

PROJECT MANUAL

3108 Columbia Pike Demolition

3108 Columbia Pike
Arlington VA, 22204



ARLINGTON COUNTY CONTRACT NUMBER: 22-DES-RFP-19b
DEWBERRY PROJECT NUMBER 50156517

ISSUED FOR BID

NOVEMBER 10, 2023

VOLUME 1 DIVISIONS 1 thru 33

DEPARTMENT OF ENVIRONMENTAL SERVICES
DESIGN AND CONSTRUCTION DIVISION
ARLINGTON COUNTY GOVERNMENT
1400 N. UHLE ST., ARLINGTON, VA 22201



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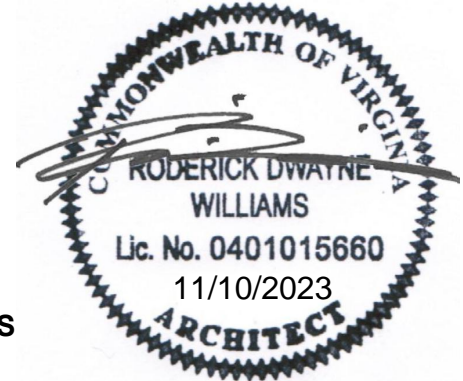


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SECTION 01 0010 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Project location.
2. Scope of Work
3. Notice to Proceed.
4. Construction Operations
5. Sequencing
6. Construction phasing and staging plan
7. Specifications, standards and construction documents
8. Items furnished to contractor
9. Permit requirements
10. Sources

B. Related Requirements:

1. Section 013516 "Alteration Project Procedures" for procedure during alteration work.
2. Section 013523 "Safety and Security" for construction site safety and security requirements.
3. Section 015200 "Temporary Facilities, Utilities, Access and Construction Aids" for limitations and procedures governing temporary use of Owner's facilities.

1.03 PROJECT LOCATION

- A. The project is located at 3108 Columbia Pike, Arlington VA 22204.

1.04 SCOPE OF WORK

- A. The project scope is to remove hazardous materials, demolish the existing building, regrade as necessary, pave and stripe the area where the building was located, and provide landscaping. The site is 0.9858 acres and is presently occupied by a three-story building with a mezzanine, approximately 15,200 sf above grade with an additional 2,400 sf basement.
- B. The scope of Work described herein is an overall summary of the responsibilities of the Contractor and his relation to the Owner. The summary is not meant to be a comprehensive, detailed or exhaustive description of the work and shall not be construed to supersede the specific requirements of the Contract Documents.
- C. Work and equipment provided by Owner: The Owner may furnish certain items of equipment to Contractor for installation under this Contract. These items shall be as indicated on the drawings and numbered for identification purposes. Contractor shall provide in the contract price a sum sufficient to cover the cost of such installation which includes roughing in, unloading, uncrating, storing, protection, assembling, setting in place and making final connections to equipment furnished by the Owner.

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1.05 NOTICE TO PROCEED

- A. The Notice to Proceed will be issued by Arlington County upon approval of the required preconstruction submittals and completion of the preconstruction conference. Failure to comply with the requirements of this Section and Section 013216 may be grounds for a determination by Arlington County that the Contractor is not prosecuting the work with sufficient diligence to guarantee contract completion within the time specified. Upon such determination, Arlington County may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the Contract Documents.

1.06 CONSTRUCTION OPERATIONS

- A. On-Site Work Hours: Limit work to normal business working hours in accordance with Arlington County regulations as follows, unless otherwise indicated.
 - 1. Weekday Hours: 7:00am to 9:00pm Monday through Friday.
 - 2. Weekend Hours: 8:00am to 5:00pm.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- C. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- D. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- E. Employee Screening: Comply with Owner's requirements for background screening of Contractor personnel working on Project site.
- F. Maintain list of approved screened personnel with Owner's representative
- G. Rock Blasting: No blasting is allowed on the project

1.07 SEQUENCING

- A. Submit preconstruction submittals and attend a Preconstruction Conference within 30 calendar days of effective date of Owner-Contractor Agreement (See Section 013100 and 017300).
- B. Constraints on Contractor's Activities: The contractor maintains safe working conditions in and around the site. Construction traffic and parking will be restricted within the limits of disturbance as identified on the construction drawings.

1.08 CONSTRUCTION PHASING AND STAGING PLAN:

- A. The contractor shall give the utmost attention to the safety of all neighbors, including but not limited to the critical need of allowing safe pedestrian and vehicular access to all adjacent neighbors and/or all neighbors effected by the construction on site and off site throughout the course of construction. Provide appropriate access to Arlington County Police and Arlington

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County Fire and Rescue to allow uninterrupted emergency response services to the site and the community throughout the course of construction. Provide two weeks prior notice including plan of action and scheduling of activities for owner's review and approval prior to construction disturbance.

- B. The contractor shall prepare a draft Construction Phasing and Staging Plan (CPSP) for discussion at the Preconstruction Conference. This portion of the meeting shall include representatives from Arlington County, the Arlington County Police and Arlington County Fire and Rescue and the Architect/Engineer. The CPSP shall be coordinated with all appropriate requirements including but not limited to the following Specification Sections:
 - 1. 013216 - Activities Schedule and Progress Payments
 - 2. 014100 - Coordination, Field Engineering, and Regulatory Requirements
 - 3. 015200 - Temporary Facilities, Utilities, Access and Construction Aides
- C. After the initial discussion of the draft CPSP, the final CPSP will be developed by the Contractor incorporating feedback from the parties at the Preconstruction Conference. Owner shall review and finally approve CPSP plan.
- D. The CPSP shall also include the following:
 - 1. The CPSP shall recognize inclusion of 6'-0" high secure chain link temporary construction fence provided by contractor to physically separate the adjacent neighbors from the construction disturbance area.
 - 2. The CPSP shall also recognize the importance of maintaining clear paths of travel for egress and ingress for emergency vehicles on site and off site relative to the construction work area.
 - 3. The CPSP shall also designate adequate parking (minimum 6 spaces) in the area adjacent to temporary trailer for Arlington County field staff and owner/users/consultants etc.
 - 4. The CPSP shall designate parking areas to be provided within construction site for construction workers who shall not be allowed to park in the surrounding residential community and on Church Street.
 - 5. The CPSP shall identify a construction route(s) through Arlington County to the project site for delivery of construction materials.
- E. Trash removal should be considered as part of the CPSP.
- F. Arlington County, site owners/users and Contractors recognize good communication and a "team attitude" is necessary by all parties to facilitate and accommodate smooth on-going construction activities throughout the project.

1.09 SPECIFICATIONS, STANDARDS AND CONTRACT DOCUMENTS

- A. The latest edition, at the time of award, of specifications or standards referenced in this specification apply as though wholly incorporated herein, unless otherwise noted. In case of differences between the referenced specifications and standards, and these specifications and accompanying drawings, these specifications and accompanying drawings shall govern. The Contractor is responsible for providing the necessary references, if needed for clarification during the course of the contract. For this project, please note that the existing conditions may differ from what is shown on the plans. The Contractor is to verify existing conditions, relative to underground utility locations.

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Source: Arlington County Department of Building & Development

- O. Business License: Contractor Responsibility
Required for all firms doing business in the County
- P. Trailer Permit: Provided by Arlington County
Contractor Responsibility
Required for all office trailers on site
- Q. Temporary Sign Permit: Provided by Arlington County
Contractor Responsibility
- R. VDOT Permit(s): Contractors Responsibility
Contractor to submit appropriate bonds to VDOT

3.02 SOURCES

- A. DES, Facilities Design and Construction
Arlington County
1400 N Uhle St. Suite 403
Arlington, VA 22201 703-216-6555
- B. Department of Planning and Zoning
Arlington County
2100 Clarendon Blvd. Suite 100
Arlington Blvd., VA 20176 (703) 703-228-3883
- C. Arlington County
Permit Arlington Center
First Floor, 2100 Clarendon Blvd.,
Arlington, VA 22201 (703)-228-3800
- D. Arlington County
Fire Marshal
1020 N. Hudson St.
Arlington, VA (703) 771-5440
- E. Virginia Department of Transportation (VDOT)
4975 Alliance Drive
Fairfax VA 22030 (800)-367-7623

END OF SECTION 010010

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. General Conditions and Invitation for Bid Documents.
 - 2. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form acceptable to Construction Manager.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication, or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section.

Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Construction Manager Action: If necessary, Construction Manager will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Construction Manager will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Request for Proposal, or Field Order for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

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1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. .
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on web-based Project management software.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

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finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use form provided as part of web-based Project management software.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Construction Manager.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form provided as part of web-based Project management software.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor on form provided as part of web-based Project management software.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Construction Manager may issue a Construction Change Directive on form provided as part of web-based Project management software. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

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1.7 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Construction Manager may issue a Work Change Directive on form provided as part of web-based Project management software. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Section 013216 "Activities Schedule" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect through Construction Manager at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
 - 5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract, as described in Section 011000 "Summary."

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- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Owner's name.
 - c. Owner's Project number.
 - d. Name of Architect.
 - e. Architect's Project number.
 - f. Contractor's name and address.
 - g. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703.
 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 - 4) Shop Drawings and Submittals
 - 5) LEED Submittals
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 7. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
 8. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 9. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.

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10. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
11. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and Construction Manager and paid for by Owner.
- B. Payment Application Times: Submit Application for Payment to Architect by the last day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 1. Submit draft copy of Application for Payment five days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect and Construction Manager will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices and photographs. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

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- c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit one signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 5. Products list (preliminary if not final).
 6. Sustainable design action plans, including preliminary project materials cost data.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Initial progress report.
 14. Report of preconstruction conference.
 15. Certificates of insurance and insurance policies.
 16. Performance and payment bonds.
 17. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

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- a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017800 "Project Closeout and Closeout Submittals."
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Certification of completion of final punch list items.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. AIA Document G706.
 6. AIA Document G706A.
 7. AIA Document G707.
 8. Evidence that claims have been settled.
 9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 10. Final liquidated damages settlement statement.
 11. Proof that taxes, fees, and similar obligations are paid.
 12. Waivers and releases.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - PRECONSTRUCTION CONFERENCE AND PRECONSTRUCTION SUBMITTALS

PART 1 - GENERAL

1.01 PRECONSTRUCTION CONFERENCE

- A. The Contractor, and major subcontractors as deemed necessary by the Contractor or Arlington County, shall attend a Preconstruction Conference (Precon) within 30 days of the effective date of the Owner – Contractor Agreement and prior to the issuance of Notice to Proceed.
- B. At the Precon, the Contractor, the Owner and the other attendees will discuss contract administration matters, the proposed Activities Schedule (013216), the List of Technical Submittals (013300), the timing and approval of submittals and any technical questions or recommendations. All attendees will receive drafted minutes of the Precon for review and agreement.

1.02 PRECONSTRUCTION SUBMITTALS

- A. The Precon will not be held, nor will Arlington County issue the Notice to Proceed, accept requests for partial payments or allow for on-site mobilization until the Precon submittals have been received and accepted. Thirty (30) calendar days have been allowed for completion of the Preconstruction Conference. All Precon submittals must be received a minimum of seven calendar days prior to the Precon meeting and shall be sent to Arlington County Construction Manager and the A/E.
- B. Early submission of the submittals is required, for our common goal is a "reasonable" submittal package that can be approved (or approved subject to corrections) at the Precon. If the submittals are poorly prepared, incomplete or inaccurate, they may be returned to the Contractor, and the Precon and the Notice to Proceed (NTP) may be delayed. The contract completion time may be reduced by the number of days that the NTP is delayed due to poorly prepared, incomplete or inaccurate Precon submittals.
- C. Precon Submittal List: Provide all preconstruction submittals to Arlington County's Construction Manager and the A/E no later than seven days before the Precon. Submit electronically an original letter of transmittal and copies of the following submittal enclosures to Arlington County's Construction Manager and the A/E via email:
 - 1. Detailed Schedule of Values
 - 2. Activities Schedule (See Section 013216).
 - 3. An environmental protection plan (See Section 015719).
 - 4. Project organization diagram for Contractor's project management personnel, outlining areas of responsibility for Contractor's management personnel, and showing the Contractor's organization and the flow of information between the Contractor and Arlington County. Indicate who is responsible for submittal review and Field Quality Assurance. Provide after-hours point of contact. Include the names and after-hours phone number of the Contractor's project manager and superintendent. Update this information by re-submitting this diagram whenever key personnel change.
 - 5. Resumes of the Project Manager, Superintendent, and Quality Control Manager. Resumes must demonstrate ten (10) years' of closely related experience in similar sizes and types of projects as the Project contained herein. Resumes should include the following as a minimum:
 - A. Biographical sketch, education, and construction related certifications and licenses related to the type of work they will be performing. The Quality Control Manager must

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have at the time of submission a U.S Army Corps of Engineers certification for Construction Quality Control Management for Contractors or equivalent. The Superintendent must have at the time of submission an OSHA 30-hour certification.

- B. Project list that includes a description of the project, role related to the project, completion date of the project and final construction cost of the project to demonstrate ten (10) years of closely related experience in similar sizes and types of projects to the plans and specification contained herein.
6. Qualifications of Quality Control Firms/Individuals (see Section 014516).
 7. Complete register (list) of technical submittals as required by the contract documents including identification of those critical technical submittals with long lead time requiring early submittal (See Section 013300). The register shall be provided by the Contractor in the Excel template format required and provided to the Contractor by Arlington County.
 8. Any technical questions or recommendations which may require a change in the specifications or drawings shall be presented, in writing.
 9. Copy of Responsible Land Disturber Certificate
 10. Contractors Safety Plan
 11. List of planned Pre-Installation Conference(s)
 12. Update - Demolition Plan
 13. Construction Phasing and Staging Plan (CPSP) to identify location of jobsite trailer, storage, site access, etc. (See Section 010010)
 14. Insurance Certificate (See General Conditions)
 15. Performance Bond (See IFB)
 16. Payment Bond (See IFB)
- 1.03 NOTICE TO PROCEED
- A. The Notice to Proceed will be issued by Arlington County upon approval of the required Precon submittals and completion of the Preconstruction Conference. Failure to comply with the requirements of this Section and Section 013216 may be grounds for a determination by Arlington County that the Contractor is not prosecuting the work with sufficient diligence to guarantee contract completion within the time specified. Upon such determination, Arlington County may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the Contract Documents.

PART 2 - MATERIALS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 013100

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SECTION 013119 - PROGRESS MEETINGS AND PHOTOGRAPHS

PART 1 - GENERAL

1.01 PRECONSTRUCTION CONFERENCE (Refer to Section 013100)

1.02 PROGRESS MEETINGS

- A. Progress meetings shall be held at the jobsite every two weeks, and additionally as requested by Arlington County or Contractor. Arlington County shall schedule the meeting dates. The second meeting each month shall be coordinated with preparation of the payment request.
- B. Attendees: At a minimum regular attendee are the Owner, Construction Manager, A/E and General Contractor.
- C. Administration: The Architect/Engineer shall prepare the agenda and distribute written notice and agenda of each meeting to all attendees two days in advance of the meeting date. The Architect or Arlington County Construction Manager will preside at these meetings.
- D. The minimum agenda shall include the following items of discussion:
 - 1. Review, correct and approve minutes of the previous progress meeting.
 - 2. Review Contractor's Activities Schedule: Review progress since the last meeting and review Contractor's proposed minimum 2-Week Look-Ahead schedule. Determine where each activity is in relation to the Contractor's Activities Schedule, whether on time or ahead or behind schedule. Discuss whether schedule revisions are required to ensure activities will be completed within the Contract Time.
 - 3. Identify other items of significance that could affect progress such as open RFI's, RFP's, CO's, submittal log etc.
 - 4. Discuss other topics appropriate to the current status of the project.
 - a. Verify Status of Record Drawings.
 - b. Daily Work Hours
 - c. Utilities Status
 - d. Deficiency Logs Review
 - 5. Review the present and future needs of each entity present, including such items as:
 - a. Sequences.
 - b. Deliveries.
 - c. Site utilization.
 - d. Temporary facilities and services.
 - e. Hours of Work.
 - f. Hazards and risks.
 - g. Housekeeping.
 - h. Quality and Work standards.
 - i. Change Orders.
 - j. Documentation of information for payment requests.
- E. The AE shall record minutes of the meeting and shall distribute copies to all attendees. Meeting minutes will be recorded and distributed electronically.
- F. Revise the Activities Schedule after each progress meeting where revisions to the schedule have been made. Issue the revised schedule concurrently at the last meeting of each month. See Section 013216 for additional requirements for the Activities Schedule.

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1.03 PREINSTALLATION CONFERENCES

- A. Contractor shall conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Arlington County Construction Manager and AE of scheduled meeting dates. Arlington County and AE shall be included as optional attendees for these meetings.
- B. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - 1. Contract Documents.
 - 2. Related Change Orders.
 - 3. Purchases.
 - 4. Deliveries.
 - 5. Shop Drawings, Product Data and quality control Samples.
 - 6. Possible conflicts.
 - 7. Time schedules.
 - 8. Weather limitations.
 - 9. Manufacturer's recommendations.
 - 10. Compatibility of materials.
 - 11. Acceptability of substrates.
 - 12. Temporary facilities.
 - 13. Space and access limitations.
 - 14. Governing regulations.
 - 15. Safety.
 - 16. Inspection and testing requirements.
 - 17. Required performance results.
 - 18. Recording requirements.
 - 19. Protection.
- C. The Contractor shall record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned including Arlington County Construction Manager and the AE.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PROGRESS AND FINAL PHOTOGRAPHS

- A. Progress and final photographs shall be furnished electronically by the Contractor. Identify all photographs with project name, contractor's name, location and date taken. Locations for photos shall be approved by Arlington County Construction Manager.
- B. Progress photographs shall be taken each week until the project is completed. Photographs shall best illustrate the work accomplished during the previous month.

