

CHESAPEAKE BAY
BRIDGE and TUNNEL DISTRICT



BID PROPOSAL AND CONTRACT
REPLACE VENT BUILDING UPS

PROJECT NUMBER: 0305
BID NUMBER: M-26-004

TABLE OF CONTENTS

BID DOCUMENTS

Instruction to Bidders
Contract
Fillable Bid Document
Appendix A- Title VI Evaluation Form

SPECIAL PROVISIONS

	<u>Page No.</u>
SP-1 - SUBMITTALS	SP-1
SP-2 - LIMITATIONS OF OPERATIONS	SP-2
SP-3 - PROGRESS MEETINGS	SP-3
SP-4 - CONSTRUCTION RECORD DRAWINGS	SP-3
SP-5 - ON-SITE TEMPORARY STORAGE	SP-3
SP-6 - WORK AROUND EXISTING UTILITIES	SP-3
SP-7 - PROTECTION OF EXISTING FACILITY	SP-4
SP-8 - MOBILIZATION	SP-4
SP-9 - PROJECT TIMELINE	SP-5
SP-10 - SUBSTITUTIONS	SP-5
SP-11 - PROJECT CLOSEOUT	SP-5

GENERAL PROVISIONS

SECTION 101 - DEFINITION OF TERMS	GP-1
SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS	GP-18
102.01 - Not Used	
102.02 - Content of Proposal	
102.03 - Not Used	
102.04 - Examination of Site of Work and Proposal	
102.05 - Preparation of Bid	
102.06 - Irregular Bids	
102.07 - Proposal Guaranty (Bid Bond)	
102.08 - Disqualification of Bidder	
102.09 - Withdrawal of Bid	
102.10 - Not Used	
102.11 - Public Opening Bids	
102.12 - Not Used	

TABLE OF CONTENTS (Continued)

SECTION 103	-	AWARD AND EXECUTION OF CONTRACTS	GP-25
103.01	-	Consideration of Bids	
103.02	-	Award of Contract	
103.03	-	Cancellation of Award	
103.04	-	Forfeiture of Proposal Guaranty	
103.05	-	Requirement of Contract Bond	
103.06	-	Contract Documents	
103.07	-	Failure to Furnish Bonds or Certificates of Insurance	
103.08	-	Contract Audit	
103.09	-	Execution of Contract	
103.10	-	Assignments, Transfers, or Assumptions of Contract	
SECTION 104	-	SCOPE OF WORK	GP-32
104.01	-	Intent of Contract	
104.02	-	Changes in Quantities or Alterations in the Work	
104.03	-	Differing Site Conditions	
SECTION 105	-	CONTROL OF WORK	GP-35
105.01	-	Notice to Proceed	
105.02	-	Pre-Construction Conference	
105.03	-	Authorities of Project Personnel, Communication and Decision Making	
105.04	-	Cooperation by Contractor	
105.05	-	Character Workers, Work Methods, and Equipment	
105.06	-	Subcontracting	
105.07	-	Cooperation of Contractor	
105.08	-	Cooperation with Regard to Utilities	
105.09	-	Cooperation among Contractors	
105.10	-	Plans and Working Drawings	
105.11	-	Conformity with Plans and Specifications	
105.12	-	Coordination of Plans, General Provisions, Special Provisions and Technical Specifications	
105.13	-	Not Used	
105.14	-	Maintenance during Construction	
105.15	-	Removing and Disposing of Structures and Obstructions	
105.16	-	Clean Up	
105.17	-	Inspection of Work	
105.18	-	Removal of Unacceptable and Unauthorized Work	
105.19	-	Submission and Disposition of Claims	

TABLE OF CONTENTS (Continued)

SECTION 106	-	CONTROL OF MATERIAL	GP-58
106.01	-	Source of Supply and Quality Requirements	
106.02	-	Material Delivery	
106.03	-	Local Material Sources (Pits and Quarries)	
106.04	-	Disposal Areas	
106.05	-	Rights For and Use of Materials Found on Project	
106.06	-	Samples, Tests, and Cited Specifications	
106.07	-	Plant Inspections	
106.08	-	Storing Materials	
106.09	-	Handling Materials	
106.10	-	Unacceptable Materials	
106.11	-	Materials Furnished by the Department	
106.12	-	Critical Materials	
SECTION 107	-	LEGAL RESPONSIBILITIES	GP-68
107.01	-	Laws to be Observed	
107.02	-	Permits, Certificates, and Licenses	
107.03	-	Not Used	
107.04	-	Not Used	
107.05	-	Patented Devices, Materials, and Processes	
107.06	-	Personal Liability of Public Officials	
107.07	-	No Waiver of Legal Rights	
107.08	-	Protecting and Restoring Property and Landscape	
107.09	-	Contractor's Responsibility for Utility Property and Services	
107.10	-	Restoration of Work Performed by Others	
107.11	-	Not Used	
107.12	-	Responsibility for Damage Claims	
107.13	-	Not Used	
107.14	-	Not Used	
107.15	-	Not Used	
107.16	-	Environmental Stipulations	
107.17	-	Construction Safety and Health Standards	
107.18	-	Sanitary Provisions	
107.19	-	Railway-Highway Provisions	
107.20	-	Not Used	
107.21	-	Size and Weight Limitations	
SECTION 108	-	PROSECUTION AND PROGRESS OF WORK	GP-96
108.01	-	Prosecution of Work	
108.02	-	Limitation of Operations	
108.03	-	Progress Schedule	
108.04	-	Determination and Extension of Completion Date	

TABLE OF CONTENTS (Continued)

108.05	-	Suspension of Work Ordered by the Engineer	
108.06	-	Failure to Complete on Time	
108.07	-	Default of Contract	
108.08	-	Termination of Contract	
108.09	-	Acceptance	
108.10	-	Termination of Contractor's Responsibilities	
SECTION 109	-	MEASUREMENT AND PAYMENT	GP-108
109.01	-	Measurement of Quantities	
109.02	-	Not Used	
109.03	-	Scope of Payment	
109.04	-	Payment for Non-Significant Changes and Additional Units of In-Scope of Work	
109.05	-	Payment for Contract Changes	
109.06	-	Not Used	
109.07	-	Eliminated Items	
109.08	-	Partial Payments	
109.09	-	Payment for Material on Hand	
109.10	-	Final Payment	

TECHNICAL SPECIFICATIONS

DIVISION 09 FINISHES

SECTION 095113	-	ACOUSTICAL PANEL CEILING	
PART 1	-	GENERAL	095113-1
1.1	-	Summary	095113-1
1.2	-	Action Submittals	095113-1
1.3	-	Delivery, Storage, and Handling	095113-1
PART 2	-	PRODUCTS	095113-1
2.1	-	Performance Requirements	095113-1
2.2	-	Acoustical Panels	095113-2
2.3	-	Metal Suspension System	095113-2
2.4	-	Accessories	095113-2
2.5	-	Metal Edge Molding and Trim	095113-3
PART 3	-	EXECUTION	095113-3
3.1	-	Examination	095113-3
3.2	-	Preparation	095113-3
3.3	-	Installation of Acoustical Panel Ceilings	095113-3
3.4	-	Cleaning	095113-5

TABLE OF CONTENTS (Continued)

DIVISION 23 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 230000	-	MECHANICAL AND PLUMBING GENERAL PROVISIONS	
PART 1	-	GENERAL	230000-1
1.1	-	Related Documents	230000-1
1.2	-	Codes and Standards	230000-1
1.3	-	Permits, Inspections, Fees and Notices	230000-2
1.4	-	Scope of Work	230000-2
1.5	-	Drawings and Specifications	230000-2
1.6	-	Wording	230000-3
1.7	-	Definitions	230000-3
1.8	-	Submittals	230000-4
1.9	-	Manufacturer's Instructions	230000-5
1.10	-	Additional Requirements	230000-6
PART 2	-	PRODUCTS	230000-6
2.1	-	Manufacturing Standards	230000-6
2.2	-	Electrical Requirements	230000-6
2.3	-	Motors and Motor Controls	230000-7
PART 3	-	EXECUTION	230000-7
3.1	-	Schedule of Work	230000-7
3.2	-	Building Openings for Admission of Equipment	230000-8
3.3	-	Work in Existing Buildings	230000-9
3.4	-	Storage and Protection	230000-9
3.5	-	Transportation and Handling	230000-10
3.6	-	Cleaning	230000-10
3.7	-	Electrical Requirements	230000-10
3.8	-	Equipment Connections	230000-11
3.9	-	System Start-Up	230000-11
3.10	-	Completion of Work	230000-11
3.11	-	Guarantee of Work	230000-11
SECTION 230500	-	MECHANICAL AND PLUMBING BASIC MATERIALS AND METHODS	
PART 1	-	GENERAL	230500-1
1.1	-	General Conditions	230500-1
1.2	-	Work Included	230500-1
1.3	-	Applicable Publications	230500-1
1.4	-	Submittals	230500-1
PART 2	-	PRODUCTS	230500-1
2.1	-	Acceptable Manufacturers	230500-1
2.2	-	Piping and Equipment	230500-2
2.3	-	Fabricated Steel Supports	230500-2

TABLE OF CONTENTS (Continued)

PART 3	-	EXECUTION	230500-2
3.1	-	General	230500-2
3.2	-	Piping and Equipment Identification	230500-2
3.3	-	Fabricated Steel Supports	230500-3
3.4	-	Placing of Equipment	230500-3
SECTION 230517	-	SLEEVES AND SLEEVE SEALS FOR HVAC PIPING	
PART 1	-	GENERAL	230517-1
1.1	-	Summary	230517-1
1.2	-	Action Submittals	230517-1
PART 2	-	PRODUCTS	230517-1
2.1	-	Sleeves	230517-1
2.2	-	Sleeve-Seal Systems	230517-1
2.3	-	Grout	230517-2
PART 3	-	EXECUTION	230517-2
3.1	-	Sleeve Installation	230517-2
3.2	-	Sleeve-Seal-System Installation	230517-3
3.3	-	Sleeve and Sleeve-Seal Schedule	230517-3
SECTION 230719	-	HVAC PIPING INSULATION	230719-1
PART 1	-	GENERAL	230719-1
1.1	-	Summary	230719-1
1.2	-	Action Submittals	230719-1
1.3	-	Quality Assurance	230719-1
PART 2	-	PRODUCTS	230719-1
2.1	-	Insulation Materials	230719-1
2.2	-	Insulating Cements	230719-2
2.3	-	Adhesives	230719-2
2.4	-	Mastics	230719-4
2.5	-	Sealants	230719-5
2.6	-	Factory-Applied Jackets	230719-7
2.7	-	Field-Applied Fabric-Reinforcing Mesh	230719-7
2.8	-	Field-Applied Jackets	230719-7
2.9	-	Tapes	230719-8
2.10	-	Securements	230719-10
PART 3	-	EXECUTION	230719-10
3.1	-	Preparation	230719-10
3.2	-	General Installation Requirements	230719-11
3.3	-	Penetrations	230719-12
3.4	-	General Pipe Insulation Installation	230719-13
3.5	-	Installation of Flexible Elastomeric Insulation	230719-14
3.6	-	Installation of Mineral-Fiber Preformed Pipe Insulation	230719-15

TABLE OF CONTENTS (Continued)

3.7	-	Field-Applied Jacket Installation	230719-16
3.8	-	Finishes	230719-16
3.9	-	Field Quality Control	230719-17
3.10	-	Piping Insulation Schedule, General	230719-17
3.11	-	Indoor Piping Insulation Schedule	230719-17
3.12	-	Outdoor, Aboveground Piping Insulation Schedule	230719-18
3.13	-	Indoor, Field-Applied Jacket Schedule	230719-18
3.14	-	Outdoor, Field-Applied Jacket Schedule	230719-18
 SCHEDULE 238127 - DUCTLESS SPLIT-SYSTEM AIR-CONDITIONERS			
PART 1	-	GENERAL	238127-1
1.1	-	Related Documents	238127-1
1.2	-	Summary	238127-1
1.3	-	Action Submittals	238127-1
1.4	-	Informational Submittals	238127-1
1.5	-	Closeout Submittals	238127-2
1.6	-	Maintenance Material Submittals	238127-2
1.7	-	Quality Assurance	238127-2
1.8	-	Coordination	238127-2
1.9	-	Warranty	238127-3
PART 2	-	PRODUCTS	238127-3
2.1	-	Manufacturers	238127-3
2.2	-	Wall Mounted Indoor Unit	238127-3
2.3	-	Outdoor, Air-Source Condensing Units (3 Tons or Less Nominal Capacity)	238127-5
2.4	-	Controls	238127-7
PART 3	-	EXECUTION	238127-7
3.1	-	Installation	238127-7
3.2	-	Connections	238127-8
3.3	-	Field Quality Control	238127-8
3.4	-	Startup Service	238127-9
 SECTION 260500 - ELECTRICAL GENERAL REVISIONS			
PART 1	-	GENERAL	260500-1
1.1	-	Related Documents	260500-1
1.2	-	Codes and Standards	260500-1
1.3	-	References	260500-1
1.4	-	Definitions of Acronyms	260500-4
1.5	-	Scope of Work	260500-4
1.6	-	Drawings	260500-5
1.7	-	Permits, Inspection and Tests	260500-6
1.8	-	Submittals	260500-6

TABLE OF CONTENTS (Continued)

PART 2	-	PRODUCTS	260500-7
2.1	-	Manufacturing Standards	260500-7
2.2	-	Motors and Equipment	260500-7
2.3	-	Temporary Electrical Service	260500-8
2.4	-	Grounding	260500-8
PART 3	-	EXECUTION	260500-8
3.1	-	Schedule of Work	260500-8
3.2	-	Storage and Materials	260500-8
3.3	-	Labeling of Equipment	260500-9
3.4	-	Coordination	260500-9
3.5	-	Guarantee of Work	260500-9
3.6	-	Final Acceptance	260500-10
SECTION 260519	-	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES	
PART 1	-	GENERAL	
1.1	-	Summary	260519-1
PART 2	-	PRODUCTS	260519-1
2.1	-	Conductors and Cables	260519-1
2.2	-	Connectors and Splices	260519-1
PART 3	-	EXECUTION	260519-1
3.1	-	Conductor Material Applications	260519-1
3.2	-	Conductor Insulation Applications and Wiring Methods	260519-1
3.3	-	Installation of Conductors	260519-2
3.4	-	Connections	260519-2
3.5	-	Field Quality Control	260519-2
SECTION 260526	-	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS	
PART 1	-	GENERAL	260526-1
1.1	-	Summary	260526-1
1.2	-	Quality Assurance	260526-1
PART 2	-	PRODUCTS	260526-1
2.1	-	Conductors	260526-1
2.2	-	Connectors	260526-1
PART 3	-	EXECUTION	260526-2
3.1	-	Applications	260526-2
3.2	-	Grounding at the Service	260526-2
3.3	-	Equipment Grounding	260526-2
3.4	-	Installation	260526-2
3.5	-	Labeling	260526-2
3.6	-	Field Quality Control	260526-3

TABLE OF CONTENTS (Continued)

SECTION 260529	-	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS	
PART 1	-	GENERAL	260529-1
1.1	-	Summary	260529-1
1.2	-	Performance Requirements	260529-1
1.3	-	Quality Assurance	260529-1
PART 2	-	PRODUCTS	260529-1
2.1	-	Support, Anchorage, and Attachment Components	260529-1
PART 3	-	EXECUTION	260529-2
3.1	-	Application	260529-2
3.2	-	Support Installation	260529-2
3.3	-	Concrete Bases	260529-3
 SECTION 260533	-	 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS	
PART 1	-	GENERAL	260533-1
1.1	-	Summary	260533-1
1.2	-	Action Submittals	260533-1
PART 2	-	PRODUCTION	260533-1
2.1	-	Metal Conduits, Tubing, and Fittings	260533-1
2.2	-	Boxes, Enclosures, and Cabinets	260533-2
PART 3	-	EXECUTION	260533-2
3.1	-	Raceway Application	260533-2
3.2	-	Installation	260533-3
3.3	-	Protection	260533-4
 SECTION 560544	-	 SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING	
PART 1	-	GENERAL	260544-1
1.1	-	Summary	260544-1
PART 2	-	PRODUCTS	260544-1
2.1	-	Sleeves	260544-1
2.2	-	Sleeve-Seal Systems	260544-1
2.3	-	Grout	260544-2
PART 3	-	EXECUTION	260544-2
3.1	-	Sleeve Installation for Non-Fire-Rated Electrical Penetrations	260544-2
3.2	-	Sleeve-Seal-System Installation	260544-3
3.3	-	Sleeve-Seal-Fitting Installation	260544-3
 SECTION 260533	-	 IDENTIFICATION FOR ELECTRICAL SYSTEMS	
PART 1	-	GENERAL	260553-1
1.1	-	Summary	260553-1
1.2	-	Quality Assurance	260553-1

TABLE OF CONTENTS (Continued)

PART 2	-	PRODUCTS	260553-1
2.1	-	Conductor Identification Materials	260553-1
2.2	-	Floor Marketing Tape	260553-2
2.3	-	Warning Labels and Signs	260553-2
2.4	-	Equipment Identification Labels	260553-2
2.5	-	Miscellaneous Identification Products	260553-2
PART 3	-	EXECUTION	260553-2
3.1	-	Installation	260553-2
3.2	-	Identification Schedule	260553-3
SECTION 260573	-	OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY	
PART 1	-	GENERAL	260573-1
1.1	-	Summary	260573-1
1.2	-	Submittals	260573-1
1.3	-	Quality Assurance	260573-1
PART 2	-	PRODUCTS	260573-1
2.1	-	Computer Software Program Requirements	260573-1
PART 3	-	EXECUTION	260573-2
3.1	-	Power System Data	260573-2
3.2	-	Fault-Current Study	260573-3
3.3	-	Coordination Study	260573-4
SECTION 262200	-	LOW-VOLTAGE TRANSFORMERS	
PART 1	-	GENERAL	262200-1
1.1	-	Summary	262200-1
1.2	-	Submittals	262200-1
1.3	-	Closeout Submittals	262200-1
1.4	-	Quality Assurance	262200-1
PART 2	-	PRODUCTS	262200-1
2.1	-	Manufacturers	262200-1
2.2	-	General Transformers Requirements	262200-2
2.3	-	Distribution Transformers	262200-2
2.4	-	Identification Devices	262200-2
PART 3	-	EXECUTION	262200-2
3.1	-	Installation	262200-2
3.2	-	Field Quality Control	262200-3
3.3	-	Adjusting	262200-3
SECTION 262416	-	PANELBOARDS	
PART 1	-	GENERAL	262416-1
1.1	-	Summary	262416-1
1.2	-	Submittals	262416-1

TABLE OF CONTENTS (Continued)

1.3	-	Closeout Submittals	262416-1
1.4	-	Quality Assurance	262416-1
PART 2	-	PRODUCTS	262416-1
2.1	-	General Requirements for Panel Boards	262416-1
2.2	-	Distribution and Lighting and Appliance Branch Circuit Panel Boards	262416-2
2.3	-	Disconnecting and Overcurrent Protective Devices	262416-3
PART 3	-	EXECUTION	262416-3
3.1	-	Installation	262416-3
3.2	-	Identification	262416-3
3.3	-	Field Quality Control	262416-4
SECTION 262726	-	WIRING DEVICES	
PART 1	-	GENERAL	262726-1
1.1	-	Summary	262726-1
1.2	-	Administrative Requirements	262726-1
PART 2	-	PRODUCTS	262726-1
2.1	-	Manufacturers	262726-1
2.2	-	General Wiring-Device Requirements	262726-1
2.3	-	Straight-Blade Receptacles	262726-1
2.4	-	GFI Receptacles	262726-2
2.5	-	Toggle Switches	262726-2
2.6	-	Wall Plates	262726-2
2.7	-	Finishes	262726-2
PART 3	-	EXECUTION	262726-2
3.1	-	Installation	262726-2
3.2	-	Field Quality Control	262726-4
SECTION 262816	-	ENCLOSED SWITCHES AND CIRCUIT BREAKERS	
PART 1	-	GENERAL	262816-1
1.1	-	Summary	262816-1
1.2	-	Submittals	262816-1
1.3	-	Quality Assurance	262816-1
PART 2	-	PRODUCTS	262816-1
2.1	-	Fusible Switches	262816-1
2.2	-	Non-Fusible Switches	262816-2
2.3	-	Molded-Case Circuit Breakers	262816-2
2.4	-	Enclosures	262816-2
PART 3	-	EXECUTION	262816-3
3.1	-	Installation	262816-3
3.2	-	Field Quality Control	262816-3

TABLE OF CONTENTS (Continued)

SECTION 263353	-	STATIC UNINTERRUPTIBLE POWER SUPPLY	
PART 1	-	GENERAL	263353-1
1.1	-	Summary	263353-1
1.2	-	Action Submittals	263353-1
1.3	-	Informational Submittals	263353-1
1.4	-	Closeout Submittals	263353-2
1.5	-	Quality Assurance	263353-2
1.6	-	Warranty	263353-2
PART 2	-	PRODUCTS	263353-2
2.1	-	Operational Requirements	263353-2
2.2	-	Performance Requirements	263353-4
2.3	-	UPS Systems	263353-5
2.4	-	Surge Suppression	263353-6
2.5	-	Rectifier-Charger	263353-6
2.6	-	Inverter	263353-6
2.7	-	Controls and Indications	263353-6
2.8	-	Static Bypass Transfer Switch	263353-8
2.9	-	Battery	263353-8
2.10	-	Basic Battery Monitoring	263353-8
2.11	-	Battery-Cycle Warranty Monitoring	263353-9
2.12	-	Source Quality Control	263353-9
2.13	-	Communications	263353-9
PART 3	-	EXECUTION	263353-10
3.1	-	Installation	263353-10
3.2	-	Grounding	263353-10
3.3	-	Battery Initialization	263353-10
3.4	-	Field Quality Control	263353-11
3.5	-	Demonstration	263353-12
SECTION 265100	-	INTERIOR LIGHTING	
PART 1	-	GENERAL	265100-1
1.1	-	Summary	265100-1
1.2	-	Submittals	265100-1
1.3	-	Quality Assurance	265100-1
PART 2	-	PRODUCTS	265100-1
2.1	-	Manufacturers	265100-1
2.2	-	General Requirements for Lighting Fixtures and Components	265100-1
2.3	-	LED Drivers	265100-2
2.4	-	LED Fixtures	265100-2
2.5	-	Lighting Fixture Support Components	265100-3
PART 3	-	EXECUTION	265100-3
3.1	-	Installation	265100-3

DRAWINGS

Title Sheet	T-001	Sheet 1 of 13
Location Map	G-001	Sheet 2 of 13
General Notes	E-001	Sheet 3 of 13
General Notes	E-002	Sheet 4 of 13
Partial One-Line Diagram-Building #3-Demolition	ED100	Sheet 5 of 13
Electrical Equipment Room Floor Plan-Demolition	ED201	Sheet 6 of 13
Fan Room Floor Plan-Demolition	ED202	Sheet 7 of 13
Tunnel Lighting Control Room Floor Plan-Demolition	ED203	Sheet 8 of 13
Partial One-Line Diagram-Building #3-New Work	E100	Sheet 9 of 13
Electrical Equipment Room Floor Plan-New work	E201	Sheet 10 of 13
Fan Room Floor Plan-New Work	E202	Sheet 11 of 13
Tunnel Lighting Control Room Floor Plan-New Work	E203	Sheet 12 of 13
Details and Schedules	E801	Sheet 13 of 13

INSTRUCTION TO BIDDERS

SCOPE OF WORK

The work generally includes: Installation of four (4) new 40kVa Uninterruptible Power Supply (UPS) units, one each at the four (4) Ventilation Buildings at the Chesapeake Bay Bridge and Tunnel. Minor building renovations to accommodate the new UPS units to include minor demolition work, installation of new transformers, new ductless split system heat pump, lighting, ceiling and associated cabling and conduit to connect the new equipment to the existing building systems.

SUBMISSION OF BIDS

Sealed bids for this project will be received until 2:00 p.m. on October 30, 2026 in the office of the Director of Maintenance, Chesapeake Bay Bridge and Tunnel District, 32386 Lankford Highway, Cape Charles, Virginia 23310, Attention: Mr. Timothy R. Holloway, at which time the bids will be publicly opened.

Bids may also be submitted electronically online via eVA using the Bidder's established eVA Supplier account. To learn how to submit an online bid in eVA please refer to the online supplier training page at: <https://eva.virginia.gov/supplier-training-materials.html>, however the District prefers that you submit sealed bids to us as reference in first paragraph in Submission of Bids.

Bids must be submitted with the project number, bid number, name of bidder, and the opening date clearly marked on the outside face of the envelope; otherwise, your bid will be opened upon receipt in order to determine the inquiry to which it is applicable. The project number for this project is 0305 and the bid number for this project is M-26-004.

PRE-BID CONFERENCE

A **mandatory** pre-bid conference will be held on October 6, 2026, at 10:00 a.m. It will be held at the Chesapeake Bay Bridge and Tunnel District Administration Building, located at the North Toll Plaza, U.S. Route 13, Northampton County, VA. The pre-bid conference is open to all interested potential contractors, subcontractors and/or suppliers. Interested parties should contact Mr. Timothy R. Holloway, Director of Maintenance, by phone at (757) 331-2960 at least two days in advance of the conference date in order to arrange for toll-free passage.

NOTE: Attendance at the pre-bid conference and site visitation is **mandatory** for Bidders and a prerequisite for submitting a bid. Bidders shall register in writing with the District at the pre-bid conference. Failure on the part of a Bidder to attend the pre-bid conference for this project and to register their attendance with the District will be cause for their bid to be rejected. Such bids will not be opened, but will be returned to the Bidder. Please bring a Hard Hat, Safety Vest and harness, for the mandatory site visitation portion of the pre-bid conference.

PROJECT SCHEDULE REQUIREMENTS

All project work shall be completed within 548 calendar days following the issuance of the Notice to Proceed.

PLANS AND SPECIFICATIONS

Plans and Specifications for this project are available on the District's website at <https://www.cbbt.com/requests-for-proposals/> . To bid you must complete the required **Fillable Bid Document** that may be obtained on the District's webpage at <https://www.cbbt.com/requests-for-proposals/> . All addenda (if applicable) will be posted on the District's webpage at <https://www.cbbt.com/requests-for-proposals/>, no later than 10 calendar days prior to the date of bid submittal, to allow Bidders to contact their prospective subcontractors and suppliers prior to submission of the Bid. It is the responsibility of the Bidder to provide all appropriate plans, specifications, addenda (if applicable), and all other contract documents to proposed subcontractors and suppliers.

TOLLS

Bidders shall **not** include payment of Chesapeake Bay Bridge and Tunnel tolls in their Bid. The District will furnish passes to the successful contractor for his use, as needed, during the time limit set forth in the Contract.

INTERPRETATION OF DOCUMENTS

Any comments or questions concerning specifications or other provisions of this Request for Bid should be directed via email to Mr. Timothy R. Holloway, Director of Maintenance at tholloway@cbbt.com and shall be received at least 15 days prior to receipt of bid, October 15, 2026 with an answer to be given at least 10 days prior to bid, October 20, 2026. The District is not responsible for any explanation, clarification or approval made or given in any manner except by addendum. A copy of each addendum (if applicable) will be posted on the District's webpage at <https://www.cbbt.com/requests-for-proposals/>. Any addenda so issued are to be considered part of this bid, please insert date of any addenda on the Acknowledgement of Revisions page, which is included in the **Fillable Bid Document**.

SUBMITTAL REQUIREMENTS

The Bidders' attention is directed to the points noted herein, as compliance with all provisions is mandatory in order to be considered responsive. Sealed bids only, will be received for this project.

TO BID THIS PROJECT – PLEASE PERFORM THE FOLLOWING STEPS:

1. Download and read the project specifications: <https://www.cbbt.com/requests-for-proposals/>

2. Open and complete the Fillable Bid Document: <https://www.cbbt.com/requests-for-proposals/>
3. Print Completed Fillable Bid Document and sign it in the appropriate locations. Add your executed Certificate of Insurance. Place all in a sealed envelope.
4. Deliver sealed bid by 2:00 p.m. on October 30, 2026. Sealed bids for this project will be received until 2:00 p.m. on Friday, October 30, 2026 in the office of the Director of Maintenance, Chesapeake Bay Bridge and Tunnel District, 32386 Lankford Highway, Cape Charles, VA 23310, Attention: Mr. Timothy Holloway, at which time the bids will be publicly opened. The common delivery services, including priority mail, FedEx and UPS do not guarantee delivery to the lower Eastern Shore (Cape Charles area) by 2:00 p.m. Use of these services to deliver a proposal may result in delivery to the District after the submittal deadline.

Bids may also be submitted electronically online via eVA using the Bidder's established eVA Supplier Account.

To learn how to submit an online bid in eVA please refer to the online supplier training page at: <https://eva.virginia.gov/supplier-training-materials.html> , however the District prefers bids to be mailed or hand delivered to us as reference on page 1, under "Submission of Bids".

Bids must be submitted with the project number, bid number, name of Bidder, and the opening date clearly marked on the outside of the package. The project number for this project 0305 and the Bid No. is M-26-004.

5. Bids Conditioned by the Bidder with proposed alternates, other than those specified or permitted will **not** be considered.
6. The bid shall be prepared in accordance with all requirements of the project Specifications in their entirety.

AWARD OF CONTRACT

The District reserves the right to reject or cancel this solicitation and any or all bids, waive any information and irregularities in the bidding; to accept or reject any or all items of bid; and to accept other than the lowest bid should it be deemed to be in the best interest of the District.

The award of the contract, if it is awarded, will be made to the lowest responsible and responsive Bidder. In determining the lowest responsible and responsive Bidder, the following factors shall be considered:

1. The Bidder's total bid price to complete the Contract.
2. Ability, capability, and skills of the Bidder to perform the Contract work.

3. Proof that the Bidder can perform the Contract work promptly and within the time frame specified.
4. Character, integrity, reputation, judgment, experience, and efficiency of the Bidder and his proposed subcontractors.
5. The quality of performance of previous contracts.
6. The financial resources and ability of the Bidder to perform the contract work.
7. Ties between two lowest responsible and responsive Bidders will be decided by lot.
8. A bidder may withdraw a bid, provided the request for the withdraw is written and signed by a person (s) who qualifies to execute the bid. The request must be received by the District at least one hour prior to the time specified for receiving bids.

The anticipated timeline for this project is to receive bids on October 30, 2026 and recommend the lowest responsible and responsive bid to the Commission on November 10th. If awarded, the successful Bidder will be called the afternoon of November 10th with a verbal Notice of Award.

Within 15 days of Notice of Award, the District shall provide an executed Notice to Proceed.

Within 15 days of Notice of Award, the Successful Bidder shall provide the following:

- Payment & Performance Bonds in the General Provisions, Section 103.05.
- A signed Contract, which is included after the Instructions to Bidder Section of the Specifications.
- A draft Schedule of Values
- A draft Project Schedule
- Appendix A- Title VI Evaluation Form

CONTRACT

This **Contract**, dated this ____ day of _____, 2026, by and between the **Chesapeake Bay Bridge and Tunnel District** hereinafter called the Owner; and _____ (a corporation, or an unincorporated organization organized and existing under the laws of the State/ Commonwealth of Virginia or, an individual trading under the above name) hereinafter called the Contractor.

WITNESSETH: The Owner and Contractor, for the consideration stated herein, agree as follows:

A. Scope of Work

The work generally includes: Installation of four (4) new 40kVa Uninterruptible Power Supply (UPS) units, one each at the four (4) Ventilation Buildings at the Chesapeake Bay Bridge and Tunnel. Minor building renovations to accommodate the new UPS units to include minor demolition work, installation of new transformers, new ductless split system heat pump, lighting, ceiling and associated cabling and conduit to connect the new equipment to the existing building systems.

B. Guarantee

Unless otherwise specified in the Special Provisions, all materials and equipment, furnished by the Contractor, and all construction involved in this Contract are hereby guaranteed by the Contractor to be free from defects owing to faulty materials or workmanship for a period of two (2) years after date of Completion of the work. All work that proves defective, by reason of faulty material or workmanship within said period of two (2) years, shall be replaced by the Contractor free of cost to the Owner. These guarantees shall not operate as a waiver of any of the Owner's rights and remedies for default under or breach of the Contract which rights and remedies may be exercised at any time within the period of any applicable statute of limitations.

C. Contract Price

The Owner shall pay the Contractor as just compensation for the satisfactory performance of the Work, subject to any additions or deductions as provided in the Contract Documents, the unit and/or lump sum price as contained in the Bid Schedule attached hereto.

The Contract Price is _____ (\$_____) based upon unit and/or lump sum prices extended as herein contained.

D. Payments

The Chesapeake Bay Bridge Tunnel District will pay the Contract Price to the Contractor in the manner and at such times as set forth in the approved Progress Schedule, found in General Provision 108.03, and associated Schedule of Values.

E. Time

The undersigned Contractor agrees to complete all work under this Contract within the phased specified timelines on page 2 of the Instruction to Bidders, under Project Schedule Requirements.

F. Applicable Law/Compliance

1. Applicable Law

This Contract shall be deemed to be a Virginia contract and shall be governed as to all matters of validity, interpretations, obligations, performance, or otherwise, exclusively by the laws of the Commonwealth of Virginia, and all questions arising with respect thereto shall be determined in accordance with such laws. Regardless of where actually delivered and accepted, this Contract shall be deemed to have been delivered and accepted by the parties in the Commonwealth of Virginia.

2. Compliance with all Laws

Contractor shall comply with all Federal, state and local statutes, ordinances, and regulations, now in effect or hereafter adopted, in the performance of work set forth herein. Contractor represents that it possesses all necessary licenses and permits required to conduct its business and will acquire any additional license and permits necessary for performance of this Contract prior to the initiation of work. Contractor shall at all times observe all health and safety measures and precautions necessary for the sanitary and safe performance of the contract work.

3. Venue

Any and all suits for any claims or for any breach or dispute arising out of these Contract Documents shall be maintained in the appropriate court of competent jurisdiction in Northampton County, Virginia.

4. Environmental Considerations

Any cost or expense associated with environmentally related violations of the law, the creation or maintenance of a nuisance, or releases of hazardous substance, including but not limited to, the cost of any cleanup activities, removals, remediation, responses, damages, fines, administrative or civil penalties or charges imposed on the Owner, whether because of actions or suits by any governmental or regulatory agency or by any private party, as a result of the release of any hazardous substances, or any noncompliance with or failure to meet any Federal, state or local standards, requirements, laws, statutes, regulations or the law of nuisance by the Contractor (or its agents, officers, employees, subcontractors, consultants, sub-consultants, or any other persons, corporations, or legal entities employed, utilized, or retained by the Contractor) in the performance of this Contract or related

activities, shall be paid by the Contractor.

5. Non-Discrimination/Drug-Free Workplace Provisions

- a. Employment discrimination by Contractor shall be prohibited. Contractor agrees to comply with all Federal and State Laws. Furthermore, during the performance of this Contract, Contractor agrees as follows:
 - i. Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification/consideration reasonably necessary to the normal operation of Contractor.

Contractor will conform to the provisions of the Virginia Fair Employment Act of 1975, as amended, the Virginians With Disabilities Act, and the Code of Virginia § 2.2-4311.

If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the Contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body.

Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

- ii. Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that Contractor is an equal opportunity employer.
- iii. Notices, advertisements and solicitations placed in accordance with Federal law, rule or regulations shall be deemed sufficient for the purpose of meeting the requirements of this section.
- iv. Contractor will include the provisions of the foregoing subsections (i) and (ii), and (iii) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor

- b. During the performance of this Contract, Contractor agrees as follows:
- i. Contractor will provide a drug-free workplace for Contractor's employees.
 - ii. Contractor will post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.
 - iii. Contractor will state in all solicitations or advertisements for employees placed by or on behalf of Contractor that Contractor maintains a drug-free workplace.
 - iv. Contractor will include the provisions of the foregoing subsections (i), (ii) and (iii) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.
 - v. For the purposes of this section, "Drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession, or use of any controlled substance or marijuana during the performance of the contract."
- c. "The *Chesapeake Bay Bridge and Tunnel District (District)*, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies the Contractor, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award."
- d. The below adopted clauses were taken directly from, "**The United States Department of Transportation (USDOT) Standard Title VI/Non-Discrimination Assurances DOT Order No. 1050.2A, Appendix A**". During the performance of this Contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:
1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, the Federal Highway Administration, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. Non-discrimination: The Contractor, with regard to the work performed by it during the Contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the Contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. Information and Reports: The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the Federal Highway Administration, as appropriate, and will set forth what efforts it has made to obtain the information. (At a minimum, but not limited to, Contractor reporting shall include the District Title VI Evaluation Form, see attached Appendix A.)

5. Sanctions for Noncompliance: In the event of a Contractor's noncompliance with the Nondiscrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:

- i. withholding payments to the contractor under the contract until the contractor complies; and/or

- ii. cancelling, terminating, or suspending a contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Chesapeake Bay Bridge and Tunnel District to enter into any litigation to protect the interests of the Chesapeake Bay Bridge and Tunnel District. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

- e. The below clauses to be used were taken directly from, “**The United States Department of Transportation (USDOT) Standard Title VI/Non-Discrimination Assurances DOT Order No. 1050.2A, Appendix E**”.

During the performance of this Contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
2. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
3. Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
4. Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
5. The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
6. Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
7. The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and Contractors, whether such programs or activities are Federally funded or not);
8. Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
9. The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
10. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

11. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

12. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

G. Liquidated Damages

The damage and loss to the Owner resulting from failure of the Contractor to complete the Work within the time specified in this Contract, plus any extension of time granted, shall be as stipulated in Section 108.06 of the General Provisions, unless otherwise stated in the Special Provisions.

H. Component Parts of the Contract

This Contract includes all completed components of the Bid and Contract Documents as defined in Section 103.06 of the *General Provisions*. Certain portions of the project are revised by the Project Special Provisions included in the Contract Documents. Project Special Provisions shall control over all other Specifications, plans, and standard drawings.

I. Ownership of Documents

All data, sketches, charts, calculations, plans, specifications, electronic files, correspondence and other documents created or collected under the terms of the Contract Documents shall be considered “works for hire” for which the District owns the copyright. Design Documents shall become the District’s property upon preparation; Construction Documents shall become the District’s property upon delivery to the District; and other documents prepared or obtained by the Contractor in connection with the performance of its obligation under the Contract Documents, including studies, manuals, Record Drawings, technical and other reports and the like, shall become property of the District upon the Design Builder’s preparation or receipt thereof. Copies of Design Documents and Construction documents shall be furnished to the District upon preparation or receipt thereof by the Contractor.

J. Binding

This Contract shall be binding upon all parties hereto and their respective heirs, executors, and administrators, successors, and assigns.

K. Changes to the Contract

No provision of this Contract shall be changed, amended, modified, waived, or discharged except as agreed to in writing by the Chesapeake Bay Bridge and Tunnel

District and the Contractor.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be executed as of the day and first above written in (_____) counterparts each of which shall for all purposes be deemed an original.

<u>Chesapeake Bay Bridge and Tunnel District</u>	_____
Owner	Contractor
By: <u>Jeffrey B. Holland</u>	By: _____
Name	Name
Signature: _____	Signature: _____
Title: <u>Executive Director</u>	Title: _____
Attest: _____	Attest: _____
Address: _____	Address: _____

Contractor's Registration No.: _____ (Corporate Seal)

(If Contractor is a corporation or an unincorporated organization, attach evidence of authority to sign)

**CHESAPEAKE BAY
BRIDGE and TUNNEL DISTRICT**



FILLABLE BID DOCUMENT

PROJECT DESCRIPTION:

Replace Vent Building UPS

PROJECT NUMBER: 0305; BID NUMBER: M-26-004

(Name of Individual, Firm or Corporation)

CHESAPEAKE BAY BRIDGE AND TUNNEL DISTRICT

ACKNOWLEDGEMENT OF REVISIONS

Acknowledgement shall be made of receipt of any and all revisions and/or addenda pertaining to the above designated project which are issued by the District prior to the bid opening date shown herein. Failure to include this acknowledgement in the bidding may result in the rejection of your bid.

By signing this bid, the Bidder acknowledges receipt of the following revision and/or addenda to the bid and/or plans for the above designated project which were issued under cover letter(s) of the date(s) shown hereon:

1. Cover Letter of _____
(Date)
2. Cover Letter of _____
(Date)
3. Cover Letter of _____
(Date)

CHESAPEAKE BAY BRIDGE AND TUNNEL DISTRICT

WORK REFERENCES

The Bidder shall list at least three (3) similar projects performed in the past five (5) years. Each listed project shall include the name, address, contact person(s) and the telephone number of the Owner and Owner's representative for whom the work was performed, the description and value of the portion of the project with work of a similar nature. Each listed project shall also include the project location, completion date and the names of the Bidder's project manager and superintendent(s). If for any of the listed projects, the Bidder's participation was that of a subcontractor, the value of the subcontracted work performed by the Bidder shall be included. In such cases, the Owner of the project is the General Contractor.

Project Name: _____

Date of Project: _____ Project Value: _____

Contact Person: _____ Telephone Number: _____

Description of Work Performed: _____

Project Name: _____

Date of Project: _____ Project Value: _____

Contact Person: _____ Telephone Number: _____

Description of Work Performed: _____

Project Name: _____

Date of Project: _____ Project Value: _____

Contact Person: _____ Telephone Number: _____

Description of Work Performed: _____

CHESAPEAKE BAY BRIDGE AND TUNNEL DISTRICT

NON-COLLUSION AFFIDAVIT

THIS FORM must be completed, signed, notarized and returned with Bid; and failure to do so, may result in the rejection of your Bid. A separate form must be submitted by each principal of a joint venture Bid.

1. In preparing and submitting this Bid, I, the firm, corporation or officers, agents or employees thereof did not, either directly or indirectly, enter into any combination or arrangement with any person, firm or corporation or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free, competitive bidding in violation of the Sherman Act (15 U.S.C. Section 1) or Article 1.1 or Chapter 12 of Title 18.2 (Virginia Governmental Frauds Act), Sections 59.1-9.1 through 59.1-9.17 or Sections 59.1-68.6 through 59.1-68.8 of the Code of Virginia.

2. I, the firm, corporation or officers, agents or employees thereof have neither directly nor indirectly entered into any combination or arrangement with any person, firm or corporation or entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this Contract, the effect of which is to prevent competition or increase the cost of construction of this Contract.

During the preceding 12 months, I (we) have been a member of the following Highway Contractor's Associations, as defined in Section 33.1-336 of the Code of Virginia (1970). (If none, so state).

Name

Location of Principal Office

3. The undersigned is duly authorized by the Bidder to make the foregoing statements to be filed with Bids submitted on behalf of the Bidder for this Project.

Signed at _____, this _____ day of _____, 20 _____.

Name of Organization _____

By: _____

(Signature and Title)

State of _____

To-wit:

County (city) of _____,

I, _____, a Notary Public in and for the State and County (City) aforesaid, hereby certify

that this day _____ personally appeared before me and made oath that he is duly authorized to make the above statements and that such statements are true and correct:

Subscribed and sworn to before me this _____ day of _____, 20 _____.

Notary Public

My commission expires _____.

CHESAPEAKE BAY BRODGE AND TUNNEL DISTRICT

ITEMIZED BID

Replace Vent Building UPS

Item No.	Description	Qty	Unit	Unit Price	Total
A	Mobilization/Demobilization	1	LS	_____	_____
B	Vent Building #1 UPS, and Associated Work	1	LS	_____	_____
C	Vent Building #2 UPS, and Associated Work	1	LS	_____	_____
D	Vent Building #3 UPS, and Associated Work	1	LS	_____	_____
E	Vent Building #4 UPS, and Associated Work	1	LS	_____	_____
				Total	\$ _____

DISTRICT TITLE VI CONTRACTOR EVALUATION FORM

This Title VI Evaluation Form is used for both a Pre-award Review and Post-award Review. The Chesapeake Bay Bridge Tunnel District (District) is required to conduct routine assessments prior to releasing funds to ensure Title VI compliance. A pre- award review assists the District in determining whether applicants operate in a nondiscriminatory manner. Pre-award reviews can also be used to require applicants to take preventive measures to ensure that discrimination will not occur in their services as a condition of receiving contracts. Pre-award reviews represent a frontline approach to eliminating and preventing discrimination before it occurs.

Post-Award Reviews are generally conducted after a contractor begins the scope of work. However, to minimize the burden on the District's contractors, a form that serves as both a pre-award and post-award compliance tool is herein provided.

The District will also conduct on-site reviews of prime contractors periodically to ensure that the contractor remains in compliance with Title VI and to verify that the contractor has preventive measures to ensure Title VI compliance by their sub-contractors.

Name of Preparer:	Preparer's Title:
Phone #:	Email Address:
Name of Organization:	Address of Organization:

Type of Contractor/Organization: ☐ Private Organization ☐ Governmental Agency	☐ Supplier ☐ Other _____
---	---

Workforce for CBBT District Project

Total	% Minority	% Female
-------	------------	----------

Business Ownership/Control				
Minority	Yes ☐	No ☐	DBE Certified	Yes ☐ No ☐
Female	Yes ☐	No ☐	SWAM Certified	Yes ☐ No ☐

Does your organization currently have contracts or subcontracts with the District?	Yes ☐ No ☐
What is your organization's most recent date of District Title VI approval?	

Status of Project(s):	Value of current Contract(s):
-----------------------	-------------------------------

What does your organization have in place to ensure nondiscrimination in your CBBT District scope of work and your programs and services?
--

Virginia Workforce CONSULTANT EQUAL EMPLOYMENT OPPORTUNITY WORKFORCE ANALYSIS
--

Employment at this establishment – Report all permanent full and part-time employees including apprentices and on-the job trainees unless specifically excluded as set forth in the instructions. Enter the appropriate figures on all lines and in all columns. Blank spaces will be considered zeros.

[illegible]

Organization, Staffing, & Training

1. What type of services will your organization provide the CBBT District?
2. Identify the person responsible for the administration of Title VI policies and procedures (a Title VI Coordinator), and provide the name, position, and contact information.

Title VI/Nondiscrimination

1. Is your Title VI Coordinator, project managers, and other staff made aware of Title VI compliance and regulations relative to nondiscrimination in federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21 and the Federal Highway Administration's 23 Code of Federal Regulations 200? Please explain how they are made aware.
2. What procurement procedures does your organization have in place to ensure nondiscrimination in the selection and retention of subcontractors including procurements of materials and leases of equipment? *** Please note N/A is not an acceptable response, please provide a complete answer**
3. How does your organization notify your subcontractors and suppliers of their obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, national origin, sex, age, disability and low-income populations? *** Please note N/A is not an acceptable response, please provide a complete answer**
4. Are facilities and meeting areas fully accessible to persons with disabilities?
5. Does your organization have a system in place to accommodate persons with disabilities? If yes, how does your organization notify the public? If no, please explain. *** Please note N/A is not an acceptable response, please provide a complete answer**
6. How are limited English proficient persons made aware that they can receive translation services for access to services? *** Please note N/A is not an acceptable response, please provide a complete answer**

7. Has your organization been reviewed by any governmental agencies for compliance with Title VI and other laws and regulations? If yes, provide a copy of the letter identifying the review findings?
8. Does your organization receive federal assistance (grants, loans, donations of property, or detail of personnel) from any Federal government entity?
9. List any discrimination complaints and/or lawsuits received in Virginia during the reporting period. Include the basis for the complaint (ethnicity, gender, etc.) and summarize the outcome or resolution. If applicable, include a copy of the investigation report.

Disadvantaged Business Enterprises (DBE)

1. Did your organization award any contracts/subcontracts related to CBBT District work to DBEs during the reporting period?

☐ Yes ☐ No

If yes, provide the following:

1. The DBE's name and amount awarded.
2. Total # of contracts awarded to DBEs.
3. Total dollar amount of contracts awarded to DBEs.

I certify that the data given in this report is correct to the best of my knowledge.
(Report has to be submitted with original signature, not a photocopy.)

Signature:

(Authorized Officer)

(Title)

(Date)

For Office Use Only:

Provide award? Yes _____ No _____

Recommendations:

SPECIAL PROVISIONS

SP-1 SUBMITTALS

Contractor's submittals, including working plans and construction record drawings, shall be in accordance with Section 105.10 of the General Provisions, the Technical Specifications associated with this project, and the following:

1. **Submittal Log:** The Contractor shall submit to the District, within 30 days after Notice to Proceed, a schedule of specific dates for submission of working and shop drawings required by the General Provisions, the Technical Specifications, and these Special Provisions. This shall be prepared as a Submittal Log and the Submittal Log shall be updated and submitted with each new, revised, or re-submitted submission. At a minimum, the Submittal Log shall contain the following information:
 - a. Project Name/Reference
 - b. CBBT RMF Project Number
 - c. Submittal Number(s)
 - d. Submittal Name/Reference
 - e. Date of Submittal
 - f. Date of Submittal Return
 - g. Disposition of Submittal
 - a. Accepted
 - b. Accepted as Noted
 - c. Revise and Resubmit
 - d. Review not Required by Contract
 - e. Notes
2. **Progress Schedule:** in accordance with Section 108.03 of the General Provisions, shall be submitted no later than 30 days after the Notice of Award.
3. **Submittal Required Information:** Each submittal shall contain a cover sheet that at a minimum shall contain the following information:
 - a. CBBT Project Name
 - b. CBBT RMF Project Number
 - c. Date
 - d. Submittal Name/Reference
 - e. Specification Section / Drawing Reference
 - f. Submittal Number
 - a. Sequentially numbered (1, 2, 3, 4, etc.)
 - b. Resubmittals shall be noted with a letter suffix amended to the original submittal number (1a, 1b, 1c, etc.)

- c. Revisions: In the event Contractor chooses to modify a submittal, such as providing a material substitution after acceptance, the submittal shall be noted with the original submittal number and a “rev” suffix amended to the original submittal number (1 Rev1, 1Rev2 or 1a Rev1, etc.)
 - d. Clear space of a minimum 3-in. x 5-in. shall be provided for CBBT’s review stamp.
4. Submittal Format:
- a. Electronic file in pdf format and the file shall be named with the CBBT RMF Number_Submittal_Number (ex. 4444.0145_Submittal_01). The file numbers shall be updated with each re-submittal, or revision, as noted above.
 - b. Formatted to print
 - a. 8-1/2 x 11 portrait – manufacturer data, cut sheets, calculations, etc.
 - b. 11 x 17 landscape – drawings, large data tables, etc.
 - c. Emailed to the CBBT POC
 - d. All submittals shall be sent to the District:
 - a. tholloway@cbbt.com and drosales@cbbt.com
 - b. Attention: Mr. Timothy R. Holloway, Director of Maintenance
5. Each submittal shall have been reviewed by the Contractor prior to submittal to the District and shall bear the Contractor's stamp of approval.
6. The District will review for conformance with Contract Documents each submittal and shall return one (1) electronic copy duly marked within thirty (30) calendar days after receipt from the Contractor. The Contractor shall revise and resubmit any submittal returned to him for correction after review by the District.

SP-2 LIMITATIONS OF OPERATIONS

All vehicles crossing the facility to deliver equipment, materials or supplies for this project shall comply fully with the limitations stated in the current edition of the Virginia Department of Transportation publication entitled *Size, Weight and Equipment Requirements for Trucks, Trailers and Towed Vehicles*. Any vehicles that are scheduled to be used, which do not meet these criteria may be used only with the written permission of the District. In requesting permission from the District to use non-complying vehicles, the Contractor shall specify whether the non-complying equipment will enter the facility from the south or north end. The District may require that any non-complying vehicles be accompanied by an escort, the cost of which will be borne by the District. The vertical clearance in both tunnels is 13 feet-6 inches.

SP-3 PROGRESS MEETINGS

The District will establish and conduct monthly progress meetings with representatives of the Contractor. More frequent or less frequent meetings shall be held to the extent that the District reasonably determines that construction conditions make it advisable to do so. These meetings will be onsite and maintained throughout the entire construction period until final Project inspection by the District and for the primary purposes of assessing the progress of the Contractor's work, recommending such remedial actions as are necessary to maintain its progress within the Project schedule, and discussing the Contractor's and its subcontractors' respective safety performance. Unless otherwise directed by the District, on site attendance shall include the following Contractor personnel (and, if necessary, its corresponding subcontractors' personnel): Project Manager, designated Safety Representative, and Superintendents as may be appropriate to meet agenda requirements.

SP-4 CONSTRUCTION RECORD DRAWINGS

The Contractor shall maintain, in readable condition at the project, one complete set of plans, specifications and working drawings for his work including all shop drawings. Such drawings and specifications shall be available for use by the District or his authorized representative.

As the work progresses, the Contractor shall keep a complete record of any and all variations between actual Project installations and Contract Plans and Specification requirements. Upon the completion of the Project, an electronic set of drawings and/or a spreadsheet, whichever better demonstrates the work performed, and specifications shall be marked in red to show all such variations and shall be **submitted** to the District in pdf format **within 30 days of final acceptance.**

SP-5 ON-SITE TEMPORARY STORAGE

The District will provide space on #3 Island, or an area in the Maintenance Yard (to be designated by the District) for storage of materials and equipment. The Contractor will not be allowed, under any circumstances, to store any materials or equipment in any of the ventilation buildings or in the tunnels. The materials and equipment must be securely stowed in the storage area to prevent their movement by high winds. Furthermore, all materials and equipment must be removed from the storage area at least 5 days in advance of any time for which the National Weather Service predicts winds within a 20-mile radius of the storage site to exceed a speed of 75 mph. If the portal island is utilized, a two-lane width (24-ft minimum) travel-way for vehicular traffic must also be maintained around the storage area along the length of the portal island and through the security gates.

SP-6 WORK AROUND EXISTING UTILITIES

The Contractor shall immediately notify the District Representative of any damage done to the existing or newly installed utilities (equipment, conduits, wiring, cabling, cable trays, etc.) during any portion of the work. If utility service is interrupted due to Contractor activity, repair work shall be continuous until service is restored. All repair work shall be done in accordance with District specifications and requires approval by the District prior to

commencing the repair work. The Contractor shall be responsible for any damage to any utilities that are attributable to his neglect or methods of performing the work and make appropriate repairs, as approved by the District, at no additional cost to the District.

SP-7 PROTECTION OF EXISTING FACILITY

During the progress of the work, the Contractor shall provide temporary protection as is determined appropriate to protect the existing facility and equipment from damage due to Contractor activity. All costs associated with this Work shall be considered as incidental to other items of Work.

The Contractor shall immediately notify the District Representative of any damage done to the facility or equipment during any portion of the work. If damage does occur, repair work shall be continuous until service is restored. All repair work shall be done in accordance with District specifications and requires approval by the District prior to commencing the repair work. The Contractor shall be responsible for any damage to any facility components that are attributable to his neglect or methods of performing the work and shall make appropriate repairs, as approved by the District, at no additional cost to the District.

The Contractor shall contain all materials used during the remediation operations and the cleaning process, as well as all materials removed from the structures. The Contractor shall not allow any of the materials to run or be drawn into or rest upon any existing electrical equipment, onto the portal island surface, or into the Chesapeake Bay. The Contractor shall be responsible for clean-up of spills and uncontained construction material and debris at no additional cost to the District. Containment Plans shall be developed and included in the General Work Plan, considering all methods/stages of construction, including demolition, cleaning, preparation and repair and shall be submitted to the District for approval. Contractor shall be responsible for the repair or replacement of any damages caused by the demolition and construction activities. Particular focus shall be taken to prevent the following:

- Damage to existing equipment in the ventilation buildings.
- Any concrete dust created entering the ventilation or electrical/mechanical equipment.

If the Contractor fails to keep construction materials or debris out of the building, tunnel drains or out of existing mechanical and electrical equipment, the Contractor shall perform any clean up necessary and/or make appropriate repairs, including possible equipment rebuilding or replacement, as approved by the District, at no additional cost to the District. The Contractor shall take all appropriate measures to assure that dust, debris, liquid and particulate resulting from demolition or any other Contract work, will not come into contact with switchgear and/or any other electrical/mechanical equipment.

SP-8 MOBILIZATION

Mobilization shall be in accordance with VDOT's Road and Bridge Specifications, Section 513.

SP-9 PROJECT TIMELINE

The project duration shall be 548 Calendar days from the Notice to Proceed.

SP-10 SUBSTITUTIONS

1. The Contractor may recommend substitutions for certain materials after the bid has been awarded. This should not be perceived as an allowance to bid on a different system/product than what is described in the Specifications. Recommendations shall be based on one or both of the following:
 - a. Alternative materials to improve quality, schedule or pricing.
 - b. Exceptions to the Specifications covering materials, manner of application, or other details.
2. To recommend substitutions regarding the above subjects the Contractor shall:
 - a. Submit a written description of proposed changes or modifications to the District for review. In accordance with SP-1 Submittals, the District requires 30 days for review of proposed substitutions.
 - b. Include catalog data sheets as a minimum and shop drawings, samples and other supportive information as necessary for the District to evaluate the proposed materials.
 - c. The District will review any substitution requests and will be the sole judge in determining whether the proposed item meets is considered equal to the specified item. The Districts' decision regarding the proposed substitution shall be final.
 - d. It is the Contractor's responsibility to notify and receive written approval from the District for substitutions that deviate from contract documents.
 - e. Do not proceed with proposed changes or modifications until authorized to do so by the District in writing. The cost of work performed on proposed changes or modifications without the District's written approval will be at the Contractor's expense, as well as any cost for correcting such unauthorized work.

SP-11 PROJECT CLOSE OUT

1. General
 - a. The requirements set forth herein are in addition to and shall be considered as complementary to the balance of Specifications and the Contract Drawings.
 - b. Compliance with the requirements of this Section is a condition precedent to the issuance of Final Payment.

2. Final Cleanup
 - a. Perform final cleaning prior to Final Completion, as applicable, including but not limited to the following activities:
 - i. Leave the work area(s) and storage site(s) ready for use by the District and without the need of further cleaning of any kind.
 - ii. Remove all tools, appliances, equipment, waste, surplus materials, and rubbish.
 - iii. Remove all temporary construction equipment and materials.
3. Certification
 - a. Prior to acceptance of Work, submit a written notification to the District certifying that:
 - i. Work has been completed in accordance with these Specification and Drawings.
 - ii. Work has been inspected for compliance with these Specification and Drawings.
 - iii. Work is completed and ready for final inspection.
4. The District will inspect to verify the status of completion after receipt of such certification.
5. Should the District consider that the Work is incomplete or defective:
 - a. The District will notify the Contractor in writing, by form of a punch list, listing the incomplete or defective Work.
 - b. The Contractor shall take immediate steps to remedy the stated deficiencies and send a second or subsequent written certification to the District stating that the Work is complete.
 - c. The District will re-inspect the Work.
6. Upon completion of the Work, the District will direct the Contractor to submit closeout documents.
7. Closeout Documentation
 - a. Documentation of startup performance test results.
 - b. All data and manuals for the UPS shall be provided to the District.
 - c. Operation and Maintenance Manuals.
8. Final Application for Payment
 - a. Upon Final Completion of the Work, as determined by the District, the Contractor may request Final Payment in accordance with the Contract Terms and Conditions.

