



Office of the Purchasing Agent
2100 Clarendon Blvd., Suite 500
Arlington, VA 22201

Invitation to Bid Number 23-DPR-ITBPW-575
Project Manual

Department of Parks and Recreation

LUBBER RUN PEDESTRIAN BRIDGE
PEDESTRIAN BRIDGE OVER LUBBER RUN
LUBBER RUN PARK
200 North Columbus Street, Arlington, VA 22203

Project includes, but is not limited to, demolition; tree protection and erosion and sediment control; bridge installation, walkways, signage, and landscaping.



LUBBER RUN PEDESTRIAN BRIDGE

23-DPR-ITBPW-575

Exhibit C "Project Technical Specifications"

Refer to Plan Set for Exhibit C "Project Drawings & Construction Notes"

TABLE OF CONTENTS

DIVISION 01 – SUMMARY AND GENERAL REQUIREMENTS

011000	GENERAL REQUIREMENTS
012000	MOBILIZATION
013300	SUBMITTAL PROCEDURES
016000	PRODUCT REQUIREMENTS
017700	CLOSEOUT PROCEDURES

DIVISION 03 – CONCRETE

033000	CAST-IN-PLACE CONCRETE
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DIVISION 10 - SPECIALTIES

101400	SINGAGE
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DIVISION 31 – EARTHWORK

311000	SITE CLEARING, DEMOLITION AND REMOVALS
311300	TREE PROTECTION AND ROOT PRUNING
312000	EARTH MOVING
312500	TEMPORARY EROSION AND SEDIMENT CONTROL

DIVISION 32 – EXTERIOR IMPROVEMENTS

321216	ASPHALT PAVEMENT
329100	PLANTING PREPARATION
329200	TURF AND GRASSES
329300	EXTERIOR PLANTS

SPECIAL PROVISION

	PREFABRICATED STEEL TRUSS
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SECTION 011000 – GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
 - 2. Use of premises.
 - 3. General requirements.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Lubber Run Pedestrian Bridge – Pedestrian Bridge Over Lubber Run – Lubber Run Park
- B. Project Location: 200 North Columbus Street, Arlington, VA 22203
- C. Owner: Arlington County, Virginia
Department of Parks and Recreation
2100 Clarendon Boulevard, Suite 414
Arlington, VA 22201
- D. The Work consists of, but is not limited to, the following:
 - 1. Demolition, site work, pedestrian bridge, walkways, signage, and landscaping; the construction of site improvements as shown on the Plans and specified hereinafter, including:
 - a. Site preparation including construction fences, tree protection fencing, temporary erosion and sediment control measures, test pits and construction stake-out.
 - b. Protection and maintaining and all other existing park property, Arlington County right-of-way, and other existing improvements as required.
 - c. Site restoration of all facilities damaged by construction operations, or as directed by Department of Parks and Recreation (DPR), to the original condition and/or the satisfaction of DPR. Site restoration includes, but is not limited to, pavement restoration, site grading, topsoil, seeding and sodding.
 - 2. Site Improvements:

- a. Project includes, but is not limited to, demolition; tree protection and erosion and sediment control; bridge installation, walkways, signage, and landscaping.
- E. Project will be constructed under a single prime contract.

1.3 USE OF PREMISES

- A. General: Contractor shall have limited use of premises for construction operations as indicated in the Specifications and on the Drawings by the Contract limits.
- B. Any existing water fountain or other site water sources shall not be used as supply for construction water.
- C. Use of Site: Do not disturb portions of Project site beyond areas in which the Limit of Disturbance (LOD) is shown. Specific limitations on use of the site include the following:
 - 1. Construction activity shall not take place inside designated tree protection areas, except when necessary and as approved by Project Officer. Contractor shall provide Project Officer with 72 hours' notice when work within a tree protection area is necessary, so that the County's urban forester can be notified.
 - 2. Maintain public access to areas outside the limits of work whenever possible. Contractor shall request approval from Project Officer 72 hours in advance when closures outside the limits of work are necessary.

1.4 GENERAL REQUIREMENTS

- A. Coordination: The Contractor shall be responsible for coordinating all construction operations included in the various Sections of the Specifications to ensure efficient and orderly installation of each part of the work.
- B. Contact Person: The Contractor shall establish a single contact person that will be responsible for all communication between the Contractor (including all subcontractors) and the Project Officer, Landscape Architect, and/or Engineer.
- C. Submittals: Upon Contract award, the Contractor shall immediately prepare a list of required submittals, based on the specifications, and begin to gather the required submittals for submission to the Project Officer within 30 days for critical (long-lead items) submittals and 45 days for others.
- D. Site Access: Contractor shall ONLY access site per plans. Contractor shall be responsible for any damage to park property from access point to construction entrance at the project's limits of disturbance.
- E. Permits:
 - 1. The County shall provide the following permits if applicable:
 - a. Virginia Stormwater Management Permit (VSMP)
 - b. Building

- c. Land Disturbance Activity (LDA) . After award of contract, the contractor shall transfer the LDA permit to the contractor's name and notify the Project Officer.
2. The Contractor is responsible for obtaining all other required permits from the Arlington County Department of Environmental Services (DES) and/or Inspection Services Division (ISD). The permits shall include but not limited to Right of Way, electrical, plumbing, mechanical, Energy Assessment, Certificate of Occupancy, Dumpster permit, Trailer permit and/or any other work necessary for the completion of the project.
3. The Contractor is required to submit designs, shop drawings, structural calculations, engineer certifications, or other items required for permit approval. In that case, the Contractor shall build in the required time for obtaining, submitting, and gaining approval of these items into the construction schedule.
4. If applicable: The Contractor is responsible for obtaining final BMP certification upon completion of the project. The Contractor shall submit to the Project Officer all documentation verifying approval and acceptance by the Department of Environmental Services. The Contractor is responsible for obtaining the services of an approved and qualified licensed third-party testing agency to inspect, document and certify the BMP installation per the approved plans and checklist. Final certification and acceptance of the BMP shall be granted by the Department of Environmental Services.
 - a. The contractor shall submit all documentation including as-builts for the BMP within one week after final planting and mulching is complete.
 - b. The contractor shall maintain all BMPs to include weed removal, general cleaning, erosion control, plant maintenance, maintain mulch depth, as required till the BMPs are certified by DES.

F. Subcontractors:

1. A list of proposed subcontractors shall be submitted to the Project Officer. Proposed subcontractors shall be subject to the review and approval of the Project Officer, who will respond to the proposed list of subcontractors within ten (10) working days of receipt. Reasons for rejection of a proposed subcontractor may include, but are not limited to, the following:
 - a. Unsatisfactory work on previous County contracts.
 - b. Lack of experience in the type of work to be subcontracted.
2. The Contractor is fully responsible for the work of its subcontractors, and any unsatisfactory work on the part of a subcontractor shall be remedied at the Contractor's expense if necessary.
3. A competent person from the Prime Contractor shall be present on the site during the work of all subcontractors. If such a person is not present while a subcontractor is working on the site, the Project Officer reserves the right to stop work. No Claims for Delay will be allowed as a result of such stoppages.
4. All subcontractors must be furnished with a full set of the contract drawings and specifications at the Contractor's expense, and subcontractors shall be required to have these documents on site while the work is being performed. If the subcontractor does not have access to a full set of plans and specifications while working on the site, the Project Officer reserves the right to stop work. No Claims for Delay will be allowed as a result of such stoppages.

G. Construction Schedule:

1. The construction schedule shall indicate the dates and date ranges where major components of the Work will be performed.
2. The schedule shall indicate the dates that required submittals will be provided and shall also indicate time allotted for the review and approval of submittals.
3. The Contractor shall maintain and update the schedule when conditions change and shall resubmit the updated schedule on a monthly basis to the Project Officer.
4. The Contract completion date cannot be changed by submission of a construction schedule indicating a different completion date. The Contract completion date can only be changed if specifically authorized by Change Order.

H. Preconstruction Meeting:

1. The Contractor shall attend a preconstruction meeting on-site with the Project Officer, Landscape Architect, their Consultants, the Contractor, major subcontractors, major suppliers, and other concerned parties.
2. At the meeting, the Contractor shall provide the following:
 - a. Construction schedule
 - b. List of required submittals
 - c. List of proposed subcontractors
3. Items of significance that could affect the progress of the work shall be discussed at the meeting.
4. Requirements for tree protection and erosion control shall be reviewed.
5. The Contractor shall record and distribute meeting minutes.

I. Notice to Proceed:

1. After the preconstruction meeting, the Project Officer will issue a written Notice to Proceed (NTP) to the Contractor.
2. The work commencement date shall be (7) calendar days from the date of issuance of Notice to Proceed.
3. The commencement date shall be the first day of the contract.
4. Generally, the NTP date is agreed-upon between the Project Officer and the Contractor. However, in the event of non-responsiveness or delay on the part of the Contractor, the Project Officer reserves the right to issue a NTP unilaterally without the agreement of the Contractor.

J. Contract Deliverables (if applicable):

1. Construction Schedule
2. List of required submittals
3. List of proposed sub-contractors
4. Submittals - See Specification 133000, Submittal Procedures
5. Safety Plan prior to NTP date.
6. SWPPP book prior to NTP date. SWPPP shall be approved by DES prior to construction start.
7. Existing Conditions Photograph. See Specification 133000, Submittal Procedures.

K. Progress Meetings:

1. The Contractor shall attend construction progress meetings on a bi-weekly basis, and at the request of the Project Officer.
 2. A two week look ahead schedule shall be submitted at each progress meeting.
 3. At the meeting, the following issues shall be discussed:
 - a. Work completed to date.
 - b. Work remaining to be completed and anticipated timeframes.
 - c. Issues affecting the progress of the work.
 - d. Items that require correction.
 4. The Contractor shall record and distribute meeting minutes.
- L. Requests for Information (RFI):
1. The Contractor shall upload RFIs to a digital platform such as Procore, Proforma, Submittal Exchange, Oracle or approved equal. It is the contractor's responsibility to set-up this digital platform. The contractor shall grant access of this digital platform to applicable County staff so they can download and upload project materials.
 2. The Contractor shall upload RFIs in any of the following instances (not all-inclusive):
 - a. If the intent of any item in the drawings and specifications is unclear.
 - b. If existing conditions differ from those indicated on the drawings.
 - c. To document any verbal agreements or instructions.
 3. In instances (a) and (b), the Contractor shall stop work in the affected area, notify the Project Officer, and await instructions.
 4. The Contractor shall be responsible for any expenses incurred due to unexpected conditions if he fails to notify the Project Officer and wait for direction prior to continuing work in the affected area.
 5. The Contractor's failure to properly document any verbal agreements or instructions will result in the rejection of any claim for changes to the Contract amount or additional time for completion.
 6. The Contractor is responsible for making the necessary inquiries to determine the design intent of the drawings and specifications if anything is unclear, prior to submitting a bid. Claims for changes to the contract amount submitted after Contract award due to an RFI response may be approved or rejected at the sole discretion of the Project Officer.
- M. Documentation of Events: The Contractor shall document and immediately report any of the following events to the Project Officer:
1. Accidents.
 2. Stoppages, delays, shortages, and losses.
 3. Orders and requests of authorities having jurisdiction.
 4. Services connected and disconnected.
 5. Existing conditions that significantly differ from those indicated on the drawings.
- N. Documentation of Work Activity: The Contractor shall document and submit on a daily basis a daily report. The daily report shall contain the following information:

1. Contractor name.
 2. Date and time.
 3. Temperature and weather condition.
 4. Project number.
 5. Contract number.
 6. List of sub-contractors on site by trade.
 7. List of number of man-hours for contractor and subcontractor.
 8. Description of each activity performed by the contractor and sub-contractor(s).
 9. List of materials stored on site and delivered.
 10. List of equipment materials stored on site and delivered.
 11. Submit all tickets for verification for the following, but not limited to materials and equipment delivered, concrete pours and soil removal.
- O. If the project site will not be worked on a particular workday or days, the Contractor shall notify the Project Officer that the site will not be worked on and shall state the reason for such.
- P. Claims for Delay:
1. The Contractor shall submit a written Claim for Delay within ten (10) working days of any event where the Contractor believes that an extension to the Contract time for completion is necessary or justified.
 2. The written Claim for Delay must include the following information:
 - a. Amount of days claimed
 - b. Justification for the delay
 - c. Supporting documentation
 3. Justifications for Claims for Delay include the following:
 - a. Inclement weather that prevents work on the site
 - b. Events beyond the control of the Contractor that result in a delay to the project, with the following exceptions:
 - 1) Delays in the delivery of materials.
 - 2) Failure of suppliers to provide required submittals in a timely manner.
 - 3) Any delays that result from the actions of a subcontractor.
 - 4) Disputes between the Contractor and subcontractors or suppliers
 - 5) Rejection of submittals.
 - 6) Re-work resulting from unsatisfactory work.
 - 7) Re-work resulting from failure to provide required submittals.
 - 8) Re-work resulting from failure to submit a Request for Information (RFI) if the design intent is unclear.
 - 9) Failure to obtain required permits in a timely fashion, as stated in Section above 1.4.E, Permits.
 - 10) Failure to request required inspections from the Inspection Services Division (ISD) in a timely fashion, or rejection of work by an inspector.
 - 11) Stop work orders issued by authorities having jurisdiction that are due to items that are the Contractor's responsibility.

4. A Claim for Delay may be denied if the Contractor fails to continue work on other aspects of the project that are not affected by the particular delayed item, or if, in the Project Officer's determination, the Contractor has failed to continuously work on the project or effectively manage the project.
 5. If planting installation is not feasible because it is not the proper season for planting, the Contractor shall notify the Project Officer. The Project Officer, at his sole discretion, may decide to treat planting as a Punch List item, thereby exempting it as a requirement for a Determination of Final Completion.
- Q. Liquidated Damages (Damages for Delay): The Project Officer does NOT have the authority to waive Liquidated Damages unless the supporting documentation described above has been provided by the Contractor (within the aforementioned time limit) and approved by the Project Officer.
- R. Existing Conditions: Dimensions and/or locations of existing facilities and/or underground utilities shown on the plans are approximate. The contractor shall verify exact locations before commencing work.
- S. Code Compliance: Comply with all applicable codes and regulations of authorities having jurisdiction.
- T. Safety: Take all precautions necessary to protect the public during the construction period.
- U. Protection of Existing Conditions: Take all precautions necessary to protect existing facilities to remain during the construction period. Repair any and all damage to existing facilities to remain caused by construction operations. Maintain existing utilities and protect them against damage during construction. Contact Miss Utility at (800) 552-7001 for utility locations prior to any excavation.
- V. County Rights-of-Way: Work taking place within the right-of-way of County streets shall conform to the Arlington County DES Construction Standards and Specifications. The Contractor shall obtain a right-of-way permit from the County for work to take place within street rights-of-way.
- W. Differing or Conflicting Requirements: If a Specification section requires compliance with two or more standards, or if requirements conflict, the more stringent standard or requirement shall apply.
- X. Quality Control Testing and Laboratory Services: The Contractor shall provide necessary labor and supervision required to support field testing and inspection by the Project Officer. Defects disclosed by tests shall be rectified at no additional cost to the County.
- Y. Record "As-Built" Drawings: The Contractor shall submit a digital set of marked-up plans in both PDF and AutoCAD format at the end of the construction period indicating any and all conditions that differ from the original Contract drawings. The As-built drawings shall be signed and stamped by a Professional Engineer or Licensed Land Surveyor. The As-built drawings shall comply with Arlington County Minimum Acceptance Criteria (MAC) Checklist (Link).