END OF SECTION 013119

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SECTION 013216 - ACTIVITIES SCHEDULE

PART 1 GENERAL

1.01 REFERENCE:

1.02 SUBMITTALS (See General Conditions)

- A The Contractor shall within twenty (20) days after the effective date of the Owner- Contractor Agreement, prepare and submit to the A/E and Owner for review, a reasonably practicable and feasible Construction Schedule showing the method by which the Contractor will comply with the Contract Milestone and Completion date requirements as set forth in the Owner-Contractor Agreement.
- B The schedule must be updated by the Contractor monthly with each progress payment application and submitted to the Owner and A/E for review with the progress payment application. Owner shall not be required to process and review the Contractor's Application for Payment if Contractor has failed or refused to provide the scheduling update information required herein.
- C If an extension or contraction of any Milestone or Completion Date is authorized by any Change Order, the Contractor shall revise his Construction Schedule, Milestone and Completion Dates accordingly.
- D If, in the opinion of the Owner, the Construction Schedule does not accurately reflect the actual progress and sequence of the Contractor's performance of the Work, the Contractor shall revise the Construction Schedule, upon the Owner's request, and submit a revised Construction Schedule that accurately represents the progress and sequence of the Contractor's performance of the Work.

1.03 SCHEDULE PREPARER

- A Designate an authorized representative to be responsible for the preparation of the schedule and all required updating (activity status) and preparation of reports. The authorized representative shall be experienced in schedule, have previously developed, created and maintained at least two (2) electronic schedules for project similar in nature and complexity to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A Prepare a Project Schedule, as specified herein, pursuant to the Contract terms and conditions. Show in the schedule the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The schedule of the entire project, including the design (as applicable) and construction sequences, is required. The scheduling of design (as applicable) and construction sequences is the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Designers (as applicable), Subcontractors and Suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool.
- B PROJECT SCHEDULE: Use the Project Schedule to measure the progress of the work and to aid in evaluating time extensions. Make the schedule activity coded. An acceptable schedule update must be submitted concurrently with each progress payment. If the Contractor fails to submit any schedule

within the time prescribed, Arlington County shall not be required to process and review Contractor's application for payment.

- C SCHEDULE STATUS REPORT: Provide a Schedule Status Report on at least a monthly basis. If, in the opinion of Arlington County's Construction Manager, the Contractor falls behind the approved schedule, take steps necessary to improve its progress including those that may be required by Arlington County's Construction Manager, without additional cost to Arlington County. In this circumstance, Arlington County's Construction Manager may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules as Arlington County's Construction Manager deems necessary to demonstrate how the acceptable rate of progress will be regained.
- D DEFAULT TERMS: Failure of the Contractor to comply with the requirements of Arlington County's Construction Manager shall be grounds for a determination, by Arlington County's Construction Manager, that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the terms and conditions of the contract.

3.02 PROJECT SCHEDULE DETAILED REQUIREMENTS

- A The computer software system utilized to produce and update the Project Schedule shall be capable of meeting all requirements of this specification. Arlington County has the use of Microsoft Project and Primavera P6 computer software systems and recommends the Contractor utilize one of these products in the development and management of the Project Schedule. Should the Contractor choose to utilize a computer software system not listed herein, then the Contractor will be required to provide a software license to Arlington County for the purposes of reviewing the Contractor's Project Schedule through the life the Project.
- B CRITICAL PATH METHOD: Use the Critical Path Method (CPM) of network calculation to generate the Project Schedule. Prepare the Project Schedule using the Precedence Diagram Method (PDM).
- C LEVEL OF DETAIL REQUIRED: Develop the Project Schedule to an appropriate level of detail. Failure to develop the Project Schedule to an appropriate level of detail, as determined by Arlington County's Construction Manager, will result in its disapproval. Arlington County's Construction Manager will consider, but is not limited to, the following characteristics and requirements to determine the appropriate level of detail
- D ACTIVITY DURATIONS: Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than two (2) percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days. Procurement activities are defined herein.
- E DESIGN AND PERMIT ACTIVITIES: Where applicable, include design and permit activities with the necessary conferences and follow-up actions and design submission dates. Include the design schedule in the project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. This shall be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. The schedule shall include review and correction periods associated with each item.
- F PROCUREMENT ACTIVITIES: The schedule must include activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over ninety (90) calendar days. A typical procurement sequence includes the string of activities: submit, approve, procure, fabricate, and deliver.
- G MANDATORY TASKS: The following tasks must be included and properly scheduled:

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1. Notice to Proceed (NTP) Milestone
2. Submission, review and acceptance of design packages (as applicable).
3. Submission and approval of Operations & Maintenance (O&M) Manuals.
4. Submission and approval of as-built drawings and specifications.
5. Other systems testing, if required.
6. Systems Trainings.
7. Issuance of a Certificate of Occupancy (prior to Substantial Completion).
8. Contractor's pre-final inspection.
9. Correction of punchlist from Contractor's pre-final inspection.
10. Arlington County's pre-final inspection. All activities except "Correction of punchlist from Arlington County's pre-final inspection," "Substantial Completion Milestone," "Final Inspection," and "Final Completion Milestone" shall be statuses one-hundred percent (100%) before Arlington County's pre-final inspection occurs.
11. Correction of punchlist from Arlington County's pre-final inspection.
12. Substantial Completion Milestone.
13. Final Inspection
14. Final Completion Milestone

H ARLINGTON COUNTY ACTIVITIES: Show Arlington County and other government agency activities that could impact progress. These activities include, but are not limited to: approvals, design reviews (as applicable), environmental permit approvals by State regulators, inspections, utility tie-in, FF&E and Notice to Proceed (NTP) for phasing requirements.

I ACTIVITY RESPONSIBILITY CODING (RESP): Assign responsibility Code for all activities to the Prime Contractor, Subcontractor or Government agency responsible for performing the activity. Activities coded with a Government Responsibility code include but are not limited to: Arlington County approvals, Arlington County design reviews (as applicable), environmental permit approvals by State regulators, Arlington County furnished FF&E and Notice to Proceed (NTP) for phasing requirements. Code all activities not coded with a Government Responsibility Code to the Prime Contractor or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and CONTY (for Arlington County). Unacceptable code values are abbreviations of the names of subcontractors.

J ACTIVITY WORK AREA CODING: Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew, from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area Coded. A lack of a Work Area coding will indicate the activity is not resource or space constrained.

K CONTRACT CHANGES/REQUESTS FOR EQUITABLE ADJUSTMENT CODING: Assign Activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Arlington County's Construction Manager, with a Contract Change

Order. Key all Code values to Arlington County's PCO Number. Any activity or sequence of activities added to the schedule as a result of alleged constructive changes made by Arlington County may be added to a copy of the current schedule, subject to the approval of Arlington County's Construction Manager. Assign Activity Codes for these activities with a PCO Number. Key the code values to the Contractor's numbering system.

Approval to add these activities does not necessarily mean Arlington County accepts responsibility and, therefore, liability for such activities and any associated impacts to the schedule, but rather Arlington County recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to Arlington County unless approved. An activity shall not have more than one PCO Number assigned to it.

- L PHASE OF WORK CODING (PHAS): Assign Phase of Work Code to all activities based upon the phase of work in which the activity occurs. Code activities to either a Design Phase (as applicable) or a Construction Phase. If the contract specifies construction phasing with separately defined performance periods, identify a Construction Phase Code to allow filtering and organizing the schedule accordingly. Each activity shall be identified with a single phase and have only one Phase of Work code.
- M SCHEDULED PROJECT COMPLETION AND ACTIVITY CALENDARS: The Schedule interval shall extend from NTP date to the required contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration in the accepted contract proposal, as adjusted for any approved contract time extension. The first scheduled work period shall be the day after NTP is received by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a seven (7) day calendar when the contract assigns calendar day durations for the activity such as a Arlington County Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays. Original durations must account for anticipated normal adverse weather. Arlington County will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.
 - 1. PROJECT START DATE: The schedule shall start no earlier than the date on which the NTP was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" (or NTP). The "Start Project" activity shall have an Early Start "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.
 - 2. SCHEDULE CONSTRAINTS AND OPEN LOGIC: Constrain completion dates in the schedule by the contract completion dates. Schedule calculations shall result in negative float when the calculated early finish date of the last activity is later than the contractual completion dates. Include as the last activity in the project schedule an activity called "End Project" or "Final Completion." The "End Project" or "Final Completion" activity shall have a Late Finish "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the "project must finish by" date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero free float" or "zero total float" are typically prohibited. There shall only be two (2) open ended activities: Start Project (or NTP) with no predecessor logic and End Project (of Final Completion) with no successor logic.
 - 3. EARLY PROJECT COMPLETION: In the event the Initial Project schedule calculates an early completion date of the last activity prior to the contract completion date, identify

those activities that it intends to accelerate and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The last activity shall have a late finish constraint equal to the contract completion date and the schedule will calculate positive float. Arlington County will not accept an early completion schedule with zero float on the longest path. Arlington County is under no obligation to accelerate activities for which it is responsible to support a proposed early contract completion.

- N INTERIM COMPLETION DATES:** Constrain contractually specified interim completion dates to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date.
- 1. START PHASE:** Include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint equal to the date on which the NTP was acknowledged, and a zero day duration.
 - 2. END PHASE:** Include as the last activity for a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the specified completion date for that phase and a zero day duration.
 - 3. PHASE "X" HAMMOCK:** Include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" hammock activity shall be logically tied to the earliest and latest activities in the phase.
- O DEFAULT PROGRESS DATA DISALLOWED:** Do not automatically update Actual Start and Finish dates with default mechanisms that may be included in the scheduling software. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided from the Contractor's Daily Construction Reports. Failure of the Contractor to document the AS and AF dates on the Contractor's Daily Construction Reports for every in-progress or completed activity, and failure to ensure that the data contained on the Contractor's Daily Construction Report is the sole basis for schedule updating shall result in the disapproval of the Contractor's updated schedule and the inability of Arlington County's Construction Manager to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Disable program features which calculate one of these parameters from the other.
- P OUT-OF-SEQUENCE PROGRESS:** Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to the approval by Arlington County's Construction Manager. Proposed logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Correct out of sequence progress that continues for more than two (2) update cycles by logic revision, as approved by Arlington County's Construction Manager.
- Q NEGATIVE LAGS AND START TO FINISH RELATIONSHIPS:** Lag durations contained in the project schedule shall not have a negative value. Do not use Start to Finish (SF) relationships.
- R CALCULATION MODE:** Schedule Calculations shall retain the logic between predecessor and successors even when the successor activity starts and the predecessor activity has not finished. Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") will not be allowed.

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- S MILESTONES: The schedule must include milestone activities for each significant project event including, but not limited to: milestone activities for each design package released for construction (when applicable); design complete (when applicable); foundations/substructure construction complete; superstructure construction complete; building dry-in or enclosure complete to allow the initiation of finish activities; permanent power completion; and building systems commissioning complete.

3.03 PROJECT SCHEDULE SUBMISSIONS: Provide the submissions described below:

- A INITIAL PROJECT SCHEDULE SUBMISSIONS: Submit the Initial Project Schedule (Baseline Schedule), defining the Contractor's planned operations through Project Completion within twenty (20) calendar days of NTP acknowledgement. It must be early start and late finish constrained and logically tied as previously specified. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Initial Schedule shall be at a reasonable level of detail as determined by Arlington County's Construction Manager.

- B PERIODIC SCHEDULE UPDATES: Submit periodic schedule updates monthly. The data date for each periodic schedule update shall be the last day of the current month or the first day of the following month. These submissions will enable Arlington County's Construction Manager to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of Arlington County's Construction Manager or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment will be made.

- C SUBMISSION REQUIREMENTS: All schedule submissions shall be done through digital media. Submit the following items for the Initial Schedule and every Periodic Schedule Update throughout the life of the project:

1. DATA CD'S: Provide one (1) set of data CD's containing the project schedule in the native file format. Each CD shall also contain all previous schedules (in native file format) and a digital copy of the Narrative Report. File medium shall be CD. Label each CD indicating the type of schedule (Initial or Update), full contract number, Data Date and file name. Each schedule shall have a unique file name as determined by the Contractor.
2. NARRATIVE REPORT: Provide a Narrative Report with the Initial Project Schedule and each Periodic Update of the Project Schedule, as the basis of the progress payment request. The Narrative Report shall include: a description of activities along the two (2) most critical paths where the total float is less than or equal to ten (10) work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The Narrative Report is expected to communicate to Arlington County, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. Identify and explain why any activities that, based their calculated late dates, should have either started or finished during the update period, but did not.
3. APPROVED CHANGES VERIFICATION: Include only those project schedule changes in the schedule submission that have been previously approved by the Contracting Offices. The Narrative Report shall specifically reference, on an activity-by- activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.
4. SCHEDULE REPORTS: Typical reports shall contain: Activity Numbers, Activity Descriptions, Original Duration, Remaining Duration, Early Start Date, Early Finish Date,

Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. The following lists typical reports that will be requested. One or all of these reports may be requested for each schedule submission:

- a. **ACTIVITY REPORT:** A list of all activities sorted according to activity number.
 - b. **LOGIC REPORT:** A list of detailed predecessor and successor activities for every activity in ascending order by activity number.
 - c. **TOTAL FLOAT REPORT:** A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.
5. **GANTT CHART:** The gantt chart is required for the Preliminary, Initial and Periodic Updates. The gantt chart shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. Arlington County's Construction Manager will use, but is not limited to, the following conditions to review compliance with this paragraph:
- a. **CONTINUOUS FLOW:** Diagrams shall show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, total float, and percentage complete on the diagram.
 - b. **PROJECT MILESTONE DATES:** Show dates on the diagram for start of project, and contract required interim completion dates, and contract completion dates.
 - c. **CRITICAL PATH:** Clearly show the critical path.
 - d. **BANDING:** Organize activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.04 PROJECT SCHEDULE UPDATE MEETINGS:

- A** Conduct periodic schedule update meetings for the purposes of reviewing the Contractor's proposed out of sequence corrections, determining cause for delay, correcting logic, maintaining schedule accuracy and determining earned value. Meetings shall occur at least monthly within five (5) days of the proposed schedule data date and after the Contractor has updated the schedule with Arlington County concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity it intends to status. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant schedule update shall be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow Arlington County and the Contractor the opportunity to review the updated schedule on a real time and interactive basis. The Contractor's authorized scheduling representative will organize, sort, filter and schedule the update as requested by Arlington County. The meeting will last no longer than four (4) hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to Arlington County forty-eight (48) hours in advance of the meeting. The Contractor's Project Manager and Authorized Scheduler shall attend the meeting with the Authorized Representative of Arlington County.
- B** **UPDATE SUBMISSION FOLLOWING PROGRESS MEETING:** Submit a complete update of the project schedule containing all approved progress, revisions and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than four (4) working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

C STATUS OF ACTIVITIES: Update information, including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete shall be subject to the approval of Arlington County prior to the meeting. As a minimum, address the following items on an activity- by-activity basis during each progress meeting.

1. START AND FINISH DATES: Accurately show the status of the AS and/or AF dates for each activity currently in-progress or completed since the last update. Arlington County may allow an AF date to be assigned with the percent complete less than 100 percent to account for the value of work remaining, but not restraining successor activities. Only assign AS dates when actual progress occurs on an activity.
2. REMAINING DURATION: Update the estimated RD for all incomplete activities independent of Percent Complete. Remaining Durations may exceed the activity OD or may exceed the activity's prior update RD if Arlington County considers the current OD or RD to be understated based on current progress, insufficient work crews actually manning the job, unrealistic OD or deficiencies that must be corrected that restrain successor activities.
3. PERCENT COMPLETE: Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete.
4. LOGIC CHANGES: Specifically identify and discuss all logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, Contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to contract provisions. Arlington County will only allow logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.
5. OTHER CHANGES: Other changes required due to delays in completion of any activity or group of activities include:
 - a. Delays beyond the Contractor's control (force majeure delays), such as strikes and unusual weather.
 - b. Delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary.
 - c. Changes required to correct a schedule that does not represent the actual or planned prosecution and progress of the work.

3.05 REQUESTS FOR TIME EXTENSION

A In the event the Contractor believes it is entitled to an extension of the contract performance period, completion date, or any interim milestone date, furnish the following for a determination by Arlington County's Construction Manager: justification, project schedule data, and supporting evidence as Arlington County's Construction Manager may deem necessary. Submission of proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by Arlington County. In response to each Request for Proposal issued by Arlington County, submit a schedule impact analysis demonstrating whether or not the change contemplated by Arlington County impacts the critical path.

B JUSTIFICATION OF DELAY: The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. Arlington County's

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Construction Manager's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own action, which result in a calculated schedule delay, will not be cause for an extension to the performance period, completion date, or any interim milestone dates.

- C SUBMISSION REQUIREMENTS: Submit a justification for each request for a change in the contract completion date based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:
1. A list of affected activities, with their associated project schedule activity number.
 2. A brief explanation of the causes of the change.
 3. An analysis of the overall impact of the changes proposed.
 4. A sub- network of the affected areas.

Identify activities impacted in each justification for change by a unique activity code contained in the required data field.

- D ADDITIONAL SUBMISSION REQUIREMENTS: Arlington County's Construction Manager may request an interim update with revised activities for any requested time extension. Provide this information within four (4) days of the Construction Manger's request.
- E DIRECTED CHANGES: If the NTP is issued for changes prior to settlement of price and/or time, submit proposed schedule revisions to Arlington County's Construction Manager within two (2) weeks of the NTP being issued. Arlington County's Construction Manager will approve proposed revisions to the schedule prior to inclusion of those changes within the Project Schedule. If the contractor fails to submit the proposed revisions, Arlington County's Construction Manager may furnish the Contractor with suggested revisions to the project schedule. Include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by Arlington County's Construction Manager, advise Arlington County's Construction Manager within two (2) weeks of receipt of the revisions. Regardless of the objections, continue to update the schedule Arlington County's Construction Manager's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions with two (2) weeks of receipt of Arlington County's Construction Manager's proposed revisions, the Contractor will be deemed to have concurred with Arlington County's Construction Manager's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.
- F OWNERSHIP OF FLOAT: Float available in the schedule, at any time, shall not be considered for the exclusive use of either Arlington County or the Contractor.

END OF SECTION 013216

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Submittal schedule requirements.
- 2. Administrative and procedural requirements for submittals.

