

DEPARTMENT OF VETERANS AFFAIRS

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SECTION 00 01 15
LIST OF DRAWINGS

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

<u>Drawing No.</u>	<u>Title</u>
X-101	Cover Sheet & Sheet Index
L-101	Site Plan
L-201	Site Furnishings Details
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SECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- 1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.
- 1-2. For the purposes of this contract, samples, 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.
- 1-3. 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.
- 1-4. 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 will not serve as a basis for extending contract time for completion.
- 1-5. Submittals will be reviewed for compliance with contract requirements by the COR and action thereon will be taken by COR on behalf of the Contracting Officer.
- 1-6. Contractor 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.
- 1-7. 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 Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.
- 1-8. 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.

- 1-9. 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. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter 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.
- B. 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.
- C. Approved samples will be kept on file by the COR 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.
- D. 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 the COR under one cover.
- 1-10. Samples, shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to the COR.

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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. Techniques to minimize waste generation.
 - 2. Sorting and separating of waste materials.
 - 3. Salvage of existing materials and items for reuse or resale.
 - 4. 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 (eg, 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 (eg, steel, wire, beverage containers, etc).
 - 7. Cardboard, paper and packaging.
 - 8. Bitumen roofing materials.
 - 9. Plastics (eg, ABS, PVC).
 - 10. Carpet and/or pad.
 - 11. Gypsum board.
 - 12. Insulation.
 - 13. Paint.

1.2 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 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.
- D. 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.
- E. 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.
- F. 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.

1.3 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.

1.4 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

PART 2 - PRODUCTS

NONE.

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.

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**SECTION 09 91 00
PAINTING**

PART 1-GENERAL

1.1 DESCRIPTION

- A. Section specifies field painting.
- B. Section specifies prime coats which may be applied in shop under other sections.
- C. Painting includes shellacs, stains, varnishes, and coatings specified.

1.2 RELATED WORK

- A. Shop prime painting of aluminum: Division 10 - EXTERIOR SIGNAGE.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.
- C. Samples:
 - 1. After painters' materials have been approved and before work is started submit samples showing each type of finish and color specified.
- D. Manufacturers' Certificates indicating compliance with specified requirements:
 - 1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
 - 2. High temperature aluminum paint.
 - 3. Epoxy coating.

1.4 QUALITY CONTROL

- A. Comply with Master Painters Institute (MPI) Standards indicated and listed in "MPI Approved Products List." Comply with the requirements in

"MPI Architectural Painting Specification Manual" before any project is started.

- B. Submit an equipment list consisting of a list of proposed equipment to be used in performance of construction work.
- C. Submit three color chips 3-inch by 4-inch or manufacture's pull-down of each finish color and gloss as scheduled.

1.5 DELIVERY AND STORAGE

- A. Deliver materials to site in manufacturer's sealed container marked to show following:
 - 1. Name of manufacturer.
 - 2. Product type.
 - 3. Batch number.
 - 4. Instructions for use.
 - 5. Safety precautions.
- B. In addition to manufacturer's label, provide a label legibly printed as following:
 - 1. Federal Specification Number, where applicable, and name of material.
 - 2. Surface upon which material is to be applied.
 - 3. If paint or other coating, state coat types; prime, body or finish.
- C. Maintain space for storage, and handling of painting materials and equipment in a neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
- D. Store materials at site at least 24 hours before using, at a temperature between 18 and 30 degrees C (65 and 85 degrees F).

1.6 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 Conference of Governmental Industrial Hygienists (ACGIH):

ACGIH TLV-BKLT-2009	Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
ACGIH TLV-DOC-2009	Documentation of Threshold Limit Values and Biological Exposure Indices, (Seventh Edition)
- C. Master Painters Institute (MPI):

MPI ASM (2004)	Architectural Painting Specification Manual
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PART 2 - PRODUCTS

2.1 MATERIALS

- A. Epoxy Coatings: Apply an Epoxy Coating System in conformance with MPI ASM, No. 80 and MPI ASM, No. 77. Apply a prime coat with a total dry-film thickness of not less than 0.1 millimeter 4 mils.
- B. Polyurethane Coatings: Apply a water base, light industrial coating system in conformance with [MPI ASM, No. 95] [MPI ASM, No. 77 and MPI ASM, No. 80 for epoxy coating] [MPI ASM, No. 80 for polyurethane] coats on aluminum surfaces. Prime coat is a polyurethane-resin material as recommended by the coating manufacturer for the substrate to be coated. Apply prime coat with a dry-film thickness of not less than 0.05 millimeter 2 mils. Finish coats are polyurethane-based material as specified.

2.2 PAINT PROPERTIES

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.

2.3 REGULATORY REQUIREMENTS

- A. Paint materials must conform to the restrictions of the local Environmental and Toxic Control jurisdiction or the requirements of this section, whichever is most stringent.
 - 1. Lead-Based Paint:
 - a. Lead based paint is not permitted to be used.
 - 2. Asbestos: Materials must not contain asbestos.
 - 3. Chromate, Cadmium, Mercury, and Silica: Materials must not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
 - 4. Human Carcinogens: Materials must not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
 - 5. Use high performance acrylic paints in place of alkyd paints, where possible.
 - 6. VOC content for solvent-based paints must not exceed specified performance requirement; aromatic hydro carbons contained in solvent-based paints must not exceed one percent by weight.

PART 3 - EXECUTION**3.1 JOB CONDITIONS**

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
 - 1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
 - 2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each day's work.
- B. Atmospheric and Surface Conditions:
 - 1. Do not apply coating when air or substrate conditions are:
 - a. Less than 3 degrees C (5 degrees F) above dew point.
 - b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the Contracting Officer and the product manufacturer.
 - 2. Do not exceed application conditions recommended by the manufacturer.
 - 3. Maintain interior temperatures until paint dries hard.
 - 4. Do no exterior painting when it is windy and dusty.
 - 5. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
 - 6. Apply only on clean, dry and frost free surfaces.

3.2 SURFACE PREPARATION

- A. Method of surface preparation shall result in final paint finish with solid even color and texture specified with no overlays.
- B. General:
 - 1. Remove prefabricated items not to be painted such as lighting fixtures, escutcheon plates, hardware, trim, and similar items for reinstallation after paint is dried.
 - 2. Remove items for reinstallation and complete painting of such items and adjacent areas when item or adjacent surface is not accessible or finish is different.
 - 3. See other sections of specifications for specified surface conditions and prime coat.
 - 4. Clean surfaces for painting with materials and methods compatible with substrate and specified finish. Remove any residue remaining

from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry.

c. Aluminum:

1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with Organic Zinc Rich Coating. Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) depending on finish coat compatibility.
3. Remove surface oxidation.

3.3 PAINT PREPARATION

- A. Mix and prepare coating materials in accordance with the coating manufacturer's printed instructions for applying the particular material and coat. Keep materials which are not in actual use in closed containers.
- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition. Coating materials that have been mixed with an automatic shaker are allowed to stand to let air bubbles escape, then given a final hand mixing before application.
- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Stir at frequent intervals during application to prevent skinning. Do not stir film which may form on the surface of the material. Remove film and strain, if necessary.
- D. Mix two component and two part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

3.4 APPLICATION

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three coats; prime, body, and finish. When two coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.

- C. Apply each coat evenly and cover substrate completely.
- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by COR.
- E. Finish surfaces to show solid even color, free from runs, lumps, brush marks, laps, holidays, or other defects.
- F. Apply by brush, roller or spray, except as otherwise specified.
- G. Spray application of coatings is limited to finish coats. Apply spray coatings as equivalent in all respects to the same coats applied by high quality brush application. Spray application equipment is limited to airless-spray equipment and electrostatic-spray equipment. Ensure equipment is clean and operated by workmen skilled in high quality application of coating materials.
- H. Permit each spray coat to cure before the succeeding coat is applied. Do not double back with application equipment, for the purpose of building up film thickness of two coats in one operation.
- I. Cover surfaces adjacent to sprayed areas to prevent damage from overspray, coating rebound, and spray drift.