Division I
GENERAL PROVISIONS

SECTION 101—DEFINITIONS OF ABBREVIATIONS, ACRONYMS, AND TERMS

101.01—Abbreviations and Acronyms

In these Specifications and other Contract Documents, the following abbreviations and acronyms shall be interpreted as follows:

AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ABS	Acrylonitrilebutadienestyrene (an elastomer)
AC	Alternating current
ACI	American Concrete Institute
ADT	Annual average daily traffic
AED	Associated Equipment Distributors
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APA	Engineered Wood Association
API	American Petroleum Institute; American Pipe Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American wire gage
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BOCA	Building Officials and Code Administrators
C	Celsius, when preceded by “degree(s)”
CABB	Contractor Advertisement Bulletin Board
CBR	California bearing ratio
CRSI	Concrete Reinforcing Steel Institute
DBE	Disadvantaged Business Enterprise
DC	Direct current
DHV	Design hourly volume
ECTC	Erosion Control Technology Council
EEL	Edison Electric Institute
EEO	Equal employment opportunity
EIA	Electronic Industries Alliance
EPA	Environmental Protection Agency
EPDM	Ethylenepropylenedienemonomer (an elastomer)
ESCCC	Erosion and Sediment Control Contractor Certification
F	Fahrenheit, when preceded by “degree(s)”
F/A	Filler/asphalt ratio
FAT	Field Acceptance Test

FHWA	Federal Highway Administration
FOOH	Field Office Overhead
FS	Federal Specifications, General Services Administration
HOOH	Home Office Overhead
ICEA	Insulated Cable Engineers Association
IMSA	International Municipal Signal Association
ITE	Institute of Transportation Engineers
LCD	Liquid crystal display
LPG	Liquid petroleum gas
MEKP	Methyl ethyl ketone peroxide
MIL	Military specifications
MSDS	Materials Safety Data Sheet
MUTCD	<i>Manual on Uniform Traffic Control Devices for Streets and Highways</i> and the Virginia Supplement to same
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NRC	Nuclear Regulatory Commission
PCI	Precast / Prestressed Concrete Institute
PE	Polyethylene
PTL	Plywood Testing Laboratory
PVC	Polyvinylchloride
PVF	Polyvinylfluoride
SAE	Society of Automotive Engineers
SAT	System Acceptance Test
SOR	Schedule of Record
SP	Special Provision
SPCN	Special Provision Copied Note
SPIB	Southern Pine Inspection Bureau
SS	Supplemental Specification
SSPC	Society for Protective Coatings
SWaM	Small, Women-Owned, and Minority-Owned Businesses
SWPPP	Storm Water Pollution Prevention Plan
TAPPI	Technical Association of the Pulp and Paper Industry
TFE	Polytetrafluoroethylene
TIE	Ticket Information Exchange (Miss Utility)
TOCIT	Traffic Operations Center Integration Test
UL	Underwriters' Laboratories, Inc.
VAC	Volts alternating current
VDC	Volts direct current
VDOT	Virginia Department of Transportation
VEP	Value engineering proposal

VFA Voids filled with asphalt
VMA Voids in mineral aggregate
VOSH Virginia Occupational Safety and Health
VTM Virginia Test Methods; voids in total mix
VWAPM..... Virginia Work Area Protection Manual

101.02—Terms

In these Specifications and other Contract Documents, the following terms and pronouns used in place of them shall be interpreted as follows:

-A-

Adjustment. An increase or decrease in the Contract amount or in the Contract time, unless the context dictates otherwise.

Advertisement, Notice of. A public announcement, as required by law, inviting bids for work to be performed or materials to be furnished that indicates, among other terms and conditions, approximate quantities of work to be performed, location of work to be performed, character and quantity of materials to be furnished, and time and place for opening bids.

Affiliate. Any business entity that is closely associated to another business entity so that one has the power to control the other either directly or indirectly; or, where one business entity systematically shares resources, officers, and/or other management with another business entity to the extent that a business relationship legally exists or is publicly perceived to exist; or, when a third party has the power to control both; or, where one business entity has been so closely allied with another through an established course of dealings, including but not limited to the lending of financial wherewithal or engaging in joint ventures, so as to cause a public perception that the two firms are one entity.

Alkali Soil. Soil in which total alkali chlorides calculated as sodium chloride are more than 0.10 percent based on total solids.

Award. The decision of the Commission to accept the bid of the lowest responsive and responsible bidder for the Work or such other criteria set forth in the solicitation. The award of the Contract is subject to the execution and approval of a satisfactory Contract for the Work, and such other approvals and conditions as may be specified or required by law.

Award Date. The date on which the decision is made by the Commission to accept the bid or proposal of the lowest responsive and responsible bidder or such other criteria set forth in the solicitation.

-B-

Backfill. Material used to replace or the act of replacing material removed during construction; may also denote material placed or the act of placing material adjacent to structures.

Balance Point. The approximate point, based on estimated shrinkage or swell, where the quantity of earthwork excavation and borrow, if required, is equal to the quantity of embankment material plus any surplus excavation material.

Base Course. A layer of material of specified thickness on which the intermediate or surface course is placed.

Base Flood. The flood or tide having a one percent chance of being exceeded in any given year.

Bid. The offer of a bidder, submitted by electronic proposal (or on paper if so specified in the Proposal) to perform the Work and furnish the materials, equipment, and labor at the prices set forth therein; valid only when properly signed and guaranteed.

Bidder. Any individual, partnership, corporation, limited liability company, or joint venture that formally submits a bid for the work contemplated, or for any portion thereof, acting directly or through a duly authorized representative.

Bids, Invitation for. See **Advertisement, Notice of. Board.** Commonwealth Transportation Board.

Borrow. Suitable material not available from designated Regular Excavation or other sources of useable materials on-site that is used primarily for embankment.

Brackish Water. Water in which total alkali chlorides calculated as sodium chloride are more than 0.10 percent based on total solids.

Bridge. A structure, including supports, that is erected over a depression or an obstruction, such as water, a highway, or a railway, that has a track or passageway for carrying traffic.

Bridge Lift. A layer of fill material placed in excess of standard depth over an area that does not support the weight of hauling equipment and for which compaction effort is not required.

Business. Any corporation, partnership, limited liability company, joint venture, firm, association, individual, or sole proprietorship operated for profit.

-C-

Calendar Day. Any day shown on the calendar, including Saturday and Sunday, beginning at 12:01 a.m. and ending at midnight.

Camber. A vertical curvature induced or fabricated into beams or girders and a deck slab or slab span formwork; a vertical curvature set in the grade line of a pipe culvert to accommodate differential settlement.

Change Order. A written order (Form C-10) signed by the Engineer to incorporate changes, alterations or other modifications into the Contract. A Change Order may be used to add, modify, or delete: pay items, Contract time, Contract Documents, or other terms of the Contract. Change Orders

may be issued on a bilateral or unilateral basis. The term change order means bilateral Change Order, except where the Change Order is designated or understood from the context as being a unilateral Change Order.

Change Order, Bilateral. A written change order signed by both the Engineer and the Contractor where the Engineer and Contractor agree upon the scope, the cost, and the time adjustment for the proposed change, alteration, or other modification to the Contract. Form C-10 shall be used to modify the Contract to include the approved change. This type of change order is what is typically meant when the term change order is used elsewhere in Department publications.

Change Order, Unilateral. A written change order signed only by the Engineer used to effect a change, alteration, or other modification to the Contract when the Engineer and the Contractor cannot agree upon the scope, the cost, or the time estimation of the proposed change, alteration, or other modification to the Contract or where due to issues of emergency, safety, environmental damage, or other similar critical factors the District must act quickly and unilaterally to effect the change. In these cases, the District must act unilaterally to establish a scope, cost, or time adjustment for, the change, alteration, or other modification to the Contract. Form C-10 shall be used to modify the Contract to include the approved change.

Channel. A watercourse or drainage way.

Claim. The Contractor's written request or demand for an adjustment to the Contractor's compensation or to the Contract time, for costs, expenses, or other damages, adjustment of the Contract terms, or for any entitlement available under the Contract, made within the time, in the form, and pursuant to the provisions for claims specified in the Contract Documents.

Commissioner. The Chief Executive Officer of the Chesapeake Bay Bridge Tunnel District.

Commonwealth. Commonwealth of Virginia.

Completion Date. The date specified in the Contract, on Form C-7, by which the Contractor shall achieve Final Acceptance according to Section 108.09.

Completion Date, Substantial. The date on or before which the project is complete such that it can be safely and effectively used by the public without delays, disruption, or other impediments and only clean up and Work of a minor nature, as agreed to by the Engineer, remains to be finished.

Composite H. A graph showing the mean daily discharge versus the calendar day, indicating trends in high and low flow for a one-year period.

Construction Area. The area where authorized construction occurs.

Construction Limits. (On-Site). The disturbed area required for the construction of a Project including the intersection of side slopes with the original ground, plus slope rounding and slopes for drainage ditches, bridges, culverts, channels, temporary or incidental construction, and identified by the surface planes as shown and/or described within the Contract Documents.

Contract. The written agreement executed by and between the District and the Contractor that sets forth the obligations of the parties thereunder. The documents that make up the Contract are specified in Section 103.06. Oral agreements, representations or promises will not be considered a part of the Contract.

Contract Amount. The sum stated as the bid total in the executed Proposal (Form C-7), as adjusted according to the Contract.

Contract Engineer. See **State Construction Contract Engineer.**

Contract Execution Date. The date on which the Contract is signed by the Executive Director.

Contract Item, Bid Item, or Pay Item. A specifically described unit of work for which a price is provided in the Contract Schedule of Items.

Contract Time. The time allowed in the Contract for final completion of the Work, including all authorized time extensions, beginning on the notice to proceed date and ending at the Contract time limit.

Contract Time Limit. The date, whether set by a number of calendar days or fixed calendar date, for final completion of the Work prescribed in the Contract, including all authorized time extensions.

Contractor. The business that has a direct contract with the District, which is in writing and signed by the Executive Director, to perform the prescribed Work as an independent contractor and not as an agent for the District or Commission.

Confirmation Of Verbal Instructions. (COVI) - Contractor-requested written confirmation of the District's instructions concerning the Work. When time and/or costs are or will be impacted, the Contractor must comply with the requirements applicable to requests for adjustments of the Contract amount or Contract time.

Controlling Item Of Work. See **Critical Path Work.**

Contractor Change Requests. (CCR) - Requests where the Contractor asks the District to make an adjustment to the Contract because of excusable and/or compensable events, instructions that have or have not been given, or other work requiring time and/or cost beyond that specified or envisioned within the Contract.

Corporation. A business entity organized and existing under the laws of the Commonwealth or other jurisdiction by virtue of articles of incorporation, amendment, or merger.

Critical Activity. Any activity on the critical path.

Critical Path. The longest continuous sequence of work or chain of activities throughout the project that defines the overall time needed to complete the project.

Critical Path Work. Any work on the critical path. A delay to any critical path work is expected to delay completion of the project.

Culvert. A structure that is not classified as a bridge which provides an opening under any roadway.

Cut. When used as a noun with reference to earthwork, that portion of a roadway formed by excavating below the existing surface of the earth and limited by design or the direction of the Engineer.

Cut Slope. See also **Fill Slope.** A surface plane generally designated by design or the direction of the Engineer which is formed during excavation below existing ground elevations that intersects with existing ground at its termini.

-D-

Day. A Calendar Day, unless specifically stated otherwise.

Deflection. The vertical or horizontal movement occurring between the supports of a bridge superstructure, guardrail, other structure, or the components (beams, girders, and slabs) thereof that results from their own weight and from dead and live loads. Although all parts of a structure are subject to deflections, usually only those deflections that occur in the superstructure are of significance during construction.

Design Flood. The magnitude of flood that a given structure can convey without exceeding a designated flood level.

Detour. The removal of traffic from one roadway or highway to an alternate roadway or highway.

Digital Identification. (I.D.) An encrypted signature that is the legal equivalent of a written signature thus allowing for the digital signing of the bid.

Direct Costs. Project-specific costs the Contractor incurs in the performance of the Work, consisting of labor; material; ownership cost, operating expense, or invoiced rental rates of equipment; and job-site general and administrative overhead.

Disincentive. If provided for in the Contract, an agreed monetary sum that the District deducts from compensation due or to become due to the Contractor if a specified milestone is not satisfactorily completed on or before the specified milestone date.

Disposable Material. Material generally found to be unsuitable for roadway construction or surplus material that is to be placed in a disposal area, unless specified otherwise.

Disposal Areas. Areas generally located outside of the Construction Limits identified in the Contract where unsuitable or surplus material is deposited.

Disqualification. The suspension or revocation of a bidder's prequalification privileges.

District. The Chesapeake Bay Bridge and Tunnel District

Diversion. A traffic shift that temporarily moves an existing Road to a new alignment.

Drainage Ditch. An artificial depression constructed to carry off surface water.

-E-

Earthwork. The work consisting of constructing roadway earthwork in conformity with the specified tolerances for the lines, grades, typical sections, and cross sections shown on the plans or as established by the Engineer. Earthwork shall include regular, borrow, undercut and minor structure excavation; constructing embankments; disposing of surplus and unsuitable material; shaping; grading; compaction; sloping; dressing; and temporary erosion control work.

Easement. A grant of the right to use property for a specific use.
Electronic Bid Submittals

Embankment. A structure of soil, soil aggregate, soil-like materials, or broken rock between the existing ground and subgrade.

Employee. Any person working on the project who is under the direction or control of or receives compensation from the Contractor or subcontractor at any tier.

Engineer. The District Deputy Director, Infrastructure, as designated by the Commission, who acts directly or through his duly authorized representative(s) and who is responsible for highway design, construction, and maintenance. The Engineer and his representative(s) act within the scope of the particular duties or the authority given to them by the Commission, these Specifications, and the Contract Documents.

Equipment. Machinery, tools, and other apparatus, together with the necessary supplies for upkeep and maintenance, that are necessary for acceptable completion of the work.

Excavation. (Excavate) The act of creating a man-made cavity in the existing soil for the removal of material necessary to obtain a specific elevation or to install a structure, material, component, or item necessary to complete a specific task or form a final surface or subsurface.

Extra Work. Any work that was not provided for or included in the Contract as awarded but the Engineer determines is essential to the satisfactory fulfillment of the Contract within its intended scope and is identified in an authorized change order for its execution subject to the limitations, exceptions and provisions in Sections 104.02, 104.03, and 109.05.

-F-

Falsework. A temporary framework used to support work in the process of constructing permanent structural units.

Federal Agencies or Officers. An agency or officer of the federal government and any agency or officer succeeding in accordance with the law to the powers, duties, jurisdictions, and authority of the agency or officer mentioned.

Fill Slope. See also **Cut Slope.** A surface plane formed during embankment above existing ground elevations that intersects with existing ground at its termini.

Final Acceptance. Acceptance of the project after Final Completion of all the Work specified in the Contract, as determined by and contingent on a final inspection by the Engineer.

Firm. A commercial partnership of two or more persons formed for the purpose of transacting business.

Flood Frequency. A statistical average recurrence interval of floods of a given magnitude.

Force Account Work. A type of extra work for which the Contractor is compensated as specified in Section 109.05 (b) Payment by Force Account pursuant to an executed Force Account authorization (Form C-1 15), for use when the scope or quantity of the extra work is undefined.

Formwork. A temporary structure or mold used to retain the plastic or fluid concrete in its designated shape until it hardens. Formwork shall be designed to resist the fluid pressure exerted by plastic concrete and additional fluid pressure generated by vibration and temporary construction loads.

-G-

Gage. U.S. Standard Gage.

Grade Separation. Any structure that provides a traveled way over or under another traveled way or over a body of water.

-H-

Highway. The entire right of way reserved for use in constructing or maintaining the roadway and its appurtenances.

Historical Flood Level. The highest flood level that is known to have occurred at a given location.

Holidays. The days specifically set forth in Section 105.14 or in the Contract Documents.

Hydrologic Data Sheet. A tabulation of hydrologic data for facilities conveying a 100-year discharge equal to or greater than 500 cubic feet per second.

-I-

Incentive. If provided for in the Contract, an agreed monetary sum that the District pays to the Contractor if a specified milestone or condition is satisfactorily completed or achieved, and accepted by the District on or before the specified milestone date.

Inspector. The District's authorized representative who is assigned to make detailed inspections of the quality and quantity of the work and its conformance to the requirements and provisions of the Contract.

Invert. The lowest point in the internal cross-section of a pipe or other drainage structure.

-J, K-

Joint Venture. Two or more businesses that join together in the nature of a partnership for the purpose of bidding on and constructing a project, for which they are all jointly and individually liable to the District.

-L-

Laboratory. The testing laboratory of the District or any other testing laboratory that may be designated by provisions in the Contract or by the District.

Liquidated Damages. As used in Section 108.06, the agreed damages the Contractor owes to the District when the Contractor fails to complete the project within the specified Contract time limit. These damages include, but are not limited to, additional costs associated with administration, engineering, supervision, and inspection of the project, and other expenses.

-M-

Major Item. Any pay item specifically indicated as such in the Schedule of Items included in the Contract.

Material. Any substance that is used in the Work specified in the Contract.

Median. The portion of a divided highway that separates the traveled ways.

Milestone. An event or a date that marks the start or completion of a specified portion of the Work. If provided for in the Contract, milestones are used to specify when the Work or a specified portion thereof must be completed in accordance with the Contract Documents. The Contract may provide for one or more Completion milestone.

Minimum Plan Concept Project. A project of a very limited scope and duration that requires few details to describe the proposed work.

Minor Item. Any pay item that is not specified as being a Major Item in the Schedule of Items included in the Contract.

-N-

Non-Contract Item. Item(s) of work that is required to permit completion of the specified work in an acceptable manner, located within the Limits of Construction, but is not included in the Contract Documents and will be completed by others prior to or during the construction of the Project.

No Plan Project. Generally, a project of a very limited scope and duration that requires no plans to describe proposed work.

Notice to Proceed. Written notice to the Contractor authorizing the prosecution of work.

-O-

Ordinary High Water. A water elevation based on analysis of all daily high waters that will be exceeded approximately 25 percent of the time during any 12- month period.

-P, Q-

Pavement Structure. The combination of select or stabilized materials, subbase, base, and surface courses, described in the Typical Pavement Section in the Plans that is placed on a subgrade to support the traffic load and distribute it to the roadbed.

Pay Item. See Contract item.

Phase Inspection. The inspection of work at predetermined stages in lieu of continuous inspection.

Plans. The approved project plans and profiles, which may include but are not limited to survey data, typical sections, summaries, general notes, details, plan and profile views, cross-sections, special design drawings, computer output listings, supplemental drawings or exact reproductions thereof, and all subsequently approved revisions thereto which show the location, character, dimensions, and details of the Work specified in the Contract.

Prequalification. The procedure for qualifying a contractor or subcontractor to bid or work on District contracts, as specified in the Department's Rules Governing Prequalification Privileges.

Profile Grade. The line of a vertical plane intersecting the top surface of the proposed wearing surface, usually along the longitudinal centerline of the roadbed.

Project. The designated section of highway, roadway, or property including all work to be performed according to the Contract Documents.

Project Showing. The scheduled event at which the District's representative meets with prospective bidders to describe and answer questions regarding the proposed work.

Proposal (Bid Proposal). The District documents in the Notice of Advertisement for Bids that contain the project requirements and other information upon which a bid is to be based. The Proposal includes the plans, Specifications, Special Provisions, Supplemental Specifications, referenced Standards, addenda, revisions, all other documents referred to therein, whether or not attached, and the electronic forms on which the District requires bids to be submitted.

-R-

Ramp. A connecting roadway between two highways or traveled ways or between two intersecting highways at a grade separation.

Requests For Information. (RFI) - Requests where either the Contractor or the District asks that the other party supply information to provide better understanding of or to clarify a certain aspect of the Work.

Requests for Department Action. (RDA) - Requests where the Contractor asks the District to take certain action that the Contractor feels is required for proper completion of all or a portion of the Work.

Right of Way. A general term denoting the District's land, property, or interest therein, that is acquired for or devoted to a highway or other transportation facilities. As used herein, the term does not denote the legal nature of the District's ownership.

Road. A general term denoting a public way for purposes of vehicular travel including the entire area within the right of way; the entire area reserved for use in constructing or maintaining the roadway and its appurtenances.

(VDOT) Road and Bridge Specifications 2016. The standard specifications applicable to contracts awarded by the Commission.

Roadbed. The graded portion of a highway within the top and side slopes that is prepared as a foundation for the pavement structure and shoulders.

Roadbed Material. The material below the subgrade in cuts, embankments, and embankment foundations that extends to a depth and width that affects the support of the pavement structure.

Roadside. A general term that denotes the area within the right of way that adjoins the outer edges of the roadway; extensive areas between the roadways of a divided highway.

Roadside Development. Items that are necessary to complete a highway that provide for the preservation of landscape materials and features; rehabilitation and protection against erosion of areas disturbed by construction through placing seed, sod, mulch, and other ground covers; and such suitable plantings and other improvements as may increase the effectiveness and service life and enhance the appearance of the highway.

Roadway. The portion of a highway within the limits of construction and all structures, ditches, channels, and waterways which are necessary for the correct drainage thereof.

Rootmat. Any material that, by volume, contains approximately 60 percent or more roots.

-S-

Schedule Impact Analysis. (SIA) A process of analyzing a schedule to determine the impact on the project schedule of a change in the Work or condition, or of a delay event, for the purposes of quantifying and apportioning the effects to the party responsible for the impact.

Schedule Of Record. (SOR) The most recent baseline progress schedule accepted by the Engineer. Upon acceptance by the Engineer, the initial baseline progress schedule or a subsequently revised baseline progress schedule shall be the SOR. The SOR is the agreed, official and only baseline schedule with which all work required to complete the project will be planned and executed, on which all subsequent schedule updates shall be based, and against which progress of the Work will be evaluated.

Seawater. Water in which total alkali chlorides calculated as sodium chloride are more than 0.10 percent of total solids.

Select Borrow. Borrow material that has specified physical characteristics.

Select Material. Material obtained from roadway cuts, borrow areas, or commercial sources that is designated or reserved for use as a foundation for the subbase, subbase material, shoulder surfacing, or other specified purposes designated in the Contract Documents.

Shoulder. The portion of the roadway contiguous with the traveled way that is for the accommodation of stopped vehicles, emergency use, and lateral support of the base and surface courses.

Sidewalk. The portion of the roadway constructed primarily for the use of pedestrians.

Skew. The acute angle formed by the intersection of a line normal to the centerline of the roadway with a line parallel to the face of the abutments or, in the case of culverts, with the centerline of the culverts.

Special Provision. (SP) Specifications or requirements for a particular project that add to or modify the standard specifications.

Special Provision Copied Note. (SPCN) Specific specifications or requirements, usually limited in scope, for a particular project.

Specialty Item. A Contract item designated as a “Specialty Item” in the Proposal that requires highly specialized knowledge, abilities, craftsmanship, or equipment not ordinarily provided by contractors pre-qualified to bid on the Contract as a whole. Specialty Items are usually limited to minor components of the overall Contract.

Specifications. A general term that includes all directions, provisions, and requirements, necessary for the proper fulfillment of the Contract. Specifications are found in the following Contract Documents:

Standard Drawings. Unless otherwise specified, applicable drawings in the VDOT Road and Bridge Standards and such other standard drawings as are referred to on the plans.

State. Commonwealth of Virginia.

State Construction Contract Engineer. The Chief Engineer's authorized representative for administering the Notice of Advertisement for Bids, receiving bids for such, and awarding contracts for the Department.

Station. When used as a definition or term of measurement, 100 linear feet.

Storm Sewer System. A drainage system consisting of a series of at least two interconnecting pipes and structures (minimum of two drop inlets, manholes, junction boxes, etc.) designed to intercept and convey storm water runoff from a specific storm event without surcharge.

Street. A general term denoting a public way for purposes of vehicular travel including the entire area within the right of way; the entire right of way reserved for use in constructing or maintaining the roadway and its appurtenances.

Structures. Bridges, culverts, catch basins, inlets, retaining walls, cribs, manholes, end walls, buildings, steps, fences, sewers, service pipes, underdrains, foundation drains, and other features that may be encountered in the work and are not otherwise classed herein.

Subbase. A layer(s) of specified or selected material of designed thickness that is placed on a subgrade to support a base course.

Subcontract. A contract between the Contractor and any other business to perform part of the Contract subject to the requirements of the Contract Documents including, but not limited to, Sections 102.01 and 105.06.

Subcontractor. Any business that has a subcontract, including any business that provides on-site labor, but not any business that furnishes or supplies only materials or equipment for the Project.

Subgrade. The top earthwork surface of a roadbed, prior to application of Select or Stabilized material courses, shaped to conform to the typical section on which the pavement structure and shoulders are constructed, or the surface that must receive an additional material layer, such as Topsoil, Stone or other Select Material.

Subgrade Stabilization. The modification of roadbed soils by admixing with stabilizing or chemical agents that will increase the load bearing capacity, firmness, and resistance to weathering or displacement.

Sublet. See **Subcontract.**

Submittals. Documents required by the Contract that the Contractor must submit for the District's review, acceptance, or approval. Submittals may include shop drawings, working drawings, material test reports, material certifications, project progress schedules, and schedule updates. The Contractor shall provide submittals as early as practicable so as not to delay review, acceptance, or approval of the Work.

Substructure. The part of a structure that is below the bearings of simple and continuous spans, skew-backs of arches, and tops of footings of rigid frames, together with the back walls, wingwalls, and wing protection railings.

Superintendent. The Contractor's Project representative who is authorized to receive and fulfill instructions from the Engineer and who supervises and directs the Work on the Contractor's behalf.

Superstructure. The portion of a structure that is above the substructure.

Supplemental Specifications.(SS) Additions and revisions to the Road and Bridge Specifications.

Supplier. Any business who manufactures, fabricates, distributes, supplies, or furnishes materials or equipment, but not on-site labor, for use in performing the Work on or for the project according to the requirements of the Contract Documents including, but not limited to, Sections 102 and 106.

Surety. A business bound with and for the Contractor for full and complete fulfillment of the Contract and for payment of debts pertaining to the Work. When applied to the proposal guaranty, it refers to the business that engages to be responsible in the execution by the bidder, within the specified time, of a satisfactory Contract and the furnishing of an acceptable payment and contract bond.

Surface Course. One or more top layers of a pavement structure designed to accommodate the traffic load, which is designed to resist skidding, traffic abrasion, and disintegrating effects of weather. Also see wearing course.

Surplus Material. Material that is present on a project as a result of unbalanced earthwork quantities, excessive swell, slides, undercutting, or other conditions beyond the control of the Contractor, or is designated as surplus material in the Contract Documents.

Suspension. A written notice issued by the Engineer to the Contractor that orders the Work on a project to be stopped wholly or in part as specified. The notice will include the reason for the suspension.

-T-

Temporary Structure. Any structure that is required to maintain traffic while permanent structures or parts of structures specified in the Contract are constructed or reconstructed. The

temporary structure shall include earth approaches.

Theoretical Maximum Density. The maximum compaction of materials that can be obtained in accordance with the values established VTM-1.

Tidewater, Virginia. Areas within the Commonwealth as defined in the Department of Conservation and Recreation Erosion and Sediment Control Manual.

Time Impact Analysis. (TIA) A forward-looking, prospective schedule impact analysis method that adds a modeled delay to the current schedule in place at the time of a change or delay to determine the possible time impact of the change or delay to project completion.

Ton. A short ton; 2,000 pounds avoirdupois.

Top of earthwork. The uppermost surface of the regular or embankment excavation, not including select material, which is shaped to conform to the typical section shown in the plans or directed by the Engineer.

Topsoil. The uppermost original layer of material that will support plant life and contains more than five (5) percent organic material reasonably free from roots exceeding one (1) inch in diameter, brush, stones larger than three (3) inches in the largest dimension, and toxic contaminants.

Traveled Way. The portion of the roadway for the movement of vehicles, not including shoulders.

-U-

Unsuitable Material. Any material which contains more than five (5) percent by weight organic matter, or which has unstable bearing capacity, excessive moisture content, plasticity indexes or liquid indexes, or other characteristics defined by the Engineer or the Contract Documents as unsuitable for the use intended.

Utilities. Private, county, city, municipal or public facility, structure, or infrastructure, designed, owned and maintained for public use or to provide a public service such as electricity, water, sanitary sewer, storm sewer, drainage culverts, telecommunications, conduits, gas, oil, fiber optics, cable television, that is not identified as a Pavement Structure, Roadway, Highway, Street or Traveled Way.

-V-

VDOT. Virginia Department of Transportation

Vouchered. The action of approval by the Department; constitutes the date of release to the State Comptroller for payment.

-W,X,Y,Z-

Wearing Course. (See **Surface course**) The top and final layer of any pavement.

Work. The furnishing of all materials, labor, tools, equipment, and incidentals necessary or convenient for the successful completion of the project and the carrying out of the duties and obligations specified in the Contract.

Working Drawings. Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data the Contractor is required to submit to the Engineer for review.

SECTION 102— BIDDING REQUIREMENTS AND CONDITIONS

102.01—Not Used

102.02—Content of Proposal

- (a) Standard Proposal - The Proposal will be defined in the Instructions to Bidders.

102.03—Not Used

102.04—Examination of Site of Work and Proposal

(a) Evidence of Examination of Site of Work and Proposal

The submission of a bid will be considered conclusive evidence that the bidder has (1) conducted a reasonable examination of the site of the proposed Work, the Proposal and other documents referenced therein, and the plans before submitting a bid, (2) is satisfied as to the nature, character, qualities, quantities, and conditions to be encountered in performing the Work and the requirements specified in the Proposal, and (3) has taken such matters into consideration when submitting the bid. A reasonable site investigation may include investigating the project site, borrow sites, disposal areas, and hauling routes related to the performance of the Work.

(b) Subsurface Data

Subsurface data may be included in the Proposal or may be made available for review by the bidder in the office of the District. . Data not included in the Proposal are not part of the Contract, but are made available to the bidder in good faith to notify the bidder of information in possession of the District. The District does not warrant any data not included in the Proposal or Contract, or any conclusions drawn from such data, either expressly or by implication. The bidder shall make his own interpretation of the subsurface data that may be available and satisfy himself with regard to the nature, condition, and extent of the material to be excavated, graded, or driven through. The submission of a bid will be considered conclusive evidence that the bidder is satisfied with regard to the subsurface conditions to be encountered in the work and has taken such conditions into consideration when submitting the bid.

(c) Notice of Alleged Ambiguities, Conflicts, Errors or Omissions

If a bidder has any questions or doubts about a word, phrase, clause, specification, or any other portion of the Proposal or alleges an ambiguity, conflict, error, or omission, the bidder shall submit a question about the ambiguity, conflict, error, or omission not later than 10 days prior to the due date of receipt of bids and request an interpretation thereof. Authorized interpretations will be issued by the District to each person who received a Proposal, and will be posted on the District Website. The District will not be responsible for any other explanations or interpretations of the alleged ambiguities, conflicts, errors or omissions.

The bidder shall not take advantage of obvious or apparent ambiguities, conflicts, errors, or omissions in the Proposal. If the bidder fails to submit a question and requests an interpretation of an obvious or apparent ambiguity, conflict, error, or omission within the specified time, the bidder shall waive any right it may have had to its own interpretation of the ambiguity, conflict, error, or omission. Further, if awarded the Contract the bidder waives any claims and shall not be entitled to any additional compensation or time, or entitled to sue the District based on such obvious or apparent ambiguity, conflict, error, or omission.

It is recognized that the bidder's review of the Proposal is made in the bidder's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract. The bidder is not required to ascertain that the Contract is in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any non-conformity discovered by or made known to the bidder shall be reported promptly to the District.

(d) Utilities

In general, the bid proposal will indicate the various utility items known to exist, will indicate items to be adjusted or improvements proposed by the respective owners and will designate any items that are to be adjusted by the Contractor. Information contained in the bid proposal regarding utility locations is advisory only and shall not be construed as being a representation of completeness or accuracy. The bidder shall contact the owners of the various utilities to determine the exact location of the utilities and the owner's schedule of work. Unless otherwise noted, all utility adjustments will be performed by the Utility or its representative. The Contractor shall cooperate with the owners of any utilities in their adjustment operations. Prior to preparing a bid, the bidder shall contact known utility owners to determine the nature, extent, and location of existing, adjusted, or proposed new utility facilities within the areas of construction. It is understood and agreed that the Contractor (1) has considered in his bid all of the permanent and temporary utility appurtenances in their present and relocated positions and, any proposed utility capital improvements, and (2) the Contractor has contacted the utility owner with regard to the Contractor's proposed schedule of work. The Contractor shall include in his proposed schedule the amount of time to make utility adjustments, from time estimates furnished by the utility owners. Any costs associated with contacting, and coordinating with the utilities shall be reflected in the bid price for other items in the Contract. In the event the utility owners are non-responsive to the Contractor's efforts to contact them, the Contractor shall notify the District prior to submitting a bid.

102.05—Preparation of Bid

(a) General

The bidder shall submit its bid by approved electronic media, unless otherwise provided for in the Proposal. The bidder shall furnish a unit or lump sum price as called for in the Proposal, in numerical figures, for each pay item listed. The bidder shall also show the products of the unit prices and quantities in numerical figures in the column provided for that purpose and the total amount of the bid.

If a unit or lump sum price is omitted, the bid will be rejected. If there is a discrepancy between the unit price and its extension, the unit price will govern. In the event there is a discrepancy between the bidder's electronically generated Proposal form and the official Proposal form as furnished by the District, the official Proposal form will govern.

Bids will be considered irregular and may be rejected for any of the reasons stated in Section 102.06.

The bidder shall submit a proposal guaranty in accordance with Section 102.07.

A bid will be rejected and the bidder disqualified for any of the reasons stated in Section 102.08.

(b) Design Options

Except as otherwise specified in the Proposal, when regular and alternate design options are shown in the Proposal, the bidder shall submit a bid price for at least one design option. The District may award the Contract to the responsive and responsible bidder who submitted the lowest bid for the regular design option or the lowest bid for the alternate design option, whichever is deemed to be in the best interest of the District.

(c) Debarred Suppliers

The bidder is cautioned against utilizing price quotes for materials for use in the preparation of bids from suppliers or vendors that are debarred by VDOT. VDOT's Engineer will not approve for use any material furnished by a supplier debarred by VDOT. The bidder shall ascertain from VDOT's listings which suppliers are debarred. Lists of approved suppliers can be found on VDOT's website at www.virginiadot.org/business/resources/Materials/Approved-Lists

If a previously debarred supplier is reinstated to eligibility subsequent to the award of a contract, the Engineer may approve the use of the supplier when requested by the Contractor.

(d) Required Certifications

A bidder who makes a false certification on the Bidder Certification of Prequalification Classification will be subject to forfeiture of his proposal guaranty or disqualification from bidding on future work for a 90-day period, or both. The Executive Director will determine the imposition and extent of such sanctions. A sworn statement shall be executed by the bidder or his agent certifying that the bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action to restrain free competitive bidding in connection with the Proposal. The sworn statement shall be part of the electronic bid or in the form of an affidavit furnished by the Department and shall be sworn to before a person who is authorized by the laws of the Commonwealth to administer oaths. The electronic bids shall contain the identical sworn statement. For the purpose of this Section, affixing a Digital ID to the bid will be considered by the Department conditional

evidence of signing before a person who is authorized by the laws of the Commonwealth to administer oaths.

(e) Acknowledgement of Addenda

The bidder shall acknowledge all addenda to the Proposal documents issued prior to receipt of bids by entering the date of any Addenda on the Acknowledgement of Revisions page included in the bid package. Bidders are responsible for checking the District's website to ensure that they have seen and considered all addenda before submitting a bid. Failure to acknowledge any addendum by the method outlined above may result in the bid being rejected as non-responsive and irregular.

(f) Signing the Bid

Bids shall be signed with a digital identification. The names of persons authorized to sign bids shall be on file with the Department. A name will be considered to be on file if it appears as that of an officer, a partner, a member, a manager or an owner on the current Contractor's Prequalification Application. Requests by the bidder to revise the list of persons authorized to sign bids on their behalf shall be submitted in writing and approved prior to the date bids are opened. A bid signed by someone whose name is not on file as someone authorized by the bidder may be rejected. If the individual signing the bid for a joint venture is not previously identified as authorized to sign a bid, the firm of record is responsible for the bid.

102.06—Irregular Bids

Bids will be considered irregular and may be rejected for any of the reasons below.

- (a) The bidder fails to comply with Sections 102.05 and 102.07.
- (b) The bidder adds any provisions reserving the right to accept or reject an award or enter into a contract pursuant to an award except as otherwise permitted in these Specifications.
- (c) The bidder fails to provide Certification of Prequalification Classification.
- (d) The bid is not properly signed.
- (e) The bidder fails to acknowledge all addenda.
- (f) There are unauthorized additions, conditional or alternate bids, or irregularities of any kind that may make the bid incomplete, indefinite, or ambiguous.
- (g) The prices in the bid are obviously mathematically and materially unbalanced, either in excess or below the cost analysis values as determined by the District. A mathematically unbalanced bid is a bid containing lump sum or unit price items that do not include reasonable labor, equipment, and material costs plus a reasonable

proportionate share of the Bidder's overhead costs, other indirect costs, and anticipated profit. A materially unbalanced bid is when the Department determines that an award to the Bidder submitting a mathematically unbalanced bid will not result in the lowest ultimate cost to the District.

- (h) The bidder fails to submit a Non-Collusion Affidavit
- (i) The bid submitted identifies a project different than the project for which the bid is submitted.
- (j) The bid is not totaled or is totaled incorrectly.
- (k) Erasures or alterations in the bidder's entries on paper bids, when allowed, are not initialed by the bidder.
- (l) Attachments included in the bid are detached or altered when the bid is submitted except as otherwise provided for herein.
- (m) The bidder, if required, fails to register or obtain authorization to transact business in Virginia from the State Corporation Commission prior to bidding.

102.07—Proposal Guaranty (Bid Bond)

A bid in excess of \$350,000.00 will be rejected unless accompanied by a proposal guaranty, also known as a bid bond, made payable to the District. The amount of the proposal guaranty shall be 5 percent of the total bid. The proposal guaranty shall be accompanied by a certified copy of the power of attorney for the surety's attorney-in-fact.

When the principal is a joint venture, each member of the joint venture shall be named and shall execute the proposal guaranty. Each surety to the proposal guaranty shall be named, and shall execute the proposal guaranty, and shall provide a certified copy of the power of attorney for the surety's attorney-in-fact.

102.08—Disqualification of Bidder

- (a) Any of the reasons set out in the Rules Governing Prequalification Privileges may be considered sufficient for the disqualification of a bidder or the rejection of a bid, or both. Such reasons for disqualification are not exclusive and disqualification may occur based on other requirements in these Specifications.
 - 1. The bidder does not have sufficient financial ability to perform the Contract. If a bond is required to ensure performance of a Contract, evidence that the bidder can acquire a surety bond from a corporation included on the U. S. Treasury Listing of Approved Sureties in the amount and type required by the public body will be sufficient to establish the financial ability of the bidder to perform the Contract.
 - 2. The bidder or any current officer, director, owner, project manager, procurement

- manager, or chief financial official thereof has been convicted of, or pled guilty or nolo contendere within the past 10 years to a crime related to governmental or nongovernmental construction or contracting, including, but not limited to, a violation of (i) Ethics in Public Contracting statutes, § 2.2-4367 et seq. of the Code of Virginia, (ii) the Virginia Governmental Frauds Act, § 18.2-498.1 et seq. of the Code of Virginia, (iii) Conspiracy to Rig Bids to Government statutes § 59.1-68.6 et seq. of the Code of Virginia, (iv) any substantially similar law of the United States or another state, or (v) any criminal offense indicating a lack of moral or ethical integrity as may reasonably be perceived to relate to or reflect upon the bidder's business practices.
3. The bidder or any officer, director or owner thereof is currently debarred pursuant to an established debarment procedure from bidding or contracting by any public body, agency of another state, or agency of the federal government.
 4. The bidder failed to respond to the District's request for clarifying information requested by the District relevant to the preceding paragraphs 1 through 3.
 5. The bidder fails to register and participate in the E-Verify program as required by § 2.2-4308.2 of the Code of Virginia.
 6. The bidder or any officer, director, or owner thereof has had a judgment entered against them for violation of the Virginia Fraud Against Taxpayers Act (Code of Virginia § 8.0 1- 216.1, et seq.).
 7. More than one bid for the same work is submitted by an individual, partnership, corporation or joint venture under the same or different name. A bid submitted by an affiliate of an individual, partnership, corporation, or any party of a joint venture will be considered as more than one bid submitted for the same work. Affiliate as used herein shall conform to the definition in Section 101.02 - Terms.
 8. Evidence of collusion among bidders; participants in such collusion will not be considered for future bids until new applications for prequalification are approved according to the Rules Governing Prequalification Privileges.
 9. Incompetency or inadequate machinery, plants, or other equipment as revealed by the bidder's financial and experience statements required by these Specifications and the Rules Governing Prequalification Privileges.
 10. Unsatisfactory workmanship or unsatisfactory progress toward timely completion of the Work as described within Sections 102.01, 102.08, 105.05, 108.03, 108.07, or other applicable Specifications as demonstrated by performance records of current or past work for the District, other agencies or departments of the Commonwealth, other public bodies in the Commonwealth, or agencies or departments of other states in the United States or federal government.
 11. Uncompleted work under contract with the District that in the judgment of the Engineer might hinder or prevent prompt completion of additional work if awarded.

12. Failure to promptly pay or settle satisfactorily all undisputed bills for materials, labor, equipment, supplies, or other items specified in contracts in force at the time the new work comes before the Commission for award.
 13. Failure to comply with any prequalification rule or regulation of the District.
 14. Failure to cooperate properly with representatives of the Commonwealth inspecting, monitoring or administering construction or disorderly conduct toward any such representative in contracts.
 15. Default under a previous contract with the Commonwealth.
 16. Failure to pay amounts owed to the District, as specified in Section 109.10, on other contracts.
 17. Making materially false statements in a bid or certified statement submitted to the District.
- (b) Temporary disqualification of a bidder as provided herein will result in the temporary disqualification of each member of a joint venture and any affiliate of the bidder having substantially the same operational management or drawing from the same equipment or labor resource pool. Temporary disqualification will also result in disqualification of the bidder, each member of a joint venture, and affiliates as defined herein, for performance of work as subcontractors that in the opinion of the District, could adversely affect other work under contract to the District.

102.09—Withdrawal of Bid

A bidder may withdraw a bid in accordance with the following.

- (a) **Standard Withdrawal:** Bids may be withdrawn until bid closing. A bidder may withdraw a bid provided the request for the withdrawal is written and signed by a person(s) who qualifies to execute the bid in accordance with Section 102.05.

102.10—Not Used

102.11—Public Opening of Bids

Electronic bids, along with all other bids will be opened and read publicly at the time and place specified in the Instruction to Bidders. Interested parties are invited to be present at the opening or can find the results on the District website at: www.cbbt.com. The as read results will be posted on this website as soon as possible on the day of the reading.

102.12—Not Used

SECTION 103—AWARD AND EXECUTION OF CONTRACTS

103.01—Consideration of Bids

After bids have been opened and read, the District will evaluate bid submittals to determine whether all requirements of Section 102 and the Proposal have been met. Bids not submitted in accordance with Section 102 and the Proposal will be rejected.

Bids will be compared on the basis of the summation of the products of the quantities shown in the bid schedule and the unit bid prices.

The District may correct arithmetical errors in the bid prior to such comparison, in accordance with Section 102.05. The results of the comparisons will be available to the public after the determination has been made to award the Contract.

The District reserves the right to reject any or all bids, waive informalities, advertise for new bids, or proceed to do the Work otherwise if it deems that the best interest of the District would be promoted thereby.

The District may, as part of its deliberations toward award of a contract, enter into a Memorandum of Understanding (MOU) with the apparent lowest responsive and responsible bidder if any of the following is determined to be necessary:

- (a) Provide and document further clarification of a specification or drawing.
- (b) Establish an order of priority (ranking) where there are conflicting specification requirements.
- (c) Ensure proper understanding of the intent\meaning of a specification or drawing.
- (d) Document the inclusion of inadvertently excluded pages from the Contract.
- (e) Document the correct unit of measurement where a conflict exists within the bid documents.
- (f) Document the elimination of an item(s).
- (g) Limit the District's exposure to contract overruns or potential unbalancing of a bid item.

This listing is not to be interpreted as all inclusive, but is provided to give examples of the types of issues that may be addressed in such an agreement. The MOU is not intended to be used to negotiate "as bid" unit prices/quantities or to renegotiate bid requirements with the apparent lowest responsive

and responsible bidder, but merely to address intent, clarify points of confusion or limit the possible future effects of such issues on project budget. If the terms of the MOU are acceptable to both parties, the District and the apparent lowest responsive and responsible bidder will document their acceptance of the terms of the MOU by both parties' signatures. The MOU will be added to and become part of the executed Contract.

103.02—Award of Contract

If the Contract is awarded, the award will be made to the lowest responsive and responsible bidder without discrimination on the grounds of race, color, gender, or national origin. In the event of tie bids, preference will be given to the lowest responsive and responsible bidder who is a resident of Virginia otherwise the tie will be decided by lot.

Whenever any bidder is a resident of any other state and such state under its laws allows a resident contractor of that state a preference, a like preference may be allowed to the lowest responsive and responsible bidder who is a resident of Virginia. The award date will not be later than midnight on the 60th day after the opening of bids. If the Commission; where permitted by law, has not awarded the Contract within this period, the bidder may withdraw his bid without penalty or prejudice unless the time limit is extended by mutual consent.

103.03—Cancellation of Award

The Commission, where permitted by law, may cancel the award of any contract at any time before the execution of the Contract by all parties without liability to the District.

103.04—Forfeiture of Proposal Guaranty

The apparent low bidder's proposal guaranty shall be subject to forfeiture if the apparent low bidder withdraws his bid prior to award, or fails to sign and return the Contract. The proposal guaranty shall be forfeited according to the forfeiture provisions in Code of Virginia (§ 2.2-4336) and the proposal guaranty. The apparent low bidder's refusal to sign a Memorandum of Understanding shall not be grounds for proposal guaranty forfeiture.

103.05—Requirements of Contract Bond

Within 15 calendar days after notification of award of the Contract the successful bidder shall furnish the following bonds for contracts in excess of \$350,000.00:

- (a) A performance bond in the sum of the Contract amount, conditioned upon the faithful performance of the Contract in strict conformity with the plans, Specifications and conditions of the Contract, and.
- (b) A payment bond in the sum of the Contract amount, conditioned upon the prompt payment for all labor, materials, public utility services and rental of equipment used in the prosecution of the work for the Contract.

Bidders will not be awarded an unbonded contract when their bid plus the balance of other unbonded contracts exceeds \$350,000.00 or as otherwise limited by their current prequalification status.

The bonds shall be made on Standard AIA forms and shall be executed by the bidder and a surety company carrying a minimum “Best Rating” of “B +” and authorized to do business in Virginia in accordance with the laws of Virginia and the rules and regulations of the State Corporation Commission. To be considered properly executed, the bonds shall include authorized signatures and titles.

103.06—Contract Documents

The Contract shall include the following documents unless otherwise specified by Special Provisions or Special Provision Copied Notes:

(a) **Contract:** The Contract shall include:

- The fully executed Proposal including all addenda or revisions thereto issued prior to the bid date; the Schedule of Items showing the prices submitted by the bidder; and any Supplemental Specifications, Special Provisions, Special Provision Copied Notes, and attachments issued with the Proposal.
- These Specifications.
- The Plans.
- The edition of the Road and Bridge Standard Drawings cited on the title sheet of the Plans including all addenda or revisions thereto issued prior to the bid date.
- Any Memoranda of Understanding agreed to between the Engineer and the Contractor conforming to Section 103.01.
- Any change orders that the Engineer issues after the Contract execution date.

(b) **Contract Performance and Payment Bonds:** Contract bonds shall conform to Section 103.05.

(c) **Affidavits and Documents:** Affidavits and documents shall include those required to be made a part of the Contract by any federal or state law in effect on the date of the Notice of Advertisement.

(d) **Workers’ Compensation Insurance Certificate:** The Contractor shall procure and continue to maintain for the duration of the Work until final acceptance, Workers’ Compensation and Employers’ Liability Insurance for all of its employees engaged in the Work in an amount not less than the minimum required by Code of Virginia (§ 2.2-4332), and the Virginia Workers’ Compensation Act, Code of Virginia §65.2-100 et seq. When any of the Work is

sublet, the Contractor shall require each subcontractor to provide similar Workers' Compensation and Employers' Liability Insurance for all of the subcontractor's employees engaged in the Work.

Within 15 days after the date of the notice of award of the Contract, the bidder shall submit a Certificate of Insurance, verifying Workers' Compensation coverage using the Department's forms (Form C-73). The certificate shall be executed by an approved and authorized insurance company as required by state law and shall cover the Contract. The Contractor shall likewise obtain a Certificate of Insurance for Workers' Compensation coverage from each subcontractor prior to performance of work and shall provide a copy to the District.

The Contractor shall notify the District in writing at least 30 days prior to the cancellation or reduction of the bonds or insurance required under this Section. The Contractor shall cease all operations on the effective date of the cancellation or reduction unless and until new bonds or insurance are in force and the same evidence of bonds or insurance are provided to the District.

- (e) **Progress Schedule:** The Contractor shall submit a progress schedule in accordance with Section 108.03 or as specified in the Contract.
- (f) **Contractor's Bodily Injury and Property Damage Liability Insurance Certificate:** The Contractor shall procure and maintain at his own expense, for the duration of the Work until final acceptance, insurance of the kinds and in the amounts specified herein. The minimum limits of liability for this insurance shall be as follows:

A Combined Single Limit for Bodily Injury Liability and Property Damage Liability

\$1,000,000	Each Occurrence
\$2,000,000	Aggregate

Within 15 days after the date of the notice of award of the Contract, the bidder shall submit Certificates of Insurance showing compliance with the above using the Department's form (Form C-73). The certificates shall be executed by an approved and authorized insurance company authorized to do business in Virginia and with a minimum "Best Rating" of "B+", and shall cover the Contract it accompanies.

The Contractor's Bodily Injury and Property Damage Liability Insurance shall cover liability of the Contractor for damage because of bodily injury to, or death of persons and damage to, or destruction of property, that may be suffered by persons other than the Contractor's own employees as a result of the negligence of the Contractor in performing the Work.

Insurance provided in compliance with this Section shall include liability of the Contractor for damage to or destruction of property that may be suffered by persons other than the Contractor's

own employees as a result of blasting operations of the Contractor in performing the work covered by the Contract of any part of the Work is sublet, insurance meeting the same requirements shall be provided by or on behalf of the subcontractors and evidence of such insurance shall be submitted with the sublet request.

Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor or subcontractor(s) of liability in excess of such coverage, nor shall it preclude the District from taking such actions as are available to it under any other provision of this Contract or otherwise in law.

103.07—Failure to Furnish Bonds or Certificate of Insurance

The successful bidder's failure to furnish to the District acceptable bonds, workers' compensation insurance certificates or the Contractor's Bodily Injury and Property Damage Liability Insurance certificates within 15 days after the date of Award Letter shall be considered just cause for cancellation of the award and forfeiture of the proposal guaranty. In such event, the proposal guaranty shall become the property of the District, not as a penalty but in liquidation of damages sustained. The Contract may then be awarded to the next lowest responsive and responsible bidder, or the Work may be re-advertised or constructed otherwise, as determined by the District.

103.08—Contract Audit

The Contractor shall permit the District to audit, examine, and copy all documents, computerized records, electronic mail, or other records of the Contractor during the life of the Contract and for a period of not less than five years after the date of final payment, or the date the Contractor is declared in default of Contract, or the date of termination of the Contract. The documents and records shall include, but not be limited to:

- (a) Those that were used to prepare and compute the bid, prepare all schedules used on the project, record the progress of work on the project, accounting records, purchasing records, personnel payments, or records necessary to determine employee credentials, vendor payments, and written policies and procedures used to record, compute, and analyze all costs incurred on the project, including those used in the preparation or presentation of claims to the District.
- (b) Records pertaining to the project as the District may deem necessary in order to permit adequate evaluation and verification of Contractor's compliance with Contract requirements, compliance with the District's business policies, and compliance with provisions for pricing change orders or claims submitted by the Contractor or the Contractor's subcontractors, insurance agents, surety bond agents, and material suppliers shall be made available to the auditor(s) at the District's request. The Contractor shall make his personnel available for interviews when requested by the District.
- (c) Upon request, the Contractor shall provide the District with data files on data disks or other suitable alternative computer data exchange format. Data furnished by the Contractor that cannot be verified will be subject to a complete audit by the District.

The Contractor shall ensure that the requirements of this provision are made applicable to his subcontractors, insurance agents, surety bond agents, and material suppliers. The Contractor shall cooperate and shall cause all related parties to furnish or make available in an expeditious manner all such information, materials, and data.

The Contractor shall provide immediate access to records for the audit and provide immediate acceptable facilities for the audit. Failure on the part of the Contractor to afford the District immediate access or proper facilities for the audit will be considered failure to cooperate and will result in disqualification as a bidder in accordance with Section 102.08.

Upon completion of the Contract audit, any adjustments or payments the Contractor owes to the District as a result of the audit shall be made to the District within 60 days from presentation of the District's findings to the Contractor. Failure on the part of the Contractor to make such payment may result in disqualification as a bidder in accordance with Section 102.08.

If the Contractor disagrees with the findings of the District's audit, the Contractor may dispute the findings in accordance Section 105.19 or the Code of Virginia as amended and as applicable, except that if the time provided for the Contractor to submit a claim within 60 days after final payment has expired, the Contractor shall instead submit a written claim to dispute the findings to the Engineer within 60 days from the date the Contractor received the findings. Failure on the part of the Contractor to submit a claim disputing the District's findings within such 60-day period shall constitute a waiver and release of any claim disputing the District's findings.

103.09—Execution of Contract

- (a) **The bid as submitted**, including the Contract Documents specified in Section 103.06 shall constitute the Contract upon submittal of the Contract bond, Contractor's bodily injury and property damage liability insurance certificates, and workers' compensation insurance certificate and the District's final execution of the Contract. After the District has recommended the bid for award, the apparent low bidder shall be required to sign and return a paper copy of the Contract to the District. Failure to sign and return the Contract will result in cancellation of the award and forfeiture of the proposal guaranty. If the Contract is not awarded within the time limit specified in Section 103.02, the bidder may withdraw his bid without penalty or prejudice unless the time limit is extended by mutual consent. The District will execute the Contract upon receipt of the Contractor's signed Contract. The Contract shall be considered binding and effective only when it has been fully executed by all parties.
- (b) **Notice of Contract execution.** The Engineer will notify the Contractor of the date that the District has executed the Contract. The Engineer or his designee will confirm the Contract execution date in such notice. The notice will identify the Engineer's authorized representative responsible for written directives and changes to the Contract, who will contact the Contractor to arrange a pre-construction and scheduling conference.
- (c) **Unbonded Contracts**

In the event the successful bidder on an unbonded contract is unwilling or unable to fulfill the Contract and fails to notify the District prior to the District's execution of the Contract, the bidder will be declared in default in accordance with Section 108.07.

In the event the bidder, on an unbonded contract, notifies the District prior to the District's execution of the Contract of such unwillingness or inability to fulfill the Contract, the bidder will be enjoined from bidding on unbonded contracts for a period of no less than 90 days from the date of notice by the District.

A bidder who has never been enjoined or defaulted on an unbonded contract and who notifies the District prior to the District's execution of the Contract of such unwillingness or inability to fulfill the Contract will not be enjoined for the first occurrence; however, said bidder will not be permitted to rebid or perform work on that specific Contract.

103.10—Assignments, Transfers, or Assumptions of the Contract

The Contractor shall not assign, transfer, convey, or allow any person or business to assume or take over, in whole or in part, the Contract, the Contractor's duties, or performance obligations, arising under, from or relating to the Contract, except for subcontracting as provided in Section 105.06 or the rights of a surety issuing a performance bond for the Contract, without the Engineer's specific written authorization. Any such unauthorized assignment, transfer, conveyance, assumption, or take over agreement shall be void and shall constitute a material breach of the Contract. No assignment, transfer, conveyance, assumption, or take over agreement shall relieve the Contractor from its duties and obligations under the Contract, or release the Contractor of any liability under the Contract bonds.

SECTION 104—SCOPE OF WORK

104.01—Intent of Contract

The intent of the Contract is to provide for completion of the Work specified therein in accordance with the Contract for the Contract amount and within the Contract time limit. Further, it is understood that the Contractor shall perform the Work under the Contract as an independent contractor and not as an agent of the District or the Commission.

104.02—Changes in Quantities or Alterations in the Work

(a) General

The Engineer reserves the right to make, in writing, at any time during the Work, such changes in quantities and such alterations in the work as are necessary to complete the project satisfactorily. Such changes in quantities and alterations shall not invalidate the Contract or release the surety, and the Contractor shall agree to perform the Work as altered. No change

alteration or modification in or deviations from the Contract, or the giving by the District of any extension of time for the performance of the Contract, or the forbearance on the part of the District shall release or exonerate in whole or in part either the Contractor or any surety on the obligations of any bond given in connection with the Contract. Neither the District nor the Contractor shall be under any obligation to notify the surety or sureties of any such alteration, change, extension or forbearance, notice thereof being expressly waived. Any increase in the Contract amount shall automatically result in a corresponding increase in the penal amount of the bonds without notice to or consent from the surety, such notice and consent being hereby waived. Decreases in the Contract amount shall not, however, reduce the penal amount of the bonds unless specifically provided in any change order as authorized in accordance with Section 109.05 decreasing the scope of the work.

(b) Significant Changes in the Character of Work

The work or changes in quantities, significantly change the character of the work under the Contract, an adjustment, excluding anticipated profits for reduced or eliminated work, may be made to the Contract. The basis for the adjustment shall be agreed upon prior to the performance of the affected Work. If a basis cannot be agreed upon, an adjustment will be made either for or against the Contractor in such amount as the Engineer may determine to be fair and equitable.

The Engineer may, at his option, direct the Contractor to accomplish the change or alteration on a force account basis when the circumstances meet the requirements for force account work under Section 109.05.

If the Engineer's changes or alterations do not result in a significant change in the character of the Work, the changed or altered work will be paid for at the Contract price for the actual quantities of work performed.

The term significant change shall be construed to apply only to the following circumstances:

1. When the character of the Work, as changed or altered, differs materially in kind or nature from that involved or included in the original proposed construction.
2. When the actual quantity of a Major Item of work, as defined elsewhere in the Contract, increases or decreases more than 25 percent of the original Contract quantity. Any adjustment for an increase or decrease in cost due to an increase in quantity of more than 25 percent shall be calculated only on that quantity in excess of 125 percent of the original pay item quantity. Any adjustment for an increase or decrease in cost due to a decrease in quantity to less than 75 percent of the original pay item quantity shall apply to the actual amount of work performed.