B. Related Requirements:

- 1. Section 013216 "Activities Schedule" for submitting schedules and reports, including Contractor's construction schedule.
- 2. Section 013119 "Progress Meetings and Photographs" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
- 3. Section 014516 "Contractor Quality Control" for submitting test and inspection reports, and schedule of tests and inspections.
- 4. Section 017800 "Close-Out and Warranty Performance" for submitting closeout submittals and maintenance material submittals.
- 5. Section 017823 "Operation Maintenance and Warranty Manuals" for submitting operation and maintenance manuals.
- 6. Section 017839 "As-Built Documentation" for submitting record Drawings, record Specifications, and record Product Data.
- 7. Section 017900 "Equipment Demonstration and Instruction" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

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1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and Construction Manager and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's and Construction Manager's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Construction Manager.
 5. Name of Contractor.
 6. Name of firm or entity that prepared submittal.
 7. Names of subcontractor, manufacturer, and supplier.
 8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 9. Category and type of submittal.
 10. Submittal purpose and description.
 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 12. Drawing number and detail references, as appropriate.

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13. Indication of full or partial submittal.
14. Location(s) where product is to be installed, as appropriate.
15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

- B. Options: Identify options requiring selection by Architect/Engineer.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect and Construction Manager on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- E. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
 - a. The contractor will be required to utilize construction management software. All construction documentation produced throughout the duration of the construction will be documented in the web based software.
 - b. Software: TBD
 - c. The General Contractor will not be required to purchase any license or pay any fees related to the web based software.
 - d. Arlington County will establish the project platform levels of access to the data.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect and Construction Manager reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

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- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 14 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 14 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.

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- g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 - 2. Shop Drawing Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
 - 3. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.
 - a. Architect will furnish the contractor the BIM model for use in preparing Shop Drawings and Project Record Drawings.
 - b. Digital Drawing Software Program: Autodesk Revit Version 2019.
 - c. Contractor shall execute a Dewberry Standard BIM Transfer Agreement.
 - d. Contractor is responsible for exporting files to AutoCAD as needed.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
 - 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.

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3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit **one** full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least **three** sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

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- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.

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- f. Test procedures and results.
- g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM Incorporation: Incorporate delegated-design drawing and data files into BIM established for Project.
 - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.
 - a. Architect will furnish the contractor the BIM model for use in preparing Shop Drawings and Project Record Drawings.
 - b. Digital Drawing Software Program: Autodesk Revit Version 2018.
 - c. Contractor shall execute a Dewberry Standard BIM Transfer Agreement.
 - d. Contractor is responsible for exporting files to AutoCAD as needed.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and Construction Manager.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

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1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required and return.
 - 1. PDF Submittals: Architect will indicate, via an action stamp on each submittal, the appropriate actions as follows:
 - a. "Approved"
 - b. "Approved as Noted"
 - c. "Return No Action Taken"
 - d. "Rejected"
 - e. "Revise and Resubmit"
- B. Informational Submittals: Architect will review each submittal and will return it as "For Information Only" or will return it if it does not comply with requirements. Architect and Construction Manager will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

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SECTION 013523 - SAFETY AND SECURITY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish all labor, materials, tools, equipment and services for effective project safety and security operations to meet all regulatory requirements in accordance with applicable codes and contract provisions.
- B. The Contractor is to furnish and install any supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a safe and secure project operation. The types of security and protection provisions required include, but are not limited to worker PPE, fire protection, barricades, warning signs/lights, site enclosure fence, sidewalk bridges, building enclosure/lockup, 24/7 site access control, environmental protection, and similar provisions intended to minimize property losses, personal injuries and claims for damages at the project site. No part of such provision(s) shall become the subject of a claim for extension of time or for excess costs or damages by the Contractor.
- C. The Contractor is required to submit a project/site specific safety and security plan to the Owner for review/approval no later than the earlier of thirty (30) calendar days after Notice to Proceed or mobilization to site.

1.2 CONSTRUCTION SAFETY

- A. It shall be a condition of each construction contract that no contractor, subcontractor, or supplier contracting for any part of the contract work shall require any laborer, mechanic, or other person employed in the performance of the Contract to work in surroundings or under working conditions which are hazardous or dangerous to his/her safety, as determined under construction safety standards promulgated by the U.S. Department of Labor or the Virginia Department of Labor and Industry.
- B. No Contractor awarded a construction contract shall knowingly employ or contract with any person, company, or corporation for services pursuant to that contract if such person, company, or corporation could not have been awarded such contract due to the restrictions set forth in the Contract Section, Information for Bidders.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SAFETY STANDARDS

- A. The Contractor shall comply with Federal, State, and local safety and fire codes and regulations and the applicable provisions of the following:
 - 1. Occupational Safety and Health Standards issued by the Secretary of Labor pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 and as amended.
 - 2. Virginia Occupational Safety and Health Standards for the construction industry.
 - 3. NFPA 70 E – Standards for Electric Safety at Workplace as referenced in OSHA 29 CFR 1926, sub-part K for safety measures, PPE protection from arc flash from electric equipment.
- B. Where requirements conflict, the most stringent requirement shall apply.

3.2 ACCIDENT REPORTS

- A. The Contractor shall maintain an accurate record of, and shall immediately report orally to the Owner, any accidents resulting in death, traumatic injury, occupational disease, or damage of property, materials, supplies, and equipment incident to Work performed under this Contract. The Contractor shall provide a written preliminary accident report to the Owner within 24 hours of occurrence and a complete written report within 7 calendar days for any accident or reportable or recordable injury.

3.3 HARD HATS, SAFETY SHOES, AND EMPLOYEE IDENTIFICATION

- A. Hard hats shall be required at the construction site from start to completion of Work. Each Contractor, employee, and visitor at the construction site shall be required to wear a hard hat. The Contractor shall provide hard hats for visitors as necessary and shall enforce the wearing of hard hats by Contractor employees and visitors. Individuals found not wearing hard hats will not be permitted to remain on site. The Contractor shall be responsible for advising all individuals who will be working on the site of this requirement. All Contractor and Subcontractor employees are required to provide employee and company identification on their hard hats or shall carry a separate ID card.
- B. The Contractor shall require all of his employees to wear OSHA approved safety shoes and all required PPE on the site at all times.

3.4 HOUSEKEEPING

- A. The Contractor shall, at all times, keep the site and surrounding property clean and free of unnecessary and hazardous debris. Any damage to surrounding property shall be repaired upon notification by the Owner at no expense to the Owner.
- B. The Contractor shall provide all items required to ensure safety of individuals and property on site.

3.5 ALLAYING DUST, REMOVAL OF CONSTRUCTION DEBRIS, SILTATION CONTROL, AND OTHER HOUSEKEEPING

- A. The Contractor will take whatever steps are necessary to ensure that dust, mud and any other construction debris is not tracked onto the surrounding roadways to the satisfaction of and at no additional cost to the Owner.
- B. Stormwater Siltation Control Maintenance: Contractor shall maintain all storm water inlets previously installed by others protecting same with silt trap devices in accordance with the overall site plan details. Contractor to maintain and replace silted inlet protection measures at storm water inlets in paved areas used by the Contractor for staging and construction operations. Maintain inlet protection devices as required in response to runoff events and in response to site inspections. Contractor shall maintain the integrity of all silt fencing at all times whether installed or installed by others in the areas of their construction operations.
- C. The Contractor shall, at all times, keep the site and surrounding property clean and free of unnecessary and hazardous debris. Any damage to surrounding property shall be repaired upon notification by the Owner at no expense to the Owner.

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- D. The Contractor shall provide all items required to ensure safety of individuals and property on site.

3.6 COMMUNITY IMPACT

The Contractor shall schedule operations with a minimum of disruption to affected or neighboring properties during construction.

- A. Consideration shall be given to adjacent and nearby property access; driveway maintenance including mud-tracking, dust & noise control; staff parking, pedestrian traffic, and overall public safety to the maximum extent possible. Dynamic signage, messaging to community, Maintenance of Traffic (MOT) (to be submitted to Owner's approval prior to execution) as well as designated safety officers from the Contractor will be required and will be provided at no cost to the Owner to maintain public safety.
- B. The Contractor shall abide by Arlington County and other applicable noise ordinances, rules, laws and regulations in effect at the job site during the entire project duration. In the case where overlapping constraints exist, the most stringent case shall apply.
- C. Staff employed by the Contractor shall recognize that they are working inside the boundaries of an active residential and commercial community and shall behave accordingly.

3.7 FIRE PROTECTION

- A. The Contractor is responsible for compliance with OSHA requirements and local fire codes and regulations as enforced by the governing Fire Marshall or his designated representative. Attention should be called, but not limited to, the following:
 - 1. Proper storage and removal of volatile waste
 - 2. Proper storage of bottled gasses
 - 3. On-site storage of fuels
 - 4. Establishment of smoking areas
 - 5. Placement of temporary portable fire extinguishers
 - 6. Employee training
 - 7. Emergency Access
- B. Adequate precautions against fire shall be taken throughout all operations. Flammable material shall be kept at an absolute minimum and shall be properly handled and stored. Fires or open salamanders shall not be permitted in any part of the Work
- C. Construction practices, including cutting and welding and protection during construction, shall be in accordance with the published standards of the National Fire Protection Association.
- D. Store gasoline and other flammable liquids in Underwriters Laboratories-listed safety containers in conformance with the National Board of Fire Underwriters recommendations. Storage, however, shall not be within a building.
- E. Make arrangements for periodic inspection of all construction areas by local fire protection authorities and insurance underwriters. Cooperate with these authorities and promptly carry out their recommendations.

3.8 HAZARDOUS MATERIALS

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- A. Hazard Communication Programs: Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with Laws or Regulations.

3.10 POLLUTION CONTROL

- A. The Contractor is responsible for compliance with governing anti-pollution laws and ordinances relative to on-going construction, clean-up, and disposal operations. On-site incineration or burial of items is not allowed.

3.11 SECURITY

- A. The Contractor is responsible for overall security of the construction site. This includes but is not necessarily limited to:
 - 1. Preservation of all property adjacent to the work, the removal or destruction of which is not part of the work of the project. The Contractor shall be responsible, at no additional cost, for all damage or injury to property of any character during the prosecution of the work and he shall restore such property to a condition at least similar and equal to that existing before such damage or injury was done by repairing, rebuilding, or restoring, as may be directed.
 - 2. Establishing and maintaining perimeter fencing and access gate(s).
 - 3. Positive site access control including effective use and maintenance of a Visitor Log.
 - 4. Securing of work in progress and materials stored on site from damage by weather, theft, or vandalism.
 - 5. Coordination with local police authorities when high value construction material/equipment is expected to be stored on site.

END OF SECTION 013523

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SECTION 013543 - HAZARDOUS MATERIALS REMEDIATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hazardous materials remediation contractor responsibilities.
2. Pre-Demolition Limited Regulated Hazardous Materials Survey Report for 3108 Columbia Pike, Arlington, VA 22206, is incorporated into these Contract Documents as Appendix A.

B. Related Requirements:

1. Section 011000 "Summary of Work" for use of the premises and phasing requirements.
2. Section 028213 "Asbestos Abatement Design Plan" for asbestos abatement requirements.
3. Section 028300 "Other Hazardous Materials Remediation" for other hazardous materials.

1.1 RESPONSIBILITIES

- A. The Contractor is responsible for all actions necessary for the safe and effective removal of any/all Hazardous Materials found on the site and as depicted in the Hazardous Materials Report. The Scope of Work shall include providing all labor, material, equipment, administration, and incidentals for performing abatement and monitoring work as required to meet current Federal, State and Local laws, codes and regulations. In the case of conflict in direction from authorities having jurisdiction, the most stringent case shall apply. Personnel performing such action(s) shall be properly trained, insured and licensed in the Commonwealth of Virginia. The Owner, at his sole discretion, may monitor and/or verify any/all activities related to the abatement and monitoring activities performed by the Contractor. Such action by the Owner shall not be construed as replacing the Contractor's responsibility to perform all required removal, abatement and/or monitoring activities for this Project.
- B. Hazardous Materials Awareness Training mandated by authorities having jurisdiction, standard industry work practices and/or per the Contractor's administrative policies including those of sub-contractors shall be scheduled, conducted, and completed at no additional expense to the Owner prior to crew members performing Work on or near hazardous materials.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 HAZARDOUS MATERIAL REPORTS

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- A. Hazardous materials identification and remediation activities are the responsibility of the Contractor as described in paragraph 1.2-A above and in accordance with findings shown in Section 028213 "Asbestos Abatement Design Plan", Section 02 and Appendix A and B.
- B. Appendix A: Pre-Demolition Limited Regulated Hazardous Materials Survey Report for 3108 Columbia Pike, Arlington, VA 22206.

END OF SECTION 013543

SECTION 014100 – COORDINATION, FIELD ENGINEERING AND REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SCHEDULES

- A. Responsibility for timely installation of all materials rests solely with the Contractor, who shall maintain coordination at all times. Coordination includes but is not limited to the following: installation of services by Dominion Energy (Electric), Arlington County Department of Public Works (Water & Sewer), Washington Gas, Cox, and Verizon. The responsibility for scheduling all activities including obtaining required permits and sequencing work as required by Arlington County Building & Development, inspectors or other Authorities Having Jurisdiction rests solely with the Contractor. The Contractor shall include such activities, their duration and the required sequencing in the Construction schedule.

1.02 FIELD DIMENSIONS

- A. The drawings accompanying these specifications indicate generally the design and arrangements of all equipment, apparatus, fixtures, accessories, etc., to complete the installation of all systems. The exact location or arrangement of equipment, unless otherwise dimensioned, is subject to minor changes necessitated by field conditions and shall be made as required without additional cost to Arlington County. Measurements shall be verified by actual observation at construction site and the Contractor shall be responsible for all of the work fitting into place in a satisfactory and workmanlike manner to the approval of Arlington County and Architect/Engineer.

1.03 CLEAN-UP DURING CONSTRUCTION

- A. During the construction period, the Contractor shall:
1. Clean up all waste materials, rubbish, and debris resulting from his operations weekly or at such frequencies as required by Arlington County.
 2. Place waste materials, rubbish, and debris from ground floor operations outside of building in a designated location.
 3. Place waste materials, rubbish, and debris from above ground floor operations in chute.
 4. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of debris.
 5. Sprinkle dusty debris with water.
 6. At reasonable intervals, clean-up site and dispose of debris off site.
 7. Be responsible for procuring permits for hauling and dumping rubbish, waste materials and debris from site to area approved by local authorities.
 8. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces of fixtures, hardware and equipment.
 9. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
 10. Comply with additional requirements defined in specifications.

1.04 DELIVERY AND STORAGE

- A. Storage of materials and equipment in conjunction with this contract is the responsibility of the Contractor. Stored materials and equipment shall be stored on the site where directed by

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Arlington County's Representative. The Contractor is responsible for security of the site and for protection from the environment. Provide fencing or other security measures. Do not damage pavement or other improvements. Restore to original condition upon completion of work

- B. Materials damaged or defective as determined by Arlington County Project Manager, shall be replaced or repaired at no additional cost to Arlington County.
- C. Hazardous material brought to the site by the Contractor shall be accompanied by a Material Safety Data Sheet, Form OSHA-20 or DD Form 1813, pursuant to Federal Standard No. 313A (or latest revision thereof)
- D. The Contractor is responsible for receipt and transportation. All shipments to the project shall be addressed to the Contractor and not Arlington County.

1.05 INTERRUPTION OF EXISTING UTILITIES AND SERVICES

- A. The Contractor shall perform the work with a minimum of outage time for all utilities. Interruption shall be at approved sections of the utilities. In some cases, the Contractor may be required to perform the work while the existing utility is in service. The exiting utility services may be interrupted only when approved by Arlington County and utility company involved. The Contractor shall notify Arlington County Project Manager in writing at least seven calendar days in advance of the time desired for the existing service to be interrupted.
- B. The amount of time requested by the Contractor for interruption of existing utility service shall be as approved by Arlington County.

1.06 LAYOUT

- A. Dimensions and elevations indicated in layout of existing conditions shall be verified by the Contractor. Discrepancies between drawings, specifications and existing conditions shall be referred to the Architect/Engineer for adjustment before work affected is performed. Failure to make such notification shall place responsibility upon the Contractor.

1.07 CONTROLS

- A. The Contractor shall establish and preserve all control points and benchmarks, including the property corners.

1.08 STAKES AND GRADES

- A. The Contractor shall employ a certified civil engineer or land surveyor to stake out all of the construction. Rough grade stakes shall be set in sufficient number so that the site can be accurately graded to meet the intent of the drawings. Stakes for final grading shall be set for all sanitary, water main and storm sewers and all pavements, curbs and gutters.
- B. The Contractor shall perform the following:
 - 1. Provide datum benchmark for the use of all work.
 - 2. Lay out all site work.
 - 3. Lay out all building corners.
 - 4. Lay out building excavation.
 - 5. Lay out interior partitions on concrete slabs.
 - a. As soon as possible after completion of floor slabs, and prior to any partitions being done, lay out the entire full-scale floor plan for each floor area.

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- b. Layout shall be made by snapping distinct and readable caulk lines or by painting lines, indicating the accurate thicknesses of walls and partitions, locations of swings of doors and similar physical features.
- c. After floor layouts have been made, Contractor and/or appropriate subcontractor shall be responsible for field checking room dimensions, wall thicknesses, dimensions of built-in equipment, and similar items of critical nature.

1.09 CODE COMPLIANCE

- A. The Contractor shall comply with all applicable Arlington County, Commonwealth of Virginia and Federal regulations, ordinances and laws. All violations shall be corrected within 24 hours from notice of violation.
- B. The Contractor is responsible for ensuring that necessary inspections are made, regarding Arlington County ordinances. It is the Contractor's responsibility to ensure that inspections are requested in a timely manner, and that the inspections are made and approvals granted.

PART 2 - MATERIALS - NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 014100

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SECTION 014516 – CONTRACTOR QUALITY CONTROL (CQC)

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS: Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- 1.2 Quality Control (QC) is the responsibility of the Contractor. The primary function of contractor quality control (CQC) is to ensure that the completed project meets all quality requirements of the contract.
- 1.4 Quality Assurance (QA) is the responsibility of the Owner. Quality assurance (QA) is the process by which the Owner assures that the Contractor's QC program is working effectively and that the end product complies with the quality established by the contract.
- 1.5 Construction Quality Management (CQM) is the performance of tasks, which ensure that construction is performed according to plans and specifications, on time, within Budget, easily maintained, and in a safe work environment. The purpose of CQM is the Owner's efforts; separate from, but in coordination and cooperation with the Contractor, to assure that the quality set by the plans and specifications for the overall Project is achieved.
- 1.6 References: American Society for testing and materials (ASTM), articles A-880; C-1077; D-3666; D-3740; E-329; E-543.
- 1.7 Payment: Separate payment will not be made for providing and maintaining an effective Quality Control Program and all costs associated shall be included in the contractor's bid.