- Z. Operation and Maintenance Manuals: Contractor shall provide operations and maintenance manuals for all applicable products and systems used in the Work prior to Final Completion inspection.
- AA. Contractor Performance Evaluation Form: At the completion of the contract, after final completion, the Project Officer will complete an evaluation form per the terms and conditions of the agreement.

END OF SECTION 011000

SECTION 012000 - MOBILIZATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Mobilization shall include the following items (if applicable):

1. Furnish and set up Contractor's necessary general plant and equipment required for operations on to the site, including construction fence, storage areas, office, and such sanitary and other facilities as are required by County, State, or Federal law or regulation. The determination of adequacy of the Contractor's facilities, except as noted above, shall be made by the Contractor.
2. Providing on-site all OSHA required notices and establishment of safety programs.
3. Obtaining all required permits for completion of the project.
4. Having the Contractor's superintendent at the jobsite full time.
5. The cost of required insurance and bonds and/or any other similar significant initial expense required for the initiation of the contract work shall be included in this item.
6. Submitting initial submittals and submittal log.
7. Provide approved SWPPP book.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

- 3.01 Such work as is done in providing the facilities and services under this item shall be done in safe and workmanlike manner and shall conform to any pertinent County, State or Federal law, regulation, or code. Good housekeeping consistent with safety shall be maintained.

PART 4 – MEASUREMENT

The Contractor's attention is directed to the condition that no payment for Mobilization, or any part thereof, will be approved for payment under the Contract Documents until all Mobilization items listed above have been completed as specified to the satisfaction of the Project Officer.

For MOBILIZATION in accordance with the specifications the Contractor shall receive the Schedule-of-Values amount, which is not to exceed three percent (3%) of the total contract bid price excluding the bid for mobilization.

END OF SECTION 012000

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Landscape Architect or Project Officer's responsive action.
- B. Informational Submittals: Written information that does not require Landscape Architect or Project Officer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 GENERAL REQUIREMENTS

- A. Upon Contract Award, the Contractor shall prepare a list of required submittals, and shall immediately begin working to compile all required submittals.
- B. The Contractor shall not begin work which requires the submission of other data, until said submittals are returned with the Project Officer's stamp indicating approval or "approved as noted."
- C. Deviations from Contract Documents: Approval of submittals does not relieve Contractor from responsibility for full compliance with the Contract Documents. Approval of a submittal does not indicate acceptance of any deviations from the Contract Documents included in the submittal. Such deviations must be approved specifically in writing by the Project Officer.

1.4 SUBMITTAL PROCEDURES

- A. 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.
- B. Project Officer: All submittals shall be submitted to the Project Officer, who will then distribute submittals to the Landscape Architect, as applicable. Landscape Architect shall return submittals with action taken to the Project Officer who will then notify the Contractor.
- C. Submittals Schedule: Include a list of submittals for review in the construction schedule.

- D. A Submittal Log shall be uploaded to a **digital platform** such as [Procore](#), Oracle or approved equal. of all items prior to NTP. Nomenclature shall include specification number, item number and description.
- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Project Officer's receipt of submittal. No extension of the Contract Time will be authorized because of the Contractor's failure to incorporate this time into the construction schedule, or transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow ten (10) business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Project Officer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Resubmittal Review: Allow ten (10) business days for review of each resubmittal.
- F. Identification: Each submittal shall indicate the following:
1. Name of firm or entity that prepared each submittal.
 2. Project name.
 3. Date.
 4. Name and address of Contractor.
 5. Name and address of subcontractor.
 6. Name and address of supplier.
 7. Name and address of manufacturer.
 8. Applicable specification section.
 9. A unique identifier, such as a submittal number.
- G. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- H. Electronic Transmittal Procedures:**
1. All submittals shall be uploaded to a **digital platform** such as [Procore](#), Oracle or approved equal. It is the contractor's responsibility to set-up this digital platform. The contractor shall grant access of this digital platform to applicable County staff so they can use as needed. Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using the County's approved transmittal form (see attached). Project Officer will discard submittals received from sources other than Contractor.
- I. Additional Requirements:**
1. After notice to proceed, the contractor shall upload to a **digital platform** such as [Procore](#), Oracle or approved equal, a minimum of one hundred (100) existing conditions photographs of the project site.
 2. In addition, the contractor shall upload to a **digital platform** such as [Procore](#), Oracle or approved equal, a minimum of thirty (30) progress photographs on a bi-weekly basis.

- J. Resubmittals: Make resubmittals in same form as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked “approved” or “approved as noted.”
- K. Use for Construction: Use only final submittals with mark indicating “approved” or “approved as noted” by Landscape Architect/Project Manager.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. 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 printed data are not suitable 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 written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Compliance with specified referenced standards.
 - f. Testing by recognized testing agency.
- C. Shop Drawings: Where required in the Specifications, prepare project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Schedules.
 - e. Notation of coordination requirements.
 - f. Notation of dimensions established by field measurement.
 - g. Relationship to adjoining construction clearly indicated.
 - h. Seal and signature of professional engineer if required.

- i. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
 3. Number of Copies: An electronic copy of each submittal. Project Officer will return one copy.
- D. Samples: When requested by Landscape Architect, contractor shall submit samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of samples that includes the following:
 - a. Generic description of sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate specification section.
 3. (If requested by Landscape Architect) Samples for Initial Selection: If colors, textures, and/or patterns are not clearly indicated in the drawings and/or specifications, 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. Project Officer will return submittal with options selected.
 4. 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 one set of samples. Project Officer will retain the sample set and indicate acceptance or rejection in writing to the Contractor.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Submittals shall be uploaded to a website such as Oracle, etc. The contractor shall grant access of this website to applicable County staff.
2. Certificates and Certifications: Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Prior to submittal to Project Officer, 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.

3.2 LANDSCAPE ARCHITECT'S ACTION

- A. Action Submittals: Landscape Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Landscape Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 1. No Exceptions Taken or Approved: A marking of "approved or "No Exceptions Taken" indicates approval of a submittal for general conformance with the design concept of the Project and with the drawings and specifications.
 - a. The Contractor is still responsible for confirming and correlating dimensions at job site, for information which pertains to fabrication processes or construction techniques and for coordination of work of all trades.
 - b. Approval of submittals does not relieve Contractor from responsibility for full compliance with the Contract Documents.
 2. Make Corrections, Approved as Noted or Approved as Noted: A marking of "Make Corrections, Approved as Noted" or "Approved as Noted" indicates conditional approval of a submittal.
 - a. The Contractor is expected to comply with the revisions or notes indicated by the Landscape Architect in the document. These notes become an integral part of the approved submittal and their acceptance by the Contractor indicates an agreement to comply with the noted requirements.
 - b. The Contractor is still responsible for confirming and correlating dimensions at job site, for information which pertains to fabrication processes or construction techniques and for coordination of work of all trades.
 - c. Approval of submittals does not relieve Contractor from responsibility for full compliance with the Contract Documents.
 3. Revise and Resubmit: Based on the notations provided by the Landscape Architect, make revisions required to comply with the requirements in the Contract Documents, and resubmit for approval.

4. Rejected: The product indicated does not comply with the requirements in the Contract Documents and shall not be used in the Project. Provide submittals for the correct product as indicated in the drawings and specifications.
- B. Informational Submittals: Landscape Architect will review each submittal and will not return it, or will return it if it does not comply with requirements.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This 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; product substitutions; and comparable products.
- B. See Division 1 Section 017700 "Closeout Procedures" for submitting warranties for Contract closeout.
- C. See Divisions 3 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.02 SUBMITTALS

- A. Substitution Requests:
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Reasons why the specified product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the product specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Architects and owners, if requested.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Statement of impact on the construction schedule. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - i. Cost information, including a proposal of change, if any, in the Contract Sum.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - k. 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.

2. Project Officer's Action: If necessary, Project Officer will request additional information or documentation for evaluation within five (5) business days of receipt of a request for substitution. Project Officer will notify Contractor of acceptance or rejection of proposed substitution within ten (10) business days of receipt of request, or five (5) business days of receipt of additional information or documentation, whichever is later.
 - a. Use product specified if Project Officer cannot make a decision on use of a proposed substitution within time allocated.

1.03 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

1.05 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: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty (if required by other specification sections): Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties (if required by other specification sections): Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and that are new at time of installation.
1. Standard Products: 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.
- B. Product Selection Procedures:
1. Sole-Source: Where Specifications name a single product and manufacturer without the words “or approved equal,” provide the named product that complies with requirements. No substitutions will be accepted.
 2. Approved Equal: Where Specifications name a single product and manufacturer accompanied by the words “or approved equal,” the specification establishes a minimum standard for design and quality. This should not be construed as eliminating from competition other products of equal or better quality that also satisfy the design intent of the project (as determined by the Project Officer). In this case, either provide the named product that complies with requirements, or submit a bidder Submission of Proposed equivalent items for consideration by the Project Officer in accordance with process described in the solicitation documents.
 - a. Protocols for Approved Equal Request(s):
 - a) When the project is in construction and the specified product(s) cannot be procured due to the following;
 - b) Product is no longer available
 - c) The County and the Contractor agree that the lead time is too long
 - d) If there is a “better” product.
 - e) *Contractor shall submit Approved Equal request to Construction Manager for approval.
 3. Product List: Where Specifications include a list of manufacturers and products, provide the specified quantity of one of the named products that complies with requirements or an equivalent. Product selected shall be compatible with products previously selected, even if previously selected products were also options. Alternatives not listed will be considered by the Project Officer based on the compliance with specification requirements. To request consideration of an alternative not listed, submit a “Bidder Submission of Proposed Equivalent” for consideration by the Project Officer.

END OF SECTION 016000

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. This 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. See Divisions 3 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.02 FINAL 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 Project Officer of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Project Officer unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit as-built drawing markups, operation and maintenance manuals, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Project Officer. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Project Officer Owner.
 - 8. Complete startup testing of systems.
 - 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 10. Advise Owner of changeover in utilities.
 - 11. Submit changeover information related to occupancy, use, operation, and maintenance.
 - 12. Complete final cleaning requirements, including touchup painting.
 - 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Final Completion. On receipt of request, Project Officer will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Officer will prepare the Certificate of Final Completion after inspection or will notify Contractor of items, either on Contractor's list or additional

items identified by the Project Officer, 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. Results of completed inspection will form the basis of requirements for Final Acceptance.

1.03 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 1. Schedule pre-final inspection with Project Officer two weeks before contract completion date. Submit copy of Final Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Project Officer. The copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 3. Instruct Project Officer in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Project Officer will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Officer will process final payment after inspection or will notify Contractor of construction that must be completed or corrected before payment will be issued.
 1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.04 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit copy 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.

1.05 WARRANTIES

- A. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. 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.
 2. 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.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Provide all of the above in digital format.
- B. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.06 FINAL PAYMENT:

Submit final pay application after the following:

1. All punch list items have been corrected and verified by the Project Officer.
2. As-Built Drawings and O/M manuals shall be submitted within 15 days from final completion date and have been submitted and accepted by the Project Officer.
3. All final inspections (plumbing, electrical, final building etc.) have been completed and closed out by the County's Inspection Services Department.
4. All BMP's (if any) shall be approved and certified by DES.
5. LDA permit is closed out by County.
6. All sub-contractors have been paid.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 – EXECUTION

4.01 FINAL CLEANING

- A. General: Provide 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: Clean each surface or unit to condition expected in an average 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 site.
 - e. Remove labels that are not permanent.
 - f. 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.
 - i. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - h. Replace parts subject to unusual operating conditions.
 - i. 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.
 - j. Leave Project clean and ready for use.
- C. 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.

END OF SECTION 017700

SECTION 033000 – CAST IN PLACE CONCRETE

PART I – GENERAL

1.1 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Bridge Abutments

1.2 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. 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.
- C. Comply with ACI 301, "Specification for Structural Concrete."
- D. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- E. Expansion Joint sealant colors.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For concrete pavement mixture.
- C. Delivery tickets for concrete including the date, time, truck identification, concrete plant, plant inspector, ticket and load number concrete class and design mix, moisture content of aggregates, quantity and location of placement.

PART 2- PRODUCTS

2.1 STEEL REINFORCEMENT

- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed, sizes as shown on the drawings.

- G. Plain Steel Wire: ASTM A 82, as drawn.
- H. Deformed-Steel Wire: ASTM A 496.
- I. 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."

2.2 CONCRETE MATERIALS

- A. The design of the concrete mix, equipment, workmanship, and materials shall conform to the applicable requirements of Division 3 sections, except as hereinafter specified. Minimum compressive strength after 28 days shall be 3000 psi. Maximum size of aggregate shall be 1-01/2 inches, but not less than 3/4 inch. Air content by volume shall be 4-1/2 per-cent, plus or minus 1-1/2 percent. The same brand of cement, source of sand, and water/cement ratio shall be maintained for each load of concrete.
 - 1. Provide Class A3 General Use (3,000 psi) concrete for curbs (all) and site furnishing foundations.
 - 2. Provide 3,500 psi concrete for all walls and steps.
- B. Portland Cement air-entrained, ASTM C 150, Class A3 General Use (3,000 psi) per VDOT 217.

2.3 CURING MATERIALS (non colored concrete)

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.4 EXPANSION JOINT FILLER

- A. Joint filler shall be 1/2 inch preformed asphalt expansion joint material conforming to ASTM D994 or ASTM D1751.
- B. If bituminous fiber material is used, a bond breaker such as one-half (1/2") wide polyethylene tape or five eighths inch (5/8") diameter expanded polyethylene foam backer rod shall be installed as recommended by the manufacturer.

2.5 EXPANSION JOINT SEALANT

- A. Expansion Joint Sealant: Sealant shall be one-component polyurethane-base elastomeric sealant. Asphalt cement will not be approved as a substitution. Sealant color shall match color of adjacent pavement. Where joints fall between pavement sections of different colors, color shall be approved by Project Officer to match one of the pavement colors.
1. Products: Subject to compliance with requirements, provide one of the following or an approved equal:
 - a. SikaFlex-1a by Sika Corporation.
 - b. Sonolastic NP-1 by Sonneborn and Chem Rex Inc.

PART 3 – EXECUTION

3.1 SAMPLING, TESTING AND ENFORCEMENT

- A. Sampling and testing shall be performed in accordance with Section 03100- Concrete Formwork Reinforcement and Materials, Arlington County Department of Public Works Construction Standards and Specifications.

3.2 PREPARATION FOR PLACING CONCRETE

- A. Formwork:
1. General: Construct forms of sound material, and of the correct shape and dimensions shown on the Drawings, constructed tightly and of sufficient strength. Brace and tie the forms together so that the movement of workers, equipment, materials, or placing and vibrating the concrete will not throw them out of line or position. Forms shall be strong enough to maintain their exact shape under all imposed loads. Construct forms that may be easily removed without damage to the concrete. Before concrete is placed in any form, the horizontal and vertical position of the form shall be carefully verified and all inaccuracies corrected. Complete all wedging and bracing in advance of placing concrete.
 2. Chamfered Corners: Unless otherwise indicated, provide chamfered corners on all exposed corners. Provide 3/4 inch moldings in forms for all chamfering required.
 3. Form Ties: Use form ties of sufficient strength and in sufficient quantities to prevent spreading of the forms. Place ties at least 1-inch away from the finished surface of the concrete. Do not use ties consisting of twisted wire loops. Leave inner rods in concrete when forms are stripped. Space all form ties equidistant, and symmetrical, and line up both vertically and horizontally.
 4. Cleanouts and Access Panels: Provide removable cleanout sections or access panels at the bottom of all forms to permit inspection and effective cleaning of loose dirt, debris, and waste material. Clean all forms and surfaces to receive concrete of all chips, sawdust, and other debris and thoroughly blow out with compressed air just before concrete is placed.
 5. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

- B. Preparing the Subgrade: Thoroughly prepare and compact the subgrade as specified in Section 312000 – Earthwork. Subgrade shall be excavated to the required elevation below the finished surface of the pavement in accordance with grades and lines shown on the Drawings.
- C. Layout: Cast in place concrete shall have true curves to the radii indicated on the Drawings. No straight segments or tangents shall be approved. A digital CADD file containing the project layout is available from the Project Officer to aid in the installation of cast in place concrete elements.
- D. Dewatering: Remove water from excavations before concrete is deposited. Divert any flow of water through proper side drains and remove water without washing over freshly-deposited concrete. Remove hardened concrete, debris, ice, and other foreign materials from the interior of the forms, and from the inner surfaces of mixing and conveying equipment. Secure reinforcing in position and place vapor barrier and have inspected and approved before the concrete is poured. Do not wheel equipment used to deposit concrete over reinforcement.
- E. Inspection: After placement of reinforcing steel in the forms, and prior to placing concrete, notify the Project Officer so that proper inspection may be made. Such notification shall be made at least 48 hours in advance of placing concrete to permit proper arrangements for inspection.