3.5 PRIME PAINTING

- A. After surface preparation, prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel. Apply an additional prime coat.
- D. Metals Not Factory Finished: MPI 9 (Exterior Alkyd Enamel (EO)).

3.6 EXTERIOR FINISHES

- A. Apply following finish coats where specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Metals without factory finish except for primer: One coat MPI 9 (Exterior Alkyd Enamel (EO)).

3.7 REFINISHING EXISTING PAINTED SURFACES

- A. Clean, patch and repair existing surfaces as specified under surface preparation.
- B. Remove and reinstall items as specified under surface preparation.
- C. Remove existing finishes or apply separation coats to prevent non-compatible coatings from having contact.

- D. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- E. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- F. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- G. Sand or dull glossy surfaces prior to painting.
- H. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

3.8 PAINT COLOR

- A. Color and gloss of finish coats shall match factory finish of new signs.

3.9 PROTECTION CLEAN UP, AND TOUCH-UP

- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
- B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
- C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

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**SECTION 10 14 00
EXTERIOR SIGNAGE**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the work required to furnish and install the indicated and specified exterior cemetery site signage systems, including, but not limited to posts and mow strips.
- B. Signs shall be products of manufacturers regularly engaged in manufacturing signs of types specified.
- C. Signs included are as follows:
 - 1. Information/Regulation
 - 2. Traffic Regulatory
 - a. Low Profile
 - 3. Post and Panel
 - a. One Line of Text
 - b. Two Lines of Text
 - c. Three Lines of Text

1.2 RELATED WORK

- A. Post Setting Excavation, Material, Backfill, Section 31 20 00, EARTH MOVING.
- B. Concrete Bases for posts: Section 03 30 53, (SHORT FORM) CAST-IN-PLACE CONCRETE

1.3 MANUFACTURER'S QUALIFICATIONS

- A. Sign manufacturer shall regularly and presently manufacture signs similar to those specified as one of their principal products. Sign manufacturer shall submit qualifications demonstrating a minimum of three years of experience manufacturing the qualifying signs and shall, if possible, demonstrate the successful manufacturing of exterior site signs installed at one or more State or National Veteran Cemeteries.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Submit 2 sets. One set to the District Engineer and one set to the Contracting Officer's Representative (COR). The Contractor shall provide submittal documents that indicate each of the sign types, mounting types and materials to be used for the various combinations to be used for this project. Submittal materials shall indicate the location(s) for the various sign types including their mounting.

1. Post & panel sign mock-up, not less than 200 mm by 250 mm (8" by 10"), shall be constructed and submitted, showing typical color, texture and fonts shown on Contract Drawings. Mock-up shall show typical fabrication methods, including panel to post(s) connection. Sample shall be capable of demonstrating how the face panels can be removed, for repair or replacement, from the mounted location between the posts, for a two post sign system. Mock-ups of all other sign systems for post mounted signs shall be capable of demonstrating how the sign panels are to be removed and replaced from the posts, or mounting support system attached to the posts, without moving the posts. Post, other than concrete or stone types, shall include typical post cap secured with tamperproof screws. Top surface of the sign panel shall not contain screws or metal joints that could trap or allow water to enter the sign assembly.
 2. Square tube post, 150 mm (6") minimum length, showing typical color and finish. Attachments for the sign panels shall be provided to demonstrate the complete signage system materials and functionality.
 3. Aluminum samples showing full range of finish colors available.
 4. Color samples of each color, 150 mm x 150 mm (6 inches x 6 inches). Show anticipated range of color and texture.
 5. Sample of typeface, arrow and symbols in a typical full size layout.
 6. Directory panels and frames, with letters and symbols, each type.
- C. Shop Drawings: All signs showing material, finish, colors, size of members, details of construction, letter spacing, size and type, numbers, symbols or image details, and mounting details. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes. The details of construction shall clearly show how the sign is to be disassembled to replace the entire sign or just one side panel, where applicable.
- D. Full size layout in full color of the Sign Panels.
- E. Manufacturer's Literature and Data (Mark literature to indicate items proposed to be furnished): Signs, each type. Manufacturer's printed specifications, anchorage details, installation and maintenance instructions. Manufacturer's recommendations for mounting the Sign Panels shall be provided.
- F. Manufacturer's Certificates: Provide certification from the coating installer, indicating exactly what they did to prepared the aluminum as and applied the coating(s) to the specified thickness(es). The

certification shall indicate that the coating has been installed according to specific and identified contract specifications and/or approved submittal materials so it is absolutely clear what was done.

1.5 DELIVERY AND STORAGE

- A. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.
- B. Deliver signs only when the site, mounting materials, and equipment are ready for installation work to proceed.
- C. Store products in dry condition inside enclosed facilities.

1.6 WARRANTY

- A. Sign Manufacturer shall guarantee the text and symbols applied to the powder coated aluminum for a warranty period of five years following final acceptance of the project. A warranty inspection shall be performed no later than one year following and up to five years after project final acceptance and the Contractor shall be responsible for removing and replacing any text and/or symbols identified, during the inspection, that have started to fade, chip, peel or otherwise fail. The Contractor shall remove and replace any sign panel faces with new, where the applied lettering, or the paint system itself, is causing damage to, or failure of, the paint system. All work to produce replacement sign panels with new lettering and/or paint system shall be provided at no cost to the Government, as part of the Warranty work for the signage system.

1.7 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. Americans with Disabilities Act - 1990, as amended and in effect as of 01-01-2009
- C. American Society for Testing and Materials (ASTM):

B209-10	Aluminum and Aluminum-Alloy Sheet and Plate
B221-12	Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
B449-93(2010)e1	Standard Specification for Chromates on Aluminum
- D. American Architectural Manufacturer's Association (AAMA):

EXTERIOR SIGNAGE

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AAMA 2605-05 Performance Requirements and Test Procedures
for High Performance Organic Coatings on
Aluminum extrusions and Panels.

E. Federal Specifications (Fed. Spec.):

MIL-P-8184F Plastic Sheet, Acrylic, Modified.

A-A-59502 Plastic Sheet, Polycarbonate

F. VA Signage Design Guide:

Section 12 National Cemetery Signs -
Signage Design Guide.pdf

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum, Extruded: Fed. Spec. QQA-200-9, alloy 6063-T5, applicable as material.
- B. Aluminum, Sheet and Plate: ASTM B209
- C. Aluminum, Extrusions and Tubing: ASTM B221
- D. Zinc Chromate Primer: Fed. Spec. TT-P-645.

2.2 SIGNAGE GENERAL

- A. Signs shall be of type, size and design shown on the drawings and as specified.
- B. Signs shall be complete with lettering, framing, and related components for a complete sign installation.
- C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- D. Do not scale drawings for dimensions. Verify all dimensions and conditions shown by the drawings. District Engineer and Contracting Officer's Representative (COR) are to be notified of any discrepancy in drawing(s), in field directions or conditions, and of any changes required for any such related construction details.
- E. The Contractor, by commencing work of this section, assumes overall responsibility, as part of his warranty of work, to assure that assemblies, components and parts shown or required within the work of the section, comply with the Contract Documents. Warranty: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.