PART 2 - SUBMITTALS

- 2.1 Submit the following in accordance with Section 013100 "Preconstruction Conference and Submittals".
- A. Quality Control (QC) Plan. Submit a QC plan within 10 calendar days after receipt of Notice to proceed.
- B. Components of the QC Plan:
1. Provide, for approval, a QC plan submitted with pages numbered sequentially that covers both on-site and off-site work and includes the following: (Note: QC plans submitted in any other manner than provided in this section will be rejected).
 - Contractor's QC Organization
 - Names and qualifications
 - Duties, responsibility and authority of QC personnel.
 - Outside organizations
 - Appointment letters
 - Submittal procedures and sample register
 - Testing Laboratory Information
 - Testing Plan and log
 - Procedures for performing the three phases of control using a quality control checklist
 - Procedures to complete rework items
 - Documentation procedures

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- List of definable features of work
 - Personnel Matrix
 - Material Inspection form
 - Inspections Report form
 - Daily report form
 - RFI form
2. A chart showing the QC organizational structure.
 3. Names and qualifications, in resume format for each person in the QC organization.
 4. Duties, responsibilities and authorities of each person in the QC organization.
 5. A listing of outside organizations that will be providing services for the project under your direction, i.e. Consultants, materials, testing, design, equipment rentals, and a description of the services these firms will provide.
 6. Letters signed by an officer of the firm appointing the QC manager and alternate QC manager, stating that they are responsible for implementing and managing the QC program as described in the contract.
 7. Procedures for reviewing, approving and managing submittals. Provide the names of individuals responsible for submittal reviews. Provide the initial submittal of the submittal register to be used on the project.
 8. Testing and laboratory information required by the paragraphs entitled "Testing Requirements" and in Divisions 21, 22, 23, 26, and 27 as applicable.
 9. A testing plan and log that includes the tests required, referenced by the specification paragraph requiring it, the frequency and the person responsible for each test.
 10. Procedures to identify, record, track and complete re-work items.
 11. A quality control checklist. For each definable feature of work (DFOW), develop a list of quality control activities broken down by preparatory, initial and follow-up phases. Each list shall include a breakdown of quality checks that will be used when performing the quality control functions, inspections and test required by the contract documents. The quality control checklist should be developed with a view towards obtaining quality construction by planning ahead and identifying potential problems for each definable feature of work.
 12. Documentation Procedures, including proposed report formats.
 13. Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch-out list inspections, pre-final and final inspections. Refer to Division 1, "Project Closeout" for additional information.

PART 3 - EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system as stated herein, and in compliance with the contract. The quality control system shall consist of plans, procedures and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction

operations both on-site and off-site and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Owner for non-compliance with the quality requirements specified in the contract (see "Levels of Authority" in section 5.3). The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site superintendent shall maintain a physical presence at the site at all times during construction and shall be responsible for all construction and construction related activities at the site.

3.2 QUALITY CONTROL (QC) PLAN

The Contractor shall furnish for review by the Owner, not later than 10 days after receipt of the Notice to Proceed, the Contractor Quality Control (CQC) plan proposed to implement the requirements of the contract. The plan shall identify personnel, procedures, control, instructions, tests, records and forms to be used.

3.2.1 Contents of the CQC plan

The CQC plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site including work by sub-contractors, fabricators, suppliers and purchasing agents for sub-contractors, and any other parties working directly for the Contractor for the Project:

- A. A description of the quality control organization, including a chart showing lines of authority and acknowledgement that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the Contractor's Executive Manager.
- B. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- C. A copy of the letter to the CQC System Manager signed by an Owner or Authorized Officer of the Firm which describes the responsibilities and delegates sufficient authority to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract (or a safety related event). The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Owner.
- D. Procedures for scheduling, reviewing, certifying and managing submittals, including those of sub-contractors, off-site fabricators, suppliers and purchasing agents. These submittals shall be provided in accordance with Division 1, "SUBMITTAL PROCEDURES".
- E. Control, verification and acceptance testing and commissioning for each specific test shall include the test name, specification paragraph requiring the test, feature of work to be tested, test frequency and person responsible for each test.
- F. Procedures for tracking preparatory, initial and follow-up control phases, and control, verification, and acceptance tests including documentation.
- G. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

- H. Reporting procedures, including proposed reporting format.
- I. A list of definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements and may be identified by different trades or disciplines or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of the CQC Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during construction. The Owner reserves the right to require the Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the Owner in writing of any proposed change. Proposed changes are subject to acceptance by the Owner.

3.3 COORDINATION MEETING

The Contractor shall meet with the Owner to discuss the Contractor's Quality Control system for the project following submission of the CQC plan. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the QC operations, control activities, testing, administration of the system for both onsite and offsite work and the interrelationship of Contractor's Management and control with the Owner's Quality Assurance. Minutes of the meeting shall be prepared by the Owner and signed by both the Contractor and the Owner. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization.

The Contractor's QC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Owner.

The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization on-site. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Owner.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual who shall be responsible for overall management of CQC and have authority to act in all QC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of five (5) years construction experience on construction similar to the contract. Or the Contractor may select a construction person with at least a minimum of fifteen (15) years of construction field experience on related construction projects and similar to the contract.

This CQC System Manager shall be on-site at all times during construction activities and shall be employed by the Contractor. The Project Superintendent may serve as the CQC System Manager. This person must meet the requirements established for the QC Manager and shall be Certified. The CQC System Manager shall attend progress meetings and report on quality issues and provide quality control updates.

An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the CQC System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 Removal of the CQC System Manager

If, at the discretion of Arlington County Construction Manager, the CQC System Manager is not fulfilling their duties outlined herein, they shall be removed from their role as the CQC System Manager. The Contractor must immediately replace them with a qualified person as outlined herein and submit that person and their qualifications to Arlington County Construction Manager for approval. Until a replacement is approved, the alternate CQC System Manager shall act as the CQC System Manager. Such grounds for removal include, but are not limited to:

1. Inadequate management of the outside organizations that are providing services for the project.
2. Failure to maintain and update the testing plan and log.
3. Failure to maintain and update the quality control checklist and sufficiently perform the inspections necessary to adequately check each phase of each definable feature of work (DFOW).
4. Failure to identify, record, track, and complete re-work items.
5. Unsatisfactory review, approval, and management of submittals.
6. Unsatisfactory documentation and reporting.
7. Failure to be on site full time during critical construction activities.

3.4.4 Additional Requirements

In addition to the above experience and/or education requirements, the CQC System Manager and alternate CQC System Manager shall have a U.S Army Corps of Engineers certification for Construction Quality Control Management for Contractors or equivalent.

3.4.5 Organizational changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the contractor shall revise the CQC plan to reflect the changes

and submit the changes to the Owner.

3.5 SUBMITTALS AND DELIVERABLES

The QC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

When COMMISSIONING of systems is included in the contract, the submittals required by those sections shall be coordinated with TECHNICAL SUBMITTALS in Division 1 to ensure adequate time is allowed for each type of submittal required.

3.6 CONTROL

Contractor quality control is the means by which the contractor ensures that the construction, which includes that of sub-contractors and suppliers, complies with the requirements of the contract. At least three (3) phases of control shall be conducted by the Contractor's CQC System Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work; after all required plans/documents/materials are approved/accepted, and after copies are at the job site. This phase shall include:

- A review of each paragraph of the applicable specification section, reference codes and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by the Owner personnel until final acceptance of the work.
- A review of the contract documents.
- A check to assure that all materials and/or equipment have been tested submitted and approved.
- Review of provisions that have been made to provide required control inspection and testing.
- Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- A physical examination of required materials, equipment and sample work to assure that they are on hand, conform to approved shop drawings or submitted data and are properly stored.
- A review of the appropriate activity hazard analysis to assure safety requirements is met.
- Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- A check to ensure that the portion of the plan for the work to be performed has been accepted by the Owner.

- Discussion of the initial control phase.
- The Owner shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other QC personnel and the foreman responsible for the definable feature of work. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily QC report. The contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- Resolve all differences.
- Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- The Owner shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily QC report. Exact location of initial phase shall be indicated for future reference and comparison with the follow-up phases.
- The initial phase should be repeated for each new crew who works on-site or any time acceptable specified quality standards are not being met.
- Failure to provide 48 hours notice of these meetings to the Owner will prevent the Contractor from starting any DFOV. Owner attendance to these meetings is not mandatory, and once notice has been provided to the Owner and the meetings have taken place; the Contractor may start work. The Owner will however assure that such meetings have taken place and will review the minutes of the meeting made available by the QC System Manager.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the QC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The contractor shall not build nor conceal any non-conforming work.

3.6.4 Additional Preparatory and initial phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, on-site superintendent or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop, including but not limited to: forces beyond the control of the Owner or Contractor, damage to the site, etc.

3.7 TESTS

3.7.1 Testing Procedure

The contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract requirements. Upon request, the contractor shall furnish to the Owner, duplicate samples of test specimens for possible testing by the Owner. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Arlington County approved testing laboratory or as recommended by the contractor, or establish an approved testing laboratory at the project site. The contractor shall perform the following activities and record and provide the following data:

- Verify that testing procedures comply with contract requirements.
- Verify that facilities and testing equipment are available and comply with testing standards.
- Check test instrument calibration data against certified standards.
- Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken and the sequential control number identifying the test shall be given.
- If approved by the Owner, actual test reports may be submitted later with a reference to the tests number and date taken. An information copy of tests performed by off-site or commercial test facility shall be provided directly to the Owner. Failure to submit timely test reports as stated may result in non-payment for related work performed and disapproval of the test facility for this contract.

3.8 CERTIFIED TEST REPORTS

Certified test reports may be required for approval of materials and equipment. Testing shall have been performed in a laboratory, meeting the requirements specified herein. Test reports shall conform to paragraph 3.9, and shall be accompanied by certificates from the manufacturer certifying that the material and equipment proposed to be supplied under the contract is of the same type, quality, manufacturer and make, as that tested.

3.9 MANUFACTURER'S CERTIFICATES OF CONFORMANCE

3.9.1 Pre-printed certifications are not acceptable.

Certificates shall be original(s), no copies will be accepted. Certifications shall name the appropriate equipment or material, specification, standard, or other document specified as controlling the quality of that item and shall have attached thereto-certified copies of test data upon which the certifications are based. Certificates shall be signed by the manufacturer's

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official authorized to sign certificates of conformance or compliance.

3.9.2 If a material is called by a specific product manufacturer's name in the technical specifications, and the Contractor proposes that specific material for use in the work, the requirement for certificates of conformance may be waived by the Owner.

3.9.3 The requirement for "original" certificates of conformance may be waived by the Project Manager for standard builders products, if conformance with referenced specifications is clearly indicated on the manufacturer's product literature.

3.10 LABORATORY REPORTS:

3.10.1 Reports shall cite the contract requirements, the test or analysis procedures used, and the actual test results. For each report, the cover sheet shall be stamped in large red letters "CONFORMS" or "DOES NOT CONFORM". Reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports.

3.10.2 Unless otherwise specified, certified tests should have been performed not earlier than one year prior to the contract award date.

3.11 PRODUCTS:

All products shall be manufactured by a company normally engaged in the product's production. Products shall have been in satisfactory commercial or industrial use a minimum of two years prior to award. Such application shall be similar to that as specified herein. Unless otherwise noted, provide the current model. Discontinued models are not acceptable.

3.12 WORKMANSHIP:

Comply with the industry standards and as specified in the technical sections.

3.13 MANUFACTURER'S INSTRUCTIONS:

Perform in compliance with the manufacturer's instructions. Should the instructions conflict with contract requirements, request clarification from the PM.

3.14 MANUFACTURER'S FIELD SERVICES:

As specified, provide qualified manufacturer's representatives to observe field conditions, installation and quality of workmanship.

3.15 TESTING, INSPECTION AND LABORATORY SERVICES

3.15.1 The contractor will employ and pay for services of an independent testing laboratory to perform specified services including the following:

- Foundation inspection
- Soils testing
- Concrete testing
- Structural steel inspection
- Bituminous paving

3.15.2 Employment of a testing laboratory shall in no way relieve the Contractor of the obligation to perform work according to the contract.

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3.16 CONTRACTOR'S RESPONSIBILITIES: The Contractor shall:

- 3.16.1 Cooperate with laboratory personnel; provide access to work and to manufacturer's operations.
- 3.16.2 Provide to laboratory preliminary representative samples of materials to be tested in required quantities.
- 3.16.3 Furnish copies of mill test reports.
- 3.16.4 Notify the testing laboratory 24 hours prior to any inspection or testing which is required. Should the Contractor schedule an inspection/testing and the work is not ready for inspection/testing, the Contractor shall be responsible for all associated costs, including stand-by time, travel time and mileage.
- 3.16.5 Furnish labor and facilities:
 - To provide access to work to be tested.
 - To obtain and handle samples at the site.
 - To facilitate inspections and tests.
 - Provide for laboratory's exclusive use for storage and curing of test samples.
- 3.16.6 Provide the Owner with the results and reports when they become available. Record in the Contractor's Daily Construction Report all inspections and tests performed that date and their results. Maintain records of all on site inspections and tests, and make them available to the Owner. Submit test and inspection reports as required below and in the technical sections. Monitoring the inspection effort will be performed by the Contractor's Superintendent and the Owner.
- 3.16.7 Where required, the Contractor shall hire testing and inspection agencies that are separate and independent from the entities that perform the Work to be tested and inspected, including but not limited to a testing and balancing firm for the mechanical systems that is separate and independent from the subcontractor performing the mechanical work.
- 3.16.8 Contractor shall arrange and pay for the following testing and inspections:
 - Re-testing of Owner provided tests due to failure.
 - Testing allowed by the Owner for consideration of acceptance of work previously determined by the Owner as non-conforming.
 - Rebar locating for core drilling or cutting of concrete.

3.17 LABORATORY'S RESPONSIBILITIES AND LIMITATIONS: The testing laboratory shall:

- 3.17.1 Cooperate with the Owner, the AE and the Contractor; provide qualified personnel promptly on notice, with no less than a 24 hour response time.
- 3.17.2 Perform specified inspections, sampling and testing of materials and methods of construction;
 - Comply with specified standards; ASTM, the recognized authorities, and as specified.
 - Ascertain compliance with requirements of the Contract.
 - Promptly notify the Owner and the Contractor of irregularities or deficiencies of work which are observed during performance of services.

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- Promptly submit reports of inspections and tests to the PM, the Contractor and the AE per REPORTS below.

3.17.3 The testing laboratory is not authorized to:

- Release, revoke, alter or enlarge on requirements of the Contract Documents.
- Approve or accept any portion of work.
- Perform any duties of the Contractor.

3.18 CERTIFICATION OF NEC COMPLIANCES:

All (120 VAC and higher) mechanical and electrical devices including but not limited to equipment, motors, components, lighting panels, control panels, motor control centers, and switch gear shall be manufactured, assembled and installed in accordance with the National Electric Code (NEC) and all ICC 2003 Codes. In order to certify said NEC compliance, the Contractor and each subcontractor shall furnish only those items which are labeled/listed by Underwriters Laboratories, Inc. Canadian Standards Association and/or Factory Mutual, may also be obtained as appropriate, for the service and conditions which are intended. Field assembled and wired equipment such as switchgear; lighting and motor control panels/centers shall be inspected and tested by the Contractor prior to turn-over to the Owner.

Manufacturer's Representatives shall be authorized, in writing, to act in the specified capacity by the product manufacturer's home office. Welders, welding operations, and completed welds shall be inspected by an AWS Certified Welding Inspector as specified in the technical sections.

3.18.1 Do not cover or conceal work until required test and inspection results indicate the work conforms to contract requirements.

3.19 REPORTS:

After each inspection or test, provide the Owner and A/E with a report to include:

- Date of report
- Project title and Contract number,
- Name of inspector
- Date and time of test, sampling or inspection,
- Product identification and applicable specification section and paragraph,
- Location of inspection or test, type of inspection or test,
- Results of inspection or test, and
- Conformance or nonconformance with Contract requirements

3.20 OWNER PERFORMED FIELD INSPECTIONS AND TESTS:

Owner performed field inspections as well as test will be made in accordance with the Department of Transportation and Capital Infrastructure's internal Quality Assurance (QA) Plan and in accordance with the provisions of the Contract Documents. Owner's personnel will be on-site throughout the duration of the Project to assure compliance with all quality standards, through repeated inspections, tests, photographs and reports.

PART 4 - COMPLETION INSPECTIONS

4.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Project

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schedule and/or required by the specifications, the CQC System Manager shall conduct an inspection of the work.

A punch list of items that do not conform to the contract documents and specifications shall be prepared and included in the CQC documentation. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. A copy of this list shall be provided to the Owner.

The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Owner that the building or facility is ready for the Pre-final inspection.

4.2 Pre-Final Inspection

The Owner will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. An Owner Pre-final punch list may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Owner.

Any items noted on the Pre-final inspection shall be corrected a timely manner as defined in the approved Project Schedule. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work (where the project is divided into increments by separate completion dates).

4.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Owner shall be in attendance at the final acceptance inspection. The final acceptance inspection will be formally scheduled by the Owner, based upon results of the Pre-final inspection. Notice shall be given to the Owner at least fourteen (14) days prior to the final acceptance inspection and shall include the Contractor's assurance that that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final inspection. Failure of the Contractor to have all contract work complete for this inspection shall result in a written notification of non-compliance. Where the Contractor fails to complete the deficiencies after the completion date assigned by the schedule, the Owner may elect to complete the work as necessary by hiring another Contractor. All associated costs incurred by the Owner as a result of such work (or re-work) shall be paid for by the original Contractor.

PART 5 - DOCUMENTATION

5.1 The CQC System Manager shall maintain all project records on site (especially those that are directly related to the work being performed) that are current and provide factual evidence that the required quality control activities and/or tests have been performed. These records shall include, at a minimum, the following:

- Daily Reports
- RFI Log
- A complete set of the County Approved permit drawings
- Updated, and current As-built drawings
- Copies of all PCO, CO's, Submittals & Safety Logs.
- Off-site activities from suppliers, vendors, and fabricators.
- All test procedures and test results.
- Complete copy of the Project Specifications.
- Copies of AHA's and Safety plans.