3.3 DELIVERY

- A. Submit a delivery ticket indicating the mix and design strength of the concrete, design slump, and time of leaving the truck mixer with each batch at the time of delivery. Record on the back of the delivery ticket: (a) the time of arrival of the truck mixer on the site; (b) the time of deposit of the concrete from the truck; and (c) the place of deposit of the concrete. The completed delivery ticket shall be delivered to the Project Officer. Failure to deliver such completed ticket to the Project Officer will be cause for the Project Officer to reject the deposited concrete at any time and cause it to be removed and replaced at no additional expense to the County.
- B. All batching of concrete shall be in accordance with the manufacturer's instructions.
- C. Do not use concrete on the job site when it has exceeded the allotted mixing time as specified in Section of the 217.09 of the VDOT Specifications.

3.4 PLACING CONCRETE

- A. Before placing concrete, remove all construction debris, water and ice from the places to be occupied by the concrete. Give particular attention to the removal of dirt and debris from all formed construction joints.
- B. Concrete, when deposited, shall have a temperature ranging between a minimum of 50 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit. When the temperature of the surrounding air is below 50 degrees or above 90 degrees Fahrenheit, concreting shall be done in accordance with the recommendations noted in ACI-306 and ACI-305 respectively.
- C. Depositing of concrete shall be in accordance with the manufacturer's instructions.
- D. Mix concrete in such quantities as required for immediate use and place prior to loss of slump. Do not re-temper concrete.

- E. Spade, work and vibrate concrete as it is being poured, to secure its maximum density, free from voids and completely filling the forms. Thoroughly work concrete to secure the complete envelopment of all parts of the reinforcing steel and completely fill the corners of the forms. Maintain not less than 2 approved vibrators on the work at all times. Use tremies or chutes for drops of more than 5-feet.

3.5 REMOVAL OF FORMS

- A. After concrete has been placed, all forms, bracing and supports shall remain undisturbed long enough to allow the concrete to reach the strength necessary to support with safety its own weight plus any live load and earth pressure that might be placed upon it without causing excessive settlement or deflection or any temporary or permanent damage to the structure. Prevent the breaking of edges and corners of concrete in the stripping of forms. Upon removal of formwork, immediately patch honeycombed areas and other voids to the satisfaction of the Project Officer.
- B. Thoroughly clean forms and recoat with specified form coating before each reuse. Do not reuse any form for exposed work which cannot be reconditioned to "like new" condition. Discard forms considered unsatisfactory by the Project Officer. Apply form coating to all forms in accordance with the manufacturer's specifications. Apply form coatings before placing reinforcing steel.

3.6 PROTECTION OF NEW WORK

- A. Protect all freshly placed concrete from mechanical injury or action of the elements until such time as the concrete is thoroughly set.
- B. Protect sleeves, projecting inserts, anchor bolts and other embedded items from disturbances until the concrete has sufficiently set to hold such items.

3.7 CONTROL JOINTS

- A. Provide sawn or tooled joints or removable insert strips; depth equal to 1/4 slab thickness. Spacing as required and approved by the Project Officer.

3.8 EXPANSION JOINTS

- A. Furnish and install preformed expansion joint material at locations shown on the drawings or every 20 feet on center, minimum, full depth of concrete at approved locations by Project Officer. Cut preformed expansion joint material slightly less than the full width of the cross section of the concrete to allow for a liquid joint sealant with any backup material. Provide smooth dowels across joint which permit 1 inch horizontal movement and no vertical shear movement.
- B. Tool the concrete edges at expansion or contraction joints to a one-eighth (1/8)-inch radius.

3.9 FINISHING

- A. Finishing and caulking of concrete shall be in accordance with the manufacturer's instructions.

- B. Concrete Walls: All areas of exposed concrete walls from the top of the wall to 1 foot below the finished grade of the structure shall be finished in the following manner:
1. After removal of forms, point cavities, stone pockets, and tie holes in exposed surfaces with mortar by thoroughly wetting the repair area. Cut out honeycombs down to dense concrete, and then patch and point as described above. The mortar mix for patching shall be determined by trial to obtain a good color match with the concrete when both patch and concrete are cured and dry. The amount of mixing water shall be as little as consistent with the requirements of handling and placing the mortar.
 2. Ground off form joint marks and fins to a smooth surface, dense and free of prominent grain markings and bulges or depressions more than 1/8-inch in 4 feet.
 3. When the mortar pointing has set, the entire exposed concrete surface shall be thoroughly covered with water by means of brush and rubbed with carborundum brick to remove all blemishes and leave the entire exposed surface uniform in color and texture.
 4. All walls shall receive a light sandblast finish. Prepare mock-up for approval prior to commencing work.
- C Concrete Flush Curbs Troweled with Fine-Broom Finish:
1. General: Do not add water to concrete surfaces during finishing operations.
 2. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 3. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.10 CURING

- A. Curing shall be started as soon as it is possible to apply the curing medium without damaging the surface, preferably immediately upon completion of the finishing operation. Curing shall continue uninterrupted for a minimum period of 14 days. Rapid drying upon completion of the curing period shall be prevented. At no time during the curing period shall the temperature of the concrete be permitted to drop below 40 degrees Fahrenheit.

3.11 DEFECTIVE CONCRETE

- A. Defective concrete is defined as concrete in place which does not conform to strength, shapes, alignments, appearance, and/or elevations as shown on the Drawings; areas which contain faulty surface areas and/or concrete surfaces not finished in accordance with these specifications.
- B. Remove all defective concrete and replace in a manner meeting with the Project Officer's approval. Should only surface imperfections occur, patch at the discretion of, and in a manner satisfactory to, the Project Officer. Permission to patch the work shall not be considered as a waiver of the County's right to require complete removal and replacement of such defective work should the patching fail to satisfactorily restore the required quality and appearance of the work.

PART 4- MEASUREMENT

- 4.1 The unit price for CAST IN PLACE CONCRETE shall be CUBIC YARD and shall include the cost of all labor, materials, equipment, and incidental expenses necessary to complete the work, including expansion material, sealant, color steel reinforcement, curing material, concrete, aggregate subbase, all in accordance with the plans and specifications, and to the approval of the Project Officer.

Does not include excavation.

END OF SECTION 033000

SECTION 101400 – SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Wayfinding Sign

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings for all signs: Include plans, elevations, sections of components, and installation details.

1.3 WARRANTY

- A. Warranty Period: Minimum of one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Available Manufacturers: Subject to compliance with requirements, provide the signs by the following or approved equal:

1. Engraphix Architectural Signage, Inc., 132 Hanley Industrial Court, St. Louis, MO 63144 (314) 781-7878.
2. Sign graphics, text layout and color shall be as shown on the drawings.

B. Manufacturers NOT listed above must meet the following requirements:

1. The vendor(s) shall have a long and established history (no less than five (5) years) of producing high quality, easily maintained, and cost conscious sign fabrications.
2. The vendor shall a long-term relationship with municipalities and public entities in the region, such as Arlington County.

3. Vendor shall be prepared to fabricate sign(s) on time and within acceptable budget provisions while providing the expected quality of craftsmanship.

2.2 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 5005-H15.
- B. Vinyl Film: Opaque, nonreflective vinyl film, 0.0035-inch minimum thickness, with pressure-sensitive adhesive backing, suitable for exterior applications.
- C. Colored Coatings for Plastic Sheet: Nonfading coatings, including inks and paints for copy and background colors. Use coatings that are recommended by manufacturers for optimum adherence to type of plastic used.
- D. Steel Plate: ASTM A36.
- E. Steel Tubing: ASTM A500, Grade B.
- F. Concrete for Postholes: Comply with requirements in Division 3 Section "Cast-in-Place Concrete."
- G. Hardware: Hot-dipped galvanized or stainless steel.

2.3 POSTS

- A. General: Fabricate posts to lengths required for mounting method indicated.
 1. Direct-Burial Method: Provide posts 36 inches longer than height of sign to permit direct embedment in concrete foundations.
 2. Size: As indicated on the drawings.
 3. Color: As shown on the drawings.

2.4 SIGN PANELS

- A. Signs:
 1. Unframed Single-Sheet Panels: Provide unframed single-sheet sign panels with edges mechanically and smoothly finished.
 - a. Panel Material: 0.125-inch-thick aluminum sheet.
 - b. Panel Finish: Per plans

2.5 TEXT

- A. All sign text shall read as shown on the drawings.

2.6 GRAPHICS

- A. Graphic Content and Style: Provide sign copy that complies with requirements indicated in Drawings for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

2.7 ALUMINUM FINISHES

- A. Baked-Enamel Finish: Cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating; thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603, medium gloss.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.8 ACCESSORIES

- A. Mounting Methods: Use fasteners fabricated from materials that are not corrosive to sign material and mounting surface.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavation: In firm, undisturbed or compacted soil, drill or (using a post-hole digger) hand-excavate holes for posts to diameters and spacing indicated.
 - 1. Excavate hole depths as indicated on the drawings.
- B. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation, unless otherwise indicated. Place concrete and vibrate or tamp for consolidation. Check for alignment and hold in position until concrete has achieved its initial set.
- C. Install signs level, plumb, and at height indicated, with surfaces free from distortion.

PART 4 – MEASUREMENT

- 4.1 The quantity of each type of SIGN to be paid for under this item shall be the number of EACH type, furnished and installed in accordance with the plans, specifications and includes the cost of

all labor, materials, and incidental expenses necessary to complete the work, hardware, concrete footings, in accordance with the plans and specifications, to the satisfaction of the Project Officer.

Does not include excavation.

END OF SECTION 101400

SECTION 311000 - SITE CLEARING, DEMOLITION & REMOVALS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes, but is not limited to, the following:
 - 1. Removal and repurposing of existing play equipment
 - 2. Tree removal
 - 3. Clearing and grubbing.
 - 4. Stripping and stockpiling topsoil.
 - 5. Removing above-grade site items.
 - 6. Disconnecting and capping or sealing site utilities.
- B. Footings, bases and foundations for the above mentioned removals shall be removed under Section 312000, "Earthwork."
- C. See Section 312500, "Temporary Erosion and Sediment Control" for temporary erosion and sedimentation control measures.
- D. See Section 311300, "Tree Protection and Root Pruning" for requirements related to tree protection.

1.2 MATERIAL OWNERSHIP

- A. Except for stripped topsoil, items identified by the Project officer as salvage, or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT 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 Project Officer and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Items: Carefully remove items indicated by the Project officer to be salvaged and store on Owner's premises where indicated in the Demolition Plans.
- C. Utility Locator Service: Notify Miss Utility at (800) 552-7001 for utility location services 72 hours prior to site clearing.

- D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Erect temporary tree protection fencing around existing trees to remain as indicated on the drawings and as specified in Section 311300, "Tree Protection and Root Pruning"
- C. Protect existing site items to remain from damage during construction.
 - 1. Restore damaged existing site items to their original condition, as acceptable to Project officer.

3.2 TREE REMOVAL

- A. General
 - 1. Remove all trees marked for removal on the Demolition Plans in a manner that will protect the adjacent trees to be preserved, vegetation and other site elements to include but not limited to the existing site fence, adjacent properties, power lines, playground, and basketball court that are outside of the Limits of Disturbance (LOD)
- B. Tree removal
 - 1. Remove all other trees using techniques as required.

3.3 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. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Project Officer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Project Officer's written permission.

3.4 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.
 - 2. Grind down stumps and remove roots larger than **2 inches**, obstructions, and debris to a depth of **18 inches** below exposed subgrade.
 - 3. Chip removed tree branches, and trunks and legally **dispose of off-site**.
- 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 6 inches, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.6 EXISTING SITE ITEMS

- A. Remove existing above-grade items as indicated and as necessary to facilitate new construction.

3.7 EXISTING PLAY EQUIPMENT

- A. The Contractor shall coordinate the removal and re-purposing of existing playground equipment with an organization whose primary goal is to re-use the play equipment domestically and/or internationally.
 - 1. Contractor shall coordinate with an organization such 'Kids Around the World' (570-412-4804), or others.

2. Contractor shall be required to provide evidence of compliance.

3.8 DISPOSAL

- A. Disposal: 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.

PART 4 – MEASUREMENT AND PAYMENT (not used)

END OF SECTION 311000

SECTION 311300 - TREE PROTECTION AND ROOT PRUNING**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes, but is not limited to, the following:
1. Protection of existing trees to remain:
 2. Protection and stress reduction of existing trees that interfere with, or are affected by, execution of the Contract, whether temporary or permanent.
 3. Contractor coordination with Construction Manager, Arlington County Arborist, Third Party Arborist, County Landscape Architect, Consultant Landscape Architect
 4. Pruning of existing trees roots that are affected by execution of the Work, whether temporary or permanent construction.
 5. Tree Protection Measures of existing trees to remain, including but not limited to Root Aeration Matting, Root Protection Matting, Fencing, Signage, Mulch and Topsoil, Trunk Protection and Super Sonic Air Tool Excavation. Installation, sequencing and removal of the above.

1.2 Provide all labor, materials, tool and equipment as required to have tree protection applied on all areas called for on the approved plans (or in the Contract Documents).

1.3 In addition to the specifications contained herein, work shall be performed in accordance with the standards laid out in ANSI A300 (Part 5) for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management – Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction) and in accordance with the Arlington County Department of Parks and Recreation Design Standards for Tree Protection and Trimming as shown on plans and available online at:

- A. <http://parks.arlingtonva.us/design-standards>

1.4 Related Work Specified Elsewhere:

- A. 311000 Site Clearing, Demolition and Removals
- B. 312000 Earthwork
- C. 329100 Planting Preparation
- D. 329200 Turf
- E. 329300 Exterior Plants
- F. 329600 Transplanting

1.5 Applicable References

- A. ANSI A300 Tree Care Operations: Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1 Pruning
- B. Arlington County Stormwater Management Ordinance Guidance Manual

1.6 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Tree Protection Area: Areas outside of the limits of disturbance or protected from disturbance by root matting or other techniques, defined to protect trees inside and outside of the project limits.
- C. Reforestation Area: Areas intended for reforestation by trees and other vegetation.
- D. ISA: International Society of Arboriculture
- E. CBAY: Chesapeake Bay, typically referring to CBAY watershed.
- F. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester
- G. Landscape Architect: Refers to an Arlington County Landscape Architect or their designee.

1.7 SUBMITTALS

- A. Product Data: For each type of product indicated in Section 2.0. List products to be used including qualifications to perform work.
- B. Certification: Contractor's arborist shall certify that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged. Contractor shall submit a letter with a certified arborist seal.
- C. Maintenance Requirements: Contractor's arborist shall submit requirements for the care and protection trees affected by construction during and after completing the work.
- D. Contract arborist Qualifications: Contractor shall submit a copy of valid ISA certification to the Project Officer for approval with confirmation by Urban Forester.
- E. Provide schedules for performance of work.