2.3 SIGN STANDARDS

- A. Typography:

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1. Type Style: Helvetica Bold and Helvetica. All caps as indicated in Site Signage Plan, unless otherwise indicated.
 2. Arrow: See graphic standards in drawings.
 3. Letter spacing: See graphic standards on drawings.
 4. All text, arrows, and symbols to be provided in size, colors, typefaces and letter spacing shown. Text shall be a true, clean, accurate reproduction of typeface(s) shown. Text shown in drawings are for layout purposes only. Text to be installed on specific signs shall be as submitted, reviewed and finally approved in shop drawings processed as submittal materials.
- B. Sign Colors and Finishes: As specified in this Specification Section and approved in the Shop Drawing & Submittal process.
1. Aluminum sign system color scheme shall have the background color of sign panels and the aluminum posts as powder coated matching existing dark-brown.

2.4 SIGNS TYPES

- A. General: The exterior sign system shall be comprised of sign type families that are derived from the 10 Types developed in Chapter 12 - National Cemetery Signs, of the VA Signage Design Guide (SDG). The sign designations used herein follow those in the SDG. An example sign designation, to identify what each of the elements is designated to represent is "NC-07.01 A - m1". "NC" Designates a National Cemetery sign. "07" the two digit numbers identify a particular sign type. "01" the two digit number following the period identifies a specific sign size within the sign type. "A" the letter designates a specific sign configuration, version and/or layout for graphics. "m1" denotes metal family with square style. All signs for this project are two post metal. All of the above is duplicated herein, originally from the graphical indications in the SDG. The basic sign designations for this project as indicated on the drawings are defined with the following SDG standards with any modifications indicated:
1. Type A1 - NC-04.01 B: Post and Panel, 36" x 8" panel (modified: all caps).
 2. Type A2 - NC-04.03 B: Post and Panel, 36" x 18" panel (modified: all caps).
 3. Type C1 - NC-03.01 A: Traffic Regulatory Sign, Stop (modified: 24" square panel with 18" graphic).

4. Type D1 - NC-03.01 G: Traffic Regulatory Sign, Authorized Vehicles Only, 18" square panel (modified: all caps).
 5. Type D2 - NC-03.01 F: Traffic Regulatory Sign, Speed Limit, 18" square panel (modified: all caps).
 6. Type D3 - NC-03.01 C: Traffic Regulatory Sign, One Way, 18" square panel (modified: all caps).
 7. Type FR - NC-01.01 B: Floral Regulations Sign, 36" x 24" panel.
- B. Location, layout and construction details for the all of the project exterior signs shall be found in the Construction Drawings. Refer to the signage details for the specific sign panel sizes, text and graphic sizes as well as the layout and content for the text and images for the respective individual signs.

2.5 TEXT AND GRAPHICS

- A. There are multiple Message Layout types for some of the different size signs within the same type of sign. See the drawing layout and detail drawings for the specifics of the locations for the signs, as well as the size, types, materials and messages for the individual signs for the project.
1. Surface applied letters, numbers and graphics shall be of a published quality and life expectancy equal to or exceeding that for reflective white opaque Engineering Grade 3M™ Scotchlite™ vinyl, unless otherwise noted. Color shall be selected from the manufacturer's standard color selection, during the submittal process. Font Type Style shall be as indicated in Paragraph "SIGN STANDARDS" as approved during the submittal process.
- B. All text and graphics for the exterior signage shall be provided in detailed submittal information. Each sign face shall be represented in scaled drawings, with exact font, letter style, font, letter spacing, graphics being shown. Only signs and or sign faces approved in the submittal process shall be manufactured.

2.6 FABRICATION

- A. Design components to allow for expansion and contraction for a minimum material temperature range of 56 °C (100 °F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.
- B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners whenever and wherever possible.

- C. Shop fabricate so far as practicable. Joints fastened flush to conceal reinforcement, or welded where thickness or section permits.
- D. Contact surfaces of connected members shall be true. Assemble so joints will be tight and practically unnoticeable, without use of filling compound.
- E. Signs shall have fine, even texture and be flat and sound. Lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern. Plane surfaces shall be smooth flat and without oil-canning, free of rack and twist. Maximum variation from true plane of surface shall be plus or minus 0.4mm (1/64 inch). Restore texture to filed or cut areas.
- F. Level or straighten wrought work. Members shall have sharp lines and angles and smooth surfaces.
- G. Extruded members to be free from extrusion marks. Members shall have square turns and corners sharp, and curves shall be true.
- H. Drill holes for bolts and screws. Conceal fastenings where possible. Exposed ends and edges mill smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.
- I. All painted surfaces properly primed. Finish coating of paint to have complete coverage with no light or thin applications allowing substrate or primer to show. Finished surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, peeling, foreign matter and other imperfections.
- J. Movable parts, including hardware, are be cleaned and adjusted to operate as designed without binding or deformation of members. All contact surfaces fit tight and even without forcing or warping components.
- K. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- L. Completed sign installations shall not have any exposed openings so insect nesting inside of signs will be prevented.
- M. No signs are to be manufactured until final sign message schedule and location review has been completed by the RE/COR & forwarded to contractor.

- N. Final sign fabrication shall not proceed until samples and shop drawings detailing the sign system as it will be installed, have been submitted and approved during the submittal process.

2.7 PROTECTION OF ALUMINUM

- A. Isolate aluminum in contact with or fastened to dissimilar metals other than stainless steel, white bronze or other metals compatible with aluminum by one of the following:
1. Painting the dissimilar metal with a prime coat of zinc-chromate or other suitable primer, followed by two coats of aluminum paint.
 2. Placing an approved caulking compound, or a non-absorptive tape, or gasket between the aluminum and the dissimilar metal.
- B. Paint aluminum in contact with or built into mortar, concrete, or other masonry materials with bituminous paint or zinc chromate primer.

2.8 DOUBLE-POST-PANEL SIGNS

- A. Post and Panel Signs: Furnish the standard post style for each of the Post and Panel Signs, as designated in the drawings.
1. Metal post signs:
 - a. The posts, frame and panel(s) that make up the metal post sign system shall be constructed of an aluminum tubing system with approved post caps. Posts and frame elements for supporting the panels at individual sign locations shall be sized using the minimum sizes, as indicated herein, or as indicated on the drawings, with the drawing sizes taking precedence. The minimum size for the metal posts, if not indicated in the drawings, shall be 50 mm x 100 mm x 3 mm (2-inch by 4-inch by 1/8").
 - b. The minimum size for the tubular aluminum frame system, if not indicated in the drawings, shall be 25 mm x 25 mm x 3 mm (1-inch x 1-inch x 1/8-inch) with the 3 mm(1/8 - inch) aluminum panels anchored to the tubing, with all corners mitered and welded and ground smooth. When the sign panel system is mounted to the posts, there shall be no openings for insects to enter. Mounting holes for attaching the sign panel and frame to the posts shall be pre-drilled before the coating system is applied. The entire sign panel and frame system shall be coated with the submitted and approved powder coating system, as indicated herein or on the drawings. The sign panels shall be secured to the frame system with tamperproof screws and each panel face shall be removable, without removing the sign system from the posts.