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- Contractor's Re-work items List

At Substantial Completion all forms and documentation, As-builts, O & M Manuals, Training material, Final Punch-out Inspection reports, Daily Reports, etc. shall be turned over to the Owner. Refer to Division 1, "Project Close-out" for the number of copies required.

5.2 Notification of Non-Compliance

The Owner will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice when delivered to the Contractor at the work Site shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly (within 24 hours), the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages incurred by the Contractor against the Owner.

5.3 LEVELS OF AUTHORITY

- 5.3.1 The Owner reserves the right to remove any member of the Contractor's team off the job at any time for lack of performance, poor or uncooperative work attitude/ethic or other negative behavior or performance of work that is contrary to the quality established in the contract documents. Also, see Notification of Non-Compliance in section 5.2 above. Refer to item 5.3.3 below.
- 5.3.2 The Contractor shall notify the Owner of any situation which may negatively impact the construction project including personnel and/or Sub-Contractor issues, material delivery, damage, theft or any safety incident or violation, within 24 hours.
- 5.3.3 The Owner shall provide written notice to the Contractor requesting the removal of any member of the Contractor's personnel and will provide notice for the time frame for the team member replacement as agreed to by the Contractor but not to exceed 14 days. Interim replacement personnel shall be provided by the Contractor at no additional cost to the Owner.

END OF SECTION 014516

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SECTION 015200 - TEMPORARY FACILITIES, UTILITIES, ACCESS AND CONSTRUCTION AIDS

PART 1 - GENERAL

1.01 CONTRACTOR'S OFFICE

- A. The Contractor shall provide office(s) for their own use. Locate within the construction site and coordinate location with the Owner. General contractor is responsible for setting up all trailer(s) with all required utilities, permits, all utility connections, modification to trailer for pump and haul need and other utilities, footing/foundation as required and maintenance of the trailer while in use on project. Provide access stairs, ramps, etc. as required to trailer(s) to meet code. Power, AC, heat, indoor toilet facility with pump and haul, phone and internet service is required for the trailer(s). Trailer(s) shall be established onsite within one (1) month of the effective date of the Notice to Proceed. Remove all trailer(s) from the jobsite upon substantial completion of work. A trailer permit is required for each unit.
- B. The Contractor may provide and maintain storage sheds, other temporary buildings or trailers within the Limits of Disturbance, installation and placement of sheds and trailers shall be approved by Arlington County Construction Manager; a trailer permit is required for each unit, Remove from the jobsite upon the completion of work, or as directed.

1.02 TEMPORARY ELECTRICAL POWER

- A. The Contractor shall furnish and install temporary electrical facilities, including lamps, for construction and safety operations. All temporary facilities shall remain the property of the Contractor and be removed after permanent connections have been completed. Electrical wiring, conduit or equipment which are part of the permanent electrical systems, shall not be used for temporary electrical facilities, unless specifically approved by the Owner.
- B. Install temporary and permanent electrical power in accordance with National Electric Code (NEC). Provide appropriate disconnects and meters. Coordinate work with the local authorities.
- C. The Contractor shall be responsible for any damage or injury to equipment, materials, or personnel caused by temporary electrical installation. Costs for materials and installation of temporary electrical facilities shall be at the Contractor's expense.
- D. The Contractor shall arrange and pay for energy consumed in providing electrical facilities, including Arlington County trailer, until the project is fully accepted by Arlington County.

1.03 TEMPORARY WATER

- A. The Contractor shall make all arrangements to install and pay for all temporary equipment, piping, water meters and outlets for an adequate supply of clean water for construction purposes until date of substantial completion. Point of tie-in, meter(s) and hose bibs shall be indicated on the site utilization plan. Contractor shall furnish drinking water for all Contractor and Owner personnel.

1.04 TEMPORARY HEAT

- A. The Contractor, at his expense, shall furnish, install and maintain temporary heat and enclosures during contract activities and shall provide heat and enclosures to maintain satisfactory working conditions for all trades.

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B. Provide heat, enclosures, fuel and services to protect all work and materials against injury from dampness and cold until final acceptance of all work and materials in the contract unless building is occupied by Arlington County prior to such acceptance.

C. Use of open salamanders and other temporary heating devices which cause smoke damage will not be permitted.

1.05 SANITATION

A. Sanitation facilities are not available from Arlington County. Construct and maintain approved sanitary conveniences for the use by persons employed on the jobsite. Arlington County Construction Manager will coordinate and approve location and installation. The conveniences shall be maintained in a clean, sanitary condition without nuisance, and their mandatory use shall be strictly enforced. Upon completion of the work, remove from the premises.

1.06 ACCESS ROADS

A. The Contractor shall provide and maintain temporary access to the project site and will accomplish this per methods as approved by the AE and Arlington County so as not to interfere with work of others. See also Section 01 0010 "Summary of Work".

B. All vehicles bringing or removing earth, loose materials or debris shall be loaded in a manner to prevent from dropping materials on roads and streets.

C. At all points, where vehicles leave the project site and enter adjacent paved streets, the Contractor shall maintain an installation and crew to prevent any mud from being carried onto such adjacent paved streets.

1.07 DUST, DIRT AND MUD CONTROL

A. The Contractor shall take whatever steps necessary to ensure that mud is not tracked onto the streets and to allay any and all dust at all times during the construction period.

B. Contractor is responsible for cleaning up all debris, materials, etc., that fall from vehicles enroute to or from the site. No debris is allowed to fall on existing public road pavement.

C. Earth, loose material or debris deposited on the streets due to Contract activities shall be removed immediately.

1.08 PARKING

A. Construction personnel shall not at any time park on any private property without the proper expressed consent of the property owner. Contractor shall be restricted to parking on-site within the Limits of Disturbance or in areas approved as parking by Arlington County and allowed by VDOT or the adjoining property owner.

B. Any Contractor personnel violating this stipulation, do so at their own risk, and should be aware that their vehicles may be towed at offender's expense.

1.09 TRAFFIC CONTROL

A. Any traffic control deemed necessary to affect smooth traffic flow shall be provided by Contractor when so directed by the Owner.

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1.10 CONSTRUCTION ELEVATORS AND HOISTS

- A. Contractors shall provide cranes, hoists, towers and other lifting devices for proper and efficient movement of materials and shall provide operating personnel for the equipment. Equipment shall be provided with guys, bracing, other safety devices in accordance with the local or State codes.

1.11 SCAFFOLDING AND PLATFORMS

- A. Provide, erect, maintain, remove when directed, all scaffolding, staging, platforms, temporary runways, temporary flooring, guards, railings, stairs, etc., as required by local agencies having jurisdiction for protection of workmen and public. Construction inspection and maintenance of these items shall comply with all safety codes and regulations as applicable to project.

1.12 TEMPORARY FENCES AND BARRICADES

- A. The Contractor shall furnish, install and maintain in a sound condition all necessary temporary fences, barricades, trench and hole covers, warning lights and all other safety devices necessary to prevent injury to persons and damage to property. Temporary fencing within limits of disturbance is required; the Contractor shall coordinate with Arlington County Project Manager on locations and extents.

1.13 TEMPORARY PUMPING

- A. The Contractor shall provide all temporary pumping required to complete the work.

1.14 TEMPORARY ENCLOSURES

- A. The Contractor shall furnish and install temporary enclosures, doors and transparent plastic windows required to protect buildings from damage due to vandalism, or the elements, or to maintain suitable temperature during installation or finishing work.

1.15 TEMPORARY TELEPHONE & BROADBAND INTERNET SERVICES

- A. The Contractor shall arrange for and provide telephone and broadband internet services for the use of the Contractor, Arlington County, the AE and authorized representatives of Arlington County for the contract period. The Contractor shall pay for all costs of installation and all local telephone service. Long distance calls shall be paid for by the person placing the call. A dedicated broadband internet service connection is required for Arlington County's sole use in Arlington County trailer.

1.16 TEMPORARY PROJECT SIGNAGE

- A. Project signs as indicated, project sign detail to be provided to general contractor after award.
 - 1. Sign to be exterior grade plywood, 4'x8', single faced with lettering and graphics
 - 2. Pressure treated posts to be 4"x4"x12'
- B. Temporary Signs: Provide other signs as indicated to inform public individuals seeking entrance to project; provide temporary, directional signs for construction personnel and visitors.
- C. Maintain and touch-up signs so they are always legible
- D. Unauthorized signs are not permitted

1.17 TEMPORARY ACCESS

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- A. Provide temporary pedestrian and vehicular access to all construction activity effected onsite or offsite neighbors in construction with any road work and utility work throughout construction phase. Provide temporary signs, detours and safety signs as required. Provide schedule/plan of action minimum 2 weeks prior of any road work and/or utility installation to Owner for review and approval.

1.18 SUBSTANTIAL COMPLETION

- A. Upon project completion, after Substantial Completion, the general Contractor shall remove all temporary facilities, including, but not limited to trailers, temporary utilities, temporary fencing, etc. from the Project Site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 015200

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SECTION 015700 - VPDES PERMIT, SWPPP, AND GENERAL E&S CONTROL REQUIREMENTS

PART 1 – GENERAL

- 1.1 The Contractor shall provide field-compliance and all documentation for VPDES, SWPPP and the General E&S Control requirements regulated by Authorities Having Jurisdiction (AHJ). Enforcement includes but is not limited to all applicable laws, rules, codes & regulations and, in the case of conflicting direction, the most stringent case shall apply.
- 1.2 The Owner will prepare the Stormwater Pollution Prevention Plan (SWPPP) and obtain the Virginia Pollution Discharge Elimination System (VPDES) permit prior to Notice-of-Award.
- 1.3 The VPDES permit and the SWPPP responsibilities shall be transferred by the Owner to the Contractor within 14 days after Notice-to-Proceed date.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

- 3.1 The Contractor shall provide the Owner with a copy of all correspondence received by the Contractor related to the transfer of the VPDES permit, within five (5) business days of receipt of said correspondence.
- 3.2 The Contractor shall be responsible for renewal of the VPDES Permit as needed including payment of associated fees by submitting a new registration statement at least 90 days before the expiration date of the existing general permit:
- 3.3 Prior to mobilization at the jobsite or commencement of construction activities, The Contactor shall:
 - A. Execute Responsible Land Disturber (RLD) Certification form.
 - B. Provide the name of a qualified individual responsible for carrying out the land disturbing activity. This individual shall ensure that all aspects of the Erosion and Sediment Control (ESC) plans are enforced in accordance with the approved Site Plan and all Virginia erosion and sediment control laws, as well as, all other applicable laws, rules, codes and regulations. Qualified individual shall possess a current Responsible Land Disturber (RLD) Certificate from the Department of Environmental Quality (DEQ):
- 3.4 The Contractor shall be responsible for compliance with all requirements outlined within the VPDES Permit and the SWPPP:

<https://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/IndustrialSWG P2014-SWPPPRequirements.pdf>

It is noted here that, in the case where regulatory direction overlaps, the more stringent case shall apply.

- 3.5 Corrective actions and payment for any fines or penalties associated with non-compliance to this specification shall be provided in a timely fashion by the Contractor without cost to the Owner.

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- A. Timely corrective action shall mean meaningful corrective work occurring immediately for urgent items, 3-calendar days for non-urgent items and completion of all corrective action within 5-days in all cases. Level of urgency shall be determined by the AHJ.
- 3.6 The Contractor shall be required to submit, as part of the monthly payment application, copies of all inspection reports, corrective actions, as-built updates, and any notices or correspondence related to the VPDES permit and SWPPP that have not yet been submitted to the Owner's representative for a previous pay-cycle. The Owner reserves the right to withhold part or all of the monthly payment in the event of failure by the Contractor to comply with this specification including reporting requirements.
- 3.7 No later than 30 days after award of final project phase Substantial Completion, submit an original and signed Notice of Termination (NOT) to DPWES LDS "Site and Addressing Center" (SAC) with a copy to the Owner in accordance with 9VAC25-880-60.
- 3.8 The Contractor shall pay the applicable annual maintenance fees for termination of permit until final project acceptance by the AHJ.
- 3.9 Upon receipt from the SAC/DEQ, the Contractor shall provide a copy of the approved DEQ termination notice to the Owner
- 3.10 Any and all references to Virginia Stormwater Management Programs (VSMP) permit found elsewhere in the Contract Documents shall be deemed to mean VPDES permit.
- 3.11 All references to Department of Conservation and Recreation (DCR) found elsewhere in the Contract Documents shall be deemed to mean DEQ.
- 3.12 General Conditions lists the Virginia Stormwater Management Program (VSMP) Permit under OWNER-PAID PERMITS AND FEES. This specification section supersedes the referenced Section of the General Conditions.

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SECTION 015719 - ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 APPLICABLE PUBLICATIONS

- A. The publications listed below form part of this specification to the extent referenced. It is referred to in the text by the basic designation only.
 - 1. U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Regulation: 29 CFR 1926 OSHA Construction Industry Standards as adopted by the Commonwealth of Virginia.
 - 2. Codified Ordinances of Arlington County Code, Arlington County Erosion and Sediment Control Ordinance, chapter 57.
 - 3. Virginia Acts of Assembly – 2001 Session, Chapter 490. An Act to amend and reenact the Code of Virginia relating to the regulation of land-disturbing activities.

1.02 DEFINITIONS

- A. Sediment: Soil and other debris that has been eroded and transported by runoff water.
 - B. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations, and from community activities.
 - C. Rubbish: A variety of combustible and noncombustible wastes such as paper, boxes, glass, crockery, metal, lumber, cans and bones.
 - D. Debris: Includes combustible and noncombustible wastes, such as ashes, waste materials that result from construction or maintenance and repair work, leaves and tree trimmings.
 - E. Chemical Wastes: Includes salts, acids, alkalies, herbicides, pesticides, and organic chemicals.
 - F. Sanitary Wastes:
 - 1. Sewage: Wastes characterized as domestic sanitary sewage.
 - 2. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.
 - G. Oily Waste: Includes petroleum products and bituminous materials.
- 1.03 ENVIRONMENTAL PROTECTION REQUIREMENTS: Provide and maintain, during the life of the contract, environmental protection. Provide environmental protective measures as required to control pollution that develops during normal construction practice. Provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with all Federal, State, and local regulations pertaining to water, air, and noise pollution.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PROTECTION OF NATURAL RESOURCES

- A. The natural resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their existing condition or restored to an

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equivalent or improved condition upon completion of the work. Repair or restore to original upon completion of the work. Repair or restore to original condition all trees or other landscape features scarred or damaged by equipment or operations. Obtain Project Manager's approval before the repair or restoration. Confine construction activities to areas defined by the work schedule, drawings, and specifications.

- B. Trees: Except in areas indicated to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without special permission from the Project Manager. Protect existing trees which may be damaged by construction operations.
- C. Protect monuments and markers.
- D. Temporary Construction: Obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and all other vestiges of construction. Temporary roads, parking areas, and similar temporary use areas shall be graded in conformance with surrounding areas.
- E. Water Resources: Perform all work in such a manner to prevent any adverse environmental impact on water resources.
- F. Oil Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil, petroleum, or liquid chemical storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of content leakage or spillage. Provide an impermeable secondary containment system for temporary tanks. Promptly dispose of all spilled material. Restore site and remove tanks, containment, and any spilled contamination upon completion or work.

3.02 EROSION AND SEDIMENT CONTROL MEASURES:

- A. Provide and maintain adequate erosion and sediment control measures according to the drawings and the provisions of the Arlington County Erosion and Sediment Control Ordinance.
- B. Burn-off of ground cover is not permitted.

3.03 CONTROL AND DISPOSAL OF WASTE

- A. Solid Wastes: All wastes shall be disposed of, by the Contractor, off the project property. With the exception of the material specifically indicated or specified to be salvaged for reuse in construction, or turned over to the County, all waste, cut trees, and demolished materials become the property of the Contractor, and shall be removed from the job site daily. Place wastes in Contractor supplied containers, and empty containers daily, in accordance with Federal, State, and local regulations.
- B. Sewage, Odor, and Pest Control: Use chemical toilets and periodically empty wastes into municipal sanitary sewage system. Include provisions for pest control and elimination of odors.
- C. Chemical Waste: Store chemical waste in corrosion resistant containers labeled to identify type of waste and date filled. Remove containers from project property, and dispose of in accordance with Federal, State, and local regulations. Submit a certified copy of the acceptance receipts for these materials, indicating quantities. For oil and hazardous material spills which may be large enough to violate Federal, State, and local regulations, notify the Project Manager immediately.
- D. Petroleum Products: Dispose of petroleum products in accordance with approved procedures meeting Federal, State, and local regulations.

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3.04 DUST CONTROL

- A. Keep dust down at all times, including non-working hours, weekends, and holidays. Sprinkle or treat with dust suppressors, the soil at the site, haul roads, and other areas disturbed by operations. No dry power brooming is permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing is permitted only for cleaning nonparticulate debris, such as steel reinforcing bars. No sandblasting is permitted unless dust there from is confined. Only wet cutting of concrete blocks, concrete, and asphalt is permitted. No unnecessary shaking of bags is permitted where bagged cement, concrete mortar, and plaster is used.

3.05 NOISE

- A. Make the maximum use of "low-noise-emission products" as certified by EPA. No blasting or use of explosives is permitted without written County Construction Manager approval.

END OF SECTION 015719

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 011000 "Summary of Work" for Contractor requirements related to Owner-furnished products.
 - 2. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 3. Section 017800 "Project Closeout and Closeout Submittals" for submitting warranties.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical

properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."
- F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Resolution of Compatibility Disputes between Multiple Contractors:
 - a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

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- a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
3. See individual identification Sections in Divisions 21, 22, 23, 25, 26, 27 and 28 for additional equipment identification requirements.

1.5 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

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1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect through Construction Manager in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.

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B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.

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7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
 1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

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- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."
 - 1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
- D. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 010010 "Summary of Work" for limits on use of Project site.
 - 2. Section 013300 " Submittal Procedures" for submitting surveys.
 - 3. Section 017800 "Project Closeout and Closeout Submittals" for submitting Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.03 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Certificates: Submit certificate signed by professional engineer or land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two (2) copies signed by professional engineer.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.04 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Dimensions: The drawings accompanying these specifications indicate generally the design and arrangements of all equipment, apparatus, fixtures, accessories, etc., to complete the installation of all systems. The exact location or arrangement of equipment, unless otherwise dimensioned, is subject to minor changes necessitated by field conditions and shall be made as required without additional cost to Arlington County. Measurements shall be verified by actual observation at construction site and the Contractor shall be responsible for all of the work fitting into place in a satisfactory and workmanlike manner to the approval of Arlington County and AE.