(c) Value Engineering Proposals

The Contractor may submit to the Engineer, written Value Engineering Contractor Proposals

(VECP) for modifying the plans, Specifications, or other Contract requirements for the purpose of reducing the total cost and/or Contract time without reducing the design capacity or quality of the finished product. If the District accepts the VECP, the District and the Contractor will equally divide the net savings or Contract time, or both. When an accepted VECP includes Contract time savings, one-half of such time savings shall be used to reduce the Contract time and the remaining one-half of such time savings shall be used exclusively by the Contractor as extra time. The Contractor shall identify in the SOR, a VECP contractor float activity for each accepted VECP that includes Contract time savings. The VECP extra time may be used by the Contractor to mitigate its delays on the project.

Each VECP shall result in a net savings over the Contract cost or Contract time, or both, without impairing essential functions and characteristics of the item(s) or of any other part of the project, including, but not limited to, service life, reliability, economy of operation, ease of maintenance, aesthetics, and safety. At least the following information shall be submitted with each VECP:

- Statement that the proposal is submitted as a VECP.
- Statement concerning the basis for the VECP benefits to the District and an itemization of the pay items and requirements affected by the VECP.
- Detailed estimate of the cost or Contract time, or both, under the existing Contract and under the VECP.
- Proposed specifications and recommendations as to the manner in which the VECP changes are to be accomplished.
- Statement as to the time by which a Contract change order adopting the VECP must be issued so as to obtain the maximum cost-effectiveness.

The District will process the VECP in the same manner as prescribed for any other proposal that would necessitate issuance of a change order. The District may accept a VECP in whole or part by issuing a change order that will identify the VECP on which it is based. The District will not be liable to the Contractor for failure to accept or act on any VECP submitted pursuant to these requirements or for delays in the work attributable to any VECP. Until a VECP is put into effect by a change order, the Contractor shall remain obligated to the terms and conditions of the existing Contract. If an executed change order has not been issued by the date on which the Contractor's proposal specifies that a decision should be made or such other date as the Contractor may subsequently have specified in writing, the VECP shall be deemed rejected.

The change order effecting the necessary modification of the Contract will establish the net savings agreed on, and provide for adjustment of the Contract prices or Contract time, or both. The Contractor shall absorb all costs incurred in preparing a VECP. Costs for reviewing and administering a VECP will be borne by the District. The District may include in the agreement any conditions it deems appropriate for consideration, approval, and implementation of the VECP. The Contractor's 50 percent share of the net savings or Contract time, or both, shall

constitute full compensation to him for effecting all changes pursuant to the VECP change order.

Unless specifically provided for in the change order authorizing the VECP, acceptance of the VECP and performance of the work thereunder will not change the Contract time limit.

The District may adopt a VECP for general use in contracts the Department administers if it determines that the VECP is suitable for application to other contracts. VECPs identical with or similar to previously submitted VECPs will be eligible for consideration and compensation under these provisions if the District has not previously adopted the VECPs for general application to other contracts the District administers. When a VECP is adopted for general use, compensation pursuant to these requirements will be applied only to those awarded contracts for which the VECP was submitted prior to the date of adoption of the VECP.

Proposed changes in the basic design of a bridge or pavement type or those changes that require different right of way limits will not normally be considered an acceptable VECP. If a VECP is based on or is similar to a change in the plans, Specifications, or Special Provisions the District has adopted prior to submission of the VECP, the Engineer will not accept the VECP.

The Engineer will be the sole judge of the acceptability of a VECP. The requirements herein apply to each VECP initiated, developed, and identified as such by the Contractor at the time of its submission to the Engineer. However, nothing herein shall be construed as requiring the Engineer to approve a VECP.

Subject to the provisions herein, the District or any other public agency shall have the right to use all or part of an accepted VECP without obligation or compensation of any kind to the Contractor.

If the District accepts a VECP, Section 104.02(b) herein, which pertains to the adjustment of Contract unit prices attributable to alterations of Contract quantities, will not apply to the items adjusted or deleted as a result of putting the VECP into effect by a change order.

104.03—Differing Site Conditions

Type I: During the progress of the Work, if subsurface or latent physical conditions differing materially from those indicated in the Contract are encountered at the site, the Contractor shall promptly notify the Engineer in writing of the specific differing conditions before the site is disturbed further and before the affected work is performed.

Type II: During the progress of the Work, if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract, are encountered at the site the Contractor shall promptly notify the Engineer in writing of the specific differing conditions before the site is disturbed further and before the affected work is performed.

Upon receipt of such written notification, the Engineer will acknowledge receipt and investigate the

conditions. If it is determined by the Engineer that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract, an adjustment, excluding anticipated profits, will be made and the Contract may be modified in writing accordingly. The Engineer will notify the Contractor of the determination whether or not an adjustment of the Contract is warranted.

No adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

SECTION 105—CONTROL OF WORK

105.01—Notice to Proceed

Unless otherwise indicated in the Contract, the Notice to Proceed date will be the date selected by the Contractor on which the Contractor intends to begin the work. That date shall be no earlier than 15 nor later than 30 calendar days after the date of Contract execution. The District will contact the Contractor on the date of Contract execution to inform him that the Contract has been executed. The District will also confirm this date in the Letter of Contract Execution. Within 10 calendar days after the date of Contract execution the Contractor shall submit to the Engineer written notice of the date he has selected as his Notice to Proceed date. If the Contractor fails to provide written notice of his selected Notice to Proceed Date within 10 calendar days of Contract execution, the selected Notice to Proceed Date will become the date 15 calendar days after the date of Contract execution. The Contractor shall begin work no later than 10 calendar days after the date he has selected as his Notice to Proceed date, unless the Notice to Proceed date is otherwise indicated in the Contract, in which case the Contractor shall begin work within 10 calendar days after the specific Notice to Proceed date indicated in the Contract.

Contract Time will commence on the date of the Notice to Proceed. The Letter of Contract Execution will identify the District's authorized representative, hereafter referred to as the Engineer, who is responsible for written directives and changes to the Contract. The Engineer will contact the Contractor after notice of award to arrange a pre-construction conference.

In the event the Contractor, for matters of his convenience, wishes to begin work earlier than 15 calendar days or later than 30 calendar days after the date of Contract execution, he shall make such a request in writing to the Engineer within 10 calendar days of the date of Contract execution or once a Notice to Proceed Date has been established, if he wishes to begin work more than 10 calendar days after his selected Notice to Proceed date or the Notice to Proceed Date indicated in the Contract, he shall make such a request to the Engineer in writing no later than 5 calendar days after the Notice to Proceed date. If this requested start date is acceptable to the District, the Contractor will be notified in writing; however, the Contract Completion Date will not be adjusted but will remain binding. The Contractor's request to adjust the start date for the work on the Contract will not be considered as a basis for claim that the time resulting from the Contractor's adjusted start date, if accepted by the Engineer, is insufficient to accomplish the work nor shall it relieve the Contractor of his responsibility to perform the

work in accordance with the scope of work and Contract requirements. In no case shall work begin before the District executes the Contract or prior to the Notice to Proceed date unless otherwise permitted by the Contract or authorized by the Engineer. The Contractor shall notify the Engineer at least 24 hours prior to the date on which he will begin the work.

105.02—Pre-Construction Conference

After notification of award and prior to the Notice to Proceed date the Contractor shall attend a pre-construction conference scheduled by the Engineer to discuss the Contractor's planned operations for prosecuting and completing the Work in accordance with the Contract. At the pre-construction Conference the Engineer and the Contractor will identify in writing the authorities and responsibilities of project personnel for each party. The Contractor and the District shall also come prepared to discuss key issues and project specific requirements necessary for preparation and submittal of the baseline progress schedule; unless a separate Scheduling Conference is otherwise scheduled as mutually agreed to by the Engineer and the Contractor, in accordance with Section 108.03 and other applicable Contract provisions.

The Engineer will be responsible for setting the conference agenda, conducting discussions, and ensuring that minutes of the conference are taken and later timely distributed to all attendees. The pre-construction conference will be the time to review the Contract plans and documents. To that end, the conference agenda may include but not be limited to discussions on the general sequence of work, including the expected primary work tasks as defined by the Contractor, and proposed means and methods for the entire scope of work, potential problems or impacts, constructability issues, special considerations such as limitations and access issues, agreements with local agencies or governments, utility impacts or relocations including railroads, coordination with schedules of the utilities and subcontractors and associated work, sources and delivery of critical materials, submittals required by Contract including shop drawings, location of field office, labs, etc., environmental concerns including permits and erosion and siltation efforts and maintenance of traffic issues.

The Contractor shall provide the Engineer with a list of all equipment available for use in the prosecution of the Work on the Contract at the pre-construction conference or no later than one week prior to the first monthly progress estimate. The make, model, size, capacity, and year of manufacture shall be listed for each piece of equipment. Where possible the Contractor shall provide this list in an electronic format. This list may take the form of the Contractor's fleet list of equipment. The Contractor shall provide the Engineer an updated list of equipment as changes occur.

105.03—Authorities of Project Personnel, Communication and Decision Making

(a) Authority of Engineer

During prosecution of the Work, the Engineer will answer all questions that may arise as to the quantity, quality, and acceptability of materials furnished and work performed; rate of progress of the Work; interpretation of the plans and Specifications; the Contractor's acceptable fulfillment of the Contract; disputes and mutual rights between contractors; and the Contractor's compensation.

The Engineer has the authority to suspend the Work wholly or in part if the Contractor has created conditions that are unsafe or fails to correct conditions that are unsafe for workers or the general public or fails to carry out the provisions of the Contract. The Engineer may also suspend the Work for such periods as he may deem necessary because of catastrophic or extraordinary weather as defined in Section 108.04, conditions considered unsuitable for prosecution of the Work, or any other condition or reason deemed to be in the public interest.

The Engineer may issue written clarifications or directives that either enhance or alter the Contract. The Engineer may issue written orders for such work as may be necessary to complete the Contract satisfactorily.

(b) Authority of Inspector

Inspectors representing the District are authorized to inspect all work performed and materials furnished. Inspection may extend to all or any part of the Work and to the preparation, fabrication, and manufacture of the materials to be used. The Inspectors are not authorized to alter or waive the provisions of these Specifications or make changes in the plans.

The Inspectors are not authorized to make final acceptance of the project, approve any operation or item, or act as foreman for the Contractor. However, the Inspectors will have the authority to reject defective work and material and suspend work that is being improperly performed, subject to the concurrence of the Engineer. Such inspections shall not relieve the Contractor of any obligation to furnish acceptable materials or provide completed construction that is in accordance with the Contracts requirements. The Inspectors will exercise only such additional authority as the Engineer may delegate. The Engineer will advise the Contractor in writing of delegations of authority that will affect his operations.

(c) The Contractor

The Contractor shall not construe reviews, approvals, or inspections by the District, the Engineer, or the District's inspectors, agents, and employees as a waiver, release, warranty, or assumption of liability on the part of the District. The Contractor understands and agrees that reviews, approvals, and inspections are for the District's sole use and benefit. Any such reviews, approvals, and inspections shall not relieve the Contractor of its contractual duties and obligations or be conclusive as to the acceptability of the Contractor's performance.

(d) Communication and Decision Making

1. **Description** The intent of this provision is to establish procedures, processes and guidelines for making decisions and managing communications regarding the Work. The information contained herein is not meant to be all inclusive but to serve as a minimal general framework for promoting efficient and effective communication and decision making at both the project and, if needed, executive administrative level. It is also not

meant to override the decision-making processes or timeframes of specific Contract requirements.

2. Definitions

- a. **Confirmation Of Verbal Instructions (COVI)** - Contractor-requested written confirmation of the District's instructions concerning the Work. When time and/or costs are or will be impacted, the Contractor must comply with the requirements applicable to requests for adjustments of the Contract amount or Contract time.
- b. **Requests for District Action (RDA)** - Requests where the Contractor asks the District to take certain action that the Contractor feels is required for proper completion of all or a portion of the Work.
- c. **Contractor Change Requests (CCR)** - Requests where the Contractor asks the District to make an adjustment to the Contract because of excusable and/or compensable events, instructions that have or have not been given, or other work requiring time and/or cost beyond that specified or envisioned within the Contract.

3. Process for Decision Making

- a. Project teams composed of the Contractor's and the District's representatives, who are directly responsible for the administration, prosecution, and inspection of the Work, shall define and agree upon the field decision-making process during the pre-construction conference. This process should be written down and distributed to all affected parties once it is established. Where there are responsibilities, authority or personnel changes associated with this process, such changes shall be distributed to all affected parties as quickly as practicable after they are effective so as not to delay or impede this process.

105.04—Gratuities

The Contractor and its subcontractors and suppliers shall not offer, give or confer upon any of the District's employees or personnel any gifts, gratuities, payments, loans, subscriptions, advances, deposits of money, services, favors, or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value is exchanged.

The Contractor shall not employ any personnel of the District for any services without the Engineer's prior written consent.

If the Engineer determines after investigation that the Contractor or the Contractor's employees, representatives, or agents of any person acting in his behalf have violated this Section, the Engineer may, at his discretion, disqualify the Contractor from bidding on future contracts with the District for a period of 6 months from the date of the Engineer's determination of such violation. Any implicated employees, agents, or representatives of the Contractor may be prohibited from working on any contract the District awards for the period of the Contractor's disqualification.

105.05—Character of Workers, Work Methods, and Equipment

(a) Workers

Workers shall have sufficient skill and experience to perform properly the Work assigned to them. Workers engaged in special or skilled work shall have sufficient experience in such work and in the operation of equipment required to perform it properly and satisfactorily. The term “workers” means the Contractor’s employees, its subcontractors at any tier, or any of their respective employees.

The Contractor shall immediately remove from the Project any workers who, in the Engineer’s opinion, do not perform their work in a proper, skillful and satisfactory manner or are intemperate or disorderly. The Engineer shall direct the Contractor to do so in writing and such workers shall not be employed again on any portion of the Work without the Engineer’s written approval. If the Contractor fails to immediately remove the workers, or furnish suitable and sufficient workers for satisfactory prosecution of the Work, the Engineer may withhold all monies that are or may become due the Contractor and may suspend the Work until the Contractor has complied with the Engineer’s directive.

(b) Equipment

Equipment shall be of sufficient size and quantity, and in such good mechanical condition as to comply with the Contract requirements and to produce a satisfactory quality of work. Equipment shall be such that no damage to the roadway, adjacent property, other highways, or no danger to the public, will result from its use. The Engineer may order the removal and require replacement of unsatisfactory equipment.

(c) Work Methods

When methods and equipment to be used by the Contractor are not prescribed in the Contract, the Contractor is free to use whatever methods or equipment he feels will accomplish the Work in conformity with the Contract requirements.

When the Contract specifies that construction be performed by the use of particular methods and equipment, they shall be used unless others are authorized by the Engineer. If the Contractor desires to use a different method or type of equipment, he may request permission from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment he proposes to use and an explanation of the reasons for desiring to make the change. If permission is not given, the Contractor shall use the specified methods and equipment. If permission is given, it will be on the condition that the Contractor shall be fully responsible for producing construction work in conformity with Contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not strictly conform to the Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment.

and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of the specified quality or take such other corrective action as the Engineer may direct. No change will be made in the basis of payment for the construction items involved or the Contract time limit as the result of authorizing or denying a change in methods or equipment under these provisions.

105.06—Subcontracting

- (a) No portion of the Contract shall be subcontracted or otherwise disposed of without the written consent of the Engineer. The Contractor shall notify the Engineer of the name of the firm to whom the work will be subcontracted, and the amount and items of work involved. Such notification shall be made and verbal approval given by the Engineer prior to the subcontractor beginning work.
- (b) The Contractor shall perform with his own organization work amounting to not less than 30 percent of the total original Contract amount, excluding any specialty items designated by the District. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original Contract amount before computing the amount of work required to be performed by the Contractor's own organization.

The term "perform work with its own organization" refers to workers employed or leased by the Contractor, and equipment owned or rented by the Contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the Contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the Contractor meets all of the following conditions:

- 1. The Contractor maintains control over the supervision of the day-to-day activities of the leased employees;
 - 2. The Contractor remains responsible for the quality of the work of the leased employees;
 - 3. The Contractor retains all power to accept or exclude individual employees from work on the project; and
 - 4. The Contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.
- (c) The Contractor shall not subcontract any part of the Contract work to a contractor who is not prequalified with VDOT in accordance with Section 102.01, unless otherwise indicated in the Contract. This restriction does not apply to Contract specialty items, service providers, engineers, consultants, manufacturers, suppliers, or haulers. Consent to subcontract or otherwise dispose of any portion of the Contract work shall not relieve the Contractor of any

responsibility for the satisfactory fulfillment of the entire Contract. All subcontracts shall be evidenced by written binding agreements that shall be available to the Department upon request, before, during, and after their approval.

105.07—Cooperation of Contractor

The Contractor shall give the Work the constant attention necessary to facilitate quality and progress, and shall fully cooperate with the Engineer, Inspector, and other contractors involved in the prosecution of the Work. If any portion of a project is located within the limits of a municipality, military installation, or other federally owned property, the Contractor shall cooperate with the appropriate officials and their agents in the prosecution of the Work to the same extent as with the District.

The Contractor shall have on the project at all times during prosecution of the Work a competent Superintendent who is capable of reading and understanding the plans and Specifications, experienced in the type of work being performed, and who shall receive instructions from the Engineer or his authorized representatives. The Superintendent shall have full authority to execute the orders and directions of the Engineer without delay and supply promptly such materials, equipment, tools, labor, and incidentals as may be required.

105.08—Cooperation With Regard to Utilities

The adjustment of utilities consists of the relocation, removal, replacement, rearrangement, reconstruction, improvement, disconnection, connection, shifting, or altering of an existing utility in any manner.

Existing utilities within the District's knowledge at the design stage of the project will be indicated on the plans. Where possible, the District will make arrangements for adjusting these utilities prior to project construction. The utility owner will adjust existing private and public utilities that require adjustment, unless the Contract requires the Contractor to perform such adjustment as a pay item. The new location of such utilities will not normally be shown on the plans. Some utilities may remain or be adjusted within the construction limits simultaneously with project construction operations.

The Contractor shall coordinate project construction with planned utility adjustments and take all necessary precautions to prevent disturbance of the utilities. The Contractor shall report to the Engineer any failure on the part of the utility owner to cooperate or proceed with the planned utility adjustments.

The Contractor shall perform Contract utility work in a manner that will cause the least inconvenience to the utility owner and those being served by the utility owner.

The Contractor shall protect existing, adjusted, or new utilities that are shown on the plans, marked by Miss Utility, or otherwise known to the Contractor that are to remain within the right of way so as to prevent disturbance or damage resulting from construction operations. If during prosecution of the work the Contractor encounters an existing utility that requires adjustment, he shall not interfere

with the utility but shall take the proper precautions to protect the utility and shall promptly notify the Engineer of the need for adjustment.

If the Contractor desires the temporary or permanent adjustment of utilities for his own benefit, he shall conduct all negotiations with the utility owners and pay all costs in connection with the adjustment.

The Contractor shall promptly notify the Engineer in writing if the Contractor encounters utilities that are not shown on the plans, marked by Miss Utility, or otherwise known to the Contractor before the site is disturbed further and before the affected work is performed. Upon receipt of the Contractor's written notification, the Engineer will acknowledge receipt and investigate the conditions. The Engineer will notify the Contractor whether or not an adjustment to the Contract is warranted. Adjustments will be made according to Sections 108.04 and 109.05, as applicable. No adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

105.09—Cooperation among Contractors

The District may at any time contract or approve concurrent Contracts for performance of other work on, near, or within the same geographical area of the work specified in an existing Contract. Contractors shall not impede or limit access to such work by others.

When separate Contracts are awarded within the limits of one project, contractors shall not hinder the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other. In the case of dispute, all Contractors shall proceed as directed by the Engineer.

When Contracts are awarded to separate Contractors for known concurrent construction in a common area, the Contractors, in conference with the Engineer, shall establish a written joint schedule of operations. The schedule shall be based on the limitations of the individual Contracts and the joining of the work of one Contract with the others. The schedule shall set forth the approximate dates and sequences for the several items of work to be performed and shall ensure completion within the respective Contract time limit. The schedule shall be submitted to the Engineer for review and approval no later than 30 days after the award date of the later Contract and prior to the first monthly progress estimate. The schedule shall be agreeable to, signed by, and binding on each Contractor. The Engineer may allow modifications of the schedule when benefit to the Contractors and the District will result.

Any modification of the schedule shall be in writing, mutually agreed to and signed by the contractors, and shall be binding on the contractors in the same manner as the original agreement.

If the contractors fail to agree on a joint schedule of operations, they shall submit their individual schedules to the Engineer, who will prepare a schedule that will be binding on each Contractor.

The joint schedule and any modification thereof shall become a part of each Contract involved. The failure of any Contractor to abide by the terms of the joint schedule will be justification for declaring the Contractor in default of his Contract.

Each Contractor shall assume all liability, financial or otherwise, in connection with his Contract and shall protect and save harmless the District from any and all damages and claims that may arise because of any inconvenience, delay, or loss he experiences as a result of the presence and operations of other contractors working in or near the work covered by his Contract. He shall also assume all responsibility for any of his work not completed because of the presence or operation of other Contractors.

The District will not assume any responsibility for acts, failures, or omissions of one Contractor that delay the work of another except as provided herein.

105.10—Plans and Working Drawings

(a) General

The Contractor will be supplied with two copies of the executed Contract. The VDOT's Road and Bridge Specifications and the VDOT's Road State and Bridge Standards are available on VDOT's website.

(b) Plans

Plans will be furnished to the Contractor, in electronic format, without charge.

The Contractor shall keep one complete set of plans, standard drawings, Contract assemblies, and Specifications available on the project at all times. For maintenance projects, certain sign projects, and other projects having no field office or on which the Contractor has no office, the Contractor shall keep one complete set of plans, Contract assemblies, and Specifications with him while prosecuting the work. In the event items of work are required as per the Standard Drawings, the Contractor shall also keep the appropriate Standard Drawings on the project during the performance of that work.

Plans consisting of general drawings and showing such details as are necessary to give a comprehensive understanding of the work specified will be furnished by the District. Except as otherwise shown on the plans, dimensions shown on the plans are measured in the respective horizontal or vertical planes. Dimensions that are affected by gradients or vertical curvatures shall be adjusted as necessary by the Contractor to accommodate actual field conditions and shall be specifically denoted as "field adjusted" on the working drawings. Failure on the part of the Contractor to so denote field adjustments on the working drawings shall not relieve the Contractor of the responsibility to accommodate and incorporate such existing conditions into the finished work.

(c) Working Drawings

The Contractor shall furnish nine sets of detailed working drawings to the extent and with the details required by the Contract Documents unless otherwise indicated in the Contract documents. Working drawings and submittals shall be identified by the complete state project and job designation number, as well as the federal project number if applicable. Items or component materials shall be identified by the specific Contract item number and

Specification reference in the Contract. Any changes from the requirements of the Contract shall be specifically denoted, together with justification, and submitted to the Engineer for review. Working drawings shall be submitted in sufficient time to allow for review, discussion and correction prior to the beginning of the work they reference and avoid causing any delay to the Work. Work shall not be performed or materials ordered prior to the completion of the District's review of the working drawings.

Reviewed working drawings will be returned to the Contractor within 30 days from the date of receipt by the District. If a railroad, municipality, or other entity as specified in the Contract or on the plans is required to review the working drawings, the reviewed working drawings will be returned within 45 days from the date of receipt by the District. If the working drawings are not returned by the time specified, no additional compensation will be allowed except that an extension of time in accordance with Section 108.04 will be considered if the work element detailed by the working drawings is on the project's critical path or involves a controlling item of work. Three sets of working drawings marked with any suggested modifications or comments will be returned to the Contractor. The other sets will be retained by the District.

The District's review of the Contractor's working drawings will be limited to evaluation for conformance with the Contract requirements. The District's review will not relieve the Contractor from responsibility for errors in the working drawings or from complying with the Contract requirements for a fully functional finished work item as specified or designed. Deviations from the Contract requirements initiated by the Contractor shall be requested in writing and clearly identified on the working drawings. Explicit supporting justification shall be furnished specifically describing the reason for the requested deviations, as well as any impact such deviations shall have on the schedule of work. Failure to address time or other impacts associated with the Contractor's request will be cause for rejection of the Contractor's request. Deviations from the Contract requirements shall not be made unless authorized by the Engineer. Such authorization shall not relieve the Contractor from the responsibility for complying with the Contract requirements for a fully functional finished work item as specified or designed.

If working drawings detailing change(s) initiated by the Contractor require more than two resubmissions or revisions, the cost of additional reviews by the District or its designated representative(s) will be assessed to the Contractor.

The Contractor shall submit as-built working drawings upon completion of the Work, if required by the Contract.

The cost of working drawings furnished by the Contractor shall be included in the cost of appropriate Contract items.

The Contractor may authorize the fabricator in writing to act for him in matters relating to working drawings. Such authorization shall have the force and effect of any other representative of the Contractor's organization.

Provide working drawings according to the following:

1. Steel Structures

Working drawings for steel structures, including metal handrails, shall consist of shop detail, erection, and other working drawings showing details, dimensions, sizes of units, and other information necessary for the fabrication and erection of metal work.

2. Falsework

Working drawings for falsework supporting a bridge superstructure shall be signed and sealed by a Professional Engineer, holding a valid license to practice engineering in the Commonwealth of Virginia.

3. Concrete Structures and Prestressed Concrete Members

Working drawings for concrete structures and prestressed concrete members shall provide such details as required for the successful prosecution of the work and which are not included in the plans furnished by the District. Drawings shall include plans for items such as prestressing strand details and elongation calculations, location of lift points, falsework, bracing, centering, form work, masonry, layout diagrams, camber management plan for prestressed members, and bending diagrams for reinforcing steel when necessary or when requested. Such drawings shall be signed and sealed by a Professional Engineer, holding a valid license to practice engineering in the Commonwealth of Virginia.

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

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

5. Reinforced Concrete Pipe

When specified, and prior to manufacture of reinforced concrete pipe, the Contractor shall furnish to the District a certification of the acceptability of the design of such pipe, as determined from a review that has been signed and sealed by a Professional

Engineer holding a valid license to practice engineering in the Commonwealth of Virginia. Such certification shall cover all design data, supporting calculations and materials. Pipe designs previously certified or approved by the District will not require recertification.

105.11—Conformity with Plans and Specifications

All materials to be used in the Work shall conform to the qualities, technical requirements, values or range of values specified in the Contract. Less than complete conformity may be permitted if obtaining exact or complete conformity would not be feasible and if authorized in writing by the Engineer.

Permissible tolerances for the elevation of subgrade and finished grade and for the thickness of the various courses of pavement structure are specified in the Contract. If permissive tolerances are exceeded, or if consistent deviations from the plans or abrupt changes in grade occur, even though within the tolerances, the affected areas shall be reconstructed to conform to the specified tolerance and provide a smooth riding surface. When it is not feasible to reconstruct the areas, payment will be made in accordance with the applicable specification for each material placed or adjusted in accordance with Section 105.18.

When the plans require the finished surface to tie into any structural item whose elevation is fixed, the elevation of the finished surface must coincide with the elevation of the structural item.

105.12—Coordination of Plans, General Provisions, Special Provisions and Technical Specifications

The plans, General Provisions, Special Provisions, Technical Specifications and other Contract Documents defined in Section 103.06 are parts of the Contract. A requirement occurring in one Contract Document shall be as binding as though occurring in all. The Contract Documents are

intended to be complementary, and to include, describe and provide all items necessary for the Contractor's proper and complete performance of the Work.

In case of a discrepancy, the following order of priority will apply, with the highest governing item appearing first and the least governing item appearing last:

- (a) Special Provision will govern over the Plans, General Provisions and the Technical Specifications.
- (b) Plans will govern over the General Provisions and Technical Specifications.
- (c) Technical Specifications will govern over the General Provisions.
- (d) Calculated dimensions, unless obviously incorrect, will govern over scaled dimensions.

The Contractor shall not take advantage of any obvious or apparent ambiguity, conflict, error or

omission in the plans or the Contract. If after beginning work the Contractor discovers an ambiguity, conflict, error, or omission in the Contract, he shall immediately notify the Engineer and before proceeding further with the affected work. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Contract.

105.13 – Not Used

105.14—Maintenance during Construction

(a) Traffic Control for Projects in the Roadway

The Contractor shall have a Superintendent on the project site during all work operations. This person shall be responsible for the oversight of work zone traffic control within the project limits in compliance with the Contract requirements, the VWAPM, and the MUTCD. This person's duties shall include the supervision of the installation, adjustment (if necessary), inspection, maintenance, and removal when no longer required, of all work zone traffic control devices on the project.

(b) Maintenance of Traffic

1. The Contractor shall prosecute the Work so as to avoid obstructions to traffic to the greatest extent practicable. The Contractor shall provide for the safety and convenience of the general public and residents along the roadway, and for the protection of persons and property.

Highways closed to traffic shall be protected by barricades and other warning devices as required by the Contract, the VWAPM, and the MUTCD. Barricades and warning devices shall be illuminated where required during periods of darkness and low visibility. The Contractor shall erect warning devices in advance of a location on the project where operations or obstructions may interfere with the use of the road by traffic and at all intermediate points where the new work crosses or coincides with an existing roadway. The Contractor shall maintain sign faces and reflective surfaces of warning devices in a clean and visible condition. The Contractor shall cover or remove signs when the messages thereon are not applicable. Barricades, warning signs, lights, temporary signals, and other protective devices shall conform to Section 512.

2. The road shall be kept open to all traffic while undergoing improvements, unless otherwise permitted in the Contract. The Contractor shall keep the portion of the project being used by public, pedestrian, and vehicular traffic in such condition that all such traffic will be safely and adequately accommodated. However, removal of snow and control of ice on roads open to public travel will be performed by the District.

The Contractor shall keep the portions of the road being used by the public free from irregularities and obstructions that could present a hazard or annoyance to traffic. Holes in hard surface pavements shall be filled with approved asphalt patching material. Where such work is not specified in the Contract and determined to be required by the Engineer,

and not the result of any failure or fault of the Contractor and due to causes beyond the Contractor's control, the cost to remedy such hazards will be handled according to Section 109.05.

If any damage is sustained by an accepted unit or portion of the project attributable to causes beyond the control of the Contractor, the Engineer may authorize the Contractor to make the necessary repairs. These repairs will be paid for at the Contract price for the items requiring repair. In the absence of Contract prices covering the items of repair, the repair work will be paid for in accordance with Section 109.05.

3. **Holidays:** No Lane Closures shall be permitted on the following holidays, as well as the normal workday preceding and following these holidays, without permission of the Engineer:

- a) New Year's Eve Day
- b) New Year's Day
- c) Martin Luther King, Jr. Day
- d) Presidents Day
- e) Easter
- f) Mother's Day
- g) Memorial Day
- h) Juneteenth Day
- i) July 4th
- j) Labor Day
- k) Columbus Day
- l) Veterans Day
- m) Thanksgiving Day
- n) Day after Thanksgiving
- o) Christmas Day

If any of these holidays occurs on a Sunday, the following Monday shall be considered the holiday. If occurring on a Saturday, the preceding Friday will be considered as the holiday.

If the Holiday occurs on a Sunday or Monday: from noon on the preceding Friday to Noon on the following Tuesday.

The District may waive, with written request within 72 hours, the restriction of working on days preceding and following the above listed holidays when the Contractor's operations have no effect on vehicular traffic, when determined by the District.

4. **Tunnel Lane Closures:** Work that requires a lane closure in the open approach or tunnel shall only be completed at night from 9:00 p.m. through 6:00 a.m. on Monday through Thursday. Closure must be scheduled with the District one week prior and the Maintenance of Traffic shall be provided by the District.
5. **Restrictions:** Lane closures on the approach roadways and trestles shall not be

permitted on Friday, Saturday or Sunday from May 1st through September 30th, unless approved in writing by the District.

Lane Closures on the approach roadways and trestles shall be permitted October 1st through April 30th, Sunday through Saturday, except for holidays as noted above.

6. **Maintenance of Traffic During Suspension of Work:** During any suspension of work, the Contractor shall temporarily open to traffic such portions of the project and temporary roadways as may be agreed upon by the Contractor and Engineer.
7. **Minimizing Traffic Delays:** Two-way traffic shall be maintained at all times unless the Contract or the Engineer permits one-way traffic. The Contractor shall not stop traffic without the Engineer's permission.
8. **Connections and Entrances:** Connections with other roads and public and private entrances shall be kept in a reasonably smooth condition at all times. Stabilization or surfacing material shall be applied to connections and entrances. The Contractor shall schedule construction operations so that approved continuous access is provided for all property adjacent to the construction when the property is shown on the plans to require access.

The Contractor shall not disturb connections or entrances until necessary. Once disturbed, the Contractor shall maintain and complete connections or entrances as follows:

- a. **Connections:** Connections that had an original paved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using temporary pavement as soon as practicable after connections are disturbed. Connections that had an original unpaved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using either the required material or a temporary aggregate stabilization course that shall be placed as soon as practicable after connections are disturbed.

If there are delays in prosecution of work for connections, connections that were originally paved shall have at least two lanes maintained with a temporary paved surface. Those that were not originally paved shall be maintained with a temporary aggregate stabilization course.

- b. **Entrances:** Entrances shall be graded concurrently with the roadway with which they intersect. Once an entrance has been disturbed, it shall be completed as soon as is practicable, including placing the required base and surface course or stabilization. If the entrance must be constructed in stages, such as when there is a substantial change in the elevation of the roadway with which it intersects, the surface shall be covered with a temporary aggregate stabilization course or other suitable salvaged material until the entrance can be completed and the required base and surface or stabilization course can be placed.

6. **Obstruction Crossing Roadways:** Where the Contractor places obstructions such as

suction or discharge pipes, pump hoses, steel plates, or any other obstruction that must be crossed by vehicular traffic, they shall be bridged as directed by the Engineer at the Contractor's expense. Traffic shall be protected by the display of warning devices both day and night. If operations or obstructions placed by the Contractor damage an existing traveled roadway, the Contractor shall cease operations and repair damages to the roadway at no additional cost to the District.

7. **Temporary Structures:** The Contractor shall construct, maintain, and remove temporary structures and approaches necessary for use by traffic. Unless otherwise specified in the Contract, the cost of these operations shall be included in pay items for the new structure. After new structures have been opened to traffic, temporary structures and approaches shall be removed. The materials contained therein shall remain the property of the Contractor.

The proposed design of temporary structures shall be submitted to the Engineer prior to the beginning of construction in accordance with Section 105.10.

8. **Haul Route:** The Contractor shall select haul routes between the project and material source(s) that will minimize disturbance to the community. The Contractor shall furnish to the Engineer, for review, his plan for the haul route and for minimizing the adverse effects of hauling operations on persons who reside adjacent to the haul route or persons who otherwise use a portion of the haul route for ingress or egress to their residential or work area. The District may select alternate haul routes, divide the hauling traffic over several routes, and impose other restrictions deemed necessary to minimize the impact of the hauling operation on local residents.

9. Opening Sections of Projects to Traffic

Certain sections of the Work may be opened to traffic when specified in the Contract or when directed by the Engineer. Such opening shall not constitute acceptance of the Work or any part thereof or a waiver of any provision of the Contract.

On any section of the Work opened by order of the Engineer where the Contract does not provide for traffic to be carried through the Work, the Contractor will not be required to assume any expense entailed in maintaining the road for traffic. The District will pay such expense or will compensate the Contractor in accordance with Section 109.05. Repair of slides and repair of damage attributable to traffic will be compensated for in accordance with Section 109.05. Slides shall be removed by the Contractor in accordance with Section 303.

On any section of the Work opened by order of the Engineer where the Contract does not provide for traffic to be carried through the Work, any additional cost incurred to complete other items of work solely because of the changed working conditions will be

compensated according to Section 109.05.

If the Contractor is not continuously prosecuting the Work to the Engineer's satisfaction as determined by the Schedule of Record, the Contractor shall not be relieved of the responsibility for maintenance of the completed work during the period that the section of the Work is opened to traffic prior to final acceptance. The Contractor shall be responsible for any expense resulting from the opening of such portions of the Work under these circumstances, except for slides. The Contractor shall conduct the remainder of the construction operations so as to cause the least obstruction to traffic.

(c) Maintenance of Work

1. The Contractor shall maintain the Work, the project site, construction area and roadway from the beginning of construction operations until final acceptance with adequate equipment and forces to keep the roadway and structures in a safe and satisfactory condition at all times and to ensure the continuous and effective day by day prosecution of the Work. The District will perform maintenance of items outside of the scope of work of the Contract. As determined by the Engineer, where maintenance is necessary within the project limits but does not affect Contract work, and not the result of any failure or fault of the Contractor and due to causes beyond the Contractor's control, the cost to perform such maintenance will be handled according to Section 109.05.

If any damage is sustained by an accepted unit or portion of the project attributable to causes beyond the control of the Contractor, the Engineer may authorize the Contractor to make the necessary repairs. These repairs will be paid for at the Contract price for the items requiring repair. In the absence of Contract prices covering the items of repair, the repair work will be paid for in accordance with Section 109.05.

2. Where the Contract specifies placing a course on another course or subgrade of embankment, base, subgrade, concrete, asphalt pavement, or other courses previously constructed, the Contractor shall maintain the courses or subgrades previously constructed in accordance with the Contract requirements when placing such course. This maintenance includes, but is not limited to draining, re-compacting, re-grading, or, if unacceptable or destroyed, the removal of work the District previously accepted.

(d) Grading Operations:

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

When the surface is to be widened on both sides of the existing pavement, construction operations involving grading or paving shall not be conducted simultaneously on sections directly opposite each other.

The surface of pavement shall be kept free from soil and other materials that might be hazardous to traffic. Prior to opening of new pavement to traffic, shoulders shall be roughly dressed for a distance of 3 feet from the edge of the paved surface.

(e) **Maintenance Cost**

The Contractor shall bear all costs of performing maintenance work before final acceptance, and of constructing and maintaining necessary approaches, crossings, intersections, and other features without direct compensation except as provided for herein. When the Contractor confines his operation to the surface of the roadway and reasonable width of the shoulder and the surface is disturbed or damaged by his operations or equipment, he shall be responsible for the restoration and maintenance of the surface that is disturbed or damaged.

(f) **Failure to Maintain Roadway or Structures:**

If the Contractor fails to remedy unsatisfactory maintenance immediately after receipt of a notice by the Engineer, the Engineer may proceed with adequate forces, equipment, and material to maintain the project. The cost of the maintenance, plus 25 percent for supervisory and administrative personnel, will be deducted from monies due the Contractor for the project.

105.15—Removing and Disposing of Structures and Obstructions

The Contractor shall remove and dispose of or store, as directed by the Engineer, fences, buildings, structures, or encumbrances within the construction limits unless separate pay items for this work are included in the Contract. Payment for these operations will be in accordance with Section 301.03. Materials so removed, including existing drains or pipe culverts, shall become the property of the Contractor, with the exception of those materials to be stored or delivered to the District or others as designated in the Contract.

- (a) **Signs:** The Contractor shall relocate all signs within the construction limits that conflict with construction work as approved by the Engineer. Signs that are not needed for the safe and orderly control of traffic during construction as determined by the Engineer shall be removed and stored at a designated location within the project limits. The removed signs shall be stored above ground in a manner that will preclude damage and shall be reinstalled in their permanent locations prior to final acceptance. If any of the removed signs are not to be reinstalled, the Contractor shall notify the Engineer at the time the signs have been properly stored. Such signs will be removed from the storage area by the District. Any sign that is damaged or lost because of the fault of the Contractor shall be repaired or replaced at his expense. Costs for removing, storing, protecting, and reinstalling such signs shall be included in the price bid for other items in the Contract, and no additional compensation will be made.

105.16—Cleanup

Removal from the project of rubbish, scrap material, and debris caused by the Contractor's personnel or construction operations shall be a continuing process throughout the course of the Work. The work site shall be kept in a neat, safe and orderly condition at all times.

Before final acceptance, the highway, borrow pits, quarries, disposal areas, storage areas, and all ground occupied by the Contractor in connection with the Work shall be cleaned of rubbish, surplus materials, and temporary structures, except where the Contractor owns or controls the property. All parts of the Work shall be left in a neat, safe and orderly condition.

Within 30 days after final acceptance, the Contractor shall remove his equipment, materials and debris from the right of way and from property adjacent to the project that he does not own or control.

105.17—Inspection of Work

Inspection will be performed at critical stages. However, all stages, materials, and details of the Work are subject to inspection. The Contractor shall provide the Engineer and Inspectors full and safe access to all parts of the Work. The Contractor shall furnish the Engineer and Inspectors such information and assistance as required to make complete, timely and detailed inspections. The Engineer, Inspectors and their appointed representatives shall have ready access to machines, plants and plant equipment used in processing or placing materials.

Prior to the beginning of operations, the Engineer will meet with the Contractor to establish an understanding of the critical stages of work that shall be performed in the presence of the Inspector. In order for the District to schedule inspection of the critical stages of work, the Contractor shall keep the Engineer informed of planned operations in accordance with Section 108.03. The Contractor shall advise the Engineer at least 24 hours in advance of any changes in the Contractor's planned operations or critical stage work requiring District inspection.

If the Engineer requests it, the Contractor shall remove or uncover such portions of the finished work as may be directed at any time before final acceptance. The Contractor shall restore such portions of the finished work to comply with the appropriate Contract specification requirements. If the work exposed is acceptable, the uncovering or removing and replacing the covering or making good the parts removed will be paid for as extra work in accordance with Section 104.02. If the work is unacceptable, the cost of uncovering or removing and replacing the covering or making good the parts removed shall be borne by the Contractor.

If materials are used or work is performed without inspection by an authorized representative of the Department, the Contractor may be ordered to remove and replace such work or material at his own expense unless the District's representative failed to inspect the work or material after having been given reasonable notice in writing that the material was to be used or the work was to be performed.

If an inspection reveals that work has not been properly performed, or materials used are unacceptable, the Contractor will be so advised and he shall immediately inform the District of his schedule for correcting such work and materials, and the time when a re-inspection can be made.

105.18—Removal of Unacceptable and Unauthorized Work

Work that does not conform to the Contract requirements, whether the result of unacceptable

workmanship, use of unacceptable materials, damage through carelessness, or any other cause within the Contractor's control, will be considered unacceptable work.

Unacceptable work shall be remedied or removed as determined by the Engineer and replaced in an acceptable manner at the Contractor's expense. The Engineer may accept the unacceptable work at a reduced price when acceptance is considered to be in the best interest of the District.

Work that is done contrary to the instructions of the Engineer, contrary to the requirements of the Contract, beyond the lines shown on the plans or as designated by the Engineer except as specified herein, or without authority will be considered unauthorized and will not be paid for. The Engineer may order the Contractor to remove or replace unauthorized work at the Contractor's expense.

The Contractor shall not perform destructive sampling or testing of the work without written authorization of the Engineer. Unauthorized destructive sampling or testing will cause the work to be considered unacceptable.

In the event the Contractor is granted authorization to perform destructive sampling or testing, the Contractor shall obtain the approval of the Engineer for the method and location of each test prior to beginning such sampling or testing. In addition, destructive sampling and testing shall be performed in the presence of the Engineer.

If the Contractor fails to comply immediately with any order of the Engineer made under this Section, the Engineer will have the authority to cause unacceptable or unauthorized work to be removed and replaced and to deduct the cost of such removal and replacement, plus 25 percent for supervisory and administrative personnel, from any monies due or to become due the Contractor.

105.19—Submission and Disposition of Claims

(a) Notice of Intent to File a Claim

Early or prior knowledge by the District of an existing or impending claim for damages could alter the plans, scheduling, or other District action or result in mitigation or elimination of the basis for the claim. Therefore, the Contractor shall submit a written statement describing the act of omission or commission by the District or its agents that allegedly caused damage to the Contractor and the nature of the claimed damage to the Engineer at the time of each and every occurrence that the Contractor believes to be the basis of a claim or prior to the beginning of the work upon which a claim and any subsequent action will be based. "Occurrence" includes, but is not limited to the Engineer's denial of the Contractor's timely request for time extension, additional compensation, change order, adjustment, or other request under the Contract, or any other decision, instruction, directive, or order that the Contractor believes will result in a claim. The written statement shall clearly state that it is a "notice of intent to file a claim." If such damage is deemed certain in the opinion of the Contractor to result from his acting on an order from the Engineer, he shall immediately take written exception to the order. Submission of a notice of intent to file a claim as specified

shall be mandatory. Failure to submit such notice of intent shall be a conclusive waiver to such claim for damages by the Contractor. An oral notice or statement will not be sufficient nor will a notice or statement after the event. Oral statements recorded in meeting minutes also will not be sufficient.

In addition, at the time of each and every occurrence that the Contractor believes to be the basis of a claim or prior to beginning the work upon which a claim and any subsequent action will be based, the Contractor shall furnish the Engineer an itemized list of materials, equipment, and labor for which additional compensation will be claimed. The Contractor shall afford the Engineer every facility for keeping an actual cost record of the work. The Contractor and the Engineer shall compare records and bring them into agreement at the end of each day. Failure on the part of the Contractor to afford the Engineer proper facilities for keeping a record of actual costs will constitute a waiver of a claim for such extra compensation except to the extent that it is substantiated by the District's records. The filing of such notice of intent by the Contractor and the keeping of cost records by the Engineer shall in no way establish the validity of a claim.

(b) Time for Submittal of Claim

Upon completion or termination of the Contract, the Contractor may, within 60 days after the final estimate date established by the District pursuant to Code of Virginia § 33.2-1101, deliver to the District a certified written claim, which must be a signed original claim document, along with an electronic copy of the claim document as a Portable Document Format (PDF) file, for the amount he deems he is entitled to under the Contract. For the purpose of this Section, the final estimate date shall be that date set forth in a letter from the Department to the Contractor sent by certified mail and shall be considered as the date of notification of the District's final estimate. Regardless of the manner of delivery of the claim, the Engineer must receive and have physical possession of the Contractor's written claim within the 60-day period that commences with the final estimate date. Submittals received by the District either before the final estimate date or after the 60-day period shall not have standing as a claim.

(c) Content of Claim

The Contractor's certified written claim shall set forth in detail the facts upon which the claim is based, including but not limited to the following:

1. A detailed statement of the facts upon which the claim is based providing items of work affected and included in each claim, and the date(s) on which actions or events resulting in the claim occurred or conditions resulting in the claim became evident; and
2. All pertinent data, documents, and correspondence that may substantiate the claim. The District shall have the right, at its expense, to review and copy all of the Contractor's non-privileged project files and documents, both electronic and paper, for use in analyzing the claim; and

3. Identification of the provisions of the Contract that the District allegedly breached, and the acts or omissions constituting such breach.
4. A detailed statement of the amount of the actual cost for materials, labor and equipment sought in the claim.
5. A copy of the notice(s) of intent to file a claim that the Contractor submitted to the District for the claim(s).

(d) **Certification of Claim.**

The Contractor shall submit with the claim a written certification of the claim in the following form:

Pursuant to the Code of Virginia, I hereby certify that this Contract claim submission for Chesapeake Bay Bridge Tunnel District Project No. in Northampton County, Virginia, is a true and accurate representation of additional costs, expenses, damages and/or delays incurred by (Contractor) or its subcontractors or suppliers in the performance of the required Contract work. Any statements, representations, writings, or documents, made or used and known to be false, shall be considered a violation of the Virginia Governmental Frauds Act, punishable as allowed by the Code of Virginia for a Class 6 Felony, and shall be considered a violation of the Virginia Fraud Against Taxpayers Act, subject to the civil penalties allowed by the Code of Virginia.

By: _____
(Contractor)

As officer or duly appointed agent of _____ (Contractor)

Title: _____ Date: _____

State Of: _____ City/County of _____, to Wit:

I, the undersigned, a Notary Public in and for the City/County and State aforesaid, do hereby certify that _____, Whose name is signed to the foregoing instrument, bearing the date of the ____ day of _____ 20____, has this day acknowledged the same before me in my city/county and State aforesaid.

Given under my hand this _____ day of _____, 20____.

Notary Public: _____

Notary Registration No.: _____

My Commission Expires: _____

Claims submitted by the Contractor for itself or its subcontractors or suppliers during the statutory period for submitting Contract claims that are submitted without the Contractor's certification described above shall not have standing as a claim and shall not be considered by the District.

(e) Review of Claim

Within 90 days from the receipt of the claim, the District will make an investigation and notify the Contractor by certified mail of its decision. However, by mutual agreement, the District and Contractor may extend the 90-day period for another 30 days.

If the Contractor is dissatisfied with the District's decision, within 30 days from receipt of the decision the Contractor shall notify the Executive Director in writing that it desires to appear before the Executive Director, whether in person or through counsel, and present additional facts and arguments in support of its claim. The Executive Director will schedule and meet with the Contractor within 30 days after receiving the request. However, the Executive Director and Contractor, by mutual agreement, may schedule the meeting to be held after 30 days but before the 60th day from the receipt of the Contractor's written request. Within 45 days from the date of the meeting, the Executive Director will investigate the claim, including the additional facts presented, and notify the Contractor in writing of his decision. However, the Executive Director and Contractor, by mutual agreement, may extend the 45-day period for another 30 days. If the Executive Director deems that all or any portion of a claim is valid, he shall have the authority to negotiate a settlement with the Contractor subject to any approvals required by the Code of Virginia.

Any monies that become payable as the result of claim settlement after payment of the final estimate will not be subject to payment of interest unless such payment is specified as a condition of the claim settlement.

(f) Compensation for Claims

The Engineer will determine time extension according to Section 108.04 and compensation according to Section 109.05 if the District concludes that the Contractor has established entitlement to compensation or a time extension for the claim.

SECTION 106—CONTROL OF MATERIAL

106.01—Source of Supply and Quality Requirements

The materials used throughout the Work shall conform to the requirements of the Contract. The Contractor shall regulate his supplies so that there will be a sufficient quantity of tested material on hand at all times to prevent any delay of work. Except as otherwise specified, materials, equipment, and components that are to be incorporated into the finished Work shall be new and fit for their intended purpose. Within 30 days after notification of award of the Contract, but not later than 7 days prior to the beginning of construction operations under the Contract, the Contractor shall submit

a statement of the known origin, composition and manufacture of all materials to be used in the work, including optional or alternate items. Material requirements not previously reported shall be submitted at least 60 days prior to their use on the project, but not less than 2 weeks prior to delivery. The Contractor's statement shall be electronically submitted by use of Form C-25 and shall be identified by the complete project number, and all items or component materials shall be identified by the specific Contract item number and the Specification reference shown in the Contract.

At the option of the Engineer, materials may be approved at the source of supply. If it is found during the life of the Contract that previously approved sources of supply do not supply materials or equipment conforming to the Contract requirements, do not furnish the valid test data required to document the quality of the material or equipment, or do not furnish documentation to validate quantities to document payment, the Contractor shall change the source of supply and furnish material or equipment from other approved sources. The Contractor shall notify the District of this change, and provide the same identifying information noted in this Section, at least 60 days prior to their use on the project, but not less than 2 weeks prior to delivery.

Materials shall not contain toxic, hazardous, or regulated solid wastes or be furnished from a source containing toxic, hazardous or regulated solid wastes.

When optional materials are included in the Contract, the Contractor shall advise the Engineer in writing of the specific materials selected. Thereafter, the Contractor shall use the selected materials throughout the project unless a change is authorized in writing by the Engineer. However, when the Contractor has an option as to the type of pipe that may be used, he may use any of the approved types for each size of pipe, but he shall use the same type for a particular line. The Engineer may authorize other types and sources in an emergency that will not unreasonably delay delivery of the selected material.

Equipment and material guaranties or warranties that are normally given by a manufacturer or supplier, or are otherwise required in the Contract, shall be obtained by the Contractor and assigned to the District in writing. The Contractor shall also provide an in-service operation guaranty on all mechanical and electrical equipment and related components for a period of at least 12 months, beginning on the date of partial acceptance of that specific item(s) or final acceptance of the project.

106.02—Material Delivery

The Contractor shall advise the Engineer at least 2 weeks prior to the delivery of any material from a commercial source. Upon delivery of any such material to the project, the Contractor shall provide the Engineer with one copy of all invoices (prices are not required). The following materials shall also comply with Section 109.01: asphalt concrete; dense graded aggregate, to include aggregate base, subbase, and select material; fine aggregate; open graded coarse aggregate; crusher run aggregate; and road stabilization aggregate. The printed weights of each load of these materials, as specified in Section 109.01, shall accompany the delivery, and such information shall be furnished to the Inspector at the project.

106.03—Local Material Sources (Pits and Quarries)

The requirements set forth herein apply exclusively to non-commercial pits and quarries from which materials are obtained for use on contracts awarded by the District.

- (a) Local material sources shall be concealed from view from the completed roadway and any existing public roadway. Concealment shall be accomplished by selectively locating the pit or quarry and spoil pile, providing environmentally compatible screening between the pit or quarry site and the roadway, or using the site for another purpose after removal of the material, or restoration equivalent to the original use (such as farm land, pasture, turf, etc.). The foregoing requirements shall also apply to any pit or quarry opened or reopened by a subcontractor or supplier. However, the requirements will not apply to commercial sand and gravel and quarry operations actively processing material at the site prior to the date of the Notice of Advertisement.
- (b) The Contractor shall furnish the Engineer a statement signed by the property owner in which the property owner agrees to the use of his property as a source of material for the project. Upon completion of the use of the property as a material source, the Contractor shall furnish the Engineer a release signed by the property owner indicating that the property has been satisfactorily restored. The requirements for a signed statement and release will not apply to commercial sources, sources owned by the Contractor, and sources furnished by the District.
- (c) Local material pits and quarries that are not operated under a local or State permit shall not be opened or reopened without authorization by the Engineer. The Contractor shall submit for approval a site plan, including, but not limited to, the following:
 - 1. The location and approximate boundaries of the excavation;
 - 2. Procedures to minimize erosion and siltation;
 - 3. Provision of environmentally compatible screening;
 - 4. Restoration;
 - 5. Cover vegetation;
 - 6. Other use of the pit or quarry after removal of material, including the spoil pile;
 - 7. The drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;
 - 8. Location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;
 - 9. Constructed or natural waterways used for discharge;

10. A sequence and schedule to achieve the approved plan; and
11. The total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Contractor shall certify that the sediment trap or basin design is in compliance with VDOT Standards and Specifications, and all local, state, and federal laws. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

The Contractor's design and restoration shall be in accordance with the Contract requirements and in accordance with the requirements of the federal, state, and local laws and regulations.

If the approved plan provides for the continued use or other use of the pit or quarry beyond the date of final acceptance, the Contractor shall furnish the District a bond made payable to the Chesapeake Bay Bridge Tunnel District in an amount equal to the Engineer's estimate of the cost of performing the restoration work. If the pit or quarry is not used in accordance with the approved plan within eight months after final acceptance, the Contractor shall perform restoration work as directed by the Engineer, forfeit his bond, or furnish the Engineer with evidence that he has complied with the applicable requirements of the State Mining Law.

- (d) Topsoil on District owned or furnished borrow sites shall be stripped and stockpiled as directed by the Engineer for use as needed within the construction limits of the project or in the reclamation of borrow and disposal areas.
- (e) If payment is to be made for material measured in its original position, material shall not be removed until Digital Terrain Model (DTM) or cross-sections have been taken. The material shall be reserved exclusively for use on the project until completion of the project or until final DTM or cross-sections have been taken.
- (f) If the Contractor fails to provide necessary controls to prevent erosion and siltation, if such efforts are not made in accordance with the approved sequence, or if the efforts are found to be inadequate the District will withdraw approval for the use of the site and may cause the Contractor to cease all contributing operations and direct his efforts toward corrective action. If the Contractor does not perform such work, the cost of performing the work, plus 25 percent for supervisory and administrative personnel, will be deducted from monies due or to become due the Contractor.
- (g) Costs for applying seed, fertilizer, lime, mulch, and for restoration drainage, erosion and siltation control, regrading haul roads, and screening shall be included in the Contract price for the type of excavation or other appropriate Contract items.
- (h) If the Contractor fails to fulfill the provisions of the approved plan for screening or restoring

material sources, the District may withhold and use for the purpose of performing such work any monies due the Contractor at the time of the final estimate. The Contractor shall be liable for penalties, fines, or the District's costs or damages that result from his failure to prevent erosion or siltation and take restorative action.

- (i) After removing all the material needed from the local material sources, the Contractor shall remove metal, lumber, and other debris resulting from his operations and shall shape and landscape the area in accordance with the approved plan for such work.

106.04—Disposal Areas

The Contractor shall dispose of unsuitable or surplus material shown on the plans according to Contract requirements. The Contractor shall dispose of unsuitable or surplus material off the right of way. The Contractor shall obtain the necessary rights to property to be used as a disposal area.

The Contractor shall handle and dispose of the materials specified in this Section in accordance with the following requirements.

(a) Disposal Areas

The Contractor shall dispose of materials not used on the project off the right of way. If an approved disposal area is not designated in the Contract, the Contractor shall obtain the necessary rights to property to be used as an approved disposal area. Prior to the District approving the Contractor's proposed disposal area, the Contractor shall submit a site plan that shall show:

1. The location and approximate boundaries of the disposal area.
2. Procedures to minimize erosion and siltation.
3. Provision of environmentally compatible screening.
4. Restoration.
5. Cover vegetation.
6. Other use of the disposal site.
7. The drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations.
8. Location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway.

9. Constructed or natural waterways used for discharge.
10. A sequence and schedule to achieve the approved plan.
11. The total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of 3 acres or more flows across a disturbed area. The Contractor shall certify that the sediment trap or basin design is in compliance with VDOT Standards and Specifications, all local, state, and federal laws. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

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

If the Contractor fails to provide and maintain necessary controls to prevent erosion and siltation, if such efforts are not made in accordance with the approved sequence, or if the efforts are found to be inadequate, the District will withdraw approval for the use of the site and may cause the Contractor to cease all contributing operations and direct his efforts toward corrective action, or may perform the work as determined by the Engineer and deduct the cost of performing the work, plus 25 percent for supervisory and administrative personnel, from monies due or to become due the Contractor.

The Contractor shall furnish the Engineer a statement signed by the property owner in which the owner agrees to the use of his property for the deposit of material from the project. Upon completion of the use of the property as an approved disposal area, the Contractor shall furnish the Engineer a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will not apply to commercial sources, sources owned by the Contractor, and sources furnished by the District.

(b) Materials encountered by the Contractor shall be handled and disposed of as follows:

1. Unsuitable material for the purpose of this Specification is defined as material having poor bearing capacity, excessive moisture content, extreme plasticity or other characteristics as defined by the Engineer that makes it unacceptable for use in the Work and shall be disposed of at an approved disposal area, landfill licensed to receive such material, or as the Engineer directs in writing.
2. Surplus material as shown on the plans shall be disposed of by flattening slopes, used

to fill in ramp gores and medians, or if not needed, disposed of at an approved disposal area, a landfill licensed to receive such material, or as the Engineer directs in writing. Surplus material stockpile areas on the right of way shall be cleared but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and the haul roads thereto. Placement of fill material shall not adversely affect existing drainage structures. If necessary, modified existing drainage structures, as approved by the Engineer, shall be paid for in accordance with Section 109.05. Within 7 days after the material has been deposited, the area shall be shaped and stabilized to minimize erosion and siltation.