- c. Sign panel assembly shall be constructed with extruded aluminum support channels and fasteners that secure a removable powder-coated aluminum sign panel assembly. Aluminum sign panel faces shall be 3 mm (1/8") minimum thick. The design for the sign panel system shall be such that the sign panels can be removed and replaced, if damaged, without having to move the posts that secure the sign panel assembly. The sign panel assembly shall be constructed so there are no gaps or holes in the assembly that could let insects enter and construct nests or otherwise become a nuisance. The top of the sign panel assembly shall be constructed such that it is water tight from above and shall not have unsealed joints where water can collect or enter the assembly. The sign configuration and mounting shall be as depicted in the drawings.
- d. Lettering shall be as indicated on the applicable "Site Details" type of Drawing(s).
- e. Exposed fasteners shall be aluminum, tamper-proof type, and shall be colored to match the color for the sign panels.
- f. Finishes of exposed aluminum surfaces:
 - 1) Pretreatment: Before the finish is applied, a five-stage pretreatment must be applied to assure maximum adhesion and corrosion resistance:
 - a) Stage 1: High alkaline cleaner to prepare the surface
 - b) Stage 2: Water rinse
 - c) Stage 3: Combination of chromic, phosphoric and hydrofluoric acids that produce the chrome-phosphate conversion coating for maximum adhesion and corrosion resistance.
 - d) Stage 4: Water rinse
 - e) Stage 5: Water rinse
 - 2) Coating: The coatings for the metal signs shall produce results that meet or exceed the testing results indicated in AAMA 2605-05. After pretreatment, the metal is dried and paint is then applied. The aluminum shall have an electrostatically applied baked-on flexible acrylic finish that meet or exceeds industry standard tests, achieving a 75 - 125 micron (3.0 - 5.0 mil) thickness, super-tough finish with maximum exterior

durability and superior adhesion characteristics. Color as indicated on the drawings and approved submittal.

3) Tests:

- a) AAMA 2605-05 (covers Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum extrusions and Panels)
- b) ASTM D2247 (Humidity resistance of 1,000 hours)
- c) ASTM B117 (Salt spray resistance of 1,000 hours)
- d) Accelerated weathering for 500 hours under Method 6152 of Federal Test Method 141 shall show no adhesion loss, with only slight fading, chalking and water staining.
- e) Outdoor weathering shall show no adhesion loss, checking or crazing, with only slight fade and chalk when exposed for one year in Florida facing south at a 45 degree angle.
- f) Minimum hardness of 2H using ASTM D3363.
- g) Color of exposed portions of fastenings shall match sign panel being attached.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set work accurately, in alignment and where shown. Signs shall be plumb, level, free of rack and twist and set parallel or perpendicular as required to line and plane the surface.
- B. Signs shall be installed with direct burial of post into concrete as shown on Contract Drawings. Depth of posts shall be such that the bottom of the concrete surrounding the posts is at least below the frost, or as indicated in the drawings, whichever is the greater depth.
- C. Protect aluminum in contact with dissimilar metals or mortar as specified in Paragraph "PROTECTION OF ALUMINUM".
- D. Furnish setting drawings and instructions for installation of anchors and for the positioning of items having anchors or sleeves to be built into construction. Provide temporary bracing for such items until permanent anchors are set.
- E. Provide anchoring devices and fasteners as shown and as necessary for securing signs to construction as specified.
- F. Verify that behind or beneath each sign location there are no utility lines, or other buried infrastructure elements, that will be affected by installation of signs. Any damage during installation of signs to

utilities, or other buried infrastructure will be the sole responsibility of the Contractor to correct and repair.

- G. Furnish inserts and anchoring devices which must be set in concrete or other material for installation of signs. Provide setting drawings, templates, instructions and directions for installation of anchorage devices which may involve other trades.
- H. Sign message panels shall be mounted using tamper-proof mechanical fasteners that are coated and colored to match the message panels.
- I. Install permanent caps on top of all aluminum posts.
- J. Mounting details and materials shall be provided as samples during the submittal process, and complete demonstration of all of the installation features, materials and methods shall be provided during the submittal process.

3.2 CLEANING

- A. After installation, all items shall be cleaned as recommended by the manufacturer and protected from damage until completion of the project.

3.3 PROTECTION

- A. Protect finished surfaces from damage during fabrication, erection and after completion of the work.

- -END- - -

SECTION 31 20 11
EARTH MOVING (SHORT FORM)

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies the requirements for furnishing all equipment, materials, labor and techniques for earthwork including excavation, fill, backfill, and site restoration utilizing fertilizer, seed and/or sod.

1.2 DEFINITIONS:

- A. Unsuitable Materials:
 - 1. Fills: Topsoil, frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 75 mm (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, that are 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. It 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 ASTM D1557.
- D. The term fill means fill or backfill as appropriate.

1.3 RELATED WORK:

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Safety Requirements: Section 00 72 00, GENERAL CONDITIONS, Article, ACCIDENT PREVENTION.
- C. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Subsurface Investigation: Section 01 00 00, GENERAL REQUIREMENTS, Article, PHYSICAL DATA.

1.4 CLASSIFICATION OF EXCAVATION:

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.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Fills: Materials approved from on site and off site sources having a minimum dry density of 110 pcf, a maximum Plasticity Index of 6, and a maximum Liquid Limit of 30.
- B. Granular Fill:
 - 1. Under concrete slab, crushed stone or gravel graded from 1 inch to No. 4.
 - 2. Bedding for sanitary and storm sewer pipe, crushed stone or gravel graded from 1/2 inch to No. 4.
- C. Fertilizer: (5-10-5) delivered to site in unopened containers that clearly display the manufacturer's label, indicating the analysis of the contents.
- D. Seed: Grass mixture comparable to existing turf delivered to site in unopened containers that clearly display the manufacturer's label, indicating the analysis of the contents.
- E. Sod: Comparable species with existing turf. Use State Certified or State Approved sod when available. Deliver sod to site immediately after

cutting and in a moist condition. Thickness of cut must be 3/4 inch to 1 1/4 inches excluding top growth. There shall be no broken pads and torn or uneven ends.

PART 3 - EXECUTION

3.1 SITE PREPARATION:

- A. Clearing: Clearing within the limits of earthwork operations as described or designated by the COR. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, debris, trash and any other obstructions. Remove materials from the Cemetery Property.
- B. Grubbing: Remove stumps and roots 3 inches and larger diameter. Undisturbed sound stumps, roots up to 3 inches diameter, and nonperishable solid objects which will be a minimum of 3 feet below subgrade or finished embankment may be left. Cemetery Projects: do not leave material within the burial profile up to 8 feet below finished grade.
- C. Trees and Shrubs: Trees and shrubs, not shown for removal, may be removed from the areas within 15 feet of new construction and 7'-6" of utility lines if such removal is approved in advance by the COR. Remove materials from the Cemetery Property. Box, and otherwise protect from damage, existing trees and shrubs which are not shown to be removed in the construction area. Repair immediately damage to existing trees and shrubs by trimming, cleaning and painting damaged areas, including the roots, in accordance with standard industry horticultural practice for the geographic area and plant species. Building materials shall not be stored closer to trees and shrubs, that are to remain, than the farthest extension of their limbs.
- D. Stripping Topsoil: Unless otherwise indicated on the drawings, the limits of earthwork operations shall extend 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, from within the limits of earthwork operations as specified above unless specifically indicated or specified elsewhere in the specifications or shown on the drawings. Topsoil shall be fertile, friable, natural topsoil of loamy character and characteristic of the locality. Topsoil shall be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by the COR. Eliminate foreign material, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials, larger than 1/2 cubic foot in volume, from soil as it is stockpiled. Retain topsoil on the station. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil used in final grading. Topsoil work, such as stripping, stockpiling, and similar topsoil work, shall not, under any circumstances, be carried out when the soil is wet so that the tilth of the soil will be destroyed.
 - 1. Cemetery Projects: Recommend that the top soil be tested for chemicals, pesticides and fertilizers if topsoil is to be removed from lands formerly utilized as farmland, to verify suitability for use as topsoil in the cemetery where new lawn areas are to be established.
 - 2. Concrete Slabs and Paving: Score deeply or saw cut to insure a neat, straight cut, sections of existing paving to be removed where excavation or trenching occurs. Extend pavement section to be removed a minimum of 12 inches on each side of widest part of trench excavation and insure final score lines are approximately parallel unless otherwise indicated. Remove material from the Cemetery Property.
- E. Disposal: All materials removed from the property shall be disposed of at a legally approved site, for the specific materials, and all removals shall be in accordance with all applicable Federal, State and local regulations. No burning of materials is permitted onsite.