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- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.03 CONSTRUCTION LAYOUT

- A. The Contractor shall employ a certified civil engineer or land surveyor to stake out all of the construction. Rough grade stakes shall be set in sufficient number so that the site can be accurately graded to meet the intent of the drawings. Stakes for final grading shall be set for all sanitary, water main and storm sewers and all pavements, curbs and gutters.
- B. Verification: Dimensions and elevations indicated in layout of existing conditions shall be verified by the Contractor. Discrepancies between drawings, specifications and existing conditions shall be referred to the A/E for adjustment before work affected is performed. Failure to make such notification shall place responsibility upon the Contractor.
- C. General: Engage a professional engineer or land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish and preserve all control points and benchmarks, including the property corners.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify A/E when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- D. The Contractor shall perform the following:
 - 1. Provide datum benchmark for the use of all work.
 - 2. Lay out all site work
 - 3. Lay out all building corners
 - 4. Lay out building excavation
 - 5. Lay out interior partitions on concrete slabs
 - a. As soon as possible after completion of floor slabs, and prior to any partitions being done, lay out the entire full-scale floor plan for each floor area.
 - b. Layout shall be made by snapping distinct and readable caulk lines or by painting lines, indicating the accurate thicknesses of walls and partitions, locations of swings of doors and similar physical features
 - c. After floor layouts have been made, Contractor and/or appropriate subcontractor shall be responsible for field checking room dimensions, wall thicknesses, dimensions of built-in equipment, and similar items of critical nature.
- E. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- F. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- G. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by A/E.

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3.04 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of A/E. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to A/E before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

3.05 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by A/E.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

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- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.06 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Clean up all waste materials, rubbish, and debris resulting from his operations weekly or at such frequencies as required by Arlington County.
 - 4. Place waste materials, rubbish, and debris from ground floor operations outside of building in area designated by Arlington County.
 - 5. Place waste materials, rubbish, and debris from above ground floor operations in chute.
 - 6. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of debris.
 - 7. Sprinkle dusty debris with water.
 - 8. At reasonable intervals, clean-up site and dispose of debris off site.
 - 9. Be responsible for procuring permits for hauling and dumping rubbish, waste materials and debris from site to area approved by local authorities.
 - 10. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces of fixtures, hardware and equipment.
 - 11. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
 - 12. Comply with additional requirements defined in specifications.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 7419 "Construction Waste Management and Disposal."

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- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.07 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 9113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4516 "Contractor Quality Control."

3.08 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous construction waste.
 - 2. Recycling nonhazardous construction waste.
 - 3. Disposing of nonhazardous construction waste.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for demolition of existing structures.
 - 2. Section 042200 "Concrete Unit Masonry" for disposal requirements for masonry waste.
 - 3. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.03 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- D. Salvage: Recovery of construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
 - 1. Construction Waste.
 - 2. Packaging.

1.05 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 15 days of date established for the Notice to Proceed.

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1.06 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 - 1. Material category.
 - 2. Generation points of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.
 - 5. Quantity of waste recycled, both estimated and actual in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Qualification Data: For waste management coordinator.

1.07 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.08 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

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- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
 - 1. Total quantity of waste.
 - 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 - 3. Total cost of disposal (with no waste management).
 - 4. Revenue from salvaged materials.
 - 5. Revenue from recycled materials.
 - 6. Savings in hauling and tipping fees by donating materials.
 - 7. Savings in hauling and tipping fees that are avoided.
 - 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 - 9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract. Comply with operation, termination, and removal requirements in Section 01 5000 "Temporary Facilities, Utilities, Access and Construction Aids."

- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

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2. Comply with Section 015200 "Temporary Facilities, Utilities, Access and Construction Aids" for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin. Inspect containers and bins for contamination and remove contaminated materials if found.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.
 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.03 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

3.04 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

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SECTION 017800 – PROJECT CLOSEOUT AND CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. Project Closeout shall be listed on the Schedule of Values as a separate line item as defined in Section 013216 "Activities Schedule".
- C. Related Requirements:
 - 1. Section 013216 "Activities Schedule" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Section 013119 "Progress Meetings and Photographs" for submitting final completion construction photographic documentation.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 4. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.03 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Prepare and submit Project Record Documents, Approved operation and maintenance manuals, construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 7. Complete startup of systems.

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8. Submit test/adjust/balance records. Correct all discrepancies of the TAB reports. Submit summary report of corrective actions.
9. Systems have been tested, balanced and adjusted according to specification requirements, in presence of Arlington County's authorized representative, and operate properly
10. Complete training instruction of the Owner's operating and maintenance personnel. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements. All maintenance training of Arlington County personnel has been completed according to Section 017823; verify completion by the Commissioning Agent. Reference Article 9 of General Conditions.
11. Complete final cleaning requirements, including touchup painting.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
13. The certificate of occupancy has been issued for the project.

Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificates and similar releases.

B. LIST OF INCOMPLETE ITEMS

1. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
2. Organize list of spaces in sequential order, starting with exterior areas first and proceeding through interior rooms as numbered on Construction Documents.
3. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
4. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.

C. INSPECTION

1. Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
2. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
3. Results of completed inspection will form the basis of requirements for Final Completion.

1.04 FINAL COMPLETION

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

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1. Contract documents have been reviewed and the work has completed according to contract documents.
 2. The project has been inspected for compliance with the contract documents.
 3. The project is completed and ready for final inspection by owner.
 4. Submit a final Application for Payment according to Division 1 Section 013216 Activities Schedule and Progress Payments.
 5. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 7. Submit pest-control final inspection report and warranty.
 8. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
 9. Submit consent of surety to final payment. Approval of Record Drawings, Record Specifications, Record Product Data, and Record Samples.
 10. Complete all other specified closeout requirements.
 11. Provide a Compact Disc with all Closeout Documents in electronic format (PDF), to include all items required in this Section. Upload and submit all documents in e-Builder as required.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Two weeks advance notice of final inspection is required.
 3. The Owner, AE and additional Arlington County representatives will make the final inspection. The Owner and AE will develop a list of any items to be corrected and distribute the punch list to the Contractor and the inspection party.
 4. The final inspection shall not be requested until the work is ready for final inspection. If the final inspection is conducted and the work is not in fact ready, the Contractor may be held liable to Arlington County for the cost of conducting a subsequent final inspection.
 5. Should the Owner consider the work is not fully complete, the Owner shall notify the Contractor in writing of the reasons. The Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Owner and Engineer certifying the work is complete and requesting re-inspection.
 6. The Contractor shall have thirty work days from receipt of the punch list to complete all items, unless otherwise directed by Arlington County's Construction Manager.
 7. Final acceptance shall not occur until all punch list items are completed.
 8. Arlington County shall notify the Contractor in writing, of final acceptance of the project by Arlington County.

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PART 2 - PRODUCTS

2.01 MAINTENANCE MATERIALS AND SPARE PARTS

- A. Provide products, spare parts, tools and maintenance materials to Arlington County in quantities specified in individual specification sections.
- B. Separately pack the items for each system or finish, clearly identifying the trade name and stock number, where item is to be used, and name, address and phone number of closest supplier.
- C. Deliver the items to the project site prior to the final inspection, unless otherwise directed by Arlington County's Construction Manager. Coordinate storage location(s) with the PM, provide bill of materials and obtain receipt from Arlington County's Construction Manager prior to final payment.

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Remove snow and ice to provide safe access to building.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - h. Remove labels that are not permanent.

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- i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - l. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - m. All Final HVAC filters shall be installed.
 - n. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
- 3.02 OPERATING AND MAINTENANCE DATA AND INSTRUCTION (See Section 017823).
- 3.03 PROJECT RECORD AS-BUILTS
- A. Deliver digital project record As-Builts to Arlington County's Construction Manager and the AE at the completion of the project and prior to final acceptance. This final submittal requires a Letter of Transmittal; documents shall be loaded electronically into e-Builder.
 - B. Project Record As-Builts include:
 - 1. As-Built drawings: See 3.04 below.
 - 2. Activities Schedule: See Section 013216.
 - 3. Technical Submittals: See Section 013300. Provide verification to Arlington County that all submittal items per the submittal register are approved, closed and loaded in e-Builder for record.
 - 4. Test Log: See Section 013300.

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5. Specifications and addenda: Mark legibly by hand or type on each section to record changes made by change order, field order, substitution or any other changes.
6. Operating and Maintenance Data: See Section 017823.

3.04 AS-BUILT DRAWINGS

- A. As-built drawings are a record of the construction, completed and maintained weekly by the Contractor, and shall include:
 1. A record of all modifications or changes from the contract drawings, however minor, including any additional work not appearing on the original contract drawings, which were incorporated in the work.
 2. All changes resulting from the final inspection.
 3. The location and description of any utility lines or other installations of any kind or description discovered or known to exist within the construction area. The location shall include dimensions to permanent features or landmarks, and depth for buried utilities.
 4. Changes in details of design or additional information obtained from submissions furnished by the Contractor, including, but not limited to:
 - a. Fabrication,
 - b. Erection,
 - c. Installation plans and placing details,
 - d. Dimensions of equipment foundations,
 - e. Sewer, utilities connection, and tie in inverts,
 - f. The topography and grades of all drainage installed or affected during the contract.
 - g. Certified copies of the surveyor's notebooks and calculations shall be submitted at the completion of the work.
- B. Mark up one set of full-size paper prints to show the as-built conditions. This set shall be maintained by and remain in the possession of the Contractor until final inspection.
- C. Arlington County approved changes to the contract documents, or additional information which might be uncovered in the course of construction, shall be accurately and neatly recorded as they occur, by means of details and notes. No construction work shall be concealed until the contractor has inspected, approved, and recorded the work.
- D. The Contractor and the AE shall jointly inspect the As-Built marked prints and other As-Built documents specified elsewhere, before the monthly pay request is submitted.
- E. Deliver the final As-Built marked prints to the A/E and a copy to Arlington County's Construction Manager and AE for review as part of the final inspection. As-Built shall be submitted electronically through e-Builder.
- F. Upon return of the As-Built to the Contractor, enter the changes resulting from the final inspection and re-submit within 10 days of the final inspection. Submit electronically through e-Builder.

3.05 WARRANTIES AND BONDS

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

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- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Provide duplicate, notarized copies to Arlington County's Construction Manager. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor. Provide additional copies of each warranty to include in operation and maintenance manuals.
- D. Submit material prior to final inspection. For equipment put into use with Arlington County's permission during construction, submit within ten days after first operation. The warranty period begins with substantial acceptance.
- E. Warranty starts on substantial acceptance date reference Section 017823. Not the date equipment is installed. Provide a copy of each warranty, bond and service contract issued.
- F. A Warranty Inspection is to be held not less than 10 months and not more than 12 months after Substantial Acceptance. This inspection is to be conducted by the Owner, Architect, Contractor and his major subcontractors (mechanical, electrical & plumbing). The purpose of this inspection is to identify systems or equipment that may not be functioning properly. A list of these warranty items will be prepared by the Owner and submitted to the Contractor for correction under the terms of the warranty

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SECTION 017839 - AS-BUILT DOCUMENTATION

PART 1 - GENERAL

- 1.1 The Contractor is to furnish all labor, materials, and data necessary to maintain and produce project As-Built drawings and specifications in accordance with applicable Contract provisions.
- 1.2 Impacts resulting from the Contractor's failure to meet As-Built requirements shall in no part become the subject of a Contractor claim for Contract Time extension, excess costs or damages.
- 1.3 The terms 'drawings', "contract drawings", "drawing files", "working as-built drawings", and "final as-built drawings" all refer to contract drawings which are revised to be used for final as-built drawings.
- 1.4 As-Built documentation are a prerequisite for award of Substantial Completion. It is the Contractor's responsibility to submit complete and acceptable as-built documentation in a timely fashion for review including consideration of the typical review-cycle durations.
- 1.5 RELATED SPECIFICATION SECTIONS
 - A. General Conditions
 - B. Section 012900 Payment Procedures
 - C. Section 017800 Project Close-out and Close-Out Submittals
 - D. Section 017823 Operation and Maintenance Data

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

- 3.1 As-Built Posting During Construction
 - A. The Contractor shall revise paper drawings and specifications by red-line process to show the as-built conditions during the execution of the project. These working as-builts shall be kept current on a weekly basis and at least one set shall be available for review at the jobsite at all times. Changes from the contract documents which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes on the drawings. The working as-built documents will be jointly reviewed for accuracy and completeness by the Owner/Architect and the Contractor prior to each of the Contractor's monthly Applications for Payment.
- 3.2 PAYMENT
 - A. As-Built packages are line items in the Schedule of Values (reference General Conditions Section & Specification 012900). Payment for as-built drawings and specifications will be made as a single payment after Owner/AE review and acceptance of each As-Built package submission.
- 3.3 CONTENT
 - A. The As-Built packages shall be submitted as follows:
 1. As-Built Site Plan
 - a. The Contractor shall submit an as-built site plan prepared by a licensed Land Surveyor or licensed Professional Engineer, for review, and obtain approval by local authorities having jurisdiction for conformance with the approved site plan. The Contractor shall pay

any required filing, correction, and resubmission fees at no additional cost to the Owner. Notify the Owner in writing when plan is submitted and when the local authorities have approved the submission.

- b. The Contractor shall confirm all project required storm sewer systems are properly installed and acceptable to the Owner prior to the site as-built submission. The Contractor shall video all pipes, structure, and other system components and obtain approval from the Owner for the storm sewer systems. The Contractor shall provide the Owner with two copies of the final approved videos on disk for all storm sewer components.
- c. Submission information should minimally include the following:
 - 1) Boundary of the site
 - 2) Dimensional location/size of all building(s)
 - 3) All storm sewer, sanitary sewer, and fire hydrants, showing pipe sizes,
 - 4) lengths, top and invert elevations and percent of slope of pipe
 - 5) Deed book and page number of any dedication and all easements
 - 6) Location and cross-sectional survey of any storm water or bio retention areas(s)
 - 7) Certification by the engineer or surveyor indicating that the as-builts conform with the approved site plan except as shown and that it represents the actual conditions on the site, and bearing his signature and Virginia Registration Number
 - 8) Curb and gutter and/or ditch elevations
 - 9) Survey and record topographic elevations for all paving, sidewalks, stairs, ramps, and entrances to verify conformance with contract requirements. Arlington County will use this specific information to confirm ADA accessibility for the site.
 - 10) Any other pertinent information as determined by the Owner/Architect

2. Sanitary Sewer As-Built Plan

- a. The Contractor shall submit a separate sanitary sewer as-builts for review and obtain approval by local authorities having jurisdiction. The Contractor shall pay any required filing, correction, and resubmission fees at no additional cost to the Owner. Notify the Owner in writing when plan is submitted and when the local authorities have approved the submission.
- b. The Contractor is responsible to confirm all required sanitary sewer systems are properly installed and acceptable to the Owner prior to the sanitary sewer as-built submission. The Department of Public Works, Line Maintenance Division, shall video the sanitary sewer system to determine acceptability. The Contractor shall correct any and all deficiencies found in during this or other inspections at no cost to the Owner.

3. Project Record As-Built Plans

- a. The Contractor shall submit two paper sets and two (2) electronic copies of red-lined Contract drawings and specifications for review and approval of the Owner/Architect. The documents should be marked to reflect actual civil, architectural, structural, electrical, plumbing, mechanical, and other trades final as-built conditions of the project.
- b. Label each set of documents "RECORD AS-BUILTS". Have skilled draft-persons and typists transfer all changes, corrections, and entries.

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- c. Submission information should minimally include the following:
- 1) Changes in details of design or additional information obtained from working drawings and specifications including but not limited to fabrication, erection, material changes/substitutions, installation plans and placing details, etc.
 - 2) Where contract drawings or specifications present options, only the option selected for construction shall be shown.
 - 3) Changes or modifications resulting from the substantial completion or final inspections.
 - 4) Changes or modifications brought about as a result of a Request for Information, Architect's Supplemental Instructions, Field Order, or Change Order.
 - 5) Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 6) Final location and depth of all utilities on the property.
 - 7) Field changes of dimension and/or detail.

END OF SECTION 017839

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SECTION 018800 - ACCESSIBILITY

PART 1 - GENERAL

- 1.1 The Contract Documents have been designed to comply with ICC/ANSI A117.1 as well as with the Department of Justice's 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design, with the more stringent of the two standards governing.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MANDATORY ADA COMPONENT PROJECT SUBMITTALS AND CONTRACTOR SCHEDULED PROJECT SITE MEETINGS:

Within 30 days after issuance of the Notice-to-Proceed (NTP), the Contractor shall submit for Owner review an ADA Compliance Submittal that outlines the Contractor's project specific ADA related work and execution plan. Subsequent to the Contractor making his ADA Compliance submittal, he shall schedule on-site review meetings to assure all work shall comply with all ADA provisions as reflected in the Contract Drawings and Specifications. At a minimum, the referenced plan shall reflect the following activities by the Contractor:

- a. Contractor to schedule and host multiple ADA pre-construction meetings with the Owner to review all ADA aspects of the project prior to the start of various ADA sensitive installation activities. Activities include, but are not limited to, partition framing, MEP rough-in, ceramic tile installation, millwork installation, toilet room plumbing fixture placement and clearances, toilet accessory component placement and installation, water cooler placement and clearances, handrail and guardrail installation, construction of interior and exterior ramps, sidewalks, stairs reviewing slope & cross pitch, limited degree of pitch, at all path of travel surfaces including landings adjacent to ramps, stairs and entries, etc.
- b. Review Contract Documents to identify items designed for conformance with accessibility criteria.
- c. Review installation/construction procedures and goals as they relate to compliance with applicable accessibility criteria and measurement criteria.
- d. Review all applicable accessibility criteria and methods of measurement of compliance.
- e. Review subcontractor shop drawings for adherence to all applicable accessibility criteria as shown in the Contract Drawings and Specifications.
- f. Develop a comprehensive checklist of all applicable accessibility criteria as shown on the Contract Drawings and Specifications for the purpose of periodic Quality Control inspections during construction and at Substantial Completion.
- g. Contractor to schedule and host a construction-phase field meeting with the Owner on site prior to close-in to review all ADA aspects of the Project and to review compliance at rough-in phase.
- h. Contractor to schedule and host a site hardscape review phase construction meeting, with the Owner present to review rough-ins of ADA aspects of the Project. This meeting is to be scheduled by the Contractor prior to concrete placement along the site "accessible path of travel" pavement. Railing and hardscape features shall be included. Concurrence regarding the ADA "path of travel" criteria including, but not limited to, accessible route(s) from handicapped parking stalls on site to the building public entrance(s) shall be addressed and confirmed.

