), Version 5.1

Traffic Control Devices and Lighting

1. USDOT FHWA Standard Highway Signs, 2004 Edition and 2012 Supplement
2. 2009 Manual of Uniform Traffic Control Devices (MUTCD), Revisions 1 and 2 (May 2012) and 2011 Virginia Supplement to MUTCD, Revision 1 (September 2013)
3. AASHTO Roadway Lighting Design Guide, 7th Edition (October 2018)

EXECUTION VERSION

4. ANSI/IESNA RP-8-18 Roadway Lighting
5. Virginia Standard Highway Signs, Revision 1, March 2015
6. VDOT Traffic and Ancillary Structures Inventory and Inspection Manual 2014
7. VDOT Traffic Operations and Safety Analysis Manual (TOSAM) Version 2.0 (February 2020)
8. VDOT Traffic Engineering Division Numbered Memoranda (Traffic Engineering and Mobility Management) including announcements from the Northern Region of the Virginia Department of Transportation

Miscellaneous

1. VDOT Survey Manual (Issued 2009, Revised August 2019)
2. VDOT Guardrail Installation Training Manual (GRIT), Published August 2017, Revised August 2019

ITS

1. Institute of Electrical and Electronics Engineer (IEEE) 802.3 Local and Metropolitan Area Networks
2. National Electric Manufacturers Association (NEMA) TS-4 Hardware Standards for Dynamic Message Signs (DMS) with NTCIP Requirements
3. IEEE 1512-2006 - IEEE Standard for Common Incident Management Message Sets for Use by Emergency Management Centers, IEEE 1512.1-2006 – IEEE Standard for Common Traffic Incident Management Message Sets for Use by Emergency Management Centers
4. National Transportation Communications for ITS Protocol (NTCIP)
5. VDOT Northern Region Operations ITS Architecture
6. I-95 and I-495 Express Lanes Tolling and Traffic Management System (TTMS) Project TMS Interface Control Document (ICD), Version: 1.5 – December 16, 2015
7. National Electrical Manufacturers Association (NEMA) Standards
8. Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) Standards and Specifications
9. Underwriters Laboratories (UL) Standards

B. Special Provision Copied Notes, Special Provisions, and Supplemental Specifications

1. VDOT 2020 Road and Bridge Specifications - Special Provision Copied Notes, Special Provisions and Supplemental Specifications
 - a. Division II – Materials

EXECUTION VERSION

- b. Division III – Roadway Construction
 - c. Division IV – Bridges and Structures
 - d. Division V – Incidental Construction
 - e. Division VI – Roadside Development
 - f. Division VII – Traffic Control Devices
 - g. Division VIII – Intelligent Transportation Systems
2. VDOT Supplemental Specifications for Section 200 - General - August 25, 2020
 3. VDOT Supplemental Specifications for Section 202 - Fine Aggregate - September 23, 2019
 4. VDOT Supplemental Specifications for Section 203 Coarse Aggregate – September 19, 2019
 5. VDOT Supplemental Specifications for Section 204 - Stone for Masonry, Riprap, Porous Backfill, and Gabions - February 22, 2019
 6. VDOT Supplemental Specifications for Section 206 - Lightweight Aggregate - September 23, 2019
 7. VDOT Special Provision for Section 208 - Subbase and Aggregate Base Material, Crushed Hydraulic Cement Concrete (CHCC) – January 10, 2019
 8. VDOT SPCN Table II-14 – June 4, 2020
 9. VDOT Special Provision for Cold Central Plant Recycling Material – December 12, 2018
 10. VDOT Special Provision for Massive Construction Hydraulic Cement Concrete (“Mass Concrete”) Operations – March 19, 2020
 11. VDOT Supplemental Specifications for Section 217 - Hydraulic Cement Concrete - September 27, 2019
 12. VDOT Supplemental Specifications for Section 223 - Steel Reinforcement – July 3, 2019
 13. VDOT Supplemental Specifications for Section 226 - Structural Steel - September 27, 2019
 14. VDOT Supplemental Specifications for Section 237 – Structure Bedding Material and Bearing Pads – July 27, 2020
 15. VDOT Special Provision for Jack and Bore – December 12, 2018
 16. VDOT Special Provision for Microtunneling – November 19, 2018