3.2 EXCAVATION:

- A. Shoring, Sheet piling and Bracing: Shore, brace, or slope to its 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 the bottom of the excavation. Shore excavations that are carried below the elevations of adjacent existing foundations.
 - 2. If the bearing of any foundation is disturbed by excavating, improper shoring or removal of shoring, placing of backfill, and similar operations, provide a concrete fill support under disturbed foundations, as directed by COR, at no additional cost to the Government. Do not remove shoring until permanent work in excavation has been inspected and approved by COR.
- B. Excavation Drainage: Operate pumping equipment, and/or provide other materials, means and equipment as required, to keep excavations free of water and subgrades dry, firm, and undisturbed until approval of permanent work has been received from COR. Approval by the COR is also required before placement of the permanent work on all subgrades. Replace disturbed subgrade in trenches by mechanically tamped sand or gravel.
- C. Trench Earthwork:
 - 1. Utility trenches (except sanitary and storm sewer):
 - a. Excavate to a width as necessary for sheet piling and bracing and proper performance of the work.
 - b. Grade bottom of trenches with bell-holes, scooped-out to provide a uniform bearing.
 - c. Support piping on undisturbed earth unless a mechanical support is shown.
 - d. The length of open trench in advance of pipe laying shall not be greater than is authorized by the COR.
 - 2. Sanitary and storm sewer trenches:
 - a. Trench width below a point 6 inches above top of the pipe shall be 24 inches for up to and including 12 inches diameter and four-thirds diameter of pipe plus 8 inches for pipe larger than 12 inches. Width of trench above that level shall be as necessary for sheet piling and bracing and proper performance of the work.
 - b. The bottom quadrant of the pipe shall be bedded on undisturbed soil or granular fill.
 - 1) Undisturbed: Bell holes shall be no larger than necessary for jointing. Backfill up to a point 12 inches above top of pipe shall be clean earth placed and tamped by hand.
 - 2) Granular Fill: Depth of fill shall be a minimum of 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 as specified the remainder of backfill using acceptable excavated materials. Do not use unsuitable materials.
 - d. Use granular fill for bedding where rock or rocky materials are excavated.
- D. Site Earthwork: Excavation shall be accomplished as required by drawings and specifications. Remove subgrade materials, that are determined by the COR as unsuitable, and replace with acceptable material. If there is a question as to whether material is unsuitable or not, the Contractor shall obtain samples of the material, under the direction of the COR, and the materials shall be examined by an independent testing laboratory for soil classification to determine whether it is unsuitable or not. When unsuitable material is encountered and removed, the contract price and time will be adjusted in accordance with Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL CONDITIONS as applicable. Adjustments to be based on yardage in cut section only.
- E. Finished elevation of subgrade shall be as follows:
 - 1. Pavement Areas - bottom of the pavement or base course as applicable.

2. Planting and Lawn Areas - 4 inches below the finished grade, unless otherwise specified or indicated on the drawings.

3.3 FILLING AND BACKFILLING:

- A. General: Do not fill or backfill until all debris, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from the excavation. Proof-roll exposed subgrades with a fully loaded dump truck. Use excavated materials or borrow for fill and backfill, as applicable. Do not use unsuitable excavated materials. Do not backfill until foundation walls have been completed above grade and adequately braced, waterproofing or dampproofing applied, and pipes coming in contact with backfill have been installed, and inspected and approved by COR.
- B. Proof-rolling Existing Subgrade: Proof-roll with a fully loaded dump truck. Make a minimum of one pass in each direction. Remove unstable uncompactable material and replace with granular fill material completed to mix requirements specified.
- C. Placing: Place material in horizontal layers not exceeding 8 inches in loose depth and then compacted. Do not place material on surfaces that are muddy, frozen, or contain frost.
- D. Compaction: Use approved equipment (hand or mechanical) well suited to the type of material being compacted. Do not operate mechanized vibratory compaction equipment within 10 feet of new or existing building walls without the prior approval of the COR. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Compact each layer until there is no evidence of further compaction.

3.4 GRADING:

- A. General: Uniformly grade the areas within the limits of this section, including adjacent transition areas. Smooth the finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between such points and existing finished grades. Provide a 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 a condition acceptable to the COR at least one day in advance of the paving operations. Maintain finished subgrade in a smooth and compacted condition until the succeeding operation has been accomplished. Scarify, compact, and grade the subgrade prior to further construction when approved compacted subgrade is disturbed by contractor's subsequent operations or adverse weather.
- D. Grading for Paved Areas: Provide final grades for both subgrade and base course to +/- 0.25 inches of indicated grades.

3.5 LAWN AREAS:

- A. General: Harrow and till to a depth of 4 inches, new or existing lawn areas to remain, which are disturbed during construction. Establish existing or design grades by dragging or similar operations. Do not carry out lawn areas earthwork out when the soil is wet so that the tilth of the soil will be destroyed. Plant bed must be approved by COR before seeding or sodding operation begins.
- B. Finished Grading: Begin finish grading after rough grading has had sufficient time for settlement. Scarify subgrade surface in lawn areas to a depth of 4 inches. Apply topsoil so that after normal compaction, dragging and raking operations (to bring surface to indicated finish grades) there will be a minimum of 4 inches of topsoil over all lawn areas; make smooth, even surface and true grades, which will not allow water to stand at any point. Shape top and bottom of banks to form reverse curves in section; make junctions with undisturbed areas to conform to existing topography. Solid lines within grading limits

indicate finished contours. Existing contours, indicated by broken lines are believed approximately correct but are not guaranteed.

- C. Fertilizing: Incorporate fertilizer into the soil to a depth of 4 inches at a rate of 25 pounds per 1000 square feet.
- D. Seeding: Seed at a rate of 4 pounds per 1000 square feet and accomplished only during periods when uniform distribution may be assured. Lightly rake seed into bed immediately after seeding. Roll seeded area immediately with a roller not to exceed 150 pounds per foot of roller width.
- E. Sodding: Topsoil shall be firmed by rolling and during periods of high temperature the topsoil shall be watered lightly immediately prior to laying sod. Sod strips shall be tightly butted at the ends and staggered in a running bond fashion. Placement on slopes shall be from the bottom to top of slope with sod strips running across slope. Secure sodded slopes by pegging or other approved methods. Roll sodded area with a roller not to exceed 150 pounds per foot of the roller width to improve contact of sod with the soil.
- F. Watering: The COR is responsible for having adequate water available at the site. As sodding is completed in any one section, the entire sodded area shall be thoroughly irrigated by the contractor, to a sufficient depth, that the underside of the new sod pad and soil, immediately below sod, is thoroughly wet. COR will be responsible for sod after installation and acceptance.

3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL:

- A. Remove excess excavated material and waste material, including unsatisfactory soil, organic matter, trash, and debris, and legally dispose of it off the Cemetery property.
- B. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.
- C. Dispose of excavated contaminated material in accordance with State and Local requirements.

3.7 CLEAN-UP:

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

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SECTION 32 05 23
CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section shall cover site work concrete constructed upon the prepared subgrade and in conformance with the lines, grades, thickness, and cross sections shown. Construction shall include the following:
- B. Curb, gutter, and combination curb and gutter.
- C. Pedestrian Pavement: Walks, wheelchair curb ramps.

1.2 RELATED WORK

- A. Laboratory and Field Testing Requirements: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Subgrade Preparation: Section 31 20 11, EARTH MOVING.
- C. Concrete Materials, Quality, Mixing, Design and Other Requirements: Section 03 30 53, CAST-IN-PLACE-CONCRETE.

1.3 DESIGN REQUIREMENTS

Design all elements with the latest published version of applicable codes.