3. Organic materials such as, but not limited to, tree stumps and limbs (not considered merchantable timber), roots, rootmat, leaves, grass cuttings, or other similar materials shall be chipped or shredded and used on the project as mulch, given away, sold as firewood or mulch, burned at the Contractor's option if permitted by local ordinance, or disposed of at a facility licensed to receive such materials. Organic material shall not be buried in state rights-of-way or in an approved disposal area.
4. Inorganic materials such as brick, cinder block, broken concrete without exposed reinforcing steel, or other such material may be used in accordance with Section 303.04 or shall be disposed of at an approved disposal area or landfill licensed to receive such materials. If disposed of in an approved disposal area, the material shall have enough cover to promote soil stabilization in accordance with Section 303 and shall be restored in accordance with other provisions of this Section.

Concrete without exposed reinforcing steel, may be crushed and used as rock in accordance with Section 303. If approved by the Engineer, these materials may be blended with soils that meet AASHTO M57 requirements and deposited in fill areas within the right of way in accordance with the requirements of Section 303 as applicable.

5. Excavated rock in excess of that used within the project site in accordance with Section 303 shall be treated as surplus material.
6. Other materials such as, but not limited to, antifreeze, asphalt (liquid), building forms, concrete with reinforcing steel exposed, curing compound, fuel, hazardous materials, lubricants, metal, metal pipe, oil, paint, wood or metal from building demolition, or similar materials shall be disposed of at a landfill licensed to receive such material.
7. Coal or other valuable materials uncovered during prosecution of the Work that are not specifically addressed by the Contract shall be disposed of as the Engineer directs in writing.

106.05—Rights For and Use of Materials Found on Project

With the approval of the Engineer, the Contractor may use in the project any materials found in the excavation that comply with the requirements of the Specifications. Unless otherwise specified, the Contractor will be paid for both the excavation of such materials at the Contract unit price and for

the Contract item for which the excavated material is used. However, the Contractor shall replace at his own expense with other acceptable material the excavation material removed and used that is needed for use in embankments, backfills, approaches, or otherwise. The Contractor shall not excavate or remove any material from within the construction limits that is not within the grading limits, indicated by the typical section, slope and grade lines shown in the plans without written authorization by the Engineer. The Contractor shall not own and shall not have the right to sell, trade or exchange, any coal or other valuable materials uncovered during the prosecution of the work without the Engineer's specific written authorization.

106.06—Samples, Tests, and Cited Specifications

Materials will be inspected and tested by the Engineer before or during their incorporation in the Work. However, the inspection and testing of such material shall not relieve the Contractor of the responsibility for furnishing material that conforms to the Specifications. The District may retest all materials that have been accepted at the source of supply after delivery and will reject those that do not conform to the requirements of the Specifications. Stored material may be re-inspected prior to use. Work in which untested materials are used without the written permission of the Engineer may be considered unacceptable.

Unless reference is made to a specific dated Specification, references in these Specifications to AASHTO, ASTM, VTM, and other standard test methods and materials requirements shall refer to either the test specifications that have been formally adopted or the latest interim or tentative specifications that have been published by the appropriate committee of such organizations as of the date of the Notice of Advertisement. Unless otherwise indicated, tests for compliance with specification requirements will be made by and at the District's expense except that the cost of retests, exclusive of the first retest, shall be borne by the Contractor. Samples shall be furnished by the Contractor at his expense, and those that are not tested by the Contractor will be tested by a representative of the District.

The inspection cost of structural steel items fabricated in a country other than the continental United States shall be borne by the Contractor. Inspection of structural fabrication shall be performed in accordance with the requirements of the appropriate VTM by a commercial laboratory approved by the District. Additional cleaning or repair necessary because of environmental conditions in transit shall be at the Contractor's expense.

In lieu of testing, the Engineer may approve the use of materials based on the receipt of the manufacturer's certification furnished by the Contractor. However, furnishing the certificate shall not relieve the Contractor of the responsibility for furnishing materials that conform to the Specifications or the Contract requirements.

Materials requiring an MSDS will not be accepted at the project site for sampling or at the District's laboratories for testing without the document.

106.07—Plant Inspection

If the Engineer inspects materials at the source, the following conditions shall be met:

- (a) The Engineer shall have the cooperation and assistance of the Contractor and producer of the materials.
- (b) The Engineer shall have full access to parts of the plant that concern the manufacture or production of the materials being furnished.
- (c) For materials accepted under a quality assurance plan, the Contractor or producer shall furnish equipment and maintain a plant laboratory at locations approved for plant processing of materials. The Contractor or producer shall use the laboratory and equipment to perform quality control testing.

The laboratory shall be of weatherproof construction, tightly floored and roofed, and shall have adequate lighting, heating, running water, ventilation, and electrical service. The ambient temperature shall be maintained between 68 degrees F and 86 degrees F and thermostatically controlled. The laboratory shall be equipped with a telephone, intercom, or other electronic communication system connecting the laboratory and scale house if the facilities are not in close proximity to each other. The laboratory shall be constructed in accordance with the requirements of local building codes.

The Contractor or producer shall furnish, install, maintain, and replace, as conditions necessitate, testing equipment specified by the appropriate ASTM, AASHTO method or VTM being used and provide necessary office equipment and supplies to facilitate keeping records and generating test reports. The Contractor or producer's technician shall maintain current copies of test procedures performed in the laboratory. The Contractor shall calibrate or verify all balances, scales and weights associated with testing performed as specified in AASHTO R18. The Contractor or producer shall also provide and maintain an approved test stand for accessing truck beds for the purpose of sampling and inspection. The District may approve a single laboratory to service more than one plant belonging to the same Contractor or producer.

For crushed glass, the plant equipment requirements are waived in lieu of an independent third-party evaluation and certification of crushed glass properties by an AASHTO Materials Reference Laboratory (AMRL)-accredited commercial soil testing laboratory demonstrating that the supplied material conforms to Section 203. Random triplicate samples will be evaluated and analyzed for every 1,000 tons of material supplied to the project. The averaged results will be used for evaluation purposes. Suppliers of crushed glass shall maintain third party certification records for a period of 3 years.

106.08—Storing Materials

Materials shall be stored in a manner so as to ensure the preservation of their quality and fitness for the Work. When considered necessary by the Engineer, materials shall be stored in weatherproof buildings on wooden platforms or other hard, clean surfaces that will keep the material off the ground. Materials shall be covered when directed by the Engineer. Stored material shall be located so as to facilitate their prompt inspection. Approved portions of the right of way may be used for storage of material and equipment and for plant operations. However, equipment and materials shall

not be stored within the clear zone of the travel lanes open to traffic.

The Contractor shall provide additional required storage space at his expense. Private property shall not be used for storage purposes without the written permission of the owner or lessee. The Contractor shall furnish copies of the owner's written permission to the Engineer. Upon completion of the use of the property, the Contractor shall furnish the Engineer a release signed by the property owner indicating that the property has been satisfactorily restored.

Chemicals, fuels, lubricants, bitumens, paints, raw sewage, and other harmful materials as determined by the Engineer and the *VPDES General Permit for Discharge of Stormwater from Construction Activities* shall not be stored within any floodplain unless no other location is available and only then shall the material be stored in a secondary containment structure(s) with an impervious liner. Also, any storage of these materials in proximity to natural or man-made drainage conveyances or otherwise where the materials could potentially reach a waterway if released under adverse weather conditions, must be stored in a bermed or diked area or inside a container capable of preventing a release. Double-walled storage tanks shall meet the berm/dike containment requirement except for storage within flood plains. Any spills, leaks or releases of such materials shall be addressed in accordance with Section 107.16(b) and (e). Accumulated rain water may also be pumped out of the impoundment area into approved dewatering devices. All proposed pollution prevention measures and practices must be identified by the Contractor in his Pollution Prevention Plan as required by the Specifications, other Contract documents and/or the *VPDES General Permit for Discharge of Stormwater from Construction Activities*.

106.09—Handling Materials

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

106.10—Unacceptable Materials

Materials that do not conform to the Contract requirements shall be considered unacceptable. Such materials, whether in place or not, will be rejected, and shall be removed from the site of the work and replaced at no cost to the District. If it is not practical for the Contractor to remove rejected material immediately, the Engineer will mark the rejected material for identification. Rejected material whose defects have been corrected shall not be used until the Engineer gives written approval for its use. Upon the Contractor's failure to comply promptly with any order of the Engineer made under this Section, the Engineer may, in addition to other rights and remedies, have the unacceptable material removed and replaced, and deduct the cost of such removal and replacement from monies due or to become due the Contractor.

106.11—Material Furnished by the Department

The Contractor shall furnish all materials required to complete the Work except those specified to be furnished by the District.

Material furnished by the District will be delivered or made available to the Contractor at the locations specified in the Contract. The cost of handling and placing materials after delivery to the Contractor shall be included in the Contract price for the Contract item with which they are used.

After receipt of the materials, the Contractor shall be responsible for material delivered to him, including shortages, deficiencies, and damages that occur after delivery, and any demurrage charges.

106.12—Critical Materials

Raw or manufactured materials or supplies that are necessary for the fabrication, construction, installation, or completion of any item of work that is or becomes in extremely short supply regionally or nationally as substantiated by recognized public reports such as news media, trade association journals, or government reports, due to catastrophic events of nature, needs of national defense, or industrial conditions beyond the control of the District or Contractor, will be declared critical materials by the District.

When the supply of materials becomes critical, the provisions of this Section will become applicable to the Contract.

When all items of work involving noncritical materials have been completed by the Contractor or have progressed to a point where no further work is practicable prior to receipt of critical materials, a complete suspension of work will be granted by the District. Requests for partial suspension orders because of delays attributable to non-receipt of critical materials will be considered on the basis of merit in each case.

The District reserves the right to substitute critical materials or methods by means of a change order. Contractors, via their manufacturers or suppliers, that request relief due to critical shortage of materials as specified in this Section shall immediately supply information and other supporting data to permit the District an opportunity to assess possible alternatives or methods to avoid undue delay or expenditure.

SECTION 107— LEGAL RESPONSIBILITIES

107.01—Laws to Be Observed

The Contractor shall keep fully informed of federal, state, and local laws, bylaws, ordinances, orders, decrees, and regulations of governing bodies, courts, and agencies having any jurisdiction or authority that affects those engaged or employed on the Work, the conduct of the Work, or the execution of any documents in connection with the Work. The Contractor shall observe and comply with such laws, ordinances, regulations, orders, or decrees and shall defend, indemnify, and hold harmless the Commonwealth and its agents, officers, or employees from and against any claim for liability, fine, penalty, or cost, including attorney's fees, arising from or based on their violation, whether by himself, his agents, employees, or subcontractors. The Contractor shall execute and

file the documents, statements, certifications, and affidavits required under any applicable federal or state law or regulation required by or affecting his bid, or the Contract, or prosecution of the Work thereunder. The Contractor shall permit examination of any records made subject to such examination by any federal or state law or by regulations promulgated thereunder by any state or federal agency charged with enforcement of such law.

107.02—Permits, Certificates, and Licenses

(a) General

The Contractor shall conform to the permit conditions as shown in the Contract. Construction methods shall conform to the stipulations of the permit or certification conditions, or both. The Contractor shall assume all obligations and costs incurred as a result of complying with the terms and conditions of the permits and certificates.

If any of the permits listed below are applicable to the project, the Contract will indicate such and the applicable permit stipulations or conditions will be considered a part of the Contract.

1. **Department of the Army, Corps of Engineers Nationwide Permits:** A nationwide permit is issued to the District by the U.S. Army Corps of Engineers to place fill or dredge material in waters of the United States including wetlands.
2. **Virginia Marine Resources Commission – Virginia General Permit (VGP-1):** A VGP-1 permit is issued to the District by the Virginia Marine Resources Commission and is required on projects that cross in, on, or over state-owned land which is submerged below low water (channelward of the mean low water line), in tidal areas, including tidal wetlands, or below ordinary high water anywhere in the Commonwealth of Virginia.
3. **Virginia Water Protection Permit (VWPP):** The VWPP is issued to the District by the Virginia Department of Environmental Quality, Water Division and is required for activities that result in a discharge to surface waters and wetlands. The VWPP is issued as an individual or general permit.
4. **Virginia Department of Environmental Quality – VPDES General Permit For Discharge of Stormwater From Construction Activities (VPDES Construction Permit):** All construction activities undertaken by or for the District involving land disturbances equal to or exceeding one acre must be covered by the VPDES Construction Permit.
5. The Contractor shall be responsible for all costs to obtain VPDES Construction Permit coverage for all support facilities (both on-site and off-site) not included in the construction plans or Contract for the project. The District will not be responsible for any inconvenience, delay, or loss experienced by the Contractor as a result of his failure to gain access to any support facility areas at the time contemplated.

6. **Coastal Zone Management (CZM) Consistency Concurrence:** This clearance is issued to the District by the Virginia Department of Environmental Quality for projects in navigable waters requiring a U.S. Coast Guard bridge permit.
 7. **U.S. Coast Guard Bridge Permit:** This permit is required for bridge projects over navigable waters. The District is responsible for acquiring these permits.
 8. **Other Permits, Certificates and Licenses:** Except as otherwise specified herein, the Contractor shall procure all necessary permits, certificates or licenses that have not been obtained by the District. The Contractor shall pay all charges, fees, and taxes and shall comply with all conditions of the permits, certificates or licenses.
- (b) The Contractor shall not stockpile materials (including fill, construction debris, and excavated and woody materials) within the waterway or wetlands. The Contractor shall construct cofferdams, stream channel retaining structures, and all necessary dikes using non-erodible materials or, if specified in the permit(s), faced with coarse non-erodible materials. If faced with non-erodible material, filter cloth shall be placed between the granular fill and riprap in accordance with Sections 204, 245, 303.03, and 414. Temporary structures shall be removed from the waterway with minimal disturbance of the streambed. Discharge of dredge or fill material shall be placed in accordance with the best management practice, project permits, and all applicable laws and regulations. Dredged or fill material shall be removed to an approved, contained, upland location in accordance with Section 106.04. The disposal area will be of sufficient size and capacity to properly contain the dredge material, to allow for adequate dewatering and settling of sediment, and to prevent overtopping. The disposal area shall be stabilized prior to placement of dredge material.
- (c) The Contractor's activities shall not substantially disrupt the movement of those species of aquatic life indigenous to the water body including those species that normally migrate through the area. The Contractor, to the maximum extent practicable, shall not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water. The Contractor shall avoid and minimize all temporary disturbances to surface waters during construction. The Contractor shall remove any temporary fill in its entirety and return the affected areas to their preexisting elevation conditions within 30 days of completing work, which shall include re-establishing pre-construction contours and planting or seeding with appropriate wetland vegetation according to cover type (emergent, scrub/shrub, or forested). The Contractor shall perform all work activities during low-flow conditions and shall isolate the construction area via the implementation of non-erodible cofferdams, sheet piling, stream diversions, or similar structures.
- (d) The Contractor shall accomplish all construction, construction access (e.g., cofferdams, sheet piling, and causeways) and demolition activities associated with this project in a manner that minimizes construction or waste materials from entering surface waters. Access roads and associated bridges or culverts shall be constructed to minimize the adverse effects on surface waters. Access roads constructed above preconstruction contours and elevations in surface waters must be bridged or culverted to maintain surface flows. All utility line work in

surface waters shall be performed in a manner that minimizes disturbance, and the area shall be returned to its original contours and restored within 30 days of completing work in the area.

- (e) The Contractor shall 1) stockpile excavated material in a manner that prevents reentry into the stream, 2) restore original streambed and streambank contours, 3) revegetate barren areas, and 4) implement strict erosion and sediment control measures throughout the project period.
- (f) The Contractor shall provide fill material that is clean and free of contaminants in toxic concentrations or amounts in accordance with all applicable laws and regulations. The Contractor shall comply with all applicable FEMA-approved state or local floodplain management requirements.
- (g) The Contractor shall adhere to any time-of-year restriction conditions as required by state and federal permitting agencies. No in-stream work shall be permitted during in-stream time-of-year restriction.
- (h) The Contractor shall prohibit wet or uncured concrete from entry into surface waters. The Contractor shall not dispose of excess or waste concrete in surface waters and prevent wash water from discharging into surface waters. The Contractor shall employ measures to prevent spills of fuels or lubricants into state waters. All pollution prevention measures and practices proposed by the Contractor shall be identified in the Contractor's Pollution Prevention Plan as required by the Specifications, other Contract documents and/or the *VPDES General Permit for Discharge of Stormwater from Construction Activities*.
- (i) The Contractor shall not violate the water quality standards as a result of the construction activities. The Contractor shall not alter the physical, chemical, or biological properties of surface waters and wetlands or make them detrimental to the public health, to animal or aquatic life, to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses.
- (j) The Contractor shall not proceed with work covered by a permit until the work is released in writing by the Engineer.
- (k) If the District has not released work covered by a U.S. Army Corps of Engineers permit and the Contractor has completed all other work within the limits of the project, the Contractor shall so advise the Engineer in writing. Upon receipt of the notification, the Engineer will evaluate the status of the project and advise the Contractor within 45 days of the portion of the project that is acceptable under Section 108.09. If the Engineer determines that all of the work except that encumbered by the permit application is acceptable under Section 108.09, the Contractor will be notified accordingly. The District or the Contractor may then elect to continue or terminate the remaining portion of the Contract.

- (l) The party electing to terminate the Contract shall so advise the other party in writing after the 45-day period. The terms of Contract termination will be in accordance with Section 108.08. No compensation will be made for delays encountered or for work not performed except for an extension of time as determined in accordance with Section 108.04.
- (m) The Contractor shall submit a request to the Engineer in writing if he wants to deviate from the plans or change his proposed method(s) regarding any proposed work located in waterways or wetlands. Such work may require additional environmental permits. If the Engineer determines that the activities are necessary for completion of the work, the Contractor shall furnish the Engineer all necessary information pertaining to the activity. The Contractor shall be responsible for designing and supplying all plans, sketches and notes necessary to acquire any permit modification required for changes in the proposed construction methods. Such information shall be furnished at least 180 days prior to the date the proposed changed activity is to begin. For other than the *VPDES General Permit for Discharge of Stormwater from Construction Activities*, the District will apply for the necessary permits modifications to the permits obtained by the District. The Contractor shall not begin the activity until directed to do so by the Engineer. Additional compensation will not be made for delay to the work or change in the Contractor's proposed methods that result from jurisdiction agency review or disapproval of the Contractor's proposed methods.
- (n) If additional permits are required to perform dredging for flotation of construction equipment or for other permanent or temporary work as indicated in the Contractor's accepted plan of operation, but have not been obtained by the District, the Contractor shall furnish the Engineer, at least 75 days prior to the proposed activity, all necessary information pertaining to the proposed activity in order for the Department to apply for the permits. The Contractor shall not begin the proposed activity until the additional permits have been secured and the Engineer has advised the Contractor that the proposed activity may proceed.
- (o) The Contractor shall permit representatives of state and federal environmental regulatory agencies to make inspections at any time in order to insure that the activity being performed under authority of the permit(s) is in accordance with the terms and conditions prescribed herein.

107.03—Not Used

107.04 – Not Used

107.05 - Patented Devices, Materials, and Processes

If the Contractor employs any design, device, material, or process covered by a patent or copyright outside the Contract requirements he shall provide for its use by obtaining a legal agreement with the patentee or owner. The Contractor and the surety shall defend, indemnify, and save harmless the District, any affected third party, or political subdivision from and against any and all claims, lawsuits, or legal actions for infringement because of such use. The Contractor shall indemnify the

District for costs, expenses, or damages, including attorneys' fees, resulting from infringement during prosecution or after completion of the Work.

107.06—Personal Liability of Public Officials

In carrying out any of the provisions of these Specifications or in exercising any power or authority granted to them by or within the scope of the Contract, there shall be no liability upon the Commission, Executive Director, Engineer, or their authorized representatives, either personally or as officials of the District. In all such matters, they act solely as agents and representatives of the District.

107.07—No Waiver of Legal Rights

The District shall not be precluded or estopped by any measurement, estimate, approval, acceptance, or certificate made either before or after final acceptance of the Work, or payment therefor, from showing (1) the true amount and character of the work performed and materials furnished by the Contractor, (2) that any such measurement, estimate, acceptance, certificate or payment is untrue or incorrectly made, or (3) that the work or materials do not comply with the Contract requirements. The District shall not be precluded or estopped, notwithstanding any such measurement, estimate, approval, acceptance, certificate, or payment in accordance therewith, from recovering from the Contractor or his surety, or both, such cost or damage as the District may sustain by reason of the Contractor's failure to comply with the Contract requirements. The District's acceptance of the whole or any part of the Work, or the District's payment for the whole or any part of the Work, or the District's granting of any extension of time, or the District's taking any possession of any part of the Work, shall not operate as a waiver of any portion of the Contract or of any right or power herein reserved, or of any right to costs or damages. The District's express written waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

107.08—Protecting and Restoring Property and Landscape

The Contractor shall preserve property and improvements along the boundary lines of and adjacent to the Work unless their removal or destruction is specified in the Contract. The Contractor shall use suitable precautions to prevent damage to such property.

When the Contractor finds it necessary to enter on private property, beyond the limits of the construction easement shown on the plans, he shall secure from the owner or lessee a written permit for such entry prior to moving thereon. An executed copy of this permit shall be furnished to the Engineer.

The Contractor shall be responsible for any damage or injury to property during the prosecution of the work resulting from any act, omission, neglect, or misconduct in the Contractor's method of executing the work or attributable to defective work or materials. This responsibility shall not be released until final acceptance of the project and a written release from the owner or lessee of the property is obtained.

When direct or indirect damage is done to property by or on account of any act, omission, neglect, or misconduct in the Contractor's method of executing the Work or in consequence of the non-execution thereof on the part of the Contractor, the Contractor shall restore such property to a condition similar or equal to that existing before such damage was done by repairing, rebuilding, or restoring, as may be directed by the Engineer, or shall make a settlement with the property owner for such property damage. The Contractor shall secure from the owner a written release from any claim against the District without additional compensation therefor. A copy of this release shall be furnished the Engineer.

107.09—Contractor's Responsibility for Utility Property and Services

At points where the Contractor's operations are on or adjacent to the properties of any utility, including railroads, and damage to which might result in expense, loss, or inconvenience, work shall not commence until arrangements necessary for the protection thereof have been completed.

The Contractor shall cooperate with owners of utilities so that removal and adjustment operations may progress in a timely, responsible, and reasonable manner, duplication of adjustment work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted.

If any utility service is interrupted as a result of accidental breakage or of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate fully with the authority in the restoration of service. If utility service is interrupted, repair work shall be continuous until service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the Engineer. The Contractor shall be responsible for any damage to utilities that, in the investigation and determination of the Engineer, is found to be attributable to the Contractor's neglect, means or methods of performing the work. Nothing in this Section shall be construed to be in conflict with Section 107.08.

The Contractor shall comply with all requirements of the Virginia Underground Utility Damage Prevention Act (the Miss Utility law). The Contractor shall not make or begin any excavation or demolition without first notifying the Miss Utility notification center for the area where the project is located. The Contractor shall wait to begin its excavation or demolition until 7:00 a.m. on the third working day following the Contractor's notice to the notification center, unless the underground utilities cannot be marked within that time due to extraordinary circumstances. The Contractor may commence excavation or demolition work only if confirmed through the Ticket Information Exchange (TIE) System, or the Contractor is notified directly, that all applicable utilities have either marked their underground line locations or reported that no lines are present in the work vicinity.

107.10—Restoration of Work Performed by Others

The District may construct or reconstruct any utility service within the construction limits or grant a permit for the same at any time. The Contractor shall not be entitled to any damages occasioned thereby other than a consideration of an extension of time, unless the Contractor's Work is damaged, altered or impeded by the condition.

When authorized by the Engineer, the Contractor shall allow any person, firm, or corporation to make an opening in the highway within the limits of the project upon presentation of a duly executed permit from the District or any municipality for sections within its corporate limits. When directed by the Engineer, the Contractor shall satisfactorily repair portions of the work disturbed by the openings. The work for such repairs as authorized and directed by the Engineer will be paid for in accordance with Section 109.05 and shall be subject to the same conditions as the original work performed.

107.11 – Not Used

107.12—Responsibility for Damage Claims

- (a) The Contractor shall defend, indemnify, and save harmless the Commonwealth, the Commission, and their respective officers, agents, and employees, from and against any suits, actions, or claims for costs, expenses or damages, including attorneys' fees, brought for or on account of any injuries or damages received or sustained by any persons or property resulting from or arising out of the following:

1. the Work performed by the Contractor;
2. by or in consequence of any neglect in safeguarding the Work by the Contractor;
3. through the use of unacceptable materials in the construction or the improvement; or
4. resulting from any act, omission, neglect, or misconduct of the Contractor.

The Executive Director may retain as much of the monies due or to become due the Contractor under and by virtue of his Contract as the District considers necessary to ensure that a fund will be available to pay a settlement or judgment of such suits, actions, or claims. If no monies are due, the Contractor's surety and insurers will be held accountable until all such suits, claims and actions have been settled and suitable evidence to that effect has been furnished the Commission. Any extension of time granted the Contractor, in which to complete the Contract shall not relieve him or his surety of this responsibility.

- (b) It is not intended by any of the provisions of any part of the Contract to establish the public or any member thereof as a third party beneficiary of the Contract, or to authorize anyone not a party to the Contract to enter into a suit for personal injuries or property damage pursuant to the terms or provisions of the Contract.
- (c) The Contractor shall comply with all requirements, conditions, and terms of the Contract, including but not limited to, environmental permits, commitments identified in the Contract, and applicable environmental laws and regulations. The Contractor shall not cause damage, except as allowed under the terms of the Contract, or as allowed under applicable permits or laws, to the air, water, soil, or other natural resources, or cause damage to adjacent or off-site property. When any act, omission, or work performed or neglected by

other action of the Contractor occurs, that violates the requirements, conditions, or terms of the Contract, and affects the health, safety, or welfare of the public or natural resources, the Engineer will direct the Contractor to take prompt action to repair, replace, or restore the damage or injury within a time frame established by the Engineer, and to comply with Section 107.01. If the Contractor fails to make such repair, replacement, or restoration within the established time frame, the Engineer will have the damage or injury repaired, replaced, or restored and will deduct the cost of such repair, replacement, or restoration from monies due or to become due the Contractor.

- (d) If the District determines by its own investigation that injury or damage has occurred as a result of an act, omission, or work performed or neglected by the Contractor, the District may suspend the Contractor from future bidding for a period of time commensurate with the severity of the injury or damage as determined by the Engineer. Injury is defined as harm or impairment to persons, property or natural resources. Damage is defined as the loss or harm resulting from an injury. In addition, the District may recover either (i) the loss or damage that the District suffers as a result of such act, omission or other action or (ii) any liquidated damages established in such Contract; plus (iii) reasonable attorney's fees, expert witness fees, staff salaries, incidental and equipment charges associated with any investigation.

Upon the District's determination that injury or damage has occurred as a result of an act, omission, or work performed or neglected by the Contractor, the Contractor shall be responsible for and shall reimburse the District for all expenses associated with the injury or damage. Expenses include, but are not limited to: costs for investigating the injury or damage, financial penalties incurred by the District as a result of the injury or damage, salary and expenses incurred by employees or consultants of the District, road user expenses as determined by the District due to damage or loss of use of the project area, attorneys' fees, and expert witness fees. The District may deduct the reimbursement of expenses from any payments due or to become due the Contractor.

Upon determination by the District of willful, flagrant, or repetitious acts, omissions, or work performed or neglected by the Contractor related to injury or damage as provided in this Section, the Contractor shall in addition to reimbursing the District for all expenses as provided herein, be subject to other appropriate sanctions, as permitted by law, policy, and Specifications, including but not limited to, suspension of work, termination for default, and removal from the bidders' list.

If the Contractor disputes the District's determination in any respect, the Contractor, may submit a claim in accordance with Section 105.19.

107.13 – Not Used

107.14 – Not Used

107.15 – Not Used

107.16—Environmental Stipulations

By signing the bid, the bidder shall have stipulated (1) that any facility to be used in the performance of the Contract (unless the Contract is exempt under the Clean Air Act as amended [42 U.S.C. 1857, et seq., as amended by P.L. 91-604], the Federal Water Pollution Control Act as amended [33 U.S.C. 1251 et seq. as amended by P.L. 92-500], and Executive Order 11738 and regulations in implementation thereof [40 C.F.R., Part 15]) is not listed on the EPA's List of Violating Facilities pursuant to 40 C.F.R. 15.20; and (2) that the bidder shall promptly notify Department prior to the award of the Contract if the bidder receives any communication from the Director, Office of Federal Activities, EPA, indicating that a facility to be used for the Contract is under consideration to be listed on the EPA's List of Violating Facilities.

No separate payment will be made for the work or precautions described herein except where provided for as a specific item in the Contract or except where provision has been made for such payment in these Specifications.

- (a) **Erosion and Siltation:** The Contractor shall exercise every reasonable precaution, including temporary and permanent soil stabilization measures, throughout the duration of the project to control erosion and prevent siltation of adjacent lands, rivers, streams, wetlands, lakes, and impoundments. Soil stabilization and/or erosion control measures shall be applied to erodible soil or ground materials exposed by any activity associated with construction, including clearing, grubbing, and grading, but not limited to local or on-site sources of materials, stockpiles, disposal areas, and haul roads.

The Contractor shall comply with Sections 301.02 and 303.03. Should the Contractor as a result of negligence or noncompliance, fail to provide soil stabilization in accordance with these specifications, the cost of temporary soil stabilization in accordance with Section 303 shall be at the Contractor's expense. If the delay in stabilizing an exposed area of land is due to circumstances beyond the Contractor's control, the District will be responsible for the expense.

Temporary measures shall be coordinated with the work to ensure effective and continuous erosion and sediment control. Permanent erosion control measures and drainage facilities shall be installed as the work progresses.

For projects that disturb 2,500 square feet or greater the Contractor shall have within the limits of the project during land disturbance activities, an employee certified by VDOT in erosion and sediment control who shall inspect erosion and sediment control and pollution prevention practices, devices and measures for proper installation and operation and promptly report their findings to the Inspector. Failure on the part of the Contractor to maintain appropriate erosion and sediment control or pollution prevention devices in a functioning condition may result in the Engineer notifying the Contractor in writing of specific deficiencies. Deficiencies shall be corrected immediately or as otherwise directed by the Engineer. If the Contractor fails to correct or take appropriate actions to correct the specified deficiencies within 24 hours (or as otherwise directed) after receipt of such notification, the District may do one or more of the following: require the Contractor to suspend work in other areas and concentrate efforts towards correcting the specified deficiencies,

withhold payment of monthly progress estimates, or proceed to correct the specified deficiencies and deduct the entire cost of such work from monies due the Contractor. Failure on the part of the Contractor to maintain a VDOT certified erosion and sediment control employee within the project limits when land disturbance activities are being performed will result in the Engineer suspending work related to any land disturbance activity until such time as the Contractor is in compliance with this requirement.

(b) **Pollution:**

1. **Water:** The Contractor shall exercise every reasonable precaution throughout the duration of the project to prevent pollution of rivers, streams, and impoundments. Pollutants such as, but not limited to, chemicals, fuels, lubricants, bitumens, raw sewage, paints, sedimentation, and other harmful material shall not be discharged into or alongside rivers, streams, or impoundments or into channels leading to them. The Contractor shall provide the Engineer a contingency plan for reporting and immediate actions to be taken in the event of a dump, discharge, or spill within 8 hours after he has mobilized to the project site.

Construction discharge water shall be filtered to remove deleterious materials prior to discharge into state waters. Filtering shall be accomplished by the use of a standard dewatering basin or a dewatering bag or other measures approved by the Engineer. Dewatering bags shall conform to Section 245. During specified spawning seasons, discharges and construction activities in spawning areas of state waters shall be restricted so as not to disturb or inhibit aquatic species that are indigenous to the waters. Neither water nor other effluence shall be discharged onto wetlands or breeding or nesting areas of migratory waterfowl. When used extensively in wetlands, heavy equipment shall be placed on mats. Temporary construction fills and mats in wetlands and flood plains shall be constructed of approved non-erodible materials and shall be removed by the Contractor to natural ground when the Engineer so directs.

If the Contractor dumps, discharges, or spills any oil or chemical that reaches or has the potential to reach a waterway, he shall immediately notify all appropriate jurisdictional state and federal agencies in accordance with Sections 107.01 and 107.16(e) and the *VP-DES General Permit For Discharge of Stormwater From Construction Activities* and shall take immediate actions to contain, remove, and properly dispose of the oil or chemical.

Solids, sludges, or other pollutants removed in the course of the treatment or management of pollutants shall be disposed of in a manner that prevents any pollutant from such materials from entering surface waters in compliance with all applicable state and federal laws and regulations.

Excavation material shall be disposed of in approved areas above the mean high water mark shown on the plans in a manner that will prevent the return of solid or suspended materials to state waters. If the mark is not shown on the plans, the mean high water mark shall be considered the elevation of the top of stream banks.

Constructing new bridge(s) and dismantling and removing existing bridge(s) shall be accomplished in a manner that will prevent the dumping or discharge of construction or disposable materials into rivers, streams, or impoundments.

Construction operations in rivers, streams, or impoundments shall be restricted to those areas where identified on the plans and to those that must be entered for the construction of structures. Rivers, streams, and impoundments shall be cleared of falsework, piling, debris, or other obstructions placed therein or caused by construction operations. Stabilization of the streambed and banks shall occur immediately upon completion of work or if work is suspended for more than 14 days.

The Contractor shall prevent stream constriction that would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.

If it is necessary to relocate an existing stream or drainage facility temporarily to facilitate construction, the Contractor shall design and provide temporary channels or culverts of adequate size to carry the normal flow of the stream or drainage facility. The Contractor shall submit a temporary relocation design to the Engineer for review and acceptance in sufficient time to allow for discussion and correction prior to beginning the work the design covers. Costs for the temporary relocation of the stream or drainage facility shall be included in the Contract price for the related pipe or box culvert, unless specifically provided for under another Pay Item. Stabilization of the streambed and banks shall occur immediately upon completion of, or during the work or if the work is suspended for more than 14 days.

2. **Air:** The Contractor shall comply with Section 107.01 and the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.

Asphalt mixing plants shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the rules of the State Air Pollution Control Board.

3. **Noise:** The Contractor's operations shall be performed so that exterior noise levels measured during a noise-sensitive activity shall not exceed 80 decibels. Such noise level measurements shall be taken at a point on the perimeter of the construction limit that is closest to the adjoining property on which a noise sensitive activity is occurring. A noise-sensitive activity is any activity for which lowered noise levels are essential if the activity is to serve its intended purpose and not present an unreasonable public nuisance. Such activities include, but are not limited to, those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.

The District may monitor construction-related noise. If construction noise levels exceed 80 decibels during noise sensitive activities, the Contractor shall take corrective action before proceeding with operations. The Contractor shall be responsible for costs

associated with the abatement of construction noise and the delay of operations attributable to noncompliance with these requirements.

The District may prohibit or restrict to certain portions of the project any work that produces objectionable noise between 10 PM and 6 AM. If other hours are established by local ordinance, the local ordinance shall govern.

Equipment shall in no way be altered so as to result in noise levels that are greater than those produced by the original equipment.

When feasible, the Contractor shall establish haul routes that direct his vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

These requirements shall not be applicable if the noise produced by sources other than the Contractor's operation at the point of reception is greater than the noise from the Contractor's operation at the same point.

- (c) **Forest Fires:** The Contractor shall take all reasonable precautions to prevent and suppress forest fires in any area involved in construction operations or occupied by him as a result of such operations. The Contractor shall cooperate with the proper authorities of the state and federal governments in reporting, preventing, and suppressing forest fires. Labor, tools, or equipment furnished by the Contractor upon the order of any forest official issued under authority granted the official by law shall not be considered a part of the Contract. The Contractor shall negotiate with the proper forest official for compensation for such labor, tools, or equipment.
- (d) **Archeological, Paleontological, and Rare Mineralogical Findings:** In the event of the discovery of prehistoric ruins, Indian or early settler sites, burial grounds, relics, fossils, meteorites, or other articles of archeological, paleontological, or rare mineralogical interest during the prosecution of work, the Contractor shall act immediately to suspend work at the site of the discovery and notify the Engineer. The Engineer will immediately notify the proper state authority charged with the responsibility of investigating and evaluating such finds. The Contractor shall cooperate and, upon the request of the Engineer, assist in protecting, mapping, and removing the findings. Labor, tools, or equipment furnished by the Contractor for such work will be paid for in accordance with Section 104.03. Findings shall become the property of the Commonwealth unless they are located on federal lands, in which event they shall become the property of the U.S. government.

When such findings delay the progress or performance of the work, the Contractor shall notify the Engineer in accordance with Sections 108.03 and Section 109.05.

- (e) **Storm Water Pollution Prevention Plan and VPDES General Permit for the Discharge of Stormwater from Construction Activities**

A Stormwater Pollution Prevention Plan (SWPPP) identifies potential sources of pollutants

which may reasonably be expected to affect the stormwater discharges from the construction site and any on-site or off-site support facilities located on District rights of way and easements. The SWPPP also describes and ensures implementation of practices which will be used to minimize or prevent pollutants in such discharges.

The SWPPP shall include, but not be limited to, the approved Erosion and Sediment Control (ESC) Plan, the approved Stormwater Management (SWM) Plan (if applicable), the approved Pollution Prevention Plan and all related Specifications, Standards, and notes contained within all Contract documents and shall be required for all land-disturbing activities that disturb 2,500 square feet or greater.

Land-disturbing activities that disturb one acre or greater require coverage under the Department of Environmental Quality's VPDES General Permit for the Discharge of Stormwater from Construction Activities (hereafter referred to as the VPDES Construction Permit). The Contractor shall be responsible for securing VPDES Construction Permit coverage and complying with all permit conditions.

The required contents of a SWPPP for those land disturbance activities requiring coverage under the VPDES Construction Permit are found in Section II of the permit.

While a SWPPP is an important component of the VPDES Construction Permit, it is only one of the many requirements that must be addressed in order to be in full compliance with the conditions of the permit.

The Contractor and all other persons that oversee or perform activities covered by the VPDES Construction Permit shall be responsible for reading, understanding, and complying with all of the terms, conditions, and requirements of the permit and the project's SWPPP including, but not limited to, the following:

1. Project Implementation Responsibilities

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

The Contractor shall be solely responsible for the temporary erosion and sediment control protection and permanent stabilization of all borrow areas and soil disposal areas.

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

2. Unauthorized Discharges and Reporting Requirements

The Contractor shall not discharge into state waters sewage, industrial wastes, other

wastes, or any noxious or deleterious substances nor shall he otherwise alter the physical, chemical, or biological properties of such waters that render such waters detrimental for or to domestic use, industrial consumption, recreational, or other public uses.

a. Notification of non-compliant discharges

The Contractor shall immediately notify the Engineer upon the discovery of or the potential of any unauthorized, unusual, extraordinary, or non-compliant discharge from the land construction activity or any of support facilities located on District right of way or easement. Where immediate notification is not possible, such notification shall be not later than 24 hours after said discovery.

b. Detailed report requirements for non-compliant discharges

The Contractor shall submit to the Engineer within 5 days of the discovery of any actual or potential non-compliant discharge a written report describing details of the discharge to include a description of the nature and location of the discharge; the cause of the discharge; the date of occurrence; the length of time that the discharge occurred, the volume of the discharge; the expected duration and total volume if the discharge is continuing; a description of any apparent or potential effects on private and/or public properties and state waters or endangerment to public health; and any steps planned or taken to reduce, eliminate, and prevent a recurrence of the discharge.

3. Changes and Deficiencies

The Contractor shall report to the Engineer when any planned physical alterations or additions are made to the land disturbing activity or deficiencies in the project plans or Contract are discovered that could significantly change the nature of or increase the

potential for pollutants discharged from the land disturbing activity to surface waters and that have not previously been addressed in the SWPPP.

4. Amendments, Modifications, Revisions and Updates to the SWPPP

- a. The Contractor shall amend the SWPPP whenever site conditions, construction sequencing or scheduling necessitates revisions or modifications to the erosion and sediment control plan, the pollution prevention plan, or any other component of the SWPPP for the land disturbing activity or onsite support facilities.
- b. The Contractor shall amend the SWPPP to identify any additional or modified erosion and sediment control and pollution prevention measures implemented to correct problems or deficiencies identified through any inspection or investigation process.
- c. The Contractor shall amend the SWPPP to identify any new or additional person(s)

or Contractor(s) not previously identified that will be responsible for implementing and maintaining erosion and sediment control and pollution prevention devices.

d. The Contractor shall update the SWPPP to include:

- 1) A record of dates when major grading activities occur, construction activities temporarily or permanently cease on a portion of the site, and stabilization measures are initiated.
- 2) Documentation of replaced or modified erosion and sediment control and pollution prevention controls where periodic inspections or other information have indicated that the controls have been used inappropriately or incorrectly.
- 3) Identification of areas where final stabilization has occurred and where no further SWPPP or inspection requirements apply.
- 4) The date of any prohibited discharges, the discharge volume released, and what actions were taken to minimize the impact of the release.
- 5) A description of any measures taken to prevent the reoccurrence of any prohibited discharge.
- 6) A description of any measures taken to address any issues identified by the required erosion and sediment control and pollution prevention inspections.

- e. The Contractor shall update the SWPPP no later than 7 days after the implementation and/or the approval of any amendments, modifications, or revisions to the erosion and sediment control plan, the pollution prevention plan, or any other component of the SWPPP.
- f. The record set of plans shall be maintained with other SWPPP documents on the project site or at a location convenient to the project site where no onsite facilities are available.

107.17—Construction Safety and Health Standards

- (a) In the performance of this Contract the Contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The Contractor, subcontractors at any tier, and their respective employees, agents and invitees, shall at all times while in or around the project site comply with all applicable laws, regulations, provisions, and policies governing safety and health under the Virginia Occupational Safety and Health (VOSH) Standards adopted under the Code of Virginia, and any laws, regulations, provisions, and policies incorporated by reference including but not limited to the Federal Construction Safety Act (Public Law 9 1-54), 29 CFR Chapter XVII, Part 1926, Occupational Safety and Health Regulations for Construction, and the Occupation Safety and Health Act (Public Law 9 1-596), 29 CFR Chapter XVII, Part 1910 Occupational

Safety and Health Standards for General Industry, and subsequent publications updating these regulations.

- (b) The Contractor shall provide all safeguards, safety devices and protective equipment, and take any other needed actions as it determines, or as the Engineer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the Work. The Contractor shall be responsible for maintaining and supervising all safety and health protections and programs to ensure compliance with this Section. The Contractor shall routinely inspect the project site for safety and health violations. The Contractor shall immediately abate any violations of the safety and health requirements or duties at no cost to the District.
- (c) It is a condition of this Contract, and shall be made a condition of each subcontract, which the Contractor enters into pursuant to this Contract, that the Contractor and any subcontractor shall not permit any employees, in performance of the Contract, to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to their health or safety, as determined by the Virginia Work Area Protection Manual or under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
- (d) VOSH personnel, on all Federal-aid construction contracts and related subcontracts, pursuant to 29 CFR 1926.3, the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out their duties.

107.18—Sanitary Provisions

The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of employees as may be necessary to comply with the requirements of the state and local Board of Health or other bodies or tribunals having jurisdiction.

107.19—Railway-Highway Provisions

If the Contractor's work requires hauling materials across the tracks of a railway, he shall make arrangements with the railway for any new crossing(s) required. Access to existing rail crossings with off-road heavy equipment shall also be arranged by the Contractor. Charges made by the railway company for the construction or use of new or existing crossings and their subsequent removal and for watchperson or flagger service at such crossings shall be reimbursed by the Contractor directly to the railway company under the terms of their separate individual arrangements before final acceptance.

Work to be performed by the Contractor in construction on or over the railway right of way shall be

performed at times and in a manner that will not unnecessarily interfere with the movement of trains or traffic on the railway track. The Contractor shall use care to avoid accidents, damage, or unnecessary delay or interference with the railway company's trains or other property. If any interruption of railway traffic is required by the Contractor's actions, he shall obtain prior written approval from the railway company.

The Contractor shall conduct operations that occur on or over the right of way of any railway company fully within the rules, regulations, and requirements of the railway company and in accordance with the requirements of any agreements made between the District and the railway company that are a part of the Contract. Said agreements are included within the Contract.

- (a) **Flagger or Watchperson Services:** Flagger or watchperson services required by the railway company for the safety of railroad operations because of work being performed by the Contractor or incidental thereto will be provided by the railway company. The cost for such services as required for work shown on the plans will be borne by the District. Any cost of such services resulting from work not shown on the plans or for the Contractor's convenience shall be borne by the Contractor and shall be paid directly to the railway company(s) under the terms of their separate individual agreement.

No work shall be undertaken on or over the railway right of way until the watchpersons or flaggers are present at the project site. The Contractor shall continuously prosecute the affected work to completion to minimize the need for flagger or watchperson services. Costs for such services that the Engineer determines to be unnecessary because of the Contractor's failure to give notice as required herein before; initially starting, intermittently continuing, or discontinuing work on or over the railway right of way shall be borne by the Contractor and will be deducted from monies due him.

- (b) **Approval of Construction Methods on Railway Right of Way:** The Contractor shall submit to the District a plan of operations showing the design and method of proposed structural operations and shall obtain its approval before performing any work on the railway company's right of way unless otherwise indicated in the railroad agreement. The plan shall be clear and legible, and details shall be drawn to scale. The plan shall incorporate any stipulations or requirements the railroad may impose for the evaluation of the Contractor's contemplated operations. The plan shall show, but not be limited to, the following:

1. Proximity of construction operations to tracks.
2. Depth of excavation with respect to tracks.
3. Description of structural units.
4. Vertical and horizontal clearances to be afforded the railroad during installation and upon completion of excavation.
5. Sheeting and bracing.
6. Method and sequence of operations.

Approval shall not relieve the Contractor of any liability under the Contract. The Contractor shall arrange the work so as not to interfere with the railway company's operation except by agreement with the railway company.

- (c) **Insurance:** In addition to insurance or bonds required under the terms of the Contract, the Contractor shall carry insurance covering operations affecting the property of the railway company. The original railroad protective liability insurance policy and certificate of insurance showing insurance carried by the Contractor and any subcontractors shall be submitted to the railway company for approval and retention.

Neither the Contractor nor any subcontractor shall begin any work affecting the railway company until the railway company has received the insurance.

Notice of any material change in or cancellation of the required policies shall be furnished the District and the railway company at least 30 days prior to the effective date of the change or cancellation. The insurance shall be of the following kinds and amounts:

1. **Contractor's public liability and property damage insurance:** The Contractor shall furnish evidence to the District with respect to the operations to be performed that he carries regular contractor's public liability insurance. The insurance shall provide for a limit of at least the dollar value specified in the Contract for all damages arising out of bodily injuries to or the death of one person, and subject to that limit for each person, a total limit of at least the dollar value specified in the Contract for all damages arising out of bodily injuries to or death of two or more persons in any one occurrence, and regular contractor's property damage insurance providing for a limit of at least the dollar value specified in the Contract for all damages arising out of bodily injury to or destruction of property in any one occurrence, and subject to that limit per occurrence, a total or aggregate limit of at least the dollar value specified in the Contract for all damages arising out of injury to or destruction of property during the policy period. The Contractor's public liability and property damage insurance shall include explosion, collapse, and underground damage coverage. If the Contractor subcontracts any portion of the work, he shall secure insurance protection in his own behalf under the Contractor's public liability and property damage insurance policies to cover any liability imposed on him by law for damages because of bodily injury to, or death of persons and injury to, or destruction of property as a result of work undertaken by the subcontractors. In addition, the Contractor shall provide similar insurance protection for and on behalf of any subcontractors to cover their operation by means of separate and individual contractor's public liability and property damage policies. As an alternative, he shall require each subcontractor to provide such insurance in his own behalf.
2. **Railroad protective insurance and public liability and property damage:** The policy furnished the railway company shall include coverage for contamination, pollution, explosion, collapse, and underground damage. The policy shall be of the type specified hereinafter and shall be expressed in standard language that may not be amended. No part shall be omitted except as indicated hereinafter or by an endorsement

that states an amendment or exclusion of some provision of the form in accordance with the provisions of a manual rule. The form of the endorsement shall be approved as may be required by the supervising authority of the state in which the policy is issued. A facsimile of the Policy Declarations form as shown in the proposal shall be made a part of the policy and shall be executed by an officer of the insurance company. The several parts of the requirements and stipulations specified or inferred herein may appear in the policy in such sequence as the company may elect.

a. For a policy issued by one company:

NAME AND LOCATION OF INDEMNITY COMPANY, a Type of Company, Insurance Company, herein called the Company, agrees with the insured named in the Policy Declarations made a part hereof, in consideration of the payment of the premium and in reliance upon the statements in the Policy Declarations made by the named insured and subject to all of the terms of his policy.

For a policy issued by two companies:

NAME AND LOCATION OF INDEMNITY COMPANY and NAME AND LOCATION OF INDEMNITY COMPANY, each Insurance Company, Type of Company, herein called the Company, severally agree with the insured named in the Policy Declarations made a part hereof, in consideration of the payment of the premium and in reliance upon the statements in the Policy Declaration made by the named insured and subject to all of the terms of this policy, provided the named Indemnity Company shall be the insured with respect to Coverage and no other and the named Insurance Company shall be the insurer with respect to Coverage and no other.

b. Insuring agreements:

- 1) **Coverages: Coverage A—Bodily injury liability:** To pay on behalf of the insured all sums that the insured shall become legally obligated to pay as damages because of bodily injury, sickness, or disease including death at any time resulting therefrom (hereinafter called bodily injury) either (1) sustained by any person arising out of acts or omissions at the designated job site that are related to or are in connection with the work described in Item 6 of the Policy Declarations; or (2) sustained at the designated job site by the Contractor, any employee of the Contractor, any employee of the governmental authority specified in Item 5 of the Policy Declarations, or any designated employee of the insured, whether or not arising out of such acts or omissions.

Coverage B—Property damage liability: To pay on behalf of the insured all sums the insured shall become legally obligated to pay as damages because of physical injury to or destruction of property, including loss of use of any property because of such injury or destruction (hereinafter called property damage) arising

out of acts or omissions at the designated job site that are related to or are in connection with the work described in Item 6 of the Policy Declarations.

Coverage C—Physical damage to property: To pay for direct and accidental loss of or damage to rolling stock and other contents, mechanical construction equipment, or motive power equipment (hereinafter called loss) arising out of acts or omissions at the designated job site that are related to or are in connection with the work described in Item 6 of the Policy Declarations; provided such property is owned by the named insured or is leased or entrusted to the named insured under a lease or trust agreement.

- 2) **Definitions:** *Insured* means and includes the named insured and any executive officer, director, or stockholder thereof while acting within the scope of his duties as such. *Contractor* means the Contractor designated in Item 4 of the Policy Declarations and includes all subcontractors of the Contractor but not the named insured. *Designated employee* of the insured means (1) any supervisory employee of the insured at the job site; (2) any employee of the insured while operating, attached to, or engaged on work trains or other railroad equipment at the job site that is assigned exclusively to the Contractor; or (3) any employee of the insured not within (1) or (2) who is specifically loaned or assigned to the work of the Contractor for prevention of accidents or protection of property, the cost of whose services is borne specifically by the Contractor or governmental authority. *Contract* means any contract or agreement to carry a person or property for a consideration or any lease, trust, or interchange contract or agreement respecting motive power, rolling stock, or mechanical construction equipment.
- 3) **Defense and settlement supplementary payments:** With respect to such insurance as is afforded by this policy under Coverages A and B, the Company shall defend any suit against the insured alleging such bodily injury or property damage and seeking damages that are payable under the terms of this policy, even if any of the allegations of the suit are groundless, false, or fraudulent. However, the Company may make such investigation and settlement of any claim or suit as it deems expedient.

In addition to the applicable limits of liability, the Company shall pay (1) all expenses incurred by the company, all costs taxed against the insured in any such suit, and all interest on the entire amount of any judgment therein that accrues after entry of the judgment and before the Company has paid or tendered or deposited in court that part of the judgment that does not exceed the limit of the Company's liability thereon; (2) premiums on appeal bonds required in any such suit and premiums on bonds to release attachments for an amount not in excess of the applicable limit of liability of this policy, but without obligation to apply for or furnish any such bonds; (3) expenses incurred by the insured for first aid to others that shall be imperative at the time of the occurrence; and (4) all reasonable expenses, other than loss of earnings, incurred by the insured at the Company's request.

- 4) **Policy period and territory:** This policy applies only to occurrences and losses during the policy period and within the United States, its territories or possessions, or Canada.
- c. **Exclusions:** This policy does not apply to the following:
- 1) Liability assumed by the insured under any contract or agreement except a contract as defined herein.
 - 2) Bodily injury or property damage caused intentionally by or at the direction of the insured.
 - 3) Bodily injury, property damage, or loss that occurs after notification to the named insured of the acceptance of the work by the governmental authority, other than bodily injury, property damage, or loss resulting from the existence or removal of tools, uninstalled equipment, and abandoned or unused materials.
 - 4) Under Coverage A(1), B, and C, to bodily injury, property damage, or loss, the sole proximate cause of which is an act or omission of any insured.
 - 5) Under Coverage A, to any obligation for which the insured or any carrier as his insurer may be held liable under any workers' compensation, employment compensation, or disability benefits law or under any similar law; provided that the Federal Employer's Liability Act, U.S. Code (1946) Title 45, Sections 5 1-60, as amended, shall for the purpose of this insurance be deemed not to be any similar law.
 - 6) Under Coverage B, to injury to or destruction of property owned by the named insured or leased or entrusted to the named insured under a lease or trust agreement.
 - 7) Under any liability coverage, to injury, sickness, disease, death, or destruction (1) with respect to which an insured under the policy is also an insured under a nuclear energy liability policy issued by the Nuclear Energy Liability Insurance Association, Mutual Atomic Energy Liability Underwriters, or Nuclear Insurance Association of Canada or would be an insured under any such policy but for its termination upon exhaustion of its limit of liability; or (2) resulting from the hazardous properties of nuclear material and with respect to which any person or organization is required to maintain financial protection pursuant to the Atomic Energy Act of 1954 or any law amendatory thereof or the insured is (or had this policy not been issued would be) entitled to indemnity from the United States or any agency thereof under any agreement entered into by the United States, or any agency thereof, with any person or organization.

- 8) Under any Medical Payments Coverage or any Supplementary Payments provision relating to immediate medical or surgical relief or to expenses incurred with respect to bodily injury, sickness, disease, or death resulting from the hazardous properties of nuclear material and arising out of the operation of a nuclear facility by any person or organization.
- 9) Under any liability coverage, to injury, sickness, disease, death, or destruction resulting from the hazardous properties of nuclear material if (1) the nuclear material is at any nuclear facility owned or operated by or on behalf of an insured or has been discharged or dispersed therefrom; (2) the nuclear material is contained in spent fuel or waste at any time possessed, handled, used, processed, stored, transported, or disposed of by or on behalf of an insured; or (3) the injury, sickness, disease, death, or destruction arises out of the furnishing by an insured of services, materials, or parts for equipment in connection with the planning, construction, maintenance, operation, or use of any nuclear facility; if such facility is located in the United States, its territories or possessions, or Canada, this exclusion applies only to injury to or destruction of property at such nuclear facility.
- 10) Under Coverage C, to loss attributable to nuclear reaction, nuclear radiation, or radioactive contamination or to any act or condition incident to any of the foregoing.
- 11) As used in exclusions (7), (8), and (9), the following definitions apply:

Disposable material means material containing byproduct material and resulting from the operation by any person or organization of any nuclear facility included in the definition of nuclear facility under (i) or (ii) below.

Hazardous properties include radioactive, toxic, or explosive properties.

Injury or destruction with respect to injury to or destruction of property, includes all forms of radioactive contamination of property.

Nuclear facility means:

- a) Any nuclear reactor.
- b) Any equipment or device designed or used for separating the isotopes of uranium or plutonium; processing or utilizing spent fuel; or handling, processing, or packaging waste.
- c) Any equipment or device designed or used for the processing, fabricating, or alloying of special nuclear material if at any time the total amount of such material in the custody of the insured at the premises where such equipment or device is located consists of or contains more than 25 grams

of plutonium or uranium 233 (or any combination thereof) or more than 250 grams of uranium 235.

- d) Any structure, basin, excavation, premises, or place prepared or used for the storage or disposal of waste (includes the site on which any of the foregoing is located, all operation conducted on such site, and all premises used for such operations).

Nuclear material means source material, special nuclear material, or byproduct material.

Nuclear reactor means any apparatus designed or used to sustain nuclear fission in a self-supporting chain reaction or to contain a critical mass of fissionable material.

Source material, special nuclear material, and byproduct material have the meanings given them in the Atomic Energy Act of 1954 or in any law amendatory thereof.

Spent fuel means any fuel element or fuel component (solid or liquid) that has been used or exposed to radiation in a nuclear reaction.

- d. **Conditions:** The following conditions, except conditions (3) through (12), apply to all coverages. Conditions (3) through (12) apply only to the coverage noted thereunder.

- 1) **Premium:** The premium bases and rates for the hazards described in the Policy Declarations are stated therein. Premium bases and rates for hazards not so described are those applicable in accordance with the requirements of the manuals used by the Company. The term "Contract cost" means the total cost of all work described in Item 6 of the Policy Declaration. The term "rental cost" means the total cost to the Contractor for rental or work trains or other railroad equipment, including the remuneration of all employees of the insured while operating, attached to, or engaged thereon. The advance premium stated in the Policy Declarations is an estimated premium only. Upon termination of this policy, the earned premium shall be computed in accordance with the Company's rules, rates, rating plans, premiums, and minimum premiums applicable to this insurance. If the earned premium thus computed exceeds the estimated advance premium paid, the Company shall look to the Contractor specified in the Policy Declarations for any such excess. If the earned premium is less than the estimated advance premium paid, the Company shall return to the Contractor the unearned portion paid. In no event shall payment or premium be an obligation of the named insured.
- 2) **Inspection:** The named insured shall make available to the Company records of information relating to the subject matter of this insurance. The Company

shall be permitted to inspect all operations in connection with the work described in Item 6 of the Policy Declarations.

