

# **NCA MASTER SPECIFICATIONS**

## **NATIONAL CEMETERY OF THE ALLEGHENIES**

**CECIL TOWNSHIP  
WASHINGTON COUNTY, PENNSYLVANIA**

**PROJECT NO. 925 NRM17 08**

### **DESIGN TO CORRECT GROUNDWATER ISSUES FINAL CONSTRUCTION DOCUMENTS**

**Prepared for:**



**United States Department of Veterans Affairs**

**June 2018**



**SECTION 00 01 15**  
**LIST OF DRAWING SHEETS**

The drawings listed below accompanying this specification form a part of  
the contract.

<u>NO.</u>	<u>DRAWING</u>	<u>DRAWING TITLE</u>
01	GI001	Cover Sheet
02	GI002	General Notes, Symbols and Abbreviations
03	GI501	Site Details
04	XP101	Existing Conditions
05	GC001	Erosion and Sediment Control Notes
06	GC501	Erosion and Sediment Control Details
07	GC101	Erosion and Sediment Control Plan
08	CS101	Site Plan
09	CU261	Storm Drain Profiles

**SECTION 01 00 02**  
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**SECTION 01 00 02**  
**GENERAL REQUIREMENTS (MINOR NCA PROJECTS)**

**1.1 GENERAL INTENTION**

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor, materials, equipment and services and perform and complete all work for National Cemetery of the Alleghenies Design to Correct Groundwater Issues as required by drawings and specifications.
- B. Visits to the site by Bidders may be made only by appointment with the Cemetery Director.
- C. Offices of Gordon, as Architect-Engineers (A/E), may render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Resident Engineer/Contracting Officers Representative (RE/COR) or his duly authorized representative.
- D. All Testing Laboratory services will be retained and paid for by the Contractor (see Spec Section 01 45 29, Testing Laboratory Services). However, the Department of Veterans Affairs may elect to retain its own Testing Laboratory for any purpose. Before placement and installation of work subject to tests by testing laboratory retained by Department of Veterans Affairs, the Contractor shall notify the RE/COR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the RE/COR.
- E. All employees of general contractor and subcontractors shall comply with security requirements as established by the RE/COR, be identified by name and employer. They shall be restricted from unauthorized access.
- F. Prior to commencing work, general contractor shall provide proof that a OSHA certified "competent person" (CP) (29 CFR 1926.20(b)(2)) will maintain a presence at the work site whenever the general or subcontractors are present.
- G. Training:
  - 1. All employees of general contractor or subcontractors shall, at the minimum, have successfully completed the 10-hour OSHA certified

Construction Safety course and/or other relevant competency training, as determined by VA CP.

2. Submit OSHA training records of all employees for approval before the start of work.

#### **1.2 STATEMENT OF BID ITEM(S)**

- A. ITEM I, GENERAL CONSTRUCTION: Installation of all work shown on the plans and described in the specifications including but not limited to:
  1. Installation of new subsurface drainage improvements and storm drainage installation, as noted in the design documents.
- B. ALTERNATE NO.1: Install all work per plans and specifications, excluding subsurface drain A-1.
- C. ALTERNATE NO. 2: Substitute turf type tall fescue seed and mulch in lieu of sodding for all soil stabilization areas.

#### **1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR**

- A. AFTER AWARD OF CONTRACT, 3 bond paper set(s) of specifications and drawings will be furnished. These drawings and specifications will consist of those returned by prospective bidders.
- B. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from digital files furnished by the Issuing Office.

#### **1.4 CONSTRUCTION SECURITY REQUIREMENTS**

- A. Security Plan:
  1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
  2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.
- B. Security Procedures:
  1. General Contractor's employees shall not enter the site without following the procedures approved by the RE/COR. They may also be subject to inspection of their personal effects when entering or leaving the project site.
  2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days' notice to the RE/COR so that appropriate arrangements can be provided for the Cemetery

employees. This notice is separate from any notices required for utility shutdown described later in this section.

3. No photography of VA premises is allowed without written permission of the RE/COTR.
4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the RE/COR.

C. Guards:

1. The General Contractor shall provide unarmed guards at the project site when theft or vandalism warrants.

D. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the RE/COR for the purpose of security inspections of every area of project including tool boxes and parked machines, and to take any necessary emergency action.

E. Document Control:

1. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
3. All electronic information shall be stored in a specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
  - a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.

F. Motor Vehicle Restrictions

1. Contractor and employees shall coordinate parking and access with the COR.

**1.5 FIRE SAFETY**

A. Applicable Publications: Publications listed below form part of this Article to the extent referenced. Publications are referenced in text by basic designations only.

1. American Society for Testing and Materials (ASTM):

E84-2009a	Surface Burning Characteristics of Building Materials
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2. National Fire Protection Association (NFPA):

10-2010	Standard for Portable Fire Extinguishers
30-2008	Flammable and Combustible Liquids Code
51B-2009	Standard for Fire Prevention During Welding, Cutting and Other Hot Work
70-2008	National Electrical Code
241-2009	Standard for Safeguarding Construction, Alteration, and Demolition Operations

3. Occupational Safety and Health Administration (OSHA):

29 CFR 1926	Safety and Health Regulations for Construction
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- B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to RE/COR/Cemetery Director for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for the contractor or subcontractor's beginning work, they shall undergo a safety briefing provided by the General Contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of NCA equipment, etc. Documentation shall be provided to the RE/COR that individuals have undergone the Contractor's safety briefing.
- C. Site Access: Maintain free and unobstructed access to emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with RE/COR/Cemetery Director.



- G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to RE/COR.
- H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- J. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with RE/COR.
- K. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to RE/COR.
- L. Dispose of waste and debris in accordance with NFPA 241. Remove from site weekly.
- M. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

#### **1.6 OPERATIONS AND STORAGE AREAS**

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the RE/COR. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage trailers, office trailers) and utilities may be erected by the Contractor only with the approval of the RE/COR and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work.
- C. The Contractor shall, under regulations prescribed by the RE/COR, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the RE/COR. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the

Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

- D. Working space and space available for storing materials shall be as determined by the RE/COR with agreement of the Cemetery. Contractor parking will be only in areas and on roadways designated and agreed to by the RE/COR in agreement of the Cemetery.
- E. Workmen are subject to rules of the Cemetery applicable to their conduct.
- F. Execute work so as to interfere as little as possible with normal functioning of Cemetery as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others.
  - 1. Do not store materials and equipment in other than assigned areas.
  - 2. Provide unobstructed access to the Cemetery areas required to remain in operation.
- G. Phasing: To insure such executions, the Contractor shall furnish the RE/COR with a schedule of approximate dates on which the Contractor intends to accomplish work in each specific area of site or portion thereof. In addition, the Contractor shall notify the RE/COR two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such dates to insure accomplishment of this work in successive phases mutually agreeable to the Cemetery Director, RE/COR and Contractor.
- H. Construction Fence: Before construction operations begin, the Contractor shall provide a plastic fabric construction fence, five feet minimum height, around the construction area. Fence to have limited access for construction personnel and cemetery staff and associated vehicles and equipment. It shall be the contractor's option to relocated/rearrange fencing in order to maintain various construction operations and anticipated phasing of construction activities. Fencing shall remain in place until site stabilization. Construction fencing shall be polyethylene fabric conforming to ASTM D638, international orange color. Web of fence fabric shall be secured to a conventional metal "T" or "U" post driven into the ground a minimum depth of 18-inches, with posts spaced at 6-foot centers. The temporary fencing shall encompass the construction work area(s) to serve as a pedestrian

barrier to alert cemetery patrons of the construction site. Remove the fence when directed by RE/COR.

I. Utilities Services: Maintain existing utility services for the Cemetery at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by RE/COR. All such actions shall be coordinated with the Utility Company involved.

1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of RE/COR. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the RE/COR, and Cemetery Director's prior knowledge and written approval.
2. The Contractor shall submit a request to interrupt any such services to both RE/COR and the Cemetery Director in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
3. The Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of the Cemetery. Interruption time approved by the Cemetery and RE/COR may occur at other than Contractor's normal working hours.
4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the RE/COR.
5. In case of a contract construction emergency, service will be interrupted on approval of RE/COR. Such approval will be confirmed in writing as soon as practical.
6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam,

- payment of such fee shall be the responsibility of the Government and not the Contractor.
- J. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged.
- K. To minimize interference of construction activities with flow of Cemetery traffic, comply with the following:
1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles. Wherever excavation for new utility lines cross existing roads, at least one lane must be open to traffic at all times.
  2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the RE/COR.
- L. Coordinate the work for this contract with other construction operations as directed by RE/COR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.
- M. Coordination of Construction with Cemetery Director: The burial activities at a National Cemetery shall take precedence over construction activities. The Contractor must cooperate and coordinate with the Cemetery Director, through the RE/COR, in arranging construction schedule to cause the least possible interference with Cemetery activities in actual burial areas. Construction noise during the committal services shall not disturb the service. Trucks and workmen shall not pass through the service area during this period.
1. The Contractor is required to discontinue his work sufficiently in advance of Easter Sunday, Mother's Day, Father's Day, Memorial Day, Veteran's Day and/or Federal holidays, to permit him to clean up all areas of operation adjacent to existing burial plots before these dates.
  2. Cleaning up shall include the removal of all equipment, tools, materials and debris and leaving the areas in a clean, neat condition.

**1.7 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS**

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the RE/COR.
- B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the RE/COR may have the necessary work performed and charge the cost to the Contractor.

**(FAR 52.236-9)**

- C. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.

**1.8 RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any water/irrigation work without approval of the RE/COR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the RE/COR before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality

to that of original existing construction, except as otherwise shown or specified.

- B. Upon completion of contract, deliver work complete and undamaged. Existing work (landscape stone, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At the Contractor's own expense, the Contractor shall immediately restore to service and repair any damage caused by the Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services, irrigation system control and power, which are indicated on drawings and which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

#### **1.9 PHYSICAL DATA**

- A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.
    - 1. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by ECS Mid-Atlantic LLC.
- (FAR 52.236-4)**
- B. Subsurface conditions have been developed by core borings. Logs of subsurface exploration conducted by ECS Mid-Atlantic LLC are shown diagrammatically in their report.
  - C. A copy of the geotechnical investigation report will be made available for inspection by bidders upon request to the Contracting Officer.
  - D. The Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine the site of work and logs of borings and, after

investigation, decide for themselves the character of materials and make their bids accordingly. Upon proper application to the Department of Veterans Affairs, including approved scheduling bidders will be permitted to make subsurface explorations of their own at site.

#### **1.10 PROFESSIONAL SURVEYING SERVICES**

A registered professional land surveyor or registered civil engineer whose services are retained and paid for by the Contractor shall perform services specified herein and in other specification sections. The Contractor shall certify that the land surveyor or civil engineer is not one who is a regular employee of the Contractor, and that the land surveyor or civil engineer has no financial interest in this contract.

#### **1.11 LAYOUT OF WORK**

- A. The Contractor shall lay out the work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at the Contractor's own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the RE/COR. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the RE/COR until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized, the RE/COR may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

**(FAR 52.236-17)**

#### **1.12 AS-BUILT DRAWINGS**

- A. The Contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, which will include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the RE/COR's review, as often as requested.

C. The Contractor shall deliver two approved completed sets of as-built drawings to the RE/COR within 15 calendar days after acceptance of the project by the RE/COR.

D. Paragraphs A, B, & C shall also apply to all shop drawings.

#### **1.13 USE OF ROADWAYS**

A. For hauling, use only established public roads and designated permanent roads on Cemetery property and, temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed or modified by the Contractor at the Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.

#### **1.14 TEMPORARY TOILETS**

A. Provide where directed, (for use of all Contractor's workers) ample temporary sanitary toilet accommodations with suitable sewer and water connections, or when approved by RE/COR provide suitable dry closets where directed. Keep such places clean and free from flies, and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

#### **1.15 AVAILABILITY AND USE OF UTILITY SERVICES**

A. 120 outlets may be available and shall be coordinated with the RE/COR for use if necessary.

B. Water for Construction: Furnish temporary water service.

1. Contractor may obtain water by connecting to the Cemetery water distribution system. Provide reduced pressure backflow preventer at each connection as per code. Water is available at no cost to the Contractor.

2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation at the RE/COR's discretion of use of water from Cemetery's system.