1.4 WEATHER LIMITATIONS

Placement of concrete shall follow the recommendations of ACI 305R-06, HOT WEATHER CONCRETING and ACI 306R-2002, COLD WEATHER CONCRETING.

1.5 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. Refer to the latest edition of all referenced Standards and codes.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - M31.....Deformed and Plain Billet Steel Bars for Concrete Reinforcement (ASTM A615/A615M-96A)
 - M55M/55M.....Welded Steel Wire Fabric for Concrete Reinforcement (ASTM A185)
 - M147.....Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses (R 1996)
 - M148.....Liquid Membrane-Forming Compounds for Curing Concrete (ASTM C309A)
 - M171.....Sheet Materials for Curing Concrete (ASTM C171)
 - M182.....Burlap Cloth Made from Jute or Kenaf
 - M213.....Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Type) (ASTM D1751)
 - T99.....Moisture-Density Relations of Soils Using a 2.5 kg. (5.5 lb) Rammer and a 305 mm (12 in.) Drop
 - T180.....Moisture-Density Relations of Soils Using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
- C. American Society for Testing and Materials (ASTM):
 - C94/C94M.....Ready-Mixed Concrete
 - C143/C143M.....Slump of Hydraulic Cement Concrete

PART 2 - PRODUCTS

2.1 GENERAL

Concrete shall be Type C, air-entrained as specified in Section 03 30 53, CAST-IN-PLACE CONCRETE, with the following exceptions:

TYPE	MAXIMUM SLUMP*
Curb & Gutter	3"
Pedestrian Pavement	3"
Vehicular Pavement	2" (Machine Finished) 4" (Hand Finished)
Equipment Pad	3" to 4"
* For concrete to be vibrated: Slump as determined by ASTM C143. Tolerances as established by ASTM C94.	

2.2 REINFORCEMENT

- A. The type, amount, and locations of steel reinforcement shall be as shown on the drawings and in the specifications.
- B. Welded wire-fabric shall conform to AASHTO M55.
- C. Dowels shall be plain steel bars conforming to AASHTO M31 or M42. Tie bars shall be deformed steel bars conforming to AASHTO M31 or M42.

2.3 FORMS

- A. Use metal or wood forms that are straight and suitable in cross-section, depth, and strength to resist springing during depositing and consolidating the concrete, for the work involved.
- B. Do not use forms if they vary from a straight line more than 1/8 inch in any ten foot long section, in either a horizontal or vertical direction.
- C. Wood forms should be at least 2 inches thick (nominal). Wood forms shall also be free from warp, twist, loose knots, splits, or other defects. Use approved flexible or curved forms for forming radii.

2.4 CONCRETE CURING MATERIALS

- A. Concrete curing materials shall conform to one of the following:
 1. Burlap conforming to AASHTO M182 having a weight of seven ounces or more per square yard when dry.
 2. Impervious Sheeting conforming to AASHTO M171.
 3. Liquid Membrane Curing Compound conforming to AASHTO M148 (ASTM C309), Type 1 and shall be free of paraffin or petroleum.

2.5 EXPANSION JOINT FILLERS

Material shall conform to AASHTO M213.

PART 3 - EXECUTION

3.1 SUBGRADE PENETRATION

- A. Prepare, construct, and finish the subgrade as specified in Section 31 20 11, EARTH MOVING.
- B. Maintain the subgrade in a smooth, compacted condition, in conformance with the required section and established grade until the succeeding operation has been accomplished.

3.2 SETTING FORMS

- A. Base Support:
 1. Compact the base material under the forms true to grade so that, when set, they will be uniformly supported for their entire length at the grade as shown.
 2. Correct imperfections or variations in the base material grade by cutting or filling and compacting.
- B. Form Setting:
 1. Set forms sufficiently in advance of the placing of the concrete to permit the performance and approval of all operations required with and adjacent to the form lines.
 2. Set forms to true line and grade and use stakes, clamps, spreaders, and braces to hold them rigidly in place so that the forms and joints are free from play or movement in any direction.

3. Forms shall conform to line and grade with an allowable tolerance of 1/8 inch when checked with a straightedge and shall not deviate from true line by more than 1/4 inch at any point.
4. Do not remove forms until removal will not result in damaged concrete or at such time to facilitate finishing.
5. Clean and oil forms each time they are used.
- C. The Contractor's Registered Professional Land Surveyor, shall establish and control the alignment and the grade elevations of the forms or concrete slipforming machine operations.
 1. Make necessary corrections to forms immediately before placing concrete.
 2. When any form has been disturbed or any subgrade or subbase has become unstable, reset and recheck the form before placing concrete.

3.3 EQUIPMENT

- A. The COR shall approve equipment and tools necessary for handling materials and performing all parts of the work prior to commencement of work.
- B. Maintain equipment and tools in satisfactory working condition at all times.

3.4 PLACING REINFORCEMENT

- A. Reinforcement shall be free from dirt, oil, rust, scale or other substances that prevent the bonding of the concrete to the reinforcement.
- B. Before the concrete is placed, the COR shall approve the reinforcement, which shall be accurately and securely fastened in place with suitable supports and ties. The type, amount, and position of the reinforcement shall be as shown.

3.5 PLACING CONCRETE - GENERAL

- A. Obtain approval of the COR before placing concrete.
- B. Remove debris and other foreign material from between the forms before placing concrete. Obtain approval of the COR before placing concrete.
- C. Before the concrete is placed, uniformly moisten the subgrade, base, or subbase appropriately, avoiding puddles of water.
- D. Convey concrete from mixer to final place of deposit by a method which will prevent segregation or loss of ingredients. Deposit concrete so that it requires as little handling as possible.
- E. While being placed, spade or vibrate and compact the concrete with suitable tools to prevent the formation of voids or honeycomb pockets. Vibrate concrete well against forms and along joints. Over-vibration or manipulation causing segregation will not be permitted. Place concrete continuously between joints without bulkheads.
- F. Install a construction joint whenever the placing of concrete is suspended for more than 30 minutes and at the end of each day's work.
- G. Workmen or construction equipment coated with foreign material shall not be permitted to walk or operate in the concrete during placement and finishing operations.

3.6 PLACING CONCRETE FOR PEDESTRIAN PAVEMENT

- A. Place concrete in the forms in one layer of such thickness that, when compacted and finished, it will conform to the cross section as shown.
- B. Deposit concrete as near to joints as possible without disturbing them but do not dump onto a joint assembly.
- C. After the concrete has been placed in the forms, use a strike-off guided by the side forms to bring the surface to the proper section to be compacted.
- D. Consolidate the concrete thoroughly by tamping and spading, or with approved mechanical finishing equipment.
- E. Finish the surface to grade with a wood or metal float.

- F. All Concrete pavements shall be constructed with sufficient slope to drain properly.

3.7 PLACING CONCRETE FOR OVERLAY/TOPPING SLAB

A. General:

1. Remove the existing flagstone and mortar bed in the area to be repaired to the depth indicated to expose a surface of sound, unweathered concrete that is uncontaminated by oils, greases, or deicing salts or solutions. The actual depth of removal shall be subject to approval by the COE.
2. Remove existing flagstone and mortar bed with care to avoid damage to adjacent structures and concrete that is not to be repaired under this contract. Repair any such damage at no additional cost to the government. Mark on the surface the limits of existing flagstone and mortar bed removal for approval by the COR prior to any removal. Do not remove metal and other embedded items exposed during the flagstone and mortar bed removal operations without authorization of the COR.
3. Unless otherwise indicated, continue removal using appropriate equipment to remove unsound mortar and concrete and to eliminate any offsets in the area to be repaired which would cause an abrupt change in thickness of the repair and to remove protrusions between holes. Variations in the final prepared surface shall not exceed the nominal maximum size aggregate of the repair material. Any removal beyond the limits shown on the drawings shall be approved by the COR prior to performing the additional removal. All equipment and removal methods shall comply with applicable safety requirements.