- 3) **Limits of liability, Coverage A:** The limit of bodily injury liability stated in the Policy Declarations as applicable to “each person” is the limit of the Company’s liability for all damages (including damages for care and loss of services) arising out of bodily injury sustained by one person as the result of any one occurrence. The limit of such liability stated in the Policy Declarations as applicable to “each occurrence” is (subject to the provision respecting each person) the total limit of the Company’s liability for all such damage arising out of bodily injury sustained by two or more persons as the result of any one occurrence.
- 4) **Limits of liability, Coverages B and C:** The limit of liability under Coverages B and C stated in the Policy Declarations as applicable to “each occurrence” is the total limit of the Company’s liability for all damages and all loss under Coverages B and C combined arising out of physical injury to, destruction of, or loss of all property of one or more persons or organizations, including the loss or use of any property attributable to such injury or destruction under Coverage B, as the result of any one occurrence. Subject to the provision respecting “each occurrence”, the limit of liability under Coverages B and C stated in the Policy Declaration as “aggregate” is the total limit of the Company’s liability for all damages and all loss under Coverages B and C combined arising out of physical injury to, destruction of, or loss of property, including the loss or use of any property attributable to such injury or destruction under Coverage B. Under Coverage C, the limit of the Company’s liability for loss shall not exceed the actual cash value of the property, or if the loss is a part thereof, the actual cash value of such part, at time of loss, nor what it would then cost to repair or replace the property of such part thereof with other of like kind and quality.
- 5) **Severability of interests, Coverages A and B:** The term the insured is used severally and not collectively. However, inclusion herein of more than one insured shall not operate to increase the limits of the Company’s liability.
- 6) **Notice:** In the event of an occurrence or loss, written notice containing particulars sufficient to identify the insured and also reasonably obtainable information with respect to the time, place, and circumstances thereof and the names and addresses of the injured and of able witnesses shall be given by or for the insured to the Company or any of its authorized agents as soon as is practicable. If a claim is made or a suit is brought against the insured, he shall immediately forward to the Company every demand, notice, summons, or other process received by him or his representative.
- 7) **Assistance and cooperation of the insured, Coverages A and B:** The insured shall cooperate with the Company and upon the Company’s request attend hearings and trials and assist in making settlements, securing and giving evidence,

obtaining the attendance of witnesses, and conducting suits. Except at his own cost, the insured shall not voluntarily make any payment, assume any obligations, or incur any expense other than for first aid to others that shall be imperative at the time of an accident.

- 8) **Action against Company, Coverages A and B:** No action shall lie against the Company unless as a condition precedent thereto the insured shall have fully complied with all the terms of this policy, nor until the amount of the insured's obligation to pay shall have been finally determined either by judgment against the insured after actual trial or by written agreement of the insured, the claimant, and the Company. Any person or organization or the legal representative thereof who has secured such judgment or written agreement shall thereafter be entitled to recover under this policy to the extent of the insurance afforded by this policy. No person or organization shall have any right under this policy to join the Company as a part to any action against the insured to determine the insured's liability. Bankruptcy or insolvency of the insured or of the insured's estate shall not relieve the Company of any of its obligations hereunder.
- 9) **Action against Company, Coverage C:** No action shall lie against the Company unless as a condition precedent thereto there shall have been full compliance with all the terms of this policy nor until 30 days after proof of loss is filed and the amount of loss is determined as provided in this policy.
- 10) **Insured's duties in event of loss, Coverage C:** In the event of loss, the insured shall protect the property, whether or not the loss is covered by this policy. Any further loss attributable to the insured's failure to protect shall not be recoverable under this policy. Reasonable expenses incurred in affording such protection shall be deemed incurred at the Company's request.

The insured shall also file with the Company, as soon as practicable after loss, his sworn proof of loss in such form and including such information as the Company may reasonably require and shall, upon the Company's request, exhibit the damaged property.

- 11) **Appraisal, Coverage C:** If the insured and the Company fail to agree as to the amount of loss, either may demand an appraisal of the loss within 60 days after the proof of loss is filed. In such event the insured and the Company shall each select a competent appraiser, and the appraisers shall select a competent and disinterested umpire. An award in writing or any two shall determine the amount of loss. The insured and the Company shall each pay his chosen appraiser and shall bear equally the other expenses of the appraisal and umpire. The Company shall not be held to have waived any of its rights by any act relating to appraisal.
- 12) **Payment of loss, Coverage C:** The Company may pay for the loss in money, but there shall be no abandonment of the damaged property to the Company.

- 13) **No benefit to bailee coverage:** The insurance afforded by this policy shall not enure directly or indirectly to the benefit of any carrier or bailee (other than the named insured) liable for loss to the property.
- 14) **Subrogation:** In the event of any payment under this policy, the Company shall be subrogated to all of the insured's rights of recovery therefor against any person or organization. The insured shall execute and deliver instruments and papers and do whatever else is necessary to secure such rights. The insured shall do nothing after loss to prejudice such rights.
- 15) **Application of insurance:** The insurance afforded by this policy is primary insurance. If the insured has other primary insurance against a loss covered by this policy, the Company shall not be liable under the policy for a greater proportion of such loss than the applicable limit of liability stated in the Contract bears to the total applicable limit of all valid and equitable insurance against such loss.
- 16) **3-year policy:** A policy period of 3 years is comprised of three consecutive annual periods. Computation and adjustment of earned premium shall be made at the end of each annual period. Aggregate limits of liability as stated in this policy shall apply separately to each annual period.
- 17) **Changes:** Notice to any agent of knowledge possessed by any agent or by any other person shall not affect a waiver or a change in any part of this policy or stop the Company from asserting any right under the terms except by endorsement issued to form a part of this policy signed by *provided, however, changes may be made in the written portion of the Policy Declaration by *when initialed by such *or by endorsement issued to form a part of this policy signed by such [*Insert titles of authorized company representatives.]
- 18) **Assignment:** Assignment of interest under this policy shall not bind the Company until its consent is endorsed hereon.
- 19) **Cancellation:** This policy may be cancelled by the named insured by mailing to the Company written notice stating when the cancellation shall become effective. This policy may be cancelled by the Company by mailing to the named insured, Contractor, and governmental authority at the respective addresses shown in this policy written notice stating when such cancellation shall be effective (not less than 30 days thereafter). The mailing of notice shall be sufficient proof of notice. The effective date and hour of cancellation stated in the notice shall become the end of the policy period. Delivery of such written notice either by the named insured or the Company shall be equivalent to mailing. If the named insured cancels, the earned premium shall be computed in accordance with the customary short rate table and procedure. If the Company cancels, the earned premium shall be computed pro rata. The premium may be adjusted either at the

time cancellation is effected or as soon as practicable after the cancellation becomes effective, but payment or tender of unearned premium is not a condition of cancellation.

- 20) **Policy Declarations:** By acceptance of this policy, the named insured agrees that such statements in the Policy Declarations as are made by him are his agreements and representations, that his policy is issued in reliance on the truth of such representations, and that this policy embodies all agreements existing between himself and the Company or any of its agents relating to this insurance.

e. **For a policy issued by one company:**

In witness whereof the Indemnity Company has caused this policy to be signed by its president and a secretary at _____ and countersigned on the Policy Declarations page by a duly authorized agent of the Company.

(Facsimile of Signature)
Secretary

(Facsimile of Signature)
President

For a policy issued by two companies:

In witness whereof the Indemnity Company has caused this policy with respect to Coverages and such other parts of the policy as are applicable thereto to be signed by its president and a secretary at _____ and countersigned on the Policy Declarations page by a duly authorized agent of the Company.

(Facsimile of Signature)
Secretary

(Facsimile of Signature)
President

- f. **Submitting Copies of Insurance Policies:** Prior to beginning construction operations on or over the railway right of way, the Contractor shall submit to the Department evidence of the railway company's approval and a copy of the required insurance policies. The Commonwealth will not be responsible for any claims from the Contractor resulting from delay in the acceptance of any of these policies by the railway company other than consideration of an extension of time. If the delay is caused by the failure of the Contractor or his insurer to file the required insurance policies promptly, an extension of time will not be granted.
- g. **Beginning Construction:** Preliminary contingent work or other work by the railway company may delay the starting or continuous prosecution of the work by the Contractor. The Contractor shall be satisfied as to the probable extent of such work and its effect on the operations prior to submitting a bid for the work. The Commonwealth will not be responsible for any claims by the Contractor resulting from such delays except that an extension of time may be considered.

h. Arranging for Tests:

1. **Railroad specifications:** When ordering materials that are to conform to railroad specifications, the Contractor shall notify the railway company, who will arrange for tests. The Contractor shall specify in each order that the materials are to be tested in accordance with the requirements of the railroad specifications and not those of the Department.
2. **Highway Specifications:** When ordering materials that are to conform to highway Specifications, the Contractor shall specify in each order that the materials are to be tested in accordance with the requirements of Department Specifications.

107.20 – Not Used

107.21—Size and Weight Limitations

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

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

District prior to fabrication or manufacture of the items. The request shall state the reasons for adjustment and shall be accompanied by supporting data, including working drawings where necessary.

- (b) **Construction Loading of Structures:** In the construction, reconstruction, widening, or repair of bridge, culvert, retaining wall, and other similar type structures including approaches, the Contractor shall consider construction loads during the planning and prosecution of the work. Construction loads include but are not limited to the weight of cranes, trucks, other heavy construction, or material delivery equipment, as well as the delivery or storage of materials placed on or adjacent to the structure or parts thereof during the various stages (phases) of the work in accordance with the Contractor's proposed work plan. The Contractor shall consider the effect(s) of construction loads on the loading capacity of these type structure(s) in his sequencing of the work and operations, including phase construction. At the Engineer's request the Contractor shall be prepared to discuss or review his proposed operations with the Engineer with regard to construction loads to

demonstrate he has taken such into consideration in the planning and execution of the work.

SECTION 108—PROSECUTION AND PROGRESS OF WORK

108.01—Prosecution of Work

The Contractor shall provide sufficient labor, materials, equipment, and tools; and shall prosecute the Work with such means and methods and with such diligence as is required to attain and maintain a rate of progress necessary to ensure completion of the project within the Contract time limit in accordance with the plans, specifications, and other requirements of the Contract.

Once the Contractor has begun work, the Contractor shall prosecute the Work continuously and to the fullest extent possible except for suspensions authorized or ordered by the Engineer according to Section 108.05. If approval is given to suspend the work temporarily, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations.

The Contractor shall notify the Engineer at least 24 hours in advance of any changes in the Contractor's planned operations or work requiring inspection.

108.02—Limitation of Operations

(a) General

The Contractor shall conduct the work in a manner and sequence that will ensure its expeditious completion with the least interference to traffic and shall have due regard for the location of detours and provisions for handling traffic. The Contractor shall not open any work to the prejudice or detriment of work already started. The Engineer may require the Contractor to finish a section of work before work is started on any other section.

(b) Holidays

Except as is necessary to maintain traffic, work shall not be performed on Sundays or the following holidays, as well as the normal workday preceding and following these holidays, without the permission of the Engineer: January 1, Easter, Memorial Day, July 4, Labor Day, Thanksgiving Day, and Christmas Day.

If any of these holidays occurs on a Sunday, the following Monday shall be considered the holiday. If occurring on Saturday, the preceding Friday will be considered as the Holiday.

If the Holiday occurs on a Sunday or Monday: From noon on the preceding Friday to noon on the following Tuesday.

108.03—Progress Schedule

Unless otherwise indicated in the Contract, the Contractor shall, at a minimum, be governed by the following:

(a) General Requirements

The Contractor shall plan and schedule the work and shall submit his overall work plan in the form of a written Progress Schedule, as described herein, for the Engineer's review and acceptance. The accepted Progress Schedule will be used by the Engineer for planning and coordination of the District activities, resources, and expenditures, and for evaluation of the Contractor's rate of progress and the effects of time-related impacts on the project. When preparing the Progress Schedule, the Contractor shall consider all known constraints and restrictions such as holidays, seasonal, weather, traffic, utility, railroad, right-of-way, environmental, permits, or other known or specified limitations to the work.

At the Pre-Construction Conference the Contractor shall be prepared to discuss his planned or contemplated operations relative to the Contract requirements.

Delays resulting from the Contractor's failure to provide the Progress Schedule will not be considered just cause for extension of the Contract time limit or for additional compensation.

(b) Progress Schedule Submission Requirements

The Contractor shall submit to the Engineer three (3) copies of the written Baseline Progress Schedule at least 7 calendar days prior to beginning work. The Progress Schedule shall represent the Contractor's overall work plan to accomplish the entire scope of work in accordance with the requirements of the Contract. The Progress Schedule shall include all work including, as applicable, the work to be performed by sub-contractors, the District, or others. The Progress Schedule submittal shall consist of a written Narrative to:

- Describe the Contractor's proposed general sequence to accomplish the work;
- Indicate the general schedule of work to be completed each month in terms of the major operations, routes, or segments of work as delineated in the Contract or in the absence of such delineations, as agreed to by the Contractor and the Engineer. A bar-chart schedule may be substituted at the Contractor's option.

The Progress Schedule, including the Initial and any subsequent Revised Progress Schedules requested by the Engineer or originated by the Contractor, will not be measured or paid for separately. All associated costs to prepare, update, revise, and/or furnish the Progress Schedule in accordance with the requirements herein shall be considered incidental to the work.

1. Two Week Look-ahead (TWLA) Progress Schedule.

At least 7 calendar days prior to beginning work, the Contractor shall submit to the

Engineer, an initial written TWLA Progress Schedule for any work planned for the first two weeks. Every week thereafter, on a day agreed to by the Contractor and the Engineer, the Contractor shall submit to the Engineer, a written TWLA Progress Schedule for the following two-week period. The TWLA schedule shall provide a detailed list of operations to indicate the type of operation, locations of the work, proposed working days and hours, and the start and finish dates for any work planned, started, in progress, or scheduled for completion during the two-week period. The TWLA Progress Schedule shall also indicate any critical stages of work requiring District oversight or inspection. The Contractor shall submit 3 copies of the TWLA Progress Schedule to the Engineer in any legible format.

The Contractor may revise his TWLA Progress Schedule at his discretion. However, the Contractor shall notify the Engineer at least 48 working hours in advance of any changes in the Contractor's planned operations or critical stage work requiring District oversight or inspection. In the event of extenuating circumstances deemed by the Engineer to be beyond the Contractor's control, the Engineer may grant verbal concurrence of changes in the Contractor's planned operations with less advance notice, as the need arises.

2. **Progress Schedule Revisions.** The Contractor may revise his overall plan of operations at any time; however, the Contractor shall submit a Revised Progress Schedule to reflect any changes in his overall sequence of operations or general schedule. The Contractor may be required, as determined by the Engineer, to submit a Revised Progress Schedule. Circumstances that may prompt the Engineer's decision to request a Revised Progress Schedule may include deviations from the overall sequence of operations or if the actual progress of work varies by one month or more from the currently accepted Progress Schedule.

When required by the Engineer, the Revised Progress Schedule shall be submitted within 7 calendar days of receipt of the Engineer's written request. The Revised Progress Schedule shall be submitted in the form of the Progress Schedule as defined herein, to reflect the changes in the Contractor's overall work plan. The accepted Revised Progress Schedule will replace any previously accepted Progress Schedule for the remainder of the work.

(c) Submittal and Reporting Format

If requested by the Engineer, the Contractor shall submit its progress schedule in the following manner.

1. A transmittal letter to the Engineer listing the items, date, and number of copies of items being submitted.
2. Three printed legible paper copies of the progress schedule and progress schedule narrative.

3. Electronic “PDF” copies of the progress schedule, progress schedule narrative, and an electronic back-up file copy of the working progress schedule. Each electronic file submittal shall have a unique file name indicating the Contract ID, submission number, submittal type, and data date of the submission (e.g. C00012345C01_B01_Narrative_6-04-12.pdf).

(d) Engineer’s Review and Acceptance

The Engineer will review the Baseline or subsequent Revised Progress Schedule submittals for acceptance within 7 calendar days of receipt of the Contractor’s complete submittal.

Review and acceptance by the Engineer will be based on conformance with the requirements of this provision and the Contract.

Review and acceptance by the Engineer will not constitute a waiver of any Contract requirements and will in no way assign responsibilities of the work plan, scheduling assumptions, and validity of the work plan or schedule to the District. Failure of the Contractor to include in the Progress Schedule any element of work required by the Contract for timely completion of the Contract shall not excuse the Contractor from his contractual obligations.

(e) Failure to Comply with Progress Schedule Submission Requirements

With the exception of project start-up activities approved in writing by the Engineer, the Contractor shall not commence work, until 7 days after the date the Contractor submits a complete Baseline Progress Schedule, unless otherwise approved by the Engineer in writing.

If the Contractor fails to comply with any of the Progress Schedule submissions within the time and in the manner specified, the Engineer may withhold approval of the Contractor’s ensuing monthly progress estimates until the Contractor has satisfied the submission requirements. If the Contractor fails to submit the Final As-Built Schedule in the time and manner required, the Engineer may withhold approval of the final payment until the Contractor satisfies the submission requirement.

The District shall not be responsible for any delays, costs or damages resulting from the Contractor’s failure to submit the schedule submittals in accordance with the requirements of the Contract.

108.04—Determination and Extension of Completion Date

The District will specify the Completion Date in the Contract. The District will not consider any request for an extension of time that is based on a claim that the Completion Date as originally established is insufficient to complete the Work.

When Contract execution is not within 60 calendar days after the opening of bids, or when the Contractor is unable to commence work because of any failure of the District, the Contractor will

be given an extension of time based on the number of days delayed beyond the 60 calendar days. No time extension will be allowed for a delay in the date of Contract execution when the delay is the fault of the Contractor.

The Engineer will determine if an extension of the Contract time limit for completion is warranted by additions to the Contract. The Contractor shall inform the District, in writing, of a request for time extensions in his Work Order in accordance with the applicable portion(s) of Section 104 or 109. The Contractor shall provide written supporting data for any request for extension of time due to quantity additions and or additional or altered work.

During prosecution of the work, the Contractor shall identify the causes for any delays attributable to conditions he deems to be beyond his control and shall identify the particular construction operations affected, their criticality to project milestones or overall Contract completion, and the significant dates that encompass the periods of delay. The Contractor shall furnish all such information necessary for the District to make an adequate evaluation of any request received from the Contractor for an extension of the Contract time limit within 3 days of experiencing such a delay.

- (a) **Fixed Date:** Unless otherwise indicated in the Contract, the Contract time limit will be specified as a fixed date for completion. The Contractor shall take into consideration normal conditions considered unfavorable for the prosecution of the work, and shall place sufficient workers and equipment on the project to complete the work in accordance with the specified Contract time limit.

If the Contract identifies a contract-specific Notice to Proceed date and the Contract is not executed by that date, the Contractor will receive an extension of time equal to the number of days between the contract-specific Notice to Proceed date and the eventual date of Contract execution.

If the Notice to Proceed date is selected by the Contractor and after prior approval the Engineer directs the Contractor not to begin work on that date, the Contractor will receive an extension of time equal to the number of days between the Contractor's selected Notice to Proceed date and the eventual date the Engineer informs the Contractor that he may commence the work.

The Engineer may give consideration for extension of time when a delay occurs due to unforeseen causes beyond the control of or without the fault or negligence of the Contractor. However, consideration will not be given to extensions of time attributable to normal adverse weather conditions or conditions resulting from normal adverse weather.

For the purposes of this Section normal adverse weather is defined as that which is not considered extraordinary or catastrophic and is not reasonably conducive to the Contractor progressively prosecuting critical path work under the Contract. Weather events considered extraordinary or catastrophic include, but are not limited to tornados, hurricanes, earthquakes, and floods that exceed a 25-year storm event as defined by National Oceanic and Atmospheric Administration (NOAA) for the NOAA data gathering location that is nearest the project site.

If there is a delay in the progress of the work due to unforeseen causes described within these Specifications, and the delay extends the Contract time limit into the period between November 30 of one year and April 1 of the following year and working conditions during such period are unsuitable for the continuous prosecution or completion of the work, then consideration may only be given to granting an extension of time that will encompass a suitable period during which such work can be expeditiously and acceptably performed.

108.05—Suspension of Work Ordered by the Engineer

- (a) If the Engineer orders the Contractor in writing to suspend performance of all or any portion of the Work for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation or Contract time is due as a result of such suspension, the Contractor shall submit to the Engineer a written request for adjustment according to Section 108.04 within 7 days after receipt of the notice to resume work. The Contractor's request shall set forth the reasons and support for such adjustment.
- (b) Upon receipt, the Engineer will review the Contractor's documentation and evaluate the Contractor's request. If the Engineer agrees that the cost or time required for the performance of the Contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, his suppliers, or subcontractors at any tier, and was not caused by weather, the Engineer will make an adjustment (excluding profit and consequential damages) and modify the Contract in writing accordingly. The Engineer will notify the Contractor of the determination regarding whether or not an adjustment of the Contract is warranted.
- (c) No Contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time and in the manner prescribed.
- (d) No Contract adjustment will be allowed under this Section to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of the Contract.

108.06—Failure to Complete on Time

(a) General

For each calendar day that any work remains incomplete after the Contract time limit specified for the completion of the work, the District will assess liquidated damages against the Contractor. Liquidated damages will be assessed at the rate applicable to the Contract in accordance with the Schedule of Liquidated Damages, Table I-1, or as otherwise specified in the Contract provisions. Liquidated damages will be deducted from any monies due the Contractor for each calendar day of additional time consumed until final completion and acceptance of the Work, subject to such adjustments as provided in accordance with the requirements of Section 108.04, not as a penalty, but as liquidated damages. The

Contractor waives any defense as to the validity of any liquidated damages stated in the Contract or these Specifications and assessed by the District against the Contractor on the grounds that such liquidated damages are void as penalties or are not reasonably related to actual damages.

(b) Liquidated Damages

Liquidated damages of \$1,000 per day, representing the cost of administration, engineering, supervision, inspection and other expenses, will be charged against the Contractor for each calendar day beyond the Contract time limit that the Contract remains in an incomplete state:

108.07—Default of Contract

The Contractor may be declared in default if he does any one of the following:

- (a) Fails to begin the Work within 10 days after the notice to proceed date, except as otherwise permitted by specific Contract language, or the provisions of Section 105.01 or Section 108.02;
- (b) fails to perform the Work with sufficient workers and equipment or with sufficient materials to ensure prompt completion of the Work;
- (c) performs the Work in such manner that it is unacceptable, or fails, neglects or refuses to promptly remove and replace materials or work that are unacceptable;
- (d) discontinues prosecution of the Work without an order to do so from the Engineer;
- (e) fails to resume work that has been discontinued within a reasonable time after notice to do so;
- (f) becomes insolvent, is declared bankrupt, or commits any act of bankruptcy or insolvency;
- (g) allows any final judgment to stand against him unsatisfied for a period of 10 days;
- (h) makes an assignment for the benefit of creditors;
- (i) fails for any other cause whatsoever to carry on the work in accordance with the Contract or to perform contractual obligations in an acceptable manner;
- (j) disregards laws, regulations, ordinances, the Engineer's written instructions, or otherwise remains in substantial violation of any provision of the Contract.

If any of these conditions exists, the Engineer will give notice in writing to the Contractor and his surety of the delay, neglect, or default. If within 10 days after the date of such notice the Contractor or his surety has not taken measures that will, in the judgment of the Engineer, ensure satisfactory progress of the work or give assurances satisfactory to the Engineer that the provisions of the Contract will be fully carried out and instructions complied with, the Executive Director may then, or at any time thereafter, declare the Contractor in default. Without violating the Contract,

the Executive Director may call upon the Contractor's surety for the satisfactory and expeditious completion of all work under the Contract, the removal and replacement of any unacceptable or unauthorized work, or may otherwise terminate the Contract in accordance with the provisions of Section 108.08. If the Executive Director declares the Contractor in default, payments to the Contractor will be withheld and may be made directly to the Contractor's surety. Further negotiations regarding the remaining work will be conducted with the Contractor's surety.

If the Contractor's surety fails or refuses to proceed in accordance with the Executive Director's instructions, the Commissioner will appropriate and use any or all materials and equipment on the

project site that are suitable and acceptable and will enter into an agreement with others for the completion of the work, or he will use such other methods as he deems necessary to ensure the completion of the work.

Costs and charges incurred by the District, including the cost of completing the Work under the Contractor the cost of removal and replacement of any unacceptable or unauthorized work, will be deducted from any monies due or that will become due the Contractor and his surety. If the expense incurred by the District is less than the sum that would have been payable under the Contract had the work been completed by the Contractor, the Contractor and his surety will be entitled to receive the difference. If the expenses exceed the sum that would have been payable under the Contract, the Contractor and his surety shall be liable for and shall pay to the District the amount of the excess.

108.08—Termination of Contract

(a) **Conditions for Termination:** The District may terminate the Contract or any portion thereof because of any of the following conditions:

1. Default.
2. National emergency.
3. Action by the Commonwealth, U.S. government, or court order.
4. Conditions beyond the control of the District.
5. For the convenience of the District.

Termination of the Contract or a portion thereof shall not relieve the Contractor of his responsibilities for completed Work, nor shall it relieve his surety of its obligation for and concerning any just claims arising out of the Work performed or remaining to be performed.

Termination for Convenience: The Engineer will deliver to the Contractor and surety written notice of termination for convenience specifying the extent of the termination and the effective date. A termination for convenience may be directed at any time after the notice of award of the Contract. Termination for convenience will be accomplished in

accordance with the following:

1. **Procedure:** The Contractor shall immediately upon receipt of the notice of termination do the following:
 - a. Stop work as directed in the notice.
 - b. Promptly place disturbed areas in an acceptable condition as directed by the Engineer.
 - c. Place no further subcontracts or orders for materials, services, or equipment, unless necessary for any part of the Work not terminated or to protect any part of the Work completed.
 - d. Terminate all subcontracts or orders to the extent related to the terminated work, unless instructed otherwise by the District.
 - e. Settle all outstanding liabilities with subcontractors and suppliers arising from the termination.
 - f. Transfer title and deliver to the District any work in progress, completed work, materials, supplies, equipment, drawings, plans, information, warranties, or other property that were purchased, acquired, fabricated, produced, supplied, or constructed for the Work, whether completed or terminated, and would be required to be furnished to the District on completion of the Contract.
 - g. Complete performance of Work not terminated, if any.
 - h. Inventory along with the Engineer any acceptable materials obtained, but not incorporated into the Work.
 - i. Take any action necessary or that the Engineer may direct for the protection and preservation of the site or other property that is in the Contractor's possession or control in which the District has or may acquire an interest.

2. Payment

Within 30 days after the Contractor receives the District's notice of termination for convenience, or within such time as the Contractor and the Engineer mutually agree, the Contractor shall submit a request for payment due for work performed through the effective date of termination and as a result of the termination for convenience. The

Contractor shall submit with the request sufficient cost records to substantiate the payment amount requested.

The District shall pay and the Contractor shall accept, as full payment for all work and materials provided, a sum mutually agreed to by the Contractor and the District determined

as follows:

- a. Work on Contract pay items performed prior to termination for which the Contractor has not been paid will be paid at the Contract price according to Section 109.03, or in the absence of Contract unit prices, in accordance with the requirements of Section 109.05 (Extra and Force Account Work). Items eliminated entirely by termination will be paid for as provided in Section 109.07. No claim for loss of anticipated profits will be considered, and the provisions of Section 104.02 will not apply for costs that are then incurred as a result of the termination.
 - b. Reimbursement for organizing the Work when not specified in the Contract and moving equipment to and from the project site will be considered where the volume of work completed is too small to compensate the Contractor for these expenses under the Contract unit prices.
 - c. At the option of the Engineer, materials the Contractor obtains for the Work that have been inspected, tested, and accepted by the Engineer and that have not been incorporated in the Work may be purchased from the Contractor at actual costs as shown by receipted bills, purchase orders, bills of lading, paid invoices, or other similar actual cost records at such points of delivery as will be designated by the Engineer.
 - d. The Contractor shall be reimbursed for any actual costs incurred to terminate sub contracts or purchase orders, as shown by receipted bills, bills of lading, paid invoices, or other similar actual cost records at such points of delivery as will be designated by the Engineer.
 - e. If a sum cannot be agreed upon, the Contractor shall be paid by unilateral change order and may seek recourse for the disputed amount in accordance with Section 105.19.
 - f. When requested by the District, the Contractor shall furnish itemized statements of the cost of the work performed and shall give the District (and/or the District's Auditors) access to any and all financial and/or project records and documents, relating thereto. Unless the Contractor, when requested to do so, furnishes such itemized statements and access to any and all financial and/or project records and documents, the Contractor shall not be entitled to payment for work for which such information is sought by the District.
3. The Contractor shall incorporate the provisions of this Section as provisions in its contracts with each of their subcontractors.

Termination for Default:

In the event the Executive Director declares the Contractor in default as provided in Section 108.07, the District may terminate the Contract in accordance with the following:

1. Upon such termination becoming effective, the District shall provide written notice to the surety confirming that the Contract is terminated, and that the District is proceeding to finish the Work as set forth in the Contract performance bond, Form C-1 8A, and the terms and conditions therein if the Surety declines to complete the project. The District will also take possession of the project site and of all materials purchased for the project thereon. If the expense of completing the Work, including compensation for additional managerial and administrative services, exceeds the unpaid balance of the Contract amount and the penal amount of the Contract performance bond, the Contractor shall pay the difference to the District, together with any other costs and expenses of terminating the Contract and having it completed by others.
2. If it should be judicially determined that the District's termination for default was improper or in error, then the termination shall be deemed to be a termination for convenience and the Contractor's rights and remedies shall be limited exclusively to those provided under Section 108.08(b).
3. Termination for default as provided herein is in addition to and without prejudice to the District's other rights or remedies. Any of the District's actions permitted herein shall not be deemed a waiver of any other right or remedy of the District under the Contract or under the law. The District may offset any claims it may have against the Contractor against the amounts due or to become due to the Contractor under any other contract the Contractor may have with the District. The provisions of this Section shall survive termination of the Contract.
4. When the Contractor is terminated for default, any claims timely identified in a written notice of intent may be submitted in accordance with provisions of Section 105.19 or the Code of Virginia as amended and as applicable, except that the Contractor shall submit the required claim within 60 days after the District's notice of termination for default to the Contractor. Failure on the part of the Contractor to submit a claim within such 60-day period shall constitute a waiver and release of such claim.

108.09—Acceptance

- (a) **Contractor's Responsibility for Work:** Until final acceptance of the work by the Engineer in accordance with the requirements of this Section, the Contractor shall have charge and care thereof and shall take every precaution against damage to any part thereof by action of the elements or from any other cause. The Contractor shall rebuild, repair, restore, and make good on damage to any portion of the work occasioned by any of the foregoing causes before final acceptance and shall bear the expense thereof. The District may reimburse the Contractor for repair of damage to work attributable to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor as determined by the Engineer.

In case of suspension of work, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the work, provide for erosion control and drainage, and erect any necessary temporary structures, signs, or other facilities as

determined by the Engineer. During the suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings, and soddings furnished under the Contract and shall take adequate precautions to protect new tree growth and other important vegetation against damage.

- (b) **Partial Acceptance:** If at any time during the prosecution of the project the Contractor completes a unit or portion of the project, such as a structure, an interchange, slopes, pavement, or a section of a roadway in its entirety, he may ask the Engineer to make final inspection of such work. If the Engineer finds upon inspection that the work conforms to the requirements of the Contract and that acceptance is in the best interest of the public, he may accept the work as being completed, and the Contractor will be relieved of further responsibility for the work. Partial acceptance shall in no way void or alter any terms of the Contract.

If any damage is sustained by an accepted unit or portion of the project attributable to causes beyond the control of the Contractor, the Engineer may authorize the Contractor to make the necessary repairs. These repairs will be paid for at the Contract price for the items requiring repair. In the absence of Contract prices covering the items of repair, the repair work will be paid for in accordance with the requirements of Section 109.05.

- (c) **Final Acceptance:** Upon receipt of a written notice from the Contractor of presumptive completion of the entire project, the Engineer will make an inspection. If all work specified in the Contract has been completed, the inspection will constitute the final inspection and the Engineer will make the final acceptance. The Contractor will be notified in writing, of the determination of final acceptance within five days of the date of the Engineer's final acceptance.

If the Engineer's inspection discloses that any work, in whole or in part, is incomplete or unacceptable, the Contractor shall immediately correct the deficiency. A written list of deficiencies will be provided to the Contractor by the Engineer. Upon completion or correction of the work, another inspection will be made of the deficient work. If the work is then satisfactory, the Engineer will notify the Contractor in writing within 5 days of the Engineer's final acceptance. In any event, the Contractor shall be responsible for and maintain the project until final acceptance except under conditions that may be specifically exempted by the Specifications or other Contract documents.

108.10—Termination of Contractor's Responsibilities

The Contract will be considered fully complete upon final acceptance. The Contractor's responsibility for the Work will then cease except as set forth in his bonds, and Sections 107.12, 109.08, 109.10, and other provisions of the Contract that extend the Contractor's responsibility beyond final acceptance.

SECTION 109—MEASUREMENT AND PAYMENT

109.01—Measurement of Quantities

- (a) **General:** Work specified in the Contract will be measured by the Engineer in accordance with U.S. Standard Measure. The methods of measurement and computations to be used to determine quantities of material furnished and work performed will be those generally recognized as conforming to good engineering practice.

Specific methods of measurement shall be as indicated in the specific Section for the Contract item.

Longitudinal measurements for surface area computations will be made along the surface, and transverse measurements will be the surface measure shown on the plans or ordered in writing by the Engineer. Individual areas of obstructions with a surface area of 9 square feet or less will not be deducted from surface areas measured for payment.

Structures will be measured in accordance with the neat lines shown on the plans.

Items that are measured by the linear foot will be measured parallel to the base or foundation upon which they are placed.

Allowance will not be made for surfaces placed over an area greater than that shown on the plans or for any material moved from outside the area of the cross-section and lines shown on the plans.

When standard manufactured items are specified and are identified by weights or dimensions, such identification will be considered nominal. Unless more stringently

controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

- (b) **Measurement by Weight:** Materials that are measured or proportioned by weight shall be weighted on accurate scales as specified in this Section. When material is paid for on a tonnage basis, personnel performing the weighing shall be certified by the District and shall be bonded to the Commonwealth of Virginia in the amount of \$10,000 for the faithful observance and performance of the duties of the weighperson required herein. The bond shall be executed on a form having the exact wording as the Weighpersons Surety Bond Form furnished by the District and shall be submitted to the District prior to the furnishing of the tonnage material.

The Contractor shall have the weighperson perform the following:

1. Furnish a signed weigh ticket for each load that shows the date, load number, plant name, size and type of material, project number, schedule or purchase order number, and the weights specified herein.
2. Maintain sufficient documentation so that the accumulative tonnage and distribution of each lot of material, by Contract, can be readily identified.

3. Submit by the end of the next working day a summary of the number of loads and total weights for each type of material by Contract.

Trucks used to haul material shall be equipped with a cover suitable to protect the material and to protect the traveling public.

The truck tare to be used in the weighing operation shall be the weight of the empty truck determined with full tank(s) of fuel and the operator seated in the cab. The tare weight of trucks shall be recorded to the nearest 20 pounds. At the option of the Contractor, a new tare may be determined for each load. When a new tare is obtained for each load, the requirement for full tank(s) of fuel will be waived.

Net rail shipment weights may be used for pay quantities when evidenced by railroad bills of lading. However, such weights will not be accepted for pay quantities of materials that subsequently pass through a stationary mixing plant.

Scales shall conform to the requirements for accuracy and sensitivity as set forth in the National Institute of Standards and Technology Handbook No. 44 for Specification Tolerances and Requirements for Commercial and Weighing Devices. Scales used in the weighing of materials paid for on a tonnage basis shall be approved and sealed in accordance with the requirements of the policies of the Bureau of Weights and Measures of the Department of Agriculture and Consumer Services, or other approved agencies, at least once every six months and upon being moved. Hopper and truck scales shall be serviced and tested by a scale service representative at least once every six months. Hopper scales shall be checked with a minimum 500 pounds of test weights and truck scales shall be checked with a minimum 20,000 pounds of test weights.

Copies of scale test reports shall be maintained on file at the scale location for at least 18 months, and copies of all scale service representative test reports shall be forwarded to the Department.

The quantity of materials paid for on a tonnage basis shall be determined on scales equipped with an automatic printer. Truck scale printers shall print the net weight and either the gross or tare weight of each load. Hopper scale printers shall print the net weight of each load. The weigh ticket shall also show the legal gross weight for material weighed on truck scales and the legal net weight for material weighed on hopper scales.

If the automatic printer becomes inoperative, the weighing operation may continue for 48 hours provided satisfactory visual verification of weights can be made. The written permission of the District Materials Engineer shall be required for the operation of scales after 48 hours.

If significant discrepancies are discovered in the printed weight, the ultimate weight for payment will be calculated on volume measurements of the materials in place and unit weights determined by the Engineer or by other methods deemed appropriate to protect the interests of the Commonwealth.

- (c) **Measurement by Cubic Yard:** Material that is measured by the cubic yard, loose measurement or vehicular measurement, shall be hauled in approved vehicles and measured therein at the point of delivery. Material measured in vehicles, except streambed gravel, silt cleanout, or other self-consolidating material will be allowed at the rate of 2/3 the volume of the vehicle. The full volume of the vehicle will be allowed for streambed gravel. Such vehicles may be of any size or type acceptable to the Engineer provided the body is of such shape that the actual contents can be readily and accurately determined. Unless all approved vehicles are of uniform capacity, each vehicle shall bear a plainly legible identification mark indicating the specific approved capacity. Each vehicle shall be loaded to at least its water level capacity.

When approved by the Engineer in writing, material specified to be measured by the cubic yard may be weighed and such weights converted to cubic yards for payment purposes. Factors for conversion from weight to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before they are used.

- (d) **Measurement by Lump Sum:** When used as an item of payment, the term lump sum will mean full payment for completion of the corresponding item of work described in the Contract. When a complete structure or structural unit is specified as a Contract item, the unit of measurement will be lump sum, and shall include all necessary fittings and accessories. The quantities may be shown on the plans for items for which lump sum is the method of measurement. If shown, the quantities are approximate and are shown for estimating purposes only and no measurement of quantities will be made for payment. Items that are to be measured as complete units will be counted by the Inspector in the presence of a representative of the Contractor.
- (e) **Excavation, embankment, and borrow:** In computing volumes of excavation, embankment, and borrow, methods having general acceptance in the engineering profession will be used. When the measurement is based on the cross-sectional area, the average end area method will be used.

109.02 – Not Used

109.03—Scope of Payment

Payments to the Contractor will be made for the actual quantities of Contract items performed in accordance with the plans and the requirements of the Specifications and other Contract documents. If, upon completion of the Work, the actual quantities vary, either by an increase or decrease from the estimated quantities shown in the Contract, the Contract unit prices shall prevail and payment will be made for actual quantities performed at such unit prices, unless the unit prices have been modified by written change orders according to Sections 104 and 109.04, as determined by the Engineer.

Quantities appearing on the Proposal are estimated quantities for the basic design shown on the plans. With the Engineer's approval, the Contractor may furnish other design(s) that may involve changes in quantities or the use of different materials. However, payment will be made for the original quantities listed in the Contract only and in the units of measure given in the Contract for the basic

design unless the dimensions for the basic design are changed by an authorized change order to conform to field conditions encountered. In this event, the original quantities listed will be modified based on the change in dimension, and the modified quantities will be used for pay quantities at Contract unit prices for the items listed on the Proposal.

The Contractor shall accept the compensation provided for in the Contract as full payment for the following:

- (a) Furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the Work according to the Contract.
- (b) Performing all work specified in the Contract.
- (c) All loss or damage arising from the nature of the Work or from action of the elements or any other unforeseen difficulties that may be encountered during prosecution of the Work and until its final acceptance.
- (d) Any license, use, or infringement of a patent, trademark, or copyright.
- (e) The completion of the work in accordance with the Contract requirements.

If the payment clause in the Specifications relating to any unit price in the Contract requires that the unit price cover and be considered compensation for certain work or material essential to the item, the work or material will not be measured or paid for under any other item except as provided in Section 106.05.

The payment of any partial estimate, the final estimate, or any retainage shall in no way affect the obligation of the Contractor to repair or replace any unacceptable, unauthorized or defective work or materials, or to be responsible for all damages attributable to such unacceptable, unauthorized or defective work or materials.

109.04—Payment for Non-Significant Changes and Additional Units of In-scope Work

When the accepted quantities of work vary from the estimated quantities set forth in the Contract, whether or not there have been any alterations in the plans, the quantities of work, or the character of work, the Contractor shall accept as payment in full, so far as Contract items are concerned, payment at the original Contract unit prices for the accepted quantities of work performed, except where such variance is a significant change as set forth in Section 104.02. No allowance or other adjustment except as provided for a significant change in Section 104.02 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting directly from such variance, or from the Contractor's unbalanced allocation among the Contract items of overhead expense and subsequent loss of expected reimbursements therefor, or from any other cause.

109.05—Payment for Contract Changes

The District will pay the Contractor for adjustments to the Contract amount based on one of the following methods.

(a) Payment for Extra Work

The District may add any extra work that in the judgment of the Engineer is necessary for the satisfactory fulfillment of the Contract within its intended scope. Extra work may be accomplished by change order if the scope is defined as provided in this Section (a), or on a force account basis, if the scope is not defined as provided in Section 109.05(b). Where possible, the District and Contractor will each proceed to secure any information, documentation, or plans to assist in detailing the extent and character of such work, if known, in sufficient detail to define, analyze, and estimate the cost and time required to perform such work. Extra work does not include overruns of Contract items according to 104.02.

1. The Engineer may notify the Contractor in writing that extra work is necessary. When no such notice is given, but the Contractor believes extra work is necessary, he shall notify the Engineer in writing within 2 days of such a determination or before performing any such work. If the Engineer agrees with the Contractor, the Engineer will notify the Contractor that extra work is necessary. Within 7 days of the Engineer notifying the Contractor of extra work, or within such time as mutually decided with the Engineer, the Contractor shall submit a proposal that includes a determination of the extent of such work, and the additional compensation and/or time he seeks, if any, relative to his determination. The Contractor's request shall be in sufficient detail to enable the Engineer to determine the basis for and extent of the Contractor's entitlement to additional compensation or time. Failure on the part of the Contractor to furnish sufficient documentation or to qualify his reason for failure to do so will delay the determination of entitlement for such work. If such delay occurs, it will in no way relieve the Contractor of his obligation to meet the contract time limits or other Contract requirements or constitute basis for a Contractor to make a delay claim.
2. If the Contractor requests a time extension based on extra work, the requested time extension will only be considered if the extra work impacts the critical path, a controlling work item, or an interim milestone established in the Contract to the extent that it extends the Completion Date of the project beyond the lattermost of the Contract Completion Date or its most recent extension. The Contractor shall submit detailed documents and information showing how the extra work or interim milestone impacted the critical path in accordance with Section 108.04. Any time extension given, including time extensions in accordance with Section 108.04, must be included in the executed change order.
3. Upon receipt and review of the Contractor's costs for the proposed extra work, if it is found that the Contractor's prices or the time differ considerably from the District's estimate, the Engineer may request the Contractor to provide support for his prices or his requested time extension. Where the District and the Contractor can determine and agree upon an accurate cost and time estimation for the proposed work, the

Engineer will issue a Bilateral Change Order to authorize the work. When the Contractor and the District cannot agree upon the cost or the time estimation for the extra work after the Engineer's analysis and subsequent discussion with the Contractor, or where due to issues of emergency, safety, environmental damage, other similar critical factors as determined by the District, the Engineer will act unilaterally and issue a Unilateral Change Order to authorize the work. The issuance of a Unilateral Change Order by the Engineer shall in no way invalidate or relinquish the Contractor's rights under Section 105.19.

(b) Payment by Force Account

The District will require the Contractor to proceed with extra work on a force account basis when neither the District nor the Contractor can firmly establish a reliable estimate for the cost of the extra work because either the scope or the quantity of work is unknown, is of such character that a price cannot be determined to a reasonable degree of accuracy, or the level of effort required to perform and complete the extra work is unknown or not quantifiable at the time of discovery or start of the extra work, and will be determined as work progresses. The compensation provided for in this Section for force account work applies only to extra work the Engineer orders in writing to be performed on a force account basis, and does not apply to any other work performed under the Contract or to claims.

The Contractor shall be paid for all labor, materials, equipment, services, supplies, taxes, overhead, profit and miscellaneous costs or expenses, for extra work performed on a force account basis in the following manner:

1. **Labor:** Unless otherwise approved, the Contractor will receive the rate of wage or scale as set forth in his most recent payroll for each classification of laborers, forepersons, and superintendent(s) who are in direct charge of the specific operation. The time allowed for payment will be the number of hours such workers are actually engaged in the work. If overtime work is authorized, payment will be at the normal overtime rate set forth in the Contractor's most recent payroll. If workers performing the class of labor needed have not been employed on the project, mutually agreed on rates will be established. However, the rates shall be not less than those predetermined for the project, if applicable. An amount equal to 45 percent of the approved force account payroll will be included in the payment for labor to cover administrative costs, profit, and benefits and/or deductions normally paid by the Contractor.
2. **Insurance and Tax:** The Contractor will receive an amount equal to 25 percent of the approved force account payroll exclusive of additives of administrative cost as full compensation for property damage and liability, workers' compensation insurance premiums, unemployment insurance contributions, and social security taxes of force account work.
3. **Materials:** The Contractor will receive the actual cost of materials accepted by the Engineer that are delivered and used for the work including taxes, transportation, and handling charges paid by the Contractor, not including labor and equipment rentals as

herein set forth, to which 15 percent of the cost will be added for administration and profit. The Contractor shall make every reasonable effort to take advantage of trade discounts offered by material suppliers. Any discount received shall pass through to the

District. Salvageable temporary construction materials will be retained by the District, or their appropriate salvage value shall be credited to the District.

4. **Equipment:** The Contractor shall provide the Engineer a list of all equipment to be used in the work. For each piece of equipment, the list shall include the serial number; date of manufacture; location from which equipment will be transported; and, for rental equipment, the rental rate and name of the company from which it is rented. The Contractor will be paid rental rates for pieces of machinery, equipment, and attachments necessary for prosecution of the work that are approved for use by the Engineer. Equipment rental will be measured by time in hours of actual time engaged in the performance of the work and necessary traveling time of the equipment within the limits of the project or source of supply and the project. Hourly rates will not exceed 1/176 of the monthly rates of the schedule shown in the Rental Rate Blue Book modified in accordance with the Rental Rate Blue Book rate adjustment tables that are current at the time the force account is authorized. Equipment rental rates not modified by the adjustment factors or rate modifications indicated in the Rental Rate Blue Book will not be considered. Hourly rates for equipment on standby will be at 50 percent of the rate paid for equipment performing work. Operating costs shall not be included in the standby rate. For the purposes herein "standby time" is defined as the period of time equipment ordered to the jobsite by the Engineer is available on-site for the work but is idle for reasons not the fault of the Contractor or normally associated with the efficient and necessary use of that equipment in the overall operation of the work at hand.

Payment will be made for the total hours the equipment is performing work. When equipment is performing work less than 40 hours for any given week and is on standby, payment for standby time will be allowed for up to 40 hours, minus hours performing work. Payment will not be made for the time that equipment is on the project in excess of 24 hours prior to its actual performance in the force account work. An amount equal to the Rental Rate Blue Book estimated operating cost per hour will be paid for all hours the equipment is performing work. This operating cost shall be full compensation for fuel, lubricants, repairs, greasing, fueling, oiling, small tools, and other incidentals. No compensation will be paid for the use of machinery or equipment not authorized by the Engineer.

The Contractor will be paid freight cost covering the moving of equipment to and from the specific force account operation provided such cost is supported by an invoice showing the actual cost to the Contractor. However, such payment will be limited to transportation from the nearest source of available equipment. If equipment is not returned to the nearest equipment storage lot but is moved to another location, the freight cost paid will not exceed the cost of return to the nearest storage lot.

The rates for equipment not listed in the Rental Rate Blue Book schedule shall not exceed the hourly rate being paid for such equipment by the Contractor at the time of the force account authorization. In the absence of such rates, prevailing rates being paid in the area where the authorized work is to be performed shall be used.

If the Contractor does not possess or have readily available equipment necessary for performing the force account work and such equipment is rented from a source other than a company that is an affiliate of the Contractor, payment will be based on actual invoice rates, to which 15 percent of the invoice cost will be added for administrative cost and profit. If the invoice rate does not include the furnishing of fuel, lubricants, repairs, and servicing, the invoice rate will be converted to an hourly rate, and an amount equal to the Rental Rate Blue Book estimated operating cost per hour will be added for each hour the equipment is performing work.

5. **Miscellaneous:** No additional allowance will be made for attachments that are common accessories for equipment as defined in the Rental Rate Blue Book, general superintendents, timekeepers, secretaries, the use of small hand held tools or other costs for which no specific allowance is herein provided. The Contractor will receive compensation equal to the cost of the bond, special railroad insurance premiums, and other additional costs necessary for the specific force account work as determined by the Department. The Contractor shall supply documented evidence of such costs.
6. **Compensation:** The compensation as set forth in this Section shall be accepted by the Contractor as payment in full for work performed on a force account basis. At the end of each day, the Contractor's representative and the Inspector shall compare and reconcile records of the hours of work and equipment, labor and materials used in the work as ordered on a force account basis. Such accounting may not include actual costs or labor rates where these are not available but shall be used to verify quantities, types of materials or labor, and number and types of equipment.

If all or a portion of the force account work is performed by an approved subcontractor, the Contractor will be paid 10 percent of the subcontract net force account costs to cover the Contractor's profit and administrative cost. The amount resulting will not be subject to any further additives. The itemized statements of costs as required below shall be submitted on a form that separates the subcontracted portions of the force account labor, materials, and equipment from the other force account costs.

7. **Statements:** Payments will not be made for work performed on a force account basis until the Contractor has furnished the Engineer duplicate itemized statements of the cost of such work detailed as follows:
 - a. payroll indicating name, classification, date, daily hours, total hours, rate, and extension of each laborer, foreperson, and superintendent.
 - b. designation, dates, daily hours, total hours, rental rate, and extension for each unit of

equipment.

c. quantities of materials, prices, and extensions.

d. transportation of materials.

Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock; that the quantity claimed was actually used; and that the price, transportation, and handling claimed represented his actual cost.

(c) Payment for Significant Changes

When the Contractor alleges that there is a significant change as defined in Section 104.02, then, within a mutually agreed upon timeframe, he shall submit a request for the additional compensation, excluding anticipated profits for reduced or eliminated work, for such significant change. The Contractor's request shall be in sufficient detail to enable the Engineer to determine the basis for and extent of the Contractor's entitlement to additional compensation.

Failure on the part of the Contractor to furnish sufficient documentation or to qualify his reason for failure to do so will delay the determination of entitlement to additional compensation. If such delay occurs, it will in no way relieve the Contractor of his obligation to meet milestone dates, the Contract time limit, or other Contract requirements, or constitute the basis for a claim of any kind.

(d) Payment for Differing Site Conditions

When the Contractor encounters a differing site condition as defined in Section 104.03, then, within a mutually agreed upon timeframe, he shall submit a written request for the additional compensation, excluding anticipated profits, he seeks as a result of such condition. The Contractor's request shall be in sufficient detail to enable the Engineer to determine the basis for and extent of the Contractor's entitlement to additional compensation.

Failure on the part of the Contractor to furnish sufficient documentation or to qualify his reason for failure to do so will delay the determination of entitlement to additional compensation. If such delay occurs, it will in no way relieve the Contractor of his obligation to meet the Contract time limits or other Contract requirements or constitute basis for a claim of any kind.

If the Engineer determines that the conditions materially differ and cause an increase or decrease in the cost required for the performance of any of the Work, an adjustment, excluding anticipated profits, will be made and the Contract may be modified accordingly.

(e) Payment for Compensable Delay

The Contractor is entitled to compensation for a compensable delay. Compensable delays are critical delays that are not the Contractor's fault or responsibility and are the District's fault or responsibility. Compensable delays may include, but are not limited to:

- Delays due to alteration of quantities or character of work according to 104.02.
- Delays due to differing site conditions according to 104.03.
- Delays due to an Engineer-ordered suspension according to 108.05.
- Delays due to the acts or omissions of the District or its failure to act in a timely manner. The following delays are not compensable:
 - Acts or omissions of the Contractor, its agents, employees, subcontractors or suppliers or causes within their control; or conditions that the Contractor could reasonably have foreseen or avoided.
 - Floods, tidal waves, tornadoes, hurricanes, lightning strikes, earthquakes, fires, epidemics, or similar natural phenomena.
 - Normal adverse weather.
 - Extraordinary, unforeseen, and unavoidable delays in material deliveries.
 - Acts of government entities other than the District.
 - Unforeseen and unavoidable industry-wide labor strikes affecting the Contractor or its subcontractors' or suppliers' workforce that are beyond the Contractor's control.
 - Actions of third parties that are not the responsibility of the Contractor or within its or the District's control.
 - Civil disturbances or sovereign acts of the State, including but are not limited to states of emergency or epidemic or quarantine restrictions.

To request payment for a compensable delay, the Contractor shall within 14 days after the end date of a delay event, unless directed otherwise in writing by the Engineer, submit a written request for a change order for the Engineer's approval. With the request, the Contractor shall submit a Schedule Impact Analysis (SIA) and all supporting data to objectively substantiate its request. The Engineer will evaluate the Contractor's SIA and all supporting data to determine entitlement and the appropriate amount of compensation.

109.06 – Not Used

109.07—Eliminated Items

If all or a part of any Contract item is determined to be unnecessary for the proper completion of the Work, the District may, upon written notice to the Contractor and issuance of an appropriate change order, eliminate all or part of such item from the Contract. Payment will not be made for such item except that the Contractor will be compensated for the actual cost of any work performed for such item and the net cost of materials purchased, including freight and tax costs, as evidenced by invoice. No additional compensation will be made for overhead or anticipated profit.

109.08—Partial Payments

(a) General

Partial payments will be based on a monthly progress estimate consisting of approximate quantities and value of work performed as determined by the Engineer. When the method of measurement for a Contract item is in units of each or lump sum, the value of work accomplished for partial payment will be determined on a pro rata basis. Partial payments will be made once each month for the work performed in accordance with the Contract requirements. The Contractor will be given the opportunity to review the monthly progress estimate prior to each partial payment. Upon final acceptance, one last monthly estimate will be prepared and any additional payment due will be submitted for payment.

For contracts without a payment bond, the Contractor shall submit to the Engineer a letter from each materials supplier and subcontractor involved stating that the Contractor has paid or made satisfactory arrangements for settling all bills for materials and subcontracted work that was paid on the previous month's progress estimate. The District will use the source of supply letter and approved subletting request to verify that certifications have been received for work that was paid on the previous monthly estimate. The Contractor shall furnish these and other certificates as are required as a prerequisite to the issuance of payment for the current monthly estimate.

The District may withhold the payment of any partial or final estimate voucher or any sum(s) thereof from such vouchers if the Contractor fails to make payment promptly to all persons supplying equipment, tools, or materials; or for any labor he uses in the prosecution of the Contract work. Unless otherwise provided under the terms of the Contract, interest shall accrue at the rate of one percent per month.

(b) Payment to Subcontractors

Upon District payment of the subcontractor's portion of the work as shown on the monthly progress estimate and the receipt of payment by the Contractor for such work, the Contractor shall make compensation in full to the subcontractor. For the purposes of this Section, payment of the subcontractor's portion of the Work shall mean that payment has been issued for that portion of the Work that was identified on the monthly progress estimate for which the subcontractor has performed service.

Payment to subcontractors shall be in accordance with the provisions of Code of Virginia §2.2- 4354 and § 2.2-4355. The Contractor shall take one of the following two actions within 7 days after receipt of payment from the District for the subcontractor's portion of the Work as shown on the monthly progress estimate:

1. Pay the subcontractor for the proportionate share of the total payment received from the agency attributable to the Work performed by the subcontractor; or
2. Notify the District and subcontractor, in writing, of his intention to withhold all or a part of the subcontractor's payment along with the reason for nonpayment.

In the event payment is not made as required, the Contractor shall pay interest at the rate of one percent per month, unless otherwise provided in the Contract, to the subcontractor on all amounts that remain unpaid after 7 days, except for the amounts withheld as provided in this Section. The Contractor shall include in each of its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower tier subcontractor.

If the Contractor fails to make payment to the subcontractor within the time frame specified herein, the subcontractor shall notify the Engineer and the Contractor's bonding company.

(c) Retainage

If the Engineer determines the Contractor's progress is unsatisfactory according to Section 108.03 or other applicable Contract documents, the Engineer will send a notice of unsatisfactory progress to the Contractor advising him of such determination. This notification will also advise the Contractor that five percent retainage of the monthly progress estimate is being withheld and will continue to be withheld for each month the Contractor's actual progress is determined to be unsatisfactory.

When the Engineer determines that the Contractor's progress is satisfactory in accordance with these requirements, the 5 percent retainage previously withheld because of unsatisfactory progress will be released in the next monthly progress estimate, and the remaining monthly progress estimates will be paid in full provided the Contractor's progress continues to be satisfactory.

109.09—Payment for Material on Hand

When requested in writing by the Contractor, payment allowances may be made for materials secured for use on the project and required to complete the project. Such material payments will be made for only those actual quantities of materials identified in the Contract, approved change orders, or otherwise authorized and documented by the Engineer based on delivery tickets, bills of lading, or paid invoices. All such payments shall be in accordance with the following terms and conditions:

- (a) **Structural Steel or Reinforcing Steel:** An allowance of 100 percent of the cost to the Contractor for structural steel **or reinforcing steel** materials secured for fabrication not to exceed 60 percent of the Contract price may be made when such material is delivered to the fabricator and has been adequately identified for exclusive use on the project. The provisions of this section for steel reinforcement will only apply where the quantity of steel reinforcement is identified as a separate and distinct bid item for payment. An allowance of 100 percent of the cost to the Contractor for superstructure units and reinforcing steel, not to exceed 90 percent of the Contract price, may be made when fabrication is complete. Prior to the granting of such allowances, the materials and fabricated units shall have been tested or certified and found acceptable to the District and shall have been stored in accordance with the requirements specified herein. Allowances will be based on invoices, bills, or the estimated value as approved by the Engineer and will be subject to the retainage requirements of Section 109.08. For the purposes of this section fabrication is defined as any manufacturing process such as bending, forming, welding, cutting or coating with paint or anti-corrosive materials which alters, converts, or changes raw material for its use in the permanent finished work.
- (b) **Other Materials:** For aggregate, pipe, guardrail, signs and sign assemblies, and other nonperishable material, an allowance of 100 percent of the cost to the Contractor for materials, not to exceed 90 percent of the Contract price, may be made when such material is delivered to the project and stockpiled or stored in accordance with the requirements specified herein. Prior to the granting of such allowances, the material shall have been tested and found acceptable to the District. Allowances will be based on invoices, bills, or the estimated value of the material as approved by the Engineer and will be subject to the retainage provisions of Section 109.08.
- (c) **Excluded Items:** No allowance will be made for fuels, form lumber, falsework, temporary structures, or other work that will not become an integral part of the finished construction.

Additionally, no allowance will be made for perishable material such as cement, seed, plants, or fertilizer.

