

SPECIFICATIONS

Fort Sill National Cemetery
Elgin, OK

Update Site Signage

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Memorial Service Network III
Department of Veterans Affairs
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SECTION 00 01 15
LIST OF DRAWING SHEETS

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

<u>Drawing No.</u>	<u>Title</u>
X-101	COVER SHEET AND SHEET INDEX
D-101	DEMOLITION PLAN
L-101	OVERALL SITE PLAN
L-201	CAST STONE POST SIGNS
L-202	CAST STONE POST SIGN DETAILS
L-203	METAL POST SIGN 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 MSN III Engineer, and action thereon will be taken by the Contracting Officer's Technical Representative (COTR) on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, the COTR 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 MSN III Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and MSN III 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. Submit samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.
 - B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Cemetery, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.
 1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
 2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Cemetery, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.
 3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.
 - C. 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.

- D. Approved samples will be kept on file by the COTR 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.
 - E. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.
 - 1. For each drawing required, submit one legible photographic paper or vellum reproducible.
 - 2. Reproducible shall be full size.
 - 3. Each drawing shall have marked thereon, proper descriptive title, including Cemetery location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
 - 4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
 - 5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
 - 6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
 - 7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Architect-Engineer under one cover.
- 1-10. Shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to:

VA National Cemetery Administration
MSN III General Engineer
155 Van Gordon Street, Suite 510
Denver, Colorado 89225-0126

1-11. At the time of transmittal to the MSN III Engineer, the Contractor shall also send a copy of the complete submittal directly to the COR.

1-12. Samples for approval shall be sent to:

COR, Fort Sill National Cemetery
24665 N-S Road 260
Elgin, OK 73538

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**SECTION 04 72 00
CAST STONE MASONRY**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies concrete manufactured and installed to simulate natural cut stone. Cast Stone is made from fine and coarse aggregates, Portland cement, mineral oxide color pigments, chemical admixtures and water to simulate a natural stone.
- B. Unless specifically indicated otherwise, cast stone provided for this project is to be wet-cast type.

1.2 RELATED WORK

- A. Cast-in-place concrete: Section 03 30 53, (SHORT FORM) CAST-IN-PLACE CONCRETE.
- B. Joint Sealant and Application: Section 07 92 00, JOINT SEALANTS.
- C. Color and texture specified in Section 09 06 00, SCHEDULE FOR FINISHES.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
 - 1. Provide 3-inch by 3-inch color chip of proposed cast stone prior to sample section markers.
 - 2. Provide two (2) finished cast stone sample section markers, size and detail as shown in drawings, showing color and finish. If approved, samples may be applied to the quantity of additional blank markers requested in contract.
- D. Certificates: Test results indicating that the cast stone meets specification requirements and proof of plant certification; certification documents must be current within one year of Award.
- E. Submit manufacturers test results of cast stone previously made by manufacturer, indicating compliance with ASTM C1364.
- F. Laboratory Qualifications: Description of testing laboratories facilities and qualifications of its principals and key personnel.
- G. List of jobs furnished by the manufacturer, which were similar in scope and at least three (3) years of age.
- H. Installer Qualifications: Provide documentation of requirements specified herein.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Store cast stone under waterproof covers on planking clear of ground.

- B. Protect from handling, dirt, stain, and water damage.
- C. Mark production units with the identification marks as shown on the shop drawings.
- D. Package units and protect them from staining or damage during shipping and storage.
- E. Provide packaging and lifting devices from the manufacturer that are designed to permit the installer easy removal for inspection, or to handle the cast stone for installation without causing damage to the units.
- F. Provide an itemized list of product to support the bill of lading.

1.6 WARRANTY

- A. Warranty exterior masonry against any defects and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period is extended to two years.