B. Concrete Mix Criteria for Overlay/Topping Slab

1. Low Shrinkage: < 0.04% @ 28 days when tested in accordance with ASTM C157M "Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete."
2. Regular weight concrete topping shall have a design strength of 4,000 P.S.I. at 28 days, with minimum 6-1/2 bags of cement (Type II) in each cubic yard of concrete.
3. Maximum size of aggregate of 1/3 of overlay/topping depth.
4. Maximum 0.45 water/cement ratio.

C. Preliminary Surface Cleaning

1. Clean concrete surfaces that are contaminated with oil, grease or dirt prior to beginning concrete removal in the area. Use detergents, proprietary cleaners formulated for removal of contaminants from concrete, or steam cleaning in accordance with the manufacturer's written instructions. Do not use solvents for removal of oil or grease. All traces of cleaning agents and contaminants shall be removed from the surface.
2. Existing reinforcing steel in base slab: Following the flagstone and mortar bed removal operation, inspect the condition of any exposed reinforcing bars. Where the bond between the concrete and any reinforcing steel has been destroyed, or where the concrete deterioration is caused by corrosion of the reinforcing steel, remove the adjacent concrete to a depth that will permit cleaning of the steel and bonding of the concrete. Provide a minimum clearance below the steel 1 inch or 1/4 inch plus the maximum size of aggregate in the repair material, whichever is greater, clearance around the steel, except where other reinforcing steel makes this impractical. Use chipping hammers weighing less than 15 pounds, abrasive water cutting, or high-pressure water for removal of concrete around reinforcing steel. Remove all corrosion from reinforcing steel.

D. Surface preparation

1. General: After removal of the flagstone and mortar bed to the specified limits, clean the surface to which the repair material is to be applied to remove dust, debris and laitance. Perform final cleaning immediately prior to placement of the repair material. Scarify existing surface to a minimum 1/4-inch amplitude. Keep the existing concrete wet for a minimum of 12 hours and dried for 12 hours immediately prior to placing new concrete. The surface shall be dry with no standing water on the surface upon which concrete is placed.
2. Cleaning: Perform all cleaning operations to the satisfaction of the COR. Protect adjacent structures and embedded items. Use potable water for all cleaning operations. Perform a preliminary washing as soon as the chipping and trimming are completed to remove loose materials and dust particles. Clean surfaces to which new concrete is to be bonded. Final cleaning shall remove all laitance, carbonation, scum, dirt, oil, grease, and loose or disintegrated concrete. Perform additional surface chipping to remove coarse aggregate that is undercut by cleaning process. Perform such additional chipping as determined necessary by the cor at no additional cost to the government. Wire brush or sandblast metal surfaces against which concrete is to be placed to remove rust and other contaminants which would prevent proper bond with the concrete. Perform final cleaning immediately prior to concrete placement. Protect all work from contamination during all phases of cleanup and preparation prior to repair.

E. Waste water disposal

1. Dispose of waste water employed in cutting, washing, and rinsing of concrete surfaces in a manner such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall meet all requirements of section 01 57 19 temporary environmental controls.

F. Placement of Concrete Overlay/Topping Slab

1. Bonding grout: Immediately before a fully bonded overlay is placed, scrub a thin coating of bonding grout into the cleaned, dry surface or cleaned, damp (but not wet) surface if it has been pre-wetted overnight. Make the grout with approximate portions of 1 part Portland cement, 1 part concrete or masonry sand, and 1/2 part water mixed to give a thick, creamy, paint-like consistency. Tensile strength of the bonding grout should equal or be slightly greater than the tensile strength of the concrete substrate—typically 300 to 500 psi for 3000- to 4000-psi concrete. Place the grout in a 1/16- to 1/8-in. When brooming the grout into the surface, make sure that the entire surface receives a thorough, even coating and that no excess grout collects in pockets. Don't apply grout faster than the overlay concrete can be placed and never let the grout dry to a whitish appearance before the overlay concrete is placed. If it dries, the grout will act as a debonding layer instead of improving the bond. If the grout does dry before the overlay can be placed, remove the grout completely by sandblasting, sweeping, and then waterblasting.
2. Place, consolidate, finish and cure concrete in accordance with the applicable requirements of section 03 30 53, CAST-IN-PLACE CONCRETE, except only moist curing will be permitted.

3. Joints: Construct control joints in concrete overlay at the locations shown. Maintain alignment of control joints within 1/4-inch, to either side, of the required joint alignment. Construct control joints by tooling the plastic concrete, then sawcutting at the appropriate time. Saw control joints to a minimum 1 inch. Begin sawcutting as soon as it is possible to saw the concrete without damaging adjacent concrete. Inspect the faces of joints during sawcutting for undercutting or washing of the concrete due to early sawing. Complete sawcutting within 16 hours of concrete placement. Continue sawcutting regardless of weather conditions. Delay sawing if undercutting is sufficiently deep to cause structural weakness or excessive roughness in the joint or chipping, tearing, or spalling of the concrete occurs at the surface. Discontinue sawing when a crack develops ahead of the saw cut. Immediately after the joint is sawed, flush the saw cut and adjacent concrete surface thoroughly with water until all residue from sawing moved from the joint. Control and dispose of waste water from sawcutting and cleanup in accordance with section 01 57 19 temporary environmental controls.
4. Curing: Proper curing is even more important in bonded resurfacing than in ordinary concrete work because of the potential for rapid, early drying of the thin concrete overlay due to its high surface-to-volume ratio. Start curing as soon as possible after finishing operations have been completed. If drying occurs soon after concrete is placed it may cause surface crazing and cracking. Use a fog spray immediately after finishing to protect against rapid drying, and cover with wet burlap, plastic sheets, or waterproof paper as soon as these materials can be placed without marring the surface. Keep the concrete covered and wet for at least 7 days.

3.8 CONCRETE FINISHING - GENERAL

- A. The sequence of operations, unless otherwise indicated, shall be as follows:
 1. Consolidating, floating, straight-edging, troweling, texturing, and edging of joints.
 2. Maintain finishing equipment and tools in a clean and approved condition.

3.9 CONCRETE FINISHING PEDESTRIAN PAVEMENT

- A. Walks, Wheelchair Curb Ramps:
 1. Finish the surfaces to grade and cross section with a metal float, trowled smooth and finished with a broom moistened with clear water.
 2. Brooming shall be transverse to the line of traffic.
 3. Finish all slab edges, including those at formed joints, carefully with an edger having a radius as shown on the Drawings.
 4. Unless otherwise indicated, edge the transverse joints before brooming. The brooming shall eliminate the flat surface left by the surface face of the edger. Execute the brooming so that the corrugation, thus produced, will be uniform in appearance and not more than 1/16 inch in depth.
 5. The completed surface shall be uniform in color and free of surface blemishes, form marks, and tool marks. The finished surface of the pavement shall not vary more than 3/16 inch when tested with a 10 foot straightedge.
 6. The thickness of the pavement shall not vary more than 1/4 inch.
 7. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints.

3.10 JOINTS - GENERAL

- A. Place joints, where shown, conforming to the details as shown, and perpendicular to the finished grade of the concrete surface.

- B. Joints shall be straight and continuous from edge to edge of the pavement.

3.11 CONTRACTION JOINTS

- A. Cut joints to depth as shown with a grooving tool or jointer of a radius as shown or by sawing with a blade producing the required width and depth.
- B. Construct joints in curbs and gutters by inserting 1/8 inch steel plates conforming to the cross sections of the curb and gutter.
- C. Plates shall remain in place until concrete has set sufficiently to hold its shape and shall then be removed.
- D. Finish edges of all joints with an edging tool having the radius as shown.
- E. Score pedestrian pavement with a standard grooving tool or jointer.