- (d) **Storage:** Material for which payment allowance is requested shall be stored in an approved manner in areas where damage is not likely to occur. If any of the stored materials are lost or become damaged, the Contractor shall repair or replace them at no additional cost to the District. Repair or replacement of such material will not be considered the basis for any extension of Contract time. If payment allowance has been made prior to such damage or loss, the amount so allowed or a proportionate part thereof will be deducted from the next progress estimate payment and withheld until satisfactory repairs or replacement has been made.

When it is determined to be impractical to store materials within the limits of the project, the Engineer may approve storage on private property or, for structural units and reinforcing steel, on the manufacturer's or fabricator's yard. Requests for payment allowance for such

stored material shall be accompanied by a release from the owner or tenant of such property or yard agreeing to permit the removal of the materials from the property without cost to the District. The District must be allowed access to the materials for inspection during normal business hours.

- (e) **Materials Inventory:** If the Contractor requests a payment allowance for properly stored material, he shall submit a certified and itemized inventory statement to the Engineer no earlier than 5 days and no later than 2 days prior to the progress estimate date. The statement shall be submitted to the District and shall be accompanied by supplier's or manufacturer's invoices or other documents that will verify the material's cost. Following the initial submission, the Contractor shall submit to the Engineer a monthly-certified update of the itemized inventory statement within the same time frame. The updated inventory statement shall show additional materials received and stored with invoices or other documents and shall list materials removed from storage since the last certified inventory statement, with appropriate cost data reflecting the change in the inventory. If the Contractor fails to submit the monthly-certified update within the specified time frame, the Engineer will deduct the full amount of the previous statement from the progress estimate.

At the conclusion of the project, the cost of material remaining in storage for which payment allowance has been made will be deducted from the progress estimate.

109.10—Final Payment

When final acceptance has been duly made by the Engineer as provided for in Section 108.09 the Engineer will prepare the final statement of the quantities of the items of work performed. Thereafter, the Contractor will be afforded 10 days in which to review the final estimate before payment. The

time may be extended by mutual agreement, and the extension added to the 90-day criteria set forth within this Section.

Prior partial estimates and payments shall be subject to correction in the final estimate and payment.

For Contracts not requiring a payment bond, the Contractor shall certify to the District that he has paid or made satisfactory arrangements for settling all bills for materials, labor, equipment, supplies, and other items entering into or used on the work and shall furnish other certificates as are required by the District as a prerequisite to the issuance of final payment.

Failure by the Contractor to provide required information and certifications will extend the 90-day period for final payment by the number of days equivalent to the delay attributable to the Contractor.

Upon review of the final estimate by the Contractor and approval by the Engineer, the Contractor will be paid the entire sum due after previous payments are deducted and other amounts are retained or deducted under the provisions of the Contract. Final payment will become due within 90 days after final acceptance.

Interest will accrue on the amount the District owes to the Contractor that remains unpaid after 7 days following the 90-day payment date. The rate of interest will be the base rate on corporate loans (prime rate) at large U.S. money center commercial banks as reported daily in The Wall Street Journal. When a split rate is published, the lower of the two rates shall be used. The rate effective on the 91st day following final acceptance will be applicable throughout the period of time for which interest is paid. However, in no event shall the rate of interest paid exceed the rate of interest established pursuant to the Code of Virginia. The period subject to payment of interest will begin on the 91st calendar day after final acceptance and will extend through the date of the payment of the final estimate.

When the payment date is delayed beyond the 90-day period by the fault of the Contractor and monies are due the District, the Contractor will be assessed annual interest on the balance due the District for the time delay attributable to the Contractor. The rate of interest will be determined as specified hereinbefore. The District may deduct monies owed to the District from the final payment. If the final payment is insufficient, monies owed to the District will become due and payable within 30 days of Contractor's receipt of a certified letter giving notification of the amount owed. The Contractor will be assessed annual interest at the rate determined as specified within this Section for any balance that remains unpaid after 37 days from receipt of the letter.

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Samples for Initial Selection: For components with factory-applied finishes.

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.

1.3 DELIVERY, STORAGE, AND HANDLING

- ##### A.
- Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other cases:

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- ##### A.
- Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.
3. Fire Classification: Class A.

- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.2 ACOUSTICAL PANELS

A. Acoustical Panels:

- 1. Acoustical Panel Standard: Provide manufacturer's standard mineral-fiber acoustical panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- 2. Basis of design product: USG Fifth Avenue Fissured 562 series Acoustical Panels or approved equal.
- 3. Classification: Provide panels as follows:
 - a. Type and Form: 2' X 2' acoustical lay-in.
 - b. Pattern: Medium-textured, fissured.
- 4. Color: Flat white.
- 5. Light Reflectance (LR): Not less than 0.81.
- 6. Ceiling Attenuation Class (CAC): Not less than 33.
- 7. Noise Reduction Coefficient (NRC): Not less than 0.55.
- 8. Edge/Joint Detail: Square edge.
- 9. Thickness: 5/8 inch.

2.3 METAL SUSPENSION SYSTEM

A. Exposed Metal Suspension System:

- 1. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.
 - a. 15/16 in. exposed tee, hot-dipped galvanized steel grid with painted aluminum cap, Flat White.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.

- C. Hold-Down Clips: Manufacturer's standard hold-down.

2.5 METAL EDGE MOLDINGS AND TRIM

A. Metal Edge Moldings and Trim:

1. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - a. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less than half width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

- A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.

- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 2. Install hold-down clips in areas indicated; space in accordance with panel manufacturer's written instructions unless otherwise indicated.
 - a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 230000 - MECHANICAL AND PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Conditions, Supplementary General Conditions, and Special Conditions of this Contract form a part of this Division of Specification.
- B. This section forms a part of all sections under, Division 22 Plumbing, Division 23 Heating, Ventilating, and Air Conditioning.
- C. Requirements herein augment or clarify articles specified under aforementioned General and Special Conditions.

1.2 CODES AND STANDARDS

- A. Latest effective publications of applicable codes and ordinances of VUSBC and of the following standards, codes, etc., as they apply, form part of these specifications as if were written fully herein. The publication date is the publication in effect as of the bid date, except when a specific publication date is listed. These will be referred to throughout in abbreviated form.
 - 1. Virginia Uniform Statewide Building Code (VUSBC)
 - 2. National Fire Protection Association (NFPA)
 - 3. Factory Mutual Engineering Association (FM)
 - 4. Underwriters' Laboratories, Inc. (UL)
 - 5. Occupational Safety and Health Administration (OSHA)
 - 6. American Society of Mechanical Engineers (ASME)
 - 7. American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)
 - 8. Air Conditioning and Refrigeration Institute (ARI)
 - 9. American National Standards Institute (ANSI)
 - 10. American Society for Testing and Materials (ASTM)
 - 11. Health Care Facilities Handbook
 - 12. American Welding Society (AWS)
 - 13. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS)
 - 14. Air Movement and Control Association, Inc. (AMCA)
 - 15. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA)
 - 16. American Gas Association (AGA)
 - 17. Electrical Testing Laboratories (ETL)
 - 18. Americans with Disabilities Act (ADA)
 - 19. Virginia Mechanical Code
 - 20. Virginia Plumbing Code
 - 21. ASHRAE

1.3 PERMITS, INSPECTIONS, FEES AND NOTICES

- A. Unless modified by the General Conditions and Supplementary Conditions, work is to be executed and inspected in accordance with governing codes, laws, ordinances, rules, and regulations as applicable to particular class of work, and fees in connection therewith are to be paid by this Contractor.
- B. Unless otherwise noted, this Contractor is to arrange for project inspection, and paying charges pertaining hereto. The Contractor shall give The District requisite notice relating to work under his charge, shall afford Engineer and authorized inspectors every facility for inspection and shall be responsible for violations of law. Upon completion of work, he shall have work inspected, if required.

1.4 SCOPE OF WORK

- A. Work required for Division 22 Plumbing, Division 23 Heating, Ventilating, and Air Conditioning shall include labor, materials, equipment, appurtenances, and services to provide first class working systems, tested and ready for operation. Installation shall conform to the drawings and specifications, incorporating the best standards of workmanship. Materials shall be new and of good quality, and labor shall be performed by skilled mechanics under the direction of a competent superintendent.

1.5 DRAWINGS AND SPECIFICATIONS

- A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable mechanical systems complete in every respect.
- B. Apparatus, appliance, material or work not shown on drawings but mentioned in the specifications, or vice versa, or incidental accessories necessary to make the work complete and ready for operation, even if not particularly specified, shall be provided by the Contractor without additional expense to the Owner.
- C. Contractor shall examine and consult drawings and specifications of other trades to better familiarize himself with the character of construction and include in his bid work of his trade shown or reasonably inferred. He shall consult the drawings and specifications of other trades in installing his work.
- D. This Contractor shall be thoroughly familiar with specified products relating to his work and shall submit written objections prior to bid if he objects to the proposed use of any product.
- E. Should structural difficulties prevent the installation of piping, ductwork, fixtures, or equipment at the points shown on the drawings, necessary deviations therefrom, as determined by the Engineer, will be permitted and shall be made without additional cost. This Contractor shall work with other Contractors and arrange his work so as not to interfere with the work of other Contractors.
- F. Drawings are diagrammatic, intending to show general arrangement and location of system components, with no attempt made to show every ell, tee, fitting, etc. Due to the small scale of

the drawings, and to unforeseen job conditions, required offsets and fittings may not be shown but shall be provided at no change in Contract price. Ducts and pipes shall be run in spaces indicated as job conditions warrant, arranged for most convenient access for servicing, with due consideration given to swing joints and to other Contractor's work. If departures from the contract drawings are deemed necessary, Contractor shall submit details of such departures and the reasons therefor as soon as practicable after award of contract to the Engineer for approval. Make no such departures without prior written approval of the Engineer.

- G. Contractor shall maintain on site a current set of drawings and specifications.
- H. In case of conflicting information on the drawings and/or in the specifications, the proper interpretation shall be made by the Engineer.
- I. Disagreements occurring between trades covering various phases of the work shall be referred to General Contractor for decision.
- J. Changes and additions to scope of the work under this contract shall be submitted to the Engineer and his written approval obtained before proceeding with the changed work.

1.6 WORDING

- A. Specifications are of simplified form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "shall be", "provide", "furnish", "a", "an", "the" is intentional. Omitted words or phrases shall be supplied by inference.

1.7 DEFINITIONS

- A. "Provide": To furnish, erect, install, and connect up complete and ready for regular operation, particular work referred to, unless specifically indicated or specified otherwise.
- B. "Work": Labor and materials, or both, including apparatus, controls, accessories, and other items necessary or required to provide a complete installation.
- C. "Piping": Pipe and fittings, flanges, valves, controls, hangers, traps, drains, insulation, and items necessary or required in connection with or relating to such piping to provide a complete installation.
- D. "Concealed": Embedded in masonry or other construction, installed behind wall furring, within double partitions or above hung ceilings, in trenches, tunnels, or crawl spaces.
- E. "Exposed": Not installed underground or "concealed" as defined above.
- F. "Indicated" or "Shown": As indicated or shown on drawings.
- G. "Noted": As indicated on drawings and/or specified.
- H. "Contract" or "this Contract" shall consist of documents listed in the Contractor Agreement and Supplemental Agreements, data or drawings which could reasonably be required to complete

the work. This shall be considered as one instrument and referred to collectively as the "Contract Documents".

- I. Whenever the words "as shown" or "indicated" are used in the description of any part of the work, it shall be understood to mean as shown on the contract drawings, unless another meaning is plainly indicated or noted.

1.8 SUBMITTALS

A. Products List:

1. Within 15 days after Contract Award Date, submit to Engineer a complete list of major products proposed to be used, with the name, address, and phone number of the manufacturer, manufacturer's representative, and the installing subcontractor.

- ### B. Submit Shop Drawings, Product Data and Samples within thirty (30) days of award of contract and in accordance with the General Conditions and Supplementary Conditions. All interdependent equipment shall be submitted simultaneously. Submittals are required for items provided under this specification. Review of submittals by the Engineer and associated action taken by the Engineer does not relieve the Contractor of requirements set forth by the contract documents.

- ### C. Submittals shall clearly indicate all features, options, capacities, etc. to show compliance with the drawings and specifications.

D. The Contractor Shall:

1. Coordinate submittal with requirements of the work and of the Contract Documents.
2. Notify the Engineer in writing, at time of submission, of deviations in the submittals from requirements of the Contract Documents.
3. Begin no fabrication or work which requires submittals until return of submittals with Engineer approval.
4. Make submittals promptly and in such sequence as to cause no delay in the work or in the work of other Contractors.
5. Package inter-related submittals together and submit simultaneously. This is especially important for pumps, chillers, boilers, air handlers and hydronic specialties.

- ### E. Drawings prepared by the Contractor, for the Contractor's use, shall be submitted. Such drawings include, but are not limited to: duct fabrication and layout drawings, fire protection piping and layout drawings, equipment layout drawings, coordination drawings, and drawings of miscellaneous details. Such drawings shall be submitted for information purposes only.

F. Prepare Product Data as Follows:

1. Clearly mark each copy to identify pertinent products or models.
2. Show performance characteristics and capacities.
3. Show dimensions and clearances required.
4. Show wiring diagrams, piping diagrams and controls.

- G. Prepare manufacturer's standard schematic drawings and diagrams as follows:
 - 1. Modify drawings and diagrams to delete information which is not applicable to the work.
 - 2. Supplement standard information to provide information specifically applicable to the work.
- H. Prepare office samples of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 - 2. Full range of color, texture and pattern.
- I. Submittals shall contain:
 - 1. The date of submission and of any previous submissions.
 - 2. The project title and number.
 - 3. Contract or project identification.
 - 4. The names of:
 - a. Contractor.
 - b. Supplier.
 - c. Manufacturer.
 - 5. Identification of the product, and specification section.
 - 6. Field dimensions, clearly identified as such.
 - 7. Relation to adjacent or critical features or materials.
 - 8. Applicable standards.
 - 9. Identification of deviations from Contract Documents.
 - 10. Identification of non-complying features and reason for the non-compliance. The reason shall be specific in nature.
 - 11. Identification of revisions on resubmittals.
 - 12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.
- J. Submittals of Mechanical and Plumbing Equipment requiring maintenance shall be accompanied by three (3) sets of the manufacturers' standard Operating and Maintenance Instructions and Parts Lists. A bound manual with an index and identification tabs shall be prepared for each set. These are to be retained by Contractor, until completion of job, at which time they will be assembled and turned over to the Engineer.

1.9 MANUFACTURER'S INSTRUCTIONS

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Engineer.

1. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements.
 1. Perform work in accordance with manufacturer's instructions. Do not omit any preparatory steps or installation procedure unless specifically modified or exempted by Contract Documents.
 2. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
 3. Do not proceed with work without clear instructions.

1.10 ADDITIONAL REQUIREMENTS

- A. All equipment and appliances that comprise part of the building mechanical systems regulated by the Virginia Mechanical Code shall be listed and labeled in accordance with the Virginia Mechanical Code.
- B. All listed and labeled equipment shall be installed in accordance with its listing label, manufacturer's installation instructions, and the Virginia Mechanical Code.
- C. Manufacturer's installation instructions shall be available at the job site for use and inspection.

PART 2 - PRODUCTS

2.1 MANUFACTURING STANDARDS

- A. Materials shall be new and designed and/or constructed for their intended use and application. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of the Engineer. Materials to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. All items of the same type and rating shall be identical.

2.2 ELECTRICAL REQUIREMENTS

- A. Except as otherwise detailed or specified, all interconnecting power wiring required to operate electrical devices and equipment furnished in this Division will be provided under Division 26 Electrical.
- B. All controllers, motors, and starters, etc. shall be as specified under this Division of the specifications and furnished with equipment under this Division. If there is no specification for motors and controllers under this Division, then motors and controllers shall be as defined under the electrical provisions of the specifications. Starters and controllers that are not mounted on the equipment shall be turned over to the Electrical Contractor for installation.

- C. Disconnect switches shall be provided under Division 26 Electrical unless specified in Division 22 Plumbing and/or Division 23 Heating, Ventilating, and Air Conditioning as integral with equipment.
- D. Requirements for electrical apparatus, devices, controls, etc. furnished in this Division shall conform to Division 26 Electrical if not established under this Division.
- E. Control and interlock, wiring and conduit required for electrical devices and equipment furnished in this Division will be provided under this Division.

2.3 MOTORS AND MOTOR CONTROLS

- A. All motors furnished as a part of the work of this Division, unless otherwise specified, shall be furnished by the manufacturer of the equipment served and shall be mounted and aligned so as to run free and true.
- B. All motors shall be provided with a terminal box of adequate size to accommodate the required conduit and wiring. Wire nuts and lugs will be provided under Division 26 Electrical.

PART 3 - EXECUTION

3.1 SCHEDULE OF WORK

- A. The schedule of the mechanical work shall be arranged to suit the progress of work by the other trades and shall in no way retard progress of construction of the Project.
- B. Work under this Division shall proceed in advance of the work of others whenever possible, eliminating cutting and patching. When such procedure is impossible, cutting and patching shall be done in an approved manner. Cutting shall not endanger structural function of the building. Patching shall match existing work. Actual work of cutting and patching of existing surfaces shall be performed by the subcontractor who originally prepared these surfaces, e.g., cutting and patching of masonry wall will be performed by the masonry subcontractor. Cutting shall be carefully done and damage to building, piping, wiring or equipment as a result of cutting shall be repaired by skilled mechanics of trade involved. Each Contractor shall furnish sketches showing locations and sizes of all openings, chases, etc. required for installation of his work.
- C. Contractor shall furnish and locate sleeves and inserts required before floors and walls are built. Contractor shall coordinate all drilling required for installation of his hangers.
- D. Exposed piping and ductwork shall be completely installed and ready for painting by General Contractor. Any incorrect and added work installed by Mechanical Contractor after the General Contractor has painted the areas shall be painted at no additional cost to the Owner.
- E. Contractor must cooperate completely with Contractors providing equipment under other Divisions of the specifications. This is particularly important in accordance with Division 26 Electrical.

F. Space Priority:

1. Ensure equitable use of available space for materials and equipment installed above ceilings. Allocate space in the order of priority as listed below. Items are listed in the order of priority, with items of equal importance listed under a single priority number.
 - a. Gravity flow piping systems.
 - b. Vent piping systems.
 - c. Ceiling recessed lighting fixtures.
 - d. Concealed air terminal units, fans.
 - e. Air duct systems.
 - f. Sprinkler systems piping.
 - g. Forced flow piping systems.
 - h. Electrical conduit, wiring, control wiring.
2. Order of priority does not dictate installation sequence. Installation sequence shall be as mutually agreed by all affected trades.
3. Change in order of priority is permissible by mutual agreement of all affected trades.
4. The work of a particular trade shall not infringe upon the allocated space of another trade without permission of the Contractor for the affected trade.
5. The work of a particular trade shall not obstruct access for installation, operation and maintenance of the work, materials and equipment of another trade.

G. Installation

1. Inaccessible Equipment:
 - a. Where the end user determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the end user.
 - b. The term "conveniently accessible" is defined as capable of being reached without the use of ladders 2'-0" greater than the ceiling height, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork. Equipment above ceilings shall be within 12" of top of ceiling.

3.2 BUILDING OPENINGS FOR ADMISSION OF EQUIPMENT

- A. Contractor shall ascertain from his examination of the building whether any special temporary openings in the building for the admission of apparatus furnished under this Contract will be necessary, and he shall notify the Engineer accordingly. Failure to give this notification in sufficient time for Engineer to arrange for same during construction shall not incur any additional cost to the Owner.

3.3 WORK IN EXISTING BUILDINGS

- A. Work in existing buildings must be scheduled during times when the buildings are occupied. Systems serving the existing building(s) must be kept operative at all times. Temporary system shutdown shall be approved by the Owner prior to actual shutdown.
- B. Fixtures, equipment, piping, etc. that are removed and not indicated "to be reused" are to become property of the Contractor and shall be removed from the building site.
- C. Demolition drawings indicate approximate location, size and quantity of piping: Minor variations in location of piping exposed by removal of walls or openings in walls and required to maintain an operating system shall be relocated as directed at no additional expense to the Owner. Piping not required to maintain an operating system shall be removed. The Mechanical Contractor shall be responsible for the piping work involved in cutting required for all trades.
- D. Cutting and patching will be performed by the General Contractor. Contractor shall furnish sketches showing locations, and sizes of openings, chases, etc. required for installation of his work.

3.4 STORAGE AND PROTECTION

- A. Work, fixtures, equipment, and materials shall be protected at all times. The Contractor shall make good damage caused, whether directly or indirectly, by the workmen. Work shall be properly protected to prevent destruction or damage. Pipe and ductwork openings shall be closed with caps and plugs or plastic sheeting during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemical, and mechanical injury.
- B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weathertight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
- C. Exterior Storage:
 - 1. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
 - 2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- D. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

E. Protection After Installation:

1. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

3.5 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

3.6 CLEANING

A. Contractor shall be responsible for keeping the premises free of shipping cartons, crates, material scrap, pipe cuttings, etc. related to his work. Floors shall be protected with leakproof pans where pipe cutting or threading operations are in progress.

B. Prime coated equipment, insulation, piping, and pipe covering shall be left dust-free where painting is not required. Thorough cleaning shall be done where painting is required.

C. Factory finished painted equipment shall be washed with mild soap and water and left in first class condition, entirely free of stains or streaks. Abrasive materials shall not be used.

D. Plumbing fixtures shall be cleaned with mild soap and water containing a disinfecting agent. Trim handles shall be set at same angle and trim shall be polished. Aerators shall be removed, cleaned and reinstalled after piping has been cleaned and disinfected. Pop-up wastes shall be checked for proper operation.

E. Sumps, pits, trenches, manholes, catch basins, and floor drains shall be cleaned and left free of foreign material.

3.7 ELECTRICAL REQUIREMENTS

A. Except as otherwise detailed or specified, all electrical devices, apparatus, etc., furnished in this Division, but which are not integral with the equipment served, will be installed under Division 26 Electrical.

3.8 EQUIPMENT CONNECTIONS

- A. Contractor shall connect equipment and/or fixtures requiring piping or plumbing connections.
- B. Equipment not particularly specified in this Division of the specification is either specified under other Divisions of these specifications, or furnished by the Owner: Plumbing work in connection therewith is to be included under this Division unless otherwise indicated. Contractor shall carefully examine drawings and other Divisions of the specifications and shall provide roughing-in, including traps, to connect this equipment to the piping or plumbing system, and leave ready for use and operation, with stops, supplies, etc.
- C. Connections to equipment shall be in accordance with shop drawings to be furnished by the equipment supplier.

3.9 SYSTEM START-UP

- A. Provide material and labor required to perform start-up of equipment and system prior to beginning of test, adjust and balance procedures.
- B. Prior to start of balancing, this Contractor shall review balancing test procedures with the Engineer. Contractor shall provide information and assistance as required in cooperation with the test, adjust and balance service.
- C. Start-up procedures shall be as follows:
 - 1. Replace items which are defaced, broken, or which read incorrectly.
 - 2. Repair damaged insulation.

3.10 COMPLETION OF WORK

- A. Record Drawings:
 - 1. During construction, the Contractor shall keep an accurate record of deviations between the work as shown on the contract drawings and that which is actually installed. He shall secure a set of blue line prints of the plumbing and mechanical drawings for this purpose, and note changes thereon in red ink, in a neat and accurate manner, thus making a complete record of all changes and revisions in the original design which exist in the completed work. The cost of furnishing above prints and preparing these record drawings shall be included in the contract price by the Mechanical Contractor. When revisions have been shown on these prints to indicate the work as installed, the prints shall be delivered to the Engineer, before final payment.

3.11 GUARANTEE OF WORK

- A. Contractor guarantees by his acceptance of the contract that work installed is free from defects in workmanship and/or materials, and that the apparatus will develop capacities and

characteristics specified. If, during the period of two years or as otherwise specified from date of certificate of completion, defects in workmanship, material or performance appear, he will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from Engineer. In default thereof, the Owner may have such work done and charge cost to Contractor. **Equipment guarantees from date of "start-up" or "delivery" will not be recognized.**

- B. Comply, also, with the General Conditions and the Supplementary Conditions and the applicable Sections of Division 01 General Requirements.
- C. This Contractor shall service the installation for two years from date of substantial completion. This shall include emergency service and adjustment, with the exception of the oiling of motors and cleaning of filters and screens.

END OF SECTION 230000

SECTION 230500 – MECHANICAL AND PLUMBING BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions apply to work of this section.

1.2 WORK INCLUDED

- A. Piping and equipment identification.
- B. Fabricated steel supports.

1.3 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referenced to in the text by the basic designation only.
 - 1. American Institute of Steel Construction (AISC).
 - 2. American National Standards Institute (ANSI) Standards.
 - 3. American Society for Testing and Materials (ASTM) Publications.
 - 4. American Welding Society (AWS) Publications.
 - 5. Underwriters' Laboratories, Inc. (UL) Standards.

1.4 SUBMITTALS

- A. Submit product data for the following:
 - 1. Piping and equipment identification.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Piping and Equipment Identification
 - 1. Seton Name Plate Corp.
 - 2. W. H. Brady Co., Signmark Division
 - 3. Communications Technology Corp.

2.2 PIPING AND EQUIPMENT IDENTIFICATION

- A. Pipe markers shall be sub-surface printed plastic, with protective undercoating. Markers shall be permanently curled for snap-on installation and shall identify the pipe contents and direction of flow through 360 degree visibility range. Marker size and letter color and size, shall be in accord with ANSI A13.1. Background color shall be as follows:
 - 1. A/C Condensate Drain - Green.
 - 2. Refrigerant Liquid and Suction - Safety Yellow.
 - 3. Marker wording shall be in accord with legend on drawings. Markers for outdoor installation shall be covered with outdoor grade acrylic plastic.
- B. Equipment nameplates shall be 1/16 inch thick plastic with black satin surface and white core. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering. Equipment identifying name and number shall be in accord with schedules on drawings. Plate manufacturer shall furnish nameplates with pre-drilled holes for permanently attaching plate to equipment with self-tapping screws or rivets.

2.3 FABRICATED STEEL SUPPORTS

- A. Steel angles, channels, and plate shall be hot dipped galvanized steel where used indoors, conforming to ASTM A36/A36M and A123/123M.
- B. Bolts, including nuts and washers, used for fabricating steel members where used indoors shall be in accord with ASTM A307 and F2329/2329M.
- C. Welding of steel members shall be in accord with AWS D1.1.
- D. Steel members, including fasteners, used outdoors shall be Type 316 or 316L stainless conforming to ASTM A240/A240M, ASTM A276/A276M, or ASTM A1069/A1069M..

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation of materials and equipment shall be in accord with the manufacturer's written instructions, except as specified.

3.2 PIPING AND EQUIPMENT IDENTIFICATION

- A. Install pipe markers adjacent to each shutoff valve, at each branch connection, at equipment, on each side of wall, floor, and ceiling penetrations, and at intervals not more than 40 feet on horizontal and vertical pipe runs.

- B. In mechanical equipment rooms and equipment areas, install pipe markers adjacent to each piece of equipment, on each side of wall, floor, and ceiling penetrations, and at intervals not more than 20 feet on all pipe runs.

3.3 FABRICATED STEEL SUPPORTS

- A. Fabricated steel supports may be shop or field-fabricated, and shall be in accord with details on drawings or as required.
- B. Steel members shall be saw cut, with corners ground smooth, and shall be assembled with welded or bolted connections at Contractor's option. Connections shall be in accord with specified AISC Publications.

3.4 PLACING OF EQUIPMENT

- A. Coordinate setting of equipment with the requirements of other trades so as to avoid conflicts and to insure compatibility. Equipment shall not block access for installation of other equipment.
- B. Set base mounted equipment on permanent and finished supports. Temporary support, if any, shall be removed prior to making final pipe, duct, or electrical connections to equipment.

END OF SECTION 230500

SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves.
2. Sleeve-seal systems.
3. Grout.

1.2 ACTION SUBMITTALS

- A. No submittals are required for this Section.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Galvanized-Steel Wall Sleeves: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- B. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- C. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Advance Products & Systems, Inc.
 2. CALPICO, Inc.
 3. Metraflex Company (The).
 4. Pipeline Seal and Insulator, Inc.
 5. Proco Products, Inc.
- B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.

2. Pressure Plates: 316 stainless steel.
3. Connecting Bolts and Nuts: 316 stainless steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
 1. Sleeves are not required for core-drilled holes.
- C. Fire-Rated Construction Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping as specified. The installation of sleeves shall only be permitted in fire-rated partitions if sleeves are part of an approved UL through-penetration fire stopping assembly. The type and installation method of the sleeve shall be in accordance with the approved UL through-penetration fire stopping assembly.
- D. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
 2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- E. Install sleeves for pipes passing through interior partitions.
 1. Cut sleeves to length for mounting flush with both surfaces.

2. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants as specified.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6: 316 stainless-steel wall sleeves.
 2. Interior Partitions:
 - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.

END OF SECTION 230517

SECTION 230719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following HVAC piping systems:

1. Condensate drain piping.
2. Heating hot-water piping.
3. Refrigerant suction and hot-gas piping.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of insulation indicated.

1.3 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- D. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

- E. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Aeroflex USA, Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.
- F. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000-Degree Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 3. Type II, 1200 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 4. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Knauf Insulation; Permawick Pipe Insulation.
 - b. Owens Corning; VaporWick Pipe Insulation.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

- B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-84.
 - 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Aeroflex USA, Inc.; Aeroseal.
 - b. Armacell LLC; Armaflex 520 Adhesive.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
 - d. K-Flex USA; R-373 Contact Adhesive.
 - 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
 - b. Eagle Bridges - Marathon Industries; 225.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
 - d. Mon-Eco Industries, Inc.; 22-25.
 - 2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- E. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
 - b. Eagle Bridges - Marathon Industries; 225.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
 - d. Mon-Eco Industries, Inc.; 22-25.
 - 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- F. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 739, Dow Silicone.
 - b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Polyco VP Adhesive.
 - 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
 - 1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.

- b. Knauf Insulation.
 - c. Vimasco Corporation; 749.
 - 2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 - 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
 - b. Eagle Bridges - Marathon Industries; 550.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
 - d. Mon-Eco Industries, Inc.; 55-50.
 - e. Vimasco Corporation; WC-1/WC-5.
 - 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: 60 percent by volume and 66 percent by weight.
 - 5. Color: White.

2.5 SEALANTS

A. Joint Sealants:

- 1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
 - b. Eagle Bridges - Marathon Industries; 405.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
- 2. Materials shall be compatible with insulation materials, jackets, and substrates.
- 3. Permanently flexible, elastomeric sealant.
- 4. Service Temperature Range: Minus 100 to plus 300 deg F.
- 5. Color: White or gray.
- 6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
 - b. Eagle Bridges - Marathon Industries; 405.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
 - d. Mon-Eco Industries, Inc.; 44-05.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Flashing Sealants, and Vinyl, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
 5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
 - b. Vimasco Corporation; Elastafab 894.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.

4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- D. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
 - b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
 - c. RPR Products, Inc.; Insul-Mate.
 2. Sheet and roll stock ready for shop or field sizing.
 3. Finish and thickness are indicated in field-applied jacket schedules.
 4. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper.
 5. Moisture Barrier for Outdoor Applications: 2.5-mil- thick polysurlyn.
 6. Factory-Fabricated Fitting Covers:
 - a. Same material, finish, and thickness as jacket.
 - b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - c. Tee covers.
 - d. Flange and union covers.
 - e. End caps.
 - f. Beveled collars.
 - g. Valve covers.
 - h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- E. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with stucco-embossed aluminum-foil facing.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Polyguard Products, Inc.; Alumaguard 60.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABI, Ideal Tape Division; 428 AWF ASJ.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
 - c. Compac Corporation; 104 and 105.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABI, Ideal Tape Division; 491 AWF FSK.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - c. Compac Corporation; 110 and 111.
 - d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABI, Ideal Tape Division; 370 White PVC tape.
 - b. Compac Corporation; 130.
 - c. Venture Tape; 1506 CW NS.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABI, Ideal Tape Division; 488 AWF.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - c. Compac Corporation; 120.
 - d. Venture Tape; 3520 CW.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

- A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal or closed seal.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ITW Insulation Systems; Gerrard Strapping and Seals.
 - b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
- C. Wire: 0.062-inch soft-annealed, stainless steel.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. C & F Wire.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Installation of all materials shall comply with manufacturer's installation instructions.
- B. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- C. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- E. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- F. Install multiple layers of insulation with longitudinal and end seams staggered.
- G. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- H. Keep insulation materials dry during application and finishing.
- I. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- J. Install insulation with least number of joints practical.
- K. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Inserts not required on piping 1-1/2 inches and smaller. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- M. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.

2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- N. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- O. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- P. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- Q. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Manholes.
 5. Handholes.
 6. Cleanouts.

3.3 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Hydronic Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Where indicated, insulate pipe elbows using blanket insulation under PVC ell covers having the same R-value as adjacent pipe insulation. Otherwise, insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.

7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.

4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER PREFORMED PIPE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Insulate pipe elbows using blanket insulation under PVC ell covers having the same R-value as adjacent pipe insulation.

2. Install preformed sections of same material as straight segments of pipe insulation when available.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with 316 stainless-steel bands 12 inches o.c. and at end joints.

3.8 FINISHES

A. Pipe Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

- C. Color: Final color as selected by Engineer. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of solder/threaded fittings, three locations of welded fittings, two locations of solder/threaded strainers, two locations of welded strainers, three locations of solder/threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Drainage piping located in crawl spaces.
 - 2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F:
 - 1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: ½ inch thick.
- B. Heating-Hot-Water Supply and Return, 200 Deg F and Below: Insulation shall be the following:
 - 1. Mineral-Fiber, Preformed Pipe, Type I: 1-1/2 inch for piping less than 2" diameter and 2 inch for piping 2" diameter and larger.
- C. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric, 1 inch thick.
- D. Refrigerant Suction and Hot-Gas Flexible Tubing: Flexible elastomeric, 1 inch thick.

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping: Insulation shall be the following:
 - 1. Flexible Elastomeric: 2 inches thick.
- B. Refrigerant Suction and Hot-Gas Flexible Tubing: Insulation shall be the following:
 - 1. Flexible Elastomeric: 2 inches thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 - 1. Factory applied white ASJ jacketing with permanently affixed color coded pipe labels.
- D. Piping, Exposed:
 - 1. PVC, White: 20 mils thick. Field applied with permanently affixed color coded pipe labels.

3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed and Exposed:
 - 1. Aluminum, Stucco Embossed: 0.016 inch thick.

END OF SECTION 230719

SECTION 238127 – DUCTLESS SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. Section includes variable capacity, ductless split-system heat-pump and air-conditioning system, consisting of single outdoor condensing unit, and controls.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Sustainable Design Submittals:
 - 1. Product Data for EA Prerequisite 3, "Fundamental Refrigerant Management": For refrigerants, indicating compliance with refrigerant management practices.
 - 2. Product Data: For energy performance.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Submit air cooled condensing unit and fan coil unit shop drawings including the following information: specific manufacturer and model numbers, dimensional and weight data, required clearances, materials of construction, capacities and ratings, efficiencies, stages of unloading capacity achievable without hot gas bypass, refrigerant type and charge, component information, size and location of piping connections, electrical connections, wiring diagrams and information for all specialties and accessories.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
 - 3. Submit manufacturer's installation and start-up instructions, maintenance data, troubleshooting guide, parts lists, controls and accessories.
 - 4. At substantial completion, submit warranty certificate and copy of start-up report.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For split-system heat-pump and air-conditioning systems to include in emergency, operation, and maintenance manuals. Service and installation manuals must be readily available on the manufacturer's website without entering a username and password.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Filters: Two sets for each fan coil unit.

1.7 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:
 - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
 - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.
- D. Unit rated performance in accordance with the latest edition of ARI Standard 365 or ARI Standard 210/240, whichever is applicable for the equipment.
- E. Construct units in accordance with ASHRAE 15, UL standards and the NEC. Units shall carry the UL label.
- F. Factory run and test units to see that each control device operates properly. Pressure test, evacuate, charge with holding charge of refrigerant and full oil charge prior to shipping from the factory.

1.8 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in the section regarding cast-in-place concrete.
- B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system heat-pump and air-conditioning systems that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

- a. For Compressor: Five years from date of Substantial Completion.
- b. For Parts: One year from date of Substantial Completion.
- c. For Labor: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Mitsubishi Electric & Electronics USA, Inc.
2. Daikin AC (Americas), Inc.
3. SANYO North America Corporation.
4. Trane.
5. YORK; a Johnson Controls company.
6. Carrier Corporation; a unit of United Technologies Corp.

2.2 WALL MOUNTED INDOOR UNIT

- A. Description: Factory-assembled and -tested complete unit with components, piping, wiring, and controls required for mating to ductwork, piping, power, and control board with field connections.

B. Cabinet:

1. Material: Hot-dipped galvanized steel frame with high impact plastic chassis and fascia, UL 94 V-0 flammability rating.
2. Mounting: Manufacturer-designed provisions for field installation.
3. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.

C. DX Coil Assembly:

1. Construction: Nonferrous construction, slit fins coated with hydrophilic paint on copper tubing.
2. Coil Tubes: Copper with internal grooves.
3. Internal Tubing: Copper tubing with brazed joints.
4. Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.

5. Field Piping Connections: Manufacturer's standard.
6. Factory Charge: Dehydrated air or nitrogen.
7. Testing: Factory pressure tested and verified to be without leaks.

D. Drain Assembly:

1. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
2. Condensate Removal: Unit-mounted condensate pump with check valve, with a maximum vertical lift of 29 inches. **Electrical connection shall be hard wired.**
3. Condensate Float Switch: Disable unit operation in the event of condensate overflow.
4. Field Piping Connection: Non-ferrous material.

E. Fan and Motor Assembly:

1. Fan: Direct-drive turbo fan arrangement driven by a single motor statically and dynamically balanced.
2. Construction: Fabricated from non-ferrous components.
3. Motor: Brushless dc or electronically commutated with permanently lubricated bearings.
4. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
5. Speed Settings and Control: Three or more speed settings with a speed range of least 50 percent.
6. Vibration Control: Integral isolation to dampen vibration transmission.

F. Filter Assembly:

1. Unit shall have a filter track with factory supplied cleanable filters.

G. Air Outlet Assembly:

1. Discharge Pattern Adjustment: Horizontal and/or vertical discharge louvers shall be adjustable.

H. Unit Accessories:

1. Remote Room Temperature Sensor Kit: Wall-mounted, hardwired room temperature sensor kit for use in rooms that do not have room temperature measurement.

I. Unit Controls:

1. Enclosure: Manufacturer's standard, and suitable for indoor locations.
2. EEPROM: Removable EEPROM on PCB stores all system data, programming information, unit name, serial number, and other data.
3. Factory-Installed Controller: Configurable digital control.
4. Features and Functions: Self-diagnostics, time delay, auto-restart, auto operation mode, manual operation mode, filter service notification, power consumption display, drain assembly high water level safety shutdown and notification and run test switch.
5. Wireless Controller: Infrared receiver and LED indicator lights on fascia panel for wireless controller use.
6. Communication: Network communication with other indoor units and outdoor unit(s).

7. Cable and Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
8. Field Connection: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.

J. Unit Electrical:

1. Enclosure: Manufacturer's standard, and suitable for indoor locations.
2. Field Connection: Single point connection to power entire unit and integral controls, 208/230 V, single phase, 60 hertz.
3. Disconnecting Means: Circuit breaker or switch, complying with NFPA 70.
4. Control Transformer: Manufacturer's standard, factory installed.
5. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
6. Raceways: Enclose line voltage wiring in raceways to comply with NFPA 70.

2.3 OUTDOOR, AIR-SOURCE CONDENSING UNITS (3 TONS OR LESS NOMINAL CAPACITY)

A. MANUFACTURER

1. Outdoor condensing unit shall be of the same manufacture as the associated fan coil unit.

B. Description: Factory-assembled and -tested complete unit with components, piping, wiring, and controls required for mating to piping, power, and controls field connections.

1. Equipped with multiple circuit boards that shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.
2. Outdoor unit sound ratings shall not exceed 48 to 55 dB, depending on model.
3. Outdoor units shall have an accumulator.
4. The outdoor unit shall be capable of operating between 0 to 120 deg F with the addition of wind baffle accessory.
5. The shall be capable of operating in heating mode between minus 5 to 75 deg F ambient temperatures, without low ambient controls.

C. Cabinet:

1. Galvanized steel, bonderized, with a powder coated baked enamel finish.
2. Piping Connections: Make pipe connections inside the outdoor unit chassis. Refrigerant pipes can exit through the front, side, rear, or bottom sides of the outdoor unit.

D. Compressor and Motor Assembly:

1. Twin positive-displacement, inverter driven, scroll compressors with a turndown to 15 percent of rated capacity.
2. Vibration Control: Integral isolation to dampen vibration transmission.
3. Accumulator: Systems shall have an accumulator with accumulator return valve control.

4. Expansion Valve: Electronic modulating type with linear or proportional characteristics, to control refrigerant flow to the indoor unit.
 5. Protection: Systems shall have a high pressure safety switch, fuse, over-current protection, over-voltage protection, temperature limit protection logic, compressor overload sensing.
 6. Crankcase heaters with integral control to maintain safe operating temperature.
- E. Condenser Coil Assembly: Aluminum, flat fin, micro-channel with integral guard.
1. Corrosion Protection: Coating with documented salt spray test performance of 2,000 hours according ASTM B 117 surface scratch test (SST) procedure.
- F. Condenser Fan and Motor Assembly:
1. Fans: One or two, propeller type.
 - a. Horizontal discharge airflow.
 - b. Direct-drive arrangement.
 - c. Fabricated from non-ferrous components or ferrous components with corrosion protection finish to match performance indicated for condenser coil.
 - d. Statically and dynamically balanced.
 2. Fan Guards: Raised guards to protect moving parts. If using metal materials, coat with corrosion-resistant coating to match performance indicated for condenser coil.
 3. Motor(s): Brushless dc with permanently lubricated bearings and rated for outdoor duty.
 4. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
 5. Speed Settings and Control: Variable speed with a speed range of least 15 percent.
 6. Vibration Control: Integral isolation to dampen vibration transmission.
- G. Unit Controls:
1. Enclosure: Manufacturer's standard, and suitable for unprotected outdoor locations.
 2. Factory-Installed Controller: Configurable digital control.
 3. Removable EPROM: The outdoor unit shall have a removable EEPROM to store system programming information, unit name, and other data.
 4. Night Time Quiet Mode: Reduces sound during the evening. This control option is activated based on time and temperature or an external, zero-volt, dry contact input.
 5. Condenser Fan Snow Clearing: Systems shall have a snow blowing setting to prevent snow accumulation on top of unit at fan discharge. Setting is field enabled by installer.
- H. Unit Electrical:
1. Enclosure: Metal, similar to enclosure, and suitable for unprotected outdoor locations.
 2. Field Connection: Single point connection to power entire unit and integral controls.
 3. Control Voltage Circuit: Stranded, annealed copper conductor, 16 AWG, shielded, two-core cable to provide total integration of the system.
 4. Disconnecting Means: Circuit breaker or switch, complying with NFPA 70.
 5. Control Transformer: Manufacturer's standard.
 6. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
 7. Raceways: Enclose line voltage wiring in raceways to comply with NFPA 70.

I. Unit Piping:

1. Unit Tubing: Copper tubing with brazed joints.
2. Unit Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
3. Field Piping Connections: Manufacturer's standard.
4. Factory Charge: Dehydrated air or nitrogen.
5. Testing: Factory pressure tested and verified to be without leaks.

J. Refrigerant:

1. ASHRAE 34, Class A1 refrigerant classification.
2. Refrigerant: A full charge of R-32 or R-454B is included for the condensing unit by system manufacturer for lines sets up to 25 feet. Provide additional refrigerant based on diameters and lengths of system liquid refrigerant lines, and indoor equipment model and quantity.

2.4 CONTROLS

A. Control equipment and sequence of operation are specified in the section regarding direct digital control (DDC) system for HVAC.

B. Control Network

1. The manufacturer's control system shall consist of remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to integration with Building Management Systems (BMS) using either LonWorks or BACnet.
2. Network: Indoor units and outdoor units shall include integral controls and connect through a TIA-485A or manufacturer-selected control network.
3. Network Communication Protocol: Open control communication between interconnected units.
4. Simplified Controls: For control of individual systems, or up to 16 indoor units, with options for wired controllers, wireless controllers, wireless signal receivers, external room temperature sensors, external contact controls.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for storing, rigging, unloading, and transporting units. Protect units from physical damage. Leave factory-shipping covers in place until installation.
- B. Ship units to jobsite fully assembled.
- C. Install units level and plumb.

- D. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Install and connect refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.
- D. Insulation: Insulate both refrigerant line from the outdoor unit to the indoor unit.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

END OF SECTION 238127

SECTION 260500 – ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Division I General Provisions and Special Provisions form a part of this Division of Specification.
- B. This section forms a part of all sections under Division 26 Electrical.
- C. Requirements herein augment or clarify articles specified under aforementioned General and Special Conditions.

1.2 CODES AND STANDARDS

- A. Latest effective publications of following standards, codes, etc., as they apply, form part of these specifications as if were written fully herein and constitute minimum requirements. Minimum requirements shall not relieve the Contractor of the responsibility of furnishing and installing higher grade materials and workmanship than herein specified. The following will be referred to throughout in abbreviated forms.
 - 1. National Electrical Code, (NFPA 70) (NEC)
 - 2. Standard Rules of Institute of Electrical and Electronic Engineers (IEEE)
 - 3. Rules and Regulations of Local Electric Utility Company
 - 4. Applicable Standards of the National Electrical Manufacturer's Association (NEMA)
 - 5. Applicable Standards of the American National Standards Institute (ANSI)
 - 6. Applicable Local Codes
 - 7. Virginia Uniform Statewide Building Code
 - 8. Applicable Standards and Lists of the Underwriter's Laboratories, Inc. (UL)
 - 9. Applicable Standards of the National Fire Protection Association (NFPA)
 - 10. International Building Code (IBC)
 - 11. The Americans with Disabilities Act (ADA)
 - 12. International Electrical Testing Association (NETA)

1.3 REFERENCES

Latest effective publications of following references, as they apply, form part of these specifications as if were written fully herein and constitute minimum requirements.

- A. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
 - 1. ANSI A13.1 Pipe Labeling Requirements and Standards
 - 2. ANSI C57.12.22 Transformers
 - 3. ANSI C80.1 Rigid Steel Conduit, Zinc Coated.
 - 4. ANSI Z535 Safety Signage Standards

B. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)

1. ASTM A53-M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
2. ASTM B3 Solid Conductors
3. ASTM B8 Assembly of Stranded Conductors
4. ASTM C1107-M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

C. CODE OF FEDERAL REGULATIONS (CFR)

1. 29 CFR 1910.145 Specifications for Accident Prevention Signs and Tags

D. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

1. IEEE 241 IEEE Recommended Practice for Electric Power Systems in Commercial Buildings
2. IEEE 242 IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book)
3. IEEE 399 IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book)
4. IEEE 837 Standard for Qualifying Permanent Connections Used in Substation Grounding
5. IEEE 1015 IEEE Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems (BLUE BOOK)
6. IEEE C37.20.1 IEEE Standard for Metal-Enclosed Low-Voltage (1000 Vac and below, 3200 Vdc and below) Power Circuit Breaker Switchgear
7. IEEE C37.46 IEEE Standard Specifications for High-Voltage (>1000 V) Expulsion and Current-Limiting Power Class Fuses and Fuse Disconnecting Switches
8. IEEE C57.12.91 Test Code for Dry-Type Distribution and Power Transformers
9. IEEE C57.96 IEEE Guide for Loading Dry-Type Distribution and Power Transformers

E. INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

1. ICEA S-95-658 Power Cables Rated 2000 Volts or Less for Distribution of Electrical Energy

F. INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

G. INTERNATIONAL STANDARDS ORGANIZATION (ISO)

1. ISO 3864-1 Graphical Symbols – Safety Colors and Safety Signs
2. ISO 7010 Graphical Symbols – Safety colors and Safety Signs -- Safety signs used in workplaces and public areas

H. METAL FRAMING MANUFACTURERS ASSOCIATION

1. MFMA-4 Metal Framing Standards Publications

I. NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

1. NECA 1 Standard for Good Workmanship in Electrical Construction
2. NECA 101 Standard for Installing Steel Conduit
3. NECA 331 Recommended Practice for Grounding and Bonding Buildings and Service Entrances.

J. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

1. NEMA AB 1 Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures
2. NEMA AB 3 Molded-Case Circuit Breakers and Their Application
3. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable
4. NEMA FB 2.10 Selection and Installation Guidelines for Fittings for use with Non-Flexible Metallic Conduit
5. NEMA FB 2.20 Selection and Installation Guidelines for Fittings for use with Flexible Electrical Conduit and Cable
6. NEMA ICS 2 Controllers, Contactors, and Overload Relays Rated 600V
7. NEMA KS1 Heavy Duty Enclosed and Dead-Front Switches (600V Maximum)
8. NEMA OS 1 Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
9. NEMA PB1 Panelboards
10. NEMA MG 1 Motors and Generators
11. NEMA ST 20 Dry-Type Transformers for General Applications
12. NEMA TP 1 Energy Efficiency Standard
13. NEMA WC 70 Power Cables Rated 2000 Volts or Less for Distribution of Electrical Energy
14. NEMA 250 Enclosures for Electrical Equipment

K. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1. NFPA 70 National Electric Code
2. NFPA 70E Standard for Electrical Safety in the Workplace

L. TELECOMMUNICATIONS INDUSTRY ASSOCIATION/ELECTRONIC INDUSTRIES ALLIANCE (TIA/EIA)

1. TIA/EIA 568 Commercial Building Telecommunications Cabling Standard
2. TIA/EIA 569 Commercial Building Standard for Telecommunications Pathways and Spaces

M. UNDERWRITERS' LABORATORIES (UL)

1. UL 1 Flexible Metal Conduit
2. UL 5 Standard for Surface Metal Raceways and Fittings
3. UL 6 Rigid Metal Conduit
4. UL 44 Thermoset-Insulated Wires and Cables

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|-----|-----------|---|
| 5. | UL 50 | Enclosures for Electrical Equipment |
| 6. | UL 67 | Panelboards |
| 7. | UL 83 | Thermoplastic Insulated Wires and Cables |
| 8. | UL 98 | Enclosed and Dead-Front Switches |
| 9. | UL 360 | Liquid-Tight Flexible Steel Conduit |
| 10. | UL 467 | Grounding and Bonding Equipment |
| 11. | UL 486A-B | Wire Connectors |
| 12. | UL 489 | Molded Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures |
| 13. | UL 514A | Metallic Outlet Boxes |
| 14. | UL 514B | Conduit, Tubing and Cable Fittings |
| 15. | UL 1449 | Surge Protective Devices |
| 16. | UL 1561 | Standard for Dry-Type General Purpose and Power Transformers |
| 17. | UL 1773 | Standard for Personal Termination Boxes |

1.4 DEFINITIONS AND ACRONYMS

- A. Terms are defined below as applicable to this project.

1. MCC – Motor Control Center
2. MCCB – Molded-case Circuit Breaker
3. MCOV – Maximum Continuous Operating Voltage
4. MCP – Motor Circuit Protector
5. NRTL – Nationally Recognized Testing Laboratory
6. NTP – Notice to Proceed
7. OCPD – Overcurrent Protection Device
8. PLC – Programmable Logic Controller
9. PTST – Parallel Thimble Shoal Tunnel Project
10. SCADA System – Supervisor Control and Data Acquisition System
11. SCCR – Short Circuit Current Rating
12. SPD – Surge Protection Device
13. VPR – Voltage Protection Rating

1.5 SCOPE OF WORK

- A. Provide all work required for this Division including all labor, materials, equipment, appurtenances and services to provide complete electrical systems as shown on the drawings and specified in this Division of the specifications. The word "Provide" shall mean "Furnish and Install Complete and Ready for Use". The work includes, but is not limited to the following:

1. Interior lighting system including fixtures and control devices.
2. Power wiring system, including outlets, receptacles, switches, wire, conduit, junction boxes, panelboards, and transformer.
3. System of cables, conduits, and equipment for interfacing to existing SCADA equipment (SCADA integration will be performed by others).
4. Disconnect switches and power wiring up to and including motor connections for all equipment provided under other Divisions of this specification shall be included in this Division. Where manual motor control switches for single phase motors are indicated,

they shall be provided and wired complete under this Division. Motor controllers and motor starters furnished under other Divisions shall be set in place and connected to source and load under this Division. In general, motors will be provided with the equipment they drive and are not part of this work under this Division, except that they shall be connected hereunder.

5. Temporary Construction Power and Lighting.

B. The following work is not included in this Division:

1. Heating, ventilating, and air conditioning equipment and all associated motors and magnetic motor starters.
2. Plumbing equipment except as specifically indicated.
3. Control, interlock, and internal equipment wiring regardless of voltage.
4. Terminals, instrument wiring, and instruments for telephone, computer and other communication systems unless specifically addressed by other sections of the specification.

1.6 DRAWINGS AND SPECIFICATIONS

- A. The drawings are diagrammatic and indicate the general extent, character and arrangement of equipment, fixtures and conduit and wiring systems. If any departures from the contract drawings are deemed necessary, submit details of such departures and the reasons therefore as soon as practicable after award of contract to the Engineer for approval. Make no such departures without prior written approval of the Engineer.
- B. It is the intention of these specifications and drawings to fully cover all work and materials for a complete electrical installation, and any devices such as pull boxes and disconnect switches, usually employed in this class of work, though not specifically mentioned or shown on the drawings or in this specification, but which may be necessary for the satisfactory completion of the work, shall be furnished and installed by the Contractor as a part of his total work under this Division. All Emergency Power System Upgrades work and warranty described in this project shall be measured and paid for on a lump sum basis. Compensation for incidental items not specifically called out for herein or on project plans, but are necessary for the successful completion of the project in accordance with applicable codes, standards and project requirements, shall be included in the lump sum price.
- C. Electrical installation workmanship shall comply with NEC Article 110.12 and ANSI/NECA 1-2023, Standard for Good Workmanship in Electrical Construction. Consult the specifications and drawings of all other trades and perform all electrical work required therein. Cooperate with all other Contractors or Subcontractors to furnish complete workable systems.
- D. In case of conflicting information on the drawings and/or in the specifications, the proper priority shall be in accordance with General Provision 105.12.
- E. Disagreements occurring between trades covering various phases of the work shall be referred to General Contractor for final decision.
- F. Changes and additions to scope of the work under this contract shall be submitted to the Engineer and his written approval obtained before proceeding with the changed work.

- G. During construction, the Contractor shall keep an accurate record of all deviations between the work as shown on the contract drawings and that which is actually installed. He shall secure a set of full size blue line prints of the electrical drawings for this purpose, and note changes thereon with red marks, in a neat and accurate manner, thus making a complete record of all changes and revisions in the original design which exist in the completed work. When all revisions have been shown on these prints to indicate the work as finally installed, the full size set of prints shall be delivered to the Owner, before final payment. Contractor shall also provide electronic record drawings to the District in .PDF and AutoCAD file formats, with all of the red marks indicating actual work installed incorporated. The District will furnish CAD files of the contract drawings to the Contractor for use in developing the electronic record drawings.

1.7 PERMITS, INSPECTION AND TESTS

- A. The right is reserved to inspect and test any portion of the installation/equipment during the progress of its installation. Test all wiring for continuity and grounds before connecting any fixtures or devices. Perform insulation resistance tests on wiring #6 or larger. Test the entire system when the work is finally completed to insure that all portions are free from short circuits and grounds. Provide all equipment, labor, and material necessary to conduct the above tests.

1.8 SUBMITTALS

- A. The Contractor shall submit all required shop drawings, work drawings, plans, and all other specified documents for approval to the District in accordance with the requirements of the contract documents. Provide the following at a minimum:
1. Contractor's sequence of construction.
 2. O&M Manuals.
 3. Testing Reports.
 4. Submit Shop Drawings, Product Data and Samples within sixty (60) days of award of contract and in accordance with the General Provisions. All interdependent equipment, i.e. uninterruptible power supply system and circuit breakers shall be submitted simultaneously. Review of submittals by the Engineer and any associated action taken by the Engineer does not relieve the Contractor of any requirements set forth by the contract documents. Provide shop drawings for the following items:
 - a. Panelboards
 - b. Circuit Breakers
 - c. Lighting Fixtures
 - d. Static Uninterruptible Power System and all associated components
 - e. Transformers
 5. Submittals shall contain:
 - a. The date of submission and of any previous submissions.
 - b. The project title and number.
 - c. Contract or project identification.

- d. The names of:
 - 1) Contractor.
 - 2) Supplier.
 - 3) Manufacturer.
- e. Identification of the product, and specification section.
- f. Field dimensions, clearly identified as such.
- g. Relation to adjacent or critical features or materials.
- h. Applicable standards.
- i. Identification of deviations from Contract Documents, including District's substitution authorization in writing.
- j. Identification of non-complying features and reason for the non-compliance. The reason shall be specific in nature. Include District's substitution authorization in writing with submittal.
- k. Identification of revisions on resubmittals.
- l. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURING STANDARDS

- A. Materials shall be new and approved and labeled by UL wherever standards have been established by that agency. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of the Engineer. Materials to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. All items of the same type and rating shall be identical.

2.2 MOTORS AND EQUIPMENT

- A. All motors shall have disconnecting means, controller and thermal overload protection. All three phase motors shall have power loss, phase outage, and phase reversal protection features.
- B. Provide motors, controllers, integral disconnects, and contactors with their respective pieces of equipment. Combination motor controllers and disconnect switches shall be provided under this division of the Specifications. Motors, controllers, integral disconnects, and contactors shall conform to the requirements defined under the same specification division specifying the equipment. If there is no specification for motors and controllers under the division specifying the equipment, then motors and controllers shall be as defined under the electrical provisions of the specifications. Extended voltage range motors shall not be permitted. Control voltage for controllers and contactors shall not exceed 120 volts nominal. When motors and equipment furnished are larger than sizes indicated, the cost of additional electrical service and related work shall be included under the section that specified that motor or equipment. Where fuse

protection is specifically recommended by the equipment manufacturer, provide fused switches in lieu of non-fused switches indicated.

- C. Provide internal wiring for components of packaged equipment as an integral part of the equipment. Provide power wiring and conduit for field-installed equipment under the electrical provisions of the contract. Control wiring and conduit shall be provided under the section specifying the associated equipment. Wiring and conduit for power systems and control systems shall conform to the requirements defined under the electrical provisions of the specifications.

2.3 TEMPORARY ELECTRICAL SERVICE

- A. The District will provide (1) 20A 120V receptacle circuit in the vicinity of the work area. Contractor shall be responsible for extending electricity to the specific required locations within the project and for providing any additional power otherwise required for the completion of their work.