1.8 QUALITY ASSURANCE

- A. Contractor shall ensure that tree and plant protection methods are implemented by an arborist certified by the International Society of Arboriculture (ISA) to provide for the care of the trees and plants impacted by construction activities.
- B. The Contractor shall identify to the Project Officer at least one authorized on-site Point of Contact (POC) who is, by training or experience, familiar with the policies, regulations and standards applicable to the work being performed. The POC and the certified arborist may be the same individual.
- C. Crews shall be directly supervised by an ISA certified arborist.
- D. All workers, through related training and on the job experience, shall be familiar with the technical aspects of arboricultural work and equipment used in such operations.
- E. Trucks and mechanized equipment shall not enter Tree Protection Areas, unless approved by the Project Officer as authorized by Urban Forester.
- F. No stump grinding shall be performed within the Tree Protection Areas, unless approved by the Project Officer as authorized by Urban Forester.
- G. Where stump grinding is authorized, it shall be with small machines specifically designed for that purpose. No stumps shall be excavated except as described herein. Stumps shall be ground not more than 8” below grade and care must be taken to minimize damage to root of the trees to remain.
- H. All work in or near Tree Protection Areas shall be carefully performed by Contractor in order to avoid damage to tree trunks, branches, root system, and other existing plant materials and soils that are to remain.
- I. Silt shall not be allowed to collect in Tree Protection or Reforestation Areas. Silt accumulating in such areas shall constitute damage and shall require remedial activity. All silt shall be removed from Tree Protection Areas within 24 hours of siltation. The methods and procedures for silt removal within Tree Protection and Reforestation Areas shall be approved by the Project Officer as authorized by the Urban Forester.
- J. Pruning shall conform to the techniques and standards specified in the current edition of ANSI A300 (Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices) Part 1 (Pruning)."
 - 1. Pruning shall remove only dead, dying, damaged or broken limbs greater than 1” – 1.5” in diameter.
 - 2. Pruning for clearance shall be reviewed and approved by Project Officer as authorized by the Urban Forester.
- K. Urban Forester Notification: The Contractor shall notify the Project Officer 72 hours prior to the following events, so that the County’s Urban Forester can be notified and be present at a pre-construction site meeting (refer to Section 3) and to observe work:
 - 1. Tree protection fencing installation
 - 2. Other tree protection operations

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3. Work within Tree Protection Areas.
 4. Tree planting.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. 6' Height Tree Protection Fence/Construction Fence (Chain Link): This fence is used around the perimeter of the entire protect site and demarcates the Limits of Work (LOW)/Limits of Disturbance (LOD). Galvanized tension wires, line posts, end posts, and tension bars. 2" chain link fabric (12 or 13 gauge). See plans for locations.
- B. Tree Protection Signs: Shall be of heavy-duty sheet aluminum or weatherproof plastic material measuring 12 inches by 18 inches. Signs shall state "NO ENTRY, TREE PRESERVATION AREA, CALL 703-228-6557 TO REPORT VIOLATIONS" in both English and Spanish. Signs shall be mounted on fence every 30 feet.
- C. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.
 - i. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.
- D. Wood Chip Mulch. Refer to Section 329300 – Exterior Plants. Application of a wood mulch product to areas surrounding designated trees. Mulch increases moisture-holding capacity, helps mitigate soil compaction, and increases needed soil organic composition
- E. Temporary Root Protection Matting: Double-side geocomposite, geonet core with non-woven covering (Tenax Tendrain 770/2 or approved equal). See plans for locations. The purpose of the RPM is to reduce compaction, rutting, and contamination of soils and root systems of trees to be retained should staging, temporary stockpile, or equipment access be required within the CRZ areas due to extreme site constraints. Various materials or combinations are specified depending up the anticipated construction work equipment, stockpile, or storage. Location of all RPM may or may not be shown on drawings but shall be coordinated between the Contractor, Third-Party Arborist, Arlington County Arborist and Construction Manager.
 - i. May be required for access during hardscape demolition operations where sharp turns are difficult.
 - ii. Shall be used for all access within critical root zones of trees to remain.
 - iii. Not required over existing pavement or concrete that will remain undisturbed.
- F. Trunk Trunk & Limb Protection Wrap: Wrap trunks and root flare in doubled-sided geocomposite geonet core with non-woven covering (such as Tenax Tendrain 770/2), ¼" or greater closed-cell foam pads with 2x4 planks and strap binding planks, or approved equal. Secure wrap with wire or rope. Install tree protection sign on each tree that receives wrap protection. See plans for locations.

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- G. Permanent Root Aeration Matting (Stage One & Stage Two): Triax TX130S Geogrid or approved equal. The purpose of this RAM geocomposite matting is to distribute compressive loads, resist compaction of soil CBR, provide atmospheric air / gas exchange to top soil and roots, to maximize airflow throughout the core for buried Critical Root Zones of protected trees. This prevents suffocation of roots under grade fills and pavement sections such as parking lots and driveways. See plans for locations.
 - H. Root Pruning: Action indicated on Drawings to provide a more suitable cut for protected tree roots prior to excavations or grading with standard construction equipment. Removal of roots is always a cause for concern by arborists, however proper root pruning will minimize ripped or torn roots during excavations and grading with standard construction equipment. Various methods may be used as specified. See plans for locations.
 - I. Super-Sonic Air Tool Excavation: Hand held tool designed to focus highly compressed air (90-125 psi) provided from a large air compressor (185-375 cfm) at speeds close to 1400 mph at the tip of the tool. Widely used by arboricultural firms and consultants for multiple purposes including but not limited to: root collar investigation, CRZ investigation, root pruning for large roots, or where existing underground cables or conduits are located (existing underground cables or conduits are located), vertical or radial mulching and restoration of compacted soils, excavation for utilities within protected CRZs to minimize root damage from construction. See plans for locations.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to the construction activities, the Contractor and Certified Arborist shall meet on-site with the Project Officer and Urban Forester to review the exact location of Tree Protection Areas and the protective measures required.
- B. Temporary Tree Protection Fencing: Install temporary tree protection fencing and signs around tree protection zones to protect indicated trees and vegetation from construction damage. Maintain Tree Protection fence and remove when construction is complete and after approval by Project Officer as authorized by the County Urban Forester.
- C. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- D. No personnel, vehicles, equipment, construction materials, or construction debris shall be allowed inside the tree protection areas at any time during demolition and construction without the written consent of the Project Officer and as authorized by the Urban Forester. If a violation is observed, the Contractor shall be notified by the Project Officer and shall immediately rectify the situation. Continued and subsequent violations shall result in a fine of \$500 per day of violation.
- E. Special Demolition Procedures:

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1. Demolition of walks and hardscape within tree protection areas shall be directly supervised by an ISA certified arborist.
 2. Mechanized equipment shall not enter tree protection areas (TPAs) or reforestation areas.
 3. Backfill of voids created by demolition within the TPAs and reforestation areas shall be loosely placed approved topsoil (refer to Section 329100, Plant Preparation). Only the amount of topsoil necessary to fill the void without spreading over existing grades shall be allowed.

3.2 EXCAVATION

- A. Install shoring or other protective support systems to minimize sloping or benching of excavations as approved by the Project Officer and authorized by County Urban Forester.
- B. Do not excavate within Tree Protection Areas, unless otherwise indicated.
- C. Where utility trenches are required within Tree Protection Areas, Contractor shall perform root pruning in accordance with Section 3.3 of this Specification prior to the utility trenching, unless otherwise directed by the Project Officer as authorized by the County Urban Forester.
- D. Where excavation is proposed within the critical root zone of protected trees, the Contractor shall perform root pruning in accordance with Section 3.3 of this Specification and as indicated in approved plans prior to excavation, unless otherwise directed by the Project Officer as authorized by the County Urban Forester.
- E. Where new finish grade is indicated below existing grade around trees, Contractor shall slope grade outside of tree protection zones. Maintain existing grades within tree protection zones.

3.3 ROOT PRUNING:

- A. When required, root pruning locations shall be indicated on the approved plans. Exact location and depth shall be confirmed on site with Project Officer and Urban Forester during the pre-construction meeting.
- B. Root pruning shall take place on the tree side of the tree protection fence.
- C. Root Pruning shall be done with a trencher or vibratory plow to a depth of 12 inches. A root pruning trench shall be no more than 6 inches wide.
- D. If excavation is for the installation of underground utilities, leave the root intact and thread the lines underneath. Refer to Arlington County Department of Parks & Recreation Design Standards Detail, 'Root Protection in Utility Trench'.
- E. Roots over 1.5" in diameter shall have a clean cut made by a clean saw on the surface of the root, which is still attached to the tree. Do not break or chop.
- F. Do not paint the cut root end.

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- G. Backfill the root pruning trench with approved loose topsoil (per Specification 329100) and top with 3-4" bark mulch and mark location for future reference.
 - H. Do not unnecessarily cut tree roots extending into grading limits. When roots are exposed by the work, cut them back cleanly with sharp hand pruning shears, lopping shears or hand saws, and backfill with approved topsoil immediately. Backfill around tree roots immediately after completion of construction in vicinity of the trees. Backfill around trees and roots shall be compacted to no more than 80% unless otherwise directed by the Project Officer.
 - I. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities, unless authorized by Urban Forester. Cut roots with clean, sharp pruning instruments; do not break or chop, following ANSI A300 standards. All root pruning shall be performed by an ISA certified arborist. Refer to Arlington County Department of Parks & Recreation, Design Standards Detail, Root Pruning', as shown on plans and available online at: <http://parks.arlingtonva.us/design-standards/>

3.4 TREE REPAIR AND REPLACEMENT

- A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots as approved by Project Officer and per directions and authorization of Arlington County Urban Forester or contract arborist's written instructions.
- B. The Contractor shall be responsible for any damage to trees within the Tree Protection Area caused by the Contractor's personnel, vehicles, or equipment at the site. Any damage to a tree to remain shall result in a payment by the Contractor to the Project Officer for the amount of damage based on the latest edition of the Council of Tree and Landscape Appraisers Guide for Plant Appraisal published by the International Society of Arboriculture (ISA). All trees are to be valued as landscape trees.

3.5 DISPOSAL OF WASTE MATERIALS

- A. Burning is not permitted.
- B. Disposal: Remove excess excavated material and displaced trees from Owner's property and legally dispose.

PART 4 - MEASUREMENT

- 4.1 The measurement of TREE PROTECTION FENCE shall be for LINEAR FOOT of fence including all appurtenances as delivered to the site, furnished, installed, maintained and removed at project completion in accordance with the plans and specifications and shall include the cost of all labor, materials, equipment and incidental expenses necessary to complete the work, including typical signage.
- 4.2 The measurement of ROOT PRUNING shall be for LINEAR FOOT of root pruning performed on the project in accordance with the plans and specifications and shall include the cost of all labor, materials, equipment and incidental expenses necessary to complete the work.
- 4.3 The measurement of ROOT AERATION MATTING/GEOGRID shall be for SQUARE FOOT of matting as delivered to the site, furnished, installed, maintained and removed at project completion in accordance with the plans and specifications and shall include the cost of all labor, materials, equipment and incidental expenses necessary to complete the work including anchor/landscaping nails, in accordance with the approved plans and specifications. Unless otherwise specified on the approved plan, excavation for ROOT Protection Matting installation is considered incidental to the work and shall not be paid separately.
- 4.4 The measurement of MULCH to be paid for under this item shall be the number of CUBIC YARD to be furnished and installed at individual trees in accordance with the approved plans and specifications and shall include the cost of all labor, materials, equipment and incidental expenses necessary to complete the work.
- 4.5 The measurement of THIRD PARTY ARBORIST to be paid for under this item shall be the number of LUMP SUM to be furnished and installed at individual trees in accordance with the approved plans and specifications and shall include the cost of all labor, materials, equipment and incidental expenses necessary to complete the work.
- 4.6 The measurement of SUPER SONIC AIR TOOL EXCAVATION to be paid for under this item shall be the number of LINEAR FEET to be furnished and installed at individual trees in accordance with the approved plans and specifications and shall include the cost of all labor, materials, equipment and incidental expenses necessary to complete the work.

Does not include excavation.

END OF SECTION 311300

SECTION 312000 EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide all labor, material and equipment to perform all work pertaining to earthwork as called for on the approved plans and as specified herein.

1.02 RELATED DOCUMENTS

- A. Construction Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Virginia Erosion and Sedimentation Control Handbook, Latest Edition
- C. Underground Utility Protection Ordinance – Chapter 55 Arlington County Code
- D. Local Governing Authority and Code Requirements – Chapter 57 Arlington County Code
- E. Arlington County DES Construction Standards and Specifications
- F. Virginia Department of Transportation Road and Bridge Specifications
- G. Tree Protection Standards and Specifications – as indicated in Construction Drawings

1.03 SUMMARY

- A. This Section includes, but is not limited to, the following:
 - 1. Excavation for footings, steps, subgrades for slabs-on-grade, walks, pavements, lawns and grasses.
 - 2. Subsurface drainage backfill for trenches.
 - 3. Excavating and backfilling for utility trenches (vault, water hydrant and water pump).

- B. Related Sections include the following:

- 1. 311000 – Site Clearing, Demolition and Removals
- 2. 033000 – Cast in Place Concrete
- 3. 321216 – Asphalt Pavement
- 4. 321313 – Concrete Pavement
- 5. 321315 – Asphalt Court Pavement
- 6. 321316 – Asphalt Court Surfacing
- 7. 329200 – Turf
- 8. 329300 – Exterior Plants
- 9. 329600 - Transplanting

1.05 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course 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: Course 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 Project Officer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Project Officer. Unauthorized excavation, as well as remedial work directed by Project Officer, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
 - 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- I. 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.

- J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.06 SUBMITTALS

- A. Product Data: For the following:
 - 1. Geotextile.
 - 2. Controlled low-strength material, including design mixture.
 - 3. Geofoam.
- B. Samples: 12-by-12-inch Sample of subdrainage geotextile.
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.
- D. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.07 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Coordination, Field Engineering, Cutting and Patching, and Regulatory Requirements."

1.08 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Project Officer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Project Officer's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.

- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.
- C. Protect all existing pipes, poles, wires, fences, trees, and landscape plant materials, and other structures that are to remain in place. In case of damage, notify the appropriate agency to affect repair in a manner resulting in a condition at least equal to the condition prior to damage.
- D. Excavations near existing structures shall not be closer than the distance from finished grade to the bottom of the foundation without sheeting and shoring to protect the existing structure.
- E. On paved surfaces, do not use or operate tractors, bulldozers, or other power-operated equipment, the treads or wheels of which are so shaped as to cut or otherwise damage such surfaces. Placing mats or using other methods of protection may be allowed subject to the approval of the Project Officer. Promptly restore all surfaces that have been damaged to a condition at least equal to that in which they were found immediately prior to the beginning of operations. Suitable materials and methods shall be used for such restoration.
- F. The Contractor shall be solely responsible for the stability of excavations and meeting of all State and Federal OSHA requirements. Provide all sheathing, lagging, bracing, and other support required to retain the stability of excavations.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups CL, ML, SC, GC, GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 4 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups 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.
- D. Subbase Material: Naturally or crushed stone, slag, and natural or crushed sand: with or without soil motor.
- E. Base Course: designated as Type I or Type II as follows: Type I shall consist of crushed stone, crushed slag, or crushed gravel with or without soil mortar or other admixtures. Crushed gravel shall consist of particles of which at least 90 percent by weight of the material retained on the No. 10 sieve shall have at least one face fractured by artificial crushing. Type II shall consist of gravel, stone or slag screenings; fine aggregate and crushed coarse aggregate; sand-clay-soil mortar or other admixtures.

- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Crushed stone Virginia Department of Transportation (VDOT) size 57, 68, or 78 in accordance with VDOT specification section 203 Table II-5
- 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 0 to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.02 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
 - 4. Tear Strength: 56 lbf; ASTM D 4533.
 - 5. Puncture Strength: 56 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: Equal to or smaller than 0.300mm.
 - 7. Permittivity: 0.8 second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
 - 4. Tear Strength: 90 lbf; ASTM D 4533.
 - 5. Puncture Strength: 90 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.03 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.
- B. 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 as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface as specified in section 311000 Site Clearing, Demolition, and Removals.
- C. Protect and maintain erosion and sedimentation controls, which are specified in section 312500 Temporary Erosion and Sediment Control, during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.02 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.03 EXPLOSIVES

- A. Explosives: Use of explosives is prohibited.

3.04 EXCAVATION, GENERAL

- A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by the Geotech. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.05 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. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.06 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.07 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.
 1. Clearance: As indicated on details.
- C. Trench Bottoms: Excavate trenches deeper than bottom of pipe elevation to allow for bedding course.
 1. Width and Depth: As indicated on details.

3.08 SUBGRADE INSPECTION

- A. Notify Project Officer when excavations have reached required subgrade.
- B. If Project Officer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and 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 Project Officer, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Project Officer, without additional compensation.

3.09 UNAUTHORIZED EXCAVATION

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

3.10 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 tree protection areas and drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section "Cast-in-Place Concrete."
- D. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation.

- F. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 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. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- B. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 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.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 6 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 structures, building slabs, steps, and 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 90 percent.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
 - 4. For utility trenches, compact each layer of final backfill soil material at 95 percent.

3.16 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.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBSURFACE DRAINAGE

- A. Subdrainage Pipe: Specified in Section 334000, "Storm Drainage."
- B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 - 1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.
- C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with 1 layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 - 1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.
 - 2. Place and compact impervious fill over drainage backfill in 6-inch- thick compacted layers to final subgrade.

3.18 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
 - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase and base course to required crown elevations and cross-slope grades.
4. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
5. Place subbase 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.
- 6.. Compact subbase 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.

3.19 DRAINAGE COURSE

- 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. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place drainage course 6 inches or less in compacted thickness in a single layer.
 3. 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.
 4. 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.

3.20 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing for site work. The Project Officer may engage a qualified independent geotechnical engineering testing agency to perform testing for critical structures and building foundations.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. 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 Project Officer.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 5,000 sf or less of building slab, but in no case fewer than 3 tests for building slabs and at least 1 test every 500 linear feet of paved roadway, but in no case fewer than 2 tests for pavements.

2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
 3. Trench Backfill: At each compacted bedding and final backfill layer, at least 1 test for each 300' or less of trench length, but no fewer than 2 tests.
- E. 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 to depth required; recompact and retest until specified compaction is obtained.

3.21 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.
 1. Scarify or remove and replace soil material to depth as directed by Project Officer; reshape and recompact.
- 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.

3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

PART 4 – MEASUREMENT (not used)

END OF SECTION 312000

SECTION 312500 - TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes temporary measures throughout the life of the project to control erosion and siltation.
- B. Such measures shall include, but are not limited to:
 - 1. Stabilized Construction Entrance
 - 2. Super Silt Fence
 - 3. Inlet Protection
- C. Temporary erosion and siltation control measures as described herein, shall be applied to erodible material exposed by any activity associated with construction, consistent with state and local control standards.
- D. Related Sections:
 - 1. 310000 Earthwork
 - 2. 311000 Site Clearing, Preparation, Demolition and Removals
 - 3. 311300 Tree Protection and Root Pruning
 - 4. 329100 Planting Preparation
 - 5. 329200 Turf and Grasses

1.02 GENERAL REQUIREMENTS

- A. The Contractor is responsible for providing and maintaining facilities adequate to control erosion and sedimentation. The Project Officer reserves the right to order the performance of other temporary measures not specifically described herein to correct an adverse erosion or siltation condition.

1.03 APPLICABLE SPECIFICATIONS

- A. The following specifications are hereby incorporated into this specification section by reference.
 - 6. Arlington County Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code).
 - 7. Virginia Soil and Water Conservation Commission Erosion and Sediment Control Handbook.
 - 8. Virginia Department of Conservation and Recreation Stream Restoration & Stabilization Best Management Practices Guide.

PART 2 - PRODUCTS

TEMPORARY EROSION AND SEDIMENT CONTROL

2.01 MATERIALS

- A. Materials shall be at the Contractor's Option, in accordance with the Removals Plan and all applicable standards listed above.

PART 3 - EXECUTION

3.01 TIMING OF INSTALLATION

- A. No grading operations will be allowed until temporary erosion and sediment control measures have been installed in accordance with the Erosion and Sediment Control Plan and all applicable standards listed above.

3.02 MINIMIZE EXPOSED SOIL

- A. The Contractor shall limit the surface area of earth material exposed by grubbing and stripping of topsoil and excavation to that which is necessary to perform the next operation within a given area.
- B. Unless specifically authorized by the Project Officer, the grubbing of root mat and stumps shall be confined to the area over which excavation is to be actively executed within 30 days following the grubbing operations.
- C. The stripping of topsoil shall be confined to the area over which excavation is to be actively executed within 15 days following the stripping operations.
- D. Excavation and embankment construction shall be confined to the minimum area necessary to accommodate the Contractor's equipment and work force engaged in the earth moving work.
- E. No disturbed area, including stockpiles, is to remain denuded longer than 30 days without temporary seeding or otherwise stabilizing the area.

3.03 CLEANING AND MAINTENANCE

- A. Control measures shall be periodically cleaned of silt and maintained. Immediately after every rainstorm, all control measures shall be inspected and any deficiencies corrected by the Contractor.

PART 4 - MEASUREMENT

4.01 The measurement for CONSTRUCTION ENTRANCE to be paid for under this item shall be the number of LUMP SUM type furnished and installed in accordance with the plans, specifications and shall include the cost of all labor, materials, and incidental expenses necessary to complete the work, including, hardware, in accordance with the plans and specifications, to the satisfaction of the Project Officer.

4.02 The measurement of SILT FENCE AND SUPER SILT FENCE to be paid for under this item shall be the number of LINEAR FEET type furnished and installed in accordance with the plans, specifications and shall include the cost of all labor, materials, and incidental expenses necessary to

TEMPORARY EROSION AND SEDIMENT CONTROL

complete the work, including, hardware, in accordance with the plans and specifications, to the satisfaction of the Project Officer.

4.03 The measurement of INLET PROTECTION to be paid for under this item shall be the number of EACH type furnished and installed in accordance with the plans, specifications and shall include the cost of all labor, materials, and incidental expenses necessary to complete the work, including, hardware, in accordance with the plans and specifications, to the satisfaction of the Project Officer.

Does not include excavation.

END OF SECTION 312500

SECTION 321216 – ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes hot-mix asphalt paving.

1.2 REFERENCES

- A. Virginia Department of Transportation Construction Standards and Specifications (VDOT)

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Material certificates.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.
- B. Regulatory Requirements: Comply with the Arlington County DPW Construction Standards and Specifications for asphalt paving work.
- C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp 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. Subbase: VDOT 208, gradation 21-A.

2.2 ASPHALT MATERIALS

- A. Base Course: Bituminous concrete consisting of coarse and fine aggregate combined with asphalt cement, resulting in a mixture of type BM-2 in conformance with VDOT 211.
- B. Tack Coat: Asphalt cement of viscosity grade CMS-2 or CRS-2 in conformance with VDOT 310.
- C. Surface Course: Bituminous concrete consisting of crushed stone, crushed slag, or crushed gravel in fine aggregate, slag or stone screenings, or combination thereof, combined with asphalt cement, resulting in a mixture of type SM-2A in conformance with VDOT 211.

2.3 AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

PART 3 - EXECUTION

3.1 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd..
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.

3.2 SURFACE PREPARATION

- A. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

- B. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
 - 1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.
- C. 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.

3.3 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to 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 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.
- B. Place paving in a strip of the full width of the walkway being constructed, or in strips of not less than 10 feet for larger areas.
- 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.

3.4 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 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, but not less than 90 percent nor greater than 96 percent.

- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- F. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 INSTALLATION TOLERANCES

- A. 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. 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. Cross Slope: Ensure cross slope of 1.5% perpendicular to the direction of travel, in the direction of site drainage.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: If deemed necessary by the Project Officer, Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.7 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

PART 4 - MEASUREMENT

- 4.1 The measurement of ASPHALT to be paid for shall be the number of TONS of asphalt pavement constructed in accordance with the plans, specifications and shall include the cost of furnishing all labor, materials, equipment and incidental expenses necessary to complete the work, including expansion material, sealant, curing compound, aggregate subbase, all in accordance with the plans, specifications and approval of the Project Officer. Does not include excavation.

END OF SECTION 321216

SECTION 329100 - PLANTING PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes erosion control materials, soil amendments, mulching and topsoil.
- B. Provide all labor, materials, tools and equipment as required to have topsoil, planting soil mix, soil stabilization, amendments, and mulch applied per the specifications on all areas disturbed by construction to receive plant materials as indicated in the approved plans.
- C. Related Sections:
 - 1. Section 311000 Site Clearing, Demolition and Removals
 - 2. Section 311300 Tree Protection and Root Pruning
 - 3. Section 312000 Earthwork
 - 4. Section 312500 Temporary Erosion and Sediment Control
 - 5. Section 329200 Turf and Grasses
 - 6. Section 329300 Exterior Plants
- D. In addition to the specifications contained herein, Work shall be performed in accordance with the:
 - 1. Drawings and general provisions of the contract, including general and supplementary conditions
 - 2. Arlington County Department of Parks & Recreation Design Standards as shown on the plans and available online at:
<http://parks.arlingtonva.us/design-standards/>

1.02 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Imported Topsoil: Soil obtained off-site that meets the specifications herein for topsoil and is suitable for use in planting soil/backfill soil mixture when existing soil quantities are insufficient.
- C. Planting Soil/Backfill Soil Mixture: Existing soil modified as specified to be suitable for planting.
- D. Bioretention Media: Soil mixture imported from off-site that meets stormwater management specifications (see plans) for stormwater management facilities.
- E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- F. ISA: International Society of Arboriculture
- G. CBAY: Chesapeake Bay, typically referring to CBAY watershed.

- H. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester
- I. Landscape Architect: Refers to an Arlington County Landscape Architect or their designee.

1.03 SUBMITTALS

- A. Samples of all materials specified shall be submitted to the Project Officer for approval with coordination of the Landscape Architect. All approvals shall be in writing.
- B. Samples:
 - 1. Existing Topsoil: Provide 1-pound sample of existing topsoil with the following soil test reports.
 - a. Fertility: pH, nitrate nitrogen, ammonia nitrogen, phosphate phosphorous, potassium, calcium, magnesium, zinc, iron, manganese.
 - b. Suitability: total salinity, boron, sodium, potassium, calcium, magnesium, chloride, sulfate.
 - c. Physical properties including organic content and particle size distribution.
 - 2. Imported Topsoil: If imported topsoil is required, Contractor shall provide a 1-pound sample of the imported topsoil with the soil test reports as noted above for "Existing Topsoil."
 - 3. Imported Topsoil for Bioretention Areas: If bioretention areas are indicated in the approved plans, the Contractor shall submit soil sample per specifications.
 - 4. Bioretention Basin and Planter Box: See Plans for specifications.
 - 5. Mulches and Organic Matter/Compost: Sample of mulch and organic matter/compost may be requested in lieu of inspection.
 - 6. Product certificates: Contractor shall submit for each type of manufactured product, to be approved by the Project Officer in coordination with Landscape Architect or Urban Forester and complying with the following:
 - 7. Manufacturer's certified analysis for standard products.
- E. Geotextile/Soil Stabilization/Erosion Control Fabric: Sample

1.04 QUALITY ASSURANCE

- A. Contractor shall have all existing and furnished topsoil to be used for seeding and sodding, and for planting areas tested by a state laboratory or recognized commercial soil-testing laboratory in order to determine recommendations for the types and quantities of soil amendments. The results of this test will determine the rates and types of fertilizers, lime, soil conditioners, and other amendments, if necessary.
 - 1. Soil tests shall use a representative sample of on-site soils. If existing soil has been undisturbed and is suitable as determined by the soil test, no additional amendments are required.
 - 2. Adjustments should be made based on soil test results.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall conform to those stipulated below, unless otherwise approved in writing by the Project Officer with confirmation by the Landscape Architect or County Urban Forester.
- B. Specified materials to be applied in amounts and methods herein stipulated.
- C. Delivery tickets indicating date, weight, analysis and vendor's name, to be submitted to Project Officer.

2.02 SOIL AMENDMENTS

- A. Lime: Application rates for liming materials and lime material type chosen shall be determined by required soil tests and approved by the Project Officer in coordination with the Landscape Architect or Urban Forester.
 - 1. When required and unless test results indicate otherwise, lime material shall be dry and free flowing pulverized limestone, hydrate lime or burnt lime that contains at least 50% total oxides (calcium oxide plus magnesium oxide). Ground limestone shall be ground to such fineness that at a minimum of 50% will pass through a 100-mesh sieve and 98% - 100% will pass through a 20-mesh sieve. Lime material shall meet the Virginia Agricultural Liming Materials Act, Code of Virginia Section 3.1-126.1.
 - 2. Fertilizer: Fertilizer type and application rate shall be determined by results of required soil tests and approved by the Project Officer in coordination with the Landscape Architect or Urban Forester:
 - a. When required and unless test results indicate otherwise, commercial-grade complete fertilizer will be 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:
 - i. Composition: 10 percent nitrogen, 20 percent phosphorous, and 10 percent potassium, by weight.
 - b. All fertilizers shall be uniform in composition, free flowing, and suitable for application with approved equipment.
 - c. Fertilizers shall be delivered to the Project Site fully labeled according to applicable state fertilizer laws and shall bear the name, trade name, or trademark and warranty of the product.
 - 3. Delay mixing fertilizer with planting soil if planting will not proceed within 2 days.

4. Spread fertilizer and lime with approved equipment.

2.03 EXISTING TOPSOIL

- A. Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation period and stockpiled.
 1. Contractor shall verify suitability of stockpiled soil to produce or to be amended to produce viable planting soil for lawns and planting beds as described herein.
- B. Existing topsoil is to be used to extent possible for lawn areas and is to be amended per the specifications to become the Planting Soil/Backfill Soil Mixture for use in planting pits and bed areas.
- C. Prior to use for lawn areas or in planting soil mix, Contractor shall remove all stones, roots, plants, sod, clods, and clay lumps larger than 1/2 –inch in any direction, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris and other extraneous materials that are harmful to plant growth.
- D. After removal of debris and extraneous materials noted above, the Contractor shall obtain soil tests for the existing soil per the requirements in section 1.04 “Quality Assurance.”
- E. Contractor shall submit soil test results to the Project Officer for approval with confirmation by the Landscape Architect or Urban Forester.
- F. Contractor shall supplement the existing soil as recommended in soil test results to achieve a viable planting soil for lawns and/or planting beds. Contractor shall supplement with imported topsoil per the specifications from off-site sources when quantities of approved, existing topsoil are insufficient for lawns and planting beds.
- G. Contractor shall submit a sample of the topsoil that has been amended based on soil test results for approval by the Project Officer with confirmation by Landscape Architect or Urban Forester prior to use in lawn areas or planting beds or pits.
- H. Topsoil installed on grade shall attempt to match existing soil texture, except for situations where clay subsoil exists. In the event that clay subsoil exists, use loam or silt loam topsoil.
- I. Imported topsoil rather than existing topsoil is to be used for planting in bioretention areas, unless otherwise indicated on the approved plans.