3.12 EXPANSION JOINTS

- A. Use a preformed expansion joint filler material of the thickness as shown to form expansion joints.
- B. Material shall extend the full depth of concrete, cut and shaped to the cross section as shown, except that top edges of joint filler shall be below the finished concrete surface where shown to allow for sealing.
- C. Anchor with approved devices to prevent displacing during placing and finishing operations.
- D. Round the edges of joints with an edging tool.
- E. Form expansion joints as follows:
 - 1. Without dowels, about structures and features that project through, into, or against any site work concrete construction.
 - 2. Using joint filler of the type, thickness, and width as shown.
 - 3. Installed in such a manner as to form a complete, uniform separation between the structure and the site work concrete item.

3.13 CONSTRUCTION JOINTS

- A. Place transverse construction joints of the type shown, where indicated and whenever the placing of concrete is suspended for more than 30 minutes.
- B. Use a butt-type joint with dowels in curb and gutter if the joint occurs at the location of a planned joint.
- C. Use keyed joints with tiebars if the joint occurs in the middle third of the normal curb and gutter joint interval.

3.14 FORM REMOVAL

- A. Forms shall remain in place at least 12 hours after the concrete has been placed. Remove forms without injuring the concrete.
- B. Do not use bars or heavy tools against the concrete in removing the forms. Promptly repair any concrete found defective after form removal.

3.15 CURING OF CONCRETE

- A. Cure concrete by one of the following methods appropriate to the weather conditions and local construction practices, against loss of moisture, and rapid temperature changes for at least seven days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready to install before actual concrete placement begins. Provide protection as necessary to prevent cracking of the pavement due to temperature changes during the curing period. If any selected method of curing does not afford the proper curing and protection against concrete cracking, remove and replace the damaged pavement and employ another method of curing as directed by the COR.

- B. Burlap Mat: Provide a minimum of two layers kept saturated with water for the curing period. Mats shall overlap each other at least 6 inches.
- C. Impervious Sheeting: Use waterproof paper, polyethylene-coated burlap, or polyethylene sheeting. Polyethylene shall be at least 4 mils in thickness. Wet the entire exposed concrete surface with a fine spray of water and then cover with the sheeting material. Sheets shall overlap each other at least 12 inches. Securely anchor sheeting.
- D. Liquid Membrane Curing:
 - 1. Apply pigmented membrane-forming curing compound in two coats at right angles to each other at a rate of 200 square feet per gallon for both coats.
 - 2. Do not allow the concrete to dry before the application of the membrane.
 - 3. Cure joints designated to be sealed by inserting moistened paper or fiber rope or covering with waterproof paper prior to application of the curing compound, in a manner to prevent the curing compound entering the joint.
 - 4. Immediately re-spray any area covered with curing compound and damaged during the curing period.

3.16 CLEANING

- A. After completion of the curing period:
 - 1. Remove the curing material (other than liquid membrane).
 - 2. Sweep the concrete clean.
 - 3. After removal of all foreign matter from the joints, seal joints as herein specified.
 - 4. Clean the entire concrete of all debris and construction equipment as soon as curing and sealing of joints has been completed.

3.17 PROTECTION

The contractor shall protect the concrete against all damage prior to final acceptance by the Government. Remove concrete containing excessive cracking, fractures, spalling, or other defects and reconstruct the entire section between regularly scheduled joints, when directed by the COR, and at no additional cost to the Government. Exclude traffic from vehicular pavement until the concrete is at least seven days old, or for a longer period of time if so directed by the COR.

3.18 FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the Station.

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**SECTION 32 33 00
SITE FURNISHINGS**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Furnish and install the Gravesite Layout Markers at the specified locations.
 2. Furnish and install the Flower-watering stations, including trash receptacles, water spigot, and flower vase container and complete any required work necessary to make the water supply equipment operate using the water supply source indicated.
 3. Furnish and install Ash Urns at the locations depicted on the Contract Drawings.
 4. Furnish and install benches at the specified locations.
 5. Steel Pipe Bollards, Chain and Locks
 6. Flag Sleeves

1.2 RELATED WORK

- A. The following items are not included in this Section and will be performed under the designated Sections:
1. Section 033000: CAST-IN-PLACE-CONCRETE

1.3 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
1. General: For each item specified in description of work or Part 2 - Products, provide information showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors. Mark items requiring field assembly for erection identification and furnish erection drawings and instruction.
 2. Provide templates and rough-in measurements as required.
 3. Provide samples of full range of colors and finishes available for review and approval, prior to ordering.

1.4 REFERENCE STANDARDS

The publications listed below form a part of this specification and the work shall comply with pertinent standards of the latest editions as

specified below or by industry standards unless designated otherwise herein.

- A. American Society for Testing and Materials (ASTM):
B221-08Aluminum and Aluminum-Alloy Extruded Bars,
Rods, Wire, Shapes, and Tubes
- B. American Welding Society (AWS):
D1.2-97..... Structural Welding Code Aluminum
- C. National Association of Architectural Metal Manufacturers (NAAMM)

PART 2 - PRODUCTS

2.1 FLOWER VASE RECEPTACLE

- A. Flower vase receptacles shall completely meet the specifications and Contract Drawings or be approved as an equal. To achieve approval as an equal, submittal of a point by point comparison of the proposed equal product to the specifications and Contract Drawings is required by the Contractor during the submittal process. If the product being submitted for approval as an equal has any features that are different than the specifications and Contract Drawings, they must be identified in the submittal. If the differences result in a product that is deemed less than that specified and shown in the Contract Drawings, then the process for attempting approval as an equal shall NOT be performed during submittals. The product should be submitted for consideration as part of a variance request along with explanation of the differences, why they should be accepted and any cost or project completion factors shall be included.
- B. MATERIALS:
 - 1. Flower vase receptacles shall be regularly produced by the manufacturer for use at VA Cemeteries, with a special light weight hinged lid designed for the VA Cemeteries. Flower vase receptacles shall be of the size indicated on the Contract Drawings, and shall be of the same construction, finish and indicated Victor Stanley color as the trash receptacles, with the following exceptions:
 - 2. All flower vase receptacles shall be signed to read "FLOWER VASES" as indicated on the details in the Contract Drawings.
 - 3. The "Floral Regulations" decal shall be as indicated on the Contract Drawings and be factory applied to the top of the receptacle lid. Decal shall be pressure sensitive vinyl designed for outdoor use. The content of the decal, lettering color and background color of decal shall be as approved during the shop drawing process. The

materials for the decal shall be regularly used by the manufacturer for flower vase receptacles at VA National Cemeteries.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Prior to installation of any of the work in this section, contractor shall inspect the planned installation locations to insure that conditions are not significantly different from those indicated on the contract drawings. All materials shall be inspected prior to installation to insure compliance with the contract documents and to insure there is no damage. Should conditions be different from those indicated on the contract documents, contractor should immediately notify the Resident Engineer.

3.2 PREPARATION

- A. Stake alignment and locations for all site furnishings for review and approval by Resident Engineer. Verify that all elements in this section "fit" within location provided.
- B. Install items rigid, plumb and true to lines and levels shown.
- C. Assemble (if required) and install items as per manufacturer's printed instructions, or approved shop drawings, unless otherwise specified or shown.

3.3 INSTALLATION

- A. Flower Vase Receptacles:
 - 1. Anchor flower vase receptacles as shown on the Contract Drawings and following the manufacturer's recommended installation instructions. All mounting hardware shall be stainless steel.

3.4 CLEAN UP

- A. Clean up area of excess material and debris. Clean above ground portions of all receptacles and other site improvements.

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