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. American Concrete Institute (ACI):
 - 318/318M-11 Building Code Requirements for Structural Concrete and Commentary
- C. Architectural Precast Association; certification program.
- D. American Society for Testing and Materials (ASTM):
 - A167-99(2009) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
 - A185/A185M-07 Steel, Welded Wire Reinforcement, Plain, for Concrete
 - A240/A240M-13a Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - A276-13 Stainless Steel Bars and Shapes
 - A615/A615M-12 Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - A666 Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
 - C33/C33M-13 Concrete Aggregates
 - C150/C150M-12 Portland Cement

C260/C260M-10a	Air-Entraining Admixtures for Concrete
C426-10	Linear Drying Shrinkage of Concrete Masonry Units
C494/C494M-13	Chemical Admixtures for Concrete
C503/C503M-10	Marble Dimension Stone
C568/C568M-10	Limestone Dimension Stone
C615/C615M-11	Granite Dimension Stone
C616/C616M-10	Quartz-Based Dimension Stone
C618-12a	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
C979/C979M-10	Pigments for Integrally Colored Concrete
C989/C989M-13	Slag Cement for Use in Concrete and Mortars
C1194-03(2011)	Compressive Strength of Architectural Cast Stone
C1195-03(2011)	Absorption of Architectural Cast Stone
C1364-10b	Architectural Cast Stone
D2244-11	Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

E. Cast Stone Institute Technical Manual and Cast Stone Institute standard specifications.

1.8 QUALITY ASSURANCE

A. Manufacturer:

1. Must have five years minimum continuous operating experience, and have facilities for producing cast stone of the shapes, quantities and size required for this project.
2. Must be a producer certified by the Cast Stone Institute or the Architectural Precast Association.
3. Producer assumes responsibility for engineering units to comply with performance requirements and use indicated, including a comprehensive engineering analysis by a qualified professional engineer who is licensed in their place of practice and who is experienced in providing engineering services of the kind indicated.
4. Shop drawings to bear seal and signature of professional engineer responsible for the design and preparation.
5. Manufacturer to submit a written list of projects similar and at least three (3) years of age, along with owner, architect and contractor references.

B. Installer:

1. Must provide documentation demonstrating that they have a minimum of five years' experience setting cast or natural building stone.
2. Provide written handling and installation procedures that will be followed for the installation of the work for cast stones lifted, moved, adjusted in any way, other than by hand. Describe procedure starting at the inspection of the products once delivered to the site, and continue through the final setting of the cast stone units with them being secured into place in the work. Include procedures with description of the equipment that will be used, as well as all protection procedures to be followed, to ensure that no exposed surfaces or edges of the cast stone are damaged during handling or installation.
3. Provide written procedures for removal and replacement of cast stone units that have been damaged on any edges or faces that will be visible in the final installation.
4. Provide procedures for inspection and identification of any exposed damage, with procedures for immediate marking of the units to be removed and replaced prior to grouting or sealing of joints.

C. Testing:

1. Follow the procedures in ASTM C1364.

- D. Pre-Installation Conference: Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include COR and all parties whose work is effected or related to the work of this section.

1.9 MANUFACTURING TOLERANCES

- A. Cross section dimensions must not deviate by more than + 1/8 in. from approved dimensions.
- B. Length of units must not deviate by more than + 1.0 in.
- C. Warp bow or twist of units must not exceed + 1/8 in.

1.10 PROJECT CONDITIONS

- A. Field Measurements: Verify actual conditions to receive cast stone components by field measurements before production.
- B. Dimensions on shop drawings to be based upon field measurements.

PART 2 - PRODUCTS**2.1 ARCHITECTURAL CAST STONE**

- A. Comply with ASTM C1364.
- B. Physical Properties: Provide the following:
 - 1. Compressive Strength - ASTM C1194: 45 Mpa (6,500 psi) minimum for products at 28 days.
 - 2. Absorption - ASTM C1195: 6 percent maximum by the cold water method, or 10 percent maximum by the boiling method for products as 28 days.
 - 3. Air Content for Wet Cast Product - ASTM C173 or C231: 4-8 percent for units exposed to freeze-thaw environments.
 - 4. Freeze Thaw - ASTM C1364: The cumulative percent weight loss (CPWL) less than 5 percent after 300 cycles of freezing and thawing.
 - 5. Linear Shrinkage - ASTM C426: Maximum 0.065 percent.