#### **1.16 PROJECT HEALTH AND SAFETY PLAN**

A. Prior to commencing any construction, the Contractor shall submit a site specific Project Health and Safety Plan (PHSP). At a minimum, the PHSP shall cover the following topics:

1. Organizational structure (including Responsible Persons)
2. Site Characterization and Job Hazard Identification
3. Site Control and Security



4. Training
5. PPE
6. Heat Stress
7. Spill Containment
8. Decontamination
9. Emergency Response
10. Trench Safety

- - - E N D - - -

**SECTION 01 33 23**  
**SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

- 1-1. For the purposes of this contract, samples (including laboratory samples to be tested), test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
- 1-2. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
  - A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
  - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
  - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- 1-3. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals (including any laboratory samples to be tested) will not serve as a basis for extending contract time for completion.
- 1-4. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by Resident Engineer on behalf of the Contracting Officer.
- 1-5. Upon receipt of submittals, Architect-Engineer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.
- 1-6. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional

submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price and time will be made in accordance with VA Standards.

- 1-7. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect- Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.
- 1-8. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.
  - A. Submit samples required in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.
  - B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Cemetery, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.
    1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
    2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Cemetery, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.

3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.
- C. In addition to complying with the applicable requirements specified in preceding Article 1.9, samples which are required to have Laboratory Tests (those preceded by symbol "LT" under the separate sections of the specification shall be tested, at the expense of Contractor, in a commercial laboratory approved by Contracting Officer.
1. Laboratory shall furnish Contracting Officer with a certificate stating that it is fully equipped and qualified to perform intended work, is fully acquainted with specification requirements and intended use of materials and is an independent establishment in no way connected with organization of Contractor or with manufacturer or supplier of materials to be tested.
  2. Certificates shall also set forth a list of comparable projects upon which laboratory has performed similar functions during past five years.
  3. Samples and laboratory tests shall be sent directly to approved commercial testing laboratory.
  4. Contractor shall send a copy of transmittal letter to both Resident Engineer and to Architect-Engineer simultaneously with submission of material to a commercial testing laboratory.
  5. Laboratory test reports shall be sent directly to Resident Engineer for appropriate action.
  6. Laboratory reports shall list contract specification test requirements and a comparative list of the laboratory test results. When tests show that the material meets specification requirements, the laboratory shall so certify on test report.
  7. Laboratory test reports shall also include a recommendation for approval or disapproval of tested item.
- D. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.
- E. Approved samples will be kept on file by the Resident Engineer at the site until completion of contract, at which time such samples will be

delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.

F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.

1. For each drawing required, submit one legible photographic paper or vellum reproducible.
  2. Reproducible shall be full size.
  3. Each drawing shall have marked thereon, proper descriptive title, including Cemetery location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
  4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
  5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
  6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
  7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Architect-Engineer under one cover.
- 1-9. Samples (except laboratory samples), shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to:

GORDON

148 S. Queen Street, Suite 201,  
Martinsburg, WV 25401

1-10. At the time of transmittal to the Architect-Engineer, the Contractor shall also send a copy of the complete submittal directly to the Resident Engineer.

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**SECTION 01 42 19  
REFERENCE STANDARDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

**1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)**

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to - GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

**1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)**

- A. The specifications and standards cited in this solicitation can be examined at the following location:
- United States Department of Veteran Affairs  
Technical Information Library  
<http://www.cfm.va.gov/til/>

**1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-3) (JUN 1988)**

- A. The specifications cited in this solicitation may be obtained from the associations or organizations listed below.

- AA Aluminum Association, Inc.  
<http://www.aluminum.org>
- AABC Associated Air Balance Council  
<http://www.aabchq.com>

AADM	American Association of Automatic Door Manufacturers <a href="http://www.aaadm.com">http://www.aaadm.com</a>
AATC	American Association of Textile Chemists and Colorist <a href="http://www.aatcc.org">http://www.aatcc.org</a>
AAMA	American Architectural Manufacturer's Association <a href="http://www.aamanet.org">http://www.aamanet.org</a>
AAN	American Nursery and Landscape Association <a href="http://www.anla.org">http://www.anla.org</a>
AASHTO	American Association of State Highway and Transportation Officials <a href="http://www.transportation.org/Pages/default.aspx">http://www.transportation.org/Pages/default.aspx</a>
ACGIH	American Conference of Governmental Industrial Hygienists <a href="http://www.acgih.org">http://www.acgih.org</a>
ACI	American Concrete Institute <a href="http://www.aci-int.net">http://www.aci-int.net</a>
ACPA	American Concrete Pipe Association <a href="http://www.concrete-pipe.org">http://www.concrete-pipe.org</a>
ACPPA	American Concrete Pressure Pipe Association <a href="http://www.acppa.org">http://www.acppa.org</a>
ADA	American with Disabilities Act <a href="http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/adaag">http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/adaag</a>
ADC	Air Diffusion Council <a href="http://flexibleduct.org">http://flexibleduct.org</a>
AGA	American Gas Association <a href="http://www.aga.org">http://www.aga.org</a>
AGC	Associated General Contractors of America <a href="http://www.agc.org">http://www.agc.org</a>
AHA	American Hardboard Association <a href="http://www.domensino.com/AHA/">http://www.domensino.com/AHA/</a>
AIHA	American National Standards Institute/American Industrial Hygiene Association <a href="http://www.aiha.org/Pages/default.aspx">http://www.aiha.org/Pages/default.aspx</a>
AISC	American Institute of Steel Construction <a href="http://www.aisc.org">http://www.aisc.org</a>
AISI	American Iron and Steel Institute <a href="http://www.steel.org">http://www.steel.org</a>



AITC	American Institute of Timber Construction <a href="http://www.aitc-glulam.org">http://www.aitc-glulam.org</a>
ALI	Automotive Lift Institute <a href="http://www.autolift.org/">http://www.autolift.org/</a>
AMCA	Air Movement and Control Association <a href="http://www.amca.org/">http://www.amca.org/</a>
ANLA	American Nursery & Landscape Association <a href="http://www.anla.org">http://www.anla.org</a>
ANSI	American National Standards Institute, Inc. <a href="http://www.ansi.org">http://www.ansi.org</a>
APA	Architectural Precast Association <a href="http://www.archprecast.org/">http://www.archprecast.org/</a>
APA	The Engineered Wood Association <a href="http://www.apawood.org">http://www.apawood.org</a>
ARI	Air-Conditioning and Refrigeration Institute <a href="http://www.lightindustries.com/ARI/">http://www.lightindustries.com/ARI/</a>
ARMA	Asphalt Roofing Manufacturers Association <a href="http://www.asphaltroofing.org/">http://www.asphaltroofing.org/</a>
ASAE	American Society of Agricultural Engineers <a href="http://www.asabe.org">http://www.asabe.org</a>
ASCE	American Society of Civil Engineers <a href="http://www.asce.org">http://www.asce.org</a>
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers <a href="http://www.ashrae.org">http://www.ashrae.org</a>
ASME	American Society of Mechanical Engineers <a href="http://www.asme.org">http://www.asme.org</a>
ASSE	American Society of Sanitary Engineering <a href="http://www.asse-plumbing.org">http://www.asse-plumbing.org</a>
ASTM	American Society for Testing and Materials <a href="http://www.astm.org">http://www.astm.org</a>
AWI	Architectural Woodwork Institute <a href="http://www.awinet.org">http://www.awinet.org</a>
AWS	American Welding Society <a href="http://www.aws.org">http://www.aws.org</a>
AWPA	American Wood Protection Association <a href="http://www.awpa.com">http://www.awpa.com</a>

AWWA	American Water Works Association <a href="http://www.awwa.org">http://www.awwa.org</a>
BHMA	Builders Hardware Manufacturers Association <a href="http://www.buildershardware.com">http://www.buildershardware.com</a>
BIA	The Brick Industry Association <a href="http://www.bia.org">http://www.bia.org</a>
CAGI	Compressed Air and Gas Institute <a href="http://www.cagi.org">http://www.cagi.org</a>
CARB	California Environmental Protection Agency Air Resources Board <a href="http://arb.ca.gov/hompage.html/">http://arb.ca.gov/hompage.html/</a>
CFR	Code of Federal Regulations <a href="http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR">http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCo de=CFR</a>
CGA	Compressed Gas Association, Inc. <a href="http://www.cganet.com">http://www.cganet.com</a>
CID	Commercial Item Description <a href="http://www.gsa.gov/portal/content/100847">http://www.gsa.gov/portal/content/100847</a>
CISCA	Ceilings and Interior Systems Construction Association <a href="http://www.cisca.org">http://www.cisca.org</a>
CISPI	Cast Iron Soil Pipe Institute <a href="http://www.cispi.org">http://www.cispi.org</a>
CLFMI	Chain Link Fence Manufacturers Institute <a href="http://www.chainlinkinfo.org">http://www.chainlinkinfo.org</a>
CPA	Composite Panel Association <a href="http://www.compositepanel.org/">http://www.compositepanel.org/</a>
CRA	California Redwood Association <a href="http://www.calredwood.org">http://www.calredwood.org</a>
CRI	Carpet and Rug Institute <a href="http://www.carpet-rug.com">http://www.carpet-rug.com</a>
CRRC	Cool Roof Rating System <a href="http://coolroofs.org/">http://coolroofs.org/</a>
CRSI	Concrete Reinforcing Steel Institute <a href="http://www.crsi.org">http://www.crsi.org</a>
CSI	Cast Stone Institute <a href="http://www.caststone.org">http://www.caststone.org</a>
DASMA	Door and Access Systems Manufacturers Association <a href="http://www.dasma.com/">http://www.dasma.com/</a>

DHI	Door and Hardware Institute <a href="http://www.dhi.org">http://www.dhi.org</a>
DOE	U.S. Department of Energy <a href="http://www.energy.gov/">http://www.energy.gov/</a>
EEI	Edison Electric Institute <a href="http://www.eei.org">http://www.eei.org</a>
EGSA	Electrical Generating Systems Association <a href="http://www.egsa.org">http://www.egsa.org</a>
EIMA	Exterior Insulation Manufacturers Association <a href="http://www.eima.com/">http://www.eima.com/</a>
EPA	Environmental Protection Agency <a href="http://www.epa.gov">http://www.epa.gov</a>
ETL	ETL Testing Laboratories, Inc. <a href="http://www.envirotestinglabs.com/">http://www.envirotestinglabs.com/</a>
FCC	Federal Communications Commission <a href="http://www.fcc.gov">http://www.fcc.gov</a>
FHA	Federal Highway Administration <a href="http://www.fhwa.dot.gov/">http://www.fhwa.dot.gov/</a>
FM	FM Global <a href="http://www.fmglobal.com">http://www.fmglobal.com</a>
FPS	The Forest Products Society <a href="http://www.forestprod.org">http://www.forestprod.org</a>
FSC	Forest Stewardship Council <a href="http://www.fscus.org">http://www.fscus.org</a>
GA	Gypsum Association <a href="http://www.gypsum.org">http://www.gypsum.org</a>
GANA	Glass Association of North America <a href="http://www.glasswebsite.com">http://www.glasswebsite.com</a>
GBI	Green Building Initiative <a href="http://www.thegbi.org/">http://www.thegbi.org/</a>
GS	Green Seal <a href="http://www.greenseal.org">http://www.greenseal.org</a>
GSA	General Services Administration <a href="http://www.gsa.gov">http://www.gsa.gov</a>
HI	Hydraulic Institute <a href="http://www.pumps.org">http://www.pumps.org</a>

HPVA	Hardwood Plywood & Veneer Association <a href="http://www.hpva.org">http://www.hpva.org</a>
ICC	The International Code Council <a href="http://www.iccsafe.org/Pages/default.aspx">http://www.iccsafe.org/Pages/default.aspx</a>
ICEA	Insulated Cable Engineers Association Inc. <a href="http://www.icea.net">http://www.icea.net</a>
IEEE	Institute of Electrical and Electronics Engineers <a href="http://www.ieee.org/">http://www.ieee.org/</a>
IGMA	Insulating Glass Manufacturers Alliance <a href="http://www.igmaonline.org">http://www.igmaonline.org</a>
ITS	Intertek Training Services <a href="http://www.intertek.com/">http://www.intertek.com/</a>
MBMA	Metal Buildings Manufacturers Association <a href="http://www.mbma.com">http://www.mbma.com</a>
MHI	Material Handling Industry of America <a href="http://www.mhi.org/">http://www.mhi.org/</a>
MIA	Marble Institute of America <a href="http://www.marble-institute.com/">http://www.marble-institute.com/</a>
MIC	Masonry Industry Council
MPI	Master Painters Institute <a href="http://www.mpi.net/">http://www.mpi.net/</a>
MSJC	Masonry Standards Joint Committee <a href="http://www.masonrysociety.org/msjc/">http://www.masonrysociety.org/msjc/</a>
NAAMM	National Association of Architectural Metal Manufacturers <a href="http://www.naamm.org">http://www.naamm.org</a>
NAPHCC	Plumbing-Heating-Cooling Contractors Association <a href="http://www.phccweb.org/">http://www.phccweb.org/</a>
NBS	National Bureau of Standards See - NIST
NEC	National Electric Code See - NFPA National Fire Protection Association
NEMA	National Electrical Manufacturers Association <a href="http://www.nema.org">http://www.nema.org</a>
NFPA	National Fire Protection Association <a href="http://www.nfpa.org">http://www.nfpa.org</a>
NFRC	National Fenestration Rating Council <a href="http://www.nfrc.org/">http://www.nfrc.org/</a>