2.04 PLANTING SOIL MIX/BACKFILL SOIL MIXTURE

- A. The planting soil mix (also known as backfill soil mixture) shall consist of existing topsoil that has been approved for planting per the specifications above and approved organic matter.
- B. The planting soil mix/backfill soil mixture shall be composed of $\frac{3}{4}$ approved existing topsoil and $\frac{1}{4}$ approved organic matter as described in the Arlington County DPR Standard planting details, unless otherwise indicated by the Project Officer with confirmation by the Landscape Architect and Urban Forester.

2.05 IMPORTED TOPSOIL

- A. Contractor shall add imported topsoil when required on the drawings, when quantity of existing topsoil is insufficient or when determined to be necessary due to soil testing results.
- B. Topsoil shall be the natural, original surface soil, a sandy loam uniform in composition and shall be in a friable condition and shall contain less than 3 percent subsoil, hardpan material, stones and clods larger than 1/2 inch in diameter in any direction. It shall also be free of sticks, tree or shrub roots, debris and other material undesirable for plant growth. The area and the topsoil shall be free of undesirable plant such as, but not limited to, Bermuda grass, nut sedge, mugwort or noxious weeds as set forth in the Federal Seed Act.
- C. The topsoil shall contain at least 5 percent organic matter. It shall be a sandy loam consisting of at least 5 but not more than 20% clay, at least 10 but not more than 80% sand. It shall have a pH between 5.5 to 6.5. Soluble salts (salinity) shall not exceed 500 ppm. Soil fertility shall be "High" in natural nutrients based on the coordinated ratings in pounds per acre as established by the National Soil and Fertilizer Research Committee.
- D. Topsoil which has been manufactured by blending materials which individually do not meet the requirements of this specification will not be accepted even though the resulting blend meets the organic matter, mechanical analysis, pH and soluble salts requirements. Agricultural limestone at not more than 5 pounds per cubic yard of topsoil any be used to adjust the pH provided it is well mixed in a manner which does not destroy the structure of the soil.

2.06 IMPORTED TOPSOIL FOR BIO-RETENTION AREAS

- A. Soil for bioretention areas shall comply with the Filter Media and Surface Cover section of the Virginia Department of Environmental Quality's (DEQ) Design Specification No. 9 for Bioretention, Version 2.0, January 1, 2013.
- B. Placement of the planting soil in the bioretention area should be in lifts of 12 to 18 inches and lightly compacted. Minimal compaction effort can be applied to the soil by tamping with a bucket from a dozer or backhoe.

2.07 MULCHES AND ORGANIC MATTER

- A. Straw Mulch for Seeded Areas: Provide air-dry, clean, mildew and seed-free, salt hay or threshed straw of wheat, rye, oats or barley.
- B. Wood Chip Bark Mulch for Planted Areas: Wood Chip Bark Mulch shall be double-shredded hardwood bark mulch, uniform in size and free of stones, clods, non-organic debris or other foreign material and aged for at least 6 months from an approved source. Insufficiently or improperly aged mulch containing high bacterial counts or high levels of bark or other materials resistant to decomposition shall not be used. Mulch shall not contain the trunk of trees.
- C. Organic Matter/Compost Mulch: Well-composted, trash-free, stable, and weed-free organic matter such as composted bark, leaf mold or other plant debris material that has been composted to a point of decay and is mature.

1. pH range of 5.5 to 8; moisture content 35 to 55 percent by weight
2. 100 percent passing through 1-inch sieve
3. Peat moss shall not be used.
4. Organic amendments shall be commercially prepared and shall comply with the U.S. Compost Council Seal of Testing Assurance Program's Test Methods for the Examination of Composting and Compost (STA/TMECC) criteria, or as modified in approved plan documents.

2.08 SOIL STABILIZATION/EROSION CONTROL FABRIC

- A. ECS-2B Double New Straw Biodegradable Rolled Erosion Control Product, or an approved equal shall be used in all planting beds.
 1. Shall meet Type 2.D specifications for ECTC and HFWA FP-03 Section 713.17
 2. Shall have two (2) layers of organic jute netting sewn together with biodegradable thread.
 3. Overlap sections 12" and secure with manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- C. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches.
- D. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped grades, of 3 inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.
 1. Products: Subject to compliance with requirements and plan documents, the products below, or an approved equivalent, be used:
 - a. Curlex Excelsior Erosion Control Mat; American Excelsior, or approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. All identified areas within the project limits shall have approved topsoil mix spread on them and be prepared for seeding and sodding by bringing ground surfaces to grades shown on the drawings. Planting pits and bed areas identified on the approved plans shall be prepared in accordance with the applicable DPR Landscape Standard details.
 1. No seeding shall be done on frozen ground or when the temperature is 32F or lower. Refer to specification 329200, "Seeding and Sodding." Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties, sidewalks and areas.

2. Rototilling shall not be performed within the critical root zone of trees to be preserved.
 3. The soil shall not be tilled or amended when the soil's moisture capacity is above field capacity or when the soil is frozen.
 4. Contractor shall identify utilities, existing irrigation and underground utilities. All areas on either side of the utility marking shall be amended by hand.
 5. Contractor shall verify that no foreign or deleterious material or liquid has been deposited in soil within a planting area.
 6. Contractor shall proceed with installation only after both unsatisfactory conditions have been corrected and rough grading has been completed and approved by the Project Officer in coordination with the Landscape Architect or Urban Forester.
 7. Contractor shall protect structures, utilities, sidewalks, pavements and other facilities, trees, shrubs and plantings from damage caused by planting operations.
 - a. Protect adjacent and adjoining areas from hydro-seeding and hydro-mulching overspray.
 - b. Protect grade stakes set by others until directed to move them.
 8. Surfaces shall conform to finish grade, free of water retaining depressions, soil friable, free of clay and of uniformly firm texture.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1/2 inch in any direction and sticks, roots, rubbish, and other extraneous matter including grass vegetation and turf and legally dispose of them off of Arlington County property. Do not mix into surface soil.
1. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix. Delay mixing amendments with soil if planting will not proceed within 2 days.
 2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
 3. Spread planting soil mix to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- C. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
1. Remove stones larger than 1/2 inch in any dimension and sticks, roots, trash, and other extraneous matter. Legally dispose them off of Arlington County property. Do not mix into surface soil

2. Loosen surface soil to a depth of at least 6 inches, apply soil amendments and fertilizers according to the planting soil mix proportion and mix thoroughly into the top 4 inches of soil.
- D. Finish Grading: Grade landscape areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Adjust for the thickness of sod, where applicable. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
 - E. If bioretention areas are specified in the approved plans, the Contractor shall construct these areas in accordance with the Virginia DEQ Stormwater Design Specification No. 9, Version 2.0, January 1, 2013.
 - F. Contractor shall avoid unnecessary compaction of the soil during grading.
 - G. Contractor shall ensure appropriate slopes of the swales, berms and final grades.
 - H. Immediately following each day's work, contractor shall clean all dirt, excess soil, debris and trash from the Project Site. Contractor shall protect and store additional soils in stockpiles protected from saturation, erosion, weed growth and contamination with plastic sheeting or tarps.
 - I. Amendments for seeding and sodding areas shall be applied after determining by soils test as follows:
 1. Lime as specified shall be spread uniformly over designated area. Rate depends on soil tests. Soil tests shall be made before lime application at 8 to 10 plugs per acre taken by the method prescribed the United States Department of Agriculture.
 2. Fertilizer shall be spread after the lime has been applied. Rate shall be as recommended per the soil tests.
 3. Fertilizer shall be spread with approved equipment and at an even rate over the area to be seeded or sodded.
 4. Work lime and fertilizer into top 4 inches of topsoil and grade to smooth surface ready for seeding.
 - J. Restore areas if eroded or otherwise disturbed after finish grading and before planting.
 - K. Prepared lawns and planting areas shall be inspected and approved by Project Officer in coordination with Landscape Architect prior to seeding, sodding or planting.
 - L. If the graded areas develop volunteer weed growth, the growth shall be eliminated at the expense of the Contractor.

- M. Refer to Sheet LS-01, Detail 1/LS-02 and Detail 2/LS-02 for additional information.

3.02 SOIL STABILIZATION MATERIALS

- A. Prepare planting area as specified.
- B. Moisten prepared planting area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- C. Install Soil Stabilization from top of slope, overlapping joints by 12 inches, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
- D. Plant shrubs, trees and perennials through Soil Stabilization fabric by carefully separating fabric layers to allow space for planting.
- E. Remove non-biodegradable stabilization materials after plant establishment.

PART 4 – MEASUREMENT

- A. Not used.

END OF SECTION 329100

SECTION 329200 – TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes sodding, seeding, mulching, and topsoil.

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For proposed erosion control fabric to be used, if required.
- C. Product certificates.
- D. Planting Schedule: Indicating anticipated planting dates.
- E. Samples of all materials shall be submitted to the Project Officer for approval with confirmation by the County Landscape Architect prior to delivery to Project Site.
- F. Contractor shall submit qualifications per section 1.4 “Quality Assurance” to Project Officer for approval.

1.4 QUALITY ASSURANCE

- A. Contractor Qualifications:
 - 1. Evidence of completion of at least three (3) projects of similar nature and scope to this project completed within the last five (5) years that have resulted in successful turf and meadow establishment.
 - 2. Contractor shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 3. Experience: Three to Five years’ experience in turf installation.

2.3 SEED (if used): State-certified seed of Kentucky 31 or Turf-Type Tall Fescue.

2.4 PLANTING MATERIALS

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 2 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.

B. Inorganic Soil Amendments:

1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

C. Organic Soil Amendments

1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.
2. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with pH range of 3.4 to 4.8.
3. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

D. Fertilizer:

1. 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:
 - a. Composition: 10 percent nitrogen, 20 percent phosphorous, and 10 percent potassium, by weight.

E. Mulches (for seeded areas):

1. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

2.5 PLANTING SOIL MIX

A. Planting Soil Mix: Mix topsoil with the following soil amendments and fertilizers in the following quantities:

1. Planting Soil Mix: Shall be 1/2 clean existing soil (no subsoil, clay, gravel, rocks, etc.), mixed with 1/4 approved topsoil, and 1/4 approved organic material.
2. Weight of Lime per 1000 Sq. Ft.: 90 lbs.
3. Weight of Commercial Fertilizer per 1000 Sq. Ft.: 23 lbs.

PART 3 - EXECUTION

3.1 LAWN PREPARATION

- A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
1. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 2. Spread planting soil mix to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- B. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
1. Remove existing grass, vegetation, turf, and/or mulch. Do not mix into surface soil.
 2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
- D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- E. Restore areas if eroded or otherwise disturbed after finish grading and before planting.
- 1.

3.2 SODDING

- A. Cultivated Grass Sod shall be certified and obtained from State Certified nurseries and have been grown on natural native mineral soils comparable to those afforded at the job site. Sod containing netting is not acceptable. Grower's name, together with substantiating information as to field location from which sod is to be cut and species, percent purity and mixture of grass sod to be applied shall be submitted for Landscape Architect's approval prior to delivery. Failure to obtain advance approval will constitute grounds for rejection of all sod delivered to the

site. Invoices for all sod to clearly state point of origin and have attached to them a facsimile of the Grower's Nursery Certificate issued by the U.S. Department of Agriculture or Certified Delivery Ticket per truck load. All grass sod shall meet the following basic requirements.

1. Sod shall be free of disease and soil borne insects.
2. Sod shall be free of clover, broadleaf weeds and noxious weeds. Sod considered free of such weeds if less than 2 such plants are found per 100 square feet of area.
3. Sod shall be of uniform color and density.
4. All cultivars must be on the current approved list of the Virginia Turfgrass Variety Recommendations and the sod shall be certified by the Virginia Sod Certification Program. Provide appropriate certifications at the time of installation.
5. Sod sample shall be submitted to and approved by Landscape Architect before cutting. Sod placed on the job shall conform to the approved sample or shall be removed and replaced at the Contractor's expense.
6. Sod shall have been mowed prior to stripping and shall have been maintained for a minimum of three months.
7. Sod shall be relatively free of thatch. Thatch build up that significantly detracts from the appearance of the sod may be sufficient cause for rejection.
8. Sod shall be machine stripped at a uniform soil thickness of approximately $\frac{3}{4}$ -inch. Measurement for thickness to exclude tip growth and thatch.
9. Individual pieces of sod shall be cut to supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be 5%. Broken pads, torn or uneven ends shall not be permitted.
10. Root development shall be such that standard size pieces will support their own weight and retain their size and shape when suspended vertically from a firm grasp on uppermost 10% of the area.
11. Under moderate moisture conditions, weight shall not exceed 7 pounds per square foot. Minimum weight shall not be less than 4 lbs. per square foot.
12. All areas within the project limits that are not shown for paving, sodding, or special treatment shall be sodded with the specified Bermuda or Cool Season sod mix approved by the Arlington County Landscape Architect.

3.3 PROTECTION

- A. Install post and rope barriers around seeded areas until otherwise instructed by Project Officer. Tie cloth or ribbon to rope at 10' intervals.
- B. Install "KEEP OFF LAWN" signs at appropriate locations.
- C. Remove non-biodegradable erosion control measures after plant establishment period.

3.4 MAINTENANCE

- A. Maintain surfaces and supply additional topsoil where necessary, including areas affected by erosion.
- B. Water to ensure uniform sod germination and to keep surface of soil damp:
 1. Each watering shall consist of 1 gallon per 3 sq. yd. of sod
 2. Apply water slowly so that surface of soil will not puddle and crust

- C. Cut lawn areas when grass reached height of 3". Maintain minimum height of 2.5". Do not cut more than 1/3 of blade at any one mowing.
- D. After first mowing of lawn, water grass sufficiently to moisten soil from 3" to 5" deep.
- E. Resod damaged grass areas showing root growth failure, deterioration, bare or thin spots and erosion.

3.5 SATISFACTORY LAWNS

- A. Satisfactory Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 95 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches.
- B. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

PART 4 - MEASUREMENT

- 4.1.1 The measurement of TURF to be paid for shall be the number of SQUARE FEET of Turf in accordance with the plans, specifications and to the satisfaction of the Project Officer and shall include the cost of furnishing all labor, materials, equipment and incidental expenses necessary to complete the work, all in accordance with the plans, specifications and approval of the Project Officer. Does not include excavation.

END OF SECTION 329200

SECTION 329300 - EXTERIOR PLANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ALL trees.
- B. Provide all labor, materials, tools and equipment as required to have plants, topsoil, amendments, and mulch applied on all areas called for on the approved plans.
- C. Related Sections:
 - 1. Section 310000 Earthwork
 - 2. Section 311000 Site Clearing, Preparation, Demolition and Removals
 - 3. Section 311300 Tree Protection and Root Pruning
 - 4. Section 329100 Planting Preparation
 - 5. Section 329200 Seeding and Sodding
- D. Applicable References
 - 1. ANSI A300 Tree Care Operations: Standard Practices for Tree, Shrub, and Other Woody Plant Maintenances
 - 2. American Standard for Nursery Stock (ANSI Z60.1) by the American Nursery & Landscape Association
- E. In addition to the specifications contained herein, Work shall be performed in accordance with the:
 - 1. Drawings and general provisions of the contract, including general and supplementary conditions
 - 2. Arlington County Department of Parks & Recreation Design Standards as shown on the plans and available online at: <http://parks.arlingtonva.us/design-standards/>

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Existing Topsoil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation period and stockpiled.
- C. Imported Topsoil: Soil obtained off-site that meets the specifications herein for topsoil and is suitable for use in planting soil/backfill soil mixture when existing soil quantities are insufficient. Refer to Section 329100 Planting Preparation.
- D. Planting Soil Mix/Backfill Soil Mixture: Existing soil modified as specified to be suitable for planting. Refer to Section 329100 Planting Preparation.