2.2 RAW MATERIALS

- A. Portland Cement: Type I or Type III, white and/or grey, ASTM C150.
- B. Coarse Aggregates: Granite, quartz or limestone, ASTM C33, except for gradation, and are optional for the vibrant dry tamp (VDT) casting method.
- C. Fine Aggregates: Manufactured or natural sands, ASTM C33, except for gradation.
- D. Colors: Inorganic iron oxide pigments, ASTM C979 except that carbon black pigments cannot be used.
- E. Admixtures: Comply with the following:
 - 1. ASTM C260 for air-entraining admixtures.
 - 2. ASTM C494/C495M Types A-G for water reducing, retarding, accelerating and high range admixtures.
 - 3. Other Admixtures: Integral water repellents and other chemicals, for which no ASTM Standard exists, must be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
 - a. Produce units with water repellent accepted by fabricator within mix design; product for mix design and setting mortar to be from same source.
 - 4. ASTM C618; do not use mineral admixtures of dark and variable colors in surfaces intended to be exposed to view.
 - 5. ASTM C989; granulated blast furnace slag may be used to improve physical properties, as verified by testing documentation.
- F. Water: Potable.

G. Reinforcing Bars:

1. ASTM A615/A615M, Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 37 mm (1.5 in.).
2. Welded Wire Fabric: ASTM A185 where applicable for wet cast units.

H. Provide anchors, dowels and other anchoring devices and shims that are standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

2.3 COLOR AND FINISH

- A. Color: Integrally colored concrete as selected. Color to match as close as possible Light Buff Limestone or Natural Stone, depending on manufacturer.
- B. Units to comply with ASTM D2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
 1. Total color difference - not greater than 6 units.
 2. Total hue difference-not greater than 2 units.
- C. Provide fine-grained texture similar to natural stone, for surfaces intended to be exposed to view. Air voids are not permitted in excess of 0.8 mm (1/32 in.), and the density of such voids must be less than 3 occurrences per any 25 mm² (1 in²). Air voids are not permitted when obvious under direct daylight illumination at a 1.5 m (5 ft.) distance.
- D. Units must exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 3 m (10 ft.) distance.
- E. Minor chips, whether resulting from shipment, delivery or other factors or causes may be allowed if they are not obvious under direct daylight illumination from a 1 m (3 ft.) distance as determined by the COR.
- F. The occurrence of crazing or efflorescence may constitute a cause for rejection, at the sole discretion of the RE/COR.
- G. Remove cement film, if required, from exposed surface prior to packaging for shipment.

2.4 REINFORCING

- A. Reinforce the units as required by the shop drawings, and prepared under direction of professional engineer, for safe handling and structural stress. For wall caps, include adequate reinforcing to prevent the caps from breaking when supported by shims at the ends of the units, and having workers on top of the units.
 1. Reinforcing to be minimum 0.25 percent of the cross section area.

- B. Provide non-corrosive reinforcement where faces exposed to weather are covered with less than 38 mm (1.5 in.) of concrete material. Provide reinforcement with minimum concrete coverage of twice the diameter of the bars.

2.5 EMBEDDED ANCHORS AND OTHER INSERTS

- A. Fabricate from stainless steel complying with ASTM A240/A240M, ASTM A276, or ASTM A666, Type 304.