NHLA	National Hardwood Lumber Association <a href="http://www.natlhardwood.org">http://www.natlhardwood.org</a>
NIH	National Institute of Health <a href="http://www.nih.gov">http://www.nih.gov</a>
NIOSH	The National Institute for Occupational Safety and Health <a href="http://www.cdc.gov/niosh/">http://www.cdc.gov/niosh/</a>
NIST	National Institute of Standards and Technology <a href="http://www.nist.gov">http://www.nist.gov</a>
NLMA	Northeastern Lumber Manufacturers Association, Inc. <a href="http://www.nelma.org">http://www.nelma.org</a>
NPA	National Particleboard Association 18928 Premiere Court Gaithersburg, MD 20879 (301) 670-0604
NPCA	National Precast Concrete Association <a href="http://www.precast.org">http://www.precast.org</a>
NRCA	National Roofing Contractors Association <a href="http://www.nrca.net">http://www.nrca.net</a>
NSF	National Sanitation Foundation <a href="http://www.nsf.org">http://www.nsf.org</a>
NSF	NSF International <a href="http://www.nsf.org/">http://www.nsf.org/</a>
NTMA	National Terrazzo and Mosaic Association <a href="http://ntma.com/">http://ntma.com/</a>
NWWDA	Window and Door Manufacturers Association <a href="http://www.nwwda.org">http://www.nwwda.org</a>
OSHA	Occupational Safety and Health Administration Department of Labor <a href="http://www.osha.gov">http://www.osha.gov</a>
PCA	Portland Cement Association <a href="http://www.cement.org/">http://www.cement.org/</a>
PCI	Precast Prestressed Concrete Institute <a href="http://www.pci.org">http://www.pci.org</a>
PPI	The Plastic Pipe Institute <a href="http://www.plasticpipe.org">http://www.plasticpipe.org</a>
PEI	Porcelain Enamel Institute, Inc. <a href="http://www.porcelainenamel.com">http://www.porcelainenamel.com</a>

PTI	Post-Tensioning Institute <a href="http://www.post-tensioning.org">http://www.post-tensioning.org</a>
RCSC	Research Council of Structural Connections <a href="http://www.boltcouncil.org/">http://www.boltcouncil.org/</a>
RFCI	The Resilient Floor Covering Institute <a href="http://www.rfci.com">http://www.rfci.com</a>
RIS	Redwood Inspection Service See - CRA
RMA	Rubber Manufacturers Association, Inc. <a href="http://www.rma.org">http://www.rma.org</a>
SCAQMD	South Coast Air Quality Management District <a href="http://www.aqmd.gov">http://www.aqmd.gov</a>
SCMA	Southern Cypress Manufacturers Association <a href="http://www.cypressinfo.org">http://www.cypressinfo.org</a>
SDI	Steel Deck Institute <a href="http://www.sdi.org">http://www.sdi.org</a>
SDI	Steel Door Institute <a href="http://www.steeldoor.org">http://www.steeldoor.org</a>
SEI	Structural Engineering Institute <a href="http://www.asce.org/SEI/">http://www.asce.org/SEI/</a>
SJI	Steel Joist Institute <a href="http://www.steeljoist.org">http://www.steeljoist.org</a>
SMACNA	Sheet Metal and Air-Conditioning Contractors National Association, Inc. <a href="http://www.smacna.org">http://www.smacna.org</a>
SPRI	Single Ply Roofing Industry <a href="http://www.spri.org">http://www.spri.org</a>
SSPC	The Society for Protective Coatings <a href="http://www.sspc.org">http://www.sspc.org</a>
STI	Steel Tank Institute <a href="http://www.steeltank.com">http://www.steeltank.com</a>
SWI	Steel Window Institute <a href="http://www.steelwindows.com">http://www.steelwindows.com</a>
SWRI	Sealant Waterproofing and Restoration Institute <a href="http://www.swrionline.org/">http://www.swrionline.org/</a>
TCNA	Tile Council of North America, Inc. <a href="http://www.tileusa.com">http://www.tileusa.com</a>

TPI        Truss Plate Institute, Inc.  
<http://www.tpinst.org/>

UL        Underwriters' Laboratories Incorporated  
<http://www.ul.com>

ULC       Underwriters' Laboratories of Canada  
<http://www.ulc.ca>

USDA      U.S. Department of Agriculture  
<http://www.usda.gov>

USGBC     U.S. Green Building Council  
<http://www.usgbc.org>

WCLIB     West Coast Lumber Inspection Bureau  
<http://www.wclib.org/>

WDMA      Window and Door Manufacturers Association  
<https://www.wdma.com/>

WH        Warnock Hersey  
<http://www.intertek.com/marks/wh/>

WRCLA     Western Red Cedar Lumber Association  
<http://www.wrcla.org/>

WWPA      Western Wood Products Association  
<http://www2.wwpa.org/>

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**SECTION 01 45 29**  
**TESTING LABORATORY SERVICES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained and paid for by Contractor. Refer to Section 01 00 02, GENERAL REQUIREMENTS, for additional information.

**1.2 RELATED DOCUMENTS**

- A. Section 01 00 02, GENERAL REQUIREMENTS.

**1.3 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

- B. American Association of State Highway and Transportation Officials (AASHTO):

T27-11	Sieve Analysis of Fine and Coarse Aggregates
T96-02(R2006)	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
T99-10	The Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
T104-99(R2007)	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
T180-10	Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
T191-02(R2006)	Density of Soil In-Place by the Sand-Cone Method

- C. American Society for Testing and Materials (ASTM):

C31/C31M-12	Making and Curing Concrete Test Specimens in the Field
C33/C33M-13	Concrete Aggregates
C39/C39M-12	Compressive Strength of Cylindrical Concrete Specimens



C138/C138M-12a	Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
C172/C172M-10	Sampling Freshly Mixed Concrete
C173/C173M-12	Air Content of freshly Mixed Concrete by the Volumetric Method
C1077-13	Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
D698-12	Laboratory Compaction Characteristics of Soil Using Standard Effort
D1556-07	Density and Unit Weight of Soil in Place by the Sand-Cone Method
D1557-12	Laboratory Compaction Characteristics of Soil Using Modified Effort
D2166-06	Unconfined Compressive Strength of Cohesive Soil
D2167-08	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
D2216-10	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
D2974-07	Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
D3740-12a	Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock
E329-11c	Agencies Engaged in Construction Inspection, Testing, or Special Inspection
E543-13	Agencies Performing Nondestructive Testing
E709-08	Guide for Magnetic Particle Testing

E

D. American Welding Society (AWS):

D1.1-07                      Structural Welding Code-Steel

**1.4 REQUIREMENTS**

- A. Accreditation Requirements: Testing Laboratory retained and paid for by Contractor must be accredited by one or more of the National Voluntary Laboratory Accreditation Program (NVLAP) programs acceptable in the geographic region for the project. Furnish to the RE/COR a copy of the Certificate of Accreditation and Scope of Accreditation. For testing

laboratories that have not yet obtained accreditation by a NVLAP program, submit an acknowledgement letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started, and submit to the RE/COR for approval, certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the ASTM standards listed below as appropriate to the testing field.

1. Laboratories engaged in testing of construction materials must meet the requirements of ASTM E329.
  2. Laboratories engaged in testing of concrete and concrete aggregates must meet the requirements of ASTM C1077.
  3. Laboratories engaged in testing of bituminous paving materials must meet the requirements of ASTM D3666.
  4. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, must meet the requirements of ASTM D3740.
  5. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A880.
  6. Laboratories engaged in non-destructive testing (NDT) must meet the requirements of ASTM E543.
  7. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA and EPA.
- B. Inspection and Testing: Testing laboratory to inspect materials and workmanship and perform tests described herein and additional tests requested by RE/COR. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory must direct attention of RE/COR to such failure.
- C. Written Reports: Testing laboratory to submit test reports to RE/COR, Contractor within 24 hours after each test is completed unless other arrangements are agreed to in writing by the RE/COR. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to RE/COR immediately of any irregularity.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

**3.1 EARTHWORK**

A. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with AASHTO T99/T180.
2. Make field density tests in accordance with the primary testing method following ASTM D2922 wherever possible. Field density tests utilizing ASTM D1556, AASHTO T191, or ASTM D2167 to be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they must provide satisfactory explanation to the RE/COR before the tests are conducted.

e. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.

D. Testing Materials: Test suitability of on-site and off-site borrow as directed by RE/COR.

**3.2 NOT USED**

**3.3 LANDSCAPING**

A. Test topsoil for organic materials, pH, phosphate, potash content, and gradation of particles.

1. Test for organic material by using ASTM D2974.
2. Determine percent of silt, sand, clay, and foreign materials such as rock, roots, and vegetation.
3. Test for moisture absorption capacity.
4. Test for soil infiltration rate greater than 1 inch per hour.

B. Submit laboratory test report of topsoil to RE/COR.

C. Submit recommendations for soil amendments, from a regional soil conservation service or cooperative extension, to bring soil into compliance with minimum parameters in these specifications.

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**SECTION 01 57 19**  
**TEMPORARY ENVIRONMENTAL CONTROLS**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, and solid waste, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
  - 1. Adversely affect human health or welfare.
  - 2. Unfavorably alter ecological balances of importance to human life.
  - 3. Affect other species of importance to humankind.
  - 4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.

**1.2 DEFINITIONS OF POLLUTANTS**

- A. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
- B. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
- C. Sediment: Soil and other debris that has been eroded and transported by runoff water.
- D. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from project construction activities.
- E. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and require a permit to discharge water from the governing agency.
- F. Rubbish: Combustible and noncombustible wastes such as, but not limited to, paper, plastic, metal and plastic containers and cans, boxes, metal and lumber scrap.
- G. Sanitary Wastes: Domestic Sanitary Sewage.

### **1.3 QUALITY CONTROL**

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, ordinances and note any corrective action taken.

### **1.4 REFERENCES**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. Federal Environmental Regulatory Requirements: Comply with applicable regulations. The following is for Contractor's information only:
  - 1. Storm water permits; refer to The Office of Wastewater Management, NPDES Storm Water Program: <http://www.epa.gov/npdes/stormwater>
  - 2. RCRA hazardous and non-hazardous solid waste requirements; refer to EPA's Office of Solid Waste and Emergency Response: <http://www.epa.gov/epaoswer/osw/laws-reg.htm>
  - 3. Oil spill requirements for construction activities; refer to EPA Oil Program web site: <http://www.epa.gov/oilspill/>
  - 4. Air quality requirements for construction activities; refer to EPA'S Air Program Mobile Sources Page: <http://www.epa.gov/ebtpages/airmobilesources.html>
  - 5. National Environmental Policy Act (NEPA) requirements for construction activities
  - 6. Endangered Species Act; refer to The US Fish and Wildlife Service Endangered Species Program: <http://endangered.fws.gov/>
- C. State and Local Environmental Regulatory Requirements: Comply with applicable regulations. The following is for Contractor's information only:
  - 1. Pennsylvania Department of Environmental Protection.
  - 2. The Construction Industry Compliance Assistance Center: <http://www.cicacenter.org/index.cfm>
  - 3. The National Environmental Compliance Assistance Clearinghouse: <http://cfpub.epa.gov/clearinghouse/>

### **1.5 NOT USED**

## 1.6 SUBMITTALS

A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, the Contractor shall furnish the following:

1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, meet with the Resident Engineer/Contracting Officer's Representative (RE/COR) to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, prepare and submit to the RE/COR for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
  - a. Name(s) and qualifications of person(s) within the Contractor's organization who is (are) responsible for:
    - 1) Ensuring adherence to the Environmental Protection Plan.
    - 3) Training the Contractor's environmental protection personnel.
  - b. Description of the Contractor's environmental protection personnel training program.
  - c. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
  - d. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.
  - e. Procedures to provide environmental protection that complies with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
  - f. Permits, licenses, and the location of the solid waste disposal area.
  - g. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or

spoil materials. Include as part of an Erosion Control Plan approved by the Department of Veterans Affairs.