EXECUTION VERSION

17. VDOT Special Provision for Prefabricated Vertical Drains – December 18, 2018
18. VDOT Special Provision for Pipe Replacement – December 17, 2018
19. VDOT Special Provision for Use of Number 10 Screenings – November 14, 2018
20. VDOT Special Provision for Cement Treated Aggregate (CTA) Base – December 19, 2018
21. VDOT Special Provision for Type OGB (Open Graded Base) With Type I No. 21B Aggregate Material – November 14, 2018
22. VDOT SPCN Section 315.05(c) Placing and Finishing – January 18, 2017
23. VDOT Special Provision for BM-25.0D with Increased Asphalt Content – July 6, 2020
24. VDOT Special Provision for Pavement Shoulder Wedge – March 19, 2020
25. VDOT SPCN Section 317 - Stone Matrix Asphalt Concrete Placement – January 10, 2019
26. VDOT Special Provision for Clearing and Grubbing at Bridge Approaches – February 28, 2018
27. VDOT Supplemental Specifications for Section 401 - Structure Excavation – May 1, 2020
28. VDOT Special Provision for Dynamic Pile Testing for End Bearing Piles (LRFD) – November 14, 2018
29. VDOT SPCN Section 404 – Exposed Aggregate Finish – November 14, 2018
30. VDOT Special Provision for Elastic Inclusion – December 19, 2012
31. VDOT Supplemental Specifications for Section 406 – Reinforcing Steel – June 22, 2020
32. VDOT Supplemental Specifications for Section 407 - Steel and Other Metal Structures – August 29, 2019
33. VDOT Supplemental Specifications for Section 410 – Railings and Parapets – January 4, 2021
34. VDOT Supplemental Specifications for Section 412 - Widening, Repairing, and Reconstructing Existing Structures – May 11, 2020
35. VDOT SPCN Impact Attenuator – July 26, 2019
36. VDOT SPCN Section 512 - Maintaining Traffic – July 13, 2016
37. VDOT SPCN Temporary Contrast Markings – February 26, 2019
38. VDOT SPCN Uniformed Flaggers – November 14, 2018

EXECUTION VERSION

39. VDOT SPCN Section 512—Maintaining Traffic – November 19, 2018
40. VDOT SPCN Contractor Maintenance of Temporary Markings – June 13, 2017
41. VDOT Special Provision for Work Zone Traffic Control Management – November 14, 2018
42. VDOT Special Provision for Installation Of “Work Zone No Handheld Communication Devices” Signs – March 18, 2020
43. VDOT Supplemental Specifications for Section 512 - Maintaining Traffic – September 22, 2020
44. VDOT Special Provision for Modifications to AASHTO’S Sign Structure Specification – September 29, 2020
45. VDOT Special Provision for Mast Arm Hanger Assembly STD SM-3 and SMD-2 – July 12, 2016
46. VDOT Special Provision for Signal Head Module and Signal Head Backplate Replacement – August 20, 2019
47. VDOT Special Provision for Inlaid Pavement Markers – August 26, 2019
48. VDOT Special Provision for Light Emitting Diode (LED) Luminaires – November 14, 2018
49. VDOT Supplemental Specifications for Section 700 – Traffic Engineering (General) - July 17, 2020
50. VDOT Supplemental Specifications for Section 701 – Traffic Signs - October 20, 2020
51. VDOT Supplemental Specifications for Section 704 – Pavement Markings and Markers - September 3, 2020
52. VDOT Special Provision for SWPPP General Information Sheets – December 19, 2018
53. VDOT Special Provision for Reflection Crack Retardant Material – December 20, 2018
54. VDOT Special Provision for Low Density Cementitious Fill – December 20, 2018
55. VDOT Special Provision for Densified Aggregate Piers for Foundation Reinforcement – December 20, 2018
56. VDOT Special Provision for Densified Cement-Treated/Grouted Aggregate Pier Foundation Reinforcement – December 20, 2018
57. VDOT Special Provision for Geotechnical Instrumentation – December 20, 2018
58. VDOT Special Provision for Lime Modification of Soils – December 20, 2018