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- E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
 - F. ISA: International Society of Arboriculture
 - G. CBAY: Chesapeake Bay, typically referring to CBAY watershed.
 - H. ANSI: American National Standards Institute
 - I. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester
 - J. Landscape Architect: Refers to an Arlington County Landscape Architect or their designee.

1.3 SUBMITTALS

- A. All submittals specified in Section 329100 Planting Preparation shall be provided to Project Officer for approval as authorized by the Landscape Architect and the Urban Forester. All approvals shall be in writing.
- B. Product Certificates: Contractor shall submit for each type of manufactured product, to be approved by the Project Officer and complying with the following:
 - 1. Manufacturer's certified analysis for standard products
 - 2. Provide the provenance of the plant material. Provenance is the geographical origin of the seed or cutting used in propagation and can have a direct effect on plant vigor and survivability.
- C. Refer to Section 329100 Planting Preparation for soil test requirements.
- D. Contractor shall submit State Nursery inspection certificates to the Project Officer.
- E. Contractor shall submit to Project Officer for verification the Landscape Industry Certified Technician and Landscape Industry Certified Officer certificates for those responsible for plant installation.
- F. Planting Schedule: Contractor shall submit the planting schedule to the Project Officer for approval as authorized by the Landscape Architect and the Urban Forester. The plant schedule shall indicate anticipated planting dates for exterior plants. Contractor shall be responsible for furnishing and installing all plant material shown on the drawings and plant list, as submitted with the contract. Contractor shall have investigated the sources of supply and satisfied himself/herself that he/she can supply all of the plants specified on the drawings in the size, variety, quantity and quality noted before submitting the bid. Failure to take this precaution shall not relieve the successful bidder from the responsibility of furnishing and installing all the plant material in strict accordance with the contract documents.
- G. Substitutions:
 - 1. The Contractor shall submit a written request for a substitute plant a minimum of thirty (30) calendar days prior to planting date if specific plants shall not be available in time for the scheduled planting. Contractor shall submit the request to the Project Officer for approval as authorized by the Landscape Architect and the Urban Forester.

2. Contractor shall be responsible for documenting any plant suitability or availability problems.
 3. If a substitute plant is offered to the County, it shall be of the same size, value and quality as the plant originally specified on the plan. Substitution shall be approved by the Project Officer as authorized by the Landscape Architect and the Urban Forester. If the County does not accept the substitute plant, the Contractor shall provide the type and size of plant material specified on the plans, or a substitute requested by the Project Officer as authorized by the Landscape Architect and the Urban Forester.
- H. Plant Establishment Period Instructions: Contractor shall submit to the Project Officer recommended procedures for establishment of exterior plants during a calendar year. Submit before the beginning of the required establishment period.

1.4 QUALITY ASSURANCE

A. References and standards to be used:

1. ASTM: American Society of Testing Materials
2. USDA United States Department of Agriculture.
3. ANSI Z60.1 American Standard for Nursery Stock 2004 or more recent.
4. ANSI A300 Standard Practices for Tree, Shrub and other Woody Plant Maintenance.
5. Pruning practices shall conform with recommendations in *An Illustrated Guide to Pruning*, Second Edition, Edward F Gilman, Delmar Publishing, Albany, NY, 2000.

B. Installer Qualifications: The installer shall be a firm with at least 5 years of successful experience in work similar in material, design and extent to that indicated for this Project and with a record of successful landscape establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - a. Contractor shall designate a project crew leader who possesses one or more of the following certifications:
 - i. Certified by the Professional Landcare Network (PLANET) as a "Landscape Industry Certified Technician"
 - ii. Certified by the Professional Landcare Network (PLANET) as a "Landscape Industry Certified Officer"
 - b. The Contractor shall identify to the Project Officer at least one full-time on-site supervisor who is the Contractor's competent, qualified, and authorized person on the worksite and who is, by training or experience, familiar with the policies, regulations and standards applicable to the work being performed, and capable of sufficiently communicating with the Project Officer.
 - c. Crew leader and supervisor may be the same individual.

C. Installer Qualifications for Reforestation/Conserved Open Space Projects:

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1. ISA Certified Arborist shall be on the worksite during planting of reforested areas.
 2. Demonstrate experience in Reforestation/Afforestation and Stream-Bank Stabilization projects through:
 - a. Project portfolio detailing a minimum of three (3) successfully completed reforestation/afforestation/streambank restoration projects in the CBAY watershed area over the past three years.
- D. The County will, throughout the contract term, have the right of reasonable rejection and approval of staff or subcontractors assigned to the project by the Contractor. If the County reasonably rejects staff or subcontractors, the Contractor shall provide replacement staff or subcontractors satisfactory to the County in a timely manner and at no additional cost to the County. The day-to-day supervision and control of the Contractor's employees, and any employees of any of its subcontractors, shall be solely the responsibility of the Contractor.
- E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- F. The Contractor shall comply with all applicable requirements of the laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
- G. The contractor shall comply with all requirements for control of silt and sediment during plant installation work as indicated in the contract documents.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination" with landscape architect, general contractor, all subcontractors, and owner's representative attending. This conference can occur simultaneously with the "Soil Preparation" conference.
- 1.5 SELECTION, TAGGING, ORDERING AND ACCEPTANCE OF PLANT MATERIAL
- A. Plants shall be subject to selection, tagging and/or inspection and approval by Landscape Architect at place of growth and upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. Submit written request for inspection of plant material at place of growth to Landscape Architect. Written request shall state the place of growth and quantity of plants to be inspected. Landscape Architect reserves right to refuse inspection at this time if, in his judgment, a sufficient quantity of plants is not available for inspection.
1. Notify Landscape Architect of sources of planting materials a minimum 30 days in advance of delivery to site. If digging of ball and burlap stock is required prior to 30 days before

delivery to site notify Landscape Architect of plants sources to allow for sufficient time to plan and execute a tagging trip.

- B. Before trees are dug and during tagging activities a Contractor or nursery representative shall apply a one inch diameter white dot of landscape marking paint on the North side of all trees 12 inches above the top structural root. Maintain North orientation when planted at Project site.
- C. Substitutions of plant materials will not be permitted unless authorized in writing by Landscape Architect. If proof is submitted that any plant specified is not obtainable, a proposal will be considered for use of the nearest equivalent size or variety with corresponding adjustment of Contract price. These provisions shall not relieve Contractor of the responsibility of obtaining specified materials in advance if special growing conditions or other arrangements must be made in order to supply specified materials.
- D. Plant Acceptance: Landscape Architect will inspect all work for final completion upon written request of the Contractor. The request shall be received at least ten days before the anticipated date of inspection. Acceptance of plant material shall be for general conformance to specified size, character and quality and not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.
 - 1. The Contractor is responsible for the condition and quality of work and materials during construction and until Acceptance. Contractor shall bear the cost of replacing any and all plant material until this time.
 - 2. Remove rejected trees, shrubs or perennials immediately from Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials from damage or deterioration during delivery and while stored at the site. Adequately protect plants from drying out, whipping, exposure of roots to sun, wind, extremes of heat and cold temperatures or other handling or tying damage. Do not bend or bind trees or shrubs in such a manner that damages bark, breaks branches or destroys their natural shape.
- B. When weather conditions are such that exposure to sun, wind and/or extremes of heat or cold temperatures during transit may adversely affect health of plants, transport plant material to site in controlled environment trailer. Use carrier experienced in handling live plants.
- C. Provide protective covering over all vehicles during delivery of all plants.
- D. Do not prune prior to delivery unless approved in advance by Landscape Architect.
- E. If deciduous trees are moved when in full-leaf, spray with an approved anti-desiccant per manufacturer's recommendations at nursery no greater than 48 hours prior to digging, and again two weeks after transplanting. Spraying should take place in early morning hours with foliage at maximum turgidity. It is the responsibility of the contractor to decide if anti-desiccant shall be applied to the tree before delivery.
- F. Deliver trees and plants after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery:
 - 1. Set trees and plants in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.

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2. Mist plant tops regularly such that plant tops remain moist. Water root zones to maintain water levels in the root zone above wilt point but below soil saturation.
 3. The duration, method and location of storage of plant materials shall be subject to approval.
 4. Provide proper spacing for trees, such that the stockpiled plant material has full access to light and air. Take all precautions to prevent defoliation of stockpiled material.
 5. Do not deliver more plants to the site than there is space with adequate storage conditions to receive the plants. Provide a suitable remote staging area for plants and other supplies.
 6. Do not remove container-grown stock from containers until planting time. Prepare and plant container-grown stock immediately once removed from container.
- G. Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- H. Bulk Materials:
1. Do not dump or store bulk materials on existing turf 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.

1.7 PROJECT CONDITIONS

- A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned. Notification of Miss Utility, 1-800-257-7777 is required for all planting around utilities. The contractor is responsible for knowing the location and avoiding utilities that are not covered by Miss Utility.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting. Do not proceed with work until unsatisfactory conditions have been corrected.
- C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Final Completion.
1. Spring Planting: March 15 – June 15.
 2. Fall Planting: September 15 – December 15.
- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained.

1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. Watering does not include reforestation and protected open space.

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- B. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period:
1. Warranty Period for Trees and Shrubs: One year from date of Final Completion.
 2. Warranty Period for Groundcovers, Grasses and Perennials: One year from date of Final Completion.
- C. When the work is accepted in parts, the warranty periods shall extend from each of the partial acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of warranty, shall terminate at one time. An agreement by the owner that the overall project is at final completion, does not begin the plant warranty period if all plants have not been accepted.
- D. Plants shall be healthy, free of pests and disease, and in flourishing condition at the end of the warranty period. Plants shall be free of dead and dying branches and branch tips, and shall bear foliage of normal density, size, and color for the species.
- E. Plants that are dead, diseased, insect infested, or not in a vigorous, thriving condition, as determined by the Landscape Architect during or at the end of the warranty period, shall be deemed defective. Plants that have had more than 25% of their branches die or removed shall be replaced. Plants that have had a major branch or side of the plant removed such that current or future aesthetic appeal or structural integrity of the plant, as determined by the Landscape Architect, is diminished shall be considered defective. Plant material determined to be defective shall be replaced without cost to the Owner.
1. Remove defective or dead plants immediately. Replace as soon as weather conditions permit and within one of the specified planting periods.
- F. The Contractor is exempt from replacing plants, after Final and during the warranty period, that are removed by others, lost or damaged due to inappropriate use of project in any part, lost or damaged by a third party, vandalism, or any natural disaster.
- G. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.
- H. The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the extended warranty period, the Owner may elect one more replacement item or credit for each item.
- I. At the end of the warranty period, and no less than five days prior to final completion, all trees that have leaned shall be straightened
- 1.9 MAINTENANCE
- A. Contractor shall be responsible for maintaining plantings by pruning, cultivating, watering, weeding, fertilizing, resetting plants to proper elevations or vertical position, and performing other operations as required to establish healthy, viable plantings. Utilize an Integrated Pest Management (IPM) plan using organic methods to the greatest extent possible to keep plants free of harmful insects and disease. Begin maintenance immediately after plants are installed and

continue until plantings are acceptably healthy and well established but for not less than the following maintenance period.

B. Trees and Shrubs:

1. Maintenance Period: 12 months from date of Final Completion.

C. Perennials:

1. Maintenance Period: 12 months from date of Final Completion.

PART 2 - PRODUCTS

2.1 EXTERIOR PLANTS

- A. Contractor shall select plants only from nurseries that have been inspected by state or federal agencies and shall have been grown in USDA Plant Hardiness Zones 4, 5, 6, or 7, and in one of the following states: Maryland, Virginia, Delaware, New Jersey, North Carolina or Pennsylvania.
- B. Tree and Shrub Material: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions, and disfigurement.
1. Provide Balled and Burlapped, bare root or container-grown trees and shrubs, as indicated on the Drawings.
 2. Balled and Burlapped plants shall be dug with firm root balls of earth and free of noxious weeds. There shall be no extra soil on top of the root ball or around the trunk. Balled and Burlapped trees shall be securely held in place by untreated burlap and stout rope. Nylon rope is NOT acceptable. Loose, broken or manufactured balls are unacceptable.
 3. Ball sizes shall be in accordance with current ANSI standards.
 4. In size-grading B&B single stem trees, caliper shall take precedence over height. For multiple-trunk trees, height measurement shall take precedence over caliper.
 5. Trees over 1" in caliper shall have a strong central leader (free and clear of branches or splits in the trunk) from the top of the root ball to a height of at least 6'-6". Only minimal bends in the trunk shall be acceptable. Co-dominant stems and V-crotches shall be cause for rejection.
 6. The root system of container-grown plants shall be well developed and well distributed throughout the container.
 7. All container-grown trees and shrubs that have circling and matted roots shall be rejected.
 8. Perennials: Provide healthy, container grown plants with well-developed, fibrous root systems from a commercial nursery, of species, variety and size shown in the drawings. All container-grown plants shall be healthy, vigorous, well rooted and established in the container in which they are growing. A container-grown plant shall have a well-established root system reaching the sides of the container to maintain a firm root ball and shall not have excessive root growth outside the container.
- C. Bulbs: Provide top size bulbs as indicated on plan in accordance with most current version of ANSI Z60.1 specification.

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- D. Field grown trees and shrubs shall be grown in soils of the Piedmont region, or west of that region in the above approved states and zones.
 - E. All plant materials shall be labeled by grower to identify genus, species, and cultivar, if applicable, in accordance with Section 1.4 Quality Assurance above.
 - F. Bare root plant materials: Bare root plants shall be dug with adequate fibrous roots. Do not root prune. Roots shall be protected during handling and planting to guard against drying out and damage.
 - G. Deep plug plant materials: Deep plug plants shall not be dormant at the time of planting and shall display a healthy, vigorous root system and viable top growth, unless otherwise approved by the Project Officer, as authorized by the Landscape Architect and the Urban Forester. Deep plug plants shall have a minimum root volume of 10 in³ and a minimum rooting depth of four (4) inches.
 - H. Plant Materials for ecologically sensitive areas: Plant materials identified on planting plan as being located within an Arlington County Natural Resource Conservation Area (NCRA) shall be native species of local provenance.
 - I. Plant stock shall originate from a location within 150 miles of Arlington County.

2.2 OTHER MATERIALS

- A. Refer to Section 329200 Seeding and Sodding for specifications for seeding, specialty seeding, sodding, and soil stabilization/erosion control fabric.
- B. Refer to Section 329100 Planting Preparation for specifications for soils, mulch, soil amendments and other items related to planting preparation.