- h. Environmental Monitoring Plans for the job site including land, water, air, and noise.
  - i. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of construction limits or protected areas. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
- B. Within 20 days after the date of its submittal, the RE/COR shall approve the Contractor's Comprehensive Environmental Protection Plan, or respond with an explanation for its rejection and resubmittal.
- C. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

#### **1.7 PROTECTION OF ENVIRONMENTAL RESOURCES**

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract and after the project is complete, based upon leaving the site that has yet to mature of sodding. Confine construction activities to areas defined by construction limits, the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, land forms, wetlands or wetland buffers without prior approval from the RE/COR. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or dictated by special emergency use.
- 1. Work Area Limits: Prior to any construction, mark/fence/protect the areas that require work to be performed under this contract. Prior to construction, mark/fence/protect monuments, works of art, and any other markers to remain. Convey to all personnel the purpose of marking and protecting all marked and protected objects.
  - 2. Protection of Specific Regulated Elements: Wetlands and wetland buffers and other landscape features shown on the drawings to be

- preserved by marking, fencing, or using any other approved protective techniques.
- a. Protect trees and shrubs to remain on site to protect from damage per contract details.
  - b. All damage to existing trees and shrubs shall be immediately repaired by trimming, cleaning, and painting with antiseptic tree paint.
  - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas only as needed to use to work the area to be developed. Form earthwork to final grade as shown as quickly as possible to minimize potential erosion damage. Immediately protect side slopes and back slopes upon completion of rough grading or clearing with appropriate material as defined in the Sediment and Erosion Control Plan.
5. Erosion and Sedimentation Control Devices: Construct or install all temporary and permanent erosion and sedimentation control features shown on the Environmental Protection Plan to avoid violating water quality in accordance with federal and state regulations. Maintain temporary erosion and sediment control measures such as berms, grassing, and mulching, fiber rolls, until permanent drainage and erosion control facilities are completed and operative.
6. Manage and control borrow and spoil areas on Government property to minimize erosion and to prevent soil and/or sediment from entering nearby water courses or lakes.
7. Protect adjacent areas from despoilment by temporary excavations and embankments.
8. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.



9. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
  10. Handle discarded materials other than those included in the solid waste category as directed by the RE/COR.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
- D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife. Prior to beginning construction operations, list protected species that require specific attention along with measures for their protection.
- E. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of Pennsylvania Air Pollution Control Act and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.
1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials at all times, including weekends, holidays, and hours when work is not in progress.
  2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, or other methods are permitted to control particulates in the work area as approved in the Environmental Protection Plan.
  3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.

4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.

F. Noise Control: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Resident Engineer/COR. Maintain noise-produced work at or below the decibel levels and within the time periods specified.

1. Perform construction activities involving repetitive, high-level impact noise only between 6:00 a.m. and 6:00 p.m. unless otherwise permitted by local ordinance or the RE/COR. Repetitive impact noise on the property shall not exceed the following Decibel A-scale (dBA) limitations:

Time Duration of Impact Noise	Sound Level in dBA
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:

- a. Maintain maximum permissible construction equipment noise levels as measured with an A-scale decibel measuring device at 15 m (50 feet) (dBA):

CATEGORY OF EQUIPMENT			
EARTHMOVING		MATERIALS HANDLING	
EQUIPMENT STYLE	SOUND LEVEL dBA	EQUIPMENT STYLE	SOUND LEVEL dBA
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80

PUMPS	75		
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

- b. Provide soundproof housings or enclosures for noise-producing machinery.
  - c. Use efficient silencers on equipment air intakes.
  - d. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
  - e. Line hoppers and storage bins with sound deadening material.
  - f. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 75 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighted sound level of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the Resident Engineer/COR noting any problems and the alternatives for mitigating actions.
- G. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- H. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition as approved by the RE/COR. The site shall be left meeting the requirements of the local and state environmental requirements associated with the (SWPPP) Storm Water Pollution Protection Plan as submitted. Cleaning shall include off-cemetery disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition

and new work operations, clearing, logging and general construction in  
accordance with state and local regulations and the contract.

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**SECTION 01 74 19**  
**CONSTRUCTION WASTE MANAGEMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
  - 1. Waste Management Plan development and implementation.
  - 2. Techniques to minimize waste generation.
  - 3. Sorting and separating of waste materials.
  - 4. Salvage of existing materials and items for reuse or resale.
  - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
  - 1. Soil.
  - 2. Inerts (e.g., concrete, masonry and asphalt).
  - 3. Clean dimensional wood and palette wood.
  - 4. Green waste (biodegradable landscaping materials).
  - 5. Engineered wood products (plywood, particle board and I-joists, etc.).
  - 6. Metal products (e.g., steel, wire, beverage containers, etc.).
  - 7. Cardboard, paper and packaging.
  - 8. Bitumen roofing materials.
  - 9. Plastics (e.g., ABS, PVC).
  - 10. Carpet and/or pad.
  - 11. Gypsum board.
  - 12. Insulation.
  - 13. Paint.

**1.2 RELATED WORK**

- A. Section 02 41 00, DEMOLITION.
- B. Section 01 00 02, GENERAL REQUIREMENTS.

### 1.3 QUALITY ASSURANCE

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
1. Excess or unusable construction materials.
  2. Packaging used for construction products.
  3. Poor planning and/or layout.
  4. Construction error.
  5. Over ordering.
  6. Weather damage.
  7. Contamination.
  8. Mishandling.
  9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to reuse and recycle new materials to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.wbdg.org/tools/cwm.php> provides a Construction Waste Management Database that contains information on companies that haul. Collect, and process recyclable debris from construction projects.
- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.

- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

#### **1.4 TERMINOLOGY**

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.

- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
  - 1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
  - 2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

#### **1.5 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:



- B. Prepare and submit to the Resident Engineer a written demolition debris management plan. The plan shall include, but not be limited to, the following information:
1. Procedures to be used for debris management.
  2. Techniques to be used to minimize waste generation.
  3. Analysis of the estimated job site waste to be generated:
    - a. List of each material and quantity to be salvaged, reused, recycled.
    - b. List of each material and quantity proposed to be taken to a landfill.
  4. Detailed description of the Means/Methods to be used for material handling.
    - a. On site: Material separation, storage, protection where applicable.
    - b. Off site: Transportation means and destination. Include list of materials.
      - 1) Description of materials to be site-separated and self-hauled to designated facilities.
      - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
    - c. The names and locations of mixed debris reuse and recycling facilities or sites.
    - d. The names and locations of trash disposal landfill facilities or sites.
    - e. Documentation that the facilities or sites are approved to receive the materials.
- B. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- C. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

#### **1.6 APPLICABLE PUBLICATIONS**

Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.

A. U.S. Green Building Council (USGBC):

LEED Green Building Rating System for New Construction

**1.7 RECORDS**

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records shall be kept in accordance with the LEED Reference Guide and LEED Template.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

**PART 3 - EXECUTION**

**3.1 COLLECTION**

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

**3.2 DISPOSAL**

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

**3.3 REPORT**

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.

- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

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**SECTION 02 41 10**  
**DEMOLITION AND SITE CLEARING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies all site preparation work, demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown.

**1.2 RELATED WORK**

- A. Demolition and removal of roads, walks, curbs, and on-grade slabs outside buildings to be demolished: Section 31 20 11, EARTH MOVING.
- B. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- C. Disconnecting utility services prior to demolition: Section 01 00 02, GENERAL REQUIREMENTS.
- D. Reserved items that are to remain the property of the Government: Section 01 00 02, GENERAL REQUIREMENTS.
- E. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- F. Waste Management: Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT

**1.3 PROTECTION**

- A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities. Comply with requirements of GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 02, GENERAL REQUIREMENTS, Article 1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.
- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.
- D. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.

- E. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
  - 1. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 15 feet of fire hydrants.
- G. Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Cemetery; any damaged items shall be repaired or replaced as approved by the Resident Engineer/Contracting Officer's Representative (RE/COR). Coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required.
- H. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

**3.1 SITE CLEARING**

- A. General: Remove trees, shrubs, grass, and other vegetation, pavements, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.
  - 1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
- B. Erosion Control: Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Install fiber rolls and inlet protection as shown and as per requirements of the SWPPP, prior to any soil disturbance activities. Provide temporary seeding as required by the SWPPP.
- C. Maintain site controls in accordance with Storm Water Pollution Prevention Plan and repair as directed by COTR. Maintain all records as required by the SWPPP. Perform inspections as required by the SWPPP.
- D. Topsoil - On-site: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 6 inches. Satisfactory topsoil is reasonably free and/or screened of subsoil, clay lumps, stones, and

other objects over 1 inch in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.

- a. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles to prevent wind erosion in accordance with the Storm Water Pollution Prevention Plan. Refer to Section 32 90 00, PLANTING for soil amendments required prior to spreading topsoil.

- a. Stockpile shall be contained with erosion and sediment controls (silt fence) and stabilized if undisturbed in accordance with the Storm Water Pollution Prevention Plan.

3. Dispose of unsuitable or excess topsoil as specified for disposal of waste material only after approval of the RE/COR.

E. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.

2. Use only hand methods for grubbing inside drip line of trees indicated to remain.

3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

- a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.

F. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

G. Continue maintenance of erosion controls in compliance with the Storm Water Pollution Prevention Plan until the work is completed and the threat of erosion is gone by either around surface stabilizer or lawn

"grow-in" is at 85% complete. Temporary erosion control devices shall not be removed until the area is certified as being stabilized by the Qualified Inspector.

### **3.2 DEMOLITION**

- A. Remove and legally dispose of all materials, other than earth to remain as part of project work, from any trash dumps shown. Materials removed shall become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations. All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 5 feet below surrounding grade, shall be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 5 feet, or materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications. Burning is not permitted on the property.
- B. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the RE/COR. When Utility lines are encountered that are not indicated on the drawings, the RE/COR shall be notified prior to further work in that area.

### **3.2 CLEAN-UP**

- A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to RE/COR. Clean-up shall include off the Cemetery Property disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

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**SECTION 31 20 11  
EARTH MOVING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Earthwork including excavation, fill, backfill, and lawn restoration.

**1.2 RELATED REQUIREMENTS**

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

**1.3 DEFINITIONS**

A. Unsuitable Materials:

1. Fills: Topsoil, frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 3 inches; organic materials, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable.
2. Existing Subgrade (except footings): Same materials as above paragraph, not capable of direct support of slabs, pavement, and similar items, with the possible exception of improvement by compaction, proof rolling, or similar methods of improvement.

- B. Earthwork: Earthwork operations required within the new construction area. Also includes earthwork required for auxiliary structures and buildings and sewer and other trench work throughout the job site.

- C. Degree of Compaction: Degree of compaction is expressed as a percentage of maximum density obtained by the test procedure presented in AASHTO T99 Method A or ASTM D698 Method A.

- D. The term fill means fill or backfill.

- E. Topsoil: Fertile, friable, natural topsoil of loamy character and characteristic of locality, capable of growing healthy horticultural crops of grasses.

**1.4 CLASSIFICATION OF EXCAVATION**

- A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on the surface; utilities, and other items including underground structures indicated to be demolished and



removed; together with any type of materials regardless of character of material and obstructions encountered.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. American Nursery and Landscape Association (ANLA):
  - 1. 2004 - American Standard for Nursery Stock.
- C. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. T99-01 (R2004) - Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) Drop.
  - 2. T180-01 (2004) - Moisture-Density Relations of Soils Using a 4.54-kg [10 lb] Rammer and a 457 mm (18 inch) Drop.
- D. ASTM International (ASTM):
  - 1. D698-07 - Laboratory Compaction Characteristics of Soil Using Standard Effort.
  - 2. D1557-07 - Laboratory Compaction Characteristics of Soil Using Modified Effort.
- E. Standard Specifications of Pennsylvania State Department of Transportation, latest revision.

#### **1.6 SUBMITTALS**

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
  - 1. Show size, configuration, and fabrication and installation details.
  - 2. Plot plan showing elevations.
- C. Samples:
- D. Soil Samples: Provide proposed off site or on site fill material to COR, suitable for laboratory tests.