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- i. Field measurements and measurement criteria shall be applied to the accessible path(s) of travel slopes and cross slopes prior to placing concrete and shall be included as an agenda item of this meeting.
- j. Provide ADA component updates and field installation schedules for Owner review during regular Progress Meetings.

END OF SECTION 018800

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SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of buildings and site improvements.
2. Removing below-grade construction.
3. Disconnecting, capping or sealing, and removing site utilities.
4. Salvaging items for reuse by Owner.

B. Related Requirements:

1. Section 011000 "Summary" for use of the premises and phasing requirements.
2. Section 013200 "Construction Progress Documentation" for preconstruction photographs taken before building demolition.
3. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be demolished.
2. Review structural load limitations of existing structures.
3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review and finalize protection requirements.
5. Review procedures for noise control and dust control.
6. Review procedures for protection of adjacent buildings.
7. Review items to be salvaged and returned to Owner.

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1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before the Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

1.8 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.

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2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.

a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before building demolition, Owner will remove the following items:

a. Existing Furniture.

D. Hazardous Materials: Present in buildings and structures to be demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified in Hazardous Materials Survey report conducted dated June 6, 2022 by JSK Environmental Consulting, LLC.

2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

3. Owner will provide material safety data sheets for materials that are known to be present in buildings and structures to be demolished because of building operations or processes performed there.

E. On-site storage or sale of removed items or materials is not permitted.

1.9 COORDINATION

A. Arrange demolition schedule so as not to interfere with operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

2.2 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

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PART 3 - EXECUTION

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3.1 DEMOLITION CONTRACTOR

A. Demolition Contractor:

1. See requirements in section 013543 Hazardous Materials Remediation.

3.2 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Inventory and record the condition of items to be removed and salvaged.

3.3 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Salvaged Items: Comply with the following:
1. Clean salvaged items of dirt and demolition debris.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to storage area designated by Owner.
 5. Protect items from damage during transport and storage.

3.4 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Utilities to Be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
1. Arrange to shut off utilities with utility companies.
 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.

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3. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
4. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.5 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."
 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

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3.6 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 - 2. Maintain fire watch during and for at least two (2) hours after flame-cutting operations.
 - 3. Maintain adequate ventilation when using cutting torches.
 - 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
 - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

- C. Explosives: Use of explosives is not permitted.

3.7 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.

- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.

- D. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

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- E. Hydraulic Elevator Systems: Demolish and remove elevator system, including cylinder, plunger, well assembly, steel well casing and liner, oil supply lines, and tanks.

3.8 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Section 312000 "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.9 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.10 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction, and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal"
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

3.11 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
 - 1. Clean roadways of debris caused by debris transport.

END OF SECTION 024116

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SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Protecting existing vegetation to remain.
 - 2. Removing existing vegetation.
 - 3. Clearing and grubbing.
 - 4. Stripping and stockpiling topsoil.
 - 5. Removing above- and below-grade site improvements.
 - 6. Disconnecting, capping or sealing, and removing site utilities.

1.3 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain on Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

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1.6 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or video recordings.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify Miss Utility for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.
- D. Tree-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earthwork."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.

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- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to the Drawings.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. Protect trees and plants remaining on-site.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Locate and identify, and disconnect utilities indicated to be abandoned in place.
- C. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 3. Use only hand methods or air spade for grubbing within protection zones.
 - 4. Chip removed tree branches and dispose of off-site.

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- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Do not stockpile topsoil within protection zones.
 - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

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SECTION 311020 – EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for temporary erosion and sedimentation control.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site. The Contractor shall present a general overview of erosion and sediment control measures will be implemented of the project.

1.3 CONTRACTOR PERSONNEL

- A. The Contractor shall assign a Certified Employee to the project site in the capacity of the Responsible land Disturber (RLD).

1.4 STANDARDS AND SPECIFICATIONS

- A. Temporary erosion and sediment control measures shall be constructed in conformance with the local jurisdiction and the latest edition of the Virginia Erosion and Sediment Control Handbook (VESCH), published by the Virginia Department of Conservation.
- B. The installation and maintenance of temporary erosion and sediment control devices shall be in accordance with the Stormwater Pollution Prevention Plan (SWPPP) required by the Virginia Department of Environmental Quality, which shall be prepared and submitted by the Contractor.

1.5 CONSTRUCTION OPERATION

- A. Storage of construction vehicles, trucks, and equipment is limited to the area within the limits of disturbance.

PART 2 - PRODUCTS

2.1 STABILIZATION MATERIALS

- A. Seed, mulch, fertilizer, soil conditioner and other materials for seeding and soil stabilization shall meet the requirements of the VESCH, latest edition.

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2.2 GEOTEXTILE (FILTER CLOTH)

- A. Geotextiles shall conform to the standards and specifications of the Contract Drawings and shall meet the requirements of the VESCH, latest edition.

2.3 STONE

- A. Stone 2 to 3 inches in size shall conform to AASHTO M43, No. 2.
- B. Stone 3/4 –inch to 12-inch shall conform to AASHTO M43, No.4.
- C. VDOT No. 1 Coarse Aggregate, Section 203.
- D. VDO No. 57 Coarse Aggregate, Section 203.

2.4 SILT FENCE

- A. Silt fence shall be installed in the locations reflected on the Contract Drawings.
- B. VESCH Standard 3.05.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Install the Phase 1 Erosion and Sediment Controls as shown on the Contract Drawings. All measures shall be inspected and approved by the Engineer and the local jurisdiction prior to beginning any land disturbance. The Contractor shall ensure all runoff from the disturbed area is directed to the erosion and sediment control measures.
- C. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- D. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- E. The Contractor shall not remove any erosion and sediment control measure without the approval of the Engineer and the local jurisdiction.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION

- A. The Contractor shall implement the Erosion and Sediment Control Plan (E&S Plan) and sequence of construction reflected in the Contract Documents. Minor adjustments to the sediment control measures may be made in the field with the prior approval of the Engineer.

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- B. Major revisions, deletions, or substitutions to the E&S Plan will require a formal review and approval by the Engineer and the authority having jurisdiction prior to implementing the change.
- C. The Contractor shall apply for and obtain the Virginia Pollutant Discharge Elimination System (VPDES) Construction Permit.

3.3 RESPONSIBLE LAND DISTURBER

- A. At least 10 days prior to applying to the permit, the name and credentials of the Responsible Land Disturber (RLD) shall be submitted to the Engineer for approval. Any substitutes for the RLD will be subject to the approval of the Engineer. The substitution shall be timed to ensure that a RLD is assigned to the project at all times.
- B. The RLD shall be thoroughly experienced in all aspects of construction and have satisfactorily completed the Erosion and Sediment Control Training Program either conducted or authorized by the Commonwealth of Virginia pursuant to the appropriate legislation. The RLD shall have the primary responsibility and authority for the implementation of the approved erosion and sediment control plans, schedules and methods of operation for both onsite and offsite activities.
- C. The RLD's duties shall include":
 1. Inspect all erosion and sediment controls on a daily basis to ensure that all controls are in place at all times and to develop a list of activities and schedules to ensure conformance with the Contract Documents.
 2. Maintain a daily log of these inspections, including actions taken and submit a written report to the Engineer at the end of the week.
 3. Conduct after storm inspections with the Engineer both during and beyond normal working hours/days and submit a written report.
 4. Be assigned the authority by the Contractor to mobilize crews to make immediate repairs to the controls during working and nonworking hours.
 5. When requested, accompany the Engineer on Quality Assurance Inspections and inspections made by the regulating agencies.
 6. Coordinate with the Engineer to ensure all the corrections are made immediately and that the project is in compliance with the approved plans.

3.4 SCHEDULE

- A. Within the 14 days after the Notice of Award, the Contractor shall submit to the Engineer an Erosion and Sediment Control Schedule to implement the E&S Plan. The schedule shall indicate the sequence of construction, implementation and maintenance of controls, temporary and permanent stabilization, and various stages of soil disturbance.
- B. The schedule shall include:
 1. Clearing and grubbing of areas necessary for installation of perimeter controls specified in the Contract Documents.

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- 2. Construction of perimeter controls specified in the Contract Documents.
- 3. Excavation and backfilling.
- C. No work shall be started onsite until the Erosion and Sediment Control schedule and methods of operation have been accepted by the Engineer.

3.5 MEETINGS

- A. At least seven (7) working days prior to the start of work, the Contractor shall initiate and conduct an Erosion and Sediment Control Field Meeting.

3.6 INITIAL CONTROLS

- A. All perimeter controls such as silt fence, earth dikes/swales, check dams, traps, basins, etc., shall be installed prior to the clearing and grubbing operation. Remove sod and grass before stripping topsoil.
- B. If the Engineer determines that the clearing area has been disturbed and a potential for sediment runoff or erosion exists, the Engineer will direct the Contractor to install the controls at that time.

3.7 STABILIZATION REQUIREMENTS

- A. Areas flatter than 3:1 and stockpile areas shall be permanently or temporarily stabilized as soon as possible, but not later than fourteen days after grubbing and grading activities have ceased in the area. Trap embankments and slopes, earth dikes, temporary swales, perimeter dike/swales, ditches, and slopes 3:1 or steeper shall be permanently or temporarily stabilized as soon as possible, but not later than seven days after grubbing and grading activities have ceased in the area. Slope 2:1 and steeper shall be stabilized with slope stabilization mat. The seven- and fourteen-day requirements mean that the stabilization operation is complete within the applicable seven or fourteen day time frame.
- B. When permanently stabilized areas are disturbed by the Contractor's grading operation or other activities not specifically approved by the Engineer, the re-stabilization will be at no additional cost to the Owner. Stabilization requirements may be reduced to less than seven days for sensitive areas and can be required at any point in time by the local jurisdiction. Maintenance shall be performed as necessary to ensure continued stabilization.
- C. All slopes shall be tracked within five days of establishment with cleated type equipment operating perpendicular to the slope.

3.8 MAINTENANCE

- A. All erosion and sediment control devices shall be maintained during the construction season, the winter months, and other times when the project is shut down. Access shall be maintained to all erosion and sediment controls until the controls are removed. Lack of maintenance by the Contractor will be considered as noncompliance with the E&S Plan.

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- B. Controls shall be inspected immediately following storm events. The Contractor shall repair controls when damaged and clean out controls as necessary as the first order of business after a storm event.
- C. Any pumping activity, including dewatering sediment traps and basins, shall be directed through a dewatering device approved by the Engineer.
- D. The Contractor shall remove accumulated sediment from sediment controls or other areas during routine maintenance of sediment controls, or as directed by the Engineer. Silt fence, super silt fence, stone outlet structures, stone check dams, sediment control logs, and straw bales shall have sediment removed when it reaches 50 percent of the height of the control device.
- E. Sediment removed from control devices shall be placed in an approved waste site either on or off the project. Material stored on-site may be reused once it has dried and it conforms to project requirements for embankment.

3.9 INSPECTIONS

- A. Field inspections relative to erosion and sediment control compliance may be conducted. If noncompliance with erosion and sediment control provisions are found, the Contractor shall conduct corrective action immediately. This corrective action may require a shutdown of construction activities until the noncompliance is satisfactorily corrected, and no claims against the project will be considered due to a shutdown of the grading operations or the entire project.

3.10 REMOVAL OF CONTROLS

- A. No erosion and sediment control measures shall be removed until all previously disturbed areas are vegetated and the removal has been approved by the Engineer and local jurisdiction. The sediment controls shall be backfilled, graded, and stabilized as specified in the Contract Documents.
- B. All control devices shall be removed, except where an attempt to remove a particular control may severely disturb an area that has been stabilized. When a sediment trap or stone outlet structure is placed at the bottom of a fill greater than 8 feet, the controls may be left in place as determined by the Engineer. Sediment traps left in place shall be stabilized by placing erosion control matting over a permanent seed mix.

3.11 SILT FENCE

- A. The geotextile shall be trenched a minimum of 8 inches into the ground and extend a minimum of 22 inches above ground. Silt fence shall be removed and reset when and as directed by the Engineer. All of the requirements for the original placement of the silt fence shall be strictly adhered to when the fence is reset.

3.12 STABILIZED CONSTRUCTION ENTRANCE

- A. Stabilized construction entrances shall be located as specified in the Contract Documents or as directed by the Engineer. Rehabilitation of stabilized construction entrance shall consist of periodic top dressing with additional VDOT No. 1 aggregate, replacement of pipe, or other

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repairs to the entrance and sediment trapping devices as needed or as directed by the Engineer.

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SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses and plants.
3. Subbase course for concrete walks and pavements.
4. Subbase course and base course for asphalt paving.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by the Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

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- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct pre-excavation conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.5 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earthwork operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by the Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GP, GM, SW, SP, and SM according to ASTM D 2487 or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - 1. Liquid Limit: 40
 - 2. Plasticity Index: less than 15
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

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- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve. Fill materials shall have a minimum standard Proctor (ASTM D 698) maximum dry density of approximately 100 pounds per cubic feet for fill materials. A mixture of on-site soils and boulders/cobbles is not an acceptable fill material.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

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1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. All foundation subgrades shall be observed, evaluated, and verified for the design bearing pressure by the Engineer after excavation. If low consistency soils are encountered during foundation construction, localized undercutting and/or in-place stabilization of foundation subgrades will be required. The actual need for and extent of undercutting shall be based on field observations made by the Engineer at the time of construction.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trenches in Tree-Protection Zones:

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1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.6 SUBGRADE INSPECTION

- A. Proof-roll subgrade below new fill, slabs and pavements with a pneumatic-tired 20- to 30-ton truck to identify soft pockets and areas of excess yielding. Do not proof-roll frozen, wet or saturated subgrades.
- B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.
 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Roadways: Provide 4-inch of concrete before backfilling or placing roadway subbase course.

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- D. Initial Backfill: Place and compact initial backfill of subbase material free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.

3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95percent.

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4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 2. Walks: Plus or minus 1 inch.
 3. Pavements: Plus or minus 1/2 inch.

3.14 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than **95** percent of maximum dry unit weight according to ASTM D 698.

3.16 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform inspections:
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

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- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Field density tests to verify fill compaction should be performed for every 2,500 square feet (approximately 50 feet square) of fill area, with a minimum of two tests per lift. In confined areas, a greater frequency shall may be required.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

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SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes construction dewatering.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 FIELD CONDITIONS

- A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide temporary grading to facilitate dewatering and control of surface water.
- B. Protect and maintain temporary erosion and sedimentation controls, which are specified during dewatering operations.

3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
 - 1. Space well points or wells at intervals required to provide sufficient dewatering.
 - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

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- B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.
- C. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

- A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- B. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
 - 2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 - 3. Maintain piezometric water level a minimum of 24 inches below bottom of excavation.
- C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

3.4 FIELD QUALITY CONTROL

- A. Survey-Work Benchmarks: Resurvey benchmarks regularly during dewatering and maintain an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

END OF SECTION 312319

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SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes temporary excavation support and protection systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For excavation support and protection system, prepared by or under the supervision of a qualified professional engineer.
- B. Delegated-Design Submittal: For excavation support and protection systems, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For the following:
 - 1. Professional Engineer: Experience with providing delegated-design engineering services of the type indicated, including documentation that engineer is licensed in the state in which Project is located.
- B. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Existing Conditions: Using photograph or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

1.5 CLOSEOUT SUBMITTALS

- A. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

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1.6 FIELD CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility-serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
 - 1. Notify Engineer no fewer than two days in advance of proposed interruption of utility.
 - 2. Do not proceed with interruption of utility without Engineer's written permission.

- B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks, and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design excavation support and protection systems to resist all lateral loading and surcharge, including but not limited to, retained soil, groundwater pressure, adjacent building loads, adjacent traffic loads, construction traffic loads, material stockpile loads, and seismic loads, based on the following:
 - 1. Compliance with OSHA Standards and interpretations, 29 CFR 1926, Subpart P.
 - 2. Compliance with AASHTO Standard Specification for Highway Bridges or AASHTO LRFD Bridge Design Specification, Customary U.S. Units.
 - 3. Compliance with requirements of authorities having jurisdiction.
 - 4. Compliance with utility company requirements.
 - 5. Compliance with railroad requirements.

2.2 MATERIALS

- A. Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
 - 1. Corners: Site-fabricated mechanical interlock.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.
- E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- G. Tiebacks: Steel bars, ASTM A 722/A 722M.

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PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Locate excavation support and protection systems clear of permanent construction, so that construction and finishing of other work is not impeded.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

3.2 SOLDIER PILES AND LAGGING

- A. Install steel soldier piles before starting excavation.
 - 1. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement.
 - 2. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging.
 - 3. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds.
 - 1. Trim excavation as required to install lagging.
 - 2. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.
- B. Accurately place the piling using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer.
 - 1. Limit vertical offset of adjacent sheet piling to 60 inches.
 - 2. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- C. Cut tops of sheet piling to uniform elevation at top of excavation.

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3.4 TIEBACKS

- A. Drill, install, grout, and tension tiebacks.
- B. Test load-carrying capacity of each tieback, and replace and retest deficient tiebacks.
 - 1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.
- C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 BRACING

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
 - 2. Install internal bracing if required to prevent spreading or distortion of braced frames.
 - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 MAINTENANCE

- A. Monitor and maintain excavation support and protection system.
- B. Prevent surface water from entering excavations by grading, dikes, or other means.
- C. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

3.7 FIELD QUALITY CONTROL

- A. Survey-Work Benchmarks: Resurvey benchmarks regularly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open.
 - 1. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions.
 - 2. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.
- B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.
- C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

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3.8 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures.
 - 1. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.
 - 2. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction, and abandon remainder.
 - 3. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earthwork."
 - 4. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000

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SECTION 321216 - ASPHALT PAVING

1.1 SUMMARY

A. Section Includes:

1. Cold milling of existing asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt overlay.

B. Related Requirements:

1. Section 312000 "Earthwork" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the Virginia Department of Transportation.
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the Virginia Department of Transportation standards and specifications, latest editions for asphalt paving work.
1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

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1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Tack Coat: Minimum surface temperature of 60 deg F.
 - 2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 - 3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. Aggregates: As specified in Section 211 of VDOT Specifications.
- B. Mineral Filler: As specified in Section 201 of VDOT Specifications.