2.4 GROUNDING

- A. The entire electrical system, including equipment frames, conduit, switches, controllers, wireways, neutral conductors, and all other such equipment shall be permanently and effectively grounded in accordance with the NEC. Grounding of each transformer secondary shall be provided and each shall be considered as a separate service ground. Provide a separate insulated ground conductor in all branch circuit conduits sized in accordance with the N.E.C.

PART 3 - EXECUTION

3.1 SCHEDULE OF WORK

- A. The schedule of the electrical work shall be arranged to suit the progress of work by the other trades and shall in no way retard progress of construction of the project.
- B. Comply, also, with Section 105.09 of Division I General Provisions.

3.2 STORAGE AND MATERIALS

- A. Space will be assigned to the Contractor by the Owner for the storage of materials. This Contractor will be responsible for the protection and safekeeping of materials, tools, and equipment. All materials and equipment shall be kept in its assigned place until the time of its installation. Excess materials, dirt and refuse shall be promptly removed from the work site.
- B. At Portal Islands #1 and #2, two parking spaces will be provided for use by the Contractor. Contractor shall plan for no other space being available on these islands, including a lay down area.

3.3 LABELING OF EQUIPMENT

- A. All equipment shall be identified by machine engraved laminated plastic designation plates permanently attached thereto with self-tapping screws or rivets. All component parts of each item of equipment or device shall bear the manufacturer's nameplate, giving name of manufacturer, description, size, type, serial and model number and electrical characteristics in order to facilitate maintenance or replacement. The nameplate of a Contractor or distributor will not be acceptable. Self-adhesive, plastic laminate labels are not acceptable.
- B. All panelboards shall be field marked to warn personnel of the potential for Arc Flash. Labels shall state "WARNING – ARC FLASH AND SHOCK HAZARD APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIRED".

3.4 COORDINATION

- A. Cooperate and coordinate efforts with all Contractors on the project. Verify ceiling and wall construction and material prior to ordering devices to ensure proper device is furnished to match construction. This verification must be executed regardless of information placed on the drawings. Any cost incurred which in the opinion of the Engineer, could have been avoided by this step shall be the responsibility of the Contractor.
- B. Carefully check space requirements with the other Contractors to insure that electrical equipment can be installed in the spaces allotted for them. Sufficient access and working space shall be provided and maintained about all electrical equipment as required by the National Electrical Code. Consult all applicable drawings for details. Where interferences occur and work must be relocated, relocate without additional cost.
- C. No conduit, outlet box, conduit stub-up, or any other electrical devices shall be installed until the exact location has been determined by the coordinated effort of all Contractors and other parties concerned. Any relocating of devices or cutting or patching which becomes necessary due to improper coordination shall be done at this Contractor's expense.
- D. Determine electrical requirements of other Divisions in order to fully understand wiring, and provide as required for complete and satisfactory operation of project. Make connections for other Divisions where indicated.
- E. Obtain approved shop drawings showing wiring diagrams, connection diagrams, roughing-in and hookup details, from other involved Contractors for all equipment and comply therewith.
- F. Comply, also, with Section 105.09 of Division I General Provisions.

3.5 GUARANTEE OF WORK

- A. Contractor guarantees by his acceptance of the contract that all work installed is free from any and all defects in workmanship and/or materials, and that the apparatus will develop capacities and characteristics specified, and that if, during the period of two years or as otherwise specified, from date of certificate of completion and acceptance of the work any such defects in

workmanship, material or performance appear, he will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from Engineer. In default thereof, the Owner may have such work done and charge cost to Contractor. Equipment guarantees from date of "start-up" will not be recognized.

- B. Comply, also, with applicable Sections of Division I General Provisions.
- C. Provide service for the installation for two years from date of final acceptance. This shall include all emergency service and adjustment. Provide evidence upon request by the Engineer that a factory authorized local service organization is in existence to service and furnish spare and replacement parts for all equipment under this Division of the specifications.
- D. Compile and assemble and provide all shop drawings, maintenance manuals, operation manuals and warranties in a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference, with all options labeled. Provide .PDF electronic format and three (3) hard copies to the District.

3.6 FINAL ACCEPTANCE

- A. Comply with closeout requirements of Special Provisions.

END OF SECTION 260500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Types THW-2, THHN-2-THWN-2, and XHHW-2.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION APPLICATIONS AND WIRING METHODS

- A. Feeders and Branch Circuits: Type THHN-2-THWN-2, or XHHW-2 single conductors in raceway.
- B. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with ground. Stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- C. All conductor insulation shall be low smoke halogen free.

3.3 INSTALLATION OF CONDUCTORS

- A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used shall not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway. Conductors #8 and smaller shall be pulled by hand and without aid of block and tackle or other mechanical device. Only approved equipment for pulling conductors shall be used for #6 and larger conductors.
- C. Install exposed conduits parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- D. All wiring shall be in conduit unless otherwise noted.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test all conductors #6 and larger for continuity, shorts, and insulation resistance and perform NETA testing described under 3.6.A.2.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification Section 7.3.2.
 - 3. All conductors of all sizes shall be tested for continuity shorts and grounds and the results recorded.
 - 4. Perform a thermographic survey of all conductor terminations and splices installed under this project in accordance with NETA Acceptance Testing Specification Chapter 9. Perform thermographic survey with equipment and wiring loaded to at least 50% of circuit capacity. The optional thermographic survey is not required.
 - 5. All conductors failing any of the tests shall be repaired or replaced and retested at the Contractor's expense.

- B. Cables will be considered defective if they do not pass tests and inspections. Cables shall be repaired or replaced in their entirety at no additional cost to the District.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Grounding and bonding systems and equipment.

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.

2.2 CONNECTORS

- A. Listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductor in all feeder and branch circuits.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
- C. Grounding Electrode System: All grounding electrodes that are present at each building or structure served shall be bonded together to form the grounding electrode system. The grounding electrode system is existing.

3.5 LABELING

- A. Comply with specified requirements. The label or its text shall be green.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- B. Perform all visual and mechanical inspections and electrical tests of the grounding system and components in accordance with NETA Acceptance Testing Specification Section 7.13.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Metallic Coatings: Indoors: Hot-dip Galvanized after fabrication and applied according to MFMA-4. Outdoors: 316 stainless steel.
 - 2. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit Support Devices: Hot-dipped Galvanized Steel for indoor and 316 stainless steel for exterior hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; hot-dipped, galvanized (indoors), and 316 stainless steel.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, 316 stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded hot-dipped galvanized steel.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1, NECA 101 and 120 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for RMC as maximum of 8 feet on center. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1, NECA 101 and 120 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, RMC may be supported by openings through structural members, as permitted in NFPA 70.

- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To New Concrete: Drill and epoxy anchor.
 - 2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 3. To Existing Concrete: Expansion anchor fasteners.
 - 4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 5. To Steel: Beam clamps complying with Spring-tension clamps.
 - 6. To Light Steel: Sheet metal screws.
 - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 4000-psi, 28-day compressive-strength concrete unless otherwise noted on drawings.
- C. Anchor equipment to concrete base.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Conduits, tubing, and fittings.
2. Boxes, enclosures, and cabinets.

1.2 ACTION SUBMITTALS

- A. Product Data: For wireways and fittings, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Galvanized Rigid Conduit (GRC): Comply with ANSI C80.1 and UL 6.
- C. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- D. Stainless Steel Rigid Conduit: Comply with UL6A. Conduit shall be Type-316.
- E. Liquidtight Flexible Metal Conduit (LFMC): Flexible steel conduit with PVC jacket and complying with UL 360.
- F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
- G. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- C. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773 or NEMA 250 Type 12, galvanized steel with gasketed cover.
- D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- E. Device Box Dimensions: Except as noted hereinafter minimum size outlet box shall be 4" square, 2 1/8" deep, and shall be increased in dimensions to accommodate conductors, conduits, and devices as required by the NEC. Shallower boxes may be used where required by structural conditions and when specifically approved by the Engineer. Provide raised ring to accommodate the wiring device.
- F. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 12 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: PVC – coated steel conduit.
 - 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 3. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X 316 stainless steel.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
 - 1. Exposed: GRC.
 - 2. Exposed within fan room and where specifically indicated on drawings: Stainless steel rigid conduit.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment).
 - 4. Boxes and Enclosures: NEMA 250, Type 12. Where exposed within fan room and where specifically indicated on drawings: NEMA 250, Type 4X 316 stainless steel.
- C. Minimum Raceway Size: 3/4-inch above grade or finish floor and 3/4-inch below grade, below floor, or in concrete floor.

- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

- A. Comply with NECA 1, NECA 101 and NECA 120 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- D. Install no more than the equivalent of three 90-degree bends in any conduit run. Support within 12 inches of changes in direction.
- E. Install conduits parallel or perpendicular to building lines.
- F. Support conduit within 12 inches of enclosures to which attached.
- G. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
- H. Stub-ups:
 - 1. Use GRC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors No. 4 AWG and larger.
- K. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-inch trade size, and insulated throat metal

bushings on 1-1/4-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

- M. Install pull wires in empty raceways. Use polypropylene line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- N. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
- O. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- P. Expansion-Joint Fittings:
 - 1. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Q. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- R. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- S. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- T. Locate boxes so that cover or plate will not span different building finishes.
- U. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- V. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

3.3 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: Hot-dipped galvanized (indoors), 316 stainless steel (outdoors).

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: EDPM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Connecting Bolts and Nuts: Stainless steel (Type 316) of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves as walls are erected. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Aboveground, Exterior-Wall Penetrations: Seal penetrations using 316 stainless steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch or 2-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals as recommended by the manufacturer.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed or core drill existing walls and slabs as required.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.2 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 FLOOR MARKING TAPE

- A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Baked-Enamel Warning Signs:
 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 2. 1/4-inch grommets in corners for mounting.
 3. Nominal size, 7 by 10 inches.
- C. Metal-Backed, Butyrate Warning Signs:
 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
 2. 1/4-inch grommets in corners for mounting.
 3. Nominal size, 10 by 14 inches.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: with black letters on a white background. Minimum letter height shall be 1/2 inch.
- B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Equipment Identification Labels, and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Attach all signs and labels with mechanical fasteners appropriate to the location and substrate.

3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box with the circuit number and panelboard of circuits within.
- B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding to identify the phase.
 - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit. Color shall be factory applied for sizes No. 8 AWG and smaller.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral: White
 - c. Colors for 480/277-V and 600/347-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral: Gray.
 - d. Common Conductors
 - 1) Ground: Green
 - e. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

- D. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs or metal-backed, butyrate warning signs.
 - 1. Comply with 29 CFR 1910.145.
 - 2. Identify system voltage with black letters on white background.
 - 3. Apply to exterior of door, cover, or other access.
 - 4. For equipment with multiple power or control sources, apply warning to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
- E. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- F. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.
- G. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label or stenciled legend 4 inches high.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 2. Labels shall indicate equipment designation and associated panel and circuit that serves it.

END OF SECTION 260553

SECTION 260573 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes computer-based, fault-current and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

1.2 SUBMITTALS

- A. The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.
 - 1. Coordination-study input data, including completed computer program input data sheets.
 - 2. Study and Equipment Evaluation Reports.
 - 3. Coordination-Study Report.

1.3 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.
- B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. Professional engineer, licensed in the Commonwealth of Virginia, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.
- C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.
- D. Comply with IEEE 399 for general study procedures.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

- A. Comply with IEEE 399.
- B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

PART 3 - EXECUTION

3.1 POWER SYSTEM DATA

- A. Gather and tabulate the following input data to support coordination study:
 - 1. Product Data for overcurrent protective devices specified in other Division 26 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 - 2. Obtain the Impedance of utility service entrance in writing from the utility company.
 - 3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:
 - a. Circuit-breaker and fuse-current ratings and types.
 - b. Relays and associated power and current transformer ratings and ratios.
 - c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
 - d. Generator kilovolt amperes, size, voltage, and source impedance.
 - e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
 - f. Busway ampacity and impedance.
 - g. Motor horsepower and code letter designation according to NEMA MG 1.
 - 4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
 - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
 - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
 - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
 - d. Generator thermal-damage curve.
 - e. Ratings, types, and settings of utility company's overcurrent protective devices.
 - f. Special overcurrent protective device settings or types stipulated by utility company.
 - g. Time-current-characteristic curves of devices indicated to be coordinated.
 - h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.

- i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
- j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

3.2 FAULT-CURRENT STUDY

- A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:
 - 1. Switchgear and switchboard bus.
 - 2. Motor-control center.
 - 3. Distribution panelboard.
 - 4. Branch circuit panelboard.
- B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.
- C. Calculate momentary and interrupting duties on the basis of maximum available fault current.
- D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.
 - 1. Transformers:
 - a. ANSI C57.12.22.
 - b. IEEE C57.12.00.
 - c. IEEE C57.96.
 - 2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
 - 3. Low-Voltage Fuses: IEEE C37.46.
- E. Study Report:
 - 1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.
- F. Equipment Evaluation Report:
 - 1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
 - 2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.

3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

3.3 COORDINATION STUDY

- A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.
 1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
 2. Calculate the maximum and minimum ground-fault currents.
- B. Comply with IEEE 241 xfs recommendations for fault currents and time intervals.
- C. Transformer Primary Overcurrent Protective Devices:
 1. Device shall not operate in response to the following:
 - a. Inrush current when first energized.
 - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
 - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
 2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
- D. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the total clearing time of the fuse or circuit breaker. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- E. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:
 1. Tabular Format of Settings Selected for Overcurrent Protective Devices:
 - a. Device tag.
 - b. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
 - c. Fuse-current rating and type.
 - d. Ground-fault relay-pickup and time-delay settings.
 2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series. Prepare separate sets of curves for the switching

schemes and for emergency periods where the power source is local generation. Show the following information:

- a. Device tag.
 - b. Voltage and current ratio for curves.
 - c. Three-phase and single-phase damage points for each transformer.
 - d. No damage, melting, and clearing curves for fuses.
 - e. Cable damage curves.
 - f. Transformer inrush points.
 - g. Maximum fault-current cutoff point.
- F. Completed data sheets for setting of overcurrent protective devices.
- G. Contractor shall adjust all breakers in field to match completed data sheet settings.
- H. No electrical equipment shall be ordered until submitted study is approved.

END OF SECTION 260573

SECTION 262200 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Indicate dimensions and weights.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Field quality-control test reports.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D; Schneider Electric.
 - 2. Eaton Electrical Inc.; Cutler-Hammer Products.
 - 3. ABB Electrification.

2.2 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Cores: Grain-oriented, non-aging silicon steel.
- C. Coils: Continuous windings without splices except for taps.
 - 1. Internal Coil Connections: Brazed or pressure type.
 - 2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NEMA ST 20, and list and label as complying with UL 1561.
- B. Cores: One leg per phase.
- C. Enclosure: Ventilated, NEMA 250, Type 2 unless otherwise indicated on drawings.
 - 1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
- D. Taps for Transformers 7.5 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- E. Insulation Class: Class 155, 155 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.
- F. Energy Efficiency for Transformers Rated 15 kVA and Larger:
 - 1. Complying with NEMA TP 1, Class 1 efficiency levels.
 - 2. Tested according to NEMA TP 2.

2.4 IDENTIFICATION DEVICES

- A. Nameplates: Engraved, laminated-plastic or metal nameplate.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Where indicated on the drawings, install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.
- B. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions and other requirements specified herein.

3.2 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification Section 7.2.1.1 and 7.2.1.2. Certify compliance with test parameters.

3.3 ADJUSTING

- A. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions.

END OF SECTION 262200

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 6. Include wiring diagrams for power, signal, and control wiring.
- C. Panelboard schedules for installation in panelboards.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: Surface-mounted cabinets as indicated.

1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 12, unless otherwise noted on drawings.
 2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
 3. Directory Card: Inside panelboard door, mounted in transparent card holder.
- B. Incoming Mains Location: Top or bottom.
- C. Phase, Neutral, and Ground Buses: Tin-plated aluminum or copper.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Main and Neutral Lugs: Mechanical type.
 2. Ground Lugs and Bus Configured Terminators: Mechanical type.
- E. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.
- F. Future Devices: Where “space only” is indicated, provide mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- G. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.
- 2.2 DISTRIBUTION AND LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. Square D; a brand of Schneider Electric.
 3. ABB Electrification.
- B. Panelboards: NEMA PB 1, power and feeder distribution type or lighting and appliance branch circuit type as required.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
- D. Main Circuit Breaker: Thermal-magnetic circuit breaker, inverse time-current element and adjustable instantaneous magnetic trip element.
- E. Branch Overcurrent Protective Devices: Bolt-on circuit breakers.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, fully rated with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger. Provide the following features where shown on plans:
 - a. GFI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (5-mA trip).
 - b. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
 - c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
 - 2. Molded-Case Circuit-Breaker (MCCB) Features and Accessories, provide as required or indicated.
 - a. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
 - b. Shunt Trip: 120 -V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Receive, inspect, handle, store and install panelboards and accessories according to NEMA PB 1.1.
- B. Mount top of trim so that the handle on any breaker does not exceed 78".
- C. Mount panelboard cabinet plumb and rigid without distortion of box..
- D. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- E. Comply with NECA 1.

3.2 IDENTIFICATION

- A. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable. Update any existing panelboard directories affected by work under this contract.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Receptacles, switches, and associated device plates.
2. Weather-resistant receptacles.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
2. Provide samples of each device type and cover plate specified herein for Owner approval prior to ordering material.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand (Pass & Seymour).

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

2.3 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. Device shall be "specification" grade.

2.4 GFI RECEPTACLES

A. General Description:

1. Straight blade.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.

2.5 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A.

2.6 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Spaces: Type 302 stainless steel.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, "in use" type, complying with NEMA Type 3R, weather-resistant. Die-cast aluminum construction with 3-1/4" internal depth and lockable provisions.

2.7 FINISHES

A. Device Color:

1. Wiring Devices Ivory.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates, where possible.

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test ground-fault receptacles with a “load” (such as a plug in light) to verify that the “line” and “load” leads are not reversed.
- B. Wiring device shall be considered defective if it does not pass tests and inspections.

END OF SECTION 262726

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Enclosures.

1.2 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
1. Wiring Diagrams: For power, signal, and control wiring.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Type GD, General Duty, Single Throw, 240-V ac, 400 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with cartridge fuse interiors to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- B. Type HD, Heavy Duty, Single Throw, all current ratings at 600-V ac, and 240V ac 600 A and Larger: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

2.2 NONFUSIBLE SWITCHES

- A. Type GD, General Duty, Single Throw, 240V ac, 400 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- B. Type HD, Heavy Duty, Single Throw, all current ratings at 600-V ac, and 240V ac 600 A and Larger: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Lugs: Suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- B. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- C. For circuit breakers 1200A and greater provide breaker with energy-reducing maintenance switching with local status indicator.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 12, unless otherwise noted.

2. Outdoor Locations: NEMA 250, Type 4X stainless steel, unless otherwise noted.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Install fuses in fusible devices.
- C. Comply with NECA 1.

3.2 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 2. Test continuity of each circuit.
- C. Tests and Inspections:
 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification Section 7.5.1.1 and 7.6.1.1. Certify compliance with test parameters.
 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

END OF SECTION 262816

SECTION 263353 - STATIC UNINTERRUPTIBLE POWER SUPPLY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Three-phase, on-line, double-conversion, static-type, UPS units with the following features:
 - a. Surge suppression.
 - b. Rectifier-charger.
 - c. Inverter.
 - d. Controls and indications.
 - e. Static bypass transfer switch.
 - f. Output distribution section.
 - g. Battery and battery disconnect device.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of UPS.

B. Shop Drawings: For UPS.

1. Include plans, elevations, sections, and mounting attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Show access, workspace, and clearance requirements; details of control panels; and battery arrangement.
4. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each product, from manufacturer.
- B. Factory test reports.
- C. Product test reports.
- D. Field quality-control reports.
- E. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Power Quality Specialist Qualifications: A registered professional electrical engineer or engineering technician, currently certified by the National Institute for Certification in Engineering Technologies, NICET Level 4, minimum, experienced in performance testing UPS installations and in performing power quality surveys similar to that required in "Performance Testing" Article.
- B. Testing Agency Qualifications: Accredited by NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.6 WARRANTY

- A. Special Battery Warranties: Manufacturer and Installer agree to repair or replace UPS system storage batteries that fail in materials or workmanship within specified warranty period.
- B. Special UPS Warranties: Specified form in which manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within special warranty period.
 - 1. Special Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OPERATIONAL REQUIREMENTS

- A. Automatic operation includes the following:
 - 1. Double Conversion, IGBT:
 - a. Normal Conditions: Load is supplied with power flowing from the normal power input terminals, through the rectifier-charger and inverter, with the battery connected in parallel with the rectifier-charger output. High-efficiency carrier stored trench IGBT, in both rectifier-charger and inverter circuits.
 - b. Abnormal Supply Conditions: If normal supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, the battery supplies energy to provide constant, regulated inverter power output to the load.
 - c. Power Failure: If normal power fails, the rectifier-charger and inverter use energy from the battery to supply constant, regulated power output to the load without switching or disturbance.
 - 2. When power is restored at the normal supply terminals of the system, controls shall automatically synchronize the inverter with the external source before transferring the

- load. The rectifier-charger shall supply power to the load through the inverter and simultaneously recharge the battery.
3. If the battery becomes discharged and normal supply is available, the rectifier-charger shall charge the battery. The rectifier-charger shall automatically shift to float-charge mode on reaching full charge.
 4. If any element of the UPS system fails and power is available at the normal supply terminals of the system, the static bypass transfer switch shall switch the load to the normal ac supply circuit without disturbance or interruption.
 5. The output power converters shall produce up to 300 percent of rated full-load current for short-circuit clearing. The inverter shall sustain steady-state overload conditions of up to 150 percent of rated full-load current for 30 seconds in normal operation.
 6. The inverter shall be capable of sustaining 125 percent of system capacity for 60 seconds while powered from the battery.
 7. Should overloads persist past the time limitations, the automatic static transfer switch shall switch the load to the bypass output of the UPS. When the fault has cleared, the static bypass transfer switch shall return the load to the UPS system.
 8. If the battery is disconnected, the UPS shall supply power to the load from the normal supply with no degradation of its regulation of voltage and frequency of the output bus.
- B. Manual operation includes the following:
1. Turning the inverter off causes the static bypass transfer switch to transfer the load directly to the normal ac supply circuit without disturbance or interruption.
 2. Turning the inverter on causes the static bypass transfer switch to transfer the load to the inverter.
- C. Maintenance Bypass/Isolation Switch Operation: Switch is interlocked so it cannot be operated unless the static bypass transfer switch is in the bypass mode. Provide "kirk key" trapped-key interlock system (solenoid key release unit – SKRU) or approved equal. Device provides manual selection among the three conditions described below without interrupting supply to the load during switching:
1. Full Isolation: Load is supplied, bypassing the UPS. Normal UPS ac input circuit, static bypass transfer switch, and UPS load terminals are completely disconnected from external circuits.
 2. Maintenance Bypass: Load is supplied, bypassing the UPS. UPS ac supply terminals are energized to permit operational checking, but system load terminals are isolated from the load. Maintenance bypass panel shall located be in a standalone cabinet.
 3. Normal: Normal UPS ac supply terminals are energized and the load is supplied through the static bypass transfer switch and the UPS rectifier-charger and inverter, or the battery and the inverter.
- D. Environmental Conditions: The UPS shall be capable of operating continuously in the following environmental conditions without mechanical or electrical damage or degradation of operating capability, except battery performance:
1. Ambient Temperature for Electronic Components: 32 to 104 deg F.
 2. Ambient Temperature for Battery: 41 to 95 deg F.
 3. Relative Humidity: Zero to 95 percent, noncondensing.
 4. Altitude: Sea level to 3300 feet.

2.2 PERFORMANCE REQUIREMENTS

- A. UL Compliance: Listed and labeled by an NRTL to comply with UL 1778.
- B. NFPA Compliance: UPS components shall be listed and labeled by an NRTL as suitable for installation in computer rooms according to NFPA 75.
- C. The UPS shall perform as specified in this article while supplying rated full-load current, composed of any combination of linear and nonlinear load, up to 100 percent nonlinear load with a maximum load crest factor of 3.0, under the following conditions or combinations of the following conditions:
 - 1. Inverter is switched to battery source.
 - 2. Steady-state ac input voltage deviates up to plus or minus 10 percent from nominal voltage.
 - 3. Steady-state input frequency deviates up to plus or minus 5 percent from nominal frequency.
 - 4. THD of input voltage is 15 percent or more with a minimum crest factor of 3.0, and the largest single harmonic component is a minimum of 5 percent of the fundamental value.
 - 5. Load is 100 percent unbalanced continuously.
- D. Minimum Duration of Supply: If battery is sole energy source supplying rated full-load UPS current at unity power factor, duration of supply is 30 minutes.
- E. Input Voltage Tolerance: System steady-state and transient output performance remains within specified tolerances when steady-state ac input voltage varies plus 10 percent and minus 15 percent from nominal voltage.
- F. Overall UPS Efficiency: Equal to or greater than 95 percent at 100 percent load, 95.3 percent at 75 percent load, and 94 percent at 25 percent load.
- G. Maximum Acoustical Noise: 70dBA, emanating from any UPS component under any condition of normal operation, measured 5 ft. from nearest surface of component enclosure.
- H. AC Output-Voltage Regulation for Loads 100 Percent Unbalanced: Maximum of plus or minus 2 percent over the full range of battery voltage.
- I. AC Output-Voltage Regulation for Loads 100 Percent Balanced: Maximum of plus or minus 1 percent over the full range of battery voltage.
- J. Output Frequency: 60 Hz, plus or minus 0.1 percent over the full range of input voltage, load, and battery voltage.
- K. Limitation of harmonic distortion of input current to the UPS shall be as follows:
 - 1. Description: Rectifier-charger circuits shall limit THD to 5 percent, maximum, at rated full-load UPS current, for power sources with X/R ratio between 2 and 30. Provide tuned harmonic filter if required to meet harmonic distortion limit.

- L. Maximum Harmonic Content of Output-Voltage Waveform: 5 percent rms total and 3 percent rms for any single harmonic, for rated full load with THD up to 50 percent, with a load crest factor of 3.0.
- M. Maximum Output-Voltage Transient Excursions from Rated Value: For the following instantaneous load changes, stated as percentages of rated full UPS load, voltage shall remain within stated percentages of rated value and recover to, and remain within, plus or minus 2 percent of that value within 50 ms:
 - 1. 50 Percent: Plus or minus 3 percent.
 - 2. 100 Percent: Plus or minus 5 percent.
 - 3. Loss of AC Input Power: Plus or minus 1 percent.
 - 4. Restoration of AC Input Power: Plus or minus 1 percent.
- N. Input Power Factor: A minimum of 0.90 lagging when supply voltage and current are at nominal rated values and the UPS is supplying rated full-load current without additional filters.
- O. EMI Emissions: Comply with FCC rules and regulations and with 47 CFR 15 for Class A equipment.

2.3 UPS SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit, 93PM series.
 - 2. Square D; a brand of Schneider Electric. Galaxy VS series.
 - 3. ABB Electrification, TLE series.
- B. Description: Self-contained, battery backup device and accessories that provides three-phase electrical power in the event of failure or sag in the normal power system.
- C. Electronic Equipment: Solid-state devices using hermetically sealed, semiconductor elements. Devices include rectifier-charger, inverter, static bypass transfer switch, and system controls.
- D. Enclosures: Comply with NEMA 250, Type 12 or IP52 equivalent, unless otherwise indicated.
- E. Configuration: Multicabinet modular style units.
- F. Control Assemblies: Mount on modular plug-ins, readily accessible for maintenance.
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- H. Output Circuit Neutral Bus, Conductor, and Terminal Ampacity: Rated phase current times a multiple of 1.73, minimum.

2.4 SURGE SUPPRESSION

- A. Protect internal UPS components from surges that enter at each ac power input connection including main disconnect switch, static bypass transfer switch, and maintenance bypass/isolation switch. Protect rectifier-charger, inverter, controls, and output components.
 - 1. Use factory-installed surge suppressors tested according to IEEE C62.41.1 and IEEE C62.41.2, Category B.
 - 2. Additional Surge Protection: Protect internal UPS components from low-frequency, high-energy voltage surges described in IEEE C62.41.1 and IEEE C62.41.2. Design the circuits connecting with external power sources and select circuit elements, conductors, conventional surge suppressors, and rectifier components and controls so input assemblies will have adequate mechanical strength and thermal and current-carrying capacity to withstand stresses imposed by 400-Hz, 180 percent voltage surges described in IEEE C62.41.1 and IEEE C62.41.2.

2.5 RECTIFIER-CHARGER

- A. Description: Voltage source converter,- IGBT rectifier.
- B. Capacity: Adequate to supply the inverter during rated full output load conditions and simultaneously recharge the battery from fully discharged condition to 95 percent of full charge within 10 times the rated discharge time for duration of supply under battery power at full load.
- C. Output Ripple: Limited by output filtration to less than 1.0 percent of rated current, peak to peak.
- D. Control Circuits: Immune to frequency variations within rated frequency ranges of normal and emergency power sources.
 - 1. Response Time: Field adjustable for maximum compatibility with local generator-set power source.
- E. Battery Float-Charging Conditions: Comply with battery manufacturer's written instructions for battery terminal voltage and charging current required for maximum battery life. The battery charger shall be matched to the battery type supplied.

2.6 INVERTER

- A. Description: Pulse-width modulated, IGBT with sinusoidal output. Include a bypass phase synchronization window adjustment to optimize compatibility with local engine-generator-set power source.

2.7 CONTROLS AND INDICATIONS

- A. Description: Group displays, indications, and basic system controls on a common control panel on front of UPS enclosure.

- B. Minimum displays, indicating devices, and controls include those in lists below. Provide sensors, transducers, terminals, relays, and wiring required to support listed items. Alarms include audible signals and visual displays.
- C. Indications: Plain-language messages on a digital LCD.
 - 1. Quantitative indications shall include the following:
 - a. Input voltage, each phase, line to line.
 - b. Input current, each phase, line to line.
 - c. Bypass input voltage, each phase, line to line.
 - d. Bypass input frequency.
 - e. System output voltage, each phase, line to line.
 - f. System output current, each phase.
 - g. System output frequency.
 - h. DC bus voltage.
 - i. Battery current and direction (charge/discharge).
 - j. Elapsed time discharging battery.
 - 2. Basic status condition indications shall include the following:
 - a. Normal operation.
 - b. Load-on bypass.
 - c. Load-on battery.
 - d. Inverter off.
 - e. Alarm condition.
 - 3. Alarm indications shall include the following:
 - a. Bypass ac input overvoltage or undervoltage.
 - b. Bypass ac input overfrequency or underfrequency.
 - c. Bypass ac input and inverter out of synchronization.
 - d. Bypass ac input wrong-phase rotation.
 - e. Bypass ac input single-phase condition.
 - f. Bypass ac input filter fuse blown.
 - g. Internal frequency standard in use.
 - h. Battery system alarm.
 - i. Control power failure.
 - j. Fan failure.
 - k. UPS overload.
 - l. Battery-charging control faulty.
 - m. Input overvoltage or undervoltage.
 - n. Input circuit breaker tripped.
 - o. Input wrong-phase rotation.
 - p. Input single-phase condition.
 - q. Approaching end of battery operation.
 - r. Battery undervoltage shutdown.
 - s. Maximum battery voltage.
 - t. Inverter fuse blown.
 - u. Inverter transformer overtemperature.
 - v. Inverter overtemperature.

- w. Static bypass transfer switch overtemperature.
 - x. Inverter power supply fault.
 - y. Inverter transistors out of saturation.
 - z. Identification of faulty inverter section/leg.
 - aa. Inverter output overvoltage or undervoltage.
 - bb. UPS overload shutdown.
 - cc. Inverter current sensor fault.
 - dd. Inverter output contactor open.
 - ee. Inverter current limit.
4. Controls shall include the following:
- a. Inverter on-off.
 - b. UPS start.
 - c. Battery test.
 - d. Alarm silence/reset.
 - e. Output-voltage adjustment.
- D. Dry-form "C" contacts shall be available for remote indication of the following conditions:
- 1. UPS on battery.
 - 2. UPS on-line.
 - 3. UPS load-on bypass.
 - 4. UPS in alarm condition.
 - 5. UPS off (maintenance bypass closed).
- E. Emergency Power off Switch: Capable of local operation and operation by means of activation by external dry contacts.

2.8 STATIC BYPASS TRANSFER SWITCH

- A. Description: Solid-state switching device providing uninterrupted transfer with a contactor or electrically operated circuit breaker to automatically provide electrical isolation for the switch.
- B. Switch Rating: Continuous duty at the rated full-load UPS current, minimum.

2.9 BATTERY

- A. Description: Valve-regulated lead acid, heavy-duty, industrial, complete with battery disconnect switch and intercell connectors.
 - 1. Factory assembled in an external cabinet.
 - 2. Arrange for drawout removal of battery assembly from cabinet for testing and inspecting.

2.10 BASIC BATTERY MONITORING

- A. Description: Continuous, real-time capture of battery performance data.

- B. Battery Ground-Fault Detector: Initiates alarm when resistance to ground of positive or negative bus of battery is less than 5000 ohms.
- C. Battery compartment high-temperature detector initiates an alarm when a temperature greater than 167 deg F occurs within the compartment.
- D. Annunciation of Alarms: At UPS control panel and remotely.

2.11 BATTERY-CYCLE WARRANTY MONITORING

- A. Description: Electronic device, acceptable to battery manufacturer as a basis for warranty action, for monitoring of charge-discharge cycle history of batteries covered by cycle-life warranties.
- B. Performance: Automatically measure and record each discharge event, classify it according to duration category and total discharges according to warranty criteria, and display remaining warranted battery life on front panel display.

2.12 SOURCE QUALITY CONTROL

- A. Factory test complete UPS system before shipment. Include the following:
 - 1. Test and demonstration of all functions, controls, indicators, sensors, and protective devices.
 - 2. Full-load test.
 - 3. Transient-load response test.
 - 4. Overload test.
 - 5. Power failure test.
- B. Report test results. Include the following data:
 - 1. Description of input source and output loads used. Describe actions required to simulate source load variation and various operating conditions and malfunctions.
 - 2. List of indications, parameter values, and system responses considered satisfactory for each test action. Include tabulation of actual observations during test.
 - 3. List of instruments and equipment used in factory tests.

2.13 COMMUNICATIONS

- A. Provide communications card(s) for both MODBUS RTU and MODBUS TCP/IP ethernet connection to The District's network for remote monitoring. Provide all required software and licensing to The District.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the UPS.
- B. Comply with NECA 1.
- C. Wiring Method: Install cables in raceways except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
 - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
 - 2. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- F. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NFPA 70.
- G. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams unless otherwise indicated. Apply oxide inhibitor on battery terminals.
- H. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
 - 1. Identify each battery unit and its position within the battery string.

3.2 GROUNDING

- A. Ground equipment in accordance with manufacturer's requirements. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.3 BATTERY INITIALIZATION

- A. Initialize and charge VRLA batteries according to the battery manufacturer's written instructions and IEEE 1188. Do not perform an equalizing charge unless specifically required by the battery manufacturer. Record total battery-string voltage and individual battery-unit voltages.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Tests and Inspections:
 - 1. Inspect interiors of enclosures, including the following:
 - a. Inspect anchorage, alignment, grounding, and required clearances.
 - b. Component type and labeling verification.
 - c. Ratings of installed components.
 - 2. Test electrical and mechanical interlock systems for correct operation and sequencing.
 - 3. Test static transfer from inverter to bypass and back. Use normal load, if possible.
 - 4. Test dc undervoltage trip level on inverter input breaker. Set according to manufacturer's published data.
 - 5. Verify synchronizing indicators for static switch and bypass switches.
 - 6. Test the VRLA battery system. Testing procedures and acceptance criteria shall comply with IEEE 1188 and the battery manufacturer's written recommendations.
 - a. Verify adequacy of battery support racks, mounting, anchorage, alignment, grounding, and clearances.
 - b. Verify all charger functions and alarms.
 - c. Measure the voltage of each battery unit and the total battery-string voltage with the charger energized and in float mode of operation.
 - d. Perform a load test in accordance with IEEE 1188 and the battery manufacturer's published procedures.
 - e. Measure the charger float-voltage level and adjust it to the battery manufacturer's recommended setting.
 - f. Test values.
 - 1) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) The charger float-voltage level shall be according to the battery manufacturer's published data.
 - 3) The results of charger functions and alarms shall be according to manufacturer's published data.
 - 4) Battery-unit voltages shall be within the battery manufacturer's published tolerances.
 - 5) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 6) Battery-unit internal ohmic values (resistance, impedance, or conductance) shall be evaluated in accordance with IEEE 1188 and shall be within the battery manufacturer's published acceptance limits.
 - 7) Results of load tests shall comply with IEEE 1188 and the battery manufacturer's published acceptance criteria.

7. Test communication of status and alarms to remote monitoring equipment.
 8. Load the system using a variable-load bank to simulate kilovolt amperes, kilowatts, and power factor of loads for unit's rating. Use instruments calibrated within the previous six months according to NIST standards.
 - a. Simulate malfunctions to verify protective device operation.
 - b. Test duration of supply on emergency, low-battery voltage shutdown, and transfers and restoration due to normal source failure.
 - c. Test harmonic content of input and output current at 25, 50, and 100 percent of rated loads.
 - d. Test output voltage under specified transient-load conditions.
 - e. Test efficiency at 50, 75, and 100 percent of rated loads.
 - f. Test remote status and alarm panel functions.
 - g. Test battery-monitoring system functions.
- C. The UPS system will be considered defective if it does not pass tests and inspections.
- D. Record of Tests and Inspections: Maintain and submit documentation of tests and inspections, including references to manufacturers' written instructions and other test and inspection criteria. Include results of tests, inspections, and retests.
- E. Prepare test and inspection reports.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the UPS.

END OF SECTION 263353

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, and drivers.

1.2 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, and finishes.
- B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide products as indicated on Drawings or Engineer approved equal.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to

prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

2.3 LED DRIVERS

A. LED Electronic Drivers shall be UL approved and shall have the following characteristics:

1. Electronic with Input Voltage range as shown on the drawings $\pm 10\%$, 50/60 Hz, with primary fusing.
2. Output Drive Current shall be 350mA maximum, $\pm 5\%$.
3. Power Factor shall be $>90\%$ at full load with THD $<20\%$ at full load
4. Load regulation shall be $\pm 1\%$ from no load to full load
5. Output shall be isolated
6. Case temperature shall be rated for -40°C through $+80^{\circ}\text{C}$ and provided with thermal protection and self-limited short circuit and overload protection.
7. Driver Life Rating shall have less than 0.5% failure rate at the LED module's maximum L70 rated life.
8. Dimming Range: 100 to 10 percent of rated lamp lumens.

B. Driver Manufacturer

Drivers shall be considered acceptable for approval as manufactured by the following LED Driver manufacturers.

1. Advance Transformer Co.
2. Magtech
3. Thomas Research Products (TRP)
4. Osram/Sylvania

2.4 LED FIXTURES

A. Life Rating (L_{70}) – Provide L_{70} documentation, defined as time of operation (in hours) to 30% lumen depreciation (70% lumen maintenance), derived from temperature measurement testing under UL1598 environments and directly correlated to LED package manufacturers IESNA LM-80-08 data.

B. Mechanical – Housing shall be designed specifically for use with LED components and incorporate high performance Thermal Management methods, i.e. heat sink(s). No active thermal management/cooling features (i.e. fans), etc. will be allowed. Luminaire configuration shall allow for modular replacement and/or field repair of all electrical components (i.e. LED modules, Drivers, etc.).

C. LED Module Manufacturers

LED modules considered acceptable for approval are as manufactured by the following LED component (chip) manufacturers.

1. Nichia Corporation.

2. Cree, Inc
3. Philips LumiLED
4. Osram Opto Semiconductors

2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls.
- B. Comply with NFPA 70 for minimum fixture supports.
- C. Recessed Fixture Support
 1. All recessed lighting fixtures shall be independently supported from the ceiling grid or framing system. Each fixture shall have a minimum of two #12 AWG wires supporting opposite corners of the fixture and attached to the structure above.

END OF SECTION 265100

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES, VIRGINIA
PROJECT NUMBER 0305



PACE COLLABORATIVE
MECHANICAL / ELECTRICAL ENGINEERS

DRAWING INDEX		
SHEET No.	DRAWING	DRAWING TITLE
1	T001	TITLE SHEET
2	G001	LOCATION MAP
3	E001	NOTES
4	E002	LEGENDS AND ABBREVIATIONS
5	ED100	PARTIAL ONE-LINE DIAGRAM - BUILDING #3 - DEMOLITION
6	ED201	ELECTRICAL EQUIPMENT ROOM FLOOR PLAN - DEMOLITION
7	ED202	FAN ROOM FLOOR PLAN - DEMOLITION
8	ED203	TUNNEL LIGHTING CONTROL ROOM FLOOR PLAN - DEMOLITION
9	E100	PARTIAL ONE-LINE DIAGRAM - BUILDING #3 - NEW WORK
10	E201	ELECTRICAL EQUIPMENT ROOM FLOOR PLAN - NEW WORK
11	E202	FAN ROOM FLOOR PLAN - NEW WORK
12	E203	TUNNEL LIGHTING CONTROL ROOM FLOOR PLAN - NEW WORK
13	E801	DETAILS AND SCHEDULES

GENERAL CONTRACT NOTES:	
1.	COORDINATE CONTRACTOR PARKING AND THE LOCATION FOR ANY CONSTRUCTION OFFICES OR STORAGE TRAILERS WITH THE OWNER. CONTRACTOR SHALL NOT BLOCK ANY PARKING AREAS OR DRIVE AISLES, OR INTERFERE WITH THE TRAFFIC FLOW AROUND THE BUILDINGS WITHOUT PRIOR APPROVAL AND COORDINATION WITH THE OWNER.
2.	CONTRACTOR MUST PROVIDE SAFETY TAPE AND BARRIERS AROUND AREAS OF WORK. ALL EQUIPMENT AND MATERIALS MUST BE SECURED FROM THEFT AND VANDALISM.
3.	CONTRACTOR SHALL CONTROL WORKERS ON SITE AT ALL TIMES. WORKERS SHALL BE RESTRICTED TO THE WORKING AREAS ONLY.
4.	WORK AREAS SHALL BE CLEANED WHEN WORK HAS BEEN COMPLETED OR ON A DAILY BASIS, WHICHEVER MAINTAINS THE CLEANEST AND MOST PROFESSIONAL WORK ENVIRONMENT. CONTRACTOR SHALL NOT USE ANY BUILDING DUMPSTER FOR DISPOSAL OF DEBRIS/TRASH. CONTRACTOR SHALL FURNISH MEANS FOR DISPOSAL OF DEBRIS OR TRASH TO A SUITABLE LOCATION OFF-SITE AND ANY ASSOCIATED FEES INCURRED.

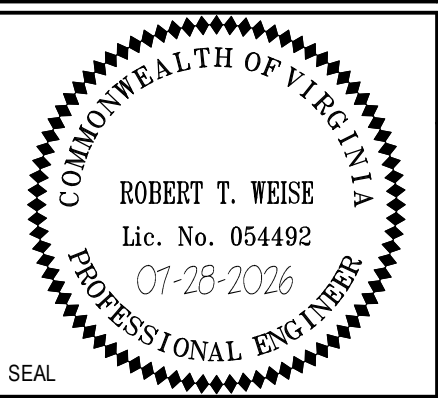
GENERAL NOTE:	
WORK SHOWN IN THIS SET OF CONTRACT DOCUMENTS IS BASED ON PORTAL ISLAND BUILDING #3. THIS WORK IS TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.	



1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222

Designed By:	RTW
Drawn By:	JAC
Checked By:	JSB
Scale:	AS NOTED
Date:	07-28-2026



REVISIONS		DESCRIPTION	
No.	DATE		

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES

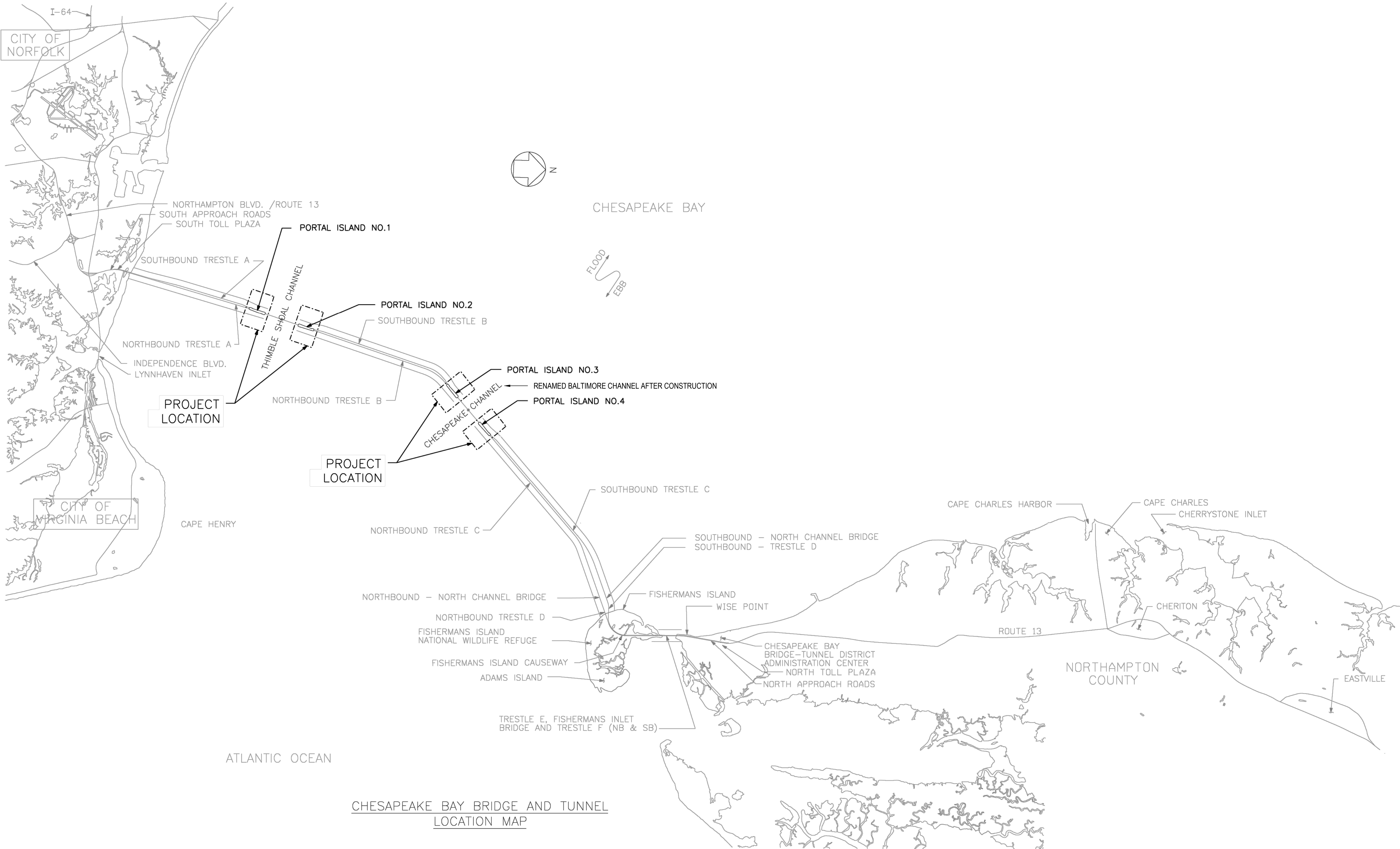
VIRGINIA

TITLE SHEET

PROJECT No: 26007

T001

SHEET 1 OF 13



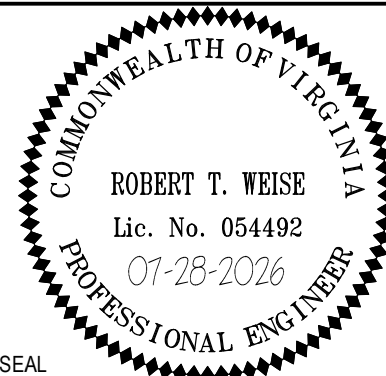
CHESAPEAKE BAY BRIDGE AND TUNNEL
LOCATION MAP



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No.	REVISIONS		DATE	DESCRIPTION

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS

VIRGINIA

CAPE CHARLES

LOCATION MAP

PROJECT No: 26007

GENERAL NOTE:
WORK SHOWN IN THIS SET OF CONTRACT DOCUMENTS IS
BASED ON PORTAL ISLAND BUILDING #3. THIS WORK IS
TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.

GENERAL ELECTRICAL NOTES

GENERAL: UNLESS SPECIFICALLY INDICATED OTHERWISE, ALL WORK SHOWN ON ELECTRICAL DRAWINGS IS NEW WORK TO BE PROVIDED UNDER THIS CONTRACT.

COORDINATION: CONTRACTOR SHALL COORDINATE AND COOPERATE WITH ALL TRADES ON THE PROJECT. THE CONTRACTOR SHALL REVIEW ALL CONTRACT DOCUMENTS INCLUDING DRAWINGS AND SPECIFICATIONS. CONTRACTOR SHALL COORDINATE AND ADJUST ACCORDINGLY AS DIRECTED BY THE ENGINEER/OWNER.

AS-BUILT DRAWINGS: CONTRACTOR SHALL SECURE AN EXTRA SET OF ELECTRICAL DRAWINGS TO BE KEPT ON SITE AND MARK, DAILY, THE DRAWINGS IN RED AS THE PROJECT PROGRESSES IN ORDER TO KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DRAWINGS AND THE WORK WHICH IS ACTUALLY INSTALLED. THESE MARKED DRAWINGS SHALL REFLECT ANY AND ALL CHANGES AND REVISIONS TO THE ORIGINAL DESIGN WHICH EXISTS IN THE COMPLETED WORK. CONTRACTOR SHALL DELIVER THE MARKED DRAWINGS TO THE ENGINEER AT PROJECT CLOSE-OUT.

TESTS: CONTRACTOR SHALL TEST ALL WIRING FOR CONTINUITY AND GROUNDS BEFORE CONNECTING ANY FIXTURES OR DEVICES. CONTRACTOR SHALL PERFORM INSULATION RESISTANCE TESTS ON ALL WIRING #6 OR LARGER TO ENSURE THAT ALL PORTIONS ARE FREE FROM SHORT-CIRCUITS AND GROUNDS.

GROUNDING: CONTRACTOR SHALL PROVIDE GROUNDING IN ACCORDANCE WITH THE NEC FOR THE ENTIRE ELECTRICAL SYSTEM INCLUDING EQUIPMENT FRAMES CONDUITS, SWITCHES, CONTROLLERS, WIRE-WAYS, NEUTRAL CONDUCTORS, AND OTHER EQUIPMENT. CONTRACTOR SHALL PROVIDE A GROUNDING CONDUCTOR IN ALL POWER CONDUITS.

SHORT CIRCUIT AND COORDINATION STUDY: CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING A SHORT CIRCUIT AND COORDINATION STUDY COMPLETED FOR THE AS-BUILT ELECTRICAL DISTRIBUTION SYSTEM (600V AND DOWNSTREAM EQUIPMENT ADDED OR MODIFIED UNDER THIS CONTRACT) BASED UPON ACTUAL EQUIPMENT AND FEEDER LENGTHS INSTALLED. THE STUDY SHALL BE COMPLETED WITH STANDARD COMMERCIAL SOFTWARE, AND INCLUDE RECOMMENDED SETTINGS FOR ALL ADJUSTABLE DEVICES. THE STUDY SHALL BE PERFORMED BY A LICENSED PROFESSIONAL ENGINEER.

FOR EMERGENCY AND LEGALLY REQUIRED STANDBY POWER SYSTEMS, THE STUDY SHALL DEMONSTRATE SELECTIVE COORDINATION WITH SUPPLY SIDE OVERCURRENT PROTECTIVE DEVICES IN ACCORDANCE WITH NFPA 110.

CONTRACTOR SHALL ADJUST ALL BREAKER SETTINGS IN FIELD. NO ELECTRICAL EQUIPMENT SHALL BE ORDERED UNTIL SUBMITTED STUDY IS APPROVED.

EXISTING STUDY WILL BE MADE AVAILABLE TO THE CONTRACTOR AFTER PROJECT IS AWARDED.

LABELS: CONTRACTOR SHALL PROVIDE LABELS FOR ALL TRANSFORMERS, PANELBOARDS, SAFETY SWITCHES AND MOTOR CONTROL CENTERS. LABELS SHALL BE MACHINE ENGRAVED, LAMINATED PLASTIC, PERMANENTLY ATTACHED WITH SELF-TAPPING SCREWS OR RIVETS. DO NOT USE SELF-ADHESIVE LABELS. LABEL SHALL INDICATE EQUIPMENT DESIGNATION AND ASSOCIATED PANEL AND CIRCUIT THAT SERVES IT.

WIRING DEVICES: LABEL ALL WIRING DEVICES WITH PANELBOARD AND CIRCUIT DESIGNATION PERMANENTLY ATTACHED WITH BLACK TYPED DESIGNATION ON CLEAR TAPE.

J-BOX LABELING: CONTRACTOR SHALL LABEL ALL JUNCTION BOXES WITH PERMANENT MARKER IDENTIFYING CIRCUIT NUMBER AND PANELBOARD OF CIRCUITS WITHIN.

PANEL DIRECTORY: CONTRACTOR SHALL PROVIDE TYPEWRITTEN PANELBOARD DIRECTORY CARD IN EACH PANELBOARD ADDED OR MODIFIED WITH CIRCUIT LOAD INFORMATION AND ROOM NUMBER CLEARLY IDENTIFIED. CONTRACTOR SHALL USE ACTUAL ROOM NUMBERS IN THE BUILDING, NOT THE ROOM NUMBERS SHOWN ON THE CONTRACT DRAWINGS, AS THEY ARE OFTEN DIFFERENT.

CONDUCTORS AND MATCHING LUGS: IN SITUATIONS WHERE CONDUCTOR SIZES AND/OR QUANTITIES OF PARALLEL SETS HAVE BEEN INCREASED DUE TO VOLTAGE DROP OR FOR OTHER REASONS, CONTRACTOR SHALL PROVIDE THE APPROPRIATE LUG SIZES/QUANTITIES WITHIN THE EQUIPMENT CONNECTED TO PERMIT SATISFACTORY CONNECTION OF THE INDICATED CONDUCTORS. WHERE SUFFICIENT LUG SIZES AND/OR QUANTITIES CANNOT BE PROVIDED TO ACCOMMODATE THE CONDUCTORS INDICATED, THEN PROVIDE REDUCING ADAPTERS, PIN TERMINALS, OR A JUNCTION BOX TO SPLICE LARGER CONDUCTORS TO APPROPRIATELY SIZED SMALLER CONDUCTORS TO FIT INTO THE LUGS PROVIDED. ALL CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE NEC.

MOTOR DISCONNECTS: ALL MOTORS SHALL HAVE DISCONNECTING MEANS.

CONNECTION DETAILS: CONTRACTOR SHALL SECURE APPROVED SHOP DRAWINGS SHOWING WIRING DIAGRAMS, ROUGH-IN AND HOOK UP DETAILS FROM OTHER INVOLVED CONTRACTORS FOR EQUIPMENT WHICH MUST BE CONNECTED ELECTRICALLY.

COORDINATION DETAILS: MECHANICAL EQUIPMENT WILL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR. THE LOCATIONS SHOWN ON THE ELECTRICAL DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR TO DETERMINE THE EXACT LOCATION OF EACH PIECE OF EQUIPMENT AND DETERMINE THE EXACT ROUGH-IN AND CONNECTION REQUIREMENTS.

WORKING CLEARANCE: CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF ELECTRICAL EQUIPMENT WITH MECHANICAL DUCTWORK, PIPING ETC. AND ASSURE WORKING CLEARANCE REQUIRED BY NEC WILL BE MET. SUFFICIENT ACCESS AND WORKING SPACE SHALL BE PROVIDED AND MAINTAINED AROUND ELECTRICAL EQUIPMENT AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. CONTRACTOR SHALL COORDINATE FINAL LOCATION OF EQUIPMENT PROVIDED AND INSTALLED BY OTHER TRADES.

MATERIAL COORDINATION: CONTRACTOR SHALL VERIFY CEILING AND WALL CONSTRUCTION AND MATERIAL PRIOR TO ORDERING LIGHT FIXTURES, EQUIPMENT, OR OTHER DEVICES TO INSURE PROPER EQUIPMENT OR DEVICE IS FURNISHED TO MATCH CONSTRUCTION.

MOUNTING HEIGHTS: MOUNTING HEIGHTS INDICATED ARE FROM THE FINISHED FLOOR TO THE CENTERLINE OF THE WIRING DEVICE UNLESS OTHERWISE NOTED. MOUNTING HEIGHTS OF LIGHTING FIXTURES ARE TO THE BOTTOM OF THE FIXTURE UNLESS OTHERWISE NOTED.

DEVICE LOCATIONS: CONTRACTOR SHALL COORDINATE LOCATIONS OF SWITCHES, RECEPTACLES, AND TELE/DATA OUTLETS WITH OTHER WALL MOUNTED DEVICES SUCH AS THERMOSTATS AND CONTROL STATIONS.

BARRIERS: WHERE A MULTIPLE-GANG BOX HAS CIRCUITS OF DIFFERENT VOLTAGES OR SYSTEMS WHICH ARE REQUIRED TO BE SEPARATED, CONTRACTOR SHALL PROVIDE THE CODE-REQUIRED SEPARATION USING A FULL HEIGHT AND DEPTH BARRIER PLATE.

CLEAN UP: ON PROJECT CLOSE-OUT, CONTRACTOR SHALL CLEAN ALL ELECTRICAL DEVICES, AND EQUIPMENT AND REMOVE ALL PAINT SPATTERS.

PHASE ROTATION: CONTRACTOR SHALL ENSURE PROPER PHASE ROTATION PRIOR TO ENERGIZING LOADS.

ELECTRICAL DEMOLITION NOTES

DASHED ITEMS: ALL ITEMS SHOWN DASHED ON DEMOLITION PLANS ARE EXISTING AND SHALL BE REMOVED BY THE CONTRACTOR.

SOLID ITEMS: ALL ITEMS SHOWN SOLID ON DEMOLITION PLANS ARE EXISTING TO REMAIN.

CIRCUITING TO REMAIN: EXISTING CIRCUITING TO REMAIN SHALL BE REROUTED OR RECONNECTED BY THE CONTRACTOR, AS REQUIRED, WHERE AFFECTED BY NEW WORK IN ORDER TO MAINTAIN CONTINUITY OF THE CIRCUIT.