#### **1.7 DELIVERY**

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS.**

- A. Fills: Materials approved from on site and off site sources.
  - 1. Dry Density: 1760 kg/m<sup>3</sup> (110 pcf) minimum.
  - 2. Plasticity Index: 6 maximum.
  - 3. Liquid Limit: 30 maximum.
- B. Granular Fill:
  - 1. Subsurface Drain and Storm Sewer Stone, Washed, narrowly graded mixture of clean crushed stone, AASHTO #3 or AASHTO #57 coarse aggregate sizes as indicated on the plans.
- C. Fertilizer: 5 percent nitrogen, 10 percent phosphorus, and 5 percent potash.
- D. Seed: Grass mixture comparable to existing turf delivered to the site in unopened containers that clearly display the manufacturer's label, indicating the analysis of the contents.
- E. Sod: Comparable species with existing turf, without broken pads and torn or uneven ends. Use State Certified or State Approved sod when available.
  - 1. Thickness of Cut: 3/4 inch to 1 1/4 inches excluding top growth.

## **PART 3 - EXECUTION**

### **3.1 SITE PREPARATION**

- A. Clearing:
  - 1. Clear within the limits of earthwork operations as described or designated by the COR.
  - 2. Remove trees, shrubs, fences, foundations, incidental structures, paving, debris, trash and any other obstructions.
  - 3. Remove materials from the Cemetery Property.
- B. Grubbing:
  - 1. Remove stumps and roots 3 inches and larger diameter.
  - 2. Leave undisturbed sound stumps, roots up to 3 inches diameter, and nonperishable solid objects minimum 3 feet below subgrade or finished embankment.
  - 3. Do not leave material within the burial profile up to 8 feet below finished grade.
- C. Trees and Shrubs:

1. Remove trees and shrubs, not shown for removal, within 15 feet of new construction and 7'-6" of utility lines when approved in advance by the COR.
  2. Remove materials from the Cemetery Property.
  3. Protect from damage, existing trees and shrubs. Trim, clean, and paint existing trees and shrubs including the roots, according to standard industry horticultural practice for the geographic area and plant species.
  4. Do not store building materials closer to trees and shrubs to remain than the farthest extension of limbs.
- D. Stripping Topsoil: Unless otherwise indicated on the drawings, extend limits of earthwork operations anywhere the existing grade is filled or cut or where construction operations have compacted or otherwise disturbed the existing grade or turf. Strip topsoil as defined herein, or as indicated in the geotechnical report, within the limits of earthwork operations as specified above, unless specifically indicated or specified elsewhere in the specifications or shown on the drawings. Stockpile topsoil and protect as directed by the COR. Eliminate foreign material larger than 1/2 cubic foot in volume, from soil when stockpiled. Retain topsoil on station. Remove foreign materials larger than 1.5 inches in any dimension from topsoil used in final grading. Do not excavate wet topsoil.
1. Test soil per Specification Section 01 45 29 TESTING LABORATORY SERVICES Para 3.3 and 32 90 00 PLANTING Para 1.5.D to verify suitability for use in new lawn areas. If soil does not meet minimum requirements, then soil shall either be amended to meet requirements or topsoil shall be imported that does meet requirements.

### **3.2 EXCAVATION**

- A. Shoring, Sheet piling and Bracing: Shore, brace, or slope to an angle of repose banks of excavations to protect workmen, banks, adjacent paving, structures, and utilities, in compliance with OSHA requirements.
1. Extend shoring and bracing to bottom of the excavation. Shore excavations carried below the elevations of adjacent existing foundations.

B. Excavation Drainage:

1. Operate pumping equipment and/or install other materials, means and equipment to keep excavations free from water and subgrades dry, firm, and undisturbed until permanent work is received by COR.
2. Obtain approval from COR before placement of permanent work on subgrades.
3. Remove disturbed material to firm undisturbed material after water is brought under control, when subgrade for foundations is disturbed by water. Replace disturbed subgrade in trenches by mechanically tamped sand or gravel. When removed disturbed material is located where it is not possible to install and properly compact disturbed subgrade material with mechanically compacted sand or gravel, coordinate with COR to consider use of flowable fill.

C. Blasting: Blasting is not acceptable.

D. Trench Earthwork:

1. Storm sewer trenches:

a. Trench Width:

- 1) Below Point 6 inches Above Top of Pipe:
  - a) Pipe up to 12 inches: 24 inches diameter.
  - b) Pipe Larger than 12 inches:  $4/3$  diameter of pipe plus 8 inches.
- 2) Trench Width Above 6 inches: Pipe size as required for sheeting and bracing and proper performance of the Work.

b. Bed Bottom Quadrant of Pipe:

- 1) Undisturbed Soil: Bell holes no larger than necessary for jointing. Backfill with clean earth, placed and tamped by hand, maximum 12 inches above top of pipe.
- 2) Granular Fill: Depth of fill minimum 3 inches plus one-sixth of pipe diameter below the pipe of 12 inches above top of pipe. Place and tamp fill material by hand.

c. Place and compact excess backfill using acceptable excavated materials. Do not use unsuitable materials.

d. Use granular fill for bedding where rock or rocky materials are excavated.

2. Subsurface Drain trenches:

a. Trench Width:

- 1) Below Point 6 inches Above Top of Pipe:
  - a) Width indicated on plans.
- 2) Trench Width Above 6 inches: Size as required for sheeting and bracing and proper performance of the Work.
  - b. Place granular backfill and topsoil as indicated on plans.

E. Site Earthwork:

1. Perform excavation as indicated on Drawings and as follows:
  - a. Remove and replace unsuitable subgrade materials, as determined by the COR.
  - b. Obtain material samples for soil classification, under COR's direction, for testing by an approved testing laboratory to determine suitability.
  - c. When unsuitable material is encountered and removed, the contract price and time will be adjusted according to Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL REQUIREMENTS as applicable. Adjustments to be based on cubic meters (cubic yard) in cut section only.
2. Finished subgrade elevation as follows:
  - a. Pavement Areas: Bottom of pavement or base course as applicable.
  - b. Planting and Lawn Areas: 12 inches below finished grade, unless otherwise specified or indicated on the Drawings.

**3.3 FILLING AND BACKFILLING**

- A. General: Fill or backfill when all debris, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation. Use excavated materials or borrow for fill and backfill, as applicable. Do not use unsuitable excavated materials. Do not backfill until pipes in contact with backfill have been installed, and work inspected and approved by COR.
- B. Placing: Place material in horizontal layers not exceeding 200 mm 8 inches loose depth and then compacted. Do not place material muddy, frozen, or with frost surfaces.
- C. Compaction: Use approved equipment (hand or mechanical) to suit type of material compacted. Do not operate mechanized vibratory compaction equipment within 10 feet of new or existing building walls without

prior approval of the COR. Moisten or aerate material necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Compact each layer until there is no evidence of further compaction.

### **3.4 GRADING**

- A. General: Uniformly grade areas within limits specified, including adjacent transition areas. Smooth finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between points and existing finished grades. Provide smooth transition between abrupt changes in slope.
- B. Cut rough or sloping rock to level beds for foundations. In unfinished areas, fill low spots and level off with coarse sand or fine gravel.
- C. Finish subgrade in condition acceptable to the COR at least one day in advance of paving operations. Maintain finished subgrade in a smooth and compacted condition until succeeding operation has been accomplished. Scarify, compact, and grade subgrade before further construction when approved compacted subgrade is disturbed by subsequent operations or adverse weather.
- D. Tolerances:
  - 1. Subgrade and Base Course Final Grades for Paved Areas: Plus, or minus 0.25 inches of indicated grades.

### **3.5 LAWN AREAS**

- A. General: Harrow and till new or existing lawn areas to remain, 4 inches deep. Establish existing or design grades by dragging or similar operations. Do not do earthwork on wet soil. Obtain plant bed approval from COR before seeding or sodding operation begins.
- B. Finished Grading: Begin after rough grading has settled. Scarify subgrade surface areas 4 inches deep. Apply topsoil smooth, even surface, and true grades minimum 12 inches. Shape top and bottom of banks to form reverse curves in section; make junctions with undisturbed areas to conform to existing topography.
- C. Fertilizing: Mix fertilizer into the soil 4 inches deep at a rate of 25 pounds per 1000 square feet.
- D. Seeding: Apply seed at a rate of 4 pounds per 1000 square feet. Rake seed lightly. Roll area not to exceed 150 pounds per foot of roller width.

- E. Sodding: Water topsoil lightly before laying sod. Tightly butt sod strips at the ends and stagger in a running bond fashion. Place sod strips running across slope from bottom to top. Secure sodded slopes by pegging or other approved methods. Roll sodded area not to exceed 150 pounds per foot of the roller width.
- F. Watering: Upon completion in any one section, water thoroughly new sod pad and soil to a sufficient depth. COR will be responsible for sod after installation and acceptance.

### **3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL**

- A. Disposal: Transport surplus satisfactory soil to designated storage areas on Cemetery property. Stockpile or spread soil as directed by COR.
  - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of Cemetery property

### **3.7 CLEANING**

- A. Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Clean site, free of debris, and suitable for subsequent construction operations. Remove debris, rubbish, and excess material from the Cemetery Property.

- - - E N D - - -

**SECTION 32 90 00  
PLANTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Plants, soils, turf, and landscape materials and accessories.

**1.2 RELATED REQUIREMENTS**

- A. Topsoil Materials, Stripping and Stockpiling: Section 31 20 02, EARTH MOVING SHORT FORM.
- B. Topsoil Testing: Section 01 45 29, TESTING LABORATORY SERVICES.
- C. Erosion control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- D. Protection of Tress and Plantings: Section 02 41 10, DEMOLITION AND SITE CLEARING.
- E. Topsoil Placement and Compaction Test: Section 31 20 02, EARTH MOVING.

**1.3 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. American National Standards Institute (ANSI) Publications:
  1. ANSI Z60.1-2014 - Nursery Stock.
  2. ANSI Z133.1-2012 - Tree Care Operations-Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush- Safety Requirements.
- C. ASTM International (ASTM):
  1. C33/C33M-16-Concrete Aggregates.
  2. C136/C136M-14 - Sieve Analysis of Fine and Coarse Aggregates.
  3. D698-12 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  4. D977-13e1 - Emulsified Asphalt.
  5. D2028/D2028M-15 - Cutback Asphalt (Rapid-Curing Type).
  6. D2103-15 - Polyethylene Film and Sheeting.
- D. Hortus Third, most current edition: A Concise Dictionary of Plants Cultivated in the United States and Canada.
- E. National Cemetery Administration (NCA):
  1. Handbook 3410 - Integrate Pest Management.
  2. Handbook 3420-11 - Turfgrass Maintenance.
- F. Turfgrass Producers International (TPI):
  1. 2006 Guideline Specifications to Turfgrass Sodding.



G. United States Department of Agriculture (USDA):

1. Federal Seed Act-2011 - Rules and Regulations of the Secretary of Agriculture.

H. United States Environmental Protection Agency (EPA):

1. 40 CFR Part 503-1993 - Biosolids Rule.

**1.4 PREINSTALLATION MEETINGS**

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:

- a. Contracting Officer's Representative (COR).
- b. COR (RE).
- c. Contractor.
- d. Installer.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.

- a. Inspection of planting materials.
- b. Installation schedule.
- c. Installation sequence.
- d. Preparatory work.
- e. Protection before, during, and after installation.
- f. Installation.
- g. Inspecting.
- h. Environmental procedures.

3. Document and distribute meeting minutes to participants to record decisions affecting installation.

**1.5 SUBMITTALS**

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.

- a. Seeds.
- b. Sod.
- c. Soil amendments.
- d. Antidesiccant.
- e. Erosion control materials.
- f. Hydro mulch.

- g. Non-Asphaltic Trackifier.
- h. Herbicide.
- i. Weed Control.
- j. Mulches.
- k. Edging.