EXECUTION VERSION

59. VDOT Special Provision for Soldier Pile Retaining Walls – December 20, 2018
60. VDOT Special Provision for Secant Pile Tangent Pile (Drilled Shaft) Walls – December 20, 2018
61. VDOT Special Provision for Permanent Soil Nails – December 20, 2018
62. VDOT Special Provision for Reinforced Earth Walls with Low Density Cementitious Fill (LDCF) – June 2, 2020
63. VDOT Special Provision for Micropiles – December 20, 2018
64. VDOT Special Provision for Vibration Control and Monitoring of Existing Structures & Utilities During Construction – February 12, 2019
65. VDOT Special Provision for Drilled Shafts Using Self-Consolidating Concrete – December 20, 2018
66. VDOT Special Provision for Drilled Shafts – December 20, 2018
67. VDOT Special Provision for Quality Assurance/Quality Control (QA/QC) for the Construction of Deep Foundation Systems – December 20, 2018
68. VDOT Special Provision for Thermal Integrity Profiling of Drilled Shafts – February 20, 2015
69. VDOT Special Provision for Mechanically Stabilized earth Walls (Concrete Panel Facing) – February 2, 2017
70. VDOT Special Provision for Dismantling and Removing Existing Structures or Removing Portions of Existing Structures – December 20, 2018
71. VDOT Special Provision for Sound Barrier Walls – April 29, 2021
72. VDOT General Notes for Alternate Retaining Wall Plans – April 10, 2009
73. VDOT Guidelines for Preparation of Alternate Retaining Wall Plans – March 6, 2008
74. VDOT Special Provision for Architectural Finish, Concrete Form Liners and Color Stain Coating– April 29, 2021
75. VDOT Special Provision for Traffic Signal Installation – December 19, 2018
76. VDOT Special Provision for Intelligent Transportation System – Junction Boxes – December 20, 2018
77. VDOT Special Provision for Clearing and Grubbing – November 15, 2006
78. VDOT Special Provision for Sealing Cracks in Asphalt Concrete Surfaces or Hydraulic Cement Concrete Pavement – July 12, 2016

EXECUTION VERSION

79. VDOT Special Provision for Guidelines for Traffic Signal Timing Plan Submission Process – September 4, 2019
80. VDOT Special Provision for Bat Inventory for Bridge Repair or Demolition – December 7, 2018
81. VDOT Special Provision for Tree Removal Time of Year Restriction for Roosting Bat Habitat – November 19, 2018
82. VDOT Special Provision for Protection of Wood Turtle – June 19, 2019
83. VDOT Special Provision for Phase I and II Environmental Site Assessments – December 19, 2018
84. VDOT Special Provision for Asbestos Inspection Procedures – May 14, 2004
85. VDOT Special Provision for Asbestos Monitoring and Clearance Air Monitoring Procedures – May 14, 2004
86. VDOT Special Provision for Inspection of D-B Structures for Asbestos Containing Materials – July 17, 2017
87. VDOT Special Provision for Asbestos Removal and NESHAP-Related Demolition Requirements for Structures – September 9, 2020
88. VDOT Special Provision for Compensatory Mitigation Site Survey Data – April 11, 2017
89. VDOT Special Provision for Construction Record Documentation of Permanent SWM Facilities – November 14, 2018
90. VDOT SPCN for Protection of Bat Species – January 17, 2018
91. VDOT Special Provision for Removal of Asbestos from Bridge Structures – September 12, 2017
92. VDOT Special Provision for Removal or Connection of Asbestos Cement Pipe – July 12, 2016
93. VDOT Special Provision for Patching Hydraulic Cement Concrete Pavement – July 12, 2016
94. VDOT Special Provision for Sawing and Sealing Joints in Asphalt Overlays Over Jointed Concrete Pavements - July 12, 2016