2.2 ASPHALT MATERIALS

- A. Emulsified Asphalt Prime Coat: Liquid asphalt conforming to Sections 210 and 311 of VDOT Specifications.
- B. Tack Coat: Emulsified asphalt conforming to Section 210 and 310 of VDOT Specifications.
- C. Water: Potable.

2.3 AUXILIARY MATERIALS

- A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires, asphalt shingles, or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.
- B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

2.4 MIXES

- A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes per Section 211 of the VDOT Specifications. :
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 - 2. Base Course: As specified on the Drawings.
 - 3. Surface Course: As specified on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed

3.3 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
 - 1. Mill to a depth of 2 inches.
 - 2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
 - 3. Control rate of milling to prevent tearing of existing asphalt course.
 - 4. Repair or replace curbs, driveway aprons, manholes, and other construction damaged during cold milling.
 - 5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
 - 6. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.
 - 7. Handle milled asphalt material according to approved waste management plan."
 - 8. Keep milled pavement surface free of loose material and dust.
 - 9. Do not allow milled materials to accumulate on-site.

3.4 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Re-compact existing unbound-aggregate base course to form new subgrade.

- B. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.5 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
 - 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.
 - 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 - 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
 - 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.6 SURFACE PREPARATION

- A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.7 PLACING HOT-MIX ASPHALT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Spread mix at a minimum temperature of 250 deg F.
 - 2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

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- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 - 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.9 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041/D 2041M, but not less than 90 percent or greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

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3.10 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.

- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 1/8 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

- B. Replace and compact hot-mix asphalt where core tests were taken.

- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.12 WASTE HANDLING

- A. General: Handle asphalt-paving waste according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."

END OF SECTION 321216

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SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes Concrete Paving Including the Following:
 - 1. Curbs and gutters.
 - 2. Walks and Pads

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.
- B. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or epoxy adhesive.
 - 8. Joint fillers.

- C. Material Test Reports: For each of the following:

- 1. Aggregates

- D. Field quality-control reports

1.4 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

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1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

1.6 FIELD CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
 - 4. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 5. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 6. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 7. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. Portland Cement class A3 in accordance with VDOT Section 217.

2.2 FORMS

- A. Curb and Gutter: VDOT Section 502
- B. Sidewalks: VDOT Section 504.
- C. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

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2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- D. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.4 CONCRETE MATERIALS

- A. VDOT Section 217

2.5 CURING MATERIALS

- A. VDOT Section 220.

2.6 RELATED MATERIALS

- A. Joint Fillers: ½-inch preformed asphalt expansion joint material conforming ASTM D 994, or ASTM D 1751.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness:
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

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3.6 CONCRETE PLACEMENT

- A. Curbs, Gutters, Combination Curb and Gutter, and Paved Ditches: VDOT Section 502, "Road and Bridge Standards," and as indicated on the Drawings.
- B. Sidewalks: VDOT Section 504.

3.7 FLOAT FINISHING

- A. Slip-Resistive Aggregate Finish: Constructed in accordance with the requirements and procedures of VDOT standards

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with VDOT Section 316.04.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:
 - 1. Elevation: 3/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-feet- long; unlevelled straightedge not to exceed 1/2 inch.
 - 4. Joint Spacing: 3 inches.
 - 5. Contraction Joint Depth: 1/4 inch, no minus.
 - 6. Joint Width: Plus 1/8 inch, no minus.

3.10 REPAIR AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

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SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes painted markings applied to asphalt and concrete pavement.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 PAVEMENT-MARKING PAINT

- A. Pavement-Marking Paint: MPI #32, solvent-borne traffic-marking paint.
 - 1. Color: As indicated on Drawings.

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow paving to age for a minimum of 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.

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- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils. Apply paint so that it cannot run beneath stencil.

END OF SECTION 321723

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SECTION 329113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes planting soils specified by composition of the mixes.
- B. Related Requirements:
 - 1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.

1.2 DEFINITIONS

- A. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- B. Imported Soil: Soil that is transported to Project site for use.
- C. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- E. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- F. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- G. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- H. USCC: U.S. Composting Council.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.

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3. Include sieve analyses for aggregate materials.
4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
- B. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable
- C. Samples: For each bulk-supplied material in sealed containers labeled with content, source, and date obtained; providing an accurate representation of composition, color, and texture.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Contractor shall engage an independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
 1. Laboratories: Subject to compliance with requirements, provide testing by the following:
 2. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil.
 1. Notify Architect seven (7) days in advance of the dates and times when laboratory samples will be taken.
- B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
 1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.8 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of COR or state-certified, -licensed, or -registered soil scientist under the direction of the testing agency.
 - 1. Number and Location of Samples: Minimum of three representative soil samples where directed by Architect for each soil to be used or amended for landscaping purposes.
 - 2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
 - 3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
 - 4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.9 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
- B. Physical Testing:
 - 1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
 - a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
 - 2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 - 3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 - 4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).
- C. Chemical Testing:
 - 1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
 - 2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
 - 3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
 - 4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NCR-13, including the following:
1. Percentage of organic matter.
 2. CEC, calcium percent of CEC, and magnesium percent of CEC.
 3. Soil reaction (acidity/alkalinity pH value).
 4. Buffered acidity or alkalinity.
 5. Nitrogen ppm.
 6. Phosphorous ppm.
 7. Potassium ppm.
 8. Manganese ppm.
 9. Manganese-availability ppm.
 10. Zinc ppm.
 11. Zinc availability ppm.
 12. Copper ppm.
 13. Sodium ppm and sodium absorption ratio.
 14. Soluble-salts ppm.
 15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
 16. Other deleterious materials, including their characteristics and content of each.
- E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
- F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.
 2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Do not move or handle materials when they are wet or frozen.
 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

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PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Planting-Soil Type: Imported, naturally formed soil from off-site sources and consisting of sandy loam loam silt loam loamy sand or sand soil according to USDA textures; and modified to produce viable planting soil.
 - 1. Planting soil shall conform to Virginia standards.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
 - 2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
 - 3. Form: Provide lime in form of ground dolomitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M.

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 - 1. Feedstock: Limited to leaves.
 - 2. Reaction: pH of 5.5 to 8.
 - 3. Soluble-Salt Concentration: Less than 4 dS/m
 - 4. Moisture Content: 35 to 55 percent by weight.
 - 5. Organic-Matter Content: 30 to 40 percent of dry weight.
 - 6. Particle Size: Minimum of 98 percent passing through a 4-inch sieve.

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- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 6 to 7.5, a soluble-salt content measured by electrical conductivity of maximum 5 dS/m, having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- D. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
 - 1. Partially Decomposed Wood Derivatives: In lieu of shredded and composted wood derivatives, mix shredded and partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.

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- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.
- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- D. Screening: Pass unamended soil through a 2-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.
- C. Mixing: Spread unamended soil to total depth of 4 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix lime and sulfur with dry soil before mixing fertilizer.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

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3.4 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply approximately half the thickness of planting soil over prepared, loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.
- C. Application: Spread planting soil to total depth of 4 inches, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Lifts: Apply planting soil in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 BLENDING PLANTING SOIL IN PLACE

- A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Mixing: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.
 - 1. Mix lime and sulfur with dry soil before mixing fertilizer.
 - 2. Mix fertilizer with planting soil no more than seven days before planting.
- D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

- A. Application: Apply compost component of planting-soil mix to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

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- B. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 1000 sq. ft. of in-place soil or part thereof.
- C. Soil will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.8 PROTECTION

- A. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- B. If planting soil or subgrade is over-compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by COR and replace contaminated planting soil with new planting soil.

3.9 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.
 - 1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

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SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sodding.

1.2 DEFINITIONS

- A. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- B. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" and drawing designations for planting soils.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- 1. Certification of each seed mixture for turfgrass sod.
- B. Product certificates.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

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1.7 SCHEDULING

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: 3/15 to 6/15
 - 2. Fall Planting: 9/15 to 12/01
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 LAWN MAINTENANCE

- A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
 - 1. Sodded Lawns: 1-year from date of Substantial Completion.
- B. Maintain and establish lawn by watering, fertilizing, weeding, cutting, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas to produce a uniformly smooth lawn.
 - 1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
 - 2. Minimum maintenance shall include weekly watering and spring and fall mulching.
- C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches.
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water lawn at a minimum rate of 1 inch per week
- D. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
 - 1. Mow grass 2 to 3 inches high.
- E. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
 - 1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to lawn area.

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PART 2 - PRODUCTS

2.1 TURFGRASS SOD

- A. Turfgrass Sod: Certified complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.
- B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
 - 1. Full Sun: Kentucky bluegrass (*Poa pratensis*), a minimum of three cultivars.

2.2 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.3 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

2.4 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as

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required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 TURF AREA PREPARATION

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."
- B. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 - 1. Lay sod across slopes exceeding 1:3.
 - 2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.3 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
 - 1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
- B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

END OF SECTION 329200

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SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plants.
 - 2. Landscape edgings.
- B. Related Requirements:

1.2 DEFINITIONS

- A. Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.1.
- B. Balled and Potted Stock: Exterior plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of exterior plant required.
- C. Bare-Root Stock: Exterior plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for kind and size of exterior plant required.
- D. Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for kind, type, and size of exterior plant required.
- E. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted exterior plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of exterior plant.
- F. Finish Grade: Elevation of finished surface of planting soil.
- G. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- H. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- I. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

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1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each of the following:
 - 1. Samples of each kind of mulch.
 - 2. Edging materials and accessories, of manufacturer's standard size, to verify color selected.
- C. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following: Manufacturer's certified analysis for standard products.
 - 1. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. Qualification Data: For landscape Installer.
- E. Material Test Reports: For existing surface soil and imported topsoil.
- F. Planting Schedule: Indicating anticipated planting dates for exterior plants.
- G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

1.5 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.

1.7 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 1. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

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- C. Tree and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
- D. Observation: Architect may observe trees and shrubs either at place of growth or at site before planting for compliance with requirements for genus, species, variety, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
- E. Notify Architect of sources of planting materials seven days in advance of delivery to site

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.
- B. Do not prune trees and shrubs before delivery, except as approved by Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery.
- C. Handle planting stock by root ball.
- D. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants trees in shade, protect from weather and mechanical damage, and keep roots moist.
- E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.
- F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.9 COORDINATION

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: 3/15 to 6/15
 - 2. Fall Planting: 9/15 to 12/01
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

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- C. Coordination with Lawns: Plant trees and shrubs after finish grades are established and before planting lawns, unless otherwise acceptable to Architect.
 - 1. When planting trees and shrubs after lawns, protect lawn areas and promptly repair damage caused by planting operations.

1.10 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Warranty Periods: a minimum of one year after installation and acceptance of the landscaping, but not less than one year from date of substantial completion. Upon completion of the maintenance and warranty period, the Facilities Management Department (FMD), Building Design and Construction Division (BDCD) and the Contractor shall conduct a final walk-through of the site to ensure all plantings and lawn areas (grass) are acceptable.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

1.11 MAINTENANCE

- A. Trees and Shrubs: Maintain for the following maintenance period by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings.
 - 1. Maintenance Period: 12 months from date of Substantial Completion.
- B. Ground Cover and Plants: Maintain for the following maintenance period by watering, weeding, fertilizing, and other operations as required to establish healthy, viable plantings:
 - 1. Maintenance Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock,

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densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

- B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

2.2 FERTILIZERS

- A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 - 1. Size: 5-gram tablets.
 - 2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

- A. Organic Mulch: Shredded hardwood.

2.4 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.
- B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd.

2.5 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

2.6 LANDSCAPE EDGINGS

- A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 - 2. Edging Size: 3/16 inch thick by 4 inches deep.
 - 3. Finish: Manufacturer's standard paint.

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2.7 TREE-WATERING DEVICES

- A. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period; manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.

PART 3 - EXECUTION

3.1 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."
- B. Place and mix planting soil over exposed subgrade.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
 - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 2. Retain first two subparagraphs below if applicable.
 - 3. Excavate approximately three times as wide as ball diameter.
 - 4. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - 5. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

3.3 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

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1. Retain "Backfill" Subparagraph below if backfill or planting-soil type is not indicated on Drawings; revise to suit Project.
 2. Backfill: For trees, use excavated soil for backfill.]
 3. Retain applicable stock in first four subparagraphs below.
 4. Balled and Burlapped Stock: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 5. Balled and Potted and Container-Grown Stock: Carefully remove root ball from container without damaging root ball or plant.
 6. Fabric Bag-Grown Stock: Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 7. Bare-Root Stock: Support stem of each plant and spread roots without tangling or turning toward surface. Plumb before backfilling, and maintain plumb while working. Carefully work backfill around roots by hand. Bring roots into close contact with the soil.
 8. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 9. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - a. Bare-Root Stock: Place tablets beside soil-covered roots; do not place tablets touching the roots.
 - b. Quantity: Three for each caliper inch of plant.
 10. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.4 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.

3.5 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines 9 inches apart or as indicated on Drawings in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

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3.6 PLANTING AREA MULCHING

- A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6 inches and secure seams with galvanized pins.
- B. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Retain required mulch applications in two subparagraphs below.
 - 2. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
 - 3. Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.7 EDGING INSTALLATION

- A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

3.8 INSTALLING SLOW-RELEASE WATERING DEVICE

- A. Provide one device for each tree.

3.9 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.
- D. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- F. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

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3.10 MAINTENANCE SERVICE

- A. Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
1. Revise time periods in "Maintenance Period for Trees and Shrubs" and "Maintenance Period for Ground Cover and Other Plants" subparagraphs below to suit local customs and growing conditions.
 2. Maintenance Period for Trees and Shrubs: 12 months from date of planting completion or Substantial Completion.
 3. Maintenance Period for Ground Cover and Other Plants: 12 months from date of planting completion or Substantial Completion.

END OF SECTION 329300

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SECTION 334200 - STORMWATER CONVEYANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete pipe and fittings.
2. Non-pressure transition couplings.
3. Cleanouts.
4. Manholes.
5. Catch basins.
6. Stormwater inlets.
7. Stormwater detention structures.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Certification of compliance with VDOT Specifications and Standards where applicable.

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.
3. Stormwater Quality Structures: Include plans, elevations, sections, details, frames, covers, design calculations, and concrete design-mix reports.

1.3 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. NSF Marking: Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic storm drain and "NSF-sewer" for plastic storm sewer piping.

B. PVC Corrugated Sewer Piping:

1. Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.
3. Gaskets: ASTM F 477, elastomeric seals.

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- C. Adhesive Primer: ASTM F 656.

2.2 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings: as specified in VDOT Specification Section 232.02 (a) 1b; class as shown on Drawings.
- B. Joint Material: as specified in VDOT Specification Section 302.03 (a) 2.d (1).

2.3 NONPRESSURE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 - 1. For Concrete Pipes: ASTM C 443, rubber.
 - 2. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 3. For Fiberglass Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 4. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 5. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded, Flexible Couplings:
 - 1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
- D. Shielded, Flexible Couplings:
 - 1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
- E. Ring-Type, Flexible Couplings:
 - 1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

2.4 CLEANOUTS

- A. Cast-Iron Cleanouts:
 - 1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside caulk or spigot connection and countersunk, tapered-thread, brass closure plug.
 - 2. Top-Loading Classification(s): Heavy Duty.
 - 3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

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B. PVC Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.5 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: Cast into base, riser, and top section at intervals shown.
10. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

2.6 CONCRETE

A. General: Cast-in-place concrete in accordance with ACI 318, ACI 350, and the following:

1. Cement: ASTM C 150/C 150M, Type II.
2. Fine Aggregate: ASTM C 33/C 33M, sand.
3. Coarse Aggregate: ASTM C 33/C 33M, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 1064, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615, Grade 60 deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

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1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 1 percent through manhole.
 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 4 percent.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 1064, steel, welded wire fabric, plain.
 2. Reinforcing Bars: ASTM A 615, Grade 60 deformed steel.

2.7 CATCH BASINS

- A. Standard Precast Concrete Catch Basins:
1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
 3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
 4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
 7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and grate.
 8. Steps: Cast into base, riser and top section sidewall at intervals shown.
 9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Frames and Grates: VFDOT Section 204.
1. Size: 24 by 24 inches minimum unless otherwise indicated.
 2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.8 STORMWATER INLETS

- A. Curb Inlets: Made with vertical curb opening, of materials and dimensions according to VDOT standards.

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PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping in accordance with the following:
 - 1. Install piping pitched down in direction of flow.
 - 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
 - 3. Install piping with 2-foot minimum cover.
 - 4. Install PVC sewer piping in accordance with ASTM D 2321 and ASTM F 1668.
 - 5. Install reinforced-concrete sewer piping in accordance with ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping in accordance with the following:
 - 1. Join PVC corrugated sewer piping in accordance with ASTM D 2321 for elastomeric-seal joints.
 - 2. Join reinforced-concrete sewer piping in accordance with ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
 - 3. Join dissimilar pipe materials with nonpressure-type flexible couplings.
- B. Join force-main pressure piping in accordance with the following:
 - 1. Join PVC pressure piping in accordance with AWWA M23 for gasketed joints.
 - 2. Join dissimilar pipe materials with pressure-type couplings.

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3.4 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
 - 2. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants in accordance with ASTM C 891.
- C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.
- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops **3 inches** above finished surface elsewhere unless otherwise indicated.

3.6 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.7 CONCRETE PLACEMENT

- A. Place cast-in-place concrete in accordance with ACI 318.

3.8 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering

connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

- a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.9 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
1. Close open ends of piping with at least 8-inch thick, brick masonry bulkheads.
 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Backfill to grade in accordance with Section 312000 "Earth Moving."

3.10 IDENTIFICATION

- A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
1. Use warning tape or detectable warning tape over ferrous piping.
 2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.11 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
1. Submit separate reports for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.

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3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems in accordance with requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Gravity-Flow Storm Drainage Piping: Test in accordance with requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
 - b. Option: Test plastic piping in accordance with ASTM F 1417.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.12 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 334200

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