2.6 CURING

- A. Cure units in a warm curing chamber 537.8 C (1000 F) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 371.1 C (700 F) for 16 hours after casting. Provide additional yard curing at 95 percent relative humidity and 350-degree-days (i.e. 7 days at 260.0 C (500 F) or 5 days at 371.1 C (700 F) prior to shipping. Protect form-cured units from moisture evaporation with curing blankets or curing compounds after casting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check cast stone materials for damage, coloration, finish, crazing, efflorescence, fit and finish prior to installation. Do not set unacceptable units.

3.2 SETTING TOLERANCES

- A. Comply with the more stringent tolerances of the Cast Stone InstituteSM Technical Manual or this section.
- B. Set stones 3 mm (1/8 in.) or less, within the plane of adjacent units.
- C. Joints, plus - 1.5 mm (1/6 in.), minus - 3 mm (1/8 in.).

3.3 REPAIR AND CLEANING

- A. Repair chips with touchup materials furnished by manufacturer.
- B. Saturate units to be cleaned prior to applying an approved masonry cleaner.
- C. Consult with manufacturer for appropriate cleaners.

3.4 INSPECTION AND ACCEPTANCE

- A. Inspect finished installation according to Bulletin #36 published by the Cast Stone Institute except distance for measuring acceptability to be reduced to 1 m (3 ft.).

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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 posts. The signage systems to be provided include all those shown on the drawings including: identification signs, directional signs, section marker, traffic regulatory signs, directory, and warning/informational signs.
- B. Signs shall be products of manufacturers regularly engaged in manufacturing signs of types specified.
- C. Signs included are as follows:
 - 1. Double post & panel signs.
 - 2. Single post traffic regulatory signs.
 - 3. Single post non-traffic regulatory signs.
 - 4. Directory signs.

1.2 RELATED WORK

- A. Cast Stone Concrete Posts: Section 04 72 00 CAST STONE MASONRY.

1.3 MANUFACTURER'S QUALIFICATIONS

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 3 sets. One set to the Contractor, one set to the Contracting Officer's Representative (COR) and one set to the MSN III Engineer.
 - 1. Post & panel sign mock-up, not less than 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 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") length, showing typical color and finish.
 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.
- 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, that they prepared the aluminum and applied the coating(s) to the specified thickness(es).

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 text and symbols application to aluminum for an extended warranty period of five years.

1.7 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Americans with Disabilities Act - 1990
- C. Federal Highway Administration
Manuals on Uniform Traffic Control Devices for Street and Highways. Single Post Traffic Regulatory Signs:
- D. American Society for Testing and Materials (ASTM):
B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate
B221-07.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
B449-93(2004).....Standard Specification for Chromates on Aluminum
- E. American Architectural Manufacturer's Association (AAMA):
AAMA 2604.....Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum extrusions and Panels.
- F. Federal Specifications (Fed. Spec.):
MIL-P-8184E Plastic Sheet, Acrylic, Modified.
MIL-P-46144C Plastic Sheet, Polycarbonate

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 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. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings.

COR to be notified of any discrepancy in drawing, in field directions or conditions, and/or of any changes required for all such construction details.

- E. The Sign 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. The Contractor shall further warrant: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.
- F. All aluminum sign panels and frames shall match "Victor Stanley - Bronze" or other suitable Cast Bronze color as approved by the COR.

2.3 SIGN STANDARDS

- A. Typography:
 - 1. Type Style: Helvetica. Initial caps or and lower case 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; final text for signs shall be as approved in the shop drawings.
- B. Sign Colors and Finishes: As specified and approved in the Shop Drawing & Submittal process.
- C. Copy color: Reflective white, equal to engineering grade 3M Scotchlite.

2.3 SIGNS TYPES

- A. General: The exterior sign system shall be comprised of sign type families that are identified by a letter and number which identify a particular group of signs. An additional number identifies a specific type of sign within that family, as indicated below:
 - 1. Type A - Traffic Regulatory Signs, both non-traffic code type as shown on the drawing details.
 - 2. Type C - Directional Signs, shall be as shown on the drawing details and shall be coated aluminum signs with integral mounting frame and letters, numbers and arrows as indicated.