2. Warranty.

C. Samples: Submit before beginning Work of this section:

Inert Mulch	5 lb. of each type to be used.
Organic Mulch	5 lb. of each type to be used.
Topsoils	5 lb. of each type to be used.
Organic Amendments	5 lb. of each type to be used.
All pesticides required such as preemergence or post emergence herbicides, insecticides, or fungicides.	EPA approved labeling and MSDS sheet for each such product selected for use.
Edging Materials	Manufacturer's standard size

D. Test reports: Certify products comply with specifications.

1. Topsoil: Provide 5 lbs. representative sample from each proposed source for testing, analysis, and approval. Deliver samples to acceptable testing laboratory and have testing report sent directly to COR. Testing reports to include following tests and recommendations according to Association of Official Agricultural Chemists standards:
  - a. Soil Composition: USDA particle size analysis indicating percentages of sand, silt and clay, and percent organic matter. Mechanical gradation (sieve analysis) and chemical (pH soluble salts) performed by public extension service agency, State Land Grant College, or certified private testing laboratory. Percentages of clay and silt to be determined by hydrometer.

- b. Percent of organics to be determined by loss on ignition of oven-dried samples. Test samples to be oven-dried to constant weight at 230 degrees F, plus or minus (41 degrees F).
  - c. Macro and micro nutrient fertility tests as determined by Chemical analysis to include Macro and micro nutrient fertility tests as determined by pH, Salinity (EC), Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Soluble Copper, Zinc, Manganese, Iron, Saturation Extract Boron, Aluminum, Soluble Salts, Exchangeable Sodium Percentage (ESP), Sodium Adsorption Ratio (SAR), and Cation Exchange Capacity (CEC).
  - d. Tests, as specified, for gradation, organics, soil chemistry and pH to be performed by testing laboratory retained by National Cemetery Administration as described in Section 01 45 29, TESTING LABORATORY SERVICES.
  - e. Infiltration rate test.
  - f. Include recommendations for soil additives to correct soils deficiencies, as necessary, and for fertilizing and to adjust soil pH to optimum range for cool season turfgrass liming applications to support successful turfgrass growth.
2. Organic Soil Amendment:
- a. Testing: Provide testing by an independent laboratory, with the experience and capability to conduct the testing indicated following U.S. Composting Council Seal of Testing Assurance (STA) procedures, or equivalent.
  - b. Soil Amendment Analysis: Provide documentation from supplier that compost has reached a monitored temperature of 140 degrees Fahrenheit for at least one week. Engage an independent soil testing laboratory to test representative samples of compost and provide compost analysis report for the following parameters:
    - 1) Percent organic matter, percent moisture, percent inerts (foreign matter), pH, soluble salts, and particle size.
    - 2) Nutrient content, including: Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), and Magnesium (Mg) and Sulfur s.
    - 3) Trace Metals, including: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn).

- 4) Maturity Indicator. Provide bioassay results. Provide Carbon-Nitrogen ratio.
- 5) Stability Indicator: Provide respiration test results.
3. Amended Soil (in place): Following incorporation of amendments and additives, provide minimum six(6) samples per 40,000 sq. ft., 6 inch depth by 3 inch diameter core samples of amended soil taken from project site for testing, analysis, and approval. Locate each samples as directed by COR from areas designated to be planted in turfgrass. Deliver samples to testing laboratories and have testing report sent directly to COR. Obtain amended soil sample acceptance before seeding or hydroseeding.
- E. Certificates: Certify products comply with specifications.
- F. Before delivery, submit notarized certificates for approval to COR attesting that following materials meet specified requirements:
  1. Plant Materials (Department of Agriculture certification by State Nursery Inspector from the state in which the plant material originates declaring material to be free from insects and disease).
  2. Fertilizers: Four certificates of analysis for each type of fertilizer.
  3. Seed: Include guaranteed percentages of purity, weed content and germination of seed, and net weight and date of shipment.
  4. Sod.
- G. Maintenance Data:
  1. Care instructions for each plant material.

#### **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications:
  1. Regularly installs specified materials and products.
  2. Installed specified products with satisfactory service on five similar installations for minimum five years.
    - a. Project Experience List: Provide contact names and addresses for completed projects.
    - b. A member with good standing of either the Professional Landcare Network (PLANET) the AmericanHort.
    - c. Maintain an experienced full-time supervisor on Project site when work is in progress.

- d. Installer's personnel assigned to the Work shall have certification in one of the following categories from the Professional Landcare Network and submit one copy of certificate to the COR:
  - e. Certified Landscape Technician (CLT) - Exterior
  - f. Certified Ornamental Landscape Professional designated COLP.
- B. Licenses: Submit licenses to RE/COR:
- 1. Pesticide Applicator: License in state of project, commercial.

#### **1.7 DELIVERY**

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.
- D. Bulk Products:
  - 1. Deliver bulk products away from buildings, utilities, pavement, and existing turf and planted areas. Maintain dry bulk product storage away from contaminants. Protect products from weather.
  - 2. Install erosion control materials to prevent erosion or displacement of bulk products.
- E. Notify RE/COR of delivery schedule five days in advance, minimum. RE/COR will inspect materials upon arrival. Remove unacceptable plant materials from project site immediately.
- F. Protect sod from drying out.

#### **1.8 STORAGE AND HANDLING**

- A. Store seeds, soil amendments, fertilizers, and packaged materials in dry locations away from contaminants.
- B. Keep sod moist and protect from exposure to wind and direct sunlight.

#### **1.9 FIELD CONDITIONS**

- A. Seasons and Conditions:
- B. Perform turfgrass installation operations within following dates.
  - 1. Spring Planting: May 15 to June 15.
  - 2. Fall Planting: August 15 to October 1.
- C. Restrictions: Do not plant when ground is frozen, snow covered, saturated or in otherwise unsuitable condition for planting. Special conditions may exist that warrant variance in specified planting dates

or conditions. Submit written request for approval to RE/COR stating special conditions and proposal variance.

#### **1.10 WARRANTY**

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Comply with "Warranty" requirements in Section 00 72 00, GENERAL CONDITIONS, including the following supplements:
  - 1. One Year Turfgrass Warranty: Warranty begins when Government accepts turfgrass but not before end of Landscape Turfgrass Establishment Period.
  - 2. Replace any areas void of turfgrass immediately during warranty period and during an active growing season. One-year warranty for replaced turfgrass begins on day replacement work is completed and accepted.
  - 3. Government will inspect replacement turfgrass at end of Warranty period. Replace any dead, missing, or defective plant material and turfgrass immediately and during growing season. Warranty ends on date of this inspection provided work specified in this section is complied.

### **PART 2 - PRODUCTS**

#### **2.1 PRODUCTS - GENERAL**

- A. Provide each product from one source or manufacturer.
- B. Turf Grasses: Comply with the varieties specified.
- C. Maintain equipment, tools and machinery on project site in sufficient quantities and capacity for proper execution of Work.

#### **2.2 ORGANIC SOIL AMENDMENT**

- A. Organic Soil Amendment: Dark brown or black and capable of enhancing plant growth. Ninety-eight percent of material passes 1 inch screen. No admixture of refuse (i.e. noticeable inert contamination) or materials toxic to plant growth are permitted, free of all woody fibers, seeds, leaf structures, plastic, petroleum products, and toxic and non-organic matter.
  - 1. Acceptable Organic Soil Amendments: Peat moss, humus or peat, and commercially available combinations thereof.

2. Acceptable Compost: Natural organic sources such as food or animal residuals, or yard trimmings.
3. Unacceptable Sole Sources of Organic Matter: Untreated sludge from wastewater treatment plants, fresh manure, sawdust, and immature composts.

B. Minimum Material Requirements:

Test Parameter	Acceptable Ranges
Organic Matter	27 to 80 percent
pH	5.5 to 8.5
Ash	20 to 65 percent
Nitrogen	0.4 to 3.5 percent
Phosphorus	0.2 to 1.5 percent
Potassium	0.4 to 1.5 percent
C: N Ratio	25 to 30: 1
CEC	50 to 150 meq/100 g
Heavy Metals	Less than max. limits established by EPA 40 CFR Part 503
Inert Contents	Less than 1 percent by weight
Water-Holding Capacity	150 to 200 percent
Pathogen/Weed Seed Destruction	Proof of EPA minimum heating requirements

- C. Topsoil stripped and stockpiled on project site is acceptable provided, after testing and addition of necessary additives, meets above specification. Provide additional Organic Soil Amendment as required to complete work.
- D. Provide organic soil amendment in areas with organic matter content below 4 percent that will be seeded, sodded or sprigged after grading activities are completed to create satisfactory topsoil horizon.
- E. Spread and incorporate organic soil amendment into finished subgrade at depths indicated on drawings to raise soil organic content to minimum four percent and maximum six percent. Allow for additional depth of organic soil amendment to bring all grades to required finished grades as shown on grading plans.

### **2.3 LABELS**

- A. Legibly tag each plant, or group and bundles or containers of the species, variety, and size of plant with durable, waterproof and weather-resistant label indicating correct plant name and size specified in plant list. Labels to be securely attached and not removed until acceptance by the Government.

### **2.4 TOPSOIL**

- A. Topsoil: Provide well-graded soil of good uniform quality, natural, friable soil representative of productive soils in project vicinity. Topsoil to be free of subsoil, foreign matter, objects larger than 1 inch in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and have pH value of minimum 6.0 and maximum 7.0, and infiltration rate of 1 inch per hour or greater, and be best suited to region, climate and plant material specific to project.
- B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING SHORT FORM, subparagraph, Stripping Topsoil that meet general requirements stated above. Amend topsoil not meeting pH range specified by the addition of pH adjusters.
- C. When sufficient topsoil is not available on project site to specified depth, provide additional topsoil. Minimum 10 days before topsoil delivery, notify RE/COR of sources from which topsoil will be furnished. Obtain topsoil meeting general requirements stated above and comply with requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting pH range specified by adding pH adjusters.

### **2.5 INORGANIC SOIL AMENDMENTS**

- A. Lime: Agricultural limestone, minimum 90 percent calcium and magnesium carbonates. Grind lime fineness, minimum 90 percent passes No. 8 mesh and minimum 25 percent passes No. 100 mesh. Maximum moisture, 10 percent.
  - 1. Dolomitic Lime: Natural, agricultural limestone (calcium and magnesium carbonate), minimum of 20 percent calcium and 11 percent magnesium and as follows:
    - a. Screen Analysis: 100 percent passing through No.30 sieve; 70 percent passing through No. 100 sieve; minimum 30 percent



passing through No.325 sieve. Provide lime in form of granulated, prilled, dolomitic limestone.

2. Calcitic Lime: Natural, agricultural limestone (calcium carbonate), minimum of 36 percent calcium and as follows:
  - a. Screen Analysis: minimum of 100 percent passing through No. 10 sieve; minimum of 80 percent passing through No. 100 sieve.  
Provide lime in form of granulated, prilled, limestone.
3. Agricultural Gypsum: Finely ground, minimum of 90 percent calcium sulfate, or 85 percent calcium sulfate dihydrate.
4. Sulfur: Granular, biodegradable, minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
5. Iron Sulfate: Granulated ferrous sulfate minimum of 20 percent iron and 10 percent sulfur.
6. Aluminum Sulfate: Commercial grade, unadulterated.
7. Sand: Clean washed river sand, free of calcium, chlorides and other deleterious substances.

## **2.6 ORGANIC SOIL AMENDMENTS**

- A. Peat: Natural product of sphagnum moss peat derived from fresh-water site conforming to Fed. Spec. Q-P-166, except as otherwise specified. Shred and granulate peat to pass 1/2 inch mesh screen and condition in storage piles for minimum six months after excavation.
- B. Perlite: Horticulture grade.
- C. Vermiculite: Horticultural grade, free of any toxic materials.
- D. Organic Matter: Commercially prepared compost, composted sufficiently to be free of all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.

## **2.7 TURFGRASS FERTILIZER**

- A. Provide commercial grade granular fertilizer, free flowing, uniform in composition, and complying with applicable state and federal regulations. Submit fertilizer manufacturer's warranted statement of analysis. Fertilizer contain minimum 20 percent nitrogen by weight (50 percent from controlled release source such as sulfur coated urea), 5 percent available phosphoric acid, and 15 percent potash. Liquid starter fertilizer for hydro mulch slurry, commercial type with 50 percent of nitrogen from controlled release source.

## **2.8 MULCH**

- A. Mulch: Free of deleterious materials and stored to prevent inclusion of foreign material.
- B. Mineral Mulch: Riverbank stone, granite chips, marble chips, volcanic rock or similar and ranging from 1 inch to 2-1/2 inches according to ASTM C 136.
- C. Organic Mulch: Wood based products such as chips, nuggets or shredded hardwood:
  - 1. Straw for turfgrass seedbed mulch: Stalks from oats, wheat, rye, barley, or rice free of noxious weeds, mold or other objectionable material. Straw to be air-dried and suitable for placing with blower equipment.