C. Reference Documents

1. FHWA Geotechnical Engineering Circular No. 2 - Earth Retaining Systems, FHWA-SA-96-038 – Feb 1997

EXECUTION VERSION

2. FHWA Geotechnical Engineering Circular No. 4 - Ground Anchors and Anchored Systems, FHWA-IF-99-015, 1999
3. FHWA Geotechnical Engineering Circular No. 6, Shallow Foundations, September 2002, FHWA-SA-02-054
4. FHWA Geotechnical Engineering Circular No. 7 - Soil Nail Walls – Reference Manual, FHWA-NHI-14-007 – February 2015
5. FHWA Geotechnical Engineering Circular No. 10 - Drilled Shafts Construction Procedures and LRFD Design Methods, May 2010, FHWA NHI-10-016
6. FHWA Geotechnical Engineering Circular No. 11, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Volumes I & II, November 2009, FHWA-NHI-10-024 & 025
7. FHWA Permanent Ground Anchors, Volume 1, Final Report, FHWA-DP-90-068 – April 1990
8. FHWA Permanent Ground Anchors, Volume 2, Field Demonstration Project Summaries, FHWA-DP-90-068, April 1990
9. FHWA Manual of Subsurface Investigations, May 2002, FHWA NHI-01-031
10. FHWA Soil Nailing Field Inspectors Manual-Soil Nail Walls, FHWA-SA-93-068 – April 1994
11. FHWA The Osterberg Cell for Load Testing Drilled Shafts and Driven Piles, FHWA-SA-94-035, 1994
12. Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures (July 2015), FHWA-NHI-15-047
13. Load and Resistance Factor Design (LRFD) for Highway Bridge Substructures (May 2001), FHWA-NHI-08-036
14. Load and Resistance Factor Design (LRFD) For Highway Bridge Superstructures - Examples (August 2015), FHWA-NHI-15-058
15. LRFD for Highway Bridge Substructures and Earth Retaining Structures (Jan 2007), FHWA-NHI-05-095
16. Ground Improvements Reference Manual Volume I, FHWA-NHI-06-019 (as of date of RFP)
17. Ground Improvements Reference Manual Volume II, FHWA-NHI-06-020 (as of date of RFP)
18. Earth Retaining Structures (RM), FHWA-NHI-07-071, June 2008
19. Micropile Design and Construction Reference Manual (December 2005), FHWA-NHI-05-039
20. VDOT NRO Change and Clearance Interval Data Collection Processing Best Practices – July 17, 2015
21. VDOT NRO TEP No. 406.2 – Clearance Intervals – July 2015

EXECUTION VERSION

22. VDOT NRO TEP – Pedestrian Timing at Traffic Signals, December 8, 2011
23. VDOT NRO TEP – Pedestrians Accommodations at Traffic Signals, August 7, 2014
24. VDOT Traffic Calming Guide for Neighborhood Streets, 2002 (Revised September, 2018)
25. VDOT Detector Placement, January 13, 2005
26. VDOT NRO TEP – Pavement Marking at Intersections, July 20, 2012
27. VDOT NRO TEP – Hatch Marks on Non-Limited-Access Roadways, April 17, 2015
28. VDOT NRO TEP – Yellow Change and Red Clearance Intervals, January 7, 2013
29. VDOT NRO – 2015 Bicycle Marking Reference Guide (as of date of RFP)
30. VDOT NRO - Permit Process For Traffic Signal Construction (as of date of RFP)
31. American Water Works Association Standards (as of date of RFP)
32. FHWA - A Guide for HOT Lane Development, March 2003
33. ITE TMDD - Traffic Management Data Dictionary and Message Sets for External TMC Communication (TMDD and MS/ETMCC) (as of date of RFP)
34. VDOT DBE Program, July 2016
35. Virginia Department of Transportation CII/SSI Policy Guide for Employees, Vendors, Contractor or other Persons Accessing VDOT’s CII/SSI – March 2006 (Interim Revision November, 2009)
36. DMS Upgrade and Expansion Program *Concept of Operations*, February 25, 2008
37. VDOT NRO Vehicle Detector Master Plan, June 13, 2008
38. VDOT NRO CCTV Master Plan, June 2008
39. VDOT NRO CCTV Concept of Operations, June 2008
40. VDOT NRO Vehicle Detector Concept of Operations, May 14, 2008
41. FHWA 23 CFR PART 940—Intelligent Transportation System Architecture and Standards – January 8, 2001
42. VDOT ITS Projects – Systems Engineering and Architecture Compliance (Rule 940) Checklist (as of date of RFP)
43. Virginia Megaprojects Program Lane Closure Policy and Procedures, September 21, 2016