3. Type B - Identification Signs, shall be as shown on the drawing details and shall be coated aluminum signs with integral mounting frame and letters and symbols as indicated in the detail drawings.
4. Type D - Section Marker Signs shall be as shown on the drawing details and shall be cast stone post signs with numbers or symbols placards as indicated in the detail drawings.

B. Text and Graphics:

1. Types A, B, C, and D:
 - a. Surface applied reflective white opaque vinyl letters, numbers and graphics shall be of a quality and life expectancy equal to or exceeding that for Engineering Grade 3M Scotchlite, unless otherwise noted. Color shall be selected from the manufacturer's standard selection, during the submittal process. Font Type Style shall be Helvetica Bold, unless otherwise approved during design review for the specific project.

C. Post and Panel Signs:

1. Sign shall be constructed of aluminum tubing system utilizing 25 mm x 50mm x 3mm (1-inch by 2-inch by 1/8") tubular aluminum frame system and 3 mm (1/8 - inch) aluminum panels anchored to the tubing, with all corners mitered and welded and ground smooth. 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 indicated powder coating, as indicated on the drawings.
2. Insulating sleeves, gaskets, bolts and concrete anchors shall be provided and signs anchored to sign posts as indicated on the drawings and approved shop drawings.
3. Signs to be installed with direct burial precast architectural concrete shall be installed and mounted at the locations as indicated on the drawings.

2.4 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 be true. Assembled 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 be smooth flat and without oil-canning, free of rack and twist. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches). 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. Square turns and corners sharp, curves 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, foreign matter and other imperfections.
- J. Movable parts, including hardware, are to be cleaned and adjusted to operate as designed without binding or deformation of members. Doors and covers centered in opening or frame. 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. Aluminum plate recesses and all exposed surfaces shall receive the acid etch finish. Aluminum plates installed in post recesses shall be installed prior to delivery to the site. Protect all surfaces from damage.

- M. No signs are to be manufactured until final sign message schedule and location review has been completed by the Resident Engineer & forwarded to contractor.

2.5 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.

2.6 DOUBLE-POST-PANEL SIGNS

- A. 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 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.
- B. Lettering shall be as indicated on the "Site Details" Contract Drawing.
- C. Exposed fasteners shall be aluminum, tamper-proof type, and shall be colored to match the color for the sign panels.
- D. 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: 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 2604 (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 or crushed stone as shown on Contract Drawings.
- C. Protect aluminum in contact with dissimilar metals or mortar as specified in Paragraph 2.4.
- 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. Certain signs may be installed on glass. A blank glass back up is required to be placed on opposite side of glass exactly behind sign being installed. This blank glass back up is to be the same size as sign being installed.
- G. Contractor will be responsible for verifying that behind each sign location there are no utility lines that will be affected by installation of signs. Any damage during installation of signs to utilities will be the sole responsibility of the Contractor to correct and repair.
- H. 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.

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 10 85 00
BURIAL SECTION MARKERS (INSTALLATION)

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies materials, and installation of burial section markers to be installed in the project area indicated.

1.2 RELATED WORK

- B. Excavation and backfill: Section 31 20 00, EARTH MOVING.

PART 2 - PRODUCTS

2.1 CRUSHED ROCK

- A. Crushed rock base material shall be composed of limestone, granite, dolomite, or any other hard, sound rock that is produced by blasting and then crushing.
- B. Crushed rock base material shall be clean, hard, tough, and durable fragments (excluding schist, shale or slate) of uniform quality throughout and free of any detrimental quantities of soft, friable, thin, elongated or laminated pieces, disintegrated material, dirt, organic matter, oil, alkali, or other deleterious substance.
- C. Crushed rock base material shall consist of hard durable fragments of particles of rock, free of stripping dirt, vegetation, and other foreign substances.
- D. Hardness: Resistant to breaking, crushing or crumbling
- E. Shape: Sharp and angular (**Do not use rounded pea gravel.**)
- F. Gravel or Crushed Gravel mixed with filler, sand, crushed rock, or crushed stone is **NOT** an acceptable substitute.
- G. Crushed Rock shall consist of the product obtained by crushing rock or stone so that it meets the following gradation requirements:

Sieve Size % Passing	
Particle Size	% of Passing
1/2 inch	100
3/8 inch	70 - 90
No. 4	50 - 72
No. 8	35 - 55
No. 40	14 - 32
No. 200	4.0- 10.0

- H. The gradation of crushed rock shall comply with ASTM D-448. Sampling and sieve analysis shall be performed in accordance with ASTM D-75 and ASTM C-136.

PART 3 - EXECUTION

- 3.1 INSTALLATION:** The installation of the new burial section markers shall be in accordance with the contract drawings, specifications, and the following:

- A. Prior to fabrication and installation, the contractor shall verify the burial section numbering and the location of the burial section markers

with the COR and the Cemetery Director. Contractor shall not proceed until the locations of the new burial section markers have been approved by the COR.

- B. Existing section markers shall be removed from their sockets by the Contractor using wooden clamps or other means to prevent damaging the section marker.
- C. All section marker sockets (holes) shall be dug to allow four (4) inches of clearance from the front, back, sides and underneath the section marker.
- D. Section marker sockets shall be dug to the required depth to meet the height requirement to have the top of the section marker eight (8) inches above the finish grade (soil level).
- E. All section marker sockets shall be clean and free of loose dirt and debris prior to adding crushed rock base material.
- F. Moistened crushed rock base material (see specifications below in Paragraph 5) shall be added at three (3) inch intervals and heavily tamped to 90% to 95% compaction in the bottom of the sockets to provide a minimum four (4) inch footing under the base of the section marker prior to the installation or re-installation of the section markers.
- G. Moistened crushed rock base material shall be placed at three (3) inch intervals around all four sides of the section markers and heavily tamped to 90% to 95% compaction.
- H. Typically there should be two (2) inches of space remaining from the top of the compacted crushed rock base material to the ground surface to allow tamped topsoil and grass seed to be applied.
- I. Existing section marker sockets that exceed the correct depth requirements shall be filled with sufficient moistened crushed rock base material and heavily tamped to 90% to 95% compaction to achieve the correct final depth before installation of the section marker.
- J. All burial section markers shall be set plumb.
- K. The completed section markers shall be set and anchored firmly in place such that the section markers are rigid with no give or play in any direction regardless of the soil and terrain conditions. The section markers shall show no movement from forces subjected by the COR.

3.2 COMPACTION

- I. The crushed rock base material shall be compacted in lifts not exceeding 3" in thickness. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. If the fines are dry at the time of compaction, use a very fine mist type hose and spray the crushed rock base material sparingly. The moisture content of the material during placing operations shall be within $\pm 2\%$ of the optimum moisture content as determined by ASTM D 1557. Compact each layer to 90% to 95% relative density. Do not perform compaction operations on excessively wetted soils.
- J. Tamping Tools shall be approved by COR prior to use. Tamping tools shall have sufficient impact area and weight to achieve 90% to 95% compaction of the Crushed Rock Base Material. Tamping tools made of wood or containing wood are not acceptable.

3.3 BACKFILLING

- A. Backfilling shall be done after the burial section marker(s) have been installed or re-set.
- B. The voided area around the base of upright section marker created by the installation or re-setting process will be backfilled and tamped to grade with a suitable top soil material.

- C. The section markers shall have soil tamped in the voided area between the existing sod to the vertical surface of the upright section marker which results in no voids or depressions within the surrounding perimeter of the base of the burial section marker
- D. Soil for backfilling will be made available to the Contractor by the cemetery.
- E. Contractor will provide their own vehicle to haul backfill soil on cemetery property.