## **2.9 WATER**

- A. Water: Contains no elements toxic to plant life, obtained from existing cemetery potable water.

## **2.10 ANTIDESICCANT**

- A. Antidesiccant: Emulsion manufactured for agricultural use to provide protective film over plant surfaces permeable enough to permit transpiration.

## **2.11 SEED**

- A. Seed: State-certified seed of latest season's crop delivered in original sealed packages, bearing producer's warranted analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Label complying with USDA Federal Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will not be acceptable. Onsite seed mixing will only be acceptable in presence of COR. Apply turfgrass seed separate from and before mulch material application.
- B. Minimum Acceptable Seed Quality Standards: Purity 95 percent, Germination 85 percent, Weed Seed Content less than 0.5 percent, Noxious Weeds 0.0 percent, Inert Material less than 3 percent, Germination Test Date no older than 6 months.
- C. All turfgrass seed mixtures, or sod composition to conform to species and cultivar requirements detailed below. Seed mixtures listed below are representative of an almost endless list of acceptable seed mixtures that roughly approximate these guidelines.

Cool Season Turfgrass Seed Mixtures	Percent by Weight
Primary Mixture	50 percent turf-type tall fescue and 50 percent perennial rye grass
Seeding Rate	(10 lbs./1000 sq. ft.)

1. Blend each species component with minimum two regionally adapted cultivars.

- D. Obtain approval of RE/COR and NCA Agronomist for deviations from these turfgrass species requirements.

#### **2.12 SOD**

- A. Sod: Nursery grown, certified sod as classified in TPI "Guideline Specifications to Turfgrass Sodding." Sod must also conform to turfgrass species limitations as outlined in seeding mixtures above.
- B. Sod: 50% Perennial Rye Grass, 30% Kentucky Bluegrass and 20% Fine Fescue Blend

#### **2.13 HERBICIDES AND OTHER PESTICIDES**

- A. Properly label and register pesticides with U.S. Environmental Protection Agency. Keep all pesticides in original labeled containers indicating analysis and method of use.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Examine areas to receive planting for compliance with requirements and other conditions affecting performance.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Identify and review all underground utility locations before commencing work and exercise caution when working close to utilities. Notify COR of apparent conflicts with construction and utilities to plan adjustment before installation.

### **3.2 FINE GRADING AND ORGANIC AND INORGANIC SOIL AMENDMENT INCORPORATION**

- A. Obtain RE/COR's written approval of previously completed rough grading work before incorporating organic soil amendments.
- B. Immediately before dumping and spreading approved organic soil amendment, clean subgrade of stones larger than 2 inches and debris or rubbish and remove from project site. Before spreading organic soil amendment, rip subgrades too compact to drain water or based upon compaction tests with claw 12 inches deep, pulled by bulldozer 610 mm (24 inches') on center, both directions, then regrade surface.
- C. Place and uniformly spread soil amendment materials over approved sub-grades. Apply inorganic soil amendments as recommended by soils report. Apply organic amendments to depth sufficiently greater than specified depth so after natural settlement and light rolling, specified minimum settled depth conform to lines, grades and elevations indicated on drawings. Incorporate soil amendment by disc harrowing, rototilling or other means in uniform manner. Incorporate upon organic matter deep enough to produce finished soil with organic matter content of between 4 and 6 percent. Provide additional organic soil amendment material, after in-place testing and approval, as required for organic matter content and finished grades at no additional cost to Government.
- D. Spread organic soil amendment material minimum 4 inches deep to finished grade at disturbed areas outside project limits.
- E. Do not handle subsoil or organic soil amendment material when wet or frozen.
- F. Set sufficient number of grade stakes to check finished grades. Set stakes in bottom of swales and at top of slopes. Connect contours and spot elevations with even slope.
- G. After incorporating soil amendments material into subsoil, prepare by scarifying or harrowing and hand raking. Remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove stones over 1-1/2 inch diameter from amended soil bed. Amended soil also to be free of smaller stones in excessive quantities as determined by RE/COR.

### **3.3 EXCAVATION FOR PLANTING**

- A. Compact whole surface with roller or by other suitable means to achieve 88 to 85 percent maximum dry density according to ASTM D698. During

compaction process, fill all depressions caused by settling or rolling with additional organic soil amendment. Regrade and roll surface until presenting smooth and even finish corresponding to required grades. Acceptable finished soil grade condition for all new turfgrass areas is "fine textured and firm." Satisfactory firmness test requires surface soil not be fluffy or powdery and able to support weight of average adult person without creating visible depression.

- B. Verify location of underground utilities before plant pit or bed excavation. Repair damaged utility lines. Where lawns have been established before planting, cover and protect before beginning excavations. Protect existing trees, shrubbery, and beds with barricades during project construction.
- C. Remove rocks and other underground obstructions to depth necessary to permit proper planting according to Drawings. Where underground utilities, construction, or solid rock ledges are encountered, RE/COR may select other locations for plant material.

### **3.4 FINISH GRADING**

- A. After ripping subgrade for topsoil/subsoil bonding, spread topsoil evenly to minimum 12 inches deep. Incorporate topsoil at least 2 to 3 inches into subsoil to avoid soil layering. Spread additional topsoil as required to meet finish grades. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished lawn areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

### **3.5 APPLICATION OF FERTILIZER AND SOIL AMENDMENTS FOR TURFGRASS AREAS**

- A. Apply turfgrass fertilizer and adjust soil acidity as recommended by soil test results. Add soil conditioners as specified for suitable topsoil in PART 2.
- B. Spread soil amendments as recommended by soil test results.
- C. Incorporate soil amendments into soil to minimum 4 inches as recommended by soil test results. Lightly mix starter fertilizer with top 1/2 inch of soil. Immediately restore soil an even condition before seeding or sod placement.

### **3.6 MECHANICAL SEEDING**

- A. Broadcast seed with approved equipment rate as outlined in "Seed" article above. Plant turfgrass seed before application of mulch material. Uniformly distribute seed in 2 directions at right angles to each other. Drag seeded area using approved device.
- B. Immediately after dragging, firm entire area with roller maximum 150 lbs./ft. of roller width.
- C. Immediately after preparing seeded area, evenly spread straw mulch at 2 tons/acre. Anchor mulch by mulch tiller, non-asphaltic tackifier, twine, or netting.

### **3.7 SODDING**

- A. Place sod according to TPI Guideline Specifications for sodding. Lay sod at right angles to slope or the flow of water. On slope areas, start at bottom of slope.
- B. Finishing: After sodding, blend edges of sod smoothly into surrounding area. Roll with lightweight roller to eliminate air spaces between sod and firmed soil.

### **3.8 WATERING**

- A. Watering: Start watering turfgrass areas immediately after installation at sufficient rate to ensure thorough wetting of soil to minimum 2 inches deep. Supervise watering operation to prevent run-off. Supply necessary pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations. Keep soil surface constantly moist, not wet, until turfgrass plants are well established.
- B. Deep water all trees twice each week during Plant Establishment Period, providing water penetration throughout root zone to full depth of planting pits, as verified by COR. Discontinue watering at first hard frost in fall and resume at ground thaw in spring.

### **3.9 TURFGRASS ESTABLISHMENT PERIOD**

- A. Turfgrass Establishment Period: Begins immediately after installation, with RE/COR's approval, and continues through growing season sufficiently long for turfgrass materials to become establish and provide satisfactory to District Agronomist and NCA. Conditions and appearance are as follows:
  - 1. Turfgrass has obtained minimum of 98 percent generally weed-free surface cover.

2. Maintain turfgrass during establishment period.
3. Turfgrass will not be accepted until completion of acceptable establishment period.
4. During Turfgrass Establishment Period complete the following:
  - a. Water turfgrass to maintain moist soil surface until turfgrass is well established. Quantity of applied water required to achieve and maintain these conditions determined on site by District Agronomist in consultation with RE/COR.
  - b. Replace mulch as required.
  - c. Provide the following during turfgrass establishment:
    - 1) Eradicate weeds. Water, fertilize, overseed, and perform other operation necessary to promote growth of turfgrass.
    - 2) Mow turfgrasses as often as necessary to maintain NCA specified mowing height for each type of turfgrass before final acceptance. Begin mowing when cool season turfgrass is 4 inches high.
  - d. Replace dead, missing or defective plant material during establishment period and an active growing season. Immediately replace each plant with one of same size and species.
  - e. Replant areas void of turfgrass during an active growing season only.
  - f. Sod will be evaluated for species and health thirty (30) days after laying last piece and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from sod operation will be living sod, uniform in color and leaf texture. Bare spots to be maximum 2 sq. inches. Joints between sod pieces to be tight and free of weeds and other undesirable growth.
  - g. Seeding will be evaluated for species and health thirty (30) days after final planting and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from seeding operation will be 98 percent coverage uniform in color and leaf texture. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Reseed unsatisfactory areas within seven days during an active growing season.
  - h. Complete remedial measures as directed by COR in consultation with District Agronomist to ensure plant and turfgrass survival.

- i. Repair damage caused while making plant or turfgrass replacements.

### **3.10 LANDSCAPE PLANT AND TURFGRASS ACCEPTANCE**

- A. Turfgrass acceptance will occur after completion of TURFGRASS ESTABLISHMENT PERIOD. Contractor to have completed, located, and installed all turfgrass according to drawings and specifications. All turfgrass is expected to be living and in healthy condition at time of inspection and acceptance. Make written request two weeks before final inspection of turfgrass. Upon inspection, when work is found to not meet specifications, TURFGRASS ESTABLISHMENT PERIOD will be extended at no additional cost to Government until work has been satisfactorily completed, inspected and accepted.
- B. Criteria for Acceptance of Turfgrass:
  - 1. Sod: Living sod grass plants uniform in color and leaf texture and well rooted into soil below so that gentle pulling of turfgrass leaves by hand does not dislodge sod. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Joints between sod pieces shall be tight and free from weeds and other undesirable growth.
  - 2. Seed: Living turfgrass plants with 98 percent coverage, uniform in color and leaf texture. Bare spots to be maximum 0.05 sq. m (0.5 sq. ft.).

### **3.11 CLEANING**

- A. Remove and legally dispose of all debris, rubbish, and excess material from project site.
- B. Where existing or new turfgrass areas have been damaged or scarred, restore disturbed areas to original condition.
- C. In areas where planting and turfgrass work have been completed, clear the area of all debris, spoil piles, and containers.
- D. Maintain minimum one paved pedestrian access route and one paved vehicular access route to each building clean at all times.
- E. Clear other paved areas when work in adjacent areas are completed.

### **3.12 PROTECTION**

- A. Protect plants and turfgrass areas from traffic and construction operations. Erect barricades, as required, and place approved signs at appropriate intervals until final acceptance.
- B. Remove protective materials immediately before acceptance.



C. Repair damage.

**3.13 ENVIRONMENTAL PROTECTION**

A. All work and operations to comply with requirements of Section  
01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

- - - E N D - - -

**SECTION 33 40 00  
STORM SEWER UTILITIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies materials and procedures for construction of outside, underground storm sewer systems that are complete and ready for operation. This includes piping, structures, and all other incidentals.

**1.2 RELATED WORK**

- A. Section 01 00 02, GENERAL REQUIREMENTS.  
B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES: Materials and Testing Report Submittals.  
C. Section 01 42 19, REFERENCE STANDARDS.  
D. Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS: Erosion and Sediment Control.  
E. Section 31 20 11, EARTH MOVING SF: Excavation, Trench Widths, Pipe Bedding, Backfill, Shoring, Sheeting, Bracing.