EXISTING CONDUIT: ALL EXISTING CONDUITS AND WIRING THAT WILL NOT BE REUSED SHALL BE REMOVED BY THE CONTRACTOR WHERE THEY WILL BE EXPOSED UPON COMPLETION OF NEW WORK. EXISTING CONDUIT TO REMAIN CONCEALED IN WALLS SHALL BE ABANDONED. EXISTING CONDUIT TO REMAIN BELOW FLOOR SLAB SHALL BE CUT OFF ONE INCH BELOW ROUGH FLOOR AND GROUTED FLUSH BY THE CONTRACTOR. ALL EXISTING WIRING IN CONDUITS TO BE ABANDONED SHALL BE DISCONNECTED FROM POWER SOURCE AND REMOVED BY THE CONTRACTOR.

REPAIR DAMAGE: CONTRACTOR SHALL EXERCISE CARE IN REMOVAL OF DEMOLITION ITEMS. CONTRACTOR SHALL REPAIR, AT NO ADDITIONAL COST TO THE OWNER, ANY DAMAGE CAUSED TO EXISTING CONSTRUCTION AND/OR EQUIPMENT TO REMAIN.

ASSOCIATED APPURTENANCES: CONTRACTOR SHALL REMOVE ALL ELECTRICAL APPURTENANCES (DISCONNECTS, STARTERS, WIRING, CONDUIT, ETC.) ASSOCIATED WITH ITEMS TO BE REMOVED.

KNOCKOUT PLUGS AND COVERS: ALL CONDUIT REMOVED SHALL BE REMOVED IN ITS ENTIRETY BY THE CONTRACTOR, INCLUDING FITTINGS, MOUNTING DEVICES, MOUNTING HARDWARE, ETC. CONTRACTOR SHALL PROVIDE CONDUIT PLUGS AND BLANKS FOR ALL OPENINGS CREATED BY THE REMOVAL OF CONDUIT. CONTRACTOR SHALL PROVIDE BLANK COVER PLATES FOR ALL OPENED OUTLET BOXES CREATED BY THE REMOVAL OF EQUIPMENT AND/OR DEVICES

DEMOLISHED MATERIALS: ALL MATERIALS REMOVED UNDER DEMOLITION, NOT TO BE RELOCATED OR DESIGNATED TO BE TURNED OVER TO THE OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED COMPLETELY FROM THE SITE BY THE CONTRACTOR.

SCHEDULE OUTAGES: CONTRACTOR SHALL SCHEDULE ALL WORK AND ALL POWER OUTAGES IN THE EXISTING BUILDINGS AT TIMES CONVENIENT TO THE OWNER WITH A MINIMUM OF 48 HOURS NOTICE.

NOTIFICATION: CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO TURNING OFF ANY CIRCUITS.

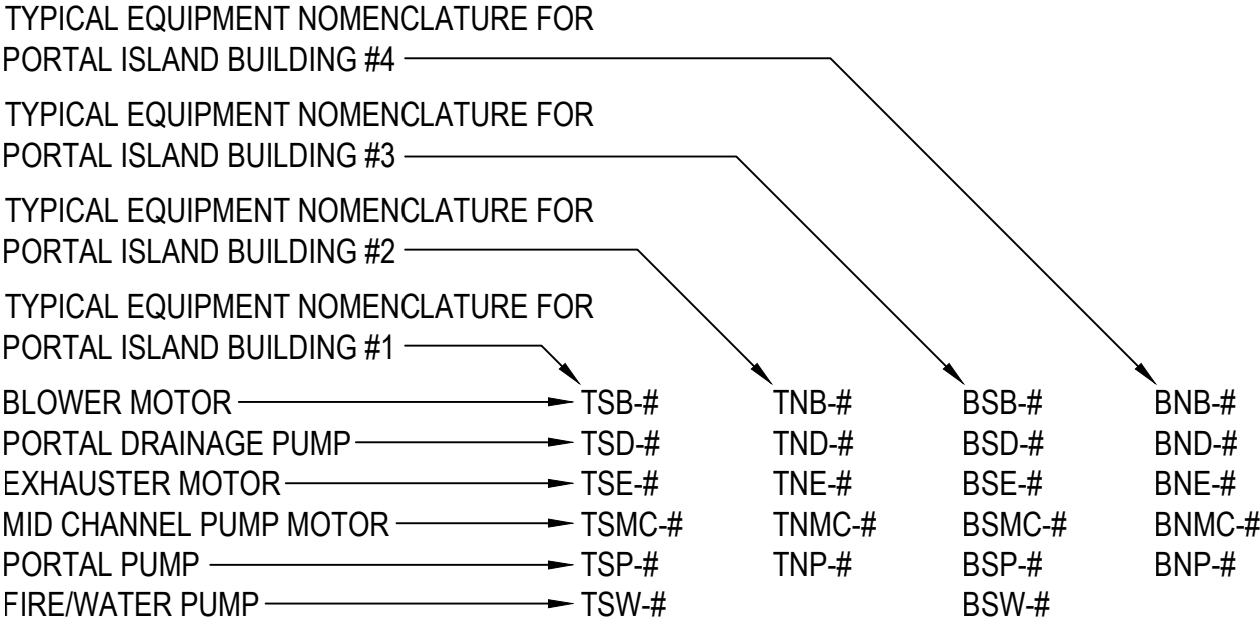
SEQUENCE OF CONSTRUCTION NOTES

- GENERAL NOTES:**
- CONTRACTOR SHALL COORDINATE THE DEMOLITION OF EXISTING EQUIPMENT AND ASSOCIATED CONDUIT, WIRE, ETC. TO ALLOW FOR MINIMAL PLANNED POWER OUTAGES.
 - THE FINAL CONNECTION OF EXISTING PANEL "UPS" SHALL BE PERFORMED AS EXPEDITIOUSLY AS POSSIBLE, NOT TO EXCEED (8) HOURS. DURING FINAL CONNECTION, IT IS UNDERSTOOD EMERGENCY POWER WILL BE UNAVAILABLE. REQUIRED OUTAGES SHALL BE COORDINATED WITH THE DISTRICT A MINIMUM OF FOURTEEN (14) CALENDAR DAYS IN ADVANCE, WITH GOOD WEATHER FORECASTS TO THE EXTENT POSSIBLE. CONTRACTOR SHALL WORK CONTINUOUSLY MULTIPLE SHIFTS AND THROUGH THE NIGHT AS REQUIRED TO COMPLETE THIS PORTION OF THE PROJECT.
 - IN THE EVENT THERE IS A UTILITY OUTAGE BEYOND THE MAXIMUM (8) HOUR PLANNED DOWN TIME, AND THE DISTRICT MUST TAKE EXTRAORDINARY MEASURES TO RESTORE POWER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASSOCIATED COSTS TO RESTORE POWER.
 - THE CONTRACTOR SHALL CAREFULLY COORDINATE THE PROPOSED SEQUENCE OF CONSTRUCTION AND SUBMIT A DETAILED PHASING PLAN WITH PROPOSED SEQUENCE OF CONSTRUCTION, INCLUDING CONTINGENCY PLANS IN THE EVENT OF UNEXPECTED SEVERE WEATHER, TO THE DISTRICT AND THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
 - CONSTRUCTION MAY TAKE PLACE CONCURRENTLY AT ALL FOUR ISLANDS, WITH THE EXCEPTION THAT FINAL CUTOVERS AND OUTAGES SHALL TAKE PLACE AT ONLY ONE PORTAL ISLAND VENT BUILDING AT ANY GIVEN TIME. CONTRACTOR SHALL PERFORM FINAL CUTOVERS AND OUTAGES IN THE FOLLOWING ORDER: ISLAND #3, ISLAND #4, ISLAND #2, ISLAND #1.

PROPOSED SEQUENCE OF CONSTRUCTION:

NOTE: THE INTENT OF THIS SEQUENCE IS TO DISPLAY AN OVERVIEW OF THE PROJECT WITH SUGGESTED PHASING TO MINIMIZE DOWN TIME DURING REQUIRED POWER OUTAGES. FINAL SEQUENCING AND SCHEDULING IS THE RESPONSIBILITY OF THE CONTRACTOR.

- 1: UPS ROOM DEMOLITION**
- COMPLETE DEMOLITION OF EXISTING EQUIPMENT AND DEVICES AS INDICATED ON PLANS.
- 2: INSTALL NEW UPS AND ASSOCIATED EQUIPMENT**
- INSTALL THE FOLLOWING EQUIPMENT:
 - a.a. XFMR "T-UPSH3"
 - a.b. UPS, BATTERY CABINET, AND MAINTENANCE BYPASS PANEL
 - a.c. PANEL "UPSH3"
 - a.d. XFMR "T-UPLS3"
 - a.e. PANEL "CRPP-03"
 - a.f. PANEL "ESL3"
 - RUN ALL ASSOCIATED FEEDERS AND TERMINATE, WITH THE EXCEPTION OF FEEDER TO PANEL "ESL3" (ROUGH-IN CONDUIT AND PULL FEEDER TO THE EXTENT POSSIBLE AS REQUIRED TO MINIMIZE FACILITY OUTAGE FOR FINAL TERMINATIONS).
 - ENERGIZE AND COMMISSION UPS SYSTEM.
- 3: RE-FEED EXISTING PANEL "UPSCR" (ISLANDS #1 AND #3 ONLY)**
- ROUGH-IN CONDUIT FROM EXISTING PANEL "UPSCR" TO PANEL "CRPP-03" AND PULL FEEDER TO THE EXTENT POSSIBLE TO MINIMIZE FACILITY OUTAGE FOR FINAL TERMINATIONS).
 - COORDINATE OUTAGE WITH THE DISTRICT.
 - DE-ENERGIZE EXISTING PANEL "UPSCR" AND TERMINATE FEEDER FROM PANEL "CRPP-03".
 - COMPLETE DEMOLITION OF EXISTING FEEDER FROM PANEL "UPS2A" AS INDICATED ON DRAWINGS.
- 4: FINAL CONNECTIONS TO EXISTING PANEL "UPS" AND PANEL "ESL3"**
- ROUGH-IN CONDUIT EXTENSION FROM EXISTING PANEL "UPS" TO PANEL "UPSH3".
 - COORDINATE OUTAGE WITH THE DISTRICT.
 - DE-ENERGIZE EXISTING UPS AND REMOVE FEEDER WIRING.
 - RUN FEEDER FROM PANEL "UPSH3" TO PANEL UPS AND ENERGIZE.
 - TERMINATE FEEDER TO PANEL "ESL3" AT ESSENTIAL SERVICE BUS.
 - COMPLETE DEMOLITION OF EXISTING UPS.



TYPICAL EQUIPMENT NOMENCLATURE DETAIL

NO SCALE

GENERAL NOTE:

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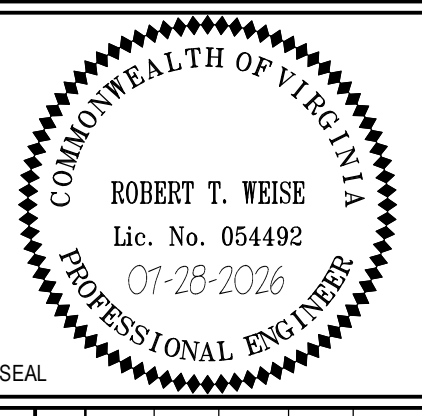
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Drawn By: JAC

Checked By: JSB

Scale: AS NOTED

Date: 07-28-2026



SEAL

No.	DATE	REVISIONS				DESCRIPTION

CHESAPEAKE BAY BRIDGE TUNNEL

REPLACE VENT BUILDING UPS

CAPE CHARLES

VIRGINIA

NOTES

PROJECT No: 26007

E001

SHEET 3 OF 13

MECHANICAL LEGEND AND ABBREVIATIONS

	DETAIL/RISER/ENLARGED PLAN
	SHEET WHERE SHOWN/CUT
CUH-1	CABINET UNIT HEATER DESIGNATION
DSS-1	DUCTLESS SPLIT SYSTEM DESIGNATION
HP-1	HEAT PUMP DESIGNATION
	WALL THERMOSTAT/TEMPERATURE SENSOR
	PIPE TURNING UP
	PIPE TURNING DOWN
	CONDENSATE DRAIN
	REFRIGERANT LIQUID PIPING
	REFRIGERANT SUCTION PIPING
AFF	ABOVE FINISHED FLOOR
CFM	CUBIC FEET PER MINUTE
DB	DRY BULB TEMPERATURE
EAT	ENTERING AIR TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
MBH	1000 BRITISH THERMAL UNITS PER HOUR
MCA	MIN CIRCUIT AMPACITY
MOCp	MAX OVERCURRENT PROTECTION
WB	WET BULB TEMPERATURE
WG	WATER GAUGE
Ø	DIAMETER
°F	DEGREE FAHRENHEIT

ELECTRICAL LEGEND

LIGHTING	
	LIGHTING FIXTURE
	LIGHTING FIXTURE TYPE SYMBOL. SEE LIGHTING FIXTURE DETAILS.
S	SINGLE POLE SWITCH, 20A, 120/277V, 46" AFF UON
POWER	
THE FOLLOWING SUBSCRIPTS SHALL APPLY TO RECEPTACLES WHERE USED:	
• GFI:	GROUND FAULT INTERRUPTING TYPE RECEPTACLE.
• +XX":	DEVICE MOUNTING HEIGHT DESIGNATION ABOVE FINISHED FLOOR IF OTHER THAN 18" OR 46".
• WP:	WEATHER RESISTANT GFI RECEPTACLE WITH WEATHERPROOF WHILE-IN-USE COVER.
• EWC:	ELECTRIC WATER COOLER RECEPTACLE, PROVIDE GROUND FAULT INTERRUPTING TYPE BREAKER. LOCATE BEHIND THE EWC PER MANUFACTURER'S RECOMMENDATIONS.
	DUPLEX CONVENIENCE RECEPTACLE 20A, 120V, 18" AFF, UON
	DUPLEX CONVENIENCE RECEPTACLE 20A, 120V, 46" AFF, UON (OR 6" ABOVE COUNTER OR BACKSPLASH AS APPLICABLE)
	SPECIAL RECEPTACLE, AS NOTED ON PLANS
	EQUIPMENT CONNECTION
	JUNCTION BOX
	MOTOR CONNECTION
	CIRCUIT BREAKER
	CONTACTOR
	MOTOR CONTROLLER
	MULTI-FUNCTION DIGITAL METER
	SAFETY SWITCH, 60A-3P, FU @ 30A, 3R
	ENCLOSED CIRCUIT BREAKER, 60A-3P, 3R
	SURGE PROTECTIVE DEVICE
	ELECTRICAL PANELBOARD
	DRY-TYPE TRANSFORMER
	ELECTRICAL CIRCUIT RUN IN CONDUIT AND CIRCUIT HOMERUN TO PANELBOARD (PANEL AND CIRCUIT DESIGNATION AS INDICATED). AS A MINIMUM CONDITION, EACH SINGLE PHASE CIRCUIT SHALL HAVE 1 #12 PHASE CONDUCTOR, 1 #12 NEUTRAL CONDUCTOR AND 1 #12 GROUNDING CONDUCTOR IN 3/4" CONDUIT. PROVIDE ADDITIONAL PHASE CONDUCTORS AS REQUIRED FOR "MULTIPLE PHASED" ELECTRICAL LOADS. PROVIDE NEUTRAL CONDUCTOR TO ALL WALL SWITCH OUTLET BOXES WHETHER REQUIRED OR NOT. PROVIDE ADDITIONAL "SWITCH LEG" CONDUCTORS TO PROVIDE THE LIGHT FIXTURE CONTROL INDICATED. MULTIPLE SINGLE PHASE CONDUCTORS MAY BE GROUPED TOGETHER IN A COMMON CONDUIT IN ACCORDANCE WITH THE NEC AND AT THE CONTRACTOR'S DISCRETION. GROUNDING CONDUCTORS MAY BE SHARED AS ALLOWED BY THE NEC. NEUTRAL CONDUCTORS SHALL NOT BE SHARED. MULTI-POLE BREAKERS SHALL BE PROVIDED IN ACCORDANCE WITH THE NEC WHERE MULTI-WIRE BRANCH CIRCUITS ARE REQUIRED. CONDUIT LARGER THAN 3/4" AND CONDUCTORS LARGER THAN #12 SHALL BE AS INDICATED.
	MECHANICAL UNIT CONNECTION - SEE SCHEDULE. "XXX" INDICATES UNIT TYPE. "#" INDICATES UNIT NUMBER.

TELECOMMUNICATIONS	
	EXISTING TELE/DATA OUTLET
	EXISTING TELECOMMUNICATIONS BACKBOARD
GENERAL	
	SECTION OR ENLARGED PLAN NOTATION
	ENUMERATION: A = SECTION, 1 = ENLARGED PLAN
	SHEET WHERE SECTION OR ENLARGED PLAN IS SHOWN
	SHEET WHERE SECTION OR ENLARGED PLAN IS CUT
	NEW WORK NOTE SYMBOL
	DEMOLITION NOTE SYMBOL
	NOTE SYMBOL

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ATS	AUTOMATIC TRANSFER SWITCH
BATT	BATTERY CABINET
BIB	BYPASS INPUT BREAKER
C	CONDUIT
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT	CIRCUIT
CB	CIRCUIT BREAKER
DE	DOMINION ENERGY
DSS	DUCTLESS SPLIT SYSTEM
EC	EMPTY CONDUIT
ECB	ENCLOSED CIRCUIT BREAKER
EF	EXHAUST FAN
ETR	EXISTING TO REMAIN
FLA	FULL LOAD AMPS
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HP	HORSE POWER/HEAT PUMP
KAIC	THOUSAND AMPERE INTERRUPTING CAPACITY
KVA	KILO-VOLT-AMPERES
KW	KILO-WATTS
LTG	LIGHTING
MBB	MAINTENANCE BYPASS BREAKER
MBP	MAINTENANCE BYPASS PANEL
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MIB	MAINTENANCE ISOLATION BREAKER
MLO	MAIN LUGS ONLY
MTS	MANUAL TRANSFER SWITCH
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
P	POLE
PF	POWER FACTOR
PNL	PANEL
PNLBD	PANELBOARD
Ø	PHASE
PTST	PARALLEL THIMBLE SHOAL TUNNEL
RECEPT	RECEPTACLE
REQD	REQUIRED
SE	SERVICE ENTRANCE
SEC	SECONDARY
SPD	SURGE PROTECTION DEVICE
SS	STAINLESS STEEL
TFTI	TENANT FURNISHED, TENANT INSTALLED
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
W	WATTS/WIRE
WP	WEATHERPROOF



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COMMONWEALTH OF VIRGINIA
ROBERT T. WEISE
Lic. No. 054492
07-28-2026
PROFESSIONAL ENGINEER
SEAL

No.	REVISIONS		DATE	DESCRIPTION

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES

VIRGINIA

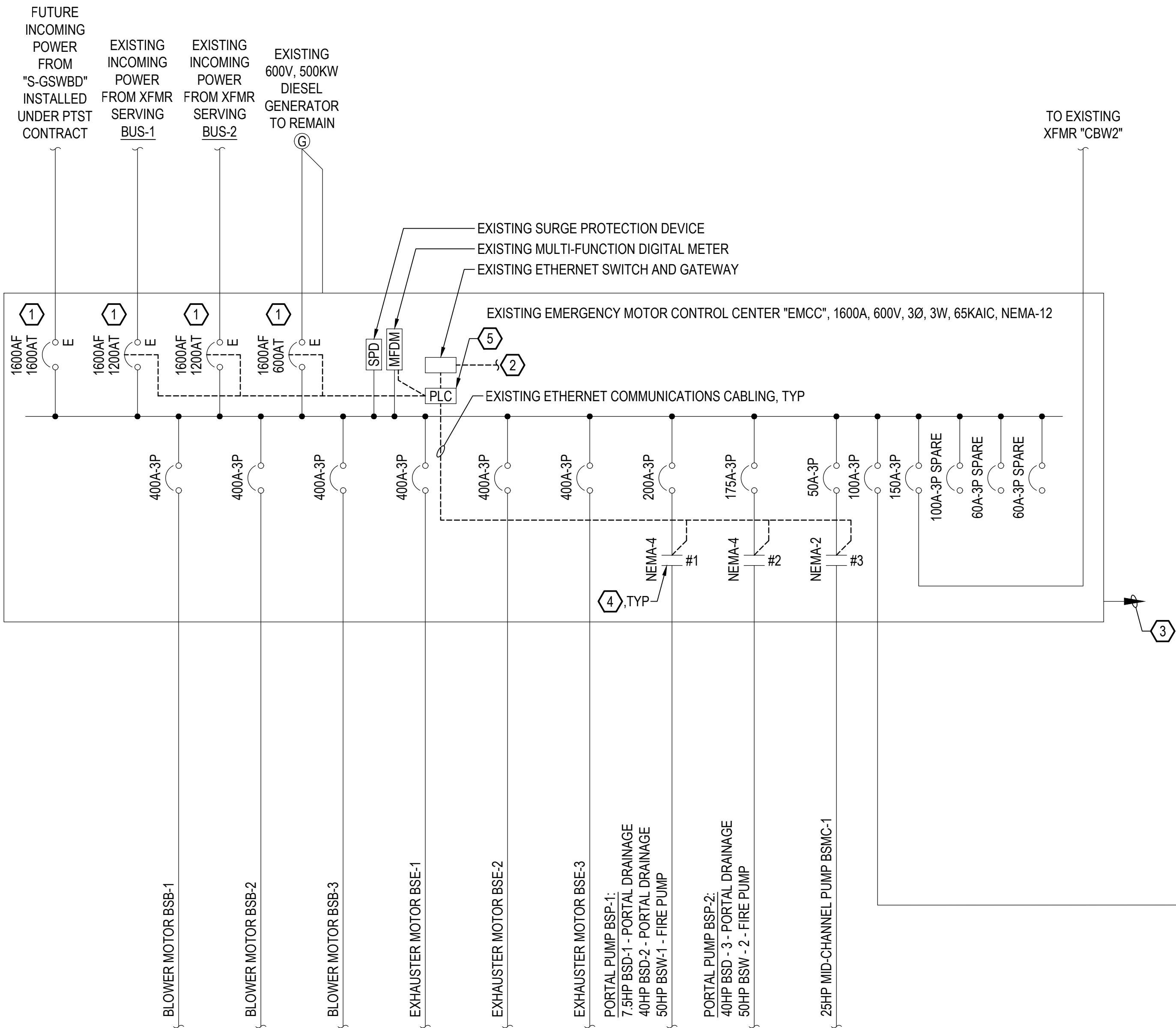
LEGENDS AND ABBREVIATIONS

PROJECT No: 26007

E002

SHEET 4 OF 13

GENERAL NOTE:
WORK SHOWN IN THIS SET OF CONTRACT DOCUMENTS IS
BASED ON PORTAL ISLAND BUILDING #3. THIS WORK IS
TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.



PARTIAL ONE-LINE DIAGRAM - BUILDING #3 - DEMOLITION
NO SCALE

NOTES THIS SHEET

- EXISTING INSULATED CASE, ELECTRICALLY OPERATED BREAKER.
- EXISTING CAT-5E CABLE IN 3/4" C TO EXISTING SCADA SYSTEM (AT EXISTING CNC CABINET LOCATED IN TUNNEL LIGHTING CONTROL ROOM).
- EXISTING 2 #12 - 3/4" C TO EXISTING DC LIGHTING PANEL LOCATED IN CONTROL ROOM.
- EXISTING CONTACTOR WITH COMMUNICATIONS CARD/DEVICE TO ALLOW CONTACTOR COIL TO ENERGIZE/DE-ENERGIZE VIA NETWORK COMMUNICATIONS.
- EXISTING AUTO-TRANSFER AND INHIBIT PLC.
- QUANTITY AND SIZE OF UPS SYSTEM CABINETS VARIES BY ISLAND. CONTRACTOR SHALL REMOVE ALL COMPONENTS AND INTERCONNECTING CONDUIT AND WIRE COMPLETE.

GENERAL NOTE:

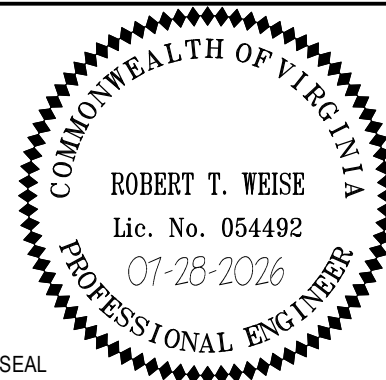
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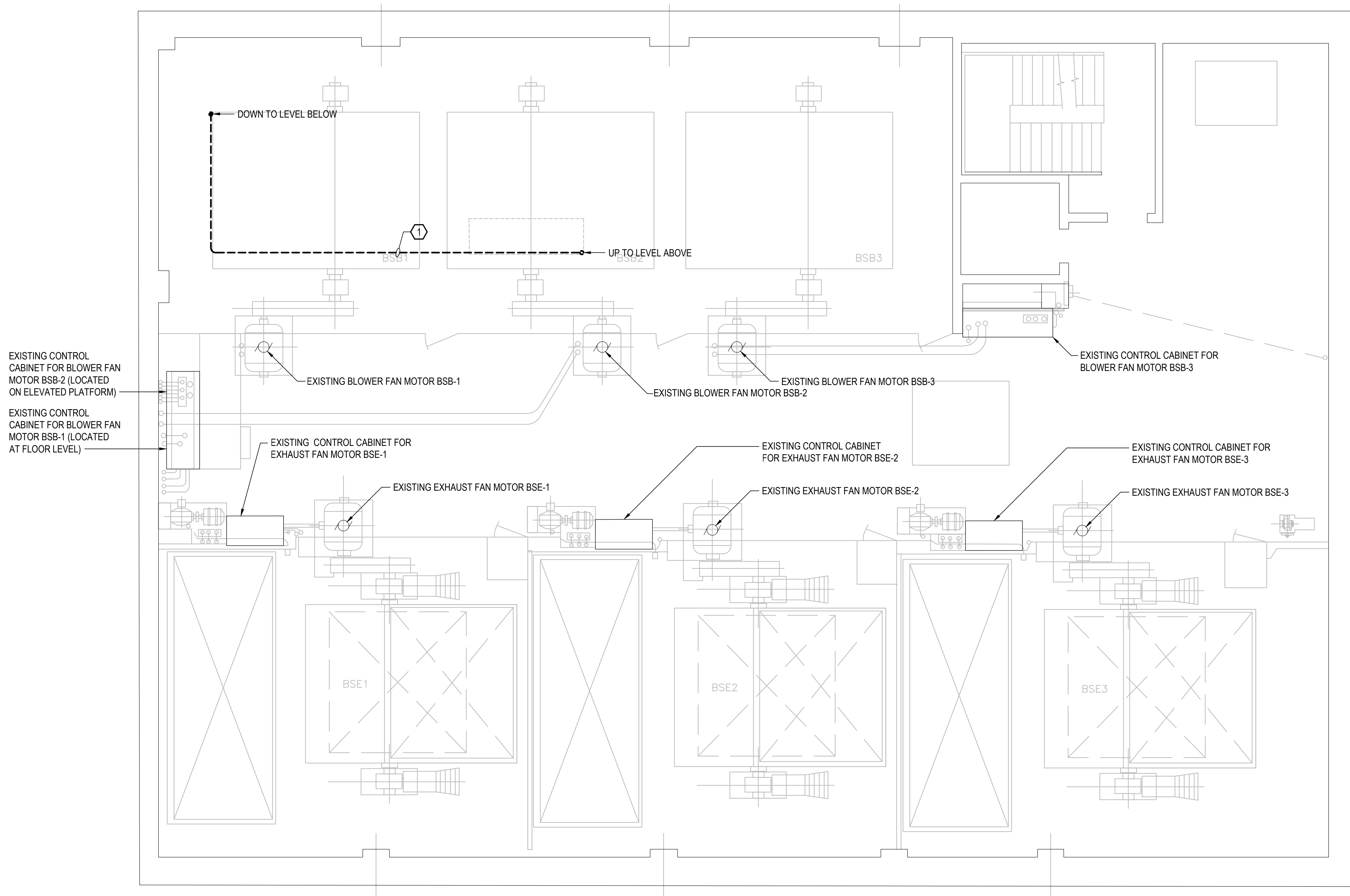


No.	REVISIONS	
	DATE	DESCRIPTION

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES
VIRGINIA
PARTIAL ONE-LINE DIAGRAM - BUILDING #3 - DEMOLITION

PROJECT No: 26007

ED100



FAN ROOM FLOOR PLAN - DEMOLITION (ELEVATION +17.0')
SCALE: APPROXIMATELY 1/4" = 1'-0" (CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS)

NOTES THIS SHEET

- 1 REMOVE EXISTING FEEDER FROM ESSENTIAL SERVICE BUS TO EXISTING UPS - SAVE CONDUIT FOR REUSE.



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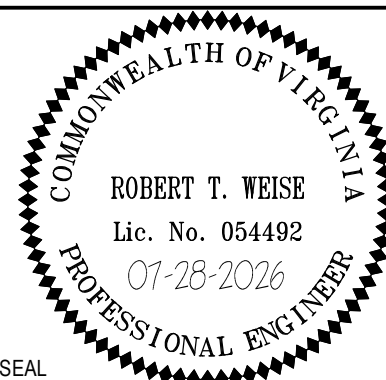
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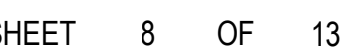
CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES
VIRGINIA
FAN ROOM FLOOR PLAN - DEMOLITION

PROJECT No: 26007

GENERAL NOTE:

WORK SHOWN IN THIS SET OF CONTRACT DOCUMENTS IS BASED ON PORTAL ISLAND BUILDING #3. THIS WORK IS TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.

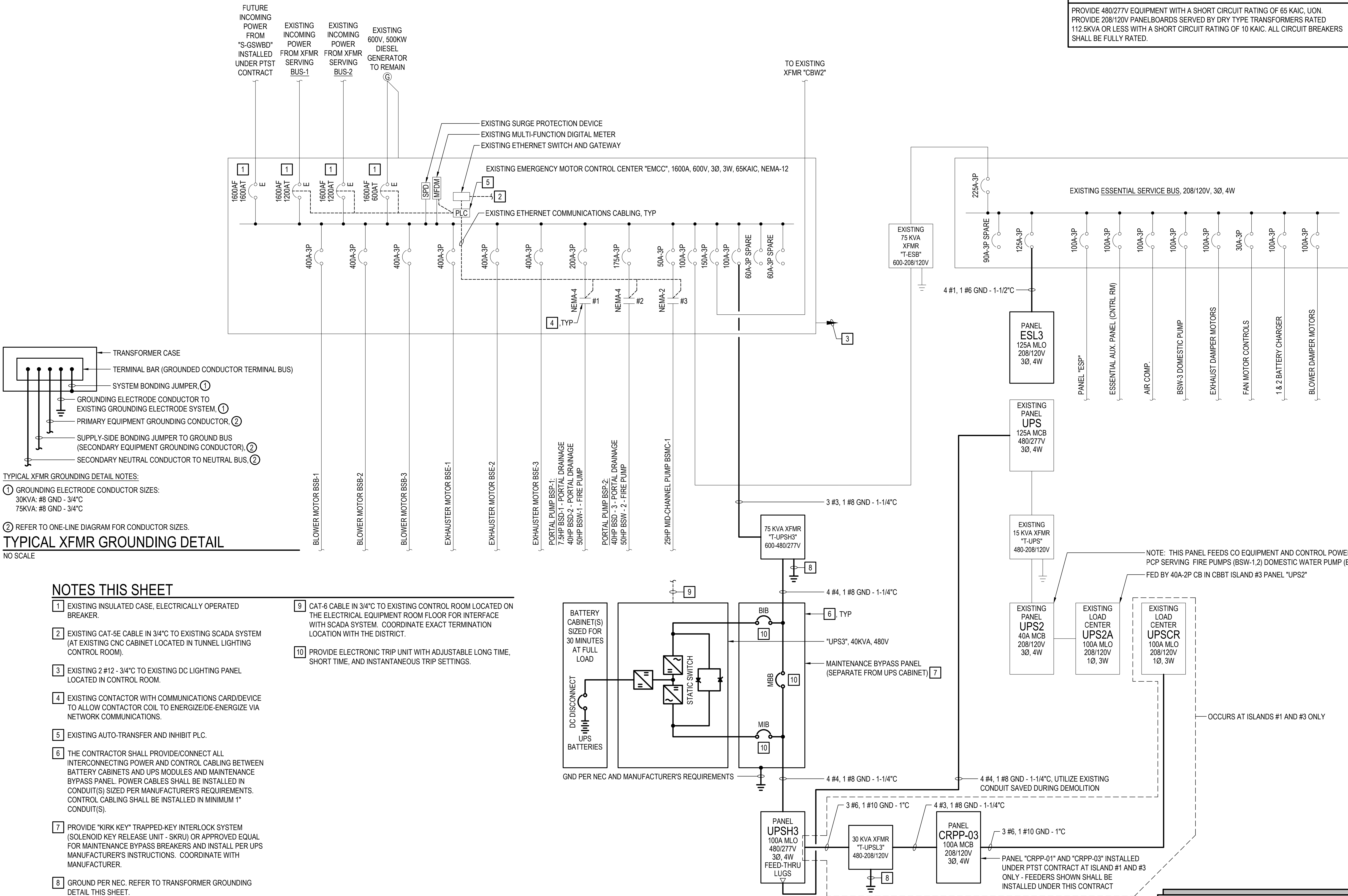
ED202



7 REMOVE FEEDER FROM EXISTING UPS TO ESSENTIAL SERVICE BUS, SAVE CONDUIT FOR REUSE.



WORK SHOWN IN THIS SET OF CONTRACT DOCUMENTS IS
BASED ON PORTAL ISLAND BUILDING #3. THIS WORK IS
TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.



FAULT CURRENT NOTE:

PROVIDE 480/277V EQUIPMENT WITH A SHORT CIRCUIT RATING OF 65 KAIC, UON. PROVIDE 208/120V PANELBOARDS SERVED BY DRY TYPE TRANSFORMERS RATED 112.5KVA OR LESS WITH A SHORT CIRCUIT RATING OF 10 KAIC. ALL CIRCUIT BREAKERS SHALL BE FULLY RATED.



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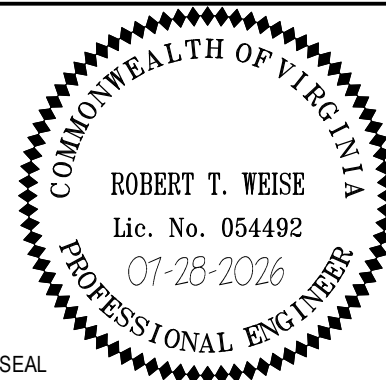
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Date: 07-28-2026



No.	DATE	DESCRIPTION

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES
VIRGINIA
PARTIAL ONE-LINE DIAGRAM - BUILDING #3 - NEW WORK

PROJECT No: 26007

E100

SHEET 9 OF 13

ELECTRICAL CONNECTION SCHEDULE										
TAG	MCA	LOAD	MOCP	FLA	VOLTS	Ø	CIRCUIT #	CONNECTION	CONDUIT AND WIRE	NOTES
DSS-1	-	-	-	-	208	1	NOTE-3	NOTE-3	NOTE-3	1,2
HP-1	22.0		35	17.6	208	1	ESL3-4	60A-2P, FU@35A, 4X SS	2 #8, 1 #10 GND - 3/4"C	1,2
DH-1	2.8		15	2.2	120	1	ESL3-2	NEMA 5-20R	2 #12, 1 #12 GND - 3/4"C	1
NOTES: 1. COORDINATE ALL CONNECTIONS TO EQUIPMENT WITH MECHANICAL SUB-CONTRACTOR AND APPROVED SHOP DRAWINGS. 2. OUTDOOR UNIT PROVIDES POWER TO INDOOR UNIT. 3. PROVIDE 20A-3P MOTOR RATED SWITCH AT INDOOR UNIT OR DISCONNECT SWITCH AS REQUIRED BY MANUFACTURER. PROVIDE INTERCONNECTING CONDUIT AND WIRING PER MANUFACTURER'S REQUIREMENTS.										

NOTES THIS SHEET

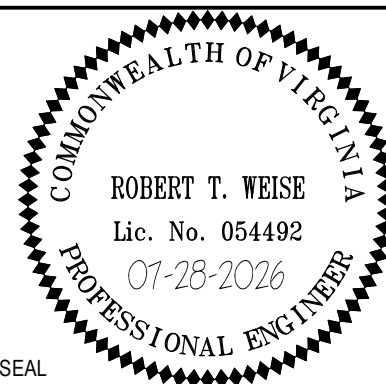
- 1
- CONTRACTOR SHALL PROVIDE WALL MOUNTING BRACKET FOR HP SUPPORT. MOUNT BOTTOM OF BRACKET ± 8'-0" ABOVE GRADE.
- 2
- PROVIDE CORE DRILL FOR PIPING PENETRATIONS.
- 3
- MOUNT TOP OF EQUIPMENT 6" BELOW CEILING.
- 4
- PROVIDE 2'x2' SUSPENDED ACOUSTICAL TILE CEILING, ± 10'-0" AFF.
- 5
- ROUTE 3/4" TYPE L COPPER CONDENSATE DRAIN PIPING TO EXISTING SANITARY PIPING. PROVIDE OPEN-HUB DRAIN AND P-TRAP AT EXISTING SINK ROUGH-IN (SIZE TO MATCH EXISTING). WASTE PIPING SHALL BE SCHEDULE-40 PVC DWV.



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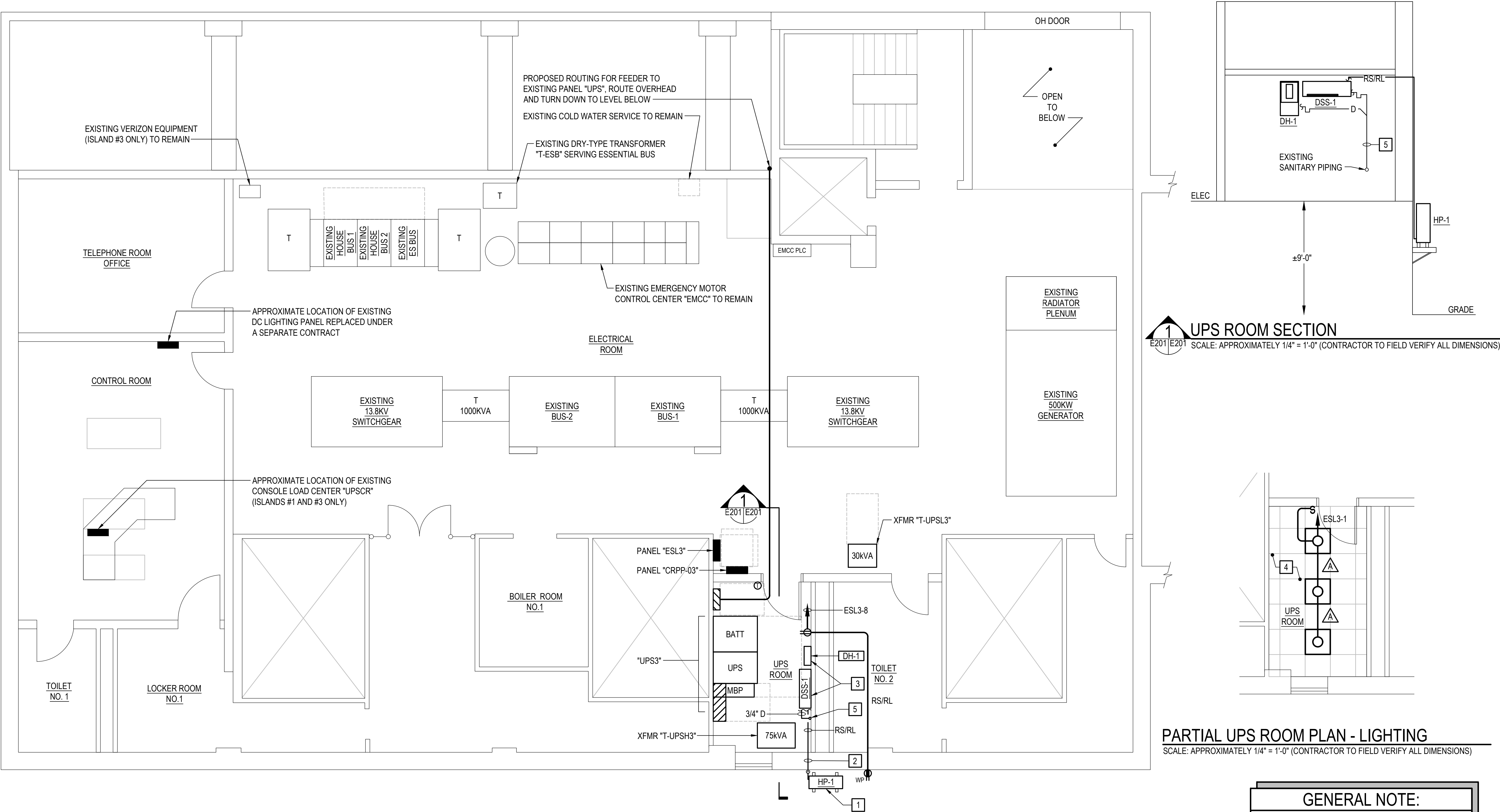
No.	REVISIONS		DATE	DESCRIPTION

CHESAPEAKE BAY BRIDGE TUNNEL
REPLACE VENT BUILDING UPS
CAPE CHARLES
VIRGINIA
ELECTRICAL EQUIPMENT ROOM FLOOR PLAN -
NEW WORK

PROJECT No: 26007

E201

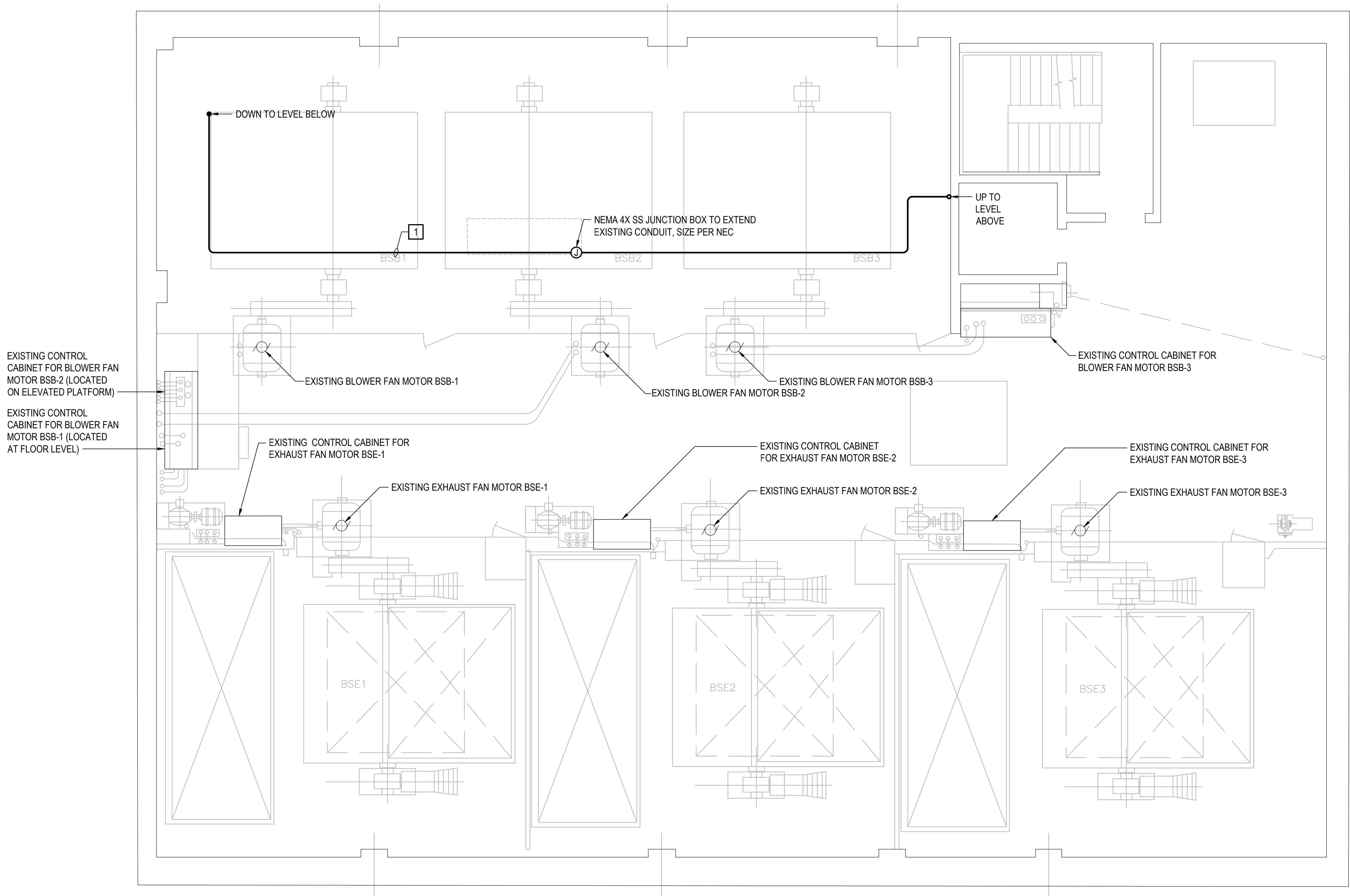
SHEET 10 OF 13



ELECTRICAL EQUIPMENT ROOM FLOOR PLAN - NEW WORK (ELEVATION +39.0')
SCALE: APPROXIMATELY 1/4" = 1'-0" (CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS)

PARTIAL UPS ROOM PLAN - LIGHTING
SCALE: APPROXIMATELY 1/4" = 1'-0" (CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS)

GENERAL NOTE:
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FAN ROOM FLOOR PLAN - NEW WORK (ELEVATION +17.0')

SCALE: APPROXIMATELY 1/4" = 1'-0" (CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS)

NOTES THIS SHEET

- 1 PROPOSED ROUTING FOR FEEDER FROM PANEL "UPSH3" TO EXISTING PANEL "UPS" - UTILIZE EXISTING CONDUIT SAVED DURING DEMOLITION AND EXTEND AS REQUIRED.



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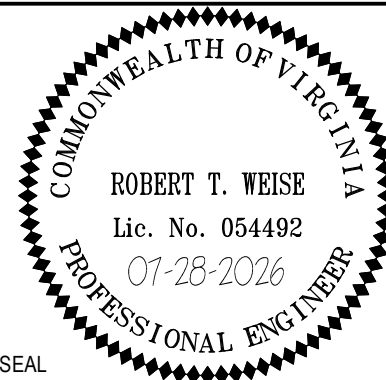
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No.	DATE	REVISIONS	
		DESCRIPTION	

CHESAPEAKE BAY BRIDGE TUNNEL REPLACE VENT BUILDING UPS CAPE CHARLES	VIRGINIA	FAN ROOM FLOOR PLAN - NEW WORK

PROJECT No: 26007

GENERAL NOTE:

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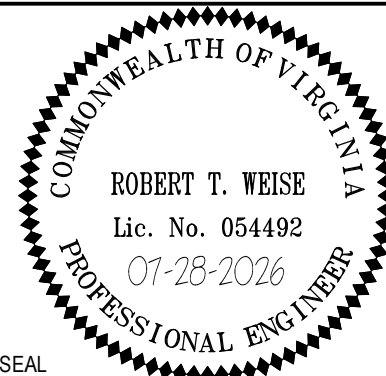
E202



6 PROPOSED ROUTING FOR FEEDER FROM PANEL "UPSH3" TO EXISTING PANEL "UPS" - UTILIZE EXISTING CONDUIT SAVED DURING DEMOLITION AND EXTEND AS REQUIRED.



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TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.



No.	REVISIONS		DATE	DESCRIPTION
	DESCRIPTION	DATE		

LUMINAIRE DESCRIPTION:

- HOUSING SHALL BE DIE-FORMED CODE GAUGE COLD-ROLLED STEEL.
- LENS SHALL BE CURVED ACRYLIC.
- FINISH SHALL BE MATTE WHITE PAINT.
- FIXTURE SHALL HAVE HIGH PERFORMANCE LED DRIVER, STANDARD 0-10VDC DIMMING TO 10%.
- FIXTURE SHALL BE UL LISTED AND IC RATED.

DETAIL BASED ON COLUMBIA LIGHTING, "LCAT22" SERIES					
TYPE	LUMENS	LAMP TYPE	INPUT WATTS	VOLTAGE	MOUNTING
	3,614	4000K LED	23.8	120-277V	RECESSED, CEILING

2' X 2' LED RECESSED TROFFER

PANELBOARD UPSH3 SCHEDULE													
SEE ONE-LINE DIAGRAM FOR RATINGS													
LOAD SERVED	LOAD (AMPS)			BKR TRIP	CKT NO.	PHASE			BKR TRIP	CKT NO.	LOAD (AMPS)		
	A	B	C			A	B	C			A	B	C
SPARE				20/1P	1				2	20/1P			
SPARE				20/1P	3				4	20/1P			
SPARE				20/1P	5				6	20/1P			
SPARE				20/1P	7				8	20/1P			
SPARE				20/1P	9				10	20/1P			
SPARE				20/1P	11				12	20/1P			
SPARE				20/1P	13				14	20/1P			
SPARE				20/1P	15				16	20/1P			
SPARE				20/1P	17				18	20/1P			
SPARE				20/1P	19				20	20/1P			
SPARE				20/1P	21				22	20/1P			
SPARE				20/1P	23				24	20/1P			
SPARE				30/3P	25				26	50/3P	7.9		
												8.6	
													8.4
TOTAL	14.0	15.0	18.0								7.9	8.6	8.4
TOTAL CONNECTED AMPS A: 21.9 B: 23.6 C: 26.4													
NOTE-1: TOTAL CONNECTED LOAD INCLUDES EXISTING UPS LOAD OBSERVED AT PORTAL ISLAND #4.													

PANELBOARD ESL3 SCHEDULE													
SEE ONE-LINE DIAGRAM FOR RATINGS													
LOAD SERVED	LOAD (AMPS)			BKR TRIP	CKT NO.	PHASE			BKR TRIP	CKT NO.	LOAD (AMPS)		
	A	B	C			A	B	C			A	B	C
LIGHTING	0.4			20/1P	1				2	15/1P	2.2		
SPARE				20/1P	3				4	35/2P		17.6	
SPARE				20/1P	5								17.6
SPARE				20/1P	7				8	20/1P	3.0		
SPARE				20/1P	9				10	20/1P			
SPARE				20/1P	11				12	20/1P			
SPARE				20/3P	13				14	20/1P			
									16	40/2P			
TOTAL	0.4	0.0	0.0								5.2	17.6	17.6
TOTAL CONNECTED AMPS A: 5.6 B: 17.6 C: 17.6													

PANELBOARD CRPP-03 SCHEDULE													
SEE ONE-LINE DIAGRAM FOR RATINGS													
LOAD SERVED	LOAD (AMPS)			BKR TRIP	CKT NO.	PHASE			BKR TRIP	CKT NO.	LOAD (AMPS)		
	A	B	C			A	B	C			A	B	C
CONTROL RM PDU #1 RECEPTACLE*	16.0			20/1P	1				2	20/1P	0.8		
CONTROL RM PDU #2 RECEPTACLE*		16.0		20/1P	3				4	20/1P		3.0	
CONTROL RM PRINTER RECEPTACLE*			5.0	20/1P	5				6	20/1P			3.0
CONTROL RM FUTURE PDU RCPT*	0.0			20/1P	7				8	20/1P	0.8		
CONSOLE*		0.0		20/1P	9				10	20/1P		0.8	
CLEAN AGENT CONTROL PANEL*			1.3	20/1P	11				12	20/1P			10.0
SPARE				20/1P	13				14	20/1P	0.6		
SPARE				20/1P	15				16	20/1P			
SPARE				20/1P	17				18	20/1P			
SPARE				20/1P	19				20	20/1P			
SPARE				20/1P	21				22	20/1P			
SPARE				20/1P	23				24	20/1P			
SPARE				20/1P	25				26	20/1P			
SPARE				20/1P	27				28	60/2P	*		
SPACE ONLY					29							*	
SPACE ONLY					31				32				
SPACE ONLY					33				34				
SPACE ONLY					35				36				
SPACE ONLY					37				38				
SPACE ONLY					39				40				
SPACE ONLY					41				42				
TOTAL	16.0	16.0	6.3								2.2	3.8	13.0
TOTAL CONNECTED AMPS A: 18.2 B: 19.8 C: 19.3													
*DENOTES LOAD CONNECTED UNDER A SEPARATE CONTRACT.													
NOTE-1: EXISTING PANEL AT PORTAL ISLANDS #1 AND #3 IS MANUFACTURED BY EATON, "PRL1A" SERIES, 18KAIC													
NOTE-2: ITEMS IN BOLD INDICATE LOADS AND/OR CIRCUIT BREAKERS ADDED UNDER THIS CONTRACT.													

DUCTLESS SPLIT SYSTEM HEAT PUMP SCHEDULE

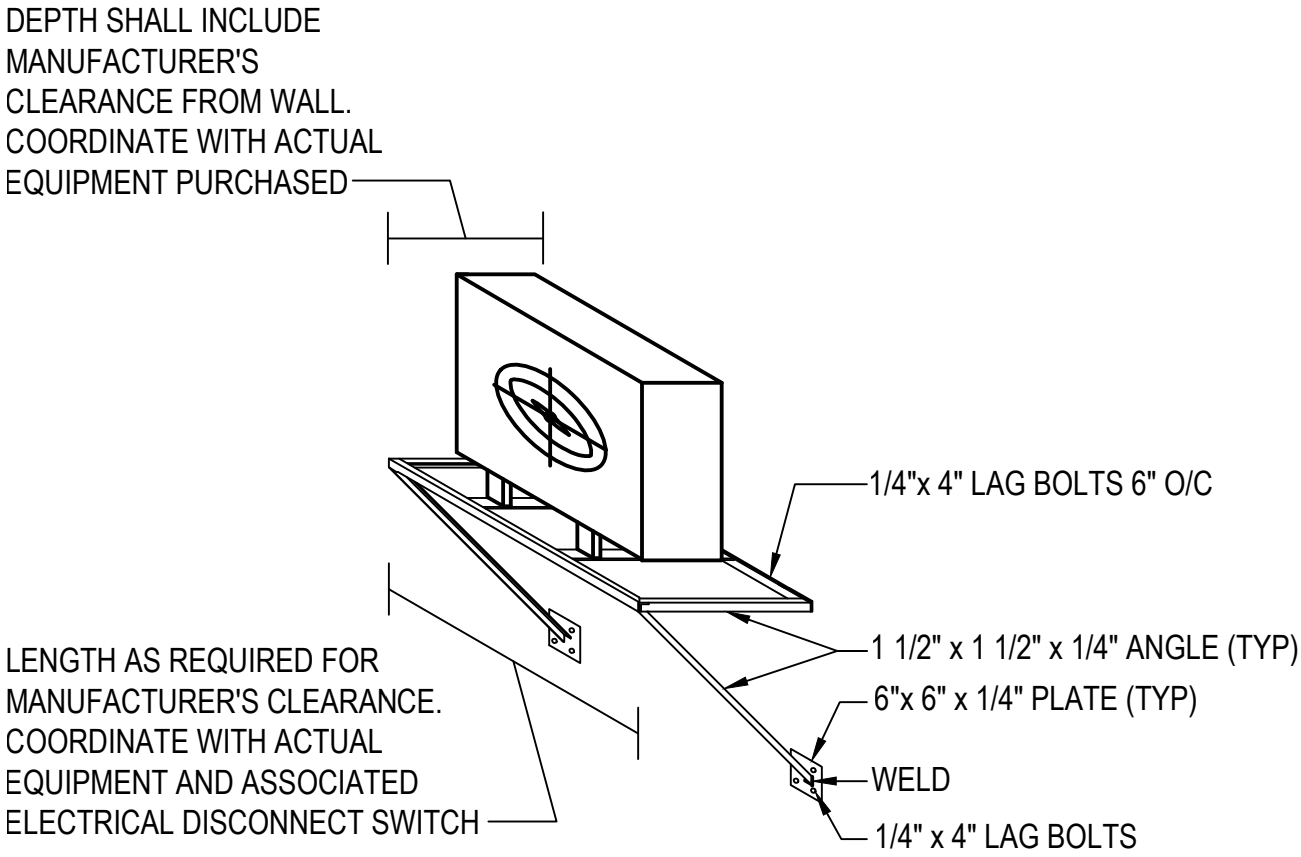
TAG	TOTAL COOLING CAPACITY (MBH)	COIL EAT		FAN DATA			HEATING DATA			ELECTRIC DATA INDOOR UNIT				TAG	ELECTRIC DATA OUTDOOR UNIT				REMARKS
		°F DB	°F WB	SUPPLY AIR (CFM)	ESP (IN. WG)	MOTOR W	TOTAL MBH	COP	EAT (°F)	MCA	MOCP	VOLTS	PHASE		MCA	MOCP	VOLTS	PHASE	
DSS-1	24.0	80.0	67.0	635-775	-	69	15.3	3.4	70.0					HP-1	22.0	35.0	208	1	SEE NOTES

- NOTES:
- SELECTIONS BASED ON MITSUBISHI PKA & PUZ.
 - COOLING CAPACITY BASED ON 95° F AMBIENT. HEATING CAPACITY BASED ON 17° AMBIENT.
 - PROVIDE INDOOR UNIT WITH COIL FREEZE PROTECTION, REMOTE MOUNTED THERMOSTAT, CONDENSATE PUMP, HIGH SIDE WALL CASSETTE CONFIGURATION.
 - INDOOR UNIT POWERED FROM OUTDOOR UNIT. IF AN ALTERNATE UNIT IS PROVIDED THAT REQUIRES SEPARATE POWER CONNECTIONS, ELECTRICAL CONTRACTOR TO PROVIDE ALL ADDITIONAL DISCONNECTS, BREAKERS, WIRING, AS REQUIRED FOR A FULLY FUNCTIONAL SYSTEM.
 - PROVIDE OUTDOOR UNIT WITH LOW AMBIENT CONTROL. PROVIDE WITH FACTORY ASTM B117 CORROSION COATING MEETING 2,000 HOUR SALT SPRAY TEST.

DEHUMIDIFICATION UNIT SCHEDULE

TAG	FAN DATA	WATER REMOVAL PINTS/DAY	ELECTRICAL DATA				REMARKS
	CFM		VOLTS	PHASE	MCA	MOCP	
DH-1	150 @ 0.0" WG	37	120	1	2.8	15.0	SEE NOTES

- NOTES:
- SELECTION BASED ON SANTA FE ULTRAMD .
 - PROVIDE SURFACE MOUNT KIT.
 - PROVIDE STANDARD CORD AND PLUG POWER CONNECTION.
 - DEHUMIDIFIER TO BE CONTROLLED BY ASSOCIATED HUMIDISTAT.



NOTE: ALL STEEL SHALL BE TYPE 316 STAINLESS OR 316L STAINLESS WHERE WELDED.

OUTDOOR UNIT SUPPORT DETAIL

NO SCALE

GENERAL NOTE:

WORK SHOWN IN THIS SET OF CONTRACT DOCUMENTS IS BASED ON PORTAL ISLAND BUILDING #3. THIS WORK IS TYPICAL FOR PORTAL ISLAND BUILDINGS #1, #2, AND #4.