PART 3 - EXECUTION

3.1 EXTERIOR PLANTING

- A. Contractor shall install plant materials in accordance with the current Arlington County Standard Planting Details as published on the Arlington County website and as specified below.
- B. Refer to Section 329100 Planting Preparation for specifications on soil amendments.
- C. Bed Establishment:
 - 1. Planting beds shall be established in accordance with Specification 329100 Planting Preparation.
 - 2. Lawns, trees and shrubs shall be installed between 10/01 through 06/01. If a project completion is outside of this planting period, contact the Arlington County Urban Forester to obtain a deferral or approval for planting out of season.
- D. Landscape Plantings (Trees, Shrubs, Ground Covers, Bulbs, Grasses and Perennials)

1. Contractor shall install plantings in accordance with Arlington County DPR standard details available at <https://parks.arlingtonva.us/design-standards/>. Refer to plans for appropriate planting details.
 2. Handling: Prepare pit and/or planting bed per Section 329100 Planting Preparation. Place plant in pit by carrying by the root ball (not by branches or trunk) and plant per ANSI Standards. Make sure the plant remains plumb during the backfilling procedure.
- E. Tree and Shrub Pruning: Contractor shall conform to the most current version of ANSI A-300 Tree Pruning Standards. Do not cut tree leaders; remove only injured or dead branches from trees and shrubs, or those that pose a hazard to pedestrians. Make all cuts back to a lateral branch or bud. Cuts should be perpendicular above branch collar. Final pruning shall be done after the tree is in place. Do not prune into old wood on evergreens.
- F. Plant Protection: Contractor shall protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged exterior planting. Injured roots shall be pruned per most current ANSI 300 specifications.
1. Protect shrubs, groundcovers and perennials from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
 2. Contractor shall remove all tags, labels, strings and wire from the plants, unless otherwise directed.
 3. Contractor shall remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Arlington County property.
 4. Refer to Section 3.4 Water Requirements.

3.2 WORKMANSHIP

- A. Protect bark, branches, and root systems from sunscald, 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. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be handled from the bottom of the root ball only.
- B. All plants in transit shall be tarped or covered and shall be kept from drying out. Desiccation damage shall be cause for rejection. Plants damaged in handling or transportation may be rejected by the Project Officer as authorized by the Landscape Architect and the Urban Forester. Any tree or shrub found to have wounds over 12.5% of the circumference of any limb or trunk, or over 1 inch in any direction, whichever is smaller, shall be rejected.
- C. 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. Plants shall not remain unplanted for longer than a three-day period after delivery. Any plants not installed during this time period shall be rejected, unless Project Officer and contractor provide otherwise by written agreement. All plants kept on site for any period of time shall be secured, watered and cared for using ANSI A300 standards.

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- D. Plants shall be installed immediately following excavation of the hole. No holes shall remain open overnight. The Contractor shall cover and barricade any open holes to effectively prevent any danger of injury to pedestrians.
 - E. During delivery and installation, the landscape contractor shall perform in a professional manner, coordinating his/her activities so as not to interfere with the work of other trades, and leaving his/her work area(s) clean of litter and debris at the close of each workday.
 - F. During planting, all areas shall be kept neat and clean, and precautions shall be taken to avoid damage to existing plants, trees, turf and structures. Where existing trees are to be preserved, additional precautions shall be taken to avoid unnecessary accumulation of excavated materials, soil compaction, or root damage. The Contractor shall cover sidewalks or pavers with plywood, and cover turf with plywood, burlap or tarp during excavation.
 - G. Any damaged areas caused by the Contractor shall be restored to their original condition at no cost to the County. All debris and waste material, including small stones and clumps of clay or dirt exceeding 1” by 1” in any direction, resulting from planting operations shall be removed from the project, legally disposed, and the area cleaned up by the Contractor.
 - H. Plants with soil covering the root flare, if not removed by Contractor, shall be rejected by Project Officer as authorized by the Landscape Architect and the Urban Forester.
 - I. Contractor shall take full responsibility for any cost incurred due to damage of utilities by their operations.
 - J. The Contractor shall not be held responsible for uncommon concealed conditions such as concrete/asphalt/stone spoils encountered in excavation work which are not apparent at the time of bidding. Rocks, tree roots and hard clay are common elements of “urban” soils and shall frequently be encountered in the execution of the contract.
 - K. No plants shall be planted in locations where drainage may, in the opinion of the Contractor, be unacceptable. Such situations shall be brought to the attention of the Project Officer before work continues and, if approved by the Project Officer as authorized by the Landscape Architect and Urban Forester, the plants shall be relocated or the contract shall be modified to allow for drainage correction at a negotiated cost. Any such modification shall be in writing and signed by both parties.
 - L. The Contractor shall layout plants according to the project landscape plan. The Project Officer shall approve the layout as authorized by the Landscape Architect and Urban Forester prior to plant installation. Plants installed without layout approval from the Project Officer as authorized by Landscape Architect and Urban Forester are subject to removal and replanting by the Contractor at no additional cost to Arlington County.

3.3 WATER REQUIREMENTS

- A. Initial Waterings: The Contractor shall supply water for all plantings and shall water all plants at time of installation and 48 hours after installation, even if it is raining. Contractor shall then water plantings at least twice per week at amounts specified below until Final Acceptance of work unless specified otherwise in the contract documents.

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- B. Each watering shall consist of:
1. 20 gallons of water per individual tree, and
 2. 4 gallons of water per individual shrub or plant of 5 gal size, and
 3. 2 gallons per individual plant of 3 gallon size, and
 4. 2 gallons of water per square yard of perennial bed of smaller sized plants
 5. 1 gallon of water per 2 square yards of seed or sod

3.4 FINAL INSPECTION

- A. Contractor shall schedule the final inspection with the Project Officer as authorized by the Landscape Architect and the Urban Forester.
1. Contractor shall provide Project Officer with a minimum of 72 hours notification. to arrange final inspection meeting with the Landscape Architect and Urban Forester.
 2. Contractor shall conduct the final inspection of the landscape materials no less than three months after the installation of the plants or final completion of construction work, whichever comes last, and in the presence of the Project Officer, the Landscape Architect and Urban Forester.
 3. The landscaping inspection shall review all landscape work under the contract.
 4. All plants shall be alive and in good health at the time of final inspection.
 5. Any plant material that is 25% dead or more shall be considered dead and shall be replaced at no charge to the County. A tree shall be considered dead when the main leader has died back, or 25% of the crown is dead.
 6. It shall be the Contractor's responsibility to provide in writing the results of the final inspection. The Project Officer shall provide agreement with the written results prior to acceptance.
 7. The Contractor shall make replacements during the next planting period unless the County specifies an earlier date.
 8. Contractor is responsible for maintenance and watering of replacement material per Section 3.4 after planting and until the replacement plantings are finally accepted by Project Officer.
 9. A replacement plant shall be of the same size as the original plant with no additional soil additives to be used.
 10. The Contractor shall not be responsible for plants that have been damaged by vandalism, fire, removal or other activities beyond the control of the Contractor.

3.5 MAINTENANCE

- A. Trees, Shrubs, Perennials, Bulbs & Groundcovers: Contractor shall maintain plantings at his/her own expense until final acceptance of the plantings per Section 1.7.
- B. Maintenance shall include pruning, mulching, cultivating, watering, weeding, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. For natural areas, maintenance shall be limited to pruning, watering, resetting to proper grades or vertical position, and invasive plant control.
- C. Pruning: Remove all sucker growth, dead or broken branches at initial planting and as needed during the warranty period. Pruning shall conform to ANSI-300 Tree Pruning Standards.

- D. Fertilizing: No plants shall be fertilized without prior approval of Project Officer for approval as authorized by the Landscape Architect and the Urban Forester.
- E. Mulching: Contractor shall re-mulch areas to a depth of two to three inches prior to final acceptance if the time between planting and final acceptance extends beyond six months. Mulch shall be of the same quality as mulch provided at the time of planting. Keep mulch six inches away from trunks of trees and shrubs.
- F. Weeding: Contractor shall perform weeding until final acceptance to keep the planting area as free of weeds as possible. A minimum of one weeding per month from April through October is required if time between planting and final acceptance extends through any months of the growing season.
- G. Stakes and Guy Supports: If installed, Contractor shall monitor and adjust all stakes and guy supports until final acceptance.
- H. Invasive Plant Control: Contractor shall inspect the planting area monthly for invasive plants and control plants using manual methods as needed to maintain healthy and viable plantings. Use of chemical control methods may occur with the approval of the Project Officer for approval as authorized by the Landscape Architect and the Urban Forester.

PART 4 - MEASUREMENT

- 4.1 The measurement of TREE to be paid for under this item shall be the number of EACH type of furnished and installed plant in accordance with the approved plans and specifications shall include the cost of all labor, materials, and other expenses necessary to complete the work, including but not limited to required waterings (at time of planting and second watering for each plant 48 hours after installation), and maintenance and watering necessary to keep plants healthy until final acceptance as described herein, in accordance with the approved plans and specifications.

Does not include excavation.

END OF SECTION 329300

PREFABRICATED STEEL TRUSS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Virginia Department of Transportation Road and Bridge Specifications, 2020 (VDOT Specifications)

1.2 SUMMARY

- A. These specifications are for a fully engineered clear span steel truss bridge and shall be designed and manufactured by CONTECH Engineered Solutions at www.conteches.com or equivalent as approved by the Engineer. Truss shall be similar to the CONTECH Connector® Truss.

1.3 MEASUREMENT AND PAYMENT

- A. Prefabricated Steel Truss shall be paid for as a lump sum.

1.4 SUBMITTALS

- A. Shop drawings shall be submitted to the County for review and approval. Shop drawings shall be signed and sealed by a Professional Engineer licensed in the Commonwealth of Virginia.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. All structural members shall have a minimum thickness of material of at least 3/16".
- B. Type of steel:
 - 1. Members shall be fabricated from ASTM A242 or ASTM A588 steel for plates and structural shapes, and ASTM A606 or ASTM A847 for tubular sections.
 - 2. Minimum yield strength of steel members shall be greater than or equal to 50,000 psi.
 - 3. Steel shall be unpainted weathering steel.
- C. Bridge deck:
 - 1. Wood decking shall be No. 1 Grade Southern Yellow Pine.

2. Wood decking shall be treated to a minimum of 0.40 pounds of preservative per cubic foot of wood.
 3. Wood decking shall be designed for a pedestrian loading condition of 90 psf.
- D. Field splices shall be bolted with High Strength ASTM A325 bolts. Type 3 bolts shall be used for weathering steel bridges.
- E. Welding materials shall be in strict accordance with the American Welding Society (AWS). Structural welding code, D1.1. Filler metal as specified in 4.1 shall be used for the particular welding process required. Welders will be certified in accordance with AWS D1.1

PART 3 – EXECUTION

3.1 DIMENSIONS

- A. Dimensions shall be in accordance with the details shown in the plans.

3.2 DESIGN

- A. Open truss bridges shall be designed by a professional engineer experienced in pony truss bridge design for pedestrian use. Engineers shall be licensed in the Commonwealth of Virginia.
- B. In addition to self-weight and other dead loads, the bridges shall be designed for the following:
1. Pedestrian live load: A uniformly applied load of 90 psf, in accordance with the AASHTO Guide Specification for the Design of Pedestrian Bridges.
 2. Vehicle load: Bridge will also be designed to withstand a moving vehicle load which weighs 4000 pounds.
 3. Wind load: Bridge shall be designed for a minimum wind load of 35 pounds per square foot (approximately 120 mph). The wind should be calculated on the entire vertical surface of the bridge as if fully enclosed.
 4. Stream load: Bridge and anchorage shall be designed for a minimum stream velocity of 13.5 feet per second. The stream force should be calculated on the entire vertical surface of the bridge as if fully submerged.
- C. Design Criteria: The design of the bridges shall be in accordance with the AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017; and LRFD Guide Specifications for Design of Pedestrian Bridges, 2nd Edition, 2009.
- D. Temperature: Bridge shall be designed to accommodate a temperature differential of 120 degrees Fahrenheit. Bridges shall be placed on elastomeric bearing pads sufficient to accommodate thermal movements. At least 3/4" clearance shall be provided between the bridge and concrete abutments.

- E. Deflection: The vertical deflection of the bridge due to pedestrian live load shall not exceed $1/400$ of the span length. The maximum deflection due to vehicular loads shall not exceed $1/800$ of the span length. For pedestrian comfort, the load used for the deflection check be a minimum of 500 pounds per lineal foot of bridge or the uniform pedestrian live load, whichever is greater. The horizontal deflection due to lateral wind load shall not exceed $1/500$ of the span length.

3.3 FABRICATION AND QUALITY CONTROL

- A. Bridge fabricator shall be certified by the American Institute of Steel Construction to have the personnel, organization, experience, capability, and commitment to produce fabricated structural steel for Major Steel Bridge Structures with Fracture Critical and Sophisticated Paint Endorsements as set forth in the American Institute of Steel Construction (AISC) Certification Program.
- B. Workmanship, fabrication, and shop connections shall be in accordance with American Association of State Highway and Transportation Officials Specifications (AASHTO).
- C. Welding operators shall be properly accredited experienced operators, each of whom shall submit satisfactory evidence of experience and skill in welding structural steel with the kind of welding to be used in the work, and who have demonstrated the ability to make uniform good welds meeting the size and type of weld required.
- D. All welding shall utilize E70 or E80 series electrodes. The weld process used shall be Flux Core Arc Welding (FCAW) or Gas Metal Arch Welding (GMAW).
- E. All structural elements used in the bridge shall be identified by heat number of the steel member used. Specific mill test reports and individual welder certificates shall be tracked and kept on file to be provided at the request of the owner or engineer.
- F. To ensure quality control during bridge fabrication, the bridge supplier shall be the designer and fabricator of the bridge and shall not assign, sublet, or subcontract any part of the bridge fabrication including painting.
- G. The bridge design Professional Engineer shall inspect the bridge structure after fabrication and furnish a signed and sealed Conformance Report and Affidavit verifying that the bridge has been inspected by the Engineer and fabricated in accordance with the Engineer's design calculations and approved shop drawings. This inspection and report shall not be delegated to any other engineer or person. The report shall include a summary of computations of the corrosion index (per ASTM G101) for every heat number of structural steel used in the bridge to verify that the steel is of a weathering grade.
- H. Each bridge shall be inspected by a Certified Welding Inspector that is qualified under the American Welding Society (AWS) QC-1 program. This inspection shall include as a minimum requirement the following: review of shop drawings, weld procedures, welder qualifications, and weld testing reports, visual inspection of welds and verification of overall dimensions and geometry of the bridge. A report shall be produced indicating the above items were reviewed and shall be signed and sealed by the CWI signifying compliance with AWS D1.1 codes

3.4 RAILING AND ACCESSORIES

- A. All railings shall have a smooth inside surface with no protrusions or depressions. All ends of angles and tubes shall be closed and ground smooth. In accordance with AASHTO, railings for bicycle use should be a minimum height of 54" above the floor deck.
- B. Continuous rails shall be located on the inside of the trusses. The safety rails shall be horizontal rails with a maximum opening of 6 inches.

3.5 FINISHES

- A. All boldly exposed surfaces of weathering steel bridges shall be sand blasted in accordance with the Steel Structures Painting Council (SSPC) Surface Preparation Specification No. 7 "Brush Blast Cleaning".

3.6 DELIVERY AND ERECTION

- A. Bridges will be delivered by truck to a location nearest to the site accessible by roads. Hauling permits and freight charges are the responsibility of the manufacturer.
- B. The manufacturer will notify the Contractor in advance of the expected arrival. Information regarding delays after the trucks depart the plant such as weather, delays in permits, re-routing by public agencies or other circumstances will be passed on to the customer as soon as possible but the expense of such unavoidable delays will not be accepted by the manufacturer.
- C. The manufacturer will advise the Contractor of the actual lifting weights, attachment points and all necessary information to install the bridge. Unloading, splicing, bolting, and proper lifting equipment is the responsibility of others.
- D. The Contractor shall install the anchor bolts in accordance with the manufacturer's anchor bolt spacing dimensions. All grounding and lightning protection shall be the responsibility of the Contractor.

3.7 LIMITED WARRANTY

- A. The bridge supplier shall warrant their steel structure(s) to be free of design, material and workmanship defects for a period of ten years from the date of delivery.