**1.3 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.  
B. American Association of State Highway and Transportation Officials (AASHTO):  
HB-17-2002.....Standard Specifications for Highway Bridges,  
17th Edition  
  
M252-2009.....Standard Specification for Corrugated  
Polyethylene Drainage Pipe  
M294-2015.....Standard Specification for Corrugated  
Polyethylene Pipe, 300 to 1500 mm (12 to 60  
In.) Diameter  
C. American Concrete Institute (ACI):  
318-2014.....Building Code Requirements for Structural  
Concrete and Commentary  
350-2006.....Code Requirements for Environmental Engineering  
Concrete Structures and Commentary

D. American Society of Mechanical Engineers (ASME):

A112.36.2M-1991.....Cleanouts

E. American Society for Testing and Materials (ASTM):

A48/A48M-2003 (R2012)...Standard Specification for Gray Iron Castings

A615/A615M-2016.....Standard Specification for Deformed and Plain  
Carbon-Steel Bars for Concrete Reinforcement

A1064/A1064M-2016.....Standard Specification for Carbon-Steel Wire  
and Welded Wire Reinforcement, Plain and  
Deformed, for Concrete

C33/C33M-2016.....Standard Specification for Concrete Aggregates

C150/C150M-2016.....Standard Specification for Portland Cement

C443-2012.....Standard Specification for Joints for Concrete  
Pipe and Manholes, Using Rubber Gaskets

C478-2015.....Standard Specification for Circular Precast  
Reinforced Concrete Manhole Sections

C890-2013.....Standard Practice for Minimum Structural Design  
Loading for Monolithic or Sectional Precast  
Concrete Water and Wastewater Structures

C891-2011.....Standard Practice for Installation of  
Underground Precast Concrete Utility Structures

C913-2008.....Standard Specification for Precast Concrete  
Water and Wastewater Structures

C923-2008 (R2013)e1.....Standard Specification for Resilient Connectors  
Between Reinforced Concrete Manhole Structures,  
Pipes, and Laterals

C990-2009 (R2014).....Standard Specification for Joints for Concrete  
Pipe, Manholes, and Precast Box Sections Using  
Preformed Flexible Joint Sealants

C1173-2010 (R2014).....Standard Specification for Flexible Transition  
Couplings for Underground Piping Systems

D448-2012.....Standard Classification for Sizes of Aggregate  
for Road and Bridge Construction

D698-2012e2.....Standard Test Methods for Laboratory Compaction  
Characteristics of Soil Using Standard Effort  
(12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))

- D2321-2014e1.....Standard Practice for Underground Installation  
of Thermoplastic Pipe for Sewers and Other  
Gravity-Flow Applications
- D3034-2015.....Standard Specification for Type PSM Poly (Vinyl  
Chloride) (PVC) Sewer Pipe and Fittings
- D3350-2014.....Standard Specification for Polyethylene  
Plastics Pipe and Fittings Materials
- D4101-2014.....Standard Specification for Polypropylene  
Injection and Extrusion Materials
- D5926-2015.....Standard Specification for Poly (Vinyl  
Chloride) (PVC) Gaskets for Drain, Waste, and  
Vent (DWV), Sewer, Sanitary, and Storm Plumbing  
Systems
- F477-2014.....Standard Specification for Elastomeric Seals  
(Gaskets) for Joining Plastic Pipe
- F714-2013.....Standard Specification for Polyethylene (PE)  
Plastic Pipe (DR-PR) Based on Outside Diameter
- F794-2003 (R2014).....Standard Specification for Poly (Vinyl  
Chloride) (PVC) Profile Gravity Sewer Pipe and  
Fittings Based on Controlled Inside Diameter
- F894-2013.....Standard Specification for Polyethylene (PE)  
Large Diameter Profile Wall Sewer and Drain  
Pipe
- F1417-2011a (R2015).....Standard Practice for Installation Acceptance  
of Plastic Non-Pressure Sewer Lines Using Low-  
Pressure Air
- F1668-2008.....Standard Guide for Construction Procedures for  
Buried Plastic Pipe

F. National Stone, Sand and Gravel Association (NSSGA):

.....Quarried Stone for Erosion and Sediment Control

#### **1.4 SUBMITTALS**

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 33 40 00, STORM SEWER UTILITIES", with applicable paragraph identification.

- C. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.

#### **1.5 QUALITY ASSURANCE**

A. Products Criteria:

1. When two or more units of the same type or class of materials or equipment are required, these units shall be products of one manufacturer.
2. A nameplate bearing manufacturer's name or trademark, including model number, shall be securely affixed in a conspicuous place on equipment. In addition, the model number shall be either cast integrally with equipment, stamped, or otherwise permanently marked on each item of equipment.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Handle catch basins according to manufacturer's written rigging instructions.

#### **1.7 COORDINATION**

- A. Coordinate connection to storm sewer main with the Cemetery.

#### **1.8 WARRANTY**

- A. Guaranty: Warranty of Construction, FAR clause 52.246-21.
- B. The Contractor shall remedy any defect due to faulty material or workmanship and pay for any damage to other work resulting therefrom within a period of one year from final acceptance. Further, the Contractor will furnish all manufacturers' and suppliers' written guarantees and warranties covering materials and equipment furnished under this Contract.

#### **1.9 AS-BUILT DOCUMENTATION**

- A. Submit manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
- B. The installing contractor shall maintain as-built drawings of each completed phase for verification; and, shall provide the complete set at the time of final systems certification testing. As-built drawings are to be provided, and a copy of them in Auto-CAD version 2004 provided on CD or DVD. Should the installing contractor engage the testing company to provide as-built or any portion thereof, it shall

not be deemed a conflict of interest or breach of the 'third party testing company' requirement.

- C. Certification documentation shall be provided to COR 10 working days prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and certification that all results of tests were within limits specified.

## **PART 2 - PRODUCTS**

### **2.1 FACTORY-ASSEMBLED PRODUCTS**

- A. Standardization of components shall be maximized to reduce spare part requirements. Guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.

### **2.2 PE PIPE AND FITTINGS**

- A. Corrugated PE pipe and fittings, DN 300 to DN 1500 (NPS 12 to NPS 60); AASHTO M294, Type S with smooth waterway for coupling joints. Pipe shall be produced from PE certified by the resin producer as meeting the requirements of ASTM D3350, minimum cell class 335434C.
1. Silt-tight Couplings: PE sleeve with ASTM D1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.

### **2.3 PVC PIPE AND FITTINGS**

- A. PVC Type PSM Sewer Piping:
1. Pipe: ASTM D3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends.
  2. Fittings: ASTM D3034, PVC with bell ends.
  3. Gaskets: ASTM F477, elastomeric seals.
  4. Perforations: ASTM F-758

### **2.4 NONPRESSURE TRANSITION COUPLINGS**

- A. Comply with ASTM C1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be joined, and corrosion resistant metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
1. For concrete pipes: ASTM C443, rubber.
  2. For plastic pipes: ASTM F477, elastomeric seal or ASTM D5926, PVC.

3. For dissimilar pipes: ASTM D5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded, Flexible Couplings: Couplings shall be an elastomeric sleeve with stainless steel shear ring and corrosion resistant metal tension band and tightening mechanism on each end.
- D. Shielded, flexible couplings shall be elastomeric or rubber sleeve with full length, corrosion resistant outer shield and corrosion resistant metal tension band and tightening mechanism on each end.
- E. Ring-type, flexible couplings shall be elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

## **2.5 CLEANOUTS**

- A. Cast Iron Cleanouts: ASME A112.36.2M, round, gray iron housing with clamping device and round, secured, scoriated, gray iron cover. Include gray iron ferrule with inside calk or spigot connection and countersunk, tapered thread, brass closure plug.
  1. Top-Loading Classification(s): Heavy Duty.
  2. Pipe fitting and riser to cleanout shall be same material as main pipe line.
- B. Plastic Cleanouts shall have PVC body with PVC threaded plug. Pipe fitting and riser to cleanout shall be of same material as main line pipe.

## **2.6 CATCH BASINS**

- A. Designed Precast Concrete Structures:
  1. Description: ASTM C913; designed for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
  2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
  3. Joint Sealant: ASTM C990, bitumen or butyl rubber.
  4. Resilient Pipe Connectors: ASTM C923, cast or fitted into manhole walls, for each pipe connection.
  5. Steps: If total depth from floor of structure to finished grade is greater than 1500 mm (60 inches). ASTM A615/A615M deformed, 15 mm (1/2 inch) steel reinforcing rods encased in ASTM D 4101, PP, width of 400 mm (16 inches) minimum, spaced at 300 to 400 mm (12 to 16 inch) intervals.

6. Adjusting Rings: Reinforced concrete rings, 150 to 225 mm (6 to 9 inches) total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

## **2.7 CONCRETE FOR CATCH BASINS**

- A. General: Cast-in-place concrete according to ACI 318, ACI 350, and the following:
  1. Cement: ASTM C150/C150M, Type II.
  2. Fine Aggregate: ASTM C33/C33M, sand.
  3. Coarse Aggregate: ASTM C33/C33M, crushed gravel.
  4. Water: Potable.
- B. Concrete Design Mix: 27.6 MPa (4000 psi) minimum, compressive strength in 28 days.
  1. Reinforcing Fabric: ASTM A1064/A1064M, steel, welded wire fabric, plain.
  2. Reinforcing Bars: ASTM A615/A615M, Grade 60 420 MPa (60,000 psi) deformed steel.
- C. Manhole Channels and Benches: Channels shall be the main line pipe material. Include benches in all manholes and catch basins.
  1. Channels: Main line pipe material or concrete invert. Height of vertical sides to 3/4 of pipe diameter. Form curved channels with smooth, uniform radius and slope. Invert Slope: Same slope as the main line pipe. Bench to be concrete, sloped to drain into channel. Minimum of 6 inch slope from main line pipe to wall sides.

## **2.8 WARNING TAPE**

- A. Standard, 4-Mil polyethylene 75 mm (3 inch) wide tape detectable type, purple with black letters, and imprinted with "CAUTION BURIED STORM SEWER BELOW".

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. If an installation is unsatisfactory to the COR, the Contractor shall correct the installation at no additional cost or time to the Government.

### **3.2 PIPE BEDDING**

- A. The bedding surface of the pipe shall provide a firm foundation of uniform density throughout the entire length of pipe. Plastic pipe bedding requirements shall meet the requirements of ASTM D2321.



Bedding, haunching and initial backfill shall be either Class IB or Class II material.

### **3.3 PIPING INSTALLATION**

- A. Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping with minimum cover as shown on the Drawings.
- C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
  - 1. Do not lay pipe on unstable material, in wet trench or when trench and weather conditions are unsuitable for the work.
  - 2. Support pipe on compacted bedding material. Excavate bell holes only large enough to properly make the joint.
  - 3. Inspect pipes and fittings, for defects before installation. Defective materials shall be plainly marked and removed from the site. Cut pipe shall have smooth regular ends at right angles to axis of pipe.
  - 4. Clean interior of all pipe thoroughly before installation. When work is not in progress, open ends of pipe shall be closed securely to prevent entrance of storm water, dirt or other substances.
  - 5. Lower pipe into trench carefully and bring to proper line, grade, and joint. After jointing, interior of each pipe shall be thoroughly wiped or swabbed to remove any dirt, trash or excess jointing materials.
  - 6. Do not walk on pipe in trenches until covered by a depth of 300 mm (12 inches) over the crown of the pipe.
  - 7. Warning tape shall be continuously placed 300 mm (12 inches) above storm sewer piping.
- D. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

- E. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install PE corrugated sewer piping according to ASTM D2321 with gasketed joints.
  - 2. Install PVC sewer piping according to ASTM D2321 and ASTM F1668.

### **3.4 CONNECTIONS TO EXISTING VA-OWNED MANHOLES**

- A. Make pipe connections and alterations to existing manholes so that finished work will conform as nearly as practicable to the applicable requirements specified for new manholes, including concrete and masonry work, cutting, and shaping.

### **3.5 CATCH BASIN INSTALLATION**

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

### **3.6 CONNECTIONS**

- A. Make connections to existing piping and underground manholes.
  - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping.
  - 2. Make branch connections from side into existing piping, DN 100 to DN 500 (NPS 4 to NPS 20). Remove section of existing pipe, install wye fitting into existing piping.
  - 3. Make branch connections from side into existing piping, DN 525 (NPS 21) or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 75 mm (3 inches) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, use epoxy-bonding compound as interface between new and existing concrete and piping materials.
  - 4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

B. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
  - a. Shielded flexible couplings for same or minor difference OD pipes.
  - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
  - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

### **3.7 IDENTIFICATION**

- A. Install green warning tape directly over piping and at outside edge of underground structures.

### **3.8 FIELD QUALITY CONTROL**

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Prior to final acceptance, provide a video record of all piping from the building to the municipal connection to show the lines are free from obstructions, properly sloped and joined.
  1. Submit separate reports for each system inspection.
  2. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  4. Reinspect and repeat procedure until results are satisfactory.

### **3.9 STARTUP AND TESTING**

- A. Make tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various

items of equipment shall be performed simultaneously with the system of which each item is an integral part.

- B. Submit separate report for each test.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
  - 1. Do not enclose, cover, or put into service before inspection and approval.
  - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
  - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  - 4. Submit separate report for each test.
- D. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government. Leaks and loss in test pressure constitute defects that must be repaired. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

### **3.10 CLEANING**

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

--- E N D ---